FZM-4163-5
5 June 1964

EARTH-MARS-EARTH BALLISTIC TRAJECTORY DATA, 1975-1986

Volume V: Mission-Map Data, 1982 Opposition Period

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GENERAL DYNAMICS/FORT WORTH

A Division of General Dynamics Corporation

FOREWORD

This document contains trajectory data for Earth-Mars and Mars-Earth planar ballistic transfers in the 1982 opposition period. The complete report consists of seven volumes:

Volume I:	Description and Application of Data
Volume II:	Mission-Map Data, 1975 Opposition Period
Volume III:	Mission-Map Data, 1978 Opposition Period
Volume IV:	Mission-Map Data, 1980 Opposition Period
Volume V:	Mission-Map Data, 1982 Opposition Period
Volume VI:	Mission-Map Data, 1984 Opposition Period
Volume VII:	Mission-Map Data, 1986 Opposition Period

The mission-map data contained in this report were generated in support of a study on Manned Mars Exploration in the Unfavorable Time Period (1975-1985). This investigation was performed by General Dynamics/Fort Worth for the George C. Marshall Space Flight Center of the National Aeronautics and Space Administration. Only trajectory data for selected types of round-trip missions were published as a direct result of the study contract. Because the mission-map data are applicable to a wide variety of Mars missions, and particularly because they span the time interval during

which manned interplanetary capture missions will probably first become feasible, it was decided to document and publish these data in their entirety as a part of the General Dynamics/Fort Worth internal research program.

Previous publications of a similar nature are referenced in Volume I. The purpose of this report is to complement, rather than replace, the earlier data. Some trajectory parameters contained in this report have not heretofore been published. In some instances, the range of launch dates and flight times has been extended beyond that of previous publications. However, the strongest justification for the current publication is based on the format employed for computer output. The basic mission-map format is not original, but it is believed that the incorporation of a number of refinements has resulted in a format which is significantly better adapted to certain types of interplanetary mission analyses than that of any previous publication.

ACKNOWLEDGMENTS

The author is indebted to Dr. Vernon A. Lee for his advice concerning trajectory computation methods, and to Mr. Oliver A. Schwausch and Mr. John J. Miller for their assistance in preparing the data for publication.

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NOTATION

AU	Astronomical unit (149.599×10^6 kilometers)
ALENT	Earth atmospheric entry altitude (kilometers)
ALMARS	Mars parking orbit altitude (kilometers)
ALPARK	Earth parking orbit altitude (kilometers)
EMOS	Earth mean orbital speed (29.785 kilometers/second, or 97.719×10^3 feet/second)
ECMARS	Mars parking orbit eccentricity
ECPARK	Earth parking orbit eccentricity
ENTMAX	Maximum allowable Earth atmospheric entry velocity (kilometers/second)
JD	Julian date (days)
r	Heliocentric radial distance (AU)
t	Time (days)
ΔV	Propulsive velocity increment (kilometers/second)

EXPLANATION OF DATA

General

The trajectory data contained in this document are essentially self-explanatory. Every page of data is completely identified as to content. The identification includes a verbal description of the data and their physical dimensions. The planar ballistic heliocentric trajectories to which the data apply are completely identified by flight time, departure date, and arrival date. Both the civil dates (year, month, and day) and the Julian dates of departure and arrival are tabulated. A detailed description of the data and computation methods is presented in Volume I. A brief summary of the more important points relating to the use of the data is presented in the following subsections.

Computer Program

An IBM 7090 computer program was used to map numerical values of selected trajectory parameters at 10-day intervals on a Mars-date versus Earth-date grid. This computer program, which was developed by General Dynamics/Fort Worth, is quite flexible and economical. The average computer time required to generate a typical set of 12 printer maps (273 trajectories x 21 mapped parameters) is approximately 30 seconds. The program is capable of computing trajectory data for transfer between any two bodies in heliocentric elliptical orbits. The

mission-map resolution (date interval) is variable down to a practical limit of approximately two-tenths of a day. Up to 12 pages of printer maps may be generated by each computer problem, with one or two trajectory parameters mapped on each page. The order and combination of mapped parameters is controlled by problem input data. The unit values of the mapped data are defined by the user's specification of a set of appropriate scale factors. Output headings on the printer maps are also specified by the user.

Planetary positions and velocities are determined by solution of the two-body equations. Mean orbit elements and their rates of variation at any convenient epoch are loaded as library input data, and the computer program then calculates mean fixed planetary orbit elements at an appropriate epoch for each problem, i.e., for each printer-map grid. Elements of the heliocentric transfer trajectories, for specified departure and arrival dates, are determined by the application of Lambert's theorem. Perturbations of the transfer trajectory are neglected.

Master Mission Map

Only a limited area of the complete Mars-date versus Earth-date survey region could be covered by a single page of computer output. In order to allow

an orderly survey of the overall 1975-1986 time period, a reference grid system was set up on a master mission map, as shown in Figure 1. Each small rectangle in this figure is identified by a unique pair of reference-grid coordinates (M02, E03, etc.), and represents a set of 13 pages of trajectory data. Every page in each set of data is identified by its reference-grid coordinates in the upper right-hand corner.

The first page in each 13-page set of data contains the mean planetary orbit elements upon which that particular set of trajectory data are based. The remaining 12 pages are the IBM 7090 printer maps containing the numerical values of 21 selected trajectory parameters. The printer map format is identical for inbound and outbound trajectories; in fact, inbound and outbound trajectory data often appear on the same printer map. Outbound trajectory data are distinguished only by the fact that the Mars date coordinate is greater than the Earth date coordinate. The converse is true, of course, for inbound trajectories.

Mapped Parameters

The order and contents of the printer maps are shown in Table 1. The data contained in the first nine printer maps are applicable to any ballistic interplanetary mission profile; they are not significantly affected by the characteristics of the planetocentric segments of the complete transfer trajectory. The

angular coordinates of the departure and arrival asymptotes (Maps 2 and 3) are referenced to the mean-of-date equinox and equator of the applicable planet. The inclination of the transfer orbit (Map 7) is referenced to the mean-of-date ecliptic plane.

The data contained in Maps 10 through 12 are strictly applicable only to trajectory profiles having the following reference characteristics:

1. Outbound transfers
   a. The Earth escape maneuver is initiated from a circular orbit at 325 kilometers altitude.
   b. All-propulsive braking is used at Mars to enter a circular orbit at 800 kilometers altitude.
2. Inbound transfers
   a. The Mars escape maneuver is initiated from a circular orbit at 800 kilometers altitude.
   b. Earth-capture propulsive braking is used only (when required) to reduce the entry velocity to 15.24 kilometers/second at 121.92 kilometers altitude (50,000 feet/second at 400,000 feet).

Reference Earth entry velocities (15.24 kilometers/second or less) for inbound trajectories are contained in Map 10. For outbound trajectories, Map 10 contains the constant circular velocity in the Earth parking orbit, and is therefore of no particular consequence. Maps 11 and 12 contain propulsive velocity increment (ΔV) requirements applicable to the reference planetocentric profiles delineated under Items 1 and 2 above. All propulsive maneuvers were assumed to be impulsive and planar. Propulsive velocity requirements for other planetocentric profiles can be calculated, if desired, by use of the data contained in Maps 1-3 or, in some cases, by manipulation of the data in Maps 10-12.

The most significant deviation from the reference planetocentric profiles likely to be encountered in interplanetary missions will probably be in the allowable Earth entry velocity. Serious technical problems are associated with Earth atmospheric entry velocities of 15.24 kilometers/second, and interplanetary mission profiles based on such a high entry velocity may be too optimistic, especially before the 1980's. Propulsive velocity requirements for other entry velocity limits may be easily obtained by adding the propulsive braking ΔV (Map 11) to the reference entry velocity (Map 10) to obtain the unbraked entry velocity, and then subtracting the new value of maximum allowable entry velocity.

$$V_e = V_{e_{Ref}} + \Delta V_{4_{Ref}}$$

$$\Delta V_4 = V_e - V_{e_{Max}} \quad ; \quad V_e > V_{e_{Max}}$$

$$\Delta V_4 = 0 \quad ; \quad V_e \leq V_{e_{Max}}$$

where V_e = unbraked entry velocity

$V_{e_{Ref}}$ = reference entry velocity (Map 10)

$\Delta V_{4_{Ref}}$ = reference Earth-capture velocity increment (Map 11)

ΔV_4 = new Earth-capture velocity increment

$V_{e_{Max}}$ = new Earth entry velocity limit

Next to a different entry velocity limit, the most probable deviation in the mission profile will be a change in the circular parking orbit altitude at Earth and/or Mars. The effect of reasonable changes in planetocentric orbit altitudes on propulsive velocity requirements is relatively small. For reasonable hyperbolic excess velocities, a 1 percent change in planetocentric orbit radius will cause the ΔV required for escape or capture to change by less than 0.2 percent of the circular velocity at the applicable planet.

Incorporation of elliptical planetocentric orbits in the mission profile can cause significant changes in escape and/or capture ΔV requirements. If the escape

or capture maneuver is always initiated at periapsis of the planetocentric ellipse, and if the periapsis altitude is equal to the reference circular orbit altitude, the ΔV requirement for the applicable maneuver will be reduced by a constant amount regardless of the hyperbolic excess velocity. The magnitude of this reduction is given by the equation:

$$\delta \Delta V = V_c(\sqrt{1 + e} - 1)$$

where V_c = circular velocity at reference altitude

e = planetocentric orbit eccentricity

The reference circular velocities at Earth and Mars are 7.72 kilometers/second and 3.21 kilometers/second, respectively.

ΔV Contour Charts

The total propulsive velocity increment is generally the most significant single parameter for the purpose of trajectory evaluation, and the one which is most widely used for preliminary trajectory selection. For this reason, a contour chart of both outbound and inbound one-way total ΔV requirements for the entire opposition period is presented in Figure 2. These total ΔV values correspond to those listed in Map 12, and they are merely the sums of the escape and

capture ΔV values presented in Map 11. Velocity requirements for surface-to-orbit operations, planetocentric orbit modification, guidance, gravity loss, and performance reserves are not included. As noted in the previous subsection, the velocity increments of Figure 2 are precisely applicable only to mission profiles having the specific planetocentric characteristics previously described; however, they are useful for comparative evaluation of heliocentric trajectories even when alternate planetocentric ground rules are applied.

ERRORS AND ACCURACY

The printer map format of the computer program allows a maximum of four decimal digits for any number appearing in the data region of the map. A value of ±9999 signifies that the actual number went "off scale" in the direction indicated by the algebraic sign. All "on-scale" positive numbers are rounded off to the nearest low-order digit. Due to an error in the round-off equation used in the mapping subroutine, the absolute values of all on-scale negative numbers are one unit too small. For instance, a number listed as "-678" should read "-679." The computer program was corrected after the data of this report were generated, but since the error is consistent and relatively minor (the erroneous numbers were not used in any subsequent calculations within the computer program), it was not considered necessary to recompute the existing data.

Certain internal tests were incorporated in the computer program to check the accuracy of the computed data. Zeros will be found occasionally in the printer maps because the computed data failed to pass these tests. In such cases, rather than print out questionable information, all data for the applicable trajectory were set equal to zero. These occurrences are infrequent, and the affected trajectories are seldom of interest because their energy requirements

are very high. (Zeros also appear on the printer maps whenever the interplanetary flight time was less than 60 days or greater than 700 days; i.e., data were not computed for flight times outside of these limits.

With the exception of the error described in the first paragraph, all data are believed to be accurate to the lowest-order digit appearing on the computer output sheets. Random spot checks were made to verify the accuracy of the data, but it is impossible to verify every number in such a bulk of data. It is requested that the author be notified of any errors which might be discovered.

TABLE 1

MAPPED PARAMETERS

Earth-Mars/Mars-Earth Trajectories

Map No.		Parameters
1.	(a)	Hyperbolic excess speed at Earth departure/Earth arrival
	(b)	Hyperbolic excess speed at Mars arrival/Mars departure
2.	(a)	Declination of Earth departure/Earth arrival asymptote
	(b)	Right ascension of Earth departure/Earth arrival asymptote
3.	(a)	Declination of Mars arrival/Mars departure asymptote
	(b)	Right ascension of Mars arrival/Mars departure asymptote
4.	(a)	Communication distance at Mars arrival/Mars departure
5.	(a)	Sun-Mars-Earth angle at Mars arrival/Mars departure
	(b)	Sun-Earth-Mars angle at Mars arrival/Mars departure
6.	(a)	Heliocentric transfer angle
	(b)	True anomaly in transfer orbit at Earth departure/Mars departure
7.	(a)	Inclination of transfer orbit, relative to ecliptic
	(b)	Eccentricity of transfer orbit
8.	(a)	Perihelion distance
	(b)	Aphelion distance
9.	(a)	$\int_{t_1}^{t_2} r^{-2} dt$ (Solar radiation parameter)
	(b)	$\int_{t_1}^{t_2} r^{-1} dt$ (Solar radiation parameter)
10.	(a)	Perigee speed at Earth departure/Earth arrival (Entry speed for inbound trajectory)

TABLE 1

MAPPED PARAMETERS (CONT'D.)

Map No.		Parameters
11.	(a)	Propulsive ΔV required for Earth departure/Earth capture
	(b)	Propulsive ΔV required for Mars capture/Mars departure
12.	(a)	Total propulsive ΔV required for one-way trip
	(b)	Heliocentric transfer angle (repeated)

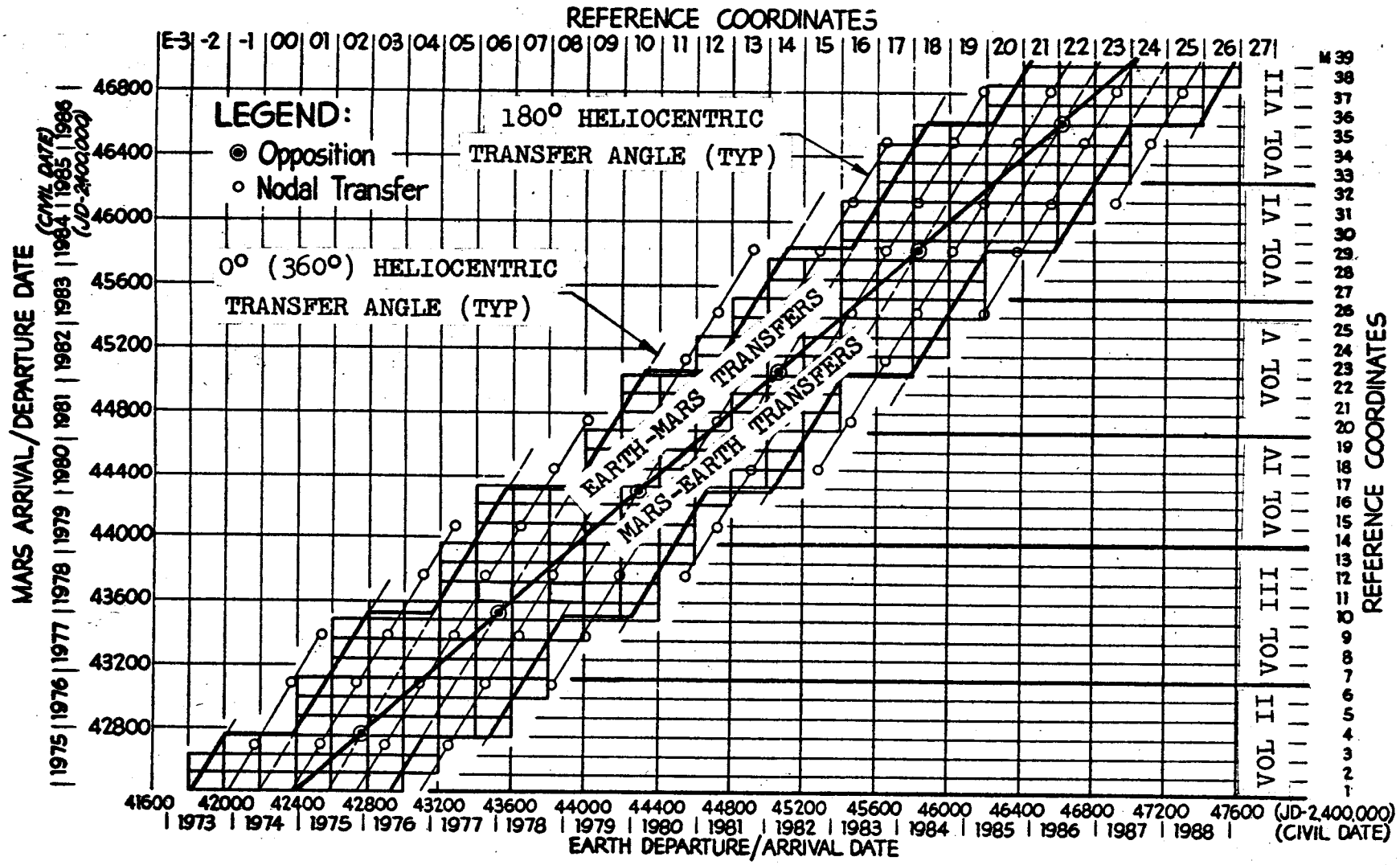

FIGURE 1 MASTER MISSION MAP

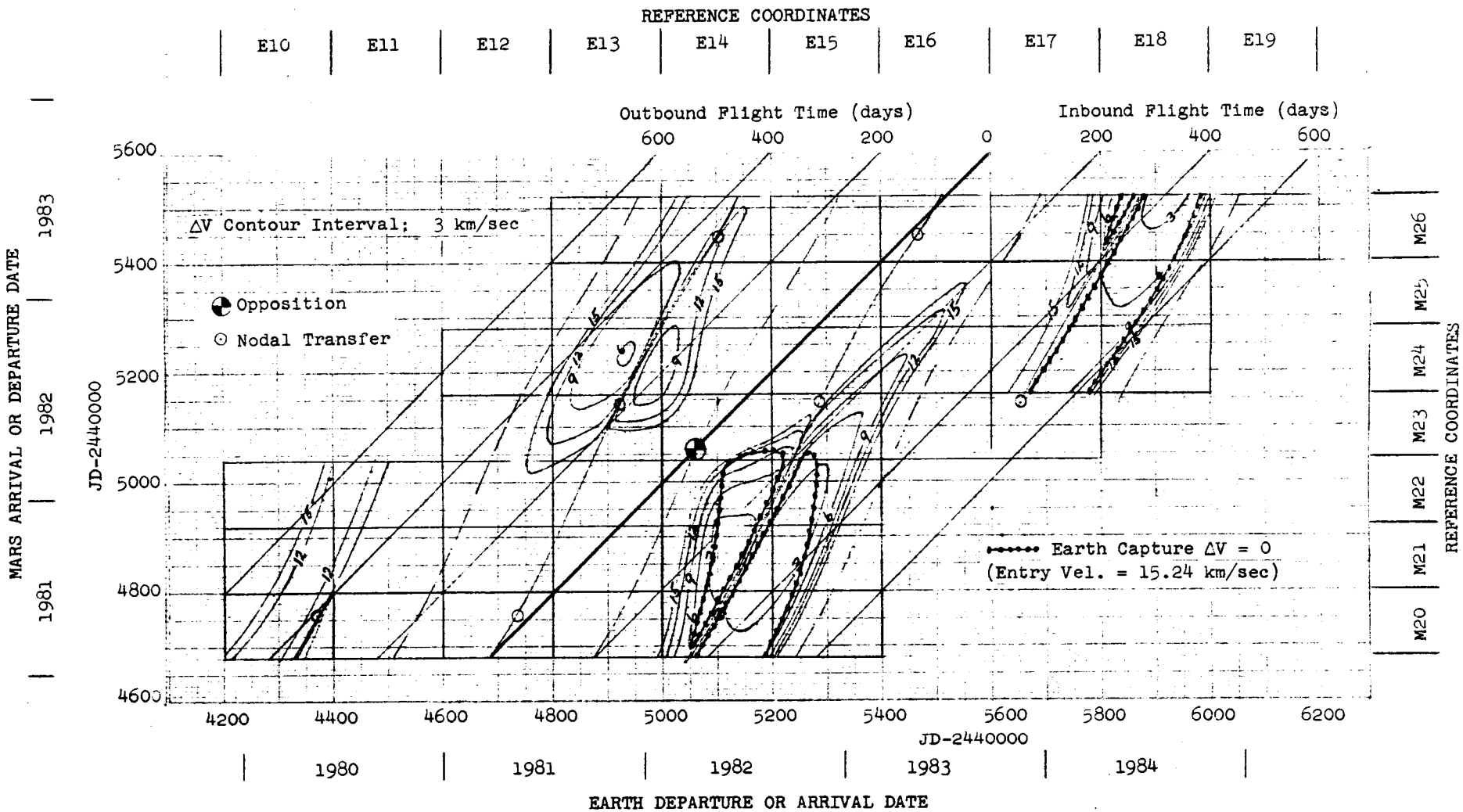

FIGURE 2 ΔV CONTOUR CHART, ONE-WAY TOTAL ΔV, 1982 OPPOSITION PERIOD

M20
E10

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444500.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671728	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.609	DEGREES
MEAN ANOM. AT EPOCH	=	254.464	DEGREES
DATE OF NODAL PASSAGE	=	2444505.371	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444500.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338765	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.409	DEGREES
ARG. OF PERIHELION	=	286.295	DEGREES
MEAN ANOM. AT EPOCH	=	287.922	DEGREES
DATE OF NODAL PASSAGE	=	2444072.517	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.064	DEGREES

M20
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5	1489	0	1240	944	724	568	454	369	302	250	207	175	152	141	142	153	174	202	238	459	315
1981 JUL 15.0	1153	0	980	779	632	530	461	411	376	351	333	320	312	308	307	309	314	321	331	426	368
JD 2444790.5	1519	1395	1067	809	625	495	399	325	267	221	185	158	142	137	145	161	185	216	261	324	323
1981 JUL 5.0	1181	1095	870	694	572	488	431	390	360	340	325	315	309	307	308	311	317	326	339	378	370
JD 2444780.5	0	1207	908	692	541	432	350	286	236	196	165	145	135	138	151	172	199	231	505	303	340
1981 JUN 25.0	0	974	767	620	520	452	405	371	347	329	318	311	307	307	309	314	321	331	455	363	377
JD 2444770.5	1359	1024	770	593	468	376	306	251	208	173	149	135	133	142	160	184	213	249	284	319	360
1981 JUN 15.0	1089	854	677	557	476	421	382	354	334	321	312	307	305	307	311	317	326	337	356	369	387
JD 2444760.5	1158	861	652	508	405	328	268	220	183	155	137	130	135	150	171	198	229	266	300	339	382
1981 JUN 5.0	954	744	600	504	439	394	362	339	323	313	306	303	304	307	313	321	331	347	359	377	397
JD 2444750.5	968	722	554	437	351	285	234	193	162	140	129	130	141	160	185	214	251	283	320	361	404
1981 MAY 26.0	824	650	535	459	406	370	344	325	313	305	301	301	303	308	315	325	341	350	367	386	407
JD 2444740.5	803	606	472	376	304	248	204	170	145	130	126	134	150	173	201	236	312	303	341	383	427
1981 MAY 16.0	710	572	481	420	378	348	328	313	304	299	297	298	302	309	319	333	356	357	375	396	419
JD 2444730.5	667	512	403	324	263	216	178	150	132	125	128	142	163	189	222	392	292	324	363	406	451
1981 MAY 6.0	615	507	436	387	353	330	313	302	296	293	293	297	303	311	325	421	348	364	384	406	430
JD 2444720.5	557	434	346	280	228	188	157	135	124	124	135	153	178	209	268	320	309	345	386	430	476
1981 APR 26.0	537	453	397	359	332	313	300	292	288	288	290	295	303	315	345	354	353	371	393	416	443
JD 2444710.5	468	370	297	242	198	164	140	125	122	129	145	167	196	240	1187	301	329	367	409	454	502
1981 APR 16.0	473	408	364	333	312	298	288	283	282	283	287	295	306	326	947	344	359	379	402	427	455
JD 2444700.5	396	316	256	209	173	145	127	120	124	137	158	185	222	390	319	315	350	390	433	480	529
1981 APR 6.0	421	370	336	311	295	284	278	275	275	279	285	295	312	410	346	347	365	387	412	439	468
JD 2444690.5	337	272	221	182	152	131	120	120	130	149	174	208	283	500	308	334	371	413	458	506	557
1981 MAR 27.0	378	338	311	292	279	271	268	267	270	275	284	299	339	449	336	351	372	395	421	450	482
JD 2444680.5	289	235	192	159	136	122	118	125	141	163	194	247	985	317	321	354	394	437	484	533	586
1981 MAR 17.0	341	310	289	274	265	260	258	260	265	273	285	311	829	334	337	356	378	404	431	462	495

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5	89	0	-232	-236	-236	-234	-230	-227	-224	-225	-230	-243	-263	-285	-302	-312	-322	-341	-399	-796	-54
1981 JUL 15.0	206	0	2922	2908	2918	2945	2979	3014	3043	3063	3066	3045	2993	2913	2821	2746	2703	2690	2700	2302	2758
JD 2444790.5	84	-234	-238	-240	-239	-237	-234	-231	-230	-232	-240	-254	-271	-285	-293	-298	-307	-334	-446	77	-154
1981 JUL 5.0	193	2880	2852	2850	2870	2902	2937	2970	2994	3005	2995	2955	2884	2794	2709	2652	2627	2628	2639	2674	2738
JD 2444780.5	0	-238	-240	-240	-239	-237	-235	-233	-233	-237	-246	-258	-268	-273	-274	-277	-288	-326	-764	-147	-197
1981 JUN 25.0	0	2802	2786	2797	2824	2858	2893	2922	2939	2938	2910	2851	2765	2675	2606	2569	2561	2573	1895	2661	2711
JD 2444770.5	-236	-238	-238	-238	-238	-236	-235	-234	-234	-238	-245	-251	-253	-250	-247	-250	-262	-323	-136	-205	-219
1981 JUN 15.0	2759	2727	2726	2747	2779	2814	2846	2868	2875	2859	2812	2734	2643	2564	2516	2499	2506	2523	2584	2628	2682
JD 2444760.5	-234	-233	-234	-234	-234	-233	-231	-231	-231	-233	-235	-233	-226	-218	-215	-215	-221	-136	-222	-228	-232
1981 JUN 5.0	2675	2659	2671	2699	2733	2767	2794	2808	2801	2766	2700	2611	2527	2468	2441	2441	2461	2507	2543	2596	2654
JD 2444750.5	-226	-226	-226	-227	-227	-226	-225	-223	-222	-219	-213	-202	-190	-181	-175	-166	-95	-272	-242	-239	-239
1981 MAY 26.0	2598	2599	2620	2653	2687	2717	2737	2738	2715	2660	2579	2492	2423	2386	2379	2395	2437	2448	2506	2565	2627
JD 2444740.5	-215	-215	-217	-218	-218	-217	-214	-210	-203	-193	-177	-161	-147	-137	-124	-72	-513	-267	-246	-243	-243
1981 MAY 16.0	2530	2544	2573	2606	2639	2663	2672	2659	2617	2545	2458	2383	2336	2320	2330	2366	2232	2411	2474	2536	2600
JD 2444730.5	-201	-203	-205	-206	-205	-202	-196	-187	-173	-154	-132	-114	-101	-86	-45	351	-327	-259	-246	-244	-244
1981 MAY 6.0	2471	2495	2527	2560	2587	2603	2599	2568	2507	2426	2346	2290	2265	2268	2297	2367	2297	2379	2443	2508	2574
JD 2444720.5	-185	-188	-190	-190	-188	-182	-171	-154	-131	-104	-82	-65	-48	-16	136	-486	-282	-249	-242	-243	-244
1981 APR 26.0	2419	2448	2481	2511	2531	2535	2516	2467	2393	2312	2248	2214	2209	2232	2292	2083	2277	2349	2415	2482	2550
JD 2444710.5	-168	-171	-173	-171	-165	-153	-135	-108	-78	-50	-29	-12	14	103	-381	-330	-256	-240	-238	-240	-243
1981 APR 16.0	2372	2403	2434	2459	2470	2460	2423	2359	2280	2210	2167	2153	2168	2216	1181	2156	2252	2322	2389	2457	2525
JD 2444700.5	-149	-151	-151	-146	-135	-116	-87	-53	-20	4	24	47	107	420	-430	-272	-237	-230	-232	-237	-241
1981 APR 6.0	2327	2359	2386	2403	2402	2376	2323	2249	2175	2123	2101	2108	2145	2239	1972	2148	2227	2296	2364	2432	2502
JD 2444690.5	-128	-129	-125	-115	-96	-67	-30	6	37	59	81	125	286	-555	-304	-237	-221	-221	-226	-232	-239
1981 MAR 27.0	2284	2313	2335	2341	2326	2284	2218	2144	2084	2052	2050	2078	2154	1497	2030	2130	2203	2272	2340	2409	2478
JD 2444680.5	-104	-102	-94	-77	-48	-10	31	67	93	114	148	247	762	-366	-243	-212	-207	-211	-219	-228	-235
1981 MAR 17.0	2242	2266	2280	2274	2244	2187	2115	2049	2007	1996	2015	2073	1832	1877	2028	2110	2181	2249	2317	2386	2456

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD2444200.5																						
1979 NOV 23.0																						
JD2444240.5																						
1980 JAN 2.0																						
JD2444280.5																						
1980 FEB 11.0																						
JD2444320.5																						
1980 MAR 22.0																						
JD2444360.5																						
1980 MAY 1.0																						

EARTH DEPARTURE OR ARRIVAL DATE

M20
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5		92	0	55	17	-8	-25	-37	-45	-50	-53	-55	-55	-54	-52	-48	-41	-32	-16	19	319	-127
1981 JUL 15.0		211	0	165	93	47	18	3600	3587	3579	3572	3568	3564	3562	3560	3559	3558	3558	3556	3548	3472	41
JD 2444790.5		77	58	14	-17	-38	-52	-61	-68	-73	-76	-77	-77	-76	-73	-69	-63	-53	-34	29	-212	-98
1981 JUL 5.0		174	159	74	18	3582	3560	3546	3536	3530	3525	3522	3519	3517	3517	3516	3516	3516	3514	3496	36	3573
JD 2444780.5		0	14	-23	-49	-66	-77	-86	-91	-95	-98	-99	-99	-98	-95	-91	-85	-74	-51	320	-124	-94
1981 JUN 25.0		0	61	3591	3547	3520	3504	3493	3486	3481	3478	3475	3474	3473	3473	3474	3475	3475	3472	3388	3526	3522
JD 2444770.5		17	-27	-58	-79	-92	-102	-109	-114	-118	-120	-121	-121	-120	-118	-114	-108	-99	-65	-150	-113	-100
1981 JUN 15.0		52	3568	3513	3481	3461	3449	3441	3436	3432	3430	3429	3428	3429	3429	3431	3433	3435	3428	3477	3469	3475
JD 2444760.5		-28	-66	-90	-106	-117	-126	-132	-136	-139	-142	-143	-143	-142	-141	-138	-135	-130	-167	-124	-117	-110
1981 JUN 5.0		3550	3482	3441	3417	3403	3394	3389	3386	3384	3382	3382	3382	3384	3386	3388	3392	3397	3424	3412	3420	3430
JD 2444750.5		-71	-99	-118	-131	-141	-148	-153	-158	-161	-163	-165	-165	-165	-165	-165	-168	-201	-114	-128	-126	-122
1981 MAY 26.0		3454	3403	3373	3356	3346	3341	3337	3335	3334	3334	3335	3336	3338	3342	3346	3354	3379	3347	3363	3374	3386
JD 2444740.5		-107	-129	-144	-154	-163	-169	-174	-179	-182	-184	-186	-188	-189	-192	-198	-223	20	-128	-138	-138	-134
1981 MAY 16.0		3367	3330	3309	3297	3291	3287	3285	3284	3284	3285	3287	3289	3293	3298	3306	3326	3247	3301	3316	3329	3342
JD 2444730.5		-138	-154	-166	-176	-183	-189	-194	-199	-202	-206	-208	-211	-215	-223	-245	-446	-103	-143	-150	-151	-147
1981 MAY 6.0		3286	3260	3246	3239	3235	3233	3233	3233	3234	3236	3238	3242	3247	3256	3272	3464	3232	3255	3270	3283	3297
JD 2444720.5		-163	-177	-187	-195	-202	-208	-213	-218	-222	-226	-231	-236	-245	-264	-347	5	-136	-158	-163	-163	-161
1981 APR 26.0		3212	3195	3186	3181	3179	3179	3180	3181	3183	3186	3189	3195	3203	3217	3273	3149	3192	3209	3224	3238	3253
JD 2444710.5		-185	-196	-205	-213	-219	-226	-231	-237	-242	-247	-254	-264	-282	-335	400	-106	-157	-172	-176	-176	-173
1981 APR 16.0		3142	3131	3126	3124	3124	3125	3126	3128	3131	3135	3140	3147	3160	3194	3311	3124	3147	3163	3177	3192	3208
JD 2444700.5		-202	-212	-220	-228	-235	-242	-248	-255	-261	-269	-279	-297	-337	-521	-22	-145	-174	-185	-188	-188	-185
1981 APR 6.0		3075	3069	3067	3067	3068	3070	3072	3075	3079	3084	3090	3101	3125	3309	3053	3083	3100	3115	3130	3146	3162
JD 2444690.5		-217	-226	-234	-242	-250	-257	-264	-272	-281	-292	-309	-342	-448	211	-114	-169	-188	-196	-199	-199	-197
1981 MAR 27.0		3012	3009	3009	3010	3012	3015	3018	3021	3026	3032	3041	3059	3129	3012	3018	3037	3053	3068	3083	3099	3117
JD 2444680.5		-228	-237	-246	-254	-263	-271	-280	-290	-301	-318	347	-420	-557	-47	-153	-186	-200	-207	-209	-209	-207
1981 MAR 17.0		2950	2950	2951	2954	2956	2959	2963	2967	2972	2980	2994	3033	43	2955	2974	2990	3004	3019	3035	3052	3071
	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20 E10

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5 1981 JUL 15.0	2388	0	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388
JD 2444790.5 1981 JUL 5.0	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406
JD 2444780.5 1981 JUN 25.0		0	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419
JD 2444770.5 1981 JUN 15.0	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428
JD 2444760.5 1981 JUN 5.0	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434
JD 2444750.5 1981 MAY 26.0	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436
JD 2444740.5 1981 MAY 16.0	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435
JD 2444730.5 1981 MAY 6.0	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432
JD 2444720.5 1981 APR 26.0	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426
JD 2444710.5 1981 APR 16.0	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418
JD 2444700.5 1981 APR 6.0	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409
JD 2444690.5 1981 MAR 27.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
	•			•				•				•				•				•	
	JD2444200.5 1979 NOV 23.0			JD2444240.5 1980 JAN 2.0				JD2444280.5 1980 FEB 11.0				JD2444320.5 1980 MAR 22.0				JD2444360.5 1980 MAY 1.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E10

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5	162	0	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1981 JUL 15.0	247	0	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247
JD 2444790.5	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
1981 JUL 5.0	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
JD 2444780.5	0	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
1981 JUN 25.0	0	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194
JD 2444770.5	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
1981 JUN 15.0	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
JD 2444760.5	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
1981 JUN 5.0	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144
JD 2444750.5	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
1981 MAY 26.0	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
JD 2444740.5	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
1981 MAY 16.0	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
JD 2444730.5	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
1981 MAY 6.0	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
JD 2444720.5	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
1981 APR 26.0	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
JD 2444710.5	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
1981 APR 16.0	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
JD 2444700.5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
1981 APR 6.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
JD 2444690.5	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
1981 MAR 27.0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
JD 2444680.5	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
1981 MAR 17.0	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E10

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5	114	0	3511	3410	3308	3206	3104	3002	2901	2800	2699	2599	2500	2401	2303	2205	2108	2011	1914	1820	1722
1981 JUL 15.0	1732	0	-1533	-1276	-1074	-910	-769	-643	-525	-413	-306	-202	-100	-1	94	188	278	366	451	532	614
JD 2444790.5	62	3560	3459	3357	3255	3153	3051	2950	2849	2748	2647	2547	2447	2348	2250	2152	2055	1958	1862	1765	1670
1981 JUL 5.0	1763	-1674	-1388	-1160	-980	-830	-697	-576	-462	-352	-246	-143	-43	54	149	241	330	417	500	582	660
JD 2444780.5	0	3507	3405	3304	3202	3100	2998	2896	2795	2694	2594	2493	2394	2295	2197	2099	2002	1905	1809	1712	1617
1981 JUN 25.0	0	-1512	-1254	-1054	-892	-753	-627	-510	-398	-290	-186	-84	14	111	204	295	383	468	549	629	706
JD 2444770.5	3554	3453	3351	3249	3147	3046	2944	2842	2741	2640	2539	2439	2340	2241	2142	2044	1947	1850	1754	1658	1562
1981 JUN 15.0	-1650	-1360	-1134	-957	-809	-678	-558	-444	-334	-228	-125	-25	72	167	260	349	435	518	599	676	752
JD 2444760.5	3499	3397	3296	3194	3092	2990	2888	2787	2685	2584	2484	2384	2284	2185	2087	1989	1892	1795	1699	1603	1507
1981 JUN 5.0	-1478	-1223	-1026	-868	-731	-606	-490	-378	-271	-166	-64	34	131	224	315	402	487	569	648	724	797
JD 2444750.5	3442	3341	3240	3138	3036	2934	2832	2730	2629	2528	2428	2328	2228	2129	2031	1933	1836	1739	1642	1546	1451
1981 MAY 26.0	-1321	-1101	-928	-784	-655	-535	-422	-313	-207	-104	-3	94	189	281	370	456	539	619	696	771	843
JD 2444740.5	3385	3284	3182	3081	2979	2877	2775	2673	2572	2471	2370	2270	2171	2072	1974	1876	1778	1681	1585	1489	1393
1981 MAY 16.0	-1182	-992	-838	-704	-581	-466	-355	-248	-143	-41	57	153	246	337	424	508	590	668	744	817	888
JD 2444730.5	3327	3226	3124	3022	2921	2819	2717	2615	2514	2413	2312	2212	2113	2014	1915	1818	1720	1623	1527	1431	1335
1981 MAY 6.0	-1060	-894	-753	-627	-509	-397	-288	-183	-80	19	117	212	304	392	478	560	640	717	791	863	933
JD 2444720.5	3268	3167	3065	2963	2861	2760	2658	2556	2455	2354	2253	2153	2054	1955	1857	1758	1661	1564	1468	1372	1276
1981 APR 26.0	-953	-804	-674	-553	-439	-329	-223	-119	-17	81	177	270	360	447	531	613	690	765	838	909	[illegible]
JD 2444710.5	3208	3107	3005	2903	2802	2700	2598	2496	2395	2294	2193	2093	1994	1895	1790	1698	1601	1504	1408	1312	1216
1981 APR 16.0	-856	-721	-598	-482	-371	-263	-158	-55	44	141	235	327	415	500	589	663	739	813	884	955	1021
JD 2444700.5	3147	3046	2945	2843	2741	2639	2537	2436	2334	2233	2133	2033	1933	1836	1735	1638	1540	1444	1347	1251	1156
1981 APR 6.0	-769	-642	-524	-412	-303	-198	-94	6	104	200	293	383	469	552	635	712	787	859	929	997	1064
JD 2444690.5	3086	2985	2883	2781	2680	2578	2476	2374	2273	2172	2071	1972	1873	1770	1674	1576	1479	1382	1286	1190	1094
1981 MAR 27.0	-687	-568	-454	-345	-238	-134	-32	67	163	257	349	437	521	607	684	760	834	905	974	1041	1106
JD 2444680.5	3024	2923	2821	2719	2618	2516	2414	2312	2211	2110	2010	1910	1817	1710	1612	1514	1417	1320	1224	1128	1032
1981 MAR 17.0	-611	-497	-386	-279	-175	-72	27	125	221	313	403	489	567	655	732	807	879	949	1017	1083	1148
	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5		351	0	452	214	143	110	92	81	74	71	70	71	74	80	91	107	136	194	351	2091	516
1981 JUL 15.0		997	0	944	803	665	557	478	421	379	349	327	312	303	298	297	300	307	317	330	346	366
JD 2444790.5		498	775	220	131	95	76	66	59	56	54	54	56	59	66	76	93	125	197	498	891	239
1981 JUL 5.0		999	987	871	722	598	506	440	392	357	332	314	303	296	294	295	300	309	320	335	354	375
JD 2444780.5		0	229	111	75	58	48	43	39	37	37	38	40	43	49	58	74	107	203	2401	242	117
1981 JUN 25.0		0	934	785	644	538	462	407	367	338	317	303	295	291	291	294	301	312	325	342	362	385
JD 2444770.5		244	77	47	34	28	24	22	20	20	20	20	22	24	28	35	47	77	224	244	80	49
1981 JUN 15.0		982	852	698	575	487	423	378	345	321	305	294	289	287	289	295	304	316	331	350	371	396
JD 2444760.5		10	5	3	3	2	2	2	2	2	2	2	2	2	3	4	6	11	207	10	5	4
1981 JUN 5.0		917	758	618	515	442	390	353	326	307	294	287	284	285	289	297	307	321	339	359	382	409
JD 2444750.5		60	37	28	23	20	18	17	16	16	17	18	21	24	30	42	71	263	153	60	38	29
1981 MAY 26.0		823	667	548	464	404	362	331	310	295	286	281	281	284	290	300	312	328	347	369	395	423
JD 2444740.5		95	66	52	44	39	36	35	35	36	38	41	47	57	76	116	263	909	169	95	67	53
1981 MAY 16.0		723	586	489	421	372	338	313	296	285	279	277	279	284	292	304	319	336	357	381	408	439
JD 2444730.5		115	87	72	63	57	54	53	53	56	60	68	80	102	145	264	1681	380	174	115	88	73
1981 MAY 6.0		630	518	439	384	345	318	298	285	278	274	275	279	286	296	309	326	346	368	394	423	456
JD 2444720.5		129	103	88	79	74	71	71	73	78	86	100	123	165	265	718	969	295	177	129	104	89
1981 APR 26.0		551	461	398	354	323	301	286	276	272	271	274	280	289	301	316	335	356	381	409	440	474
JD 2444710.5		140	116	102	94	90	88	90	94	102	116	139	180	266	534	6786	500	260	179	140	117	104
1981 APR 16.0		485	414	364	329	304	287	276	270	267	269	274	282	293	307	326	345	368	395	425	458	494
JD 2444700.5		148	128	115	108	105	106	109	117	131	153	191	266	455	1712	930	376	240	180	148	128	116
1981 APR 6.0		432	376	336	308	289	276	268	265	265	269	276	286	299	314	334	356	381	410	442	477	516
JD 2444690.5		154	137	127	122	121	123	131	143	164	200	265	409	958	2386	553	317	227	181	154	138	128
1981 MAR 27.0		389	344	313	291	276	267	262	261	264	270	278	290	305	324	344	369	396	427	461	498	539
JD 2444680.5		160	146	138	135	137	142	154	173	206	262	378	710	5454	864	419	282	218	182	160	147	139
1981 MAR 17.0		354	319	294	277	266	260	258	259	264	272	282	296	311	333	356	382	412	444	481	520	563
	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E10

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5	-4	0	79	277	472	625	737	820	880	925	957	979	993	999	-998	-992	-979	-961	-937	-908	-873
1981 JUL 15.0	3060	0	2753	2544	2347	2197	2089	2011	1956	1916	1887	1868	1855	1847	1844	1845	1848	1854	1862	1871	1882
JD 2444790.5	-0	18	181	390	564	693	787	856	907	944	969	987	996	-997	-994	-984	-968	-947	-920	-888	-850
1981 JUL 5.0	3031	2806	2627	2412	2239	2113	2024	1960	1914	1881	1858	1843	1833	1829	1828	1830	1835	1842	1850	1861	1872
JD 2444780.5	0	92	300	495	643	751	830	887	929	959	979	991	-995	-994	-987	-974	-955	-931	-902	-866	-826
1981 JUN 25.0	0	2705	2487	2290	2144	2040	1967	1914	1877	1850	1832	1820	1814	1811	1812	1816	1822	1830	1839	1850	1862
JD 2444770.5	26	206	418	588	712	801	866	913	947	971	986	994	-994	-989	-978	-962	-940	-913	-881	-843	-800
1981 JUN 15.0	2763	2567	2350	2181	2061	1976	1916	1873	1843	1822	1808	1800	1796	1796	1798	1803	1811	1819	1830	1841	1853
JD 2444760.5	115	333	525	667	769	842	896	934	961	979	990	-992	-990	-981	-967	-948	-923	-693	-858	-817	-772
1981 JUN 5.0	2647	2420	2226	2087	1989	1920	1872	1837	1813	1797	1787	1781	1779	1781	1785	1792	1800	1809	1820	1832	1843
JD 2444750.5	242	455	618	734	817	877	920	951	972	985	991	-990	-984	-972	-955	-932	-905	-871	-833	-790	-742
1981 MAY 26.0	2497	2280	2119	2006	1927	1872	1833	1805	1786	1774	1767	1764	1765	1768	1774	1781	1790	1800	1811	1823	1834
JD 2444740.5	377	562	696	790	857	906	940	964	980	988	-989	-985	-975	-960	-940	-915	-884	-848	-807	-761	-711
1981 MAY 16.0	2343	2158	2027	1937	1874	1830	1799	1777	1763	1754	1750	1749	1751	1756	1763	1771	1781	1792	1803	1814	1826
JD 2444730.5	500	652	759	835	890	928	956	974	985	-988	-986	-978	-965	-947	-923	-895	-861	-822	-779	-731	-678
1981 MAY 6.0	2204	2054	1950	1878	1828	1793	1769	1752	1742	1736	1734	1736	1739	1746	1753	1762	1773	1783	1795	1806	1817
JD 2444720.5	604	726	812	872	916	947	968	981	987	-986	-980	-969	-953	-932	-905	-873	-837	-795	-749	-699	-644
1981 APR 26.0	2086	1967	1885	1829	1789	1761	1742	1730	1723	1720	1720	1723	1729	1736	1744	1754	1765	1776	1787	1798	1809
JD 2444710.5	689	786	854	902	937	961	976	984	-985	-982	-972	-958	-939	-914	-882	-850	-811	-767	-718	-665	-608
1981 APR 16.0	1988	1895	1831	1786	1755	1734	1719	1711	1707	1706	1708	1713	1719	1727	1739	1747	1758	1769	1780	1790	1801
JD 2444700.5	757	833	887	926	953	971	981	-984	-982	-975	-963	-945	-923	-896	-862	-825	-783	-736	-685	-630	-572
1981 APR 6.0	1908	1836	1785	1750	1726	1710	1699	1694	1692	1693	1697	1703	1710	1719	1730	1740	1751	1762	1772	1783	1792
JD 2444690.5	811	871	914	945	965	978	984	-983	-978	-967	-951	-931	-906	-874	-839	-799	-754	-705	-651	-594	-534
1981 MAR 27.0	1843	1786	1747	1720	1701	1689	1682	1679	1679	1682	1688	1694	1702	1713	1723	1733	1744	1755	1765	1775	1783
JD 2444680.5	854	901	935	959	974	982	-983	-979	-971	-957	-938	-915	-889	-852	-814	-771	-723	-672	-616	-557	-495
1981 MAR 17.0	1790	1745	1715	1694	1680	1671	1667	1666	1668	1673	1679	1687	1693	1706	1716	1727	1738	1748	1758	1767	1774

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD2444200.5 1979 NOV 23.0				JD2444240.5 1980 JAN 2.0				JD2444280.5 1980 FEB 11.0				JD2444320.5 1980 MAR 22.0				JD2444360.5 1980 MAY 1.0					

EARTH DEPARTURE OR ARRIVAL DATE

M20
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5	115	0	910	489	378	330	302	282	267	254	243	233	223	214	205	197	189	181	174	167	160
1981 JUL 15.0	253	0	406	400	393	384	375	366	357	347	338	329	319	310	301	292	283	274	266	257	249
JD 2444790.5	115	1920	603	416	348	313	291	274	261	249	238	228	219	210	201	193	185	178	170	163	157
1981 JUL 5.0	251	408	403	396	387	379	369	360	351	341	332	323	313	304	295	286	277	269	260	252	243
JD 2444780.5	0	844	472	371	327	300	282	267	254	243	233	223	214	205	197	189	181	174	167	160	153
1981 JUN 25.0	0	405	398	390	382	373	364	354	345	335	326	317	308	298	289	280	272	263	254	246	238
JD 2444770.5	1601	568	404	343	310	289	273	260	249	238	228	219	210	201	193	185	178	170	163	156	150
1981 JUN 15.0	406	401	393	385	376	367	358	348	339	329	320	311	301	292	283	274	266	257	249	240	232
JD 2444760.5	756	450	363	322	298	280	266	254	243	233	223	214	205	197	189	181	174	166	160	153	146
1981 JUN 5.0	403	396	388	379	370	361	351	342	333	323	314	305	295	286	277	268	260	251	243	235	227
JD 2444750.5	525	389	336	307	288	272	260	248	238	228	219	210	201	193	185	177	170	163	156	149	143
1981 MAY 26.0	398	391	382	373	364	355	345	336	326	317	308	298	289	280	271	262	254	245	237	229	221
JD 2444740.5	426	353	317	295	279	265	253	243	233	223	214	205	197	189	181	173	166	159	152	146	140
1981 MAY 16.0	394	385	376	367	358	348	339	329	320	311	301	292	283	274	265	256	248	239	231	223	215
JD 2444730.5	374	329	303	285	271	259	247	237	227	218	209	201	192	184	177	169	162	155	149	142	136
1981 MAY 6.0	388	379	370	361	352	342	333	323	314	304	295	286	277	268	259	250	242	233	225	217	209
JD 2444720.5	343	312	292	277	264	252	242	232	222	213	205	196	188	180	172	165	158	151	145	139	133
1981 APR 26.0	382	373	364	355	345	336	326	317	307	298	289	279	270	261	253	244	236	227	219	211	204
JD 2444710.5	322	299	283	269	257	246	236	227	217	208	200	192	184	176	168	161	154	148	141	135	129
1981 APR 16.0	376	367	357	348	339	329	319	310	301	291	282	273	264	255	246	238	230	221	213	206	198
JD 2444700.5	307	289	274	262	251	241	231	221	212	204	195	187	179	172	164	157	150	144	137	131	126
1981 APR 6.0	370	360	351	341	332	322	313	303	294	285	276	267	258	249	240	232	223	215	207	200	192
JD 2444690.5	295	280	267	256	245	235	225	216	207	199	190	182	175	167	160	153	146	140	134	128	122
1981 MAR 27.0	363	354	344	335	325	316	306	297	287	278	269	260	251	242	234	225	217	209	201	194	186
JD 2444680.5	285	272	260	249	239	229	220	211	202	194	186	178	171	163	156	149	142	136	130	124	119
1981 MAR 17.0	356	347	337	328	318	309	299	290	281	271	262	253	245	236	227	219	211	203	195	188	180

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2444200.5 1979 NOV 23.0 — JD2444240.5 1980 JAN 2.0 — JD2444280.5 1980 FEB 11.0 — JD2444320.5 1980 MAR 22.0 — JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E10

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5 1981 JUL 15.0	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444790.5 1981 JUL 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444780.5 1981 JUN 25.0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444770.5 1981 JUN 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444760.5 1981 JUN 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444750.5 1981 MAY 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444740.5 1981 MAY 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444730.5 1981 MAY 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444720.5 1981 APR 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444710.5 1981 APR 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444700.5 1981 APR 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444690.5 1981 MAR 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444680.5 1981 MAR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD2444200.5 1979 NOV 23.0					JD2444240.5 1980 JAN 2.0				JD2444280.5 1980 FEB 11.0				JD2444320.5 1980 MAR 22.0				JD2444360.5 1980 MAY 1.0				

EARTH DEPARTURE OR ARRIVAL DATE

M20
E10

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5	3797	0	3080	2244	1645	1241	967	777	643	549	482	437	410	398	398	412	437	474	530	978	668
1981 JUL 15.0	3144	0	2632	2042	1614	1323	1124	985	888	818	769	735	714	703	700	705	717	736	764	1028	865
JD 2444790.5	3881	3524	2589	1873	1387	1062	841	688	579	503	450	417	399	394	402	421	452	495	569	685	683
1981 JUL 5.0	3226	2972	2308	1794	1441	1203	1040	925	845	787	748	721	706	700	702	711	727	750	787	893	870
JD 2444780.5	0	2985	2145	1561	1173	915	737	613	526	466	425	402	392	394	408	433	470	519	1086	644	718
1981 JUN 25.0	0	2615	2008	1580	1294	1100	967	873	807	760	729	709	700	699	705	718	738	765	1108	851	891
JD 2444770.5	3420	2469	1767	1303	998	793	651	552	483	436	406	392	389	399	419	450	491	547	609	676	759
1981 JUN 15.0	2952	2262	1745	1399	1169	1012	903	827	773	736	712	699	695	698	709	727	751	781	831	867	916
JD 2444760.5	2845	2015	1457	1094	855	693	580	502	448	413	393	387	391	407	433	469	515	576	639	716	804
1981 JUN 5.0	2556	1942	1522	1247	1062	936	848	786	743	714	698	690	691	699	715	737	765	809	842	890	944
JD 2444750.5	2310	1639	1207	926	739	611	523	462	421	397	386	386	398	419	451	493	551	608	677	759	852
1981 MAY 26.0	2175	1668	1337	1119	971	870	799	749	716	695	685	683	689	702	722	749	792	815	862	915	974
JD 2444740.5	1857	1338	1008	792	646	546	477	431	402	386	383	390	408	435	473	526	661	644	719	806	904
1981 MAY 16.0	1842	1441	1182	1010	893	812	755	717	692	678	673	677	688	706	731	770	831	834	885	942	1006
JD 2444730.5	1495	1103	851	685	572	495	442	408	388	381	385	399	422	456	504	828	625	684	764	856	960
1981 MAY 6.0	1565	1255	1053	918	825	761	716	687	670	663	663	672	688	711	747	1012	809	854	908	970	1039
JD 2444720.5	1214	920	729	601	514	455	415	392	381	381	391	411	441	484	580	677	656	727	813	910	1018
1981 APR 26.0	1340	1102	946	839	766	715	682	661	650	649	655	669	690	722	802	827	823	874	933	1000	1073
JD 2444710.5	999	778	633	535	469	424	396	382	378	385	401	428	466	534	2927	642	694	773	864	966	1080
1981 APR 16.0	1159	976	854	771	714	675	650	637	632	636	648	667	696	751	2536	799	840	896	959	1030	1109
JD 2444700.5	836	670	560	485	435	402	384	377	380	393	416	450	505	823	676	668	737	821	918	1026	1145
1981 APR 6.0	1012	872	777	712	668	639	622	615	616	625	642	669	713	981	805	806	857	918	986	1062	1146
JD 2444690.5	712	587	503	447	410	387	377	377	387	406	436	483	608	1076	654	705	782	873	975	1089	1214
1981 MAR 27.0	891	783	710	660	626	606	596	595	602	616	640	677	785	1091	778	818	875	940	1014	1095	1183
JD 2444680.5	619	524	461	419	392	378	375	381	397	423	463	544	2358	671	679	747	831	928	1036	1155	1286
1981 MAR 17.0	792	708	651	613	589	576	572	577	589	609	642	711	2190	771	781	832	893	964	1042	1128	1222

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E10

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444800.5	6941	0	5712	4286	3259	2563	2090	1762	1531	1367	1251	1173	1124	1100	1098	1117	1154	1210	1294	2006	1533
1981 JUL 15.0	114	0	3511	3410	3308	3206	3104	3002	2901	2800	2699	2599	2500	2401	2303	2205	2108	2011	1914	1820	1722
JD 2444790.5	7107	6496	4897	3667	2828	2265	1881	1613	1424	1290	1198	1138	1105	1094	1103	1132	1179	1245	1356	1578	1553
1981 JUL 5.0	62	3560	3459	3357	3255	3153	3051	2950	2849	2748	2647	2547	2447	2348	2250	2152	2055	1958	1862	1765	1670
JD 2444780.5	0	5601	4154	3141	2467	2015	1704	1486	1333	1226	1154	1111	1092	1093	1113	1152	1208	1284	2194	1495	1609
1981 JUN 25.0	0	3507	3405	3304	3202	3100	2998	2896	2795	2694	2594	2493	2394	2295	2197	2099	2002	1905	1809	1712	1617
JD 2444770.5	6373	4731	3513	2702	2167	1805	1554	1378	1255	1172	1119	1091	1084	1097	1128	1176	1241	1328	1441	1543	1675
1981 JUN 15.0	3554	3453	3351	3249	3147	3046	2944	2842	2741	2640	2539	2439	2340	2241	2142	2044	1947	1850	1754	1658	1562
JD 2444760.5	5401	3957	2979	2341	1917	1629	1428	1287	1191	1128	1091	1077	1083	1107	1148	1206	1280	1385	1480	1605	1748
1981 JUN 5.0	3499	3397	3296	3194	3092	2990	2888	2787	2665	2584	2484	2384	2284	2185	2087	1989	1892	1795	1699	1603	1507
JD 2444750.5	4486	3307	2543	2045	1711	1481	1321	1211	1137	1092	1070	1069	1086	1121	1173	1242	1343	1423	1539	1674	1827
1981 MAY 26.0	3442	3341	3240	3138	3036	2934	2832	2730	2629	2528	2428	2328	2228	2129	2031	1933	1836	1739	1642	1546	1451
JD 2444740.5	3699	2780	2190	1802	1539	1358	1232	1147	1093	1064	1056	1067	1095	1141	1204	1296	1492	1479	1604	1748	1910
1981 MAY 16.0	3385	3284	3182	3081	2979	2877	2775	2673	2572	2471	2370	2270	2171	2072	1974	1876	1778	1681	1585	1489	1393
JD 2444730.5	3060	2358	1905	1603	1397	1255	1158	1095	1058	1044	1048	1071	1110	1168	1251	1840	1434	1538	1673	1827	1999
1981 MAY 6.0	3327	3226	3124	3022	2921	2819	2717	2615	2514	2413	2312	2212	2113	2014	1915	1818	1720	1623	1527	1431	1335
JD 2444720.5	2554	2022	1674	1440	1280	1170	1097	1052	1031	1029	1046	1080	1131	1206	1382	1504	1479	1601	1746	[illegible]	[illegible]
1981 APR 26.0	3268	3167	3065	2963	2861	2760	2658	2556	2455	2354	2253	2153	2054	1955	1857	1758	1661	1564	1468	1372	[illegible]
JD 2444710.5	2158	1755	1488	1306	1182	1099	1047	1018	1011	1021	1049	1095	1163	1285	5463	1440	1534	1668	1823	1997	2189
1981 APR 16.0	3208	3107	3005	2903	2802	2700	2598	2496	2395	2294	2193	2093	1994	1895	1790	1698	1601	1504	1408	1312	1216
JD 2444700.5	1847	1542	1336	1197	1102	1041	1006	992	997	1019	1059	1119	1218	1804	1481	1475	1594	1739	1904	2088	2291
1981 APR 6.0	3147	3046	2945	2843	2741	2639	2537	2436	2334	2233	2133	2033	1933	1836	1735	1638	1540	1444	1347	1251	1156
JD 2444690.5	1603	1371	1213	1106	1036	993	973	972	988	1022	1076	1160	1393	2167	1433	1523	1657	1813	1989	2184	2397
1981 MAR 27.0	3086	2985	2883	2781	2680	2578	2476	2374	2273	2172	2071	1972	1873	1770	1674	1576	1479	1382	1286	1190	1094
JD 2444680.5	1411	1233	1112	1032	981	954	947	958	986	1032	1105	1255	4548	1442	1460	1578	1724	1891	2078	2283	2508
1981 MAR 17.0	3024	2923	2821	2719	2618	2516	2414	2312	2211	2110	2010	1910	1817	1710	1612	1514	1417	1320	1224	1128	1032
(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E11

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444600.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671716	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.613	DEGREES
MEAN ANOM. AT EPOCH	=	353.024	DEGREES
DATE OF NODAL PASSAGE	=	2444505.367	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444600.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338790	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.411	DEGREES
ARG. OF PERIHELION	=	286.298	DEGREES
MEAN ANOM. AT EPOCH	=	340.324	DEGREES
DATE OF NODAL PASSAGE	=	2444072.514	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.065	DEGREES

M20
E11

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	315	344	386	432	480	532	587	644	705	769	836	905	978	1052	1129	1207	1286	1366	1275	1059	911
1981 JUL 15.0	368	377	394	415	438	464	492	523	557	592	631	671	714	759	805	854	904	955	836	648	508
JD 2444790.5	323	362	406	453	503	556	612	671	733	798	866	937	1010	1086	1163	1242	1322	1403	1148	967	858
1981 JUL 5.0	370	386	405	428	453	480	510	542	577	614	654	696	740	786	834	884	935	988	735	569	461
JD 2444780.5	340	383	428	476	527	581	638	699	762	828	897	969	1044	1120	1199	1279	1360	1247	1035	897	824
1981 JUN 25.0	377	396	417	441	468	497	528	562	598	637	678	721	767	815	864	915	968	830	641	507	432
JD 2444770.5	360	404	450	500	552	608	666	727	792	860	930	1003	1079	1156	1236	1317	1399	1116	945	850	808
1981 JUN 15.0	387	407	430	456	483	514	547	582	620	661	703	748	795	844	895	948	1002	724	562	465	425
JD 2444760.5	382	426	474	525	578	635	695	757	823	892	964	1038	1115	1194	1274	1356	1208	1004	881	823	807
1981 JUN 5.0	397	419	443	470	500	532	567	604	643	685	729	776	825	875	928	982	814	628	505	446	438
JD 2444750.5	404	450	499	551	605	663	724	789	856	926	999	1074	1152	1232	1314	1305	1076	921	843	815	822
1981 MAY 26.0	407	431	457	486	517	551	587	626	667	711	757	805	855	907	961	908	703	553	473	451	472
JD 2444740.5	427	474	524	578	634	693	755	821	889	961	1035	1112	1191	1272	1355	1159	971	867	826	824	851
1981 MAY 16.0	419	444	472	502	535	570	608	649	692	737	785	834	886	940	996	787	610	506	467	478	524
JD 2444730.5	451	500	551	606	663	724	787	854	924	997	1073	1151	1231	1313	1249	1031	899	840	829	850	896
1981 MAY 6.0	430	457	487	519	554	591	630	673	717	764	814	865	919	975	876	676	545	487	486	526	594
JD 2444720.5	476	526	579	635	694	756	821	889	961	1035	1112	1191	1273	1357	1103	938	858	836	851	893	959
1981 APR 26.0	443	471	503	536	573	612	653	697	744	793	844	897	953	1011	750	591	513	498	530	593	683
JD 2444710.5	502	553	608	665	725	789	856	925	998	1074	1152	1233	1316	1184	987	882	846	853	890	953	1041
1981 APR 16.0	455	486	519	554	592	633	677	722	771	822	875	930	988	832	646	543	514	536	595	681	792
JD 2444700.5	529	582	637	696	758	823	891	963	1037	1114	1194	1277	1269	1046	912	859	857	889	949	1035	1149
1981 APR 6.0	468	500	535	573	613	655	701	748	799	852	907	965	916	709	580	532	545	598	680	790	926
JD 2444690.5	557	611	668	729	792	859	929	1002	1078	1157	1238	1323	1115	950	877	864	890	946	1029	1141	1287
1981 MAR 27.0	482	516	552	592	634	678	725	775	828	883	941	1001	780	623	555	556	602	682	789	923	1090
JD 2444680.5	586	641	700	762	827	896	967	1042	1120	1201	1284	1192	997	900	873	893	944	1025	1135	1279	1467
1981 MAR 17.0	495	531	570	611	655	702	751	803	858	915	975	856	673	582	569	609	684	789	922	1088	1295
(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E11

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	-54	-157	-182	-188	-185	-177	-164	-148	-130	-109	-86	-62	-38	-12	13	38	63	88	-208	-202	-188
1981 JUL 15.0	2758	2817	2874	2934	2996	3060	3124	3187	3251	3313	3376	3437	3498	3559	19	79	139	199	3030	3063	3117
JD 2444790.5	-154	-190	-200	-201	-196	-186	-173	-156	-138	-117	-94	-71	-46	-20	4	30	55	79	-214	-205	-190
1981 JUL 5.0	2738	2793	2851	2913	2977	3041	3106	3170	3234	3297	3359	3421	3482	3542	2	61	121	180	2992	3038	3102
JD 2444780.5	-197	-211	-214	-211	-204	-194	-181	-164	-146	-125	-103	-79	-54	-29	-4	21	46	-222	-217	-206	-190
1981 JUN 25.0	2711	2767	2828	2891	2956	3022	3087	3152	3216	3280	3342	3404	3465	3525	3584	43	102	2925	2961	3019	3089
JD 2444770.5	-219	-224	-224	-219	-212	-201	-188	-172	-153	-133	-111	-87	-63	-38	-13	12	37	-225	-218	-207	-191
1981 JUN 15.0	2682	2742	2805	2870	2936	3002	3068	3134	3199	3262	3325	3386	3447	3507	3566	24	82	2887	2937	3004	3077
JD 2444760.5	-232	-233	-231	-226	-218	-208	-195	-179	-161	-140	-119	-96	-72	-47	-22	2	-229	-226	-218	-207	-191
1981 JUN 5.0	2654	2716	2781	2848	2915	2982	3049	3115	3180	3244	3307	3368	3429	3488	3547	4	2816	2856	2918	2991	3066
JD 2444750.5	-239	-239	-236	-231	-224	-214	-201	-185	-168	-148	-127	-104	-81	-56	-32	-230	-229	-225	-218	-207	-192
1981 MAY 26.0	2627	2691	2758	2826	2894	2962	3029	3096	3161	3225	3288	3349	3409	3469	3527	2749	2779	2834	2903	2978	3054
JD 2444740.5	-243	-242	-240	-236	-229	-219	-207	-192	-175	-156	-135	-113	-90	-66	-42	-228	-228	-225	-218	-207	-193
1981 MAY 16.0	2600	2667	2735	2803	2873	2941	3009	3076	3142	3206	3268	3330	3390	3448	3506	2705	2750	2816	2889	2965	3041
JD 2444730.5	-244	-244	-243	-239	-233	-224	-212	-198	-181	-163	-143	-121	-99	-76	-225	-225	-226	-224	-218	-208	-195
1981 MAY 6.0	2574	2642	2712	2781	2851	2920	2988	3055	3121	3185	3248	3309	3369	3427	2636	2670	2729	2800	2875	2951	3027
JD 2444720.5	-244	-245	-245	-242	-236	-228	-217	-204	-188	-170	-151	-130	-108	-86	-219	-222	-224	-223	-219	-210	-197
1981 APR 26.0	2550	2619	2689	2759	2829	2898	2967	3034	3100	3164	3227	3288	3347	3404	2594	2644	2712	2785	2860	2936	3012
JD 2444710.5	-243	-246	-246	-244	-239	-232	-222	-209	-194	-177	-159	-139	-118	-210	-215	-220	-223	-223	-220	-212	-200
1981 APR 16.0	2525	2595	2666	2736	2807	2876	2945	3012	3078	3142	3204	3265	3324	2522	2562	2624	2695	2768	2843	2919	2996
JD 2444700.5	-241	-245	-246	-245	-242	-235	-226	-214	-200	-185	-167	-148	-199	-203	-211	-218	-223	-224	-221	-214	-203
1981 APR 6.0	2502	2572	2643	2713	2784	2854	2922	2990	3055	3119	3181	3241	2453	2484	2539	2606	2677	2750	2825	2902	2979
JD 2444690.5	-239	-243	-246	-246	-243	-238	-230	-219	-206	-191	-175	-157	-189	-198	-208	-217	-222	-224	-222	-216	-206
1981 MAR 27.0	2478	2549	2620	2690	2761	2830	2899	2966	3031	3095	3157	3216	2410	2457	2519	2587	2657	2730	2806	2883	2962
JD 2444680.5	-235	-241	-245	-246	-245	-240	-233	-224	-212	-198	-183	-172	-181	-194	-206	-216	-222	-225	-224	-219	-209
1981 MAR 17.0	2456	2526	2596	2667	2737	2807	2875	2942	3007	3070	3131	2340	2378	2434	2498	2566	2636	2710	2786	2864	2944
(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20 E11

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	-127	-71	-49	-33	-20	-8	2	14	25	37	49	61	74	86	99	112	125	138	158	154	168
1981 JUL 15.0	41	21	22	30	40	53	67	83	101	120	140	163	186	211	238	266	296	328	429	437	507
JD 2444790.5	-98	-72	-57	-45	-33	-22	-11	-0	11	23	35	47	60	73	86	100	113	127	142	150	174
1981 JUL 5.0	3573	3573	3579	3589	1	15	30	46	65	84	106	128	152	178	205	234	265	297	381	426	532
JD 2444780.5	-94	-80	-68	-58	-47	-37	-26	-15	-3	8	20	33	46	59	73	87	101	132	132	154	184
1981 JUN 25.0	3522	3528	3537	3548	3562	3576	3592	10	29	49	71	94	119	145	173	202	234	337	355	439	574
JD 2444770.5	-100	-90	-81	-71	-62	-51	-41	-30	-18	-6	5	18	31	45	59	74	89	116	132	164	196
1981 JUN 15.0	3475	3484	3495	3508	3522	3538	3554	3573	3592	14	36	60	85	112	141	171	203	295	355	473	628
JD 2444760.5	-110	-102	-94	-85	-76	-66	-56	-45	-34	-22	-9	3	17	31	46	61	102	110	140	177	207
1981 JUN 5.0	3430	3441	3454	3467	3482	3499	3517	3536	3556	3578	1	26	52	80	109	140	246	280	379	523	684
JD 2444750.5	-122	-115	-108	-100	-91	-81	-71	-60	-49	-37	-24	-11	3	17	32	91	90	114	154	192	215
1981 MAY 26.0	3386	3398	3412	3427	3443	3460	3479	3499	3520	3543	3567	3592	19	48	78	206	214	292	423	580	731
JD 2444740.5	-134	-129	-122	-114	-106	-96	-86	-76	-64	-52	-39	-25	-11	3	19	72	89	128	171	204	221
1981 MAY 16.0	3342	3355	3370	3386	3403	3421	3441	3462	3484	3508	3533	3559	3587	17	48	158	212	328	479	631	765
JD 2444730.5	-147	-142	-136	-129	-120	-111	-101	-90	-79	-67	-53	-40	-25	-10	57	64	100	146	187	212	225
1981 MAY 6.0	3297	3312	3327	3344	3362	3382	3402	3424	3448	3472	3498	3526	3555	3586	112	141	239	381	533	670	783
JD 2444720.5	-161	-156	-150	-143	-135	-126	-116	-105	-94	-81	-68	-54	-39	-23	42	71	118	165	198	217	227
1981 APR 26.0	3253	3268	3285	3303	3322	3342	3364	3387	3411	3437	3464	3493	3523	3555	78	156	288	437	577	694	788
JD 2444710.5	-173	-169	-163	-156	-149	-140	-130	-119	-108	-95	-82	-68	-52	23	43	88	139	179	205	220	228
1981 APR 16.0	3208	3224	3242	3261	3281	3303	3326	3350	3375	3402	3431	3461	3492	24	79	198	344	486	606	704	781
JD 2444700.5	-185	-181	-176	-169	-162	-153	-143	-133	-121	-109	-95	-81	7	17	58	110	157	189	209	221	228
1981 APR 6.0	3162	3180	3199	3219	3240	3263	3287	3313	3339	3368	3398	3429	3579	9	113	254	396	519	620	700	765
JD 2444690.5	-197	-193	-188	-182	-174	-166	-156	-146	-134	-122	-108	-94	-5	27	80	130	169	194	210	220	227
1981 MAR 27.0	3117	3135	3155	3176	3199	3223	3249	3276	3304	3334	3365	3398	3548	33	167	308	434	537	620	686	741
JD 2444680.5	-207	-204	-199	-193	-186	-178	-168	-158	-147	-134	-121	-26	-1	48	102	145	175	195	209	218	224
1981 MAR 17.0	3071	3091	3112	3134	3158	3184	3211	3239	3269	3300	3333	3494	3557	83	223	350	455	540	609	665	712
(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20 E11

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5 1981 JUL 15.0	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388
JD 2444790.5 1981 JUL 5.0	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406
JD 2444780.5 1981 JUN 25.0	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419
JD 2444770.5 1981 JUN 15.0	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428
JD 2444760.5 1981 JUN 5.0	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434
JD 2444750.5 1981 MAY 26.0	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436
JD 2444740.5 1981 MAY 16.0	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435
JD 2444730.5 1981 MAY 6.0	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432
JD 2444720.5 1981 APR 26.0	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426
JD 2444710.5 1981 APR 16.0	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418
JD 2444700.5 1981 APR 6.0	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409
JD 2444690.5 1981 MAR 27.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E11

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1981 JUL 15.0	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247
JD 2444790.5	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
1981 JUL 5.0	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
JD 2444780.5	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
1981 JUN 25.0	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194
JD 2444770.5	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
1981 JUN 15.0	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
JD 2444760.5	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
1981 JUN 5.0	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144
JD 2444750.5	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
1981 MAY 26.0	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
JD 2444740.5	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
1981 MAY 16.0	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
JD 2444730.5	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
1981 MAY 6.0	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
JD 2444720.5	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
1981 APR 26.0	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
JD 2444710.5	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
1981 APR 16.0	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
JD 2444700.5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
1981 APR 6.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
JD 2444690.5	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
1981 MAR 27.0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
JD 2444680.5	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
1981 MAR 17.0	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E11

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	1722	1627	1532	1436	1341	1245	1150	1054	957	860	763	665	567	468	368	268	167	67	3564	3463	3361
1981 JUL 15.0	614	690	765	838	908	977	1045	1112	1177	1242	1306	1370	1434	1497	1561	1625	1690	1756	-1744	-1614	-1525
JD 2444790.5	1670	1574	1479	1384	1288	1193	1097	1001	905	808	710	613	514	415	316	215	115	15	3512	3411	3309
1981 JUL 5.0	660	735	809	880	949	1017	1084	1150	1214	1278	1342	1405	1468	1532	1595	1660	1725	1790	-1673	-1567	-1498
JD 2444780.5	1617	1521	1426	1330	1235	1139	1044	948	851	754	657	559	461	362	262	162	61	3560	3459	3357	3255
1981 JUN 25.0	706	780	852	922	990	1057	1123	1188	1252	1315	1378	1441	1504	1567	1630	1694	1760	-1739	-1615	-1533	-1477
JD 2444770.5	1562	1467	1371	1276	1181	1085	989	893	797	700	603	505	406	307	208	108	7	3506	3405	3303	3201
1981 JUN 15.0	752	824	895	964	1031	1097	1162	1226	1289	1352	1414	1477	1539	1602	1665	1730	1795	-1668	-1571	-1507	-1459
JD 2444760.5	1507	1411	1316	1221	1125	1030	934	838	742	645	547	449	351	252	152	52	3552	3451	3349	3248	3146
1981 JUN 5.0	797	869	938	1006	1072	1137	1201	1264	1327	1389	1451	1513	1575	1638	1701	1766	-1728	-1613	-1539	-1487	-1444
JD 2444750.5	1451	1355	1260	1164	1069	973	878	782	685	588	491	393	295	196	96	3596	3495	3394	3293	3191	3089
1981 MAY 26.0	843	913	981	1048	1113	1177	1240	1302	1364	1426	1487	1549	1611	1674	1738	-1792	-1660	-1573	-1515	-1470	-1429
JD 2444740.5	1393	1298	1203	1107	1012	916	821	724	628	531	434	336	238	139	39	3539	3438	3337	3236	3134	3032
1981 MAY 16.0	888	957	1024	1089	1154	1217	1279	1341	1402	1463	1524	1586	1648	1711	1775	-1713	-1609	-1544	-1496	-1454	-1414
JD 2444730.5	1335	1240	1144	1049	954	858	762	666	570	473	376	278	179	80	3580	3481	3380	3279	3178	3076	2974
1981 MAY 6.0	933	1000	1066	1131	1194	1256	1318	1379	1440	1501	1562	1623	1685	1748	-1770	-1650	-1574	-1522	-1479	-1438	-1398
JD 2444720.5	1276	1181	1085	990	895	799	703	607	511	414	317	219	121	22	3521	3421	3321	3220	3119	3017	2915
1981 APR 26.0	977	1043	1108	1172	1234	1296	1357	1418	1478	1538	1599	1660	1723	1785	-1695	-1606	-1548	-1503	-1462	-1421	-1381
JD 2444710.5	1216	1121	1025	930	835	739	643	547	451	354	257	159	61	3560	3462	3362	3261	3160	3059	2957	2855
1981 APR 16.0	1021	1086	1150	1213	1274	1335	1396	1456	1516	1576	1637	1698	1761	-1744	-1640	-1575	-1527	-1485	-1444	-1404	-1362
JD 2444700.5	1156	1060	965	869	774	679	583	487	390	294	196	99	3589	3500	3401	3301	3200	3099	2998	2896	2794
1981 APR 6.0	1064	1128	1191	1253	1314	1375	1435	1495	1554	1614	1675	1737	-1784	-1678	-1603	-1552	-1508	-1467	-1426	-1384	-1342
JD 2444690.5	1094	999	903	808	713	617	521	425	329	232	135	39	3537	3439	3339	3239	3139	3038	2937	2835	2733
1981 MAR 27.0	1106	1170	1232	1293	1354	1414	1474	1533	1593	1653	1714	1775	-1719	-1632	-1576	-1531	-1489	-1448	-1406	-1364	-1320
JD 2444680.5	1032	937	841	746	651	555	459	364	267	171	74	3571	3476	3377	3277	3177	3077	2976	2875	2773	2671
1981 MAR 17.0	1148	1211	1272	1333	1393	1453	1512	1572	1631	1692	1753	-1761	-1664	-1601	-1554	-1511	-1470	-1428	-1385	-1342	-1297

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E11

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	516	234	154	118	97	85	77	72	70	70	72	76	83	96	116	155	242	602	1123	294	172
1981 JUL 15.0	366	389	415	445	478	514	554	596	641	688	737	785	833	878	920	955	981	997	993	922	834
JD 2444790.5	239	140	101	81	69	62	57	55	54	54	57	61	69	81	103	146	270	2135	352	166	110
1981 JUL 5.0	375	399	428	459	494	532	573	617	663	711	760	808	855	899	938	969	991	1000	963	875	799
JD 2444780.5	118	79	61	51	44	40	38	37	37	38	41	45	51	63	84	133	346	533	152	90	65
1981 JUN 25.0	385	411	441	474	511	551	593	638	686	735	784	832	878	919	955	982	997	991	917	833	774
JD 2444770.5	49	36	29	25	22	21	20	20	20	21	23	25	30	38	55	105	1573	120	59	40	31
1981 JUN 15.0	396	425	456	491	529	571	615	661	710	759	808	856	900	939	970	991	1000	957	870	801	759
JD 2444760.5	4	3	2	2	2	2	2	2	2	2	2	3	3	4	7	20	22	7	4	3	2
1981 JUN 5.0	409	439	473	509	549	592	638	686	735	784	833	879	921	957	983	998	987	909	830	779	753
JD 2444750.5	29	23	20	18	17	16	16	17	18	19	22	26	33	49	98	2219	90	47	32	25	21
1981 MAY 26.0	423	455	491	529	571	615	662	711	761	810	858	902	941	972	993	1000	947	863	802	768	756
JD 2444740.5	53	45	40	37	35	35	35	36	39	43	50	63	86	145	509	324	124	78	58	48	41
1981 MAY 16.0	439	473	510	550	594	640	688	737	787	836	883	924	960	985	999	979	899	828	786	768	768
JD 2444730.5	73	64	58	55	53	53	54	58	63	72	87	113	172	375	1536	255	141	99	79	67	60
1981 MAY 6.0	456	492	531	573	618	666	715	765	814	862	907	945	975	995	998	934	856	805	781	776	789
JD 2444720.5	89	80	75	72	71	72	75	81	91	107	135	190	339	1841	519	231	151	115	95	83	76
1981 APR 26.0	474	512	553	597	644	692	742	793	842	888	929	964	988	1000	967	887	827	795	786	794	818
JD 2444710.5	104	95	90	88	89	92	98	108	125	152	204	322	833	1289	369	218	158	127	109	98	92
1981 APR 16.0	494	534	577	623	671	720	771	821	869	913	951	980	997	990	920	851	812	797	800	820	856
JD 2444700.5	116	109	106	105	108	113	123	140	167	214	313	613	8853	607	308	211	163	137	121	111	106
1981 APR 6.0	516	557	602	650	699	749	800	849	895	936	969	992	999	951	878	830	809	808	824	856	905
JD 2444690.5	128	122	121	122	127	137	153	178	222	306	517	1818	1109	435	275	205	167	145	132	124	121
1981 MAR 27.0	539	582	629	678	728	779	829	877	920	957	984	999	978	906	851	823	817	829	857	902	967
JD 2444680.5	139	135	136	140	149	164	188	228	301	461	1057	2815	628	356	253	201	171	152	142	136	135
1981 MAR 17.0	563	608	657	707	758	809	858	904	944	975	995	995	935	873	839	828	836	860	901	960	1043

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E11

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	-873	-832	-787	-737	-682	-623	-561	-497	-431	-365	-300	-238	-180	-127	-81	-44	-17	-2	6	64	139
1981 JUL 15.0	1882	1894	1907	1920	1932	1945	1956	1966	1975	1982	1986	1987	1984	1978	1967	1951	1930	1903	1651	1590	1539
JD 2444790.5	-850	-807	-760	-707	-650	-590	-527	-462	-396	-331	-268	-207	-152	-103	-61	-29	-8	0	30	103	169
1981 JUL 5.0	1872	1884	1897	1909	1921	1933	1944	1953	1960	1965	1968	1966	1962	1953	1939	1920	1896	1866	1599	1541	1513
JD 2444780.5	-826	-781	-731	-676	-618	-556	-492	-427	-361	-297	-235	-178	-125	-80	-43	-16	-2	7	67	137	191
1981 JUN 25.0	1862	1874	1887	1899	1911	1921	1931	1939	1945	1948	1948	1945	1938	1926	1910	1888	1861	1605	1546	1505	-1502
JD 2444770.5	-800	-752	-700	-643	-583	-521	-456	-391	-326	-263	-204	-149	-100	-59	-27	-7	0	34	104	165	207
1981 JUN 15.0	1853	1865	1877	1888	1900	1910	1918	1925	1929	1930	1928	1923	1913	1898	1879	1854	1823	1554	1502	-1485	-1510
JD 2444760.5	-772	-722	-668	-609	-548	-485	-420	-355	-291	-230	-173	-121	-77	-41	-15	-1	10	72	137	185	217
1981 JUN 5.0	1843	1855	1867	1878	1888	1897	1905	1910	1912	1911	1907	1899	1886	1869	1846	1818	1559	1504	1474	-1485	-1540
JD 2444750.5	-742	-690	-634	-574	-512	-448	-383	-319	-256	-197	-143	-95	-55	-25	-5	0	41	108	161	197	222
1981 MAY 26.0	1834	1846	1857	1868	1877	1885	1890	1894	1894	1891	1885	1874	1858	1838	1812	1557	1508	1467	-1464	-1506	-1596
JD 2444740.5	-711	-657	-599	-538	-474	-410	-346	-283	-222	-166	-115	-72	-37	-12	-0	16	78	137	177	204	222
1981 MAY 16.0	1826	1837	1848	1857	1865	1872	1876	1877	1876	1870	1861	1847	1829	1805	1776	1512	1464	-1448	-1478	-1554	-1690
JD 2444730.5	-678	-622	-562	-500	-436	-372	-309	-247	-189	-136	-89	-50	-21	-4	2	50	111	157	187	206	218
1981 MAY 6.0	1817	1828	1838	1846	1853	1858	1860	1860	1856	1848	1836	1820	1798	1771	1512	1464	1438	-1454	-1517	-1637	-1844
JD 2444720.5	-644	-586	-525	-462	-398	-334	-272	-212	-157	-107	-65	-32	-9	0	25	85	136	170	191	204	211
1981 APR 26.0	1809	1819	1828	1835	1841	1844	1844	1841	1835	1825	1810	1790	1765	1735	1467	1431	-1434	-1486	-1591	-1775	-2106
JD 2444710.5	-608	-549	-486	-423	-359	-296	-235	-178	-126	-81	-44	-17	-2	7	60	114	152	176	191	199	202
1981 APR 16.0	1801	1810	1817	1824	1827	1829	1827	1822	1813	1800	1782	1759	1731	1468	1427	-1419	-1458	-1550	-1715	-2010	-2603
JD 2444700.5	-572	-510	-448	-384	-321	-259	-200	-146	-98	-58	-26	-6	1	36	92	133	160	177	186	190	190
1981 APR 6.0	1792	1800	1807	1811	1814	1813	1809	1801	1790	1773	1752	1726	1465	1427	-1408	-1435	-1515	-1663	-1927	-2449	-3813
JD 2444690.5	-534	-472	-408	-345	-282	-222	-166	-116	-72	-37	-13	-0	16	69	114	144	163	173	179	179	176
1981 MAR 27.0	1783	1790	1796	1799	1799	1796	1790	1780	1765	1746	1721	1692	1428	1401	-1417	-1485	-1617	-1856	-2320	-3478	-9999
JD 2444680.5	-495	-432	-369	-306	-245	-187	-134	-88	-49	-21	-3	4	47	95	128	149	161	167	168	166	160
1981 MAR 17.0	1774	1780	1784	1785	1783	1778	1769	1756	1739	1716	1688	1428	1398	-1402	-1459	-1578	-1795	-2212	-3214	-8172	-9999

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E11

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	160	153	147	141	135	130	125	120	115	111	107	103	100	97	94	91	89	87	3416	999	676
1981 JUL 15.0	249	241	233	225	217	210	203	196	189	183	176	170	165	159	154	149	144	140	289	282	273
JD 2444790.5	157	150	144	138	133	127	122	117	113	109	105	101	98	95	92	90	88	86	1459	789	609
1981 JUL 5.0	243	235	227	220	212	205	198	191	184	178	172	166	160	155	150	145	140	136	284	275	265
JD 2444780.5	153	147	141	135	130	124	119	115	110	106	103	99	96	93	91	88	86	3059	981	680	567
1981 JUN 25.0	238	230	222	214	207	200	193	186	179	173	167	161	156	150	145	141	136	285	278	268	258
JD 2444770.5	150	144	138	132	127	122	117	112	108	104	101	97	94	91	89	87	85	1372	782	616	538
1981 JUN 15.0	232	224	217	209	202	195	188	181	175	168	162	157	151	146	141	136	132	279	271	260	249
JD 2444760.5	146	140	135	129	124	119	114	110	106	102	98	95	92	90	87	85	2527	947	679	575	518
1981 JUN 5.0	227	219	211	204	196	189	183	176	170	164	158	152	147	142	137	132	281	273	263	252	241
JD 2444750.5	143	137	131	126	121	116	111	107	103	100	96	93	90	88	86	9999	1257	769	620	548	503
1981 MAY 26.0	221	213	206	198	191	184	177	171	165	159	153	148	142	137	133	282	275	265	255	243	232
JD 2444740.5	140	134	128	123	118	113	109	105	101	97	94	91	89	86	84	2016	905	678	583	529	491
1981 MAY 16.0	215	207	200	193	186	179	172	166	160	154	148	143	138	133	128	276	268	257	246	234	222
JD 2444730.5	136	130	125	120	115	110	106	102	99	95	92	89	87	84	5942	1139	755	625	558	515	483
1981 MAY 6.0	209	202	194	187	180	174	167	161	155	149	144	138	133	129	277	269	260	249	237	225	213
JD 2444720.5	133	127	122	117	112	108	104	100	96	93	90	87	85	83	1620	865	676	592	542	506	477
1981 APR 26.0	204	196	189	182	175	168	162	156	150	144	139	134	129	124	271	262	251	239	228	215	203
JD 2444710.5	129	124	119	114	109	105	101	97	94	91	88	85	83	3057	1037	743	631	571	530	499	473
1981 APR 16.0	198	191	183	176	170	163	157	151	145	140	134	129	124	272	264	253	242	230	218	205	193
JD 2444700.5	126	121	115	111	106	102	98	95	91	88	86	83	9999	1345	832	678	603	556	522	495	471
1981 APR 6.0	192	185	178	171	164	158	152	146	140	135	130	125	273	265	255	244	232	220	208	195	182
JD 2444690.5	122	117	112	108	103	99	96	92	89	86	84	81	2020	962	737	641	586	547	517	493	472
1981 MAR 27.0	186	179	172	165	159	153	147	141	135	130	125	120	267	257	246	235	222	210	197	184	171
JD 2444680.5	119	114	109	105	100	97	93	90	87	84	81	4267	1169	813	686	618	575	542	516	494	475
1981 MAR 17.0	180	173	167	160	154	147	142	136	130	125	120	267	259	248	237	225	212	199	186	173	159

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20 E11

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5 1981 JUL 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444790.5 1981 JUL 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444780.5 1981 JUN 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444770.5 1981 JUN 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444760.5 1981 JUN 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444750.5 1981 MAY 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444740.5 1981 MAY 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444730.5 1981 MAY 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444720.5 1981 APR 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444710.5 1981 APR 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444700.5 1981 APR 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444690.5 1981 MAR 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444680.5 1981 MAR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E11

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	668	726	814	914	1027	1152	1288	1436	1595	1766	1946	2137	2338	2547	2763	2985	3211	3441	3179	2567	2152
1981 JUL 15.0	865	889	937	995	1060	1133	1214	1302	1398	1501	1611	1729	1853	1984	2120	2262	2409	2561	2209	1663	1258
JD 2444790.5	683	763	858	964	1082	1212	1353	1505	1669	1844	2029	2224	2429	2641	2861	3086	3315	3548	2817	2308	2007
1981 JUL 5.0	870	914	969	1031	1101	1179	1263	1356	1456	1564	1678	1800	1929	2064	2205	2351	2502	2657	1916	1434	1124
JD 2444780.5	718	806	906	1018	1140	1275	1421	1578	1747	1926	2116	2315	2523	2739	2962	3191	3423	3098	2498	2114	1914
1981 JUN 25.0	891	943	1002	1069	1144	1226	1315	1413	1517	1629	1749	1875	2008	2147	2292	2443	2598	2192	1642	1256	1045
JD 2444770.5	759	853	958	1074	1202	1341	1492	1654	1828	2011	2205	2409	2621	2841	3068	3299	3535	2726	2248	1984	1869
1981 JUN 15.0	916	973	1038	1110	1189	1276	1370	1472	1581	1698	1822	1953	2091	2234	2384	2538	2698	1881	1415	1137	1023
JD 2444760.5	804	903	1013	1134	1267	1412	1567	1734	1912	2101	2299	2507	2723	2947	3177	3412	2987	2413	2071	1911	1868
1981 JUN 5.0	944	1006	1075	1152	1236	1327	1426	1533	1648	1769	1898	2034	2176	2325	2479	2638	2145	1603	1251	1083	1061
JD 2444750.5	852	957	1072	1198	1336	1485	1646	1818	2001	2194	2397	2609	2829	3057	3290	3265	2613	2181	1965	1890	1908
1981 MAY 26.0	974	1041	1115	1196	1285	1381	1486	1597	1717	1843	1977	2118	2265	2419	2578	2420	1821	1388	1159	1096	1155
JD 2444740.5	904	1014	1134	1265	1409	1563	1729	1906	2093	2291	2499	2715	2939	3171	3408	2848	2318	2033	1919	1915	1988
1981 MAY 16.0	1006	1077	1156	1242	1336	1438	1547	1664	1788	1920	2059	2205	2358	2516	2681	2066	1551	1252	1142	1172	1303
JD 2444730.5	960	1074	1199	1336	1485	1644	1815	1997	2190	2392	2604	2825	3054	3290	3105	2487	2119	1958	1928	1986	2112
1981 MAY 6.0	1039	1115	1199	1290	1389	1496	1610	1733	1863	2000	2144	2296	2454	2618	2328	1742	1364	1200	1197	1309	1505
JD 2444720.5	1018	1138	1269	1411	1565	1730	1906	2093	2290	2498	2715	2940	3173	3414	2689	2227	2008	1947	1987	2103	2285
1981 APR 26.0	1073	1154	1243	1340	1444	1556	1676	1804	1940	2082	2232	2390	2554	2724	1960	1498	1272	1231	1320	1503	1762
JD 2444710.5	1080	1205	1342	1489	1648	1819	2000	2193	2395	2608	2830	3060	3298	2919	2363	2073	1973	1993	2096	2271	2517
1981 APR 16.0	1109	1195	1289	1391	1501	1619	1744	1878	2019	2168	2324	2487	2658	2199	1656	1359	1274	1338	1507	1757	2081
JD 2444700.5	1145	1276	1418	1571	1736	1912	2099	2297	2505	2722	2949	3185	3163	2529	2156	2010	2004	2093	2258	2498	2820
1981 APR 6.0	1146	1237	1336	1444	1559	1683	1814	1954	2101	2256	2418	2588	2446	1840	1464	1328	1363	1516	1756	2074	2473
JD 2444690.5	1214	1350	1498	1657	1828	2009	2202	2405	2619	2842	3075	3316	2725	2262	2058	2022	2095	2250	2483	2799	3215
1981 MAR 27.0	1183	1280	1385	1498	1620	1749	1887	2032	2186	2347	2517	2694	2046	1588	1393	1395	1529	1760	2071	2465	2957
JD 2444680.5	1286	1428	1582	1747	1923	2111	2309	2518	2738	2967	3206	2942	2393	2121	2049	2102	2245	2470	2781	3192	3731
1981 MAR 17.0	1222	1325	1435	1554	1682	1817	1961	2113	2273	2442	2619	2268	1733	1471	1434	1548	1767	2073	2463	2950	3562

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E11

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444800.5	1533	1615	1751	1909	2088	2285	2502	2738	2993	3266	3558	3866	4191	4530	4883	5247	5621	6002	5388	4229	3410
1981 JUL 15.0	1722	1627	1532	1436	1341	1245	1150	1054	957	860	763	665	567	468	368	268	167	67	3564	3463	3361
JD 2444790.5	1553	1678	1827	1995	2183	2390	2616	2861	3125	3408	3708	4025	4358	4705	5065	5437	5817	6205	4733	3742	3131
1981 JUL 5.0	1670	1574	1479	1384	1288	1193	1097	1001	905	808	710	613	514	415	316	215	115	15	3512	3411	3309
JD 2444780.5	1609	1749	1908	2087	2284	2501	2736	2991	3264	3555	3864	4190	4531	4887	5255	5633	6021	5290	4140	3370	2959
1981 JUN 25.0	1617	1521	1426	1330	1235	1139	1044	948	851	754	657	559	461	362	262	162	61	3560	3459	3357	3255
JD 2444770.5	1675	1826	1996	2184	2391	2617	2862	3126	3409	3709	4028	4362	4712	5075	5451	5838	6233	4607	3662	3121	2893
1981 JUN 15.0	1562	1467	1371	1276	1181	1085	989	893	797	700	603	505	406	307	208	108	7	3506	3405	3303	3201
JD 2444760.5	1748	1909	2088	2286	2503	2739	2994	3268	3560	3870	4197	4541	4899	5272	5656	6050	5132	4016	3322	2995	2929
1981 JUN 5.0	1507	1411	1316	1221	1125	1030	934	838	742	645	547	449	351	252	152	52	3552	3451	3349	3248	3146
JD 2444750.5	1827	1997	2186	2394	2621	2867	3132	3415	3717	4037	4374	4727	5095	5475	5868	5685	4435	3569	3124	2986	3062
1981 MAY 26.0	1451	1355	1260	1164	1069	973	878	782	685	588	491	393	295	196	96	3596	3495	3394	3293	3191	3089
JD 2444740.5	1910	2091	2290	2508	2745	3001	3276	3569	3882	4211	4558	4920	5297	5687	6089	4914	3869	3284	3061	3087	3291
1981 MAY 16.0	1393	1298	1203	1107	1012	916	821	724	628	531	434	336	238	139	39	3539	3438	3337	3236	3134	3032
JD 2444730.5	1999	2189	2398	2626	2874	3140	3426	3730	4052	4392	4749	5121	5508	5908	5433	4229	3483	3158	3125	3294	3617
1981 MAY 6.0	1335	1240	1144	1049	954	858	762	666	570	473	376	278	179	80	3580	3481	3380	3279	3178	3076	2974
JD 2444720.5	2091	2292	2512	2751	3009	3286	3582	3897	4230	4580	4947	5330	5727	6138	4649	3725	3280	3178	3307	3606	4047
1981 APR 26.0	1276	1181	1085	990	895	799	703	607	511	414	317	219	121	22	3521	3421	3321	3220	3119	3017	2915
JD 2444710.5	2189	2400	2631	2880	3149	3437	3745	4070	4414	4776	5153	5547	5956	5118	4020	3432	3248	3331	3603	4027	4597
1981 APR 16.0	1216	1121	1025	930	835	739	643	547	451	354	257	159	61	3560	3462	3362	3261	3160	3059	2957	2855
JD 2444700.5	2291	2513	2754	3015	3295	3595	3913	4250	4606	4978	5368	5773	5609	4369	3620	3338	3367	3608	4014	4572	5292
1981 APR 6.0	1156	1060	965	869	774	679	583	487	390	294	196	99	3589	3500	3401	3301	3200	3099	2998	2896	2794
JD 2444690.5	2397	2631	2883	3156	3447	3758	4089	4437	4804	5189	5591	6010	4771	3850	3451	3417	3624	4009	4554	5264	6171
1981 MAR 27.0	1094	999	903	808	713	617	521	425	329	232	135	39	3537	3439	3339	3239	3139	3038	2937	2835	2733
JD 2444680.5	2508	2753	3017	3301	3605	3928	4270	4631	5011	5409	5825	5211	4126	3592	3484	3650	4013	4543	5243	6142	7293
1981 MAR 17.0	1032	937	841	746	651	555	459	364	267	171	74	3571	3476	3377	3277	3177	3077	2976	2875	2773	2671

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E12

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444700.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671705	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.618	DEGREES
MEAN ANOM. AT EPOCH	=	91.584	DEGREES
DATE OF NODAL PASSAGE	=	2444870.620	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444700.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338816	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.413	DEGREES
ARG. OF PERIHELION	=	286.301	DEGREES
MEAN ANOM. AT EPOCH	=	32.726	DEGREES
DATE OF NODAL PASSAGE	=	2444759.491	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.066	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E12

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5	911	826	787	777	790	820	866	928	1008	1107	1231	1386	1583	1840	2184	0	0	0	0	0	0
1981 JUL 15.0	508	422	386	389	423	478	552	641	746	870	1018	1196	1415	1694	2059	0	0	0	0	0	0
JD 2444790.5	858	803	785	793	820	864	925	1003	1102	1225	1380	1578	1835	2180	0	0	0	0	0	0	0
1981 JUL 5.0	461	406	397	422	473	543	631	735	858	1005	1183	1401	1680	2046	0	0	0	0	0	0	0
JD 2444780.5	824	795	796	819	861	920	998	1096	1219	1374	1571	1829	2174	0	0	0	0	0	0	0	0
1981 JUN 25.0	432	409	424	469	536	621	724	846	993	1169	1388	1666	2032	0	0	0	0	0	0	0	0
JD 2444770.5	807	801	819	858	915	991	1089	1211	1366	1563	1820	2165	0	0	0	0	0	0	0	0	0
1981 JUN 15.0	425	430	467	530	613	714	835	981	1157	1375	1652	2017	0	0	0	0	0	0	0	0	0
JD 2444760.5	807	820	855	910	985	1081	1203	1356	1553	1810	2155	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0	438	468	526	606	705	825	969	1144	1361	1638	2001	0	0	0	0	0	0	0	0	0	0
JD 2444750.5	822	853	905	978	1073	1194	1347	1543	1799	2143	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0	472	524	600	697	816	959	1133	1349	1624	1986	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5	851	901	971	1065	1184	1336	1532	1786	2130	0	0	0	0	0	0	0	0	0	0	0	2132
1981 MAY 16.0	524	596	691	808	950	1122	1337	1611	1972	0	0	0	0	0	0	0	0	0	0	0	2089
JD 2444730.5	896	965	1057	1175	1326	1520	1774	2116	0	0	0	0	0	0	0	0	0	0	0	2118	1777
1981 MAY 6.0	594	686	801	941	1113	1327	1599	1958	0	0	0	0	0	0	0	0	0	0	0	2081	1717
JD 2444720.5	959	1049	1166	1316	1509	1761	2102	0	0	0	0	0	0	0	0	0	0	0	0	2104	1765	1514
1981 APR 26.0	683	796	935	1105	1317	1588	1946	0	0	0	0	0	0	0	0	0	0	0	0	2072	1711	1437
JD 2444710.5	1041	1157	1306	1497	1748	2088	0	0	0	0	0	0	0	0	0	0	0	0	2091	1753	1503	1312
1981 APR 16.0	792	929	1099	1309	1578	1935	0	0	0	0	0	0	0	0	0	0	0	0	2062	1703	1432	1217
JD 2444700.5	1149	1296	1486	1736	2074	0	0	0	0	0	0	0	0	0	0	0	0	2078	1741	1492	1301	1153
1981 APR 6.0	926	1094	1303	1571	1925	0	0	0	0	0	0	0	0	0	0	0	0	2051	1695	1425	1213	1040
JD 2444690.5	1287	1476	1725	2061	0	0	0	0	0	0	0	0	0	0	0	0	2066	1730	1481	1291	1143	1027
1981 MAR 27.0	1090	1298	1565	1917	0	0	0	0	0	0	0	0	0	0	0	0	2040	1686	1418	1207	1036	895
JD 2444680.5	1467	1714	2049	0	0	0	0	0	0	0	0	0	0	0	0	2055	1720	1472	1282	1134	1018	927
1981 MAR 17.0	1295	1560	1911	0	0	0	0	0	0	0	0	0	0	0	0	2028	1677	1410	1201	1031	891	773
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(.0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5
1980 DEC 27.0

JD2444640.5
1981 FEB 5.0

JD2444680.5
1981 MAR 17.0

JD2444720.5
1981 APR 26.0

JD2444760.5
1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E12

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5	-188	-169	-146	-119	-90	-60	-29	2	33	64	94	121	146	168	185	0	0	0	0	0	0
1981 JUL 15.0	3117	3184	3256	3329	3402	3474	3546	18	91	164	239	314	391	469	549	0	0	0	0	0	0
JD 2444790.5	-190	-170	-146	-120	-91	-61	-31	0	31	62	92	120	145	167	0	0	0	0	0	0	0
1981 JUL 5.0	3102	3173	3247	3320	3393	3466	3538	10	83	156	230	306	383	461	0	0	0	0	0	0	0
JD 2444780.5	-190	-170	-147	-121	-93	-63	-33	-1	29	60	90	118	144	0	0	0	0	0	0	0	0
1981 JUN 25.0	3089	3163	3237	3311	3384	3457	3529	2	74	148	222	297	374	0	0	0	0	0	0	0	0
JD 2444770.5	-191	-171	-148	-123	-95	-66	-35	-4	27	58	88	117	0	0	0	0	0	0	0	0	0
1981 JUN 15.0	3077	3152	3227	3301	3374	3447	3520	3592	65	139	213	288	0	0	0	0	0	0	0	0	0
JD 2444760.5	-191	-172	-150	-125	-98	-68	-38	-7	24	55	86	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0	3066	3141	3216	3291	3364	3437	3510	3583	56	130	204	0	0	0	0	0	0	0	0	0	0
JD 2444750.5	-192	-174	-152	-127	-101	-72	-41	-10	21	53	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0	3054	3130	3205	3279	3353	3427	3500	3573	46	120	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5	-193	-176	-155	-130	-104	-75	-45	-13	18	0	0	0	0	0	0	0	0	0	0	0	-231
1981 MAY 16.0	3041	3117	3192	3267	3342	3416	3489	3563	37	0	0	0	0	0	0	0	0	0	0	0	2803
JD 2444730.5	-195	-178	-158	-134	-108	-79	-48	-17	0	0	0	0	0	0	0	0	0	0	0	-235	-233
1981 MAY 6.0	3027	3103	3179	3255	3330	3404	3479	3553	0	0	0	0	0	0	0	0	0	0	0	2705	2786
JD 2444720.5	-197	-181	-161	-138	-112	-83	-53	0	0	0	0	0	0	0	0	0	0	0	-233	-236	-235
1981 APR 26.0	3012	3089	3165	3242	3317	3393	3467	0	0	0	0	0	0		0	0	0	0	2607	2688	2768
JD 2444710.5	-200	-184	-165	-142	-116	-87	0	0	0	0	0	0	0	0	0	0	0	-225	-233	-237	-237
1981 APR 16.0	2996	3073	3151	3228	3305	3381	0	0	0	0	0	0	0	0	0	0	0	2510	2591	2671	2750
JD 2444700.5	-203	-188	-169	-146	-120	0	0	0	0	0	0	0	0	0	0	0	-211	-224	-233	-238	-239
1981 APR 6.0	2979	3058	3136	3214	3292	0	0	0	0	0	0	0	0	0	0	0	2414	2494	2574	2653	2732
JD 2444690.5	-206	-191	-173	-151	0	0	0	0	0	0	0	0	0	0	0	-192	-209	-223	-233	-239	-241
1981 MAR 27.0	2962	3041	3121	3200	0	0	0	0	0	0	0	0	0	0	0	2319	2398	2478	2557	2636	2713
JD 2444680.5	-209	-195	-177	0	0	0	0	0	0	0	0	0	0	0	0	-168	-190	-208	-222	-233	-240	-243
1981 MAR 17.0	2944	3025	3105	0	0	0	0	0	0	0	0	0	0	0	0	2227	2305	2383	2461	2540	2618	2694
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20 E12

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5	168	191	210	214	205	189	173	158	145	133	122	113	105	97	91	0	0	0	0	0	0
1981 JUL 15.0	507	632	793	958	1100	1212	1297	1362	1414	1456	1491	1521	1547	1571	1594	0	0	0	0	0	0
JD 2444790.5	174	200	215	215	205	191	177	165	153	143	134	126	118	111	0	0	0	0	0	0	0
1981 JUL 5.0	532	681	847	999	1122	1216	1288	1344	1390	1427	1459	1487	1512	1536	0	0	0	0	0	0	0
JD 2444780.5	184	209	219	216	206	194	183	172	163	154	146	138	131	0	0	0	0	0	0	0	0
1981 JUN 25.0	574	737	895	1027	1131	1210	1272	1322	1362	1396	1426	1452	1476	0	0	0	0	0	0	0	0
JD 2444770.5	196	216	221	217	209	199	190	181	173	165	158	151	0	0	0	0	0	0	0	0	0
1981 JUN 15.0	628	789	930	1043	1130	1197	1251	1294	1331	1362	1390	1414	0	0	0	0	0	0	0	0	0
JD 2444760.5	207	221	223	219	212	204	197	189	182	176	170	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0	684	831	952	1046	1119	1177	1224	1263	1296	1325	1351	0	0	0	0	0	0	0	0	0	0
JD 2444750.5	215	225	226	222	216	210	204	198	192	187	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0	731	859	960	1039	1101	1152	1193	1229	1259	1286	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5	221	228	228	225	221	216	211	206	202	0	0	0	0	0	0	0	0	0	0	0	-141
1981 MAY 16.0	765	872	957	1023	1077	1121	1159	1191	1219	0	0	0	0	0	0	0	0	0	0	0	3264
JD 2444730.5	225	230	230	228	225	222	218	214	0	0	0	0	0	0	0	0	0	0	0	-161	-153
1981 MAY 6.0	783	873	944	1001	1048	1087	1121	1150	0	0	0	0	0	0	0	0	0	0	0	3204	3231
JD 2444720.5	227	231	232	231	229	227	224	0	0	0	0	0	0	0	0	0	0	0	0	-179	-172	-164
1981 APR 26.0	788	863	923	972	1013	1049	1080	0	0	0	0	0	0	0	0	0	0	0	0	3142	3169	3199
JD 2444710.5	228	232	233	233	233	231	0	0	0	0	0	0	0	0	0	0	0	0	-195	-190	-183	-174
1981 APR 16.0	781	844	896	939	976	1008	0	0	0	0	0	0	0	0	0	0	0	0	3078	3105	3135	3169
JD 2444700.5	228	232	234	235	235	0	0	0	0	0	0	0	0	0	0	0	0	-210	-205	-199	-192	-183
1981 APR 6.0	765	818	863	901	935	0	0	0	0	0	0	0	0	0	0	0	0	3011	3039	3069	3103	3142
JD 2444690.5	227	231	234	235	0	0	0	0	0	0	0	0	0	0	0	0	-221	-218	-213	-208	-201	-191
1981 MAR 27.0	741	787	826	861	0	0	0	0	0	0	0	0	0	0	0	0	2943	2971	3001	3035	3074	3120
JD 2444680.5	224	229	232	0	0	0	0	0	0	0	0	0	0	0	0	-230	-228	-225	-221	-215	-208	-197
1981 MAR 17.0	712	752	787	0	0	0	0	0	0	0	0	0	0	0	0	2873	2900	2931	2965	3004	3050	3104
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E12

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5 1981 JUL 15.0	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	0	0	0	0	0	0
JD 2444790.5 1981 JUL 5.0	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	0	0	0	0	0	0	0
JD 2444780.5 1981 JUN 25.0	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	0	0	0	0	0	0	0	0
JD 2444770.5 1981 JUN 15.0	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	0	0	0	0	0	0	0	0	0
JD 2444760.5 1981 JUN 5.0	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	0	0	0	0	0	0	0	0	0	0
JD 2444750.5 1981 MAY 26.0	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5 1981 MAY 16.0	2435	2435	2435	2435	2435	2435	2435	2435	2435	0	0	0	0	0	0	0	0	0	0	0	2435
JD 2444730.5 1981 MAY 6.0	2432	2432	2432	2432	2432	2432	2432	2432	0	0	0	0	0	0	0	0	0	0	0	2432	2432
JD 2444720.5 1981 APR 26.0	2426	2426	2426	2426	2426	2426	2426	0	0	0	0	0	0	0	0	0	0	0	2426	2426	2426
JD 2444710.5 1981 APR 16.0	2418	2418	2418	2418	2418	2418	0	0	0	0	0	0	0	0	0	0	0	2418	2418	2418	2418
JD 2444700.5 1981 APR 6.0	2409	2409	2409	2409	2409	0	0	0	0	0	0	0	0	0	0	0	2409	2409	2409	2409	2409
JD 2444690.5 1981 MAR 27.0	2398	2398	2398	2398	0	0	0	0	0	0	0	0	0	0	0	2398	2398	2398	2398	2398	2398
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	0	0	0	0	0	0	0	0	0	0	0	2386	2386	2386	2386	2386	2386	2386
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E12

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	0	0	0	0	0	0
1981 JUL 15.0	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	0	0	0	0	0	0
JD 2444790.5	146	146	146	146	146	146	146	146	146	146	146	146	146	146	0	0	0	0	0	0	0
1981 JUL 5.0	220	220	220	220	220	220	220	220	220	220	220	220	220	220	0	0	0	0	0	0	0
JD 2444780.5	130	130	130	130	130	130	130	130	130	130	130	130	130	0	0	0	0	0	0	0	0
1981 JUN 25.0	194	194	194	194	194	194	194	194	194	194	194	194	194	0	0	0	0	0	0	0	0
JD 2444770.5	114	114	114	114	114	114	114	114	114	114	114	114	0	0	0	0	0	0	0	0	0
1981 JUN 15.0	169	169	169	169	169	169	169	169	169	169	169	169	0	0	0	0	0	0	0	0	0
JD 2444760.5	99	99	99	99	99	99	99	99	99	99	99	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0	144	144	144	144	144	144	144	144	144	144	144	0	0	0	0	0	0	0	0	0	0
JD 2444750.5	83	83	83	83	83	83	83	83	83	83	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0	120	120	120	120	120	120	120	120	120	120	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5	67	67	67	67	67	67	67	67	67	0	0	0	0	0	0	0	0	0	0	0	67
1981 MAY 16.0	97	97	97	97	97	97	97	97	97	0	0	0	0	0	0	0	0	0	0	0	97
JD 2444730.5	52	52	52	52	52	52	52	52	0	0	0	0	0	0	0	0	0	0	0	52	52
1981 MAY 6.0	74	74	74	74	74	74	74	74	0	0	0	0	0	0	0	0	0	0	0	74	74
JD 2444720.5	36	36	36	36	36	36	36	0	0	0	0	0	0	0	0	0	0	0	36	36	36
1981 APR 26.0	52	52	52	52	52	52	52	0	0	0	0	0	0	0	0	0	0	0	52	52	52
JD 2444710.5	21	21	21	21	21	21	0	0	0	0	0	0	0	0	0	0	0	21	21	21	21
1981 APR 16.0	30	30	30	30	30	30	0	0	0	0	0	0	0	0	0	0	0	30	30	30	30
JD 2444700.5	7	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0	7	7	7	7	7
1981 APR 6.0	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	10
JD 2444690.5	11	11	11	11	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	11	11
1981 MAR 27.0	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	16	16	16	16	16	16
JD 2444680.5	26	26	26	0	0	0	0	0	0	0	0	0	0	0	26	26	26	26	26	26	26
1981 MAR 17.0	37	37	37	0	0	0	0	0	0	0	0	0	0	0	37	37	37	37	37	37	37
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

H20
E12

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5	3361	3259	3158	3056	2954	2853	2752	2652	2552	2453	2354	2256	2159	2062	1965	0	0	0	0	0	0
1981 JUL 15.0	-1525	-1465	-1419	-1378	-1340	-1302	-1264	-1226	-1187	-1147	-1107	-1066	-1025	-983	-940	0	0	0	0	0	0
JD 2444790.5	3309	3207	3105	3003	2902	2801	2700	2599	2500	2400	2302	2204	2106	2009	0	0	0	0	0	0	0
1981 JUL 5.0	-1498	-1447	-1405	-1366	-1328	-1290	-1251	-1212	-1172	-1131	-1090	-1049	-1007	-964	0	0	0	0	0	0	0
JD 2444780.5	3255	3153	3052	2950	2848	2747	2646	2546	2446	2347	2248	2150	2053	0	0	0	0	0	0	0	0
1981 JUN 25.0	-1477	-1432	-1392	-1354	-1315	-1276	-1237	-1197	-1156	-1115	-1073	-1031	-988	0	0	0	0	0	0	0	0
JD 2444770.5	3201	3099	2997	2895	2794	2693	2592	2492	2392	2293	2194	2096	0	0	0	0	0	0	0	0	0
1981 JUN 15.0	-1459	-1418	-1379	-1340	-1301	-1261	-1221	-1180	-1139	-1097	-1054	-1011	0	0	0	0	0	0	0	0	0
JD 2444760.5	3146	3044	2942	2840	2739	2637	2537	2436	2337	2237	2139	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0	-1444	-1404	-1365	-1326	-1286	-1245	-1204	-1162	-1120	-1077	-1034	0	0	0	0	0	0	0	0	0	0
JD 2444750.5	3089	2988	2886	2784	2682	2581	2480	2380	2280	2181	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0	-1429	-1390	-1350	-1310	-1269	-1228	-1186	-1143	-1100	-1057	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5	3032	2930	2828	2727	2625	2524	2423	2323	2223	0	0	0	0	0	0	0	0	0	0	0	2538
1981 MAY 16.0	-1414	-1374	-1334	-1293	-1251	-1209	-1166	-1123	-1079	0	0	0	0	0	0	0	0	0	0	0	-1289
JD 2444730.5	2974	2872	2770	2669	2567	2466	2365	2265	0	0	0	0	0	0	0	0	0	0	0	2501	2596
1981 MAY 6.0	-1398	-1357	-1316	-1274	-1232	-1189	-1145	-1101	0	0	0	0	0	0	0	0	0	0	0	-1271	-1324
JD 2444720.5	2915	2813	2711	2610	2508	2407	2306	0	0	0	0	0	0	0	0	0	0	0	2465	2560	2655
1981 APR 26.0	-1381	-1339	-1297	-1254	-1211	-1167	-1123	0	0	0	0	0	0	0	0	0	0	0	-1254	-1307	-1360
JD 2444710.5	2855	2753	2651	2550	2448	2347	0	0	0	0	0	0	0	0	0	0	0	2429	2524	2620	2715
1981 APR 16.0	-1362	-1320	-1277	-1233	-1189	-1145	0	0	0	0	0	0	0	0	0	0	0	-1237	-1290	-1343	-1397
JD 2444700.5	2794	2693	2591	2489	2387	0	0	0	0	0	0	0	0	0	0	0	2394	2490	2585	2680	2776
1981 APR 6.0	-1342	-1299	-1255	-1211	-1166	0	0	0	0	0	0	0	0	0	0	0	-1220	-1273	-1326	-1380	-1435
JD 2444690.5	2733	2631	2529	2428	0	0	0	0	0	0	0	0	0	0	0	2360	2456	2551	2647	2742	2837
1981 MAR 27.0	-1320	-1276	-1232	-1187	0	0	0	0	0	0	0	0	0	0	0	-1203	-1256	-1310	-1364	-1419	-1474
JD 2444680.5	2671	2569	2467	0	0	0	0	0	0	0	0	0	0	0	2326	2422	2518	2613	2709	2804	2899
1981 MAR 17.0	-1297	-1253	-1208	0	0	0	0	0	0	0	0	0	0	0	-1187	-1240	-1294	-1348	-1403	-1458	-1514
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5	JD2444640.5	JD2444680.5	JD2444720.5	JD2444760.5
1980 DEC 27.0	1981 FEB 5.0	1981 MAR 17.0	1981 APR 26.0	1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E12

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5	172	124	100	86	77	72	70	70	72	77	85	98	119	158	245	0	0	0	0	0	0
1981 JUL 15.0	834	769	730	712	710	723	749	789	845	921	1023	1160	1348	1617	2023	0	0	0	0	0	0
JD 2444790.5	110	85	71	62	57	55	54	55	57	62	70	83	106	151	0	0	0	0	0	0	0
1981 JUL 5.0	799	751	725	718	727	749	785	837	908	1004	1132	1308	1559	1932	0	0	0	0	0	0	0
JD 2444780.5	65	53	45	41	38	37	37	38	41	45	52	64	87	0	0	0	0	0	0	0	0
1981 JUN 25.0	774	741	728	732	750	783	831	897	986	1107	1271	1504	1848	0	0	0	0	0	0	0	0
JD 2444770.5	31	26	23	21	20	20	20	21	23	26	31	40	0	0	0	0	0	0	0	0	0
1981 JUN 15.0	759	740	739	753	781	825	887	970	1083	1237	1453	1770	0	0	0	0	0	0	0	0	0
JD 2444760.5	2	2	2	2	2	2	2	2	2	3	3	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0	753	747	757	781	821	878	956	1061	1205	1406	1699	0	0	0	0	0	0	0	0	0	0
JD 2444750.5	21	19	17	16	16	17	18	19	22	26	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0	756	762	782	818	871	944	1042	1177	1364	1633	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5	41	38	36	35	35	36	39	44	51	0	0	0	0	0	0	0	0	0	0	0	36
1981 MAY 16.0	768	785	817	865	933	1025	1150	1324	1574	0	0	0	0	0	0	0	0	0	0	0	1298
JD 2444730.5	60	55	53	53	54	58	63	73	0	0	0	0	0	0	0	0	0	0	0	56	54
1981 MAY 6.0	789	816	860	923	1009	1127	1289	1519	0	0	0	0	0	0	0	0	0	0	0	1321	1173
JD 2444720.5	76	72	71	72	75	81	92	0	0	0	0	0	0	0	0	0	0	0	77	73	71
1981 APR 26.0	818	858	916	996	1105	1257	1470	0	0	0	0	0	0	0	0	0	0	0	1345	1187	1071
JD 2444710.5	92	89	89	91	98	108	0	0	0	0	0	0	0	0	0	0	0	99	93	89	88
1981 APR 16.0	856	910	984	1087	1227	1425	0	0	0	0	0	0	0	0	0	0	0	1369	1201	1078	986
JD 2444700.5	106	105	107	113	123	0	0	0	0	0	0	0	0	0	0	0	122	112	107	105	106
1981 APR 6.0	905	975	1070	1201	1385	0	0	0	0	0	0	0	0	0	0	0	1394	1215	1085	988	916
JD 2444690.5	121	122	126	136	0	0	0	0	0	0	0	0	0	0	0	146	133	125	121	121	124
1981 MAR 27.0	967	1056	1178	1348	0	0	0	0	0	0	0	0	0	0	0	1420	1230	1092	991	915	858
JD 2444680.5	135	139	147	0	0	0	0	0	0	0	0	0	0	0	170	153	142	137	135	137	144
1981 MAR 17.0	1043	1157	1316	0	0	0	0	0	0	0	0	0	0	0	1447	1245	1100	994	914	854	810
(FLT T)	(80)	(70)	(60)	(50)	(-40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E12

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5		139	199	242	271	292	305	314	319	320	319	315	310	303	295	286	0	0	0	0	0	0
1981 JUL 15.0		1539	-1524	-1548	-1611	-1720	-1896	-2184	-2700	-3815	-7777	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0
JD 2444790.5		169	217	250	273	289	298	303	305	304	301	295	288	279	268	0	0	0	0	0	0	0
1981 JUL 5.0		1513	-1523	-1573	-1667	-1823	-2077	-2523	-3450	-6345	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0
JD 2444780.5		191	229	255	272	283	289	291	290	287	281	273	264	252	0	0	0	0	0	0	0	0
1981 JUN 25.0		-1502	-1539	-1620	-1756	-1981	-2369	-3148	-5345	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0
JD 2444770.5		207	236	255	267	274	277	277	273	268	260	249	237	0	0	0	0	0	0	0	0	0
1981 JUN 15.0		-1510	-1577	-1697	-1895	-2235	-2895	-4614	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0
JD 2444760.5		217	238	252	260	264	264	260	255	247	236	224	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0		-1540	-1644	-1818	-2117	-2682	-4060	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0
JD 2444750.5		222	237	246	250	251	248	242	234	224	211	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0		-1596	-1751	-2014	-2502	-3629	-8533	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5		222	232	237	238	236	231	222	212	198	0	0	0	0	0	0	0	0	0	0	0	115
1981 MAY 16.0		-1690	-1923	-2349	-3288	-6756	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999
JD 2444730.5		218	224	226	224	219	211	200	187	0	0	0	0	0	0	0	0	0	0	0	124	137
1981 MAY 6.0		-1844	-2218	-3013	-5614	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999
JD 2444720.5		211	214	212	208	200	190	176	0	0	0	0	0	0	0	0	0	0	0	133	147	157
1981 APR 26.0		-2106	-2788	-4822	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999
JD 2444710.5		202	201	197	190	179	166	0	0	0	0	0	0	0	0	0	0	0	143	157	168	176
1981 APR 16.0		-2603	-4246	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999
JD 2444700.5		190	186	179	169	156	0	0	0	0	0	0	0	0	0	0	0	153	167	178	187	193
1981 APR 6.0		-3813	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-4408
JD 2444690.5		176	169	160	147	0	0	0	0	0	0	0	0	0	0	0	162	177	189	198	205	208
1981 MAR 27.0		-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-4589	-2725
JD 2444680.5		160	150	138	0	0	0	0	0	0	0	0	0	0	0	173	187	199	209	216	220	221
1981 MAR 17.0		-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-4789	-2795	-2113
	(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20 E12

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5	676	558	495	455	424	399	377	356	337	318	299	280	260	238	214	0	0	0	0	0	0
1981 JUL 15.0	273	263	252	240	229	217	205	193	181	169	156	143	129	116	101	0	0	0	0	0	0
JD 2444790.5	609	528	479	445	417	393	372	352	333	314	294	274	253	230	0	0	0	0	0	0	0
1981 JUL 5.0	265	255	243	232	220	208	196	184	171	159	146	132	118	104	0	0	0	0	0	0	0
JD 2444780.5	567	507	467	436	411	388	368	348	329	309	290	269	246	0	0	0	0	0	0	0	0
1981 JUN 25.0	258	246	235	223	211	199	187	174	161	148	135	121	107	0	0	0	0	0	0	0	0
JD 2444770.5	538	491	457	429	406	384	364	344	325	305	285	262	0	0	0	0	0	0	0	0	0
1981 JUN 15.0	249	238	226	214	202	190	177	164	151	138	124	109	0	0	0	0	0	0	0	0	0
JD 2444760.5	517	479	449	423	401	380	361	341	321	301	279	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0	241	229	217	205	192	180	167	154	140	126	112	0	0	0	0	0	0	0	0	0	0
JD 2444750.5	503	469	442	419	397	377	358	338	318	297	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0	232	220	208	195	182	170	156	143	129	114	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5	491	462	437	415	395	375	356	336	316	0	0	0	0	0	0	0	0	0	0	0	501
1981 MAY 16.0	222	210	198	185	172	159	145	131	117	0	0	0	0	0	0	0	0	0	0	0	132
JD 2444730.5	483	457	433	412	393	373	354	335	0	0	0	0	0	0	0	0	0	0	0	473	483
1981 MAY 6.0	213	200	188	175	161	148	134	119	0	0	0	0	0	0	0	0	0	0	0	131	145
JD 2444720.5	477	453	431	411	392	373	355	0	0	0	0	0	0	0	0	0	0	0	447	459	472
1981 APR 26.0	203	190	177	164	150	136	121	0	0	0	0	0	0	0	0	0	0	0	129	144	158
JD 2444710.5	473	451	430	411	393	375	0	0	0	0	0	0	0	0	0	0	0	424	436	450	466
1981 APR 16.0	193	180	166	152	138	124	0	0	0	0	0	0	0	0	0	0	0	127	142	156	169
JD 2444700.5	471	450	431	414	397	0	0	0	0	0	0	0	0	0	0	0	402	416	430	446	463
1981 APR 6.0	182	168	155	141	126	0	0	0	0	0	0	0	0	0	0	0	126	140	154	168	181
JD 2444690.5	472	452	435	419	0	0	0	0	0	0	0	0	0	0	0	382	397	412	428	444	463
1981 MAR 27.0	171	157	143	128	0	0	0	0	0	0	0	0	0	0	0	124	139	153	166	179	192
JD 2444680.5	475	458	443	0	0	0	0	0	0	0	0	0	0	0	363	379	395	411	427	445	465
1981 MAR 17.0	159	145	130	0	0	0	0	0	0	0	0	0	0	0	123	137	151	164	177	190	202
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E12

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5 1981 JUL 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0
JD 2444790.5 1981 JUL 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0
JD 2444780.5 1981 JUN 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0
JD 2444770.5 1981 JUN 15.0	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0
JD 2444760.5 1981 JUN 5.0	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0
JD 2444750.5 1981 MAY 26.0	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5 1981 MAY 16.0	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524
JD 2444730.5 1981 MAY 6.0	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524
JD 2444720.5 1981 APR 26.0	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524
JD 2444710.5 1981 APR 16.0	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524
JD 2444700.5 1981 APR 6.0	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524
JD 2444690.5 1981 MAR 27.0	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524
JD 2444680.5 1981 MAR 17.0	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5 1980 DEC 27.0 — JD2444640.5 1981 FEB 5.0 — JD2444680.5 1981 MAR 17.0 — JD2444720.5 1981 APR 26.0 — JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E12

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5	2152	1920	1813	1788	1822	1904	2030	2201	2422	2702	3053	3498	4069	4817	5825	0	0	0	0	0	0
1981 JUL 15.0	1258	1016	914	923	1017	1174	1384	1641	1947	2311	2744	3269	3918	4744	5829	0	0	0	0	0	0
JD 2444790.5	2007	1858	1810	1829	1903	2023	2191	2409	2687	3037	3482	4053	4803	5814	0	0	0	0	0	0	0
1981 JUL 5.0	1124	971	945	1015	1158	1359	1611	1914	2275	2706	3230	3877	4703	5790	0	0	0	0	0	0	0
JD 2444780.5	1914	1836	1839	1902	2016	2178	2394	2669	3019	3463	4033	4783	5795	0	0	0	0	0	0	0	0
1981 JUN 25.0	1045	978	1021	1148	1338	1583	1882	2240	2670	3191	3838	4662	5747	0	0	0	0	0	0	0	0
JD 2444770.5	1869	1852	1902	2007	2165	2377	2650	2997	3439	4009	4758	5769	0	0	0	0	0	0	0	0	0
1981 JUN 15.0	1023	1036	1143	1322	1559	1853	2208	2635	3154	3798	4619	5702	0	0	0	0	0	0	0	0	0
JD 2444760.5	1868	1903	2000	2151	2358	2628	2973	3413	3981	4728	5738	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0	1061	1146	1310	1539	1827	2178	2601	3117	3759	4577	5657	0	0	0	0	0	0	0	0	0	0
JD 2444750.5	1908	1993	2137	2339	2605	2948	3385	3951	4695	5703	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0	1155	1304	1523	1805	2151	2571	3083	3722	4537	5612	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5	1988	2124	2320	2582	2921	3356	3919	4660	5664	0	0	0	0	0	0	0	0	0	0	0	4923
1981 MAY 16.0	1303	1512	1786	2127	2543	3053	3688	4498	5569	0	0	0	0	0	0	0	0	0	0	0	5916
JD 2444730.5	2112	2302	2559	2894	3326	3885	4623	5624	0	0	0	0	0	0	0	0	0	0	0	4882	3884
1981 MAY 6.0	1505	1772	2107	2519	3025	3656	4463	5529	0	0	0	0	0	0	0	0	0	0	0	5892	4814
JD 2444720.5	2285	2537	2868	3296	3852	4586	5582	0	0	0	0	0	0	0	0	0	0	0	4841	3848	3120
1981 APR 26.0	1762	2092	2500	3002	3629	4431	5492	0	0	0	0	0	0	0	0	0	0	0	5865	4794	3983
JD 2444710.5	2517	2843	3267	3819	4548	5541	0	0	0	0	0	0	0	0	0	0	0	4802	3812	3086	2538
1981 APR 16.0	2081	2484	2983	3605	4401	5459	0	0	0	0	0	0	0	0	0	0	0	5836	4772	3967	3333
JD 2444700.5	2820	3240	3788	4513	5501	0	0	0	0	0	0	0	0	0	0	0	0	4765	3778	3055	2507	2085
1981 APR 6.0	2473	2967	3586	4379	5430	0	0	0	0	0	0	0	0	0	0	0	0	5804	4747	3948	3319	2810
JD 2444690.5	3215	3758	4480	5463	0	0	0	0	0	0	0	0	0	0	0	0	4729	3746	3025	2479	2057	1730
1981 MAR 27.0	2957	3572	4361	5407	0	0	0	0	0	0	0	0	0	0	0	0	5770	4720	3926	3302	2797	2381
JD 2444680.5	3731	4450	5428	0	0	0	0	0	0	0	0	0	0	0	0	4696	3719	2998	2453	2031	1703	1451
1981 MAR 17.0	3562	4348	5390	0	0	0	0	0	0	0	0	0	0	0	0	5736	4693	3903	3284	2782	2370	2027

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444800.5																					
1981 JUL 15.0																					
JD 2444790.5																					
1981 JUL 5.0																					
JD 2444780.5																					
1981 JUN 25.0																					
JD 2444770.5																					
1981 JUN 15.0																					
JD 2444760.5																					
1981 JUN 5.0																					
JD 2444750.5																					
1981 MAY 26.0																					
JD 2444740.5																					
1981 MAY 16.0																					
JD 2444730.5																					
1981 MAY 6.0																					
JD 2444720.5																					
1981 APR 26.0																					
JD 2444710.5																					
1981 APR 16.0																					
JD 2444700.5																					
1981 APR 6.0																					
JD 2444690.5																					
1981 MAR 27.0																					
JD 2444680.5																					
1981 MAR 17.0																					

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E12

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444800.5	3410	2936	2726	2711	2838	3078	3414	3842	4369	5012	5796	6767	7987	9561	9999	0	0	0	0	0	0
1981 JUL 15.0	3361	3259	3158	3056	2954	2853	2752	2652	2552	2453	2354	2256	2159	2062	1965	0	0	0	0	0	0
JD 2444790.5	3131	2829	2754	2844	3061	3383	3801	4323	4962	5743	6712	7930	9506	9999	0	0	0	0	0	0	0
1981 JUL 5.0	3309	3207	3105	3003	2902	2801	2700	2599	2500	2400	2302	2204	2106	2009	0	0	0	0	0	0	0
JD 2444780.5	2959	2814	2860	3050	3354	3762	4276	4910	5689	6654	7870	9445	9999	0	0	0	0	0	0	0	0
1981 JUN 25.0	3255	3153	3052	2950	2848	2747	2646	2546	2446	2347	2248	2150	2053	0	0	0	0	0	0	0	0
JD 2444770.5	2893	2888	3045	3329	3724	4230	4857	5632	6593	7807	9377	9999	0	0	0	0	0	0	0	0	0
1981 JUN 15.0	3201	3099	2997	2895	2794	2693	2592	2492	2392	2293	2194	2096	0	0	0	0	0	0	0	0	0
JD 2444760.5	2929	3049	3310	3690	4186	4806	5575	6529	7740	9305	9999	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0	3146	3044	2942	2840	2739	2637	2537	2436	2337	2237	2139	0	0	0	0	0	0	0	0	0	0
JD 2444750.5	3062	3297	3660	4144	4756	5519	6468	7673	9232	9999	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0	3089	2988	2886	2784	2682	2581	2480	2380	2280	2181	0	0	0	0	0	0	0	0	0	0	0
JD 2444740.5	3291	3636	4107	4710	5464	6408	7606	9158	9999	0	0	0	0	0	0	0	0	0	0	0	9999
1981 MAY 16.0	3032	2930	2828	2727	2625	2524	2423	2323	2223	0	0	0	0	0	0	0	0	0	0	0	2538
JD 2444730.5	3617	4074	4667	5414	6351	7542	9086	9999	0	0	0	0	0	0	0	0	0	0	0	9999	8698
1981 MAY 6.0	2974	2872	2770	2669	2567	2466	2365	2265	0	0	0	0	0	0	0	0	0	0	0	2501	2596
JD 2444720.5	4047	4629	5368	6299	7481	9017	9999	0	0	0	0	0	0	0	0	0	0	0	9999	8642	7103
1981 APR 26.0	2915	2813	2711	2610	2508	2407	2306	0	0	0	0	0	0	0	0	0	0	0	2465	2560	2655
JD 2444710.5	4597	5327	6250	7424	8949	9999	0	0	0	0	0	0	0	0	0	0	0	0	9999	8584	7053	5871
1981 APR 16.0	2855	2753	2651	2550	2448	2347	0	0	0	0	0	0	0	0	0	0	0	0	2429	2524	2620	2715
JD 2444700.5	5292	6207	7374	8892	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	9999	8525	7003	5826	4895
1981 APR 6.0	2794	2693	2591	2489	2387	0	0	0	0	0	0	0	0	0	0	0	0	0	2394	2490	2585	2680	2776
JD 2444690.5	6171	7330	8841	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9999	8466	6952	5781	4854	4112
1981 MAR 27.0	2733	2631	2529	2428	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2360	2456	2551	2647	2742	2837
JD 2444680.5	7293	8798	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9999	8412	6901	5736	4813	4073	3477
1981 MAR 17.0	2671	2569	2467	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2326	2422	2518	2613	2709	2804	2899
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444600.5	JD2444640.5	JD2444680.5	JD2444720.5	JD2444760.5
1980 DEC 27.0	1981 FEB 5.0	1981 MAR 17.0	1981 APR 26.0	1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E13

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444840.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671688	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.625	DEGREES
MEAN ANOM. AT EPOCH	=	229.568	DEGREES
DATE OF NODAL PASSAGE	=	2444870.614	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444840.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338852	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.416	DEGREES
ARG. OF PERIHELION	=	286.305	DEGREES
MEAN ANOM. AT EPOCH	=	106.089	DEGREES
DATE OF NODAL PASSAGE	=	2444759.487	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.068	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E13

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444800.5	0	0	0	0	0	0	2213	1867	1616	1434	1304	1222	1190	1217	1310	1264	1167	1075	987	902	822
1981 JUL 15.0	0	0	0	0	0	0	2113	1733	1444	1218	1038	899	805	771	815	765	689	619	555	496	441
JD 2444790.5	0	0	0	0	0	2200	1855	1603	1418	1284	1195	1151	1161	1238	1313	1217	1125	1037	952	872	795
1981 JUL 5.0	0	0	0	0	0	2111	1734	1446	1221	1040	897	794	744	767	819	742	670	604	543	487	435
JD 2444780.5	0	0	0	0	2187	1842	1590	1403	1265	1170	1117	1112	1169	1296	1264	1173	1085	1001	919	842	768
1981 JUN 25.0	0	0	0	0	2109	1734	1448	1223	1042	897	787	723	725	809	794	721	654	591	533	479	429
JD 2444770.5	0	0	0	2174	1829	1577	1389	1248	1148	1087	1068	1106	1215	1308	1218	1131	1047	965	887	812	741
1981 JUN 15.0	0	0	0	2106	1733	1449	1225	1044	898	784	708	690	753	845	772	703	639	579	523	471	424
JD 2444760.5	0	0	2160	1816	1564	1374	1232	1128	1060	1030	1050	1137	1299	1261	1174	1090	1009	931	856	784	715
1981 JUN 5.0	0	0	2101	1730	1449	1226	1046	899	782	698	663	702	827	821	752	687	625	568	515	465	419
JD 2444750.5	0	2146	1803	1551	1361	1217	1110	1036	998	1002	1067	1210	1300	1215	1132	1051	973	898	825	756	689
1981 MAY 26.0	0	2095	1727	1447	1226	1047	900	781	692	643	659	764	870	800	734	671	613	558	506	458	414
JD 2444740.5	2132	1790	1538	1348	1202	1093	1015	969	960	1004	1124	1338	1253	1171	1091	1013	938	865	795	728	664
1981 MAY 16.0	2089	1723	1445	1226	1048	901	781	688	629	624	703	917	846	780	717	657	601	548	498	452	410
JD 2444730.5	1777	1526	1335	1189	1077	996	944	925	951	1045	1226	1289	1208	1129	1051	976	903	833	765	700	639
1981 MAY 6.0	1717	1442	1224	1047	901	781	685	619	598	651	798	892	825	762	701	644	590	539	491	447	405
JD 2444720.5	1514	1323	1176	1063	979	922	895	906	976	1132	1323	1243	1164	1087	1012	940	869	801	736	673	614
1981 APR 26.0	1437	1221	1046	901	781	684	612	578	607	730	936	869	805	744	686	631	579	530	484	441	401
JD 2444710.5	1312	1164	1050	964	903	869	869	917	1044	1263	1275	1198	1122	1047	974	904	836	770	707	646	589
1981 APR 16.0	1217	1043	900	780	682	607	564	573	667	857	911	847	786	728	672	618	568	521	477	435	397
JD 2444700.5	1153	1038	950	886	847	837	869	968	1163	1306	1230	1154	1080	1008	937	869	803	739	678	620	564
1981 APR 6.0	1040	898	779	680	603	553	547	614	782	952	888	827	768	711	657	606	558	512	470	430	394
JD 2444690.5	1027	938	871	827	810	828	903	1068	1336	1260	1185	1111	1039	969	901	834	770	709	650	594	540
1981 MAR 27.0	895	776	678	599	545	527	571	710	991	928	866	807	750	696	644	594	548	504	463	425	390
JD 2444680.5	927	858	811	788	795	849	983	1220	1289	1214	1141	1070	1000	931	865	800	738	679	622	568	516
1981 MAR 17.0	773	675	596	538	511	536	647	858	965	904	845	788	733	680	630	582	537	495	456	420	387

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E13

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444800.5	0	0	0	0	0	0	-99	-73	-47	-22	2	26	49	69	88	-194	-179	-163	-144	-124	-103
1981 JUL 15.0	0	0	0	0	0	0	3357	3421	3483	3542	3598	51	102	150	194	3074	3132	3191	3251	3310	3370
JD 2444790.5	0	0	0	0	0	-131	-107	-82	-57	-32	-7	15	37	57	-210	-198	-184	-167	-149	-129	-107
1981 JUL 5.0	0	0	0	0	0	3269	3336	3400	3461	3519	3574	27	76	121	2991	3051	3111	3172	3233	3293	3354
JD 2444780.5	0	0	0	0	-160	-138	-114	-90	-66	-41	-18	4	25	43	-213	-202	-188	-172	-153	-133	-111
1981 JUN 25.0	0	0	0	0	3180	3249	3316	3379	3439	3496	3551	3	50	92	2966	3028	3090	3152	3215	3277	3338
JD 2444770.5	0	0	0	-185	-166	-145	-122	-99	-75	-51	-28	-6	12	-224	-216	-205	-192	-176	-157	-137	-115
1981 JUN 15.0	0	0	0	3089	3161	3230	3296	3358	3418	3475	3528	3579	23	2880	2942	3005	3069	3133	3197	3260	3323
JD 2444760.5	0	0	-206	-190	-172	-151	-130	-107	-85	-62	-39	-18	-2	-226	-218	-208	-195	-179	-161	-141	-119
1981 JUN 5.0	0	0	2996	3070	3142	3210	3275	3338	3397	3453	3507	3555	3593	2854	2918	2983	3049	3114	3179	3243	3307
JD 2444750.5	0	-221	-209	-195	-178	-158	-138	-116	-94	-72	-50	-33	-231	-227	-220	-210	-198	-183	-165	-145	-122
1981 MAY 26.0	0	2900	2977	3051	3123	3191	3255	3317	3376	3433	3485	3527	2765	2829	2895	2962	3029	3095	3161	3227	3291
JD 2444740.5	-231	-224	-213	-200	-184	-165	-146	-125	-104	-82	-63	-231	-231	-228	-222	-213	-200	-185	-168	-148	-125
1981 MAY 16.0	2803	2882	2959	3033	3103	3171	3236	3297	3357	3412	3460	2674	2739	2805	2873	2941	3009	3077	3144	3210	3275
JD 2444730.5	-233	-227	-217	-205	-190	-173	-154	-134	-114	-94	-79	-230	-230	-228	-223	-214	-203	-188	-170	-150	-128
1981 MAY 6.0	2786	2864	2940	3014	3084	3151	3216	3278	3338	3390	3429	2648	2714	2782	2850	2920	2989	3058	3126	3193	3259
JD 2444720.5	-235	-230	-221	-210	-196	-180	-163	-144	-124	-108	-223	-227	-229	-228	-223	-215	-204	-190	-173	-153	-130
1981 APR 26.0	2768	2846	2922	2994	3065	3132	3197	3260	3318	3363	2557	2622	2690	2759	2829	2899	2970	3039	3108	3176	3242
JD 2444710.5	-237	-233	-226	-215	-203	-188	-171	-153	-137	-125	-219	-225	-228	-227	-223	-216	-206	-192	-175	-155	-132
1981 APR 16.0	2750	2827	2902	2975	3045	3113	3179	3242	3294	3325	2531	2598	2666	2736	2807	2879	2950	3021	3090	3158	3225
JD 2444700.5	-239	-236	-230	-221	-210	-196	-180	-164	-152	-206	-216	-222	-226	-226	-223	-217	-207	-193	-176	-156	-132
1981 APR 6.0	2732	2809	2883	2956	3026	3095	3162	3221	3261	2441	2506	2574	2643	2714	2786	2858	2931	3002	3072	3141	3207
JD 2444690.5	-241	-239	-235	-227	-217	-204	-190	-177	-189	-201	-211	-219	-224	-225	-223	-217	-207	-194	-177	-156	-132
1981 MAR 27.0	2713	2790	2864	2937	3008	3078	3143	3192	2352	2416	2482	2550	2620	2692	2765	2838	2911	2983	3054	3122	3188
JD 2444680.5	-243	-243	-240	-233	-224	-213	-201	-192	-182	-196	-207	-215	-221	-223	-222	-216	-207	-194	-177	-156	-130
1981 MAR 17.0	2695	2770	2845	2919	2991	3061	3119	3149	2327	2392	2458	2527	2598	2671	2744	2818	2891	2964	3035	3103	3169

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20 E13

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444800.5	0	0	0	0	0	0	-7	5	21	40	64	95	133	174	206	234	230	226	221	215	209
1981 JUL 15.0	0	0	0	0	0	0	3587	17	52	96	151	224	320	438	550	911	952	989	1022	1052	1079
JD 2444790.5	0	0	0	0	0	-30	-17	-2	15	38	67	104	148	188	235	234	231	227	222	217	211
1981 JUL 5.0	0	0	0	0	0	3536	3565	3599	41	93	160	250	364	487	851	892	931	966	998	1027	1052
JD 2444780.5	0	0	0	0	-53	-41	-27	-10	11	38	74	119	165	197	234	233	231	228	223	219	213
1981 JUN 25.0	0	0	0	0	3484	3513	3546	3585	34	97	180	289	416	522	831	870	907	941	971	999	1023
JD 2444770.5	0	0	0	-75	-64	-51	-35	-15	9	43	87	137	178	233	233	233	231	228	224	220	215
1981 JUN 15.0	0	0	0	3432	3459	3491	3529	3575	34	112	214	340	462	768	808	846	881	913	942	968	991
JD 2444760.5	0	0	-98	-88	-75	-61	-42	-18	12	54	105	154	184	230	231	231	230	228	224	220	216
1981 JUN 5.0	0	0	3377	3405	3436	3472	3517	3572	44	140	262	393	482	745	783	818	851	882	910	935	958
JD 2444750.5	0	-120	-110	-99	-85	-69	-47	-18	20	70	124	165	225	227	229	229	229	227	224	220	216
1981 MAY 26.0	0	3321	3348	3379	3415	3457	3510	3578	67	183	317	428	680	718	755	788	820	849	876	900	921
JD 2444740.5	-141	-132	-122	-110	-94	-74	-48	-13	34	90	140	216	220	224	226	227	226	225	222	219	214
1981 MAY 16.0	3264	3290	3321	3356	3397	3448	3512	3596	105	238	365	615	653	690	724	756	786	814	840	863	883
JD 2444730.5	-153	-144	-133	-119	-101	-78	-46	-2	53	110	146	210	216	219	222	223	223	222	220	216	212
1981 MAY 6.0	3231	3261	3295	3336	3385	3446	3525	28	157	293	383	588	624	659	691	722	751	777	801	824	844
JD 2444720.5	-164	-154	-142	-126	-106	-77	-37	15	75	121	198	204	210	214	216	218	218	218	216	213	208
1981 APR 26.0	3199	3233	3273	3321	3380	3455	3552	75	215	327	522	558	593	626	657	686	713	738	762	783	802
JD 2444710.5	-174	-164	-150	-132	-107	-71	-22	37	92	120	190	197	203	207	210	212	213	212	210	207	203
1981 APR 16.0	3169	3209	3256	3313	3385	3477	3595	134	262	322	493	527	560	591	620	648	674	698	720	741	759
JD 2444700.5	-183	-172	-156	-134	-103	-59	-2	57	96	173	182	189	195	199	203	205	206	205	204	200	195
1981 APR 6.0	3142	3189	3245	3314	3403	3515	52	190	275	428	461	494	525	554	582	608	633	656	678	697	715
JD 2444690.5	-191	-178	-160	-133	-94	-41	20	69	154	164	172	179	185	190	194	196	197	197	195	191	185
1981 MAR 27.0	3120	3175	3243	3328	3437	3569	112	220	363	396	428	459	488	516	543	568	592	614	634	653	670
JD 2444680.5	-197	-182	-160	-126	-78	-18	37	64	143	153	162	169	175	180	184	186	187	187	185	181	174
1981 MAR 17.0	3104	3171	3253	3358	3487	31	155	205	332	363	393	423	450	477	502	526	549	570	590	608	625

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20 E13

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444800.5 1981 JUL 15.0	0	0	0	0	0	0	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388
JD 2444790.5 1981 JUL 5.0	0	0	0	0	0	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406
JD 2444780.5 1981 JUN 25.0	0	0	0	0	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419
JD 2444770.5 1981 JUN 15.0	0	0	0	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428
JD 2444760.5 1981 JUN 5.0	0	0	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434
JD 2444750.5 1981 MAY 26.0	0	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436
JD 2444740.5 1981 MAY 16.0	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435
JD 2444730.5 1981 MAY 6.0	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432
JD 2444720.5 1981 APR 26.0	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426
JD 2444710.5 1981 APR 16.0	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418
JD 2444700.5 1981 APR 6.0	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409
JD 2444690.5 1981 MAR 27.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
	JD2444800.5 1981 JUL 15.0			JD2444840.5 1981 AUG 24.0			JD2444880.5 1981 OCT 3.0			JD2444920.5 1981 NOV 12.0			JD2444960.5 1981 DEC 22.0								

EARTH DEPARTURE OR ARRIVAL DATE

M20
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444800.5	0	0	0	0	0	0	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1981 JUL 15.0	0	0	0	0	0	0	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247
JD 2444790.5	0	0	0	0	0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
1981 JUL 5.0	0	0	0	0	0	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
JD 2444780.5	0	0	0	0	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
1981 JUN 25.0	0	0	0	0	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194
JD 2444770.5	0	0	0	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
1981 JUN 15.0	0	0	0	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
JD 2444760.5	0	0	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
1981 JUN 5.0	0	0	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144
JD 2444750.5	0	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
1981 MAY 26.0	0	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
JD 2444740.5	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
1981 MAY 16.0	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
JD 2444730.5	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
1981 MAY 6.0	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
JD 2444720.5	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
1981 APR 26.0	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
JD 2444710.5	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
1981 APR 16.0	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
JD 2444700.5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
1981 APR 6.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
JD 2444690.5	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
1981 MAR 27.0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
JD 2444680.5	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
1981 MAR 17.0	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E13

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444800.5	0	0	0	0	0	0	2786	2883	2982	3080	3180	3279	3380	3480	3581	84	185	287	389	491	592
1981 JUL 15.0	0	0	0	0	0	0	-1410	-1463	-1517	-1572	-1626	-1680	-1730	-1771	-1796	1779	1750	1721	1690	1661	1631
JD 2444790.5	0	0	0	0	0	2741	2838	2936	3034	3133	3232	3332	3432	3533	35	136	238	340	441	543	645
1981 JUL 5.0	0	0	0	0	0	-1388	-1442	-1496	-1550	-1605	-1660	-1712	-1758	-1789	1791	1762	1732	1701	1670	1639	1609
JD 2444780.5	0	0	0	0	2698	2795	2892	2989	3088	3186	3286	3385	3486	3586	88	189	291	393	495	597	698
1981 JUN 25.0	0	0	0	0	-1367	-1421	-1475	-1529	-1585	-1640	-1694	-1743	-1781	-1798	1775	1744	1712	1680	1648	1617	1586
JD 2444770.5	0	0	0	2656	2752	2849	2946	3044	3142	3241	3340	3440	3540	41	142	244	345	447	549	651	753
1981 JUN 15.0	0	0	0	-1347	-1400	-1454	-1509	-1564	-1620	-1675	-1727	-1772	-1797	1788	1757	1725	1692	1659	1626	1594	1563
JD 2444760.5	0	0	2616	2712	2808	2904	3001	3099	3197	3296	3395	3495	3595	96	197	299	401	503	605	706	808
1981 JUN 5.0	0	0	-1327	-1380	-1434	-1489	-1544	-1600	-1656	-1711	-1760	-1793	1800	1770	1737	1704	1670	1636	1603	1570	1539
JD 2444750.5	0	2576	2672	2768	2864	2961	3058	3155	3253	3352	3451	3551	52	152	254	355	457	559	661	763	864
1981 MAY 26.0	0	-1308	-1361	-1415	-1469	-1525	-1581	-1637	-1693	-1746	-1787	1796	1784	1751	1716	1682	1647	1613	1579	1546	1515
JD 2444740.5	2538	2633	2729	2825	2921	3018	3115	3213	3311	3409	3509	9	109	210	311	412	514	616	718	820	922
1981 MAY 16.0	-1289	-1342	-1396	-1450	-1506	-1562	-1619	-1676	-1731	-1778	1794	1797	1764	1729	1694	1659	1624	1589	1555	1522	1490
JD 2444730.5	2596	2692	2787	2883	2979	3076	3173	3271	3369	3467	3566	67	167	268	369	471	572	674	776	878	980
1981 MAY 6.0	-1324	-1378	-1432	-1487	-1543	-1600	-1658	-1715	-1767	1795	1792	1777	1743	1707	1671	1636	1600	1565	1531	1497	1465
JD 2444720.5	2655	2751	2846	2942	3038	3135	3232	3330	3428	3526	27	126	226	327	428	530	631	733	835	937	1039
1981 APR 26.0	-1360	-1414	-1469	-1525	-1582	-1640	-1698	-1754	-1799	1784	1791	1756	1720	1684	1648	1611	1576	1540	1506	1472	1440
JD 2444710.5	2715	2811	2906	3002	3098	3195	3292	3389	3487	3584	86	186	286	387	488	590	691	793	895	997	1099
1981 APR 16.0	-1397	-1452	-1508	-1565	-1623	-1681	-1739	-1790	1780	1794	1770	1734	1697	1660	1623	1587	1551	1515	1481	1447	1415
JD 2444700.5	2776	2871	2967	3063	3159	3255	3352	3450	3547	48	147	246	347	448	549	650	752	854	956	1058	1159
1981 APR 6.0	-1435	-1491	-1547	-1605	-1664	-1723	-1778	1781	1780	1783	1747	1710	1673	1636	1599	1562	1526	1490	1455	1422	1389
JD 2444690.5	2837	2933	3028	3124	3220	3317	3414	3511	16	109	208	308	408	509	610	712	813	915	1017	1119	1221
1981 MAR 27.0	-1474	-1531	-1589	-1648	-1707	-1765	1786	1769	1794	1760	1723	1686	1648	1611	1573	1536	1500	1465	1430	1397	1364
JD 2444680.5	2899	2995	3090	3186	3282	3379	3475	3570	73	171	270	370	470	571	672	774	875	977	1079	1181	1283
1981 MAR 17.0	-1514	-1572	-1631	-1691	-1751	1795	1764	1783	1773	1736	1699	1661	1623	1585	1548	1511	1475	1440	1405	1372	1340

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E13

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(0)(	10)(	20)(	30)(	40)(	50)(	60)(	70)(	80)(	90)(	(100)(	(110)(	(120)(	(130)(	(140)(	(150)(	(160)(	(170)(	(180)(	(190)(	(200)
JD 2444800.5	0	0	0	0	0	0	70	73	79	88	104	131	186	337	2095	480	219	145	111	92	81
1981 JUL 15.0	0	0	0	0	0	0	1168	1085	1024	983	958	950	959	980	999	991	962	917	862	801	738
JD 2444790.5	0	0	0	0	0	54	55	59	64	74	90	119	186	460	890	229	133	96	77	66	60
1981 JUL 5.0	0	0	0	0	0	1188	1096	1029	982	952	939	942	963	991	999	979	943	894	837	777	715
JD 2444780.5	0	0	0	0	37	38	39	42	47	56	71	101	187	1536	242	114	76	58	49	43	39
1981 JUN 25.0	0	0	0	0	1209	1109	1034	981	946	927	926	943	974	999	991	964	922	870	813	753	692
JD 2444770.5	0	0	0	20	20	20	22	24	27	33	45	71	188	275	80	48	35	28	24	22	20
1981 JUN 15.0	0	0	0	1231	1121	1040	981	940	917	910	921	952	990	998	979	945	899	846	788	729	669
JD 2444760.5	0	0	2	2	2	2	2	2	3	4	5	10	228	11	5	4	3	2	2	2	2
1981 JUN 5.0	0	0	1253	1134	1046	981	935	907	894	900	927	970	1000	991	964	924	875	821	763	705	648
JD 2444750.5	0	17	16	16	17	18	20	23	29	39	64	192	181	62	38	28	23	20	18	17	16
1981 MAY 26.0	0	1275	1147	1052	982	931	897	880	880	901	943	991	997	978	945	901	850	795	738	682	626
JD 2444740.5	36	35	35	35	37	41	46	55	72	106	218	2208	183	97	67	53	44	39	36	35	35
1981 MAY 16.0	1298	1160	1058	982	927	889	867	862	876	913	969	1000	989	962	924	877	825	770	714	659	605
JD 2444730.5	54	53	53	56	60	67	78	97	135	231	906	454	184	117	88	72	63	57	54	53	53
1981 MAY 6.0	1173	1064	983	923	881	855	845	853	883	939	994	996	976	943	901	852	799	745	690	636	584
JD 2444720.5	71	71	73	78	85	98	118	156	239	553	1531	325	184	131	104	89	79	74	71	71	73
1981 APR 26.0	1071	985	921	874	844	829	831	855	905	974	999	986	959	922	877	827	774	719	666	614	564
JD 2444710.5	88	90	94	102	115	136	172	246	453	3315	590	277	184	141	117	103	94	90	88	90	94
1981 APR 16.0	986	918	868	834	815	812	829	871	942	998	994	973	940	899	851	800	748	694	642	592	545
JD 2444700.5	106	110	117	130	151	186	251	406	1153	1256	414	252	184	149	128	116	109	105	105	109	117
1981 APR 6.0	916	863	825	803	795	805	839	904	983	998	983	955	918	874	825	774	722	670	619	571	526
JD 2444690.5	124	131	144	163	196	254	378	781	5076	638	340	236	185	155	138	127	122	121	123	130	142
1981 MAR 27.0	858	817	791	779	784	810	867	952	1000	990	968	935	894	848	799	747	696	646	597	551	507
JD 2444680.5	144	155	174	204	257	359	627	2724	1067	460	297	225	185	161	147	138	135	136	142	153	172
1981 MAR 17.0	810	781	766	766	785	832	914	993	996	978	950	913	869	822	772	721	671	622	575	531	490

(FLT T)(120)(	(130)(	(140)(	(150)(	(160)(	(170)(	(180)(	(190)(	(200)(	(210)(	(220)(	(230)(	(240)(	(250)(	(260)(	(270)(	(280)(	(290)(	(300)(	(310)(	(320)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E13

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444800.5	0	0	0	0	0	0	65	70	73	72	66	55	38	16	1	-6	-32	-72	-125	-187	-257
1981 JUL 15.0	0	0	0	0	0	0	-9999	-9999	-9999	-8346	-3109	-2155	-1784	-1615	-1548	1648	1669	1686	1698	1706	1709
JD 2444790.5	0	0	0	0	0	72	79	83	83	79	69	53	31	7	-0	-16	-49	-94	-151	-215	-285
1981 JUL 5.0	0	0	0	0	0	-9999	-9999	-9999	-9106	-3205	-2191	-1796	-1613	-1534	1643	1668	1687	1702	1712	1718	1720
JD 2444780.5	0	0	0	0	80	89	94	95	92	84	70	48	20	0	-6	-30	-69	-118	-177	-243	-314
1981 JUN 25.0	0	0	0	0	-9999	-9999	-9999	-9999	-3311	-2231	-1813	-1614	-1525	-1499	1664	1687	1705	1718	1726	1730	1730
JD 2444770.5	0	0	0	89	98	104	107	105	99	87	66	37	7	-1	-17	-47	-91	-144	-205	-272	-343
1981 JUN 15.0	0	0	0	-9999	-9999	-9999	-9999	-3423	-2276	-1834	-1620	-1519	-1486	1660	1686	1707	1722	1733	1739	1741	1740
JD 2444760.5	0	0	97	107	115	118	119	114	104	85	58	22	0	-7	-31	-67	-115	-171	-234	-302	-373
1981 JUN 5.0	0	0	-9999	-9999	-9999	-9999	-3544	-2324	-1858	-1630	-1516	-1474	1477	1684	1707	1725	1739	1747	1751	1752	1749
JD 2444750.5	0	106	117	125	130	132	129	120	104	79	43	7	-1	-18	-48	-89	-141	-200	-264	-333	-403
1981 MAY 26.0	0	-9999	-9999	-9999	-9999	-3671	-2375	-1884	-1642	-1517	-1465	1465	1681	1707	1728	1743	1754	1761	1763	1762	1758
JD 2444740.5	115	127	136	142	144	143	136	123	100	66	23	0	-8	-32	-68	-114	-168	-229	-295	-364	-434
1981 MAY 16.0	-9999	-9999	-9999	-9999	-3804	-2427	-1912	-1656	-1520	-1458	1452	1677	1706	1729	1747	1761	1769	1773	1774	1771	1766
JD 2444730.5	137	146	153	157	157	152	141	121	90	45	4	-3	-20	-50	-91	-141	-198	-260	-327	-395	-464
1981 MAY 6.0	-9999	-9999	-9999	-3943	-2482	-1941	-1673	-1526	-1453	1438	1461	1704	1730	1750	1766	1777	1783	1785	1784	1780	1773
JD 2444720.5	157	165	169	170	167	158	141	114	71	19	-0	-11	-35	-71	-116	-169	-228	-292	-359	-427	-495
1981 APR 26.0	-9999	-9999	-4089	-2538	-1972	-1690	-1535	-1452	-1426	1447	1701	1730	1753	1771	1784	1792	1796	1796	1794	1788	1780
JD 2444710.5	176	181	183	181	174	160	136	98	43	1	-5	-23	-54	-94	-143	-199	-260	-325	-392	-459	-525
1981 APR 16.0	-9999	-4244	-2597	-2005	-1710	-1545	-1454	-1417	1431	1471	1729	1754	1775	1790	1800	1806	1808	1807	1802	1796	1787
JD 2444700.5	193	196	195	190	178	158	123	71	13	-1	-14	-40	-76	-121	-173	-231	-293	-358	-425	-491	-556
1981 APR 6.0	-4408	-2659	-2039	-1731	-1557	-1458	-1412	1416	1459	1727	1755	1778	1795	1808	1816	1819	1819	1816	1811	1802	1793
JD 2444690.5	208	208	204	195	177	148	100	35	0	-7	-28	-59	-100	-149	-204	-264	-327	-392	-458	-523	-586
1981 MAR 27.0	-2725	-2075	-1754	-1571	-1465	-1410	1403	1442	1726	1756	1781	1800	1815	1824	1830	1832	1830	1825	1818	1809	1798
JD 2444680.5	221	219	211	196	170	128	64	5	-3	-19	-46	-82	-127	-179	-236	-298	-361	-426	-491	-555	-617
1981 MAR 17.0	-2113	-1778	-1587	-1473	-1411	1394	1424	1481	1756	1783	1804	1821	1833	1840	1843	1843	1839	1833	1825	1815	1803

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444800.5	0	0	0	0	0	0	756	764	787	829	898	1018	1265	1983	9999	71	74	78	81	85	90
1981 JUL 15.0	0	0	0	0	0	0	141	156	171	185	198	211	223	233	243	102	108	114	120	126	132
JD 2444790.5	0	0	0	0	0	699	706	725	758	810	894	1052	1423	3052		71	74	78	81	85	89	93
1981 JUL 5.0	0	0	0	0	0	140	155	169	183	196	209	221	233	243		102	108	114	119	126	132	138
JD 2444780.5	0	0	0	0	650	656	673	699	740	802	909	1129	1790	9999		74	77	81	84	88	93	97
1981 JUN 25.0	0	0	0	0	138	153	167	181	194	207	220	231	242	251		108	114	119	125	131	138	144
JD 2444770.5	0	0	0	606	613	627	650	683	731	808	950	1293	2955			75	77	81	84	88	92	96	101
1981 JUN 15.0	0	0	0	137	152	166	179	193	206	218	230	241	251			108	114	119	125	131	137	144	150
JD 2444760.5	0	0	567	575	588	608	636	675	732	830	1034	1690	9999			78	81	84	87	91	95	100	104
1981 JUN 5.0	0	0	135	150	164	178	191	204	216	229	240	250	258			114	119	125	131	137	143	150	156
JD 2444750.5	0	532	541	554	572	596	628	674	745	878	1216	3163				78	80	84	87	91	94	99	103	108
1981 MAY 26.0	0	134	148	162	176	189	202	215	227	239	249	258				114	119	125	130	136	142	149	156	162
JD 2444740.5	501	510	524	541	562	590	627	681	774	974	1689					78	81	83	87	90	94	98	102	107	112
1981 MAY 16.0	132	147	161	174	188	200	213	225	237	248	258					114	119	125	130	136	142	148	155	162	169
JD 2444730.5	483	497	513	533	557	588	632	700	830	1189	4026					81	83	86	90	93	97	101	106	111	116
1981 MAY 6.0	145	159	173	186	199	211	223	235	247	257	266					119	124	130	136	142	148	154	161	168	175
JD 2444720.5	472	488	507	529	556	592	645	736	945	1830						81	83	86	89	93	96	100	105	109	114	120
1981 APR 26.0	158	171	184	197	209	222	234	245	256	265						119	124	130	135	141	147	153	160	167	174	181
JD 2444710.5	466	484	504	528	559	601	669	804	1224	7440						83	86	89	92	96	100	104	108	113	118	124
1981 APR 16.0	169	182	195	208	220	232	244	255	265	272						125	130	135	141	147	153	159	166	173	180	187
JD 2444700.5	463	482	504	531	567	619	714	952	2261							83	86	89	92	95	99	103	107	112	117	122	128
1981 APR 6.0	181	193	206	218	230	242	253	264	272							125	130	135	140	146	152	158	165	172	179	186	193
JD 2444690.5	463	483	508	538	581	651	802	1358								83	86	88	91	95	98	102	106	111	115	121	126	132
1981 MAR 27.0	192	204	216	228	240	252	262	272								125	130	135	140	146	152	158	164	171	177	185	192	199
JD 2444680.5	465	487	514	550	604	708	1007	3609								86	88	91	94	97	101	105	109	114	119	124	130	136
1981 MAR 17.0	202	215	227	238	250	261	271	279								130	135	140	145	151	157	163	170	176	183	191	198	206

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320
JD 2444800.5																					
1981 JUL 15.0																					
JD 2444840.5																					
1981 AUG 24.0																					
JD 2444880.5																					
1981 OCT 3.0																					
JD 2444920.5																					
1981 NOV 12.0																					
JD 2444960.5																					
1981 DEC 22.0																					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E13

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444800.5 1981 JUL 15.0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444790.5 1981 JUL 5.0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444780.5 1981 JUN 25.0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444770.5 1981 JUN 15.0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444760.5 1981 JUN 5.0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444750.5 1981 MAY 26.0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444740.5 1981 MAY 16.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444730.5 1981 MAY 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444720.5 1981 APR 26.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444710.5 1981 APR 16.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444700.5 1981 APR 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444690.5 1981 MAR 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444680.5 1981 MAR 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320
JD2444800.5 1981 JUL 15.0	JD2444840.5 1981 AUG 24.0	JD2444880.5 1981 OCT 3.0	JD2444920.5 1981 NOV 12.0	JD2444960.5 1981 DEC 22.0																	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E13

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444800.5	0	0	0	0	0	0	5160	4147	3417	2889	2515	2281	2189	2266	2533	2400	2125	1864	1617	1383	1164
1981 JUL 15.0	0	0	0	0	0	0	5988	4860	4003	3334	2803	2394	2118	2020	2147	2003	1781	1578	1392	1223	1069
JD 2444790.5	0	0	0	0	0	5123	4110	3377	2843	2458	2203	2079	2108	2326	2541	2267	2006	1758	1522	1299	1089
1981 JUL 5.0	0	0	0	0	0	5984	4862	4009	3342	2808	2389	2087	1940	2008	2161	1935	1727	1535	1359	1198	1051
JD 2444780.5	0	0	0	0	5084	4073	3340	2800	2405	2134	1982	1968	2130	2493	2401	2141	1893	1656	1430	1217	1017
1981 JUN 25.0	0	0	0	0	5977	4862	4015	3350	2815	2388	2067	1879	1885	2131	2087	1875	1679	1497	1329	1175	1034
JD 2444770.5	0	0	0	5045	4035	3302	2758	2355	2071	1897	1845	1951	2262	2528	2270	2022	1785	1558	1342	1138	946
1981 JUN 15.0	0	0	0	5967	4859	4018	3355	2821	2391	2057	1837	1783	1968	2237	2022	1822	1636	1462	1302	1155	1019
JD 2444760.5	0	0	5004	3997	3264	2717	2309	2014	1822	1739	1794	2041	2501	2391	2145	1908	1680	1463	1256	1060	877
1981 JUN 5.0	0	0	5954	4853	4017	3359	2827	2395	2051	1808	1705	1819	2184	2167	1964	1774	1596	1431	1277	1135	1006
JD 2444750.5	0	4964	3959	3227	2678	2266	1962	1755	1647	1659	1840	2248	2505	2261	2025	1798	1579	1370	1172	985	809
1981 MAY 26.0	0	5937	4843	4014	3360	2831	2398	2050	1789	1647	1693	1998	2308	2104	1911	1730	1560	1401	1254	1117	993
JD 2444740.5	4923	3922	3190	2641	2225	1914	1696	1567	1544	1666	2002	2611	2370	2136	1909	1691	1481	1280	1090	910	743
1981 MAY 16.0	5916	4830	4007	3358	2832	2401	2050	1778	1606	1593	1823	2446	2240	2046	1862	1688	1525	1373	1231	1100	980
JD 2444730.5	3884	3154	2605	2186	1871	1643	1498	1446	1518	1780	2291	2473	2241	2016	1798	1587	1385	1193	1010	838	677
1981 MAY 6.0	4814	3997	3353	2831	2402	2049	1770	1578	1517	1670	2100	2374	2178	1992	1816	1649	1493	1346	1210	1084	969
JD 2444720.5	3120	2570	2150	1831	1595	1437	1363	1394	1587	2024	2569	2340	2116	1899	1689	1486	1292	1107	931	767	614
1981 APR 26.0	3983	3344	2827	2401	2049	1765	1558	1460	1544	1900	2503	2307	2120	1941	1772	1612	1461	1320	1189	1068	958
JD 2444710.5	2538	2117	1794	1553	1384	1291	1290	1425	1778	2398	2433	2212	1996	1786	1583	1388	1200	1023	855	697	551
1981 APR 16.0	3333	2820	2397	2046	1760	1543	1419	1445	1718	2271	2431	2243	2064	1893	1730	1576	1431	1295	1169	1053	947
JD 2444700.5	2085	1761	1515	1338	1230	1204	1291	1564	2114	2522	2302	2088	1879	1676	1480	1291	1111	940	780	629	490
1981 APR 6.0	2810	2390	2042	1755	1531	1388	1370	1564	2051	2551	2363	2183	2011	1846	1689	1541	1401	1271	1150	1038	936
JD 2444690.5	1730	1481	1298	1178	1131	1180	1384	1844	2606	2388	2175	1967	1764	1568	1379	1197	1024	860	706	563	430
1981 MAR 27.0	2381	2035	1749	1521	1364	1312	1439	1842	2665	2478	2298	2125	1959	1800	1649	1506	1372	1246	1130	1024	926
JD 2444680.5	1451	1262	1134	1070	1089	1237	1606	2276	2471	2259	2052	1850	1653	1463	1280	1105	939	782	634	498	372
1981 MAR 17.0	2027	1741	1511	1344	1268	1340	1657	2274	2588	2409	2235	2068	1908	1755	1609	1472	1343	1222	1111	1009	916

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E13

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444800.5	0	0	0	0	0	0	9999	9006	7420	6223	5318	4674	4307	4285	4680	4404	3906	3442	3009	2606	2233
1981 JUL 15.0	0	0	0	0	0	0	2786	2883	2982	3080	3180	3279	3380	3480	3581	84	185	287	389	491	592
JD 2444790.5	0	0	0	0	0	9999	8972	7387	6185	5266	4592	4166	4048	4334	4702	4202	3733	3293	2881	2497	2140
1981 JUL 5.0	0	0	0	0	0	2741	2838	2936	3034	3133	3232	3332	3432	3533	35	136	238	340	441	543	645
JD 2444780.5	0	0	0	0	9999	8935	7355	6149	5220	4522	4050	3847	4014	4624	4488	4016	3572	3153	2760	2392	2051
1981 JUN 25.0	0	0	0	0	2698	2795	2892	2989	3088	3186	3286	3385	3486	3586	88	189	291	393	495	597	698
JD 2444770.5	0	0	0	9999	8894	7319	6113	5176	4461	3954	3682	3735	4229	4764	4292	3844	3420	3020	2644	2292	1965
1981 JUN 15.0	0	0	0	2656	2752	2849	2946	3044	3142	3241	3340	3440	3540	41	142	244	345	447	549	651	753
JD 2444760.5	0	0	9999	8850	7281	6076	5136	4409	3873	3547	3500	3859	4685	4557	4108	3682	3277	2893	2533	2196	1882
1981 JUN 5.0	0	0	2616	2712	2808	2904	3001	3099	3197	3296	3395	3495	3595	96	197	299	401	503	605	706	808
JD 2444750.5	0	9999	8803	7240	6038	5096	4360	3805	3436	3307	3533	4246	4813	4364	3936	3527	3139	2771	2425	2102	1802
1981 MAY 26.0	0	2576	2672	2768	2864	2961	3058	3155	3253	3352	3451	3551	52	152	254	355	457	559	661	763	864
JD 2444740.5	9999	8752	7197	5999	5057	4315	3746	3345	3150	3259	3825	5057	4610	4182	3771	3379	3006	2653	2321	2011	1723
1981 MAY 16.0	2538	2633	2729	2825	2921	3018	3115	3213	3311	3409	3509	9	109	210	311	412	514	616	718	820	922
JD 2444730.5	8698	7151	5958	5017	4273	3692	3268	3024	3035	3449	4391	4846	4419	4008	3613	3237	2878	2539	2220	1922	1646
1981 MAY 6.0	2596	2692	2787	2883	2979	3076	3173	3271	3369	3467	3566	67	167	268	369	471	572	674	776	878	980
JD 2444720.5	7103	5915	4977	4231	3644	3202	2920	2854	3131	3923	5072	4647	4236	3841	3461	3098	2753	2427	2121	1835	1571
1981 APR 26.0	2655	2751	2846	2942	3038	3135	3232	3330	3428	3526	27	126	226	327	428	530	631	733	835	937	1039
JD 2444710.5	5871	4936	4191	3599	3144	2834	2709	2870	3496	4668	4865	4455	4060	3679	3313	2963	2631	2318	2024	1750	1498
1981 APR 16.0	2715	2811	2906	3002	3098	3195	3292	3389	3487	3584	86	186	286	387	488	590	691	793	895	997	1099
JD 2444700.5	4895	4151	3556	3093	2762	2591	2660	3127	4165	5073	4666	4271	3889	3521	3168	2832	2512	2211	1929	1667	1426
1981 APR 6.0	2776	2871	2967	3063	3159	3255	3352	3450	3547	48	147	246	347	448	549	650	752	854	956	1058	1159
JD 2444690.5	4112	3516	3046	2699	2495	2492	2823	3687	5272	4867	4473	4092	3723	3368	3027	2703	2396	2107	1836	1586	1356
1981 MAR 27.0	2837	2933	3028	3124	3220	3317	3414	3511	16	109	208	308	408	509	610	712	813	915	1017	1119	1221
JD 2444680.5	3477	3004	2645	2415	2357	2577	3264	4550	5059	4968	4287	3918	3561	3217	2889	2577	2281	2004	1746	1507	1288
1981 MAR 17.0	2899	2995	3090	3186	3282	3379	3475	3570	73	171	270	370	470	571	672	774	875	977	1079	1181	1283

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E14

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444940.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671677	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.629	DEGREES
MEAN ANOM. AT EPOCH	=	328.129	DEGREES
DATE OF NODAL PASSAGE	=	2444870.610	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444940.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338878	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.418	DEGREES
ARG. OF PERIHELION	=	286.308	DEGREES
MEAN ANOM. AT EPOCH	=	158.491	DEGREES
DATE OF NODAL PASSAGE	=	2444759.484	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.069	DEGREES

M20
E14

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS. ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5	822	746	674	607	544	484	430	379	332	290	252	223	353	185	142	124	118	121	133	152	177
1981 JUL 15.0	441	391	346	305	268	236	207	181	159	141	125	115	225	135	106	98	95	95	98	103	111
JD 2444790.5	795	721	652	587	526	469	417	368	322	281	245	224	258	159	135	121	117	122	136	157	184
1981 JUL 5.0	435	387	344	304	269	237	209	184	163	145	130	123	195	116	105	101	99	100	104	111	120
JD 2444780.5	768	697	631	568	509	454	403	356	312	272	238	347	179	150	131	120	117	125	141	163	192
1981 JUN 25.0	429	383	341	303	269	238	211	188	167	149	134	223	128	114	108	105	105	107	112	119	131
JD 2444770.5	741	673	609	549	492	439	390	344	302	263	230	202	168	145	128	119	119	128	146	171	202
1981 JUN 15.0	424	379	339	303	270	240	214	191	171	154	139	142	124	117	113	111	111	114	120	129	142
JD 2444760.5	715	650	588	530	475	424	376	332	291	254	1300	189	162	140	125	118	121	133	153	180	214
1981 JUN 5.0	419	376	337	302	270	242	217	195	176	160	1005	136	128	122	118	117	119	123	130	140	155
JD 2444750.5	689	626	567	511	458	409	363	320	281	248	214	182	157	137	123	119	124	138	161	191	228
1981 MAY 26.0	414	373	336	302	271	244	220	199	182	173	150	140	133	128	125	125	127	132	140	153	170
JD 2444740.5	664	603	546	492	441	393	349	309	273	316	205	176	151	133	122	120	128	145	171	204	245
1981 MAY 16.0	410	370	334	302	272	246	224	204	192	217	155	146	139	135	133	133	136	142	152	167	187
JD 2444730.5	639	580	525	473	424	378	336	299	352	236	197	169	146	130	121	123	134	154	182	219	265
1981 MAY 6.0	405	368	333	302	274	249	228	213	281	176	161	152	146	142	141	142	146	154	166	183	207
JD 2444720.5	614	557	504	454	407	363	324	307	317	222	188	162	141	127	122	126	141	165	197	237	289
1981 APR 26.0	401	365	332	302	275	252	234	238	232	179	167	159	153	150	149	152	157	167	181	201	230
JD 2444710.5	589	535	483	435	390	349	320	1373	254	210	180	155	137	125	124	132	150	177	214	260	319
1981 APR 16.0	397	363	331	302	278	257	248	1093	203	184	174	166	161	159	159	163	170	181	198	222	257
JD 2444700.5	564	512	463	417	374	340	399	314	234	199	171	149	133	125	127	139	162	193	234	287	356
1981 APR 6.0	394	360	330	303	281	266	331	248	204	190	180	174	169	168	170	175	184	197	218	247	290
JD 2444690.5	540	490	443	399	361	354	582	264	220	188	163	143	130	126	132	149	176	212	259	321	403
1981 MAR 27.0	390	358	330	305	286	295	452	229	208	196	187	182	178	178	181	188	199	216	241	277	331
JD 2444680.5	516	468	423	383	358	813	310	242	206	1.8	154	137	128	129	140	162	193	235	290	363	464
1981 MAR 17.0	387	356	330	308	300	668	265	229	213	203	195	190	188	189	194	203	217	238	269	314	383

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445000.5 1982 JAN 31.0	JD2445040.5 1982 MAR 12.0	JD2445080.5 1982 APR 21.0	JD2445120.5 1982 MAY 31.0	JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH -- MARS TRAJECTORY PARAMETERS

M20
E14

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5	-103	-80	-57	-34	-11	10	29	46	57	59	44	-24	-423	457	301	234	179	129	89	64	52
1981 JUL 15.0	3370	3429	3487	3545	3	60	115	169	221	271	321	380	662	190	232	196	135	73	28	8	8
JD 2444790.5	-107	-84	-61	-37	-14	7	27	44	55	57	36	-87	592	289	224	180	135	93	60	41	33
1981 JUL 5.0	3354	3414	3473	3532	3590	47	102	156	208	258	308	390	82	247	236	187	120	57	13	3594	3595
JD 2444780.5	-111	-88	-65	-41	-17	4	25	43	55	57	26	-390	270	201	168	133	95	59	32	18	15
1981 JUN 25.0	3338	3399	3459	3519	3577	34	89	142	193	242	296	589	240	255	227	170	99	36	3595	3577	3581
JD 2444770.5	-115	-92	-68	-44	-20	3	24	43	57	61	13	251	164	143	121	92	57	26	6	-3	-3
1981 JUN 15.0	3323	3384	3445	3505	3563	20	75	127	177	224	283	214	256	247	209	146	74	12	3573	3559	3565
JD 2444760.5	-119	-96	-71	-47	-22	1	25	46	65	79	692	109	108	99	81	53	21	-4	-19	-24	-21
1981 JUN 5.0	3307	3369	3431	3490	3549	5	59	110	157	198	1605	246	250	230	184	116	44	3585	3550	3539	3547
JD 2444750.5	-122	-99	-74	-49	-23	2	27	53	84	170	9	60	68	62	43	15	-13	-34	-44	-45	-39
1981 MAY 26.0	3291	3354	3416	3475	3533	3589	42	90	130	141	241	239	233	206	153	82	9	3554	3524	3517	3527
JD 2444740.5	-125	-102	-76	-50	-23	4	34	70	143	-319	-6	28	35	26	5	-21	-46	-62	-68	-65	-57
1981 MAY 16.0	3275	3338	3400	3460	3517	3571	22	64	87	387	223	222	210	175	116	42	3572	3521	3496	3493	3506
JD 2444730.5	-128	-104	-78	-51	-22	9	48	111	468	-112	-22	1	4	-7	-31	-57	-78	-89	-91	-85	-75
1981 MAY 6.0	3259	3322	3384	3443	3500	3552	3598	28	3532	219	201	199	181	139	74	3598	3531	3486	3467	3468	3483
JD 2444720.5	-130	-105	-79	-49	-17	20	78	242	-317	-88	-38	-23	-26	-43	-68	-93	-109	-115	-112	-104	-92
1981 APR 26.0	3242	3306	3367	3426	3480	3529	3566	3558	299	179	177	171	146	96	25	3549	3487	3449	3435	3440	3458
JD 2444710.5	-132	-106	-78	-46	-8	43	152	743	-180	-88	-57	-50	-59	-79	-105	-126	-138	-139	-133	-123	-110
1981 APR 16.0	3225	3288	3349	3406	3458	3501	3518	976	166	148	148	137	104	46	3571	3496	3440	3410	3402	3411	3431
JD 2444700.5	-132	-106	-75	-39	8	92	410	-321	-149	-97	-78	-78	-93	-117	-142	-158	-164	-161	-153	-141	-127
1981 APR 6.0	3207	3270	3330	3385	3433	3463	3412	201	118	117	116	98	56	3589	3510	3439	3392	3369	3368	3380	3401
JD 2444690.5	-132	-104	-70	-26	42	221	-484	-226	-143	-111	-102	-110	-130	-156	-177	-188	-188	-181	-171	-158	-145
1981 MAR 27.0	3188	3251	3310	3361	3401	3400	498	94	81	84	77	51	3598	3524	3445	3380	3342	3327	3331	3347	3368
JD 2444680.5	-130	-99	-59	-0	120	682	-331	-198	-1[illegible]	-130	-130	-144	-169	-193	-209	-214	-209	-200	-188	-175	-163
1981 MAR 17.0	3169	3231	3287	3333	3355	3419	96	42	45	46	33	3595	3532	3451	3375	3319	3291	3284	3293	3311	3330

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445000.5 1982 JAN 31.0					JD2445040.5 1982 MAR 12.0					JD2445080.5 1982 APR 21.0					JD2445120.5 1982 MAY 31.0					JD2445160.5 1982 JUL 10.0	

EARTH DEPARTURE OR ARRIVAL DATE

M20
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5	209	202	196	190	184	179	176	176	179	192	225	322	789	-186	-56	-7	20	41	60	76	92
1981 JUL 15.0	1079	1102	1121	1136	1148	1155	1158	1158	1154	1147	1139	1141	1277	1023	1040	1044	1051	1066	1089	1118	1153
JD 2444790.5	211	205	199	193	187	182	178	176	179	191	228	392	-281	-43	10	34	51	65	79	92	105
1981 JUL 5.0	1052	1074	1093	1108	1119	1127	1131	1131	1128	1123	1119	1134	989	1042	1044	1046	1053	1066	1086	1113	1143
JD 2444780.5	213	207	201	195	189	183	179	176	177	187	233	746	-26	36	56	67	76	86	96	106	117
1981 JUN 25.0	1023	1044	1062	1077	1088	1096	1100	1101	1100	1096	1095	1162	1038	1041	1039	1040	1047	1059	1077	1100	1127
JD 2444770.5	215	209	203	197	190	184	178	173	171	178	241	-10	73	86	90	93	98	104	111	120	129
1981 JUN 15.0	991	1012	1029	1043	1054	1062	1067	1069	1068	1065	1068	1026	1032	1029	1026	1028	1034	1045	1061	1082	1106
JD 2444760.5	216	210	204	198	191	183	175	168	160	154	-245	127	123	118	115	114	115	119	124	132	140
1981 JUN 5.0	958	977	994	1008	1019	1026	1031	1033	1033	1030	683	1018	1013	1009	1007	1009	1015	1025	1040	1058	1079
JD 2444750.5	216	210	204	197	189	180	170	156	135	56	228	170	152	142	135	131	130	132	136	142	149
1981 MAY 26.0	921	940	957	970	981	988	993	995	994	985	999	991	986	983	982	985	991	1000	1014	1030	1047
JD 2444740.5	214	209	203	195	186	174	159	135	72	606	234	191	171	158	150	145	143	143	146	151	158
1981 MAY 16.0	883	902	917	930	941	949	953	955	951	945	962	957	954	952	953	956	962	971	983	997	1012
JD 2444730.5	212	206	199	191	179	164	140	90	-199	338	237	203	184	171	162	156	153	153	155	159	165
1981 MAY 6.0	844	861	876	889	899	907	912	913	868	922	922	920	918	918	919	922	928	937	947	960	972
JD 2444720.5	208	202	194	184	170	148	106	-30	558	295	238	210	192	180	170	164	161	160	161	165	170
1981 APR 26.0	802	819	834	846	857	864	869	863	831	877	879	879	879	879	881	885	891	899	908	918	928
JD 2444710.5	203	196	187	174	154	120	33	-272	375	276	237	214	198	185	176	170	166	165	166	169	173
1981 APR 16.0	759	776	790	802	813	821	825	491	818	831	834	835	836	838	841	845	851	858	866	873	880
JD 2444700.5	195	187	176	159	131	69	-177	506	320	264	235	215	200	188	179	173	169	167	168	170	175
1981 APR 6.0	715	731	746	758	769	777	760	718	773	783	787	789	791	794	797	801	807	813	820	825	827
JD 2444690.5	185	176	162	139	92	-45	683	375	292	254	231	213	200	189	180	174	170	168	168	170	173
1981 MAR 27.0	670	686	700	713	725	733	276	703	725	733	738	742	745	748	751	755	760	766	770	773	771
JD 2444680.5	174	162	143	107	19	-349	452	321	272	244	225	210	197	187	179	172	168	166	165	167	169
1981 MAR 17.0	625	641	655	670	683	558	606	661	675	683	688	692	696	699	703	707	711	715	718	717	708

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E14

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T) (200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5 1981 JUL 15.0	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388
JD 2444790.5 1981 JUL 5.0	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406
JD 2444780.5 1981 JUN 25.0	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419
JD 2444770.5 1981 JUN 15.0	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428
JD 2444760.5 1981 JUN 5.0	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434
JD 2444750.5 1981 MAY 26.0	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436
JD 2444740.5 1981 MAY 16.0	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435
JD 2444730.5 1981 MAY 6.0	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432
JD 2444720.5 1981 APR 26.0	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426
JD 2444710.5 1981 APR 16.0	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418
JD 2444700.5 1981 APR 6.0	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409
JD 2444690.5 1981 MAR 27.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386

(FLT T) (320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445000.5 1982 JAN 31.0			JD2445040.5 1982 MAR 12.0				JD2445080.5 1982 APR 21.0					JD2445120.5 1982 MAY 31.0					JD2445160.5 1982 JUL 10.0			

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E14

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1981 JUL 15.0	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247
JD 2444790.5	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
1981 JUL 5.0	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
JD 2444780.5	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
1981 JUN 25.0	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194
JD 2444770.5	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
1981 JUN 15.0	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
JD 2444760.5	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
1981 JUN 5.0	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144
JD 2444750.5	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
1981 MAY 26.0	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
JD 2444740.5	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
1981 MAY 16.0	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
JD 2444730.5	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
1981 MAY 6.0	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
JD 2444720.5	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
1981 APR 26.0	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
JD 2444710.5	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
1981 APR 16.0	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
JD 2444700.5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
1981 APR 6.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
JD 2444690.5	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
1981 MAR 27.0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
JD 2444680.5	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
1981 MAR 17.0	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E14

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5		592	694	795	895	995	1095	1194	1292	1390	1487	1584	1681	1776	1873	1968	2064	2159	2254	2350	2445	2541
1981 JUL 15.0		1631	1603	1577	1552	1529	1509	1491	1475	1463	1453	1445	1440	1436	1434	1432	1429	1426	1421	1415	1407	1398
JD 2444790.5		645	746	847	948	1048	1147	1246	1345	1443	1540	1637	1733	1830	1925	2021	2116	2211	2307	2402	2498	2594
1981 JUL 5.0		1609	1580	1553	1528	1504	1483	1464	1448	1434	1424	1415	1409	1404	1400	1398	1395	1391	1387	1381	1374	1366
JD 2444780.5		698	800	901	1001	1101	1201	1300	1398	1496	1593	1690	1786	1883	1979	2074	2169	2265	2360	2456	2551	2647
1981 JUN 25.0		1586	1557	1529	1503	1479	1457	1438	1421	1406	1394	1385	1377	1372	1368	1364	1361	1357	1353	1348	1342	1336
JD 2444770.5		753	854	955	1056	1156	1255	1354	1453	1551	1648	1745	1841	1937	2033	2128	2224	2319	2415	2510	2606	2702
1981 JUN 15.0		1563	1533	1505	1478	1454	1431	1411	1394	1378	1366	1355	1347	1341	1336	1332	1328	1325	1321	1317	1312	1308
JD 2444760.5		808	909	1010	1111	1211	1311	1410	1508	1606	1703	1800	1896	1992	2088	2184	2279	2374	2470	2565	2661	2757
1981 JUN 5.0		1539	1509	1480	1453	1428	1405	1385	1366	1351	1337	1326	1317	1310	1305	1301	1297	1294	1291	1287	1284	1281
JD 2444750.5		864	966	1067	1167	1267	1367	1466	1564	1662	1759	1856	1953	2049	2144	2240	2335	2431	2526	2622	2717	2813
1981 MAY 26.0		1515	1484	1455	1428	1402	1379	1358	1339	1323	1309	1298	1288	1281	1275	1271	1267	1264	1262	1260	1258	1257
JD 2444740.5		922	1023	1124	1224	1325	1424	1523	1621	1719	1817	1914	2010	2106	2202	2297	2393	2488	2583	2679	2775	2871
1981 MAY 16.0		1490	1459	1430	1402	1377	1353	1332	1313	1296	1282	1270	1260	1252	1247	1242	1239	1237	1235	1234	1234	1236
JD 2444730.5		980	1081	1182	1283	1383	1482	1581	1680	1777	1875	1972	2068	2164	2260	2355	2451	2546	2641	2737	2833	2929
1981 MAY 6.0		1465	1434	1405	1377	1351	1327	1306	1286	1269	1255	1243	1233	1225	1219	1215	1212	1211	1210	1211	1214	1219
JD 2444720.5		1039	1140	1241	1342	1442	1541	1640	1738	1837	1934	2031	2127	2223	2319	2414	2510	2605	2700	2796	2892	2988
1981 APR 26.0		1440	1409	1379	1351	1326	1302	1280	1260	1243	1229	1217	1207	1199	1193	1190	1188	1187	1188	1191	1196	1205
JD 2444710.5		1099	1200	1301	1401	1502	1601	1700	1791	1897	1994	2091	2187	2283	2379	2474	2570	2665	2760	2856	2952	3048
1981 APR 16.0		1415	1384	1354	1326	1300	1276	1255	1235	1218	1204	1192	1182	1175	1170	1166	1165	1166	1169	1174	1183	1197
JD 2444700.5		1159	1261	1362	1462	1562	1661	1759	1860	1957	2055	2151	2248	2344	2439	2535	2630	2726	2821	2917	3012	3108
1981 APR 6.0		1389	1358	1329	1301	1276	1252	1230	1211	1194	1180	1168	1159	1152	1148	1145	1146	1148	1153	1161	1174	1194
JD 2444690.5		1221	1322	1423	1523	1623	1722	1825	1921	2019	2116	2213	2309	2405	2501	2596	2692	2787	2882	2978	3074	3170
1981 MAR 27.0		1364	1334	1304	1277	1251	1228	1206	1188	1171	1157	1146	1137	1131	1128	1127	1129	1133	1141	1152	1171	1199
JD 2444680.5		1283	1384	1485	1585	1685	1780	1885	1983	2081	2178	2275	2371	2467	2563	2658	2754	2849	2944	3040	3136	3232
1981 MAR 17.0		1340	1309	1280	1253	1228	1205	1184	1166	1150	1137	1126	1118	1113	1111	1112	1115	1122	1133	1149	1174	1214
	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E14

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5	81	74	71	70	71	74	80	90	106	134	190	337	1676	550	241	157	119	98	85	77	72
1981 JUL 15.0	738	675	613	556	502	454	410	372	339	311	287	268	253	242	234	229	228	230	235	244	256
JD 2444790.5	60	56	54	54	56	59	65	75	92	123	191	462	1037	248	143	103	82	69	62	57	55
1981 JUL 5.0	715	653	595	539	488	442	401	365	333	307	284	266	252	241	234	230	229	232	238	247	261
JD 2444780.5	39	38	37	38	39	43	48	57	73	105	195	1562	257	121	80	62	51	45	41	38	37
1981 JUN 25.0	692	633	576	523	475	431	392	358	328	302	281	264	251	241	234	231	231	234	241	251	266
JD 2444770.5	20	20	20	20	22	24	28	34	47	75	204	274	83	50	36	29	25	22	21	20	20
1981 JUN 15.0	669	612	558	508	462	420	383	350	322	298	278	262	250	240	234	232	233	237	244	256	273
JD 2444760.5	2	2	2	2	2	2	3	4	5	11	7644	11	6	4	3	2	2	2	2	2	2
1981 JUN 5.0	648	592	541	493	449	409	374	343	317	294	275	260	249	240	235	233	235	240	249	262	281
JD 2444750.5	16	16	17	18	20	24	30	41	68	231	166	62	39	29	23	20	18	17	16	16	17
1981 MAY 26.0	626	573	524	478	436	399	366	337	312	290	273	258	248	240	236	235	237	244	254	269	291
JD 2444740.5	35	35	37	41	47	57	74	113	247	1172	176	97	68	54	45	40	37	35	35	35	36
1981 MAY 16.0	605	554	507	464	424	389	357	330	306	286	270	257	247	240	237	237	241	248	260	278	302
JD 2444730.5	53	56	60	67	79	100	142	253	1322	405	179	117	89	73	64	58	55	53	53	54	57
1981 MAY 6.0	584	536	491	450	412	379	349	324	302	283	267	255	246	241	239	240	245	254	268	288	317
JD 2444720.5	73	78	86	99	121	162	257	660	1098	306	181	131	105	90	81	75	72	71	72	75	81
1981 APR 26.0	564	518	475	436	401	369	341	317	296	279	265	254	246	242	241	243	249	260	277	301	334
JD 2444710.5	94	102	115	138	177	259	508	8077	525	266	182	141	118	104	96	91	88	89	92	98	107
1981 APR 16.0	545	501	460	423	390	360	334	314	292	276	263	253	246	243	243	247	255	268	288	316	356
JD 2444700.5	117	130	152	189	260	439	1501	1006	387	244	182	149	129	117	109	106	105	107	113	123.	139
1981 APR 6.0	526	484	445	410	379	351	327	305	287	273	261	252	247	245	246	252	262	278	302	336	383
JD 2444690.5	142	163	197	260	398	896	2849	575	324	230	183	155	139	128	123	121	122	127	136	152	177
1981 MAR 27.0	507	468	431	398	369	343	318	300	283	270	260	252	248	248	251	258	271	291	319	360	419
JD 2444680.5	172	203	259	369	679	4258	914	430	287	220	183	161	147	139	135	136	140	148	163	186	225
1981 MAR 17.0	490	452	417	386	359	336	313	295	280	268	259	253	250	251	256	266	282	306	341	391	465

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445000.5																					
1982 JAN 31.0																					
JD2445040.5																					
1982 MAR 12.0																					
JD2445080.5																					
1982 APR 21.0																					
JD2445120.5																					
1982 MAY 31.0																					
JD2445160.5																					
1982 JUL 10.0																					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E14

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5		-257	-331	-408	-485	-560	-632	-700	-761	-817	-865	-906	-941	-968	-989	-1004	-1012	-1016	1015	1007	995	977
1981 JUL 15.0		1709	1709	1706	1701	1694	1685	1676	1666	1657	1647	1639	1631	1626	1621	1618	1617	1618	1621	1627	1636	1649
JD 2444790.5		-285	-359	-435	-510	-583	-653	-718	-776	-829	-875	-914	-947	-973	-992	-1006	-1013	1017	1014	1005	992	972
1981 JUL 5.0		1720	1719	1714	1708	1700	1691	1681	1671	1661	1651	1642	1635	1628	1624	1621	1620	1622	1626	1632	1643	1657
JD 2444780.5		-314	-388	-462	-536	-606	-673	-735	-792	-842	-885	-922	-953	-977	-995	-1008	-1014	1017	1012	1003	988	966
1981 JUN 25.0		1730	1728	1722	1715	1706	1696	1686	1675	1665	1655	1646	1639	1632	1628	1625	1625	1626	1631	1639	1651	1668
JD 2444770.5		-343	-416	-489	-561	-629	-694	-753	-807	-854	-895	-930	-959	-982	-998	-1009	-1015	1016	1011	1000	983	959
1981 JUN 15.0		1740	1736	1730	1721	1712	1701	1690	1679	1669	1659	1650	1642	1636	1632	1629	1629	1632	1638	1647	1661	1680
JD 2444760.5		-373	-445	-517	-586	-652	-714	-771	-822	-867	-906	-939	-965	-986	-1002	-1011	-1015	1015	1009	996	977	950
1981 JUN 5.0		1749	1744	1736	1727	1717	1706	1695	1683	1673	1663	1654	1646	1640	1636	1634	1635	1638	1645	1656	1672	1693
JD 2444750.5		-403	-474	-544	-611	-675	-734	-788	-837	-879	-916	-947	-972	-991	-1005	-1013	1017	1014	1006	991	969	939
1981 MAY 26.0		1758	1751	1743	1733	1722	1711	1699	1688	1677	1667	1658	1651	1645	1641	1640	1641	1645	1653	1666	1684	1710
JD 2444740.5		-434	-503	-571	-636	-697	-754	-805	-851	-891	-926	-955	-978	-995	-1007	-1014	1016	1012	1002	985	960	926
1981 MAY 16.0		1766	1758	1749	1738	1727	1715	1703	1692	1681	1671	1662	1655	1650	1647	1646	1648	1653	1663	1678	1699	1729
JD 2444730.5		-464	-532	-598	-661	-720	-774	-822	-866	-903	-936	-963	-984	-999	-1010	-1015	1015	1009	997	977	948	909
1981 MAY 6.0		1773	1765	1755	1743	1731	1719	1707	1696	1685	1675	1667	1660	1655	1652	1652	1656	1663	1674	1692	1717	1752
JD 2444720.5		-495	-561	-625	-685	-742	-793	-839	-880	-916	-946	-970	-989	-1003	-1012	1016	1014	1005	990	967	934	888
1981 APR 26.0		1780	1771	1760	1748	1736	1723	1711	1700	1689	1679	1671	1665	1661	1659	1660	1664	1673	1687	1708	1737	1779
JD 2444710.5		-525	-590	-652	-710	-763	-812	-856	-891	-927	-955	-977	-995	-1007	-1013	1016	1011	1000	982	954	915	861
1981 APR 16.0		1787	1776	1765	1752	1740	1727	1715	1707	1693	1684	1676	1670	1667	1666	1668	1674	1685	1702	1727	1762	1813
JD 2444700.5		-556	-619	-678	-734	-785	-831	-871	-908	-939	-964	-984	-1000	-1010	-1014	1014	1007	993	971	938	892	827
1981 APR 6.0		1793	1781	1769	1757	1744	1731	1720	1707	1697	1689	1682	1676	1674	1674	1678	1686	1699	1720	1750	1792	1854
JD 2444690.5		-586	-647	-704	-757	-805	-849	-889	-921	-949	-973	-991	-1004	-1012	1015	1011	1001	984	957	917	861	781
1981 MAR 27.0		1798	1786	1774	1761	1748	1735	1722	1712	1702	1694	1687	1683	1681	1683	1688	1699	1716	1741	1777	1830	1907
JD 2444680.5		-617	-675	-730	-780	-826	-864	-903	-934	-960	-981	-997	-1007	-1013	1014	1007	994	971	938	890	822	722
1981 MAR 17.0		1803	1791	1778	1765	1752	1741	1727	1716	1707	1699	1694	1690	1690	1693	1701	1714	1735	1766	1811	1877	1975
	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M20
E14

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5	90	94	99	104	110	116	122	128	135	142	149	156	164	171	179	188	196	205	214	223	233
1981 JUL 15.0	132	139	146	153	161	168	176	184	192	200	209	217	226	235	244	253	262	271	280	290	299
JD 2444790.5	93	98	103	108	114	120	126	132	139	146	153	161	168	176	184	192	201	209	218	228	238
1981 JUL 5.0	138	145	152	159	167	175	182	190	199	207	215	224	233	242	251	260	269	278	287	296	306
JD 2444780.5	97	102	107	112	118	124	130	137	144	150	158	165	173	181	189	197	205	214	223	233	243
1981 JUN 25.0	144	151	158	166	173	181	189	197	205	214	222	231	240	248	257	266	275	285	294	303	313
JD 2444770.5	101	106	111	116	122	128	135	141	148	155	162	170	177	185	193	202	210	219	228	238	248
1981 JUN 15.0	150	157	165	172	180	187	195	203	212	220	229	237	246	255	264	273	282	291	301	310	319
JD 2444760.5	104	109	115	120	126	132	139	146	152	160	167	174	182	190	198	207	215	224	233	243	254
1981 JUN 5.0	156	163	171	178	186	194	202	210	218	227	235	244	253	262	271	280	289	298	308	317	326
JD 2444750.5	108	113	119	125	131	137	143	150	157	164	172	179	187	195	203	211	220	229	239	249	259
1981 MAY 26.0	162	170	177	185	192	200	208	217	225	234	242	251	260	269	278	287	296	305	314	324	333
JD 2444740.5	112	117	123	129	135	141	148	155	162	169	176	184	192	200	208	216	225	234	244	254	265
1981 MAY 16.0	169	176	183	191	199	207	215	223	232	240	249	258	267	276	285	294	303	312	321	330	340
JD 2444730.5	116	121	127	133	139	146	152	159	166	174	181	189	197	205	213	222	230	240	250	260	272
1981 MAY 6.0	175	182	190	197	205	213	222	230	238	247	256	265	274	282	292	301	310	319	328	337	347
JD 2444720.5	120	125	131	137	143	150	157	164	171	178	186	194	202	210	218	227	236	245	255	266	279
1981 APR 26.0	181	188	196	204	212	220	228	237	245	254	263	271	280	289	298	308	317	326	335	344	354
JD 2444710.5	124	129	135	141	148	154	161	168	176	183	191	199	207	215	223	232	241	251	261	273	286
1981 APR 16.0	187	194	202	210	218	226	235	243	252	261	270	278	287	296	305	315	324	333	342	351	360
JD 2444700.5	128	133	139	146	152	159	166	173	181	188	196	204	212	220	229	238	247	257	268	280	295
1981 APR 6.0	193	201	209	217	225	233	241	250	259	268	276	285	294	303	312	322	331	340	349	358	367
JD 2444690.5	132	138	144	150	157	164	171	178	185	193	201	209	217	225	234	243	253	263	275	288	305
1981 MAR 27.0	199	207	215	223	231	240	248	257	266	274	283	292	301	310	319	329	338	347	356	365	374
JD 2444680.5	136	142	148	155	161	168	176	183	190	198	206	214	222	231	240	249	259	270	282	298	319
1981 MAR 17.0	206	213	222	230	238	246	255	264	273	291	290	299	308	317	326	336	345	354	363	372	381

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E14

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5 1981 JUL 15.0	1524	1524	1524	1524	1524	1524	1524	1524	1486	1405	1338	1292	1524	1238	1186	1169	1162	1165	1177	1197	1227
JD 2444790.5 1981 JUL 5.0	1524	1524	1524	1524	1524	1524	1524	1524	1467	1389	1327	1294	1349	1205	1179	1166	1162	1167	1180	1203	1236
JD 2444780.5 1981 JUN 25.0	1524	1524	1524	1524	1524	1524	1524	1524	1447	1374	1315	1515	1230	1195	1175	1164	1162	1169	1185	1210	1247
JD 2444770.5 1981 JUN 15.0	1524	1524	1524	1524	1524	1524	1524	1510	1427	1358	1304	1261	1216	1189	1172	1163	1163	1172	1191	1220	1261
JD 2444760.5 1981 JUN 5.0	1524	1524	1524	1524	1524	1524	1524	1486	1408	1342	1524	1243	1209	1185	1170	1163	1165	1177	1198	1231	1279
JD 2444750.5 1981 MAY 26.0	1524	1524	1524	1524	1524	1524	1524	1462	1389	1332	1278	1234	1203	1181	1168	1163	1168	1182	1208	1245	1300
JD 2444740.5 1981 MAY 16.0	1524	1524	1524	1524	1524	1524	1520	1440	1375	1454	1266	1226	1197	1177	1166	1165	1172	1190	1219	1263	1327
JD 2444730.5 1981 MAY 6.0	1524	1524	1524	1524	1524	1524	1493	1422	1524	1313	1254	1217	1191	1174	1166	1167	1178	1200	1234	1286	1361
JD 2444720.5 1981 APR 26.0	1524	1524	1524	1524	1524	1524	1470	1437	1456	1290	1242	1209	1186	1171	1166	1171	1185	1212	1254	1315	1404
JD 2444710.5 1981 APR 16.0	1524	1524	1524	1524	1524	1521	1462	1524	1342	1273	1231	1201	1181	1170	1168	1176	1195	1228	1278	1352	1460
JD 2444700.5 1981 APR 6.0	1524	1524	1524	1524	1524	1501	1524	1451	1310	1257	1220	1194	1177	1169	1171	1184	1208	1249	1310	1400	1524
JD 2444690.5 1981 MAR 27.0	1524	1524	1524	1524	1524	1524	1524	1360	1287	1242	1210	1187	1174	1170	1176	1194	1226	1276	1351	1463	1524
JD 2444680.5 1981 MAR 17.0	1524	1524	1524	1524	1524	1524	1443	1323	1267	1228	1200	1181	1172	1173	1184	1209	1249	1312	1406	1524	1524

(FLT T)(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445000.5 1982 JAN 31.0			JD2445040.5 1982 MAR 12.0				JD2445080.5 1982 APR 21.0					JD2445120.5 1982 MAY 31.0					JD2445160.5 1982 JUL 10.0			

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

N20
E14

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5		1164	959	770	596	438	296	169	58	0	0	0	0	4	0	0	0	0	0	0	0	0
1981 JUL 15.0		1069	930	805	695	598	515	444	384	336	297	266	247	488	286	232	218	214	214	218	227	241
JD 2444790.5		1089	894	713	547	396	260	140	34	0	0	0	0	0	0	0	0	0	0	0	0	0
1981 JUL 5.0		1051	918	798	692	599	518	449	391	344	305	275	263	417	249	230	223	221	223	229	240	258
JD 2444780.5		1017	830	657	499	355	225	110	10	0	0	0	0	0	0	0	0	0	0	0	0	0
1981 JUN 25.0		1034	907	792	690	600	522	455	399	352	314	284	484	272	246	235	230	230	233	242	256	277
JD 2444770.5		946	767	602	451	314	191	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981 JUN 15.0		1019	897	786	688	601	526	462	407	362	325	294	300	265	251	244	240	241	246	257	274	300
JD 2444760.5		877	706	548	404	273	156	53	0	0	0	2505	0	0	0	0	0	0	0	0	0	0
1981 JUN 5.0		1006	888	781	687	603	531	469	416	372	337	2705	288	272	260	254	252	254	262	275	296	327
JD 2444750.5		809	646	495	358	234	122	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 26.0		993	879	777	686	606	536	476	426	385	365	316	296	282	272	266	266	270	280	296	322	359
JD 2444740.5		743	587	443	312	194	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 16.0		980	871	773	686	609	542	485	438	409	469	327	308	294	285	281	281	288	300	321	352	398
JD 2444730.5		677	529	392	268	156	56	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
1981 MAY 6.0		969	864	770	686	612	549	496	458	631	372	340	321	308	300	297	299	308	324	349	387	444
JD 2444720.5		613	472	342	224	118	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981 APR 26.0		958	857	767	686	616	557	512	522	506	380	353	335	323	316	315	320	331	352	383	430	500
JD 2444710.5		551	416	293	181	82	0	0	2712	0	0	0	0	0	0	0	0	0	0	0	0	0
1981 APR 16.0		947	850	764	688	622	569	547	2967	435	391	367	350	339	334	335	343	358	384	423	481	568
JD 2444700.5		490	361	245	140	48	0	101	0	0	0	0	0	0	0	0	0	0	0	0	0	11
1981 APR 6.0		936	844	762	690	630	592	764	546	438	405	382	367	358	355	358	369	390	422	471	544	654
JD 2444690.5		430	308	198	101	21	6	534	0	0	0	0	0	0	0	0	0	0	0	0	0	110
1981 MAR 27.0		926	838	761	694	645	667	1099	498	448	419	399	385	378	377	384	400	426	467	529	622	763
JD 2444680.5		372	257	154	66	14	1140	0	0	0	0	0	0	0	0	0	0	0	0	0	25	247
1981 MAR 17.0		916	833	761	703	682	1719	590	498	460	434	416	405	400	403	414	435	469	521	600	719	905

	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E14

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444800.5	2233	1889	1575	1291	1036	810	613	442	336	297	266	247	491	286	232	218	214	214	218	227	241
1981 JUL 15.0	592	694	795	895	995	1095	1194	1292	1390	1487	1584	1681	1776	1873	1968	2064	2159	2254	2350	2445	2541
JD 2444790.5	2140	1812	1511	1239	995	778	589	425	344	305	275	263	417	249	230	223	221	223	229	240	258
1981 JUL 5.0	645	746	847	948	1048	1147	1246	1345	1443	1540	1637	1733	1830	1925	2021	2116	2211	2307	2402	2498	2594
JD 2444780.5	2051	1737	1449	1188	955	747	566	409	352	314	284	484	272	246	235	230	230	233	242	256	277
1981 JUN 25.0	698	800	901	1001	1101	1201	1300	1398	1496	1593	1690	1786	1883	1979	2074	2169	2265	2360	2456	2551	2647
JD 2444770.5	1965	1664	1389	1139	915	717	543	407	362	325	294	300	265	251	244	240	241	246	257	274	300
1981 JUN 15.0	753	854	955	1056	1156	1255	1354	1453	1551	1648	1745	1841	1937	2033	2128	2224	2319	2415	2510	2606	2702
JD 2444760.5	1882	1594	1330	1091	877	687	521	416	372	337	5210	288	272	260	254	252	254	262	275	296	327
1981 JUN 5.0	808	909	1010	1111	1211	1311	1410	1508	1606	1703	1800	1896	1992	2088	2184	2279	2374	2470	2565	2661	2757
JD 2444750.5	1802	1525	1272	1044	839	658	500	426	385	365	316	296	282	272	266	266	270	280	296	322	359
1981 MAY 26.0	864	966	1067	1167	1267	1367	1466	1564	1662	1759	1856	1953	2049	2144	2240	2335	2431	2526	2622	2717	2813
JD 2444740.5	1723	1458	1216	998	803	631	485	438	409	469	327	308	294	285	281	281	288	300	321	352	398
1981 MAY 16.0	922	1023	1124	1224	1325	1424	1523	1621	1719	1817	1914	2010	2106	2202	2297	2393	2488	2583	2679	2775	2871
JD 2444730.5	1646	1393	1162	953	768	605	496	458	633	372	340	321	308	300	297	299	308	324	349	387	444
1981 MAY 6.0	980	1081	1182	1283	1383	1482	1581	1680	1777	1875	1972	2068	2164	2260	2355	2451	2546	2641	2737	2833	2929
JD 2444720.5	1571	1329	1108	910	735	582	512	522	506	380	353	335	323	316	315	320	331	352	383	430	500
1981 APR 26.0	1039	1140	1241	1342	1442	1541	1640	1738	1837	1934	2031	2127	2223	2319	2414	2510	2605	2700	2796	2892	2988
JD 2444710.5	1498	1266	1057	869	704	569	547	5679	435	391	367	350	339	334	335	343	358	384	423	461	568
1981 APR 16.0	1099	1200	1301	1401	1502	1601	1700	1791	1897	1994	2091	2187	2283	2379	2474	2570	2665	2760	2856	2952	3048
JD 2444700.5	1426	1206	1007	830	678	592	865	546	438	405	382	367	358	355	358	369	390	422	471	544	665
1981 APR 6.0	1159	1261	1362	1462	1562	1661	1759	1860	1957	2055	2151	2248	2344	2439	2535	2630	2726	2821	2917	3012	3108
JD 2444690.5	1356	1147	959	795	665	673	1633	498	448	419	399	385	378	377	384	400	426	467	529	622	874
1981 MAR 27.0	1221	1322	1423	1523	1623	1722	1825	1921	2019	2116	2213	2309	2405	2501	2596	2692	2787	2882	2978	3074	3170
JD 2444680.5	1288	1090	915	769	696	2859	590	498	460	434	416	405	400	403	414	435	469	521	600	744	1153
1981 MAR 17.0	1283	1384	1485	1585	1685	1780	1885	1983	2081	2178	2275	2371	2467	2563	2658	2754	2849	2944	3040	3136	3232

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445000.5					JD2445040.5					JD2445080.5					JD2445120.5					JD2445160.5	
1982 JAN 31.0					1982 MAR 12.0					1982 APR 21.0					1982 MAY 31.0					1982 JUL 10.0	

EARTH DEPARTURE OR ARRIVAL DATE

M20
E15

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445040.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671665	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.634	DEGREES
MEAN ANOM. AT EPOCH	=	66.688	DEGREES
DATE OF NODAL PASSAGE	=	2445235.863	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445040.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338903	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.420	DEGREES
ARG. OF PERIHELION	=	286.311	DEGREES
MEAN ANOM. AT EPOCH	=	210.893	DEGREES
DATE OF NODAL PASSAGE	=	2444759.481	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.070	DEGREES

M20
E15

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T) (400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5	177	207	243	286	338	404	488	602	762	989	1290	0	1449	1390	1330	1268	1206	1144	1081	1019	958
1981 JUL 15.0	111	123	140	163	193	234	290	369	483	648	870	0	1009	965	922	878	835	792	751	710	671
JD 2444790.5	184	216	255	302	360	434	532	667	860	1130	1460	1477	1419	1360	1299	1238	1176	1114	1053	991	931
1981 JUL 5.0	120	134	153	179	214	261	327	423	562	761	1007	1041	997	953	910	866	823	780	739	699	660
JD 2444780.5	192	227	270	321	386	471	586	749	983	1297	0	1446	1388	1329	1268	1207	1146	1085	1024	963	904
1981 JUN 25.0	131	147	168	198	238	293	373	489	661	896	0	1029	985	942	898	854	811	769	728	687	649
JD 2444770.5	202	240	287	344	418	517	654	853	1136	1481	1472	1415	1357	1297	1237	1177	1116	1055	995	935	877
1981 JUN 15.0	142	160	185	219	266	333	430	574	785	1047	1061	1018	974	929	886	842	799	757	716	677	638
JD 2444760.5	214	256	307	372	458	575	742	987	1319	1495	1440	1383	1325	1266	1206	1146	1085	1025	966	907	849
1981 JUN 5.0	155	176	205	245	301	382	502	684	935	1093	1050	1006	962	917	873	830	787	746	705	666	628
JD 2444750.5	228	274	332	406	507	648	856	1157	0	1463	1408	1351	1293	1234	1174	1114	1054	995	936	879	822
1981 MAY 26.0	170	194	228	275	343	443	596	823	0	1081	1038	994	949	905	861	818	776	734	694	655	618
JD 2444740.5	245	296	362	449	569	745	1006	1358	1485	1431	1375	1318	1260	1201	1142	1083	1024	965	907	850	794
1981 MAY 16.0	187	216	255	312	396	524	719	990	1113	1069	1025	981	937	893	849	806	764	723	683	645	608
JD 2444730.5	265	323	399	503	651	873	1196	0	1453	1398	1342	1285	1227	1168	1110	1051	992	935	878	822	767
1981 MAY 6.0	207	240	289	359	465	630	877	0	1101	1057	1013	968	924	880	837	794	752	712	673	635	599
JD 2444720.5	289	356	446	572	760	1042	1418	1473	1420	1364	1308	1251	1193	1135	1077	1019	961	904	848	793	740
1981 APR 26.0	230	270	329	418	556	771	1064	1131	1088	1044	1000	955	911	867	824	782	741	701	662	625	590
JD 2444710.5	319	398	506	665	906	1257	1492	1440	1386	1330	1274	1217	1160	1102	1044	987	930	874	819	765	712
1981 APR 16.0	257	307	381	496	678	950	1161	1118	1074	1030	986	942	898	854	812	770	729	690	652	616	581
JD 2444700.5	356	450	585	790	1101	1499	1459	1406	1351	1296	1240	1183	1126	1068	1011	955	898	843	789	736	685
1981 APR 6.0	290	353	448	601	841	1155	1147	1104	1060	1016	972	928	884	841	799	758	718	679	642	606	573
JD 2444690.5	403	519	692	960	1342	1477	1425	1371	1317	1261	1205	1148	1091	1035	978	922	867	813	760	708	0
1981 MAR 27.0	331	411	538	744	1044	1176	1133	1089	1045	1001	957	913	870	828	786	745	706	668	632	597	0
JD 2444680.5	464	611	839	1186	0	1443	1390	1336	1281	1226	1170	1114	1057	1001	945	890	836	782	730	0	0
1981 MAR 17.0	383	489	661	932	0	1160	1117	1074	1030	986	942	899	856	814	773	733	694	657	622	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445200.5 1982 AUG 19.0				JD2445240.5 1982 SEP 28.0				JD2445280.5 1982 NOV 7.0				JD2445320.5 1982 DEC 17.0				JD2445360.5 1983 JAN 26.0					

EARTH DEPARTURE OR ARRIVAL DATE

M20
E15

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5	52	51	57	68	82	98	113	126	136	139	133	0	-197	-178	-157	-134	-108	-82	-54	-26	1
1981 JUL 15.0	8	25	54	90	132	175	219	258	288	301	290	0	3052	3128	3202	3274	3345	3414	3483	3550	16
JD 2444790.5	34	35	43	55	70	86	100	112	119	117	106	-214	-199	-182	-161	-138	-113	-86	-58	-30	-2
1981 JUL 5.0	3595	13	42	78	118	160	200	233	254	253	229	2960	3037	3113	3188	3261	3332	3402	3470	3537	4
JD 2444780.5	15	19	29	42	57	73	86	96	98	91	0	-216	-202	-185	-164	-142	-117	-90	-63	-35	-7
1981 JUN 25.0	3581	3600	28	64	103	142	177	204	212	196	0	2944	3022	3099	3174	3247	3319	3389	3457	3525	3591
JD 2444770.5	-3	3	14	29	44	58	70	76	73	60	-227	-217	-204	-187	-168	-145	-121	-94	-67	-39	-11
1981 JUN 15.0	3565	3584	14	49	86	122	151	167	161	130	2849	2929	3007	3084	3160	3233	3305	3375	3444	3511	3578
JD 2444760.5	-21	-12	0	14	29	43	52	53	43	-233	-228	-219	-206	-190	-171	-149	-125	-99	-71	-43	-15
1981 JUN 5.0	3547	3568	3597	31	66	97	119	122	99	2753	2834	2913	2992	3069	3145	3219	3291	3362	3430	3498	3564
JD 2444750.5	-39	-28	-15	-0	13	25	30	24	0	-232	-228	-220	-208	-193	-174	-152	-128	-102	-75	-47	-18
1981 MAY 26.0	3527	3549	3579	11	43	69	80	66	0	2737	2817	2898	2977	3054	3131	3205	3277	3348	3417	3484	3550
JD 2444740.5	-57	-45	-31	-16	-3	4	3	-9	-231	-232	-229	-222	-210	-195	-177	-156	-132	-106	-79	-51	-22
1981 MAY 16.0	3506	3529	3558	3589	16	33	29	3597	2640	2720	2801	2882	2961	3039	3116	3190	3263	3334	3403	3470	3535
JD 2444730.5	-75	-62	-47	-34	-23	-20	-28	0	-230	-231	-229	-222	-212	-197	-180	-159	-135	-110	-82	-54	-24
1981 MAY 6.0	3483	3507	3535	3563	3584	3588	3566	0	2623	2704	2785	2866	2945	3024	3100	3175	3248	3319	3388	3455	3520
JD 2444720.5	-92	-79	-65	-53	-46	-49	-65	-221	-228	-231	-229	-223	-213	-199	-182	-162	-138	-113	-85	-56	-25
1981 APR 26.0	3458	3482	3509	3532	3543	3531	3487	2527	2607	2687	2768	2849	2929	3008	3085	3160	3233	3304	3373	3439	3504
JD 2444710.5	-110	-96	-83	-74	-73	-84	-207	-219	-226	-230	-229	-224	-214	-201	-184	-164	-141	-115	-88	-58	-25
1981 APR 16.0	3431	3455	3478	3494	3491	3457	2431	2510	2590	2671	2752	2833	2913	2992	3069	3145	3218	3289	3357	3423	3486
JD 2444700.5	-127	-114	-104	-99	-105	-122	-204	-216	-224	-228	-228	-224	-215	-203	-186	-166	-143	-118	-89	-58	-22
1981 APR 6.0	3401	3424	3442	3446	3423	3366	2415	2493	2573	2654	2735	2816	2897	2976	3053	3129	3202	3273	3341	3406	3467
JD 2444690.5	-145	-134	-126	-128	-141	-184	-200	-213	-222	-227	-228	-224	-216	-204	-188	-168	-145	-119	-89	-55	0
1981 MAR 27.0	3368	3387	3397	3384	3335	2322	2399	2477	2556	2637	2718	2799	2880	2959	3037	3112	3186	3256	3323	3387	0
JD 2444680.5	-163	-154	-152	-160	0	-179	-196	-210	-220	-225	-227	-224	-217	-205	-189	-170	-146	-119	-88	0	0
1981 MAR 17.0	3330	3343	3339	3301	0	2306	2382	2460	2539	2620	2701	2782	2863	2943	3020	3096	3169	3239	3305	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
	JD2445200.5			JD2445240.5			JD2445280.5			JD2445320.5			JD2445360.5								
	1982 AUG 19.0			1982 SEP 28.0			1982 NOV 7.0			1982 DEC 17.0			1983 JAN 26.0								

EARTH DEPARTURE OR ARRIVAL DATE

M20
E15

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T) (400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5	92	105	117	127	136	144	153	163	176	194	217	0	209	204	197	191	185	178	171	164	157
1981 JUL 15.0	1153	1191	1229	1265	1297	1322	1339	1344	1331	1292	1218	0	1189	1213	1237	1260	1283	1305	1327	1348	1368
JD 2444790.5	105	117	128	138	147	156	166	177	193	213	234	221	217	211	206	200	194	188	181	175	168
1981 JUL 5.0	1143	1176	1209	1240	1266	1286	1296	1292	1266	1207	1111	1123	1147	1171	1195	1218	1241	1263	1284	1306	1326
JD 2444780.5	117	128	138	148	158	167	178	192	209	230	0	227	223	218	213	208	203	197	191	185	178
1981 JUN 25.0	1127	1156	1184	1210	1231	1244	1246	1231	1188	1107	0	1080	1104	1128	1152	1175	1197	1219	1241	1262	1282
JD 2444770.5	129	139	148	158	168	179	191	206	224	240	235	232	228	224	220	215	210	205	199	194	188
1981 JUN 15.0	1106	1130	1154	1175	1191	1197	1190	1161	1096	991	1011	1036	1060	1084	1107	1130	1153	1175	1196	1217	1237
JD 2444760.5	140	149	158	168	178	189	203	219	234	239	237	235	232	229	225	221	217	212	207	201	196
1981 JUN 5.0	1079	1100	1120	1136	1145	1144	1125	1076	986	942	966	991	1015	1038	1062	1084	1107	1129	1150	1171	1191
JD 2444750.5	149	158	167	176	187	199	213	228	0	240	238	237	235	232	229	225	222	217	213	207	202
1981 MAY 26.0	1047	1065	1081	1092	1094	1083	1048	975	0	896	920	944	968	992	1015	1038	1060	1081	1103	1123	1143
JD 2444740.5	158	166	174	184	195	207	220	230	239	239	238	237	236	234	231	229	225	221	217	212	207
1981 MAY 16.0	1012	1026	1037	1042	1037	1013	956	855	825	849	873	897	921	944	967	989	1011	1033	1054	1074	1094
JD 2444730.5	165	172	180	190	201	212	221	0	236	237	237	236	236	234	232	230	227	224	220	215	209
1981 MAY 6.0	972	982	989	987	971	929	845	0	778	802	825	849	872	895	918	940	962	983	1004	1024	1044
JD 2444720.5	170	177	185	194	204	212	213	230	231	233	234	234	234	233	232	230	227	224	220	215	209
1981 APR 26.0	928	934	935	925	894	828	715	706	730	754	777	800	823	846	868	890	912	933	953	973	992
JD 2444710.5	173	180	187	195	202	203	220	223	225	227	229	230	230	230	229	228	226	223	219	214	206
1981 APR 16.0	880	882	875	853	802	707	636	659	682	705	728	751	774	796	818	840	861	882	902	921	940
JD 2444700.5	175	180	186	192	193	182	211	215	218	220	222	224	225	225	225	224	222	219	215	209	198
1981 APR 6.0	827	824	808	770	692	568	588	611	634	656	679	701	724	746	767	789	809	830	850	869	887
JD 2444690.5	173	177	181	182	172	197	201	205	209	212	215	217	218	219	219	218	217	213	208	200	0
1981 MAR 27.0	771	759	731	670	561	519	541	563	585	608	630	652	673	695	716	737	758	778	797	816	0
JD 2444680.5	169	171	170	161	0	185	190	194	198	202	205	208	210	211	211	211	209	205	198	0	0
1981 MAR 17.0	708	687	640	549	0	472	494	515	537	559	580	602	623	644	665	686	706	726	745	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445200.5 1982 AUG 19.0			JD2445240.5 1982 SEP 28.0				JD2445280.5 1982 NOV 7.0					JD2445320.5 1982 DEC 17.0					JD2445360.5 1983 JAN 26.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E15

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T) (400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5 1981 JUL 15.0	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	0	2388	2388	2388	2388	2388	2388	2388	2388	2388
JD 2444790.5 1981 JUL 5.0	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406
JD 2444780.5 1981 JUN 25.0	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419	0	2419	2419	2419	2419	2419	2419	2419	2419	2419	2419
JD 2444770.5 1981 JUN 15.0	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428	2428
JD 2444760.5 1981 JUN 5.0	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434	2434
JD 2444750.5 1981 MAY 26.0	2436	2436	2436	2436	2436	2436	2436	2436	0	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436	2436
JD 2444740.5 1981 MAY 16.0	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435	2435
JD 2444730.5 1981 MAY 6.0	2432	2432	2432	2432	2432	2432	2432	0	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432	2432
JD 2444720.5 1981 APR 26.0	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426	2426
JD 2444710.5 1981 APR 16.0	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418	2418
JD 2444700.5 1981 APR 6.0	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409	2409
JD 2444690.5 1981 MAR 27.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	0
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	2386	0	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
	JD2445200.5 1982 AUG 19.0				JD2445240.5 1982 SEP 28.0				JD2445280.5 1982 NOV 7.0				JD2445320.5 1982 DEC 17.0				JD2445360.5 1983 JAN 26.0				

EARTH DEPARTURE OR ARRIVAL DATE

M20
E15

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5	162	162	162	162	162	162	162	162	162	162	162	0	162	162	162	162	162	162	162	162	162
1981 JUL 15.0	247	247	247	247	247	247	247	247	247	247	247	0	247	247	247	247	247	247	247	247	247
JD 2444790.5	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
1981 JUL 5.0	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
JD 2444780.5	130	130	130	130	130	130	130	130	130	130	0	130	130	130	130	130	130	130	130	130	130
1981 JUN 25.0	194	194	194	194	194	194	194	194	194	194	0	194	194	194	194	194	194	194	194	194	194
JD 2444770.5	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
1981 JUN 15.0	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
JD 2444760.5	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
1981 JUN 5.0	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144
JD 2444750.5	83	83	83	83	83	83	83	83	0	83	83	83	83	83	83	83	83	83	83	83	83
1981 MAY 26.0	120	120	120	120	120	120	120	120	0	120	120	120	120	120	120	120	120	120	120	120	120
JD 2444740.5	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
1981 MAY 16.0	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
JD 2444730.5	52	52	52	52	52	52	52	0	52	52	52	52	52	52	52	52	52	52	52	52	52
1981 MAY 6.0	74	74	74	74	74	74	74	0	74	74	74	74	74	74	74	74	74	74	74	74	74
JD 2444720.5	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
1981 APR 26.0	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
JD 2444710.5	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
1981 APR 16.0	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
JD 2444700.5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
1981 APR 6.0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
JD 2444690.5	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	0
1981 MAR 27.0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	0
JD 2444680.5	26	26	26	26	0	26	26	26	26	26	26	26	26	26	26	26	26	26	26	0	0
1981 MAR 17.0	37	37	37	37	0	37	37	37	37	37	37	37	37	37	37	37	37	37	37	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445200.5 1982 AUG 19.0	JD2445240.5 1982 SEP 28.0	JD2445280.5 1982 NOV 7.0	JD2445320.5 1982 DEC 17.0	JD2445360.5 1983 JAN 26.0																	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E15

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5		2541	2638	2735	2832	2930	3028	3127	3227	3327	3427	3528	0	132	234	335	437	539	641	742	843	943
1981 JUL 15.0		1398	1388	1378	1368	1361	1359	1366	1387	1434	1523	1668	0	1747	1706	1665	1624	1583	1542	1502	1462	1423
JD 2444790.5		2594	2690	2787	2885	2982	3081	3180	3279	3379	3480	3580	83	184	286	388	490	592	693	794	895	995
1981 JUL 5.0		1366	1358	1350	1344	1341	1344	1360	1394	1463	1583	1761	1767	1725	1684	1643	1601	1560	1520	1479	1439	1400
JD 2444780.5		2647	2744	2841	2938	3036	3134	3233	3333	3433	3533	0	136	238	339	441	543	645	746	848	949	1049
1981 JUN 25.0		1336	1330	1324	1321	1323	1334	1360	1413	1509	1667	0	1745	1703	1661	1620	1579	1537	1497	1456	1416	1377
JD 2444770.5		2702	2798	2895	2992	3090	3189	3288	3387	3487	3588	89	190	292	394	496	598	699	801	902	1003	1103
1981 JUN 15.0		1308	1304	1301	1302	1310	1330	1370	1446	1579	1774	1763	1722	1680	1638	1597	1555	1514	1473	1432	1392	1353
JD 2444760.5		2757	2854	2950	3048	3146	3244	3343	3443	3543	43	144	246	347	449	551	653	755	856	957	1058	1159
1981 JUN 5.0		1281	1280	1281	1287	1303	1334	1394	1501	1676	1782	1740	1699	1657	1615	1573	1531	1490	1449	1408	1368	1329
JD 2444750.5		2813	2910	3007	3104	3202	3300	3399	3499	0	99	200	302	403	505	607	709	811	912	1014	1114	1215
1981 MAY 26.0		1257	1259	1265	1277	1302	1349	1435	1583	0	1759	1717	1675	1632	1590	1548	1507	1465	1424	1384	1343	1304
JD 2444740.5		2871	2967	3064	3161	3259	3357	3456	3556	56	157	258	359	461	563	664	766	868	970	1071	1172	1272
1981 MAY 16.0		1236	1242	1253	1273	1311	1379	1501	1696	1776	1734	1692	1650	1608	1566	1524	1482	1440	1399	1358	1318	1279
JD 2444730.5		2929	3025	3122	3219	3317	3416	3514	0	114	215	316	417	519	621	723	824	926	1028	1129	1230	1330
1981 MAY 6.0		1219	1229	1246	1277	1332	1431	1599	0	1752	1710	1667	1625	1582	1540	1498	1456	1415	1374	1333	1293	1254
JD 2444720.5		2988	3084	3181	3278	3376	3474	3573	74	173	274	375	476	578	680	782	884	985	1087	1188	1289	1389
1981 APR 26.0		1205	1221	1247	1292	1372	1512	1730	1769	1727	1684	1642	1599	1557	1514	1472	1430	1389	1348	1307	1267	1228
JD 2444710.5		3048	3144	3241	3338	3436	3534	35	133	233	334	435	536	638	740	842	943	1045	1147	1248	1349	1449
1981 APR 16.0		1197	1219	1257	1322	1437	1630	1785	1743	1701	1658	1616	1573	1531	1488	1446	1404	1363	1322	1281	1241	1202
JD 2444700.5		3108	3205	3301	3399	3496	3588	95	194	294	395	496	597	698	800	902	1004	1106	1207	1309	1409	1510
1981 APR 6.0		1194	1226	1280	1374	1537	1768	1760	1717	1675	1632	1589	1547	1504	1462	1420	1378	1336	1295	1255	1215	1176
JD 2444690.5		3170	3266	3363	3460	3556	58	156	255	355	456	557	658	760	862	964	1065	1167	1269	1370	1471	0
1981 MAR 27.0		1199	1245	1322	1457	1678	1775	1733	1691	1648	1605	1563	1520	1477	1435	1393	1351	1310	1269	1229	1189	0
JD 2444680.5		3232	3328	3425	3521	0	119	218	317	417	516	619	720	822	924	1026	1127	1229	1331	1432	0	0
1981 MAR 17.0		1214	1278	1390	1582	0	1749	1706	1664	1621	1578	1535	1493	1450	1408	1366	1325	1283	1243	1203	0	0

	(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445200.5																						
1982 AUG 19.0																						
JD2445240.5																						
1982 SEP 28.0																						
JD2445280.5																						
1982 NOV 7.0																						
JD2445320.5																						
1982 DEC 17.0																						
JD2445360.5																						
1983 JAN 26.0																						

EARTH DEPARTURE OR ARRIVAL DATE

M20
E15

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5	72	70	70	72	76	83	95	115	152	235	559	0	306	176	126	101	86	78	72	70	70
1981 JUL 15.0	256	272	294	322	359	407	472	560	677	824	962	0	995	985	969	949	926	899	870	839	807
JD 2444790.5	55	54	54	57	61	68	80	101	143	258	1585	374	170	112	86	71	63	57	55	54	54
1981 JUL 5.0	261	279	303	334	376	431	506	608	744	899	997	998	990	978	960	939	914	886	856	825	793
JD 2444780.5	37	37	38	40	44	51	62	82	129	319	0	158	92	66	53	46	41	38	37	37	38
1981 JUN 25.0	266	287	313	349	396	460	548	668	820	964	0	995	985	969	950	927	901	872	842	810	778
JD 2444770.5	20	20	21	23	25	30	38	54	101	920	127	60	40	31	26	23	21	20	20	20	21
1981 JUN 15.0	273	296	326	367	421	496	600	740	901	999	998	990	977	960	939	914	887	858	827	795	764
JD 2444760.5	2	2	2	2	3	3	4	7	18	24	7	4	3	3	2	2	2	2	2	2	2
1981 JUN 5.0	281	307	341	388	452	541	664	823	970	999	994	984	969	950	927	901	873	843	812	781	749
JD 2444750.5	17	17	19	21	25	33	48	93	0	94	48	32	25	21	19	17	17	16	17	18	19
1981 MAY 26.0	291	320	360	414	490	596	742	911	0	997	989	977	959	938	914	887	858	828	797	765	734
JD 2444740.5	36	39	43	50	62	84	140	450	354	128	80	59	48	42	38	36	35	35	36	39	43
1981 MAY 16.0	302	336	382	447	538	667	834	980	999	993	983	968	949	926	900	873	843	813	781	750	719
JD 2444730.5	57	63	71	86	112	167	355	0	267	144	101	79	67	60	55	53	53	54	57	63	72
1981 MAY 6.0	317	356	411	488	600	754	927	0	997	988	975	958	937	913	886	858	828	797	766	735	705
JD 2444720.5	81	90	106	133	186	326	1503	554	238	154	116	96	84	76	72	71	72	75	81	91	108
1981 APR 26.0	334	381	447	542	678	855	991	999	992	981	966	946	924	899	871	842	812	781	750	720	690
JD 2444710.5	107	124	150	200	312	769	1476	383	223	160	128	110	98	92	89	89	91	97	107	125	153
1981 APR 16.0	356	412	493	611	776	951	1000	995	986	973	955	934	910	884	856	826	796	765	735	705	675
JD 2444700.5	139	165	211	305	584	6549	639	316	214	165	138	122	112	107	105	107	112	122	139	167	216
1981 APR 6.0	383	452	553	700	885	998	998	991	979	963	944	921	896	868	840	810	780	749	719	690	661
JD 2444690.5	177	219	300	499	1611	1205	449	280	208	169	146	132	124	121	121	126	135	151	177	222	0
1981 MAR 27.0	419	505	632	810	976	999	994	984	970	952	931	907	880	852	823	793	763	733	703	675	0
JD 2444680.5	225	296	449	990	0	654	364	257	203	172	153	142	136	135	138	146	161	185	225	0	0
1981 MAR 17.0	465	574	734	924	0	996	988	976	960	940	917	892	865	836	807	777	747	717	688	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445200.5 1982 AUG 19.0					JD2445240.5 1982 SEP 28.0				JD2445280.5 1982 NOV 7.0				JD2445320.5 1982 DEC 17.0				JD2445360.5 1983 JAN 26.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E15

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5	977	953	922	882	832	766	681	567	415	226	50	0	-6	-21	-44	-73	-110	-152	-199	-250	-304
1981 JUL 15.0	1649	1666	1690	1721	1763	1820	1898	2006	2154	2345	2534	0	2823	2843	2859	2869	2875	2876	2874	2868	2858
JD 2444790.5	972	946	912	868	811	737	639	506	331	131	4	-2	-13	-31	-57	-90	-129	-174	-223	-275	-330
1981 JUL 5.0	1657	1677	1704	1740	1789	1856	1948	2076	2250	2456	2603	2823	2846	2864	2876	2884	2888	2887	2883	2875	2865
JD 2444780.5	966	937	900	851	787	702	586	430	233	47	0	-6	-21	-44	-73	-109	-151	-197	-247	-301	-357
1981 JUN 25.0	1668	1691	1721	1763	1820	1899	2008	2162	2362	2560	0	2847	2867	2882	2893	2898	2900	2897	2891	2882	2870
JD 2444770.5	959	927	885	830	756	657	521	339	129	2	-2	-13	-32	-58	-91	-129	-173	-221	-273	-328	-384
1981 JUN 15.0	1680	1706	1741	1790	1857	1951	2083	2265	2482	2630	2847	2870	2887	2900	2908	2911	2910	2906	2898	2887	2874
JD 2444760.5	950	914	867	804	718	601	439	231	39	-0	-7	-22	-45	-74	-110	-151	-197	-247	-300	-355	-412
1981 JUN 5.0	1693	1724	1765	1822	1902	2015	2175	2386	2592	2846	2871	2891	2906	2916	2921	2922	2920	2913	2904	2892	2877
JD 2444750.5	939	899	845	771	670	530	338	118	0	-3	-14	-34	-60	-92	-131	-174	-222	-274	-328	-384	-441
1981 MAY 26.0	1710	1745	1794	1862	1958	2095	2288	2517	0	2872	2894	2911	2923	2930	2933	2932	2928	2920	2909	2895	2880
JD 2444740.5	926	880	817	730	609	439	219	26	-0	-8	-24	-47	-77	-112	-153	-199	-249	-301	-356	-412	-469
1981 MAY 16.0	1729	1770	1828	1910	2027	2196	2421	2629	2871	2895	2914	2929	2938	2943	2944	2941	2935	2925	2913	2898	2881
JD 2444730.5	909	855	781	677	530	326	96	0	-4	-16	-36	-63	-95	-134	-177	-225	-276	-330	-385	-442	-498
1981 MAY 6.0	1752	1801	1871	1970	2116	2322	2561	0	2896	2917	2934	2945	2952	2955	2954	2949	2941	2929	2916	2900	2882
JD 2444720.5	888	824	735	609	427	193	11	-1	-10	-27	-50	-80	-116	-157	-203	-252	-305	-359	-415	-472	-528
1981 APR 26.0	1779	1838	1923	2048	2229	2469	2669	2896	2919	2938	2951	2960	2965	2965	2962	2955	2945	2933	2918	2901	2883
JD 2444710.5	861	785	676	519	299	66	0	-6	-19	-40	-67	-100	-139	-182	-230	-281	-334	-389	-445	-502	-557
1981 APR 16.0	1813	1885	1991	2147	2369	2615	2896	2921	2941	2957	2968	2974	2976	2974	2969	2960	2949	2935	2919	2901	2882
JD 2444700.5	827	733	598	401	154	2	-2	-13	-31	-55	-86	-122	-163	-209	-258	-310	-365	-420	-476	-532	-587
1981 APR 6.0	1854	1944	2078	2275	2531	2704	2922	2944	2961	2974	2982	2986	2986	2982	2975	2965	2952	2936	2919	2901	2881
JD 2444690.5	781	665	494	256	33	-0	-8	-23	-45	-73	-106	-146	-189	-237	-288	-341	-396	-451	-507	-562	0
1981 MAR 27.0	1907	2021	2192	2434	2673	2922	2946	2965	2980	2990	2995	2997	2995	2989	2980	2968	2953	2937	2919	2900	0
JD 2444680.5	722	574	358	103	0	-4	-16	-35	-61	-92	-129	-171	-217	-266	-318	-372	-427	-483	-538	0	0
1981 MAR 17.0	1975	2122	2339	2605	0	2948	2969	2985	2997	3004	3007	3006	3002	2994	2983	2970	2954	2937	2918	0	0

(FLT T)(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445200.5			JD2445240.5				JD2445280.5				JD2445320.5					JD2445360.5				
1982 AUG 19.0			1982 SEP 28.0				1982 NOV 7.0				1982 DEC 17.0					1983 JAN 26.0				

EARTH DEPARTURE OR ARRIVAL DATE

M20
E15

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5	233	243	254	266	280	296	317	348	405	542	1148	0	112	113	115	117	118	121	123	126	129
1981 JUL 15.0	299	308	318	327	337	346	355	364	373	380	386	0	233	237	240	244	248	253	258	263	268
JD 2444790.5	238	248	259	272	286	304	329	369	452	707	3998	113	113	115	116	118	120	122	125	128	131
1981 JUL 5.0	306	315	325	334	343	353	362	370	379	385	390	234	237	240	244	248	252	257	262	267	272
JD 2444780.5	243	253	265	278	294	314	344	399	535	1176	0	114	115	116	118	120	122	124	127	130	133
1981 JUN 25.0	313	322	331	341	350	359	368	377	384	390	0	237	240	243	247	252	256	261	266	271	277
JD 2444770.5	248	259	271	285	302	326	365	448	714	6080	114	115	116	117	119	121	124	126	129	132	136
1981 JUN 15.0	319	329	338	347	357	366	374	382	389	394	237	240	243	247	251	255	260	265	270	276	282
JD 2444760.5	254	265	278	293	313	342	397	538	1290	114	115	116	117	119	121	123	126	128	131	135	138
1981 JUN 5.0	326	335	345	354	363	372	380	388	394	237	240	243	247	251	255	259	264	269	275	280	286
JD 2444750.5	259	271	285	302	325	364	449	749	0	115	116	117	119	121	123	125	128	131	134	137	141
1981 MAY 26.0	333	342	351	361	370	378	386	393	0	240	243	247	250	254	259	263	268	274	279	285	291
JD 2444740.5	265	278	293	312	342	398	553	1579	115	116	117	118	120	122	124	127	130	133	136	140	144
1981 MAY 16.0	340	349	358	367	376	385	392	397	240	243	246	250	254	258	263	268	273	278	284	290	296
JD 2444730.5	272	285	302	325	366	458	827	0	116	117	118	120	122	124	126	129	132	135	139	142	146
1981 MAY 6.0	347	356	365	374	383	390	397	0	243	246	250	254	258	262	267	272	277	283	289	295	301
JD 2444720.5	279	293	313	343	404	589	2404	116	117	118	120	121	123	126	128	131	134	138	141	145	149
1981 APR 26.0	354	363	372	380	389	396	401	243	246	250	253	257	262	266	271	276	282	287	293	300	306
JD 2444710.5	286	303	327	371	478	998	116	117	118	119	121	123	125	128	130	133	137	140	144	148	152
1981 APR 16.0	360	369	378	387	395	401	243	246	250	253	257	261	265	270	275	281	286	292	298	305	311
JD 2444700.5	295	315	348	417	659	5405	117	118	119	121	123	125	127	130	133	136	139	143	147	151	155
1981 APR 6.0	367	376	385	393	400	404	246	249	253	256	260	265	269	274	280	285	291	297	303	310	316
JD 2444690.5	305	331	380	516	1419	117	118	119	120	122	124	126	129	132	135	138	142	145	149	154	0
1981 MAR 27.0	374	383	391	399	404	246	249	253	256	260	264	269	273	279	284	290	296	302	308	315	0
JD 2444680.5	319	355	441	802	0	118	119	120	122	124	126	128	131	134	137	140	144	148	152	0	0
1981 MAR 17.0	381	389	397	404	0	249	252	256	259	264	268	273	278	283	288	294	300	307	313	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445200.5 1982 AUG 19.0	JD2445240.5 1982 SEP 28.0	JD2445280.5 1982 NOV 7.0	JD2445320.5 1982 DEC 17.0	JD2445360.5 1983 JAN 26.0																	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E15

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5 1981 JUL 15.0	1227	1268	1324	1398	1498	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444790.5 1981 JUL 5.0	1236	1282	1344	1428	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444780.5 1981 JUN 25.0	1247	1299	1369	1465	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444770.5 1981 JUN 15.0	1261	1319	1399	1510	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444760.5 1981 JUN 5.0	1279	1345	1437	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444750.5 1981 MAY 26.0	1300	1377	1485	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444740.5 1981 MAY 16.0	1327	1417	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444730.5 1981 MAY 6.0	1361	1468	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444720.5 1981 APR 26.0	1404	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444710.5 1981 APR 16.0	1460	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444700.5 1981 APR 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444690.5 1981 MAR 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0
JD 2444680.5 1981 MAR 17.0	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445200.5 1982 AUG 19.0	JD2445240.5 1982 SEP 28.0	JD2445280.5 1982 NOV 7.0	JD2445320.5 1982 DEC 17.0	JD2445360.5 1983 JAN 26.0																	

EARTH DEPARTURE OR ARRIVAL DATE

M20
E15

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5	0	0	0	0	0	111	304	585	1002	1623	2475	0	2933	2763	2589	2412	2235	2058	1882	1708	1538
1981 JUL 15.0	241	263	296	343	411	511	656	869	1188	1662	2310	0	2718	2590	2461	2333	2207	2082	1960	1842	1727
JD 2444790.5	0	0	0	0	19	179	409	751	1266	2020	2962	3012	2846	2675	2501	2326	2150	1975	1801	1630	1463
1981 JUL 5.0	258	284	323	379	461	579	755	1017	1412	1990	2713	2811	2683	2555	2426	2298	2171	2047	1926	1808	1695
JD 2444780.5	0	0	0	0	74	264	544	966	1606	2496	0	2924	2757	2586	2413	2239	2065	1892	1720	1552	1388
1981 JUN 25.0	277	309	355	422	520	664	879	1205	1698	2385	0	2778	2649	2520	2391	2263	2137	2013	1893	1776	1664
JD 2444770.5	0	0	0	0	144	373	718	1248	2037	3024	2997	2833	2666	2496	2324	2152	1979	1808	1639	1474	1313
1981 JUN 15.0	300	338	394	474	593	769	1037	1448	2060	2829	2872	2743	2614	2484	2355	2227	2102	1979	1860	1744	1633
JD 2444760.5	0	0	0	44	233	515	949	1618	2558	3065	2906	2742	2575	2405	2235	2063	1893	1724	1558	1396	1238
1981 JUN 5.0	327	373	440	538	683	902	1242	1765	2500	2966	2838	2708	2578	2449	2320	2192	2068	1946	1827	1713	1604
JD 2444750.5	0	0	0	117	349	703	1257	2095	0	2974	2813	2649	2482	2314	2144	1975	1807	1641	1477	1318	1163
1981 MAY 26.0	359	415	496	616	797	1075	1512	2171	0	2932	2803	2673	2542	2413	2284	2157	2033	1913	1796	1683	1575
JD 2444740.5	0	0	22	213	502	956	1670	2671	3037	2880	2719	2555	2389	2221	2053	1886	1720	1557	1396	1240	1089
1981 MAY 16.0	398	465	565	714	943	1303	1869	2663	3024	2896	2766	2636	2506	2376	2248	2122	1999	1880	1764	1653	1547
JD 2444730.5	0	0	101	339	710	1302	2206	0	2943	2785	2624	2460	2294	2128	1962	1796	1633	1472	1316	1163	1015
1981 MAY 6.0	444	527	651	840	1136	1609	2329	0	2988	2859	2729	2598	2468	2339	2212	2087	1965	1847	1733	1624	1520
JD 2444720.5	0	11	206	509	996	1772	2843	3002	2847	2688	2527	2364	2199	2034	1870	1707	1546	1389	1235	1086	942
1981 APR 26.0	500	603	760	1004	1395	2019	2879	3079	2950	2821	2690	2560	2430	2302	2175	2052	1931	1815	1703	1596	1493
JD 2444710.5	0	98	347	745	1393	2380	3057	2905	2750	2591	2430	2267	2103	1940	1778	1617	1459	1305	1155	1009	869
1981 APR 16.0	568	699	902	1224	1749	2545	3167	3040	2911	2781	2650	2520	2391	2263	2138	2016	1897	1783	1673	1568	1468
JD 2444700.5	11	216	542	1076	1938	3075	2961	2807	2651	2492	2331	2169	2007	1846	1686	1528	1373	1221	1075	933	798
1981 APR 6.0	654	823	1090	1525	2224	3148	3126	2998	2869	2739	2609	2479	2351	2225	2101	1980	1864	1751	1643	1541	1444
JD 2444690.5	110	379	817	1544	2625	3013	2862	2708	2551	2392	2232	2071	1911	1751	1593	1438	1286	1138	996	858	0
1981 MAR 27.0	763	985	1346	1939	2820	3210	3083	2955	2825	2695	2566	2437	2310	2185	2063	1944	1830	1719	1614	1515	0
JD 2444680.5	247	608	1210	2177	0	2915	2763	2608	2451	2292	2132	1973	1814	1657	1501	1349	1200	1056	917	0	0
1981 MAR 17.0	905	1204	1700	2491	0	3165	3037	2909	2780	2650	2521	2394	2268	2145	2025	1908	1796	1688	1586	0	0

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD 2445200.5																					
1982 AUG 19.0																					
JD 2445240.5																					
1982 SEP 28.0																					
JD 2445280.5																					
1982 NOV 7.0																					
JD 2445320.5																					
1982 DEC 17.0																					
JD 2445360.5																					
1983 JAN 26.0																					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M20
E15

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2444800.5	241	263	296	343	411	622	960	1454	2191	3285	4785	0	5651	5352	5050	4746	4442	4140	3842	3550	3265
1981 JUL 15.0	2541	2638	2735	2832	2930	3028	3127	3227	3327	3427	3528	0	132	234	335	437	539	641	742	843	943
JD 2444790.5	258	284	323	379	479	758	1164	1768	2678	4010	5676	5824	5529	5230	4927	4624	4322	4022	3727	3439	3158
1981 JUL 5.0	2594	2690	2787	2885	2982	3081	3180	3279	3379	3480	3580	83	184	286	388	490	592	693	794	895	995
JD 2444780.5	277	309	355	422	594	928	1422	2171	3304	4881	0	5701	5405	5106	4804	4502	4202	3905	3613	3328	3051
1981 JUN 25.0	2647	2744	2841	2938	3036	3134	3233	3333	3433	3533	0	136	238	339	441	543	645	746	848	949	1049
JD 2444770.5	300	338	394	474	736	1142	1755	2696	4097	5853	5869	5577	5280	4980	4679	4379	4081	3787	3499	3218	2946
1981 JUN 15.0	2702	2798	2895	2992	3090	3189	3288	3387	3487	3588	89	190	292	394	496	598	699	801	902	1003	1103
JD 2444760.5	327	373	440	581	916	1417	2191	3383	5058	6031	5744	5450	5153	4854	4554	4256	3961	3670	3386	3109	2842
1981 JUN 5.0	2757	2854	2950	3048	3146	3244	3343	3443	3543	43	144	246	347	449	551	653	755	856	957	1058	1159
JD 2444750.5	359	415	496	733	1145	1778	2769	4265	0	5905	5616	5322	5025	4726	4428	4132	3840	3553	3273	3001	2738
1981 MAY 26.0	2813	2910	3007	3104	3202	3300	3399	3499	0	99	200	302	403	505	607	709	811	912	1014	1114	1215
JD 2444740.5	398	465	587	927	1445	2259	3538	5334	6061	5776	5485	5191	4894	4597	4301	4008	3719	3436	3161	2894	2636
1981 MAY 16.0	2871	2967	3064	3161	3259	3357	3456	3556	56	157	258	359	461	563	664	766	868	970	1071	1172	1272
JD 2444730.5	444	527	752	1179	1846	2911	4535	0	5931	5644	5353	5058	4763	4467	4174	3883	3598	3320	3049	2787	2535
1981 MAY 6.0	2929	3025	3122	3219	3317	3416	3514	0	114	215	316	417	519	621	723	824	926	1028	1129	1230	1330
JD 2444720.5	500	614	966	1514	2391	3791	5723	6080	5797	5509	5217	4924	4629	4336	4045	3758	3477	3203	2938	2681	2435
1981 APR 26.0	2988	3084	3181	3278	3376	3474	3573	74	173	274	375	476	578	680	782	884	985	1087	1188	1289	1389
JD 2444710.5	568	797	1249	1969	3142	4925	6224	5945	5660	5371	5080	4787	4494	4203	3916	3633	3357	3088	2827	2577	2338
1981 APR 16.0	3048	3144	3241	3338	3436	3534	35	133	233	334	435	536	638	740	842	943	1045	1147	1248	1349	1449
JD 2444700.5	665	1039	1632	2601	4162	6223	6087	5806	5520	5231	4940	4648	4358	4070	3786	3508	3236	2972	2718	2474	2242
1981 APR 6.0	3108	3205	3301	3399	3496	3588	95	194	294	395	496	597	698	800	902	1004	1106	1207	1309	1409	1510
JD 2444690.5	874	1364	2163	3483	5446	6223	5945	5663	5376	5088	4798	4508	4221	3936	3656	3382	3116	2858	2610	2373	0
1981 MAR 27.0	3170	3266	3363	3460	3556	58	156	255	355	456	557	658	760	862	964	1065	1167	1269	1370	1471	0
JD 2444680.5	1153	1812	2911	4669	0	6080	5800	5517	5230	4942	4654	4367	4082	3801	3526	3257	2996	2744	2503	0	0
1981 MAR 17.0	3232	3328	3425	3521	0	119	218	317	417	518	619	720	822	924	1026	1127	1229	1331	1432	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445200.5 1982 AUG 19.0	JD2445240.5 1982 SEP 28.0	JD2445280.5 1982 NOV 7.0	JD2445320.5 1982 DEC 17.0	JD2445360.5 1983 JAN 26.0																	

EARTH DEPARTURE OR ARRIVAL DATE

M21
E10

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444560.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671720	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.612	DEGREES
MEAN ANOM. AT EPOCH	=	313.600	DEGREES
DATE OF NODAL PASSAGE	=	2444505.369	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444560.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338780	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.410	DEGREES
ARG. OF PERIHELION	=	286.297	DEGREES
MEAN ANOM. AT EPOCH	=	319.363	DEGREES
DATE OF NODAL PASSAGE	=	2444072.515	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.065	DEGREES

M21
E10

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	1279	1340	1400	1459	1516	1490	1202	948	751	604	491	404	334	278	234	200	177	168	171
1981 NOV 12.0	0	0	927	964	1000	1036	1072	1039	855	696	576	488	426	380	347	323	306	294	287	284	284
JD 2444910.5	0	1244	1306	1366	1426	1484	1540	1360	1079	850	677	547	447	369	306	256	216	187	170	166	175
1981 NOV 2.0	0	913	950	986	1022	1058	1094	963	785	642	537	461	407	368	339	318	303	294	288	286	287
JD 2444900.5	1209	1271	1332	1393	1452	1510	1519	1227	966	763	611	496	407	337	280	235	200	176	165	166	180
1981 OCT 23.0	900	936	972	1009	1045	1081	1073	885	720	594	503	438	391	357	332	314	301	294	290	289	291
JD 2444890.5	1236	1298	1359	1419	1478	0	1385	1098	862	684	551	450	370	307	256	216	186	167	162	169	188
1981 OCT 13.0	923	959	996	1032	1068	0	995	811	662	552	474	418	377	347	326	310	300	294	292	292	296
JD 2444880.5	1263	1325	1386	1446	1504	1544	1247	978	769	613	497	407	336	279	234	198	174	161	161	174	197
1981 OCT 3.0	946	983	1019	1056	1092	1105	914	742	610	516	449	400	365	339	321	308	300	295	294	296	301
JD 2444870.5	1291	1352	1413	1472	1530	1405	1111	868	685	550	448	368	305	254	213	183	164	157	163	181	208
1981 SEP 23.0	970	1007	1044	1080	1116	1025	834	679	565	485	427	385	355	332	317	306	300	297	297	300	307
JD 2444860.5	1318	1380	1440	1499	0	1260	983	769	611	494	404	333	276	231	195	170	157	156	168	190	221
1981 SEP 13.0	995	1032	1069	1105	0	939	760	623	526	457	408	372	345	327	313	305	300	299	300	305	313
JD 2444850.5	1346	1407	1467	1526	1418	1116	866	681	545	442	363	300	249	209	179	160	153	158	175	200	237
1981 SEP 3.0	1020	1057	1094	1130	1052	854	692	575	492	433	391	360	338	322	311	304	301	301	304	310	320
JD 2444840.5	1375	1435	1495	0	1264	980	762	603	485	396	326	270	225	190	165	152	151	162	183	213	258
1981 AUG 24.0	1046	1083	1120	0	960	773	632	533	462	412	376	350	331	318	309	304	303	304	309	316	329
JD 2444830.5	1403	1463	1522	1422	1111	857	670	534	432	354	292	242	203	173	154	148	153	169	194	228	295
1981 AUG 14.0	1072	1109	1146	1074	868	700	580	496	436	394	363	341	325	314	308	305	305	308	314	323	344
JD 2444820.5	1432	1491	0	1259	968	747	588	472	385	316	261	217	183	159	147	146	157	178	207	247	472
1981 AUG 4.0	1099	1136	0	974	780	635	534	464	414	378	352	333	320	312	307	306	307	312	319	330	429
JD 2444810.5	1461	1520	1415	1096	838	651	517	418	341	281	233	195	166	148	142	148	165	189	221	277	433
1981 JUL 25.0	1126	1163	1089	874	701	579	495	436	394	363	342	326	316	310	307	307	310	316	325	342	435
JD 2444800.5	1489	0	1240	944	724	568	454	369	302	250	207	175	152	141	142	153	174	202	238	459	315
1981 JUL 15.0	1153	0	980	779	632	530	461	411	376	351	333	320	312	308	307	309	314	321	331	426	368

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M21
E10

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	192	209	222	232	238	-69	-78	-82	-79	-73	-65	-60	-59	-64	-79	-107	-148	-195	-240
1981 NOV 12.0	0	0	500	577	656	736	818	3512	3501	3502	3518	3542	3571	3600	23	38	39	21	3578	3516	3448
JD 2444910.5	0	168	188	206	220	231	238	-90	-97	-98	-93	-86	-79	-75	-76	-85	-105	-138	-183	-230	-271
1981 NOV 2.0	0	413	488	565	643	724	805	3465	3458	3466	3487	3514	3544	3571	3593	3	3596	3568	3516	3448	3382
JD 2444900.5	141	164	185	203	218	229	-101	-111	-115	-113	-107	-99	-93	-91	-95	-108	-133	-172	-218	-263	-300
1981 OCT 23.0	328	401	476	552	631	711	3431	3417	3417	3431	3456	3486	3516	3542	3559	3563	3548	3509	3447	3376	3316
JD 2444890.5	137	160	181	200	215	0	-122	-130	-131	-127	-120	-113	-108	-108	-115	-133	-164	-206	-253	-293	-325
1981 OCT 13.0	316	389	463	540	618	0	3381	3371	3378	3398	3427	3457	3486	3509	3522	3518	3492	3442	3372	3302	3251
JD 2444880.5	132	156	177	196	212	-132	-142	-147	-146	-140	-133	-126	-123	-125	-137	-160	-196	-240	-284	-319	-349
1981 OCT 3.0	305	377	451	527	605	3346	3330	3327	3341	3366	3397	3428	3455	3474	3480	3467	3429	3367	3293	3228	3189
JD 2444870.5	127	151	173	193	210	-152	-161	-162	-159	-152	-145	-140	-139	-144	-160	-189	-229	-273	-311	-342	-372
1981 SEP 23.0	293	365	439	514	592	3293	3281	3285	3305	3334	3366	3396	3421	3435	3432	3408	3357	3285	3210	3154	3129
JD 2444860.5	122	146	169	189	0	-171	-177	-176	-171	-164	-157	-154	-155	-165	-186	-219	-261	-301	-333	-360	-396
1981 SEP 13.0	281	352	426	502	0	3238	3233	3245	3270	3302	3334	3363	3383	3390	3377	3339	3275	3197	3126	3082	3073
JD 2444850.5	117	142	165	186	-180	-188	-191	-188	-182	-175	-170	-168	-173	-187	-213	-249	-289	-323	-350	-377	-426
1981 SEP 3.0	269	340	414	489	3200	3184	3187	3206	3236	3269	3300	3326	3341	3338	3313	3260	3184	3104	3043	3015	3020
JD 2444840.5	111	137	161	0	-197	-203	-202	-198	-192	-186	-182	-183	-191	-210	-240	-277	-312	-339	-361	-393	-471
1981 AUG 24.0	256	328	401	0	3140	3131	3143	3169	3201	3234	3264	3285	3292	3278	3237	3169	3086	3011	2964	2951	2971
JD 2444830.5	106	132	156	-204	-212	-214	-212	-207	-201	-196	-195	-198	-211	-233	-265	-299	-327	-347	-369	-413	-560
1981 AUG 14.0	244	315	388	3101	3081	3081	3101	3131	3165	3198	3224	3238	3235	3207	3149	3068	2984	2921	2890	2891	2923
JD 2444820.5	101	127	0	-218	-223	-223	-219	-215	-210	-206	-207	-214	-230	-256	-286	-313	-333	-349	-376	-445	-821
1981 AUG 4.0	232	303	0	3035	3023	3034	3060	3093	3128	3158	3178	3184	3167	3122	3048	2960	2883	2836	2822	2835	2583
JD 2444810.5	95	122	-222	-229	-231	-229	-226	-221	-217	-216	-219	-229	-248	-274	-299	-318	-331	-347	-383	-518	280
1981 JUL 25.0	219	290	2994	2970	2969	2989	3020	3054	3087	3113	3126	3120	3087	3024	2937	2851	2789	2759	2759	2775	2694
JD 2444800.5	89	0	-232	-236	-236	-234	-230	-227	-224	-225	-230	-243	-263	-285	-302	-312	-322	-341	-399	-796	-54
1981 JUL 15.0	206	0	2922	2908	2918	2945	2979	3014	3043	3063	3066	3045	2993	2913	2821	2746	2703	2690	2700	2302	2758

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M21
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	232	235	238	241	242	213	201	188	179	172	168	167	168	170	174	179	186	195	206
1981 NOV 12.0	0	0	711	734	758	782	806	812	717	643	591	554	527	507	491	479	469	461	456	452	450
JD 2444910.5	0	222	227	231	234	237	240	203	187	174	164	158	154	153	154	156	160	166	173	183	196
1981 NOV 2.0	0	649	672	695	719	743	767	719	634	571	527	496	473	456	442	431	423	416	412	409	407
JD 2444900.5	210	215	220	225	229	232	206	188	170	157	147	142	139	138	139	141	146	152	160	170	185
1981 OCT 23.0	588	610	633	656	680	704	725	630	556	504	467	441	421	407	395	385	378	373	368	366	364
JD 2444890.5	202	208	213	218	223	0	191	169	151	139	130	125	122	122	123	126	131	137	146	157	173
1981 OCT 13.0	550	572	594	617	641	0	632	546	483	440	410	388	371	359	348	340	334	329	326	323	321
JD 2444880.5	193	199	205	211	216	196	171	148	131	119	111	107	105	105	106	110	115	122	131	144	163
1981 OCT 3.0	512	534	556	579	602	637	542	467	416	380	355	337	323	312	303	296	291	287	284	281	279
JD 2444870.5	183	190	196	202	208	175	147	125	109	99	92	88	87	87	89	93	98	106	116	130	153
1981 SEP 23.0	474	496	518	540	563	543	457	395	352	323	303	287	275	266	259	253	248	245	242	240	237
JD 2444860.5	172	179	186	193	0	149	122	101	87	78	72	69	68	68	71	75	81	89	100	117	145
1981 SEP 13.0	436	458	480	502	0	452	378	327	293	269	252	239	229	221	215	210	206	203	201	198	194
JD 2444850.5	161	168	175	182	153	121	95	77	64	56	51	49	48	49	52	57	63	72	85	104	141
1981 SEP 3.0	399	420	442	464	452	366	304	263	236	216	202	192	183	177	171	167	164	162	160	156	149
JD 2444840.5	148	156	164	0	122	91	68	52	41	35	30	28	28	30	33	38	45	55	69	93	146
1981 AUG 24.0	361	382	404	0	359	286	236	204	181	166	154	145	138	133	128	125	123	121	118	114	101
JD 2444830.5	135	144	152	127	89	60	41	27	18	13	9	8	8	10	13	18	26	37	54	85	180
1981 AUG 14.0	324	345	366	358	272	212	173	147	129	116	107	99	94	89	86	83	81	80	77	71	43
JD 2444820.5	122	130	0	91	56	31	14	3	-4	-9	-11	-12	-12	-10	-6	-0	7	19	39	84	369
1981 AUG 4.0	286	307	0	264	192	144	113	92	78	68	60	54	50	46	43	42	40	39	35	24	3555
JD 2444810.5	107	116	95	54	23	2	-11	-21	-27	-31	-33	-34	-33	-31	-27	-21	-12	1	26	108	-273
1981 JUL 25.0	249	269	261	176	117	79	55	39	28	20	14	9	6	3	1	3600	3599	3597	3593	3568	225
JD 2444800.5	92	0	55	17	-8	-25	-37	-45	-50	-53	-55	-55	-54	-52	-48	-41	-32	-16	19	319	-127
1981 JUL 15.0	211	0	165	94	47	18	3600	3587	3579	3572	3568	3564	3562	3560	3559	3558	3558	3556	3548	3472	41

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M21
E10

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5 1981 NOV 12.0	0	0	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759	1759
JD 2444910.5 1981 NOV 2.0	0	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
JD 2444900.5 1981 OCT 23.0	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919
JD 2444890.5 1981 OCT 13.0	1991	1991	1991	1991	1991	0	1991	1991	1991	1991	1991	1991	1991	1991	1991	1991	1991	1991	1991	1991	1991
JD 2444880.5 1981 OCT 3.0	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058	2058
JD 2444870.5 1981 SEP 23.0	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119	2119
JD 2444860.5 1981 SEP 13.0	2174	2174	2174	2174	0	2174	2174	2174	2174	2174	2174	2174	2174	2174	2174	2174	2174	2174	2174	2174	2174
JD 2444850.5 1981 SEP 3.0	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223	2223
JD 2444840.5 1981 AUG 24.0	2267	2267	2267	0	2267	2267	2267	2267	2267	2267	2267	2267	2267	2267	2267	2267	2267	2267	2267	2267	2267
JD 2444830.5 1981 AUG 14.0	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305	2305
JD 2444820.5 1981 AUG 4.0	2338	2338	0	2338	2338	2338	2338	2338	2338	2338	2338	2338	2338	2338	2338	2338	2338	2338	2338	2338	2338
JD 2444810.5 1981 JUL 25.0	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365	2365
JD 2444800.5 1981 JUL 15.0	2388	0	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388	2388

(FLT T)(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M21
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336
1981 NOV 12.0	0	0	671	671	671	671	671	671	671	671	671	671	671	671	671	671	671	671	671	671	671
JD 2444910.5	0	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325
1981 NOV 2.0	0	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626	626
JD 2444900.5	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312
1981 OCT 23.0	584	584	584	584	584	584	584	584	584	584	584	584	584	584	584	584	584	584	584	584	584
JD 2444890.5	299	299	299	299	299	0	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299
1981 OCT 13.0	544	544	544	544	544	0	544	544	544	544	544	544	544	544	544	544	544	544	544	544	544
JD 2444880.5	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285
1981 OCT 3.0	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505
JD 2444870.5	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
1981 SEP 23.0	468	468	468	468	468	468	468	468	468	468	468	468	468	468	468	468	468	468	468	468	468
JD 2444860.5	256	256	256	256	0	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256
1981 SEP 13.0	432	432	432	432	0	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432
JD 2444850.5	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
1981 SEP 3.0	398	398	398	398	398	398	398	398	398	398	398	398	398	398	398	398	398	398	398	398	398
JD 2444840.5	225	225	225	0	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225
1981 AUG 24.0	366	366	366	0	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366
JD 2444830.5	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209
1981 AUG 14.0	334	334	334	334	334	334	334	334	334	334	334	334	334	334	334	334	334	334	334	334	334
JD 2444820.5	193	193	0	193	193	193	193	193	193	193	193	193	193	193	193	193	193	193	193	193	193
1981 AUG 4.0	304	304	0	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304
JD 2444810.5	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178
1981 JUL 25.0	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275
JD 2444800.5	162	0	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1981 JUL 15.0	247	0	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247	247

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M21
E10

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	485	383	282	180	79	3570	3473	3373	3272	3172	3073	2974	2876	2778	2681	2584	2488	2392	2296
1981 NOV 12.0	0	0	1506	1568	1629	1691	1752	-1715	-1463	-1238	-1052	-895	-758	-634	-518	-409	-304	-202	-103	-7	85
JD 2444910.5	0	542	440	339	237	136	37	3529	3429	3328	3228	3128	3028	2929	2831	2733	2636	2539	2443	2347	2251
1981 NOV 2.0	0	1472	1533	1595	1657	1718	1778	-1604	-1357	-1150	-979	-832	-702	-582	-469	-362	-258	-158	-60	34	126
JD 2444900.5	598	497	395	293	192	91	3578	3484	3384	3283	3183	3083	2983	2884	2786	2688	2591	2494	2398	2302	2206
1981 OCT 23.0	1438	1500	1561	1623	1684	1745	-1739	-1489	-1258	-1069	-910	-771	-646	-530	-420	-314	-212	-113	-17	76	168
JD 2444890.5	552	451	350	248	146	0	3539	3439	3338	3237	3137	3037	2938	2839	2740	2643	2545	2448	2352	2256	2161
1981 OCT 13.0	1467	1528	1589	1650	1712	0	-1631	-1379	-1167	-992	-844	-712	-592	-479	-371	-267	-166	-68	26	119	210
JD 2444880.5	506	405	304	202	101	3584	3494	3393	3292	3191	3091	2991	2892	2793	2694	2596	2499	2402	2306	2210	2115
1981 OCT 3.0	1495	1556	1617	1678	1739	-1753	-1511	-1275	-1081	-920	-781	-655	-538	-428	-322	-219	-119	-22	71	163	253
JD 2444870.5	460	358	257	155	55	3549	3448	3347	3246	3145	3044	2944	2845	2746	2648	2550	2453	2356	2260	2164	2068
1981 SEP 23.0	1524	1585	1645	1706	1767	-1654	-1395	-1179	-1002	-852	-719	-598	-485	-376	-272	-170	-72	23	117	208	296
JD 2444860.5	412	311	210	109	0	3503	3401	3300	3199	3098	2997	2897	2798	2699	2601	2503	2405	2309	2212	2116	2021
1981 SEP 13.0	1553	1613	1674	1735	0	-1529	-1286	-1089	-926	-786	-659	-542	-431	-325	-221	-121	-24	70	163	253	340
JD 2444850.5	365	263	162	61	3556	3455	3354	3252	3151	3050	2950	2849	2750	2651	2553	2455	2358	2261	2165	2069	1973
1981 SEP 3.0	1582	1642	1703	1763	-1672	-1406	-1185	-1006	-855	-722	-600	-486	-377	-272	-170	-71	24	118	210	298	384
JD 2444840.5	316	215	114	0	3509	3407	3305	3204	3103	3002	2901	2801	2702	2603	2504	2406	2309	2212	2116	2020	1925
1981 AUG 24.0	1611	1672	1732	0	-1539	-1291	-1091	-927	-786	-659	-541	-430	-323	-219	-119	-21	74	167	257	345	429
JD 2444830.5	267	166	65	3560	3460	3358	3256	3155	3053	2952	2852	2752	2652	2553	2455	2357	2260	2163	2067	1971	1876
1981 AUG 14.0	1641	1701	1761	-1682	-1410	-1185	-1004	-852	-719	-597	-483	-374	-268	-166	-66	30	124	216	305	391	475
JD 2444820.5	217	116	0	3512	3410	3308	3206	3105	3003	2902	2802	2702	2602	2503	2405	2307	2210	2113	2017	1921	1827
1981 AUG 4.0	1671	1731	0	-1541	-1288	-1086	-922	-780	-653	-536	-424	-317	-213	-112	-13	82	175	266	353	438	519
JD 2444810.5	166	65	3562	3461	3359	3257	3156	3054	2953	2852	2751	2651	2552	2453	2354	2256	2159	2062	1966	1870	1773
1981 JUL 25.0	1702	1761	-1684	-1404	-1176	-995	-844	-711	-589	-475	-365	-259	-157	-57	40	134	226	316	402	486	568
JD 2444800.5	114	0	3511	3410	3308	3206	3104	3002	2901	2800	2699	2599	2500	2401	2303	2205	2108	2011	1914	1820	1722
1981 JUL 15.0	1732	0	-1533	-1276	-1074	-910	-769	-643	-525	-413	-306	-202	-100	-1	94	188	278	366	451	532	614

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M21
E10

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	243	293	386	589	1327	3684	830	471	336	268	229	205	191	184	182	186	195	212	239
1981 NOV 12.0	0	0	948	967	982	992	998	995	921	799	681	585	512	458	417	387	366	351	342	337	337
JD 2444910.5	0	220	257	321	445	765	2879	1454	607	391	295	243	213	194	183	179	180	186	198	219	252
1981 NOV 2.0	0	936	957	974	987	996	1000	973	868	742	633	548	483	435	400	374	355	343	336	334	335
JD 2444900.5	202	229	274	356	531	1111	5409	873	473	332	262	222	198	184	176	174	178	186	202	227	268
1981 OCT 23.0	923	945	964	980	991	998	997	932	809	688	589	513	457	415	384	361	346	336	331	331	334
JD 2444890.5	206	238	295	403	669	0	1620	611	383	286	234	203	185	174	169	170	175	187	206	236	287
1981 OCT 13.0	933	954	972	985	995	0	979	878	749	636	548	482	433	396	370	350	338	330	327	328	333
JD 2444880.5	210	250	321	470	932	8134	889	460	317	248	209	186	172	164	162	165	173	187	210	247	311
1981 OCT 3.0	943	962	978	990	998	998	940	816	691	590	512	454	411	380	357	341	330	325	324	327	333
JD 2444870.5	215	264	357	577	1632	1750	592	362	267	217	187	170	160	155	155	160	170	187	215	261	343
1981 SEP 23.0	952	970	984	994	999	984	885	753	637	547	479	429	392	364	345	332	324	321	321	326	334
JD 2444860.5	221	282	407	776	0	865	429	291	226	189	168	155	148	146	148	155	167	188	221	278	388
1981 SEP 13.0	961	977	989	997	0	946	820	692	587	508	450	406	374	351	335	324	318	317	320	326	336
JD 2444850.5	228	306	486	1281	1786	544	326	238	192	166	150	140	136	136	140	149	164	188	228	300	456
1981 SEP 3.0	969	983	994	999	988	888	753	634	542	474	423	385	358	339	325	317	314	315	319	327	338
JD 2444840.5	238	340	633	0	786	377	253	195	163	144	133	126	124	126	132	143	160	189	238	332	577
1981 AUG 24.0	976	989	997	0	949	820	688	581	502	443	399	367	344	328	317	312	310	313	319	329	342
JD 2444830.5	250	394	1000	1651	464	274	199	160	138	124	116	113	113	116	123	136	156	190	250	382	855
1981 AUG 14.0	983	993	999	989	888	749	627	534	465	415	378	351	331	318	311	307	308	312	320	332	346
JD 2444820.5	268	494	0	646	304	203	156	130	115	106	101	99	101	105	114	128	151	191	268	473	2167
1981 AUG 4.0	988	997	0	949	815	679	571	492	433	390	359	336	320	310	305	304	306	313	322	335	351
JD 2444810.5	297	749	1295	354	208	151	121	104	94	88	85	85	88	93	103	119	145	192	297	694	1818
1981 JUL 25.0	993	999	990	883	738	615	522	454	404	368	342	323	311	303	300	301	306	314	326	340	359
JD 2444800.5	351	0	452	214	143	110	92	81	74	71	70	71	74	80	91	107	136	194	351	2091	516
1981 JUL 15.0	997	0	944	803	665	557	478	421	379	349	327	312	303	298	297	300	307	317	330	346	366

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M21
E10

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	-87	-55	-30	-12	-1	8	120	305	484	629	741	826	889	936	970	994	1008	1014	-1011
1981 NOV 12.0	0	0	3313	3306	3295	3279	3258	3054	2923	2729	2549	2406	2299	2220	2161	2119	2089	2067	2054	2046	2043
JD 2444910.5	0	-108	-72	-43	-21	-6	-0	41	200	389	554	683	782	856	911	952	981	1000	1011	-1013	-1008
1981 NOV 2.0	0	3297	3294	3285	3272	3254	3230	2993	2821	2627	2463	2337	2244	2175	2125	2088	2062	2045	2034	2028	2027
JD 2444900.5	-130	-91	-58	-32	-13	-2	4	103	286	468	617	731	817	882	930	966	990	1005	1012	-1011	-1004
1981 OCT 23.0	3281	3280	3274	3263	3247	3227	3025	2906	2713	2529	2383	2274	2193	2133	2090	2059	2037	2023	2015	2011	2012
JD 2444890.5	-112	-75	-46	-23	-7	0	31	183	374	542	674	774	849	906	947	977	997	1008	-1011	-1008	-997
1981 OCT 13.0	3264	3261	3253	3240	3222	0	2970	2803	2607	2439	2311	2216	2146	2095	2058	2031	2013	2002	1996	1994	1997
JD 2444880.5	-94	-61	-34	-15	-3	2	89	272	457	608	724	812	877	926	962	986	1002	1010	-1009	-1003	-990
1981 OCT 3.0	3246	3241	3230	3215	3194	2994	2885	2692	2505	2356	2245	2163	2103	2059	2028	2005	1991	1982	1978	1978	1982
JD 2444870.5	-78	-48	-24	-8	-0	23	170	363	534	668	769	845	902	944	974	994	1006	-1009	-1006	-997	-981
1981 SEP 23.0	3227	3219	3207	3189	3166	2943	2780	2581	2411	2280	2184	2114	2063	2026	1999	1981	1969	1963	1961	1963	1968
JD 2444860.5	-63	-36	-16	-4	0	80	263	451	604	721	809	874	923	959	984	999	1007	-1007	-1001	-989	-971
1981 SEP 13.0	3207	3197	3182	3161	0	2860	2666	2475	2324	2212	2130	2070	2026	1995	1972	1958	1949	1945	1945	1948	1954
JD 2444850.5	-49	-26	-9	-0	18	163	359	532	667	768	843	900	941	971	991	1003	-1006	-1004	-995	-980	-959
1981 SEP 3.0	3186	3173	3155	3132	2913	2752	2550	2377	2246	2150	2080	2029	1992	1965	1947	1936	1930	1928	1929	1934	1941
JD 2444840.5	-37	-17	-4	0	74	260	451	605	722	809	874	922	957	981	997	1005	-1005	-999	-987	-969	-945
1981 AUG 24.0	3164	3148	3128	0	2830	2633	2439	2287	2175	2093	2034	1991	1960	1938	1924	1915	1911	1911	1914	1920	1928
JD 2444830.5	-26	-10	-1	15	161	361	536	670	770	845	900	941	970	989	1001	-1004	-1001	-992	-977	-956	-930
1981 AUG 14.0	3140	3122	3099	2881	2718	2512	2337	2206	2111	2042	1992	1956	1930	1913	1902	1896	1894	1896	1900	1907	1916
JD 2444820.5	-17	-4	0	74	264	458	612	727	813	876	922	956	980	995	1002	-1002	-996	-984	-966	-942	-913
1981 AUG 4.0	3115	3094	0	2794	2593	2397	2245	2134	2054	1996	1954	1924	1903	1889	1881	1878	1878	1881	1887	1895	1904
JD 2444810.5	-10	-1	15	167	371	546	679	777	849	902	941	969	988	998	-1001	-998	-988	-973	-952	-926	-893
1981 JUL 25.0	3088	3065	2845	2677	2466	2291	2162	2069	2002	1954	1919	1895	1878	1868	1862	1860	1862	1867	1874	1883	1894
JD 2444800.5	-4	0	79	277	472	625	737	820	880	925	957	979	993	999	-998	-992	-979	-961	-937	-908	-873
1981 JUL 15.0	3060	0	2753	2544	2347	2197	2089	2011	1956	1916	1887	1868	1855	1847	1844	1845	1848	1854	1862	1871	1882

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M21
E10

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	119	117	116	115	114	2919	735	462	368	322	295	275	260	247	236	226	217	208	200
1981 NOV 12.0	0	0	275	272	268	265	263	420	416	410	402	394	386	377	368	359	350	341	332	323	314
JD 2444910.5	0	120	118	117	116	115	114	1251	570	410	344	309	285	268	254	242	232	222	213	205	197
1981 NOV 2.0	0	277	273	269	266	263	261	417	412	406	398	389	381	372	363	354	344	335	327	318	309
JD 2444900.5	121	119	118	116	115	114	4075	794	477	375	326	297	277	262	249	238	228	218	210	201	193
1981 OCT 23.0	278	274	270	267	264	261	418	414	408	401	393	384	375	366	357	348	339	330	321	312	304
JD 2444890.5	120	118	117	116	115	0	1450	596	419	349	312	288	270	256	244	233	224	215	206	198	190
1981 OCT 13.0	275	271	268	264	261	0	416	411	404	396	388	379	370	361	352	343	334	325	316	307	298
JD 2444880.5	119	118	116	115	115	5268	852	490	380	329	300	279	264	251	239	229	220	211	202	194	187
1981 OCT 3.0	272	269	265	262	259	416	413	407	399	391	383	374	365	355	346	337	328	319	310	302	293
JD 2444870.5	119	117	116	115	114	1676	618	425	352	314	290	272	258	246	235	225	216	207	199	191	183
1981 SEP 23.0	270	266	263	260	257	414	409	403	395	386	377	368	359	350	341	332	323	314	305	296	287
JD 2444860.5	118	117	116	115	0	903	499	383	331	301	281	265	252	241	230	221	212	203	195	187	180
1981 SEP 13.0	267	264	260	258	0	411	405	398	390	381	372	363	354	344	335	326	317	308	299	291	282
JD 2444850.5	117	116	115	115	1902	633	429	354	315	291	273	259	247	236	226	217	208	200	192	184	177
1981 SEP 3.0	264	261	258	255	412	408	401	393	384	376	366	357	348	339	330	321	312	303	294	285	277
JD 2444840.5	117	116	115	0	936	502	384	332	302	282	266	253	242	231	222	213	204	196	188	181	173
1981 AUG 24.0	262	259	256	0	410	404	396	388	379	370	361	352	342	333	324	315	306	297	288	280	271
JD 2444830.5	116	115	115	2070	636	429	354	316	292	274	260	248	237	227	218	209	200	192	185	177	170
1981 AUG 14.0	260	257	254	411	406	399	391	383	374	365	355	346	337	328	318	309	300	292	283	274	266
JD 2444820.5	116	115	0	941	499	383	332	302	282	267	254	243	232	222	213	205	196	189	181	174	167
1981 AUG 4.0	257	254	0	408	402	394	386	377	368	359	350	340	331	322	313	304	295	286	277	269	260
JD 2444810.5	116	115	2094	627	424	352	315	292	274	260	248	238	228	218	209	201	193	185	177	170	163
1981 JUL 25.0	255	252	409	404	397	389	381	372	362	353	344	335	325	316	307	298	289	280	272	263	255
JD 2444800.5	115	0	910	489	378	330	302	282	267	254	243	233	223	214	205	197	189	181	174	167	160
1981 JUL 15.0	253	0	406	400	393	384	375	366	357	347	338	329	319	310	301	292	283	274	266	257	249

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD2444200.5 1979 NOV 23.0				JD2444240.5 1980 JAN 2.0				JD2444280.5 1980 FEB 11.0				JD2444320.5 1980 MAR 22.0				JD2444360.5 1980 MAY 1.0					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M21
E10

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5 1981 NOV 12.0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444910.5 1981 NOV 2.0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444900.5 1981 OCT 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444890.5 1981 OCT 13.0	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444880.5 1981 OCT 3.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444870.5 1981 SEP 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444860.5 1981 SEP 13.0	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444850.5 1981 SEP 3.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444840.5 1981 AUG 24.0	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444830.5 1981 AUG 14.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444820.5 1981 AUG 4.0	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444810.5 1981 JUL 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444800.5 1981 JUL 15.0	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD2444200.5 1979 NOV 23.0				JD2444240.5 1980 JAN 2.0				JD2444280.5 1980 FEB 11.0				JD2444320.5 1980 MAR 22.0				JD2444360.5 1980 MAY 1.0					

EARTH DEPARTURE OR ARRIVAL DATE

M21
E10

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	3192	3366	3539	3708	3872	3799	2970	2256	1718	1331	1053	852	705	599	523	471	441	428	433
1981 NOV 12.0	0	0	2478	2585	2692	2798	2903	2807	2267	1801	1452	1203	1026	899	809	743	697	666	647	638	638
JD 2444910.5	0	3091	3267	3442	3613	3781	3945	3422	2624	1986	1522	1189	950	777	650	559	495	453	431	426	437
1981 NOV 2.0	0	2437	2543	2650	2757	2863	2968	2582	2060	1644	1341	1126	974	864	786	729	690	664	650	644	647
JD 2444900.5	2990	3167	3343	3517	3688	3855	3884	3042	2305	1748	1349	1065	860	710	602	524	471	439	425	427	444
1981 OCT 23.0	2396	2503	2610	2717	2824	2930	2906	2355	1871	1505	1245	1061	929	834	766	718	685	664	653	652	658
JD 2444890.5	3067	3244	3420	3594	3763	0	3496	2677	2018	1539	1199	956	780	652	560	495	452	428	421	430	454
1981 OCT 13.0	2464	2571	2679	2786	2893	0	2676	2136	1701	1386	1162	1004	890	809	750	709	682	665	659	660	670
JD 2444880.5	3145	3322	3498	3670	3839	3955	3099	2338	1765	1356	1067	860	710	601	523	469	436	420	421	436	467
1981 OCT 3.0	2533	2641	2749	2856	2963	3002	2438	1934	1553	1282	1091	955	857	787	737	702	680	668	665	671	684
JD 2444870.5	3224	3401	3575	3747	3914	3554	2713	2034	1543	1197	952	776	648	556	491	448	424	416	423	445	483
1981 SEP 23.0	2604	2712	2821	2928	3034	2764	2205	1751	1423	1192	1029	912	828	768	726	697	680	672	673	682	699
JD 2444860.5	3304	3480	3654	3824	0	3136	2353	1765	1350	1059	852	703	595	518	465	432	416	415	429	457	503
1981 SEP 13.0	2677	2786	2894	3002	0	2512	1987	1590	1310	1114	975	875	804	752	717	694	682	678	682	695	716
JD 2444850.5	3384	3560	3733	3901	3591	2727	2030	1531	1184	939	765	639	549	485	443	419	411	417	437	472	528
1981 SEP 3.0	2751	2860	2969	3076	2844	2262	1790	1450	1213	1047	928	843	782	739	710	693	684	685	693	709	735
JD 2444840.5	3465	3640	3812	0	3149	2345	1747	1330	1040	835	689	584	509	458	426	410	409	422	449	491	563
1981 AUG 24.0	2827	2937	3045	0	2574	2026	1616	1329	1129	988	887	815	764	728	705	692	689	693	704	724	760
JD 2444830.5	3547	3721	3891	3602	2714	2004	1502	1157	916	746	624	537	476	436	413	405	411	430	463	514	629
1981 AUG 14.0	2904	3014	3123	2909	2302	1813	1464	1224	1056	937	852	791	748	719	702	694	694	702	717	742	800
JD 2444820.5	3630	3802	0	3132	2310	1707	1293	1009	810	669	568	497	449	418	404	404	416	442	481	545	1009
1981 AUG 4.0	2983	3093	0	2616	2046	1625	1333	1133	992	892	820	770	735	712	700	696	701	712	731	762	1035
JD 2444810.5	3713	3884	3582	2669	1952	1454	1116	883	720	604	521	464	427	406	399	406	425	456	503	597	918
1981 JUL 25.0	3063	3173	2955	2320	1815	1462	1221	1054	936	853	793	751	723	707	699	700	708	724	747	794	1051
JD 2444800.5	3797	0	3080	2244	1645	1241	967	777	643	549	482	437	410	398	398	412	437	474	530	979	668
1981 JUL 15.0	3144	0	2633	2042	1614	1323	1124	985	888	818	769	735	714	703	700	705	717	736	764	1028	865

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M21
E10

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444920.5	0	0	5670	5951	6231	6506	6776	6606	5237	4057	3170	2534	2079	1752	1514	1342	1220	1138	1088	1067	1071
1981 NOV 12.0	0	0	485	383	282	180	79	3570	3473	3373	3272	3172	3073	2974	2876	2778	2681	2584	2488	2392	2296
JD 2444910.5	0	5528	5810	6092	6371	6645	6912	6004	4684	3630	2863	2316	1924	1641	1436	1288	1185	1118	1081	1070	1085
1981 NOV 2.0	0	542	440	339	237	136	37	3529	3429	3328	3228	3128	3028	2929	2831	2733	2636	2539	2443	2347	2251
JD 2444900.5	5387	5670	5953	6235	6513	6785	6789	5397	4175	3253	2594	2125	1789	1545	1368	1242	1156	1103	1078	1078	1103
1981 OCT 23.0	598	497	395	293	192	91	3578	3484	3384	3283	3183	3083	2983	2884	2786	2688	2591	2494	2398	2302	2206
JD 2444890.5	5531	5815	6099	6380	6656	0	6172	4813	3719	2924	2361	1960	1670	1461	1310	1204	1133	1093	1080	1090	1125
1981 OCT 13.0	552	451	350	248	146	0	3539	3439	3338	3237	3137	3037	2938	2839	2740	2643	2545	2448	2352	2256	2161
JD 2444880.5	5678	5963	6246	6527	6802	6957	5537	4272	3317	2638	2158	1815	1567	1388	1260	1171	1116	1089	1086	1107	1151
1981 OCT 3.0	506	405	304	202	101	3584	3494	3393	3292	3191	3091	2991	2892	2793	2694	2596	2499	2402	2306	2210	2115
JD 2444870.5	5828	6113	6396	6675	6949	6318	4917	3785	2966	2389	1981	1688	1477	1324	1217	1146	1104	1088	1096	1127	1182
1981 SEP 23.0	460	358	257	155	55	3549	3448	3347	3246	3145	3044	2944	2845	2746	2648	2550	2453	2356	2260	2164	2068
JD 2444860.5	5980	6265	6548	6826	0	5649	4340	3356	2661	2173	1827	1578	1398	1270	1182	1126	1097	1093	1111	1152	1219
1981 SEP 13.0	412	311	210	109	0	3503	3401	3300	3199	3098	2997	2897	2798	2699	2601	2503	2405	2309	2212	2116	2021
JD 2444850.5	6135	6420	6702	6977	6434	4989	3820	2981	2397	1986	1693	1482	1331	1224	1153	1111	1095	1101	1130	1181	1264
1981 SEP 3.0	365	263	162	61	3556	3455	3354	3252	3151	3050	2950	2849	2750	2651	2553	2455	2358	2261	2165	2069	1973
JD 2444840.5	6292	6577	6857	0	5723	4371	3362	2658	2169	1823	1577	1399	1273	1186	1131	1102	1098	1115	1153	1215	1323
1981 AUG 24.0	316	215	114	0	3509	3407	3305	3204	3103	3002	2901	2801	2702	2603	2504	2406	2309	2212	2116	2020	1925
JD 2444830.5	6452	6735	7014	6511	5016	3816	2966	2380	1972	1683	1476	1328	1224	1155	1114	1099	1105	1132	1181	1256	1429
1981 AUG 14.0	267	166	65	3560	3460	3358	3256	3155	3053	2952	2852	2752	2652	2553	2455	2357	2260	2163	2067	1971	1876
JD 2444820.5	6613	6896	0	5748	4356	3332	2627	2142	1802	1561	1389	1267	1183	1131	1104	1100	1117	1154	1213	1307	2044
1981 AUG 4.0	217	116	0	3512	3410	3308	3206	3105	3003	2902	2802	2702	2602	2503	2405	2307	2210	2113	2017	1921	1827
JD 2444810.5	6776	7057	6536	4989	3767	2916	2337	1937	1656	1456	1314	1215	1150	1112	1099	1106	1133	1180	1250	1391	1969
1981 JUL 25.0	166	65	3562	3461	3359	3257	3156	3054	2953	2852	2751	2651	2552	2453	2354	2256	2159	2062	1966	1870	1773
JD 2444800.5	6941	0	5712	4286	3259	2563	2090	1762	1531	1367	1251	1173	1124	1100	1098	1117	1154	1210	1294	2006	1533
1981 JUL 15.0	114	0	3511	3410	3308	3206	3104	3002	2901	2800	2699	2599	2500	2401	2303	2205	2108	2011	1914	1820	1722

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E17

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T) (200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2445400.5	3366	3464	3562	63	163	263	364	465	566	668	770	872	974	1075	1177	1278	1378	1478	1578	1677	1774
1983 MAR 7.0	1749	1729	1769	1776	1739	1700	1662	1624	1585	1547	1510	1473	1436	1401	1367	1333	1302	1271	1243	1216	1191
JD 2445390.5	3427	3524	26	123	223	323	424	525	627	728	830	932	1034	1136	1237	1338	1439	1539	1638	1737	1837
1983 FEB 25.0	1723	1741	1790	1753	1715	1676	1637	1598	1560	1522	1484	1447	1411	1376	1341	1308	1277	1247	1218	1192	1167
JD 2445380.5	3487	3582	86	185	284	384	485	586	688	790	891	993	1095	1197	1298	1399	1500	1600	1699	1788	1898
1983 FEB 15.0	1720	1782	1767	1729	1690	1651	1612	1573	1534	1496	1459	1422	1386	1350	1316	1284	1252	1222	1194	1170	1144
JD 2445370.5	3548	50	147	246	346	446	547	648	750	851	953	1055	1157	1259	1360	1461	1561	1661	1759	1862	1959
1983 FEB 5.0	1749	1781	1743	1704	1665	1625	1586	1547	1509	1471	1433	1396	1360	1325	1292	1259	1228	1199	1171	1145	1122
JD 2445360.5	0	111	210	309	408	509	609	711	812	914	1016	1118	1219	1321	1422	1523	1624	1723	1828	1924	2022
1983 JAN 26.0	0	1756	1718	1678	1639	1600	1560	1522	1483	1445	1408	1371	1335	1301	1267	1235	1205	1176	1148	1123	1101
JD 2445350.5	77	174	272	372	471	572	672	773	875	977	1079	1180	1282	1384	1485	1586	1686	1780	1888	1986	2085
1983 JAN 16.0	1770	1731	1692	1653	1613	1574	1535	1496	1457	1420	1382	1346	1311	1277	1244	1212	1182	1155	1127	1103	1081
JD 2445340.5	139	237	336	435	535	635	736	837	938	1040	1142	1244	1345	1447	1548	1649	1748	1853	1951	2049	2148
1983 JAN 6.0	1745	1705	1666	1627	1587	1548	1509	1470	1432	1394	1358	1322	1287	1253	1221	1190	1161	1132	1107	1084	1063
JD 2445330.5	203	300	399	498	598	698	799	900	1002	1103	1205	1307	1409	1510	1611	1711	1822	1915	2014	2113	2211
1982 DEC 27.0	1719	1680	1640	1601	1561	1522	1483	1445	1407	1370	1333	1298	1264	1231	1199	1169	1138	1113	1089	1067	1048
JD 2445320.5	266	364	462	562	661	762	862	964	1065	1167	1269	1370	1472	1573	1674	1770	1879	1978	2077	2176	2275
1982 DEC 17.0	1693	1654	1614	1575	1535	1497	1458	1420	1382	1346	1310	1275	1241	1209	1178	1150	1121	1096	1073	1052	1034
JD 2445310.5	329	427	526	625	725	825	926	1027	1128	1230	1332	1434	1535	1637	1736	1844	1942	2041	2141	2240	2338
1982 DEC 7.0	1667	1628	1588	1549	1510	1471	1433	1396	1359	1322	1287	1253	1220	1189	1159	1129	1104	1080	1058	1039	1024
JD 2445300.5	392	490	589	688	788	888	989	1090	1192	1293	1395	1497	1598	1699	1819	1905	2005	2104	2204	2303	2401
1982 NOV 27.0	1642	1602	1563	1524	1485	1447	1409	1372	1336	1300	1266	1232	1200	1170	1137	1113	1089	1066	1046	1029	1016
JD 2445290.5	455	553	652	751	851	951	1052	1153	1254	1356	1458	1560	1661	1759	1868	1967	2067	2167	2267	2366	2464
1982 NOV 17.0	1616	1577	1538	1499	1461	1423	1386	1349	1314	1279	1245	1213	1182	1153	1124	1099	1076	1055	1037	1022	1011
JD 2445280.5	518	616	714	814	913	1014	1114	1216	1317	1419	1520	1622	1722	1832	1929	2029	2130	2230	2329	2428	2527
1982 NOV 7.0	1591	1552	1514	1476	1438	1400	1364	1328	1293	1259	1226	1195	1165	1135	1110	1086	1065	1046	1030	1018	1009

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
	JD2445600.5			JD2445640.5				JD2445680.5				JD2445720.5				JD2445760.5					
	1983 SEP 23.0			1983 NOV 2.0				1983 DEC 12.0				1984 JAN 21.0				1984 MAR 1.0					

EARTH DEPARTURE OR ARRIVAL DATE

M25
E17

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2445400.5	209	354	1274	758	297	188	140	115	99	90	85	83	84	87	94	105	124	156	220	389	1864
1983 MAR 7.0	782	887	988	997	983	959	926	887	844	797	750	702	654	609	566	525	487	452	421	392	367
JD 2445390.5	336	762	2288	468	264	187	148	126	113	105	101	100	103	109	120	139	170	227	359	909	1561
1983 FEB 25.0	833	953	1000	990	970	941	905	864	820	773	726	679	633	589	547	508	472	439	410	383	359
JD 2445380.5	596	4008	781	367	244	187	155	136	124	118	116	118	123	134	151	180	232	339	662	8299	685
1983 FEB 15.0	904	997	995	980	954	922	883	841	796	749	702	656	612	570	530	493	458	427	399	377	351
JD 2445370.5	1467	1525	515	314	230	186	160	145	135	131	131	136	145	161	188	235	324	546	1875	1224	477
1983 FEB 5.0	974	998	987	966	936	900	860	816	771	725	679	634	592	551	513	477	445	415	389	365	344
JD 2445360.5	0	749	404	281	221	186	165	153	146	144	147	155	170	194	236	311	477	1082	3120	675	383
1983 JAN 26.0	0	992	975	949	916	878	836	792	746	701	656	613	572	533	496	463	432	404	378	357	338
JD 2445350.5	1176	523	341	258	213	186	169	160	156	158	164	177	199	235	299	428	792	5054	1025	489	328
1983 JAN 16.0	996	983	960	930	894	854	811	767	722	677	634	592	552	515	480	448	420	396	369	349	332
JD 2445340.5	691	413	301	241	207	186	173	167	166	171	182	201	233	287	390	638	1849	1828	640	394	291
1983 JAN 6.0	989	969	942	909	871	830	786	742	698	654	612	571	533	498	465	435	408	382	361	342	326
JD 2445330.5	503	348	271	228	201	185	177	174	177	186	202	230	276	359	539	1137	5186	876	477	335	265
1982 DEC 27.0	978	953	923	887	847	805	761	717	674	631	590	552	515	481	450	422	393	373	353	336	321
JD 2445320.5	402	303	249	217	197	185	180	181	188	201	225	264	332	468	829	3754	1317	589	387	295	244
1982 DEC 17.0	963	935	901	863	822	780	736	693	650	609	570	533	498	466	437	412	385	364	346	330	317
JD 2445310.5	338	271	231	207	193	185	184	188	199	219	252	308	412	654	1678	2467	751	449	328	264	228
1982 DEC 7.0	946	915	879	839	797	755	711	669	627	588	550	514	481	451	424	397	376	356	339	325	314
JD 2445300.5	292	245	216	198	189	185	187	196	212	239	285	367	537	1062	8311	1021	530	365	286	241	213
1982 NOV 27.0	927	893	855	814	772	730	687	645	605	567	531	497	466	438	406	387	367	349	334	322	312
JD 2445290.5	258	224	203	191	185	185	191	204	226	263	328	452	768	2697	1582	641	410	308	253	221	201
1982 NOV 17.0	907	870	831	790	747	705	663	623	584	547	513	481	451	425	399	378	359	343	330	319	312
JD 2445280.5	231	206	191	183	181	185	195	213	243	293	386	593	1355	3460	814	465	333	266	227	204	190
1982 NOV 7.0	885	847	806	765	723	681	640	601	564	528	496	465	438	410	389	369	352	338	326	318	312

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445600.5 1983 SEP 23.0				JD2445640.5 1983 NOV 2.0				JD2445680.5 1983 DEC 12.0				JD2445720.5 1984 JAN 21.0				JD2445760.5 1984 MAR 1.0					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E17

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2445400.5	176	90	9	-2	-15	-39	-73	-115	-165	-220	-279	-341	-405	-469	-533	-595	-654	-710	-762	-809	-852
1983 MAR 7.0	1440	1505	1590	1867	1895	1916	1933	1945	1952	1955	1954	1951	1944	1935	1924	1912	1898	1885	1870	1856	1843
JD 2445390.5	134	37	0	-8	-28	-58	-96	-142	-194	-251	-311	-374	-437	-501	-563	-623	-681	-734	-784	-829	-870
1983 FEB 25.0	1474	1565	1866	1895	1919	1938	1952	1961	1966	1967	1964	1959	1951	1941	1929	1916	1902	1888	1874	1860	1845
JD 2445380.5	78	3	-3	-19	-44	-79	-121	-170	-224	-283	-344	-407	-470	-532	-593	-652	-707	-758	-805	-844	-887
1983 FEB 15.0	1532	1621	1895	1922	1943	1958	1969	1976	1979	1978	1973	1966	1957	1946	1933	1920	1905	1891	1877	1867	1849
JD 2445370.5	21	-1	-12	-33	-64	-103	-148	-200	-256	-316	-378	-440	-503	-564	-623	-679	-732	-781	-825	-867	-903
1983 FEB 5.0	1602	1895	1924	1946	1964	1977	1986	1990	1990	1987	1981	1973	1962	1950	1937	1923	1909	1894	1880	1865	1852
JD 2445360.5	0	-6	-24	-51	-86	-129	-178	-232	-290	-350	-412	-474	-535	-595	-653	-707	-757	-804	-849	-885	-918
1983 JAN 26.0	0	1925	1950	1970	1984	1995	2001	2002	2001	1996	1989	1979	1967	1955	1941	1926	1912	1897	1880	1868	1856
JD 2445350.5	-2	-16	-39	-71	-111	-157	-209	-265	-324	-385	-446	-508	-568	-626	-682	-734	-782	-823	-867	-902	-933
1983 JAN 16.0	1926	1953	1975	1991	2003	2011	2014	2014	2010	2004	1995	1984	1972	1958	1944	1929	1915	1903	1885	1872	1860
JD 2445340.5	-10	-30	-58	-95	-138	-188	-241	-299	-359	-420	-481	-542	-600	-657	-710	-760	-805	-849	-886	-918	-946
1983 JAN 6.0	1956	1979	1998	2011	2021	2026	2027	2024	2019	2011	2001	1989	1976	1962	1947	1932	1918	1901	1888	1875	1864
JD 2445330.5	-21	-47	-80	-121	-168	-220	-275	-334	-394	-455	-516	-575	-632	-687	-738	-785	-833	-869	-903	-934	-959
1982 DEC 27.0	1983	2004	2019	2030	2037	2039	2038	2034	2027	2017	2006	1993	1979	1965	1950	1935	1916	1905	1891	1879	1869
JD 2445320.5	-37	-67	-105	-149	-199	-253	-310	-370	-430	-491	-550	-608	-664	-716	-765	-807	-852	-888	-920	-948	-970
1982 DEC 17.0	2010	2027	2039	2047	2051	2051	2048	2042	2034	2023	2011	1997	1983	1968	1953	1940	1922	1908	1895	1884	1874
JD 2445310.5	-55	-90	-132	-179	-232	-288	-346	-406	-466	-526	-584	-641	-694	-744	-790	-836	-873	-907	-936	-961	-981
1982 DEC 7.0	2034	2048	2058	2063	2065	2063	2058	2050	2040	2029	2015	2001	1986	1971	1957	1938	1925	1912	1900	1889	1881
JD 2445300.5	-77	-116	-161	-211	-266	-323	-382	-442	-502	-561	-618	-672	-724	-771	-824	-857	-892	-924	-950	-972	-989
1982 NOV 27.0	2057	2068	2075	2078	2077	2073	2066	2057	2046	2034	2020	2005	1990	1975	1951	1943	1929	1917	1905	1896	1889
JD 2445290.5	-101	-144	-192	-245	-301	-359	-419	-479	-538	-595	-651	-703	-753	-797	-841	-878	-911	-939	-963	-982	-995
1982 NOV 17.0	2078	2086	2091	2091	2088	2083	2074	2064	2052	2038	2024	2008	1993	1979	1961	1947	1934	1922	1912	1903	1898
JD 2445280.5	-127	-174	-225	-279	-337	-396	-455	-515	-573	-629	-683	-733	-780	-826	-863	-898	-928	-953	-974	-989	-999
1982 NOV 7.0	2097	2103	2105	2104	2099	2091	2082	2070	2057	2043	2028	2012	1997	1978	1965	1952	1939	1928	1919	1913	1909

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445600.5					JD2445640.5					JD2445680.5					JD2445720.5					JD2445760.5	
1983 SEP 23.0					1983 NOV 2.0					1983 DEC 12.0					1984 JAN 21.0					1984 MAR 1.0	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E17

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2445400.5	610	852	2633	90	92	95	98	101	104	108	112	116	121	125	131	136	142	148	154	160	167
1983 MAR 7.0	276	286	293	142	147	152	157	162	168	174	180	187	193	200	207	215	222	230	238	246	254
JD 2445390.5	701	1323	90	92	95	97	100	103	107	111	115	119	124	129	134	140	146	152	158	164	171
1983 FEB 25.0	284	293	142	147	152	157	162	167	173	179	186	192	199	206	213	221	229	237	245	253	261
JD 2445380.5	921	5055	92	94	97	100	103	106	110	114	118	123	128	133	138	144	150	156	162	168	176
1983 FEB 15.0	292	299	147	151	156	161	167	173	179	185	191	198	205	212	219	227	235	243	251	259	268
JD 2445370.5	1755	92	94	97	99	102	105	109	113	117	121	126	131	136	142	148	154	160	167	174	180
1983 FEB 5.0	298	147	151	156	161	166	172	178	184	190	197	204	211	218	226	233	241	249	257	266	274
JD 2445360.5	0	94	96	99	101	105	108	112	116	120	125	130	135	140	146	152	158	164	171	178	185
1983 JAN 26.0	0	151	156	161	166	171	177	183	189	196	202	209	217	224	232	240	247	256	264	272	281
JD 2445350.5	94	96	98	101	104	107	111	115	119	123	128	133	138	144	150	156	162	168	176	183	190
1983 JAN 16.0	151	156	160	165	171	176	182	188	195	201	208	215	223	230	238	246	254	262	271	279	288
JD 2445340.5	96	98	100	103	106	110	113	117	122	126	131	137	142	148	154	160	166	173	180	187	194
1983 JAN 6.0	155	160	165	170	176	181	187	194	200	207	214	221	228	236	244	252	260	269	277	286	294
JD 2445330.5	97	100	102	105	109	112	116	120	125	130	135	140	146	152	158	164	171	178	185	192	199
1982 DEC 27.0	160	165	170	175	180	186	192	199	205	212	220	227	234	242	250	258	267	275	284	292	301
JD 2445320.5	99	102	105	108	111	115	119	123	128	133	138	144	150	156	162	168	175	182	189	197	204
1982 DEC 17.0	164	169	174	180	185	191	198	204	211	218	225	233	240	248	256	264	273	282	290	299	308
JD 2445310.5	101	104	107	110	114	118	122	126	131	136	142	148	153	160	166	173	180	187	194	201	209
1982 DEC 7.0	168	174	179	184	190	196	203	210	216	224	231	239	246	254	263	271	279	288	297	305	314
JD 2445300.5	103	106	109	112	116	120	125	130	135	140	145	151	157	164	171	177	184	191	199	206	214
1982 NOV 27.0	173	178	183	189	195	202	208	215	222	229	237	245	252	261	270	277	286	294	303	312	321
JD 2445290.5	105	108	111	115	119	123	128	133	138	143	149	155	161	167	175	181	188	196	203	211	219
1982 NOV 17.0	177	183	188	194	200	207	213	220	228	235	243	250	258	266	275	284	292	301	310	318	327
JD 2445280.5	107	110	114	117	121	126	131	136	141	147	153	159	165	172	179	186	193	200	208	216	224
1982 NOV 7.0	182	187	193	199	205	212	219	226	233	241	248	256	264	273	281	290	299	307	316	325	334

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
	JD2445600.5 1983 SEP 23.0			JD2445640.5 1983 NOV 2.0				JD2445680.5 1983 DEC 12.0				JD2445720.5 1984 JAN 21.0				JD2445760.5 1984 MAR 1.0					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25 E17

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2445400.5 1983 MAR 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445390.5 1983 FEB 25.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445380.5 1983 FEB 15.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1467
JD 2445370.5 1983 FEB 5.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1414
JD 2445360.5 1983 JAN 26.0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1471	1377	
JD 2445350.5 1983 JAN 16.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1417	1346	
JD 2445340.5 1983 JAN 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1465	1378	1317	
JD 2445330.5 1982 DEC 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1413	1344	1291	
JD 2445320.5 1982 DEC 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1454	1372	1314	1268	
JD 2445310.5 1982 DEC 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1504	1403	1337	1286	1247	
JD 2445300.5 1982 NOV 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1437	1362	1306	1262	1228
JD 2445290.5 1982 NOV 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1477	1389	1326	1278	1240	1214
JD 2445280.5 1982 NOV 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1418	1349	1295	1253	1223	1203

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445600.5 1983 SEP 23.0	JD2445640.5 1983 NOV 2.0	JD2445680.5 1983 DEC 12.0	JD2445720.5 1984 JAN 21.0	JD2445760.5 1984 MAR 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M25
E17

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2445400.5	1135	1578	2309	2599	2395	2193	1994	1799	1607	1422	1243	1072	909	754	610	475	351	238	137	54	265
1983 MAR 7.0	1172	1562	2221	2603	2431	2264	2102	1944	1793	1648	1511	1381	1259	1146	1041	945	859	781	714	667	922
JD 2445390.5	1335	1975	2678	2477	2277	2079	1885	1694	1508	1328	1155	990	833	685	547	418	300	194	103	81	152
1983 FEB 25.0	1379	1963	2714	2543	2376	2213	2055	1902	1754	1614	1481	1355	1238	1128	1028	936	853	781	723	741	765
JD 2445380.5	1668	2497	2554	2357	2161	1967	1777	1591	1411	1236	1069	909	758	617	484	362	251	154	92	2845	0
1983 FEB 15.0	1724	2474	2651	2484	2321	2162	2008	1859	1716	1580	1451	1330	1216	1111	1015	927	849	784	756	3104	621
JD 2445370.5	2156	2628	2432	2238	2046	1856	1671	1490	1314	1146	984	830	686	550	424	309	206	126	315	77	0
1983 FEB 5.0	2208	2754	2588	2426	2266	2111	1961	1817	1678	1546	1422	1304	1195	1095	1002	919	848	800	1011	753	610
JD 2445360.5	0	2505	2313	2121	1933	1747	1566	1390	1220	1057	901	753	614	485	365	258	168	161	718	0	0
1983 JAN 26.0	0	2687	2526	2367	2211	2060	1914	1774	1640	1512	1392	1280	1175	1078	991	914	854	876	1315	678	611
JD 2445350.5	2576	2384	2194	2006	1821	1640	1463	1292	1127	970	819	678	545	422	309	212	156	1544	38	0	0
1983 JAN 16.0	2781	2621	2463	2307	2156	2009	1867	1731	1602	1479	1363	1255	1155	1063	981	912	884	2083	777	668	617
JD 2445340.5	2454	2265	2078	1893	1712	1535	1363	1196	1037	884	740	604	477	361	258	180	344	269	0	0	0
1983 JAN 6.0	2711	2554	2399	2248	2100	1958	1820	1689	1563	1445	1334	1230	1135	1049	973	922	1087	993	732	668	624
JD 2445330.5	2335	2148	1963	1782	1604	1431	1264	1102	948	801	662	532	412	304	214	208	1602	8	0	0	0
1982 DEC 27.0	2640	2486	2335	2187	2044	1906	1773	1646	1525	1412	1305	1206	1116	1036	972	982	2102	812	722	672	634
JD 2445320.5	2217	2032	1850	1672	1499	1330	1167	1011	862	720	587	463	350	252	195	1025	127	0	0	0	0
1982 DEC 17.0	2568	2417	2270	2127	1988	1854	1726	1603	1487	1378	1277	1183	1098	1026	990	1682	935	782	721	678	644
JD 2445310.5	2101	1919	1740	1565	1395	1231	1073	921	778	642	514	397	292	213	324	500	0	0	0	0	0
1982 DEC 7.0	2495	2349	2205	2066	1932	1802	1678	1561	1450	1345	1249	1160	1082	1025	1123	1258	849	773	724	686	657
JD 2445300.5	1987	1807	1632	1461	1295	1135	981	835	696	566	444	334	242	220	2907	55	0	0	0	0	0
1982 NOV 27.0	2422	2280	2140	2005	1875	1750	1631	1518	1412	1313	1221	1139	1071	1057	3179	934	826	770	728	696	671
JD 2445290.5	1875	1698	1526	1358	1197	1041	892	751	617	492	378	277	211	636	213	0	0	0	0	0	0
1982 NOV 17.0	2349	2210	2075	1945	1819	1699	1585	1477	1375	1281	1195	1120	1071	1398	1082	883	817	771	735	707	688
JD 2445280.5	1766	1592	1423	1259	1101	950	806	669	541	422	315	229	263	894	5	0	0	0	0	0	0
1982 NOV 7.0	2276	2141	2010	1884	1763	1648	1538	1435	1339	1250	1170	1105	1129	1627	949	865	813	774	743	721	707

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445600.5 1983 SEP 23.0				JD2445640.5 1983 NOV 2.0				JD2445680.5 1983 DEC 12.0				JD2445720.5 1984 JAN 21.0				JD2445760.5 1984 MAR 1.0					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E17

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2445400.5	2307	3140	4531	5201	4827	4458	4096	3743	3400	3070	2754	2453	2168	1900	1651	1421	1210	1019	852	721	1186
1983 MAR 7.0	3366	3464	3562	63	163	263	364	465	566	668	770	872	974	1075	1177	1278	1378	1478	1578	1677	1774
JD 2445390.5	2714	3938	5392	5020	4653	4292	3939	3596	3263	2942	2636	2345	2070	1813	1574	1354	1153	975	827	822	917
1983 FEB 25.0	3427	3524	26	123	223	323	424	525	627	728	830	932	1034	1136	1237	1338	1439	1539	1638	1737	1837
JD 2445380.5	3392	4972	5205	4841	4482	4129	3785	3450	3127	2816	2520	2239	1975	1728	1499	1289	1101	939	848	5949	621
1983 FEB 15.0	3487	3582	86	185	284	384	485	586	688	790	891	993	1095	1197	1298	1399	1500	1600	1699	1788	1898
JD 2445370.5	4363	5382	5021	4664	4312	3968	3632	3306	2992	2692	2406	2135	1881	1644	1426	1228	1054	926	1326	830	610
1983 FEB 5.0	3548	50	147	246	346	446	547	648	750	851	953	1055	1157	1259	1360	1461	1561	1661	1759	1862	1959
JD 2445360.5	0	5193	4838	4488	4144	3808	3481	3164	2860	2569	2293	2033	1789	1563	1356	1172	1022	1037	2033	678	611
1983 JAN 26.0	0	111	210	309	408	509	609	711	812	914	1016	1118	1219	1321	1422	1523	1624	1723	1828	1924	2022
JD 2445350.5	5357	5005	4657	4314	3977	3649	3331	3024	2729	2448	2182	1932	1699	1485	1290	1124	1040	3626	814	668	617
1983 JAN 16.0	77	174	272	372	471	572	672	773	875	977	1079	1180	1282	1384	1485	1586	1686	1780	1888	1986	2085
JD 2445340.5	5165	4819	4477	4141	3812	3492	3183	2885	2600	2329	2074	1834	1612	1409	1231	1102	1431	1261	732	668	624
1983 JAN 6.0	139	237	336	435	535	635	736	837	938	1040	1142	1244	1345	1447	1548	1649	1748	1853	1951	2049	2148
JD 2445330.5	4974	4634	4298	3969	3648	3337	3037	2748	2473	2213	1968	1739	1528	1339	1186	1191	3704	819	722	672	634
1982 DEC 27.0	203	300	399	498	598	698	799	900	1002	1103	1205	1307	1409	1510	1611	1711	1822	1915	2014	2113	2211
JD 2445320.5	4784	4450	4121	3799	3487	3184	2893	2614	2349	2099	1864	1646	1448	1278	1185	2707	1062	782	721	678	644
1982 DEC 17.0	266	364	462	562	661	762	862	964	1065	1167	1269	1370	1472	1573	1674	1770	1879	1978	2077	2176	2275
JD 2445310.5	4596	4267	3945	3632	3327	3033	2751	2482	2227	1987	1763	1557	1375	1238	1447	1758	849	773	724	686	657
1982 DEC 7.0	329	427	526	625	725	825	926	1027	1128	1230	1332	1434	1535	1637	1736	1844	1942	2041	2141	2240	2338
JD 2445300.5	4409	4087	3772	3466	3170	2885	2612	2353	2108	1879	1666	1473	1313	1277	6086	989	826	770	728	696	671
1982 NOV 27.0	392	490	589	688	788	888	989	1090	1192	1293	1395	1497	1598	1699	1819	1905	2005	2104	2204	2303	2401
JD 2445290.5	4224	3909	3601	3303	3016	2740	2477	2227	1992	1773	1573	1396	1281	2035	1295	883	817	771	735	707	688
1982 NOV 17.0	455	553	652	751	851	951	1052	1153	1254	1356	1458	1560	1661	1759	1868	1967	2067	2167	2267	2366	2464
JD 2445280.5	4042	3733	3433	3143	2864	2598	2344	2104	1880	1672	1485	1334	1392	2521	954	865	813	774	743	721	707
1982 NOV 7.0	518	616	714	814	913	1014	1114	1216	1317	1419	1520	1622	1722	1832	1929	2029	2130	2230	2329	2428	2527

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2445600.5 1983 SEP 23.0	JD2445640.5 1983 NOV 2.0	JD2445680.5 1983 DEC 12.0	JD2445720.5 1984 JAN 21.0	JD2445760.5 1984 MAR 1.0																	

EARTH DEPARTURE OR ARRIVAL DATE

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445640.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671597	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.662	DEGREES
MEAN ANOM. AT EPOCH	=	298.049	DEGREES
DATE OF NODAL PASSAGE	=	2445601.096	(J.D.)
OBLIQUITY OF EQUATOR	=	23.441	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445640.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09339058	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.433	DEGREES
ARG. OF PERIHELION	=	286.329	DEGREES
MEAN ANOM. AT EPOCH	=	165.305	DEGREES
DATE OF NODAL PASSAGE	=	2445446.443	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.077	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E18

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5	471	315	262	227	197	172	152	140	138	147	168	200	243	300	375	477	625	847	1176	1515	1463
1983 MAR 7.0	388	253	228	214	203	195	189	186	186	190	198	212	232	262	307	373	476	639	890	1179	1137
JD 2445390.5	422	288	248	215	187	164	147	139	141	156	182	219	269	335	424	550	738	1025	1415	1482	1430
1983 FEB 25.0	331	250	232	219	208	201	196	195	196	202	212	229	254	292	347	433	569	785	1089	1166	1124
JD 2445380.5	323	270	234	204	178	157	144	140	148	168	199	243	301	379	488	647	892	1254	1500	1449	1396
1983 FEB 15.0	277	251	235	223	214	208	204	204	207	215	229	250	281	328	400	513	696	976	1194	1152	1109
JD 2445370.5	295	254	221	192	168	151	142	143	157	183	221	272	341	436	572	780	1099	1511	1466	1415	1362
1983 FEB 5.0	273	254	240	229	221	215	213	215	220	231	248	275	314	374	469	621	867	1192	1179	1137	1094
JD 2445360.5	274	238	207	181	160	146	142	150	170	202	248	308	391	509	685	961	1356	1484	1433	1380	1327
1983 JAN 26.0	273	257	244	235	228	224	223	227	235	249	271	305	356	435	562	771	1081	1206	1164	1121	1079
JD 2445350.5	256	223	194	171	153	144	146	160	187	227	281	354	457	607	842	1200	0	1450	1398	1345	1292
1983 JAN 16.0	276	261	250	241	236	234	235	241	252	270	299	342	409	515	691	969	0	1189	1147	1105	1062
JD 2445340.5	239	208	182	162	148	145	154	175	209	257	322	412	543	742	1056	1476	1467	1415	1363	1310	1256
1983 JAN 6.0	278	266	256	249	245	244	248	257	272	296	333	389	479	625	866	1199	1213	1172	1130	1087	1044
JD 2445330.5	222	194	171	154	146	150	166	195	237	295	375	489	659	928	1324	1483	1433	1381	1328	1275	1221
1982 DEC 27.0	282	271	262	257	255	257	263	275	296	327	375	451	573	777	1088	1235	1195	1153	1111	1069	1026
JD 2445320.5	206	181	161	149	148	159	183	220	272	343	443	590	820	1174	0	1450	1398	1346	1293	1239	1185
1982 DEC 17.0	286	276	270	266	266	271	280	297	324	365	429	532	703	978	0	1216	1175	1134	1092	1050	1008
JD 2445310.5	191	169	154	148	154	173	206	252	316	405	533	729	1037	1457	1467	1415	1363	1310	1257	1203	1149
1982 DEC 7.0	291	283	278	276	279	287	301	323	359	414	501	644	880	1209	1236	1196	1155	1113	1072	1030	988
JD 2445300.5	178	159	150	152	166	194	235	293	372	485	653	918	1308	1484	1433	1381	1328	1275	1221	1167	1113
1982 NOV 27.0	296	290	287	288	294	305	325	355	402	476	596	795	1098	1254	1214	1174	1133	1092	1051	1009	968
JD 2445290.5	166	153	150	160	184	221	273	344	444	590	816	1163	1502	1451	1399	1346	1293	1240	1186	1132	0
1982 NOV 17.0	302	298	298	302	311	327	353	394	457	558	724	990	1270	1232	1192	1152	1111	1070	1029	988	0
JD 2445280.5	157	151	156	176	208	255	320	409	536	730	1031	1440	1469	1417	1365	1312	1258	1204	1150	0	0
1982 NOV 7.0	310	308	310	317	331	353	388	442	528	667	893	1208	1247	1208	1169	1128	1088	1048	1007	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445800.5					JD2445840.5				JD2445880.5				JD2445920.5				JD2445960.5				
1984 APR 10.0					1984 MAY 20.0				1984 JUN 29.0				1984 AUG 8.0				1984 SEP 17.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E18

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5		482	-161	-48	-10	5	7	-3	-25	-53	-79	-94	-100	-97	-90	-80	-70	-62	-60	-70	-207	-219
1983 MAR 7.0		3499	206	189	205	214	208	179	125	51	3577	3519	3486	3474	3479	3492	3509	3522	3520	3490	2429	2508
JD 2445390.5		-353	-115	-54	-28	-18	-22	-39	-65	-93	-114	-124	-125	-119	-110	-100	-91	-86	-91	-108	-204	-216
1983 FEB 25.0		298	151	161	176	180	166	127	63	3586	3516	3466	3441	3436	3444	3458	3471	3475	3455	3403	2413	2492
JD 2445380.5		-205	-105	-65	-48	-45	-56	-78	-106	-131	-146	-151	-148	-140	-130	-121	-114	-115	-127	-184	-200	-213
1983 FEB 15.0		127	116	132	143	141	116	66	3594	3517	3453	3413	3396	3396	3406	3419	3426	3416	3373	2320	2397	2476
JD 2445370.5		-165	-108	-81	-71	-75	-92	-119	-147	-167	-176	-175	-169	-160	-150	-142	-140	-147	-164	-179	-196	-210
1983 FEB 5.0		72	83	99	106	94	58	3597	3519	3445	3390	3360	3350	3355	3366	3375	3371	3339	3272	2305	2381	2459
JD 2445360.5		-155	-118	-100	-98	-109	-132	-161	-185	-199	-202	-197	-189	-179	-171	-166	-168	-182	-154	-175	-192	-207
1983 JAN 26.0		33	50	63	62	39	3591	3519	3439	3370	3326	3306	3303	3311	3320	3321	3299	3240	2215	2289	2365	2443
JD 2445350.5		-158	-132	-124	-129	-147	-174	-202	-220	-226	-224	-217	-207	-198	-191	-191	-199	0	-149	-170	-188	-203
1983 JAN 16.0		3596	13	20	9	3574	3512	3432	3354	3296	3263	3252	3254	3262	3267	3254	3206	0	2199	2273	2349	2426
JD 2445340.5		-167	-152	-151	-164	-188	-217	-239	-249	-249	-243	-234	-224	-216	-213	-217	-228	-120	-144	-165	-184	-200
1983 JAN 6.0		3558	3572	3570	3547	3496	3421	3338	3267	3221	3200	3197	3203	3208	3202	3166	3090	2112	2183	2257	2332	2410
JD 2445330.5		-182	-176	-183	-203	-231	-256	-270	-272	-266	-258	-248	-240	-234	-235	-242	-88	-114	-138	-160	-179	-196
1982 DEC 27.0		3517	3523	3510	3471	3404	3320	3239	3181	3149	3138	3140	3146	3145	3121	3054	2027	2096	2168	2241	2316	2393
JD 2445320.5		-202	-204	-219	-244	-270	-288	-292	-288	-280	-270	-261	-254	-252	-256	0	-82	-108	-132	-155	-175	-192
1982 DEC 17.0		3468	3465	3437	3380	3298	3211	3140	3097	3078	3076	3081	3083	3068	3015	0	2012	2081	2152	2225	2300	2377
JD 2445310.5		-226	-236	-257	-283	-303	-310	-307	-299	-289	-280	-272	-268	-268	-269	-48	-75	-102	-127	-150	-170	-187
1982 DEC 7.0		3411	3393	3347	3271	3181	3099	3044	3016	3009	3012	3016	3009	2970	2888	1929	1997	2066	2137	2210	2284	2360
JD 2445300.5		-254	-271	-295	-316	-325	-323	-314	-304	-295	-287	-281	-279	-278	-13	-41	-69	-96	-121	-144	-165	-183
1982 NOV 27.0		3342	3305	3238	3147	3058	2991	2953	2940	2940	2946	2944	2918	2849	1847	1914	1982	2051	2122	2194	2268	2344
JD 2445290.5		-284	-306	-327	-337	-335	-326	-316	-306	-297	-291	-287	-284	22	-6	-35	-63	-90	-115	-139	-160	0
1982 NOV 17.0		3256	3197	3110	3015	2937	2890	2869	2867	2872	2874	2859	2806	1765	1832	1899	1967	2036	2106	2178	2252	0
JD 2445280.5		-315	-334	-346	-344	-334	-323	-313	-304	-297	-292	-288	-279	28	-0	-28	-56	-84	-109	-133	0	0
1982 NOV 7.0		3149	3068	2970	2883	2826	2798	2791	2796	2801	2794	2757	2679	1751	1818	1885	1952	2021	2091	2163	0	0

	(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)

JD2445800.5	JD2445840.5	JD2445880.5	JD2445920.5	JD2445960.5
1984 APR 10.0	1984 MAY 20.0	1984 JUN 29.0	1984 AUG 8.0	1984 SEP 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E18

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5	-188	387	276	240	219	205	194	185	178	173	171	170	171	175	180	187	195	203	208	223	226
1983 MAR 7.0	838	912	924	930	934	937	939	941	942	944	945	946	947	945	940	928	903	853	763	655	678
JD 2445390.5	579	323	267	240	222	209	198	190	183	178	175	174	175	178	182	188	194	198	192	215	218
1983 FEB 25.0	768	860	870	876	881	884	887	889	890	892	893	893	892	887	878	858	819	746	627	608	630
JD 2445380.5	387	295	259	238	223	211	200	192	185	180	176	175	175	178	181	185	188	182	201	205	209
1983 FEB 15.0	781	805	815	822	827	831	833	835	837	838	838	837	833	826	810	779	721	619	538	560	582
JD 2445370.5	327	278	252	234	221	209	200	191	184	179	176	174	173	175	176	177	172	153	189	194	198
1983 FEB 5.0	734	750	760	767	772	776	779	781	782	782	781	779	772	760	735	689	605	475	491	512	533
JD 2445360.5	295	263	243	228	216	206	196	188	181	176	172	169	168	168	166	161	143	171	176	182	186
1983 JAN 26.0	681	695	704	711	716	720	723	724	725	725	723	718	707	688	651	583	468	423	443	464	485
JD 2445350.5	272	249	233	221	209	200	191	183	176	170	165	162	159	156	149	132	0	156	162	168	173
1983 JAN 16.0	627	639	648	654	659	663	666	667	668	666	662	654	638	609	555	457	0	376	397	417	438
JD 2445340.5	253	235	222	211	200	191	182	174	167	161	156	151	146	138	122	91	134	141	147	153	159
1983 JAN 6.0	573	583	591	598	602	606	608	609	609	606	599	587	563	520	440	313	310	330	350	370	390
JD 2445330.5	234	220	209	198	189	180	171	163	156	149	142	136	126	111	81	110	117	124	131	137	143
1982 DEC 27.0	518	528	535	541	545	549	550	550	548	543	533	515	480	416	305	246	265	285	304	324	343
JD 2445320.5	215	204	194	184	175	167	158	150	142	134	125	115	100	72	0	93	100	107	114	121	127
1982 DEC 17.0	464	472	479	484	488	491	492	491	487	479	464	436	385	292	0	202	221	240	259	278	297
JD 2445310.5	196	186	177	168	160	151	142	134	125	115	104	88	63	21	67	74	82	89	96	103	109
1982 DEC 7.0	410	417	423	428	431	433	433	430	424	412	390	349	273	151	139	157	176	195	214	232	251
JD 2445300.5	176	167	159	151	142	133	124	115	105	93	77	53	14	40	48	56	64	71	78	85	91
1982 NOV 27.0	356	363	368	372	374	375	373	369	359	341	308	247	142	77	95	114	132	151	169	187	206
JD 2445290.5	155	147	139	131	123	114	104	93	81	65	43	7	13	21	29	37	45	52	60	67	0
1982 NOV 17.0	303	309	313	316	317	316	313	305	291	264	215	127	16	34	52	70	89	107	125	143	0
JD 2445280.5	134	126	119	110	102	92	81	69	53	32	0	-46	-5	2	10	18	26	34	41	0	0
1982 NOV 7.0	250	255	258	260	260	258	251	240	218	179	107	3591	3573	3591	9	28	46	63	81	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
	JD2445800.5			JD2445840.5				JD2445880.5				JD2445920.5				JD2445960.5					
	1984 APR 10.0			1984 MAY 20.0				1984 JUN 29.0				1984 AUG 8.0				1984 SEP 17.0					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E18

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5 1983 MAR 7.0	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292
JD 2445390.5 1983 FEB 25.0	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254	2254
JD 2445380.5 1983 FEB 15.0	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215
JD 2445370.5 1983 FEB 5.0	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176	2176
JD 2445360.5 1983 JAN 26.0	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136	2136
JD 2445350.5 1983 JAN 16.0	2095	2095	2095	2095	2095	2095	2095	2095	2095	2095	2095	2095	2095	2095	2095	2095	0	2095	2095	2095	2095
JD 2445340.5 1983 JAN 6.0	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054	2054
JD 2445330.5 1982 DEC 27.0	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
JD 2445320.5 1982 DEC 17.0	1972	1972	1972	1972	1972	1972	1972	1972	1972	1972	1972	1972	1972	1972	0	1972	1972	1972	1972	1972	1972
JD 2445310.5 1982 DEC 7.0	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930	1930
JD 2445300.5 1982 NOV 27.0	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888	1888
JD 2445290.5 1982 NOV 17.0	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	1846	0	
JD 2445280.5 1982 NOV 7.0	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	0	0	

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)

JD2445800.5 1984 APR 10.0 | JD2445840.5 1984 MAY 20.0 | JD2445880.5 1984 JUN 29.0 | JD2445920.5 1984 AUG 8.0 | JD2445960.5 1984 SEP 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M25
E18

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
1983 MAR 7.0	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218
JD 2445390.5	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167
1983 FEB 25.0	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242
JD 2445380.5	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183
1983 FEB 15.0	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265
JD 2445370.5	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199
1983 FEB 5.0	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
JD 2445360.5	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
1983 JAN 26.0	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312
JD 2445350.5	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	0	231	231	231	231
1983 JAN 16.0	335	335	335	335	335	335	335	335	335	335	335	335	335	335	335	335	0	335	335	335	335
JD 2445340.5	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246
1983 JAN 6.0	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359
JD 2445330.5	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261
1982 DEC 27.0	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382
JD 2445320.5	276	276	276	276	276	276	276	276	276	276	276	276	276	276	0	276	276	276	276	276	276
1982 DEC 17.0	406	406	406	406	406	406	406	406	406	406	406	406	406	406	0	406	406	406	406	406	406
JD 2445310.5	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290
1982 DEC 7.0	429	429	429	429	429	429	429	429	429	429	429	429	429	429	429	429	429	429	429	429	429
JD 2445300.5	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304	304
1982 NOV 27.0	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454
JD 2445290.5	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	318	0
1982 NOV 17.0	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	0
JD 2445280.5	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	0	0
1982 NOV 7.0	503	503	503	503	503	503	503	503	503	503	503	503	503	503	503	503	503	503	503	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
	JD2445800.5			JD2445840.5			JD2445880.5			JD2445920.5			JD2445960.5								
	1984 APR 10.0			1984 MAY 20.0			1984 JUN 29.0			1984 AUG 8.0			1984 SEP 17.0								

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E18

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5	1774	1874	1971	2068	2164	2260	2356	2451	2547	2642	2737	2833	2929	3025	3121	3218	3315	3413	3511	13	110
1983 MAR 7.0	1191	1168	1148	1130	1115	1103	1094	1087	1085	1085	1090	1098	1112	1131	1161	1204	1272	1384	1568	1794	1753
JD 2445390.5	1837	1934	2031	2128	2224	2320	2416	2512	2607	2702	2798	2893	2989	3085	3181	3278	3375	3473	3570	71	171
1983 FEB 25.0	1167	1145	1125	1108	1093	1082	1074	1069	1067	1070	1077	1089	1106	1132	1170	1229	1322	1477	1715	1769	1727
JD 2445380.5	1898	1995	2092	2189	2286	2382	2477	2573	2668	2764	2859	2954	3050	3146	3242	3339	3436	3534	35	132	232
1983 FEB 15.0	1144	1122	1103	1086	1073	1062	1055	1052	1053	1058	1068	1083	1107	1140	1191	1270	1400	1611	1785	1743	1700
JD 2445370.5	1959	2057	2154	2251	2348	2444	2539	2635	2730	2825	2921	3016	3112	3208	3304	3401	3498	3586	96	194	294
1983 FEB 5.0	1122	1101	1082	1067	1054	1045	1040	1038	1041	1049	1063	1083	1114	1158	1225	1334	1515	1759	1759	1716	1673
JD 2445360.5	2022	2119	2217	2314	2410	2506	2602	2697	2793	2888	2983	3079	3174	3270	3366	3463	3558	61	158	257	356
1983 JAN 26.0	1101	1080	1063	1049	1038	1030	1027	1028	1034	1045	1063	1090	1129	1187	1279	1432	1673	1774	1732	1689	1646
JD 2445350.5	2085	2182	2280	2376	2473	2569	2665	2760	2855	2951	3046	3141	3237	3333	3429	3525	0	123	221	319	419
1983 JAN 16.0	1081	1062	1046	1033	1024	1018	1017	1021	1030	1045	1069	1104	1155	1234	1362	1574	0	1747	1704	1662	1619
JD 2445340.5	2148	2246	2343	2440	2536	2632	2728	2823	2919	3014	3109	3205	3300	3396	3492	3581	89	186	284	383	482
1983 JAN 6.0	1063	1046	1031	1020	1012	1009	1011	1018	1031	1052	1082	1127	1195	1304	1484	1737	1761	1719	1677	1634	1591
JD 2445330.5	2211	2309	2406	2503	2599	2695	2791	2887	2982	3077	3172	3268	3363	3459	3553	56	151	249	347	446	545
1982 DEC 27.0	1048	1032	1019	1009	1004	1004	1009	1019	1037	1065	1104	1164	1256	1408	1650	1776	1734	1692	1649	1606	1564
JD 2445320.5	2275	2372	2470	2566	2663	2759	2855	2950	3045	3141	3236	3331	3427	3521	0	118	215	312	411	509	609
1982 DEC 17.0	1034	1020	1009	1002	1000	1003	1011	1026	1050	1085	1137	1216	1345	1556	0	1748	1706	1664	1621	1579	1536
JD 2445310.5	2338	2436	2533	2630	2726	2822	2918	3013	3109	3204	3299	3394	3489	3577	85	181	278	376	474	573	672
1982 DEC 7.0	1024	1011	1003	999	999	1006	1019	1039	1070	1116	1184	1293	1472	1726	1763	1721	1679	1636	1594	1551	1509
JD 2445300.5	2401	2499	2596	2693	2789	2885	2981	3077	3172	3267	3362	3457	3551	53	148	244	341	439	537	636	735
1982 NOV 27.0	1016	1006	1000	999	1003	1014	1031	1059	1099	1158	1250	1402	1641	1777	1736	1694	1651	1609	1567	1524	1482
JD 2445290.5	2464	2562	2659	2756	2852	2948	3044	3140	3235	3330	3425	3519	25	115	210	307	404	502	600	699	0
1982 NOV 17.0	1011	1004	1001	1003	1011	1026	1050	1085	1137	1216	1343	1551	1789	1750	1708	1666	1624	1582	1540	1498	0
JD 2445280.5	2527	2624	2722	2818	2915	3011	3107	3202	3297	3392	3487	3576	82	177	273	369	466	564	662	0	0
1982 NOV 7.0	1009	1005	1005	1011	1024	1045	1075	1121	1189	1296	1472	1722	1764	1723	1681	1639	1597	1556	1514	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445800.5 1984 APR 10.0	JD2445840.5 1984 MAY 20.0	JD2445880.5 1984 JUN 29.0	JD2445920.5 1984 AUG 8.0	JD2445960.5 1984 SEP 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M25
E18

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5	1863	648	283	184	140	115	101	92	86	83	83	85	90	98	112	134	174	259	537	3898	435
1983 MAR 7.0	367	345	325	309	296	286	279	275	275	279	289	304	327	361	410	482	587	738	917	1000	997
JD 2445390.5	1561	432	255	185	148	127	114	106	101	100	101	106	114	128	150	188	262	455	1950	807	341
1983 FEB 25.0	359	338	320	306	294	285	279	277	279	285	297	315	344	385	445	535	667	844	989	999	993
JD 2445380.5	685	347	237	185	155	137	125	119	116	117	121	128	142	163	199	264	412	1008	1941	507	295
1983 FEB 15.0	351	332	316	302	292	284	280	280	283	292	307	330	365	416	491	605	768	947	1000	996	988
JD 2445370.5	477	302	226	185	160	145	136	132	131	134	141	154	174	207	265	384	739	7470	789	394	267
1983 FEB 5.0	344	326	311	299	290	284	282	283	289	301	320	348	392	456	552	696	883	998	998	991	981
JD 2445360.5	383	273	217	185	165	153	146	144	146	152	164	183	213	265	364	610	2032	1380	531	333	248
1983 JAN 26.0	338	321	308	297	289	285	284	288	297	312	336	372	427	509	633	810	977	999	994	985	972
JD 2445350.5	328	252	210	185	169	160	156	157	162	172	190	218	264	348	532	1204	0	736	416	295	234
1983 JAN 16.0	332	317	305	295	289	287	288	295	307	327	357	403	473	580	739	928	0	996	989	977	962
JD 2445340.5	291	237	205	185	173	167	166	170	179	195	220	261	332	477	887	5842	1084	522	350	268	223
1983 JAN 6.0	326	313	302	295	291	290	294	303	320	345	385	444	535	674	862	994	998	992	982	968	951
JD 2445330.5	265	224	200	185	177	174	176	184	197	220	256	318	434	716	2178	1814	667	414	306	248	214
1982 DEC 27.0	321	309	301	295	293	295	302	315	337	370	421	499	618	793	969	999	995	986	974	958	939
JD 2445320.5	244	214	196	185	180	181	187	199	218	250	303	398	605	1328	0	883	492	347	274	232	206
1982 DEC 17.0	317	307	300	296	297	301	312	330	359	402	469	572	727	918	0	997	990	979	964	946	926
JD 2445310.5	228	205	192	185	184	188	198	215	243	288	366	523	961	5459	1247	592	394	301	249	218	199
1982 DEC 7.0	314	306	301	299	302	311	326	350	388	445	533	669	855	992	998	993	983	970	953	934	912
JD 2445300.5	213	197	188	185	187	195	210	234	272	337	459	752	2201	2026	727	448	330	267	229	207	193
1982 NOV 27.0	312	306	303	304	311	323	344	376	426	502	619	790	965	999	995	987	975	960	941	920	897
JD 2445290.5	201	190	185	185	191	203	223	256	309	406	613	1323	4711	931	514	361	284	240	213	196	0
1982 NOV 17.0	312	307	307	312	322	339	367	410	476	577	729	916	1000	997	990	980	965	948	928	906	0
JD 2445280.5	190	183	181	185	195	211	239	283	359	511	928	4835	1286	598	396	302	249	217	198	0	0
1982 NOV 7.0	312	311	313	321	336	361	398	455	542	675	856	992	998	993	984	971	955	936	915	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
	JD2445800.5			JD2445840.5			JD2445880.5			JD2445920.5			JD2445960.5								
	1984 APR 10.0			1984 MAY 20.0			1984 JUN 29.0			1984 AUG 8.0			1984 SEP 17.0								

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E18

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5	-852	-891	-924	-952	-976	-994	-1007	-1014	1016	1011	999	977	944	895	826	725	577	366	116	0	-3
1983 MAR 7.0	1843	1830	1818	1807	1798	1792	1787	1786	1788	1796	1809	1829	1861	1906	1973	2072	2219	2432	2692	3015	3040
JD 2445390.5	-870	-906	-937	-963	-984	-1000	-1010	-1015	1015	1007	990	963	923	864	778	652	467	219	15	-1	-10
1983 FEB 25.0	1845	1833	1822	1812	1804	1798	1794	1795	1799	1809	1825	1851	1889	1945	2029	2153	2339	2594	2815	3041	3064
JD 2445380.5	-887	-920	-949	-972	-991	-1005	-1013	1016	1012	1000	978	945	896	823	716	556	327	75	0	-5	-18
1983 FEB 15.0	1849	1837	1826	1816	1809	1804	1802	1804	1811	1824	1844	1876	1924	1994	2100	2259	2492	2757	3041	3065	3085
JD 2445370.5	-903	-934	-960	-981	-997	-1009	-1014	1014	1007	990	963	922	860	769	632	429	166	4	-2	-13	-30
1983 FEB 5.0	1852	1841	1830	1822	1815	1812	1811	1815	1825	1841	1868	1908	1967	2057	2193	2398	2669	2853	3066	3088	3105
JD 2445360.5	-918	-947	-970	-989	-1003	-1011	1015	1011	999	977	943	891	813	696	520	270	33	-0	-8	-22	-43
1983 JAN 26.0	1856	1845	1835	1827	1822	1820	1822	1828	1841	1863	1896	1947	2023	2138	2315	2571	2823	3067	3091	3109	3123
JD 2445350.5	-933	-959	-980	-996	-1007	-1013	1013	1005	988	959	915	849	749	598	372	103	0	-4	-16	-35	-59
1983 JAN 16.0	1860	1849	1840	1834	1830	1830	1834	1844	1861	1889	1932	1997	2095	2247	2475	2755	0	3092	3113	3129	3140
JD 2445340.5	-946	-970	-988	-1002	-1010	1013	1008	996	972	935	879	793	663	465	197	8	-2	-11	-27	-50	-78
1983 JAN 6.0	1864	1854	1846	1841	1839	1841	1848	1862	1886	1922	1977	2061	2191	2390	2666	2875	3094	3116	3134	3147	3155
JD 2445330.5	-959	-980	-996	-1006	1012	1010	1001	982	951	903	830	718	546	297	45	-0	-7	-21	-41	-67	-99
1982 DEC 27.0	1869	1860	1853	1850	1850	1855	1866	1885	1916	1963	2035	2146	2318	2573	2839	3095	3119	3138	3153	3163	3169
JD 2445320.5	-970	-988	-1001	-1009	1011	1005	990	964	922	859	763	615	392	118	0	-4	-15	-33	-57	-86	-121
1982 DEC 17.0	1874	1867	1862	1860	1863	1871	1887	1913	1954	2016	2111	2259	2485	2770	0	3122	3142	3158	3170	3178	3181
JD 2445310.5	-981	-995	-1005	1010	1006	995	973	938	884	801	673	478	209	11	-2	-11	-26	-48	-75	-108	-146
1982 DEC 7.0	1881	1875	1872	1873	1879	1892	1914	1948	2002	2084	2211	2408	2684	2902	3124	3146	3164	3177	3186	3191	3192
JD 2445300.5	-989	-1001	-1006	1007	999	981	951	904	831	721	552	304	50	-0	-7	-20	-40	-65	-96	-132	-172
1982 NOV 27.0	1889	1884	1884	1888	1898	1917	1946	1993	2064	2173	2344	2596	2864	3126	3150	3169	3184	3194	3200	3203	3201
JD 2445290.5	-995	-1003	1006	1001	986	961	920	857	761	615	394	123	0	-4	-15	-32	-55	-84	-118	-157	0
1982 NOV 17.0	1898	1896	1898	1906	1922	1947	1988	2049	2144	2291	2515	2797	3127	3153	3174	3190	3202	3210	3213	3213	0
JD 2445280.5	-999	1004	1002	990	969	933	878	795	668	475	211	12	-1	-10	-25	-46	-73	-106	-143	0	0
1982 NOV 7.0	1909	1910	1916	1929	1951	1986	2039	2122	2249	2444	2715	2932	3156	3178	3196	3209	3219	3224	3225	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
	JD2445800.5			JD2445840.5				JD2445880.5				JD2445920.5				JD2445960.5					
	1984 APR 10.0			1984 MAY 20.0				1984 JUN 29.0				1984 AUG 8.0				1984 SEP 17.0					

EARTH DEPARTURE OR ARRIVAL DATE

M25
E18

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5	167	174	181	188	195	203	211	219	227	236	245	255	266	278	293	315	351	434	754	118	118
1983 MAR 7.0	254	263	271	280	289	297	306	315	324	333	342	351	360	369	378	387	396	404	410	253	256
JD 2445390.5	171	178	185	192	200	208	216	224	232	241	251	261	272	286	304	332	388	555	2065	118	119
1983 FEB 25.0	261	270	278	287	295	304	313	322	331	340	349	358	367	376	385	394	402	409	414	256	259
JD 2445380.5	176	183	190	197	205	213	221	229	238	247	257	267	280	296	318	359	459	939	118	119	120
1983 FEB 15.0	268	276	285	293	302	311	320	329	338	347	356	365	374	383	392	400	408	414	256	259	262
JD 2445370.5	180	187	195	202	210	218	226	234	243	253	263	275	289	308	338	404	635	4349	119	120	121
1983 FEB 5.0	274	283	291	300	309	318	327	336	345	354	363	372	381	390	398	406	413	417	259	261	265
JD 2445360.5	185	192	200	207	215	223	231	240	249	259	270	283	299	324	371	503	1410	119	120	121	122
1983 JAN 26.0	281	289	298	307	316	325	334	343	352	361	370	379	387	396	404	412	417	258	261	264	268
JD 2445350.5	190	197	204	212	220	228	237	246	255	265	277	292	313	348	432	801	0	120	121	122	123
1983 JAN 16.0	288	296	305	314	323	332	340	349	358	367	376	385	394	403	410	416	0	261	264	267	271
JD 2445340.5	194	202	209	217	225	234	242	251	261	273	286	304	332	390	585	2887	120	120	122	123	125
1983 JAN 6.0	294	303	312	321	329	338	347	356	365	374	383	392	401	409	416	420	261	264	267	271	274
JD 2445330.5	199	207	214	222	231	239	248	258	268	281	296	320	363	481	1209	119	120	121	122	124	126
1982 DEC 27.0	301	310	318	327	336	345	354	363	372	381	390	399	407	414	420	261	264	267	270	274	278
JD 2445320.5	204	212	220	228	236	245	254	264	276	290	310	344	422	751	0	120	121	122	124	125	127
1982 DEC 17.0	308	316	325	334	343	352	361	370	379	388	397	405	413	419	0	263	266	270	273	277	281
JD 2445310.5	209	217	225	233	242	251	261	272	285	302	330	386	568	2456	120	120	122	123	125	127	129
1982 DEC 7.0	314	323	332	341	350	359	368	377	386	394	403	411	418	422	263	266	269	272	276	280	285
JD 2445300.5	214	222	230	238	247	257	268	280	296	319	361	475	1144	119	120	121	122	124	126	128	130
1982 NOV 27.0	321	330	339	348	357	366	375	383	392	401	409	417	422	263	266	269	272	275	279	284	288
JD 2445290.5	219	227	235	244	253	264	275	290	310	343	421	737	119	120	121	122	123	125	127	129	0
1982 NOV 17.0	327	336	345	354	363	372	381	390	399	407	415	421	263	265	268	271	275	279	283	287	0
JD 2445280.5	224	232	241	250	260	271	284	302	330	386	565	2316	119	120	121	123	124	126	128	0	0
1982 NOV 7.0	334	343	352	361	370	379	388	397	405	413	420	424	265	268	271	274	278	282	286	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445800.5					JD2445840.5				JD2445880.5				JD2445920.5				JD2445960.5				
1984 APR 10.0					1984 MAY 20.0				1984 JUN 29.0				1984 AUG 8.0				1984 SEP 17.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E18

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5 1983 MAR 7.0	1524	1452	1356	1299	1254	1221	1197	1184	1182	1192	1216	1258	1324	1423	1524	1524	1524	1524	1524	1524	1524
JD 2445390.5 1983 FEB 25.0	1524	1402	1332	1281	1241	1211	1192	1183	1186	1202	1234	1287	1368	1492	1524	1524	1524	1524	1524	1524	1524
JD 2445380.5 1983 FEB 15.0	1467	1370	1310	1264	1228	1203	1188	1184	1193	1216	1257	1324	1426	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445370.5 1983 FEB 5.0	1414	1342	1289	1247	1217	1196	1186	1188	1203	1235	1289	1373	1504	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445360.5 1983 JAN 26.0	1377	1316	1269	1233	1207	1191	1187	1195	1219	1262	1331	1440	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445350.5 1983 JAN 16.0	1346	1292	1251	1220	1199	1189	1191	1207	1241	1298	1388	1524	1524	1524	1524	1524	0	1524	1524	1524	1524
JD 2445340.5 1983 JAN 6.0	1317	1270	1234	1208	1193	1190	1199	1225	1272	1347	1466	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445330.5 1982 DEC 27.0	1291	1250	1220	1200	1191	1195	1213	1251	1314	1415	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445320.5 1982 DEC 17.0	1268	1232	1208	1194	1193	1205	1235	1288	1373	1508	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524
JD 2445310.5 1982 DEC 7.0	1247	1218	1199	1193	1200	1223	1267	1339	1455	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445300.5 1982 NOV 27.0	1228	1206	1195	1197	1214	1250	1312	1411	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445290.5 1982 NOV 17.0	1214	1198	1196	1207	1236	1289	1375	1510	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0
JD 2445280.5 1982 NOV 7.0	1203	1196	1202	1226	1270	1344	1461	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445800.5 1984 APR 10.0	JD2445840.5 1984 MAY 20.0	JD2445880.5 1984 JUN 29.0	JD2445920.5 1984 AUG 8.0	JD2445960.5 1984 SEP 17.0																	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E18

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5	265	0	0	0	0	0	0	0	0	0	0	0	0	0	49	279	642	1231	2150	3122	2973
1983 MAR 7.0	922	560	497	462	435	415	402	395	396	405	424	456	506	582	699	879	1166	1634	2368	3220	3096
JD 2445390.5	152	0	0	0	0	0	0	0	0	0	0	0	0	0	157	455	938	1724	2834	3027	2877
1983 FEB 25.0	765	550	505	473	448	430	419	415	419	432	458	499	562	659	809	1046	1432	2062	2955	3181	3056
JD 2445380.5	0	0	0	0	0	0	0	0	0	0	0	0	0	59	304	700	1355	2372	3079	2931	2780
1983 FEB 15.0	621	554	514	485	462	447	438	437	446	465	498	551	632	757	953	1272	1800	2620	3264	3140	3014
JD 2445370.5	0	0	0	0	0	0	0	0	0	0	0	0	0	182	508	1049	1933	3112	2982	2833	2681
1983 FEB 5.0	610	561	525	498	478	465	460	463	477	503	546	614	719	883	1147	1585	2301	3258	3221	3096	2970
JD 2445360.5	0	0	0	0	0	0	0	0	0	0	0	0	85	354	799	1545	2665	3032	2884	2734	2581
1983 JAN 26.0	611	569	537	512	495	486	485	493	513	548	605	693	831	1051	1413	2020	2930	3298	3175	3050	2923
JD 2445350.5	0	0	0	0	0	0	0	0	0	0	0	6	230	598	1218	2219	0	2934	2785	2634	2480
1983 JAN 16.0	617	579	550	529	515	510	513	528	556	603	678	794	978	1279	1785	2602	0	3250	3126	3000	2874
JD 2445340.5	0	0	0	0	0	0	0	0	0	0	0	131	436	949	1810	3011	2983	2835	2685	2532	2379
1983 JAN 6.0	624	591	565	547	538	537	546	568	607	670	769	924	1175	1596	2299	3278	3320	3198	3074	2949	2823
JD 2445330.5	0	0	0	0	0	0	0	0	0	0	50	305	731	1454	2572	3031	2884	2735	2584	2431	2277
1982 DEC 27.0	634	604	582	568	563	568	584	616	669	753	885	1096	1446	2038	2949	3386	3266	3143	3019	2894	2769
JD 2445320.5	0	0	0	0	0	0	0	0	0	0	200	554	1157	2146	0	2934	2785	2635	2482	2329	2175
1982 DEC 17.0	644	619	601	592	592	604	630	674	745	858	1036	1328	1822	2628	0	3329	3208	3086	2962	2838	2714
JD 2445310.5	0	0	0	0	0	0	0	0	0	114	412	913	1759	2956	2983	2835	2685	2533	2381	2227	2074
1982 DEC 7.0	657	636	623	619	626	646	683	744	840	992	1238	1649	2338	3307	3388	3269	3148	3026	2903	2779	2657
JD 2445300.5	0	0	0	0	0	0	0	0	44	296	714	1425	2527	3034	2886	2736	2585	2432	2279	2126	1973
1982 NOV 27.0	671	655	648	650	665	696	747	830	960	1167	1510	2089	2979	3441	3324	3205	3084	2963	2841	2719	2598
JD 2445290.5	0	0	0	0	0	0	0	0	201	553	1146	2114	3085	2937	2788	2637	2484	2331	2178	2025	0
1982 NOV 17.0	688	677	676	686	711	755	825	937	1113	1401	1883	2663	3490	3375	3258	3139	3019	2898	2777	2657	0
JD 2445280.5	0	0	0	0	0	0	0	122	420	916	1742	2906	2991	2841	2690	2537	2384	2231	2077	0	0
1982 NOV 7.0	707	702	708	728	764	825	921	1072	1314	1715	2378	3306	3421	3306	3189	3070	2951	2832	2712	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445800.5				JD2445840.5					JD2445880.5					JD2445920.5					JD2445960.5		
1984 APR 10.0				1984 MAY 20.0					1984 JUN 29.0					1984 AUG 8.0					1984 SEP 17.0		

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M25
E18

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD 2445400.5	1186	560	497	462	435	415	402	395	396	405	424	456	506	582	748	1158	1808	2865	4518	6342	6069
1983 MAR 7.0	1774	1874	1971	2068	2164	2260	2356	2451	2547	2642	2737	2833	2929	3025	3121	3218	3315	3413	3511	13	110
JD 2445390.5	917	550	505	473	448	430	419	415	419	432	458	499	562	659	966	1500	2370	3786	5789	6209	5933
1983 FEB 25.0	1837	1934	2031	2128	2224	2320	2416	2512	2607	2702	2798	2893	2989	3085	3181	3278	3375	3473	3570	71	171
JD 2445380.5	621	554	514	485	462	447	438	437	446	465	498	551	632	815	1257	1972	3155	4991	6343	6071	5794
1983 FEB 15.0	1898	1995	2092	2189	2286	2382	2477	2573	2668	2764	2859	2954	3050	3146	3242	3339	3436	3534	35	132	232
JD 2445370.5	610	561	525	498	478	465	460	463	477	503	546	614	719	1066	1655	2634	4234	6371	6203	5929	5650
1983 FEB 5.0	1959	2057	2154	2251	2348	2444	2539	2635	2730	2825	2921	3016	3112	3208	3304	3401	3498	3586	96	194	294
JD 2445360.5	611	569	537	512	495	486	485	493	513	548	605	693	916	1405	2212	3565	5595	6330	6059	5783	5504
1983 JAN 26.0	2022	2119	2217	2314	2410	2506	2602	2697	2793	2888	2983	3079	3174	3270	3366	3463	3558	61	158	257	356
JD 2445350.5	617	579	550	529	515	510	513	528	556	603	678	800	1208	1877	3003	4821	0	6184	5911	5634	5354
1983 JAN 16.0	2085	2182	2280	2376	2473	2569	2665	2760	2855	2951	3046	3141	3237	3333	3429	3525	0	123	221	319	419
JD 2445340.5	624	591	565	547	538	537	546	568	607	670	769	1055	1611	2545	4109	6289	6303	6033	5759	5481	5201
1983 JAN 6.0	2148	2246	2343	2440	2536	2632	2728	2823	2919	3014	3109	3205	3300	3396	3492	3581	89	186	284	383	482
JD 2445330.5	634	604	582	568	563	568	584	616	669	753	935	1401	2176	3492	5522	6418	6150	5879	5603	5325	5046
1982 DEC 27.0	2211	2309	2406	2503	2599	2695	2791	2887	2982	3077	3172	3268	3363	3459	3553	56	151	249	347	446	545
JD 2445320.5	644	619	601	592	592	604	630	674	745	858	1236	1883	2979	4774	0	6263	5993	5720	5444	5167	4889
1982 DEC 17.0	2275	2372	2470	2566	2663	2759	2855	2950	3045	3141	3236	3331	3427	3521	0	118	215	312	411	509	609
JD 2445310.5	657	636	623	619	626	646	683	744	840	1106	1649	2562	4096	6263	6371	6104	5833	5559	5283	5007	4730
1982 DEC 7.0	2338	2436	2533	2630	2726	2822	2918	3013	3109	3204	3299	3394	3489	3577	85	181	278	376	474	573	672
JD 2445300.5	671	655	648	650	665	696	747	830	1003	1463	2225	3514	5506	6475	6210	5941	5669	5395	5120	4845	4570
1982 NOV 27.0	2401	2499	2596	2693	2789	2885	2981	3077	3172	3267	3362	3457	3551	53	148	244	341	439	537	636	735
JD 2445290.5	688	677	676	686	711	755	825	937	1314	1953	3029	4776	6575	6312	6046	5776	5503	5229	4955	4682	0
1982 NOV 17.0	2464	2562	2659	2756	2852	2948	3044	3140	3235	3370	3425	3519	25	115	210	307	404	502	600	699	0
JD 2445280.5	707	702	708	728	764	825	921	1194	1734	2631	4120	6212	6412	6147	5878	5608	5335	5062	4790	0	0
1982 NOV 7.0	2527	2624	2722	2818	2915	3011	3107	3202	3297	3392	3487	3576	82	177	273	369	466	564	662	0	0

(FLT T)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)
JD2445800.5					JD2445840.5					JD2445880.5					JD2445920.5					JD2445960.5	
1984 APR 10.0					1984 MAY 20.0					1984 JUN 29.0					1984 AUG 8.0					1984 SEP 17.0	

EARTH DEPARTURE OR ARRIVAL DATE

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445160.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671652	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.640	DEGREES
MEAN ANOM. AT EPOCH	=	184.960	DEGREES
DATE OF NODAL PASSAGE	=	2445235.858	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445160.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338935	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.423	DEGREES
ARG. OF PERIHELION	=	286.315	DEGREES
MEAN ANOM. AT EPOCH	=	273.776	DEGREES
DATE OF NODAL PASSAGE	=	2444759.478	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.071	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	715	770	826	884	944	1004	1066	1128	1191	1254	1317	1379	1441	1501	1476	1166	902	706	565
1983 JUL 5.0	0	0	665	694	725	757	790	825	860	897	934	972	1009	1047	1085	1123	1098	890	714	584	493
JD 2445510.5	0	688	742	797	854	913	973	1033	1095	1158	1221	1284	1346	1408	1469	1529	1317	1019	789	622	502
1983 JUN 25.0	0	657	685	715	747	780	814	849	885	922	960	998	1036	1074	1112	1150	1001	800	645	535	458
JD 2445500.5	662	715	769	825	883	942	1002	1063	1125	1188	1251	1314	1376	1438	1498	1472	1154	885	689	549	446
1983 JUN 15.0	648	676	706	737	769	803	838	874	911	948	986	1025	1063	1101	1139	1116	899	717	585	492	427
JD 2445490.5	689	742	797	854	912	971	1032	1093	1156	1218	1281	1344	1406	1467	1527	1302	998	767	602	484	396
1983 JUN 5.0	667	696	727	759	792	827	863	899	937	975	1013	1052	1091	1129	1167	1010	801	642	532	455	400
JD 2445480.5	717	771	826	883	942	1002	1062	1124	1186	1249	1312	1374	1436	1496	1456	1128	858	664	527	427	351
1983 MAY 26.0	687	717	749	782	816	851	888	925	963	1002	1041	1080	1118	1157	1126	898	711	578	487	422	376
JD 2445470.5	745	800	856	914	972	1033	1094	1155	1218	1280	1343	1405	1466	0	1273	964	735	575	461	377	311
1983 MAY 16.0	707	738	771	805	840	876	914	952	990	1029	1068	1108	1146	0	1008	791	632	523	447	394	355
JD 2445460.5	775	830	886	944	1004	1064	1125	1187	1250	1312	1374	1436	1496	1426	1088	819	631	500	404	332	275
1983 MAY 6.0	728	760	794	829	865	902	940	978	1018	1057	1096	1136	1175	1124	885	695	564	475	413	368	336
JD 2445450.5	805	861	918	976	1036	1096	1158	1219	1282	1344	1406	1467	0	1228	918	696	543	435	355	293	243
1983 APR 26.0	749	782	817	853	890	928	966	1006	1045	1085	1125	1164	0	992	770	612	506	434	383	346	318
JD 2445440.5	836	892	949	1008	1068	1129	1190	1252	1314	1376	1438	1498	1377	1033	771	592	468	379	311	258	215
1983 APR 16.0	771	805	841	878	916	954	993	1033	1073	1113	1153	1192	1107	858	669	542	457	398	356	325	303
JD 2445430.5	867	924	982	1041	1101	1162	1223	1285	1347	1409	1469	0	1165	860	649	506	405	331	273	227	189
1983 APR 6.0	793	828	865	903	941	981	1020	1061	1101	1141	1181	0	959	737	584	483	415	367	332	307	288
JD 2445420.5	900	957	1015	1074	1135	1196	1257	1319	1380	1441	1501	1309	964	715	549	434	352	289	239	199	166
1983 MAR 27.0	815	852	889	928	967	1007	1047	1088	1129	1169	1209	1071	816	633	514	434	379	339	311	290	275
JD 2445410.5	933	990	1049	1108	1169	1230	1291	1352	1413	1474	1458	1085	793	598	467	374	306	252	210	175	147
1983 MAR 17.0	838	875	914	953	993	1034	1075	1115	1156	1197	1188	909	692	548	455	391	347	315	292	275	263
JD 2445400.5	966	1024	1083	1143	1203	1264	1325	1386	1447	0	1221	885	655	503	399	324	266	221	184	154	131
1983 MAR 7.0	861	899	938	979	1019	1060	1101	1143	1184	0	1015	761	589	479	406	355	319	293	274	261	251

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	-158	-145	-127	-107	-84	-58	-32	-4	23	51	79	106	132	156	-197	-205	-208	-205	-198
1983 JUL 5.0	0	0	3105	3173	3240	3307	3374	3440	3506	3572	39	106	174	243	314	386	3126	3106	3106	3127	3160
JD 2445510.5	0	-177	-167	-153	-135	-114	-90	-65	-38	-11	17	45	73	100	127	151	-212	-217	-217	-213	-206
1983 JUN 25.0	0	3022	3090	3159	3226	3294	3361	3427	3493	3560	26	93	161	230	301	373	3062	3049	3060	3088	3126
JD 2445500.5	-192	-186	-175	-160	-142	-121	-97	-72	-45	-17	10	39	67	95	121	-217	-224	-226	-224	-219	-212
1983 JUN 15.0	2937	3006	3075	3144	3212	3280	3348	3414	3481	3547	14	81	149	218	288	3022	2998	2996	3017	3051	3092
JD 2445490.5	-202	-194	-183	-167	-149	-127	-104	-78	-51	-24	4	33	61	89	116	-228	-232	-233	-229	-224	-217
1983 JUN 5.0	2919	2989	3059	3129	3198	3266	3334	3401	3468	3534	1	68	136	205	275	2952	2936	2947	2976	3015	3057
JD 2445480.5	-209	-201	-189	-174	-155	-134	-110	-85	-58	-30	-1	26	55	83	-230	-236	-237	-236	-232	-227	-221
1983 MAY 26.0	2902	2972	3043	3114	3183	3252	3320	3388	3455	3522	3588	55	123	192	2911	2882	2879	2901	2936	2978	3021
JD 2445470.5	-216	-207	-195	-179	-161	-140	-116	-91	-64	-37	-8	20	49	0	-236	-239	-239	-237	-234	-229	-224
1983 MAY 16.0	2884	2955	3027	3098	3168	3238	3306	3374	3441	3508	3575	42	110	0	2834	2816	2827	2857	2898	2941	2983
JD 2445460.5	-221	-213	-200	-185	-167	-146	-123	-98	-71	-43	-14	14	43	-236	-238	-239	-238	-237	-234	-229	-225
1983 MAY 6.0	2866	2938	3011	3082	3153	3223	3292	3360	3428	3495	3562	29	97	2792	2760	2757	2779	2816	2859	2903	2943
JD 2445450.5	-226	-217	-205	-190	-172	-152	-129	-104	-77	-50	-21	7	0	-235	-235	-235	-235	-234	-231	-228	-224
1983 APR 26.0	2848	2921	2994	3067	3138	3208	3278	3346	3414	3481	3548	16	0	2710	2691	2703	2735	2776	2821	2863	2898
JD 2445440.5	-229	-221	-210	-195	-178	-157	-135	-110	-84	-56	-28	0	-231	-229	-229	-230	-230	-229	-227	-224	-221
1983 APR 16.0	2829	2904	2977	3050	3122	3193	3263	3332	3400	3468	3535	2	2666	2632	2631	2655	2693	2737	2781	2820	2849
JD 2445430.5	-232	-225	-214	-200	-183	-163	-141	-116	-90	-63	-34	0	-222	-220	-220	-222	-223	-222	-221	-217	-213
1983 APR 6.0	2811	2886	2960	3034	3107	3178	3248	3318	3386	3454	3521	0	2580	2563	2578	2611	2653	2697	2739	2773	2793
JD 2445420.5	-235	-228	-218	-204	-188	-168	-146	-122	-97	-69	-41	-214	-208	-208	-210	-212	-214	-213	-211	-207	-201
1983 MAR 27.0	2793	2868	2943	3017	3090	3162	3233	3303	3371	3439	3507	2534	2502	2504	2531	2570	2614	2657	2694	2721	2730
JD 2445410.5	-237	-231	-221	-208	-192	-173	-152	-128	-103	-76	-206	-196	-192	-194	-197	-201	-202	-201	-198	-191	-182
1983 MAR 17.0	2774	2850	2926	3001	3074	3146	3218	3288	3357	3425	2494	2447	2436	2454	2488	2531	2575	2615	2646	2663	2660
JD 2445400.5	-238	-233	-224	-212	-197	-179	-158	-134	-109	0	-184	-176	-175	-179	-183	-187	-188	-185	-179	-169	-154
1983 MAR 7.0	2756	2832	2908	2983	3057	3130	3202	3272	3342	0	2400	2373	2380	2409	2449	2493	2534	2570	2594	2599	2580
(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	36	47	58	68	77	87	96	105	114	123	132	140	149	157	141	105	76	56	43
1983 JUL 5.0	0	0	143	157	172	187	204	221	239	258	277	297	317	338	360	382	399	312	249	209	184
JD 2445510.5	0	11	23	33	44	53	63	72	82	91	100	109	118	127	136	144	107	72	47	30	19
1983 JUN 25.0	0	92	105	119	134	150	167	184	202	221	240	260	280	301	322	344	305	230	180	149	130
JD 2445500.5	-13	-1	9	19	29	38	48	57	67	76	86	95	104	113	122	112	71	40	18	4	-4
1983 JUN 15.0	41	54	67	82	97	113	130	147	165	184	203	223	243	264	285	303	216	154	116	93	78
JD 2445490.5	-26	-15	-5	4	13	23	32	42	51	61	70	80	89	98	108	73	35	8	-8	-20	-27
1983 JUN 5.0	1	15	29	44	59	76	93	110	128	147	166	186	206	227	247	207	132	85	56	39	28
JD 2445480.5	-40	-30	-20	-11	-2	7	16	26	35	45	55	64	74	83	77	33	0	-20	-35	-44	-51
1983 MAY 26.0	3562	3575	3590	5	21	38	55	73	91	110	129	149	169	189	202	115	56	20	3599	3587	3579
JD 2445470.5	-54	-45	-36	-27	-18	-9	0	9	19	29	38	48	58	0	34	-5	-31	-49	-60	-68	-73
1983 MAY 16.0	3521	3536	3551	3567	3583	0	17	35	54	73	92	111	131	0	103	30	3585	3559	3544	3536	3531
JD 2445460.5	-70	-61	-52	-43	-34	-25	-16	-6	2	12	22	32	42	37	-8	-40	-61	-75	-84	-91	-96
1983 MAY 6.0	3481	3496	3512	3528	3544	3562	3579	3597	16	35	54	74	94	96	10	3553	3520	3502	3491	3486	3483
JD 2445450.5	-85	-77	-69	-60	-51	-42	-33	-23	-14	-4	5	15	0	-8	-47	-72	-89	-100	-108	-113	-118
1983 APR 26.0	3440	3456	3472	3488	3505	3523	3541	3559	3578	3597	16	36	0	3594	3523	3481	3458	3446	3440	3437	3436
JD 2445440.5	-101	-93	-85	-76	-68	-59	-49	-40	-31	-21	-11	-1	-6	-51	-82	-101	-114	-123	-130	-135	-140
1983 APR 16.0	3398	3415	3431	3448	3465	3483	3501	3520	3539	3558	3578	3597	3584	3498	3444	3415	3400	3392	3389	3388	3388
JD 2445430.5	-116	-109	-101	-93	-84	-75	-66	-57	-48	-38	-28	0	-53	-89	-112	-127	-137	-145	-151	-156	-161
1983 APR 6.0	3356	3373	3390	3407	3425	3443	3462	3480	3500	3519	3539	0	3477	3409	3372	3352	3343	3340	3339	3340	3341
JD 2445420.5	-132	-125	-117	-109	-101	-92	-83	-74	-65	-55	-46	-53	-94	-121	-138	-150	-159	-166	-172	-177	-181
1983 MAR 27.0	3313	3330	3348	3365	3384	3402	3421	3440	3460	3479	3499	3463	3379	3330	3305	3293	3289	3288	3289	3292	3294
JD 2445410.5	-147	-140	-133	-125	-117	-108	-100	-91	-82	-72	-51	-97	-129	-148	-161	-171	-178	-185	-191	-196	-202
1983 MAR 17.0	3269	3287	3305	3323	3342	3361	3380	3399	3419	3439	3453	3353	3290	3257	3242	3236	3235	3237	3240	3244	3247
JD 2445400.5	-161	-155	-148	-140	-133	-124	-116	-107	-99	0	-98	-134	-156	-170	-181	-189	-197	-203	-209	-215	-222
1983 MAR 7.0	3224	3242	3261	3280	3299	3318	3338	3358	3378	0	3333	3253	3210	3190	3182	3181	3183	3187	3191	3196	3200

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5 1983 JUL 5.0	0	0	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564
JD 2445510.5 1983 JUN 25.0	0	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562
JD 2445500.5 1983 JUN 15.0	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555
JD 2445490.5 1983 JUN 5.0	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543
JD 2445480.5 1983 MAY 26.0	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527
JD 2445470.5 1983 MAY 16.0	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	0	2508	2508	2508	2508	2508	2508	2508
JD 2445460.5 1983 MAY 6.0	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485
JD 2445450.5 1983 APR 26.0	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	0	2458	2458	2458	2458	2458	2458	2458	2458
JD 2445440.5 1983 APR 16.0	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429
JD 2445430.5 1983 APR 6.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	0	2398	2398	2398	2398	2398	2398	2398	2398	2398
JD 2445420.5 1983 MAR 27.0	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364
JD 2445410.5 1983 MAR 17.0	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329
JD 2445400.5 1983 MAR 7.0	2292	2292	2292	2292	2292	2292	2292	2292	2292	0	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
1983 JUL 5.0	0	0	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
JD 2445510.5	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
1983 JUN 25.0	0	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2445500.5	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
1983 JUN 15.0	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
JD 2445490.5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1983 JUN 5.0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
JD 2445480.5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
1983 MAY 26.0	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
JD 2445470.5	32	32	32	32	32	32	32	32	32	32	32	32	32	0	32	32	32	32	32	32	32
1983 MAY 16.0	48	48	48	48	48	48	48	48	48	48	48	48	48	0	48	48	48	48	48	48	48
JD 2445460.5	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
1983 MAY 6.0	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
JD 2445450.5	67	67	67	67	67	67	67	67	67	67	67	67	0	67	67	67	67	67	67	67	67
1983 APR 26.0	98	98	98	98	98	98	98	98	98	98	98	98	0	98	98	98	98	98	98	98	98
JD 2445440.5	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
1983 APR 16.0	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123
JD 2445430.5	101	101	101	101	101	101	101	101	101	101	101	0	101	101	101	101	101	101	101	101	101
1983 APR 6.0	147	147	147	147	147	147	147	147	147	147	147	0	147	147	147	147	147	147	147	147	147
JD 2445420.5	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
1983 MAR 27.0	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171
JD 2445410.5	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
1983 MAR 17.0	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195
JD 2445400.5	151	151	151	151	151	151	151	151	151	0	151	151	151	151	151	151	151	151	151	151	151
1983 MAR 7.0	218	218	218	218	218	218	218	218	218	0	218	218	218	218	218	218	218	218	218	218	218

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM. IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	1367	1271	1175	1079	982	884	786	687	588	488	388	287	186	85	3579	3480	3378	3276	3175
1983 JUL 5.0	0	0	969	1030	1091	1151	1210	1270	1329	1389	1448	1508	1568	1628	1689	1749	-1738	-1472	-1247	-1068	-920
JD 2445510.5	0	1413	1318	1222	1125	1029	932	834	736	637	538	438	338	237	136	36	3532	3430	3329	3227	3125
1983 JUN 25.0	0	943	1004	1064	1124	1183	1242	1301	1361	1420	1479	1539	1598	1658	1719	1779	-1605	-1352	-1150	-989	-852
JD 2445500.5	1458	1363	1267	1171	1075	978	881	784	686	587	488	388	287	187	86	3581	3482	3380	3278	3176	3075
1983 JUN 15.0	917	978	1038	1098	1157	1216	1275	1333	1392	1451	1510	1569	1629	1689	1749	-1744	-1469	-1241	-1062	-915	-787
JD 2445490.5	1407	1311	1216	1120	1024	927	830	732	634	535	436	336	236	135	35	3532	3430	3329	3227	3125	3023
1983 JUN 5.0	953	1013	1073	1132	1191	1249	1307	1366	1424	1483	1541	1601	1660	1720	1779	-1600	-1343	-1141	-980	-845	-725
JD 2445480.5	1354	1259	1163	1068	971	875	778	680	582	483	384	284	184	83	3581	3480	3378	3276	3175	3073	2971
1983 MAY 26.0	989	1049	1108	1166	1224	1282	1340	1398	1456	1515	1573	1632	1691	1751	-1741	-1457	-1227	-1049	-904	-778	-663
JD 2445470.5	1301	1206	1110	1014	918	822	724	627	529	430	331	231	131	0	3528	3427	3325	3223	3121	3020	2918
1983 MAY 16.0	1025	1084	1143	1201	1258	1316	1373	1431	1489	1547	1605	1664	1723	0	-1584	-1324	-1124	-965	-832	-713	-603
JD 2445460.5	1247	1152	1056	960	864	767	670	573	475	376	277	177	76	3575	3474	3373	3271	3169	3067	2965	2864
1983 MAY 6.0	1061	1120	1178	1235	1292	1350	1407	1464	1522	1579	1638	1696	1755	-1722	-1432	-1205	-1030	-887	-763	-650	-543
JD 2445450.5	1192	1097	1001	905	809	712	615	518	420	321	222	122	0	3521	3419	3318	3216	3114	3012	2910	2809
1983 APR 26.0	1098	1155	1213	1270	1327	1384	1441	1498	1555	1612	1670	1729	0	-1554	-1295	-1099	-945	-814	-697	-588	-483
JD 2445440.5	1136	1041	945	849	753	656	559	462	364	265	166	66	3565	3465	3363	3262	3160	3058	2956	2854	2753
1983 APR 16.0	1134	1191	1248	1305	1361	1418	1474	1531	1588	1646	1703	1762	-1687	-1396	-1174	-1004	-866	-744	-633	-526	-424
JD 2445430.5	1079	984	888	792	696	600	502	405	307	208	109	0	3508	3408	3306	3205	3103	3001	2899	2798	2696
1983 APR 6.0	1170	1227	1284	1340	1396	1452	1509	1565	1622	1679	1737	0	-1509	-1257	-1068	-919	-792	-677	-569	-466	-364
JD 2445420.5	1021	926	830	735	638	542	445	347	249	150	51	3551	3451	3350	3249	3147	3045	2943	2841	2740	2638
1983 MAR 27.0	1207	1263	1319	1375	1431	1487	1543	1599	1656	1713	1770	-1635	-1349	-1136	-974	-840	-722	-612	-507	-405	-305
JD 2445410.5	963	867	772	676	580	483	386	288	190	92	3590	3492	3392	3291	3190	3088	2987	2885	2783	2681	2579
1983 MAR 17.0	1243	1299	1355	1411	1466	1522	1578	1634	1690	1747	-1763	-1452	-1211	-1032	-890	-767	-655	-549	-446	-345	-245
JD 2445400.5	903	808	712	616	520	423	326	229	131	0	3532	3432	3332	3231	3130	3029	2927	2825	2723	2621	2520
1983 MAR 7.0	1280	1335	1391	1446	1501	1557	1612	1668	1725	0	-1567	-1293	-1094	-941	-812	-698	-591	-487	-386	-286	-186

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	169	146	131	122	117	116	118	125	136	154	185	242	364	790	3320	558	308	217	172
1983 JUL 5.0	0	0	685	715	744	775	805	835	865	893	919	942	962	979	991	998	997	914	775	647	546
JD 2445510.5	0	165	138	122	112	106	103	104	108	115	128	149	186	257	439	1677	871	354	226	170	140
1983 JUN 25.0	0	671	700	729	759	790	820	850	879	906	930	952	971	985	995	1000	968	844	703	588	501
JD 2445500.5	159	129	111	100	94	90	89	91	96	104	119	143	186	279	600	2877	436	238	168	132	112
1983 JUN 15.0	658	686	715	744	775	805	835	864	892	918	942	962	979	991	998	997	911	766	635	535	460
JD 2445490.5	117	99	87	80	76	74	75	78	83	92	108	134	186	318	1239	629	255	163	123	101	88
1983 JUN 5.0	672	700	730	760	790	821	850	879	906	931	952	971	985	995	1000	966	834	690	574	487	424
JD 2445480.5	84	72	65	61	59	59	60	63	69	79	94	123	186	406	1772	282	155	110	87	74	66
1983 MAY 26.0	687	716	746	776	806	836	865	893	919	942	962	979	991	998	997	902	751	619	519	446	392
JD 2445470.5	55	49	45	43	42	43	44	47	53	62	77	107	187	0	338	142	91	69	57	50	45
1983 MAY 16.0	703	732	762	792	822	852	880	907	932	953	972	986	995	0	960	818	670	555	470	409	363
JD 2445460.5	30	28	26	25	25	26	27	30	34	41	54	82	188	585	115	65	46	37	31	28	26
1983 MAY 6.0	719	749	779	809	839	868	895	921	944	964	980	992	998	995	885	728	596	499	428	377	338
JD 2445450.5	8	8	7	7	7	8	8	9	11	14	19	34	0	53	23	15	12	10	9	8	7
1983 APR 26.0	736	766	796	826	855	883	910	934	955	973	987	996	0	946	793	644	531	450	392	348	316
JD 2445440.5	12	11	11	11	11	12	13	15	18	24	38	94	179	46	27	19	16	13	12	11	11
1983 APR 16.0	753	783	813	843	871	898	924	946	966	981	993	999	989	860	698	569	475	408	360	324	297
JD 2445430.5	31	29	29	30	31	34	38	45	57	82	154	0	183	88	59	46	38	34	31	29	29
1983 APR 6.0	771	801	830	859	887	913	937	958	975	988	997	0	924	759	612	504	427	372	332	303	281
JD 2445420.5	48	47	48	49	53	58	68	83	113	183	533	552	184	112	82	67	57	52	49	47	48
1983 MAR 27.0	789	818	848	876	903	928	950	968	983	994	999	975	824	661	537	449	387	342	309	284	266
JD 2445410.5	66	66	67	71	77	88	105	136	201	411	3942	349	184	127	100	84	75	69	66	65	67
1983 MAR 17.0	807	836	865	892	918	941	961	978	990	998	999	890	716	575	474	403	353	316	288	268	254
JD 2445400.5	83	84	88	94	105	123	154	214	368	0	702	288	184	138	114	99	90	85	83	84	87
1983 MAR 7.0	825	854	882	908	932	954	972	986	995	0	949	778	618	502	422	365	324	293	271	255	244

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
	•			•				•					•				•				•
	JD2444800.5			JD2444840.5				JD2444880.5					JD2444920.5				JD2444960.5				
	1981 JUL 15.0			1981 AUG 24.0				1981 OCT 3.0					1981 NOV 12.0				1981 DEC 22.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	-551	-495	-438	-381	-325	-271	-220	-172	-128	-90	-57	-31	-13	-2	4	119	309	486	624
1983 JUL 5.0	0	0	2958	2976	2993	3009	3022	3033	3040	3045	3046	3042	3035	3023	3005	2983	2771	2637	2439	2263	2128
JD 2445510.5	0	-576	-521	-464	-408	-351	-297	-244	-195	-149	-108	-73	-44	-21	-6	-0	43	214	405	563	683
1983 JUN 25.0	0	2934	2953	2970	2986	3000	3012	3021	3027	3029	3028	3022	3012	2997	2978	2952	2702	2519	2324	2168	2053
JD 2445500.5	-600	-546	-490	-433	-377	-322	-269	-218	-171	-127	-89	-57	-31	-13	-2	3	121	317	494	632	735
1983 JUN 15.0	2911	2930	2947	2964	2979	2991	3001	3009	3013	3013	3009	3001	2988	2971	2948	2735	2598	2395	2217	2084	1987
JD 2445490.5	-569	-514	-458	-402	-347	-293	-241	-192	-147	-107	-72	-43	-21	-6	0	46	223	417	574	692	780
1983 JUN 5.0	2907	2925	2942	2957	2971	2982	2990	2995	2997	2995	2989	2979	2963	2943	2918	2663	2472	2275	2121	2008	1927
JD 2445480.5	-538	-482	-427	-371	-317	-264	-214	-167	-125	-87	-56	-31	-12	-2	4	132	333	510	645	744	819
1983 MAY 26.0	2903	2920	2936	2950	2962	2971	2978	2981	2981	2976	2968	2955	2937	2914	2698	2551	2343	2166	2035	1941	1873
JD 2445470.5	-505	-450	-395	-340	-287	-236	-188	-143	-104	-70	-41	-20	-6	0	54	243	438	592	706	790	852
1983 MAY 16.0	2899	2915	2930	2942	2953	2960	2965	2966	2963	2956	2945	2929	2909	0	2618	2417	2219	2068	1959	1882	1825
JD 2445460.5	-472	-417	-362	-309	-257	-208	-162	-121	-84	-53	-29	-11	-1	7	152	358	533	663	758	828	881
1983 MAY 6.0	2894	2910	2923	2934	2943	2948	2951	2950	2945	2935	2921	2903	2879	2658	2495	2282	2108	1982	1893	1829	1782
JD 2445450.5	-439	-384	-330	-278	-228	-181	-138	-99	-66	-39	-18	-5	0	71	272	467	615	723	802	861	906
1983 APR 26.0	2890	2904	2916	2925	2932	2935	2936	2932	2925	2913	2896	2874	0	2565	2353	2156	2011	1908	1835	1782	1744
JD 2445440.5	-406	-352	-299	-248	-200	-155	-115	-79	-50	-26	-10	-1	15	183	393	562	685	774	840	889	926
1983 APR 16.0	2885	2897	2908	2915	2920	2922	2920	2914	2903	2888	2869	2844	2613	2428	2213	2045	1927	1843	1784	1741	1709
JD 2445430.5	-372	-319	-268	-219	-173	-131	-93	-61	-35	-16	-4	0	98	313	503	643	744	817	872	912	943
1983 APR 6.0	2880	2891	2899	2905	2908	2907	2902	2894	2880	2863	2840	0	2502	2278	2087	1950	1855	1787	1739	1704	1678
JD 2445420.5	-339	-287	-237	-190	-147	-108	-73	-45	-23	-8	-0	33	226	437	596	711	793	853	898	932	956
1983 MAR 27.0	2874	2883	2890	2893	2894	2891	2883	2872	2856	2836	2810	2559	2351	2137	1979	1870	1793	1739	1700	1671	1651
JD 2445410.5	-306	-255	-207	-163	-122	-86	-56	-31	-13	-2	2	14'	363	544	674	766	833	883	920	947	967
1983 MAR 17.0	2867	2875	2879	2881	2879	2873	2863	2849	2830	2807	2585	2425	2196	2015	1889	1802	1741	1697	1665	1642	1626
JD 2445400.5	-273	-225	-179	-137	-99	-67	-40	-19	-6	0	65	282	486	633	737	812	866	907	937	960	975
1983 MAR 7.0	2860	2865	2868	2867	2863	2855	2842	2825	2803	0	2492	2263	2058	1913	1813	1744	1695	1660	1635	1617	1604

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	144	140	136	133	130	127	124	122	120	118	116	115	114	113	3936	741	463	372	328
1983 JUL 5.0	0	0	305	299	293	287	281	276	271	266	262	258	254	250	247	244	401	397	390	382	374
JD 2445510.5	0	146	142	138	135	131	128	126	123	121	119	117	116	115	114	113	1228	555	407	346	313
1983 JUN 25.0	0	308	301	295	289	283	278	273	268	263	259	255	251	248	245	242	398	393	385	377	368
JD 2445500.5	148	144	140	137	133	130	127	124	122	120	118	117	115	114	113	4362	733	458	370	327	301
1983 JUN 15.0	310	303	297	291	285	280	274	269	265	260	256	252	249	245	243	399	395	388	380	372	363
JD 2445490.5	146	142	138	135	132	129	126	123	121	119	117	116	115	114	113	1195	544	402	344	312	291
1983 JUN 5.0	306	299	293	287	281	276	271	266	261	257	253	249	246	243	240	397	391	383	375	366	357
JD 2445480.5	144	140	137	133	130	127	125	122	120	118	117	115	114	114	4053	705	449	366	325	301	282
1983 MAY 26.0	302	295	289	283	278	272	267	263	258	254	250	247	244	241	398	393	386	378	369	360	351
JD 2445470.5	142	138	135	132	129	126	123	121	119	118	116	115	114	0	1100	524	394	341	311	290	275
1983 MAY 16.0	297	291	285	280	274	269	264	260	255	251	248	244	241	0	395	389	381	373	364	354	345
JD 2445460.5	140	137	133	130	127	125	122	120	118	117	116	115	114	3066	659	435	360	323	299	282	268
1983 MAY 6.0	293	287	281	276	271	266	261	256	252	249	245	242	239	396	391	384	376	367	358	348	339
JD 2445450.5	138	135	132	129	126	123	121	119	118	116	115	114	0	964	497	384	336	309	289	274	261
1983 APR 26.0	289	283	277	272	267	262	258	253	249	246	243	240	0	393	387	379	370	361	351	342	332
JD 2445440.5	137	133	130	127	125	122	120	118	117	116	115	114	2090	603	418	352	319	297	281	267	255
1983 APR 16.0	285	279	274	268	263	259	254	250	247	243	240	237	394	389	382	373	364	355	345	336	326
JD 2445430.5	135	132	129	126	123	121	119	118	116	115	114	0	818	466	373	331	306	288	273	260	249
1983 APR 6.0	281	275	270	265	260	256	251	247	244	241	238	0	391	384	376	367	358	348	339	329	320
JD 2445420.5	133	130	127	124	122	120	118	117	116	115	114	1420	545	399	344	315	295	279	266	254	243
1983 MAR 27.0	277	271	266	261	257	252	248	245	241	238	235	392	386	379	370	361	351	342	332	323	313
JD 2445410.5	131	128	126	123	121	119	118	116	115	114	6518	687	436	361	325	302	285	272	259	248	238
1983 MAR 17.0	273	268	263	258	253	249	245	242	239	236	393	388	381	373	364	354	345	335	326	316	306
JD 2445400.5	130	127	124	122	120	118	117	116	115	0	1007	492	381	336	310	292	277	265	253	242	232
1983 MAR 7.0	269	264	259	254	250	246	242	239	236	0	390	383	375	367	357	348	338	329	319	309	300

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5 1981 JUL 15.0 — JD2444840.5 1981 AUG 24.0 — JD2444880.5 1981 OCT 3.0 — JD2444920.5 1981 NOV 12.0 — JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5 1983 JUL 5.0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445510.5 1983 JUN 25.0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445500.5 1983 JUN 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445490.5 1983 JUN 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445480.5 1983 MAY 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445470.5 1983 MAY 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	0	772	772	772	772	772	772	772
JD 2445460.5 1983 MAY 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445450.5 1983 APR 26.0	772	772	772	772	772	772	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772
JD 2445440.5 1983 APR 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445430.5 1983 APR 6.0	772	772	772	772	772	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772
JD 2445420.5 1983 MAR 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445410.5 1983 MAR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445400.5 1983 MAR 7.0	772	772	772	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	1621	1768	1921	2080	2244	2413	2586	2762	2940	3120	3300	3479	3656	3830	3757	2869	2129	1599	1233
1983 JUL 5.0	0	0	1712	1796	1885	1979	2076	2177	2281	2388	2497	2608	2719	2831	2943	3054	2979	2369	1853	1478	1215
JD 2445510.5	0	1549	1692	1841	1997	2158	2324	2494	2668	2845	3025	3205	3384	3563	3739	3911	3299	2455	1819	1379	1078
1983 JUN 25.0	0	1687	1769	1857	1949	2045	2145	2248	2354	2463	2573	2685	2798	2910	3022	3133	2693	2104	1653	1336	1116
JD 2445500.5	1481	1620	1766	1917	2075	2238	2406	2578	2753	2931	3110	3290	3469	3647	3821	3747	2833	2082	1553	1193	946
1983 JUN 15.0	1662	1743	1829	1920	2014	2113	2216	2321	2429	2539	2651	2764	2878	2991	3102	3033	2395	1861	1478	1214	1030
JD 2445490.5	1552	1694	1842	1996	2156	2320	2490	2663	2839	3017	3197	3377	3555	3732	3904	3257	2395	1759	1328	1036	835
1983 JUN 5.0	1717	1801	1891	1984	2082	2183	2288	2396	2506	2617	2731	2845	2959	3072	3184	2720	2106	1646	1327	1108	954
JD 2445480.5	1625	1770	1921	2077	2238	2405	2576	2750	2927	3105	3285	3464	3642	3817	3701	2761	2006	1487	1140	904	740
1983 MAY 26.0	1774	1862	1954	2051	2151	2255	2362	2472	2584	2697	2811	2926	3041	3154	3062	2392	1844	1459	1198	1016	888
JD 2445470.5	1702	1849	2002	2160	2324	2492	2663	2838	3016	3195	3374	3552	3729	0	3174	2301	1675	1260	983	794	660
1983 MAY 16.0	1833	1924	2019	2119	2222	2329	2438	2549	2663	2778	2893	3009	3124	0	2714	2079	1615	1300	1086	936	829
JD 2445460.5	1781	1930	2085	2246	2411	2580	2753	2929	3107	3285	3464	3642	3817	3613	2648	1901	1402	1074	854	702	594
1983 MAY 6.0	1893	1988	2086	2189	2295	2403	2515	2628	2743	2859	2976	3092	3207	3057	2354	1799	1419	1164	989	866	777
JD 2445450.5	1862	2014	2171	2333	2500	2671	2845	3021	3199	3377	3555	3731	0	3044	2172	1570	1179	922	747	625	538
1983 APR 26.0	1955	2053	2155	2260	2368	2479	2593	2708	2825	2942	3059	3176	0	2667	2017	1559	1254	1048	905	804	730
JD 2445440.5	1946	2100	2259	2423	2591	2763	2938	3114	3292	3470	3647	3821	3474	2493	1771	1302	1000	798	660	563	493
1983 APR 16.0	2019	2120	2224	2332	2443	2557	2672	2789	2907	3025	3143	3259	3007	2275	1724	1357	1114	948	832	749	688
JD 2445430.5	2033	2189	2350	2515	2685	2857	3032	3209	3386	3563	3739	0	2865	2012	1448	1089	856	698	589	511	456
1983 APR 6.0	2083	2187	2295	2405	2519	2634	2752	2870	2989	3108	3226	0	2572	1920	1477	1189	995	862	768	699	650
JD 2445420.5	2121	2280	2442	2609	2779	2953	3128	3305	3481	3657	3831	3278	2301	1622	1193	921	741	618	531	470	427
1983 MAR 27.0	2149	2256	2366	2479	2595	2713	2831	2951	3071	3190	3309	2902	2152	1619	1274	1048	894	787	710	655	615
JD 2445410.5	2213	2373	2537	2705	2876	3050	3225	3401	3577	3752	3705	2640	1830	1317	996	788	649	553	486	437	404
1983 MAR 17.0	2215	2325	2438	2554	2672	2791	2911	3032	3153	3272	3245	2425	1789	1374	1107	930	808	721	659	615	584
JD 2445400.5	2306	2467	2633	2802	2974	3148	3323	3499	3674	0	3026	2081	1463	1083	843	685	577	502	449	412	387
1983 MAR 7.0	2282	2395	2511	2628	2748	2869	2990	3112	3233	0	2735	1991	1492	1175	969	830	732	663	613	578	554
(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E13

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2445520.5	0	0	3333	3564	3806	4058	4320	4590	4867	5150	5437	5728	6020	6311	6600	6884	6737	5239	3982	3076	2448
1983 JUL 5.0	0	0	1367	1271	1175	1079	982	884	786	687	588	488	388	287	186	85	3579	3480	3378	3276	3175
JD 2445510.5	0	3236	3461	3698	3946	4203	4469	4742	5023	5308	5598	5890	6182	6473	6761	7043	5992	4559	3471	2716	2194
1983 JUN 25.0	0	1413	1318	1222	1125	1029	932	834	736	637	538	438	338	237	136	36	3532	3430	3329	3227	3125
JD 2445500.5	3143	3363	3595	3837	4090	4351	4621	4898	5182	5470	5761	6054	6347	6637	6924	6780	5228	3942	3031	2407	1976
1983 JUN 15.0	1458	1363	1267	1171	1075	978	881	784	686	587	488	388	287	187	86	3581	3482	3380	3278	3176	3075
JD 2445490.5	3269	3495	3733	3980	4238	4504	4778	5058	5344	5635	5928	6221	6514	6803	7088	5977	4501	3404	2655	2144	1789
1983 JUN 5.0	1407	1311	1216	1120	1024	927	830	732	634	535	436	336	236	135	35	3532	3430	3329	3227	3125	3023
JD 2445480.5	3399	3632	3875	4128	4390	4660	4938	5221	5510	5802	6096	6390	6682	6971	6763	5153	3850	2946	2337	1921	1628
1983 MAY 26.0	1354	1259	1163	1068	971	875	778	680	582	483	384	284	184	83	3581	3480	3378	3276	3175	3073	2971
JD 2445470.5	3534	3773	4021	4279	4546	4820	5101	5388	5679	5972	6267	6561	6852	0	5888	4379	3290	2560	2069	1730	1489
1983 MAY 16.0	1301	1206	1110	1014	918	822	724	627	529	430	331	231	131	0	3528	3427	3325	3223	3121	3020	2918
JD 2445460.5	3674	3918	4172	4434	4705	4984	5268	5557	5850	6145	6440	6734	7024	6670	5002	3700	2821	2238	1843	1567	1371
1983 MAY 6.0	1247	1152	1056	960	864	767	670	573	475	376	277	177	76	3575	3474	3373	3271	3169	3067	2965	2864
JD 2445450.5	3817	4067	4326	4593	4868	5150	5437	5729	6024	6319	6614	6907	0	5712	4189	3129	2433	1970	1653	1429	1269
1983 APR 26.0	1192	1097	1001	905	809	712	615	518	420	321	222	122	0	3521	3419	3318	3216	3114	3012	2910	2809
JD 2445440.5	3965	4220	4484	4755	5034	5320	5610	5903	6199	6495	6789	7081	6481	4768	3495	2659	2113	1747	1492	1311	1181
1983 APR 16.0	1136	1041	945	849	753	656	559	462	364	265	166	66	3565	3465	3363	3262	3160	3058	2956	2854	2753
JD 2445430.5	4116	4376	4645	4921	5203	5491	5784	6079	6375	6671	6965	0	5438	3932	2925	2278	1851	1560	1356	1211	1106
1983 APR 6.0	1079	984	888	792	696	600	502	405	307	208	109	0	3508	3408	3306	3205	3103	3001	2899	2798	2696
JD 2445420.5	4270	4536	4809	5089	5375	5665	5959	6256	6552	6848	7140	6180	4453	3241	2468	1969	1635	1405	1242	1125	1042
1983 MAR 27.0	1021	926	830	735	638	542	445	347	249	150	51	3551	3451	3350	3249	3147	3045	2943	2841	2740	2638
JD 2445410.5	4428	4698	4975	5259	5548	5841	6136	6433	6730	7024	6950	5065	3619	2691	2103	1718	1457	1275	1145	1052	988
1983 MAR 17.0	963	867	772	676	580	483	386	288	190	92	3590	3492	3392	3291	3190	3088	2987	2885	2783	2681	2579
JD 2445400.5	4588	4862	5144	5430	5722	6017	6314	6611	6907	0	5761	4072	2955	2258	1812	1515	1310	1165	1063	990	941
1983 MAR 7.0	903	808	712	616	520	423	326	229	131	0	3532	3432	3332	3231	3130	3029	2927	2825	2723	2621	2520
(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445260.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671641	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.645	DEGREES
MEAN ANOM. AT EPOCH	=	283.520	DEGREES
DATE OF NODAL PASSAGE	=	2445235.854	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445260.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338960	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.425	DEGREES
ARG. OF PERIHELION	=	286.318	DEGREES
MEAN ANOM. AT EPOCH	=	326.178	DEGREES
DATE OF NODAL PASSAGE	=	2444759.475	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.073	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E14

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	565	460	379	315	264	222	187	161	144	137	142	157	184	237	1437	296	314	353	397	446	498
1983 JUL 5.0	493	428	380	345	319	299	285	275	269	266	265	268	274	289	1073	320	322	336	354	376	400
JD 2445510.5	501	411	340	284	238	200	170	148	136	135	145	165	198	316	323	293	327	369	416	466	519
1983 JUN 25.0	458	402	362	332	309	292	281	272	268	266	267	271	279	321	342	317	329	345	365	388	414
JD 2445500.5	446	367	305	255	214	180	155	138	131	136	150	175	220	1034	277	304	343	387	435	486	541
1983 JUN 15.0	427	380	345	319	300	286	276	270	267	267	269	274	286	810	315	322	337	355	377	401	428
JD 2445490.5	396	327	273	228	192	163	142	130	129	139	158	187	285	276	282	318	360	406	455	508	564
1983 JUN 5.0	400	360	331	309	292	281	273	268	267	268	271	278	311	321	316	329	346	366	389	415	443
JD 2445480.5	351	291	243	204	172	147	131	125	130	144	167	204	478	262	295	335	379	426	477	531	588
1983 MAY 26.0	376	342	317	299	285	276	270	267	267	269	274	283	446	310	321	337	356	378	402	429	459
JD 2445470.5	311	259	216	181	154	134	124	124	134	152	178	251	245	273	312	353	399	447	499	554	613
1983 MAY 16.0	355	326	305	290	278	271	267	266	267	271	277	298	305	313	328	346	366	390	416	445	476
JD 2445460.5	275	230	192	162	139	124	120	125	140	162	191	242	253	289	330	373	419	469	522	579	640
1983 MAY 6.0	336	312	294	281	272	267	265	265	268	273	280	308	305	319	336	355	378	402	430	461	494
JD 2445450.5	243	203	170	145	127	118	119	130	149	173	206	234	269	307	349	393	441	492	547	605	667
1983 APR 26.0	318	298	284	274	267	263	263	264	269	275	283	296	310	326	344	365	389	416	445	477	513
JD 2445440.5	215	179	151	130	118	115	122	138	159	187	218	250	286	326	369	415	464	516	573	632	696
1983 APR 16.0	303	286	274	266	262	260	261	264	270	279	287	300	316	333	353	376	402	430	461	495	532
JD 2445430.5	189	158	135	119	113	116	128	148	174	1302	234	267	305	346	390	437	487	542	599	661	726
1983 APR 6.0	288	275	266	260	257	257	260	265	274	1047	291	305	322	341	363	387	414	444	477	513	552
JD 2445420.5	166	141	122	112	112	121	138	163	222	232	251	286	324	366	412	460	512	568	627	691	758
1983 MAR 27.0	275	264	257	254	253	255	259	267	296	285	295	311	329	350	373	399	428	460	495	532	574
JD 2445410.5	147	126	113	109	115	129	152	192	402	239	268	304	344	388	434	485	538	596	657	722	791
1983 MAR 17.0	263	255	250	248	249	253	260	277	368	285	299	316	336	358	383	411	442	476	512	552	596
JD 2445400.5	131	115	108	110	122	142	175	453	242	253	286	324	365	410	458	510	565	624	687	754	825
1983 MAR 7.0	251	245	243	243	246	252	265	434	280	287	303	322	343	367	394	424	457	492	531	573	619
(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26 E14

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	-198	-190	-181	-175	-171	-175	-187	-212	-249	-293	-335	-374	-425	-553	401	50	-77	-114	-123	-119	-109
1983 JUL 5.0	3160	3199	3240	3277	3308	3327	3330	3310	3263	3192	3113	3051	3022	3044	2133	2945	3021	3079	3137	3195	3254
JD 2445510.5	-206	-198	-190	-185	-184	-191	-208	-237	-275	-316	-351	-389	-459	-728	198	-61	-120	-138	-140	-133	-120
1983 JUN 25.0	3126	3167	3207	3242	3268	3280	3272	3237	3174	3093	3017	2968	2957	3006	2838	2947	3005	3061	3119	3178	3237
JD 2445500.5	-212	-205	-198	-195	-197	-207	-228	-260	-296	-330	-360	-403	-520	509	-21	-122	-151	-157	-154	-145	-131
1983 JUN 15.0	3092	3134	3172	3204	3223	3225	3203	3151	3074	2990	2924	2891	2895	2271	2872	2931	2986	3042	3101	3160	3221
2445490.5	-217	-211	-206	-205	-210	-223	-247	-278	-308	-334	-362	-420	-693	75	-117	-160	-173	-173	-167	-155	-140
JUN 5.0	3057	3099	3134	3160	3171	3160	3121	3052	2966	2887	2836	2818	2808	2791	2858	2910	2965	3022	3082	3142	3203
2445480.5	-221	-216	-213	-214	-221	-237	-261	-288	-310	-329	-360	-457	427	-103	-167	-186	-190	-186	-177	-165	-150
MAY 26.0	3022	3061	3092	3111	3110	3083	3026	2943	2856	2790	2756	2749	2598	2786	2834	2886	2943	3002	3062	3124	3186
JD 2445470.5	-224	-220	-218	-221	-231	-247	-268	-286	-299	-315	-353	-612	-72	-174	-197	-204	-203	-197	-187	-174	-158
1983 MAY 16.0	2984	3019	3044	3053	3038	2993	2917	2828	2750	2701	2683	2649	2715	2759	2807	2862	2920	2981	3042	3105	3167
JD 2445460.5	-225	-222	-222	-226	-236	-250	-263	-271	-277	-290	-347	35	-183	-209	-216	-217	-213	-206	-196	-182	-166
1983 MAY 6.0	2943	2973	2990	2985	2953	2888	2801	2715	2654	2624	2619	2646	2683	2728	2780	2837	2897	2959	3022	3085	3148
JD 2445450.5	-224	-222	-222	-226	-233	-241	-244	-243	-243	-251	-360	-206	-223	-228	-229	-227	-222	-214	-203	-190	-174
1983 APR 26.0	2898	2921	2926	2906	2854	2773	2684	2612	2571	2560	2558	2607	2647	2696	2752	2812	2874	2937	3001	3065	3129
JD 2445440.5	-221	-218	-218	-219	-220	-218	-211	-203	-193	-159	-302	-247	-241	-239	-238	-234	-229	-221	-210	-197	-182
1983 APR 16.0	2849	2862	2852	2813	2743	2656	2576	2524	2504	2513	2516	2563	2612	2666	2725	2787	2850	2915	2980	3045	3109
JD 2445430.5	-213	-210	-206	-202	-194	-181	-167	-148	-105	617	-297	-259	-249	-246	-243	-240	-234	-227	-216	-204	-189
1983 APR 6.0	2793	2794	2767	2709	2627	2543	2482	2452	2454	1804	2471	2524	2578	2636	2698	2762	2827	2893	2959	3024	3088
JD 2445420.5	-201	-194	-185	-171	-153	-132	-109	-67	145	-424	-287	-261	-252	-249	-247	-244	-239	-232	-222	-210	-196
1983 MAR 27.0	2730	2716	2671	2598	2514	2444	2405	2398	2435	2338	2431	2489	2547	2608	2672	2737	2804	2870	2937	3002	3067
JD 2445410.5	-182	-169	-150	-127	-100	-72	-32	88	-680	-340	-276	-258	-253	-251	-249	-247	-242	-236	-227	-216	-202
1983 MAR 17.0	2660	2628	2566	2486	2411	2362	2346	2370	1649	2324	2395	2456	2517	2581	2646	2713	2780	2847	2914	2980	3044
JD 2445400.5	-154	-132	-103	-71	-38	0	85	536	-442	-301	-265	-254	-251	-250	-250	-249	-245	-239	-231	-221	-208
1983 MAR 7.0	2580	2531	2458	2381	2324	2298	2311	2354	2172	2295	2363	2426	2489	2554	2621	2688	2756	2824	2891	2957	3021
(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E14

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	43	34	29	25	24	24	26	29	35	42	53	71	102	185	-183	-99	-24	7	28	45	59
1983 JUL 5.0	184	167	156	148	142	137	133	129	126	123	119	115	106	80	738	230	199	197	202	211	224
JD 2445510.5	19	12	7	4	3	4	6	10	15	23	36	56	100	287	-198	-61	-20	2	19	34	47
1983 JUN 25.0	130	117	109	102	98	94	90	87	84	82	78	73	60	1	244	161	152	155	162	173	187
JD 2445500.5	-4	-10	-14	-16	-17	-16	-14	-10	-4	4	18	43	114	-304	-106	-49	-23	-5	8	22	35
1983 JUN 15.0	78	69	62	57	54	51	48	46	43	41	37	31	8	595	129	108	108	114	123	135	150
JD 2445490.5	-27	-32	-36	-38	-38	-37	-35	-31	-25	-15	0	34	208	-176	-79	-49	-30	-16	-3	9	21
1983 JUN 5.0	28	21	16	13	10	8	6	4	2	0	3596	3586	3530	115	65	61	65	74	85	98	113
JD 2445480.5	-51	-55	-58	-59	-60	-59	-56	-52	-46	-36	-17	37	-364	-111	-73	-54	-40	-28	-16	-4	8
1983 MAY 26.0	3579	3574	3571	3569	3567	3565	3564	3563	3562	3560	3555	3537	282	24	14	17	24	34	46	61	77
JD 2445470.5	-73	-77	-80	-81	-81	-81	-78	-75	-68	-58	-35	112	-148	-96	-77	-63	-52	-40	-29	-18	-6
1983 MAY 16.0	3531	3528	3526	3524	3523	3523	3522	3522	3521	3519	3514	3463	3585	3566	3568	3574	3583	3595	8	24	41
JD 2445460.5	-96	-99	-102	-103	-104	-103	-101	-98	-92	-82	-51	-216	-115	-96	-85	-74	-64	-54	-43	-32	-20
1983 MAY 6.0	3483	3481	3481	3480	3480	3480	3480	3480	3481	3480	3471	3568	3516	3517	3523	3532	3543	3556	3570	3587	5
JD 2445450.5	-118	-121	-124	-125	-126	-126	-125	-123	-119	-112	-58	-124	-112	-103	-95	-87	-78	-68	-57	-46	-35
1983 APR 26.0	3436	3435	3436	3436	3437	3437	3438	3440	3441	3442	3424	3461	3465	3471	3480	3491	3503	3517	3533	3550	3569
JD 2445440.5	-140	-143	-146	-148	-149	-150	-150	-150	-152	-164	-97	-119	-118	-114	-107	-100	-91	-82	-72	-61	-49
1983 APR 16.0	3388	3389	3390	3392	3393	3395	3397	3400	3404	3416	3391	3409	3418	3427	3438	3450	3463	3478	3495	3513	3533
JD 2445430.5	-161	-164	-167	-170	-173	-175	-178	-183	-201	-324	-110	-127	-128	-125	-120	-113	-105	-96	-86	-76	-64
1983 APR 6.0	3341	3343	3345	3347	3350	3352	3356	3362	3375	383	3346	3362	3373	3383	3395	3408	3423	3439	3457	3477	3498
JD 2445420.5	-181	-186	-189	-193	-197	-202	-210	-228	-329	-53	-126	-138	-140	-138	-133	-127	-119	-111	-101	-90	-78
1983 MAR 27.0	3294	3297	3300	3303	3306	3310	3317	3329	3398	3270	3302	3316	3328	3340	3353	3367	3383	3400	3419	3440	3463
JD 2445410.5	-202	-207	-212	-217	-223	-233	-251	-310	238	-106	-141	-151	-153	-151	-146	-140	-133	-124	-115	-104	-92
1983 MAR 17.0	3247	3251	3254	3258	3263	3269	3281	3319	3168	3238	3258	3271	3284	3297	3311	3326	3343	3361	3382	3404	3428
JD 2445400.5	-222	-228	-234	-242	-253	-271	-315	-540	-45	-133	-156	-163	-165	-163	-159	-154	-146	-138	-128	-118	-106
1983 MAR 7.0	3200	3204	3209	3214	3220	3231	3258	3583	3166	3198	3213	3227	3239	3253	3268	3285	3303	3323	3344	3368	3393

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E14

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5 1983 JUL 5.0	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564
JD 2445510.5 1983 JUN 25.0	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562
JD 2445500.5 1983 JUN 15.0	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555
JD 2445490.5 1983 JUN 5.0	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543
JD 2445480.5 1983 MAY 26.0	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527
JD 2445470.5 1983 MAY 16.0	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508
JD 2445460.5 1983 MAY 6.0	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485
JD 2445450.5 1983 APR 26.0	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458
JD 2445440.5 1983 APR 16.0	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429
JD 2445430.5 1983 APR 6.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398
JD 2445420.5 1983 MAR 27.0	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364
JD 2445410.5 1983 MAR 17.0	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329
JD 2445400.5 1983 MAR 7.0	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292

(FLT T)(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD2445000.5 1982 JAN 31.0				JD2445040.5 1982 MAR 12.0				JD2445080.5 1982 APR 21.0				JD2445120.5 1982 MAY 31.0				JD2445160.5 1982 JUL 10.0				

EARTH DEPARTURE OR ARRIVAL DATE

M26
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
1983 JUL 5.0	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
JD 2445510.5	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
1983 JUN 25.0	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2445500.5	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
1983 JUN 15.0	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
JD 2445490.5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1983 JUN 5.0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
JD 2445480.5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
1983 MAY 26.0	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
JD 2445470.5	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
1983 MAY 16.0	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
JD 2445460.5	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
1983 MAY 6.0	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
JD 2445450.5	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
1983 APR 26.0	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
JD 2445440.5	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
1983 APR 16.0	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123
JD 2445430.5	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
1983 APR 6.0	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147
JD 2445420.5	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
1983 MAR 27.0	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171
JD 2445410.5	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
1983 MAR 17.0	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195
JD 2445400.5	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
1983 MAR 7.0	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD2445000.5 1982 JAN 31.0				JD2445040.5 1982 MAR 12.0				JD2445080.5 1982 APR 21.0					JD2445120.5 1982 MAY 31.0				JD2445160.5 1982 JUL 10.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E14

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	3175	3073	2972	2872	2772	2672	2573	2475	2377	2280	2183	2087	1991	1895	1788	1703	1608	1513	1417	1322	1226
1983 JUL 5.0	-920	-792	-677	-568	-465	-364	-265	-168	-72	22	116	209	299	388	487	561	642	722	800	876	950
JD 2445510.5	3125	3024	2923	2822	2722	2623	2524	2425	2327	2230	2133	2037	1941	1846	1748	1654	1559	1463	1368	1272	1176
1983 JUN 25.0	-852	-732	-620	-515	-413	-313	-215	-118	-22	72	165	257	347	434	522	605	686	764	841	916	988
JD 2445500.5	3075	2973	2872	2772	2672	2572	2473	2375	2277	2180	2083	1986	1891	1790	1699	1603	1508	1413	1317	1222	1126
1983 JUN 15.0	-787	-672	-564	-461	-360	-261	-163	-66	28	122	215	306	395	488	567	649	729	807	882	956	1028
JD 2445490.5	3023	2922	2821	2720	2620	2521	2422	2323	2226	2128	2031	1935	1840	1743	1647	1552	1457	1361	1266	1170	1074
1983 JUN 5.0	-725	-614	-508	-406	-306	-208	-110	-14	80	174	266	356	444	531	614	695	773	849	924	996	1067
JD 2445480.5	2971	2870	2769	2668	2568	2468	2369	2271	2173	2076	1979	1883	1785	1691	1595	1500	1405	1309	1214	1118	1022
1983 MAY 26.0	-663	-556	-452	-351	-252	-154	-57	38	133	226	317	407	495	579	661	740	817	892	965	1037	1106
JD 2445470.5	2918	2817	2715	2615	2515	2415	2316	2218	2120	2023	1926	1830	1733	1638	1542	1447	1351	1256	1161	1065	969
1983 MAY 16.0	-603	-498	-396	-296	-197	-99	-2	92	187	279	369	457	544	627	708	786	862	935	1007	1077	1146
JD 2445460.5	2864	2762	2661	2561	2461	2361	2262	2164	2066	1969	1872	1775	1679	1584	1488	1393	1297	1202	1106	1011	915
1983 MAY 6.0	-543	-440	-339	-239	-141	-43	52	147	241	332	422	509	593	675	755	831	906	978	1049	1118	1186
JD 2445450.5	2809	2707	2606	2506	2406	2306	2207	2109	2011	1914	1817	1720	1624	1529	1433	1338	1242	1147	1051	956	860
1983 APR 26.0	-483	-381	-281	-182	-84	12	108	203	296	386	475	560	643	724	802	877	950	1021	1091	1159	1225
JD 2445440.5	2753	2651	2550	2450	2350	2250	2151	2053	1955	1858	1761	1664	1568	1473	1377	1282	1186	1091	995	900	804
1983 APR 16.0	-424	-323	-223	-124	-27	69	165	259	351	440	527	611	693	772	848	922	994	1064	1132	1199	1265
JD 2445430.5	2696	2594	2493	2393	2293	2193	2094	1996	1898	1803	1704	1607	1511	1416	1320	1225	1129	1034	939	843	747
1983 APR 6.0	-364	-264	-165	-66	30	127	222	315	405	491	579	662	742	820	895	967	1038	1107	1174	1240	1305
JD 2445420.5	2638	2537	2436	2335	2235	2135	2036	1938	1840	1743	1646	1550	1454	1358	1262	1167	1072	976	881	785	689
1983 MAR 27.0	-305	-205	-106	-8	88	184	278	370	460	547	631	713	791	867	941	1012	1082	1149	1215	1281	1345
JD 2445410.5	2579	2478	2377	2276	2176	2077	1978	1880	1780	1684	1587	1491	1395	1299	1204	1108	1013	917	822	726	630
1983 MAR 17.0	-245	-146	-47	50	146	241	335	425	515	600	683	763	840	914	986	1056	1125	1191	1257	1321	1384
JD 2445400.5	2520	2418	2317	2217	2117	2017	1918	1821	1721	1624	1527	1431	1335	1239	1144	1048	953	858	762	667	571
1983 MAR 7.0	-186	-87	10	108	204	298	390	478	568	652	733	812	887	960	1031	1100	1167	1233	1298	1361	1424
(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E14

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	172	146	131	122	117	116	119	126	137	156	187	242	355	702	8630	692	354	242	188	157	138
1983 JUL 5.0	546	471	415	373	342	318	301	289	282	278	279	283	290	301	318	334	355	381	410	443	480
JD 2445510.5	140	122	112	106	103	104	108	116	130	151	188	257	424	1292	1157	409	252	186	151	130	116
1983 JUN 25.0	501	436	388	352	325	305	290	281	276	274	276	282	291	303	320	339	363	390	421	456	495
JD 2445500.5	112	100	93	90	89	92	97	106	121	145	188	279	567	5831	508	265	183	143	120	105	97
1983 JUN 15.0	460	405	363	332	309	293	281	274	270	271	275	282	293	309	325	346	372	401	434	471	512
JD 2445490.5	88	80	76	74	75	78	84	94	110	137	189	319	1085	746	283	177	132	107	93	84	78
1983 JUN 5.0	424	377	341	315	296	282	273	268	266	269	274	283	296	312	331	355	382	413	448	487	530
JD 2445480.5	66	61	59	59	60	64	70	80	97	127	191	407	2363	310	168	117	92	78	69	63	60
1983 MAY 26.0	392	352	322	300	283	272	266	263	263	267	275	286	300	318	339	364	393	426	463	504	549
JD 2445470.5	45	43	42	43	44	48	54	63	80	111	193	814	363	151	97	73	60	52	47	44	42
1983 MAY 16.0	363	330	304	286	273	264	260	259	261	267	276	289	305	325	348	375	406	441	480	523	570
JD 2445460.5	26	25	25	26	27	30	35	42	56	86	200	579	119	68	48	38	32	29	27	25	25
1983 MAY 6.0	338	310	289	274	263	257	255	256	260	268	279	294	311	333	358	387	420	458	499	544	593
JD 2445450.5	7	7	7	8	8	9	11	14	20	37	249	53	24	16	12	10	9	8	8	7	7
1983 APR 26.0	316	293	275	263	256	252	251	254	261	270	283	299	319	343	370	401	436	476	519	566	617
JD 2445440.5	11	11	11	12	13	15	19	25	40	108	158	46	27	20	16	14	12	11	11	11	11
1983 APR 16.0	297	278	264	254	249	247	249	254	262	273	288	306	328	354	383	416	454	495	541	590	643
JD 2445430.5	29	30	31	34	38	46	59	87	171	7672	174	88	60	47	39	34	32	30	29	29	30
1983 APR 6.0	281	265	254	247	244	244	248	255	265	277	295	315	338	366	398	433	473	517	564	616	670
JD 2445420.5	48	49	53	59	69	86	118	198	673	474	178	112	83	68	59	53	50	48	47	48	51
1983 MAR 27.0	266	254	245	241	240	242	248	257	268	284	302	324	350	380	414	452	494	540	590	643	699
JD 2445410.5	67	71	77	89	107	141	214	473	1936	325	180	127	101	85	76	70	67	65	66	69	73
1983 MAR 17.0	254	244	239	236	238	242	249	260	274	291	311	335	363	395	432	472	516	565	617	672	729
JD 2445400.5	87	94	106	125	158	224	405	2297	608	275	181	138	115	100	91	86	83	83	86	90	99
1983 MAR 7.0	244	237	233	233	236	242	252	264	280	299	321	348	378	413	451	494	541	591	646	702	760

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2445000.5 1982 JAN 31.0 — JD2445040.5 1982 MAR 12.0 — JD2445080.5 1982 APR 21.0 — JD2445120.5 1982 MAY 31.0 — JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E14

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	624	729	808	869	915	949	975	992	1003	-1006	-1004	-996	-982	-963	-932	-903	-865	-821	-770	-715	-654
1983 JUL 5.0	2128	2029	1956	1903	1864	1835	1814	1799	1790	1784	1782	1783	1787	1792	1804	1810	1820	1831	1843	1855	1866
JD 2445510.5	683	773	842	894	933	962	983	997	1005	-1005	-1000	-989	-972	-950	-920	-885	-844	-797	-744	-687	-624
1983 JUN 25.0	2053	1969	1908	1863	1830	1806	1788	1776	1769	1766	1765	1767	1772	1778	1787	1797	1807	1818	1830	1842	1853
JD 2445500.5	735	812	871	915	949	973	990	1001	-1004	-1002	-994	-980	-960	-933	-903	-865	-821	-772	-717	-657	-593
1983 JUN 15.0	1987	1916	1864	1826	1798	1778	1764	1755	1750	1748	1749	1752	1758	1767	1774	1784	1795	1806	1817	1829	1839
JD 2445490.5	780	846	896	934	962	982	995	1002	-1002	-997	-986	-969	-947	-918	-883	-843	-796	-744	-687	-625	-560
1983 JUN 5.0	1927	1868	1824	1792	1769	1753	1741	1735	1731	1731	1733	1738	1744	1752	1761	1772	1782	1794	1805	1815	1825
JD 2445480.5	819	875	917	949	973	989	998	-1001	-998	-990	-976	-957	-931	-900	-862	-819	-770	-716	-656	-593	-526
1983 MAY 26.0	1873	1824	1788	1761	1742	1729	1720	1715	1714	1715	1718	1724	1732	1740	1749	1760	1770	1781	1792	1802	1811
JD 2445470.5	852	900	936	962	981	993	999	-998	-993	-982	-965	-943	-914	-880	-839	-793	-742	-685	-624	-558	-491
1983 MAY 16.0	1825	1784	1754	1733	1717	1707	1700	1697	1697	1700	1704	1711	1719	1727	1737	1748	1758	1769	1779	1788	1796
JD 2445460.5	881	921	951	973	987	996	-997	-994	-986	-972	-952	-926	-895	-858	-814	-766	-712	-653	-590	-523	-454
1983 MAY 6.0	1782	1748	1724	1706	1694	1686	1682	1680	1682	1686	1691	1698	1706	1716	1726	1736	1747	1757	1766	1774	1781
JD 2445450.5	906	939	963	981	991	-995	-995	-988	-977	-960	-937	-908	-874	-834	-788	-736	-680	-619	-554	-486	-417
1983 APR 26.0	1744	1716	1696	1682	1672	1667	1664	1665	1667	1672	1678	1686	1695	1704	1715	1725	1735	1744	1753	1760	1765
JD 2445440.5	926	953	973	986	993	-994	-990	-981	-966	-946	-920	-888	-851	-808	-759	-705	-646	-583	-517	-449	-380
1983 APR 16.0	1709	1687	1671	1659	1653	1649	1648	1650	1654	1660	1667	1675	1684	1694	1704	1713	1723	1732	1739	1745	1749
JD 2445430.5	943	965	980	990	-992	-991	-984	-971	-953	-931	-901	-866	-826	-780	-729	-672	-611	-547	-479	-410	-341
1983 APR 6.0	1678	1660	1647	1639	1634	1633	1634	1637	1641	1647	1655	1664	1673	1683	1693	1702	1711	1719	1725	1730	1732
JD 2445420.5	956	974	985	991	-990	-985	-975	-960	-939	-912	-881	-843	-799	-751	-697	-638	-575	-509	-441	-372	-303
1983 MAR 27.0	1651	1636	1626	1621	1618	1618	1620	1624	1630	1637	1645	1654	1663	1673	1682	1691	1699	1706	1711	1714	1715
JD 2445410.5	967	980	988	-989	-986	-978	-965	-947	-922	-893	-858	-817	-771	-719	-663	-602	-537	-470	-401	-332	-265
1983 MAR 17.0	1626	1615	1608	1604	1603	1604	1607	1612	1619	1627	1635	1644	1654	1663	1672	1680	1687	1693	1697	1698	1697
JD 2445400.5	975	985	-988	-987	-981	-970	-953	-932	-904	-872	-834	-790	-741	-686	-627	-564	-498	-430	-361	-293	-228
1983 MAR 7.0	1604	1595	1590	1589	1589	1592	1596	1601	1609	1617	1626	1635	1644	1653	1661	1669	1675	1679	1681	1681	1677
(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2445000.5	JD2445040.5	JD2445080.5	JD2445120.5	JD2445160.5
1982 JAN 31.0	1982 MAR 12.0	1982 APR 21.0	1982 MAY 31.0	1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	328	301	282	267	254	242	232	222	213	204	195	187	179	172	164	157	151	144	138	132	126
1983 JUL 5.0	374	365	355	346	337	327	318	309	300	290	281	272	264	255	246	238	230	221	213	206	198
JD 2445510.5	313	291	274	261	248	237	227	218	209	200	192	183	176	168	161	154	147	141	135	129	123
1983 JUN 25.0	368	359	350	340	331	322	312	303	294	285	275	267	258	249	241	232	224	216	208	200	193
JD 2445500.5	301	282	267	255	243	233	223	213	204	196	188	180	172	164	157	151	144	138	132	126	121
1983 JUN 15.0	363	353	344	334	325	316	306	297	288	279	270	261	252	243	235	227	218	210	203	195	188
JD 2445490.5	291	275	261	249	238	228	218	209	200	192	184	176	168	161	154	147	141	135	129	123	118
1983 JUN 5.0	357	347	338	328	319	310	300	291	282	273	264	255	246	238	229	221	213	205	197	190	182
JD 2445480.5	282	268	255	244	233	223	214	205	196	188	180	172	165	157	151	144	138	131	126	120	115
1983 MAY 26.0	351	341	332	322	313	304	294	285	276	267	258	249	240	232	223	215	207	199	192	184	177
JD 2445470.5	275	261	249	239	228	219	209	201	192	184	176	168	161	154	147	140	134	128	122	117	112
1983 MAY 16.0	345	335	326	316	307	297	288	279	270	261	252	243	234	226	218	210	202	194	186	179	172
JD 2445460.5	268	255	244	233	224	214	205	196	188	180	172	164	157	150	143	137	131	125	119	114	109
1983 MAY 6.0	339	329	320	310	301	291	282	273	264	255	246	237	228	220	212	204	196	188	181	173	166
JD 2445450.5	261	249	239	228	219	210	201	192	184	176	168	161	153	147	140	134	127	122	116	111	106
1983 APR 26.0	332	323	313	304	294	285	276	266	257	248	240	231	222	214	206	198	190	183	175	168	161
JD 2445440.5	255	244	233	223	214	205	196	188	180	172	164	157	150	143	136	130	124	118	113	108	103
1983 APR 16.0	326	316	307	297	288	279	269	260	251	242	234	225	216	208	200	192	184	177	170	163	156
JD 2445430.5	249	238	228	219	209	200	192	183	175	168	160	153	146	139	133	127	121	115	110	105	100
1983 APR 6.0	320	310	300	291	282	272	263	254	245	236	227	219	210	202	194	186	179	171	164	157	150
JD 2445420.5	243	233	223	214	205	196	187	179	171	163	156	149	142	135	129	123	117	112	107	102	97
1983 MAR 27.0	313	303	294	284	275	266	257	247	239	230	221	213	204	196	188	180	173	166	158	152	145
JD 2445410.5	238	228	218	209	200	191	183	175	167	159	152	145	138	131	125	119	114	108	103	99	94
1983 MAR 17.0	306	297	287	278	268	259	250	241	232	223	215	206	198	190	182	175	167	160	153	146	139
JD 2445400.5	232	222	213	204	195	186	178	170	162	155	148	141	134	128	122	116	110	105	100	96	91
1983 MAR 7.0	300	290	281	271	262	253	243	235	226	217	208	200	192	184	176	169	161	154	147	140	134

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
	•				•				•				•				•				•
	JD2445000.5				JD2445040.5				JD2445080.5				JD2445120.5				JD2445160.5				
	1982 JAN 31.0				1982 MAR 12.0				1982 APR 21.0				1982 MAY 31.0				1982 JUL 10.0				

EARTH DEPARTURE OR ARRIVAL DATE

M26
E14

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5 1983 JUL 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445510.5 1983 JUN 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445500.5 1983 JUN 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445490.5 1983 JUN 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445480.5 1983 MAY 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445470.5 1983 MAY 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445460.5 1983 MAY 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445450.5 1983 APR 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445440.5 1983 APR 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445430.5 1983 APR 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445420.5 1983 MAR 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445410.5 1983 MAR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445400.5 1983 MAR 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E14

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	1233	979	799	668	573	504	454	420	401	394	399	416	450	528	3646	631	666	743	838	947	1070
1983 JUL 5.0	1215	1031	898	802	731	679	642	616	599	591	590	597	612	651	2908	735	740	778	828	886	954
JD 2445510.5	1078	868	718	609	529	472	431	406	393	391	402	426	469	669	683	626	692	778	879	993	1121
1983 JUN 25.0	1116	960	848	766	705	661	630	609	596	592	595	604	625	738	793	728	758	803	858	921	992
JD 2445500.5	946	773	648	557	492	445	413	394	388	392	408	438	501	2497	596	645	723	816	922	1042	1175
1983 JUN 15.0	1030	898	803	733	682	645	619	603	595	594	600	613	644	2133	722	740	780	830	889	957	1032
JD 2445490.5	835	692	589	514	460	422	398	386	386	395	417	454	612	594	605	674	759	857	969	1094	1232
1983 JUN 5.0	954	844	763	704	661	630	610	598	594	596	606	623	709	736	723	758	805	860	923	995	1075
JD 2445480.5	740	623	538	477	433	404	388	382	386	401	428	478	1023	570	630	707	798	902	1019	1149	1292
1983 MAY 26.0	888	795	727	677	642	617	602	594	594	600	613	636	1082	708	737	780	832	892	960	1036	1121
JD 2445470.5	660	565	498	446	412	391	380	380	390	410	442	552	541	590	661	745	841	950	1072	1208	1356
1983 MAY 16.0	829	751	695	653	624	605	595	591	594	604	620	676	696	716	756	804	861	925	998	1079	1168
JD 2445460.5	594	516	460	421	395	381	377	382	397	421	459	536	554	619	696	785	887	1001	1129	1270	1424
1983 MAY 6.0	777	712	665	632	609	595	588	589	596	609	628	702	695	732	777	830	891	961	1038	1124	1219
JD 2445450.5	538	476	432	402	383	375	376	386	406	435	481	523	582	652	735	829	936	1056	1189	1336	1496
1983 APR 26.0	730	677	638	612	594	585	583	588	599	616	637	672	707	750	800	858	924	998	1080	1171	1272
JD 2445440.5	493	443	409	387	375	372	379	394	419	453	498	549	613	689	777	876	989	1114	1253	1405	1571
1983 APR 16.0	688	645	614	593	581	577	579	588	603	627	647	682	723	770	825	888	958	1037	1125	1221	1327
JD 2445430.5	456	417	391	376	370	373	385	405	437	3257	523	579	648	729	821	927	1045	1176	1321	1479	1651
1983 APR 6.0	650	615	591	576	569	569	576	589	613	2830	657	695	740	792	851	919	994	1078	1171	1274	1385
JD 2445420.5	427	397	379	370	369	378	395	422	504	520	551	612	686	772	870	980	1104	1241	1392	1557	1735
1983 MAR 27.0	615	588	570	560	558	563	574	595	670	640	667	709	758	815	879	951	1032	1122	1220	1328	1446
JD 2445410.5	404	382	370	367	372	386	410	460	848	531	580	647	726	817	921	1038	1167	1311	1468	1639	1824
1983 MAR 17.0	584	563	551	546	548	558	577	621	865	642	678	724	778	839	908	985	1071	1167	1271	1386	1510
JD 2445400.5	387	372	366	368	378	399	438	964	536	555	613	685	770	866	976	1098	1234	1384	1548	1726	1918
1983 MAR 7.0	554	539	532	533	540	556	590	1050	629	648	690	740	798	864	938	1020	1112	1214	1325	1446	1577

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E14

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2445520.5	2448	2010	1697	1471	1305	1183	1096	1036	1000	985	989	1013	1062	1180	6554	1366	1406	1522	1666	1834	2023
1983 JUL 5.0	3175	3073	2972	2872	2772	2672	2573	2475	2377	2280	2183	2087	1991	1895	1788	1703	1608	1513	1417	1322	1226
JD 2445510.5	2194	1828	1566	1374	1234	1133	1061	1014	989	983	997	1030	1094	1407	1476	1353	1450	1581	1736	1914	2113
1983 JUN 25.0	3125	3024	2923	2822	2722	2623	2524	2425	2327	2230	2133	2037	1941	1846	1748	1654	1559	1463	1368	1272	1176
JD 2445500.5	1976	1671	1451	1291	1173	1089	1032	997	982	986	1008	1051	1145	4629	1318	1385	1503	1646	1812	1999	2207
1983 JUN 15.0	3075	2973	2872	2772	2672	2572	2473	2375	2277	2180	2083	1986	1891	1790	1699	1603	1508	1413	1317	1222	1126
JD 2445490.5	1789	1535	1352	1218	1121	1053	1008	984	979	992	1023	1078	1321	1330	1328	1432	1564	1717	1893	2089	2307
1983 JUN 5.0	3023	2922	2821	2720	2620	2521	2422	2323	2226	2128	2031	1935	1840	1743	1647	1552	1457	1361	1266	1170	1074
JD 2445480.5	1628	1418	1265	1154	1075	1022	989	976	980	1001	1041	1114	2104	1277	1367	1487	1630	1794	1979	2185	2413
1983 MAY 26.0	2971	2870	2769	2668	2568	2468	2369	2271	2173	2076	1979	1883	1785	1691	1595	1500	1405	1309	1214	1118	1022
JD 2445470.5	1489	1316	1190	1100	1037	996	975	971	985	1014	1062	1227	1237	1306	1417	1549	1702	1875	2070	2286	2525
1983 MAY 16.0	2918	2817	2715	2615	2515	2415	2316	2218	2120	2023	1926	1830	1733	1638	1542	1447	1351	1256	1161	1065	969
JD 2445460.5	1371	1228	1126	1053	1004	976	965	971	993	1030	1087	1238	1249	1351	1473	1616	1778	1962	2167	2394	2643
1983 MAY 6.0	2864	2762	2661	2561	2461	2361	2262	2164	2066	1969	1872	1775	1679	1584	1488	1393	1297	1202	1106	1011	915
JD 2445450.5	1269	1153	1070	1013	977	960	959	974	1005	1051	1118	1194	1289	1403	1535	1687	1860	2054	2269	2507	2767
1983 APR 26.0	2809	2707	2606	2506	2406	2306	2207	2109	2011	1914	1817	1720	1624	1529	1433	1338	1242	1147	1051	956	860
JD 2445440.5	1181	1088	1023	980	956	949	958	982	1022	1080	1145	1231	1336	1459	1602	1764	1947	2151	2378	2627	2898
1983 APR 16.0	2753	2651	2550	2450	2350	2250	2151	2053	1955	1858	1761	1664	1568	1473	1377	1282	1186	1091	995	900	804
JD 2445430.5	1106	1032	982	952	939	942	961	995	1050	6087	1180	1274	1388	1521	1673	1845	2039	2254	2492	2753	3036
1983 APR 6.0	2696	2594	2493	2393	2293	2193	2094	1996	1898	1803	1704	1607	1511	1416	1320	1225	1129	1034	939	843	747
JD 2445420.5	1042	985	949	930	927	940	969	1018	1174	1160	1218	1321	1444	1586	1749	1932	2136	2363	2612	2885	3182
1983 MAR 27.0	2638	2537	2436	2335	2235	2135	2036	1938	1840	1743	1646	1550	1454	1358	1262	1167	1072	976	881	785	689
JD 2445410.5	988	945	921	913	920	944	986	1081	1713	1173	1259	1372	1504	1656	1829	2023	2239	2477	2739	3025	3335
1983 MAR 17.0	2579	2478	2377	2276	2176	2077	1978	1880	1780	1684	1587	1491	1395	1299	1204	1108	1013	917	822	726	630
JD 2445400.5	941	911	898	901	918	955	1028	2014	1165	1203	1303	1425	1567	1730	1914	2119	2347	2598	2873	3172	3496
1983 MAR 7.0	2520	2418	2317	2217	2117	2017	1918	1821	1721	1624	1527	1431	1335	1239	1144	1048	953	858	762	667	571
(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445360.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671629	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.649	DEGREES
MEAN ANOM. AT EPOCH	=	22.081	DEGREES
DATE OF NODAL PASSAGE	=	2445601.106	(J.D.)
OBLIQUITY OF EQUATOR	=	23.441	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445360.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338986	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.427	DEGREES
ARG. OF PERIHELION	=	286.320	DEGREES
MEAN ANOM. AT EPOCH	=	18.580	DEGREES
DATE OF NODAL PASSAGE	=	2445446.452	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.074	DEGREES

M26
E15

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5	498	554	613	675	742	811	884	960	1038	1119	1202	1287	1373	1223	1066	971	929	926	951	1000	1072
1983 JUL 5.0	400	427	457	489	525	563	604	648	694	742	793	847	903	721	579	494	467	489	546	630	735
JD 2445510.5	519	576	637	701	768	839	913	990	1070	1153	1237	1324	1315	1135	1013	952	937	955	999	1068	1162
1983 JUN 25.0	414	442	473	507	544	584	626	671	719	770	822	878	808	649	537	487	493	541	619	721	847
JD 2445500.5	541	599	661	727	796	868	944	1023	1104	1188	1274	1362	1214	1064	981	951	960	999	1064	1155	1275
1983 JUN 15.0	428	458	491	526	565	606	650	697	746	798	853	910	727	591	516	503	538	609	708	831	981
JD 2445490.5	564	624	687	754	825	899	976	1056	1139	1225	1312	1299	1126	1016	968	967	999	1060	1148	1266	1419
1983 JUN 5.0	443	475	509	546	586	629	675	723	774	828	885	812	655	554	519	540	603	696	816	965	1146
JD 2445480.5	588	649	714	783	855	930	1009	1091	1176	1263	1353	1197	1060	991	976	1000	1056	1141	1256	1407	1604
1983 MAY 26.0	459	492	528	567	609	653	701	751	804	861	920	729	602	543	547	599	686	803	949	1128	1351
JD 2445470.5	613	676	742	812	886	963	1044	1127	1214	1303	1276	1113	1019	988	1003	1053	1133	1246	1395	1590	1847
1983 MAY 16.0	476	511	549	589	633	679	728	781	836	895	810	660	574	559	599	679	791	934	1112	1333	1615
JD 2445460.5	640	704	772	844	919	998	1080	1166	1254	1346	1176	1055	1005	1008	1050	1126	1236	1382	1575	1830	2177
1983 MAY 6.0	494	530	570	612	657	706	757	812	870	931	728	615	577	602	674	781	921	1096	1315	1595	1965
JD 2445450.5	667	733	803	876	953	1034	1118	1206	1297	1246	1099	1026	1015	1049	1120	1226	1369	1560	1812	2157	0
1983 APR 26.0	513	551	592	636	684	734	788	845	906	802	666	603	611	672	774	910	1082	1299	1576	1944	0
JD 2445440.5	696	764	835	910	989	1072	1158	1248	1342	1152	1053	1026	1050	1115	1216	1357	1544	1795	2137	0	0
1983 APR 16.0	532	572	615	662	711	764	821	881	945	725	636	624	674	768	900	1070	1284	1559	1924	0	0
JD 2445430.5	726	796	869	946	1027	1112	1201	1293	1212	1088	1040	1053	1111	1207	1345	1530	1778	2117	0	0	0
1983 APR 6.0	552	594	640	688	740	796	855	919	791	677	643	679	766	893	1059	1271	1544	1906	0	0	0
JD 2445420.5	758	829	904	983	1067	1154	1246	1342	1130	1060	1059	1108	1200	1333	1515	1761	2097	0	0	0	0
1983 MAR 27.0	574	618	665	716	771	830	892	960	726	668	689	766	888	1050	1260	1530	1890	0	0	0	0
JD 2445410.5	791	864	941	1023	1109	1199	1294	1179	1085	1068	1108	1194	1323	1502	1745	2078	0	0	0	0	0
1983 MAR 17.0	596	642	692	746	804	866	932	782	700	702	769	885	1044	1250	1519	1875	0	0	0	0	0
JD 2445400.5	825	901	981	1065	1154	1247	0	1117	1081	1110	1189	1314	1490	1730	2061	0	0	0	0	0	0
1983 MAR 7.0	619	668	721	778	839	905	0	738	721	776	885	1040	1243	1509	1863	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5 1982 AUG 19.0 | JD2445240.5 1982 SEP 28.0 | JD2445280.5 1982 NOV 7.0 | JD2445320.5 1982 DEC 17.0 | JD2445360.5 1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E15

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5	-109	-94	-75	-54	-32	-8	16	40	65	88	111	133	153	-162	-147	-125	-100	-72	-43	-12	17
1983 JUL 5.0	3254	3313	3373	3433	3492	3552	11	71	131	190	251	311	371	3223	3268	3325	3388	3454	3521	3589	57
JD 2445510.5	-120	-104	-85	-63	-40	-16	7	32	56	80	103	125	-179	-168	-150	-128	-102	-74	-45	-15	14
1983 JUN 25.0	3237	3297	3357	3417	3477	3536	3596	55	114	173	232	291	3158	3197	3250	3312	3377	3443	3510	3578	47
JD 2445500.5	-131	-113	-94	-72	-49	-25	-1	23	48	72	95	117	-186	-172	-153	-130	-105	-77	-48	-19	11
1983 JUN 15.0	3221	3281	3341	3402	3461	3520	3579	38	96	155	213	271	3128	3176	3235	3299	3365	3431	3499	3567	36
JD 2445490.5	-140	-123	-103	-81	-58	-34	-9	14	39	63	86	-201	-191	-175	-156	-133	-108	-81	-52	-22	7
1983 JUN 5.0	3203	3264	3325	3385	3445	3504	3562	20	78	136	193	3060	3102	3157	3220	3285	3352	3419	3487	3555	25
JD 2445480.5	-150	-132	-111	-90	-67	-43	-18	5	30	53	77	-206	-194	-178	-158	-136	-111	-85	-56	-26	3
1983 MAY 26.0	3186	3247	3308	3368	3428	3487	3545	2	59	116	172	3030	3080	3140	3205	3271	3338	3406	3474	3543	13
JD 2445470.5	-158	-140	-120	-98	-76	-52	-28	-3	20	44	-217	-209	-197	-181	-161	-140	-115	-89	-61	-31	-0
1983 MAY 16.0	3167	3229	3290	3351	3410	3469	3526	3583	39	95	2958	3003	3060	3123	3189	3256	3323	3391	3460	3530	0
JD 2445460.5	-166	-148	-129	-107	-85	-61	-37	-13	10	33	-220	-211	-199	-183	-165	-144	-120	-94	-66	-36	-5
1983 MAY 6.0	3148	3211	3272	3332	3392	3450	3507	3563	19	73	2927	2980	3041	3105	3172	3239	3307	3376	3446	3516	3587
JD 2445450.5	-174	-157	-137	-116	-94	-71	-47	-23	-0	-227	-221	-213	-201	-187	-169	-148	-125	-99	-71	-41	0
1983 APR 26.0	3129	3192	3253	3313	3372	3430	3487	3542	3597	2852	2900	2958	3021	3086	3153	3222	3291	3361	3431	3502	0
JD 2445440.5	-182	-164	-145	-125	-103	-80	-57	-34	-11	-228	-223	-215	-204	-190	-173	-153	-130	-105	-77	0	0
1983 APR 16.0	3109	3172	3233	3293	3352	3410	3466	3520	3574	2821	2875	2936	3000	3066	3134	3203	3273	3344	3416	0	0
JD 2445430.5	-189	-172	-153	-133	-112	-90	-68	-45	-230	-228	-224	-217	-207	-194	-178	-159	-136	-111	0	0	0
1983 APR 6.0	3088	3151	3213	3273	3331	3388	3443	3497	2743	2792	2850	2912	2977	3044	3113	3184	3255	3327	0	0	0
JD 2445420.5	-196	-179	-162	-142	-122	-100	-79	-57	-229	-228	-225	-220	-211	-199	-183	-164	-142	0	0	0	0
1983 MAR 27.0	3067	3130	3191	3251	3309	3365	3419	3472	2711	2765	2824	2887	2953	3021	3092	3164	3236	0	0	0	0
JD 2445410.5	-202	-187	-170	-151	-131	-111	-90	-225	-228	-228	-227	-222	-214	-203	-188	-170	0	0	0	0	0
1983 MAR 17.0	3044	3107	3168	3228	3285	3341	3394	2631	2680	2736	2796	2860	2927	2997	3069	3143	0	0	0	0	0
JD 2445400.5	-208	-194	-178	-160	-141	-122	0	-223	-226	-228	-228	-225	-218	-208	-194	0	0	0	0	0	0
1983 MAR 7.0	3021	3084	3145	3203	3260	3315	0	2597	2649	2705	2766	2832	2900	2972	3046	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5	JD2445240.5	JD2445280.5	JD2445320.5	JD2445360.5
1982 AUG 19.0	1982 SEP 28.0	1982 NOV 7.0	1982 DEC 17.0	1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E15

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5	59	73	86	98	111	123	135	147	159	171	182	194	204	212	215	218	210	188	160	135	113
1983 JUL 5.0	224	239	256	275	296	319	345	372	401	433	467	503	541	703	772	904	1068	1222	1345	1437	1507
JD 2445510.5	47	60	73	86	98	111	124	136	149	161	174	186	208	209	217	219	206	183	159	138	119
1983 JUN 25.0	187	202	220	240	262	286	312	339	369	402	436	473	653	691	799	956	1118	1254	1358	1436	1495
JD 2445500.5	35	47	60	73	86	99	112	125	138	151	165	178	202	211	221	218	202	181	161	142	126
1983 JUN 15.0	150	166	185	206	228	252	279	307	338	371	406	444	623	703	845	1009	1157	1274	1361	1427	1478
JD 2445490.5	21	34	46	59	73	86	100	113	127	141	155	196	201	216	223	217	200	182	164	148	135
1983 JUN 5.0	113	131	150	171	194	220	247	276	307	341	378	569	619	739	899	1056	1185	1282	1356	1412	1457
JD 2445480.5	8	20	33	46	59	73	87	102	116	131	146	190	205	221	225	215	200	184	169	156	145
1983 MAY 26.0	77	95	115	137	161	187	215	245	278	312	350	547	640	789	951	1091	1200	1281	1344	1392	1432
JD 2445470.5	-6	6	19	32	46	60	75	90	105	121	180	192	213	226	225	215	201	188	175	164	155
1983 MAY 16.0	41	60	81	104	129	155	184	215	248	284	488	552	684	845	994	1113	1203	1272	1325	1368	1404
JD 2445460.5	-20	-8	4	18	32	47	62	78	94	110	176	199	221	229	225	215	204	193	183	173	165
1983 MAY 6.0	5	25	47	71	96	124	154	186	220	257	476	585	739	893	1022	1122	1197	1256	1302	1340	1372
JD 2445450.5	-35	-22	-9	4	18	33	49	66	83	162	181	209	227	231	226	217	208	199	191	183	0
1983 APR 26.0	3569	3590	13	38	64	93	124	157	193	412	494	635	792	929	1037	1120	1184	1234	1275	1309	0
JD 2445440.5	-49	-37	-23	-9	5	20	37	54	72	162	192	219	231	232	227	220	213	206	199	0	0
1983 APR 16.0	3533	3556	3579	5	33	63	95	130	167	414	537	691	834	950	1040	1109	1163	1208	1244	0	0
JD 2445430.5	-64	-51	-38	-23	-8	7	25	43	143	172	205	226	234	233	229	224	218	212	0	0	0
1983 APR 6.0	3498	3521	3546	3573	2	34	67	103	344	446	592	738	861	957	1032	1090	1138	1177	0	0	0
JD 2445420.5	-78	-65	-51	-37	-21	-4	13	32	150	186	215	230	235	235	232	228	223	0	0	0	0
1983 MAR 27.0	3463	3487	3513	3542	3572	5	40	78	363	497	643	771	873	953	1016	1066	1108	0	0	0	0
JD 2445410.5	-92	-79	-65	-50	-34	-16	1	127	164	199	222	233	236	236	234	231	0	0	0	0	0
1983 MAR 17.0	3428	3454	3481	3511	3543	3578	15	288	407	550	682	789	873	939	993	1037	0	0	0	0	0
JD 2445400.5	-106	-92	-78	-63	-46	-28	0	139	179	209	226	234	237	237	237	0	0	0	0	0	0
1983 MAR 7.0	3393	3421	3450	3481	3515	3552	0	323	460	593	704	792	862	918	965	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5 1982 AUG 19.0 | JD2445240.5 1982 SEP 28.0 | JD2445280.5 1982 NOV 7.0 | JD2445320.5 1982 DEC 17.0 | JD2445360.5 1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E15

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5 1983 JUL 5.0	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564
JD 2445510.5 1983 JUN 25.0	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562
JD 2445500.5 1983 JUN 15.0	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555
JD 2445490.5 1983 JUN 5.0	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543
JD 2445480.5 1983 MAY 26.0	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527
JD 2445470.5 1983 MAY 16.0	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508
JD 2445460.5 1983 MAY 6.0	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485
JD 2445450.5 1983 APR 26.0	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	0	
JD 2445440.5 1983 APR 16.0	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	0	0	
JD 2445430.5 1983 APR 6.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	0	0	0	
JD 2445420.5 1983 MAR 27.0	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	0	0	0	0	
JD 2445410.5 1983 MAR 17.0	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	0	0	0	0	0
JD 2445400.5 1983 MAR 7.0	2292	2292	2292	2292	2292	2292	0	2292	2292	2292	2292	2292	2292	2292	2292	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5 1982 AUG 19.0 | JD2445240.5 1982 SEP 28.0 | JD2445280.5 1982 NOV 7.0 | JD2445320.5 1982 DEC 17.0 | JD2445360.5 1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E15

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
1983 JUL 5.0	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
JD 2445510.5	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
1983 JUN 25.0	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2445500.5	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
1983 JUN 15.0	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
JD 2445490.5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1983 JUN 5.0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
JD 2445480.5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
1983 MAY 26.0	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
JD 2445470.5	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
1983 MAY 16.0	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
JD 2445460.5	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
1983 MAY 6.0	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
JD 2445450.5	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	0
1983 APR 26.0	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	0
JD 2445440.5	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	0	0
1983 APR 16.0	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	0	0
JD 2445430.5	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	0	0	0
1983 APR 6.0	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	0	0	0
JD 2445420.5	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	0	0	0	0
1983 MAR 27.0	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	0	0	0	0
JD 2445410.5	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	0	0	0	0	0
1983 MAR 17.0	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	0	0	0	0	0
JD 2445400.5	151	151	151	151	151	151	0	151	151	151	151	151	151	151	151	0	0	0	0	0	0
1983 MAR 7.0	218	218	218	218	218	218	0	218	218	218	218	218	218	218	218	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5 1982 AUG 19.0 — JD2445240.5 1982 SEP 28.0 — JD2445280.5 1982 NOV 7.0 — JD2445320.5 1982 DEC 17.0 — JD2445360.5 1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E15

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5	1226	1129	1033	935	837	739	640	541	441	340	239	138	38	3533	3432	3330	3228	3127	3026	2925	2824
1983 JUL 5.0	950	1022	1093	1163	1232	1300	1367	1435	1502	1569	1637	1705	1774	-1718	-1621	-1552	-1499	-1455	-1413	-1373	-1332
JD 2445510.5	1176	1080	983	886	788	689	590	491	391	290	189	88	3583	3484	3382	3280	3179	3077	2976	2875	2775
1983 JUN 25.0	988	1060	1130	1199	1267	1334	1402	1468	1535	1603	1670	1739	-1777	-1669	-1589	-1531	-1484	-1441	-1400	-1359	-1318
JD 2445500.5	1126	1029	932	835	737	639	540	440	340	240	139	38	3535	3433	3332	3230	3128	3026	2925	2824	2724
1983 JUN 15.0	1028	1098	1167	1235	1303	1370	1436	1503	1569	1637	1705	1773	-1723	-1631	-1565	-1514	-1469	-1427	-1386	-1345	-1303
JD 2445490.5	1074	978	881	784	686	587	488	389	289	188	87	3584	3484	3382	3280	3178	3077	2975	2874	2773	2673
1983 JUN 5.0	1067	1136	1205	1272	1339	1405	1471	1537	1604	1671	1740	-1780	-1676	-1600	-1545	-1498	-1455	-1413	-1371	-1329	-1287
JD 2445480.5	1022	926	829	731	634	535	436	337	237	136	35	3533	3432	3330	3228	3126	3024	2923	2822	2721	2621
1983 MAY 26.0	1106	1175	1242	1309	1375	1441	1507	1573	1639	1707	1775	-1725	-1638	-1576	-1527	-1482	-1440	-1397	-1355	-1312	-1270
JD 2445470.5	969	872	776	678	580	482	383	283	183	83	3581	3480	3379	3277	3175	3073	2971	2870	2769	2668	2567
1983 MAY 16.0	1146	1213	1280	1346	1412	1477	1542	1608	1675	1743	-1778	-1679	-1609	-1556	-1510	-1466	-1423	-1381	-1338	-1294	-1251
JD 2445460.5	915	818	721	624	526	428	329	229	129	29	3528	3426	3325	3223	3121	3019	2917	2816	2714	2614	2513
1983 MAY 6.0	1186	1252	1318	1383	1448	1513	1579	1644	1711	1780	-1723	-1644	-1585	-1537	-1492	-1449	-1406	-1363	-1319	-1275	-1231
JD 2445450.5	860	763	666	569	471	373	274	174	74	3574	3473	3371	3270	3168	3066	2964	2862	2761	2659	2559	0
1983 APR 26.0	1225	1291	1356	1421	1485	1550	1615	1681	1749	-1771	-1680	-1616	-1564	-1519	-1475	-1431	-1387	-1343	-1299	-1255	0
JD 2445440.5	804	707	610	513	415	317	218	118	18	3518	3417	3315	3214	3112	3010	2908	2806	2705	2603	0	0
1983 APR 16.0	1265	1330	1395	1459	1523	1587	1653	1719	1787	-1719	-1647	-1592	-1545	-1500	-1456	-1412	-1368	-1323	-1278	0	0
JD 2445430.5	747	650	554	456	358	260	161	61	3561	3461	3360	3258	3157	3055	2953	2851	2749	2648	0	0	0
1983 APR 6.0	1305	1369	1433	1497	1561	1625	1691	1758	-1766	-1679	-1620	-1571	-1525	-1480	-1436	-1391	-1346	-1301	0	0	0
JD 2445420.5	689	593	496	398	301	202	103	6	3503	3403	3302	3200	3099	2997	2895	2793	2691	0	0	0	0
1983 MAR 27.0	1345	1408	1472	1535	1599	1664	1729	1796	-1713	-1648	-1596	-1550	-1505	-1460	-1415	-1370	-1324	0	0	0	0
JD 2445410.5	630	534	437	340	242	143	45	3544	3445	3344	3243	3142	3040	2938	2836	2734	0	0	0	0	0
1983 MAR 17.0	1384	1448	1511	1574	1638	1703	1769	-1748	-1677	-1622	-1574	-1528	-1483	-1438	-1392	-1346	0	0	0	0	0
JD 2445400.5	571	474	377	280	182	84	0	3485	3385	3284	3183	3082	2980	2879	2777	0	0	0	0	0	0
1983 MAR 7.0	1424	1487	1550	1613	1677	1742	0	-1706	-1648	-1598	-1551	-1506	-1460	-1415	-1369	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5 1982 AUG 19.0 | JD2445240.5 1982 SEP 28.0 | JD2445280.5 1982 NOV 7.0 | JD2445320.5 1982 DEC 17.0 | JD2445360.5 1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E15

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5	138	126	119	116	117	121	129	143	167	208	287	488	1800	999	401	256	192	158	138	126	119
1983 JUL 5.0	480	521	566	614	665	718	771	824	874	919	957	985	999	984	925	867	830	813	815	832	866
JD 2445510.5	116	108	104	103	105	111	120	137	164	213	318	674	3644	513	278	195	154	130	116	108	104
1983 JUN 25.0	495	538	585	634	686	740	794	846	895	937	971	993	999	959	898	852	828	823	836	864	909
JD 2445500.5	97	92	89	90	93	99	110	128	160	220	372	1353	790	312	198	148	122	106	97	91	89
1983 JUN 15.0	512	557	605	656	709	763	817	868	915	955	984	999	985	930	877	845	834	840	864	904	962
JD 2445490.5	78	75	74	76	80	87	99	119	154	231	490	2759	370	201	141	111	94	84	78	75	74
1983 JUN 5.0	530	576	626	679	733	788	841	891	935	970	993	999	960	904	865	846	847	865	900	952	1026
JD 2445480.5	60	59	59	61	66	73	85	106	146	249	955	505	203	129	97	80	70	63	60	59	59
1983 MAY 26.0	549	598	649	703	758	813	865	913	954	983	999	985	933	886	861	855	868	897	944	1012	1105
JD 2445470.5	42	42	43	46	50	57	68	89	134	293	1300	203	112	79	62	53	47	44	42	42	43
1983 MAY 16.0	570	620	673	728	784	838	889	934	970	993	999	960	910	877	865	872	896	938	999	1085	1201
JD 2445460.5	25	25	26	28	31	37	46	64	112	498	198	84	54	41	34	29	27	25	25	25	26
1983 MAY 6.0	593	645	699	755	810	864	912	954	984	999	983	935	895	877	878	897	933	989	1066	1174	1321
JD 2445450.5	7	7	8	9	10	12	16	24	56	158	33	19	13	11	9	8	8	7	7	8	0
1983 APR 26.0	617	670	726	782	837	889	935	971	994	998	959	915	890	886	899	930	980	1051	1149	1283	0
JD 2445440.5	11	11	12	14	16	21	29	53	339	75	34	23	17	14	13	12	11	11	11	0	0
1983 APR 16.0	643	698	754	810	864	914	956	986	1000	980	936	905	895	903	929	973	1037	1127	1250	0	0
JD 2445430.5	30	32	35	41	50	66	105	272	430	121	71	52	42	36	32	30	29	29	0	0	0
1983 APR 6.0	670	726	783	839	891	938	974	996	995	957	922	905	908	929	967	1025	1107	1220	0	0	0
JD 2445420.5	51	55	62	74	95	137	264	5341	282	140	95	74	62	55	50	48	47	0	0	0	0
1983 MAR 27.0	699	756	813	868	918	959	988	1000	976	939	917	915	930	963	1015	1090	1193	0	0	0	0
JD 2445410.5	73	81	95	117	160	264	841	676	244	151	112	91	79	72	67	66	0	0	0	0	0
1983 MAR 17.0	729	787	843	896	942	978	998	991	956	930	922	933	961	1007	1075	1169	0	0	0	0	0
JD 2445400.5	99	113	136	177	266	569	0	416	226	159	125	106	94	87	84	0	0	0	0	0	0
1983 MAR 7.0	760	818	873	923	964	992	0	973	944	931	937	960	1001	1062	1148	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(.90)	(.80)	(.70)	(.60)	(.50)	(.40)	(.30)	(.20)	(.10)	(.0)

JD2445200.5	JD2445240.5	JD2445280.5	JD2445320.5	JD2445360.5
1982 AUG 19.0	1982 SEP 28.0	1982 NOV 7.0	1982 DEC 17.0	1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E15

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5		-654	-590	-522	-452	-382	-313	-246	-183	-127	-79	-40	-13	-0	13	61	112	151	179	198	210	216
1983 JUL 5.0		1866	1878	1888	1896	1903	1907	1908	1905	1899	1887	1871	1850	1823	1597	1570	-1574	-1626	-1737	-1935	-2287	-2995
JD 2445510.5		-624	-558	-490	-419	-349	-281	-216	-156	-103	-59	-26	-5	1	33	84	127	158	180	193	201	204
1983 JUN 25.0		1853	1863	1872	1880	1885	1887	1886	1882	1873	1859	1840	1816	1592	1564	-1555	-1590	-1682	-1852	-2155	-2750	-4277
JD 2445500.5		-593	-525	-456	-386	-317	-249	-187	-130	-81	-41	-14	-0	12	56	102	137	161	177	186	190	190
1983 JUN 15.0		1839	1849	1857	1863	1866	1867	1864	1857	1845	1829	1807	1780	1560	1542	-1560	-1634	-1778	-2039	-2542	-3752	-9806
JD 2445490.5		-560	-492	-422	-352	-283	-218	-158	-105	-60	-26	-5	1	31	77	116	143	161	171	177	178	175
1983 JUN 5.0		1825	1834	1840	1845	1847	1845	1840	1831	1817	1798	1773	1553	1532	-1536	-1591	-1713	-1938	-2365	-3340	-7267	-9999
JD 2445480.5		-526	-457	-387	-318	-251	-188	-130	-81	-42	-14	-0	12	53	94	124	144	157	163	165	163	158
1983 MAY 26.0		1811	1818	1824	1827	1826	1823	1815	1803	1787	1765	1737	1524	-1517	-1555	-1656	-1849	-2213	-3013	-5769	-9999	-9999
JD 2445470.5		-491	-421	-351	-283	-218	-158	-104	-59	-26	-5	1	31	72	105	128	142	150	153	152	147	139
1983 MAY 16.0		1796	1802	1806	1807	1805	1799	1789	1775	1755	1730	1515	1503	-1524	-1606	-1771	-2084	-2748	-4786	-9999	-9999	-9999
JD 2445460.5		-454	-385	-316	-249	-186	-129	-80	-40	-13	-0	13	51	86	112	128	137	141	141	137	129	118
1983 MAY 6.0		1781	1786	1788	1787	1783	1775	1762	1744	1722	1694	1491	-1500	-1563	-1703	-1972	-2530	-4098	-9999	-9999	-9999	-9999
JD 2445450.5		-417	-348	-280	-215	-155	-102	-57	-24	-4	2	31	67	95	114	125	130	130	127	120	110	0
1983 APR 26.0		1765	1768	1769	1766	1759	1749	1733	1713	1687	1481	-1480	-1526	-1644	-1876	-2350	-3593	-9999	-9999	-9999	-9999	0
JD 2445440.5		-380	-311	-244	-132	-125	-76	-38	-11	0	15	49	79	100	112	119	120	118	111	102	0	0
1983 APR 16.0		1749	1750	1749	1744	1735	1721	1703	1680	1651	-1464	-1495	-1593	-1793	-2199	-3209	-8647	-9999	-9999	-9999	0	0
JD 2445430.5		-341	-274	-209	-150	-97	-54	-21	-2	4	32	63	86	100	108	110	109	103	94	0	0	0
1983 APR 6.0		1732	1732	1728	1721	1709	1693	1671	1645	-1451	-1470	-1549	-1722	-2074	-2911	-6598	-9999	-9999	-9999	0	0	0
JD 2445420.5		-303	-237	-175	-119	-71	-34	-9	0	17	48	72	88	97	101	100	95	87	0	0	0	0
1983 MAR 27.0		1715	1712	1706	1696	1682	1663	1638	1609	-1450	-1513	-1662	-1967	-2674	-5372	-9999	-9999	-9999	0	0	0	0
JD 2445410.5		-265	-201	-142	-91	-48	-17	-1	6	33	58	76	86	91	91	88	80	0	0	0	0	0
1983 MAR 17.0		1697	1692	1683	1671	1653	1631	1604	-1435	-1482	-1610	-1878	-2484	-4569	-9999	-9999	-9999	0	0	0	0	0
JD 2445400.5		-228	-166	-111	-65	-29	-6	0	20	45	64	76	82	83	80	74	0	0	0	0	0	0
1983 MAR 7.0		1677	1670	1659	1644	1623	1598	0	-1458	-1567	-1802	-2329	-4005	-9999	-9999	-9999	0	0	0	0	0	0
	(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5 1982 AUG 19.0 | JD2445240.5 1982 SEP 28.0 | JD2445280.5 1982 NOV 7.0 | JD2445320.5 1982 DEC 17.0 | JD2445360.5 1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E15

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5	126	121	116	111	106	102	98	95	91	88	85	83	81	2250	1017	740	623	557	512	479	451
1983 JUL 5.0	198	191	184	177	170	164	157	152	146	140	135	130	125	272	264	254	243	232	220	208	196
JD 2445510.5	123	118	113	108	104	100	96	92	89	86	84	81	8462	1389	861	686	599	546	507	477	451
1983 JUN 25.0	193	186	179	172	165	159	153	147	141	136	131	126	273	266	256	246	235	223	211	199	186
JD 2445500.5	121	115	110	106	102	98	94	90	87	84	82	80	2366	1058	772	651	584	538	504	476	452
1983 JUN 15.0	188	180	173	167	160	154	148	142	137	131	126	121	267	259	249	237	226	214	201	189	176
JD 2445490.5	118	113	108	103	99	95	92	88	85	83	80	9321	1431	895	717	628	573	534	503	478	456
1983 JUN 5.0	182	175	168	162	155	149	143	138	132	127	122	268	261	251	240	229	217	204	192	179	166
JD 2445480.5	115	110	105	101	97	93	89	86	83	81	78	2371	1089	803	682	613	567	533	505	482	462
1983 MAY 26.0	177	170	163	157	150	144	138	133	127	122	117	262	253	243	231	219	207	194	182	168	155
JD 2445470.5	112	107	102	98	94	91	87	84	81	79	8177	1443	925	748	659	604	565	534	510	489	471
1983 MAY 16.0	172	165	158	152	145	139	134	128	123	118	263	255	245	234	222	210	197	184	171	157	143
JD 2445460.5	109	104	100	96	92	88	85	82	79	77	2268	1110	834	714	646	600	566	539	518	500	487
1983 MAY 6.0	166	160	153	147	140	135	129	123	118	113	257	247	236	225	212	200	187	173	160	145	131
JD 2445450.5	106	101	97	93	89	86	83	80	77	6006	1429	952	781	694	639	600	571	549	531	518	0
1983 APR 26.0	161	154	148	142	135	130	124	119	113	258	249	239	227	215	202	189	176	162	148	133	0
JD 2445440.5	103	99	94	91	87	84	80	78	75	2100	1124	867	750	683	638	606	582	564	552	0	0
1983 APR 16.0	156	149	143	136	130	125	119	114	109	251	241	230	217	205	192	178	164	150	135	0	0
JD 2445430.5	100	96	92	88	84	81	78	75	4285	1401	979	818	733	680	643	617	598	587	0	0	0
1983 APR 6.0	150	144	137	131	125	120	114	109	252	243	232	220	207	194	181	167	152	137	0	0	0
JD 2445420.5	97	93	89	85	82	79	76	73	1922	1137	903	792	727	684	655	635	625	0	0	0	0
1983 MAR 27.0	145	138	132	126	120	115	109	104	244	234	222	209	196	183	169	154	139	0	0	0	0
JD 2445410.5	94	90	86	83	79	76	73	3210	1375	1011	861	780	730	696	675	665	0	0	0	0	0
1983 MAR 17.0	139	133	127	121	115	110	104	246	236	224	211	198	185	171	156	141	0	0	0	0	0
JD 2445400.5	91	87	83	80	77	74	0	1777	1157	946	842	780	742	718	707	0	0	0	0	0	0
1983 MAR 7.0	134	128	122	116	110	104	0	237	226	213	200	187	173	158	143	0	0	0	0	0	0
(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5	JD2445240.5	JD2445280.5	JD2445320.5	JD2445360.5
1982 AUG 19.0	1982 SEP 28.0	1982 NOV 7.0	1982 DEC 17.0	1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26 E15

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5 1983 JUL 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445510.5 1983 JUN 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445500.5 1983 JUN 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445490.5 1983 JUN 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445480.5 1983 MAY 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445470.5 1983 MAY 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445460.5 1983 MAY 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2445450.5 1983 APR 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0
JD 2445440.5 1983 APR 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0
JD 2445430.5 1983 APR 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0
JD 2445420.5 1983 MAR 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0
JD 2445410.5 1983 MAR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0
JD 2445400.5 1983 MAR 7.0	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
	JD2445200.5 1982 AUG 19.0			JD2445240.5 1982 SEP 28.0				JD2445280.5 1982 NOV 7.0					JD2445320.5 1982 DEC 17.0				JD2445360.5 1983 JAN 26.0				

EARTH DEPARTURE OR ARRIVAL DATE

M26
E15

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5	1070	1206	1355	1517	1692	1879	2078	2288	2507	2736	2972	3214	3461	3032	2585	2320	2204	2194	2264	2401	2603
1983 JUL 5.0	954	1029	1113	1205	1306	1416	1534	1660	1794	1936	2085	2242	2405	1873	1463	1218	1143	1205	1368	1609	1916
JD 2445510.5	1121	1262	1416	1583	1763	1955	2159	2374	2598	2831	3072	3319	3294	2780	2437	2267	2225	2274	2399	2592	2857
1983 JUN 25.0	992	1072	1160	1257	1362	1476	1599	1730	1869	2015	2170	2332	2128	1663	1341	1200	1216	1352	1576	1874	2241
JD 2445500.5	1175	1321	1480	1653	1838	2035	2244	2464	2693	2931	3177	3429	3004	2581	2346	2263	2288	2397	2580	2838	3180
1983 JUN 15.0	1032	1117	1209	1311	1421	1540	1667	1803	1947	2099	2259	2427	1892	1495	1281	1244	1345	1549	1835	2195	2636
JD 2445490.5	1232	1383	1548	1726	1916	2119	2333	2558	2792	3036	3287	3249	2755	2445	2312	2307	2398	2568	2818	3154	3593
1983 JUN 5.0	1075	1164	1262	1368	1483	1607	1739	1880	2030	2188	2354	2139	1682	1390	1290	1350	1530	1801	2152	2587	3121
JD 2445480.5	1292	1449	1619	1802	1998	2206	2426	2656	2896	3145	3402	2958	2568	2375	2333	2401	2557	2797	3125	3559	4129
1983 MAY 26.0	1121	1214	1317	1428	1548	1677	1815	1962	2117	2282	2455	1898	1528	1358	1369	1519	1772	2113	2541	3069	3729
JD 2445470.5	1357	1519	1694	1883	2084	2298	2523	2759	3005	3260	3183	2719	2454	2367	2408	2548	2776	3096	3524	4087	4838
1983 MAY 16.0	1168	1267	1374	1491	1617	1751	1895	2048	2210	2382	2133	1696	1449	1404	1519	1751	2079	2498	3021	3674	4511
JD 2445460.5	1424	1592	1773	1968	2175	2394	2625	2868	3120	3382	2897	2555	2413	2422	2541	2756	3067	3487	4044	4788	5804
1983 MAY 6.0	1219	1322	1435	1557	1689	1830	1980	2139	2309	2489	1893	1567	1457	1530	1737	2050	2459	2975	3622	4452	5548
JD 2445450.5	1496	1669	1857	2057	2270	2496	2733	2982	3242	3097	2679	2473	2442	2538	2738	3039	3451	4000	4736	5745	0
1983 APR 26.0	1272	1381	1499	1627	1765	1912	2069	2237	2415	2111	1712	1530	1554	1732	2027	2426	2934	3574	4396	5486	0
JD 2445440.5	1571	1751	1944	2151	2370	2603	2847	3103	3371	2828	2550	2472	2540	2723	3011	3414	3955	4685	5686	0	0
1983 APR 16.0	1327	1442	1567	1701	1845	2000	2164	2340	2529	1884	1626	1593	1736	2012	2398	2897	3529	4346	5427	0	0
JD 2445430.5	1651	1837	2037	2250	2476	2715	2967	3232	2999	2647	2513	2549	2712	2987	3380	3913	4635	5627	0	0	0
1983 APR 6.0	1385	1506	1637	1779	1930	2092	2266	2452	2079	1744	1648	1752	2004	2376	2866	3491	4300	5373	0	0	0
JD 2445420.5	1735	1928	2134	2354	2588	2835	3096	3371	2765	2569	2565	2705	2965	3347	3872	4586	5569	0	0	0	0
1983 MAR 27.0	1446	1574	1712	1860	2020	2191	2375	2573	1887	1721	1779	2005	2361	2840	3458	4259	5325	0	0	0	0
JD 2445410.5	1824	2024	2237	2465	2707	2963	3234	2905	2640	2591	2704	2947	3318	3833	4539	5514	0	0	0	0	0
1983 MAR 17.0	1510	1645	1790	1947	2116	2297	2493	2050	1813	1819	2015	2353	2821	3431	4225	5283	0	0	0	0	0
JD 2445400.5	1918	2125	2346	2582	2833	3100	0	2729	2628	2709	2934	3292	3798	4496	5463	0	0	0	0	0	0
1983 MAR 7.0	1577	1720	1873	2039	2218	2411	0	1924	1873	2034	2353	2809	3410	4197	5247	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5	JD2445240.5	JD2445280.5	JD2445320.5	JD2445360.5
1982 AUG 19.0	1982 SEP 28.0	1982 NOV 7.0	1982 DEC 17.0	1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E15

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2445520.5	2023	2235	2468	2723	2998	3295	3612	3948	4302	4672	5057	5456	5866	4905	4048	3538	3347	3398	3632	4010	4518
1983 JUL 5.0	1226	1129	1033	935	837	739	640	541	441	340	239	138	38	3533	3432	3330	3228	3127	3026	2925	2824
JD 2445510.5	2113	2333	2576	2840	3125	3432	3758	4103	4467	4847	5242	5651	5422	4443	3778	3467	3441	3626	3975	4465	5098
1983 JUN 25.0	1176	1080	983	886	788	689	590	491	391	290	189	88	3583	3484	3382	3280	3179	3077	2976	2875	2775
JD 2445500.5	2207	2437	2690	2963	3259	3575	3911	4267	4640	5030	5436	5856	4896	4076	3627	3507	3634	3947	4415	5033	5817
1983 JUN 15.0	1126	1029	932	835	737	639	540	440	340	240	139	38	3535	3433	3332	3230	3128	3026	2925	2824	2724
JD 2445490.5	2307	2547	2810	3093	3399	3725	4072	4438	4822	5223	5641	5388	4437	3835	3602	3658	3928	4369	4970	5741	6714
1983 JUN 5.0	1074	978	881	784	686	587	488	389	289	188	87	3584	3484	3382	3280	3178	3077	2975	2874	2773	2673
JD 2445480.5	2413	2663	2936	3230	3546	3883	4241	4618	5013	5427	5858	4856	4096	3732	3703	3920	4330	4910	5666	6628	7858
1983 MAY 26.0	1022	926	829	731	634	535	436	337	237	136	35	3533	3432	3330	3228	3126	3024	2923	2822	2721	2621
JD 2445470.5	2525	2786	3069	3374	3701	4049	4418	4807	5215	5642	5315	4415	3903	3772	3927	4299	4855	5594	6545	7762	9348
1983 MAY 16.0	969	872	776	678	580	482	383	283	183	83	3581	3480	3379	3277	3175	3073	2971	2870	2769	2668	2567
JD 2445460.5	2643	2915	3209	3525	3864	4224	4605	5007	5429	5872	4790	4122	3870	3951	4278	4806	5526	6463	7666	9240	9999
1983 MAY 6.0	915	818	721	624	526	428	329	229	129	29	3528	3426	3325	3223	3121	3019	2917	2816	2714	2614	2513
JD 2445450.5	2767	3050	3356	3684	4035	4408	4803	5219	5657	5208	4391	4003	3996	4270	4766	5464	6384	7574	9132	9999	0
1983 APR 26.0	860	763	666	569	471	373	274	174	74	3574	3473	3371	3270	3168	3066	2964	2862	2761	2659	2559	0
JD 2445440.5	2898	3193	3511	3852	4216	4602	5011	5444	5900	4712	4176	4065	4277	4735	5409	6311	7484	9031	9999	0	0
1983 APR 16.0	804	707	610	513	415	317	218	118	18	3518	3417	3315	3214	3112	3010	2908	2806	2705	2603	0	0
JD 2445430.5	3036	3343	3674	4028	4406	4808	5233	5684	5078	4391	4161	4301	4716	5363	6245	7404	8935	9999	0	0	0
1983 APR 6.0	747	650	554	456	358	260	161	61	3561	3461	3360	3258	3157	3055	2953	2851	2749	2648	0	0	0
JD 2445420.5	3182	3502	3846	4215	4608	5026	5471	5944	4652	4289	4344	4709	5326	6187	7330	8845	9999	0	0	0	0
1983 MAR 27.0	689	593	496	398	301	202	103	6	3503	3403	3302	3200	3099	2997	2895	2793	2691	0	0	0	0
JD 2445410.5	3335	3669	4028	4412	4822	5260	5727	4955	4452	4410	4718	5300	6139	7264	8764	9999	0	0	0	0	0
1983 MAR 17.0	630	534	437	340	242	143	45	3544	3445	3344	3243	3142	3040	2938	2836	2734	0	0	0	0	0
JD 2445400.5	3496	3845	4219	4621	5051	5511	0	4652	4501	4743	5287	6101	7208	8693	9999	0	0	0	0	0	0
1983 MAR 7.0	571	474	377	280	182	84	0	3485	3385	3284	3183	3082	2980	2879	2777	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2445200.5 1982 AUG 19.0 | JD2445240.5 1982 SEP 28.0 | JD2445280.5 1982 NOV 7.0 | JD2445320.5 1982 DEC 17.0 | JD2445360.5 1983 JAN 26.0

EARTH DEPARTURE OR ARRIVAL DATE

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445500.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671613	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.656	DEGREES
MEAN ANOM. AT EPOCH	=	160.065	DEGREES
DATE OF NODAL PASSAGE	=	2445601.101	(J.D.)
OBLIQUITY OF EQUATOR	=	23.441	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445500.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09339022	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.430	DEGREES
ARG. OF PERIHELION	=	286.325	DEGREES
MEAN ANOM. AT EPOCH	=	91.942	DEGREES
DATE OF NODAL PASSAGE	=	2445446.447	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.075	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E16

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	1072	1168	1291	1449	1652	1918	2276	0	0	0	0	0	0	0	0	0	0	0	2277	1920	1657
1983 JUL 5.0	735	863	1016	1202	1430	1721	2102	0	0	0	0	0	0	0	0	0	0	0	2199	1814	1520
JD 2445510.5	1162	1284	1440	1642	1907	2264	0	0	0	0	0	0	0	0	0	0	0	2264	1908	1646	1447
1983 JUN 25.0	847	999	1183	1410	1700	2079	0	0	0	0	0	0	0	0	0	0	0	2200	1817	1525	1294
JD 2445500.5	1275	1430	1630	1894	2249	0	0	0	0	0	0	0	0	0	0	0	0	2250	1895	1633	1434	1282
1983 JUN 15.0	981	1164	1390	1678	2056	0	0	0	0	0	0	0	0	0	0	0	0	2199	1819	1528	1299	1112
JD 2445490.5	1419	1618	1879	2233	0	0	0	0	0	0	0	0	0	0	0	0	0	2235	1881	1620	1421	1268	1149
1983 JUN 5.0	1146	1371	1657	2033	0	0	0	0	0	0	0	0	0	0	0	0	0	2196	1818	1530	1302	1117	962
JD 2445480.5	1604	1864	2215	0	0	0	0	0	0	0	0	0	0	0	0	2218	1866	1606	1407	1253	1134	1042
1983 MAY 26.0	1351	1636	2010	0	0	0	0	0	0	0	0	0	0	0	0	2191	1816	1530	1304	1120	966	837
JD 2445470.5	1847	2197	0	0	0	0	0	0	0	0	0	0	0	0	2200	1850	1591	1393	1239	1119	1025	956
1983 MAY 16.0	1615	1987	0	0	0	0	0	0	0	0	0	0	0	0	2184	1812	1529	1305	1122	970	841	731
JD 2445460.5	2177	0	0	0	0	0	0	0	0	0	0	0	0	2181	1833	1575	1378	1224	1103	1009	937	887
1983 MAY 6.0	1965	0	0	0	0	0	0	0	0	0	0	0	0	2176	1807	1525	1303	1123	972	844	735	642
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	0	2161	1816	1559	1362	1209	1088	993	920	866	834
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	0	2164	1799	1520	1300	1122	973	846	738	645	569
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	0	2140	1797	1542	1347	1194	1074	978	903	847	810	795
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	0	2151	1789	1513	1296	1119	972	847	740	647	570	509
JD 2445430.5	0	0	0	0	0	0	0	0	0	0	2118	1778	1525	1331	1179	1059	963	887	829	789	768	770
1983 APR 6.0	0	0	0	0	0	0	0	0	0	0	2136	1778	1505	1289	1115	969	846	740	649	571	508	466
JD 2445420.5	0	0	0	0	0	0	0	0	0	2095	1759	1508	1315	1164	1044	948	872	813	770	745	739	762
1983 MAR 27.0	0	0	0	0	0	0	0	0	0	2119	1764	1494	1281	1109	966	844	739	649	571	507	461	443
JD 2445410.5	0	0	0	0	0	0	0	0	2073	1739	1490	1299	1149	1030	934	857	797	752	723	713	726	774
1983 MAR 17.0	0	0	0	0	0	0	0	0	2101	1750	1483	1272	1102	960	840	737	648	571	506	457	431	444
JD 2445400.5	0	0	0	0	0	0	0	2049	1719	1473	1283	1135	1016	920	843	782	736	704	689	694	729	812
1983 MAR 7.0	0	0	0	0	0	0	0	2081	1733	1469	1261	1093	954	835	734	646	569	505	454	422	423	478
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5 1983 MAR 7.0 | JD2445440.5 1983 APR 16.0 | JD2445480.5 1983 MAY 26.0 | JD2445520.5 1983 JUL 5.0 | JD2445560.5 1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E16

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	17	48	77	106	133	158	179	0	0	0	0	0	0	0	0	0	0	0	-119	-92	-64
1983 JUL 5.0	57	127	199	272	347	424	503	0	0	0	0	0	0	0	0	0	0	0	3297	3369	3438
JD 2445510.5	14	45	75	104	131	156	0	0	0	0	0	0	0	0	0	0	0	-149	-124	-97	-69
1983 JUN 25.0	47	117	189	262	337	414	0	0	0	0	0	0	0	0	0	0	0	3210	3284	3355	3424
JD 2445500.5	11	42	72	101	129	0	0	0	0	0	0	0	0	0	0	0	-175	-153	-128	-102	-75
1983 JUN 15.0	36	107	178	252	327	0	0	0	0	0	0	0	0	0	0	0	3121	3197	3271	3342	3411
JD 2445490.5	7	38	68	98	0	0	0	0	0	0	0	0	0	0	0	-196	-178	-156	-133	-107	-80
1983 JUN 5.0	25	96	168	241	0	0	0	0	0	0	0	0	0	0	0	3030	3109	3185	3258	3329	3398
JD 2445480.5	3	34	65	0	0	0	0	0	0	0	0	0	0	0	-213	-199	-181	-160	-137	-112	-85
1983 MAY 26.0	13	84	156	0	0	0	0	0	0	0	0	0	0	0	2937	3018	3097	3172	3246	3316	3385
JD 2445470.5	-0	30	0	0	0	0	0	0	0	0	0	0	0	-225	-215	-202	-185	-164	-142	-117	-91
1983 MAY 16.0	0	72	0	0	0	0	0	0	0	0	0	0	0	2843	2926	3006	3084	3160	3233	3304	3372
JD 2445460.5	-5	0	0	0	0	0	0	0	0	0	0	0	-232	-227	-218	-205	-188	-169	-147	-122	-97
1983 MAY 6.0	3587	0	0	0	0	0	0	0	0	0	0	0	2748	2832	2914	2994	3072	3148	3221	3291	3360
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	-232	-233	-228	-220	-208	-192	-173	-152	-128	-103
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	2652	2736	2820	2902	2982	3060	3135	3209	3279	3348
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	-227	-233	-234	-230	-223	-211	-196	-178	-157	-134	-109
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	2556	2641	2725	2808	2890	2970	3048	3123	3196	3268	3337
JD 2445430.5	0	0	0	0	0	0	0	0	0	-217	-228	-234	-235	-232	-225	-215	-200	-183	-162	-140	-115
1983 APR 6.0	0	0	0	0	0	0	0	0	0	2462	2545	2629	2713	2796	2877	2957	3035	3111	3185	3257	3327
JD 2445420.5	0	0	0	0	0	0	0	0	-202	-217	-228	-234	-237	-235	-228	-218	-205	-188	-168	-146	-122
1983 MAR 27.0	0	0	0	0	0	0	0	0	2369	2451	2533	2617	2700	2783	2865	2945	3023	3099	3174	3246	3317
JD 2445410.5	0	0	0	0	0	0	0	-183	-201	-217	-228	-235	-238	-237	-232	-222	-209	-193	-174	-153	-130
1983 MAR 17.0	0	0	0	0	0	0	0	2277	2357	2439	2522	2605	2688	2770	2852	2932	3011	3088	3163	3236	3306
JD 2445400.5	0	0	0	0	0	0	-161	-182	-201	-216	-228	-236	-240	-240	-235	-227	-215	-199	-181	-160	-139
1983 MAR 7.0	0	0	0	0	0	0	2187	2266	2346	2427	2509	2592	2675	2758	2839	2920	2999	3077	3153	3227	3294
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5 1983 MAR 7.0 | JD2445440.5 1983 APR 16.0 | JD2445480.5 1983 MAY 26.0 | JD2445520.5 1983 JUL 5.0 | JD2445560.5 1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E16

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	113	95	80	67	56	47	38	0	0	0	0	0	0	0	0	0	0	0	46	55	66
1983 JUL 5.0	1507	1560	1602	1637	1666	1691	1713	0	0	0	0	0	0	0	0	0	0	0	110	133	159
JD 2445510.5	119	104	90	79	69	60	0	0	0	0	0	0	0	0	0	0	0	24	33	44	56
1983 JUN 25.0	1495	1541	1579	1610	1636	1659	0	0	0	0	0	0	0	0	0	0	0	61	83	108	137
JD 2445500.5	126	113	102	92	83	0	0	0	0	0	0	0	0	0	0	0	1	10	20	32	46
1983 JUN 15.0	1478	1519	1552	1581	1605	0	0	0	0	0	0	0	0	0	0	0	11	32	56	84	117
JD 2445490.5	135	124	113	104	0	0	0	0	0	0	0	0	0	0	0	-21	-12	-2	8	22	38
1983 JUN 5.0	1457	1493	1523	1550	0	0	0	0	0	0	0	0	0	0	0	3560	3581	5	31	62	100
JD 2445480.5	145	135	126	0	0	0	0	0	0	0	0	0	0	0	-44	-35	-26	-15	-2	12	31
1983 MAY 26.0	1432	1464	1492	0	0	0	0	0	0	0	0	0	0	0	3509	3529	3552	3578	8	43	87
JD 2445470.5	155	146	0	0	0	0	0	0	0	0	0	0	0	-67	-59	-50	-39	-27	-13	3	26
1983 MAY 16.0	1404	1433	0	0	0	0	0	0	0	0	0	0	0	3456	3477	3499	3524	3553	3587	28	80
JD 2445460.5	165	0	0	0	0	0	0	0	0	0	0	0	-90	-82	-73	-64	-52	-39	-23	-2	23
1983 MAY 6.0	1372	0	0	0	0	0	0	0	0	0	0	0	3402	3422	3445	3469	3498	3530	3569	18	79
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	-112	-105	-97	-87	-77	-64	-49	-31	-6	25
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	3346	3367	3389	3414	3441	3473	3510	3556	14	88
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	-133	-126	-119	-110	-101	-89	-76	-58	-36	-7	30
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	3288	3309	3332	3356	3384	3415	3451	3495	3549	18	110
JD 2445430.5	0	0	0	0	0	0	0	0	0	-153	-147	-140	-133	-124	-113	-101	-85	-65	-39	-4	42
1983 APR 6.0	0	0	0	0	0	0	0	0	0	3228	3250	3273	3297	3325	3356	3391	3433	3485	3550	34	145
JD 2445420.5	0	0	0	0	0	0	0	0	-172	-166	-160	-153	-145	-136	-125	-111	-93	-69	-38	4	59
1983 MAR 27.0	0	0	0	0	0	0	0	0	3166	3188	3212	3237	3264	3295	3330	3371	3421	3483	3562	65	196
JD 2445410.5	0	0	0	0	0	0	0	-188	-184	-179	-173	-166	-157	-147	-135	-119	-98	-70	-31	19	80
1983 MAR 17.0	0	0	0	0	0	0	0	3101	3124	3148	3174	3202	3233	3267	3308	3356	3416	3490	3587	110	256
JD 2445400.5	0	0	0	0	0	0	-202	-199	-195	-190	-184	-177	-168	-157	-143	-125	-100	-66	-19	39	99
1983 MAR 7.0	0	0	0	0	0	0	3034	3058	3083	3109	3137	3168	3203	3243	3291	3348	3420	3511	27	167	314
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5 1983 MAR 7.0 | JD2445440.5 1983 APR 16.0 | JD2445480.5 1983 MAY 26.0 | JD2445520.5 1983 JUL 5.0 | JD2445560.5 1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E16

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5 1983 JUL 5.0	2564	2564	2564	2564	2564	2564	2564	0	0	0	0	0	0	0	0	0	0	0	2564	2564	2564
JD 2445510.5 1983 JUN 25.0	2562	2562	2562	2562	2562	2562	0	0	0	0	0	0	0	0	0	0	0	2562	2562	2562	2562
JD 2445500.5 1983 JUN 15.0	2555	2555	2555	2555	2555	0	0	0	0	0	0	0	0	0	0	0	2555	2555	2555	2555	2555
JD 2445490.5 1983 JUN 5.0	2543	2543	2543	2543	0	0	0	0	0	0	0	0	0	0	0	2543	2543	2543	2543	2543	2543
JD 2445480.5 1983 MAY 26.0	2527	2527	2527	0	0	0	0	0	0	0	0	0	0	0	2527	2527	2527	2527	2527	2527	2527
JD 2445470.5 1983 MAY 16.0	2508	2508	0	0	0	0	0	0	0	0	0	0	0	2508	2508	2508	2508	2508	2508	2508	2508
JD 2445460.5 1983 MAY 6.0	2485	0	0	0	0	0	0	0	0	0	0	0	2485	2485	2485	2485	2485	2485	2485	2485	2485
JD 2445450.5 1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458
JD 2445440.5 1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429
JD 2445430.5 1983 APR 6.0	0	0	0	0	0	0	0	0	0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398
JD 2445420.5 1983 MAR 27.0	0	0	0	0	0	0	0	0	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364
JD 2445410.5 1983 MAR 17.0	0	0	0	0	0	0	0	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329
JD 2445400.5 1983 MAR 7.0	0	0	0	0	0	0	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292

(FLT T)(0)(10)(20)(30)(40)(50)(60)(70)(80)(90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)

JD2445400.5 1983 MAR 7.0 | JD2445440.5 1983 APR 16.0 | JD2445480.5 1983 MAY 26.0 | JD2445520.5 1983 JUL 5.0 | JD2445560.5 1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E16

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	56	56	56	56	56	56	56	0	0	0	0	0	0	0	0	0	0	0	56	56	56
1983 JUL 5.0	86	86	86	86	86	86	86	0	0	0	0	0	0	0	0	0	0	0	86	86	86
JD 2445510.5	38	38	38	38	38	38	0	0	0	0	0	0	0	0	0	0	0	38	38	38	38
1983 JUN 25.0	58	58	58	58	58	58	0	0	0	0	0	0	0	0	0	0	0	58	58	58	58
JD 2445500.5	20	20	20	20	20	0	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20
1983 JUN 15.0	31	31	31	31	31	0	0	0	0	0	0	0	0	0	0	0	31	31	31	31	31
JD 2445490.5	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4
1983 JUN 5.0	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	6
JD 2445480.5	15	15	15	0	0	0	0	0	0	0	0	0	0	0	15	15	15	15	15	15	15
1983 MAY 26.0	22	22	22	0	0	0	0	0	0	0	0	0	0	0	22	22	22	22	22	22	22
JD 2445470.5	32	32	0	0	0	0	0	0	0	0	0	0	0	32	32	32	32	32	32	32	32
1983 MAY 16.0	48	48	0	0	0	0	0	0	0	0	0	0	0	48	48	48	48	48	48	48	48
JD 2445460.5	49	0	0	0	0	0	0	0	0	0	0	0	49	49	49	49	49	49	49	49	49
1983 MAY 6.0	73	0	0	0	0	0	0	0	0	0	0	0	73	73	73	73	73	73	73	73	73
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	67	67	67	67	67	67	67	67	67	67
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	98	98	98	98	98	98	98	98	98	98
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	84	84	84	84	84	84	84	84	84	84	84
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	123	123	123	123	123	123	123	123	123	123	123
JD 2445430.5	0	0	0	0	0	0	0	0	0	101	101	101	101	101	101	101	101	101	101	101	101
1983 APR 6.0	0	0	0	0	0	0	0	0	0	147	147	147	147	147	147	147	147	147	147	147	147
JD 2445420.5	0	0	0	0	0	0	0	0	117	117	117	117	117	117	117	117	117	117	117	117	117
1983 MAR 27.0	0	0	0	0	0	0	0	0	171	171	171	171	171	171	171	171	171	171	171	171	171
JD 2445410.5	0	0	0	0	0	0	0	134	134	134	134	134	134	134	134	134	134	134	134	134	134
1983 MAR 17.0	0	0	0	0	0	0	0	195	195	195	195	195	195	195	195	195	195	195	195	195	195
JD 2445400.5	0	0	0	0	0	0	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
1983 MAR 7.0	0	0	0	0	0	0	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5 1983 MAR 7.0 — JD2445440.5 1983 APR 16.0 — JD2445480.5 1983 MAY 26.0 — JD2445520.5 1983 JUL 5.0 — JD2445560.5 1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E16

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	2824	2725	2625	2527	2429	2331	2234	0	0	0	0	0	0	0	0	0	0	0	2516	2614	2711
1983 JUL 5.0	-1332	-1292	-1251	-1210	-1168	-1126	-1084	0	0	0	0	0	0	0	0	0	0	0	-1281	-1335	-1391
JD 2445510.5	2775	2675	2576	2477	2379	2281	0	0	0	0	0	0	0	0	0	0	0	2470	2566	2663	2761
1983 JUN 25.0	-1318	-1277	-1236	-1194	-1152	-1109	0	0	0	0	0	0	0	0	0	0	0	-1259	-1313	-1368	-1423
JD 2445500.5	2724	2624	2525	2426	2328	0	0	0	0	0	0	0	0	0	0	0	2424	2520	2617	2714	2811
1983 JUN 15.0	-1303	-1261	-1219	-1177	-1134	0	0	0	0	0	0	0	0	0	0	0	-1237	-1291	-1345	-1401	-1457
JD 2445490.5	2673	2573	2474	2375	0	0	0	0	0	0	0	0	0	0	0	2379	2475	2571	2668	2765	2863
1983 JUN 5.0	-1287	-1244	-1202	-1159	0	0	0	0	0	0	0	0	0	0	0	-1215	-1269	-1324	-1379	-1435	-1492
JD 2445480.5	2621	2521	2421	0	0	0	0	0	0	0	0	0	0	0	2336	2432	2528	2624	2720	2817	2915
1983 MAY 26.0	-1270	-1226	-1183	0	0	0	0	0	0	0	0	0	0	0	-1194	-1248	-1302	-1357	-1413	-1471	-1529
JD 2445470.5	2567	2468	0	0	0	0	0	0	0	0	0	0	0	2294	2389	2485	2581	2677	2773	2871	2968
1983 MAY 16.0	-1251	-1207	0	0	0	0	0	0	0	0	0	0	0	-1174	-1228	-1282	-1337	-1392	-1449	-1507	-1566
JD 2445460.5	2513	0	0	0	0	0	0	0	0	0	0	0	2253	2348	2443	2539	2635	2731	2828	2925	3022
1983 MAY 6.0	-1231	0	0	0	0	0	0	0	0	0	0	0	-1154	-1208	-1262	-1316	-1372	-1429	-1486	-1545	-1605
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	2212	2308	2403	2498	2594	2690	2786	2883	2980	3077
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	-1135	-1188	-1242	-1297	-1352	-1409	-1466	-1525	-1585	-1645
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	2173	2268	2364	2459	2554	2650	2746	2842	2939	3036	3133
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	-1116	-1170	-1223	-1278	-1333	-1389	-1446	-1505	-1564	-1625	-1687
JD 2445430.5	0	0	0	0	0	0	0	0	0	2134	2230	2325	2420	2516	2611	2707	2803	2899	2996	3093	3190
1983 APR 6.0	0	0	0	0	0	0	0	0	0	-1098	-1151	-1205	-1259	-1314	-1370	-1427	-1485	-1545	-1606	-1668	-1730
JD 2445420.5	0	0	0	0	0	0	0	0	2096	2192	2288	2383	2478	2574	2669	2765	2861	2957	3053	3150	3248
1983 MAR 27.0	0	0	0	0	0	0	0	0	-1080	-1133	-1187	-1241	-1296	-1352	-1409	-1466	-1526	-1586	-1649	-1711	-1772
JD 2445410.5	0	0	0	0	0	0	0	2059	2155	2251	2346	2442	2537	2632	2728	2823	2919	3016	3112	3209	3307
1983 MAR 17.0	0	0	0	0	0	0	0	-1062	-1116	-1169	-1224	-1278	-1334	-1391	-1448	-1507	-1568	-1630	-1693	-1756	1785
JD 2445400.5	0	0	0	0	0	0	2022	2118	2214	2310	2406	2501	2597	2692	2787	2883	2979	3075	3172	3269	3366
1983 MAR 7.0	0	0	0	0	0	0	-1045	-1099	-1152	-1207	-1261	-1317	-1373	-1431	-1489	-1549	-1611	-1674	-1738	1799	1749
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5	JD2445440.5	JD2445480.5	JD2445520.5	JD2445560.5
1983 MAR 7.0	1983 APR 16.0	1983 MAY 26.0	1983 JUL 5.0	1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E16

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	119	116	117	122	131	145	169	0	0	0	0	0	0	0	0	0	0	0	122	117	116
1983 JUL 5.0	866	916	986	1081	1211	1389	1643	0	0	0	0	0	0	0	0	0	0	0	1349	1202	1095
JD 2445510.5	104	103	106	112	122	139	0	0	0	0	0	0	0	0	0	0	0	112	106	103	104
1983 JUN 25.0	909	973	1061	1180	1344	1576	0	0	0	0	0	0	0	0	0	0	0	1385	1225	1108	1021
JD 2445500.5	89	90	94	101	112	0	0	0	0	0	0	0	0	0	0	0	101	94	90	89	91
1983 JUN 15.0	962	1043	1153	1303	1514	0	0	0	0	0	0	0	0	0	0	0	1423	1248	1121	1027	958
JD 2445490.5	74	76	81	88	0	0	0	0	0	0	0	0	0	0	0	88	81	76	75	75	78
1983 JUN 5.0	1026	1128	1266	1459	0	0	0	0	0	0	0	0	0	0	0	1461	1272	1134	1033	958	903
JD 2445480.5	59	62	66	0	0	0	0	0	0	0	0	0	0	0	73	66	61	59	59	60	63
1983 MAY 26.0	1105	1232	1408	0	0	0	0	0	0	0	0	0	0	0	1501	1295	1148	1039	958	899	857
JD 2445470.5	43	46	0	0	0	0	0	0	0	0	0	0	0	56	49	45	43	42	43	44	47
1983 MAY 16.0	1201	1362	0	0	0	0	0	0	0	0	0	0	0	1540	1319	1161	1045	959	894	848	818
JD 2445460.5	26	0	0	0	0	0	0	0	0	0	0	0	35	31	28	26	25	25	26	27	30
1983 MAY 6.0	1321	0	0	0	0	0	0	0	0	0	0	0	1580	1343	1174	1051	959	891	840	805	786
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	11	9	8	8	7	7	7	8	8	9
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	1621	1366	1187	1057	960	887	833	795	771	761
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	18	15	13	12	11	11	11	11	12	13	15
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	1661	1389	1200	1062	960	884	826	785	757	743	744
JD 2445430.5	0	0	0	0	0	0	0	0	0	53	43	37	33	31	29	29	30	31	33	38	44
1983 APR 6.0	0	0	0	0	0	0	0	0	0	1701	1412	1212	1068	961	880	820	775	744	726	723	736
JD 2445420.5	0	0	0	0	0	0	0	0	96	75	63	56	51	49	47	48	49	53	58	67	82
1983 MAR 27.0	0	0	0	0	0	0	0	0	1741	1434	1224	1073	961	877	813	766	732	711	703	710	737
JD 2445410.5	0	0	0	0	0	0	0	150	113	92	80	73	68	66	65	67	71	77	87	104	134
1983 MAR 17.0	0	0	0	0	0	0	0	1781	1456	1235	1078	962	874	808	758	721	697	686	688	707	751
JD 2445400.5	0	0	0	0	0	0	220	157	125	107	95	88	84	83	84	87	94	105	122	152	209
1983 MAR 7.0	0	0	0	0	0	0	1820	1478	1247	1082	962	871	802	750	711	685	670	668	681	716	782
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5 1983 MAR 7.0 | JD2445440.5 1983 APR 16.0 | JD2445480.5 1983 MAY 26.0 | JD2445520.5 1983 JUL 5.0 | JD2445560.5 1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E16

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	216	218	217	212	205	195	183	0	0	0	0	0	0	0	0	0	0	0	110	121	128
1983 JUL 5.0	-2995	-4967	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999
JD 2445510.5	204	203	199	192	182	170	0	0	0	0	0	0	0	0	0	0	0	122	133	141	147
1983 JUN 25.0	-4277	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999
JD 2445500.5	190	187	180	171	158	0	0	0	0	0	0	0	0	0	0	0	133	145	154	161	164
1983 JUN 15.0	-9805	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-7569
JD 2445490.5	175	169	159	147	0	0	0	0	0	0	0	0	0	0	0	145	158	168	175	179	179
1983 JUN 5.0	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-8288	-3523
JD 2445480.5	158	149	137	0	0	0	0	0	0	0	0	0	0	0	158	171	181	189	194	196	193
1983 MAY 26.0	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9069	-3663	-2506
JD 2445470.5	139	127	0	0	0	0	0	0	0	0	0	0	0	171	184	195	204	209	212	211	206
1983 MAY 16.0	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9904	-3800	-2568	-2051
JD 2445460.5	118	0	0	0	0	0	0	0	0	0	0	0	184	198	209	218	224	228	228	224	216
1983 MAY 6.0	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-3935	-2628	-2086	-1799
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	198	212	223	233	239	244	245	242	236	223
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-4065	-2686	-2119	-1820	-1644
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	212	226	237	247	254	259	261	260	255	244	227
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-4190	-2741	-2151	-1840	-1656	-1545
JD 2445430.5	0	0	0	0	0	0	0	0	0	226	240	252	261	269	274	277	277	273	265	250	226
1983 APR 6.0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-4308	-2794	-2182	-1860	-1669	-1550	-1481
JD 2445420.5	0	0	0	0	0	0	0	0	241	254	266	276	283	289	293	293	291	284	271	251	219
1983 MAR 27.0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-4419	-2844	-2212	-1880	-1681	-1557	-1481	-1444
JD 2445410.5	0	0	0	0	0	0	0	257	269	280	290	298	304	308	309	307	302	292	275	247	203
1983 MAR 17.0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-4525	-2892	-2241	-1899	-1694	-1564	-1483	-1439	1431
JD 2445400.5	0	0	0	0	0	0	272	284	295	304	312	318	323	324	324	320	311	296	273	235	176
1983 MAR 7.0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-4627	-2938	-2270	-1918	-1707	-1572	-1486	-1436	1420	1440
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5	JD2445440.5	JD2445480.5	JD2445520.5	JD2445560.5
1983 MAR 7.0	1983 APR 16.0	1983 MAY 26.0	1983 JUL 5.0	1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E16

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	451	428	406	386	366	346	326	0	0	0	0	0	0	0	0	0	0	0	501	514	530
1983 JUL 5.0	196	183	170	157	144	130	116	0	0	0	0	0	0	0	0	0	0	0	130	144	158
JD 2445510.5	451	428	408	388	369	350	0	0	0	0	0	0	0	0	0	0	0	465	479	495	515
1983 JUN 25.0	186	173	160	147	133	118	0	0	0	0	0	0	0	0	0	0	0	128	142	156	170
JD 2445500.5	452	431	411	393	375	0	0	0	0	0	0	0	0	0	0	0	433	447	464	482	504
1983 JUN 15.0	176	163	149	135	121	0	0	0	0	0	0	0	0	0	0	0	126	140	154	167	180
JD 2445490.5	456	436	418	401	0	0	0	0	0	0	0	0	0	0	0	404	419	436	454	474	497
1983 JUN 5.0	166	152	138	123	0	0	0	0	0	0	0	0	0	0	0	124	138	152	165	178	191
JD 2445480.5	462	444	428	0	0	0	0	0	0	0	0	0	0	0	377	394	411	429	448	469	493
1983 MAY 26.0	155	141	126	0	0	0	0	0	0	0	0	0	0	0	122	136	150	163	176	189	201
JD 2445470.5	471	456	0	0	0	0	0	0	0	0	0	0	0	354	371	388	406	424	444	466	492
1983 MAY 16.0	143	128	0	0	0	0	0	0	0	0	0	0	0	120	134	148	161	174	187	199	211
JD 2445460.5	487	0	0	0	0	0	0	0	0	0	0	0	332	350	368	385	403	422	443	466	494
1983 MAY 6.0	131	0	0	0	0	0	0	0	0	0	0	0	118	132	146	159	172	185	197	209	221
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	312	331	349	367	384	403	422	443	468	498
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	116	130	144	157	170	183	195	207	219	231
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	294	313	332	350	367	385	403	423	446	472	506
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	114	128	142	155	168	180	193	205	217	229	240
JD 2445430.5	0	0	0	0	0	0	0	0	0	277	297	316	334	352	369	387	406	426	450	478	517
1983 APR 6.0	0	0	0	0	0	0	0	0	0	112	126	140	153	166	178	191	203	215	227	238	249
JD 2445420.5	0	0	0	0	0	0	0	0	262	283	302	320	337	354	372	390	409	430	456	488	535
1983 MAR 27.0	0	0	0	0	0	0	0	0	110	124	138	151	164	176	189	201	213	225	236	247	259
JD 2445410.5	0	0	0	0	0	0	0	247	269	288	307	324	341	358	375	394	414	436	464	502	562
1983 MAR 17.0	0	0	0	0	0	0	0	108	122	136	149	162	175	187	199	211	223	234	245	257	267
JD 2445400.5	0	0	0	0	0	0	234	256	276	294	312	329	346	362	380	399	419	444	475	522	610
1983 MAR 7.0	0	0	0	0	0	0	106	120	134	147	160	173	185	197	209	221	232	243	255	266	276
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5 1983 MAR 7.0 | JD2445440.5 1983 APR 16.0 | JD2445480.5 1983 MAY 26.0 | JD2445520.5 1983 JUL 5.0 | JD2445560.5 1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E16

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5 1983 JUL 5.0	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524
JD 2445510.5 1983 JUN 25.0	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524
JD 2445500.5 1983 JUN 15.0	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524
JD 2445490.5 1983 JUN 5.0	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524
JD 2445480.5 1983 MAY 26.0	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2445470.5 1983 MAY 16.0	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445460.5 1983 MAY 6.0	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445450.5 1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445440.5 1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445430.5 1983 APR 6.0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445420.5 1983 MAR 27.0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445410.5 1983 MAR 17.0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445400.5 1983 MAR 7.0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
	JD2445400.5 1983 MAR 7.0				JD2445440.5 1983 APR 16.0				JD2445480.5 1983 MAY 26.0				JD2445520.5 1983 JUL 5.0				JD2445560.5 1983 AUG 14.0				

EARTH DEPARTURE OR ARRIVAL DATE

M26
E16

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	2603	2874	3227	3680	4268	5044	6094	0	0	0	0	0	0	0	0	0	0	0	5348	4302	3535
1983 JUL 5.0	1916	2289	2740	3286	3963	4823	5955	0	0	0	0	0	0	0	0	0	0	0	6245	5101	4229
JD 2445510.5	2857	3205	3654	4239	5011	6058	0	0	0	0	0	0	0	0	0	0	0	5310	4267	3501	2926
1983 JUN 25.0	2241	2688	3231	3904	4761	5888	0	0	0	0	0	0	0	0	0	0	0	6247	5110	4244	3558
JD 2445500.5	3180	3625	4205	4973	6015	0	0	0	0	0	0	0	0	0	0	0	5269	4229	3465	2889	2451
1983 JUN 15.0	2636	3175	3845	4698	5820	0	0	0	0	0	0	0	0	0	0	0	6244	5115	4254	3573	3021
JD 2445490.5	3593	4169	4931	5968	0	0	0	0	0	0	0	0	0	0	0	5224	4188	3426	2851	2411	2074
1983 JUN 5.0	3121	3787	4634	5751	0	0	0	0	0	0	0	0	0	0	0	6236	5114	4259	3584	3035	2579
JD 2445480.5	4129	4886	5916	0	0	0	0	0	0	0	0	0	0	0	5175	4145	3385	2811	2370	2030	1772
1983 MAY 26.0	3729	4571	5682	0	0	0	0	0	0	0	0	0	0	0	6221	5108	4260	3589	3046	2593	2212
JD 2445470.5	4838	5861	0	0	0	0	0	0	0	0	0	0	0	5122	4098	3342	2769	2329	1987	1725	1532
1983 MAY 16.0	4511	5614	0	0	0	0	0	0	0	0	0	0	0	6201	5096	4255	3591	3052	2603	2224	1904
JD 2445460.5	5804	0	0	0	0	0	0	0	0	0	0	0	5066	4048	3297	2727	2287	1945	1679	1480	1341
1983 MAY 6.0	5548	0	0	0	0	0	0	0	0	0	0	0	6174	5079	4245	3587	3054	2609	2234	1915	1646
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	5007	3996	3250	2683	2245	1902	1635	1431	1285	1195
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	6141	5055	4230	3578	3051	2611	2240	1923	1654	1432
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	4945	3942	3201	2638	2202	1860	1592	1385	1232	1132	1089
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	6103	5027	4209	3564	3043	2609	2241	1928	1660	1435	1263
JD 2445430.5	0	0	0	0	0	0	0	0	0	4881	3887	3152	2592	2160	1818	1550	1341	1184	1075	1018	1024
1983 APR 6.0	0	0	0	0	0	0	0	0	0	6058	4993	4183	3546	3031	2602	2239	1929	1663	1438	1258	1140
JD 2445420.5	0	0	0	0	0	0	0	0	4815	3830	3101	2546	2117	1777	1509	1299	1138	1023	955	942	1003
1983 MAR 27.0	0	0	0	0	0	0	0	0	6008	4953	4153	3522	3014	2590	2233	1927	1664	1439	1256	1124	1074
JD 2445410.5	0	0	0	0	0	0	0	4748	3772	3051	2501	2074	1737	1470	1259	1096	976	899	870	905	1034
1983 MAR 17.0	0	0	0	0	0	0	0	5953	4909	4118	3495	2992	2574	2222	1920	1661	1438	1253	1113	1040	1078
JD 2445400.5	0	0	0	0	0	0	4680	3715	3000	2455	2033	1698	1431	1220	1056	932	849	809	822	914	1135
1983 MAR 7.0	0	0	0	0	0	0	5893	4861	4079	3463	2967	2555	2207	1910	1654	1434	1249	1104	1015	1018	1172
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5 1983 MAR 7.0 | JD2445440.5 1983 APR 16.0 | JD2445480.5 1983 MAY 26.0 | JD2445520.5 1983 JUL 5.0 | JD2445560.5 1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E16

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2445520.5	4518	5163	5967	6967	8230	9868	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9403	7765
1983 JUL 5.0	2824	2725	2625	2527	2429	2331	2234	0	0	0	0	0	0	0	0	0	0	0	2516	2614	2711
JD 2445510.5	5098	5892	6885	8143	9772	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9378	7745	6484
1983 JUN 25.0	2775	2675	2576	2477	2379	2281	0	0	0	0	0	0	0	0	0	0	0	2470	2566	2663	2761
JD 2445500.5	5817	6800	8050	9671	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9344	7719	6462	5471
1983 JUN 15.0	2724	2624	2525	2426	2328	0	0	0	0	0	0	0	0	0	0	0	2424	2520	2617	2714	2811
JD 2445490.5	6714	7955	9566	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9303	7686	6434	5446	4652
1983 JUN 5.0	2673	2573	2474	2375	0	0	0	0	0	0	0	0	0	0	0	2379	2475	2571	2668	2765	2863
JD 2445480.5	7858	9457	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9252	7645	6400	5416	4623	3984
1983 MAY 26.0	2621	2521	2421	0	0	0	0	0	0	0	0	0	0	0	2336	2432	2528	2624	2720	2817	2915
JD 2445470.5	9348	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9194	7597	6360	5381	4590	3949	3435
1983 MAY 16.0	2567	2468	0	0	0	0	0	0	0	0	0	0	0	2294	2389	2485	2581	2677	2773	2871	2968
JD 2445460.5	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9127	7542	6313	5341	4554	3913	3395	2987
1983 MAY 6.0	2513	0	0	0	0	0	0	0	0	0	0	0	2253	2348	2443	2539	2635	2731	2828	2925	3022
JD 2445450.5	0	0	0	0	0	0	0	0	0	0	0	9999	9052	7479	6261	5296	4513	3875	3354	2938	2627
1983 APR 26.0	0	0	0	0	0	0	0	0	0	0	0	2212	2308	2403	2498	2594	2690	2786	2883	2980	3077
JD 2445440.5	0	0	0	0	0	0	0	0	0	0	9999	8969	7410	6202	5245	4469	3833	3313	2892	2568	2352
1983 APR 16.0	0	0	0	0	0	0	0	0	0	0	2173	2268	2364	2459	2554	2650	2746	2842	2939	3036	3133
JD 2445430.5	0	0	0	0	0	0	0	0	0	9999	8879	7335	6138	5190	4420	3789	3270	2847	2513	2277	2164
1983 APR 6.0	0	0	0	0	0	0	0	0	0	2134	2230	2325	2420	2516	2611	2707	2803	2899	2996	3093	3190
JD 2445420.5	0	0	0	0	0	0	0	0	9999	8783	7254	6069	5130	4367	3742	3225	2802	2462	2211	2066	2076
1983 MAR 27.0	0	0	0	0	0	0	0	0	2096	2192	2288	2383	2478	2574	2669	2765	2861	2957	3053	3150	3248
JD 2445410.5	0	0	0	0	0	0	0	9999	8682	7169	5995	5067	4311	3691	3179	2756	2414	2152	1983	1945	2112
1983 MAR 17.0	0	0	0	0	0	0	0	2059	2155	2251	2346	2442	2537	2632	2728	2823	2919	3016	3112	3209	3307
JD 2445400.5	0	0	0	0	0	0	9999	8576	7079	5918	5000	4253	3639	3131	2710	2367	2098	1913	1837	1932	2307
1983 MAR 7.0	0	0	0	0	0	0	2022	2118	2214	2310	2406	2501	2597	2692	2787	2883	2979	3075	3172	3269	3366
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2445400.5 1983 MAR 7.0 | JD2445440.5 1983 APR 16.0 | JD2445480.5 1983 MAY 26.0 | JD2445520.5 1983 JUL 5.0 | JD2445560.5 1983 AUG 14.0

EARTH DEPARTURE OR ARRIVAL DATE

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S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445600.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671601	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.661	DEGREES
MEAN ANOM. AT EPOCH	=	258.625	DEGREES
DATE OF NODAL PASSAGE	=	2445601.097	(J.D.)
OBLIQUITY OF EQUATOR	=	23.441	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445600.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09339048	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.432	DEGREES
ARG. OF PERIHELION	=	286.328	DEGREES
MEAN ANOM. AT EPOCH	=	144.345	DEGREES
DATE OF NODAL PASSAGE	=	2445446.444	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.076	DEGREES

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E17

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	1657	1459	1309	1197	1118	1073	1065	1106	1207	1367	1274	1184	1097	1012	931	852	778	706	639	576	516
1983 JUL 5.0	1520	1287	1098	942	813	712	645	628	682	822	751	684	622	563	509	458	411	368	328	292	260
JD 2445510.5	1447	1295	1180	1097	1045	1026	1049	1129	1272	1324	1235	1148	1063	981	902	826	754	685	620	558	501
1983 JUN 25.0	1294	1106	949	819	714	638	603	632	735	801	733	669	609	553	500	451	405	364	325	291	259
JD 2445500.5	1282	1165	1078	1020	992	1000	1059	1181	1370	1282	1196	1112	1030	951	874	801	731	664	601	541	485
1983 JUN 15.0	1112	956	825	718	635	586	592	672	850	781	716	655	597	543	492	444	400	360	323	289	259
JD 2445490.5	1149	1060	997	961	958	997	1096	1262	1327	1242	1159	1077	998	921	847	776	708	643	582	524	470
1983 JUN 5.0	962	831	722	635	576	561	615	745	829	764	701	642	586	534	484	438	396	357	321	288	258
JD 2445480.5	1042	976	934	921	944	1019	1164	1369	1286	1204	1123	1044	966	892	820	751	685	622	563	507	455
1983 MAY 26.0	837	727	637	570	540	568	674	877	811	748	688	630	576	525	477	433	391	353	319	287	258
JD 2445470.5	956	910	888	898	952	1071	1263	1327	1246	1166	1087	1010	935	863	793	726	662	602	544	490	439
1983 MAY 16.0	731	639	568	526	532	610	767	857	794	733	675	619	567	517	471	427	387	350	317	286	258
JD 2445460.5	887	859	859	896	988	1157	1365	1285	1206	1129	1052	977	905	834	767	702	640	581	526	473	424
1983 MAY 6.0	642	568	517	505	557	691	903	839	778	719	662	608	557	509	464	422	384	348	315	285	259
JD 2445450.5	834	825	847	917	1057	1276	1323	1245	1168	1092	1018	945	874	806	740	677	618	561	507	456	408
1983 APR 26.0	569	512	487	514	620	804	884	822	762	705	650	598	549	502	458	418	380	345	314	285	259
JD 2445440.5	795	806	856	968	1164	1357	1281	1205	1130	1056	984	913	844	778	714	653	595	540	488	439	393
1983 APR 16.0	509	474	483	559	723	928	866	806	748	692	639	588	540	495	452	413	377	343	313	285	260
JD 2445430.5	770	805	892	1057	1304	1315	1240	1166	1093	1021	950	881	815	750	689	630	573	520	470	422	378
1983 APR 6.0	466	459	511	645	857	908	848	790	734	680	628	579	532	488	447	409	373	341	312	285	262
JD 2445420.5	762	828	962	1188	1347	1273	1200	1127	1056	986	917	850	785	723	663	606	551	500	451	405	363
1983 MAR 27.0	443	473	578	772	950	890	832	775	720	667	617	569	524	481	442	405	371	339	311	286	265
JD 2445410.5	774	880	1075	1376	1304	1232	1160	1089	1019	951	884	819	756	695	637	582	530	480	433	390	355
1983 MAR 17.0	444	522	688	990	931	872	815	760	707	655	606	560	516	475	436	401	368	338	311	289	275
JD 2445400.5	812	973	1232	1333	1262	1191	1121	1052	983	916	851	788	727	668	612	559	508	460	415	377	471
1983 MAR 7.0	478	614	840	970	912	855	799	745	693	643	596	551	508	468	431	397	366	337	312	295	388

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD2445600.5 1983 SEP 23.0	JD2445640.5 1983 NOV 2.0	JD2445680.5 1983 DEC 12.0	JD2445720.5 1984 JAN 21.0	JD2445760.5 1984 MAR 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

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UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	-64	-35	-6	22	49	76	101	124	143	-164	-146	-126	-105	-82	-58	-34	-10	12	35	56	74
1983 JUL 5.0	3438	3506	3571	35	98	159	218	275	325	3192	3250	3309	3368	3427	3486	3544	3	62	121	180	238
JD 2445510.5	-69	-41	-12	15	43	70	95	116	133	-170	-152	-132	-110	-87	-64	-40	-15	8	30	52	71
1983 JUN 25.0	3424	3492	3557	20	83	143	201	255	299	3171	3230	3291	3351	3411	3471	3530	3590	49	109	168	226
JD 2445500.5	-75	-46	-18	9	37	63	88	107	-191	-175	-157	-137	-116	-93	-69	-44	-20	3	26	48	67
1983 JUN 15.0	3411	3478	3543	6	68	128	184	232	3088	3150	3211	3273	3334	3395	3456	3516	3576	36	96	155	214
JD 2445490.5	-80	-52	-24	3	31	57	79	95	-195	-180	-162	-142	-121	-98	-74	-49	-25	-0	22	44	63
1983 JUN 5.0	3398	3464	3529	3592	54	112	165	205	3066	3129	3192	3255	3318	3380	3441	3502	3563	23	83	142	201
JD 2445480.5	-85	-58	-30	-2	24	49	68	-212	-199	-184	-167	-147	-126	-103	-79	-54	-29	-4	19	41	60
1983 MAY 26.0	3385	3451	3516	3579	40	96	142	2980	3045	3109	3173	3238	3301	3364	3426	3488	3549	10	70	129	187
JD 2445470.5	-91	-64	-36	-9	17	39	54	-215	-203	-188	-171	-151	-130	-107	-83	-58	-33	-8	15	38	58
1983 MAY 16.0	3372	3439	3504	3567	26	77	113	2958	3023	3089	3155	3220	3285	3349	3412	3474	3536	3596	56	115	173
JD 2445460.5	-97	-70	-43	-16	8	26	-226	-217	-206	-192	-175	-156	-134	-112	-87	-62	-37	-11	12	35	56
1983 MAY 6.0	3360	3427	3492	3554	10	53	2868	2935	3003	3070	3137	3203	3269	3333	3397	3460	3521	3582	42	100	158
JD 2445450.5	-103	-76	-49	-23	-2	10	-227	-219	-209	-195	-178	-160	-139	-116	-91	-66	-40	-15	10	34	56
1983 APR 26.0	3348	3416	3481	3541	3590	20	2845	2914	2982	3051	3119	3186	3252	3318	3382	3445	3507	3568	27	85	141
JD 2445440.5	-109	-83	-57	-33	-17	-232	-228	-221	-211	-198	-182	-163	-142	-119	-95	-70	-43	-17	8	34	60
1983 APR 16.0	3337	3405	3469	3525	3562	2754	2823	2892	2962	3031	3101	3169	3236	3302	3367	3430	3492	3553	12	68	122
JD 2445430.5	-115	-90	-66	-46	-37	-232	-229	-222	-213	-200	-185	-167	-146	-123	-98	-73	-46	-18	8	37	69
1983 APR 6.0	3327	3394	3456	3502	3524	2730	2800	2871	2942	3012	3083	3152	3220	3286	3351	3415	3477	3537	3595	50	100
JD 2445420.5	-122	-98	-77	-64	-230	-231	-229	-223	-215	-203	-188	-170	-149	-126	-101	-75	-47	-19	11	45	92
1983 MAR 27.0	3317	3383	3437	3468	2638	2707	2778	2850	2922	2994	3064	3134	3203	3270	3336	3399	3461	3520	3577	29	72
JD 2445410.5	-130	-108	-92	-223	-228	-230	-229	-224	-216	-205	-190	-172	-152	-129	-104	-77	-48	-17	17	63	159
1983 MAR 17.0	3306	3368	3410	2545	2614	2685	2757	2829	2902	2975	3046	3117	3186	3254	3319	3383	3444	3502	3556	2	26
JD 2445400.5	-139	-120	-111	-219	-225	-229	-228	-224	-217	-206	-192	-174	-154	-131	-105	-77	-47	-12	31	106	482
1983 MAR 7.0	3294	3346	3367	2522	2592	2663	2736	2809	2883	2956	3028	3099	3169	3237	3302	3366	3426	3482	3532	3566	3499

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD2445600.5 1983 SEP 23.0	JD2445640.5 1983 NOV 2.0	JD2445680.5 1983 DEC 12.0	JD2445720.5 1984 JAN 21.0	JD2445760.5 1984 MAR 1.0																	

EARTH DEPARTURE OR ARRIVAL DATE

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EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	66	79	94	113	137	165	199	229	247	219	211	202	193	184	175	167	159	151	144	139	135
1983 JUL 5.0	159	190	227	274	336	418	530	670	806	1111	1151	1187	1221	1252	1281	1307	1331	1352	1371	1387	1401
JD 2445510.5	56	71	89	111	139	174	210	237	249	221	214	206	198	190	182	174	166	159	152	147	144
1983 JUN 25.0	137	172	215	271	345	446	578	724	834	1090	1128	1163	1196	1226	1253	1278	1301	1322	1340	1356	1370
JD 2445500.5	46	64	85	112	146	185	221	242	230	224	218	211	203	196	188	180	173	166	160	155	152
1983 JUN 15.0	117	157	208	275	366	487	635	768	1028	1067	1103	1137	1168	1197	1224	1248	1270	1289	1307	1322	1336
JD 2445490.5	38	58	84	116	156	198	230	244	231	226	221	214	208	201	194	187	180	173	167	162	159
1983 JUN 5.0	100	147	208	289	399	541	688	785	1004	1041	1076	1108	1138	1166	1192	1215	1237	1255	1272	1287	1300
JD 2445480.5	31	55	85	125	170	211	234	236	233	229	224	218	212	206	199	192	186	179	174	169	165
1983 MAY 26.0	87	143	216	316	447	599	723	939	977	1013	1046	1078	1107	1134	1158	1181	1201	1220	1236	1250	1263
JD 2445470.5	26	54	92	138	185	219	235	237	234	231	226	221	216	210	204	198	191	185	179	174	170
1983 MAY 16.0	80	147	236	357	505	648	727	912	948	982	1015	1045	1073	1099	1123	1145	1164	1182	1198	1211	1223
JD 2445460.5	23	58	103	154	198	223	238	237	235	232	228	224	219	214	208	202	196	190	184	178	174
1983 MAY 6.0	79	161	270	411	563	671	845	882	917	950	981	1010	1037	1062	1085	1107	1126	1143	1158	1171	1182
JD 2445450.5	25	67	118	170	206	221	236	236	235	232	230	226	222	217	211	206	200	193	187	180	174
1983 APR 26.0	88	188	318	471	602	658	815	851	884	916	946	974	1000	1024	1046	1067	1085	1101	1116	1128	1139
JD 2445440.5	31	80	136	183	207	233	234	234	234	232	230	227	223	219	213	208	202	195	188	180	171
1983 APR 16.0	110	230	377	523	610	748	783	817	849	879	908	935	961	984	1005	1025	1043	1059	1072	1084	1094
JD 2445430.5	42	99	153	189	202	229	231	232	232	231	229	227	223	219	214	209	202	195	186	176	160
1983 APR 6.0	145	285	436	549	578	715	749	781	812	841	869	895	920	942	963	982	999	1014	1027	1039	1047
JD 2445420.5	59	118	164	187	221	225	227	229	229	229	228	225	222	219	214	208	201	193	181	165	135
1983 MAR 27.0	196	346	478	538	647	681	713	744	774	802	829	854	877	899	919	937	954	969	981	991	998
JD 2445410.5	80	134	167	210	215	219	222	224	225	225	224	223	220	216	212	205	197	187	171	145	70
1983 MAR 17.0	256	398	486	579	613	645	676	705	734	761	787	811	833	854	874	892	907	922	934	943	944
JD 2445400.5	99	142	159	203	208	213	216	219	220	221	220	219	216	212	207	200	191	177	153	101	-188
1983 MAR 7.0	314	424	453	545	577	607	637	665	693	719	743	767	788	809	827	845	860	874	885	892	838

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
	JD2445600.5 1983 SEP 23.0			JD2445640.5 1983 NOV 2.0				JD2445680.5 1983 DEC 12.0					JD2445720.5 1984 JAN 21.0					JD2445760.5 1984 MAR 1.0			

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E17

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5 1983 JUL 5.0	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564
JD 2445510.5 1983 JUN 25.0	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562
JD 2445500.5 1983 JUN 15.0	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555
JD 2445490.5 1983 JUN 5.0	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543
JD 2445480.5 1983 MAY 26.0	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527
JD 2445470.5 1983 MAY 16.0	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508
JD 2445460.5 1983 MAY 6.0	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485
JD 2445450.5 1983 APR 26.0	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458
JD 2445440.5 1983 APR 16.0	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429
JD 2445430.5 1983 APR 6.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398
JD 2445420.5 1983 MAR 27.0	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364
JD 2445410.5 1983 MAR 17.0	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329
JD 2445400.5 1983 MAR 7.0	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
	JD2445600.5 1983 SEP 23.0			JD2445640.5 1983 NOV 2.0				JD2445680.5 1983 DEC 12.0					JD2445720.5 1984 JAN 21.0				JD2445760.5 1984 MAR 1.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E17

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
1983 JUL 5.0	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
JD 2445510.5	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
1983 JUN 25.0	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2445500.5	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
1983 JUN 15.0	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
JD 2445490.5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1983 JUN 5.0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
JD 2445480.5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
1983 MAY 26.0	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
JD 2445470.5	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
1983 MAY 16.0	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
JD 2445460.5	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
1983 MAY 6.0	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
JD 2445450.5	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
1983 APR 26.0	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
JD 2445440.5	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
1983 APR 16.0	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123
JD 2445430.5	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
1983 APR 6.0	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147
JD 2445420.5	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
1983 MAR 27.0	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171
JD 2445410.5	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
1983 MAR 17.0	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195
JD 2445400.5	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
1983 MAR 7.0	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD2445600.5 1983 SEP 23.0	JD2445640.5 1983 NOV 2.0	JD2445680.5 1983 DEC 12.0	JD2445720.5 1984 JAN 21.0	JD2445760.5 1984 MAR 1.0																	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E17

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	2711	2809	2908	3007	3107	3207	3308	3409	3510	17	115	217	318	420	521	622	723	823	923	1022	1120
1983 JUL 5.0	-1391	-1446	-1503	-1560	-1617	-1673	-1726	-1770	-1796	1795	1768	1737	1706	1675	1644	1614	1585	1557	1531	1506	1484
JD 2445510.5	2761	2859	2958	3057	3157	3257	3358	3459	3559	63	164	266	368	470	571	672	773	873	972	1071	1170
1983 JUN 25.0	-1423	-1480	-1537	-1595	-1652	-1707	-1756	-1792	1797	1782	1751	1720	1687	1655	1624	1593	1564	1535	1508	1484	1461
JD 2445500.5	2811	2909	3008	3107	3207	3307	3408	3509	14	113	215	317	419	520	622	723	823	923	1023	1122	1220
1983 JUN 15.0	-1457	-1514	-1572	-1630	-1688	-1741	-1784	1794	1796	1766	1734	1701	1668	1635	1603	1572	1542	1513	1486	1461	1437
JD 2445490.5	2863	2961	3060	3159	3259	3359	3460	3560	63	164	266	368	470	572	673	774	875	975	1074	1173	1272
1983 JUN 5.0	-1492	-1550	-1609	-1667	-1723	-1773	1794	1792	1781	1748	1715	1681	1647	1614	1582	1550	1520	1491	1463	1437	1413
JD 2445480.5	2915	3013	3112	3211	3311	3411	3512	14	115	217	318	420	522	624	725	826	927	1027	1126	1225	1324
1983 MAY 26.0	-1529	-1587	-1647	-1705	-1759	1799	1784	1795	1763	1729	1695	1661	1626	1593	1560	1528	1497	1467	1440	1414	1389
JD 2445470.5	2968	3066	3165	3264	3364	3464	3565	66	168	270	371	473	575	677	778	879	980	1080	1180	1279	1377
1983 MAY 16.0	-1566	-1626	-1685	-1742	-1791	1780	1789	1778	1744	1709	1674	1639	1604	1570	1537	1505	1474	1444	1416	1389	1365
JD 2445460.5	3022	3120	3219	3318	3418	3518	19	120	222	324	426	527	629	731	832	933	1034	1134	1234	1333	1431
1983 MAY 6.0	-1605	-1665	-1725	-1779	1781	1775	1794	1759	1724	1688	1653	1617	1582	1548	1514	1481	1450	1420	1392	1365	1340
JD 2445450.5	3077	3175	3274	3373	3473	3573	74	175	277	379	481	583	684	786	887	988	1089	1189	1289	1388	1486
1983 APR 26.0	-1645	-1706	-1764	1787	1766	1787	1774	1739	1703	1667	1630	1594	1559	1524	1490	1457	1426	1396	1367	1340	1315
JD 2445440.5	3133	3231	3330	3429	3529	29	130	231	333	435	537	638	740	842	943	1044	1145	1245	1345	1444	1542
1983 APR 16.0	-1687	-1747	1798	1763	1767	1790	1754	1718	1681	1644	1607	1571	1535	1500	1466	1433	1401	1371	1342	1315	1290
JD 2445430.5	3190	3288	3387	3486	3586	86	187	288	390	492	594	695	797	899	1000	1101	1202	1302	1402	1501	1599
1983 APR 6.0	-1730	-1788	1766	1752	1791	1769	1732	1695	1658	1621	1584	1547	1511	1476	1442	1409	1377	1346	1317	1290	1265
JD 2445420.5	3248	3346	3445	3544	44	144	245	346	448	549	651	753	855	957	1058	1159	1260	1360	1459	1558	1657
1983 MAR 27.0	-1772	1774	1745	1765	1784	1747	1710	1672	1634	1597	1559	1523	1486	1451	1417	1384	1352	1321	1292	1265	1240
JD 2445410.5	3307	3405	3503	7	103	203	304	405	507	608	710	812	914	1016	1117	1218	1319	1419	1518	1617	1715
1983 MAR 17.0	1785	1744	1743	1797	1762	1724	1686	1648	1610	1572	1535	1498	1461	1426	1392	1359	1327	1296	1267	1240	1215
JD 2445400.5	3366	3464	3562	63	163	263	364	465	566	668	770	872	974	1075	1177	1278	1378	1478	1578	1677	1774
1983 MAR 7.0	1749	1729	1769	1776	1739	1700	1662	1624	1585	1547	1510	1473	1436	1401	1367	1333	1302	1271	1243	1216	1191

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD2445600.5					JD2445640.5					JD2445680.5					JD2445720.5					JD2445760.5	
1983 SEP 23.0					1983 NOV 2.0					1983 DEC 12.0					1984 JAN 21.0					1984 MAR 1.0	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E17

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	116	118	124	135	153	183	238	355	745	4284	584	315	220	174	147	131	122	117	116	119	125
1983 JUL 5.0	1095	1016	959	920	899	894	908	940	981	1000	987	958	916	865	810	752	693	636	582	531	484
JD 2445510.5	104	107	115	127	148	183	251	423	1466	943	365	230	172	141	123	112	106	103	104	108	116
1983 JUN 25.0	1021	958	914	887	877	884	911	955	995	996	975	941	896	844	788	731	674	619	566	518	473
JD 2445500.5	91	96	104	118	141	183	272	566	3895	456	244	170	134	113	101	94	90	89	91	96	105
1983 JUN 15.0	958	908	876	860	861	882	923	975	1000	988	961	922	875	822	767	710	655	602	551	505	462
JD 2445490.5	78	83	92	107	133	182	307	1079	681	263	166	124	102	89	81	76	74	75	78	84	93
1983 JUN 5.0	903	866	845	840	854	889	944	994	996	977	945	903	854	801	746	690	636	585	537	492	451
JD 2445480.5	63	69	78	93	121	181	383	2404	295	159	111	88	74	66	62	59	59	60	64	70	79
1983 MAY 26.0	857	831	821	828	856	907	971	1000	989	964	927	882	832	779	724	671	618	569	522	479	441
JD 2445470.5	47	53	61	76	105	180	690	365	146	93	70	57	50	46	43	42	43	44	48	53	63
1983 MAY 16.0	818	803	804	824	868	935	994	996	978	947	907	861	810	757	704	651	600	553	508	46[illegible]	430
JD 2445460.5	30	34	41	53	80	176	742	120	66	47	37	31	28	26	25	25	26	27	30	34	42
1983 MAY 6.0	786	781	795	831	893	969	1000	989	964	929	887	839	788	735	683	632	583	537	495	456	421
JD 2445450.5	9	11	14	19	33	157	56	24	16	12	10	9	8	7	7	7	8	8	9	11	14
1983 APR 26.0	761	768	796	850	930	996	996	978	948	910	865	816	765	714	662	613	566	522	481	444	411
JD 2445440.5	15	18	24	37	87	210	48	27	20	16	13	12	11	11	11	11	12	13	15	18	25
1983 APR 16.0	744	764	809	884	972	999	988	964	930	889	843	794	743	692	642	595	549	507	469	433	402
JD 2445430.5	44	56	80	147	1175	193	91	60	46	38	34	31	30	29	29	31	34	38	45	58	85
1983 APR 6.0	736	771	836	930	999	995	976	947	910	867	820	771	720	671	623	577	533	493	456	423	392
JD 2445420.5	82	110	177	485	616	190	114	83	67	58	52	49	47	48	49	53	58	68	85	116	191
1983 MAR 27.0	737	792	881	978	999	986	962	929	889	844	797	748	698	650	603	559	517	479	444	412	384
JD 2445410.5	134	196	390	6635	366	188	129	101	85	75	69	66	65	67	70	77	88	106	138	209	445
1983 MAR 17.0	751	830	938	1000	993	974	945	909	867	821	773	725	676	629	584	542	502	465	432	402	375
JD 2445400.5	209	354	1274	758	297	188	140	115	99	90	85	83	84	87	94	105	124	156	220	389	1864
1983 MAR 7.0	782	887	988	997	983	959	926	887	844	797	750	702	654	609	566	525	487	452	421	392	367

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD2445600.5																					
1983 SEP 23.0																					
JD2445640.5																					
1983 NOV 2.0																					
JD2445680.5																					
1983 DEC 12.0																					
JD2445720.5																					
1984 JAN 21.0																					
JD2445760.5																					
1984 MAR 1.0																					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E17

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	128	133	133	129	120	105	82	49	15	0	-11	-38	-78	-129	-190	-256	-328	-401	-476	-549	-619
1983 JUL 5.0	-9999	-9999	-6329	-3119	-2262	-1884	-1691	-1597	-1567	1730	1757	1778	1794	1805	1812	1815	1814	1810	1803	1795	1785
JD 2445510.5	147	148	146	139	126	105	74	36	4	-2	-21	-54	-99	-153	-215	-283	-354	-427	-501	-572	-640
1983 JUN 25.0	-9999	-6915	-3249	-2321	-1915	-1705	-1597	-1556	1559	1754	1778	1797	1811	1821	1825	1826	1824	1819	1811	1802	1792
JD 2445500.5	164	163	157	146	128	100	62	19	0	-9	-34	-72	-121	-178	-242	-310	-381	-454	-525	-595	-661
1983 JUN 15.0	-7568	-3385	-2382	-1948	-1721	-1600	-1547	1545	1749	1777	1799	1816	1828	1835	1838	1837	1834	1827	1819	1809	1798
JD 2445490.5	179	176	167	151	127	90	44	5	-2	-20	-50	-93	-144	-204	-269	-338	-408	-480	-550	-617	-681
1983 JUN 5.0	-3523	-2444	-1982	-1739	-1605	-1541	1530	1552	1774	1799	1819	1834	1843	1849	1850	1848	1843	1835	1826	1816	1804
JD 2445480.5	193	186	173	152	120	74	22	0	-9	-33	-69	-115	-169	-230	-296	-365	-436	-506	-574	-640	-702
1983 MAY 26.0	-2506	-2017	-1759	-1613	-1537	1516	1535	1769	1798	1821	1838	1851	1858	1862	1861	1858	1851	1843	1833	1822	1809
JD 2445470.5	206	195	177	148	106	51	4	-2	-19	-49	-89	-139	-196	-258	-325	-394	-463	-532	-599	-662	-722
1983 MAY 16.0	-2051	-1779	-1622	-1536	-1503	1516	1554	1795	1821	1841	1856	1866	1872	1874	1872	1867	1859	1850	1839	1827	1815
JD 2445460.5	216	200	176	138	84	24	0	-9	-32	-67	-111	-164	-223	-287	-354	-422	-491	-558	-623	-684	-741
1983 MAY 6.0	-1799	-1633	-1537	-1493	1496	1536	1792	1820	1843	1861	1874	1881	1885	1885	1881	1875	1867	1856	1845	1832	1819
JD 2445450.5	223	202	169	120	55	3	-3	-20	-49	-88	-136	-191	-251	-316	-383	-451	-518	-584	-647	-706	-761
1983 APR 26.0	-1644	-1540	-1487	1479	1512	1565	1818	1844	1864	1880	1890	1895	1897	1895	1890	1883	1873	1862	1850	1837	1824
JD 2445440.5	227	198	155	92	22	-0	-10	-33	-67	-110	-161	-219	-281	-346	-412	-479	-545	-609	-670	-727	-780
1983 APR 16.0	-1545	-1483	1464	1488	1546	1815	1844	1867	1884	1897	1905	1908	1908	1905	1898	1890	1879	1868	1855	1841	1828
JD 2445430.5	226	188	131	55	1	-4	-21	-50	-88	-135	-189	-248	-311	-376	-442	-508	-573	-635	-694	-748	-798
1983 APR 6.0	-1481	-1452	1466	1519	1582	1843	1868	1888	1903	1913	1919	1920	1918	1913	1906	1896	1885	1872	1859	1846	1832
JD 2445420.5	219	168	95	17	-0	-12	-36	-69	-112	-162	-218	-278	-342	-407	-472	-537	-600	-660	-717	-769	-817
1983 MAR 27.0	-1444	1447	1491	1564	1840	1869	1891	1908	1921	1928	1932	1931	1928	1921	1913	1902	1890	1877	1863	1849	1836
JD 2445410.5	203	136	49	0	-6	-24	-53	-91	-137	-190	-248	-309	-373	-438	-503	-566	-627	-685	-739	-789	-835
1983 MAR 17.0	1431	1464	1537	1838	1868	1893	1913	1927	1937	1942	1944	1941	1936	1928	1919	1907	1894	1881	1867	1853	1839
JD 2445400.5	176	90	9	-2	-15	-39	-73	-115	-165	-220	-279	-341	-405	-469	-533	-595	-654	-710	-762	-809	-852
1983 MAR 7.0	1440	1505	1590	1867	1895	1916	1933	1945	1952	1955	1954	1951	1944	1935	1924	1912	1898	1885	1870	1856	1843

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD2445600.5 1983 SEP 23.0				JD2445640.5 1983 NOV 2.0				JD2445680.5 1983 DEC 12.0					JD2445720.5 1984 JAN 21.0				JD2445760.5 1984 MAR 1.0				

EARTH DEPARTURE OR ARRIVAL DATE

M26
E17

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	530	551	578	612	659	730	851	1117	2060	75	77	80	83	86	90	94	98	103	108	113	118
1983 JUL 5.0	158	172	185	198	210	222	234	245	254	111	116	122	127	133	139	145	152	158	165	172	180
JD 2445510.5	515	538	567	606	659	743	904	1328	4083	77	80	83	86	89	93	97	102	106	111	117	122
1983 JUN 25.0	170	183	195	208	220	232	243	253	261	117	122	127	133	138	144	151	157	164	171	178	186
JD 2445500.5	504	530	562	604	666	772	1003	1928	78	80	83	86	89	92	96	101	105	110	115	120	126
1983 JUN 15.0	180	193	206	218	230	241	252	261	117	122	127	132	138	144	150	156	163	170	177	184	192
JD 2445490.5	497	525	560	608	683	825	1203	3762	80	83	85	88	92	96	100	104	108	113	118	124	130
1983 JUN 5.0	191	204	216	228	239	250	260	268	122	127	132	138	143	149	156	162	169	176	183	190	198
JD 2445480.5	493	523	562	618	713	922	1694	80	83	85	88	91	95	99	103	107	112	117	122	128	134
1983 MAY 26.0	201	214	226	237	248	259	268	122	127	132	137	143	149	155	161	168	175	182	189	196	204
JD 2445470.5	492	525	569	637	767	1123	3840	83	85	88	91	94	98	102	106	111	115	120	126	132	137
1983 MAY 16.0	211	223	235	246	257	267	275	127	132	137	143	148	154	160	167	173	180	187	195	202	210
JD 2445460.5	494	530	581	669	868	1649	83	85	88	91	94	97	101	105	109	114	119	124	130	135	141
1983 MAY 6.0	221	233	244	255	266	274	127	132	137	142	148	154	160	166	172	179	186	193	201	208	216
JD 2445450.5	498	539	603	726	1084	4590	85	88	90	93	97	100	104	108	113	117	123	128	133	139	145
1983 APR 26.0	231	242	253	264	274	281	132	137	142	148	153	159	165	172	178	185	192	199	207	215	223
JD 2445440.5	506	554	638	836	1710	86	88	90	93	96	100	103	107	112	116	121	126	132	137	143	150
1983 APR 16.0	240	252	262	272	281	132	137	142	147	153	159	164	171	177	184	191	198	206	213	221	229
JD 2445430.5	517	578	702	1088	7763	88	90	93	96	99	102	106	110	115	120	125	130	136	141	147	154
1983 APR 6.0	249	260	271	280	287	137	142	147	152	158	164	170	176	183	190	197	204	212	219	227	235
JD 2445420.5	535	619	829	1950	88	90	93	95	98	102	105	109	114	118	123	128	134	140	145	152	158
1983 MAR 27.0	259	269	279	287	137	142	147	152	158	163	169	175	182	189	196	203	210	218	226	233	242
JD 2445410.5	562	692	1152	88	90	92	95	98	101	105	109	113	117	122	127	132	138	144	150	156	162
1983 MAR 17.0	267	278	286	138	142	147	152	157	163	169	175	181	188	194	202	209	216	224	232	240	248
JD 2445400.5	610	852	2633	90	92	95	98	101	104	108	112	116	121	125	131	136	142	148	154	160	167
1983 MAR 7.0	276	286	293	142	147	152	157	162	168	174	180	187	193	200	207	215	222	230	238	246	254

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD2445600.5 1983 SEP 23.0				JD2445640.5 1983 NOV 2.0				JD2445680.5 1983 DEC 12.0					JD2445720.5 1984 JAN 21.0				JD2445760.5 1984 MAR 1.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E17

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5 1983 JUL 5.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445510.5 1983 JUN 25.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445500.5 1983 JUN 15.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445490.5 1983 JUN 5.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445480.5 1983 MAY 26.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445470.5 1983 MAY 16.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445460.5 1983 MAY 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445450.5 1983 APR 26.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445440.5 1983 APR 16.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445430.5 1983 APR 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445420.5 1983 MAR 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445410.5 1983 MAR 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445400.5 1983 MAR 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
	•				•				•				•				•				•
	JD2445600.5 1983 SEP 23.0				JD2445640.5 1983 NOV 2.0				JD2445680.5 1983 DEC 12.0				JD2445720.5 1984 JAN 21.0				JD2445760.5 1984 MAR 1.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E17

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	3535	2961	2530	2209	1986	1857	1836	1951	2238	2695	2430	2174	1926	1689	1462	1246	1044	854	679	518	371
1983 JUL 5.0	4229	3540	2982	2521	2143	1847	1652	1605	1761	2169	1961	1767	1585	1417	1260	1116	984	865	757	661	577
JD 2445510.5	2926	2490	2162	1927	1779	1727	1792	2016	2423	2571	2317	2070	1831	1602	1383	1176	980	798	630	475	334
1983 JUN 25.0	3558	3003	2542	2161	1853	1631	1532	1616	1916	2106	1908	1722	1549	1386	1235	1096	969	853	749	656	575
JD 2445500.5	2451	2117	1873	1709	1631	1655	1818	2165	2704	2453	2207	1969	1739	1517	1306	1106	918	743	581	432	298
1983 JUN 15.0	3021	2562	2179	1864	1623	1483	1499	1730	2250	2050	1860	1682	1515	1358	1213	1078	955	843	742	653	573
JD 2445490.5	2074	1821	1645	1546	1536	1646	1923	2396	2582	2339	2102	1871	1649	1435	1231	1038	857	689	533	391	262
1983 JUN 5.0	2579	2196	1877	1623	1453	1412	1565	1943	2190	1999	1817	1645	1483	1332	1191	1061	942	834	736	649	573
JD 2445480.5	1772	1586	1471	1434	1498	1707	2116	2703	2463	2228	1999	1776	1561	1354	1158	972	798	636	486	350	226
1983 MAY 26.0	2212	1891	1628	1437	1350	1430	1737	2330	2136	1952	1776	1610	1454	1308	1171	1045	930	825	731	646	572
JD 2445470.5	1532	1403	1344	1372	1522	1854	2397	2580	2348	2121	1898	1682	1474	1275	1085	906	739	583	440	309	191
1983 MAY 16.0	1904	1637	1431	1310	1326	1552	2008	2272	2086	1908	1738	1578	1426	1284	1152	1030	919	817	726	644	572
JD 2445460.5	1341	1265	1264	1365	1622	2097	2690	2462	2236	2015	1800	1591	1390	1197	1014	842	681	531	394	269	156
1983 MAY 6.0	1646	1430	1285	1251	1398	1785	2406	2219	2039	1867	1702	1547	1400	1262	1134	1016	908	810	721	643	573
JD 2445450.5	1195	1171	1232	1424	1815	2434	2568	2346	2127	1912	1703	1501	1306	1120	944	778	624	480	349	229	122
1983 APR 26.0	1432	1270	1199	1277	1580	2117	2350	2169	1995	1827	1668	1517	1375	1241	1117	1003	898	803	718	642	575
JD 2445440.5	1089	1120	1257	1566	2116	2668	2449	2233	2020	1811	1608	1412	1224	1045	875	716	567	430	304	190	88
1983 APR 16.0	1263	1163	1186	1406	1878	2478	2297	2121	1952	1790	1635	1488	1350	1221	1101	990	889	797	715	642	577
JD 2445430.5	1024	1119	1355	1815	2515	2546	2333	2122	1914	1712	1515	1325	1143	970	807	654	512	381	261	152	55
1983 APR 6.0	1140	1121	1266	1654	2273	2422	2246	2075	1911	1753	1603	1461	1327	1201	1085	978	880	792	713	642	582
JD 2445420.5	1003	1179	1548	2184	2637	2427	2218	2012	1810	1614	1423	1239	1064	897	740	594	457	332	218	115	25
1983 MAR 27.0	1074	1158	1458	2022	2545	2368	2197	2031	1871	1718	1572	1434	1304	1182	1070	967	872	787	711	645	590
JD 2445410.5	1034	1322	1864	2723	2515	2309	2105	1905	1708	1517	1332	1155	986	825	675	534	404	285	177	81	8
1983 MAR 17.0	1078	1298	1779	2663	2487	2316	2149	1987	1832	1633	1541	1407	1281	1164	1055	956	865	783	712	651	616
JD 2445400.5	1135	1578	2309	2599	2395	2193	1994	1799	1607	1422	1243	1072	909	754	610	475	351	238	137	54	265
1983 MAR 7.0	1172	1562	2221	2603	2431	2264	2102	1944	1793	1648	1511	1381	1259	1146	1041	945	859	781	714	667	922

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2445600.5 1983 SEP 23.0 | JD2445640.5 1983 NOV 2.0 | JD2445680.5 1983 DEC 12.0 | JD2445720.5 1984 JAN 21.0 | JD2445760.5 1984 MAR 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E17

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2445520.5	7765	6502	5511	4730	4129	3705	3489	3556	3998	4864	4391	3941	3512	3105	2722	2362	2028	1719	1436	1179	948
1983 JUL 5.0	2711	2809	2908	3007	3107	3207	3308	3409	3510	17	115	217	318	420	521	622	723	823	923	1022	1120
JD 2445510.5	6484	5493	4705	4088	3632	3358	3325	3632	4339	4677	4225	3792	3380	2988	2619	2272	1949	1652	1379	1131	909
1983 JUN 25.0	2761	2859	2958	3057	3157	3257	3358	3459	3559	63	164	266	368	470	571	672	773	873	972	1071	1170
JD 2445500.5	5471	4679	4051	3573	3253	3138	3317	3895	4955	4503	4068	3651	3253	2876	2519	2185	1874	1586	1323	1085	871
1983 JUN 15.0	2811	2909	3008	3107	3207	3307	3408	3509	14	113	215	317	419	520	622	723	823	923	1023	1122	1220
JD 2445490.5	4652	4017	3522	3169	2989	3057	3488	4339	4772	4337	3918	3516	3132	2767	2423	2100	1800	1523	1269	1040	834
1983 JUN 5.0	2863	2961	3060	3159	3259	3359	3460	3560	63	164	266	368	470	572	673	774	875	975	1074	1173	1272
JD 2445480.5	3984	3477	3099	2871	2848	3137	3853	5032	4599	4180	3775	3386	3015	2662	2329	2017	1728	1461	1217	996	798
1983 MAY 26.0	2915	3013	3112	3211	3311	3411	3512	14	115	217	318	420	522	624	725	826	927	1027	1126	1225	1324
JD 2445470.5	3435	3040	2775	2681	2848	3406	4405	4852	4434	4028	3637	3260	2901	2559	2238	1937	1657	1400	1165	953	763
1983 MAY 16.0	2968	3066	3165	3264	3364	3464	3565	66	168	270	371	473	575	677	778	879	980	1080	1180	1279	1377
JD 2445460.5	2987	2695	2548	2616	3020	3882	5096	4681	4275	3882	3502	3138	2789	2459	2149	1858	1589	1341	1115	912	729
1983 MAY 6.0	3022	3120	3219	3318	3418	3518	19	120	222	324	426	527	629	731	832	933	1034	1134	1234	1333	1431
JD 2445450.5	2627	2441	2430	2701	3395	4551	4918	4515	4122	3740	3371	3018	2681	2362	2061	1781	1522	1283	1067	871	696
1983 APR 26.0	3077	3175	3274	3373	3473	3573	74	175	277	379	481	583	684	786	887	988	1089	1189	1289	1388	1486
JD 2445440.5	2352	2283	2444	2972	3994	5147	4746	4354	3972	3601	3243	2901	2575	2266	1976	1706	1456	1227	1019	832	665
1983 APR 16.0	3133	3231	3330	3429	3529	29	130	231	333	435	537	638	740	842	943	1044	1145	1245	1345	1444	1542
JD 2445430.5	2164	2239	2621	3469	4787	4968	4579	4197	3825	3465	3118	2786	2470	2172	1892	1632	1392	1173	973	795	637
1983 APR 6.0	3190	3288	3387	3486	3586	86	187	288	390	492	594	695	797	899	1000	1101	1202	1302	1402	1501	1599
JD 2445420.5	2076	2338	3007	4206	5182	4795	4415	4043	3681	3331	2995	2673	2368	2080	1810	1560	1330	1119	929	760	615
1983 MAR 27.0	3248	3346	3445	3544	44	144	245	346	448	549	651	753	855	957	1058	1159	1260	1360	1459	1558	1657
JD 2445410.5	2112	2620	3643	5386	5003	4625	4254	3892	3540	3200	2873	2562	2267	1989	1730	1490	1269	1068	888	732	625
1983 MAR 17.0	3307	3405	3503	7	103	203	304	405	507	608	710	812	914	1016	1117	1218	1319	1419	1518	1617	1715
JD 2445400.5	2307	3140	4531	5201	4827	4458	4096	3743	3400	3070	2754	2453	2168	1900	1651	1421	1210	1019	852	721	1186
1983 MAR 7.0	3366	3464	3562	63	163	263	364	465	566	668	770	872	974	1075	1177	1278	1378	1478	1578	1677	1774

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD2445600.5 1983 SEP 23.0				JD2445640.5 1983 NOV 2.0				JD2445680.5 1983 DEC 12.0				JD2445720.5 1984 JAN 21.0				JD2445760.5 1984 MAR 1.0					

EARTH DEPARTURE OR ARRIVAL DATE

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445700.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671590	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.665	DEGREES
MEAN ANOM. AT EPOCH	=	357.185	DEGREES
DATE OF NODAL PASSAGE	=	2445601.093	(J.D.)
OBLIQUITY OF EQUATOR	=	23.441	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445700.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09339073	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.434	DEGREES
ARG. OF PERIHELION	=	286.330	DEGREES
MEAN ANOM. AT EPOCH	=	196.747	DEGREES
DATE OF NODAL PASSAGE	=	2445446.441	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.078	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E18

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5	516	461	409	361	318	281	266	1212	218	164	141	131	132	144	164	191	224	265	313	373	447
1983 JUL 5.0	260	231	205	183	164	149	149	852	160	126	115	111	110	113	120	129	144	163	188	222	268
JD 2445510.5	501	447	397	351	309	276	312	303	186	155	137	130	134	148	170	199	235	279	332	398	482
1983 JUN 25.0	259	231	206	184	166	153	190	225	139	124	117	115	116	120	127	138	154	175	204	243	295
JD 2445500.5	485	433	385	340	300	275	1432	214	172	148	134	130	137	153	177	209	248	296	354	428	523
1983 JUN 15.0	259	232	207	186	169	160	1058	159	134	125	121	119	121	126	135	147	165	189	222	266	328
JD 2445490.5	470	419	372	329	292	304	261	193	163	143	132	131	140	159	186	221	263	315	380	463	573
1983 JUN 5.0	258	232	209	188	171	188	194	147	134	128	125	125	128	134	144	158	178	205	243	294	367
JD 2445480.5	455	406	360	318	286	662	216	182	157	140	131	133	145	166	196	234	280	337	410	505	635
1983 MAY 26.0	258	233	210	190	175	505	162	145	137	132	130	131	135	142	153	170	192	224	267	328	415
JD 2445470.5	439	392	348	307	296	243	203	174	152	137	131	135	150	175	207	249	300	364	446	557	712
1983 MAY 16.0	258	234	212	192	189	180	158	147	140	137	135	137	142	151	164	183	209	245	296	368	475
JD 2445460.5	424	378	335	296	289	225	194	168	147	135	132	139	158	185	221	266	323	395	490	621	809
1983 MAY 6.0	259	235	213	195	217	171	159	151	145	142	142	145	151	161	176	198	228	271	331	420	551
JD 2445450.5	408	364	322	285	247	215	186	161	143	133	134	145	166	197	237	287	350	433	545	703	933
1983 APR 26.0	259	236	216	197	185	172	162	155	150	148	149	153	160	173	190	216	251	302	375	485	651
JD 2445440.5	393	350	310	274	237	206	178	156	140	133	137	152	176	211	255	311	384	480	614	809	1091
1983 APR 16.0	260	239	221	200	187	175	166	160	156	155	157	162	171	186	206	236	278	340	431	569	778
JD 2445430.5	378	337	570	262	227	197	171	151	138	134	142	160	189	228	277	341	424	539	703	946	1285
1983 APR 6.0	262	243	455	203	190	179	171	165	162	162	165	172	183	200	225	261	312	387	502	680	936
JD 2445420.5	363	339	298	251	217	189	164	146	136	136	148	171	204	247	303	377	475	614	820	1123	1501
1983 MAR 27.0	265	263	227	207	194	184	176	172	169	170	175	183	197	218	247	290	353	449	597	825	1116
JD 2445410.5	355	553	277	239	207	180	158	142	136	141	157	184	222	271	335	421	540	714	975	1339	1496
1983 MAR 17.0	275	413	226	210	198	189	182	178	177	180	186	197	213	238	274	327	406	530	724	1003	1150
JD 2445400.5	471	315	262	227	197	172	152	140	138	147	168	200	243	300	375	477	625	847	1176	0	1463
1983 MAR 7.0	388	253	228	214	203	195	189	186	186	190	198	212	232	262	307	373	476	639	890	0	1137

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD2445800.5 1984 APR 10.0	JD2445840.5 1984 MAY 20.0	JD2445880.5 1984 JUN 29.0	JD2445920.5 1984 AUG 8.0	JD2445960.5 1984 SEP 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E18

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5	74	90	100	103	92	51	-83	-454	577	429	361	306	251	205	171	152	145	146	153	162	173
1983 JUL 5.0	238	296	354	410	464	521	597	1359	401	433	396	330	261	210	184	181	197	224	260	302	345
JD 2445510.5	71	86	96	97	81	20	-241	702	437	359	311	263	216	175	147	133	129	132	141	151	162
1983 JUN 25.0	226	284	341	397	453	515	653	290	431	423	374	304	236	188	165	165	181	209	245	285	327
JD 2445500.5	67	82	91	90	67	-34	532	456	350	305	267	224	181	147	124	114	113	119	128	139	151
1983 JUN 15.0	214	272	328	385	442	518	1862	402	429	405	348	275	209	164	145	147	165	194	229	268	306
JD 2445490.5	63	79	87	84	47	-178	525	338	290	259	226	187	148	119	102	96	98	105	115	127	138
1983 JUN 5.0	201	258	315	371	433	564	333	415	416	380	318	244	180	140	124	129	148	177	212	249	284
JD 2445480.5	60	76	84	76	11	873	326	268	243	219	188	151	117	93	80	77	82	91	102	113	123
1983 MAY 26.0	187	244	301	358	429	2585	383	407	395	351	284	210	149	114	102	110	130	159	193	227	257
JD 2445470.5	58	74	82	68	-103	325	240	219	203	181	150	116	86	67	59	59	66	76	87	99	107
1983 MAY 16.0	173	229	285	343	459	334	384	391	368	318	247	174	118	87	80	90	111	140	172	203	227
JD 2445460.5	56	73	82	60	407	204	188	180	166	144	113	81	57	42	38	41	50	61	72	82	88
1983 MAY 6.0	158	213	267	328	243	350	371	368	337	280	206	136	86	60	56	69	91	120	150	176	191
JD 2445450.5	56	76	90	49	153	150	151	145	131	107	77	48	28	18	18	23	33	44	55	63	65
1983 APR 26.0	141	195	246	312	313	342	352	340	302	239	164	97	52	32	32	47	70	97	124	143	147
JD 2445440.5	60	86	126	43	101	115	119	113	96	71	41	16	0	-4	-1	5	16	27	37	42	37
1983 APR 16.0	122	172	212	292	307	325	327	308	262	193	118	56	18	3	7	23	46	72	94	104	93
JD 2445430.5	69	116	696	31	72	87	89	80	61	33	5	-15	-25	-26	-21	-12	-1	9	16	16	4
1983 APR 6.0	100	141	3574	274	290	303	298	270	217	144	71	15	3583	3574	3581	3598	21	43	58	56	27
JD 2445420.5	92	242	-96	18	49	60	59	47	24	-4	-29	-45	-50	-48	-41	-30	-20	-11	-7	-14	-32
1983 MAR 27.0	72	72	266	253	269	276	264	228	167	91	22	3572	3548	3543	3553	3571	3592	10	15	3595	3549
JD 2445410.5	159	-412	-53	5	27	34	29	11	-14	-42	-62	-73	-74	-69	-60	-50	-40	-34	-36	-50	-221
1983 MAR 17.0	26	540	219	230	244	244	225	179	111	35	3571	3529	3511	3512	3524	3542	3560	3570	3560	3520	2525
JD 2445400.5	482	-161	-48	-10	5	7	-3	-25	-53	-78	-94	-100	-97	-90	-80	-70	-62	-60	-70	0	-219
1983 MAR 7.0	3499	206	189	205	214	208	179	125	51	3577	3519	3486	3474	3479	3492	3509	3522	3520	3490	0	2508

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2445800.5 1984 APR 10.0 | JD2445840.5 1984 MAY 20.0 | JD2445880.5 1984 JUN 29.0 | JD2445920.5 1984 AUG 8.0 | JD2445960.5 1984 SEP 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E18

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5		135	135	138	148	172	227	382	739	-240	-123	-69	-35	-10	9	27	43	56	68	78	87	96
1983 JUL 5.0		1401	1414	1425	1436	1449	1471	1533	1141	1274	1333	1356	1373	1389	1407	1427	1448	1470	1492	1511	1526	1536
JD 2445510.5		144	143	147	159	187	263	547	-315	-128	-62	-28	-4	14	30	46	59	71	83	93	102	112
1983 JUN 25.0		1370	1382	1393	1404	1419	1448	1575	1187	1303	1330	1344	1356	1370	1385	1403	1422	1442	1460	1476	1488	1494
JD 2445500.5		152	151	156	169	206	326	-186	-144	-53	-16	5	22	36	50	63	75	87	97	108	118	129
1983 JUN 15.0		1336	1348	1359	1370	1387	1431	886	1264	1302	1316	1326	1335	1346	1360	1376	1393	1410	1425	1438	1447	1448
JD 2445490.5		159	159	163	180	230	485	-196	-42	-0	20	34	46	57	68	80	91	102	112	123	134	146
1983 JUN 5.0		1300	1312	1323	1335	1355	1447	1205	1272	1288	1296	1302	1310	1320	1332	1346	1360	1375	1388	1398	1402	1398
JD 2445480.5		165	165	170	190	270	-349	-33	20	39	50	59	67	76	85	95	106	116	127	138	149	163
1983 MAY 26.0		1263	1274	1284	1297	1325	966	1239	1258	1265	1270	1275	1281	1290	1300	1313	1325	1338	1348	1354	1354	1343
JD 2445470.5		170	169	174	199	396	-33	45	63	70	76	81	86	93	102	110	120	130	141	152	165	180
1983 MAY 16.0		1223	1234	1244	1258	1315	1199	1226	1233	1236	1240	1244	1249	1257	1266	1277	1287	1297	1304	1307	1301	1280
JD 2445460.5		174	171	175	209	-105	76	91	94	96	97	100	104	109	116	125	134	143	154	166	180	196
1983 MAY 6.0		1182	1192	1202	1216	1132	1192	1199	1201	1203	1206	1209	1214	1221	1229	1238	1246	1254	1257	1255	1241	1209
JD 2445450.5		174	169	167	219	120	125	122	119	117	116	117	119	124	130	137	146	156	167	179	194	211
1983 APR 26.0		1139	1148	1156	1173	1157	1162	1164	1166	1167	1169	1172	1176	1182	1189	1196	1203	1207	1207	1198	1175	1126
JD 2445440.5		171	158	130	222	167	154	145	139	135	132	132	133	137	142	149	158	167	178	191	206	223
1983 APR 16.0		1094	1102	1104	1127	1123	1124	1125	1126	1127	1129	1132	1135	1140	1146	1151	1155	1156	1151	1134	1098	1028
JD 2445430.5		160	127	-289	229	190	174	163	155	149	146	145	145	148	153	160	168	177	189	202	216	229
1983 APR 6.0		1047	1051	887	1081	1080	1081	1082	1083	1085	1086	1089	1092	1096	1100	1104	1105	1102	1090	1062	1008	911
JD 2445420.5		135	11	349	234	204	188	176	168	161	157	155	156	158	162	168	176	186	197	209	221	226
1983 MAR 27.0		998	986	1034	1032	1034	1035	1037	1038	1039	1041	1043	1046	1049	1052	1053	1051	1042	1021	979	900	778
JD 2445410.5		70	720	293	238	213	198	187	178	171	167	164	164	166	170	175	183	192	202	212	217	232
1983 MAR 17.0		944	763	978	981	985	987	989	990	992	993	995	997	999	1000	998	992	976	944	881	773	726
JD 2445400.5		-188	387	276	240	219	205	194	185	178	173	171	170	171	175	180	187	195	203	208	0	226
1983 MAR 7.0		838	912	924	930	934	937	939	941	942	944	945	946	947	945	940	928	903	853	763	0	678
	(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2445800.5 1984 APR 10.0 JD2445840.5 1984 MAY 20.0 JD2445880.5 1984 JUN 29.0 JD2445920.5 1984 AUG 8.0 JD2445960.5 1984 SEP 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E18

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5 1983 JUL 5.0	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564
JD 2445510.5 1983 JUN 25.0	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562
JD 2445500.5 1983 JUN 15.0	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555
JD 2445490.5 1983 JUN 5.0	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543
JD 2445480.5 1983 MAY 26.0	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527
JD 2445470.5 1983 MAY 16.0	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508
JD 2445460.5 1983 MAY 6.0	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485
JD 2445450.5 1983 APR 26.0	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458
JD 2445440.5 1983 APR 16.0	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429
JD 2445430.5 1983 APR 6.0	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398
JD 2445420.5 1983 MAR 27.0	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364
JD 2445410.5 1983 MAR 17.0	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329
JD 2445400.5 1983 MAR 7.0	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	0	2292

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD2445800.5 1984 APR 10.0				JD2445840.5 1984 MAY 20.0				JD2445880.5 1984 JUN 29.0					JD2445920.5 1984 AUG 8.0					JD2445960.5 1984 SEP 17.0			

EARTH DEPARTURE OR ARRIVAL DATE

M26
E18

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
1983 JUL 5.0	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
JD 2445510.5	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
1983 JUN 25.0	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2445500.5	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
1983 JUN 15.0	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
JD 2445490.5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1983 JUN 5.0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
JD 2445480.5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
1983 MAY 26.0	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
JD 2445470.5	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
1983 MAY 16.0	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
JD 2445460.5	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
1983 MAY 6.0	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
JD 2445450.5	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
1983 APR 26.0	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
JD 2445440.5	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
1983 APR 16.0	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123
JD 2445430.5	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
1983 APR 6.0	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147
JD 2445420.5	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
1983 MAR 27.0	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171
JD 2445410.5	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
1983 MAR 17.0	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195
JD 2445400.5	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	0	151
1983 MAR 7.0	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	218	0	218

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD2445800.5					JD2445840.5					JD2445880.5					JD2445920.5					JD2445960.5	
1984 APR 10.0					1984 MAY 20.0					1984 JUN 29.0					1984 AUG 8.0					1984 SEP 17.0	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E18

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5	1120	1218	1315	1412	1508	1604	1700	1788	1892	1987	2082	2178	2273	2369	2466	2562	2660	2758	2856	2955	3054
1983 JUL 5.0	1484	1463	1446	1430	1417	1407	1398	1390	1387	1383	1380	1377	1373	1369	1364	1359	1353	1348	1345	1345	1351
JD 2445510.5	1170	1268	1365	1462	1558	1654	1749	1847	1941	2037	2132	2227	2323	2419	2515	2612	2709	2807	2906	3005	3104
1983 JUN 25.0	1461	1440	1421	1405	1392	1381	1371	1365	1359	1355	1351	1348	1345	1341	1337	1333	1329	1326	1326	1330	1342
JD 2445500.5	1220	1318	1415	1512	1609	1704	1809	1897	1992	2087	2182	2278	2374	2470	2566	2663	2760	2858	2956	3055	3155
1983 JUN 15.0	1437	1416	1397	1380	1366	1354	1346	1337	1331	1327	1323	1320	1317	1314	1311	1308	1306	1306	1309	1319	1338
JD 2445490.5	1272	1369	1467	1564	1660	1756	1853	1948	2043	2138	2234	2329	2425	2521	2617	2714	2811	2909	3008	3107	3206
1983 JUN 5.0	1413	1392	1372	1355	1341	1328	1318	1310	1304	1299	1295	1292	1289	1287	1285	1284	1285	1288	1295	1311	1340
JD 2445480.5	1324	1422	1519	1616	1712	1810	1904	2000	2095	2191	2286	2381	2477	2573	2669	2766	2864	2961	3060	3159	3258
1983 MAY 26.0	1389	1367	1347	1330	1315	1302	1291	1283	1276	1271	1268	1265	1263	1262	1262	1262	1265	1272	1285	1308	1349
JD 2445470.5	1377	1475	1572	1669	1765	1862	1957	2053	2148	2244	2339	2435	2530	2626	2723	2819	2917	3015	3113	3212	3311
1983 MAY 16.0	1365	1343	1322	1304	1289	1276	1265	1256	1249	1244	1241	1239	1238	1238	1239	1242	1249	1260	1279	1312	1369
JD 2445460.5	1431	1529	1626	1723	1820	1916	2011	2107	2202	2298	2393	2489	2584	2680	2777	2874	2971	3069	3167	3266	3366
1983 MAY 6.0	1340	1318	1297	1279	1263	1250	1238	1230	1223	1218	1215	1214	1214	1215	1218	1224	1234	1251	1278	1324	1402
JD 2445450.5	1486	1584	1681	1778	1875	1971	2067	2162	2257	2353	2448	2544	2639	2735	2832	2929	3026	3124	3222	3321	3421
1983 APR 26.0	1315	1292	1272	1253	1237	1224	1213	1204	1197	1193	1190	1190	1191	1194	1200	1209	1224	1247	1285	1348	1454
JD 2445440.5	1542	1640	1737	1834	1931	2027	2122	2218	2313	2409	2504	2600	2695	2791	2888	2985	3082	3180	3278	3377	3477
1983 APR 16.0	1290	1267	1246	1228	1212	1198	1187	1178	1172	1168	1167	1167	1170	1175	1184	1197	1218	1250	1302	1388	1532
JD 2445430.5	1599	1697	1794	1891	1988	2084	2179	2275	2370	2466	2561	2657	2752	2848	2945	3041	3139	3237	3335	3434	3533
1983 APR 6.0	1265	1242	1221	1203	1187	1173	1162	1154	1148	1145	1144	1146	1151	1159	1171	1190	1217	1261	1332	1451	1640
JD 2445420.5	1657	1755	1852	1949	2046	2142	2237	2333	2428	2524	2619	2714	2810	2906	3003	3099	3197	3294	3393	3492	3590
1983 MAR 27.0	1240	1217	1196	1178	1162	1149	1138	1130	1125	1123	1124	1128	1135	1146	1162	1187	1224	1284	1381	1543	1775
JD 2445410.5	1715	1815	1911	2008	2104	2200	2296	2392	2487	2582	2678	2773	2869	2965	3061	3158	3255	3353	3452	3550	51
1983 MAR 17.0	1215	1192	1172	1154	1138	1125	1115	1108	1104	1103	1106	1111	1121	1136	1158	1191	1241	1322	1457	1669	1779
JD 2445400.5	1774	1874	1971	2068	2164	2260	2356	2451	2547	2642	2737	2833	2929	3025	3121	3218	3315	3413	3511	0	110
1983 MAR 7.0	1191	1168	1148	1130	1115	1103	1094	1087	1085	1085	1090	1098	1112	1131	1161	1204	1272	1384	1568	0	1753

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD2445800.5					JD2445840.5					JD2445880.5					JD2445920.5					JD2445960.5	
1984 APR 10.0					1984 MAY 20.0					1984 JUN 29.0					1984 AUG 8.0					1984 SEP 17.0	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E18

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5	125	137	155	185	238	347	668	7035	729	363	246	190	158	139	127	120	116	117	121	129	143
1983 JUL 5.0	484	442	404	371	343	319	299	284	270	261	256	254	256	261	269	283	300	324	355	396	450
JD 2445510.5	116	129	150	185	252	410	1169	1277	423	257	189	152	130	117	109	104	103	105	110	120	136
1983 JUN 25.0	473	433	397	365	338	315	296	281	269	261	257	256	258	264	274	288	308	334	369	415	476
JD 2445500.5	105	120	144	186	272	539	8612	533	272	186	144	121	106	97	92	89	90	93	99	110	127
1983 JUN 15.0	462	423	389	359	334	312	291	279	269	261	258	257	260	267	279	295	317	346	385	437	507
JD 2445490.5	93	109	135	186	308	966	816	292	181	134	108	93	84	78	75	74	76	80	87	98	117
1983 JUN 5.0	451	414	382	354	329	309	291	278	268	262	259	259	263	272	284	302	327	360	404	464	545
JD 2445480.5	79	96	125	186	385	3465	324	172	119	93	78	69	63	60	59	59	61	65	73	84	104
1983 MAY 26.0	441	406	375	348	325	305	289	277	268	262	260	262	267	276	291	311	339	376	426	495	590
JD 2445470.5	63	78	109	186	699	392	155	99	74	60	52	47	44	43	42	43	45	49	56	67	87
1983 MAY 16.0	430	397	368	343	321	302	287	276	268	263	262	264	271	282	298	321	352	395	453	534	645
JD 2445460.5	42	55	84	187	724	125	69	49	39	33	29	27	26	25	25	26	28	31	36	45	63
1983 MAY 6.0	421	389	361	337	317	299	286	275	268	264	264	267	275	288	306	333	368	418	486	581	711
JD 2445450.5	14	20	36	193	56	25	16	12	10	9	8	8	7	7	8	8	9	10	12	16	24
1983 APR 26.0	411	381	355	332	313	297	284	274	268	265	266	271	280	295	316	346	388	446	526	640	790
JD 2445440.5	25	39	99	180	48	28	20	16	14	12	11	11	11	11	11	12	14	16	20	28	50
1983 APR 16.0	402	373	348	327	309	294	282	274	269	267	269	275	287	304	328	363	412	480	577	712	877
JD 2445430.5	85	162	2716	183	90	61	47	39	35	32	30	29	29	30	32	35	40	49	65	102	251
1983 APR 6.0	392	366	343	322	305	292	281	274	270	269	273	281	294	314	343	384	441	523	641	799	957
JD 2445420.5	191	599	519	184	114	84	68	59	53	50	48	47	48	51	55	62	73	93	134	252	2874
1983 MAR 27.0	384	359	336	318	302	289	280	274	271	272	277	287	303	327	361	409	478	579	720	893	999
JD 2445410.5	445	2565	339	184	129	102	86	76	70	67	65	66	68	73	81	94	116	157	255	755	744
1983 MAR 17.0	375	351	331	313	299	288	279	274	273	275	282	294	314	342	382	441	526	649	816	973	999
JD 2445400.5	1864	648	283	184	140	115	101	92	86	83	83	85	90	98	112	134	174	259	537	0	435
1983 MAR 7.0	367	345	325	309	296	286	279	275	275	279	289	304	327	361	410	482	587	738	917	0	997

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
	•				•				•				•				•				•
	JD2445800.5				JD2445840.5				JD2445880.5				JD2445920.5				JD2445960.5				
	1984 APR 10.0				1984 MAY 20.0				1984 JUN 29.0				1984 AUG 8.0				1984 SEP 17.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E18

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5	-619	-686	-747	-802	-852	-894	-930	-957	-983	-999	-1009	-1014	1013	1006	993	974	947	913	868	811	736
1983 JUL 5.0	1785	1775	1764	1753	1742	1733	1724	1719	1710	1707	1705	1706	1709	1715	1726	1740	1761	1788	1825	1874	1941
JD 2445510.5	-640	-704	-763	-816	-863	-904	-938	-966	-987	-1002	-1011	-1014	1012	1004	989	968	939	901	852	787	703
1983 JUN 25.0	1792	1781	1769	1758	1747	1738	1729	1721	1716	1712	1711	1712	1716	1724	1735	1752	1775	1806	1848	1905	1982
JD 2445500.5	-661	-723	-779	-830	-875	-913	-948	-971	-991	-1005	-1012	-1014	1011	1001	985	961	929	887	832	760	663
1983 JUN 15.0	1798	1787	1775	1763	1752	1743	1731	1726	1721	1718	1717	1719	1724	1733	1746	1765	1791	1827	1875	1940	2030
JD 2445490.5	-681	-741	-795	-843	-886	-922	-953	-977	-995	-1007	-1014	1015	1010	998	980	953	918	871	809	726	615
1983 JUN 5.0	1804	1792	1780	1768	1757	1748	1738	1731	1726	1723	1723	1726	1732	1742	1758	1779	1809	1850	1905	1982	2087
JD 2445480.5	-702	-759	-810	-857	-897	-932	-960	-982	-999	-1010	-1015	1015	1008	994	973	944	904	851	781	685	556
1983 MAY 26.0	1809	1797	1785	1773	1762	1751	1744	1737	1732	1729	1730	1733	1741	1753	1770	1795	1830	1877	1941	2031	2156
JD 2445470.5	-722	-776	-826	-870	-908	-940	-967	-987	-1002	-1012	-1015	1014	1005	989	965	932	888	827	746	635	484
1983 MAY 16.0	1815	1802	1790	1778	1767	1757	1749	1742	1738	1736	1737	1742	1750	1764	1785	1813	1853	1907	1983	2090	2239
JD 2445460.5	-741	-794	-841	-882	-918	-949	-973	-992	-1006	-1013	1016	1012	1001	983	956	919	868	798	704	573	395
1983 MAY 6.0	1819	1807	1794	1782	1771	1762	1754	1747	1744	1742	1745	1750	1761	1777	1801	1834	1880	1944	2034	2162	2340
JD 2445450.5	-761	-811	-855	-895	-929	-957	-980	-997	-1009	-1015	1016	1009	996	975	944	902	843	762	650	494	288
1983 APR 26.0	1824	1811	1798	1786	1776	1766	1759	1753	1750	1750	1753	1760	1772	1792	1819	1858	1912	1988	2096	2250	2459
JD 2445440.5	-780	-827	-870	-907	-939	-965	-986	-1001	-1011	-1015	1015	1006	990	966	930	881	812	717	583	397	169
1983 APR 16.0	1828	1815	1802	1791	1780	1771	1764	1759	1756	1757	1762	1771	1786	1808	1840	1885	1950	2041	2173	2359	2594
JD 2445430.5	-798	-844	-884	-919	-949	-973	-992	-1005	-1013	1017	1013	1001	982	954	912	855	774	659	497	279	59
1983 APR 6.0	1832	1819	1807	1795	1785	1776	1769	1765	1763	1765	1771	1783	1800	1827	1865	1919	1996	2107	2269	2490	2723
JD 2445420.5	-817	-860	-898	-930	-958	-980	-997	-1009	-1015	1016	1009	995	973	939	890	822	724	585	388	149	1
1983 MAR 27.0	1836	1823	1810	1799	1789	1781	1775	1771	1771	1774	1782	1796	1817	1849	1894	1959	2053	2191	2389	2636	2805
JD 2445410.5	-835	-876	-911	-942	-967	-987	-1002	-1012	-1016	1014	1005	987	960	920	862	780	661	489	257	38	-0
1983 MAR 17.0	1839	1826	1814	1803	1794	1786	1781	1778	1779	1784	1795	1811	1837	1875	1930	2009	2126	2297	2534	2768	3016
JD 2445400.5	-852	-891	-924	-952	-976	-994	-1007	-1014	1016	1011	999	977	944	895	826	725	577	366	116	0	-3
1983 MAR 7.0	1843	1830	1818	1807	1798	1792	1787	1786	1788	1796	1809	1829	1861	1906	1973	2072	2219	2432	2692	0	3040

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD2445800.5				JD2445840.5				JD2445880.5					JD2445920.5				JD2445960.5				
1984 APR 10.0				1984 MAY 20.0				1984 JUN 29.0					1984 AUG 8.0				1984 SEP 17.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E18

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5	118	124	130	136	143	150	157	164	172	180	188	196	204	213	223	233	243	254	267	282	300
1983 JUL 5.0	180	187	195	203	211	219	228	236	245	254	263	272	281	290	299	309	318	327	337	346	355
JD 2445510.5	122	128	134	140	147	154	161	168	176	184	192	200	209	218	227	237	248	260	273	289	309
1983 JUN 25.0	186	193	201	209	217	226	234	243	252	260	269	278	287	297	306	315	324	334	343	352	362
JD 2445500.5	126	132	138	144	151	158	166	173	180	188	196	205	213	222	232	242	253	265	279	297	320
1983 JUN 15.0	192	199	207	215	224	232	241	249	258	267	276	285	294	303	312	322	331	340	349	359	368
JD 2445490.5	130	136	142	148	155	162	169	177	184	192	201	209	218	227	237	247	258	271	286	306	334
1983 JUN 5.0	198	206	214	222	230	238	247	256	264	273	282	291	300	309	319	328	337	347	356	365	374
JD 2445480.5	134	140	146	152	159	166	174	181	189	197	205	214	222	232	242	252	264	278	294	317	352
1983 MAY 26.0	204	212	220	228	236	245	253	262	271	280	289	298	307	316	325	334	344	353	362	371	380
JD 2445470.5	137	144	150	157	163	171	178	185	193	201	210	218	227	237	247	258	270	285	303	330	377
1983 MAY 16.0	210	218	226	234	243	251	260	268	277	286	295	304	313	323	332	341	350	359	369	377	386
JD 2445460.5	141	148	154	161	168	175	182	190	198	206	214	223	232	242	252	264	277	293	314	348	416
1983 MAY 6.0	216	224	232	241	249	258	266	275	284	293	302	311	320	329	338	348	357	366	375	384	392
JD 2445450.5	145	152	158	165	172	179	187	194	202	211	219	228	237	247	258	270	284	302	328	374	483
1983 APR 26.0	223	231	239	247	256	264	273	282	290	299	308	317	327	336	345	354	363	372	381	390	397
JD 2445440.5	150	156	163	170	177	184	191	199	207	215	224	233	242	252	264	276	292	313	347	416	626
1983 APR 16.0	229	237	245	254	262	271	279	288	297	306	315	324	333	342	352	361	370	379	387	395	402
JD 2445430.5	154	160	167	174	181	188	196	204	212	220	229	238	248	258	270	284	302	328	375	492	1052
1983 APR 6.0	235	243	252	260	269	277	286	295	304	313	322	331	340	349	358	367	376	385	394	401	407
JD 2445420.5	158	165	171	179	186	193	201	209	217	225	234	243	253	264	277	292	313	348	421	667	6756
1983 MAR 27.0	242	250	258	267	275	284	293	302	311	320	329	338	347	356	365	374	383	391	399	406	410
JD 2445410.5	162	169	176	183	190	198	206	214	222	230	239	249	259	271	285	302	329	379	513	1319	117
1983 MAR 17.0	248	256	265	273	282	291	299	308	317	326	335	344	354	363	372	381	389	398	405	410	253
JD 2445400.5	167	174	181	188	195	203	211	219	227	236	245	255	266	278	293	315	351	434	754	0	118
1983 MAR 7.0	254	263	271	280	289	297	306	315	324	333	342	351	360	369	378	387	396	404	410	0	256

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD2445800.5				JD2445840.5					JD2445880.5				JD2445920.5				JD2445960.5				
1984 APR 10.0				1984 MAY 20.0					1984 JUN 29.0				1984 AUG 8.0				1984 SEP 17.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E18

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5 1983 JUL 5.0	1524	1524	1524	1524	1458	1389	1362	1524	1285	1212	1186	1175	1177	1188	1211	1246	1294	1360	1449	1524	1524
JD 2445510.5 1983 JUN 25.0	1524	1524	1524	1523	1441	1380	1447	1430	1239	1200	1181	1174	1178	1193	1219	1257	1312	1386	1486	1524	1524
JD 2445500.5 1983 JUN 15.0	1524	1524	1524	1501	1424	1379	1524	1279	1221	1193	1178	1174	1181	1198	1228	1272	1332	1416	1524	1524	1524
JD 2445490.5 1983 JUN 5.0	1524	1524	1524	1480	1409	1432	1354	1248	1211	1188	1176	1175	1184	1205	1239	1288	1357	1452	1524	1524	1524
JD 2445480.5 1983 MAY 26.0	1524	1524	1524	1459	1397	1524	1282	1234	1203	1184	1175	1177	1189	1214	1253	1309	1387	1496	1524	1524	1524
JD 2445470.5 1983 MAY 16.0	1524	1524	1517	1438	1416	1323	1262	1224	1197	1181	1175	1180	1196	1225	1269	1333	1423	1524	1524	1524	1524
JD 2445460.5 1983 MAY 6.0	1524	1524	1491	1417	1403	1295	1249	1216	1192	1179	1176	1184	1204	1238	1289	1363	1467	1524	1524	1524	1524
JD 2445450.5 1983 APR 26.0	1524	1524	1466	1397	1331	1280	1239	1208	1188	1177	1178	1189	1214	1254	1314	1400	1523	1524	1524	1524	1524
JD 2445440.5 1983 APR 16.0	1524	1521	1442	1376	1314	1267	1229	1202	1184	1177	1181	1197	1227	1274	1344	1445	1524	1524	1524	1524	1524
JD 2445430.5 1983 APR 6.0	1524	1495	1524	1356	1299	1254	1220	1196	1182	1178	1185	1207	1243	1299	1382	1503	1524	1524	1524	1524	1524
JD 2445420.5 1983 MAR 27.0	1524	1499	1421	1336	1284	1243	1212	1191	1180	1181	1193	1220	1264	1331	1430	1524	1524	1524	1524	1524	1524
JD 2445410.5 1983 MAR 17.0	1524	1524	1382	1317	1269	1231	1204	1187	1180	1185	1203	1236	1290	1371	1492	1524	1524	1524	1524	1524	1524
JD 2445400.5 1983 MAR 7.0	1524	1452	1356	1299	1254	1221	1197	1184	1182	1192	1216	1258	1324	1423	1524	1524	1524	1524	1524	0	1524

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD2445800.5 1984 APR 10.0					JD2445840.5 1984 MAY 20.0					JD2445880.5 1984 JUN 29.0					JD2445920.5 1984 AUG 8.0					JD2445960.5 1984 SEP 17.0	

EARTH DEPARTURE OR ARRIVAL DATE

M26
E18

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5	371	240	123	21	0	0	0	2252	0	0	0	0	0	0	0	0	0	0	0	44	209
1983 JUL 5.0	577	503	441	388	345	314	314	2258	338	267	248	240	240	245	256	275	303	343	400	482	598
JD 2445510.5	334	208	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99	290
1983 JUN 25.0	575	504	443	392	350	323	405	489	294	264	252	247	249	256	270	291	324	370	437	532	669
JD 2445500.5	298	177	70	0	0	0	2883	0	0	0	0	0	0	0	0	0	0	0	6	164	389
1983 JUN 15.0	573	505	445	396	356	338	2862	334	284	266	258	256	259	268	285	311	348	403	480	592	755
JD 2445490.5	262	146	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	245	512
1983 JUN 5.0	573	506	448	400	362	400	414	309	284	272	266	265	271	283	303	333	377	440	532	665	861
JD 2445480.5	226	116	18	0	0	738	0	0	0	0	0	0	0	0	0	0	0	0	125	345	668
1983 MAY 26.0	572	507	452	405	371	1251	341	306	289	279	275	277	284	299	323	358	410	485	594	755	994
JD 2445470.5	191	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	207	471	868
1983 MAY 16.0	572	510	456	410	403	381	332	310	296	289	286	290	300	318	346	388	449	539	670	867	1164
JD 2445460.5	156	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	310	634	1127
1983 MAY 6.0	573	513	460	415	470	361	335	317	305	299	299	305	318	340	373	423	497	605	765	1008	1383
JD 2445450.5	122	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177	442	846	1468
1983 APR 26.0	575	516	466	422	393	364	342	326	316	312	313	322	338	365	405	465	554	686	885	1192	1669
JD 2445440.5	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	285	615	1127	1910
1983 APR 16.0	577	522	477	428	397	371	351	337	328	326	330	341	362	394	443	516	624	788	1039	1434	2040
JD 2445430.5	55	0	503	0	0	0	0	0	0	0	0	0	0	0	0	0	157	427	845	1503	2460
1983 APR 6.0	582	533	1109	435	405	380	361	349	342	342	348	363	389	429	489	578	713	919	1243	1755	2504
JD 2445420.5	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	274	616	1158	2000	3081
1983 MAR 27.0	590	585	493	443	414	390	373	362	358	360	370	389	421	470	544	655	825	1091	1515	2177	3034
JD 2445410.5	8	462	0	0	0	0	0	0	0	0	0	0	0	0	0	150	429	873	1585	2615	3068
1983 MAR 17.0	616	990	491	452	424	402	387	378	376	381	395	420	460	521	613	753	971	1321	1883	2701	3133
JD 2445400.5	265	0	0	0	0	0	0	0	0	0	0	0	0	0	49	279	642	1231	2150	0	2973
1983 MAR 7.0	922	560	497	462	435	415	402	395	396	405	424	456	506	582	699	879	1166	1634	2368	0	3096

(FLT T)(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD2445800.5 1984 APR 10.0	JD2445840.5 1984 MAY 20.0	JD2445880.5 1984 JUN 29.0	JD2445920.5 1984 AUG 8.0	JD2445960.5 1984 SEP 17.0																

EARTH DEPARTURE OR ARRIVAL DATE

M26
E18

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2445520.5	948	743	563	409	345	314	314	4509	338	267	248	240	240	245	256	275	303	343	400	526	807
1983 JUL 5.0	1120	1218	1315	1412	1508	1604	1700	1788	1892	1987	2082	2178	2273	2369	2466	2562	2660	2758	2856	2955	3054
JD 2445510.5	909	712	539	392	350	323	405	489	294	264	252	247	249	256	270	291	324	370	437	631	959
1983 JUN 25.0	1170	1268	1365	1462	1558	1654	1749	1847	1941	2037	2132	2227	2323	2419	2515	2612	2709	2807	2906	3005	3104
JD 2445500.5	871	682	516	396	356	338	5745	334	284	266	258	256	259	268	285	311	348	403	486	757	1144
1983 JUN 15.0	1220	1318	1415	1512	1609	1704	1809	1897	1992	2087	2182	2278	2374	2470	2566	2663	2760	2858	2956	3055	3155
JD 2445490.5	834	652	492	400	362	400	414	309	284	272	266	265	271	283	303	333	377	440	592	910	1374
1983 JUN 5.0	1272	1369	1467	1564	1660	1756	1853	1948	2043	2138	2234	2329	2425	2521	2617	2714	2811	2909	3008	3107	3206
JD 2445480.5	798	623	470	405	371	1989	341	306	289	279	275	277	284	299	323	358	410	485	720	1100	1662
1983 MAY 26.0	1324	1422	1519	1616	1712	1810	1904	2000	2095	2191	2286	2381	2477	2573	2669	2766	2864	2961	3060	3159	3258
JD 2445470.5	763	595	456	410	403	381	332	310	296	289	286	290	300	318	346	388	449	565	877	1338	2032
1983 MAY 16.0	1377	1475	1572	1669	1765	1862	1957	2053	2148	2244	2339	2435	2530	2626	2723	2819	2917	3015	3113	3212	3311
JD 2445460.5	729	568	460	415	470	361	335	317	305	299	299	305	318	340	373	423	497	697	1075	1642	2510
1983 MAY 6.0	1431	1529	1626	1723	1820	1916	2011	2107	2202	2298	2393	2489	2584	2680	2777	2874	2971	3069	3167	3266	3366
JD 2445450.5	696	542	466	422	393	364	342	326	316	312	313	322	338	365	405	465	554	863	1327	2038	3136
1983 APR 26.0	1486	1584	1681	1778	1875	1971	2067	2162	2257	2353	2448	2544	2639	2735	2832	2929	3026	3124	3222	3321	3421
JD 2445440.5	665	522	477	428	397	371	351	337	328	326	330	341	362	394	443	516	692	1073	1654	2561	3950
1983 APR 16.0	1542	1640	1737	1834	1931	2027	2122	2218	2313	2409	2504	2600	2695	2791	2888	2985	3082	3180	3278	3377	3477
JD 2445430.5	637	533	1612	435	405	380	361	349	342	342	348	363	389	429	489	578	870	1345	2088	3258	4964
1983 APR 6.0	1599	1697	1794	1891	1988	2084	2179	2275	2370	2466	2561	2657	2752	2848	2945	3041	3139	3237	3335	3434	3533
JD 2445420.5	615	585	493	443	414	390	373	362	358	360	370	389	421	470	544	708	1099	1706	2674	4176	6115
1983 MAR 27.0	1657	1755	1852	1949	2046	2142	2237	2333	2428	2524	2619	2714	2810	2906	3003	3099	3197	3294	3393	3492	3590
JD 2445410.5	625	1452	491	452	424	402	387	378	376	381	395	420	460	521	613	902	1401	2194	3467	5316	6201
1983 MAR 17.0	1715	1815	1911	2008	2104	2200	2296	2392	2487	2582	2678	2773	2869	2965	3061	3158	3255	3353	3452	3550	51
JD 2445400.5	1186	560	497	462	435	415	402	395	396	405	424	456	506	582	748	1158	1808	2865	4518	0	6069
1983 MAR 7.0	1774	1874	1971	2068	2164	2260	2356	2451	2547	2642	2737	2833	2929	3025	3121	3218	3315	3413	3511	0	110

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2445800.5	JD2445840.5	JD2445880.5	JD2445920.5	JD2445960.5
1984 APR 10.0	1984 MAY 20.0	1984 JUN 29.0	1984 AUG 8.0	1984 SEP 17.0

EARTH DEPARTURE OR ARRIVAL DATE

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445800.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671578	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.670	DEGREES
MEAN ANOM. AT EPOCH	=	95.745	DEGREES
DATE OF NODAL PASSAGE	=	2445966.346	(J.D.)
OBLIQUITY OF EQUATOR	=	23.441	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2445800.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09339099	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.436	DEGREES
ARG. OF PERIHELION	=	286.333	DEGREES
MEAN ANOM. AT EPOCH	=	249.149	DEGREES
DATE OF NODAL PASSAGE	=	2445446.438	(J.D.)
OBLIQUITY OF EQUATOR	=	24.024	DEGREES
ARG. OF V. EQUINOX	=	219.079	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E19

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5	447	544	674	855	1101	1404	1502	1444	1383	1321	1259	1196	1133	1070	1008	947	886	828	770	715	661
1983 JUL 5.0	268	331	419	544	718	936	1022	980	938	896	854	812	772	732	693	655	619	585	552	520	491
JD 2445510.5	482	593	746	959	1241	0	1474	1415	1354	1293	1230	1168	1105	1043	981	921	862	804	747	693	640
1983 JUN 25.0	295	369	473	623	825	0	1010	968	926	883	841	800	759	719	681	644	608	574	541	510	481
JD 2445500.5	523	653	834	1084	1398	1503	1445	1386	1325	1264	1202	1139	1077	1016	955	895	837	780	724	671	619
1983 JUN 15.0	328	415	540	719	946	1041	998	956	913	871	829	788	747	707	669	632	597	563	531	500	472
JD 2445490.5	573	726	942	1233	0	1473	1415	1356	1296	1234	1173	1111	1050	989	929	870	812	756	701	649	0
1983 JUN 5.0	367	471	624	835	0	1029	987	944	901	859	817	775	735	696	658	621	586	553	521	491	0
JD 2445480.5	635	818	1075	1401	1500	1444	1385	1326	1266	1205	1144	1082	1022	961	902	844	787	732	679	0	0
1983 MAY 26.0	415	542	728	968	1060	1018	975	932	889	847	805	764	723	684	647	611	576	543	512	0	0
JD 2445470.5	712	933	1236	0	1470	1413	1355	1296	1236	1175	1114	1054	993	934	876	819	763	708	0	0	0
1983 MAY 16.0	475	632	855	0	1049	1006	963	920	877	835	793	752	712	673	636	600	566	534	0	0	0
JD 2445460.5	809	1076	1418	1495	1439	1382	1324	1265	1205	1145	1085	1025	965	907	849	793	738	0	0	0	0
1983 MAY 6.0	551	747	1002	1080	1038	995	951	908	865	823	781	740	701	662	626	590	557	0	0	0	0
JD 2445450.5	933	1252	0	1464	1408	1351	1293	1234	1174	1114	1055	995	937	879	823	767	0	0	0	0	0
1983 APR 26.0	651	888	0	1069	1026	983	939	896	853	811	769	729	690	652	615	581	0	0	0	0	0
JD 2445440.5	1091	1450	1487	1432	1376	1319	1261	1202	1143	1084	1025	966	908	852	796	0	0	0	0	0	0
1983 APR 16.0	778	1050	1100	1058	1014	971	927	884	841	799	758	718	679	642	606	0	0	0	0	0	0
JD 2445430.5	1285	1508	1455	1400	1344	1287	1229	1170	1112	1053	995	937	880	824	0	0	0	0	0	0	0
1983 APR 6.0	936	1131	1089	1046	1002	958	915	872	829	787	747	707	668	631	0	0	0	0	0	0	0
JD 2445420.5	1501	1476	1423	1368	1311	1254	1196	1138	1080	1022	964	907	851	0	0	0	0	0	0	0	0
1983 MAR 27.0	1116	1119	1077	1033	990	946	903	859	817	776	735	696	658	0	0	0	0	0	0	0	0
JD 2445410.5	1496	1444	1390	1334	1278	1221	1164	1106	1048	991	934	878	0	0	0	0	0	0	0	0	0
1983 MAR 17.0	1150	1107	1064	1020	977	933	890	847	805	764	724	685	0	0	0	0	0	0	0	0	0
JD 2445400.5	1463	1410	1356	1301	1245	1188	1131	1073	1016	959	903	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0	1137	1094	1051	1007	964	920	877	834	793	752	713	0	0	0	0	0	0	0	0	0	0

(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)

JD2446000.5	JD2446040.5	JD2446080.5	JD2446120.5	JD2446160.5
1984 OCT 27.0	1984 DEC 6.0	1985 JAN 15.0	1985 FEB 24.0	1985 APR 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E19

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5	173	184	193	198	197	190	-169	-146	-122	-95	-68	-40	-11	16	43	69	93	115	134	149	158
1983 JUL 5.0	345	388	425	451	458	444	3167	3241	3312	3383	3452	3520	3587	54	121	187	254	321	388	456	524
JD 2445510.5	162	173	180	183	179	0	-172	-150	-126	-100	-73	-44	-16	11	38	65	89	111	130	144	152
1983 JUN 25.0	327	366	397	413	407	0	3154	3228	3300	3370	3440	3508	3575	42	109	175	242	308	375	443	510
JD 2445500.5	151	160	166	165	157	-195	-176	-154	-130	-104	-77	-49	-21	6	34	60	85	107	126	140	146
1983 JUN 15.0	307	340	363	368	350	3064	3140	3214	3287	3358	3427	3496	3563	30	97	163	229	295	362	429	496
JD 2445490.5	138	146	149	144	0	-197	-179	-158	-134	-108	-81	-54	-25	2	29	56	80	103	122	135	0
1983 JUN 5.0	284	311	324	315	0	3050	3126	3201	3274	3345	3415	3483	3551	18	84	150	216	282	348	415	0
JD 2445480.5	123	129	128	118	-214	-200	-182	-161	-138	-113	-86	-58	-30	-2	25	52	76	99	118	0	0
1983 MAY 26.0	258	277	277	254	2957	3036	3112	3187	3260	3332	3402	3471	3539	5	72	137	203	269	334	0	0
JD 2445470.5	107	109	103	0	-216	-202	-185	-165	-142	-117	-90	-63	-34	-6	21	47	73	95	0	0	0
1983 MAY 16.0	227	236	222	0	2942	3021	3098	3173	3247	3319	3389	3458	3526	3593	59	124	190	254	0	0	0
JD 2445460.5	88	85	73	-227	-218	-205	-188	-168	-145	-121	-94	-67	-39	-10	17	44	69	0	0	0	0
1983 MAY 6.0	191	186	157	2847	2927	3006	3084	3159	3233	3306	3376	3445	3513	3580	46	111	175	0	0	0	0
JD 2445450.5	65	56	0	-228	-219	-207	-191	-171	-149	-125	-98	-71	-43	-14	13	40	0	0	0	0	0
1983 APR 26.0	147	127	0	2832	2912	2991	3069	3145	3220	3292	3363	3432	3500	3566	32	97	0	0	0	0	0
JD 2445440.5	37	22	-233	-229	-221	-209	-193	-174	-152	-128	-102	-75	-47	-18	9	0	0	0	0	0	0
1983 APR 16.0	93	57	2735	2816	2897	2976	3054	3131	3205	3278	3349	3418	3486	3552	18	0	0	0	0	0	0
JD 2445430.5	4	-231	-232	-229	-222	-211	-196	-177	-156	-132	-106	-79	-51	-22	0	0	0	0	0	0	0
1983 APR 6.0	27	2637	2719	2800	2881	2961	3039	3116	3191	3264	3335	3404	3472	3538	0	0	0	0	0	0	0
JD 2445420.5	-32	-230	-232	-229	-223	-212	-198	-180	-159	-135	-110	-82	-54	0	0	0	0	0	0	0	0
1983 MAR 27.0	3549	2621	2703	2784	2865	2945	3024	3101	3176	3250	3321	3390	3458	0	0	0	0	0	0	0	0
JD 2445410.5	-221	-228	-231	-229	-224	-214	-200	-182	-162	-138	-113	-85	0	0	0	0	0	0	0	0	0
1983 MAR 17.0	2525	2605	2686	2768	2849	2930	3009	3086	3162	3235	3306	3375	0	0	0	0	0	0	0	0	0
JD 2445400.5	-219	-226	-230	-229	-224	-215	-202	-185	-164	-141	-116	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0	2508	2589	2670	2752	2833	2914	2993	3071	3146	3220	3291	0	0	0	0	0	0	0	0	0	0

(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)

JD2446000.5	JD2446040.5	JD2446080.5	JD2446120.5	JD2446160.5
1984 OCT 27.0	1984 DEC 6.0	1985 JAN 15.0	1985 FEB 24.0	1985 APR 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E19

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5		96	106	119	136	159	188	170	162	155	147	138	130	122	114	106	99	91	85	79	75	73
1983 JUL 5.0		1536	1538	1529	1502	1451	1370	1351	1374	1397	1419	1441	1462	1483	1504	1524	1544	1564	1583	1603	1622	1642
JD 2445510.5		112	124	139	159	185	0	181	174	166	158	151	143	135	127	120	112	106	99	94	90	90
1983 JUN 25.0		1494	1490	1473	1435	1367	0	1313	1336	1358	1380	1402	1424	1445	1465	1486	1506	1525	1544	1564	1583	1603
JD 2445500.5		129	143	160	183	210	197	191	184	177	170	163	155	148	140	133	126	119	113	108	105	107
1983 JUN 15.0		1448	1438	1411	1357	1271	1250	1273	1296	1319	1341	1363	1384	1405	1426	1446	1466	1485	1504	1523	1543	1564
JD 2445490.5		146	161	181	206	0	206	200	194	187	181	174	167	160	153	146	139	133	127	122	120	0
1983 JUN 5.0		1398	1380	1340	1267	0	1209	1232	1255	1278	1300	1322	1343	1364	1385	1405	1425	1444	1463	1482	1502	0
JD 2445480.5		163	180	202	226	219	214	208	203	197	191	184	178	171	164	158	151	145	140	135	0	0
1983 MAY 26.0		1343	1313	1256	1163	1143	1167	1190	1213	1236	1258	1280	1301	1322	1343	1363	1382	1402	1421	1439	0	0
JD 2445470.5		180	199	222	0	225	220	216	211	205	200	194	188	181	175	169	162	156	151	0	0	0
1983 MAY 16.0		1280	1237	1158	0	1100	1123	1147	1170	1193	1215	1237	1258	1279	1299	1319	1339	1358	1377	0	0	0
JD 2445460.5		196	216	236	233	230	226	222	218	213	208	202	197	191	185	179	173	167	0	0	0	0
1983 MAY 6.0		1209	1147	1045	1031	1055	1079	1102	1126	1148	1170	1192	1214	1234	1255	1274	1294	1313	0	0	0	0
JD 2445450.5		211	230	0	236	234	231	227	223	219	215	210	204	199	193	187	181	0	0	0	0	0
1983 APR 26.0		1126	1040	0	986	1010	1034	1057	1080	1102	1125	1146	1168	1188	1208	1228	1247	0	0	0	0	0
JD 2445440.5		223	237	240	238	236	234	231	228	224	220	216	211	206	200	195	0	0	0	0	0	0
1983 APR 16.0		1028	916	916	940	963	987	1010	1033	1056	1078	1099	1120	1141	1161	1180	0	0	0	0	0	0
JD 2445430.5		229	240	239	239	237	236	234	231	228	224	220	216	211	206	0	0	0	0	0	0	0
1983 APR 6.0		911	845	869	893	916	939	962	985	1008	1030	1051	1072	1092	1112	0	0	0	0	0	0	0
JD 2445420.5		226	237	238	238	237	236	235	233	230	227	224	219	215	0	0	0	0	0	0	0	0
1983 MAR 27.0		778	798	821	845	868	891	914	936	959	980	1002	1022	1043	0	0	0	0	0	0	0	0
JD 2445410.5		232	233	235	235	235	235	234	232	230	228	225	221	0	0	0	0	0	0	0	0	0
1983 MAR 17.0		726	749	773	796	819	842	864	887	909	930	951	972	0	0	0	0	0	0	0	0	0
JD 2445400.5		226	228	230	231	232	232	232	231	229	227	224	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0		678	701	724	747	769	792	814	836	858	879	900	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)
		JD2446000.5		JD2446040.5		JD2446080.5				JD2446120.5				JD2446160.5								
		1984 OCT 27.0		1984 DEC 6.0		1985 JAN 15.0				1985 FEB 24.0				1985 APR 5.0								

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E19

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5 1983 JUL 5.0		2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564	2564
JD 2445510.5 1983 JUN 25.0		2562	2562	2562	2562	2562	0	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562	2562
JD 2445500.5 1983 JUN 15.0		2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555	2555
JD 2445490.5 1983 JUN 5.0		2543	2543	2543	2543	0	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	0
JD 2445480.5 1983 MAY 26.0		2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	0	0
JD 2445470.5 1983 MAY 16.0		2508	2508	2508	0	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	2508	0	0	0
JD 2445460.5 1983 MAY 6.0		2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	2485	0	0	0	0
JD 2445450.5 1983 APR 26.0		2458	2458	0	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	2458	0	0	0	0	0
JD 2445440.5 1983 APR 16.0		2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	2429	0	0	0	0	0	0
JD 2445430.5 1983 APR 6.0		2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	2398	0	0	0	0	0	0	0
JD 2445420.5 1983 MAR 27.0		2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	0	0	0	0	0	0	0	0
JD 2445410.5 1983 MAR 17.0		2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	2329	0	0	0	0	0	0	0	0	0
JD 2445400.5 1983 MAR 7.0		2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	2292	0	0	0	0	0	0	0	0	0	0

	(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)

JD2446000.5 1984 OCT 27.0 — JD2446040.5 1984 DEC 6.0 — JD2446080.5 1985 JAN 15.0 — JD2446120.5 1985 FEB 24.0 — JD2446160.5 1985 APR 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M26
E19

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
1983 JUL 5.0	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
JD 2445510.5	38	38	38	38	38	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
1983 JUN 25.0	58	58	58	58	58	0	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2445500.5	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
1983 JUN 15.0	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
JD 2445490.5	4	4	4	4	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
1983 JUN 5.0	6	6	6	6	0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	0
JD 2445480.5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	0	0
1983 MAY 26.0	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	0	0
JD 2445470.5	32	32	32	0	32	32	32	32	32	32	32	32	32	32	32	32	32	32	0	0	0
1983 MAY 16.0	48	48	48	0	48	48	48	48	48	48	48	48	48	48	48	48	48	48	0	0	0
JD 2445460.5	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	0	0	0	0
1983 MAY 6.0	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	0	0	0	0
JD 2445450.5	67	67	0	67	67	67	67	67	67	67	67	67	67	67	67	67	0	0	0	0	0
1983 APR 26.0	98	98	0	98	98	98	98	98	98	98	98	98	98	98	98	98	0	0	0	0	0
JD 2445440.5	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	0	0	0	0	0	0
1983 APR 16.0	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	0	0	0	0	0	0
JD 2445430.5	101	101	101	101	101	101	101	101	101	101	101	101	101	101	0	0	0	0	0	0	0
1983 APR 6.0	147	147	147	147	147	147	147	147	147	147	147	147	147	147	0	0	0	0	0	0	0
JD 2445420.5	117	117	117	117	117	117	117	117	117	117	117	117	117	0	0	0	0	0	0	0	0
1983 MAR 27.0	171	171	171	171	171	171	171	171	171	171	171	171	171	0	0	0	0	0	0	0	0
JD 2445410.5	134	134	134	134	134	134	134	134	134	134	134	134	0	0	0	0	0	0	0	0	0
1983 MAR 17.0	195	195	195	195	195	195	195	195	195	195	195	195	0	0	0	0	0	0	0	0	0
JD 2445400.5	151	151	151	151	151	151	151	151	151	151	151	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0	218	218	218	218	218	218	218	218	218	218	218	0	0	0	0	0	0	0	0	0	0

(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)
JD2446000.5 1984 OCT 27.0	JD2446040.5 1984 DEC 6.0	JD2446080.5 1985 JAN 15.0	JD2446120.5 1985 FEB 24.0	JD2446160.5 1985 APR 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E19

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5	3054	3154	3255	3356	3457	3557	62	163	265	367	468	569	670	770	870	970	1068	1166	1264	1361	1458
1983 JUL 5.0	1351	1367	1401	1463	1569	1724	1775	1735	1694	1654	1613	1573	1533	1494	1455	1417	1379	1342	1306	1270	1236
JD 2445510.5	3104	3204	3305	3405	3507	0	111	213	315	416	518	619	720	820	920	1019	1118	1216	1314	1411	1507
1983 JUN 25.0	1342	1368	1416	1500	1635	0	1756	1715	1674	1633	1593	1552	1512	1473	1434	1395	1357	1320	1284	1249	1215
JD 2445500.5	3155	3255	3355	3456	3557	60	161	263	365	467	568	670	770	871	971	1070	1169	1267	1364	1461	1558
1983 JUN 15.0	1338	1375	1441	1553	1718	1776	1735	1694	1653	1612	1571	1531	1491	1451	1412	1373	1336	1299	1263	1227	1194
JD 2445490.5	3206	3306	3407	3507	0	111	213	314	416	518	620	721	822	922	1022	1121	1220	1318	1416	1513	0
1983 JUN 5.0	1340	1392	1481	1625	0	1755	1714	1672	1631	1590	1549	1509	1468	1429	1390	1351	1313	1276	1240	1205	0
JD 2445480.5	3258	3358	3459	3559	62	163	265	367	469	570	672	773	874	974	1074	1173	1272	1370	1468	0	0
1983 MAY 26.0	1349	1420	1540	1717	1775	1734	1692	1650	1609	1568	1527	1486	1446	1406	1367	1328	1291	1254	1218	0	0
JD 2445470.5	3311	3411	3512	0	115	216	318	420	522	624	725	826	927	1027	1127	1227	1325	1424	0	0	0
1983 MAY 16.0	1369	1465	1620	0	1753	1711	1670	1628	1586	1545	1504	1463	1423	1383	1344	1305	1267	1230	0	0	0
JD 2445460.5	3366	3466	3566	67	169	270	372	474	576	678	779	880	981	1082	1181	1281	1379	0	0	0	0
1983 MAY 6.0	1402	1532	1725	1772	1730	1688	1647	1605	1563	1521	1480	1439	1399	1359	1320	1281	1244	0	0	0	0
JD 2445450.5	3421	3521	0	122	224	325	427	529	631	733	834	935	1036	1137	1236	1336	0	0	0	0	0
1983 APR 26.0	1454	1624	0	1749	1707	1665	1623	1581	1539	1497	1456	1415	1375	1335	1296	1257	0	0	0	0	0
JD 2445440.5	3477	3577	77	178	280	381	483	585	687	789	890	991	1092	1193	1292	0	0	0	0	0	0
1983 APR 16.0	1532	1744	1768	1726	1683	1641	1599	1557	1515	1473	1432	1391	1350	1310	1271	0	0	0	0	0	0
JD 2445430.5	3533	34	134	235	336	438	540	642	744	846	947	1048	1149	1250	0	0	0	0	0	0	0
1983 APR 6.0	1640	1786	1744	1701	1659	1616	1574	1532	1490	1448	1406	1366	1325	1285	0	0	0	0	0	0	0
JD 2445420.5	3590	92	192	293	394	496	598	700	802	903	1005	1106	1207	0	0	0	0	0	0	0	0
1983 MAR 27.0	1775	1761	1719	1676	1634	1591	1549	1506	1464	1422	1381	1340	1300	0	0	0	0	0	0	0	0
JD 2445410.5	51	150	251	352	453	555	657	759	860	962	1064	1165	0	0	0	0	0	0	0	0	0
1983 MAR 17.0	1779	1736	1694	1651	1608	1566	1523	1481	1438	1397	1355	1314	0	0	0	0	0	0	0	0	0
JD 2445400.5	110	210	310	411	513	614	716	818	920	1022	1123	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0	1753	1710	1668	1625	1582	1539	1497	1454	1412	1371	1329	0	0	0	0	0	0	0	0	0	0

(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)

JD2446000.5	JD2446040.5	JD2446080.5	JD2446120.5	JD2446160.5
1984 OCT 27.0	1984 DEC 6.0	1985 JAN 15.0	1985 FEB 24.0	1985 APR 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26 E19

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5	143	166	205	281	470	1584	1083	414	260	195	159	139	126	119	116	117	121	130	144	168	207
1983 JUL 5.0	450	522	617	741	883	988	999	993	981	965	944	920	893	864	834	803	771	739	708	678	649
JD 2445510.5	136	162	209	310	637	0	537	285	198	155	131	117	109	104	103	105	111	121	138	164	211
1983 JUN 25.0	476	558	668	805	943	0	997	988	974	956	934	909	881	851	821	789	758	726	696	666	638
JD 2445500.5	127	158	215	359	1192	858	321	201	150	123	107	97	92	89	90	93	100	111	130	160	218
1983 JUN 15.0	507	602	727	874	986	999	993	982	966	946	923	896	868	838	807	776	744	714	683	654	627
JD 2445490.5	117	152	225	463	0	387	205	143	112	95	84	78	75	74	76	80	88	100	120	155	0
1983 JUN 5.0	545	654	795	939	0	997	988	975	957	935	911	884	855	824	793	762	731	701	671	643	0
JD 2445480.5	104	143	241	834	548	209	132	98	80	70	64	60	59	59	62	66	74	86	107	0	0
1983 MAY 26.0	590	717	869	987	999	993	982	967	947	924	898	870	841	811	780	749	718	688	659	0	0
JD 2445470.5	87	131	276	0	212	115	80	63	53	48	44	43	42	43	46	50	57	69	0	0	0
1983 MAY 16.0	645	790	940	0	997	988	975	957	936	912	885	857	827	797	766	735	705	676	0	0	0
JD 2445460.5	63	108	423	214	86	55	41	34	30	27	26	25	25	26	28	32	37	0	0	0	0
1983 MAY 6.0	711	870	990	999	993	982	966	947	925	899	872	843	813	782	752	722	692	0	0	0	0
JD 2445450.5	24	53	0	35	19	14	11	9	8	8	7	7	8	8	9	10	0	0	0	0	0
1983 APR 26.0	790	946	0	996	988	974	957	936	912	886	858	829	799	768	738	708	0	0	0	0	0
JD 2445440.5	50	264	80	35	23	17	14	13	12	11	11	11	11	12	14	0	0	0	0	0	0
1983 APR 16.0	877	995	998	992	981	966	947	924	899	872	844	814	784	754	724	0	0	0	0	0	0
JD 2445430.5	251	495	125	73	52	42	36	32	30	29	29	30	32	35	0	0	0	0	0	0	0
1983 APR 6.0	957	1000	996	987	973	956	935	912	886	858	829	799	769	739	0	0	0	0	0	0	0
JD 2445420.5	2874	298	144	97	74	62	55	50	48	47	48	51	55	0	0	0	0	0	0	0	0
1983 MAR 27.0	999	998	991	980	964	945	923	898	872	843	814	784	755	0	0	0	0	0	0	0	0
JD 2445410.5	744	252	154	113	92	79	72	67	66	66	68	73	0	0	0	0	0	0	0	0	0
1983 MAR 17.0	999	995	985	972	954	934	910	884	857	828	799	769	0	0	0	0	0	0	0	0	0
JD 2445400.5	435	232	161	126	106	95	87	84	83	85	90	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0	997	990	978	962	943	921	896	870	842	813	783	0	0	0	0	0	0	0	0	0	0

(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)
JD2446000.5 1984 OCT 27.0				JD2446040.5 1984 DEC 6.0				JD2446080.5 1985 JAN 15.0				JD2446120.5 1985 FEB 24.0				JD2446160.5 1985 APR 5.0					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E19

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5	736	639	510	345	156	16	-1	-10	-27	-52	-84	-122	-166	-214	-266	-321	-378	-436	-494	-552	-608
1983 JUL 5.0	1941	2031	2154	2318	2512	2668	2895	2919	2937	2951	2959	2963	2963	2959	2951	2941	2928	2912	2895	2877	2857
JD 2445510.5	703	592	444	260	77	0	-4	-17	-38	-66	-101	-142	-187	-237	-291	-346	-403	-461	-519	-576	-632
1983 JUN 25.0	1982	2087	2231	2416	2610	0	2920	2941	2957	2968	2974	2976	2974	2968	2959	2947	2933	2917	2899	2880	2860
JD 2445500.5	663	535	367	170	18	-0	-9	-26	-51	-82	-119	-162	-210	-261	-316	-372	-429	-487	-545	-601	-655
1983 JUN 15.0	2030	2154	2321	2523	2691	2920	2943	2962	2975	2984	2988	2988	2984	2976	2966	2953	2937	2920	2902	2882	2862
JD 2445490.5	615	466	276	82	0	-4	-17	-37	-65	-99	-139	-184	-234	-286	-341	-398	-456	-513	-570	-625	0
1983 JUN 5.0	2087	2233	2425	2629	0	2944	2965	2981	2992	2998	3000	2998	2992	2983	2972	2957	2941	2923	2904	2884	0
JD 2445480.5	556	384	178	18	-0	-9	-26	-50	-81	-118	-160	-207	-258	-312	-368	-425	-482	-539	-595	0	0
1983 MAY 26.0	2156	2328	2539	2716	2944	2967	2985	2999	3007	3012	3011	3007	3000	2990	2976	2961	2944	2925	2906	0	0
JD 2445470.5	484	286	82	0	-4	-17	-37	-65	-98	-138	-183	-231	-284	-338	-394	-452	-509	-565	0	0	0
1983 MAY 16.0	2239	2438	2653	0	2968	2989	3004	3015	3022	3023	3021	3016	3007	2995	2980	2964	2946	2927	0	0	0
JD 2445460.5	395	178	14	-1	-10	-27	-50	-81	-118	-160	-206	-257	-310	-365	-422	-479	-536	0	0	0	0
1983 MAY 6.0	2340	2562	2744	2968	2991	3009	3022	3030	3034	3034	3030	3023	3012	2999	2983	2966	2947	0	0	0	0
JD 2445450.5	288	74	0	-5	-18	-38	-66	-99	-138	-183	-231	-283	-337	-393	-449	-506	0	0	0	0	0
1983 APR 26.0	2459	2684	0	2992	3012	3027	3038	3044	3046	3044	3038	3029	3017	3002	2986	2968	0	0	0	0	0
JD 2445440.5	169	7	-1	-11	-28	-52	-83	-119	-161	-207	-257	-310	-365	-421	-477	0	0	0	0	0	0
1983 APR 16.0	2594	2774	2992	3014	3032	3045	3053	3056	3056	3052	3044	3034	3020	3005	2987	0	0	0	0	0	0
JD 2445430.5	59	0	-6	-19	-40	-68	-101	-141	-185	-233	-284	-338	-393	-449	0	0	0	0	0	0	0
1983 APR 6.0	2723	2991	3015	3035	3050	3060	3066	3067	3065	3059	3050	3037	3023	3006	0	0	0	0	0	0	0
JD 2445420.5	1	-2	-13	-30	-55	-86	-122	-164	-210	-259	-312	-366	-422	0	0	0	0	0	0	0	0
1983 MAR 27.0	2805	3016	3038	3055	3067	3075	3078	3077	3073	3065	3054	3040	3025	0	0	0	0	0	0	0	0
JD 2445410.5	-0	-7	-22	-43	-71	-105	-144	-188	-236	-287	-341	-396	0	0	0	0	0	0	0	0	0
1983 MAR 17.0	3015	3039	3058	3073	3082	3087	3088	3086	3079	3070	3057	3042	0	0	0	0	0	0	0	0	0
JD 2445400.5	-3	-15	-34	-59	-90	-127	-168	-214	-264	-316	-370	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0	3040	3061	3078	3089	3096	3099	3098	3093	3084	3073	3059	0	0	0	0	0	0	0	0	0	0

(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)
JD2446000.5					JD2446040.5					JD2446080.5					JD2446120.5					JD2446160.5	
1984 OCT 27.0					1984 DEC 6.0					1985 JAN 15.0					1985 FEB 24.0					1985 APR 5.0	

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E19

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5	300	325	364	440	647	1993	112	113	114	115	117	119	121	123	126	129	132	136	139	143	148
1983 JUL 5.0	355	365	373	381	388	393	237	240	243	247	251	255	259	264	269	274	280	286	292	299	305
JD 2445510.5	309	339	389	504	920	0	113	114	115	117	118	120	123	125	128	131	135	138	142	146	150
1983 JUN 25.0	362	371	379	387	393	0	240	243	246	250	254	258	263	268	273	279	285	291	297	303	310
JD 2445500.5	320	357	428	622	1884	113	114	115	116	118	120	122	125	127	130	133	137	141	144	149	153
1983 JUN 15.0	368	376	385	392	397	240	243	246	250	254	258	262	267	272	278	283	289	295	302	308	315
JD 2445490.5	334	382	491	892	0	114	115	116	118	119	122	124	126	129	132	136	139	143	147	151	0
1983 JUN 5.0	374	382	390	396	0	243	246	250	253	257	262	266	271	276	282	288	294	300	306	313	0
JD 2445480.5	352	420	609	1922	114	115	116	117	119	121	123	126	128	131	135	138	142	146	150	0	0
1983 MAY 26.0	380	388	395	400	243	246	249	253	257	261	265	270	275	281	286	292	298	305	311	0	0
JD 2445470.5	377	483	894	0	115	116	117	119	121	123	125	128	130	134	137	140	144	148	0	0	0
1983 MAY 16.0	386	394	400	0	246	249	253	256	260	265	269	274	280	285	291	297	303	310	0	0	0
JD 2445460.5	416	609	2181	115	116	117	119	120	122	124	127	130	133	136	139	143	147	0	0	0	0
1983 MAY 6.0	392	399	404	247	249	253	256	260	264	269	274	279	284	290	296	302	308	0	0	0	0
JD 2445450.5	483	939	0	116	117	118	120	122	124	126	129	132	135	138	142	146	0	0	0	0	0
1983 APR 26.0	397	403	0	250	253	256	260	264	268	273	278	283	288	294	300	307	0	0	0	0	0
JD 2445440.5	626	2997	116	117	118	120	121	123	126	128	131	134	137	141	144	0	0	0	0	0	0
1983 APR 16.0	402	407	250	253	256	259	263	267	272	277	282	287	293	299	305	0	0	0	0	0	0
JD 2445430.5	1053	116	117	118	120	121	123	125	128	130	133	136	140	143	0	0	0	0	0	0	0
1983 APR 6.0	407	250	253	256	259	263	267	271	276	281	286	292	298	304	0	0	0	0	0	0	0
JD 2445420.5	6757	117	118	119	121	123	125	127	130	132	135	139	142	0	0	0	0	0	0	0	0
1983 MAR 27.0	410	253	256	259	263	266	271	275	280	285	291	296	302	0	0	0	0	0	0	0	0
JD 2445410.5	117	118	119	121	122	124	126	129	132	134	138	141	0	0	0	0	0	0	0	0	0
1983 MAR 17.0	253	256	259	262	266	270	275	279	284	290	295	301	0	0	0	0	0	0	0	0	0
JD 2445400.5	118	119	120	122	124	126	128	131	134	137	140	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0	256	259	262	266	270	274	278	283	289	294	300	0	0	0	0	0	0	0	0	0	0

(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)

JD2446000.5	JD2446040.5	JD2446080.5	JD2446120.5	JD2446160.5
1984 OCT 27.0	1984 DEC 6.0	1985 JAN 15.0	1985 FEB 24.0	1985 APR 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E19

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5 1983 JUL 5.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445510.5 1983 JUN 25.0	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445500.5 1983 JUN 15.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2445490.5 1983 JUN 5.0	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0
JD 2445480.5 1983 MAY 26.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0
JD 2445470.5 1983 MAY 16.0	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0
JD 2445460.5 1983 MAY 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0
JD 2445450.5 1983 APR 26.0	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0
JD 2445440.5 1983 APR 16.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0
JD 2445430.5 1983 APR 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0	0
JD 2445420.5 1983 MAR 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0	0	0
JD 2445410.5 1983 MAR 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0	0	0	0
JD 2445400.5 1983 MAR 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0	0	0	0	0

(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)
	JD2446000.5 1984 OCT 27.0				JD2446040.5 1984 DEC 6.0				JD2446080.5 1985 JAN 15.0				JD2446120.5 1985 FEB 24.0				JD2446160.5 1985 APR 5.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E19

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5	209	439	770	1252	1938	2803	3086	2916	2742	2565	2386	2206	2027	1850	1676	1505	1339	1179	1024	876	735
1983 JUL 5.0	598	765	1007	1361	1865	2502	2756	2633	2509	2385	2262	2141	2021	1905	1792	1683	1578	1478	1383	1294	1210
JD 2445510.5	290	562	959	1539	2336	0	3004	2833	2659	2482	2304	2126	1949	1774	1602	1435	1272	1114	962	818	680
1983 JUN 25.0	669	868	1160	1588	2177	0	2722	2598	2473	2349	2225	2104	1985	1869	1757	1649	1545	1446	1353	1265	1182
JD 2445500.5	389	714	1195	1891	2784	3087	2920	2749	2575	2399	2223	2046	1871	1698	1529	1364	1204	1050	901	760	627
1983 JUN 15.0	755	995	1351	1867	2534	2811	2687	2562	2437	2312	2189	2068	1950	1834	1723	1616	1513	1416	1324	1237	1156
JD 2445490.5	512	907	1492	2313	0	3002	2835	2664	2491	2316	2140	1966	1793	1623	1456	1294	1137	986	841	703	0
1983 JUN 5.0	861	1154	1591	2206	0	2778	2653	2527	2401	2277	2153	2033	1915	1800	1690	1584	1483	1387	1296	1210	0
JD 2445480.5	668	1152	1865	2794	3079	2916	2749	2578	2405	2232	2058	1885	1714	1547	1383	1224	1070	922	781	0	0
1983 MAY 26.0	994	1357	1893	2596	2869	2744	2618	2492	2366	2241	2118	1998	1881	1767	1658	1553	1453	1358	1269	0	0
JD 2445470.5	868	1467	2320	0	2992	2829	2661	2491	2319	2147	1975	1804	1636	1471	1310	1154	1004	859	0	0	0
1983 MAY 16.0	1164	1616	2264	0	2836	2710	2583	2457	2331	2206	2083	1964	1847	1735	1627	1523	1425	1332	0	0	0
JD 2445460.5	1127	1868	2842	3064	2904	2740	2573	2403	2232	2061	1891	1723	1557	1395	1238	1085	938	0	0	0	0
1983 MAY 6.0	1383	1948	2696	2928	2803	2676	2548	2421	2295	2171	2049	1930	1815	1703	1597	1494	1397	0	0	0	0
JD 2445450.5	1468	2365	0	2974	2814	2650	2483	2314	2145	1975	1807	1641	1479	1320	1165	1016	0	0	0	0	0
1983 APR 26.0	1669	2361	0	2895	2769	2641	2513	2386	2260	2136	2015	1897	1783	1673	1567	1467	0	0	0	0	0
JD 2445440.5	1910	2935	3041	2884	2723	2559	2392	2224	2056	1889	1723	1560	1400	1244	1093	0	0	0	0	0	0
1983 APR 16.0	2040	2840	2987	2861	2734	2606	2478	2351	2225	2102	1982	1865	1751	1643	1539	0	0	0	0	0	0
JD 2445430.5	2460	3103	2949	2791	2630	2466	2301	2134	1968	1802	1639	1478	1321	1169	0	0	0	0	0	0	0
1983 APR 6.0	2504	3078	2953	2826	2698	2569	2442	2315	2190	2067	1948	1832	1721	1614	0	0	0	0	0	0	0
JD 2445420.5	3081	3010	2856	2697	2536	2373	2208	2043	1878	1715	1555	1397	1243	0	0	0	0	0	0	0	0
1983 MAR 27.0	3034	3044	2917	2790	2661	2533	2405	2279	2155	2033	1915	1801	1691	0	0	0	0	0	0	0	0
JD 2445410.5	3068	2916	2761	2602	2441	2278	2115	1951	1789	1628	1470	1315	0	0	0	0	0	0	0	0	0
1983 MAR 17.0	3133	3007	2880	2752	2623	2495	2368	2242	2119	1999	1882	1769	0	0	0	0	0	0	0	0	0
JD 2445400.5	2973	2821	2665	2506	2345	2183	2021	1859	1699	1541	1386	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0	3096	2969	2841	2713	2584	2456	2330	2205	2083	1964	1849	0	0	0	0	0	0	0	0	0	0

(FLT T)	(500)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)

JD2446000.5	JD2446040.5	JD2446080.5	JD2446120.5	JD2446160.5
1984 OCT 27.0	1984 DEC 6.0	1985 JAN 15.0	1985 FEB 24.0	1985 APR 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M26
E19

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD 2445520.5	807	1204	1777	2613	3803	5305	5843	5549	5251	4950	4648	4347	4049	3755	3468	3188	2917	2657	2407	2169	1944
1983 JUL 5.0	3054	3154	3255	3356	3457	3557	62	163	265	367	468	569	670	770	870	970	1068	1166	1264	1361	1458
JD 2445510.5	959	1429	2118	3126	4514	0	5725	5431	5132	4831	4530	4230	3934	3644	3359	3083	2817	2560	2315	2082	1862
1983 JUN 25.0	3104	3204	3305	3405	3507	0	111	213	315	416	518	619	720	820	920	1019	1118	1216	1314	1411	1507
JD 2445500.5	1144	1709	2545	3758	5318	5898	5607	5311	5012	4712	4412	4114	3821	3533	3252	2980	2718	2466	2225	1997	1783
1983 JUN 15.0	3155	3255	3355	3456	3557	60	161	263	365	467	568	670	770	871	971	1070	1169	1267	1364	1461	1558
JD 2445490.5	1374	2061	3083	4518	0	5780	5488	5191	4892	4592	4294	3998	3708	3423	3146	2878	2620	2372	2137	1914	0
1983 JUN 5.0	3206	3306	3407	3507	0	111	213	314	416	518	620	721	822	922	1022	1121	1220	1318	1416	1513	0
JD 2445480.5	1662	2508	3758	5391	5948	5660	5367	5070	4771	4473	4176	3883	3595	3314	3041	2777	2523	2281	2050	0	0
1983 MAY 26.0	3258	3358	3459	3559	62	163	265	367	469	570	672	773	874	974	1074	1173	1272	1370	1468	0	0
JD 2445470.5	2032	3083	4584	0	5828	5539	5245	4948	4650	4353	4058	3768	3483	3206	2937	2678	2429	2191	0	0	0
1983 MAY 16.0	3311	3411	3512	0	115	216	318	420	522	624	725	826	927	1027	1127	1227	1325	1424	0	0	0
JD 2445460.5	2510	3817	5538	5992	5707	5416	5121	4825	4528	4232	3940	3653	3372	3099	2834	2579	2335	0	0	0	0
1983 MAY 6.0	3366	3466	3566	67	169	270	372	474	576	678	779	880	981	1082	1181	1281	1379	0	0	0	0
JD 2445450.5	3136	4727	0	5870	5583	5291	4996	4700	4405	4112	3823	3539	3261	2992	2732	2482	0	0	0	0	0
1983 APR 26.0	3421	3521	0	122	224	325	427	529	631	733	834	935	1036	1137	1236	1336	0	0	0	0	0
JD 2445440.5	3950	5775	6028	5745	5456	5164	4870	4575	4282	3991	3705	3425	3151	2887	2632	0	0	0	0	0	0
1983 APR 16.0	3477	3577	77	178	280	381	483	585	687	789	890	991	1092	1193	1292	0	0	0	0	0	0
JD 2445430.5	4964	6181	5902	5617	5328	5036	4742	4449	4158	3870	3587	3311	3042	2782	0	0	0	0	0	0	0
1983 APR 6.0	3533	34	134	235	336	438	540	642	744	846	947	1048	1149	1250	0	0	0	0	0	0	0
JD 2445420.5	6115	6054	5773	5487	5197	4905	4613	4322	4033	3748	3469	3197	2933	0	0	0	0	0	0	0	0
1983 MAR 27.0	3590	92	192	293	394	496	598	700	802	903	1005	1106	1207	0	0	0	0	0	0	0	0
JD 2445410.5	6201	5924	5641	5354	5064	4773	4483	4194	3908	3627	3352	3085	0	0	0	0	0	0	0	0	0
1983 MAR 17.0	51	150	251	352	453	555	657	759	860	962	1064	1165	0	0	0	0	0	0	0	0	0
JD 2445400.5	6069	5790	5506	5219	4929	4640	4351	4065	3782	3505	3235	0	0	0	0	0	0	0	0	0	0
1983 MAR 7.0	110	210	310	411	513	614	716	818	920	1022	1123	0	0	0	0	0	0	0	0	0	0

(FLT T)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)

JD2446000.5 1984 OCT 27.0 | JD2446040.5 1984 DEC 6.0 | JD2446080.5 1985 JAN 15.0 | JD2446120.5 1985 FEB 24.0 | JD2446160.5 1985 APR 5.0

EARTH DEPARTURE OR ARRIVAL DATE