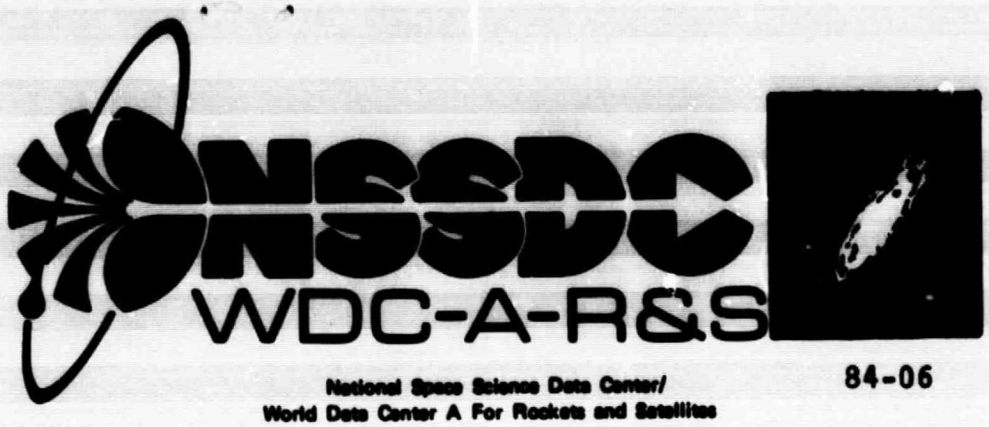

National Space Science Data Center/
World Data Center A For Rockets and Satellites

84-06

NSSDC/WDC-A-R&S 84-06

DOCUMENTATION FOR THE MACHINE-READABLE VERSION

OF THE

AGK3 STAR CATALOGUE OF POSITIONS AND PROPER MOTIONS

NORTH OF -2°5 DECLINATION

(DIECKVOSS AND COLLABORATORS 1975)

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May 1984

National Space Science Data Center (NSSDC)/
World Data Center A for Rockets and Satellites (WDC-A-R&S)
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

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ABSTRACT

A detailed description of the machine-readable catalog as it is currently being distributed from the Astronomical Data Center is given. The version described is that originally received from the Astronomisches Rechen-Institut, Heidelberg, with a few minor corrections found when the file was examined at the Astronomical Data Center, NASA Goddard Space Flight Center.

TABLE OF CONTENTS

LIST OF TABLES

Table

SECTION 1 - INTRODUCTION AND SOURCE REFERENCE

The *AGK3 Star Catalogue of Positions and Proper Motions North of -2°5 Declination* (hereinafter AGK3) was conceived and planned during discussions between O. Heckmann and D. Brouwer at Hamburg Observatory following the 1952 International Astronomical Union (IAU) General Assembly in Rome. It was concluded that an adequate number of reference stars (AGK3R) should be observed by as many meridian circles of as many observatories as possible, the revision of FK3, then in progress (FK4), should define the reference frame, and the same instruments as used for AGK2 should be used for the observations for AGK3. A formal recommendation was adopted through Commission 8 at the 1955 IAU General Assembly in Dublin, with the observatories at Babelsberg, Bergedorf, Bordeaux, Greenwich, Heidelberg, Nikolajew, Ottawa, Paris, Pulkovo, Strasbourg and Washington (USNO) to collaborate in the work, and with F. P. Scott (USNO) to coordinate the meridian circle observations of AGK3R stars. The completion of the photographic observations was to be the responsibility of the observatories at Bergedorf and Bonn, with all plate measurements to be done at the former. (However, it was finally decided that all plates, even for the AGK2 Bonn zones, would be taken at Bergedorf.) The plates for AGK3 were secured at Bergedorf between August 1956 and June 1964, with special precautions (exposures on both sides of the pier) made to compensate for possible changes in the camera objective. The two sets of plates were measured at Bergedorf in opposite directions and averaged to obtain final x,y coordinates. The detailed procedures for the correction of magnitude-color errors, reduction of the measures using the AGK3R stars, re-reduction of AGK2 using its reference catalog AGK2A transformed to the FK4 system, and final reduction of the AGK3 positions and proper motions, are discussed by W. Dieckvoss in his technical introduction to the source reference. Although a more detailed discussion of errors is given by Dieckvoss, the standard error for one coordinate on one plate as determined from a limited sample of 110 pairs of plates is ±0".025 for AGK3.

This document describes the machine-readable version of the AGK3 as it is currently being distributed by the Astronomical Data Center. It is intended to enable users to process the magnetic tape file and its data without problems and guesswork. A copy of this document should be supplied with any secondary copies of the machine version originally obtained from the Astronomical Data Center.

SOURCE REFERENCE

Dieckvoss, W. (in collaboration with H. Kox, A. Günther and E. Brosterhus) 1975, *AGK3 Star Catalogue of Positions and Proper Motions North of -2°5 Declination*, Hamburg-Bergedorf (printed with financial support from Deutsche Forschungsgemeinschaft Bonn-Bad Godesberg).

SECTION 2 - TAPE CONTENTS

A byte-by-byte description of the contents of the machine-readable AGK3 file is given in Table 1. The suggested format specifications apply to FORTRAN formatted read statements, but can be modified depending upon individual programming and processing requirements. Default values are given only for those fields where the primary suggested format specifications are numerical, but where data are not always present; null values are always blanks in fields for which primary suggested formats are given as character (A), except that a null value of "0" is present in multiple-system component identifications. Alternate format specifications are given in parentheses.

Table 1. Tape Contents. *AGK3 Catalogue.*

Byte(s)	Units	Suggested Format	Default Value	Description
1	---	A1	---	Sign of AGK3 number.
2- 3	---	I2	---	AGK3 zone.
4- 7	---	I4	---	AGK3 number in increasing order within each declination zone. The field is filled with preceding zeros.
8	---	A1	"0"	Component identification when duplicate AGK3 numbers occur. The lower case letters "a" and "b" may be present.
9-11	mag	F3.1	blank	Photographic magnitude, m_{pg}, taken from AGK2 and recorded as an integer.
12-13	---	A2	---	Spectral type adopted from the *Henry Draper Catalogue* (Cannon and Pickering 1918-1924), its *Extension* (Cannon 1925-1936), Schildt (*Yale Transactions*) or determined by A. N. Vyssotsky and collaborators at the Leander-McCormick Obs.
14-15	hours	I2	---	Right ascension, α, for equator and equinox 1950.0.
16-17	min	I2	---	α
18-22	sec	F5.3	---	α, recorded as an integer number.
23	---	A1	---	Sign of declination, δ, for equator and and equinox 1950.0.
24-25	°	I2	---	δ
26-27	'	I2	---	δ
28-31	"	F4.2	---	δ, written as an integer number.

Table 1 (continued)

Byte(s)	Units	Suggested Format	Default Value	Description
32-33	---	I2	---	Number of photographic observations used to determine the position. Single-digit numbers are preceded by a zero.
34-37	years	F4.2	---	Epoch of AGK3 position - 1900 (e.g. 1958.81 is recorded as 5881).
38	---	A1	---	Sign of annual proper motion in α, $\mu_\alpha \cos \delta$.
39-42	0".001	F4.3	blank	Annual proper motion, $\mu_\alpha \cos \delta$, determined by differencing the AGK3 and AGK2 positions and dividing by the epoch difference. Proper motions are missing for stars new in AGK3 (see Table 6). If a calculated value of $\mu_\alpha \cos \delta$ exceeded the field capacity a value of "9999" is given with a "+" in byte 38. The suggested format reads the datum in the correct units.
43	---	A1	---	Sign of annual proper motion in δ, μ_δ.
44-47	0".001	F4.3	blank	Annual proper motion, μ_δ. See information for bytes 39-42.
48-51	years	F4.2	blank	Epoch difference AGK3-AGK2.
52	---	A1	---	Sign of zone number in *Bonner Durchmusterung* (BD).
53-54	---	A2 (I2)	---	BD zone.
55-58	---	A4 (I4)	---	BD number within zone.
59	---	A1 (I1)	zero	Numerical code for identification of a component of a multiple system: (1 = primary [P]; 2 = secondary [S]; 3 = A; 4 = B; 5 = S1; 6 = S2; 7 = P1; 8 = P2; 9 = C). BD supplemental stars (lower case letters) are assigned codes but are indistinguishable from A and B designations because the codes are the same. Since the tape format only allows one byte for the duplicity code, and nine

Table 1 (continued)

Byte(s)	Units	Suggested Format	Default Value	Description
				codes are already used, the distinction cannot be drawn. If it is necessary to distinguish or identify supplemental stars, the *Catalog of BD Supplemental Stars* (Warren and Kress 1980) should be used.
60-61	---	A2 (I2)	---	Sum of discrepancy codes, $\Sigma e_v = \Sigma 2^v$, where v = 0 (BD number), 1 (m_{pg} and/or spectral type), 2 (α_{AGK2}), 3 (δ_{AGK2}), 4 (α_{AGK3}), 5 (δ_{AGK3}).
62	---	A1	---	Sign of μ_α following.
63-67	sec	F5.4	blank	Annual proper motion, μ_α, computed by dividing μ_α by 15cos δ.
68	---	A1	---	Sign of $\Delta\alpha\cos\delta$.
69-73	"	F5.4	blank	The residual quantity $\Delta\alpha(\cos\delta)_{AGK3}$ in the sense AGK3 - ($AGK2_{modified}$), where the last quantity denotes data from the re-reduced AGK2.
74	---	A1	---	Sign of $\Delta\delta$.
75-79	"	F5.4	blank	The residual quantity $\Delta\delta$ in the sense AGK3 - ($AGK2_{modified}$).
80	---	1X	---	Blank

SECTION 3 - TAPE CHARACTERISTICS

The information in Table 2 is sufficient for a user to describe the indigenous characteristics of the *AGK3 Catalogue* to a computer. Information easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, tape density, number of tracks, and internal coding (EBCDIC, ASCII, etc.) is not included. These parameters should always be transmitted if secondary copies of the catalog are supplied to other users or installations.

Table 2. Tape Characteristics. *AGK3 Catalogue.*

NUMBER OF FILES	1
LOGICAL RECORD LENGTH (BYTES)	80
RECORD FORMAT	FB*
TOTAL NUMBER OF LOGICAL RECORDS	183145

* Fixed block length (last block may be short)

SECTION 4 - REMARKS, MODIFICATIONS AND REFERENCES

The machine version of the AGK3 was received on magnetic tape from the Centre de Données Stellaires, Strasbourg in 1978. The version received had been obtained originally from the Astronomisches Rechen-Institut in Heidelberg. A preliminary document for a modified and corrected version of the catalog was produced by Nagy (1979). The following changes were made to the Heidelberg file in order to correct some minor errors and to produce a tape conforming more closely to the published version:

1. AGK3 component identifications for stars where more than one AGK3 star has the same number were changed from upper case characters (A, B) to lower case (a, b) as in the printed edition.

2. Nine stars in AGK3 zone -00°, but in BD zone +00° were found to have a BD zone of +90°. The BD zone for these stars was changed to +00°. These stars are: AGK3 -00°1467, 1510, 1530, 1531, 1532, 1602, 1693, 1774, and 2120.

The tables following give information on the zone statistics of the AGK3, on stars for which proper-motion data are not included, and on stars which are omitted or new in AGK3. These tables are taken from documentation prepared by T. Lederle (1976) for distribution with the Heidelberg version of the AGK3 tape. Table 8 lists positional data for two AGK3 stars for which the declination data are suspect. These stars were pointed out by D. W. Dunham. A list of errata to AGK3 magnitudes recently published by Willstrop (1983) has not been incorporated into this version of the machine-readable catalog.

Table 3. Numbers of AGK2 and AGK3 Stars in Each Zone.

Zone	Number in AGK2	Omitted in AGK3	New in AGK3	Number in AGK3
+89°	56	2	-	54
+88	136	-	-	136
+87	180	-	-	180
+86	329	-	-	329
+85	402	-	-	402
+84	518	-	-	518
+83	618	1	-	617
+82	731	-	-	731
+81	739	-	-	739
+80	508	1	-	507

Table 3 (continued)

Zone	Number in AGK2	Omitted in AGK3	New in AGK3	Number in AGK3
+79°	698	1	-	697
+78	586	1	-	585
+77	700	-	-	700
+76	981	-	-	981
+75	1027	-	-	1027
+74	704	-	-	704
+73	643	1	-	642
+72	659	-	-	659
+71	733	-	-	733
+70	853	3	-	850
+69	1056	-	-	1056
+68	1054	-	-	1054
+67	1099	-	-	1099
+66	1247	-	-	1247
+65	1332	-	-	1332
+64	1266	-	-	1266
+63	1372	4	-	1368
+62	1501	5	-	1496
+61	1511	5	-	1506
+60	1626	6	-	1620
+59	1672	7	-	1665
+58	1611	3	-	1608
+57	1719	8	-	1711
+56	1793	2	-	1791
+55	1740	5	-	1734
+54	1726	4	-	1722
+53	1711	8	-	1703
+52	1847	8	-	1839
+51	1866	4	-	1862
+50	2018	8	-	2010
+49	2182	4	-	2178
+48	2149	8	1	2142
+47	2141	4	-	2137
+46	2233	2	1	2232
+45	2210	5	-	2205
+44	2267	2	-	2265
+43	2315	4	-	2311
+42	2341	2	-	2339
+41	2368	1	-	2367
+40	2515	-	-	2515

Table 3 (continued)

Zone	Number in AGK2	Omitted in AGK3	New in AGK3	Number in AGK3
+39	2544	5	-	2539
+38	2466	6	-	2460
+37	2371	8	-	2363
+36	2460	10	-	2450
+35	2496	-	-	2496
+34	2457	2	-	2455
+33	2396	-	-	2396
+32	2384	1	-	2383
+31	2466	4	-	2462
+30	2692	5	-	2687
+29	2978	3	-	2975
+28	2859	2	-	2857
+27	2820	1	-	2819
+26	2849	1	-	2848
+25	2861	2	-	2859
+24	2594	1	-	2593
+23	2491	1	-	2490
+22	2591	3	-	2588
+21	2640	6	-	2634
+20	2676	8	-	2668
+19	2478	12	-	2466
+18	2415	8	-	2407
+17	2652	7	-	2645
+16	2646	9	1	2638
+15	2666	13	-	2653
+14[1]	2661	15	-	2646
+13	2568	9	-	2559
+12	2816	21	-	2795
+11	2996	14	-	2982
+10[2]	3289	21	-	3268
+ 9	3330	21	-	3309
+ 8	3296	13	-	3283
+ 7	3456	9	-	3447
+ 6	3254	8	-	3246
+ 5	3434	10	-	3424
+ 4	3199	7	-	3192
+ 3	3063	9	-	3054
+ 2	2998	11	-	2987
+ 1	2877	5	-	2872
+ 0	2957	4	-	2953

Table 3 (concluded)

Zone	Number in AGK2	Omitted in AGK3	New in AGK3	Number in AGK3
- 0	3018	9	-	3009
- 1	2893	10	-	2883
- 2	1246	12	-	1234
Total	183588	446	3	183145

[1]Note that star +14°1650 was missing in AGK2 already
[2]Note that star +10° 986 was missing in AGK2 already

Table 4. List of the 446 AGK2 Stars Omitted from AGK3.

+89°	4	+59°	31	+53°	120	+49°	1611	+39°	963	+34°	1005
	52		388		155		1785		2084	+32	446
+83	41		389		377	+48	83		2085	+31	239
+80	5		391		378		108		2087		1305
+79	157		704		380		457		2088		1341
+78	245		1076		381		459	+38	211		1435
+73	621		1165		383		460		875	+30	838
+70	738	+58	380		384		462		1000		944
	776		381	+52	36		463		1225		1424
	838		1609		417		1751		1711		1646
+63	28*	+57	282	+52	418	+47	422	+38	2350*	+30	2496
	162		468		419		424	+37	434	+29	492
	544		469		420		425		991		1162
	796		470		1009		426		1265		2255
+62	353		471		1490a	+46	185		1495	+28	209
	354		778		1490b		1980		2049		1124
	355		1017	+51	168	+45	412		2138	+27	1118
	548		1640		513		1730		2188	+26	2794
	790	+56	170		514		1985		2273	+25	464
+61	361		869		1411		2144	+36	414		465
+61	377	+55	365	+50	47	+45	2196	+36	665	+24	456
	378		392		173	+44	337		764	+23	481
	379		563		391		618		883	+22	817
	382		595		432	+43	58		1016		818
+60	396		884		433		1960		1334		2096
	398		1530		524		2289		1340	+21	251
	399	+54	90		766		2305		1386		503
	434		182		1258	+42	213		2214		1083
	435		408	+49	476		2291		2313		1866
	438		1471		477	+41	1837	+34	553		1977

Table 4 (concluded)

+21°	2164	+15°	131	+12°	799	+10°	2264	+ 7°	3100	+ 2°	2304
+20	491		247		1094		2518	+ 6	574	+ 1	122
	839		356		1199		3107		637		662
	1363		529		1416	+ 9	255		1136		1599
	1633		1219		1421		317		1155		1784
	1666		1471		1568		381		1421		2016
	1711		1542		1569		544		1833	+ 0	229
	1886		1579		1768		549		2617		2241
	1962		1580		1827		754		3249		2415
+19	176		1595		2243		1050	+ 5	120		2901
+19	243	+15	1690	+12	2597	+ 9	1239	+ 5	186	- 0	616
	352		1692		2760		1241		425		648
	1335		2267		2782		1308		525		1104
	1372	+14	11	+11	23		1321		1072		1637
	1509		116		44		1388		1999		1719
	1525		413		147		1482		2439		1843
	1531		597		163		1621		3105		2584
	1666		1239		393		1923		3241		2832
	1867		1444*		399		1973		3403		2882
	1953		1510		438		2155	+ 4	617	- 1	300
+19	2173	+14	1600	+11	1107	+ 9	2190	+ 4	698	- 1	345
+18	894		1643		1231		2822		748		596
	1196		1736		1241		3049		1079		622
	1238		1954		1470		3065		1919		1517
	1285		2256		2242	+ 8	199		2178		1685
	1427		2276		2513		265		2420		1734
	1919		2576		2790		355	+ 3	308		1906
	2002		2584	+10	48		434		346		2162
	2405	+13	356		172		981		696		2732
+17	384		359		403		1313		1347	- 2	13
+17	429	+13	428	+10	410	+ 8	1335	+ 3	1526	- 2	204
	523		1186		425		2127		1660		205
	1015		1193		479		2193		2068		208
	1099		1410		1245		2203		2453		325
	1387		1449		1293		2636		2992		428
	1769		1887		1300		2842	+ 2	192		870
+16	248		2300		1359		3225		505		962
	256	+12	60		1425	+ 7	86		801		963
	257		62		1426		116		1244		1177
	400		285		1427		516		1527		1180
+16	651	+12	365	+10	1428	+ 7	681	+ 2	1777		1215
	755		389		1465		894		1946		
	1243		402		1538		1413		2134		
	2248		414		1884		1508		2151		
	2434		453		2092		2902		2186		

* star listed in published catalog, but without proper motion

Table 5. List of Three Stars New in AGK3.

+48° 1052a	+46° 2072a	+16° 1409a

Table 6. AGK3 Stars for which Proper-Motion Data in α and/or δ are Missing.

Star	Machine Version	Published Version
+66° 961	4	2
+63 164	4	2
282	4	2
452	4	2
+62 106	4	2
+60 31	4	2
1126	4	2
+59 1334	4	2
+58 545a	5	3
+57 644	4	4
+54 126	.	2
+43 1056	4	2
+42 1131	4	4
1192	4	2
+38 523	4	4
2214	4	4
+37 1649	4	4
+32 1596	6	2
+30 188	4	2
1493	4	2
+29 484	4	2
486	4	2
510	4	4
546	4	2
856	4	2
1716	4	2
+28 454	6	2
792	4	2
1077	4	2
1083	4	4
+27 126	4	2
1113	4	4
1539	4	4
+19 218	4	4
849	4	4
+18 1450	4	2

(1) No proper motion in α and δ; (2) Omitted from catalog; (3) Included with proper motions; (4) Included without proper motions; (5) Proper motion in α only; (6) Proper motion in δ only.

Table 7. List of 19 AGK3 Stars with Component Identifications.

AGK3		Remarks
+83°	508a	
	508b	
+78	551a	
	551b	
+73	274a	
+69	438a	
+64	1087a	
	1087b	
+63	33a	
+58	545a	
+55	58a	
	58b	
+51	1442a	
+48	1052a	New in AGK3
+46	132a	
	2072a	New in AGK3
+17	1610a	Omitted in the printed catalo[illegible]
+16	1409a	
+11	889a	

Table 8. AGK3 Stars with Probable Erroneous δ Data.

	AGK2	Yale	SAO	AGK3
AGK3 +20° 549				
α:	5 40 39.31	5 40 39.304	5 40 39.317	5 40 39.203
δ:	+20 24 31.8	+20 24 31.86	+20 24 31.79	+20 24 31.15
AGK3 +24° 523				
α:	5 35 23.76	5 35 27.749	5 35 23.73	5 35 23.725
δ:	+24 57 53.3	+24 57 53.54	+24 57 52.28	+24 58 8.49

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SECTION 5 - SAMPLE LISTING

The sample listing given on the following pages presents logical data records just as they are recorded on the tape. Groups of records from the beginning and end of the file are illustrated. The beginning of each record and bytes within the record are indicated by the column heading across the top of each page (digits read vertically).

L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

```
          TAPE FILE NAME: AGK3 Catalog
                 RECORDS        1 TO      20
              TAPE FILE      15
           RECORD LENGTH     80 BYTES
            INPUT VOLSER   ADC001

C O L U M N                                                                                                            111111111111111
H E A D I N G          1111111111222222222233333333334444444444555555555566666666667777777777888888888899999999990000000000111111
I N D E X     123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

RECORD     1 +8900010110G2001511657+89231781025881+0027-00362869+880001000+01676+00077-00103
RECORD     2 +8900020090G8002423185+89100703025881-0013+00202869+880002000-00593-00037+00057
RECORD     3 +8900030115K5005038798+89022269025881+0088-00632869+880003000+03494+00252-00181
RECORD     4 +8900050107K2024209130+89280352025839+0031-00012805+890002000+02225+00087-00003
RECORD     5 +8900060103G8033100222+89175276025839+0029+00112805+880010000+01571+00081+00031
RECORD     6 +8900070117G8040406721+89024391025839+0016+00032805+880015000+00642+00045+00008
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L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

TAPE FILE NAME: AGK3 Catalog

RECORDS 183126 TO 183145

TAPE FILE 15

RECORD LENGTH 80 BYTES

INPUT VOLSER ADC001

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