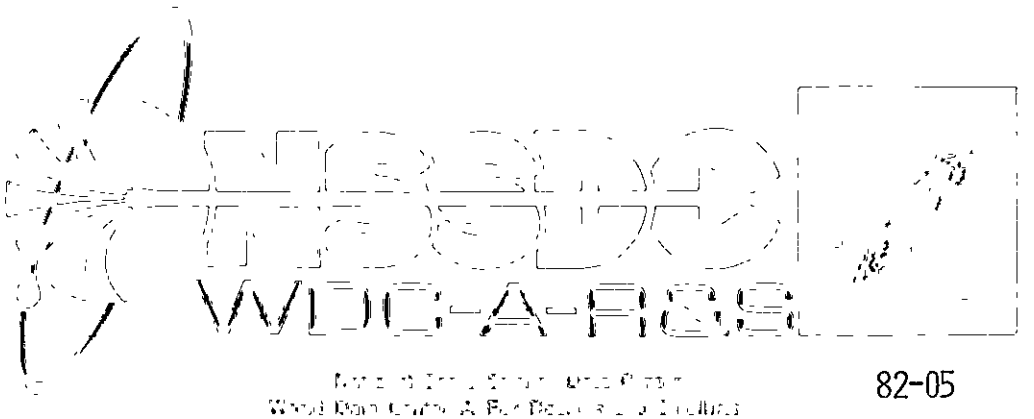

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DOCUMENTATION FOR THE

MACHINE-READABLE VERSION OF THE

LICK SATURN-VOYAGER REFERENCE STAR CATALOGUE

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DOCUMENTATION FOR THE MACHINE-READABLE VERSION OF THE *LICK SATURN-VOYAGER REFERENCE STAR CATALOGUE*

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SECTION 1 - INTRODUCTION

The *Lick Saturn-Voyager Reference Star Catalogue* (Klemola, Taraji and Ocampo 1979) was prepared for purposes of determining up-to-date, reasonably accurate, equatorial coordinates for reference stars in a band of sky against which cameras of the Voyager spacecraft were aligned for observations in the region of Saturn during the flyby. The requirements were a surface density of about 3 reference stars per observation frame of 24 arcmin^2 of the cameras -- somewhat greater than the SAO (Smithsonian Astrophysical Observatory 1966) and AGK3 (Dieckvoss, *et al*. 1975) densities -- and a positional accuracy ~0.5 arcsec. Visual magnitudes were also required. The completed catalogue contains 4555 stars in the right ascension range $12^h\ 40^m$ to $14^h\ 12^m$, declination zones +2° to -9°. Mean errors of the positions, as derived from least squares solutions against the Perth 70 Catalogue (Høg and von der Heide 1976), are about 0".25; however, individual residuals for some bright and excessively faint stars are as high as 0".5 to 1".0. Apparent photographic and visual magnitudes were derived from iris photometer measurements, m_v being approximated from a derived color-index relation using *UBV* stars selected from USNO photoelectric catalogue (Blanco *et al*. 1968) and extended with Perth 70 stars. The resulting magnitudes appear to have mean errors of at least $0^m.2$ - $0^m.3$ for the brighter stars ($m_v < 10^m$) and uncertainties can be as much as $0^m.5$ for the fainter stars. The magnitudes are considered to be only approximate, especially on the faint end, because of a lack of photoelectric standards there.

This document is intended to describe the machine-readable version of the *Lick Saturn-Voyager Reference Star Catalogue* in sufficient detail for users to avoid the common difficulties, uncertainties and guesswork frequently encountered when processing a computerized catalogue. The original publication (available from A. R. Klemola) should be consulted for additional details regarding the observations and reductions. A copy of this paper should be supplied with any secondary copies of the machine version distributed to other individuals and installations.

REFERENCE

Klemola, A. R. (Lick Obs.), Taraji, H. and Ocampo, A. (Jet Propulsion Lab.) 1979, *Lick Saturn-Voyager Reference Star Catalogue*, Lick Observatory, University of California, Santa Cruz.

SECTION 2 - TAPE CONTENTS

A byte-by-byte description of the contents of the machine-readable catalogue is given in Table 1. The suggested format specifications are given primarily for locating decimal points for real numbers and can be modified depending upon usage. Care must be exercised when processing the magnitude and proper-motion data since fields missing data are blank and will be read as zeroes unless initially buffered in or processed with an A (character) format and tested. Unless indicated otherwise, a given field always has a data value in it.

Table 1. Tape Contents. *Lick Saturn-Voyager Reference Star Catalogue*

Byte(s)	Units	Suggested Format	Description
1- 4	---	I4	Lick plate pair identification.
5- 8	---	I4	Plate number.
9-10	hours	I2	Right ascension (α), epoch 1978.92, equinox 1950.0.
11-12	min.	I2	α
13-18	sec.	F6.3	α
19	---	A1	Sign of declination zone.
20-21	°	I2	Declination (δ), epoch 1978.92, equinox 1950.0.
22-23	'	I2	δ
24-28	"	F5.2	δ
29-33	mag	F5.2	Apparent photographic magnitude m_b (blank for 20 stars).
34-38	mag	F5.2	Apparent visual magnitude m_v.
39-46	---	A8 (I8)	AGK3 or SAO identification number (blank if data absent). For AGK3 numbers, byte 39 contains the zone and bytes 42-46 the number. SAO numbers are contained in bytes 41-46.

Table 1. (continued)

Byte(s)	Units	Suggested Format	Description
47-51	arcsec	F5.1	Centennial proper motion in right ascension, μ_α, taken from AGK3 or SAO (blank for missing data).
52-56	arcsec	F5.1	Centennial proper motion in declination, μ_δ, taken from AGK3 or SAO (blank for missing data).

SECTION 3 - TAPE CHARACTERISTICS

The information contained in Table 2 is sufficient for a user to read the machine version of the catalogue. 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 coding (EBCDIC, ASCII, BCD, etc.) is not included. These parameters should always be supplied if secondary copies of the tape are transmitted to other users or installations.

Table 2. Tape Characteristics. *Lick Saturn-Voyager Reference Star Catalogue.*

NUMBER OF FILES	1
LOGICAL RECORD LENGTH	56
RECORD FORMAT	FB*
TOTAL NUMBER OF LOGICAL RECORDS	4555

*Fixed block length (last block may be short)

SECTION - REMARKS, MODIFICATIONS AND REFERENCES

A magnetic tape contai ng the catalogue, in binary format, was received from Dr. A. R. Klemola in N ember 1981. The data were converted to character format and written to direct access device for editing, which consisted of adding signs to all po tive declination zones, converting missing data from zeroes to blanks, and anging all AGK3 numbers to the uniform representation ±XX XXXX (SAO numbers re not modified). The catalogue was then transferred back to magnetic tape character format with a logical record length of 56 bytes, after sorting t complete data set by increasing right ascension (the stars were originally some kind of plate or measurement order).

ACKNOWLEDGMENTS

Appreciation is expres d to A. R. Klemola for providing the magnetic tape of the catalogue and for viewing the modifications made and the resulting documentation.

REFERENCES

Blanco, V. M., Demers, ., Douglass, G. G. and FitzGerald, M. P. 1968, *Publ. U. S. Naval Obs.*, 2nd r., 21.

Dieckvoss, W., Kox. H. Gunther, A. and Brosterhus, E. 1975, *AGK3. Star catalogue of positi s and proper motions north of -2°5 declination, derived from plates taken a Bergedorf and Bonn in the years 1928-1932 and 1956-1963*, Hamburge Sternwarte, Hamburg-Bergedorf.

Hog, E. and von der He le, J. 1976, *Abh. der Hamburger Sternwarte*, Band IX.

Klemola, A. R., Taraji H. and Ocampo, L. 1979, *Lick Saturn-Voyager Reference Star Catalogue*, Lic Observatory, University of California, Santa Cruz.

Smithsonian Astrophysi l Observatory. 1966, *Star Catalog*, Smithsonian Publ. 4652.

SECTION 5 - SAMPLE LISTING

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

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: SATURN-VOYAGER REF CAT.

       RECORDS        1 TO      20

     TAPE FILE       21

 RECORD LENGTH       56 BYTES

  INPUT VOLSER     WTS014

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


RECORD      1   5438711124019.165- 11720.65      11.04
RECORD      2   6218711124019.708- 01535.94      11.28
RECORD      3   5488711124019.844- 1 216.25      11.27
RECORD      4    598711124021.292- 44120.1510.56 9.61  138926-14.5 -1.0
RECORD      5   5468711124022.150- 15839.4510.00 8.84-01 1688-18.4  3.9
RECORD      6   6208711124022.870- 02932.72      10.31
RECORD      7   3118711124025.009- 34628.10 8.41 7.78  138928-22.9-19.0
RECORD      8   5458711124026.283- 14254.6110.10 9.22-01 1689  1.6 -5.5
RECORD      9   3108711124028.213- 34133.0211.2010.68
RECORD     10   6228711124032.200- 01552.7110.23 9.33-00 1760 -1.2 -0.2
RECORD     11    578711124033.109- 45411.4311.5110.93
RECORD     12   3128711124033.711- 3 059.6211.8411.37
RECORD     13   6988711124034.462+ 032 6.4711.2010.25
RECORD     14   6978711124036.307+ 01617.67      9.68+00 1598 -2.5 -2.5
RECORD     15   5448711124038.126- 13640.9111.2910.20
RECORD     16   3188711124038.606- 24125.43 9.94 9.00-02  755  4.8-10.4
RECORD     17   6968711124040.599+ 0 732.4512.6411.58
RECORD     18   5428711124041.845- 12220.4911.4310.70
RECORD     19    568711124042.197- 44850.3411.0210.13
RECORD     20   6958711124043.154+ 0 4 9.1011.25 9.99+00 1599 -2.8 -2.4
```

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: SATURN-VOYAGER REF CAT.

      RECORDS   4536 TO   4555

    TAPE FILE     21

RECORD LENGTH     56 BYTES

  INPUT VOLSER   WTS014

C O L U M N                                                                                                                   111111111111111
H E A D I N G             11111111112222222222333333333344444444445555555555666666666677777777778888888888999999999900000000001111111
I N D E X        1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

RECORD    4536   6758719141156.065+ 21431.9210.7310.29+02 1736 -0.2 -4.1
RECORD    4537   7508719141158.579+ 22828.5010.37 9.80+02 1737 -4.9 -5.1
RECORD    4538   37087191412 1.548- 04749.8611.7111.49
RECORD    4539   67487191412 3.581+ 15149.03 9.70 9.18+01 1620  2.9 -5.9
RECORD    4540    4987191412 6.005+ 24344.49 9.46 8.95+02 1738 -4.6 -1.5
RECORD    4541     987191412 6.318+ 2 147.23 9.47 8.66+02 1739 -2.4 -1.7
RECORD    4542   75187191412 7.140+ 23447.1610.8210.31
RECORD    4543    7087191412 9.766- 31224.5311.2711.38
RECORD    4544   2998719141211.666- 13234.1711.9011.40
RECORD    4545   3018719141216.723- 1 132.3310.7910.52
RECORD    4546   5298719141216.772+ 02911.6410.01 9.51+00 1729 -5.8 -2.1
RECORD    4547    698719141220.002- 32336.51 9.46 8.57  139813-15.4 -3.6
RECORD    4548   1438719141222.854- 22627.7110.8111.10
RECORD    4549    108719141224.097- 2 414.0510.29 9.66-02  855 -0.5 -3.1
RECORD    4550   4478719141226.598- 01230.2011.2111.12
RECORD    4551    508719141226.756+ 2 744.18 9.47 9.03+02 1740 -0.2 -0.6
RECORD    4552   6028719141228.465+ 12547.4910.8210.51
RECORD    4553   5328719141230.613+ 05836.1710.8110.51
RECORD    4554   6018719141231.029+ 11137.9210.30 9.57+01 1621 -8.5 -5.4
RECORD    4555   3008719141231.802- 11118.05 9.84 9.27-01 1821 -4.4 -2.9
```

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