

02 TM  
DATE OVERRIDE

32999



p29

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

89-08

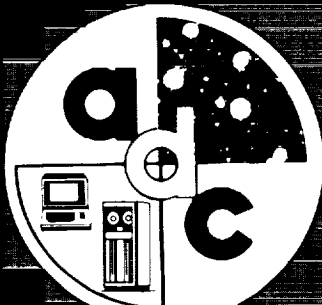
**SMITHSONIAN ASTROPHYSICAL**

**OBSERVATORY STAR CATALOG (SAO)**

**(SAO Staff 1966)**

**(Edition ADC 1989)**

**Documentation for the Machine-Readable Version**



June 1989

(NASA-TM-105064) SMITHSONIAN ASTROPHYSICAL  
OBSERVATORY (SAO) STAR CATALOG (SAO STAFF  
1966, EDITION ADC 1989): DOCUMENTATION FOR  
THE MACHINE-READABLE VERSION (NASA) 29 p

N91-31036

Unclas  
0032999

CSCL 03A G3/89



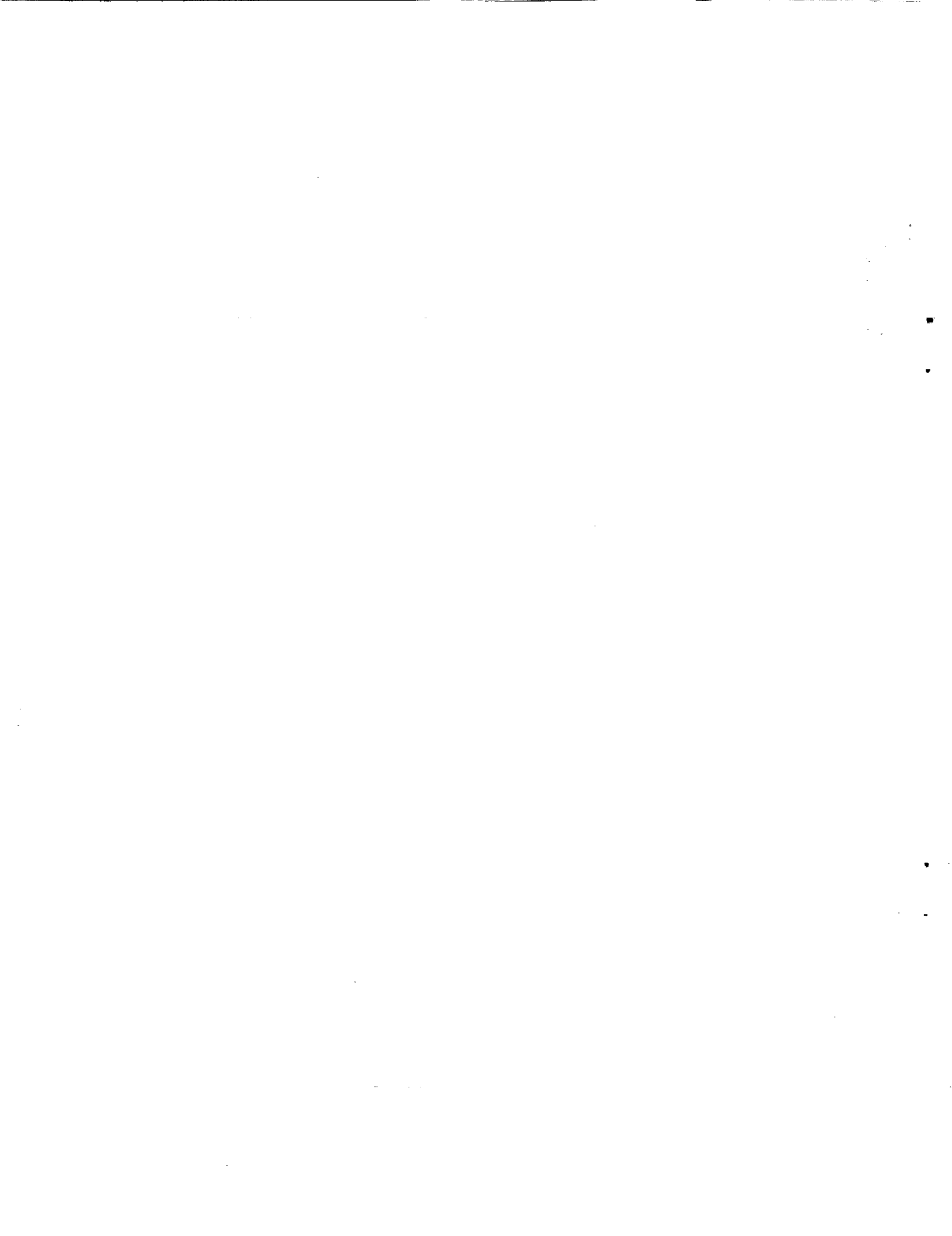
***SMITHSONIAN ASTROPHYSICAL  
OBSERVATORY STAR CATALOG (SAO)***  
**(SAO Staff 1966)**  
**(Edition ADC 1989)**

**Documentation for the Machine-Readable Version**

Nancy G. Roman and Wayne H. Warren Jr.

June 1989

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



SMITHSONIAN ASTROPHYSICAL OBSERVATORY STAR CATALOG (SAO)

DOCUMENTATION FOR THE MACHINE-READABLE VERSION

(EDITION 1989)

ABSTRACT

An updated, corrected and extended machine-readable version of the catalog is described. Published and unpublished errors discovered in the previous version have been corrected, and multiple-star and supplemental BD identifications have been added to stars where more than one SAO entry has the same Durchmusterung number. *Henry Draper Extension* (HDE) numbers have been added for stars found in both volumes of the extension. Data for duplicate SAO entries (those referring to the same star) have been flagged. J2000 positions in usual units and in radians have been added.



TABLE OF CONTENTS

Section 1 - INTRODUCTION AND PROCEDURE . . . . .	1-1
Section 2 - FILE CONTENTS . . . . .	2-1
Section 3 - FILE CHARACTERISTICS . . . . .	3-1
Section 4 - REMARKS, ACKNOWLEDGMENTS AND REFERENCES . . . . .	4-1
Section 5 - SAMPLE LISTING . . . . .	5-1

LIST OF TABLES

Table

1 File Contents . . . . .	2-1
2 Explanation of HD Codes . . . . .	2-5
3 Visual Magnitude Sources . . . . .	2-6
4 Star-Number Sources and Footnotes . . . . .	2-7
5 Photographic Magnitude Sources . . . . .	2-7
6 Proper-Motion Sources . . . . .	2-8
7 Spectral-Type Sources . . . . .	2-8
8 Miscellaneous Coded Remarks for Duplicity and Variability . . . . .	2-9
9 References for the Source Catalogs . . . . .	2-10
10 File Characteristics . . . . .	3-1
11 References for Changes to the SAO Catalog, Version 1984 . . . . .	4-1
12 Explanatory Notes to Individual Changes . . . . .	4-2
13 Changes to the 1984 Version . . . . .	4-3
14 Sources for Changes Since 1984 Version . . . . .	4-6





## SECTION 1 - INTRODUCTION AND PROCEDURE

### INTRODUCTION

A character-coded machine-readable version of the *Smithsonian Astrophysical Observatory Star Catalog* (SAO, SAO Staff 1966) was prepared by T. A. Nagy (1979) from a packed binary tape obtained from the Smithsonian Astrophysical Observatory. In addition to certain format modifications, equatorial coordinates in radians and cross identifications from the *Table of Correspondences SAO/HD/DM/GC* (Morin 1973) were added to the converted version; however, the known errata lists were not incorporated at that time. This version of the catalog served as a starting point for the new version described here. As a prelude to creation of the 1984 version of the SAO, a new version of the *SAO-HD-GC-DM Cross Index* was prepared (Roman, Warren and Schofield 1983), since most of the changes and extensions for the SAO involve data presently in the Cross Index. The 1984 version of the SAO contains the corrected and extended cross identifications, all errata published up to January 1984 and known to us, numerous errors forwarded to us by colleagues, and errors discovered at the Astronomical Data Center during the course of this work. Recently, Clayton Smith, at the U.S. Naval Observatory, volunteered to provide J2000 positions for the SAO stars. These have been added in both normal and radian form. Additional errors of which we are aware (as of May 1989) have been corrected.

This document describes the current version of the machine-readable SAO Catalog. It outlines the procedures used to correct and extend the previous versions and is intended to enable users to read and process the data without problems and guesswork. The following section describes the analysis and methods used to cross identify the stars and to add component identifications for stars where more than one SAO record has the same *Durchmusterung* (DM) identification. Section 2 provides detailed descriptions of the catalog format and codes used in the data records, while Section 3 contains information on the characteristics of the magnetic tape file. Miscellaneous remarks and sources for the corrections incorporated into the 1984 version and in this version are given in Section 4, which also contains bibliographical references. A sample listing of data records exactly as they are recorded on the tape comprises Section 5. A copy of this document should accompany any machine-readable version of the SAO Catalog.

### PROCEDURE

The assignment of components to SAO stars for which more than one entry has the same DM number was done when preparing the new *SAO-HD-GC-DM Cross Index*, and that procedure is described in Roman *et al.* (1983). A somewhat less detailed description is given here for completeness.

Components were assigned according to the *Index Catalogue of Visual Double Stars* (IDS, Jeffers *et al.* 1963; Worley 1980); for stars not in the IDS, components were labeled according to visual magnitude. Supplemental (footnoted) BD stars (Warren and Kress 1980) were identified and entered with lower case letters. Corrections and additions to cross-identification data were made as necessary. Some duplicate DM numbers actually referred to the same star for which SAO data had been obtained from different source catalogs. In these cases, one record has been marked "D" in byte 7, normally the one whose position was judged to be of lower accuracy. However, in the 1989 version all data have been retained so that a different choice may be made by the user.

Many stars occur in two DM catalogs (CD, CPD) in the southern hemisphere. The SAO gives numbers from different catalogs for the components of some double stars; hence, although there are no duplicate DM numbers, component confusion can occur. Although a search for such systems was not exhaustive, the catalog was searched for adjacent entries with declinations within 3' of each other. Most of these entries proved to be double stars and were appended with letter designations as if their DM numbers had been the same. These DM numbers were not changed.

An important subset of rather bright stars in the published SAO Catalog has no DM numbers given. (Most of the stars in this subset were identified as FK3 double stars which were omitted from the FK4.) Many of these had been identified by W. L. Stein, who supplied probable DM numbers. The positions for these stars were compared manually with their positions in the various DM catalogs and many additional identifications were made.

Although the *Henry Draper Extension* (Cannon 1925-1936) stars from *Harvard Annals*, Volume 100, having DM numbers listed in the original catalog, were included in the SAO, those listed with AG numbers only (Astronomische Gesellschaft, zones +50° to +54°, Harvard, Rogers 1892; zones +55° to +59°, Helsingfors-Gotha, Krüger 1890) had not been cross identified and inserted into the machine version. The *Yale Zone Catalogues* (YZ, Barney *et al.* 1959a, 1959b), which identify stars by their AG numbers, but also give corresponding DM numbers, were used to cross identify the AG stars. This was accomplished by using the magnetic tape versions of the YZ and HD catalogs and matching the stars by machine. A cross index of *Henry Draper Extension* stars from *Harvard Annals*, Volume 112 (Cannon and Walton Mayall 1949) and DM numbers (Bonnet 1978) was used to insert HDE numbers from the final HD volume.

Since the GC (Boss 1937) numbers in the SAO-HD-GC-DM Cross Index had been assigned by comparing with HD numbers in the GC, stars without HD numbers in the Cross Index were missing GC identifications. The magnetic tape file of the GC was therefore searched by DM number for all stars having no GC numbers in the Cross Index. Additional GC numbers were found manually (by position) for the few remaining stars without DM numbers. Fourteen GC stars were found not to be in the SAO Catalog. HD numbers in the GC were then compared with their counterparts in the Cross Index for stars in common, leading to the detection and correction of a number of additional errors.

The catalog contains a numerical code appended to each HD number. The code originally followed the convention of the *Strasbourg Catalog of Stellar Identifications* (CSI, Ochsenbein *et al.* 1981) which assigned the numbers 1, 2, ... for individual components of multiple systems and the digit 9 if two contiguous HD stars are included in the entry (the lower HD number is usually given with code 9). Since the component codes were assigned to CSI entries without regard to letter designations, and because letter designations have now been added, the HD code was changed to a consistent indication of major contamination of the spectral type of the component to which the entry applies by the spectrum of another star (see Table 2). A visual magnitude difference of 0.<sup>m</sup>3 was used as the limit for which contamination was indicated. Although photographic magnitudes would have been more appropriate, the visual magnitudes in the SAO appeared to be more consistent.

Many HD numbers were added to the SAO-HD-GC-DM Cross Index and subsequently to the SAO, and quite a few incorrect HD numbers were changed. The SAO already contained spectral types for many of these stars; those types were compared with the types in the HD, and discrepancies were corrected only where it seemed desirable. For stars with new HD numbers and no spectral types in the SAO, the latter were inserted using the machine version of the

HD for the main catalog and the first extension. Spectral types were read from the charts of the second extension (*Harvard Annals* 112) and approximately 5000 inserted manually; types were also inserted for other HD stars for which they were missing in the SAO. For components of multiple stars, spectral types were added or removed according to the likelihood that the star contributed to the HD type.

Following completion of the Cross Index, all appropriate cross-identification data were replaced in the 1984 SAO. Additional corrections involving the SAO only were then made. In certain cases, SAO positions had been found in error, but correct positions in the SAO system could not have been derived without a re-reduction of all the original data. Since this would clearly have been impracticable, positions were taken from the *Cape Photographic Catalogues* for 1950.0 (CPC). (Errata for the CPCs have been published in the zone catalog for  $-80^{\circ}$  to  $-90^{\circ}$  [Stoy 1968]). The CPC proper motions were applied to the positions at epoch to bring them to epoch 1950.0.

In the 1984 version, a total of 12,373 SAO records was corrected or supplemented with 17,915 individual data changes. All changes in this version are itemized on the microfiche cards accompanying this document (see Section 4). Changes in the 1989 version, from the 1984 version, are given in Table 13.

As noted in the introduction, Clayton Smith provided J2000 positions in both standard and radian format for the 1989 version.



## SECTION 2 - FILE CONTENTS

A byte-by-byte description of the contents of the machine-readable SAO Catalog is given in Table 1. The suggested format specifications apply to FORTRAN formatted read statements and can be modified depending upon individual programming and processing requirements. All data fields with primary A-format specifications are blank for missing data; hence, the alternate numerical specifications used for machine searches will produce zero values. Data are always present in fields for which primary numerical formats are given, except where specifically noted.

Table 1. File Contents. *Smithsonian Astrophysical Observatory Star Catalog*.  
Version 1989.

Byte(s)	Units	Suggested Format	Description
1- 6	—	I6	SAO number.
7	—	A1	"D" if this SAO entry refers to a duplicate star from the catalog.
8- 9	hours	I2	Right ascension ( $\alpha$ ) 1950.0 equinox and epoch.
10- 11	min	I2	$\alpha$
12- 17	sec	F6.3	$\alpha$
18- 24	sec yr <sup>-1</sup>	F7.4	Annual proper motion $\mu_\alpha$ .
25- 26	0.001 yr <sup>-1</sup>	I2 (F2.3)	Standard deviation ( $\sigma_\mu$ ) of $\mu_\alpha$ .
27	—	A1	A "+" or "-" to indicate that the minutes of time associated with the seconds portion of $\alpha$ (bytes 28-33) must be increased or decreased by 1, respectively; otherwise blank (if $\alpha_2$ is the same minute as $\alpha^S$ in bytes 12-17).
28- 33	sec	F6.3	Seconds portion ( $\alpha_2$ ) of $\alpha$ at original epoch, precessed to 1950.0 (i.e. 1950 position modified by proper motion).
34- 35	0.01 yr <sup>-1</sup>	I2 (F2.2)	Standard deviation ( $\sigma$ ) of $\alpha_2$ .
36- 41	years	F6.1	Epoch of $\alpha_2$ .

Table 1. (continued)

Byte(s)	Units	Suggested Format	Description
42	—	A1	Sign of declination.
43- 44	°	I2	Declination ( $\delta$ ) 1950.0 equinox and epoch.
45- 46	'	I2	$\delta$
47- 51	"	F5.2	$\delta$
52- 57	" yr <sup>-1</sup>	F6.3	Annual proper motion $\mu_{\delta}$ .
58- 59	0.001 yr <sup>-1</sup>	I2 (F2.3)	Standard deviation ( $\sigma_{\mu}$ ) of $\mu_{\delta}$ .
60	—	A1	A "+" or "-" to indicate that the arc-minutes associated with the arcseconds portion of $\delta$ (bytes 61-65) must be increased or decreased by 1, respectively; otherwise blank (if $\delta_2$ is in the same minute as $\delta$ in bytes 47-51).
61- 65	"	F5.2	Seconds portion ( $\delta_2$ ) of $\delta$ at original epoch, precessed to 1950.0 (i.e. 1950 position modified by the proper motion).
66- 67	0.01	I2 (F2.2)	Standard deviation ( $\sigma$ ) of $\delta_2$ .
68- 73	years	F6.1	Epoch of $\delta_2$ .
74- 76	0.01	I3 (F3.2)	Standard deviation of position at epoch 1950.0.
77- 80	mag	F4.1	Photographic magnitude $m_{pg}$ (99.9 if no value present). When both magnitude fields are 99.9, the miscellaneous code (byte 95) should be checked for possible variability in which case magnitudes may not be reported.
81- 84	mag	F4.1	Visual magnitude $m_v$ (99.9 if no value present).
85- 87	—	A3	Spectral type ("+++" for composite spectra).
88- 89	—	I2	Coded source of visual magnitude (see Table 3).

Table 1. (continued)

Byte(s)	Units	Suggested Format	Description
90- 91	—	I2	Coded source of star number and footnotes (see Table 4).
92	—	I1	Coded source of photographic magnitude (see Table 5).
93	—	I1	Coded source of proper motions (see Table 6).
94	—	I1	Coded source of spectral type (see Table 7).
95	—	I1	Coded miscellaneous remarks for duplicity and variability (see Table 8).
96	—	I1	Accuracy of visual magnitude: 0 indicates that the magnitude in the source catalog is reported to 0 <sup>m</sup> 00; 1 to 0 <sup>m</sup> 0.
97	—	I1	Accuracy of photographic magnitude (same coding as for byte 96).
98- 99	—	I2	Code for source catalog (see Table 9).
100- 104	—	I5	Number in source catalog.
105- 106	—	A2	Durchmusterung (DM) identification (BD = <i>Bonner Durchmusterung</i> ; CD = <i>Córdoba Durchmusterung</i> ; CP = <i>Cape Photographic Durchmusterung</i> ). All DM fields are blank if no DM identification is present.
107	—	A1	Sign of DM zone.
108- 109	—	I2 (A2)	DM zone.
110- 114	—	I5 (A5)	DM number.
115- 116	—	A2	Component identification if there are two or more SAO stars having the same DM number. For multiple systems included in the <i>Index Catalogue of Visual Double Stars</i> (IDS, see Worley 1980) the IDS components are given; for non-IDS stars, components were assigned on the basis of magnitude. If two components of southern double stars are listed, DM numbers from different catalogs are often quoted for the components. In these cases, component identifications are usually given without changing the DM numbers.

Table 1. (concluded)

Byte(s)	Units	Suggested Format	Description
117	—	A1	Lower case letter identification for BD supplemental stars (Warren and Kress 1980).
118- 123	—	A6 (I6)	<i>Henry Draper</i> (HD or HDE) <i>Catalogue</i> number.
124	—	A1 (I1)	HD code (1, 2, ... for component identifications where more than one star has the same HD number [not necessarily equivalent to A, B, ... or to the component identifications in the IDS; see Table 2]).
125- 129	—	A5 (I5)	Number in <i>General Catalogue of 33342 Stars for 1950</i> (GC, Boss 1937).
130- 139	rad	F10.8	Right ascension (1950.0).
140- 150	rad	F11.8	Declination (1950.0).
151- 152	hours	I2	Right ascension ( $J\alpha$ ) for J2000.
153- 154	min	I2	$J\alpha$
155- 160	sec	F6.3	$J\alpha$
161- 167	sec yr <sup>-1</sup>	F7.4	Annual proper motion in right ascension for J2000.
168	—	A1	Sign of declination.
169- 170	°	I2	Declination ( $J\delta$ ) for J2000.
171- 172	'	I2	$J\delta$
173- 177	"	F5.2	$J\delta$
178- 183	" yr <sup>-1</sup>	F6.3	Proper motion in declination for J2000.
184- 193	rad	F10.8	$J\alpha$ in radians.
194- 204	rad	F11.8	$J\delta$ in radians.



Table 2 gives a detailed description for each HD code that can occur in byte 124 of a data record.

Table 2. Explanation of HD Codes.

---

---

**Code Meaning**

---

- 0 Single star, or primary with a companion  $> 0^m3$  (visual) fainter.
  - 1 Brighter component with a companion  $\leq 0^m3$  fainter.
  - 2 Fainter component with a companion  $\leq 0^m3$  brighter.
  - 9 The *SAO Catalog* entry refers to two consecutive HD numbers, the lower of which is given.
- 
-

Tables 3 through 9 give data sources and duplicity / variability codes.

Table 3. Visual Magnitude Sources.

Visual	Photo-visual	Magnitude source
0		Does not appear in source catalog
1	21	Determined by source catalog
2	22	Determined by source catalog or by authority in footnote
3	23	Source cited in source catalog introduction
	24	Source unspecified
5		Taken from <i>Bonner Durchmusterung</i>
8		Based on <i>Durchmusterung</i> magnitudes and visual estimates
9		Taken from AGK1
10		Taken from Córdoba Zones (Resultados)
12		Taken from CGA (Perrine 1911a, b) or Córdoba Zones
13		Taken from Harvard publications
14		Taken from Harvard or San Luis photometry
15		Taken from the <i>Henry Draper Catalogue</i>
16		Combined magnitude of component stars
17		Arithmetic mean of maximum and minimum magnitudes of a variable star

Always check the duplicity / variability code (Table 8) when using magnitudes. When blank, code = 0 and field = 99.9.

Table 4. Star-Number Sources and Footnotes.

Footnote without	with	Star Number
0	16	Source catalog only
1	17	Source catalog and BD
2	18	Source catalog and CD
3	19	Source catalog and CPD
4	20	Córdoba B (Resultados) and CD
5	21	Córdoba A (Resultados) and CD
6	22	AGK1 and BD
7		GC and BD
8	24	Córdoba B (Resultados) and CPD
9		Córdoba A (Resultados) and CPD

When blank, the code for DM is 0 or 16, footnote is 0 through 9, and field is all zeros. Footnotes and star numbers are those appearing in the source catalogs.

Table 5. Photographic Magnitude Sources.

Code	Source
0	Does not appear in source catalog
1	Determined by source catalog
4	Taken from magnitudes of the CPD and diameters of the Cape Astrographic Catalogue
8	Source cited in source catalog introduction
9	Columbia Contributions Numbers 30 and 31 (Schilt and Hill 1937, 1938)

When blank, code is 0 and field is all zeros.

Table 6. Proper-Motion Sources.

Code	Source
1	Determined by source catalog
3	Determined by comparison of catalog and Greenwich AC
5	Determined by comparison of catalog and AGK1
6	Determined by comparison of catalog and Greenwich AC on the basis of the smallest difference in positions (see page xiii of source reference)
6	Determined by comparison of catalog and AGK1 on the basis of the smallest difference in positions (see page xiii of source reference)

Table 7. Spectral-Type Sources.

Code	Source
0	Taken from the Henry Draper Catalogue or no spectrum in source catalog
1	Taken from the HD with M stars reclassified by Miss Cannon
2	Classified by G. G. Cillie
3	Classified by Goedicke
4	Classified by D. Hoffleit
5	Classified by M. W. Mayall
6	Classified at Leander McCormick Observatory
7	Classified by Nassau and Seyfert

If the spectrum is composite, "+++" is stored in the field and the code is 0.

Table 8. Miscellaneous Coded Remarks for Duplicity and Variability.

---

---

Code	Meaning
0	No additional information
1	Double star - see source catalog for source
2	Double star in Aitken's Double Star Catalogue (Aitken 1932)
3	Double star in Burnham's Double Star Catalogue (Burnham 1906)
4	Variable star in visual magnitude in source catalog
5	Variable star in photographic magnitude in source catalog
6	Variable star in both magnitudes
7	Both double and variable, in either visual or photographic magnitudes

---

---

When blank, code is 0, no field is involved.

Table 9. References for the Source Catalogs.

No.	Abbreviated Title
01	AGK2, Volume 1
02	AGK2, Volume 2
03	AGK2, Volume 5
04	AGK2, Volume 6
05	AGK2, Volume 7
06	AGK2, Volume 8
20	<i>Yale Transactions</i> 11
21	<i>Yale Transactions</i> 12 Part I
22	<i>Yale Transactions</i> 12 Part II
23	<i>Yale Transactions</i> 13 Part I
24	<i>Yale Transactions</i> 13 Part II
25	<i>Yale Transactions</i> 14
26	<i>Yale Transactions</i> 16
27	<i>Yale Transactions</i> 17
28	<i>Yale Transactions</i> 18
29	<i>Yale Transactions</i> 19
30	<i>Yale Transactions</i> 20
31	<i>Yale Transactions</i> 21
32	<i>Yale Transactions</i> 22 Part I
33	<i>Yale Transactions</i> 22 Part II
34	<i>Yale Transactions</i> 24
35	<i>Yale Transactions</i> 25
36	<i>Yale Transactions</i> 26 Part I
37	<i>Yale Transactions</i> 26 Part II
38	<i>Yale Transactions</i> 27
40	<i>Cape Annals</i> 17
41	<i>Cape Annals</i> 18
42	<i>Cape Annals</i> 19
43	<i>Cape Annals</i> 20
48	Cape Zone
60	Melbourne 3
61	Melbourne 4
70	GC
71	FK3
74	FK4

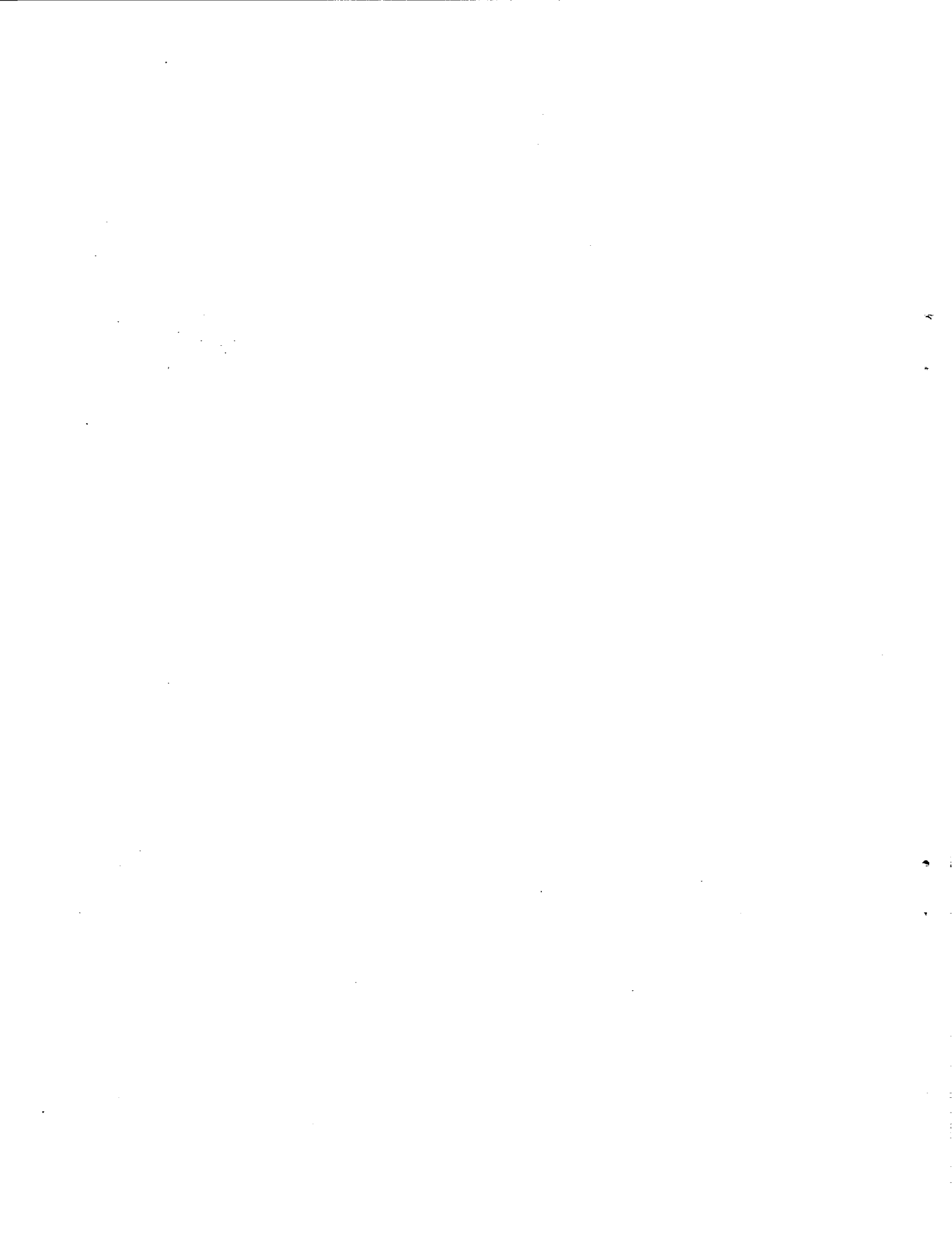
### SECTION 3 - FILE CHARACTERISTICS

The information in Table 10 is sufficient for a user to describe the indigenous characteristics of the machine-readable *Smithsonian Astrophysical Observatory Star Catalog, Version 1989* to a computer. Not included is 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.). These parameters should always be transmitted if secondary copies of the catalog are supplied to other users or installations.

Table 10. File Characteristics. *Smithsonian Astrophysical Observatory Star Catalog, Version 1989.*

NUMBER OF FILES . . . . .	1
LOGICAL RECORD LENGTH (BYTES) . . . . .	204
RECORD FORMAT . . . . .	FB*
TOTAL NUMBER OF LOGICAL RECORDS . . . . .	258997

\* Fixed block length (last block may be short).





## SECTION 4 - REMARKS, ACKNOWLEDGMENTS AND REFERENCES

As mentioned in Section 1, the individual data corrections, additions and changes included in the 1984 version of the SAO Catalog number 17,915, with 12,373 records (4.8%) having at least one change. Since many of the changes involve corrections to data given in previously published catalogs, it is important for a user to have access to the individual changes if a discrepancy is found between this catalog and a previously published one. For this reason, we have prepared a complete table of all changes made to the previous version to produce the 1984 version as well as a table of additional changes in the 1989 version. The former corrections and changes table was prepared by comparing the uncorrected file against the new version with a computer program that compared the data fields one by one and produced a formatted changes table. The complete table for the 1984 version is given on the microfiche cards contained in the envelope inside the back cover of this document. If a data entry is blank in either version, it is blank for the corresponding item in the table. The column labeled "S" gives the source of the change, as defined in Table 11 by its numerical code. Table 13 gives similar data for the 1989 version.

Table 11. References for Changes to the SAO Catalog, Version 1984.

Code	Reference(s)
1	Haramundanis, K. undated, <i>Errata Sheet for the SAO Star Catalog; 1971, Note on SAO Catalog Errata</i> (January).
2	Stein, W. L. and Rudisill, J. C., 1977, <i>Introduction to the Dahlgren General Catalog</i> , Naval Surface Weapons Center NSWC/DL TR-3607.  Stein, W. L. 1978, in Bischoff, M., <i>Bull. Inf. Cent. Données Stellatres</i> , No. 14, 2; No. 15, 103.  Stein, W. L., private communication.
3	Bischoff, M. 1978, <i>Bull. Inf. Cent. Données Stellatres</i> , No. 14, 2; No. 15, 103.
4	Hoffleit, D., private communication.
5	Parsons, S. B. 1977, <i>Bull. Inf. Cent. Données Stellatres</i> , No. 12, 41.
6	Nagy, T. A. 1979, <i>Documentation for the Machine-Readable Version of the Smithsonian Astrophysical Observatory Catalog[ue]</i> (EBCDIC Version), Systems and Applied Sciences Corporation R-SAW-7/79-34.
7	Houziaux, L. and Blondelot-Lickes, J. 1970, Centre Univ. Mons, Fac. Sci., Dept. Astrophys., Communication No. 13.
8	Stoy, R. H. 1968, <i>Cape Photographic Catalogue for 1950.0, Zones -80° to -90°, Ann. Cape Obs. 22</i> (London: Her Majesty's Stationery Office).

Table 11. (concluded)

Code	Sources
9	McLaughlin, S. F., private communication.
10	Bonnet, R. 1978, <i>Cross Identifications of HDE Stars</i> , <i>Bull. Inf. Cent. Données Stellaires</i> , No. 15, 155. Magnetic tape version, CDS Strasbourg catalog number 4008.
11	Warren, W. H. Jr. and Kress, K. 1980, <i>Catalog of Supplemental Stars to the Bonner Durchmusterung</i> , <i>Astron. Data Center Bull.</i> 1, 19.
12	Errors and additions from the present work.
13	Schmidtke, P. C., private communication.
14	Herald, D. 1979, <i>Occultation Newsl.</i> 2, 49.

Table 12 includes further notes on entries in the microfiche table for which additional explanations are considered useful to clarify the reasons for certain changes.

Table 12. Explanatory Notes to Individual Changes.

SAO	Note(s)
6404	The GC incorrectly identifies this star as BD+76° 309; GC 11190 is BD+76° 309, while this star is +77° 309.
9947	This star is misidentified as BD+70° 1162 in the GC, as it is in the IDS and ADS (Altken 1932). Source 3 corrects the DM number to +70° 1161, assuming that the double entry for +70° 1161 represents the two components of the double star. This is not the case. SAO 9949 is a duplicate entry and should be deleted.
15097	The GC incorrectly lists this star as BD+65° 761. It is actually +65° 751, while +65° 761 is SAO 15120, which does not appear in the GC.
17589	The GC incorrectly identifies this star as BD+68° 936, whereas it is actually +69° 936.
23221	Source 1 incorrectly gives this star as BD+53° 568a. It is actually +52° 568a.

Table 12. (concluded)

SAO	Note(s)
24753	This star is listed as BD+57° 825 in several catalogs. It is not in the proper position for the BD star, however. There is a star at the SAO position on photographs, but it is not in the BD.
29370 29372	These corrections are probably in error. The BD gives +54° 1724 as being SW of +54° 1725 and lists both stars as magnitude 7.5. The SAO, AGK3 and IDS list the brighter star ( $\Delta m \sim 0^m.6$ ) as SE. The HD also lists the brighter star as south, but gives the same right ascension for both stars. The IDS identifies the brighter star as BD+54° 1724, as do the HD and the SAO, but the AGK3 reverses the DM numbers, listing the brighter star as +54° 1725.
101858	Sources 2 and 3 suggested changing this star to BD+17° 2945. It is part of a triple system, of which C, the fainter, more distant component, is +17° 2945. SAO 101858 and 101859 appear to be the A and B components, respectively, of +17° 2946.
238176	The GC is in error. GC 14513 is CP-54° 3795 and is not in the HD. GC 14517 is CP-54° 3797, which is HD 91593.

Table 13. Changes to the 1984 Version.

No.	Field	For	Read	S
5840	DM No.	BD+78 222		21
9160	DM No.	BD+69 993a	BD+69 993	21
9773	DM No.	BD+77 778		21
12509	Spectrum	B:	Bp	22
20758	DM No.	BD+63 2030	BD+63 2030a	21
23221	DM No.	BD+53 568a	BD+52 568a	21
27123	DM No.	BD+57 1199	BD+57 1194	21
29370	DM No.	BD+54 1725	BD+54 1724	21
29372	DM No.	BD+54 1724	BD+54 1725	21
39436	Spectrum	B:	Bp	22
45289	DM No.	BD+46 2005a	BD+46 2005	21
56771	Spectrum	G0	G0	22
62236	DM No.	CD+31 2180	BD+31 2180	21
64711	DM No.	BD+40 2872	BD+39 2872	21
74667	DM No.	BD+28 255	BD+28 225	21
76943	DM No.	BD+28 741	BD+28 742	21
76943	HD No.	HD 32479		21
76944	DM No.	BD+28 742	BD+28 741	21
76944	HD No.		HD 32479	21

Table 13. (continued)

No.	Field	For	Read	S
82706	DM No.	CD+28 2193	BD+28 2193	21
85564	DM No.	BD+29 3149a	BD+29 3149	21
85567	DM No.	BD+29 3149	BD+29 3149a	21
86043	DM No.	CD+29 3259	BD+29 3259	21
94818	HD No.	HD 247073		23
97434	RA	7h56m2.355s	7h56m4.172s	24
97434	PM (RA)	+0.0021s/a	+0.0302 s/a	24
107156	DM No.	BD+13 4710	BD+13 4714	21
111240	DM No.	BD+ 0 602	BD+ 0 603	21
114916	DM No.	BD+ 1 1687	BD+ 1 1686	21
128522	DM No.	BD- 0 5077	BD+ 0 5077	21
129898	DM No.	BD- 0 361	BD- 0 361a	21
130238	PM (RA)	0.03s/a	+0.019:s/a	25
130238	PM (DEC)	1.30"/a	-0.08:"/a	25
131091	DM No.	BD- 7 787	BD- 7 788	21
133461	Record		Delete	23
142402	Record		Delete	23
156969	HD No.		HD 103314	21
156999	HD No.	HD 103314		21
159442	DM No.	CD-19 4188	BD-19 4188	21
159682	DM No.	CD-19 4307	BD-19 4307	21
163131	DM No.	BD-12 5991	BD-12 5591	21
163131	HD No.	HD 204013	HD 188763	21
167662	DM No.	CD-30 804	CD-29 804	21
172151	DM No.	BD-20 1550	BD-21 1550	21
172631	Record		Delete	23
172821	DM No.	CD-28 3844	CD-28 3744	21
178737	DM No.	BD-21 3161	BD-20 3161	21
178737	HD No.	HD 93814	HD 89913	21
179258	DM No.	BD-20 3161	BD-21 3161	21
179258	HD No.	HD 89913	HD 93814	21
180619	Record		Delete	23
181584	Record		Delete	23
185579	DM No.	CD-27 11769	CD-27 11768	21
186318	DM No.	CD-23 13936	CD-23 13937	21
186419	DM No.	CD-26 12900	CD-26 12898	21
186717	Record		Delete	23
187331	DM No.	BD-22 13325	CD-22 13325	21
190341	DM No.	BD-22 15388	CD-22 15388	21
192236	DM No.	CD-22 16507	CD-22 16508	21
193858	Record		Delete	23
193896	Record		Delete	23
198195	DM No.	BD-34 3755	CD-34 3755	23
201368	DM No.	CD-37 6528B		21
204943	DM No.	CD-31 10729	CD-31 10727	21
206001	DM No.	CD-38 9673	CD-38 9693	21

Table 13. (concluded)

No.	Field	For	Read	S
208948	DM No.	CD-36 11642	CD-36 11632	21
209763	DM No.	CD-31 15539	CD-31 15149	21
209763	HD No.	HD 165930	HD 165725	21
210778	DM No.	CD-38 13224	CD-38 13239	21
211312	DM No.	CD-36 13215	CD-37 13215	21
213279	DM No.	CD-32 16734		21
215182	Record		Delete	23
216710	DM No.	BD-42 1425	CD-42 1425	21
220069	Spectrum	B:	Bp	22
222287	Record		Delete	23
223213	DM No.	CP-49 4828	CP-49 4827	21
226867	DM No.	CD-45 10733	CD-45 10731	21
226867	GC No.		GC 22215	21
226868	DM No.	CP-45 8001C	CP-45 8001	21
226868	GC No.	GC 22215		21
227380	Record		Delete	23
227535	DM No.	CD-44 11300	CD-43 11300	21
228027	Record		Delete	21
228306	Record	Delete	Keep	21
229059	Record		Delete	23
232734	RA	2h20m50.218s	2h20m53.218s	24
234389	Record		Delete	23
236668	Record		Delete	23
238148	DM No.	CP-53 3909	CP-53 3909B	26
238511	Record		Delete	23
240305	Record		Delete	23
241167	Record		Delete	23
242605	Record		Delete	23
242962	Record		Delete	23
244399	HD No.	HD 153772	HD 153771	26
244399	GC No.	GC 22982		21
244400	HD No.		HD 153772	26
244400	GC No.		GC 22982	21
244725	DM No.	CD-55 8100	CP-55 8100	21
246634	DM No.	CP-51 10511	CP-51 11511	21
250957	Dec.	-60°51'49.26"	-60°31'49.26"	24
251166	DM No.	CP-66 1447	CP-66 1453	21
251166	HD No.	HD 94494		21
252071	DM No.	CP-59 4544		21
252312	Spectrum	B:	Bp	22
256721	DM No.	CP-73 746	CP-73 745	21
256935	DM No.		CD-74 677	21
258552	DM No.	CP-83 398	CP-80 398	21

All communications resulting in the changes in Table 13 are unpublished. For 13028, it is apparent that the proper motions are in error, but accurate values are unavailable. In addition to the changes noted in Table 13, R. E. Reaves pointed out that plus signs were missing in bytes 27 and 60, that minus signs were occasionally found in byte 61, and that the second of arc field for the declinations sometimes read 60.00. These problems have been corrected.

Table 14. Sources for Changes Since 1984 Version.

---

Code	Source
21	T. Lederle
22	R. E. Reaves
23	T. Lederle and ADC
24	T. Lederle and T. E. Corbin
25	H. Jahreiss and T. E. Corbin
26	ADC

---

#### ACKNOWLEDGMENTS

We wish to express our appreciation to N. J. Schofield Jr., who worked on an early phase of the SAO project in connection with the revised *SAO-HD-GC-DM Cross Index*, and to D. Hoffleit, S. F. McLaughlin, R. E. Reaves, P. C. Schmidtke and W. L. Stein for communicating errors. We also thank several people who pointed out additional errors, and T. E. Corbin for checking data for several stars in other catalogs.

Especially significant was the work of T. Lederle (Astronomisches Rechen-Institut, Heidelberg), who analyzed a large number of cross identifications for Durchmusterung stars, provided a large list of possible errors, and worked with us to improve the changes, which were then inserted into the 1989 version.

Finally, the new J2000 version of the catalog owes much to the work of C. A. Smith (U.S. Naval Observatory), who computed the J2000 positions and proper motions and added them to the data records.

## REFERENCES

- Aitken, R. G. 1932, *New General Catalogue of Double Stars within 120° of the North Pole*, Carnegie Institution of Washington Pub. 417 (Washington: Carnegie Institution of Washington).
- Barney, I., Hoffleit, D. and Jones, R. B. 1959a, *Catalogue of the Positions and Proper Motions of 8380 Stars Between Declinations +50° and +55°, reduced without applying Proper Motions to the Equinox 1950.0*, *Trans. Astron. Obs. Yale Univ.* **28**, Part II.
- Barney, I., Hoffleit, D. and Jones, R. B. 1959b, *Catalogue of the Positions and Proper Motions of 8164 Stars Between Declinations +55° and +60°, reduced without applying Proper Motions to the Equinox 1950.0*, *Trans. Astron. Obs. Yale Univ.* **27**.
- Bonnet, R. 1978, *Bull. Inf. Cent. Données Stellaires*, No. 15, 115.
- Boss, B. 1937, *General Catalogue of 33342 Stars for the Epoch 1950*, Carnegie Institution of Washington Pub. 468 (Washington: Carnegie Institution of Washington).
- Burnham, S. W. 1906, *A General Catalogue of Double Stars within 120° of the North Pole* (Washington: Carnegie Institution of Washington).
- Cannon, A. J. 1925-1936, *The Henry Draper Extension*, *Ann. Astron. Obs. Harvard College* **100**.
- Cannon, A. J. and Walton Mayall, M. 1949, *The Henry Draper Extension, The Annie J. Cannon Memorial Volume*, *Ann. Astron. Obs. Harvard College* **112**.
- Jeffers, H. M., van den Bos, W. H. and Greeby, F. M. 1963, *Index Catalogue of Visual Double Stars, 1961.0*, *Pub. Lick Obs.* **21**.
- Krüger, A. 1890, *Zonenbeobachtungen der Sterne zwischen 55° and 65° nörd. Decl. angestellt an der Sternwarten von Helsingfors und Gotha. I Band, Inhalt d. Zonen 1-338 nebst den mittleren Oertern der Sterne für 1875* (Helsingfors: Kaiserl. Alexanders-Universität).
- Morin, D. 1973, *Table of Correspondences SAO/HD/DM/GC*, Obs. de Meudon, unpublished.
- Nagy, T. A 1979, *Documentation for the Machine-Readable Version of the Smithsonian Astrophysical Observatory Catalog[ue] (EBCDIC Version)*, Systems and Applied Sciences Corporation R-SAW-7/79-34.
- Ochsenbein, F., Bischoff, M. and Egret, D. 1981, *Astron. Astrophys. Suppl.* **43**, 259.
- Perrine, C. D. 1911a, *Catálogo de 5791 estrellas para 1900.0. II. Catálogo General Argentino, Resultados del Observatorio Nacional Argentino en Córdoba* **20**, 1.
- Perrine, C. D. 1911b, *Segundo Catálogo General Argentino. Estrellas Boreales, Resultados del Observatorio Nacional Argentino en Córdoba* **20**, 106.
- Rogers, W. A. 1892, *Catalogue of 8627 Stars*, *Ann. Astron. Obs. Harvard College* **15**, Part II.
- Roman, N. G., Warren, W. H. Jr. and Schofield, N. J. Jr. 1983, *Documentation for the Machine-Readable Version of the SAO-HD-GC-DM Cross Index, Version 1983*, NSSDC/WDC-A 83-17.

**REFERENCES** (continued)

- Schilt, J. and Hill, S. J. 1937, *Photographic Magnitudes for 6,902 Stars in the Zone +55° to +60°*, *Contr. Rutherford Obs.*, Columbia Univ., No. 30; 1938, *Photographic Magnitudes of 7,280 Stars in the Zone +50° to +55°*, *Contr. Rutherford Obs.*, Columbia Univ., No. 31.
- Smithsonian Astrophysical Observatory Staff 1966, *Star Catalog. Positions and Proper Motions of 258,997 Stars for the Epoch and Equinox of 1950.0*, Pub. of the Smithsonian Institution of Washington, D.C. No. 4652 (Washington: Smithsonian Institution).
- Stoy, R H. 1968, *Cape Photographic Catalogue for 1950.0. Zone -80° to -90°*, *Ann. Cape Obs.* 22.
- Warren, W. H. Jr. and Kress, K. 1980, *Astron. Data Center Bull.* 1, 19.
- Worley, C. E. 1980, *Bull. Inf. Cent. Données Stellaires*, No. 18, 20.



## SECTION 5 - SAMPLE LISTING

The sample listing given on the following pages contains logical data records exactly as they are recorded in the machine-readable version of the catalog. Sample records for stars at the beginning and the end of the data file are listed. The beginning of each record and bytes within the record are indicated by the column heading index across the top of each page (digits read vertically).

LISTING OF RECORDS FROM DATA FILE

Date File Name: SMD J2000.0 (ADC 1989)

Records 1 to 95

Date File 1

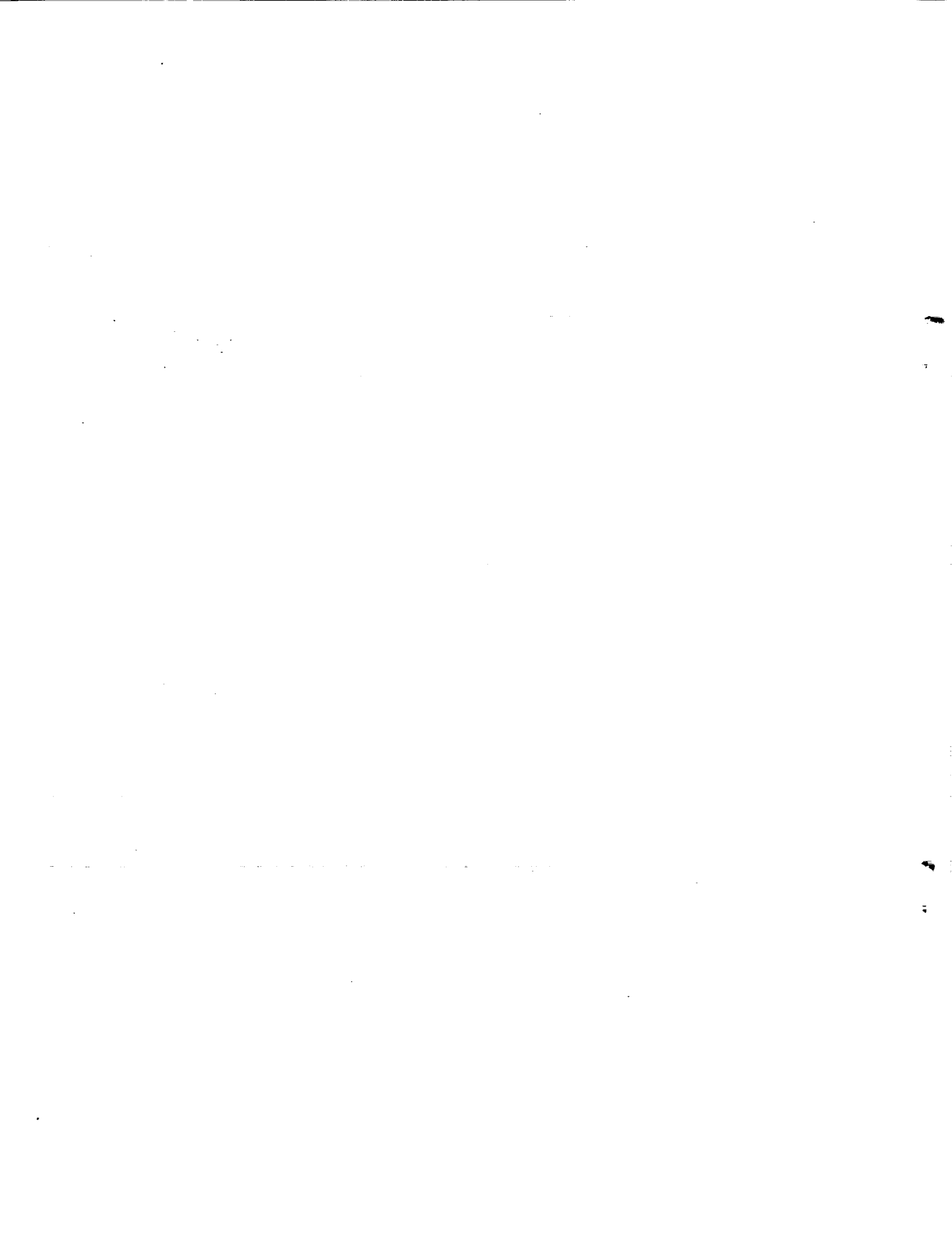
Record Length 284 bytes

Input VOLSER ADC816

Column header information including file name 'SMD J2000.0 (ADC 1989)', column counts '1 to 95', record length '284 bytes', and input volume 'ADC816'. The header also lists the column names: 'Date File', 'Record Length', and 'Input VOLSER'.

Main data table with 35 columns and 95 rows. Each row contains numerical data points, likely representing time-series measurements or sensor readings. The data is organized into vertical columns corresponding to the header information.





***1990 ADDENDUM TO THE 1989 VERSION  
SMITHSONIAN ASTROPHYSICAL  
OBSERVATORY STAR CATALOG***

Nancy Grace Roman  
Wayne H. Warren Jr.

November 1990

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



1. The first part of the document is a list of names and addresses.

2. The second part of the document is a list of names and addresses.

3. The third part of the document is a list of names and addresses.

4. The fourth part of the document is a list of names and addresses.

5. The fifth part of the document is a list of names and addresses.

6. The sixth part of the document is a list of names and addresses.

## 1.0 Discussion

The Astronomical Data Center (ADC) has recently completed the preparation of machine-readable versions of the three DM catalogs: the BD, the CD, and the CPD. Using these versions, Mr. Barry Rappaport compared the positions of the stars in the *Smithsonian Astrophysical Observatory Star Catalog* (SAO) with the positions of the DM stars whose number had been assigned to each entry. A very lengthy list of possible assignment errors resulted. Each of these has been checked and the assignment corrected in those cases in which correction appeared desirable. In many cases, the assignment in the printed SAO was probably incorrect, but the evidence was not strong enough to warrant a change. As the *Henry Draper Catalogue* numbers (HD) had been derived from the DM numbers, those were also corrected as necessary.

Since the 1989 version of the SAO was prepared, we have received several other corrections and some were found in the course of this checking. These have also been incorporated into the 1990 version.

Mr. Allan Moluf pointed out an error in the document for the 1989 version. In table 8, the second entry for the value 6 should read 8 instead.

The original SAO did not use lower case letters, making some spectral types seem strange. All capital letters that really should have been lower case in the spectral types have been changed. These changes, which are numerous, are not listed in Table 1

Table 1 lists all other changes that have been introduced in the 1990 version of the SAO since the 1989 version. Table 2 on page 4 gives the sources of those corrections that did not result from the ADC checking of Mr. Rappaport's suggested changes.

A copy of this document, together with the document for the 1989 version, should accompany any machine-readable version of this catalog originating from one of the international network of astronomical data centers.

SAO Number	Field	For	Read
15475	DM Number	+ 66 717	
19985	DM Number	+ 61 2278	+ 61 2277
19985	HD Number		211871
27062	Spec. Type	5	R5
27100	Spec. Type	5	R5
31951	Spec. Type	P	Pd
32162	DM Number	+ 57 2104	+ 57 2103
32162	HD Number	239271	
35236	DM Number	+ 56 2966	+ 56 2967
35236	HD Number	219134	
40312	DM Number	+ 43 1261	+ 43 1260
40314	DM Number	+ 43 1260	+ 43 1261
51472	DM Number	+ 46 3506	+ 46 3505
52114	DM Number	+ 48 3759	+ 48 3757

SAO Number	Field	For	Read
56597	Dec. Sec.	60.00	00.00
56597	Dec. Min.	0	1
75878	Dec Sec at Epoch	- 1.71	+ 53.26
84129	m pg	99.9	11.3
84129	m v	2.0	9.9
92548	m pg	99.9	8.5
92548	m v	8.5	8.2
97645	HD Number	68257	68256
97646	HD Number	68256	68255
114632	DM Number	+ 06 1439	+ 06 1440
114632	HD Number	266432	266532
124781	DM Number	+ 08 4139	+ 08 4137 a
124781	HD Number		184243
135104	DM Number	- 08 2069	- 08 2070
135104	HD Number		63229
135105	DM Number	- 08 2070	- 08 2071
135105	HD Number	63229	
138570	DM Number	- 09 3427	- 09 3428
143378	J2000 RA Sec	10.718	09.627
143378	J2000 Dec Deg	- 15	- 05
143378	J2000 Dec Sec	43.28	43.32
143378	J2000 RA Rad	5.08405088	5.08397154
143378	J2000 Dec Rad	- 0.03249842	- 0.01504532
147320	DM Number	- 19 70	- 19 71
147320	HD Number		2797
166231	DM Number	- 26 116	- 26 115
166537	DM Number	- 24 298	- 24 299
166537	HD Number		4287
167403	DM Number	- 23 715	- 23 716
167750	DM Number	- 30 859	- 29 859
167750	HD Number		14965
168790	DM Number	- 23 1537	- 23 1547
168790	HD Number		23507
170048	DM Number	- 25 2208	- 25 2205
170048	HD Number		32872
170358	DM Number	- 23 2671	- 23 2670
170377	DM Number	- 26 2184	- 26 2186
170832	DM Number	- 25 2666	- 25 2665
170832	HD Number		38759
172316	DM Number	- 22 3491	- 22 3492
172433	DM Number	- 22 3588	- 22 3594
172760	DM Number	- 22 3867	- 22 3866
172821	HD Number		53041
173007	DM Number	- 22 4043	- 22 4042
173496	DM Number	- 28 4184	- 28 4183
173593	DM Number	- 28 4258	- 28 4259
173593	HD Number		58105
175338	DM Number	- 26 5646	- 26 5645
175478	DM Number	- 22 5914	- 22 5915
175478	HD Number		69419
175770	DM Number	- 26 5993	- 26 5992
176831	DM Number	- 27 6162	- 27 6161
176831	HD Number		77362



SAO Number	Field	For	Read
176905	DM Number	- 20 2776	- 20 2777
178094	DM Number	- 23 8790	- 23 8791
178525	DM Number	- 22 7991	- 22 7992
178525	HD Number		88521
178673	DM Number	- 22 8093	- 22 8094
178673	HD Number		89473
179728	DM Number	- 24 9641	- 24 9640
179728	HD Number		98082
179948	DM Number	- 28 8902	- 28 8912
180091	DM Number	- 22 9051	- 22 9052
180649	DM Number	- 26 9072	- 26 9073
180717	DM Number	- 2410290	- 2410291
181474	DM Number	- 2410780	- 2410790
181474	HD Number		114963
182256	DM Number	- 2311490	- 2311491
182256	HD Number		123288
183629	DM Number	- 2811446	- 2811449
183629	HD Number		139123
184502	DM Number	- 2912689	- 2912698
184502	HD Number		149790
185973	DM Number	- 2712131	- 2712135
186035	DM Number	- 2313709	- 2413709
186395	DM Number	- 2314011	- 2314012
186395	HD Number		166147
186966	DM Number	- 2213074	- 2213075
188116	DM Number	- 20 5546	- 20 5545
188116	HD Number		182540
189554	DM Number	- 2214899	- 2214900
190441	DM Number	- 2515489	- 2515491
190441	HD Number		205094
190806	DM Number	- 2817538	- 2817537
190806	HD Number		208909
191272	DM Number	- 2918404	- 2918408
191272	HD Number		214287
191768	DM Number	- 2516359	- 2516358
192242	DM Number	- 2417901	- 2417911
192242	HD Number	224162	
192244	DM Number	- 2417903	- 2417913
192244	HD Number	224181	
192348	DM Number	- 3715492	- 3715495
192348	HD Number	225213	
194607	DM Number	- 31 1585	- 31 1589
194834	Spec. Type	KK	K2
195548	DM Number	- 34 2056	- 34 2057
198046	DM Number	- 29 4457	- 29 4458
198046	HD Number		59572
199080	DM Number	- 33 4843	- 33 4844
199080	HD Number		70215
202035	DM Number	- 34 7161	- 34 7162
203019	DM Number	- 37 7586	- 37 7587
203870	DM Number	- 32 8979	- 32 8978
208759	Mu Dec. J2000	+ 0.002	
208795	Mu Dec. J2000	+ 0.002	

SAO Number	Field	For	Read
209822	DM Number	- 3512351	- 3512350
211074	DM Number	- 3713108	- 3713109
212391	DM Number	- 3018140	- 3018139
212470	Mu Dec. - J2000	- 0.003	
215732	DM Number	- 43 611	- 43 612
227379	HD Number	152233	
227380	HD Number		152233
227380	Delete Code	D	
228306	RA Sec at Epoch	36.692	36.693
232345	DM Number	- 51 312	- 51 311
232345	HD Number	7456	7455
232346	DM Number	- 51 311	- 51 312
232346	HD Number	7455	7456
234535	Spec. Type	GO	G0
239348	DM Number	- 58 3829	- 58 3823
239348	HD Number	307183	102117
244400	Supp. Code	1	
244400	HD Number	537720	153772
244400	HD Code	2	0
244400	GC Number	29820	22982

Table 1. Changes to the SAO since the 1989 Version

SAO Number	Field	Source
27062	Spec. Type	Allan Moluf
27100	Spec. Type	Allan Moluf
31951	Spec. Type	ADC
56597	Declination	Allan Moluf
75878	Dec Sec at Epoch	William M. Owen, Jr.
84129	Magnitudes	William M. Owen, Jr.
92548	Magnitudes	David W. Dunham
97645	HD Number	A. R. Peters
97646	HD Number	A. R. Peters
143378	J2000 Positions	Clayton A. Smith
194834	Spec. Type	Allan Moluf
208759	Mu Dec. - J2000	Allan Moluf
208795	Mu Dec. - J2000	Allan Moluf
212470	Mu Dec. - J2000	Allan Moluf
227379	HD Number	A. R. Peters
227380	Delete Code	ADC
227380	HD Number	A. R. Peters
228306	RA Sec at Epoch	ADC
234535	Spec. Type	Allan Moluf
244400	Misalignment	Allan Moluf

Note: The magnitudes for 84129 and 92548 are from the SIMBAD data bank of the Centre de Données Astronomiques de Strasbourg.

Table 2. Sources of Changes other than DM Numbers

## 2.0 Acknowledgments and References

### 2.1 Acknowledgments

We particularly thank Mr. Rappaport for sending us the extensive list of possible problems in the DM numbers assigned in the SAO. We also thank those listed in Table 2 on page 4 for alerting us to other errors.

### 2.2 References

Argelander, F.W.A. 1859-1862, *Bonner Sternverzeichniss*, erste bis dritte Sektion, *Astronomischen Beobachtungen auf der Sternwarte des Königlichen Rhein.*, Friedrich-Wilhelms-Universität zu Bonn, Bände 3-5.

Becker, F. 1949, *Bonner Durchmusterung*, Südlicher Teil, Deklinations-Zonen  $-2^{\circ}$  bis  $-22^{\circ}$  Sternverzeichnis, zweite, berichtigte Auflage, Ferd. Dümmmlers Verlag, Bonn.

Becker, F. 1951, *Bonner Durchmusterung*, Nördlicher Teil, Deklinations-Zonen  $-1^{\circ}$  bis  $+89^{\circ}$  Sternverzeichnis, dritte, berichtigte Auflage, Ferd. Dümmmlers Verlag, Bonn.

Cannon, A. J. and Pickering, E. C. 1918-1924, *The Henry Draper Catalogue* Ann. Astron. Obs. Harvard Coll., 91-99.

Gill, D. and Kapteyn, J. C. 1895-1900, *Cape Photographic Durchmusterung*, Ann. Cape Obs. 3 (1895, Part I: zones  $-18^{\circ}$  to  $-37^{\circ}$ ); 4 (1897, Part II: zones  $-38^{\circ}$  to  $-52^{\circ}$ ); 5 (1900, Part III: zones  $-53^{\circ}$  to  $-89^{\circ}$ ).

Küstner, F. 1903, *Bonner Durchmusterung des Nördlichen Himmels*, zweite berichtigte Auflage, Bonn Universitäts Sternwarte, A. Marcus und E. Weber's Verlag, Bonn.

Schönfeld, E. 1886, *Bonner Sternverzeichniss*, vierte Sektion, *Astronomische Beobachtungen auf der Sternwarte der Königlichen Rhein.* Friedrich-Wilhelms-Universität zu Bonn 8, Part IV, Adolph Marcus, Bonn.

Thome, J. M. 1892-1932, *Córdoba Durchmusterung*, *Resultados del Observatorio Nacional Argentino* 16 (1892, Part I:  $-22^{\circ}$  to  $-32^{\circ}$ ); 17 (1894, Part II:  $-32^{\circ}$  to  $-42^{\circ}$ ); 18 (1900, Part III:  $-42^{\circ}$  to  $-52^{\circ}$ ); 21 (Part I) (1914, Part IV,  $-52^{\circ}$  to  $-62^{\circ}$ ); 21 (Part II) (1932, Part V:  $-62^{\circ}$  to  $-90^{\circ}$ ).



## 3.0 Sample Listings

The sample listings given on the following pages show logical records exactly as they are recorded in the machine-readable file for this catalogue. Groups of records from the beginning and end of the file are illustrated. The beginning of each record and the bytes within the record are indicated by the column heading index across the top of each page (digits read vertically).

PRECEDING PAGE BLANK NOT FILMED



ORIGINAL PAGE IS  
OF POOR QUALITY

LISTING OF RECORDS FROM DATA FILE

Date File Name: SAO WITH J2000.0  
Records 250943 to 250997  
Data File 2  
Record Length 204 bytes  
Input VOLSER MER005

Column	Head	Index
Record	250943	250943
Record	250944	250944
Record	250945	250945
Record	250946	250946
Record	250947	250947
Record	250948	250948
Record	250949	250949
Record	250950	250950
Record	250951	250951
Record	250952	250952
Record	250953	250953
Record	250954	250954
Record	250955	250955
Record	250956	250956
Record	250957	250957
Record	250958	250958
Record	250959	250959
Record	250960	250960
Record	250961	250961
Record	250962	250962
Record	250963	250963
Record	250964	250964
Record	250965	250965
Record	250966	250966
Record	250967	250967
Record	250968	250968
Record	250969	250969
Record	250970	250970
Record	250971	250971
Record	250972	250972
Record	250973	250973
Record	250974	250974
Record	250975	250975
Record	250976	250976
Record	250977	250977
Record	250978	250978
Record	250979	250979
Record	250980	250980
Record	250981	250981
Record	250982	250982
Record	250983	250983
Record	250984	250984
Record	250985	250985
Record	250986	250986
Record	250987	250987
Record	250988	250988
Record	250989	250989
Record	250990	250990
Record	250991	250991
Record	250992	250992
Record	250993	250993
Record	250994	250994
Record	250995	250995
Record	250996	250996
Record	250997	250997

Faint, illegible text or markings in the lower-left quadrant of the page.

Vertical text or markings along the right edge of the page.