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National Space Science Data Center/
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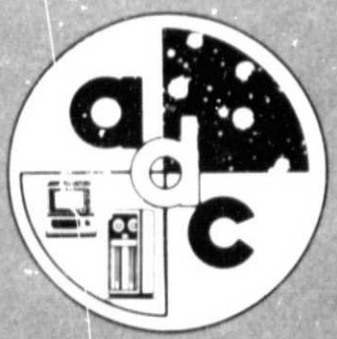
DOCUMENTATION FOR THE MACHINE-READABLE VERSION

OF

A LIBRARY OF STELLAR SPECTRA

(JACOBY, HUNTER AND CHRISTIAN 1984)



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Wayne H. Warren Jr.

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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 library as it is currently being distributed from the Astronomical Data Center is given. The library contains digital spectra for 161 stars of spectral classes O through M and luminosity classes I, III and V in the wavelength range 3510 Å to 7427 Å. The resolution is approximately 4.5 Å, while the typical photometric uncertainty of each resolution element is ~ 1 percent and broadband variations are < 3 percent. The documentation includes a format description, a table of the indigenous characteristics of the magnetic tape file, and a sample listing of logical records exactly as they are recorded on the tape.

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SECTION 1 - INTRODUCTION AND SOURCE REFERENCE

The machine-readable version of *A Library of Stellar Spectra* (Jacoby, Hunter and Christian 1984) contains digital spectra of 161 stars of spectral types O through M and luminosity classes I, III and V. Although two stars were chosen for low metallicity, the library contains stars of mostly solar metallicity. The data were obtained with the Intensified Reticon Scanner on the #1 91-cm telescope at Kitt Peak National Observatory.

This document describes the machine version of the library as it is currently being distributed from the Astronomical Data Center; it is intended to enable users to read and process the data without problems and guesswork. For more detailed descriptions of the instrumentation used to secure the spectra, the observing program, data reduction, the combining of three overlapping spectra to produce a single effective spectrum, interstellar reddening effects, the library itself and possible applications of the data, the source reference should be consulted. A copy of this document should accompany any machine version of the library originally obtained from the Astronomical Data Center.

SOURCE REFERENCE

Jacoby, G. H., Hunter, D. A. and Christian, C. A. 1984, *A Library of Stellar Spectra*, *Astrophys. J. Suppl.* 56, 278.

SECTION 2 - TAPE CONTENTS

The machine version of *A Library of Stellar Spectra* consists of groups of records for each star. There are 161 groups of 352 logical records each, with each group consisting of two header records and 350 data records containing eight flux values each. Since all record groups are identical, Table 1 contains byte-by-byte descriptions of the two header records only, plus a general description of the remaining data records.

Table 1. Tape Contents. *A Library of Stellar Spectra.*

Byte(s)	Units	Suggested Format	Description
Record 1			
1-10	---	A10	Star identification (HD, BD, SAO, miscellaneous).
11-17	---	A7	Adopted spectral type. The field is reasonably uniform in that temperature class occurs in byte 11, subclass in 12-14, luminosity class in 15-17, but there are a few other alphabetic characters for peculiar types.
18-20	---	3X	Blank
21-27	---	A7	Spectral type taken from the literature if different from the adopted type. Field format is structured as in bytes 11-17.
28-36	---	9X	Blank
37-40	mag	F4.2	Derived color excess, $E(B-V)$, used to to deredden the spectrum.
41-46	---	6X	Blank
47-50	mag	F4.2	Observed $U-B$ color, as synthesized from the spectrum.
51-56	---	6X	Blank
57-60	mag	F4.2	Observed $B-V$ color, as synthesized from the spectrum.
61-65	---	5X	Blank

Table 1 (concluded)

Byte(s)	Units	Suggested Format	Description
66-70	mag	F5.2	Dereddened color $(U-B)_0$, as derived from the synthesized $U-B$.
71-76	---	6X	Blank
77-80	---	F4.2	Dereddened color $(B-V)_0$, as derived from the synthesized $B-V$.
Record 2			
1- 6	---	6X	Blank
7-10	mag	F4.2	$U-B$ color taken from the literature. Field is blank if no data present.
11-16	---	6X	Blank
17-20	mag	F4.2	$B-V$ color taken from the literature. Blank if no data present.
21-23	---	3X	Blank
24-30	Å	F7.2	Wavelength of first pixel (always equal to 3510.00).
31-36	---	6X	Blank
37-40	Å	F4.2	Wavelength increment per pixel (always 1.40).
41-80	---	40X	Blank
Records 3-352			
Data records containing eight flux values per record in format 1P8E10.3. There are 2799 pixels to be read in each spectrum.			

It should be noted that the data fields in the header records were all written as groups of 10 bytes each; thus, they can all be read, e.g., as A10 or F10.2. The table contains exact format specifications in order to alert the user as to which bytes are always blank and to specify the actual data ranges.

SECTION 3 - TAPE CHARACTERISTICS

The information contained in Table 2 is sufficient for a user to describe the indigenous characteristics of the machine-readable version of *A Library of Stellar Spectra* 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, but should always accompany secondary copies if any are supplied to other users or installations.

Table 2. Tape Characteristics. *A Library of Stellar Spectra.*

NUMBER OF FILES	1
LOGICAL RECORD LENGTH (BYTES)	80
RECORD FORMAT	FB*
TOTAL NUMBER OF LOGICAL RECORDS	56672

* Fixed block length (last block may be short)

SECTION 4 - REMARKS, MODIFICATIONS, ACKNOWLEDGMENT AND REFERENCE

The magnetic tape version of *A Library of Stellar Spectra* was received on magnetic tape from Dr. George H. Jacoby on 26 April 1984. As received, each spectrum contained 360 logical records, the last eight of which were blank. The blank records were deleted to conserve storage space. In addition, name fields were examined and certain ones modified to effect a more uniform presentation (e.g., the catalog numbers were aligned). No other changes have been made to the original data.

ACKNOWLEDGMENT

Appreciation is expressed to G. H. Jacoby for supplying the original magnetic tape of the library and for sending a preprint of the published paper. Dr. Jacoby also kindly reviewed and commented on a draft copy of this document before its final printing for distribution with the machine version of the library.

REFERENCE

Jacoby, G. H., Hunter, D. A. and Christian, C. A. 1984, *A Library of Stellar Spectra*, *Astrophys. J. Suppl.* 56, 278.

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 library are illustrated. 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 TAPE FILE

```
          TAPE FILE NAME: KPNO Lib Stellar Spectra
                 RECORDS       1 TO      20
               TAPE FILE      51
           RECORD LENGTH      80 BYTES
            INPUT VOLSER    ADC003

COLUMN                                                                                                        111111111111111
HEADING            1111111111222222222233333333334444444444555555555566666666667777777777888888888899999999990000000000111111
INDEX     123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123

RECORD       1 HD 242908 05    V                .60      -.67       .29     -1.11      -.30
RECORD       2       -.72       .28   3510.00      1.40
RECORD       3  2.851E-11 2.872E-11 2.899E-11 2.903E-11 2.890E-11 2.884E-11 2.904E-11 2.927E-11
RECORD       4  2.902E-11 2.897E-11 2.919E-11 2.975E-11 2.990E-11 2.986E-11 2.961E-11 2.869E-11
RECORD       5  2.864E-11 2.922E-11 2.960E-11 2.973E-11 2.936E-11 2.899E-11 2.876E-11 2.933E-11
RECORD       6  2.984E-11 2.982E-11 2.934E-11 2.905E-11 2.937E-11 2.919E-11 2.911E-11 2.870E-11
RECORD       7  2.890E-11 2.910E-11 2.902E-11 2.843E-11 2.802E-11 2.776E-11 2.760E-11 2.724E-11
RECORD       8  2.710E-11 2.744E-11 2.749E-11 2.740E-11 2.716E-11 2.675E-11 2.631E-11 2.581E-11
RECORD       9  2.557E-11 2.521E-11 2.534E-11 2.588E-11 2.636E-11 2.650E-11 2.628E-11 2.615E-11
RECORD      10  2.619E-11 2.636E-11 2.604E-11 2.548E-11 2.495E-11 2.485E-11 2.538E-11 2.583E-11
RECORD      11  2.566E-11 2.536E-11 2.505E-11 2.488E-11 2.502E-11 2.535E-11 2.573E-11 2.592E-11
RECORD      12  2.596E-11 2.600E-11 2.583E-11 2.532E-11 2.495E-11 2.494E-11 2.497E-11 2.502E-11
RECORD      13  2.504E-11 2.491E-11 2.480E-11 2.489E-11 2.515E-11 2.535E-11 2.510E-11 2.471E-11
RECORD      14  2.481E-11 2.511E-11 2.510E-11 2.498E-11 2.489E-11 2.439E-11 2.438E-11 2.460E-11
RECORD      15  2.504E-11 2.529E-11 2.488E-11 2.467E-11 2.514E-11 2.531E-11 2.576E-11 2.656E-11
RECORD      16  2.681E-11 2.629E-11 2.572E-11 2.592E-11 2.578E-11 2.554E-11 2.532E-11 2.501E-11
RECORD      17  2.477E-11 2.466E-11 2.483E-11 2.454E-11 2.422E-11 2.473E-11 2.456E-11 2.446E-11
RECORD      18  2.447E-11 2.421E-11 2.411E-11 2.425E-11 2.468E-11 2.423E-11 2.382E-11 2.400E-11
RECORD      19  2.432E-11 2.372E-11 2.309E-11 2.358E-11 2.466E-11 2.513E-11 2.508E-11 2.496E-11
RECORD      20  2.445E-11 2.403E-11 2.363E-11 2.349E-11 2.321E-11 2.341E-11 2.353E-11 2.341E-11
```

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: KPNO Lib Stellar Spectra

RECORDS 56653 TO 56672

TAPE FILE 51

RECORD LENGTH 80 BYTES

INPUT VOLSER ADC003

```
C O L U M N                                                                                                   111111111111111
H E A D I N G          111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999000000000011111
I N D E X      123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
```

RECORD	56653	1.582E-12	1.632E-12	1.673E-12	1.679E-12	1.689E-12	1.680E-12	1.651E-12	1.652E-12
RECORD	56654	1.696E-12	1.770E-12	1.781E-12	1.723E-12	1.677E-12	1.642E-12	1.604E-12	1.585E-12
RECORD	56655	1.608E-12	1.611E-12	1.531E-12	1.444E-12	1.454E-12	1.579E-12	1.674E-12	1.633E-12
RECORD	56656	1.570E-12	1.552E-12	1.559E-12	1.581E-12	1.598E-12	1.603E-12	1.599E-12	1.581E-12
RECORD	56657	1.564E-12	1.551E-12	1.587E-12	1.619E-12	1.570E-12	1.587E-12	1.606E-12	1.612E-12
RECORD	56658	1.560E-12	1.550E-12	1.520E-12	1.610E-12	1.668E-12	1.626E-12	1.609E-12	1.556E-12
RECORD	56659	1.498E-12	1.421E-12	1.391E-12	1.461E-12	1.542E-12	1.562E-12	1.528E-12	1.531E-12
RECORD	56660	1.534E-12	1.479E-12	1.440E-12	1.438E-12	1.486E-12	1.545E-12	1.570E-12	1.572E-12
RECORD	56661	1.584E-12	1.586E-12	1.559E-12	1.535E-12	1.524E-12	1.501E-12	1.523E-12	1.576E-12
RECORD	56662	1.538E-12	1.467E-12	1.468E-12	1.519E-12	1.560E-12	1.562E-12	1.553E-12	1.514E-12
RECORD	56663	1.494E-12	1.519E-12	1.560E-12	1.598E-12	1.589E-12	1.563E-12	1.548E-12	1.534E-12
RECORD	56664	1.597E-12	1.581E-12	1.542E-12	1.512E-12	1.497E-12	1.521E-12	1.463E-12	1.478E-12
RECORD	56665	1.506E-12	1.503E-12	1.499E-12	1.537E-12	1.573E-12	1.579E-12	1.545E-12	1.505E-12
RECORD	56666	1.510E-12	1.516E-12	1.530E-12	1.549E-12	1.541E-12	1.538E-12	1.519E-12	1.492E-12
RECORD	56667	1.476E-12	1.468E-12	1.476E-12	1.490E-12	1.503E-12	1.515E-12	1.516E-12	1.501E-12
RECORD	56668	1.443E-12	1.410E-12	1.419E-12	1.425E-12	1.446E-12	1.453E-12	1.445E-12	1.435E-12
RECORD	56669	1.442E-12	1.466E-12	1.483E-12	1.482E-12	1.468E-12	1.459E-12	1.460E-12	1.484E-12
RECORD	56670	1.478E-12	1.461E-12	1.444E-12	1.430E-12	1.406E-12	1.389E-12	1.384E-12	1.390E-12
RECORD	56671	1.393E-12	1.406E-12	1.430E-12	1.419E-12	1.418E-12	1.478E-12	1.520E-12	1.520E-12
RECORD	56672	1.513E-12	1.486E-12	1.471E-12	1.483E-12	1.444E-12	1.412E-12	1.409E-12	