DSC - 413

OAO-C

\# 413

UV DATA OF STELLAR OBJECTS

72-065A-01A ASUV-00053

SPECTRAL ATLAS OF TAU SCORPII

72-065A-01B ASUV.00027

IOTA HERCULIS UV SPECTRAL ATLAS

72-065A-01C ASUV.00004

UV SPECTRAL ATLAS OF BETA ORIONIS

72-065A-01I ASUV.00002

UV ATLAS OF GAMMA PEGASI

72-065A-01K ASUV.00015

UV ATLAS OF SIRIUS

72-065A-01L ASUV.00026

UV SPECTRAL ATLAS OF VEGA

72-065A-01M ASUV.00054

FAR UV Spectra

72-065A-01H - ASUV-00003

Table of Contents

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1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC INFORMATION SYSTEM:

http://nssdc.gsfc.nasa.gov/nmc/

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

a. Associated Documents — To find associated documents you will need to know the document ID number and then click here.
http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/

b. Core Catalog Materials

OAO 2
TD1A
APOLLO 16
ANS
IUE

ULTRAVIOLET PHOTOMETRY

68-110A-02I,J
72-014A-01A,B,C
72-031C-10D
72-065A-01H ASUV-00003
74-070A-01A
78-012A-01I

These data sets have been restored. There was originally one 7-track, 556 BPI tape written in BCD and two 9-track, 1600, 6250 BPI tapes written in ASCII. There is one restored tape written in ASCII. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The original tapes were created on an IBM 3081 & 7094 computer and the restored tapes were created on an IBM 9021 computer. The DR and DS numbers along with the corresponding D numbers are as follows:

DR#	DS#	D#	FILES	
DR005899	DS005899	D047314	1 - 3	68-110A-02I
		D065925	4 - 16	68-110A-02~~I~~,~~J~~; 72-014A-01A,B,C; 72-031C-10D; 72-065A-01H; 74-070A-01A; 78-012A-01I;
		D047324	17 - 20	68-110A-02J

OAO-3

ULTRAVIOLET DATA

72-065A-01A ASUV-00053

This data set has been restored. There were originally 10 Binary 9-track, 1600 BPI tapes. There are three restored tapes. The DR tapes are 3480 cartridges and the DS tapes are 9-track, 6250. The tapes were created on a 360 computer. The DR and DS numbers along with the corresponding D numbers and the time spans are as follows:

DR#	DS#	DD#	FILES	TIME SPAN
DR03544	DS03544	D-31177	1-91	08/27/72 - 07/30/73
		D-31178	92-260	08/03/73 - 07/31/74
		D-31179	261-543	08/01/74 - 07/30/75
		D-31180	544-872	08/02/75 - 07/30/76
DR03545	DS03545	D-33812	1-232	08/01/76 - 01/31/77
		D-35151	233-397	02/01/77 - 07/31/77
		D-37203	398-566	08/01/77 - 01/31/78
		D-41931	567-713	02/02/78 - 07/29/78
DR03546	DS03546	D-46627	1-157	08/01/78 - 01/31/79
		D-46628	158-321	02/01/79 - 07/29/79

REQ. AGENT	RAND NO.	ACQ. AGENT
CMP	RC8424	WSC
CAW	RD0217	
CMP	RD2321	

UV DATA OF STELLAR OBJECTS
AND
SPECTRAL ATLAS OF TAU SCORPII

72-065A-01A

72-065A-01B

There are 9 tapes for OAO-C UV data (72-065A-01A) and 1 tape for OAO-C Spectral Atlas data (72-065A-01B). The tapes are 9 track, 1600 bpi, Binary, and multifiled. They were created on the 360/75 computer. There is a program in the tape library (SCORPI) that is to change the printout into a list type format. The tape formats are different for each data set and they are on the following pages.

72-065A-01A

D#	C#	FILES	TIME SPAN
D-31177	C-20127	91	08/27/72-07/30/73
D-31178	C-20128	169	08/03/73-07/31/74
D-31179	C-20129	283	08/01/74-07/30/75
D-31180	C-20130	329	08/02/75-07/30/76
D-33812	C-20675	323	08/01/76-01/31/77
D-37203	C-21012	169	08/01/77-01/31/78
D-35151	C-21016	165	02/01/77-07/31/77
* D-46627	C-21795	157	08/01/78-01/31/79
* D-46628	C-21796	164	02/01/79-07/29/79

* These tapes are not in the twos complement format.

72-065A-01B

D-30551	C-19639	2	949 - 1420 Angstroms

Format p-1

TAPE FORMAT

OAO-C

72-065A-01A

This data set consists of a 9-track, 1600 BPI, Binary tape created on the IBM 360 computer, with a physical blocksize of 7294 bytes. The tapes are multifiled ~~contains 52 files of data~~. Each logical record consists of a 13 word header and an array of scan information containing a variable number of words. An array contains wave length and count information in pairs of words. Therefore, an array of 60 data points is actually 120 words.

The G.M.T. of the Observation, and the wavelength and count information (in the array and header) are in 2's complement format. That is, if the first bit of the word is on, the entire word is complemented. This is easily done by breaking the word down into bits and reversing them. (0 to 1, 1 to 0.)

Example -

indicates pos or neg value

$B35A6421_{16}$

= 1011/0011/0101/1010/0110/0100/0010/0001

2's compl. = 0100/1100/1010/0101/1001/1011/1101/1111*

= 4CA59BDF

* note - because this is 2's complement, one is added to the number. Therefore, instead of the last digit being an 'E', it is now an 'F'.

WORD	ID	DESCRIPTION
1		360 control word
2		360 control word
3	STARN	Star observation no. (floating point)
4	INFO1	VVSSSSNNNT VV = S.E.T. clock reading at L.A.N. SSSS = No. of points in data scan T = NTUBE = Photomultiplier tube no.
5	INFO2	+/-LLLLL00000 LLLLL = Longitude of ascending node (LAN) of orbit 00000 = Orbit in which data was dumped
6	INFO3	+/-YDDDHHMMSS (GMT of LAN) +/-Y = Year no. code DDD = Day HH = Hour MM = Minute SS = Second See appendix A for computing GMT of observation
7(Bits 23-32)	TIME	First time for this scan in S/C equivalent time (S.E.T.) from L.A.N.
(Bits 1-22)	WL	First wavelength for this scan for the 4 moving tubes (*1000). See Appendix B for computing time and WL
8(Bits 23-32)	TIME	Last time for this scan in S.E.T.s from LAN
(Bits 1-22)	WL	Last wavelength for this scan for the 4 moving tubes (*1000).
9	INFO6	PPPPEEWWYY PPPP = Sat. orbital parameter EE = Earth orbital parameter WW = Not used YY = used as part of year no. code (in INFO3) for years 1975
10(Bits 1-14)	TOTAL	Total observed counts
(Bits 15-28)	BKGND	Sum of the 3 components of the backgrond noise estmate
(Bits 29-31)	STATUS	3 status flags
(Bits 32)	SIGN	Sign bit (not used) See appendix C for computing counts
11(Bits 1-14)	TOTAL	Sigma & average counts
(Bits 15-28)	BKGND	Sum of the 3 components of the background noise estimate
(Bits 29-31)	STATUS	3 status flags
(Bit 32)	SIGN	Sign bit (not used)

Format p.2

Format p.3

WORD	ID	DESCRIPTION
12	INFO9	PGM in EBCDIC
13	INFO10	1111223344 = comment codes
14	INFO11	YYDDDDD YY = Reduction year DDDDD = Reduction day & fraction (*100)
15	INFO 12	(Contains no info)
16	CONTROL WORD	#Bytes in scan array to follow
17	N	# of data points in the scan
18---N*2	IWLT	Integer array 'N' words long (same format as word #7-see appendix B)
19---N*2	ICNT	Integer array 'N' words long (same format as word #10-see appendix C)

APPENDIX A

GMT OF OBSERVATION

The GMT of observation (in 2's complement) is found by adding the GMT of L.A.N. (Word 6) to IFIX (S.E.T. in word 7 * 15.72887 + 0.5).

Example -

GMT of L.A.N. (word 6) = $B6160299_{16}$ Y DDD HH MM SS

2's complement = $-49E9FD67_{16}$ = -1/240/07/15/27

IFIX = S.E.T. (word 7-see appendix B) * 15.72887+0.5

= 301. * 15.72887+0.5 = 4734. sec's.

GMT of Observation = -1240071527+4734 sec's

= -1 240 08 34 21

The year code is as follows:

If Y .LT.0 - Year is 1973

If Y .LE.-1 - Year is 1972

If Y .GT. 0 - Year is 1974

If Y .GE. 1*10**9 - Year is 1975 + word 9(100)

1st number in conversion (1s+0's) indicates + or - number. A number 1 in the first position indicates a neg. number, a 0 number, a positive number,

APPENDIX B

WAVELENGTH & S/C EQUIVALENT TIME (S.E.T.)

WLTIME (IWLT) in words 7 and 8 of the header and IWLT (1) ... IWLT (N) in the scan arrays are 2's complement numbers computed as follows:

Example -

$IWLT(1) = CB62210\overset{9}{\cancel{8}}_{16}$

2's complement = $-349DDEF8_{16}$

The low order 22 bits is the wavelength -

-00/1101/0010 01/1101/1101/1110/1111/1000

Wavelength = $1DDEF8_{16}$ = 1957624 (÷1000) = 1957.624

The remaining 10 bits is time in S.E.T.

-00/1101/0010

-D2 = -210

511 is added to utilize the sign bit

S.E.T. = -210 + 511 = 301.

APPENDIX C

COUNTS

Counts, background, and status (in 2's complement) are computed from words 10 and 11 of the header and ICNT(1)....ICNT(N) in the scan arrays. Counts is found by taking the appropriate pscale array number (see below) * total observed counts.

PSCALE (6)/2,4,8,16,32,32

The appropriate PSCALE array number depends on in the NTUBE number ~~is~~ in word 4 of the header. On the sample tape, in the first logical record, the NTUBE #=4. Therefore the PSCAL #=16.

Example -

ICNT(1) = $00000A4C_{16}$ (1st bit off- no complemented required)

The low order 14 bits is total observed counts -

0 000 00/0000/0000/0000 00/1010/0100/1010

$0A4C_{16} = 2636_{10}$

Counts = 16*2636 = 42176.

The next 14 bits is the sum of the 3 components of the background noise estimate -

Background = 0

The next 3 bits contains the status flags

Bit 32 is a sign bit and is not used

OAO 3

TAU SCORPII UV SPECTRAL ATLAS,TPE

72-065A-01B ASUV-00027

This data set has been restored. There was originally one 9-track, 1600 BPI tape written in Binary. There is one restored tape. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The original tape was created on a 360 computer and the restored tape was created on an IBM 9021 computer. The DR and DS numbers along with the corresponding D number are as follows:

DR#	DS#	D#	FILES
DR004841	DS004841	D030551	1 - 2

OAO 3

SPECTRAL ATLAS OF TAU SCORPII

72-065A-01B

This data set has been updated with a FITS formatted version obtained from the Multimission Archive at STScI (MAST). There was originally one 9-track, 1600 bpi, Binary formatted tape. The data set has been processed to one CD-Write Once containing 3 files; file 1 is the 2nd order spectrum and file 2 is the 1st order spectrum, and file 3 contains the data set description documentation.

KD#	KW#	VOLUME	
KD021292	KW000162	Tau_Scorpii_UV	File 1 tausco1.fts File 2 tausco2.fts File 3 readme.txt

```
SIMPLE  =                    T / True fits records follow
BITPIX  =                    8 / Bits per pixel
NAXIS   =                    0 / No data array present
EXTEND  =                    T / There may be standard extensions
SPACECRF= 'OAO-3   '           / Spacecraft name
TELESCOP= 'COPERNICUS'         / Telescope name
INSTRUME= 'PASCHEN-RUNGE SPECTROMETER' / Instrument name
FILENAME= 'TAUSCO1.FTS'        / File name
HD-NUM  =               149438 / Henry Draper Catalog Number
OBJECT  = 'TAU SCO '           / Object Name
RA-DEGS =            248.97084 / Right Ascension in degrees
DEC-DEGS=           -28.216112 / Declination in degrees
EQUINOX =               2000.0 / Coordinate system epoch
SPECTYPE= 'B0V     '           / Spectral Type and Luminosity Class
V-MAG   =                 2.82 / Apparent Visual Magnitude
M-MAG   =                -4.10 / Absolute Visual Magnitude
EBV     =                0.060 / Color Excess
B-V     =               -0.250 / B-V Color Index
VSINI   =                   24 / Rotational Velocity (km/sec)
VSTARYBS=                 1.00 / YBS Catalog Radial Velocity (km/sec)
VSTAR   =                 1.00 / PUO Radial Velocity (km/sec)
ISM-VEL =                -7.90 / Interstellar Velocity (km/sec)
LSR-VEL =                 9.32 / LSR Velocity Correction (km/sec)
DISTANCE=                  236 / Distance (parsecs)
ORIGIN  = 'NASA/GSFC'          / Institution generating file
DATE    = '05/10/95'           / Date this file was created

COMMENT  Second order U1 spectrum (948.735 A - 1420.510 A) of
COMMENT  Tau Scorpii at a nominal resolution of 0.05 Angstroms.
COMMENT  The data were obtained between 1973 July 2 and August 27.
COMMENT
COMMENT  See "The Copernicus Ultraviolet Spectral Atlas of Tau Scorpii",
COMMENT  by John B. Rogerson, Jr.and Walter L. Upson II:  Astrophysical
COMMENT  Journal Supplement Series, Volume 35, number 1, September, 1977.
COMMENT
COMMENT  The variables in the binary table (after proper scaling) have the
COMMENT  following meanings and are in direct agreement with the numbers
COMMENT  used in preparing and presenting the above atlas.
COMMENT       WAVE: The wavelength in angstroms of a data point.
COMMENT     COUNTS: The corrected count rate for that wavelength point
COMMENT             (the scattered light has not been removed).
COMMENT      SCAT1: A scattered light estimate for that data point
COMMENT             derived by Rogerson and Upson (see paper for details).
COMMENT      SCAT2: A scattered light estimate for that data point
COMMENT             derived by Ralph Bohlin (see paper for details).
COMMENT   CNT_NORM: The normalized corrected count.
COMMENT   SC1_NORM: The normalized scattered light discussed in scat1.
COMMENT   SC2_NORM: The normalized scattered light discussed in scat2.
END
```

```
SIMPLE  =                    T / True fits records follow
BITPIX  =                    8 / Bits per pixel
NAXIS   =                    0 / No data array present
EXTEND  =                    T / There may be standard extensions
SPACECRF= 'OAO-3   '           / Spacecraft name
TELESCOP= 'COPERNICUS'         / Telescope name
INSTRUME= 'PASCHEN-RUNGE SPECTROMETER' / Instrument name
FILENAME= 'TAUSCO2.FTS'        / File name
HD-NUM  =               149438 / Henry Draper Catalog Number
OBJECT  = 'TAU SCO '           / Object Name
RA-DEGS =            248.97084 / Right Ascension in degrees
DEC-DEGS=           -28.216112 / Declination in degrees
EQUINOX =               2000.0 / Coordinate system epoch
SPECTYPE= 'B0V     '           / Spectral Type and Luminosity Class
V-MAG   =                 2.82 / Apparent Visual Magnitude
M-MAG   =                -4.10 / Absolute Visual Magnitude
EBV     =                0.060 / Color Excess
B-V     =               -0.250 / B-V Color Index
VSINI   =                   24 / Rotational Velocity (km/sec)
VSTARYBS=                 1.00 / YBS Catalog Radial Velocity (km/sec)
VSTAR   =                 1.00 / PUO Radial Velocity (km/sec)
ISM-VEL =                -7.90 / Interstellar Velocity (km/sec)
LSR-VEL =                 9.32 / LSR Velocity Correction (km/sec)
DISTANCE=                  236 / Distance (parsecs)
ORIGIN  = 'NASA/GSFC'          / Institution generating file
DATE    = '05/10/95'           / Date this file was created

COMMENT  First order U1 spectrum (1418.187 A - 1560.372 A)
COMMENT  of Tau Scorpii at a resolution of 0.1 Angstroms.
COMMENT
COMMENT  See "The Copernicus Ultraviolet Spectral Atlas of Tau Scorpii",
COMMENT  by John B. Rogerson, Jr.and Walter L. Upson II:  Astrophysical
COMMENT  Journal Supplement Series, Volume 35, number 1, September, 1977.
COMMENT
COMMENT  The variables in the binary table (after proper scaling) have the
COMMENT  following meanings and are in direct agreement with the numbers
COMMENT  used in preparing and presenting the above atlas.
COMMENT       wave: The wavelength in angstroms of a data point.
COMMENT     counts: The corrected count rate for that wavelength point
COMMENT             (The scattered light has not been removed.)
COMMENT      scat1: A scattered light estimate for that data point
COMMENT             derived by Rogerson and Upson (see paper for details).
COMMENT      scat2: A vector of zeroes since there is no alternative
COMMENT             calculation for scattered light in this part of the
COMMENT             spectrum.
COMMENT   cnt_norm: The normalized corrected count.
COMMENT  sci1_norm: This is the normalized scattered light discussed in scat1.
COMMENT  sci2_norm: A vector of zeroes since there is no alternative
COMMENT             calculation for scattered light in this part of the
COMMENT             spectrum.
COMMENT
COMMENT  ERRATUM: Wavelengths greater than 1499.9 angstroms are incorrect in
COMMENT           both the file and the published paper. These wavelengths (W)
COMMENT           may be corrected using the following formula:
COMMENT
COMMENT                 W(correct) = 1.0014523 * W(table) - 2.2656
END
```

72-065A-013

"THE <u>COPERNICUS</u> ULTRAVIOLET SPECTRAL ATLAS OF TAU SCORPII"

Description of the Magnetic Tape Version

The tape contains two files. Both files may be read in the same way. The tape is 9 track, 1600 BPI and the IBM Data Control Block is:

DCB=(RECFM=FB,LRECL=676,BLKSIZE=6760,DEN=3)

FILE ONE: This is the second order spectrum (948.735Å - 1420.510Å). The tape can be read using repeated reads of the form:

```
      READ(10,601)N,(IW(I),IC(I),IB1(I),IB2(I),ICN(I),
     A           IBN1(I),IBN2(I),I=1,N)
  601 FORMAT(169A4)
```

Note that this amounts to a formatted "binary" READ. All variables on the tape are integers (INTEGER*4). Hopefully, this coding will allow all users to read the tape easily, regardless of their home installation. It does, however, require that the variables be rescaled and returned to floating point form before use.

The variables on the tape have the following meaning:

N: The number of sets of data in a given "READ". N is always 24 except for the last record on a file.

IW: The wavelength of a data point in milli-Angstroms. It may be converted to the Atlas wavelength by dividing by 1000.0.

IC: The corrected count rate for that wavelength point, multiplied by 10.0 and integerized. The scattered light has <u>not</u> been subtracted from IC. Dividing IC by 10.0 will return it to the count scale tabulated in the Atlas.

IB1: A scattered light estimate for that data point multiplied by 10.0 and integerized. This is the estimate derived by Rogerson and Upson and discussed by them in the Atlas. IB1 should be divided by 10.0 to return it to the scale of the counts in the Atlas.

IB2: Another scattered light estimate multiplied by 10.0 and integerized. This estimate is derived using the algorithm of Ralph C. Bohlin (see Atlas for discussion and references). IB2 should also be divided by 10.0 to put it on the correct scale.

ICN: This is the normalized count which is plotted in the Atlas (so that the top of each plot is unity) multiplied by 10000.0 and integerized. Dividing ICN by 10000.0 will return it to a scale of 0.0 to 1.0.

IBN1: This is the scattered light discussed in IB1 normalized using the same normalization factor as for ICN, multiplied by 10000.0 and integerized. Dividing IBN1 by 10000.0 will place it on the same scale as shown in the plots.

IBN2: IB2 normalized and integerized in the same way as discussed above for IBN1.

FILE TWO: This is the first order spectrum (1418.187Å - 1560.372Å). The construction of this file and the definition of the variables contained in it is identical to FILE ONE except that the variables IB2 and IBN2 contain "0"s since there is no alternative calculation for the scattered light in this part of the spectrum.

THE *COPERNICUS* ULTRAVIOLET SPECTRAL ATLAS OF TAU SCORPII

by

JOHN B. ROGERSON, JR. and WALTER L. UPSON, II
Princeton University Observatory

Received: ____________________

ABSTRACT

An ultraviolet spectral atlas is presented for the B0 V star, Tau Scorpii. It has been scanned from 949 to 1560 Angstroms by the Princeton spectrometer aboard the *Copernicus* satellite. From 949 to 1420 Angstroms the observations have a nominal resolution of 0.05 Angstroms. At the longer wavelengths, the resolution is 0.1 Angstroms. The atlas is presented in both tables and graphs.

I. INTRODUCTION

The successful launching in August 1972 of the Third Orbiting Astronomical Observatory (now called Copernicus) made possible the acquisition of high resolution stellar spectra at ultraviolet wavelengths not accessible to ground observatories. The present atlas has been prepared in the belief that high resolution ultraviolet spectra of good photometric quality could be a useful new resource for the astronomical community.

Tau Scorpii was the first star chosen for an atlas because a) it is an early, bright, little reddened star which provides ample flux in the far ultraviolet for a good signal to noise ratio, b) its spectral lines are essentially unbroadened by rotation and thus it makes good use of the high resolution of the instrument, c) it has been well studied in the visible (see Hardorp and Scholz, 1970 and further references cited therein), and d) it is the prototype B0 V star and thus intrinsically of interest to astronomers as a standard star. Basic data for Tau Scorpii are collected in Table 1.

The conditions under which the observations were made are discussed in section II. The determination of the wavelength scale is considered in section III. Photometric reductions are discussed in section IV, and the atlas is described in section V.

II. OBSERVATIONS

The data for this atlas have been obtained with the U1 photomultiplier of the Copernicus spectrometer (Rogerson, Spitzer, et al. 1973) during four observing intervals between July 2 and August 27, 1973. The spectrum is scanned stepwise with the stellar photons being detected by a windowless photomultiplier. The resulting photoelectrons are counted for approximately 13.76 seconds at each measurement point. In this manner the second order spectrum has been scanned from 948.7 to 1420.6 Å, and the first order spectrum has been scanned from 1418.2 to 1560.2 Å.

The spectral resolution is limited by the width of the spectrometer entrance slit. The image of the entrance slit in the spectrum corresponds to a constant bandpass of .050 Å in the second order and 0.101 Å in the first order. In contrast, the bandpass of the scanning slit, which defines the wavelength interval admitted to the U1 photomultiplier, varies with wavelength though it never exceeds 0.043 Å in the second order wavelength region or 0.091 Å in the first order region. The spectral resolution is therefore estimated to be approximately 0.050 Å in the second order spectrum and 0.101 Å in the first order spectrum. This is consistent with the result by Spitzer and Morton (1976) who find from observations of weak interstellar molecular hydrogen lines in the spectrum of Delta Persei that the second order apparatus function can be represented as a Gaussian profile with a full width at half maximum of 0.051 Å.

During the scanning of the spectrum, the carriage for the U2 photomultiplier was suitably positioned to shield the U1 photomultiplier from a known source of stray light (Rogerson, York, et al. 1973). The signal from the stationary U2 has been used to correct the spectral data for changes in the amount of starlight entering the spectrometer due to small guidance variations. This technique for the compensation of input light variations works best when the monitor and scan phototubes view the grating from the same direction. For this reason U2 was repositioned each time U1 had scanned about 25 Angstroms. The original data set thus consisted of 32 consecutive U1 spectral segments, each with U2 fixed at a different position in the spectrometer.

III. WAVELENGTH REDUCTIONS

At each spectral measurement point an encoder value has been recorded. These encoder values measure the position of the scanning slit in the spectrum and are converted into wavelengths by means of a calibration algorithm. The algorithm is a mathematical description of the relation between encoder value and wavelength taking into account the geometrical optics of the spectrometer and the geometry of the scanning mechanism. Several adjustable parameters corresponding to physical lengths and angles in the spectrometer have been optimized by comparing the observed encoder values for a number of interstellar absorption lines with their velocity-corrected wavelengths. A small, theoretically-predicted temperature correction is also included and is applied by using periodically-recorded spectrometer temperature data from the satellite.

The encoder value for each measurement was converted by the calibration algorithm, and the resulting wavelengths were reduced to a frame of reference fixed in Tau Scorpii by correcting for Doppler shifts due to a) the heliocentric radial velocity of Tau Scorpii, b) the component of the earth's heliocentric orbital velocity in the direction of Tau Scorpii, and c) the component of the satellite's geocentric orbital velocity in the direction of Tau Scorpii.

For an overall check of the wavelength calibration, the wavelengths of numerous identified absorption features in the spectrum of Tau Scorpii were compared with their laboratory values. From 950 to 1350 Å (the region containing the interstellar absorption lines used to optimize the calibration algorithm) the observed wavelengths were found to be systematically smaller than the laboratory wavelengths with the difference varying slowly along the spectrum between 25 and 35 milliangstroms. At wavelengths greater than 1350 Å, the magnitude of the difference begins to decrease rapidly, changing sign near 1385 Å and reaching nearly 150 milliangstroms at 1419 Å. Evidently the calibration algorithm is subject to some error. These wavelength differences have been used to correct the observed wavelengths and to obtain the values reported in this atlas.

There remain observed random differences between wavelengths of spectral features seen in the atlas and laboratory wavelengths of the transitions with which they are identified. These differences are nearly always smaller than 10 milliangstroms and are not well understood, but possible sources include guidance and temperature variations, quantization noise of the position encoder, errors in the observed wavelengths due to undetected blending, misidentification of the observed features, and small errors in the laboratory wavelengths.

IV. PHOTOMETRIC REDUCTIONS

The variation of the instrument sensitivity with wavelength is not well known, and consequently no attempt has been made to normalize the observations to a constant sensitivity condition. This atlas should therefore not be used to estimate the general shape of the ultraviolet continuum of Tau Scorpii, but it is entirely suitable for investigation of the line spectrum.

The counts detected at each measurement point reflect the flux in the stellar spectrum but are also affected a) by a background due to cosmic rays and trapped ions from the lower Van Allen belt, b) by how well the guidance system keeps the star image centered on the spectrometer entrance slit, and c) by scattered light within the spectrometer. Corrections for these three effects are considered below. The counts may also be affected by the strength and direction of the magnetic field in which the photomultipliers find themselves, but the behavior of many repeated U2 counts at a fixed point in the spectrum suggests this effect must be small. This is presumably also true for U1 which is physically identical and operated identically.

Cosmic Rays and Charged Particles

This source of background count has been carefully studied by York and Miller (1974) using counts obtained when starlight was not entering the spectrometer. The cosmic ray flux depends mainly on the geomagnetic latitude of the satellite, while the trapped particles are primarily concentrated in the South Atlantic Anomaly. In addition, some of the data photomultipliers have windows that fluoresce for some time following a heavy exposure to the charged particles with the result that the background for these tubes at a particular time depends not only on the current particle flux but also on their recent exposure. Although the data for this atlas do not depend on these fluorescing tubes, the background counts for all tubes are estimated by the same procedure. Under these circumstances it is expedient to designate the position of the satellite by the longitude of the ascending node of the orbit and the time after passage of the satellite through this node. Using this coordinate system insures that each time the satellite reaches a certain coordinate pair, it will have had the same recent history of cosmic ray and trapped particle flux exposure. The study by York and Miller shows that the background counts are quite repeatable (within expected statistical fluctuations) over time intervals that are long compared to the Tau Scorpii observing interval when using the above-described coordinate system. Armed with this empirical result, a table was prepared giving the expected background count as a function of the satellite coordinates, and this table was then used in removing the background count from each measurement.

Guidance Variations

In spite of an excellent guidance system, changing external torques operating on the satellite cause the stellar image to drift about on the entrance slit of the spectrometer. The result is that the amount of stellar flux entering the spectrometer slowly changes, giving rise to variations in the observed spectrum which have no counterpart in the star's intrinsic spectrum. These variations may be as great as 10%. This effect can be corrected with the help of the signal from U2 which, as noted before, is held fixed so that its output signal provides information on the variation of stellar flux entering the spectrometer. Each U1 count is corrected for guidance drift by dividing it by the simultaneously-acquired U2 count and multiplying it by the average of all U2 measurements made with U2 held fixed in position.

While the correction procedure is straightforward in theory, there are four operations that must be performed on the U2 counts before they can be used to correct for guidance variation. First, the cosmic ray and charged particle background must be removed. This is accomplished in the same manner as described above for U1. Second, while U2 is held fixed in the spectrometer, its wavelength is not quite fixed in the star's spectrum. This is caused by the changing Doppler shift mainly due to the orbital motion of the satellite. The component of the satellite velocity in the direction of the star is known for each measurement and hence the instantaneous wavelength being observed by U2 can be calculated. In order to predict the U2 count variations due to the changing wavelength, the U1 spectrum in the neighborhood of the U2 position has been numerically degraded to the U2 spectral resolution (nominally 0.2 Angstroms).

This degraded U1 spectrum gives the local spectral variation of the U2 signal and allows the U2 counts to be corrected to what they would have been in the absence of a variable Doppler shift. The correction is generally quite small since the satellite velocity range of $\pm$ 7.5 km s^{-1} is small compared to the U2 resolution of about 50 km s^{-1}. Nevertheless in a few monitoring positions the U2 slit was unintentionally fixed near the edge of a strong absorption feature and the deduced corrections are not negligible. Third, the corrected U2 signal still contains a noise component which is mainly statistical. Since the guidance variations have a slow time scale (that of the satellite orbital period), we have smoothed the high frequency noise in the U2 signal leaving intact the low frequency guidance-induced variations. Fourth, a possible systematic error exists in the guidance correction procedure. The average U2 values for each monitoring position do not necessarily reflect the same average quality of guidance i.e., the total stellar flux passing the entrance slit, averaged over the time interval that U2 is in one monitoring position, may differ from that at another monitoring position. In order to fit together the various spectral segments, the average U2 signals must be corrected for variations in average guidance quality at each fixed position.

This correction was made by forming the ratio of U2 signals (corrected as above) near spacecraft midnight for consecutive U2 positions. This ratio is assumed to be the correct intrinsic ratio since it is measured under approximately the same orbital configuration during a time (midnight) when guidance perturbations due to scattered light are at a minimum. This ratio was then used to correct the average U2 signals to the same quality of guidance.

The corrected and smoothed U2 signal finally was used to monitor and remove the guidance variations in the U1 signal. The separate spectral segments then formed one continuous spectrum.

Scattered Light

Finally, the U1 counts must be corrected for scattered light within the spectrometer. This component of the observed counts may be estimated with the help of a number of interstellar absorption features which appear to be saturated. The residual signal in the saturated core is assumed to be due only to scattered light at the wavelength of the feature. The interstellar features that have been used for the scattered light analysis of the second order spectrum are listed in Table 2.

While studying interstellar absorption at Lyman Alpha, Bohlin (1975) found the U1 scattered light to be linearly proportional to the strength of the local spectrum averaged over a 24-Angstrom band centered on the wavelength of interest. Scattered light values, predicted according to Bohlin's method, were compared with the observed values given in Table 2, and while the dependence on the local average is quite evident, the detailed agreement was of inadequate quality for the purposes of this atlas. Attempts to modify Bohlin's formulation to improve the detailed agreement over the whole second order spectrum were only partially successful, though it was found that an 18-Angstrom average is somewhat superior to the 24-Angstrom average. The following procedure was adopted. Between consecutive saturated interstellar absorption lines, the scattered light is presumed to be equal to a constant plus a coefficient times the local 18-Angstrom average. The measured residual signal in two consecutive lines then uniquely determines the constant term and the coefficient for that interval. Scattered light values were then computed every five Angstroms throughout the second order spectrum (see Table 3a). If the scattered light is adequately represented by a linear function of the 18-Angstrom average, the uncertainty in the tabulated values is due to the statistical errors in the counts measured in the cores of the saturated features. The error in each core count is taken to be the square root of the measured count divided by $\sqrt{N}$ where N is the number of points used to determine the average core count. These data indicate that the uncertainty in the scattered light estimate is under 5% for all wavelengths up to 1335 Å, but since the estimates are extrapolated longward of 1335 Å, the uncertainty grows and reaches nearly 14% at 1420 Å. Scattered light estimates for arbitrary wavelengths found by linear interpolation in the data of Table 3a can be applied directly to the data in Table 5.

The scattered light in the first order spectrum is more difficult to estimate. There appears to be only one saturated interstellar feature available; this is due to Si II, at 1526.719 Angstroms with a residual core signal of 148 counts.

At least one other scattered light estimate is required to determine an interpolation formula like that used for the second order spectrum. The additional estimate can be obtained indirectly by comparing the first and second order spectra in the following way. The wavelengths between 1418.187 and 1420.510 have been scanned in both orders. These two spectra were fitted together by linearly equating first order points to resolution-degraded second order points and determining the fitting constants by least squares. Qualitatively, the coefficient of the linear term is equal to the ratio of spectrometer efficiencies in the two orders at the mean wavelength of the fitting region, and the constant term is the difference between the first order scattered light and the second order scattered light corrected for the different efficiencies and bandpasses of the two orders. The first order scattered light is then deduced to be 686 counts and refers to a mean wavelength of 1419.349 Å.

The local signal averages computed for 1419.349 and 1526.719 Angstroms are 2414 and 575 counts respectively and refer to a bandpass of 36 Angstroms since the first order dispersion is just half of that for the second order. The formula fitted to these data was used to compute scattered light values every five Angstroms along the first order spectrum, and the resulting values are given in Table 3b. The uncertainty in the scattered light estimate at 1420 Å is about 14% since this estimate is derived from the second order scattered light estimate at 1420 Å (which has this uncertainty). The uncertainty then decreases to 6% at 1526 Å, and because of extrapolation, increases toward longer wavelengths reaching 51% at 1561 Å. Linear interpolation in Table 3b provides scattered light estimates that can be applied directly to the data in Table 6.

V. THE ATLAS

The atlas is presented both in graphs and tables. In preparing the graphical form, a smooth artificial continuum, guided by the upper envelope of the measured spectrum, was established and used for normalization. This allows the spectrum to be presented everywhere on a scale of 0 to 1. The reader is warned not to assume that the true stellar continuum lies at the ordinate of unity. An attempt has been made to control the wavelength scale so that published graphs will have two centimeters per Angstrom. The individual graphs each cover 9.5 Angstroms and overlap the preceding and following graphs by 0.5 Angstroms. Because the scattered light is not always small relative to the signal, it was decided not to remove it from the measurements but rather to display it on the graphs. It appears on each graph as a nearly horizontal solid line below most spectral features. The data for these lines were determined from Tables 3a and 3b as described in section IV and then normalized by the same artificial continuum as is used for the spectrum.

The tabular form of the data is given in Tables 5 and 6 for the second and first orders respectively. The counts in these tables have not been normalized but are the original observations corrected only for cosmic rays and trapped particles and for guidance variations; scattered light has not been removed. Small gaps may be noted in the wavelength coverage in Table 5. These gaps are due to different Doppler corrections to the wavelengths resulting from different satellite orbital velocities before and after scanning was interrupted by an observing constraint. These gaps are not present in Table 6 since an overlap scan was programmed following all scan interruptions in the first order spectrum.

The accuracy of the Atlas is believed to be quite good. In general, the corrections applied to the counts are quite smooth on the scale of the observed spectral features. We believe the principle cause for all errors to be the statistical variation in the photon counting rates. Repeated measurements by U1 and U2 during periods when the guidance and background are steady show fluctuations whose r.m.s. amplitude agrees with that expected for the random arrival of photons. Thus the expected error in a count is taken to be equal to the square root of the count. Possible errors due to the particle background estimates must be negligible since the background counts themselves are negligible relative to the large stellar signal.

We have investigated as a function of wavelength the expected errors in the counts in Tables 5 and 6 resulting from statistical fluctuations in the observed U1 and U2 counts. As described in the Guidance Variations part of section IV, four operations were performed on the U2 counts in preparing them to be used for guidance monitoring. Each operation was analyzed for its effect on the statistical accuracy of U2. The U2 smoothing operation was assumed to reduce the statistical errors in the observed U2 counts by a factor of $10^{\frac{1}{2}}$ since 10 or more consecutive U2 values were used in the smoothing process. The relative statistical errors introduced by these four operations were combined quadratically. Finally, the relative errors in the U1 counts and the corrected U2 counts were combined quadratically to estimate the total uncertainty.

The uncertainty of any point in the Atlas can be estimated from the formula:

$$\sigma = U1 \times (U1^{-1} + X)^{\frac{1}{2}}$$

where σ is the uncertainty (in counts), U1 is the count rate from Table 5 or Table 6 and X is a correction to be found from Table 4 and represents the effect on U1 of the uncertainty in U2 introduced by the monitoring procedure.

Except for unrecognized sources of systematic errors, we feel that uncertainties calculated using Table 4 conservatively represent the accuracy of the data presented in Tables 5 and 6.

Magnetic tapes containing the data in Tables 5 and 6 are available by application to the National Space Science Data Center at the Goddard Space Flight Center in Greenbelt, Maryland.

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OAO 3

IOTA HERCULIS UV SPECTRAL ATLAS

72-065A-01C ASUV-00004

This data set has been restored. There was originally one 9-track, 1600 BPI tape written in Binary. There is one restored tape. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The original tape was created on a 360 computer and the restored tape was created on an IBM 9021 computer. The DR and DS numbers along with the corresponding D number are as follows:

DR#	DS#	D#	FILES
DR004913	DS004913	D037998	1 - 3

OAO-3

IOTA HERCULIS UV SPECTRAL ATLAS

72-065A-01C

These data are contained on one 9-track, 1600 BPI, binary magnetic tape created on an IBM 360 computer. The tape contains 3 files. File 1 is the second order spectrum; file 2 is the first order spectrum; and file 3 contains a program to read files 1 and 2 and list them. The spectral data are blocked at 10 logical blocks of 145 words per physical record. The first word of each logical block contains the number of sets of data *24, except for the last set of data) in the read. The format for the data is as follows:

WORD	VARIABLE NAME	DESCRIPTION
1	N	Number of sets of data in the following read
2 (N)	W	Wavelength in Angstroms of a data point
3 (N)	C	Corrected count rate for the wavelength point. (Scattered light has not been removed)
4 (N)	CS	Smoothed count rate computed at the wavelength point using a fourier smoother. (Scattered light has not been removed).
5 (N)	SL	Scattered light estimate derived by Rogerson and Upson.
6 (N)	CSN	Normalized smoothed count rates as displayed in the atlas with unity at the top of each plot.
7 (N)	SLN	SL normalized using the same normalization factors as were used on CS above to compute CSN.

These data are detailed in the paper "The Copernicus Ultra Violet Atlas of Iota Herculis." Walter L. Upson II and John B. Rogerson, Jr.; Astrophysical Journal Supplement series, Volume 42, Number 1, January, 1980.

D#	C#
D-37998	C-20902

HEXDUMP OF TAPE X-431

72-065A-01A

D-30550

C-19656

INPUT TAPE X-431 ON MS3

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(80)	100E8A3B	CBE220A8	100E0A40	CC222077	100E0A0D	CC622048	100D8A25	CCA22018	100D4A13	CCE21FE9
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(160)	100C89F6	CE621EC7	100C89EE	CEA21E98	100C898A	CEE21E67	100C4980	D0621E3C	100A49B7	D0A21E0B
(200)	100A09B2	D0E21DDC	100A0969	D1221DAB	1009C976	D1621D7A	1009895F	D1A21D4B	10098946	D1E21D1A
(240)	10098903	D2221CEB	100948FF	D2621CBA	10090946	D2A21C8A	10090911	D2E21C5A	100908ED	D3221C2A
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(320)	1007C8B6	D5E21B0E	100788CC	D6221ADD	100748DE	D6621AAC	10070912	D6A21A7D	1006C8FC	D6E21A4C
(360)	1006C935	D7221A1B	1006C937	D76219EC	10068967	D7A219BB	1006499C	D7E2198B	100649AD	D822195B
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(720)	71068657	CEF0E6C4	710A4640	D070E6AE	70FB869D	D0B0E696	70FAC6A3	D0F0E67E	70FB869B	D130E666
(760)	70FD0692	D170E64D	71064687	D1B0E636	7107C67E	D1F0E61E	71098673	D230E606	71068686	D270E5EE
(800)	7105468E	D2B0E5D5	7103C697	D2F0E5BE	7108467B	D330E5A5	7102C69E	D370E58E	710A869B	D3B0E576
(840)	710D8689	D3F0E55D	710C4690	D570E548	710E4684	D5B0E52F	710A069F	D5F0E518	710C6A6	D630E4FF
(880)	710BC693	D670E4E7	710D468A	D6B0E4D0	710B4697	D6F0E4B7	710FC694	D730E49F	710F0699	D770E487
(920)	710C46AA	D7B0E46F	710C06AB	D7F0E457	710A46B6	D830E43F	710806C6	D870E427	71104690	D8B0E40E
(960)	710CC6AC	D8F0E3F7	7113C699	DA70E3EC	7113C69A	DAB0E3C8	711106AA	DAF0E3AF	71144697	DB30E397
(1000)	7111C6A6	DB70E380	710E06BB	DBB0E367	7112C69E	DBF0E34F	711146A7	DC30E337	711506B2	DC70E31F
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(5560)	40BA1016	5D7BD798	40911015	9E21D7D8	406D1015	5DEAD818	40401015	1DB5D858	40171014	DDA8D898
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(5720)	3D8D1012	5D49DDD8	3D641011	DD97DE18	3D3A1011	5DBEDF98	3D131010	DD59DFD8	3CEA1011	1DE8E018
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(5800)	3BF31012	1E0AE198	3BC91012	9D27E1D8	3BA21011	9E28E218	3B791011	DD5DE258	3B4F1011	9D8DE298
(5840)	3B261011	9D75E2D8	3AFC1011	9DE5E318	3AD31012	1D660038	00004110	28F5078C	FD83A034	12A7B615
(5880)	3FC7D5AD	AFCCE32D	AC300000	0000105C	649B102A	5E5BD3E2	F1F10121	FB2A4040	40F1F9F7	F2400170
(5920)	00000000	002DD5AD	AFCB1000	61B1D5ED	AFB61000	6338D62D	AFA21000	6362D66D	AF8C1000	63B6D6AD
(5960)	AF771000	63B5D6ED	AF631000	6425D72D	AF4E1000	63DAD76D	AF391000	63CED7AD	AF241000	6436D7ED
(6000)	AF111000	649BD82D	AEFA1000	6421D86D	AEE51000	6300D8AD	AED01000	632ED8ED	AEBB1000	629DD92D
(6040)	AEA61000	61DADAAD	AE931000	6164DAED	AE7E1000	61C3DB2D	AE681000	604ADB6D	AE541000	5AB1DBAD
(6080)	AE3F1000	516ADBED	AE291000	8D36DC2D	AE141000	525BDC6D	AE001000	5A26DCAD	ADEA1000	5E19DCED
(6120)	ADD51000	5F14DD2D	ADC21000	5EB6DD6D	ADAB1000	5E9EDDAD	AD961000	5EE4DDED	AD811000	5E6CDE2D
(6160)	AD6B1000	5DA7DFAD	AD571000	5DFFDFED	AD421000	5CD4E02D	AD2E1000	5C71E06D	AD181000	5BF9E0AD
(6200)	AD031000	5B30E0ED	ACED1000	5B15E12D	ACD81000	5ADAE16D	ACC31000	5B1BE1AD	ACAD1000	5B1AE1ED
(6240)	AC991000	5B66E22D	AC841000	5B9AE26D	AC6E1000	5C4BE2AD	AC591000	5CCCE2ED	AC441000	5D0AE32D
(6280)	AC2F1000	5C760038	00004110	28F5078C	FD85A034	12A7B615	3FC7D5B0	29E6E330	29E60000	000010FC
(6320)	68A51000	AB58D3E2	F1F1015F	042A4040	40F1F9F7	F2400170	00000000	002DD5B0	29E51000	289CD5F0
(6360)	29E51000	287CD630	29E51000	2878D670	29E51000	2895D6B0	29E51000	284FD6F0	29E51000	288DD730
(6400)	29E51000	286DD770	29E51000	2893D7B0	29E51000	2887D7F0	29E51000	285CD830	29E51000	286CD870
(6440)	29E51000	284FD8B0	29E51000	285ED8F0	29E51000	2877D930	29E51000	283CDAB0	29E51000	286BDAF0
(6480)	29E51000	2865DB30	29E51000	2811DB70	29E51000	2857DBB0	29E51000	2819DBF0	29E51000	2826DC30
(6520)	29E51000	284FDC70	29E51000	2868DCB0	29E51000	2843DCF0	29E51000	285BDD30	29E51000	281EDD70
(6560)	29E51000	2846DDB0	29E51000	281CDDF0	29E51000	2848DE30	29E51000	2863DFB0	29E51000	2873DFF0
(6600)	29E51000	28A5E030	29E51000	2882E070	29E51000	286EE0B0	29E51000	284CE0F0	29E51000	2844E130
(6640)	29E51000	2850E170	29E51000	2847E1B0	29E51000	286CE1F0	29E51000	281CE230	29E51000	282AE270
(6680)	29E51000	285FE2B0	29E51000	2860E2F0	29E51000	2837E330	29E51000	280D0038	00004110	28F5078C
(6720)	FD86A034	12A7B615	3FC7D5A0	A3F8E320	A3F80000	000010F9	4EB31001	8E88D3E2	F1F10121	FB2A4040
(6760)	40F1F9F7	F2400170	00000000	002DD5A0	A3F71005	CE9DD5E0	A3F71005	8E99D620	A3F71005	4EA3D660
(6800)	A3F71005	4E97D6A0	A3F71005	0E65D6E0	A3F71005	0E9CD720	A3F71005	0E88D760	A3F71004	CE7DD7A0
(6840)	A3F71004	CE80D7E0	A3F71004	CE75D820	A3F71004	CE79D860	A3F71004	CEB0D8A0	A3F71004	CE70D8E0
(6880)	A3F71004	CE74D920	A3F71004	8E57DAA0	A3F71004	4E8FDAE0	A3F71004	4E6ADB20	A3F71004	4E8ADB60
(6920)	A3F71004	4EADDBA0	A3F71004	4E82DBE0	A3F71004	4E7FDC20	A3F71004	0E95DC60	A3F71004	0E6CDCA0
(6960)	A3F71004	0E77DCE0	A3F71004	0E78DD20	A3F71004	0E62DD60	A3F71004	0E9FDDA0	A3F71004	4E9CDDE0
(7000)	A3F71004	4E8BDE20	A3F71004	8E6BDFA0	A3F71004	0EA5DFE0	A3F71004	0EAEE020	A3F71003	CEA9E060
(7040)	A3F71003	CE86E0A0	A3F71003	CE7AE0E0	A3F71003	CEB3E120	A3F71004	0E81E160	A3F71004	0E94E1A0
(7080)	A3F71004	0E9DE1E0	A3F71004	0E90E220	A3F71004	0E80E260	A3F71004	0E76E2A0	A3F71004	0E84E2E0
(7120)	A3F71004	0EA1E320	A3F71004	0E680038	00004110	28F5078C	FD87A034	12A7B615	3FC7D584	849CE304
(7160)	833C0000	000010F9	0C871001	0C5BD3E2	F1F10121	FB2A4040	40F1F9F7	F2400068	01000000	002DD584
(7200)	849C1006	4C35D5C4	84941006	4C53D604	848C1006	0C6BD644	84841006	0C66D684	847C1006	0C50D6C4
(7240)	84741006	0C5AD704	846C1006	0C5DD744	84641006	0C5DD784	845C1006	0C63D7C4	84551006	0C53D804
(7280)	844C1005	CC79D844	84441005	CC66						

FILE	INPUT RECS.	DATA RECORDS INPUT	MAX. SIZE	READ ERROR SUMMARY PERM	ZERO B	SHORT	UNDEF.	INPUT RETRIES #RECS.	TOTAL#
1	4	4	7294	0	0	0	0	0	0

267 -059 144647

FILE 52 RECORD 1 LENGTH 7294BYTES

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(40)	10620764	D3E2F2F8	0112BF8E	404040F1	F9F7F340	01700000	0000002D	87AFF6D6	100303AE	87EFF6C0
(80)	1005C1ED	882FF6A9	100C00F1	886FF692	101000B8	88AFF67D	100B410B	88EFF666	1005423C	892FF64F
(120)	100303F8	896FF639	100245B8	89AFF623	100206B0	89EFF60F	1001C752	8A2FF5F6	100187D5	8A6FF5DF
(160)	10018850	8AAFF5C9	100188B1	8AEFF5B3	100188CD	8B2FF59C	100188FA	8CAFF588	1001492F	8CEFF571
(200)	100148FC	8D2FF55B	10014959	8D6FF544	10014982	8DAFF52E	10014970	8DEFF51B	1001492A	8E2FF501
(240)	10018878	8E6FF4EB	1002064A	8EAFF4D5	1003C357	8EEFF4BE	1005C238	8F2FF4A8	1002C488	8F6FF492
(280)	1001C7B8	8FAFF47C	100188FA	8FEFF465	1001893B	902FF44E	10018930	91AFF43B	10014962	91EFF424
(320)	10014955	922FF40D	10018941	926FF3F8	10018956	92AFF3E1	1001891A	92EFF3CB	10018961	932FF3B7
(360)	10018942	936FF39D	1001895E	93AFF388	10018995	93EFF371	10018951	942FF35B	10018981	946FF345
(400)	1001896D	94AFF32E	1001894E	94EFF318	1001896B	952FF302	1001892C	00380000	421A051E	08441884
(440)	0479FA2F	FC798951	879CB288	951CAB11	00000000	00000000	00000000	D3E2F2F8	0000170E	404040F1
(480)	F9F7F340	01700000	0000002D	879CB287	00000000	87DCB25D	00000000	881CB230	00000000	885CB204

72-065A-01A

D-33812

***** Copernicus Data Bank Directory *****

Copernicus Data Bank Program
January 1978
Princeton University Astrophysics Department

Questions? Contact:
Jill Sherman
18 Peyton Hall
609-452-3816

Each databank tape contains six months worth of data. The following table defines what is contained in each file of the tape. Explanation of column headings:

FILE: File number on tape

ORBIT: Orbit range for observation

OBSERVATION: According to our system, LAMBDA SCO is star number 1 since it was the first star to be observed by Copernicus. ZETA OPH was the second star to be observed and is therefore assigned number 2. Each time a different star is observed, it is given a new star number. At present (January 1978) we have observed 363 different stars. Each time the same star is observed, it is given a new observation number. For example, the first time LAMBDA SCO was observed, it was assigned an observation number of 1. The next time it was observed, it was assigned observation number 2. So, for our OBSERVATION, we specify both the star number and the observation number as follows: star number . observation number. Example: the first time LAMBDA SCO was observed it was numbered 1.01; the next time 1.02; etc.

NAME: Star name

HD#: Self explanatory

OF SCANS: Total number of line scans in file - includes all tubes

DATE OBSERVED: Date observation of star took place

PGM: Name of observing program which was used to determine how and what was to be scanned

A copy of each tape will remain at Princeton if ever needed.

Contents of [illegible] tape (52 files) 72-065A-01A

D-30550 [illegible]

File#	ORBITS	OBSERVATION	HD#	NAME	# OF SCANS	DATE OBSERVED
1	86- 91	1.01	HD158926	LAMBDA SCO	64	8/27/72
2	115- 247	2.01	HD149757	ZETA OPH	1637	8/29/72
3	256- 300	3.01	HD149438	TAU SCO	686	9/ 8/72
4	301- 353	4.01	HD158408	UPSILON SCO	644	9/11/72
5	355- 426	5.01	HD157246	GAMMA ARA	897	9/14/72
6	426- 463	1.02	HD158926	LAMBDA SCO	664	9/19/72
7	464- 504	6.01	HD164353	67 OPH	702	9/22/72
8	505- 547	7.01	HD175191	SIGMA SGR	707	9/25/72
9	548- 619	8.01	HD193924	ALPHA PAV	756	9/28/72
10	620- 670	9.01	HD209952	ALPHA GRU	729	10/ 3/72
11	671- 739	10.01	HD 10144	ALPHA ERI	714	10/ 6/72
12	740- 793	11.01	HD 14228	PHI ERI	806	10/11/72
13	798- 862	12.01	HD200120	59 CYG	744	10/15/72
14	863- 893	13.01	HD214680	10 LAC	460	10/20/72
15	895- 923	14.01	HD217675	OMICRON AND	499	10/22/72
16	925- 963	15.01	HD 886	GAMMA PEG	688	10/24/72
17	966- 1014	16.01	HD 24398	ZETA PER	667	10/27/72
18	1015- 1039	17.01	HD 24912	XI PER	435	10/30/72
19	1042- 1076	18.01	HD 24760	EPSILON PER	651	11/ 1/72
20	1077- 1114	19.01	HD 22928	DELTA PER	704	11/ 3/72
21	1115- 1161	20.01	HD 21278	HD 21278	468	11/ 6/72
22	1163- 1195	21.01	HD 30614	ALPHA CAM	486	11/ 9/72
23	1198- 1230	22.01	HD 40111	139 TAU	489	11/12/72
24	1231- 1288	23.01	HD 37202	ZETA TAU	716	11/14/72
25	1289- 1337	24.01	HD 37742	ZETA ORI A	735	11/18/72
26	1338- 1390	25.01	HD 36486	DELTA ORI A	779	11/21/72
27	1392- 1470	26.01	HD 36861	LAMBDA ORI A	1196	11/25/72
28	1471- 1520	27.01	HD 37128	EPSILON ORI	794	11/30/72
29	1521- 1595	28.01	HD 47839	15 MON	660	12/ 4/72
30	1596- 1643	29.01	HD 87901	ALPHA LEO	1152	12/ 9/72
31	1644- 1684	30.01	HD 91316	RHO LEO	916	12/13/72
32	1685- 1742	31.01	HD 38666	MU COL	653	12/15/72
33	1748- 1783	17.02	HD 24912	XI PER	758	12/20/72
34	1785- 1813	32.01	HD 24534	X PER	210	12/22/72
35	1819- 1882	33.01	HD 37043	IOTA ORI	769	12/25/72
36	1883- 1930	34.01	HD 34085	BETA ORI A	820	1/ 1/73
37	1932- 2034	35.01	HD 38771	KAPPA ORI	775	1/ 1/73
38	2035- 2054	36.01	HD 37795	ALPHA COL	243	1/ 8/73
39	2155- 2223	37.01	HD 52089	EPSILON CMA	907	1/17/73
40	2223- 2286	38.01	HD 44743	BETA CMA	816	1/22/73
41	2308- 2363	39.01	HD 23630	ETA TAU	759	1/27/73
42	2364- 2431	40.01	HD 23408	20 TAU	804	1/31/73
43	2437- 2441	41.01	HD 29139	ALPHA TAU	57	2/ 5/73
44	2462- 2478	18.02	HD 24760	EPSILON PER	300	2/ 7/73
45	2478- 2497	19.02	HD 22928	DELTA PER	315	2/ 8/73
46	2498- 2518	21.02	HD 30614	ALPHA CAM	310	2/10/73
47	2523- 2572	36.02	HD 37795	ALPHA COL	746	2/11/73
48	2574- 2635	42.01	HD 58350	ETA CMA	702	2/15/73
49	2636- 2678	43.01	HD 68273	GAMMA2 VEL	773	2/19/73
50	2682- 2730	44.01	HD 66811	ZETA PUP	728	2/22/73
51	2734- 2749	22.02	HD 40111	139 TAU	300	2/26/73
52	2767- 2782	26.02	HD 36861	LAMBDA ORI A	278	2/28/73

9trk, 1600 BPI, BLKSIZE = 7294   52 files

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TAPE CREATED ON 04/26/79

FILE	ORBITS	OBSERVATION	NAME	HD#	# OF SCANS	DATE OBSERVED	PGM
~~1~~	~~20858-20880~~	~~213.03~~	~~PHI HER~~	~~HD145389~~	~~240~~	~~8/ 1/76~~	~~BH02~~
2	20883-20948	70.11	ALPHA LYR	HD172167	740	8/ 3/76	FP06
3	20899-20899	384.01	ZETA AQL	HD177724	6	8/ 4/76	EW14
4	20901-20917	68.05	UPSILON SGR	HD181615	120	8/ 4/76	MF01
5	20919-20928	68.06	UPSILON SGR	HD181615	77	8/ 5/76	MF02
6	20949-20949	386.01	KAPPA OPH	HD153210	34	8/ 7/76	EW06
~~7~~	~~20950-20959~~	~~64.09~~	~~DELTA SCO~~	~~HD143275~~	~~135~~	~~8/ 7/76~~	~~DY73~~
8	20960-20960	125.03	ALPHA SCO A	HD148478	45	8/ 8/76	EW08
9	20961-20961	385.01	EPSILON SCO	HD151680	41	8/ 8/76	EW07
10	20962-20977	231.03	HD153919	HD153919	323	8/ 8/76	BS04
11	20978-21014	231.04	HD153919	HD153919	848	8/ 9/76	BS05
12	21015-21064	231.05	HD153919	HD153919	1347	8/12/76	BS06
~~13~~	~~21065-21105~~	~~2.14~~	~~ZETA OPH~~	~~HD149757~~	~~990~~	~~8/[illegible]/76~~	~~DY53~~
14	21106-21106	387.01	GAMMA AQL	HD186791	52	8/18/76	EW10
15	21107-21121	13.06	10 LAC	HD214680	108	8/18/76	DM19
16	21122-21125	329.04	UX ARI	HD 21242	140	8/19/76	EW02
17	21126-21126	388.01	ALPHA TRI	HD 11443	36	8/19/76	EW06
18	21129-21129	389.01	IOTA PEG	HD210027	20	8/20/76	EW04
~~19~~	~~21129-21135~~	~~148.03~~	~~ALPHA AQL~~	~~HD187642~~	~~[illegible]~~	~~8/20/76~~	~~HA01~~
20	21136-21136	390.01	ETA PEG	HD215182	52	8/20/76	EW11
21	21138-21138	391.01	OMICRON TAU	HD 21120	52	8/20/76	EW11
22	21139-21142	330.10	HR1099	HD 22468	136	8/20/76	EW02
23	21143-21143	392.01	ALPHA FOR	HD 20010	20	8/21/76	EW04
24	21143-21164	238.04	EPSILON IND	HD209100	956	8/21/76	WM08
~~25~~	~~21166-21166~~	~~61.16~~	~~SIGMA SCO~~	~~HD147165~~	~~6~~	~~8/22/76~~	~~EW12~~
26	21167-21174	321.01	M80	NGC 6093	896	8/22/76	DY67
27	21175-21175	393.01	THETA LUP	HD144294	6	8/23/76	EW12
28	21176-21181	124.03	HD135591	HD135591	60	8/23/76	DY73
29	21182-21184	394.01	ALPHA RET	HD 27256	124	8/23/76	EW11
30	21185-21188	395.01	19 ERI	HD 22203	24	8/23/76	EW12
~~31~~	~~21189-21610~~	~~50.08~~	~~JUPITER~~		~~1958~~	~~8/24/76~~	~~EB13~~
32	21201-21201	77.02	GAMMA CYG	HD194093	28	8/25/76	EW05
33	21203-21234	2.15	ZETA OPH	HD149757	930	8/25/76	PW03
34	21235-21263	2.16	ZETA OPH	HD149757	681	8/27/76	TS46
35	21264-21280	328.01	DELTA CIR	HD135240	150	8/29/76	DY73
36	21281-21292	60.03	MU NOR	HD149038	130	8/30/76	DY73
~~37~~	~~21295-21296~~	~~323.01~~	~~KAPPA SCO~~	~~HD160578~~	~~48~~	~~8/31/76~~	~~JH06~~
38	21297-21310	324.01	ALPHA1 HER	HD156014	246	8/31/76	LA02
39	21314-21327	325.01	GAMMA DRA	HD164058	624	9/ 1/76	WM12
40	21333-21340	323.02	KAPPA SCO	HD160578	190	9/ 3/76	MW01
41	21348-21360	128.03	HD150898	HD150898	135	9/ 4/76	DY73
42	21361-21377	5.05	GAMMA ARA	HD157246	95	9/ 5/76	DM19
~~43~~	~~21379-21392~~	~~68.07~~	~~UPSILON SGR~~	~~HD181615~~	~~115~~	~~9/ 6/76~~	~~MF02~~
44	21394-21418	68.08	UPSILON SGR	HD181615	128	9/ 7/76	MF01
45	21419-21419	396.01	ZETA CYG	HD202109	23	9/ 9/76	EW04
46	21420-21422	397.01	51 AND	HD 9927	41	9/ 9/76	EW05
47	21436-21447	73.09	BETA PER	HD 19356	186	9/10/76	SR03
48	21448-21448	398.01	IOTA CEP	HD216228	19	9/11/76	EW03
~~49~~	~~21561-21561~~	~~392.02~~	~~ALPHA FOR~~	~~HD 20010~~	~~5~~	~~9/19/76~~	~~EW04~~
50	21561-21572	327.01	COMET-ARREST		839	9/19/76	EB15
51	21573-21573	400.01	ALPHA TUC	HD211416	19	9/19/76	EW06
52	21574-21574	399.02	TAU SGR	HD177716	15	9/19/76	EW03
53	21575-21583	288.03	NGC6624	NGC6624	922	9/19/76	DY68

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FILE	ORBITS	OBSERVATION	NAME	HD#	# OF SCANS	DATE OBSERVED	PGM
54	21584-21584	401.01	EPSILON SGR	HD169022	34	9/20/76	EW06
~~55~~	~~21586-21603~~	~~245.02~~	~~TAU CET~~	~~HD 10700~~	~~808~~	~~9/20/76~~	~~WH08~~
56	21586-21586	402.01	GAMMA TUC	HD219571	40	9/20/76	EW06
57	21615-21761	329.01	UX ARI	HD 21242	2434	9/22/76	EW15
58	21638-21675	330.01	HR1099	HD 22468	1955	9/24/76	EW15
59	21676-21679	330.02	HR1099	HD 22468	85	9/26/76	EW18
60	21700-21744	330.03	HR1099	HD 22468	1183	9/28/76	EW19
~~61~~	~~21707-21738~~	~~330.04~~	~~HR1099~~	~~HD 22468~~	~~905~~	~~9/29/76~~	~~EW17~~
62	21763-21765	329.02	UX ARI	HD 21242	95	10/ 2/76	EW18
63	21766-21769	329.03	UX ARI	HD 21242	186	10/ 3/76	EW17
64	21771-21783	327.02	COMET-ARREST		825	10/ 3/76	EB13
65	21784-21784	399.01	TAU SGR	HD177716	41	10/ 4/76	EW11
66	21785-21794	70.12	ALPHA LYR	HD172167	80	10/ 4/76	RK19
~~67~~	~~21796-21804~~	~~70.13~~	~~ALPHA LYR~~	~~HD172167~~	~~90~~	~~10/ 5/76~~	~~RK03~~
68	21804-21814	70.14	ALPHA LYR	HD172167	110	10/ 5/76	RK13
69	21815-21824	70.15	ALPHA LYR	HD172167	85	10/ 6/76	RK09
70	21825-21834	70.16	ALPHA LYR	HD172167	70	10/ 7/76	RK15
71	21835-21843	70.17	ALPHA LYR	HD172167	100	10/ 7/76	RK04
72	21844-21849	70.18	ALPHA LYR	HD172167	30	10/ 8/76	RK14
~~73~~	~~21850-21850~~	~~398.02~~	~~IOTA CEP~~	~~HD216228~~	~~25~~	~~10/ 8/76~~	~~EW18~~
74	21852-21861	73.10	BETA PER	HD 19356	120	10/ 8/76	SR03
75	21863-21872	159.03	LAMBDA AND	HD222107	291	10/ 9/76	AD14
76	21873-21873	396.02	ZETA CYG	HD202109	46	10/10/76	EW08
77	21874-21883	68.09	UPSILON SGR	HD181615	75	10/10/76	MF02
78	21886-21904	88.07	EPSILON ERI	HD 22049	944	10/11/76	WH08
~~79~~	~~21906-21906~~	~~403.01~~	~~41 ERI~~	~~HD 27376~~	~~5~~	~~10/12/76~~	~~EW12~~
80	21909-21909	251.02	VV CEP	HD208816	21	10/12/76	DY33
81	21909-21945	165.02	KAPPA CAS	HD 2905	395	10/13/76	TS01
82	21909-21909	397.02	51 AND	HD 9927	50	10/12/76	EW11
83	21926-21926	404.01	NU PER	HD 23230	23	10/14/76	EW05
84	21927-21930	50.09	JUPITER		108	10/14/76	EB14
~~85~~	~~21946-21946~~	~~405.01~~	~~ALPHA LAC~~	~~HD213558~~	~~6~~	~~10/15/76~~	~~EW12~~
86	21948-21948	396.03	ZETA CYG	HD202109	52	10/15/76	EW10
87	21949-22396	331.01	OMICRON AQR	HD209409	545	10/15/76	TS01
88	21958-21958	14.07	OMICRON AND	HD217675	6	10/16/76	EW13
89	21959-21963	332.01	NGC7662	NGC7662	816	10/16/76	SB01
90	21966-21991	84.09	GAMMA CAS	HD 5394	174	10/16/76	WU09
~~91~~	~~21968-21969~~	~~84.14~~	~~GAMMA CAS~~	~~HD 5394~~	~~18~~	~~10/17/76~~	~~WU09~~
92	22009-22014	333.01	NGC7027	NGC7027	924	10/19/76	SB01
93	22040-22040	406.01	ALPHA CAS	HD 3712	31	10/22/76	EW07
94	22041-22041	404.02	NU PER	HD 23230	28	10/22/76	EW07
95	22042-22045	50.10	JUPITER		126	10/22/76	EB14
96	22053-22067	176.03	25 ORI	HD 35439	168	10/22/76	DY73
97	22067-22090	334.01	OMICRON2 ERI	HD 26965	836	10/23/76	WH08
98	22091-22113	335.01	DELTA ERI	HD 23249	814	10/25/76	WH08
99	22114-22114	11.02	PHI ERI	HD 14228	5	10/27/76	EW14
100	22115-22115	407.01	88 AQR	HD218594	42	10/27/76	EW11
101	22116-22116	408.01	ZETA PEG	HD214923	5	10/27/76	EW12
102	22117-22125	336.01	12 LAC	HD214993	149	10/27/76	JA02
103	22126-22134	336.02	12 LAC	HD214993	100	10/28/76	JA03
104	22136-22142	336.03	12 LAC	HD214993	87	10/28/76	JA04
105	22143-22143	72.08	PHI PER	HD 10516	6	10/29/76	EW14
106	22144-22144	18.13	EPSILON PER	HD 24760	6	10/29/76	EW14
107	22145-22150	41.06	ALPHA TAU	HD 29139	288	10/29/76	WM13

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FILE	ORBITS	OBSERVATION	NAME	HD#	# OF SCANS	DATE OBSERVED	PGM
108	22153-32433	404.03	MU PER	HD 23230	55	10/29/76	EW11
~~109~~	~~22153-22178~~	~~337.01~~	~~ETA CAS A~~	~~HD 4614~~	~~840~~	~~10/29/76~~	~~WH08~~
110	22179-22186	322.01	16 LAC	HD216916	88	10/31/76	JA02
111	22187-22195	322.02	16 LAC	HD216916	95	11/ 1/76	JA03
112	22196-22204	322.03	16 LAC	HD216916	75	11/ 1/76	JA04
113	22205-22205	249.02	EPSILON CAS	HD 11415	10	11/ 2/76	EW14
114	22207-22220	142.10	ALPHA AUR	HD 34029	392	11/ 2/76	AD15
~~115~~	~~22220-22220~~	~~409.01~~	~~GAMMA CEP~~	~~HD222404~~	~~53~~	~~11/ 3/76~~	~~EW11~~
116	22229-22229	410.01	EPSILON DEL	HD195810	6	11/ 4/76	EW12
117	22230-22249	9.09	ALPHA GRU	HD209952	152	11/ 4/76	SF15
118	22237-22279	9.07	ALPHA GRU	HD209952	374	11/ 4/76	TS01
119	22280-22280	411.01	BETA AQR	HD204867	23	11/ 7/76	EW10
120	22281-22296	14.03	OMICRON AND	HD217675	241	11/ 7/76	MP01
~~121~~	~~22297-22320~~	~~158.03~~	~~HD199579~~	~~HD199579~~	~~555~~	~~11/ 8/76~~	~~DY56~~
122	22321-22353	76.05	P CYG	HD193237	613	11/10/76	TS54
123	22354-22370	13.07	10 LAC	HD214680	340	11/12/76	DY54
124	22370-22370	411.02	BETA AQR	HD204867	15	11/13/76	EW03
125	22371-22391	295.02	ALPHA PSA	HD216956	212	11/14/76	SF19
126	22397-22397	412.01	BETA CET	HD 4128	32	11/15/76	EW11
~~127~~	~~22398-22398~~	~~413.01~~	~~GAMMA ERI~~	~~HD 25025~~	~~28~~	~~11/15/76~~	~~EW11~~
128	22399-22425	26.11	LAMBDA ORI A	HD 36861	204	11/15/76	EB17
129	22401-24052	26.16	LAMBDA ORI A	HD 36861	336	11/16/76	SF25
130	22426-22440	140.02	PHI1 ORI	HD 36822	390	11/17/76	DY78
131	22441-22819	136.03	MU LEP	HD 33904	113	11/18/76	BH01
132	22450-22450	87.09	ALPHA CMI	HD 61421	38	11/19/76	EW11
~~133~~	~~22451-22468~~	~~414.01~~	~~DELTA HYA~~	~~HD 73262~~	~~40~~	~~11/19/76~~	~~EW14~~
134	22455-22463	25.09	DELTA ORI A	HD 36486	165	11/19/76	MJ04
135	22463-22466	95.02	LAMBDA LEP	HD 34816	60	11/20/76	DY73
136	22469-22469	415.01	DELTA AUR	HD 40035	46	11/20/76	EW10
137	22470-22470	406.02	ALPHA CAS	HD 3712	34	11/20/76	EW10
138	22471-22487	13.08	10 LAC	HD214680	390	11/20/76	DY78
~~139~~	~~22490-22511~~	~~145.06~~	~~HD214080~~	~~HD214080~~	~~540~~	~~11/22/76~~	~~DY56~~
140	22519-22525	170.02	LAMBDA ERI	HD 33328	120	11/24/76	DY73
141	22519-22519	392.03	ALPHA FOR	HD 20010	31	11/24/76	EW11
142	22526-22526	392.04	ALPHA FOR	HD 20010	43	11/24/76	EW11
143	22532-22532	498.01	OMICRON1 ERI	HD 26574	34	11/25/76	EW11
144	22533-22539	33.06	IOTA ORI	HD 37043	145	11/25/76	MJ04
~~145~~	~~22540-22540~~	~~413.02~~	~~GAMMA ERI~~	~~HD 25025~~	~~38~~	~~11/25/76~~	~~EW11~~
146	22547-22562	84.10	GAMMA CAS	HD 5394	136	11/26/76	WU10
147	22547-22547	15.08	GAMMA PEG	HD 886	6	11/26/76	EW14
148	22562-22562	416.01	GAMMA AUR	HD 35497	76	11/27/76	EW11
149	22562-22569	248.01	HD 60848	HD 60848	48	11/27/76	PC01
150	22570-22570	33.07	IOTA ORI	HD 37043	36	11/27/76	MD02
~~151~~	~~22571-22571~~	~~326.01~~	~~SIGMA ORI~~	~~HD 37468~~	~~36~~	~~11/27/76~~	~~MD02~~
152	22572-22572	24.09	ZETA ORI A	HD 37742	36	11/27/76	MD02
153	22629-22640	14.04	OMICRON AND	HD217675	172	12/ 1/76	MP01
154	22641-22642	338.01	KAPPA DRA	HD109387	10	12/ 2/76	EW20
155	22643-22671	162.02	KAPPA CNC	HD 78316	200	12/ 2/76	BH03
156	22674-22688	33.08	IOTA ORI	HD 37043	405	12/ 4/76	DY78
~~157~~	~~22690-22693~~	~~15.06~~	~~GAMMA PEG~~	~~HD 886~~	~~62~~	~~12/ 5/76~~	~~MD04~~
158	22690-22690	144.04	PI CET	HD 17081	12	12/ 5/76	EW14
159	22694-22698	339.01	DELTA CET	HD 16582	50	12/ 6/76	JH06
160	22699-22718	225.05	HD219188	HD219188	490	12/ 6/76	DY56
161	22721-22750	144.03	PI CET	HD 17081	185	12/ 7/76	BH05

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FILE	ORBITS	OBSERVATION	NAME	HD#	# OF SCANS	DATE OBSERVED	PGM
162	22751-22751	34.03	BETA ORI A	HD 34085	5	12/10/76	EW14
~~163~~	~~22752-22757~~	~~340.01~~	~~HD 41335~~	~~HD 41335~~	~~110~~	~~12/10/76~~	~~GP03~~
164	22759-22759	45.06	OMICRON 2 CMA	HD 53138	36	12/10/76	MD02
165	22760-22770	43.08	GAMMA2 VEL	HD 68273	198	12/10/76	MJ04
166	22771-22773	37.02	EPSILON CMA	HD 52089	38	12/11/76	MD03
167	22774-22775	38.05	BETA CMA	HD 44743	38	12/11/76	MD03
168	22778-22791	19.08	DELTA PER	HD 22928	312	12/12/76	MJ05
~~169~~	~~22778-22778~~	~~413.03~~	~~GAMMA ERI~~	~~HD 25025~~	~~20~~	~~12/11/76~~	~~EW11~~
170	22778-22778	418.01	ALPHA ARI	HD 12929	24	12/11/76	EW11
171	22791-23107	50.11	JUPITER		696	12/13/76	EB14
172	22792-22807	72.03	PHI PER	HD 10516	268	12/13/76	MP01
173	22808-22808	391.02	OMICRON TAU	HD 21120	24	12/14/76	EW11
174	22809-22822	136.04	MU LEP	HD 33904	102	12/14/76	BH01
~~175~~	~~22823-22823~~	~~419.01~~	~~ALPHA CET~~	~~HD 18884~~	~~36~~	~~12/15/76~~	~~EW11~~
176	22828-22850	166.02	SIGMA CAS	HD224572	678	12/15/76	DY82
177	22851-22874	93.03	23 TAU	HD 23480	660	12/17/76	DY76
178	22875-22892	17.10	XI PER	HD 24912	222	12/18/76	T556
179	22892-22909	18.06	EPSILON PER	HD 24760	342	12/19/76	MJ05
180	22910-22911	16.04	ZETA PER	HD 24398	84	12/21/76	MD02
~~181~~	~~22912-22912~~	~~41.09~~	~~ALPHA TAU~~	~~HD 29139~~	~~44~~	~~12/21/76~~	~~EW07~~
182	22915-22915	258.02	ETA ORI	HD 35411	96	12/21/76	MD02
183	22916-22948	205.02	HD 54662	HD 54662	626	12/21/76	DY82
184	22949-22969	33.09	IOTA ORI	HD 37043	280	12/23/76	MJ05
185	22975-22975	420.01	MU TAU	HD 26912	6	12/25/76	EW12
186	22976-22977	27.06	EPSILON ORI	HD 37128	36	12/25/76	MD03
~~187~~	~~22979-23001~~	~~87.07~~	~~ALPHA CMI~~	~~HD 61421~~	~~760~~	~~12/25/76~~	~~WM08~~
188	23004-23004	25.17	DELTA ORI A	HD 36486	5	12/27/76	EW12
189	23005-23005	421.01	27 TAU	HD 23850	5	12/27/76	EW13
190	23007-23024	72.04	PHI PER	HD 10516	235	12/27/76	MP01
191	23025-23043	14.05	OMICRON AND	HD217675	194	12/29/76	MP01
192	23043-23050	330.05	HR1099	HD 22468	205	12/30/76	EW27
~~193~~	~~23051-23073~~	~~18.07~~	~~EPSILON PER~~	~~HD 24760~~	~~111~~	~~1/ 1/77~~	~~JP05~~
194	23057-23103	73.13	BETA PER	HD 19356	248	1/ 1/76	SF26
195	23073-23098	18.08	EPSILON PER	HD 24760	697	1/ 1/77	T551
196	23108-23126	17.11	XI PER	HD 24912	144	1/ 3/77	EB19
197	23111-28974	17.14	XI PER	HD 24912	768	1/ 4/77	SF25
198	23136-23136	335.02	DELTA ERI	HD 23249	26	1/ 5/77	EW11
~~199~~	~~23137-23159~~	~~174.06~~	~~ALPHA CMA AB~~	~~HD 48915~~	~~404~~	~~1/ 5/77~~	~~MS04~~
200	23159-23178	155.12	ALPHA CMA A	HD 48915	368	1/ 7/77	MS04
201	23179-23179	75.09	OMICRON PER	HD 23180	6	1/ 8/77	SF32
202	23187-23201	341.01	BETA TRI	HD 13161	440	1/ 9/77	RA02
203	23202-23202	422.01	IOTA AUR	HD 31398	40	1/10/77	EW11
204	23208-23266	27.07	EPSILON ORI	HD 37128	54	1/10/77	JP05
~~205~~	~~23221-23231~~	~~27.08~~	~~EPSILON ORI~~	~~HD 37128~~	~~239~~	~~1/11/77~~	~~CL01~~
206	23237-23246	18.09	EPSILON PER	HD 24760	215	1/12/77	CL01
207	23248-23252	17.12	XI PER	HD 24912	270	1/13/77	TS61
208	23253-23257	190.03	BETA TAU	HD 35497	69	1/13/77	MD02
209	23258-23334	32.06	X PER	HD 24534	85	1/14/77	BS08
210	23261-23263	246.05	GAMMA ORI	HD 35468	50	1/14/77	WM07
~~211~~	~~23267-23274~~	~~25.10~~	~~DELTA ORI A~~	~~HD 36486~~	~~54~~	~~1/14/77~~	~~TS40~~
212	23274-23275	246.06	GAMMA ORI	HD 35468	42	1/15/77	MD03
213	23276-23276	26.12	LAMBDA ORI A	HD 36861	34	1/15/77	MD02
214	23282-23331	25.11	DELTA ORI A	HD 36486	98	1/15/77	TS68
215	23287-23294	139.02	23 ORI	HD 35149	120	1/16/77	DY73

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FILE	ORBITS	OBSERVATION	NAME	HD#	# OF SCANS	DATE OBSERVED	PGM
216	23295-23324	35.07	KAPPA ORI	HD 38771	39	1/16/77	JP05
~~217~~	~~23299-23305~~	~~25.12~~	~~DELTA ORI A~~	~~HD 36486~~	~~55~~	~~1/16/77~~	~~TS40~~
218	23305-23305	423.01	EPSILON TAU	HD 28305	53	1/17/77	EW11
219	23306-23310	73.11	BETA PER	HD 19356	40	1/17/77	BS08
220	23335-23338	140.03	PHI1 ORI	HD 36822	66	1/19/77	DY73
221	23339-23349	17.17	XI PER	HD 24912	200	1/19/77	SF31
222	23350-23360	256.02	ZETA CAS	HD 3360	386	1/20/77	HY01
~~223~~	~~23362-23370~~	~~84.11~~	~~GAMMA CAS~~	~~HD 5394~~	~~210~~	~~1/21/77~~	~~CL01~~
224	23372-23384	84.12	GAMMA CAS	HD 5394	235	1/22/77	MJ05
225	23384-23394	75.08	OMICRON PER	HD 23180	175	1/22/77	TS56
226	23395-23407	82.04	40 PER	HD 22951	195	1/23/77	TS56
227	23408-23439	24.10	ZETA ORI A	HD 37742	403	1/24/77	DY74
228	23441-23451	16.05	ZETA PER	HD 24398	165	1/26/77	TS56
~~229~~	~~23452-23490~~	~~84.13~~	~~GAMMA CAS~~	~~HD 5394~~	~~300~~	~~1/27/77~~	~~TS53~~
230	23491-23505	21.07	ALPHA CAM	HD 30614	708	1/30/77	TS27
231	23507-23507	16.06	ZETA PER	HD 24398	5	1/31/77	EW12
232	23508-23542	33.10	IOTA ORI	HD 37043	495	1/31/77	DY74

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FILE	ORBITS	OBSERVATION	NAME	HD#	# OF SCANS	DATE OBSERVED	PGM
1	28837-28841	365.03	ETA AUR	HD 32630	504	2/ 2/78	KP01
2	28842-28847	366.03	LAMBDA TAU	HD 25201	508	2/ 4/78	KP02
3	28847-28850	366.04	LAMBDA TAU	HD 25201	504	2/ 4/78	KP01
4	28851-28855	365.04	ETA AUR	HD 32630	482	2/ 4/78	KP02
5	28856-28864	93.04	23 TAU	HD 23480	246	2/ 4/78	MJ07
6	28880-28886	326.03	SIGMA ORI	HD 37468	102	2/ 6/78	DY73
7	28889-28893	39.02	ETA TAU	HD 23630	234	2/ 7/78	MJ07
8	28894-28897	17.15	XI PER	HD 24912	60	2/ 7/78	PU00
9	28908-28968	366.05	LAMBDA TAU	HD 25201	581	2/ 8/78	RP01
10	28948-28994	73.14	BETA PER	HD 19356	190	2/11/78	FW08
11	28969-28969	366.06	LAMBDA TAU	HD 25201	7	2/12/78	TEST
12	28979-28986	18.11	EPSILON PER	HD 24760	137	2/13/78	DY91
13	28987-28989	18.12	EPSILON PER	HD 24760	77	2/13/78	PU00
14	28995-29017	35.11	KAPPA ORI	HD 38771	615	2/14/78	DY78
15	29019-29032	35.12	KAPPA ORI	HD 38771	245	2/16/78	MJ05
16	29032-29034	46.06	TAU CMA	HD 57061	15	2/17/78	JH09
17	29035-29039	24.11	ZETA ORI A	HD 37742	110	2/17/78	DY93
18	29040-29054	17.16	XI PER	HD 24912	274	2/17/78	RB27
19	29055-29077	326.04	SIGMA ORI	HD 37468	509	2/18/78	DY78
20	29078-29081	326.05	SIGMA ORI	HD 37468	88	2/20/78	JD24
21	29082-29117	26.17	LAMBDA ORI A	HD 36861	646	2/20/78	DY74
22	29119-29138	340.06	HD 41335	HD 41335	176	2/23/78	RP06
23	29138-29149	33.15	IOTA ORI	HD 37043	198	2/24/78	DY92
24	29149-29182	25.15	DELTA ORI A	HD 36486	784	2/25/78	DY78
25	29182-29196	25.16	DELTA ORI A	HD 36486	300	2/27/78	MJ05
26	29197-29225	139.03	23 ORI	HD 35149	492	2/28/78	DY74
27	29227-29350	35.13	KAPPA ORI	HD 38771	186	3/ 2/78	MH04
28	29250-29310	35.14	KAPPA ORI	HD 38771	412	3/ 4/78	MH05
29	29328-29341	27.09	EPSILON ORI	HD 37128	273	3/ 9/78	JS01
30	29352-29360	27.10	EPSILON ORI	HD 37128	186	3/11/78	DY78
31	29361-29422	50.14	JUPITER		1194	3/11/78	WC02
32	29371-29381	35.15	KAPPA ORI	HD 38771	198	3/12/78	MZ01
33	29400-29413	50.15	JUPITER		260	3/14/78	WC01
34	29423-29423	45.09	OMICRON2 CMA	HD 53138	5	3/16/78	EW13
35	29425-30413	187.02	LAMBDA VEL	HD 78647	763	3/16/78	SF36
36	29466-29466	187.03	LAMBDA VEL	HD 78647	25	3/19/78	EW11
37	29476-29484	345.04	KAPPA VEL	HD 81188	60	3/19/78	JR10
38	29485-29485	46.07	TAU CMA	HD 57061	5	3/20/78	JH09
39	29486-29545	202.02	GAMMA GEM	HD 47105	720	3/20/78	AB14
40	29547-29552	348.02	HR5110	HD118216	208	3/24/78	EW24
41	29556-29589	368.01	HR 4830	HD110432	454	3/25/78	RP02
42	29590-29615	49.20	BETA CEN A	HD122451	371	3/27/78	TS01
43	29616-29626	111.02	3 CEN A	HD120709	80	3/28/78	MH06
44	29626-29660	111.03	3 CEN A	HD120709	245	3/30/78	MH07
45	29669-29704	116.04	THETA MUS	HD113904	715	4/ 1/78	DY82
46	29704-29718	63.05	PI SCO	HD143018	325	4/ 4/78	MZ02
47	29718-29734	109.08	CHI OPH	HD148184	265	4/ 5/78	MJ06
48	29736-29742	369.01	HD135160	HD135160	90	4/ 6/78	DY73
49	29744-29773	62.04	ZETA CEN	HD121263	470	4/ 7/78	DY80
50	29762-29853	62.05	ZETA CEN	HD121263	140	4/ 8/78	JR10
51	29773-29782	123.03	NU SCO AB	HD145502	405	4/ 9/78	TS58
52	29783-29783	459.01	ZETA LUP	HD134505	40	4/ 9/78	EW11
53	29794-29816	301.02	GAMMA LUP	HD138690	460	4/10/78	DY80

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FILE	ORBITS	OBSERVATION	NAME	HD#	# OF SCANS	DATE OBSERVED	PGM
54	29817-29818	43.15	GAMMA2 VEL	HD 68273	22	4/12/78	PU00
55	29831-29840	345.05	KAPPA VEL	HD 81188	175	4/13/78	DY91
56	29854-29858	301.03	GAMMA LUP	HD138690	85	4/14/78	JD24
57	29859-29859	460.01	EPSILON NOR	HD147971	5	4/15/78	EW13
58	29860-29862	370.01	HD148937	HD148937	25	4/15/78	DY33
59	29863-29863	461.01	ALPHA CIR	HD128898	50	4/15/78	EW11
60	29874-29874	434.02	ALPHA TRA	HD150798	9	4/16/78	EW11
61	29875-29918	119.03	1 SCO	HD141637	575	4/16/78	DY82
62	29908-31579	349.02	CHI LUP	HD141556	356	4/18/78	SF28
63	29919-29964	120.04	BETA1 SCO	HD144217	670	4/19/78	DY82
64	29967-29971	235.04	ALPHA LUP	HD129056	30	4/22/78	JH06
65	29972-29972	3.12	TAU SCO	HD149438	5	4/22/78	EW13
66	29973-29976	371.01	V1010 OPH	HD151676	25	4/23/78	TS38
67	29989-30030	372.01	V861 SCO	HD152667	514	4/24/78	RP02
68	30033-30035	2.23	ZETA OPH	HD149757	52	4/27/78	PU00
69	30071-30071	462.01	DELTA BOO	HD135722	20	4/29/78	EW11
70	30081-30081	270.02	HD102776	HD102776	5	4/30/78	EW13
71	30087-30087	434.03	ALPHA TRA	HD150798	20	4/30/78	EW13
72	30105-30105	380.03	ETA AQL	HD187929	15	5/ 2/78	EW11
73	30182-30191	373.01	HR7275	HD179094	417	5/ 7/78	EW31
74	30192-30192	387.03	GAMMA AQL	HD186791	20	5/ 8/78	EW11
75	30205-30205	323.05	KAPPA SCO	HD160578	10	5/ 9/78	EW13
76	30217-30233	235.05	ALPHA LUP	HD129056	155	5/ 9/78	JH06
77	30243-30243	463.01	BETA CHA	HD106911	5	5/11/78	EW13
78	30305-30305	101.07	THETA ARA	HD165024	5	5/16/78	EW13
79	30315-30319	240.02	DELTA2 CHA	HD 93845	47	5/16/78	PU00
80	30320-30327	345.06	KAPPA VEL	HD 81188	40	5/17/78	JR10
81	30328-30333	345.08	KAPPA VEL	HD 81188	30	5/17/78	EW13
82	30344-30344	30.12	RHO LEO	HD 91316	5	5/18/78	EW13
83	30346-30365	374.01	XI BOO	HD131156	499	5/18/78	WM12
84	30365-30374	375.01	SIGMA CRB	HD146361	384	5/20/78	EW31
85	30374-30374	437.03	EPSILON VIR	HD113226	60	5/20/78	EW11
86	30375-30376	464.01	EPSILON CRV	HD105707	20	5/20/78	EW11
87	30386-30550	110.06	ALPHA CEN A	HD128620	1540	5/21/78	AD21
88	30461-30461	465.01	BETA CRV	HD109379	25	5/26/78	EW11
89	30462-30462	280.04	ETA BOO	HD121370	35	5/26/78	EW11
90	30464-30464	466.01	PI HER	HD156283	45	5/26/78	EW11
91	30465-30465	376.02	ALPHA OPH	HD159561	5	5/27/78	EW13
92	30465-30469	376.01	ALPHA OPH	HD159561	41	5/27/78	SP39
93	30470-30470	467.01	IOTA AQL	HD184930	6	5/27/78	EW13
94	30471-30471	431.02	ETA SGR	HD167618	60	5/27/78	EW11
95	30472-30507	372.02	V861 SCO	HD152667	395	5/27/78	RP04
96	30507-30513	7.02	SIGMA SGR	HD175191	69	5/30/78	SP39
97	30514-30536	377.01	NU SGR	HD166937	390	5/30/78	RP02
98	30537-30537	468.01	THETA1 SGR	HD189103	6	6/ 1/78	EW13
99	30538-30538	130.02	LAMBDA PAV	HD173948	6	6/ 1/78	EW13
100	30558-30568	201.04	ETA CEN	HD127972	170	6/ 2/78	DY91
101	30569-30571	201.05	ETA CEN	HD127972	48	6/ 3/78	PU00
102	30572-30572	55.22	ALPHA VIR	HD116658	6	6/ 3/78	EW13
103	30573-30573	54.16	ALPHA BOO	HD124897	30	6/ 3/78	EW11
104	30574-30594	54.15	ALPHA BOO	HD124897	1056	6/03/78	GB01
105	30595-30595	325.02	GAMMA DRA	HD164058	42	6/ 5/78	EW11
106	30599-30602	151.05	UPSILON CYG	HD202904	78	6/ 5/78	PU00
107	30615-30646	145.07	HD214080	HD214080	585	6/ 6/78	DY76

CONTENTS OF DATA BANK TAPE#008 CONT.

FILE	ORBITS	OBSERVATION	NAME	HD#	# OF SCANS	DATE OBSERVED	PGM
108	30658-30669	145.08	HD214080	HD214080	85	6/ 9/78	BS07
109	30669-30717	9.10	ALPHA GRU	HD209952	416	6/10/78	TS01
110	30687-30687	469.01	ALPHA APS	HD129078	24	6/11/78	EW11
111	30687-30694	345.07	KAPPA VEL	HD 81188	55	6/11/78	JR10
112	30694-30694	470.01	GAMMA HYI	HD 24512	48	6/11/78	EW11
113	30718-30718	471.01	ZETA CAP	HD204075	60	6/13/78	EW11
114	30720-30746	134.03	KAPPA AQL	HD184915	300	6/13/78	MJ06
115	30755-30788	225.06	HD219188	HD219188	548	6/16/78	DY76
116	30789-30789	133.04	EPSILON PEG	HD206778	48	6/18/78	EW11
117	30792-30792	380.04	ETA AQL	HD187929	59	6/18/78	EW11
118	30795-30803	151.06	UPSILON CYG	HD202904	126	6/18/78	JD24
119	30814-30838	151.07	UPSILON CYG	HD202904	550	6/20/78	DY76
120	30839-30846	312.02	PI AQR	HD212571	121	6/21/78	PU00
121	30857-30881	336.04	12 LAC	HD214993	535	6/23/78	DY76
122	30882-30888	336.05	12 LAC	HD214993	102	6/24/78	JD24
123	30900-30912	378.01	L CAR	HD 84810	299	6/26/78	EW24
124	30912-31064	60.05	MU NOR	HD149038	633	6/26/78	DM19
125	30969-30969	472.01	LAMBDA OPH	HD148857	6	6/30/78	EW13
126	30970-30970	384.02	ZETA AQL	HD177724	6	6/30/78	EW14
127	30977-30977	473.01	102 HER	HD166182	6	7/ 1/78	EW13
128	30978-30978	2.26	ZETA OPH	HD149757	6	7/ 1/78	EW13
129	31065-31084	120.05	BETA1 SCO	HD144217	285	7/ 7/78	MJ06
130	31085-31097	64.18	DELTA SCO	HD143275	220	7/ 8/78	DY90
131	31104-31107	231.06	HD153919	HD153919	60	7/10/78	JS03
132	31108-31179	231.07	HD153919	HD153919	390	7/10/78	JS04
133	31180-31180	125.07	ALPHA SCO A	HD148478	72	7/15/78	EW11
134	31181-31198	319.02	70 OPH	HD165341	741	7/15/78	WM08
135	31200-31219	316.03	MU HER	HD161797	744	7/16/78	WM08
136	31220-31220	474.01	XI HER	HD163993	20	7/18/78	EW11
137	31220-31220	387.04	GAMMA AQL	HD186791	30	7/18/78	EW11
138	31229-31229	475.01	21 AQL	HD179761	6	7/18/78	EW13
139	31240-31265	4.04	UPSILON SCO	HD158408	455	7/19/78	DY80
140	31266-31336	372.03	V861 SCO	HD152667	425	7/21/78	RP07
141	31336-31336	476.01	NU OPH	HD163917	36	7/26/78	EW11
142	31342-31342	387.05	GAMMA AQL	HD186791	48	7/26/78	EW11
143	31344-31344	477.01	ALPHA DEL	HD196867	6	7/26/78	EW13
144	31354- 0	15.07	GAMMA PEG	HD 886	2995	7/27/78	JR11
145	31383-31383	147.03	ETA LYR	HD180163	6	7/29/78	EW13
146	31384-31384	478.01	EPSILON HER	HD153808	6	7/29/78	EW13
147	31385-31415	123.04	NU SCO AB	HD145502	328	7/29/78	MJ06

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**********                                                  **********
**********        END OF TAPE#008 CONTAINING  147 FILES     **********
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THESE ARE THE SECOND ORDER DATA FOR TAU SCORPII READ OFF THE DATA TAPE.

FILE # 1 READ # 1 N = 24

IW	IC	IB1	IB2	ICN	IBN1	IBN2	IW	IC	IB1	IB2	ICN	IBN1	IBN2
948.735	523.4	200.2	206.2	0.6533	0.2499	0.2574	948.758	540.7	200.4	206.2	0.6736	0.2497	0.2569
948.782	524.7	200.6	206.3	0.6523	0.2495	0.2564	948.805	521.7	200.9	206.3	0.6473	0.2492	0.2560
948.829	485.4	201.1	206.4	0.6010	0.2490	0.2555	948.852	507.6	201.3	206.4	0.6272	0.2487	0.2551
948.876	427.8	201.5	206.5	0.5276	0.2485	0.2546	948.900	433.8	201.7	206.5	0.5338	0.2482	0.2541
948.923	394.3	201.9	206.6	0.4843	0.2480	0.2537	948.947	447.6	202.1	206.6	0.5486	0.2478	0.2532
948.970	379.8	202.4	206.7	0.4646	0.2475	0.2528	948.994	424.9	202.6	206.7	0.5187	0.2473	0.2524
949.017	475.9	202.8	206.8	0.5798	0.2471	0.2519	949.038	478.6	203.0	206.8	0.5820	0.2469	0.2515
949.064	412.8	203.2	206.9	0.5010	0.2466	0.2511	949.086	431.8	203.4	206.9	0.5230	0.2464	0.2506
949.110	403.2	203.6	207.0	0.4874	0.2462	0.2502	949.133	352.9	203.8	207.0	0.4257	0.2459	0.2498
949.157	372.1	204.1	207.1	0.4480	0.2457	0.2493	949.181	395.2	204.3	207.1	0.4749	0.2455	0.2489
949.204	358.8	204.5	207.2	0.4304	0.2453	0.2485	949.228	397.3	204.7	207.2	0.4756	0.2450	0.2481
949.251	402.5	204.9	207.3	0.4808	0.2448	0.2476	949.275	368.6	205.1	207.3	0.4395	0.2446	0.2472

FILE # 1 READ # 2 N = 24

949.299	374.5	205.3	207.4	0.4456	0.2444	0.2468	949.322	326.6	205.6	207.4	0.3879	0.2442	0.2464
949.346	362.0	205.8	207.5	0.4291	0.2439	0.2460	949.369	302.0	206.0	207.5	0.3573	0.2437	0.2456
949.393	266.5	206.2	207.6	0.3147	0.2435	0.2451	949.417	244.8	206.4	207.6	0.2886	0.2433	0.2447
949.439	202.1	206.6	207.7	0.2377	0.2431	0.2443	949.463	229.5	206.8	207.7	0.2694	0.2429	0.2439
949.486	277.5	207.0	207.8	0.3252	0.2427	0.2435	949.510	287.2	207.3	207.8	0.3360	0.2425	0.2431
949.534	268.6	207.5	207.9	0.3137	0.2422	0.2427	949.557	215.6	207.7	207.9	0.2513	0.2420	0.2423
949.581	206.8	207.9	208.0	0.2405	0.2418	0.2419	949.605	209.7	208.1	208.0	0.2434	0.2416	0.2415
949.628	238.1	208.3	208.1	0.2759	0.2414	0.2412	949.652	215.5	208.6	208.1	0.2493	0.2412	0.2408
949.676	230.2	208.8	208.2	0.2658	0.2410	0.2404	949.700	222.3	209.0	208.2	0.2562	0.2408	0.2400
949.723	223.3	209.2	208.3	0.2569	0.2406	0.2396	949.747	219.4	209.4	208.3	0.2519	0.2404	0.2392
949.771	226.3	209.6	208.4	0.2593	0.2402	0.2388	949.791	238.4	209.8	208.4	0.2728	0.2401	0.2385
949.815	251.2	210.0	208.5	0.2869	0.2399	0.2381	949.838	261.2	210.2	208.5	0.2977	0.2397	0.2377

FILE # 1 READ # 3 N = 24

949.865	228.9	210.5	208.6	0.2603	0.2394	0.2373	949.889	260.4	210.7	208.7	0.2957	0.2393	0.2369
949.913	289.1	210.9	208.7	0.3276	0.2391	0.2365	949.937	298.1	211.1	208.8	0.3372	0.2389	0.2362
949.960	311.1	211.3	208.8	0.3513	0.2387	0.2358	949.984	300.4	211.6	208.9	0.3386	0.2385	0.2354
950.008	337.1	211.8	208.9	0.3793	0.2383	0.2351	950.032	336.3	212.0	209.0	0.3778	0.2381	0.2347
950.056	394.5	212.2	209.0	0.4422	0.2379	0.2343	950.080	342.6	212.4	209.1	0.3834	0.2377	0.2340
950.103	397.6	212.6	209.1	0.4442	0.2375	0.2336	950.127	373.7	212.8	209.2	0.4168	0.2372	0.2332
950.151	387.6	213.0	209.2	0.4315	0.2370	0.2329	950.174	384.2	213.1	209.3	0.4269	0.2368	0.2325
950.197	402.7	213.3	209.3	0.4467	0.2366	0.2322	950.219	423.2	213.5	209.4	0.4686	0.2364	0.2319
950.242	405.2	213.7	209.4	0.4479	0.2362	0.2315	950.265	425.7	213.9	209.5	0.4699	0.2360	0.2312
950.288	428.2	214.0	209.5	0.4718	0.2358	0.2308	950.311	400.2	214.2	209.6	0.4402	0.2356	0.2305
950.333	373.6	214.4	209.6	0.4103	0.2354	0.2302	950.356	362.7	214.6	209.7	0.3976	0.2353	0.2298
950.379	390.7	214.8	209.7	0.4276	0.2351	0.2295	950.402	443.9	215.0	209.8	0.4850	0.2349	0.2292

FILE # 1 READ # 4 N = 24

950.425	480.1	215.1	209.8	0.5237	0.2347	0.2289	950.448	460.3	215.3	209.9	0.5012	0.2345	0.2285
950.471	441.4	215.5	209.9	0.4799	0.2343	0.2282	950.494	454.6	215.7	210.0	0.4934	0.2341	0.2279
950.516	454.9	215.9	210.0	0.4929	0.2339	0.2276	950.540	402.2	216.1	210.1	0.4351	0.2337	0.2272
950.560	395.9	216.2	210.1	0.4276	0.2336	0.2270	950.584	380.7	216.4	210.2	0.4106	0.2334	0.2266
950.608	320.9	216.6	210.2	0.3455	0.2332	0.2263	950.634	318.9	216.8	210.3	0.3426	0.2330	0.2259
950.658	311.5	217.0	210.3	0.3342	0.2328	0.2256	950.681	330.1	217.2	210.4	0.3536	0.2326	0.2253
950.705	355.1	217.4	210.4	0.3796	0.2324	0.2250	950.729	358.5	217.6	210.5	0.3826	0.2322	0.2246
950.752	378.8	217.8	210.5	0.4036	0.2320	0.2243	950.776	294.4	218.0	210.6	0.3131	0.2318	0.2240
950.799	265.2	218.1	210.6	0.2816	0.2317	0.2237	950.823	245.8	218.3	210.7	0.2607	0.2315	0.2234
950.847	224.7	218.5	210.7	0.2378	0.2313	0.2230	950.869	347.1	218.7	210.8	0.3668	0.2311	0.2228
950.893	386.1	218.9	210.8	0.4074	0.2309	0.2224	950.917	487.0	219.1	210.9	0.5130	0.2308	0.2221
950.941	405.3	219.3	210.9	0.4262	0.2306	0.2218	950.964	431.3	219.5	211.0	0.4528	0.2304	0.2215

FILE # 1 READ # 5 N = 24

950.988	458.1	219.6	211.0	0.4802	0.2302	0.2212	951.012	462.4	219.8	211.1	0.4838	0.2301	0.2209
951.035	420.3	220.0	211.1	0.4392	0.2299	0.2206	951.059	388.0	220.2	211.2	0.4047	0.2297	0.2203

THESE ARE THE DATA FOR THE FIRST ORDER SPECTRUM OF TAU SCORPII.

FILE # 2 READ # 1 N = 24

1418.187	2496.4	671.5	0.0	0.8567	0.2304	0.0	1418.240	2665.8	671.4	0.0	0.9153	0.2305	0.0
1418.293	2501.1	671.3	0.0	0.8591	0.2306	0.0	1418.346	2371.1	671.2	0.0	0.8149	0.2306	0.0
1418.399	2663.9	671.0	0.0	0.9159	0.2307	0.0	1418.452	2715.6	670.9	0.0	0.9341	0.2308	0.0
1418.505	2520.2	670.8	0.0	0.8673	0.2308	0.0	1418.558	2525.9	670.7	0.0	0.8697	0.2309	0.0
1418.611	2644.9	670.6	0.0	0.9111	0.2310	0.0	1418.664	2855.2	670.5	0.0	0.9839	0.2310	0.0
1418.717	2689.4	670.4	0.0	0.9273	0.2311	0.0	1418.770	2621.6	670.3	0.0	0.9043	0.2312	0.0
1418.823	2787.4	670.2	0.0	0.9619	0.2313	0.0	1418.870	2894.4	670.1	0.0	0.9993	0.2313	0.0
1418.929	2750.9	670.0	0.0	0.9502	0.2314	0.0	1418.980	2452.3	669.9	0.0	0.8475	0.2315	0.0
1419.033	2353.9	669.8	0.0	0.8138	0.2315	0.0	1419.086	2005.5	669.7	0.0	0.6937	0.2316	0.0
1419.139	2130.0	669.6	0.0	0.7371	0.2317	0.0	1419.192	2446.0	669.4	0.0	0.8468	0.2317	0.0
1419.245	2571.6	669.3	0.0	0.8907	0.2318	0.0	1419.298	2363.5	669.2	0.0	0.8190	0.2319	0.0
1419.351	2292.9	669.1	0.0	0.7949	0.2320	0.0	1419.404	2098.1	669.0	0.0	0.7277	0.2320	0.0

FILE # 2 READ # 2 N = 24

1419.457	2010.1	668.9	0.0	0.6975	0.2321	0.0	1419.510	2155.1	668.8	0.0	0.7482	0.2322	0.0
1419.563	1876.3	668.7	0.0	0.6517	0.2322	0.0	1419.615	1919.2	668.6	0.0	0.6669	0.2323	0.0
1419.668	2324.5	668.5	0.0	0.8081	0.2324	0.0	1419.721	2334.7	668.4	0.0	0.8120	0.2324	0.0
1419.771	2507.3	668.3	0.0	0.8725	0.2325	0.0	1419.824	2592.9	668.2	0.0	0.9027	0.2326	0.0
1419.877	2589.8	668.1	0.0	0.9020	0.2327	0.0	1419.930	2580.8	668.0	0.0	0.8993	0.2327	0.0
1419.983	2658.8	667.8	0.0	0.9269	0.2328	0.0	1420.036	2446.8	667.7	0.0	0.8534	0.2329	0.0
1420.089	2075.1	667.6	0.0	0.7241	0.2329	0.0	1420.136	1797.1	667.5	0.0	0.6273	0.2330	0.0
1420.194	1730.8	667.4	0.0	0.6045	0.2331	0.0	1420.247	1917.1	667.3	0.0	0.6699	0.2332	0.0
1420.300	2241.8	667.2	0.0	0.7837	0.2332	0.0	1420.353	2325.7	667.1	0.0	0.8134	0.2333	0.0
1420.406	2158.8	667.0	0.0	0.7554	0.2334	0.0	1420.452	2012.1	666.9	0.0	0.7043	0.2334	0.0
1420.512	2153.1	666.8	0.0	0.7541	0.2335	0.0	1420.562	2386.5	666.7	0.0	0.8362	0.2336	0.0
1420.614	2226.0	666.6	0.0	0.7803	0.2336	0.0	1420.667	2495.5	666.5	0.0	0.8752	0.2337	0.0

FILE # 2 READ # 3 N = 24

1420.720	2566.1	666.4	0.0	0.9004	0.2338	0.0	1420.773	2505.6	666.3	0.0	0.8796	0.2339	0.0
1420.826	2601.5	666.1	0.0	0.9136	0.2339	0.0	1420.879	2757.7	666.0	0.0	0.9690	0.2340	0.0
1420.932	2707.9	665.9	0.0	0.9519	0.2341	0.0	1420.984	2671.6	665.8	0.0	0.9396	0.2341	0.0
1421.037	2361.0	665.7	0.0	0.8307	0.2342	0.0	1421.090	2496.9	665.6	0.0	0.8789	0.2343	0.0
1421.143	2412.9	665.5	0.0	0.8497	0.2344	0.0	1421.196	1871.2	665.4	0.0	0.6593	0.2344	0.0
1421.249	1558.1	665.3	0.0	0.5492	0.2345	0.0	1421.295	1873.2	665.2	0.0	0.6606	0.2346	0.0
1421.352	2251.7	665.1	0.0	0.7945	0.2346	0.0	1421.405	2593.9	665.0	0.0	0.9156	0.2347	0.0
1421.458	2526.2	664.9	0.0	0.8921	0.2348	0.0	1421.510	2541.5	664.8	0.0	0.8980	0.2348	0.0
1421.563	2516.8	664.7	0.0	0.8896	0.2349	0.0	1421.616	2678.7	664.5	0.0	0.9473	0.2350	0.0
1421.669	2698.0	664.4	0.0	0.9546	0.2351	0.0	1421.722	2584.3	664.3	0.0	0.9148	0.2351	0.0
1421.775	2542.9	664.2	0.0	0.9005	0.2352	0.0	1421.828	2458.5	664.1	0.0	0.8711	0.2353	0.0
1421.881	2541.4	664.0	0.0	0.9008	0.2353	0.0	1421.934	2490.2	663.9	0.0	0.8831	0.2354	0.0

FILE # 2 READ # 4 N = 24

1421.987	2212.9	663.8	0.0	0.7851	0.2355	0.0	1422.040	2146.9	663.7	0.0	0.7620	0.2356	0.0
1422.093	2184.7	663.6	0.0	0.7758	0.2356	0.0	1422.143	2032.2	663.5	0.0	0.7220	0.2357	0.0
1422.196	2254.4	663.4	0.0	0.8013	0.2358	0.0	1422.249	2616.1	663.3	0.0	0.9303	0.2358	0.0
1422.302	2491.2	663.2	0.0	0.8863	0.2359	0.0	1422.355	2592.0	663.1	0.0	0.9226	0.2360	0.0
1422.408	2421.8	662.9	0.0	0.8624	0.2361	0.0	1422.461	2358.6	662.8	0.0	0.8403	0.2361	0.0
1422.514	2329.7	662.7	0.0	0.8304	0.2362	0.0	1422.568	2209.5	662.6	0.0	0.7879	0.2363	0.0
1422.621	2274.9	662.5	0.0	0.8116	0.2363	0.0	1422.674	2429.0	662.4	0.0	0.8670	0.2364	0.0
1422.727	2503.4	662.3	0.0	0.8940	0.2365	0.0	1422.780	2550.8	662.2	0.0	0.9113	0.2366	0.0
1422.833	2502.4	662.1	0.0	0.8944	0.2366	0.0	1422.886	2329.1	661.8	0.0	0.8329	0.2366	0.0
1422.937	2144.1	661.4	0.0	0.7671	0.2366	0.0	1422.991	2201.9	661.0	0.0	0.7881	0.2366	0.0
1423.044	2548.1	660.6	0.0	0.9125	0.2365	0.0	1423.097	2426.7	660.2	0.0	0.8694	0.2365	0.0
1423.150	2268.7	659.8	0.0	0.8132	0.2365	0.0	1423.197	2224.3	659.5	0.0	0.7976	0.2365	0.0

FILE # 2 READ # 5 N = 24

1423.256	2597.5	659.1	0.0	0.9319	0.2364	0.0	1423.310	2720.2	658.7	0.0	0.9764	0.2364	0.0
1423.363	2554.9	658.3	0.0	0.9175	0.2364	0.0	1423.416	2245.0	657.9	0.0	0.8065	0.2363	0.0

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```
                  C
                  C
                  C      THIS PROGRAM IS INTENDED TO SERVE AS AN EXAMPLE FOR READING THE DATA
                  C      TAPE FOR "THE COPERNICUS ULTRAVIOLET ATLAS OF TAU SCORPII."
                  C      JOHN B. ROGERSON, JR. AND WALTER L. UPSON II:  ASTROPHYSICAL JOURNAL
                  C      SUPPLEMENT SERIES, VOLUME 35, NUMBER 1, SEPTEMBER, 1977.
                  C
                  C
                  C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                  C
                  C
                  C      THE TAPE CONTAINS TWO FILES.  FILE ONE IS THE SECOND ORDER SPECTRUM AND
                  C      FILE NUMBER TWO IS THE FIRST ORDER SPECTRUM.
                  C
                  C
                  C      THE FOLLOWING DIMENSION STATEMENTS DEFINE THE VARIABLES NEEDED FOR BOTH
                  C      READING THE TAPE AND WRITING OUT UNSCALED NUMBERS.
                  C
   0001                  DIMENSION IW(24),IC(24),IB1(24),IB2(24),ICN(24),IBN1(24),IBN2(24)
   0002                  DIMENSION W(24),C(24),B1(24),B2(24),CN(24),BN1(24),BN2(24)
                  C
                  C
                  C      THE FOLLOWING FORMAT IS USED FOR BOTH FILES.  NOTE THAT THIS AMOUNTS TO A
                  C      BINARY READ OF THE DATA.  ALL THE VARIABLES STORED ON THE TAPE ARE 4 BYTE
                  C      INTEGERS (INTEGER*4)
                  C      - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                  C      ALTHOUGH THIS FORM FOR TAPE DATA SEEMS SOMEWHAT ARTIFICIAL, IT IS USED TO
                  C      MAKE THE TAPE READABLE FOR AS MANY USERS AS POSSIBLE EVEN THOUGH THERE IS
                  C      A SLIGHT INCREASE IN COMPLEXITY IN THE READING PROGRAM TO RETURN THE DATA
                  C      TO THEIR ORIGINAL STATE.
                  C
   0003              601 FORMAT(169A4)
                  C
                  C
                  C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                  C
                  C      FILE NUMBER ONE -- THE SECOND ORDER SPECTRUM.
                  C
                  C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                  C
                  C      THE VARIABLES IN FILE ONE ARE DEFINED AS FOLLOWS:
                  C         N:  THE NUMBER OF SETS OF DATA IN THE FOLLOWING READ
                  C         IW:  THE INTEGERIZED WAVELENGTH IN MILLI-ANGSTROMS.
                  C         IC:  THE CORRECTED COUNT RATE MULTIPLIED BY 10.0 AND INTEGERIZED.
                  C              THE SCATTERED LIGHT HAS NOT BEEN REMOVED FROM IC.
                  C         IB1:  A SCATTERED LIGHT ESTIMATE (SEE B1 DISCUSSED AFTER STATEMENT
                  C               NUMBER 100 BELOW) MULTIPLIED BY 10.0 AND INTEGERIZED.
                  C         IB2:  ANOTHER SCATTERED LIGHT ESTIMATE (SEE B2) MULTIPLIED BY 10.0
                  C               AND INTEGERIZED.
                  C         ICN:  CN MULTIPLIED BY 10000.0 AND INTEGERIZED.  (SEE CN)
                  C         IBN1:  BN1 MULTIPLIED BY 10000.0 AND INTEGERIZED. (SEE BN1)
                  C         IBN2:  BN2 MULTIPLIED BY 10000.0 AND INTEGERIZED. (SEE BN2)
                  C
                  C      - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                  C
                  C      THIS PROGRAM RESTORES THE VARIABLES TO THEIR PROPER FORM AND ORDER OF
```

```
             C      MAGNITUDE BEFORE PRINTING OUT THE DATA.  NOTE THE SCALE FACTORS PRESENT
             C      IN THE CONVERSION STATEMENTS.
             C      THE VARIABLES PRINTED OUT ARE THE SAME AS IN THE ATLAS.  THEY ARE
             C      DISCUSSED BELOW WITH THE WRITE STATEMENT.
             C
             C
0004                WRITE(6,610)
0005            610 FORMAT(1H1,//,'       THESE ARE THE SECOND ORDER DATA FOR TAU SCORPII
               PII READ OFF THE DATA TAPE.'//)
             C
             C
             C      NOW WE MUST DO REPEATED READS OF THE FILE TO OBTAIN ALL THE DATA.  EACH
             C      READ OBTAINS "N" SETS OF DATA WHERE 'N' IS ALWAYS = 24 EXCEPT FOR THE
             C      LAST SET OF DATA.
             C
             C      THE COUNTERS IFILE AND NREAD ARE FOR BOOKKEEPING PURPOSES ONLY AND ARE
             C      NOT NECESSARY FOR READING THE TAPE.
             C
0006                IFILE = 1
0007                NREAD = 0
0008            100 CONTINUE
0009                NREAD = NREAD + 1
0010                READ(10,601,END=500)  N,(IW(I),IC(I),IB1(I),IB2(I),ICN(I),
               A       IBN1(I),IBN2(I),I=1,N)
             C
             C
             C      THIS LOOP CONVERTS THE SCALED AND INTEGERIZED NUMBERS ON TAPE FILE ONE
             C      BACK TO THEIR CORRECT FORM AND MAGNITUDE.
             C
             C
0011                DO 101 J=1,N
0012                W(J) = IW(J)/1000.0
0013                C(J) = IC(J)/10.0
0014                B1(J) = IB1(J)/10.0
0015                B2(J) = IB2(J)/10.0
0016                CN(J) = ICN(J)/10000.
0017                BN1(J) = IBN1(J)/10000.
0018                BN2(J) = IBN2(J)/10000.
0019            101 CONTINUE
             C
             C
             C      THE VARIABLES PRINTED OUT HAVE THE FOLLOWING MEANINGS AND ARE IN DIRECT
             C      AGREEMENT WITH THE NUMBERS USED AND TABULATED IN THE ATLAS:
             C
             C         W:  THE WAVELENGTH IN ANGSTROMS OF A DATA POINT.
             C         C:  THE CORRECTED COUNT RATE FOR THAT WAVELENGTH POINT.
             C             THE SCATTERED LIGHT HAS NOT BEEN REMOVED FROM C.
             C         B1:  THE SCATTERED LIGHT ESTIMATE DERIVED BY ROGERSON AND UPSON AND
             C             DESCRIBED IN DETAIL IN THE PAPER.
             C         B2:  THE SCATTERED LIGHT ESTIMATED BY THE ALGORITHM OF RALPH C. BOHLIN
             C             AND REFERRED TO IN THE PAPER.
             C         CN:  THE NORMALIZED COUNT RATES AS DISPLAYED IN THE ATLAS WITH UNITY AT
             C             THE TOP OF EACH PLOT.
             C         BN1:  B1 NORMALIZED USING THE SAME NORMALIZATION FACTORS AS WERE USED
             C             FOR C ABOVE.
             C         BN2:  B2 NORMALIZED THE SAME AS B1 AND C.
```

```
                C
                C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                C
                C
 0020                 WRITE(6,605) IFILE,NREAD,N,(W(I),C(I),B1(I),B2(I),CN(I),                KO C
                    A   BN1(I),BN2(I),I=1,N)                                                  KO C
 0021             605 FORMAT('  FILE # ',I1,'  READ # ',I4,'  N = ',I3,
                    A   /,(2(14X,F9.3,3F7.1,3F7.4)))
 0022                 GO TO 100
 0023             500 CONTINUE
 0024                 WRITE(6,622) IFILE,NREAD
 0025             622 FORMAT('    FINISHED FILE ',I3,'  WITH ',I6,'  RECORDS.')
                C
                C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                C
                C     FILE NUMBER TWO -- THE FIRST ORDER SPECTRUM
                C
                C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                C
                C     THE VARIABLES IN FILE TWO HAVE THE SAME MEANING AS IN FILE ONE, EXCEPT
                C     THAT IB2 AND IBN2 ARE SET EQUAL TO 0 AND B2 AND B2N WILL ALSO BE 0.0 SINCE
                C     THERE IS NO ALTERNATIVE ALGORITHM FOR THE SCATTERED LIGHT IN THE FIRST
                C     ORDER SPECTRUM.
                C
                C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                C
                C
                C
 0026                 WRITE(6,611)
 0027             611 FORMAT(1H1,//,'        THESE ARE THE DATA FOR THE FIRST ORDER SPECTRUM
                    RUM OF TAU SCORPII.'//)
                C
                C
                C     NOW WE MUST DO REPEATED READS OF THE FILE TO OBTAIN ALL THE DATA.  EACH
                C     READ OBTAINS "N" SETS OF DATA WHERE 'N' IS ALWAYS = 24 EXCEPT FOR THE
                C     LAST SET OF DATA.
                C
                C     THE COUNTERS IFILE AND NREAD ARE FOR BOOKKEEPING PURPOSES ONLY AND ARE
                C     NOT NECESSARY FOR READING THE TAPE.
                C
 0028                 IFILE = 2
 0029                 NREAD = 0
 0030             200 CONTINUE
 0031                 NREAD = NREAD + 1
 0032                 READ(10,601,END=501)  N,(IW(I),IC(I),IB1(I),IB2(I),ICN(I),
                    A        IBN1(I),IBN2(I),I=1,N)
                C
                C
                C     THIS LOOP CONVERTS THE SCALED AND INTEGERIZED NUMBERS ON TAPE FILE TWO
                C     BACK TO THEIR CORRECT FORM AND MAGNITUDE.
                C
                C
 0033                 DO 201 J=1,N
 0034                 W(J) = IW(J)/1000.0
 0035                 C(J) = IC(J)/10.0
 0036                 B1(J) = IB1(J)/10.0
```

```
 0037               B2(J) = IB2(J)/10.0
 0038               CN(J) = ICN(J)/10000.
 0039               BN1(J) = IBN1(J)/10000.
 0040               BN2(J) = IBN2(J)/10000.
 0041           201 CONTINUE
                C
                C
                C   THIS WRITE STATEMENT GENERATES NUMBERS WITH THE SAME MEANING FOR FILE TWO
                C   AS THE WRITE STATEMENT ABOVE DOES FOR FILE ONE.
                C
                C
 0042               WRITE(6,605) IFILE,NREAD,N,(W(I),C(I),B1(I),B2(I),CN(I),           KO C
                   A   BN1(I),BN2(I),I=1,N)                                              KO C
 0043               GO TO 200
 0044           501 CONTINUE
 0045               WRITE(6,622) IFILE,NREAD
 0046               STOP
 0047               END
```

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D-37998 C-20902

DUMP OF TAPE BMWB

INPUT TAPE BMWB ON FTU
DATA INPUT H9 FL=1=1 STOP

FILE 1 RECORD 1 LENGTH 5800BYTES

(0)	00000018	000F3FA6	0000025C	00000202	00000060	000007C4	00000175	000F3FBD	00000131	00000191
(40)	00000061	00000609	00000174	000F3FD4	0000019C	000001B2	00000061	00000686	00000174	000F3FEB
(80)	000003BE	000003B0	00000061	00000E27	00000174	000F4002	0000051D	000004E9	00000061	000012CF
(120)	00000174	000F4019	000003F6	000003E4	00000061	00000EE0	00000174	000F4030	0000026B	0000027D
(160)	00000061	0000097C	00000174	000F4047	00000174	00000197	00000062	0000060B	00000173	000F405D
(200)	000001B0	000001B5	00000062	0000067A	00000173	000F4074	00000320	0000035D	00000062	00000CBC
(240)	00000173	000F408B	000005AD	00000555	00000062	00001428	00000173	000F40A2	0000068A	000006CE
(280)	00000062	000019A9	00000173	000F40B9	000007F9	00000797	00000063	00001C8E	00000173	000F40D0
(320)	0000076A	0000079C	00000063	00001C8F	00000173	000F40E7	0000072F	00000707	00000063	00001A50
(360)	00000172	000F40FE	00000667	0000069E	00000063	000018B9	00000172	000F4115	00000762	00000764
(400)	00000063	00001B8F	00000172	000F412B	0000085E	00000825	00000063	00001E4E	00000172	000F4142
(440)	0000077F	00000786	00000064	00001BED	00000172	000F4159	0000060C	000005E9	00000064	000015E5
(480)	00000172	000F4170	00000433	00000470	00000064	00001065	00000172	000F4187	000003DE	000003C0
(520)	00000064	00000DD5	00000171	000F419E	00000339	00000375	00000064	00000CB9	00000171	000F41B5
(560)	00000492	0000049B	00000065	000010E7	00000171	00000018	000F41CC	00000654	00000621	00000065
(600)	00001675	00000171	000F41E2	00000690	0000069E	00000065	00001830	00000171	000F41F9	0000063C
(640)	000005F9	00000065	000015CA	00000171	000F4210	000004B5	0000052C	00000065	000012D2	00000171
(680)	000F4228	00000665	00000632	00000065	0000167F	00000171	000F423F	00000777	0000078F	00000066
(720)	00001B64	00000170	000F4255	00000822	000007E6	00000066	00001C91	00000170	000F426C	00000781
(760)	0000078B	00000066	00001B38	00000170	000F4283	00000645	00000633	00000066	00001651	00000170
(800)	000F429A	000004E2	00000506	00000066	0000120D	00000170	000F42B1	000004E7	000004F4	00000067
(840)	000011C2	00000170	000F42C8	00000518	000004F9	00000067	000011CA	00000170	000F42DF	000004E3
(880)	0000052B	00000067	00001274	0000016F	000F42F6	000006A1	0000065E	00000067	000016AE	0000016F
(920)	000F430D	00000661	00000646	00000067	0000164C	0000016F	000F4324	00000479	00000493	00000067
(960)	0000103B	0000016F	000F433B	000003EB	00000401	00000068	00000E2C	0000016F	000F4352	000003FF
(1000)	000003F2	00000068	00000DF0	0000016F	000F4369	0000043A	00000485	00000068	00000FED	0000016F
(1040)	000F438?	00000657	000005F5	00000068	000014F5	0000016F	000F4397	0000061A	0000063D	00000068
(1080)	000015E3	0000016E	000F43AE	0000058E	0000054F	00000069	00001299	0000016E	000F43C5	000003D6
(1120)	0000041F	00000069	00000E68	0000016E	000F43DC	000003FE	00000402	00000069	00000DFA	0000016E
(1160)	00000018	000F43F3	000004EE	000004BF	00000069	00001083	0000016E	000F440A	000003A9	00000394
(1200)	00000069	00000C6F	0000016E	000F4421	000001C2	000002C1	0000006A	000006F2	0000016E	000F4438
(1240)	00000239	0000024E	0000006A	000007F9	0000016E	000F444F	00000457	00000473	0000006A	00000F5C
(1280)	0000016D	000F4466	00000677	00000629	0000006A	00001539	0000016D	000F447D	00000703	00000751
(1320)	0000006A	00001926	0000016D	000F4494	000008E5	00000884	0000006A	00001D37	0000016D	000F44AB
(1360)	0000088B	000008CA	0000006B	00001E16	0000016D	000F44C3	00000900	000008D3	0000006B	00001E24
(1400)	0000016D	000F44DA	00000925	00000939	0000006B	00001F71	0000016D	000F44F1	000008AA	00000877
(1440)	0000006B	00001CCC	0000016D	000F4508	00000756	000007A9	0000006B	00001A04	0000016C	000F451F
(1480)	00000831	000007ED	0000006C	00001ADA	0000016C	000F4536	00000717	000006FF	0000006C	000017A8
(1520)	0000016C	000F454D	00000456	0000046B	0000006C	00000EE7	0000016C	000F4564	000002AE	000002CA
(1560)	0000006C	00000965	0000016C	000F457C	00000280	00000288	0000006C	00000882	0000016C	000F4593
(1600)	00000252	0000023A	0000006C	00000776	0000016C	000F45AA	000001FB	0000024A	0000006D	000007A8
(1640)	0000016C	000F45C1	0000045D	0000044A	0000006D	00000E55	0000016C	000F45D8	0000066F	0000063F
(1680)	0000006D	000014D3	0000016B	000F45F0	00000649	0000061C	0000006D	00001453	0000016B	000F4607
(1720)	00000468	0000045C	0000006D	00000E78	0000016B	00000018	000F461E	00000238	00000263	0000006E
(1760)	000007E8	0000016B	000F4635	000001E5	00000212	0000006E	000006D9	0000016B	000F464D	00000396
(1800)	0000039A	0000006E	00000BE2	0000016B	000F4664	000005F8	000005EF	0000006E	0000138B	0000016B
(1840)	000F467B	00000781	00000735	0000006E	000017B2	0000016B	000F4692	000006CA	000006EB	0000006E
(1880)	000016B2	0000016A	000F46A9	000006D8	000006CE	0000006F	00001648	0000016A	000F46C1	00000721
(1920)	0000072E	0000006F	00001777	0000016A	000F46D8	0000081D	00000827	0000006F	00001A97	0000016A
(1960)	000F46EF	0000093F	000008F8	0000006F	00001D32	0000016A	000F4706	00000862	0000086D	0000006F
(2000)	00001B5F	0000016A	000F471D	000006FC	000006C7	00000070	000015F7	0000016A	000F4735	0000048E
(2040)	000004E4	00000070	00000FD1	0000016A	000F474D	000004B2	000004B5	00000070	00000F34	0000016A
(2080)	000F4764	0000063F	00000649	00000070	00001442	00000169	000F477B	0000076B	00000721	00000070
(2120)	000016EE	00000169	000F4793	0000068D	000006C3	00000071	000015B3	00000169	000F47AA	00000754
(2160)	0000074E	00000071	00001768	00000169	000F47C1	00000871	00000856	00000071	00001AA9	00000169
(2200)	000F47D9	00000834	0000082A	00000071	00001A0D	00000169	000F47F0	00000842	00000854	00000071
(2240)	00001A87	00000169	000F4807	00000810	000007A1	00000071	00001840	00000169	000F481F	0000052D
(2280)	0000057E	00000072	0000116D	00000169	000F4836	000003F5	000003CF	00000072	00000C0E	00000168

(2320)	00000018	000F484D	00000374	000003E9	00000072	00000C5D	00000168	000F4865	00000693	0000066D
(2360)	00000072	00001445	00000168	000F4876	00000876	0000082B	00000072	000019B9	00000168	000F488D
(2400)	00000888	000008A6	00000073	00001B31	00000168	000F48A4	00000C8D	00000865	00000073	00001A56
(2440)	00000168	000F48BB	0000081D	00000852	00000073	00001A10	00000168	000F48D2	0000083E	000007E3
(2480)	00000073	000018A9	00000168	000F48E9	000006ED	0000072B	00000073	0000165D	00000168	000F4900
(2520)	000006AE	0000066D	00000073	00001403	00000168	000F4917	00000582	000005A8	00000074	00001195
(2560)	00000167	000F492E	000004AF	00000475	00000074	00000DD5	00000167	000F4945	000002D8	000002F7
(2600)	00000074	00000930	00000167	000F495C	000001D3	000001CD	00000074	00000591	00000167	000F4973
(2640)	00000114	0000010F	00000074	00000345	00000167	000F498A	00000CB5	000000DE	00000075	000002AC
(2680)	00000167	000F49A1	000001B5	000001A1	00000075	000005C1	00000167	000F49B8	00000342	00000370
(2720)	00000075	00000A8D	00000167	000F49CF	00000618	000005CD	00000075	000011C5	00000167	000F49E6
(2760)	0000068C	00000670	00000075	000013AE	00000167	000F49FC	00000647	00000672	00000075	000013AC
(2800)	00000166	000F4A13	00000763	0000072C	00000076	000015D7	00000166	000F4A2A	000006C1	000006DA
(2840)	00000076	000014D5	00000166	000F4A41	00000751	0000076B	00000076	00001682	00000166	000F4A58
(2880)	0000086E	000007EE	00000076	00001804	00000166	00000018	000F4A6F	00000566	000005B9	00000076
(2920)	0000114E	00000166	000F4A86	000004F1	0000051A	00000077	00000F66	00000165	000F4A9D	000006E0
(2960)	000006A3	00000077	000013FE	00000166	000F4AB4	0000063D	00000625	00000077	0000127B	00000166
(3000)	000F4ACB	000004B2	000004E4	00000077	00000EAF	00000166	000F4AE1	000004E8	000004CE	00000077
(3040)	00000E66	00000165	000F4AF8	00000534	00000560	00000077	00001012	00000165	000F4B0F	00000580
(3080)	00000525	00000078	00000F5B	00000165	000F4B26	0000048D	0000050B	00000078	00000F08	00000165
(3120)	000F4B3D	0000066A	000005E4	00000078	00001185	00000165	000F4B53	000005CA	0000052A	00000078
(3160)	00000F56	00000165	000F4B6A	0000037B	00000372	00000078	00000A35	00000165	000F4B81	0000027A
(3200)	00000283	00000079	0000076F	00000165	000F4B98	000001D8	000001ED	00000079	000005B0	00000165
(3240)	000F4BAF	00000222	00000213	00000079	0000061F	00000165	000F4BC6	000001C8	000001AA	00000079
(3280)	000004E6	00000164	000F4BDD	000000B1	000000E9	00000079	000002AD	00000164	000F4BF4	000000FD
(3320)	000000E0	00000079	00000290	00000164	000F4C0B	00000101	00000131	0000007A	0000037E	00000164
(3360)	000F4C21	00000220	00000214	0000007A	00000614	00000164	000F4C38	00000356	00000358	0000007A
(3400)	000009C1	00000164	000F4C4F	0000048B	0000048A	0000007A	00000D37	00000164	000F4C66	0000057D
(3440)	0000055C	0000007A	00000F95	00000164	000F4C7D	0000057A	00000586	0000007B	00001008	00000164
(3480)	00000018	000F4C93	000005A2	00000595	0000007B	0000102B	00000164	000F4CAA	000005AF	000005BC
(3520)	0000007B	00001095	00000163	000F4CC1	00000657	00000662	0000007B	0000126E	00000163	000F4CD8
(3560)	0000076A	00000748	0000007B	000014FC	00000163	000F4CEF	0000076B	0000075F	0000007B	00001536
(3600)	00000163	000F4D06	00000711	00000727	0000007C	000014E9	00000163	000F4D1D	0000070F	00000702
(3640)	0000007C	00001417	00000163	000F4D33	0000077B	000007A5	0000007C	000015E0	00000163	000F4D4A
(3680)	0000086D	000007EA	0000007C	0000169C	00000163	000F4D61	00000552	00000590	0000007C	00000FDC
(3720)	00000163	000F4D78	0000037D	000003C5	0000007D	00000ABB	00000163	000F4D8F	0000059A	000005B0
(3760)	0000007D	0000102A	00000163	000F4DA5	00000815	000007A6	0000007D	000015B5	00000162	000F4DBC
(3800)	00000639	00000621	0000007D	0000115D	00000162	000F4DD3	0000049F	0000052E	0000007D	00000EA6
(3840)	00000162	000F4DEA	00000721	000006B1	0000007D	000012E5	00000162	000F4E01	00000844	000008C5
(3880)	0000007E	000018B5	00000162	000F4E18	00000B15	00000A4C	0000007E	00001CF8	00000162	000F4E2F
(3920)	000009F7	00000A84	0000007E	00001D8A	00000162	000F4E45	00000AC8	00000A48	0000007E	00001CD3
(3960)	00000162	000F4E5C	00000984	000009C8	0000007E	00001B61	00000162	000F4E73	000008A4	00000844
(4000)	0000007F	00001718	00000162	000F4E8A	00000596	000005BB	0000007F	00000FFC	00000162	000F4EA1
(4040)	0000032A	00000357	0000007F	0000094D	00000161	00000018	000F4EB8	00000365	00000397	0000007F
(4080)	000009FB	00000161	000F4ECF	00000512	000004E1	0000007F	00000D8B	00000161	000F4EE5	000005AD
(4120)	000005BD	0000007F	00000FE6	00000161	000F4EFC	000005D3	00000575	00000080	00000F19	00000161
(4160)	000F4F13	0000037D	000003B3	00000080	00000A36	00000161	000F4F2A	0000020B	00000204	00000080
(4200)	00000590	00000161	000F4F41	000001A4	000001F2	00000080	0000055B	00000161	000F4F58	0000037A
(4240)	0000035F	00000080	00000943	00000161	000F4F6F	0000058D	000005AA	00000081	00000F89	00000161
(4280)	000F4F85	0000074D	000006F3	00000081	00001309	00000161	000F4F9C	00000734	00000793	00000081
(4320)	000014B5	00000161	000F4FB3	000008C5	0000086E	00000081	00001703	00000160	000F4FCA	000008C2
(4360)	0000090A	00000081	000018A1	00000160	000F4FE1	000009CA	00000987	00000081	000019EC	00000160
(4400)	000F4FF8	0000093D	0000092C	00000082	000018E8	00000160	000F500F	0000076B	0000075F	00000082
(4440)	000013FD	00000160	000F5026	000004CE	000004BB	00000082	00000CCD	00000160	000F503D	00000232
(4480)	00000287	00000082	000006D6	00000160	000F5054	00000247	00000227	00000082	000005D0	00000160
(4520)	000F506B	00000285	000002C6	00000083	00000778	00000160	000F5082	000003F1	000003DB	00000083
(4560)	00000A5F	00000160	000F5099	00000677	000006CD	00000083	00001241	00000160	000F50B0	00000A02
(4600)	00000946	00000083	000018DA	0000015F	000F50C7	000008AA	00000919	00000083	00001857	0000015F
(4640)	00000018	000F50DD	000008E3	000008A2	00000083	0000170F	0000015F	000F50F4	00000919	00000969
(4680)	00000084	00001918	0000015F	000F510B	00000AB7	00000A5F	00000084	00001B5E	0000015F	000F5122
(4720)	0000099B	0000098B	00000084	0000195F	0000015F	000F5139	00000832	00000896	00000084	000016C9
(4760)	0000015F	000F5150	000009C1	00000971	00000084	00001905	0000015F	000F5167	00000997	000009BE
(4800)	00000085	000019C6	0000015F	000F517E	0000096C	0000092D	00000085	0000183C	0000015F	000F5195
(4840)	000007AF	000007CD	00000085	00001492	0000015F	000F51AC	0000066C	0000066C	00000085	000010E7
(4880)	0000015F	000F51C3	000005B5	000005A4	00000085	00000ED4	0000015E	000F51DA	00000370	00000371
(4920)	00000086	00000907	0000015E	000F51F2	000002F6	000003B8	00000086	000009BD	0000015E	000F5209

(4960)	0000085C	000007B5	00000086	00001429	0000015E	000F521F	0000095A	0000096E	00000086	000018A0
(5000)	0000015E	000F5237	00000946	00000938	00000086	00001809	0000015E	000F524E	00000995	00000997
(5040)	00000086	000018F7	0000015E	000F5265	00000A0B	00000A27	00000087	00001A63	0000015E	000F527C
(5080)	00000AA7	00000A6B	00000087	00001B07	0000015E	000F5293	00000A06	00000A5A	00000087	00001AD1
(5120)	0000015E	000F52AA	00000BC4	00000B98	00000087	00001DFD	0000015E	000F52C1	00000C3A	00000C15
(5160)	00000087	00001F33	0000015C	000F52D9	00000AAD	00000AB7	00000088	00001B9F	0000015D	000F52EF
(5200)	000009FA	00000A0C	00000088	000019DC	0000015D	00000018	000F5307	00000920	000008F6	00000088
(5240)	00001706	0000015D	000F531E	0000081E	000008A0	00000088	00001621	0000015D	000F5335	00000AFF
(5280)	00000A93	00000088	00001B17	0000015D	000F534C	00000AEC	00000AF2	00000088	00001BFD	0000015D
(5320)	000F5363	00000AD8	00000B0A	00000089	00001C2F	0000015D	000F537A	00000CC2	00000B84	00000089
(5360)	00001D5D	0000015D	000F5391	00000A20	00000A89	00000089	00001AD2	0000015D	000F53A8	00000A82
(5400)	00000A2E	00000089	000019DE	0000015D	000F53BF	000009A3	000009C5	00000089	000018CB	0000015D
(5440)	000F53D7	00000951	0000092C	0000008A	0000173F	0000015C	000F53EE	00000833	000007FD	0000008A
(5480)	00001435	0000015C	000F5406	00000547	0000058B	0000008A	00000E00	0000015C	000F541D	0000057C
(5520)	000005A7	0000008A	00000E41	0000015C	000F5434	0000076D	00000715	0000008A	000011D4	0000015C
(5560)	000F544C	000006EE	00000713	0000008A	000011C6	0000015C	000F5463	00000721	000006EE	0000008B
(5600)	00001163	0000015C	000F547A	000006F0	0000071D	0000008B	000011D2	0000015C	000F5491	00000762
(5640)	00000744	0000008B	0000122E	0000015C	000F54A9	000008A2	000008F5	0000008B	0000165E	0000015C
(5680)	000F54C0	00000B51	00000AB1	0000008B	00001AAA	0000015C	000F54D8	00000A0B	00000A51	0000008C
(5720)	000019AE	0000015C	000F54EF	00000967	00000949	0000008C	00001715	0000015B	000F5506	000009CB
(5760)	00000A20	0000008C	00001920	0000015B	000F551D	00000CE2	00000C9F	0000008C	00001F45	0000015B

EOJ STOP REQUESTED IN FILE 1

EOJ DUMP STOPPED AFTER FILE 1 # OF PERMANENT READ ERRORS 0

START TIME 03/22/90 07:33:58 STOP TIME 03/22/90 07:34:15

$$

OAO 3

FAR UV SPECTRA COPERNICUS

72-065A-01H ASUV-00003

In 2004, this data set was updated with an ASCII version copied from the Astronomical Data Center (ADC) archives. The original data had been restored to tape written in ASCII. The data set has been processed to one CD-Write Once containing 63 files. File 1 contains the source reference, brief description of catalog, file summary and format description. File 2 contains the condensed catalog data and file 3 contains the basic data of observed stars. Files 4 - 63 contain the Catalog of 0.2-A Resolution Far-Ultraviolet Stellar Spectra Measured with Copernicus.

KD#	KW#	VOLUME	FILES	
KD021462	KW000174	Far_UV_Spectra	1	readme.txt
			2	catalog.ori
			3	stars.dat
			4 - 63	*.dat

```
      Copernicus 0.2-A Resolution Far-UV Stellar Spectra (Snow+ 1977)
================================================================================
A Catalog of 0.2-A Resolution Far-Ultraviolet Stellar Spectra
Measured with Copernicus
    Snow Jr. T.P., Jenkins E.B.
   <Astrophys. J. Suppl. 33, 269 (1977)>
   =1977ApJS...33..269S
================================================================================
ADC_Keywords: Spectrophotometry; Spectra, ultraviolet
Mission_Name: Copernicus

Description:
    The catalog is a subset comprising data for 60 O- and B-type stars
    observed by the Copernicus satellite. For each star a FITS file was
    created of the observed spectrum. Each spectrum has 2250 photometric
    data points. The wavelength range is from 1000 to 1450 Angstroems in
    0.2-Angstrom steps. The data were acquired with photomultiplier U2,
    which had a nominal bandpass of 0.2 Angstrom (A) and scanned the
    spectrum with a 0.2 A step length, integrating for 13.6 sec at each
    wavelength position.

File Summary:
--------------------------------------------------------------------------------
 FileName      Lrecl   Records    Explanations
--------------------------------------------------------------------------------
readme.txt       80          .    This file
catalog.ori     120       9060    Condensed catalog data
stars.dat        88         60    Basic data of observed stars
zet_pup.dat      42       2250    Spectrum of Zeta Pup
9_sgr.dat        42       2250    Spectrum of  9 Sgr
29_cma.dat       42       2250    Spectrum of 29 CMa
hd199579.dat     42       2250    Spectrum of HD 199579
15_mon.dat       42       2250    Spectrum of 15 Mon
th1ori_c.dat     42       2250    Spectrum of Theta 1 Ori C
xi_per.dat       42       2250    Spectrum of Xi Per
la_ori_a.dat     42       2250    Spectrum of Lambda Ori A
tau_cma.dat      42       2250    Spectrum of Tau CMa
iot_ori.dat      42       2250    Spectrum of Iota Ori
10_lac.dat       42       2250    Spectrum of 10 Lac
alp_cam.dat      42       2250    Spectrum of Alpha Cam
de_ori_a.dat     42       2250    Spectrum of Delta Ori A
zet_oph.dat      42       2250    Spectrum of Zeta Oph
mu_col.dat       42       2250    Spectrum of Mu Col
mu_nor.dat       42       2250    Spectrum of Mu Nor
ze_ori_a.dat     42       2250    Spectrum of Zeta Ori A
eps_ori.dat      42       2250    Spectrum of Epsilon Ori
tau_sco.dat      42       2250    Spectrum of Tau Sco
kap_ori.dat      42       2250    Spectrum of Kappa Ori
eps_per.dat      42       2250    Spectrum of Epsilon Per
del_sco.dat      42       2250    Spectrum of Delta Sco
th_car.dat       42       2250    Spectrum of Theta Car
rho_leo.dat      42       2250    Spectrum of Rho Leo
gam_ara.dat      42       2250    Spectrum of Gamma Ara
zet_per.dat      42       2250    Spectrum of Zeta Per
139_tau.dat      42       2250    Spectrum of 139 Tau
bet_cma.dat      42       2250    Spectrum of Beta CMa
be_cen_a.dat     42       2250    Spectrum of Beta Cen A
```

```
sig_sco.dat       42       2250    Spectrum of Sigma Sco
omi_per.dat       42       2250    Spectrum of Omicron Per
40_per.dat        42       2250    Spectrum of 40 Per
alp_vir.dat       42       2250    Spectrum of Alpha Vir
42_ori.dat        42       2250    Spectrum of 42 Ori
pi_sco.dat        42       2250    Spectrum of Pi Sco
lam_sco.dat       42       2250    Spectrum of Lambda Sco
eps_cma.dat       42       2250    Spectrum of Epsilon CMa
gam_peg.dat       42       2250    Spectrum of Gamma Peg
ups_sco.dat       42       2250    Spectrum of Upsilon Sco
zet_cen.dat       42       2250    Spectrum of Zeta Cen
sig_sgr.dat       42       2250    Spectrum of Sigma Sgr
alp_pav.dat       42       2250    Spectrum of Alpha Pav
om_2_cma.dat      42       2250    Spectrum of Omicron2 CMa
iot_her.dat       42       2250    Spectrum of Iota Her
eta_uma.dat       42       2250    Spectrum of Eta UMa
hd21278.dat       42       2250    Spectrum of HD 21278
eta_cma.dat       42       2250    Spectrum of Eta CMa
67_oph.dat        42       2250    Spectrum of 67 Oph
del_per.dat       42       2250    Spectrum of Delta Per
zet_dra.dat       42       2250    Spectrum of Zeta Dra
alp_col.dat       42       2250    Spectrum of Alpha Col
eta_tau.dat       42       2250    Spectrum of Eta Tau
phi_eri.dat       42       2250    Spectrum of Phi Eri
alp_gru.dat       42       2250    Spectrum of Alpha Gru
alp_leo.dat       42       2250    Spectrum of Alpha Leo
be_ori_a.dat      42       2250    Spectrum of Beta Ori A
20_tau.dat        42       2250    Spectrum of 20 Tau
bet_lib.dat       42       2250    Spectrum of Beta Lib
alp_lyr.dat       42       2250    Spectrum of Alpha Lyr
alp_cma.dat       42       2250    Spectrum of Alpha CMa A
--------------------------------------------------------------------------------

See also:
  http://iuewww.gsfc.nasa.gov/copernicus/oao3.html : data in FITS

Byte-by-byte Description of file: stars.dat
--------------------------------------------------------------------------------
   Bytes Format Units   Label     Explanations
--------------------------------------------------------------------------------
   1- 12  A12   ---     FileName  Name of file (in this directory) with spectrum
  14- 17  I4    ---     HR        Harvard Revised (Bright Star) number (1)
  20- 29  A10   ---     Name      Current designation of the star (1)
  32- 37  I6    ---     HD        Henry Draper (cat. <III/135>) designation (1)
  40- 41  I2    h       RAh       Right Ascension J2000 (hours) (1)
  43- 44  I2    min     RAm       Right Ascension J2000 (minutes) (1)
  46- 49  F4.1  s       RAs       Right Ascension J2000 (seconds) (1)
      51  A1    ---     DE-       Declination J2000 (sign) (1)
  52- 53  I2    deg     DEd       Declination J2000 (degrees) (1)
  55- 56  I2    arcmin  DEm       Declination J2000 (minutes) (1)
  58- 59  I2    arcsec  DEs       Declination J2000 (seconds) (1)
  61- 65  F5.2  mag     Vmag      Visual magnitude (1)
  67- 71  F5.2  mag     B-V       Colour index (1)
  74- 88  A15   ---     SpType    Spectral type (1)
--------------------------------------------------------------------------------
Note (1): These values were extracted from the Bright Star Catalog,
     5th Revised Edition by D. Hoffleit and W. Warren H. Jr, 1991,
```

Byte-by-byte Description of file: zet_pup.dat, 9_sgr.dat, 29_cma.dat
Byte-by-byte Description of file: xi_per.dat, hd199579.dat, 15_mon.dat
Byte-by-byte Description of file: th1ori_c.dat, la_ori_a.dat, tau_cma.dat
Byte-by-byte Description of file: iot_ori.dat, 10_lac.dat, alp_cam.dat
Byte-by-byte Description of file: de_ori_a.dat, zet_oph.dat, mu_col.dat
Byte-by-byte Description of file: mu_nor.dat, ze_ori_a.dat, eps_ori.dat
Byte-by-byte Description of file: tau_sco.dat, kap_ori.dat, eps_per.dat
Byte-by-byte Description of file: del_sco.dat, th_car.dat
Byte-by-byte Description of file: rho_leo.dat, gam_ara.dat, zet_per.dat
Byte-by-byte Description of file: 139_tau.dat, bet_cma.dat, be_cen_a.dat
Byte-by-byte Description of file: sig_sco.dat, omi_per.dat
Byte-by-byte Description of file: 40_per.dat, alp_vir.dat, 42_ori.dat
Byte-by-byte Description of file: pi_sco.dat, lam_sco.dat, eps_cma.dat
Byte-by-byte Description of file: gam_peg.dat, ups_sco.dat
Byte-by-byte Description of file: zet_cen.dat, sig_sgr.dat, alp_pav.dat
Byte-by-byte Description of file: om_2_cma.dat, iot_her.dat, eta_uma.dat
Byte-by-byte Description of file: hd21278.dat, eta_cma.dat
Byte-by-byte Description of file: 67_oph.dat, del_per.dat, zet_dra.dat
Byte-by-byte Description of file: alp_col.dat, eta_tau.dat, phi_eri.dat
Byte-by-byte Description of file: alp_gru.dat, alp_leo.dat
Byte-by-byte Description of file: be_ori_a.dat, 20_tau.dat, bet_lib.dat

Byte-by-byte Description of file: alp_lyr.dat, alp_cma.dat

Bytes	Format	Units	Label	Explanations
2- 7	F6.2	nm	wave	[100/145] Wavelength in nm
9- 14	I6	0.0714/s	S	? average corrected signal counts per 14 seconds
16- 17	I2	---	o_S	[0/10]? number of observations per wavelength point
19- 20	I2	---	ERR	Error Flag: 1 = good; 0 = blank data; -1 = S negative; -2 = OBS = zero; -3 = OBS overflow OBS > 9, data lost
22- 31	E10.3	---	COUNTS	*?=-9.990E+01 uncorrected count rate
33- 42	E10.3	---	e_COUNTS	*?=-9.990E+01 noise in observed counts

Note on COUNTS, e_COUNTS:
From these two numbers we can estimate the noise in the spectrum, i.e., (COUNTS/N_S)**(1/2), where COUNTS ~= 1.5*S + 40 (Bohlin 1975), is the total observed (namely, uncorrected) count rate. This was done for the good data points.

Brief description of catalog.ori:

If space is at a premium, the original data file prepared by the ADC is still available. All the spectra, including the number of observations, are in this file. The format of the file is a block of 151 records for each object:

Record 1 contains the object identification in the first 16 bytes.
Records 2-151 contain the spectral data, 15 data points per record.
Each data point consists of two numbers and is of the form:

```
    S/Obs == Average Corrected Signal/Number of Observations,

    in format (I6,1H/,I1) or blank.
    Note that S is the corrected signal in counts per 14s and that Obs is
    the number of observations that were averaged together to determine S.

    From these two numbers we can estimate the noise in the spectrum,
    i.e., (S'/Obs)**(1/2), where S' ~= 1.5*S + 40 (Bohlin 1975), is the
    total observed (namely, uncorrected) count rate.

    If a data point is blank, it was deleted from the originally published
    results because of an obvious flaw attributable to guidance errors or
    to overcorrection or undercorrection for particle background. Since
    data fields can contain blanks and zeroes (see the data tables and
    associated graphical spectra in Snow and Jenkins 1977) which indicate
    that they should not be used, the 'number of observations' field must
    be checked for zero before using a data point.

Historical Notes:
  * A magnetic tape containing the far-ultraviolet spectral data was
    received from Dr. Edward B. Jenkins in June 1979. This tape was
    formatted as a print tape having the record structure and spacing of
    the printed pages in the Snow and Jenkins (1977) paper. Due to
    programming complications arising from the original format, which
    contains blank lines and data fields for many stars within each
    logical record, it was decided to rewrite the tape to a more suitable
    format for data analysis and plotting purposes. Thus, the tape was
    converted at the Astronomical Data Center to the format contained in
    the previous catalog data, catalog.ori, where the data fields and
    slash characters remain identical to those used in the published
    tables. One more reformatting round was done to bring the data format
    in line with other standardized catalogs. This work was started by J.
    Lyu and completed by P. Kuin. An error in the number of observations
    field, that was allowed only one character during the previous
    reformatting, was found. There appears to have been a number of data
    points with more than 9 observations. These numbers were lost. For the
    reformatted files the number has been set to 10 and an error flag has
    been added to identify the record. The data were converted by P. Kuin
    into separate files that can be easily converted to the FITS format
    using the tofits program.
  * 20-May-1998: the file "stars.dat" containing basic data of the
    observed stars was added at CDS (F. Ochsenbein)
```

```
Acknowledgments:
  The original ADC documentation by William T. Sheridan and Wayne H.
  Warren Jr. (1981) and the ApJS publication (Snow and Jenkins, 1977)
  were used to generate this ReadMe file.
```


```
References:
  Bohlin, R.C. 1975, ApJ, 200, 402. (1975ApJ...200..402B)
```

```
================================================================================
(End)           Paul Kuin [Hughes STX/NASA]                          07-Aug-1997
```

OAO 3

BETA ORIONIS UV SPECTRAL ATLAS

72-065A-01I ASUV-00002

This data set has been updated with a FITS formatted version obtained from the Multimission Archive at STScI (MAST). There was originally one 9-track, 1600 bpi, EBCDIC and Binary formatted tape. The data set has been processed to one CD-Write Once containing 3 files; file 1 is the 2nd order continuum and estimated scattered light, file 2 is the first order continuum and estimated scattered light and file 3 contains the data set description documentation.

KD#	KW#	VOLUME	
KD021294	KW000164	Beta_Orionis_UV	File 1 betaori1.fts File 2 betaori2.fts File 3 readme.txt

```
SIMPLE  =                    T / True fits records follow
BITPIX  =                    8 / Bits per pixel
NAXIS   =                    0 / No data array present
EXTEND  =                    T / There may be standard extensions
SPACECRF= 'OAO-3   '           / Spacecraft name
TELESCOP= 'COPERNICUS'         / Telescope name
INSTRUME= 'PASCHEN-RUNGE SPECTROMETER' / Instrument name
FILENAME= 'BETAORI1.FTS'       / File name
HD-NUM  =                34085 / Henry Draper Catalog Number
OBJECT  = 'BETA ORI A'         / Object Name
RA-DEGS =            78.634580 / Right Ascension in degrees
DEC-DEGS=           -8.2016665 / Declination in degrees
EQUINOX =               2000.0 / Coordinate system epoch
SPECTYPE= 'B8Ia:   '           / Spectral Type and Luminosity Class
V-MAG   =                 0.12 / Apparent Visual Magnitude
M-MAG   =                -7.10 / Absolute Visual Magnitude
EBV     =                0.000 / Color Excess
B-V     =               -0.030 / B-V Color Index
VSINI   =                   33 / Rotational Velocity (km/sec)
VSTARYBS=                20.70 / YBS Catalog Radial Velocity (km/sec)
VSTAR   =                20.70 / PUO Radial Velocity (km/sec)
ISM-VEL =                18.30 / Interstellar Velocity (km/sec)
LSR-VEL =               -18.11 / LSR Velocity Correction (km/sec)
DISTANCE=                  232 / Distance (parsecs)
ORIGIN  = 'NASA/GSFC'          / Institution generating file
DATE    = '01/08/95'           / Date this file was created

COMMENT  The Second Order Continuum and Estimated Scattered Light
COMMENT  for Beta Orionis (999.3 - 1420.2 Angstroms)
COMMENT
COMMENT  The spectral region from 999 - 1420.2 Angstroms was scanned with
COMMENT  the U1 detector in second order, which has a resolution of 0.05
COMMENT  Angstroms. The data were obtained between 1974 December 3 - 17
COMMENT  with a short observation on 1975 January 19.
COMMENT
COMMENT  See "THE COPERNICUS ULTRAVIOLET SPECTRAL ATLAS OF BETA ORIONIS."
COMMENT  John B. Rogerson, jr. and Walter L. Upson II:  Astrophysical
COMMENT  Journal Supplement Series, Volume 49, Number 3, July, 1982.
COMMENT
COMMENT  The variables in the binary table are defined (after proper scaling)
COMMENT  as follows:
COMMENT        WAVE: the wavelength in Angstroms,
COMMENT      COUNTS: the corrected count rate (the scattered light has not
COMMENT              been removed),
COMMENT    CNTS_SMT: the smoothed corrected count rate (the scattered light
COMMENT              has not been removed),
COMMENT     SCATTER: the scattered light estimate,
COMMENT    CNTS_NRM: the normalized smoothed count rate,
COMMENT    SCT_NORM: the normalized scattered light estimate.
END
```

```
SIMPLE  =                    T / True fits records follow
BITPIX  =                    8 / Bits per pixel
NAXIS   =                    0 / No data array present
EXTEND  =                    T / There may be standard extensions
SPACECRF= 'OAO-3   '           / Spacecraft name
TELESCOP= 'COPERNICUS'         / Telescope name
INSTRUME= 'PASCHEN-RUNGE SPECTROMETER' / Instrument name
FILENAME= 'BETAORI2.FTS'       / File name
HD-NUM  =                34085 / Henry Draper Catalog Number
OBJECT  = 'BETA ORI A'         / Object Name
RA-DEGS =            78.634580 / Right Ascension in degrees
DEC-DEGS=           -8.2016665 / Declination in degrees
EQUINOX =               2000.0 / Coordinate system epoch
SPECTYPE= 'B8Ia:   '           / Spectral Type and Luminosity Class
V-MAG   =                 0.12 / Apparent Visual Magnitude
M-MAG   =                -7.10 / Absolute Visual Magnitude
EBV     =                0.000 / Color Excess
B-V     =               -0.030 / B-V Color Index
VSINI   =                   33 / Rotational Velocity (km/sec)
VSTARYBS=                20.70 / YBS Catalog Radial Velocity (km/sec)
VSTAR   =                20.70 / PUO Radial Velocity (km/sec)
ISM-VEL =                18.30 / Interstellar Velocity (km/sec)
LSR-VEL =               -18.11 / LSR Velocity Correction (km/sec)
DISTANCE=                  232 / Distance (parsecs)
ORIGIN  = 'NASA/GSFC'          / Institution generating file
DATE    = '01/08/95'           / Date this file was created

COMMENT  The Continuum and Estimated Scattered Light
COMMENT  for Beta Orionis
COMMENT
COMMENT  The spectral region from 1416.5 - 1561.1 Angstroms was scanned
COMMENT  with the U1 detector in first order at a resolution of 0.1
COMMENT  Angstroms.
COMMENT
COMMENT  See "THE COPERNICUS ULTRAVIOLET SPECTRAL ATLAS OF BETA ORIONIS."
COMMENT  John B. Rogerson, JR. and Walter L. Upson II:  Astrophysical
COMMENT  Journal Supplement Series, Volume 49, number 3, July, 1982.
COMMENT
COMMENT  The variables in the binary table (after proper scaling) are
COMMENT  defined as follows :
COMMENT        WAVE: the wavelength in Angstroms,
COMMENT      COUNTS: the corrected count rate (the scattered light has
COMMENT              not been removed),
COMMENT    CNTS_SMT: the smoothed corrected count rate (the scattered
COMMENT              light has not been removed),
COMMENT     SCATTER: the scattered light estimate,
COMMENT    CNTS_NRM: the normalized smoothed count rate,
COMMENT     SCT_NRM: the normalized scattered light estimate.
END
```

OAO 3

UV SPECTRAL ATLAS OF BETA ORIONIS

72-065A-01I

The data of this data set are contained on 3 files of one 9 track, 1600 BPI, EBCDIC & BINARY formatted tape. It was created on the IBM 360 computer. The program for reading the tape is located in file 3, and is written in EBCDIC. Due to the type of data, no time span is available. The D & C numbers are as follows:

D-71562	C-26686

12-065A-01I

Princeton University Observatory PEYTON HALL

PRINCETON, NEW JERSEY 08544

April 26, 1982

Mr. Ralph Post
Code 601
Goddard Space Flight Center
Greenbelt, MD 20771

Dear Mr. Post:

Under separate cover, I am mailing to you a package as a submittal to the National Space Science Data Center. This represents the data for "The Copernicus Ultraviolet Spectral Atlas of Beta Orionis", by John B. Rogerson, Jr. and Walter L. Upson II to be published in the Astrophysical Journal Supplement Series, Volume 49, Number 3, July 1982. The paper concludes by saying that the Atlas will be available on tape from the NSSDC.

The package contains a 9 track 1600 BPI tape of the data as well as a printout of some of the tape. The tape was written on an IBM 3033 computer and contains 3 files: (1) the second order spectrum, (2) the first order spectrum, and (3) a program to read the tape. The blocking of the files and the format of the data should be readily deduced from the enclosed printout. Except for the data, the tape is in all respects the same as that sent to you in March 1980 containing "The Copernicus Ultraviolet Spectral Atlas of Iota Herculis".

If you have any problems or questions, please contact me.

Sincerely yours,

John B. Rogerson, Jr.

John B. Rogerson, Jr.

JBR:ejj

72-065A-01 I

THESE ARE THE SECOND ORDER DATA FOR BETA ORIONIS READ OFF THE DATA TAPE.

FILE # 1	READ #	1 N = 24															
999.281	23.1	22.2	16.3	0.064	0.047	999.304	22.9	23.7	16.3	0.069	0.047	999.327	24.6	25.7	16.4	0.074	0.047
999.350	26.1	28.0	16.4	0.081	0.047	999.373	35.4	30.0	16.5	0.087	0.048	999.396	30.7	31.3	16.5	0.090	0.048
999.419	40.2	31.5	16.6	0.091	0.048	999.442	8.7	30.4	16.6	0.087	0.048	999.465	34.2	29.8	16.7	0.085	0.048
999.488	49.7	31.3	16.7	0.090	0.048	999.511	22.5	36.2	16.8	0.104	0.048	999.534	43.8	44.3	16.8	0.127	0.048
999.557	57.2	55.1	16.9	0.157	0.048	999.580	80.8	67.2	16.9	0.192	0.048	999.603	62.8	78.5	17.0	0.223	0.048
999.626	80.4	85.8	17.0	0.244	0.048	999.649	95.9	87.7	17.1	0.249	0.048	999.672	88.8	84.2	17.1	0.239	0.048
999.695	63.6	77.5	17.2	0.219	0.049	999.718	86.3	69.8	17.2	0.197	0.049	999.741	56.7	62.9	17.3	0.177	0.049
999.764	49.6	57.2	17.3	0.161	0.049	999.787	64.6	52.9	17.4	0.149	0.049	999.811	41.3	49.8	17.4	0.140	0.049
FILE # 1	READ #	21 N = 24															
1010.296	41.8	37.1	22.5	0.060	0.037	1010.319	39.8	37.9	22.5	0.061	0.037	1010.341	39.7	38.8	22.6	0.063	0.037
1010.363	23.2	39.9	22.6	0.065	0.037	1010.386	63.1	41.2	22.6	0.067	0.037	1010.409	43.4	42.7	22.7	0.069	0.037
1010.432	29.8	43.7	22.7	0.071	0.037	1010.455	48.1	44.6	22.8	0.072	0.037	1010.477	54.4	45.8	22.8	0.074	0.037
1010.500	46.7	48.4	22.9	0.078	0.037	1010.523	39.3	54.1	22.9	0.087	0.037	1010.546	71.6	64.1	22.9	0.103	0.037
1010.569	93.5	78.9	23.0	0.127	0.037	1010.592	102.7	98.3	23.0	0.158	0.037	1010.615	97.8	120.4	23.1	0.193	0.037
1010.638	143.3	143.0	23.1	0.229	0.037	1010.660	167.0	163.0	23.1	0.261	0.037	1010.683	188.5	178.0	23.2	0.285	0.037
1010.705	184.4	187.0	23.2	0.299	0.037	1010.728	167.9	189.5	23.3	0.302	0.037	1010.751	219.8	186.3	23.3	0.297	0.037
1010.774	170.2	179.2	23.3	0.285	0.037	1010.797	149.9	169.8	23.4	0.270	0.037	1010.819	157.9	159.3	23.4	0.253	0.037
FILE # 1	READ #	41 N = 24															
1021.240	49.5	58.1	27.8	0.062	0.030	1021.263	64.6	57.7	27.7	0.062	0.030	1021.287	58.8	58.4	27.7	0.063	0.030
1021.310	75.9	60.9	27.7	0.065	0.030	1021.333	54.7	64.2	27.7	0.069	0.030	1021.355	73.7	67.4	27.7	0.072	0.030
1021.379	54.4	70.4	27.7	0.075	0.029	1021.402	73.1	72.3	27.7	0.077	0.029	1021.425	86.1	73.3	27.7	0.078	0.029
1021.448	67.8	74.5	27.6	0.079	0.029	1021.471	77.2	76.3	27.6	0.081	0.029	1021.493	75.8	78.5	27.6	0.083	0.029
1021.517	88.8	81.6	27.6	0.087	0.029	1021.539	95.8	85.4	27.6	0.091	0.029	1021.563	79.8	89.3	27.6	0.095	0.029
1021.586	71.8	92.3	27.6	0.098	0.029	1021.608	95.3	94.2	27.6	0.100	0.029	1021.631	118.7	96.0	27.6	0.102	0.029
1021.654	104.2	97.4	27.6	0.103	0.029	1021.677	89.7	99.5	27.6	0.105	0.029	1021.700	104.1	102.0	27.5	0.108	0.029
1021.723	97.3	104.8	27.5	0.110	0.029	1021.744	102.0	107.7	27.5	0.113	0.029	1021.766	114.3	111.4	27.5	0.117	0.029
FILE # 1	READ #	61 N = 24															
1032.089	73.5	82.5	33.1	0.064	0.025	1032.112	89.3	80.8	33.1	0.062	0.025	1032.135	69.7	77.5	33.1	0.060	0.025
1032.158	82.5	73.4	33.1	0.056	0.025	1032.180	56.4	70.1	33.1	0.054	0.025	1032.203	77.9	69.4	33.1	0.053	0.025
1032.226	67.0	71.7	33.1	0.055	0.025	1032.248	88.1	76.6	33.2	0.059	0.025	1032.271	72.1	82.4	33.2	0.063	0.025
1032.294	86.1	87.4	33.2	0.067	0.025	1032.316	85.8	90.9	33.2	0.070	0.025	1032.338	111.6	93.2	33.2	0.071	0.025
1032.361	96.9	96.2	33.2	0.074	0.025	1032.384	87.9	101.9	33.2	0.078	0.025	1032.407	114.0	113.0	33.2	0.086	0.025
1032.429	132.8	130.7	33.2	0.100	0.025	1032.452	141.9	155.7	33.2	0.119	0.025	1032.475	202.4	188.2	33.2	0.144	0.025
1032.498	241.5	228.1	33.3	0.174	0.025	1032.520	277.1	274.5	33.3	0.209	0.025	1032.543	303.4	326.0	33.3	0.248	0.025
1032.566	385.0	380.3	33.3	0.290	0.025	1032.589	413.1	433.5	33.3	0.330	0.025	1032.611	497.9	480.6	33.3	0.366	0.025
FILE # 1	READ #	81 N = 24															
1042.938	598.1	564.8	37.5	0.335	0.022	1042.960	583.6	606.5	37.5	0.359	0.022	1042.983	635.8	644.5	37.5	0.381	0.022
1043.005	680.1	672.9	37.5	0.398	0.022	1043.028	687.3	687.8	37.6	0.407	0.022	1043.051	711.9	687.0	37.6	0.406	0.022
1043.073	631.9	671.6	37.6	0.397	0.022	1043.096	665.6	645.4	37.6	0.381	0.022	1043.119	615.5	614.1	37.6	0.362	0.022
1043.141	560.7	583.8	37.6	0.344	0.022	1043.164	593.8	559.9	37.6	0.330	0.022	1043.186	523.4	547.6	37.6	0.323	0.022
1043.209	576.7	545.0	37.6	0.321	0.022	1043.231	524.7	550.8	37.7	0.324	0.022	1043.254	559.9	558.9	37.7	0.329	0.022
1043.277	561.4	563.3	37.7	0.331	0.022	1043.300	560.4	559.6	37.7	0.329	0.022	1043.322	555.7	546.4	37.7	0.321	0.022
1043.345	506.3	524.2	37.7	0.308	0.022	1043.368	536.8	498.2	37.7	0.293	0.022	1043.390	448.1	472.9	37.7	0.278	0.022
1043.413	459.3	453.7	37.7	0.266	0.022	1043.435	443.4	442.0	37.7	0.259	0.022	1043.458	428.3	438.8	37.8	0.257	0.022
FILE # 1	READ #	101 N = 24															
1053.705	1156.6	1125.6	43.0	0.554	0.021	1053.727	1146.3	1157.1	43.0	0.569	0.021	1053.749	1171.6	1212.0	43.0	0.596	0.021
1053.771	1298.7	1280.0	43.0	0.629	0.021	1053.793	1369.5	1341.4	43.0	0.659	0.021	1053.816	1356.4	1373.5	43.1	0.675	0.021
1053.839	1328.6	1360.0	43.1	0.668	0.021	1053.861	1325.0	1295.0	43.1	0.636	0.021	1053.884	1208.0	1186.2	43.1	0.582	0.021
1053.906	1018.0	1048.8	43.1	0.514	0.021	1053.928	919.0	902.1	43.1	0.442	0.021	1053.951	786.2	764.3	43.1	0.375	0.021
1053.973	606.1	647.9	43.1	0.317	0.021	1053.995	519.7	557.8	43.1	0.273	0.021	1054.018	553.7	493.5	43.1	0.242	0.021
1054.040	471.4	449.9	43.1	0.220	0.021	1054.062	427.1	420.4	43.1	0.206	0.021	1054.084	364.1	399.1	43.1	0.195	0.021
1054.107	354.4	381.6	43.1	0.187	0.021	1054.129	377.2	365.6	43.1	0.179	0.021	1054.151	361.3	350.9	43.1	0.171	0.021
1054.174	356.5	337.9	43.1	0.165	0.021	1054.196	324.2	328.0	43.1	0.160	0.021	1054.219	318.2	321.9	43.1	0.157	0.021
FILE # 1	READ #	121 N = 24															

72-065A-01 I

THESE ARE THE DATA FOR TEE FIRST ORDER SPECTRUM OF BETA ORIONIS.

FILE # 2 READ # 1 N = 24																	
1416.514	1518.5	1419.8	102.3	0.694	0.050	1416.567	1346.9	1326.5	102.3	0.649	0.050	1416.620	1221.3	1250.4	102.3	0.612	0.050
1416.673	1108.0	1194.1	102.3	0.584	0.050	1416.726	1154.0	1172.5	102.3	0.574	0.050	1416.779	1232.4	1194.7	102.2	0.585	0.050
1416.832	1330.4	1244.4	102.2	0.609	0.050	1416.885	1235.0	1275.0	102.2	0.624	0.050	1416.938	1236.3	1254.5	102.2	0.614	0.050
1416.991	1109.0	1179.4	102.2	0.578	0.050	1417.044	1118.3	1062.2	102.2	0.520	0.050	1417.097	957.1	923.3	102.2	0.452	0.050
1417.150	773.8	793.8	102.1	0.389	0.050	1417.203	718.1	706.1	102.1	0.346	0.050	1417.255	654.2	673.1	102.1	0.330	0.050
1417.308	691.7	688.9	102.1	0.338	0.050	1417.360	731.7	744.7	102.1	0.365	0.050	1417.413	827.7	830.2	102.1	0.407	0.050
1417.465	923.6	924.9	102.1	0.454	0.050	1417.519	1017.0	995.4	102.0	0.488	0.050	1417.572	1014.7	1012.8	102.0	0.497	0.050
1417.625	970.4	981.2	102.0	0.481	0.050	1417.678	922.9	936.5	102.0	0.459	0.050	1417.731	933.3	929.8	102.0	0.456	0.050
FILE # 2 READ # 21 N = 24																	
1441.800	895.0	898.9	92.7	0.497	0.051	1441.852	911.4	962.0	92.7	0.533	0.051	1441.904	1022.8	1045.5	92.6	0.579	0.051
1441.958	1163.2	1120.9	92.6	0.621	0.051	1442.010	1246.8	1170.4	92.5	0.649	0.051	1442.063	1124.9	1188.2	92.5	0.659	0.051
1442.116	1151.2	1181.9	92.4	0.656	0.051	1442.168	1164.1	1162.7	92.4	0.645	0.051	1442.221	1152.2	1139.4	92.4	0.632	0.051
1442.274	1122.9	1119.5	92.3	0.622	0.051	1442.327	1123.3	1109.9	92.3	0.617	0.051	1442.379	1107.4	1116.9	92.2	0.621	0.051
1442.433	1151.5	1146.2	92.2	0.637	0.051	1442.485	1175.7	1191.8	92.1	0.663	0.051	1442.538	1207.6	1235.4	92.1	0.687	0.051
1442.590	1268.8	1249.7	92.0	0.696	0.051	1442.643	1234.8	1215.0	92.0	0.677	0.051	1442.696	1184.8	1134.5	91.9	0.632	0.051
1442.748	977.7	1036.6	91.9	0.578	0.051	1442.802	923.6	965.7	91.8	0.538	0.051	1442.854	988.1	958.3	91.8	0.534	0.051
1442.907	1025.0	1024.1	91.7	0.571	0.051	1442.959	1162.8	1143.0	91.7	0.638	0.051	1443.013	1305.8	1275.2	91.6	0.712	0.051
FILE # 2 READ # 41 N = 24																	
1466.951	963.3	946.9	76.5	0.655	0.053	1467.003	855.5	873.6	76.4	0.604	0.053	1467.056	782.1	781.9	76.4	0.541	0.053
1467.109	674.7	684.3	76.3	0.474	0.053	1467.161	642.0	603.6	76.3	0.418	0.053	1467.207	540.4	566.5	76.3	0.393	0.053
1467.266	589.4	587.2	76.2	0.407	0.053	1467.318	649.0	657.7	76.2	0.456	0.053	1467.371	738.9	749.7	76.2	0.521	0.053
1467.423	855.1	825.0	76.1	0.573	0.053	1467.476	835.7	851.8	76.1	0.592	0.053	1467.528	826.5	818.4	76.0	0.569	0.053
1467.581	734.3	736.7	76.0	0.513	0.053	1467.633	620.7	635.6	76.0	0.443	0.053	1467.687	587.4	556.4	75.9	0.388	0.053
1467.739	493.4	530.9	75.9	0.370	0.053	1467.792	571.6	575.4	75.9	0.401	0.053	1467.844	698.5	681.1	75.8	0.475	0.053
1467.896	851.3	820.6	75.7	0.573	0.053	1467.948	901.2	958.5	75.7	0.670	0.053	1468.000	1098.8	1065.6	75.6	0.745	0.053
1468.053	1101.3	1129.6	75.6	0.790	0.053	1468.105	1148.3	1157.1	75.5	0.810	0.053	1468.157	1197.5	1160.5	75.4	0.813	0.053
FILE # 2 READ # 61 N = 24																	
1492.017	710.2	659.0	52.9	0.622	0.050	1492.070	733.6	746.0	52.9	0.705	0.050	1492.122	846.9	847.1	52.8	0.801	0.050
1492.175	959.9	930.1	52.8	0.880	0.050	1492.227	928.7	964.9	52.7	0.914	0.050	1492.279	938.1	935.6	52.7	0.887	0.050
1492.332	839.6	847.9	52.7	0.804	0.050	1492.384	762.1	725.6	52.6	0.689	0.050	1492.433	587.5	597.5	52.6	0.567	0.050
1492.482	478.6	487.2	52.5	0.463	0.050	1492.530	401.1	405.2	52.5	0.385	0.050	1492.579	348.2	350.4	52.5	0.333	0.050
1492.628	315.4	315.0	52.4	0.300	0.050	1492.677	302.2	298.7	52.4	0.285	0.050	1492.726	310.8	307.3	52.4	0.293	0.050
1492.774	354.8	347.1	52.3	0.331	0.050	1492.823	405.0	419.6	52.3	0.401	0.050	1492.872	490.8	513.3	52.2	0.491	0.050
1492.920	632.5	607.0	52.2	0.581	0.050	1492.969	680.7	680.6	52.2	0.651	0.050	1493.023	737.5	721.5	52.2	0.691	0.050
1493.075	702.4	734.7	52.1	0.704	0.050	1493.127	734.5	733.0	52.1	0.703	0.050	1493.179	745.0	732.2	52.1	0.703	0.050
FILE # 2 READ # 81 N = 24																	
1516.946	399.2	364.0	34.1	0.521	0.049	1516.998	360.0	352.1	34.1	0.505	0.049	1517.050	333.0	356.1	34.0	0.511	0.049
1517.102	388.5	376.6	34.0	0.541	0.049	1517.154	408.8	406.3	34.0	0.584	0.049	1517.206	419.0	436.2	33.9	0.628	0.049
1517.258	478.3	460.1	33.9	0.663	0.049	1517.310	466.2	478.6	33.9	0.690	0.049	1517.363	483.0	495.7	33.9	0.716	0.049
1517.414	547.7	514.6	33.8	0.744	0.049	1517.466	538.9	535.6	33.8	0.775	0.049	1517.519	529.6	551.7	33.8	0.799	0.049
1517.571	528.1	556.2	33.7	0.806	0.049	1517.623	592.2	546.4	33.7	0.793	0.049	1517.676	514.9	525.5	33.7	0.763	0.049
1517.728	493.5	502.6	33.7	0.731	0.049	1517.780	517.2	485.5	33.6	0.707	0.049	1517.832	432.1	479.6	33.6	0.699	0.049
1517.885	496.6	484.1	33.6	0.706	0.049	1517.937	499.9	496.1	33.5	0.724	0.049	1517.990	530.1	511.5	33.5	0.747	0.049
1518.042	515.8	526.2	33.5	0.770	0.049	1518.094	530.5	538.1	33.5	0.788	0.049	1518.145	555.3	546.9	33.5	0.802	0.049
FILE # 2 READ # 101 N = 24																	
1541.765	268.2	274.3	20.8	0.655	0.050	1541.817	278.3	272.7	20.8	0.652	0.050	1541.869	274.3	278.3	20.8	0.666	0.050
1541.921	294.3	288.1	20.8	0.690	0.050	1541.972	275.5	297.0	20.7	0.712	0.050	1542.023	320.9	299.0	20.7	0.718	0.050
1542.075	280.7	291.6	20.7	0.701	0.050	1542.127	291.6	276.0	20.7	0.664	0.050	1542.178	238.6	256.6	20.6	0.618	0.050
1542.229	244.1	239.7	20.6	0.578	0.050	1542.281	234.4	228.7	20.6	0.552	0.050	1542.333	222.7	224.1	20.6	0.541	0.050
1542.384	211.5	223.6	20.5	0.541	0.050	1542.436	238.3	224.8	20.5	0.544	0.050	1542.487	236.3	226.5	20.5	0.549	0.050
1542.539	209.5	231.6	20.5	0.562	0.050	1542.590	246.9	242.4	20.4	0.589	0.050	1542.641	261.9	259.2	20.4	0.630	0.050
1542.693	282.9	278.7	20.4	0.679	0.050	1542.745	286.0	295.9	20.4	0.721	0.050	1542.796	326.6	305.3	20.3	0.745	0.050
1542.849	279.0	304.5	20.3	0.744	0.050	1542.900	304.6	293.7	20.3	0.718	0.050	1542.951	285.8	277.5	20.3	0.679	0.050

FINISHED FILE 2 WITH 116 RECORDS.

72-065A-01 I
Program 1

THIS IS THE TAPE READING PROGRAM.

```
* C
* C
* C     THIS PROGRAM IS INTENDED TO SERVE AS AN EXAMPLE FOR READING THE DATA
* C     TAPE FOR "THE COPERNICUS ULTRAVIOLET SPECTRAL ATLAS OF BETA ORIONIS."
* C     JOHN B. ROGERSON, JR. AND WALTER L. UPSON II:  ASTROPHYSICAL JOURNAL
* C     SUPPLEMENT SERIES, VOLUME 49, NUMBER 3, JULY, 1982.
* C
* C     THE TAPE IS NINE-TRACK, 1600 BPI
* C
* C
* C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* C
* C
* C     THE TAPE CONTAINS THREE FILES.  FILE ONE IS THE SECOND ORDER SPECTRUM
* C     AND FILE NUMBER TWO IS THE FIRST ORDER SPECTRUM.
* C     FILE THREE IS THIS PROGRAM.
* C
* C
* C     THE FOLLOWING DIMENSION STATEMENTS DEFINE THE VARIABLES NEEDED FOR BOTH
* C     READING THE TAPE AND WRITING OUT UNSCALED NUMBERS.
* C
*       DIMENSION IW(24),IC(24),ICS(24),ISL(24),ICSN(24),ISLN(24)
*       DIMENSION W(24),C(24),CS(24),SL(24),CSN(24),SLN(24)
* C
* C
* C     THIS DIMENSION STATEMENT IS FOR READING THE PROGRAM STORED ON FILE THREE
* C
* C
*       DIMENSION CHAR(20)
* C
* C
* C     THE FOLLOWING FORMAT IS USED FOR BOTH FILES.  NOTE THAT THIS AMOUNTS TO A
* C     BINARY READ OF THE DATA.  ALL THE VARIABLES STORED ON THE TAPE ARE 4 BYTE
* C     INTEGERS (INTEGER*4)
* C     - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
* C     ALTHOUGH THIS FORM FOR TAPE DATA SEEMS SOMEWHAT ARTIFICIAL, IT IS USED TO
* C     MAKE THE TAPE READABLE FOR AS MANY USERS AS POSSIBLE EVEN THOUGH THERE IS
* C     A SLIGHT INCREASE IN COMPLEXITY IN THE READING PROGRAM TO RETURN THE DATA
* C     TO THEIR ORIGINAL STATE.
* C
*   601 FORMAT(145A4)
* C
* C
* C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* C
* C     FILE NUMBER ONE -- THE SECOND ORDER SPECTRUM.
* C
* C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* C
* C
* C     THE VARIABLES IN FILE ONE ARE DEFINED AS FOLLOWS:
* C         N:  THE NUMBER OF SETS OF DATA IN THE FOLLOWING READ
* C         IW:  THE INTEGERIZED WAVELENGTH IN MILLI-ANGSTROMS.
* C         IC:  THE CORRECTED COUNT RATE MULTIPLIED BY 10.0 AND INTEGERIZED.
* C              THE SCATTERED LIGHT HAS NOT BEEN REMOVED FROM IC.
* C         ICS:  THE SMOOTHED CORRECTED COUNT RATE MULTIPLIED BY 10.0 AND
* C              INTEGERIZED. THE SCATTERED LIGHT HAS NOT BEEN REMOVED FORM ICS.
* C         ISL:  THE SCATTERED LIGHT ESTIMATE (SEE SL DISCUSSED AFTER STATEMENT
* C               NUMBER 101 BELOW) MULTIPLIED BY 10.0 AND INTEGERIZED.
* C         ICSN:  THE NORMALIZED SMOOTHED COUNT RATE (SEE CSN DISCUSSED AFTER
```

-01 I
Program p. 2

```
      C                STATEMENT 101 BELOW) MULTIPLIED BY 10000.0 AND INTEGERIZED.
      C         ISLN:  THE NORMALIZED SCATTERED LIGHT ESTIMATE (SEE SLN DISCUSSED AFTER
      C                STATEMENT 101 BELOW) MULTIPLIED BY 10000.0 AND INTEGERIZED.
      C
      C       - - - - - - - - - - - - - - - - - - - - - - - - -
      C
      C       THIS PROGRAM RESTORES THE VARIABLES TO THEIR PROPER FORM AND ORDER OF
      C       MAGNITUDE BEFORE PRINTING OUT THE DATA.  NOTE THE SCALE FACTORS PRESENT
      C       IN THE CONVERSION STATEMENTS.
      C       THE VARIABLES PRINTED OUT ARE THE SAME AS IN THE ATLAS.  THEY ARE
      C       DISCUSSED BELOW WITH THE WRITE STATEMENT.
      C
      C
              WRITE(6,610)
          610 FORMAT(1H1,//,'       THESE ARE THE SECOND ORDER DATA FOR BETA ORIO
             @NIS READ OFF THE DATA TAPE.'//)
      C
      C
      C       NOW WE MUST DO REPEATED READS OF THE FILE TO OBTAIN ALL THE DATA.  EACH
      C       READ OBTAINS "N" SETS OF DATA WHERE 'N' IS ALWAYS = 24 EXCEPT FOR THE
      C       LAST SET OF DATA.
      C
      C       THE COUNTERS IFILE AND NREAD ARE FOR BOOKKEEPING PURPOSES ONLY AND ARE
      C       NOT NECESSARY FOR READING THE TAPE.
      C
              IFILE = 1
              NREAD = 0
          100 CONTINUE
              READ(10,601,END=500)  N,(IW(I),IC(I),ICS(I),ISL(I),ICSN(I),ISLN(I),
             A    I=1,N)
              NREAD = NREAD + 1
      C
      C
      C       THIS LOOP CONVERTS THE SCALED AND INTEGERIZED NUMBERS ON TAPE FILE ONE
      C       BACK TO THEIR CORRECT FORM AND MAGNITUDE.
      C
      C
              DO 101 J=1,N
              W(J) = IW(J)/1000.0
              C(J) = IC(J)/10.0
              CS(J)  = ICS(J)/10.0
              SL(J)  = ISL(J)/10.0
              CSN(J)  = ICSN(J)/10000.0
              SLN(J)  = ISLN(J)/10000.0
          101 CONTINUE
      C
      C
      C       THE VARIABLES PRINTED OUT HAVE THE FOLLOWING MEANINGS AND ARE IN DIRECT
      C       AGREEMENT WITH THE NUMBERS USED IN PREPARING AND PRESENTING THE ATLAS
      C
      C          W:   THE WAVELENGTH IN ANGSTROMS OF A DATA POINT.
      C          C:   THE CORRECTED COUNT RATE FOR THAT WAVELENGTH POINT.
      C               THE SCATTERED LIGHT HAS NOT BEEN REMOVED FROM C.
      C          CS:   THE SMOOTHED COUNT RATE COMPUTED AT THAT WAVELENGTH POINT USING
      C                A FOURIER SMOOTHER DESCRIBED IN THE PAPER.  THE SCATTERED LIGHT
      C                HAS NOT BEEN REMOVED FROM CS.
      C          SL:   THE SCATTERED LIGHT ESTIMATE DERIVED BY ROGERSON AND UPSON AND
      C               DESCRIBED IN DETAIL IN THE PAPER.
      C          CSN:   THE NORMALIZED SMOOTHED COUNT RATES AS DISPLAYED IN THE ATLAS
      C                WITH UNITY AT THE TOP OF EACH PLOT.
```

-81 I
program p. 3

```
C
      DO 201 J=1,N
      W(J) = IW(J)/1000.0
      C(J) = IC(J)/10.0
      CS(J)  = ICS(J)/10.0
      SL(J)  = ISL(J)/10.0
      CSN(J)  = ICSN(J)/10000.0
      SLN(J)  = ISLN(J)/10000.0
  201 CONTINUE
C
C
C     THIS WRITE STATEMENT GENERATES NUMBERS WITH THE SAME MEANING FOR FILE TWO
C     AS THE WRITE STATEMENT ABOVE DOES FOR FILE ONE. AGAIN FOR THE PURPOSES OF
C     THIS EXAMPLE, ONLY EVERY TWENTIETH RECORD IS PRINTED AS IN FILE ONE
C
C
      IF(MOD(NREAD,20).EQ.1)
     *WRITE(6,605) IFILE,NREAD,N,(W(I),C(I),CS(I),SL(I),CSN(I),SLN(I),
     A    I=1,N)
      GO TO 200
  501 CONTINUE
      WRITE(6,622) IFILE,NREAD
C
C
C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C
C     FILE NUMBER THREE -- CONTAINS THIS PROGRAM TO READ THE TAPE.
C     NOTE THAT THE PROGRAM IS STORED IN STANDARD IBM ALPHA-NUMERIC FORMAT
C     WHICH MAY MAKE IT DIFFICULT TO OBTAIN FROM THE TAPE ON SOME MACHINES
C
C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
C
C
C
      IFILE = 3
      NREAD = 0
      WRITE(6,614)
  614 FORMAT(1H1,'  THIS IS THE TAPE READING PROGRAM.')
  300 CONTINUE
      READ(10,612,END=502) CHAR
  612 FORMAT(20A4)
      NREAD = NREAD + 1
      WRITE(6,613) NREAD,CHAR
  613 FORMAT(10X,I5,' * ',20A4,' *')
      GO TO 300
  502 CONTINUE
      WRITE(6,622) IFILE,NREAD
      STOP
      END
C//GO.FT10F001 DD DSN=COPER.NICUS.BETA.ORIONIS.ORDERTWO.SPECTRUM,
C//    LABEL=(1,BLP),DISP=(OLD,KEEP),UNIT=TAPE9,VOL=SER=1869,
C//    DCB=(RECFM=FB,LRECL=580,BLKSIZE=5800,DEN=3)
C//GO.FT10F002 DD DSN=COPER.NICUS.BETA.ORIONIS.ORDERONE.SPECTRUM,
C//    LABEL=(2,BLP),DISP=(OLD,KEEP),UNIT=TAPE9,VOL=SER=1869,
C//    DCB=(RECFM=FB,LRECL=580,BLKSIZE=5800,DEN=3)
C//GO.FT10F003 DD DSN=COPER.NICUS.BETA.ORIONIS.TAPEREAD.PROGRAM,
C//    LABEL=(3,BLP),DISP=(OLD,KEEP),UNIT=TAPE9,VOL=SER=1869,
C//    DCB=(RECFM=FB,LRECL=80,BLKSIZE=4800,DEN=3)
FINISHED FILE   3  WITH    236  RECORDS.
```

-01 I
program p. 4

```
* C        SLN:  SL NORMALIZED USING THE SAME NORMALIZATION FACTORS AS WERE USED   *
* C                ON CS ABOVE TO COMPUTE CSN.                                      *
* C                                                                                 *
* C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *    *
* C                                                                                 *
* C                                                                                 *
* C      FOR THE PURPOSES OF THIS EXAMPLE, WE WRITE ONLY EVERY TWENTIETH RECORD     *
* C      OBVIOUSLY, THE MODULUS CONTROL OF THE WRITE STATEMENT BELOW MUST BE        *
* C      REMOVED TO OBTAIN ALL THE DATA ON THE TAPE.                                *
* C                                                                                 *
* C                                                                                 *
* C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *    *
* C                                                                                 *
* C                                                                                 *
*        IF (MOD (NREAD,20).EQ.1)                                                   *
*       *WRITE(6,605) IFILE,NREAD,N,(W(I),C(I),CS(I),SL(I),CSN(I),SLN(I),          *
*       A   I=1,N)                                                                  *
*    605 FORMAT('  FILE # ',I1,'  READ # ',I4,'  N = ',I3,                          *
*       A   /,(3(F11.3,2F7.1,F6.1,2F6.3)))                                          *
* C      IF(NREAD.GT.5) STOP                                                  KO C *
*        GO TO 100                                                                  *
*    500 CONTINUE                                                                   *
*        WRITE(6,622) IFILE,NREAD                                                   *
*    622 FORMAT('   FINISHED FILE ',I3,'  WITH ',I6,'  RECORDS.')                   *
* C                                                                                 *
* C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *    *
* C                                                                                 *
* C      FILE NUMBER TWO -- THE FIRST ORDER SPECTRUM                                *
* C                                                                                 *
* C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *    *
* C                                                                                 *
* C      THE VARIABLES IN FILE TWO HAVE THE SAME MEANING AS IN FILE ONE             *
* C                                                                                 *
* C      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *    *
* C                                                                                 *
* C                                                                                 *
* C                                                                                 *
*        WRITE(6,611)                                                               *
*    611 FORMAT(1H1,//,'       THESE ARE THE DATA FOR THE FIRST ORDER SPECTR        *
*       @UM OF BETA ORIONIS.'//)                                                    *
* C                                                                                 *
* C                                                                                 *
* C      NOW WE MUST DO REPEATED READS OF THE FILE TO OBTAIN ALL THE DATA.  EACH    *
* C      READ OBTAINS "N" SETS OF DATA WHERE 'N' IS ALWAYS = 24 EXCEPT FOR THE      *
* C      LAST SET OF DATA.                                                          *
* C                                                                                 *
* C      THE COUNTERS IFILE AND NREAD ARE FOR BOOKKEEPING PURPOSES ONLY AND ARE     *
* C      NOT NECESSARY FOR READING THE TAPE.                                        *
* C                                                                                 *
*        IFILE = 2                                                                  *
*        NREAD = 0                                                                  *
*    200 CONTINUE                                                                   *
*        READ(10,601,END=501) N,(IW(I),IC(I),ICS(I),ISL(I),ICSN(I),ISLN(I),        *
*       A   I=1,N)                                                                  *
*        NREAD = NREAD + 1                                                          *
* C                                                                                 *
* C                                                                                 *
* C      THIS LOOP CONVERTS THE SCALED AND INTEGERIZED NUMBERS ON TAPE FILE TWO     *
* C      BACK TO THEIR CORRECT FORM AND MAGNITUDE.                                  *
* C                                                                                 *
```

```
DATA IGNORED
$NOP
$NOP
$NOP
$NOP ***************** LIST OF DAWNOUT1 *******************
$EXE TPLIST BS

INPUT PARAMETERS ARE:  ED SR=1=4 1 1 3

TAPE NO.   1                FILE NO.   3
RECORD   1                  LENGTH   4800
C                                                                          C
                                                  C      THIS PROGRAM IS INTENDED TC SERV
E AS AN EXAMPLE FOR READING THE DATA        C      TAPE FOR "THE COPERNICUS ULTRAVIOLET SPECTRAL ATLAS
OF BETA ORIONIS."       C      JOHN B. ROGERSON, JR. AND WALTER L. UPSON II:  ASTROPHYSICAL JOURNAL
    C        SUPPLEMENT SERIES, VOLUME 49, NUMBER 3, JULY, 1982.                 C
                                                             C      THE TAPE IS NINE-TRACK, 1600
BPI                                          C
                          C
      C     * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * C
                                                             C
                                              C      THE TAPE CONTAINS THREE FILES.  FILE ONE IS
THE SECOND ORDER SPECTRUM      C      AND FILE NUMBER TWO IS THE FIRST ORDER SPECTRUM.
          C      FILE THREE IS THIS PROGRAM.                                      C
                                                                 C
                                                 C      THE FOLLOWING DIMENSION STATEMENTS DEFI
NE THE VARIABLES NEEDED FOR BOTH    C      READING THE TAPE AND WRITING OUT UNSCALED NUMBERS.
                     C
   DIMENSION IW(24),IC(24),ICS(24),ISL(24),ICSN(24),ISLN(24)                    DIMENSION W(24),
C(24),CS(24),SL(24),CSN(24),SLN(24)                         C
                                      C
                      C      THIS DIMENSION STATEMENT IS FOR READING THE PROGRAM STORED ON FILE THREE
C                                                                      C
                                                              DIMENSION CHAR(20)
                                         C
                        C
    C      THE FOLLOWING FORMAT IS USED FOR BOTH FILES.  NOTE THAT THIS AMOUNTS TO A C      BINARY R
EAD OF THE DATA.  ALL THE VARIABLES STORED ON THE TAPE ARE 4 BYTE C      INTEGERS (INTEGER*4)
                                           C  - - - - - - - - - - - - - - - -
  - - - - - - - - - - - - C      ALTHOUGH THIS FORM FOR TAPE DATA SEEMS SOMEWHAT ARTIFICIAL, IT IS
USED TO C      MAKE THE TAPE READABLE FOR AS MANY USERS AS POSSIBLE EVEN THOUGH THERE IS C      A SL
IGHT INCREASE IN COMPLEXITY IN THE READING PROGRAM TO RETURN THE DATA C      TC THEIR ORIGINAL STATE
.                                            C
                                  601 FORMAT(145A4)
               C                                                                 C
                                                                C      * * * * * * * * * *
 * * * * * * * * * * * * * * * * * * * * * * * * * * C
                                   C      FILE NUMBER ONE -- THE SECOND ORDER SPECTRUM.
                   C                                                                 C
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * C
                                                     C      THE VARIABLES IN FILE ONE ARE DEFI
NED AS FOLLOWS:                        C      N:  THE NUMBER CF SETS OF DATA IN THE FOLLOWING RE
AD                     C      IW:  THE INTEGERIZED WAVELENGTH IN MILLI-ANGSTROMS.
 C         IC:  THE CORRECTED COUNT RATE MULTIPLIED BY 10.0 AND INTEGERIZED.      C          THE
SCATTERED LIGHT HAS NOT BEEN REMOVED FROM IC.           C      ICS:  THE SMOOTHED CORRECTE
D COUNT RATE MULTIPLIED BY 10.0 AND        C      INTEGERIZED. THE SCATTERED LIGHT HAS NOT
BEEN REMOVED FORM ICS.    C      ISL:  THE SCATTERED LIGHT ESTIMATE (SEE SL DISCUSSED AFTER STATEM
ENT   C         NUMBER 101 BELOW) MULTIPLIED BY 10.0 AND INTEGERIZED.       C          ICSN
:  THE NORMALIZED SMOOTHED COUNT RATE (SEE CSN DISCUSSED AFTER      C          STATEMENT 101 BE
LOW) MULTIPLIED BY 1 000.0 AND INTEGERIZED.

TAPE NO.   1                FILE NO.   3
RECORD   2                  LENGTH   4800
C       ISLN:  THE NORMALIZED SCATTERED LIGHT ESTIMATE (SEE SLN DISCUSSED AFTERC          STA
TEMENT 101 BELOW) MULTIPLIED BY 1000.0 AND INTEGERIZED.     C
                                        C  - - - - - - - - - - - - - - - - -
```

OAO 3
UV ATLAS OF BETA ORIONIS
72-065A-01I

OAO 3

UV ATLAS OF GAMMA PEGASI

72-065A-01K ASUV-00015

The data of this data set are contained on 3 files of one 9 track, 1600 BPI, ASCII formatted tape. It was created on the VAX 8200 computer. The documentation is contained on file 3. Due to the type of data no time span is available. The D & C numbers are as follows:

D-76347 C-26668

UV ATLAS OF SIRIUS

72-065A-01L ASUV-00026

The data of this data set are contained on 7 files of one 9 track, 1600 BPI, ASCII formatted tape. It was created on the VAX 8200 computer. The documentation is contained in file 1. Due to the type of data no time span is available. The D & C numbers are as follows:

D-76348 C-26669

'70 - 9021 - 0 -

This file describes how to read the data tape for "The Copernicus Ultraviolet Spectral Atlas of Sirius", by John B. Rogerson, Jr.: Astrophysical Journal Supplement Series, Volume 63, number 2, February, 1987.

The tape is nine-track, 1600 bpi, and written in ascii by a UNIX operating system on a VAX 8200. Each record is terminated by a newline character whose ascii decimal code is 10. Physical tape records are blocked to 512 bytes.

The tape contains seven files. File 1 is this description file. file 2 contains the counts for the vacuum spectrum, file 3 contains the normalizing continuum and the scattered light values for the vacuum spectrum, file 4 contains the identification table for the vacuum spectrum, file 5 contains the counts for the air spectrum, file 6 contains the normalizing continuum and the scattered light values for the air spectrum, and file 7 contains the identification table for the air spectrum.

* *

File number one -- the ascii version of this printout.

* *

The records of file 1 are of variable length and terminated by the newline character, as noted above.

There are 170 records in file 1.

* *

File number two -- the vacuum spectrum.

* *

The variables in file 2 have the following meanings and are in direct agreement with the numbers used in preparing and presenting the atlas.

- w: The wavelength in angstroms of a data point.
- c: The corrected count rate for that wavelength point. (The scattered light has not been removed from c.)
- cns: The corrected count normalized and smoothed for plotting in the vacuum atlas.

- -

Each record of file 2 contains 21 bytes. The variables w,c, and cns are written with the fortran format, (1x,f8.3,i6,f6.3).

There are 7119 21-byte records in file 2.

* *

File number three -- the normalizing continuum and estimated scattered values for the vacuum spectrum.

* *

sln: The scattered light estimate, sl, normalized using the same normalization factors as were used on cs to compute csn.

\- -

Each record of file 2 contains 37 bytes. The variables w,c,sl,cn and sln are written with the fortran format, (1x,f8.3,2f7.1,2f7.4)

There are 1609 37-byte records in file 2.

* *

File number three -- the ascii version of this printout.

* *

The records of file 3 are of variable length and terminated by the newline character, as noted above.

There are 76 records in file 3.

The variables in file 3 have the following meaning;

- w: Wavelength values to specify the location of the values for the normalizing continuum and the estimated scattered light.
- nc: Normalizing continuum values on the same scale as "c" in file 2.
- sc: Scattered light estimate on the same scale as "c" in file 2.

- -

Each record of file 3 contains 17 bytes. The variables w,nc, and sc are written with the fortran format, (1x,i4,1x,i6,1x,i4).

There are 74 17-byte records in file 3.

* *

File number four -- the identification table for the vacuum spectrum.

* *

The variables in file 4 have the following meanings:

- wo: The observed wavelength in Angstroms.
- wl: The laboratory wavelength in Angstroms.
- ci: The line central intensity as it appears in the atlas.
- elt: The element associated with the "wl" line.
- ion: The ionization level of "elt".
- mult: The multiplet number associated with the "wl" line.
- S: The computed line center strength index as described in Ap.J.Suppl.58,265,1985.
- rem: The remark code for the suggested identification -- see the Sirius Atlas paper for code meanings.

- -

Each record of file 4 contains 42 bytes. The variables wo,wl,ci,elt, ion,mult,S,and rem are written with the fortran format, (a8,a8,a4,a3,a4,a7,a5,a3).

There are 1351 42-byte records in file 4.

* *

File number five -- the air spectrum.

* *

The variables in file 5 have the following meanings and are in direct agreement with the numbers used in preparing and presenting the atlas.

- w: The wavelength in angstroms of a data point.
- c: The corrected count rate for that wavelength point. (The scattered light has not been removed from c.)
- cns: The corrected count normalized and smoothed for plotting in the air atlas.

- -

Each record of file 5 contains 21 bytes. The variables w,c, and cns are written with the fortran format, (1x,f8.3,i6,f6.3).

There are 28062 21-byte records in file 5.

* *

File number six -- the normalizing continuum and estimated scattered values for the air spectrum.

* *

The variables in file 6 have the following meaning;

w: Wavelength values to specify the location of the values for the normalizing continuum and the estimated scattered light.
nc: Normalizing continuum values on the same scale as "c" in file 5.
sc: Scattered light estimate on the same scale as "c" in file 5.

- -

Each record of file 6 contains 17 bytes. The variables w,nc, and sc are written with the fortran format, (1x,i4,1x,i6,1x,i4).

There are 236 17-byte records in file 6.

* *

File number seven -- the identification table for the air spectrum.

* *

The variables in file 7 have the following meanings:

wo: The observed wavelength in Angstroms.
wl: The laboratory wavelength in Angstroms.
ci: The line central intensity as it appears in the atlas.
elt: The element associated with the "wl" line.
ion: The ionization level of "elt".
mult: The multiplet number associated with the "wl" line.
S: The computed line center strength index as described in Ap.J.Suppl.58,265,1985.
rem: The remark code for the suggested identification -- see the Sirius Atlas paper for code meanings.

- -

Each record of file 7 contains 42 bytes. The variables wo,wl,ci,elt, ion,mult,S,and rem are written with the fortran format, (a8,a8,a4,a3,a4,a7,a5,a3).

There are 4089 42-byte records in file 7.

72-065A-01K

This file describes how to read the data tape for
"the Copernicus Ultraviolet Atlas of Gamma Pegasi", by
John B. Rogerson, Jr.: Astrophysical Journal Supplement Series
Volume 57, number 4, April, 1985.

The tape is nine-track, 1600 bpi, and written in ascii by a UNIX operating system on a VAX 8200. Each record is terminated by a newline character whose ascii decimal code is 10. Physical tape records are blocked to 512 bytes.

The tape contains three files. File 1 is the second-order spectrum, file 2 is the first-order spectrum and file 3 is this description file.

* *

File number one -- the second-order spectrum. 969.932-1430.177 Ang.

* *

The variables in file 1 have the following meanings and are in direct agreement with the numbers used in preparing and presenting the atlas.

- w: The wavelength in angstroms of a data point.
- c: The corrected count rate for that wavelength point. (The scattered light has not been removed from c.)
- cs: The corrected count rate as smoothed using the Fourier smoother described in the paper.
- sl: The scattered light estimate.
- csn: The smoothed count rate, cs, normalized as described in the paper.
- sln: The scattered light estimate, sl, normalized using the same normalization factors as were used on cs to compute csn.

- -

Each record of file 1 contains 44 bytes. The variables w,c,cs,sl,csn and sln are written with the fortran format, (1x,f8.3,3f7.1,2f7.4)

There are 21699 records in file 1.

* *

File number two -- the first order spectrum. 1417.040-1501.398 Ang.

* *

The variables in file 2 have the following meanings and are in direct agreement with the numbers used in preparing and presenting the atlas.

- w: The wavelength in angstroms of a data point.
- c: The corrected count rate for that wavelength point. (The scattered light has not been removed from c.)
- sl: The scattered light estimate.
- cn: The corrected count rate, c, normalized as described in the paper.

OAO 3

UV ATLAS OF VEGA

72-065A-01M ASUV-00054

This data set has been updated with a FITS formatted version obtained from the Multimission Archive at STScI (MAST). There was originally one 9-track, 1600 bpi, ASCII formatted tape created on a VAX 8200 computer. The data set has been processed to one CD-Write Once containing 5 files; file 1 contains the air spectrum, file 2 is the normalization continuum and estimated scattered light, file 3 contains the equivalent flux values in 20 A intervals in ergs/cm^2/s/A, file 4 contains the table of line identifications, and file 5 contains the data set description documentation.

KD#	KW#	VOLUME	
KD021297	KW000167	UV_Atlas_Vega	File 1 alphalr2.fts*
			File 2 alphalr3.fts*
			File 3 alphalr4.fts*
			File 4 alphalr5.fts*
			File 5 readme.txt

*In order to meet the ISSO 9660 file naming requirements the file names on the CD-Write Once differ from the original file names recorded in the FITS headers.

```
SIMPLE  =                    T / True fits records follow
BITPIX  =                    8 / Bits per pixel
NAXIS   =                    0 / No data array present
EXTEND  =                    T / There may be standard extensions
SPACECRF= 'OAO-3   '           / Spacecraft name
TELESCOP= 'COPERNICUS'         / Telescope name
INSTRUME= 'PASCHEN-RUNGE SPECTROMETER' / Instrument name
FILENAME= 'ALPHALYR2.FTS'      / File name
HD-NUM  =               172167 / Henry Draper Catalog Number
OBJECT  = 'ALPHA LYR'          / Object Name
RA-DEGS =            279.23459 / Right Ascension in degrees
DEC-DEGS=            38.783611 / Declination in degrees
EQUINOX =               2000.0 / Coordinate system epoch
SPECTYPE= 'A0Va    '           / Spectral Type and Luminosity Class
V-MAG   =                 0.03 / Apparent Visual Magnitude
M-MAG   =                 0.60 / Absolute Visual Magnitude
EBV     =                0.000 / Color Excess
B-V     =                0.000 / B-V Color Index
VSINI   =                   15 / Rotational Velocity (km/sec)
VSTARYBS=               -13.90 / YBS Catalog Radial Velocity (km/sec)
VSTAR   =               -13.90 / PUO Radial Velocity (km/sec)
LSR-VEL =                19.66 / LSR Velocity Correction (km/sec)
DISTANCE=                    8 / Distance (parsecs)
ORIGIN  = 'NASA/GSFC'          / Institution generating file
DATE    = '05/10/95'           / Date this file was created

COMMENT  The Air spectrum for Vega
COMMENT
COMMENT  The spectral region from 2000 - 3187 A was scanned with the
COMMENT  V1 detector in first order at a resolution of 0.1 A. The
COMMENT  data was obtained mainly during the periods 1975 September
COMMENT  12-21 and Spetember 27 - October 7. Several gaps were filled
COMMENT  on 1976 April 20.
COMMENT
COMMENT  See "The COPERNICUS Ultraviolet Spectral Atlas of Vega" by John
COMMENT  B. Rogerson, Jr., published in the Astrophysical Journal
COMMENT  Supplement Series, 71:1011-1055,1989.
COMMENT
COMMENT  The attached binary table contains 28724 rows. Each row contains
COMMENT  the following:
COMMENT           WAVE: the air wavelength in Angstroms
COMMENT         COUNTS: the unsmoothed counts
COMMENT       CNT_SMTH: the smoothed counts at a measured point in the
COMMENT                 spectrum.
END
```

```
SIMPLE  =                    T / True fits records follow
BITPIX  =                    8 / Bits per pixel
NAXIS   =                    0 / No data array present
EXTEND  =                    T / There may be standard extensions
SPACECRF= 'OAO-3   '           / Spacecraft name
TELESCOP= 'COPERNICUS'         / Telescope name
INSTRUME= 'PASCHEN-RUNGE SPECTROMETER' / Instrument name
FILENAME= 'ALPHALYR5.FTS'      / File name
HD-NUM  =               172167 / Henry Draper Catalog Number
OBJECT  = 'ALPHA LYR'          / Object Name
RA-DEGS =            279.23459 / Right Ascension in degrees
DEC-DEGS=            38.783611 / Declination in degrees
EQUINOX =               2000.0 / Coordinate system epoch
SPECTYPE= 'A0Va    '           / Spectral Type and Luminosity Class
V-MAG   =                 0.03 / Apparent Visual Magnitude
M-MAG   =                 0.60 / Absolute Visual Magnitude
EBV     =                0.000 / Color Excess
B-V     =                0.000 / B-V Color Index
VSINI   =                   15 / Rotational Velocity (km/sec)
VSTARYBS=               -13.90 / YBS Catalog Radial Velocity (km/sec)
VSTAR   =               -13.90 / PUO Radial Velocity (km/sec)
LSR-VEL =                19.66 / LSR Velocity Correction (km/sec)
DISTANCE=                    8 / Distance (parsecs)
ORIGIN  = 'NASA/GSFC'          / Institution generating file
DATE    = '05/10/95'           / Date this file was created

COMMENT  Line identifications for Vega (2000.8 - 3186.8 Angstroms)
COMMENT
COMMENT  See "The COPERNICUS Ultraviolet Spectral Atlas of Vega" by John
COMMENT  B. Rogerson, Jr., published in the Astrophysical Journal
COMMENT  Supplement Series, 71:1011-1055,1989.
COMMENT
COMMENT  The attached binary table contains 2167 rows and contains the
COMMENT  data in Table 6 of the paper. Note that all the fields contain
COMMENT  ASCIIdata and some entries may contain blanks. The fields
COMMENT  include:
COMMENT      WAVE_OBS: the observed wavelength,
COMMENT      CINT_OBS: the central intensity of the feature,
COMMENT      WAVE_LAB: the laboratory wavelength of the identifying
COMMENT                transition,
COMMENT       ELEMENT: the element symbol for the proposed identification,
COMMENT           ION: the ionization stage of the identifying transition,
COMMENT      ULTORVIS: a character (blank or V) indicating whether the
COMMENT                following multiplet number is an ultraviolet multiplet
COMMENT                or a visual multiplet,
COMMENT      MULTIPLT: the multiplet number,
COMMENT        REMARK: a        character (?, #, *, or blank) which characterizes
COMMENT                the quality of the identification as shown:
COMMENT                  blank : indicates good confidence in identification
COMMENT                    "#" : no oscillator strength available for
COMMENT                          laboratory line,
COMMENT                    "?" : transition that is theorectically strong
COMMENT                          enough to be seen but which is not reported
COMMENT                          in the available lab. line lists (these
COMMENT                          identifications must be suspect),
COMMENT                    "*" : indicates the one or two major contributors
COMMENT                          to an observed feature.
END
```

This tape contains data relative to "The COPERNICUS Ultraviolet Spectral Atlas of Vega" by John B. Rogerson, Jr., published in the Astrophysical Journal Supplement Series, 71:1011-1055,1989.

The tape is nine track, 1600 bpi. The tape has been written on a VAX machine, and all records are in ASCII and are terminated by a newline or linefeed character (ascii decimal 10).

The data is in five files:

File 1 is this description file, and consists of 60 records of variable length.

File 2 contains 28724 records. Each record contains 24 bytes of data and is terminated by a newline character making a total of 25 bytes per record. Each record contains the air wavelength, the unsmoothed count, and the smoothed count at a measured point in the spectrum. The format for reading a record is (a8,1x,a7,1x,a7), i.e., 8 ascii bytes for the wavelength followed by a space character followed by 7 bytes for the unsmoothed count followed by a space character followed by 7 bytes for the smoothed count.

File 3 has 239 records and contains the data in Table 3 of the paper. These records contain the wavelength, continuum count and scattered light count at 5 Angstrom intervals along the spectrum. The records are each 16 bytes long, 15 bytes of data plus a newline character. The format for reading a record is (a4,1x,a5,1x,a4), i.e., 4 bytes for the wavelength followed by a space followed by 5 bytes for the continuum count followed by a space followed by 4 bytes for the scattered light count.

File 4 has 61 records and contains the data in Table 4 of the paper. These records contain the wavelength, continuum count, and flux value at 20 Angstrom intervals along the spectrum. The records are each 21 bytes long, 20 bytes of data plus a newline character. The format for reading a record is (a4,1x,a5,1x,a8,a1), i.e., 4 bytes for the wavelength followed by a space followed by 5 bytes for the continuum count followed by a space followed by 8 bytes for the flux value. The last data byte is either a colon (:) or a space, with the colon indicating uncertainty in the value of the flux value.

File 5 has 2167 records and contains the data in Table 6 of the paper. Thes records contain the observed wavelength, the central intensity of the feature, the laboratory wavelength of the identifying transition, the element symbol for the proposed identification, the ionization stage of the identifying transition, a character (blank or V) indicating whether the following multiplet number is an ultraviolet multiplet or a visual multiplet, the multiplet number, and finally a character (?, #, *, or blank) which characterizes the quality of the identification. Each record is 38 bytes long, 37 bytes of data followed by a newline character. The format for reading a record is (a7,1x,a3,1x,a7,1x,a2,1x,a3,1x,a1,1x,a6,1x,a1), i.e., 7 bytes for the observed wavelength followed by a space followed by 3 bytes for the central intensity followed by a space followed by 7 bytes for the laboratory wavelength followed by a space followed by 2 bytes for the element symbol followed by a space followed by 3 bytes for the

ionization stage followed by a space followed by (blank or V) to designate the kind of multiplet number followed by a space followed 6 bytes for the multiplet number followed by a space followed by 1 byte for the identification quality symbol.

```
$NOP
$NOP   ************* BMWOUT1 *************
$EXE TPLIST BS

 INPUT PARAMETERS ARE:   AS AL 1

  TAPE NO.    1             FILE NO.    1
  RECORD    1               LENGTH    3432
This tape contains data relative to "The COPERNICUS Ultraviolet Spectral Atlas of Vega" by John B.
Rogerson, Jr., published in the Astrophysical Journal Supplement Series, 71:1011-1055,1989.  The ta
pe is nine track, 1600 bpi.  The tape has been written on a VAX machine, and all records are in ASC
II and are terminated by a newline or linefeed character (ascii decimal 10).  The data is in five f
iles:  File 1 is this description file, and consists of 60 records of variable length.  File 2 con
tains 28724 records.  Each record contains 24 bytes of data and  is terminated by a newline charact
er making a total of 25 bytes per  record.  Each record contains the air wavelength, the unsmoothed
 count,  and the smoothed count at a measured point in the spectrum.  The format  for reading a rec
ord is (a8,1x,a7,1x,a7), i.e., 8 ascii bytes for the  wavelength followed by a space character foll
owed by 7 bytes for the  unsmoothed count followed by a space character followed by 7 bytes for  th
e smoothed count.  File 3 has 239 records and contains the data in Table 3 of the paper.  These rec
ords contain the wavelength, continuum count and scattered  light count at 5 Angstrom intervals alo
ng the spectrum.  The records  are each 16 bytes long, 15 bytes of data plus a newline character.
The  format for reading a record is (a4,1x,a5,1x,a4), i.e., 4 bytes for the  wavelength followed by
 a space followed by 5 bytes for the continuum  count followed by a space followed by 4 bytes for t
he scattered light  count.  File 4 has 61 records and contains the data in Table 4 of the paper.  T
hese records contain the wavelength, continuum count, and flux value  at 20 Angstrom intervals alon
g the spectrum.  The records are each 21  bytes long, 20 bytes of data plus a newline character.  T
he format for  reading a record is (a4,1x,a5,1x,a8,a1), i.e., 4 bytes for the  wavelength followed
by a space followed by 5 bytes for the continuum  count followed by a space followed by 8 bytes for
 the flux value.  The  last data byte is either a colon (:) or a space, with the colon  indicating
uncertainty in the value of the flux value.  File 5 has 2167 records and contains the data in Table
 6 of the paper.  Thes records contain the observed wavelength, the central intensity of  the featu
re, the laboratory wavelength of the identifying transition, the element symbol for the proposed i
dentification, the ionization  stage of the identifying transition, a character (blank or V)  indic
ating whether the following multiplet number is an ultraviolet  multiplet or a visual multiplet, th
e multiplet number, and finally a  character (?, #, *, or blank) which characterizes the quality of
 the  identification.  Each record is 38 bytes long, 37 bytes of data  followed by a newline charac
ter.  The format for reading a record is  (a7,1x,a3,1x,a7,1x,a2,1x,a3,1x,a1,1x,a6,1x,a1), i.e., 7 b
ytes for the  observed wavelength followed by a space followed by 3 bytes for the  central intensit
y followed by a space followed by 7 bytes for the  laboratory wavelength followed by a space follow
ed by 2 bytes for the  element symbol followed by a space followed by 3 bytes for the  ionization s
tage followed by a space followed by (blank or V) to  designate the kind of multiplet number follow
ed by a space followed 6  bytes for the multiplet number followed by a space followed by 1 byte  fo
r the identification quality symbol. . . . . . . . . . . . . . . . .

***** JOB DONE.
$WEO LPS

$$
$ASS IN HTU OUT FT1
$EXE TPDUPC BS
```

72-065A-01M

Expt 72-065A-01M

0-80336 C-27668

DUMP OF TAPE BMWOUT1

INPUT TAPE BMWOUT1 ON HT1
DATA INPUT FS NF=5 SR=2=1=1 SR=5=1=1

FILE	INPUT RECS.	DATA RECORDS INPUT	MAX. SIZE	READ ERROR SUMMARY PERM	ZERO B	SHORT	UNDEF.	INPUT RETRIES #RECS.	TOTAL#
1	1	1	3432	0	0	0	0	0	0

FILE 2 RECORD 1 LENGTH 8192BYTES

(0)	32303030	2E363132	20203633	36362E36	20203635	34352E36	0A323030	302E3636	30202036	3839392E
(40)	39202036	3733322E	390A3230	30302E37	30372020	36373337	2E352020	36383336	2E380A32	3030302E
(80)	37353520	20373139	312E3420	20363734	312E360A	32303030	2E383032	20203632	35372E37	20203635
(120)	35392E36	0A323030	302E3835	30202036	3138392E	35202036	3532392E	360A3230	30302E38	39372020
(160)	36393035	2E382020	36363939	2E360A32	3030302E	39343520	20373236	312E3120	20363839	342E380A
(200)	32303030	2E393932	20203633	37322E37	20203730	30302E32	0A323030	312E3034	30202037	3636352E
(240)	30202037	3035342E	300A3230	30312E30	38372020	36373931	2E362020	37313139	2E340A32	3030312E
(280)	31333520	20363934	382E3920	20373139	352E330A	32303031	2E313833	20203830	30382E37	20203732
(320)	30382E35	0A323030	312E3232	39202036	3338302E	39202037	3131392E	330A3230	30312E32	37362020
(360)	37333639	2E312020	36393833	2E390A32	3030312E	33323420	20363735	322E3020	20363835	322E320A
(400)	32303031	2E333731	20203637	36372E32	20203637	33392E34	0A323030	312E3431	39202036	3536322E
(440)	38202036	3638392E	380A3230	30312E34	36372020	36383439	2E392020	36373239	2E350A32	3030312E
(480)	35313320	20363339	332E3420	20363737	332E360A	32303031	2E353631	20203736	32332E30	20203637
(520)	30332E31	0A323030	312E3630	39202035	3831342E	32202036	3538312E	380A3230	30312E36	35362020
(560)	36343839	2E312020	36363132	2E370A32	3030312E	37303420	20373235	362E3320	20363831	312E340A
(600)	32303031	2E373531	20203636	36382E32	20203639	36312E32	0A323030	312E3739	39202037	3236322E
(640)	34202036	3930362E	300A3230	30312E38	34362020	36373035	2E342020	36373336	2E370A32	3030312E
(680)	38393220	20363332	302E3420	20363730	322E320A	32303031	2E393430	20203637	38332E37	20203639
(720)	31352E39	0A323030	312E3938	38202037	3733382E	33202037	3230382E	390A3230	30322E30	33352020
(760)	37333337	2E302020	37333933	2E340A32	3030322E	30383320	20363834	372E3320	20373436	312E350A
(800)	32303032	2E313331	20203833	35322E37	20203734	30342E30	0A323030	322E3137	39202036	3730302E
(840)	38202037	3138322E	330A3230	30322E32	32362020	37323331	2E302020	36393730	2E300A32	3030322E
(880)	32373420	20363239	332E3820	20373035	302E340A	32303032	2E333232	20203737	33352E30	20203733
(920)	39352E36	0A323030	322E3337	30202038	3032322E	31202037	3633382E	380A3230	30322E34	31382020
(960)	37363835	2E372020	37353538	2E330A32	3030322E	34363520	20363537	362E3020	20373330	382E370A
(1000)	32303032	2E353133	20203738	33342E30	20203730	38332E31	0A323030	322E3536	30202036	3431302E
(1040)	34202036	3839322E	310A3230	30322E36	30382020	37313534	2E362020	36373538	2E340A32	3030322E
(1080)	36353620	20363134	392E3920	20363830	352E330A	32303032	2E373034	20203733	37342E34	20203730
(1120)	35382E39	0A323030	322E3735	31202037	3438382E	38202037	3337392E	330A3230	30322E37	39392020
(1160)	37343930	2E312020	37363336	2E340A32	3030322E	38343720	20373738	352E3120	20373735	302E330A
(1200)	32303032	2E383935	20203736	34322E36	20203735	35392E33	0A323030	322E3934	33202037	3738302E
(1240)	37202036	3939392E	380A3230	30322E39	39312020	35373539	2E342020	36343735	2E320A32	3030332E
(1280)	31333920	20353437	302E3720	20363533	372E350A	32303033	2E303837	20203738	35362E34	20203730
(1320)	36322E36	0A323030	332E3133	35202038	3539302E	31202037	3339372E	300A3230	30332E31	38332020
(1360)	35383232	2E312020	37333833	2E350A32	3030332E	32333020	20373932	352E3720	20373432	312E330A
(1400)	32303033	2E323738	20203733	33302E36	20203736	30382E31	0A323030	332E3332	36202038	3735392E
(1440)	33202037	3637342E	370A3230	30332E33	37342020	36353434	2E312020	37363235	2E300A32	3030332E
(1480)	34323220	20373636	392E3020	20373638	332E350A	32303033	2E343730	20203831	35312E30	20203737
(1520)	31392E35	0A323030	332E3531	38202038	3033332E	33202037	3430382E	340A3230	30332E35	36362020
(1560)	36323035	2E332020	36393133	2E350A32	3030332E	36313420	20363239	322E3720	20363738	362E360A
(1600)	32303033	2E363633	20203735	36372E31	20203731	39382E30	0A323030	332E3731	31202037	3634332E
(1640)	37202037	3730302E	380A3230	30332E37	35392020	38313338	2E322020	37373235	2E320A32	3030332E
(1680)	38303720	20373533	312E3320	20373130	342E380A	32303033	2E383535	20203536	38332E35	20203632
(1720)	30362E33	0A323030	332E3930	33202035	3138352E	30202035	3537382E	310A3230	30332E39	35312020
(1760)	35393232	2E382020	35343834	2E370A32	3030332E	39393820	20353238	322E3020	20353834	342E370A
(1800)	32303034	2E303436	20203633	39312E30	20203633	37392E31	0A323030	342E3039	33202037	3337382E
(1840)	38202036	3639352E	350A3230	30342E31	34312020	36343930	2E342020	36353434	2E380A32	3030342E
(1880)	31383820	20353833	312E3120	20363036	322E320A	32303034	2E323336	20203537	36332E31	20203535
(1920)	38312E38	0A323030	342E3238	33202034	3935382E	36202035	3332312E	360A3230	30342E33	33302020
(1960)	35343935	2E322020	35333235	2E360A32	3030342E	33373820	20353431	342E3020	20353534	392E370A
(2000)	32303034	2E343235	20203537	39302E38	20203538	39392E31	0A323030	342E3437	33202036	3437392E
(2040)	37202036	3230382E	380A3230	30342E35	32302020	36323035	2E352020	36333136	2E380A32	3030342E
(2080)	35363820	20363831	362E3720	20363237	392E380A	32303034	2E363135	20203534	39392E33	20203634
(2120)	32322E37	0A323030	342E3636	32202036	3834332E	38202036	3933302E	350A3230	30342E37	31302020