SCIENCE AND ENGINEERING RESEARCH COUNCIL
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SUN/29.1

Starlink Project
Starlink User Note 29.1

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ADC - Astronomical Data Catalogues on Magnetic Tape

1. SUMMARY

Starlink is in the process of acquiring magnetic tape versions of a large number of astronomical data catalogues from the Strasbourg stellar data centre (CDS), and Starlink tape versions of these catalogues are being distributed to all sites. The CDS tapes are not written in a standard format, and so the catalogues are being converted to a uniform Starlink format (ADC format) before distribution.

A directory of files containing full specifications of the currently available catalogues is maintained in ADCDIR: , and an index to these files is kept in ADCINDEX.LIS in the same directory.

A set of Fortran subroutines has been written for users to link into their own programs, enabling simple access to any of the catalogues.

In due course, Starlink may acquire astronomical catalogues from other sources as well as the CDS.

2. ADC FORMAT

There are many variations in the way the CDS catalogues are written, and so they are not immediately readable by the Starlink VAXs. A standard Starlink tape format has therefore been defined for Astronomical Data Catalogues, called ADC format, and the catalogues will be converted to this before distribution to the sites. Conversions are currently being carried out at ROE (other sites will probably participate later) and distribution of all tapes produced

will be coordinated from there.

The format follows the following conventions, proposed by the Starlink Database SIG:

a) The tapes are VAX "foreign" tapes
b) The data are organised into fixed length blocks of fixed length records
c) Only ASCII characters are permitted

Point (a) ensures that the catalogues can be read on other (non-VAX) computers without further format conversions.

No alterations are made to the data on the CDS tapes during conversion to ADC format. This implies that, for example, a Right Ascension catalogued on the CDS tape in hours, minutes and seconds, will not be converted to decimal hours. It also means that even known errors will be deliberately propagated, although in this case warning notes may be added to the ADC tape via the NOTES keyword (see below).

The final block is padded with asterisk characters if necessary to make up a complete block.

Information on CDS data is disseminated through the "Bulletin d'Information du Centre de Donnees Stellaires". The most recent complete list of available catalogues is in Bulletin no. 21, September 1981.

3. DESCRIPTION FILE

An ADC format tape usually contains several catalogues, and each catalogue is stored in one or more parts. Each part is preceded by a "description file" which holds all the information required to access that part of the catalogue.

The description file contains 100-character lines, and each line consists of a keyword followed by information that is keyword dependent, as follows:

```
Column
     1 : blank
 2- 11 : keyword              (eg TITLE, RECORDSIZE, PARAMETER, FIELD)
    12 : blank
13-100 : contents are keyword dependent
```

There are many key-words, of which the most important are PARAMETER describing any catalogue-wide values, and FIELD describing the contents of each field. The formats for these are as follows:

Keyword PARAMETER. The PARAMETER lines contain catalogue-wide values. Examples are equinox of equatorial coordinates, accuracy, units.

Column		
1	blank	
2-11	PARAMETER	
12	blank	
13-21	field name	(eg EQUINOX)
22	blank	
23-34	value	(eg 1950.0)
35-50	blank	
52-80	description	(eg Equinox of Coordinates)

Keyword FIELD. The FIELD lines contain the specification of each field within the catalogue. Examples are HD number, RA, parallax.

Column		
1	blank	
2-11	FIELD	
12	blank	
13-21	field name	(eg HD, RA, DEC)
22	blank	
23-34	units	(eg arcsec/yr)
35	blank	
36-39	start position of record	(eg 23)
40	blank	
41-44	length of field	(eg 6)
45	blank	
46-53	format, each item separate	(eg I2,I2,I2)
54	blank	
55-66	null value	
67	blank	
68-97	text description	(eg Henry Draper number)

Other current keywords are:

TITLE	Catalogue title
REFNO	CDS reference number
ISSUE	Starlink version number and date of issue
CITATION	Citation of published catalogue
AUTHOR	Author of published catalogue
YEAR	Year of issue of published catalogue
RECORDSIZE	Logical data record size
BLOCKSIZE	Tape data block size
NRECS	Number of records in this part of the catalogue
NBLOCKS	Number of tape blocks in this part of the catalogue
NTAPES	Number of tapes to contain the whole catalogue
NFILES	Number of data files occupied by the whole catalogue
TAPENAME	Name of tape containing this part of the catalogue
STARTFILE	File number on tape where catalogue starts
HEADING	Heading information for field description
COMMENT	Comments taken from CDS documentation

NOTES : Notes added during conversion to ADC format

Not all keywords need appear in the description file.

A more complete specification of the description file is given in Starlink System Note SSN/16.

The description files are small and a complete set is kept on disc in ADCDIR: so that users can find out about any catalogue without having to mount a tape. An example of a description file is given in the appendix. A summary of the available files is kept in the file ADCINDEX.LIS in the same directory.

4. ACCESSING A STARLINK FORMAT CATALOGUE ON MAGNETIC TAPE

The description file is designed so that a program can access any catalogue by picking up the relevant details via the description file.

A set of Fortran subroutines is available to access and manipulate catalogue data on tape in ADC format. The subroutines have names of the form ADC_<name>. The object code is kept in LIBDIR:ADC.OLB. These routines use Starlink tape utilities and certain other Starlink routines, and for a user to utilise them in his own programs, the linking procedure is

```
LINK <jobname>,LIBDIR:TAPEIO/LIB,STARDIR:INTERIM/LIB,-
                LIBDIR:ADC/LIB
```

In a sequence of calls to these subroutines, ADC_INIT must always be called first, and ADC_FIN last.

The subroutines normally used by the programmer are:

a) ADC_INIT(DESNAME,ISTAT)
Must be called first in a program. Initialises catalogue reading. The character variable DESNAME is the description file name, e.g. 'ADCDIR:TWOMICRN1'. ISTAT=1 if the initialisation fails.

b) ADC_FIN
Must be called last in a program. Closes catalogue and description file on disc.

c) ADC_NXREC(LINE,ISTAT)
Gets the next record, returns it in CHARACTER*1 array LINE. ISTAT=1 if process fails (eg because there is no next record).

d) ADC_RECN(NR, LINE, ISTAT)
Gets record number NR and returns it in CHARACTER*1 array LINE; ISTAT=1 if process fails (eg because NR out of range).

e) ADC_GETVL(LINE, FNAME, VTYPE, NVALS, AVALS, IVALS, RVALS, ISTAT)
Gets field FNAME (character expression) from current record in CHARACTER*1 array LINE; returns VTYPE (=A, I or R) of the values in the field and NVALS the number of values in the field; if values are A format, then returned in character array AVALS; if I format then returned in integer array IVALS; if R format then returned in real array RVALS; ISTAT=1 if FNAME is not in description file. (FNAME must have no leading blanks, but may have trailing blanks provided the total character length is not more than nine characters).

f) ADC_PRCUR (LINE)
Outputs record, stored in CHARACTER*1 array LINE, as text, to logical unit 6 (i.e. defaults to the terminal in interactive mode).

g) ADC_RNUM(NUMREC)
Gets the number of the current record and returns it in NUMREC.

The source code for the complete set of subroutines is contained in LIBDIR:ADC.FOR together with explanatory comments, and full details are in SSN/16. An example of the use of these subroutines is provided by the demonstration program LIBDIR:ADCDEM.FOR (see below).

Additions and revisions to this set of subroutines are planned, for example to allow selection from a catalogue according to the values of one or more fields, and these will be announced by reissues of this SUN.

5. DEMONSTRATION PROGRAM

To gain a feel for the facilities available, a potential user may run a demonstration program that is interactive and provides a menu of possible activities. Load a tape containing catalogues in ADC format on tape deck <n>, and type

```
ALLOCATE MTA<n>: INPUT
MOUNT/FOR INPUT
RUN LIBDIR:ADCDEM
```

The user is prompted for a valid catalogue description file specification, for example ADCDIR:TWOMICRN1

The program, via ADC_INIT, checks that the required catalogue is on the mounted tape by comparing the disc and tape description files. If the catalogue is found, a menu of activities is displayed.

6. FIRST AVAILABLE CATALOGUES

This is a list of the first available catalogues. An up to date list will be maintained in ADCDIR:ADCINDEX.LIS.

Title	Description Files
Catalogue of Extinction Data	EXTINCTN.DAT
Catalogue of Homogeneous Data in UBV Photoelectric Photometry	HOMOGUBV1.DAT HOMOGUBV2.DAT
Catalogue of Stars Photoelectrically Measured	PHOTOSYS.DAT
General Catalogue of Variable Stars	VARIABLE.DAT
Two Micron Sky Survey: A Preliminary Catalogue	TWOMICRN1.DAT TWOMICRN2.DAT TWOMICRN3.DAT
UBVRIJKLMNH Photoelectric Photometric Catalogue	ELEVENCL1.DAT ELEVENCL2.DAT
UVBYBETA Photoelectric Photometric Catalogue	STROMGRN1.DAT STROMGRN2.DAT STROMGRN3.DAT STROMGRN4.DAT STROMGRN5.DAT

7. FEEDBACK

Please send comments on this project via local site managers to David Brownrigg (ROE) or Keith Tritton (RAL).

8. AKCNOWLEDGEMENTS

The main ideas behind ADC format were drawn from "Starlink Format for Catalogues on Magnetic Tape" by Dave Carnochan and Sid Wright, UCL, 11 October 1981.

9. APPENDIX

Not available in the on-line version of this SUN.