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ULDA User's Guide

by

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Chapter 1

Introduction

The **Uniform Low Dispersion Archive (ULDA)** is a software system which, in a single sitting, allows you to obtain copies on your computer of those IUE (International Ultraviolet Explorer) low dispersion spectra of interest to you.

The search programs and data base are maintained by the European Space Agency (ESA) at the ESA IUE Observatory, Villafranca, Spain (VILSPA) and updates are sent from them to the national host sites. Regular updates to the user ID files are done by VILSPA. The NSSDC is currently running version 2.0 which contains approximately 38,000 images. All the programs, search routines, and the data base are on the NSSDC's VAX 8650 and its disk packs.

The ULDA software is menu-driven from within the National Space Science Data Center (NSSDC) captive account (NODIS). The ULDA user does *not* need to have the IUE/ULDA Coordinator intercede in order to access the data or search routines. It is a reasonably self-contained series of programs and a data base.

NSSDC is the United States national host site for users within the U.S. and a temporary host to astronomers in other countries that do not have an established national site.

The overall concept is that research institutes within a country are served by a single national host which can be accessed using intercomputer links. This center holds the ULDA as a relational data base as well as the software to interrogate and select spectra from the data base. In order to ensure that everyone has access to the same data, these national hosts are in turn served by a principal center.

Below are the two ULDA programs you will use:

- A program to search for and select spectra
- A program to convert those spectra you choose into a form which will be suitable for your image processing system (UNSPL)

The search program runs at your national center while UNSPL runs at your local computing center. The following section comprises an overview of how to use the ULDA and its components.

Chapter 2

Overview of How to Use the ULDA

Retrieving spectra in a form suitable for your image processing system comprises a two or three stage process, the number of steps required depending on the nature of your connection to your national center. The steps required are described below.

Stage 1: Search and Select Spectra

When you log in to your national center's ULDA account from your institute, you will enter the Query/Select program through the NSSDC NODIS account. A user can initiate a new search for data or recover a previous file that may not have successfully been transferred to the user's node.

If a search is chosen, the program writes the data to several user files and returns the user to the SELECT menu. Here users may edit the files, view the files and/or save the files they wish to transfer to their host nodes.

The search menus start with a specific search target and regress to a wider, more general search window with each new menu display. A "?" in any of the search displays could yield further examples and/or clarification of what is expected within that panel. This is particularly useful when you have reached the Object Class and Homogeneous Object ID menus.

Stage 2: Transfer Data to Your Computer

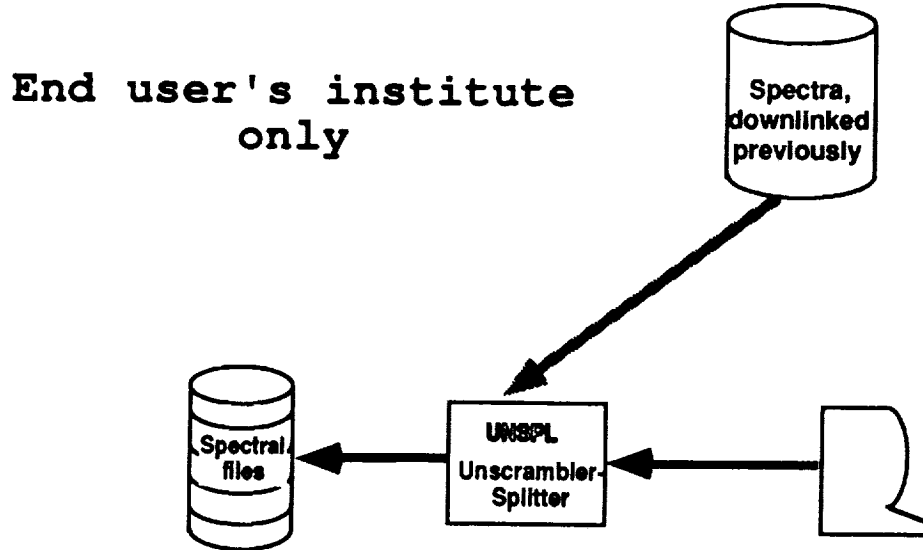
This stage is required only if you are not connected to a national center by DECnet. To begin this stage, copy the spectra you have selected (held on a single file) to your computer using either a file transfer system (e.g., KERMIT) or computer mail. The Query/Select program affords you the option of outputting the spectra in compressed ASCII encoded form, which is essential if you intend

to use E-mail or a file transfer system which does not support the transfer of 2K blocks of binary data. If you have saved auxiliary data (e.g., what a search found), these will be in ASCII format and should be downlinked as well using E-mail or a file transfer system.

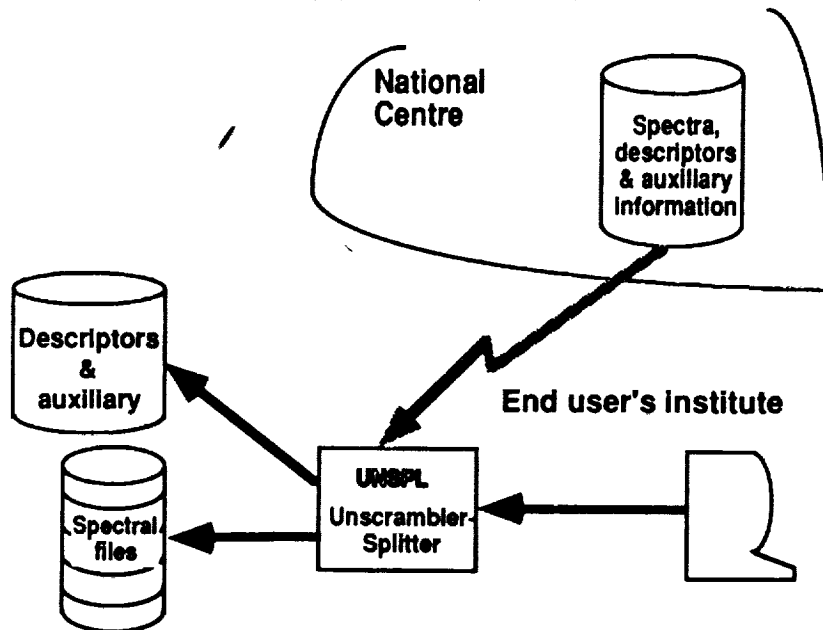
Stage 3: Generate Spectral Files on Your Computer

To generate individual spectral files having a format suitable for your image processing system, run program UNSPL on your computer. UNSPL (UNscrambler/SPLitter) will downlink your data for you from the national host if you are connected to it by a DECnet link (these data comprise your spectra and auxiliary information). The following two diagrams illustrate what this stage involves if you are connected to the national host by a DECnet-like link or not.

No DECnet Link to National Center



With a DECnet Link to National Center



Chapter 3

Overview of How to Run the Query/Select Program

3.1 GENERAL CONSIDERATIONS

- Replies to the ULDA may be in upper- or lowercase and are free format where reasonable.
- At every stage in the program you will be prompted for what you can reply next. Examples are included wherever possible.
- Whenever a question mark appears in a prompt, you can get HELP information by entering a "?."

3.2 THE MINIMUM YOU HAVE TO DO

If you ignore all but the absolutely essential actions required, you are left with a three stage process.

1. LOGIN

- LOGIN via the NSSDC IUE NODIS account. Choose option #8 on the main menu and then option #2 in the IUE main menu display.
- Give the ULDA your ID (if you do not have one, ask ULDA to give you one of your choice). See section 4.1.2 (Getting an ULDA ID [Registration]) and section 4.1 (Functions Available During LOGIN) for more information. This ID is used to form the names of your work files. If your ID is UKMIKE, then the spectra which you eventually choose will be stored on a file called UKMIKE.SPE.

- Give your motive (a number corresponding to an entry in a menu) and you will be presented with the main menu.

2. SEARCH

You may search on one or more of the following:

- A list of cameras and/or image numbers and/or apertures
- A list of R.A. and Declination ranges
- A list of IUE object classes
- A list of homogeneous object IDs

You will always be prompted for the above four classes of input (carriage return <CR> for those you do not wish to use). If you reply to more than one of the above types of search criteria, the search will be for the intersection of the hits found for each set.

EXAMPLE: Find spectra taken with the SWP camera for objects with class 57 or 58.

Reply SWP to the camera/image number/aperture prompt.

and

Reply 57, 58 to the object class prompt.

3. SELECT

Enter the SELECT command from the main menu and a description of the spectra found by the last search will be displayed a screen at a time. These descriptors (i.e., camera, image number, aperture, homogeneous ID, coordinates, date of observation) take one line each and are prefixed by an index (ranging from one to the number of spectra found) used to perform the selection.

EXAMPLE: Suppose you want the 5th., 6th., and 20th. spectra displayed.

Reply 5, 6, 20
OR
5-6, 20

When you have picked the spectra you want, type E and the ULDA will terminate. From this you can see that SELECT is *not* cumulative (which is also true for the other data base commands; for example, the output from a search overwrites the previous search's results).

3.3 OUTPUT FROM THE ULDA

Your output from the ULDA is stored on work files whose names comprise your ULDA ID (see section 3.2 [LOGIN]) and standard qualifiers. These files are listed below.

- **id.SPE** Holds the spectra you selected, output from the SELECT command. This is an ASCII file if you asked SELECT to perform ASCII encoding; otherwise, it is a binary file with a block length of 2K bytes.
- **id.DES** Description of what the last search found, output from the last SAVE DESCRIPTORS command, followed by the descriptors for all the spectra selected. It is an ASCII file.

- **id.AUX** Auxiliary information about the spectra you found, output from the last DUBIOUS command as well as usage data if you opted to look at it (from the SELECT command). It is an ASCII file.

Note:

1. The ULDA will normally delete and recreate your work files when you LOGIN to it. Therefore, never use someone else's ID since you may destroy his output. For the same reason do not use communal IDs.
2. Work files have a lifetime (48 hours) set by your national host manager. After this time has expired, anyone using the ULDA will automatically delete the files.
3. If a command which writes to a work file (e.g., SAVE DESCRIPTORS) is issued more than once, only the output from the last call is saved.

Chapter 4

How to Use the ULDA (for Reference)

4.1 FUNCTIONS AVAILABLE DURING LOGIN

Logging in to the ULDA will normally involve entering your ULDA ID and a number from a menu. However, certain additional functions are also available to you at startup. For instance:

- If you do not have an ID, the ULDA will let you choose one.
- If you have forgotten your ID, the ULDA will help you find it.
- If you were unable to download all your spectra, you can enter recovery mode.

4.1.1 Giving Your ULDA ID

On entry the ULDA will ask you to enter your ID. Such an ID should have a two-letter country ID followed by up to six nonspecial characters and must have been given to you by the ULDA in a previous session. Examples of valid IDs are as follows:

UKJO	Jo in the UK
WGINGE	Inge in West Germany

Since IDs define your output file names (see section 3.3 [Output from the ULDA]), under no circumstances use someone else's ID since you will erase his data files. If you have forgotten your ID, see section 4.1.3 (Displaying the IDs and Their Owners' Names for a Country), or if you do not have one, see section 4.1.2 (Getting an ULDA ID [Registration]).

4.1.2 Getting an ULDA ID (Registration)

To avoid delays the ULDA allows you to register yourself, a process you need to do only once. When the startup prompt is displayed on the screen, reply R and the possible countries and their two-letter abbreviations are displayed (the two character codes will be the first two letters of your ID). You are then prompted in turn for each of the following:

1. The ID of your choice (rejected if invalid or already exists). Keep your ID short and easy to remember. Do not forget it forms part of your output file names; hence, you will need it for more than just logging in to the ULDA.
2. If the first ID you choose already exists, you may look at the extant IDs for your country (see section 4.1.3 [Display IDs and Their Owners' Names for a Country]) to help you choose one of your preference.
3. You will be asked for your work address and/or telephone number and/or computer address, used if someone has to get in touch with you.
4. You will be asked to confirm each reply to guard against possible typing errors.

4.1.3 Displaying the IDs and Their Owners' Names for a Country

Should you forget your ID or have difficulty choosing one, use this command by replying D to the startup question as indicated on the screen. The possible countries and their two-letter abbreviations will be displayed.

COUNTRIES AND THEIR ABBREVIATIONS, THOSE IN BRACKETS ARE INACTIVE		
ID - COUNTRY	ID - COUNTRY	ID - COUNTRY
AA - (AUSTRIA)	AR - (ARGENTINA)	AU - (AUSTRALIA)
BE - BELGIUM	BR - BRAZIL	CA - CANADA
CH - CHINA	CI - (CHILE)	CK - (CZECHOSLOVAKIA)
CO - (COLOMBIA)	DK - DENMARK	EQ - (EQUADOR)
FI - FINLAND	FR - FRANCE	HL - SWITZERLAND
IN - (INDIA)	IR - (IRELAND)	IS - (ISRAEL)
IT - ITALY	JA - (JAPAN)	LU - (LUXEMBOURG)
ME - (MEXICO)	NL - NETHERLANDS	NO - NORWAY
PE - (PERU)	PO - (POLAND)	PP - (PORTUGAL)
SP - SPAIN	SU - (SOVIET UNION)	SW - SWEDEN
TW - (TAIWAN)	UK - UNITED KINGDOM	US - UNITED STATES
VE - (VENEZUELA)	WG - WEST GERMANY	

GIVE A COUNTRY'S 2 CHARACTER ABBREVIATION OR X (OR EX) TO EXIT COUNTRY ID OR X>

If you enter the country's ID only, it will display all the registered users of that country. See example below.

DISPLAY OF IDs AND THEIR OWNER NAMES FOR UNITED STATES

USCRANE	= PHIL CRANE	USGEOFF	= GEOFF CLAYTON	USGEORGE	= G.SONNEBORN
USJLG	= JAMES L. GREEN	USJOY	= J.NICHOLS-BOHLIN	USKMH	= KEVIN M.HASSETT
USMARION	= MARION SCHMITZ	USMAUCHE	= MAUCH	EUSMEV	= MVANSTEENBERG
USNSSDC	= CHARLEEN PERRY		=	USRED	= CINDY-LOU SIMKIN
USSDC	= SANDRA CLEMENTS	USSTONE	= D.STONE	USJLG	= JAMES L. GREEN
USJAM	= NATHAN JAME	SUSWZ	= WEI ZHENG		=

END OF ID/ADDRESS DISPLAY FOR UNITED STATES

4.1.4 Recovery Mode

If you are unable to downlink all the spectra you chose, you may send the ULDA into recovery mode by giving your motive for using the ULDA as "recovery" (in answer to the second question). If you ask for recovery, you will not go through the normal pathway but will be sent directly to the SELECT command where you will be able to choose spectra from those selected during the previous run.

EXAMPLE: Suppose you only managed to downlink and unscramble (using UNSPL) the first two spectra you selected. In this case, reenter the ULDA, go into recovery mode, and reply as follows to the Select prompt :-

3-100

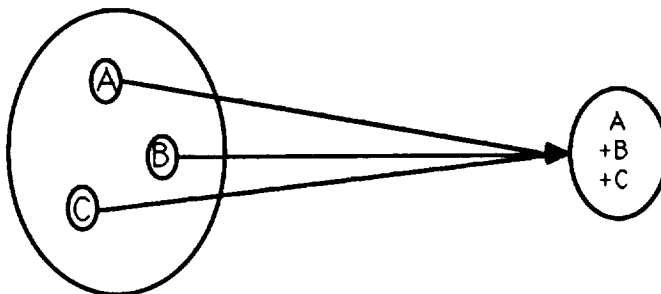
Your id.SPE work file will now hold only those spectra you were unable to download.

Please note that, when in recovery mode:

- The only function available to you is SELECT.
- Your work file's expiry date/time will be increased.
- No new "usage" data will be written (see section 4.6, Auxiliary Information [Dubious Comments and Usage Data]).

4.2 SEARCH FUNCTION

Before describing the SEARCH function, it is worth remembering that your goal is the selection of spectra, which, as illustrated in the diagram below, the ULDA helps you do in a two-step procedure. First, do a data base search for a set of spectra which includes those you want, and, secondly, select those spectra you want. See the graph below.



The search itself is invoked from the main menu in two forms, differing only in the amount of explanatory text which is displayed. Because of the easy nature of the search and because the "short" format form gives free examples and prompts, this is how you will start your searches except for the first couple of times.

4.2.1 Overall Search Rules

You may search on one or more of four types of criteria, each of which you will be prompted for in turn. A carriage return <CR> will skip the search menu currently being displayed. The possible search classes are as follows:

- A list of cameras and/or image numbers and/or apertures
- A list of R.A. and Declination ranges
- A list of IUE object classes
- A list of homogeneous object IDs

Putting one search element per line is often the best option. If you make a detectable typing error, the line is discarded. Furthermore, the separation between requests stands out better.

4.2.2 Search on Camera and/or Image Number and/or Aperture

Each search element comprises a maximum of three fields, written as a contiguous string. These fields are below:

1. Camera = SWP - Short Wave Prime
SWR - Short Wave Redundant (not used)
LWP - Long Wave Prime
LWR - Long Wave Redundant
2. Image number = an integer from 1000 upwards.
3. Aperture = S - Small
L - Large

If all three of the above are given (e.g., SWP12345L), you will specify a spectrum uniquely (the maximum number of spectra found will be one). However, any combination of one to three of the fields is also valid, providing the order of [Camera] [Image number] [Aperture] is preserved within a query element.

Examples of some valid search requests follow:

- SWP - Short Wave Prime
- SWP - all spectra taken with SWP
- L - all spectra taken with large aperture
- 12345 - all spectra with image number = 12345, irrespective of camera or aperture
- SWPL - spectra taken with the SWP and large aperture.

In all search requests you can specify a list of criteria separated by commas, spaces, semicolons, or (preferably) by entering each element on a separate line, in which case the list elements will be joined by logical ORs.

EXAMPLE: Find all spectra with image numbers 12345 or 12551 or spectra taken with the SWP and having image number 1673.

```
CAMERA,IM.NO.& AP'S/<CR>/?/R/X > 12345,12551,SWP1673 <CR>  
CAMERA,IM.NO.& AP'S/<CR>/?/R/X > <CR>
```

Your understanding of the logic is in good shape if you see that "LWRL" is not the same as "LWR L."

- LWRL = Find all spectra taken with the LWR and the large aperture.
- LWR L = Find all spectra taken with either the LWR or with a large aperture (useless request).

4.2.3 Search on R.A. and Declinations

Search requests are always composed of pairs of coordinates, in the order R.A., then Declination. Both coordinates of such a pair must be given on the same input line and be separated by one or more blanks. If you wish to enter more than one pair, they should preferably be on separate input lines, though they may be on the same line, separated by one or more spaces, commas, or semicolons. Valid coordinates are one-, two-, three-, four-, or six-digit integers which may be signed for Declinations only. In addition, either coordinate may be entered as "ALL" or "*" (in which case the search will be made on the other coordinate only).

EXAMPLES: 5 hrs. 8 mins. (of R.A.) must be represented by 0508; however, 5 hrs. of R.A. can be entered as either 5 or 05.

IMPLICIT RANGES

Each sky position you enter is, in fact, a search window whose dimensions are determined by the accuracy with which you specify the coordinates. For example, if you give hours of R.A. only, you will get a larger range of R.A. (by default) than if you specify hours and minutes, which in turn give a larger default range than if you specify the R.A. down to seconds. The "fuzziness factors" for the various precisions of coordinates are given in the following table, which you can display anytime with the R.A./Dec. help (i.e., "?").

Search Window Sizes

R.A.		DECLINATION	
Accuracy Used	Window Size	Accuracy Used	Window Size
Hours Only	+30 Mins.	Degrees Only	+4 Degs.
Hours & Minutes	±10 Mins.	Degrees & Minutes	±25 Mins.
Hours, Mins. & Secs.	±30 Secs.	Degrees, Mins. & Secs.	±1 Min.

See the following diagrams for an illustration of how implicit ranges work.

Search Windows for Two Different Requests for R.A.= 8 Hrs, Dec.= 6

For request = 86
Search window:

7 hr. 30 min., 10°



8 hr. 30 min., 2°

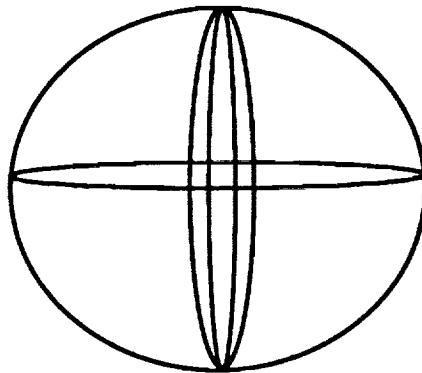
For request = 08006
Search window:

7 hr. 50 min., 10°



8 hr. 10 min., 2°

Window Generated by "8 ALL"



4.2.4 Search on IUE Object Classes

IUE object classes are integers in the range 0-99 whose meaning you can display within a search by using the object class search query's help (i.e., "?"). If you want to search on more than one class at a time, separate them by one or more commas, blanks, or semicolons, or enter them on separate lines.

EXAMPLE: Search for pulsars and supernova remnants.

```
OBJECT CLASSES/<CR>/?/X > 62 , 75 <CR>
OBJECT CLASSES/<CR>/?/X > <CR>
```

----- OBJECT CLASSES 0 - 29 -----		
0 Sun	10 W C	20 B0-B2 V-IV
1 Earth	11 W N	21 B3-B5 V-IV
2 Moon	12 MAIN SEQUENCE O	22 B6-B9,5 V-IV
3 Planet	13 SUPERGIANT O	23 B0-B2 III-I
4 Planetary satellite	14 OE	24 B3-B5 III-I
5 Minor planet	15 OF	25 B6-B9,5 III-I
6 Comet	16 SD O	26 BE
7 Interplanet. medium	17 WD O	27 BP
8 Giant red spot	18	28 SDB
9	19 UV-STRONG	29 WDB
----- OBJECT CLASSES 30 - 59 -----		
30 A0-A3 V-IV	40 F0-F9	50 R, N OR S TYPES
31 A4-A9 V-IV	41 F3-F9	51 LONG PERIOD VARIABLE
32 A0-A3 III-I	42 FP	52 IRREGULAR VARIABLE
33 A4-A9 III-I	43 LATE TYPE DEGEN.STARS	53 REGULAR VARIABLE
34 AE	44 G IV-VI	54 DWARF NOVAE
35 AM	45 G I-II	55 CLASSICAL NOVAE
36 AP	46 ELSE K IV-VI	56 SUPERNOVAE
37 WDA	47 K I-III	57 SYMBIOTIC STARS
38 HORIZONTAL BRANCH	48 M DWARF	58 T TAURI
39 COMPOSITE	49 M I-III	59 X-RAY

----- OBJECT CLASSES 60 - 79 -----

60 SHELL STAR	70 PLANETARY NEBULA + CENTRAL STAR
61 ETA CARINAE	71 PLANETARY NEBULA-CENTRAL STAR
62 PULSAR	72 H II REGION
63 NOVA-LIKE	73 REFLECTION NEBULA
64 STELLAR OBJECTS NOT GIVEN ABOVE	74 DARK CLOUD (ABSORPTION SPECTRUM)
65 MISIDENTIFIED TARGETS	75 SUPERNOVA REMNANT
66 INTERACTING BINARIES	76 RING NEBULA (SHOCK IONISED)
67	77
68	78
69 HERBIG - HARO OBJECT	79

----- OBJECT CLASSES 80 - 99 -----

80 SPIRAL GALAXY	90 INTERGALACTIC MEDIUM
81 ELLIPTICAL GALAXY	91
82 IRREGULAR GALAXY	92
83 GLOBULAR CLUSTER	93
84 SEYFERT GALAXY	94
85 QUASAR	95
86 RADIO GALAXY	96
87 BL LACERTAE OBJECT	97
88 EMISSION LINE GALAXY (NON-SEYFERT)	98 WAVELENGTH CALIBRATION (NASA LOG)
89	99 NULLS & FLAT FIELDS (NASA LOG)

4.2.5 Search on Homogeneous Object IDs

The IDs comprise a catalogue (one to four letters) followed by the object's ID within it. If the latter has two parts which are *not* a pair of celestial coordinates (e.g., BD -17 4554), these must be separated by one or more spaces. Otherwise, do not insert blanks. Spaces between the catalogue and the ID are optional except for catalogues which are prefixed by AOO (Any Other Object) when a space is required after the catalogue.

EXAMPLES: 1) NGC6960 is equivalent to NGC 6960
 2) BD-17 4554 is equivalent to BD -17 4554, however, BD-174554 is incorrect.

If you specify more than one ID to search on, it is preferable to put them on separate input lines, though you can enter them on a single line separated by commas or semicolons. Please note that unlike all the other search queries a space is not a request separator.

The catalogues, ordered by their priority, are as follows:

IUE	IUE Related (e.g., WAVECAL's)	HD	Henry Draper
BD	Bonner Durchmusterung	CD	Cordova Durchmusterung
CPD	Cape Durchmusterung	V*	Variable Stars (Kukarkin)
WD	White Dwarfs (Villanova Un.)	GD	Giglas White Dwarfs
NGC	New General Catalogue	IC	Index Catalogue
PK	Perek-Kohoutek (Plan.Neb.)	SK, AZV, LMC, SMC, FD	(Mag.clouds)
MRK	Markarian	QSO	Hewitt + Burbidge Quasar Cat.
MCG	Morphol. Cat. of Galaxies	ESOB	SO (B) Uppsala Catalogue
PG	Palomar Green Catalogue	ABCG	Abell Rich Clusters
ZZ	Solar System	NOVA	Novae
SN	Supernovae	AOO	Any Other Objects (see below)

AOO is composed of catalogues not listed above plus those objects which could not be uniquely identified.

Note: Spaces are optional between the above catalogue IDs and their entry but mandatory between an AOO's subcatalogue and its entry.

4.3 DISPLAY COMMAND

DISPLAY is invoked from the main menu and shows what the last executed search found, a screen at a time, up to a host center dependent number of records (400 when distributed). See the following sample output (the search was for object class 40).

Example of Output from DISPLAY

REF>CAM+IMAGE NO.>+APERTURE	HOMOGEN- EOUS ID	R.A. HH:MMSS	DECL DD:MMSS	OBSERV. DATE	EXP.T. SECS.	OB CL	USAGE/ DUBIOUS	EXP CODE
58>LWR10004L	HD15164	2:24 6	10:2130	24FEB81	600.0	40		
59>SWP13426L	HD99028	11:2119	10:4815	7MAR81	220.0	40	D	
60>LWR10090L	HD99028	11:2119	10:4815	7MAR81	55.0	40	D	
61>SWP13668L	HD118216	13:3234	37:2615	6APR81	1500.0	40	U	
62>LWR 5230L	BD+39 4926	22:4354	39:5059	2AUG79	420.0	40		40
63>SWP 6044L	BD+39 4926	22:4354	39:5059	2AUG79	2400.0	40		40
64>SWP 6512L	HD178524	19: 646	-21: 559	14SEP79	1260.0	40		702
65>SWP 6514L	HD163506	17:5323	26: 259	14SEP79	1500.0	40		501
66>SWP 7344L	HD118216	13:3233	37:2559	8DEC79	2100.0	40		741
67>LWR 6595S	HD132322	14:5725	-63:4359	9JAN80	300.0	40		503
68>LWR 6595L	HD132322	14:5725	-63:4359	9JAN80	600.0	40		703
69>SWP 7619S	HD132322	14:5725	-63:4359	9JAN80	900.0	40		502
70>SWP 7619L	HD132322	14:5725	-63:4359	9JAN80	1800.0	40		702
71>SWP 7793S	HD93614	10:4556	2:39 0	27JAN80	220.0	40		501
72>SWP 7793L	HD93614	10:4556	2:39 0	27JAN80	260.0	40		701
73>LWR 6005L	HD31964	4:5822	43:45 0	1NOV79	120.0	40		801
74>SWP 7063S	HD31964	4:5822	43:45 0	1NOV79	960.0	40		721
75>SWP 7063L	HD31964	4:5822	43:45 0	1NOV79	1200.0	40		821
76>SWP 9375L	HD175813	18:5521	-37:1027	26JUN80	3000.0	40		

<CR> = NEXT, "-" = PREVIOUS, "E" = END >

The Usage/Dubious column contains flags, "U" and "D," respectively, whose presence indicates that auxiliary information is available and what type it is, see section 4.6 (Auxiliary Information [Dubious and Usage Data]). "Usage" data will tell you who has selected this spectrum previously while "Dubious" comments usually indicate why the flux units of the spectrum may be in doubt or should be treated with care, e.g., trailed spectrum, no exposure time available.

4.4 SAVE DESCRIPTORS COMMAND

This function, which is executed from the main menu, saves the descriptors of what the last search found, onto your work file id.DES (where "id" is your ULDA ID). The format on the file is almost identical to DISPLAY's (see previous section, 4.3 [Display]), with the text prefixed by your search request. Like DISPLAY only the first 400 finds are saved.

One possible application of the command is for those who would like to look at the list of spectra at their leisure.

Note: If you issue the command more than once, your work file will hold the result of the last Save Descriptors only. However, remember the descriptors of any spectra you subsequently select will be appended automatically to your descriptor work file.

4.5 SELECT COMMAND

SELECT, which is started from the main menu, enables you to pick those spectra of interest from those found by the last search. The spectra you choose will be stored in your work file id.SPE (where "id" is your ULDA ID), their descriptors in id.DES, and their usage data appended to id.AUX.

Before starting the selection you are asked if you want the spectra that you will select to be encoded in compressed ASCII format (the default output being 2K binary blocks).

DO YOU WANT ASCII ENCODING OF SPECTRA? (<CR>/Y) >

If you intend to ship the data to your computer by E-mail or will be using a KERMIT of limited power, then ask for ASCII encoding (each spectrum, its header, and epsilons will be compressed and converted into universally recognised ASCII characters and altogether will take between 20 and 26 lines of text, each 72 characters long). Please note that ASCII encoded spectra will be illegible to all programs except the UNSPL, which will convert spectra into the format you want.

SELECT displays the descriptors of the spectra found by the last search in a format and a manner identical to those used by DISPLAY. The only difference is the bottom prompt lines, which include an example and read as follows.

GIVE REF.NOS.(E.G. 3,8) AND/OR RANGES(E.G.3-8) TO SELECT/END/NEXT OR LAST PAGE
NEXT (CR) OR PREV.(-) PAGE/E/SELECT LIST >

You select spectra by using the reference numbers in the first column of the display. You may either select spectra individually or as ranges by entering the reference numbers or ranges separated by commas, spaces, or semicolons, or by putting them on separate input lines.

EXAMPLE: Choosing individual spectra: 3, 7, 9, 14
EXAMPLE: Selecting ranges of displayed spectra: 8-14 2

Should you specify a spectrum more than once, only one copy will be made.

EXAMPLE: Had you specified 3, 5, 6, 3-8

then only one copy of spectra 3 through 8 would be stored on your work file.

Note:

1. When SELECT ends so does the ULDA and you are automatically returned to the IUE main menu. If you want to SAVE DESCRIPTORS or look at Dubious Information, this must be done before starting SELECT. However, SELECT will automatically append the descriptors of any spectra you selected to your descriptor work file.
2. There is a country dependent upper limit on the number of spectra you can select at a time (about 40).
3. If you have a line error while downloading your spectra, you can specify RECOVERY when logging in. You will be sent directly to SELECT, where you will then be able to select spectra from those you selected last time (i.e., normally those that you failed to download).

4. To select all the spectra found just enter 1-1000. (If the upper limit exceeds the number of spectra you have available to choose from, it is taken to mean "to the end.")
5. Each selection of a spectrum you make will be recorded in a "usage data" file and be flagged as having been used. These flags will show up in subsequent DISPLAYs.
6. If before terminating you choose any spectra which have "usage data," SELECT will inquire if you want to see it. If you say "yes," the dates selected, motives, and names and addresses of those who have previously chosen the spectra are displayed for each spectrum. In addition, the information is appended to your id.DES work file.

4.6 AUXILIARY INFORMATION (Dubious and Usage Data)

Two forms of auxiliary information are available, as described below. Both are being output to your id.AUX work file (where "id" is your ULDA ID), if they are displayed.

- "Dubious" comments. These compose a short description of why certain spectra's absolute fluxes should be treated with caution and are usually an indication that the spectrum was taken in "trailed mode," though a number of other reasons occur occasionally, e.g., "no exposure time is available." DISPLAY shows which spectra have dubious data with a "D" in the Dubious/Usage column. This is displayed and stored on your id.AUX work file using the "dubious comments" command in the ULDA's main menu.
- "Usage" data. If a spectrum has been selected previously, you can find out by whom, his address, when he chose it, and for what stated reason. Both "display" and "select" indicate the presence of usage data for a spectrum by a "U" in the Dubious/Usage column of displayed spectral descriptors.

For dubious comments display and filing use the DUBIOUS command in the main menu. All the dubious comments are displayed and filed (on your id.AUX work file) for the first 400 spectra found by the last search. For usage data display and filing use the SELECT command. When this terminates, if any spectra have been selected that have usage data, you will be asked if you want to see it. If you reply "yes," it will be shown on your terminal and appended to your id.AUX file.

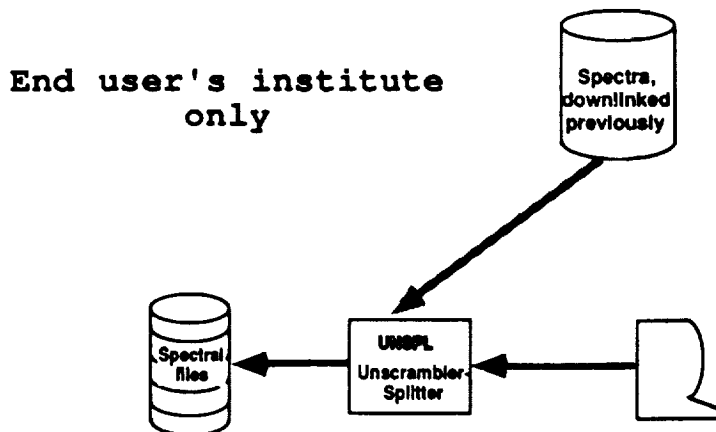
Chapter 5

How to Convert Selected Spectra into a Usable Form (UNSPL)

Since the output from the ULDA will be in a compressed format, a program (UNSPL) is supplied by your national host site to unscramble your file of selected spectra and split it up into separate files, one per spectrum, with a format suitable for immediate processing. Every end user institute will have its own version of UNSPL running on its computer, tailored suitably if necessary to its particular needs.

A useful additional feature of UNSPL for users connected to their national center by DECnet is the optional automatic down link of their work files.

If You are Connected to National Center by DECnet



5.1 UNSPL INSTALLATION UNDER VAX/VMS

Contact your national host site (see Appendix C for listing) and ask for a copy of the UNSPL program that should be installed at your computer node. This program does come in a mailable form; so obtaining a copy is very easy. If it is mailed, the program will need 222 blocks of disk space to be received.

When you receive the mailed UNSPL, enter the MAIL utility and, using the EXTRACT command, place the file in your library. UNSPL should be placed in the directory where you will be working with the ULDA data. The easiest way to handle UNSPL is to set up a directory just for ULDA work and place the program there. Edit the header in the file according to the instructions in the first part of the file.

Execute the COM (command) file by typing @ALL_UNSP.LMAIL and then execute a COM (command) file by typing @UNSP.LBLD. This will create 67 various files using approximately 371 blocks of disk space. You can delete all of the .OBJ (object files) when it is completed for a new total disk usage of 299 blocks. Also, you can delete the ALL_UNSP.LMAIL file.

You should put this definition in your LOGIN.COM file.

```
$ UNSPL ::= RUN disk:[directory]UNSP.L
```

"disk:[directory]" defines *your* ULDA disk and directory location on *your* computer system under your ID.

There are two files that will be of interest to the user. First is the file AAAREADME.FIRST. This is a file with simple instructions for using the UNSPL. The second file, UNSPL.LOG, will be created after you have used the UNSPL. This is a file which stores your responses to the UNSPL queries for a particular run. A new UNSPL.LOG is created each time you execute UNSPL. It may be useful to view if you have problems with UNSPL. Otherwise, this file can be deleted also.

5.2 RUNNING UNSPL

To execute the UNSPL, type in UNSPL. UNSPL will ask you a few simple questions to determine what it has to do.

1. UNSPL has to know in what form the input data are, i.e., binary input in 2K byte blocks or compressed encoded ASCII. The input data form is what you requested of ULDA's SELECT command. The first question is

```
UNSP.L> DID YOU ASK QUEST FOR ASCII CONVERSION [Y/N] ?
```

2. Next you are asked what output format you want.

```
UNSP.L> OUTPUT SPECTRAL FILES FORMAT: (check what is available with "?")
```

Reply with one of the three formats below. These formats may change with subsequent updates of software and/or this guide.

- FITS (FITS with image extension)
- ASCII (each record comprises a wavelength, flux, and epsilon)
- MIDAS (see Appendix A for a description of these formats)

In addition, a dummy format called LOCAL is available which you can use to install your institute's own output format. **Note:** If you choose MIDAS, then UNSPL must have been started under a MIDAS session.

3. *If and only if* you are

- a. running under VAX/VMS and are connected to the national host by DECnet
and
- b. an assignment has been made for the address of the work area (see section 5.1 [UNSPL Installation Under VAX/VMS]),

are you asked if you want automatic downlink of your user work files. For example:

```
UNSPL> DOWNLINK DATA FROM HOST SITE [Y/N] ?
```

```
UNSPL> ULDA USER IDENTIFICATION : (i.e., your ULDA ID)
```

```
UNSPL> ULDA HOST USER DIRECTORY :
```

4. Please contact your ULDA host for user directory location information. See Appendix C.
5. If the conditions in number 3 above are untrue or you replied N to the downlink question, give your input file name. For example:

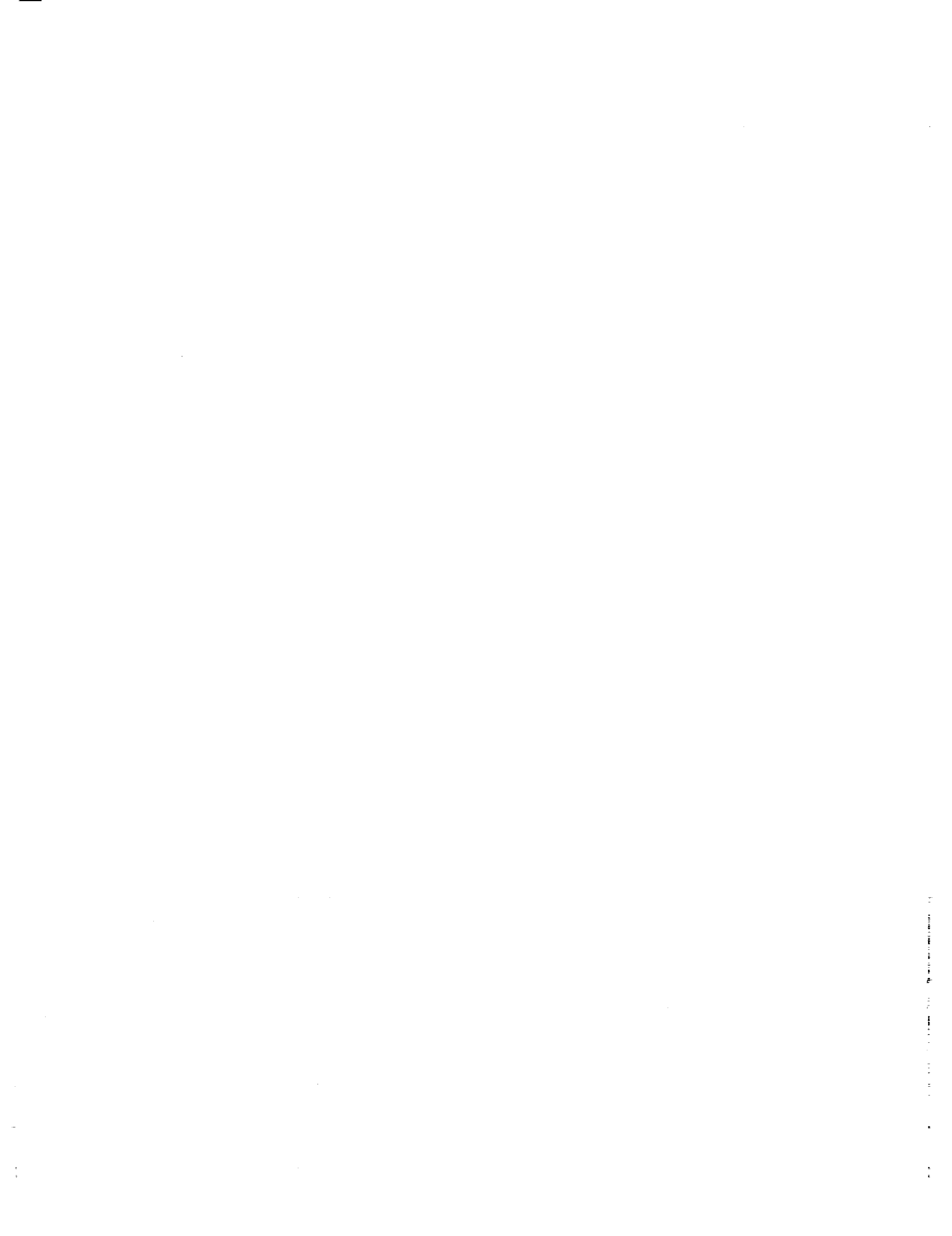
```
UNSPL> NAME OF USER WORK FILE :
```

UNSPL will retrieve your ULDA data files from the national host site, unscramble/unsplit the data, and write them out to your directory on your host computer. The files will be named as follows:

```
ULDAuserid.SPE
```

```
ULDAuserid.AUX
```

```
ULDAuserid.DES
```



Glossary

- ASCII** American Standard Code for Information Interchange; a standard 8-bit information code used with most computer and data terminals
- ESA** European Space Agency
- DECnet** Digital Equipment Corporation Networking products; a suite of hardware and software communication packages
- FITS** Flexible Image Transport System; a general purpose format for the interchange of astronomical data
- KERMIT** Publicly available software package used by dissimilar computer systems to access each other for communication and file transfers; developed at Columbia University Center for Computing Activities (New York, NY) about 1980
- MIDAS** Munich Image Data Analysis System
- NODIS** NSSDC's Online Data and Information Service, formerly known as the NSSDC account
- NSSDC** National Space Science Data Center, United States host for the ULDA

- QUEST** QUERy/SelecT program, also known as ULDA search and select program
- ULDA** Uniform Low Dispersion Archive of IUE spectra, corrected for bad ITFs and expressed as absolute fluxes (ergs/sec/cm²/)
- UNSPL** UNscrambler/SPLitter; program to generate individual spectral files on the user's computer node
- USSP** ULDA Software Support Package
- VILSPA** ESA IUE Observatory, VILlafranca, SPAIN

Appendix A

UNSPL Output Format Descriptions

A.1 ASCII TABLE

The user's compressed spectral work file is split into a number of ASCII files containing one spectrum each. Such files have a table format: The first column contains wavelengths, the second contains absolute fluxes (ergs/sec/cm²/), and the third contains quality flags in standard IUE format (epsilons). This format can be used as input to a surprising number of image processing systems and it allows printouts of spectral data.

The name of each output file is built with the camera, image number, and aperture keywords; the file extension is .ASC (e.g., the file concerning image number 12460, obtained from camera SWP with large aperture, will be assigned the name SWP12460L.ASC).

Records may be read subsequently using the FORTRAN statement

```
READ (n,*) WAVELEN,FLUX,IEPSIL
```

A.2 FITS FORMAT (IUE Extension)

Another standard output format provided by UNSPL is FITS, with the "image" extension. Each output file contains one spectrum in the format described in the following.

Block 1 of the FITS file contains the file header. The following FITS keywords are filled, some with fixed values, some with the contents of the user work file record header.

SIMPLE,	with " T," indicating standard FITS format
BITPIX,	with 16, indicating 16 bits/pixel
NAXIS,	with 1, indicating one axis
NAXIS1,	with the number of pixels in the spectrum
CRPIX1,	with 1, indicating the reference pixel location
CRVAL1,	with the start wavelength in Angstroms
CDEL1,	with the wavelength step in Angstroms
CTYPE1,	with "LAMBDA," indicating that wavelength is expressed in Angstroms
CAMERA,	with the IUE camera name
IMAGE,	with the image number
APERTURE,	with the aperture ("L" or "S")
DISPERSN,	with "LOW," indicating the dispersion
BSCALE,	with the scale factor
BZERO,	with the scale offset
DATAMAX,	with the computed maximum data value
DATAMIN,	with the computed minimum data value
RA,	with the right ascension
DEC,	with the declination

Block 2 of the FITS file contains the spectrum pixels as a string of binary half words, the number of pixels being given by the NAXIS1 keyword in the FITS header.

Block 3 of the FITS file contains the extension header. The following FITS keywords are filled, some with fixed values, some with the contents of the user work file record header:

XTENSION,	with "IMAGE," indicating Image extension
BITPIX,	with 16, indicating 16 bits/pixel
NAXIS,	with 1, indicating one axis
NAXIS1,	with the number of pixels in the spectrum
EXTNAME,	with "EPSILONS," indicating that the extension contains epsilons
CRPIX1,	with 1, indicating the reference pixel location
CRVAL1,	with the start wavelength in Angstroms
CDEL1,	with the wavelength step in Angstroms
CTYPE1,	with "LAMBDA," indicating that wavelength is expressed in Angstroms

Block 4 of the FITS file contains the error flags, one per pixel, as a string of binary half words. The number of pixels is given by the NAXIS1 keyword in the FITS header.

The name of each output file is built with the camera, image number, and aperture keywords; the file extension is .ULD (e.g., the file concerning image number 12460, obtained from camera SWP with large aperture, will be assigned the name SWP12460L.ULD).

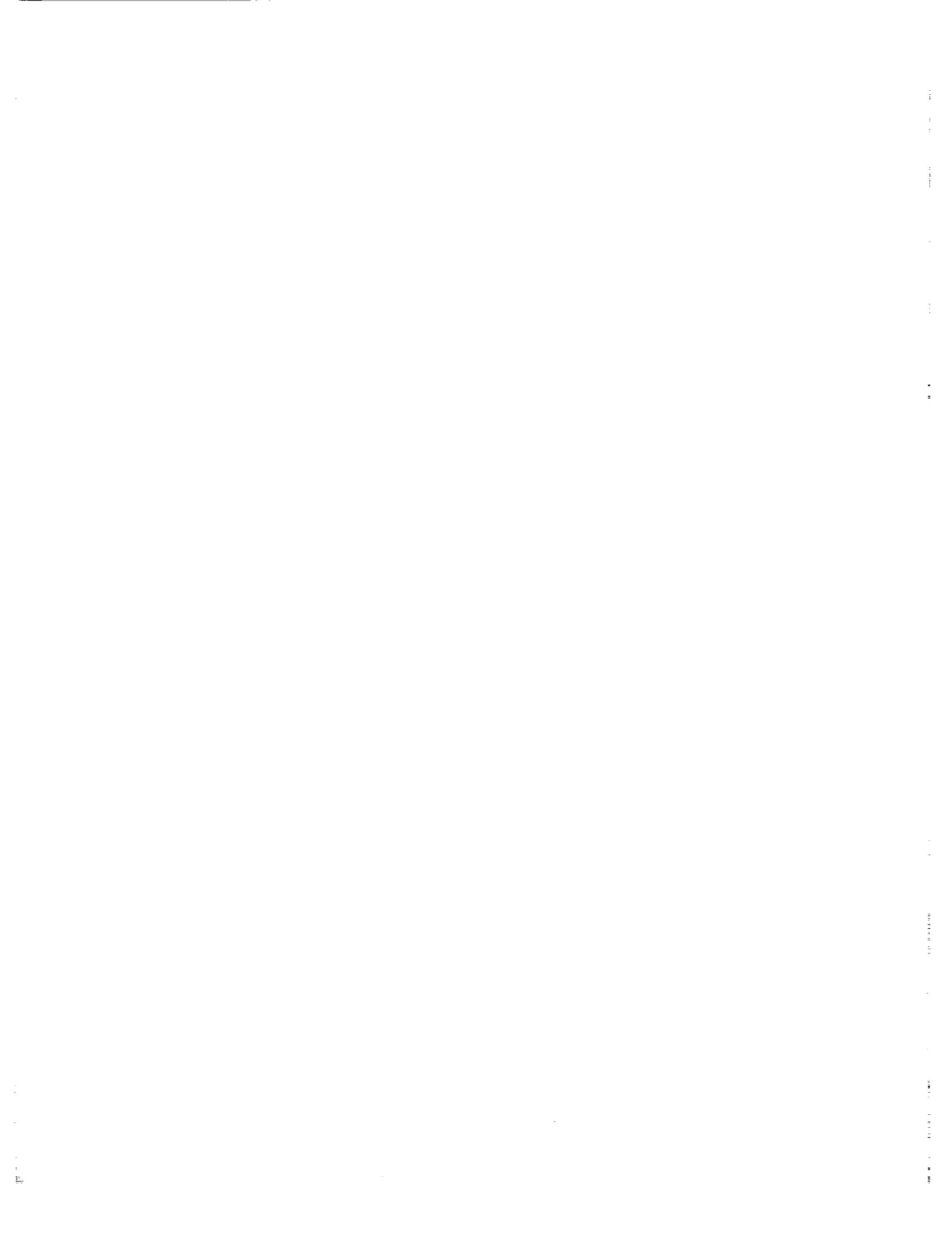
A.3 MIDAS FORMAT

MIDAS is a data processing system commonly available in Europe. The compressed user work file is split into a number of files in MIDAS format: The data of each spectrum constitute a one-dimensional "bulk data frame" (BDF) file, while an additional file of type "table" is provided to hold the epsilons of each spectrum. A table file is composed of three columns: The first contains the wavelengths of all the data flagged as of "bad quality" data, the second contains the value of the quality flag, and the third contains the "bad quality" data themselves.

The name of each output file is built with the camera, image number, and aperture keywords; the file extensions are .BDF for the bulk data frame file and .TBL for the table file (e.g., the files concerning image number 12460, obtained from camera SWP with large aperture, will be assigned the names SWP12460L.BDF and SWP12460L.TBL, respectively).

A.4 LOCAL FORMAT

At UNSPL installation time, it is possible to provide a routine allowing output of spectral files in a locally-defined format. If such a format is available at your institute, refer to your own system's data processing documentation for additional information.



Appendix B

UNSPL Messages

- **Message:** ASCII CONVERSION NOT REQUIRED
To: Log file
Severity: Informative
Meaning: The ASCII encoding of the user's spectral work file has not been asked for or is not necessary.
- **Message:** ASCII CONVERSION REQUIRED
To: Log file
Severity: Informative
Meaning: ASCII encoding of the spectral user work file has been requested.
- **Message:** CREATED ASCII FILE: filename
To: User terminal, log file
Severity: Informative
Meaning: A file in ASCII table format, containing data and epsilons for one spectrum, has been created.
- **Message:** CREATED FITS FILE: filename
To: User terminal, log file
Severity: Informative
Meaning: A file in FITS ("image" extension) format, containing data and epsilons for one spectrum, has been created.

- **Message:** CREATED MIDAS BDF FILE: filename
To: User terminal, log file
Severity: Informative
Meaning: A file in MIDAS bulk-data-frame format, containing one spectrum (data only), has been created.

- **Message:** CREATED MIDAS TBL FILE: filename
To: User terminal, log file
Severity: Informative
Meaning: A file in MIDAS table format, containing one spectrum (epsilons only), has been created.

- **Message:** DOWNLINK OF REMOTE USER WORK FILE(S) REQUESTED
To: Log file
Severity: Informative
Meaning: A downlink request has been issued: UNSPL will try to connect to the ULDA host site and copy user work files.
Note: DECnet systems only

- **Message:** END OF UNSCRAMBLING SESSION time date
To: Log file
Severity: Informative
Meaning: UNSPL has come to an end.

- **Message:** END-OF-FILE - NUMBER OF SPECTRA: nf
To: User terminal, log file
Severity: Informative
Meaning: EOF of the user's spectral work file has been reached: nf spectra have been formatted.

- **Message:** END-OF-FILE - RECORDS COPIED: nr
To: User terminal, log file
Severity: Informative
Meaning: EOF of a remote file has been reached: nr records have been downlinked and written on a file on your local system.

- **Message:** ERROR OPENING LOCAL USER WORK FILE
To: User terminal, log file
Severity: Fatal
Meaning: An error has been encountered trying to open the user spectral work file on your local system: Check correctness of file name and/or directory.

- **Message:** ERROR OPENING REMOTE USER WORK FILE
To: User terminal, log file
Severity: Fatal
Meaning: An error has been encountered trying to open a user work file on the ULDA host system: Check if connection to the ULDA host system is active or if your work files are still on USSP_DIR.
Note: DECnet systems only

- **Message:** ERROR READING LOCAL USER WORK FILE-RECORD NO.rm
To: User terminal, log file
Severity: Warning
Meaning: An error has been encountered trying to read the rm-th record of the user spectral work file on your local system: The file has possibly been transmitted only partially from the ULDA host to your system.

- **Message:** ERROR READING REMOTE USER WORK FILE-RECORD NO.m
To: User terminal, log file
Severity: Warning
Meaning: An error has been encountered trying to read the m-th record of the user spectral work file on the ULDA host system: Check if connection to the ULDA host system is active; if so, retry. Your file has only partially been downlinked.
Note: DECnet systems only

- **Message:** ERROR WRITING ASCII/FITS FILE filename
To: User terminal, log file
Severity: Warning
Meaning: An error has been encountered while writing an output file on your system: Either you got a system error (e.g., disk quota exceeded) or your user spectral work file is ruined due to transmission problems. The files output up to this moment are correct.

- **Message:** ERROR WRITING LOCAL USER WORK FILE-RECORD NO.m
To: User terminal, log file
Severity: Fatal/warning
Meaning: While copying a user work file from the ULDA host to your system, an error occurred. The error is fatal if the file is the spectral one.
Note: DECnet systems only

- **Message:** FORMAT OF OUTPUT SPECTRAL FILES = format
To: Log file
Severity: Informative
Meaning: This message recalls selected format of output files.

- **Message:** LOCAL FORMAT NOT AVAILABLE
To: User terminal, log file
Severity: Fatal
Meaning: A routine allowing the output of spectral files in your own institute format has not been provided at installation time: Contact your local system manager.

- **Message:** LOCAL USER WORK FILE NAME = filename
To: Log file
Severity: Informative
Meaning: A file having the specified filename will be available on your system after the downlink phase.
Note: DECnet systems only

- **Message:** MIDAS FORMAT NOT AVAILABLE
To: User terminal, log file
Severity: Fatal
Meaning: The output of spectral files in MIDAS format is not available: Contact your local system manager to find out if MIDAS is available at your institute.

- **Message:** PROBLEMS WITH MIDAS BDF/TBL FILE: filename
To: User terminal, log file
Severity: Fatal
Meaning: An error has occurred while writing files in MIDAS format: Check your local MIDAS environment.

- **Message:** REMOTE AUXILIARY USER WORK FILE NAME = rem_file
To: User terminal, log file
Severity: Informative
Meaning: This message displays the name of the auxiliary information user work file that is to be copied.
Note: DECnet systems only
- **Message:** REMOTE DESCRIPTORS USER WORK FILE NAME = rem_fil
To: User terminal, log file
Severity: Informative
Meaning: This message displays the name of the descriptor's user work file that is to be copied.
Note: DECnet systems only
- **Message:** REMOTE SPECTRAL USER WORK FILE NAME = rem_fil
To: User terminal, log file
Severity: Informative
Meaning: This message displays the name of the user's spectral work file that is to be copied.
Note: DECnet systems only
- **Message:** ULDA/USSP UNSCRAMBLER-SPLITTER date time UNSCRAMBLING SESSION STARTED
To: Log file
Severity: Informative
Meaning: This is self-explanatory.
- **Message:** UNABLE TO OPEN ASCII/FITS FILE filename
To: User terminal, log file
Severity: Warning
Meaning: An error has been encountered trying to open an output file in the specified format on your local system, probably due to a system error (e.g., disk quota exceeded).
- **Message:** USER WORK FILE NAME = filename
To: Log file
Severity: Informative
Meaning: Name of user work file (remote or local) used for downlinking and/or unscrambling/splitting.

Appendix C

National Host Information

The following is basic contact and address information for the various national hosts, ordered alphabetically by the country served with the following two exceptions.

- Sweden, Norway, Denmark, and Finland are grouped together under Nordic Countries (since they share a single host).
- ST-ECF/ESO serves itself only, though it has national host status.

BELGIUM

Host Manager: Marijke Burger
Host: Royal Belgian Observatory, Ringlaan 3, B-1180 Brussels
E-mail Address: N/A
Tel.: +32 2 3752484
Telex: 21565 OBSBEL B
FAX: +32 2 3749822

CANADA

Host Manager: Dennis Crabtree
Host: DAO/CSADC, 5071 W. Saanich Road, Victoria, B.C. V8X 4M6
E-mail Address: SPAN - NSSDCA::PSI%DAO::CRABTREE
also see DATAPAC
BITNET - CRABTREE@NRCD AO
CRABTREE@UVPHYS
DATAPAC - 0302068100434

Tel.: +1 604 3880025
Telex: 049 - 7295
FAX: +1 604 388 - 0045

FRANCE

Host Manager: Gerard Jasniewicz
Host: CDS, Observatoire de Strasbourg, 11 rue de l'Universite, 67000 Strasbourg
E-mail Address: EARN - JASNIEWI@FRCCSC21
Tel.: +33 88 358200
Telex: 890506 STAROBS F

ITALY

Host Manager: Mariagrazia Franchini
Host: Osservatorio Astronomico di Trieste, Via G.B. Tiepolo 11, I-24131, Trieste
E-mail Address: SPAN - ASTRTS::ADOC
 ESRIN1::VAXLNF::ASTRTS::ADOC
 PSI%02222403259::ADOC
 40057::ADOC
 EARN - ADOC@ASTRTS.INFNET
Tel.: +39 40 309398
Telex: 461137 OAT I

NETHERLANDS

Host Manager: Cor de Vries
Host: Sterrewacht Leiden, Postbus 9513, 2300 RA
E-mail Address: EARN - DEVRIES@HLERUL51
Tel.: +31 71 275861
Telex: 39058 ASTRO NL

NORDIC COUNTRIES

Host Manager: Kjell Eriksson
Host: Uppsala Astronomical Observatory, P.O. Box 515, S-75120 Uppsala, Sweden
E-mail Address: EARN - ASTKE@SEUDAC21
 KJELL@SEMAX51
Tel.: +46 18 112488
Telex: 76024 UNIVUPS S

SPAIN

Host Manager: Cornelius Driessen
Host: ESA/VILSPA, Apartado 54065, 28080 Madrid
E-mail Address: EARN - LU@ESOC
 SPAN - VILSPA::CD
Tel.: +34 1 4019661
Telex: 42555 VILS E

ST-ECF/ESO

Host Manager: Fabio Pasian
Host: ST-ECF/ESO, Karl Schwarzschild Strasse 2, D-8046 Garching
E-mail Address: SPAN - ESOMC1::PASIAN
28754::PASIAN
PSI%0262458900924::PASIAN
EARN - PASIAN@DGAESO51
Tel.: +49 89 32006365
Telex: 52828222 EO D

SWITZERLAND

Host Manager: Thierry Lanz
Host: Institut d'Astronomie de Universite de Lausanne, CH-1290 Chavannes-des-bois
E-mail Address: SPAN - 20539::LANZ
EARN - LANZ@CGEUGE54 or
- POSTMASTER@CGEUGE54
PSI - PSI%4682161350::LANZ
Tel.: +41 22 552611
Telex: 419209 OBSG CH
FAX: 41 22553983

UNITED KINGDOM

Host Manager: Josephine Murray and Michael Lawden
Host: RAL, Chilton, Didcot, Oxon OX11 OQX, England
E-mail Address: JANET - User name STAR,
Site - UK.AC.RL.STAR
SPAN - 19457::JM
- RLVAD::JM
Tel.: +44 235 21900
Telex: 83159

UNITED STATES

Host Managers: Charleen Perry and Michael Van Steenberg
Host: NASA/GSFC, NSSDC Code 633, Greenbelt, Maryland 20771
E-mail Address: SPAN - NCF::ULDA
- NCF::PERRY
Tel.: [+1] (301) 286 - 2899
Telex: 89675 NASCOM GBLT
FAX: [+1] (301) 286-4952
TWX: 7108289716

WEST GERMANY

Host Manager: Dominic R. Scales
Host: Astronomisches Institut der Universitat, Waldhauserstrasse 64, 74 Tubingen
E-mail Address: SPAN - AITMVX::SCALES
EARN - PSSC001@DTUZDV5A
Datex-P - [0262] 45707130039
Tel.: +49 7071 295471

