

IUE  esa



NEWSLETTER

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IUE ESA NEWSLETTER

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IUE OBSERVATORY CONTROLLER'S MESSAGE

It is a pleasure for me to be very brief this time in this special issue of the Newsletter. The 10th Anniversary Celebrations in VILSPA were a very enjoyable event involving many of those who were and still are associated with VILSPA activities in general and the IUE Project in particular.

Today finds the spacecraft still in good shape and I am pleased to tell you that the ESA-SPC, at the last meeting in June, approved the continuation of the IUE operations in 1989. The call for proposals will be sent to you shortly.

The present issue is special in two ways: as you will have noticed, the 10th Anniversary has been used to give the ESA IUE Newsletter a new cover. This composition showing the FES image of SN 1987A has been very tastefully done by Paul Berkhout of the STP Branch of ESTEC. Our thanks for a very nice layout.

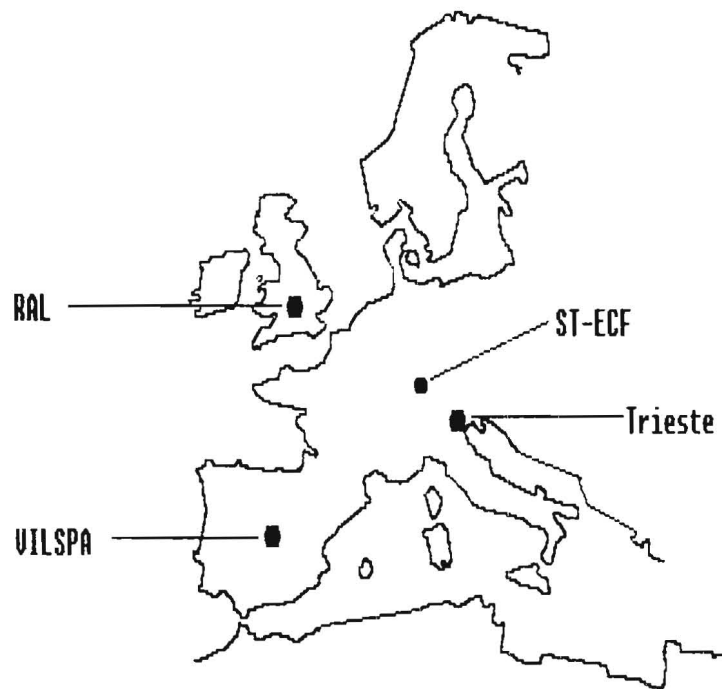
The second item which makes this issue special is its content. We are pleased to have supplied the ULDA/USSP (ULDA = Uniform Low Dispersion Archive and USSP = ULDA Support Software Package). This represents a new IUE

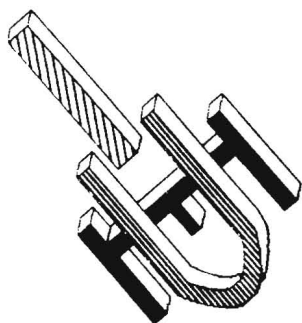
Project Product and will allow you to get directly to the IUE Archive, without any intervention by us. In the meantime the ULDA/USSP has been installed in national hosts in nine countries, and the availability of direct access to low dispersion IUE data (25000 spectra up to 1984) is now a reality for most members of the astronomical community in twelve countries. Since the ULDA/USSP Host in France is not yet running, all interested parties are welcome to connect to VILSPA for the time being.

I hope that you will find this new initiative of the IUE Project consistent with our tradition of service to the users and we hope that it will be as useful to you as we designed it to be. The effort in creating the ULDA/USSP has been, in the best IUE tradition, truly international since important contributions have been made by J.R. Munoz (VILSPA, Spain), C. Driessen (VILSPA, Spain), F. Pasian (Observatory of Trieste, Italy), J. Murray (RAL, U.K.) and G. Russo (STECF, RFA). We would also like to mention the critical review of the original concept by our colleagues in GSFC, especially Cathy Imhoff.

WILLEM WAMSTEKER

The USSP is a software system produced as a collaborative venture by VILSPA, OAT (Trieste), RAL and ST-ECF, under the control and coordination of VILSPA.





USSP

Version 1.0

USER'S GUIDE

Cornelius Driessen (ECD / VILSPA)
Fabio Pasian (OAT)
February '88

USSP USER's GUIDE

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0 Glossary

ULDA - Uniform Low Dispersion Archive of IUE spectra. These have been corrected for bad ITF's and expressed as absolute fluxes (ergs/sec/cm²/Å).

USSP - ULDA Software Support Package.

1 Introduction.

The USSP is a software system which, in a single sitting, allows you to obtain copies on your computer of those IUE low dispersion spectra you are interested in.

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

There are two USSP programs you will use:

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

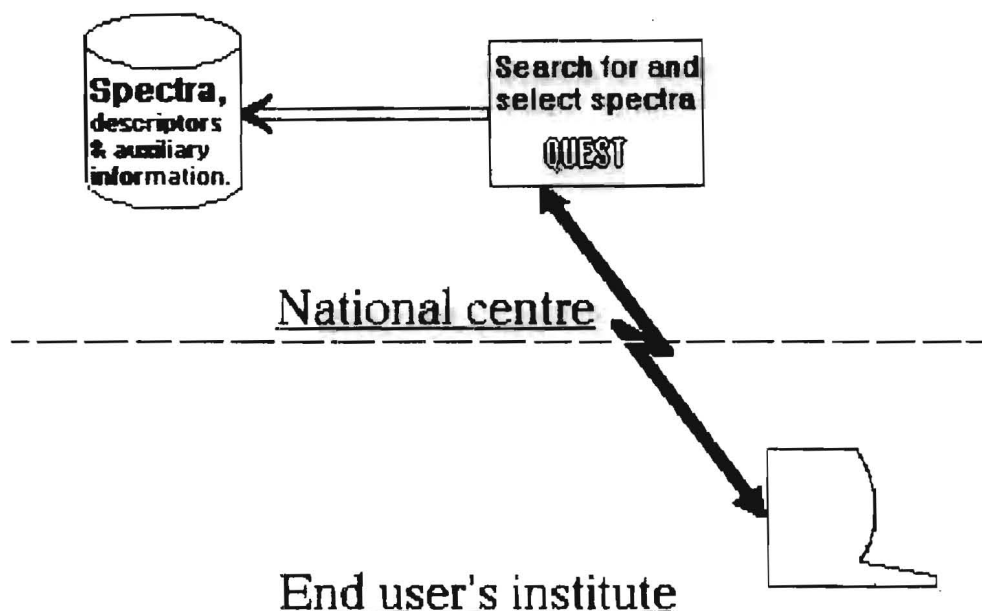
QUEST runs at your national centre while UNSPL runs at your local computing centre. The following section comprises an overview of how to use the USSP and its components.

2 Overview of how to use the USSP

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 centre. The steps required are:

Stage 1 Search and Select spectra

Login to your national centre's USSP account from your institute, whereupon you will normally enter the Query/Select program QUEST automatically. QUEST will allow you to search for and select spectra in a simple way (described in the section 'Using QUEST') and will store them and/or any additional information requested on files at the national centre - see the following illustration.



Stage 2 Transfer data to your computer

Only required if not connected to National centre by DECnet.

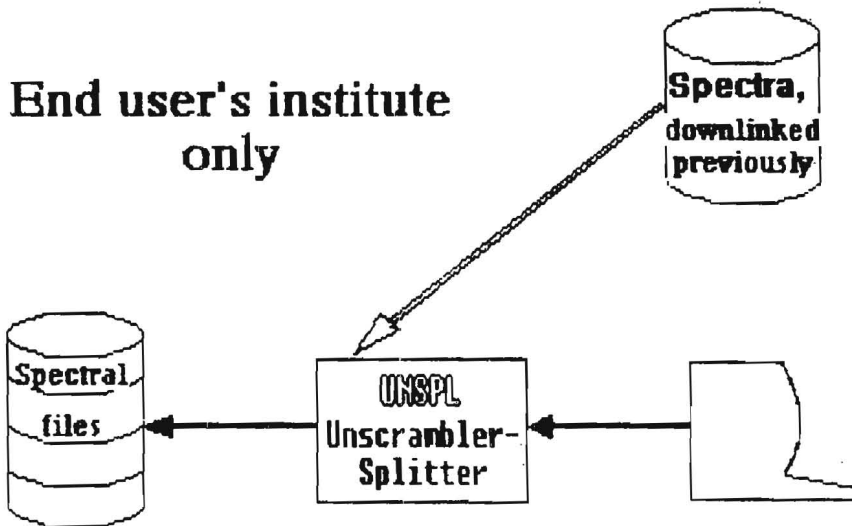
Copy the spectra you have selected (held on a single file) to your computer using either a file transfer system (e.g. KERMIT) or computer mail. The Query / Select program affords you the option of outputting the spectra in compressed ASCII encoded form, which is essential if you intend to use E-Mail or a file transfer system which does not support transfer of 2K blocks of binary data.

Should 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.

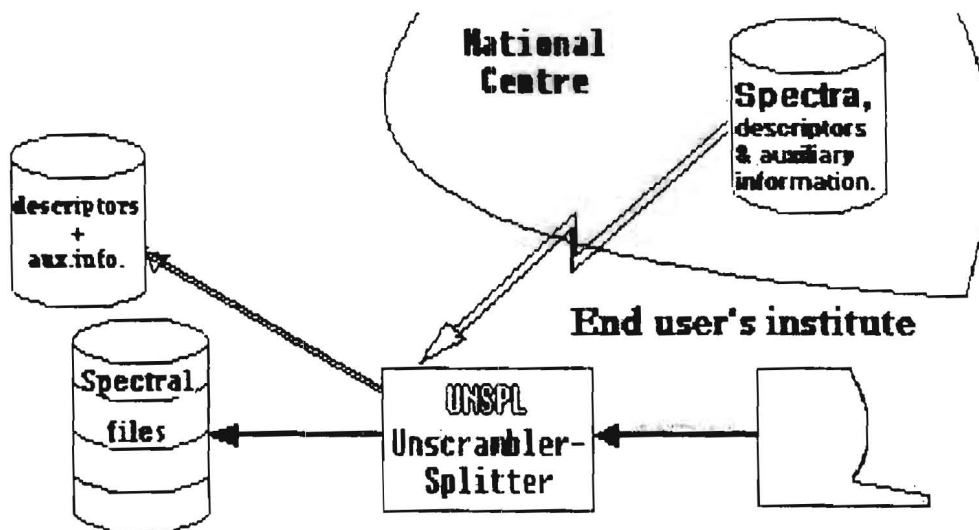
Stage 3 Generate spectral files on your computer

Run program UNSPL on your computer to generate individual spectral files having a format suitable for your image processing system. UNSPL (UNscrambler/SPLitter) will downlink your data for you from the national host **IF** you are connected to it by a **DECnet** link (this data comprises 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 centre



If you are connected to national centre by DECnet



3 Overview of how to run the Query/Select program (QUEST).

3.1 General considerations.

- 1) Replies to QUEST may be in upper or lowercase and are free format where reasonable.
- 2) At every stage in the program you will be prompted for what you can reply next, using examples wherever possible.
- 3) 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** to QUEST.
- 2) **SEARCH** for a set of spectra.
- 3) **SELECT** those spectra you want from those found by the last search.

LOGIN

- o Give QUEST your ID (if you do not have one yet, ask QUEST to give you one of your choice). This ID is used to form the names of your workfiles output by QUEST. e.g. if your ID is 'UKMIKE' then the spectra which you eventually choose will be stored on a file called 'UKMIKE.SPE'.

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

SEARCH

You may search on one or more of the following.

- o A list of cameras and/or image numbers and/or apertures.
- o A list of R.A and Declination ranges.
- o A list of IUE object classes.
- o A list of homogeneous object ID's.

You will always be prompted for the above four classes of input, just press <CR> for those you are not interested in. 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.

SELECT

You enter the SELECT command from the main menu, whereupon a description of the spectra found by the last search will be displayed a screen-full at a time. These descriptors, (i.e. camera, image number, aperture, homogeneous ID, coordinates, date of observation etc.) take one line each and are prefixed by an index (ranging from one to the number of spectra found) which are 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', whereupon QUEST will terminate. From this you can see that SELECT is NOT cumulative (which is also true for the other database commands, e.g. the output from a search overwrites the previous search's results).

3.3 Output from QUEST.

Your output from QUEST is stored on workfiles whose names comprise your QUEST ID (see LOGIN) and standard qualifiers, these being:

- id.SPE - Holds the spectra you selected, output from the SELECT command. ASCII file if you asked SELECT to perform ASCII encoding, else a binary file with block length of 2K bytes.

- id.DES - Description of what the last search found, output from the last SAVE DESCRIPTORS command. (ASCII file)

- id.AUX - Auxiliary information about the spectra you found, output from the last AUXILIARY INFO. command. (ASCII file)

Please note that

- A)** QUEST will normally delete and recreate your own workfiles when you LOGIN to it. Therefore **never** use someone else's ID since you may destroy his output and he delete yours. For the same reason do not use communal ID's.

- B)** Workfiles have a lifetime set by your national host manager which will be in the order of 24 - 48 hours. After this time has expired anyone using QUEST will automatically delete them.

- C)** Workfiles are not cumulative, for example, if you issue a command that writes to disc (e.g. SAVE DESCRIPTORS) more than once, the workfile will hold the output from the last use of the command only.

4 How to use QUEST (for reference)

4.1 Functions available during LOGIN to QUEST

Logging in to QUEST will normally comprise entering your QUEST ID and a number from a menu. However, certain additional functions are also available to you at start up, for instance:

- o If you do not have an ID - QUEST will let you choose one.
- o If you have forgotten your ID - QUEST will help you find it.
- o If you were unable to download all your spectra you can enter RECOVERY mode.

4.1.1 Giving your QUEST ID

On entry QUEST will ask you to enter your QUEST ID. Such an ID comprises a two letter country ID followed by up to 6 non-special characters **and must have been given to you by QUEST** in a previous session. Examples of valid ID's are:

UKJO - Jo in the UK
WGINGE - Inge in West Germany.

Since ID's define your output file names (see 3.3) on no account use someone else's since you stand a chance of wiping out his files (and he yours). If you have forgotten your ID see 4.1.3, while if you do not have one see 4.1.2.

4.1.2 Getting an ID (Registration)

To avoid possible bureaucratic delays QUEST allows you to register yourself, a process you need go through once and once only.

Very briefly, as you are told on the screen, reply 'R' to the startup prompt whereupon the possible countries and their two letter abbreviations are displayed (the 2 character codes will be the first two letters of your ID). You are then prompted in turn for:

- o The ID of your choice (rejected if invalid or already exists).
- o Your name (used, for example, when displaying the ID's and owners for a country).
- o Your work address and / or telephone number and / or computer address, used if someone has to get in touch with you, **not** to check up on you.

NOTES

- 1) 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 into QUEST.
- 2) If the first ID you choose already exists it may be wise to look at the extant ID's for your country (see next subsection) to help you choose one you like.
- 3) You will be asked to confirm each reply to guard against possible typing errors.

4.1.3 Display the QUEST ID's 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, pick the one you are interested in as requested.

4.1.4 Recovery Mode

Should you have been unable to downlink all the spectra you chose you may send QUEST into 'recovery mode' by giving your motive for using QUEST as 'recovery' (in answer to the second question QUEST asks you). If you ask for recovery you will not go through QUEST's 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 of QUEST.

EXAMPLE: Suppose you only managed to downlink and unscramble (using UNSPL) the first 2 spectra you selected, then reenter QUEST, go into recovery mode and reply as follows to the Select prompt :-

3-100

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

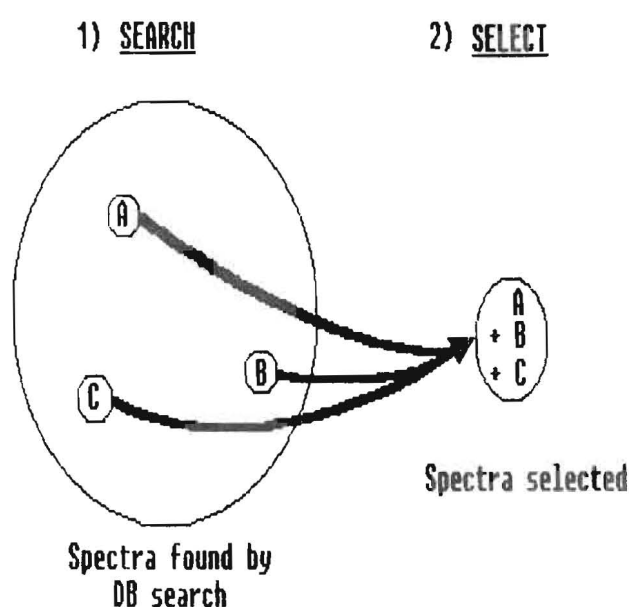
Please note, when in Recovery mode:-

- 1) The only function available to you is SELECT.
- 2) Your workfile's expiry date/time will be increased.
- 3) No new 'usage' data will be written (see section 4.6).

This page is intentionally left blank.

4.2 Search

Before describing the SEARCH function it is worth remembering that your goal is the selection of spectra, which, as illustrated in the diagram below, QUEST helps you to do in a two step procedure. Namely, first do a DB search for a set of spectra which includes those you want and second, select those spectra you want, i.e:-



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 (just reply <CR> to those you are uninterested in). Therefore there are no keywords to remember and, because of the way the requests are made, you supply no logical operators (EQ, LT, GT, AND, OR and parentheses in the search request are all deduced from the context). The possible search classes are:-

- o A list of Cameras and/or image numbers and/or apertures.
- o A list of R.A and Declination ranges.
- o A list of IUE object classes.
- o A list of homogeneous object ID's.

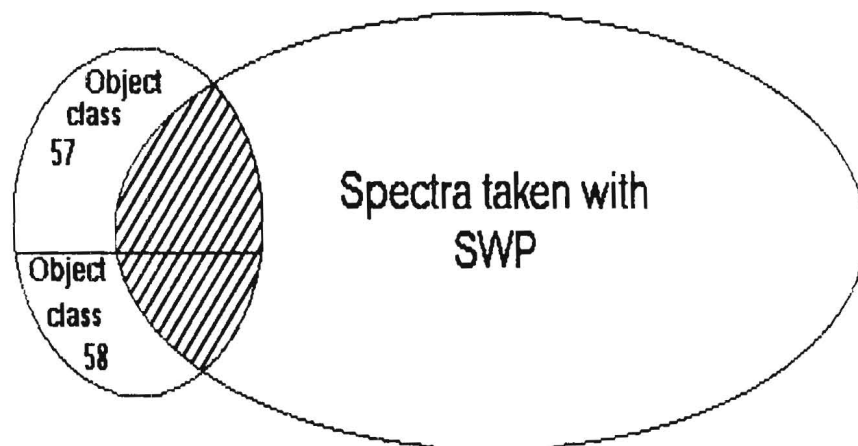
Should you have specified something for more than one of the above classes of request a search will be made for spectra which meet all the classes specified - see the following example and diagram.

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.

Reply **<CR>** to the other prompts (for homogeneous ID & RA+Declination)



Spectra falling into the shaded zone will be found by Search

You can specify many search elements within a class, these being separated by commas, spaces or preferably entered one per line. In such a case these requests are linked by logical OR's.

Example:- Search for spectra with Declinations of around either 7 or 15 degrees respectively.

Reply to the RA/DEC search prompt thus:

```
RA+DEC.PAIRS/<CR>/?/X > ALL 7 <CR>
RA+DEC.PAIRS/<CR>/?/X > ALL 15 <CR>
RA+DEC.PAIRS/<CR>/?/X > <CR>
```

Also reply <CR> to all the other search prompts.

OR

```
RA+DEC.PAIRS/<CR>/?/X > ALL 7 , ALL 15 <CR>
RA+DEC.PAIRS/<CR>/?/X > <CR>
```

Notes

- 1) Putting one search element per line (see above example) is often the best option since should you make a detectable typing error the current line is discarded, hence the less on it the better. Furthermore the separation between requests stands out better.
- 2) As was shown diagrammatically on the previous page, OR's within a class of requests have a higher precedence than AND's between two or more classes. As will be shown later, any implicit AND's within a search element have the highest precedence of all.

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 are:

- 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 3 of the above are given (e.g. SWP12345L) you will specify a spectrum uniquely (hence 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 are:-

- 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.

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

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 always comprise 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, while 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 comprise 1, 2, 4 or 6 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: 5hrs. 8mins. (of R.A.) must be represented by **0508**, however 5hrs. 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 (?).

Search window sizes

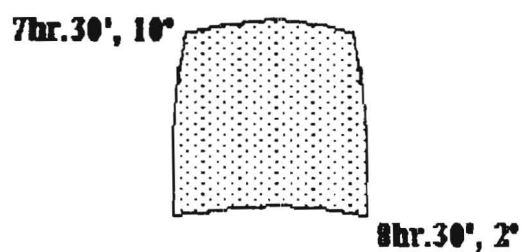
R.A.		DECLINATION	
Accuracy used	Window size	Accuracy used	Window size
Hours only	± 30 Mins.	Degrees only	± 4 Degs.
Hours & minutes	± 10 Mins.	Degrees & minutes	± 25 Mins
Hours, mins.& secs	± 30 Secs.	Degrees, mins.& secs.	± 1 Min.

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

Search windows for 2 different requests for R.A. = 8hrs, Dec. = 6°

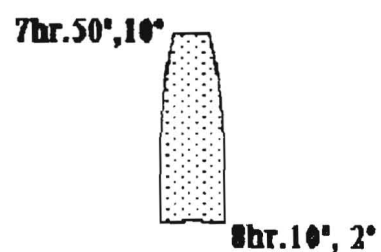
For request = 8 6

Search window:-

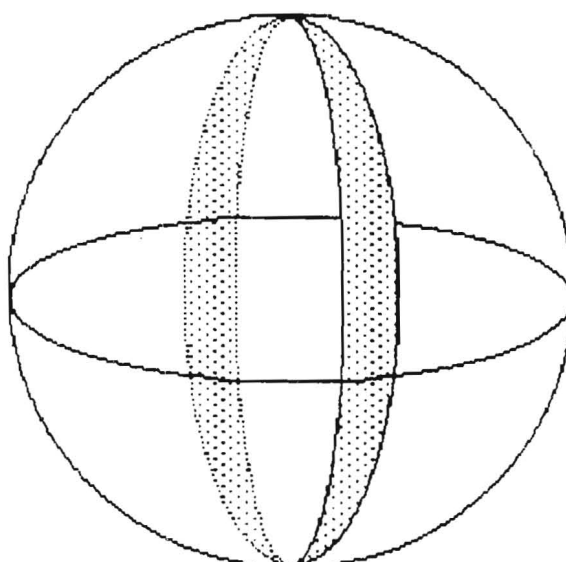


For request = 0800 6

Search window:-



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>
```

4.2.5 Search on Homogeneous object ID's

The ID's comprise a catalogue (one to four letters) followed by the object's ID within it. Should the latter have 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 rare 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.

Please note:

Use HELP (i.e. '?') to display the possible catalogues and their heirarchy - if an object has an entry in two or more catalogues, the catalogue nearest to the top of HELP's list of catalogues will be used.

4.3 DISPLAY

DISPLAY is invoked from the main menu and shows what the last search found, a screenfull at a time, up to a host centre 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!  HOMOGENEOUS  !  R.A.  !  DECL.  !OBSERV. !EXP.T.  !OB!USAGE/  !EXP.
NO.)+APERTURE!  ID           !HH:MMSS! DD:MMSS! DATE  !SECS.  !CL!DUBIOUS!CODE!
58>LVR10004L!HD15164         ! 2:24 6! 10:2130!24FEB81! 600.0!40!  !  !
59>SVP13426L!HD99028         !11:2119! 10:4815! 7MAR81! 220.0!40!  D  !
60>LVR10090L!HD99028         !11:2119! 10:4815! 7MAR81! 55.0!40!  D  !
61>SVP13668L!HD118216        !13:3234! 37:2615! 6APR81! 1500.0!40!  U  !
62>LVR 5230L!BD+39 4926      !22:4354! 39:5059! 2AUG79! 420.0!40!  ! 40 !
63>SVP 6044L!BD+39 4926      !22:4354! 39:5059! 2AUG79! 2400.0!40!  ! 40 !
64>SVP 6512L!HD178524        !19: 646! -21: 559!14SEP79! 1260.0!40!  ! 702!
65>SVP 6514L!HD163506        !17:5323! 26: 259!14SEP79! 1500.0!40!  ! 501!
66>SVP 7344L!HD118216        !13:3233! 37:2559! 8DEC79! 2100.0!40!  ! 741!
67>LVR 6595S!HD132322        !14:5725! -63:4359! 9JAN80! 300.0!40!  ! 503!
68>LVR 6595L!HD132322        !14:5725! -63:4359! 9JAN80! 600.0!40!  ! 703!
69>SVP 7619S!HD132322        !14:5725! -63:4359! 9JAN80! 900.0!40!  ! 502!
70>SVP 7619L!HD132322        !14:5725! -63:4359! 9JAN80! 1800.0!40!  ! 702!
71>SVP 7793S!HD93614         !10:4556!  2:39 0!27JAN80! 220.0!40!  ! 501!
72>SVP 7793L!HD93614         !10:4556!  2:39 0!27JAN80! 260.0!40!  ! 701!
73>LVR 6005L!HD31964         ! 4:5822! 43:45 0! 1NOV79! 120.0!40!  ! 801!
74>SVP 7063S!HD31964         ! 4:5822! 43:45 0! 1NOV79! 960.0!40!  ! 721!
75>SVP 7063L!HD31964         ! 4:5822! 43:45 0! 1NOV79! 1200.0!40!  ! 821!
76>SVP 9375L!HD175813        !18:5521! -37:1027!26JUN80! 3000.0!40!  !  !

<OR> = 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 4.6. '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 etc.

4.4 Save Descriptors

This function, which is started from the main menu, saves the descriptors of what the last search found, onto your workfile 'id.DES' (where 'id' is your QUEST ID). The format on the file is almost identical to DISPLAY's - see previous section, with the text prefixed by your search request. Like DISPLAY only the first 400 finds are saved, though this figure can be altered by your USSP host manager.

One possible application of the command is for those who would like to look at the list of spectra at their leisure rather than being stampeded into making a real time decision.

Note If you issue the command more than once your workfile will hold the result of the last Save Descriptors only.

4.5 SELECT

'Select', which is started from the main menu, enables you to pick those spectra you are interested in from those found by the last search, or to be exact, from the first 400 spectra found by the search. The spectra you choose will be stored on your workfile 'id.SPE', where 'id' is your QUEST ID.

Before starting the selection you are asked if you wish 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 you 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 - 26 lines of text, each 72 characters long). Please note that ASCII encoded spectra will be illegible to all except the UNSPL program which will convert them 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 that used by DISPLAY, the only difference being 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 of them separated by commas, spaces or semicolons, or put them on separate input lines.

Example Choosing individual spectra: 3 7 9, 14

Example Selecting ranges of displayed spectra: 8-14 , 20-22

Should you specify a spectrum more than once don't worry, only one copy will be selected.

Example Had you specified 3, 5, 6, 3-8

then only one copy of spectra 3 through 8 will be stored on your workfile.

- NOTE**
- 1) There is a country dependent upper limit on the number of spectra you can select at a time (circa 40).
 - 2) When SELECT ends so does QUEST. Hence if you wanted to, say, SAVE DESCRIPTORS or look at Auxiliary Info., this must have been done **before** starting SELECT.
 - 3) Should you have had a line error when downloading your spectra you can specify 'recovery' when logging in, when you will be sent directly to SELECT. 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, which will show up in subsequent DISPLAY's.

4.6 AUXILIARY Information

The AUXILIARY Info. command, which is started from the main menu, enables you to get at two specific types of additional information about the spectra found by the last search, namely:

- o **'Dubious'** comments. These comprise 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.

- o **'Usage'** data. If a spectrum has been selected previously you can find out by whom, when and for what stated reason. DISPLAY shows which spectra have usage data by a 'U' in the Dubious/Usage column.

Upon starting, the command will ask you which of the above types of data you are interested in. Whichever you choose the information will be displayed and filed on your workfile id.AUX, should you want the other type as well you will be given the opportunity when you have finished with your first choice.

Dubious comments display & filing: All the dubious comments are displayed & filed for the first 400 or so spectra found by the last search.

Usage data display & filing: At the time of writing this has not been implemented yet. The scheme proposed is one very similar to the SELECT command, namely the spectral descriptors will be displayed and you choose the ones for which you want usage information.

5 How to convert selected spectra into a usable form (UNSPL).

Since the output from QUEST will prove indigestible to image processing systems, a program ('UNSPL') is supplied to unscramble your file of selected spectra and split it up into separate files, one per spectrum, which have a format suitable for immediate processing. Every end user institute will have its own version of UNSPL running on their computer, tailored suitably if necessary to their peculiar needs.

A useful additional feature of UNSPL for users connected to their national centre by DECnet is the optional automatic downlink of their workfiles. Please see the diagrams on page 5.

5.1 Running UNSPL

Upon starting UNSPL will ask you a few simple questions to determine what it has to do, should uncertainty overcome you suddenly you can get HELP by entering '?' to any question.

1) UNSPL has to know in what form the input data are, i.e. 'normal' binary input in 2K byte blocks, or compressed encoded ASCII. The input data form is what you requested of QUEST's Select command. Hence its first question is:

```
UNSPL> ASCII CONVERSION [Y/N] ?      (reply 'Y' if the input is ASCII)
```

2) Next you are asked what output format you want:

```
UNSPL> OUTPUT SPECTRAL FILES FORMAT : (check what is available with '?')
```

Reply with one of the three formats available at the time of writing this guide, namely FITS (FITS with image extension), ASCII (each record comprises a wavelength, flux and epsilon) and 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 easily. It seems safe to say that this repertoire will grow. **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 5.2,
are you asked if you want automatic downlink of your user workfiles, i.e.

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

If you reply 'Y' the final question will be:

```
UNSPL> USSP USER IDENTIFICATION :          (i.e. your QUEST ID)
```

4) If 3)'s conditions are untrue or you replied 'N' to the downlink question, give
your input file name, i.e.:

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

5.2 UNSPL installation under VAX/VMS

Your SPOD should have installed the symbols UNSPL and USSP_DIR: system wide, though if you meet resistance just put these definitions in your LOGIN.COM.

```
$ UNSPL ::= RUN disc:[area]UNSPL  
$ ASSIGN disc:[area] USSP_DIR:
```

'disc:[area]' defines where exactly the UNSPL software runs.

In addition, if you are linked to the national centre's computer with DECnet (or are on the same machine or cluster) include the following to make retrieval of your data easier:

```
$ ASSIGN mc::disc:[USSP.USER] ULDA$HOST_DIR:
```

ULDA\$HOST defines where your workfiles are stored by QUEST. Hence in the above assignment 'mc' and 'disc' are your national centre's QUEST computer and disc addresses which your host manager will be glad to give you.

APPENDIX A UNSPL output format descriptions

A.1 ASCII table

The user's compressed spectral workfile 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/Å), the third contains quality flags in standard IUE format (epsilons). This format, although trivial, can be useful, not only since it can be used as input to a surprising number of image processing systems, but also because 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 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 workfile record header:

SIMPLE,	with "T", indicating standard FITS format
BITPIX,	with 16, indicating 16 bits/pixel
NAXIS,	with 1, indicating 1 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
CDELTA1,	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 workfile record header:

XTENSION,	with "IMAGE", indicating Image extension
BITPIX,	with 16, indicating 16 bits/pixel
NAXIS,	with 1, indicating 1 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
CDELTA1,	with the wavelength step in Angstroms
CTYPE1,	with "LAMBDA", indicating that the 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 name SWP12460L.ULD).

A.3 MIDAS format

MIDAS is a data processing system commonly available in Europe. The compressed user workfile 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" datum itself.

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 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 workfile 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 workfile has been asked for.

- 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 WORKFILE(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 workfiles.
 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 workfile 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 WORKFILE
 To: user terminal, log file
 Severity: fatal
 Meaning: An error has been encountered trying to open the user spectral workfile on your local system: check correctness of file name and/or directory.

- Message: ERROR OPENING REMOTE USER WORKFILE
 To: user terminal, log file
 Severity: fatal
 Meaning: An error has been encountered trying to open a user workfile on the ULDA host system: check if connection to the ULDA host system is active, or if your workfiles are still on USSP_DIR.
 Note: DECnet systems only.

- Message: ERROR READING LOCAL USER WORKFILE-RECORD NO.rn
 To: user terminal, log file
 Severity: warning
 Meaning: An error has been encountered trying to read the rn-th record of the user spectral workfile on your local system: the file has possibly been transmitted only partially from the ULDA host to your system.

- Message: ERROR READING REMOTE USER WORKFILE-RECORD NO.rn
 To: user terminal, log file
 Severity: warning
 Meaning: An error has been encountered trying to read the rn-th record of the user spectral workfile 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 workfile is ruined, due to transmission problems. The files output up to this moment are anyhow correct.

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

- Message: FORMAT OF OUTPUT SPECTRAL FILES = format
 To: log file
 Severity: informative
 Meaning: Recalls selected format for 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 WORKFILE 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 WORKFILE NAME = rem_file
To: user terminal, log file
Severity: informative
Meaning: Name of the auxiliary into user workfile to be copied.
Note: DECnet systems only.

- Message: REMOTE DESCRIPTORS USER WORKFILE NAME = rem_fil
 To: user terminal, log file
 Severity: informative
 Meaning: Name of the descriptor's user workfile to be copied.
 Note: DECnet systems only.

- Message: REMOTE SPECTRAL USER WORKFILE NAME = rem_fil
 To: user terminal, log file
 Severity: informative
 Meaning: Name of the user's spectral workfile to be copied.
 Note: DECnet systems only.

- Message: ULDA / USSP UNSCRAMBLER-SPLITTER date time
 UNSCRAMBLING SESSION STARTED
 To: log file
 Severity: informative
 Meaning: 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 WORKFILE NAME = filename
 To: log file
 Severity: informative
 Meaning: Name of user workfile (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 they serve with the following two exceptions.

- o **Sweden, Norway, Denmark and Finland** are grouped together under '**Nordic Countries**' (since they share a single host).
- o **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.

Computer address: n.a.

Tel.: +32 2 3752484

Tlx.: 21565 OBSBEL B

Fax: +32 2 3753110

Canada

Host manager: **Dennis Crabtree**

Host: DAO/CSADC, 5071 W. Saanich Road, Victoria, B.C. V8X 4M6.

Computer address: SPAN - NSSDCA: :PSI%DAO::CRABTREE also see DATAPAC

 BITNET - CRABTREE@NRCD AO

 CRABTREE@UVPHYS

 DATAPAC - 302068100434

Tel.: +1 604 3880025

Tlx.: 049 - 7295

Fax: +1 604 388 - 0045

France

Host manager: **Gerard Jasiewicz**

Host: CDS, Observatoire de Strasbourg, 11 rue de l'Université, 67000 Strasbourg.

Computer address: EARN - U01109@FRCCSC21

Tel.: +33 88 358200

Tlx.: 890506 STAROBS F

Italy

Host manager: **Fabio Pasian**

Host: Osservatorio Astronomico di Trieste, Via G.B. Tiepolo 11, I- 24131, Trieste.

Computer address: SPAN - ASTRTS: :PASIAN
ESRIN1: :VAXLNF: :ASTRTS: :PASIAN
PSI%02222403259: :ADOC
40057: :ADOC
EARN - ADOC@ASTRTS.INFNET

Tel.: +39 40 768005

Tlx.: 461137 OAT I

Netherlands

Host manager: **Cor de Vries**

Host: Sterrewacht Leiden, Postbus 9513, 2300 RA.

Computer address: EARN - DEVRIES@HLERUL51

Tel.: +31 71 275861

Tlx.: 39058 ASTRO NL

Nordic countries

Host manager: **Kjell Eriksson**

Host: Uppsala Astronomical Observatory, P.O. Box 515, S-75120 Uppsala, Sweden.

Computer address: EARN - ASTKE@SEUDAC21
KJELL@SEMAX51

Tel.: +46 18 112488

Tlx.: 76024 UNIVUPS S

Spain

Host manager: **Antonio Talavera**

Host: ESA/VILSPA, Apartado 54065, 28080 Madrid.

Computer address: EARN - IUEHOT@ESOC
SPAN - VILSPA: :MAX: :AT

Tel.: +34 1 4019661

Tlx.: 42555 VILS E

ST-ECF / ESO

Host manager: **Guido Russo**
Host: ST-ECF/ESO, Karl Schwarzschild Strasse 2, D-8046 Garching.
Computer address: SPAN - ESOMC1::RUSSO
28754::RUSSO
PSI%0262458900924::RUSSO
EARN - RUSSO@DGAESO51
Tel.: +49 89 32006365
Tlx.: 52828222 EO D

Switzerland

Host manager: **Thierry Lanz & Paul Bartholdi**
Host: Institut d'Astronomie de Univerité de Lausanne, CH - 1290 Chavannes-des-bois.
Computer address: SPAN - 20539: : LANZ
EARN - LANZ@CGEUGE54 or
- POSTMASTER@CGEUGE54
PSI - PSI%4682161350: :LANZ
Tel.: +41 22 552611
Tlx.: 27720 OBSG CH
Fax: 41 22553983

United Kingdom

Host manager: **Michael Lawden & Josephine Murray**
Host: RAL, Chilton, Didcot, Oxon OX11 OQX, England
Computer address: JANET - User name STAR, Site - UK.AC.RL.STAR
SPAN - JANET%UK.AC.RL.STAR: :MDL
Tel.: +44 235 21900
Tlx.: 83159

West Germany

Host manager: **Dominic R. Scales**
Host: Astronomisches Institut der Universitat, Waldhauserstrasse 64, 74 Tubingen.
Computer address: SPAN - AITMVX: :SCALES
EARN - PSSC001@DTUZDV5A
Datex-P - [0262] 45707100039
Tel.: +49 7071 295471

USSP -C3-



ULDA

Version 1.0

**Antonio Talavera (ESA IUE Observatory, VILSPA)
March '88**

ULDA: Uniform Low Dispersion Archive.

Table of Contents

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- 2 Corrections applied.
- 3 Absolute flux calibration.
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- 6 Access to the ULDA.
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1 Introduction.

The ULDA is a compacted subset of the IUE Archive, especially created at the ESA IUE Observatory for the IUE Project to ease the access to the low resolution IUE data. Version 1.0 of the ULDA contains all (98.5%) spectra taken in low resolution before 1 Jan. 1984 (24772 spectra).

The ULDA consists of all Low Resolution (6\AA) spectra taken with IUE in either of its two wavelength ranges ($1150\text{-}2000\text{ \AA}$ and $1825\text{-}3200\text{ \AA}$) with any of the three operational cameras (LWP, LWR, SWP).

Throughout the history of IUE there have been several changes in the IUE Spectral Image Processing Software (IUESIPS) which have improved the quality of the IUE data products. The spectra contained in the ULDA have NOT been re-processed with the latest version of IUESIPS. Instead, some corrections have been applied. They are described here.

The spectra in the ULDA Version 1.0 have all been calibrated with the latest version of the IUE low resolution calibration. To obtain physically meaningful quantities, the spectra have been divided by their exposure times, which have been checked, and corrected when necessary.

The compact form of the 24772 spectra allows direct, on line access to the data. Fast access is provided via a software package called USSP (ULDA Software Support Package) which is delivered together with the data. The USSP allows the user to interrogate the ULDA database, to select spectra of interest, and to transfer these to his working environment where he will be able to perform further analysis.

Updates extending the ULDA contents to more recent dates are expected to be made regularly. Version 2.0 is foreseen for early 1989.

2 Corrections applied.

Since the beginning of the IUE project, IUESIPS has gone through three major changes. These are known as:

"Very Old" Software - prior to 22/May/78 at GSFC and 14/June/78 at VILSPA,

"Old" Software - till 3/Nov/80 at GSFC and 10/Mar/81 at VILSPA,

"New" Software - from 3/Nov/1980 at GSFC and 10/Mar/1981 at VILSPA.

For the period between 22/May/78 and 7/July/79 at GSFC and between 14/June/78 and 7/Aug/79 at Vilspa, all spectra obtained with the SWP camera were processed with an incorrect ITF (Intensity Transfer Function) which gave erroneous fluxes at certain exposure levels (see the "SNAFU" correction below).

All corrections applied to the data have been made on the Line-by-Line spectra. This causes the data to be not fully homogeneous in spectral sampling. All data processed with the new software have twice the spectral sampling produced by the earlier software.

Very Old and Old

The following corrections have been applied to these data:

1. To all Very Old data a flux correction has been applied. This consists of the multiplication of the data by a constant factor.
2. The wavelength scale in the Very Old and Old data is in error owing to misidentifications in the calibration spectra. Therefore the dispersion constants were wrong. The wavelength scales have been corrected using a new set of mean dispersion constants.
3. All spectra have been recalibrated with the version of the Absolute calibration corresponding to the "New" software, so no calibration differences are present in the ULDA data.
4. SNAFU Correction. The spectra affected by the incorrect SWP ITF have been corrected in the Line by Line spectra using the algorithm of Holm et al. (1982, A&A, 112, 341).

3 Absolute flux calibration.

The IUE absolute calibration for low dispersion is described in Holm et al (1982, Astr.Astrph. **112**, 341) and Cassatella & Harris (1983, ESA IUE Newsletter No. 17, p12). All spectra in the ULDA have been calibrated with this calibration.

4 Exposure time corrections.

The exposure times have been carefully checked. For those cases where it was not possible to determine the time unambiguously, a "dubious" flag was added to the ULDA data. These flags indicate doubts in the exposure time and therefore in the absolute flux level of the corresponding spectrum.

These doubtful cases correspond to multiple exposures in the large apertures, to trailed spectra, and in general to any spectra taken with non-standard observing techniques.

- o In the case of **multiple exposures**, the total exposure time has been taken and only the merged spectrum has been considered.
- o For **trailed spectra** a standard length of 20 arc sec has been assumed for the large aperture.

If a ULDA spectrum is flagged as dubious, the reason is given in a special file accessible under USSP.

There are two types of data included in the ULDA which might have uncertain absolute fluxes but which are not flagged as such. One group refers to the short exposure time spectra. Because of the quantization of the exposure time counter at 0.4096 sec. the actual exposure time is an integer multiple of this unit. This introduces an error which is important for short exposures only.

The second special case is that of spectra obtained using the small aperture. Since the IUE absolute calibration was obtained using large aperture data, any small aperture spectrum must be scaled with respect to the large aperture. However, this scaling is not well known. The transmission of the small apertures is roughly 50 % of the large ones, but this is strongly dependent on various factors like centering accuracy, guiding, focus, etc. The absolute fluxes for small aperture spectra should therefore be treated with extreme caution.

5 Final form of the ULDA.

The whole ULDA and USSP package is distributed to one astronomical institute per country. That institute, called the National Host, will install the data base in a remotely accessible computer which can be addressed by the scientists of that country. An important part of the USSP, the routines for decoding the spectra after transfer, will be distributed to all user sites by their National Host.

6 Access to the ULDA.

It is intended that the use of the ULDA-USSP be very easy and friendly (see User's Guide). User's will connect with their national host institute and automatically enter the search programme which will allow them to interrogate the data base and select interactively the data they are interested in.

Four different search criteria may be used to look for spectra. These are:

- IUE camera/image number/aperture
- Right Ascension and/or Declination (equinox 1950.0)
- IUE object class
- Homogeneous object identification

After a search, the user can see which spectra have been found, uniquely identified by their camera, image number and aperture, together with the homogeneous object identification, coordinates, and exposure time. Additional information, like data quality, dubious and user flags, is displayed as well.

Users will be able to downlink the selected spectra, to their own computers as files containing flux ($\text{erg/sec/cm}^2/\text{\AA}$) versus wavelength, together with the standard IUESIPS quality factors (epsilons) which denote abnormal pixels. The formats currently supported are: MIDAS, FITS and ASCII.

If MIDAS format is requested, an image file plus a table file, containing respectively fluxes versus wavelength and epsilons (for abnormal pixels only) will be obtained.

If FITS format has been chosen, a standard FITS file will be downlinked, with the epsilons in a FITS table extension.

When ASCII is selected, the result will be a table file containing wavelengths, fluxes and epsilons.

The meaning of the "epsilons" is as follows:

- 100** - normal pixel
- 200** - extrapolated ITF pixel
- 220** - microphonic noise
- 250** - filtered bright spot
- 300** - unfiltered bright spot
- 800** - reseau mark
- 1600** - saturated pixel
- 3200** - pixel outside photometrically corrected region

7 Homogeneous object nomenclature in the ULDA.

In cooperation with the Centre de Donnees Astronomiques de Strasbourg (CDS - Strasbourg) the IUE project has undertaken the task of homogenizing the object identifications in the observing log. Considering the fact that the IUE satellite primarily provides spectral data, the following nomenclature hierarchy was agreed upon between the IUE project and CDS at the time of the creation of ULDA version 1.0 (the numbers in column one give the hierarchical sequence).

<u>Catalogue</u>	<u>Explanation</u>	<u>Example</u>
0, IUE	IUE related images	IUE NULL
1, HD	Henry Draper catalogue	HD 219749
2, BD	Bonner Durchmusterung	BD +28 5211
3, CD	Cordova "	CD -26 1340
4, CPD	Cape "	CPD -69 2698
5, V*	Variable stars(Kukarkin)	V* BF CYG
6, WD	White Dwarf	WD 2034-53
7, GD	Giglas white dwarfs	GD 323
8, NGC	New General Catalogue	NGC 4151
9, IC	Index catalogue	IC 2003
10,PK	Perek-Kohoutek (Plan.Nebulae)	PK 059+09 1
11,SK, AZV, LMC, SMC & FD (Mag.clouds)		SK 108
12,MRK	Markarian	MRK 509
13,ESOB	ESO (B) Catalogue	ESOB 113-IG45
14,MCG	Morph. Catalogue of Galaxies	MCG +08-11-0011
15,PG	Palomar Green	PG 0108+101
16,QSO	Hewitt Burbidge	QSO 0414-060
17,ABCG	Abell rich clusters	ABCG 36
18,ZZ	Solar System objects	ZZ COM 1982J
19,NOVA	Novae	NOVA MUS 1983
20,SN	Supernovae	SN 1983N
21,AOO	Any Other Objects	AOO PKS 1543+091

Four "super-groups" were created to avoid an excessive number of catalogues, ie.:

- IUE : which contains all IUE related images such as WAVECAL, NULL, CALUV, T FLOOD, UV FLOOD, etc.
- ZZ : the CDS invented a "Z"olar "Z"ystem catalogue.
- Hierarchy class 11 includes all objects in the Magellanic Clouds (ie. catalogues LMC, SMC, FD, SK, AZV). Note, therefore, that this group has not been homogenized yet.
- AOO : the catalogue of "A"ll "O"ther "O"bjects which holds objects which are not included in any of the catalogues given above, or in any of the other three defined supergroups.

One systematic exception to the hierarchical structure has been made for extended objects containing many stars (i.e. objects such as bright galaxies and globular clusters). For these objects the NGC catalogue has preference over the stellar catalogues such as HD (e.g. Omega Centauri Cluster is NGC 5139 rather than HD 116790).

The format (see examples above) of the homogeneous object identifiers has been defined according to the "First Dictionary of the Nomenclature of Celestial Objects" (A. Fernandez, M.-C. Lortet, F. Spite, 1983: Astron. & Astrophys. Suppl. Vol. 52, No.4), Table II, Column 3.