DIRECT ACCESS TO THE IUE SPECTRAL ARCHIVE

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I. INTRODUCTION

If you have access to a graphics computer terminal and a telephone modem, any of the ~50,000 releasable spectra in the IUE archives can be displayed on your terminal. Display options include plots, data listings, and catalog information from the IUE Merged Observing Log for the selected camera and image number. This access system permits a quick look evaluation of the available IUE data and enables the user to decide which spectra to obtain for detailed analysis. The complete archive of extracted spectra resides on a mass storage device connected to an IBM 3081 at the Goddard Space Flight Center. A public account has been established to permit access to this archive over standard telephone lines. The details of how to connect your terminal to the archival system are in the Appendix. Any problems or suggestions for improvements should be brought to the attention of the authors.

II. DATA PROCESSING

(a) High Dispersion

The ripple corrected data are displayed for any wavelength interval that is an integral number of Angstroms. The production processing ripple correction currently in use is applied to the net spectrum as it was extracted by the original production processing. Two examples of high dispersion plots are shown in Figure 1.

(b) Low Dispersion

The plots of the complete absolute flux distribution are from 1150 to 1970 Å for SWP and from 1900 to 3200 Å for the long wavelength cameras. Listings on your screen of the absolute flux can be produced for user specified wavelength intervals. As shown in Figure 2, the low dispersion plots also display the gross and smoothed background spectrum to help in evaluating the photometric quality of the data. For low dispersion, the absolute calibration

is as specified by Bohlin (1986) for SWP and LWR. For LWP, the calibration of Cassatella and Harris (1983) is used. Future improvements to low dispersion calibrations will be included, as available.

The following special processing applies to the low dispersion spectra:

1. The spectrum is extracted from the line-by-line file (Turnrose and Thompson 1984) for all image numbers before 13464 for SWP and 10124 for LWR, unless the data have been reprocessed with the new software in use since 1980 at GSFC and 1981 at Vilspa.

2. The wavelength correction of Harvel, Turnrose, and Bohlin (1979) is made for SWP and LWR image numbers less than 6023, unless those data have been reprocessed. The mean small aperture dispersion constants of Turnrose, Bohlin, and Harvel (1979) with the displacements for the large aperture from Turnrose et al. (1979) are used for the wavelength assignments.

3. The correction algorithm that was adopted by the three IUE agencies is applied to remedy the error in the intensity transfer function for the SWP camera (Holm et al. 1982) for those images taken in the first year of operations that have still not been reprocessed for the archive.

4. The Lyman-α region and the 2200 Å bright spot are excluded for the automatic scaling of the plots.

(c) Caution and Warnings

Since some errors exist in the processing and cataloging of the thousands of IUE spectra, the user should critically evaluate the data recalled from the archive. The system described here is intended primarily for quick-look evaluations. For a more thorough examination, the complete data set can be obtained directly (Heap 1986) for analysis at your home institution or at a Regional Data Analysis Facility.

Some common pitfalls are:

1. Many exposure times are wrong in the IUE Merged Observing Log, especially in the case of short exposures, where the high voltage rise time of 0.12 s or the timing interval of 0.4096 s is important. Many times have been reduced by one second for unknown reasons. Trailed exposure times do not have the true slit length taken into account. The exposure time used to compute absolute fluxes in low dispersion is listed at the top of the plot, so that the true exposure time can be used to correct the displayed fluxes.

2. Since the small IUE apertures do not transmit a constant fraction of the light from a point source, the true level of the stellar flux cannot be precisely determined from a small aperture spectrum. A warning message will appear on small aperture plots for low dispersion. A rough estimate of the absolute flux can be obtained by doubling the fluxes shown, although the transmission can vary over the range of 0.25 to 0.75.

3. Fluxes for diffuse sources are the total transmitted by the aperture. To get surface brightness, the user must divide by the area of the aperture used to make an observation (Panek 1982).

III. FUTURE WORK

Suggestions for improvements and errors that you discover should be sent to Edward Sullivan, Code 684, Goddard Space Flight Center, Greenbelt, Md. 20771. If you have access problems, he can be reached at 301-286-8808. One major addition that is planned for the near future is the correction to the low dispersion for changes in the sensitivity with time.

APPENDIX A

LOGGING ON TO THE IUE ARCHIVE SYSTEM

Extracted spectra observed by the IUE satellite have been placed on the Scientific Computing Facility's (SCF) IBM 3850 Mass Storage System, and the spectra are accessible through the SCF IBM 3081 computer. The SCF 3850 has a total capacity of 235 gigabytes of data. Currently, the IUE Archive Spectra amount to 23 gigabytes of data. Access to the data is fairly rapid, but not as fast as conventional disk access. Typically a spectrum can be retrieved within 10 to 30 seconds. The variability in retrieval time is due to the number of requests the 3850 has outstanding at the time a retrieval request is issued.

An interactive system has been developed to process requests to either plot or list spectra in the IUE archive. Since access is by camera and image number, you will want to consult the IUE Merged Observing Log that is distributed annually on microfiche with the IUE Proposal Instruction Package before starting a session. The plotting is done with Template, a device independent plotting package which supports most IBM, DEC, and Tektronix graphics terminals. An account on the SCF 3081 has been set up to allow astronomers access to the IUE archive. Although the user must pay for the telephone call, no charge is made for the computer time.

To use the system, set your terminal to flow control off and local echo on. Next dial 301-286-6699 for 1200 baud (-6696 for 300 baud or -6698 for 2400 baud), in the case you are using an even parity terminal. In the case of terminals with no parity such as a VT100, the phone numbers are 301-286-9967 (1200 baud), -9966 (300 baud), or -9968 (2400 baud). For phone problems, contact the Technical Assistance Group at 301-286-9120 or -9450. Other questions can be addressed to Carol Grady in the RDAF at 301-286-8800. Sometimes a wait at the end of the phone number is required, such as % % % in the case of the VAXNET autodialing software. When the system answers, hit a carriage return and the following line will appear on your screen:

ENTER NUMBER:

You should reply:

scf1

After the CALL COMPLETE message appears, hit another carriage return or two.

You should then receive the message:

INVALID-SW-CHARS

You should enter the following line in response:

btso

The system will respond with the line:

READY-TO-IBM

Next enter:

logon iueas/gsfc

The system will log you into the archive system and prompt you for required information. First time users are required to go through a registration procedure so that we can monitor the usage of the data. Subsequent logons require only the entering of your computer id and password that are assigned during the initial session. Only one user can be on the IUEAS account at a time. If the system proves to be popular, we will provide multiple access. Please send your comments in writing.

To log off enter three zeros in response to the query for a camera, image number, and option.

REFERENCES

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Cassatella, A., and Harris, A. W. 1983, ESA IUE Newsletter, **17**, 12; and NASA IUE Newsletter, **23**, 21.

Harvel, C. A., Turnrose, B. E., and Bohlin, R. C. 1979, NASA IUE Newsletter, 5.

Heap, S. R. 1986, NASA IUE Newsletter, **29**, 98.

Holm, A. V., Bohlin, R. C., Cassatella, A., Ponz, D. P., and Schiffer, F. H. 1982, Astr. Ap., **112**, 341.

Panek, R. J. 1982, NASA IUE Newsletter, **18**, 68.

Turnrose, B. E., Bohlin, R. C., Holm, A. V., and Harvel, C. A. 1979, NASA IUE Newsletter, **6**, 180.

Turnrose, B. E., Bohlin, R. C., and Harvel, C. A. 1979, NASA IUE Newsletter, 7, 17.

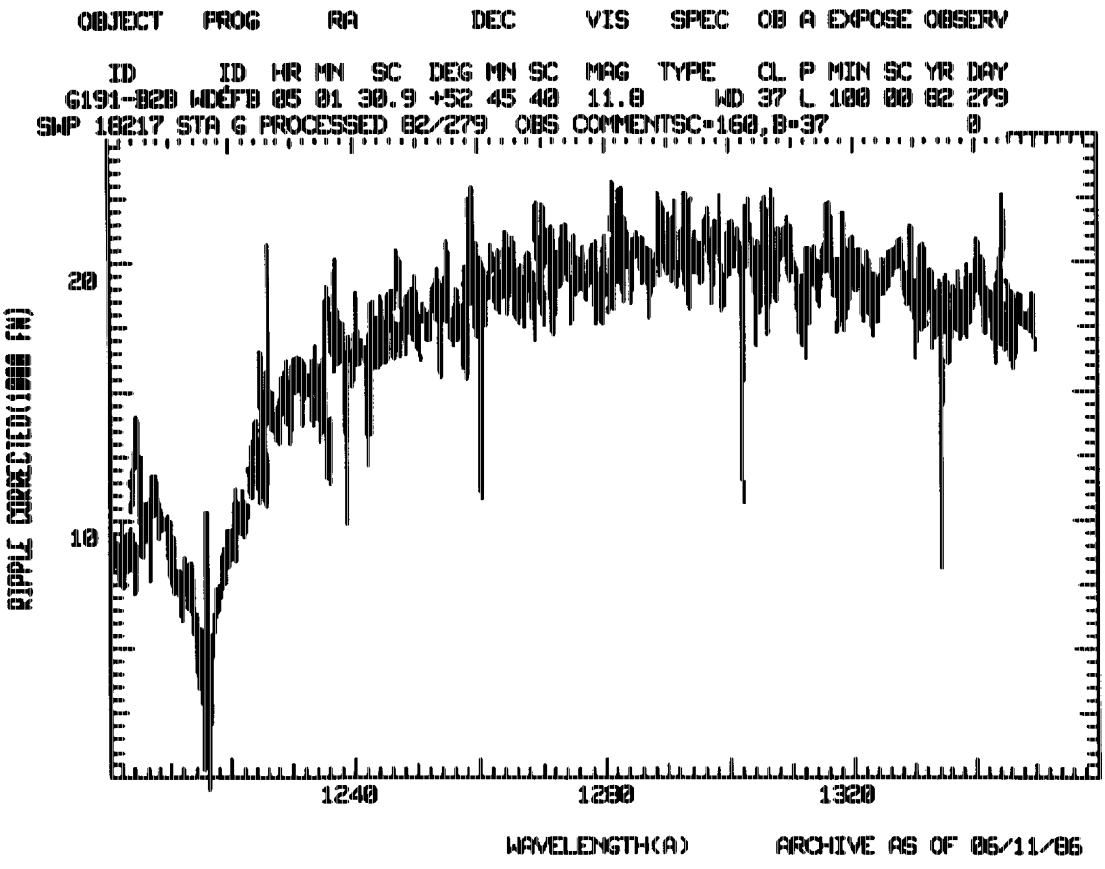
Turnrose, B. E., and Thompson, R. W. 1984, "IUE Image Processing Manual Version 2.0", CSC/TM-84/6058.

FIGURE CAPTIONS

Fig. 1 -- Sample high dispersion plots. The catalog information at the top of the plots is from the IUE Merged Observing Log.

Fig. 2 -- Sample low dispersion plots. For the small aperture, the warning message about the accuracy of the flux appears at the bottom of the plot. The flux in absolute units occupies the main body of the plot, while the gross (solid line) and smoothed background (dashed line) appear in the lower panel in units of 1000 Flux Numbers (FN). The FN unit is the linearized measure of the IUE signal.

Fig. 3 -- The beginning menu of a session showing both the user and computer responses.


OBJECT PROG RA DEC VIS SPEC OB A EXPOSE OBSERV
ID ID HR MN SC DEG MN SC MAG TYPE CL P MIN SC YR DAY
G191-B2B WDEFB 05 01 30.9 +52 45 40 11.8 WD 37 L 100 00 82 279
SWP 18217 STA G PROCESSED 82/279 OBS COMMENTSC=160,B=37 0
20
10
1240
1280
1320
WAVELENGTH(A)
ARCHIVE AS OF 06/11/86

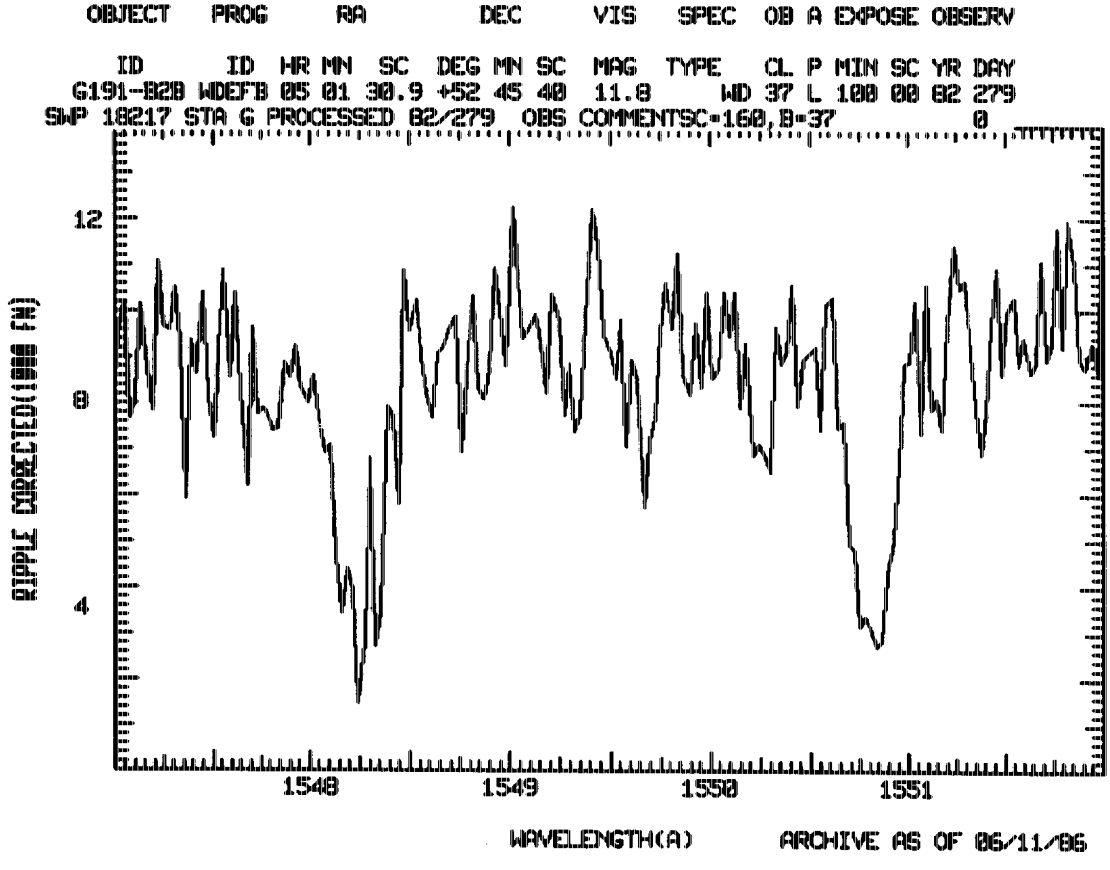
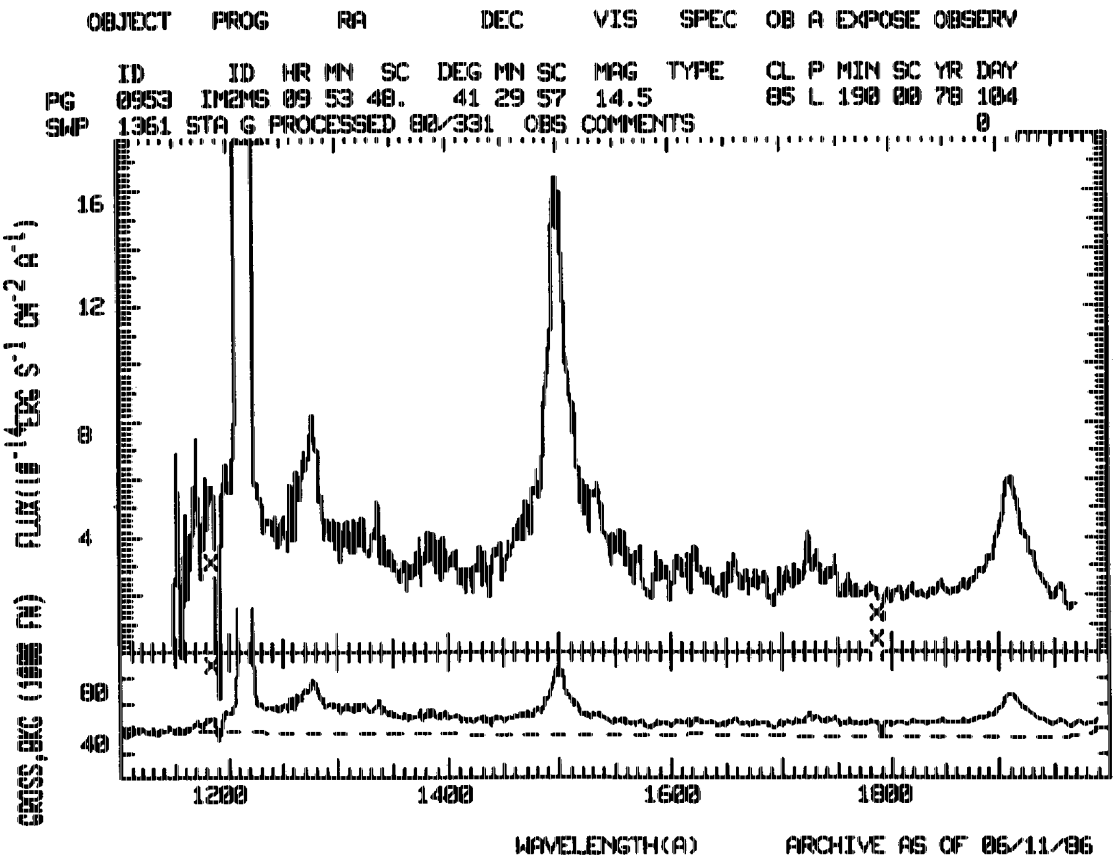

OBJECT PROG RA DEC VIS SPEC OB A EXPOSE OBSERV
ID ID HR MN SC DEG MN SC MAG TYPE CL P MIN SC YR DAY
G191-B2B WDEFB 05 01 30.9 +52 45 40 11.8 WD 37 L 100 00 82 279
SWP 18217 STA G PROCESSED 82/279 OBS COMMENTSC=160,B=37 0
12
8
4
1548
1549
1550
1551
WAVELENGTH(A)
ARCHIVE AS OF 06/11/86

Fig. 1


OBJECT PROG RA DEC VIS SPEC OB A EXPOSE OBSERV
ID ID HR MN SC DEG MN SC MAG TYPE CL P MIN SC YR DAY
PG 0953 IM2MS 09 53 48. 41 29 57 14.5 85 L 190 00 78 104
SWP 1361 STA G PROCESSED 80/331 OBS COMMENTS 0
16
12
8
4
80
40
1200
1400
1600
1800
WAVELENGTH(A)
ARCHIVE AS OF 06/11/86

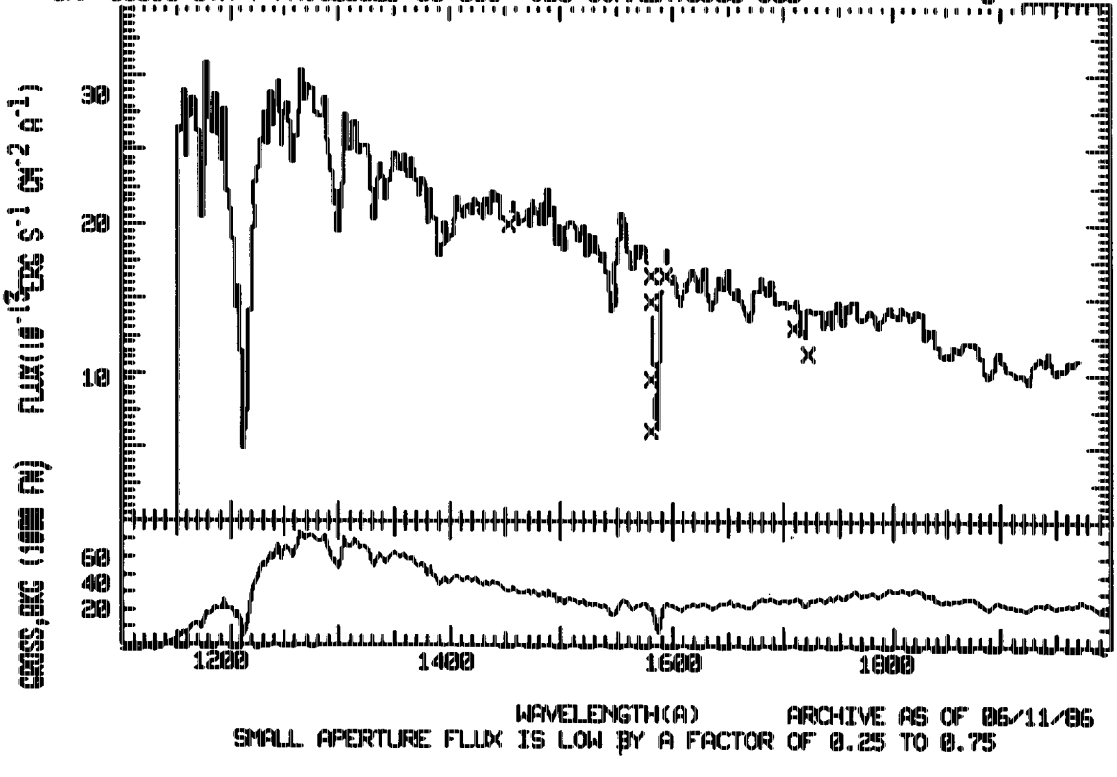

OBJECT PROG RA DEC VIS SPEC OB A EXPOSE OBSERV
ID ID HR MN SC DEG MN SC MAG TYPE CL P MIN SC YR DAY
B+332642 PHOAL 15 50 01.0 +33 05 00 +10.8 20 S 000 00 00 361
SWP 10893 STA V PROCESSED 80/361 OBS COMMENTS500 500 0
30
20
10
60
40
20
1200
1400
1600
1800
WAVELENGTH(A)
ARCHIVE AS OF 06/11/86
SMALL APERTURE FLUX IS LOW BY A FACTOR OF 0.25 TO 0.75

Fig. 2

NUMBER	CAMERA	SEQUENCE NUMBER MIN	SEQUENCE NUMBER MAX
1	LWP	1022	7744
2	LWR	1024	17871
3	SWP	1036	27848

NUMBER	OPTION
0	EXIT
1	PLOT SPECTRA
2	LIST SPECTRA
3	LIST CATALOG INFO

```
ENTER CAMERA NUMBER, SEQUENCE NUMBER, OPTION NUMBER
?
3 2799 1

ENTER L OR S FOR THE LARGE OR SMALL APERTURE SPECTRUM :
L
```

FOLLOWING IS A LIST OF TERMINALS ON WHICH SPECTRA MAY BE PLOTTED

TERMINAL NAME	DESCRIPTION
DGG	VT125, VT240, VT241, DEC GIGI
GDM	IBM 3279
TEK	TEKTRONICS 4010
TK1	TEKTRONICS 4100
TK4	TEKTRONICS 4014, 4015
TK7	TEKTRONICS 4025, 4027
VT6	VT640 (RETRO-GRAPHICS VT100)
RET	---- RETURN TO MAIN MENU ----

```
ENTER TERMINAL NAME -
```


Fig. 3