JADE COMPUTER NOTE 85/D

JADEZ
THE JADE GRAPHICS PROGRAM

C. BOWDERY, J. OLSSON

21/10/86

ABSTRACT. This revised note describes how to use the JADE Graphics Program and is especially suited to beginners. Changed sections are marked in the margin.

1. What is the JADE Graphics Program?

The JADE Graphics Program is a tool to view JADE events and perform certain analysis operations on them if required. It drives Tektronix storage tube graphics terminals (and compatible types) allowing 2D monochrome graphics display. It is currently implemented on the DESY IBM computers, on several computers in the UK (MAGA, RLGB, RLIB), in Tokyo and in Maryland. Please note that the operating instructions given here apply to the DESY version of the program.

2. What preparation is needed before a graphics session?

The dataset with the events[1] to be viewed must be on an HSM-controlled volume or on MSS.[2] Tape datasets cannot be read. Thus if your selected events reside on tape, you must first copy them to a disk or MSS dataset. As a rule, multi-hadronic events occupy about 2 disk tracks and simpler events are somewhat shorter. Thus if you want to look at a large number of events, then space on the VTMP MSS volumes may be your best bet.

Assuming that your events are on a usable volume, you could either read this note all the way through first or go to a graphics terminal and follow the instructions as you go along. Remember, allow at least 15 minutes for a graphics session, since reading the calibration files can take some time. You will probably need a notebook and a pen, as well as this note, if you intend to scan events (rather than just casually looking). Finally, have you written down the name of the dataset which contains the events?

3. How is a graphics session started?

The recommended method of running the Graphics Program is with the so-called Graphical Attachment (GA) mode. This involves linking a graphics terminal to a TSO session. This allows the interactive dialogue with the program to take place at a TSO terminal and the graphical output to be sent to a (normally adjacent) graphics terminal. The alternative mode of usage is referred to here as Direct mode which only needs a graphics terminal.

[1] The events must have BOS format.

[2] See the DESY Computer Center User's Guide.

GA Mode

a) Find a free graphics terminal with a free TSO terminal next to it. If none is available, you can try later or use Direct mode.

b) Select GA mode using the graphics terminal keyboard. This is done by pressing the ESCAPE key (or CONTROL+ESCAPE or CONTROL+SHIFT+K)[1] once or twice until the DESYNET menu appears. Then type the number it says to get Graphic Attachment mode. At present it is 2.

c) Read the 3-hexadecimal-digit IBM-UNIT number written on the graphics screen.

d) Logon using the TSO terminal and start a normal NEWLIB session.

e) If your source library has the JADE CLIST library[2] allocated, use the TSO terminal keyboard and simply type:

`JADEZ hhh` where hhh is the IBM-UNIT number.

If hhh is not given, it will be prompted for. The JADEZ CLIST asks you to confirm that the correct IBM-UNIT number has been given and press ENTER to continue. If it is not correct, press PA1 to abort the CLIST and repeat this step.

f) If your source library does NOT have the JADE CLIST library allocated, then, using the TSO terminal keyboard, type:

`IPS 'F11LHO.GRAPHL(JADEZ)' GA(hhh)` where hhh is the IBM-UNIT number.

g) The Graphics Program should now have started.[3]

Direct mode

If you elect to run the program in Direct mode, only a graphics terminal is needed and the dialogue and graphics will appear on the same screen.

a) Find a free graphics terminal.

b) Select TSO IBM mode using the graphics terminal keyboard. This is done by pressing the ESCAPE key (or CONTROL+ESCAPE or CONTROL+SHIFT+K)[1] once or twice until the DESYNET menu appears. Then type the number it says to get TSO IBM mode. At present it is 1.

c) Type: `LOGON userid` where `userid` is a valid TSO identifier.

d) The TSO LOGON screen will then appear. Type in the appropriate password for the identifier. If all goes well, a TSO session will begin and the `READY` prompt should soon appear.

e) Type: `IPS 'F11LHO.GRAPHL(JADEZ)'`

f) The Graphics Program should now have started.[3]

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[1] If the terminal still won't respond, try pressing ENTER before moving to another terminal.

[2] `ALLOC F(CLIST) D('F22BOW.JADE.CLISTS')` is required in the `#START` member.

[3] If it hasn't then you may have mistyped the IPS command.

4. What happens during the 'first three minutes'?

After printing some mundane greetings and some general information, the graphics program then requests the name of a catalogued dataset which contains some JADE events to be viewed. While the dataset is being allocated, you can read the latest news about the program which is written in the box outlined with asterisks.

If the dataset does not exist or the name was mistyped, a message to that effect will be displayed. You can type in another dsname or press ENTER[1] on its own to end the program.[2] If the allocation is successful, the program then allocates the compact calibration dataset. (Currently this is F11LHO.AUPDAT1.) This will be adequate for most sessions, in which case, when the program responds with the ALLOCATION READY message, simply press ENTER. If however you plan to do LG analysis, the full calibration datasets will be needed, which include the 'spinning block numbers'. (Currently these are F11LHO.BUPDAT0 and F11LHO.BUPDAT1.) In this case, when the program responds with the ALLOCATION READY message, type any non-blank character key followed by ENTER. This will cause them to be allocated for the session.

The command screen is then cleared and the BOS start message is printed followed by some information about default settings of the graphics program. These will be explained later. The first event is then read in and the relevant calibration fetched. The CAMAC date and time of the event is written on the command screen.[3] Depending on the event date, the calibration datasets being used and the response time of the computer, you may have to wait between 30 seconds and 5 minutes before the event is drawn on the graphics screen (if it is real data).[4] Monte Carlo events do not need the calibration datasets so the waiting time is much less. However in this case, the program will print out the MC Smearing Constants and the Trigger Settings on the command screen.[5] This is usually of interest to experts only.

The default view of the event is the so-called RB view.[6] This shows the Central Detectors, the TOF hodoscope and the Lead Glass Shower Array in the R-ϕ projection. Other possible views of the event are explained later. The energies shown in the lead glass blocks are in MeV and represent the sum of all energies in the complete row of blocks along the Z direction.[7] The TOF times are displayed in nanoseconds with the counter numbers also shown.

The Jet Chamber (and, if shown, the Vertex Chamber) hits are drawn along with their mirror hits. You may also see hits in the Z Chamber which lies outside the Jet Chamber pressure tank. At the top left hand corner, the event number, run number and sequence number on the dataset are shown along with a brief summary of information from the main detectors. At the bottom left hand corner, the JADE coordinate axes are drawn to show the detector orientation.

You can now type in any command you like, to see the event in another view or superimpose the detector hardware on the current view or see results displays or perform additional analyses. A short overview of all the commands now follows. Where a synonym exists, it is

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[1] In what follows, when the ENTER key is mentioned, the RETURN key applies in Direct mode.

[2] An emergency stop can be done at any time using the PA1 key or by pressing CONTROL+G .

[3] The format is seconds.minutes.hours day/month/year

[4] If you are using the AUPDAT1 dataset, a warning message will be printed on the command screen.

[5] See JADE Computer Note 66.

[6] Unless this has been altered with the DEFVIEW macro, as explained later in this note.

[7] In Z views, the LG energies are summed for each half ring.

shown in brackets at the end of the command description. Detailed information about all the commands can be found using the graphics interactive HELP system.

— G E N E R A L —

HELP Gives detailed information on all commands and macros.

MENU Lists the available commands along with a 1 line description.

NEWS Lists recent news about the JADE graphics program.

— V I E W S —

RA Displays the Central Detectors and TOF counters in the R-ϕ view.

RB Displays the Central Detectors, TOF counters and Barrel LG in the R-ϕ view.

RC Displays the Central Detectors, TOF counters, Barrel LG and Muon Filter in R-ϕ.

ZXA Displays the Central Detectors in the Z-X view.

ZXB Displays the Central Detectors and the LG in the Z-X view.

ZXC Displays the Central Detectors, the LG and the Muon Filter in the Z-X view.

ZXD Displays the whole detector in the Z-X view, including the Forward Detector.

ZYA Displays the Central Detectors in the Z-Y view.

ZYB Displays the Central Detectors and the LG in the Z-Y view.

ZYC Displays the Central Detectors, the LG and the Muon Filter in the Z-Y view.

ZYD Displays the whole detector in the Z-Y view, including the Forward Detector.

FW Displays the end-on views of the Forward Detector.

RU Displays the rolled-out view of the Lead Glass and the Forward Detector.

ZC Displays the rolled-out view of the Z Chamber (RZ).

VC Displays the Vertex Chamber in the R-ϕ view.

CYL Displays a perspective view of the Jet Chamber and the Barrel Lead Glass.

FWMU Displays the Forward Muon Counters.

VRX Displays the vertex region, R-ϕ view. (A cylinder centred at the origin, radius 5 mm.)

VRZX Displays the vertex region, Z-X view.

VRZY Displays the vertex region, Z-Y view.

STVW Displays the current standard view. Needed if the view has a non-standard scale (S).

If a non-zero argument is given with any view command, the detector outline is also drawn, e.g. `RA1` or `CYL 1`. Spaces between command and argument are ignored.

— R E S U L T S —

RES	Displays ID and LG analysis results.
VRES	Like RES but with vertex extrapolation. Recommended for all views.
MUPT	Displays muon analysis results. (Re)analysis possible.
MUONS	Displays 'good' muons.
TR	Displays ID hits with various options. TR1 is useful to remove mirror and noise hits.
TRUE	Displays the original 4-vectors in Monte Carlo events.
VX	Displays vertex results with several options.
DEDX	Displays dE/dx results with several options.
TOF	Displays TOF results with several options.
AX	Displays the event jet-axes with several options.
QP	Displays Q-plots with several options.
ZV	Displays Z vertex histogram (with your assistance).
FAMP	Displays FAMP-found tracks.
ND50	Displays NORD 50-found tracks.
VAC	Displays the amplitudes on signal wires in any one cell of the Vertex Chamber.
FADC	Displays the Jet Chamber test wire Flash-ADC values (test data only).
ZTRG	Displays the Z-trigger Flash-ADC values (test data only).
CLUS	Displays Lead Glass energy clusters in the RU view. VRES is usually better.
MUR2	Like RES but displays full muon data in list form. For experts only.

— E X T R A S —

DET	Displays the detector hardware on top of the current view.
PRO	Displays projections of the other 2 orthogonal views.
EC	Displays the End Cap LG hits in R-ϕ views.
FC	Displays Tagging System hits in R-ϕ views.
TRLG	Displays the T1 Lead Glass trigger conditions.
TRG2	Displays the T2 Track trigger conditions. See JN 31.
PL	Displays 'dead', 'killed' and 'spinning' LG blocks. Other options exist too.
COM	Adds a comment to the picture which will also appear on any hard copy made.

— C O N T R O L —

N	Goes to next event WITHOUT writing out the current one (NN).
LEVELS	Changes the 'stop flag' settings in USER (CSTL).
CSTV	Changes the standard view and the automatic display of event and detector (CS).
OPT	Flips any one of the many drawing flags. See Appendix 1. (CDTL).
STAT	Displays status of the drawing flags (CDST).
WRIT	Writes out the current event and fetches the next. Output dsname prompted for.
MORE	Switches to a new input dataset. The dsname is prompted for (NEW).
STOP	Stops the program (EXIT, END, QUIT).
FIND	Fetches an event by Run Number and Event Number. Numbers are prompted for.
ZOOM	Changes scale and/or origin of current view. CONTROL+E ends input (JOYS).
RESET	Returns to the standard scale and origin after ZOOM (RS).
PATR	Selects the number of the PATR bank to be used.
JETC	Selects the number of the JETC bank to be used.
VTXC	Selects the number of the VTXC bank to be used.
C	Continues to the next USER level with 'stop flag' set.
JUMP	Causes a jump to the specified SUPERVISOR level.

— M A C R O S —

MACRO	Creates a macro command sequence.
EDITMAC	Edits a user-defined macro.
DELMAC	Deletes a user-defined macro.
RENAMAC	Renames a user-defined macro.

— O T H E R S —

H	Generates a Hard Copy of the display (Q).
HX	Generates an External Hard Copy (QX).
LASER	Generates a publication-quality Hard Copy on the laser printer (HLP).
MASS	Computes the effective mass of a group of particles. All input is prompted for.

VFIT Performs vertex fit of chosen tracks (GVTX).

SPVA Users own command for private graphics modules ; no action in JADEZ.

PRINT Writes out a BOS bank on the graphics screen, usually in a readable format (BW).

DELETE Deletes BOS banks as requested (BDLS).

DRAW Invokes a drawing routine for circles, lines and points. Good for debugging.

PICK Returns the coordinates of the cross-hairs on the screen. Joystick is activated first.

RECAL Recalibrates the Lead Glass and JETC data (NWCL).

EDIT Invokes the PATREC editor subsystem. See JCN 28. Experts only!

RET Returns to the PATREC editor subsystem.

SAVE Saves PATREC /CWORK/ onto a scratch file.

6. How does the program handle event analysis and I/O?

The control commands will need some explanation here. The program has the JADE SUPERVISOR built into it so that it can analyse events. If the events you are looking at have had charged track pattern recognition and lead glass energy analysis done (which is normally the case), then what follows is not so important. It will be sufficient to know that command 'N' fetches the next event. Otherwise some understanding of the actions of the SUPERVISOR is necessary.[1]

This routine coordinates the basic analysis steps between calls to a routine called USER. Each 'level' of the SUPERVISOR performs one step and then calls the USER routine at the corresponding level.[2] The graphics program's USER routine incorporates 'stop flags' at each level, which if set, cause a halt of the analysis to allow you to view the results so far.

By default, the 'stop flags' at levels 2 and 6 are set. This means that when an event is read in, there is a 'stop' at level 2 (that is, before any analysis is attempted). If pattern recognition and lead glass energy analysis is to be done, then the SUPERVISOR can be continued with the 'C' command until the next 'stop' occurs at level 6. Using the 'C' command again, takes you through the SUPERVISOR to level 11 where the event is either discarded or (if the 'WRIT' command has been issued once already) the current event is written out. A new event is then read in and processing continues up to and including level 2.

As stated above, the SUPERVISOR will do nothing at a given level if the appropriate results banks already exist.[3] By using the 'LEVELS' command, you can examine and set the 'stop flags' as you wish. (Should you ever need to skip a certain analysis level, then 'JUMP' will do this. Please note that this command does not change the 'stop flags' so the SUPERVISOR will just continue onwards at the requested level.)

Finally, command 'WRIT', as its name suggests, explicitly writes out an event. (The first time this command is given, the output dataset is allocated. This dataset must be existing

[1] See JADE Computer Note 73 for full details.

[2] A short description of each level is given in Appendix 2 of this note.

[3] Except at levels 7 and 9 (graphics program only) in the SUPERVISOR.

and on an HSM-controlled volume or MSS.) No further analysis is done, a direct jump to level 11 is made, the event is written out and then the next event fetched. Please note that at present, events cannot be appended to a dataset.

7. What are macros and how are they used?

Whenever the program outputs its arrow prompt (→), you can type in a command or a 1-line sequence of commands separated by semi-colons, e.g.

```
N;VRES;MUONS;DEDX-4;TOF-4
```

By pressing just ENTER, the last command line will be re-executed. This can save much typing but if you want to type another command before repeating the multiple command line, then you would have to retype the long line again. This can be avoided if you save that multiple command line as a macro. This can be easily done using command 'MACRO' which prompts for a macro name (up to 8 letters long) and then for the definition. Executing the macro is also easy, just type the macro name and the whole sequence of commands will be executed. Up to 30 macros can be defined at one time and these can be edited, renamed or deleted as necessary. In addition macros can call other macros to a depth of 9 which should be more than enough.

Macros can also be pre-defined before a graphics session and stored in a 'Profile' dataset. This must have the name `yourid.GRAPHICS.PROFILE.MACROS` so that the graphics program will read in the macros at the start. They will then be immediately available for use. The format of the Profile must be repeated pairs of lines as follows:

macro_name

macro_definition

e.g.
```
CLEAN
CSTV2;N;TR1;RESULTS;CSTV2
RESULTS
VRES;MUONS;DEDX-4;TOF-4
SETUP
OPT 5; OPT 31; OPT 32; OPT 40
```
etc.

The easiest way to create such a Profile dataset is with the following procedure:

1) type the Profile contents into an unnumbered NEWLIB member,
2) create a new sequential dataset using the ALLOC command, giving it DCB=CARDS and FILENAME=COPY,
3) copy the member into the dataset with the command: COPY member

If the sequential dataset already exists, use ALLOC OLD to allocate the filename COPY to it before the COPY operation. Please note that the macro definitions are only checked when they are executed. If a mistake has been made, you can edit the erroneous macro inside the graphics program. Later on, you should correct the Profile to prevent the error occurring again.

If your Profile contains a macro called `DEFVIEW`, it will be automatically executed at the start of the graphics program in order to set up the standard view. The macro must contain one valid view command only. An optional non-zero argument will be interpreted as a command to draw the detector whenever the standard view is drawn. The standard view can be changed at any time with the `CSTV1` command after the required view has been selected. (A more general 'auto-execute' macro facility may be available later.)

8. Anything else to be remembered?

There are a number of miscellaneous points:

a) Many commands have options which can usually be given as numerical arguments. Spaces between a command and its first argument are optional. If a second argument can be given, this must be separated by spaces or a comma. Some commands prompt for arguments if they are not given, but not all do this. Full information about the meaning of the arguments is given in the HELP system.

b) If the program asks a question which needs a 'yes' or 'no' answer, the following are understood as affirmative replies:

```
YES   YE   .Y     JA   JAWOHL   J      HAI   HA   H
```

Anything else, e.g. just ENTER, is treated as `NO`.

c) For scanning purposes, drawing speeds can be increased by flipping the drawing flags 6 and 26. To do this, type:

```
OPT 6; OPT 26
```

d) If the side projections are active with a magnified main view, only Jet Chamber hits visible in the main view will be drawn in the projections.

e) The Z views of the Jet Chamber can be drawn in one of 2 modes: project or rotate. Project mode shows a projection of the 3 dimensional coordinates onto the screen whereas rotate mode shows the hits rotated into the plane of the screen. Thus rotate mode is a 'top-bottom split' R-Z display mode. Drawing flag 9 controls which mode is to be used and can be changed with `OPT 9`. The current mode is also written near the top of the graphics screen in Z views. Note that in muon filter views, project mode is selected automatically and no permanent change is made to flag 9.

f) In rotate mode for the Z views, no Jet Chamber mirror hits are shown to avoid confusion unless `OPT 10` is `ON`. The hits are drawn at the mean position of the left and right ambiguities. In project mode, both ambiguities are shown unless the mirror hits have been suppressed using the `TR1` command.

g) To produce pictures suitable for showing in public, it is recommended to resolve

mirror hits and suppress noise hits (with the TR1 command), use the CYL view when possible, draw tracks and photons using VRES and draw good muons using MUONS. Caption text might be worth suppressing too. The output should be sent to the laser printer with command LASER.

Useful OPT's to flip: 5, 13, 15, 23, 31 to 38, 46 to 48

h) All the true views (not displays like dE/dx or TOF) can be magnified or demagnified using the ZOOM command. If no argument is specified, then you must define a rectangular box on the screen which will become the new view. This is done by defining any 2 opposite corners with the cross-hairs controlled by the joystick.[1] Press CONTROL+E *on the graphics terminal keyboard* to have the coordinates read.[2] The picture will then be redrawn. Alternatively, specify a (de)magnification as an argument to ZOOM and use the cross-hairs to define the new view centre. Press CONTROL+E to get the picture redrawn. Changing views or typing RS resets the magnification. Typing CSTV1 will make the magnified picture become the standard view for drawing new events.

i) You may notice that sometimes in multiple command lines a screen erase can occur before picture drawing has been completed. This results in the next picture beginning with the undrawn parts of the previous one. This can be seen with N;TR1 which gets the next event, draws it and then redraws it with mirror hits suppressed. Unfortunately this is a problem with the DESY IPS system. It can be avoided in this case by using CSTV2 which switches off/on the automatic drawing of a new event: CSTV2;N;TR1;CSTV2.

j) If you view REFORM data, remember it has not been analysed. If you wish to calibrate and analyse it with the graphics program, remember to allocate the BUPDAT calibration datasets at the beginning.

k) Private graphics modules can be linked for special purposes. See one of the authors for details. The SPVA command exists to allow interaction with your own routines.

l) If anything this note says is in conflict with what is stated in the graphics HELP system, then the latter should be treated as the definitive guide. This reflects the fact that the program is subject to frequent (minor) change.

Appendix 1 : The Drawing Flags (OPT's and CSTV's)

The program has many drawing flags which used to be known as CDTL's since the CDTL command can be used to flip them. However, the synonym OPT is preferred since it is easier to remember than CDTL. The definitive list of flags and their status can be found with the STAT command, also known as CDST. The following list reflects the current meanings and the default settings.

1 ON Display of the Jet Chamber

[1] Or Rolling Ball or Graphics Tablet; whatever is available.

[2] Press one of the mouse keys if using a Graphics Tablet, etc.

2	ON	Display of the Lead Glass
3	ON	Display of the Muon Filter
4	OFF	Display of the Jet Chamber walls
5	ON	Display of the Jet Chamber wires
6	ON	Crosses drawn for Jet Chamber hits instead of short lines
7	OFF	Logarithmic histogram display of Lead Glass energies
8	OFF	Full muon hit symbols. See JCN 52
9	ON	Rotate mode (not project mode) for Jet Chamber hits in Z views
10	OFF	Draw both hit ambiguities rather than an 'average hit' in rotate mode
11	OFF	Automatic T2 trigger display in R-ϕ views. See JN 31
12	ON	Track numbers for Jet Chamber tracks with the RES command
13	ON	Track list printout with results display
14	ON	Obsolete. Do not change!
15	OFF	Dashed line display of the Lead Glass in RU and CYL views.
16	OFF	Automatic results display (= RES)
17	OFF	Automatic display of the 2 orthogonal projections on the right
18	OFF	Automatic T3 trigger display
19	OFF line	Extrapolation of Jet Chamber tracks to the closest approach to the beam
20	ON	Jet Chamber hit display in side projections
21	ON	Jet Chamber hit display in main view
22	OFF	Muon hit number display
23	OFF	Extrapolation of Jet Chamber tracks to inner surface of LG in R-ϕ views
24	OFF	Automatic display of muon hits in other planes
25	OFF	Unused at present
26	OFF	Suppression of the odd layer hits in the Jet Chamber. (Saves time)
27	OFF	Automatic display of the main vertex
28	ON	Photons displayed in commands RES and VRES. Overridden by flag 29
29	OFF VRES	Charged tracks suppressed but photons displayed in commands RES and
30	OFF	Display of the Forward Muon Counter TOF values
31	ON	Display of track numbers with the TR command

32	ON	Display of track numbers with the VRES command
33	OFF	Suppression of TOF values and TOF counter numbers
34	OFF	Suppression of spinning 1-block photons
35	OFF	Suppression of photons with energies less than 200 MeV
36	OFF	Suppression of muon mirror hits if the ambiguity has been resolved
37	OFF	Display of only those muon hits assigned to muon candidate tracks
38	ON	Display of muon track numbers with commands MUPT and MUONS
39	OFF	Display of muon chamber numbers and raw muon hit numbers
40	OFF	Suppression of the bottom right projection
41	ON	Display of the Z chamber if appropriate
42	OFF	Forced display of the Z chamber (not normally needed)
43	ON	Display of the Vertex Chamber / Beam Pipe Counters
44	OFF	Forced display of the Vertex Chamber (not normally needed)
45	ON	Hatched area display of the beam pipe and pressure tank
46	OFF	Suppression of the picture caption text
47	OFF	Suppression of the origin marker
48	OFF	Suppression of the coordinate axes
49	ON	Display of detailed dE/dx plot for single tracks with DEDX n

In addition to the above drawing flags, there are 2 more which are frequently needed in macros. Because of this, no printout occurs when they are changed. They control the display of an event that has just been read in. The first, flipped by CSTV 2 (or CS 2), determines whether or not the program will display the event (default value: YES) and the second, flipped by CSTV 3 (or CS 3), determines whether the detector will be automatically added (default value: NO).

Appendix 2 : USER Levels in the Graphics Program

1 New event of a new run has just been read in. Not very useful in graphics.

2 First opportunity to see a new event in general.

3 LG calibration has been done if not previously done.

4 JETC calibration & Fast Z vertex finding has been done if not previously done.

5 Pattern recognition has been done if not previously done.

6 LG analysis has been done if not previously done.

7 LG clusters have been (re)linked with ID tracks.

8 Nothing further has been done.

9 Muon analysis has been done or repeated.

10 Nothing further has been done.

ADDENDUM TO JADE COMPUTER NOTE 85

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21/10/86

Please note that the NEWLIB member which contains your macros should be unnumbered before the contents are copied to the `yourid.GRAPHICS.PROFILE.MACROS` dataset. Otherwise the line numbers will be copied into columns 73 to 80 which will later on confuse JADEZ and lead to a `Bad Macro Name` error.

Unnumbering a member can be done by issuing the NEWLIB command `RENUM 0`. This command should always be used before copying members into sequential datasets unless the contents are FORTRAN statements (or JCL). Users of TEX will probably be aware that unnumbered members are always used for TEX source.

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Assuming that your events are on a usable volume, you could either read this note all the way through first or go to a graphics terminal and follow the instructions as you go along. Remember, allow at least 15 minutes for a graphics session, since reading the calibration files can take some time. You will probably need a notebook and a pen, as well as this note, if you intend to scan events (rather than just casually looking). Finally, have you written down the name of the dataset which contains the events?

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