



## TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
1	AN INTRODUCTION TO THE PROGRAM .....	1
2	A DESCRIPTION OF THE PROGRAM .....	2
2.1	THE DISPLAY FOR ENTERING THE BASIC PARAMETERS .....	2
2.2	THE DISPLAY FOR SHOWING TAPE PROCESSING .....	5
2.3	THE DISPLAY FOR SELECTING A PLOT TO BE VIEWED .....	6
2.4	THE DISPLAY FOR SELECTING PART OF A PLOT .....	6
3	RUNNING THE PROGRAM ON AN INTERACTIVE DEVICE .....	9
3.1	THE IBM 2250 DISPLAY CONSOLE .....	9
3.2	THE GIP-IDITION DISPLAY CONSOLE .....	10
3.3	THE TEKTRONIX 4013 DISPLAY TERMINAL .....	11

The textual part of this document was formatted using the **FORMAT** Text Processing Program. Figures 2 through 5 were drawn on the 10 inch **CALCOMP** Drum Plotter using the **SLAC** Unified Graphics System and these drawings were then photographically reduced.

This report describes a program which runs on the central computing facility at SLAC and enables a user to view the pictures recorded on a CALCOMP tape with an interactive display console. The purpose of this program is to eliminate the time wasted by plotting incorrect pictures on the CALCOMP, and to speed up the check-out of new computer programs using the CALCOMP by eliminating the long delay between the time that a CALCOMP tape is written and the time that a finished plot is returned to the programmer.

At present, the CALCOMP tapes which can be processed are those written for the following units:

1. The Model 564 (29 inch wide) CALCOMP Drum Plotter.
2. The Model 565 (10 inch wide) CALCOMP Drum Plotter.

The interactive devices which may be used are the following:

1. The IBM 2250 Display Console.
2. The GIF-IDIION Display Console.
3. The TERTRONIX 4013 Display Terminal.

The sequence of operations that this program performs is controlled by the Display Console Operator. The normal sequence is to read the CALCOMP plot tape and generate a Direct Access data set which contains a representation of the pictures. At this time, the tiny CALCOMP steps are coalesced into the longer line segments that the interactive devices need. The Console Operator may then select any processed plot and display it on the interactive device. Small sections of a plot may be displayed at full screen size to check on details in a picture.

As this program executes, it continually prints a summary of the operations it has performed. Some of this information, such as the amount of Direct Access space actually used, can be useful in planning additional uses of this program.

When running this program, the Console Operator is presented with a series of displays which ask for information to be supplied and decisions to be made. Samples of these displays are shown in Figures 2 through 5. At the bottom of most displays is a keyboard input buffer where the Console Operator may type parameter changes and commands. In general, the permissible commands are "GO" and "END". The command "GO" carries the program forward to the next logical display, while "END" returns to the previous display. Figure 1 shows the sequence in which these displays will occur and the commands that are needed to go from one display to another.

The Console Operator may enter many parameter changes and commands at once by separating them by commas. For instance, when Figure 2 is on the screen, it would be possible to change the first two parameters by typing:

TYP=29,MPL=5

and generating a keyboard attention. This would cause the display to be re-generated with the new values of the parameters shown. To proceed to the next display, the Console Operator types:

GO

and generates a keyboard attention. Both of these operations could have been done at once if the Console Operator had typed:

TYP=29,MPL=5,GO

However, this can be a dangerous way of doing things because invalid or unrecognizable items in the keyboard input buffer are ignored. Thus, a simple typing error can cause an item to be ignored. It is usually better, at least until you are familiar with running the program, to check that your parameter changes have been accepted.

All lengths and distances that are referred to in these displays are in inches as measured on the CALCOMP Plotter.

### SECTION 2.1: THE DISPLAY FOR ENTERING THE BASIC PARAMETERS

Figure 2 is the first display which will appear on the screen. The seven parameters that are shown are used in the creation of the Direct Access data set from the CALCOMP tape.

The TYP parameter must be set to 10 or 29 and refers to the width of the paper on the plotter. MPL is the maximum number of plots which will be selected from the tape. If there are more plots than this on the tape, they are ignored.

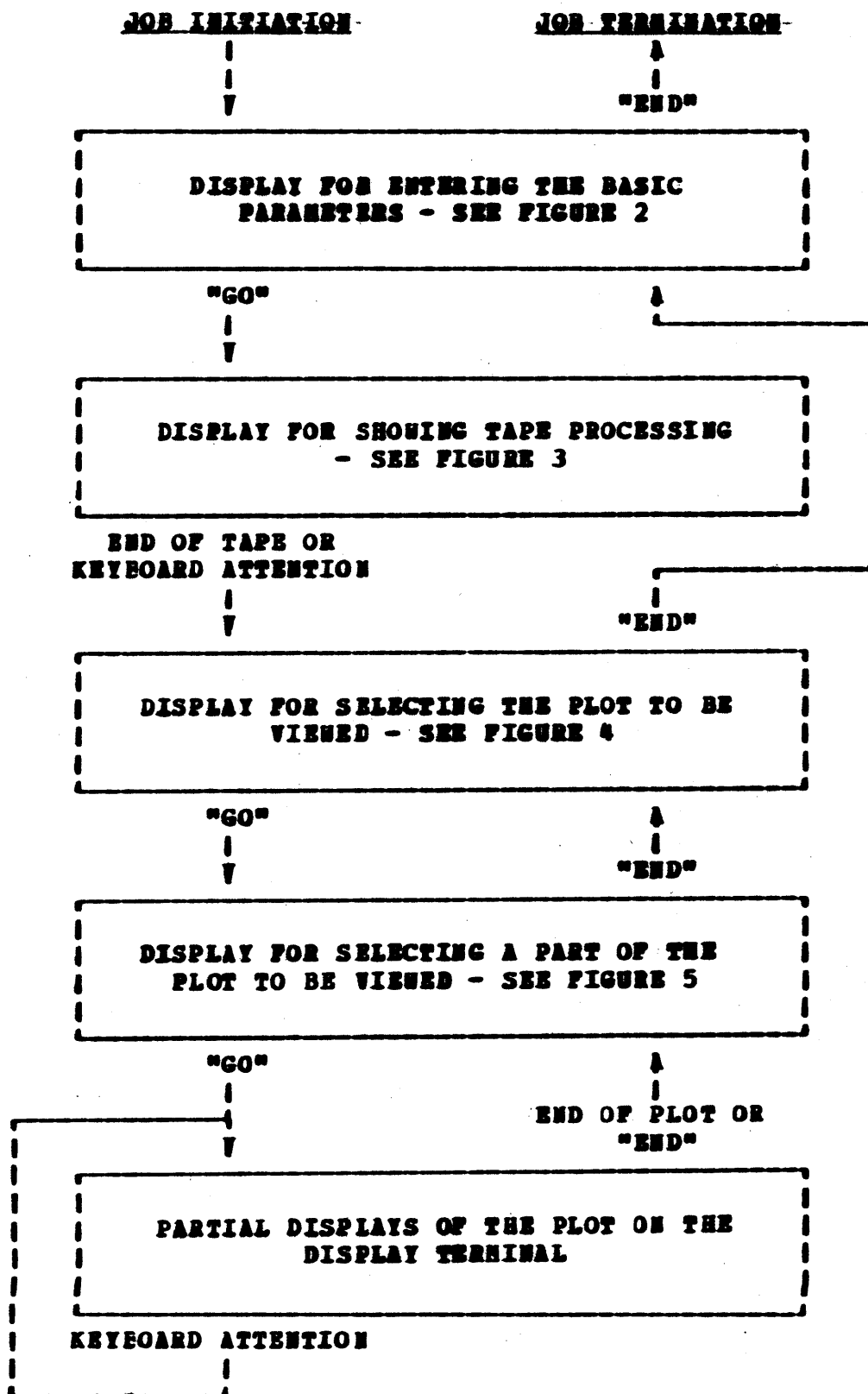


Figure 1: Sequencing between the Program Generated Displays.

## CALCOMP TAPE "QUICK LOOK" PROGRAM

THE CURRENT JOB IDENTIFICATION IS ..... RCBCCL2

YOU MAY NOW ENTER THE FOLLOWING INTO THE INPUT BUFFER...

1. PARAMETER CHANGES IN THE FORM "XXX=NNN".
2. "GO" TO PROCESS THE CALCOMP DATA SET.
3. "END" TO TERMINATE THE PROGRAM.

AFTER THIS INFORMATION IS ENTERED, YOU SHOULD GENERATE A KEYBOARD ATTENTION TO SIGNAL THE PROGRAM TO READ AND PROCESS THE INFORMATION.

CALCOMP PLOTTER SIZE (10 OR 29 INCH) .....	TYP=	10
MAXIMUM NUMBER OF PLOTS TO BE SELECTED .....	MPL=	10
MAXIMUM TAPE RECORD SIZE .....	MTR=	4096
DIMENSION OF SEGMENT ACCUMULATOR .....	DSA=	5
POINT-OFF-LINE INTERNAL TOLERANCE .....	POL=	0.0150
MAXIMUM CURVED SEGMENT LENGTH .....	MCS=	0.5000
DDNAME FOR INPUT DATA SET .....	DDN=	SYSIN

INPUT AREA...

Figure 2: Display for Entering the basic parameters.

MTR is the size of the tape input buffer. Most CALCOMP routines at SLAC produce records about 3000 bytes long. If records longer than the default value are generated, then the DCB parameter for the CALCOMP data set in the JCL will also need changing.

DSA, POL, and MCS control the conversion from short CALCOMP steps to longer line segments. As the tape is read, certain critical points are saved in a buffer until the points in the buffer are clearly not co-linear. At that time, the linear part is transferred to the Direct Access data set. DSA is the dimension of the critical point buffer; POL is the distance that an intermediary point must lie off of the line joining the extreme critical points for non-co-linearity to be recognized; and MCS is the maximum distance apart that the extreme critical points will be allowed to become, except when certain straight lines are being drawn. Increasing MTR and/or decreasing POL or MCS will (1) slow the program, (2) increase the amount of data put into the Direct Access data set, and (3) improve the closeness that

the display matches the CALCOMP plot.

The final parameter, DDN, is the name of the CALCOMP data set to be processed. One of the advantages of having this parameter available is that the Console Operator can process multiple data sets on a single job.

```

CALCOMP TAPE "QUICK LOOK" PROGRAM

THE CALCOMP DATA SET IS NOW BEING READ AND A COMPACT, DIRECT
ACCESS DATA SET IS BEING CREATED. TO TERMINATE THIS
PROCESSING YOU MAY DO THE FOLLOWING...
  1. GENERATE A SINGLE KEYBOARD ATTENTION TO TERMINATE
    AFTER THE CURRENT PLOT.
  2. GENERATE TWO KEYBOARD ATTENTIONS TO TERMINATE
    IMMEDIATELY.
OTHERWISE, PROCESSING WILL GO TO COMPLETION. THE CURRENT
STATUS IS SHOWN BELOW...

      PLOT   CALCOMP   D.A.
      NUMBER RECORD   TRACK
        0         0         0

PLEASE BE PATIENT

```

**Figure 3: Display for Showing Tape Processing.**

## SECTION 2.2: THE DISPLAY SHOWING TAPE PROCESSING

Figure 3 shows the display which is on the screen when the tape is being processed. There is little for the Console Operator to do at this time except to relax and watch the counters change

about once a second. When the TEKTRONIX 4013 is being used, the counters are continually written over without clearing the screen. With this device, the Console Operator may clear the screen by hitting the RESET-PAGE key.

The Console Operator may terminate tape processing at the end of the current plot by generating a single keyboard attention; or processing may be terminated immediately by generating two keyboard attentions.

The Console Operator should pay some attention to the third of the three numbers being displayed. This is a count of the number of tracks in the Direct Access data set that have been used. The program cannot tell when it is about to run out of the space allocated in the SPACE parameter for SYSUT1 in the JCL. It is the Console Operator's responsibility to terminate tape processing before this space is exhausted; otherwise the program will terminate abnormally.

### SECTION 2.3: THE DISPLAY FOR SELECTING A PLOT TO BE VIEWED

Figure 4 shows a display which informs the Console Operator of the number of available pictures and asks that one of them be selected for viewing.

### SECTION 2.4: THE DISPLAY FOR SELECTING PART OF A PLOT

Figure 5 shows the display which can be used to select all or only part of a plot for viewing. When this display appears, immediately after selecting the plot, some viewing parameters are suggested. These suggested parameters will result in the entire plot being displayed, centered on the screen, with the same scaling in both the X and Y directions.

The Console Operator may magnify a portion of the plot by changing the maximum and minimum X and Y values. The total extent of the plot is shown at the top of the screen and may be used as a guide in selecting a viewing window. The part of the plot specified by the maximum and minimum X and Y values will be expanded to fill a square area on the screen. Thus, if the Console Operator requires the same scaling factor in both the X and Y directions, the quantity  $(XHI-XLO)$  should equal the quantity  $(YHI-YLO)$ .



```

CALCOMP TAPE "QUICK LOOK" PROGRAM

THE NUMBER OF AVAILABLE PLOTS IS..... 5

YOU MAY NOW ENTER THE FOLLOWING INTO THE INPUT BUFFER...
  1. PARAMETER CHANGES IN THE FORM "XXX=NNN".
  2. "GO" TO BEGIN PROCESSING THE SELECTED PLOT.
  3. "END" TO RETURN TO THE INITIAL DISPLAY.
AFTER THIS INFORMATION IS ENTERED, YOU SHOULD GENERATE A
KEYBOARD ATTENTION TO SIGNAL THE PROGRAM TO READ AND PROCESS
THE INFORMATION.

THE NUMBER OF THE PLOT TO BE PROCESSED ..... NPL= 1

INPUT AREA...

```

Figure 4: Display for Selecting the Plot to be Viewed.

The DHD parameter may be used to select one of two different modes that may be used to view the picture on the display console. The requirement that two modes be supplied is caused by the fact that a CALCOMP plot can contain an arbitrarily large amount of information, while some interactive devices like the IBM 2250 and GIF-IDILION have severe limits on the amount of information which can be shown at once. Other interactive devices like the TEKTRONIX 4013, with its storage tube, are capable of displaying arbitrarily complex pictures.

The first of these two viewing modes is the "Multiple Exposure" mode. This mode is intended primarily for display devices which have limits on the complexity of the displayed picture. In this case, the picture is segmented into sections which may be displayed one at a time. A Polaroid camera attached to these devices may be used to form a multiple exposure of these pictures to view the entire plot. A keyboard attention must be generated to cause each section to be displayed. If you wish to terminate

sequencing through these partial pictures and return immediately to the display in Figure 5, you may type "END" before generating the keyboard attention.

```

CALCOMP TAPE "QUICK LOOK" PROGRAM

YOU HAVE SELECTED PLOT NUMBER ..... 1
THE TOTAL EXTENT OF THIS PLOT IN INCHES IS...
      5.000 < X < 15.000
      0.000 < Y < 10.000

YOU MAY NOW ENTER THE FOLLOWING INTO THE INPUT BUFFER...
  1. PARAMETER CHANGES IN THE FORM "XXX=NNN".
  2. "G0" TO DISPLAY THE SELECTED PLOT.
  3. "END" TO RETURN TO THE PLOT SELECTION DISPLAY.
AFTER THIS INFORMATION IS ENTERED, YOU SHOULD GENERATE A
KEYBOARD ATTENTION TO SIGNAL THE PROGRAM TO READ AND PROCESS
THE INFORMATION.

DISPLAY MODE (M=MULTIPLE EXPOSURE, F=FLASH) ... DMD=M
MINIMUM X VALUE IN INCHES ..... XL0= 5.000
MAXIMUM X VALUE IN INCHES ..... XHI= 15.000
MINIMUM Y VALUE IN INCHES ..... YL0= 0.000
MAXIMUM Y VALUE IN INCHES ..... YHI= 10.000

INPUT AREA...
-

```

Figure 5: Display for Selecting a Part of the Plot to be Viewed.

The second viewing mode is the "Flash" mode and is intended primarily for display devices which do not have a limitation on picture complexity. In this mode, the entire picture will be displayed. A keyboard attention will return the program to Figure 5.

Either mode may be used on any device but they may work differently on different devices. For instance, if the "Flash" mode is used on an IBM 2250, the sections of the picture will be flashed on the screen for short intervals, but only the last section will be retained.

Using this program is basically a two step process. First, the CALCOMP tape is generated and then it is processed by this program. When the job is run to create a plot tape, the user previously simply included a /\*SETUP card in the deck and specified VOLUME=SER=PLOTAP in the JCL statement for the plot tape. The tape would then be placed in the user's bin to wait for a decision on whether the tape should be plotted. If this program is to be used in a later step, additional messages should be sent to the setup operator to tell the operator that the plot tape is to be temporarily saved and labeled. To do this, the following cards could be included in the program deck:

```
/*SETUP MSG OPERATOR...PLEASE LABEL THE PLOT TAPE "xxxxxx"  
/*SETUP MSG AND SAVE IT FOR A LATER JOB.
```

where "xxxxxx" is a unique name the user is giving to the tape. This name should usually start with the user's identification. After the tape has been viewed, the user should always inform the operations staff about the disposition of the tape. It should either be plotted on the CALCOMP or returned to the available plot tape rack.

Actually, when a user is just checking out a program, it is much more convenient to modify the JCL of the CALCOMP tape generating job so that it writes the CALCOMP orders into a disk data set instead of a tape. If this is done, then all of the statements about sending messages to the setup operator can be ignored.

The following sections describe the JCL that is needed to run the program on each of the Display Consoles. The most suitable device is the IBM 2250. The GIF-IDIXION is less suitable because it has a flicker problem when large amounts of data are displayed and the TEKTRONIX 4013 has a very slow picture drawing rate.

### SECTION 3.1: THE IBM 2250 DISPLAY CONSOLE

The IBM 2250 is an on-line interactive display console with a CRT with a 10 inch by 10 inch working area. The IBM 2250's at SLAC have a keyboard and a light pen. This program does not use the light pen. The keyboard attention is generated by holding the ALT key down and depressing the key marked END.

The audible alarm on the IBM 2250 will sound once at the beginning of the program and once after each picture segment is ready in the "Multiple Exposure" mode.

The JCL that can be used to run this program on an IBM 2250 is:

```
//uuuCCQL JOB uuu$gg,REGION=150K,CLASS=0,PRTY=10,
//
//*SETUP      TIME=30,ET=30
//*SETUP      UNIT=TAPE7,VOL=xxxxxx,NL
//*SETUP      MSG OPERATOR...THE TAPE "xxxxxx" IS A PLOT TAPE
//*SETUP      MSG GENERATED ON JOB uuuyyyyy.
//GO          EXEC PGM=BCBCCQL2
//SYEPLIB     DD DSN=UWL.CG.PUB.LOADMODS,DISP=SHR
//            DD DSN=UWL.CG.RCB.UGXLIB,DISP=SHR
//SYSPRINT    DD SYSOUT=A
//SYSUT1      DD SPACE=(TRK,25),UNIT=SYSDA
//SYSDISP     DD UNIT=OD1
//SYSIN       DD DISP=(OLD,PASS),UNIT=TAPE7,
//            VOLUME=SER=xxxxxx,LABEL=(1,NL),
//            DCB=(RECFM=U,BLKSIZE=4096,DEN=0)
//
```

Where "uuu" is the user's identification, "gg" is the group identification, and "xxxxxx" is the label on the tape. If multiple files are to be used, the DD cards for them should also be included in the deck.

One important consideration in preparing a set of JCL for running this program is the number of tracks allocated to the SYSUT1 data set. This data set must be large enough to hold the processed plots. If too few tracks are provided, the console operator will have to terminate tape processing or the job will terminate abnormally. When processed by this program, Figures 2 through 5 required either 3 or 4 tracks each. When viewed in the "Multiple Exposure" mode, these plots were divided into 3 to 5 displays.

### SECTION 3.2: THE GIF-IDIION DISPLAY CONSOLE

The GIF-IDIION is an on-line interactive display console. The Graphic Interpretation Facility (GIF) is operated by the SLAC Computation Group as a research facility for on-line graphic systems. The facility consists of a Varian 620/I computer and an IDIION display console with a 21 inch CRT, an alphanumeric keyboard, a light pen, and a number of other devices. Only the keyboard is used by this program. The keyboard attention is generated by the escape (ESC) key.

The JCL required to use the GIF-IDIION is the same as for the IBM 2250 except that the job should run with CLASS=C and the SYSDISP DD card should be:

```
//SYSDISP DD UNIT=GIF
```

### SECTION 3.3: THE TEKTRONIX 4013 DISPLAY TERMINAL

The TEKTRONIX 4013 is an interactive storage display terminal with an eight inch wide by six inch high screen and a keyboard. The keyboard attention is generated by the RETURN key.

The JCL required to use the TEKTRONIX 4013 is the same as for the IBM 2250, except that the job can run in any interactive job class and the SYSDISP DD card should be:

```
//SYSDISP DD DUMMY
```

In addition, the EXEC card may be of the form:

```
//GO EXEC PGM=RCBCCQL2,PARN=zzzzzzzz
```

where "zzzzzzzz" is a "Magic Word" of one to eight characters. Its use is described in the next paragraph.

To run a job using the TEKTRONIX 4013, the user should do the following:

1. Sign on the terminal and begin using the WYLBUR Text Editing System in the usual manner.
2. Submit the job. This job will become a sub-system running under the MILTEN Terminal Manager. The command SHOW SYSTEMS will list the currently running systems. The name of your sub-system will be the same as the job name.
3. When your sub-system is known to MILTEN, you may type its name to connect your terminal to your sub-system. However, before this connection is made, MILTEN will ask for the sub-system's Magic Word. If no Magic Word is supplied, then the default will be "XXXXXXXX".

As the pictures corresponding to Figures 2 through 5 are drawn on the screen, you will notice that the important items are drawn first and the instructions last. You may use the BREAK key at any time to terminate the transmission of a picture. If you have been typing information and wish to delete the entire line, you may do so by using the BREAK key. In addition, you may temporarily return to WYLBUR by typing \$WYL and hitting the RETURN key. When you are finished using WYLBUR, you may type the name of your sub-system to resume.