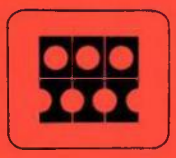

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Chapter 1
INTRODUCTION

1.1 The standard FR 80/COMp 80 software described in this manual is distributed by Information International to customers for use on FR 80/COMp 80 systems. Programs are assembled upon request and distributed on magnetic tape in an executable binary format.

1.2 All programs are custom-assembled to match particular machine configurations and to meet particular software requirements. It is often advantageous for optional program features which are not required to be omitted to allow a larger input buffer area. It may also be necessary to assemble special versions of some programs with especially large buffers to allow the processing of large blocks of data, large forms, and/or multiple buffering.

1.3 The purpose of this document is to supply the user with a menu of programs and the assembly options available to these programs. With this information the user can request the appropriate software to meet his particular software requirements.

1.4 For each program and assembly option there is a unique assembly mumble, or Teletype message, which is produced at program assembly time. Chapter 2 describes "program mumbles" and discusses hardware assembly options.

1.5 Chapter 3 consists of individual descriptions of each of the standard production programs available. Additional information given with each program description includes Program Mumble and Available Assembly Options, a list of all of the standard software assembly options available to the particular program.

1.6 Chapter 4 consists of individual descriptions of each of the standard software assembly options available; they are listed in alphabetical order according to their respective assembly mumbles. Additional information given with each assembly option description includes Assembly Parameter, the syntax used at assembly time to include the assembly option; Core Requirements, the approximate amount of core required to include the assembly option; and Special Hardware Requirements.

1.7 Note that the core requirement specifications are approximate. A particular assembly option could require less core than specified if it uses coding previously inserted with the inclusion of another assembly option.

Chapter 2

PROGRAM MUMBLES AND HARDWARE ASSEMBLY OPTIONS

PROGRAM MUMBLES

2.1 Each program and assembly option has a unique assembly mumble, or Teletype message, which is produced at program assembly time. A "program mumble" is an accumulation of these messages. It indicates the program name, the hardware configuration for which the program was assembled, the software assembly options which were included in the program assembly, etc.

EXAMPLE OF PROGRAM MUMBLE

2.2 A typical program appears as follows:

```
/AUTOMATIC CUSTOMER PROGRAM SET-UP
ASSEMBLED ON APRIL 15, 1975
REVISION 3-AB
WELLS ENTERPRISES
#15. 7-TRACK PRINT (MON;P7)
8K III-15 FR 80
WITH 7-TRACK TAPES
WITH HIGH-SPEED CHARACTERS
WITH 35 MM UNSPROCKETED CAMERA
NO DEBUG
BIGBUF=0 TAPE MONITOR
PTYPE=1
WITH BCD CHARACTER SET
FONT=0. III FILM FONT
WITH DASHED LINES
WITH FORM FLASH
BUFFER SIZE IS 1661. WORDS (4983. 6-BIT BYTES)
/AUTOMATIC CUSTOMER PROGRAM SET-UP
```

DESCRIPTION OF EXAMPLE

2.3 The first and last lines of a program mumble are always identical. In the example, the words /AUTOMATIC CUSTOMER PROGRAM SET-UP indicate that the program was assembled according to specifications maintained in a disk file. A disk file is maintained for the preparation of each user's software. This file specifies the assembly options desired for each of the programs included in the user's current software system.

2.4 The second line indicates the exact date on which the program was assembled.

2.5 The third line indicates the revision level of the symbolics used to assemble the binary program. Each time these symbolics are revised, the revision letters are incremented and a Software Release Notice describing the revisions is mailed to each user.

2.6 The fourth line indicates the user's company.

2.7 The fifth line indicates the program's number and name. The number relates to the program's listing in the program specifications disk file. (This number does not relate to its sequence on the system tape.) The first program name is used for tape systems. The second program name, which is enclosed in parentheses, is used for disk systems.

2.8 The sixth line describes the basic hardware system. nK specifies core size, where 1 x n = 1024 18-bit words. Next, either PDP-9L, PDP-15, or III-15 indicates that the system has either a Digital Equipment Corporation PDP-9/L or PDP-15, or an Information International triple-I Series 15 computer.

2.9 If a program is assembled for a disk system, WITH DISK will also be printed in the sixth line. DISK DEBUG will automatically be included.

2.10 The second to the last line indicates the remaining buffer size. With BIGBUF=1 programs, three lines may appear (see chapter 4, BIGBUF=n). With the FR 80 Displayer program, the remaining FREE SIZE will be indicated (see chapter 4, DOUBLE BUFFERED).

2.11 Normally one or two lines will consist of the Program Mumble for the particular program, as given with the program's description in chapter 3. The remaining lines either indicate the inclusion of software assembly options, as described in chapter 4, or give more information about the hardware configuration.

2.12 Programs can be assembled for any camera. The Camera Table (below) gives the Assembly Parameter, Assembly Mumble, and core requirements for each camera.

2.13 When assembling for certain cameras, the assembly parameter NUMCAM can be set to 2 to include the operator command CAMERA. This requires approximately 50 words of core. With NUMCAM==2, other cameras can then be listed as secondary cameras; they can later be selected with the CAMERA command. This feature only applies to certain cameras. For each of these cameras, two core requirements are given in the table. The second number specifies the core requirements for the camera as a secondary camera.

2.14 CAMERA TABLE

NOTE

CAMNUM==1 is considered to be the basic camera and therefore no core requirement is given. Certain other cameras require more core.

Assembly Parameter	Assembly Mumble	Core Reqts.
CAMNUM==1	WITH 35 MM UNSPROCKETED CAMERA	0,20
CAMNUM==2	WITH 16 MM UNSPROCKETED CAMERA	0,20
CAMNUM==3	WITH 35 MM SPROCKETED CAMERA	10,30
CAMNUM==4	WITH 16 MM SPROCKETED CAMERA	10,30
CAMNUM==5	WITH STRIP FICHE CAMERA	0,20
CAMNUM==7	WITH III FICHE MOD 1 CAMERA	150
CAMNUM==8	WITH 16 MM III FICHE UNSPROCKETED MOD 1 CAMERA	10
CAMNUM==9	WITH III FICHE MOD 2 CAMERA	140
CAMNUM==10.	WITH 16 MM III FICHE UNSPROCKETED MOD 2 CAMERA	0
CAMNUM==16.	WITH HARDCOPY II CAMERA WITH Y AXIS MIRRORING	140,170

Chapter 3

PRODUCTION PROGRAMS

FR 80 DISPLAYER

3.1 This program processes data tapes written in the FR 80 Standard Data Format. This is the preferred format for the FR 80 because it permits the utilization of all of the FR 80's capabilities. The FR 80 has a 16K raster, eight programmable beam intensities, eight programmable beam spot sizes, 64 programmable character sizes, and two programmable image rotations.

3.2 Data input may be from either 7- or 9-track tapes. 9-track tapes must be written in core dump mode. Fiche titles may be specified on the data tape.

3.3 Operator commands are available which permit the operator to modify the image at run-time. Although the actual data cannot be changed, the appearance of the image can be enhanced. In some cases, this will eliminate the need to make modifications to the data tape on the host computer. Commands permit changes to the scaling, positioning, and rotation of the image, and modifications, through conversion tables, to the programmable intensities, spot sizes, and character sizes specified on the data tape. If desired, only particular jobs or frames may be plotted.

3.4 The forms flash capability is always present; it uses the picture name routines (see chapter 5).

3.5 Programs may be assembled either with or without LOWER CASE (see chapter 4).

3.6 Program Mumble: WITH III CHARACTER SET or
WITH III LOWERCASE CHARACTER SET

3.7 Software Assembly Options:

BIGBUF=n
COLOR
DOUBLE BUFFERED
FONT=n.
LOAD AND GO
LOWER CASE
MAPCOM=n
SUBTRACTIVE COLOR
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE

WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE TITLING
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH IMAGE SCALING
WITH INDEPENDENT X&Y SCALING
WITH MULTIPLE IMAGES PER FRAME
WITH MULTIPLE REEL PROCESSING
WITH PROPORTIONAL SPACING
WITH VECTOR FAMILIES
WITH 64 INTENSITY LEVELS
WITH 256 INTENSITY LEVELS
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

4020 INTERPRETER

3.8 This program processes 7-track data tapes formatted for the Stromberg DatagraphiX 4020 COM system. The 4020 has a 1K raster, two programmable line weights, two programmable character weights, and one character size. The CRT can be physically rotated 90 degrees.

3.9 Operator commands permit the operator to scale the image for both normal and abutted frames, select programmable intensity and spot size combinations for the two 4020 line weights, select programmable intensity and spot size combinations for the two 4020 character weights, and change the image rotation. Also see chapter 4, WITH FORM FLASH.

NOTE

This program must be assembled with WITH MANYUP CAPABILITY (see chapter 4).

3.10 Program Mumble: WITH BCD SC4020 CHARACTER SET

3.11 Software Assembly Options:

BIGBUF=n
DOUBLE BUFFERED
FONT=n.
LOAD AND GO
MAPCOM=n
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES

WITH EXACT DASHED LINES
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MULTIPLE REEL PROCESSING
WITH REPEAT FRAME
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

META INTERPRETER

3.12 This program processes data tapes formatted in the META language (output by the IGS host computer package) for use on the Stromberg DatagraphiX 4060 COM system. The 4060 has a 4K raster, eight programmable line weights, and four programmable character sizes. The CRT can be physically rotated 90 degrees.

3.13 Data input may be from either 7- or 9-track tapes and in either a 6-bit or an 8-bit command format.

3.14 Operator commands permit the operator to specify image scaling, pulldown and rotation for 11" x 14" and 8.5" x 11" normal modes and expand mode, select programmable intensity and spot size combinations for the eight META line weights, and select a programmable intensity and spot size combination for META characters. Also see chapter 4, WITH FORM FLASH.

3.15 Programs may be assembled for 6-bit and/or 8-bit command formats. They may also be assembled either with or without LOWER CASE (see chapter 4).

NOTE

This program must be assembled with WITH VECTOR FAMILIES (see chapter 4).

3.16 Program Mumble: WITH META CHARACTER SET
and
6-BIT ONLY or
8-BIT ONLY or
6- AND 8-BIT or
LOWER CASE 6-BIT ONLY or
LOWER CASE 8-BIT ONLY or
LOWER CASE 6- AND 8-BIT

3.17 Software Assembly Options:

BIGBUF=n
DOUBLE BUFFERED
FONT=n.
LOAD AND GO
LOWER CASE
MAPCOM=n
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MULTIPLE REEL PROCESSING
WITH REPEAT FRAME
WITH STRIP CHART
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

CalComp INTERPRETER 500 SERIES

3.18 This program processes data tapes formatted for the 500 series CalComp bed and drum plotters. These are incremental plotters which use a pen to create an image on paper. Both the maximum image size and the size of a single step, or increment, vary between the different models available.

3.19 Data input may be from either 7- or 9-track tapes. When recording abutted frames, the data for the entire plot must be contained in one magnetic tape file.

3.20 Operator commands permit the operator to scale the image for both normal and abutted frames, position the image, and change the image rotation. If desired, only particular blocks of data may be plotted. (Data blocks are identified by block address commands on the data tape.)

3.21 The forms flash capability is not available with this program.

3.22 Program Mumble: 500 SERIES

3.23 Software Assembly Options:

```
BIGBUF=n
DOUBLE BUFFERED
DOUBLE PRECISION
LOAD AND GO
MAPCOM=n
SINGLE PRECISION
WITH COMMAND FOR MIRROR IMAGE
WITH "CONVERT" FEATURE
WITH FICHE TITLING
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MULTIPLE REEL PROCESSING
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY
```

CalComp INTERPRETER 600 SERIES

3.24 This program processes data tapes formatted for the 600 series CalComp bed and drum plotters. These are incremental plotters which use a pen to create an image on paper. Both the maximum image size and the size of a single step, or increment, vary between the different models available.

3.25 Data input may be from either 7- or 9-track tapes. When recording abutted frames, the data for the entire plot must be contained in one magnetic tape file.

3.26 Operator commands permit the operator to scale the image for both normal and abutted frames, position the image, and change the image rotation. If desired, only particular blocks of data may be plotted. (Data blocks are identified by block address commands on the data tape.)

3.27 The forms flash capability is not available with this program.

3.28 Program Mumble: 500 SERIES
WITH 600 FORMAT

3.29 Software Assembly Options:

```
BIGBUF=n
DOUBLE BUFFERED
DOUBLE PRECISION
LOAD AND GO
MAPCOM=n
SINGLE PRECISION
```

WITH COMMAND FOR MIRROR IMAGE
WITH "CONVERT" FEATURE
WITH FICHE TITLING
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MULTIPLE REEL PROCESSING
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

CalComp INTERPRETER 700 SERIES

3.30 This program processes data tapes formatted for the 700 series CalComp bed and drum plotters. These are incremental plotters which use a pen to create an image on paper. Both the maximum image size and the size of a single step, or increment, vary between the different models available.

3.31 Data input may be from either 7- or 9-track tapes. When recording abutted frames, the data for the entire plot must be contained in one magnetic tape file.

3.32 Operator commands permit the operator to scale the image for both normal and abutted frames, position the image, and change the image rotation. If desired, only particular blocks of data may be plotted. (Data blocks are identified by block address commands on the data tape.)

3.33 The forms flash capability is not available with this program.

3.34 Program Mumble: 700 SERIES

3.35 Software Assembly Options:

BIGBUF=n
DOUBLE BUFFERED
DOUBLE PRECISION
LOAD AND GO
MAPCOM=n
SINGLE PRECISION
WITH COMMAND FOR MIRROR IMAGE
WITH "CONVERT" FEATURE
WITH FICHE TITLING
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MULTIPLE REEL PROCESSING
WITHOUT FOCUS PATTERN

WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

CalComp INTERPRETER 900 SERIES

3.36 This program processes data tapes formatted for the 900 series CalComp bed and drum plotters. These are incremental plotters which use up to four pens to create an image on paper. Both the maximum image size and the size of a single step, or increment, vary between the different models available. Character codes are used to place characters within the image.

3.37 Data input may be from either 7- or 9-track tapes and in either a 6-bit or an 8-bit command format. The 8-bit format uses ASCII character codes, and the 6-bit format uses ASCII character codes plus 40 octal.

3.38 Operator commands permit the operator to scale the image, select programmable intensity and spot size combinations for the four pens available, position the image, and change the image rotation. If desired, only particular blocks of data may be plotted. (Data blocks are identified by block address commands on the data tape.)

3.39 This program uses the vector generator and the character descriptors for the particular font being used to create characters at the various sizes specified on the data tape.

3.40 The forms flash capability is not available with this program.

3.41 Programs may be assembled for either 6- or 8-bit command formats. 8-bit versions may be assembled either with or without LOWER CASE (see chapter 4).

3.42 Program Mumble: WITH SIMULATED LARGE COM CHARACTERS
and
WITH ASCII 6-BIT ORED 40 CHARACTER SET and
MULTI PEN CALCOMP 900 CONTROLLER
or
WITH ASCII CHARACTER SET and
MULTI PEN CALCOMP 900 (8 BIT) CONTROLLER

3.43 Software Assembly Options:

BIGBUF=n
DOUBLE BUFFERED
DOUBLE PRECISION
FONT=n.
LOAD AND GO
LOWER CASE

```
MAPCOM=n
SINGLE PRECISION
WITH COMMAND FOR MIRROR IMAGE
WITH "CONVERT" FEATURE
WITH FICHE TITLING
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MULTIPLE REEL PROCESSING
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY
```

GERBER INTERPRETER

3.44 This program processes data tapes formatted for Gerber automatic drafting tables. These are incremental drafting machines which may be equipped with either a single tool drafting head, a multiple tool drafting head, or an optical exposure head. The tool drafting heads hold pens and/or scribing devices. (The multiple tool drafting head has a turret which holds up to six devices.) The optical exposure head has a light source and a 24-position turret. It is used to record an image on film. Each turret position can hold a different aperture which is selectable under program control. Apertures are used either in flash mode, to expose a specific pattern, or in line drawing mode, to draw a line.

3.45 Data input may be from either 7- or 9-track tapes. 7-track tapes are written with 6-bit BCD character codes; 9-track tapes are written with 8-bit EBCDIC character codes.

3.46 Operator commands permit the operator to automatically scale and center the image, manually scale and/or center the image, select either absolute or relative coordinates, specify the apertures to be used, change the image rotation, etc.

3.47 The Gerber Interpreter program is available in two forms. When specifying apertures, both forms permit the specification of aperture size. With the first form, however, only four aperture shapes may be selected. These are filled round, doughnut, filled square, and cross. The second form is created by assembling with WITH FORM FLASH (see chapter 4). With this option, all apertures are designed as forms and loaded into the program. It is possible to create an aperture of any shape.

3.48 Programs may be assembled for either BCD or EBCDIC input codes.

3.49 Program Mumble: GTYPE 2 WITH 6 BIT INPUT CODES and
WITH BCD FORTRAN CHARACTER SET
or
GTYPE 3 WITH EBCDIC INPUT CODES and
WITH EBCDIC CHARACTER SET

3.50 Software Assembly Options:

BIGBUF=n
DOUBLE BUFFERED
FONT=n.
LOAD AND GO
MAPCOM=n
WITH ARCS
WITH BATCH PROCESSING
WITH CIRCULAR INTERPOLATION
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH EXACT DASHED LINES
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH "MEASURE PLOT" COMMAND
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

BCD PRINT

3.51 This program processes 7-track data tapes written in line printer format with 6-bit BCD character codes. The tape format consists of a single byte carriage control followed by a fixed or variable length print line. Record marks may be used to terminate print lines. COM control records (fiche title, indexing, and title extraction specifications) may be included on the data tape.

3.52 Operator commands permit the operator to scale the image by specifying spacing and line feed values, select a programmable character size, specify multiple images per frame, position the image(s), change the image rotation, specify the maximum number of characters per line and lines per page, select either the commercial or the scientific character set, specify a nonstandard character set, select a standard carriage control set or specify nonstandard carriage controls, specify line numbers for channel skips, specify a record mark character, etc.

3.53 Program Mumble: PTYPE = 1
WITH BCD CHARACTER SET

3.54 Software Assembly Options:

BIGBUF=n
FONT=n.
LOAD AND GO
MAPCOM=n
STRIP FICHE
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE INDEXING
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MANYUP CAPABILITY
WITH MULTIPLE REEL PROCESSING
WITH SINGLE BUFFERING
WITH TITLE EXTRACTION WITH OPERATOR INPUTS
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

EBCDIC PRINT

3.55 This program processes 9-track data tapes written in line printer format with 8-bit EBCDIC character codes. The tape format consists of a single byte carriage control followed by a fixed or variable length print line. Record marks may be used to terminate print lines. This program will also process data tapes written in the standard IBM variable blocked format. COM control records (fiche title, indexing, and title extraction specifications) may be included on the data tape.

3.56 Operator commands permit the operator to scale the image by specifying spacing and line feed values, select a programmable character size, specify multiple images per frame, position the image(s), change the image rotation, specify the maximum number of characters per line and lines per page, specify a nonstandard character set, select a standard carriage control set or specify non-standard carriage controls, specify line numbers for channel skips, specify a record mark character, etc.

3.57 Programs may be assembled either with or without LOWER CASE (see chapter 4).

3.58 Program Mumble: PTYPE = 3 and
WITH EBCDIC CHARACTER SET or
WITH EBCDIC LOWER CASE CHARACTER SET

3.59 Software Assembly Options:

BIGBUF=n
FONT=n.
LOAD AND GO
LOWER CASE
MAPCOM=n
STRIP FICHE
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE INDEXING
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MANYUP CAPABILITY
WITH MULTIPLE REEL PROCESSING
WITH SINGLE BUFFERING
WITH TAPE LABEL PROCESSING
WITH TITLE EXTRACTION WITH OPERATOR INPUTS
WITH VECTOR FAMILIES
WITH VOLUME SEQUENCE CHECKING
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

7-TRACK CONVERT-ON PRINT

3.60 This program is similar to the EBCDIC Print program, except that it accepts the EBCDIC data format from 7-track tape and it must be assembled with WITH SINGLE BUFFERING (see chapter 4).

3.61 Program Mumble: PTYPE = 4 and
CONVERT ON 9 TRACK and
WITH EBCDIC CHARACTER SET or
WITH EBCDIC LOWER CASE CHARACTER SET

4360/4400/4440 PRINT

3.62 This program processes data tapes formatted for the 4360 4400, and 4440 DatagraphiX Micromation Printers (COM systems).

3.63 Data input may be from either 7- or 9-track tapes. 7-track tapes are written with 6-bit BCD character codes; 9-track tapes are written with 8-bit EBCDIC character codes.

3.64 Operator commands permit the operator to scale the image by specifying spacing and line feed values, select a programmable character size, specify multiple images per frame, position the image(s), change the image rotation, select either the commercial or the scientific character set (7-track format only), etc.

3.65 Programs may be assembled for either 7- or 9-track data tapes. 9-track versions may be assembled either with or without LOWER CASE (see chapter 4).

3.66 Program Mumble:

```
WITH SC4440 CODE
        and
PTYPE = 6 and
WITH SC4440 (BCD) CHARACTER SET
        or
PTYPE = 7 and
WITH EBCDIC CHARACTER SET or
WITH EBCDIC LOWER CASE CHARACTER SET
```

3.67 Software Assembly Options:

```
BIGBUF=n
FONT=n.
LOAD AND GO
LOWER CASE
MAPCOM=n
STRIP FICHE
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE INDEXING
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MANYUP CAPABILITY
WITH MULTIPLE REEL PROCESSING
WITH SINGLE BUFFERING
```

WITH TITLE EXTRACTION WITH OPERATOR INPUTS
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

BURROUGHS BACKUP PRINT

3.68 This program processes 7-track data tapes formatted in the Burroughs printer backup print tape format for Burroughs line printers.

3.69 Operator commands permit the operator to scale the image by specifying spacing and line feed values, select a programmable character size, specify multiple images per frame, position the image(s), change the image rotation, etc.

3.70 Program Mumble: PTYPE = 12 and
WITH BACKUP FOR BURROUGHS and
WITH BURROUGHS (5500) CHARACTER SET

3.71 Software Assembly Options:

BIGBUF=n
FONT=n.
LOAD AND GO
MAPCOM=n
STRIP FICHE
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE INDEXING
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MANYUP CAPABILITY
WITH MULTIPLE REEL PROCESSING
WITH SINGLE BUFFERING
WITH TITLE EXTRACTION WITH OPERATOR INPUTS
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

3.72 This program processes 9-track data tapes formatted in the block type C, record type Z, print tape format (as defined in the SCOPE 3.4 reference manual) for CDC line printers. COM control records (fiche title, indexing, and title extraction specifications) may be included on the data tape.

3.73 Operator commands permit the operator to scale the image by specifying spacing and line feed values, select a programmable character size, specify multiple images per frame, position the image(s), change the image rotation, etc.

3.74 Program Mumble: PTYPE = 27 and
WITH CDC 6000 CHARACTER SET

3.75 Software Assembly Options:

BIGBUF=n
DOUBLE BUFFERED
FONT=n.
LOAD AND GO
MAPCOM=n
STRIP FICHE
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE INDEXING
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MANYUP CAPABILITY
WITH MULTIPLE REEL PROCESSING
WITH TITLE EXTRACTION WITH OPERATOR INPUTS
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

G. E. PRINT (HONEYWELL)

3.76 This program processes 7-track data tapes formatted in the 600 Series standard SYSOUT print tape format for G. E. line printers.

3.77 Operator commands permit the operator to scale the image by specifying spacing and line feed values, select a programmable character size, specify multiple images per frame, position the image(s), change the image rotation, etc.

3.78 Programs may be assembled either with or without LOWER CASE (see chapter 4).

3.79 Program Mumble: PTYPE = 5 and
WITH G.E. CHARACTER SET
or
PTYPE = 11 and
WITH G.E. LOWER CASE CHARACTER SET

3.80 Software Assembly Options:

BIGBUF=n
FONT=n
LOAD AND GO
LOWER CASE
MAPCOM=n
STRIP FICHE
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE INDEXING
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MANYUP CAPABILITY
WITH MULTIPLE REEL PROCESSING
WITH SINGLE BUFFERING
WITH TITLE EXTRACTION WITH OPERATOR INPUTS
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

NCR 315 PRINT

3.81 This program processes 7-track data tapes formatted for NCR 315 line printers. COM control records (fiche title, indexing, and title extraction specifications) may be included on the data tape.

3.82 Operator commands permit the operator to scale the image by specifying spacing and line feed values, select a programmable character size, specify multiple images per frame, position the image(s), change the image rotation, etc.

3.83 Program Mumble: PTYPE = 1 and
WITH NCR (315) CHARACTER SET

3.84 Software Assembly Options:

BIGBUF=n
FONT=n.
LOAD AND GO
MAPCOM=n
STRIP FICHE
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE INDEXING
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MANYUP CAPABILITY
WITH MULTIPLE REEL PROCESSING
WITH SINGLE BUFFERING
WITH TITLE EXTRACTION WITH OPERATOR INPUTS
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

NCR CENTURY PRINT

3.85 This program processes 9-track data tapes formatted for NCR Century line printers.

3.86 Operator commands permit the operator to scale the image by specifying spacing and line feed values, select a programmable character size, specify multiple images per frame, position the image(s), change the image rotation, etc.

3.87 Programs may be assembled either with or without LOWER CASE (see chapter 4).

3.88 Program Mumble: PTYPE = 14 and
WITH CNTURY (ASCII) CHARACTER SET

3.89 Software Assembly Options:

BIGBUF=n
FONT=n.
LOAD AND GO
LOWER CASE
MAPCOM=n
STRIP FICHE
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE INDEXING
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MANYUP CAPABILITY
WITH MULTIPLE REEL PROCESSING
WITH SINGLE BUFFERING
WITH TITLE EXTRACTION WITH OPERATOR INPUTS
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

3.90 This program processes 7-track data tapes formatted in the 1100 series print tape format for UNIVAC line printers. COM control records (fiche title, indexing, and title extraction specifications) may be included on the data tape.

3.91 Operator commands permit the operator to scale the image by specifying spacing and line feed values, select a programmable character size, specify multiple images per frame, position the image(s), change the image rotation, etc.

3.92 Programs may be assembled for either the Fieldata character set alone or the Fieldata and ASCII lower case character sets.

3.93 Program Mumble:

```
PTYPE = 15 and
WITH UNIVAC (1108) CHARACTER SET
        or
PTYPE = 24 and
WITH UNIVAC (UNIASC) 8-BIT ASCII CHARAC-
  TER SET
```

3.94 Software Assembly Options:

```
BIGBUF=n
FONT=n.
LOAD AND GO
MAPCOM=n
STRIP FICHE
WITH ARCS
WITH BATCH PROCESSING
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE TITLING
WITH FORM FLASH
WITH FRAME RESET
WITH GOGO (LOADGO2)
WITH IMAGE MARK
WITH INDEPENDENT X&Y SCALING
WITH MANYUP CAPABILITY
WITH MULTIPLE REEL PROCESSING
WITH SINGLE BUFFERING
WITH VECTOR FAMILIES
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY
```

Chapter 4

SOFTWARE ASSEMBLY OPTIONS

BIGBUF=n

4.1 Programs may be assembled with either BIGBUF==0 or BIGBUF==1. BIGBUF=0 programs are the most convenient from an operations standpoint; they always have the full set of operator commands assembled into the program.

4.2 Programs may be assembled with BIGBUF=1 in order to create especially large buffers to allow the processing of large blocks of data, large forms, and/or multiple buffering. BIGBUF=1 programs vary from BIGBUF=0 programs in the following ways:

1. Many commands are available only until a GO or FORM command has been activated. This allows the operator to set a parameter, and then increases the buffer size by eliminating the command.

2. With programs assembled with the forms flash capability (see WITH FORM FLASH), three lines which refer to buffer size will appear in the program mumble. The first line will specify the buffer size with a form. The second line will specify the buffer size without a form. (If a form has not been loaded, activating the GO command will increase the buffer size by eliminating the forms displayer portion of the program.) The third line will specify the maximum form size.

3. Neither the = nor the ? commands will print the current status of certain commands.

4. The SCAN JOB,FRAME,COMMAND command in the FR 80 Displayer program will not accept a parameter; it will always move the tape forward to the first valid CHECK POINT DELIMITER command.

4.3 Core Requirements: 0 words with BIGBUF=0
-500 to -2000 words with BIGBUF=1

NOTE

BIGBUF==0 is considered to be basic and therefore no core requirement is given. Assembling a program with BIGBUF==1 excludes certain program features and makes more core available.

4.4 Special Hardware Requirements: none

COLOR

4.5 Includes the additive color routines for FR 80s with the additive color option.

4.6 Assembly Parameter: COLOR==1

NOTE

FR 80 Displayer programs assembled with this option must not be assembled with TWOBUF==1.

4.7 Core Requirements: 450 words

Special Hardware Requirements: additive color option

DOUBLE BUFFERED

4.8 Causes programs to double buffer magnetic tape records.

4.9 This feature provides two input buffer areas which allow the program to read into one buffer while it is processing the other. This generally provides the highest throughput rate as I/O time is kept to a minimum. Also see WITH SINGLE BUFFERING.

4.10 Assembly Parameter: TWOBUF==1

NOTE

FR 80 Displayer programs assembled with this option must not be assembled with either COLOR==1 or COLOR==2.

4.11 Core Requirements:

NOTE

The FR 80 Displayer normally has a buffer size of 512 words. Double buffering increases the buffer size requirements by another 512 plus 80 words. The maximum buffer size requirement, then, is 1104 words. Remaining core is designated as FREE SIZE and is used to store picture names, character descriptions, etc. FREE SIZE is specified in the Teletype assembly mumble for each FR 80 Displayer.

With other programs, double buffering does not require more core. The single buffer size is decreased by 80 words, and then divided into two parts.

4.12 Special Hardware Requirements: none

DOUBLE PRECISION

4.13 Causes CalComp programs to do double precision arithmetic.

4.14 With double precision arithmetic, the current X and Y coordinates will each be maintained in two consecutive 18-bit words. This allows coordinate values greater than 262,143 CalComp increments. With small plots, where coordinates will not be greater than this figure, a program assembled with SINGLE PRECISION may be used. Programs assembled with SINGLE PRECISION may run slightly faster than programs assembled with DOUBLE PRECISION. Also see SINGLE PRECISION.

4.15 Assembly Parameter: PRE==2

Core Requirements: 470 words

Special Hardware Requirements: none

FONT=n.

4.16 Includes a particular font. The value of n determines the font, as follows:

Assembly Parameter	Assembly Mumble	Core Reqts.
FONT==0	FONT=0. III FILM FONT	0
FONT==2	FONT=2. OCRB FONT DOUBLE STRUCK ENDS	40
FONT==3	FONT=3. BELL FONT NO SPACES DOUBLE STRUCK ENDS	180
FONT==5	FONT=5. 8X14 MICROFONT DOUBLE STRUCK ENDS	20
FONT==8	FONT=8. COURIER FONT	580
	FONT=8. COURIER ITALIC FONT	530
FONT==14.	FONT=14. REVISED OCRB FONT DOUBLE STRUCK ENDS	180

NOTES

FONT==0 is considered to be the basic font and therefore no core requirement is given. Other fonts require more core.

Core requirement specifications are based upon assemblies with the Information International character set. Smaller character sets require less core.

The Bell font and the two Courier fonts are available at extra cost.

4.17 Special Hardware Requirements:

NOTE

The two Courier fonts require the utility font character generator.

LOAD AND GO

4.18 Permits the automatic processing of multi-file data tapes with files written in one or more data formats.

4.19 This option is similar to WITH GOGO (LOADGO2) except that only the FR 80 Displayer, 4020 Interpreter, and META Interpreter programs and the ROTATION command may be specified in the header records. Also see WITH GOGO (LOADGO2).

4.20 Assembly Parameter: LOADGO==1

Core Requirements: 140 words

Special Hardware Requirements: two magnetic tape transports

LOWER CASE

4.21 Includes the lower case characters a through z in the particular character set being used.

NOTE

If the program is not assembled with lower case characters, upper case characters will be used in their place.

4.22 Assembly Parameter: LOCASE==1

Core Requirements: 220 words

Special Hardware Requirements: none

MAPCOM=n

4.23 Includes a particular set of operator commands. The value of n determines the makeup of the set, as follows:

Assembly Parameter	Command(s) Included	Core Reqts.
MAPCOM==1	SPOT SIZE INTENSITY	80,40
MAPCOM==2	DELTA SIZE (1 parameter)	40,30
MAPCOM==3	SPOT SIZE INTENSITY DELTA SIZE (1 parameter)	110,70
MAPCOM==4	DELTA SIZE (64 parameters)	130,80
MAPCOM==5	SPOT SIZE INTENSITY DELTA SIZE (64 parameters)	200,120

NOTE

Core requirements are given for BIGBUF=0 and BIGBUF=1, respectively.

4.24 The SPOT SIZE command may be used to set up a conversion table for all spot sizes, whether specified by the program or the data.

4.25 The INTENSITY command may be used to set up a conversion table for all intensities, whether specified by the program or the data. See the NOTE below.

4.26 The DELTA SIZE command is available in two forms. The first form accepts one parameter. This parameter, which may be positive or negative, increases or decreases all character sizes according to its value. The second form accepts up to 64 pairs of parameters. This allows the conversion of each of any number of the 64 character sizes to the particular size desired.

4.27 Special Hardware Requirements: none

IMPORTANT NOTES

Special consideration must be given to the use of the INTENSITY command on FR 80s that have either the 64- or the 256-Intensity-Level Recording Feature. All intensity levels will be converted to one of the eight single-digit parameters of the INTENSITY command. To accomplish this, the software looks at only the three low-order bits of each intensity specification.

See WITH 64 INTENSITY LEVELS and WITH 256 INTENSITY LEVELS.

SINGLE PRECISION

4.28 Causes CalComp programs to do single precision arithmetic.

4.29 With single precision arithmetic, the current X and Y coordinates will each be maintained in one 18-bit word. This allows a maximum coordinate of 262,143 CalComp increments. With large plots, where coordinates may become greater than this figure, double precision arithmetic will be required. Also see DOUBLE PRECISION.

4.30 Assembly Parameter: PRE==1

4.31 Core Requirements:

NOTE

SINGLE PRECISION is considered to be a basic requirement and therefore no core requirement is given. DOUBLE PRECISION requires more core.

4.32 Special Hardware Requirements: none

STRIP FICHE

4.33 Includes the strip fiche routines and the operator command STRIP FICHE in print programs.

4.34 The STRIP FICHE command sets the program to produce groups of images on roll film suitable for cutting and creating microfiche. The ROTATION, BY COLUMNS, BY ROWS, X - #, STEP,LEFT, and Y - #,STEP,TOP commands are used to specify the format of the "fiche."

4.35 Assembly Parameter: STRIPM==1

NOTE

The program must also be assembled with MANYUP==1.

4.36 Core Requirements: 310 words with BIGBUF=0
230 words with BIGBUF=1

Special Hardware Requirements: 16mm or 35mm unsprocketed camera

SUBTRACTIVE COLOR

4.37 Includes the subtractive color routines for FR 80s with the subtractive color option.

4.38 Assembly Parameter: COLOR==2

NOTE

FR 80 Displayer programs assembled with this option must not be assembled with TWOBUF==1.

4.39 Core Requirements: 460 words

Special Hardware Requirements: subtractive color option

WITH ARCS

4.40 Includes the arc (circle) routines.

4.41 FR 80 software actually generates arcs by instructing the hardware to draw a series of short, straight vectors. The parameters required to draw an arc are the radius, arc length, and starting position.

NOTE

In order for arcs to be displayed in a form, the arc routines must also be assembled into the program which will use the form.

4.42 Assembly Parameter: CIRCLE==1

Core Requirements: 175 words

Special Hardware Requirements: none

WITH BATCH PROCESSING

4.43 Permits the automatic processing of multiple files.

4.44 As always, the first parameter of the GO command may be used to specify the number of frames to be recorded. Assembling with this option permits the use of the second and third parameters. The second parameter of the GO command may be used to specify the number of files to be recorded. When processing multiple files, the third parameter may be used to specify a number of frames to be advanced between files.

4.45 Assembly Parameter: BATCH==1

Core Requirements: 80 words

Special Hardware Requirements: none

WITH CIRCULAR INTERPOLATION

4.46 Includes the circular interpolation routines in the Gerber Interpreter program.

4.47 The circular interpolation routines are required when processing Gerber data tapes which contain circular data. These routines translate the Gerber data into the appropriate parameters for the Information International arc routines (see WITH ARCS).

4.48 Assembly Parameter: GCIRCL==1

NOTE

The program must also be assembled with CIRCLE==1.

4.49 Core Requirements: 330 words.

Special Hardware Requirements: none

WITH COMMAND FOR MIRROR IMAGE

4.50 Includes the image mirroring routines and the operator command MIRROR IMAGE X,Y. The MIRROR IMAGE X,Y command may be used to mirror the image in the X and/or Y axes.

NOTE

If this option is assembled with the fiche titling routines, the fiche titles will also be mirrored.

4.51 Assembly Parameter: MIRROR==3

Core Requirements: 290 words with BIGBUF=0
280 words with BIGBUF=1

Special Hardware Requirements: none

WITH "CONVERT" FEATURE

4.52 Includes special data conversion routines and the operator command DATA FORMAT (7 OR 9) in the CalComp Interpreter programs. The DATA FORMAT (7 OR 9) command may be used to specify 7-track data on 9-track tapes, or vice versa.

NOTE

The use of this feature results in an estimated 10% decrease in throughput time.

4.53 Assembly Parameter: CONVRT==1

Core Requirements: 10 words

Special Hardware Requirements: none

WITH DASHED LINES

4.54 Includes the dashed line routines.

4.55 The dashed line routines allow you to enter dashed line mode, and then draw dashed lines using the normal vector commands. The length of the dashes, and the gaps between them, are specified upon entering dashed line mode.

4.56 Dashed lines are created by repeatedly blanking and unblanking the CRT during the drawing of a single vector. There is no loss in recording time. Software timing routines are used to control the length of the dashes and the gaps. Because these timing routines can be interrupted, the length and placement of the dashes may not be exact. When multiple hits are required, or it is desirable to have the dashes within a number of parallel dashed lines coincide to form a grid, exact dashed lines should be used. Also see WITH EXACT DASHED LINES.

NOTE

In order for dashed lines to be displayed in a form, the dashed line routines must also be assembled into the program which will use the form.

4.57 Assembly Parameter: DASHED==1

Core Requirements: 160 words

Special Hardware Requirements: none

WITH DOTTED LINES

4.58 Includes the dotted line routines.

4.59 The dotted line routines allow you to enter dotted line mode, and then draw dotted lines using the normal vector commands. The hardware will point plot the dots. The distance between them is specified upon entering dotted line mode.

NOTE

In order for dotted lines to be displayed in a form, the dotted line routines must also be assembled into the program which will use the form.

4.60 Assembly Parameter: DOTVEC==1

Core Requirements: 190 words

Special Hardware Requirements: none

WITH EXACT DASHED LINES

4.61 Includes the exact dashed line routines.

4.62 The exact dashed line routines allow you to enter exact dashed line mode, and then draw dashed lines using the normal vector commands. The length of the dashes, and the gaps between them, are specified upon entering exact dashed line mode.

4.63 Exact dashed lines are created by software routines which draw each dash as an individual vector. The placement of the dashes is programmable exact. The disadvantage of using these routines is that the time required to draw an exact dashed line is increased, roughly, by as many times as the number of dashes within the line. For greater speed, where exact length and placement of the dashes is not required, dashed lines should be used. Also see WITH DASHED LINES.

NOTE

In order for exact dashed lines to be displayed in a form, the exact dashed line routines must also be assembled into the program which will use the form.

4.64 Assembly Parameter: DASHED==2

Core Requirements: 230 words

Special Hardware Requirements: none

WITH FICHE INDEXING

4.65 Includes the fiche indexing routines and the operator command INDEX FORM.

4.66 The fiche indexing routines permit data to be extracted from each data page of a fiche and recorded in the index frame. The index frame appears in the lower right-hand corner of the fiche.

4.67 The FICHE INDEX command may be used by the operator to specify the field to be extracted from each page. With programs which accept COM control records from the data tape (see chapter 3), the field may also be specified in this manner.

4.68 Form design syntax is used to create the index frame. It is used to specify which portions of the field will appear, and to position them within the form. Index forms normally include column and row numbers to identify the data. The form is loaded with the INDEX FORM command by the operator.

4.69 Also see WITH FICHE TITLING and WITH FORM FLASH.

4.70 Assembly Parameter: FINDEX==1

NOTES

The program must also be assembled with TITLE==1, ALLOW==1, and either CAMNUM==7 or CAMNUM==9.

Form assemblers which will be used to assemble index forms must also be assembled with FINDEX==1.

4.71 Core Requirements: 370 words with BIGBUF=0
350 words with BIGBUF=1

NOTE

Additional core is required for the index buffer which is allocated at run time. The size of the buffer is the product of the parameters of the IMAGES-FICHE command times 15.

4.72 Special Hardware Requirements: 12K
fiche camera

WITH FICHE TITLING

4.73 Includes the fiche titling routines and the operator commands TITLE, SIZE OF TITLE, END JOB, IMAGES-FICHE, and PITCH-MARGIN.

4.74 The fiche titling routines permit the recording of eye-readable characters across the top row(s) of a fiche. A fiche title may consist of a number of separate messages. Each message may be placed in a different position within the title row(s), and may be recorded with a different character size. A title may also contain an incrementing fiche number.

4.75 The TITLE command may be used by the operator to enter fiche titles from the Teletype. With certain programs, fiche titles may also be specified on the data tape. See chapter 3.

4.76 Additional commands are used to specify the format of the fiche and to complete the titling of a partial fiche at the end of a job.

4.77 Also see WITH FICHE INDEXING and WITH TITLE EXTRACTION WITH OPERATOR INPUTS.

4.78 Assembly Parameter: TITLE==1

NOTE

The program must also be assembled with either CAMNUM==7 or CAMNUM==9.

4.79 Core Requirements: 1740 with BIGBUF=0
1720 with BIGBUF=1

Special Hardware Requirements: fiche camera

WITH FORM FLASH

4.80 Includes the forms flash routines and the operator commands FORM, OVERALL FORM (in most programs), and ERROR FORM (in print programs only).

4.81 Form assemblers are used to create forms which are used either in conjunction with data or as an independent source of data. The forms design syntax permits the coding of any type drawing using all of the FR 80's drawing capabilities.

4.82 The various form commands permit the loading of a form such that it will be drawn either with every image, with only certain images (as selected by print program carriage controls), with every frame (once per frame even when there are multiple images in each frame), or when the operator command CONTINUE is activated following a TAPERROR response. Multiple forms may be loaded in such a manner that only the appropriate form(s) will flash at the appropriate times.

4.83 Also see WITH FICHE INDEXING.

NOTE

Assembling with this option will exclude the MARK command in the 4020 Interpreter and the CUT MARK command in the META Interpreter.

4.84 Assembly Parameter: ALLOW==1

Core Requirements: 1300 words with BIGBUF=0
1100 words with BIGBUF=1

Special Hardware Requirements: none

WITH FRAME RESET

4.85 Includes the frame count resetting routines.

4.86 Setting DATA switch 08 to the one position and activating the GO command will always cause a program to reset the parameter of the TIME command to zero. In addition, with a program assembled with the frame count resetting

routines, the parameter of the FRAME command will be reset to zero and an incrementing fiche number in a fiche title will be reset to its original value.

4.87 Assembly Parameter: FRMRST==1

Core Requirements: 10 words without WITH FICHE TITLING
60 words with WITH FICHE TITLING

Special Hardware Requirements: none

WITH GOGO (LOADGO2)

4.88 Permits the automatic processing of multi-file data tapes with files written in one or more data formats.

4.89 The LOADGO2 software system was designed to increase production by eliminating operator intervention. Data tapes may contain files written in any data format normally processed by standard FR 80 software. Header records preceding each file specify the program to be used and any operator commands required to prepare the program. Also see LOAD AND GO.

4.90 Assembly Parameter: GOGO==1

NOTES

Every program on a LOAD AND GO system must be assembled with both GOGO==1 and LOADGO==1.

The following core requirement specification is for GOGO==1 and LOADGO==1.

4.91 Core Requirements: 240 words

Special Hardware Requirements: two magnetic tape transports or a disk

WITH IMAGE MARK

4.92 Includes the image mark routines and the operator command IMAGE MARK (HITS,X,Y,WIDTH,HEIGHT,INT).

4.93 The "IMAGE MARK" command may be used to specify an image positioning mark or a cut mark. The parameters are used to specify number of hits, X position, Y position, width, height, and programmable intensity. The HITS parameter may be set to 0 to negate the command.

4.94 Assembly Parameter: IMGMRK==1

Core Requirements: 110 words with BIGBUF=0
80 words with BIGBUF=1

4.95 Special Hardware Requirements: none

NOTE

This option may not be assembled for a fiche camera.

WITH IMAGE SCALING

4.96 Includes the image scaling routines and the operator command SET SIZE in the FR 80 Displayer program. The SET SIZE command may be used to rescale the image.

4.97 Assembly Parameter: SCALNG==1

Core Requirements: 70 words with BIGBUF=0
50 words with BIGBUF=1

Special Hardware Requirements: none

WITH INDEPENDENT X&Y SCALING

4.98 Includes special image scaling and positioning routines and the operator commands X CORRECTION (N,D,O) and Y CORRECTION (N,D,O).

4.99 These commands may be used to adjust image size and position in the X and/or Y axes independently. The first and second parameters may be used to rescale and image. The third parameter may be used to offset the image.

NOTE

The scaling parameters adjust CRT beam positioning and vector lengths only. Character size and spacing are not affected.

4.100 Assembly Parameter: XYGAIN==1

Core Requirements: 170 words with BIGBUF=0
90 words with BIGBUF=1

Special Hardware Requirements: none

WITH MANYUP CAPABILITY

4.101 Includes the multiple image routines and the operator commands BY COLUMNS, BY ROWS, and CURRENT PAGE.

4.102 With a print program assembled with this option, the # and STEP parameters of the X - #,STEP,LEFT and Y - #, STEP,TOP commands may be used to specify and position multiple images in the X and/or Y axes. The BY COLUMNS

and BY ROWS commands are used to specify the format in which the images will be recorded in the frame. The CURRENT PAGE command specifies the number of images recorded. As always, the FRAME command specifies the number of frames (or fiche) recorded.

4.103 With the 4020 Interpreter program, the X - NUMBER UP and Y - NUMBER UP commands are used to specify multiple images. See chapter 3.

4.104 Assembly Parameter: MANYUP==1

Core Requirements: 140 words

Special Hardware Requirements: none

WITH "MEASURE PLOT" COMMAND

4.105 Includes the automatic image scaling routines and the operator command MEASURE PLOT in the Gerber Interpreter program. The MEASURE PLOT command may be used to automatically scale and center the image.

4.106 Assembly Parameter: EXTRMS==1

Core Requirements: 450 words

Special Hardware Requirements: none

WITH MULTIPLE IMAGES PER FRAME

4.107 Includes the multiple image routines and the operator commands X - NUMBER UP and Y - NUMBER UP in the FR 80 Displayer program. These commands may be used to specify multiple images in the X and/or Y axes.

4.108 Assembly Parameter: MULTIUP==1

NOTES

The program must also be assembled with MANYUP==1 and SCALNG==1.

The following core requirement specification is for MULTIUP==1 and MANYUP==1.

4.109 Core Requirements: 270 words with BIGBUF=0
120 words with BIGBUF=1

Special Hardware Requirements: none

WITH MULTIPLE REEL PROCESSING

4.110 Includes the multiple reel processing routines.

4.111 With a program assembled with this option, two data tapes may be mounted at the same time. The program will read data tapes alternately between units #1 and #2. Tapes will be rewound automatically. This process will continue until an END OF FILE is encountered and there is not another tape mounted (ON LINE) on the alternate unit.

4.112 Assembly Parameter: MULREL==1

Core Requirements: 20 words

Special Hardware Requirements: two magnetic tape transports

WITH PROPORTIONAL SPACING

4.113 Includes the proportional spacing routines in the FR 80 Displayer program. The FR 80 Standard Data Format may then be used to specify either monospacing or proportional spacing.

4.114 Assembly Parameter: COMPRP==1

Core Requirements: 660 words

Special Hardware Requirements: none

WITH REPEAT FRAME

4.115 Includes the repeat frame routines in the 4020 Interpreter and META Interpreter programs.

4.116 The 4020 and META data formats permit the repeated recording of the same frame. With a program assembled with this option, each frame will be recorded as many times as specified on the data tape. Without this option, each frame will be recorded once.

4.117 Assembly Parameter: REPEAT==1 in the 4020 Interpreter
MTRPT==1 in the META Interpreter

Core Requirements: 140 words

Special Hardware Requirements: none

WITH SINGLE BUFFERING

4.118 Causes print programs to single buffer magnetic tape records.

4.119 Print programs normally include the multiple buffering routines and the operator commands FIXED BLOCKING and VARIABLE BLOCKING. The FIXED BLOCKING command may be used to multiple buffer magnetic tape records whenever the largest block on the data tape is less than half the buffer size. The VARIABLE BLOCKING command may be used to single buffer magnetic tape records.

4.120 Assembling a program with this option excludes the multiple buffering routines and the operator commands FIXED BLOCKING and VARIABLE BLOCKING. The program will single buffer magnetic tape records. Also see DOUBLE BUFFERED.

4.121 Assembly Parameter: ONEBF==1

Core Requirements: -300 words with BIGBUF=0
-260 words with BIGBUF=1

NOTE

Assembling a program with this option excludes the multiple buffering routines and makes more core available.

4.122 Special Hardware Requirements: none

WITH STRIP CHART

4.123 Includes the frame abutment routines and the operator command ABUT - SIZE,PULLDOWN in the META Interpreter program.

4.124 The ABUT - SIZE,PULLDOWN command may be used to adjust the image size and camera advance for abutted frames recorded in the META expand mode. When the data tape has not selected the expand mode, and/or the program has been assembled without this option, the image size and camera advance parameters of the SET SIZE,PULLDOWN command will be used.

4.125 Assembly Parameter: ABUT==1

Core Requirements: 40 words with BIGBUF=0
20 words with BIGBUF=1

Special Hardware Requirements: none

WITH TAPE LABEL PROCESSING

4.126 Includes the tape label processing routines and the operator commands STANDARD LABELS and UNLABELLED in the EBCDIC Print program.

4.127 The STANDARD LABELS command may be used to initiate the processing of standard IBM labels. The program will verify the volume label at the beginning of the tape and extract the physical record format, physical record length, logical record length, and carriage control set specifications from each header label. Processing will continue until an end of volume label is encountered.

NOTE

When processing standard IBM labels, multiple files will be processed automatically. It is not necessary to use the second parameter of the GO command. See WITH BATCH PROCESSING.

4.128 The UNLABELLED command may be used to negate the STANDARD LABELS command. Also see WITH VOLUME SEQUENCE CHECKING.

4.129 Assemble Parameter: TAPELB==1

Core Requirements: 300 words with BIGBUF=0
280 words with BIGBUF=1

Special Hardware Requirements: none

WITH TITLE EXTRACTION WITH OPERATOR INPUTS
UP TO 6. EXTRACTION FIELDS

4.130 Includes the title extraction routines and the operator command EXTRACT FIELD(ID,PAGE,LINE,START).

4.131 The title extraction routines permit data to be extracted from the data tape and recorded in the fiche title. Up to six separate fields may be extracted.

4.132 The EXTRACT FIELD(ID,PAGE,LINE,START) command may be used by the operator to specify the first characters of the fields to be extracted. With programs that accept COM control records from the data tape (see chapter 3), the first characters of the fields may also be specified in this manner.

4.133 The fiche title is used to specify the length of the fields and where they are to be positioned within the fiche title. Also see WITH FICHE TITLING.

4.134 Assembly Parameter: TITEXT==1

NOTE

The program must also be assembled with TITLE==1 and CAMNUM==9.

4.135 Core Requirements: 510 words

Special Hardware Requirements: fiche camera

WITH VECTOR FAMILIES

4.136 Includes the vector family routines.

4.137 The vector family routines may be used to draw grids, shade areas by drawing numerous parallel lines, or draw special designs. The routines interpolate the specified number of lines between the next two straight vectors drawn.

NOTE

In order for vector families to be displayed in a form, the vector family routines must also be assembled into the program which will use the form.

4.138 Assembly Parameter: VECFAM==1

Core Requirements: 150 words

Special Hardware Requirements: none

WITH VOLUME SEQUENCE CHECKING

4.139 Includes the volume sequence checking routines and the operator command VOLUME SEQUENCE in the EBCDIC Print program.

4.140 When processing standard IBM labels, the VOLUME SEQUENCE command may be used to initiate volume sequence checking. The parameter of the VOLUME SEQUENCE command may be used either to specify the next volume to be processed or to terminate volume sequence checking. If the program encounters an out-of-sequence volume, it will respond with VOLUME SEQUENCE ERROR. Also see WITH TAPE LABEL PROCESSING.

4.141 Assembly Parameter: VOLSEQ==1

NOTE

The program must also be assembled with TAPELB==1.

4.142 Core Requirements: 70 words

Special Hardware Requirements: none

WITH 64 INTENSITY LEVELS

4.143 Includes the 64-intensity-level routines for FR 80s with the 64-Intensity-Level Recording Feature.

IMPORTANT NOTES

Programs assembled without this option will convert all intensity levels to one of eight single-digit intensity levels. To accomplish this, the software looks at only the three low-order bits of each intensity specification.

See MAPCOM=n, NOTE.

4.144 Assembly Parameter: GRSCAL==64.

Core Requirements: 30 words

Special Hardware Requirements: 64-Intensity-Level Recording Feature

WITH 256 INTENSITY LEVELS

4.145 Includes the 256-intensity-level routines for FR 80s with the 256-Intensity-Level Recording Feature.

IMPORTANT NOTES

Programs assembled without this option will convert all intensity levels to one of eight single-digit intensity levels. To accomplish this, the software looks at only the three low-order bits of each intensity specification.

See MAPCOM=n, NOTE.

4.146 Assembly Parameter: GRSCAL==256.

Core Requirements: 30 words

Special Hardware Requirements: 256-Intensity-Level Recording Feature

WITHOUT FOCUS PATTERN

4.147 Excludes the focusing routines and the operator command FOCUS.

4.148 The FOCUS command is used to set the intensity level and check the electrical focus of the CRT. In addition, with programs with a monitor display, the FOCUS command may be used to make run-time annotations on film. Also see WITHOUT MONITOR DISPLAY.

4.149 Programs are normally assembled with the FOCUS command. If more core is needed for other purposes, programs may be assembled without it. In this case, other programs may be used for focusing.

4.150 Assembly Parameter: NOFOCS==1

Core Requirements: -150 words with BIGBUF=0
0 words with BIGBUF=1

NOTE

Assembling a program with this option excludes the FOCUS command and makes more core available.

4.151 Special Hardware Requirements: none

WITHOUT MONITOR DISPLAY

4.152 Excludes the monitor display of the operator commands available to the program.

4.153 The primary purpose of the monitor display is to indicate that the program is in MONITOR. It is also useful in that it displays the status of each of the commands listed. Although the monitor display is a desirable convenience, it is not necessary. The ? command may be used to create a similar list on the Teletype. The = command may be used to print the status of a single command.

NOTE

A monitor display is required in order for a program to have the FOCUS command run-time annotation feature. See WITHOUT FOCUS PATTERN.

4.154 Assembly Parameter: NODISP==1

Core Requirements: -160 words with BIGBUF=0
-110 words with BIGBUF=1

NOTE

Assembling a program with this option excludes the monitor display and makes more core available.

4.155 Special Hardware Requirements: none

WITHOUT MULTIPLE HITTING CAPABILITY

4.156 Excludes the multiple hitting routines and the operator command HITS-CHAR,VEC,PTS,TITLE,CUT. The "HITS" command is used to multiple hit characters, vectors, point plots, fiche titles, and/or fiche cut marks.

4.157 Programs are normally assembled with the "HITS" command. If multiple hits are not required, and more core is needed for other purposes, programs may be assembled without it.

4.158 Assembly Parameter: NOHITS==1

Core Requirements: -60 words with BIGBUF=0
-20 words with BIGBUF=1

NOTE

Assembling a program with this option excludes the "HITS" command and makes more core available.

4.159 Special Hardware Requirements: none

Chapter 5

FORM ASSEMBLERS

5.1 A universal form assembler has been developed to eliminate the need for a separate form assembler for each application program. With Revision 3 software, only two form assemblers will be required: one to assemble forms for application programs, and one to produce magnetic tape input for the FR 80 Displayer program.

5.2 The Universal Form Design assembler generates only Information International character codes, eliminating the requirement of a form assembler for each character set. Information International character codes will be converted to tape codes the first time the form is flashed in an applications program. The assembly mumbles for the Universal Form Design assembler are UNIVERSAL FORM DESIGN and WITH ISG CHARACTER SET.

5.3 The FR 80 Form Design assembler produces magnetic tape input for the FR 80 Displayer program. The assembly mumbles for the FR 80 Form Design assembler are WITH MAG TAPE and WITH ISG CHARACTER SET.

5.4 The form assembler display feature may be omitted in order to allow a larger buffer area. In this case, there will be an assembly mumble WITHOUT FORM DISPLAY. The form assembler will type *OK when the form has been assembled, and the binary form may then be saved as usual.

5.5 Standard Software Assembly Options:

BIGBUF=n
COLOR
FONT=n.
LOWER CASE
MAPCOM=n
SUBTRACTIVE COLOR
WITH ARCS
WITH COMMAND FOR MIRROR IMAGE
WITH DASHED LINES
WITH DOTTED LINES
WITH EXACT DASHED LINES
WITH FICHE INDEXING
WITH INDEPENDENT X&Y SCALING
WITH VECTOR FAMILIES
WITH 64 INTENSITY LEVELS
WITHOUT FOCUS PATTERN
WITHOUT MONITOR DISPLAY
WITHOUT MULTIPLE HITTING CAPABILITY

Chapter 6

UTILITY PROGRAMS

SYSTEM MAINTENANCE

6.1 This program appears as the first program on system tapes created for tape system FR 80s. It is used to initialize the system and to create, copy, and index system tapes.

6.2 For either tape or disk systems, the abut command may be used to determine the correct abutment number for each camera.

DISK AUDIT

6.3 This program displays the contents of the disk and may be used to delete or rename disk files.

TAPE DUMP RELOADER

6.4 This program copies files from magnetic tape onto the disk. The magnetic tape must be in the Information International disk dump format, as are tapes created with the Disk Dumper program.

DISK DUMPER

6.5 This program copies files from the disk onto magnetic tape. The magnetic tape is written in the Information International disk dump format.

DEBUG

6.6 Debug is the basic operating system within the disk system structure. It may be used to load binary programs from the disk; to debug, modify, and/or start programs; and to file binary files onto the disk.

6.7 For debugging purposes, Debug may be used to examine and/or change cell contents, search, set break points, etc.

TEXT EDITOR

6.8 This program is used to create and modify symbolic text files. Input and output devices are the Teletype, the papertape reader/punch, and, with disk system, the disk.

ASSEMBLER

6.9 The Assembler is used to assemble a symbolic source program into an executable binary format. The source program must be coded in the Information International assembly language. Input is from either the papertape reader, magnetic tape, or, with disk systems, the disk.

MAGNETIC TAPE DISPLAY

6.10 This program reads and displays data from magnetic tape. Output may be to either the monitor or the Teletype. Data may be displayed in either octal, decimal, hexadecimal, BCD, or EBCDIC.

MAGNETIC TAPE COPY

6.11 This program is used to copy magnetic tapes. It will copy between any two drives available on the FR 80.

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