KEL
F2000 SERIES
REFERENCE MANUAL

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PREFACE

This manual must be used in conjunction with the KEL J1000 series Graphic Terminal Reference Manual (Manual No. 830909) printed November, 1983. The purpose of this manual is as follows:

1. Define the features unique to the F2000 series;

2. Define changes to the J1000 graphic emulation; and

3. Define changes to the VT-100 emulation.

SECTION 1
INTRODUCTION

1.1 GENERAL

The F2000 series is a color graphic terminal line that emulates the Tektronix 4010/4014 and includes the Tektronix 4107 color command sets. Two models are available, 1) the F2014C which uses a 14" CRT, and 2) the F2019C which uses a 19" CRT. Additional extensions have been added by KEL. The F2000 series also includes VT-100 emulation. The resolution of the terminal is 1024 x 780 and sixteen colors may be displayed concurrently out of a palette of 64 colors. Hard copy is available using the KEL M4120 dot marix impact printer or Diablo C-150 color ink jet printer. Digitizer tablet and mouse options are not supported.

1.2 EMULATION MODE SWITCHING

When power is turned on, the F2000 series will enter the Tektronix or VT-100 emulation mode as specified in set up Table B. The following commands may be used to switch emulation modes.

1.2.1 Tektronix to VT-100

a. ESC * 1

b. CAN - HEX '18' or Control X on keyboard

c. ESC % ! 1

1.2.2 VT-100 or VT-52 to Tektronix

a. Shift and page keys simultaneously depressed

b. ESC * 0 (zero)

c. ESC FF

d. ESC % ! 0 (zero)

1.2.3 Tektronix or VT-100 to VT-52

a. ESC % ! 3

SECTION 2
SET-UP TABLES

2.1 GENERAL

Four set-up tables are employed in the F2000 series to set up various parameters and a fifth set-up table is used to display the contents of the Programmable Function Keys. The set-up tables are identified below.

a. **Set-up Table A** -- VT-100 Menu A for setting tab stops;

b. **Set-up Table B** -- Communication parameters for both Tektronix and VT-100 emulation and VT-100 features;

c. **Set-up Table C** -- Tektronix emulation features and tablet/mouse communication features;

d. **Set-up Table D** -- Base display color map indices;

e. **Programmable Function Key Table** -- Displays the contents of the programmable function keys.

2.2 SET-UP TABLE SELECTION AND CONTROL

Depressing the shift and set-up keys concurrently on the keyboard will cause set-up table A to appear on the screen. Each time the '5' key is depressed when in set-up mode, the table will sequence from A to B to C to D and then back to A. If the shift key and '5' key are concurrently depressed while in set-up mode, the set-up tables will sequence in reverse order, **i.e.**, A to D to C to B to A. If the shift and 'F' keys are depressed while in set-up mode, the Programmable Function Key Table will be displayed. If the shift and F keys are again depressed, the terminal will return to Set-Up A. The set-up mode is exited by depressing the shift and set-up keys concurrently.

2.3 SAVING SET-UP FEATURES

The set-up features are saved by depressing the shift and 'S' keys concurrently. The same action will save the features for all five tables (Set-up A-D tables and the PF Key table), **i.e.**, it is not necessary to repeat for each table.

2.4 SET-UP TABLE A

Set-up Table A is shown in Figure 2-1 and is used for setting tab stops for the VT-100 emulation mode. Only 80 columns are available in the VT-100 mode. The '2' key is used to set tabs and the '3' key is used to clear all tabs. The 'T' key will clear all tabs and set the tab positions to the default condition (every eighth character position). The tab settings are stored in EPROM memory so it is not necessary to reset the tab stops after turning power off and back on again unless new tab positions are required.

2.5 SET-UP TABLE B

Set-up Table B is shown in Figure 2-2 and is used to set up communication parameters for both Tektronix and VT-100 emulation. The up and down arrow keys are used to move the block cursor between selection parameters, and the left and right arrow keys are used to change the parameter value. A buffer size selection parameter has been added to set-up Table B for the following I/O buffer sizes -- 128, 512, 1024, 2048, or 4096 bytes.

2.6 SET-UP TABLE C

Set-up Table C is shown in Figure 2-3 and is used to set up Tektronix emulation features and the tablet/mouse communication features. However, the tablet and mouse are not supported with the F2000 series. The up and down arrow keys will move the block cursor, and the left and right arrow keys will change the parameter values.

2.7 SET-UP TABLE D

Set-up Table D is shown in Figure 2-4 and is used to specify the colors for sixteen indices for the base screen. All operations available on the base screen (**i.e.**, characters, vectors, rectangle fill, and background color) will refer to these indices for color specification. The right arrow keys will move the pointer in ascending order (**i.e.**, index 0, index 1, . . . index 15), and the left arrow key will move the pointer in descending order (**i.e.**, index 15, index 14, . . . index 0). The '1,' '2,' and '3' keys are used to change the color mix for each index as follows:

'1' key--each depression will increase the Red color;

'2' key--each depression will increase the Green color;

'3' key--each depression will increase the Blue color.

If the shift key is depressed in conjunction with the '1,' '2,' or '3' key, the corresponding color will be decreased. There are four values for each color as follows: no color, 33 percent, 67 percent, and 100 percent. Index 0 is used to specify the background color, and Index 3 is used to specify the default line and text color.

SET-UP A ROM NO. M4120 PRINTER

2: SET/CLEAR TAB.

3: CLEAR ALL TABS.

T: CLEAR ALL TABS AND SET AT EVERY 8 CHARACTER POSITION.

```
■       T       T       T       T       T       T       T       T       T
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

Figure 2-1
Set-up Table A
4

SET-UP B

COMMUNICATION		COMMON	
TRANSMIT SPEED	9600	FULL/HALF DUPLEX	FULL
RECEIVE SPEED	9600	CR EFFECT	CR
INTERFACE	RS232C	LF EFFECT	LF
BIT PER CHARACTER	8 BIT	EMULATE MODE (POWER: ON)	TEK
PARITY CHECK	ON	VT-100	
PARITY SENSE	EVEN	ANSI/VT52	ANSI
STOP BIT	1 BIT	CURSOR TYPE	BLOCK
BUSY CONTROL	X-ON/X-OFF	WRAP AROUND	ON
LINE/LOCAL	ON LINE	AUTOREPEAT	ON
INTERFACE CLOCK	INTERNAL	MARGIN BELL	ON
BUFFER SIZE	128 WORD	KEYCLICK	ON

Figure 2-2
Set-up Table B
5

SET-UP C

TEKTRO		TABLET	
DEL IMPLIES LOW Y	DELESC?	TRANSMIT AND RECEIVE SPEED	9600
BREAK SIGNAL TIME	500mS	BIT PER CHARACTER	7 BIT
G-IN TERMINATORS	NONE	PARITY CHECK	ON
PAGE FULL BREAK	OFF	PARITY SENSE	EVEN
PRINTING DIRECTION	SINGLE	STOP BIT	1 BIT
PRINTING FORMAT	FORMAT B	TABLET CLICK	ON
ALPHA MODE SELECTION	SCROLL	STATUS	ON
CHARACTER WRITE MODE	MODE 2	HEADER	CONTROL
SHIFT CODE SELECT	ESC SHIFT	DELAY	10 mS
		COMPUTER SUPPRESSION	PEN DOWN
		ECHO SUPPRESSION	EFFECT(OUT)
		TERMINATOR	CR

Figure 2-3
Set-up Table C
6

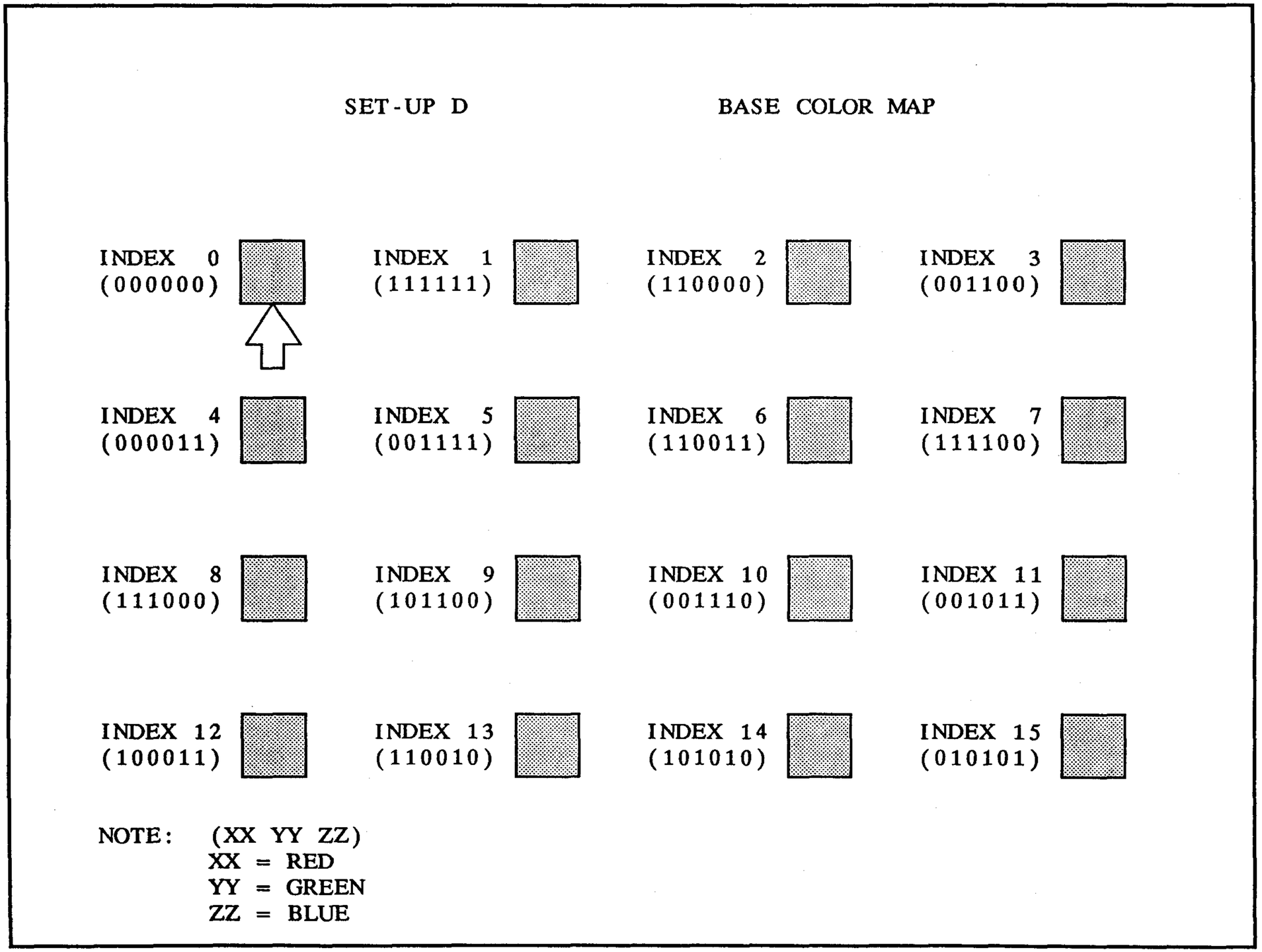

Figure 2-4
Set-up Table D
7

2.8 PROGRAMMABLE FUNCTION KEY TABLE

2.8.1 General

The Programmable Function Key Table is shown in Figure 2-5 and is used to display the contents of the 18 PF keys (3 modes--unshifted, shifted, and control) and the contents of the numeric pad keys in shifted operation with the Numeric Lock-ON. When on line in normal operation, the code sequence depicted in Figure 2-5 will be transmitted to the host when a PF key is depressed, or when a numeric pad key is depressed in conjunction with the shift key and the numeric lock lamp is illuminated. Also, the code sequence will be transmitted for the case of the numeric lock lamp off, unshifted and if one of the numeric pad keys listed in Figure 2-5 is depressed. Figure 2-5 is displayed when the 'Shift' and 'F' keys are depressed concurrently while in the set-up mode. To exit the PF Key Table, depress 'Shift' and 'F' a second time. The keys depicted in Figure 2-5 may be programmed by the user (see next paragraph). Figure 2-5 lists the factory-set programmed codes.

2.8.2 PF Key Programming

The 18 PF keys and 13 numeric pad keys may be programmed by the user when in the Tektronix emulation mode. The command structure is as follows:

ESC]: PFn Cn Programmed Codes Cn

ESC]: Designates PF Key program mode

PFn: Designates which PF key is to be programmed. Figure 2-6 lists the designator code for each key to be programmed.

Cn: Is a delimiter character that must precede and immediately follow the programmed codes. It can be any character not contained in the programmed codes.

Programmed Codes: Up to eight characters may be stored for each PF key and numeric pad key. These codes are transmitted to the host when the corresponding key(s) are depressed.

After programming the PF keys and NP keys, the programmed codes may be stored in non-volatile memory by depressing the 'Shift' and 'S' keys.

PF KEYS				NUMERIC PAD KEYS	
				NUMERIC LOCK ON	
				NUMERIC	+SHIFT OR
PFKEY	NORMAL	SHIFT	CTRL	LOCK ON NO SHIFT	NUMERIC LOCK OFF NO SHIFT
PF1	US<A	US>A	US=A	0	US]A
PF2	US<B	US>B	US=B	1	US]B
PF3	US<C	US>C	US=C	2	US]C
PF4	US<D	US>D	US=D	3	US]D
PF5	US<E	US>E	US=E	4	US]E
PF6	US<F	US>F	US=F	5	US]F
PF7	US<G	US>G	US=G	6	US]G
PF8	US<H	US>H	US=H	7	US]H
PF9	US<I	US>I	US=I	8	US]I
PF10	US<J	US>J	US=J	9	US]J
PF11	US<K	US<K	US=K	-	US]K
PF12	US<L	US>L	US=L	,	US]L
PF13	US<M	US>M	US=M	.	US]M
PF14	US<N	US>N	US=N		
PF15	US<O	US>O	US=O		
PF16	US<P	US>P	US=P		
PF17	US<Q	US>Q	US=Q		
PF18	US<R	US>R	US=R		

Figure 2-5
PF Key Table

PF KEY DESIGNATOR CODES

Key	Normal	Shifted	Control
PF1	21	33	45
PF2	22	34	46
PF3	23	35	47
PF4	24	36	48
PF5	25	37	49
PF6	26	38	4A
PF7	27	39	4B
PF8	28	3A	4C
PF9	29	3B	4D
PF10	2A	3C	4E
PF11	2B	3D	4F
PF12	2C	3E	50
PF13	2D	3F	51
PF14	2E	40	52
PF15	2F	41	53
PF16	30	42	54
PF17	31	43	55
PF18	32	44	56

Numeric Pad

0	57
1	58
2	59
3	5A
4	5B
5	5C
6	5D
7	5E
8	5F
9	60
-	61
,	62
.	63

Figure 2-6
PF Key Designator Codes

NOTE: Code is hex equivalent of ASCII character.

SECTION 3

KEYBOARD

3.1 GENERAL

The keyboard layout is shown in Figure 3-2. The delete key and PF keys will repeat when held depressed in addition to those repeat keys described in the J1000 Reference Manual in Section 3.1. The PF keys will transmit the three character sequences shown in Figure 2-6 for unshifted, shifted, and control key operations. In addition, the numeric pad keys will transmit the three character sequences shown in Figure 2-6 when the terminal is on line, for shifted operation with the numeric lock on, or when the numeric lock is off, in unshifted operation. When off line and the numeric lock is off, the '2,' '4,' '6,' and '8' keys will move the block cursor down, left, right, and up, respectively. ASCII control characters may be generated by depressing the control key and an additional key concurrntly on the keyboard. Figure 3-1 below identifies the key combinations required to generate the desired control codes.

Key Combination	ASCII Character	Hex Code	Key Combination	ASCII Character	Hex Code
(CS) @	NUL	00	(C) P	DLE	10
(C) A	SOH	01	(C) Q	DC1	11
(C) B	STX	02	(C) R	DC2	12
(C) C	ETX	03	(C) S	DC3	13
(C) D	EOT	04	(C) T	DC4	14
(C) E	ENQ	05	(C) U	NAK	15
(C) F	ACK	06	(C) V	SYN	16
(C) G	BEL	07	(C) W	ETB	17
(C) H	BS	08	(C) X	CAN	18
(C) I	HT	09	(C) Y	EM	19
(C) J	LF	0A	(C) Z	SUB	1A
(C) K	VT	0B	(C) [	ESC	1B
(C) L	FF	0C	(C) \	FS	1C
(C) M	CR	0D	(C)]	GS	1D
(C) N	SO	0E	(CS) ^	RS	1E
(C) O	SI	0F	(CS)_	US	1F

Figure 3-1
Control Code Table

NOTE: (C) Indicates Control Key

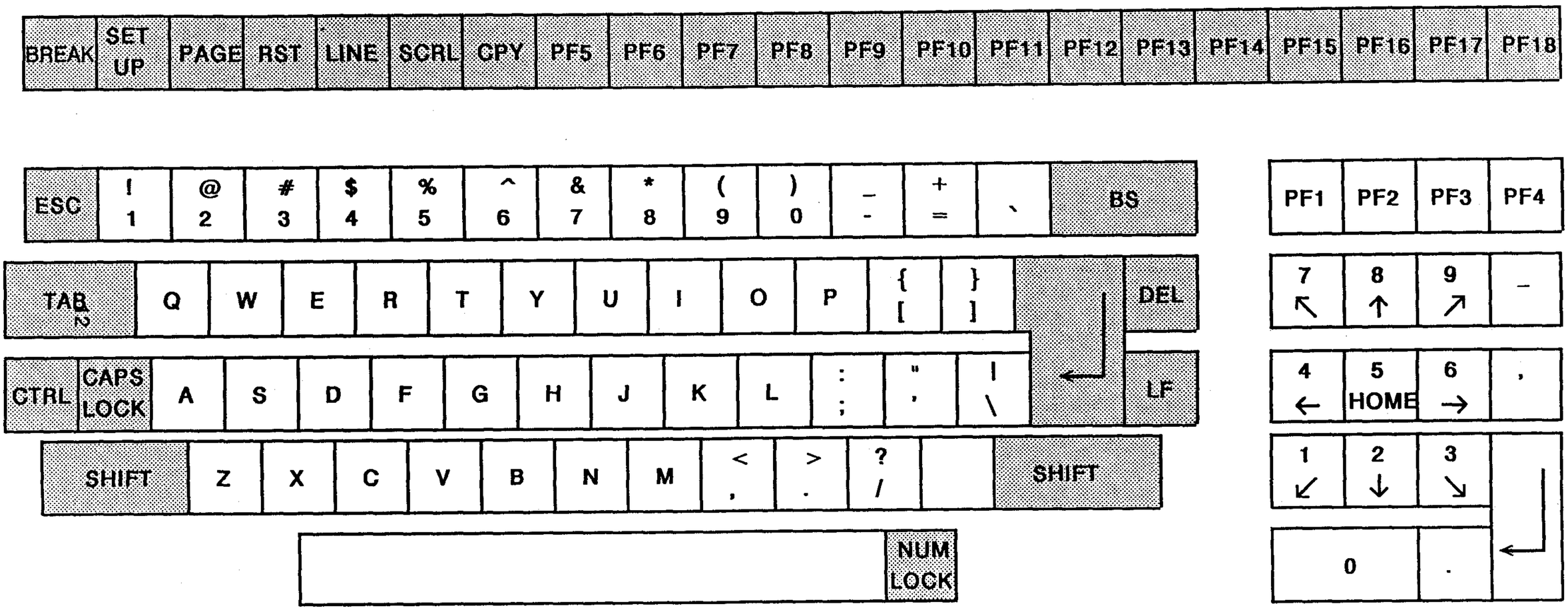

Figure 3 - 2

Keyboard Layout

SECTION 4
NEW GRAPHIC FEATURES

4.1 GENERAL

This section describes those features added to or revised in the F2000 series terminals compared to the J1000 series terminals as described in the J1000 series Reference Manual, Tektronix operation.

4.2 CHARACTER SIZES AND SPACING

Figure 4-1 shows the character cell sizes, number of character columns, and number of character rows for the four standard character sizes.

Character Size	Command	Character Cell Size (Dots) (W X H)	Characters Per Line	Lines Per Page
Large	ESC 8	10 x 14	73	35
Size 2	ESC 9	9 x 11	85	39
Size 3	ESC :	7 x 9	128	60
Small	ESC ;	5 x 7	146	65

Figure 4-1
Character Sizes

Figure 4-2 shows the character cell sizes, including horizontal and vertical spacing, for the four standard character sizes.

Character Size	Spacing Width Including Character Cell	Spacing Height Including Character Cell
Large	14	22
Size 2	12	20
Size 3	8	13
Small	7	12

Figure 4-2
Character Spacing

4.3 RECTANGLE FILL

The purpose of this command is to enable the host computer or operator to fill in a specified rectangular area in a designated color. The color is specified by the Set Line Index command, ESC ML 0-15. The rectangular area is defined from the current x-y location to the x-y location specified in the Rectangle Fill command.

The command format is as follows:

ESC R Yn Xn

4.4 RECTANGLE ERASE

The purpose of this command is to erase a defined rectangular area on the CRT screen. The area to be erased is defined from the current x-y location to the x-y location specified with this command. The rectangle erase function erases the specified retangular area in the Red, Green, and Blue memories.

This command format is as follows:

ESC F Yn Xn

4.5 RECTANGLE REVERSE VIDEO

The purpose of this command is to generate reverse video for a defined rectangular area on the CRT screen. The reverse video area is defined from the current cursor location to the x-y location specified with this command. The data to be written into a reverse video field must be written first, followed by the reverse video field. For the case of color, the reverse video command operates on all three primary color memory planes (Red-Green-Blue), by turning 'on' image bits off and 'off' image bits on. Therefore, white data will be changed to black data, blue to yellow, green to magenta, cyan to red, and the reverse; black to white, yellow to blue, magenta to green, and red to cyan. The background will therefore change from black to white for normal presentations that include a black background.

The command format is as follows:

ESC E Yn Xn

4.6 SET COLOR MODE COMMAND

4.6.1 General

The Set Color Mode Command is used to specify the color mode to be used by the F2014C. Three color modes are available as follows:

1. Red, Green, Blue;
2. Cyan, Magenta, Yellow; and
3. Hue, Lightness, Saturation.

4.6.2 Command Structure

The command structure is: **ESC T M Pn**

Pn values are: 0 - No change
1 - RGB
2 - CMY
3 - HLS

4.6.3 HLS System

Hue is an angular system for specifying color where 0 degrees is Blue, 60 is Magenta, 120 is Red, 180 is yellow, 240 is green, and 300 is cyan. The degrees inbetween represent proportional mixing of the closest two primary colors.

Lightness is a linear method of specifying shading. A lightness of zero percent is black, and 100 percent is white, with varying shades of gray inbetween.

Saturation is a linear method for specifying the color intensity where zero percent would produce a light gray color for the color selected (Hue) to 100 percent where the color selected (Hue) would be a dark color.

4.6.4 RGB System

The RGB System defines the mixture of three additive color primaries ranging from zero to 100 percent for each color. Increasing the percentage of a color increases that color in the resulting mixture. For example, 100, 100, 0 produce Yellow.

4.6.5 CMY System

The CMY System defines the mixture of three subtractive color primaries ranging from zero to 100 percent for each color. Increasing the percentage of a color decreases that color in the resulting mixture. For example, 0, 100, 100 produce Red.

4.7 SET SURFACE COLOR MAP

4.7.1 General

The Set Surface Color Map is used to specify the color for the sixteen indices. It essentially enables the host programmer to change the indices stored in set-up Table D or, in other words, it selects the 16 current colors displayable out of the 64-color pallette.

4.7.2 Command Structure

The command structure is:

ESC T G PS PC0 PC1 . . . PC15

Parameter values are:

PS	Selects surface number. In the case of the F2000 series, this value must be zero, signifying the base screen.

PC0 Is an integer array of four integers, whereby the first integer selects the color index and the next three integers specify the color mixture for that color index.

PC1 - PC15 Additional quadruple integer arrays to change additional indices.

The color mixture is specified in the HLS, RGB, or CMY coordinate system, according to most recent Set Color Mode command. The first integer values range from 0 to 15, corresponding to the 16 color indices.

The valid ranges for the second, third, and fourth integers in each system are, respectively:

HLS:	Integer 2	-32768 to 32768
	Integer 3	0 to 100
	Integer 4	0 to 100
RGB and CMY:	Integer 2	0 to 100
	Integer 3	0 to 100
	Integer 4	0 to 100

Figure 4-3 shows the default color mixtures for the Base Screen in the HLS coordinate system.

Color Index	Color Mixture	Color Coordinates		
		H	L	S
0	Transparent	0	0	0
1	White	0	100	0
2	Red	120	50	100
3	Green	240	50	100
4	Blue	0	50	100
5	Cyan	300	50	100
6	Magenta	60	50	100
7	Yellow	180	50	100
8	Orange (Red-Yellow)	150	50	100
9	Green Yellow	210	50	100
10	Green Cyan	270	50	100
11	Blue Cyan	330	50	100
12	Blue Magenta	30	50	100
13	Red Magenta	90	50	100
14	Dark Gray	0	33	0
15	Light Gray	0	66	0

Figure 4-3
Default Color Mixtures

4.8 SET LINE INDEX

4.8.1 General

This command is used to specify the color index for all subsequent vectors, circles, and rectangle fill areas.

4.8.2 Command Structure

The command structure is:

ESC ML Pn

Pn is an integer which specifies the color index for subsequent vectors, circles, and rectangle fill areas. Pn values range from 0 to 32767; however, values greater than 15 set the index to 15.

4.9 SET TEXT INDEX

4.9.1 General

This command is used to specify the color index for subsequent alpha text.

4.9.2 Command Structure

The command structure is:

ESC MT Pn

Pn is an integer which specifies the color index for subsequent alpha text. Pn values range from 0 to 65535; however, values greater than 15 set the index to 15.

4.10 SET CHARACTER CELL INDEX

4.10.1 General

This command is used to specify the character cell color index.

4.10.2 Command Structure

The command structure is:

ESC MT Pn

Pn is an integer which specifies the color index for subsequent character cells when in alpha mode. Pn values range from 0 to 65535; however, values greater than 15 set the index to zero.

4.11 CLEAR VECTOR OR CLEAR CIRCLE

4.11.1 General

This command provides a selective vector or circle erase mode similar to the same command in the J1014C, as described in the J1000 Reference Manual, page 18, Section 3.4-16. However, in the case of the F2014C, it will change the vector circle to color index 0. If index 0 is no color (transparent), it will erase the designated vector or circle.

4.11.2 Command Structure

The command structure is: **ESC C**

4.12 SET VECTOR OR SET CIRCLE

4.12.1 General

This command resets the Clear Vector or Clear Circle mode as described in the J1000 Reference Manual, page 18, Section 3.4-17. However, in the case of the F2000 series, it will revert to color index 3 until a subsequent Set Line Index Command is received.

4.12.2 Command Structure

The command structure is: **ESC D**

4.13 HARD COPY

A hard copy function is available on the F2000 series using the KEL M4120 monochrome impact dot matrix printer or the Diablo C-150 color ink jet printer. The hard copy operates as described in the J1000 Reference Manual, page 23, Section 3.5. Two fundamental print sequences are supported: 1) Bit map printing, and 2) ASCII printing. Bit map printing is used to make an image copy from the CRT screen to the M4120 or Diable C-150 and can include text and graphics. ASCII printing is used when it is desired to use the M4120 or Diablo C-150 as a receive-only character printer. In ASCII mode, the ASCII codes are transferred through the terminal to the printer. The ASCII mode is identified as Through Print Mode or Scroll and Through Print Mode and is described in the J1000 Reference Manual, page 15, Sections 3.3.9 and 3.3.10.

Printer selection is accomplished, as follows:

Esc @ 0 : Select M4120
Esc @ 1 : Select Diable C-150

Once set, printer mode is saved in EEPROM memory so power can be cycled off and on without changing printer selection.

Additional features are:

a. Format A & B (set-up mode) operate for the C-150 the same as for the M4120;

b. Initiate hard copy by:

   1) Depress copy key on keyboard;
   2) Send ESC ETC to terminal;

c. Hard copy interrupt - the copying function may be interrupted by receipt of the DEL code, if on line, or by depressing the DEL key if off line.

4.14 COMMAND/INTEGER ENCODING

4.14.1 General

As described previously in Section 4, it is seen that commands consist of the Escape character followed by a two-character command identifier and then followed by an integer or a string of integers. This sub-section defines how the integers are encoded. Each integer consists of one, two, or three bytes, depending on the value of the integer. Decimal integers from 0 to 15 and from 0 to -15 are encoded into one byte. Decimal integers from 16 to 1023 and from -16 to -1023 are encoded into two bytes. Decimal integers from 1024 to 65535 and from -1024 to -65535 are encoded into three bytes.

4.14.2 Encoding

The decimal number must first be converted to a binary number. The binary number is then converted into one, two, or three bytes (low - LO, middle - MI, high - HI) depending on its length. All integers have a LO byte. Integers from 16 to 1023 and from -16 to -1023 have a LO and MI byte, and integers from 1024 to 65535 and from -1024 to -65535 have a LO, MI, and HI byte. The four LSB'S of the binary number are encoded in the LO byte; the next six bits are encoded in the MI byte; and the six MSB's are encoded in the HI byte. A binary one is added to the MSB position of the HI and MI bytes and binary 01 is added to the two MSB positions of the LO byte. The extra bit in the LO byte is used to encode the sign of the integer: 0 = negative and 1 = positive.

Example:

Decimal 3018 = Binary 000010 111100 1010 = ASCII B|j

HI MI LO

Encodes as:

	ASC II Character	
HI	1 0 0 0 0 1 0 =	B
MI	1 1 1 1 1 0 0 =	| (Vertical Bar)
LO	0 1 1 1 0 1 0 =	:

sign

4.14.3 Command Structure

The integers in a command structure must be preceded by an integer that identifies the number of integers that follow. For example, using the Set Surface Color Map command, and setting index 11 to Blue Cyan (330, 50, and 100) using the HLS system, the encoded command structure is as follows:

ESC T G 0 4 ; T: C2 F4

where:

0	designates base screen
4	indicates four values follow
;	represents index 11
T:	Hue 330
C2	Lightness 50
F4	Saturation 100

4.15 TEST PATTERNS

Two operator-initiated test patterns are available and are initiated when off line, as follows:

ESC A 1 : White sphere

ESC A 2 : White cross hatch

SECTION 5
FUNCTIONS DELETED

5.1 General

This section describes functions currently available in the J1000 series that have been deleted in the F2000 series.

5.2 Blink

The blink function, as described in the J1000 Reference Manual, page 45, Section 7.4, is not available with the F2000 series.

5.3 Pan Function

The pan function, as described in the J1000 brochure, is not available with the F2000 series.

5.4 Digitizer Tablet and Mouse

The digitizer tablet and mouse are not supported in the F2000 series.

5.5 VT-100 Emulation

Only 80 columns are supported in the F2000 series.

5.6 Self Tests/Diagnostics

The self tests, as described on page 45, paragraph 7.7 of the J1000 Reference Manual, are not incorporated in the F2000 series.

5.7 J1000 Color Mode

The color set command, as described in the J1000 Reference Manual, page 45, Section 7.1, will select color indices 0 - 7 corresponding to commands ESC 0 through ESC 7, respectively. The Select Write Commands (Section 7.2) and the Select Display Commands (Section 7.3) are not available with the F2000 series.

SECTION 6
SPECIFICATIONS

6.1 Control Section

CPU	:	68000 (10 MHz)
ROM	:	Maximum 256K bytes (27128 chips)
EEPROM	:	Maximum 4K bytes (2817 chips)
RAM	:	512K bytes
Parallel I/O	:	68321 for printer I/F
Serial I/O	:	68681 for communication and keyboard
Graphic controller	:	ACRTC HD63484
Graphic memory	:	1M bytes (1024 x 1024 x 4 planes) x 2
Bandwidth	:	40 MHz

6.2 Display Section

6.2.1 F2014C

CRT	:	Inline-type 14-inch high-resolution color CRT
Dot pitch	:	0.31 mm
Phosphor	:	BL9 long-persistence type
Screen	:	Dark tinted non-glare glass
Viewing area	:	240 (W) x 182 (H) mm
Display colors	:	Any 16 of 64 colors can be used at the same time

6.2.2 F2019C

CRT	:	Inline-type 19-inch high-resolution color CRT
Dot pitch	:	0.31 mm
Phosphor	:	BL9 long-persistence type
Screen	:	Polished face
Viewing area	:	350 (W) x 265 (H) mm
Display colors	:	Any 16 of 64 colors can be used at the same time

6.3 Keyboard

CPU	:	8748
Key switch	:	Mechanical contact
Number of Keys	:	99
Rollover	:	2 keys
Automatic repetition	:	Automatic repeat operation is done every 100 ms when a key is held down for 400 ms (certain keys only).

6.4 Weight

6.4.1 F2014C

Terminal	:	25 kg
Tiltable stand	:	1.2 kg
Keyboard	:	2 kg

6.4.2 F2019C

Monitor	:	32 kg
Controller	:	13 kg
Keyboard	:	2 kg

6.5 Size

6.5.1 F2014C

With stand	:	380 (W) x 480 (H) x 460 (D) mm
Keyboard	:	455 (W) x 35 (H) x 216 (D) mm

6.5.2 F2019C

Monitor	:	482 (W) x 443 (H) x 492 (D) mm
Controller	:	480 (W) x 88 (H) x 450 (D) mm
Keyboard	:	455 (W) x 35 (H) x 216 (D) mm

6.6 Power

Input voltage	:	100 to 120 VAC +/- 10% or
		200 to 240 VAC +/- 10% (switched internally)
Frequency	:	50/60 Hz
Power consumption	:	F2014C - 250 VA or less F2019C - Monitor: 160 VA Controller:

6.7 Environmental Requirements

Operation

Temperature	:	0 to 40 C
Humidity	:	20 to 95%, no condensation

Storage

Temperature	:	-20 to 60 C
Humidity	:	20 to 95%, no condensation

Do not use the graphics terminal under the following conditions:

In direct sunlight

In a dusty environment (conductive dust)

In a room subject to vibration

Near strong magnetic fields (especially AC fields)

SECTION 7
INTERCONNECTION DIAGRAMS

7.1 F2014C

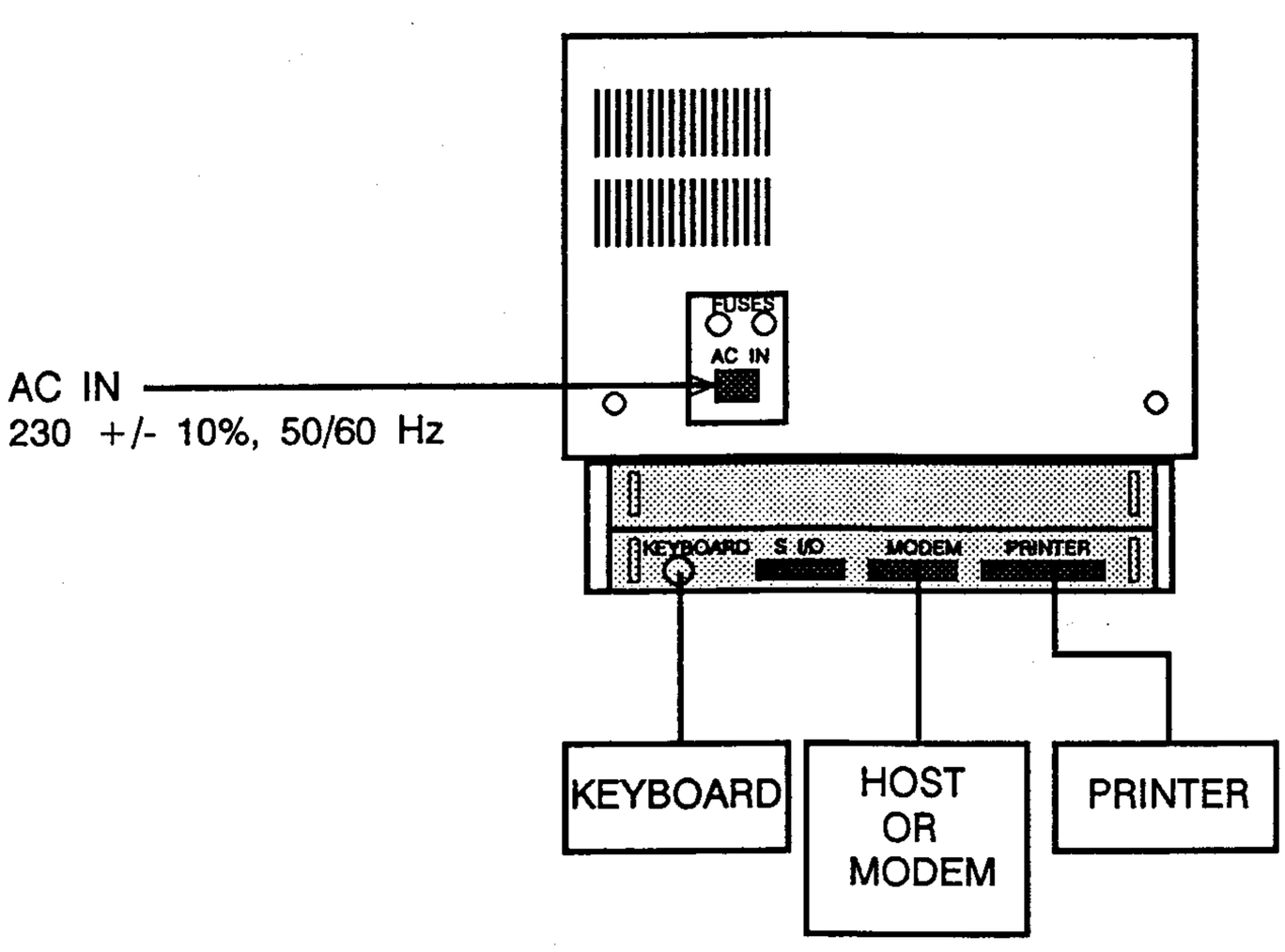

Figure 7-1
Interconnecting Diagram - Rear View

7.2 F2019C

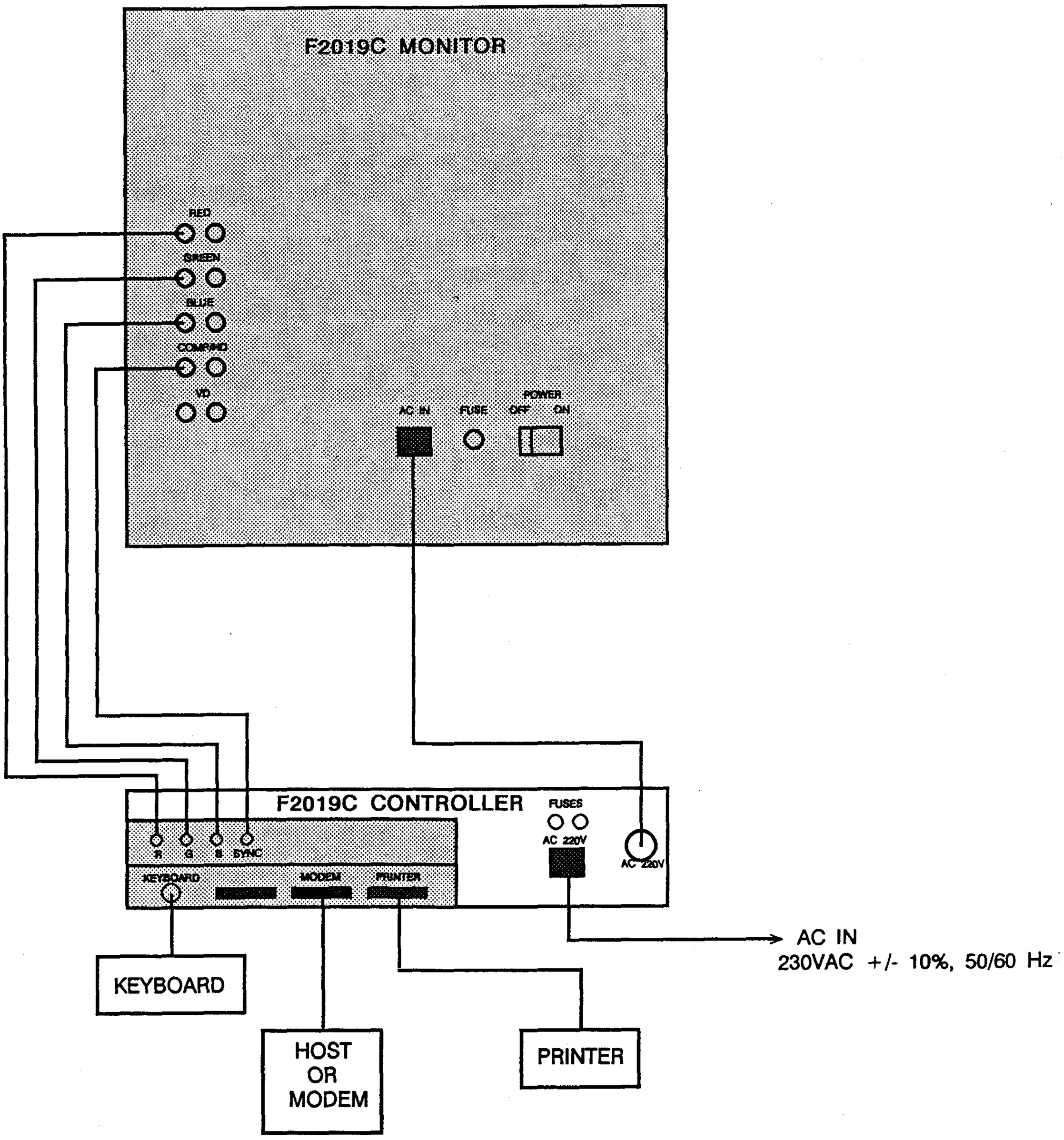

Figure 7-2
Interconnecting Diagram - Rear View

Note:

1. The impedance switches on the monitor must be set to the 75 ohm position.
2. For four wire operation internal monitor switch S301 must be set to "EXT" and S302 to "COMP" position.