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VIP7200 VIDEO DISPLAY PRODUCT MANUAL

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VIP7200 VIDEO
DISPLAY TERMINAL PRODUCT MANUAL

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1 INTRODUCTION

1.1 SCOPE AND PURPOSE OF MANUAL

This manual provides the information necessary for field engineering personnel to install, maintain, and repair the Honeywell VIP7200 video display terminals listed below.

TYPE	DESCRIPTION	PART NO.
VIP7200	Terminal, 60-Hz, uppercase Keyboard Cable, W3, 10-foot	BTRM901A BKBD002A 59B400394-010
VIP7205	Terminal, 60-Hz, uppercase and lowercase Keyboard Cable, W3, 10-foot	BTRM902A BKBD002A 59B400394-010
VIP7250	Terminal, 50-Hz, uppercase Keyboard Cable, W3, 10-foot	BTRM801A BKBD002A 59B400394-010
VIP7255	Terminal, 50-Hz, uppercase and lowercase Keyboard Cable, W3, 10-foot	BTRM802A BKBD002A 59B400394-010

1.2 GENERAL DESCRIPTION

The VIP7200 Video Display Terminal consists of: (1) a logic and CRT display unit and (2) a separate keyboard unit with an interconnecting ribbon cable (see Figure 1-1). It is a one-at-a-time character mode keyboard entry device capable of block transmission over the communications interface. It can emulate all of the functions of an ASR/KSR33 except for hard copy output; however, an extension port allows auxiliary input and/or output devices (such as a serial printer) to be connected directly to the terminal.

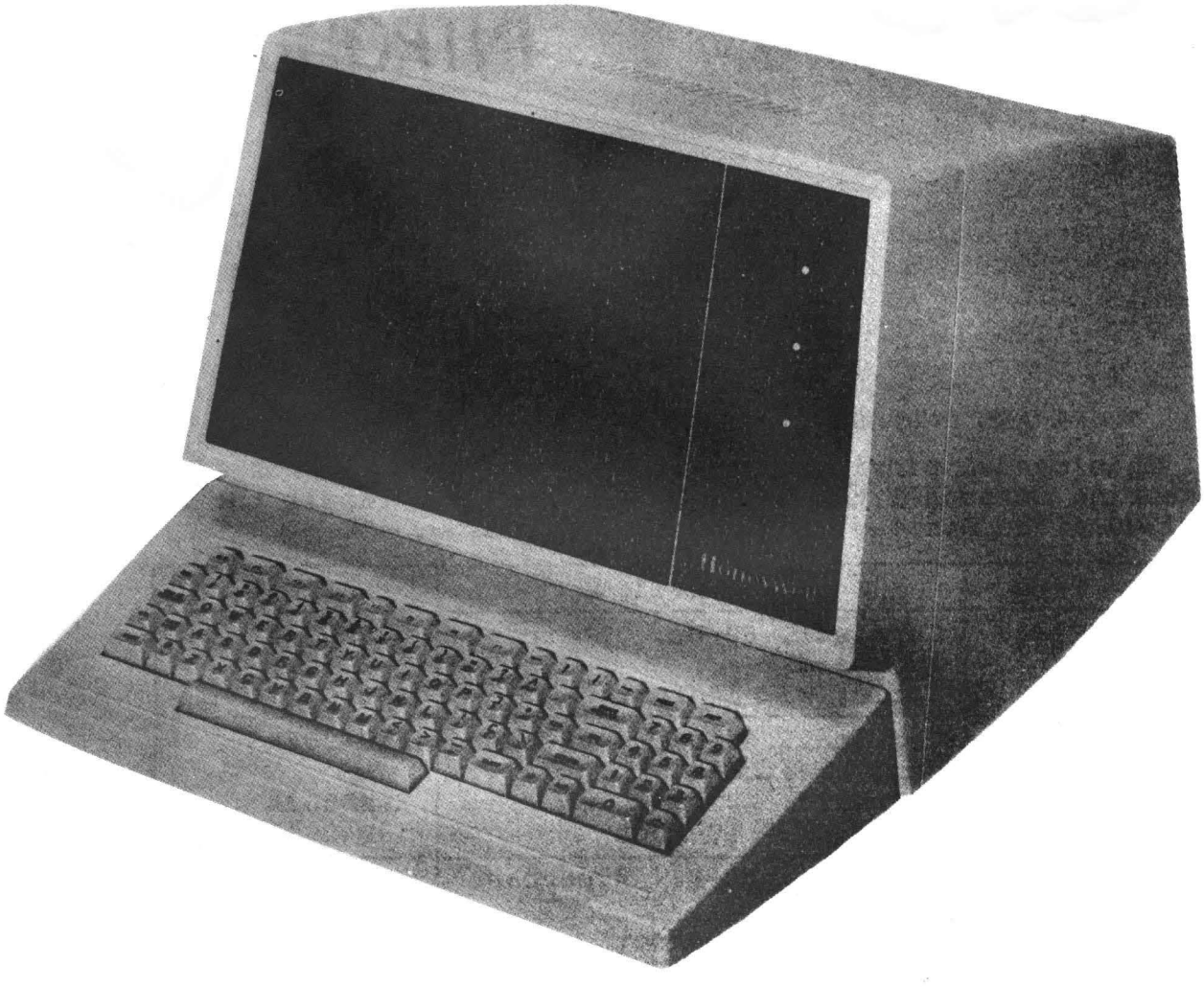


Figure 1-1 VIP7200 Video Display Terminal

The terminal is a top-line entry device with the first position of the top line as the cursor home position. Data is entered in either page or roll mode. In the page mode, data entry is limited to the page displayed on the screen. In the roll mode,

the top line rolls off the screen after the page is full, allowing data entry to continue on a new bottom line. Full cursor control allows data entry at any location on the page.

The terminal has a four-wire, full-duplex interface capable of two-way simultaneous or two-way alternate data transfer using either 20-mA/60-mA current loop or EIA RS232C voltage levels on the interface leads. It can operate with Western Electric modems 103A, 103E, 103G (or equivalent full-duplex modems not requiring control of interface leads or line turnarounds), and Western Electric modems 202C and 202D (or equivalent half-duplex modems requiring control of interface leads or line turnarounds).

All 128 ASCII character codes can be generated from the keyboard. The terminal buffers and transmits a single keyed character in character mode, or a line or page (up to the cursor location) in the line or page mode. Special code sequences using escape and another keyboard character will generate special codes for non-ASR/KSR33 functions.

Start, parity, and stop bits are added to each character before it is transmitted. The number of stop bits can be selected at either one or two, and parity can be selected to add an odd bit, an even bit or a mark bit. Thus, in combination with the 7-bit ASCII code, either 10- or 11-bit characters can be transmitted and received. When the mark bit parity setting is selected for the transmitted data, the parity testing on received data is simultaneously set to a 'don't care' condition.

The terminal operates at switch selectable baud rates between 75 and 9600 baud when direct connected, and at the modem limitation of up to 1200 baud when connected to a modem.

CAUTION

When the terminal is set for 110 or 75 baud, repeated keying of a cursor movement key (without using REPEAT) could result in the display of extraneous characters on the screen instead of the intended cursor movement.

1.3 FEATURES

1.3.1 Keyboard

The keyboard characteristics consist of:

- ASCII code (128 characters) on an 86-key communications keyboard
- Extended capability via escape sequence coding
- Seven dual-coded special function keys
- N-key rollover protection.

1.3.2 Display

Display unit characteristics include:

- Screen display area of 54 square inches
- Total of 1920 characters displayed in 24 lines of 80 characters each
- Total of 63 displayable graphic characters plus space
- Top line entry; cursor homes at left margin of top line
- Full cursor control
- Automatic carriage return/line feed
- Audible alarm upon entry of keyed data in column 72
- Buffered line or page with local edit via keyboard
- Page or roll mode of operation
- Parity check and display of ? on recognition of error
- Line turnaround control for half-duplex communication data sets.

1.3.3 Interface

The VIP7200 Video Display unit has the following interface capabilities.

1. Selectable communications interface: EIA RS232C or 20-mA/60-mA current loop.
2. Selectable baud rate: 75 to 9600 baud.
3. Selectable character length: 10 bits (start, 7 data, parity, and stop) or 11 bits (start, 7 data, parity, and 2 stop).
4. Selectable parity: odd, even, or no parity (always a mark on transmit and 'don't care' on receive).
5. Selectable operating mode:
   a. Full-duplex, no local display: full-duplex echoplex mode of operation for displaying keyed data on screen.
   b. Full-duplex, local display: full-duplex capability with display responding directly to keyboard (no echoplex) and/or to received data.
   c. Half-duplex: two-way alternate capability with line turnaround and display responding directly to keyboard and/or to received data.
   d. Half-duplex, buffered mode: keyed data transmitted only by special block mode character; display responds directly to keyboard and/or to received data.
   e. Local display: keyed data displayed directly on screen for test purposes; no transmission of data over communication line.

6. Extensions port for auxiliary input/output device: limited EIA interface works in combination with and through communications interface.

1.3.4 Options

Two options are available with the terminal: 31 displayable lowercase graphic characters and an 18-key auxiliary special function keypad.

1.4 SPECIFICATIONS

VIP7200 specifications consist of the following.

1. Environmental:
   a. Temperature: 10°C to 38°C ambient (50°F to 100°F)
   b. Relative Humidity: 10% to 80%
   c. Suitable for use in Honeywell class 2 environment.
2. Electrical:
   a. Voltage (60 Hz ±0.5 Hz): 120 Vac +10%, - 15%, 1 A
   b. Voltage (50 Hz ±0.5 Hz): 220 Vac +6%, -15%, or 240 Vac +6%, -15%, 0.0175 A
3. Mechanical:
   a. Dimensions: See Figure 1-2
   b. Weight: Approximately 50 pounds (22.68 kilograms).

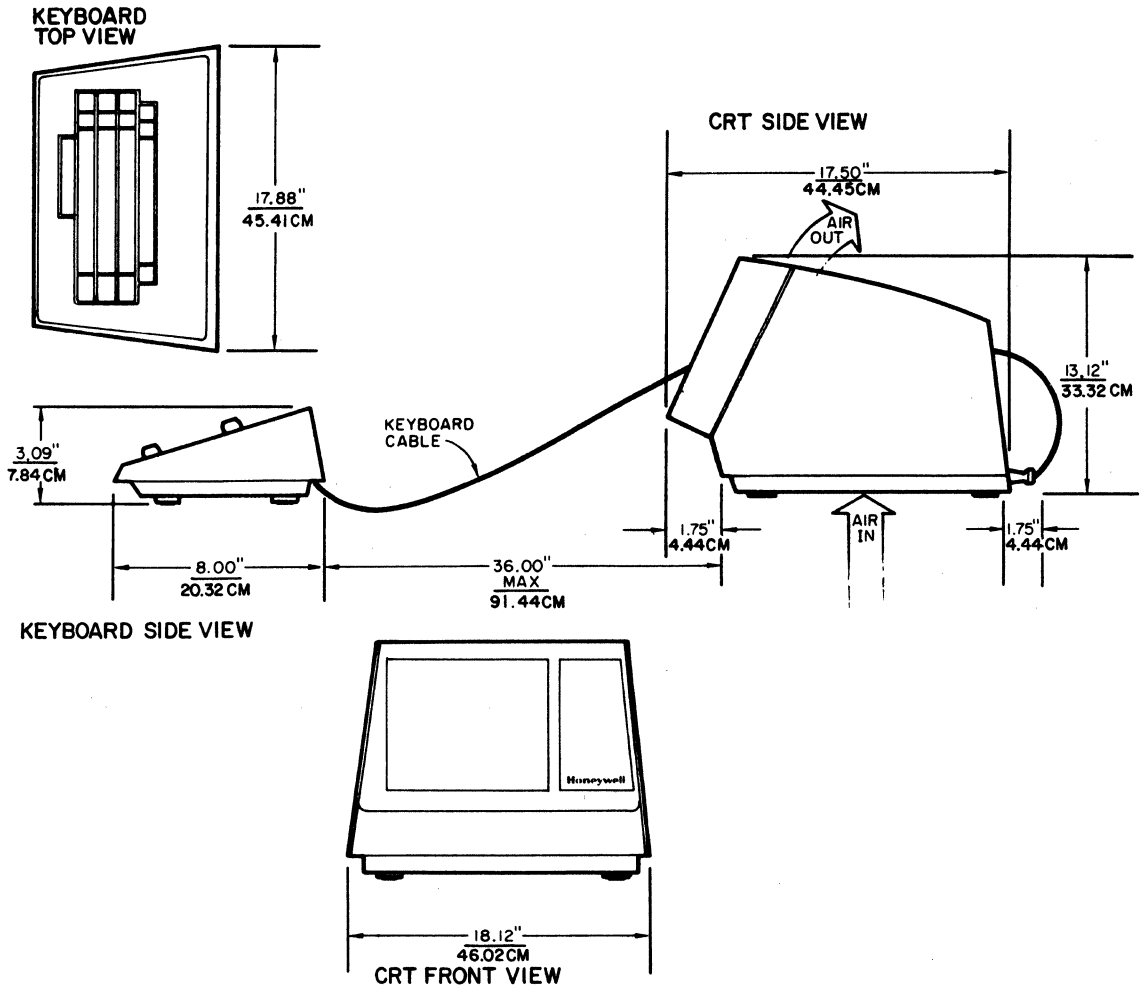


Figure 1-2 VIP7200 Video Display Terminal Dimensions

II
OPERATING CONTROLS AND PROCEDURES

This section identifies and describes all operating controls and internal switches used for operating and configuring the terminal. It also contains guidelines for normal operation, error recognition, and general testing.

2.1 DESCRIPTION OF CONTROLS AND INDICATORS

2.1.1 Front Panel Controls and Indicators

Three switches and three indicators are located on the front panel to the right of the screen. They are shown in Figure 2-1 and described in Table 2-1.

2.1.2 Operator-Accessible Controls

The operator-accessible controls on the back of the terminal are identified in Figure 2-2. The functions of these controls are described in Table 2-2.

2.1.3 Internal Switches

The internal switches are shown in Figure 2-3 and described in Table 2-3. These switches are normally set at the factory or by the installing FER when configuring the terminal to be compatible with the host system. Refer to Section IX Installation for further information on these switches.

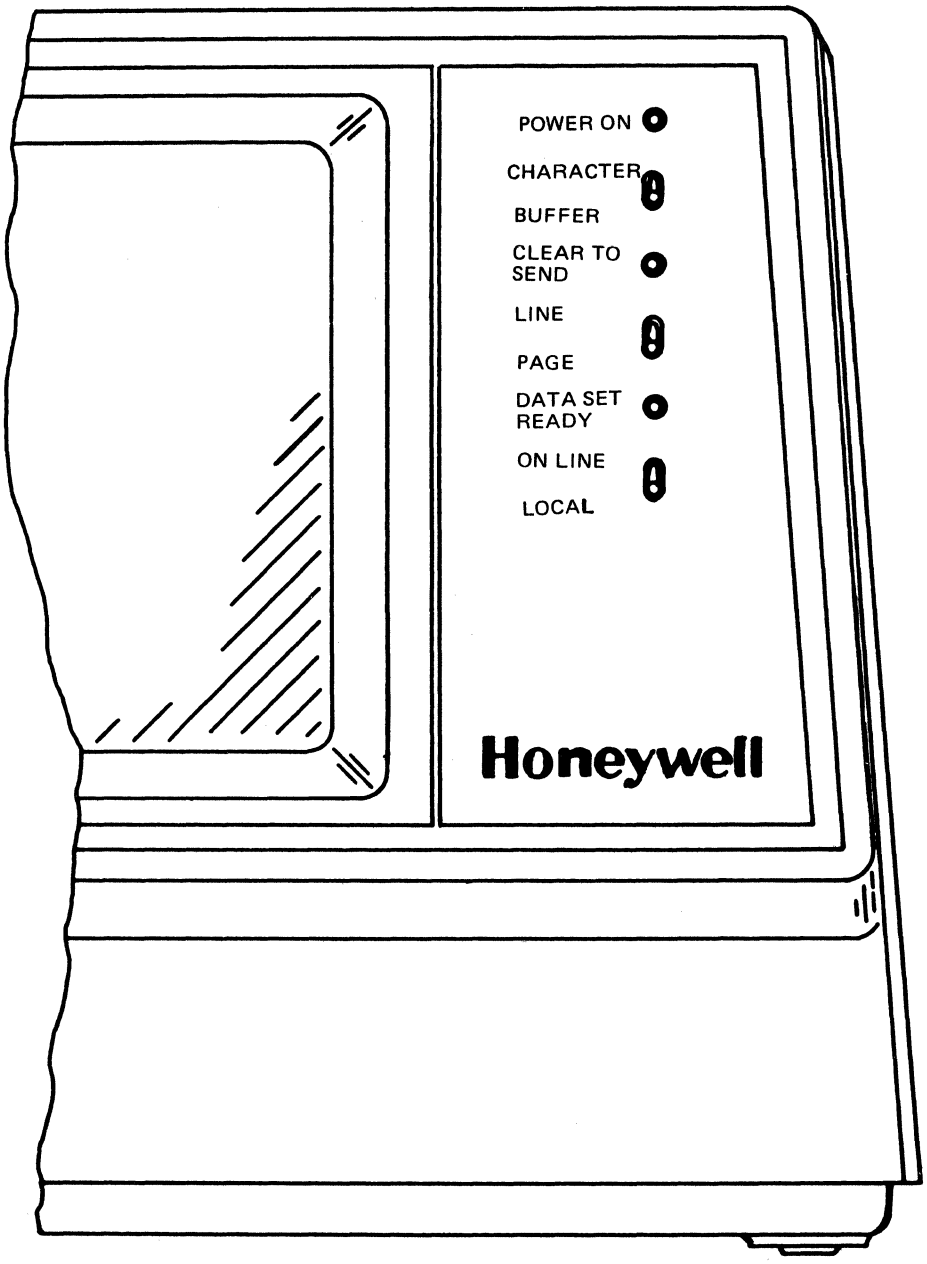


Figure 2-1 Front Panel Controls and Indicators

Table 2-1 Front Panel Controls and Indicators

CONTROL/INDICATOR	FUNCTION
POWER ON indicator	Illuminates when power switch is on and dc power is present.
CHARACTER/BUFFER switch	In CHARACTER position, allows terminal to transmit characters as they are keyed. In BUFFER position, keyed data is displayed but not transmitted until the TRANSMIT key initiates a block mode transmission. See NOTE.
CLEAR TO SEND indicator	Illuminates when interface signal CB (Clear to Send) is on.
LINE/PAGE switch	Selects line or page for block mode transmission. Transmission starts at beginning of line or page and continues to cursor position.
DATA SET READY indicator	Illuminates when interface signal CC (Data Set Ready) is on, indicating that a communication link has been established.
ON LINE/LOCAL switch	Controls interface signal CD (Data Terminal Ready). In ON LINE position, CD is on and terminal is capable of data communication. In LOCAL position, a mask is placed on the line. Terminal may be used for testing or training. See NOTE.

NOTE

Local COPY switch must be in LOCAL COPY position.

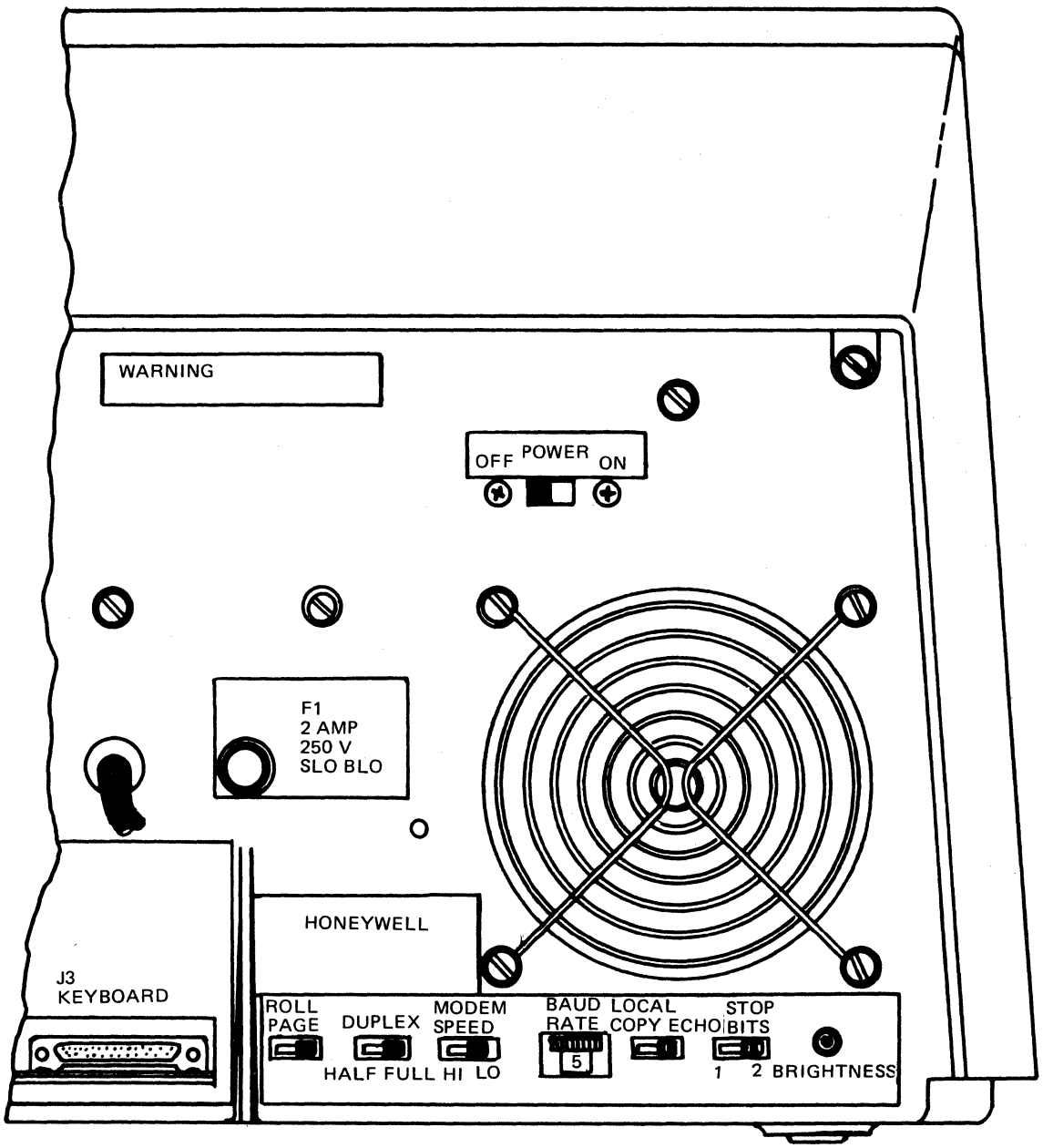
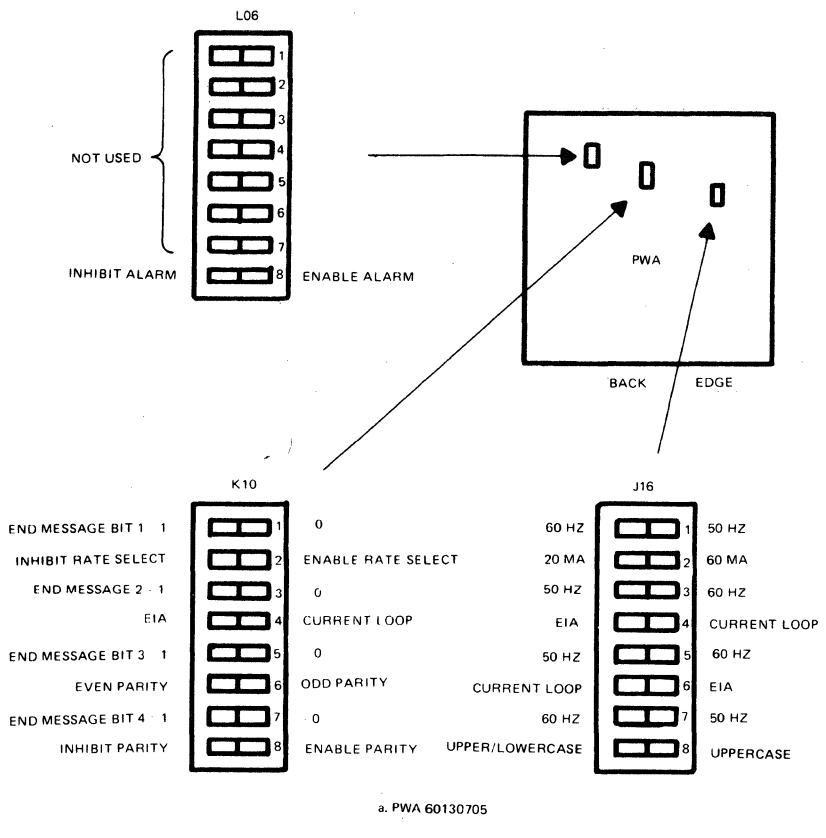


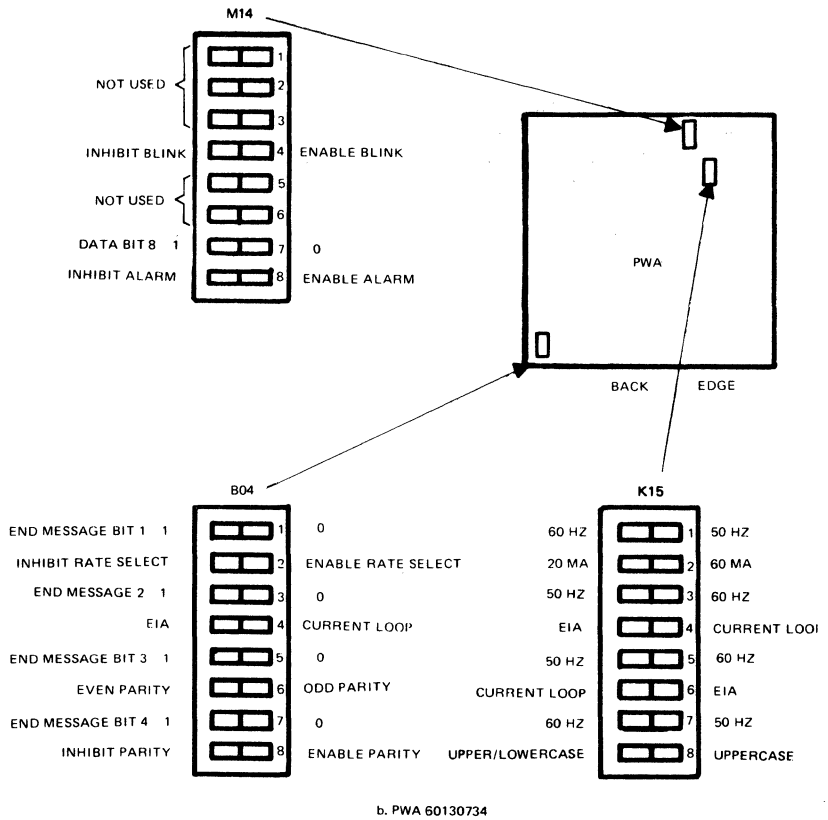
Figure 2-2 Operator-Accessible Controls

Table 2-2 Operator-Accessible Controls

CONTROL	FUNCTION
POWER OFF/ON	Controls application of ac power to terminal.
ROLL/PAGE	In ROLL position, allows continuous data entry. When page is full, top line rolls off page to provide blank bottom line. In PAGE position, data entry is limited to page (24 lines).
HALF/FULL DUPLEX	In FULL position, CA (Request to Send) is in high state. In HALF position, CA is controlled for half-duplex line protocol and CB is the signal for line turnaround completion.
HI/LO MODEM SPEED	In conjunction with internal rate select switch, indicates 1200- or 600-baud operation to modem. Must be set appropriately for European/UK applications.
BAUD RATE	Permits selection of communication interface baud rate from 75 to 9600 baud.
LOCAL COPY/ECHO	In LOCAL COPY position, keyed data is displayed simultaneously with its transmission to host system. In ECHO position, display receives signal from communication interface (echoplex).
1/2 STOP BITS	Permits selection of either 1 or 2 stop bits per character.
BRIGHTNESS	Adjusts intensity of display.



a. PWA 60130705



b. PWA 60130734

Figure 2-3 Internal Switches

Table 2-3 Internal Switches

SWITCH	FUNCTION
Locations L06/M14*	
Audible Alarm	In inhibit position, alarm sounds only on receipt of BEL code.
Inhibit/Enable Blink	In Inhibit position, the cursor does not blink.
Data Bit 8 = 1/0	Data Bit 8 = 1 indicates that an 8-bit ASCII code is sent to the controller. Data Bit 8 = 0 indicates that a 7-bit ASCII code is sent to the controller.
Locations K10/B04*	
End of Message Bits (4 switches)	Selects CR, ETX, or EOT as ending character for block mode transmissions by establishing first 4 bits of character.
Inhibit/Enable Data Signaling Rate	Routes appropriate level to interface when required for European/UK applications.
Even/Odd Parity	Selects even or odd parity in I/O character format.
Inhibit/Enable Parity	Allows inhibiting or enabling or parity bit in I/O character format.
EIA/Current Loop	Selects EIA RS232C or current loop interface.
Locations J16/K15*	
60 Hz/50 Hz (4 switches)	Selects CRT scan rate to correspond with line frequency of terminal.
EIA/Current Loop (2 switches)	Selects EIA RS232C or current loop as the communication interface.
20 mA/60 mA	Selects 20 or 60 mA for current loop interface.
Uppercase and Uppercase/Lowercase	In the uppercase and lowercase position, enables lowercase display function if terminal is equipped with this option. In uppercase position, received lowercase characters are displayed as their uppercase equivalents.

*L06, K10, and J16 are used with PWA 60130705. M14, B04, and K15 are used with PWA 60130734.

2.1.4 Maintenance Controls and Adjustments

The maintenance controls located inside the enclosure and their adjustments are described in Section VIII Maintenance. Adjustment of these controls is normally required only when repairs are necessary.

2.2 OPERATING GUIDES

2.2.1 Normal Operation

When the terminal has been properly installed as directed in Section IX of this manual, placing the POWER switch in the ON position causes the POWER ON indicator to light and the cursor to appear on the screen. The cursor is a reverse video, block that appears in the home position (first column, top line of display). As data is keyed in, any character written in column 80 moves the cursor into a nonexistent column (i.e., outside the data display area). The next character written causes an automatic carriage return/line feed with the character appearing in the first column of the next line and the cursor in column 2.

The cursor movement keys (←, ↑, →, and ↓) move the cursor one character space in the direction indicated. The HOME key moves the cursor directly to the home position. When used in conjunction with the repeat (RPT) key, the cursor moves at the rate of 15 character spaces per second until the repeat key is released.

The carriage return (CR) code from the host on the keyboard RETURN key moves the cursor to column 1 of the line it is in. There is no automatic line feed with a carriage return.

Each line feed (LF) code moves the cursor down the display one line without changing its column position. If the display is in the roll mode, a line feed issued with the cursor in line 24 rolls the entire display up one line (the top line being lost). If the display is in the page mode with the cursor in line 24, the line feed code is ignored.

All keyboard entered characters (see Figure 3-1) are encoded except for break (BRK) and END OF MESSAGE which are dc level output keys. The code generated is controlled by the alternate action CAP LOCK key. With the CAP LOCK key released, depressing any key by itself generates the code for the lowercase character or symbol. Any key used in conjunction with the SHIFT key generates the uppercase character or symbol code. The CAP LOCK key sets the keyboard in the uppercase only mode, preventing lowercase characters from being displayed. However, the SHIFT key can still be used to select the appropriate uppercase or lowercase symbol for numeric and symbol keys.

Depressing the control (CTL) key with an alphabetic key generates a control character. For example, CTL depressed along with G generates the BEL code; CTL depressed with [generates the escape (ESC) code which, when followed by SHIFT depressed with the A key, moves the cursor up one line (the same as for the ↑ key code - see Table 3-4).

The break (BRK) key allows the operator to halt or break processing, displaying, or printing. This key generates an open line (spacing or all-Zeros condition) for 130 milliseconds.

The escape (ESC) and delete (DEL) keys generate their respective ASCII codes when depressed.

The separate numeric group keys generate their respective codes independent of the SHIFT and CAP LOCK keys. If depressed in conjunction with the control (CTL) key, no output code is generated.

The END OF MESSAGE key is used in half-duplex character mode communication to indicate the end of a message and to turn the communication line around to allow the terminal to receive data from the host.

The clear (CLR) code clears the screen and returns the cursor to its home position.

The ERASE EOP/EOL key is used in conjunction with the SHIFT key. When depressed with the SHIFT key released, the display is erased from the cursor position to the end of the line. With the SHIFT key also depressed, the display is erased from the cursor to the end of the page.

The transmit (XMIT) key is used for line or page buffered mode operation. In the line buffered mode, this code instructs the display to transmit the line containing the cursor up to but not including the cursor position. In the page buffered mode, transmission starts at the home position and proceeds up to the cursor position. In both cases, the keyboard is not connected to the communication line but to the display.

The seven special function keys, F1 through F7, are host dependent. They are used for application programming and are user-defined.

An audible alarm is provided as an operator warning. It sounds when a character is keyed after displaying the 71st character in a line or when the BEL code is received. An internal switch can be used to disable the keyed-character end-of-line warning to the operator.

2.2.2 Error Conditions

The terminal will display parity errors received over the communication line by substituting a ? for the faulty character. Any other malfunctions will be exhibited as a loss of displayed video, improper response to keyboard entries, etc.

2.2.3 Local Mode Test Operations

The ON LINE/LOCAL switch on the front panel allows the terminal to be isolated from the host system for test purposes. It may also be used for editing where communication procedures allow devices to drop out and return. In the local mode, the keyboard is connected to the display and the communication line is locked out. See Section VII for testing procedures.

NOTE

The LOCAL COPY switch must be in the LOCAL COPY position.

III
PROGRAMMING

This section describes the interface and functional operations between the terminal and a host system, and between the terminal and an auxiliary input/output device.

In general, the terminal functions as an ASR/KSR33, but without hard copy capability (except through the extension port). For such applications, it can be configured to be directly compatible with standard TTY software support (refer to Section IX Installation). However, for other applications some additional features may be enabled which require additional software in order to function properly.

NOTE

All alphanumeric codes referred to in this section are represented in hexadecimal.

The following areas are described in this section: keyboard functions, keyboard associated functions, display functions, communication interface, auxiliary device interface, interface functionality, and performance.

3.1 KEYBOARD FUNCTIONS

The keyboard layout and keytop legends are shown in Figure 3-1. In normal mode, the keyboard is capable of generating the full 128 seven-bit ASCII character set plus selected 8-bit codes.

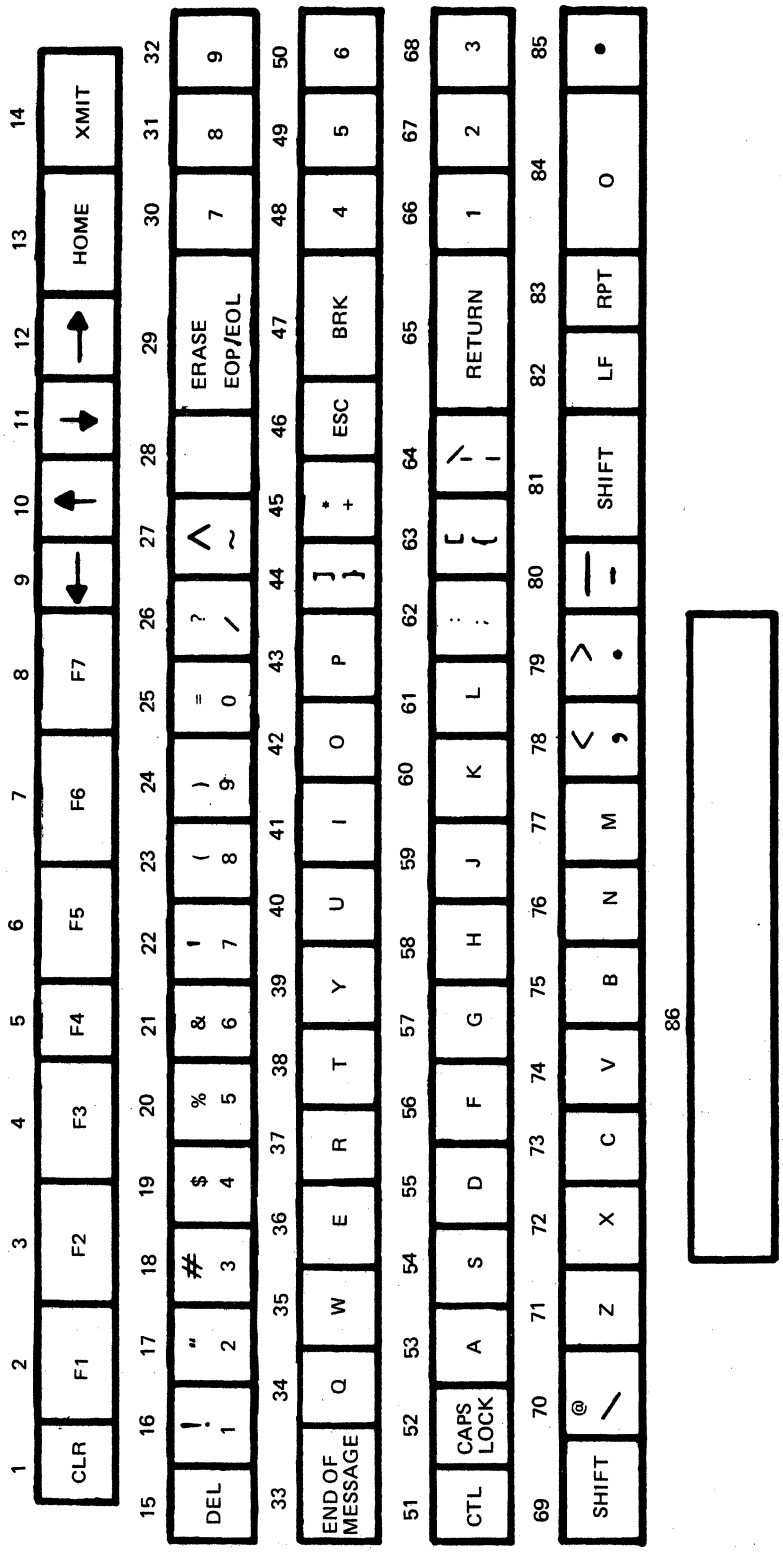


Figure 3-1 VIP7200 Keyboard Layout

The keyboard is divided into the following functional groups.

- Alphanumeric cluster (48 keys)
- Standard control function group (12 keys)
- Numeric pad group (11 keys)
- Editing function group (8 keys)
- Special control function keys (7 keys)
- Auxiliary function keypad option (18 keys).

3.1.1 Alphanumeric Cluster

The 48-key alphanumeric cluster consists of 26 alphabetic keys, 10 combination numeric and graphic keys, 11 dual graphic keys, and a space key. With these keys, in combination with the control function key, it is possible to generate the full 128-character, seven-bit ASCII code set shown in Figure 3-2 or the 128-character eight-bit ASCII code set shown in Figure 3-3. The keys in the alphanumeric cluster are described in Table 3-1.

3.1.2 Standard Control Function Group

The 12 keys of the standard control function group are described in Table 3-2.

3.1.3 Numeric Pad Group

The 11-key numeric pad group consists of keys 0 through 9 and the decimal point (period). When depressed, these keys generate ASCII codes 3/0 through 3/9 and 2/E, as appropriate (independent of the SHIFT and CAP LOCK keys). If depressed in combination with the CTL key, no output is generated.

3.1.4 Editing Function Group

The eight keys in the editing function group provide editing capabilities including cursor position and erase modes. Except for the ERASE EOL/EOP (which operates with the SHIFT key), these keys are independent of the SHIFT, CAP LOCK, and CTL keys. The output codes generated consist of the two-character escape sequences given in Table 3-4.

b_7 b_6 b_5 / BITS b_4 b_3 b_2 b_1* / ROW ↓ COLUMN →	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
	0	1	2	3	4	5	6	7
0 0 0 0	0	NUL	DLE	SP	0	@	P	`	p
0 0 0 1	1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0	2	STX	DC2	"	2	B	R	b	r
0 0 1 1	3	ETX	DC3	#	3	C	S	c	s
0 1 0 0	4	EOT	DC4	$	4	D	T	d	t
0 1 0 1	5	ENQ	NAK	%	5	E	U	e	u
0 1 1 0	6	ACK	SYN	&	6	F	V	f	v
0 1 1 1	7	BEL	ETB	'	7	G	W	g	w
1 0 0 0	8	BS	CAN	(	8	H	X	h	x
1 0 0 1	9	HT	EM	)	9	I	Y	i	y
1 0 1 0	A	LF	SUB	*	:	J	Z	j	z
1 0 1 1	B	VT	ESC	+	;	K	[	k	{
1 1 0 0	C	FF	FS	,	<	L	\	l	|
1 1 0 1	D	CR	GS	-	=	M	]	m	}
1 1 1 0	E	SO	RS	.	>	N	^	n	~
1 1 1 1	F	SI	US	/	?	O	_	o	DEL

*b_1 IS LOW-ORDER BIT.

Code produced by first depressing and holding the CTL key, then the corresponding key in columns 4, 5, 6, 7 (except for DEL). Action of the CTL key is to force bits 6 and 7 to zero. Example: CTL, then a (or A) produces the output code for SOH. Note: Depressing CTL, then any key in column 2 or 3 produces either no output or the NUL code.

Code produced as a result of depressing a single key as marked on the keyboard. Where dual markings are indicated, code for the character shown on the lower portion of the key is produced.

Code produced by first depressing and holding SHIFT key, then depressing appropriately marked key. Where dual markings are indicated, code for the character shown on the upper portion of the key is produced.

When CAPS LOCK key is depressed and locked, these character codes are inhibited. The associated keys will always produce the uppercase equivalent code as if the SHIFT key were activated, regardless of the actual position of the SHIFT key. Note: CAPS LOCK is not a SHIFT lock since only the characters indicated are affected.

Figure 3-2 ASCII Code Chart for Keyboard Generated Characters

					$b_8 = 0$								$b_8 = 1$							
b_7 / b_6 / b_5 / Bits					0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b_4	b_3	b_2	b_1	COLUMN / ROW	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p					C(N0)	F0	C(0)	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	TAB (SET)	TAB (CLR)			C(N7)	F1	C(1)	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	CLEAR (EOL)	CLEAR (EOP)			C(N4)	F2	C(2)	
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	CHAR (INS)	CHAR (DEL)			C(N1)	F3	C(3)	
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t	LINE (INS)	LINE (DEL)			C(N8)	F4	C(4)	
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	TRANS (MSG)	TRANS (PAGE)			C(N5)	F5	C(5)	
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	OFF LINE	ON LINE			C(N2)	F6	C(6)	
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	PRT (VAR)	PRT (FORM)			C(N9)	F7	C(7)	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	←	→			C(N6)	F8	C(8)	
1	0	0	1	9	HT	EM	)	9	I	Y	i	y	TAB (FOR)	TAB (REV)			C(N3)	F9	C(9)	
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	↓	↑			C(N.)	F10	C(:)	
1	0	1	1	B	VT	ESC	+	;	K	[	k	{	HOME	RESET			C(N+)	F11	C(;)	
1	1	0	0	C	FF	FS	,	<	L	\	l	|	CLEAR (VAR)	CLEAR (ALL)			C(N-)	F12	C(,)	
1	1	0	1	D	LC	GS	-	=	M	]	m	}	RTN	NEW LINE				F13	C(-)	
1	1	1	0	E	SO	RS	.	>	N	^ BLANK	n	~ BLINK					F17	F14	C(.)	
1	1	1	1	F	SI	US	/	?	O	_	o	DEL					F18	F15	C(/)	

NOTE 1 NOTE 2

NOTE 3

SPECIAL CODES

NOTES: 1. THE 13 CODES LABELED C(NX) ARE GENERATED FROM NUMERIC PAD PLUS CONTROL KEY.

2. THE 16 CODES LABELED C(X) ARE GENERATED FROM THE STANDARD KEYBOARD USING THE CONTROL KEY.

3. THE 18 CODES LABELED F(X) ARE GENERATED FROM THE EXTENDED FUNCTION PAD OPTION.

Figure 3-3 Keyboard Character Coding Chart

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Table 3-1 Keyboard Alphanumeric Cluster

KEYS	DESCRIPTION
Alphabetic (26 keys)	When depressed alone, each key generates the appropriate ASCII code 6/1 through 7/A. With SHIFT or CAP LOCK also used, codes 4/1 through 5/A are produced. If CTL key is also depressed (SHIFT or CAP LOCK in either position), codes 0/1 through 1/A are produced.
Combined numeric and graphic (10 keys)	When depressed alone, ASCII codes 3/0 through 3/9 are produced. With SHIFT depressed, codes 3/D and 2/1 through 2/9 are generated corresponding to the upper legends. CAP LOCK has no effect on operation of these keys. If CTL key is also depressed (independent of SHIFT key), no code is generated.
Dual graphic (11 keys)	ASCII codes produced by these keys are shown in Table 3-3. With the CTL key also depressed (independent of position of SHIFT and CAP LOCK keys), codes 0/0 and 1/B through 1/F are produced when any of the six appropriate graphic symbol keys are depressed. The other five keys in this group produce no output in conjunction with CTL key. With CAP LOCK used, the five appropriate keys produce codes corresponding to upper legend on key regardless of position of SHIFT key. The other six keys operate as previously stated in combination with SHIFT and CTL keys, regardless of position of CAP LOCK key.
Space bar	When depressed, always generates ASCII code 2/0 independent of the SHIFT, CAP LOCK, and CTL keys.

Table 3-2 Keyboard Standard Control Function Group (Sheet 1 of 2)

KEY	DESCRIPTION
DEL (delete)	When depressed, always generates ASCII code 7/F independent of SHIFT, CAP LOCK, and CTL keys.
ESC (escape)	When depressed, always generates ASCII code 1/B independent of SHIFT, CAP LOCK, and CTL keys.

Table 3-2 Keyboard Standard Control Function Group (Sheet 2 of 2)

	DESCRIPTION
RETURN	When depressed, always generates ASCII code 0/D independent of SHIFT, CAP LOCK, and CTL keys.
LF (line feed)	When depressed, always generates ASCII code 0/A independent of SHIFT, CAP LOCK, and CTL keys.
CAP LOCK	An alternate action key which locks down when depressed and unlocks when depressed again. When down, modifies codes generated by the 26 alphabetic and 5 dual graphic keys in same manner as SHIFT key.
SHIFT	Generates no output by itself but when depressed in combination with certain other keys, modifies their generated codes to correspond to ASCII uppercase alphabetic codes or to codes corresponding to upper legends on keytops.
CTL (control)	Generates no output by itself but when depressed in combination with certain other keys modifies their generated codes to the bit paired corresponding to the ASCII control function codes in columns 0 and 1 (see Figure 3-2).
RPT (repeat)	When depressed, produces a dc voltage output which has no effect by itself. However, if held down while depressing any graphic character key or coded function key (with or without SHIFT), this key causes output code to be repeated at a rate of approximately 15 characters per second until RPT key is released.
BRK (break)	When depressed, produces a dc voltage output which causes a space code to be sent to modem for 130 milliseconds (conventional teletypewriter dicipline interrupt).
END OF MESSAGE	When depressed, produces a dc voltage output which causes interface signal CA (Request To Send) to go to off state when terminal is being operated in half-duplex (two-way alternate) mode.
Blank (key 28)	When depressed, this key produces a dc voltage output. It is reserved for possible future use.

Table 3-3 Code Chart for Dual Graphic Keys

LOWER	UPPER	ASCII CODE GENERATED			
		DEPRESSED ALONE	WITH SHIFT	WITH CONTROL	WITH CAP LOCK
`	@	6/0	4/0	0/0	4/0
{	[	7/B	5/B	1/B	5/B
¦	\	7/C	5/C	1/C	5/C
}	]	7/D	5/D	1/D	5/D
~	^	7/E	5/E	1/E	5/E
-	_	2/D	5/F	1/F	
/	?	2/F	3/F	No Output	
+	*	2/B	2/A	No Output	
,	<	2/C	3/B	No Output	
.	>	2/E	3/E	No Output	
;	:	3/B	3/A	No Output	
+	*	2/B	2/A	No Output	

See NOTE 1 (WITH CONTROL)

See NOTE 1 (WITH CAP LOCK)

See NOTE 2 (WITH CAP LOCK)

NOTES

1. SHIFT key may be in either position.
2. CAP LOCK does not affect operation of these keys. SHIFT key causes same actions shown in columns 2 and 3.

Table 3-4 Keyboard Editing Function Group

KEY	FUNCTION NAME	MNEMONIC	GENERATED OUTPUT CODE SEQUENCE
↑	Cursor up	CUU	1/B, 4/1
↓	Cursor down	CUD	1/B, 4/2
→	Cursor forward	CUF	1/B, 4/3
←	Cursor backward	CUB	1/B, 4/4
HOME	Cursor home	CUH	1/B, 4/8
CLR	Reset to initial state	RIS	1/B, 6/0
ERASE EOL/EOP	Erase end of line	EL	1/B, 4/B
	Erase end of page (with SHIFT depressed)	ED	1/B, 4/A
TRANSMIT	Transmit data	MC	1/B, 6/9

3.1.5 Special Control Function Keys

This group of seven special function keys are designated F1 through F7. When depressed, each of these keys produces an output consisting of a two-character escape sequence as indicated in Figure 3-4. Codes designated F1 through F7 are produced when the keys alone are depressed. Codes FS1 through FS7 are produced when these keys are depressed in combination with the SHIFT key. The CAP LOCK and CTL keys have no effect.

3.1.6 Auxiliary Function Keypad Option

The optional 18-key auxiliary function keypad layout is shown in Figure 3-5. The two-character escape sequence codes produced by these keys are designated as AF0 through AF17 in Figure 3-4. The SHIFT, CAP LOCK, and CTL keys on the main keyboard have no effect on these auxiliary function keys.

3.2 KEYBOARD ASSOCIATED FUNCTIONS

3.2.1 Transmit Data Function

The XMIT (transmit) key initiates transmission of data from the terminal to the host when the unit is operating in one of the buffered (line or page) transmission modes.

3.2.1.1 Transmit Procedure

Depressing the XMIT key generates the two-character escape sequence code MC (1/B, 6/9) within the terminal. When operating in the buffered mode (line or page), this code is not transmitted; however, because of the local copy connection, it is decoded by the

display logic and interpreted as the instruction to initiate transfer of data from the terminal to the host system.

TWO CHARACTER SEQUENCE = I/B (2nd. CHAR.), WHERE 2nd. CHAR. IS:

b_7 b_6 b_5 / Bits b_4 b_3 b_2 b_1*	COLUMN → / ROW ↓	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
		0	1	2	3	4	5	6	7
0 0 0 0	0				F1		AF0	RIS	
0 0 0 1	1				FS1	CUU	AF1		
0 0 1 0	2				F2	CUD	AF2		
0 0 1 1	3					CUF	AF3		
0 1 0 0	4					CUB	AF4		
0 1 0 1	5				FS2		AF5		
0 1 1 0	6				F3		AF6	HVP	
0 1 1 1	7				FS3		AF7		
1 0 0 0	8				F4	CUH	AF8		
1 0 0 1	9				FS4		AF9	MC	
1 0 1 0	A				F5	ED	AF10		
1 0 1 1	B				FS5	EL	AF11		
1 1 0 0	C				F6		AF12		
1 1 0 1	D				FS6		AF13		
1 1 1 0	E				F7	AF16	AF14		
1 1 1 1	F				FS7	AF17	AF15		

*b_1 IS LOW-ORDER BIT.

Figure 3-4 Keyboard-Generated Two-Character Escape Sequences

(AF0)	(AF1)	(AF2)
(AF3)	(AF4)	(AF5)
(AF6)	(AF7)	(AF8)
(AF9)	(AF10)	(AF11)
(AF12)	(AF13)	(AF14)
(AF15)	(AF16)	(AF17)

Figure 3-5 Optional Auxiliary Function Keypad Layout

When operating in the half-duplex mode, the first action of this sequence of events is to activate the line turnaround to assure that the terminal is in the transmit state.

With the mode select switches set for buffered page mode, data is transmitted serially, character-by-character, starting at the home position and proceeding line-by-line, but not including, the cursor position.

With the mode select switches set for buffered line mode, data is transmitted in the same manner except the transmission starts at the beginning of the line in which the cursor is located rather than at the home position.

NOTE

When the terminal is operating in the character mode, the XMIT key is normally not used. However, if it is depressed, the MC code will be generated and transmitted, and if echoplexed back will trigger transmission of a line or page in the block mode format.

3.2.1.2 End of Message Procedure

Following transmission of the last data character, the terminal adds and transmits an ending character. This character can be any ASCII code in column 0 (bits 5, 6, and 7 equal to zero); however, the VIP7200 only uses NUL (0/0), ETX (0/3), EOT (0/4), LF (0/A), or CR (0/D), as determined by the switch settings for these character codes. Once a transmission sequence has been initiated, all received signals are blocked from the display and signals from the keyboard (if any) are ignored. The keyboard signals have no effect on the output until the transmission sequence (including the ending character) has been completed.

In the half-duplex operating mode after transmission of the ending character, the terminal reverts to the receive state by turning the CA (Request to Send) interface signal off and thus ending the sequence. At this point, the host can transmit an acknowledgment, send a reply, request retransmission by sending the MC code, or do nothing. Upon acknowledgement, the operator may start entering new data to the display in preparation for the next block mode transmission.

3.2.2 Roll/Page Mode

The roll mode is the normal operating mode. In this mode, after completion of data entry into line 24, all data on the screen rolls up one line with the top line being lost. This leaves line 24 clear to accept the next line of data. Roll-up is initiated whenever the cursor is in line 24 and a line feed code is received, or the automatic carriage return/line feed function is activated.

In the page mode, data on the screen is held in place (not permitted to roll up) by inhibiting response to a line feed code and the automatic carriage return/line feed function when the cursor is in line 24.

3.2.3 End of Message Key

In the half-duplex character mode this key provides line turnaround control to switch the terminal from a master (send) state to a slave (ready to receive) state by turning the CA (Request to Send) interface signal off. In buffered page or line modes, this key is not used since line turnaround is provided automatically by the terminal logic. In full-duplex modes this key has no function since the interface signal CA is strapped to remain on whenever the CD (Data Terminal Ready) signal is on.

3.3 DISPLAY FUNCTION

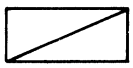
3.3.1 General Display Functions

The display receives signals: (1) directly from the host system as a message, (2) echoplexed from the host controller, or (3) from the keyboard when direct connected as in full-duplex/local display, half-duplex, or local modes.

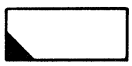
The display responds to a subset of the 7-bit ASCII code and to a specific subset of escape sequence codes. The applicable code tables are shown in Figures 3-6 and 3-7 and are described in the following subsections.

b_7 b_6 b_5 / BITS b_4 b_3 b_2 b_1* / ROW / COLUMN	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
	0	1	2	3	4	5	6	7
0 0 0 0 0	NUL	~~DLE~~	SP	0	@	P	`	p
0 0 0 1 1	~~SOH~~	~~DC1~~	!	1	A	Q	a	q
0 0 1 0 2	~~STX~~	~~DC2~~	"	2	B	R	b	r
0 0 1 1 3	~~ETX~~	~~DC3~~	#	3	C	S	c	s
0 1 0 0 4	~~EOT~~	~~DC4~~	$	4	D	T	d	t
0 1 0 1 5	~~ENQ~~	~~NAK~~	%	5	E	U	e	u
0 1 1 0 6	~~ACK~~	~~SYN~~	&	6	F	V	f	v
0 1 1 1 7	BEL	~~ETB~~	'	7	G	W	g	w
1 0 0 0 8	~~BS~~	~~CAN~~	(	8	H	X	h	x
1 0 0 1 9	~~HT~~	~~EM~~	)	9	I	Y	i	y
1 0 1 0 A	LF	~~SUB~~	*	:	J	Z	j	z
1 0 1 1 B	~~VT~~	ESC	+	;	K	[	k	{
1 1 0 0 C	~~FF~~	~~FS~~	,	<	L	\	l	¦
1 1 0 1 D	CR	~~GS~~	-	=	M	]	m	}
1 1 1 0 E	~~SO~~	~~RS~~	.	>	N	^	n	~
1 1 1 1 F	~~SI~~	~~US~~	/	?	O	_	o	DEL

* b_1 IS LOW-ORDER BIT.



Codes not recognized by this unit. Receipt of these characters in a data stream will not cause any action; they will be ignored as if not present.



Receipt of these codes are recognized by the unit, but will be displayed as their upper case equivalents as shown in columns 4 and 5 when lower case option is not installed.

Figure 3-6 Received ASCII Codes Recognized by Receive and Display Logic

TWO CHARACTER SEQUENCE = I/B (2nd CHAR.), WHERE 2nd CHAR. IS:

b_7 b_6 b_5 / Bits b_4 b_3 b_2 b_1*	COLUMN → / ROW ↓	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
		0	1	2	3	4	5	6	7
0 0 0 0	0							RIS	
0 0 0 1	1					CUU			
0 0 1 0	2					CUD			
0 0 1 1	3				SHI	CUF			
0 1 0 0	4				SLI	CUB			
0 1 0 1	5								
0 1 1 0	6							HVP	
0 1 1 1	7								
1 0 0 0	8					CUH			
1 0 0 1	9							MC	
1 0 1 0	A					ED			
1 0 1 1	B					EL			
1 1 0 0	C								
1 1 0 1	D								
1 1 1 0	E							RCA	
1 1 1 1	F								

* b_1 IS LOW-ORDER BIT.

NOTE

Blank codes are not recognized and cause no action in the display.

Figure 3-7 Two-Character Escape Sequence Codes Recognized by Display

3.3.2 Response to Single-Character ASCII Codes

The actions taken by the terminal upon receipt of the character codes shown in Figure 3-6 are described in Table 3-5.

NOTE

When the cursor is in column 81 and a DEL character is decoded, the cursor is subjected to an automatic CR/LF. No data is lost as a result of this action.

Table 3-5 Response to Single-Character ASCII Codes

CODE	RESPONSE
NUL (0/0) and DEL (7/F)	The terminal accepts these codes as time-fill characters, thus assuring compatibility with slower teletypewriter-like electromechanical devices; however, no action is taken by the terminal.
BEL (0/7)	Sounds the audible alarm.
LF (1/A)	Moves cursor down one line. If in roll mode with cursor on bottom line, performs upward scroll.
CR (0/D)	Moves cursor to start of line that it is on.
ESC (1/B)	Identifies the start of a multicharacter instruction. No display action takes place until the full multicharacter escape sequence has been interpreted.
SP (2/0) and 63 Graphic characters (2/1 through 5/F)	Appropriate graphic character is displayed at cursor position overwriting and replacing any previously displayed information, if present; cursor is advanced one position to right.
31 Lowercase Graphic characters (6/0 through 7/E)	If terminal has lowercase feature, these characters will be displayed in the same manner as uppercase characters described above. If terminal does not have lowercase feature, these codes will be displayed as equivalent uppercase characters (the bit paired equivalents in 4/0 through 5/E).
Other remaining codes	Strike-throughs in Table 3-4 indicates that the terminal does not respond to receipt of these codes.
Automatic CR/LF	As each graphic character code is received and displayed, cursor is advanced one position to right to indicate next active position. Upon entry of a graphic character in last position of a line (column 80), cursor advances to a phantom position (equivalent to a column 81) until next character has been received and interpreted. If next character is a graphic character, cursor moves to column 1 of next line, character is displayed, and then cursor moves to column 2. However, if character received (while cursor is in phantom position) is a control character, control function is performed directly. (EL/ED are inhibited and therefore ignored.) This is necessary to prevent double line feeds when receiving full line messages containing CR/LF signals as part of message.

3.3.3 Response to Two-Character Escape Sequence Codes

Table 3-6 describes the actions taken by the terminal upon receipt of the two-character escape sequence codes shown in Figure 3-7.

Table 3-6 Response to Two-Character Escape Sequence Codes (Sheet 1 of 2)

CODE	RESPONSE
SHI (1/B, 3/3)	Set High Intensity: returns display of each subsequent character to higher intensity level (normal intensity).
SLI (1/B, 3/4)	Set Low Intensity: instructs terminal to display subsequent characters in lower intensity "background" level.
CUU (1/B, 4/1)	Cursor Up: moves cursor up one line. If already on top line, cursor wraps around and appears in same column of bottom line.
CUD (1/B, 4/2)	Cursor Down: moves cursor down one line. If already on bottom line, cursor wraps around and appears in same column of top line.
CUF (1/B, 4/3)	Cursor Forward: moves cursor right one character position without erasing or modifying contents of display memory. If cursor is at end of a line, this code advances cursor forward to a phantom position equivalent to a column 81. If cursor is already in a phantom position, this code moves it to column 1 of next line, or if on the last line, to home position.
CUB (1/B, 4/4)	Cursor Backspace: moves cursor left one character position without erasing or modifying contents of display memory. If cursor is at start of a line, this code moves cursor to a phantom position, equivalent to a column 0, of present line. If cursor is already in a phantom position, this code moves it to column 80 of previous line.* If cursor is in home position, this code moves it to phantom position of last line.
CUH (1/B, 4/8)	Cursor Home: moves cursor to home position.
ED (1/B, 4/A)	Erase End of Display: erases all data from and including cursor position to end of page.

*While in column zero, the terminal will ignore an EL/ED command and respond to an MC command by transmitting the full page when in page mode or transmit the remainder of the page when in line mode. This position is intended for wrapping the cursor only.

Table 3-6 Response to Two-Character Escape Sequence Codes (Sheet 2 of 2)

CODE	RESPONSE
	NOTE To ensure proper operation of the 9600-bit-per-second rate, one character (NUL or DEL) or a time delay equivalent to one character time must be provided in the data stream immediately following an ED or RIS code before sending the next graphic or control character code. This time delay is not required at speeds of 4800 bits per second or slower.
EL (1/B, 4/B)	Erase End of Line: erases all data from and including cursor position to end of line.
RIS (1/B, 6/0)	Reset Initial State: resets display by erasing entire screen, moving cursor to home position, and setting display to normal (high) intensity level. NOTE Refer to note following ED above.
RCA (1/B, 6/E)	Read Cursor Address: terminal transmits horizontal and vertical position (HVP) code sequence 1/B, 6/6, Px, Py where Px and Py are parameter values of current cursor address in accordance with coding shown in Figure 3-7.
MC (1/B, 6/9)	Media Copy: initiates transfer (transmission) of data from terminal to host system.
HVP (1/B, 6/6, Px, Py)	Horizontal and Vertical Position: moves cursor to horizontal and vertical position identified by parameters Px and Py in accordance with coding shown in Figure 3-8. NOTE When the VIP7200 is being used for composition and special edit functions (where many of the special two-character ESC sequence cursor movement and control characters are being used), any equipment connected to the auxiliary interface should be switched to a nonprinting, standby or off condition.

CODE FOR HORIZONTAL POSITION P_x (VALUES 1 ⟶ 81)
VERTICAL POSITION P_y (VALUES 1 ⟶ 24)

b_7 b_6 b_5 / Bits	b_4	b_3	b_2	b_1*	COLUMN → / ROW ↓	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
						0	1	2	3	4	5	6	7
	0	0	0	0	0			HOME	17	33	49	65	81
	0	0	0	1	1			2	18	34	50	66	
	0	0	1	0	2			3	19	35	51	67	
	0	0	1	1	3			4	20	36	52	68	
	0	1	0	0	4			5	21	37	53	69	
	0	1	0	1	5			6	22	38	54	70	
	0	1	1	0	6			7	23	39	55	71	
	0	1	1	1	7			8	24	40	56	72	
	1	0	0	0	8			9	25	41	57	73	
	1	0	0	1	9			10	26	42	58	74	
	1	0	1	0	A			11	27	43	59	75	
	1	0	1	1	B			12	28	44	60	76	
	1	1	0	0	C			13	29	45	61	77	
	1	1	0	1	D			14	30	46	62	78	
	1	1	1	0	E			15	31	47	63	79	
	1	1	1	1	F			16	32	48	64	80	

*b_1 IS LOW-ORDER BIT.

Figure 3-8 Horizontal and Vertical Cursor Position Codes for Px and Py

3.3.4 Parity Error in Character Codes

If a parity error is detected in any received graphic or control character code, this invalid character or function code is replaced by the 7-bit code 3/F in the display's memory, and the error is indicated on the screen by the graphic ?.

Parity errors in multicharacter control functions can result in several different conditions. If an error occurs in the first character (the ESC code), the code is replaced by the ? and the following characters are interpreted independently. If an error occurs in the second character, the two-character sequence is aborted and replaced by the ?. In the HVP four-character sequence, an error in

Parity errors in multicharacter control functions can result in several different conditions. If an error occurs in the first character (the ESC code), the code is replaced by the ? and the following characters are interpreted independently. If an error occurs in the second character, the two-character sequence is aborted and replaced by the ?. In the HVP four-character sequence, an error in the third character causes an abort and display of a ? with the fourth character displayed as a graphic. An error in the fourth character causes a ? to be displayed at the new Px position as a result of valid reception and interpretation of the first three characters.

3.3.5 Audible Alarm

The audible alarm sounds upon receipt of the BEL code. An operator end-of-line warning is heard upon the keystroke following the display of the 71st character in a line. The end-of-line warning can be inhibited by an internal switch so that only the BEL code sounds the alarm.

3.3.6 Special Considerations

In the local display mode the keyboard and the communication channels are combined; both are considered received signals. If a key is depressed during receipt of a communication message, a garbled signal may result.

3.4 COMMUNICATION INTERFACE

The terminal provides both EIA and current loop interface as described in subsections 3.4.1 and 3.4.2. Both are asynchronous interfaces capable of operating at data rates up to 9600 baud. Internal switches allow selection of the appropriate interface.

3.4.1 EIA Interface

The terminal provides all of the interface and functional characteristics identified as Interface Type D in section 5 of the RS232C specification. The EIA interface can be used to connect the terminal to an asynchronous full-duplex modem, an asynchronous half-duplex modem, or directly to a local computer or communication adapter. Interconnection distance is limited to 50 cable feet. This interface is compatible with Western Electric data sets 103A, 103E, and 103G (full duplex) and 202C and 202D (half duplex). The EIA interface signals are shown in Figure 3-9. The auxiliary interface at the terminal extension port is a subset of the EIA communications interface.

3.4.2 Current Loop Interface

The terminal provides a full-duplex current loop interface which can be used for direct connection to a local computer or to a communication adapter for distances up to 1000 feet. The current loop interface signals are shown in Figure 3-10.

The current loop interface can operate at either 20-mA or 60-mA signal current as selected by an internal switch. The terminal does not provide power for the current loop interface; an external power source is required.

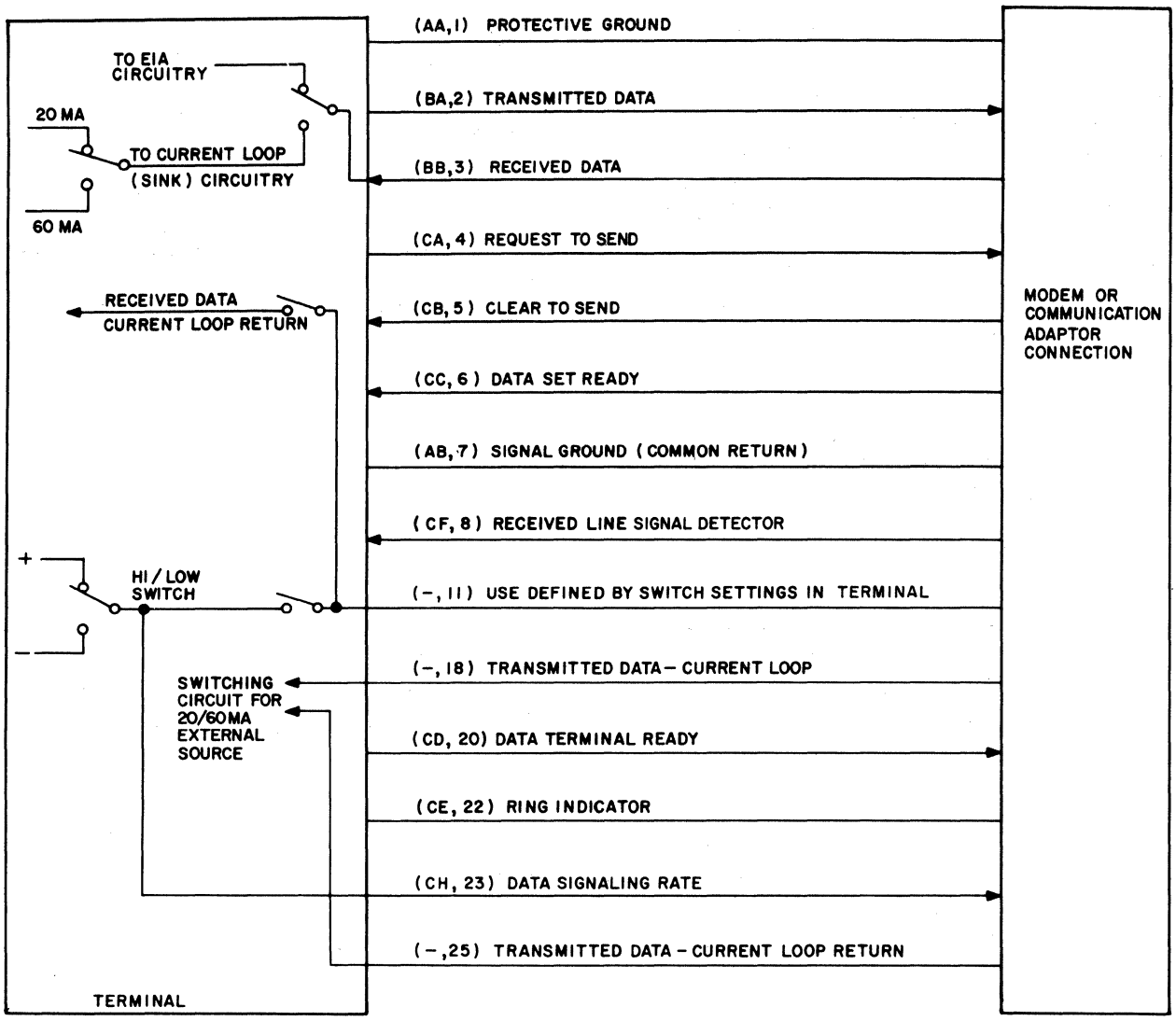


Figure 3-9 EIA Primary I/O Communication Interface

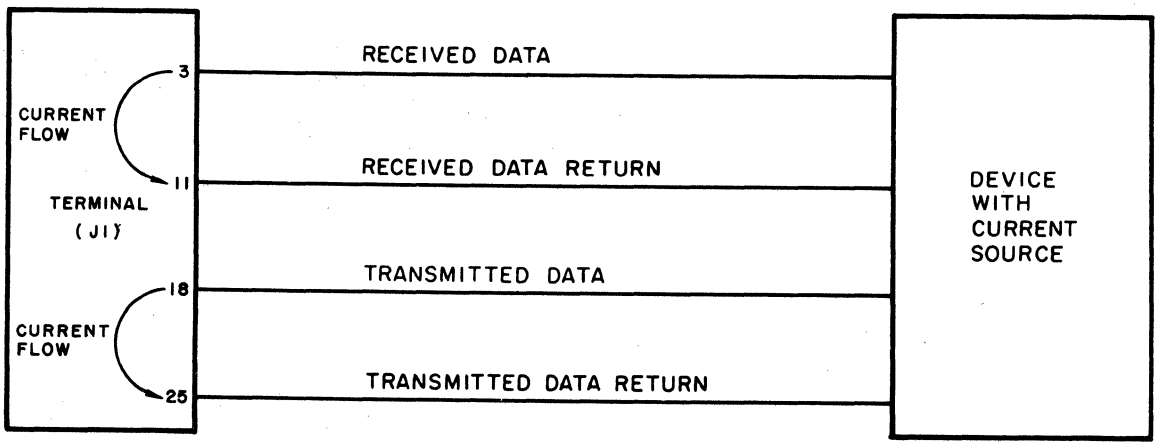


Figure 3-10 Current Loop Interface Signals

3.4.3 Interface Timing and Data Structure

The terminal provides configurable data rate, character structure, and character parity sense for both EIA and current loop interfaces. The following operating characteristics are selectable.

- Data Rate: 75, 110, 150, 300, 600, 1200, 1800, 2400, 4800, or 9600 baud.
- Character Structure: 10 bits (start, 7 data, parity, stop) or 11 bits (start, 7 data, parity, 2 stop).
- Parity Sense: odd, even, or mark (One) parity for 10- and 11-bit characters (mark parity for transmit, 'don't care' on receive).

3.4.4 Communication Procedure

The terminal does not use a formalized communication procedure; its communication functionality is similar to that of a TTY KSR. It is intended for use on point-to-point links only, and has no facilities for terminal addressing, polling, or selection.

In the half-duplex character mode, line turnaround is initiated by the first keyed data code, and the line is retained until the END OF MESSAGE key is depressed. The line is then released and turned around to receive data.

Block mode transmissions of displayed data are terminated with an ending character. This character can be any ASCII code in column 0 (bits 5, 6, and 7 equal to zero); however, the VIP7200 only uses NUL, ETX, EOT, LF, or CR. The receive portion of the cummunications line is blinded to all transmissions from the host while transmitting block data. Parity may be generated on transmitted data and checked on received data. Each received character is displayed, or activates the corresponding control function if the data bits correspond to one of the graphic or control characters recognized by the terminal.

3.5 AUXILIARY DEVICE INTERFACE

The terminal provides an auxiliary device interface (to the extension port) which is an extension of the communication interface described in subsection 3.4. The auxiliary interface is a full-duplex, limited-function EIA interface capable of operating at data rates up to 9600 baud. The auxiliary interface can be used to connect an input device, input/output device, or an output device (for example, a receive only printer) to the terminal. Interconnection distance between the terminal and the auxiliary device is limited to 50 feet.

The auxiliary device interface can be used when the communication interface is in either the EIA or current loop configuration. When the communication interface is in the current loop configuration, the terminal provides the current loop to EIA signal conversions required for the auxiliary interface.

3.5.1 Interface Signals

The auxiliary interface provides the EIA interface signals shown in Figure 3-11. The Request To Send and Data Terminal Ready signals are strapped permanently on by the terminal.

The Transmitted Data signal is produced by the terminal. It is derived and reproduced to match the data received by the terminal display logic. This data may be a combination of data received from the host system, data entered via the keyboard, data entered via the auxiliary device, and/or data transmitted from the display screen memory (depending upon the settings of the mode selection switches).

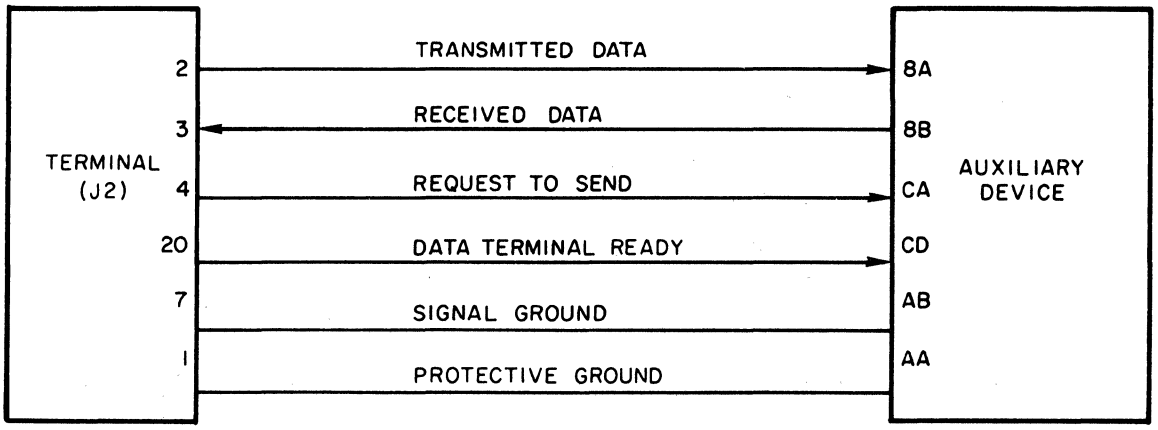


Figure 3-11 Auxiliary Interface EIA Signals

The auxiliary device extension part does not have any on/off control capabilities. Its prime use is to permit connection of an occasionally-used hard-copy printer. Some of the special edit character codes used for certain display CRT functions may cause undesirable printouts from a hard-copy printer. To prevent such occurrences, use the following guidelines.

1. When the CRT display is being used for composition and other display applications which use the edit features, the auxiliary printer should be manually switched to standby or OFF.
2. When messages are intended for hard-copy printout, and the host transmission includes special codes unique to the printer operation, the information and displayed data on the CRT should be ignored.
3. When messages are intended for hard-copy printout and CRT display, host transmission must be restricted to KSR33 ASCII subset of functions and codes.

The Received Data signal produced by the auxiliary device is reproduced by the terminal logic at the main communication interface as an output signal (in the same manner as if this data were generated via the keyboard).

The auxiliary interface does not provide Data Set Ready or Clear To Send signals. For auxiliary devices which require these signals, the corresponding interface leads must be strapped in the auxiliary device.

3.5.2 Interface Timing and Data Structure

Auxiliary interface timing and data structure must be provided by the auxiliary device. The configurable data rate, character structure, and character parity that are provided for the terminal communication interface control the auxiliary interface. All transmitted and received data signals are transferred between the terminal communication interface and auxiliary interface without modification.

The auxiliary device must operate with a data rate, character structure, and parity which are consistent with one of the selectable terminal configurations.

3.5.3 Auxiliary Devices

Examples of devices which can be supported by the terminal auxiliary interface are:

- TTY Model 33
- TTY Model 35
- TermiNet 300
- TermiNet 1200.
- PRU1001
- PRU1003
- PRU1005

In general, the supporting software must be aware of the auxiliary device characteristics since the level of support required may be different from that required by the terminal. For example, when data is sent to a terminal with an unbuffered printer attached as an auxiliary device, a time delay is required following a carriage return/line feed. Also, supporting software must manage any inconsistencies in escape sequences, automatic carriage return/line feeds, and block mode transmissions (from the display) used by the terminal and auxiliary device.

3.5.4 Auxiliary Device Operation

When operating with both the terminal and an auxiliary device, the operator should observe the following precautions.

1. No interlock is provided to prevent simultaneous data entry by both the terminal and an auxiliary input device. Therefore, the operator should not allow both input devices to be active at the same time.
2. If an auxiliary input/output device provides its own online/local mode selection (or equivalent), both the terminal and the auxiliary device should be set in the same operating mode.

3. The terminal does not provide operator controls to inhibit output to or input from the auxiliary device. If this feature is required, appropriate controls must be provided on the auxiliary device.

3.6 INTERFACE FUNCTIONALITY

Communication interface functionality, auxiliary interface functionality, and the interaction among the terminal display, keyboard, and the auxiliary device are dependent on the terminal operating mode. A brief description of the interface functionality in remote/full-duplex display mode, remote/half-duplex display mode, and local mode is given in the following subsections.

3.6.1 Remote/Full-Duplex Display Mode

Data received on the communication line is displayed on the terminal and sent to the auxiliary device.

Data entered via the terminal keyboard and data entered by the auxiliary device are transmitted on the communication line. When and if data is echoed back on the communication line, it is displayed on the terminal and sent to the auxiliary device.

3.6.2 Remote/Half-Duplex Display Mode

Data received on the communication line is displayed on the terminal and sent to the auxiliary device.

Data entered via the terminal keyboard is displayed on the terminal, sent to the auxiliary device, and transmitted on the communication line.

Data entered by the auxiliary device is displayed on the terminal, echoed back to the auxiliary device, and transmitted on the communication line.

NOTE

The communications line turnaround required for signal transmission is controlled by the display. If the auxiliary device initiates a message, the END OF MESSAGE key on the keyboard must be depressed to turn the line around before data can be received from the host.

3.6.3 Local Mode

Data is not transmitted on or accepted from the communication line. The communication interface Transmitted Data signal is held at logical mark (One).

Data entered via the terminal keyboard is displayed on the terminal and sent to the auxiliary device if the LOCAL COPY switch is in the LOCAL COPY position.

Data entered by the auxiliary device is displayed on the terminal and echoed back to the auxiliary device.

NOTE

The auxiliary communication interface Data Terminal Ready signal remains "on" even though in this mode the terminal neither transmits data nor receives data if sent by the host.

3.7 PERFORMANCE

3.7.1 Communication Data Rate

The terminal operates at data rates up to 9600 baud. The corresponding maximum character throughput rates for 9-, 10-, and 11-bit characters are 1067, 960, and 873 cps, respectively, at 9600 baud.

These throughput rates represent one-way data transfe (either input or output). Since the terminal communication interface can be operated full duplex, the maximum total throughput capability for simultaneous input/output is double the above numbers. However, since the keyboard data rate is negligible, the terminal cannot approach the maximum transmitted data rate unless an auxiliary input device is used. With an auxiliary input device, the terminal can simultaneously transmit and receive at data rates up to 9600 baud.

3.7.2 CRT Control Functions

The terminal provides a number of CRT control functions which are executed when the corresponding control character or escape sequences are received. The carriage return, line feed, cursor movement, bell, erase end-of-line, intensity control, and direct cursor addressing require negligible time for execution. Screen and page erase are the only CRT control functions which require a time delay.

3.7.2.1 Time Delay for Erase Functions

The time delay required for the screen erase (clear screen) is one null at 9600 baud. All other baud rates do not require a time delay. Since the erase end-of-page uses the same mechanism for erasing the screen, it requires the same delay.

3.7.2.2 CRT Full Screen Display Times

The maximum times required to transmit a full screen of data to the terminal are given in Table 3-7 for each of the terminal data rates. These times are based on a 24-line display, 80 characters per line, and an 11-bit character size. These figures can be used to calculate transmission times for other configurations. For example, for 60 characters per line (including CR/LF), 10-bit character size at 300 baud transmission rate, the time required to transmit 24 lines is:

$$70.4 \text{ seconds} \times \frac{60}{80} \times \frac{10}{11} = 48 \text{ seconds}$$

Table 3-7 Maximum Times for CRT Full Screen Display

DATA RATE (baud)	MAXIMUM TIME FOR FULL SCREEN DISPLAY (seconds)
75	223.3
110	192.0
150	140.9
300	70.4
600	35.2
1200	17.6
1800	13.2
2400	8.8
4800	4.4
9600	2.2

IV THEORY OF OPERATION - PRINCIPLES

This section describes the theory of operation of the terminal at the major block diagram level (see Figure 4-1). A discussion of terminal operation at an intermediate block diagram level is presented in Section VI.

Data displayed on the CRT may come from the keyboard, the host system, or an auxiliary input device (if installed) connected to the terminal extension port.

Data from the host system enters the terminal through the EIA receiver or the current loop receiver. Depending on host system and terminal configurations, the 9-, 10-, or 11-bit character data is serially received from the host system through the EIA or current loop interface receiver. The auxiliary device transfers data into this same interface block through a limited EIA receiver (full modem control is missing). The Universal Asynchronous Receiver/ Transmitter (UAR/T) removes the start, parity, and stop bits from each character, may or may not check for parity, and transfers the remaining 7 bits of data into the video RAM whose address is determined by the cursor position. If parity is enabled and a parity error is detected, the control logic substitutes a question mark character into this address in place of the received character. As this address is selected by the video address scanning, the data is shifted into a video generator where the corresponding dot matrix is generated and sent on to the CRT. A clock function provides timing for horizontal and vertical synchronization, and for the selectable baud rate.

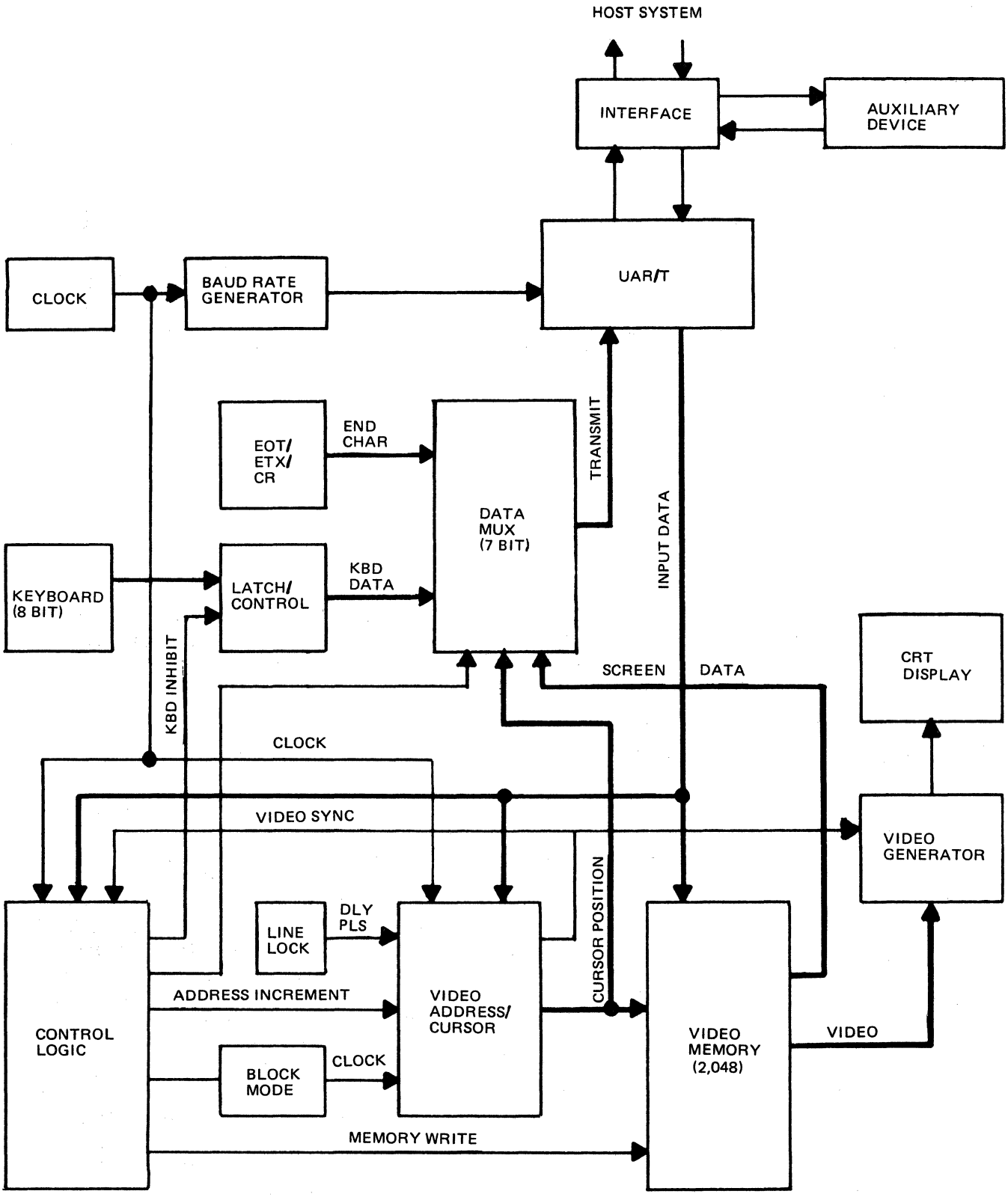


Figure 4-1 VIP7200 Major Block Diagram

The erase function is basically a subsection of the video memory write that is speeded up to allow a faster scan through the memory locations, writing blank characters in chosen locations. The control logic determines the start and stop addresses of erase writes, and controls the rate at which locations are addressed.

In normal on-line operation, the keyboard generates an 8-bit character which is converted to one or more 7-bit ASCII characters by the latch control logic and the data multiplexer. These 7-bit characters may be one-, two-, or four-character generations. These character generations are accepted by the UAR/T which adds the proper start, parity, and stop bits. The UAR/T then sends these 9-, 10-, or 11-bit characters serially to the appropriate interface transmitter for transmission to the host system and/or auxiliary device. The data from the keyboard may be internally connected back through the UAR/T to the display, or may be echoed back by the host and processed as received data. The block mode controls the transmission of video memory through the data multiplexer, and the control logic adds the proper terminating character to the end of the transmission. The cursor address may also be transmitted and received on the data channel with proper control character sequences.

Data entered via an auxiliary device is sent to the host system through the appropriate interface transmitter and is also displayed on the CRT in the same manner as keyboard data. If the auxiliary device has output capability, all data sent to or received from the host is also presented to the device. Regardless of the type of interface used between the terminal and the host, an EIA interface is present at the auxiliary device extension port.

In all modes except echoplex, data is displayed directly on the CRT rather than being echoed back by the host system. A buffered mode which disallows all terminal transmissions except block mode transmissions is available for special editing functions.

V
THEORY OF OPERATION - CYCLE FLOW

Not applicable.

VI THEORY OF OPERATION - HARDWARE IMPLEMENTATION

This section describes the theory of operation of the terminal at the intermediate block diagram level (see Figure 6-1). If more detailed information is required, refer to the schematics, logic block diagrams, and timing diagrams contained in Section XI.

This section is organized into the following major subsections.

- Clock function
- Transmit function
- Receive function
- Cursor control function
- Block control function
- Display function
- Auxiliary devices
- CRT display.

6.1 CLOCK FUNCTION

The clock function provides the basic timing required by the Universal Asynchronous Receive/Transmitter (UAR/T) to transmit and receive information. It also times the horizontal and vertical counters which provide read addressing of the Random Access Memories (RAMs) and synchronization of the CRT display.

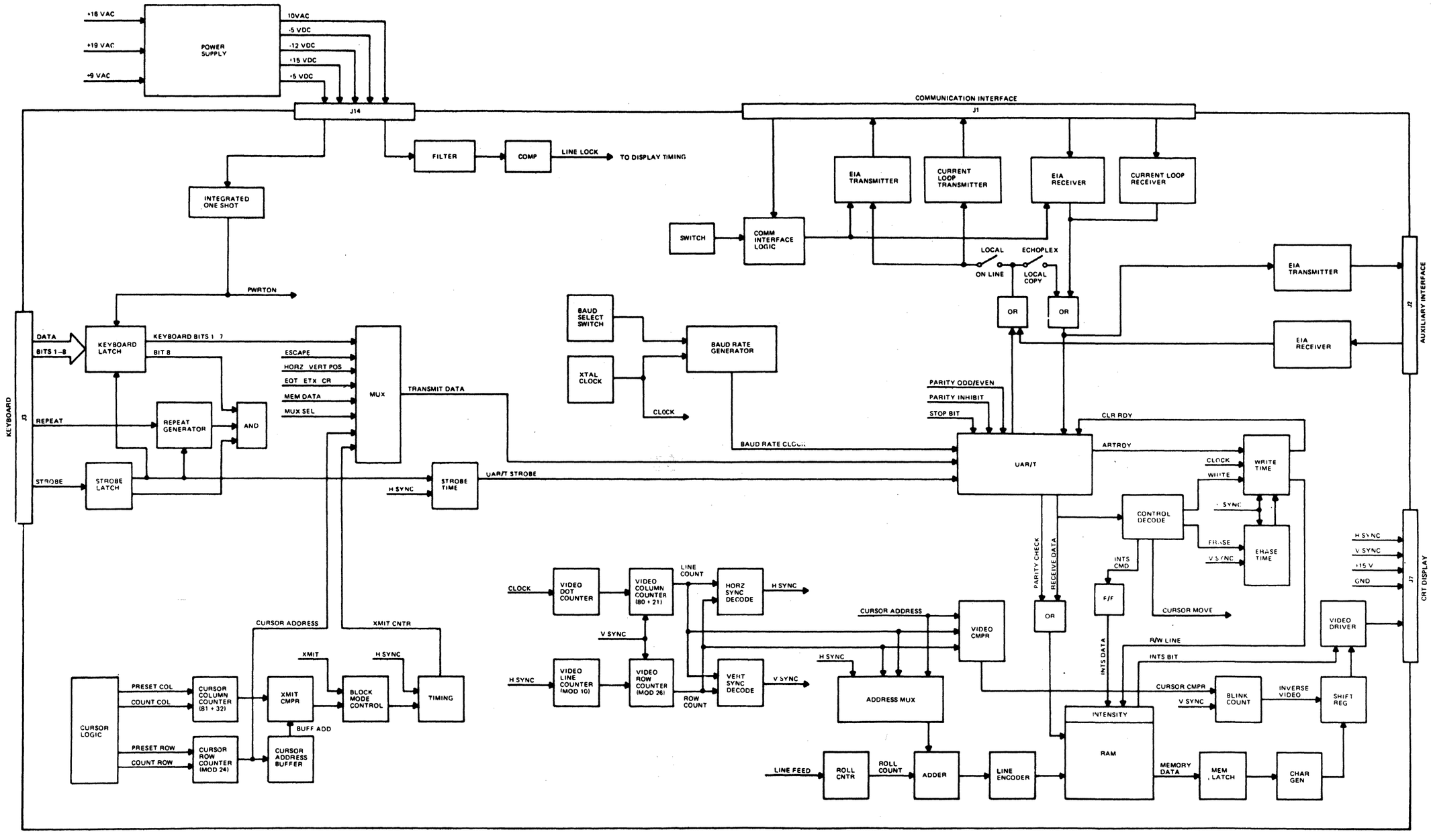


Figure 6-1 VIP7200 Intermediate Block Diagram

6.1.1 Oscillator

The oscillator is a simple circuit using ac coupling between inverters with the crystal in the feedback path. The fundamental frequency is 11.142 MHz ±0.005%. This frequency allows the circuitry to be switched from a 60-Hz to a 50-Hz refresh rate with an integral number of raster lines plus a delay time required for line lock: 60 Hz = 260 raster lines and 50 Hz = 310 raster lines. A filter and comparator are used on the line frequency to generate a line-lock function which locks the refresh rate to the line frequency in order to improve the quality of the display.

The baud rate generator clock is derived from this same clock by dividing by 12.

6.1.2 Baud Rate Generator

The baud rate generator contains count-down circuits which are programmed by a binary input code. The output of this generator provides the common transmit and receive clock for the Universal Asynchronous Receiver/Transmitter (UAR/T). This output is 16 times the required baud rate. The baud rate select switch settings and their associated baud rates are:

SWITCH SETTING	BAUD RATE
2	75
3	110
5	150
6	300
7	600
9	1200
10	1800
11	2400
13	4800
15	9600

6.1.3 Power Turn On

The Power Turn On signal (PWRTON) is generated by the integrating single-shot when power to the terminal is turned on. PWRTON resets the required counters, clears the UAR/T, and causes the space encoder to write spaces in all data character locations in the RAM, thus providing a clear screen with the cursor in the home position.

6.2 TRANSMIT FUNCTION

The transmit function starts with the generation of information at the keyboard and ends with transmission of this information on the communication interface to the host system. Within this function, the information is organized into the character bit structure required by the host system.

6.2.1 Keyboard Input

Depressing a key on the keyboard generates one of the 256 modified ASCII 8-bit codes plus a strobe. In addition, repeat, break, end-of-message, and one blank key individually present a high or low dc output level to the keyboard interface.

When a key is depressed, a ROM encoder within the keyboard converts the keystroke into an 8-bit parallel code which is then strobed into the keyboard latch. If the repeat key is depressed (making the repeat signal true) prior to depressing a character key, the repeat control continuously generates strobes which cause data to be sent to the UAR/T; this action continues as long as the repeat key is held down. Without the repeat key, a single strobe generation cycle is initiated to the UAR/T.

The break key dc output is sent to the communication interface transmitters to activate the interrupt function for 130 ± 10 milliseconds.

The end-of-message dc output is not acted upon unless the terminal is operating in a half-duplex mode on a modem with line turnaround capability. In this mode, the end-of-message key lowers Request To Send to the modem.

The blank key dc output is not acted upon unless an option (such as answer-back) is provided at some future time.

6.2.2 Keyboard Latch

The keyboard latch is a register which holds the keyboard data until it has been sent through the UAR/T. This function is necessary because the 8-bit keyboard code must be converted to one or two 7-bit ASCII code words before being sent through the UAR/T. The one 7-bit ASCII code word may be any valid code; the two 7-bit words consist of an escape character code and a noncontrol ASCII character code. Since bit stripping is used to determine if a two-character sequence is coming, strobes are ignored until the contents of the latch have been transferred to the UAR/T register.

With the keyboard latch are multiplexers which can load the UAR/T with keyboard data, cursor address data, or memory data. These functions are dependent upon the state of the control logic and internal timings. Also, the keyboard strobe is latched and retained to allow loading the UAR/T synchronously with the video timing as required for UAR/T transmisstions from video memory.

6.2.3 Universal Asynchronous Receiver/ Transmitter (UAR/T)

The Universal Asynchronous Receiver/Transmitter (UAR/T) receives 7-bit parallel data from the multiplexer. Depending on the setting of the configuration switches, which in turn is dependent on the requirements of the host system, the UAR/T adds a start bit, a parity bit, and 1 or 2 stop bits to each character. The resultant 10- or 11-bit character is then shifted out serially to the communication interface transmitters at a rate established by the baud

rate generator. There are three possible parity selections: (1) even parity, (2) odd parity, and (3) mark (always One) parity. Mark parity is obtained only with a 10-bit character having 2 stop bits (first stop bit effectively becomes the mark parity bit).

6.2.4 Communication Interface Transmitters

The appropriate communication interface transmitter, as determined by the terminal configuration, receives 9-, 10- or 11-bit characters serially from the UAR/T and transmits them over the communication line.

When the EIA transmitter is used, the data from the UAR/T is changed from +5 volts to -12 volts for a mark state (One bit) and from 0 volts to +12 volts for a space state (Zero bit) prior to being sent out on the communication line.

When the current loop transmitter is used, the data from the UAR/T is changed from +5 volts to a 20- or 60-milliampere current flow for a mark state (One bit) and from 0 volts to a no-current flow for a space state (Zero bit). Whether a 20- or a 60-milliampere current loop is used depends on the terminal configuration.

The terminal does not provide power or current limiting for the current loop interface; an external power source is required.

6.3 RECEIVE FUNCTION

The receive function starts with the receipt of incoming information from the communication interface and ends when the data is sent to the Random Access Memories (RAMs) to be processed for display by the CRT. Within this function, control characters are separated from data characters and are acted upon to provide cursor positioning (the basis for character positioning), dual intensity, and block transmission information to the display and addressing functions.

6.3.1 Communication Interface Receivers

Data from the communication line is received by either the EIA or the current loop receiver as determined by the terminal configuration.

When the EIA receiver is used, the data from the communication line is changed from -12 volts to +5 volts for a mark state (One bit) and from +12 volts to 0 volts for a space state (Zero bit) before being sent to the UAR/T.

When the current loop receiver is used, the data from the communication line is changed from a 20- or 60-milliampere current flow to +5 volts for a mark state (One bit) and from no-current flow to 0 volts for a space state (Zero bit) before being sent to the UAR/T.

6.3.2 Universal Asynchronous Receiver/ Transmitter (UAR/T)

Information coming serially from the EIA or current loop receiver to the UAR/T consists of a start bit, a 7-bit data or control character, a parity bit (if used), and 1 or 2 stop bits. The UAR/T strips off the start, parity, and stop bits, loads the 7-bit data or control character into an internal buffer register, and sends a data ready signal to the data ready control. The parity bit is latched into the parity bit buffer if the parity check switch is set. The type of parity (odd or even) is determined by the parity select switch: open selects even parity and closed selects odd parity.

6.3.3 Character Decoding

Every output character from the UAR/T is checked by a decoder to determine whether it is a data character or a control character. If it is not found to be a control character, it is assumed to be a data character (the one exception is the DEL character which is ignored).

6.3.3.1 Control Characters

If the character received from the UAR/T by the decoder is found to be a control character, as determined by bits 6 and 7 being Zeros, the write into RAM sequence is inhibited, thus preventing a control character from being written into the RAM. The control functions are accomplished as described in the following paragraphs.

Bell

An audible alarm is sounded on receipt of the BEL control character. It also sounds on the first keystroke after the cursor has entered the area between columns 72 and 80.

Line Feed

When the line feed control character is received, the cursor counter is incremented one line count (cursor on display drops one line) except in line 24. In the roll mode with the cursor in line 24, the line feed adder register is incremented changing the row address in the RAM and thus causing the display to roll up one line with the old top line becoming the new bottom line. The space encoder then loads a row of spaces into the RAM for the new bottom line, thus clearing it of previous data. In the page mode and with the cursor in line 24, the line feed character is ignored.

Carriage Return

The carriage return control character resets the cursor column counter forcing the cursor back to the first position of its present line. If there is a character in the first position which is covered by the cursor, it will be displayed in inverse video.

Escape

The escape character denotes the beginning of a multiple character command sequence. The decode of the escape character sets a mode flip-flop (reset at the end of the next decoded character) that is used with the next character to form the specific command (refer to subsection 3.3.3).

6.3.3.2 Data Character

The 7-bit character in the UAR/T buffer register is always presented to the RAM except when a line of spaces is being written. If the character is a control character or control sequence (subsection 6.3.3.1), the write into RAM function is inhibited, thus preventing those character(s) from being written. If the character is not a control character or control sequence, it is assumed to be a data character and it is allowed by the RAM write control to be written into the RAM at the memory location designated by the cursor position. The write timing function allows data to be written only during horizontal sync (scan retrace) time.

For uppercase only terminals, the 7-bit data character is written into the RAM as a 6-bit character. This is done by dropping bit 6 and inverting bit 7 in its place. Thus, any lowercase character received by the terminal will be "folded over" to become an uppercase character (an exception is the DEL character which is ignored).

6.4 CURSOR CONTROL FUNCTION

The cursor control function consists of the cursor column counter, cursor row counter, and the logic to load, count up, count down, and reset these counters.

6.4.1 Cursor Column Counter

The cursor column counter uses the display command CUL to count down (move cursor left) and CUR or a character written in the display to count up (move cursor right). The first column is a preset count of 32 with count 112 being column 81 (a phantom column off the display). The host system can change the cursor horizontal position with the HVP display command which loads this counter with a value determined by the Px portion of the command.

Additional logic presets counts 32 and 111 into the counter for cursor wraparounds (e.g., from column 81 to column 1 of the next line down, from column 1 to column 81 of the next line up, etc.). A carriage return also presets the counter to 32.

6.4.2 Cursor Row Counter

The cursor row counter uses the display command CUU to count down (move cursor up) and CUD or line feed to count up (move cursor down). For the Py portion of the HVP display command, the offset of 32 is ignored and only the first five least significant bits are used. The presets are 0 and 23 corresponding to rows 1 and 24, respectively.

Additional logic increments or decrements the row counter on cursor column wraparounds, or presets 0 or 23 for row counter wraparounds and home to end of display wraparounds.

6.4.3 Cursor Logic

The cursor logic controls the line feed in row 24 of page mode displays, steers the wraparound signals, removes any timing conflicts, and synchronizes events. It also decodes cursor counts for wraparound functions and for the automatic carriage return/line feed function which the cursor counter performs.

6.5 BLOCK CONTROL FUNCTION

The block control function contains the logic which controls the timing and data flow from the RAM to the UAR/T during block data transmissions. It consists of logic for page characterization, line characterization, and end-of-transmission character generation.

6.5.1 Page Characterization

The block of data transferred during a page transmission is all data between home and the cursor. Upon initiation, the value of the cursor location is loaded into a buffer register, and the cursor counter is set to home. The UAR/T is strobed and the cursor counter incremented until the cursor counter and the buffer register are equal. At this time the end-of-transmission character generation is initiated.

6.5.2. Line Characterization

The block of data transferred during a line transmission is all data between the beginning of the line and the cursor. Transmission proceeds similarly to page transmission except the cursor column counter is loaded to column 1 of the current line rather than home.

6.5.3 End-of-Transmission Character Generation

The block of data is multiplexed with a switch selectable end-of-transmission character. This character can be any ASCII code in column 0 (bits 5, 6, and 7 equal to zero); however, the VIP7200 only uses EOT, ETX, CR, NUL, or LF.

6.6 DISPLAY FUNCTION

The display function organizes data characters into a format which can be displayed on the CRT using standard television scanning techniques. The format consists of 24 horizontal rows of 80 characters each.

Each character within the row is displayed as a pattern of dots within a 7 by 10 matrix. The character itself uses an area of 5 by 7 dots for an uppercase character and 5 by 8 dots for a lowercase character; the unused area constitutes the spaces between adjacent characters and rows. Figure 6-2 depicts the display format and shows a sample dot pattern for a character position within the format.

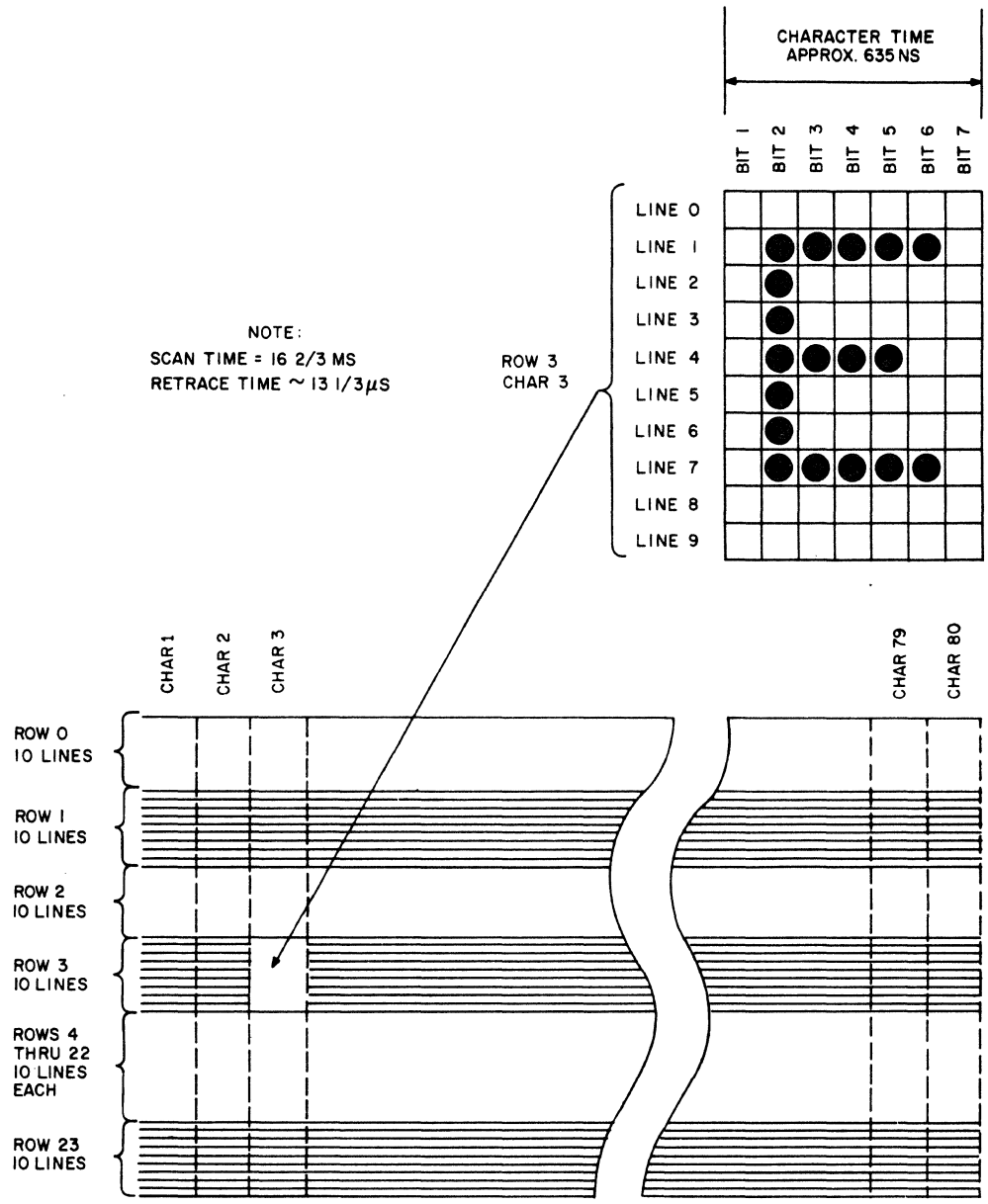


Figure 6-2 Display Format and Sample Dot Pattern

On the video display, the character matrix is formed by dot columns headed bit 1 through bit 7, and 10 horizontal raster lines (video scan lines) of the display row. As the electron beam scans from left to right, the character dot patterns are created by turning on the beam for the bits where the dots are to be formed.

Thus, the display function logic must convert the data character ASCII codes to dot pattern bits, and then send them to the CRT display along with the necessary timing information to turn the beam on at the appropriate positions as it scans each raster line.

6.6.1 Random Access Memory (RAM)

The RAM stores the data character codes (6 bits for uppercase only terminals, 7 bits for upper and lowercase terminals) for the entire display (12 rows per RAM). When power is first turned on, a space code is written into every memory location, thus providing an initially clear screen.

When characters are written into the RAM, the memory is addressed by the cursor counter. After a character has been written, the cursor counter is incremented so that the next character will be written in the next adjacent position to the right. In the case of the column 80 character position, the cursor column counter advances to count 112, waits for a display character, and then resets to 32 (column 0), advancing the cursor row counter before writing the character into the RAM. Characters can only be written into the RAM during a horizontal sync (horizontal retrace) time since read addressing is taking place at all other times.

When characters are read from the RAM to be displayed on the CRT, the memory is addressed by the video column and row counter. These counters sequentially address every location in memory which represents a physical location on the display. A character is read out and displayed at each character time (approximately every 635 nanoseconds).

6.6.2 RAM Addressing

The RAM is addressed by 10 address lines. The 24 display rows require five address lines, and the 80 columns require seven. Since only 10 lines are available, the total row and column addresses must be reduced from 12 to 10 address inputs. Additionally, the memory address is changed each time a line feed command increments the display roll counter, rolling the display data up one line. These addressing requirements are met by adding the display roll counter and the display/cursor row multiplexer before feeding these signals to the address line reduction logic.

The encoder is used in conjunction with the address adder so that as the binary row addresses are changed by a line feed (roll), binary row 23 + 1 becomes binary row 0 (not 24), row 23 + 2 becomes row 1, etc.

The display/cursor multiplexer changes the source of the address from cursor counters (memory write) during horizontal sync to video counters (memory read) during all other times. The exceptions are the erase functions which erase (write space codes) into the memory during video counter times. These erase functions are: (1) line feed roll which erases the new line 24, (2) erase in line (EL) which erases from the cursor to the end of the line, and (3) erase in display (ED) which erases from the cursor to the end of the page.

6.6.3 Dot Counter

The dot counter provides the timing required for each character display time. The fundamental clock frequency of 11.142 MHz is divided by seven to provide the five dot times for display plus the two dot times which separate adjacent characters (see Figure 6-2) to the video data shift register. The output of this counter clocks the column counter at the count of seven.

6.6.4 Column Counter

The column counter defines each of 80 column positions along the scan line. In addition, it counts another 21 columns of time for the horizontal sync (retrace). Characters and character dot patterns are loaded by a decode from this counter. It also provides a signal for video blanking during horizontal retrace time and a column count to the cursor comparator to determine where the cursor is displayed. The output of this counter clocks the video line counter at the count of 111.

6.6.5 Video Line Counter

The video line counter defines each of the 10 raster lines within a character row. As characters are read out of the RAM at each character time, a dot pattern is generated (see Figure 6-2). This counter determines which line of the dot pattern is to be loaded from the character generator into the video data shift register. It also provides a blanking signal during the scanning of the two lines used for vertical spacing between characters. The output of this counter clocks the video row counter at the count of 10.

6.6.6 Video Row Counter

The video row counter defines each of the 24 rows of the display. In addition, it counts another two rows of time for the vertical sync (retrace). The vertical row count changes from 26 to 31 for 60 Hz and 50 Hz, respectively. The additional four row counts for a 50-Hz terminal are also blanked with the horizontal blanking (retrace blanking).

6.6.7 Cursor Compare

The cursor counter is continuously compared with the RAM address counters. At the time of compare, the video data shift register output is inverted to generate the blinking reverse video which locates the cursor position on the screen. The blink is timed for counting down retrace signals to generate the blink timing.

6.6.8 Video Generation

The character codes (6 bits for uppercase only terminals, 7 bits for upper and lowercase terminals) read out of the RAM are presented through the output data register to the video character generator. The output of the character generator is a 5-bit representation for each of the seven lines of the 5 by 7 dot pattern matrix (eight

lines for 5 by 8 lowercase matrix). The video line counter determines which of the seven (or eight) possible outputs is required for the video raster line being scanned. This output is then loaded into the video data shift register where the bits for the spaces between characters (bits 6 and 7) are added. The 7-bit output is then shifted out serially to the CRT display as clocked by the dot counter.

The blanking control prevents the CRT beam from being turned on during horizontal and vertical retrace and during scans of row lines 0, 8, and 9 (0 and 9 for lowercase) which form the vertical spacing between rows.

6.6.9 Dual Intensity

The dual intensity function is controlled by a memory bit that is addressed in the same manner as the RAM except that the data written into memory is controlled by two control sequences: Set High Intensity (SHI) and Set Low Intensity (SLI). These commands reset and set, respectively, a flip-flop output that is written into the memory during all memory write sequences. The memory is read during all character times, and the output controls the intensity level of the video drive circuit. SHI is the normal display mode, and the screen erase function (RIS) writes the memory with the high intensity level. The low intensity level is used to give a background effect for a forms mode of display.

6.7 AUXILIARY DEVICE INTERFACE

The auxiliary device interface allows an input, output, or input/output device to be connected to the terminal. It consists of an EIA transmitter and an EIA receiver. The transmitter receives its input from the output of the communication interface receivers. The receiver sends its output to the input of the communication interface transmitter.

6.8 CRT DISPLAY

The CRT display receives its video, its horizontal and vertical synchronization signals from the terminal display function, and its +15 Vdc power from the terminal power supply function. The CRT display is shown in block diagram form in Figure 6-3, and schematically in Figure 6-4. Its theory of operation is discussed in the following subsections.

6.8.1 Video Amplifier

The video amplifier consists of Q101 and its associated circuitry.

The incoming video signal is applied to the display through the contrast control through R109 to the base of transistor Q101.

Transistor Q101 and its components comprise the video output driver with a gain of about 17. Q104, operating as a class B amplifier, remains cut off until a dc-coupled, positive-going

signal arrives at its base and turns on the transistor. R111 adds series feedback which makes the terminal-to-terminal voltage gain relatively independent of transistor variations as well as stabilizes the device against voltage and current changes caused by ambient temperature variations.

The negative-going signal at the collector of Q101 is dc-coupled to the cathode of the CRT. The class B biasing of the video driver allows a larger video output signal to modulate the CRT's cathode and results in a maximum available contrast ratio.

The overall brightness at the screen of the CRT is determined by the negative potential at the grid and is varied by the brightness control.

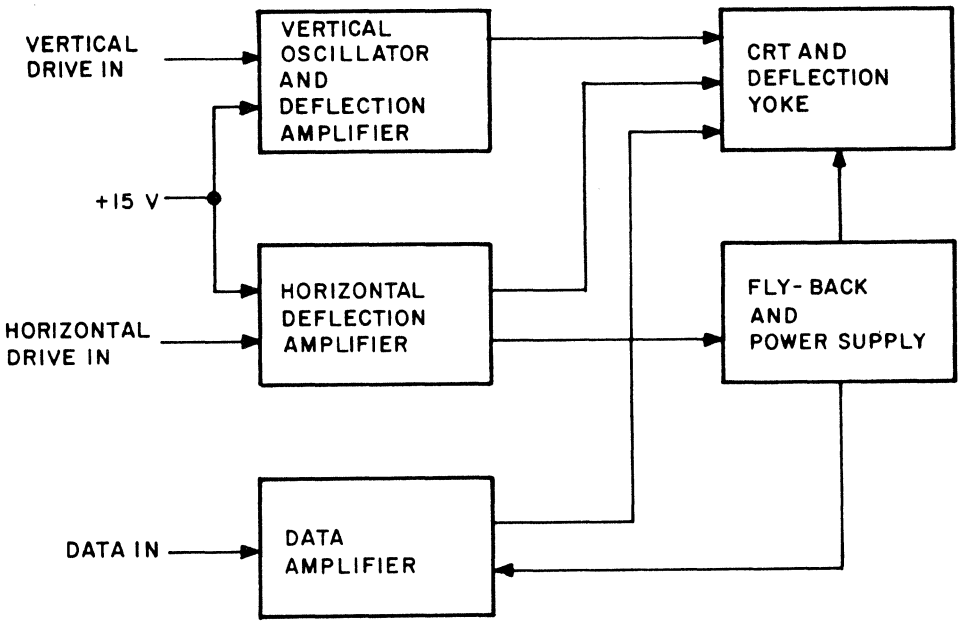


Figure 6-3 CRT Display Block Diagram

6.8.2 Vertical Deflection

Transistor Q102 is a programmable unijunction transistor, and together with its external circuitry, forms a relaxation oscillator operating at the vertical rate. Resistor R115, variable resistor R116, and capacitors C105 and C106 form an RC network providing proper timing.

When power is applied, C105 and C106 charge exponentially through R115 and R116 until the voltage at the junction of R116 and C105 equals the anode A firing voltage. At this time, one of the unijunction's diodes that is connected between the anode and anode

gate G becomes forward-biased, allowing the capacitors to discharge through another diode junction between the anode gate and the cathode K and then on through R120.

R117 and R118 control the voltage at which the diode (anode-to-anode gate) becomes forward-biased. This feature programs the firing of Q102 and prevents the unijunction from controlling this parameter. Therefore, the charging of firing points from one device to another, together with the temperature dependency of this parameter, is no longer a problem as it can be with conventional unijunction transistors.

The vertical oscillator is synchronized externally to the vertical interval from the vertical drive pulse at R113. At the time of the vertical interval, an external negative pulse is applied through R113, C104, and CR101 to the gate of Q102, causing the firing level of the unijunction to decrease.

The sawtooth voltage at the anode of Q102 is directly coupled to the base of Q103. Q103 is a driver amplifier and has two transistors wired as a Darlington pair; their input and output leads exit as a three-terminal device. This device exhibits a high in-out impedance to Q102, and thereby maintains excellent impedance isolation between Q102 and Q104.

The output waveform from the unijunction oscillator is not suitable, as yet, to produce a satisfactory vertical sweep. Such a waveform would produce severe stretching at the top of the picture and compression at the bottom. C105 and C106 modify the output waveform to produce satisfactory linearity. The sawtooth waveform output at Q103 is coupled through R122, the vertical linearity control R121, and on to C106 where the waveform is shaped into a parabola. This parabolic waveform is then added to the oscillator's waveform, changing its slope. Slope change rate is determined by the position of the variable resistor R121.

Q103 supplies base current through R123 and R124 to the vertical output transistor, Q104. Height control R124 varies the amplitude of the sawtooth voltage present at the base of Q104, and therefore, varies the size of the vertical raster on the CRT.

The vertical output stage, Q104, uses a power type transistor which operates as a Class A amplifier. No output transformer is required since the output impedance of the transistor permits a proper impedance match with the yoke connected directly to the collector. C107 is a dc-blocking capacitor which allows only ac voltages to produce yoke current. L1 is a relatively high impedance compared to the yoke inductance. During retrace time, a large positive pulse is developed by L1 which reverses the current through the yoke and moves the beam from the bottom of the screen to the top. Resistor R126 prevents oscillations by providing damping across the vertical deflection coils.

6.8.3 Horizontal Deflection

To obtain a signal appropriate for driving Q106, the horizontal output transistor, a driver stage consisting of Q105 and T101 is used. The circuitry associated with Q105 and Q106 has been designed to optimize the efficiency and reliability of the horizontal deflection circuits.

A positive-going pulse is coupled through R127 to the base of Q105. The amplitude and duty cycle of this waveform must be as indicated in the electrical specifications (refer to Section XI) for proper circuit operation.

The driver stage is either cut off or driven into saturation by the base signal. The output signal appears as a rectangular waveform and is transformer-coupled to the base of the horizontal output stage. The polarity of the voltage at the secondary of the driver transformer is chosen such that Q106 is cut off when Q105 conducts and vice versa.

During conduction of the driver transistor, energy is stored in the coupling transformer. The voltage at the secondary is then positive and keeps Q106 cut off. As soon as the primary current of T101 is interrupted due to the base signal driving Q105 into cut off, the secondary voltage changes polarity. Q106 starts conducting, and its base current flows. This gradually decreases at a rate determined by the transformer inductance and circuit resistance.

The horizontal output stage has four main functions: to supply the yoke with the correct horizontal scanning currents; to develop a +400-Vdc supply voltage for use with the CRT; to develop a +34-Vdc supply voltage for the video output stage; and to develop a -160 Vdc for the CRT bias.

Q106 acts as a switch which is turned on or off by the rectangular waveform on the base. When Q106 is turned on, the supply voltage plus the charge on C113 causes yoke current to increase in a linear manner and moves the beam from near the center of the screen to the right side. At this time, the transistor is turned off by a positive voltage on its base which causes the output circuit to oscillate. A high reactive voltage in the form of a half-cycle negative voltage pulse is developed by the yoke's inductance and the primary of T2. The peak magnetic energy which was stored in the yoke during scan time is then transferred to C109 and the yoke's distributed capacity. During this cycle, the beam is returned to the center of the screen.

The distributed capacity now discharges into the yoke and induces a current in a direction opposite to the current of the previous part of the cycle. The magnetic field thus created around the yoke moves the scanning beam to the left of the screen.

After slightly more than half a cycle, the voltage across C109 biases the damper diode CR103 into conduction and prevents the flyback pulse from oscillating. The magnetic energy that was stored in the yoke from the discharge of the distributed capacity is released

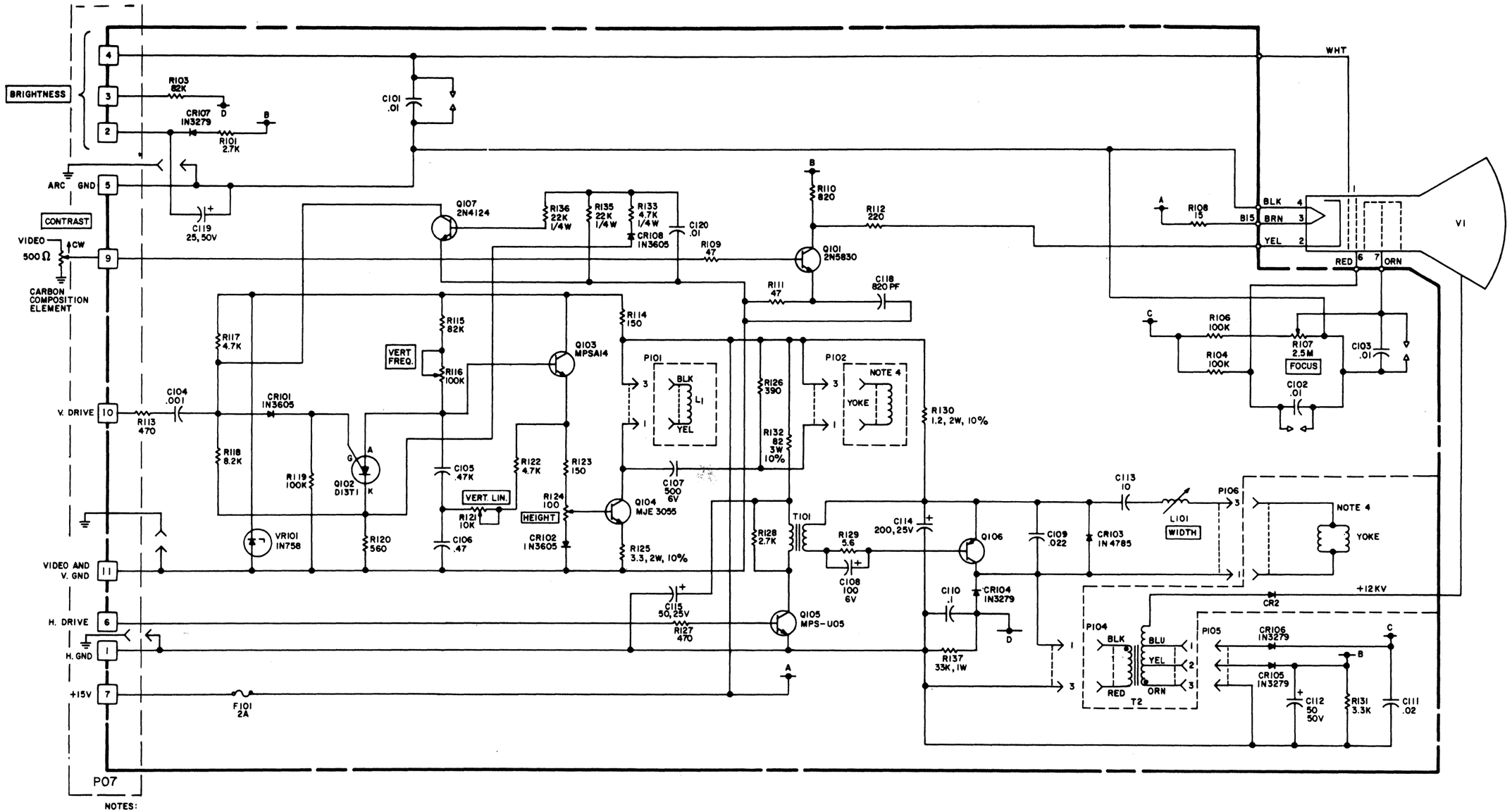
to provide sweep for the first half of scan and to charge C113 through the rectifying action of the damper diode. The beam is then at the center of the screen. The cycle will repeat as soon as the base voltage of Q106 becomes negative.

C113, in series with the yoke, also serves to block dc currents through the yoke and to provide "S" shaping of the current waveform. "S" shaping compensates for stretching at the left and right sides of the picture tube because the curvature of the CRT face and the deflected beam do not describe the same arc.

L101 is an adjustable width control placed in series with the horizontal deflection coils. The variable inductive reactance allows a greater or lesser amount of the deflection current to flow through the horizontal yoke and, therefore, varies the width of the horizontal scan.

The negative flyback pulse developed during horizontal retrace time is rectified by CR104 and filtered by C110. This produces approximately -160 Vdc which is coupled through the brightness control to the cathode of the CRT (V1).

This same pulse is transformer-coupled to the secondary transformer T2 where it is rectified by CR2, CR106, and CR105 to produce rectified voltages of approximately 12kV, +400 Vdc, and +34 Vdc, respectively. The 12kV is the anode voltage for the CRT, and the +400 Vdc serves as the source voltage for grids No. 2 and 4 (focus grid) of the CRT. The +34-Vdc potential is the supply voltage for the video output amplifier, Q101.



NOTES:

1. UNLESS OTHERWISE SPECIFIED: ALL RESISTORS ARE 1/2W ± 5%, ALL CAPACITORS ARE IN μF.
2. ⟨ ← DENOTES MOLEX PIN CONNECTOR.
3. □ DENOTES PRINTED CIRCUIT CARD EDGE CONNECTOR.
4. YOKE LEAD IDENTIFICATION: P106 - BLUE AND RED LEADS, P102 - BROWN AND YELLOW LEADS.

TEST POINT	VOLTAGE
A	+15
B	+34
C	+400
D	-180

MOLEX CONNECTOR

Figure 6-4 CRT Display Schematic Diagram

VII FAULT DIAGNOSIS

This section contains both off-line and on-line diagnostic procedures which can isolate a single VIP7200 failure to an Optimum Replaceable Unit (ORU). Specifications for the on-line program used with the on-line procedure are also included. The decision to use either the off-line or the on-line procedure will depend on the availability of a host computer system (and program) and/or the thoroughness with which the VIP7200 must be exercised to detect and isolate a faulty ORU. Both procedures require approximately the same amount of time (at a line speed of 300 baud, however, the off-line procedure exercises approximately 90% of the unit, whereas the on-line exercises nearly 100%).

The ORUs for the VIP7200 are (in decreasing order of overall failure rate):

- CRT display
- Keyboard/function pad
- Logic PWA
- Power supply PWA
- Power transformer
- EMI filter
- Front panel indicators, switches, and cable.

Replacement procedures for these ORUs are provided in Section VIII of this manual.

7.1 OFF-LINE DIAGNOSTIC PROCEDURES

These procedures are designed to test the terminal with increasingly rigorous tests. The first level of testing is simple,

operator-generated, keyboard-to-display tests. These procedures require no external device although references are made to an auxiliary device which may be used if it is available. Similarly, some of these procedures make use of a remote receiver and transmitter, if available, to aid in better fault isolation. The most rigorous level of testing is designed for use by a Field Engineering Representative (FER).

It is assumed that the operator has made a reasonable effort to verify that the problem is not a mistake in operating procedure. The quickest way to verify the terminal is to swap it with another terminal if one is available at the site.

Before these procedures are used, however, perform the following checks.

- Is power available to the terminal? Check the power source, the power plug, the POWER ON/OFF switch, and the fuse on the back of the terminal.
- Check the data set and keyboard connectors to be sure they are properly installed.
- Check the ON LINE/LOCAL switch. It should be set to ON LINE for normal operation.
- Check the BRIGHTNESS control to be sure that it is turned up enough to get a display.
- Check the BAUD RATE selection switch for the proper setting.
- Check the STOP BIT switch for the proper setting.
- FERs should refer to Section IX Installation, and check to be sure that the terminal is properly configured for its current application.

The fault diagnosis procedures contained in the following subsections function as a flow chart; i.e., the user is often directed to advance to another procedure and then return to complete the original procedure. The user should follow the directions in each applicable procedure starting with Blank Screen. If a procedure resolves a failure to more than one possible ORU, a number following each identified ORU indicates the relative probability of failure. For example, CRT display chassis (8) or PWA (1) means that the CRT display chassis is eight times more likely to be faulty than the PWA. In these cases, the user is directed to subsection 7.1.10 which contains FER procedures to further isolate a fault to one of the multiple ORUs. Usually an oscilloscope will be required to use those procedures.

7.1.1 Blank Screen

Perform the following procedure to test a blank screen.

1. Turn terminal off (if already on) and then on again. Select LOCAL mode and LOCAL COPY on terminal, and set auxiliary device (if attached) to receive from terminal. Allow a few minutes for CRT display to warm up if terminal had previously been off.

2. Terminal should have a blank screen with a bright blinking cursor (nonblinking cursor available) on top line at left-hand side of screen (home position). If true, go to video line control procedure in subsection 7.1.2.

3. If terminal's screen contains random data or if cursor is at a position other than home position, replace logic PWA.

4. If terminal does not have a blank screen with a bright cursor in home position, turn BRIGHTNESS control clockwise as far as it will go. A raster (horizontal scan lines in image area of screen) should appear. If raster appears, turn BRIGHTNESS control counterclockwise until raster just disappears, and then go to video line control procedure in subsection 7.1.2.

5. If raster appears on screen but is very dim, distorted, or not centered, faulty ORU may be CRT display chassis (80) or supply PWA (1). If further resolution is required, go to subsection 7.1.11.

6. If raster still does not appear on screen, type CTL-G. Audible alarm should sound.

7. If audible alarm sounds, power is available to terminal. Faulty ORU is probably CRT display chassis.

8. If audible alarm does not sound, verify that terminal has ac power available to it (i.e., that terminal is plugged in and receptacle has power).

9. Check fuse on back of terminal and replace it if necessary. If fuse blows again, faulty ORU is probably EMI filter.

10. If ac power is available and fuse is good, turn terminal on and off a few times and note feel of POWER ON/OFF switch. If switch does not feel right, problem may be a defective switch.

11. If switch feels normal, power supply PWA is probably faulty. If further resolution is required, go to subsection 7.1.10.

7.1.2 Video Line Control

Perform the following procedure to test the video line control.

1. Turn terminal off.

2. If auxiliary device is available and being used, ensure that 7200's external port is cabled to that device's data set interface connector. In addition, check that baud rates, parity scheme, and stop bit selection of the two units are compatible.

3. Turn terminal on. If unit does not have a blank screen with cursor at home position (top line, left margin), return to Blank Screen Test, subsection 7.1.1. Deactivate CAPS LOCK key, if depressed. If an auxiliary printer is

cabled to the 7200, manually space paper and return carriage. Note position of paper in order to later identify where this test began on printout. Place auxiliary unit in ready or on-line state.

4. Using the shift key, type U and observe on top line of screen (▯ indicates cursor):

   U ▯

   Type * and observe:

   U*▯

   Type U* (39 times) and observe:

   U*U*U*U*U*U*U*U*U*U*U*U*U∫∫ U*U*U*U*U*U*U*U*U*U*U*U*

   80th Character Position

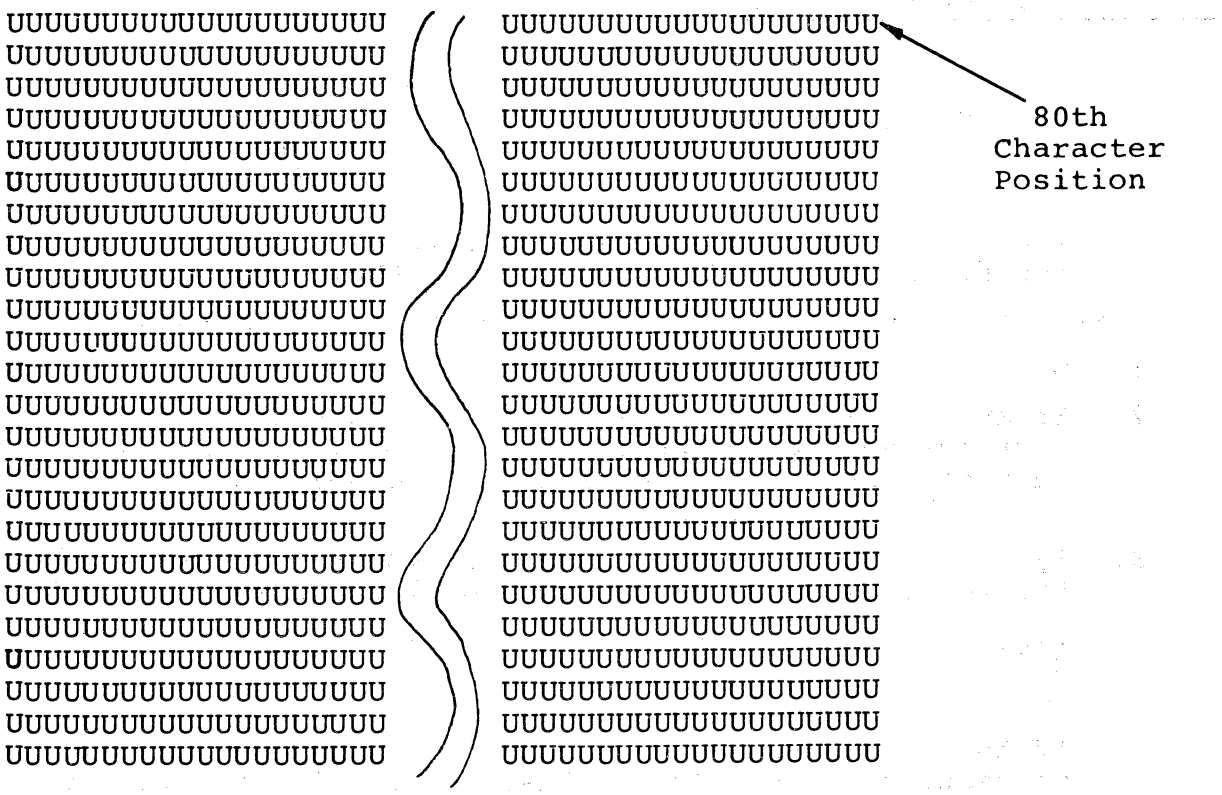
5. Note that cursor does not appear on screen. Depress CLR key. Screen should be blank with cursor in home position. If not, depress ESC and the \ key (alternate clear sequence). If screen is still not blank, replace logic PWA. If screen is now blank, type sequence → ↓ ↑ ←. If cursor moves for any of these four keys, replace keyboard. If there has been no cursor motion, the faulty ORU is logic PWA (2) or keyboard (1). If further resolution is desired, see subsection 7.1.10.

6. Type 0(LF)1(LF)2(LF)3(LF)4(LF)5(LF)6(FL)7(LF)8(LF)9(LF) 10(LF)11(LF)12(LF)13(LF)14(LF)15(LF)16(LF)17(LF)18(LF) 19(LF)20(LF)21(LF)22(LF) RETURN where (LF) is the line feed key.
   Observe:

```
0
 1
  2
   3
    4
     5
      6
       7
        8
         9
          10
            11
              12
                13
                  14
                    15
                      16
                        17
                          18
                            19
                              20
                                21
                                  22
▯
```

If no characters are displayed, or if characters that are displayed are not correct, go to auxiliary device procedure in subsection 7.1.9 if a device is available. If that procedure is executed without an error, faulty ORU is probably PWA. However, if that procedure detects an error, faulty ORU is probably keyboard. If an auxiliary device is not available, faulty ORU is either PWA or keyboard. The quickest way to isolate fault is to interchange keyboard with another one. If further resolution is required, go to subsection 7.1.10.

7. This step is designed to verify character storage of terminal. Depress CLR and then depress repeat (RPT) and the U key, holding repeat key down until bottom row is filled with Us. When 24th line is almost full, release repeat key and type Us until this last row is full; i.e., the cursor is advanced to the phantom (column 81) position and disappears. If repeat function does not work, faulty ORU may be keyboard (4) or PWA (1). If an auxiliary unit is monitoring this test, it may need manual line feeds and carriage returns to prevent overstriking in its rightmost position. The operator should observe the following pattern on the screen as long as the keyboard is not touched.



a. Look carefully at lines on display. If they are nonlinear or out of focus, faulty ORU is CRT display chassis.

b. If lines look dim (even after brightness control has been adjusted), faulty ORU is either logic PWA or CRT display chassis.

c. If lines are jittering or waving (especially at side margins), faulty ORU is either power supply (10 Vac) PWA or logic PWA.

d. If line pattern is correct but character indicated is not, execute auxiliary device procedure (see subsection 7.1.8). If an auxiliary device is not available, perform mini keyboard test (see subsection 7.1.3).

e. If total pattern is not correct but at least one line is correct, faulty ORU is PWA.

f. If total pattern is not correct and none of lines are correct, faulty ORU is PWA (2) or CRT display chassis (1).

If further resolution is required, go to subsection 7.1.10.

8. Repeat step 7 using *s in place of Us. Display on screen should be exactly same except it should be filled with asterisks.

If auxiliary device procedure has been executed without error, faulty ORU is PWA. If it has been executed with an error, faulty ORU is keyboard (4) or PWA (1).

7.1.3 Mini Keyboard Test

NOTE

If testing has progressed successfully at this point, the power supply and transformer can be considered as fault-free. If the path of diagnosis leads to subsection 7.1.10.3, replace the logic PWA. For the remainder of these off-line tests, interpret PWA to mean logic PWA.

This procedure checks out the basic keyboard controls.

1. Depress CLR key.
2. If an auxiliary device is attached, manually return carriage and space paper up. Mark beginning of this test on paper; it will be important to be able to identify where this test began.
3. Type 248. Depress SHIFT key and type A. Depress LF and RETURN keys. Observe on top two lines of screen:

   248A
   □

   If this step fails, execute auxiliary device procedure in subsection 7.1.9. If auxiliary device is not available, faulty ORU is keyboard (4) or PWA (1).
4. If auxiliary device procedure has been executed properly, faulty ORU is PWA.

5. If all characters that were typed are displayed but some are displayed as multiple characters (a double 8 may appear on screen), and if auxiliary device procedure has detected same problem, faulty ORU is keyboard. Quickest way to verify keyboard operation is to interchange it with another one (if available).

6. If auxiliary device procedure has not been executed properly, faulty ORU is keyboard (100) or PWA (1).

If further resolution is required, go to subsection 7.1.10.

7.1.4 Keyboard Test (Uppercase)

This procedure is for uppercase only terminals. If the terminal has an upper and lowercase display, skip this procedure and go to subsection 7.1.5.

1. Depress CLR key. Deactivate CAPS LOCK key, if depressed.

2. If an auxiliary device is attached, manually return carriage and space paper up. Mark beginning of this test on paper; it will be important to be able to identify where this test began.

3. Terminal should have a blank screen with cursor in home position (top row, left margin).

NOTE

During the following steps, the operator should be sure that only one character is being displayed for each keystroke. A common keyboard failure mode is multiple characters displayed for a single keystroke. This failure is generally true for only one key at a time. If many characters are failing, this note should be ignored. However, if multiple characters are being displayed for each keystroke for a small number of keys (one or two), the keyboard is the faulty ORU.

4. Type from second keyboard row 1234557890/~ and observe that one character appears on top line as each is typed. Top line should appear as follows:

   1234567890/^ []

5. Type qwertyuiop}+ and observe on screen:

   1234567890/^QWERTYUIOP]+ []

6. Type asdfghjkl;{' and observe:

   1234567890/^QWERTYUIOP]+ASDFGHJKL;[\ []

7. Type `zxcvbnm,.- and observe:

   1234567890/^QWERTYUIOP]+ASDFGHJKL;[\@ZXCVBNM,.- []

8. Depress RETURN key and observe:

   [1] 234567890/^QWERTYUIOP]+ASDFGHJKL;]\@ZXCVBNM,.-

   Cursor should have moved to left margin of screen covering the 1 and displaying it in inverse video. Freeze blinking cursor by depressing and holding break key (BRK) immediately after cursor blinks on. If inverse video is not proper, replace PWA. If depressing BRK fails to freeze cursor on, freeze cursor off by depressing BRK just as cursor blinks off. If cursor can be frozen either on or off, but not both, replace PWA. If cursor can not be frozen in either state, faulty ORU is either keyboard (5) or PWA (1).

   NOTE

   Nonblinking cursor available by setting switch 4 at PWA location M13 to inhibit blink position.

9. Depress LF key and observe:

   1234567890/^QWERTYUIOP]+ASDFGHJKL;[\@ZXCVBNM,.-
   []

10. While holding SHIFT key depressed, type !"#$%&'()=?^]*:[`@<>_TEST TEST and observe:

    1234567890/^QWERTYUIOP]+ASDFGHJKL;[\@ZXCVBNM,.-
    !"#$%&'()=?^]*:[\@<>_TEST TEST[]

11. Depress RETURN and LF keys. Depress and hold the 1 key; while holding it down type 2222. Observe on third line of screen:

    12222 []

12. Depress RETURN and LF keys again. Depress CAPS LOCK key and type 0^][\@

    Observe on fourth line:

    0^][\@[]

13. Depress RETURN and LF keys again. Type from numeric pad 0.123456789 and observe on fifth line:

    0.123456789[]

    Deactivate CAPS LOCK key.

14. If this test failed at any step, go to auxiliary device procedure in subsection 7.1.8. If no auxiliary device is available, faulty ORU is keyboard (40) or PWA (1).

If auxiliary device procedure has been executed properly, faulty ORU is PWA. If it has not been executed properly, faulty ORU is keyboard. If further resolution is required, go to subsection 7.1.10.

7.1.5 Keyboard Test (Upper and Lowercase)

This procedure is for terminals having an upper and lowercase display. If the terminal being tested does not have the upper and lowercase display, go on to subsection 7.1.6.

1. Depress CLR key. Deactivate CAPS LOCK key if depressed.
2. If an auxiliary device is attached, manually return carriage and space paper up. Mark beginning of this test on paper; it will be important to be able to identify where this test began on auxiliary device.
3. Terminal should have blank screen with cursor in home position (top row, left margin).

NOTE

During the following steps, the operator should be sure that only one character is being displayed for each keystroke. A common keyboard failure mode is multiple characters displayed for a single keystroke. This failure is generally true for only one key at a time. If many characters are failing, this note should be ignored. However, if multiple characters are being displayed for each keystroke for a small number of keys (one or two), the keyboard is the faulty ORU.

4. Type from second keyboard row 1234567890/~ and observe that each character appears on top line as it is typed. Top line should appear as follows:

   1234567890/~▯

5. Type qwertyuiop}+ and observe:

   1234567890/~qwertyuiop}+▯

6. Type asdfghjkl;{ |and observe:

   1234567890/~qwertyuiop}+asdfghjkl;}|▯

7. Type `zxcvbnm,.- and observe:

   1234567890/~qwertyuiop}+asdfghjkl;{|`zxcvbnm,.- ▯

8. Depress RETURN key and observe:

   ▯234567890/~qwertyuiop}+asdfghjkl;{|`zxcvbnm,.-

   The cursor should have moved to the left margin of the screen covering the 1 and displaying it in inverse video. Freeze blinking cursor by depressing and holding break key (BRK) immediately after cursor blinks on. If inverse video is not proper, replace PWA. If depressing BRK fails to freeze cursor on, freeze cursor off by depressing BRK just as cursor blinks off. If cursor can be frozen either on or off, but not both, replace PWA. If cursor can not be frozen in either state, faulty ORU is either keyboard (5) or PWA (1).

9. Depress LF key and observe:

   1234567890/~qwertyuiop}+asdfghjkl;{|`zxcvbnm,.-
   ▯

10. While holding SHIFT key depressed, type !"#$%&'()=?^QWE RTYUIOP]*ASDFGHJKL:[\@ZXCVBNM<>_BLANK BLANK and then depress RETURN and LF keys. Observe on top three lines of screen:

    1234567890/~qwertyuiop}+asdfghjkl;{¦`zxcvbnm,.-
    !"#$%&'()=?^QWERTYUIOP}*ASDFGHJKL:[\@ZXCVBNM<>_BLANK BLANK
    □

11. Depress and hold the 1 key; while holding it down type 2222. Observe on third line of screen:

    12222□

12. Depress RETURN and LF keys again. Depress CAPS LOCK key and type 0^][\@

    Observe on fourth line:

    0^][\@ □

13. Depress RETURN and LF keys. Type from numeric pad 0.123456789 and observe on fifth line:

    0.123456789□

    Deactivate CAPS LOCK key.

14. If this test failed at any step, go to auxiliary device procedure in subsection 7.1.8. If no auxiliary device is available, faulty ORU is keyboard (40) or PWA (1).

If auxiliary device procedure has been executed properly, faulty ORU is PWA. If it has not been executed properly, faulty ORU is keyboard. If further resolution is required, go to subsection 7.1.10.

7.1.6 Special Function Test

This procedure may affect the auxiliary device in different ways depending on the type of device available (if any). For this procedure, the auxiliary device should be disabled since the output is not predictable.

1. Depress ESC and the ` key and observe that screen is cleared. If screen is not cleared, replace keyboard.
2. Depress ESC and the 4 key and then fill screen with @ symbol. If background mode is not correct for each character position, replace PWA.
3. Depress HOME key. Cursor should be at home position (top line, left margin). If it is not at home position, depress ESC, SHIFT, and H for alternate sequence.
4. Depress EOL key. Top line only should be blank. If it is not blank, depress ESC, SHIFT, and K keys for alternate sequence.
5. Depress SHIFT and EOP keys. Entire screen should now be blank. If it is not blank, depress ESC, SHIFT, and J keys for alternate sequence.

6. Type some displayable characters. Depress ESC and the 3 key and then some more displayable characters. If these characters are not displayed in normal mode video, replace PWA.

7. Depress HOME key. Depress and hold RPT and then depress ← key. Cursor should wrap around to lower right and continue to decrement column and row counters. If cursor does not move in this manner, depress HOME, ESC, SHIFT, and D keys for alternate sequence.

8. Depress HOME key. Depress and hold RPT and then depress → key. Cursor should increment column and row counters, and wrap around from end of last line to home position. If cursor does not move in this manner, depress HOME, ESC, SHIFT, and C keys for alternate sequence.

9. Depress HOME key. Depress and hold RPT and then depress ↑ key. Cursor should wrap around to row 24 and continue to decrement row counter. If cursor fails to move in this manner, depress HOME, ESC, SHIFT, and A keys for alternate sequence.

10. Depress HOME key. Depress and hold RPT and then depress ↓ key. Cursor should increment row counter and wrap around to first row when it reaches last row. If cursor fails to move in this manner, depress HOME, ESC, SHIFT, and B keys for alternate sequence.

11. If all primary functions failed but all alternatives worked, replace either the keyboard (5) or the PWA (1). If only one (or some) primary function(s) failed, but the alternate escape sequence(s) worked, replace the keyboard.

12. Depress ESC, f, o, and the SPACE bar. If cursor fails to move to last row, last column, replace PWA.

13. Depress CTL and the g Key. If audio alarm does not sound, depress CTL and the m key. If cursor returns to column 1, replace PWA. If cursor did not move, replace keyboard.

14. Depress ESC, ff, and SPACE bar. Type testing123 and then depress the LF and RETURN keys:

    a. If audio alarm is enabled for keyboard input (see Figure 9-1) and alarm did not sound on input of s in testing123.

    b. If cursor is not in the first column of the second row, replace PWA.

15. Depress LF and RETURN keys. Alternately depress ESC and each of the 15 function keys (i.e., each key of the top row, plus ERASE key) starting with CLR, going right to XMIT and then ERASE. Observe:

    '0268:<>DABCHiK []

NOTE

If terminal does not have the lowercase option, will be @ and i will be I.

16. Now, with SHIFT held depressed, repeat step 13 and remember NOTE in step 15 while observing.

    '1579;=?DABCHiJ []

17. Depress CLR. Fill top two lines with data so that cursor is near the right end of line 2. While holding repeat key depressed, depress XMIT and note cursor activity. While repeat key is still held depressed, position LINE/PAGE switch on front panel to its alternate setting and again note cursor activity. If cursor does not scan from (near) beginning of line and page, depending on switch setting, replace PWA. If cursor begins at only either line or page, faulty ORU is either PWA switch or the attached cable. Return switch to original position.

18. Depress CLR and DEL keys. If cursor is not in home position, replace keyboard (10) or PWA (1).

19. Depress 4, ESC, f, SP, and the 7 key. Screen will have a 4 in home position and cursor in column 1 of last line. Depress LF key. If screen is now blank (4 having rolled up, off screen), ROLL/PAGE switch in rear of unit should be in ROLL position. If this switch is in PAGE position, replace logic PWA. Similarly, if 4 remains on screen and switch is in ROLL position, replace logic PWA.

If further resolution is required, refer to subsection 7.1.10.

7.1.7 Non-Local Tests

This subsection includes tests of the VIP7200 transmit/receive circuitry. The first test requires a special plug or piece of test equipment; the remaining tests require a remote station.

7.1.7.1 Loopback

Perform the following procedures for the loopback test.

1. If current loop interface is to be tested, proceed to subsection 7.1.7.2. If a device (such as a properly jumpered connector plug) which connects pin 2 to pin 3 and pin 4 to pins 6 and 8 is not available, proceed to subsection 7.1.7.2.

2. Turn off unit. Replace data set connector with test device. Configure switches as follows: On Line, Character, Full Duplex and Echoplex. Turn on unit.

3. If all three lights on front panel are not on, faulty ORU is either PWA light or connected cable.

4. Type displayable data keys. If no data appears on screen, replace PWA.

5. Place unit in half-duplex mode. If Clear To Send and Data Set Ready lights do not go out, replace PWA. Type displayable data keys. If Data Set Ready does not light, replace PWA.

6. Depress END OF MESSAGE key. If Data Set Ready light does not remain off for as long as key is held depressed, replace either keyboard (5) or PWA.
7. If further resolution is required, refer to subsection 7.1.10.
8. If these steps passed, the EIA interface circuitry of the PWA is working properly. Turn off unit. Reinstall data set cable and turn on unit. Return switches to original setting.

7.1.7.2 Transmit to Remote Station

If a remote station is not available, go on to auxiliary device procedure in subsection 7.1.8. Run on-line diagnostic (subsection 7.2) or key in simple data set to a host computer as follows:

1. Set switches to appropriate setting to transmit to remote station via site's modem.
2. Set ON LINE/LOCAL switch to ON LINE.
3. Disconnect auxiliary device as it may not be able to operate at new baud rate.
4. Repeat appropriate keyboard test (upper or upper and lowercase). The remote station should verify the result of the test and report its finding.
5. If this procedure has failed, PWA may be faulty ORU. However, before replacing PWA, check modem and communication line since they have a greater probability of failure than PWA.

7.1.7.3 Receive from Remote Station

Run on-line diagnostic (see subsection 7.2) or receive simple data set from a host computer as follows:

1. Set switches to appropriate settings to receive from remote station via site's modem.
2. Ask remote station to repeat appropriate keyboard test (upper or upper and lowercase) and special function test. Verify result of test on terminal screen.
3. If this procedure has failed, PWA may be faulty ORU. However, before replacing PWA, check modem and communication line since they have a greater probability of failure than PWA.

7.1.8 Auxiliary Device

This subsection shows how the auxiliary device printout should look for the video line control and keyboard test procedures. After comparing the printouts with these samples, return to and continue with the original fault diagnosis procedure which leads to this subsection. Consider that this procedure failed if the auxiliary device printouts do not match these samples.

This procedure may have been reached without being referenced by a previous fault diagnosis procedure; i.e., all previous tests were executed without detecting an error. In this case, if the printouts do not match these samples (assuming the auxiliary device to be operating properly), the faulty ORU is the PWA.

7.1.8.1 Video Line Control

The auxiliary device printout for this procedure should match the sample following the text in this subsection.

Actual printouts will depend on the type of auxiliary device. Printer functionality which will make actual printouts different from those given in this section are:

1. Automatic LF/RETURN. Length and depth of lines will depend on the print position at which the auxiliary unit provides the LF/RETURN.

2. Escape Sequence Handling. If printer does not respond to escape sequences, the ESC character will be ignored but the second character of the sequence will be printed. For example, PRU1001 printers will print ` each time CLR is depressed on the keyboard.

Printouts for this section were obtained with a PRU1003 auxiliary unit optioned to provide the automatic LF/RETURN at print position 80. PRU1003 and PRU1005 printers recognize escape sequences.

```
U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*U*
0
 1
  2
   3
    4
     5
      6
       7
        8
         9
          10
            11
              12
                13
                  14
                    15
                      16
                        17
                          18
                            19
                              20
                                21
                                  22
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
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```

7.1.8.2 Mini Keyboard Test

The auxiliary device printout for this procedure should match the following sample: 248A

NOTE

The first character of the next four samples in subsections 7.1.8.3 and 7.1.8.4 may be overstruck, depending on how the auxiliary printer reacts to the depression of the 7200 break key. If this first character is overstruck, the second line will be indented one position.

7.1.8.3 Keyboard Test (Uppercase)

The auxiliary device printout for this procedure should match this sample if the auxiliary device prints only uppercase:

```
1234567890/^QWERTYUIOP]+ASDFGHJKL;[\@ZXCVBNM,.-
!"#$%&'()=?^]*:[\@<>_TEST TEST
12222
0^][\@
0.123456789
```

The auxiliary device printout for this procedure should match this sample if the auxiliary device prints both upper and lowercase:

```
1234567890/~qwertyuiop}+asdfghjkl;{|`zxcvbnm,.-
 !"#$%&'()=?^]*:[\@<>_TEST TEST
12222
0^][\@
0.123456789
```

7.1.8.4 Keyboard Test (Upper and Lowercase)

The auxiliary device printout for this procedure should match this sample if the auxiliary device prints only uppercase:

```
1234567890/^QWERTYUIOP]+ASDFGHJKL;[\@ZXCVBNM,.-
!"#$%&'()=?^QWERTYUIOP]*ASDFGHJKL:[\@RXCVBNM<>_BLANK BLANK
12222
0^][\@
0.123456789
```

The auxiliary device printout for this procedure should match this sample if the auxiliary device prints both upper and lowercase:

```
01234567890/~qwertyuiop}+asdfghjkl;{|`zxcvbnm,.-
 !"#$%&'()=?^QWERTYUIOP]*ASDFGHJKL:[\@ZXCVBNM<>_BLANK BLANK
12222
0^][\@
0.123456789
```

7.1.9 Where To Go From Here

If the transmit to remote station, receive from remote station, or auxiliary device tests are not executed because these facilities are not available, the problem may be on the PWA as a small portion of the circuitry on the board is not used in local mode. However, the circuitry that was not checked is much less likely to cause a problem than the modem or the communication line itself. Therefore, the units external to the terminal should be verified before any ORU is replaced.

7.1.10 FER Procedures

This subsection provides the FER with further testing procedures to enable him to identify a faulty ORU with greater confidence.

7.1.10.1 Isolation of PWAs and CRT Display Chassis

Depress CLR key and fill screen with @ sign. Then, measure the voltages to the CRT display chassis at the 5- and 7-pin HASL connectors. Using an oscilloscope, check the following waveforms:

- Video (pin 5 HASL05 connector)
- Horizontal sync (pin 6 HASL07 connector)
- Vertical sync (pin 4 HASL05 connector).

The proper waveforms are given in Section XI of this manual.

The video may be forced by grounding function DVIDEO-00 (chip location K14, pin 11). If this pin is grounded, all Ones are forced on the screen (a complete raster). On the other hand, if CVIDEO+01 (chip location K14, pin 13) is grounded, all Zeros are written and the screen is blank (no raster and no cursor).

If the voltages and waveforms are correct, the faulty ORU is the CRT display chassis. If the voltages and waveforms are not correct, continue with subsection 7.1.10.3.

7.1.10.2 Isolation of Keyboard and PWAs

First retry test with another, known-to-be-working keyboard, if available. If failure persists, continue with subsection 7.1.10.3 If failure is resolved, replaced keyboard is faulty. When another keyboard is not available, continue with this subsection.

Measure the voltages to the keyboard at A10. Check the waveforms with an oscilloscope:

- Sync on the keyboard strobe
- Look at the keyboard data lines or dc function line of interest.

Type whatever key is suspected to be malfunctioning. While scoping the data lines or dc function line, record the data pattern. Refer to the keyboard and function pad output codes table (Section XI) and verify the data pattern, or that the dc function line of interest goes to Zero when key is depressed.

If the voltages and waveforms are correct, the faulty ORU is either the logic PWA or the power supply PWA. If further resolution is desired, continue with subsection 7.1.10.3. If the voltages and waveforms are not correct, continue with subsection 7.1.10.3.

7.1.10.3 Isolation of Power Supply PWA and Logic PWA

If the voltage checks in subsections 7.1.10.1 or 7.1.10.2 are not correct, check the power supply output voltages at the 8-pin HASL connector on the logic PWA. The voltage values should correspond to those given in Section XI.

If the power supply voltages do not correspond to those in Section XI, disconnect the HASL08 connector on the logic PWA and recheck the voltages. If the voltages are correct after the cable has been disconnected, replace the logic PWA. If the voltages are still incorrect, the problem is either the power supply PWA (8) or the transformer (1). In this case, check transformer T1 voltages. The voltage values should correspond to those given in Figure 7-1. If the transformer voltages do not correspond to those given in Figure 7-1, disconnect the secondary (unload the windings) and recheck these voltages. If the voltages are now correct, replace the power supply PWA. If the voltages are still incorrect after the secondary has been disconnected, replace the transformer.

If the power supply voltages at the HASL08 connector do correspond to those in Section XI (without removing the cable), disconnect the CRT display chassis and the keyboard. Recheck the voltage that was failing prior to entering this test. If the voltage is now correct, the faulty ORU is either the keyboard or the CRT display chassis depending on which interface has had the incorrect voltage. If the voltage is still incorrect, replace the logic PWA.

7.1.10.4 Isolation of PWA and Front Panel Lights and Switches

Turn off power and remove the cover. Disconnect the front panel cable from the PWA.

1. Lights. With an ohmmeter set to a high scale, test for an open circuit condition from pin 6 (positive ohmmeter probe) to pins 8, 9, and 10. If any are open, replace corresponding LED. Otherwise, replace PWA.

2. Switches. Table 7-1 gives the relationship of switch settings to the open/short state of pairs of cable pins. With an ohmmeter, test for the condition of the desired (or all) switch position(s). If any reading is not valid, install a new switch. Otherwise, replace PWA.

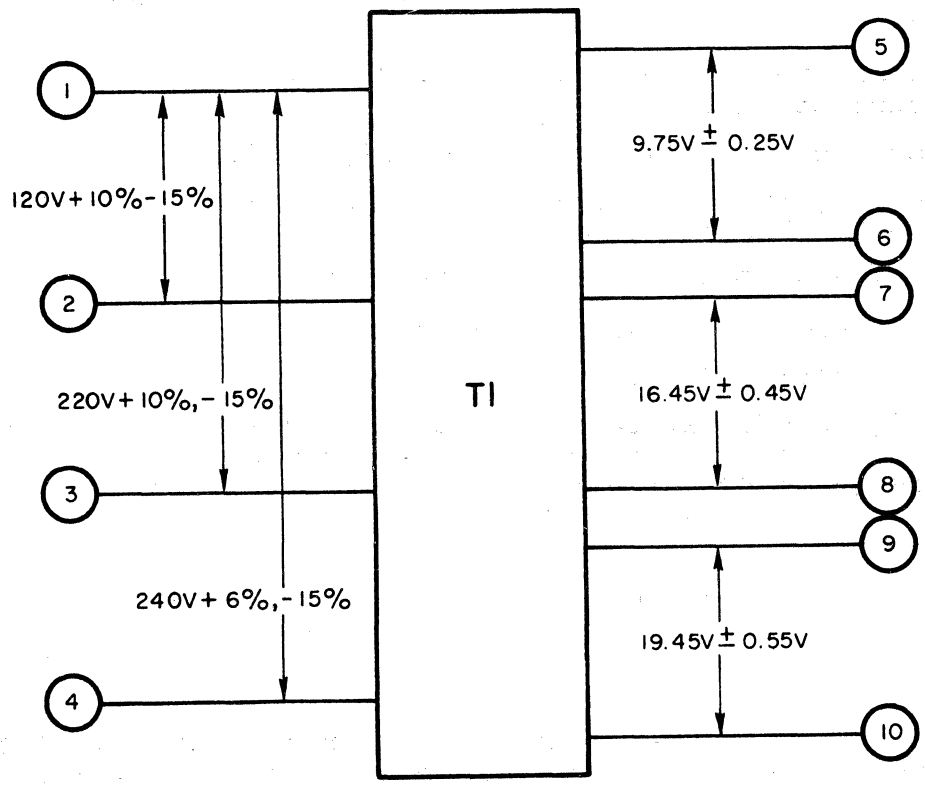


Figure 7-1 Power Transformer Voltages

Table 7-1 Switch Setting and Cable Pair Relationships

SWITCH POSITION TRUE	SHORTED CABLE PINS	OPEN CABLE PINS
Character	2,7	—
Buffered	—	2,7
Page	4,7	5,7
Line	5,7	4,7
Local	11,15 and 14,13	1,15 and 12,13
On Line	1,15 and 12,13	11,15 and 14,13

7.2 OFF-LINE AUXILIARY DEVICE TEST

7.2.1 VIP7200/PRU1001 Interaction Test

The following procedure is designed to provide a partial check of the interface between a VIP7200 and a PRU1001 printer. The printer is configured as a read-only auxiliary device and is connected to the extension part of the VIP unit.

1. Before exercising printer from VIP keyboard, perform following.
   a. Complete printer and VIP local tests described in subsection 7.1.
   b. Ensure that printer is properly cabled to VIP unit.
   c. Ensure that baud rate and parity select switches of both units are same.
2. Set VIP7200 LOCAL COPY/ECHOPLEX switch to LOCAL COPY.
3. Set VIP LOCAL/ON LINE switch to LOCAL.
4. Set printer to READY.
5. Type U* on VIP keyboard. If printer does not print U*, problem is in one of three areas: extension part logic of VIP logic PWA, cable, or auxiliary printer.

NOTE

A VIP can be substituted as the auxiliary device by cabling the extension part into the data set connector port of the auxiliary VIP. Set the auxiliary VIP to ON LINE.

6. If auxiliary device replacement is not practical to aid isolation, monitor voltage levels of pins 7, 4, 20, and 2 of extension port after unplugging it from printer. Pins 4 and 20 should be -12 Vdc with respect to pin 7 (ground). While holding REPEAT key depressed, type U and monitor voltage and waveform at pin 2. With REPEAT key still depressed, type * and recheck pin 2. If the voltages and waveforms are correct, faulty unit is either auxiliary printer or auxiliary device interface cable.

7.2.2 VIP7200/PRU1003/PRU1005 Interaction Test

The following procedure is designed to provide a partial check of the interface between a VIP7200 and a PRU1003 or PRU1005 printer. The printer is configured as a read-only auxiliary device and is connected to the extension port of the VIP unit.

1. Before exercising printer from VIP keyboard, perform following:
   a. Complete printer and VIP local tests described in subsection 7.1.
   b. Ensure that printer is properly cabled to VIP unit.

c. Ensure that baud rate, stop bit count and parity select switches of both units are same.

2. Set VIP7200 LOCAL COPY/ECHOPLEX switch to LOCAL COPY.

3. Set VIP LOCAL/ON LINE switch to LOCAL.

4. Set printer to READY.

5. Type U* on VIP keyboard. If printer does not print U*, problem is in one of three areas: extension port logic of the VIP logic PWA, cable, or auxiliary printer.

NOTE

A VIP can be substituted as the auxiliary device by cabling the extension port into the data set connector port of the auxiliary VIP. Set the auxiliary VIP to ON LINE.

6. If auxiliary device replacement is not practical to aid isolation, monitor voltage levels of pins 7,4, 20, and 2 of extension port after unplugging it from printer. Pins 4 and 20 should be -12 Vdc with respect to pin 7 (ground). While holding REPEAT key depressed, type U and monitor voltage and waveform at pin 2. With REPEAT key still depressed, type * and recheck pin 2. If voltages and waveforms are correct, faulty unit is either auxiliary printer or auxiliary device interface cable.

7. Type in data characters and ensure that column counter indicator number is one more than number of characters typed.

NOTE

The following step (power down/up cycle destroys all previously set vertical and horizontal tabs.

8. Power down printer and power up again. Do not activate Vertical Format Units (VFU) punched paper tape mechanism if installed. Depress START/STOP pushbutton to put printer on line and illuminate ON LINE indicator. Position paper so that print head is ready to start at line 1 immediately beneath form crease.

9. While holding CTL key depressed, type g (ASCII bell code) on VIP keyboard. Printer audible alarm should sound.

10. While holding CTL key depressed, type k (ASCII vertical tab code). Printer should advance paper by 66 lines.

11. While holding CTL depressed, type letter l (ASCII form feed code). Printer should again advance paper by 66 lines. If step 10 or 11 failed to cause printer to advance 66 lines, printer is faulty.

12. Type 1 and depress RETURN key. Line 1 is identified (see Figure 7-2).

13. Depress ESC key and type 0. While holding CTL key depressed, type f. Form size is now set to six lines.

14. While holding CTL key depressed, type k. Type 7 and depress RETURN key. Print tabs to line 7 (line 1 of six-line form).

15. Depress LF key three times. Type 10 and depress RETURN key. Printer advances to line 10 (line 4 of six-line form).

16. Depress ESC key and type 3. Printer sets tab to current line (line 4).

17. While holding CTL key depressed, type letter l. Type 13 and depress RETURN key. Printer form feeds to next form.

18. While holding CTL key depressed, type k. Type 16 and depress RETURN key. Vertical tab for printer moves down three lines.

19. Depress ESC key and type 4 to clear vertical tabs for printer.

20. While holding CTL key depressed, type letter l. Type 19 and depress RETURN key. Printer form feeds.

21. While holding CTL key depressed, type k. Type 25 and depress RETURN key. Printer should feed six lines.

22. While holding CTL key depressed, type i. Printer tabs to right margin.

23. Type + and depress SPACE bar. Depress RETURN key. Printer performs a LF/CR to line 26.

24. Depress ESC key and type 111. Printer sets horizontal tab at current position (column 1).

25. Depress ESC key and type 122. Printer sets horizontal tab at current position (column 3).

26. Depress ESC key and type 133. Printer sets horizontal tab at current position (column 5).

27. Depress ESC key and type 144. Printer sets horizontal tab at current position (column 7).

28. Depress ESC key and type 155. Printer sets horizontal tab at current position (column 9).

29. Depress ESC key and type 166. Printer sets horizontal tab at current position (column 11).

30. Depress ESC key and type 177. Printer sets horizontal tab at current position (column 13).

31. Depress ESC key and type 188. Printer sets horizontal tab at current position (column 15)..

32. Depress ESC key and type 199. Printer sets horizontal tab at current position (column 17).

33. Depress ESC key and type 100. Printer sets horizontal tab at current position (column 19).

34. Depress ESC key and type 111. Printer sets horizontal tab at current position (column 21).

35. Depress ESC key and type 122. Printer sets horizontal tab at current position (column 23).

36. Depress ESC key and type 133. Printer sets horizontal tab at current position (column 25).

37. Depress ESC key and type 144. Printer sets horizontal tab at current position (column 27).

38. Depress ESC key and type 155. Printer sets horizontal tab at current position (column 29).

39. Depress ESC key and type 166. Printer sets horizontal tab at current position (column 31).

40. Depress LF and RETURN keys.

41. While holding CTL key depressed and using keypad numerals, type 1i2i3i4i5i6i7i8i9i0ili2i3i4i5i6i (column indicator should be 032).

42. While holding CTL key depressed, type i. Release CTL key and type +. Column indicator should be 081 or 133.

43. Depress ESC key and type 2. Printer clears tabs.

44. Depress RETURN key. Column indicator should be 001.

45. While holding CTL key depressed, type i. Column indicator should be 080 or 132.

46. While holding CTL key depressed, type h. Depress RPT key. Column indicator should backspace.

47. Off-line test of printer is complete. Check output results with Figure 7-2. Any discrepancy indicates a faulty printer.

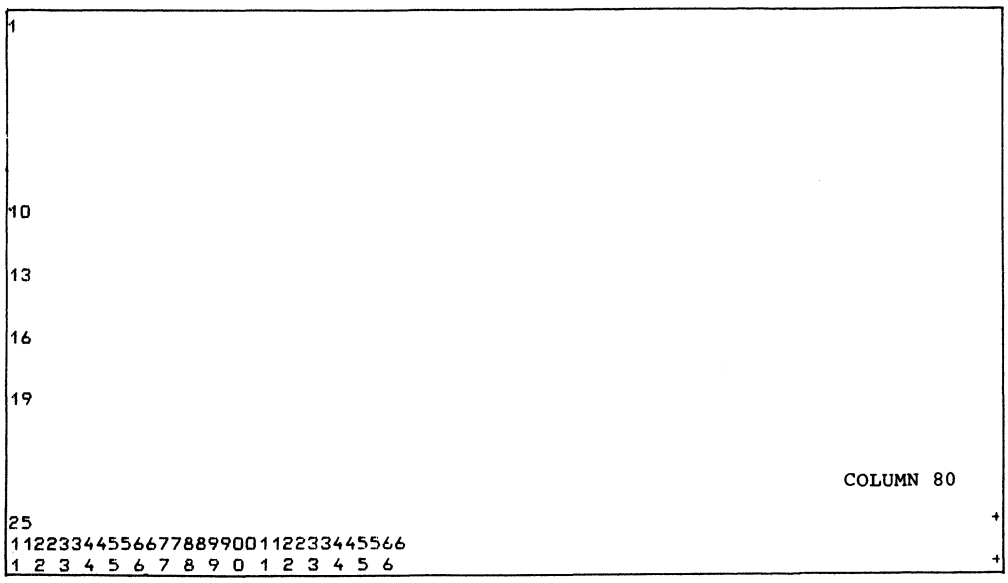


Figure 7-2 VIP7200/PRU1003/PRU1005 Interaction Test

7.3 ON-LINE DIAGNOSTIC PROCEDURE

Not available for this issue.

7.4 VIP7200 TEST AND DIAGNOSTICS SPECIFICATION

Not available for this issue.

7.5 TEST AND VERIFICATION INSTRUCTIONS

Not available for this issue.

VIII
MAINTENANCE

This section contains instructions for replacing the following Optimum Replaceable Units (ORUs).

- Keyboard
- Terminal logic PWA
- Power supply PWA
- CRT display chassis
- Power transformer.

Refer to Section VII for the fault diagnosis procedures which may be used to identify a faulty ORU.

This section also provides internal adjustment procedures for the CRT display assembly.

WARNING

Hazardous voltages are present within the terminal. To avoid electrical shock, disconnect power cord before removing cover.

8.1 COVER REMOVAL AND REPLACEMENT

To remove the terminal cover, perform the following procedure.

1. Observe WARNING at beginning of this section.
2. Remove the two screws and flat washers from extreme upper right and left corners on back of terminal.

3. Grasping cover on each side, lift back edge enough to disengage front lip from base and pull cover forward, approximately 2 inches. Then, reach inside and unplug front panel wiring harness from connector P13 on terminal logic PWA. Cover can now be completely removed from terminal.

4. Replace cover by reversing removal procedure.

8.2 KEYBOARD REPLACEMENT

To replace the keyboard, disconnect the keyboard ribbon cable from connector J3 at the back of the terminal. Then, connect the cable attached to the replacement keyboard in its place.

8.3 TERMINAL LOGIC PWA REPLACEMENT

To replace the terminal logic PWA, perform the following procedure.

1. Unplug terminal power cable.

2. Remove cover (see subsection 8.1), observing WARNING at beginning of this section.

3. At back of terminal, disconnect any cables that may be connected to J1 (data set), J2 (extension part), or J3 (keyboard).

4. Inside terminal, disconnect P7 from J7 and P12 from J12. P7 is located on top of logic PWA and P12 is on top of power supply PWA.

5. Remove three screws which attach back edge of logic PWA to terminal base.

6. At front edge of logic PWA, remove screws at each of the two PWA supports and lift PWA off.

7. Slide PWA forward slightly and out to right (as seen from front of terminal).

8. Disassemble power supply PWA from logic PWA by removing the six screws, nuts, and spacers and unplugging P14 from J14 on logic PWA.

9. On the replacement logic PWA, set switches at PWA locations L06/M13, K10/B04, and J16/K14 (see Figure 9-1) to agree with those on PWA just removed.

10. At back edge of replacement PWA, set all of operator-accessible switches to agree with those on PWA being replaced.

11. Install replacement PWA by reversing above removal procedure. Do not replace cover yet.

12. Plug in terminal power cord and turn terminal on. Adjust brightness and contrast as directed in subsection 8.6.1.

13. Perform checkout procedure described in subsection 9.4.
14. Replace terminal cover.

8.4 POWER SUPPLY PWA REPLACEMENT

To replace the power supply PWA, perform the following procedure.

1. Remove logic PWA with attached power supply from terminal (refer to subsection 8.3, steps 1 through 7).
2. Remove power supply PWA from logic PWA (refer to subsection 8.3, step 8) except unplug connector P1 from J1 on the power supply PWA.
3. Install replacement power supply PWA by reversing above removal procedure. Do not replace terminal cover yet.
4. Perform adjustment and checkout procedures given in steps 11, 12, and 13 of subsection 8.3.

8.5 CRT DISPLAY CHASSIS REPLACEMENT

To replace the CRT display chassis, perform the following procedure.

1. Unplug terminal power cable.
2. Remove cover (see subsection 8.1) observing WARNING at beginning of this section.
3. Disconnect P21 from CRT circuit board.
4. Disconnect ground wire from E03GD on CRT display chassis.
5. At front of terminal, remove the two screws and flat washers which attach chassis to terminal base.
6. At back of terminal, remove the two screws, lock-washers, and flat washers which attach chassis to terminal base. Hold onto chassis to prevent it from falling onto PWA as screws are removed.
7. Install replacement CRT display chassis by reversing above removal procedure. Do not replace the cover yet.
8. Plug in terminal power cord and turn terminal on. Adjust brightness and contrast as directed in subsection 8.6.1.
9. Replace cover on terminal.

8.6 CRT DISPLAY ADJUSTMENTS

The adjustments given in this subsection may be required following replacement of the CRT display chassis or the terminal PWA. These adjustments are made with the CRT display chassis installed in the terminal and with the terminal on and displaying a full screen of characters.

8.6.1 Contrast Adjustment

To adjust the contrast, perform the following procedure.

NOTE

The brightness control should be adjusted at a point where the white raster is just extinguished. The CRT will then be at its cutoff point, and a maximum contrast ratio can be obtained.

1. Turn terminal on.
2. Display an uppercase letter H on screen.
3. At left side of PWA as seen from front of terminal, adjust contrast control (see Figure 8-1) until the horizontal line in the H protrudes out to right as shown below.

H

4. Back contrast adjustment off until this protrusion just disappears, and then continue to back the adjustment off another half turn.

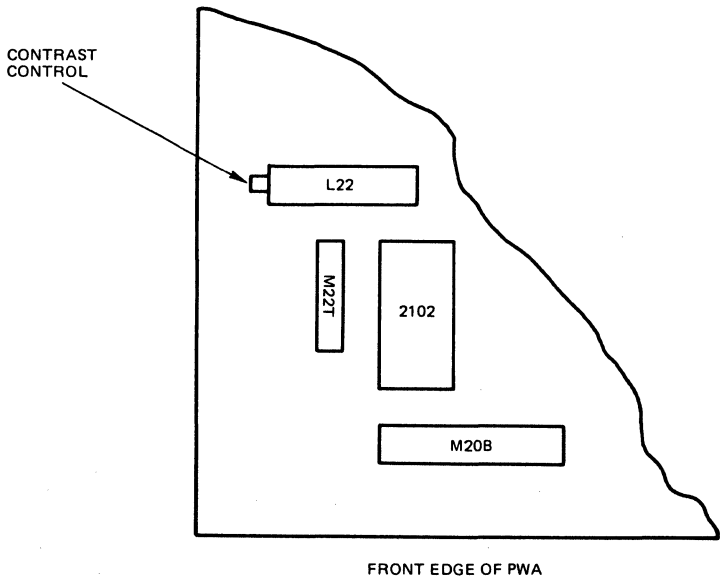


Figure 8-1 Location of Contrast Control

8.6.2 Vertical Adjustment

There is a slight interaction among the vertical frequency, height, and linearity controls. For example, a change in the height of the image may affect linearity.

1. Apply video and synchronization signals to CRT display (display a full screen of characters).
2. Set vertical frequency control (R116, Figure 8-2) near mechanical center of its rotation.

3. Adjust vertical height control (R124) for desired height.
4. Adjust vertical linearity control (R121) for best vertical linearity.
5. Remove vertical drive signal from CRT display or, alternatively, use a short jumper lead to short vertical drive input terminal of printed circuit card edge connector to ground.
6. Readjust vertical frequency control (R116) until picture rolls up slowly.
7. Restore vertical drive to CRT display.
8. Recheck height and linearity.

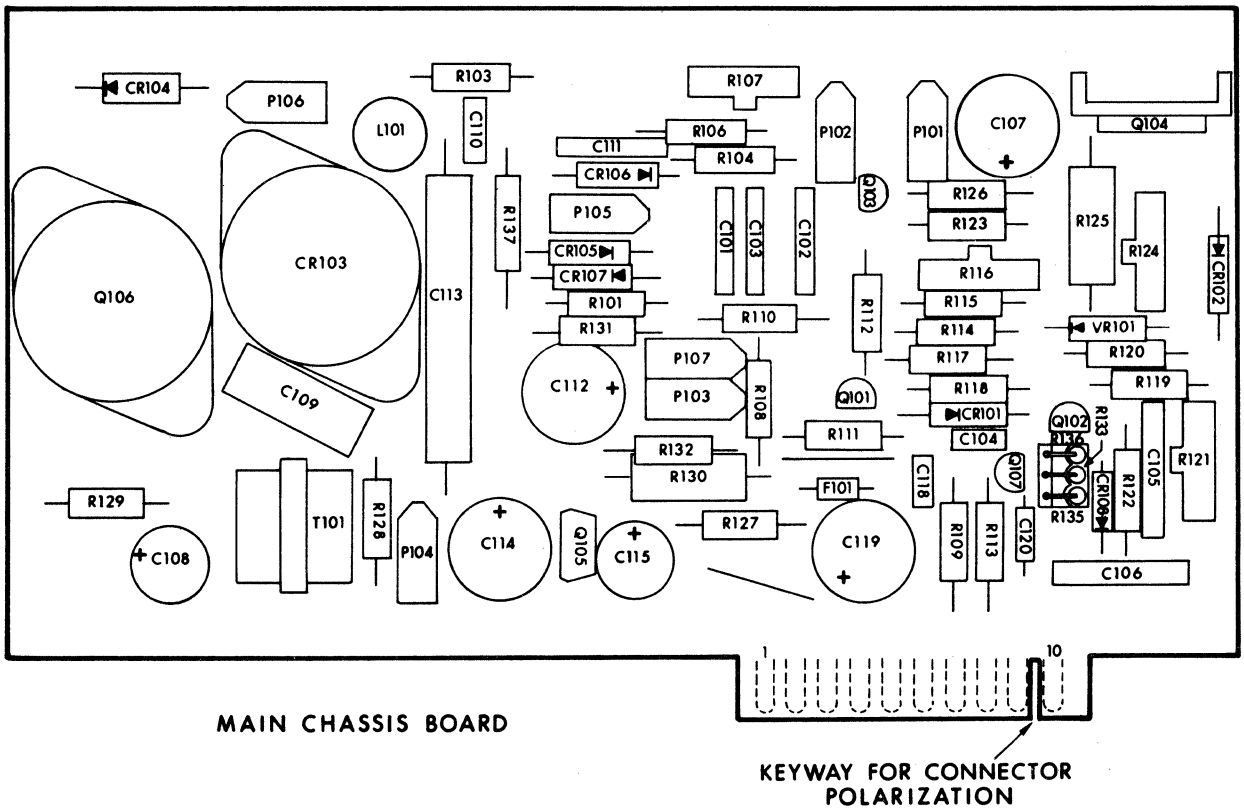


Figure 8-2 Location of Adjustments on CRT Circuit Board

8.6.3 Horizontal Adjustments

Raster width is affected by a combination of the low voltage supply, the width coil (L101, Figure 8-2), and the horizontal linearity sleeve located on the neck of the CRT beneath the yoke.

1. Apply video and synchronization signals to CRT display (display a full screen of characters).
2. Insert horizontal linearity sleeve about two-thirds of its length under yoke. If sleeve is inserted farther than necessary, excessive power will be consumed and horizontal output circuitry could be overstressed.
3. Adjust horizontal width coil (L101) for a width of 9 inches.
4. Insert linearity sleeve farther under yoke to obtain best linearity. Although this adjustment will affect raster width, it should not be used solely for that purpose. Placement of linearity sleeve should be optimized for best linearity.
5. Readjust L101 for a display width of 9 inches.
6. Observe final horizontal linearity and width, and touch up either adjustment if needed.

No horizontal hold control is used on the CRT display. The raster should be properly locked and centered by the horizontal drive signals provided by the terminal PWA.

8.6.4 Focus Adjustment

The focus control (R107, Figure 8-2) provides an adjustment for maintaining best overall display focus. However, because of the construction of the gun assembly in the CRT, this control does not have a large effect on the focus.

8.6.5 Centering Adjustment

If the raster is not properly centered, it may be repositioned by rotating the ring magnets behind the deflection yoke.

NOTE

The ring magnets should not be used to offset the raster from its nominal center position because it would degrade the resolution of the display.

If the display is tilted, rotate the entire yoke.

8.7 TRANSFORMER T1 REPLACEMENT

To replace transformer T1, perform the following procedure.

1. Unplug terminal power cord.
2. Remove cover (see subsection 8.1) observing WARNING at beginning of this section.
3. Disconnect P11 from J11 (between transformer and POWER switch).
4. Disconnect P12 from J12 on power supply PWA.
5. Disconnect transformer ground wire at E01GD on transformer ground plate.

6. Disconnect P12 ground wire at E02GD on transformer ground plate.
7. Remove the four screws and nuts, and eight flat washers which attach transformer and ground plate to terminal base.
8. Install replacement transformer by reversing above removal procedure. Be sure to reconnect all of ground wires to E01GD and E02GD as follows.
   a. E01GD: ground from power plug P12 and ground from transformer T1.
   b. E02GD: ground from power switch S1, ground from E03GD on CRT display chassis, and ground from connector P12.

IX
INSTALLATION

9.1 GENERAL

This section provides instructions for the installation of the VIP7200 series of video display terminals. Several modes of line procedure and modem protocols are available. The installing field engineer should select and follow the set of procedures that are appropriate to the particular type of installation. The procedures vary primarily in the way the terminal is configured by the setting of internal and external switches.

9.2 RECEIVING AND UNPACKING

No special tools or handling procedures are required to unpack the terminal. Exercise care while transporting and unpacking to avoid damaging the terminal. As soon as the terminal has been unpacked, inspect it carefully. Report to the carrier immediately if any damage is found.

9.3 GENERAL INSTALLATION PROCEDURE

This subsection provides a universal installation procedure which may be used to install the terminal in any application for which it is suitable. This procedure involves predetermining all of the host system's interface requirements, and then configuring and installing the terminal to be compatible with these requirements.

9.3.1 Preliminary Installation Data Requirements

The configuration of the terminal is flexible and is determined by the user's requirements. All pertinent information should be determined through prior coordination with the user, and should be

furnished to the field engineer at the time of installation. This information must include:

1. Types, quantities, and locations of all equipment to be installed, including auxiliary devices to terminals.
2. Types of interface to host system:
   a. EIA through modem or modem bypass
   b. 20-mA current loop direct connection
   c. 20-mA current loop direct connection.
3. Distance to host system or modem.
4. Communication line operating speed.
5. Mode of operation:
   a. Full-duplex (echoplex)
   b. Half-duplex (full-duplex with local copy)
   c. Two-way alternate (half-duplex, 202 data set).
6. Character structure:
   a. Ten bits: 1 start, 7 data, 1 parity, and 1 stop (odd or even parity)
   b. Ten bits: 1 start, 7 data, parity, and stop.
   c. Eleven bits: 1 start, 7 data, 1 parity, and 2 stop (odd or even parity).
7. Determine if host system software supports block transmission modes of transfer, and if so which of the following end-of-transmission characters are to be used:
   a. ETX (end of text)
   b. EOT (end of transmission)
   c. CR (carriage return).
8. Determine if host system software supports both uppercase and lowercase transmissions.
9. Determine if user wants end-of-line warning alarm.
10. Determine if user wants cursor to blink.
11. Determine if host system supports 7-bit or 8-bit ASCII code.

9.3.2 Installation

Use the information gathered in subsection 9.3.1 to properly configure the terminal as described in the following steps.

1. Position terminal in its assigned location. Space requirements and other physical data are given in Section I of this manual.
2. Remove cover from terminal (see subsection 8.1).

3. Refer to Figure 9-1 and find switches at locations B04, K14, and M13 for PWA 60130734 or K10, J16, and L06 for PWA 60130705.

4. Switches 6 and 8 at PWA location B04/K10 and STOP BIT slide switch on back of terminal are used to configure character structure. Select required character structure from Table 9-1 and set switches as indicated.

5. Set switches 4 and 6 at PWA location K14/J16 to EIA or current loop depending on type of communication interface required. If current loop is used, also set switch 2 to 20 mA or 60 mA as required. Set switch 4 of B04/K10 as appropriate.

6. Set switches 1, 3, 5, and 7 at PWA location B04/K10 as directed in Table 9-2 to select required end-of-message character for block mode transmissions.

7. If host system software supports full 128-character set of ASCII codes (upper and lowercase characters), set switch 8 at PWA location K14/J16 to upper/lowercase. If software does not support lowercase, set this switch to uppercase.

8. Set switches 1, 3, 5, and 7 at PWA location K14/J16 to agree with input power frequency to terminal (50 Hz or 60 Hz).

9. For European/UK installations where high/low alternate baud rate switching is used, set switch 2 at PWA location B04/K10 to enable position.

10. If an end-of-line warning alarm is required, set switch 8 at PWA location M13/L06 to enable position.

11. If blink feature for cursor is required, set switch 4 at PWA location M13/L06 to enable position.

12. Set switch 2 at PWA location M13/L06 to appropriate position to support host system software of either 7-bit ASCII code or 8-bit ASCII code.

13. Replace cover on terminal.

14. Install keyboard ribbon cable (shipped connected to the keyboard) to connector J3 of back of terminal.

15. Install an interface cable between host system (or modem) and connector J1 on back of terminal.

    a. If EIA RS232C interface is required, connect terminal to host system via modem or modem bypass using 10-foot modem cable (part number 59B400394G10A) provided. Cables up to 50 feet in length may be used for this type of interface connection.

    b. If current loop interface is required, connect terminal to host system using appropriate cable. Pin assignments for this cable are provided in Figure 3-10. Cables up to 1000 feet in length may be used for this type of interface connection.

NOTE

The host system must provide the power source for the current loop interface.

16. If an auxiliary device is to be connected to terminal extension port, refer to subsection 9.5 for installation instructions.

17. At back of terminal, set BAUD RATE switch for required communication line operating speed. Switch settings and their corresponding baud rates are:

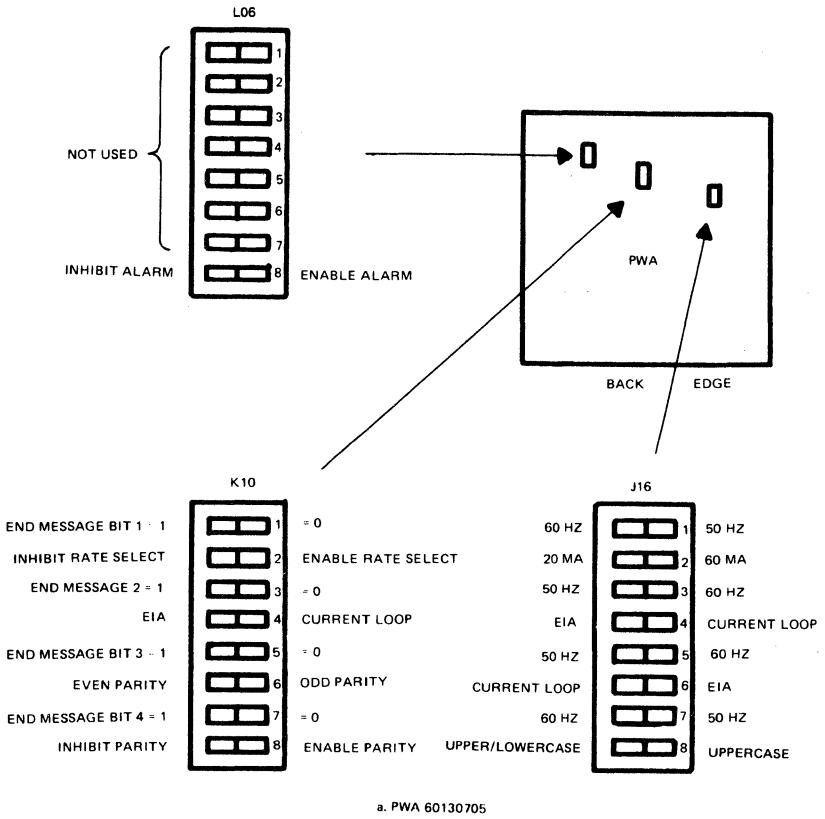
SWITCH SETTING	BAUD RATE
2	75
3	110
5	150
6	300
7	600
9	1200
10	1800
11	2400
13	4800
15	9600

18. Set HALF/FULL DUPLEX switch to proper position for mode of operation required.

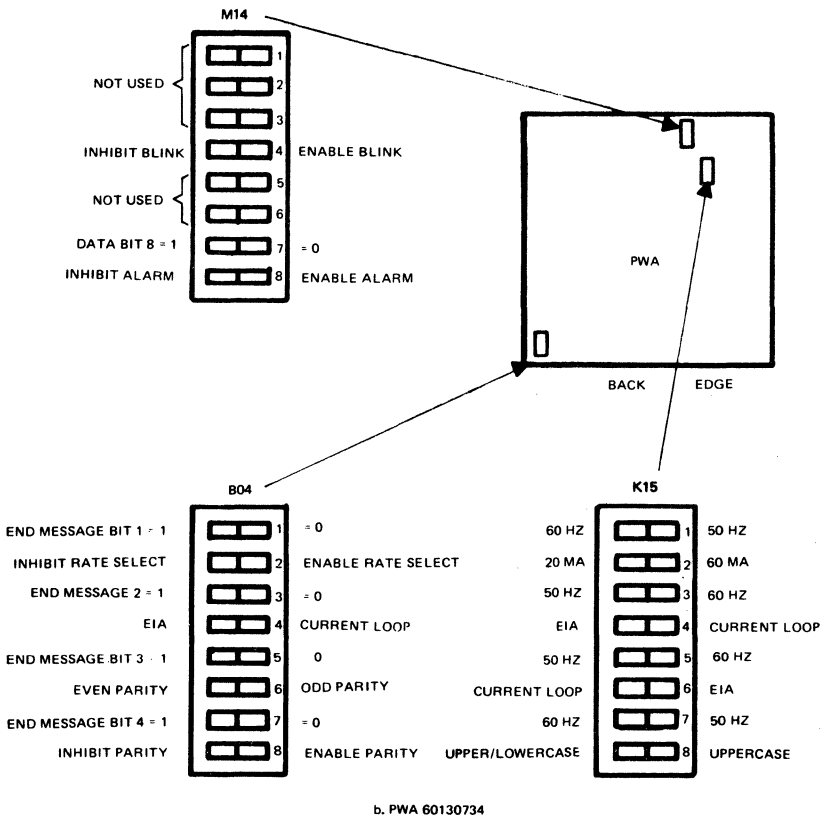
19. For European/UK installations, set MODEM SPEED switch to HI or LO as dictated by operational speed of system. For U.S. applications this switch has no effect.

20. Set LOCAL COPY/ECHO switch to the proper position for the required mode of operation. Plug terminal power cord into an appropriate electrical receptacle.

21. Verify proper operation of terminal by performing checkout procedure in subsection 9.4.



a. PWA 60130705



b. PWA 60130734

Figure 9-1 Internal Switches

Table 9-1 Character Structure Configuration

CHARACTER STRUCTURE	SWITCH SETTINGS	
	PWA LOCATION K10	STOP BIT
10 bits: 1 start, 7 data, 1 parity (odd or even), and 1 stop.	Set switch 8 to Enable Parity and switch 6 to even or odd for type of parity required.	1
10 bits: 1 start, 7 data, and 2 stop (mark parity).	Set switch 8 to Inhibit Parity. If mark parity is required, first stop bit will act as mark parity bit.	2
11 bits: 1 start, 7 data, 1 parity (odd or even), and 2 stop.	Set switch 8 to Enable Parity and switch 6 to even or odd for type of parity required.	2

Table 9-2 End-of-Message Character Configuration

END-OF-MESSAGE CHARACTER	SWITCH SETTINGS AT PWA LOCATION K10			
	SWITCH 7	SWITCH 5	SWITCH 3	SWITCH 1
NUL	0	0	0	0
ETX	0	0	1	1
EOT	0	1	0	0
LF	1	0	1	0
CR	1	1	0	1

9.4 INSTALLATION OF AUXILIARY DEVICES

A variety of auxiliary input and/or output devices can be connected to the host system through the terminal extension port (connector J2). However, before any auxiliary device is selected, two prerequisites must be satisfied:

1. The device must be capable of meeting the auxiliary interface requirements specified in subsection 9.4.1.
2. The host system supporting software must be capable of controlling the auxiliary device as described in subsection 9.4.2.

A partial list of possible auxiliary devices is given in Table 9-3.

9.4.1 Auxiliary Device Requirements

The auxiliary device must meet the following requirements in order to operate properly when connected to the terminal extension port.

1. The auxiliary device must have an EIA RS232C type of interface, or must be equipped with an option to provide this interface.
2. It must be capable of operating in a two-way, simultaneous mode.
3. It must be capable of operating with the same data rate, character structure, and parity as the terminal.

9.4.2 Host System Requirements

In general, the supporting software must be aware of the auxiliary device characteristics since the level of support required may be different from that required by the terminal. For example, when data is sent to a terminal with an unbuffered printer attached as an auxiliary device, a time delay is required following a carriage return/line feed. Also, supporting software must manage any inconsistencies in control characters or functions used by the terminal and auxiliary device. For example, terminal control characters used for cursor forward space, cursor backspace, and clear screen functions may not be compatible with the use of these control characters by the auxiliary device.

Table 9-3 Auxiliary Devices and Cables

AUXILIARY DEVICE*	REQUIRED CABLES		
	PART NO.**	TYPE	QTY
TermiNet 300	59B400394-xxx 59B400546Gxxx	W3 W8	2 1
TermiNet 1200	59B400394-xxx 59B400564Gxxx	W3 W8	2 1
VIP7100	59B400394-xxx 59B400564Gxxx	W3 W8	2 1
VIP7200	59B400394-xxx 59B400564Gxxx	W3 W8	2 1

*The auxiliary devices may not necessarily be compatible with the host system supporting software (refer to subsection 9.4.2).

**The xxx indicates the numbers which specify cable length; for example, 050 specifies a 50-foot cable. The total maximum length which can be used for the auxiliary device interface is 50 feet.

9.4.3 Installation

After ascertaining that the auxiliary device will operate compatibly with the host system and the terminal to which it will be attached (as described in subsections 9.4.1 and 9.4.2), install the auxiliary device to the terminal as follows.

1. Refer to installation procedures given in instruction manual for auxiliary device and use them as necessary in conjunction with the following steps.
2. Place auxiliary device in location where it is to be used. Maximum interconnecting distance for EIA interface is 50 feet.
3. Install interface cable between auxiliary device and extension port (connector J2) on back of terminal. Cables for some commonly used auxiliary devices are specified in Table 9-3. If necessary, refer to interface diagram (Figure 3-11) to identify pin assignments for interface cable.
4. Configure baud rate, character structure (9, 10, or 11 bits), and parity of auxiliary device to match those of terminal.
5. Auxiliary interface does not provide Data Set Ready or Clear to Send signals. If auxiliary device requires these signals, strap corresponding interface leads in auxiliary device.
6. If auxiliary device has its own on-line/local mode selection, set it to receive from terminal.
7. Plug auxiliary device into an appropriate electrical receptacle.
8. Turn on terminal and auxiliary device and check out auxiliary device as recommended in its installation or operating instructions.

9.5 CHECKOUT

Perform the following checkout procedures to ensure that the terminal is ready for normal operation.

1. Turn POWER switch to ON. Allow approximately 1 minute for display to warm up.

NOTE

The audible alarm usually (but not always) beeps as the switch is turned on indicating that power has been applied to the PWA. If the alarm is not heard, turn the switch off and then on again (several times if necessary) to find out if the alarm sounds.

2. Check to see that cursor is displayed on screen. It should appear at left margin of top line.
3. Place ON LINE/LOCAL switch (located on the front panel) in LOCAL position and ECHO/LOCAL COPY switch in LOCAL COPY position.

4. Check for proper operation of terminal by operating each key on keyboard and observing display for proper response at desired baud rate or rates. If any improper responses are observed, perform fault diagnosis procedures given Section VII.

5. With data displayed on screen, adjust BRIGHTNESS control to obtain a satisfactory display intensity under ambient light conditions. Normally, it should be adjusted at a point where white raster is just extinguished. CRT will then be at its cutoff point, and a maximum contrast ratio should be obtained.

6. If necessary, adjust height control and width coil for desired raster height and width, and focus control to product optimum focus over entire area of screen. Refer to Section VIII for these adjustment procedures.

7. Place ON LINE/LOCAL switch in the ON LINE position and repeat step 4. Ensure to take appropriate steps to protect data in host system during this procedure.

X
ILLUSTRATED PARTS CATALOG

This section contains the parts lists and applicable drawings for the VIP7200 major assemblies listed in Table 10-1.

Table 10-1 VIP7200 Major Assemblies

ASSEMBLY	PARTS LIST/ DRAWING NO.	SEE PAGE
CRT TERMINAL ASSEMBLY:		
VIP7200 Terminal, 60-Hz, Uppercase Only	BTRM901A	10-3
VIP7200 Terminal, 60-Hz, Uppercase and Lowerase	BTRM902A	10-3
VIP7200 Terminal, 50-Hz, Uppercase Only	BTRM801A	10-4
VIP7200 Terminal, 50-Hz, Uppercase and Lowercase	BTRM802A	10-4
CRT Terminal Assembly, 69-Hz, Uppercase Only	60131971-001	10-5
CRT Terminal Assembly, 60-Hz, Uppercase and Lowercase	60131971-002	10-5
CRT Terminal Assembly, 50-Hz, Uppercase Only	60131971-003	10-5
CRT Terminal Assembly, 50-Hz, Uppercase and Lowercase	60131971-004	10-5
CRT Display Chassis Assembly	59733709-002	10-11
CRT Circuit Board Assembly	6-002-0530	10-12
BP2TYC Power Supply Board Assembly	60130541-001	10-15
BP2TYC Assembly Pictorial	60130541-101	10-17
BE2TS2 Logic Board Assembly	60130702-001	10-19
BE2TS2 Assembly Pictorial	60130702-101	10-23
BE2TCY Logic Board Assembly	60130730	10-25
BE2TCY Assembly Pictorial	60130730-102	10-29
KEYBOARD ASSEMBLY	BKBD002A	10-30
Keyboard Assembly	60129887-004	10-30
Keytops for Keyboard	-	10-33
CABLE, W3, 10-FOOT	59B400394-010	10-34

770816 | SIZE TX | BTRM902A | SHEET 1/ | REV. E

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001	002	003						UM
	1	TD	60131971-002	A	CRT TERMINAL ASSY	1	1	1						EA
	2	T	60130541-001A	D	BP2TYC ASSEMBLY	1	1	1						EA
	3	T	60130702-002B	A	BE2TS2 ASSY	1	-	-						EA
	4	TB	59302315-005	P	NAME PLATE RATING	1	1	1						EA
*	5	T	60130702-003C	A	BE2TS2 ASSY	-	1	-						EA
*	6	T	60130702-004D	A	BE2TS2 ASSY	-	-	1						EA
*	7	TX	60133842-001	A	MOD KIT VIP 7200	1	1	1						EA
*	8	A	60133843-000	D	MOD INSTR VIP 7200	X	X	X						--

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TITLE: TRML U/LC 60HZ

SIZE TX | P.L. NO. BTRM902A | SHEET 1F | REV. E

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770816 | SIZE TX | BTRM901A | SHEET 1/ | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001								UM
	1	TD	60131971-001	A	CRT TERMINAL ASSY	1								EA
	2	T	60130541-001A	D	BP2TYC ASSEMBLY	1								EA
*	3	T	60130702-005E	A	BE2TS2 ASSY	1								EA
	4	TB	59302315-005	P	NAME PLATE RATING	1								EA

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770819 | SIZE TX | BTRM801A | SHEET 1// | REV. C

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001	002	UM
*	1	TD	60131971-003	A	CRT TERMINAL ASSY	1	1	EA
*	2	T	60130541-001A	D	BP2TYC ASSEMBLY	1	1	EA
*	3	T	60130702-005E	A	BE2TS2 ASSY	1	1	EA
*	4	TB	59302315-001	P	NAME PLATE RATING	1	1	EA
*	5	A	03910222-001	V	LABEL,P.S.,SERIAL	1	1	EA
*	6	TX	60133837-001	A	INST! KIT U.K.	-	1	EA

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770815 | SIZE TX | BTRM802A | SHEET 1/ | REV. E

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001	002	003	UM
	1	TD	60131971-004	A	CRT TERMINAL ASSY	1	1	1	EA
	2	T	60130541-001A	D	BP2TYC ASSEMBLY	1	1	1	EA
	3	T	60130702-002B	A	BE2TS2 ASSY	1	-	-	EA
	4	TB	59302315-001	P	NAME PLATE RATING	1	1	1	EA
*	5	T	60130702-003C	A	BE2TS2 ASSY	-	1	-	EA
*	6	T	60130702-004D	A	BE2TS2 ASSY	-	-	1	EA
*	7	TX	60133842-001	A	MCD KIT VIP 7200	1	1	1	EA
*	8	A	60133843-000	D	MCD INSTR VIP 7200	X	X	X	--

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MS 094
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S = SUBSTITUTE PARTS

770930 | SIZE TD | 60131971 | SHEET 1/5 | REV. K

•	ITEM NO.	P C	IDENTIFICATION NO.	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001	002	003	004					U M
	1	TC	60129810-001	A	BASE ASSY	1	1	1	1					EA
	2	TD	60129758-001	A	COVER ASSY	1	1	1	1					EA
	3	TC	60131962-001	P	FRONT COVER OVERLAY	1	1	1	1					EA
	4	A	59733709-002	V	CRT DISPLAY DES SPEC	1	1	1	1					EA
	5	TC	60129862-002	P	CONN PANEL NO 1	1	1	1	1					EA
	6	TB	60129861-002	P	FUSE DECAL 60HZ	1	1	-	-					EA
	7	TB	60129882-001	A	GND PLATE ASSY	1	1	1	1					EA
	8	TC	60132083-001	P	CONN PANEL NO. 2	1	1	1	1					EA
*	9	C	43134432-008	V	BUSHING	1	1	-	-					EA
	10	TK	60128558-001	A	CA 60HZ PWR CORD	1	1	-	-					EA
	11	A	04530220-001	V	TRANSFORMER	1	1	1	1					EA
	12	B	43168298-001	V	NUT BUSHING 6	2	2	2	2					EA
	13	A	43168065-007	V	BUMPER	5	5	5	5					EA
	14	A	70934301-001	-	SWITCH SLIDE	1	1	1	1					EA
	15	A	04670090-001	V	FUSE HOLDER	1	1	2	2					EA
	16	-	04670011-019	V	FUSE 1.0A SB	-	-	2	2					EA

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TITLE: CRT TERMINAL ASSY

SIZE TD | P.L. NO. 60131971 | SHEET 1/5 | REV. K

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770930 | SIZE TD | 60131971 | SHEET 2 | REV. K

•	ITEM NO.	P C	IDENTIFICATION NO.	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001	002	003	004					U M
	17	P	04170011-041	V	SLVG HEAT SHRINK SM	3	3	6	6					IN
	18	A	03820036-001	V	GUARD, FAN	1	1	1	1					EA
S	19	P	03810008-002	-	VENTURI FAN	1	1	1	1					--
	20	P	04170011-026	V	SLVG HEAT SHRINK SM	10	10	10	10					IN
	22	P	03010140-050	V	SCREW PAN HD SLOTTED	4	4	4	4					EA
	23	P	03010140-036	V	SCREW PAN HEAD	4	4	4	4					EA
	25	P	03010140-035	V	SCREW PAN HD SLOTTED	2	2	2	2					EA
	26	P	03010146-018	V	SCREW FH PHILIPS	2	2	2	2					EA
	27	P	03030004-001	V	NUT LW 4	2	2	2	2					EA
	28	P	03030004-003	V	NUT LW 8	4	4	4	4					EA
	29	P	03030004-004	V	NUT LW 6	16	16	16	16					EA
	30	-	03020021-002	V	WASHER FL NON MTLC	5	5	5	5					EA
	31	P	03020038-003	V	WASHER FLAT	10	10	10	10					EA
	32	P	03020038-004	V	WASHER FLAT	4	4	4	4					EA
	33	P	03020039-003	V	WASHER LOCK 6 STL	2	2	2	2					EA
	34	B	43168465-022	V	SWITCH CAP - WHITE	3	3	3	3					EA

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OZ - OUNCE

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TITLE: CRT TERMINAL ASSY

SIZE TD | P.L. NO. 60131971 | SHEET 2 | REV. K

MS 894
DOES A DOCUMENT REVISION STATUS SHEET EXIST? NO

S = SUBSTITUTE PARTS

770930 | SIZE TD 60131971 | SHEET 3 | REV. K

•	ITEM NO.	P C	IDENTIFICATION NO.	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001	002	003	004					U M
	35	A	60067007-001	-	SWITCH TOGGLE 1 POLE	2	2	2	2					--
	37	P	03020003-003	V	WASHER LOCK 6 STL	2	2	2	2					EA
	38	P	03020001-050	V	WASHER FLAT 8	4	4	4	4					EA
	39	B	59700061-001	P	LAMP	3	3	3	3					EA
	40	A	03010002-009	V	SCREW PH 6	6	6	6	6					EA
	41	A	03010002-047	V	SCREW PH 6	6	6	6	6					EA
	42	D	60131981-001	D	SCHEM CRT TERMINAL	X	X	X	X					--
	43	TB	60131959-001	P	SPACER	3	3	3	3					EA
	44	TK	60131970-001	A	JL 60HZ CRT TERMINAL	1	1	-	-					EA
	45	TK	60131977-001	A	JL PWR SUP TO LOGIC	1	1	1	1					EA
	46	TK	60128560-001	A	JL CRT TRANSFORMER	1	1	1	1					EA
	47	TK	60128553-001	A	CA PWB TO CRT	1	1	1	1					EA
	48	TK	60131982-001	A	CA CONTROL PANEL	1	1	1	1					EA
	49	A	60133843-000	D	MOD INSTR VIP 7200	-	X	-	X					--
	50	T	60130541-XXX	A	BP2TYC ASSY	X	X	X	X					EA
	51	-	43142270-008	V	CABLE CLAMP	INTCH	INTCH	INTCH	INTCH					EA

Honeywell
HONEYWELL INFORMATION SYSTEMS
LOC. BILLERICA, MASSACHUSETTS, USA.

UM - UNIT OF MEASURE
EA - EACH, IN - INCHES, CM - CENTIMETER, OZ - OUNCE, G - GRAMS

* ITEMS REVISED SINCE REV. J

TITLE: CRT TERMINAL ASSY

SIZE TD | P.L. NO. 60131971 | SHEET 3 | REV. K

DOES A DOCUMENT REVISION STATUS SHEET EXIST? NO

S = SUBSTITUTE PARTS

770930 | SIZE TD 60131971 | SHEET 4 | REV. K

•	ITEM NO.	P C	IDENTIFICATION NO.	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001	002	003	004					U M
	51	A	70906156-001	V	TIE	1	1	1	1					EA
	52	--	43142270-052	V	CABLE CLAMP	1	1	1	1					EA
	53	TB	59302315-XXX	P	NAMEPLATE RATING S/N	X	X	X	X					EA
	54	TB	59300158-002	P	LABEL	1	1	1	1					EA
	55	P	03010140-033	V	SCREW PAN HD SLOTTED	4	4	4	4					EA
	56	A	03910230-002	V	LABEL	1	1	1	1					EA
	57	TB	60131854-001	A	LABEL	1	1	1	1					EA
	58	A	60067007-028	V	SWITCH TOGGLE 2-POLE	1	1	1	1					EA
	59	A	04370019-001	V	FILTER,RFI,SINGLE 0	1	1	1	1					EA
	60	T	60130702-XXX	A	BE2TS2 ASSY	X	X	X	X					EA
	61	A	03910238-001	V	LABEL,WARNING	1	1	1	1					EA
	62	TB	60129886-001	P	FUSE DECAL 50HZ	-	-	1	1					EA
	63	TK	60128561-001	A	CA 50HZ PWR CORD	-	-	1	1					EA
	64	TK	60132119-001	A	JL 50HZ CRT TERMINAL	-	-	1	1					EA
	65	TK	60132108-001	A	CA JUMPER PLUG TTY-C	1	1	1	1					EA
	66	A	04670091-008	V	FUSE 2.0 A	1	1	-	-					EA

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* ITEMS REVISED SINCE REV. J

TITLE: CRT TERMINAL ASSY

SIZE TD | P.L. NO. 60131971 | SHEET 4 | REV. K

DOES A DOCUMENT REVISION STATUS SHEET EXIST? NO

S = SUBSTITUTE PARTS

VERSION TITLE: BLC SUB TO BASE

770830

SIZE		SHEET	REV.
TD	60131971	5F	K

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY QUANTITY 001	002	003	004					UM
	67	A	03050089-015	V	SPACER 6-32X1/4	2	2	2	2					EA
	68	P	03030029-002	-	NUT PLAIN HEX NYLON	2	2	2	2					--
	69	P	03020001-043	V	WASHER FLAT 6	4	4	4	4					EA
	70	P	03020005-004	V	WASHER INT TOOTH	2	2	2	2					EA
	71	A	03010002-013	V	SCREW PH 6	2	2	2	2					EA
	72	P	03020002-002	V	WASHER FLAT NYLON	2	2	2	2					EA
	73	A	60134086-001	D	INSTR MOD KIT U/C	X	-	X	-					EA
	74	A	03910251-001	V	LABEL-DIP SWITCH	1	1	1	1					EA
*	74	C	43134432-016	P	BUSHING	-	-	1	1					EA

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HONEYWELL INFORMATION SYSTEMS

LOC. BILLERICA, MASSACHUSETTS, USA.

UM - UNIT OF MEASURE

EA - EACH
CM - CENTIMETER
G - GRAMS
IN - INCHES
OZ - OUNCE

* ITEMS REVISED SINCE REV. J

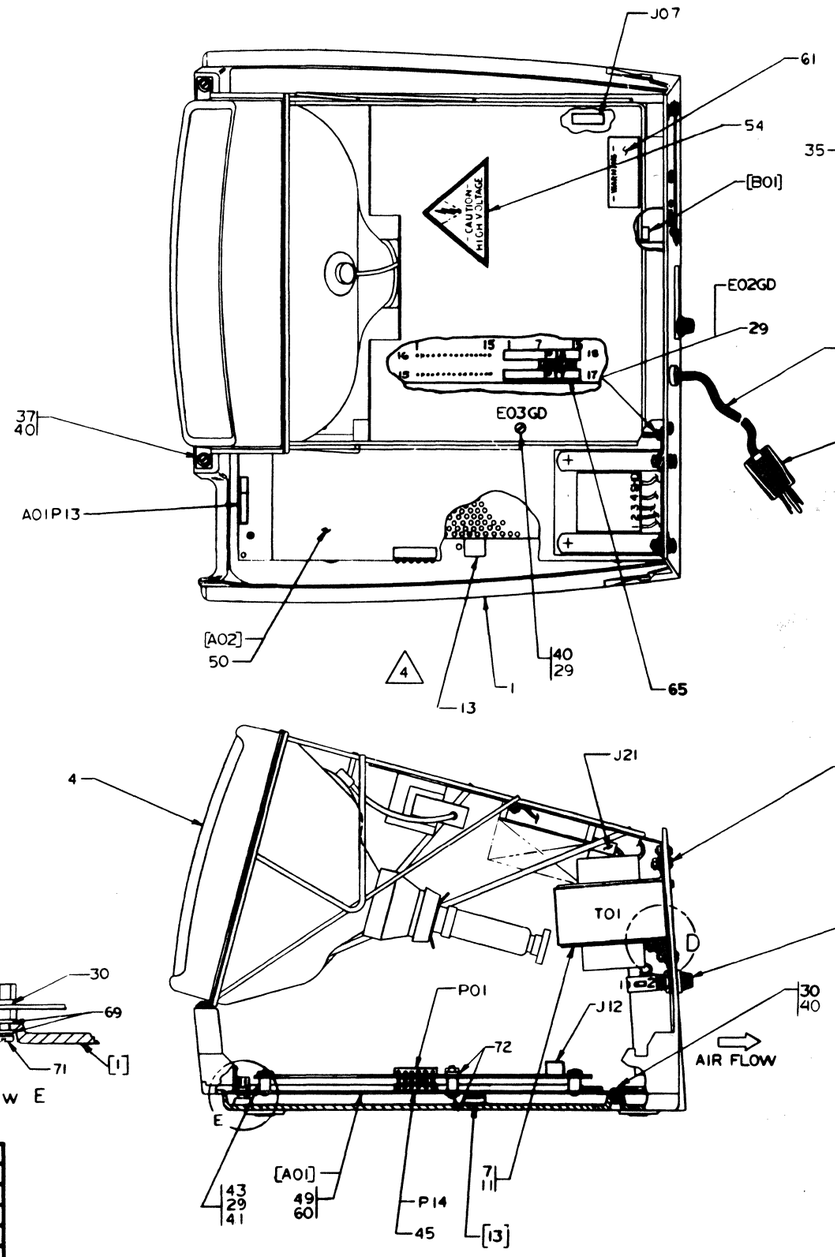
TITLE: CRT TERMINAL ASSY

SIZE	P.L. NO.	SHEET	REV.
TD	60131971	5F	K

DOES A DOCUMENT REVISION STATUS SHEET EXIST? NO

S = SUBSTITUTE PARTS

REVISIONS					
REV	AUTHORITY	DATE YR	MO	DAY	SIGNATURE
A	BLCD 67949	76	10	1	E. Hall
B	BLCO 6718	77	1	21	E. Hall
C	BLCO 61901	77	02	05	E. Hall
D	BLCO 70272	77	04	04	C. Russ
E	BLCO 70296	77	04	22	E. Hall
F	BLCO 70585	77	05	13	
G	BLCO 70440	77	06	27	E. Hall
H	BLCO 70902	77	07	20	E. Hall
J	BLCO 71069	77	09	13	



△5. CLEAN INSIDE SURFACE PRIOR TO APPLYING LABEL.
△4. THESE VIEWS SHOWN WITH COVER ASSY, ITEM 2 REMOVED
△3. ALL BLACK FINISHED HARDWARE TO SHOW ON THIS SIDE
△2. USE SLEEVING, ITEM 20, OVER TERMINALS OF ITEMS 14 AND 59 AFTER SOLDERING
△1. USE SLEEVING, ITEM 17, OVER FUSE HOLDER ITEM 15 AFTER SOLDERING

004 003 002 001

004	003	002	001
50 HZ	50 HZ	60 HZ	60 HZ
NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE OF SIZE AND FORM PER
MATERIAL
HEAT TREAT
FINISH
DRAWN 1/2
CODE
DES
APPD

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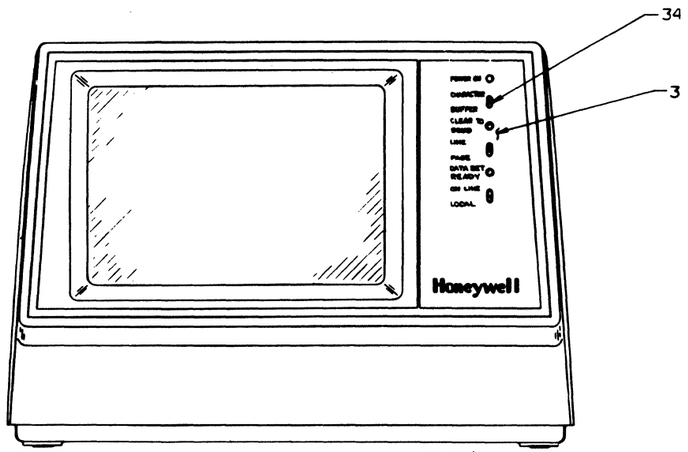
HONEYWELL INFORMATION SYSTEMS
LOC BILLERICA, MASS., U.S.A.

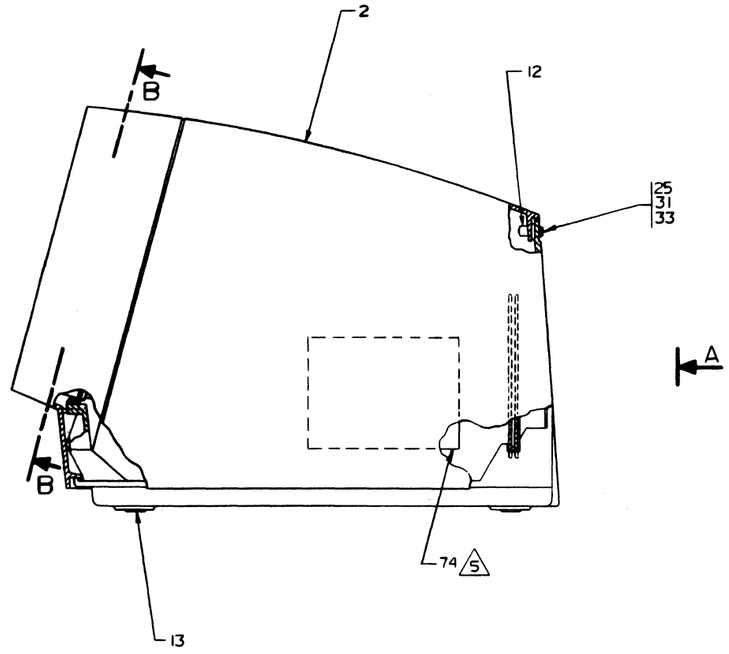
TITLE: CRT TERMINAL ASSY

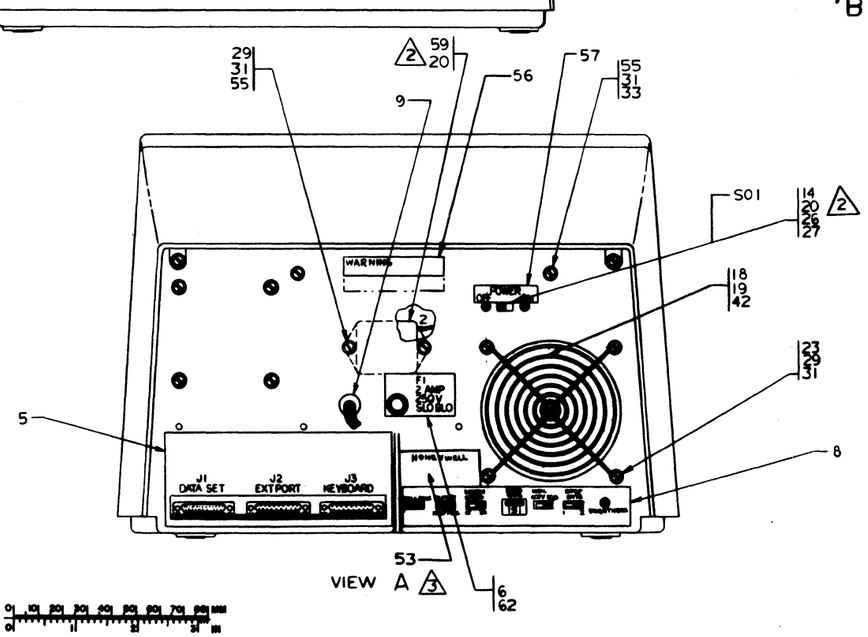
SIZE	DWG NO	SH	REV
D	6031971	1/2	J

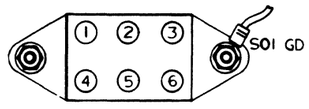
6031971

REVISIONS				
REV	AUTHORITY	DATE YR	MO DAY	SIGNATURE









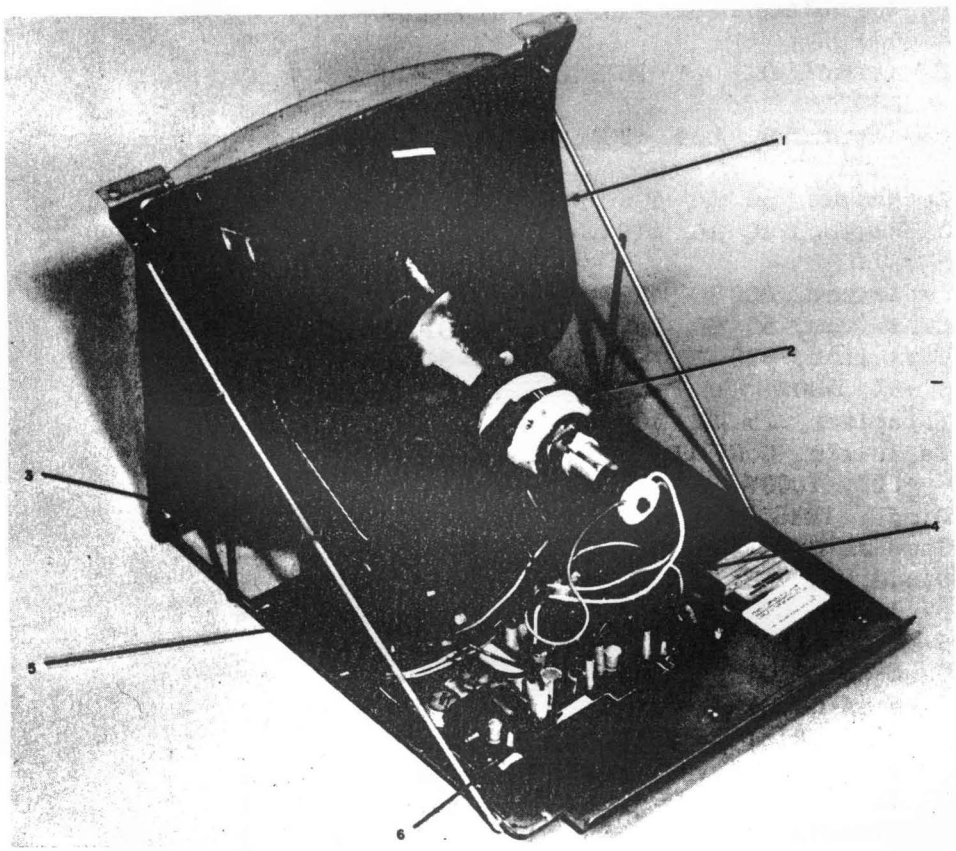
S01
WIRING SIDE OF ITEM 14
(SCALE NONE)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS= MILLIMETERS / INCHES; TOLERANCE OF SIZE AND FORM PER; INITIAL DESIGN; PROJECTION; SCALE 1/2; CODE	MATL.	Honeywell — HONEYWELL INFORMATION SYSTEMS — LOC BILLERICA, MASS. U. S. A.	
	TREAT.	TITLE: CRT TERMINAL ASSY	
	FIN.	SIZE D; DWG NO 60131971; SH 2F; REV J	
DR M.O. Thacher 76-04; APPD L. Hall 76/11/1			

HONEYWELL PROPRIETARY AND CONFIDENTIAL

Parts List for CRT Display Chassis Assembly

INDEX NO.	DESCRIPTION	PART NUMBER	QTY.	ASSY. REV.	USE ON CODE	REF. FIG.
	CRT Display Chassis Assy, Nonglare	59733709-002	Ref	B		
	NOTE					
	The following part numbers are those of Ball Brothers Research Corporation, Miratel Division, 1633 Terrace Drive, Roseville, Minnesota 55113.					
1	CRT, 12-inch, Nonglare (V1)	1-014-0747	1			
2	Deflection Coil Assy	6-004-0321	1			
3	High Voltage Rectifier, H510 (CR2)	1-021-0424	1			
4	Vertical Choke (L1)	6-003-0321	1			
5	High Voltage Transformer (T2)	6-003-0325	1			
6	Circuit Board Assy, CRT	6-002-0530	1			



CRT Display Chassis Assembly

Parts List for CRT Circuit Board Assembly
(Sheet 1 of 3)

INDEX NO.	DESCRIPTION	PART NUMBER	QTY.	ASSY. REV.	USE ON CODE	REF. FIG.

NOTE

The following part numbers are those of Ball Brothers Research Corporation, Miratel Division, 1633 Terrace Drive, Roseville, Minnesota 55113.

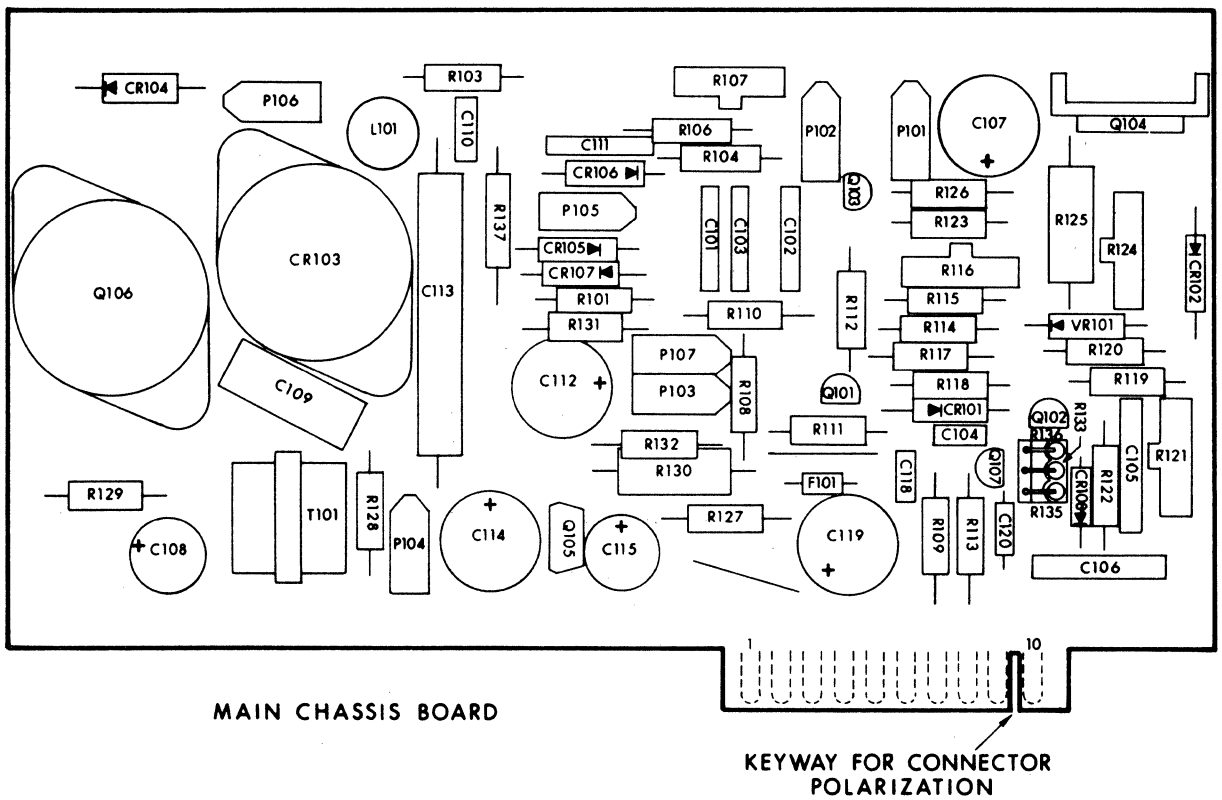
	Circuit Board Assy, CRT	6-002-0530	Ref
C101	Capacitor, 0.01 µF, 1000V	1-012-0112	3
C102	Same as C101		
C103	Same as C101		
C104	Capacitor, 0.001 µF ±10%, 1000V	1-012-0540	1
C105	Capacitor, 0.47 µF ±10%, 1000V	1-012-1005	2
C106	Same as C105		
C107	Capacitor 500 µF, 6V	1-012-2158	1
C108	Capacitor 100 µF, 6V	1-012-2160	1
C109	Capacitor 0.022 µF ±10%, 400V	1-012-0800	1
C110	Capacitor, 0.1 µF ±10%, 200V	1-012-0870	1
C111	Capacitor, 0.02 µF ±20%, 1000V	1-012-0780	1
C112	Capacitor, 50 µF, 50V	1-012-2157	1
C113	Capacitor, 10 µF, ±10%, 63V	1-012-1130	1
C114	Capacitor, 200 µF, 25V	1-012-2159	1
C115	Capacitor, 50 µF, 25V	1-012-2165	1
C118	Capacitor, 820 PF ±5%, 500V	1-012-0482	1
C119	Capacitor, 25 µF, 50V	1-012-2193	1
C120	Capacitor, 0.01 µF ±20%, 1000V	1-012-0740	1
CR101	Diode, 1N3605	1-021-0410	3
CR102	Same as CR101		
CR103	Diode, 1N4785	1-021-0360	1
CR104	Diode, 1N3279	1-021-0380	4
CR105	Same as CR104		
CR106	Same as CR104		
CR107	Same as CR104		
CR108	Same as CR101		
F101	Fuse, 2A, 125V	1-028-0247	1
L101	Coil, Width	1-016-0303	1
Q101	Transistor, 2N5830	1-015-1172	1

Parts List for CRT Circuit Board Assembly
(Sheet 2 of 3)

INDEX NO.	DESCRIPTION	PART NUMBER	QTY.	ASSY. REV.	USE ON CODE	REF. FIG.
Q102	Transistor, D13T1	1-015-1157	1			
Q103	Transistor, MPSA14	1-015-1158	1			
Q104	Transistor, MJE3055	1-015-1156	1			
Q105	Transistor, MPS-U05	1-015-1159	1			
Q106	Transistor, B1182	1-015-1182	1			
Q107	Transistor, 2N4124	1-015-1139	1			
R101	Resistor, 2.7K ±5%, 1/2W	1-011-2280	2			
R103	Resistor, 82K ±5%, 1/2W	1-011-2316	2			
R104	Resistor, 100K ±5%, 1/2W	1-011-2318	3			
R106	Same as R104					
R107	Resistor, Variable, 2.5M ±20%, 1/8W	1-011-5566	1			
R108	Resistor, 15 ohms ±5%, 1/2W	1-011-2226	1			
R109	Resistor, 47 ohms ±5%, 1/2W	1-011-2238	2			
R110	Resistor, 820 ohms ±5%, 1/2W	1-011-2268	1			
R111	Same as R109					
R112	Resistor, 220 ohms ±5%, 1/2W	1-011-2254	1			
R113	Resistor, 470 ohms ±5%, 1/2W	1-011-2262	2			
R114	Resistor, 150 ohms ±5%, 1/2W	1-011-2250	2			
R115	Same as R103					
R116	Resistor, Variable, 100K ±20%, 1/3W	1-011-5435	1			
R117	Resistor, 4.7K ±5%, 1/2W	1-011-2286	2			
R118	Resistor, 8.2K ±5%, 1/2W	1-011-2292	1			
R119	Same as R104					
R120	Resistor, 560 ohms ±5%, 1/2W	1-011-2264	1			
R121	Resistor, Variable, 10K ±20%, 1/8W	1-011-5312	1			
R122	Same as R117					
R123	Same as R114					
R124	Resistor, Variable, 100 ohms ±20%, 1/8W	1-011-5095	1			
R125	Resistor, WW, 3.3 ohms ±10%, 2W	1-011-1571	1			
R126	Resistor, 390 ohms ±5%, 1/2W	1-011-2260	1			

Parts List for CRT Circuit Board Assembly
(Sheet 3 of 3)

INDEX NO.	DESCRIPTION	PART NUMBER	QTY.	ASSY. REV.	USE ON CODE	REF. FIG.
R127	Same as R113					
R128	Same as R101					
R129	Resistor, 5.6 ohms ±5%, 1/2W	1-011-2218	1			
R130	Resistor, WW, 1.2 ohms ±10%, 2W	1-011-1395	1			
R131	Resistor, 3.3K +5%, 1/2W	1-011-2282	1			
R132	Resistor, WW, 8$\bar{2}$ ohms +10%, 3W	1-011-2375	1			
R133	Resistor, 4.7K +5%, 1/4W	70-16-0472	1			
R135	Resistor, 22K +5%, 1/4W	70-16-0223	2			
R136	Same as R135					
R137	Resistor, 33K +5%, 1W	1-011-2448	1			
VR101	Diode, Zener, 1N758	1-021-0180	1			



CRT Circuit Board Assembly

770322 | SIZE T | 60130541 | SHEET 1/ | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	UM
*	1	T	60130542-002	A	BP2TYC FABRICATED BD	1	EA
	2	A	76952516-242	V	CONNECTOR ELEC 9 PIN	1	EA
	3	A	04820294-208	V	CONNECTOR,MALE	1	EA
	4	B	43167265-001	V	BRACKET	3	EA
	5	A	03010002-012	V	SCREW PH 6	7	EA
	6	P	03020045-003	V	WASHER FLAT 6	13	EA
	7	P	03030004-004	V	NUT LW 6	13	EA
	8	A	03010002-010	V	SCREW PH 6	6	EA
→	9	A	59701520-001	-	BUSHING VIP 7760	7	EA ←
	10	P	02730001-001	V	COMPOUND SILICONE	AR	OZ
	11	A	04490003-001	V	INSULATOR PLATE	3	EA
	12	A	04490043-002	V	INSULATOR,SIL RUBBER	1	EA
	13	A	04490045-001	V	HEAT SINK	1	EA
	20	A	43168115-001	V	INT CKT LM300	2	EA
	21	A	04049758-003	V	INT CKT (L7812T)	1	EA
	22	A	04420018-001	V	DIODE 4721	8	EA

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CM = CENTIMETER OZ = OUNCE
G = GRAMS

* ITEMS REVISED SINCE REV. A

TITLE: BP2TYC ASSEMBLY

SIZE T | P.L. NO. 60130541 | SHEET 1/ | REV. B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770322 | SIZE T | 60130541 | SHEET 2 | REV B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	UM
	23	P	04420003-001	V	DIODE 20H	4	EA
	24	A	04430010-001	V	ZENER DIODE 310 5.0V	1	EA
	25	A	04450023-003	V	TSTR 2015-3(2N3055)	3	EA
	26	A	04450016-001	V	TSTR 2N2904	INTCH	EA
	26	A	60067055-001	P	TSTR 2800 (2N2904)	2	EA
	28	A	76952128-219	V	CAP 6.8UF 35V 10P	2	EA
	29	A	76952128-426	V	CAP 33 UF 35W	1	EA
	30	A	76952128-391	V	CAP 47UF 20V +10-10P	1	EA
→	31	A	76952128-109	V	CAP 1.0UF 10P 35V	3	EA ←
	32	P	04350016-002	-	CAP 0.01UF 50V 20P	8	EA
	33	A	43180064-048	V	CAP 7800 UF 20V	1	EA
	34	A	43180064-065	V	CAP 2800 UF 50V	1	EA
	35	A	43180064-082	V	CAP 470 UF 100V	1	EA
	37	P	70928001-054	V	RES 9.1 OHM 1/4W	1	EA
	38	A	70928100-021	V	RES 68 OHM 2P 1/4W	2	EA
	39		70928001-049		RES 5.6 OHM 5P .25W	1	EA

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* ITEMS REVISED SINCE REV. A

TITLE: BP2TYC ASSEMBLY

SIZE T | P.L. NO. 60130541 | SHEET 2 | REV. B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770322 | SIZE T | 60130541 | SHEET 3 | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	UM
	40	A	70928100-056	V	RES 2.0K OHM 2P 1/4W	1	EA
	41	A	70928100-060	V	RES 3.0K OHM 2P 1/4W	1	EA
	42	A	70928100-067	V	RES 5.6K OHM 2P 1/4W	1	EA
	43	A	70928100-079	V	RES 18K OHM 2P 1/4W	1	EA
	44	A	70928102-024	V	RES 91 OHM 2P 1W	1	EA
	45	-	70928102-025	V	RES 100 OHM 2% 1W	1	EA
	46	A	70928102-049	V	RES 1K OHM 2P 1W	3	EA
	47	A	70928200-006	V	RES 0.16 OHM 5P 3W	1	EA
	48	A	70928200-018	V	RES 0.51 OHM 5P 3W	2	EA
	49	A	70928200-019	V	RES 0.56 OHM 5P 3W	1	EA
	50	A	70928200-083	V	RES 270 OHM 5P 3W	1	EA
	51	A	70928503-007	V	RES 1K POT	2	EA
	900	A	14040011-000	M	PWB COMP ASSEM SPEC	X	--
	901	D	60130541-101	D	BP2TYC PICTORIAL	X	--
	902	A	60130541-301	D	BP2TYC STATUS SHEET	X	--
	903	D	60130545-001	D	BP2TYC SCHEMATIC	X	--

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CM = CENTIMETER OZ = OUNCE
G = GRAMS

* ITEMS REVISED SINCE REV. A

TITLE: BP2TYC ASSEMBLY

SIZE T | P.L. NO. 60130541 | SHEET 3 | REV. B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770322 | SIZE T | 60130541 | SHEET 4 | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	UM
	904	-	60067006-000	D	QUALITY STANDARD	X	--

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G = GRAMS

* ITEMS REVISED SINCE REV. A

TITLE: BP2TYC ASSEMBLY

SIZE T | P.L. NO. 60130541 | SHEET 4F | REV. B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

REVISIONS					
REV	AUTHORITY	DATE YR	MO	DAY	SIGNATURE
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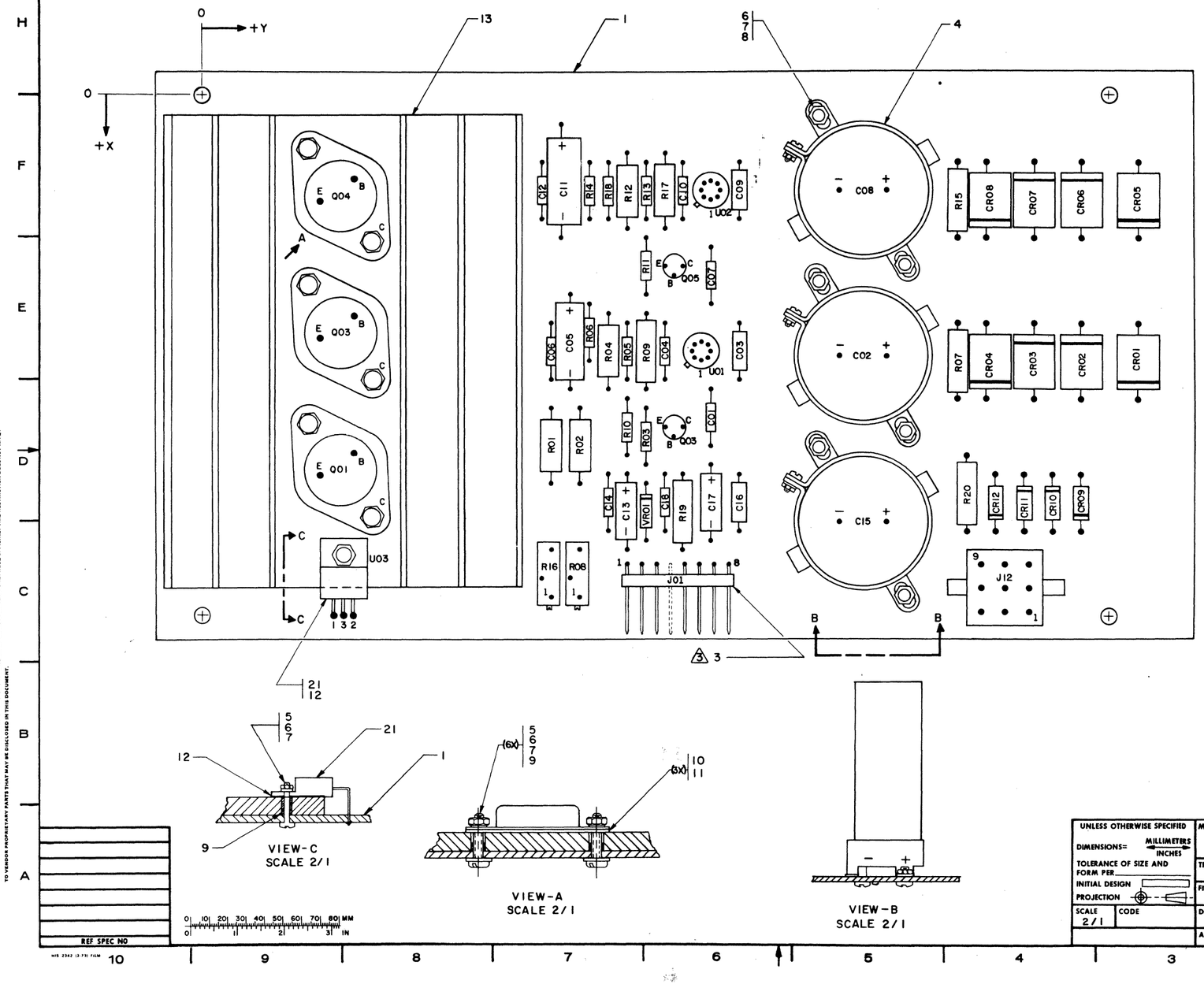

3. REMOVE PIN 4 OF ITEM 3 PRIOR TO MTG. OF CONNECTOR ON CKT. BOARD

2. ASSEMBLE PER ITEM 900

1. FOR MATERIAL LIST REF T60130541

NOTES:

UNLESS OTHERWISE SPECIFIED DIMENSIONS= MILLIMETERS / INCHES; TOLERANCE OF SIZE AND FORM PER ____; INITIAL DESIGN; PROJECTION	MATL	Honeywell HONEYWELL INFORMATION SYSTEMS LOC BIL U. S. A.
	TREAT.	TITLE: BP2TYC ASSY PICTRL
SCALE 2/1 CODE	FIN.	SIZE D DWG NO 60130541-101 SH 1 OF 1 REV A
	DR J. Patnaude 10/13/76	
	APPD	

60130541-101

770322 | SIZE T | 60130702 | SHEET 1/ | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	UM
	1	T	60130703-001	A	BE2TS FABRICATED BD	1	1	EA
	2	A	04830331-001	V	CONN 25P03 90DEG PWB	3	3	EA
	3	A	04820294-208	V	CONNECTOR,MALE	1	1	EA
	4	A	04820293-002	V	CONN,MALE,PWB, 5 PIN	1	1	EA
	5	A	04820293-003	V	CONN,MALE,PWB, 7 PIN	1	1	EA
	6	-	04820293-005	-	CONN,MALE,PWB,15 PIN	5	5	EA
	7	A	70934302-001	V	SWITCH SLIDE DPDT	5	5	EA
	8	A	04780085-001	V	SWITCH,THUMBWHEEL	1	1	EA
	9	A	04910055-003	V	LOUDSPEAKER PERM MAG	1	1	EA
	10	TC	60129954-001	A	POT BRACKET	1	1	EA
	11	B	43168465-023	V	SWITCH CAP - BLACK	1	1	EA
	12	B	43168449-3210	V	RIVET, BLIND	2	2	EA
	13	P	03020001-011	V	WASHER FLAT 8	2	2	EA
	14	P	03020003-004	V	WASHER LOCK 8 STL	1	1	EA
	15	A	03050017-004	V	SPACER	1	1	EA
	16	A	03010002-049	V	SCREW PH 8	1	1	EA

Honeywell
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LOC. BILLERICA, MASSACHUSETTS, USA.

UM = UNIT OF MEASURE
EA = EACH, IN = INCHES
CM = CENTIMETER, OZ = OUNCE
G = GRAMS

* ITEMS REVISED SINCE REV. A

TITLE: BE2TS2 ASSY

SIZE T | P.L. NO. 60130702 | SHEET 1/ | REV. B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770322 | SIZE T | 60130702 | SHEET 2 | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	UM
	17	A	04040130-001	V	INT CKT (74LS00)	28	28	EA
	18	A	04040139-001	V	INT CKT (74LS03)	3	3	EA
	19	A	04040136-001	V	INT CKT (74LS04)	19	19	EA
	20	A	04040166-001	V	INT CKT (74LS05)	1	1	EA
	21	A	04040140-001	V	INT CKT (74LS08)	10	10	EA
*	22	A	04040131-001	V	INT CKT (74LS10)	8	9	EA
	23	A	04040132-001	V	INT CKT (74LS11)	5	5	EA
	24	A	04040272-001	V	IC,FLIP FLOP(74LS109	13	13	EA
	25	A	04040133-001	V	INT CKT (74LS20)	4	4	EA
	26	A	04040141-001	V	INT CKT (74LS21)	2	2	EA
	27	A	04040441-001	V	INT CKT (74LS85)	6	6	EA
	28	A	04040135-001	V	INT CKT (74LS86)	1	1	EA
	29	A	04040436-001	V	INT CKT (74LS157)	5	5	EA
	30	A	04040257-001	V	INT CKT (74LS161)	10	10	EA
	31	A	04040273-001	V	INT CKT 74LS174	6	6	EA
	32	A	04040250-001	V	INT CKT (74LS175)	1	1	EA

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* ITEMS REVISED SINCE REV. A

TITLE: BE2TS2 ASSY

SIZE T | P.L. NO. 60130702 | SHEET 2 | REV. B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770322 | SIZE T | 60130702 | SHEET 3 | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	UM
	33	A	04040152-001	V	74LS253 IC	8	8	EA
	34	A	04040157-001	V	INT CKT 74LS257	2	2	EA
	35	A	04040251-001	V	INT CKT (74LS193)	5	5	EA
	36	A	04040457-001	V	IC,FULL ADDER,TTL	2	2	EA
	37	A	04040163-001	V	INT CKT (749140)	1	-	EA
*	38	A	76952432-001	V	INT CKT (74S03)	1	2	EA
	39	A	60067019-001	V	INT CKT (74154)	1	1	EA
	40	A	04040259-001	V	INT CKT (74166)	1	1	EA
	41	A	04040755-001	V	5307A IC	1	1	EA
	42	A	04040858-001	V	INT CKT 9208	INTCH	INTCH	EA
	42	A	04040861-001	V	INT CKT 2708	1	1	EA
	43	A	78200039-001	V	INT CKT (9602)	1	1	EA
	44	A	04040856-002	V	INT CKT (2102)	16	16	EA
	45	A	76952709-002	V	INT CKT 1602	1	1	EA
	46	A	60067093-001	V	INT CKT (LM1488)	2	2	EA
	47	A	60067074-002	V	IC LM1489A	2	2	EA

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TITLE: BE2TS2 ASSY

SIZE T | P.L. NO. 60130702 | SHEET 3 | REV. B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

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770322 | SIZE T | 60130702 | SHEET 4 | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	UM
	48	A	70950400-001	V	PHOTO TRANSISTOR	2	2	EA
	49	A	76951996-002	V	INT CKT (LM311)	1	1	EA
	50	P	74201257-003	V	SWITCH8	3	3	EA
	51	A	70950553-010	V	RES NETWORK H0160	3	3	EA
	52	A	04020524-003	V	330 OHM RES NETWORK	2	2	EA
	53	B	43168781-006	V	RES 100K VAR 1W	1	1	EA
	54	A	70928100-073	V	RES 10K OHM 2P 1/4W	1	1	EA
*	55	A	70928100-029	V	RES 150 OHM 2P 1/4W	1	2	EA
	56	A	70928100-049	V	RES 1.0K OHM 2P 1/4W	33	33	EA
	57	A	70928100-080	V	RES 20K OHM 2P 1/4W	5	5	EA
	58	A	70928100-082	V	RES 24K OHM 2P 1/4W	2	2	EA
	59	A	70928100-035	V	RES 270 OHM 2P 1/4W	2	2	EA
	60	A	70928100-058	V	RES 2.4K OHM 2P 1/4W	1	1	EA
	61	A	70928100-056	V	RES 2.0K OHM 2P 1/4W	2	3	EA
*	62	A	70928100-037	V	RES 330 OHM 2P 1/4W	3	4	EA
	63	A	70928100-086	V	RES 36K OHM 2P 1/4W	2	2	EA

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TITLE: BE2TS2 ASSY

SIZE T | P.L. NO. 60130702 | SHEET 4 | REV. B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770322 | SIZE T | 60130702 | SHEET 5 | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B							UM
	64	A	70928100-062	V	RES 3.6K OHM 2P 1/4W	1	1							EA
	65	A	70928100-060	V	RES 3.0K OHM 2P 1/4W	6	6							EA
	66	A	70928100-088	V	RES 43K OHM 2P 1/4W	2	2							EA
	67	A	70928100-041	V	RES 470 OHM 2P 1/4W	1	1							EA
	68	A	70928100-089	V	RES 47K OHM 2P 1/4W	1	1							EA
	69	A	70928503-006	V	RES 500 OHM VAR 1W	1	1							EA
	70	A	70928101-027	V	RES 51 OHM 2P 1/2W	1	1							EA
	71	A	70928100-018	V	RES 51 OHM 2P 1/4W	1	1							EA
→	72	A	70928100-043	V	RES 560 OHM 2P 1/4W	1	1							EA ←
	73	A	70928100-038	V	RES 360 OHM 2P 1/4W	1	1							EA
	74	A	70928100-095	V	RES 82K OHM 2P 1/4W	1	1							EA
	75	A	04350024-001	V	CAP,056UF 50V+80-20P	50	50							EA
	76	A	76952128-254	V	.47UF 10V CAPACITOR	1	1							EA
	77	A	76952128-151	-	CAP 4.7 UF 10P 10V	1	1							--
	78	A	04360001-030	V	CAP 100 PF 100V 5P	2	2							EA
	79	A	76951965-111	V	CAP, 4.7NF	2	2							--

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* ITEMS REVISED SINCE REV. A

TITLE: BE2TS2 ASSY

SIZE	P.L. NO.	SHEET	REV.
T	60130702	5	B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770322 | SIZE T | 60130702 | SHEET 6 | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B							UM
	80	A	04350016-001	V	CAP 0.001UF 50V 20P	1	1							EA
	81	A	04350016-003	V	CAP .01UF 10P 50V	1	1							EA
	82	A	76951963-102	V	CAP .022UF 50V	2	2							EA
	83	A	76951963-209	V	CAP .47UF 50V	3	3							EA
	84	A	60067073-001	V	DIODE 125-1	3	3							EA
	85	A	43175973-004	V	TSTR 2N2222A	1	1							EA
	86	B	43140883-001	-	TSTR 2N2369	2	2							EA
	87	-	43142298-004	V	TSTR 2N2907	2	2							EA
→	88	P	04470010-009	V	CRYSTAL (11.142 MHZ)	1	1							EA ←
	89	P	03030004-001	V	NUT LW 4	6	6							EA
	90	-	03020002-021	V	WASHER FLAT NYLON	12	12							EA
	91	A	03010016-001	V	SCREW	6	6							EA
	92	B	43138943-002	V	SCREW LOCK ASSY	6	6							EA
	93	P	04120007-008	V	WIRE,ELECTRICAL	AR	AR							IN
	94	A	04910090-003	D	SOCKET 16	2	2							EA
	95	A	04120112-005	V	30AWG MAGNET WIRE	AR	AR							IN

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* ITEMS REVISED SINCE REV. A

TITLE: BE2TS2 ASSY

SIZE	P.L. NO.	SHEET	REV.
T	60130702	6	B

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770322 | SIZE T | 60130702 | SHEET 7 | REV. B

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B							UM
#	96	-	70906180-201	V	STRAP,RETAINING	-	1							EA
	900	D	60130702-101	D	BE2TS2 PLACEMENT MAP	X	-							--
#	900	D	60130702-102	D	BE2TS2 PLACEMENT MAP	-	X							--
	901	A	60130702-301	A	BE2TS2 STATUS SHEET	X	X							--
	902	D	60130705-001	D	BE2TS LBD	X	X							--
	903	A	14040011-000	M	PWB COMP ASSEM SPEC	X	X							--
	904	A	60130702-901	D	BE2TS2 WIRE LIST	X	X							--
#	905	A	60130702-501	D	BE2TS2 DIFF DOC W/E	-	X							--

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IN = INCHES
OZ = OUNCE

ITEMS REVISED SINCE REV. A

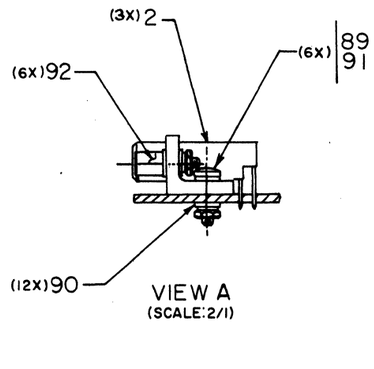
TITLE: BE2TS2 ASSY

SIZE T | P.L. NO. 60130702 | SHEET 7F | REV. B

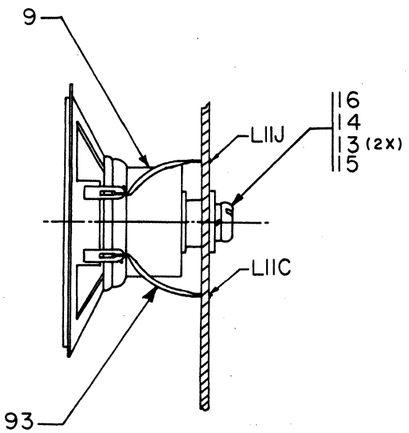
MS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

5 # SUBSTITUTE PARTS

REVISIONS					
REV	AUTHORITY	DATE YR	MO	DAY	SIGNATURE
A	BLCD68175	77	02	04	



VIEW A
(SCALE: 2/1)



VIEW B
(SCALE: 2/1)

△10. SLEEVE LEADS AND HAND INSERT L12A, L14B, M14A.
△9. MASK AREA SHOWN BEFORE FLOW SOLDERING.
△8. INSTALL SOCKET (ITEM 94) BEFORE ADDING (ITEM 22)
△7. REMOVE PIN 4 OF ITEM 3 BEFORE INSTALLING.
△6. INSTALL SPEAKER (ITEM 9) IN .187 DIA. HOLE LOCATED IN ZONE L11 PER VIEW B.
△5. INSTALL (ITEM 2) CONNECTORS PER VIEW A.
4. MOUNT 1 WATT RESISTORS .06 INCH (MIN.) FROM SURFACE OF ITEM 1.
3. SOLID BAND INDICATES CATHODE OF DIODE.
2. LOCATE PIN 1 OF DIPS AS SHOWN UNLESS OTHERWISE SPECIFIED.
1. ASSEMBLE PER ITEM 903.

NOTES:

REF SPEC NO

0 10 20 30 40 50 60 70 80 MM
0 1 2 3 IN

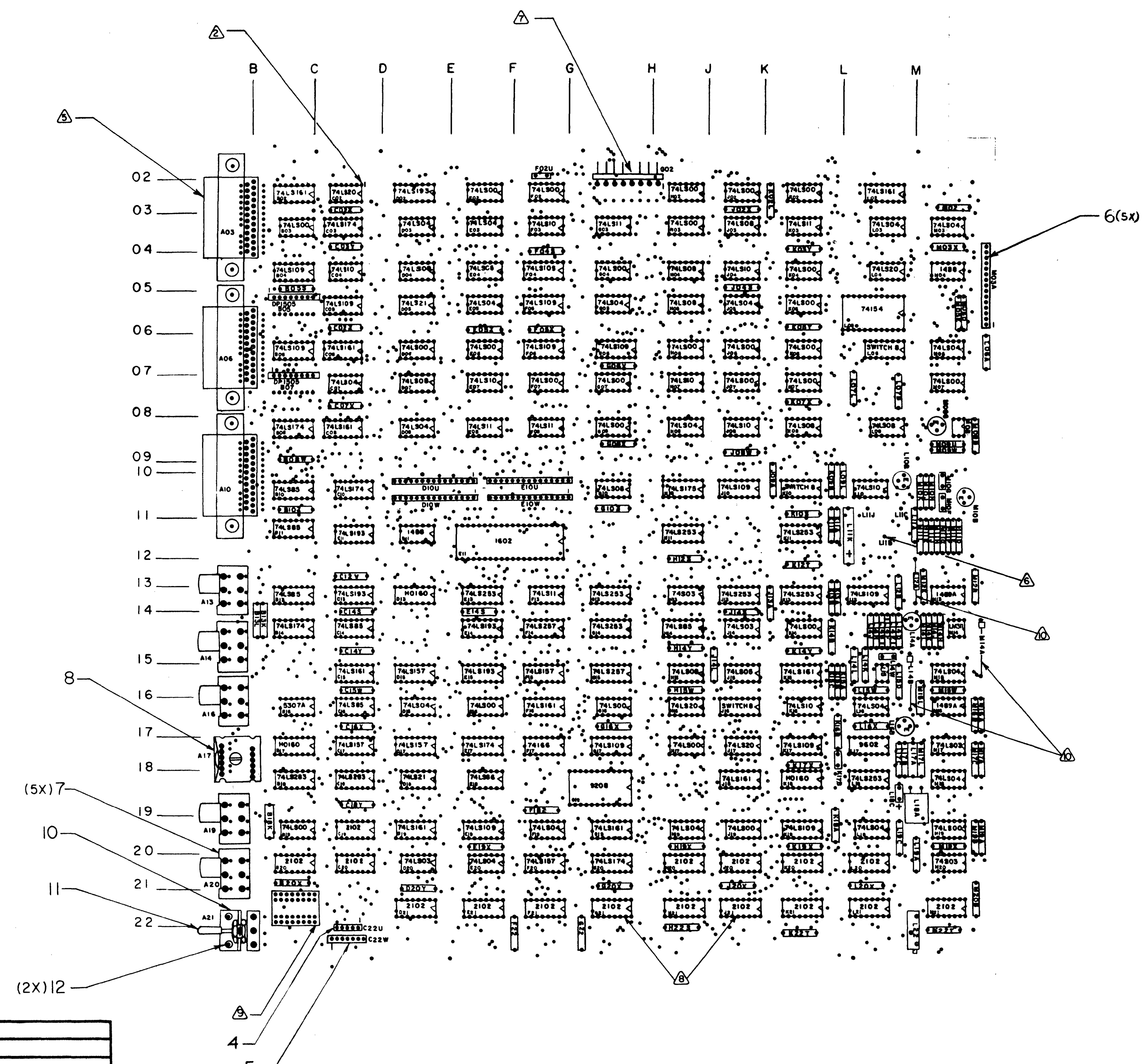
UNLESS OTHERWISE SPECIFIED
DIMENSIONS= MILLIMETERS / INCHES
TOLERANCE OF SIZE AND FORM PER
INITIAL DESIGN
PROJECTION
SCALE NONE | CODE NML
MATL
TREAT.
FIN.
DR V. TRAVERS 77-02-04
APPD

Honeywell
HONEYWELL INFORMATION SYSTEMS
LOC BLC U. S. A.

TITLE BE2TS2 PLACEMENT MAP
SIZE D | DWG NO 60130702-101 | SH 1/2 | REV A

60130702-101

REVISIONS					
REV	AUTHORITY	DATE YR	MO	DAY	SIGNATURE



P/L ITEM	COMPONENT
75	B05S.B08W.B10Z.B20X.C02X.C03Y.C05Z.C07X C12V.C14S.C14Y.C15W.C16X.C18Y.D20Y.E05Z.E14S.E19X F04S.H14Y.F18Z.G06X.G08X.G10Z.G16X.G20X.H12S H15W.H19X.H22S.J02X.J04S.J08W.J14S.J20X.K03Y K05Y.K07X.K10S.K12T.K14Y.K17X.K19X.K22T.M15W L16X.L20X.M19X .M03X.M22T
48	L15F.M08C
54	L14H
56	B13K.B13L.B18K.F22.G22.J09A.J13A.J14L.K09B. K11A.K11B. .K18A.L07L.L09L.L12A.L12B.L14J. L14K.L17B.L17C.M05D.L06A.M20B.M09W.M17A. M17C.M19A.M19B.M11L.M15L.L07B.M05E.
57	M11J.M11K.M11D.M11G.M11H
58	M14H.M10H
59	M14L.L19A
61	K13B.K15C -
62	M12B.M14K.M16A
64	M11E
65	K13A.K15B.L14D.M14J.M02.M17L
66	K16B.L19C
67	K02L
68	M09U
69	L22
70	L11A
71	L15D
72	M16B
73	F05X
74	L15W
76	L11K
77	L18C
78	L14L.L17A
79	L14W F02U
80	K14B
81	M12K
82	L14B.M14A
83	K17B.M10G.M10F
84	L14E.L14F.L14G
85	M08G
60	M11F
63	M10J.M10K
53	A21
55	M08B-K15A
86	L14A.L16B
87	M10B.L10B
88	L18A
94	G21.J21

REF SPEC NO

UNLESS OTHERWISE SPECIFIED
DIMENSIONS= MILLIMETERS / INCHES
TOLERANCE OF SIZE AND FORM PER
INITIAL DESIGN
PROJECTION
SCALE 1/1 | CODE NML

MATL
TREAT.
FIN.
DR V. Travera
APPD

Honeywell
HONEYWELL INFORMATION SYSTEMS
LOCBLC U. S. A.

TITLE: BE2TS2 PLACEMENT MAP

SIZE: D | DWG NO: 60130702-10 | SH: 2F | REV: B

60130702-10

MIS 2342 3-73 FILM

770924 | SIZE T | 60130730 | SHEET 1/2 | REV C

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	002C						UM
*	1	T	60130732-001	A	BE2TCY FABRICATED BD	1	1	1						EA
*	2	NA	04830331-001	V	CONN 25POS 90DEG PWB	3	3	3						EA
*	3	NA	04820294-208	V	CONNECTOR,MALE	1	1	1						EA
*	4	NA	04820293-002	V	CONN,MALE,PWB, 5 PIN	1	1	1						EA
*	5	NA	04820293-003	V	CONN,MALE,PWB, 7 PIN	1	1	1						EA
*	6	NA	04820293-005	V	CONN,MALE,PWB,15 PIN	1	1	1						EA
*	7	NA	70934302-001	-	SWITCH SLIDE	5	5	5						EA
*	8	NA	04780085-001	V	SWITCH-THUMBWHEEL	1	1	1						EA
*	9	NA	04910055-003	V	LOUDSPEAKER	1	1	1						EA
*	10	TC	60129954-001	A	POT BRACKET	1	1	1						EA
*	11	B	43168465-023	V	SWITCH CAP - BLACK	1	1	1						EA
*	12	B	43168449-3210	V	RIVET, BLIND	2	2	2						EA
*	13	P	03020001-050	V	WASHER FLAT 8	1	1	1						EA
*	14	P	03020003-004	V	WASHER LOCK 8 STL	1	1	1						EA
*	15	P	03020002-003	V	WASHER FLAT NYLON	2	2	2						EA
*	16	A	03010002-016	V	SCREW PH 8	1	1	1						EA

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HONEYWELL INFORMATION SYSTEMS
LOC. BILLERICA, MASSACHUSETTS, USA.

UM - UNIT OF MEASURE
EA - EACH IN - INCHES
CM - CENTIMETER OZ - OUNCE
G - GRAMS

* ITEMS REVISED SINCE REV. B

TITLE: BE2TCY ASSY

SIZE T | P.L. NO. 60130730 | SHEET 1/2 | REV C

NS 894
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770924 | SIZE T | 60130730 | SHEET 2 | REV C

*	ITEM NO.	PC	IDENTIFICATION NO	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	002C						UM
*	17	A	04040130-001	V	IC (74LS00)	28	28	28						EA
*	18	A	04040139-001	V	IC (74LS03)	3	3	3						EA
*	19	A	04040136-001	V	IC (74LS04)	19	19	19						EA
*	20	A	04040166-001	V	IC (74LS05)	1	1	1						EA
*	21	A	04040140-001	V	IC (74LS08)	10	11	11						EA
*	22	A	04040131-001	V	IC (74LS10)	10	10	10						EA
*	23	A	04040132-001	V	IC (74LS11)	5	5	5						EA
*	24	A	04040272-001	V	IC (74LS109)	13	13	13						EA
*	25	A	04040133-001	V	IC (74LS20)	4	4	4						EA
*	26	A	04040141-001	V	IC (74LS21)	2	2	2						EA
*	27	A	04040441-001	V	IC (74LS85)	6	6	6						EA
*	28	A	04040135-001	V	IC (74LS86)	1	1	1						EA
*	29	A	04040436-001	V	IC (74LS157)	5	5	5						EA
*	30	A	04040257-001	V	IC (74LS161)	10	10	10						EA
*	31	A	04040273-001	V	IC (74LS174)	6	6	6						EA
*	32	A	04040250-001	V	IC (74LS175)	1	1	1						EA

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LOC. BILLERICA, MASSACHUSETTS, USA.

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EA - EACH IN - INCHES
CM - CENTIMETER OZ - OUNCE
G - GRAMS

* ITEMS REVISED SINCE REV. B

TITLE: BE2TCY ASSY

SIZE T | P.L. NO. 60130730 | SHEET 2 | REV C

NS 894
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

VERSION TITLE= BLC SUB TO BASE

770924 | SIZE T | 60130730 | SHEET 3 | REV C

•	ITEM NO.	P C	IDENTIFICATION NO.	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	002C						U M
*	33	A	04040152-001	V	IC (74LS253)	8	8	8						EA
*	34	A	04040157-001	V	IC (74LS257)	2	2	2						EA
*	35	A	04040251-001	V	IC (74LS193)	5	5	5						EA
*	36	A	04040457-001	V	IC (74LS283)	2	2	2						EA
*	37	A	76952432-001	V	IC (74S03)	1	1	1						EA
*	38	A	60067019-001	V	IC (74154)	1	1	1						EA
*	39	A	04040259-001	V	IC (74166)	1	1	1						EA
*	40	A	04040755-001	V	IC (5307A)	1	1	1						EA
*	42	A	04040858-201	V	IC (9208) ROM	1	1	1						EA
*	42	A	04040861-001	V	IC (2708) ROM	-	-	INTCH						EA
*	43	A	78200039-001	V	IC (9602)	1	1	1						EA
*	44	A	04040856-002	V	IC (2102A-2)	16	16	16						EA
*	45	A	76952709-002	V	IC (1602)	1	1	1						EA
*	46	A	60067093-001	V	IC (1488)	2	2	2						EA
*	47	A	60067074-002	V	IC (1489A)	2	2	2						EA
*	48	A	70950400-001	V	IC (202-PCP) 2.0 MA	2	2	2						EA

Honeywell
HONEYWELL INFORMATION SYSTEMS
LOC. BILLERICA, MASSACHUSETTS, USA.

UM - UNIT OF MEASURE
EA - EACH IN - INCHES
CM - CENTIMETER OZ - OUNCE
G - GRAMS

* ITEMS REVISED SINCE REV. B

TITLE: BE2TCY ASSY

SIZE	P.L. NO.	SHEET	REV.
T	60130730	3	C

MS 894
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

VERSION TITLE= BLC SUB TO BASE

770924 | SIZE T | 60130730 | SHEET 4 | REV C

•	ITEM NO.	P C	IDENTIFICATION NO	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	002C						U M
*	49	A	76951996-002	V	IC (LM311N)	1	1	1						EA
*	50	A	74202440-005	V	SWITCH 8	3	3	3						EA
*	51	NA	70950553-010	V	RES NETWORK H0160	3	3	3						EA
*	52	NA	04020524-003	V	330 OHM RES NETWORK	2	2	2						EA
*	53	NA	43168781-006	V	RES 100K VAR 1W	1	1	1						EA
*	54	RA	70928100-073	V	RES 10K OHM 2P 1/4W	1	1	1						EA
*	55	RA	70928100-029	V	RES 150 OHM 2P 1/4W	2	2	2						EA
*	56	RA	70928100-049	V	RES 1.0K OHM 2P 1/4W	32	31	31						EA
*	57	RA	70928100-080	V	RES 20K OHM 2P 1/4W	5	6	6						EA
*	58	NA	70928100-082	V	RES 24K OHM 2P 1/4W	2	2	2						EA
*	59	RA	70928100-035	V	RES 270 OHM 2P 1/4W	2	2	2						EA
*	60	NA	70928100-058	V	RES 2.4KOHM 2P1/4WEA	1	1	1						EA
*	61	RA	70928100-056	V	RES 2.0K OHM 2P 1/4W	3	3	3						EA
*	62	RA	70928100-037	V	RES 330 OHM 2P 1/4W	4	4	4						EA
*	63	NA	70928100-086	V	RES 36K OHM 2P 1/4W	2	2	2						EA
*	64	NA	70928100-062	V	RES 3.6K OHM 2P 1/4W	1	1	1						EA

Honeywell
HONEYWELL INFORMATION SYSTEMS
LOC. BILLERICA, MASSACHUSETTS, USA.

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CM - CENTIMETER OZ - OUNCE
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* ITEMS REVISED SINCE REV. B

TITLE: BE2TCY ASSY

SIZE	P.L. NO.	SHEET	REV
T	60130730	4	C

MS 894
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770924 | SIZE T | 60130730 | SHEET 5 | REV C

*	ITEM NO.	P C	IDENTIFICATION NO	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	002C						U M
*	65	NA	70928100-060	V	RES 3.0K OHM 2P 1/4W	6	6	6						EA
*	66	NA	70928100-088	V	RES 43K OHM 2P 1/4W	2	2	2						EA
*	67	NA	70928100-041	V	RES 470 OHM 2P 1/4W	1	1	1						EA
*	68	NA	70928100-089	V	RES 47K OHM 2P 1/4W	1	1	1						EA
*	69	NA	70928503-006	-	RES VAR WW RECTILIN	1	1	1						EA
*	70	RA	70928101-027	V	RES 51 OHM 2P 1/2W	1	1	1						EA
*	71	RA	70928100-018	V	RES 51 OHM 2P 1/4W	1	1	1						EA
*	72	NA	70928100-043	V	RES 560 OHM 2P 1/4W	1	1	1						EA
*	73	NA	70928100-038	V	RES 360 OHM 2P 1/4W	1	1	1						EA
*	74	RA	70928100-095	V	RES 82K OHM 2P 1/4W	1	1	1						EA
*	75	NA	04350024-001	V	CAP.056UF 50V+80-20P	50	50	50						EA
*	76	RA	76952128-254	V	47UF 10V CAPACITOR	1	1	1						EA
*	77	RA	76952128-151	P	CAP 4.7 UF 10% 10V	1	1	1						EA
*	78	A	04360001-030	V	CAP 100 PF 100V 5P	2	2	2						EA
*	79	RA	76951965-111	V	CAP. 4.7NF	2	2	2						--
*	80	NA	04350016-001	V	CAP 0.001UF 50V 20P	1	1	1						EA

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CM - CENTIMETER OZ - OUNCE
G - GRAMS

* ITEMS REVISED SINCE REV. B

TITLE: BE2TCY ASSY
SIZE T | P.L. NO. 60130730 | SHEET 5 | REV C

MS 094
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770924 | SIZE T | 60130730 | SHEET 6 | REV C

*	ITEM NO.	P C	IDENTIFICATION NO	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	002C						U M
*	81	RA	76952149-117	V	CAP 0.01UF 100V 5P	1	1	1						EA
*	82	A	76951963-102	P	CAP 50V .022UF 20(	2	2	2						EA
*	83	A	76951963-209	P	CAP 50V .47 UF 20(	3	3	3						EA
*	84	NA	60067073-001	V	DIODE 125-1	3	3	3						EA
*	85	NA	43175973-004	V	TRANSISTOR	1	1	1						EA
*	86	NA	43140883-001	P	TRANSISTOR	2	2	2						EA
*	87	NA	43142298-004	V	TSTR 2N2907	2	2	2						EA
*	88	NA	04470010-009	V	CRYSTAL (11.142 MHZ)	1	1	1						EA
*	89	P	03030004-001	V	NUT LW 4	6	6	6						EA
*	90	P	03020002-001	V	WASHER FLAT NYLON	6	6	6						EA
*	91	A	03010016-001	V	SCREW	6	6	6						EA
*	92	B	43138943-002	V	SCREW LOCK ASSY	INTCH	INTCH	INTCH						EA
*	92	-	04890109-001	V	RETAINER ELEC CONN	6	6	6						EA
*	93	-	70906180-001	V	STRAP RETAINING	1	1	1						EA
*	94	NA	04430074-002	-	DIODE SI 3472	1	1	1						EA
*	95	NA	70928102-010	V	RES 24 OHM 2% 1W	1	1	1						EA

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G - GRAMS

* ITEMS REVISED SINCE REV. B

TITLE: BE2TCY ASSY
SIZE T | P.L. NO. 60130730 | SHEET 6 | REV C

MS 094
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

VERSION TITLE BLOCK SUB TO BASE 770924

SIZE		SHEET	REV.
T	60130730	7	C

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001A	002B	002C						UM
*	96	A	59701646-002		SOCKET-24PIN-LOW-PRO	1	1	1						EA
*	97	P	04120007-008	V	WIRE,ELECTRICAL	AR	AR	AR						IN
*	98	P	03020001-004	V	WASHER FLAT 4	6	6	6						EA
*	99	RA	70928100-066	V	RES 5.1K OHM 2P 1/4W	-	1	1						EA
	900	D	60130730-101	D	BE2TCY PLACEMENT MAP	X	-	-						--
*	900	D	60130730-102	D	BE2TCY PLACEMENT MAP	-	X	X						--
*	901	A	60130730-301	D	BE2TCY STATUS SHEET	X	X	X						--
*	902	D	60130734-001	D	BE2TCY LBD	X	X	X						--
*	903	A	14040011-000	M	PWB COMP ASSEM SPEC	X	X	X						--
	904	R	60130733-001	D	BE2TCY FILESET	X	-	-						--
*	904	R	60130733-002	D	BE2TCY FILESET	-	X	X						--
*	905	T	60130730-501	D	BE2TCY DIFF DOC W/E	-	X	X						--
	906	A	60130730-801	D	BE2TCY DIFF DOC P/A	-	X	-						--
*	906	A	60130730-802	D	BE2TCY DIFF DOC P/A	-	-	X						--

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G - GRAMS

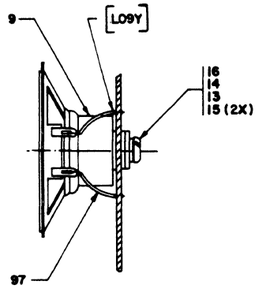
* ITEMS REVISED SINCE REV. B

TITLE			
BE2TCY ASSY			
SIZE	P.L. NO.	SHEET	REV.
T	60130730	7F	C

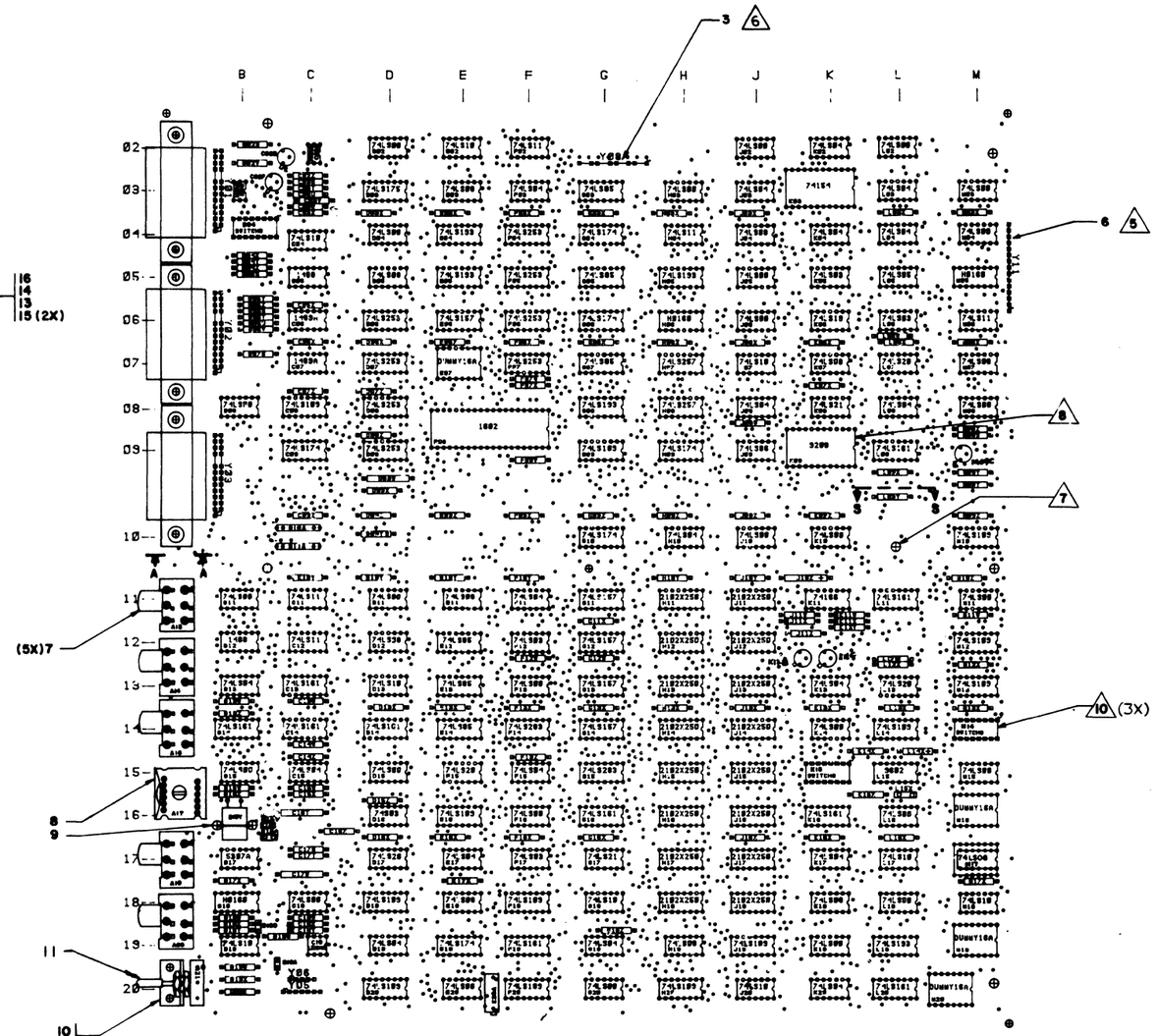
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

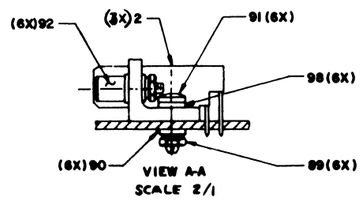
S = SUBSTITUTE PARTS

REVISIONS					
REV	AUTHORITY	DATE YR	MO	DAY	SIGNATURE
A	BLC070863	77	06	10	
B	BLC070863	77	08	11	



VIEW S-S
SCALE 2/1





VIEW A-A
SCALE 2/1

P/L ITEM NO	COMPONENT
53	A2.
56	B02X.B04Y.B04Y.B07Z.B13V.B13Z.B15Y.B16X.B18X.B18Y. C03T. C07Z.C14Z.C15W.C15X.C18X.D07Z.D08Z.F07W. F07X.F09V.F13Z.G11X.G12W.J08W K07X.L06W.L09X.M08Z. M09T.M11W.
71	M02V.
72	M06X.
73	M08Y.B08Z.B08U.B06V.B07S.L12W
74	M09S.
80	B06T.
82	B17X.
83	B13Y.
85	B16A.B16V.L16Y.
75	B20U.C00X.C05Z.C18V.D03X.D06X.H05X.D05Z.D10Y.D13Y. E03Y.E06X.E09Z.E10Y.E13X.E16X.F03Y.F06X.F09Z.F10Y. F13X.F16X.G03X.G06X.G09Z.G13X.G16X.H03X.H06X.H09Z. H10Y.K13X.J03X.J06X.J09Z.J10Y.J13X.J16X.K06X.K09Z. K10X.L03X.L06X.L13X.L16X.M03X.M06X.M09Z.M10Z.M13X.
55	C05W.
63	B17Z.B18X.
64	B11W.B15X.
65	B10W.B13S.
81	B13W.
86	C02X.
87	C02F.H05C.
88	C02Z.
89	C03X.C16X.
90	C03W.C13W.C17X.C18W.C18Y.J11W.
91	C04Y.C10Z.
92	C05Y.
93	L04Z.B11X.M09Y.M10X.
94	C14W.C17Y.F12W.
95	C18T.C17W.
96	D04Y.
97	D05Y.
98	D10X.J11Z.
99	E50X.
76	J10Z.
84	J11X.K11W.K11Z.
54	K11Y.
66	K12B.K12C.
72	K13Y.
68	K14X.K15X.
9	L05Y.
67	L12X.
77	L14X.
78	M05S.
70	M12X.
99	K06S
8	DUMMY LOCATION

NOTES:
1. ASSEMBLE PER ITEM 903
2. MASK ALL AREAS MARKED DUMMY BEFORE FLOW SOLDERING.
3. LOCATE PIN 1 OF DIPS AS SHOWN UNLESS OTHERWISE SPECIFIED.
4. SOLID BAND INDICATES CATHODE OF DIODE
5. REMOVE PIN 3 OF ITEM 6 (Y11) BEFORE INSTALLING
6. REMOVE PIN 4 OF ITEM 3 (Y08) BEFORE INSTALLING
7. INSTALL SPEAKER (ITEM 9) IN .187 DIA HOLE IN LOCATION L10 PER VIEW S-S.
8. INSTALL SOCKET (ITEM 98) BEFORE ADDING ITEM 42
9. INSTALL CONNECTORS (ITEM 2) PER VIEW A
10. HAND INSERT ITEM 50 (SWITCH 8) AFTER FLOW SOLDERING PROCESS. DO NOT CRIMP LEADS. HAND SOLDER.
11. HAND INSERT THE FOLLOWING COMPONENTS OR ADJUST CLINCHER FOR 45° CLINCH.
C08Z, E06X, E13X, E16X, F06X, F10Y, H06Y, H10Y, J03X, M08Z, M10Z, C15W, C15X, F07W, F07X, F13Z, J08W, K07X, L06W, L09X, M09T, M11W, M09S, D15Z, M08Y, L09Y, C13W, C17S, J11W, J11X, K11W, K11Y, K13X, L12X, L14X, E17X, C16X, D16X, C17T

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MATL		HONEYWELL	
		HONEYWELL INFORMATION SYSTEMS	
		LOC BIL	U.S.A.
60138732-801A	CH-MAP	ASSEMBLY DRAWING	
SCALE 1/1	CODE NML	DR P. GAGNON	BE2TCY
		APPD	SIZE D DWG NO. 60130730-102 SH 1/1 REV B

60130730-102

770322 | SIZE TX | BKBD002A | SHEET 1/ | REV. A

•	ITEM NO.	P C	IDENTIFICATION NO.	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001	UM
	1	TD	60129887-004	A	KEYBOARD ASSY	1	EA
	2	A	60126281-143	P	TECH ID TAG MARKING	1	EA

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HONEYWELL INFORMATION SYSTEMS
LOC. BILLERICA, MASSACHUSETTS, USA.

UM = UNIT OF MEASURE
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* NOT APPLICABLE

TITLE: TTYC KEYBOARD

SIZE TX | P.L. NO. BKBD002A | SHEET 1F | REV. A

NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

S = SUBSTITUTE PARTS

770322 | SIZE TD | 60129887 | SHEET 1/ | REV. E

•	ITEM NO.	P C	IDENTIFICATION NO.	S C	DRAWING TITLE	ASSEMBLY/QUANTITY 001	002	003	004	UM
	1	TD	60129760-001	A	KEYBOARD COVER ASSY	1	-	1	1	EA
	2	TD	60129760-002	A	KEYBOARD COVER ASSY	-	1	-	-	EA
	3	TD	60129759-001	P	KEYBOARD BASE	1	1	1	1	EA
	4	A	04910095-002	V	KEYBOARD	-	1	-	-	EA
	5	A	59732801-001	V	KEYBOARD-ENG A-N U-L	1	-	-	-	EA
	6	A	43168065-007	V	BUMPER	4	4	4	4	EA
	7	A	03010002-010	V	SCREW PH 6	4	4	4	4	EA
	8	P	03020001-049	V	WASHER FLAT 6	4	4	4	4	EA
	9	P	03020003-003	V	WASHER LOCK 6 STL	4	4	4	4	EA
	10	TD	60129864-001	A	RIBBON CABLE ASSY	1	1	1	1	EA
*	13	A	59733784-XXX	D	KEYBOARD	-	-	X	-	--
*	14	A	04910099-001	V	KEYBOARD	-	-	-	1	EA
*	15	A	60126281-XXX	P	TECH ID TAG MARKING	X	X	X	X	EA

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* ITEMS REVISED SINCE REV. D

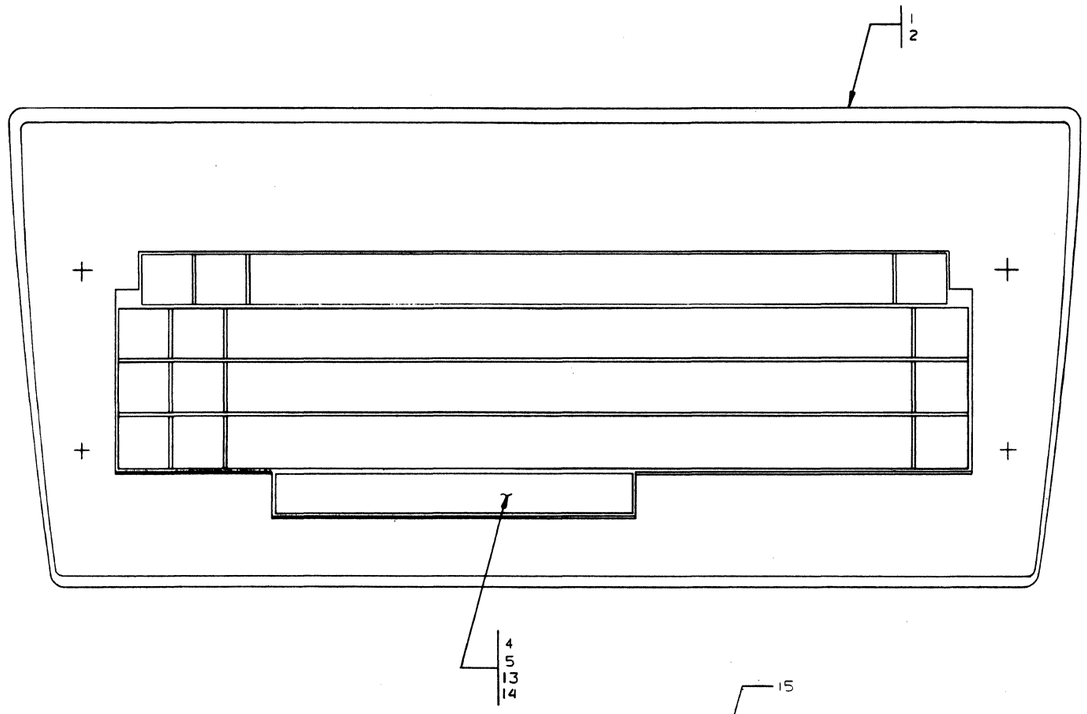
TITLE: KEYBOARD ASSY

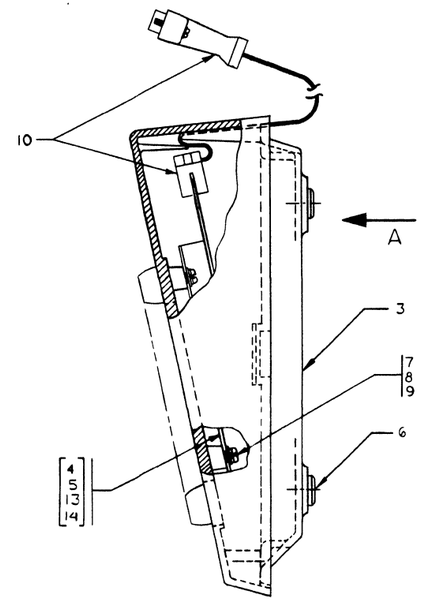
SIZE TD | P.L. NO. 60129887 | SHEET 1F | REV. E

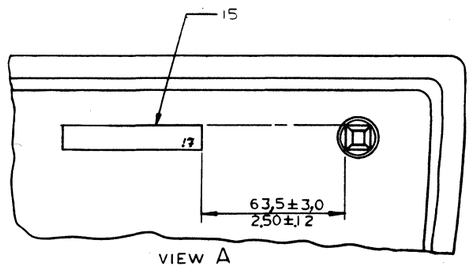
NS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? NO

S = SUBSTITUTE PARTS

REVISIONS						
REV	AUTHORITY	DATE YR	MO	DAY	SIGNATURE
A	DIN 78023	75	12	5	R. Hall
B	BLCO 60513	76	4	25	S.C. Hamm
C	BLCO 60637	76	6	02	R. Hall
D	BLCO60981	76	09	16	R. Hall
E	BLCC61666	77	1	28	R. Hall







VIEW A

(001) (002) (004)

004	003	002	001
NEXT ASSY	NEXT ASSY	NEXT ASSY	NEXT ASSY

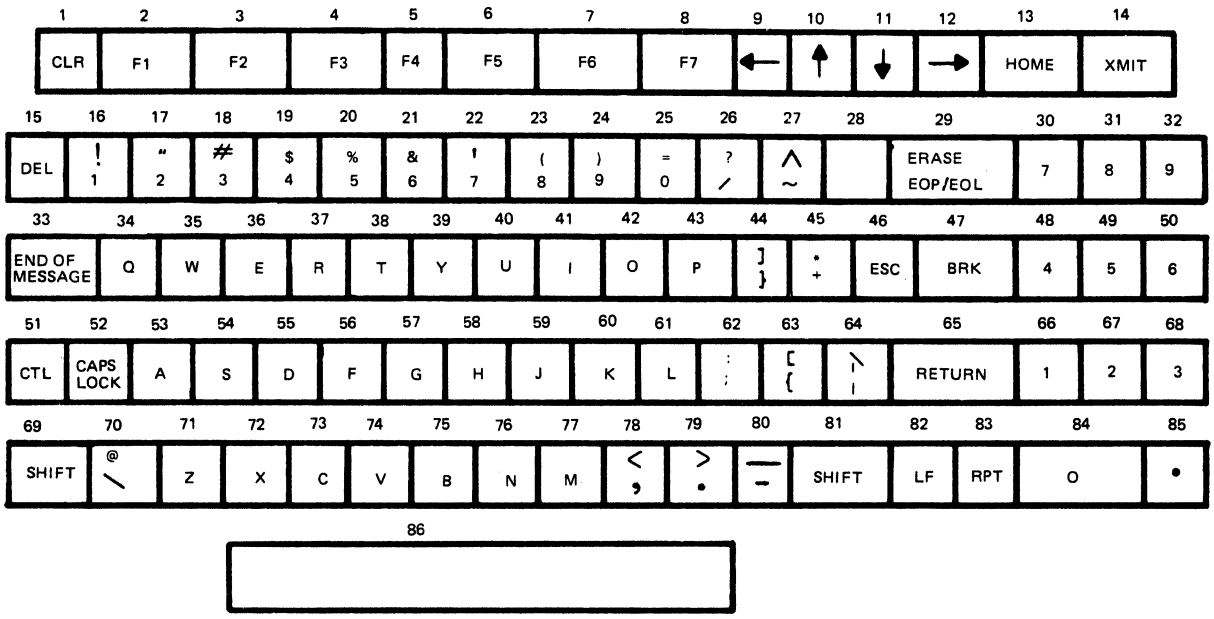
UNLESS OTHERWISE SPECIFIED
DIMENSIONS= MILLIMETERS / INCHES
TOLERANCE OF SIZE AND FORM PER
INITIAL DESIGN IN
PROJECTION
SCALE 1/1 CODE
MATL
TREAT.
FIN.
DR. F. Kangas 75 NOV 5
APPD

Honeywell
HONEYWELL INFORMATION SYSTEMS
LOC BILLERICA, MASS. U. S. A.
TITLE KEYBOARD ASSY
SIZE D DWG NO 60129887 SH 1/1 REV E

REF SPEC NO

MIS 2343 (3-73) FILM

Keytops for Keyboard Assembly 04910099-001



NOTES

1. When ordering keytops, prefix each keytop part number with 04910099-1. For example, the part number for keytop Q is 04910099-134.
2. The part number for a complete set of keytops is 04910099-500.

770722 | SIZE TB | 59400394 | SHEET 1/F | REV. J

*	ITEM NO.	PC	IDENTIFICATION NO.	SC	DRAWING TITLE	ASSEMBLY/QUANTITY 001	10A	50A						UM
	1	C	59603385-001	P	CABLE	1	10	50						IN
	3	B	43168200-001	P	HOOD	2	2	2						EA
	4	B	43168204-002	V	BUSHING CABLE ADAPTR	2	2	2						EA
	5	C	59603407-003	P	MARKER	1	1	1						EA
	6	-	878B222.-100	R	SLEEVING THERMO	INTCH	INTCH	INTCH						EA
	6	P	04170011-031	V	SLVG HEAT SHRINK SM	2	240	1200						IN
	7	B	43223079-005	V	CONNECTOR 25-PIN	2	2	2						EA
	8	B	43223079-111	V	CONTACT MALE BU	24	-	-						EA
►	P0001	D	59802021-020	P	CONNECTOR	-	1	1						EA ◄
	P0002	D	59802021-020	P	CONNECTOR	-	1	1						EA

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* ITEMS REVISED SINCE REV. H

TITLE: CABLE ASSY W3-W4

SIZE TB | P.L. NO. 59400394 | SHEET 1F | REV. J

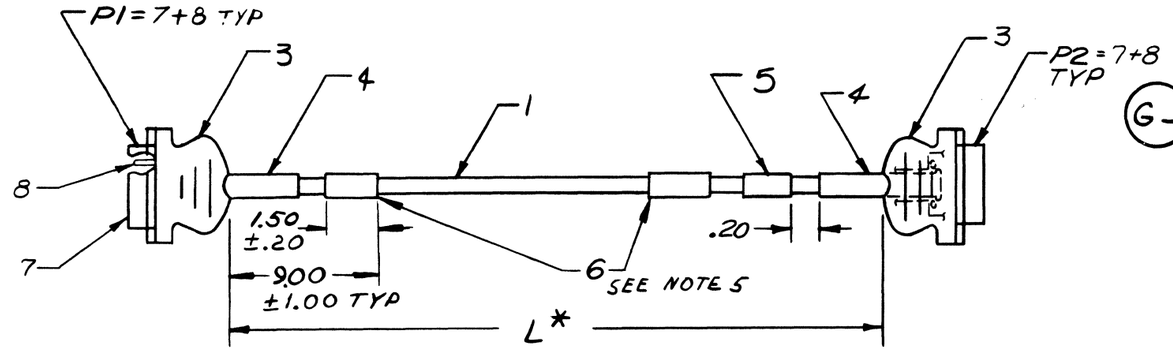
MS 851
DOES A DOCUMENT REVISION STATUS SHEET EXIST? YES

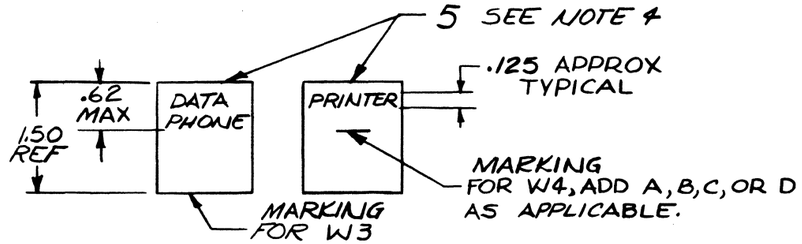
S = SUBSTITUTE PARTS

SIZE B | 59B400394 | SHEET 1 of 2 | REV J

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	C	REVISED & REDRAWN	95279-4	29 APR 66	R. Hall
	D	ADDED PT 6	95317-2	16 JUNE 66	C. Hall
	E	DELETE PT 6 & ADD NOTE 5 & NEW PT 6	95474-3	17 JAN 68	80 Fuller
	E1	REV'D NOTE 3 & 5	RECORD	18 MAR 68	Johnson

FOR DOCUMENT STATUS SEE REVISION STATUS SHEET





G- * BULK CABLE LENGTH SHALL BE 1 FT. LONGER THAN GROUP LENGTH SPECIFIED.

1. LENGTH & ASSEMBLY INSTRUCTIONS ARE DEFINED BY GROUP NO. AS FOLLOWS:
   59B400394G
   10 FT. INCREMENTS
   1 FT. INCREMENTS
   AOR1 - ASSEMBLED CABLE OF SPECIFIED LENGTH
   BOR2 - BULK CABLE & CONNECTOR PARTS NOT ASSEMBLED. *
   STANDARD LENGTH CABLE (50'-0") ASSEMBLED, MAY BE SPECIFIED AS GROUP 0000.
2. MAX PERMISSIBLE LENGTH - 50 FT.
3. LENGTH TOL ±6.00 IN. UP TO 25 FT. LENGTH TOL ±2.00 IN. FOR EACH ADDITIONAL 25 FT.
4. PART 5 SHALL BE MARKED WITH A BALL POINT PEN OR TYPE WRITTEN AS SHOWN.
5. MARK PT 6 PER 43A144110 AS A LOGIC CABLE.

FOR DOCUMENT STATUS SEE REVISION STATUS SHEET

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:
FRACTIONS ± DECIMALS ±.02 ANGLES ±
ALL SURFACES ✓
MATL-

SIGNATURES	DAY	MO	YR
DRAWN D. McFEELY	13	12	65
CHECKED			
ISSUED J. ODEN	13	1	66
ENGRG L. NAMETH	11	1	66
MFG H. THOMAS	13	1	66
MATLS			

Honeywell
HONEYWELL INFORMATION SYSTEMS
LOC OKLA. CITY, OKLA. U.S.A.

CABLE ASSEMBLY W3 - W4

SIZE	CODE IDENT NO.		REV
B		59B400394	J

SCALE NONE | SHEET 1 of 2

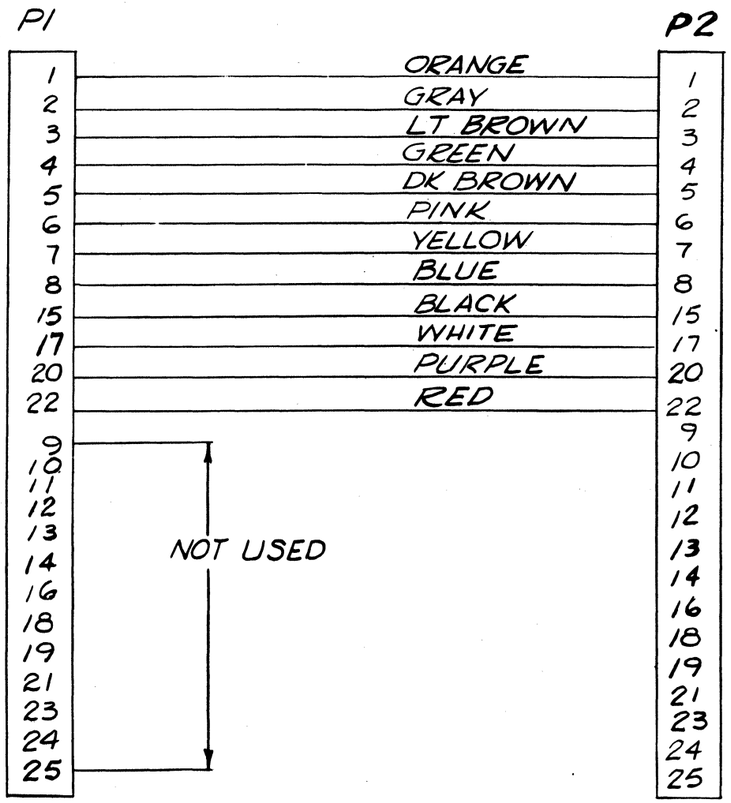
FN-902-F (12-65) PRINTED IN U.S.A.

FRI-35

SIZE	59B400394	SHEET	REV
B		2 of 2	J

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	WIRE 15 WAS 11, WIRE 17 WAS 12 95172	15 FEB 66	McFeely



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:
FRACTIONS ± DECIMALS ± ANGLES ±
ALL SURFACES ✓
MATL.

SIGNATURES	DAY	MO	YR
DRAWN McFeely	14	12	65
CHECKED			
ISSUED	13	1	66
ENGRG	11	1	66
MFG	11	1	66
MATLS			

Honeywell
HONEYWELL INFORMATION SYSTEMS
LOC OKLA CITY, OKLA U.S.A.

CABLE ASSEMBLY
W3

SIZE	CODE IDENT NO.	
B	59B400394	J
SCALE —		SHEET 2 OF 2

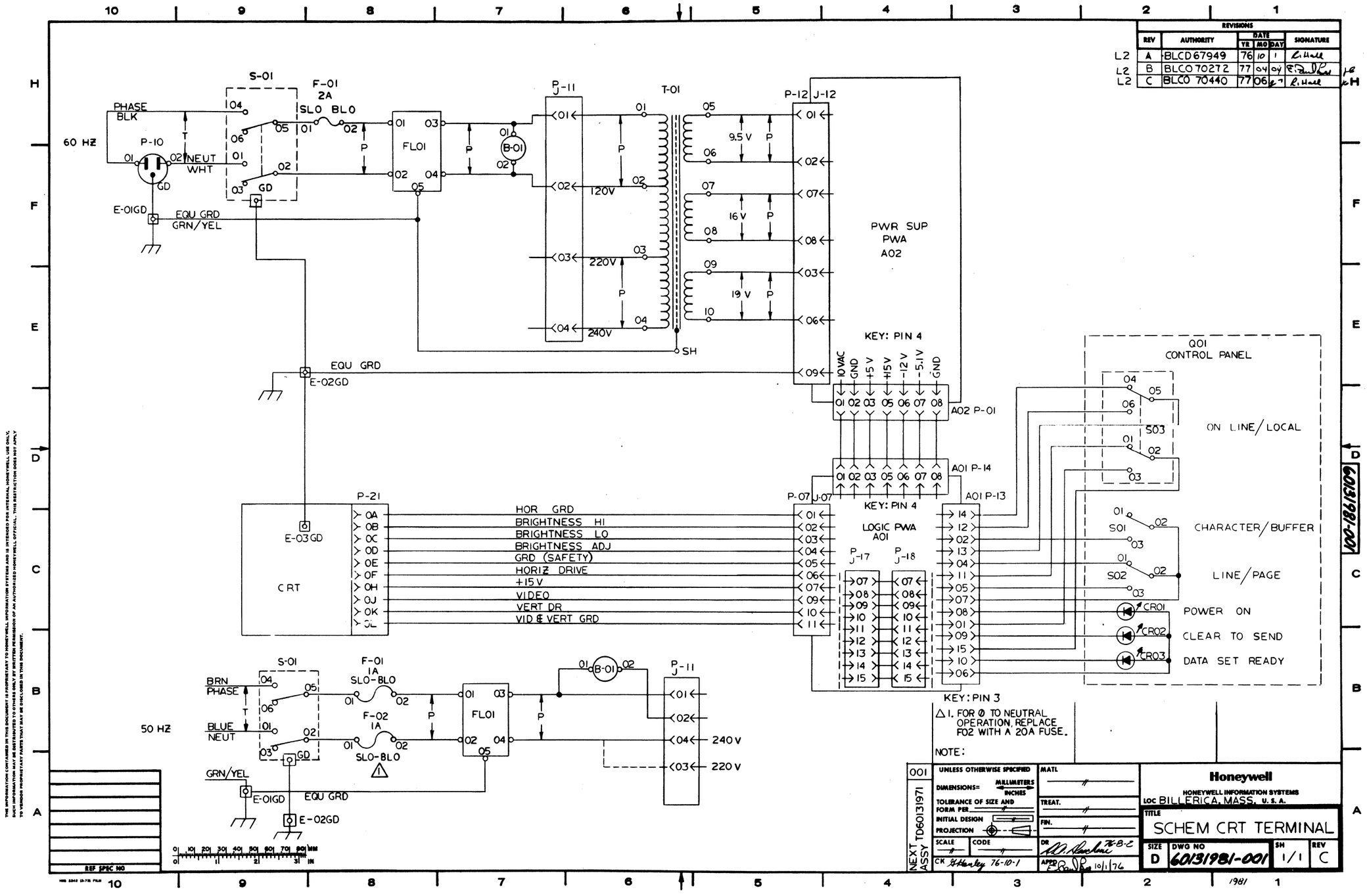
FN-902-F (9-64) REV PRINTED IN U.S.A.

XI REFERENCE DIAGRAMS

This section provides reference information which will assist a trained technician in isolating faults and making repairs below the Optimum Replaceable Unit (ORU) level should this become necessary. However, no specific repair procedures are given.

This section contains the following information.

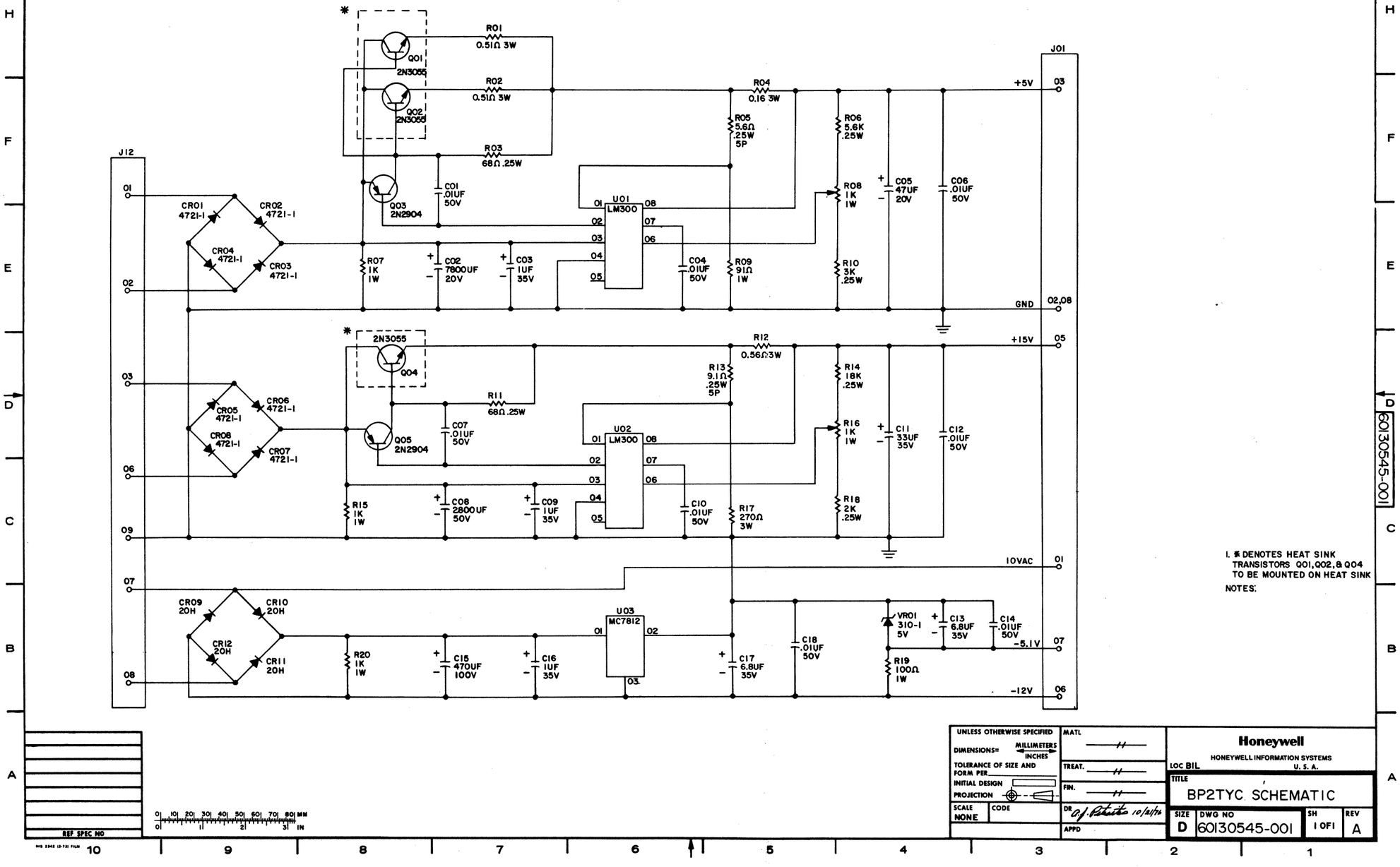
REVISIONS					
REV	AUTHORITY	DATE YR	MO	DAY	SIGNATURE
L2 A	BLCD 67949	76	10	1	R. Hunt
L2 B	BLCO 70272	77	04	04	R. Hunt
L2 C	BLCO 70440	77	06	27	R. Hunt



001	UNLESS OTHERWISE SPECIFIED	MATL	Honeywell
NEXT ASSY TD60131971	DIMENSIONS= MILLIMETERS / INCHES	TREAT.	HONEYWELL INFORMATION SYSTEMS LOC BILLERICA, MASS. U. S. A.
	TOLERANCE OF SIZE AND FORM PER.	FIN.	TITLE SCHEM CRT TERMINAL
	INITIAL DESIGN	DR	SIZE D / DWG NO 60131981-001 / SH 1/1 / REV C
	PROJECTION	CK T Hurley 76-10-1	
	SCALE / CODE	APPD 10/1/76	

60131981-001

REVISIONS					
REV	AUTHORITY	DATE YR	MO	DAY	SIGNATURE
A	BLCD 68060	76	10	29	



NOTES:
1. * DENOTES HEAT SINK TRANSISTORS Q01, Q02, & Q04 TO BE MOUNTED ON HEAT SINK

UNLESS OTHERWISE SPECIFIED
DIMENSIONS= MILLIMETERS / INCHES
TOLERANCE OF SIZE AND FORM PER
INITIAL DESIGN
PROJECTION
SCALE NONE
CODE
MATL
TREAT.
FIN.
DR R.J. Peterka 10/14/76
APPD

Honeywell
HONEYWELL INFORMATION SYSTEMS
LOC BIL U. S. A.

TITLE BP2TYC SCHEMATIC

SIZE	DWG NO	SH	REV
D	60130545-001	1 OF 1	A

60130545-001

REF SPEC NO

LOGIC BLOCK DIAGRAM GLOSSARY/INDEX
TTY-C CRT DISPLAY

DOCUMENT NO. GLB60130705 | REV. A | BOARD NAME BE2TS | ASSEMBLY DOC. NO. 60130702 | PAGE 1 OF 5 | EDITED 01/25/77

LOGIC BLOCK DIAGRAM GLOSSARY/INDEX DOCUMENT NO. REV. BOARD NAME ASSEMBLY DOC. NO. PAGE 2 OF 5
TTY-C CRT DISPLAY GLB60130705 A BE2TS 60130702 EDITED 01/25/77

SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N
OERMOX+00	01D07		ACBDB2+0B	03C09		ADEC06-00	01X13		ALCL04+00	01A07		BAUDG2-00	12X07	
OEROCT+00	06D07		ACBDB2+0C	10A09		ADEC06+00	06Y13		ALCL08+00	04A07		BAUDG2+00	12A07	
AABELL-00	07Z13		ACBDB3+0A	05B09		ADEC07-00	01X13		ALCL16+00	01A07		BAUDG3+00	12A07	
AACT81-00	01C05		ACBDB3+0B	05C09		ADEC07+00	07Y13		AMLNFD-00	09X05		BAUDG4+00	12A07	
AACT81+00	01D05		ACBDB3+0C	11A09		ADEC08-00	01X13		AMSTCL+00	08Z07		BAUDHI+00	11A12	
AACTDN-00	01B07		ACBDB4+0A	07B09		ADEC08+00	08Y13		AMXCLR-00	04D14		BAUDLL-00	13X07	
AACTUP-00	01B07		ACBDB4+0B	07C09		ADEC09-00	01X13		AMXSL2-00	09D06		BAUDRT-01	12D07	
AAHOME-00	08Z13		ACBDB4+0C	12A09		ADEC09+00	09Y13		AMXSL2+00	07D06		BAUDRT+00	11D07	
AALNC1-00	05D06		ACBDB5+0A	09B09		ADEC10-00	01X13		AMXSTB-00	06Y07		BAUDRT+01	11Z07	
AALNCT-0A	04D06		ACBDB5+0B	09C09		ADEC10+00	10Y13		ANCT81-00	04D05		BELL01-00	08A10	
AALNCT-0C	05C06		ACBDB5+0C	07D09		ADEC11-00	01X13		ANCT81+00	04D05		BELL01+00	07X10	
AAMODA+00	08X13		ACBDB6+0A	11B09		ADEC11+00	11Y13		ANHOME-00	11X07		BELL01+01	09A10	
AAMODB+00	09X13		ACBDB6+0B	11C09		ADEC13-00	01X13		ANZRCT-00	04D05		BELL01+02	09Y10	
AAMODC+00	10X13		ACBDB6+0C	08D09		ADEC13+00	12Y13		ANZRCT+00	04D05		BELL01+03	09Y10	
AAMODD+00	11X13		ACBDB7+0A	13B09		ADEC14-00	01X13		APARER-00	01A10		BELLCT+00	12A10	
AAMODE+00	12X13		ACBDB7+0B	11D09		ADEC14+00	13Y13		APARER+00	01D09		BELLEN+00	13X10	
AAPEEN-00	10Z07		ACBDB7+0C	09D09		ADEC15-00	01X13		APARER+11	01X10		BFWDCT+00	12A05	
AAROLL-00	05A07		ACIN01+0A	04A05		ADEC15+00	13A13		APTXON+00	11Y10		BLKVID-00	04D02	
AAROLL+00	08A07		ACIN02+0A	04A05		ADR000+00	01A08		APTYON-00	12Y10		BLKVID-XX	08Z02	
AARRST-00	01X08		ACIN04+0A	04A05		ADR001+00	01A08		APTYON-0A	12Z10		BLKVID+00	08D02	
AAZRCT+00	02D05		ACIN08+0A	04A05		ADR002+00	01A08		APTYON-0B	12D10		BLKVID+0X	03D02	
ABCOMP-00	13X06		ACIN16+0A	07B05		ADR003+00	04A08		ARCLRY-00	07Y11		BLKVID+XX	08Z02	
ABELR5-00	13A10		ACIN32+0A	01A05		ADR003+01	01A08		ARTRDY+00	01D09		BRIADJ+00	07A01	
ABILL1-00	02A11		ACIN64+0A	01A05		ADR004+00	04A08		ATOLFD-00	10A07		BRIGHI+00	07A01	
ABUF01+00	03A06		ACLRDY-00	07Z11		ADR004+01	07A08		AVIDEO-00	01C03		BRIGLO+00	07A01	
ABUF02+00	03A06		ACOMUN-13	01A01		ADR005+00	04A08		AXICKF-00	10Y06		BRKCNT-00	09X11	
ABUF03+00	03A06		ACOMUN+09	05A02		ADR006+00	04A08		AXICKF+00	10Z06		BRKLTH-00	11A11	
ABUF04+00	03A06		ACTLNF-00	12Z05		ADR007+00	10B08		AXLNMD-00	10A06		BRKLTH+00	09A11	
ABUF05+00	03A06		ACTNDN-00	07Z07		ADR008+00	10B08		AXLNMD+00	08A06		BUFHMD-00	08X12	
ABUF06+00	03A06		ACTNUP-00	09Z07		ADR009+00	07A08		AXMSN1-0A	02X12		BUFINH-00	05A14	
ABUF07+00	01A06		ADEC00-00	01X13		ADRCRY+00	08B08		AXMSN1-0X	10D06		BUFINH+00	05X14	
ABUF08+00	01A06		ADEC00+00	01Y13		ADRXMT-00	06A14		AXMSN1+00	11Z06		BUFMOD-00	03Z12	
ABUF09+00	01A06		ADEC01-00	01X13		ADRXMT+00	06X14		AXMSN1+0A	11X06		BUFMOD+00	06D01	
ABUF10+00	01A06		ADEC01+00	02Y13		AEXBIT-00	03Z14		AXMSN1+0X	10D06		BVIDEO+00	08A03	
ABUF11+00	01A06		ADEC02-00	01X13		AEXBIT+00	05Y14		AXPGMD-00	07A06		CARDET+01	04X12	
ABUF12+00	01A06		ADEC02+00	03Y13		AFWDCT-00	13X05		AXPGMD+00	05A06		CARRTN-00	12Z13	
ACBDB1+0A	01B09		ADEC03-00	01X13		AKYSTB-00	06Z07		AYLOAD-00	08D14		CCTR01+00	04B05	
ACBDB1+0B	01C09		ADEC03+00	04Y13		AKYSTB+00	09C06		BACKEN-00	04Y14		CCTR02+00	04B05	
ACBDB1+0C	09A09		ADEC04-00	01X13		ALCL01+00	01A07		BACKEN+00	04X14		CCTR04+00	04B05	
ACBDB2+0A	03B09		ADEC04+00	05Y13		ALCL02+00	01A07		BAUDG1+00	12A07		CCTR08+00	04B05	

NOTE AN ASTERIK IN THE COLUMN(S) LABELED N
INDICATES A NARRATIVE FOR THE GIVEN SIGNAL(S).
NARRATIVES ARE SHOWN AT THE END OF THE REPORT.

LOGIC BLOCK DIAGRAM GLOSSARY/INDEX — DOCUMENT NO. GLB60130705 REV. A — BOARD NAME BE2TS — ASSEMBLY DOC. NO. 60130702 — — EDITED 01/25/77
TTY-C CRT DISPLAY

SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N
CCTR16+00	01B05		COMDAT+03	13Y12		CTSEND-00	13X12		DATBT6+0C	06A13		DOTCLD-00	02A02	
CCTR32-00	03C05		COMDAT+13	09Y12		CTSEND+00	08Y12		DATBT7-00	07X13		DOTCT1+10	02A02	
CCTR32+00	01B05		COMDAT+14	12D06		CTSND1-00	06D01		DATBT7-0C	09D10		DOTCT2+10	02A02	
CCTR64-00	02C05		COMDAT+15	09Z12		CURSDN-00	03Z13		DATBT7-YY	07Y14		DOTCT4+10	02A02	
CCTR64+00	01B05		COMDAT+16	07Y12		CURSLF-00	05Z13		DATBT7+0C	07A13		DTFWRD-00	11X05	
CCTRB0+00	04B05		COMDAT+19	12Z06		CURSLF-1X	08D05		DATBTS+00	08Z14		DTFWRD+00	05Y11	
CCTRCA+00	04B05		COMDAT+23	06D01		CURSLF+00	08Y05		DATCLK+00	08A11		DVIDEO-00	03D03	
CCTRSM-01	13Y10		COMDAT+40	06D01		CURSRT-00	04Z13		DATCON-00	07X11		DVIDEO+00	01D03	
CGBIT1+00	01B03		COMEIA-01	01A01		CURSUP-00	02Z13		DATCON-1Z	01A11		DVIDEO+01	07C01	
CGBIT2+00	01B03		COMEIA-00	01D01		CVIDEO-02	07B03		DATCON+00	02X11		EIACFD+00	01A01	
CGBIT3+00	01B03		COMEIA-01	07B01		CVIDEO+01	04C03		DATERR+00	06D01		EIACFD+1X	05A12	
CGBIT4+00	01B03		COMEIA+00	11Y12		CVIDEO+02	05C03		DATRDY+00	08X11		EIACTS-01	07B01	
CGBIT5+00	01B03		COMIN1+00	01D09		DATAIN-00	03C15		DATSTR+00	02A14		EIACTS+00	01D01	
CHIPEN-01	11C08		COMIN2+00	01D09		DATBT1-0A	03D10		DCLEAR-00	12Y03		EIACTS+1X	12X12	
CHIPEN+01	08B08		COMIN3+00	01D09		DATBT1-0C	03Z10		DCLEAR-17	06D06		EIADSR+00	01A01	
CHMCMP+00	04B06		COMIN4+00	01D09		DATBT1-0D	03Y10		DCLEAR-21	13A03		EIADSR+1X	01A14	
CLKCON-00	03A11		COMIN5+00	01D09		DATBT1+0C	01A13		DCLEAR+00	12Y03		EIARTS-01	07B01	
CLOCK1-00	11A02		COMIN6+00	01D09		DATBT2-0A	04D10		DCLEAR+07	03Y11		EIASRS-01	01A01	
CLOCK1-01	13B02		COMIN7+00	01D09		DATBT2-0C	04Z10		DCLEAR+17	07C06		ELERAS-00	11Z13	
CLOCK1-02	12X02		COMLIN-05	01A01		DATBT2-0D	04Y10		DCLEAR+21	13A03		ELEVNX+00	03D07	
CLOCK1-03	10Y02		COMLIN-11	07D12		DATBT2+0C	02A13		DCLRDY-00	06Z11		ELEVNY+00	02D07	
CLOCK1-04	11Z02		COMLIN+01	07Z12		DATBT3-0A	05D10		DCLRDY+00	06Z11		ENBCLK+00	01D11	
CLOCK1+00	11D02		COMLIN+17	06D12		DATBT3-0C	05Z10		DECB67-00	11A13		ENSPAC-0A	01Z10	
CLOCK1+01	11Y02		COMRES-13	05A02		DATBT3-0D	05Y10		DECB67+00	12A13		ENSPAC+00	01Y10	
CLRPLS-21	13X03		COMRRT-01	06X12		DATBT3+0C	03A13		DFCDEL-00	13X13		EPGCLR-00	10Z13	
CLRRDY-00	06X11		COMTRE+00	01D09		DATBT4-0A	06D10		DEXBIT-00	07A11		ERSBLK-00	04A03	
CLRRDY+00	06X11		CON7NX+00	10A13		DATBT4-0C	06Z10		DISENA-00	03D06		ERSBLK+88	04A03	
CNT064-00	06B08		CON7PX+00	08A13		DATBT4-0D	06Y10		DISENA+00	13A08		ERSCAP+00	06A03	
CNT064+00	07Y08		CRCOMP-05	13Z06		DATBT4+0C	04A13		DLITDT+00	07A15		ERSRES+00	07A03	
CNT064+10	07A08		CRCOMP-5X	13Y06		DATBT5-00	05X13		DLYEXT-00	01A12		ESCAPE+00	11D13	
COMCLK-00	12Y06		CRCOMP+01	04D03		DATBT5-0A	07D10		DLYINH+00	06D11		ESCAPX-00	13A15	
COMDAT-00	12Z12		CRCOMP+02	07D03		DATBT5-0C	07Z10		DMYB04-00	05A11		ETXSW1+00	01A09	
COMDAT-01	06A12		CRCOMP+04	10D03		DATBT5-0D	07Y10		DMYB06-00	03C15		ETXSW2+00	01A09	
COMDAT-03	07X12		CRDYCK-00	06Y11		DATBT5+0C	05A13		DMYB18+00	08B08		ETXSW3+00	05A09	
COMDAT-11	11D12		CRSSTP-00	09X14		DATBT6-00	06X13		DMYC05-00	05Z11		ETXSW4+00	01A09	
COMDAT-14	09D12		CRSSTP+00	07X14		DATBT6-0A	08D10		DMYC08+00	12A06		FDXRTS+00	01D12	
COMDAT-19	12Z06		CRSXMT-00	13Z13		DATBT6-0B	02Z10		DMYD02-00	03X11		FREQ1P+00	11A14	
COMDAT-23	11Z12		CRTSND+00	01Z12		DATBT6-0C	08Z10		DMYE11+00	01D09		FREQ2P+00	13A14	
COMDAT+01	01D09		CTFWRD+00	10Y05		DATBT6-0D	08Y10		DMYL02+00	04A10		FREQ3P+00	12A14	
COMDAT+02	06Y12		CTMXVD-00	08Y02		DATBT6-YY	08Y14		DMYL17-00	01A12		FREQ4P+00	13Y14	

NOTE AN ASTERIK IN THE COLUMN(S) LABELED N
INDICATES A NARRATIVE FOR THE GIVEN SIGNAL(S).
NARRATIVES ARE SHOWN AT THE END OF THE REPORT.

LOGIC BLOCK DIAGRAM GLOSSARY/INDEX — DOCUMENT NO. GL860130705 — REV. A — BOARD NAME BE2TS — ASSEMBLY DOC. NO. 60130702 — PAGE 4 OF 5 — EDITED 01/25/77
TTY-C CRT DISPLAY

SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N
FREQCP+00	10Y14		KBDDB5+00	10D15		LOADSP-00	02D06		MCNT08-00	04C07		NX81CT+00	10X07	
FWDLNF-00	08X05		KBDDB5+0Z	01C01		LOADSP-0C	06C06		MCNT08+00	01B07		NZERCT-00	04D05	
FWDLNF+00	09Y05		KBDDB6+00	10D15		LOADSP+00	02D06		MCNT16-00	05C07		NZERCT+00	04D05	
HDXRTS-00	01Y12		KBDDB6+0Z	01C01		LSTCHR-00	13A05		MCNT16+00	04X07		PARINH+00	09C01	
HEREIS-00	01C01		KBDDB7+00	01B15		LSTCHR+00	01X11		MEPLEE+00	07A05		PARSEL+00	09C01	
HRSYNC-00	04Y02		KBDDB7+0Z	01C01		MBIT01+01	07D04		MLNCMP+00	01B06		PCLEAR-00	01Z13	
HRSYNC-01	03Z02		KBDDB8+0Z	01C01		MBIT01+0A	01A04		MRCT01-00	04X08		PCLEAR-XX	02D13	
HRSYNC-02	06Z02		KBDMUX+00	11X15		MBIT01+0B	04A04		MRCT01-0A	13B08		PCLEAR+XX	01D13	
HRSYNC-03	03Y02		KBDSTB-00	13A11		MBIT01+0C	13A04		MRCT01-0B	12B08		PELOAD-00	09D05	
HRSYNC-04	05D02		KBDSTB-02	03A10		MBIT02+01	07D04		MRCT01+00	13C08		PGCMPR-00	08C06	
HRSYNC-22	09Z02		KBDSTB+01	13X11		MBIT02+0A	07A04		MRCT02+00	10A08		PGCMPR+00	07B06	
HRSYNC+00	04Z02		KBDSTB+02	11D11		MBIT02+0B	10A04		MRCT04+00	10A08		PGMODE-00	06D01	
HRSYNC+01	01D02		KBDSTB+0Z	01C01		MBIT02+0C	13X04		MRCT08+00	10A08		PGMODE+00	08D13	
HRSYNC+02	01Z02		LCLOAD-00	08C03		MBIT03+01	07D04		MRCT16+00	10A08		PGXMIT-00	09D13	
HRSYNC+04	06D02		LCLOAD-01	11C03		MBIT03+0A	01B04		MS132C+00	08D11		PPADTR-00	13A12	
HRSYNC+22	09D02		LCLOAD-02	07C03		MBIT03+0B	04B04		NAXCKC+00	07X07		PPADTR+01	07B01	
HRSYNC+24	10A05		LCLOAD-03	11B03		MBIT03+0C	13Y04		NAXCKF-00	12A15		PPARCD-00	01D01	
INBIT1+0A	04A15		LCLOAD+01	08B03		MBIT04+01	07D04		NCARTN-00	11D05		PPARCD-01	07B01	
INBIT1+0B	01A15		LCLOAD+02	12Z03		MBIT04+0A	07B04		NCLRDY-00	08Y11		PPARCD+01	07A12	
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INBIT2+00	05Y15		LLCASE-01	05A02		MBIT04+0C	13Z04		NCROMP-04	12X03		PPARTS-01	07B01	
INBIT3+00	05Z15		LNCT01+00	01A03		MBIT05+01	07D04		NCROMP+04	12A03		PPARTS+00	02D12	
INCCCT-00	03D11		LNCT02+00	01A03		MBIT05+0A	01C04		NCRTEN+00	12Z15		PPATXD-00	03Y12	
INCTSX-00	03X14		LNCT04+00	01A03		MBIT05+0B	04C04		NCRTSD-00	12Y15		PPATXD-01	07B01	
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INDCTS+00	06D01		LNCT09-00	06B03		MBIT06+0A	07C04		NDTFWD-00	11Y05		PULLUP+00	10D07	
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INLNFD-00	11Z05		LNFEED-00	10D13		MBIT06+0C	11D04		NEWDTR+01	06A01		PULLUP+02	13A02	
INMSTC-00	08Y07		LNFEED+00	09X07		MBIT07+01	07D04		NEWSTB+00	02X10		PULLUP+03	12D05	
IVIDEO+00	05D15		LNFEED+10	01C06		MBIT07+0A	01D04		NEXBIT-00	05A11		PULLUP+04	01D06	
KBDBKR-00	01C01		LNFEED+11	03C06		MBIT07+0B	04D04		NFWDCT-00	13Y05		PULLUP+06	11X11	
KBDDB1+00	10D15		LNFREQ-10	12Z14		MBIT07+0C	10D04		NINLFD-00	10Z05		PULLUP+08	07A07	
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KBDDB4+0Z	01C01		LNXMIT-00	09Z13		MCNT04+00	01B07		NWMODA+00	04X13		PWRRST-00	07A14	

NOTE AN ASTERIK IN THE COLUMN(S) LABELED N
INDICATES A NARRATIVE FOR THE GIVEN SIGNAL(S).
NARRATIVES ARE SHOWN AT THE END OF THE REPORT.

LOGIC BLOCK DIAGRAM GLOSSARY/INDEX
TTY-C CRT DISPLAY

DOCUMENT NO. GLB60130705 REV. A
BOARD NAME BE2TS ASSEMBLY DOC. NO. 60130702
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SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N
PWRTON-00	11Y10		RPCT01+00	09Y11		STXMIT+00	09A15		WDULIT-00	05D13				
PWRTON+00	11Z10		RPCT02-00	12D11		STXMIT+5C	11Y15		WRCT08-XX	04Z11				
RAMC00+00	04X02		RPCT02+00	09Y11		SYNCCT+00	08X02		WRCT08+00	03X11				
RAMC00+XX	07D11		RPCTXX+00	09Y11		TERVN5-00	08A12		WRCTSM-00	03X11				
RAMC01+00	04X02		RPTKEY-01	12Y11		TESTCK-00	12Z02		WRENAB-00	05Z11				
RAMC02+00	04X02		RPTKEY-02	12Z11		THRCNT+00	12Y12		X81CTN+00	07Y07				
RAMC04-00	07Y02		RPTKEY-04	10D11		TMXCAP+00	03A12		XERMOY+00	04D07				
RAMC04+00	04X02		RPTKEY-0Z	01C01		TMXRES+00	03A12		XLDSRT-00	04Z14				
RAMCRY+00	04X02		RPTKEY+00	12A11		TWTHRE+00	05D07		XLDSRT+00	05Y14				
RCNT01-00	01Y08		RPTKEY+02	10Z11		TXDATO-01	01A01		XMTFWD-00	12X05				
RCNT01+00	01Y08		RTSEXT-00	04D12		TXDATO-11	05Y12		XMTFWD+00	10X05				
RCNT02+00	03Y08		RTSHDX-00	01X12		URCLMX+00	11A05		XMTRST-00	08D06				
RCNT04+00	03Y08		RTSHDX+00	03X12		URSEL1-00	09X15		XYCRSN-00	06Z13				
RCNT08-00	03C08		RTSLTH-00	06Z12		URSEL1+00	09X15		XYLOAD-00	07D14				
RCNT08+00	03Y08		RTSLTH+00	04Z12		URSEL2-00	09Y15		XZERCT-00	11A07				
RCNT11+10	04Z08		RTSPLS-00	04Y12		URSEL2+00	09Y15		XZERCT+00	08X07				
RCNT16+00	03Y08		RWLINE-00	05D11		URTHRE+00	01D09		Y81CTN-00	10Y07				
RDULIT-00	04D13		RWLINE+00	04D11		VCCT16+00	01X02		YLDSRT-00	05Z14				
RESETC-00	01Z08		S00000+00	11Y07		VCCT32-00	02Y02		YLDSRT+00	05Y14				
RLNFED-00	09A07		S00001+00	11Y07		VCCT32+00	01X02							
ROW004-02	06Z08		S00002+00	11Y07		VCCT64+00	01X02							
ROW004-04	09C08		S00003+00	11Y07		VCLOAD-00	01Y02							
ROW004-14	10C08		SENDIX-1Z	11Y06		VIDRES-00	12D14							
ROW004+00	01D08		SENDIX+0Z	01C01		VRCT01-00	09C03							
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ROW004+03	10B08		SET81X+00	07D05		VRCT02+00	09A03							
ROW004+04	10B08		SETZRO-00	10D05		VRCT04-00	09B03							
ROW004+0A	05D08		STBENL+00	02Y10		VRCT04+00	09A03							
ROW004+0B	06D08		STBINH+00	03B15		VRCT08-00	07X02							
ROW008-00	11D08		STBLTH-00	05X10		VRCT08+00	09A03							
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ROW008+00	03D08		STBRST-00	02A10		VRCTCO+00	09A03							
ROW008+0A	10D08		STBRST+00	02A10		VRCTCU+00	12A06							
ROW008+0B	09D08		STOPBL-00	07A10		VRCTOX+00	09Z11							
ROX004-01	08Z08		STOPBL+00	04A10		VRLOAD-00	05A02							
ROY004-01	08D08		STPBIT+00	09C01		VTSYNC-00	08A02							
ROZ004-01	07D08		STPBIT+99	01D15		VTSYNC-01	10A02							
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RPCT00+00	09Y11		STRSTX-00	12X15		VTSYNC+11	10X02							
RPCT01-00	08Z11		STXMIT-00	11A15		WDLINH-00	03D14							

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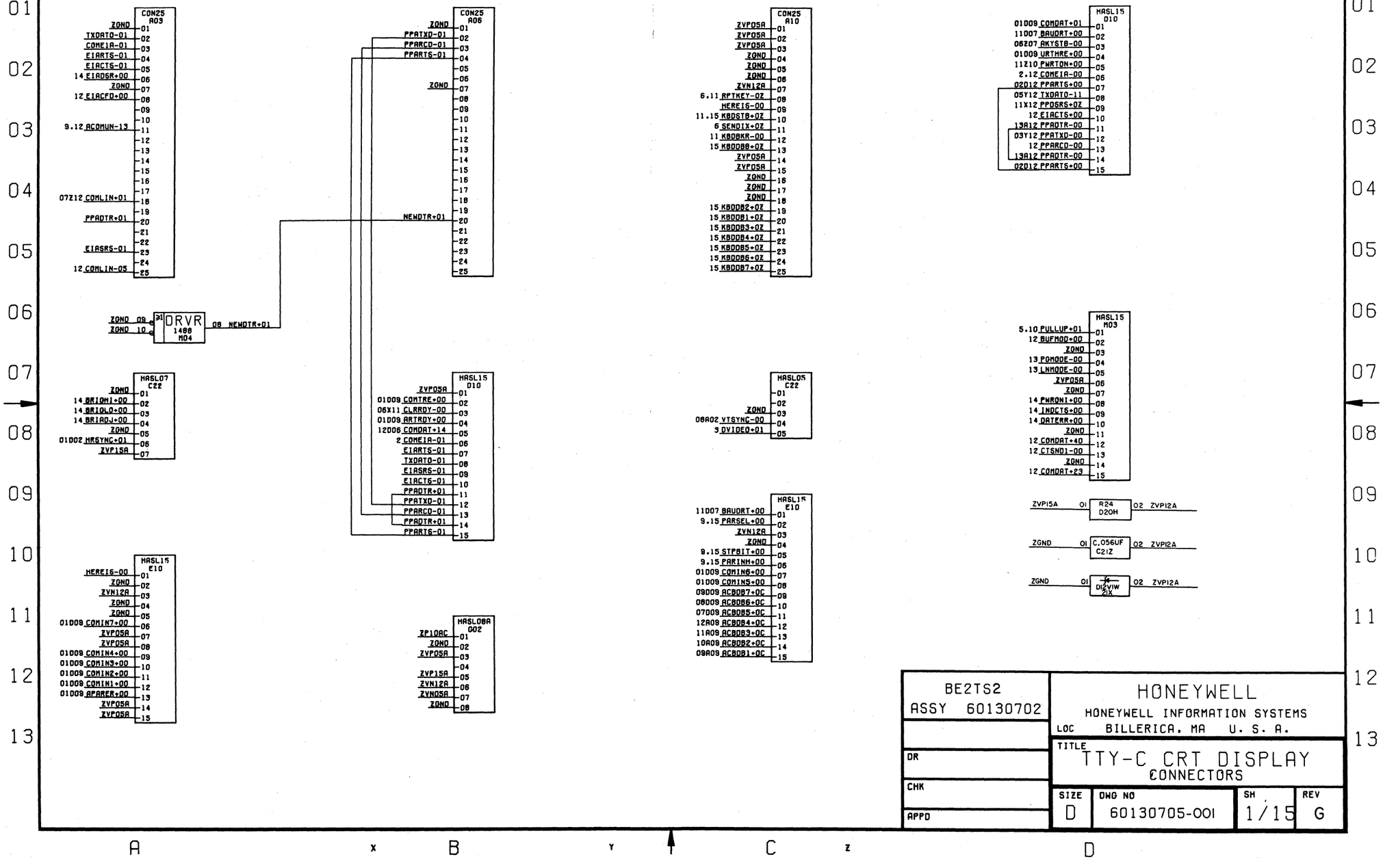
60130705



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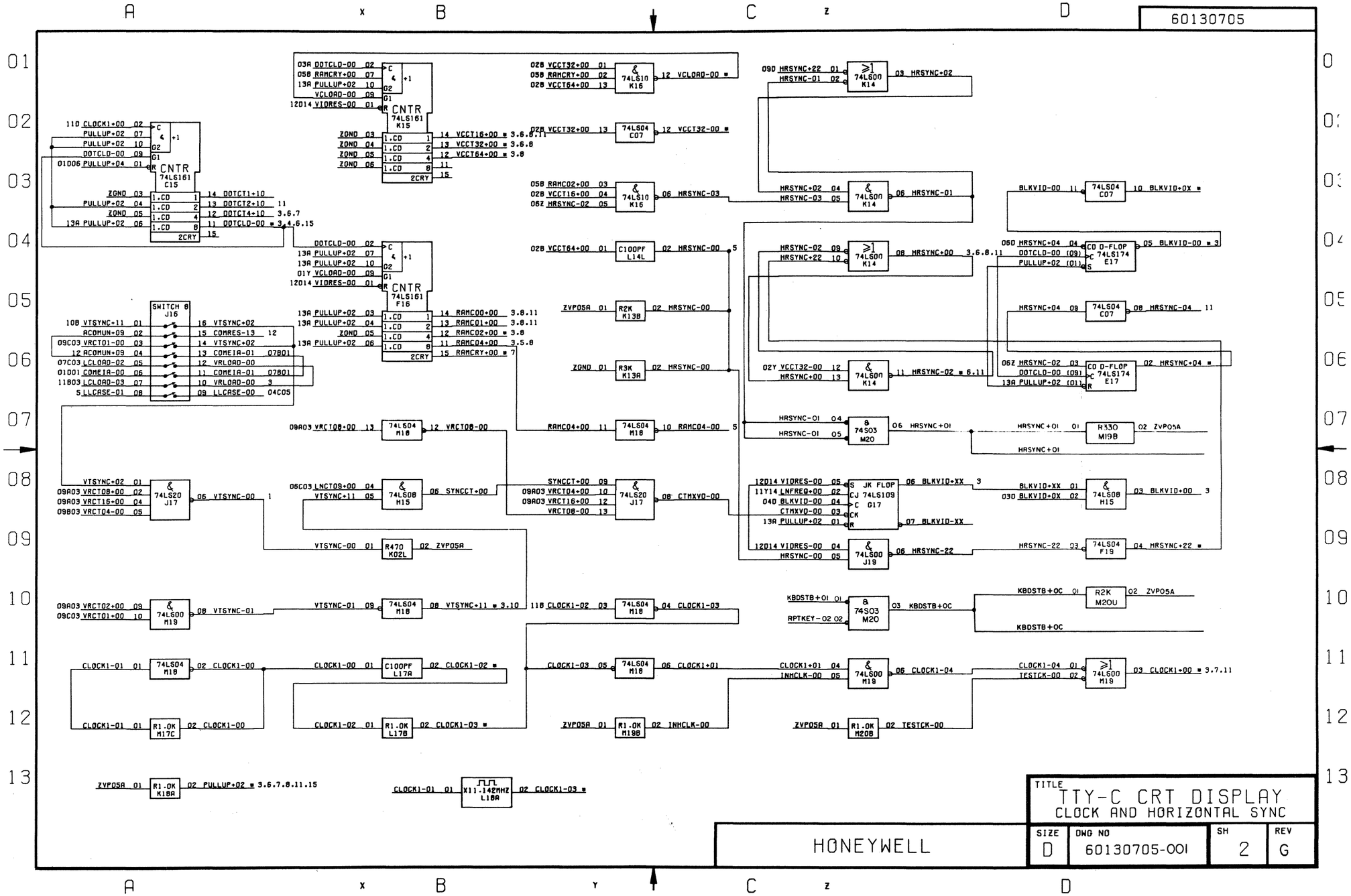
APPD	SH: 1/15	REV: G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74LS10 K16
74LS00 K14
74LS04 C07
74LS04 F19
74LS74 E17
74LS03 M20
74LS109 G17
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R3K K13A
R330 M19B
R470 K02L
R2K M20U
R1.0K M17C
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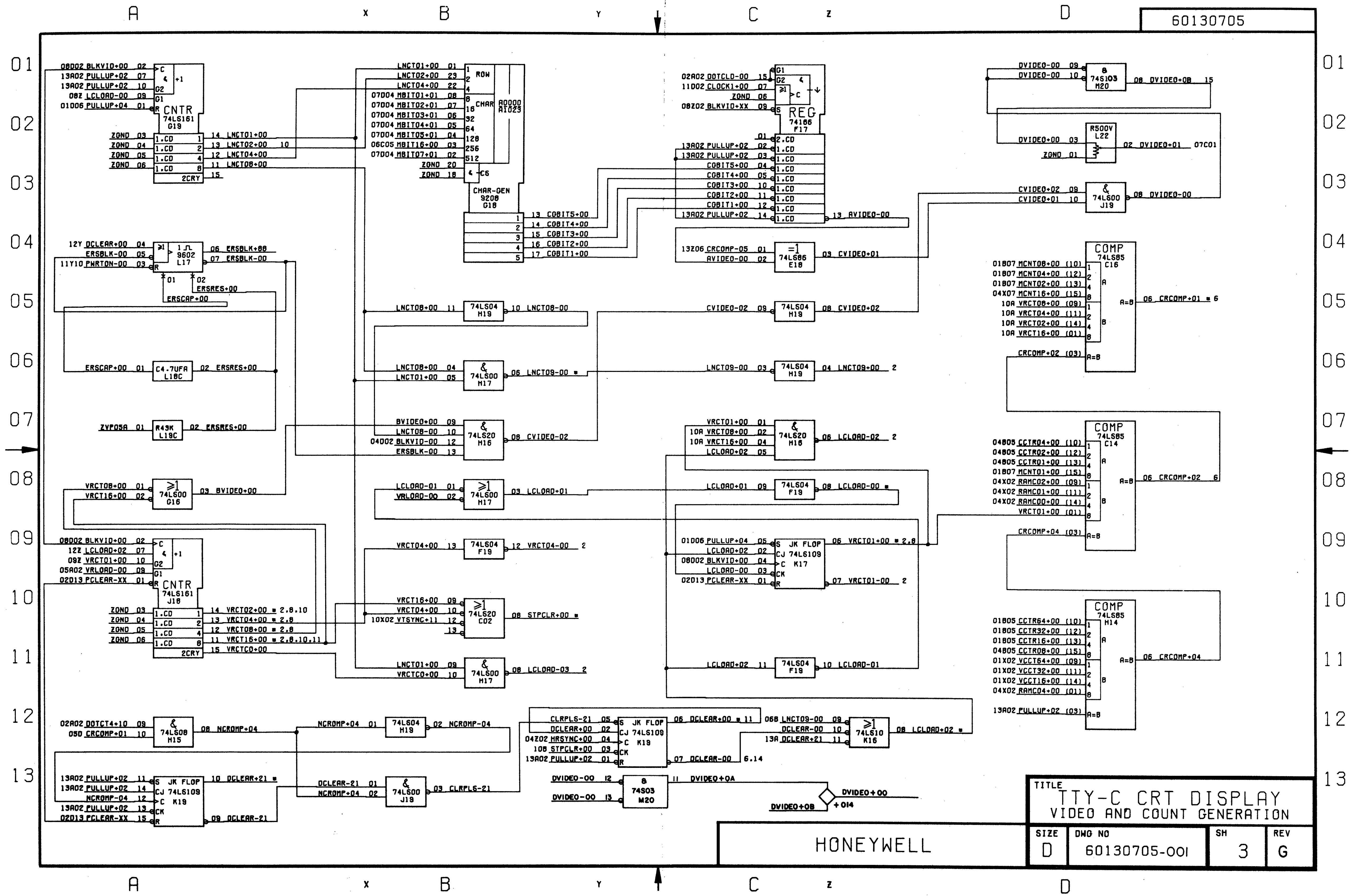
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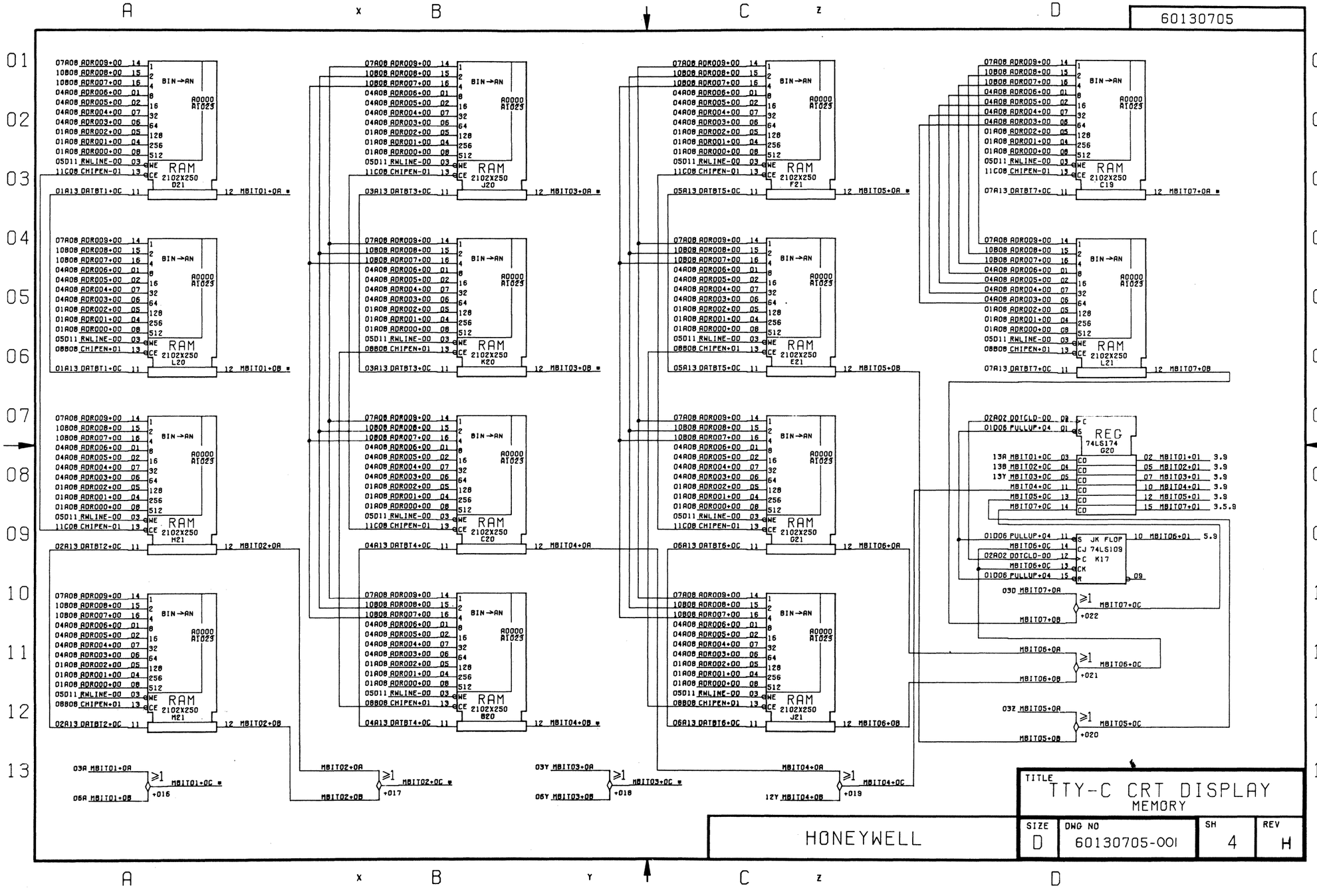
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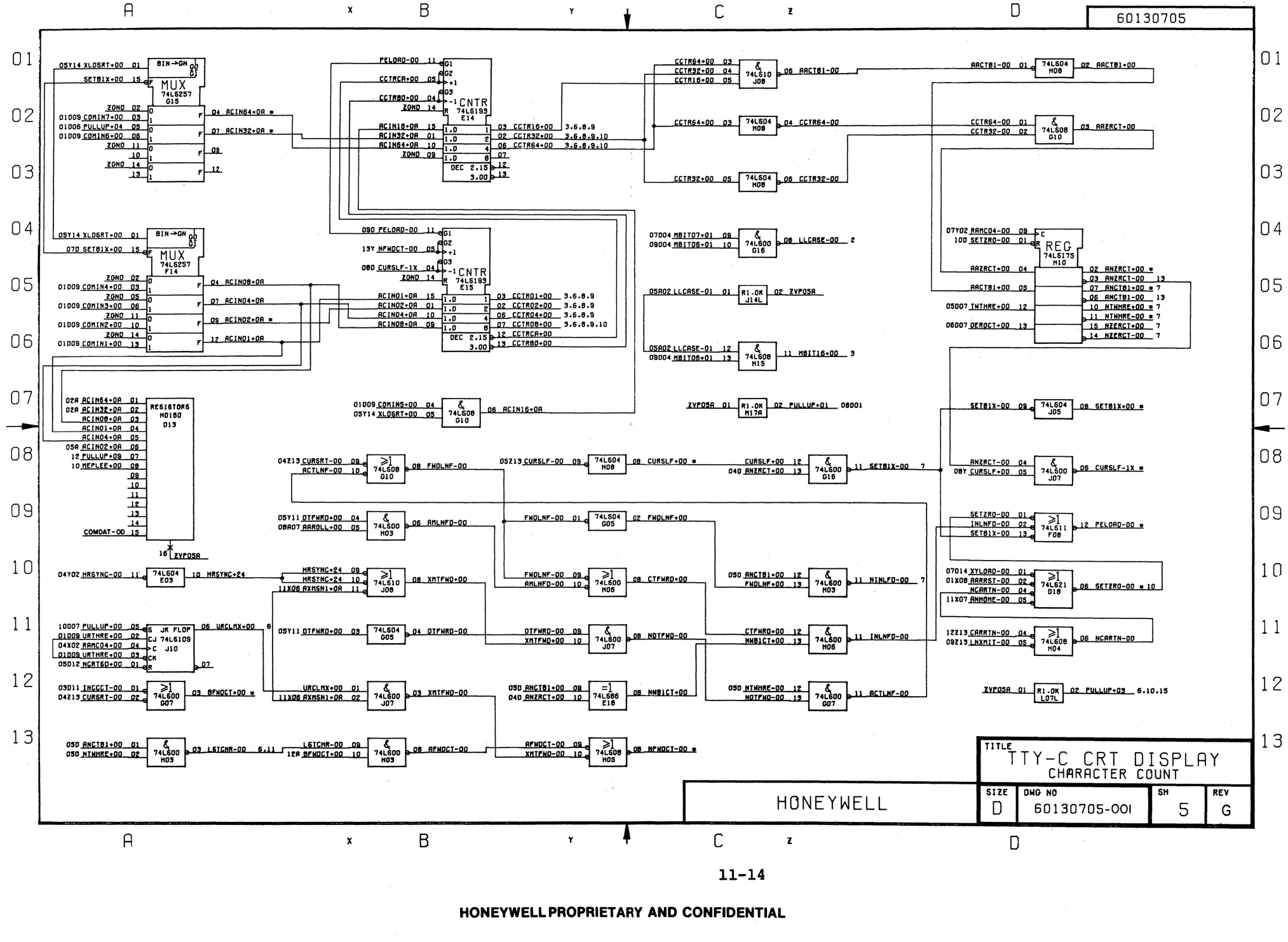
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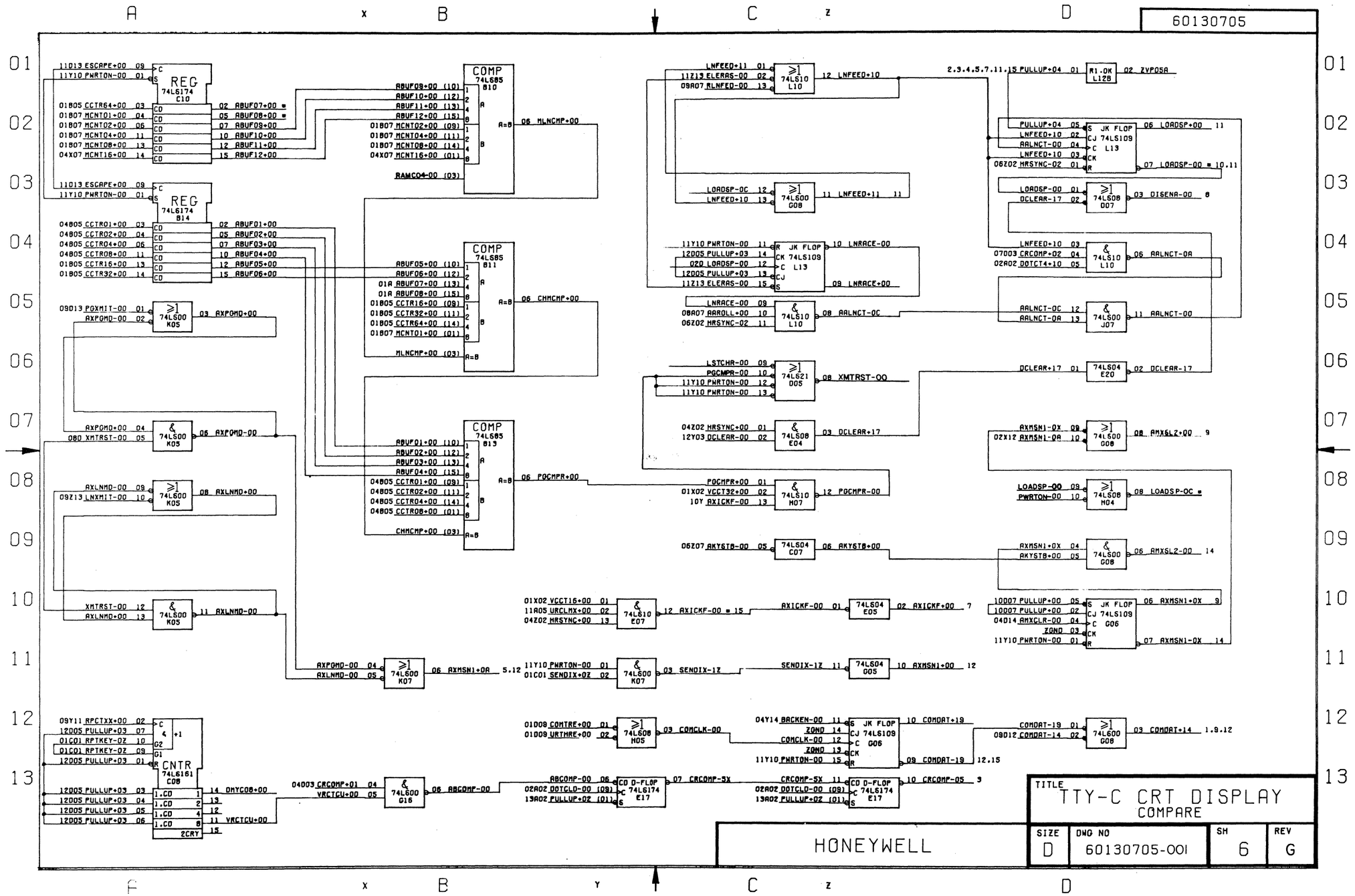
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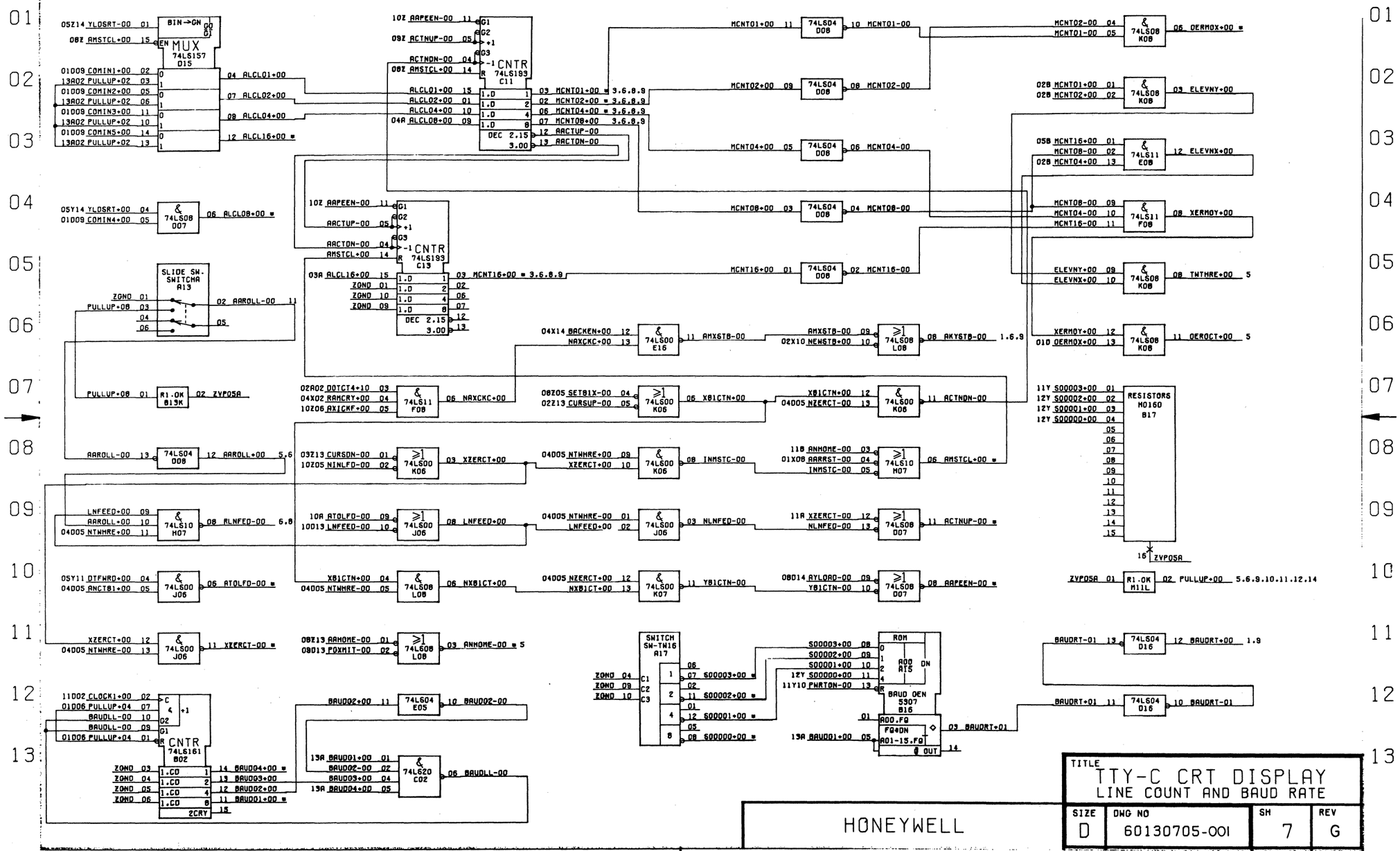
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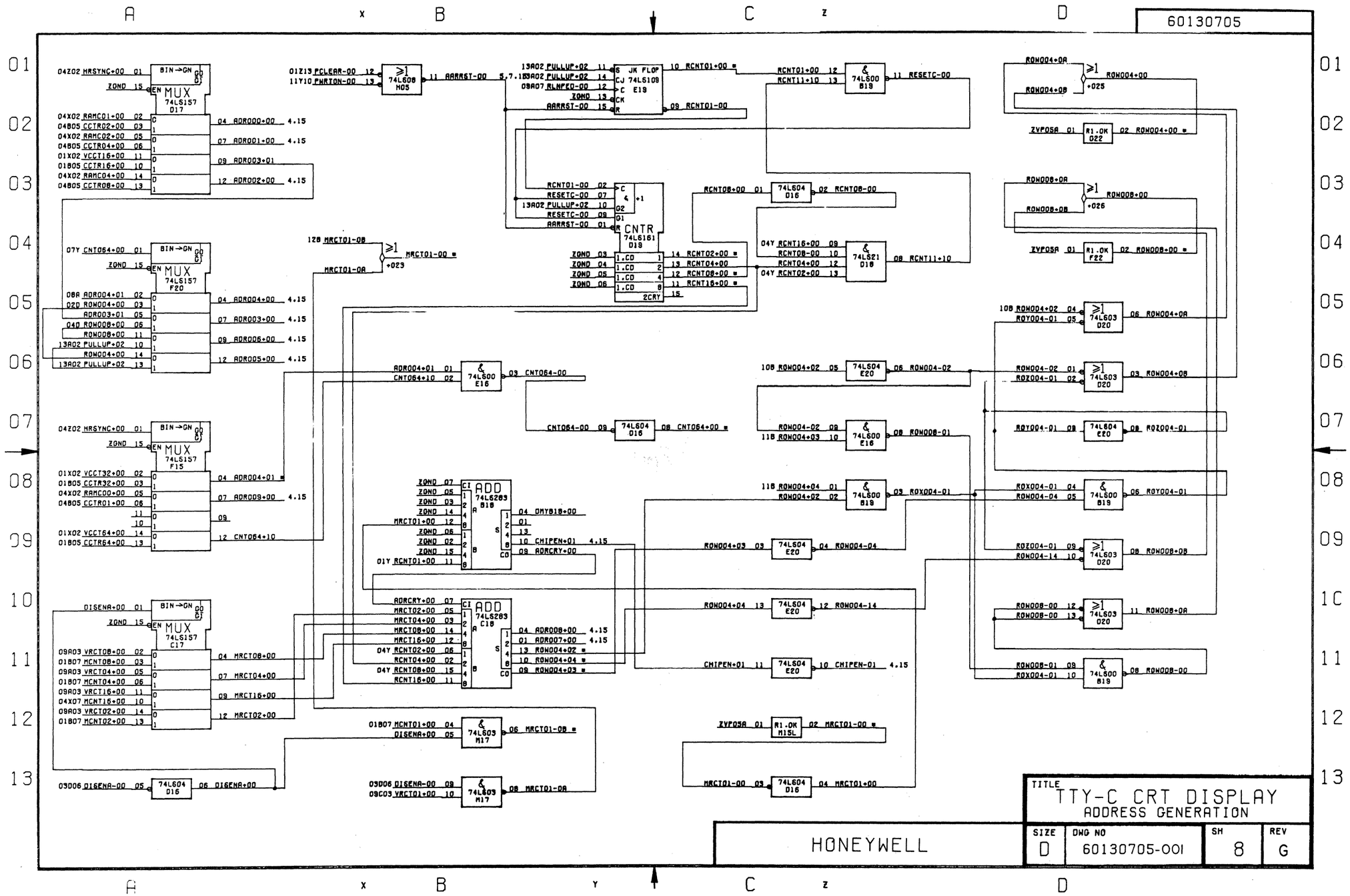
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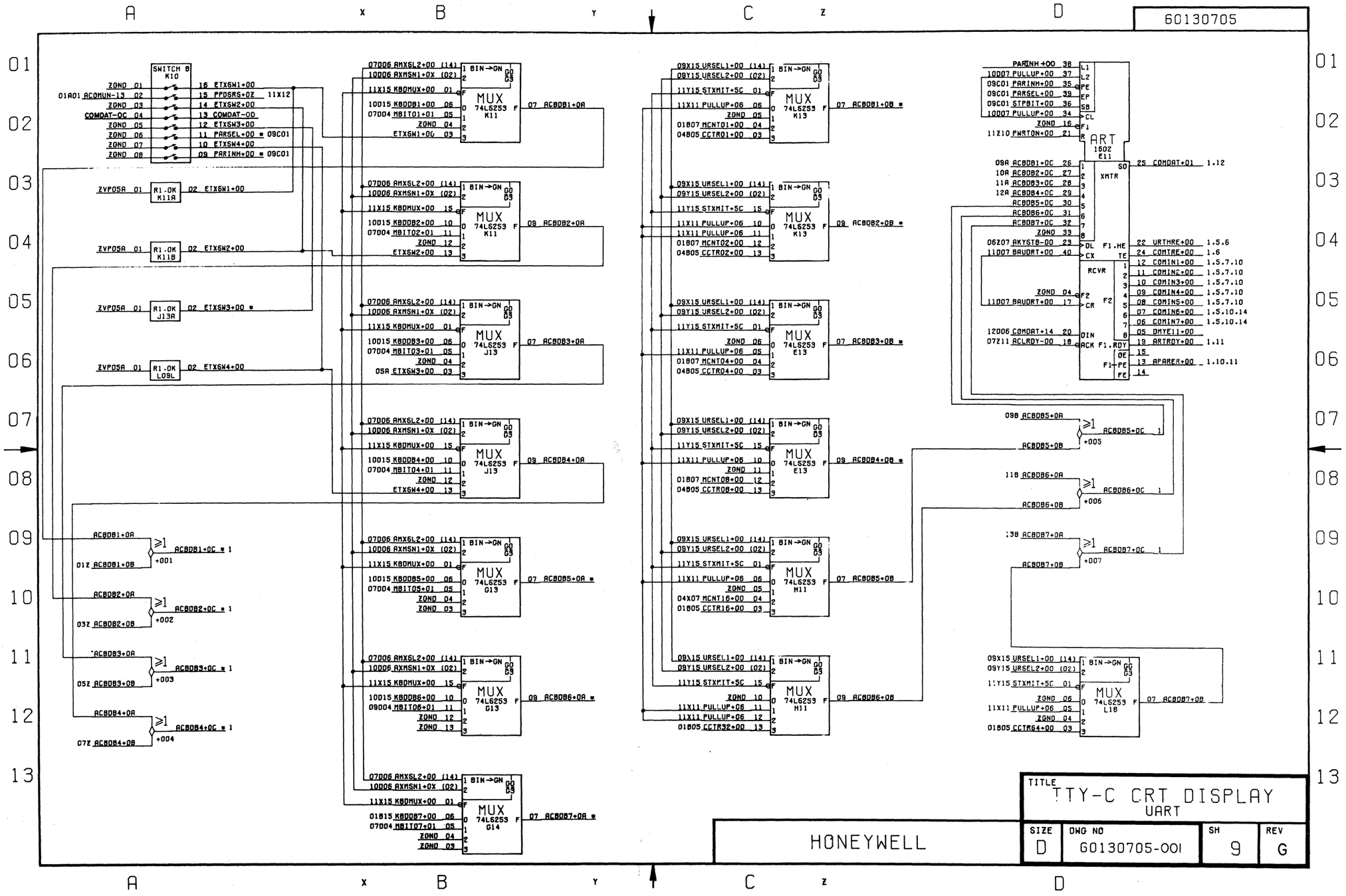
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MUX 74LS253 J13
MUX 74LS253 G13
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MUX 74LS253 K13
MUX 74LS253 E13
MUX 74LS253 H11
MUX 74LS253 L18
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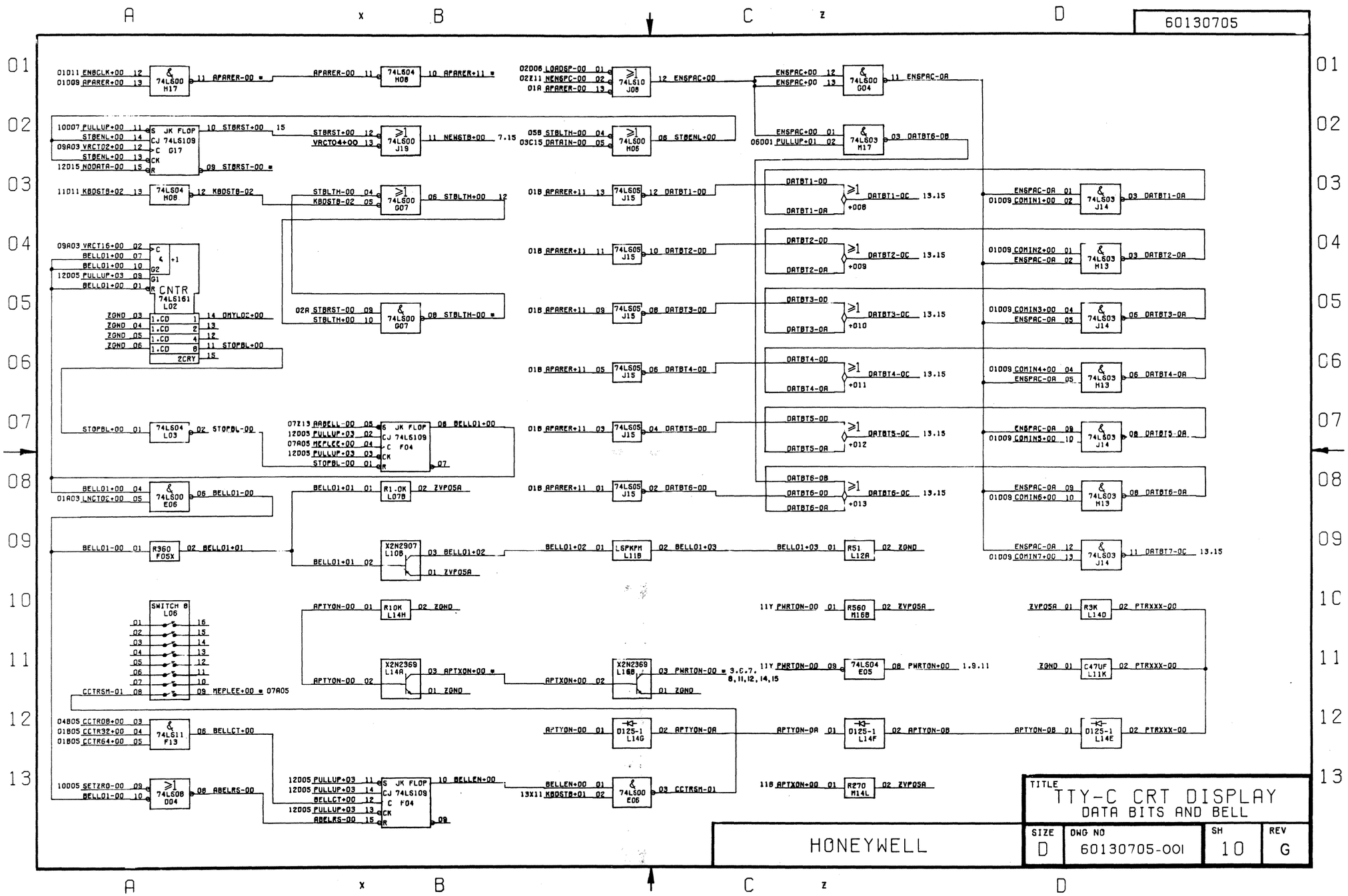
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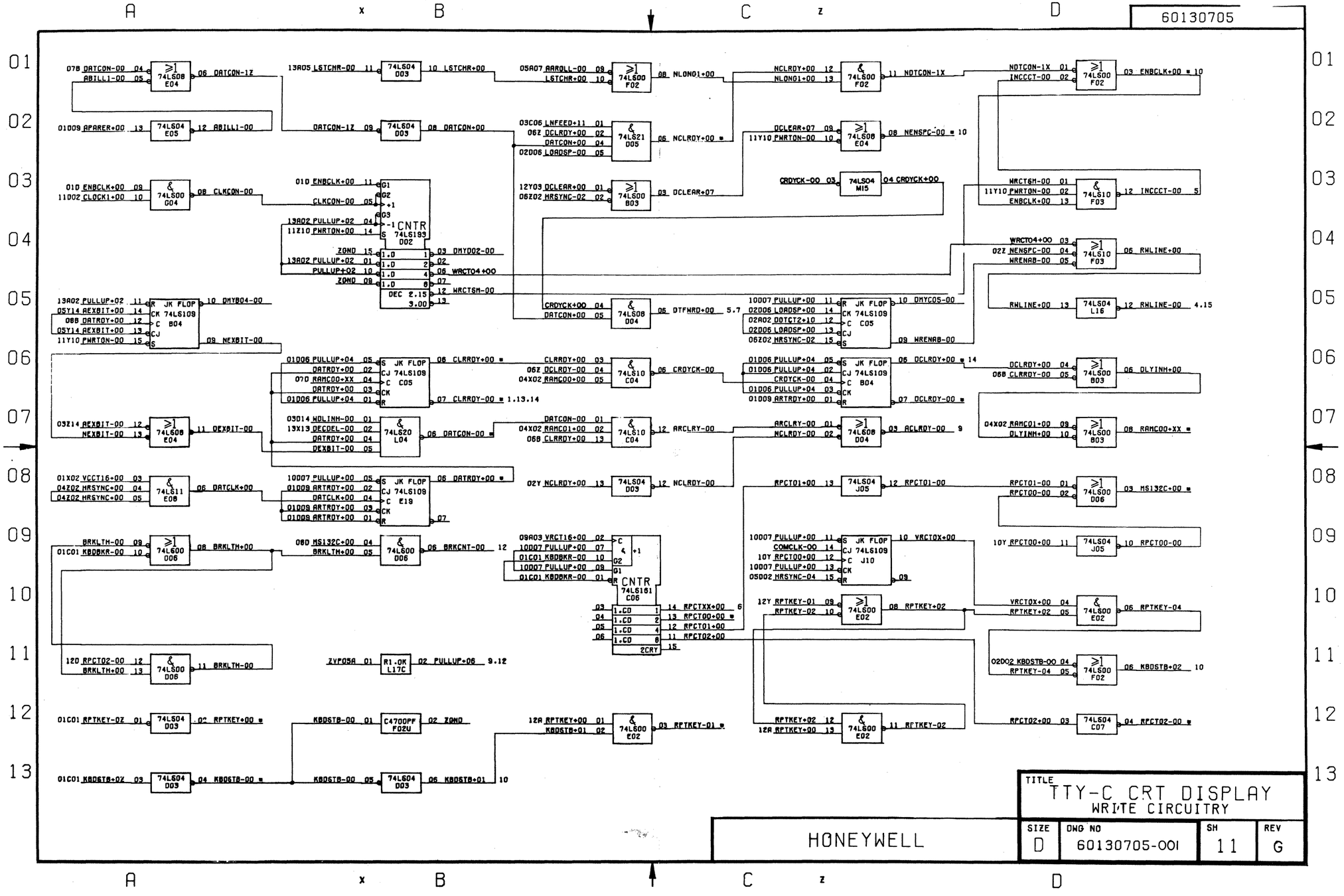
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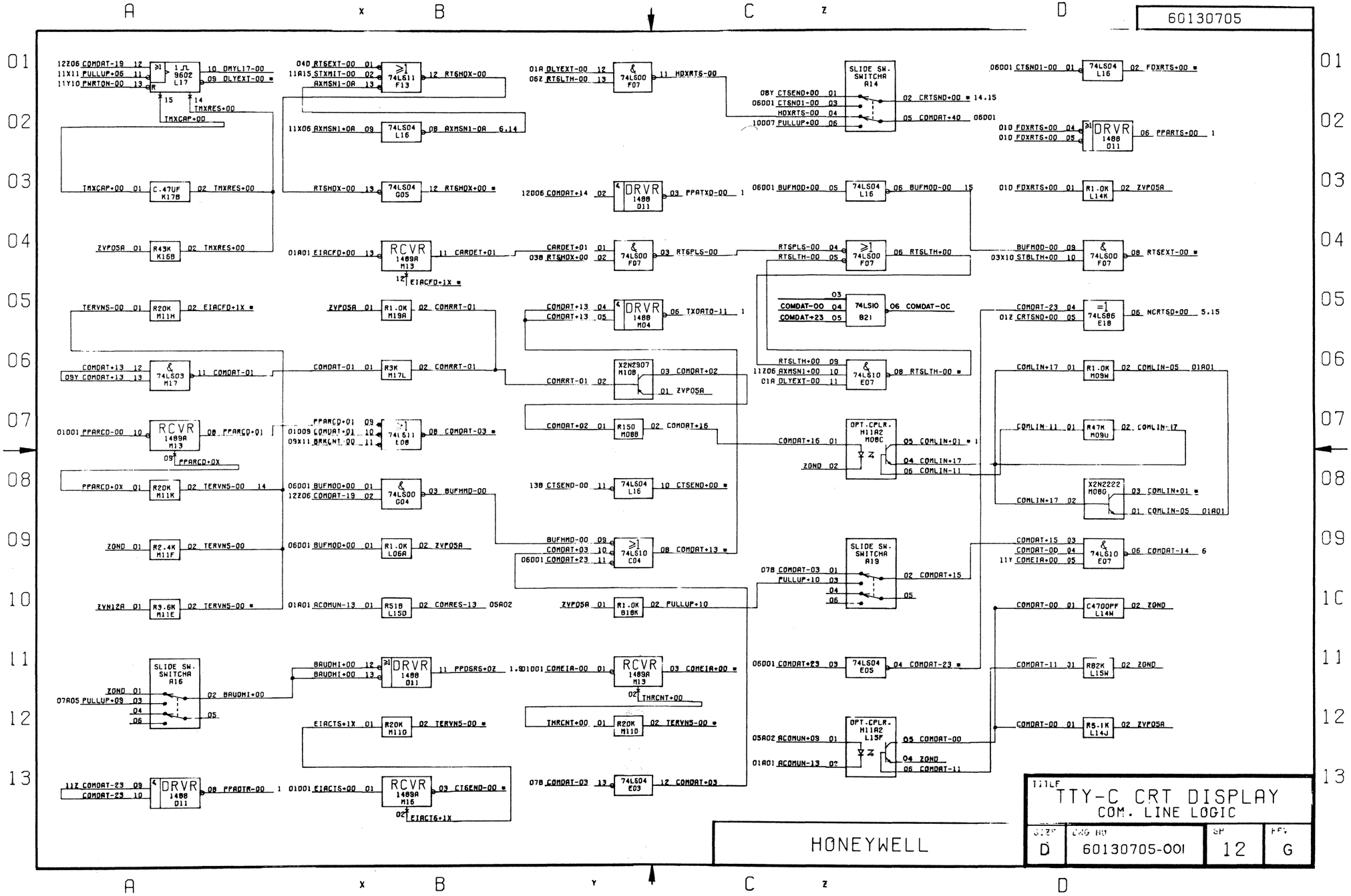
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09 DLYEXT-00 ■
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TMXCAP+00
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02 TMXRES+00
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11A15 STXMIT-00 02
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08 AXMSN1-0A 6,14
RTSMDX-00 13
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12 RTSMDX+00 ■
01A01 EIACFD+00 13
RCVR 1489A M13
11 CARDET+01
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EIACFD+1X ■
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EIACTS+1X
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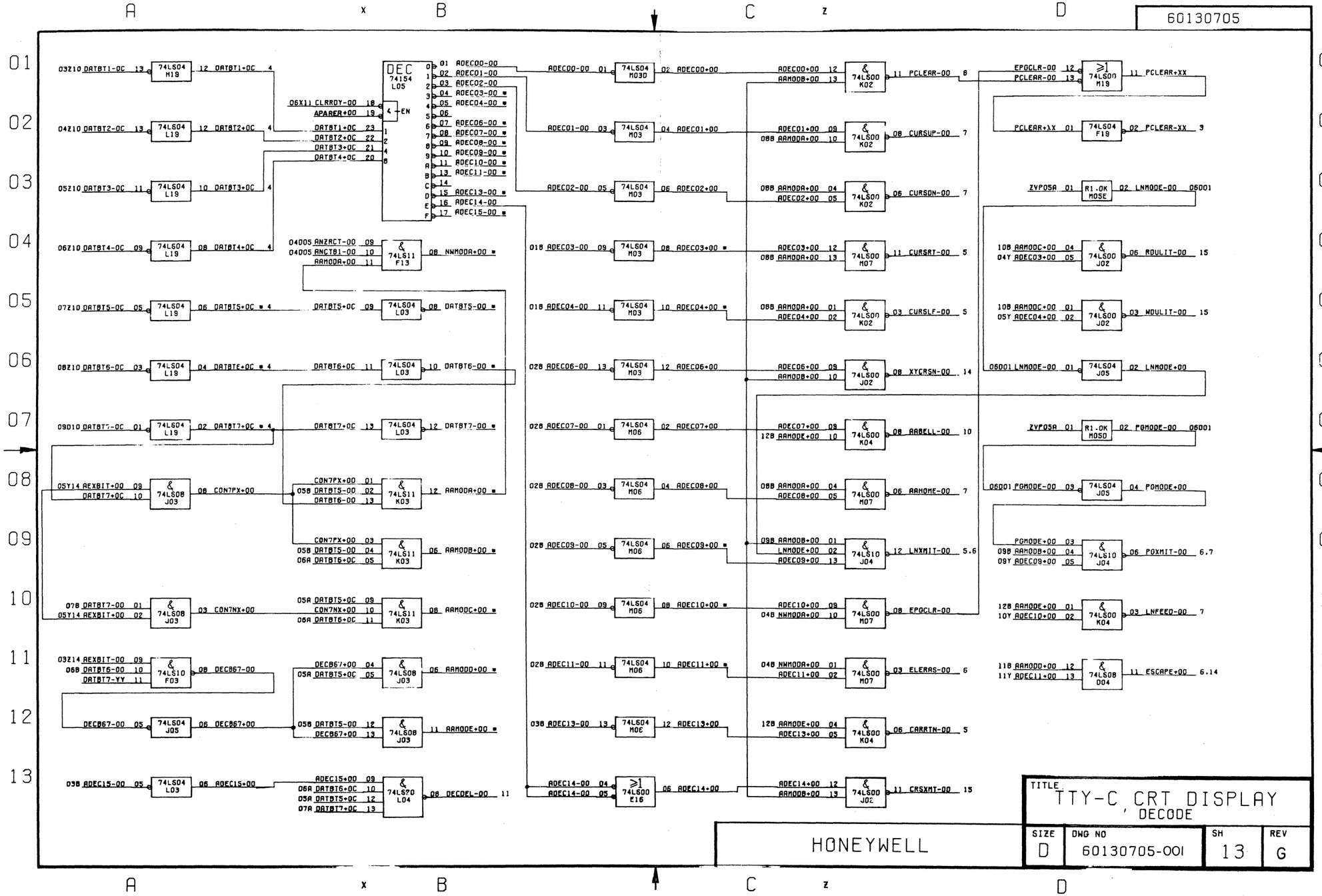
74LS04 E03
12 COMDAT+03
TITLE
TTY-C CRT DISPLAY
COM. LINE LOGIC
HONEYWELL
SIZE D
DWG NO 60130705-001
SH 12
REV G


60130705
DEC 74154 L05
74LS04 L19
74LS04 M19
74LS04 M03
74LS04 M06
74LS04 L03
74LS04 J05
74LS04 F19
74LS04 M05D
74LS00 K02
74LS00 M19
74LS00 M07
74LS00 J02
74LS00 K04
74LS00 D04
74LS08 J03
74LS08 D04
74LS11 F13
74LS11 K03
74LS10 F03
74LS10 J04
74LS70 L04
74LS00 E16
R1.OK M05E
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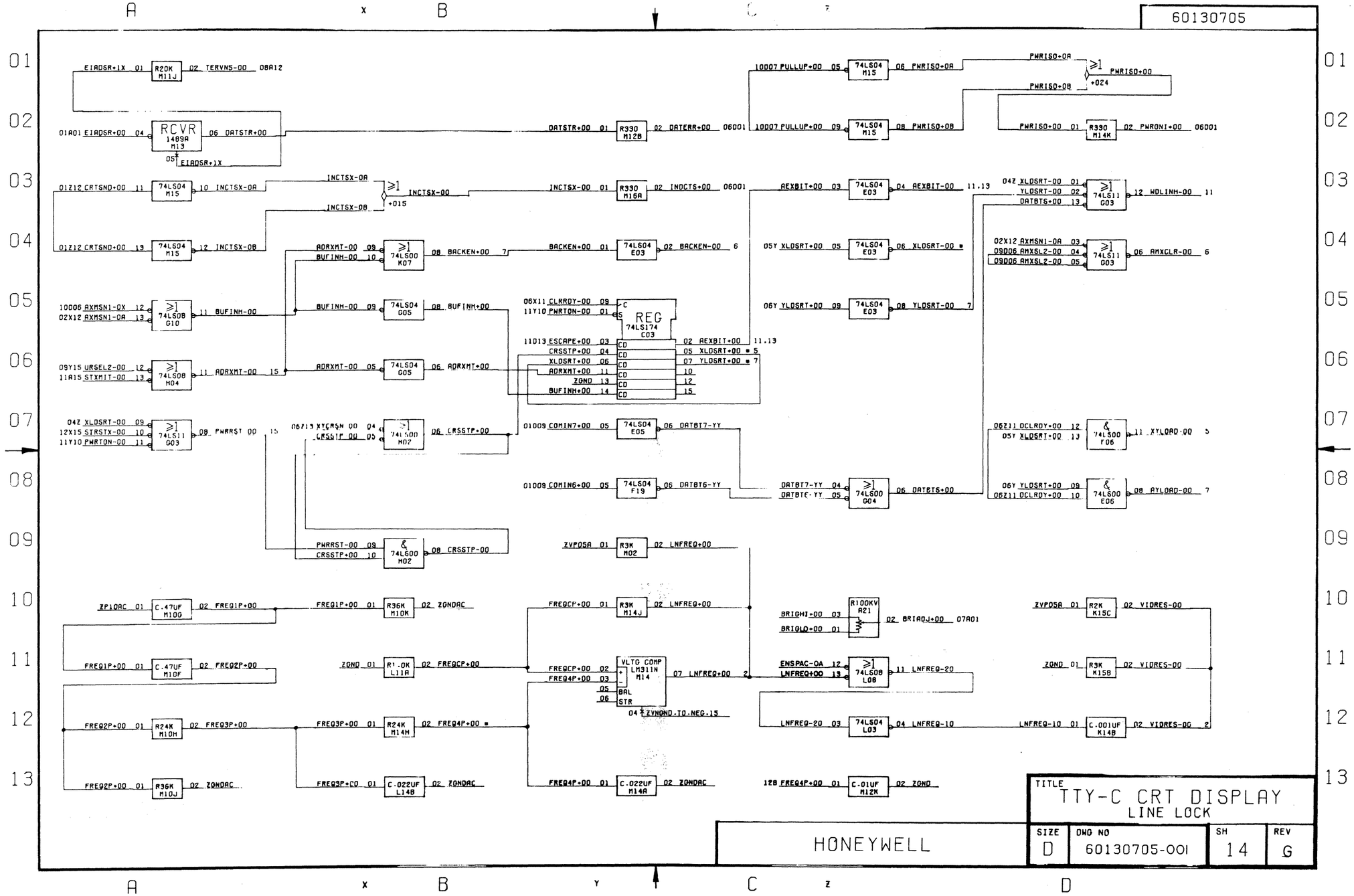
TTY-C, CRT DISPLAY
DECODE
HONEYWELL
SIZE D
DWG NO 60130705-001
SH 13
REV G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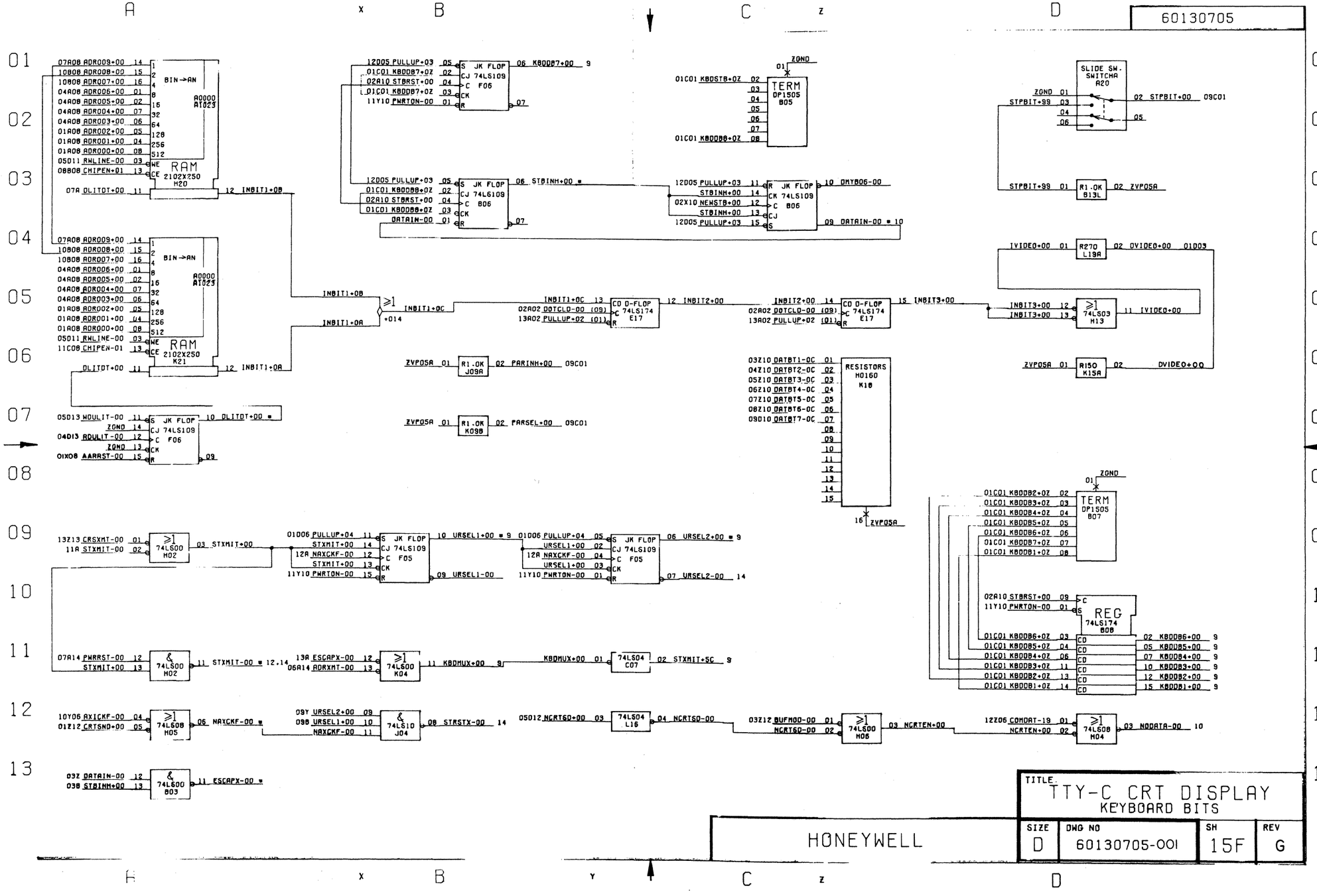
LINE LOCK
HONEYWELL
SIZE
D
DWG NO
60130705-001
SH
14
REV
G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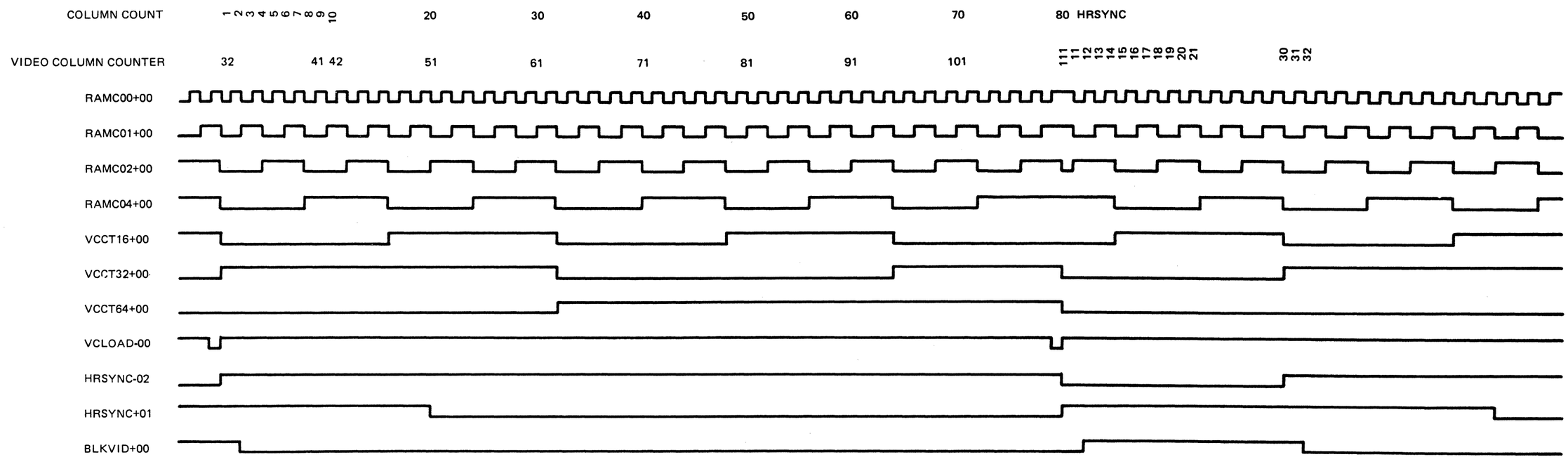
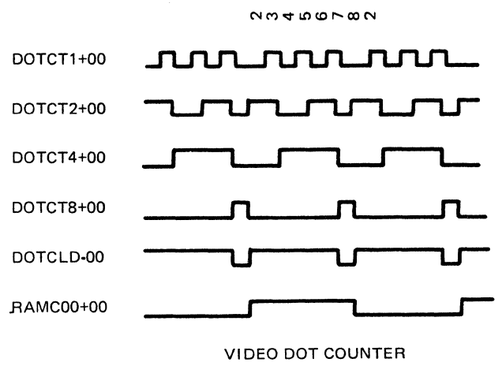
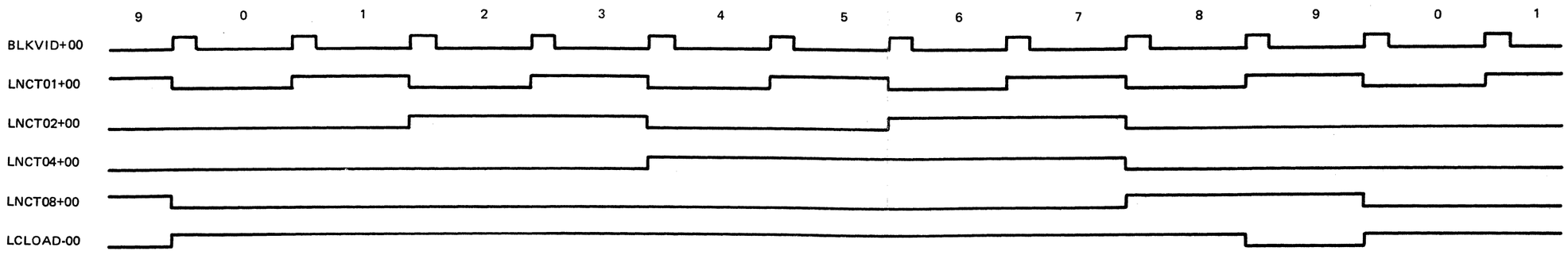
TERM DP1505 B07
SLIDE SW. SWITCHA A20
RAM 2102X250 H20
RAM 2102X250 K21
JK FLOP 74LS109 F06
JK FLOP 74LS109 B06
JK FLOP 74LS109 F05
JK FLOP 74LS109 J06
CD D-FLOP 74LS174 E17
REG 74LS174 B08
RESISTORS H0160 K18
R1.0K B13L
R270 L19A
R150 K15A
R1.0K J09A
R1.0K K09B
74LS00 H02
74LS08 H05
74LS08 H04
74LS08 B03
74LS04 C07
74LS04 L16
74LS10 J04
74LS03 H13
TITLE
TTY-C CRT DISPLAY
KEYBOARD BITS
HONEYWELL
SIZE D
DWG NO 60130705-001
SH 15F
REV G

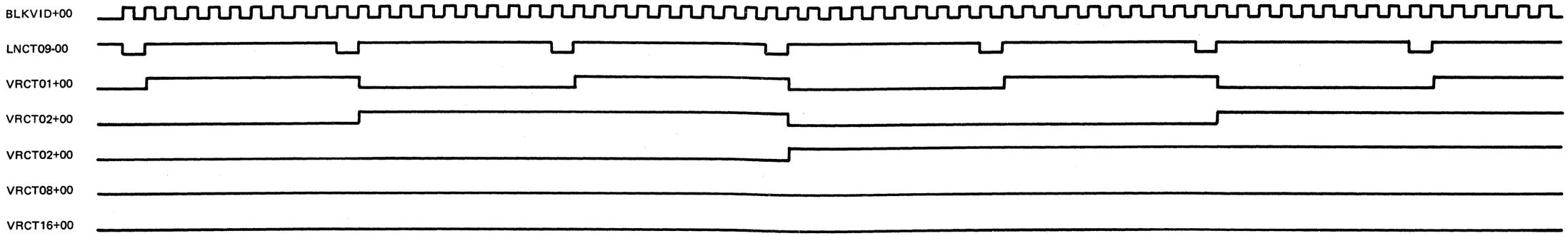


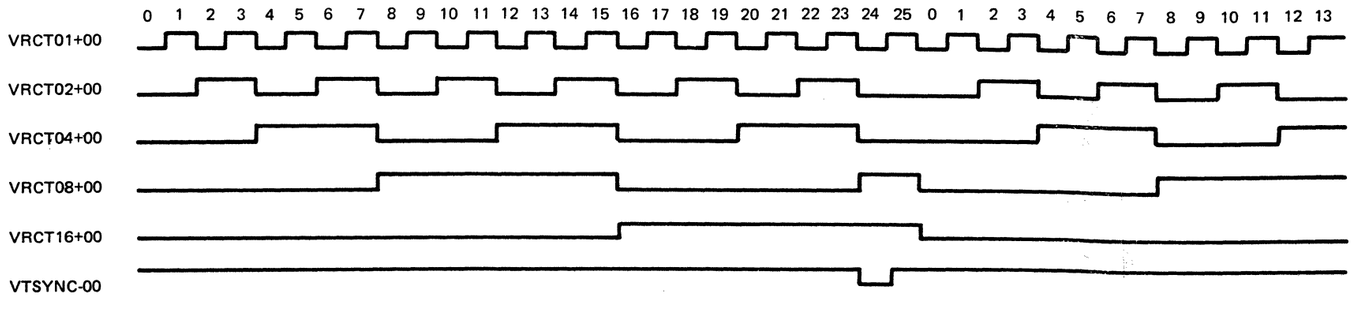


Timing Diagrams (Sheet 1 of 6)



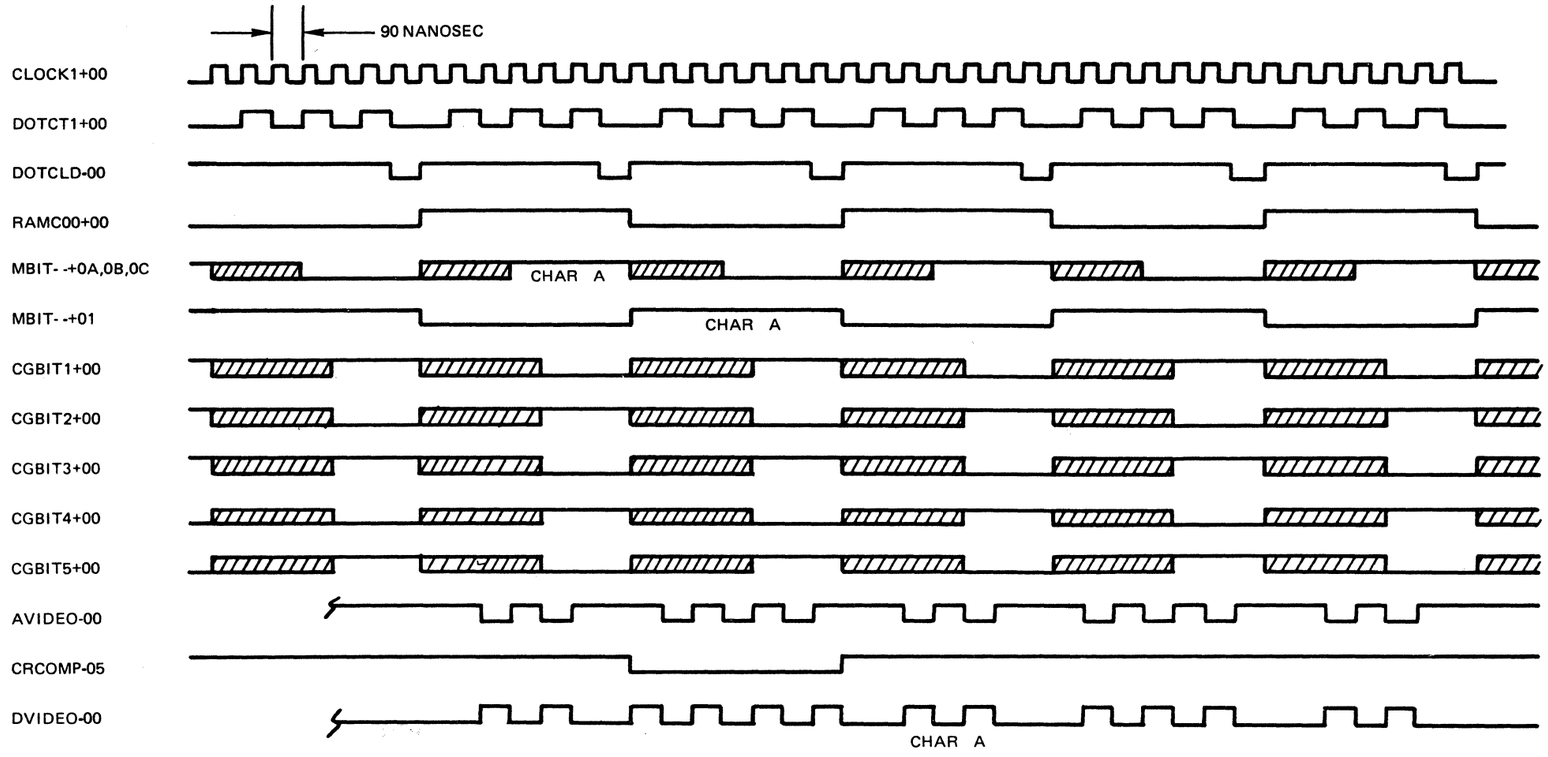
VIDEO LINE COUNTER





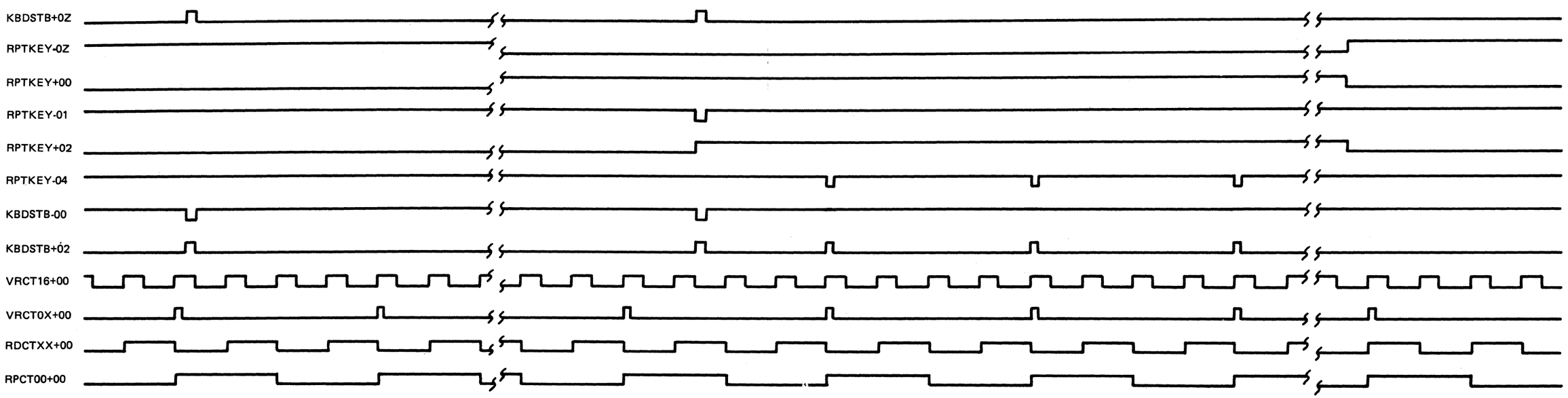
VIDEO ROW COUNTER

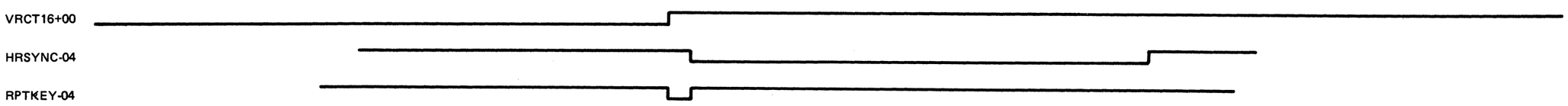
Timing Diagrams (Sheet 2 of 6)



VIDEO GENERATION

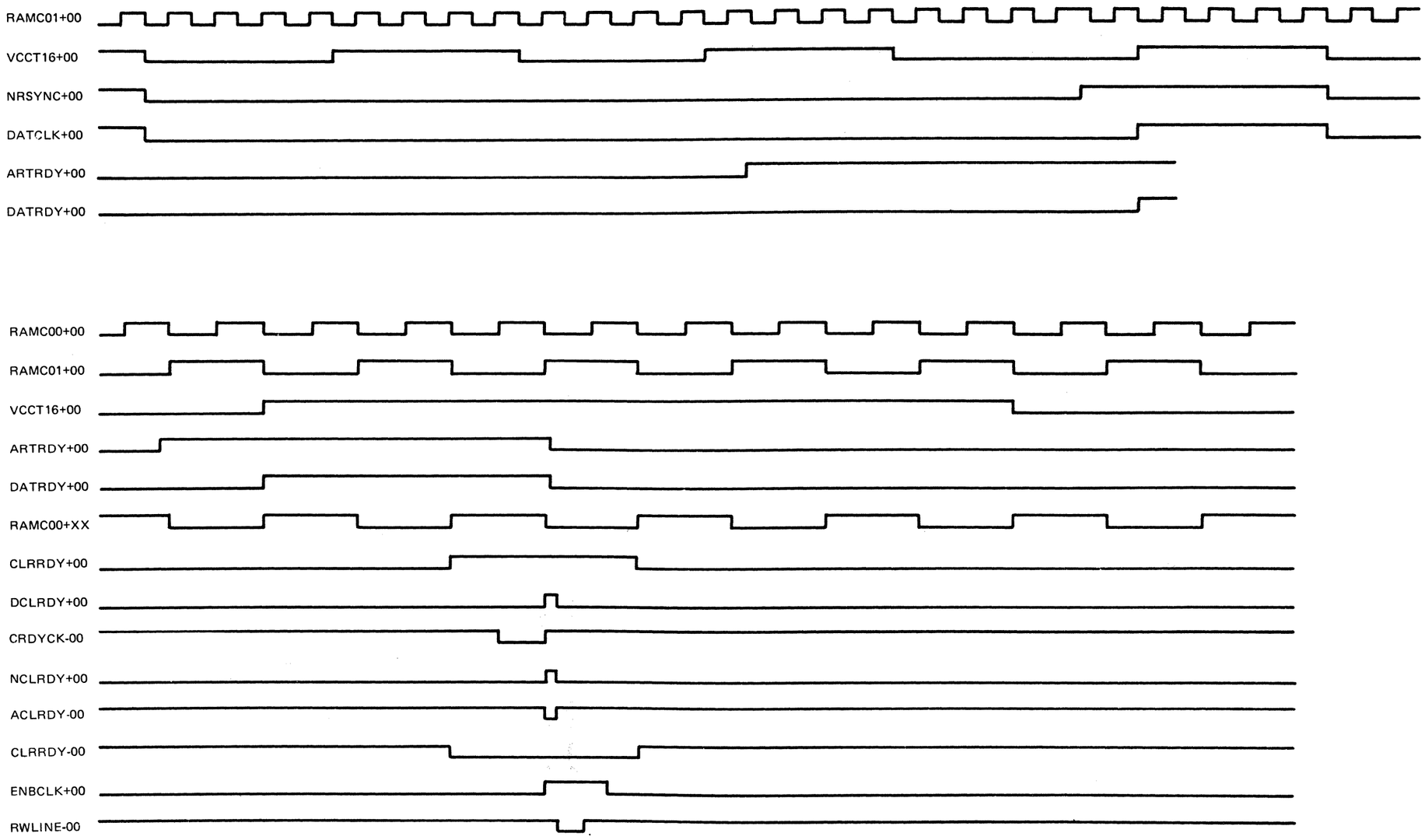
Timing Diagrams (Sheet 3 of 6)



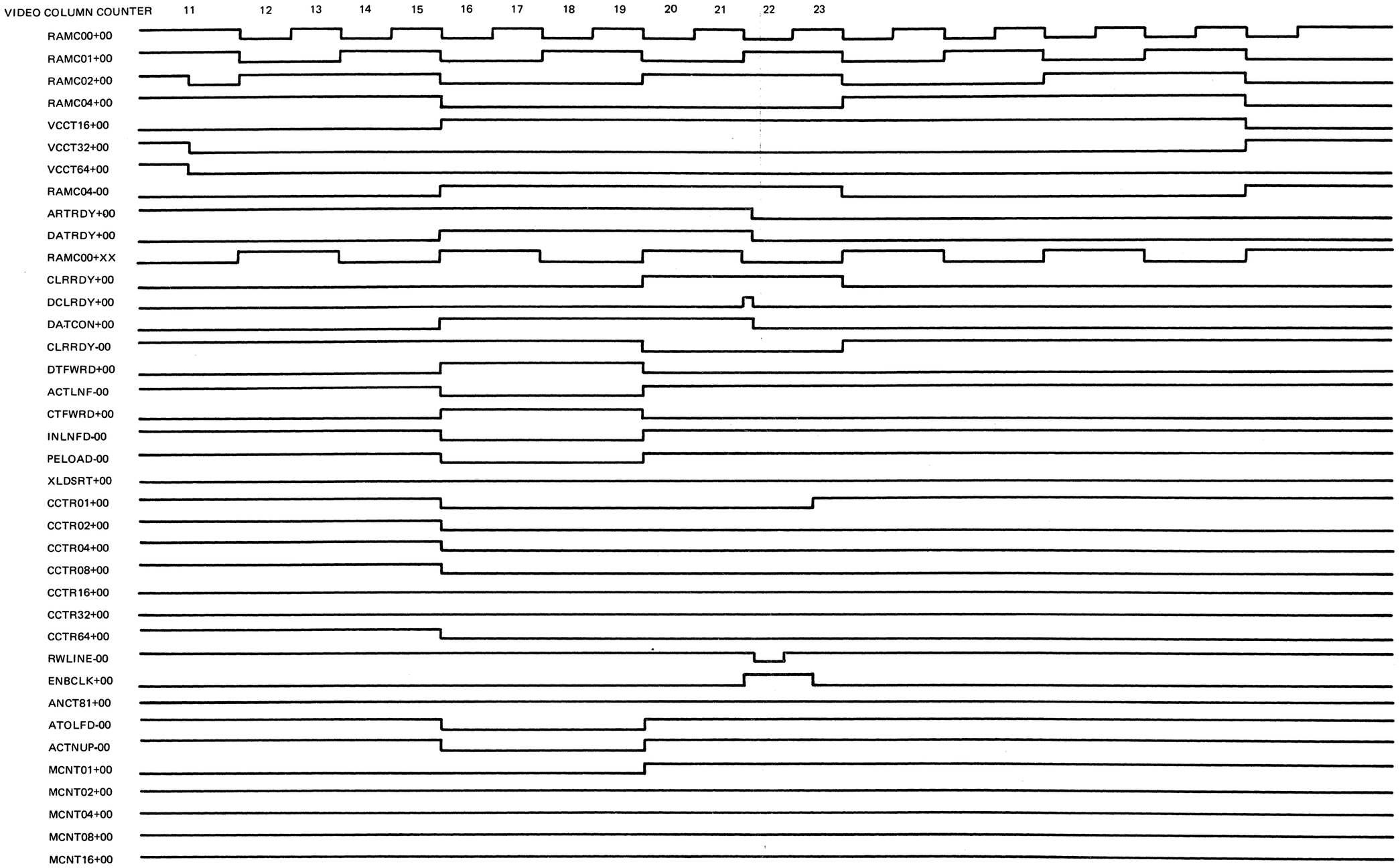


REPEAT TIMING

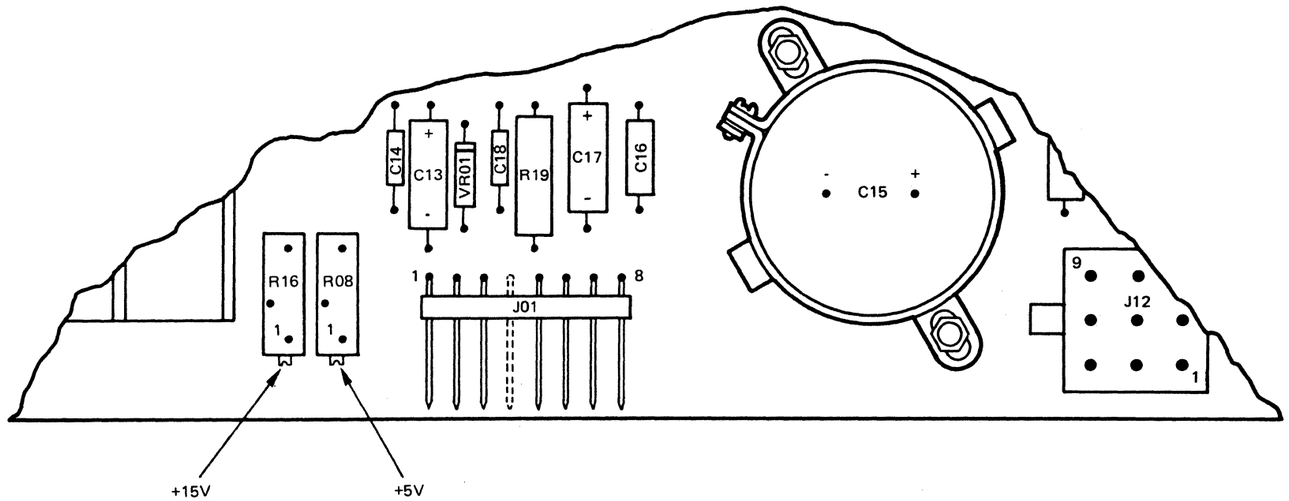
Timing Diagrams (Sheet 4 of 6)



NORMAL WRITE SEQUENCE



Timing Diagrams (Sheet 6 of 6)

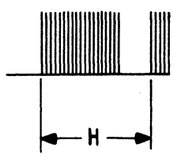


1. Remove the cover from the terminal.
2. Turn the terminal on.
3. Adjust the +5 volts as follows:
   a. Using a dc voltmeter, measure the voltage between pin 3 (+5V) and pin 8 (ground) at connector J01 of BP2TYC PWA.
   b. Adjust R08 on the power supply PWA for a nominal reading of +5 volts.
4. Adjust the +15 volts as follows:
   a. Using a dc voltmeter, measure the voltage between pin 5 (+15V) and pin 2 (ground) at connector J01 of BP2TYC PWA.
   b. Adjust R16 on the power supply PWA for a nominal reading of +15 volts.
5. Turn off the power and replace the cover.

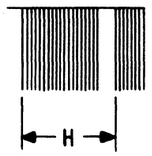
NOTE

PWA component locations are shown in Section X of this manual. The power supply schematic is provided elsewhere in this section.

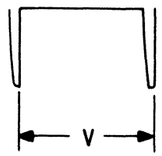
WAVEFORMS



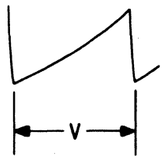
Q101-B
2.5V P-P



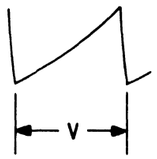
V1-CATHODE
20V P-P



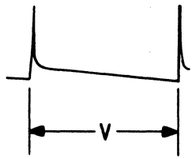
CR101-ANODE
3V P-P



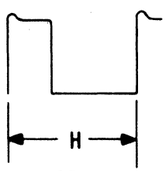
Q103-B
4.5V P-P



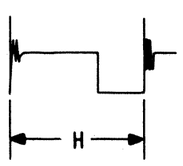
Q104-B
1.2V P-P



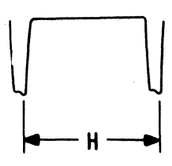
Q104-C
45V P-P



Q105-B
3V P-P

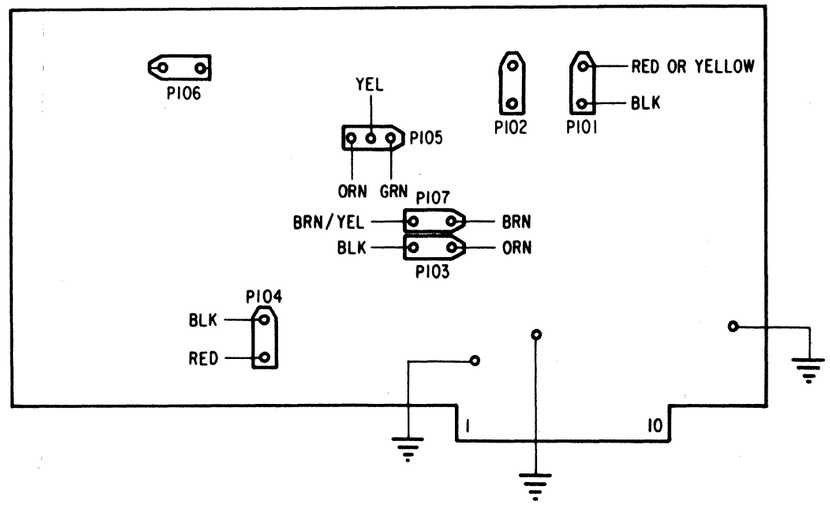


Q105-C
30V P-P



Q106-C
170V P-P

CRT CIRCUIT BOARD



TROUBLESHOOTING GUIDE

SYMPTOM	POSSIBLE REMEDY
Screen is dark	Check "A" bus Q106, Q105, CR2
Loss of video	CR105, Q101
Power consumption is too high	Check horizontal drive waveform; check proper placement of horizontal linearity sleeve; Q105, Q106

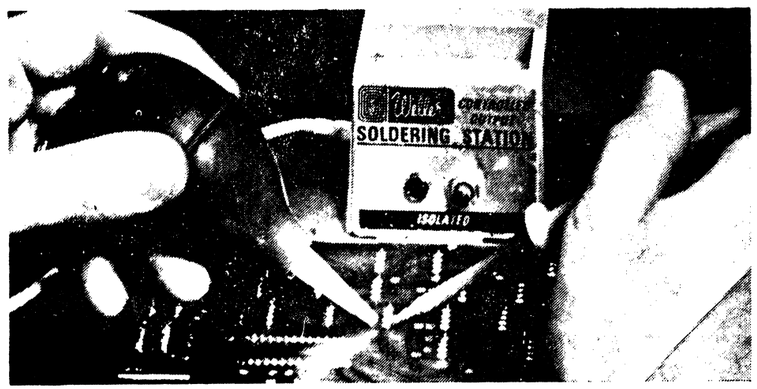
A schematic diagram is given in Figure 6-4. Circuit board component locations are given in Figure 8-2.

1. Using keytop puller (part number SW-10485), remove the button from the module being replaced and as many adjacent buttons as required to furnish adequate work space. The buttons can be removed by pulling upward or by prying upward, with a padded tool, from their under surface.

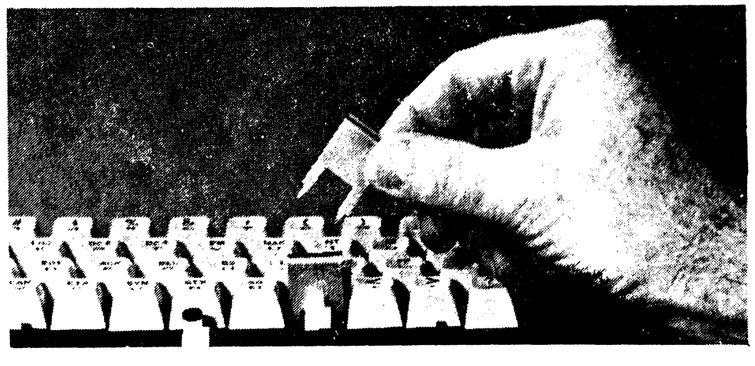
CAUTION

Remove buttons from alternate action modules only when they are in the free position. Failure to do this will result in damage to the module.

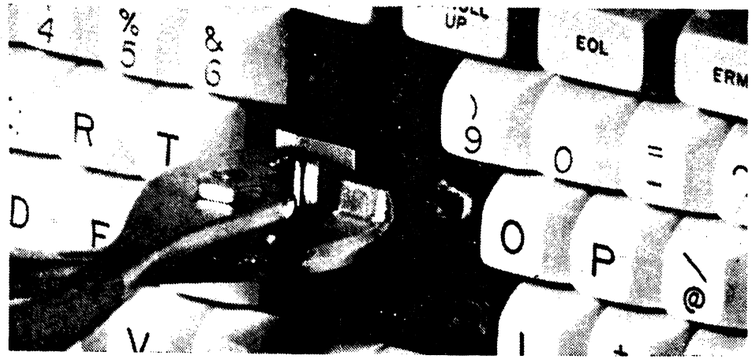
2. Unsolder the four terminals of the lead frame package from the termination board, using a 750° F controlled temperature iron. When unsoldering the terminals, use a solder removal tool to remove all solder from the pin holes in the printed circuit board.



3. Insert module removal tools (part number SD-10101) at each end of the module.



4. With the module removal tools in position, grip the switch module with a pair of pliers and pull straight out.



5. Replace with new module. Take care to orient switch properly and observe that solder terminals are through the printed circuit board prior to snapping in place.
6. Solder the new switch terminals using 60/40 rosin core solder employing a 750° F controlled temperature 1/8-inch chisel tip soldering iron.

CAUTION

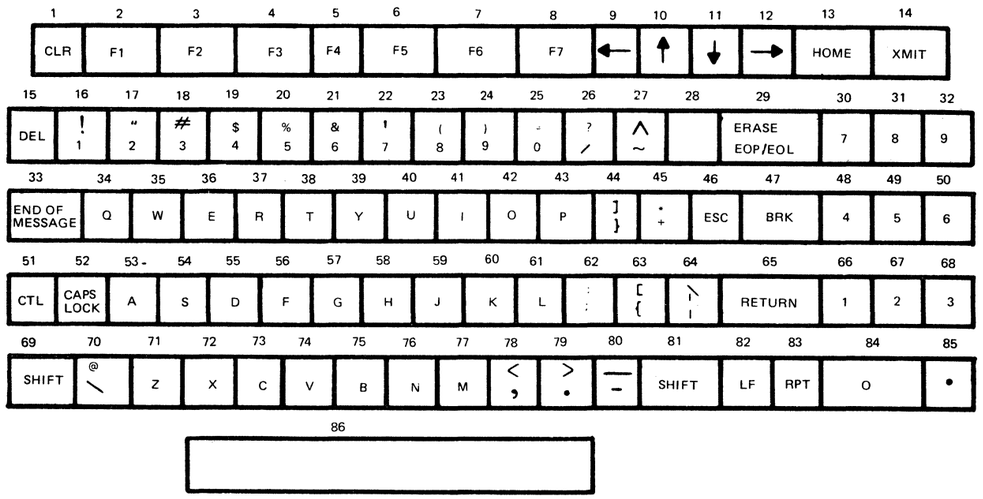
The solder tip should never be held on the terminal for over 4 seconds.

7. The solder connections may be cleaned with a mild solvent. However, take care not to contact the switch with the solvent.
8. Reassemble the buttons on the switch modules. When work has been completed, perform a visual check to see that the correct buttons are returned to the correct modules.

OUTPUT PIN ASSIGNMENTS

Pin numbers are referenced to a 3M connector, part number 3462-0000.

PIN NUMBER	OUTPUT SIGNAL
1	+5 Vdc
3	+5 Vdc
5	+5 Vdc
7	Ground
9	Ground
11	Ground
13	Bit 2
15	Bit 1
17	Bit 3
19	Bit 4
21	Bit 5
23	Bit 6
25	Bit 7
2	+5 Vdc
4	+5 Vdc
6	+5 Vdc
8	Ground
10	Ground
12	Ground
14	-12 Vdc
16	Repeat
18	Function key at position 28
20	Strobe
22	Function key at position 33
24	Break
26	Bit 8



KEY NUMBER	UNSHIFTED 8765 4321	SHIFTED 8765 4321	CONTROL 8765 4321	CAPS LOCK 8765 4321	KEY NUMBER	UNSHIFTED 8765 4321	SHIFTED 8765 4321	CONTROL 8765 4321	CAPS LOCK 8765 4321
1	1110 0000	1110 0000		1110 0000	44	0111 1101	0101 1101	0001 1101	0101 1101
2	1011 0000	1011 0001		1011 0000	45	0010 1011	0010 1010		0010 1011
3	1011 0010	1011 0101		1011 0010	46	0001 1011	0001 1011	0001 1011	0001 1011
4	1011 0110	1011 0111		1011 0110	47	FUNCTION KEY			
5	1011 1000	1011 1001		1011 1000	48	0011 0100	0011 0100	0011 0100	0011 0100
6	1011 1010	1011 1011		1011 1010	49	0011 0101	0011 0101	0011 0101	0011 0101
7	1011 1100	1011 1101		1011 1100	50	0011 0110	0011 0110	0011 0110	0011 0110
8	1011 1110	1011 1111		1011 1110	51	CONTROL			
9	1100 0100	1100 0100	1100 0100	1100 0100	52	CAPS LOCK			
10	1100 0001	1100 0001	1100 0001	1100 0001	53	0110 0001	0100 0001	0000 0001	0100 0001
11	1100 0010	1100 0010	1100 0010	1100 0010	54	0111 0011	0101 0011	0001 0011	0101 0011
12	1100 0011	1100 0011	1100 0011	1100 0011	55	0110 0100	0100 0100	0000 0100	0100 0100
13	1100 1000	1100 1000	1100 1000	1100 1000	56	0110 0110	0100 0110	0000 0110	0100 0110
14	1110 1001	1110 1001	1110 1001	1110 1001	57	0110 0111	0100 0111	0000 0111	0100 0111
15	0111 1111	0111 1111	0111 1111	0111 1111	58	0110 1000	0100 1000	0000 1000	0100 1000
16	0011 0001	0010 0001		0011 0001	59	0110 1010	0100 1010	0000 1010	0100 1010
17	0011 0010	0010 0010		0011 0010	60	0110 1011	0100 1011	0000 1011	0100 1011
18	0011 0011	0010 0011		0011 0011	61	0110 1100	0100 1100	0000 1100	0100 1100
19	0011 0100	0010 0100		0011 0100	62	0011 1011	0011 1010		0011 1011
20	0011 0101	0010 0101		0011 0101	63	0111 1011	0101 1011	0001 1011	0101 1011
21	0011 0110	0010 0110		0011 0110	64	0111 1100	0101 1100	0001 1100	0101 1100
22	0011 0111	0010 0111		0011 0111	65	0000 1101	0000 1101	0000 1101	0000 1101
23	0011 1000	0010 1000		0011 1000	66	0011 0001	0011 0001	0011 0001	0011 0001
24	0011 1001	0010 1001		0011 1001	67	0011 0010	0011 0010	0011 0010	0011 0010
25	0011 0000	0011 1101		0011 0000	68	0011 0011	0011 0011	0011 0011	0011 0011
26	0010 1111	0011 1111		0010 1111	69	SHIFT			
27	0111 1110	0101 1110	0001 1110	0101 1110	70	0010 0000	0100 0000	0000 0000	0100 0000
28	FUNCTION KEY				71	0111 1010	0101 1010	0001 1010	0101 1010
29	1100 1011	1100 1010		1100 1011	72	0111 1000	0101 1000	0001 1000	0101 1000
30	0011 0111	0011 0111	0011 0111	0011 0111	73	0110 0011	0100 0011	0000 0011	0100 0011
31	0011 1000	0011 1000	0011 1000	0011 1000	74	0111 0110	0101 0110	0001 0110	0101 0110
32	0011 1001	0011 1001	0011 1001	0011 1001	75	0110 0010	0100 0010	0000 0010	0100 0010
33	FUNCTION KEY				76	0110 1110	0100 1110	0000 1110	0100 1110
34	0111 0001	0101 0001	0001 0001	0101 0001	77	0110 1101	0100 1101	0000 1101	0100 1101
35	0111 0111	0101 0111	0001 0111	0101 0111	78	0010 1100	0011 1100		0010 1100
36	0110 0101	0100 0101	0000 0101	0100 0101	79	0010 1110	0011 1110		0010 1110
37	0111 0010	0101 0010	0001 0010	0101 0010	80	0010 1101	0101 1111	0001 1111	0010 1101
38	0111 0100	0101 0100	0001 0100	0101 0100	81	SHIFT			
39	0111 1001	0101 1001	0001 1001	0101 1001	82	0000 1010	0000 1010	0000 1010	0000 1010
40	0111 0101	0101 0101	0001 0101	0101 0101	83	FUNCTION KEY			
41	0110 1001	0100 1001	0000 1001	0100 1001	84	0011 0000	0011 0000	0011 0000	0011 0000
42	0110 1111	0100 1111	0000 1111	0100 1111	85	0010 1110	0010 1110	0010 1110	0010 1110
43	0111 0000	0101 0000	0001 0000	0101 0000	86	0010 0000	0010 0000	0010 0000	0010 0000

Keyboard Output Codes

LOGIC BLOCK DIAGRAM GLOSSARY/INDEX TTy-C CRT DISPLAY	DOCUMENT NO. GLB60130734-001	REV. B	BOARD NAME BE2TCY	ASSEMBLY DOC. NO. 60130730	PAGE 1 OF 5 EDITED 08/17/77

LOGIC BLOCK DIAGRAM GLOSSARY/INDEX
TTY-C CRT DISPLAY

DOCUMENT NO. GLB60130734-001 REV. B

BOARD NAME BE2TCY ASSEMBLY DOC. NO. 60130730

EDITED 08/17/77

SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N
OERMOX+00	01D07		ACBDB2+0B	03C09		ADEC04+00	05Y13		ALCL02+00	01A07		BAUDG1+00	12A07	
OEROCT+00	06D07		ACBDB2+0C	10A09		ADEC06-00	01X13		ALCL04+00	01A07		BAUDG2-00	12X07	
AABELL-00	07Z13		ACBDB3+0A	05B09		ADEC06+00	06Y13		ALCL08+00	04A07		BAUDG2+00	12A07	
AACT81-00	01C05		ACBDB3+0B	05C09		ADEC07-00	01X13		ALCL16+00	01A07		BAUDG3+00	12A07	
AACT81+00	01D05		ACBDB3+0C	11A09		ADEC07+00	07Y13		AMLNFD-00	09X05		BAUDG4+00	12A07	
AACTDN-00	01B07		ACBDB4+0A	07B09		ADEC08-00	01X13		AMSTCL+00	08Z07		BAUDHI+00	11A12	
AACTUP-00	01B07		ACBDB4+0B	07C09		ADEC08+00	08Y13		AMXCLR-00	04D14		BAUDLL-00	13X07	
AAHOME-00	08Z13		ACBDB4+0C	12A09		ADEC09-00	01X13		AMXSL2-00	09D06		BAUDRT-01	12D07	
AALNCT-00	05D06		ACBDB5+0A	09B09		ADEC09+00	09Y13		AMXSL2+00	07D06		BAUDRT+00	11D07	
AALNCT-0A	04D06		ACBDB5+0B	09C09		ADEC10-00	01X13		AMXSTB-00	06Y07		BAUDRT+01	11Z07	
AALNCT-0C	05C06		ACBDB5+0C	07D09		ADEC10+00	10Y13		ANCT81-00	04D05		BELL01-00	08A10	
AAMODA+00	08X13		ACBDB6+0A	11B09		ADEC11-00	01X13		ANCT81+00	04D05		BELL01+00	07X10	
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AAROLL-00	05A07		ACBDB8+0C	10A10		ADEC15-00	01X13		APARER+11	01X10		BFWDCT+00	12A05	
AAROLL+00	08A07		ACIN01+0A	04A05		ADEC15+00	13A13		APTXON+00	11X10		BLKVID-00	04D02	
AARRST-00	01X08		ACIN02+0A	04A05		ADR000+00	01A08		APTYON-00	12Y10		BLKVID-XX	08Z02	
AAZRCT+00	02D05		ACIN04+0A	04A05		ADR001+00	01A08		APTYON-0A	12Z10		BLKVID+00	08D02	
ABCOMP-00	13X06		ACIN08+0A	04A05		ADR002+00	01A08		APTYON-0B	12D10		BLKVID+0X	03D02	
ABELRS-00	13A10		ACIN16+0A	07B05		ADR003+00	04A08		ARCLRY-00	07Y11		BLKVID+XX	08Z02	
ABILL1-00	02A11		ACIN32+0A	01A05		ADR003+01	01A08		ARTRDY+00	01D09		BRIADJ+00	07A01	
ABUF01+00	03A06		ACIN64+0A	01A05		ADR004+00	04A08		ATOLFD-00	10A07		BRIGHI+00	07A01	
ABUF02+00	03A06		ACLRDY-00	07Z11		ADR004+01	07A08		AVIDEO-00	01C03		BRIGLO+00	07A01	
ABUF03+00	03A06		ACOMUN-13	01A01		ADR005+00	04A08		AXICKF-00	10Y06		BRKCNT-00	09X11	
ABUF04+00	03A06		ACOMUN+09	05A02		ADR006+00	04A08		AXICKF+00	10Z06		BRKLTH-00	11A11	
ABUF05+00	03A06		ACTLNF-00	12Z05		ADR007+00	10B08		AXLNMD-00	10A06		BRKLTH+00	09A11	
ABUF06+00	03A06		ACTNDN-00	07Z07		ADR008+00	10B08		AXLNMD+00	08A06		BUFHMD-00	08X12	
ABUF07+00	01A06		ACTNUP-00	09Z07		ADR009+00	07A08		AXMSN1-0A	02X12		BUFINH-00	05A14	
ABUF08+00	01A06		ADEC00-00	01X13		ADRCRY+00	08B08		AXMSN1-0X	10D06		BUFINH+00	05X14	
ABUF09+00	01A06		ADEC00+00	01Y13		ADRXMT-00	06A14		AXMSN1+00	11Z06		BUFMOD-00	03Z12	
ABUF10+00	01A06		ADEC01-00	01X13		ADRXMT+00	06X14		AXMSN1+0A	11X06		BUFMOD+00	06D01	
ABUF11+00	01A06		ADEC01+00	02Y13		AEXBIT-00	03Z14		AXMSN1+0X	10D06		BVIDEO+00	08A03	
ABUF12+00	01A06		ADEC02-00	01X13		AEXBIT+00	05Y14		AXPGMD-00	07A06		CARDET+01	04X12	
ACBDB1+0A	01B09		ADEC02+00	03Y13		AFWDCT-00	13X05		AXPGMD+00	05A06		CARRTN-00	12Z13	
ACBDB1+0B	01C09		ADEC03-00	01X13		AKYSTB-00	06Z07		AYLOAD-00	08D14		CCTR01+00	04B05	
ACBDB1+0C	09A09		ADEC03+00	04Y13		AKYSTB+00	09C06		BACKEN-00	04Y14		CCTR02+00	04B05	
ACBDB2+0A	03B09		ADEC04-00	01X13		ALCL01+00	01A07		BACKEN+00	04X14		CCTR04+00	04B05	

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LOGIC BLOCK DIAGRAM GLOSSARY/INDEX
TTY-C CRT DISPLAY

DOCUMENT NO. GLB60130734-001 REV. B
BOARD NAME BE2TCY
ASSEMBLY DOC. NO. 60130730

SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N
CCTR08+00	04B05		COMDAT-23	11Z12		CRTSND+00	01Z12		DATBT6-0D	08Y10		DMYL02+00	04A10	
CCTR16+00	01B05		COMDAT+01	01D09		CTFWRD+00	10Y05		DATBT6-YY	08Y14		DMYL17-00	01A12	
CCTR32-00	03C05		COMDAT+02	07Y12		CTMXVD-00	08Y02		DATBT6+0C	06A13		DOTCLD-00	02A02	
CCTR32+00	01B05		COMDAT+03	13Y12		CTSEND-00	13X12		DATBT7-0C	09D10		DOTCT1+10	02A02	
CCTR64-00	02C05		COMDAT+13	09Y12		CTSEND+00	08Y12		DATBT7-YY	07Y14		DOTCT2+10	02A02	
CCTR64+00	01B05		COMDAT+14	12D06		CTSND1-00	06C01		DATBT7+0C	07A13		DOTCT4+10	02A02	
CCTRB0+00	04B05		COMDAT+15	09Z12		CURSDN-00	03Z13		DATBTS+00	08Z14		DTFWRD-00	11X05	
CCTRCA+00	04B05		COMDAT+16	07Y12		CURSLF-00	05Z13		DATCLK+00	08A11		DTFWRD+00	05Y11	
CCTRSM-01	13Y10		COMDAT+19	12Z06		CURSLF-1X	08D05		DATCON-00	07X11		DVIDEO-00	03D03	
CGBIT1+00	01B03		COMDAT+23	06D01		CURSLF+00	08Y05		DATCON-1Z	01A11		DVIDEO+00	13Z03	
CGBIT2+00	01B03		COMDAT+40	06D01		CURSRT-00	04Z13		DATCON+00	02X11		DVIDEO+01	07C01	
CGBIT3+00	01B03		COMEIA-00	05A02		CURSUP-00	02Z13		DATERR+00	06D01		DVIDEO+0A	13Y03	
CGBIT4+00	01B03		COMEIA-01	01A01		CVIDEO-02	07B03		DATRDY+00	08X11		DVIDEO+0B	01D03	
CGBIT5+00	01B03		COMEIA+00	11Y12		CVIDEO+01	04C03		DATSTR+00	02A14		EIACFD+00	01A01	
CHIPEN-01	11C08		COMIN1+00	01D09		CVIDEO+02	05C03		DCLEAR-00	12Y03		EIACFD+1X	05A12	
CHIPEN+01	08B08		COMIN2+00	01D09		DATAIN-00	03C15		DCLEAR-17	06D06		EIACTS+00	01A01	
CHMCMP+00	04B06		COMIN3+00	01D09		DATBT1-0A	03C10		DCLEAR-21	13A03		EIACTS+1X	12X12	
CLKCON-00	03A11		COMIN4+00	01D09		DATBT1-0C	03Z10		DCLEAR+00	12Y03		EIADSR+00	01A01	
CLOCK1-00	11A02		COMIN5+00	01D09		DATBT1-0D	03Y10		DCLEAR+07	03Y11		EIADSR+1X	01A14	
CLOCK1-01	13B02		COMIN6+00	01D09		DATBT1+0C	01A13		DCLEAR+17	07C06		ELERAS-00	11Z13	
CLOCK1-02	12X02		COMIN7+00	01D09		DATBT2-0A	04C10		DCLEAR+21	13A03		ELEVNX+00	03D07	
CLOCK1-03	10Y02		COMLIN-05	01A01		DATBT2-0C	04Z10		DCLRDY-00	06Z11		ELEVNY+00	02D07	
CLOCK1-04	11Z02		COMLIN-11	07D12		DATBT2-0D	04Y10		DCLRDY+00	06Z11		ENBCLK+00	01D11	
CLOCK1+00	11D02		COMLIN+01	01A01		DATBT2+0C	02A13		DECB67-00	11A13		ENSPAC-0A	01Z10	
CLOCK1+01	11Y02		COMLIN+17	07Z12		DATBT3-0A	05C10		DECB67+00	12A13		ENSPAC+00	01Y10	
CLRBLS-21	13X03		COMRES-13	05A02		DATBT3-0C	05Z10		DECDEL-00	13X13		EPGCLR-00	10Z13	
CLRRDY-00	06X11		COMRRT-01	05X12		DATBT3-0D	05Y10		DEXBIT-00	07A11		ERSBLK-00	04A03	
CLRRDY+00	06X11		COMTRE+00	01D09		DATBT3+0C	03A13		DISENA-00	03D06		ERSBLK+88	04A03	
CNT064-00	06B08		CON7NX+00	10A13		DATBT4-0A	06C10		DISENA+00	13A08		ERSCAP+00	06A03	
CNT064+00	07Y08		CON7PX+00	08A13		DATBT4-0C	06Z10		DLITDT+00	07A15		ERSRES+00	07A03	
CNT064+10	07A08		CRCOMP-05	13Z06		DATBT4-0D	06Y10		DLYEXT-00	01A12		ESCAPE+00	11D13	
COMCLK-00	12Y06		CRCOMP-5X	13Y06		DATBT4+0C	04A13		DLYINH+00	06D11		ESCAPX-00	13A15	
COMDAT-00	10D12		CRCOMP+01	04D03		DATBT5-00	05X13		DMYB04-00	05A11		ETXSW1+00	01A09	
COMDAT-01	06A12		CRCOMP+02	07D03		DATBT5-0A	07C10		DMYB06-00	03C15		ETXSW2+00	01A09	
COMDAT-03	07X12		CRCOMP+04	10D03		DATBT5-0C	07Z10		DMYB18+00	08B08		ETXSW3+00	01A09	
COMDAT-0C	03D01		CRDYCK-00	06Y11		DATBT5-0D	07Y10		DMYC05-00	05Z11		ETXSW4+00	01A09	
COMDAT-0D	07A05		CRDYCK+00	11D01		DATBT5+0C	05A13		DMYC08+00	12A06		FDXRTS+00	01D12	
COMDAT-11	11D12		CRSSTP-00	09X14		DATBT6-0A	08C10		DMYD02-00	03X11		FREQ1P+00	10A14	
COMDAT-14	09D12		CRSSTP+00	07X14		DATBT6-0B	02Z10		DMYE11+00	01D09		FREQ2P+00	13A14	
COMDAT-19	12Z06		CRSXMT-00	13Z13		DATBT6-0C	08Z10		DMYH08+XX	01A05		FREQ3P+00	12A14	

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LOGIC BLOCK DIAGRAM GLOSSARY/INDEX — DOCUMENT NO. GLB60130734-001 REV. B — BOARD NAME BE2TCY — ASSEMBLY DOC. NO. 60130730 — — EDITED 08/17/77
TTY-C CRT DISPLAY

SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N
FREQ4P+00	13Z14		KBDDB4+0Z	01C01		LNRACE-00	04C06		MCNT02+00	01B07		NTWHRE+00	04D05	
FREQCP+00	10Y14		KBDDB5+00	10D15		LNRACE+00	04C06		MCNT04-00	03C07		NW81CT+00	12Y05	
FWDLNF-00	08X05		KBDDB5+0Z	01C01		LNXMIT-00	09Z13		MCNT04+00	01B07		NWMODA+00	04X13	
FWDLNF+00	09Y05		KBDDB6+00	10D15		LOADSP-00	02D06		MCNT08-00	04C07		NX81CT+00	10X07	
HDXRTS-00	01Y12		KBDDB6+0Z	01C01		LOADSP-0C	06C06		MCNT08+00	01B07		NZERCT-00	04D05	
HEREIS-00	01C01		KBDDB7-00	01B15		LOADSP+00	02D06		MCNT16-00	05C07		NZERCT+00	04D05	
HRSYNC-00	06Y02		KBDDB7+00	01B15		LSTCHR-00	13A05		MCNT16+00	04X07		PARINH+00	01A09	
HRSYNC-01	03Z02		KBDDB7+0Z	01C01		LSTCHR+00	01X11		MEPLEE+00	07A05		PARSEL+00	01A09	
HRSYNC-02	06Z02		KBDDB8+0Z	01C01		MBIT01+01	07D04		MLNCMP+00	01B06		PCLEAR-00	01Z13	
HRSYNC-03	03Y02		KBDMUX+00	11X15		MBIT01+0A	01A04		MRCT01-00	04X08		PCLEAR-XX	02D13	
HRSYNC-04	05D02		KBDSTB-00	13A11		MBIT01+0B	04A04		MRCT01-0A	13B08		PCLEAR+XX	01D13	
HRSYNC-22	09Z02		KBDSTB-02	03A10		MBIT01+0C	13A04		MRCT01-0B	12B08		PELOAD-00	09D05	
HRSYNC+00	04Z02		KBDSTB+01	13X11		MBIT02+01	07D04		MRCT01+00	13C08		PGCMPR-00	08C06	
HRSYNC+01	01D02		KBDSTB+02	11D11		MBIT02+0A	07A04		MRCT02+00	10A08		PGCMPR+00	07B06	
HRSYNC+02	01Z02		KBDSTB+0C	13Y11		MBIT02+0B	10A04		MRCT04+00	10A08		PGMODE-00	06D01	
HRSYNC+04	06D02		KBDSTB+0Z	01C01		MBIT02+0C	13X04		MRCT08+00	10A08		PGMODE+00	08D13	
HRSYNC+22	09D02		LCLOAD-00	08C03		MBIT03+01	07D04		MRCT16+00	10A08		PGXMIT-00	09D13	
HRSYNC+24	10A05		LCLOAD-01	11C03		MBIT03+0A	01B04		MS132C+00	08D11		PPADTR-00	13A12	
INBIT1+0A	04A15		LCLOAD-02	07C03		MBIT03+0B	04B04		NAXCKC+00	07X07		PPARCD-00	01B01	
INBIT1+0B	01A15		LCLOAD-03	11B03		MBIT03+0C	13Y04		NAXCKF-00	12A15		PPARCD+01	07A12	
INBIT1+0C	05X15		LCLOAD+01	08B03		MBIT04+01	07D04		NCARTN-00	11D05		PPARCD+0X	08A12	
INBIT2+00	05Y15		LCLOAD+02	12Z03		MBIT04+0A	07B04		NCLRDY-00	08Y11		PPARTS+00	02D12	
INBIT3+00	05Z15		LLCASE-00	04C05		MBIT04+0B	10B04		NCLRDY+00	02Y11		PPATXD-00	03Y12	
INCCCT-00	03D11		LLCASE-01	05A02		MBIT04+0C	13Z04		NCROMP-04	12X03		PPDSRS+0Z	11X12	
INCTSX-00	03X14		LNCT01+00	01A03		MBIT05+01	07D04		NCROMP+04	12A03		PTRXXX-00	11D10	
INCTSX-0A	03A14		LNCT02+00	01A03		MBIT05+0A	01C04		NCRTEN+00	12Z15		PULLUP+00	10D07	
INCTSX-0B	04A14		LNCT04+00	01A03		MBIT05+0B	04C04		NCRTSD-00	12Y15		PULLUP+01	06D01	
INDCTS+00	06D01		LNCT08-00	05B03		MBIT05+0C	12D04		NCRTSD+00	05D12		PULLUP+02	13A02	
INHCLK-00	12Y02		LNCT08+00	01A03		MBIT06+01	09D04		NDTCON-1X	01Z11		PULLUP+03	12D05	
INLNFD-00	11Z05		LNCT09-00	06B03		MBIT06+0A	07C04		NDTFWD-00	11Y05		PULLUP+04	01D06	
INMSTC-00	08Y07		LNCT09+00	06C03		MBIT06+0B	10C04		NENSPC-00	02Z11		PULLUP+06	11X11	
IVIDEO+00	05D15		LNFEED-00	10D13		MBIT06+0C	11D04		NEWDTR+01	06A01		PULLUP+08	07A07	
KBDBKK-00	01C01		LNFEED+00	09X07		MBIT07+01	07D04		NEWSTB+00	02X10		PULLUP+09	07A05	
KBDDB1+00	10D15		LNFEED+10	01C06		MBIT07+0A	01D04		NEXBIT-00	05A11		PULLUP+10	09Z12	
KBDDB1+0Z	01C01		LNFEED+11	03C06		MBIT07+0B	04D04		NFWDCT-00	13Y05		PWRISO+00	01D14	
KBDDB2+00	10D15		LNFREQ-10	12Z14		MBIT07+0C	10D04		NINLFD-00	10Z05		PWRISO+0A	01Z14	
KBDDB2+0Z	01C01		LNFREQ-20	11Z14		MBIT16+00	06C05		NLNFED-00	09Y07		PWRISO+0B	02Z14	
KBDDB3+00	10D15		LNFREQ+00	11Y14		MCNT01-00	01C07		NLONG1+00	01Y11		PWRONI+00	06D01	
KBDDB3+0Z	01C01		LNMODE-00	06D01		MCNT01+00	01B07		NODATA-00	12D15		PWRRST-00	07A14	
KBDDB4+00	10D15		LNMODE+00	06D13		MCNT02-00	02C07		NTWHRE-00	04D05		PWRTON-00	10Z10	

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TTY-C CRT DISPLAY

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BOARD NAME BE2TCY
ASSEMBLY DOC. NO. 60130730

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SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N	SIGNAL NAME	ROW/COL /PAGE	N
PWRTON+00	10Y10		RPCT02-00	12D11		STXMIT+5C	11Y15		WRCT04+00	03X11				
RAMC00+00	04X02		RPCT02+00	09Y11		SYNCCT+00	08X02		WRCTSM-00	03X11				
RAMC00+XX	07D11		RPCTXX+00	09Y11		TERVN5-00	05A12		WRENAB-00	05Z11				
RAMC01+00	04X02		RPTKEY-01	12Y11		TESTCK-00	12Z02		XB1CTN+00	07Y07				
RAMC02+00	04X02		RPTKEY-02	12Z11		THRCNT+00	12Y12		XERMOY+00	04D07				
RAMC04-00	07Y02		RPTKEY-04	10D11		TMXCAP+00	03A12		XLDSRT-00	04Z14				
RAMC04+00	04X02		RPTKEY-0Z	01C01		TMXRES+00	04A12		XLDSRT+00	05Y14				
RAMCRY+00	04X02		RPTKEY+00	12A11		TWTHRE+00	05D07		XMTFWD-00	12X05				
RCNT01-00	01Y08		RPTKEY+02	10Z11		TXDATO-11	05Y12		XMTFWD+00	10X05				
RCNT01+00	01Y08		RTSEXT-00	04D12		URCLMX+00	11A05		XMTRST-00	08D06				
RCNT02+00	03Y08		RTSHDX-00	01X12		URSEL1-00	09X15		XMTRST-0A	11D06				
RCNT04+00	03Y08		RTSHDX+00	03X12		URSEL1+00	09X15		XYCRSN-00	06Z13				
RCNT08-00	03C08		RTSLTH-00	06Z12		URSEL2-00	09Y15		XYLOAD-00	07D14				
RCNT08+00	03Y08		RTSLTH+00	04Z12		URSEL2+00	09Y15		XZERCT-00	11A07				
RCNT11+10	04Z08		RTSPLS-00	04Y12		URTHRE+00	01C09		XZERCT+00	08X07				
RCNT16+00	03Y08		RWLINE-00	05D11		VCCT16+00	01X02		Y81CTN-00	10Y07				
RDULIT-00	04D13		RWLINE+00	04D11		VCCT32-00	02Y02		YLDSRT-00	05Z14				
RESETC-00	01Z08		S00000+00	11Y07		VCCT32+00	01X02		YLDSRT+00	05Y14				
RLNFED-00	09A07		S00001+00	11Y07		VCCT64+00	01X02							
ROW004-02	06Z08		S00002+00	11Y07		VCLOAD-00	01Y02							
ROW004-04	09C08		S00003+00	11Y07		VIDRES-00	10D14							
ROW004-14	10C08		SENDIX-1Z	11Y06		VRCT01-00	09C03							
ROW004+00	01D08		SENDIX+0Z	01C01		VRCT01+00	09C03							
ROW004+02	10B08		SET81X-00	08Z05		VRCT02+00	09A03							
ROW004+03	10B08		SET81X+00	07D05		VRCT04-00	09B03							
ROW004+04	10B08		SETZRO-00	10D05		VRCT04+00	09A03							
ROW004+0A	05D08		STBENL+00	02Y10		VRCT08-00	07X02							
ROW004+0B	06D08		STBINH+00	03B15		VRCT08+00	09A03							
ROW008-00	11D08		STBLTH-00	05X10		VRCT16+00	09A03							
ROW008-01	07Z08		STBLTH+00	03X10		VRCTCO+00	09A03							
ROW008+00	03D08		STBRST-00	02A10		VRCTCU+00	12A06							
ROW008+0A	10D08		STBRST+00	02A10		VRCTCU+0D	10A10							
ROW008+0B	09D08		STOPBL-00	07A10		VRCTOX+00	09Z11							
ROX004-01	08Z08		STOPBL+00	04A10		VRLOAD-00	05A02							
ROY004-01	06D08		STPBIT+00	01D15		VTSYNC-00	08A02							
ROZ004-01	07D08		STPBIT+99	01D15		VTSYNC-01	10A02							
RPCT00-00	09D11		STPCLR+00	10B03		VTSYNC+02	05A02							
RPCT00+00	09Y11		STRSTX-00	12X15		VTSYNC+11	10X02							
RPCT01-00	08Z11		STXMIT-00	11A15		WDLINH-00	03D14							
RPCT01+00	09Y11		STXMIT+00	09A15		WDULIT-00	05D13							

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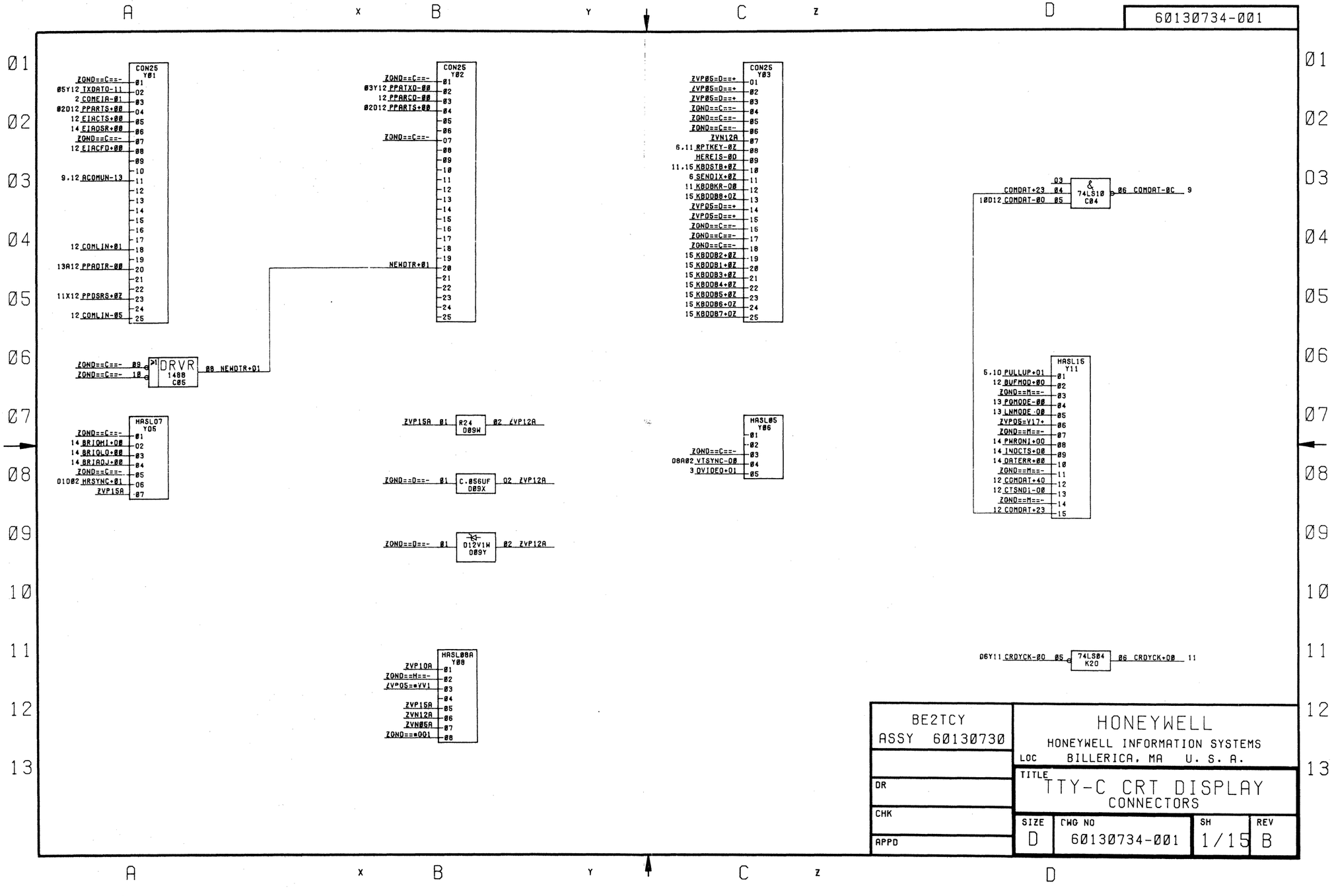
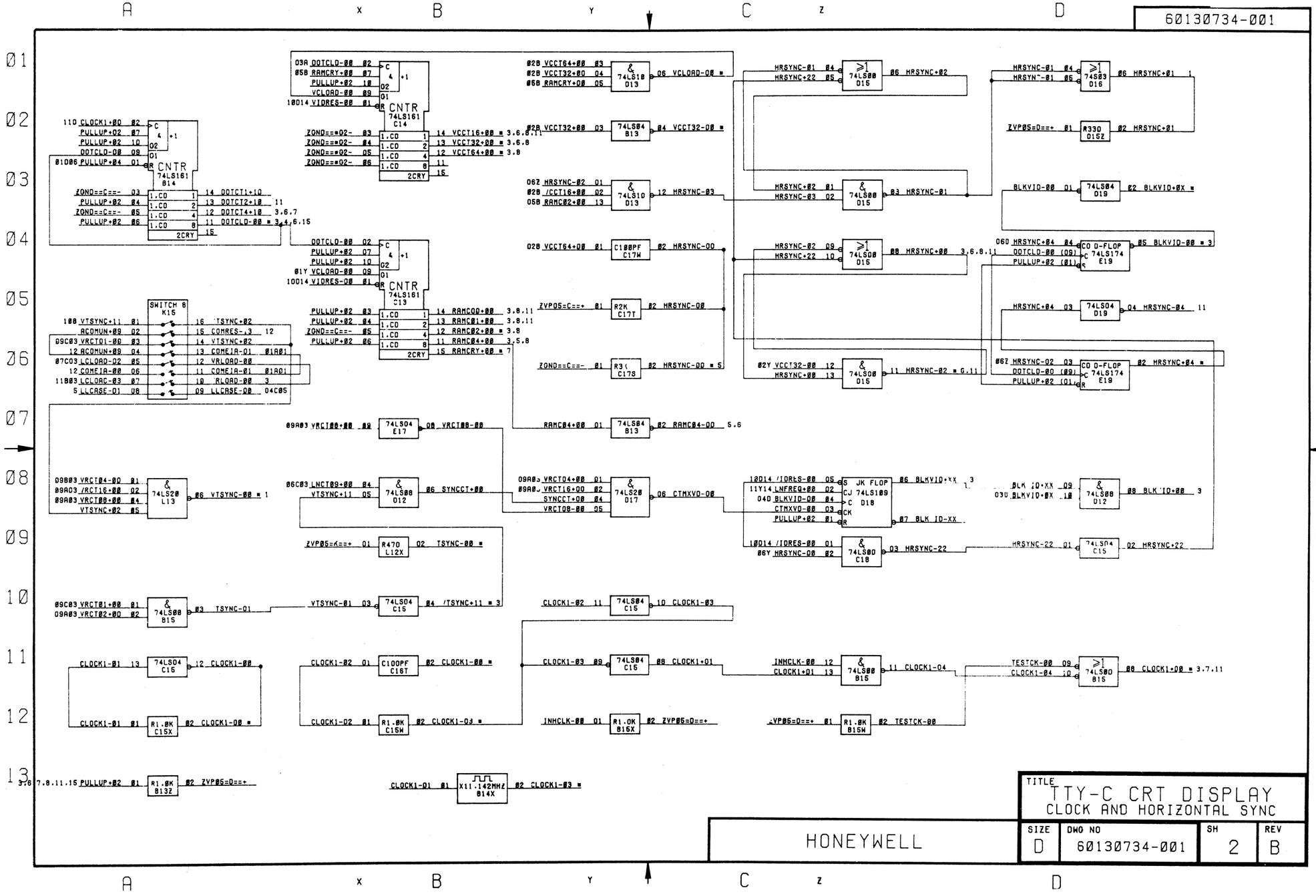
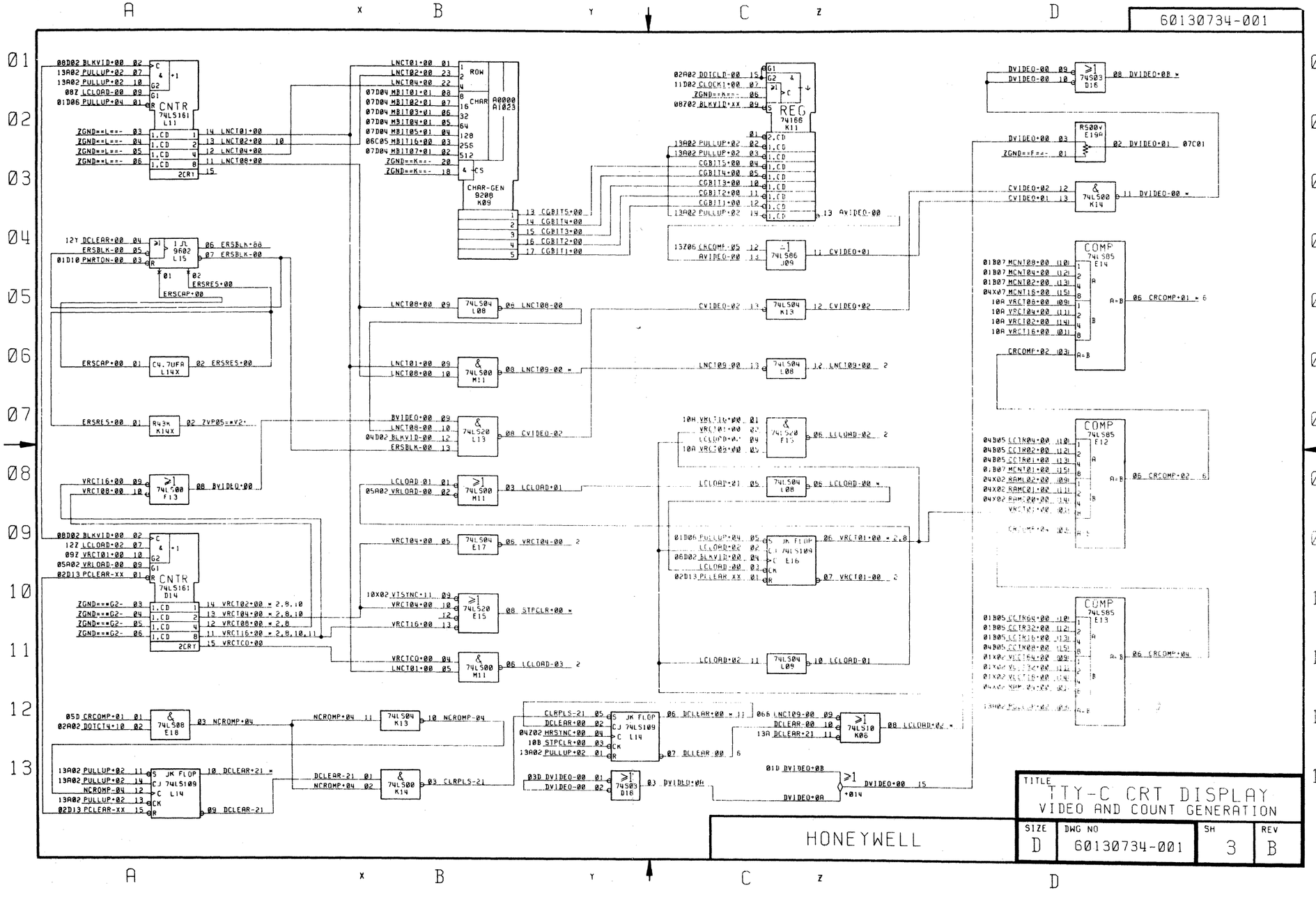
INDICATES A NARRATIVE FOR THE GIVEN SIGNAL(S).
NARRATIVES ARE SHOWN AT THE END OF THE REPORT.

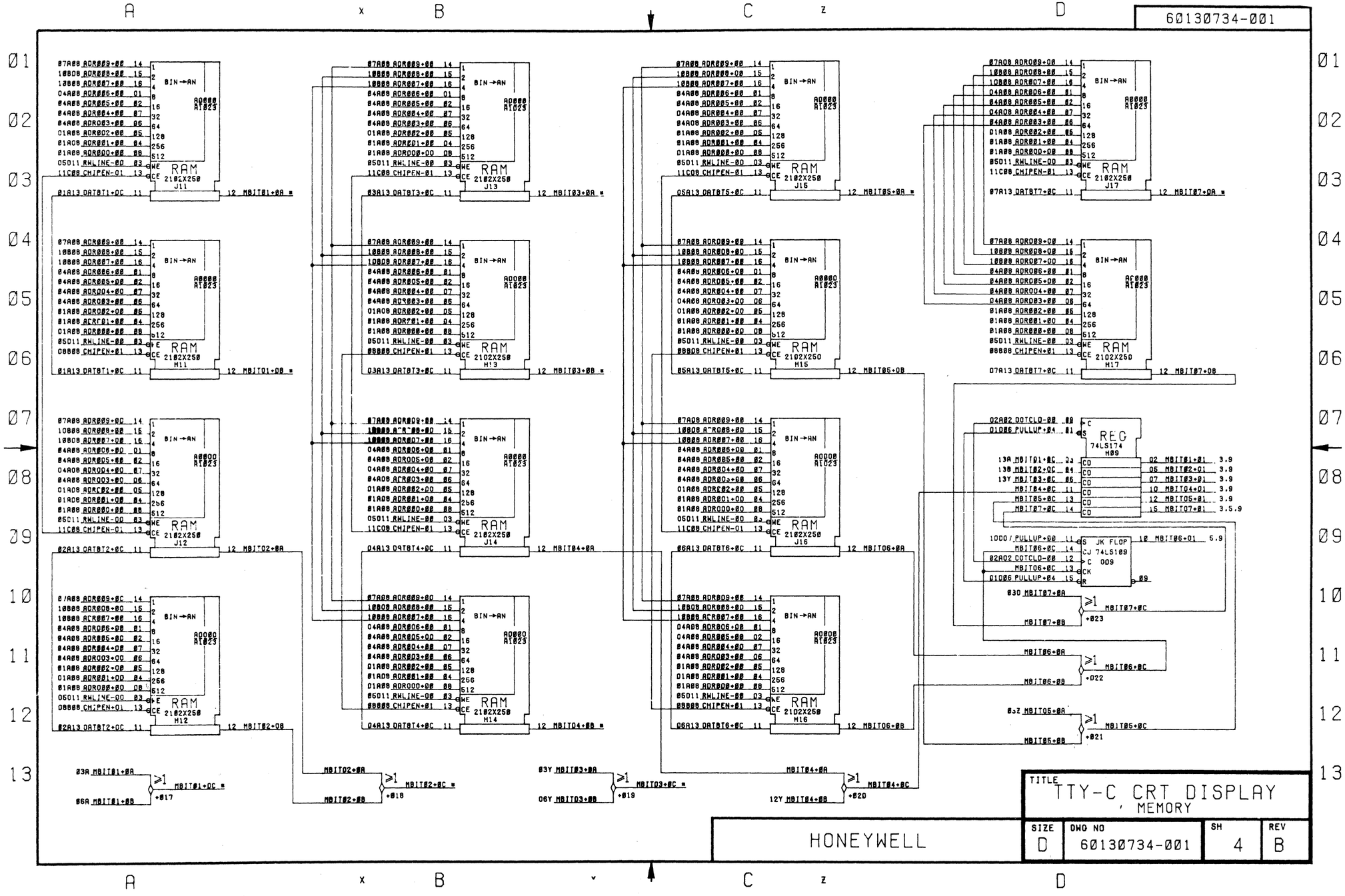

60130734-001
CON25 Y01
ZGND==C==- 01
05Y12 TXDATO-11 02
2 COMEIA-01 03
02D12 PPARTS+00 04
12 EIACTS+00 05
14 EIAOSR+00 06
ZGND==C==- 07
12 EIACFD+00 08
09
10
9,12 ACOMUN-13 11
12
13
14
15
16
12 COMLIN+01 17
18
13A12 PPAOIR-00 19
20
21
11X12 PPOSRS+0Z 22
23
24
12 COMLIN-05 25
CON25 Y02
ZGND==C==- 01
03Y12 PPATXD-00 02
12 PPARCD-00 03
02D12 PPARTS+00 04
05
06
ZGND==C==- 07
08
09
10
11
12
13
14
15
16
17
18
NEWDTR+01 19
20
21
22
23
24
25
CON25 Y03
ZVP05=D==+ 01
ZVP05=D==+ 02
ZVP05=D==+ 03
ZGND==C==- 04
ZGND==C==- 05
ZGND==C==- 06
ZVN12A 07
6,11 RPTKEY-0Z 08
HEREIS-00 09
11,15 KBDSTB+0Z 10
6 SENDIX+0Z 11
11 KBD0KR-00 12
15 KBDDB8+0Z 13
ZVP05=D==+ 14
ZVP05=D==+ 15
ZGND==C==- 16
ZGND==C==- 17
ZGND==C==- 18
15 KBDDB2+0Z 19
15 KBDDB1+0Z 20
15 KBDDB3+0Z 21
15 KBDDB4+0Z 22
15 KBDDB5+0Z 23
15 KBDDB6+0Z 24
15 KBDDB7+0Z 25
ZGND==C==- 09
ZGND==C==- 10
DRVR 1488 C05
08 NEWDTR+01
HASL07 Y05
ZGND==C==- 01
14 BRIQH1+00 02
14 BRIQLO+00 03
14 BRIAOJ+00 04
ZGND==C==- 05
01D02 HRSYNC+01 06
ZVP15A 07
ZVP15A 01
R24 D09W
02 ZVP12A
ZGND==D==- 01
C.056UF D09X
02 ZVP12A
ZGND==D==- 01
D12V1W D09Y
02 ZVP12A
HASL05 Y06
ZGND==C==- 01
08A02 VTSYNC-00 02
3 DVIDEO+01 03
04
05
HASL08A Y08
ZVP10A 01
ZGND==H==- 02
ZVP05=*VV1 03
04
ZVP15A 05
ZVN12A 06
ZVN05A 07
ZGND==*001 08
03
COMDAT+23 04
10D12 COMDAT-00 05
&
74LS10 C04
06 COMDAT-0C 9
HASL15 Y11
5,10 PULLUP+01 01
12 BUFMOD+00 02
ZGND==M==- 03
13 POMODE-00 04
13 LNMODE-00 05
ZVP05=V17+ 06
ZGND==M==- 07
14 PHRONJ+00 08
14 INOCTS+00 09
14 DATERR+00 10
ZGND==M==- 11
12 COMDAT+40 12
12 CTSND1-00 13
ZGND==M==- 14
12 COMDAT+23 15
D6Y11 CRDYCK-00 05
74LS04 K20
06 CRDYCK+00 11
BE2TCY
ASSY 60130730
DR
CHK
APPD
HONEYWELL
HONEYWELL INFORMATION SYSTEMS
LOC BILLERICA, MA U. S. A.
TITLE
TTY-C CRT DISPLAY
CONNECTORS
SIZE D
DWG NO 60130734-001
SH 1/15
REV B

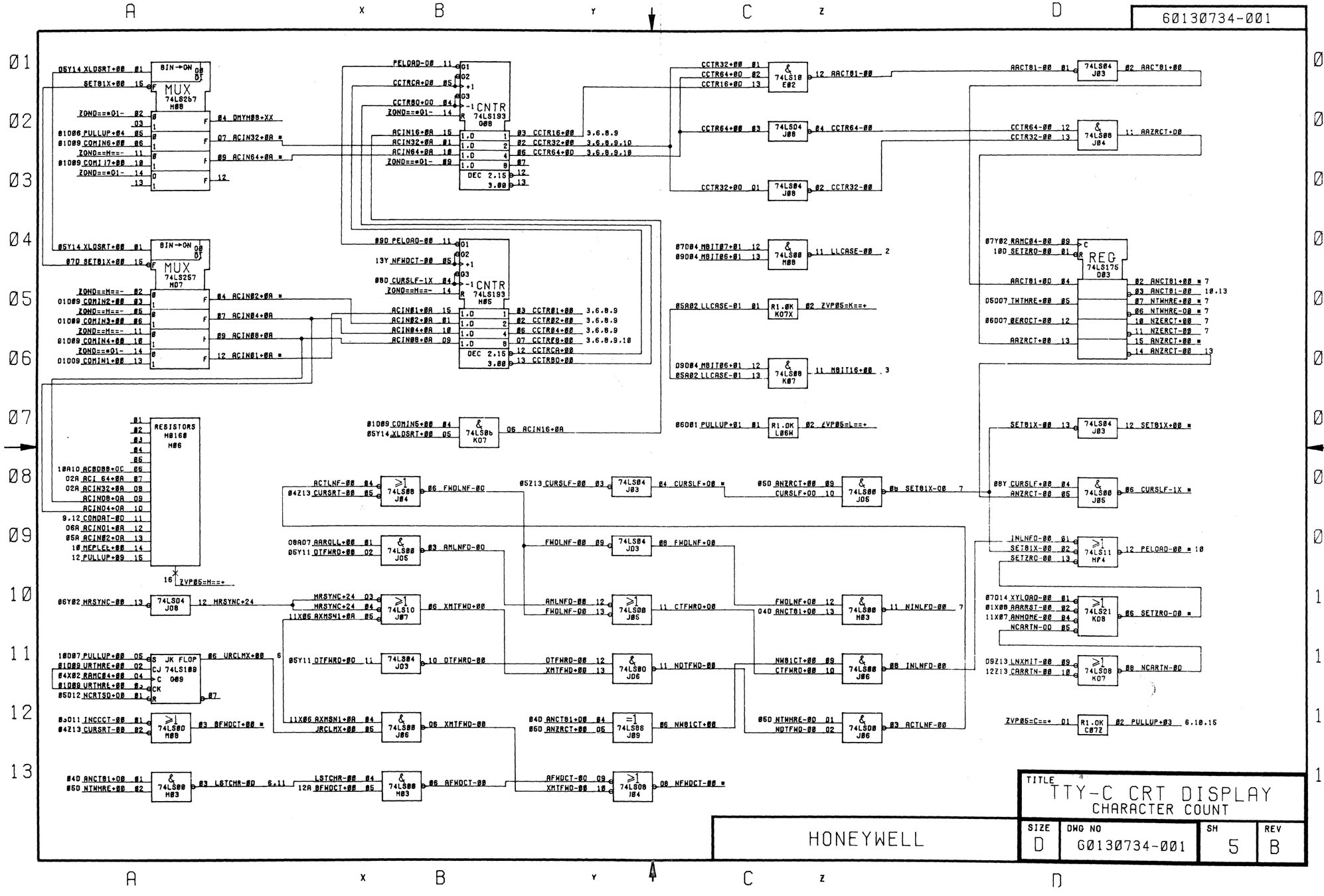
60130734-001




60130734-001
CNTR 74LS161 L11
CNTR 74LS161 D14
CHAR-GEN 9208 K09
REG 74166 K11
COMP 74LS85 E14
COMP 74LS85 F12
COMP 74LS85 E13
JK FLOP 74LS109 L14
JK FLOP 74LS109 E16
TITLE
TTY-C CRT DISPLAY
VIDEO AND COUNT GENERATION
HONEYWELL
SIZE D
DWG NO 60130734-001
SH 3
REV B

60130734-001

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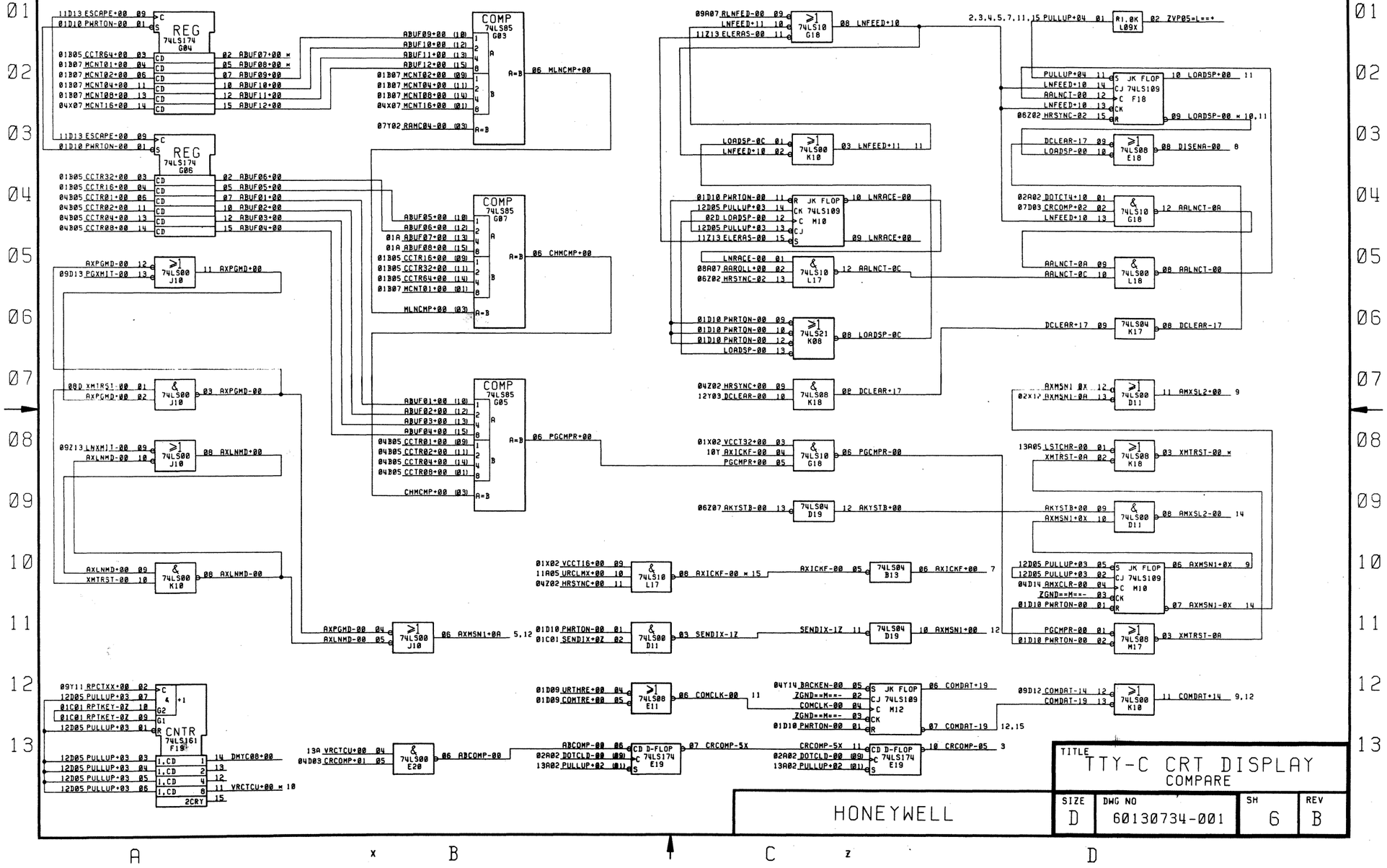
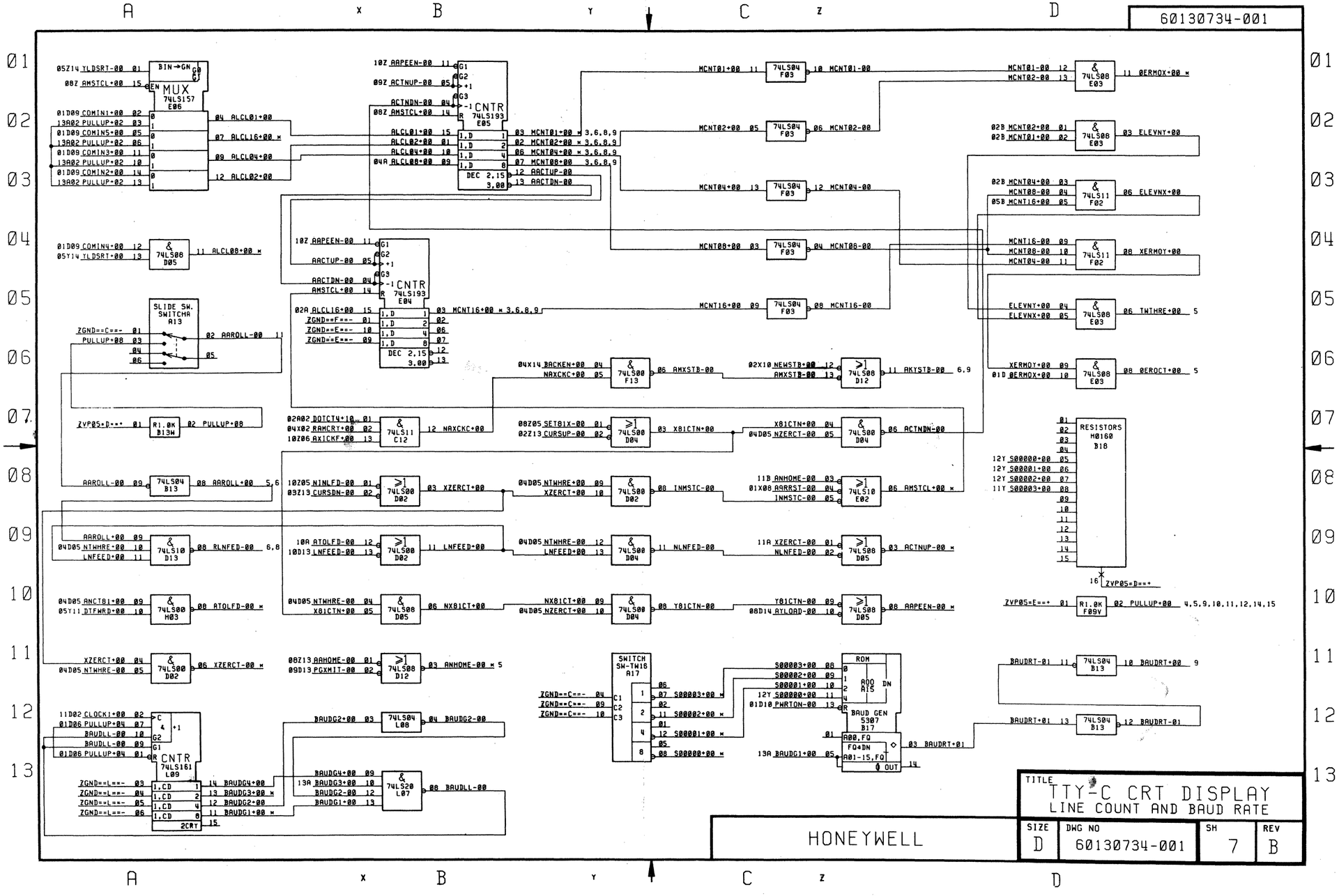
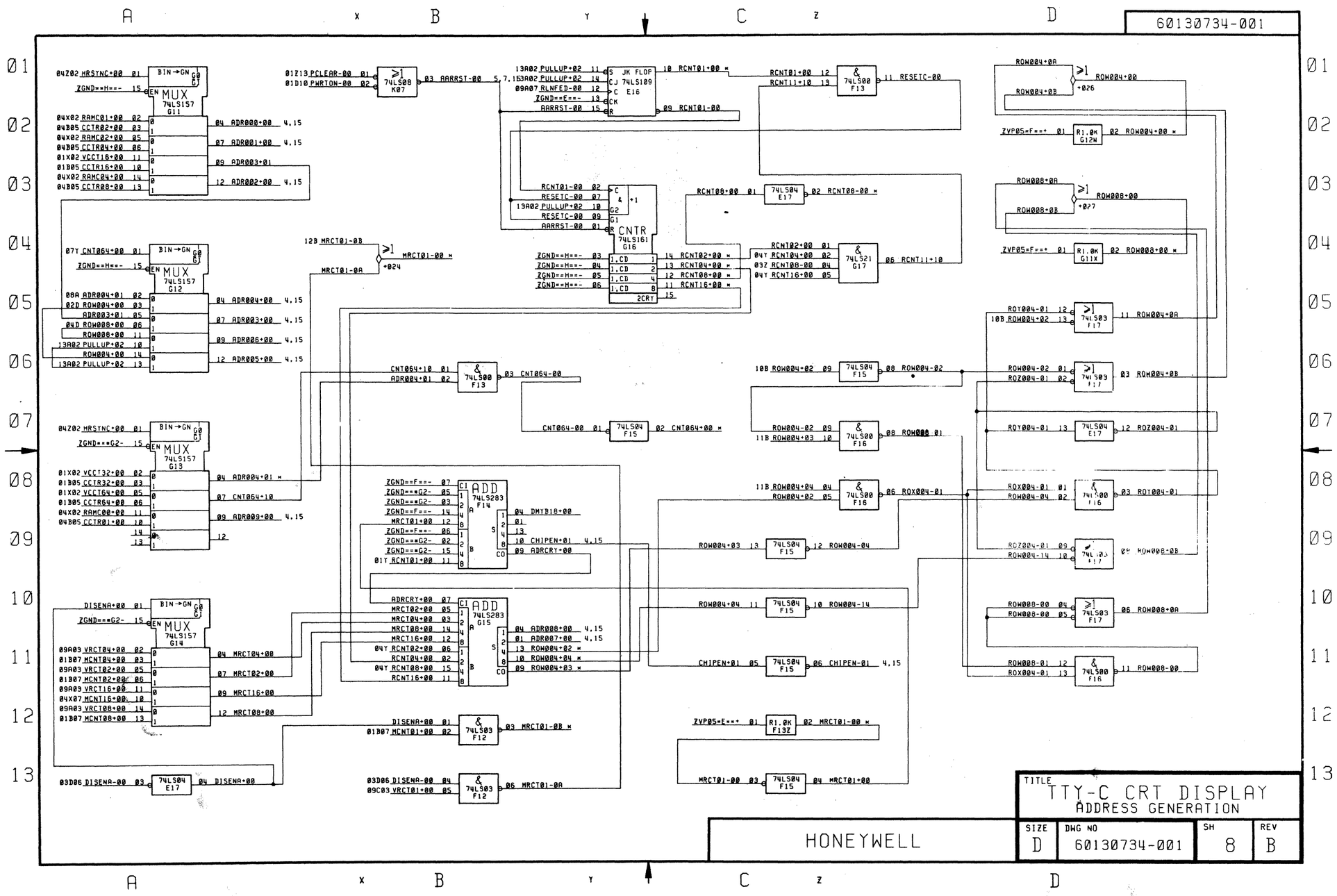
TTY-C CRT DISPLAY
CHARACTER COUNT
HONEYWELL
SIZE D
DWG NO 60130734-001
SH 5
REV B

60130734-001




60130734-001
MUX 74LS157 E06
CNTR 74LS193 E05
CNTR 74LS193 E04
SLIDE SW. SWITCHA A13
CNTR 74LS161 L09
SWITCH SW-TW16 A17
ROM AD0 A15 DN
BAUD GEN 5307 B17
RESISTORS M0160 B18
TITLE
TTY-C CRT DISPLAY
LINE COUNT AND BAUD RATE
HONEYWELL
SIZE D
DWG NO 60130734-001
SH 7
REV B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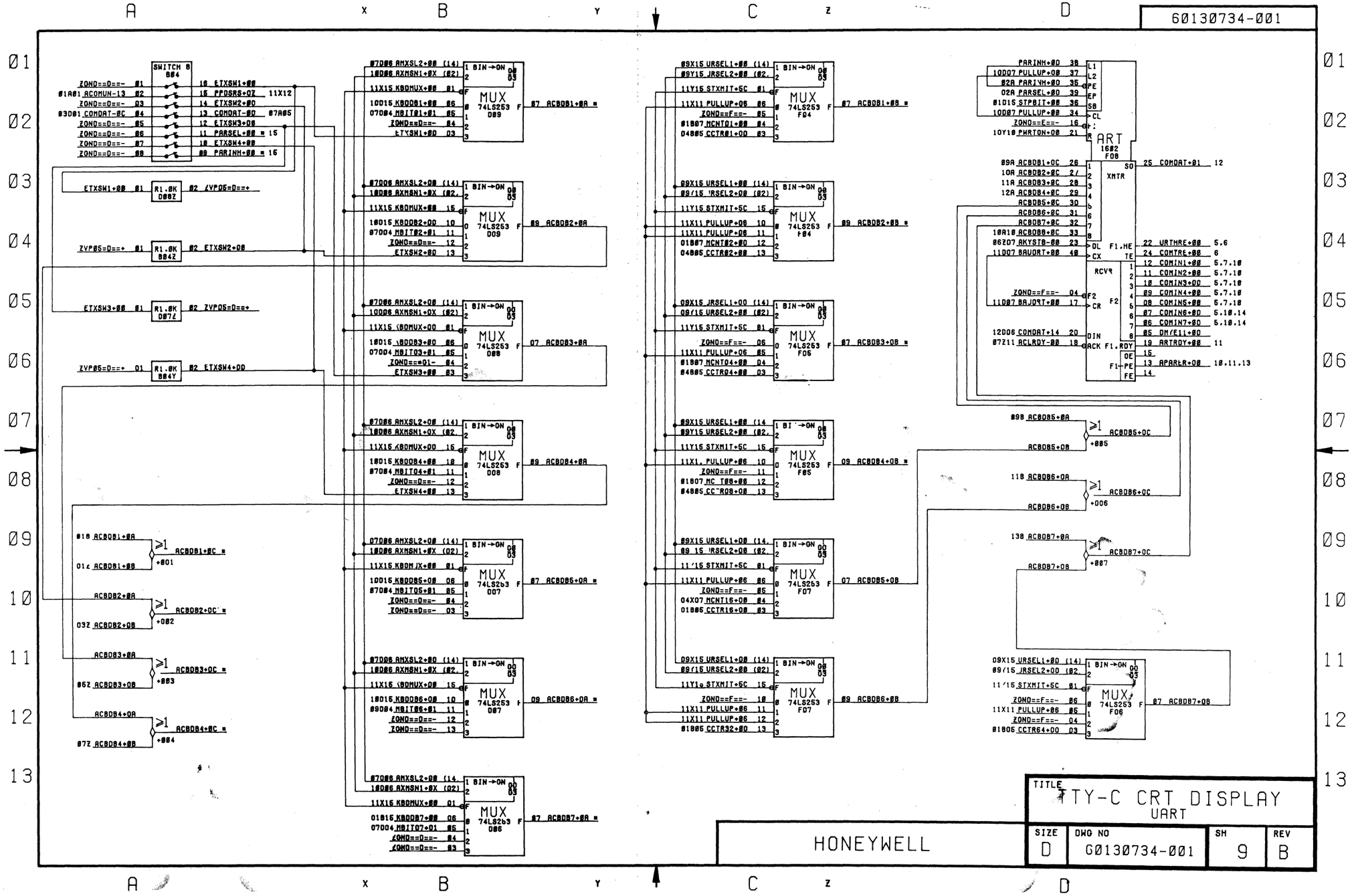
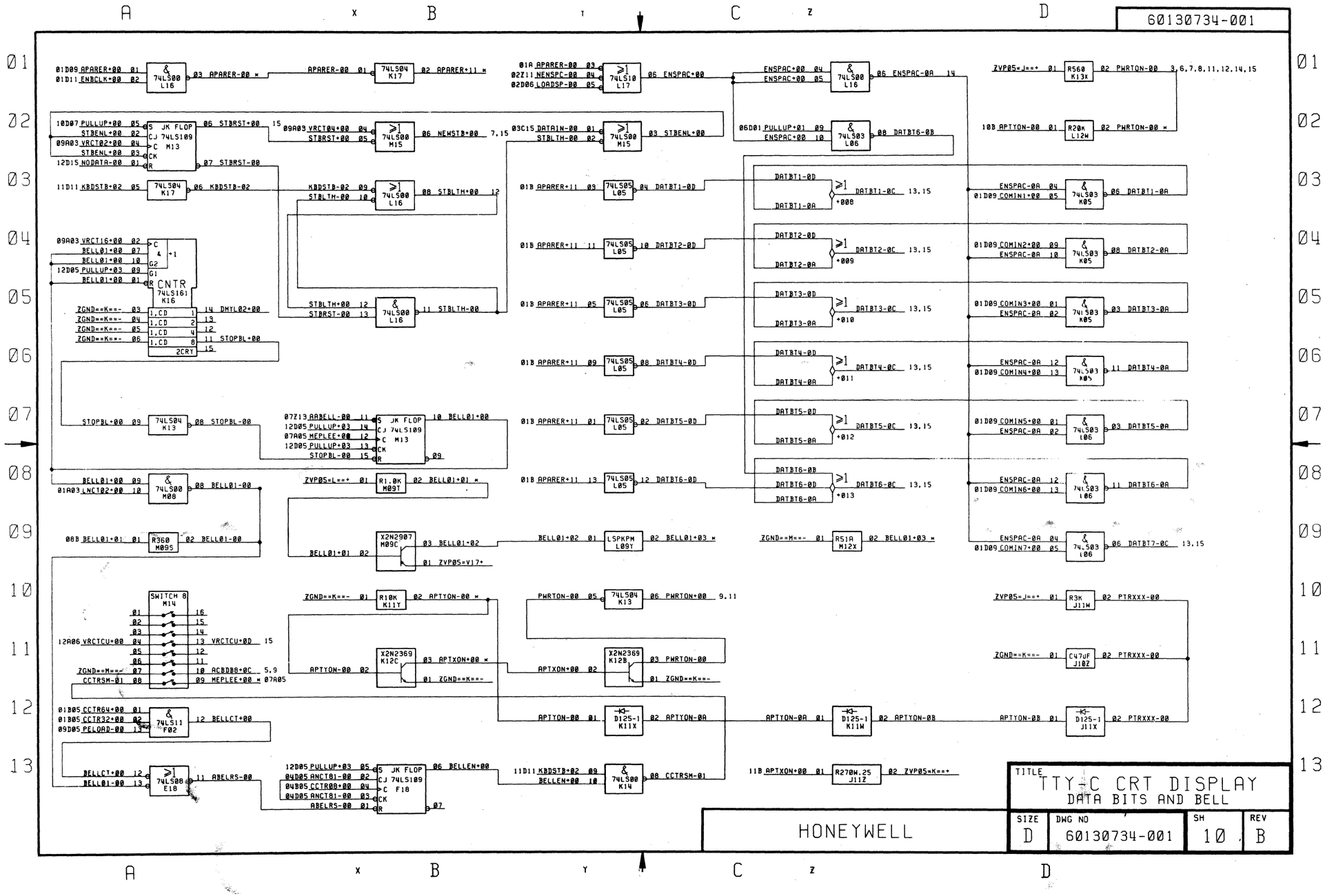
TTY-C CRT DISPLAY
ADDRESS GENERATION
HONEYWELL
SIZE D
DWG NO 60130734-001
SH 8
REV B


60130734-001
SWITCH B 884
MUX 74LS253 D09
MUX 74LS253 D08
MUX 74LS253 D07
MUX 74LS253 D06
MUX 74LS253 F04
MUX 74LS253 F05
MUX 74LS253 F06
MUX 74LS253 F07
ART 1602 F08
XMTR
RCVR
R1.8K D08Z
R1.8K D84Z
R1.8K D87Z
R1.8K D84Y
TITLE
TTY-C CRT DISPLAY UART
HONEYWELL
SIZE D
DWG NO G0130734-001
SH 9
REV B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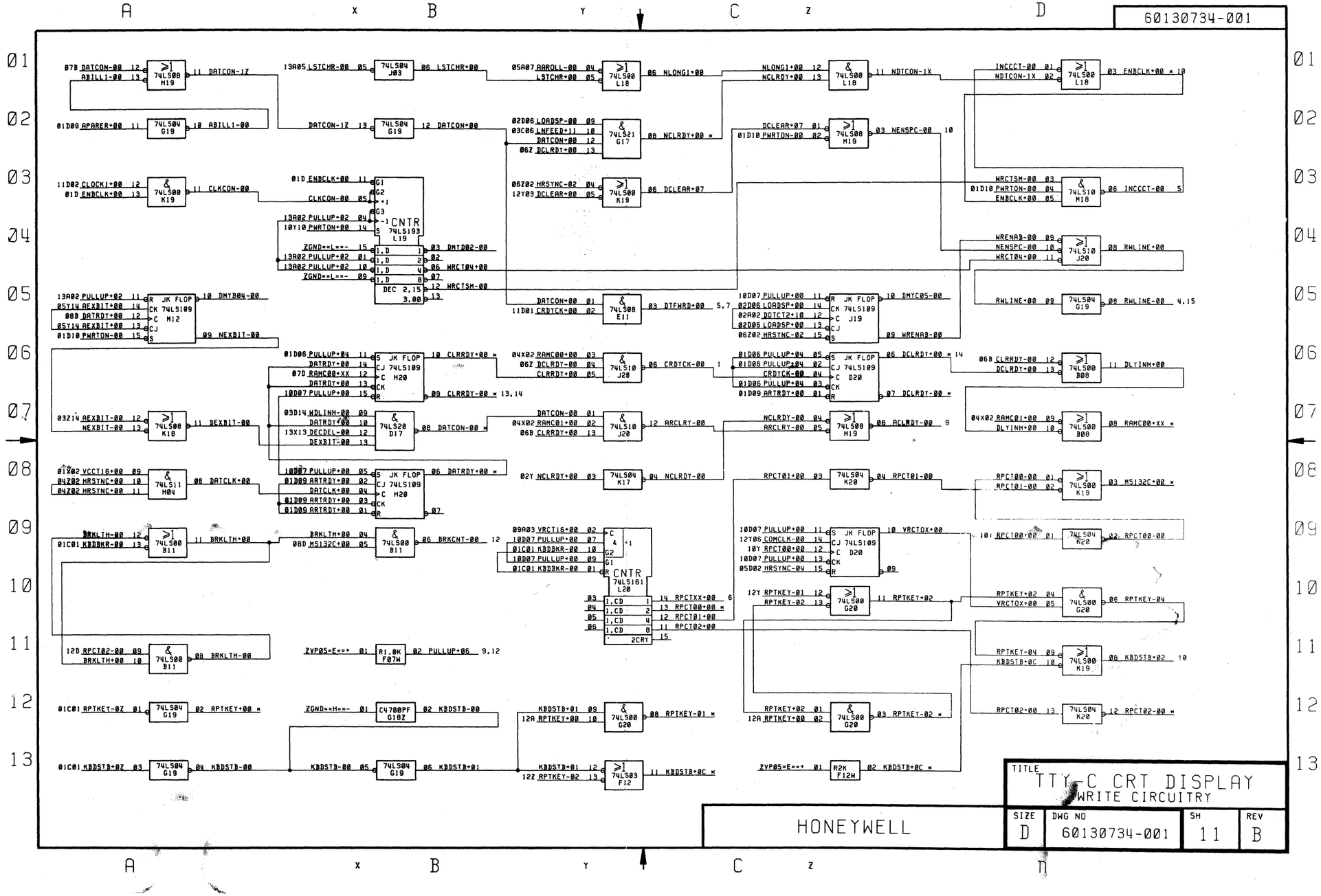
TTY-C CRT DISPLAY
DATA BITS AND BELL
HONEYWELL
SIZE D
DWG NO 60130734-001
SH 10
REV B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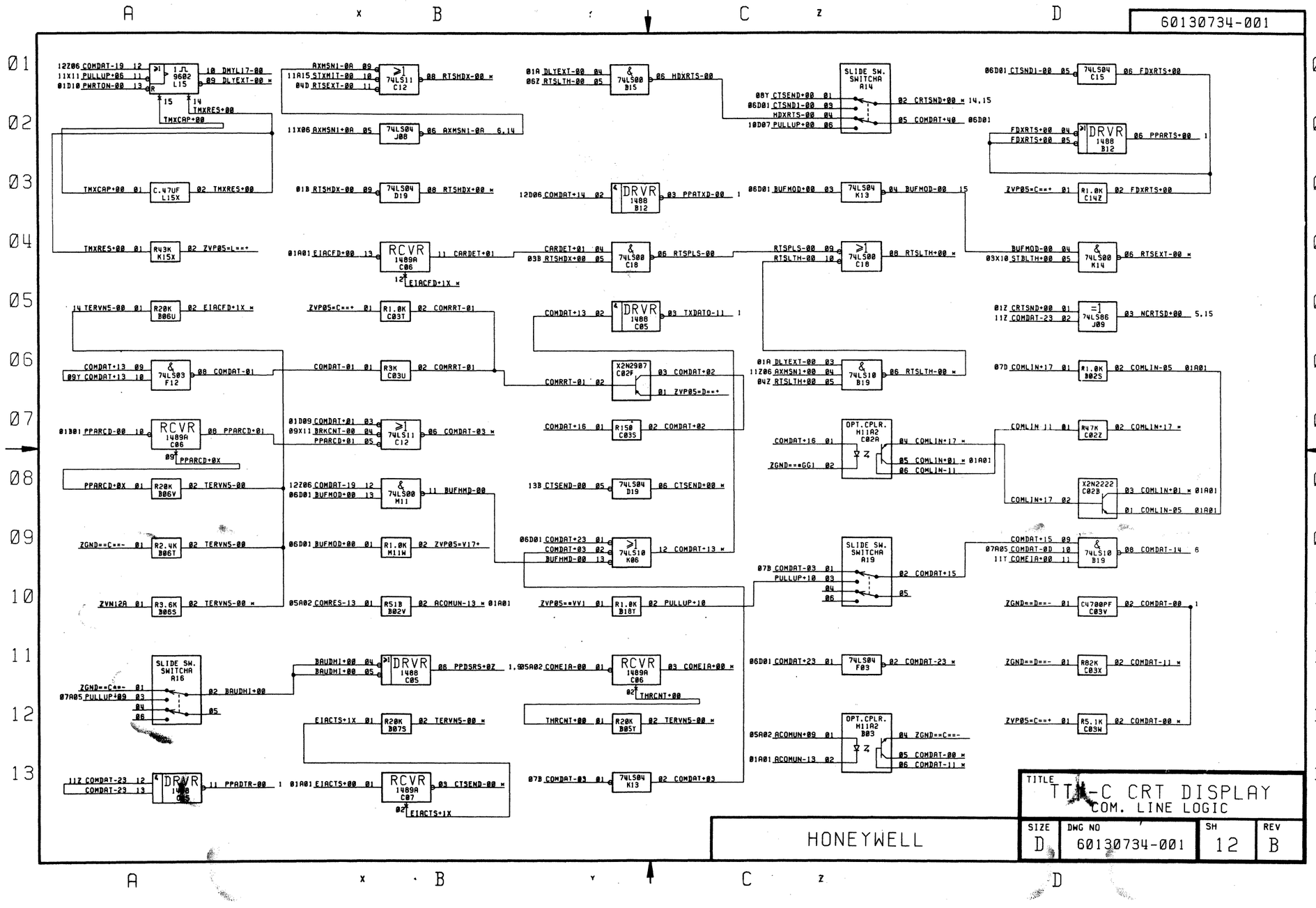
TITLE
TTY-C CRT DISPLAY
WRITE CIRCUITRY
HONEYWELL
SIZE D
DWG NO 60130734-001
SH 11
REV B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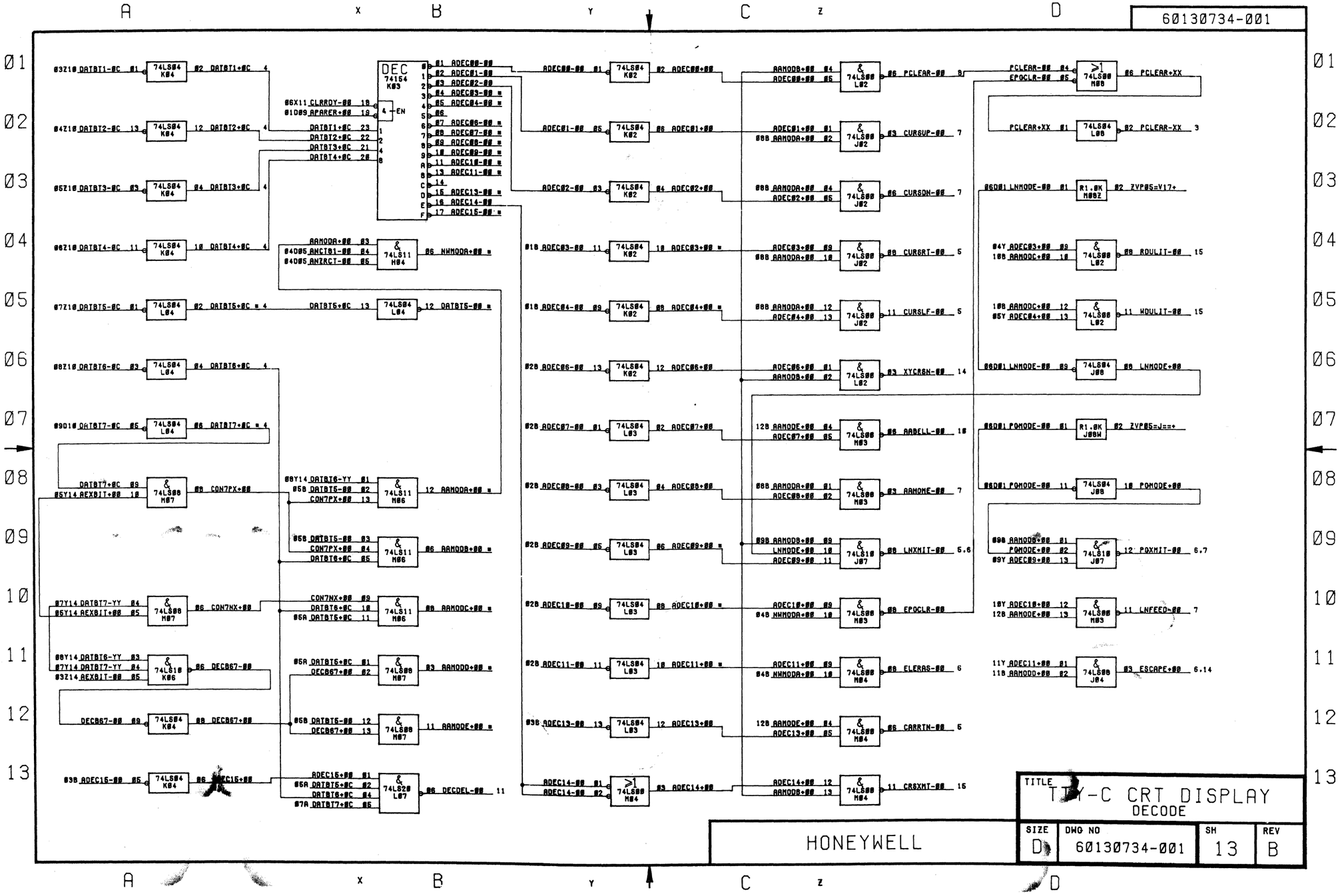
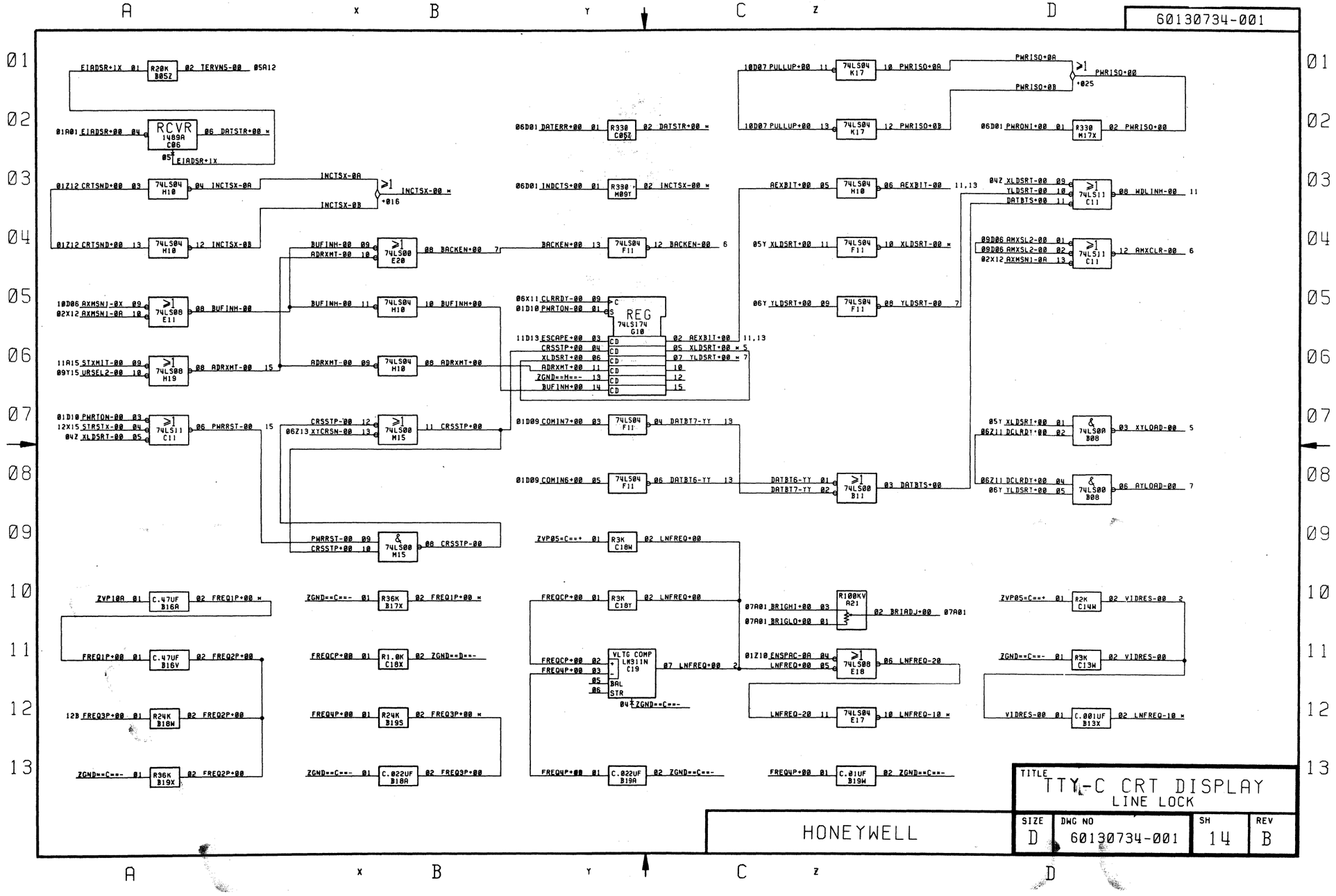
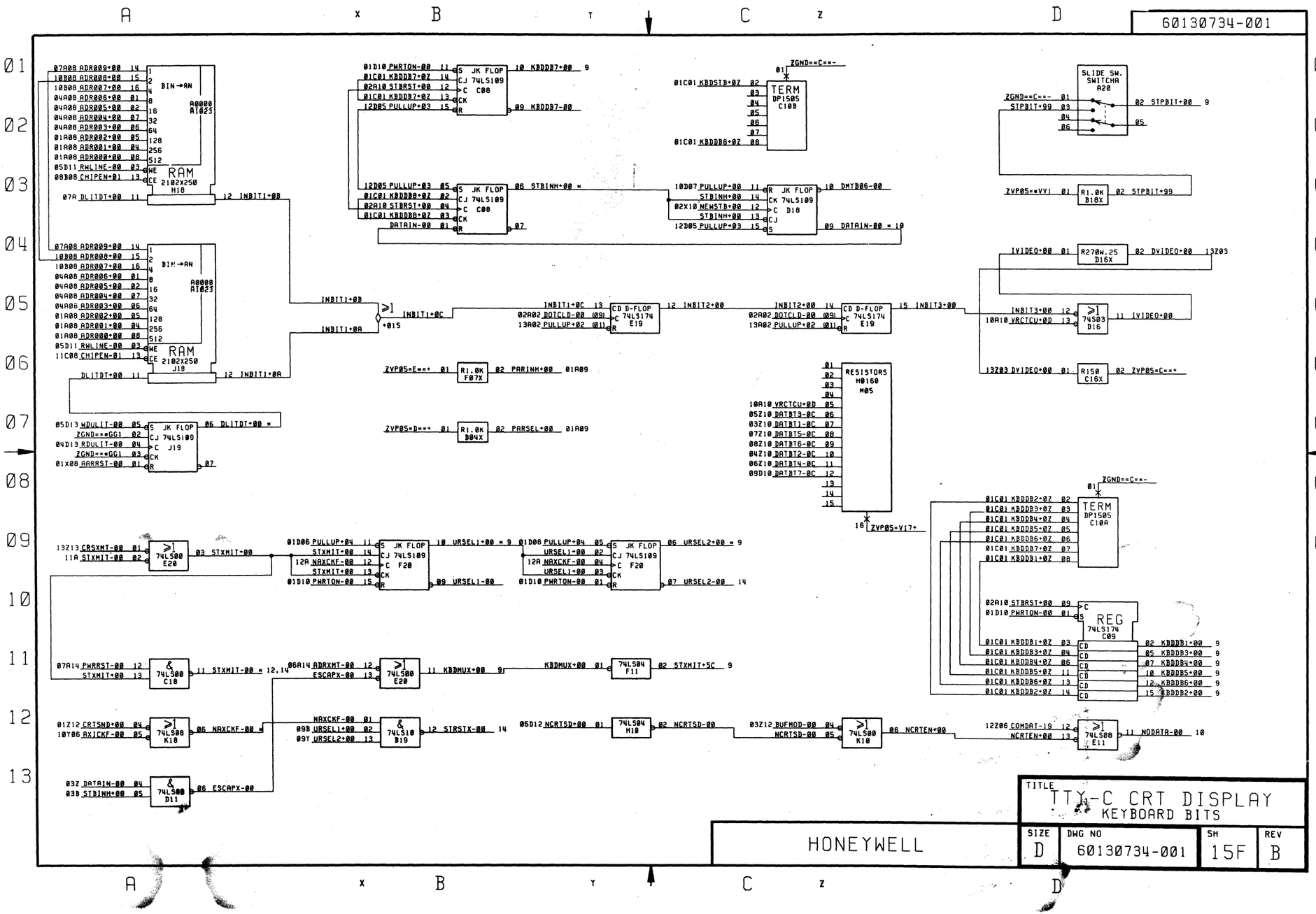
TITLE
TTY-C CRT DISPLAY
COM. LINE LOGIC
HONEYWELL
SIZE D
DWG NO 60130734-001
SH 12
REV B


60130734-001
TITLE
TTY-C CRT DISPLAY
DECODE
HONEYWELL
SIZE
D
DWG NO
60130734-001
SH
13
REV
B

60130734-001



TITLE			
TTY-C CRT DISPLAY LINE LOCK			
HONEYWELL	SIZE D	DWG NO 60130734-001	SH 14	REV B


60130734-001
RAM A1023 H18
RAM A1023 J18
JK FLOP 74LS109 C08
JK FLOP 74LS109 D18
JK FLOP 74LS109 J19
JK FLOP 74LS109 F20
CD D-FLOP 74LS174 E19
TERM DP1505 C10B
TERM DP1505 C10A
SLIDE SW. SWITCH A20
R1.0K B18X
R270W.25 D16X
74S03 D16
R150 C16X
R1.0K F07X
R1.0K B04X
RESISTORS H0160 M05
REG 74LS174 C09
74LS00 E20
74LS00 C18
74LS00 K18
74LS00 D11
74LS10 B19
74LS04 F11
74LS04 M10
74LS08 E11
TITLE
TTY-C CRT DISPLAY
KEYBOARD BITS
HONEYWELL
SIZE D
DWG NO 60130734-001
SH 15F
REV B

USERS' REMARKS FORM

TITLE:

DOC. PART NO. _____

DATED _____

ERRORS NOTED:

Fold

SUGGESTIONS FOR IMPROVEMENT:

Fold

DATE _____

FROM: NAME _____

COMPANY _____ M/S _____

TITLE _____

ADDRESS _____

_____ ZIP _____

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