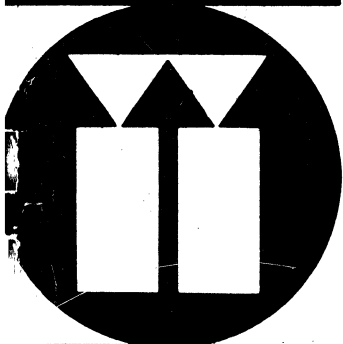


MAINTENANCE INSTRUCTIONS

VISTAR/GTX



Infoton

MAINTENANCE INSTRUCTIONS

VISTAR/GTX

Price \$20.00

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INCORPORATED.

Second Avenue

Burlington, Massachusetts 01803

APRIL 1977

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Figure 1 INFOTON VISTAR/GTX

1. SPECIFICATIONS

The INFOTON VISTAR/GTX is a stand-alone alphanumeric display terminal for use in data entry and retrieval systems where a highly flexible interaction between man and machine is desired. The VISTAR/GTX incorporates such important standard features as conversational mode, and an Infotone which operates on the bell code. Complete specifications are listed in INFOTON Document No. 02988.

1.1 BASIC SYSTEM

Power	Domestic: 150 watts, 105–130 volts; 60 Hz Export: 150 watts; 105–130, 210–260 volts; 50 Hz
Temperature	Operating: 5° to 50°C Storage: –30° to 70°C
Humidity	5% to 95% non-condensing
Dimensions, Terminal	13 inches high, 17 inches wide, 15 inches deep (33 cm x 43 cm x 38 cm)
Weight, Terminal	35 pounds (15.8 Kg)
Dimensions, Keyboard	3 inches high, 17 inches wide, 8 inches deep (7 cm x 43 cm x 20 cm)
Weight, Keyboard	5 pounds (2.2 Kg)
Screen Size	12 inch diagonal (30 cm)
Display Size	8-1/2 inches wide, 6 inches high (21 cm x 15 cm)
Characters/Line	80
Lines	24
Line Spacing	0.45 character height (11 mm)
Character Format	5 x 7 dot matrix
Character Spacing	0.4 character width
Character Size	0.08 x 0.19 inch nominal (2 mm x 5 mm)
Character Repertoire	64 ASCII
Refresh Rate	Domestic: 60 times a second Export: 50/60 times a second
Cursor	Non-destructive blinking underscore
Transmit Data	Character by character as entered by the keyboard.

1.2 STANDARD INTERFACE

The Asynchronous Serial Interface is a multi-purpose serial data interface which provides maximum flexibility in operator switch selectable data rates, and operation modes that can be applied to allow operation under a wide variety of serial data input and output situations. A panel at the rear of the display contains switches and connectors that allow the operator to match both the standard EIA RS232C voltage interface and the Teletype* compatible 20/60 mA current loop interface for serial communications and computer interfaces.

*Registered Trade Mark of Teletype Corporation

The operator selectable functions include the following:

1. Fifteen data rates — 50, 75, 110, 134.5, 150, 300, 600, 900, 1200, 1800, 2400, 3600, 4800, 7200, and 9600 bits per second
2. An external TTL clock input
3. Full or Half Duplex
4. Ten or eleven bit code selection (one or two stop bits)
5. Odd, Even, Mark, or Space Parity
6. 20 or 60 mA Teletype* compatible current loop interface
7. EIA RS232C interface — Interfaces to Bell system Type 103A, 103F, 202C, 202D modems or equivalents

*Registered Trade Mark of Teletype Corporation

VISTAR/GTX CODE SET

BITS 4, 3, 2, 1	BITS 7, 6, 5						
	000	001	010	011	100	101	110 111
0000	NULL		SPACE*	0	@	P	@ P
0001			!	1	A	Q	A Q
0010			"	2	B	R	B R
0011			#	3	C	S	C S
0100			\$	4	D	T	D T
0101			%	5	E	U	E U
0110			&	6	F	V	F V
0111	BELL		/	7	G	W	G W
1000	BSP*		(	8	H	X	H X
1001			)	9	I	Y	I Y
1010	LF		*	:	J	Z	J Z
1011		ESC	+	;	K	[	K [
1100	ERASE PAGE		,	<	L	\	L \
1101	CR		-	=	M	]	M]
1110			•	>	N	↑	N ↑
1111			/	?	O	←	O ← RUB* OUT

THE AREA ENCLOSED BY DASHED LINES REPRESENT LOWER CASE CODES DISPLAYED AS UPPER CASE CHARACTERS.

*OPTIONAL FUNCTIONS AVAILABLE FOR THESE CODES. SEE SECTION 4.

Figure 2 64 Displaying ASCII Character Set

2. OPERATING INSTRUCTION

Before using your VISTAR/GTX on line, it is suggested that this section be read and understood.

2.1 FRONT PANEL CONTROLS

There are operator controls and indicators located adjacent to the keyboard which are shown in Figure 3 and described below.

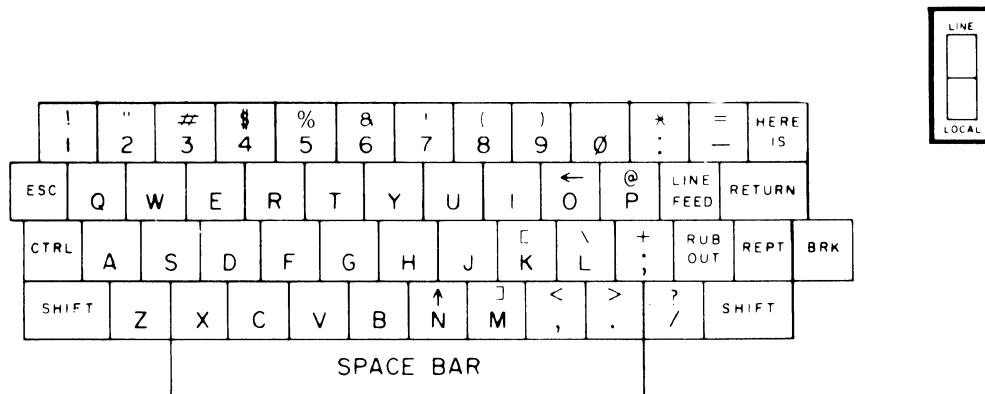


Figure 3 VISTAR/GTX Keyboard Layout

- **POWER** – In the ON position, the terminal is in the operating state and an indicator contained within the switch is illuminated. In the OFF position, power is removed from the terminal. After the switch is turned ON, a 30-second warm-up period is required before operating the terminal.

The power requirement for the unit is:

150 watts: 100 – 130 volts, 60 Hz or
210 – 260 volts, 50 Hz (Export Model).

- **LINE/LOCAL** – Selects either local or on line mode of operation. In LOCAL, data and control are provided by the keyboard. The unit is automatically configured in the half duplex mode and no data is transmitted to the interface. In ON LINE, data flow to and from the display is permitted.

2.2 KEYBOARD AND CODE SET

The VISTAR/GTX terminals are controlled by a 7-bit ASCII code set, Figure 2, generated by the keyboard, Figure 3, or received over the data line. The displaying characters in the 64-character ASCII set are arranged on the keyboard in a Teletype® format.

The 64 ASCII codes from 040₈ through 137₈ are entered into the memory when received from the data line or from the keyboard (Half Duplex). With the exception of the SPACE (040₈); all of these codes result in the display of a character on the VISTAR/GTX screen.

The 31 ASCII codes from 140₈ through 176₈ (lower case), are stored in memory if received by the data interface; and displayed as upper case characters.

2.2.1 Rollover

When one key is already depressed, and a second key is then depressed, the code for the second key will be generated as it is depressed.

LINE
FEED

LINE FEED - (from data line or from keyboard) – The LINE FEED command causes the top line of the display to be erased, lines 2 through 24 will be moved up one position, and the bottom line will be blank.

RETURN

RETURN - (from data line or from keyboard) – The carriage RETURN key places the cursor at the beginning of the bottom line, (left margin).

RUB
OUT

RUBOUT - (from keyboard) – The RUBOUT key causes a rubout code (all ones) to be transmitted, no cursor movements occur and no character enters memory. Rubout codes received from the data line are ignored, or optionally perform a backspace function. See Section 4.4.

REPT

REPEAT - (from keyboard) – The REPEAT key, when held down while any other key is depressed, causes that character or function to be repeated at a rate of 10 characters per second.

BRK

BREAK - (from keyboard) – Depressing the BREAK key forces a “space” condition on the data line as long as the key is depressed.

SHIFT

SHIFT - (from keyboard) – The SHIFT key enables keyboard generation of symbolic characters (!, &, etc.). Lower case alphabetic characters cannot be generated by this keyboard regardless of SHIFT key position.

CTRL

CONTROL - (from keyboard) – Depression of the CONTROL key allows the control code to be transmitted over the line.

ESC

ESCAPE - (from keyboard) – The ESCAPE key generates the ASCII code 023₈. If received over the data line, it is ignored.

2.3 SIDE CONTROLS

Two controls are located on the left side of the display (Figure 4) providing operator control of the following TV monitor functions:

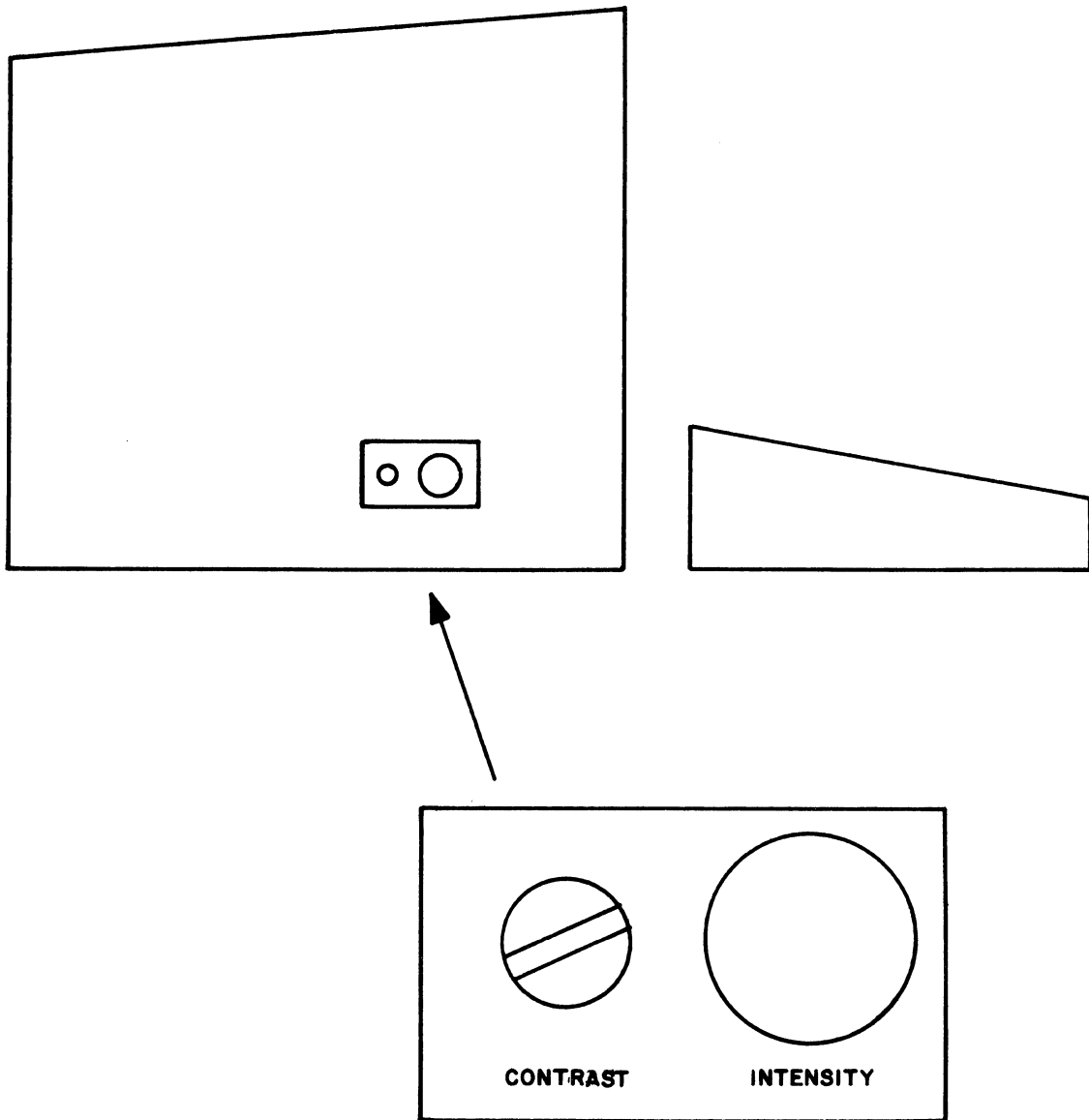


Figure 4 VISTAR/GTX Side Controls

2.3.1 Intensity

Allows adjustment of the characters displayed on the CRT.

2.3.2 Contrast

Allows adjustment of the contrast to provide image density control. This control is adjusted using a screwdriver.

2.4 REAR PANEL CONTROLS

Interface controls, located on the rear of the VISTAR/GTX terminal, provide for customer interface connection and determination of related functions (data rate, parity, etc.), for the serial asynchronous EIA or current loop interface.

2.4.1 Data Rate Selector

This switch has 16 rates — 50, 75, 110, 134.5, 150, 300, 600, 900, 1200, 2400, 3600, 4800, 7200, 9600 bits per second and EXT. The EXT setting provides for handling data rates other than the 15 fixed rates enumerated. The external clock must be a TTL compatible pulse source cycling at 16 times the rate (maximum data rate is 1800 char/second).

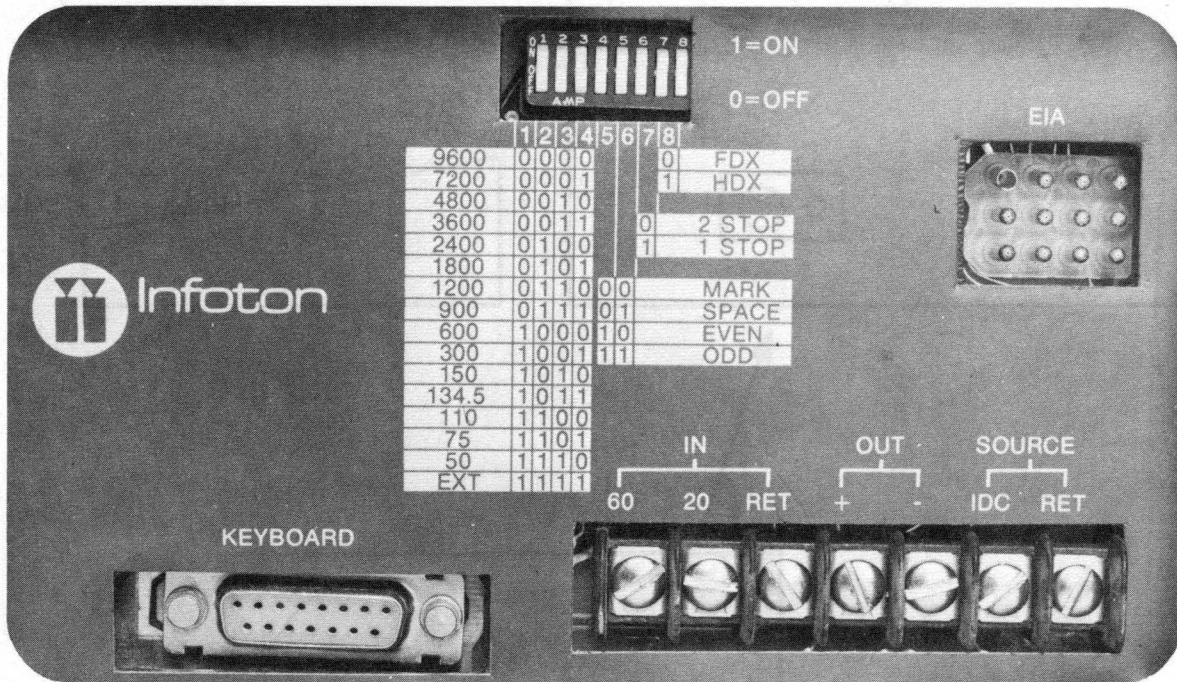


Figure 5 VISTAR/GTX Rear Controls

2.4.2 Parity

The parity switches determine both the transmit parity and receive parity. In the EVEN position, the transmit character parity bit is selected to make the number of mark bits in the character even. The switch also conditions the receive electronics to check the parity on all received characters. In the ODD position, the VISTAR/GTX transmits odd parity and checks received characters for odd parity. In the MARK position, the transmitted parity bit is always a mark bit. SPACE parity causes the transmitted parity bit to be spacing. Receive parity is not checked when MARK or SPACE parity is selected. When a receive parity error is detected, a question mark is displayed in place of the character in error.

2.4.3 FDX/HDX

The full duplex/half duplex switch configures the terminal's receiver and transmitter. Full duplex operation totally isolates the keyboard from the display; i.e., only data received from the data line is displayed. Half duplex operation causes transmitted data to loop back into the receiver.

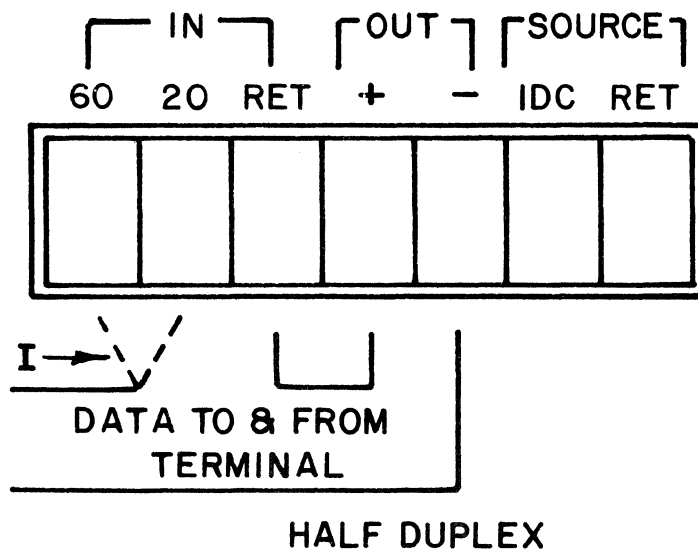
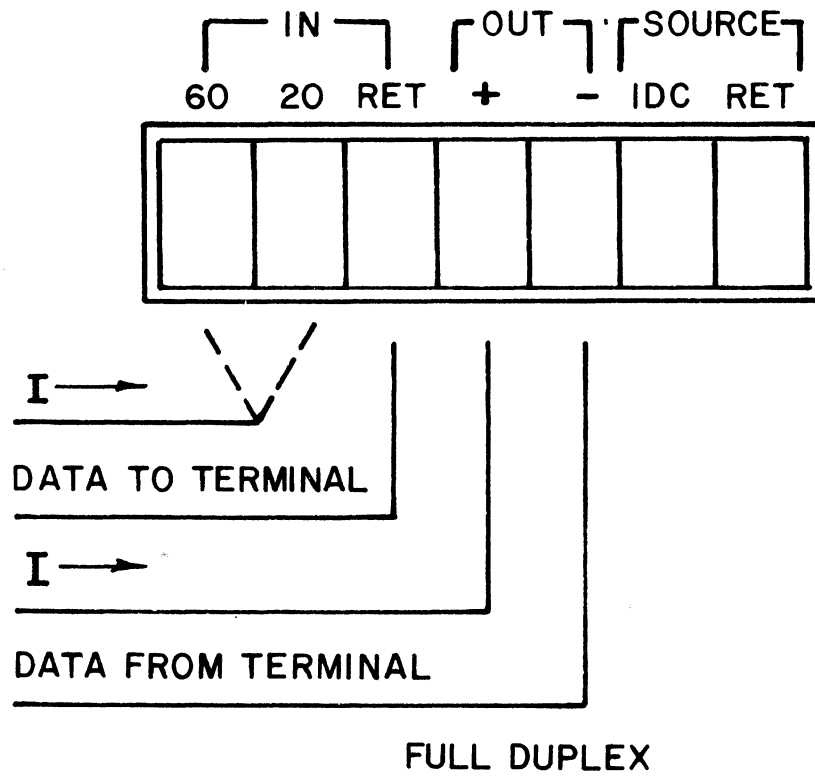


Figure 6 VISTAR/GTX Current Loop Connection

EIA RS-232C Name	CCITT V-24 Name	Description	Printer EIA Pin No.*	Modem EIA Pin No.	MOLEX Pin No.	Comments
BA	103	Data transmitted from terminal	—	2	1	Logical "1" = OFF = -12V Logical "0" = ON = +12V 300-ohm source impedance.
CA	105	Request to send signal from terminal	—	4	2	Goes high (+12V) when the terminal is ready to transmit.
CB	106	Clear to send signal to terminal	—	5	3	Must be high to allow terminal to send; is supplied by a modem.
BB	104	Data transmitted to terminal	—	3	4	Logical "1" = OFF = -5V to -25V Logical "0" = ON = +5V to +25V 6.8K ohm load impedance
CF	109	Carrier present signal to terminal	—	8	5	Must be high to allow terminal to receive; is supplied by a modem.
CD	108.2	Data terminal ready signal from terminal	—	20	8	Goes high (+12V) when terminal is on LINE; is low when terminal is in LOCAL mode.
		External clock input at TTL logic level	—	—	10	For use with RECEIVE RATE selector switch in EXT position.
AB	102	Signal ground	7	7	12	
CC	107	Data set ready	—	6	7	Must be high to allow terminal to operate; is supplied by a modem.
BB*	104	Data to printer	3	—	11	Optional print data
CB*	106	Clear to send	5	—	—	These signals are connected to the printer's data terminal ready signal.
CC*	107	Data set ready	6	—	—	
CF*	109	Carrier present	8	—	—	
CD*	108.2	Data terminal ready	20	—	—	

*Optional cable assembly, see page 18.

Figure 7 EIA RS-232 Signals and Connector Pins

2.4.4 Character Length

The CHAR LENGTH switch allows selection of 10 or 11 bits per character (1 or 2 stop bits) transmission at any data rate. Each character consists of 1 start bit (space) 7 data bits, 1 parity bit, and 1 or 2 stop bits (mark). Typical installations call for 11 bits at speeds of and below 110 baud and 10 bits for all data rates above 110 bits per second.

2.4.5 EIA

The molex connector (Figure 7) provides I/O termination for use with the INFOTON-supplied modem cable. The cable is designed to be attached to a modem; however, it may be used directly with a computer modem interface. The VISTAR/GTX EIA input/output specifications comply with EIA RS232C and CCITT/V24 specifications.

2.4.6 Current Loop Terminal Strip

A 7-pin barrier strip is provided to interconnect with the current loop interface. Either Full or Half Duplex mode may be used at either 20 or 60 mA.* The source for the loop current is external to the VISTAR/GTX. Figure 6 details typical connections.

2.5 INITIAL SETUP

At the start of any operating period, we recommend that you follow these procedures before transmitting to the data line.

- Set LINE/LOCAL switch to LOCAL, POWER switch to ON. The POWER switch will then illuminate and approximately 30 seconds later a blinking cursor will be displayed on the bottom line.
- Adjust the INTENSITY control for your viewing comfort.
- Type a message and see that it is correctly written on the screen. Exercise all functions as described in the section on function keys.

*Note. The FDX/HDX switch must be in the FDX position when operating current loop. Data will be serial at 10 or 11 bits per character depending upon switch selection (see Section 2.4.4).

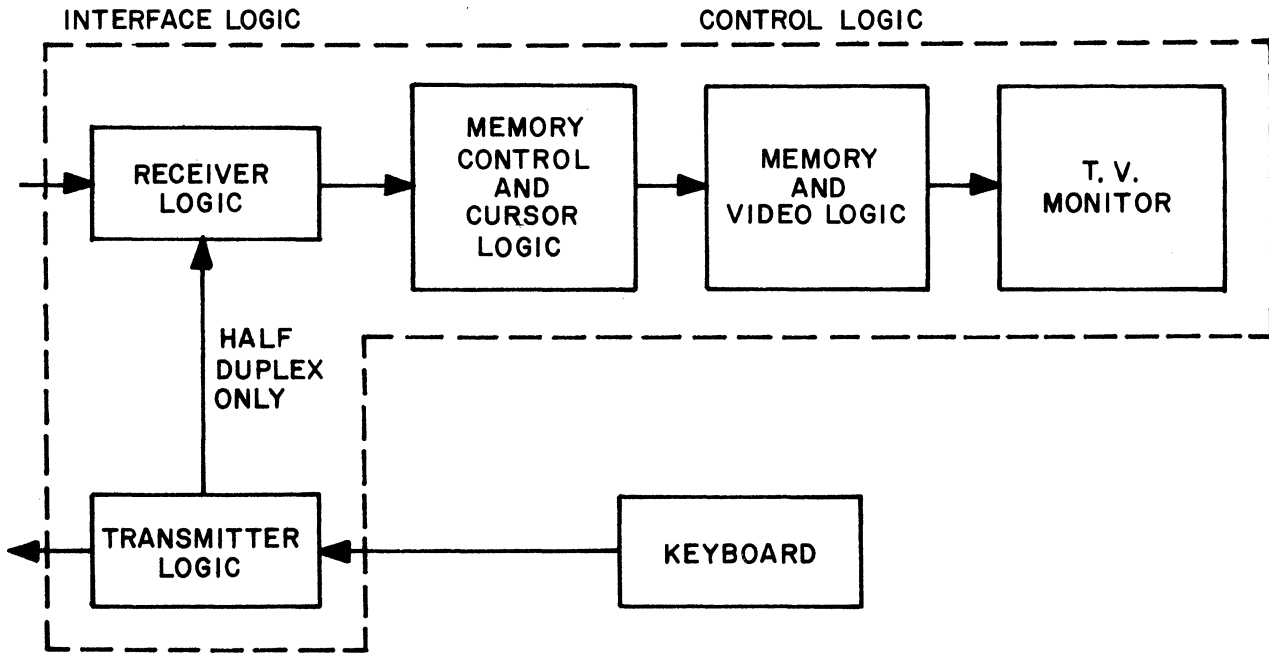


Figure 8 VISTAR/GTX Display Block Diagram

3. THEORY OF OPERATION

As an aid in maintenance of your VISTAR/GTX, this section is provided to give the reader a basic feel for how their terminal functions. It is only intended as an aid in location of a problem to the subassembly level. Repair of subassemblies is not covered in this manual. This section is broken up into three parts; Keyboard Electronics, Logic Board Assembly, and TV Monitor.

The physical configuration consists of three major groups:

- TV Monitor
- Keyboard Switch Assembly
- Logic Board Assembly (Figures 9 and 10)
 1. Timing and Control Logic
 2. Memory
 3. Video Logic
 4. EIA Drivers and Receivers
 5. Current Loop Drivers and Receivers

3.1 KEYBOARD ASSEMBLY

The keyboard assembly uses a fully encoded Capacitive Scan technique. Seven bit ASCII codes are created with each key stroke without the use of switch contacts of any kind. Rollover features are incorporated which allow proper generation of codes as keys are struck even though one or more other keys are held depressed. Documentation on the keyboard will be found in the appendix.

3.2 CONTROL LOGIC PRINTED CIRCUIT ASSEMBLY (Figures 9 and 10)

The Control Logic PCB contains most of the components comprising the terminal.

3.2.1 Power Supply Portion

The GTX power supplies are contained on the Control Logic PCB and consist of 4 + 5V supplies, a +12V supply, a -12V supply, and a +15V supply. Each supply except for the +15V supply has been implemented using 3 pin monolithic regulators. The +15V supply uses a conventional pass transistor in addition to the 3 pin monolithic regulator in order to provide sufficient power for the separate sync. TV monitor. Figure 10 indicates the test points for each supply output.

3.2.2 Interface Electronics Portion

The interface electronics provides a 20/60 mA Teletype compatible current loop interface, and an EIA RS232C compatible interface. Both operate in an asynchronous serial mode. EIA RS232C connector pin assignments and signal levels are defined in Figure 7. Both full and half duplex modes of operation are available. In addition, Mark, Space, Even, or Odd parity, the eighth bit, can be selected by the operator. Data rates of 50, 75, 110, 134.5, 150, 300, 600, 900, 1200, 1800, 2400, 3600, 4800, 7200, and 9600 baud are operator selectable. Eleven or ten bit code length at all data rates is also switch selectable.

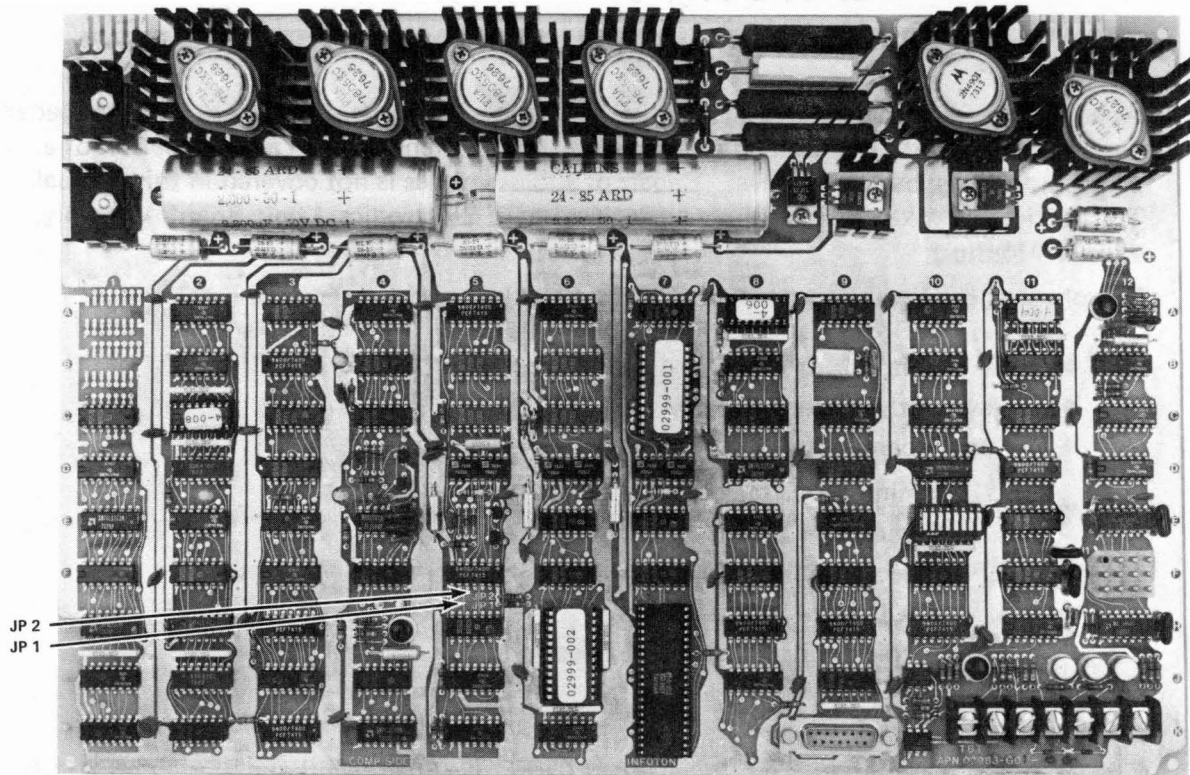


Figure 9 Control Logic PCB

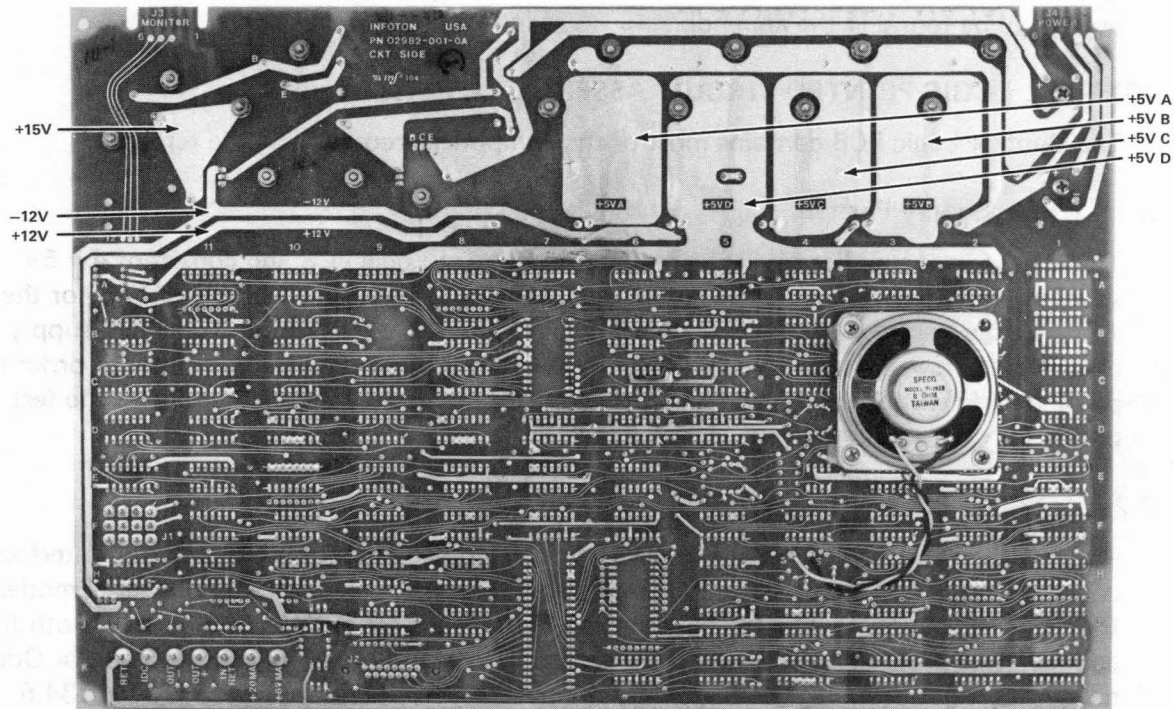


Figure 10 Power Supply Test Points

The asynchronous serial interface consists of a transmitter (parallel to serial converter) and a receiver (serial to parallel converter), (see Figure 11). Parallel data generated by the keyboard is converted by the transmitter to a serial bit stream. The bit stream is appended with a start bit, parity bit, and either one or two stop bits (10 or 11 unit code) prior to presentation at the transmit output.

Serial data at the receive input is stripped of start and stop bits, after which the parity bit is checked against the character parity and the status of the parity selection switch. The receiver converts the seven bit serial code to parallel, and forwards the character to memory. Schematic diagrams of the I/O electronics and keyboard electronics are contained in the Appendix.

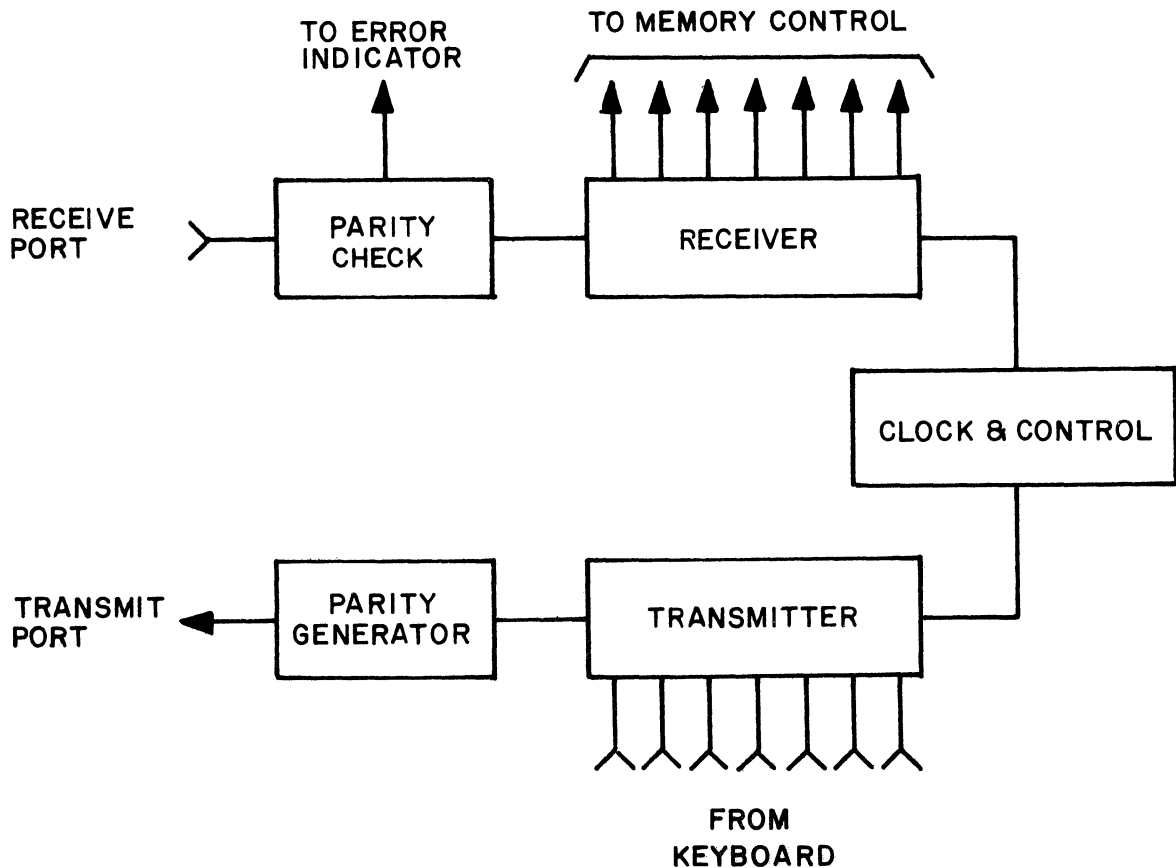


Figure 11 Serial Interface Block Diagram

3.2.3 Timing and Control Electronics

The timing and control logic provides complete timing for the display. The basic clock (24.024 MHz crystal oscillator) is used to provide the character dots to the video monitor. A divide by fourteen counter converts the basic clock to the character counter clock (DCLKD). In addition, other timing signals are derived from the basic clock to drive the read only memory (ROM) timing, vertical, and horizontal sync for the monitor, and shifting of the MOS memory. The 24.024 MHz clock is also the source of the internal data rates for the serial interface.

3.2.4 Memory

The main memory is 2048 characters long and is always circulating. Only 1920 character locations are accessible (24 x 80). The memory circulates at 4 MHz except when loading the display buffer, at which time it runs at 2 MHz. This results in an I/O rate of 1800 characters per second.

Absence of data in memory is indicated by space codes. The memory is filled with space codes when erased.

Lower case codes are maintained in main memory and displayed as upper case.

3.2.5 Main Memory Control

The main memory is controlled by a memory address counter. The memory address counter (MAC) is a modulo 2560 divider which gets reset on the 2048th count. The reset pulse indicates that address 0 is accessible. The MAC is incremented each time the memory is shifted, maintaining synchronism between the memory contents and the memory address. The only time this synchronism is altered is when a roll occurs. The roll sequence is as follows:

- Roll initiated (screen overflow, line feed, etc.) set up jam logic
- The next reset to the MAC jams the MAC to 1968_{10} (-80) which addresses memory 80 counts lower (one line earlier), and starts erasing memory.
- The next reset to the MAC (80 counts later) stops the erasing.

3.2.6 Video Logic

The display buffer provides the ROM addressing and is circulated ten times for each line of data. During each rotation, a slice counter together with the buffer contents, address the ROM for a specific line of dots. The ROM data (dots/line/character) is transferred to a parallel in, serial out, video shift register. The serial output, the horizontal and vertical sync pulses are sent to the TV monitor. Schematic diagrams are contained in the Appendix.

3.3 AUXILIARY DEVICES

An Infotone is located on this assembly, which sounds an audible tone when a bell code is received by the terminal.

3.4 VIDEO MONITOR

The separate sync video signals generated on the control PCB is channeled to the standard EIA compatible video monitor. Detailed information on the video monitor is contained in the Appendix.

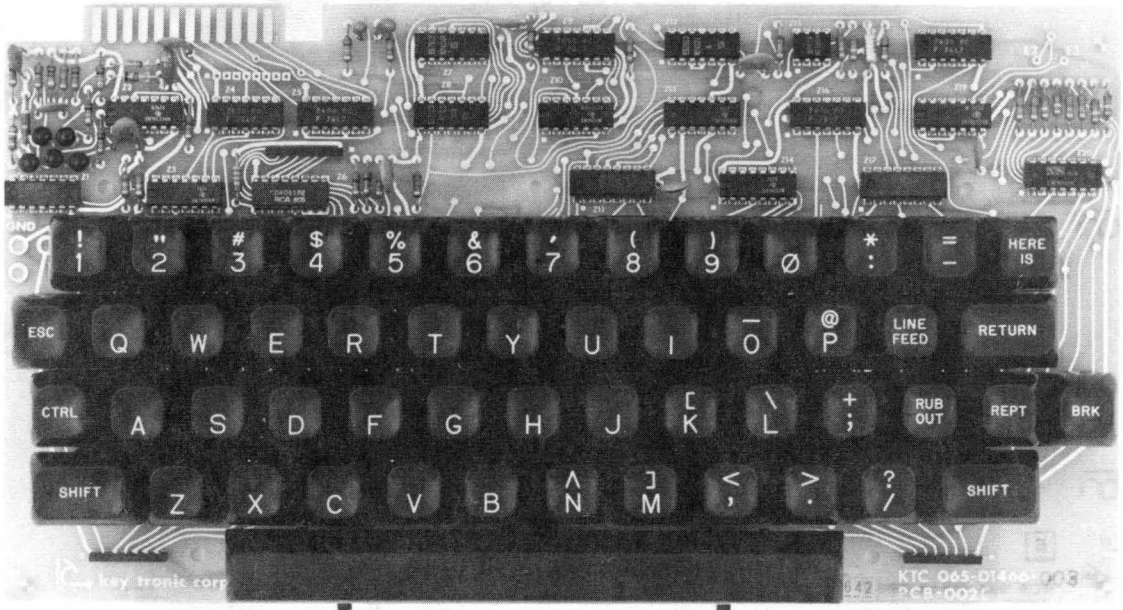


Figure 12 Keyboard Assembly

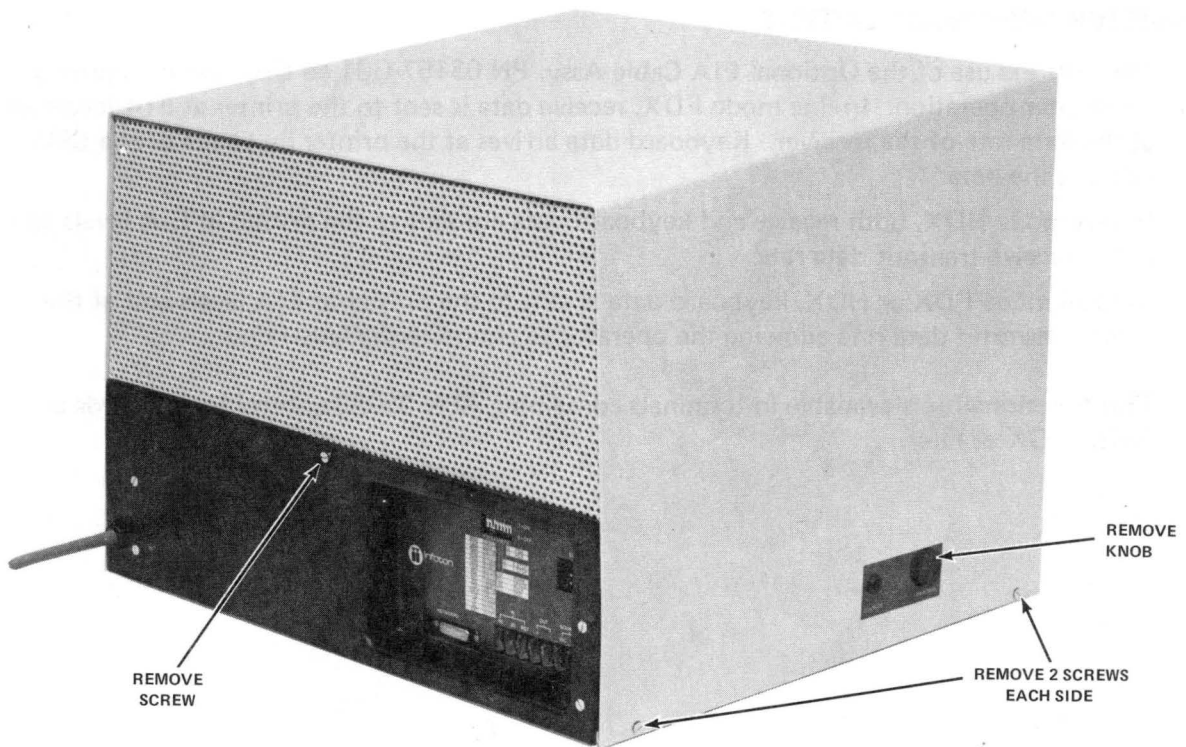


Figure 13 Cover Removal

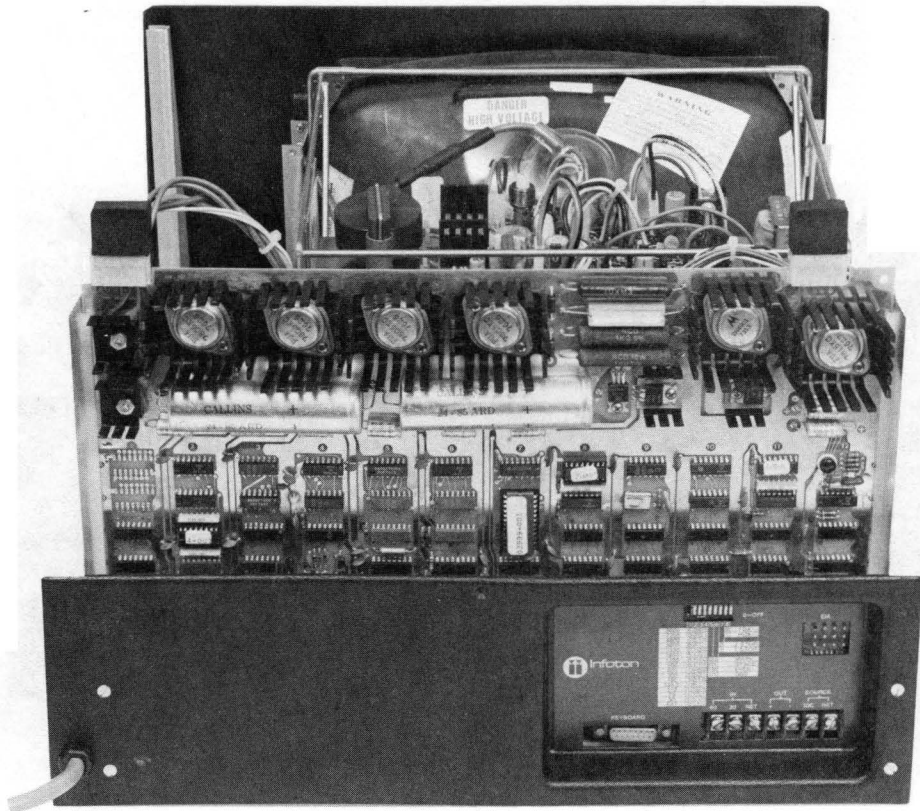


Figure 14 PCB Mounting

3.5 PRINTER COPY MODE OUTPUT

Through the use of the Optional EIA Cable Assy. PN 03157-G01 an EIA output is provided for printer operation. In line mode FDX, receive data is sent to the printer at EIA levels and at the data rate of the receiver. Keyboard data arrives at the printer by virtue of the CPU echoing the data.

In line mode HDX, both receive and keyboard data are sent to the printer at EIA levels and at the receive-transmit data rate.

In local mode FDX or HDX, keyboard data is sent to the printer at EIA levels and at the receive-transmit data rate allowing the operator to annotate the hard copy.

Note. This functionality is available in terminals containing APN 02983 control logic boards at revision OK or later.

4. SERVICE

The INFOTON VISTAR/GTX terminal is a modular system that has been designed for ease in service. In addition to a high MTBF, the VISTAR/GTX terminal has a maximum time to repair of 30 minutes. Typically fault location and replacement takes 10 minutes. This section is intended to aid the service man in module replacement. Section 5 of this manual is devoted to troubleshooting and fault location.

4.1 MECHANICAL ACCESS TO THE UNIT

4.1.1 Removal of Cover (Figure 13)

- a. Remove two flat head screws from each side of cover
- b. Remove TV intensity knob
- c. Remove one flat head screw from center rear of cover
- d. Lift cover straight up and off.

4.1.2 Removal of the Control Logic PCB (Figure 14)

- a. Remove four flat head screws from the rear bezel
- b. Remove bezel
- c. Disconnect the two connectors from the top of the PCB
- d. Unsnap the plastic bar located below the two connectors by pulling the black plastic tabs
- e. Remove the PCB

4.2 VIDEO MONITOR ADJUSTMENTS

With a screen full of H's, vertical size, vertical linearity, horizontal size, horizontal linearity, brightness, contrast, and focus adjustments can readily be made. Consult the appropriate supplement contained in Section 7 for the location of these controls. Best linearity can be achieved when the block of 1920 characters form a rectangle of from 7.5 to 8.5 inches wide (19-21 cm) and 5.5 to 6.0 inches high (14-15 cm).

4.3 POWER SUPPLY ADJUSTMENTS

The VISTAR/GTX is equipped with a general purpose power supply incorporating over-voltage protection and current foldback protection. Power Supply input is selectable as follows.

By Frequency

<u>PROM Location</u>	<u>60 Hz Part No.</u>	<u>50 Hz Part No.</u>
A8	02484-005	02484-006
C2	02484-007	02484-008
Power Transformer	02801-001	03092-001 (50/60 Hz)

By Voltage

Figure 15 details the jumper connections for AC Input range selection. This terminal strip is located adjacent to the transformer.

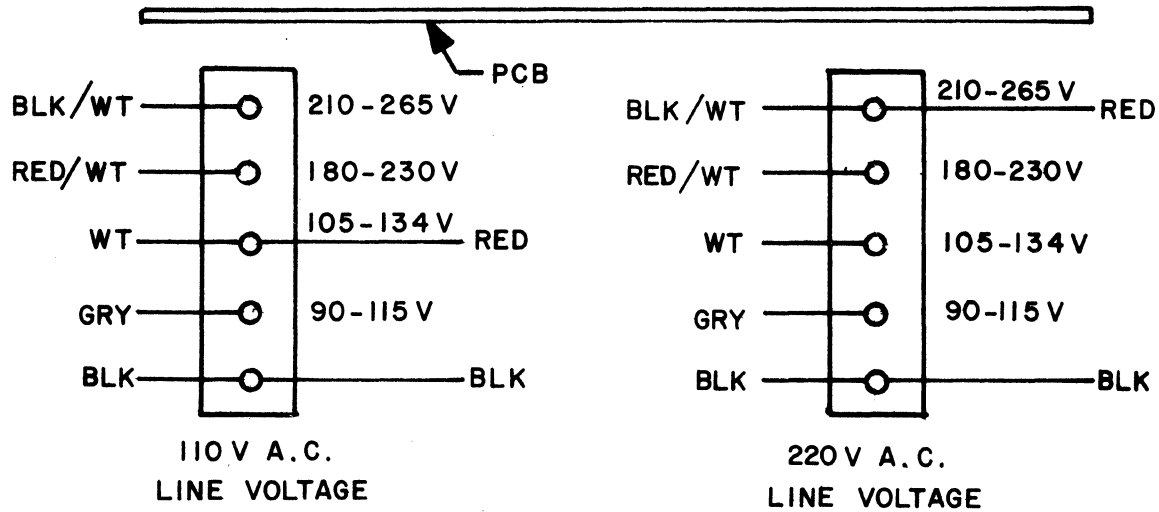


Figure 15 AC Input Selection

The proper tap is the highest voltage range which contains the value of the nominal line voltage.

The TV monitor receives its power from the +15 volt power supply. As a result there are no changes within the monitor due to line voltage or frequency changes.

4.4 CONTROL CODE OPTIONS

Four control code combinations are available within the VISTAR/GTX. When shipped the terminal has no backspace function and forward space is destructive (JP1 and JP2 installed). See Figure 9.

- To reconfigure the terminal to provide backspace on rubout and a destructive forward SPACE remove JP2(R55).
- To provide backspace on control H remove JP1(R56). With this configuration the forward space code can be either destructive or nondestructive. If JP2(R55) is left installed, space will be destructive, if JP2(R55) is removed then space will be nondestructive.

4.5 ORDERING REPLACEMENT AND SPARE PARTS

After determining the failure mode of the unit (see Section 5), a replacement part may be ordered by performing the following steps:

- Identify the terminal by name and serial number (see Figure 16). The serial number name tag is located on the bottom of your VISTAR/GTX terminal.

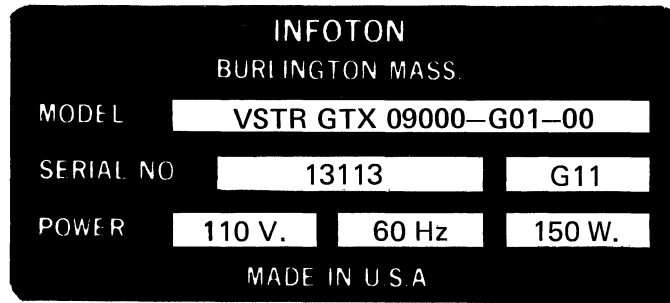


Figure 16 VISTAR Series Name Plate

- Identify the module by name and assembly part number (APN).
- Refer to the spare parts manual in Section 7 to find the proper part number when ordering parts.

If a question arises as to what is the correct part to order, write or call the Manager of Customer Engineering, INFOTON, INC., Second Avenue, Burlington, Massachusetts 01803; Phone: (617) 272-6660. Be sure to supply the terminal serial number as shown in Figure 16.

INFOTON maintains a complete product log of each unit in the field. The log is intended to aid the customer in acquiring proper service for his terminal. All factory authorized changes that are applied to a terminal in the field are entered in the product log. If a customer would like INFOTON to keep a record of authorized factory changes that he may apply to his terminal, he may do so by notifying the Manager of Customer Engineering, INFOTON, INC., in writing. Be sure to supply detailed information of the changes applied and the display serial number.

5. TROUBLESHOOTING AND FAULT LOCATION

5.1 VISTAR/GTX TERMINAL SELF CHECK

A feature of the VISTAR/GTX terminal is that it is capable of almost a complete self check when placed in the local mode of operation, all subassemblies of the VISTAR/GTX terminal are exercised. Only the serial interface is not fully exercised. The serial interface can be tested by operating the VISTAR/GTX on line with a turn-around plug, (APN 99999-022) Section 7, plugged into the EIA cable.

5.2 SUBASSEMBLY FUNCTIONS

Troubleshooting at the customer's site shall be limited to isolating the fault to one of the system's subassemblies. These subassemblies and their functional role in the system are described in the following paragraphs.

5.2.1 Keyboard Assembly (Figure 12)

- Capacitive switches and encoding logic producing parallel TTL codes
- Line/Local switch

5.2.2 Control PCB (Figure 9)

- Asynchronous Serial Interface
 1. Receives serial input data and converts it to parallel for presentation to memory.
 2. Receives parallel data from keyboard electronics and converts it to serial for data presentation to current loop and EIA output.
 3. Generates I/O direction and request signals.
 4. Contains interface clock source.
 5. Converts received EIA and current loop information to TTL logic levels.
 6. Converts transmit TTL information to EIA and current loop levels.
 7. Provides data rate, bits per character, FDX/HDX, and parity selection information.
- Timing Generator
 1. Clock Source
 2. Raster Generator
 3. Sync Generator
 4. Timing Signal Generator
 5. Synchronizing Logic for Roll
 6. Memory Timing
- Control Logic
 1. Data Input Buffer
 2. Input/Output Control Logic
 3. Cursor Counter
 4. Cursor Comparator
 5. Infotone
 6. Control Code Decoding

- Video Generation
 1. Buffer Register
 2. Display Register
 3. Read Only Memory
 4. Parallel to Serial Converter
 5. Video Drivers
- Memory
 1. MOS Shift Register
 2. Phase Pulse Drivers
 3. Recirculation Gating
 4. Input Gating
 5. Output Timing
 6. Cursor Display Logic
- Power Supply
 1. Power Supply Active Components

5.2.3 Video Monitor (Section 7)

Combines horizontal sync., vertical sync. and serial video information for presentation on the CRT screen.

5.3 TROUBLESHOOTING

Because of the modular construction of the VISTAR/GTX terminal and its built-in self-test capability, troubleshooting is a relatively simple procedure. Most troubleshooting can be accomplished by viewing the CRT while exercising VISTAR/GTX terminal in local mode. The following additional equipment may be useful when troubleshooting a VISTAR/GTX terminal, especially when the trouble is associated with the particular system configuration in the on-line mode.

- General Purpose Multimeter
- Cross Coupler APN 99999-014
- Turn-around Connector APN 99999-022
- A second terminal (VISTA, VISTAR or VISTAR/GT)
- Oscilloscope Tektronix 453 or equivalent
- ASR 33 Teletype
- Spare set of Replacement Modules

5.3.1 System Test, Off Line (terminal in local mode)

Exercise the terminal from the keyboard, being sure to test all of its functions. Make sure data is loaded onto every line of the display, and that the top and bottom line is filled completely. The turn-around connector may be used by placing the terminal on-line, thereby exercising the entire transmitter and receiver.

5.3.2 System Test, On Line

Repeat steps outlined in 5.3.1 including all control codes recognized by the computer.

5.3.3 Power Supply Testing

Because of over-voltage and over-current protection of the VISTAR/GTX power supply, the symptom of power supply failure may be caused by problems listed below:

- Over-voltage crowbar. Turn unit off, then on again. The power supply should recover from this failure mode.
- Over-current protection causes the power supply to reduce output voltage when the current capacity of the supply is exceeded. This can be caused by a short within any module. To isolate this type of failure, simply unplug each module until the supply recovers. If all modules are removed and the failure still exists, check the PCB for contaminants bridging etched circuits. Replace the control PCB assembly if failure persists.

5.4 FAULT LOCATION

Since there is inherently some interaction between the modules within the terminal, it becomes difficult to pinpoint the defective module for all possible symptoms. In the following table typical failure symptoms, probable sources of trouble, and recommended repairs are listed.

FAULT LOCATION

Fault	Probable Source of Trouble	Recommended Repair
Pilot lamp not on; unit inoperable.	Unit not plugged in.	Plug unit in.
	Circuit breaker - Underside left rear of unit tripped.	Reset circuit breaker.
	Faulty on/off switch.	Replace switch.
Pilot lamp on but no raster.	Brightness turned full off.	Turn up brightness control.
	Monitor fuse open.	Repair or replace fuse. See Section 7.
	Monitor not plugged in.	Check monitor cord in rear of monitor.
	One or more monitor connectors not connected.	Check connections. See Section 7.
	Terminal power supply defective.	Repair terminal power supply. See Section 4.
Raster but no sync.	Defective control module.	Replace control module.
	Defective video monitor.	Repair or replace video monitor. See Section 7.

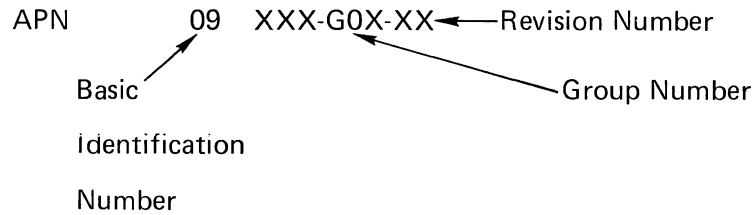
Figure 17 Fault Location

FAULT LOCATION (Continued)

Fault	Probable Source of Trouble	Recommended Repair
Sync but no video pattern.	Defective control module.	Replace control module.
	Defective video monitor.	Repair or replace video monitor. See Section 7.
Noise on screen; sync poor or nonexistent.	Defective control module.	Replace control module.
	Defective power supply.	Replace control module.
Sync and video random characters; cursor may not be present.	Unit not initialized.	Turn unit off, wait 5 seconds, turn unit on.
	Defective control module.	Replace control module.
Characters broken or unintelligible.	Defective control module.	Replace control module.
Cursor but no cursor movement and no characters.	Defective control module.	Replace control module.
	Defective keyboard.	Repair or replace keyboard. Could be stuck key for a control character.
Cursor and characters but no cursor movement.	Defective control module.	Replace control module.
Cursor movement but no characters in system.	Defective keyboard.	Repair or replace keyboard. Could be stuck key.
Enters incorrect characters.	Defective control module.	Replace control module.
	Defective asynchronous serial interface drivers/receivers.	Replace control module.
	Defective keyboard.	Repair or replace keyboard. Character errors not bit-oriented.
Enters single character for all keys.	Defective keyboard.	Stuck key usually on key of character entered on the screen.
	Defective control module.	Replace control module.
Operable off line (local); not operable on line.	Defective asynchronous serial interface.	Replace control module.
	Defective control module.	Replace control module.

6. DRAWINGS

The following drawings relate to the VISTAR/GTX terminal. Figure 18 shows the relationship between the module assembly numbers (APN 09XXX-G0X-XX) and the schematics.



The X's denote various generations of the basic module.

6.1 MNEMONICS LIST

6.2 SCHEMATIC MAIN LOGIC INCLUDING POWER SUPPLY (6 sheets)

6.3 SCHEMATIC KEYBOARD (2 sheets)

TITLE	ASSEMBLY PART NUMBER	SCHEMATIC
I/O LOGIC	APN 02983-G0X-XX	02981-2
CONTROL LOGIC	APN 02983-G0X-XX	02981-3
MEMORY LOGIC	APN 02983-G0X-XX	02981-4
VIDEO LOGIC	APN 02983-G0X-XX	02981-5/6
SCHEMATIC POWER SUPPLY	APN 02983-G0X-XX	02981-1
KEYBOARD ASSEMBLY (KTC)	APN 03023-G0X-XX	35-1466
TV MONITOR ASSEMBLY	APN 02830-001-XX	

Figure 18 Assembly to Schematic Reference Table

6.1 MNEMONICS LIST

MNEMONICS	DEFINITIONS	PCB	SCHEMATIC LOCATION	PCB CHIP LOCATION	SHEET
BELLF	Bell duration clock	Control	A7	A3	6
CARRY	Carry bit from memory address decade	Control	C7	H2	4
CCOMP	Cursor Compare	Control	D2	K3	3
CLOCK	System time base	Control	D7	C10	5
CLK P1	Clock Pulse 1 to Memory	Control	D4	F5	4
CLK P2	Clock Pulse 2 to Memory	Control	D4	F5	4
CP1	Phase 1 of system clock	Control	C4	F4	4
CP2	Phase 2 of system clock	Control	D5	E3	4
CURLD	Overflow of cursor character counter	Control	D3	J3	3
DCLKA	Data Clock A	Control	D5	C9	5
DCLKB	Data Clock B	Control	D6	D10	5
DCLKD	Data Clock D	Control	D6	D9	5
DPCCD	RS-232 Data terminal ready	Control	C1	J1	2
DPRBB	RS-232 Receive Data	Control	C8	J1	2
DPRCF	RS-232 Carrier Detect	Control	B8	J1	2
DPTBA	RS-232 Transmit data	Control	C1	J1	2
DPTCA	RS-232 Request to Send	Control	C1	J1	2
DPTCB	RS-232 Clear to Send	Control	B8	J1	2
DRCLK	Data Rate Clock	Control	B6	K4	3
ELC	End of Line Count (Slice 9)	Control	B7	A8	5
EXTCLK	External Receiver Clock	Control	C8	J1	2
EOC	End of character	Control	B4	H7	2
FDX	Full Duplex Mode	Control	D7	E10	2
HDX	Half Duplex Mode	Control	D7	E10	2
HSYNC	Horizontal Sync	Control	C4	B11	5
IHREC	Inhibit Recirculation (erase memory)	Control	C5	K3	3
INPUT	Inputs a code into Memory	Control	C5	J5	3
INRES	Initial Reset	Control	B2	J4	3
INRET	Current Loop Input Return	Control	C8	TB1	2
KBRK	Keyboard Break	Keyboard	D4	J2	2
KBDB0	Keyboard Bit 0 (LSB)	Control	B5	H7	2
KBDB1	Keyboard Bit 1	Control	B5	H7	2
KBDB2	Keyboard Bit 2	Control	B5	H7	2
KBDB3	Keyboard Bit 3	Control	B5	H7	2
KBDB4	Keyboard Bit 4	Control	B5	H7	2
KBDB5	Keyboard Bit 5	Control	B5	H7	2
KBDB6	Keyboard Bit 6 (MSB)	Control	B5	H7	2
KBSTR	Keyboard Strobe	Keyboard	E2	Z5	1
LINE	Line Local Switch	Control	B7	J2	2

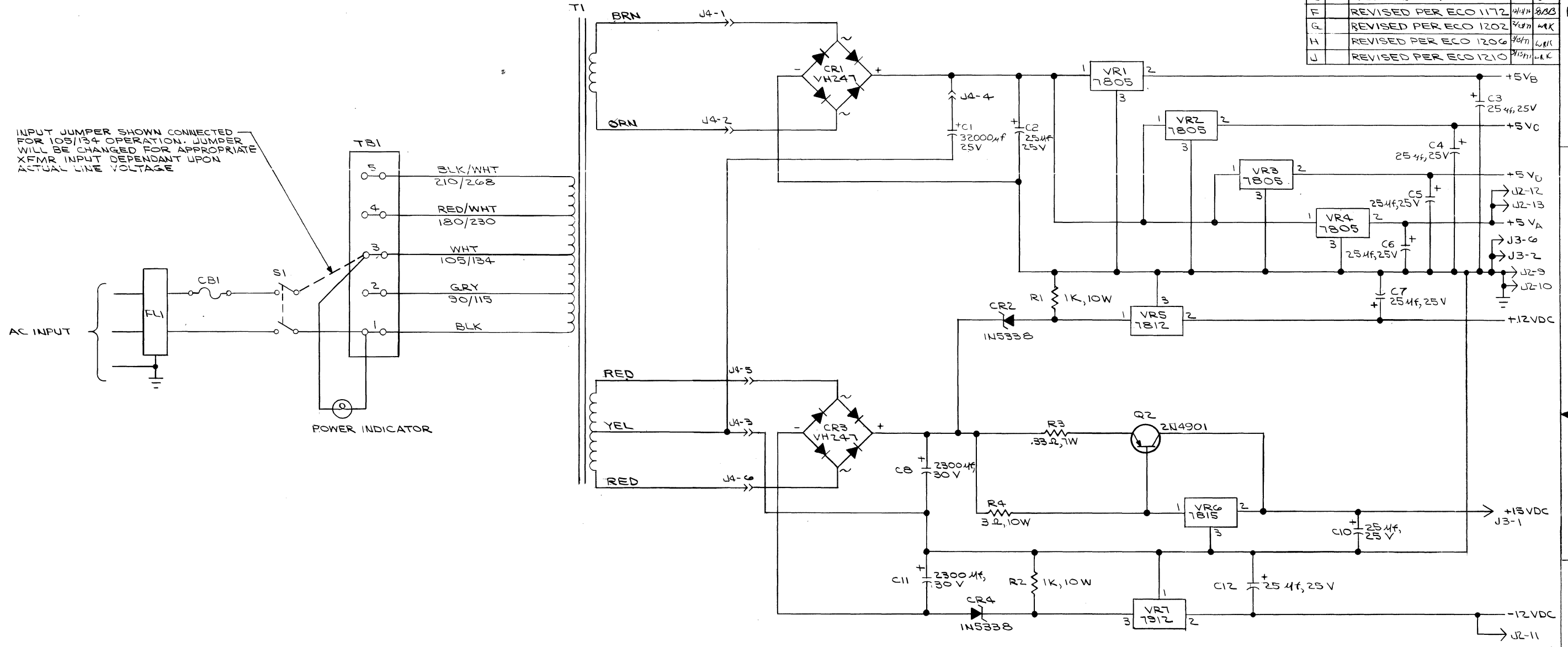
(KBD)

MNEMONICS	DEFINITIONS	PCB	SCHEMATIC LOCATION	PCB CHIP LOCATION	SHEET
MACC5	Memory Address Character Counter Bit 5	Control	B7	H1	4
MACC6	Memory Address Character Counter Bit 6	Control	B7	H1	4
MACC7	Memory Address Character Counter Bit 7	Control	B7	H1	4
MEMB0	Memory Bit 0 (LSB)	Control	D2	D7B4	4
MEMB1	Memory Bit 1	Control	C2	D7A4	4
MEMB2	Memory Bit 2	Control	C2	D6B4	4
MEMB3	Memory Bit 3	Control	B2	D6A4	4
MEMB4	Memory Bit 4	Control	A2	D5A4	4
MEMB5	Memory Bit 5 (MSB)	Control	A2	F5	4
ODD	Odd Parity Selector Position	Control	D7	E10	2
P1A	Memory Shift Pulse	Control	B4	Q7	4
P2A	Memory Shift Pulse	Control	A4	Q9	4
RCVB0	Receive Bit zero (LSB)	Control	C4	F7	2
RCVB1	Receive Bit one	Control	C4	F7	2
RCVB2	Receive Bit two	Control	C4	F7	2
RCVB3	Receive Bit three	Control	C4	F6	2
RCVB4	Receive Bit four	Control	C4	F6	2
RCVB5	Receive Bit five	Control	C4	F6	2
RCVB6	Receive Bit six (MSB)	Control	C4	F9	2
RCVDR	Receive Data Rate	Control	D5	F8	2
RESMA	Reset Memory Address	Control	B5	F1	4
SDLCK	Serial Data Time Base	Control	C5	J8	2
SCLK0	Slice Counter Bit Zero	Control	B7	A7	5
SCLK1	Slice Counter Bit One	Control	B7	A7	5
SCLK2	Slice Counter Bit Two	Control	B7	A7	5
STRBE	Receive Strobe	Control	B4	H9	2
VMSTR	Buffer Memory Strobe	Control	D1	B3	6

APPENDIX

REVISIONS			
SYM	ZONE	DESCRIPTION	DATE APPD
A		PRE-RELEASED CHANGES	4/2/75 WKB
B		REVISED PER ECO 1116	4/2/75 WKB
C		REVISED PER ECO 1119	4/16/75 WKB
D		REVISED PER ECO 1157	7/1/75 WKB
E		REVISED PER ECO 1164	12/1/75 WKB
F		REVISED PER ECO 1172	12/1/75 WKB
G		REVISED PER ECO 1202	4/2/76 WKB
H		REVISED PER ECO 1206	7/1/76 WKB
J		REVISED PER ECO 1210	11/12/76 WKB

INPUT JUMPER SHOWN CONNECTED FOR 105/134 OPERATION. JUMPER WILL BE CHANGED FOR APPROPRIATE XFMR INPUT DEPENDANT UPON ACTUAL LINE VOLTAGE

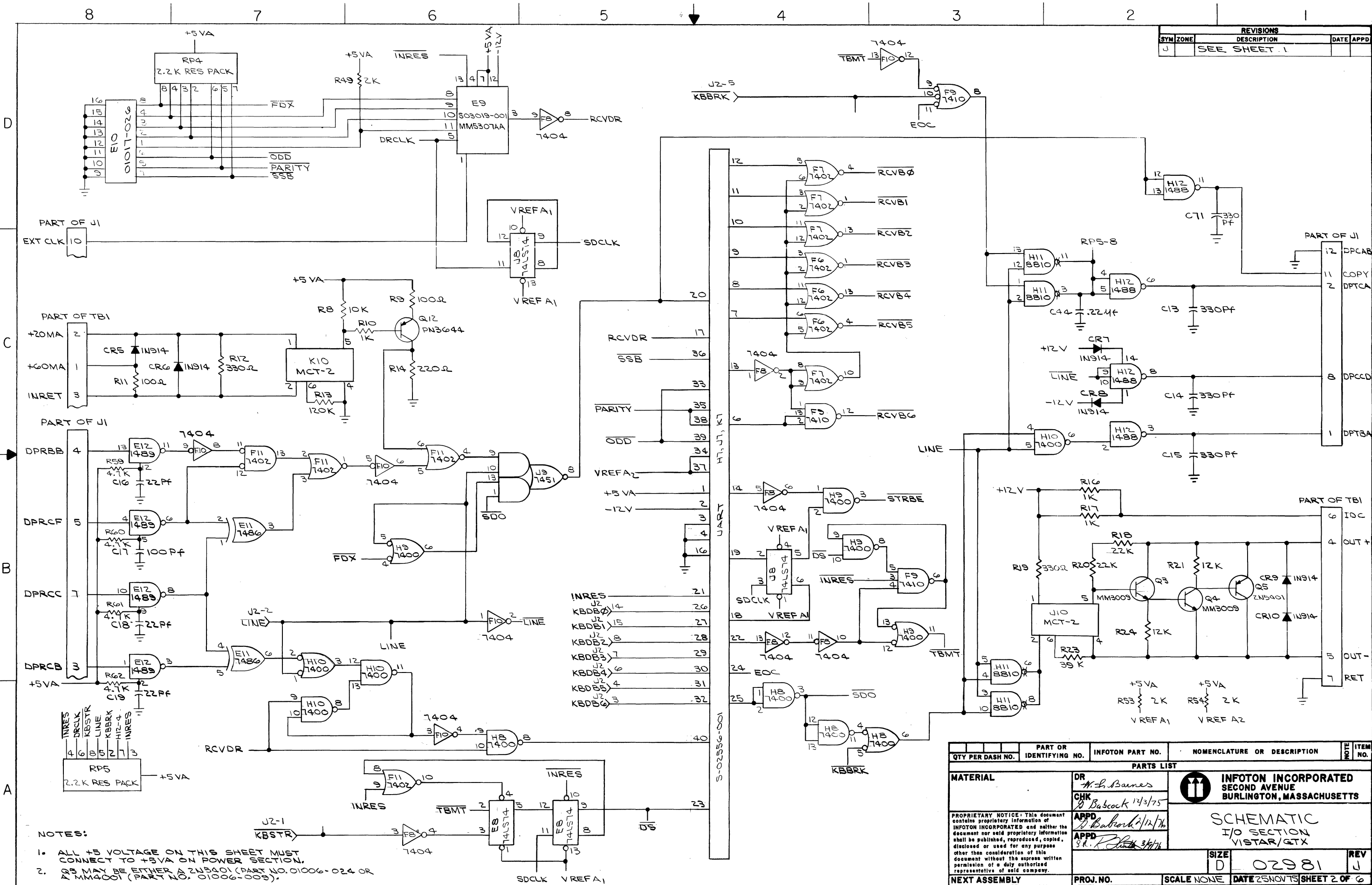


NOTES: (UNLESS OTHERWISE SPECIFIED)

- RESISTORS ARE 1/4W, 5%
- VR1, VR2, VR3, VR4, VR6 + Q2 ARE MOUNTED ON THERMALLOY HEAT SINKS, PART NO. 6054B
- VR5, VR7, CR1 + CR3 ARE MOUNTED ON THERMALLOY HEAT SINKS, PART NO. 6107B

QTY PER DASH NO.	PART OR IDENTIFYING NO.	INFOTON PART NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
MATERIAL		DR H. L. Barnes	INFOTON INCORPORATED SECOND AVENUE BURLINGTON, MASSACHUSETTS	REV J
		CHK H. Babcock 12/1/75		
		APPD H. Babcock 2/12/76		
		APPD S. R. F. Smith 7/1/76		
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NEXT ASSEMBLY		PROJ. NO.	SCALE NONE	DATE 25 NOV 75 SHEET 1 OF 6

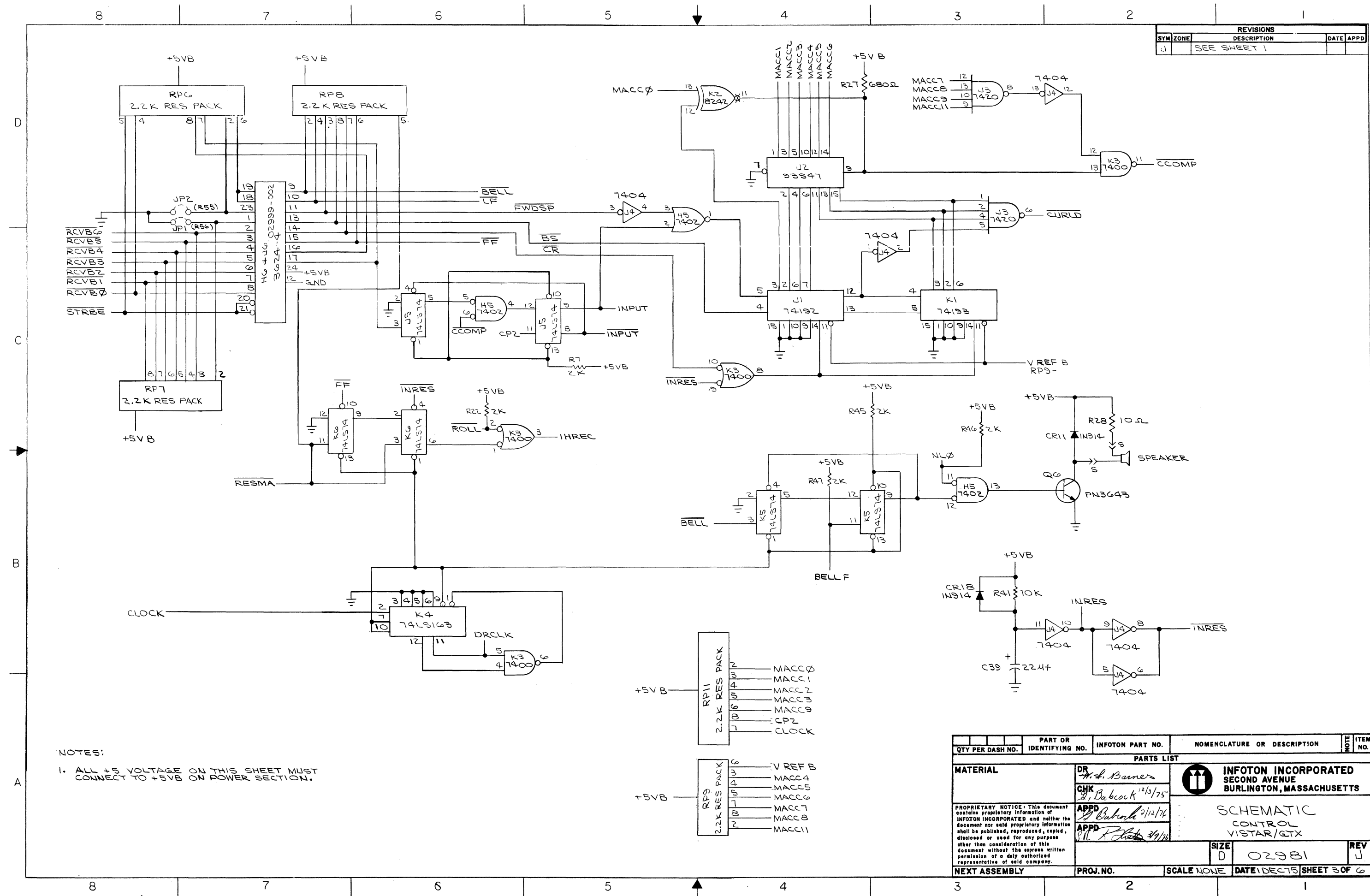
REVISIONS			
SYM	ZONE	DESCRIPTION	DATE
J		SEE SHEET 1	



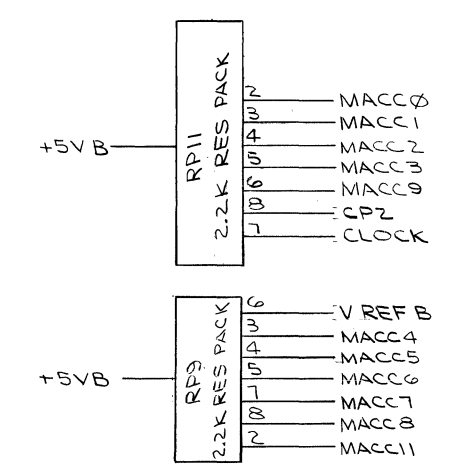
- NOTES:
1. ALL +5 VOLTAGE ON THIS SHEET MUST CONNECT TO +5VA ON POWER SECTION.
 2. Q5 MAY BE EITHER A 2N5401 (PART NO. 01006-024 OR A 1MM4001 (PART NO. 01006-009).

QTY PER DASH NO.	PART OR IDENTIFYING NO.	INFOTON PART NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
MATERIAL		DR <i>M. B. Barnes</i>	INFOTON INCORPORATED SECOND AVENUE BURLINGTON, MASSACHUSETTS	
		CHK <i>D. Bascock 12/3/75</i>		
		APPD <i>D. Babcock 12/12/76</i>		
		APPD <i>R.K. R... 3/77</i>	SCHEMATIC I/O SECTION VISTAR/GTX	
NEXT ASSEMBLY		PROJ. NO.	SCALE NONE	DATE 25 NOV 75 SHEET 2 OF 6

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
d		SEE SHEET 1		



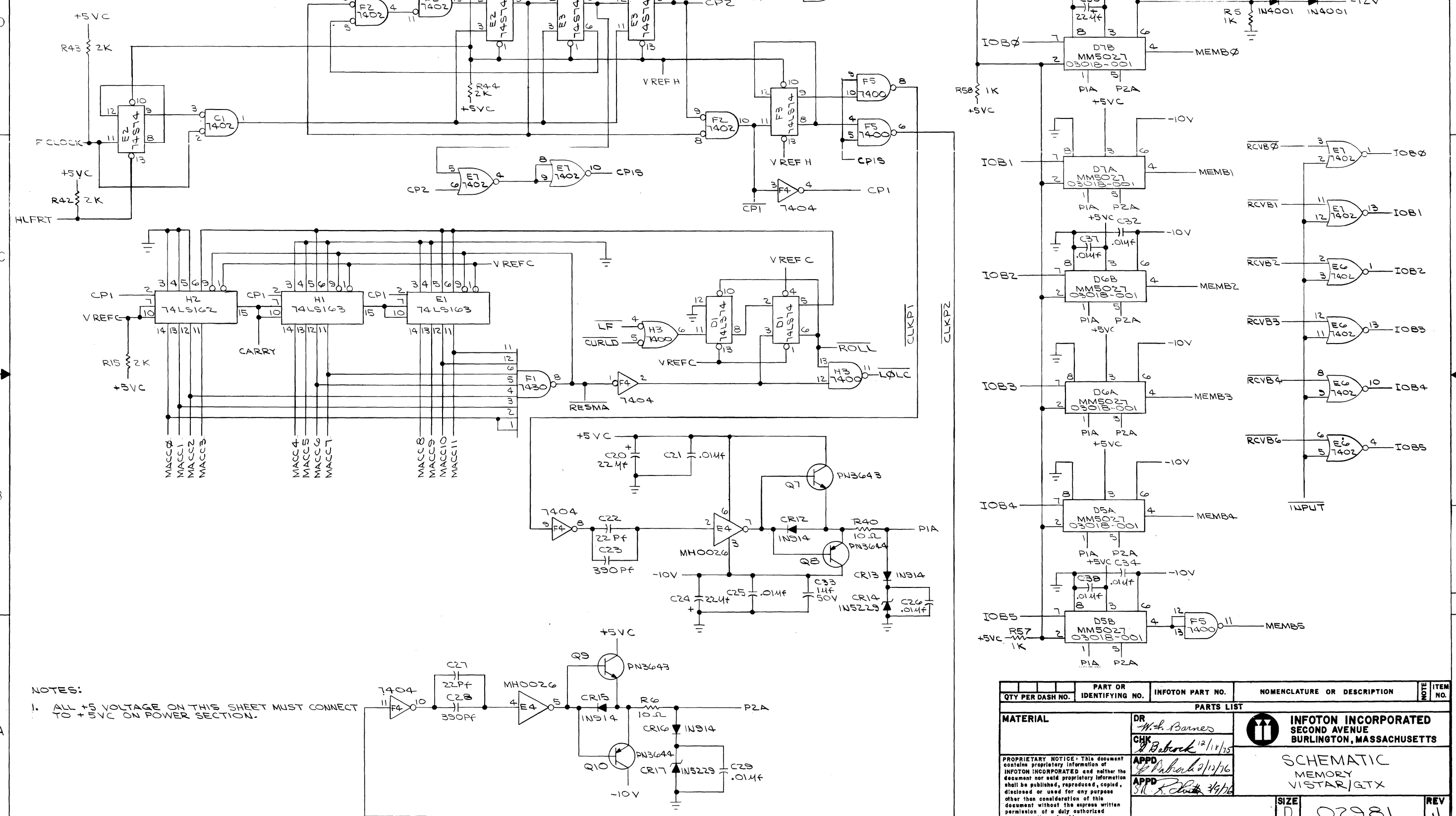
NOTES:
 1. ALL +5 VOLTAGE ON THIS SHEET MUST CONNECT TO +5VB ON POWER SECTION.



QTY PER DASH NO.	PART OR IDENTIFYING NO.	INFOTON PART NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
MATERIAL		DR <i>M. A. Barnes</i>	INFOTON INCORPORATED SECOND AVENUE BURLINGTON, MASSACHUSETTS	SCHEMATIC CONTROL VISTAR/GTX
		CHK <i>B. Babcock</i> 12/13/75		
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NEXT ASSEMBLY		APPD <i>R. R. Smith</i> 3/9/76	DATE DEC 75	SHEET 3 OF 6

8 7 6 5 4 3 2 1

REVISIONS			
SYM	ZONE	DESCRIPTION	DATE APPD
1		SEE SHEET 1...	

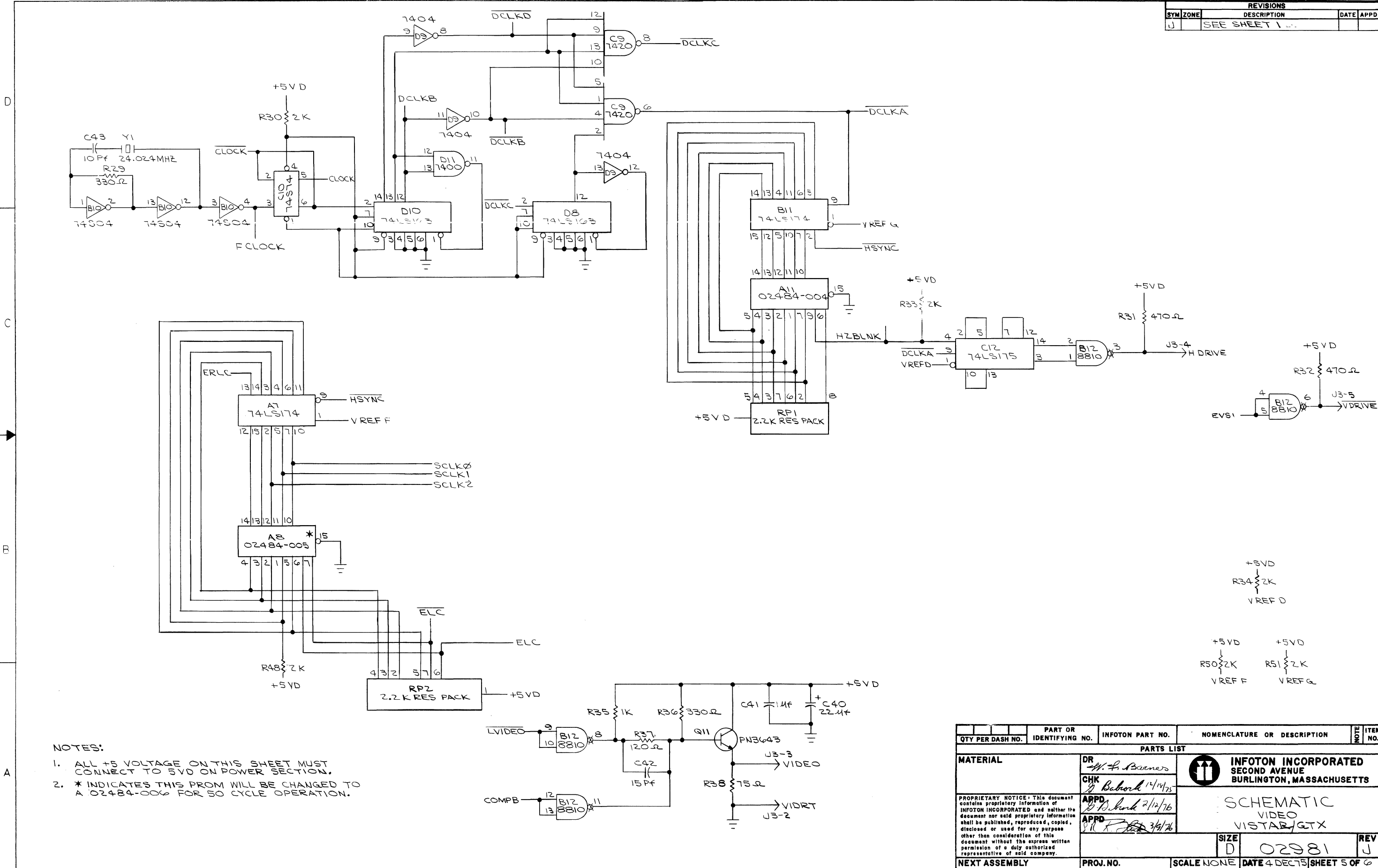


NOTES:
 1. ALL +5 VOLTAGE ON THIS SHEET MUST CONNECT TO +5VC ON POWER SECTION.

QTY PER DASH NO.	PART OR IDENTIFYING NO.	INFOTON PART NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
PARTS LIST				
MATERIAL		DR <i>M. Barnes</i>	INFOTON INCORPORATED SECOND AVENUE BURLINGTON, MASSACHUSETTS	A
		CHK <i>B. Babcock</i> 12/18/75		
		APPD <i>B. Babcock</i> 2/12/76		
		APPD <i>S. R. ...</i> 3/9/76		
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NEXT ASSEMBLY	PROJ. NO.	SCALE NONE	DATE 4 DEC 75	SHEET 4 OF 6

8 7 6 5 4 3 2 1

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
J		SEE SHEET 1		

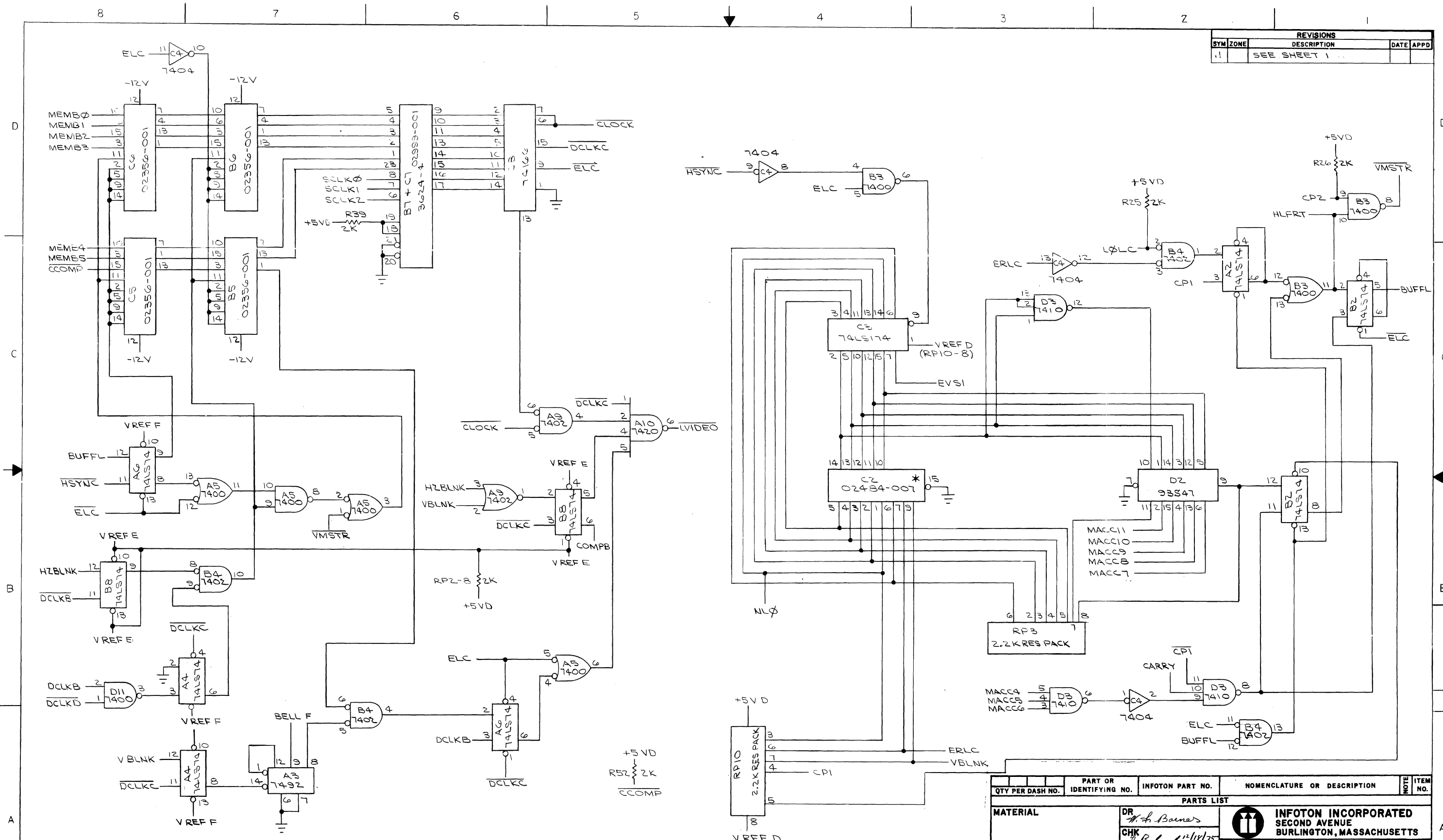


NOTES:

1. ALL +5V VOLTAGE ON THIS SHEET MUST CONNECT TO 5VD ON POWER SECTION.
2. * INDICATES THIS PROM WILL BE CHANGED TO A 02484-006 FOR 50 CYCLE OPERATION.

QTY PER DASH NO.	PART OR IDENTIFYING NO.	INFOTON PART NO.	NOMENCLATURE OR DESCRIPTION	NOTE	ITEM NO.
PARTS LIST					
MATERIAL		DR <i>W. A. Barnes</i> CHK <i>D. Babcock 12/19/75</i> APPD <i>D. Babcock 2/12/76</i> APPD <i>R. F. Jones 3/9/76</i>		INFOTON INCORPORATED SECOND AVENUE BURLINGTON, MASSACHUSETTS	
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NEXT ASSEMBLY		PROJ. NO.	SCALE NONE	DATE 4 DECS 75	SHEET 5 OF 6
		SIZE D	02981	REV J	

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
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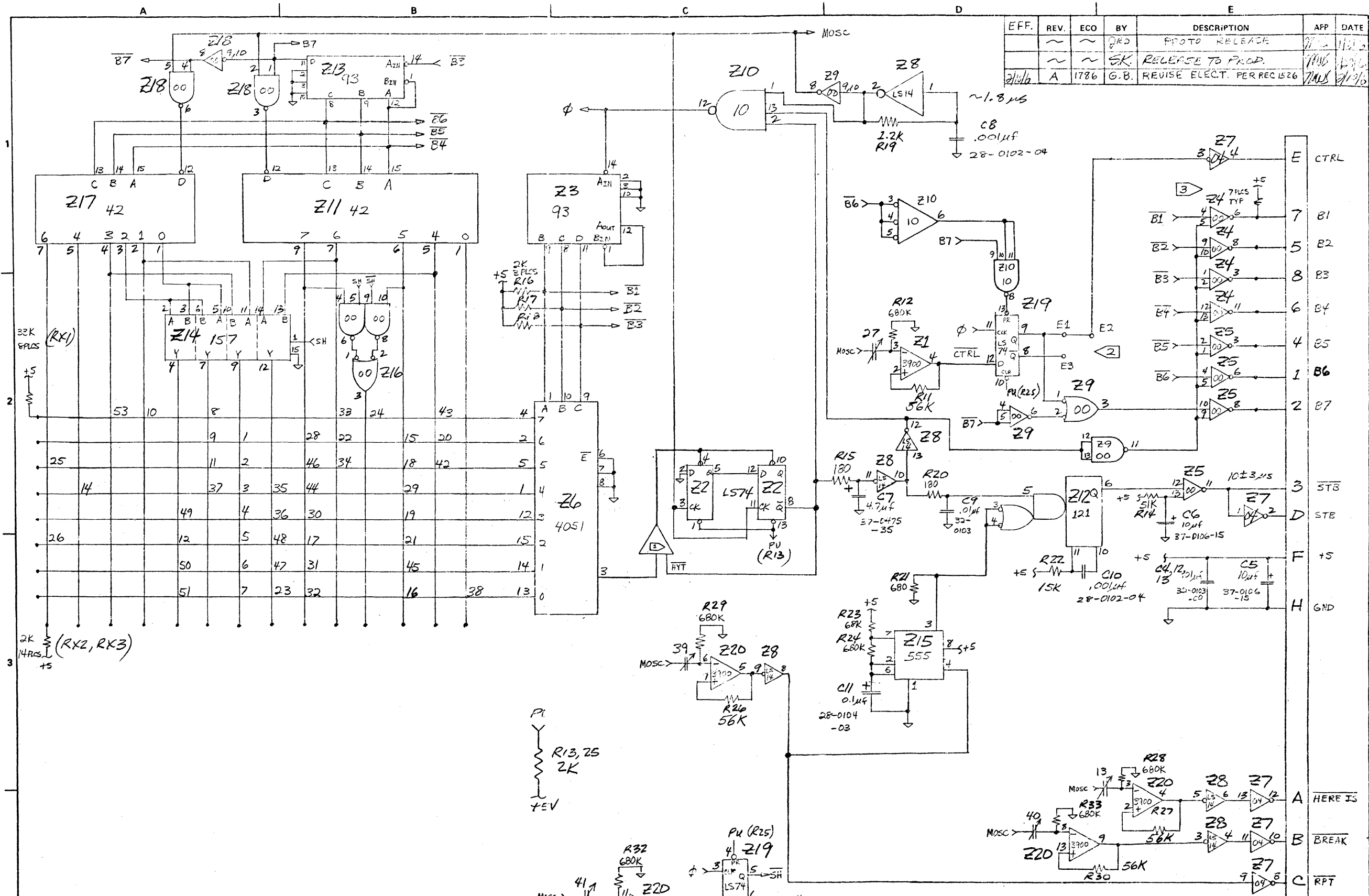


NOTES:

- ALL +5 VOLTAGE ON THIS SHEET MUST CONNECT TO 5 VD ON POWER SECTION.
- * INDICATES THIS PROM WILL BE CHANGED TO A 02484-008 FOR 50 CYCLE OPERATION.

PARTS LIST		NOMENCLATURE OR DESCRIPTION		NOTE	ITEM NO.
QTY PER DASH NO.	IDENTIFYING NO.	INFOTON PART NO.			
MATERIAL		DR <i>W. A. Barnes</i>		INFOTON INCORPORATED SECOND AVENUE BURLINGTON, MASSACHUSETTS	SCHEMATIC VIDEO VISTAR/GTX
		CHK <i>A. Babcock</i> 11/14/75			
		APPD <i>A. Babcock</i> 2/12/76			
		APPD <i>J.R. [Signature]</i> 3/9/76			
NEXT ASSEMBLY		PROJ. NO.	SCALE NONE	DATE 25 NOV 75	SHEET 6 OF 6

EFF.	REV.	ECO	BY	DESCRIPTION	APP	DATE
	~	~	JED	PHOTO RELEASE		11/2/64
	~	~	SK	RELEASE TO PROD.		11/16/64
	A	1786	G.B.	REVISE ELECT. PER REC 1526		11/16/64



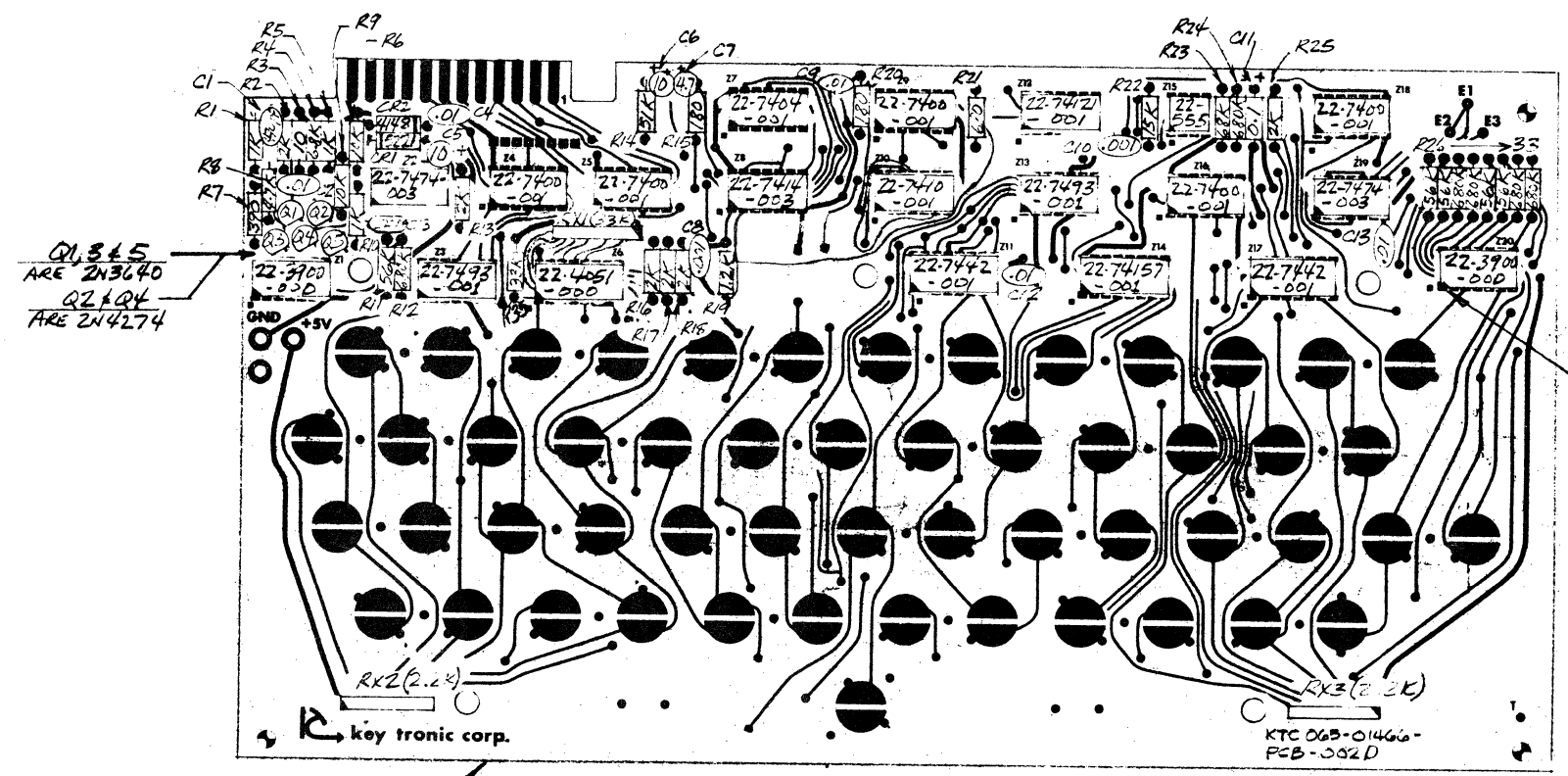
- ③ PADS FOR PULLUP RESISTORS ONLY. NO RESISTORS INSTALLED.
- ② TO MAKE CTRL INSTEAD OF CTRL, CUT TRACE FROM E1 TO E2 AND INSTALL JUMPER FROM E1 TO E3.
- ① STANDARD DETECTION CIRCUIT.

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MANUFACTURE PARTS AND/OR ASSY'S PER K.T.C. DOCUMENT: R.T.P. 32-0576

UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN INCHES		TOL. EXCEPT AS NOTED	ITEM	PART NO.	DESCRIPTION	QTY.
XXX	DIMENSION NOT TO SCALE	HOLE DIA.	SCALE	TITLE		
USED ON	RELEASED	FRACT. ± 1/64"		SCHEMATIC		
KTC STANDARD	APP. MWS	XX ± .01"		keytronic corporation		
ASR 33	CH. JNS	XXX ± .005"		DWG. NO. 35-1466		
	DR. JED	ANG. ± 1°		SHEET 1 OF 2		
				SPOKANE, WASH., U.S.A.		

REV.	ECO	BY	DESCRIPTION	DATE
~	~	~	SK PROTO RELEASE	1/17/66
~	~	~	SK RELEASE TO PROD.	1/17/66
2-5-6	A	1786 G.B	REV TO -002D PCB, REPAIR R24	1/17/66
3/11/66	B	~	ADD R25, CHG R24, ADD -003 ASSY (KEYTOP)	3/11/66
4-20-66	C	~	ADD -004 ASSY (P.C.B. 15-79) CHG FROM 10PF TO 10F7	4-20-66
1/11/76	D	2044 MS	REVISD NOTE 3	1/11/76
6-1-76	E	2050 MS	CHG 5900 (BROBARK RESISTORS TO SK)	6-1-76
12-13-76	F	2295 W.M	ADD C3 (100 PF) CHG. PER. ECO 2295	12-13-76



-002D PCB

- 001, -003 & -004 ASSY
 SEE SHEET 3 FOR MECH. ASSY &
 SHEET 4 FOR -001 KEYTOP SET
 SHEET 5 FOR -003 KEYTOP SET
 SHEET 7 FOR -004 KEYTOP SET

- NOTES**
2. RUBBER STAMP APPROPRIATE DASH NO. AFTER KTC PART NUMBER [BLACK]
 1. APPLY DATE-SERIAL NO. PRESURE ADHESIVE TAG, TO COMPONENT SIDE OF PCB

NOTICE OF CONFIDENTIAL INFORMATION
 INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND IS PROPERTY OF KEY TRONIC CORPORATION. WHERE FURNISHED WITH A PROPOSAL, THE RECIPIENT SHALL USE IT ONLY TO EVALUATE THE PROPOSAL. WHERE FURNISHED TO A CUSTOMER OR TO A SUBCONTRACTOR, THE RECIPIENT SHALL MAINTAIN IT AS CONFIDENTIAL AND SHALL NOT DISCLOSE IT TO ANY OTHER PARTY WITHOUT THE WRITTEN PERMISSION OF KEY TRONIC CORPORATION. THE INFORMATION SHALL NOT BE USED OR DISCLOSED BY THE RECIPIENT FOR ANY OTHER PURPOSE.


MANUFACTURE PARTS AND/OR ASSY'S PER K.T.C. DOCUMENT:
 MOD6
 MOD7

UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN INCHES		TOL. EXCEPT AS NOTED	ITEM	PART NO.	DESCRIPTION	QTY
XXX	DIMENSION NOT TO SCALE	HOLE DIA.	SCALE		KEYBOARD ASSY (ELECTRICAL)	
USED ON	KTC STD A SR-33	FRACT. 1/16			key tronic corporation	65-0466
RELEASED	1/20/66	XX - 01				
CHK. G.B.	1/17/66	XXX - 02				
DR. S.C.	1/17/66	ANG - 03				

TRUBLE SHOOTING KTC DETECTOR CIRCUIT

USED ON

65-1466

SCALE		TITLE	
		TROUBLE SHOOTING KTC DETECTOR CIRCUIT	
		DR. WJB	DATE 10/19/6
		APP.	DATE
SPOKANE, WASH. U.S.A.		DWG. NO. 36-0729	
REV.	DESCRIPTION	APP.	DATE

Requires 65-1466 Sheet 1, 35-1466 Sheet1, and Oscilloscope.

A. SET-UP

1. Connect external trigger of the scope to the slowest bit on the counter (Z13-8). Adjust the sweep rate to one period of this signal (equivalent to one keyboard scan). When signal is located use intensify mode for viewing short pulses.
2. Ground both vertical inputs on the scope and set both base lines to the same reference levels. Set V/Cm to 1V/Cm.
3. Unground the inputs, you are ready to look at the signals on the keyboard. Ref: Connect probe ground leads to ground near the point being measured.

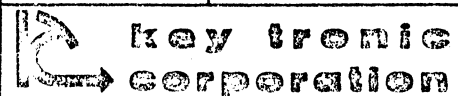
B. PROCEDURE

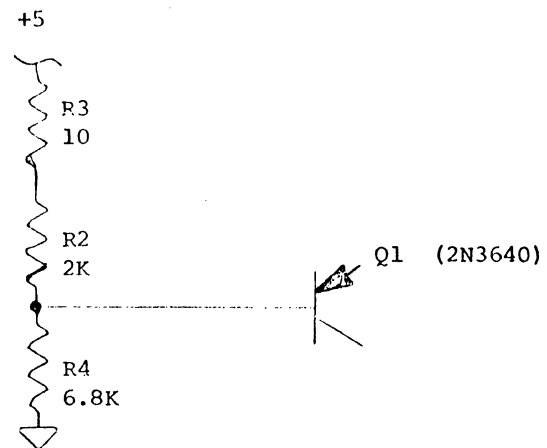
1. In order to verify that the fault is in the detector, connect probe "A" to the collector of Q2 (2N4274).
2. Repeatedly depress a key and ascertain if a negative pulse of approximately 1000 nsec is present (coinciding with key depression).
3. If negative pulses were observed, the problem does not lie in the detector and the validation and strobe processing logic should be checked.
4. If a negative pulse was not found at Q2, check the detector.
5. Before beginning to trouble shoot the detector, verify that Z11 (7442) Z17 (7442), and Z6 (4051) are working by checking inputs.

C. COMMON CHECKOUT

NOTE: After any changes to the circuit check the keyboard to ascertain whether the malfunction has been repaired.

1. Check to voltage level at the cathode of CR1 (IN5221B). It should be 2.1V. If the proper level is not present replace CR1. Verify that this level is also present at the base of Q4, if not, check trace for continuity.
2. Check the base of Q1 (2N3640) to verify the presence of a level of approximately 3.5V. If this level is not present verify continuity of the following circuit.

SCALE		TITLE	
		TROUBLE SHOOTING KTC DETECTOR CIRCUIT	
		DR.	DATE
		APP.	DATE
SPOKANE, WASH. U.S.A.		DWG. NO. 36-0729	
REV.	DESCRIPTION	APP.	DATE



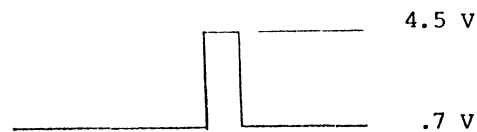
- Verify that when a key is repeatedly depressed a corresponding negative pulse occurs at the base of Q1.



If no pulse occurs check R5 (1K) and CR2 (IN4148).

D. SIGNAL TRACING

- Connect probe "A" to the base of Q3 (2N3640) and verify a positive pulse of approximately 500 nsec is present when a key is depressed.



NOTE: Probe ground must be used throughout this section.

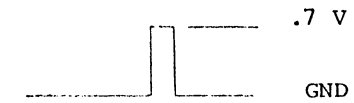
Replace Q4 (2N4274), Q5 (2N3640), R8 (4.7K), and C3 (220pf) if the pulse is not present.

- Connect probe "A" to the emitter of Q3 and verify the presence of a 1000 nsec positive pulse when depressing a key.



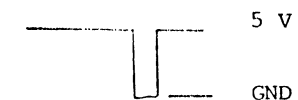
If the pulse is not present replace Q3 (2N3640) and R1 (1K).

- Connect probe "A" to the collector of Q1 (2N3640) and verify the presence of a 1000 ns positive pulse when depressing a key.



If the pulse is not present replace Q1 and R9 (10K).

- Connect probe "A" to the collector of Q2 (2N4274) and verify the presence of a 1000 nsec negative pulse when depressing a key.

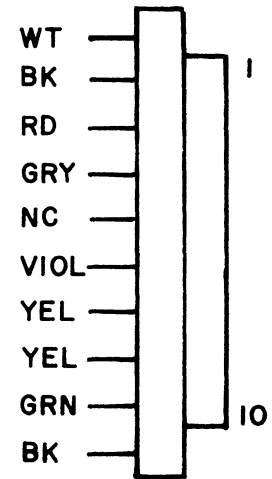
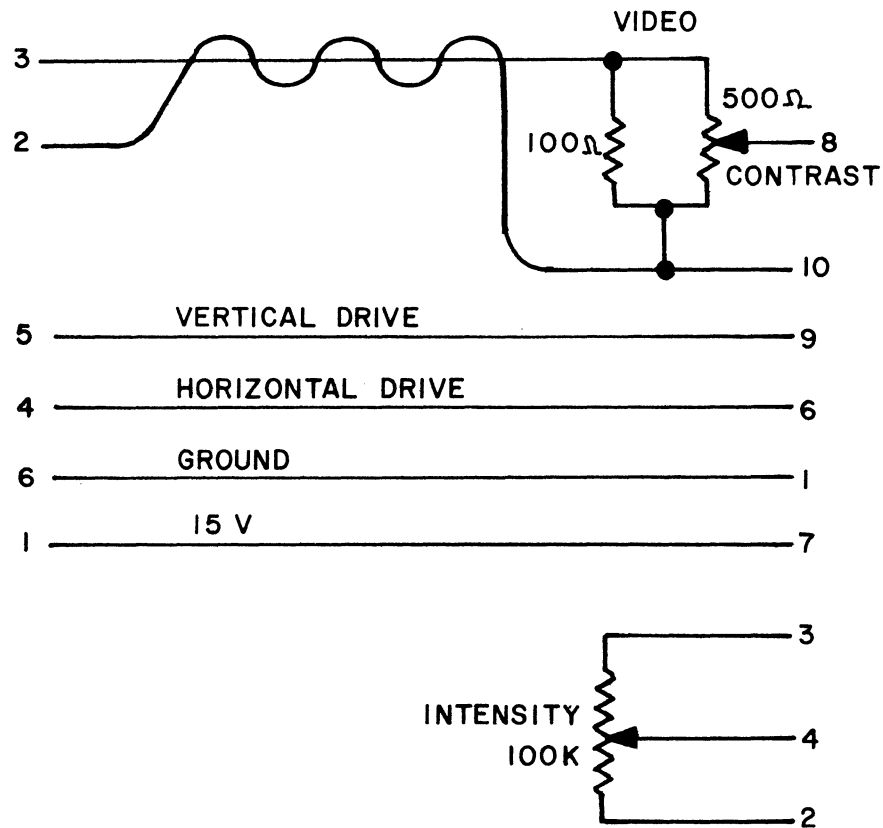
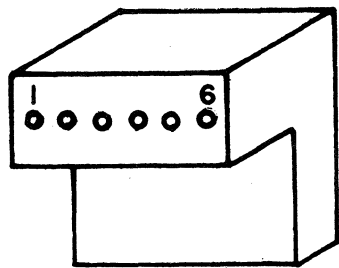


If the pulse is not present replace Q2 and R6 (10K).

- This completes the checkout of the detector.

SCALE		TITLE	
		TROUBLE SHOOTING KTC DETECTOR CIRCUIT	
 key tronic corporation SPOKANE, WASH. U.S.A.		DR.	DATE
		APP.	DATE
		DWG. NO. 36-0729	
REV.	DESCRIPTION	APP.	DATE
		SHEET 3	

SCALE		TITLE	
		TROUBLE SHOOTING KTC DETECTOR CIRCUIT	
 key tronic corporation SPOKANE, WASH. U.S.A.		DR.	DATE
		APP.	DATE
		DWG. NO. 36-0729	
REV.	DESCRIPTION	APP.	DATE
		SHEET 4	



TV Cable Assembly

256 BIT PROM P.N. 02484-004

MNEMONIC																	HB	HSYNC	VSYNC	÷ 22					
PIN	14	13	12	11	10	15	OUTPUT										9	7	6	5	4	3	2	1	Char.
BIT	A4	A3	A2	A1	A0	ENB	Word	B7	B6	B5	B4	B3	B2	B1	B0	Count									
	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	-5									
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	-10									
	0	0	0	1	0	0	2	0	1	1	0	0	0	1	1	-15									
	0	0	0	1	1	0	3	0	1	1	0	0	1	0	0	-20									
	0	0	1	0	0	0	4	0	1	1	0	0	1	0	1	-25									
	0	0	1	0	1	0	5	0	1	0	0	0	1	1	0	-30									
	0	0	1	1	0	0	6	0	1	0	0	0	1	1	1	-35									
	0	0	1	1	1	0	7	0	1	1	0	1	0	0	0	-40									
	0	1	0	0	0	0	8	0	1	1	0	1	0	0	1	-45									
	0	1	0	0	1	0	9	0	1	1	0	1	0	1	0	-50									
	0	1	0	1	0	0	10	0	1	1	0	1	0	1	1	-55									
	0	1	0	1	1	0	11	0	1	1	0	1	1	0	0	-60									
	0	1	1	0	0	0	12	0	1	1	0	1	1	0	1	-65									
	0	1	1	0	1	0	13	0	1	1	0	1	1	1	0	-70									
	0	1	1	1	0	0	14	0	1	1	0	1	1	1	1	-75									
	0	1	1	1	1	0	15	0	1	1	1	0	0	0	0	-80									
	1	0	0	0	0	0	16	1	1	0	1	0	0	0	1	-85									
	1	0	0	0	1	0	17	1	0	0	1	0	0	1	0	-90									
	1	0	0	1	0	0	18	1	0	1	1	0	0	1	1	-95									
	1	0	0	1	1	0	19	1	1	1	1	0	1	0	0	-100									
	1	0	1	0	0	0	20	1	1	1	1	0	1	0	1	-110									
	1	0	1	0	1	0	21	1	1	1	0	0	0	0	0										
	1	0	1	1	0	0	22	0	0	0	0	0	0	0	0										
	1	0	1	1	1	0	23	0	0	0	0	0	0	0	0										
	1	1	0	0	0	0	24	0	0	0	0	0	0	0	0										
	1	1	0	0	1	0	25	0	0	0	0	0	0	0	0										
	1	1	0	1	0	0	26	0	0	0	0	0	0	0	0										
	1	1	0	1	1	0	27	0	0	0	0	0	0	0	0										
	1	1	1	0	0	0	28	0	0	0	0	0	0	0	0										
	1	1	1	0	1	0	29	0	0	0	0	0	0	0	0										
	1	1	1	1	0	0	30	0	0	0	0	0	0	0	0										
	1	1	1	1	1	0	31	0	0	0	0	0	0	0	0										
	X	X	X	X	X	1	ALL	1	1	1	1	1	1	1	1										

Location A11
Character Counter

256 BIT PROM P.N. 02484-005

PIN	MNEMONIC						WORD	OUTPUT							
	14	13	12	11	10	15		9	7	6	5	÷10			
INPUT	A4	A3	A2	A1	A0	ENB	B7	B6	B5	B4	B3	B2	B1	B0	
0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	
0	0	0	0	1	0	0	1	1	0	1	0	0	1	0	
0	0	0	1	0	0	0	2	1	1	0	0	0	1	1	
0	0	0	1	1	0	0	3	1	1	0	0	1	0	0	
0	0	1	0	0	0	0	4	1	1	0	0	1	0	1	
0	0	1	0	1	0	0	5	1	1	0	0	1	1	0	
0	0	1	1	0	0	0	6	1	1	0	0	1	1	1	
0	0	1	1	1	0	0	7	1	1	0	0	1	0	0	
0	1	0	0	0	0	0	8	1	1	0	0	1	0	1	
0	1	0	0	1	0	0	9	1	0	1	1	0	0	0	
0	1	0	1	0	0	0	10	0	0	0	0	0	0	0	
0	1	0	1	1	0	0	11	0	0	0	0	0	0	0	
0	1	1	0	0	0	0	12	0	0	0	0	0	0	0	
0	1	1	0	1	0	0	13	0	0	0	0	0	0	0	
0	1	1	1	0	0	0	14	0	0	0	0	0	0	0	
0	1	1	1	1	0	0	15	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	16	0	1	0	0	0	0	1	
1	0	0	0	1	0	0	17	1	1	0	0	0	1	0	
1	0	0	1	0	0	0	18	1	1	0	0	0	1	1	
1	0	0	1	1	0	0	19	1	1	0	0	1	0	0	
1	0	1	0	0	0	0	20	1	1	0	0	1	0	1	
1	0	1	0	1	0	0	21	1	1	0	0	1	1	0	
1	0	1	1	0	0	0	22	1	1	0	0	1	1	1	
1	0	1	1	1	0	0	23	1	1	0	0	1	0	0	
1	1	0	0	0	0	0	24	1	1	0	0	1	0	1	
1	1	0	0	1	0	0	25	1	0	1	0	0	0	0	
1	1	0	1	0	0	0	26	0	0	0	0	0	0	0	
1	1	0	1	1	0	0	27	0	0	0	0	0	0	0	
1	1	1	0	0	0	0	28	0	0	0	0	0	0	0	
1	1	1	0	1	0	0	29	0	0	0	0	0	0	0	
1	1	1	1	0	0	0	30	0	0	0	0	0	0	0	
1	1	1	1	1	0	0	31	0	0	0	0	0	0	0	
X	X	X	X	X	X	1	ALL	1	1	1	1	1	1	1	

Location A8
 Slice Counter 60 Hz

256 BIT PROM P.N. 02484-006

MNEMONIC	INPUT						OUTPUT								
	14	13	12	11	10	15	9	7	6	5	4	3	2	1	
PIN	A4	A3	A2	A1	A0	ENB	WORD	B7	B6	B5	B4	B3	B2	B1	B0
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
0	0	0	0	1	0	0	1	1	1	0	0	0	0	1	0
0	0	0	1	0	0	0	2	1	1	0	0	0	0	1	1
0	0	0	1	1	0	0	3	1	1	0	1	0	1	0	0
0	0	1	0	0	0	0	4	1	1	0	1	0	1	0	1
0	0	1	0	1	0	0	5	1	1	0	1	0	1	1	0
0	0	1	1	0	0	0	6	1	1	0	0	0	1	1	1
0	0	1	1	1	0	0	7	1	1	0	0	1	0	0	0
0	1	0	0	0	0	0	8	1	1	0	0	1	0	0	1
0	1	0	0	1	0	0	9	1	0	1	0	0	0	0	0
0	1	0	1	0	0	0	10								
0	1	0	1	1	0	0	11								
0	1	1	0	0	0	0	12								
0	1	1	0	1	0	0	13								
0	1	1	1	0	0	0	14								
0	1	1	1	1	0	0	15								
1	0	0	0	0	0	0	16	0	1	0	0	0	0	0	1
1	0	0	0	1	0	0	17	1	1	0	0	0	0	1	0
1	0	0	1	0	0	0	18	1	1	0	0	0	0	1	1
1	0	0	1	1	0	0	19	1	1	0	0	0	1	0	0
1	0	1	0	0	0	0	20	1	1	0	0	0	1	0	1
1	0	1	0	1	0	0	21	1	1	0	0	0	1	1	0
1	0	1	1	0	0	0	22	1	1	0	0	0	1	1	1
1	0	1	1	1	0	0	23	1	1	0	0	1	0	0	0
1	1	0	0	0	0	0	24	1	1	0	0	1	0	0	1
1	1	0	0	1	0	0	25	1	1	0	0	1	0	1	0
1	1	0	1	0	0	0	26	1	1	0	0	1	0	1	1
1	1	0	1	1	0	0	27	1	0	1	0	0	0	0	0
1	1	1	0	0	0	0	28								
1	1	1	0	1	0	0	29								
1	1	1	1	0	0	0	30								
1	1	1	1	1	0	0	31								
X	X	X	X	X	X	1	ALL	1	1	1	1	1	1	1	1

Location A8
 Slice Counter 50 Hz

256 BIT PROM P.N. 02484-007

MNEMONIC	INPUT						OUTPUT								
	14	13	12	11	10	15	9	7	6	÷ 26					
PIN	A4	A3	A2	A1	A0	ENB	WORD	B7	B6	B5	B4	B3	B2	B1	B0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0
	0	0	0	1	0	0	2	0	0	0	0	0	0	1	1
	0	0	0	1	1	0	3	0	0	0	0	0	1	0	0
	0	0	1	0	0	0	4	0	0	0	0	0	1	0	1
	0	0	1	0	1	0	5	0	0	0	0	0	1	1	0
	0	0	1	1	0	0	6	0	0	0	0	0	1	1	1
	0	0	1	1	1	0	7	0	0	0	0	1	0	0	0
	0	1	0	0	0	0	8	0	0	0	0	1	0	0	1
	0	1	0	0	1	0	9	0	0	0	0	1	0	1	0
	0	1	0	1	0	0	10	0	0	0	0	1	0	1	1
	0	1	0	1	1	0	11	0	0	0	0	1	1	0	0
	0	1	1	0	0	0	12	0	0	0	0	1	1	0	1
	0	1	1	0	1	0	13	0	0	0	0	1	1	1	0
	0	1	1	1	0	0	14	0	0	0	0	1	1	1	1
	0	1	1	1	1	0	15	0	0	0	1	0	0	0	0
	1	0	0	0	0	0	16	0	0	0	1	0	0	0	1
	1	0	0	0	1	0	17	0	0	0	1	0	0	1	0
	1	0	0	1	0	0	18	0	0	0	1	0	0	1	1
	1	0	0	1	1	0	19	0	0	0	1	0	1	0	0
	1	0	1	0	0	0	20	0	0	0	1	0	1	0	1
	1	0	1	0	1	0	21	0	0	0	1	0	1	1	0
	1	0	1	1	0	0	22	0	0	0	1	0	1	1	1
	1	0	1	1	1	0	23	0	0	1	1	1	0	0	0
	1	1	0	0	0	0	24	1	0	0	1	1	0	0	1
	1	1	0	0	1	0	25	1	1	0	0	0	0	0	0
	1	1	0	1	0	0	26	0	0	0	0	0	0	0	0
	1	1	0	1	1	0	27	0	0	0	0	0	0	0	0
	1	1	1	0	0	0	28	0	0	0	0	0	0	0	0
	1	1	1	0	1	0	29	0	0	0	0	0	0	0	0
	1	1	1	1	0	0	30	0	0	0	0	0	0	0	0
	1	1	1	1	1	0	31	0	0	0	0	0	0	0	0
	X	X	X	X	X	1	ALL	1	1	1	1	1	1	1	1

Location C2
Line Counter 60 Hz

256 BIT PROM P.N. 02484-008

MNEMONIC	INPUT						OUTPUT								
	14	13	12	11	10	15	9	7	6	÷31					
PIN	A4	A3	A2	A1	A0	ENB	WORD	B7	B6	B5	B4	B3	B2	B1	B0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0
	0	0	0	1	0	0	2	0	0	0	0	0	0	1	1
	0	0	0	1	1	0	3	0	0	0	0	0	1	0	0
	0	0	1	0	0	0	4	0	0	0	0	0	1	0	1
	0	0	1	0	1	0	5	0	0	0	0	0	1	1	0
	0	0	1	1	0	0	6	0	0	0	0	0	1	1	1
	0	0	1	1	1	0	7	0	0	0	0	1	0	0	0
	0	1	0	0	0	0	8	0	0	0	0	1	0	0	1
	0	1	0	0	1	0	9	0	0	0	0	1	0	1	0
	0	1	0	1	0	0	10	0	0	0	0	1	0	1	1
	0	1	0	1	1	0	11	0	0	0	0	1	1	0	0
	0	1	1	0	0	0	12	0	0	0	0	1	1	0	1
	0	1	1	0	1	0	13	0	0	0	0	1	1	1	0
	0	1	1	1	0	0	14	0	0	0	0	1	1	1	1
	0	1	1	1	1	0	15	0	0	0	1	0	0	0	0
	1	0	0	0	0	0	16	0	0	0	1	0	0	0	1
	1	0	0	0	1	0	17	0	0	0	1	0	0	1	0
	1	0	0	1	0	0	18	0	0	0	1	0	0	1	1
	1	0	0	1	1	0	19	0	0	0	1	0	1	0	0
	1	0	1	0	0	0	20	0	0	0	1	0	1	0	1
	1	0	1	0	1	0	21	0	0	0	1	0	1	1	0
	1	0	1	1	0	0	22	0	0	0	1	0	1	1	1
	1	0	1	1	1	0	23	0	0	0	1	1	0	0	0
	1	1	0	0	0	0	24	1	0	0	1	0	0	0	1
	1	1	0	0	1	0	25	1	0	1	1	1	0	1	0
	1	1	0	1	0	0	26	1	0	0	1	1	0	1	1
	1	1	0	1	1	0	27	1	0	0	1	1	1	0	0
	1	1	1	0	0	0	28	1	0	0	1	1	1	0	1
	1	1	1	0	1	0	29	1	0	0	1	1	1	1	0
	1	1	1	1	0	0	30	1	1	0	0	0	0	0	0
	1	1	1	1	1	0	31	0	0	0	0	0	0	0	0
	X	X	X	X	X	1	ALL	1	1	1	1	1	1	1	1

Location C2
Line Counter 50 Hz

VISTAR-GTX
 SPARE PARTS LIST

REV.	ECO	DATE	REV.	ECO	DATE	ORIGINATED BY	INFOTON INCORPORATED			
						<i>[Signature]</i>	SECOND AVENUE, BURLINGTON, MASS.			
						CHECKED	SPARE PARTS LIST			
						<i>[Signature]</i>	VISTAR GTX			
						APPROVED	A/SPEC	03149	SHT. 1 OF 2	REV.

A. Major Items

GTX

Page 2 of 2

Dwg. No. A03149

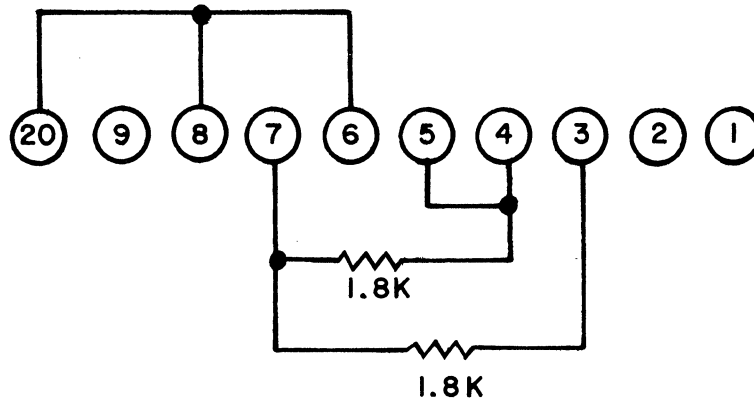
Item	Part No.	Price	Notes
T.V. Monitor	02830-001		T.V. 12 Ball Miratel
Power Transformer Assy	03034-G01		60 HZ.
Power Transformer Assy	03034-G01		50 HZ.
Logic Board Assy	02983-G01		60 HZ.
Logic Board Assy	02983-G02		50 HZ.
Keyboard	03030-G01		Standard (ASR)
Keyboard			Numeric Pad
T.V. Tube Only	99999-158		Ball Miratel (Clinton CE394-M12 P4515)
Keyboard Spares Kit	03150		
Logic Spares Kit	03151		

<u>ESTIMATED QUANTITY</u>	<u>INFOTON PN</u>	<u>KTC PN</u>	<u>DESCRIPTION</u>
1	01000-090	22-555	NE555
1	01000-001	22-7400	7400
1	01000-003	22-7404	7404
1	01000-010	22-7410	7410
1		22-7414-003	74LS14
1	01000-020	22-7442	7442
1	01000-103	22-7474-003	74LS74
1	01000-013	22-7493	7493
1		22-74121	74121
1	01000-045	22-74157	74157
1		22-3900	LM3900
1		22-4051	CD4051
1		23-03640-001	2N3640
1		23-04274-001	2N2474
1		21-04148-000	IN4148
1		21-05331-001	IN5221B

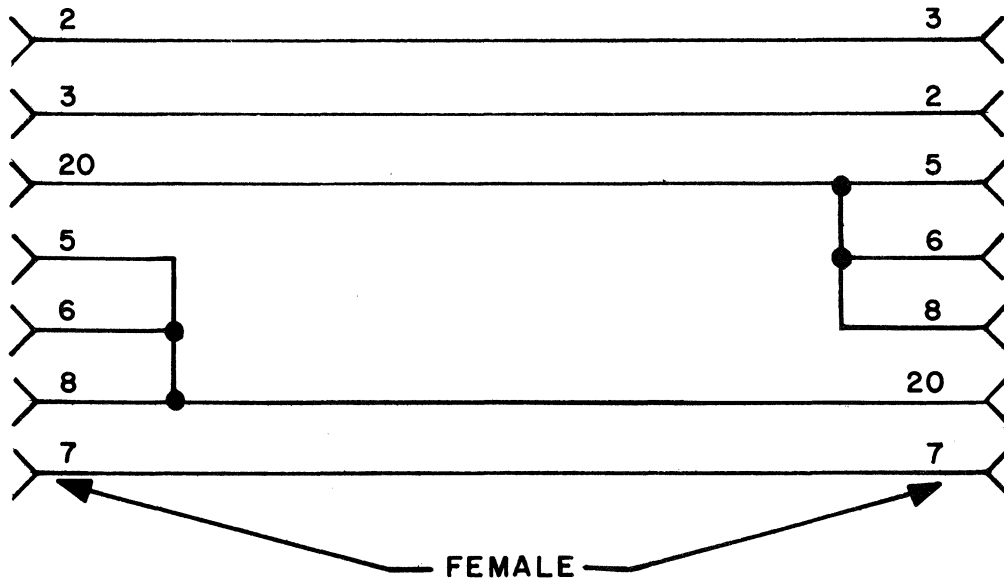
REV.	ECO	DATE	REV.	ECO	DATE	ORIGINATED BY	INFOTON INCORPORATED		
						<i>RMD</i>	SECOND AVENUE, BURLINGTON, MASS.		
						CHECKED	VISTAR GTX		
						APPROVED	KEYBOARD SPARES KIT		
						A/SPEC	03150	SHT. 1 OF 1	REV

<u>ESTIMATED QUANTITY</u>	<u>INFOTON PN</u>	<u>DESCRIPTION</u>
2	01000-001	7400
1	01000-003	7404
1	01000-004	7410
1	01000-005	7420
1	01000-006	7430
1	01000-007	7451
1	01000-012	7492
1	01000-016	74193
1	01000-025	DM 8810
2	01000-030	7407
1	01000-036	MC 1488
1	01000-042	74166
1	01000-054	DM 8242
1	01000-056	74S74
1	01000-059	74S04
1	01000-015	DM 8560
1	01000-067	MC 1489L
1	01000-068	MH 0026
1	01000-066	7486
2	01000-103	74LS74
1	01000-105	74LS163
1	01000-106	74LS162
1	01000-107	74LS174
1	01000-108	75LS175
1	03019-001	MM5307
1	01038-001	MCT2
1	02556-001	UART
1	02356-001	QUAD 80
1	01006-020	7805
1	01006-012	7812
1	01006-014	7912
1	01006-021	7815
1	02999-001	PROM
2	03018-001	2K SHIFT REGISTER
2	01007-008	IN914
1	01007-004	IN5229
1	01007-006	IN5338
1	01000-048	93S47
1	01034-014	BRIDGE RECTIFIER
1	01034-015	BRIDGE RECTIFIER
1	01006-005	TIP 30
1	01006-008	MM 3009
1	01006-009	MM 4001
1	01006-019	2N4901
1	01034-009	IN4001
2	01006-022	PN3643
2	01006-023	PN3644

REV.	ECO	DATE	REV.	ECO	DATE	ORIGINATED BY <i>WMD</i>	INFOTON INCORPORATED SECOND AVENUE, BURLINGTON, MASS.			
						CHECKED	VISTAR GTX LOGIC SPARES KIT			
						APPROVED	A/SPEC	03151	SHT. 1 OF. 1	REV.



**TURN AROUND PLUG
25 PIN CINCH CONNECTOR (FEMALE)**



**CROSS COUPLER
25 PIN CINCH CONNECTOR (FEMALE)**