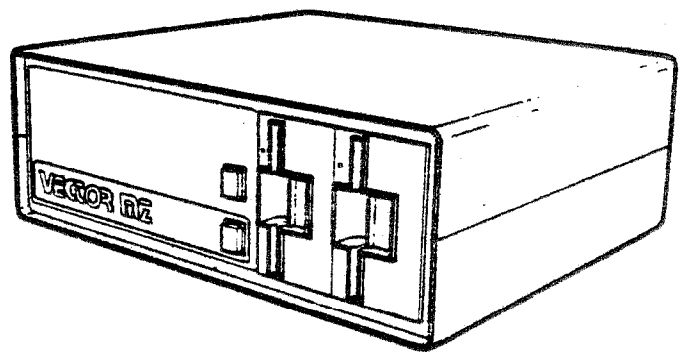
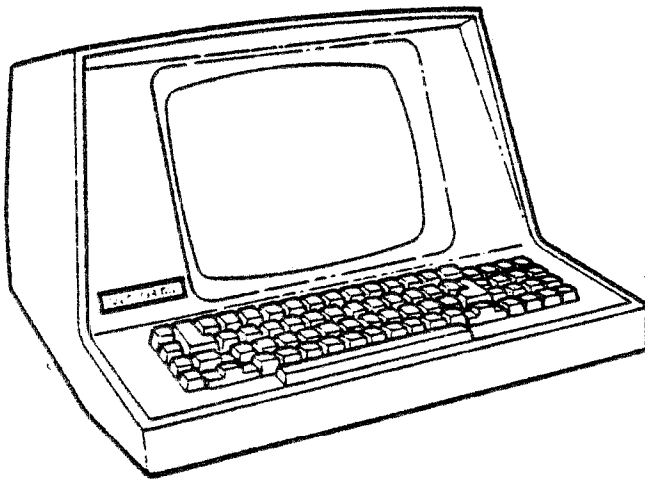


# MINDLESS TERMINAL USERS MANUAL



**VECTOR**  
VECTOR GRAPHIC, INC.



Vector Graphic Mindless Terminal Users Manual

REPAIR AGREEMENT

The Mindless Terminal sold hereunder is sold "as is", with all faults and without any warranty, either expressed or implied, including any implied warranty of fitness for intended use or merchantability. However, the above notwithstanding, VECTOR GRAPHIC, INC., will, for a period of ninety (90) days following delivery to customer, repair or replace any Mindless Terminal that is found to contain defects in materials or workmanship, provided:

1. Such defect in material or workmanship existed at the time the Mindless Terminal left the VECTOR GRAPHIC, INC., factory;
2. VECTOR GRAPHIC, INC., is given notice of the precise defect claimed within ten (10) days after its discovery;
3. The Mindless Terminal is promptly returned to VECTOR GRAPHIC, INC., at customer's expense, for examination by VECTOR GRAPHIC, INC., to confirm the alleged defect, and for subsequent repair or replacement if found to be in order.

Repair, replacement or correction of any defects in material or workmanship which are discovered after expiration of the period set forth above will be performed by VECTOR GRAPHIC, INC., at Buyer's expense, provided the Mindless Terminal is returned, also at Buyer's expense, to VECTOR GRAPHIC, INC., for such repair, replacement or correction. In performing any repair, replacement or correction after expiration of the period set forth above, Buyer will be charged in addition to the cost of parts the then-current VECTOR GRAPHIC, INC., repair rate. At the present time the applicable rate is \$35.00 for the first hour, and \$18.00 per hour for every hour of work required thereafter. Prior to commencing any repair, replacement or correction of defects in material or workmanship discovered after expiration of the period for no-cost-to-Buyer repairs, VECTOR GRAPHIC, INC., will submit to Buyer a written estimate of the expected charges, and VECTOR GRAPHIC, INC., will not commence repair until such time as the written estimate of charges has been returned by Buyer to VECTOR GRAPHIC, INC., signed by duly authorized representative authorizing VECTOR GRAPHIC, INC., to commence with the repair work involved. VECTOR GRAPHIC, INC., shall have no obligation to repair, replace or correct any Mindless Terminal until the written estimate has been returned with approval to proceed, and VECTOR GRAPHIC, INC., may at its option also require prepayment of the estimated repair charges prior to commencing work.

Repair Agreement void if the enclosed card is not returned to VECTOR GRAPHIC, INC. within ten (10) days of end consumer purchase.



# Vector Graphic Mindless Terminal Users Manual

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# Vector Graphic Mindless Terminal Users Manual

## I. INTRODUCTION

### 1.1 SPECIFICATIONS

|                        |  |
|------------------------|--|
| Screen Size            | 12-inch diagonal CRT   |
| Resolution             | 900 lines at center<br>750 lines at borders  |
| Bandwidth              | 12 MHz   |
| Video Interface        | Separate TTL video and sync  |
| Compatibility of Video | Compatible with Vector Graphic Flashwriters<br>I and II alphanumeric video display<br>boards and most other alphanumeric<br>video display boards<br>Not compatible with Vector Graphic<br>High Resolution Graphics board |
| Keyboard               | Custom 60 keys, typewriter format, 12-key<br>numeric pad, ESC, DEL, ALL CAPS<br>CTRL, LF, and cursor movement keys   |
| Keyboard Electronics   | Capacitance key switches and LSI N-channel<br>MOS encoding electronics   |
| External Controls      | Contrast   |
| Internal Controls      | Vertical hold<br>Height<br>Vertical linearity<br>Vertical centering<br>Focus<br>Brightness<br>Horizontal centering   |
| Power                  | +16V @ 1.15A<br>+8V @ 0.25A  |
| Power Source           | +16V and +8V from mainframe power supply   |
| Cables                 | Purchased separately: cable to connect<br>terminal to mainframe and to<br>connect inside of mainframe to<br>power, to keyboard port, and to<br>video board   |

1.2 DESCRIPTION OF THE MINDLESS TERMINAL

The Vector Graphic Mindless Terminal is a high quality terminal that, particularly when used with Vector Graphic video display boards, provides the user with features and versatility not available in other terminals.

The CRT monitor has up to 900 lines resolution and 12 MHz bandwidth. All elements of the display are adjustable and adjustment procedures may be found later in this manual.

The keyboard is a high reliability unit with capacitive type switches. A numeric keypad and lighted shift lock and ALL CAPS lock keys are standard.

The Mindless Terminal is designed to receive power (+8V and +16V) from the computer power supply. Cables are available (ordered separately) which make these connections quite simple to implement.

The Mindless Terminal requires that the video information be provided at TTL levels as separate video, horizontal sync and vertical sync. This is provided by Vector Graphic alphanumeric video boards.

1.3 DESCRIPTION OF THE MANUAL

This manual provides a complete Users Guide for the Mindless Terminal, including detailed explanations of all the external and internal adjustments possible, and how to connect the terminal to your computer. Complete schematics as well as ASCII and keyboard code charts are included.



II. USERS GUIDE

2.1 EXTERNAL CONTROLS

Operation of the Mindless Terminal is very straightforward. The power to the Mindless Terminal is provided by the computer power supply and is thus switched on and off by the computer power switch.

The only external control is the contrast control located on the rear panel of the Mindless Terminal. This should be adjusted to suit personal preference and ambient light level.

For other adjustments see section on CRT monitor adjustments later in this manual.

2.2 INSTALLATION

In addition to the Mindless Terminal, you must order separately the VMTC cable set, which includes:

1. A 4-foot 25-conductor flat ribbon cable used to interconnect the Mindless Terminal to the computer interface.
2. A signal/power cable assembly, used inside the mainframe chassis, to connect the terminal to power supply and also provide the video signals and receive the keyboard signals.

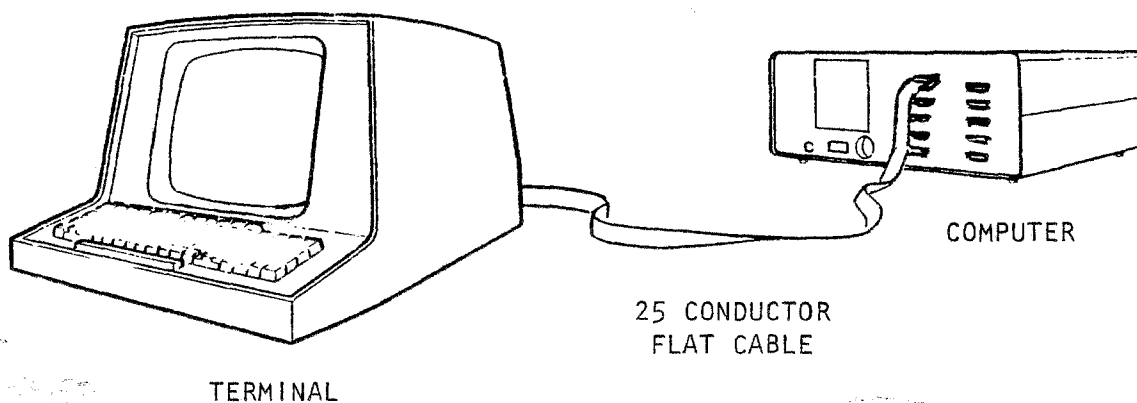


FIGURE 1

The following procedure describes how to connect the Mindless Terminal to Vector Graphic systems (such as the Vector MZ) utilizing a Vector Graphic Flashwriter Video Board and the above mentioned VMTC cable. Wire lists are provided for the user to fabricate custom cables for connection to non-standard devices. Please note that due to the large variations in manufacturer's products, it is impossible for Vector Graphic to provide interface cables for anything other than Vector Graphic products.

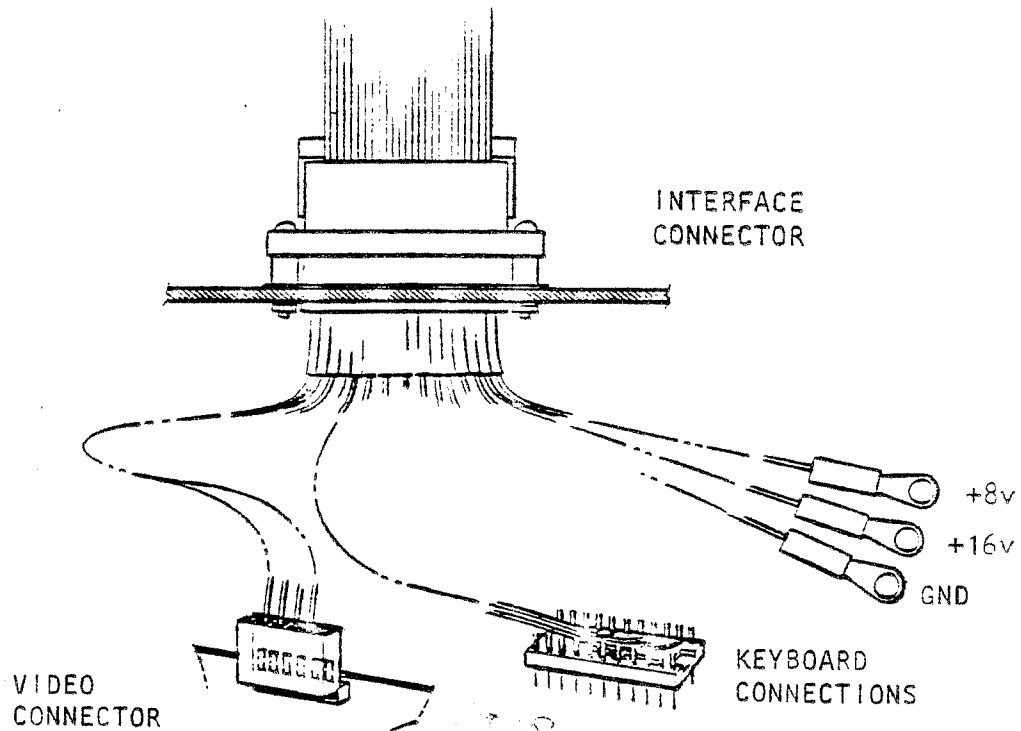


FIGURE 2

1. Before proceeding, familiarize yourself with the VMTc cables and this manual.

Note that the internal cable is divided into four parts: video connector; keyboard connector; power supply connections; and interface connector.

2. Mount the DB-25S Interface Connector in a convenient cutout on the computer chassis backpanel using the hardware supplied.
3. Connect the power terminal lug marked +8V to the +8V terminal on the large filter capacitor (see Figure 3). Verify all of the other terminal lugs are in place and tightened securely.
4. In a likewise manner connect the terminal lugs marked +16V and GND to their respective connection points as shown in Figure 3.

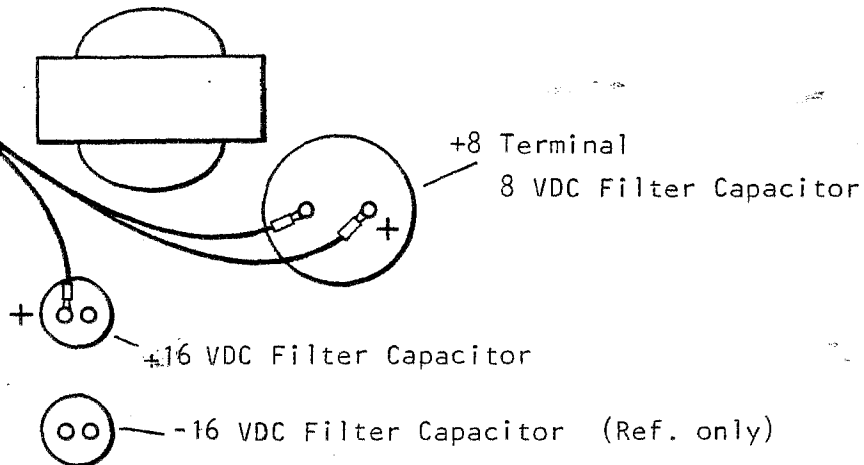


FIGURE 3

**WARNING** - It is very important that the power connections are made correctly. Failure to provide correct power may result in equipment damage.

5. Install the video board in a motherboard slot near the rear of the computer chassis to permit the video and keyboard cables to be connected to it conveniently.
6. Plug in the 24 pin DIP plug connector into the keyboard connector socket on the video board. Note correct pin orientation as shown in Figure 4.

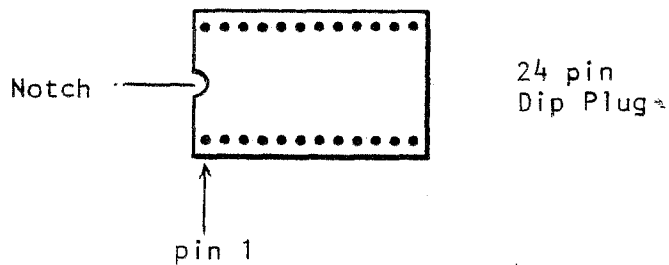


FIGURE 4

7. Connect video connector (MOLEX 6 PIN PLUG) to video output connector on video board. See figure 5.

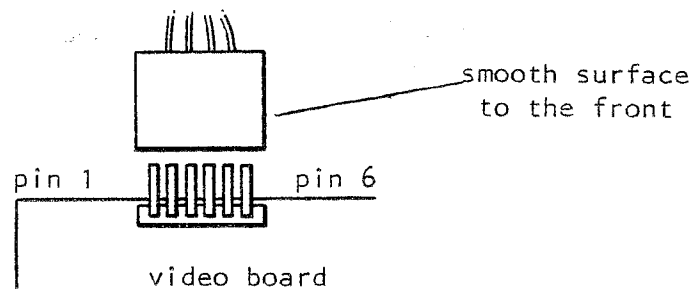


FIGURE 5

8. Check all connections; verify all boards are plugged into the motherboard. Connect the 25-conductor flat cable between the Mindless Terminal and the interface connector on the mainframe as shown in Figure 1. This completes the hardware connection of the Mindless Terminal.

2.3 CABLES

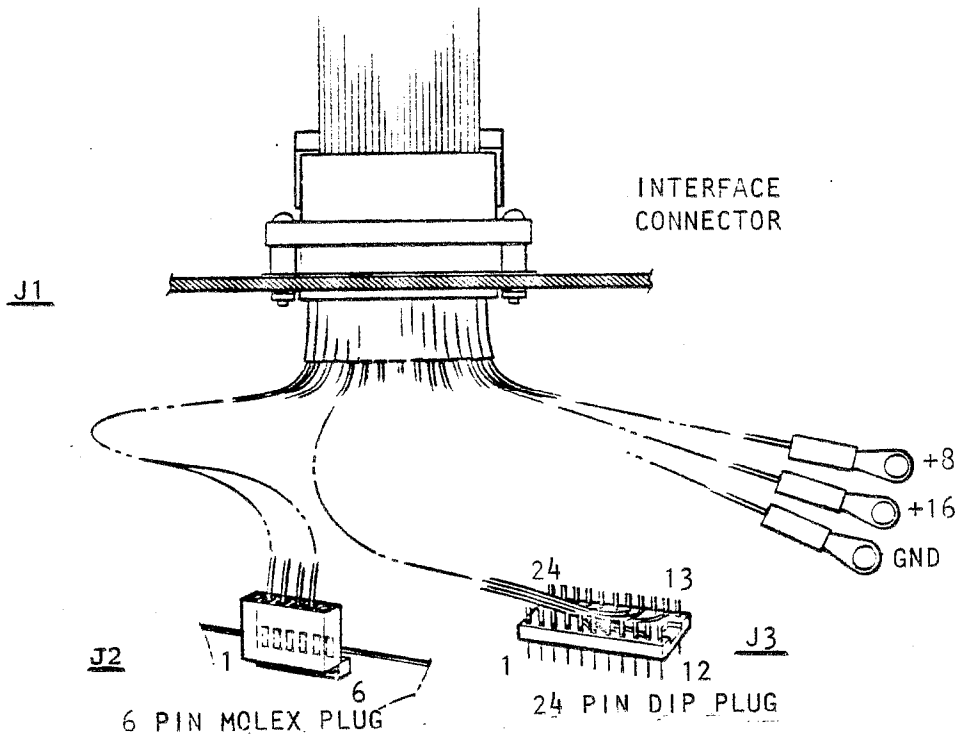
The following information is provided to help users connect the Mindless Terminal in non-standard situations. The "Interface Board" refers to the small PC board at the rear and inside the Mindless Terminal.

INTERCONNECT CABLE - CRT MONITOR / INTERFACE BOARD

| <u>MONITOR</u><br><u>10 PIN EDGE</u> | <u>INTERFACE BOARD</u><br><u>16 PIN DIP</u> | <u>SIGNAL</u> |
|--------------------------------------|---|---------------|
| 1                                    | 15, 16                                      | HORZ GND      |
| 5                                    | 12, 13, 14                                  | GND           |
| 6                                    | 6   | H SYNC        |
| 7                                    | 1, 2, 3, 4                                  | +12 VDC       |
| 8                                    | 7   | VIDEO         |
| 9                                    | 5   | V SYNC        |
| 10                                   | 9, 10, 11                                   | VIDEO GND     |

INTERCONNECT CABLE - KEYBOARD / INTERFACE BOARD

| <u>INTERFACE BOARD</u><br><u>16 PIN DIP</u> | <u>KEYBOARD</u><br><u>DUAL TEN PIN EDGE</u> | <u>SIGNAL</u> |
|---|---|---------------|
| 1   | C   | GND           |
| 2   | C   | GND           |
| 3   | 5   | DATA 8        |
| 4   | 6   | DATA 7        |
| 5   | 1   | DATA 4        |
| 6   | 4   | DATA 1        |
| 7   | N/C   | <u>PRESET</u> |
| 8   | 2   | DATA 3        |
| 9   | 10  | -V REG        |
| 10  | E   | STROBE        |
| 11  | D   | GND           |
| 12  | 7   | DATA 6        |
| 13  | 3   | DATA 2        |
| 14  | 8   | DATA 5        |
| 15  | 9   | VCC           |
| 16  | 9   | VCC           |



INTERNAL PORTION OF VMTC

| <u>FROM</u> | <u>TO</u> | <u>WIRE<br/>GAUGE</u> |       | <u>SIGNAL</u> |
|-------------|-----------|-----------------------|-------|---------------|
| J2-2        | J1-14     | 22                    | VIDEO | GROUND        |
| -3          | -15       |                       |       | TTL VIDEO     |
| -4          | -16       |                       |       | TTL HSYNC     |
| -5          | -17       |                       |       | TTL VSYNC     |
| J3-7        | J1-20     | 22                    | KYBD  | DATA 1        |
| -8          | -21       |                       |       | DATA 3        |
| -9          | -22       |                       |       | -V REG        |
| -11         | -24       |                       |       | PRESET        |
| -12         | -25       |                       |       | STROBE        |
| -13         | -12       |                       |       | GND           |
| -14         | -11       |                       |       | DATA 4        |
| -15         | -10       |                       |       | DATA 6        |
| -16         | -9        |                       |       | DATA 7        |
| -17         | -8        |                       |       | DATA 2        |
| -19         | -6        |                       |       | DATA 8        |
| -20         | -5        |                       |       | DATA 5        |
| +8V         | J1-1      | 18                    | POWER | +8V VDC UNREG |
| +16         | -18       |                       |       | +16 VDC UNREG |
| +16         | -19       |                       |       | +16 VDC UNREG |
| GND         | -2        |                       |       | GROUND        |
| GND         | -3        |                       |       | GROUND        |

2.4 KEYBOARD CODE CONVERSION

Due to limitations in the keyboard encoder chip, it was not possible to provide several codes, in particular, those for the following characters:

[ (5B)  
] (5D)  
\ (5C)  
~ (7E)

The conversion can be done in software, as the [] key generates unique codes for the four modes: unshifted, shifted, control, control shift. This conversion is done in the Version 3 Monitor PROM (purchased separately from Vector Graphic), which is the companion PROM for this keyboard. Furthermore this PROM version accepts the codes generated by the cursor control keys. Order Monitor 3 EV for the 64 X 16 Flashwriter I video board, and Monitor 3 EV-II for the 80 X 24 Flashwriter II video board.

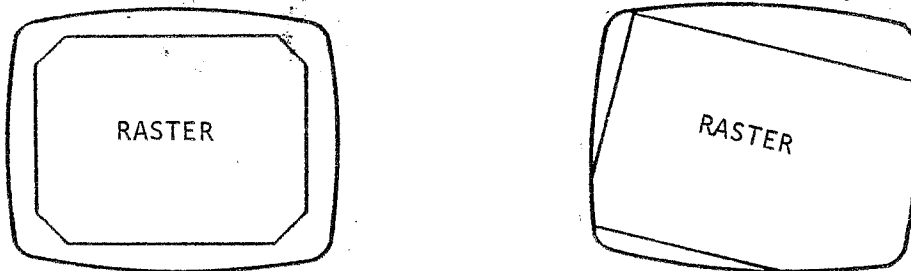


2.5 ADJUSTING PROCEDURE FOR CRT MONITOR

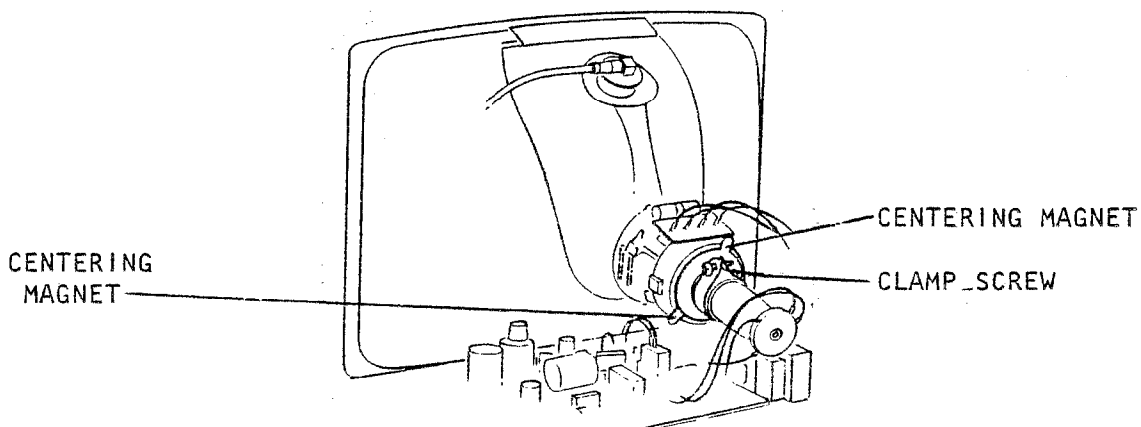
Normally, no adjustment of the CRT screen should be required as it is adjusted at the factory. However, if adjustment is required for any reason, the following explanation of the functions of the various adjustments is provided. All the adjustments except the last two must be made inside the Mindless Terminal, requiring you to unscrew and remove the shell.

It is assumed that the terminal is connected properly to the computer. A display which can be used to check adjustment is obtained by depressing RESET on the mainframe front panel to call up the Monitor Executive, then, for the Flashwriter I board, by typing Z D400 D7FF 06, or for the Flashwriter II video board by typing Z D000 D7FF 38.

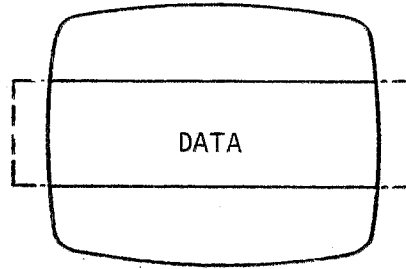
1. If the deflection yoke is not firmly against the bell of the tube, shadows will be caused at the corners of the display as shown below. If the yoke is slightly twisted, the display will also be twisted.



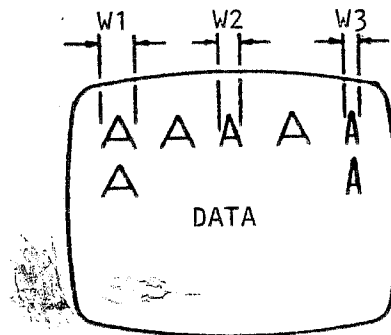
Adjustment for this is made by first loosening the clamp screw holding the yoke and positioning it properly. **CAUTION:** DO NOT TOUCH ANY OF THE ELECTRICAL TERMINALS ON THE TUBE OR YOKE, AS HIGH VOLTAGES ARE PRESENT. Tighten the clamp gently when finished.



2. If the width of the display is improper, adjust the core of the width coil (L103) on the P.C. board.

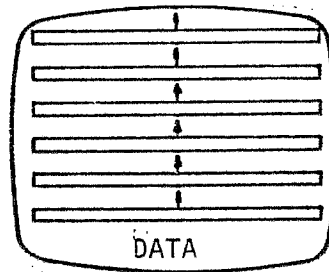


3. When data linearity in the horizontal direction is not good:



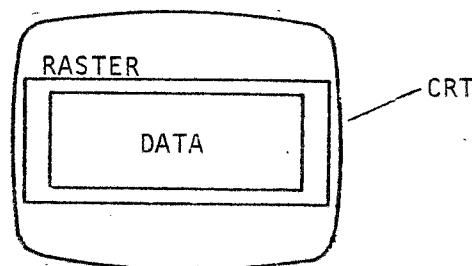
Turn the core of the horizontal linearity coil (L102) so that  $W_1=W_2=W_3$ .

4. When data runs in the vertical direction:



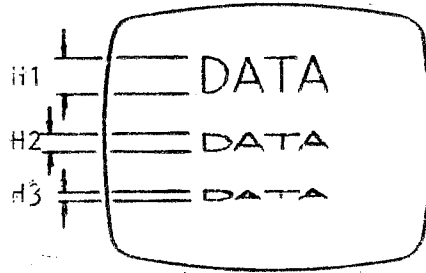
Turn the V. HOLD pot with a screwdriver and stop data display.

5. When the vertical size (height) of data is not proper:



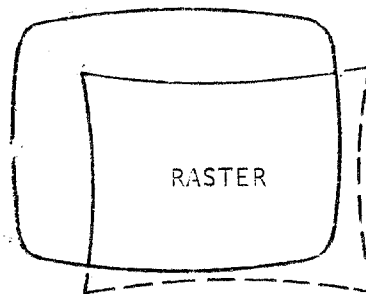
Turn the HEIGHT pot (R110) with a screwdriver to adjust the height as required.

6. When vertical linearity of data is not good:



Turn the V. LIN pot with a screwdriver so that  $H_1=H_2=H_3$ .

7. Raster deviation:



Turn the two centering magnets so that the raster is centered in the vertical direction.

8. When data is not focused satisfactorily, turn the FOCUS pot (R122) with a screwdriver so that focusing of the entire picture is optimum.
9. The correct adjustment of the brightness potentiometer R117 is when the background raster is just barely extinguished (black). If you can see faint lines zig-zagging across the screen in the background, turn the brightness down.
10. The contrast pot on the rear of the chassis should then be set to the minimum consistent with good legibility of the display. This will depend on the ambient light level and personal preference.

11. The horizontal positioning is controlled by both the video CENT (A103) control and also the position control on the upper left hand corner of the Flashwriter board. The latter is the preferred adjustment.

## ASCII CODE CHART

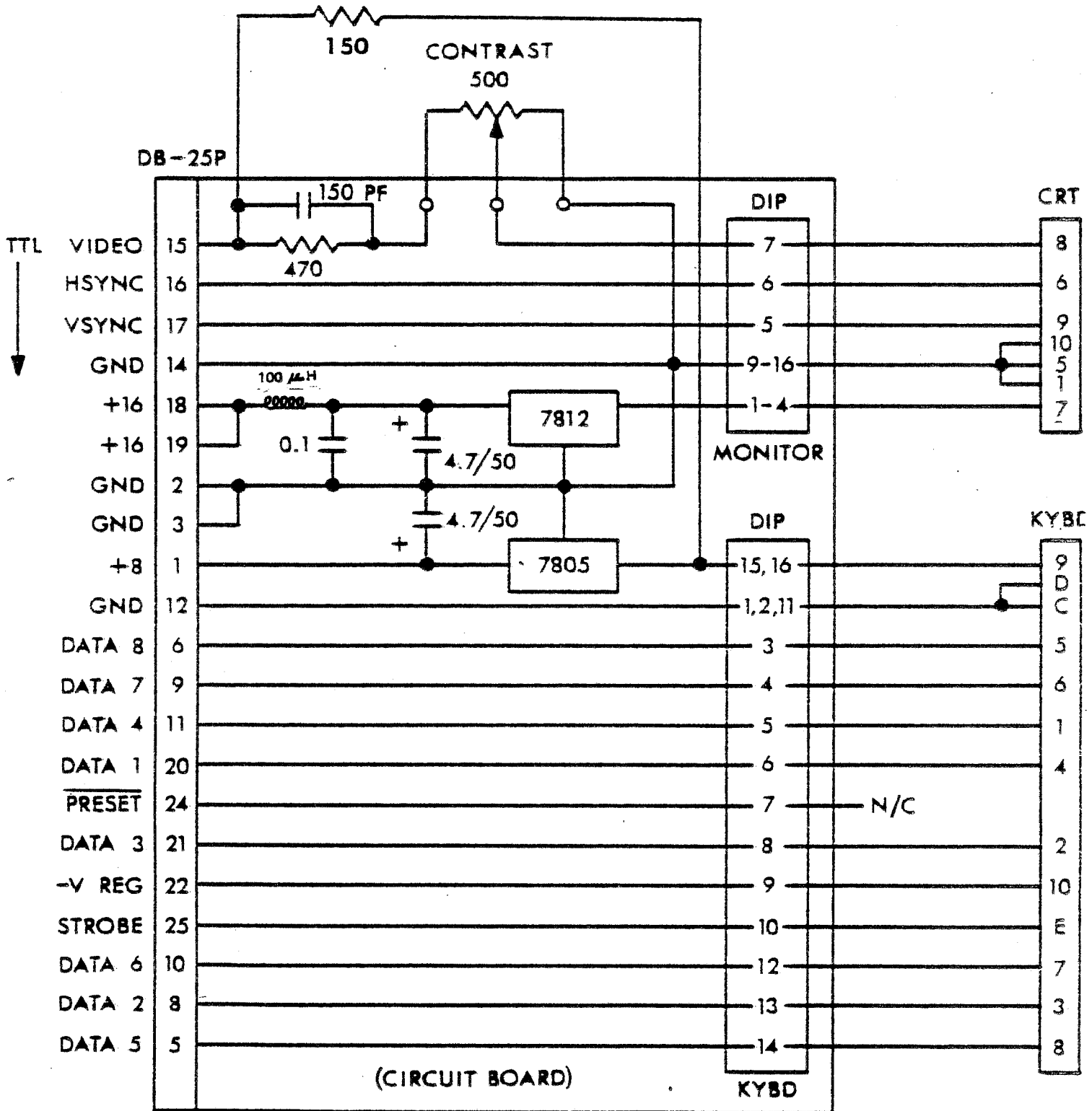
1968 ASCII: American Standard Code for Information Interchange. Standard No. X3.4-1968 of the American National Standards Institute.

| Bits |      | b7 → | 0    | 0        | 0   | 0     | 1  | 1 | 1 | 1 |     |
|------|------|------|------|----------|-----|-------|----|---|---|---|-----|
|      |      | b6 → | 0    | 0        | 1   | 1     | 0  | 0 | 1 | 1 |     |
|      |      | b5 → | 0    | 1        | 0   | 1     | 0  | 1 | 0 | 1 |     |
| b4 ↓ | b3 ↓ | b2 ↓ | b1 ↓ | COLUMN → |     | +ROW+ |    |   |   |   |     |
|      |      |      |      | 0        | 1   | 2     | 3  | 4 | 5 | 6 | 7   |
| 0    | 0    | 0    | 0    | 0        | NUL | DLE   | SP | @ | P | ' | P   |
| 0    | 0    | 0    | 1    | 1        | SOH | DC1   | !  | A | Q | a | q   |
| 0    | 0    | 1    | 0    | 2        | STX | DC2   | "  | B | R | b | r   |
| 0    | 0    | 1    | 1    | 3        | ETX | DC3   | #  | C | S | c | s   |
| 0    | 1    | 0    | 0    | 4        | EOT | DC4   | \$ | D | T | d | t   |
| 0    | 1    | 0    | 1    | 5        | ENQ | NAK   | %  | E | U | e | u   |
| 0    | 1    | 1    | 0    | 6        | ACK | SYN   | &  | F | V | f | v   |
| 0    | 1    | 1    | 1    | 7        | BEL | ETB   | '  | G | W | g | w   |
| 1    | 0    | 0    | 0    | 8        | BS  | CAN   | (  | H | X | h | x   |
| 1    | 0    | 0    | 1    | 9        | HT  | EM    | )  | 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 |

All characters in these two columns and SP (Space) are non-printing.

When UPPER CASE ONLY is used, shaded lower case characters (columns 6 & 7) from keyboard are converted to their upper case equivalents (columns 4 & 5) before being printed or transmitted.



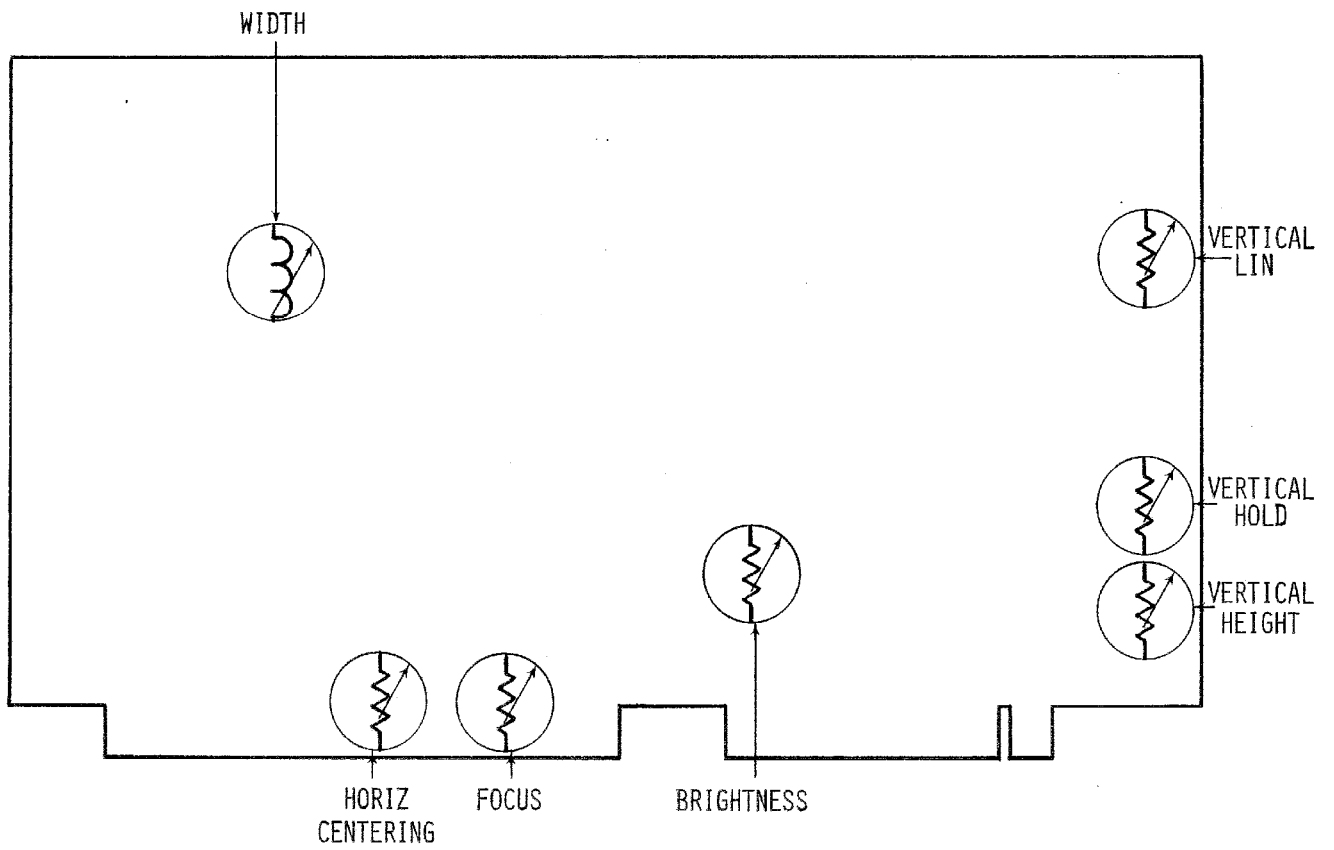


INTERFACE BOARD AT REAR OF MINDLESS TERMINAL - SCHEMATIC





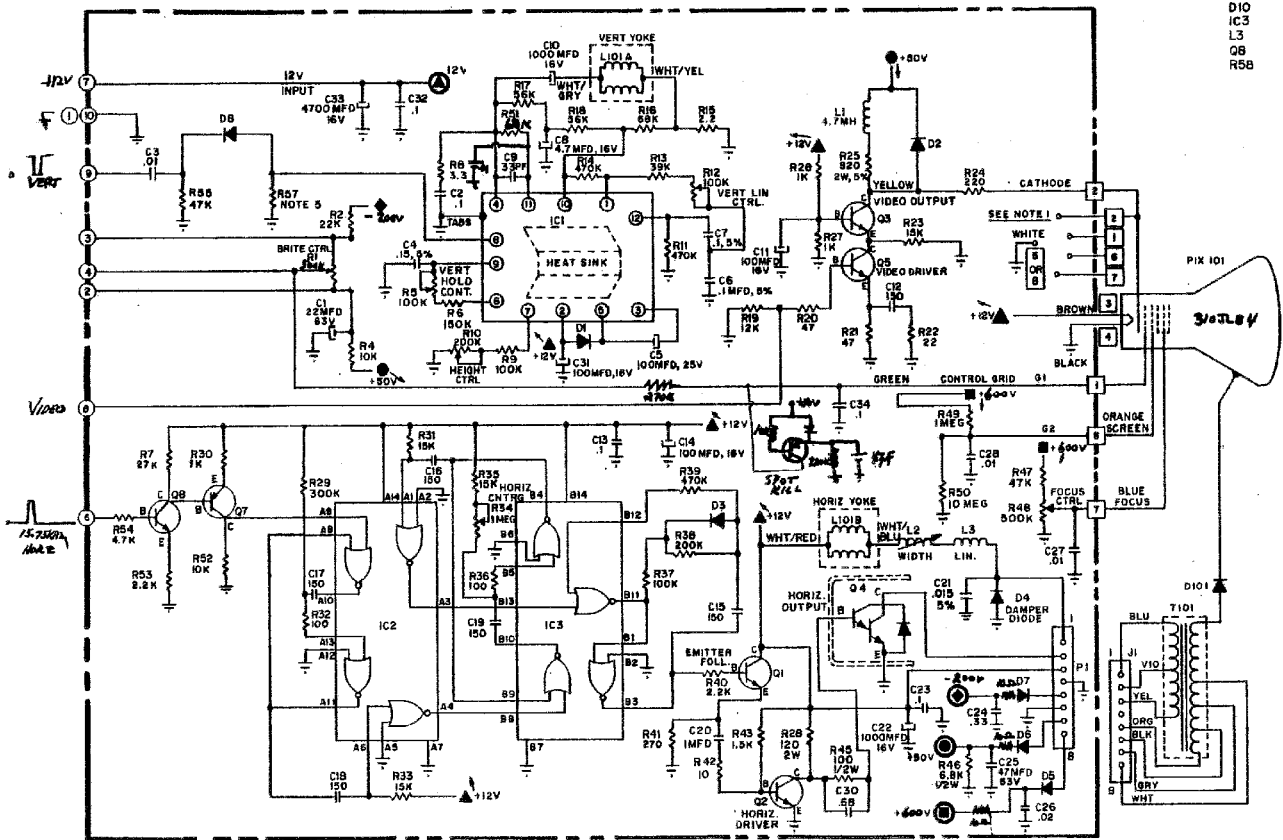
# Physical Position of Controls on P.C. Board





# 12" MONITOR KIT SCHEMATIC

LAST N<sup>o</sup>'S USED  
 C34 L101A  
 D10 L101B  
 IC3 L3  
 Q8 T101  
 R58



**NOTES:**

1. PIN 5 OF PIX SOCKET IS GROUND. RETURN FOR SPARK GAPS TO PINS 1,2,6 AND 7.
2. SOURCE VOLTAGES. SYMBOL CIRCLED. ARROWS POINT TO SOURCE.
3. EDGE CONNECTOR NUMBERS INDICATED IN CIRCLES. PIX SOCKET PIN CONNECTIONS IN RECTANGLES.

5. R57 REQUIRED WITH TD10170S BUT NOT WITH TD10170.
6. CAPACITANCE VALUES OF 10 OR LESS ARE IN MICROFARADS, ABOVE 1 IN PICOFARADS, UNLESS OTHERWISE INDICATED.

WELLS GARDNER  
 SCHEMATIC FOR  
 VECTOR GRAPHICS



# SPECIFICATIONS

**MODEL CIQ-9  
MODEL CIQ-12**

**9" and 12" CRT  
DISPLAY  
MONITOR**

 **C. ITOH ELECTRONICS, INC.**

5301 Beethoven Street Los Angeles, Calif. 90066  
Telephone: (213) 390-7778 Telex: (WU) 65-2451

280 Park Avenue, New York, NY 10017  
Telephone: (212) 682-0420 Telex (WU) 12-5059



# SPECIFICATIONS

## GENERAL

The Model CIQ-12 and CIQ-9 are a 12-inch and 9 inch CRT Display Unit is to be used as an alpha-numeric display device. The CRT will be scanned in conventional TV fashion.

All input signal connections to the monitor will be via a single 10 pin card edge connector, and comprise:

Video  
Horizontal Drive  
Vertical Sync

## RATING

- |                                     |   |
|-------------------------------------|---|
| 1. Video Input                      | 4.0Vp-p $\pm$ 1.5V positive going pulse   |
| 2. Video Input Impedance            | More than 1 K $\Omega$  |
| 3. Horizontal Drive                 | 4.0 Vp-p $\pm$ 1.5V positive going pulse<br>Pulse width: 4 to 40 $\mu$ sec.<br>Frequency: 15.75 KHz $\pm$ 500 Hz  |
| 4. Horizontal Drive Input Impedance | More than 470 $\Omega$  |
| 5. Vertical Sync.                   | 4.0 Vp-p $\pm$ 1.5V negative going pulse<br>Pulse width: 300 $\mu$ sec. to 1.4 msec.<br>Frequency: 55 Hz $\pm$ 8 Hz   |
| 6. Vertical Sync Input Impedance    | More than K $\Omega$  |
| 7. Signal Level                     | Low: 0 $\pm$ 0.4V<br>High: 4 $\pm$ 1.5V   |
| 8. Power Supply                     | DC +15V $\pm$ 0.2V (Less than 1.2A)<br>or DC +12V $\pm$ 0.2V (Less than 1.5A)<br>or AC 115/230V $\pm$ 10%, 50/60 Hz (Option)<br>Input connector for AC power supply (customer supplied).<br>Housing: AMP1-480705-0 or equivalent<br>Contact pin: AMP 350690-1 or equivalent |





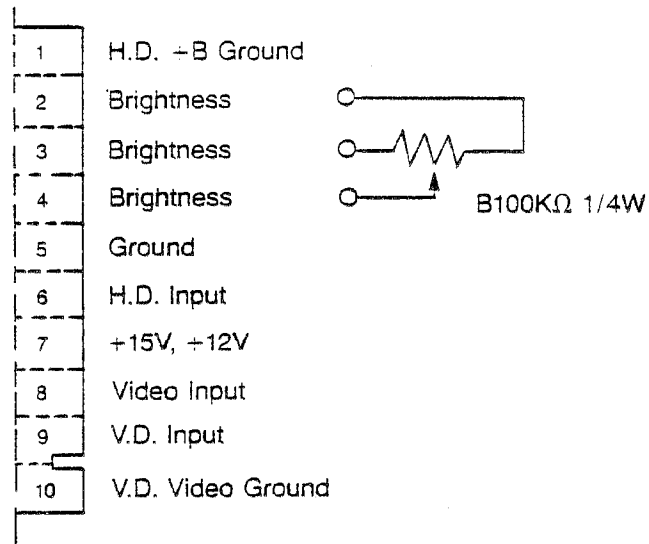
|                        |  |                      |
|------------------------|--|----------------------|
| 9. Ambient Temperature | 0°C to 55°C (Operating)<br>-30°C to 65°C (Storage) |                      |
| 10. Humidity           | 10 to 90% (Non-condensing)                         |                      |
| 11. C.R.T.             | 12 and 9-inch, 90° deflection 20°                  |                      |
| 12. X-ray Radiation    | Less than 0.5mR/H                                  |                      |
| 13. Weight             | CIQ-12   |                      |
|                        | Approx. 9.9 lbs (4.5 Kg) without AC power unit     |                      |
|                        | AC power unit Approx. 3.3 lbs. (1.5 Kg)            |                      |
| 13. Weight             | CIQ-9  |                      |
|                        | Approx. 6.2 lbs. (2.8 Kg)                          |                      |
|                        |  |                      |
| 14. Dimensions         | Based on the drawing of External View.             |                      |
| 15. Inside Controls    | Sub-brightness                                     | Horizontal Centering |
|                        | Focusing   | Horizontal Size      |
|                        | Vertical Frequency                                 | Horizontal Linearity |
|                        | Vertical Size                                      | Vertical Linearity   |
| 16. Phosphor           | P4 —Standard                                       |                      |
|                        | P31—Option   |                      |
|                        | P39—Option   |                      |

## CHARACTERISTICS

|                                    |   |
|------------------------------------|---|
| 1. Video Band Width                | 16MHz ± 3dB   |
| 2. Rise Time And Fall Time         | 35 nsec or less (linear mode)   |
| 3. Storage Time                    | 15 nsec or less (linear mode)   |
| 4. Horizontal Retrace Time         | Approx. 8.5 μsec.   |
| 5. Vertical Retrace Time           | 0.9 msec. or less   |
| 6. Resolution                      | CIQ-12  |
|                                    | Center: 850 TV lines (mean)   |
|                                    | Corner: 700 TV lines (mean)   |
|                                    | CIQ-9   |
|                                    | Center: 800 TV lines (mean)   |
|                                    | Corner: 650 TV lines (mean)   |
| 7. Distortion and Linearity Offset | Within limit equivalent to 2% measured with EIA's ball chart<br>(with PC board mounted according to manufacturer's specification) |
| 8. SN Ratio                        | 40dB or more (80% area of CRT screen)   |
| 9. MTBF                            | More than 20,000 H (without CRT)  |
| 10. Performance range              | 0°C to 40°C   |



## 1. Connection of Connector



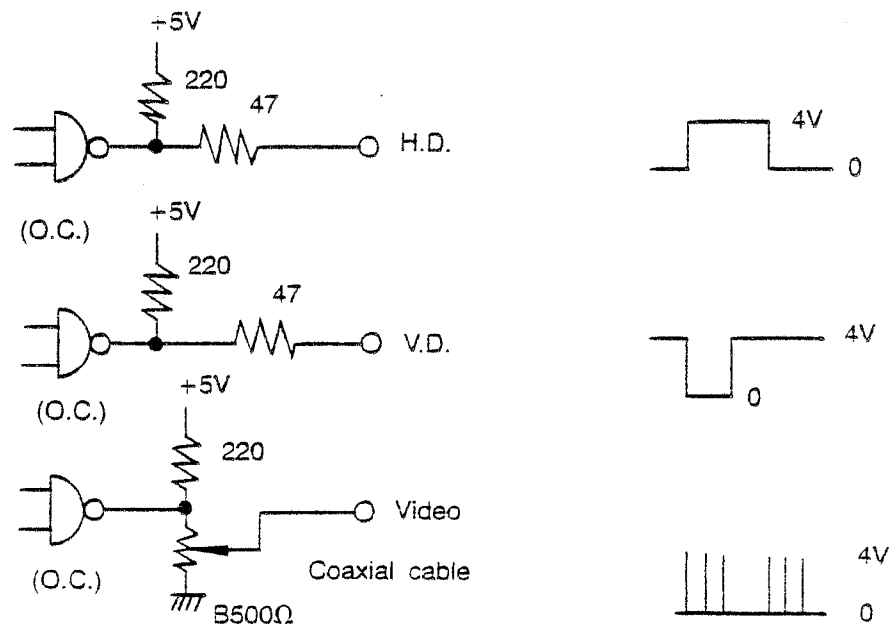
## 2. Input Connector

### Card edge connector

- Viking # 2VK10S/1-2
- Amphenol # 225-21031-101
- Cinch # 1-039-0119
- Hirose # CR7E-20DA-3.96E
- Or Equivalent

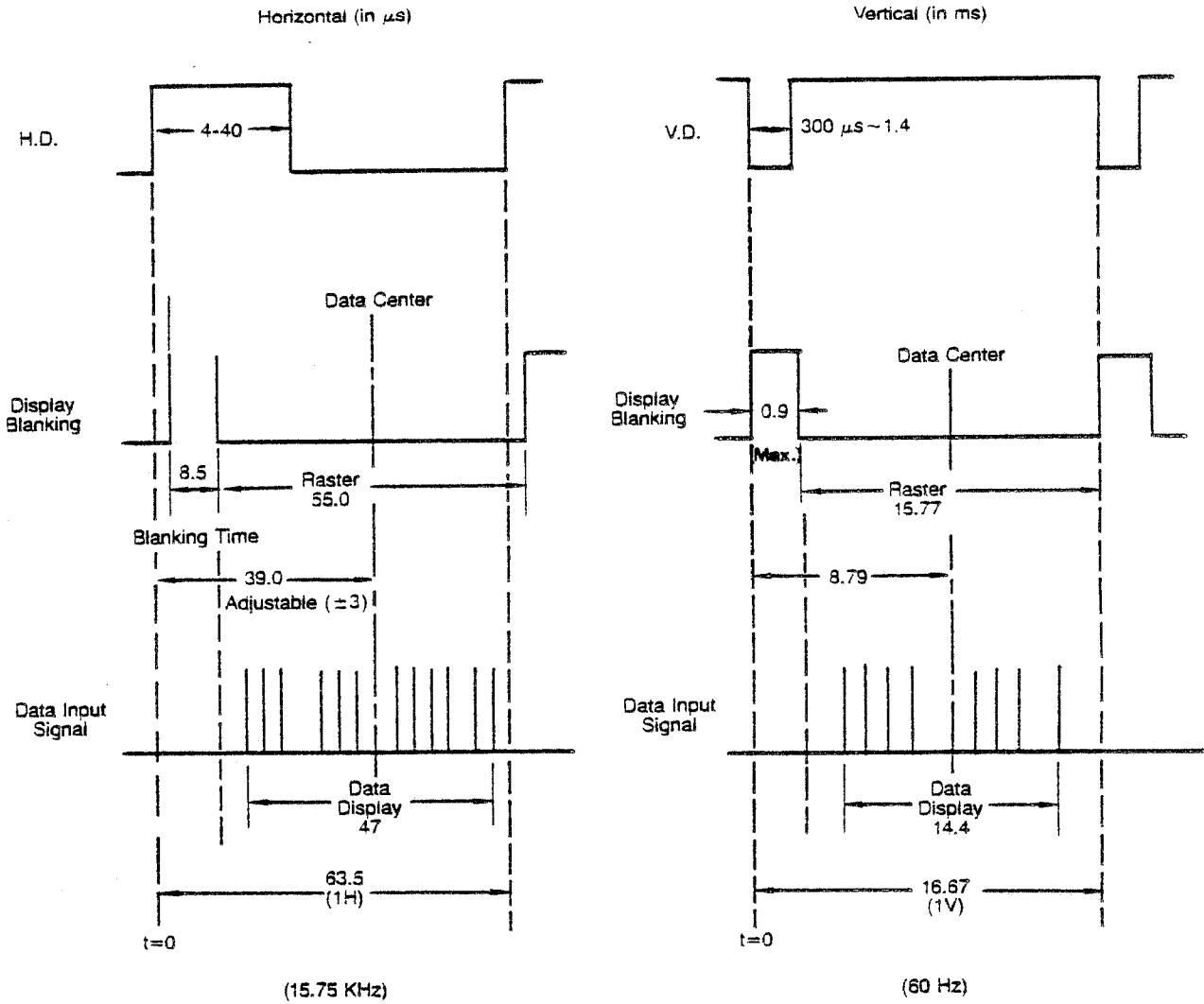
Polarizing key shall be inserted between 9 pin and 10 pin.

## 3. C.P.U. Output Circuit

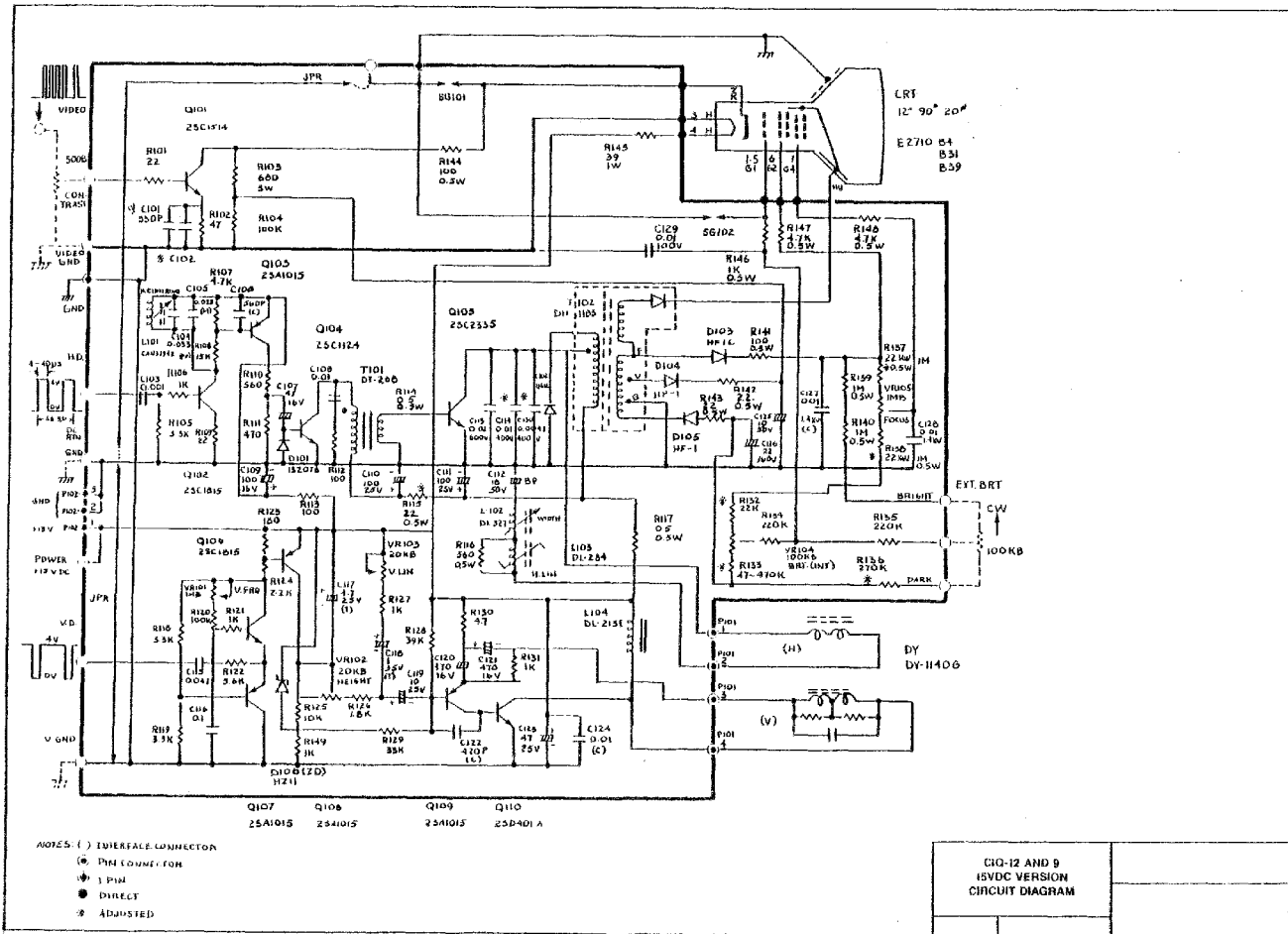




# TIMING CHART (Standard Type)

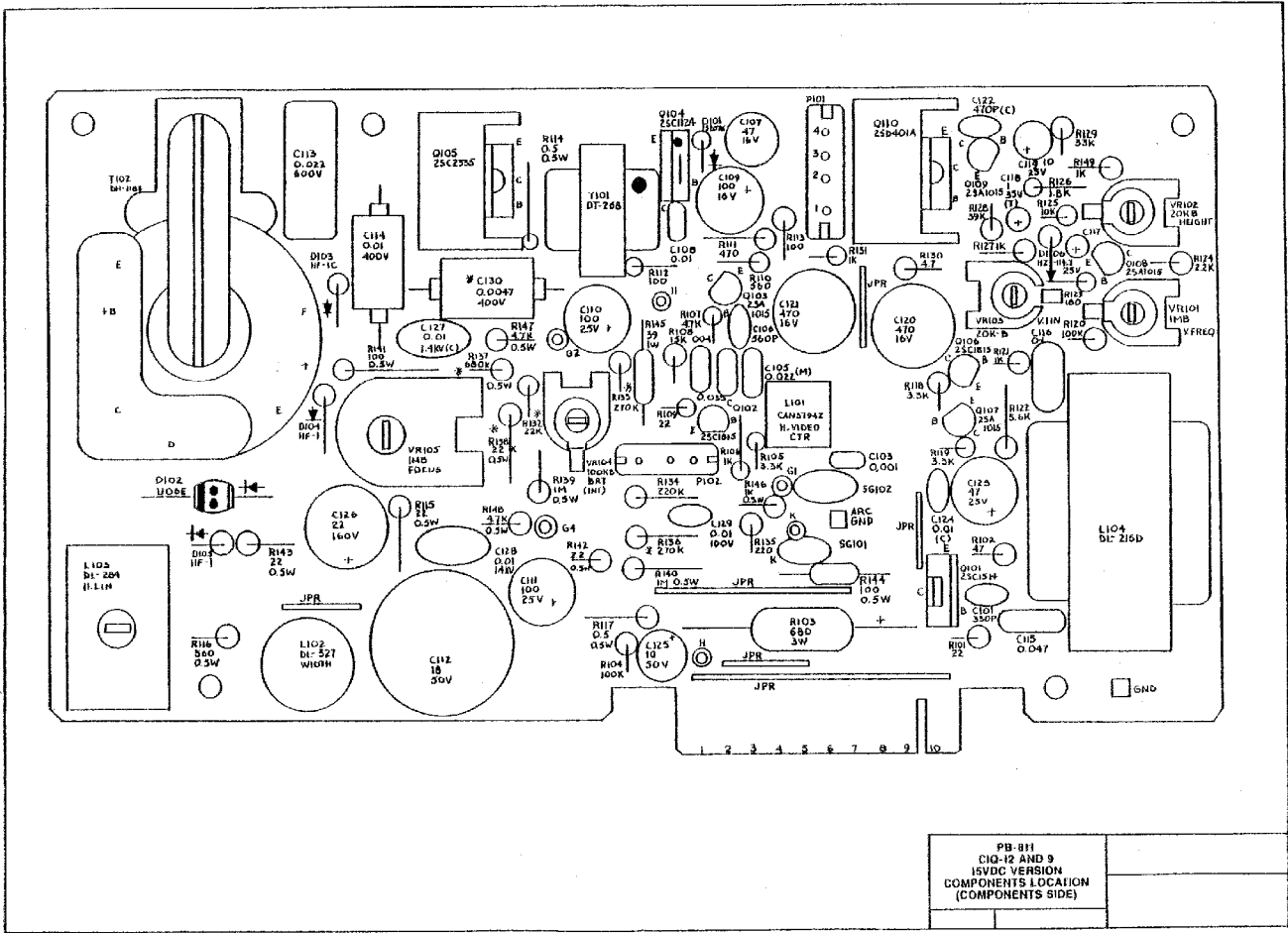




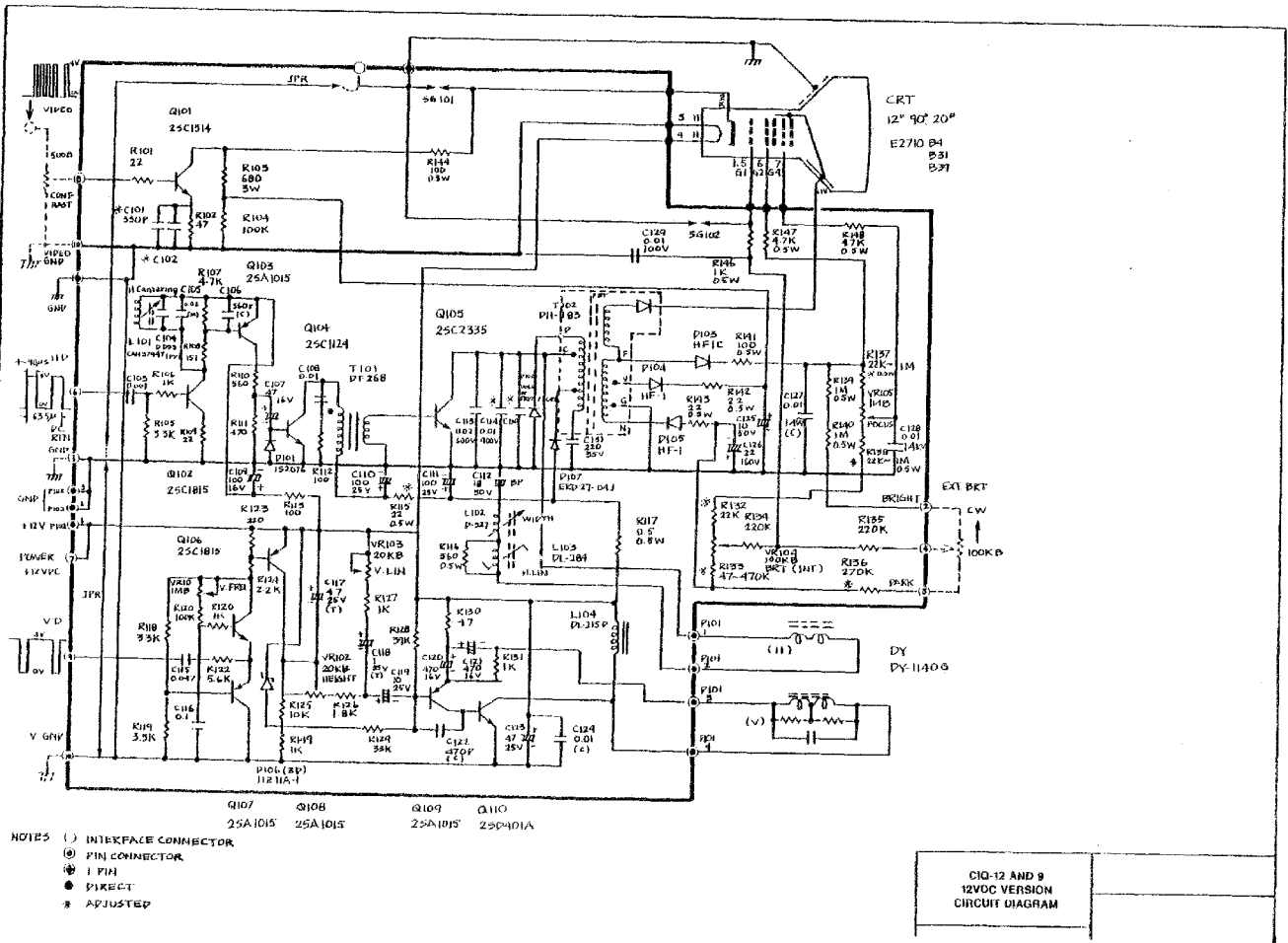






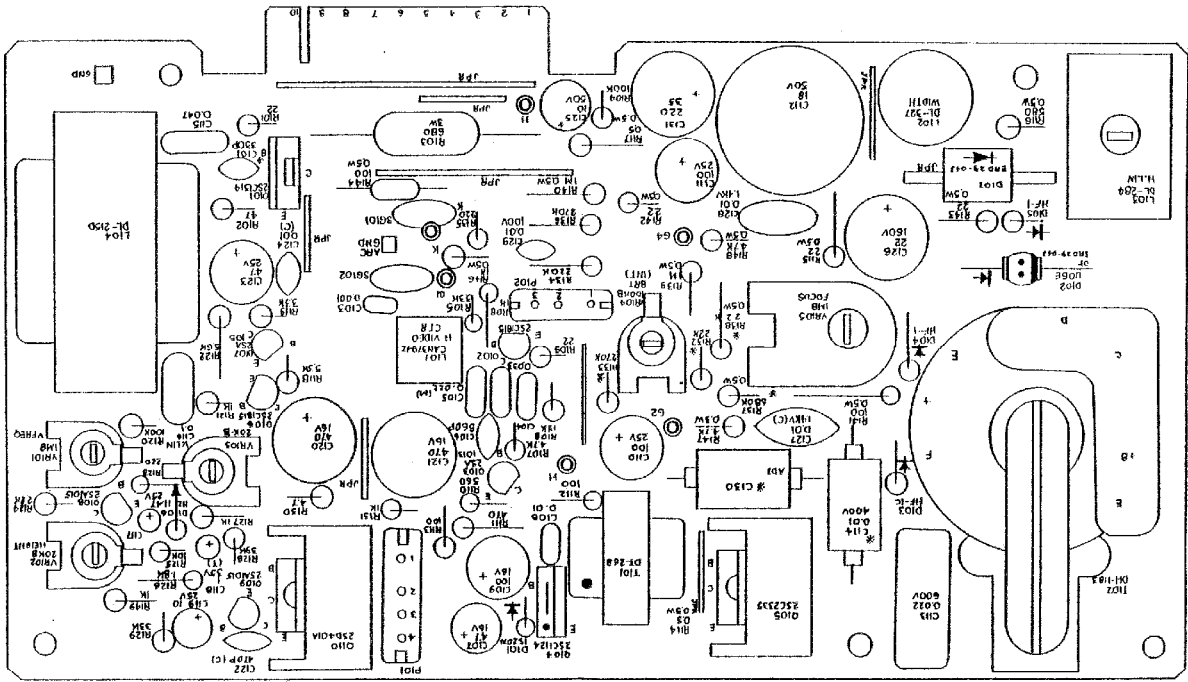




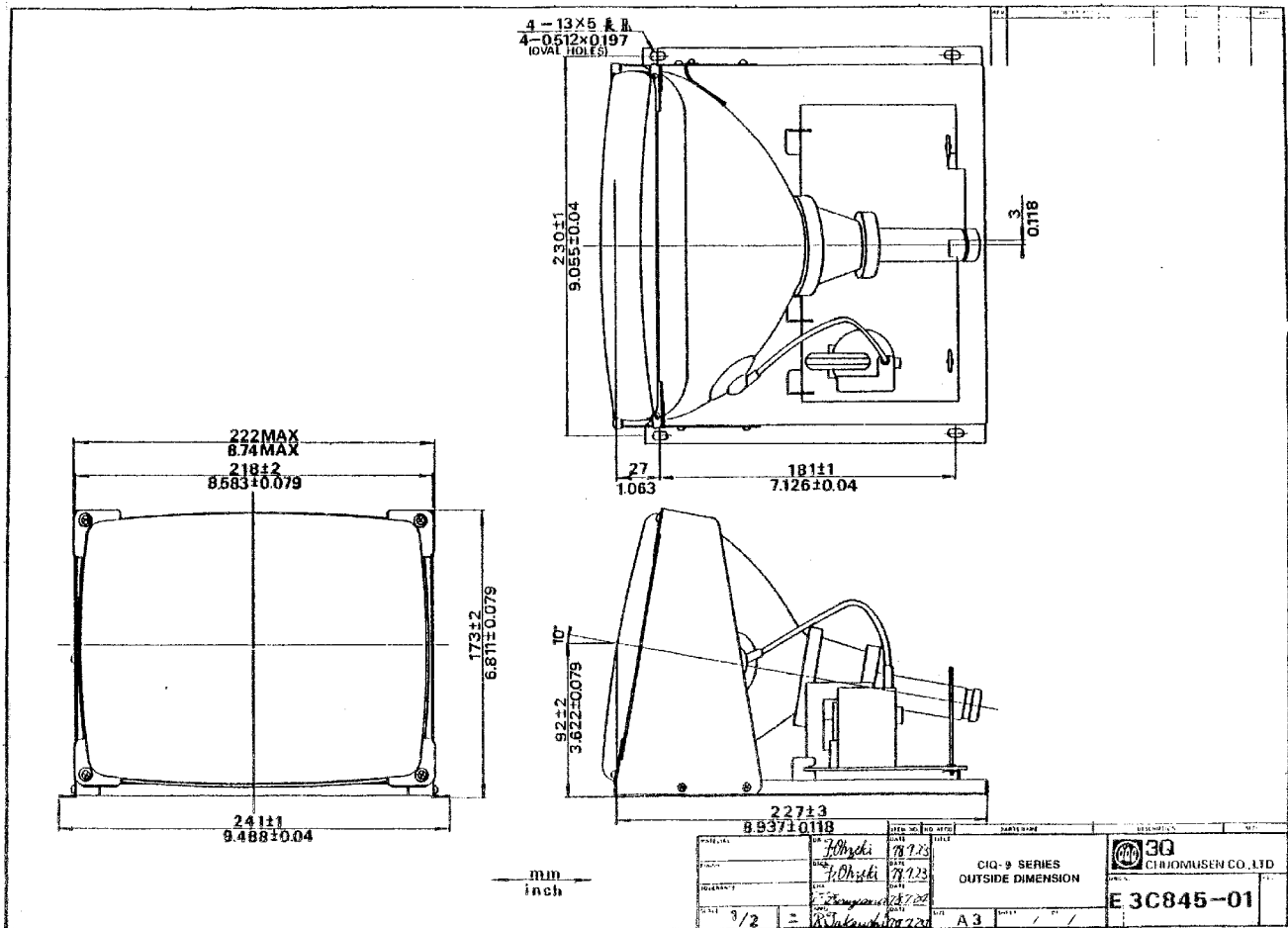




PG-811  
CM-12 AND 9  
12VDC VERSION  
COMPONENTS LOCATION  
(COMMENTS SIDE)







| DATE | BY        | CHKD | DATE | DATE | DATE | DATE | DATE | DATE |
|------|-----------|------|------|------|------|------|------|------|
|      | J. Ohishi |      | 7/23 |      |      |      |      |      |
|      | J. Ohishi |      | 7/23 |      |      |      |      |      |
|      |           |      | 7/23 |      |      |      |      |      |
| 3/2  |           |      |      |      |      |      |      |      |

CIQ-9 SERIES  
OUTSIDE DIMENSION

30  
CIJHOMUSEN CO., LTD.

E 3C845-01

A 3



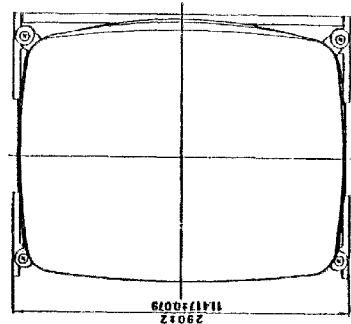


E 3C854-01

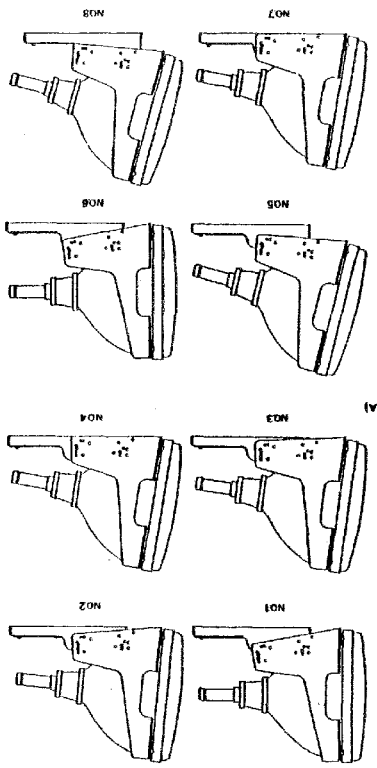
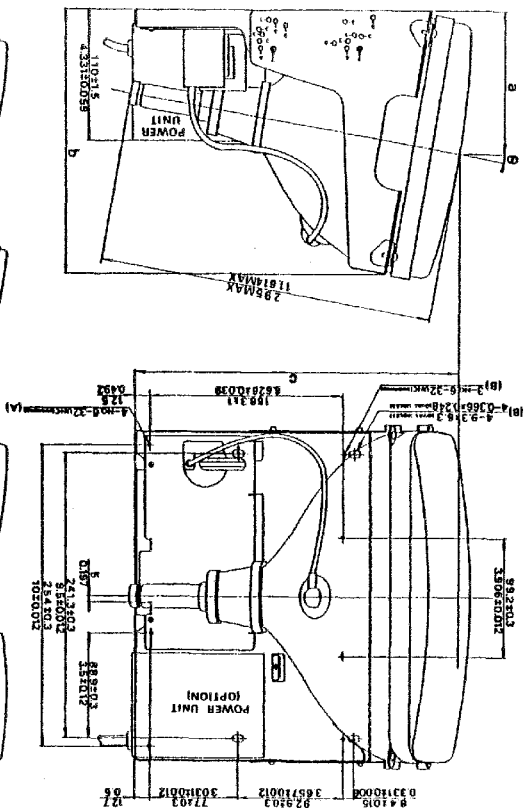
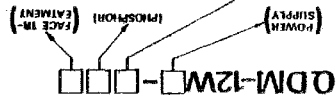
CIO-12 SERIES  
OUTSIDE DIMENSION



inch



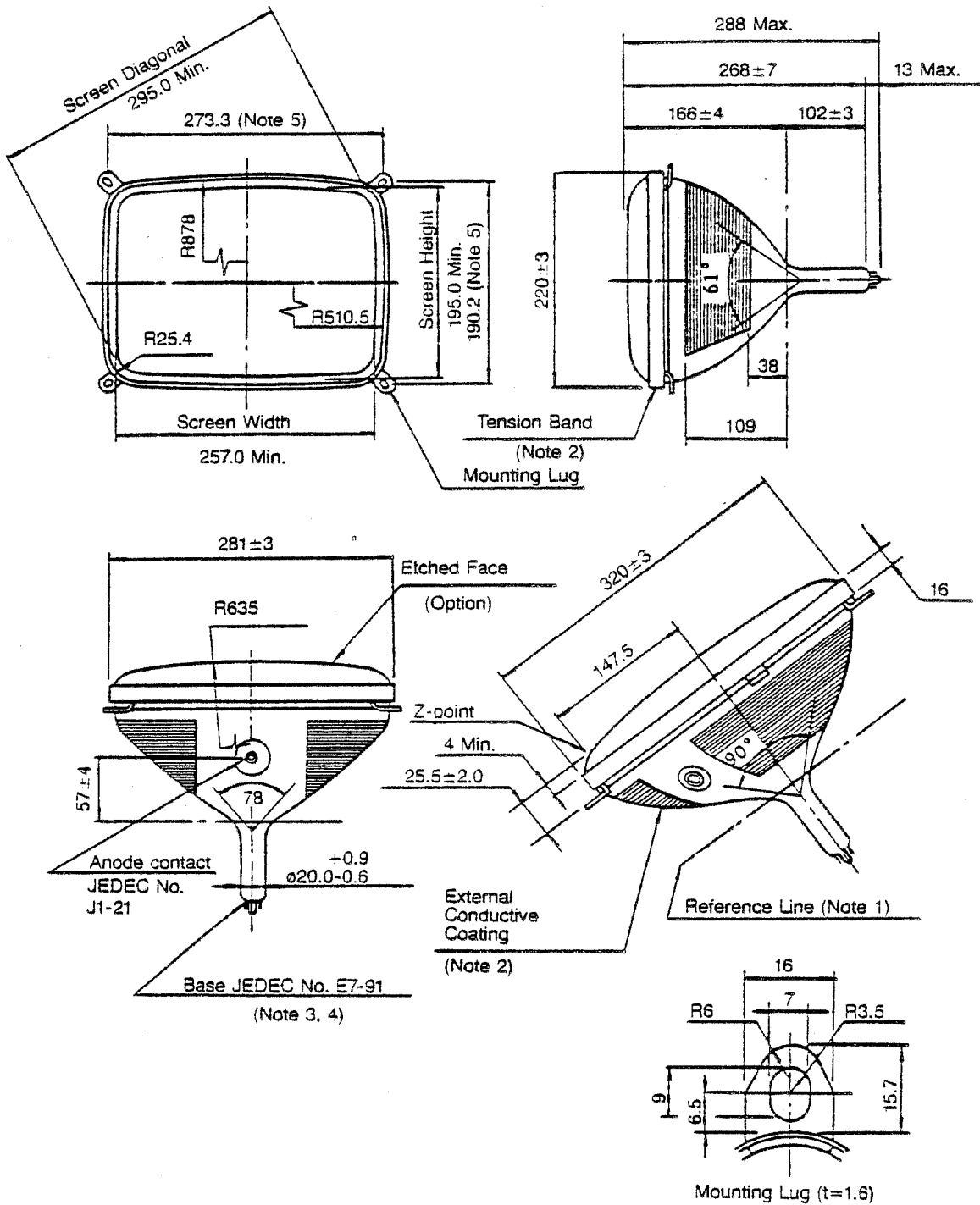
| NO. | CMT ANGLE | DIMENSIONS mm(Inch)    |                         |                        | MOUNTING HOLES |
|-----|-----------|------------------------|-------------------------|------------------------|----------------|
|     |           | B                      | L                       | C                      |                |
| 1   | 0°        | 115.12<br>(4.52810079) | 225.83<br>(8.8840118)   | 301.4<br>(11.868352)   | (A)(B)         |
| 2   | 5°        | 116.512<br>(4.5850079) | 224.213<br>(8.7740118)  | 298.14<br>(11.7321017) | (A)(B)         |
| 3   | 7.5°      | 120.12<br>(4.7240079)  | 223.313<br>(8.79180118) | 296.64<br>(11.6740157) | (A)(B)         |
| 4   | 10°       | 121.12<br>(4.7640079)  | 221.83<br>(8.72400118)  | 291.4<br>(11.4570167)  | (A)(B)         |
| 5   | 15°       | 151.12<br>(5.9450079)  | 246.213<br>(9.6930118)  | 283.4<br>(11.1421017)  | (A)(B)         |
| 6   | 0°        | 115.12<br>(4.52810079) | 226.13<br>(8.8980118)   | 296.14<br>(11.6540157) | (A)(B)         |
| 7   | 10°       | 120.12<br>(4.7240079)  | 220.43<br>(8.6840118)   | 280.4<br>(11.0240167)  | (A)(B)         |
| 8   | 15°       | 153.12<br>(6.02810079) | 247.213<br>(9.7321017)  | 281.4<br>(10.990157)   | (A)(B)         |





# CIQ-12 CATHODE RAY TUBE DIMENSIONAL OUTLINE

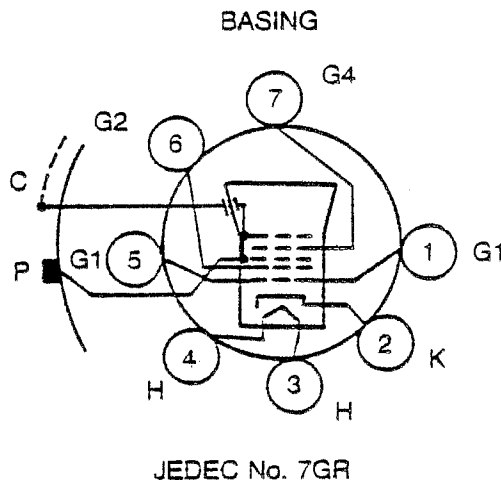
Unit: mm





### NOTE FOR DIMENSIONAL OUTLINE

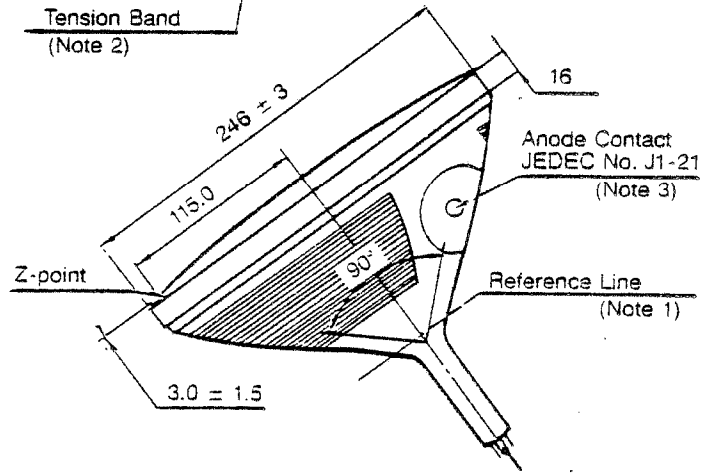
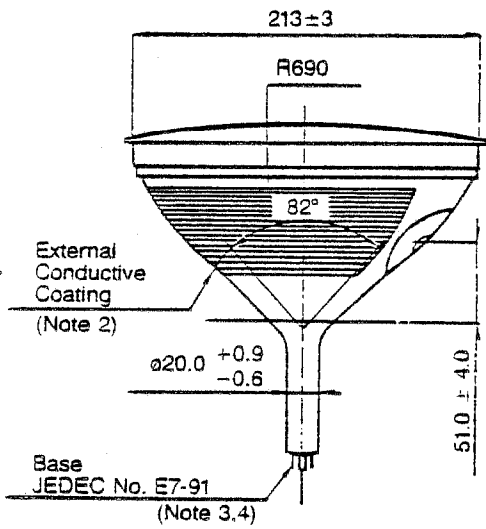
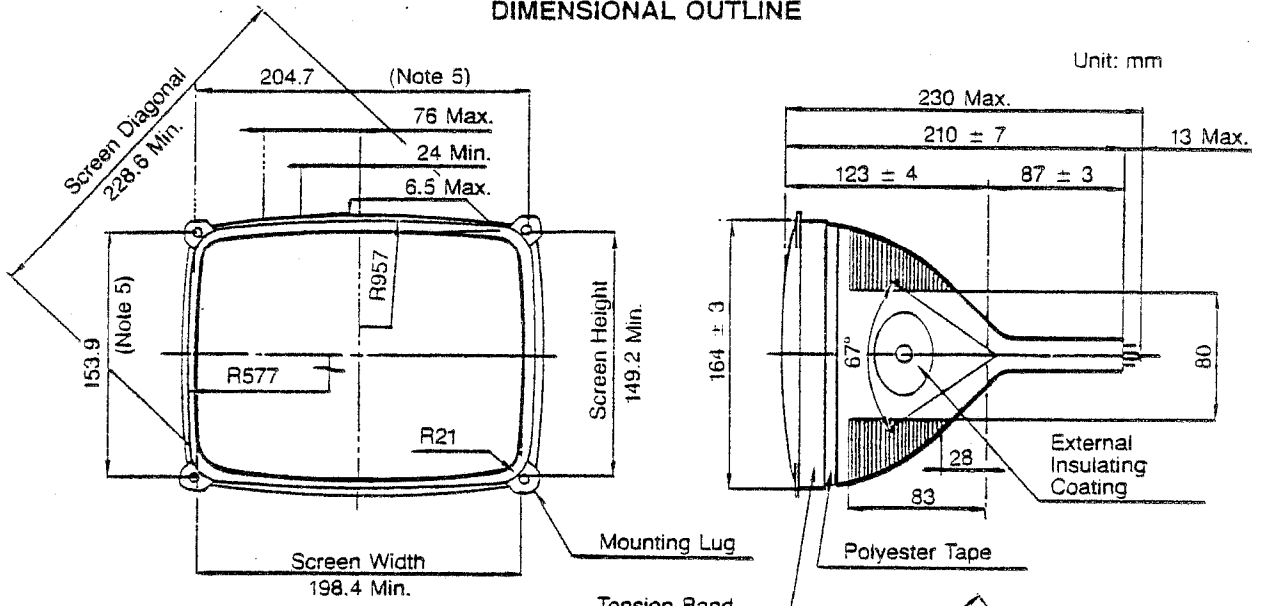
1. Reference line is determined by EIAJ G-R90J5 reference line gauge, when the reference line gauge is seated against the bulb.
2. External conductive coating and implosion protection hardware must be grounded.
3. The plane through the tube axis pin No. 5 may vary from the plane through the tube axis and anode contact by angular tolerance of  $\pm 30$  degrees. Anode contact is on same side as pin No. 5.
4. Socket for this base should not be rigidly mounted. It should have flexible leads and be allowed to move freely.
5. The mounting bolts in the cabinet must be situated inside a circle of 4.5 mm (0.177 inch) diameter on the true geometrical positions.



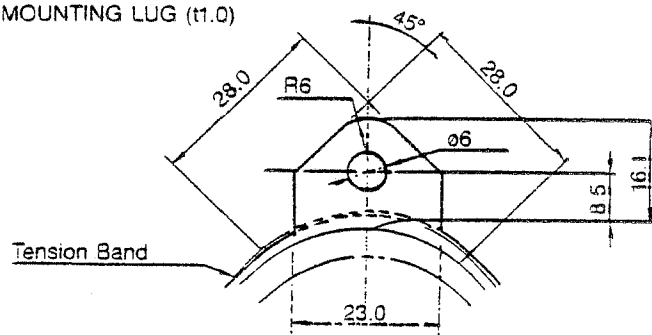


# CIQ-9 CATHODE RAY TUBE DIMENSIONAL OUTLINE

Unit: mm



MOUNTING LUG (t1.0)



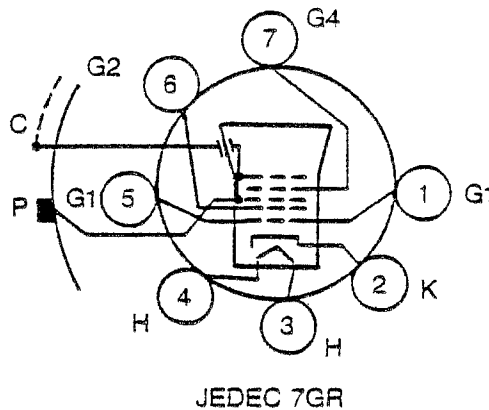




### NOTE FOR DIMENSIONAL OUTLINE

1. Reference line is determined by EIAJ G-R90J3 reference line gauge, when the reference line gauge is seated against the bulb.
2. External conductive coating and implosion protection hardware must be grounded.
3. The plane through the tube axis pin No. 5 may vary from the plane through the tube axis and anode contact by angular to tolerance of  $\pm 30$  degrees. Anode contact is on same side as pin No. 5.
4. Socket for this base should not be rigidly mounted. It should have flexible leads and be allowed to move freely.
5. For the mounting bolt holes, a free space of 4.0 mm (0.157 inch) diameter is ensured around this nominal position.

SOCKET CONNECTION (BOTTOM VIEW)





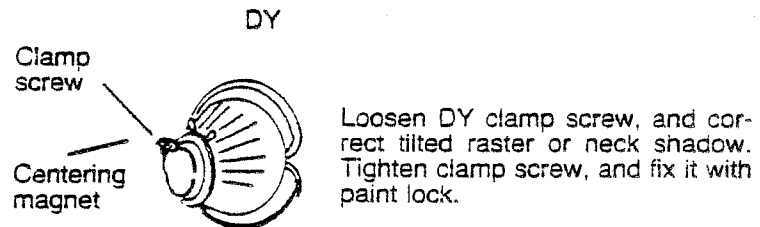
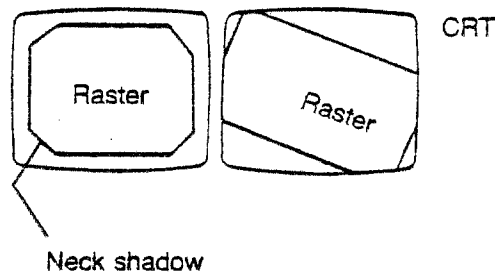
## INSPECTION/ADJUSTMENT PROCEDURE

1. Inspect the following items thoroughly upon arrival for any physical damage:

- 1) Metal works (bent, loose, and/or missing screws, etc.)
- 2) Printed circuit board (crack, fracture, etc.)
- 3) Discrete components (crack, poor soldering, etc.)
- 4) Wiring (broken lead, poor soldering, damaged insulation, etc.)
- 5) Illegible label

2. Raster Check and Adjustment Procedure

- 1) Apply HD and VD signal to the input terminal (No. 6 and 9 respectively) of the circuit board. Ref. P3-1
- 2) Apply 15VDC or 12VDC to the input terminal No. 7 of the circuit board. Raster will appear in 15 seconds or so.
- 3) Check tilting of the raster.





3. Internal Controls and Adjustments
  - Display Width-L102
  - Display Horizontal Centering-L101
  - Horizontal Linearity-L103
  - Vertical Hold-VR101
  - Vertical Height-VR102
  - Vertical Linearity-VR103
  - Focus-VR105
  - Sub-brightness-VR104

(SEE PC BOARD PARTS LAYOUT FOR LOCATION)

- 1) The brightness can be controlled by adjusting VR104. If EXT-BRT is utilized, set it to the center before Internal Brightness Control is adjusted.
- 2) Blurred display may not be caused by improper focus adjustment. High video signal will also create a blurred image. In this case, reduce video signal level by EXT-CONTRAST CONTROL.

#### 4. Shock Test

Lift one side of the unit about 2 inches off the surface and release. Observe whether or not the display is affected by the shock; if the unit is affected, check for loose soldering, screws, etc.

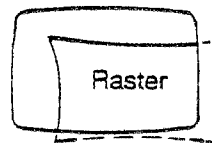
#### 5. CRT Spot Test

One minute after the power is turned off, if the spot appears at the center of the CRT screen, it may be defective.

#### 6. Raster Deviation

Turn the two centering magnets until the raster is centered. Apply screw lock when correction is completed.

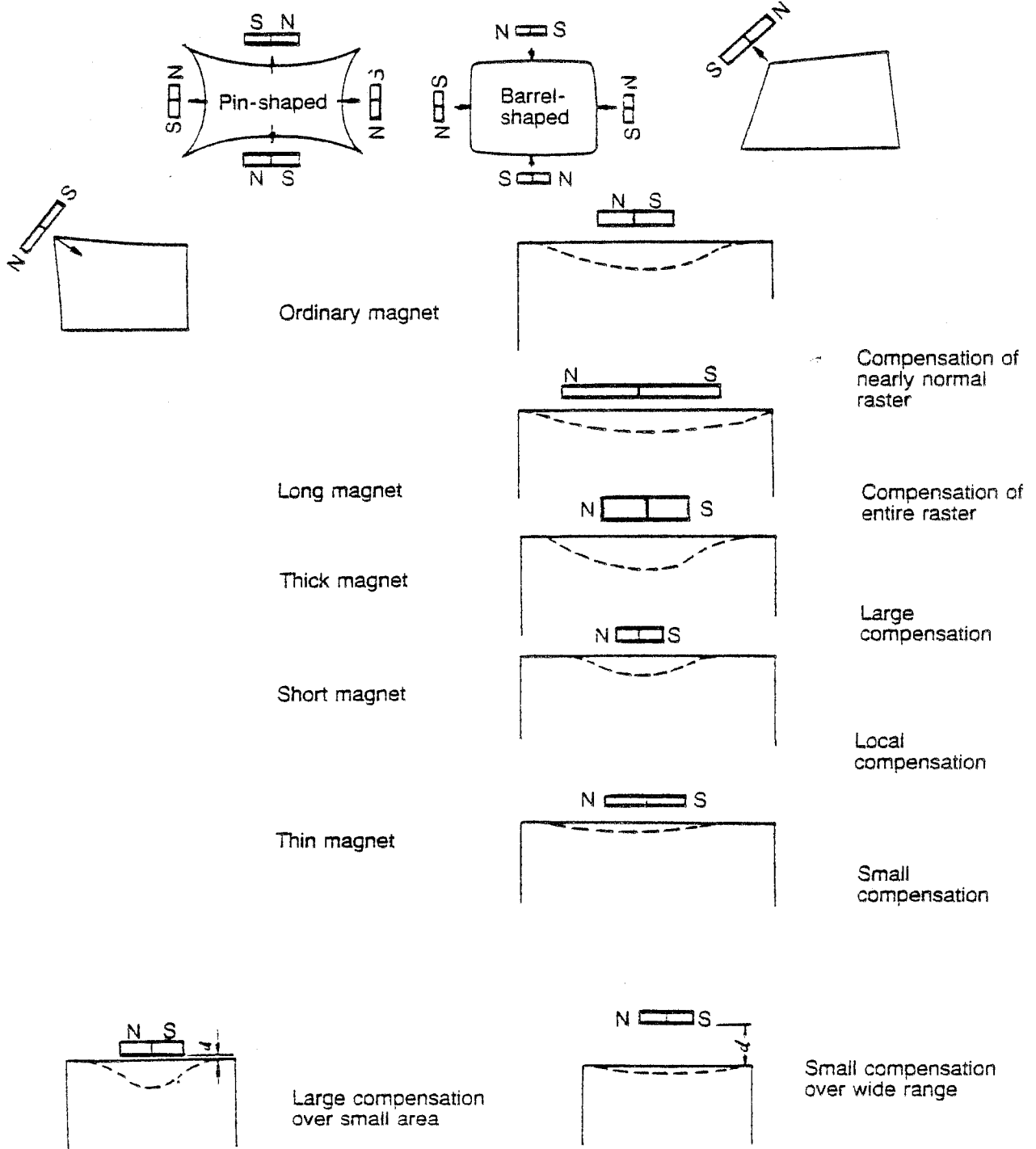
#### (6) Raster deviation





## (7) Raster distortion

Raster distortion can be compensated by applying a small magnet to the deflection yoke, as shown.







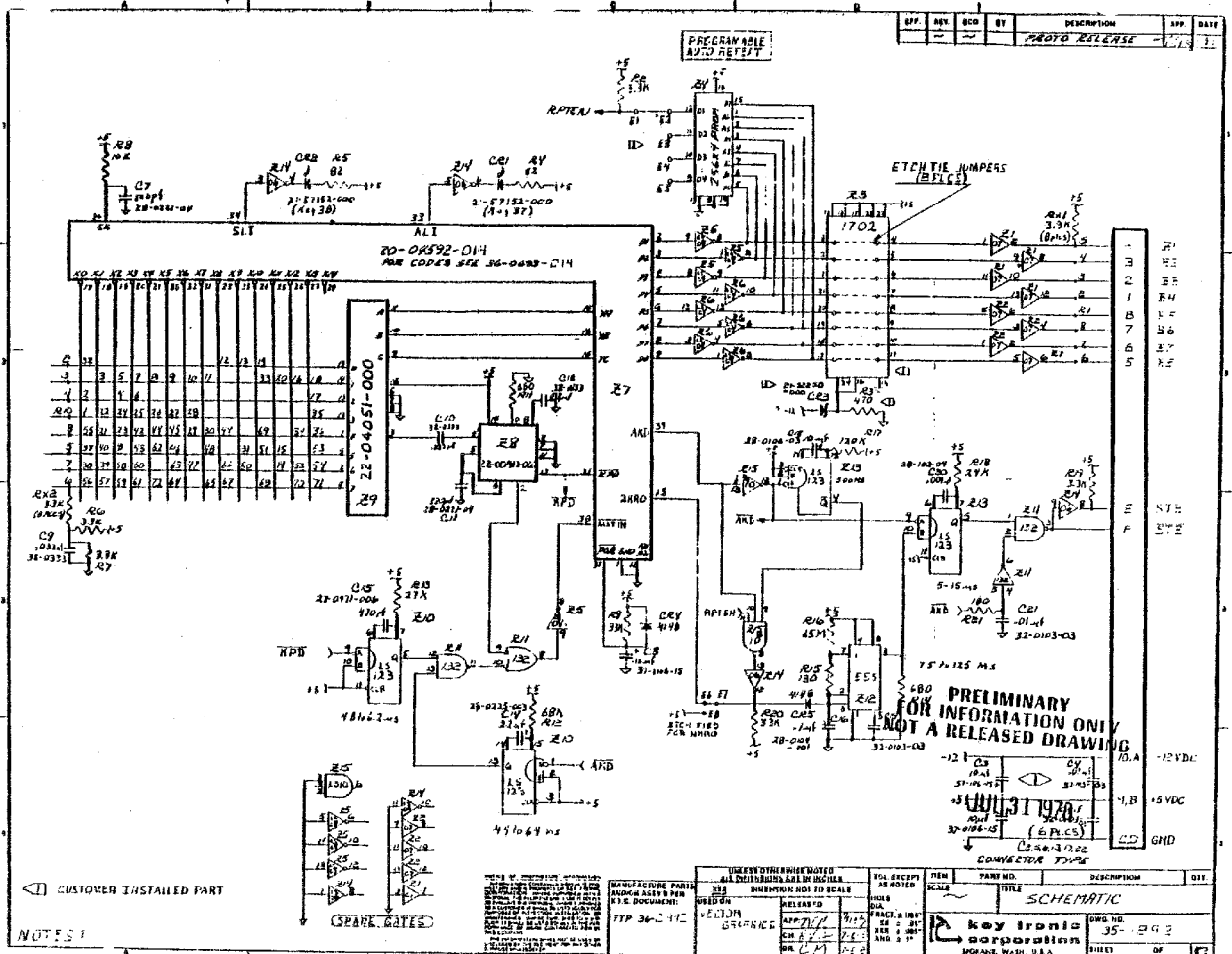
**PART NUMBER CLASSIFICATION  
FOR CIQ SERIES CRT DISPLAY MONITOR**

CIQ - 

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|

- A - 12: inches, diagonal measurement of CRT screen
  - 09: " " " " " "
  - 05: " " " " " "
- B - C: with chassis
  - X: kit version
  - U: universal chassis (settings for 0, 5, 7.5, 10, 15, -10, or -15 degree tilt positions)
  - Z: chassis per customer's requirement
- C - Q: chassis compatible with Ball TV-12 by physical measurement
  - P: " " " " " " according to Ball drawing  
(Slight difference between drawing and actual measurement.)
  - X: kit version
  - Z: chassis per customer's requirement
- D - 00, 05, 7.5, 10, 15: degree(s) tilt angle of CRT
  - XX: kit version
- E - D: DC power
  - A: AC power
- F - 015: 15 VDC
  - 012: 12 VDC
  - XXX: 115/230 VAC
- G - C: clear face (standard)
  - E: etched face (non-glare)
- H - 04: P4 phosphor
  - 31: P31 phosphor
  - 39: P39 phosphor
- I - (25-30): Horizontal drive input. 25-30 $\mu$ s pulse width
  - (04-40): " " " 4-40 $\mu$ s pulse width
- J - S: separate signal
  - C: composite signal





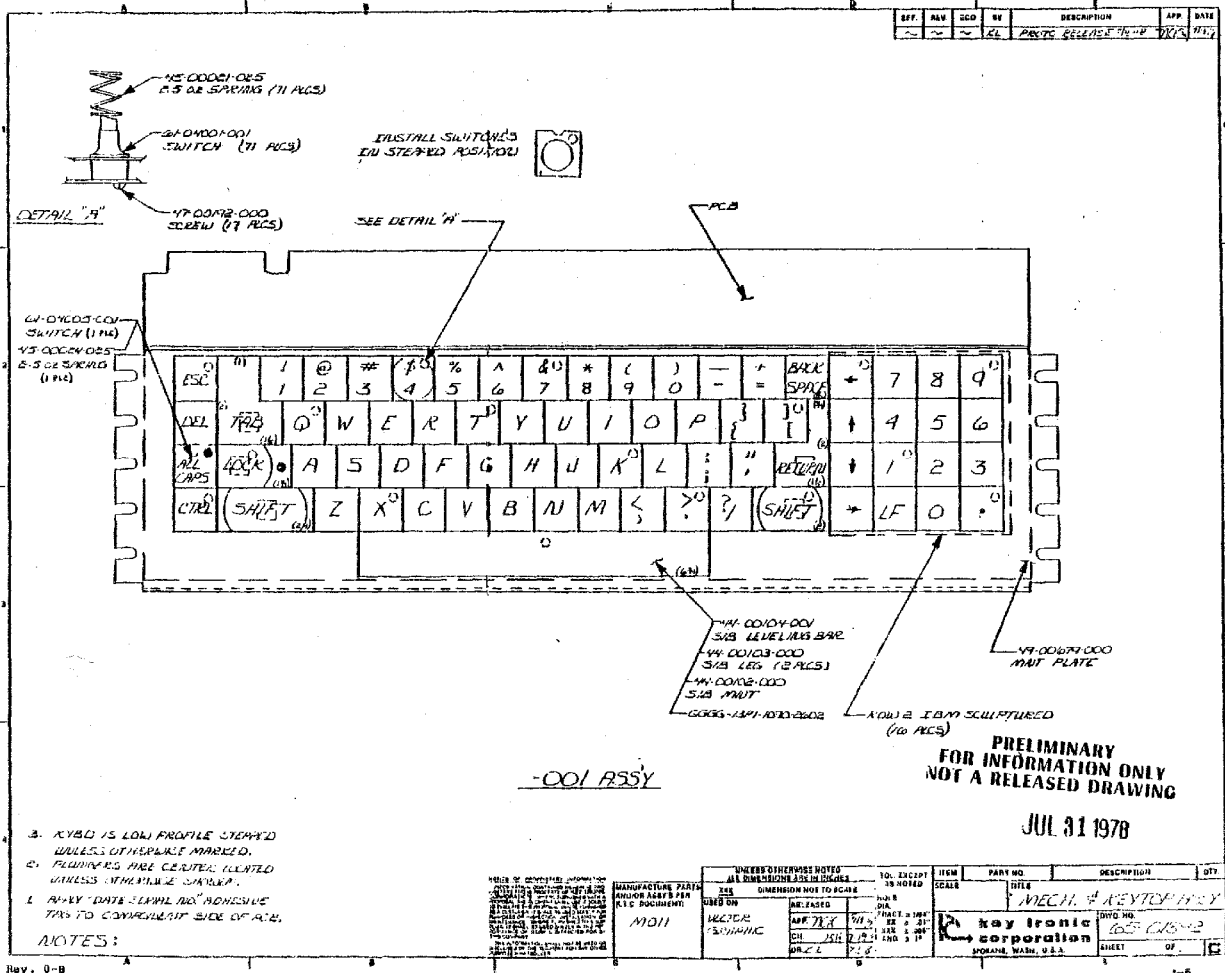
| REV. | BY | ECO | BY | DESCRIPTION   | APP. | DATE |
|------|----|-----|----|---------------|------|------|
| 1    |    |     |    | PROTO RELEASE |      |      |

◁ CUSTOMER INSTALLED PART

NOTES:

Rev. D-B





| REV | REV | REV | REV | DESCRIPTION         | APP | DATE | OTHER NOTES  |                        | NO. EXCEPT<br>AS NOTED | ITEM<br>SCALE | PART NO | DESCRIPTION              | QTY |
|-----|-----|-----|-----|---------------------|-----|------|--|------------------------|------------------------|---------------|---------|--------------------------|-----|
|     |     |     |     |                     |     |      | ALL DIMENSIONS IN INCHES                             | UNLESS OTHERWISE NOTED |                        |               |         |                          |     |
| 1   |     |     |     | MECH. & KEYTOP ASSY |     |      | MANUFACTURE PART<br>NUMBER IDENTIFY<br>THIS DOCUMENT | RELEASED               | 1                      | 1:1           |         | keytronic<br>corporation | 1   |
|     |     |     |     |                     |     |      | DATE: 7/27/78  | BY: J.S.               | 1                      | 1:1           |         |                          |     |
|     |     |     |     |                     |     |      | DATE: 7/27/78  | BY: J.S.               | 1                      | 1:1           |         |                          |     |
|     |     |     |     |                     |     |      | DATE: 7/27/78  | BY: J.S.               | 1                      | 1:1           |         |                          |     |

Rev. 0-B

J-6



|          |       |    |    |    |    |    |    |    |    |    |    |       |    |    |    | D    |      |     |    | E           |  |  |  |     |      |
|----------|-------|----|----|----|----|----|----|----|----|----|----|-------|----|----|----|------|------|-----|----|-------------|--|--|--|-----|------|
|          |       |    |    |    |    |    |    |    |    |    |    |       |    |    |    | EFF. | REV. | ECO | BY | DESCRIPTION |  |  |  | APP | DATE |
| 1B       | 21    | 00 | 23 | 24 | 25 | 5E | 26 | 2A | 28 | 29 | 5F | 2B    | 0B | 17 | 37 | 38   | 39   |     |    |             |  |  |  |     |      |
|          | 31    | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 30 | 2D | 3D    |    |    |    |      |      |     |    |             |  |  |  |     |      |
|          | 31    | 40 | 23 | 24 | 25 | 5E | 26 | 2A | 28 | 29 | 5F | 2B    |    |    |    |      |      |     |    |             |  |  |  |     |      |
| 7F       | 09    | 11 | 17 | 05 | 12 | 14 | 19 | 15 | 09 | DF | 10 | 1D    | A1 | 7E | 34 | 35   | 36   |     |    |             |  |  |  |     |      |
|          | 51    | 57 | 45 | 52 | 54 | 59 | 55 | 49 | 4F | 50 | 7D | E1    |    |    |    |      |      |     |    |             |  |  |  |     |      |
|          | 71    | 77 | 65 | 72 | 74 | 79 | 75 | 69 | 6F | 70 | 7B | F1    |    |    |    |      |      |     |    |             |  |  |  |     |      |
| ALL CAPS | LOCK  | 01 | 13 | 04 | 06 | 07 | 08 | 0A | 0B | 0C | 3A | 22    | 0D | 82 | 31 | 32   | 33   |     |    |             |  |  |  |     |      |
|          | 41    | 53 | 44 | 16 | 17 | 48 | 1A | 4B | 4C | 3A | 22 |       |    |    |    |      |      |     |    |             |  |  |  |     |      |
|          | 61    | 73 | 64 | 66 | 67 | 68 | 1A | 6B | 6C | 3A | 22 |       |    |    |    |      |      |     |    |             |  |  |  |     |      |
| CTRL     | SHIFT | 1A | 1B | 03 | 16 | 02 | 0E | 0D | 3C | 3E | 3F | SHIFT | 1A | 0A | 30 | 2E   |      |     |    |             |  |  |  |     |      |
|          | 5A    | 5B | 43 | 56 | 42 | 4E | 4D | 3C | 3E | 3F |    |       |    |    |    |      |      |     |    |             |  |  |  |     |      |
|          | 7A    | 7B | 03 | 76 | 62 | 6E | 6D | 3C | 3E | 3F |    |       |    |    |    |      |      |     |    |             |  |  |  |     |      |
| 20       |       |    |    |    |    |    |    |    |    |    |    |       |    |    |    |      |      |     |    |             |  |  |  |     |      |

XX SHIFT CTRL  
 XX CTRL  
 XX SHIFT  
 XX UNSHIFT  
 XX

LOGIC IS POSITIVE

KEY NUMBER

UNLESS OTHERWISE NOTED  
 ALL DIMENSIONS ARE IN INCHES  
 .XXX DIMENSION NOT TO SCALE  
 USED ON  
 VECTOR  
 GRAPHICS  
 1892

MANUFACTURE PARTS  
 AND/OR ISSY'S PER  
 K.T.C. DOCUMENT:

TOL. EXCEPT  
 AS NOTED  
 HOLE  
 DIA.

|                         |          |                |          |
|-------------------------|----------|----------------|----------|
| ITEM                    | PART NO. | DESCRIPTION    | QTY.     |
| SCALE                   | TITLE    | HEX CODE CHART |          |
| key tronics corporation |          | DWG. NO.       | 36-00942 |
| SPOKANE, WASH., U.S.A.  |          | SHEET          | OF       |

