MINDLESS TERMINAL
USERS MANUAL

VECTOR GRAPHIC INC.
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 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.
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Rev. 0-B 3/30/79
## 1.1 SPECIFICATIONS

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

![Diagram of terminal and computer connected by cables]

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.
1. Before proceeding, familiarize yourself with the "MTC" 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.
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.

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

<table>
<thead>
<tr>
<th>MONITOR 10 PIN EDGE</th>
<th>INTERFACE BOARD 16 PIN DIP</th>
<th>SIGNAL</th>
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<tr>
<td>1</td>
<td>15, 16</td>
<td>HORZ GND</td>
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<tr>
<td>5</td>
<td>12, 13, 14</td>
<td>GND</td>
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<tr>
<td>6</td>
<td>6</td>
<td>H SYNC</td>
</tr>
<tr>
<td>7</td>
<td>1, 2, 3, 4</td>
<td>+12 VDC</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>VIDEO</td>
</tr>
<tr>
<td>9</td>
<td>5</td>
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<tr>
<td>10</td>
<td>9, 10, 11</td>
<td>VIDEO GND</td>
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### INTERCONNECT CABLE — KEYBOARD / INTERFACE BOARD

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<td>2</td>
<td>C</td>
<td>GND</td>
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<td>DATA 4</td>
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<tr>
<td>6</td>
<td>4</td>
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</tr>
<tr>
<td>7</td>
<td>N/C</td>
<td>PRESET</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>DATA 3</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>-V REG</td>
</tr>
<tr>
<td>10</td>
<td>E</td>
<td>STROBE</td>
</tr>
<tr>
<td>11</td>
<td>D</td>
<td>GND</td>
</tr>
<tr>
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<td>7</td>
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<td>VCC</td>
</tr>
<tr>
<td>16</td>
<td>9</td>
<td>VCC</td>
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INTERNAL PORTION OF VMTC

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<td>J1-14</td>
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<td>-15</td>
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<td>TTL VIDEO</td>
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<td>-16</td>
<td></td>
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<td>-17</td>
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<td>J1-20</td>
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</tr>
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<td>-22</td>
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</tr>
<tr>
<td>GND</td>
<td>-3</td>
<td></td>
<td>GROUND</td>
</tr>
</tbody>
</table>
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.

![Display with shadows](image)

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.

![Adjustment diagram](image)
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:

   ![Diagram of DATA with W1, W2, W3 labels](image)

   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:

   ![Diagram of DATA](image)

   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:

\[
\begin{align*}
&\text{DATA} \\
&\text{DATA} \\
&\text{DATA}
\end{align*}
\]

Turn the V. LIN pot with a screwdriver so that \( H_1 = H_2 = H_3 \).

7. Raster deviation:

\[
\text{RASTER}
\]

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.
## APPENDIX A
### ASCII CODE CHART


<table>
<thead>
<tr>
<th>Bits</th>
<th>COLUMN +</th>
<th>ROW +</th>
<th>0</th>
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<th>2</th>
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<th>4</th>
<th>5</th>
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<tr>
<td>b7 b6 b5 b4 b3 b2 b1</td>
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<td>b7 b6</td>
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<td>0</td>
<td>0</td>
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<td>STX DC2 &quot;</td>
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<td>DEL</td>
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</table>

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.

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Vector Graphic Inc.

Not affiliated with Vector General, Inc.

Rev. 0-B
INTERFACE BOARD AT REAR OF MINDLESS TERMINAL - SCHEMATIC

REV. 0-B
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 ± 1.5V positive going pulse

2. Video Input Impedance
   More than 1 KΩ

3. Horizontal Drive
   4.0 Vp-p ± 1.5V positive going pulse
   Pulse width: 4 to 40 μsec.
   Frequency: 15.75 KHz ±500 Hz

4. Horizontal Drive Input Impedance
   More than 470Ω

5. Vertical Sync.
   4.0 Vp-p ± 1.5V negative going pulse
   Pulse width: 300 μsec. to 1.4 msec.
   Frequency: 55 Hz ±8 Hz

6. Vertical Sync Input Impedance
   More than KΩ

7. Signal Level
   Low: 0 = 0.4V
   High: 4 = 1.5V

8. Power Supply
   DC +15V = 0.2V (Less than 1.2A)
   or DC +12V = 0.2V (Less than 1.5A)
   or AC 115/230V = 10%, 50/60 Hz (Option)
   Input connector for AC power supply
   (customer supplied).
   Housing: AMP1-480705-0 or equivalent
   Contact pin: AMP 359690-1 or equivalent
9. Ambient Temperature
   0°C to 55°C (Operating)
   -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)
    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
   (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

<table>
<thead>
<tr>
<th>1</th>
<th>H.D. -B Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Brightness</td>
</tr>
<tr>
<td>3</td>
<td>Brightness</td>
</tr>
<tr>
<td>4</td>
<td>Brightness</td>
</tr>
<tr>
<td>5</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>H.D. Input</td>
</tr>
<tr>
<td>7</td>
<td>+15V, -12V</td>
</tr>
<tr>
<td>8</td>
<td>Video Input</td>
</tr>
<tr>
<td>9</td>
<td>V.D. Input</td>
</tr>
<tr>
<td>10</td>
<td>V.D. Video Ground</td>
</tr>
</tbody>
</table>

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

```
+5V     4V
\|      \|
+5V     4V
\|      \|
V.D.    V.D.
\|      \|
\|      \|
\|      \|
Video   Video
\|      \|
\|      \|
B500Ω   B500Ω
```

```
\|      \|
\|      \|
\|      \|
\|      \|
```

4V

```
```

4V

\|      \|
\|      \|
\|      \|
\|      \|

4V

\|      \|
\|      \|
\|      \|
\|      \|

4V

\|      \|
\|      \|
\|      \|
\|      \|

0
TIMING CHART (Standard Type)

Horizontal (in μs)

- Display Blanking
  - Blanking Time: 8.5 μs
  - Raster: 55.0 μs
  - Adjustable (±3)

- Data Center

- Data Input Signal
  - Data Display: 47 μs
  - 63.5 (1H)
  - t=0 (15.75 KHz)

Vertical (in ms)

- Display Blanking
  - Max.: 0.9 ms
  - Raster: 15.77 ms
  - 8.79

- Data Center

- Data Input Signal
  - Data Display: 14.4 ms
  - 16.67 (1V)
  - t=0 (60 Hz)
### Table: Dimensions and Dimensions (mm [inch])

<table>
<thead>
<tr>
<th>NO.</th>
<th>Δ</th>
<th>a (inch)</th>
<th>b (inch)</th>
<th>c (inch)</th>
<th>Mount-No</th>
<th>Holes</th>
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<tbody>
<tr>
<td>1</td>
<td>0°</td>
<td>3.25 x 3</td>
<td>30.164</td>
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<td>(inch)</td>
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<tr>
<td>2</td>
<td>5°</td>
<td>22.423</td>
<td>29.914</td>
<td>(inch)</td>
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<td>3</td>
<td>7.5°</td>
<td>13.011</td>
<td>29.5614</td>
<td>(inch)</td>
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<td>28.044</td>
<td>(inch)</td>
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<td>24.773</td>
<td>26.994</td>
<td>(inch)</td>
<td>10.9070</td>
<td>156</td>
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</table>
CIQ-12 CATHODE RAY TUBE
DIMENSIONAL OUTLINE

Unit: mm

Screen Diagonal
295.0 Min.

273.3 (Note 5)

257.0 Min.

Screen Width

R878

R510.5

R25.4

External Conductive Coating (Note 2)

Tension Band (Note 2)

Mounting Lug

288 Max.

166 ± 4

102 ± 3

13 Max.

268 ± 7

25.5 ± 2.0

Z-point

4 Min.

105

350 ± 3

16

R635

Elched Face (Option)

Anode contact

JEDEC No. J1-21

Base JEDEC No. 57-91 (Note 3, 4)

-0.9 ± 0.5

e20.0 ± 0.5

Reference Line (Note 1)

External Conductive Coating (Note 2)

Mounting Lug (t = 1.5)
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 ±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

Screen Diagonal
204.7 (Note 5)
76 Max.
24 Min.
5.5 Max.

Screen Width
198.4 Min.

Mounting Lug
R690

External Insulating Coating
(Note 2)

Z-point
90°

Reference Line
(Note 1)

Base
JEDEC No. E7-91
(Note 3, 4)

Unit: mm

230 Max.
210 = 7
13 Max.

123 = 4
87 = 3

3.0 = 1.5

Tension Band
(Note 2)

External Conductive Coating
(Note 2)

Z-point
90°

Reference Line
(Note 1)

Mounting Lug (11.0)

16

246 = 3
115.0

8.5

16.1
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 ± 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.

Loosen DY clamp screw, and correct tilted raster or neck shadow. Tighten clamp screw, and fix it with paint lock.
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

   ![Raster](image)
Raster distortion can be compensated by applying a small magnet to the deflection yoke, as shown.

- **Ordinary magnet**: Compensation of nearly normal raster
- **Long magnet**: Compensation of entire raster
- **Thick magnet**: Large compensation
- **Short magnet**: Local compensation
- **Thin magnet**: Small compensation
- **Large compensation over small area**: Small compensation over wide range
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, 25-30μs pulse width
(04-40): " " 4-40μs pulse width
J - S: separate signal
C: composite signal
outside the jumper area! To cut this connection, locate pad 7 of area J on the component side of the board and turn the board over. Locate pad 7 on this side of the board and notice that there is a trace which leads from the pad to the large 5V trace at the left. This also leads to pad 5 via an indirect route. To cut the jumper from pad 7 to pad 5 of jumper area cut this trace.

Schematic errata- on page 5 of the Schematic.

Area L pad 6 should be labelled pad 7 and pad 7 should be labelled pad 6.

Make the same change for area M.

Area J is correct as it is.