



102<sup>™</sup>  
108<sup>™</sup>  
211GX<sup>™</sup>

**Maintenance Guide**



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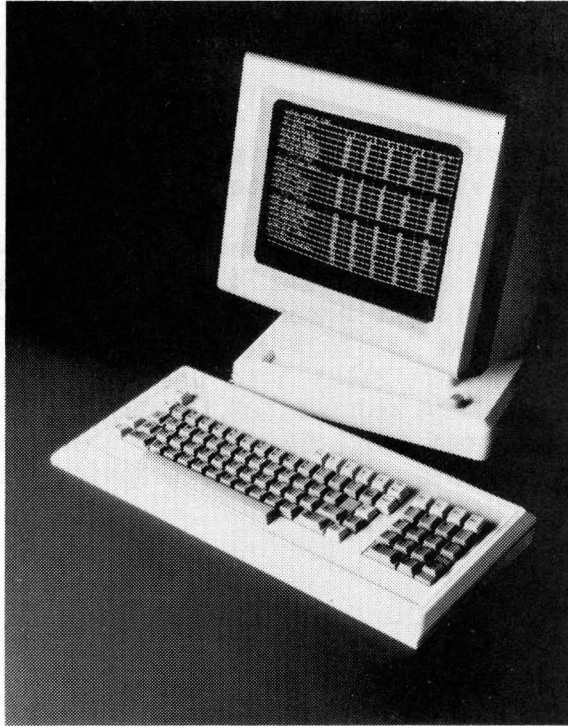
Reorder Number 35007  
April 1985

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QVT-102/QVT-102A  
Alphanumeric Video Display Terminals  
QVT-211GX  
Graphics Video Display Terminal



QVT-108  
Alphanumeric  
Video Display Terminal

## PREFACE

This QVT Maintenance Guide has been designed to allow maintenance personnel to service either the QVT-102/QVT-102A, QVT-108 or the QVT-211GX video display terminal by quickly isolating a fault and taking corrective action in a minimum amount of time. It is assumed that all who use this guide have rudimentary knowledge of video display terminals and related maintenance practices.

The QVT Maintenance Guide is divided into the following sections:

- **Troubleshooting** - for isolating a fault to a subassembly.
- **Subassembly Removal and Replacement** - for replacing the failed sub-assembly.
- **Alignment** - for performing any necessary video alignment after replacing a subassembly.
- **Parts** - for identification of parts and spares information.
- **Circuits and Diagrams** - reference.

## MAJOR DIFFERENCES AND SIMILARITIES

The QVT-102, QVT-102A and QVT-108 are alphanumeric video display terminals. The QVT-211GX is an alphanumeric and graphics video display terminal.

Maintenance of the QVT-102 and QVT-102A is identical. As compared to the QVT-102 and QVT-102A terminals, the QVT-108 has a different keyboard, minor differences in the logic PCB and different self-test error codes. The QVT-211GX uses the same keyboard as the QVT-102 and QVT-102A terminals and the same logic PCB as the QVT-102A terminal. The QVT-211GX also uses the same video PCB and power supply as the QVT-102, QVT-102A and QVT-108 terminals. In the QVT-211GX terminal, a graphics PCB is mounted above the logic PCB and in addition to the main wiring harness, four harnesses connect the graphics PCB to the logic PCB.

This QVT Maintenance Guide supersedes the QVT-102/QVT-102A/QVT-108 Maintenance Guide.

## ASSOCIATED PUBLICATIONS

For General User Information:

QVT-102/QVT-102A Operator Manual.....	Reorder Number 35003A
QVT-108 Operator Manual.....	Reorder Number 35013
QVT-211X User Reference Guide.....	Reorder Number 35033

For Abbreviated User Information:

QVT-102/QVT-102A Quick Reference Card.....	Reorder Number 35008
QVT-108 Quick Reference Card.....	Reorder Number 35009
QVT-211GX Quick Reference Card.....	Reorder Number 35048

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## **TROUBLESHOOTING**

### **INTRODUCTION**

This section provides a troubleshooting guide for isolating most QVT terminal failures to an easily replaced subassembly by systematically advancing through a series of troubleshooting flowcharts.

### **TROUBLESHOOTING TECHNIQUE**

Effective troubleshooting technique should always begin with a thorough visual inspection. Look for obvious things that may adversely effect the performance of the terminal, such as:

- Is the AC power source supplying adequate power?
- Is the brightness potentiometer properly adjusted?
- Are all connectors making good contact?
- Is there a compatibility problem between the terminal and the host?

### **TROUBLESHOOTING FLOWCHARTS**

Fault Isolation Flowcharts #1 through #5 are for use with alphanumeric terminals QVT-102, QVT-102A and QVT-108. Flowchart #6 is for use with alphanumeric and graphics terminal QVT-211GX.

When using the following alphanumeric terminals troubleshooting flowcharts #1 through #5, always begin with Fault Isolation Flowchart # 1. Although each flowchart is tailored to troubleshoot a general area, it should be noted that they have been purposely arranged to quickly isolate a fault to a replaceable subassembly. It is not recommended that the flowcharts be used out of sequence.

Refer to the Circuits and Diagrams Section for more specific information as necessary.

### **Tools and Equipment Required**

- DB25 Loopback Connector,
- Phillips Screwdriver,
- Multimeter,
- High Voltage Probe,
- Interconnect Wiring Diagrams and Schematics (refer to Section 5).

Fault Isolation Chart # 1

Power On Unit.

Does Unit  
Display an Error Code. ---YES-----> Proceed to  
Error Codes  
Summary

-NO

Perform Self-Test.

Does Unit  
Perform Self-Test. ---NO-----> Proceed to Flowchart # 2.

-YES

Exit Self-Test,  
Enter Local Mode.  
Press Each Key on  
Keyboard.

Are Characters  
Displayed as Keys  
Are Pressed. ---NO-----> Proceed to Flowchart # 3.

-YES

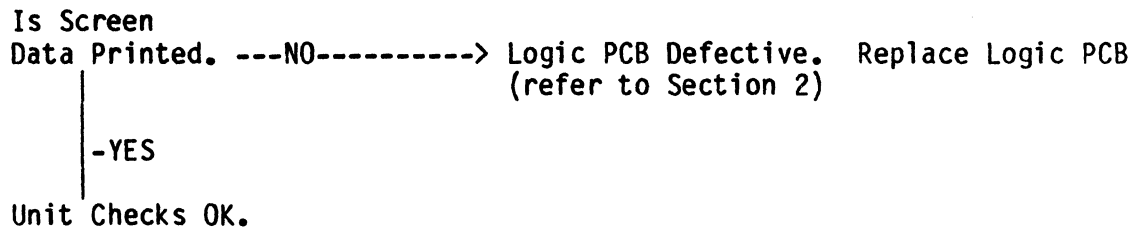
Exit Local Mode, Enter On Line  
Mode & Full Duplex Mode.  
Install Loopback Connector to EIA Port.  
Press Each Key on Keyboard.

Are Characters  
Displayed as Keys  
Are Pressed ---NO-----> Logic PCB Defective. Replace Logic PCB  
(refer to Section 2).

-YES

Connect Printer to AUX Port.  
Exit On Line Mode & Enter  
Local Mode. Print.

**Fault Isolation Flowchart # 1 (Cont)**



Fault Isolation Flowchart # 2

From Flowchart # 1.

Are AC Line and Power Supply Fuses Good. ---NO-----> Replace Bad Fuse(s). Continue.

-YES

Does Either Fuse Fail --NO--> Return. Begin Flowchart # 1. Again at Power On.

-YES

Verify Operation of ON/OFF Switch. Is Switch Defective. ---NO-----> Return. Begin Flowchart # 1.

-YES

Replace Switch (refer to Section 2). Continue.

Does Either Fuse Fail --NO--> Return. Begin Flowchart # 1. Again at Power On.

-YES

Replace Fuse(s). Disconnect P12, P13 and P14 to Isolate Power Supply. Power On Unit and Verify Power Supply Voltages: (All voltages are dc).

P12: Pin 1	NC	P13: Pin 1	NC	P14: Pin 1	-12 V
Pin 2	+12 V	Pin 2	+12 V	Pin 2	+12 V
Pin 3	GND H	Pin 3	GND V	Pin 3	GND
Pin 4	+5 V	Pin 4	+5 V	Pin 4	+5 V

Are All Voltages Present. ---NO-----> Power Supply is Defective. Replace Power Supply (refer to Section 2).

-YES

Power Supply Checks OK. Power Off Unit and Reconnect Power Supply Connectors P12, P13 and P14. Disconnect P6 and the Keyboard Telephone Jack from the Logic PCB. Power On the Unit.

**Fault Isolation Flowchart # 2 (Cont)**

Does Either Fuse Fail --NO---> Logic PCB Checks OK. Keyboard or Video PCB  
Again at Power On. is Defective. Continue.

-YES

Replace Fuse(s). Connect Keyboard Telephone Jack to the Logic PCB.  
Power On Unit.

Does Either Fuse Fail --NO---> Keyboard Checks OK. Video PCB is Shorted.  
Again at Power On. Replace Video PCB (refer to Section 2).  
Return to Flowchart # 1.

-YES

Keyboard or Coiled Keyboard Cable is Defective.  
Return to Flowchart # 1.

**Fault Isolation Flowchart # 3**

From Flowchart # 1.

Is +12 Vdc and GND Present  
at P11 on Keyboard PCB. ----NO-----> Coiled Keyboard Cable is Defective.  
(Pin 1, GND/Pin 2, +12 Vdc) Replace Coiled Keyboard Cable (refer  
to Section 2).

-YES

Is 10 Vdc + 1 V Present at ---NO----> Logic PCB is Defective. Replace Logic  
P10, Pin 1 on Logic PCB. PCB (refer to Section 2).

-YES

Depress Each Key on Keyboard For a Minimum  
of 2 Seconds Each and Observe an AC RMS  
Voltage at P10, Pin 1 on Logic PCB.

Does This Voltage Increase  
Approx. 200 mVac RMS While ---NO-----> Keyboard is Defective. Replace  
Each Key is Pressed Keyboard Assembly (Refer to  
Section 2).

-YES

Is The Correct  
Character -----NO-----> Proceed to Flowchart # 4.  
Displayed.

-YES

Unit Checks OK. Proceed to System Test.

### Fault Isolation Flowchart # 4

From Flowchart # 3.

Check the Following Voltages on the Logic PCB:

P5-1: Pin 1	+5 Vdc	P5-2: Pin 1	-12 Vdc
Pin 2	+5 Vdc	Pin 2	GND
		Pin 3	+5 Vdc
		Pin 4	+12 Vdc

Are All Voltages Present. --NO--> Defective Main Wiring Harness. Replace Main Wiring Harness (refer to Section 2).

-YES

Disconnect Connector P7 from the Logic PCB. Check the following voltages on the Logic PCB:

P7: Pin 1 to Pin 3 (Positive Pin)	Approx. 5 Vdc
Pin 2 to Pin 3 (Positive Pin)	Approx. 4.5 Vdc

Are Voltages Present. ---NO----> Logic PCB is Defective. Replace Logic PCB (refer to Section 2).

-YES

Reconnect Connector P7 to the Logic PCB. Verify Proper Operation of the Brightness Potentiometer. Rotate Pot Full CCW, Then Full CW. Observe a 3 Vdc Voltage Change Between Pins 1 and 2 of P7.

Does Voltage Change ---NO----> Brightness Potentiometer is Defective. Replace Brightness Potentiometer (refer to Section 2).  
Approx. 3 Vdc.

-YES

Clear Screen.  
At P6, Pin 5 Note an AC RMS Voltage.  
Display Self-Test.  
At P6, Pin 5 Note an AC RMS Voltage.

Did Voltage Increase  
Approx. 400 mVac RMS When Self-Test Was Displayed. ---NO----> Logic PCB is Defective. Replace Logic PCB (refer to Section 2).

-YES

Proceed to Flowchart # 5.

## Fault Isolation Flowchart # 5

From Flowchart # 4.

Display "H" Test Pattern

Check Voltages on Video PCB, P1:

Pin 1	+12 Vdc
2	GND
3	+12 Vdc
4	GND

Are Voltages Present. ---NO---> Main Wiring Harness Defective. Replace Main Main Wiring Harness (refer to Section 2).

-YES

With Brightness Potentiometer Full CW, Check P2, Pin 5 for Approx. 400 mVac RMS.

Is Approx. 400 mVac RMS Present. ---NO-----> Main Wiring Harness Defective. Replace Main Wiring Harness (refer to Section 2).

-YES

With a HIGH VOLTAGE Probe, Check the CRT Anode Cap for Approx. 13 kVdc.

**WARNING: HIGH VOLTAGE**

Is Approx. 13 kVdc Present --NO----> Video PCB Defective. Replace Video PCB at CRT Anode Cap. (refer to Section 2).

-YES

Check the Following Voltages on the Video PCB (Tolerance  $\pm$  25%):

P3, Pin 2	0.3 Vac RMS	K2	550 Vdc
P3, Pin 1	1.3 Vac RMS	K3	45 Vdc
P4, Pin 2	10 Vac RMS	K4	175 Vdc
P4, Pin 1	25 Vac RMS	K5	12 Vdc
K1	-28 Vdc	K6	0.1 Vac RMS

Are All Voltages Present. ---NO-----> Video PCB Defective. Replace Video PCB (refer to Section 2).

-YES

CRT Defective. Replace CRT (refer to Section 2).



## Fault Isolation Flowchart # 6

Remove Bottom Cover (refer to Section 2).

Disconnect J1 through J5 on Graphics PCB.

Disconnect Ribbon Cable from U10 on Graphics and U16 on Logic PCB.

Remove Graphics PCB from Unit (refer to Section 2).

Remove UART from U9 on Graphics PCB and Insert into U16 on Logic PCB.

Connect Plug P6 (Harness from P2 on Video PCB) to P6 on Logic PCB.

Connect P5-2 on Logic PCB to P14 on Power Supply.

Replace Bottom Cover (refer to Section 2).

Power On Unit.

Does Problem Continue.-----NO----->Remove Bottom Cover.

-YES

Use Fault Isolation Flowcharts #1 through #5, as Necessary, to Troubleshoot and Repair.

Mount and Reconnect same Graphics PCB (Connect J1 through J5 and UART on Graphics PCB. Connect Ribbon Cable Between U10 on Graphics and U16 on Logic PCB).

Replace Bottom Cover.

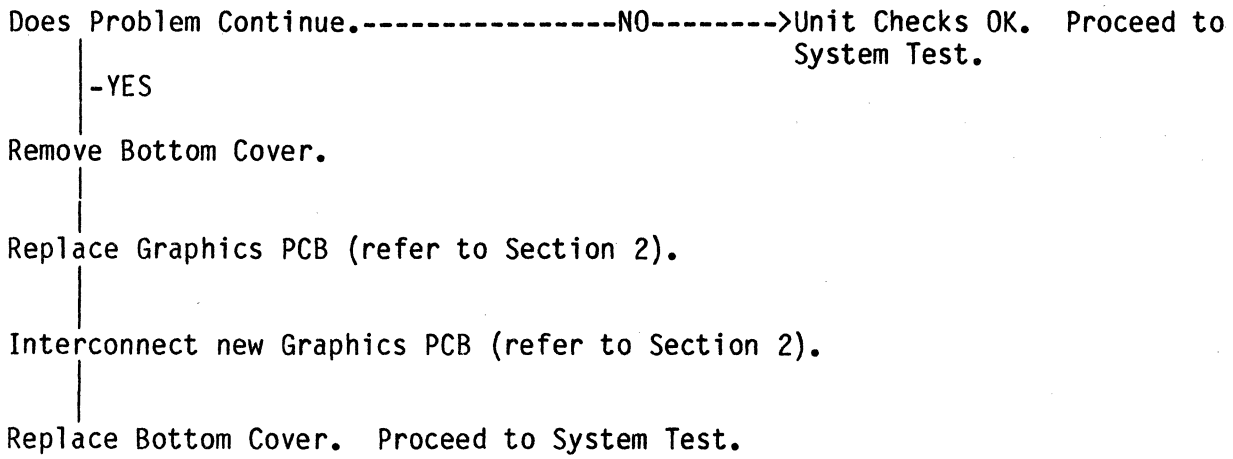
Power On Unit.

Replace Graphics PCB (refer to Section 2).

Interconnect new Graphics PCB (Connect J1 through J5 and UART on Graphics PCB. Connect Ribbon Cable Between U10 on Graphics and U16 on Logic PCB).

Replace Bottom Cover.  
Proceed to System Test.

Fault Isolation Flowchart # 6 (Cont)



**ERROR CODES SUMMARY**

As part of the terminal's power on sequence, it performs an internal self-test, and signals that it has successfully completed this test by sounding the audible alarm. However, if a non-fatal error is detected, an error code will be displayed on the screen. For example, if the letter "D" is displayed, this signifies that a fault has been isolated to the Logic PCB. The following tables list all possible error codes.

Table 1-1. QVT-102/QVT-102A/QVT-211GX Error Codes Summary

ERROR CODE	CORRECTIVE ACTION
A	Replace U8, or the Logic PCB.
B	Replace U6, U7, or the Logic PCB.
C	Replace U6, U7, U8, or the Logic PCB.
D	Replace U19, or the Logic PCB.
E	Replace U8 and U19, or the Logic PCB.
F	Replace U6, U7 and U19, or the Logic PCB.
G	Replace U6, U7, U8 and U19, or the Logic PCB.
H	Replace the Keyboard.
I	Replace U8, or the Logic PCB, and the Keyboard.
J	Replace U6 and U7, or the Logic PCB, and the Keyboard.
K	Replace U6, U7 and U8, or the Logic PCB, and the Keyboard.
L	Replace U19, or the Logic PCB and the Keyboard.
M	Replace U8 and U19, or the Logic PCB and the Keyboard.
N	Replace U6, U7 and U19, or the Logic PCB and the Keyboard.
O	Replace U6, U7, U8 and U19, or the Logic PCB and the Keyboard.

Note: U6 (5514), U7 (5514), U8 (2764), and U19 (6116) are located on the Logic PCB.

Table 1-2. QVT-108 Error Codes Summary

ERROR CODE	CORRECTIVE ACTION
A	Replace U43, U53, or the Logic PCB.
B	Replace U42, or the Logic PCB.
C	Replace U42, U43, U53, or the Logic PCB.
D	Replace U51, U52, or the Logic PCB.
E	Replace U43, U51, U52, U53, or the Logic PCB.
F	Replace U42, U51, U52, or the Logic PCB.
G	Replace U42, U43, U51, U52, U53, or the Logic PCB.
H	Replace the Keyboard.
I	Replace U43, U53, or the Logic PCB, and the Keyboard.
J	Replace U42, and the Keyboard.
K	Replace U42, U43, U53, or the Logic PCB, and the Keyboard.
L	Replace U51, U52, or the Logic PCB, and the Keyboard.
M	Replace U43, U51, U52, U53, or the Logic PCB, and the Keyboard.
N	Replace U42, U51, U52, or the Logic PCB, and the Keyboard.
O	Replace U42, U43, U51, U52, U53, or the Logic PCB, and the Keyboard.

Note: U42 (5514), U43 (2732), U51 (74LSI57), U52 (58725P), and U53 (58725P) are located on the Logic PCB.

### QVT-102/QVT-102A/QVT-108 SELF-TEST MODE

Self-test of the QVT-102, QVT-102A and QVT-108 consists of a continuous display of the character set in each terminal with all video attributes active. Key ESC V to enter self-test in the QVT-102 and QVT-102A terminals. For self-test of the QVT-108 terminal, key Ctrl/Shift/Setup/1.

### QVT-211GX SELF-TEST MODES

The QVT-211GX terminal has two types of self-tests. In the terminal (alphanumeric) mode of operation, self-test is entered by keying ESC V and the continuous display consists of its character set with all video attributes active. In the native (graphic) mode, key uppercase S to initiate self-test. Upon entering native mode self-test, the following is displayed.

- Graphics firmware revision level.
- Printers and plotters that can be installed.
- Self-test menu with the following selections:
  - P-Phase Locked Loop Test
  - R-RAM Test
  - C-Continuous RAM Test
  - D-Dipswitch Test
  - F-PROM Checksum Test
  - H-Hex Dump Monitor Mode
  - M-Print Menu Again
  - G-Exit Self-Test Mode



**SUBASSEMBLY REMOVAL AND REPLACEMENT****INTRODUCTION**

This section describes how to remove and replace the major subassemblies of the QVT terminal. Before beginning, place the Power On/Off switch in the OFF position and disconnect the power cord from the power source. Thoroughly read each procedure before attempting any subassembly removal and replacement. A medium size Phillips head screwdriver, a small adjustable wrench, a 100K ohm high voltage discharge probe, and soldering equipment are the only tools required. A special key cap puller tool (Q.P.N. 84873-01) is available for easy removal of key caps.

**SAFETY SUMMARY**

In addition to the normal safety precautions that should always be practiced during any maintenance procedure on electronic equipment, personnel should also be aware of the following safety hazards.

**Lower Monitor Area**

The lower monitor area contains the logic PCB and the power supply. In the QVT-211GX, this area also contains the graphics PCB.

**CAUTION**

Hazardous voltages are exposed in the general area of the power supply. Before performing any service in the lower monitor area, power OFF the terminal and disconnect the power cord.

**Upper Monitor Area**

The upper monitor area contains the CRT and the video PCB.

**CAUTION**

Take special care when working in the general area of the CRT. Do not scratch or strike the CRT or subject it to unusual pressure. The CRT contains a high vacuum and breakage of the tube may result in injury from flying glass. As a further precaution, wear suitable clothing and eye protection.

A hazardous residual voltage may be present on the CRT at the flyback transformer anode cap. Always discharge the CRT anode to ground before performing any maintenance in the upper monitor area (refer to Step 2 of the Video PCB Removal and Replacement procedure).

## SUBASSEMBLY REMOVAL AND REPLACEMENT

### COVER SETS

The paragraphs below describe the removal and replacement of the cover sets for the keyboard and monitor. This procedure prefaces the removal and replacement of the other subassemblies.

#### **Keyboard - Top Cover**

The top cover of the keyboard is secured from the underside of the keyboard assembly by six screws.

#### REMOVAL

1. Disconnect the keyboard cable from the monitor.
2. Place the keyboard upside down on a level surface and remove the six screws. Lift the bottom cover with keyboard PCB away from the top cover.

#### REPLACEMENT

To replace the top cover, simply reverse the above procedure.

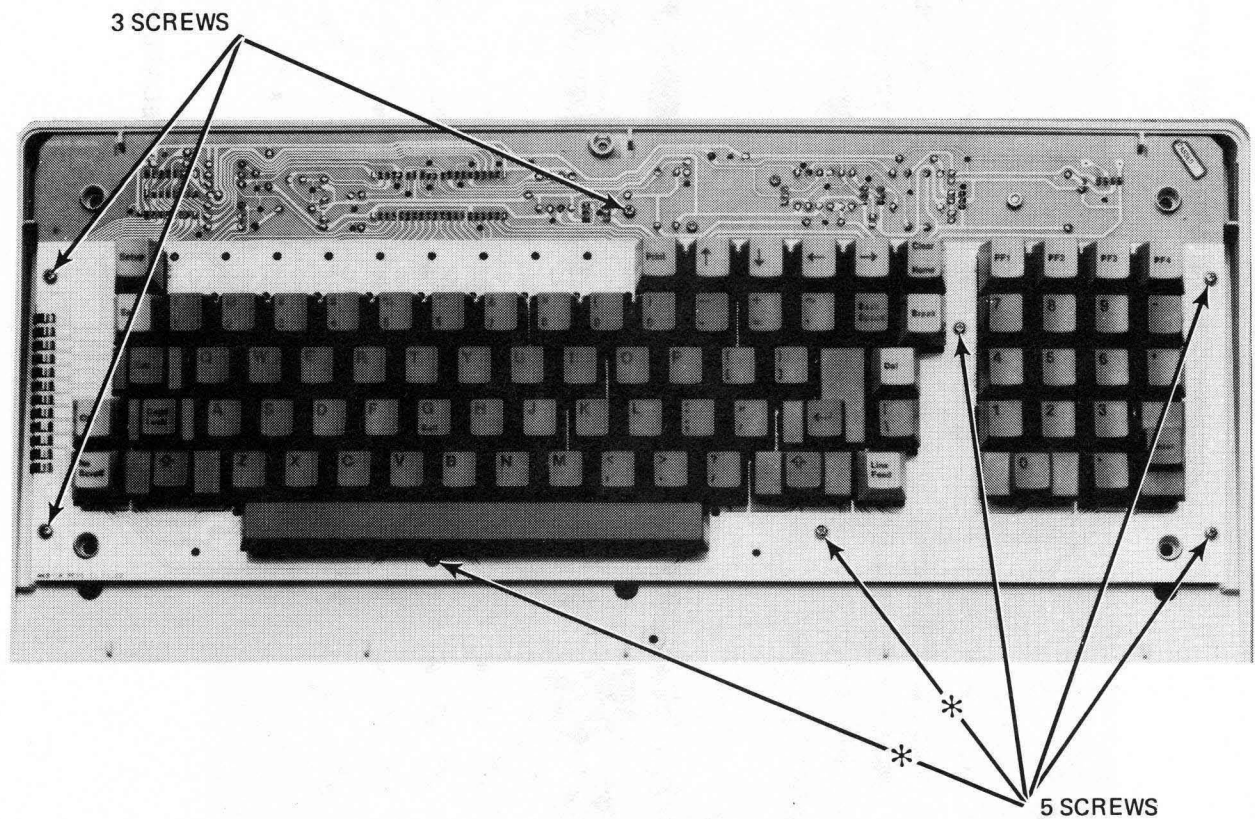
#### **Keyboard - Bottom Cover (Keyboard PCB and Coiled Keyboard Cable)**

To remove and replace the bottom keyboard cover, it is also necessary to remove and replace the keyboard PCB and the keyboard cable.

#### REMOVAL

1. Remove the top cover from the keyboard assembly. Refer to the Keyboard Top Cover Removal and Replacement procedure.
2. Remove the eight screws that secure the QVT-102/QVT-102A /QVT-211GX keyboard PCB to the bottom cover (six screws secure the QVT-108 keyboard PCB). Refer to Figure 2-1.
3. Lift the keyboard PCB up and lay it over the back edge of the bottom cover. Refer to Figure 2-2.
4. Disconnect the coiled keyboard cable from the keyboard PCB and remove the cable from its retainers on the inside of the bottom cover. Be careful not to damage the cable by crimping or overstressing its tensile strength. Remove the keyboard cable, keyboard PCB, and bottom cover.





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- NOTES:
1. Eight screws secure the QVT-102, QVT-102A or the QVT-211GX keyboard PCB inside the keyboard bottom cover.
  2. Six screws secure the QVT-108 keyboard PCB inside the keyboard bottom cover.
  3. Screws identified with an asterisk (\*) are not used on QVT-108.

Figure 2-1. Keyboard Top Cover Removed  
(QVT-102/QVT-102A and QVT-211GX Keyboard Shown)

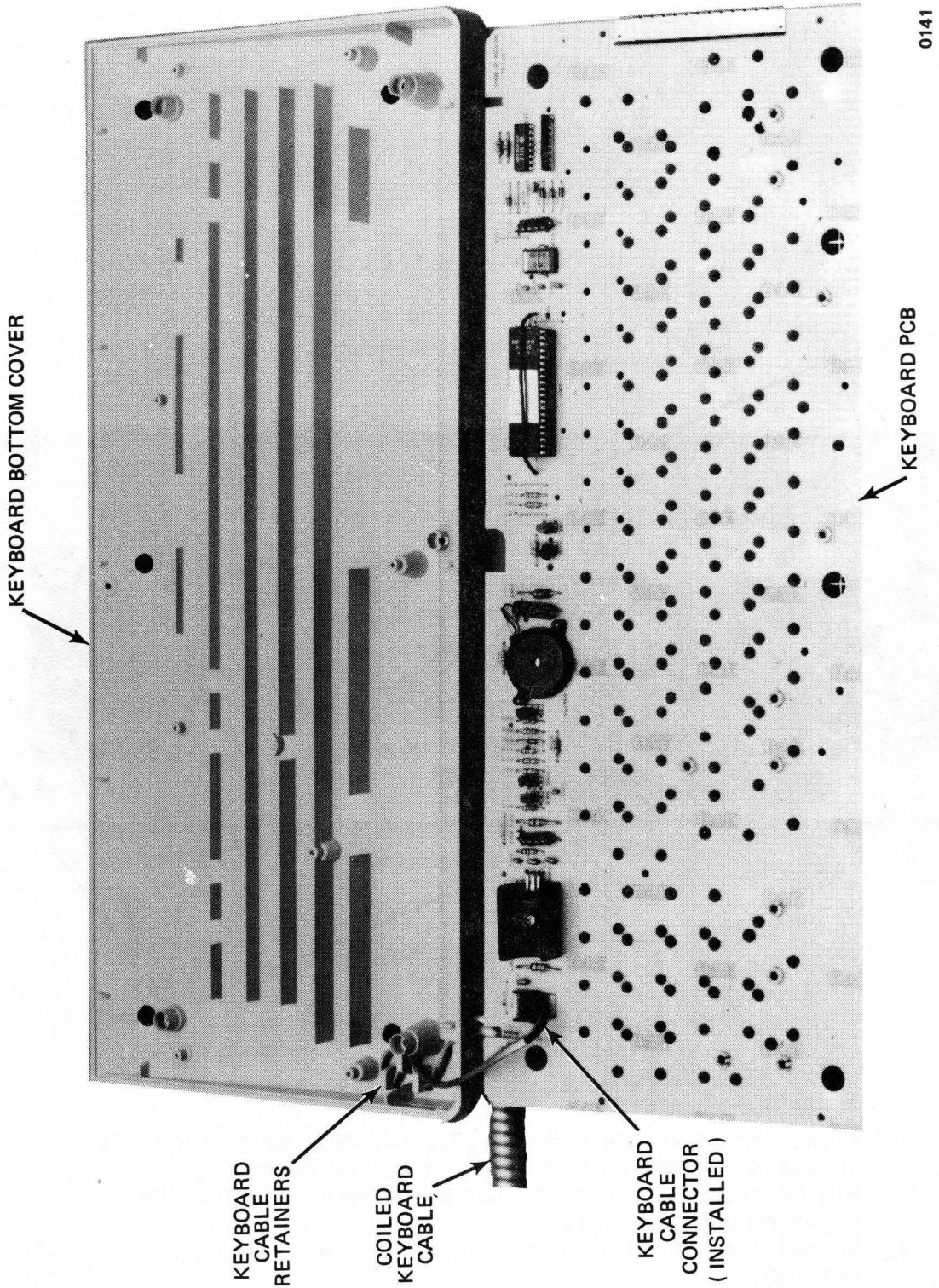


Figure 2-2. Keyboard PCB Removal and Replacement  
(QVT-102/QVT-102A and QVT-211GX Keyboard Shown)

## REPLACEMENT

1. Insert the coiled keyboard cable through its access hole in the bottom cover and secure it to its retainers. Be careful not to damage the cable by crimping or overstressing its tensile strength. Connect the keyboard cable connector to the keyboard PCB. Refer to Figure 2-2.
2. Install the keyboard PCB in the bottom cover (eight screws secure the QVT-102/QVT-102A/QVT-211 keyboard PCB, and six screws secure the QVT-108 keyboard PCB). Refer to Figure 2-1.
3. Replace the top cover on the keyboard assembly. Refer to the Keyboard Top Cover Removal and Replacement procedure.

## Key Caps

## REMOVAL

A key cap can be removed by gripping it between index finger and thumb and pulling up, or more preferably with a Key Cap Puller Tool (Q.P.N. 84873-01). Refer to Figure 2-3.

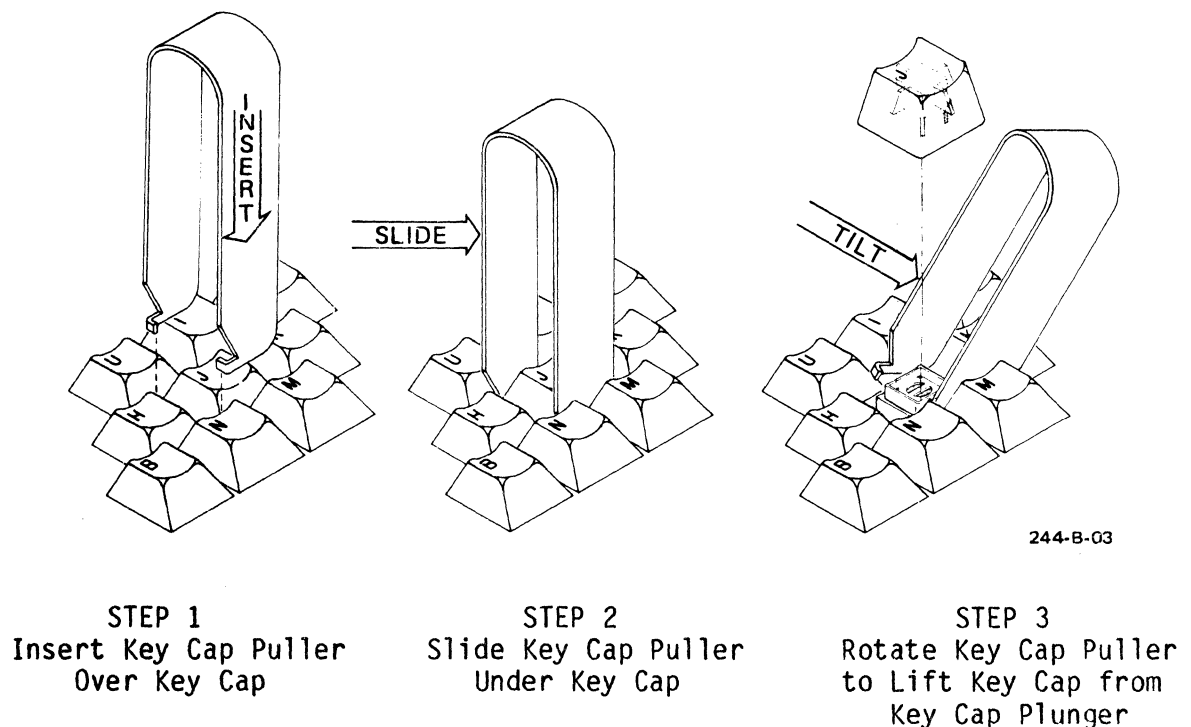


Figure 2-3. Key Cap Removal and Replacement

## REPLACEMENT

To replace a key cap, position it over its location and press downward with gentle pressure. Be sure to position the key cap so that its four alignment tabs engage the key cap plunger. Refer to Figure 2-3.

## SUBASSEMBLY REMOVAL AND REPLACEMENT

### Monitor - Back Cover

#### REMOVAL

To remove the back cover for access to the upper monitor area (CRT and video PCB), proceed as follows. Refer to Figure 2-4.

#### CAUTION

Hazardous voltages are exposed when the Monitor Back Cover is removed. Power OFF the terminal and disconnect the power cord (unless an alignment procedure is to be performed).

Discharge the CRT anode to ground to avoid electrical shock before removing or replacing any upper monitor area subassembly (refer to Step 2 of the Video PCB Removal and Replacement procedure).

Take care when working in the general area of the CRT. Do not scratch or strike the CRT or subject it to unusual pressure. The CRT contains a high vacuum and breakage of the tube may result in injury from flying glass. As a precaution wear suitable clothing with eye protection.

1. Orient the monitor to gain screwdriver access to the bottom edge of the monitor back cover.
2. Remove the two screws that secure the back cover to the monitor, and slide the back cover to the rear until it is free of its support tracks on the display swivel support.

#### REPLACEMENT

1. Install the back cover on the monitor by sliding it into position on the display swivel support. Refer to Figure 2-4.
2. Secure the back cover to the monitor with two screws.

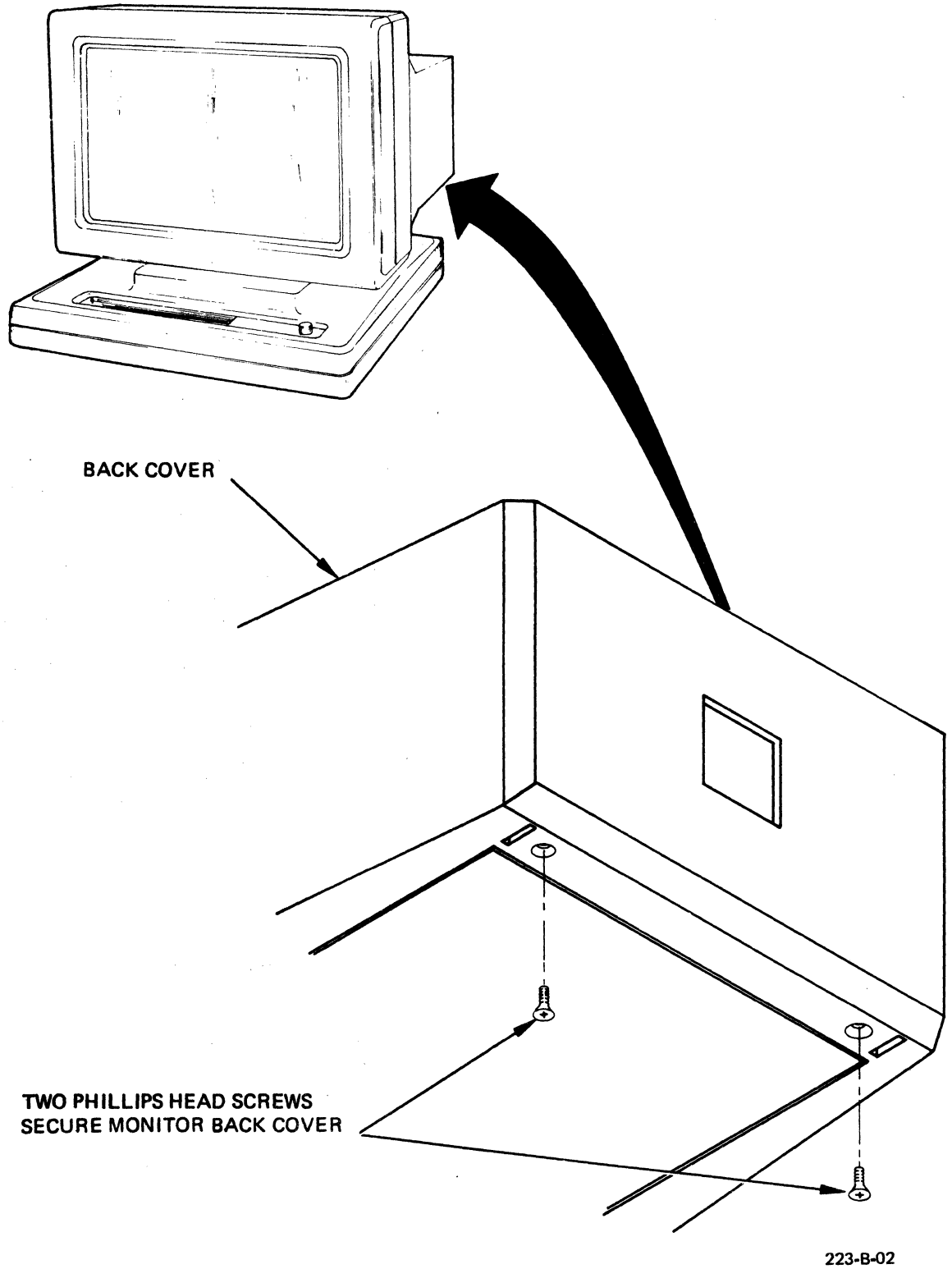


Figure 2-4. Monitor Back Cover Removal and Replacement

## SUBASSEMBLY REMOVAL AND REPLACEMENT

### Monitor - Bottom Cover

#### REMOVAL

To remove the bottom cover for access to the lower monitor area (logic PCB and power supply; also graphics PCB in QVT-211GX), proceed as follows. Refer to Figure 2-5.

#### CAUTION

Hazardous voltages are exposed in the general area of the power supply. Before performing any service in the lower monitor area, power OFF the terminal and disconnect the power cord.

1. Remove the knob from the brightness potentiometer.
2. Lay the monitor on its side and loosen the four recessed screws at the corners. These screws are captive screws, so it is not necessary to remove them.
3. Remove the bottom cover from the monitor. Note the routing of the main wiring harness so that it can be similarly routed when the bottom cover is reinstalled. To remove any of the subassemblies mounted on the inside of the bottom cover, refer to the appropriate removal procedure.

#### REPLACEMENT

1. Install any subassemblies on the inside of the bottom cover that have been previously removed. Refer to the appropriate replacement procedure.
2. Route the main wiring harness as noted in Step 3 above.
3. Position the bottom cover on the monitor and tighten the four recessed screws to secure it in place. Refer to Figure 2-5.
4. Install the knob on the stem of the brightness potentiometer.

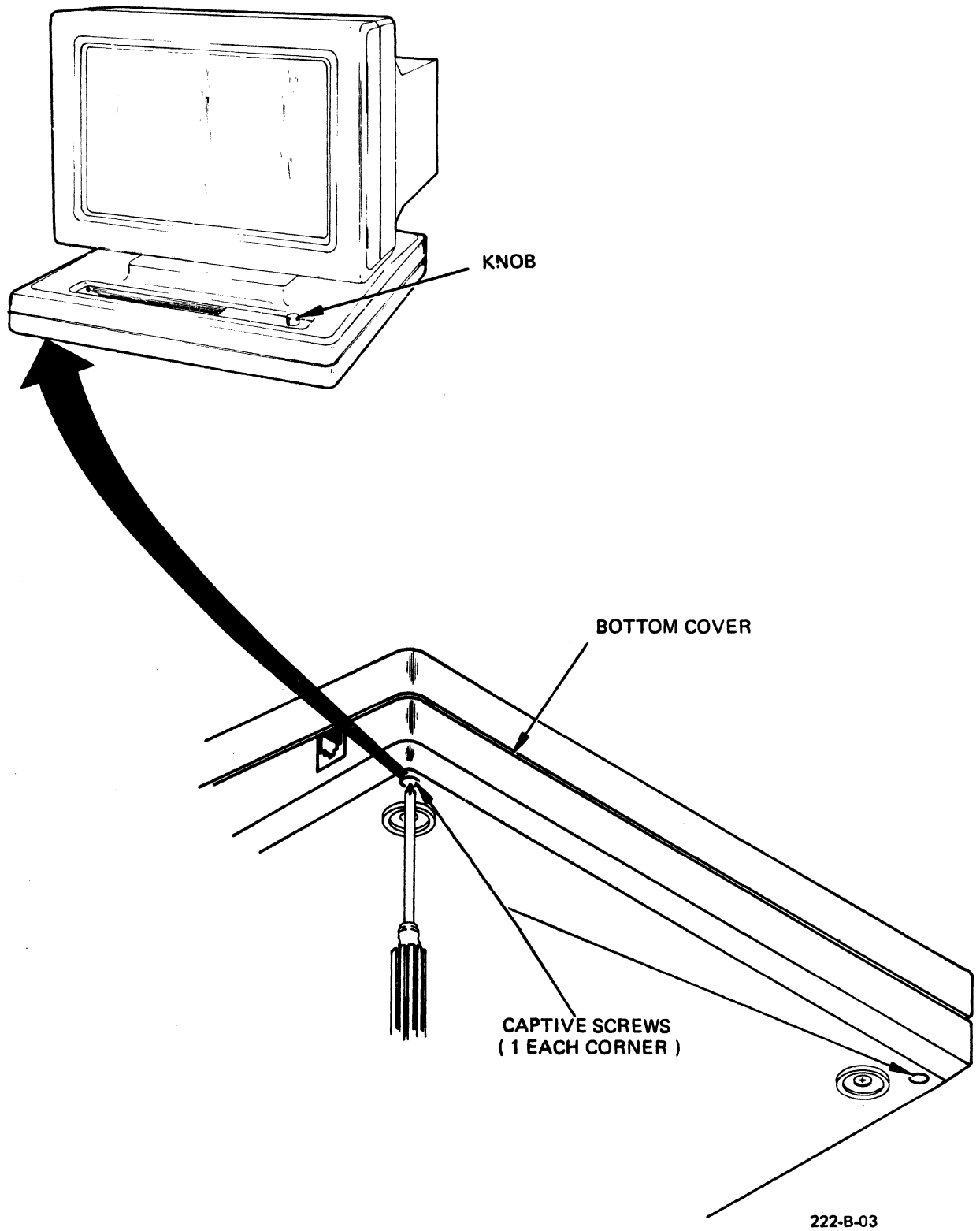


Figure 2-5. Monitor Bottom Cover Removal and Replacement

## SUBASSEMBLY REMOVAL AND REPLACEMENT

### LOWER MONITOR AREA SUBASSEMBLIES

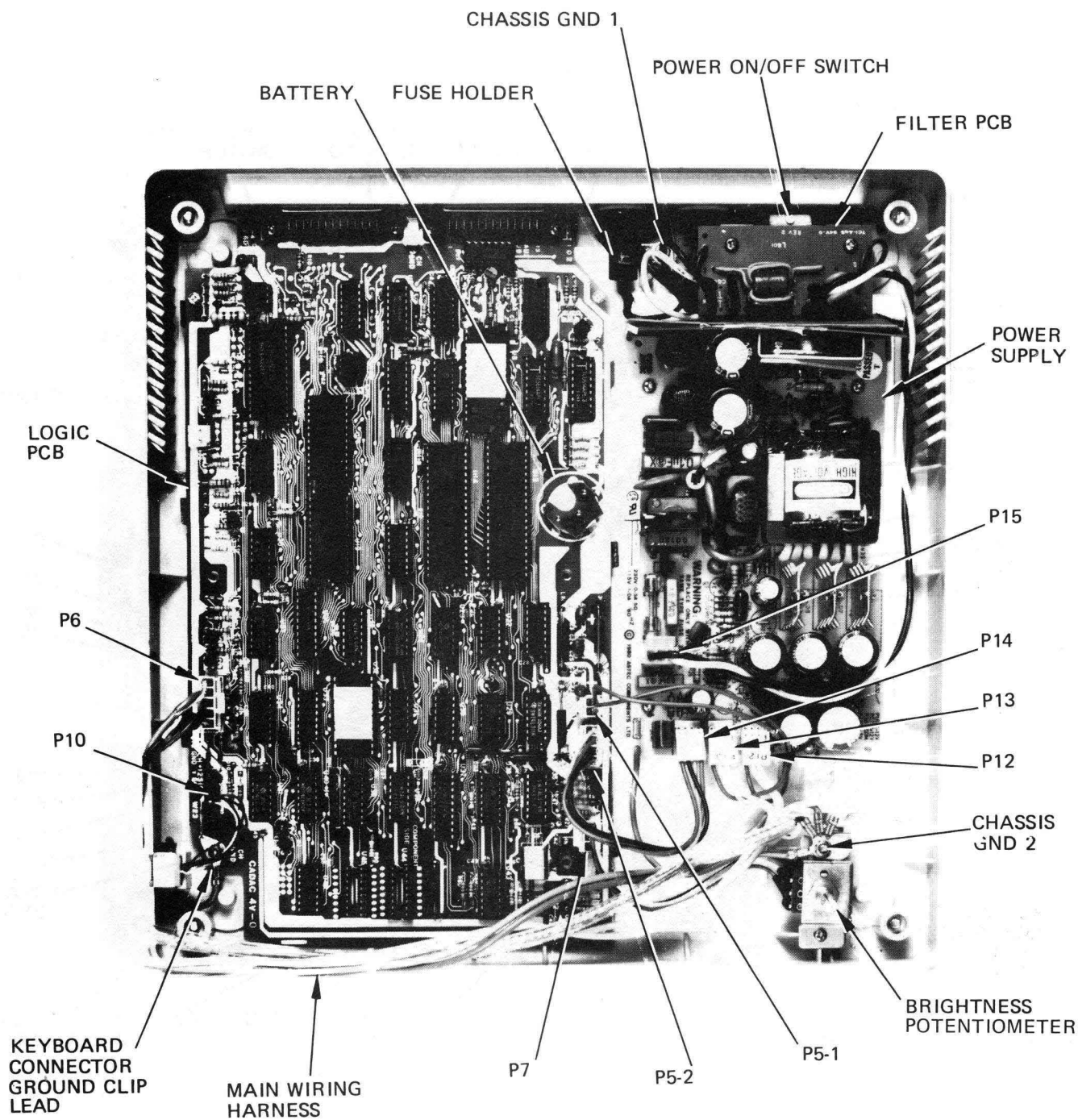
The Lower Monitor Area contains the following subassemblies.

- Graphics PCB (in QVT-211GX only)
- Logic PCB,
- Power Supply,
- Power On/Off Switch,
- Fuse Holder,
- Battery,
- Brightness Potentiometer,
- Main Wiring Harness.

Figure 2-6 illustrates the QVT-102/QVT-102A lower monitor area subassemblies, and Figure 2-6a illustrates these same subassemblies of the QVT-211GX. Figure 2-7 illustrates the QVT-108 lower monitor area subassemblies.



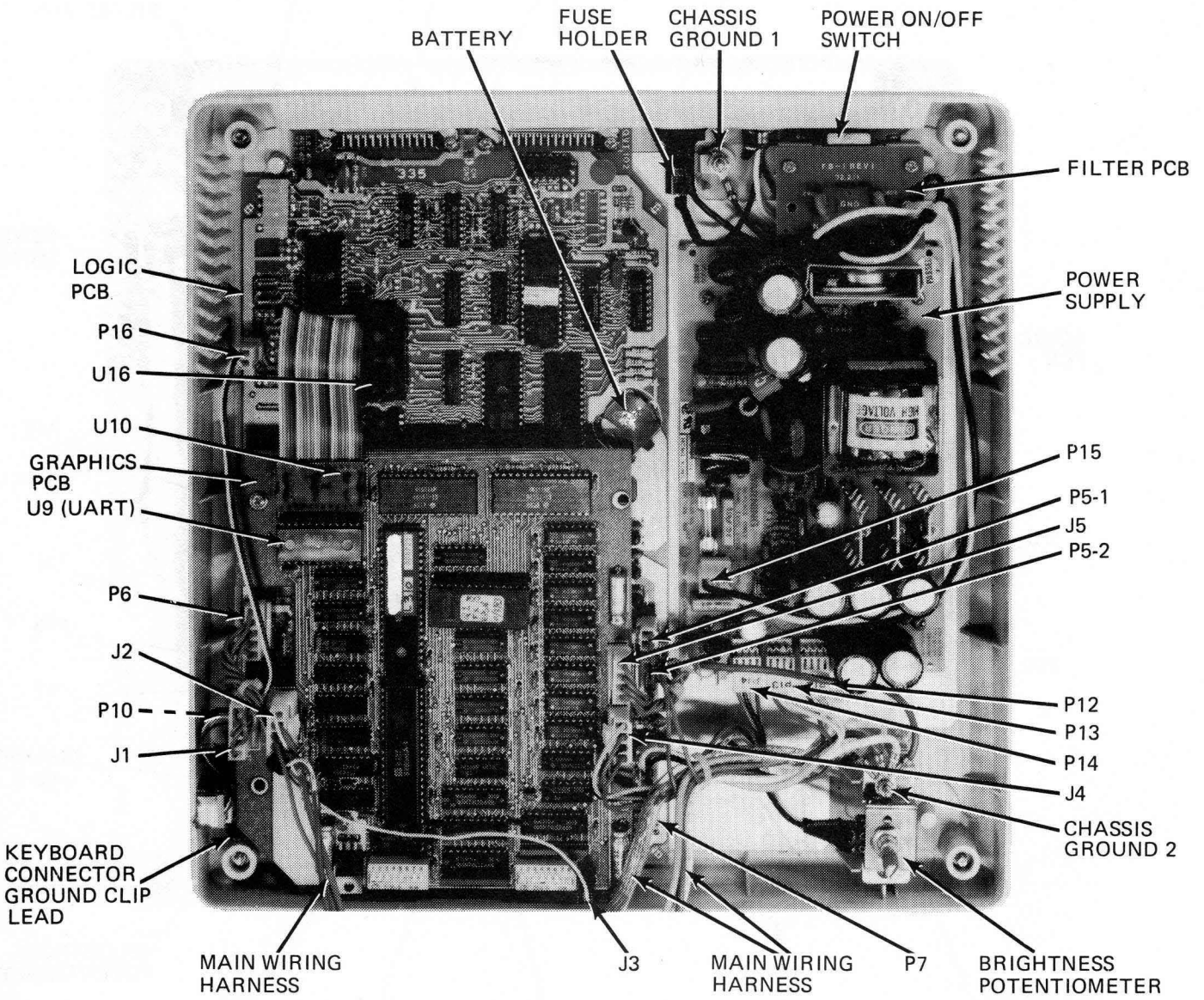
SUBASSEMBLY REMOVAL AND REPLACEMENT



0159

Figure 2-6. Lower Monitor Area (QVT-102/QVT-102A)

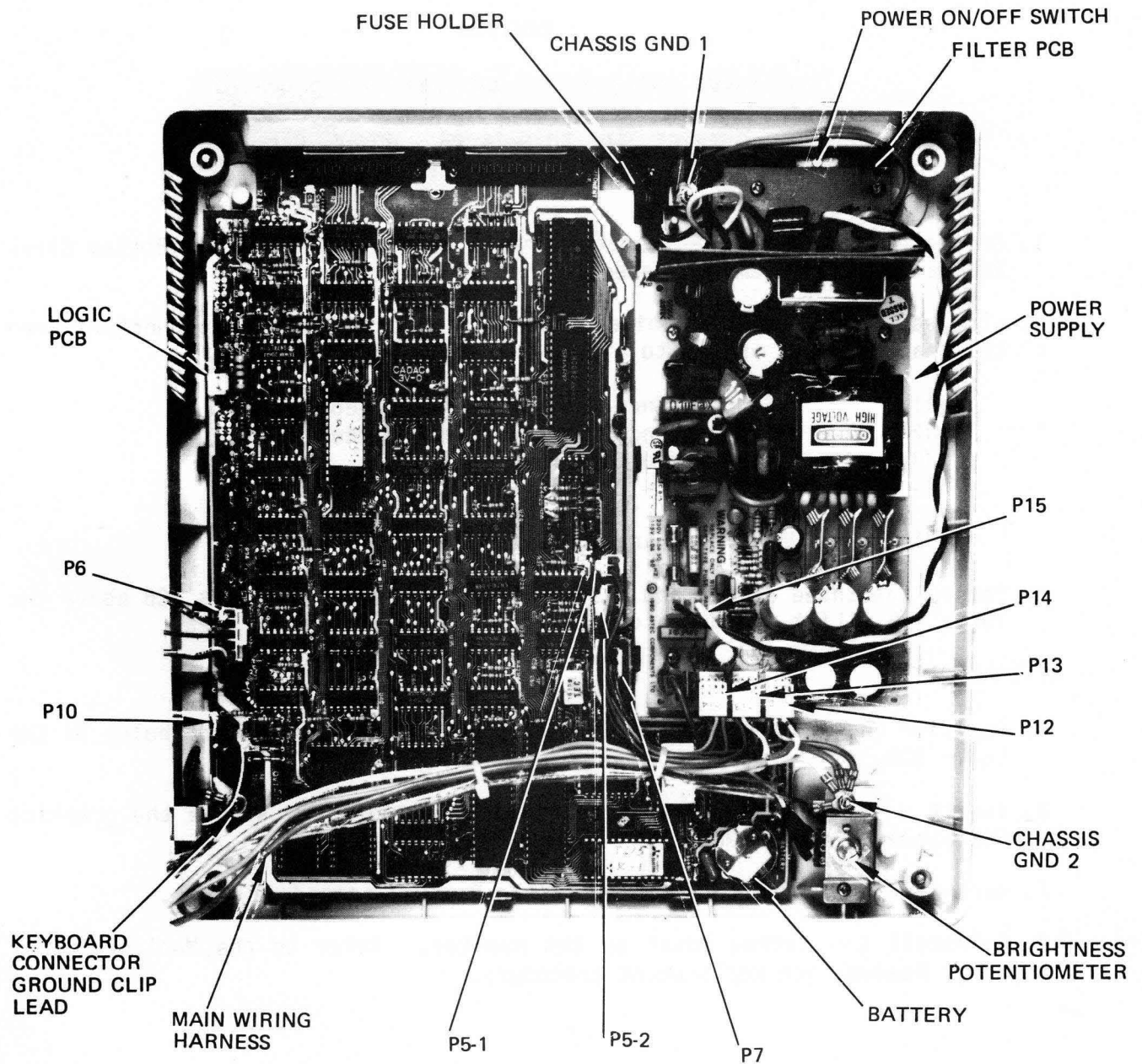
SUBASSEMBLY REMOVAL AND REPLACEMENT



0185

Figure 2-6a. Lower Monitor Area (QVT-211GX)

SUBASSEMBLY REMOVAL AND REPLACEMENT



0160

Figure 2-7. Lower Monitor Area (QVT-108)

## SUBASSEMBLY REMOVAL AND REPLACEMENT

### Graphics PCB (QVT-211GX Only)

#### REMOVAL

#### CAUTION

Hazardous voltages are exposed in the general area of the power supply. Before performing any service in this area, power OFF the terminal and disconnect the power cord.

1. Gain access to the lower monitor area. Refer to the Monitor-Bottom Cover Removal and Replacement procedure.
2. List each plug and jack while disconnecting the following connectors from the graphics PCB. Refer to Figure 2-6a.

J1	H.Sync, H.Gnd, V.Sync, V.Gnd, Video
J2	H.Sync, H.Gnd, V.Sync, V.Gnd, Video
J3	Serial video data
J4	+5V, +12V, -12V, Sig Gnd
J5	+5V, +12V, -12V, Common
U10	UART input and output

3. Remove the three screws and washers that secure the graphics PCB above the logic PCB. Lift the graphics PCB from the lower monitor area.

#### REPLACEMENT

1. Position the standoffs on the graphics PCB above their mating holes in the Logic PCB.
2. Insert a screw with washer through each standoff and secure the graphics PCB above the logic PCB.
3. Reconnect all connectors listed in the Removal procedure above.
4. Reinstall the bottom cover on the monitor. Refer to the Monitor-Bottom Cover Removal and Replacement procedure.

**Logic PCB****REMOVAL****CAUTION**

Hazardous voltages are exposed in the general area of the power supply. Before performing any service in this area, power OFF the terminal and disconnect the power cord.

1. Gain access to the lower monitor area. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.
2. Remove the graphics PCB. Refer to the Graphics PCB Removal and Replacement procedure.
3. Disconnect the following connectors from the logic PCB. Refer to Figure 2-6, 2-6a or Figure 2-7 as appropriate.

P5-1	+5 Vdc from the power supply,
P5-2	+5, +12 and -12 Vdc from the power supply,
P6	Video, H Sync, and V Sync from Logic PCB
P7	Brightness potentiometer,
P10	Keyboard input.
P16	Graphics video data (QVT-211GX)
U16	UART data (QVT-211 GX)

**NOTE**

Note the arrangement of the RFI shield material installed under the logic PCB so that it can be reinstalled in exact order (refer to the exploded view diagram in the **Parts** Section for a depiction of this arrangement). QVT-102/QVT-102A terminals prior to serial number 39480 do not have this RFI shield.

4. Remove the eight screws that secure the logic PCB (and the chassis ground strap on the keyboard input jack) to the bottom cover. Lift the logic PCB from the bottom cover.

**REPLACEMENT**

1. Position the logic PCB over its mounting holes in the bottom cover and secure it in place with eight screws. In terminals equipped with the RFI shield material, be sure that it is correctly reinstalled; also secure the chassis ground strap from the keyboard input jack. Refer to the exploded view diagram in the **Parts** Section and to Figure 2-6, 2-6a or Figure 2-7 as appropriate.

## SUBASSEMBLY REMOVAL AND REPLACEMENT

2. Reconnect all connectors listed in the Removal procedure above.
3. Reinstall the graphics PCB.
4. Reinstall the bottom cover on the monitor. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.

### Switching Power Supply

#### REMOVAL

#### CAUTION

Hazardous voltages are exposed in the general area of the power supply. Before performing any service in this area, power OFF the terminal and disconnect the power cord.

1. Gain access to the lower monitor area. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.
2. Disconnect the following connectors from the power supply. Refer to Figure 2-6 2-6a or Figure 2-7 as appropriate.

P12		
P13	>	+5 Vdc and +12 Vdc output connectors,
P14		
P15		Source voltage input,
GND		Power supply ground. (The ground lead on later model power supplies is soldered to the power supply, but easily removable from Chassis Ground 2.).

3. Remove the four screws that secure the power supply to the bottom cover. Lift the power supply from the bottom cover.

#### REPLACEMENT

1. Position the power supply over its mounting holes in the bottom cover and secure it in place with four screws. Refer to Figure 2-6, 2-6a or Figure 2-7 as appropriate.
2. Reconnect all the connectors listed in the Removal procedure above.
3. Reinstall the bottom cover on the monitor. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.

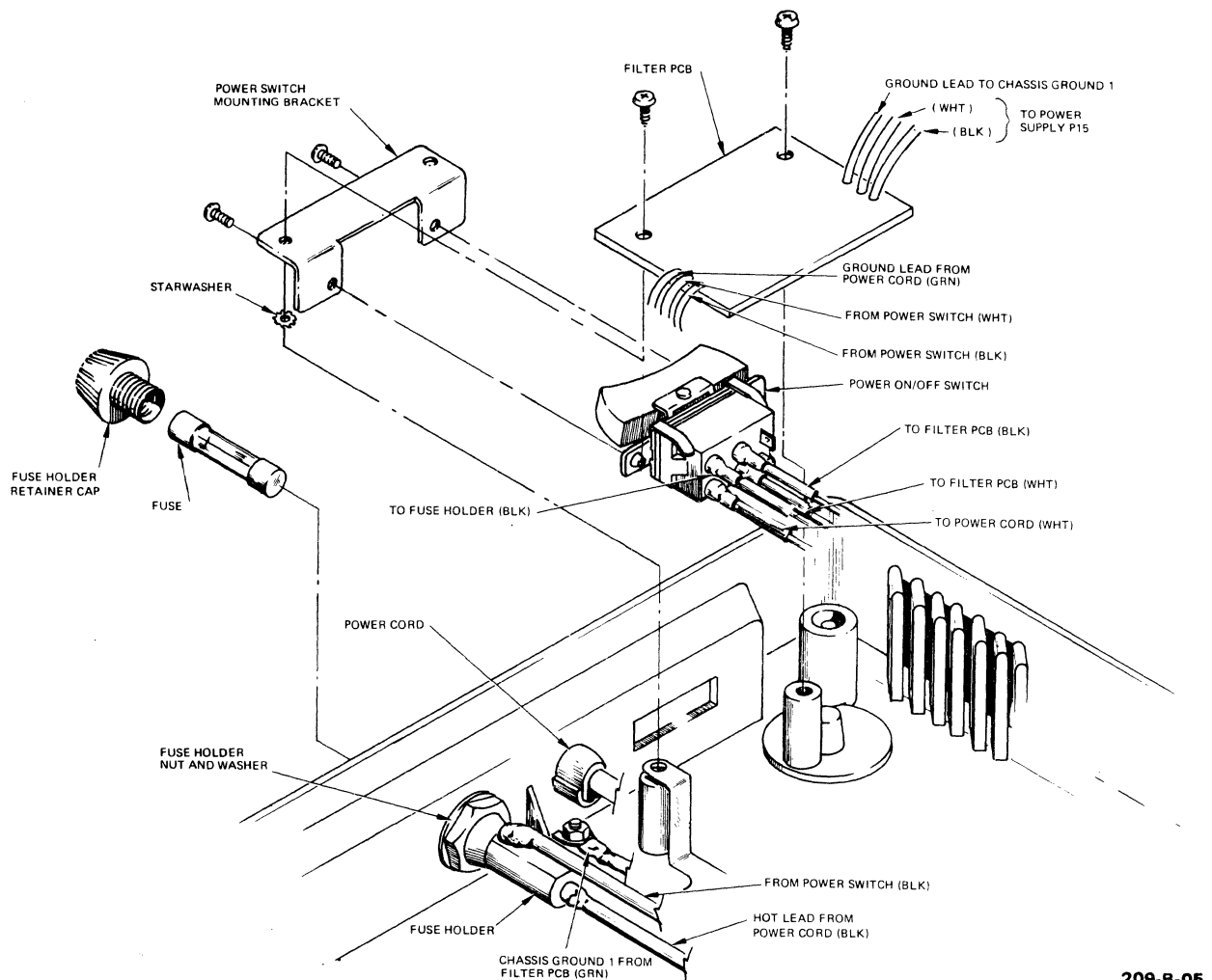
## Power On/Off Switch

## REMOVAL

## CAUTION

Hazardous voltages are exposed in the general area of the power supply. Before performing any service in this area, power OFF the terminal and disconnect the power cord.

1. Gain access to the lower monitor area. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.
2. Remove the two screws that secure the filter PCB and the power switch with bracket in the bottom cover. Refer to Figure 2-8.



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Figure 2-8. Power ON/OFF Switch and Fuse Holder Removal and Replacement

## SUBASSEMBLY REMOVAL AND REPLACEMENT

3. Move the filter PCB to expose the fuse holder; it is not necessary to de-solder the connecting leads on the filter PCB.
4. Note the arrangement of the four leads on the power switch. De-solder these leads and remove the power switch with its mounting bracket.
5. Remove the two screws that secure the power switch to its mounting bracket. Remove the power switch.

## REPLACEMENT

1. Secure the power switch to its mounting bracket with the two screws removed in Step 5 above. Refer to Figure 2-8.
2. Re-solder the four leads to the power switch.
3. Position the power switch mounting bracket over its mounting holes in the bottom cover. Position the filter PCB over the power switch mounting bracket so that all mounting holes are in line. Secure in place with the two screws removed in Step 2 above.
4. Reinstall the bottom cover on the monitor. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.

## Fuse Holder

### REMOVAL

#### CAUTION

Hazardous voltages are exposed in the general area of the power supply. Before performing any service in this area, power OFF the terminal and disconnect the power cord.

1. Gain access to the lower monitor area. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.
2. Note the arrangement of the two leads on the fuse holder. De-solder these leads from the fuse holder. Refer to Figure 2-8.
3. With a small adjustable wrench, remove the nut and washer that secures the fuse holder to the inside of the bottom cover. Remove the fuse holder.

### REPLACEMENT

1. Install the fuse holder in the bottom cover and secure it in place with the washer and nut removed in Step 3 above. Refer to Figure 2-8.
2. Re-solder the two leads to the fuse holder.



3. Reinstall the bottom cover on the monitor. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.

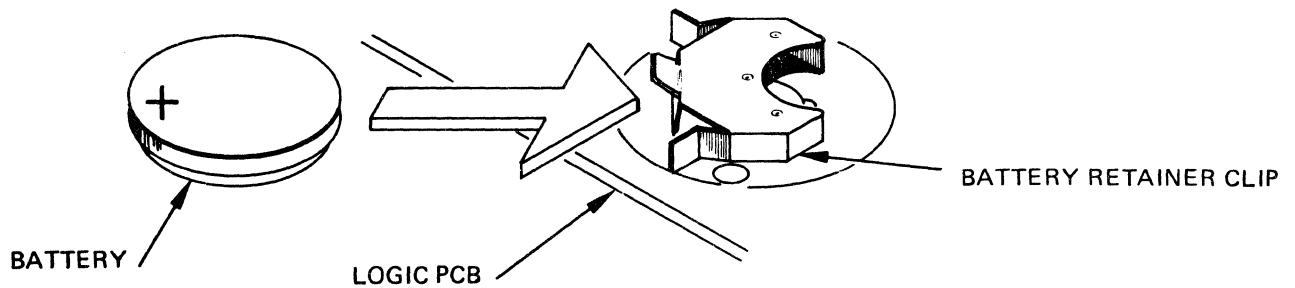
## Battery

### REMOVAL AND REPLACEMENT

#### CAUTION

Hazardous voltages are exposed in the general area of the power supply. Before performing any service in this area, power OFF the terminal and disconnect the power cord.

The battery is easily removed and replaced by sliding it in and out of its retainer clip on the logic PCB (refer to Figure 2-9). As a reference, note the status line set-up configuration of the terminal before removing the battery. Once the battery is replaced, if after power ON the status line appears to be altered, execute a Shift-D and reconfigure the status line as you have noted.



695-A-02

Figure 2-9. Battery Removal and Replacement

## SUBASSEMBLY REMOVAL AND REPLACEMENT

### Brightness Potentiometer

#### REMOVAL

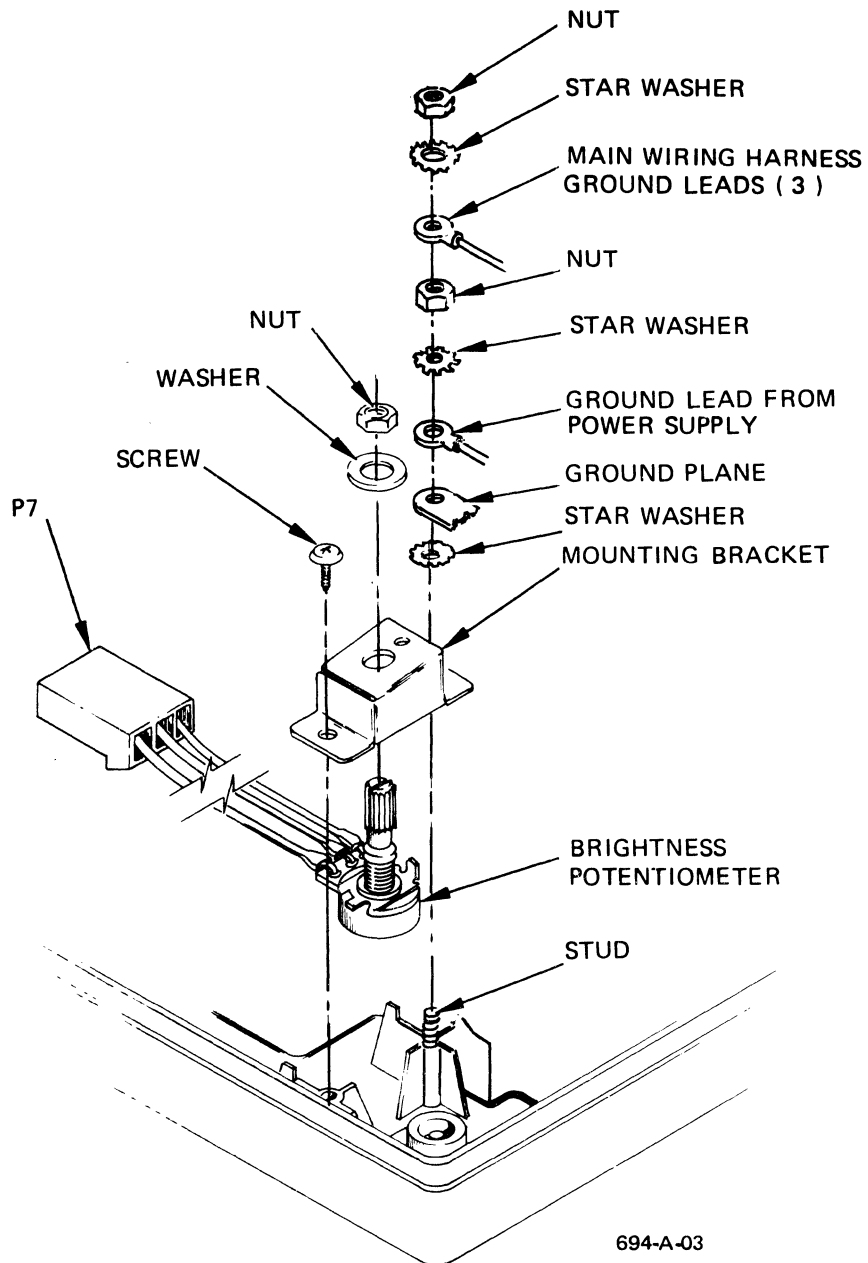
#### CAUTION

Hazardous voltages are exposed in the general area of the power supply. Before performing any service in this area, power OFF the terminal and disconnect the power cord.

1. Gain access to the lower monitor area. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.
2. Disconnect the brightness potentiometer connector (P7) from the Logic PCB. Refer to Figure 2-6, 2-6a or Figure 2-7 as appropriate.
3. Remove the screw and two nuts that secure the brightness potentiometer and mounting bracket to the bottom cover. Refer to Figure 2-10; note the arrangement of all ground leads.
4. With a small adjustable wrench, remove the nut that secures the brightness potentiometer to the mounting bracket. Remove the brightness potentiometer.

#### REPLACEMENT

1. Secure the brightness potentiometer to its mounting bracket with the nut removed in Step 4 above. Refer to Figure 2-10.
2. Position the brightness potentiometer with mounting bracket over the stud and mounting hole in the bottom cover. Be sure to orient the mounting bracket so that the high side of its sloped top surface is toward the rear. Secure the brightness potentiometer mounting bracket and all ground leads with the screw and two nuts removed in Step 3 above.
3. Reconnect the brightness potentiometer connector (P7) to the Logic PCB. Refer to Figure 2-6, 2-6a or Figure 2-7 as appropriate.
4. Reinstall the bottom cover on the monitor. Refer to the Monitor - Bottom Cover Removal and Replacement procedure.



694-A-03

Figure 2-10. Brightness Potentiometer Removal and Replacement

### Main Wiring Harness

The main wiring harness includes all the point-to-point wiring between the major subassemblies of each terminal. If removal and replacement of the main wiring harnesses is required, refer to the Interconnect Wiring Diagram in the **Circuits and Diagrams** Section.

## SUBASSEMBLY REMOVAL AND REPLACEMENT

### UPPER MONITOR AREA SUBASSEMBLIES

The Upper Monitor Area contains the following subassemblies. Refer to Figure 2-11.

- Video PCB,
- CRT.

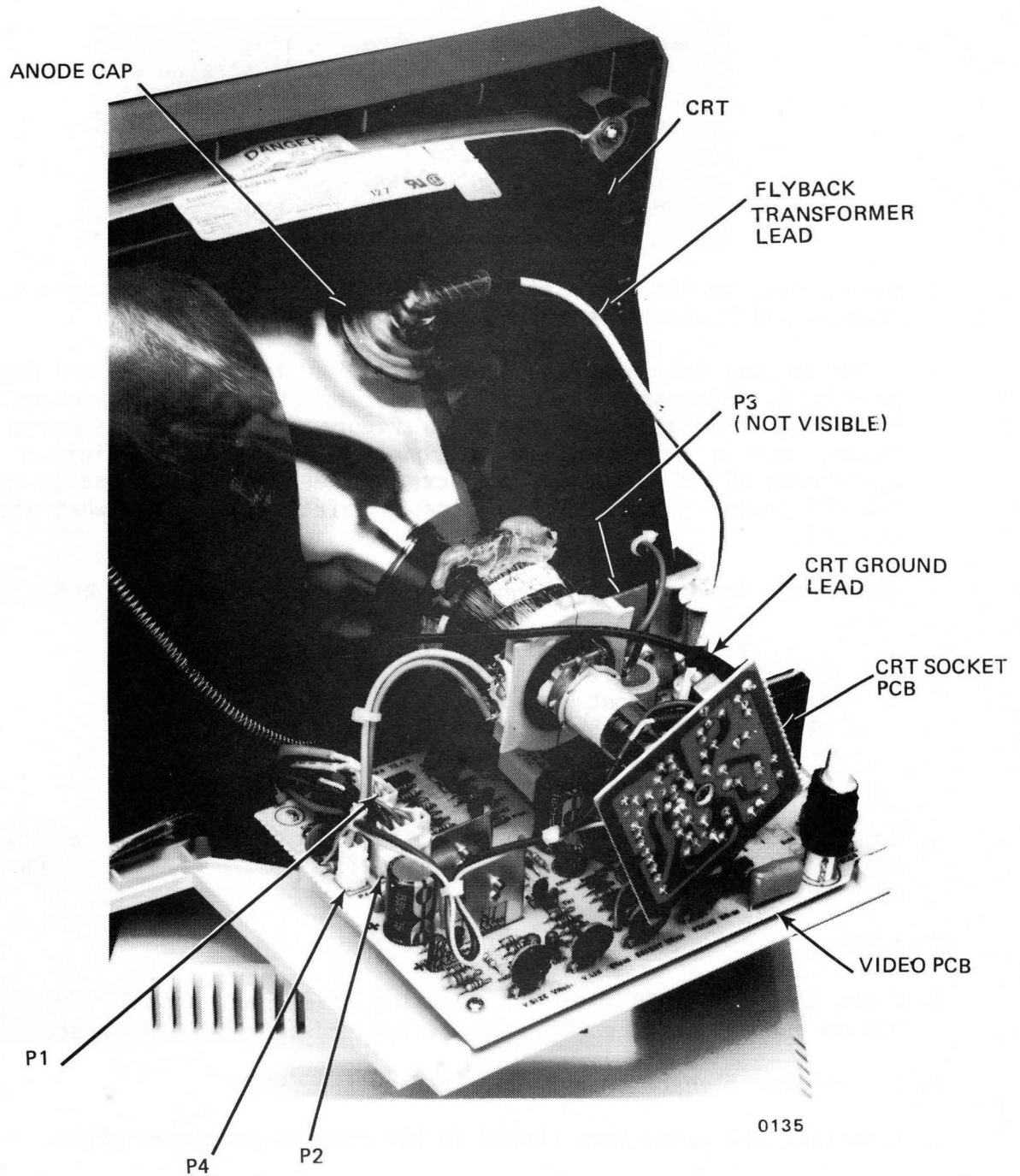


Figure 2-11. Upper Monitor Area

**Video PCB**

**REMOVAL**

**CAUTION**

Take special care when working in the general area of the CRT. Do not scratch or strike the CRT or subject it to unusual pressure. The CRT contains a high vacuum and breakage of the tube may result in injury from flying glass. As a precaution wear suitable clothing and eye protection.

1. Gain access to the upper monitor area. Refer to the Monitor - Back Cover Removal and Replacement procedure.
2. Refer to the following CRT and Deflection Yoke Removal and Replacement procedure. Discharge the CRT high voltage circuit and disconnect the CRT anode cap from the CRT (refer to Figure 2-11). To discharge the CRT anode, use a high voltage discharge probe with a minimum internal resistance of 100 kOhm, and connected between the CRT grounding spring and the CRT anode. Observe all applicable safety regulations when discharging the CRT.
3. Disconnect the following connectors from the video PCB. Refer to Figure 2-11.

P1	+12, -12 Vdc,
P2	Horizontal and vertical sync, video
P3	Horizontal yoke deflection,
P4	Vertical yoke deflection,
GND	CRT ground lead.

4. Remove the five screws that secure the video PCB in place, and remove the CRT socket PCB from the neck of the CRT. Remove the video PCB from the monitor.

**REPLACEMENT**

1. Place the video PCB over its mounting holes, and install the CRT socket PCB on the neck of the CRT. Secure the video PCB with five screws.
2. Install the flyback transformer lead on the CRT.
3. Reconnect all connectors listed in the removal procedure above.
4. Perform any video alignments necessary.
5. Reinstall the back cover on the monitor. Refer to the Monitor - Back Cover Removal and Replacement procedure.

**CRT With Deflection Yoke****REMOVAL****NOTE**

The deflection yoke is part of the CRT assembly and is aligned for minimum distortion. Do not remove the yoke from the CRT. Always replace the CRT and yoke as a single unit.

**CAUTION**

Take special care when working in the general area of the CRT. Do not scratch or strike the CRT or subject it to unusual pressure. The CRT contains a high vacuum and breakage of the tube may result in injury from flying glass. As a precaution wear suitable clothing and eye protection.

Although power has been removed from the video terminal, a hazardously high residual voltage of several thousand volts may be present in the CRT. This static charge can be accidentally contacted at the CRT anode connector or at the flyback transformer on the video PCB. To prevent electrical shock, always discharge the CRT by contacting its anode contact to ground (CRT grounding spring) before performing any maintenance in the upper monitor area.

1. Gain access to the upper monitor area. Refer to the Monitor - Back Cover Removal and Replacement procedure.
2. Discharge the CRT high voltage circuit (refer to Figure 2-11). To discharge the CRT anode, use a high voltage discharge probe with a minimum internal resistance of 100K Ohm, connected between the CRT grounding spring and the CRT anode. Observe all applicable safety procedures when discharging the CRT.
3. Disconnect the CRT anode cap and cable from the CRT. Do not use tools and use your hands only to avoid damage to the CRT. First, lift the full circle of the anode cap's plastic flange away from the CRT glass, then, hold the flange folded between thumb and index finger. Next, while pushing against one side of the anode cap near its base, disengage the cap's contact prong on that side from the CRT anode contact. Finally, disengage the cap's other contact prong to completely remove the cap from the CRT.

## SUBASSEMBLY REMOVAL AND REPLACEMENT

4. Disconnect connectors P3 and P4 (horizontal and vertical yoke deflection leads) from the video PCB. Refer to Figure 2-11.
5. Disconnect the CRT ground lead from the CRT socket PCB, and remove the socket PCB from the neck of the CRT.
6. Support the CRT and remove the four screws that secure it in the display swivel support. Remove the CRT from the monitor cabinet. Remove the grounding spring from the CRT.

## REPLACEMENT

1. Install the grounding spring between the CRT upper left and lower right mounting tabs. Then, position the CRT over its mounting holes in the display swivel support and secure it with the four screws removed in Step 5 above.
2. Install the CRT socket PCB on the neck of the CRT. Connect the ground lead from the CRT grounding spring to the CRT socket PCB. Refer to Figure 2-11.
3. Install connectors P3 and P4 on the video PCB.
4. Reconnect the flyback transformer anode cap to the CRT.
5. Perform any video alignments necessary.
6. Reinstall the back cover on the monitor. Refer to the Monitor - Back Cover Removal and Replacement procedure.



**ALIGNMENT****INTRODUCTION**

The alignment parameters presented in this section are to be regarded as guidelines only and not as specifications criteria.

Video alignment of the QVT terminal is divided into the following alignment procedures.

- Display Centering (Raster Position),
- Horizontal Display Width,
- Vertical Display Height,
- Horizontal Linearity (Uniform Character Width),
- Vertical Linearity (Uniform Character Height),
- Brightness,
- Focus.

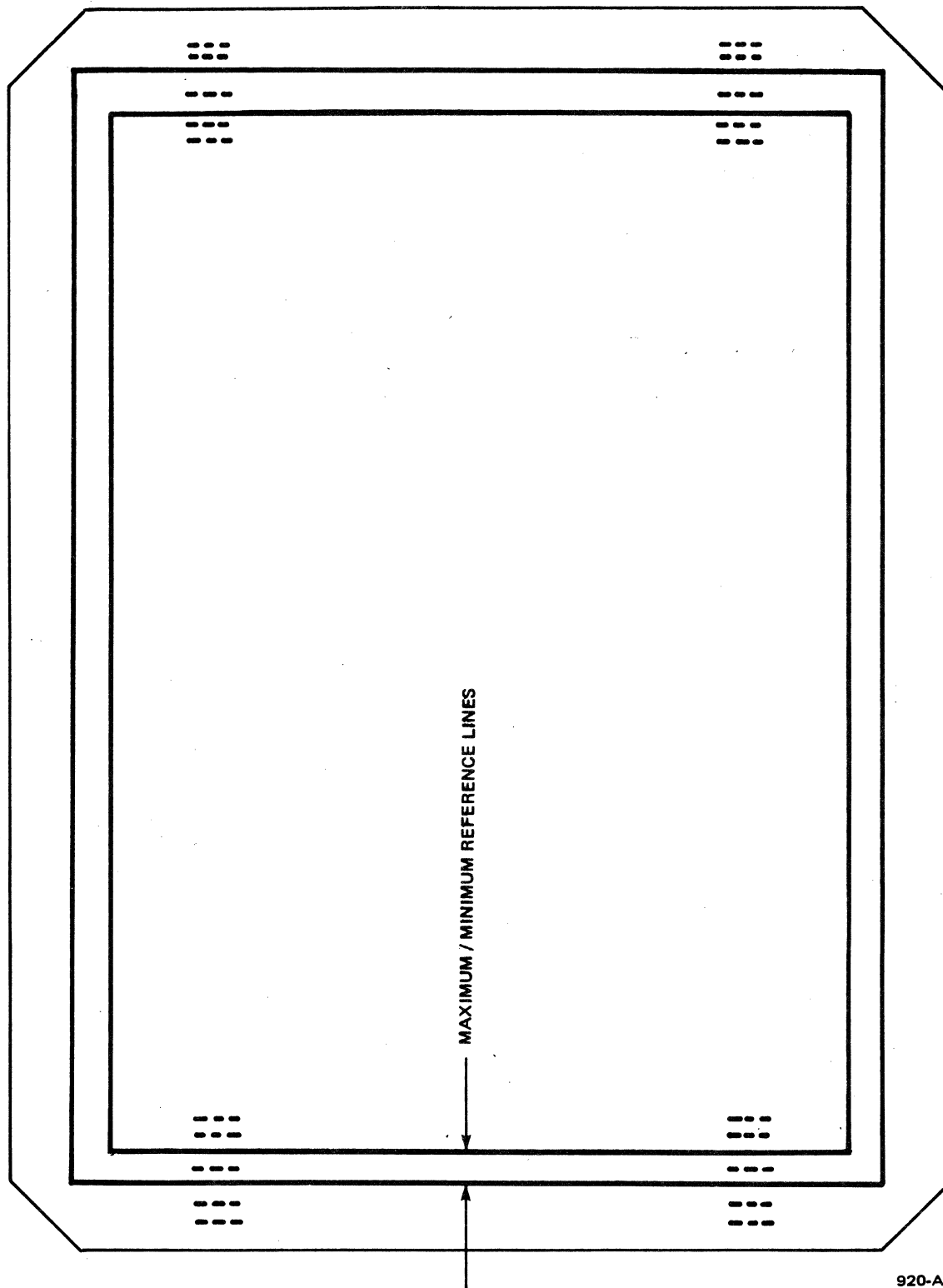
Note: It is recommended that the Display Centering alignment procedure be performed first.

**TOOLS AND EQUIPMENT REQUIRED**

The following tools are required to perform video alignment of the QVT terminal:

- QVT Field Service Tool Kit (Q.P.N. 84841-01), that includes the following:
  - o Display Alignment Template: Q.P.N. 10350-01 for 12 inch displays, and 10350-02 for 14 inch displays. Refer to Figure 3-1.
  - o Character Alignment Template: Q.P.N. 10351-01 for 12 inch displays, and 10351-02 for 14 inch displays. Refer to Figure 3-2.
  - o 0.01 inch Alignment Tool (Q.P.N. 10348-01).
  - o Small, Non-metallic Screwdriver (Q.P.N. 10349-01).
  - o Key Cap Puller (Q.P.N. 84873-01). Note: Not required for any alignment procedure.
- Phillips Screwdriver.
- Multimeter (for Brightness and Focus alignment procedures).
- Oscilloscope (for Focus alignment procedure only).

ALIGNMENT



920-A

Figure 3-1. Display Alignment Template  
(Q.P.N. 10350-01 for 12 inch displays; Q.P.N. 10350-02 for 14 inch displays)

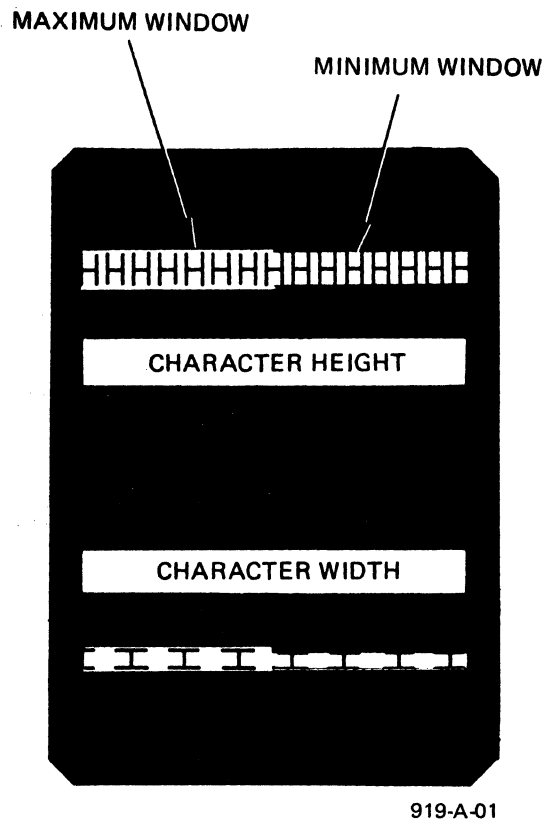


Figure 3-2. Character Alignment Template  
(Q.P.N. 10351-01 for 12 inch displays; Q.P.N. 10351-02 for 14 inch displays)

# ALIGNMENT

## ALIGNMENT CONDITIONS

All alignment procedures should be thoroughly read and only performed under the following conditions:

- Warm-up. Allow the terminal to stabilize at its operating temperature; approximately ten minutes.
- Back cover removed. Refer to the Monitor - Back Cover Removal and Replacement procedure.
- Local Mode. Configure the terminal for local mode operation.
- Standard Video/Reverse Video. Perform all alignment procedures in the terminal's normal operating display condition.
- "H" Test Pattern displayed. The terminal has a built-in test pattern that displays a full screen of "Hs," and identifies the firmware revision level. To display the "H" test pattern on the QVT terminal refer to Table 3-1. Refer to Figure 3-3 for an illustration of the "H" test pattern.

Table 3-1. Display Test Pattern Commands

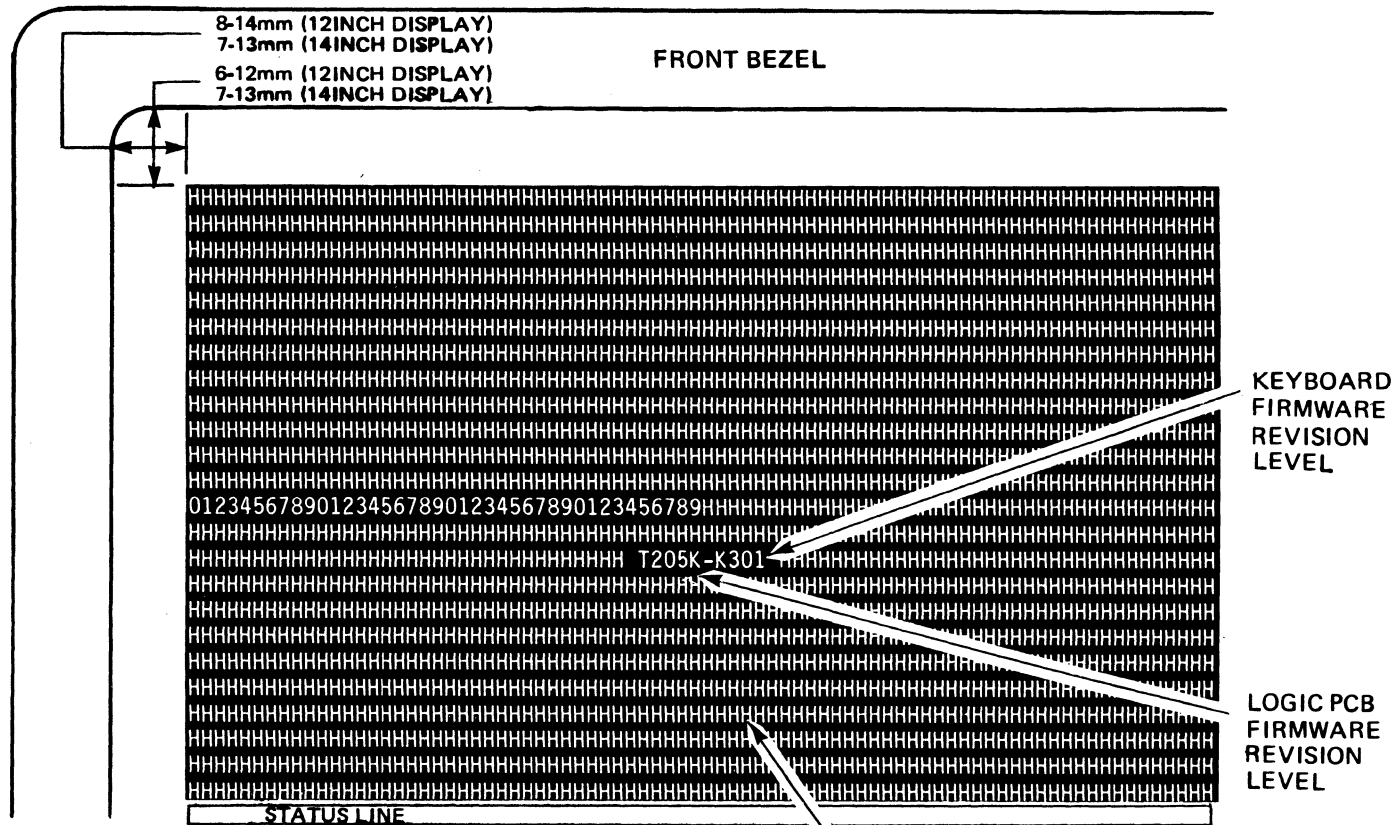
	QVT-102	QVT-102A	QVT-108
To Display "H" Test Pattern	Press Setup and Zero Keys	Press Control/Shift/Setup and Zero Keys	Press Control/Shift/Setup and Zero Keys

### CAUTION

Take care when handling the CRT. Do not scratch or strike the CRT or subject it to unusual pressure. The CRT contains a high vacuum and breakage of the tube may result in injury from flying glass. As a precaution wear suitable clothing with eye protection.

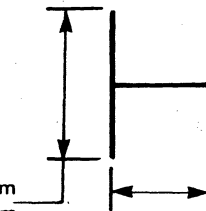
Hazardous voltages are present in the general area of the flyback transformer lead and the CRT anode cap. Exercise caution to avoid electrical shock when performing any video alignment procedure. Remember that the terminal is powered ON.

Figure 3-3. The "H" Test Pattern



DISPLAY DIMENSIONS (EACH CORNER)

(12 INCH DISPLAY) 4.25-5.05mm  
 (14 INCH DISPLAY) 4.72-5.72mm



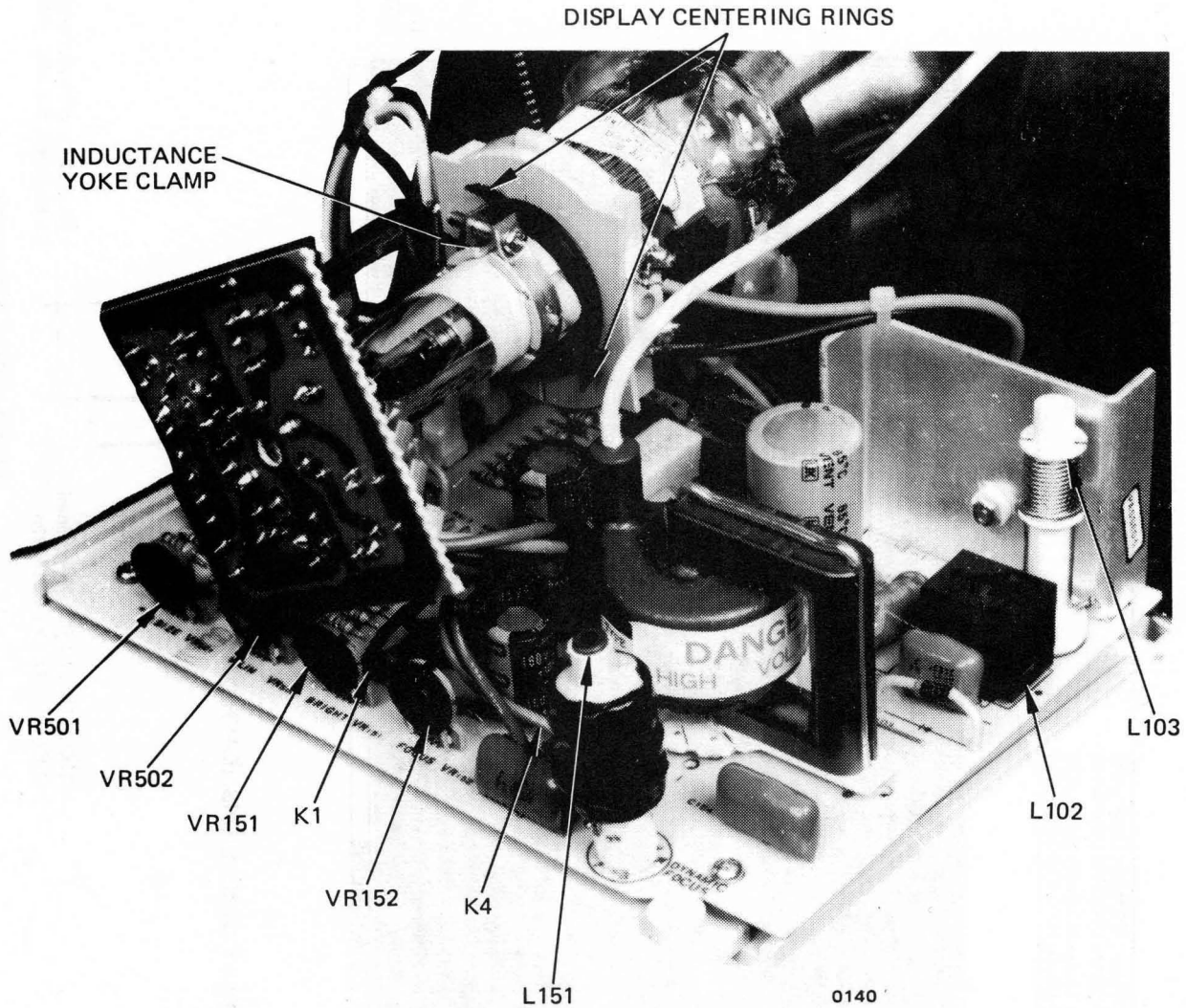
CHARACTER DIMENSIONS

1.80-2.40mm (12 INCH DISPLAY)  
 2.27-2.87mm (14 INCH DISPLAY)

# ALIGNMENT

## VIDEO ALIGNMENT PROCEDURES

Video alignment of the QVT terminal is accomplished by adjusting one or more of the adjustments illustrated in Figure 3-4. Each alignment procedure is described below.



### LEGEND

VR501	Vertical Display Height
VR502	Vertical Linearity
VR151	Brightness
VR152 and L151	Focus
L103	Horizontal Display Width
L102	Horizontal Linearity
K1 and K4	Test Points
Rings and Clamp	Display Centering

Figure 3-4. Video Alignments

Display Centering, Horizontal Display Width, and Vertical Display Height have interrelated alignment procedures. Prior to performing these procedures, perform the following preliminary steps, then proceed through the alignment procedures in order.

1. Display the "H" test pattern (refer to Table 3-1).
2. Display the status line if it is not already displayed.
3. Position the Display Template (Q.P.N. 84841-01 for 12-inch screen or 84841-02 for 14-inch screen) over the "H" test pattern. When using the display template, be sure to position the template over the display screen so that it is snug against the left side of the bezel. If the display is correctly centered, the edges of the "H" test pattern and status line will be visible between the outside edges of the parallel Maximum and Minimum Reference Lines on the display template (refer to Figure 3-1). If this condition is observed, horizontal display width and vertical display height are also correct. If the display template is not available, continue with the following steps.
4. If the edges of the "H" test pattern and status line do not fall between the template's parallel reference lines, or if a template is not available, visually center the display on the screen by rotating the centering rings (refer to Figure 3-3) on the yoke of the CRT. If a gross centering adjustment of the display is required, loosen the inductance yoke clamp and verify that it is as far forward as possible on the neck of the CRT. Re-tighten the clamp, being careful not to over tighten it, and then repeat the centering adjustment with the centering rings.
5. Perform the Horizontal Display Width alignment procedure.

### Horizontal Display Width

Horizontal display width is correctly adjusted when the width of the "H" test pattern displays with the following dimensions: Refer to Figure 3-3.

<u>12 Inch Display</u>	<u>14 Inch Display</u>
8 to 14 mm from the left and right inside edges of the bezel (Nominal)	7 to 13 mm from the left and right inside edges of the bezel (Nominal)

To verify and adjust horizontal display width, proceed as follows:

1. Display the "H" test pattern (refer to Table 3-1).
2. Measure the horizontal display width using the Display Template (Q.P.N. 10350-01, or 02 as appropriate). When using the display template, be sure to position the template over the display screen so that it is snug against the left side of the bezel. Display width is correctly adjusted when the width of the "H" test pattern falls between the outside edges of the parallel Maximum and Minimum Reference Lines on the template (refer to Figure 3-1). If a display template is not available, a non-metallic metric ruler may be used to verify the dimensions listed above.

## ALIGNMENT

3. If adjustment is required, rotate inductor L103 on the Video PCB (refer to Figure 3-3) with the 0.1 inch Alignment Tool (Q.P.N. 10348-01). Clockwise rotation of L103 increases display width and counter-clockwise rotation reduces display width.
4. Perform the Vertical Display Height alignment procedure.

### Vertical Display Height

Vertical display height is correctly adjusted when the height of the "H" test pattern, as measured from the bottom of the status line to the top of the first line, displays with the following dimensions: Refer to Figure 3-3.

<u>12 Inch Display</u>	<u>14 Inch Display</u>
6 to 12 mm from the top and bottom inside edges of the bezel (Nominal)	7 to 13 mm from the top and bottom inside edges of the bezel (Nominal)

To verify and adjust vertical display height, proceed as follows:

1. Display the "H" test pattern (refer to Table 3-1).
2. Display the status line if it is not already displayed.
3. Measure the vertical display height with the Display Template (Q.P.N. 10350-01, or 02 as appropriate). When using the display template, be sure to position the template over the display screen so that it is snug against the left side of the bezel. Display height is correctly adjusted when the height of the "H" test pattern (with status line displayed) falls between the outside edges of the parallel Maximum and Minimum Reference Lines on the template (refer to Figure 3-1). If a display template is not available, a non-metallic metric ruler may be used to verify the dimensions listed above.
4. If adjustment is required, rotate pot VR501 on the Video PCB (refer to Figure 3-3) with a small non-metallic screwdriver (Q.P.N. 10349-01). Clockwise rotation of VR501 increases display height and counter-clockwise rotation reduces display height.

### Display Centering (Raster Position)

The display is considered to be centered when the edges of the "H" test pattern (with status line displayed), are visible between the outside edges of the parallel Maximum and Minimum Reference Lines on the display template (refer to Figure 3-1). If the horizontal display width and vertical display height alignments are correct, the display is correctly centered. Should fine adjustment be absolutely necessary to center the display, rotate the centering rings (refer to Figure 3-4) on the yoke of the CRT. The centering rings are glued in position. Do not disturb the yoke clamp on the CRT.

If desired, blank the status line.



**Horizontal Linearity (Uniform Character Width)**

Horizontal linearity, or uniform character width, is considered to be properly adjusted when a sampling of measurements taken at various locations of the "H" test pattern, reveals a character having the following width dimensions.

<u>12 Inch Display</u>	<u>14 Inch Display</u>
1.80 to 2.40 mm (Nominal)	2.27 to 2.87 mm (Nominal)

To verify and adjust horizontal linearity, proceed as follows:

1. Display the "H" test pattern (refer to Table 3-1).
2. Measure character width at five locations in the test pattern (near each corner and the center). If the Character Template (Q.P.N. 10351-01, or 02 as appropriate) is used, proper character width will appear too large for the Minimum Window and too small for the Maximum Window (refer to Figure 3-2). A non-metallic metric ruler may be used if the template is not available.
3. If adjustment is required, locate inductor L102 on the Video PCB (refer to Figure 3-3). Using a small non-metallic screwdriver (Q.P.N. 10349-01), rotate L102 clockwise to increase character width or counter-clockwise to reduce character width.
4. Verify that no other display alignments have changed.

**Vertical Linearity (Uniform Character Height)**

Vertical linearity, or uniform character height, is considered to be properly adjusted when a sampling of measurements taken at various locations of the "H" test pattern, reveals a character having the following height dimensions.

<u>12 Inch Display</u>	<u>14 Inch Display</u>
4.25 to 5.05 mm (Nominal)	4.72 to 5.72 mm (Nominal)

To verify and adjust vertical linearity, proceed as follows:

1. Display the "H" test pattern (refer to Table 3-1).
2. Measure character height at five locations in the test pattern (near each corner and in the center). If the Character Template (Q.P.N. 10351-01; or 02 as appropriate) is used, proper character height will appear too high for the Minimum Window and too low for the Maximum Window (refer to Figure 3-2). A non-metallic ruler may be used if the template is not available.
3. If adjustment is required, locate pot VR502 on the Video PCB (refer to Figure 3-3). Using a small non-metallic screwdriver (Q.P.N. 10349-01), rotate VR502 clockwise to increase character height or counter-clockwise to reduce character height.
4. Verify that no other display alignments have changed.

## ALIGNMENT

### Brightness

Display brightness can be adjusted as follows:

1. Clear the screen of all data by depressing the Shift and Clear/Home keys.
2. Rotate the external brightness control on the display module pedestal fully counter-clockwise.
3. Locate pot VR151 on the Video PCB (refer to Figure 3-3), and with a small non-metallic screwdriver, rotate it until the background raster is just visible.
4. Locate test point K1 on the Video PCB (refer to Figure 3-3) and measure the DC voltage between K1 and ground. Note: This voltage may be a positive or negative voltage. Record the voltage observed.
5. Rotate pot VR151 until the raster scan disappears to reduce the voltage observed between K1 and ground by 2 volts.

### Focus

Display focus can be adjusted as follows:

1. Display the "H" test pattern (refer to Table 3-1).
2. Set the oscilloscope controls as follows:
  - Volts/Div..... 100
  - Ms/Div..... 10
  - Coupling..... DC
  - Trigger..... CH1
  - Connect the signal probe to the junction of R154 and C156 (test point K4) on the Video PCB (refer to Figure 3-3). Connect the probe ground to ground.
3. Locate inductor L151 on the Video PCB (refer to Figure 3-3), and with the 7/64 inch Alignment Tool (Q.P.N. 10348-01), adjust L151 for a sine wave having an amplitude of approximately 250 volts peak-to-peak.
4. Locate pot VR152 on the Video PCB (refer to Figure 3-3), and with a small non-metallic screwdriver (Q.P.N. 10349-01), adjust VR152 for optimum focus at the center of the display. Optimum focus occurs when the individual dots that form a character are well defined and clear.
5. Observe the scope and record the voltage offset between the negative peak of the sine wave and the ground reference. Record this value as amplitude "A".
6. Adjust pot VR152 for optimum focus near the corners of the display.

7. Observe the scope and record the voltage offset between the positive peak of the sine wave and the ground reference. Record this value as amplitude "B".
8. Subtract amplitude "A" from amplitude "B" to obtain amplitude "C". That is:  $B - A = C$ .
9. Adjust inductor L151 until the peak-to-peak voltage of the sine wave equals the value of amplitude "C".
10. Adjust pot VR152 until the negative peak of the sine wave is offset from the ground reference by the value "A".
11. Observe the screen display and visually make any fine adjustments necessary.



## SECTION 4

### PARTS

This section summarizes replacement parts and recommended spares for the QVT terminals. Stylized exploded view diagrams are provided to assist in identifying and locating parts in the QVT-102/QVT-102A, QVT-108 or QVT-211GX terminal.

REPLACEMENT PARTS

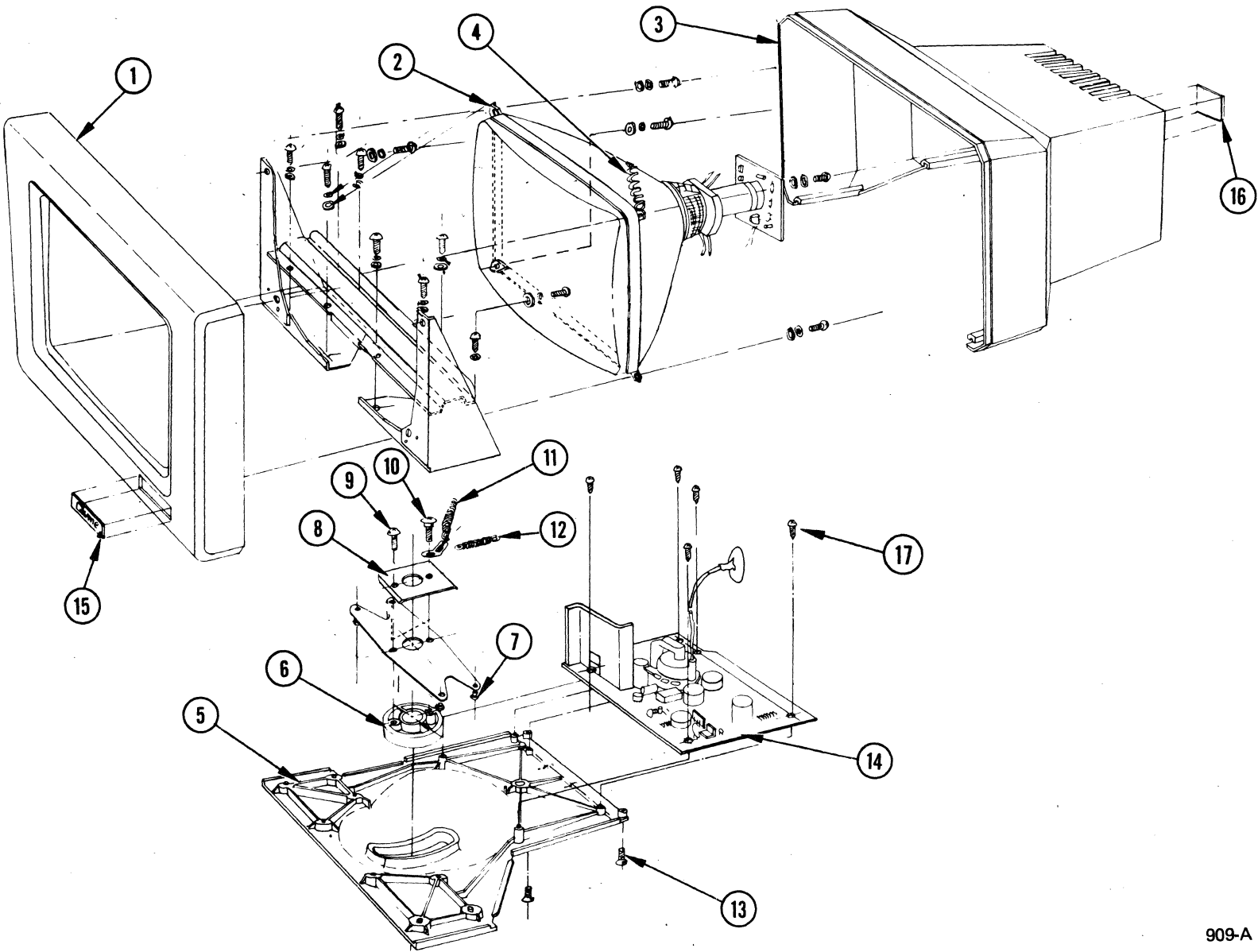


Figure 4-1a. QVT Exploded View Diagram (Upper Monitor Area)

QVT Exploded View Diagram (Upper Monitor Area Parts)

ITEM	PART NUMBER	DESCRIPTION	USED ON			
			QVT-102/QVT-102A QVT-211GX (14 INCH Only)		QVT-108	
			12 INCH	14 INCH	12 INCH	14 INCH
1	10000-01	Front Panel (without Logo)	x		x	
	10000-02	Front Panel (without Logo)		x		x
2	84803-01	CRT & Yoke Assembly, Green	x		x	
	84803-02	CRT & Yoke Assembly, Amber	x		x	
	84803-03	CRT & Yoke Assembly, Green		x		x
	84803-04	CRT & Yoke Assembly, Amber		x		x
3	10010-01	Display Module Top Back Cover (without Name Plate)	x		x	
	10010-02	Display Module Top Back Cover (without Name Plate)		x		x
4	10007	Grounding Spring	x	x	x	x
5	10012	Tilt Neck	x	x	x	x
6	10013	Slide Block	x	x	x	x
7	301550-01	Pressure Spring and Slide Clip	x	x	x	x
8	10016	Washer, Slide Fixating	x	x	x	x
9	10005	Screw, M4 x 0.7 x 10	x	x	x	x
10	10017	Screw, Neck Fixating	x	x	x	x
11	10018	Neck Spring Hook	x	x	x	x
12	10019	Tension Spring	x	x	x	x
13	10030	Screw, Flat Head, M4 x 0.7 x 10	x	x	x	x
14	84801-01	Video PCB Assembly	x		x	
	84801-02	Video PCB Assembly		x		x
15	10011	Qume Logo	x	x	x	x
16	84859-04	Rating Name Plate, 115 Volt	x	x		
	301059-01	Rating Name Plate, 115 Volt			x	x
	301060-01	Rating Name Plate, 115 Volt		x		
	10067-02	Rating Name Plate, 230 Volt	x	x	x	x
17	10024	Screw, Round Head, M3 TPA x 8,	x	x	x	x
18		Reserved				
19		Reserved				

PARTS

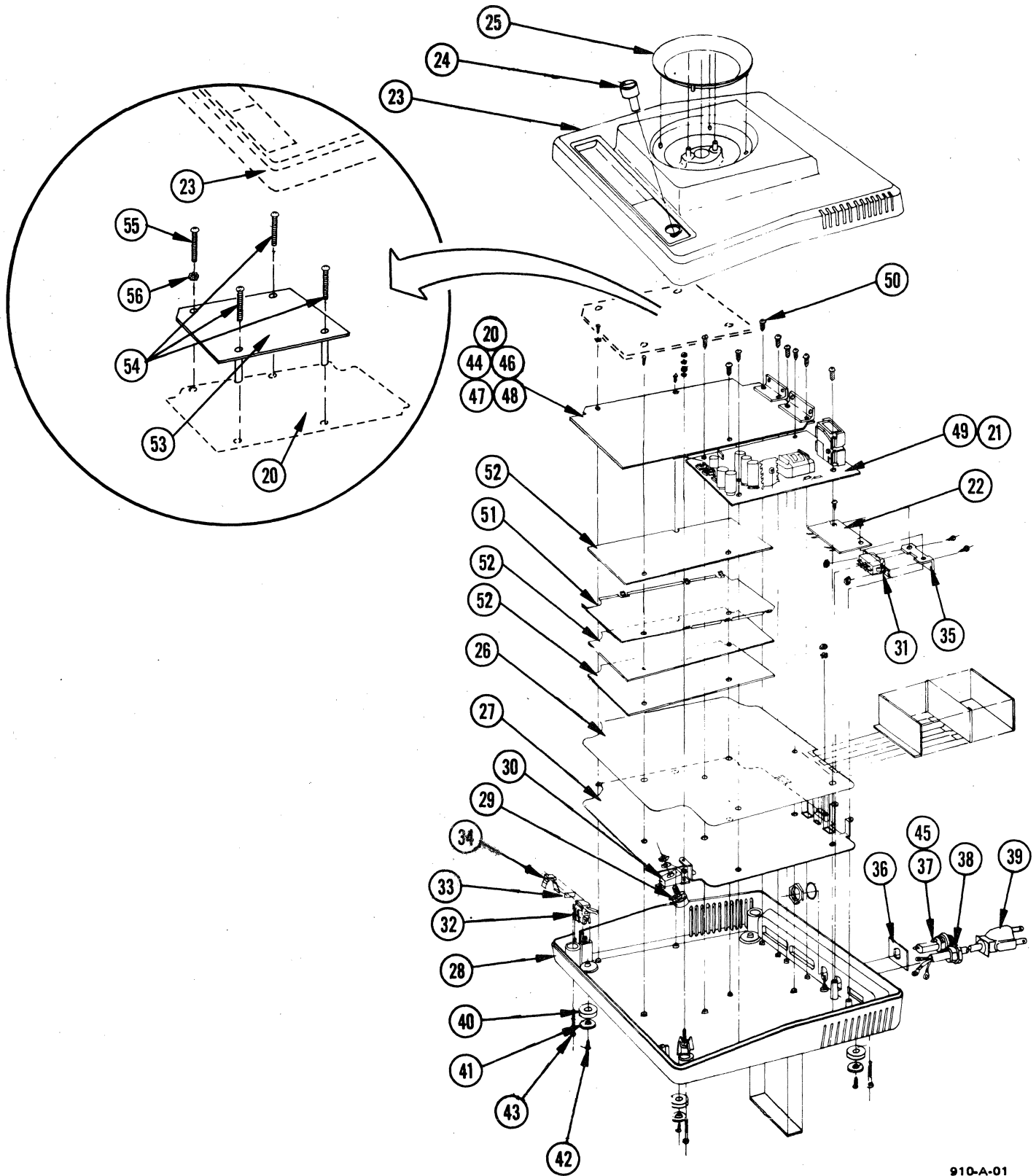


Figure 4-1b. QVT Exploded View Diagram (Lower Monitor Area)



QVT Exploded View Diagram (Lower Monitor Area Parts)

ITEM	PART NUMBER	DESCRIPTION	USED ON			
			QVT-102/QVT-102A QVT-211GX (14 INCH Only)		QVT-108	
			12 INCH	14 INCH	12 INCH	14 INCH
20	84800-01	Logic PCB Assembly (RS-232-C)	x	x		
	84800-02	Logic PCB Assembly (Current Loop)	x	x		
	84800-11	Logic PCB Assembly (RS-232-C)		x		
	84800-12	Logic PCB Assembly (Current Loop)		x		
	84839-01	Logic PCB Assembly (RS-232-C)			x	x
	84839-02	Logic PCB Assembly (Current Loop)			x	x
21	84804-01	Power Supply PCB Assembly	x	x	x	x
22	10309-01	Filter PCB Assembly	x	x	x	x
23	10027	Lower Cabinet Top	x	x	x	x
24	10028	Brightness Control Knob	x	x	x	x
25	10029	Slide Ring	x	x	x	x
26	10041	Insulation Film (ESD)	x	x	x	x
27	10040	ESD Shield Plate	x	x	x	x
28	10044	Display Module Bottom Cover (without Name Plate)	x	x	x	x
29	84807-01	Brightness Control with Wiring & Connector	x	x	x	x
30	10048	Brightness Control Bracket	x	x	x	x
31	84805-01	ON/OFF Switch, 115 Volt	x	x	x	x
	84805-02	ON/OFF Switch, 230 Volt	x	x	x	x
32	10045	Keyboard Connector Assembly with Wiring	x	x	x	x
33	10046	Insulation Film	x	x	x	x
34	10047	Cover, Keyboard Connector with Wiring	x	x	x	x
35	10052	Power Switch Mounting Bracket	x	x	x	x
36	10056-01	Fuse Name Plate, USA Domestic	x	x	x	x
	10056-02	Fuse Name Plate, International	x	x	x	x
37	10057-01	Fuse Holder (115 Volt) with Nut & Washer	x	x	x	x
	10057-02	Fuse Holder (230 Volt) with Nut & Washer	x	x	x	x
38	10059	Cable Bushing	x	x	x	x

## QVT Exploded View Diagram (Lower Monitor Area Parts - Cont)

ITEM	PART NUMBER	DESCRIPTION	USED ON			
			QVT-102/QVT-102A QVT-211GX (14 INCH Only)		QVT-108	
			12 INCH	14 INCH	12 INCH	14 INCH
39	10061-01	Power Cord Set, USA Domestic	x	x	x	x
	10061-02	Power Cord Set, Europe	x	x	x	x
	10061-03	Power Cord Set, UK	x	x	x	x
40	10063	Equipment Foot, Cushion	x	x	x	x
41	10064	Cushion Washer	x	x	x	x
42	10065	Screw, (Flat Head) M3 TPA x 10	x	x	x	x
43	10066	Screw, (Round Head) M4 x 0.7 x 14	x	x	x	x
44	84806-01	Battery, RAM Backup, 3 Volt Lithium (Sanyo CR 2032)	x	x	x	x
45	94096-02	Line Fuse, 3AG, 2 A, 250 Vac	x	x	x	x
46	84813-230	Program EPROM, U54			x	x
	84813-231	Program EPROM, U43			x	x
	84813-130	Program EPROM, U8	x	x		
48	84813-120	Character Generator	x	x		
	84813-220	Character Generator, U37			x	x
49	94437-200	Power Supply Fuse, DIN, 2 A, 250 Vac	x	x	x	x
50	10034	Screw, Round Head, M3 TPA x 10	x	x	x	x
51	10359-01	Signal Ground Plane (RFI)	x	x		
	10359-02	Signal Ground Plane (RFI)			x	x
52	10358-01	Spacer/Insulator	x	x		
	10358-02	Spacer/Insulator			x	x
53	10364-01	Graphics PCB		QVT-211GX		
54	301025-01	Screw, M3 X 26 TPA				
55	301026-01	Screw, M3 x 0.5 x 25P-2K				
56	10033	Washer, External Lock		ONLY		

QVT Exploded View Diagram (Lower Monitor Area Parts-Cont)

ITEM	PART NUMBER	DESCRIPTION	USED ON			
			QVT-102/QVT-102A QVT-211GX (14 INCH Only)		QVT-108	
			12 INCH	14 INCH	12 INCH	14 INCH
Cable Harness Assemblies (Not Illustrated)						
	10315-06	Logic-Video-Power Supply PCB	x	x		
	10315-07	Logic-Power Supply PCB	x	x	x	x
	10315-11	Logic-Video PCB	x	x	x	x
	10316-01	2-Wire-Graphics-Logic PCB		QVT-211GX   ONLY		
	10316-02	4-Wire-Graphics-Logic PCB				
	10316-03	5-Wire-Graphics-Logic PCB				
	10316-04	24-Wire-Graphics-Logic PCB				
Keyboard (Not Illustrated)						
	84811-01	Keyboard Assembly, USA Domestic	x	x		
	84821-01	Keyboard Assembly, USA Domestic			x	x

## PARTS

## RECOMMENDED SPARE PARTS

Table 4-1. QVT-102/QVT-102A Recommended Spare Parts

PART NUMBER	DESCRIPTION	QTY PER 1000	QTY PER 10,000
84811-01	Keyboard Assembly (U.S.A.)	20	100
10244	Coiled Cable Assembly, Keyboard	5	20
84813-110	8748 Microprocessor, Keyboard	5	20
84801-01	Video PCB Assembly, 12" CRT	20	100
84801-02	Video PCB Assembly, 14" CRT	20	100
84804-01	Power Supply PCB Assembly, 115/230 V	15	100
84800-01	Logic PCB Assembly, RS-232-C, QVT-102	20	150
84800-11	Logic PCB Assembly, RS-232-C, QVT-102A	20	150
84800-02	Logic PCB Assembly, Current Loop,-102	20	150
84800-12	Logic PCB Assembly, Current Loop,-102A	5	25
10045	Keyboard Connector Assembly with wiring	5	10
84807-01	Brightness Control Assembly w./wiring	10	30
10028	Brightness Control Knob	10	50
84805-01	AC Line Switch (115 Volt)	15	50
84805-02	AC Line Switch (230 Volt)	15	50
84806-01	Battery, RAM Backup, 3 Volt, Lithium	10	25
84803-01	CRT & Yoke Assembly, Green, 12" CRT	5	25
84803-02	CRT & Yoke Assembly, Amber, 12" CRT	5	25
84803-03	CRT & Yoke Assembly, Green, 14" CRT	5	25
84803-04	CRT & Yoke Assembly, Amber, 14" CRT	5	25
10315-06	Wire Harness Assembly (LB to PS to VB)	5	20
10315-07	Wire Harness Assembly (LB to PS)	5	20
10315-11	Wire Harness Assembly (LB to VB)	5	20

LB = Logic PCB, PS = Power Supply, VB = Video PCB

Table 4-2. QVT-108 Recommended Spare Parts

PART NUMBER	DESCRIPTION	QTY PER 1000	QTY PER 10,000
84821-01	Keyboard Assembly (U.S.A.)	20	100
10244	Coiled Cable Assembly, Keyboard	5	20
84813-110	8048/8748 Microprocessor Kybd IC U302	5	20
84801-01	Video PCB Assembly, 12" CRT	20	100
84801-02	Video PCB Assembly, 14" CRT	20	100
84804-01	Power Supply PCB Assembly, 115/230 V	15	100
84839-01	Logic PCB Assembly, RS-232-C	20	150
84839-02	Logic PCB Assembly, Current Loop	20	150
10045	Keyboard Connector Assembly w./wiring	5	10
84807-01	Brightness Control Assembly w./wiring	10	30
10028	Brightness Control Knob	10	50
84805-01	AC Line Switch (115 Volt)	15	50
84805-02	AC Line Switch (230 Volt)	15	50
84806-01	Battery, RAM Backup, 3 Volt, Lithium	10	25
84803-01	CRT & Yoke Assembly, Green, 12" CRT	5	25
84803-02	CRT & Yoke Assembly, Amber, 12" CRT	5	15
84803-03	CRT & Yoke Assembly, Green, 14" CRT	5	25
84803-04	CRT & Yoke Assembly, Amber, 14" CRT	5	15
10315-06	Wiring Harness Assy. (LB to PS to VB)	5	20
10315-11	Wiring Harness Assy. (LB to VB)	5	20
10315-07	Wiring Harness Assy. (LB to PS)	5	20

LB = Logic PCB, PS = Power Supply, VB = Video PCB

## PARTS

Table 4-3. QVT-211GX Recommended Spare Parts

PART NUMBER	DESCRIPTION	QTY PER 1000	QTY PER 10,000
84811-01	Keyboard Assembly (U.S.A.)	20	100
10244	Coiled Cable Assembly, Keyboard	5	20
84813-110	8748 Microprocessor, Keyboard	5	20
84801-02	Video PCB Assembly, 14" CRT	20	100
84804-01	Power Supply PCB Assembly, 115/230 V	15	100
84800-11	Logic PCB Assembly, RS-232-C	20	150
84800-12	Logic PCB Assembly, Current Loop	20	150
84842-01	graphics PCB Assembly	20	100
10045	Keyboard Connector Assembly w./wiring	5	10
84807-01	Brightness Control Assembly w./wiring	10	30
10028	Brightness Control Knob	10	50
84805-01	AC Line Switch (115 Volt)	15	50
84805-02	AC Line Switch (230 Volt)	15	50
84806-01	Battery, RAM Backup, 3 Volt, Lithium	10	25
84803-03	CRT & Yoke Assembly, Green, 14" CRT	5	25
84803-04	CRT & Yoke Assembly, Amber, 14" CRT	5	25
10315-06	Wire Harness Assy (LB to PS to VB)	5	20
10315-07	Wire Harness Assy (LB to PS)	5	20
10315-11	Wire Harness Assy (LB to VB)	5	20
10316-03	Wire Harness Assy (5 wire-GB to LB)	5	20
10316-02	Wire Harness Assy (4 wire-GB to LB)	5	20
10316-01	Wire Harness Assy (2 wire-GB to LB)	5	20
10316-04	Wire Harness Assy (24 wire-GB to LB)	5	20

LB = Main Logic PCB    PS = Power Supply    VB = Video PCB    GB = Graphics PCB

## SECTION 5

### CIRCUITS AND DIAGRAMS

The following circuits and diagrams are provided for reference:

- QVT-102/QVT-102A Functional Block Diagram
- QVT-211GX Functional Block Diagram
- QVT-108 Functional Block Diagram
- Interconnect Wiring Diagram
- QVT-102/QVT-102A/QVT-211GX Keyboard Schematic Diagram, Rev. 9C
- QVT-108 Keyboard Schematic Diagram, Rev.3
- QVT-102/QVT-102A/QVT-108/QVT-211GX Video PCB Schematic Diagram, Rev. 6B
- QVT-102/QVT-102A/QVT-211GX Logic PCB Schematic Diagram (5 Sheets), Rev. 6B/6C
- QVT-211GX Graphics PCB Schematic Diagram
- QVT-108 Logic PCB Schematic Diagram (7 Sheets), Rev. 3C
- QVT-102/QVT-102A/QVT-108/QVT-211GX Power Supply PCB Schematic Diagram





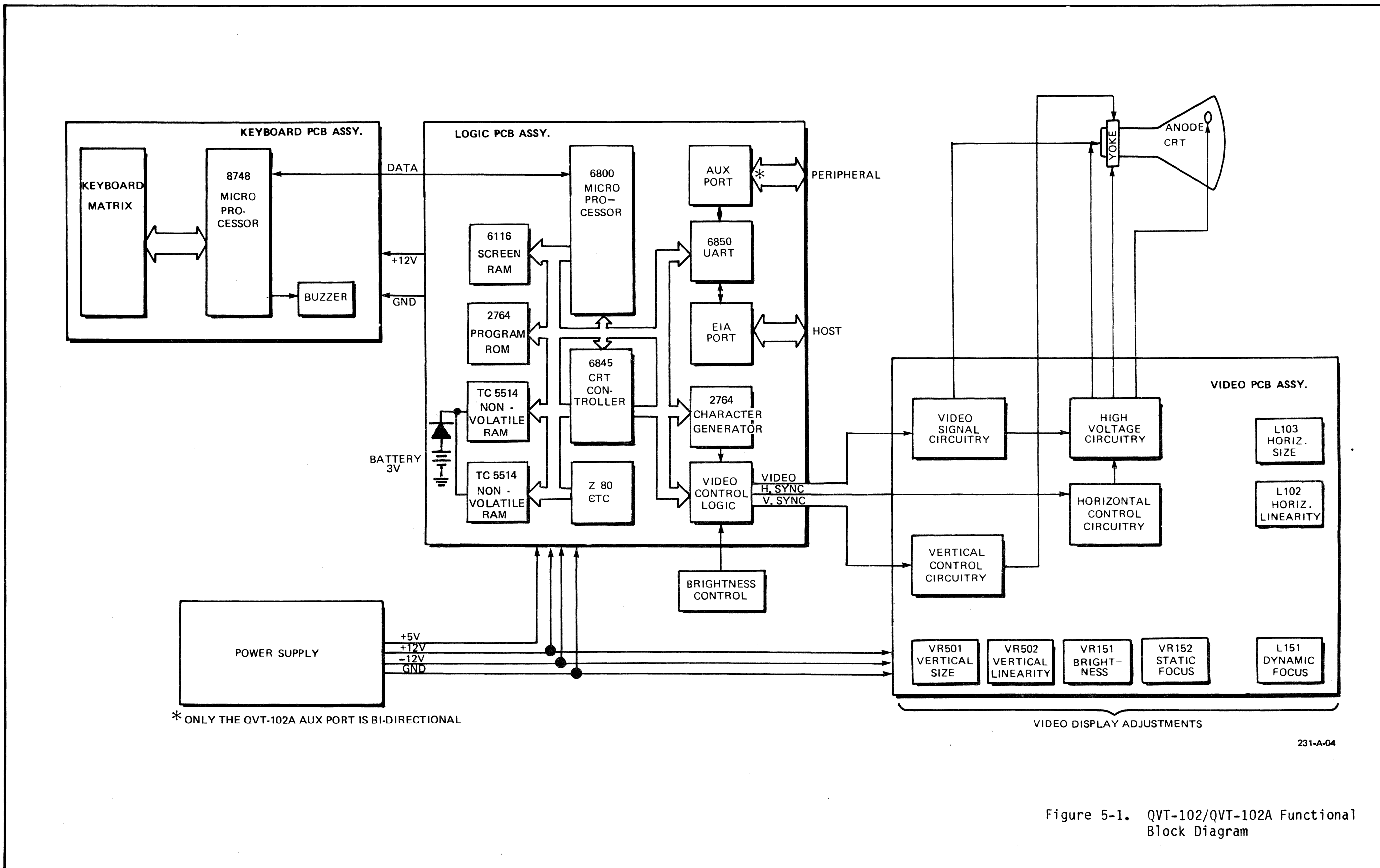


Figure 5-1. QVT-102/QVT-102A Functional Block Diagram

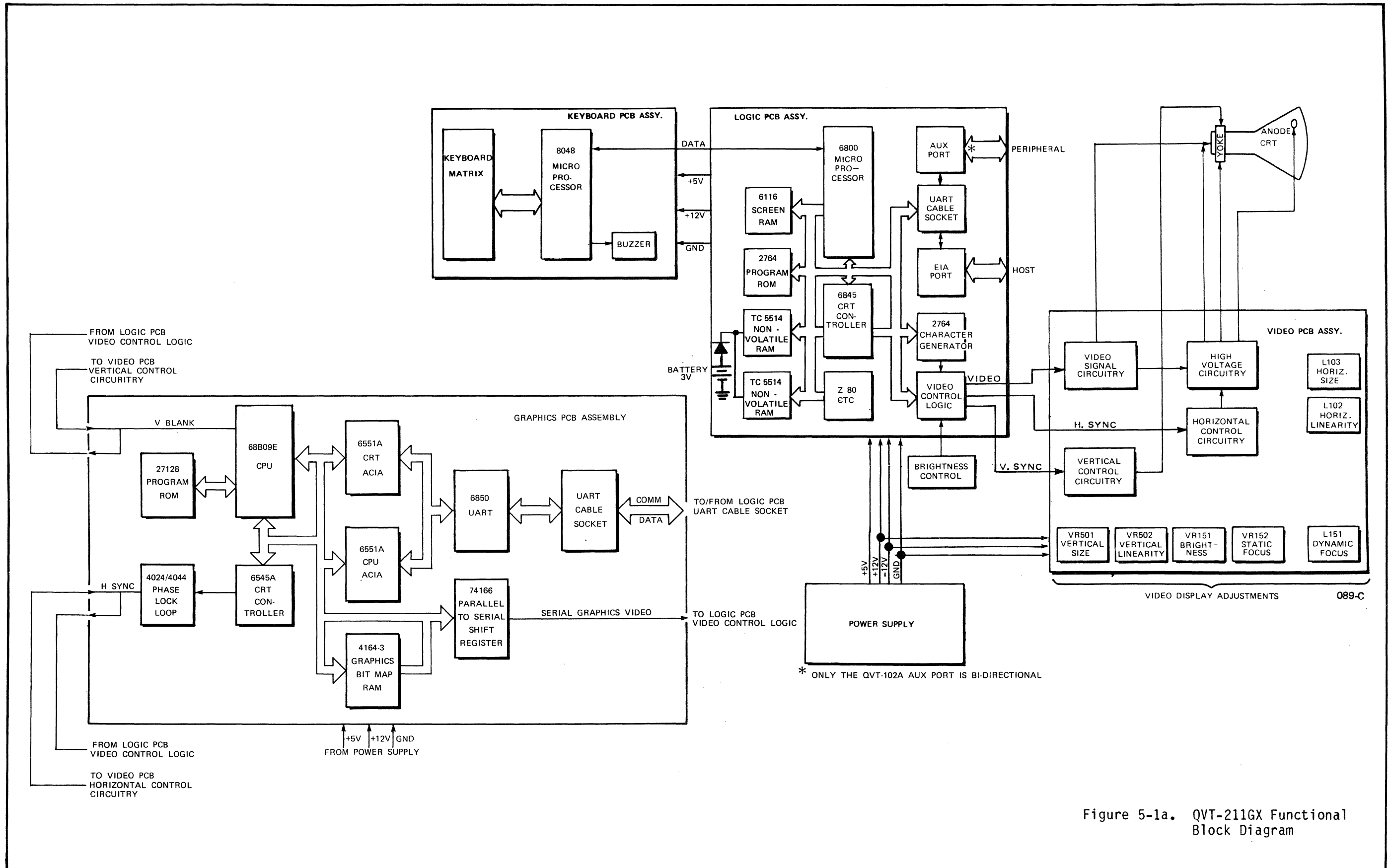


Figure 5-1a. QVT-211GX Functional Block Diagram

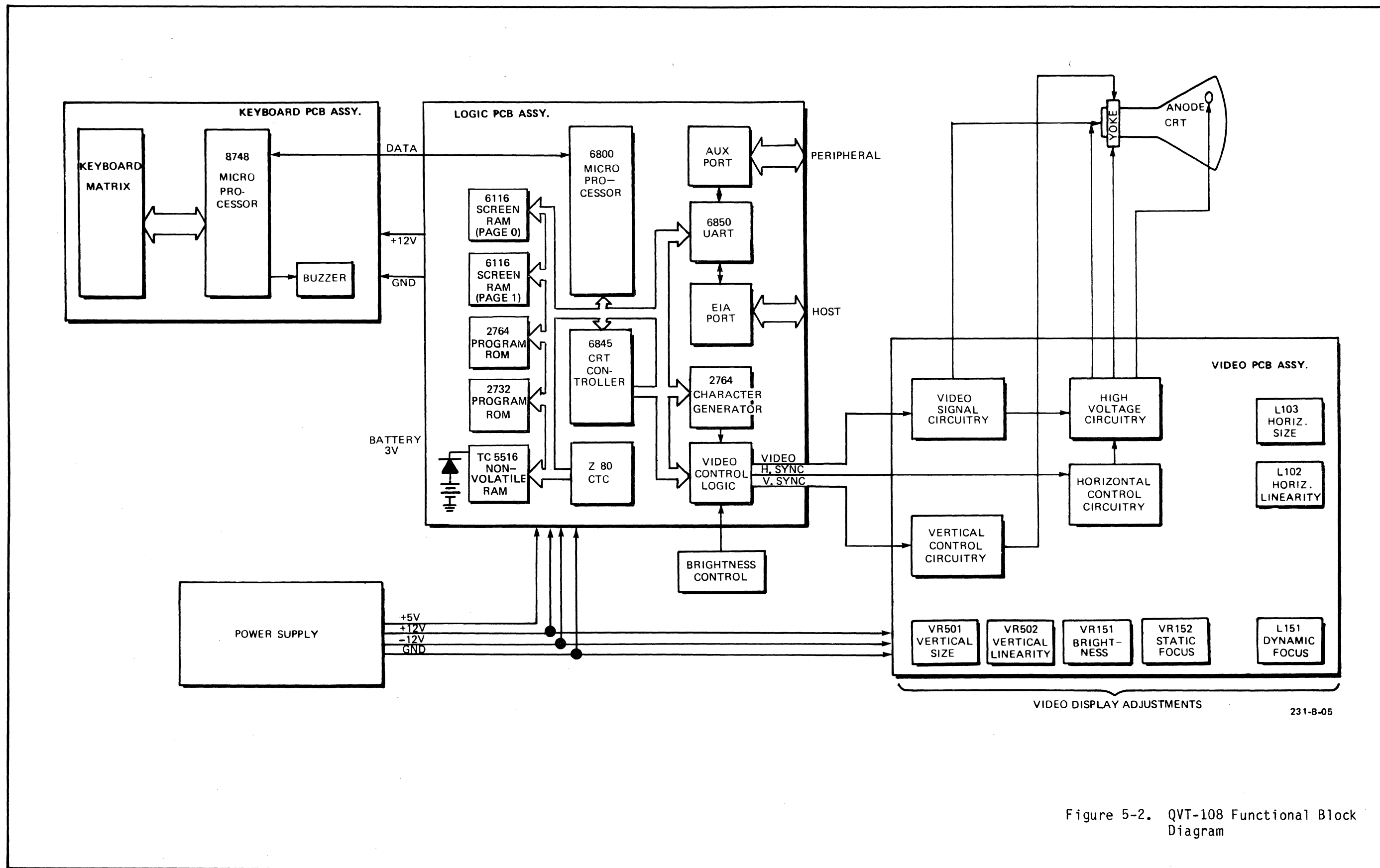


Figure 5-2. QVT-108 Functional Block Diagram

FILTER PCB WIRING ARRANGEMENT APPLICABLE TO:

QVT-102/QVT-102A up to Serial No. 39480.  
QVT-108 up to Serial No. A9321.

FILTER PCB WIRING ARRANGEMENT APPLICABLE TO:

QVT-102/QVT-102A after Serial No. 39480.  
QVT-108 after Serial No. A9321.  
QVT-211GX-A11 Serial Nos.

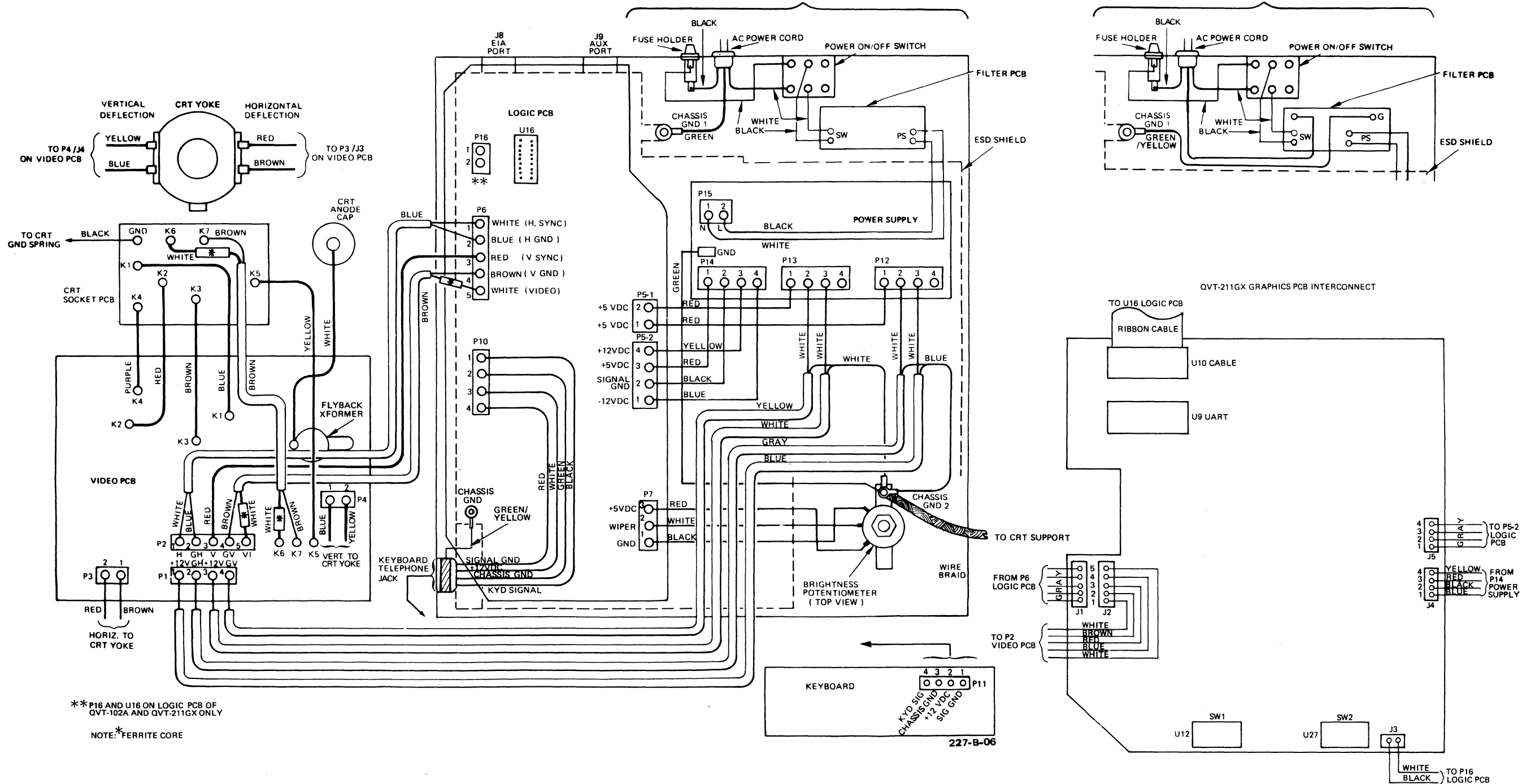
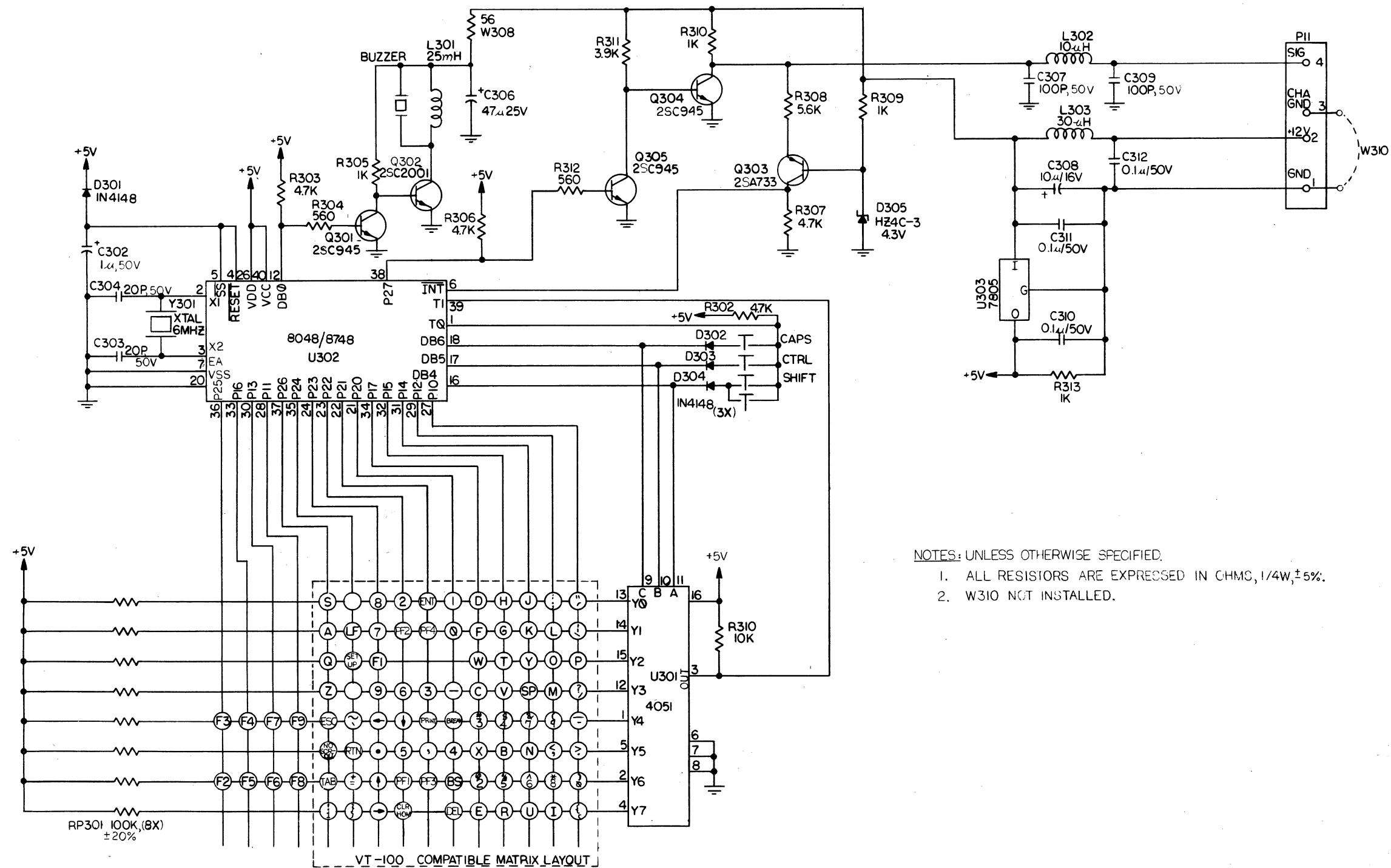
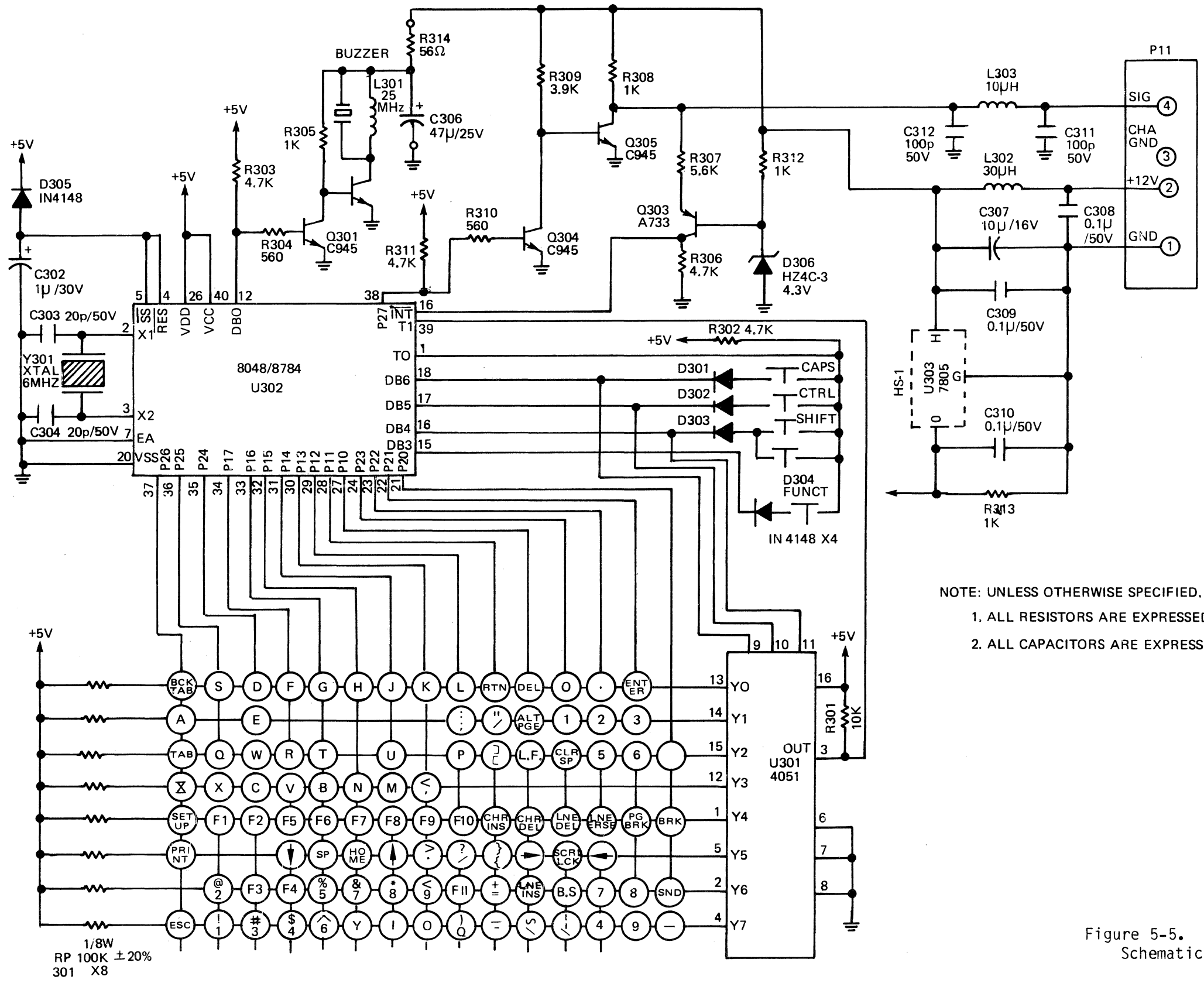


Figure 5-3. Interconnect Wiring Diagram



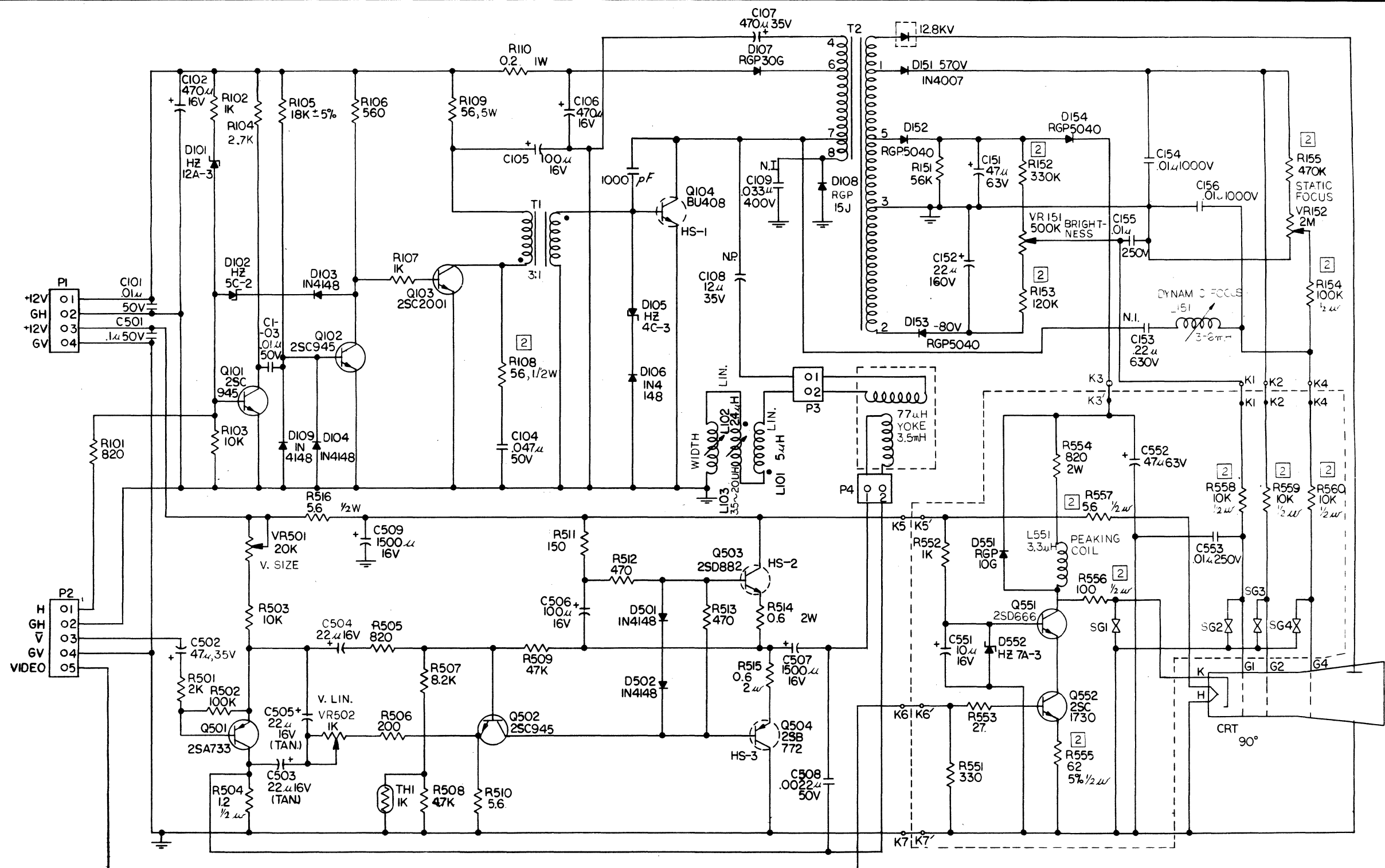
- NOTES: UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTORS ARE EXPRESSED IN OHMS, 1/4W, ±5%.
  2. W310 NOT INSTALLED.

Figure 5-4. QVT-102/QVT-102A/QVT-211GX Keyboard Schematic Diagram, Rev. 9C



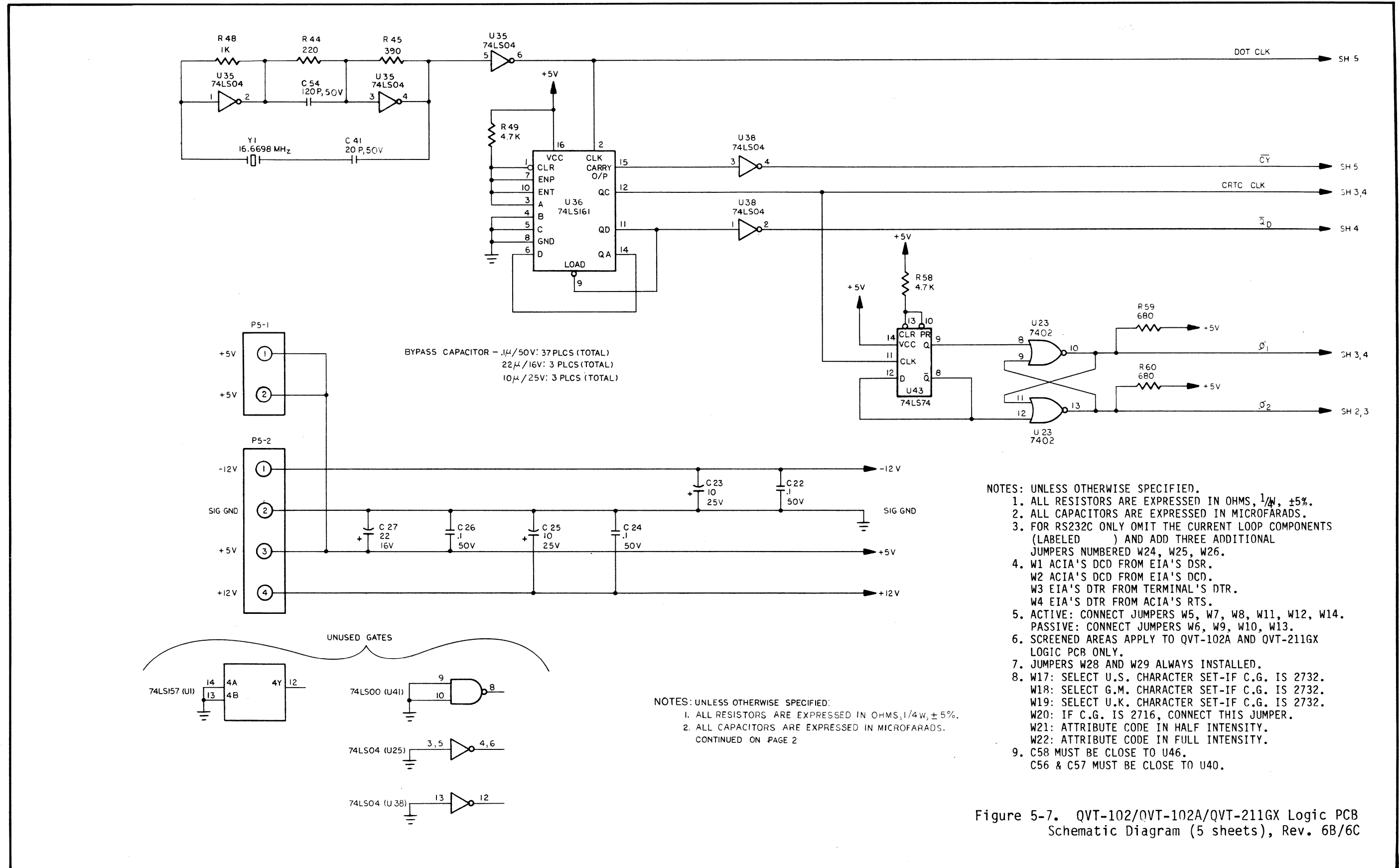
NOTE: UNLESS OTHERWISE SPECIFIED,  
 1. ALL RESISTORS ARE EXPRESSED IN OHMS, 1/4W, 15%  
 2. ALL CAPACITORS ARE EXPRESSED IN FARADS

Figure 5-5. QVT-108 Keyboard Schematic Diagram, Rev. 3



NOTES: UNLESS OTHERWISE SPECIFIED  
 1. ALL RESISTORS ARE EXPRESSED IN OHMS, 1/4W, ±1%.  
 [2] CARBON COMPOSITION RESISTOR.

Figure 5-6. QVT-102/QVT-102A/QVT-108/QVT-211GX Video PCB Schematic Diagram, Rev. 6B



- NOTES: UNLESS OTHERWISE SPECIFIED.
1. ALL RESISTORS ARE EXPRESSED IN OHMS, 1/W, ±5%.
  2. ALL CAPACITORS ARE EXPRESSED IN MICROFARADS.
  3. FOR RS232C ONLY OMIT THE CURRENT LOOP COMPONENTS (LABELED ) AND ADD THREE ADDITIONAL JUMPERS NUMBERED W24, W25, W26.
  4. W1 ACIA'S DCD FROM EIA'S DSR.  
W2 ACIA'S DCD FROM EIA'S DCD.  
W3 EIA'S DTR FROM TERMINAL'S DTR.  
W4 EIA'S DTR FROM ACIA'S RTS.
  5. ACTIVE: CONNECT JUMPERS W5, W7, W8, W11, W12, W14.  
PASSIVE: CONNECT JUMPERS W6, W9, W10, W13.
  6. SCREENED AREAS APPLY TO QVT-102A AND QVT-211GX LOGIC PCB ONLY.
  7. JUMPERS W28 AND W29 ALWAYS INSTALLED.
  8. W17: SELECT U.S. CHARACTER SET-IF C.G. IS 2732.  
W18: SELECT G.M. CHARACTER SET-IF C.G. IS 2732.  
W19: SELECT U.K. CHARACTER SET-IF C.G. IS 2732.  
W20: IF C.G. IS 2716, CONNECT THIS JUMPER.
  9. W21: ATTRIBUTE CODE IN HALF INTENSITY.  
W22: ATTRIBUTE CODE IN FULL INTENSITY.
  9. C58 MUST BE CLOSE TO U46.  
C56 & C57 MUST BE CLOSE TO U40.

- NOTES: UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTORS ARE EXPRESSED IN OHMS, 1/4W, ±5%.
  2. ALL CAPACITORS ARE EXPRESSED IN MICROFARADS.
- CONTINUED ON PAGE 2

Figure 5-7. QVT-102/QVT-102A/QVT-211GX Logic PCB Schematic Diagram (5 sheets), Rev. 6B/6C



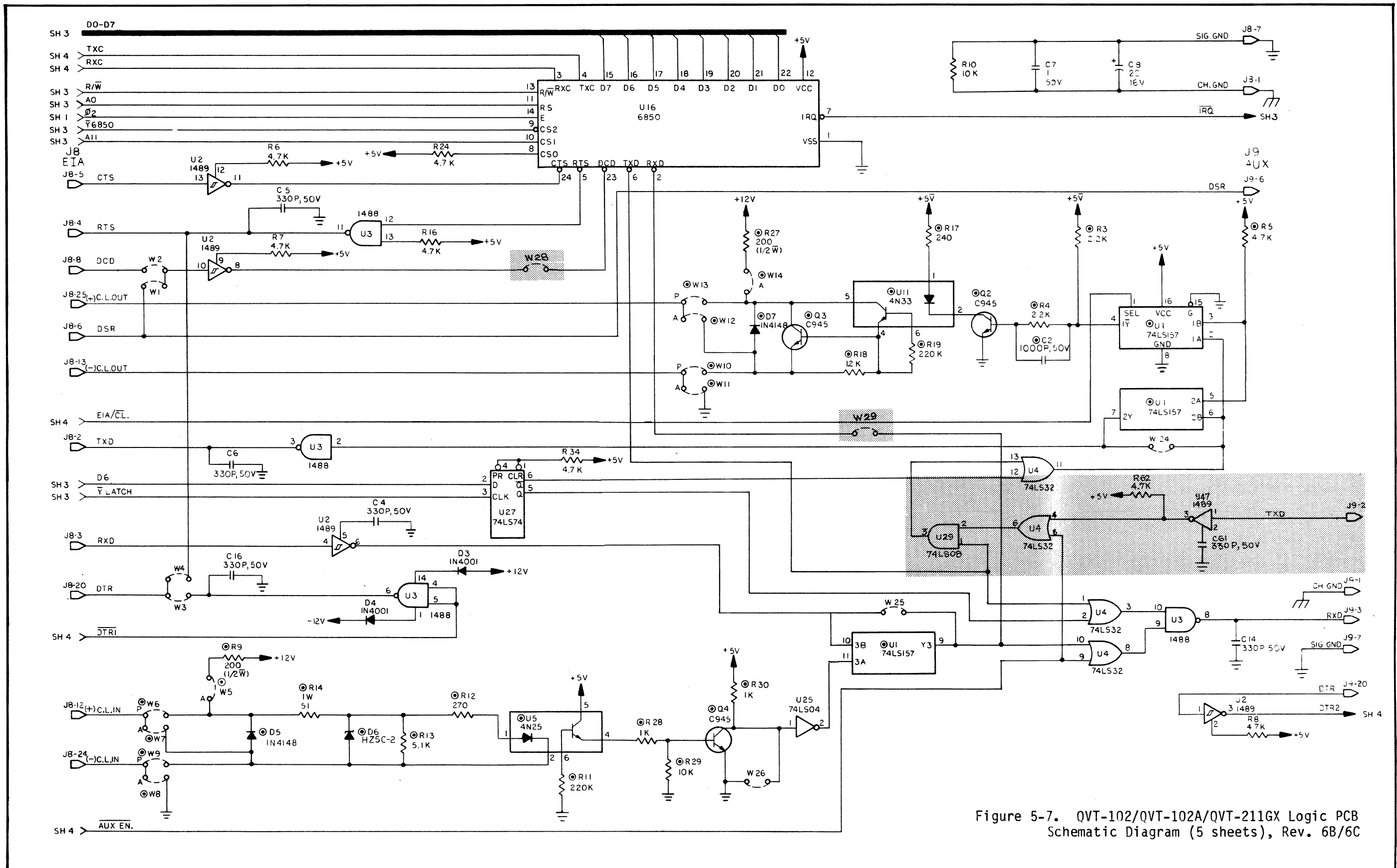


Figure 5-7. QVT-102/QVT-102A/QVT-211GX Logic PCB Schematic Diagram (5 sheets), Rev. 6B/6C

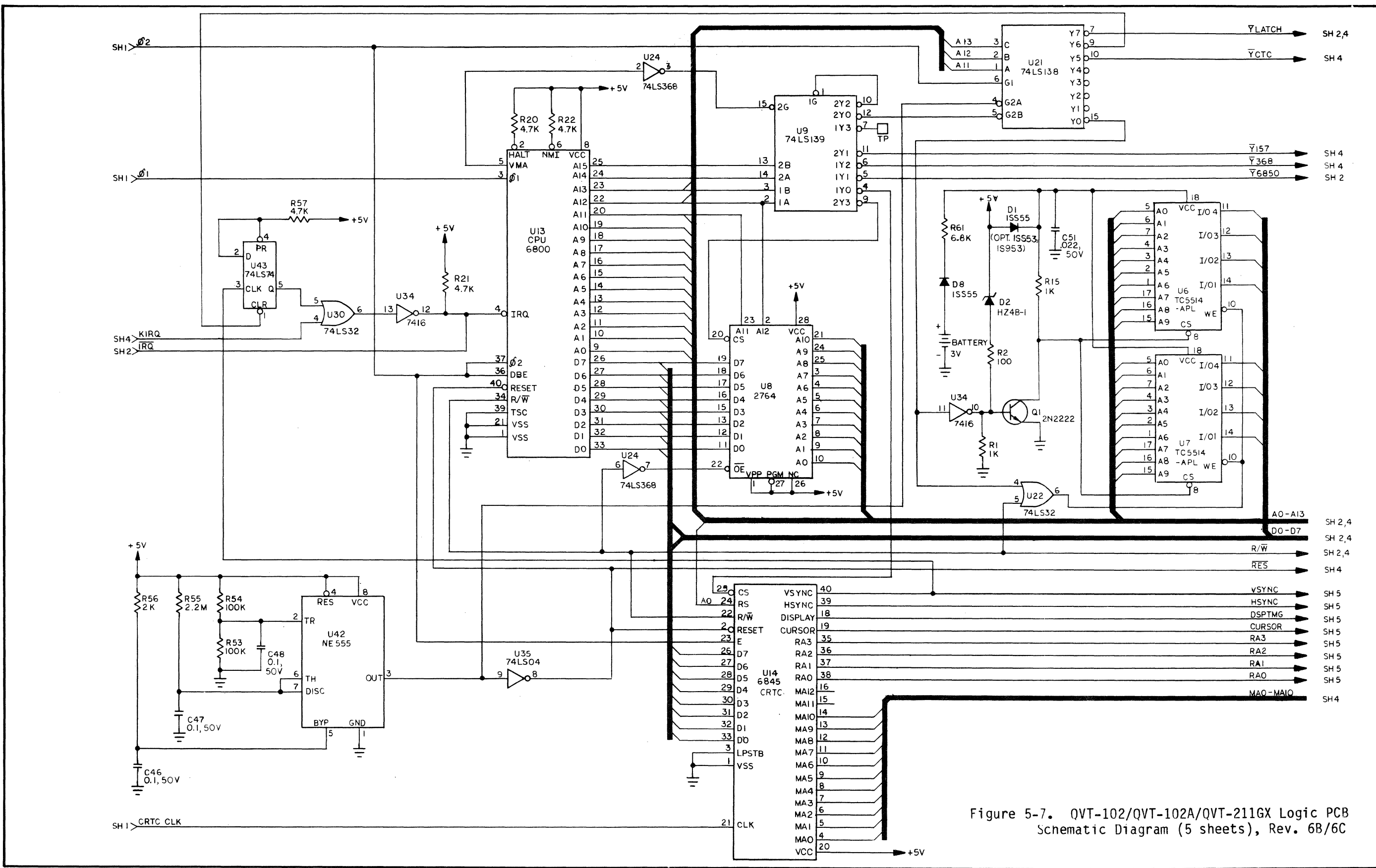


Figure 5-7. QVT-102/QVT-102A/QVT-211GX Logic PCB Schematic Diagram (5 sheets), Rev. 6B/6C

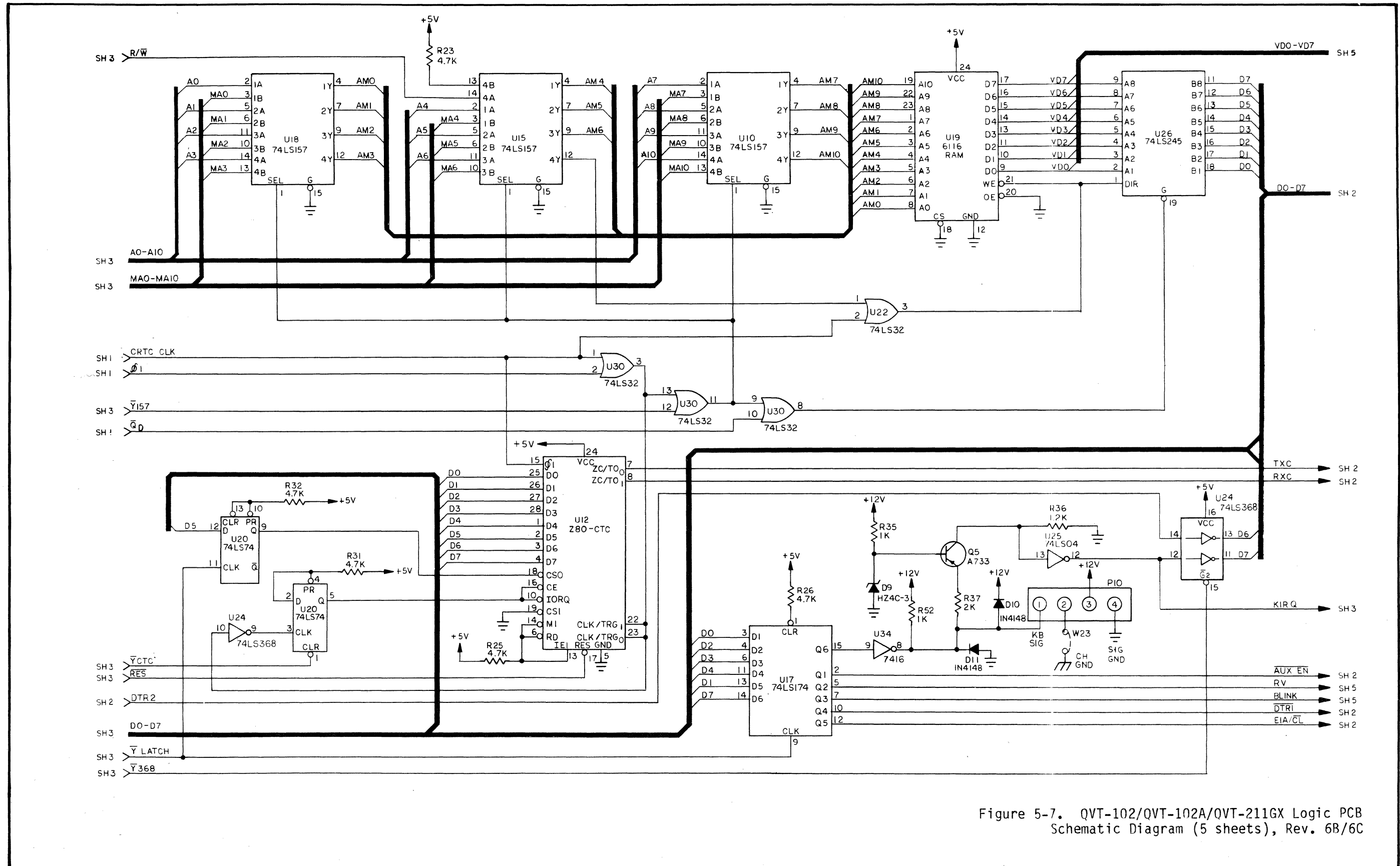


Figure 5-7. QVT-102/QVT-102A/QVT-211GX Logic PCB Schematic Diagram (5 sheets), Rev. 6B/6C

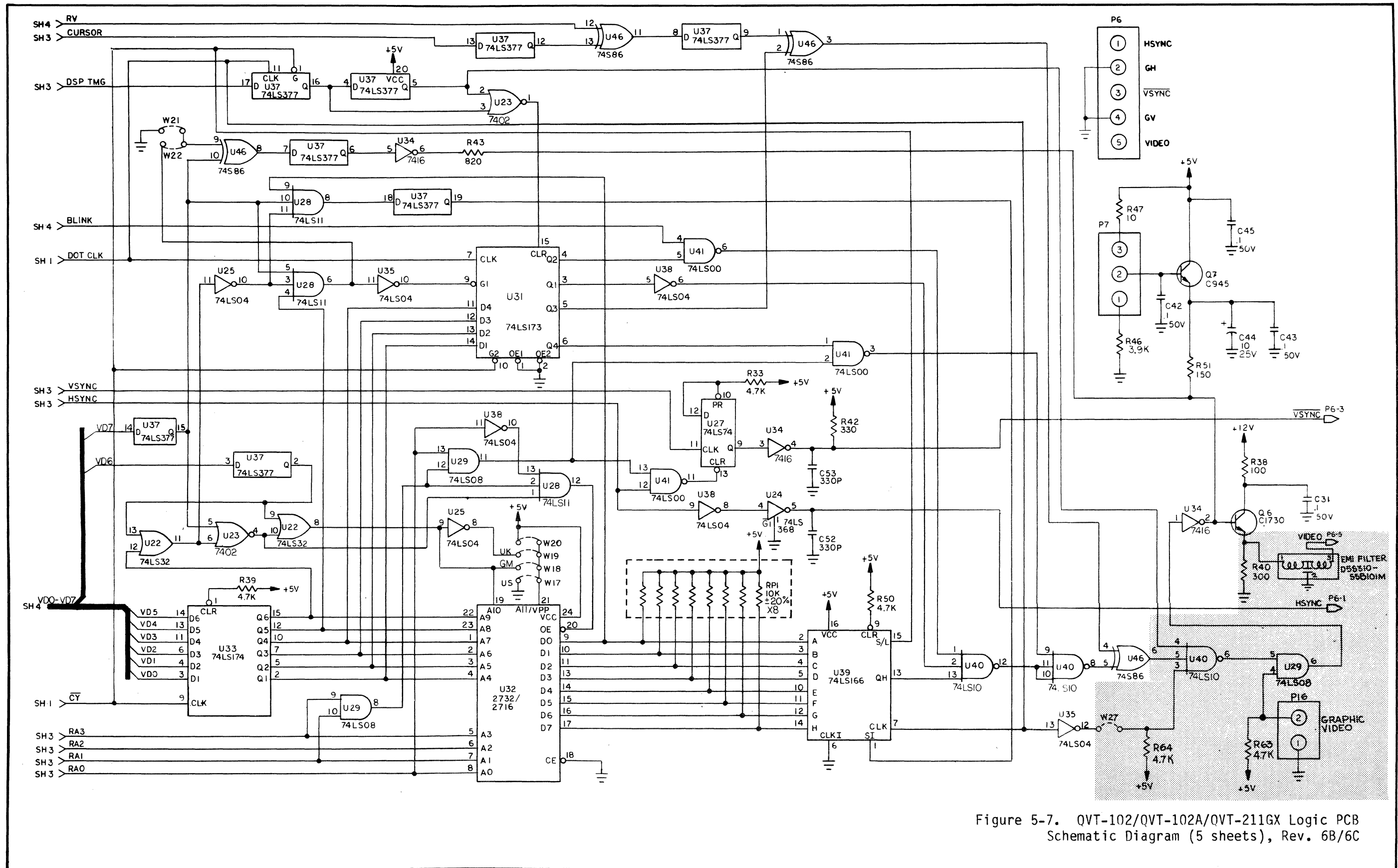


Figure 5-7. QVT-102/QVT-102A/QVT-211GX Logic PCB Schematic Diagram (5 sheets), Rev. 6B/6C

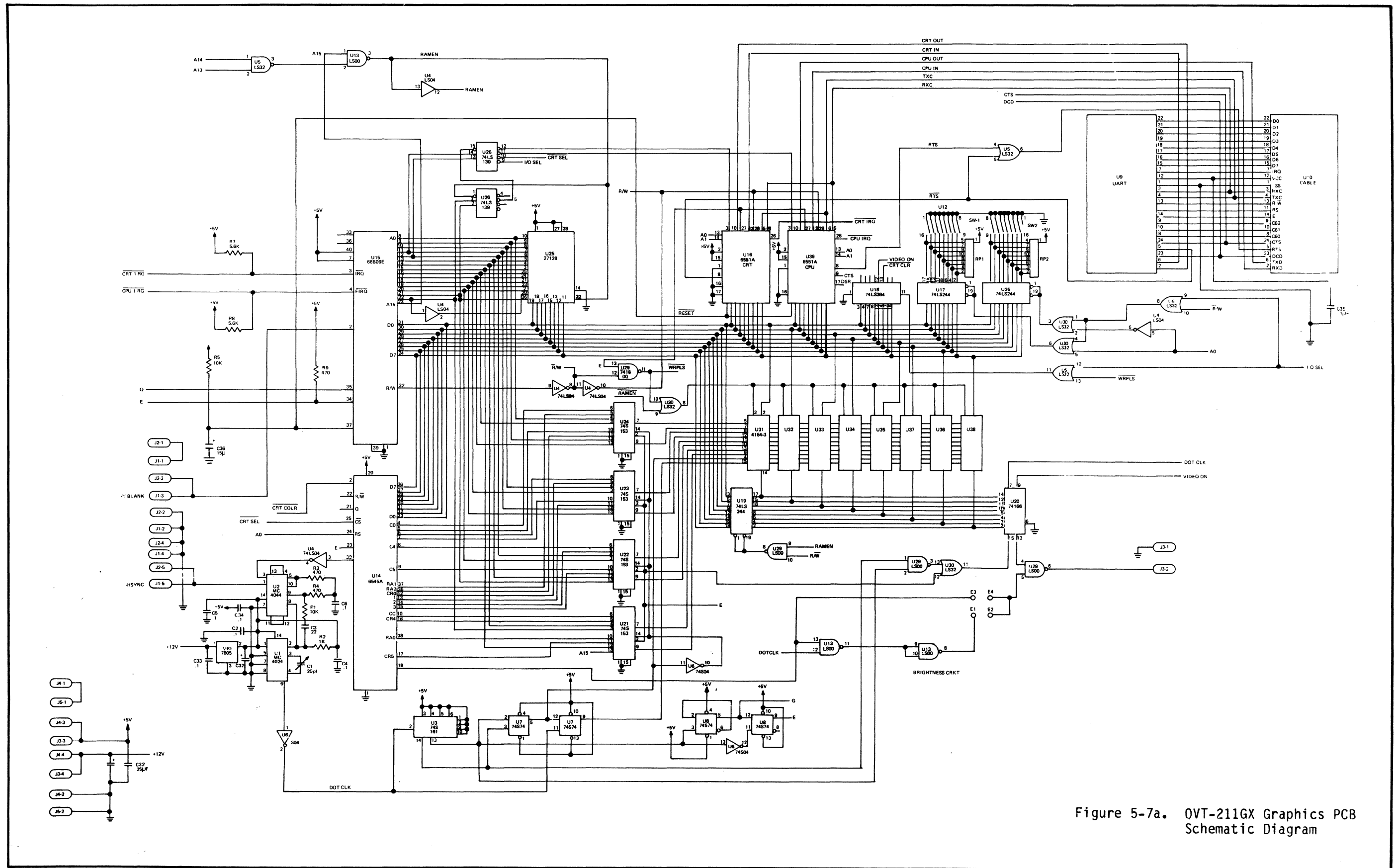
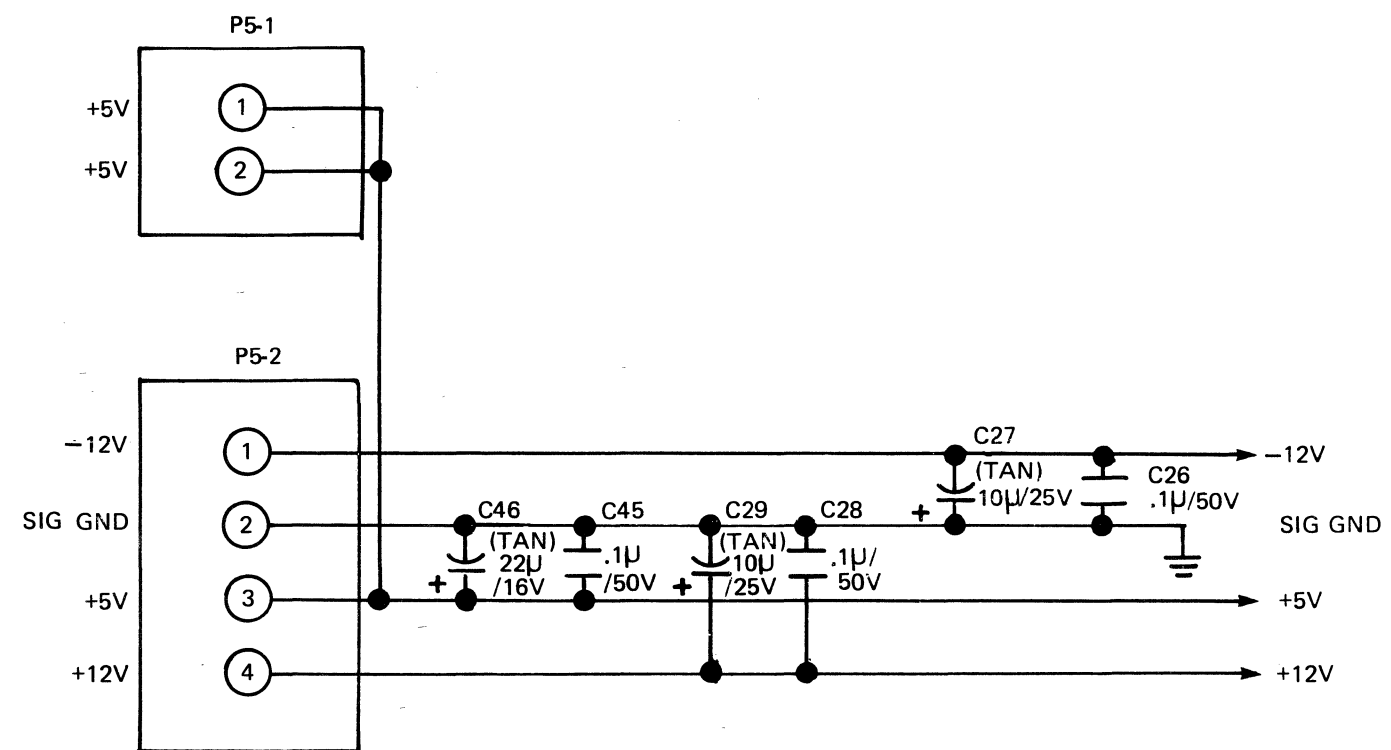
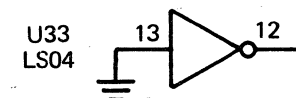
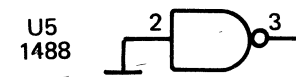
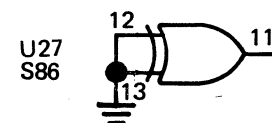
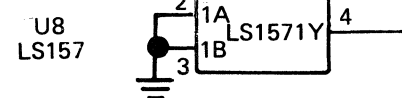
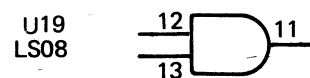
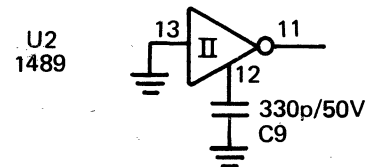


Figure 5-7a. QVT-211GX Graphics PCB Schematic Diagram



BYPASS CAP: .1μ/50V :48 PCS (TOTAL)  
 22μ/16V 3PCS ( " )  
 (TAN)  
 10μ/25V 3PCS ( " )  
 (TAN)

UNUSED GATES



NOTES: UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE EXPRESSED IN OHMS, 1/4W, ± 5%  
 ALL CAPACITORS ARE EXPRESSED IN FARADS.

Figure 5-8. QVT-108 Logic PCB Schematic Diagram (7 sheets), Rev. 3C

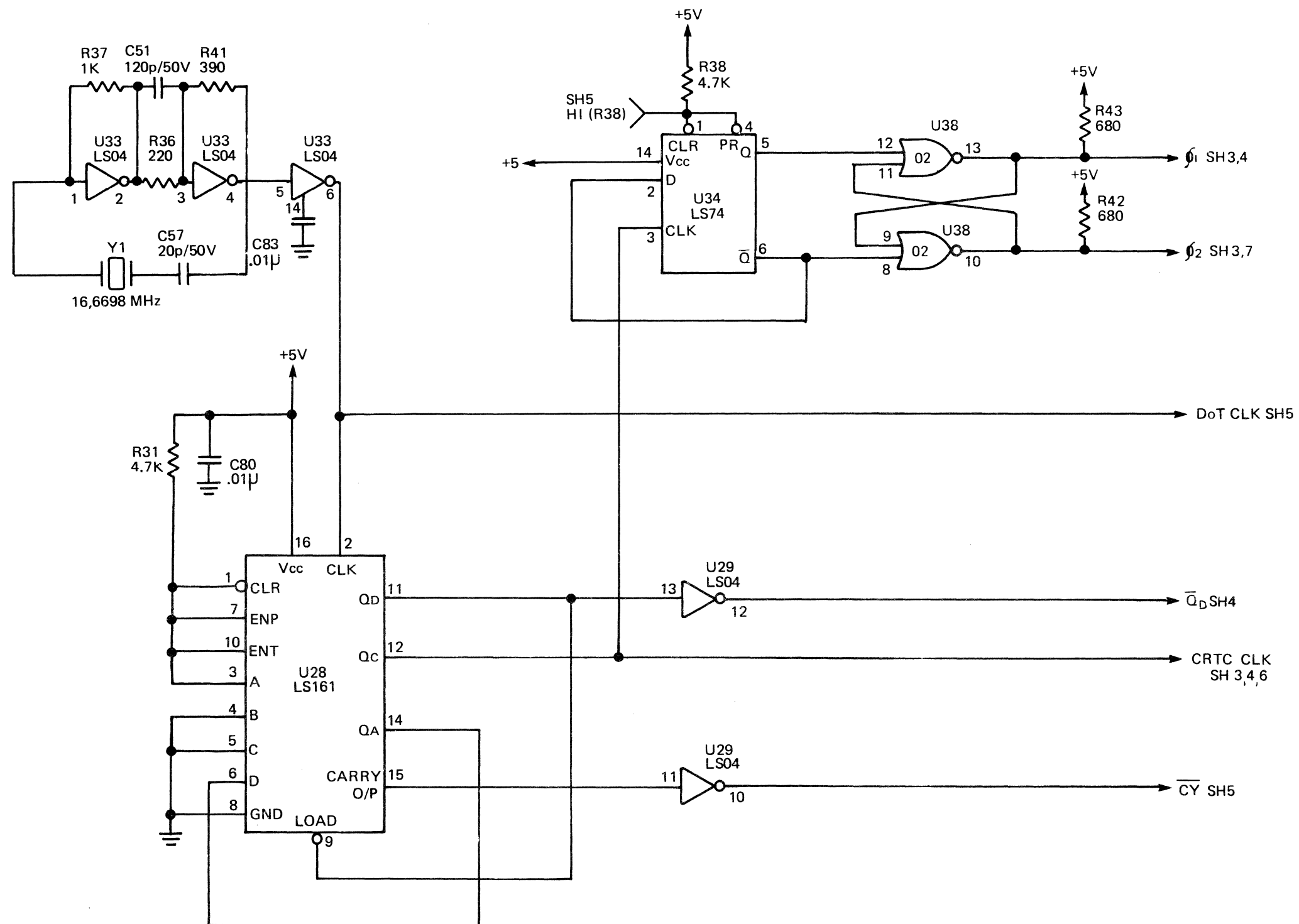


Figure 5-8. QVT-108 Logic PCB Schematic Diagram (7 sheets), Rev. 3C

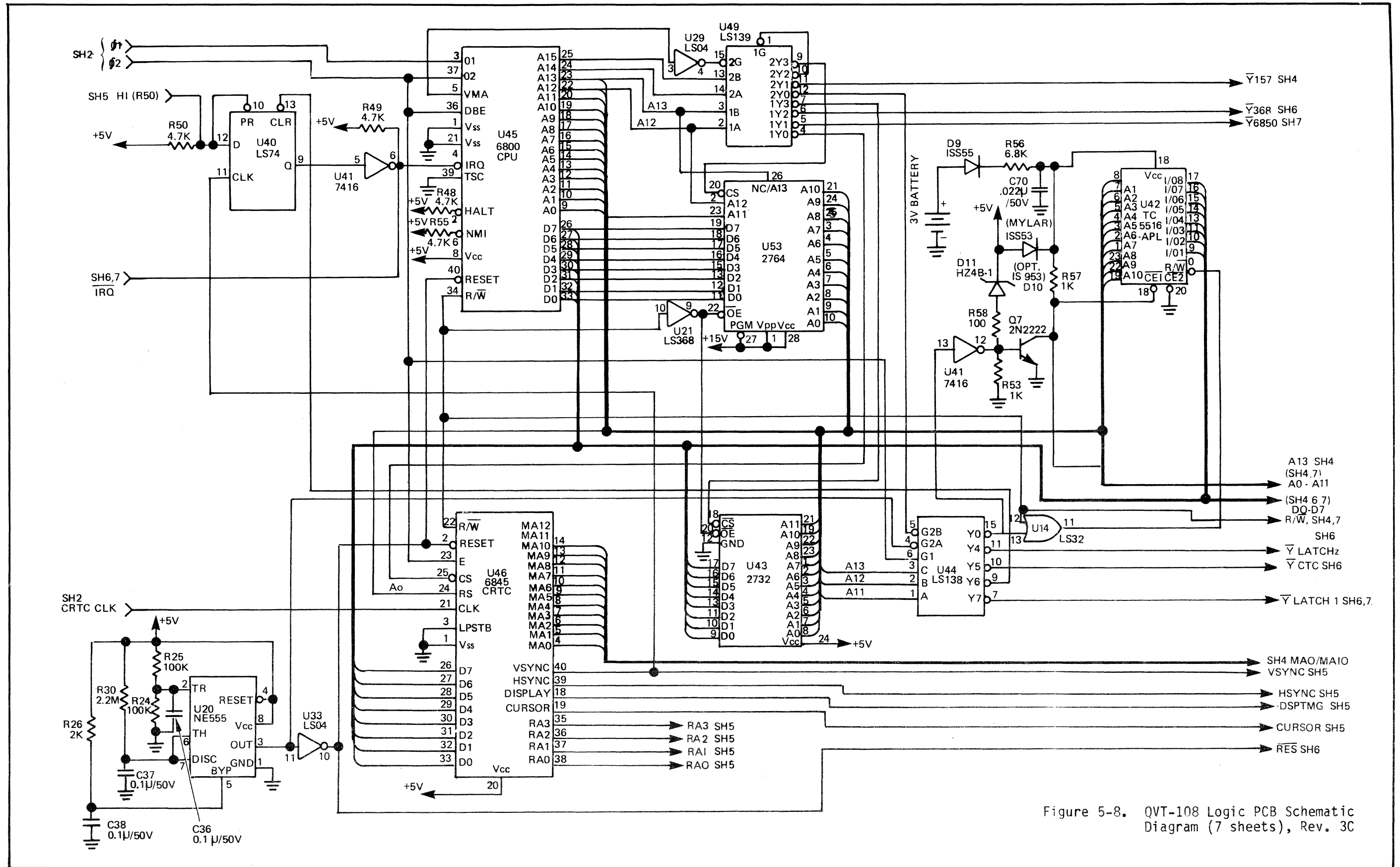


Figure 5-8. QVT-108 Logic PCB Schematic Diagram (7 sheets), Rev. 3C



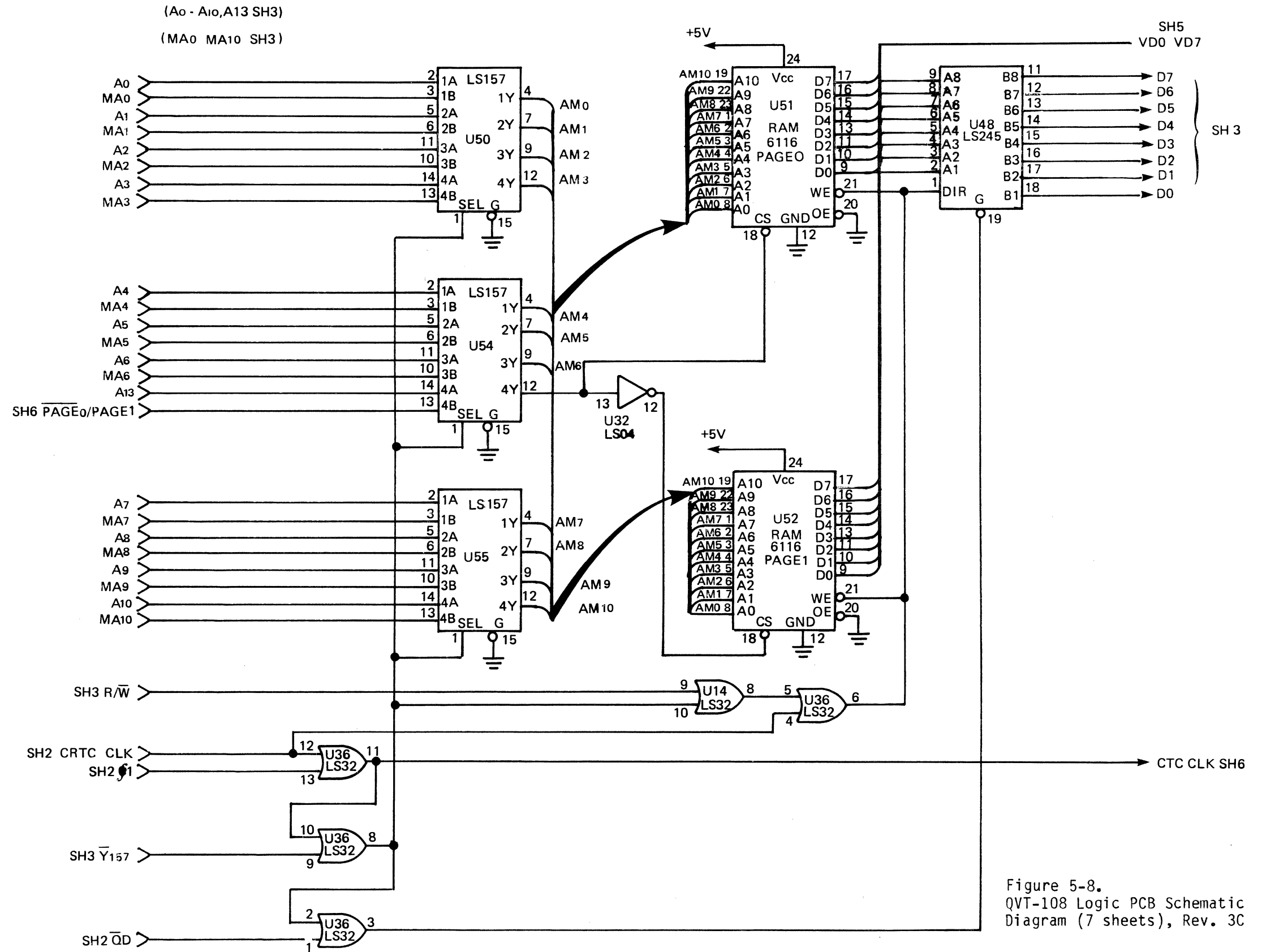
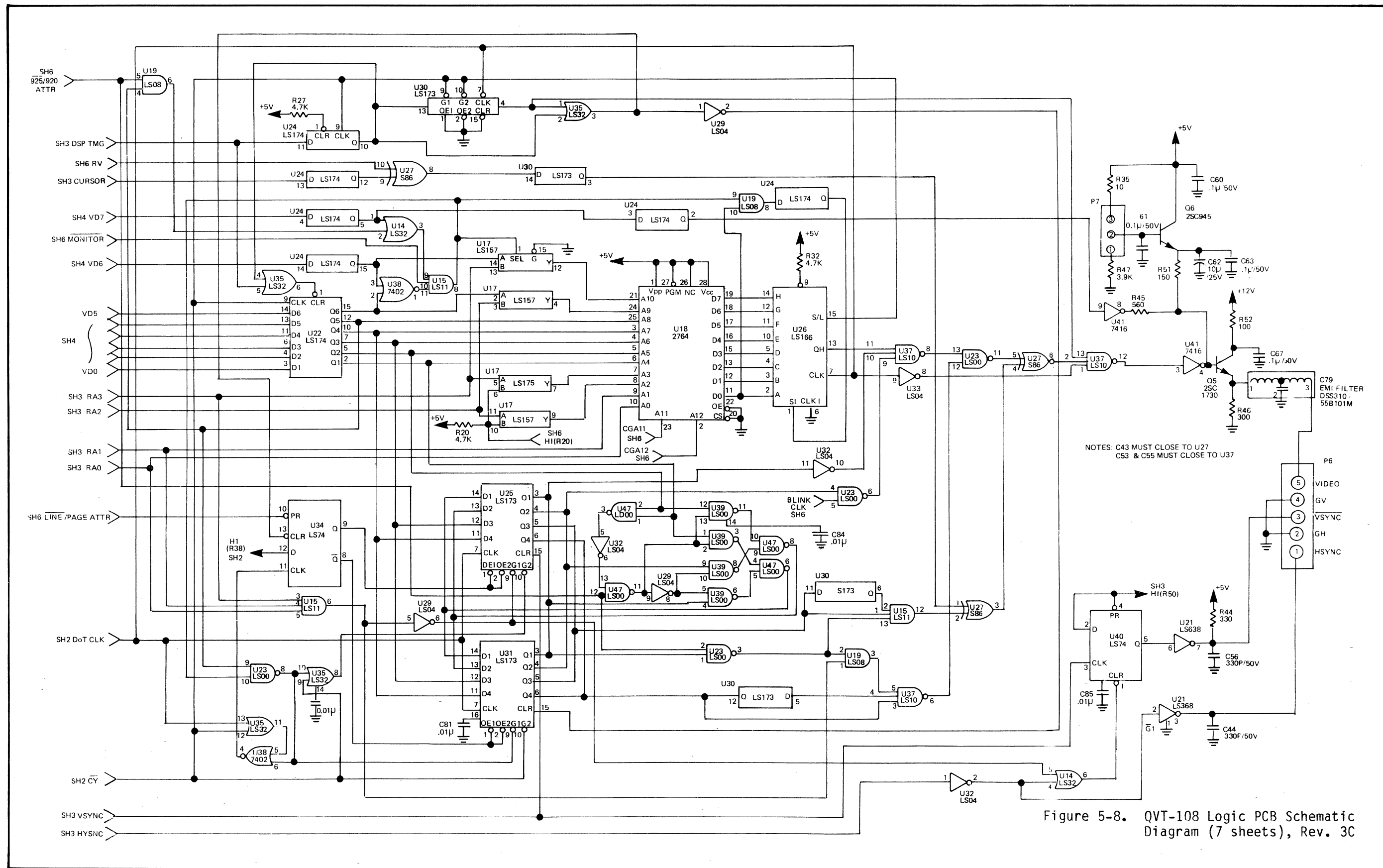


Figure 5-8.  
QVT-108 Logic PCB Schematic  
Diagram (7 sheets), Rev. 3C



NOTES: C43 MUST CLOSE TO U27  
C53 & C55 MUST CLOSE TO U37

Figure 5-8. QVT-108 Logic PCB Schematic Diagram (7 sheets), Rev. 3C

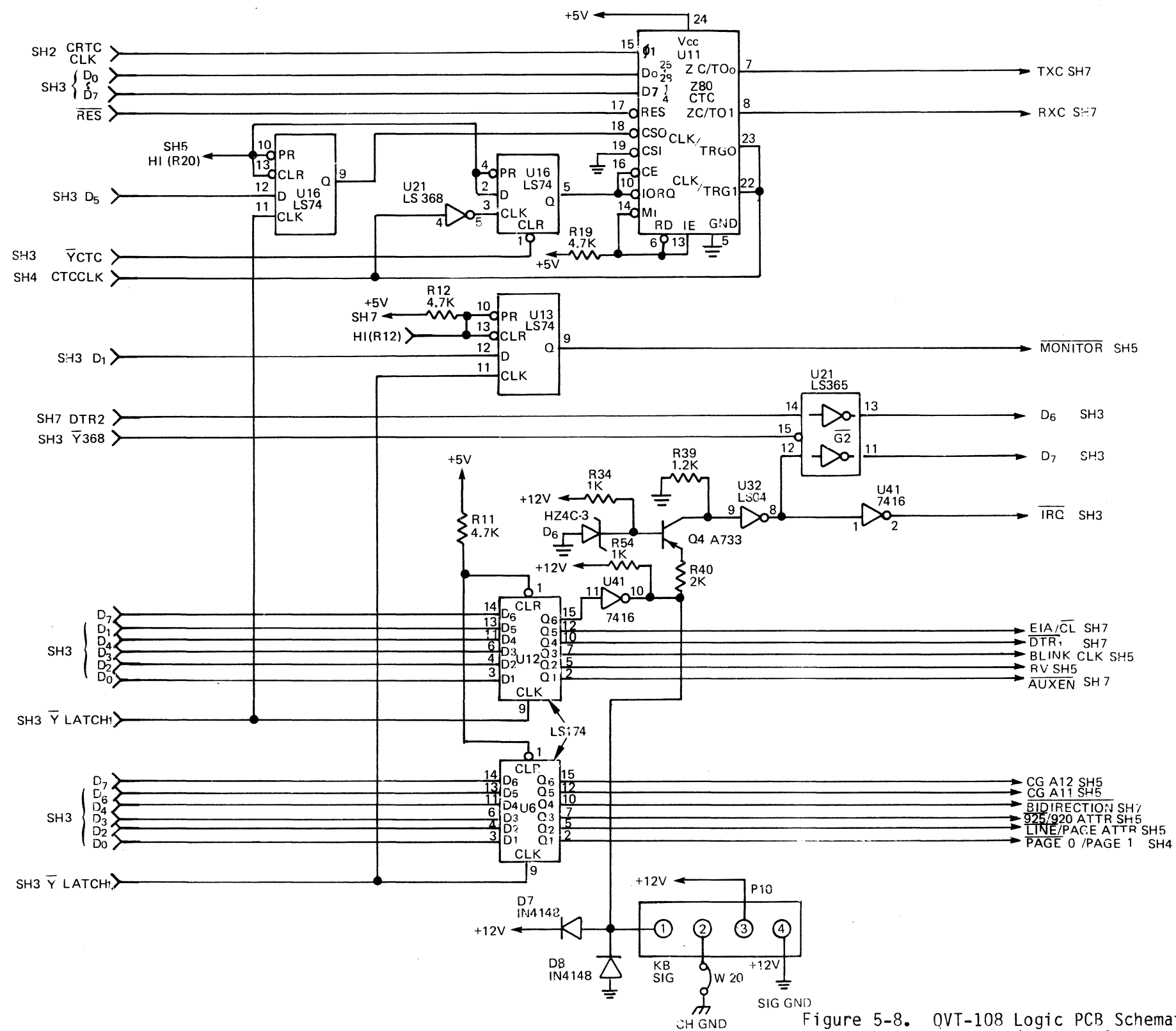
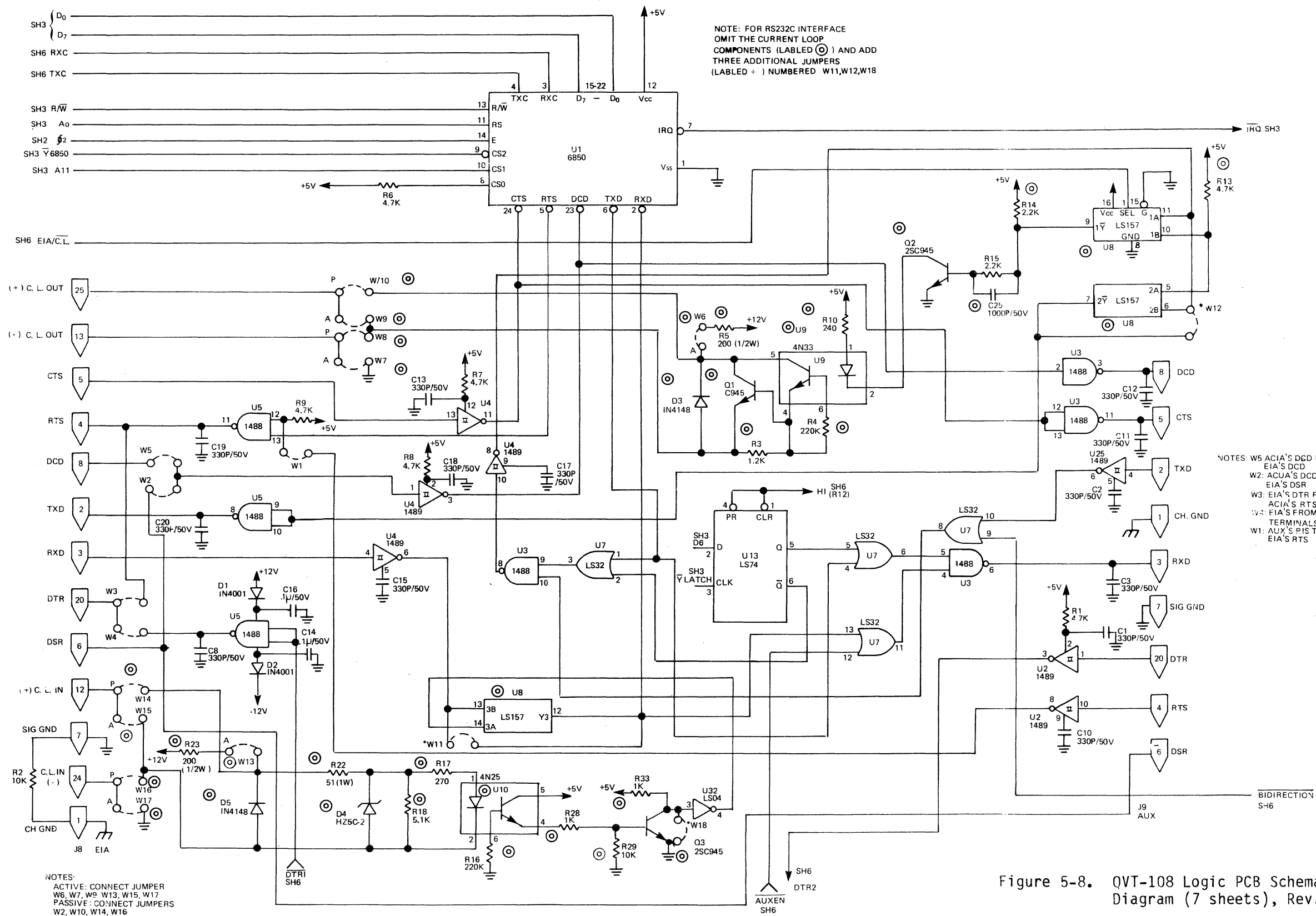


Figure 5-8. QVT-108 Logic PCB Schematic Diagram (7 sheets), Rev. 3C



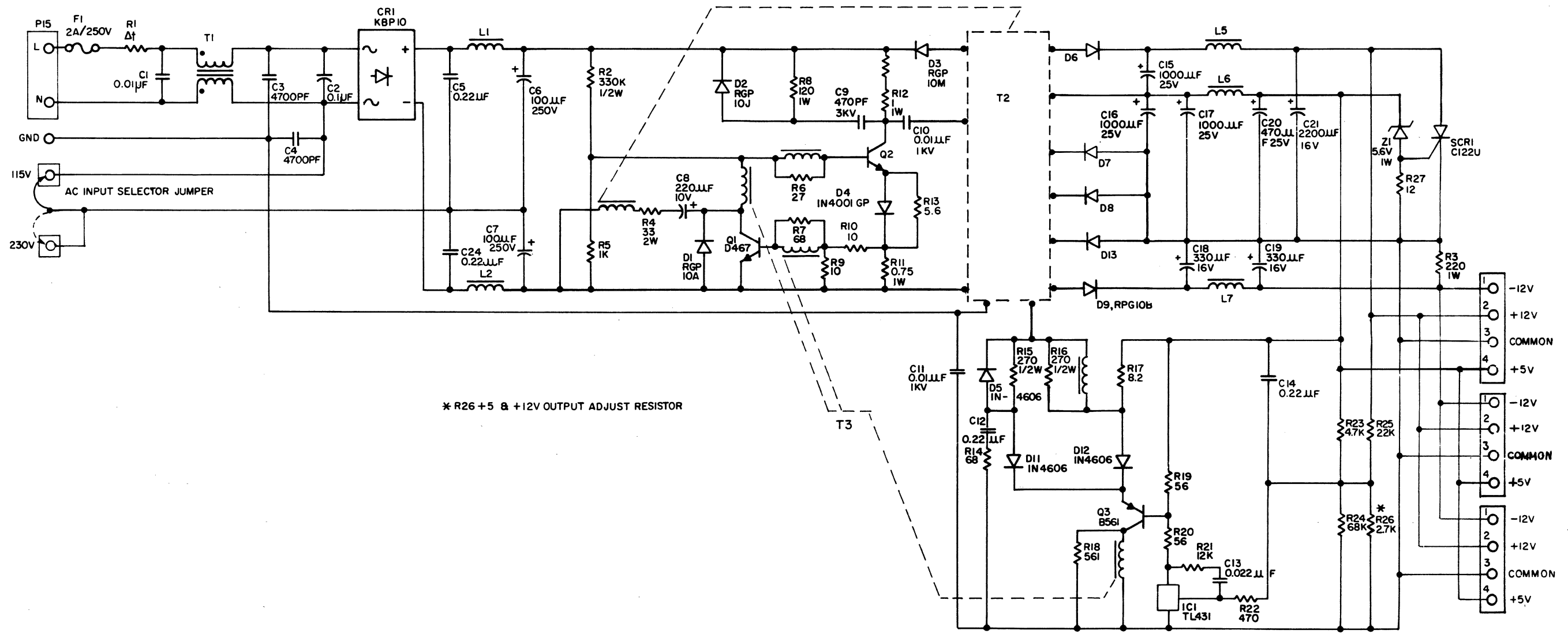


Figure 5-9 QVT-102/QVT-102A/QVT-108/QVT-211GX Power Supply PCB Schematic Diagram

## SECTION / APPENDIX

### APPENDIX

The following appendices are provided for reference.

#### Appendix

- A Specifications
- B Main/Auxiliary Connectors Pinout Description
- C Interface Jumpers Description

## Appendix A. Specifications

This appendix summarizes the specifications of the QVT-102, QVT-102A, QVT-108 and QVT-211GX terminals. The upper tabulation contains the specifications for the QVT-102, QVT-102A, QVT-108 and those for the QVT-211GX in the Terminal mode of operation. The lower tabulation has the specifications for the QVT-211GX in the Tektronix and Native modes of operation. In the upper tabulation, specifications for the four terminals are the same except where noted.

### QVT-102, QVT-102A, QVT-108 and QVT-211GX in Terminal Mode

#### Screen/Video Display

---

Screen Module	- 14-inch diagonal screen that features tilt and swivel for individual operator comfort. Early models of QVT-102, QVT-102A and QVT-108 have 12-inch screen. - Standard non-glare green screen.
Display Format	- 24-lines by 80-character columns. - 25th Status/Set-up line.
Character Formation	- 7 x 9 matrix in a 9 x 12 cell.
Video Attributes	- Blink, Blank, Underline, Normal/Reverse Video, and Half Intensity.
Cursor Type	- Blink/Steady, Block/Underline, or Invisible.
Fields	- Protected and Unprotected Fields.

#### Keyboard

---

Keyboard	- Detached, low-profile keyboard with 3-position adjustable feet for enhanced operator comfort. - Alphanumeric typewriter character set. - Programmable/Special function keys. - Numeric key pad. - 5 cursor positioning keys. - Audible key click and character auto repeat enable/disable. - 3-key rollover. - Keyboard lock enable/disable.
Character Sets	- 96 US ASCII character set. QVT-108 has on-board French, German and Spanish character sets. - 32 control characters. - 15 graphics (line drawing) symbols.

## Features

---

- Emulations**
- QVT-102, QVT-102A and QVT-211GX: In addition to own command set, three emulations are available-Hazeltine 1500, Lear Siegler ADM-3A/5, and Televideo 910.
  - QVT-108: In addition to own command set, two emulations are available-Televideo 925 and Televideo 912C/920C.
- Editing**
- Cursor position/movement keys: Home, Down, Up, Left and Right
  - Character/Line Insert and Delete.
  - Delete to End of Line/Screen.
  - Tabbing:Tab, Back, Field Tab.
  - Clear Space, Alternate Page. and Line Feed (QVT-108 only).
- Rear Panel Features (Screen Module Pedestal)**
- Power On/Off switch.
  - Line Fuse: Standard 2 Amp-250 Vac.
  - EIA: Host computer interface connector (RS-232-C).
  - AUX: Auxiliary interface connector (printer).
- Screen Intensity**
- Adjustable screen intensity from potentiometer on right front corner of the screen module pedestal.
- Keyboard Connection**
- Keyboard quick connect/disconnect to telephone style connector on left front corner of screen module pedestal.
- Screen Saver**
- Automatic video disable after 15 minutes of terminal inactivity with no loss of data. Depressing any key activates video display. Feature can be disabled.
- Set-up Mode**
- Menu style set-up feature on 25th status line with memory storage capability.
- Screen Memory**
- One page (2048 characters). QVT-108 has two pages (3840 characters).

## Communications

---

- Interface**
- Compatible with EIA RS-232-C interface standard.
  - Bidirectional printer port (AUX)
- Protocol**
- X-ON/X-OFF with DTR, X-ON/X-OFF only, or DTR only.
- Modes**
- Full or Half Duplex.
  - Character, Line or Block data transmission.
- Baud Rate**
- 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, and 19200.
- Parity**
- Odd, Even, Mark, Space, or No Parity.



Data Word Size            7- or 8-data bits.

### **Power Requirements**

---

Domestic                    - 95 to 125 Vac, 60 Hz, 0.30 A, 35 W.  
 European                   - 200 to 264 Vac, 50 Hz, 0.15 A, 35 W.

### **Physical**

---

Dimensions                - Screen Module: 14-inches high, 13-inches wide, 12-inches deep.  
                               - Keyboard: 1.5-inches high, 18-inches wide, 8-inches deep.

Weight                      - Screen module: 19-pounds.  
                               - Keyboard: 3-pounds.

Operating Temperature   - 0° to 40° C (32° to 104° F).

Relative Humidity        - 10% to 90% non-condensing.

### **Options**

---

Options                     - Foreign character sets.  
                               - Non-glare amber screen.  
                               - 20 mA current loop communications interface (active or passive).

## **QVT-211GX in Tektronix and Native Modes**

### **General**

---

Actual Dot Resolution   - 644 X by 288 Y.

Command Sets             - Tektronix Mode: Emulates Tektronix 4010/4014 command set.  
                               - Native Mode: Unique (native) graphics command set.  
                               - Terminal Mode: Compatible with QVT-102/QVT-102A alphanumeric terminal command set.

### **Tektronix Mode**

---

Addressable Area         - 1024 X by 1024 Y or 4096 X by 4096 Y.

Viewable Screen Area   - 1024 X by 780 Y or 4096 X by 3120 Y.

## APPENDIX

- Display Origin
- Tektronix Alpha Mode. Origin located in upper left corner (0 X, 0Y).
  - Tektronix Graphics Mode. Origin located in lower left corner 0 X, 0 Y).
- Features
- Tektronix Alpha Mode:
    - ASCII and APL character sets.
    - Variable character sizes.
    - Margin 1 and 2.
    - Full page Break.
  - Tektronix Graphics Mode:
    - Variable line types.
    - Point plot mode.
    - Incremental plot mode.
    - Write-Thru.
    - GIN mode.
    - Bypass mode.
    - Cursor Addressing-1024 by 1024 or 4096 by 4096.

### **Native Mode**

---

- Aspect Ratio
- 1.5 X to 1.0 Y
- Addressable Area
- Plus or minus 32,384 X by 32,384 Y.
- Viewable Screen Area
- 2572 X by 1148 Y.
- Display Origin
- Origin located in upper left corner (0 X, 0 Y).
- Features
- Unique line, arc, shape and area fill drawing commands.
  - Relocatable display origin.
  - Variable line types.
  - Variable X and Y gain.
  - Write-Thru with selectable decay time.
  - Cursor addressing.

### Appendix B. Main/Auxiliary Interface Connectors Pinout Description

This appendix describes the signals on the main (host) and auxiliary (printer) ports of the QVT-102, QVT-102A, QVT-108, and QVT-211GX terminals. The upper tabulation lists the signals of the main port and the lower lists those of the auxiliary port.

#### EIA-Main Interface Connector

Pin No.	Signal Description	Signal Direction	Designation
1	Protective Ground	-----	AA
2	Transmitted Data	From Terminal	BA
3	Received Data	To Terminal	BB
4	Request to Send	From Terminal	CA
5	Clear to Send	To Terminal	CB
6	Data Set Ready	To Terminal	CC
7	Signal Ground	-----	AB
8	Data Carrier Detect	To Terminal	CF
12	Current Loop-RXD(+)	-----	--
13	Current Loop-TXD(-)	-----	--
20	Data Terminal Ready	From Terminal	CD
24	Current Loop-RXD(-)	-----	--
25	Current Loop-TXD(+)	-----	--

#### AUX-Auxiliary Interface Connector

Pin No.	Signal Description	Signal Direction	Designation
1	Protective Ground	-----	AA
2	Transmitted Data (QVT-102A and QVT-211GX only)	To Terminal	BA
3	Received Data	From Terminal	BB
6	Data Set Ready	To Terminal	CC
7	Signal Ground	-----	AB
20	Data Terminal Ready	From Terminal	CD

**Appendix C. Interface Jumpers Description**

This appendix describes the jumpers for an EIA RS-232-C interface and for a current loop interface on the QVT-102, QVT-102A, QVT-108, and QVT-211GX terminals. The top tabulation lists the jumpers for an RS-232-C interface and the lower lists those for a current loop interface.

**EIA RS-232-C Interface Jumper Function**

Jumper	Function
STANDARD: W2 Installed	Data Carrier Detect (DCD)-Input signal to terminal used to monitor the readiness status of an external modem.
W3 Installed	Data Terminal Ready (DTR)-Output signal from the terminal to the host used to enable communications
OPTIONS: W1 Installed	Data Set Ready (DSR)-Input signal to terminal that may be used instead of Data Carrier Detect to monitor the readiness status of an external modem.
W4 Installed	Request to Send (RTS)-Output signal from terminal to host that may be used instead of Data Terminal Ready to enable communications.

**Current Loop Interface Jumper Placement \***

Jumper	Active Mode	Passive Modem
W5	In	Out
W6	Out	In
W7	In	Out
W8	In	Out
W9	Out	In
W10	Out	In
W11	In	Out
W12	In	Out
W13	Out	In
W14	In	Out

\* Additional factory installed current loop components required.

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7. Where did you purchase your QVT terminal?

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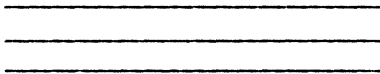
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