



**Wyse Terminal 160**

## Specifications

### Model

- Wyse 160

### Emulation

- ASCII
- ANSI
- Tektronix 4010/4014
- Alloy PC-CGA
- PC-99GT graphics w/Hercules
- CGA, EGA, VGA

### Standard Features

- Dual session support
- Two serial ports
- One parallel port
- Multiple display formats
- Tilt/Swivel base
- 14" non-glare screen

### Dimensions

- 12.7" h x 12.5" w x 12.5" d
- 16.53 Lb.

### Power

110/220 VAC @50-60 Hz using 45 watts

## Special Notes

- The terminal contains High-Voltage and is extremely dangerous. Disconnect any power cords when working on the inside of the terminal with the cover removed.
- Be careful of the CRT face. The slightest crack in the face could cause an implosion, therefore, causing an injury. Always work with the neck of the unit facing you.
- When wearing the grounding strap do not connect it to the terminal directly
- Remember to remove your grounding strap at anytime when the terminal is to be powered on.
- The Anode lead may still contain a build-up charge after the power has been removed so avoid touching it until you are able to discharge it with the removal procedure.

## Tools Needed

### Assembly/Removal Tools Needed

- Insulated #1 Phillips screwdriver
- Insulated #2 Phillips screwdriver
- Insulated 12" flat-blade screwdriver
- Long-nose pliers
- Test leads

### Diagnostic Tools Needed

- Digital multimeter
- High voltage probe
- 150 MHz oscilloscope
- DB-25 Even parallel loopback connector
- DB-25 Odd parallel loopback connector
- DB-25 Serial loopback connector
- 9 Pin loopback connector

## Field Replacement Units

| Description               | OEM Part  | IBM Part |
|---------------------------|-----------|----------|
| Wy-160 14" Amber Terminal | 900373-07 | 93F5657  |
| Wy-160 14" Green Terminal | 900373-01 | 93F5658  |
| Wy-160 14" White Terminal | 900373-04 | 93F5637  |
| Keyboard Assembly - Ascii | 840338-01 | 93F5659  |
| Keyboard Assembly - Ansi  | 840338-09 | 93F5660  |
| Enhanced PC KB Assembly   | 900242-01 | 93F5224  |
| Wyse Keyboard             | 840358-01 | 93F5661  |

## Removal Procedures

### Cables and Cover

- Turn OFF terminal.
- Remove AC cord from rear of terminal.
- Remove any other cables from the terminal.
- Place the face of the CRT on a padded surface.
- Remove (2) two screws located under the operator control panel on the side of the terminal.
- Push control panel into the terminal case so the controls do not come through the terminal case.
- Remove (2) two screws from the lower portion of the terminal back and within each corner.
- Slide cover straight back from face to remove the cover.

### Fuse

- Remove the cover as described before.
- Locate the fuse on the printed circuit board inside a housing just behind the AC power plug.
- Remove fuse by hand or carefully with the pliers using very little gripping pressure to avoid cracking the fuse.

### Anode Cap discharging

- Remove the cover as described before.
- With test leads, connect the terminal's metal frame to the flat-blade screwdriver to ground it.
- Place this grounded screwdriver under the circular anode cap which is located on the back of the CRT tube and touch the spring-clips inside the cap with the blade of the screwdriver. (*This will discharge the CRT*)
- At the same time press together the spring-clips using the pliers and pull the anode cap off.

### Operator Control Assembly

- Remove the cover as described before.
- Remove the (Contrast control harness, 3 pin marked "W401") from the circuit board.
- Remove the (Power switch harnesses, 1 pin marked "S2A" and "S2B") from the circuit board.
- Remove the (Brightness control harness, 3 pin marked "W202") from the circuit board
- Unscrew the earth ground wire (Black) from the power switch bracket
- Remove (2) two screws holding the operator control assembly to the terminal

### Tilt-Swivel Base

- Place the face of the CRT on a padded surface.
- Remove (2) two screws holding the base to the terminal, They are located at the back of the terminal's swivel base
- Slide base to the rear of the terminal to remove it.

## Removal Procedures ( Continued )

### Main Circuit Board

- Remove the cover as described before.
- Discharge the Anode Cap as described before.
- Cut or remove the strap holding the voltage capacitor to the left terminal bracket.
- Remove (2) two screws holding the circuit board to the terminal. The screws are located in the back corners.
- Remove the (Contrast control harness, 3 pin marked "W401") from the circuit board.
- Remove the (Power switch harnesses, 1 pin marked "S2A" and "S2B") from the circuit board.
- Remove the (Brightness control harness, 3 pin marked "W202") from the circuit board.
- Remove the (LED harness, 2 pin marked "P4") from the circuit board.
- Remove the (Yoke harness, 3 pin marked "W201") from the circuit board.
- Remove the (Keyboard harness, 4 pin marked "P5") from the circuit board
- Unplug the CRT harness from the CRT.
- Unscrew the earth ground wire (Green w/yellow stripe) from the right bracket
- Unscrew the Black grounding wires from the right bracket.
- Remove the circuit board's clamp-downs from both sides
- Side the circuit board back and away from the terminal.

### CRT Assembly

- Remove the cover as described before.
- Discharge the Anode Cap as described before.
- Remove Operator control assembly as described before.
- Place the face of the CRT on a padded surface.
- Remove (4) screws holding the bezel to both brackets on each side of the terminal.
- The terminal case should be clear of the CRT tube at this time, however, verify by disconnecting any remaining cables from the CRT.
- Remove the case from the actual bezel and CRT.
- Remove (4) screws, located in each of the four corners of the bezel that hold the bezel to the CRT tube.
- Lift the CRT and slide the bezel out from underneath the CRT and return the CRT to the padded surface.

### Yoke

(Refer to **Special Notes** before proceeding)

- Remove the cover as described before.
- Remove the (Yoke harness, 3 pin marked "W201") from the circuit board
- Loosen the thumbscrew on the CRT neck to loosen the Yoke lock.
- Slide the Yoke OFF the CRT's neck very carefully.

| Error Codes             | Description                          |
|-------------------------|--------------------------------------|
| 0                       | Character RAM                        |
| 1                       | Attribute RAM                        |
| 2                       | Font RAM                             |
| A                       | Port 1 RTS to CTS Error              |
| B                       | Port 1 DTS to DSR Error              |
| C                       | Port 1 DTR to DCD Error              |
| D                       | Port 2 RTS to CTS Error              |
| E                       | Port 2 DTS to DSR Error              |
| F                       | Port 2 DTR to DCD Error              |
| K                       | Lost Setup (Battery Failure)         |
| P                       | EPROM Checksum                       |
| X                       | Port 1 Transmit to Receive Error     |
| Y                       | Port 2 Transmit to Receive Error     |
| a                       | Parallel Port D0 to D1 (ACK) Error   |
| b                       | Parallel Port D2 to D3 (Busy) Error  |
| c                       | Parallel Port D4 to D5 (PE) Error    |
| d                       | Parallel Port D6 to D7 (Error) Error |
| LED On/Off (Constantly) | Parallel Port STB (Strobe) Error     |

### DB-25 Even Parallel Loopback Connector Wiring

| From Pin | To Pin |
|----------|--------|
| 2        | 10     |
| 4        | 11     |
| 6        | 12     |
| 8        | 15     |
| 1*       | 17*    |

\*An LED is installed between pin 1 (cathode side of LED) & pin 17 (Anode side of LED) of the DB-25 even parallel loopback connector

### DB-25 Odd Parallel Loopback Connector Wiring

| From Pin | To Pin |
|----------|--------|
| 3        | 10     |
| 5        | 11     |
| 7        | 12     |
| 9        | 15     |
| 1*       | 17*    |

\*An LED is installed between pin 1 (cathode side of LED) & pin 17 (Anode side of LED) of the DB-25 odd parallel loopback connector

### DB-25 Serial Loopback Connector Wiring

| From Pin | To Pin |
|----------|--------|
| 2        | 3      |
| 4        | 5      |
| 6        | 8      |
| 8        | 20     |

### 9-Pin Loopback Connector Wiring

| From Pin | To Pin |
|----------|--------|
| 1        | 4      |
| 2        | 3      |
| 4        | 6      |
| 6        | 9      |
| 7        | 8      |

### Diagnostics

The Power-On diagnostic will display one of the preceding error codes of (0-2, A-F, K, P, X, Y, a-d) if error is present.

### Servicing / Repair

If any part is determined to be non functional or in failure then the whole terminal is to be issued replaced, however, the removal procedures are included for reference.

### For certified technicians ONLY

If CRT adjustments are needed refer to the preceding Loopback configurations and the following adjustment parameters for the appropriate adjustment.

| Certified Adjustments and Specifications  | Using Test Pattern   | Point to Adjust |
|---|--|-----------------|
| +30.5 VDC<br><br>+30.5 VDC $\pm$ 0.15 VDC<br>+15 VDC $\pm$ 0.75 VDC<br>+ 5 VDC $\pm$ 0.25 VDC<br>+ 6.3 VDC $\pm$ 0.32 VDC<br>- 6.3 VDC $\pm$ 0.63 VDC | "M" test<br>measured at:<br>Cathode-D113<br>Cathode-D110<br>Cathode-D109<br>U11 PIN 14<br>U11 PIN 01 | VR101           |
| Horizontal Hold<br>Best display stability   | Mode 1 Pattern<br>H-sync to Grd.   | VR201           |
| Display Rotation<br>"square" to bezel $\pm$ 1.2mm   | Mode 1 pattern   | Yoke            |
| Vertical Center<br>Centered $\leq$ 5 mm   | Mode 1 pattern   | Center Rings    |
| Horizontal Center<br>Centered $\leq$ 5 mm   | Mode 1 pattern   | VR202           |
| Vertical Size, Mode 1<br>172 mm $\pm$ 5 mm  | Mode 1 pattern   | VR302           |
| Vertical Size, Mode 2<br>172 mm $\pm$ 5 mm  | Mode 2 pattern   | VR301           |
| Vertical Size, Mode 3<br>172 mm $\pm$ 5 mm  | Mode 3 pattern   | VR304           |
| Vertical Linearity<br>Correct linearity (10% /better)   | Mode 1 pattern   | VR303           |
| Horizontal Size<br>237 mm $\pm$ 5 mm  | Mode 1 pattern   | L201            |
| Sub-Brightness<br>1fL (+ 0.4-0.2)   | Mode 1 pattern   | VR204           |
| Sub-Contrast<br>White 45 fL (+ 7-3)<br>Green 70 fL (+ 7-3)<br>Amber 32 fL (+ 7-3)   | "M" pattern  | VR402           |
| Focus - Optimum focus   | "M" pattern  | VR203           |
| Pincushion<br>Least pincushion distortion<br>of ( $\leq$ 2.5 mm)  | Mode 1 pattern   | Yoke Magnets    |