Sechrist Millennium Technical Bulletin 002

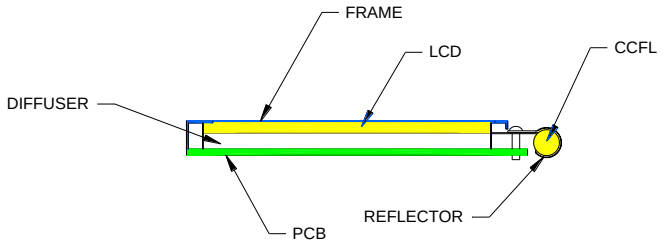
LCD Display Suddenly Became Very Dark or Hard To See

Understanding the Basics of LCD Display

A Cold Cathode Fluorescent Lamp (CCFL) is used in the Millennium ventilator LCD display as a light source. The CCFL is mounted with a reflector on the bottom edge of the LCD, reflecting the light into a white diffuser plate. The diffuser plate spreads the light evenly across the display viewing area.

Gas, which is sealed in the CCFL tube, is excited by a high voltage alternating electric field. Gas molecules then emit their characteristic radiation, which strikes the fluorescent material coated on the inner surface of the tube, causing the tube to light up. The CCFL requires a DC to AC inverter (CCFL Power Supply) to supply 500 to 800 V (AC) at 40 to 60 KHz operating frequency. The lamp current is typically 6 to 7 mA (AC).

The typical life expectancy of CCFL is 7,000 ~ 10,000 hours, depending on brightness setting, operating temperature, and vibration.



Troubleshooting

Symptom: The Millennium ventilator LCD display suddenly became very dark or hard to see.

Prior to troubleshooting inside the Millennium ventilator, make sure the ventilator power is applied, the ventilator is turned ON, and the Brightness (if applicable) and Contrast controls are properly adjusted.

***NOTE:* Certain approved Millennium CCFL Power Supply Assemblies have fixed or constant brightness level, i.e., turning the Brightness control potentiometer at the back plate does not change the LCD display brightness. For these Millennium ventilators, adjust only the Contrast control potentiometer.**

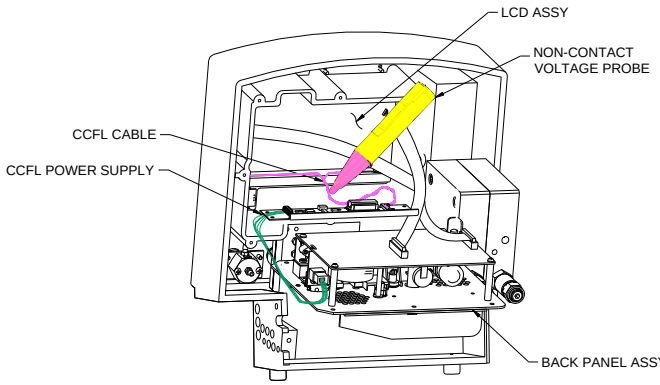
If the display is still very dark or hard to see, the problem may be in either the CCFL Backlight or the CCFL Power Supply assembly. Perform the following:

a) Make sure that the Millennium ventilator electrical power is removed;
b) Remove the back cover (5 screws);
c) Remove the Back Plate assembly (7 screws) but do not remove connectors;
d) Carefully remove the CCFL Power Supply (2 screws) located below the LCD display, but do not remove connectors;

***CAUTION:* Make sure all removed assemblies are not shorted to or touching any metal surface. You may temporarily place a sheet of paper beneath the assembly.**

e) Apply electrical power to the Millennium ventilator;
f) Press On/OFF button on the front panel to turn the ventilator ON;

***CAUTION:* Electric shock hazard: The CCFL Power Supply produces high AC voltage (500 to 800 VAC). Care should be taken not to touch any electrical circuit or exposed connector when performing the following steps.**



(*The illustration above showing the non-contact voltage probe tip snooping near the high voltage pink or white twisted cables leading to the CCFL Backlight assembly.*)

g) Use a non-contact AC voltage test probe, turn the probe on, and place the probe tip near the pink or white twisted cable from CCFL or near the transformer of the CCFL Power Supply Assembly (the cables carry high AC voltage);

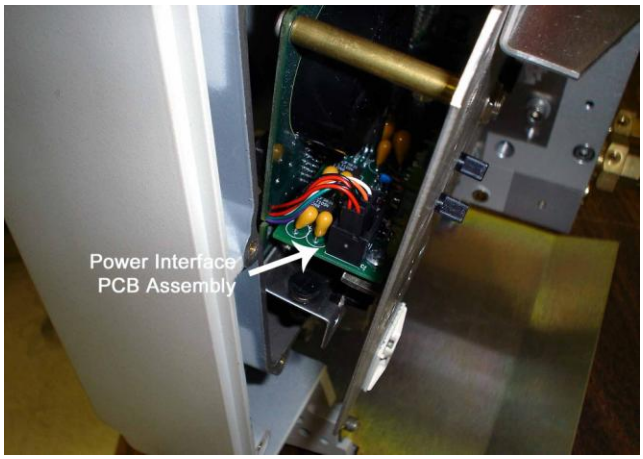
h) If you hear a continuous intermittent tone *and* notice a flashing red LED from the test probe, the CCFL Power Supply is OK**. <u>You need only to replace the CCFL Backlight assembly</u>**;

i) If you <u>DO NOT</u> hear a continuous intermittent tone *and* notice a flashing red LED**, <u>then you need to replace the CCFL Power Supply assembly</u>**.

<u>NOTE:</u> When re-assembling the CCFL Power Supply assembly, make sure that the pink or white twisted CCFL cable is routed below the assembly (away from the LCD PC Board). In addition, the ground (green/yellow) wire lug is re-attached to the left screw of the CCFL Power Supply shielded bracket.

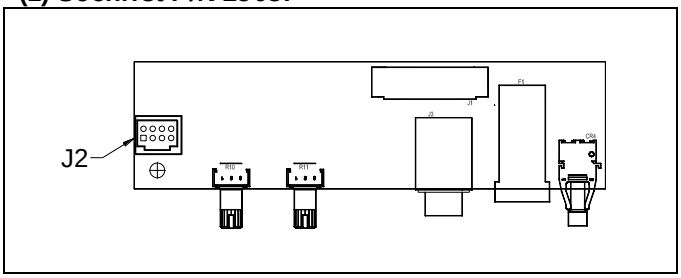
Identifying Power Interface & CCFL Power Supply PCB Assemblies Prior to Ordering Replacements

The Millennium Power Interface PCB assembly is located between the System PCB assembly and the back plate as shown below:



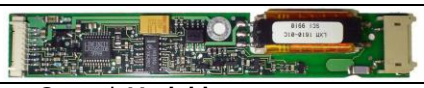
The Millennium ventilator works with either of the following two Power Interface PCB assemblies, (1) 25087 or (2) 25113, depending on which CCFL Power Supply PCB assembly (25104) variant used. They are functionally identical.

(1) Sechrist P/N 25087

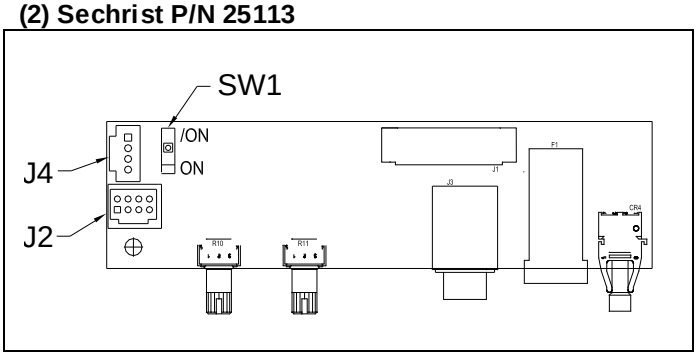


Note that only header J2 resides at the left side of the PCB assembly. The Power Interface PCB assembly (1) works with only the following CCFL Power Supply assembly (25104):

(a) Identification: **LXM 6010-01C**

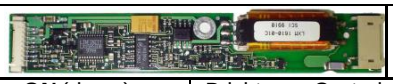
To J2		From backlight
Brightness Control: **Variable**		

(2) Sechrist P/N 25113



Note that headers J2, J4, and slide switch SW1 reside at the left side of the PCB assembly. The slide switch SW1 configures the proper logic level to turn the CCFL backlight on or off. The Power Interface assembly (2) works with all of the following CCFL Power Supply assembly (25104) variants:

(a) Identification: **LXM 6010-01C**

To J2 (8-pins)		From backlight
SW1 Position: **ON** (down)	Brightness Control: **Variable**	

(b) Identification: **CXA-L0612A-VJL**

To J4 (4-pins)		From backlight
SW1 Position: **ON** (down)	Brightness Control: **Variable**	

(c) Identification: **marked "JKL"**

To J2 (8-pins)		From backlight
SW1 Position: **/ON** (up)	Brightness Control: **Fixed**	

(d) Identification: **LS390**

To J2 (8-pins)		From backlight
SW1 Position: **/ON** (up)	Brightness Control: **Fixed**	

Replacing Power Interface PCB Assembly

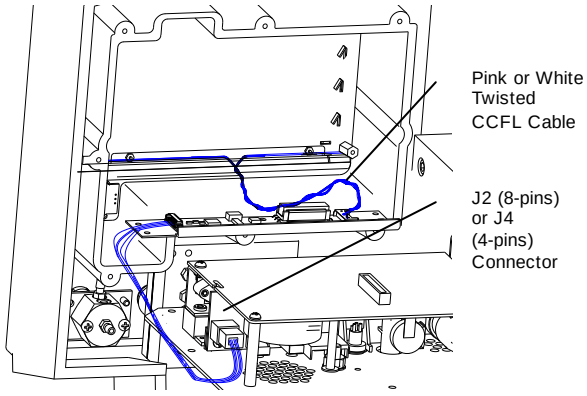
Refer to Millennium *Power Interface & CCFL Power Supply PCB Assemblies Replacement Procedure, Doc No. 100310* for details.

<u>NOTE:</u> The Power Interface PCB assembly must be installed first (if required), prior to replacing the CCFL Power Supply PCB assembly (see next section).

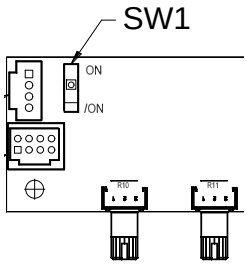
Replacing CCFL Power Supply PCB Assembly

CAUTION: ***Electric shock hazard: The CCFL Power Supply produces high AC voltage (500 to 800 VAC). Make sure that the Millennium ventilator electrical power (including the optional Backup Battery Assembly if installed) is removed before servicing.***

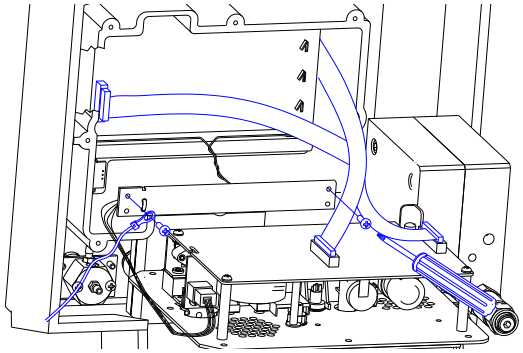
a) Follow Troubleshooting section above, remove back cover, Back Plate assembly, & CCFL Power Supply assembly;
b) Disconnect the pink or white twisted (high voltage) CCFL cable connector from the *bad* CCFL Power supply Assembly;
c) Disconnect the appropriate cable connector from either header J2 (8-pins) or J4 (4-pins) from the Power Interface PCB assembly behind the Back Plate assembly;
d) Replace the *bad* CCFL Power Supply assembly with the *new* one*;
e) Connect the appropriate cable connector securely to either the header J2 (8-pins) or J4 (4-pins) of the Power Interface PCB assembly*;



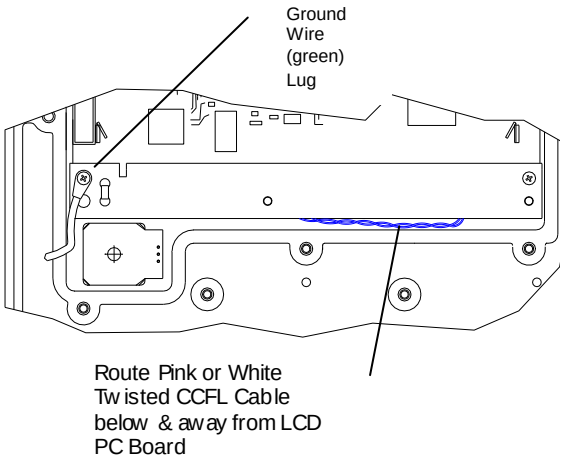
f) Set the slide switch SW1 (if using 25113) to either position **ON** (up) or **/ON** (down) for the proper LCD display ON/OFF control logic*;



g) Connect the existing pink or white twisted CCFL cable connector (from the CCFL Backlight assembly) securely to the *new* CCFL Power Supply Assembly;
h) Secure the *new* CCFL Power Supply assembly with 2 mounting screws, make sure that the pink or white twisted CCFL cable is routed below the assembly (i.e., away from the LCD PC Board);



i) Make sure that the ground (green) wire lug is re-attached to the left screw of the CCFL Power Supply shielded bracket;



j) Re-install the Back Plate assembly in place (7 screws);
k) Re-install the back cover (5 screws).

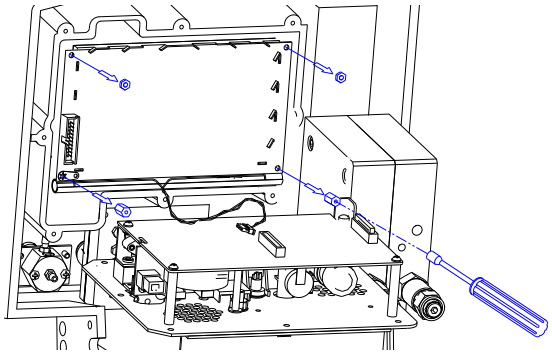
*** Refer to section: Identifying Power Interface & CCFL Power Supply PCB Assemblies Prior to Ordering Replacements for proper header (J2 or J4) connection and slide switch SW1 position.**

Replacing CCFL Backlight Assembly

CAUTION: ***Electric shock hazard: The CCFL Power Supply produces high AC voltage (600 to 800 VAC). Make sure that the Millennium ventilator electrical power is removed before servicing.***

STEPS A: Removing LCD Display Panel

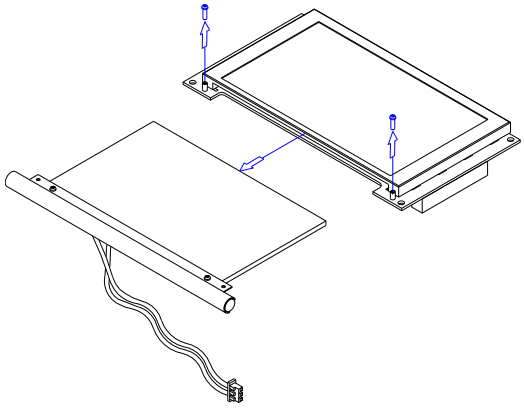
a) Follow Troubleshooting section above, remove back cover, Back Plate assembly, & CCFL Power Supply assembly;
b) Remove all connectors to expose the LCD display Panel;
c) Remove two 4-40 hex nuts from the upper corners of the LCD display panel;
d) Remove two 4-40 standoffs from the lower corners of the LCD display panel;



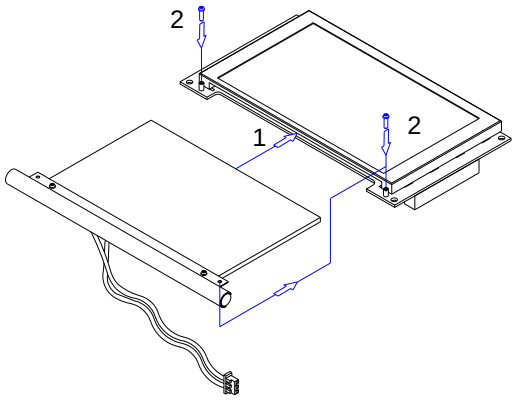
e) Carefully remove the complete LCD display panel;

STEPS B: STEPS B apply to Data Vision, AND, and Ampire displays only. If your display type is Hantronix, skip to STEPS C.

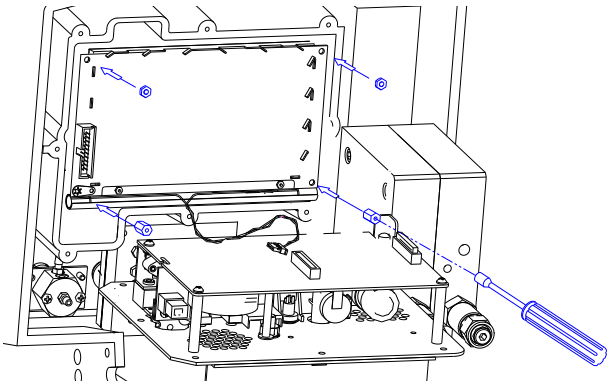
f) Remove two outer CCFL Backlight assembly retaining screws from the standoffs at bottom side of the LCD display printed circuit board;
g) Carefully slide out the *bad* CCFL Backlight assembly;



h) Carefully slide in the *new* CCFL Backlight assembly (1);

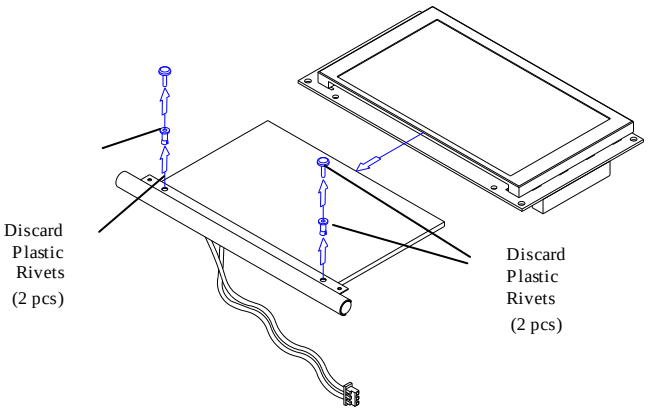


i) Re-install the outer CCFL Backlight assembly retaining screws (2);
j) Re-install the completed LCD display panel to the front cover with two 4-40 hex nuts from the upper corners and two 4-40 standoffs from the lower corners of the LCD display panel. Skip to STEPS D;

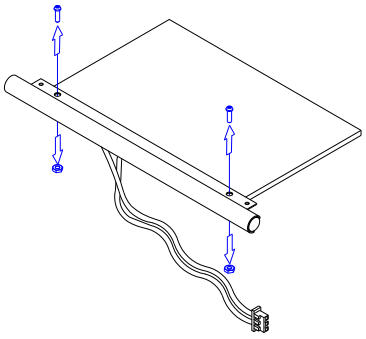


STEPS C: The following steps apply to Hantronix display only.

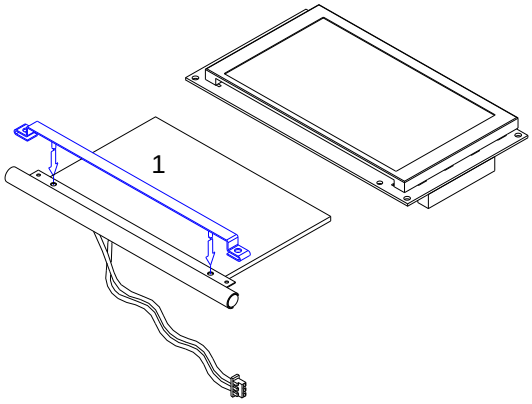
k) Remove and discard the two CCFL Backlight assembly retaining plastic rivets;
l) Carefully slide out the *bad* CCFL Backlight assembly;



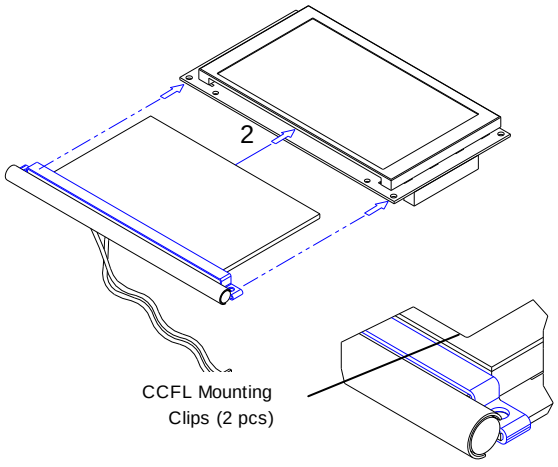
m) Remove and discard two screws/nuts from the *new* CCFL Backlight assembly;



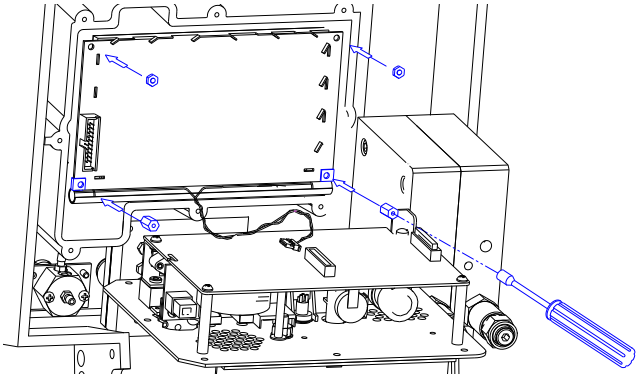
n) Carefully install CCFL retaining bracket onto the *new* CCFL Backlight assembly, making sure that the two studs on the bracket are properly aligned and inserted into the inner mounting holes as shown below (1);



Slide the new CCFL Backlight assembly with the retaining bracket into the slot of the LCD display panel as shown below (2), making sure that the end clips of the retaining bracket enclose the PCB and the mounting holes are properly aligned;



o) Re-install the completed LCD display panel to the front cover with two 4-40 hex nuts from the upper corners and two 4-40 standoffs from the lower corners of the LCD display panel, make sure that CCFL retaining clips are properly aligned and in place.



STEPS D: Finishing Remaining Assemblies Re-installation

p) Re-connect the 8-pin connector securely;
q) Re-connect the pink or white twisted CCFL cable connector securely;
r) Secure the CCFL Power Supply assembly with 2 screws, make sure that that the pink or white twisted CCFL cable shall be routed below the assembly (away from the LCD PC Board). In addition, the ground (green) wire lug shall be re-attached to the left screw of the CCFL Power Supply shielded bracket
s) Re-install the Back Plate assembly in place (7 screws);
t) Re-install the back cover (5 screws).

Approved LCD Display Assemblies

Millennium ventilator uses the following interchangeable LCD display assemblies:

Manufacturer	*Manufacturer P/N*	*Sechrist P/N*	*Identification*
Hantronix	HDM128GS 24-1WJOF	**22181**	• Manufacturer's name • 2 CCFL Black Plastic Rivets at bottom • No cut-out at bottom of printed circuit board
Data Vision / Data International	DG-24128-01SNCW		• Manufacturer's name • 2 CCFL mounting screws/nuts at bottom • Cut-out at bottom of printed circuit board
AND	AND1741BST		
Ampire Display	AG240128BF TCWC56		

CCFL Backlight Assembly Replacement Ordering Information

IMPORTANT: The CCFL retaining bracket is to be used with the CCFL Backlight assembly replacement *only if* the LCD display manufacturer is **Hantronix**. Otherwise, discard the retaining bracket. See Replacing CCFL Backlight Assembly procedure above for details.

Sechrist **P/N 20475**
(Kit contains 1 CCFL Backlight assembly & 1 CCFL retaining bracket)

CCFL Power Supply PCB Assembly Replacement Ordering Information

Please specify which of the following Power Interface PCB assembly is used in your Millennium ventilator when ordering the CCFL Power Supply assembly replacement:

(1) Sechrist P/N 25087 (identified w/ header J2 only);
(2) Sechrist P/N 25113 (identified w/ headers J2, J4, & slide switch SW1).

Depending on the availability of the CCFL Power Supply PCB assembly variants, you may also need to order the Power Interface PCB assembly, Sechrist P/N 25113.

NOTE: Refer to section: Identifying Power Interface & CCFL Power Supply PCB Assemblies Prior to Ordering Replacements for different CCFL Power Supply variants and their correct configurations during installation.

Sechrist **P/N 25104** (only one variant shown below)

Recommended Non-Contact AC Voltage Probe

The non-contact AC voltage probes are available in electronics or hardware stores. This non-contact probe was tested to be very sensitive, have wider voltage detection range and good frequency response. You may use an equivalent non-contact probe of similar specifications.

Non-Contact Probe Brand/Model:

Greenlee / 1110 Voltage Detector or equivalent.

- Fast, easy, noncontact voltage detection.
- Convenient pen size, fits in pocket or tool pouch.
- Bright LED and audible alarm if voltage is present.
- On/off switch for longer battery life.
- Use to detect the presence of voltage at outlets, lighting fixtures, circuit breakers, wires, and cables or find a break in a wire.
- Accessories included: (2) 1.5 volt AAA batteries.

Cat. No.	UPC No.	Description
1110	07561	Volt Tick Voltage Detector

SPECIFICATIONS

Voltage Detection: 50-1000VAC
Frequency Range: 50-500Hz
Overvoltage Protection: IEC 61010-1 Category III, 1000V