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CVL505 LAMP

INSTALLATION INSTRUCTIONS

These instructions describe how to replace the Backlights for the Covidien 840 Ventilator with the 9.4" GUI (Graphis User Interface) only. This process is part of the 10,000 hour Preventative Maintenance procedure for the 9.4" GUI. The 10.4" GUI does not require any maintenance at 10,000 hours.

Warning: To avoid the possibility of physical injury it is recommended that the service technician complete the Covidien training class geared specifically to the Covidien 840 Ventilator before attempting this planned maintenance. It is also recommended that the service technician have a copy of the OEM service manual available before proceeding.

Warning: Ensure that all electrostatic discharge processes are followed whenever handling the internal components and circuit boards of the 840 Ventilator. This should include a wrist strap, static dissipating surface mats and a correctly attached ground cord.

Warning: Avoid contact with the LCD panel front surface. Finger prints and smudges can be hard to remove.

Before beginning the Installation:

- 1) Run an Electrical Safety Test (EST) as described in the Covidien 840 Ventilator System service manual.
- 2) Place the ventilator into Service Mode as described in the Covidien 840 Ventilator System service manual.
- 3) Review and download the contents of the System Diagnostics Log and the Extended Self-Test and Short Self-Test (SST) Logs.
- 4) Run the Extended Self-Test as described in the Covidien 840 Ventilator System Service Manual.
- 5) Turn the ventilator power off and unplug from the wall outlet.
- 6) Disconnect the high-pressure gas lines from the ventilator.
- 7) Disconnect the Backup Power Supply (if present) from the Breath Delivery Unit.

Removing and disassembling the 9.4" Graphic User Interface (GUI):

Using the Covidien 840 Ventilator System Service Manual as a guide, perform the following procedures:

- 1) Disconnect the GUI cable from the side of the Breath Delivery Unit by loosening the captive screws and gently pulling the cable from the Breath Delivery Unit. If the 9.4" GUI is mounted on the optional cart, detach the cable from the guides at the rear of the cart.
- 2) Remove the GUI from its mount by pushing and holding the GUI release knob to the right. Lift the GUI up and away from its mounting bracket.
- 3) Place the GUI face down on a flat electrostatic protected work surface.
- 4) Remove the GUI Top and Bottom Handles as well as the Interface Cable connected to the GUI CPU. Retain all hardware. Remove 2 screws holding the RS-232 port cover and unplug the remote alarm. Remove 19 screws from the GUI Housing and retain for use later (see Figure 1).

Note: There are 3 different length screws used – do not mix them up.

- 5) Separate the rear and front covers.
- 6) Remove the GUI EMI Shield (not shown) which covers the entire GUI CPU (PCB) and is held in place with 11 screws. Retain all hardware. Disconnect the Touch Frame PC Board Cable (J19) and the Keyboard Cable (J20) and remove EMI shield.

Caution: Avoid damage to delicate wire harnesses by not pulling on the wires when disconnecting them. You can use a small straight blade screwdriver to help separate the connectors from the housings.

- 7) Disconnect the following cables from the GUI CPU PC Board (see Figure 2):

- a) LCD Harnesses from J6 & J8 and J16 & J18
- b) Backlight Inverter PC Board Ribbon Cable from J7
- c) GUI LED PC Board Ribbon Cable from J3
- d) GUI Alarm Harness from J9

Caution: Do not flex or touch any of the surface components of the Touch Frame PC Board!

- 8) Disconnect the Backlight Extender Cable Assemblies from the Backlight Inverter PC Board Connectors J2 and J3. Lift the CPU Bracket Assembly from the Front Housing. Turn the CPU Bracket Assembly over (LCD Panels up) and place on a flat electrostatic protected work surface.

Figure 1 - Removal of 9.4" GUI Handle Assembly, Interface Cable and Rear Housing

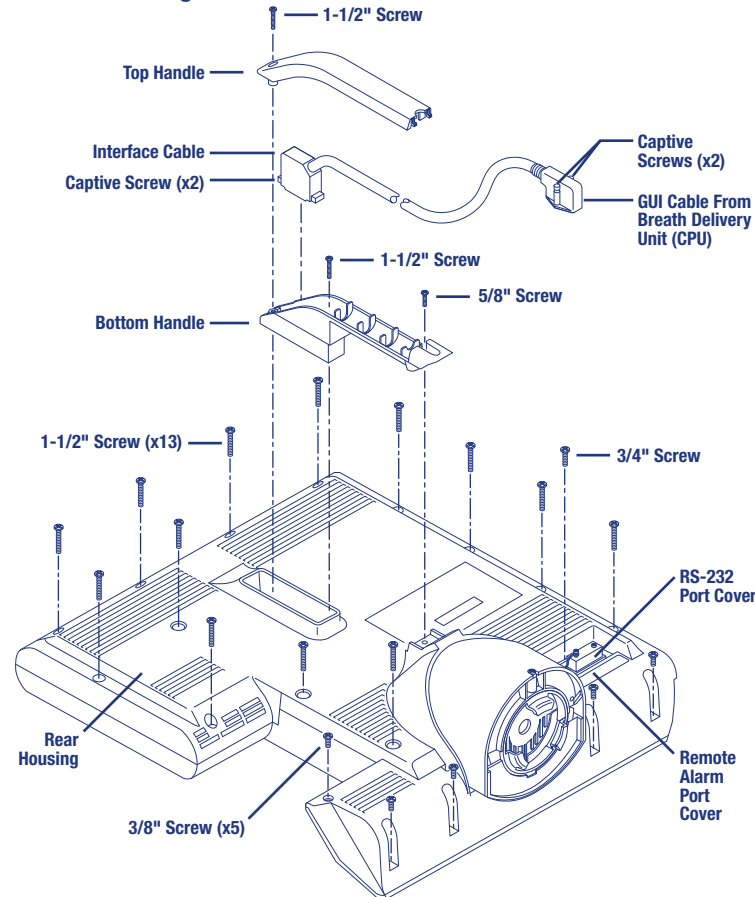


Figure 2 - CPU Bracket Assembly

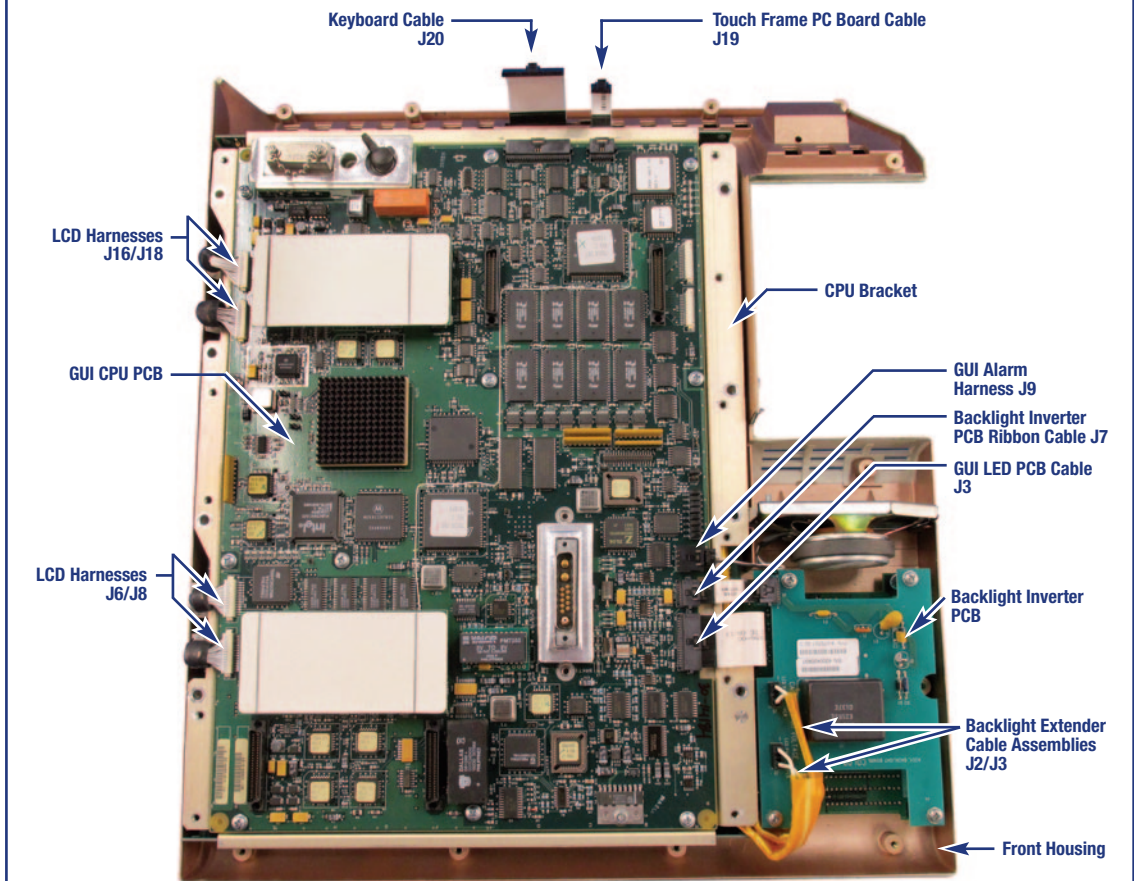
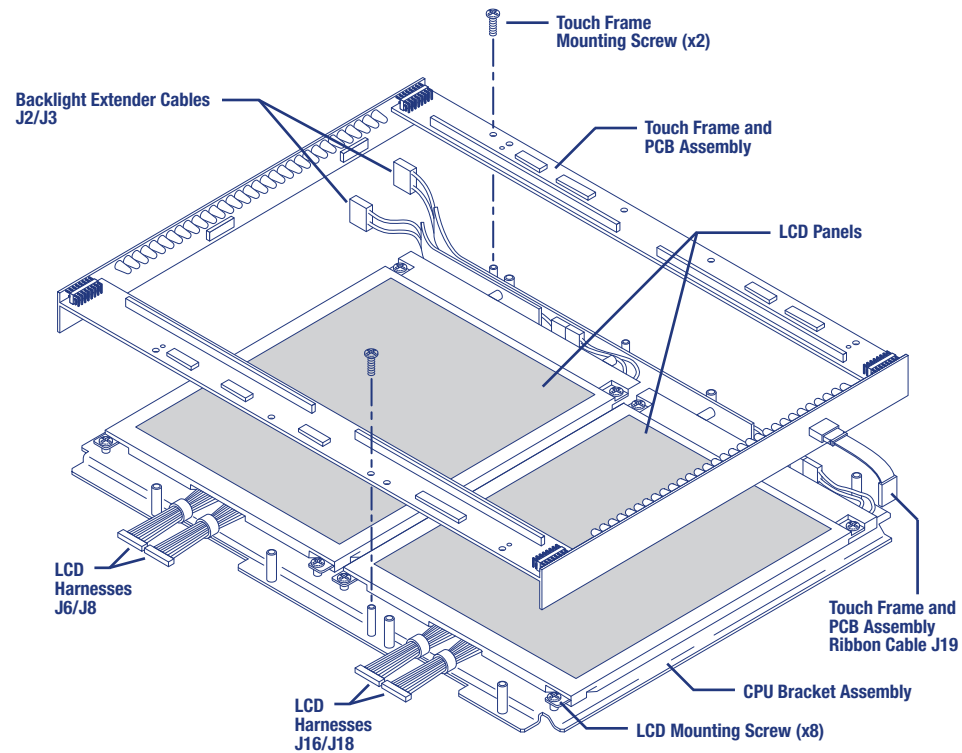


Figure 3 - Removal of 9.4" GUI Touch Frame PCB and LCD Panels

Caution: Do not flex or touch any of the surface components of the Touch Frame PC Board!



- 9) Remove and retain the two screws that secure the Touch Frame and PC Board Assembly to the CPU Bracket (see Figure 3). Remove the Touch Frame and PC Board Assembly and place it in an anti-static bag or on a flat electrostatic protected work surface.
- 10) Disconnect the Backlight Extender Cable from each LCD Panel. Leave the cables in place.
- 11) Remove and retain the four screws that secure each LCD Panel to the CPU Bracket. Removing one panel at a time, place the LCD Panel face down on a flat Electrostatic protected work surface for further disassembly. Use caution to not touch or scratch the face of the LCD Panel.

NOTE: The LCD panels are not interchangeable due to wire length.

Warning: When replacing the Backlight Panel do not touch the inside (coated surface) of the LCD window as you cannot remove smudges and finger prints. Do not allow dust or other contamination to enter the assembly. Use an ESD safe vacuum or anti-static ionized air to remove any dust or particles.

- 12) Remove the LCD Interface PC Board (with cables attached) from the rear of the LCD Panel and set aside.

Replacing the Backlight Lamp:

- 1) Using a small flat-bladed screwdriver straighten the small metal tabs found on the perimeter of the LCD Panel. Carefully remove the LCD Backlight Panel and place on a flat electrostatic protected work surface for further disassembly.
- 2) Remove the Back Plate and carefully fold back the Plastic Protective Sheeting.
- 3) Remove the old Bulb Assembly from the bottom of the Backlight Panel for further disassembly.
- 4) Slide back the white rubber boots exposing the heat shrink tubing and the solder joints. Remove the used heat shrink tubing and discard.
- 5) Unsolder the old bulb and discard per local regulations.
- 6) Slide the new Heat Shrink Tubing (included with the new Bulb) onto the wires PRIOR to soldering the wires onto the new Bulb. Slide the heat shrink tubing over the cooled solder joint and shrink in place.
- 7) Replace the Rubber Boots over the finished connections and reinstall the Bulb into the LCD Back Panel.
- 8) Complete the installation by replacing the back plate, reseating the small metal tabs found on the perimeter to hold the Backlight Panel in place,
- 9) Reattach the LCD Interface PC Board (with the Cable attached) to the LCD Panel. Align the LCD Panel (face up) with the four screw holes in the Mounting Bracket.
- 10) Reattach the Backlight Extender Cable to the LCD Panel.
- 11) Install and hand tighten the four screws until snug. **Do not overtighten screws.**
- 12) Repeat the above steps for the second LCD Panel.

Reinstall the 9.4" GUI (refer back to Figures 1 and 2 on front page):

Using the Covidien 840 Ventilator System Service Manual as a guide, perform the following procedures:

- 1) Ensure that the Backlight Extender Cables are correctly routed with the foam side away from the LCD Panels, and align the Touch Frame and PC Board Assembly with the LCD Panels. Use two retained screws to attach the Touch Frame to the CPU Bracket Assembly. **Do not overtighten the screws.**
- 2) Position the CPU PC Board Bracket Assembly into the Front Housing with the LCD Panels facing down.
- 3) Connect the two Backlight Extender Cables to the Backlight Inverter PC Board Connectors J2 and J3.
- 4) Connect the following cables to the GUI CPU PC Board:
 - a) LCD Harnesses to J6 & J8 and J16 & J18
 - b) Backlight Inverter PC Board Ribbon Cable to J7
 - c) GUI LED PC Board Ribbon Cable to J3
 - d) GUI Alarm Harness to J9

- 5) Reinstall the GUI EMI Shield using 11 retained screws. **Do not overtighten screws.**
- 6) Reconnect the Touch Frame and PC Board Assembly Ribbon Cable to the GUI CPU PC Board Connector J19.
- 7) Reconnect the Keyboard Ribbon Cable to the GUI CPU PC Board Connector J20.
- 8) Ensure that the Toroid Coils on the LCD Harness Cables are correctly positioned and do not interfere with the Rear Housing.
- 9) Align the Rear Housing and Front Housing ensuring that the Remote Alarm Cover is fed through the Rear Housing.
- 10) Check the perimeter of the GUI Housing to ensure that all Toroids and Cables are correctly positioned and not pinched by the Housing Assembly. Gently press the Housings together until fully seated.
- 11) Using the 19 screws removed earlier, complete the assembly of the GUI Housing.
Note: There are 3 different length screws used – do not mix them up.
Note: Overtightening the GUI Housing screws can stress the GUI internal components and can damage the GUI.
- 12) Reinstall the Bottom Handle using two screws removed earlier. **Do not overtighten.**
- 13) Reconnect the Interface Cable to the GUI CPU PC Board connector. **Do not overtighten the captive screws.**
- 14) Snap the Top Handle into place. Install screw removed earlier. **Do not overtighten.**
- 15) Reinstall the GUI onto its Mounting by pressing the Release Knob to the right and then to the left to engage the Housing into Mount.
- 16) Reroute and attach the Interface Cable to the side of the Breath Delivery Unit.

Performance Verification Procedures:

- 1) Place the Ventilator in Service Mode. Let Ventilator warm up for 10 minutes and run the following procedures as described in the Covidien 840 Ventilator Service Manual:
 - a) Flow Sensor calibration
 - b) Expiratory Valve calibration
 - c) Atmospheric Pressure Transducer calibration
 - d) Extended Self-test (EST)
 - e) Ventilator Inoperative test (VENT INOP TEST)
- 2) Run the Short Self-test (SST)
- 3) Calibrate the Oxygen Sensor using 100% O₂/CAL 2 min key.
- 4) Run the Performance Verification as described in the Covidien 840 Ventilator service manual. Make any needed repairs before returning the Ventilator to use.
- 5) Fill out and attach the PM sticker to the Breath Delivery Unit and update the Ventilator Maintenance Records.