

CISCO AFFIRMS SAFETY OF LIEBERT UPS/ROUTER INTERFACE

Voicemail software in Cisco routers requires a graceful shutdown in the event an outage exceeds UPS battery capacity. Liebert UPSs use a different approach to signal a low battery condition to the router than competitive units, which may require a custom interface to prevent damage to the router. Only Liebert's approach has been documented as safe by Cisco.

Situation

Cisco Unity Express voicemail is basically a server that needs to be gracefully shutdown in the event of a power failure to avoid the possibility of file system corruption. When the router senses a signal on the appropriate pin of its AUX port it will issue an autocommand to gracefully shutdown the CUE module and cleanly dismount the file system.

Liebert UPSs signal a low battery condition to the router in a way that is subtly, yet significantly, different than competitive units. When the Liebert UPS senses a low battery condition it closes a set of contacts across two pins in the RS232 cable. It receives a voltage from the router on one pin and sends the same voltage back to the router on another pin, eliminating the possibility that a surge from the UPS power supply could damage the router.

In contrast, competitive units supply a voltage from the power supply in the UPS to the router. This creates the possibility that UPS failure damages the router.

Solution

Cisco engineers have tested and approved the interface between a Liebert UPS and its routers. This interface was documented in the *Liebert UPS/Cisco Unity Express Shutdown Application Note* published by Cisco and is reproduced on the following pages.

According to Cisco, there is not currently a safe interface between Cisco routers with Cisco Unity Express software and competitive UPSs. Cisco engineers recommend an as-yet-undeveloped custom cable assembly be used, which includes varistors or zener diodes to limit the voltage applied to the RS232 port, when interfacing competitive units to a Cisco router.



Cisco Interface Procedure for Liebert UPS

This sample configuration was tested on a Cisco 3745 router running IOS 12.3(4)T with a NM-CUE. The router was connected to a Liebert GXT2U 700VA UPS.

Step 1: Test with a terminal emulator.

Cut and paste the following configuration into the router:

```
line aux 0
!Raise the default privilege level of the AUX port from 0 up to 2
privilege level 2
modem Dialin
!issue a single command triggered by a terminal plugged into the aux port
autocommand write memory
```

```
!Lower the privilege level of the service-module command from 15 down to 2
!This command still is not accessible from the console port unless the user
!has a privilege level >0 or knows the enable secret password (level 15)
privilege exec all level 2 write
```

Test the configuration by plugging the console cable into the AUX port to see if the write memory command is issued repeatedly.

Step 2: Make an autocommand dongle for the AUX port.

The AUX port sends a DTR signal out on pin 2.

The AUX port will issue the autocommand when it sees a DSR signal in on pin 7.

1. Start with a standard EIA-TIA 568B straight-through ethernet cable.
2. Cut it in two.
3. Connect pins 2 and 7 together. (Orange and White-Brown) as shown in Figure 1.
4. Insert the dongle into the AUX port to run the autocommand.
5. Issue the “show running-config” command on the console port repeatedly to see the NVRAM config last updated time increment as the autocommand is issued multiple times.

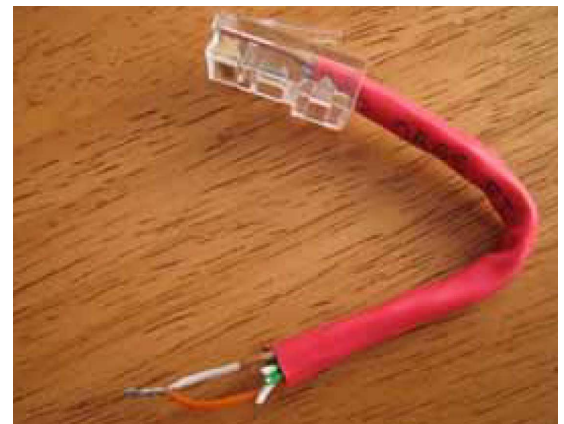


Figure 1.

continued



Step 3: Make a cable to connect the UPS to the Router.

When the Liebert UPS reaches a low battery condition, it connects pin 1 / Low Battery (open collector) to pin 7 / Low Battery (open emitter).

Upon completion, we will have connected the pins together like so:

AUX Port DTR (Out) Pin 2 ⇒ UPS Low Battery (In) Pin 1

AUX Port DSR (In) Pin 7 ⇐ UPS Low Battery (Out) Pin 7

In order to create a cable that will work you will need:

- Standard Cisco rollover console cable (RJ45-RJ45)
- Standard Cisco console connector (RJ45 female-DB9 female)
- DB9 gender changer (DB9 male-DB9 male)
- Pin extraction tool
- Paper clip
- Wire cutters

The easiest way to do this is to reconnect the pins in the console connector.

1. Pry open the console connector.
2. Use the pin extraction tool to remove all of the wires going into the back side of the DB9 female connector. To do this, gently fit the split sleeve of the tool around the wire and insert into the back of the connector as depicted in below in Figure 2. Sometimes it helps to gently twist the tool at the same time.
3. Use the paper clip to poke the loose pin and wire out of the DB9 connector.
4. Extract all remaining wires from DB9 connector.
5. Closely examine the back of the DB9 connector for pin numbers.
6. Insert the Brown wire into pin 1 of the DB9 connector.
7. Insert the Orange wire into pin 7 of the DB9 connector.
8. Cut off all remaining wires to avoid unwanted connections between them.
9. Snap console connector back together.
10. Add the DB9 gender changer to the console connector.

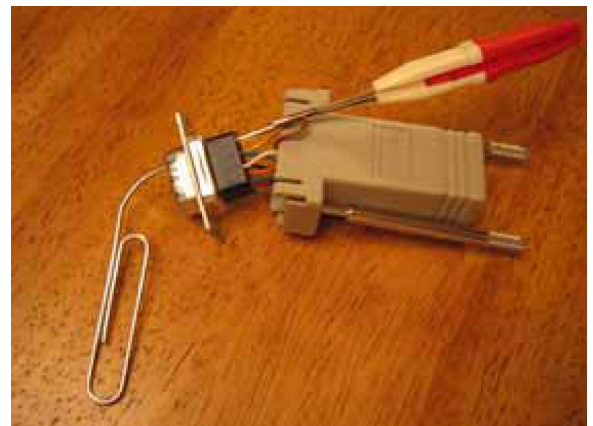


Figure 2.

continued



Figure 3.



Figure 4.

11. Plug the rollover cable into the console connector.
12. Completed adapter is shown in Figure 3.
13. Connect the cable assembly to the UPS as shown in Figure 4.
14. Connect the RJ45 end of the cable into the router AUX port.

Step 4: Change autocommand to shutdown CUE module upon low UPS battery.

Cut and paste the following modified configuration into the router. You may test with a terminal emulator, the autocommand dongle, or the actual UPS when it gets to a low battery condition.

line aux 0

!Raise the default privilege level of the AUX port from 0 up to 2

privilege level 2

modem Dialin

!issue a single command triggered by a terminal plugged into the aux port

autocommand service-module service-Engine 3/0 shutdown no-confirm

!Lower the privilege level of the service-module command from 15 down to 2

!This command still is not accessible from the console port unless the user

!has a privilege level >0 or knows the enable secret password (level 15)

privilege exec all level 2 service-module

Pinout Reference Material:

http://www.cisco.com/en/US/products/hw/univgate/ps501/products_installation_guide_chapter09186a008007c70a.html (See router AUX port pinout in Table D-1)

http://www.liebert.com/assets/products/english/products/netpwrpr/upsgxt2u/60Hz/usersman/acrobat/sl_23150.pdf (See UPS communications interface port pinout on page 23 of 40—numbered as 19.)