

AUTO PROBE SOLUTION FOR MONITORING AND REBOOTING LOCKED-UP DEVICES

1. INTRODUCTION

Internet connectivity has become an invaluable resource for businesses, organizations and individual users. Even short-term disruptions can have a significant impact on productivity and revenue. The need to quickly restore Internet service is imperative, yet the ability to fulfill that need varies widely.

In the event that Internet connectivity is lost, the typical course of action is to contact the service provider to report the issue and begin troubleshooting. Often, the provider will suggest rebooting the system in a specific sequence--first, power down the computer, switch and cable modem. Then, power on the modem and wait until it completes its start-up sequence. Finally, follow the same procedure for the switch/router and connected devices.

Having the ability to detect network interruptions and taking restorative actions without any human intervention is possible with the Auto Probe feature found in Tripp Lite's LX Platform switched PDUs and UPS systems.*

2. DESCRIPTION

The Auto Probe feature enables a Tripp Lite LX Platform device to communicate with one or more devices on the network. The ping communication response from those devices acts as a "heartbeat" that is continuously monitored by the PDU or UPS. If the PDU or UPS cannot detect the heartbeat after multiple communication attempts, the Auto Probe will autonomously perform one or more user-configurable actions, including those that can help return the network devices to an operational state.

Auto Probe is an extension of Tripp Lite's network card Watchdog Probe feature. Yet unlike Watchdog Probe, which performs a reboot of itself (the web card) when triggered, Auto Probe can perform a reboot of another device by cycling the outlet(s) powering that device.

In addition to individual load cycling, Auto Probe can be configured to perform one or more of the following actions:

- Reboot multiple loads/outlets
- Send an email
- Send an SNMP trap
- Perform a control, such as reboot the network card
- Perform an SNMP v1 Set on a remote device
- Trigger a shutdown of a computer running Tripp Lite's PowerAlert Network Shutdown Agent (PANSA)

Up to 64 unique Auto Probes can be configured per device. Execution of Auto Probe actions are captured in the Event Log of the LX Platform device's web interface.

**Tripp Lite LX Platform includes WEBCARDLX, PDU3E-series PDUs, PDU3XE-series PDUs and LX suffix PDUs. The Auto Probe feature is available with LX firmware version 15.5.2 or later.*

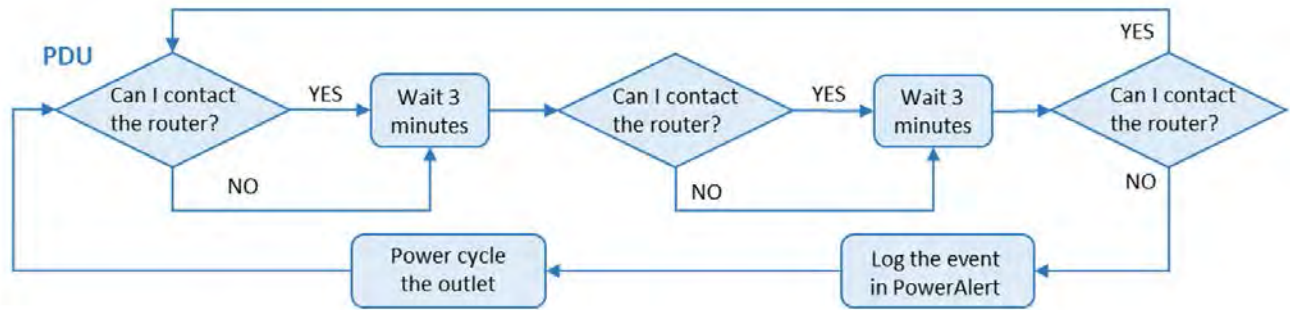


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3. AUTO PROBE OPERATION CYCLE

In the example below, a Tripp Lite LX Platform-equipped switched PDU is configured to Auto Probe a router, which is powered by one of the outlets on the PDU. If the PDU fails to communicate with the router three consecutive times, it will cycle the outlet powering the router, thereby rebooting it.



The Auto Probe can be configured to power cycle multiple outlets at specified intervals and reboot devices in a desired sequence. This ensures each component is available before the next heartbeat check. Once everything is back up and running, the Auto Probe will continue to monitor the devices.

4. PRE-CONFIGURED PROBES

Editing the Probes

Each LX Platform Device contains two pre-configured probes (disabled by default). One is a Ping probe and the other is an NTP probe. Both are Watchdog Probes set to self-reboot if enabled and triggered. Specifically, the default action tied to each probe is “Default Reboot Control Action”. These two probes can be viewed and edited in the Device Settings page of the web interface (as shown in Figure 1). Settings details can be found in the LX Platform User’s Guide (Section 3.4.1).

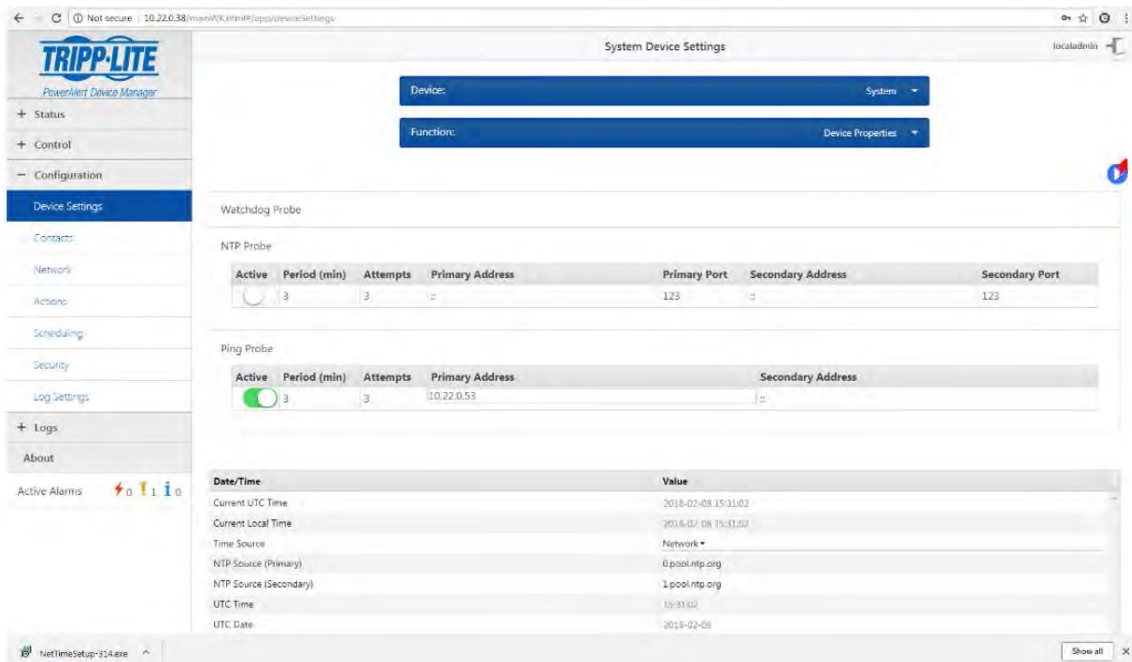


Figure 1 – Web Interface Configuration of Watchdog Probes



4. PRE-CONFIGURED PROBES

Information related to the Default Reboot Control Action can be found in the Configuration > Actions page (see Figure 2). By selecting the checkbox to the left of the item, a box in which edits can be made will appear. The Control field cannot be edited, though new Event actions can be added (as detailed in the next section). Make sure to save any edits.

The screenshot shows the 'Event Actions' configuration page in the Tripp-Lite PowerAlert Device Manager. The left sidebar contains navigation options: Status, Control, Configuration (Device Settings, Contacts, Network, Actions, Scheduling, Security, Log Settings), Logs, and About. The main area shows a table of event actions:

Name	Delay (s)	Device	Control	Events
<input checked="" type="checkbox"/> X Default Reboot Control Action	30	1	Reboot SNMP Card	On Set: 2, On Clear: 0
<input checked="" type="checkbox"/> X Auto-Probe Cycle All Loads	5	1	Cycle All Loads	On Set: 2, On Clear: 0
<input checked="" type="checkbox"/> X Reboot Device on High Temp	120	1	Reboot Device	On Set: 1, On Clear: 1

Below the table is a configuration form for the 'Default Reboot Control Action' with the following fields:

- Delay: 30
- Action Target Device: Device0001
- Control: Reboot SNMP Card
- Event Target Device: All Device Events
- On Set Events: 2 checked
- On Clear Events: Select

Figure 2 – Editing Event Actions

Enabling the Probes

Once the probe and action settings have been applied, click the Active slider in the Device Settings page to activate the probe and click save. The probe will attempt to communicate with the addresses entered and begin monitoring the addresses for failures. The probe will not become active until it successfully communicates with the addresses entered. If it cannot communicate, a handshake failure message will appear in the event log (see Figure 3).

State	Device	Time Occurred	Description
	All	2018-09-11 04:24:44	Delayed Startup handshake failed.
	All	2018-09-10 19:37:18	Test Probe handshake failed.

Figure 3 – Handshake Failure Message



4. PRE-CONFIGURED PROBES

Verifying Probe Status

The current status of the probes can be viewed by accessing the network card through Telnet or SSH and navigating to Network Configuration > Remote Services > Auto Probes. The status will display in the right-most column (as shown in Figure 4 below).

Off – The probe is disabled.

Okay – A connection has been established and the probe is active.

Fault – A connection had been established but subsequently failed.

InitFl – Initial connection failed.

Unk – Unknown state. This occurs when an initial connection has not yet been established, i.e. after a reboot, when a new probe is enabled and when a disabled probe is re-enabled.

```
10.22.0.38:23 - Tera Term VT
File Edit Setup Control Window Help
1- Email Settings
2- Remote Syslog Servers
3- Auto Probes
X- Network Configuration
M- Return to Main Menu
<ENTER> Refresh Menu

>> 3

----- Auto Probes -----

# | Name | Type | Primary Address | Interval | Retries | Status
--|-----|-----|-----|-----|-----|-----
1 | Ping Watchdog | Ping | 10.22.0.53 | 3 | 3 | Okay
2 | NTP Watchdog | NTP | :: | 5 | 3 | Off

#- Auto Probe
0- Add New Auto Probe
X- Remote Services
M- Return to Main Menu
<ENTER> Refresh Menu

>> █
```

Figure 4 – Verifying Probe Status

5. CONFIGURING NEW AUTO PROBES

Configuring a new Auto Probe will require Telnet or SSH access to the LX Platform UPS or PDU. This section describes how to create a new Auto Probe using a combination of the web interface and Telnet/SSH. To create and edit Auto Probes exclusively using Telnet/SSH, refer to section 4.3.3.3 of the LX Platform User's Guide.

In the following example, an Auto Probe is being created to turn off Load #1 of the switched PDU.

1. Log into a Telnet or SSH session on the switched PDU.



5. CONFIGURING NEW AUTO PROBES

- From the Main Menu, navigate to the Auto Probe screen by selecting:
Network Configuration (3), Remote Services (3), Auto Probes (3)

```
----- Main Menu -----
1- Devices
2- System Configuration
3- Network Configuration
4- Alarms and Logging
5- About
E- Launch CLI
Q- Logout
<ENTER> Refresh Menu

----- Network Configuration -----
1- IP Configuration
2- User Access Interfaces
3- Remote Services
X/M- Return to Main Menu
<ENTER> Refresh Menu

----- Remote Services -----
1- Email Settings
2- Remote Syslog Servers
3- Auto Probes
X- Network Configuration
M- Return to Main Menu
<ENTER> Refresh Menu
```

Figure 5 – Navigating to the Auto Probes Screen

- In the Auto Probes screen, enter 0 to add a new Auto Probe and follow the on-screen instructions:
 - Select NTP or Ping
 - Enter a Name for the Auto Probe (for this example, it is “Auto Load Cycle”)
 - Enter a Description for the Auto Probe
 - Enter a Primary IP Address, i.e. what the PDU will ping
 - Enter a Secondary IP Address, if desired.
 - Enter an interval –the number of minutes between successive pings
 - Enter Retries – the number of consecutive times a ping must fail to trigger the action
 - Enter Y or N to enable/disable the probe
- A summary of selections will appear. Enter “A” to apply changes. The screen will then show the table summary of probes, including the status of each. Edits can be made by selecting the number (#) of the Auto Probe.

```
----- Auto Probes -----
-----
# | Name | Type | Primary Address | Interval | Retries | Status
-----
1 | Ping Watchdog | Ping | :: | 3 | 3 | Off
2 | NTP Watchdog | NTP | :: | 3 | 3 | Off
3 | Test Probe | Ping | 172.17.48.97 | 3 | 3 | Okay
4 | Delayed Startup | Ping | 172.17.48.74 | 3 | 3 | Okay
5 | Auto Load Cycle | Ping | 172.17.48.215 | 3 | 3 | Unk

#- Auto Probe
0- Add New Auto Probe
X- Remote Services
M- Return to Main Menu
<ENTER> Refresh Menu
```

Figure 6 – Table Summary of Auto Probes



5. CONFIGURING NEW AUTO PROBES

- Once all edits have been made and applied, exit out of the session by returning to the Main Menu (M) and selecting Logout (Q).
- Log into the web interface of the device and navigate to the Configuration-Actions menu.
- In the Action Type drop-down menu, select Load, then click the (+) button to start an entry.

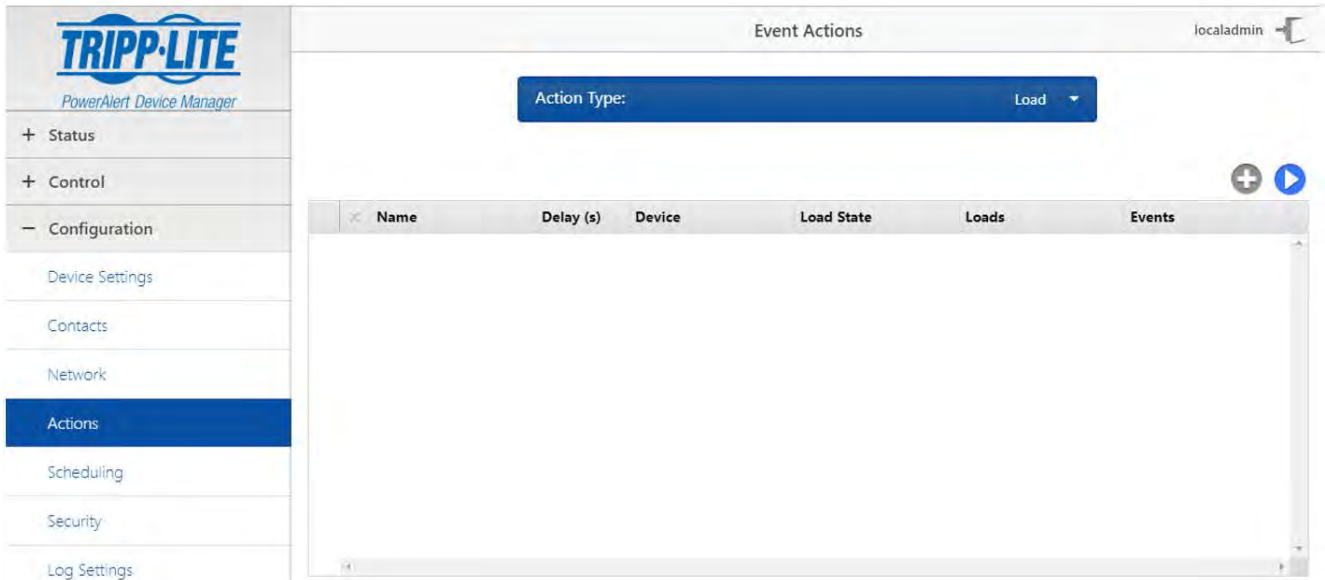


Figure 7 – Selecting Action Type “Load”

- In the box that appears below the summary table, enter the following information:
 - Name: A description of the action (for this example it is “Auto-cycle Load 1”).
 - Delay(s): The time to wait before executing the action (load cycle) once the probe is triggered.

Auto-cycle Load 1	
30	
Action Target Device:	Device0001 ▼
Loads:	1 checked ▼
Load State:	Cycle ▼
Event Target Device:	Device0001 ▼
On Set Events:	1 checked ▼
On Clear Events:	1 checked ▼

Figure 8 – Load Action Configuration



5. CONFIGURING NEW AUTO PROBES

9. Select the appropriate items from the drop-down menus:
- Action Target Device – Select the host device (not an attached sensor, if any).
 - Loads – For this example, Load 1 is selected, denoted by the check mark.
 - Loads State – On, Off or Cycle (for this example, Cycle is chosen).
 - Event Target Device – Select the host device.



Figure 9 – Load and Load State Selection Options

10. Select the “On Set Events” drop-down menu and scroll to find the Auto Probe item that was created in the Telnet/SSH session. For this example, it is “Auto Load Cycle Ping Probe Failed”.

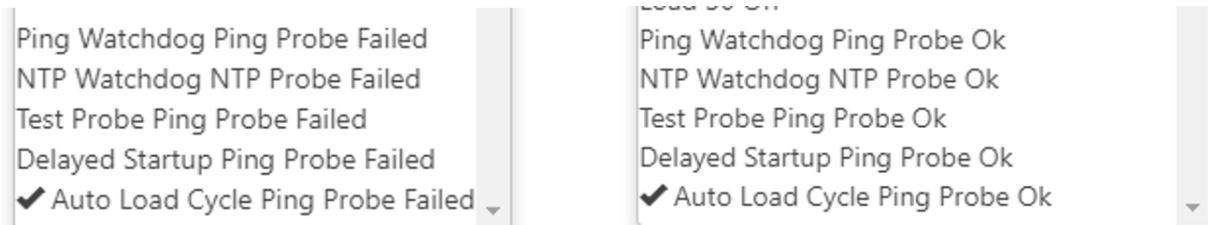


Figure 10 – On Set and On Clear Selection Options

11. Select the “On Clear Events” drop-down menu and scroll to find the Auto Probe item that was created in the Telnet/SSH session. For this example, it is “Auto Load Cycle Ping Probe OK”.
12. Click the “Save” icon. The screen will update to show the newly created action. Configuration is complete.

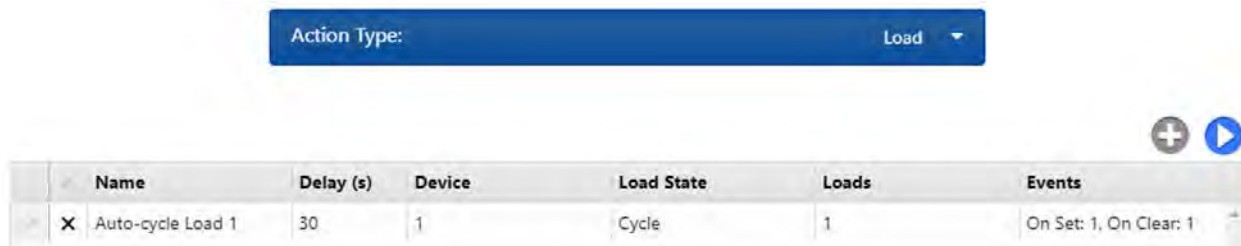


Figure 11 – Load Action Summary

