

Application Note

A Growing Need for CLECs to Manage Remote Power Control Functions of Internetworking Devices at Telco Central Offices

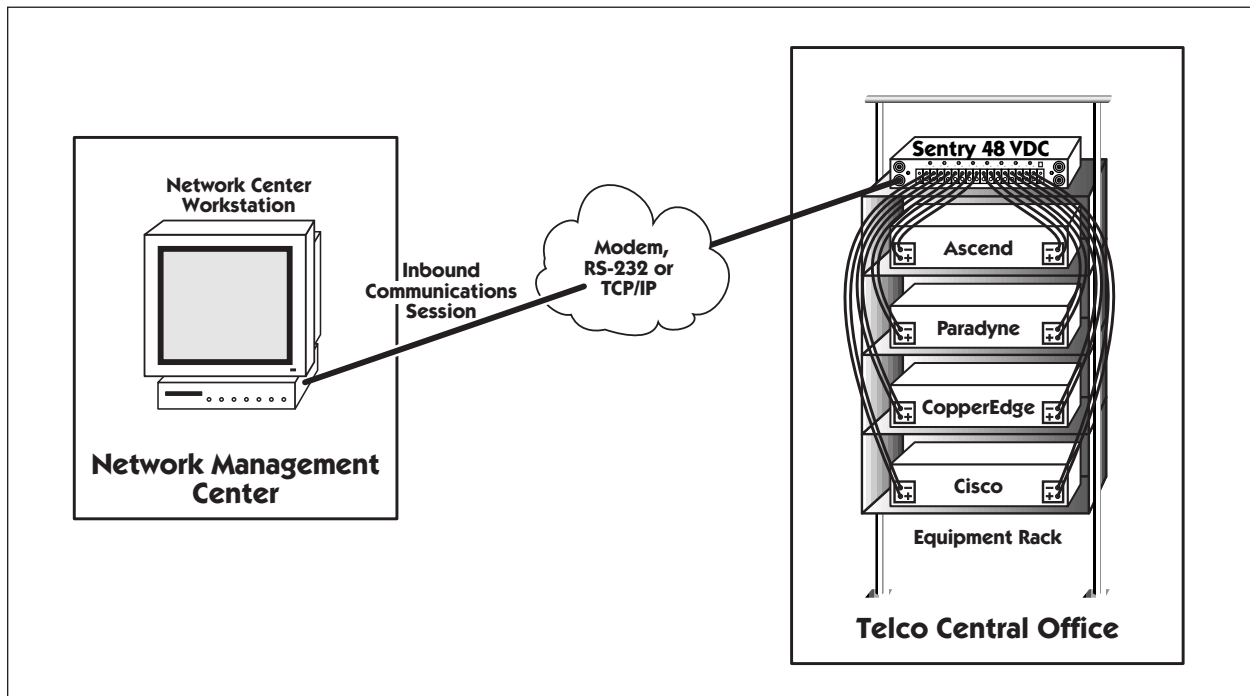
Competitive Local Exchange Carriers (CLECs), Incumbent Local Exchange Carriers (ILECs), independent telephone companies and other next generation service providers are introducing a pervasive technology called DSL (digital subscriber line) to provide high-speed access to both homes and businesses. DSL is expected to replace more established Integrated Services Digital Network (ISDN) and is competitive to the T1 line that has historically been provided by the ILEC. At a cost of about \$40-60 per month, DSL has the potential to quickly emerge as a dominant technology.

The DSL service is provided by a switch that is co-located in the telco central office called a DSLAM—Digital Subscriber Line Access Multiplexor. Many emerging CLECs are deploying DSL service in several states and are installing, or have plans to install, DSLAMs in multiple locations. DSLAMs are available from a number of different manufacturers, including Paradyne, Copper Mountain and Ascend. Nearly all DSLAMs are currently powered by –48 VDC power and usually have two power supplies: A and B channels. Additionally, they all have console ports. Further, they are controlled by a large operating system with application software, which means they have potential to fail or lock-up.

When a DSLAM locks-up, the most proven method of repair is to cycle the power: a reboot. A co-located DSLAM at a telco central office, however, presents a logistical obstacle to the simple reboot solution.

The following Problem-Solution-Benefit scenarios not only apply to CLECs, but are equally valid for ILECs and organizations that have large installed bases of routers and ATM switches from leading vendors such as Cisco, Bay Networks/Nortel, Ascend, Lucent and Fore.

Sentry -48 VDC Remote Power Manager & Intelligent Power Distribution Unit



So What Are the Benefits of Remote Power Control?

The Sentry –48 VDC Remote Power Manager & Intelligent Power Distribution Unit provides a reliable, fast and sound economic solution for rebooting remote DSLAMs in central offices. A Sentry –48 VDC provides the network management center an alternative method to dispatching a field service technician to cycle power and rectify locked-up DSLAMs when they encounter a number of problems.

Problem 1: Lock-Ups—The DSLAMs are controlled by a large amount of software. The DSLAMs use new (still buggy) software and it will frequently lock-up a DSLAM. Additionally, if a new software release is installed in the DSLAM, the equipment needs to be rebooted to make the new software operational.

Solution: The Sentry –48 VDC Remote Power Manager allows the network operation center to perform the reboot operation and eliminate the need to dispatch a technician to the remote site.

Benefit: Statistics show that 70+ percent of all lock-ups are fixed by a reboot operation. The duration of a lock-up outage, which is usually an hour or more, can be reduced to minutes using a remote power controller.

Problem 2: Fuse Panels and Power Distribution—During installation of DSLAMs, the central office provides the CLEC with a –48 VDC power feed cable, which supplies 60 to 100 amps. The CLEC must then distribute the power from this single cable to multiple DSLAMs in its equipment rack. Prior to the Sentry –48 VDC, customers used an assembly called a “fuse panel” to allow the input power cable to be distributed to multiple output terminal blocks. Individual fuses on the fuse panel protect each DSLAM from potential power overloads.

Heat from the high-amp load DSLAMs will frequently weld the fuse into the fuse panel. Many DSLAMs do not have power on/off switches, and it requires the fuse to be removed if the DSLAM is to be powered-off (rebooted). When the fuse is welded, removing the fuse without damaging the fuse panel can be nearly impossible.

Solution: The Sentry –48 VDC allows an A-power feed cable and B-power feed cable to be attached to its input terminal blocks. The DC power is then distributed to the output terminal blocks. (the Sentry 4835 has four output terminal blocks and the Sentry 4820 has eight output terminal blocks). Each output terminal block (DC circuit) is protected by a push-to-reset circuit breaker.

Therefore:

- The fuse panel is no longer required;
- Push-to-reset circuit breakers replace the fuses;
- The input power feeds are distributed to power output terminal blocks;
- The A-feed and B-feed can be matched to the DSLAM’s A-power supply and the B-power supply.

Benefit: The Sentry –48 VDC provides the following benefits:

- The welded fuse problem is eliminated.

- If an on site technician needs to power-off the DSLAM, all that is required is to push or pull the reset circuit breaker lever.
- Power can be distributed to support the A-power supply and the B-power supply.

Problem 3: Temperature—As equipment racks fill up with high-amp load equipment, increased temperature inside the equipment rack can damage expensive internetworking equipment.

Solution: The Sentry –48 VDC can be equipped with one or more external temperature pods, which measure the ambient temperature inside the equipment rack. For example, one temperature pod can be mounted at the top of the rack and a second temperature pod can be mounted at the bottom of the rack. The Sentry –48 VDC SNMP support allows temperature thresholds to be established. Whenever the ambient temperature exceeds the threshold, an SNMP trap and alarm will be executed to notify the operations center about the heat problem.

Benefit: The ability to set temperature thresholds and to provide real time monitoring and alarms if the thresholds are exceeded protects the CLEC's investment in its DSLAMs.

Problem 4: DS (Digital Signaling) lines can lose 'carrier'—If carrier is lost, the DSLAM must be rebooted to restore the DS3 line to the DSLAM. Sometimes it requires a technician to be at the physical DSLAM with a connection to the DSLAM console port to monitor how the software is rebooted and if communications are correctly restored to the DS3.

Solution: The Sentry –48 VDC is used to remotely power-off the DSLAM if carrier is lost. Next, the Sentry's companion Asynchronous Communications Switch can be used to establish a connection to the DSLAM's console port. Then using the Sentry –48 VDC, power can be restored to the DSLAM, and the Asynchronous Communications Switch can be used to monitor the reboot operation to make certain that carrier to the DS3 line restored.

Benefit: The Asynchronous Communications Switch is a low-cost alternative to an expensive terminal server, which is typically purchased and used for console port access. Now the reboot process and the console port monitoring process can be managed by the operations center, without the need to dispatch technical personnel to the remote location.

Problem 5: Rack Space—The real estate that the CLEC equipment rack sits upon is very expensive. Therefore, use of the vertical space in a rack (U space) must be optimized. A rack may typically house several DSLAMS, a terminal server, a fuse panel, and –48 VDC modems.

Solution: In just 3U (5.25 inches) of vertical space, the Sentry –48 VDC can combine the functions of the fuse panel, terminal server and modem. Sentry 4820 can support up to eight 20-Amp devices, and Sentry 4835 can support up to four 35-Amp devices.

Benefit: The Sentry –48 VDC Remote Power Manager saves rack space—saving money—and requires fewer devices to cable and maintain.

Problem 6: Available DC Power is the critical factor that defines what equipment can be installed— The installation of new equipment needed to handle the increasing data loads is constrained by the available power resources. The name plate specification by the manufacturer is generally inaccurate and cannot be used for power planning. Sending teams to perform site-verification power measurement is expensive and slow. Additionally, the availability of personnel with the skills to perform on-site verification draws from a limited field.

Solution: The new Sentry –48 VDC with the Load Sense option allows the amount of power being used at each DC circuit to be measured in a real-time manner.

Benefits: Sentry –48 VDC allows more (new) equipment to be added on existing power resources:

- Install New Equipment Faster.
- New Equipment = Increased Revenues.
- Power Measurement at each DC circuit provides improved power planning and forecasting
- Proactive Planning versus Reactive Planning

About the Sentry –48VDC Remote Power Manager

For companies seeking to co-locate equipment within a telco's central office, the NEBS compliant Sentry –48VDC provides an added level of assurance that their network equipment maintains high availability. A number of major ISPs, CLECs, Regional Bell Operating Companies and Web Hosting companies have implemented Server Technology's Sentry –48 VDC products.

Server Technology manufactures two models of the Sentry –48 VDC, Model 4820 and Model 4835, which have been tested to the following NEBS standards:

GR-63-Core		GR-1089-Core	
Spatial Requirements	Section 2.0	EMI Emissions	Section 3.2
Thermal Requirements	Section 4.1	Lightning and AC Power Fault	Section 4.0
Fire Resistance	Section 4.2	Electrical Safety	Section 7.0
Earthquake/Vibration	Section 4.4	Bonding and Grounding	Section 9.0
Acoustic Noise	Section 4.6		

The Sentry –48VDC Remote Power Managers are available by calling Server Technology at (800) 835-1515 or (408) 745-0300. For more information, visit the Server Technology web site at www.servertech.com.