1. GENERAL

1.1 Document Purpose

This practice defines the technical characteristics, specifications, and installation guidelines for the CellPak® CP528DPC Outdoor DS1 Transport System Enclosures. The intended audience for this document is Telco engineering and operations personnel who plan, install, and maintain network DS1 services for their wireless service-providing customers.

1.2 Document Status

When this practice is updated, the reason is stated in this paragraph.

1.3 Equipment Purpose

Westell's CellPak Transport System provides rapid installation and activation of DS1 services at remote cellular or other wireless service sites. All electronics are housed in a weather-tight enclosure that provides a user-friendly environment for both the Telco and customer during installation, expansion, and equipment servicing. The CP528DPC offers copper T1 and HDSL provisioning for up to eight 200 MECHANICS-type (or four 400-type) modules for use in Hi-Cap/T1/Digital/Analog applications, plus 2 POTS/voice lines. Modules can be line-powered or locally powered with an external 48 VDC power supply, and can be any of the following types:

- NIUs (or DNIs) in 1,544 Mb/s Hi-Cap digital (T1) and High-bit-rate Digital Subscriber Line (HDSL) applications
- DSTs in Analog Data Service applications
- DDIs in Digital Data Service applications
- Any combination of the above applications

1.4 Equipment Mounting

The CP528DPC can be mounted on a wall, an 8” to 20” round pole, or a square pedestal or post, typically outdoors and above ground at the customer premises.

1.5 Applications

The CP528DPC, which supports up to eight 200 MECHANICS-type T1 or HDSL plug-in modules, is primarily used in wireless applications at cell site radio equipment shelters, and serves as the point of demarcation between the CO network and the remote user (Figure 2). Special attention in the design of the CP528DPC has resulted in a high-quality, fully-tested, weather-protected, secure, outdoor enclosure for wireless cell sites. The versatile CP528DPC can also be used as a Network Interface Device (NID) for both 400-type or 200 MECHANICS-type plug-in modules for other DS1, high-capacity applications.

2. FEATURES

Each CellPak® enclosure comes fully assembled, wired, tested, and ready to install at the customer premises on a wall or pedestal. All that is required are the Telco’s T1 or HDSL facilities, the plug-in transport units, and the customer’s line connections, which can now be secured or performed independently by the service provider. Other CP528DPC features are as follows:

- Weather-proof
- Lightning protection blocks provided on the Facility and Customer sides
- Includes protection modules for customer side
- Supports eight 200 MECHANICS-type (or four 400-type) modules for use in Hi-Cap/T1/Digital/Analog applications, plus 2 POTS/voice lines
- Choice of Customer connections for each of the eight digital circuits: either RJ48 jacks (switchable for either RJ48C- or RJ48S-type), or a screw terminal strip
- Choice of voice/analog connections for the two Customer voice circuits: either RJ11 jacks or a screw terminal strip
Figure 2. Typical CP528DPC Application

- Wirewrap pin connections at Facility/Network side
- Power terminal strip for optional -48 VDC local powering
- Separate, lockable doors for access to separate Facility/Telco compartment and to separate Customer compartment
- High-quality, fully-tested, weather-protected, and secure outdoor enclosure
- Pedestal, pole, or wall-mountable
- Includes adapter plate for predrilled CP524 hole installations, and a special, Telco, 5/16" pin-in-hex, allen wrench
- Tamper resistant
- FCC Part 15 Class A approved
- Compliant with UL 60950

2.1 Outdoor Enclosure Access

Enclosure access to the CP528DPC is accomplished through two lockable and differently-sized doors (see Figure 3). Cable access is provided for both the Telco and customer through knock-out holes at the bottom of the CP528DPC. The 1/2" rubber grommets, which are furnished, provide weather-resistant entry for the Telco outside plant cable feeds and customer premises cable feeds. Figure 4 illustrates how this enclosure is organized and partitioned.

2.1.1 Network (Large) Door

The Telco has a separate, larger, lockable main door which is secured with a pin-in-hex type, tamper-proof locking mechanism that is opened with a special, Telco, 5/16" pin-in-hex allen wrench (provided). This Network door, reserved for Telco service personnel only, is the main enclosure entry and provides access to both the Telco and customer equipment (everything inside).

Behind The Door. The Telco access area behind the network door provides access to and a mounting for network transmission equipment such as HDSL Remote Units (HRUs) or T1 Digital Network Interface (DNI) modules, lightning protection blocks (including cut-through modules), all ground lugs, knock-outs for cables, and all the customer access area equipment.

2.1.2 Customer (Smaller) Door

Customer access to the enclosure is limited by the smaller, separate, padlockable door mounted on the enclosure’s larger door. The locking mechanism for this door is a 5/16" hex-nut-in-cup screw that requires either a 5/16" hex-nut-driver or one end of a 216 tool to open it. When this smaller door is open, a rectangular-shaped cut-out is provided in the lower right-hand corner of the larger Network door immediately behind it, for access to customer equipment. A see-thru window is also provided on the larger Network door, which is exposed when the smaller customer door is open; this window allows visual access only to the LEDs on the modules installed in the module housing on the left side of the CP528DPC. All customer DS1 facility connections are accessible through the cut-out when the customer door is open.

Behind The Door. In the customer access area are eight ‘sets’ of customer connectors, one for each circuit. Each set has a 4-position screw terminal strip, an RJ48C/S jack, and a 2-position jack slide switch. This gives the customer a choice of connection types, either a screw terminal-type connection or an RJ48C/S jack (jack type is selected via the adjacent jack switch). Also provided in this customer access area are two RJ11 jacks and another screw terminal strip for a choice of voice/POTS-type connections. Finally, a ground lug, several ground posts, a static wrist-strap jack for Electro-Static Discharge (ESD) protection, and cable knock-outs are also provided. Not accessible but provided for the customer side are two customer-side lightning protector blocks and lightning protector modules.
2.2 CellPak Enclosure Construction/Design

The CellPak’s housing material is aluminum, with a powder-coated paint that exceeds Bellcore outdoor cabinet requirements. The CP528DPC is approximately 14" high, 18" wide and 8" deep. The “door-in-a-door” feature allows total access to both the Network equipment and Customer access compartment by the Telco service personnel (via the larger door), while allowing limited access to the Telco’s customer (via the smaller Customer door). Cable entry is accomplished via knock-outs at the bottom of the cabinet. There are concentric knock-outs on each side of the enclosure which will accept either ½” or ¾” conduit fittings and additional 1” and 2” knock-outs for larger Telco feeds. The enclosure has two mounting brackets, one on top and one on the bottom, which will accept up to a ¼” bolt or screw. Also included is an universal adapter plate which allows the CP528 to be mounted in installations that had mounting holes predrilled for shorter CP524 enclosures.

2.3 External Environment

The CellPak enclosure is designed to be weather-tight for above-ground, outdoor applications. The CP528DPC is compliant with Bellcore Cabinet Requirements, GR-487-CORE, Issue 2, March, 2000. As such, the enclosure will withstand climatic conditions such as rain, snow, sleet, high winds, ice, and sand storms. The conditions described will be tolerated over an outside ambient temperature range of -40 degrees to 115 degrees Fahrenheit.

2.4 Internal Environment

No fans or vents are required for cooling or circulating air within the enclosure. There are no openings to the outside environment once the doors are secured.

2.5 Module Power

The CP528DPC T1 and HRU Network Interface Unit (NIU) plug-in modules are typically line-powered over the copper cable transport facility. An alternate powering option is to pro-
vide an external -48 VDC feed to the 2-position TB1 terminal strip, located at the bottom of the PC board located under the module housing (Figure 4).

2.6 Lightning Protection

2.6.1 The CP528DPC comes equipped with lightning protection blocks on both the Customer and Network sides, with Corning protector modules installed in the Customer Drop side blocks and cut-through modules installed in the Network side blocks. This protection scheme can be reconfigured to equip modules on either the Network side, the Customer side, or both sides. On both sides, the top protector block is for Circuits 1-4, and the bottom block is for Circuits 5-8. Each circuit uses two positions or modules. If modules are removed, the circuits will be open.

2.6.2 For the POTS lines, only one lightning protector module should be used, per line. The protector module should be installed in the top block on the side susceptible to surges, with a shorting plug installed in the top block of the other side. For example, if drop side (customer side) protection is required, the protector module would be installed in the top drop-side protector block (located above the customer access), and a shorting plug would be installed in the top Network protection block (located under the card cage). For the POTS 1 line, use protector block position 10, and for the POTS 2 line, use position 9.

3. INSTALLATION

Mount the enclosure per local company practices, or if none exist, per the instructions below. The enclosure should be installed by authorized trained personnel only. Always exercise caution and follow safety precautions. Each Westell CP528DPC system comes fully assembled, pre-wired, tested, and ready to install. Mount the enclosure in a location with unobstructed access to it, which has adequate room to allow the front door to be opened, and allow for adequate space for proper cable access. It is also recommended that adequate horizontal and vertical space be left between any multiple installations to allow for proper cable access. The installation process consists of inspecting the unit for shipping damages, preparing and constructing the site, gathering all tools, mounting the enclosure on a pole, pedestal or a wall, installing communications cable feeds of the Telco and customer, and connecting power and ground. Figure 5 illustrates a few methods to mount the CP528DPC system.

3.1 Gathering Installation Tools

The following tools are recommended to install the CP528DPC.

Enclosure/Cabinet Mounting Tools/Hardware
- Awl or drill with assorted bits
- Hammer
- Punch
- Socket driver & sockets, or wrenches
- Wall- or pole-mounting hardware, such as two ¼” x 20 wood-type lag screws or bolts with a 7/16” hex head

Knock-out Removal Tools
- Hammer
- Punch
- Pliers

Large Network Door Tool
- 7/16” special pin-in-hex Allen wrench/driver (provided)

Smaller Customer Door Tool
- 7/16” Hex-nut-driver (or one end of a 216 tool)

Installer/Service Personnel Connection Tools
- Pliers or line cutters
- Telephone cable wire stripper
- Screwdrivers (flat-head and Phillips-head)
- Cable ties
- Assorted wrenches for ground connections

3.2 Mounting the Enclosure

Follow the steps below to mount the CP528DPC to a wall, pedestal, post or pole. If replacing a CP524 with a CP528 enclosure (or using mounting holes that were predrilled for a CP524), see the Adapter Plate Note below.

1. Prepare site. Run all cables to the site and prepare the Earth ground.

2. Select the mounting location. The CP528DPC mounts easily to a wall, a 6” x 6” pedestal or a steel “unistrut” support, or to a round 8” to 20” diameter pole with the CPMK500 pole-mount bracket kit. Flat mounting surfaces should be at least 6” wide, to accommodate the two 4½” mounting brackets on the CP528DPC, and should be able to support 50 pounds. Allow at least 4 inches of empty space around all sides for cable and door access and clearances. See Table 1 for enclosure dimensions. If mounting on a pole, use lag screws.

3. Optional - Install Pole-Mount Kit (not provided). If pole-mounting is desired, order separately (see Table 2) and

- INSPECTION NOTE -
Visually inspect the unit for damages prior to installation. If the equipment was damaged in transit, immediately report the damage to the transportation company and to Westell (see Part 5 for telephone number).

- PRECAUTIONARY STATEMENT -
Never install telephone wiring during a lightning storm.
Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
Use caution when installing or modifying telephone lines.

- CAUTION -
Hazardous voltages exist on DS1 Lines. Always use caution when wiring a live circuit or when performing maintenance testing. Unplugging the COT Line Unit from the COT shelf will remove the hazardous voltages from the DS1 Line.

- CAUTION -
Improper grounding could be service affecting and cause service interruptions.
install the Westell CPMK500 Pole-Mount Bracket Kit (see the instructions in the CPMK500 Installation Guide).

- ADAPTER PLATE FOR PREDRILLED CP524 HOLES -
For installations where mounting holes were predrilled for shorter CP524 enclosures, Westell includes, for mounting convenience and adaptability, a Universal Adapter Plate, which allows the CP528 installer to use the same holes predrilled for the CP524. This plate (included), in essence, extends the top (or bottom) mounting holes another 1.35 inches in height, to match the CP528’s mounting ear holes. First secure the plate to the mounting surface, then attach the CP528 to the plate’s threaded posts.

4. **Attach enclosure to mounting surface.** Use the keyed center hole of the top mounting bracket to temporarily hang the enclosure at its desired height and position, using a ¼-20 starter bolt or lag screw installed ⅝” shy of flush. Level the unit. The remaining top and bottom mounting holes can be drilled, tapped, and/or fastened to its support or structure through the two mounting brackets. No mounting template is required if this method is employed. It is strongly recommended that bolts or lag screws with a minimum diameter...
Figure 6. Plug-in Module Housing Area of Opened CP528DPC Enclosure

Figure 7. Customer Access Area (Lower Right Corner) of Opened CP528DPC Enclosure
of ¼” (i.e., ¼” x 20) be used in the remaining holes. Securely tighten all mounting hardware.

3.3 Making Installer Connections

After mounting the enclosure, installer connections may be performed. This part describes the ground and the HDSL/T1 facility termination/connections for both the Telco Network and the Customer Premises sides of the demarcation. The CP528DPC enclosure is designed to support eight DS1 transmission lines to the customer’s premises. The enclosure can be configured for a maximum of eight T1 DNIs, HDSL HRUs, or analog data units. Figure 8 illustrates the pin connections for the circuit configuration of the CP528DPC.

3.3.1 Making Ground Connections

Copper ground lugs that accommodate #6 to #14 gauge wire are provided at the interior and exterior bottom of the CellPak enclosure. Network Compartment ground lugs and Customer Compartment ground lugs at the interior bottom of the enclosure have been provided to bond the Network and Customer communications cable ground sheath conductors. An additional ground lug has been provided at the exterior bottom of the enclosure, to bond the conductor to the Telco earth ground rod assembly. Make all ground connections prior to telecommunications cable connections.

- NOTE -

The green, #6 gauge conductor which bonds the lightning protector block to the interior Network Compartment ground lug should not be removed or tampered with during cable grounding procedures. This conductor ensures a minimal resistive path to ground during a lightning strike or over-voltage condition.

- KNOCK-OUT CAUTION -

Proper removal of the concentric knockouts is very important. The ½" (smaller) knockout must be removed from the inside of the enclosure, knocked outward. The ¾" (larger) knockout must be removed from the outside of the enclosure, knocked inward. Failure to remove knockouts properly can damage the enclosure, and void product warranty.

3.3.2 Telco Network Termination

Follow local company practices or the steps below to make Facility/Network connections.

1. Open The Large Network Door. Open the large Network door with the special 5/16” pin-in-hex Allen wrench provided.

2. Remove Knock-out(s). Remove the appropriately-sized concentric or standard knockout, located at the bottom left side of the enclosure. Make sure the knock-out is removed from the correct direction (top or bottom) — read the “Knock-out Caution” in this Part 3.

3. Attach Conduit Connector at Knock-out Location. A liquid-tight or steel conduit connector, with its respective tubing or pipe attached, is then inserted through the knock-out hole. The connector’s lock washer is then fastened securely from the inside of the enclosure. Loosen any strain-relief in order to feed cables through the conduit.

4. Feed Cable(s) Through Conduit. Gently feed/pull the communications cable(s) from the outside up through the liquid-tight tubing or steel conduit to the inside, allowing an adequate amount of slack in the cable for securing and splicing the circuit pairs to the protector block. To provide strain-relief to the cable, it is recommended that the cabling be tie-wrapped to the hole provided at the left side of the protector block. If conduit is not required and exposed cabling is to be installed, the ½” rubber grommets can be used to seal the communications cabling in the enclosure.

5. Strip Wires. If cable wires are blunt cut, strip sufficient wire lengths to make the wirewrap pin connections.

6. Connect Facility Wires at Wirewrap Pins. Using a wire-wrap tool, the Telco HDSL or T1 network circuit pairs are connected to the wirewrap pins located at the bottom of the lightning protector blocks. Refer to the block diagram label located on the Network Door interior for proper circuit-to-terminal designations. The lightning protector blocks are prewired to the NIU mounting slots.

7. Tighten Strain-Relief Connector. Once the connections are made, under the enclosure rotate the external nut of the water-tight, strain-relief connector clockwise until tight.

8. Install Cards. After the wiring connections are made, the plug-in module circuit cards can be inserted. Installation of the specific units depends on the application. Slot/circuit #1 is the left-most slot and slot #8 is the right-most slot in the module housing (card cage) located in the Network area. Align the card with the card guides above and below the card and insert as far as it will go into the card connector.

9. Complete Circuit Assignment Card. A Circuit Assignment Card is located on the inside of the Customer compartment door, for the Telco service personnel’s notation and reference to their customers.

10. Install/Apply Power. Modules may be line or local powered. For local DC power, see Paragraph 3.3.4.

- CAUTION -

To avoid shock, unplug any installed RJ48 plugs from their jacks before connecting the customer wires to the screw terminals.
3.3.3 Customer Connections/Termination

Follow local company practices or the steps below to make the Customer connections.

1. **Open The Smaller Customer Door**: If not already opened, open the smaller Customer door with a standard 216 tool or can wrench (7/16" hex).

2. **Remove Knock-out(s)**: Remove the appropriately-sized concentric or standard knockout, located at the bottom right side of the enclosure. Make sure the knock-out is removed from the correct direction (top or bottom) — read the “Knock-out Caution” in this Part 3.

3. **Attach Conduit Connector at Knock-out Location**: The customer service personnel should install their liquid-tight or steel conduit connector, with its respective tubing or pipe attached, at the knockout hole(s). The connector’s lock washer is then fastened securely from the inside of the enclosure.

4. **Pull Cables Into Enclosure**: Gently pull the Customer cables through the right-side strain-relief connector at the bottom of the enclosure. Pull enough extra cable through the hole into the enclosure to provide adequate cable strain relief.

5. **Make Customer Connections**: Connect the customer’s DS1 digital lines using either the eight industry-standard RJ48C/S jacks or the eight screw terminal strips (see Figure 4 and Figure 7). If the RJ48C/S jacks are used, after inserting the male plugs, set the adjacent jack switch to either the C or S position, for the proper jack type, either RJ48C or RJ48S. If the customer lines are blunt cut and the screw terminal strips are to be used, first strip sufficient wire lengths, loosen screws, loop/wrap wires around the screw terminals, then tighten the screw heads against the stripped wires. Take care to match correct leads to correct termination points; all connectors and screw terminal positions are labelled.

   If the customer specifies analog telephone service, use the two POTS/voice RJ11 jacks or the screw terminal strip, which are labelled and located near the top of the customer area.

3.3.4 Making Local Power Connections

If local power is required, follow local company practices to make local power connections. A 2-position screw terminal strip is provided below the Network Protector Blocks for DC power connections, which are connected based on the requirements of the modules installed in the housing (-24 or -48 VDC). To route power wires into the enclosure, another “knock-out” may need to be removed — see Steps 2, 3 and 7 in Paragraph 3.3.2, route and prepare power wire ends, then connect to the terminal strip. Never apply power until the installation is complete.

3.4 Completing the Installation

Upon completion, the installer should clean the installation site, and close and lock the enclosure. The customer may optionally, install a padlock (customer supplied) on the CP528DPC.

4. TESTING & TROUBLESHOOTING

4.1 Testing and Field Repairs

This equipment should not be field repaired. If the equipment is suspected of being faulty, replace it with another unit, optioned identically, and retest. If the replacement unit appears to operate correctly, the original unit may be faulty and should be returned to Westell for repair or replacement (Paragraph 6.2).

4.2 Troubleshooting

If trouble is encountered, verify all installer connections to the assembly and check that the CO power fuse is not blown. Also verify all module connections and option switch settings, and verify the modules are making a positive connection with the shelf connector. If trouble persists, replace the suspect unit and repeat procedures outlined. These procedures are not designed to effect repairs or modifications. Any tests beyond those outlined herein, or repairs made beyond replacing a faulty unit, are not recommended and may void the warranty.

4.3 If needed, touch-up paint is available from Westell. Contact Customer Service for details.

5. CUSTOMER & TECHNICAL SERVICES

If technical or customer assistance is required, contact Westell by calling or using one of the following options:

   Voice: (800) 377-8766
   email: global_support@westell.com


6. WARRANTY & REPAIRS

6.1 Warranty

Westell warrants this product to be free of defects at the time of shipment. Westell also warrants this product to be fully functional for the time period specified by the terms and conditions governing the sale of the product. Any attempt to repair or modify the equipment by anyone other than an authorized Westell representative will void the warranty.

6.2 Repair and Return

Westell will repair or replace any defective Westell equipment without cost during the warranty period if the unit is defective for any reason other than abuse, improper use, or improper installation. To return defective equipment, first request a Return Material Authorization (RMA) number from Westell by calling or using one of the options shown below. Once an RMA number is obtained, return the defective unit (freight prepaid),
Figure 8. CP528DPC Wiring and Pin-outs
along with a brief problem description, to the address we will provide to you when you contact us.

Voice: (630) 375-4457
e-mail: rgmdept@westell.com

Replacements will be shipped in the fastest manner consistent with the urgency of the situation. Westell will continue to repair or replace faulty equipment beyond the warranty period for a nominal charge. Contact Westell for details.

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7. SPECIFICATIONS

Agency specifications are listed below, physical specifications are shown in Table 1, and the ordering part # is shown in Table 2.

- Compliant with UL 60950
- FCC Part 15 Class A approved
- Compliant with Bellcore cabinet requirements, GR-487-CORE, Issue 2, March, 2000

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Table 1. Physical Specifications

8. ACRONYMS AND ABBREVIATIONS

CO - Central Office
DC - Direct Current
DNI - Digital Network Interface
ESD - Electrostatic Discharge
FCC - Federal Communications Commission
GR - Generic Requirement
HDSL - High Bit Rate Digital Subscriber Line
HRU - HDSL Remote Unit
LED - Light Emitting Diode
NID - Network Interface Device
NIU - Network Interface Unit
POTS - Plain Old Telephone Service
UL - Underwriter’s Laboratories
VDC - Volt(s) Direct Current