

Constellation™ Power Transmitter (CPCX-12)



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1 INTRODUCTION

Constellation™ delivers power and data over extended distances using a powered fiber cable. The power source for this system is the Constellation Power Transmitter (CPCX-12), documented in this quick start guide. This guide includes a product description, specifications, installation and set-up procedures, and an introduction to software tools available for monitoring the transmitter.

1.1 Trademarks

CommScope (logo), CommScope, and **Constellation** are trademarks of CommScope, Inc. **Saf-D-Grid®** is a registered trademark of Anderson Power.

1.2 Warranty Statement

There are no serviceable parts within the CPCX-12 or its modules (CTX-MGT and CPM-3K). Opening or modifying the products will void the warranty.

1.3 Standards Certification

The CommScope Constellation power source is a Limited Power Source per IEC/UL/CSA 62368-1 suitable for supplying a Class 2 circuit under NEC Art. 725 and CEC Rule 16-200. Important

1.4 Safety Cautions

To reduce the risk of fire, electric shock, and injury to persons, observe these safety cautions when installing and operating this product:

- This product has a remote risk of electric shock. Never install the product in wet conditions or during lightning storms.
- Never touch uninsulated power wires or terminals.
- This product is for indoor use only.

- All wiring that connects to this equipment must meet applicable local and national building codes & network wiring standards.

Care should be taken not to compromise rack stability by installation of this product.

Warning! *Ensure that the unit is de-energized before contacting any exposed conductors.*

Warning! *The voltage rating of the transmission wiring between the CPCX-12 and the Powered Backplane (CPCB-1) must be a minimum of 300 Vrms.*

Warning! *The CPCX-12 outputs are intended to be used with Constellation receivers such as CPCB-1 only.*




Warning! *This equipment is not suitable for use in locations where children are likely to be present.*

Warning! *The minimum wire gauge for use with the CPCX-12 transmitter is 20 AWG copper conductors. Mutual conductor capacitance shall be no more than 40 pF per foot or 131.2 pF per meter.*

1.5 Contact Information

For technical assistance, visit us at <http://www.commscope.com/SupportCenter>

1.6 Important Symbols

| | |
|---|---|
|  | Hazardous voltages present when energized. Do not open this unit while it is energized. |
|  | This symbol indicates the protective earth terminal for the device. See Section 3.4 . |
|  | This symbol indicates the supplementary ground terminal for the device. See Section 3.4 . |

2 PRODUCT DESCRIPTION

2.1 General Description

The Power Transmitter (CPCX-12), shown in [Figure 1](#), is the power source in the Constellation solution. The Power Transmitter mounts on a standard telecommunications rack.



Figure 1. Constellation Power Transmitter

The Constellation solution is a configuration of CommScope hardware and software components that delivers power via Power Interconnect Cables (CTX-CBL-10). The cables transition to a larger powered fiber cable to provide long-haul transmission of power and data, terminating at the Powered Backplane (CPCB-1). [Figure 1A](#) shows the typical components of the Constellation System.

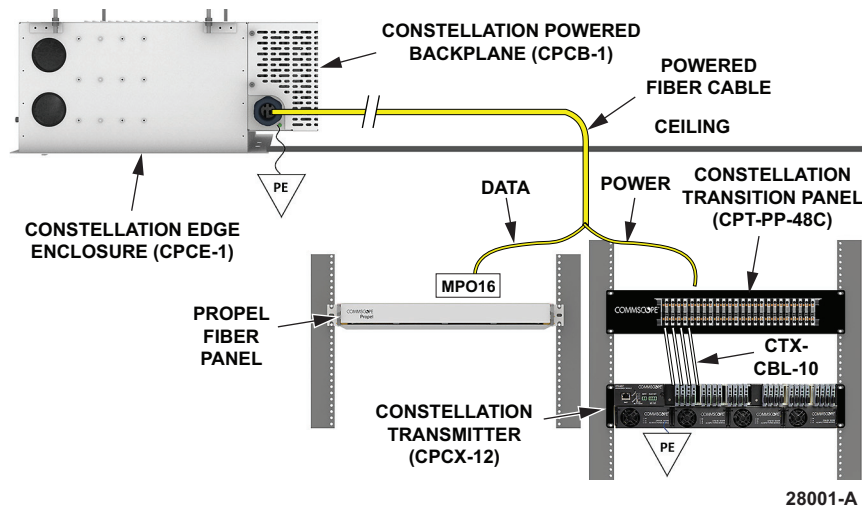


Figure 1A. Constellation System

2.2 Rear Cover With Saf-D Grid® Connectors

The rear cover of the transmitter, shown in [Figure 2](#), attaches with four security-enhancing Anderson Saf-D-Grid connectors. [Figure 3](#) shows the Saf-D-Grid Plug-Mating Receptacle and Cable.



Figure 2. Rear Cover

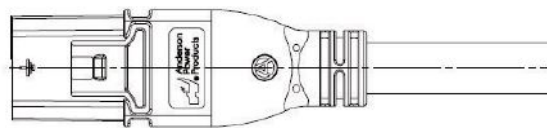
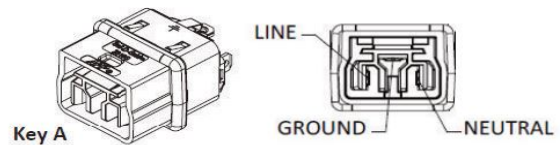


Figure 3. Saf-D Grid Plug-Mating Receptacle (above) and Cable (below)

2.3 Dimensions

Figure 4 shows the dimensions of the Constellation Power Transmitter.

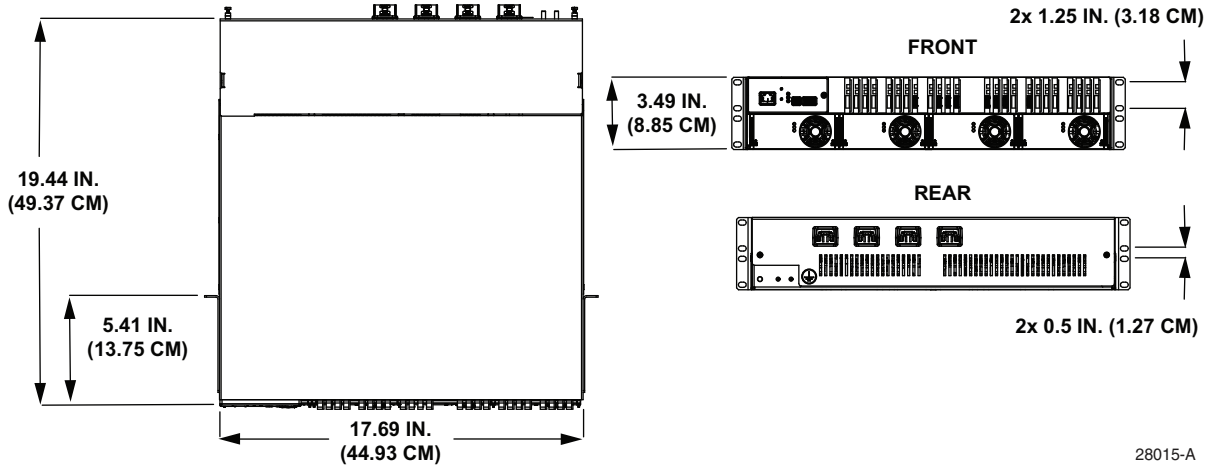


Figure 4. Constellation Power Transmitter Dimensions

2.4 Specifications

Table 1 lists specifications for the Constellation Power Transmitter.

Table 1. Constellation Power Transmitter (CTCX-12) Specifications

| TYPE | PARAMETER | SPECIFICATION | NOTES |
|--------|---------------------------|--|--|
| Input | Voltage | 100 - 277 VAC | For full power operation, input voltage must be 208 VAC or greater |
| Output | Max. current per shelf | 16 A RMS per power module | Minimum circuit breaker size is 20 A per input connection |
| | Voltage | 315-350 V (336 V Nominal) | |
| | Total power per shelf | Up to 12 kW | |
| | Number of output channels | Up to 24 Transmitter Cards | |
| | Max. current per channel | Up to 3 A | |
| | Max. distance | Consult Constellation Best Practices Guide (TC-96352-IP) | |
| | Cable capacitance | 20-40 pF/ft (65.6-131.2 pF/m) | |

Table 1. Constellation Power Transmitter (CTCX-12) Specifications, continued

| TYPE | PARAMETER | SPECIFICATION | NOTES |
|-------------|--------------------------|--|---|
| Environment | Access location | Operator accessible | |
| | Operating temperature | -20 °C (-4 °F) to 50 °C (122 °F) | Requires operation in a conditioned environment to ensure reliable operation |
| | Altitude | Up to 2000 m | |
| | Humidity | 5 to 95 % Non-condensing | |
| Mechanical | Dimensions | See Section 2.3 on page 4 | Fits 19 in. (482.6 mm) racks |
| | Weight | 43 lbs (19.55 kg) | Fully populated |
| | Sound power level | < 65 LwA(dB) | Fans at full speed |
| Approvals | Safety | IEC 62368-1 | Edition 3 |
| | EMC | EN 55032 (CISPR 32) - Class A, FCC Part 15B - Class A; EN 300 386 v2.1.1; EN 50121-4 (with exceptions) | |
| | Others | RoHs, WEEE | |
| | Ethernet | RJ45, 10/100 Mbps | Remote monitoring and control via web GUI, SNMP v2c |
| | Dry contact alarm output | 1x Normally Open (NO) 1x Normally Closed (NC) | Can support alarm circuitry with maximum steady state current of 500 mA at 25 °C; Ethernet line only: Remote monitoring and control via web GUI, SNMP v2c |
| | Dry contact alarm input | 1 | |

3 INSTALLATION

Note: Always follow local codes.

3.1 Physical Installation

The Constellation Power Transmitter (CPCX-12) is designed to be mounted in a 19-inch rack using provided rack-mount brackets.

If mounting in a 23-inch rack, use 19- to 23-inch rack mounting adapters (not provided).

If installing multiple transmitters, space them a minimum of ½ RU apart, with preferred spacing of 1 RU. Rack-mount hardware (rack screws, nuts, clips, etc.) are not included.

3.2 Input Power Connection and Wiring

The CPCX-12 requires one connection to the AC power mains for each CPM-3K power supply used in the design. The AC input connections are single phase or “bi-phase” connections consisting of L1 and L2 or Line and Neutral connections.

For branch circuit input voltages up to 250 VAC, Anderson Power SDG300 Receptacle Key “A” to NEMA L6-20 input cables should be used.

For branch circuit input voltages less than 125 VAC and input current less than 11.25 A, Anderson Power SDG300A to NEMA 5-15p input cables may be used.

Note: CommScope recommends using a voltage range of 208 to 277 VAC for all installations. 120 VAC should only be used for small demos or test systems. For voltages greater than 277 VAC, contact CommScope for guidance.

3.3 Output Connection and Wiring

Each Transmitter Card (CTX-6) has a four pin output connector (Phoenix Contact p/n:1778858). 20 AWG output connectors are recommended for output connections to terminal blocks.

CommScope recommends the use of the cables designed for the Constellation System. Consult the Constellation Best Practices Guide (TC-96344-IP) for details on power supported over different lengths and cable types.

CommScope pre-terminated output cables (CBL-TX-10) are recommended. The maximum length of output cable is 10 ft.

3.4 Grounding the Constellation Power Transmitter

Protective earth ground is provided by the corded connection. It is required that the protective earthing connection of the socket-outlet is verified before installation.

For more information, refer to the CommScope Constellation Best Practices Guide (TC-96344-IP) which is available using the URL below <http://www.commscope.com/SupportCenter>

Or contact your CommScope sales representative for guidance.

3.5 Installing CPM-3K Power Supplies

Up to four CPM-3K Power Supplies may be installed in the Power Transmitter (CPCX-12). The CPM-3K power supplies require their respective slots to be wired in order to function. All may be “hot swapped” for in-service maintenance purposes.

1. Insert a small screwdriver or similar tool under the release button in the openings located in the upper corners of the CPM-3K Power Supply. Refer to [Figure 5](#).

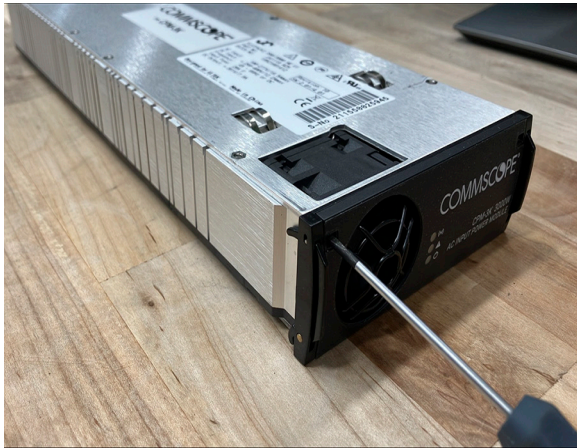


Figure 5. Inserting the Screwdriver

2. Pull the screwdriver downwards to release the CPM-3K extraction handle, repeat on opposite side. Refer to [Figure 6](#).



Figure 6. Pulling Screwdriver Downwards

3. Push the CPM-3K power supply into a bay of the transmitter shelf until it firmly seats in the connector. Refer to [Figure 7](#).



Figure 7. Power Supply in Transmitter

4. Press extraction levers upward until they fully seat, locking the CPM-3K into place. Refer to [Figure 8](#).



Figure 8. Seated CPM-3K

5. Repeat the above steps for each CPM-3K power supply to be populated.

To remove a CPM-3K power supply, perform the above steps to release the extraction handles, and pull the power supply from the transmitter using the handles.

3.6 Installing CTX-6 Transmitter Cards

The CPCX-12 transmitter shelf can accommodate up to 24 CTX-6 transmitter cards, which provide power to the Constellation Powered Backplane (CPCB-1). [Figure 1A on page 1](#) has a system diagram.

To insert a transmitter card, use the following procedure.

1. Select the proper slot and insert the CTX-6 card in the transmitter shelf as shown in [Figure 9](#).



Figure 9. Inserting a Transmitter Card



Figure 10. Fully Inserted Transmitter Card

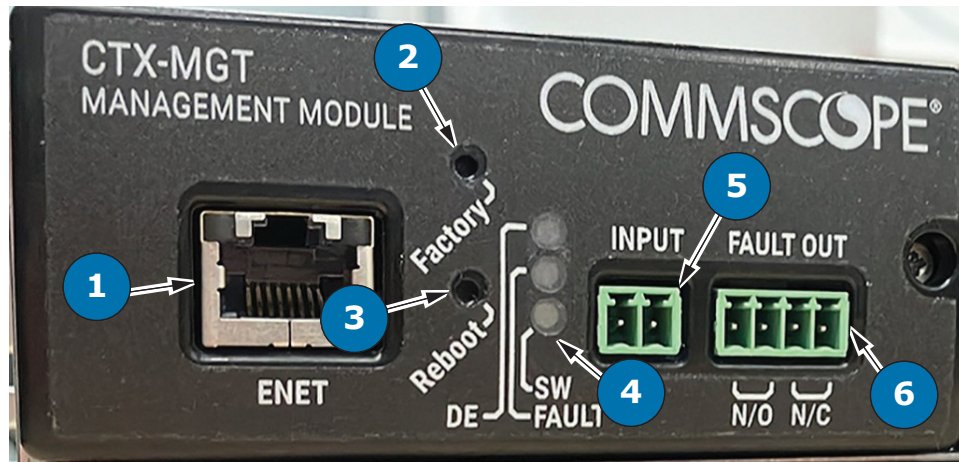
2. Seat the card by pressing on the plastic faceplate until the card edge is fully inserted. [Figure 10](#) below shows a fully inserted card.

To remove the CTX-6 card, pull the card using the indentation on the top and bottom of the plastic faceplate. CTX-6 cards may be hot-swapped as required.

4 OPERATION

4.1 Management Module (CTX-MGT) Front Panel

The Management Module (CTX-MGT) provides software control and fault alerting capability for the Power Transmitter. The control and fault alerting features are numbered (#) and described below.



27981-A

| # | DESCRIPTION |
|---|--|
| 1 | Ethernet Port: The management module provides the system with an Ethernet (IPv4/IPv6) network interface. This allows system to be converted to a local network for remote monitoring and management |
| 2 | Factory Reset Button: Hold for 5 seconds to reset the software settings to factory defaults. The “SW” LED will blink blue for more than 5 seconds while the reset is in progress. Transmitter card status will not be effaced during the reset process |
| 3 | Software Reboot Button: Push momentarily for SW reboot. The software LED will turn off for about 30 seconds. Once LED has turned back on, software is accessible |
| 4 | LED Indicators: LED information is provided in Section 5.1 on page 12 and Section 5.2 on page 12 |
| 5 | Dry Contact Input: The CPM-3K features a dry contact input that enables the user’s system to trigger the CPM-3K policy software to enable features such as load shedding for battery back-up. The dry contact input should be connected to either an open or closed circuit. Do not apply voltage to the dry contact. Max. cable length = 3 m; accepted wire gauge = 14-22 AWG; default operating mode = open circuit |
| 6 | Alarm Relay Output: The alarm relay output port can be used to notify external devices of fault conditions on the CPM- 3K |

4.2 IP Discovery via ZeroConf

The MAC address of a device on a local network may be determined using the device's hostname plus `.local` as the domain. The default hostname is printed on the unit label on the top of the device. Refer to [Figure 11](#).



Figure 11. Label Showing MAC Address

Absent any Ethernet switch the device can be connected directly to a laptop/PC using an Ethernet patch cable, i.e. "crossover connection."

By default, the device hostname is `cs-XXXX` where `XXXX` is the last 4 characters of the device's MAC address.

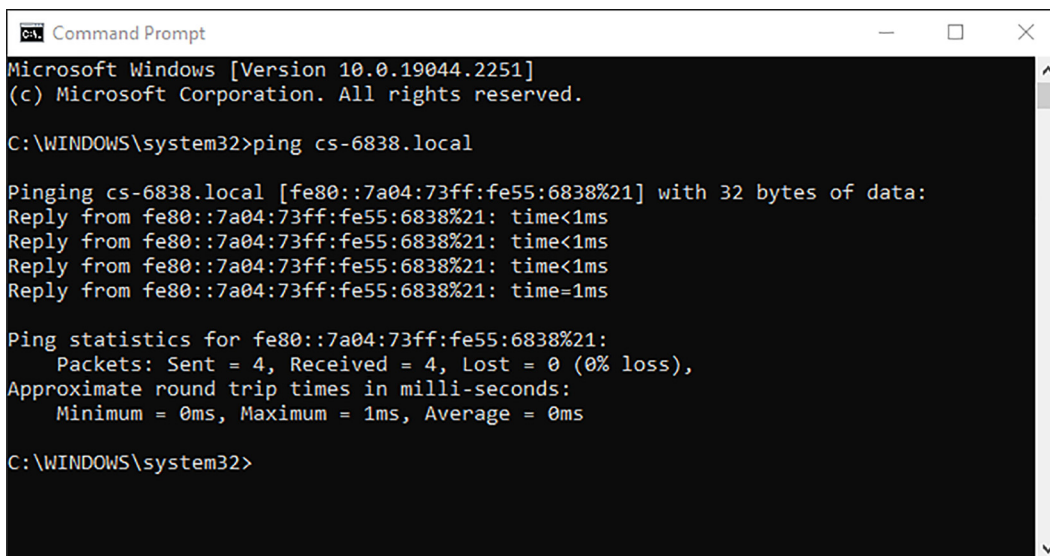
For example, if the device's MAC ends with `68:38`, the default hostname will be

`cs-6838`

Test network connectivity to the device by opening a command prompt and running

```
ping [hostname].local
```

Refer to [Figure 12](#).

A screenshot of a Windows Command Prompt window. The window title is "Command Prompt". The text in the window shows the execution of a ping command to cs-6838.local. The output shows four successful replies with a time of less than 1ms each. The ping statistics show 4 packets sent, 4 received, and 0% loss. The approximate round trip times are 0ms, 1ms, and 0ms.

```
Microsoft Windows [Version 10.0.19044.2251]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>ping cs-6838.local

Pinging cs-6838.local [fe80::7a04:73ff:fe55:6838%21] with 32 bytes of data:
Reply from fe80::7a04:73ff:fe55:6838%21: time<1ms
Reply from fe80::7a04:73ff:fe55:6838%21: time<1ms
Reply from fe80::7a04:73ff:fe55:6838%21: time<1ms
Reply from fe80::7a04:73ff:fe55:6838%21: time=1ms

Ping statistics for fe80::7a04:73ff:fe55:6838%21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\WINDOWS\system32>
```

Figure 12. Ping Test

4.3 Software Web UI Login

Software configuration is performed via the CommScope web browser user interface. The entry page is shown in [Figure 13](#).

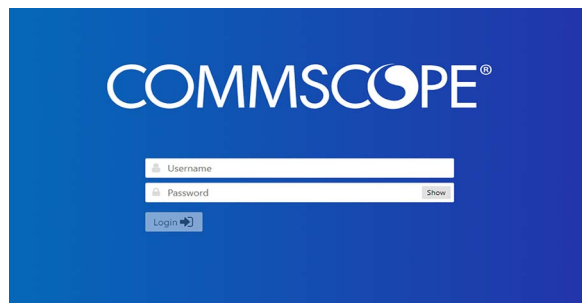


Figure 13. Web Browser User Interface Entry Screen

Access the web interface by opening

`http://[hostname].local`

or

`http://[IP address]`

The default user name is: **admin**.

The default password is: **commscope**.

Hostname and static IPv4 address may be configured from the Network Settings page. Refer to [Figure 14](#).

Click “Apply Changes” to save new settings. After network settings are saved, the browser will redirect to the new IP address or hostname after settings are applied. In most cases it will be necessary to login to the web UI again after the redirect.

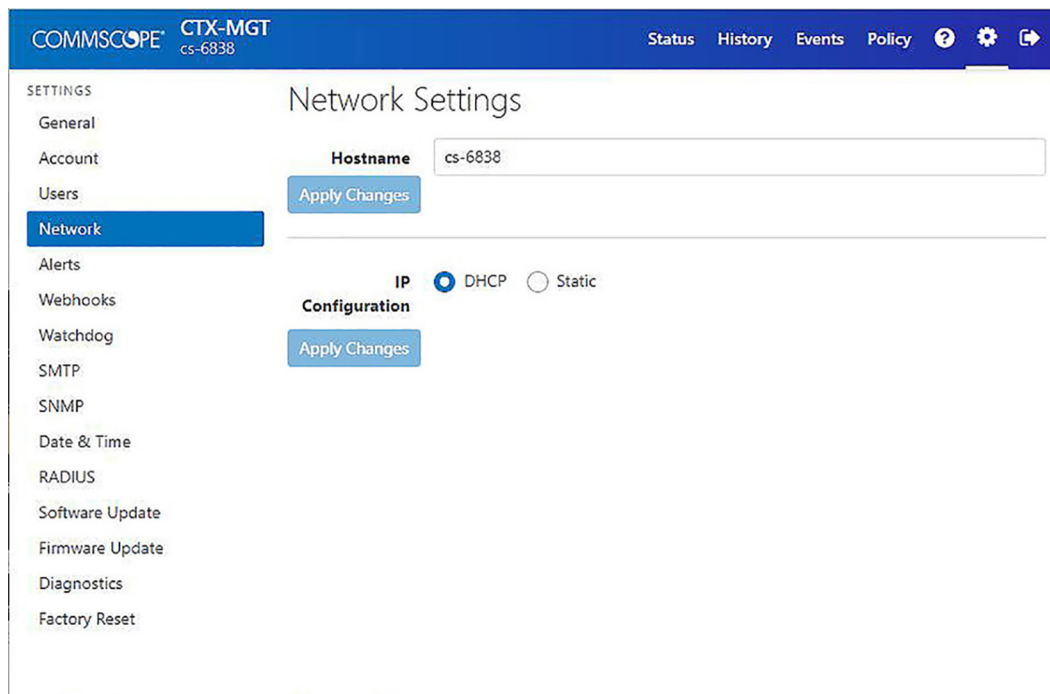


Figure 14. Network Settings Page

5 REFERENCE

5.1 Output Channel (CTX-6) LED Codes

| NORMAL STATES | LED PATTERN | NOTE |
|------------------|-------------|--|
| Normal operation | | |
| Boot-up | | Start-up sequence occurs when power is first applied to the receiver |
| Pre-charge power | | Part of normal start-up sequence |
| Pre-charge load | | Part of normal start-up sequence |

| FAULTS | LED PATTERN | FAULT CODE | TROUBLESHOOTING |
|------------------|-------------|------------|---|
| Normal operation | | 1 Blink | Check power wiring and connections |
| Start-up | | 2 Blinks | Check wiring Check receiver Check cable length and gauge |
| Transmission | | 3 Blinks | Check wiring Check receiver Check cable length and gauge Check load on receiver output |
| Overload | | 4 Blinks | Reduce load on receiver output Check receiver Check wiring |
| Temperature | | 5 Blinks | Reduce ambient temperature Reduce load |
| Short Circuit | | 6 Blinks | Check for damaged wiring Check for short in termination/connectors Reduce load |
| Ground | | 7 Blinks | Check wiring Check earth ground on receiver Check earth ground connection on transmitter |
| Input Power | | 8 Blinks | Ensure temperature card is properly inserted Check power supply, MGT, main power |
| Internal | | 9 Blinks | Internal hardware failure Contact CommScope Support |

5.2 Management Unit (CTX-MGT) “SW” LED Codes

| LED PATTERN | LED PATTERN | NOTE |
|-------------|---------------------------|---|
| | 5 s after power-on.reboot | Software module power-on and pre-boot. Pushing “Factory” button during this time causes device to boot in Recovery Mode |
| | 30 s (approximately) | Software is booting (green “heartbeat” blink pattern) |
| | Until reboot | Software is running |
| | 20 s (approximately) | Factory reset is in progress |
| | Until reboot | Software is in recovery mode (blue “heartbeat”) |