

COMMScope®



# CommScope ERA® CAP M2 Installation Guide

## Release

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# Chapter 1

## Document Overview

This guide provides product overview and installation instructions for CAP M2 variants.

**TABLE 1:** Supported CAP M2 Models

| Part Number  | Model Name                   |
|--------------|------------------------------|
| 7851671-1001 | CAP M2 C-Band F-AC           |
| 7851671-1002 | CAP M2 C-Band F-DC           |
| 7851671-1003 | CAP M2 35LT/35HT F-AC        |
| 7851671-1004 | CAP M2 35LT/35HT F-DC        |
| 7856326-1003 | CAP M2 34T/37T/37T F-AC-F1   |
| 7856326-1004 | CAP M2 34T/37T/37T F-DC-F1   |
| 7856326-1010 | CAP M2 17E/19/23/25T F-AC-F1 |
| 7856326-1011 | CAP M2 17E/19/23/25T F-DC-F1 |

**Note:** F - Fiber, F1 - Fan



**Note:**  For information on minimum software requirements for ERA hardware, refer to the product data sheets or [Hardware to Software Mapping Information](#).

## Document Revision History

This is the third release of the CommScope ERA® CAP M2, 2nd Generation Medium Power Carrier Access Point Installation Guide. This release:

- Updated [Table 1: Supported CAP M2 Models](#) (page 5)
- Updated [Table 3: Maximum Power Output by Frequency](#) (page 12)
- Updated [Table 4: Minimum Antenna Distances](#) (page 12)
- Added [Figure 2: CAP M2 Connectors and LED \(with fan unit / 4-port\)](#) (page 14)
- Updated [Table 8: CAP M2 Power Consumption](#) (page 21) table
- Added [Figure 7: CAP M2 Mounting Dimensions \(with fan unit / 4-port\)](#) (page 23)
- Updated [Table 9: Maximum CAP M2 Installation Weights](#) (page 25)
- Added [Figure 10: Wall Mounting Orientation for a CAP M2 \(with fan unit\)](#) (page 28)
- Updated [Table 11: CAP M2 Antenna Mapping](#) (page 41)
- Updated [SFP+ Module Kits](#) (page 17)

- Updated [Mounting Kits](#) (page 16)
- Updated [Mounting CAP M2 with a Wall Mounting Kit](#) (page 28)
- Added [Maintenance](#) (page 49) chapter

## Document Cautions and Notes

This document may contain any of the following notes, cautions, and warning icons.



**Note:** This symbol without additional icons indicates a general note. Notes provide information about special circumstances.



**Note:** This icon indicates a caution or warning. Cautions and warnings indicate operations or steps that could cause personal injury, induce a safety problem in a managed device, destroy or corrupt information, or interrupt or stop services.



**Note:** This icon indicates a caution or warning that pertains to laser equipment.



**Note:** This icon indicates a caution or warning that pertains to Radio Frequency (RF).



**Note:** This icon indicates that the hardware is susceptible to Electro-Static Discharge (ESD) damage.



**Note:** This icon indicates a caution or warning that pertains to an electrical hazard.



**Note:** This icon indicates a caution or warning that pertains to a fire hazard.



**Note:** This icon indicates a system configuration that can only be performed by a specific user role. The required user login credential will be identified.

## Abbreviations Used in this Guide

| Abbreviation | Description                      | Abbreviation | Description                                             |
|--------------|----------------------------------|--------------|---------------------------------------------------------|
| AC           | Alternating Current              | ISDE         | Innovation, Sciences et Développement économique Canada |
| AP           | Access Point                     | ISED         | Innovation, Science and Economic Development Canada     |
| AUX          | Auxiliary                        | kg           | Kilogram                                                |
| C            | Celsius                          | LED          | Light Emitting Diode                                    |
| CAN          | Central Area Node                | MHz          | Megahertz                                               |
| CAP H        | Carrier Access Point, High Power | mm           | Millimeter                                              |
| CAP L        | Carrier Access Point, Low Power  | MMF          | Multi-Mode Fiber                                        |

| Abbreviation | Description                        | Abbreviation | Description                    |
|--------------|------------------------------------|--------------|--------------------------------|
| CAP M        | Carrier Access Point, Medium Power | OPT          | Optical Transport              |
| Cat6A        | Category 6A twisted pair           | PoE          | Power over Ethernet            |
| CAT          | Copper Transport                   | PN           | Part Number                    |
| CMS          | CommScope Mobility Solutions       | RAN          | Regional-Area Network          |
| dB           | Decibel                            | RF           | Radio Frequency                |
| dBm          | Decibel-milliwatts                 | RU           | Rack Unit                      |
| DC           | Direct Current                     | RX           | Receive                        |
| EFTA         | European Free Trade Association    | SFP          | Small Form-Factor Pluggable    |
| EMC          | Electromagnetic Compatibility      | TEN          | Transport Expansion Node       |
| EMEA         | Europe, Middle East, Africa        | TX           | Transmit                       |
| EU           | European Union                     | UAP          | Universal Access Point         |
| F            | Fahrenheit                         | Vac          | Voltage in Alternating Current |
| FCC          | Federal Communications Commission  | Vdc          | Voltage in Direct Current      |
| Gb           | Gigabit                            | W            | Watts                          |
| GHz          | Gigahertz                          | WIN          | Wide-Area Integration Node     |
| GUI          | Graphical User Interface           | WCS          | Wireless Communications Switch |
| ION          | Intelligent Optical Network        |              |                                |

## Safely Working with ERA Hardware

The following sections provide important information that you should read and know before working with any ERA hardware. Observe all cautions and warnings listed in this section.

### Health and Safety Precautions



**Note:**  A high leakage current ground (earth) connection to the Power Supply Unit (PSU) is essential before making any other connections to the PSU.



**Note:**  Laser radiation. Risk of eye injury in operation. Do not stare into the laser beam; do not view the laser beam directly or with optical instruments.



**Note:**  High frequency radiation in operation. Risk of health hazards associated with radiation from the antenna(s) connected to the unit. Implement prevention measures to avoid the possibility of close proximity to the antenna(s) while in operation.



**Note:**  If the CAP M2 power connector is not easily accessible, a disconnect device in the mains power circuit must be provided within easy reach.

### Property Damage Warnings



**Note:**  Keep operating instructions within easy reach and make them available to all users.

-  **Note:**  Only license holders for the respective frequency range are allowed to operate this unit.
-  **Note:**  Read and obey all the warning labels attached to the unit. Keep all warning labels are kept in a legible condition. Replace missing or damaged labels.
-  **Note:**  Make sure the unit's settings are correct for the intended use (refer to the manufacturer product information) and regulatory requirements are met. Do not carry out any modifications or fit any spare parts, which are not sold or recommended by the manufacturer.

## General Installation Safety Requirements

-  **Note:**  Wet conditions increase the potential for receiving an electrical shock when installing or using electrically powered equipment. To prevent electrical shock, never install or use electrical equipment in a wet location or during a lightning storm.
-  **Note:**  This system is a RF Transmitter and continuously emits RF energy. Maintain a minimum clearance from the antenna, according to [Table 4: Minimum Antenna Distances](#) (page 12) while the system is operating. Whenever possible, power down the CAP M2 before servicing the antenna.
-  **Note:**  Do not remove protective caps from any of the connectors until instructed to do so.

## Guard Against Damage from Electro-Static Discharge

-  **Note:**  Electro-Static Discharge (ESD) can damage electronic components. To prevent ESD damage, always wear an ESD wrist strap when working with hardware components. Not all ERA hardware requires grounding. For those ERA hardware components for which grounding is required, connect the ground wire on the ESD wrist strap to an earth ground source before touching the component. Wear the wrist strap the entire time that you work with the ERA hardware.

## Compliance

1. **Notice:** For installations, which have to comply with FCC RF exposure requirements, the antenna selection and installation must be completed in a way to ensure compliance with those FCC requirements. Depending on the RF frequency, rated output power, antenna gain, and the loss between the repeater and antenna, the minimum distance D to be maintained between the antenna location and human beings is calculated according to this formula:

$$D_{[cm]} = \sqrt{\frac{P_{[mW]}}{4 * \pi * PD_{[mW/cm^2]}}}$$

where

- P (mW) is the radiated power at the antenna, i.e. the max. rated repeater output power in addition to the antenna gain minus the loss between the repeater and the antenna.
- PD (mW/cm<sup>2</sup>) is the allowed Power Density limit acc. to 47 CFR 1.1310 (B) for general population / uncontrolled exposures which is
  - f (MHz) / 1500 for frequencies from 300MHz to 1500MHz
  - 1 for frequencies from 1500MHz to 100,000MHz

RF exposure compliance may need to be addressed at the time of licensing, as required by the responsible FCC Bureau(s), including antenna co-location requirements of 1.1307(b)(3).

2. **Notice:** For installations which have to comply with European EN50385 exposure compliance requirements, the following Power Density limits/guidelines (mW/cm<sup>2</sup>) according to ICNIRP are valid:
  - 0.2 for frequencies from 10 MHz to 400 MHz
  - F (MHz) / 2000 for frequencies from 400 MHz to 2 GHz
  - 1 for frequencies from 2 GHz to 300 GHz
3. **Notice:** Installation of this equipment is in full responsibility of the installer, who has also the responsibility, that cables and couplers are calculated into the maximum gain of the antennas, so that this value, which is filed in the FCC Grant and can be requested from the FCC data base, is not exceeded. The industrial boosters are shipped only as a naked booster without any installation devices or antennas as it needs for professional installation.
4. **Notice:** For installations which have to comply with FCC/ISED requirements:

#### **English:**

This device complies with FCC Part 15. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This device complies with Health Canada's Safety Code. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement. Information can be obtained at [http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\\_guide-lignes\\_direct-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php).

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### **Antenna Statement for ISED:**

This device has been designated to operate with the antennas having a maximum gain of 15 dBi. Antennas having a gain greater than 15 dBi are prohibited for use with this device without consent by ISED regulators. The required antenna impedance is 50 ohms.

The antenna(s) used for this transmitter must be installed to provide a separation distance according to [Table 4: Minimum Antenna Distances](#) (page 12) from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

#### **French:**

Cet appareil est conforme avec Santé Canada Code de sécurité 6. Le programme d'installation de cet appareil doit s'assurer que les rayonnements RF n'est pas émis au-delà de l'exigence de Santé Canada. Les informations peuvent être obtenues: [http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\\_guide-lignes\\_direct-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php)

Les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'autorité de l'utilisateur à utiliser cet équipement.

#### Antenne déclaration pour ISDE:

Ce dispositif a été désigné pour fonctionner avec les antennes ayant un gain maximal de 15 dBi. Antennes ayant un gain plus grand que 15 dBi sont interdites pour une utilisation avec cet appareil sans le consentement des organismes de réglementation d'ISDE. L'impédance d'antenne requise est 50 ohms.

L'antenne (s) utilisé pour cet émetteur doit être installé pour fournir une distance de séparation selon le Tableau [Table 4: Minimum Antenna Distances](#) (page 12) de toutes les personnes et ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou émetteur. Les utilisateurs et les installateurs doivent être fournis avec des instructions d'installation de l'antenne et des conditions de fonctionnement de l'émetteur pour satisfaire la conformité aux expositions RF.

| Canadian Representative |                                          |
|-------------------------|------------------------------------------|
| ISED Company No:        | 3874A                                    |
| Company Name:           | Celltech Labs Inc.                       |
| Address:                | 32-364 Lougheed Road Kelowna, BC V1X 7R8 |
| Contact Name:           | Ben Hewson                               |
| Telephone No:           | (250) 765-7650 x201                      |
| Email:                  | IC-Rep@celltechlabs.com                  |

- Notice:** The unit complies with Overvoltage Category II. It also complies with the surge requirement according to EN 61000-4-5 (fine protection); however, installation of an additional medium (via local supply connection) and/or coarse protection (external surge protection) is recommended depending on the individual application in order to avoid damage caused by overcurrent.

For Canada and US, components used to reduce the Overvoltage Category shall comply with the requirements of IEC 61643-series. As an alternative, components used to reduce the Overvoltage Category may comply with ANSI/IEEE C62.11, CSA Certification Notice No. 516, CSA C22.2 No. 1, or UL 1449. Suitability of the component for the application shall be determined for the intended installation.

- Notice:** Corresponding local particularities and regulations must be observed. For national deviations, please refer to the respective documents included in the manual CD that is delivered with the unit.
- Notice:** For a Class B digital device or peripheral:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television

reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference.

8. **Notice:** For a Class A digital device or peripheral.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

9. **Notice:** This unit complies with European standard EN62368-1.

## Equipment Symbols Used / Compliance

Please observe the meanings of the following symbols used in our equipment and the compliance warnings listed in table below.

**TABLE 2:** Compliance Labels

| Symbol | Compliance | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -      | FCC        | For industrial (Part 20) signal booster:<br>WARNING: This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.                                                                                                                                              |
| -      | ISED       | WARNING: This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device.<br>AVERTISSEMENT: Ce produit N'EST PAS un appareil de CONSOMMATION. Il est conçu pour être installé par un installateur approuvé par un titulaire de licence d'ISDE. Pour utiliser cet appareil, vous DEVEZ détenir une LICENCE d'ISDE ou avoir obtenu le consentement exprès d'un titulaire de licence autorisé par ISDE. |
| CE     | CE         | To be sold exclusively to mobile operators or authorized installers - no harmonized frequency bands, operation requires license. Intended use: EU and EFTA countries.<br>Indicates conformity with the RED directive 2014/53/EU and/or RoHS directive 2011/65/EU.                                                                                                                                                                                                                                                                                 |

## Maximum Output Power Levels

Below table lists the frequencies and maximum power output for bands supported in the CAP M2 variants.

**TABLE 3:** Maximum Power Output by Frequency

| Band            | DL Frequency Range | Power Output [dBm] |
|-----------------|--------------------|--------------------|
| PCS 1900        | 1930 - 1995 MHz    | 33                 |
| AWS 1700E       | 2110 - 2200 MHz    | 33                 |
| WCS 2300        | 2350 - 2360 MHz    | 32                 |
| BRS             | 2496 - 2690 MHz    | 33                 |
| 34T             | 3450 - 3550 MHz    | 32                 |
| 35LT            | 3410 - 3640 MHz    | 34                 |
| 35HT            | 3570 - 3800 MHz    | 34                 |
| C-Band          | 3700 - 3980 MHz    | 35                 |
| 37T (Ant 1 + 3) | 3700 - 3980 MHz    | 34                 |
| 37T (Ant 2 + 4) | 3700 - 3980 MHz    | 35                 |

## Required Antenna Distances

**TABLE 4:** Minimum Antenna Distances

| Model                | Antenna Gain Without Cable Loss (dBi) | Minimum Distance (meters) |       |
|----------------------|---------------------------------------|---------------------------|-------|
|                      |                                       | FCC                       | ISED  |
| CAP M2 C-Band        | 15                                    | 1.784                     | 2.751 |
| CAP M2 17E/19/23/25T | 15                                    | 1.952                     | 2.752 |
| CAP M2 34T/37T/37T   | 15                                    | 1.911                     | 2.266 |

# Chapter 2

## CAP M2 Overview

This installation guide describes the CAP M2, which interfaces with a Classic CAN or TEN via an optical link. This allows the CAP M2 to provide data over Single-Mode Fiber (SMF) or Multi-Mode (MMF). Power for CAP M2s is provided over External AC/DC or remotely through hybrid fiber (see [Connect The Cables To The CAP M2](#) (page 37)).

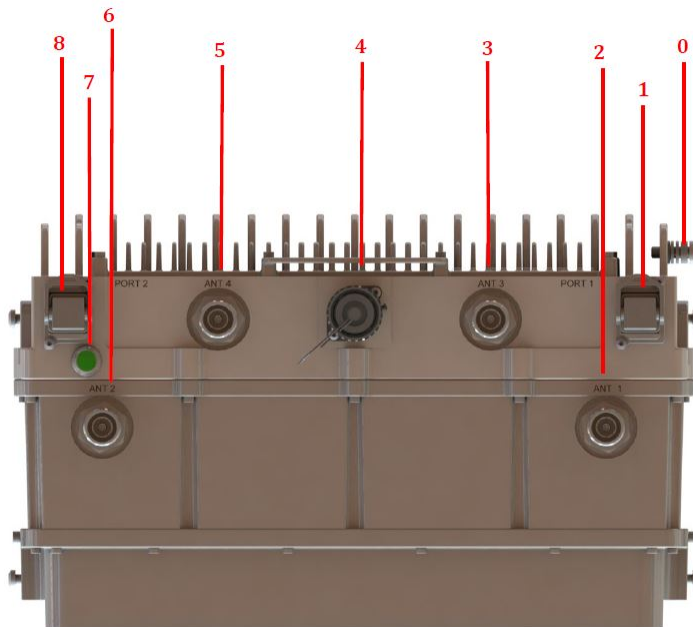
On the downlink, the CAP M2 converts data arriving at the CAP M2 to analog signals and sends them to the Antenna ports. On the uplink, received signals are digitized and serialized into data streams, which are sent back to the Classic CAN or TEN.

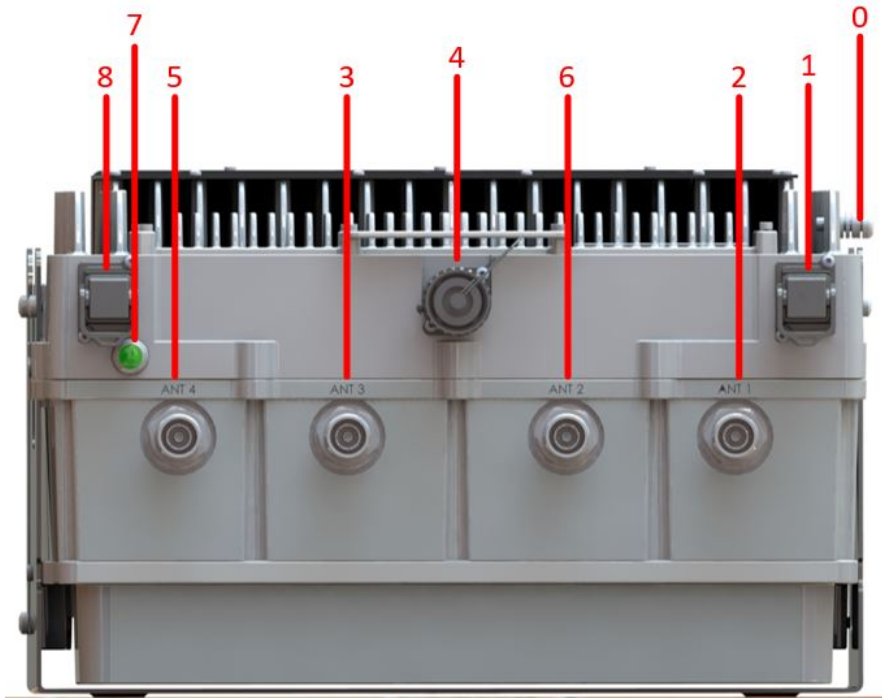
The CAP M2 is designed for indoor and outdoor (IP67) use. It is without fan unit or with fan unit cooled with a temperature range of: -33°C to +50°C (-27.4°F to +122°F); see also [Recommended Tools and Material](#).

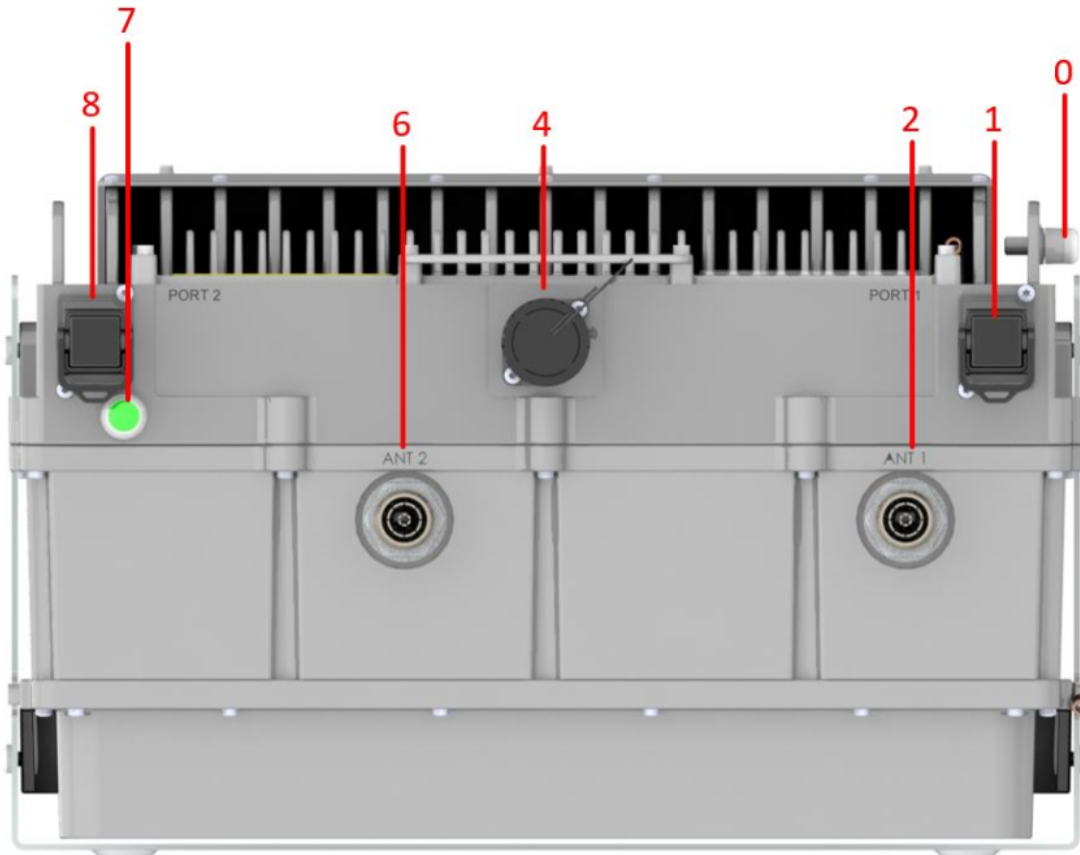
## Connectors and LED for the CAP M2

Below images and table identify the CAP M2 connectors and its LED; corresponding connectors are shown.

**FIGURE 1:** CAP M2 Connectors and LED (without fan unit)



**FIGURE 2:** CAP M2 Connectors and LED (with fan unit / 4-port)

**FIGURE 3:** CAP M2 Connectors and LED (with fan unit / 2-port)**TABLE 5:** Function of the CAP M2 Connectors and LED

| Ref # | Label  | Description            | Function                                                                                                                                                                                                   |
|-------|--------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | None   | Grounding Bolt         | Connects the CAP M2 to an approved earth-ground source.                                                                                                                                                    |
| 1     | Port 1 | Port 1 OCTIS Connector | Port to pass fiber cable to the SFP+ module. The port seal is the OCTIS Universal connector PN 7847069. Connecting the fiber cable to the CAP M2 requires removing the service lid.                        |
| 2     | ANT 1  | 4.3-10 RF connector    | Connect to external antennas or to one of the ports on a multiple input cross-polarized antenna via 50Ω coaxial cable. The antenna ports ship with dust caps that can be discarded upon unit installation. |
| 3     | ANT 3  | 4.3-10 RF connector    | Connect to external antennas or to one of the ports on a multiple input cross-polarized antenna via 50Ω coaxial cable. The antenna ports ship with dust caps that can be discarded upon unit installation. |

**TABLE 5:** Function of the CAP M2 Connectors and LED (continued)

| Ref # | Label  | Description                  | Function                                                                                                                                                                                                     |
|-------|--------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4     | None   | Power connector (Vac or Vdc) | Connects to any of the following (graphic shows the port populated): <ul style="list-style-type: none"> <li>■ Vac—Main power</li> <li>■ Vdc—Remote DC power supply or a Hybrid Fiber Junction Box</li> </ul> |
| 5     | ANT 4  | 4.3-10 RF connector          | Connect to external antennas or to one of the ports on a multiple input cross-polarized antenna via 50Ω coaxial cable. The antenna ports ship with dust caps that can be discarded upon unit installation.   |
| 6     | ANT 2  | 4.3-10 RF connector          | Connect to external antennas or to one of the ports on a multiple input cross-polarized antenna via 50Ω coaxial cable. The antenna ports ship with dust caps that can be discarded upon unit installation.   |
| 7     | None   | Power and Status LED         | See <a href="#">Connectors and LED for the CAP M2</a>                                                                                                                                                        |
| 8     | Port 2 | Port 2 OCTIS Connector       | Port to pass fiber cable to the SFP+ module. The port seal is the OCTIS Universal connector PN 7847069. Connecting the fiber cable to the CAP M2 requires removing the service lid.                          |

## CAP M2 Accessories and Options

The CAP M2 accessories and options are described in the following sections:

- [Mounting Kits](#)
- [SFP+ Module Kits](#)
- [OCTIS™ Universal Lever Assembly Kits](#)

### Mounting Kits



**Note:** For Non-US models, Wall Mounting Bracket is provided in the CAP M2 kit. No bracket is provided with US models.



**Note:** Wall Mounting Kit A7851753 is not provided in the CAP M2 kit and must be ordered separately.

Mounting and Power Kits are described in the applicable installation process:

**TABLE 6:** Mounting and Power Kits

| Mounting/Power Kit        | CommScope PN                              | See                                                      |
|---------------------------|-------------------------------------------|----------------------------------------------------------|
| Wall Mounting Bracket Kit | A7851753 (This kit contains two brackets) | <a href="#">Mounting CAP M2 with a Wall Mounting Kit</a> |

**TABLE 6:** Mounting and Power Kits (continued)

| Mounting/Power Kit                     | CommScope PN | See                                                                             |
|----------------------------------------|--------------|---------------------------------------------------------------------------------|
| Power Supply/Hybrid Fiber Mounting Kit | 7774354-xx   | <a href="#">Mounting a CAP M2 with a Hybrid Fiber Splice Box Kit (optional)</a> |

## SFP+ Module Kits

Contact your local CommScope sales representative to obtain the following components, as required, for this installation.

- Per the installation plan, obtain either Single Mode Fiber (SMF) or Multi Mode Fiber (MMF) that is of sufficient length to reach from the CAP M2 to a Classic CAN or TEN.
- All CAP M2s ship with a single OCTIS Kit (PN 7770612). A second OCTIS Kit must be ordered if the Optical Port 2 will be used to support RF Bandwidth > 320MHz.
- Obtain SFP+ Module pairs (one placed in the CAP M2 and paired with another in the TEN or Classic CAN) that are appropriate for this installation.
- Two pairs are needed to support more than 320MHz RF Bandwidth.
- When two pairs of SFP+ are used, they must be populated in adjacent ports of the same OPT card, with the lower numbered OPT port connected to the Port 1 of the CAP M2 and the higher numbered OPT port connected to the Port 2 of the CAP M2.

Consult the latest ordering guide for CommScope SFP+ modules available in your region. CAP M2 supports SFP+ and SFP+ BIDI, CSFP+ are not supported.

## OCTIS™ Universal Lever Assembly Kits



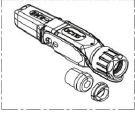
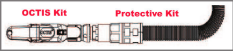
**Note:**  OCTIS™ is a trademark of Radiall. The following connector drawings and instructions were provided by Radiall.

Scan the QR code to watch the OCTIS SFP+ connector assembly video.



All CAP M2s include two OCTIS Universal Connector Kits (CommScope PN 7847069) for the interface to the Classic CAN or TEN that plugs into Port 1 and Port 2 on the CAP M2. CommScope provides the two OCTIS Kits for each CAP M2.

TABLE 7: CAP M2 OCTIS Kits

|                                                                                   | Kit Name                      | CommScope PN | Description                                                                                                                                      |
|-----------------------------------------------------------------------------------|-------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|  | OCTIS Universal Connector Kit | 7847069      | <p>This is the connector that you use to seal the fiber cable port.</p> <p>The OCTIS Universal Kit is provided with the CAP M2.</p>              |
|  | Fiber/Cable Protective Kit    | 7823597      | <p>Use to protect fibers or cables; is 2m (78.7") long.</p> <p><b>Note:</b> An Optical OCTIS Kit is required and must be ordered separately.</p> |

## OCTIS Universal Lever Assembly Instructions

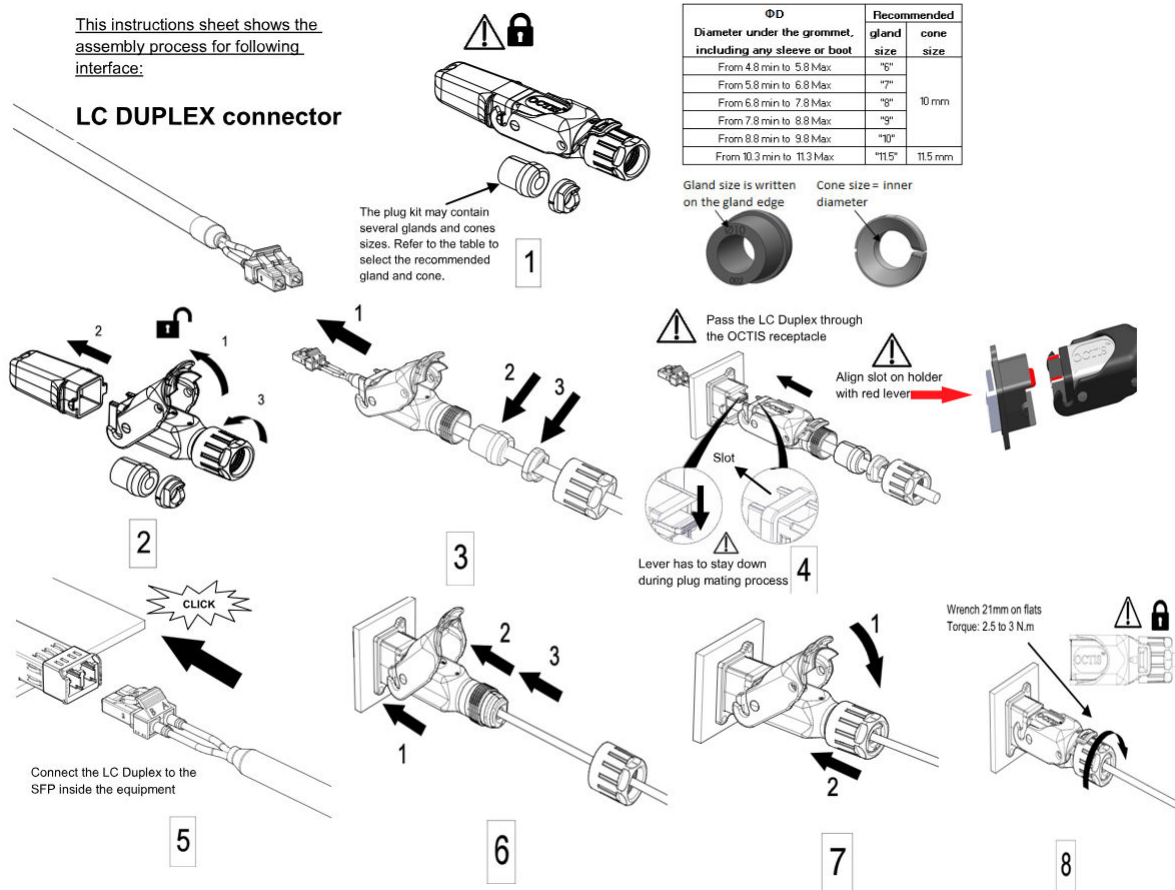
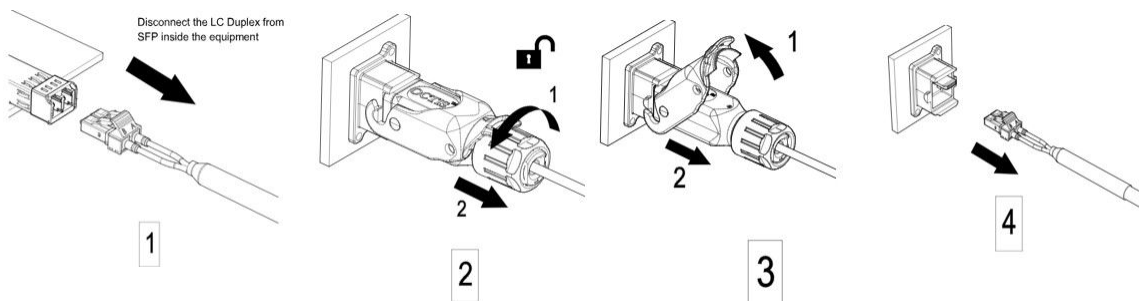


**Note:** Octis™ is a trademark of Radiall. The following connector drawings and instructions were provided by Radiall.

The following instructions are for the OCTIS Universal Lever kit (CommScope PN: 7847069). For additional information, please contact Radiall.



**Note:** The figures show the LC Duplex connector at the cable termination. The BiDi (single fiber) cable termination follows the same OCTIS assembly instructions.

**FIGURE 4: OCTIS Universal Lever Assembly Instructions****FIGURE 5: OCTIS Universal Lever Unmating Instructions**

# Chapter 3

## Plan And Prepare For CAP M2 Installation

Pre-installation steps.

1. Review and know the information in [Maximum Number of CAP M2s Supported in an ERA System](#)
2. Review and know the information in [Safely Working with ERA Hardware](#)
3. [Determine the CAP M2 Installation Site](#), which includes understanding and meeting requirements for:
  - [Recommended Tools and Material](#)
  - [CAP M2 Weights](#)
  - [Recommended Tools and Material](#)
  - [CAP M2 Dimensions](#)
4. Map out all cable runs.
5. Identify and obtain all tools and materials required to complete the installation as described in [Recommended Tools and Material](#)
6. Obtain any accessories required for this installation; see [CAP M2 Accessories and Options](#)
7. [Unpack and Inspect the CAP M2 and Optional Accessories](#).

## Maximum Number of CAP M2s Supported in an ERA System

When installing CAP M2, you must observe the following rules.

- SMF or MMF connects the CAP M2 via its Optical Port to the OPT Card.  
If the total used signal bandwidth is more than 320MHz a second fiber link is needed. It is connected to Optical Port 2.
- You connect CAP M2s to an OPT Card installed in Slots L1, L2, L3, or L4 in the TEN or Classic CAN.
  - Each OPT Card has four 10 Gbps ports (labeled 1 - 4) for fiber connections.
  - Depending on the transmit bandwidth requirements, you can connect up to four CAP M2s to each OPT Card.
  - If CAP M2 Ports 1 and 2 are both used, they must be connected to adjacent ports on the same OPT Card. CAP M2 Port 1 connects to the lower numbered OPT port than the CAP M2 Port 2.

## Determine the Power Consumption of the CAP M2

Use the power consumption matrix in the table to calculate power consumption for a CAP M2, where the consumption numbers are at the CAP M2 power inputs and do not account for feed losses.

**TABLE 8:** CAP M2 Power Consumption

| Configuration        | Voltage Range (V)                                                              | Typical Power (W) | Maximum Power (W) |
|----------------------|--------------------------------------------------------------------------------|-------------------|-------------------|
| CAP M2 C-band        | 100 to 240 Vac ( $\pm 10\%$ )<br>-60 Vdc to -36 Vdc (no add. supply tolerance) | 120               | 200               |
| CAP M2 35LT/35HT     |                                                                                | 120               | 200               |
| CAP M2 34T/37T/37T   |                                                                                | 200               | 300               |
| CAP M2 17E/19/23/25T |                                                                                | 240               | 310               |



**Note:**  Mains power must be interruptible with an external delay-actions mains breaker. For the Mains breaker, observe the following recommendations.

- CAP M2 APs require a minimum 120 Volt / 15 Amp or 240 Volt / 13 Amp, single-phase, 50 / 60 Hz AC service. MAINS power must be interruptible with an external delay-actions mains breaker.  
CommScope recommends external AC breakers capable of at least 15 Amps maximum for 120-Volt service or at least 13 Amps for 240-Volt service. One type B breaker can support up to two CAP M2 units, and a type C breaker can support up to four CAP M2 units.
- For the DC power supply, observe the local regulations of the DC service provider.

## Determine the CAP M2 Installation Site

When deciding on a suitable mounting site, observe the following rules; refer also to [Mounting Orientation for Wall Mounts](#). The CAP M2 is suitable for indoor and outdoor installation.

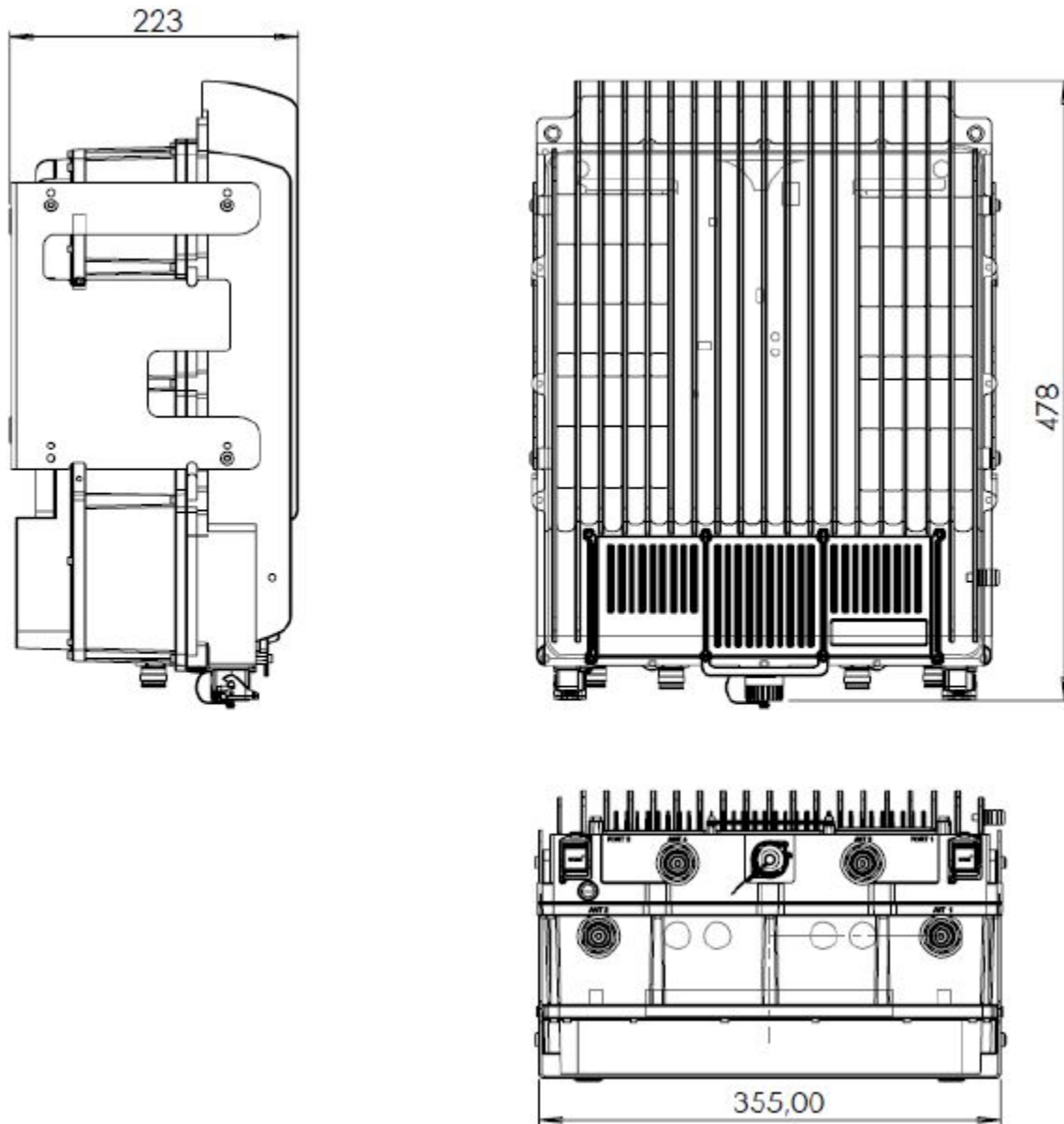
The following sections provide weight and dimension requirements needed to determine the best installation site for the CAP M2.

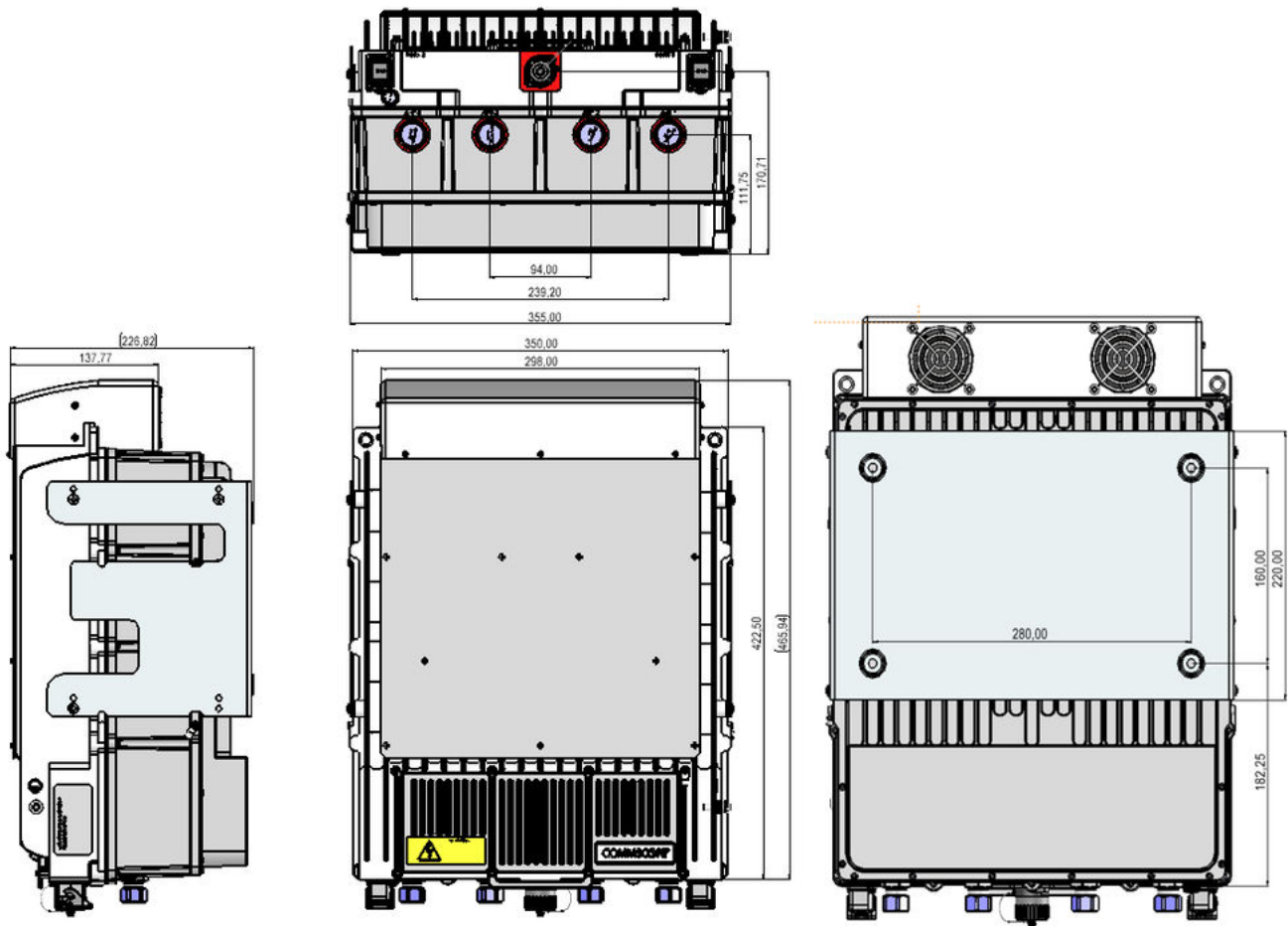
## CAP M2 Dimensions

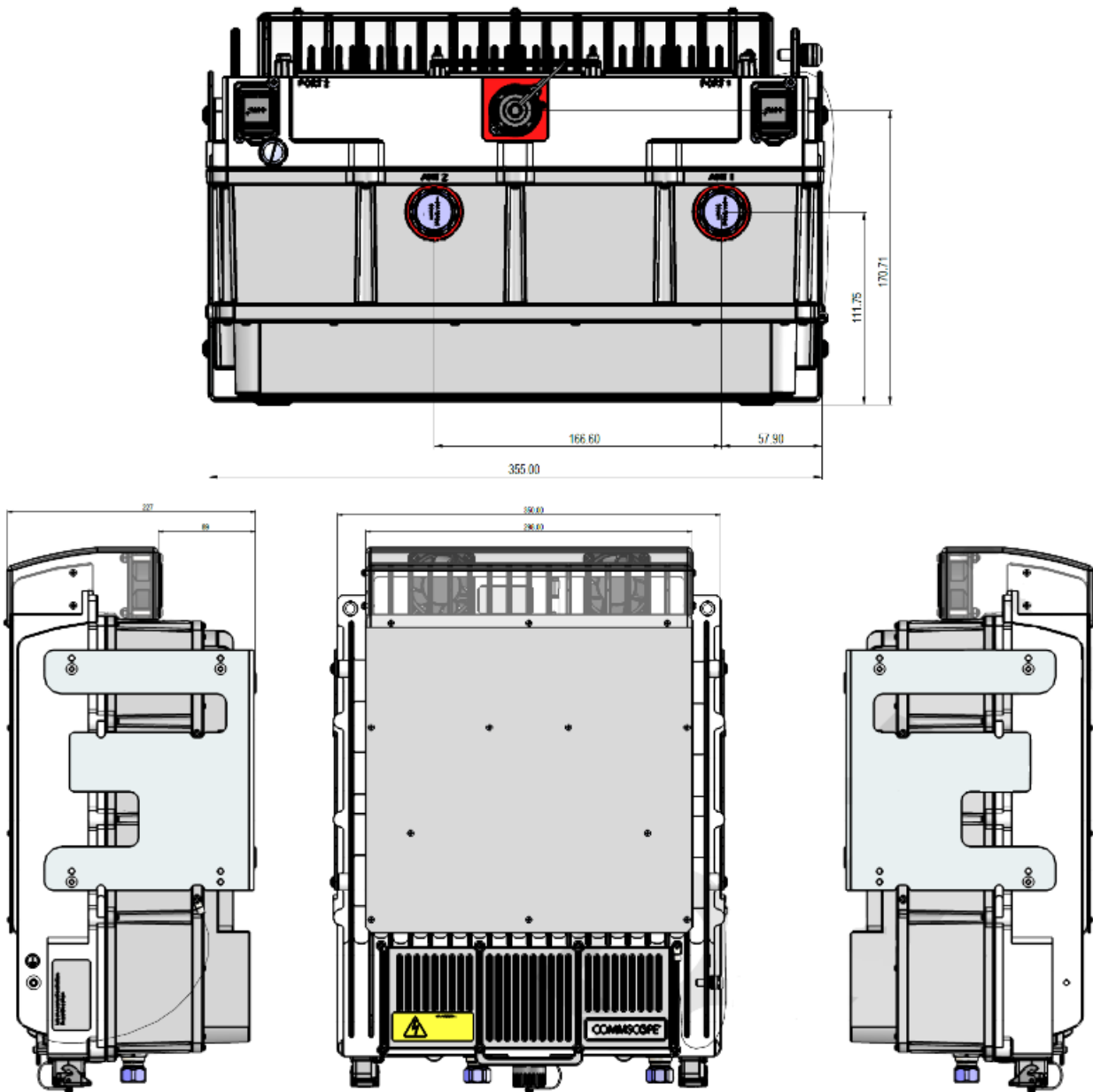
Use the dimensions shown in the figure applicable to the installation to determine the space required at the mounting site.



**Note:**  All measurements are in mm.

**FIGURE 6:** CAP M2 Mounting Dimensions (without fan unit)

**FIGURE 7: CAP M2 Mounting Dimensions (with fan unit / 4-port)**

**FIGURE 8:** CAP M2 Mounting Dimensions ((with fan unit / 2-port))

## CAP M2 Weights

Use the weights listed in the table to determine a site that can bear the weight of the CAP M2 that is being installed, where:

- The “Maximum Lift Weight” is the highest weight that must be lifted during installation. (An installer only needs to lift CAP M2 components at one time, not the wholly configured CAP M2.)
- The “Total Hanging Weight” is the weight of the CAP M2, including the weight of the Mounting Bracket and Power Supply, minus the weight of the external cables and connectors, that the mounting site must be able to support.

**TABLE 9:** Maximum CAP M2 Installation Weights

| CAP M2               | Maximum Lift weight |      | Total Hanging Weight |      |
|----------------------|---------------------|------|----------------------|------|
|                      | kg                  | lbs  | kg                   | lbs  |
| CAP M2 C-Band        | 19.7                | 43.4 | 21                   | 46.3 |
| CAP M2 35LT/35HT     |                     |      |                      |      |
| CAP M2 34T/37T/37T   | 22.4                | 49.4 | 24.7                 | 54.5 |
| CAP M2 17E/19/23/25T | 28.2                | 62.2 | 30.5                 | 67.2 |

## Recommended Tools and Material

- Electrostatic Discharge (ESD) wrist strap
- Drill and bits to mount the bracket to a wall
- Fiber cleaning equipment
- Calibrated break-over RF torque wrench

## Unpack and Inspect the CAP M2 and Optional Accessories

1. Inspect the exterior of the shipping container(s) for evidence of rough handling that may have damaged the components in the container.
2. Unpack each container while carefully checking the contents for damage and verify with the packing slip.
3. If damage is found or parts are missing, file a claim with the commercial carrier and notify CommScope Technical Support (see [DAS and Small Cell Technical Support](#)). Save the damaged cartons for inspection by the carrier.
4. Save all shipping containers for use if the equipment requires shipment at a future date.

## Obtain the Required Materials

Contact your local CommScope sales representative to obtain the following components, as required, for this installation.

- Obtain the cable required for this installation.
  - Per the installation plan, obtain either Single Mode Fiber (SMF) or Multi Mode Fiber (MMF) that is of sufficient length to reach from the CAP M2 to the Classic CAN or TEN.
  - Per the installation plan, obtain 50Ω coaxial cables that are of sufficient length to reach from the CAP M2 to the passive RF antenna. (The antenna must be 50Ω with a maximum gain of 15 dBi.) The end of the 50Ω coaxial cable that will connect to the ANT connector can be either a push-pull connector or a threaded connector.
- Obtain SFP+ Module pairs that are appropriate for this installation.

- Obtain the Mounting Kits for the installation. See [Wall Mount Kits](#).

# Chapter 4

## Mount The CAP M2

A CAP M2 is suitable for indoor and outdoor installations.

Mounting instructions are divided into the sections listed below. Follow the mounting instructions that are applicable to this installation:

- [Wall Mount a CAP M2](#)
  - [Mounting Orientation for Wall Mounts](#)
  - [Mounting CAP M2 with a Wall Mounting Kit](#)
  - [Mounting a CAP M2 with a Hybrid Fiber Splice Box Kit \(optional\)](#)

## General Mounting Cautions

The following cautions apply to all CAP M2 installations; there may be other mounting cautions applicable to a specific mounting option, which will be defined in the applicable mounting procedure.



**Note:** ⚠ Attach all CAP M2 securely to a stationary object as described in this installation guide.



**Note:** ⚠ To maintain proper ventilation, keep at least 76 mm (3-inch) clearance around the CAP M2.



**Note:** ⚠ The installation site must be able to bear the weight of the CAP M2; see [Maximum CAP M2 Installation Weights](#).



**Note:** ⚠ Do not paint the CAP M2 or antenna.



**Note:** ⚠ Do not mount the antenna on conductive surface as it may change RF propagation properties.



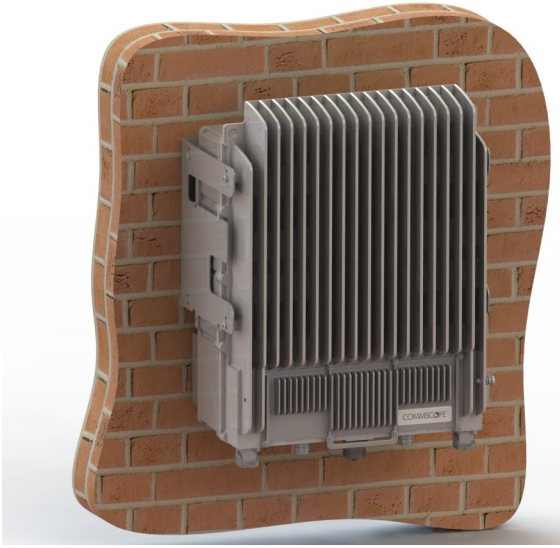
**Note:** ⚠ If mounted outdoors, all open/unused ports must be covered using IP rated caps for outdoor use. All connectors must be sealed.

## Wall Mount a CAP M2

The following sections provide the installation methodology and steps required to mount a CAP M2 to a wall.

### Mounting Orientation for Wall Mounts

When wall mounting a CAP M2, the recommendations should be observed. The correct orientation is when the antenna ports point downward and the CommScope label is located on the bottom right corner.

**FIGURE 9:** Wall Mounting Orientation for a CAP M2 (without fan unit)**FIGURE 10:** Wall Mounting Orientation for a CAP M2 (with fan unit)

## Mounting CAP M2 with a Wall Mounting Kit

The following sections provide the installation methodology and steps required to mount a CAP M2 to a wall.



**Note:** The CAP M2 must be installed with the antenna ports point downward. See [Mounting Orientation for Wall Mounts](#).

**TABLE 10:** Wall Mount Kits

| Part Number | Region | Quantity | Component                                                                |
|-------------|--------|----------|--------------------------------------------------------------------------|
| 7851781-00  | Non-US | 1        | Wall Mounting Bracket<br><b>Note:</b> Included with Non-US models CAP M2 |
| A7851753    | US     | 2        | Wall Mounting Bracket<br><b>Note:</b> Kit must be ordered from CommScope |

1. Use [Plan And Prepare For CAP M2 Installation](#) (page 20) to identify the installation site and installation requirements, and to prepare for the installation.
2. Refer to and observe all cautions listed in [General Mounting Cautions](#).
3. Determine the mounting orientation of the CAP M2. Refer to [Mounting Orientation for Wall Mounts](#) to determine the mounting orientation of the CAP M2.
4. Hold the wall mounting bracket on the wall where the CAP M2 will be mounted and mark the location of the holes on the wall.



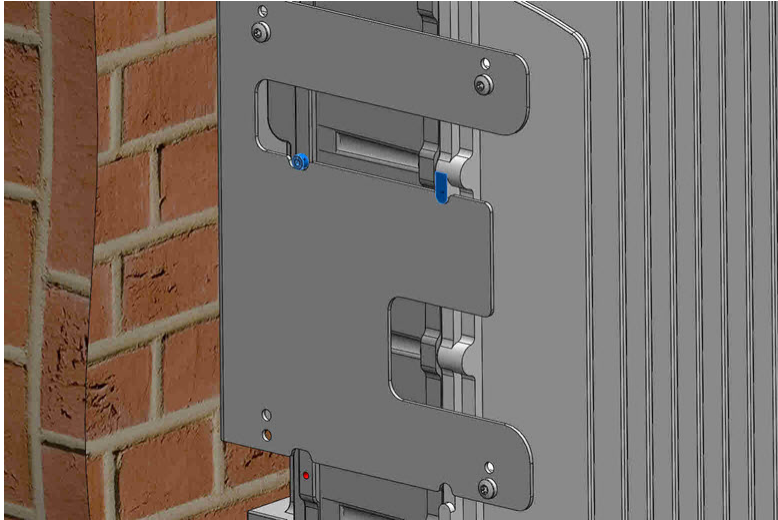
5. Secure the wall mount bracket to the wall, using four anchor screws.



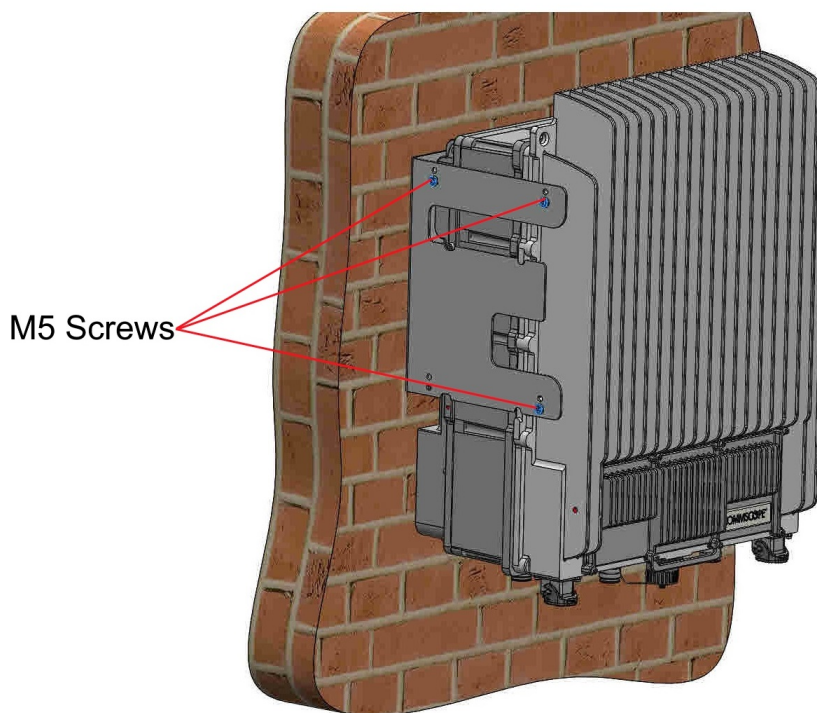
**Note:**  The anchor screws do not ship with the CAP M2 as the anchor type is dependent on the on-site conditions (wall structure and materials). Use screw anchors that are rated for the mounting surface.

The hole for the screws in the bracket is 7.5 mm in diameter and will accommodate screws between 5.8 mm and 7.5 mm.

6. Confirm that the Wall Mount Bracket is securely fastened to the wall.
7. Lift the CAP M2 onto the bracket and align the holes on the CAP M2 with the rear holes of the bracket, closest to the mounting surface. Ensure that the hanger tab is secure on the bracket.



8. Tighten the CAP M2 M5 screws, provided with the CAP M2, on both sides on the top and bottom at a Torq of 6.5 Nm.



9. Confirm that the CAP M2 is securely attached to the Wall Mount Bracket.
10. After you mount the CAP M2 on a wall, follow the steps in
  - [Ground the CAP M2 \(Optional\)](#) (if grounding is required)
  - [Connect the CAP M2 to a Passive RF Antenna](#)

# Mounting a CAP M2 with a Hybrid Fiber Splice Box Kit (optional)

The CAP M2 Hybrid Fiber Splice Box Kit (CommScope PN 7781091-xx) provides a connection solution for both power and optical signals to a CAP M2. For CAP M2s, you have the option to use composite cable to transport signals from a TEN or Classic CAN via fiber and power from a remote DC supply, and then use the CAP M2 Hybrid Fiber Splice Box Kit to terminate the power and fiber at the CAP M2.



**Note:** ⚠ The CAP M2 (without fan unit only) is designed to be supplied by two LPS (Limited Power Source, <100VA) circuits . By using LPS circuits, some electrical code requirements for installing the power cables are relaxed. The CAP M2 (without fan unit) supports a combined/parallel circuit approach. That is, two LPS circuits can be combined in parallel and the CAP M2 (without fan unit) supplied by a single, higher power source. In either configuration, all electrical and safety code requirements must be followed.



**Note:** ⚠ It is the responsibility of the customer/installer to observe the local regulations of the DC service provider and to comply with Limited Power Source (LPS) requirements where applicable.

## Prepare for CAP M2 Hybrid Fiber Splice Box Kit Installation

1. Follow the steps in [Unpack and Inspect the CAP M2 and Optional Accessories](#).
2. Refer to [Determine the CAP M2 Installation Site](#) to determine the mounting location, which must be able to support the weight and dimensions of the CAP M2.
3. Refer to [Mounting Orientation for Wall Mounts](#) to determine the mounting orientation of the CAP M2.

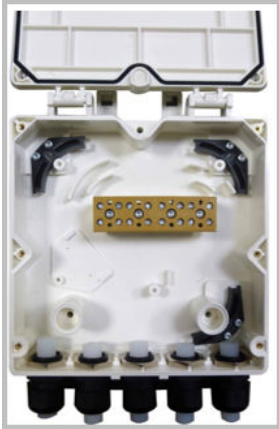
## Assembling and Wiring the Hybrid Fiber Splice Box

The following describes how to assemble the Hybrid Fiber Splice Box and then how to wire it to provide power to the CAP M2.

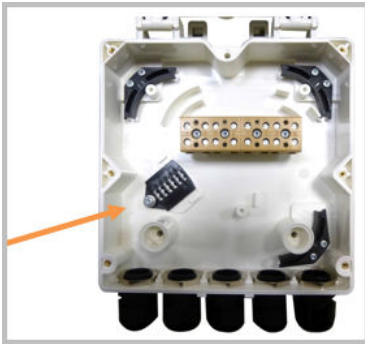
### Wire the Hybrid Fiber Splice Box

Do the following to assemble and wire the Hybrid Fiber Splice Box.

1. Open the Hybrid Fiber Splice Box and remove the installation kit that is inside.



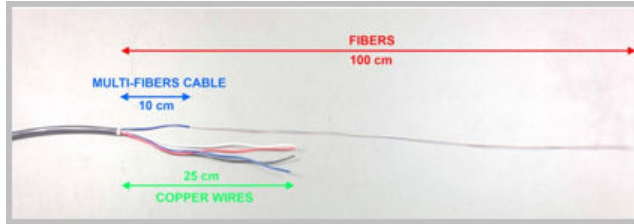
2. Using the parts from the Hybrid Fiber Splice Box, insert the Splice Holder and fasten it using a PTK 30x6 screw and one M4 washer.



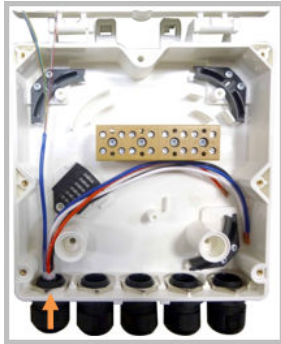
3. From the CAP M2 Hybrid Fiber Splice Box Kit, insert Fiber Patch Cord in one of the cable glands indicated in the graphic to the right.



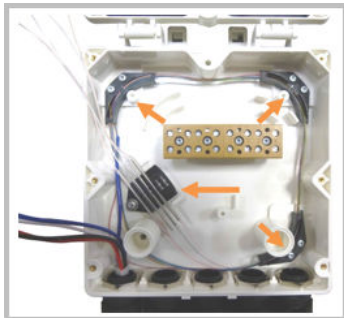
4. Strip the insulation of the composite cable for 100 cm and the fibers for 90 cm, and then shorten the copper cables to 25 cm.



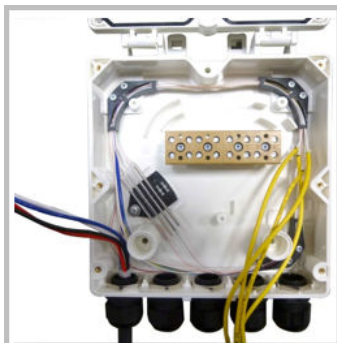
5. Insert the composite cable in the first cable gland and separate the multi-fibers cable from the copper wires. It is necessary to remove the nut to perform this action. The cable must be fed through the nut and it must be retightened once finished.



6. Bend the spliced fibers using the corner guides and fix the splices to the splice holder.



7. Bend the optical cables as shown in the picture to the right.



8. If a second splice holder is needed, it can be assembled using the M4 insulating washer and two M4 plain washers, as shown to the right. The required screw is a PTK30 x 12.



9. Remove the sealing nut and rubber of the cable gland and insert the optical cables.



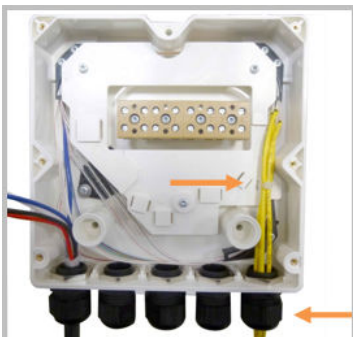
10. Place each cable into one of the grooves of the seal insert.



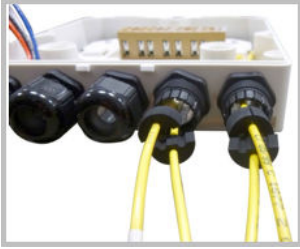
11. Press the seal insert into the clamp ring opening.



12. Fix the optical cables inside the box using one cable tie and tight the sealing nut.



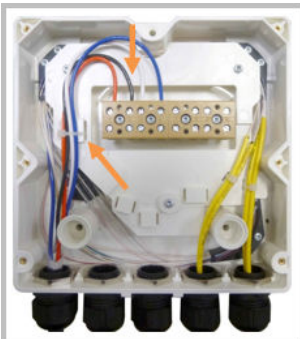
13. It is possible to separate the optical cables and use two different cable glands. Remove the sealing nut and rubber on each cable gland.



14. Close all unused grooves with the plastic cylinders, no matter if one or two cable glands are used.



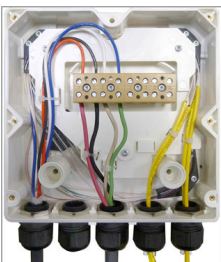
15. Insert the copper wires in the first multiple terminal connectors. See markings on the internal support. Then fasten the copper cables inside the box using one cable tie.



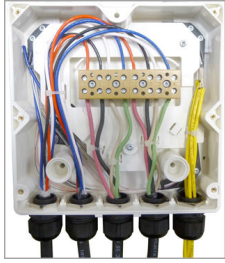
16. Remove the sealing nut and insert the CAP M2 supply cable and tighten the sealing nut.



17. Connect the supply cable to the terminal strip and fix it inside the box using one cable tie.



It is possible to connect a second supply cable to power two CAP M2s, as shown in the graphic to the right.



# Chapter 5

## Connect The Cables To The CAP M2

Complete the following procedures in the order in which they are presented.

1. [Ground the CAP M2 \(Optional\)](#) (page 37)
2. [Connect the Antenna](#) (page 41)
3. [Connect the Optical Fiber](#)
4. [Powering On A CAP M2](#) (page 45)



**Note:**  Do not remove protective caps from any of the connectors until instructed to do so.

## Ground the CAP M2 (Optional)

Follow the steps below to ground the CAP M2 only if grounding is required in your locality or if the installation plans require the CAP M2 be grounded. The different CAP M2 installation procedures will tell you when to ground the CAP M2.



**Note:** The CAP M2 is equipped with an M6 grounding stud located on the back of the unit; however, grounding is not necessary. CAP M2s are classified as low-voltage devices. CommScope recommends checking your local and national electrical codes to determine if grounding is a requirement.

Do the following to ground a CAP M2.

1. Obtain a length of #18 AWG (1.00 mm) insulated stranded copper wire for use as a chassis-grounding wire.
2. Terminate one end of the wire with a ring terminal.
3. Locate the chassis-ground stud at the rear of the enclosure.
4. Remove the Keps nut from the chassis-ground stud.
5. Attach the ring end of the wire to the chassis ground stud on the bottom, right side of the CAP M2, as shown in the graphic below.



6. Use the Keps nut removed in [Step 4](#) (page 37) to secure the ground wire to the chassis-ground stud.
7. Route the free end of the chassis grounding wire to an approved (per local code or practice) earth ground source.

## Connect the CAP M2 to a Passive RF Antenna

The following sections guide you through connecting the CAP M2; complete these procedures in the order in which they are presented.

1. [Clean the RF Cable Connectors](#)
2. [Connect the Passive RF Antenna](#)

### Clean the RF Cable Connectors

This section tells you how to clean RF cable connectors. The graphics in this section illustrate the cleaning procedure that is recommended prior to making optical and RF connections and applying power to the CAP M2.



**Note:** ⚠ This procedure requires the use of compressed air. Wear protective clothing—especially protective glasses—to protect against injury from flying particles.



**Note:** ⚠ This procedure requires the use of flammable material. There is a risk of fire. Keep away from sources of ignition.



**Note:** ⚠ This procedure requires the use of eye irritant product. There is a risk of eye irritation. Avoid contact with eyes and skin. Wear protective clothing—especially protective glasses.



**Note:** ⚠ The CAP M2 must be powered down for this procedure.

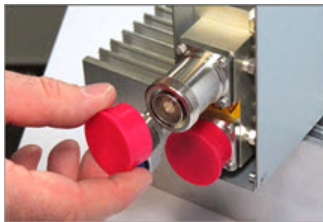
Do the following to clean the RF cable connectors.

1. Gather the following cleaning tools:
  - Isopropyl alcohol

- Compressed air
- Lint-free wipe
- Cotton buds.



2. Remove the protective cap from the RF connector.



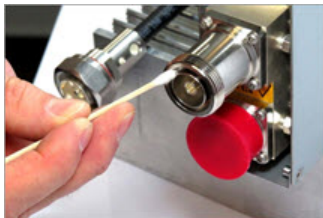
3. Use compressed air to remove metal chips and small particles from the mating and inner surfaces of the connector.



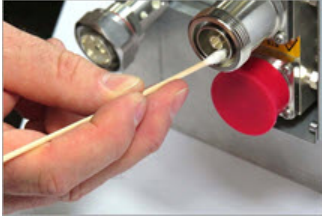
4. Use a lint-free wipe drenched with isopropyl alcohol to clean the connector winding.



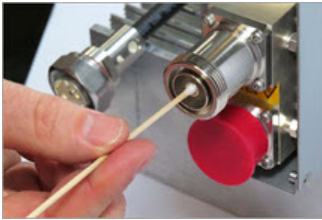
5. Use a cotton bud drenched with isopropyl alcohol to clean the lip of the inner ring.



6. Use a cotton bud drenched with isopropyl alcohol to clean the inside surface of the inner ring.



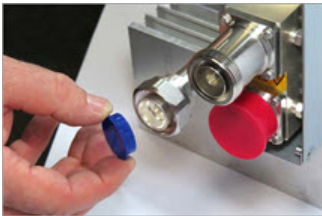
7. Use a cotton bud drenched with isopropyl alcohol to clean the inside of the center conductor spring tines.



8. Remove the protective caps from the unit connector, and then clean it the same way that you cleaned the cable connector.



**Note:** Cover the clean connector with a clean protective cap to prevent dirt or other particles from getting on the connector when using compressed air on other connectors.



9. Use compressed air to remove metal chips and small particles from the mating and inner surfaces of the connector.



10. Use a lint-free wipe drenched with isopropyl alcohol to clean the winding area.



11. Use a cotton bud drenched with isopropyl alcohol to clean the inside mating surface of the inner ring.



12. Use a cotton bud drenched with isopropyl alcohol to clean the outside surface of the center pin.



**Note:** Use caution while cleaning around the center pin; it may bend causing damage or cause signal degradation.



## Connect the Antenna

This table shows the antenna mapping for the CAP M2s.

**TABLE 11:** CAP M2 Antenna Mapping

| Band   | ANT 1 | ANT 2 | ANT 3 | ANT 4 |
|--------|-------|-------|-------|-------|
| C-Band | MIMO1 | MIMO2 | MIMO1 | MIMO2 |
| 35LT   | MIMO1 | N/A   | MIMO2 | N/A   |
| 35HT   | N/A   | MIMO1 | N/A   | MIMO2 |
| 34T    | MIMO1 | N/A   | MIMO2 | N/A   |
| 37T    | MIMO1 | MIMO1 | MIMO2 | MIMO2 |
| 17E    | MIMO1 | MIMO2 | N/A   | N/A   |
| 19     | MIMO1 | MIMO2 | N/A   | N/A   |
| 23     | MIMO1 | MIMO2 | N/A   | N/A   |
| 25T    | MIMO1 | MIMO2 | N/A   | N/A   |

Do the following to connect a CAP M2 to a passive RF antenna.

For antenna specifications, see [Obtain the Required Materials](#).

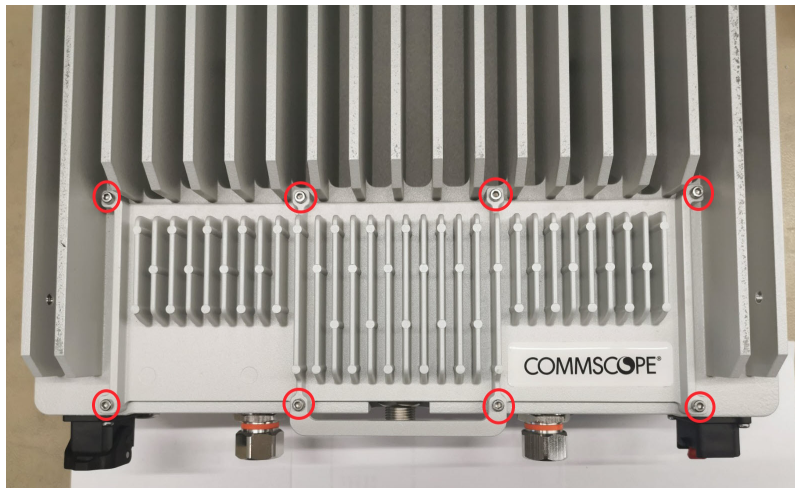
1. Connect the CAP M2 ANT 1, ANT 2, ANT 3 or ANT 4 connector to a passive RF antenna.
  - a. Locate the 50Ω coaxial cables obtained for this installation; see [Obtain the Required Materials](#).
  - b. Install the cable and passive antennas per the manufacturer's installation instructions.
  - c. Remove the IP67/EMI blank plug from the ANT 1/2/3/4 connector.

- d. Connect the passive antenna to the ANT 1, ANT 2, ANT 3 or ANT 4 connector.
  - If the 50Ω coaxial cable has a push-pull connector, make sure the cable is seated firmly in the ANT 1, ANT 2, ANT 3 or ANT 4 connector.
  - If the 50Ω coaxial cable has a threaded connector, torque the connector 5 N-m (3.69 ft-lb). Do not over-tighten the connector.
2. If necessary, repeat [Step 1](#) (page 41) to connect a 50Ω coaxial cable to the other ANT connector.

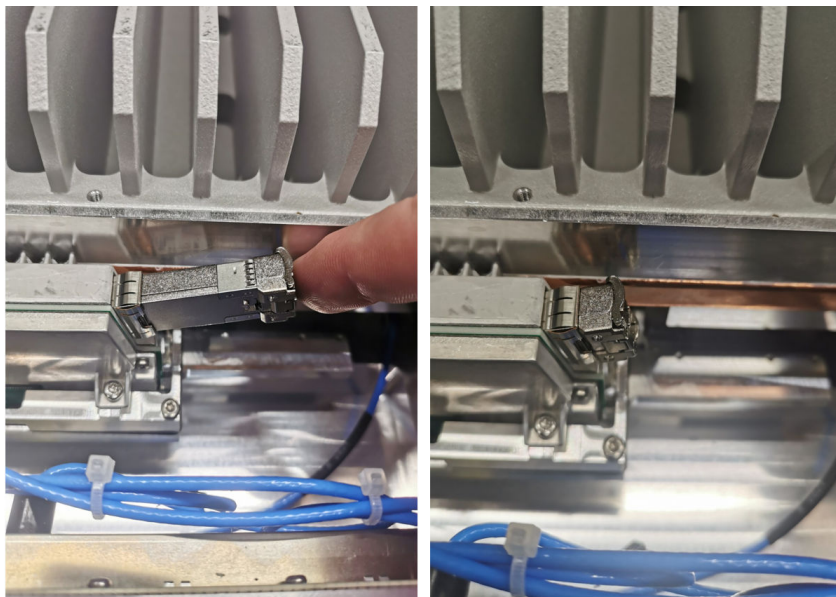
## Connect the Optical Fiber

Connecting the optical fiber cable requires removing the CAP M2 cover on the bottom of the AP and installing the SFP+ modules. See [SFP+ Module Kits](#) for more information.

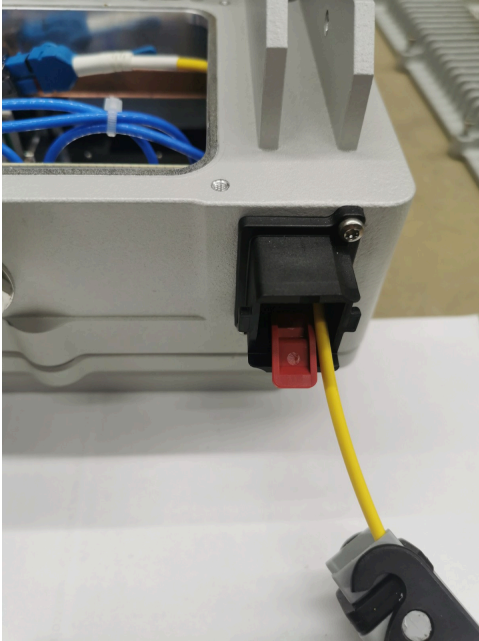
1. Loosen the eight torque screws on the cover located at the bottom of the CAP M2.



2. Insert the SFP+ module into the port as shown below.

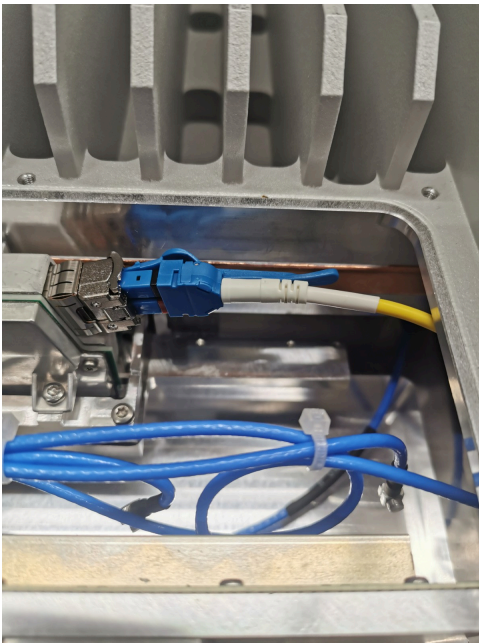


3. Feed the cable through the CAP M2 port, as shown below, and assemble the OCTIS LC Universal connector (see [Figure 4: OCTIS Universal Lever Assembly Instructions](#) (page 19)) and insert it into the CAP M2 port.



**Note:** If installing a CAP M2 with the CAP M2 Hybrid Fiber Splice Box Kit (PN 7781091-xx), the optical fiber will be hanging from the Hybrid Fiber Splice Box.

4. Connect the LC connector to the SFP+ module inside the CAP M2.



5. Replace the cover on the CAP M2. Repeat [Step 2](#) (page 42) through [Step 4](#) (page 43) for Optical Port 2, if it is being used.



**Note:** Ensure that the fiber connecting the CAP M2's SFP Tx is connected to the CAN/TEN's SFP Rx and the CAP M2's SFP Rx is connected to the CAN/TEN's SFP Tx.

6. Connect the other end of the SMF or MMF to an open port on an OPT Card installed in Slots L1-L4 in the TEN or Classic CAN. WCS Slots L5-L8 cannot be used to connect APs.



**Note:** If both fiber connections are used, they must be to adjacent ports on the same OPT card. Lowest OPT card port number must be linked to the first CAP M2 link (Port 1) Highest OPT card port number must be linked to the second CAP M2 link (Port 2).

7. Go to [Powering On A CAP M2](#) (page 45).

# Chapter 6

## Powering On A CAP M2

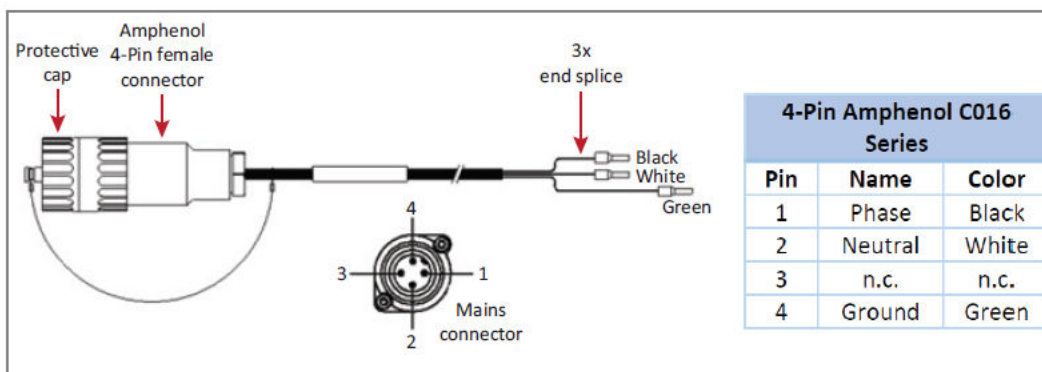
-  **Note:** ⚠ The CAP M2 is powered on as soon as power is connected to it. If the CAP M2 requires grounding, stop and complete the steps in [Ground the CAP M2 \(Optional\)](#), before proceeding.
-  **Note:** ⚠ CAP M2 APs require a minimum 120 Volt / 15 Amp or 240 Volt / 13 Amp, single-phase, 50 / 60 Hz AC service. MAINS power must be interruptible with an external delay-actions mains breaker. CommScope recommends external AC breakers capable of at least 15 Amps maximum for 120-Volt service or at least 13 Amps for 240-Volt service. One type B breaker can support up to two CAP M2 units, and a type C breaker can support up to four CAP M2 units.
-  **Note:** ⚠ For the AC power supply connection, a minimum cross section of 1.5 mm<sup>2</sup> is required and for the DC power supply connection, a minimum cross section of 2.5 mm<sup>2</sup> is required. Each wire must observe the applicable local regulations regarding loop impedance, voltage drop, and methods of installation. Make sure to connect the correct voltage to the CAP M2.

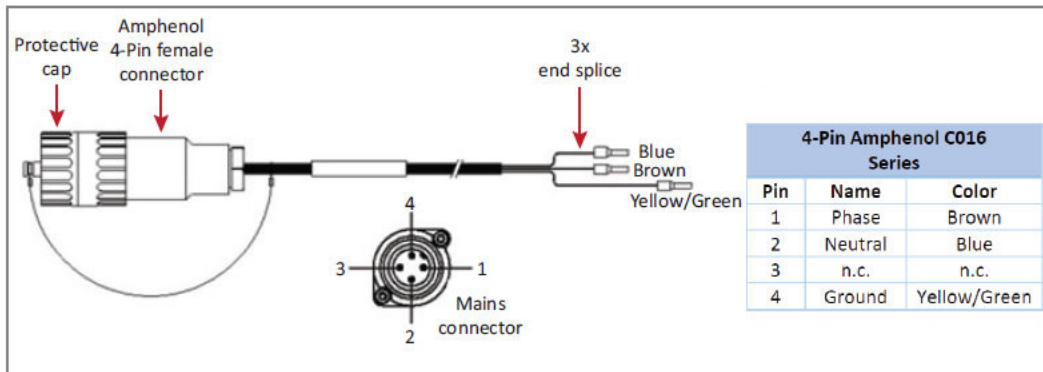
For the CAP M to operate, the Mains power must be connected to the CAP M Mains connector. Either an AC or a DC power cable is delivered with each CAP M—the type of power cable delivered is dependent on the type of power supply in the CAP M.

## CAP M2 AC Power Cable

The AC power cable is a 3.2 m (10.5 ft) 16 AWG cable with a 4-pin Amphenol C016 series plug on one end to connect to the CAP M Mains connector. The other end of the cable is unterminated with 3 end splices to connect to the AC power source. A 10 m (33.7 ft) AC power cable is also available as an option. The AC power cables for US and EU are shown.

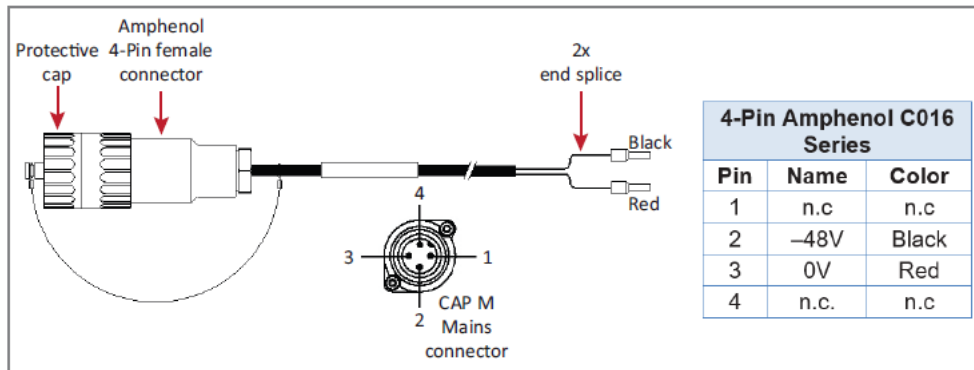
**FIGURE 11:** CAP M2 AC Power Cable US



**FIGURE 12:** CAP M2 AC Power Cable EMEA

## CAP M2 DC Power Cable

The standard CAP M2 DC power cable is a 3.2 m (10.5 ft) 13 AWG cable with a 4-pin Amphenol C016 series plug on one end to connect to the CAP M2 Mains connector. The other end of the cable is unterminated with 2 end splices to connect to the -48 Vdc power source. The standard DC power cable is shown in the figure.

**FIGURE 13:** CAP M2 DC Power Cable

## Connect the CAP M2 Power



**Note:** ⚠ Do not connect or disconnect the power cable at the Mains connector while power is on. Turn off Mains power before connecting the power cable at the unit, then, engage mains power again.

Connect the Power connector as appropriate for this installation. See [Connect the Mains Power to the CAP M2](#)

## Connect the Mains Power to the CAP M2

1. Locate the Mains power cable that was delivered with the CAP M2.

2. Locate or install a suitable power junction box or receptacle near the unit and route the power cable from the power source to the CAP M2.

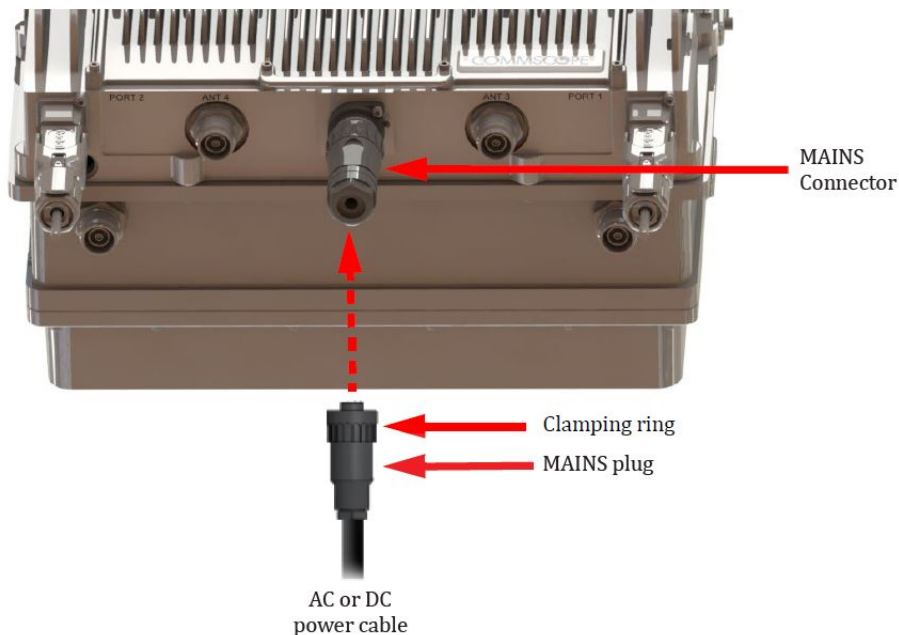


**Note:** ⚠ Do not connect the cable to the unit's Mains connector at this time. The power source must be interruptible.



**Note:** ⚠ The Mains cable must be properly secured observing local regulations and electrical codes. Be sure to allow enough slack in the cable at the CAP M2 to plug or unplug the cable into the Mains connector.

3. Dependent on the type of power supply used by the unit, wire the power cable to the junction box, hybrid splice box, or receptacle. Refer to the color code and pin numbers shown in:
  - [Figure 11](#) / [Figure 12](#) for the US or EMEA AC power cables
  - [Figure 13](#) for the DC power cable.
4. With the cable's Mains plug disconnected from the CAP M, turn the circuit breaker on, unscrew the plug's protective cover, and carefully test the plug with a voltmeter to ensure that the voltage and polarity are correct.
5. Once the testing has been completed, turn off the circuit breaker.
6. Unscrew the protective cover from the Mains connector of the unit.
7. Insert the AC or DC power cable into the Mains connector as shown below; tighten the clamping ring until it is hand tight. Do not over-tighten the clamping ring.



## Power LED Behavior

The Power LED behavior for a CAP M2 is as follows:

- Steady Green – CAP/UAP is on and operational

- Slow Flashing Green – The CAP/UAP has been powered on and is initializing or if it is updating software.
- Fast Flashing Green – The CAP unit identifier is active via the Flash LED function in the Era GUI.
- Slow-Flashing Red – The Era GUI is reporting a critical alarm for the unit. The CAP can be recovered without replacing hardware.
- Steady Red – The Era GUI is reporting a critical alarm for the unit. The CAP or CAP component (e.g SFP+ module) must be replaced.

# Chapter 7

## Maintenance

Maintenance of the CAP M2 and replacement of components should only be performed as described in this section.

For most maintenance procedures, appropriate tools are required to ensure correct handling. All of these tools can be ordered from the supplier.

Unless otherwise agreed to in writing by CommScope, CommScope's general limited product warranty (<http://www.commscope.com/Resources/Warranties/>) shall be the warranty governing the CAP M2, including its installation, maintenance, usage and operation.

## Rules to Observe During Maintenance

Adhere to all cautions and warnings listed in the following sections:

- [Health and Safety Precautions](#)
- [Property Damage Warnings](#)
- [Guard Against Damage from Electro-Static Discharge](#)
- [General Installation Safety Requirements](#)



**Note:**  The unit reaches high temperature in operation. Risk of burns by hot surface. Do not touch the unit before it has sufficiently cooled down.



**Note:**  Disconnect the CAP M2 from mains power before starting any maintenance.



**Note:**  To maintain the warranty, avoid unintentional damage to the seals on the modules.



**Note:**  If a CAP M2 must be returned to CommScope or your local sales office, use appropriate packaging. Use of the original packaging for shipping the unit is strongly recommended.



**Note:**  Defective parts should only be replaced by original parts from the supplier. All service work performed inside the housing is performed at the users own risk.



**Note:**  Due to the CAP M2 design, the Fan Unit is the only component that should be replaced in the field. The fan part number is 7856684-xx. Contact the supplier for replacement of any other components.

# Routine Maintenance of the CAP M2

Check the cleanliness of the CAP M2—in particular its heat sink / fan(s)—at appropriate intervals depending on the degree of dust and dirt at the installation site. If necessary, any dusty or dirty areas / parts should be cleaned at regular intervals, which is also dependent on the degree of dust and dirt at the installation site.

## Replacing the Fan Unit

Replacement of the Fan Unit is not required as a preventative measure. you should only replace the fan when an alarm indicates that the fan is malfunctioning or when to directed to do so by CommScope.



**Note:** ⚠ Rotating fans. Risk of injury in operation. Wear tight-fitting clothes and disconnect mains before connecting or replacing or cleaning the Fan Unit.



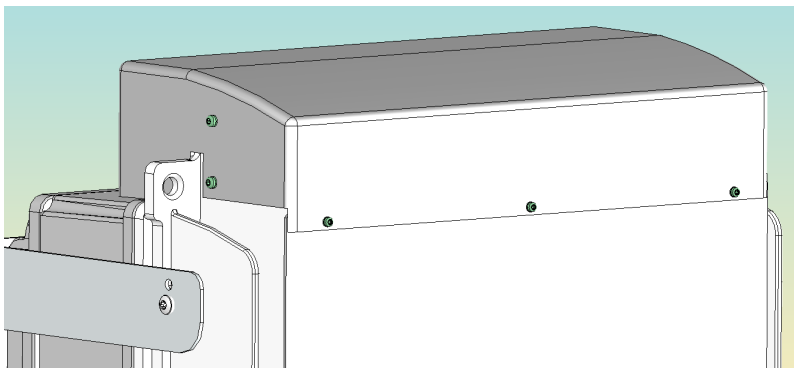
**Note:** ⚠ The Fan Unit (Part Number 7856684-xx) can only be replaced as a whole. Do not remove the fans separately.



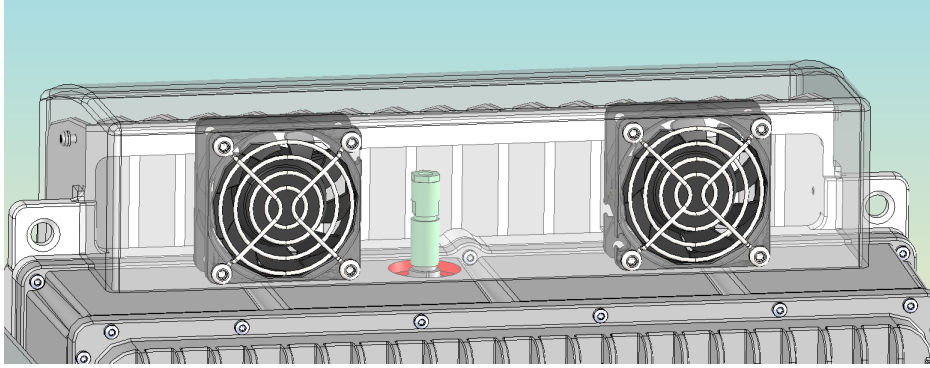
**Note:** All CAP M2 screws have a right-hand thread. Use an appropriate tool to tighten or loosen them. Turn the screws clockwise to tighten them and turn them counter-clockwise to loosen them.

Do the following to replace the Fan Unit:

1. Adhere to all cautions and warnings listed in [Rules to Observe During Maintenance](#) and at the start of this section.
2. Label any unlabeled cables before disconnecting them to ensure correct reconnection.
3. Disconnect the CAP M2 from mains power and make sure it is powered down before proceeding.
4. Unscrew the Pan-head screws (overall 7screws, 2 each side + 3 at the front):



5. Remove the fan cover.
6. Do the following to remove the Fan Unit:
  - a. Unscrew and disconnect the fan connector.
  - b. Pull the Fan Unit from the CAP M2 chassis.



7. Do the following to install the new Fan Unit:
  - a. Insert the new Fan Unit into the CAP M2 chassis.
  - b. Use the four Pan-head screws that you removed in step [Step 6](#) (page 50) to secure the new Fan Unit to the CAP M2 chassis.
  - c. Connect the fan connector and take care for proper fastening to ensure waterproof connection.
  - d. Insert new Fan unit onto the chassis.
  - e. Screw on with all 7 screws
  - f. Replace the Fan Unit cover that was removed in [Step 4](#) (page 50) and [Step 5](#) (page 50).
8. Reconnect the CAP M2 to mains power and make sure it is powered on.

# Contacting CommScope

This chapter tells you how to contact CommScope for additional information or for assistance.

## DAS and Small Cell Technical Support

The following sections tell you how to contact the DAS and Small Cell Technical Support team. Support is available 7 days a week, 24 hours a day.

### Telephone Helplines

Use the following Helpline telephone numbers to get live support, 24 hours a day:

|                          |                                                                                                           |
|--------------------------|-----------------------------------------------------------------------------------------------------------|
| 24x7                     | +1 888-297-6433 (Toll free for U.S. and Canada)                                                           |
| EMEA 8:00-17:00 (UTC +1) | + 800 73732837 (Toll free for parts of EMEA and Australia)                                                |
|                          | + 49 909969333 (Toll charge incurred)                                                                     |
|                          | Calls to an EMEA Helpline outside of the 8:00 to 17:00 time frame will be forwarded to the 24x7 Helpline. |

### Online Support

To go to the CommScope Wireless Support Request web site from which you can initiate a Technical Support ticket, do one of the following:

- Scan the QR Code below.



- If viewing this document online as a PDF, click on the following URL link: <http://www.commscope.com/wisupport>
- Enter the preceding URL into your web browser, and then press **ENTER** on your keyboard.

## Waste Electrical and Electronic Equipment Recycling

Country specific information about collection and recycling arrangements per the Waste Electrical and Electronic Equipment (WEEE) Directive and implementing regulations is available on CommScope's website. To access information on the CommScope recycling program, do any of the following:

- Scan the QR Code below.



- If viewing this document online as a PDF, click on the following URL link: <http://www.commscope.com/corporate-responsibility-and-sustainability/environment/weee-customer-recycling/>
- Enter the preceding URL into your web browser, and then press **ENTER** on your keyboard.

## Hardware to Software Mapping Information

1. To view or download the minimum software requirements for each of the DCCS hardware modules, do one of the following:
  - Scan the QR code.



- <https://www.commscope.com/resources/in-building-wireless/era>
2. Click on a document link to open it, or right click on the link and select the **Save target as...** option from the contextual menu.

## DAS and Small Cell Technical Training

1. To access training on the online technical training site, please use the following web address or scan the



QR code to the right: <https://commscopeuniversity.com>

2. Once you have logged in, you can search for training by typing search words in the **Search** bar or by going to the **Catalog** page to view the available courses.
3. Instructor-led courses are conducted in North America and Europe. Before choosing a course, please verify the region.
4. For training related questions, please contact us: [icn\\_training@commscope.com](mailto:icn_training@commscope.com)

## Accessing ERA User Documentation

1. Access to the Customer Portal requires a user account. If you don't have an account:
  - a. Visit My Commscope at <https://www.mycommscope.com>.
  - b. Click New User Registration and follow the prompts.
  - c. After you've registered in My CommScope, click the Request Additional Access button and select the DAS and Small Cell Customer Portal from the list of applications.

2. Scan the QR Code below to go directly to the DAS and Small Cell Customer Portal.



Alternatively, visit MyCommScope and use the DAS and Small Cell Customer Portal Application.

3. In Tools and Documentation, search by product, document category or title.
4. Click on the title of any document to open it.



