

**GENERAL INFORMATION**

1. The HX WCS remote is an upgrade unit and is installed in conjunction with an existing HX and/or MA1000/MA2000 remote. In installations with an MA1000/MA2000 remote, an external passive module (EPM) is required (ordered separately).
2. The HX WCS indoor unit can be installed in a 19-in communication rack or mounted on the wall (dedicated brackets are provided for both mounting options).
3. The units are maintenance-free. In the event of failure, only authorized personnel should handle the units.
4. Only trained and qualified personnel should be allowed to install or replace this equipment.
5. Verify that ambient temperature of the environment does not exceed 65°C (149°F).

This document describes the installation procedure of the HX WCS indoor remote unit.

**1. PACKAGE CONTENTS**

The following items are required for installing the HX WCS. Please verify that the items listed below are included in your kit packages. If any of the listed items are missing, contact your Corning representative.

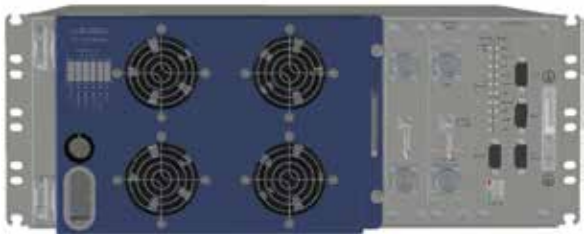


Item	Qty	Image
HX WCS Remote Unit: <ul style="list-style-type: none"> <li>• HX-WCS-SISO-NU*</li> <li>• HX-WCS-SISO-PLUS*</li> <li>• HX-WCS-MIMO**</li> </ul> <p><i>*SISO models include one HX-WCS module and one slot cover (blank panel for unoccupied HX-WCS module MIMO slot).</i>  <i>**MIMO models include two HX-WCS modules.</i></p>	1	
19-in Rack Brackets (factory assembled) – for rack-mount installations (default)	2 (RT/LT)	
Flat Head Screw UNC 6-32, 5/16-in (8 mm); stainless steel	12	
Wall-Mount Bracket Assembly (belly-to-wall)	2 (RT/LT)	
Pan Head Screw Sems UNC 6-32, 7/16-in (11 mm); stainless steel; used for securing bracket to HX sides	20	

Table 1. HX WCS Kit Contents

## 2. HX WCS PLOT PLAN

The HX WCS unit consists of the following main modules:

- Remote Control Unit (RCU) – Includes status LEDs for each module as well as control ports.
- HX-WCS MUX – Multiplexer (ANT. 1 MUX [right] for SISO; ANT. 2 MUX [left] for MIMO) includes interfaces to RF antennas and to an additional HX unit; combines signal sources' additional external RF signals (when connected to HX unit) while providing the proper filtering into a single antenna port.
- HX Module – Internal module (ANT. 1 [right] for SISO; ANT. 2 [left] for MIMO) interfaces to the optical converter unit (base unit), connects via a single-mode fiber pair, and supports one service. The HX WCS module provides the additional amplification on the DL signals routed from the base unit toward the multiplexer.
- Power Supply – DC power

The unit plot plan is provided on the left side of the enclosure door.

## 3. MOUNT THE HX REMOTE UNIT

Rack-mountable installation – refer to Section 3a.

Wall-mountable installation – refer to Section 3b.

Vertical (back-to-wall) – kit ordered separately.

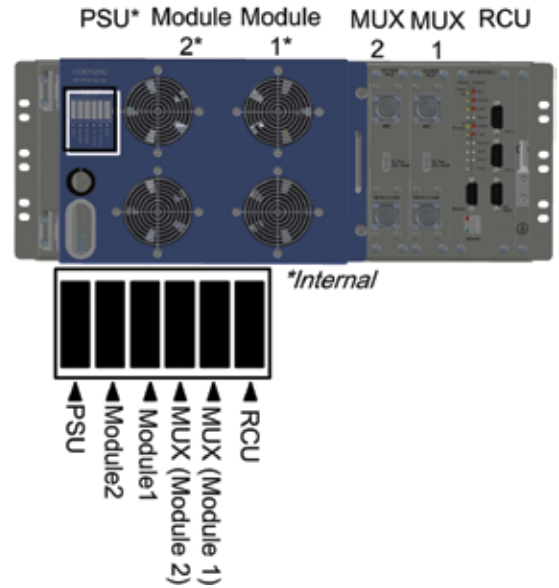


Figure 1. HX WCS Plot Plan

### 3a. RACK-MOUNTABLE INSTALLATION

**Notes:**            *The HX requires 4U rack height availability.*  
*Rack nuts and screws not provided (depend on rack type).*  
*If the HX WCS unit is to be installed with an existing MA1000/2000 remote, the EPM (1U) should be installed between remote units in order to facilitate the connections.*

**Step 1:**            Determine the location of the HX in the rack – in installations with HX tri-band/quad-band units, install above/below as so to facilitate the “Expansion” connections. See Figure 2 for rack installation example.

**Step 2:**            Secure the unit to the communication racks’ vertical uprights as follows (see Figure 3):

- Insert two screws halfway into the rack frame.
- Lift the unit using the side handles and position the bottom half slots of the rack ears onto the screws.
- Secure the unit in the rack via the remaining applicable six bracket holes using the appropriate rack nuts and screws.

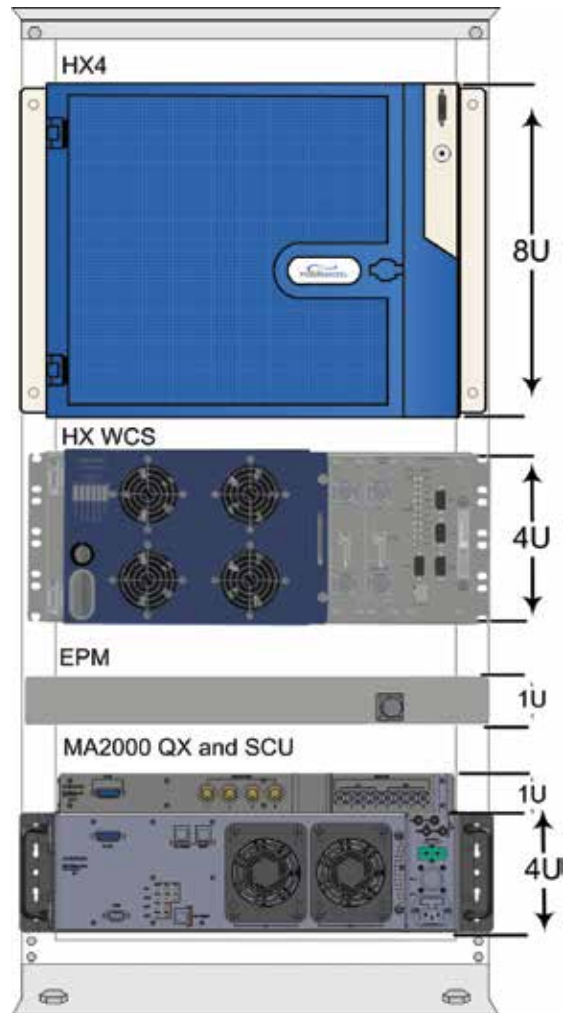


Figure 2. Examples of HX WCS Rack Mount with HX and MA2000 QX



Figure 3. Installing HX WCS in Rack

### 3b. WALL-MOUNTABLE INSTALLATION

**IMPORTANT:** The wall-mount installation procedures in this section are for concrete/brick walls. For other wall types, installer is responsible for following standard practices using the appropriate tools and materials.

When selecting the installation location, make sure that there is enough clearance distance from the bottom to open the HX WCS chassis door.

**Additional required tools and materials:**

- Phillips/electric screwdriver
- Six UNC 6-32, 5/8-in (15.8 mm) screws used for mounting EPM onto HX WCS
- Four anchors for mounting brackets on wall (anchor type depends on surface type).

**Step 1:** Remove the factory-assembled rack ears from the sides of the unit.

*Note:* If the HX WCS is to be installed in conjunction with the EPM, the latter must be assembled to the HX unit before mounting the unit on the wall – refer to Steps 2 and 3. If not, continue to Step 4.

**Step 2:** Six fixed holes on top of the EPM are used for mounting the unit onto the HX WCS. See Figure 4.

**Step 3:** Place the EPM onto the top of the HX WCS unit and, using six UNC 6-32, 5/8 (15.8 mm) screws, assemble the EPM onto the HX unit. See Figure 5.

**Step 4:** Using 10 UNC 6-32, 11 mm screws for each bracket (provided in HX kit), assemble the wall-mountable brackets to the sides of the HX WCS as shown in Figure 6.

**Step 5:** Referring to bracket hole dimensions in Appendix: Wall-Mountable Bracket Dimensions (units in mm), prepare the appropriate anchors and mount as follows:

- Mark four holes (minimum of two per bracket) on the wall for drilling the anchors.
- Drill four holes, using a hammer drill.
- Fill the holes with silicon to help weatherproof the drilled holes and to prevent erosion.
- Tap in expanding lead shield anchors.



Figure 4. Location of Fixed Holes on EPM



Figure 5. Assembled EPM and HX WCS

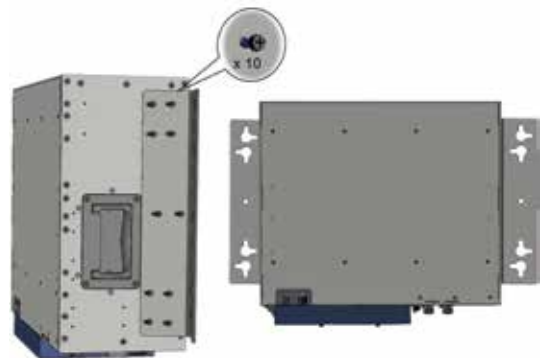


Figure 6. Wall-Mountable Bracket Assembly

- Step 6:** Insert two bolts in top anchors and tighten until bolt head is 0.5 in from surface of wall. See Figure 7.
- Step 7:** Hang the unit and bracket assembly onto the two bolts using the key holes.
- Step 8:** Insert remaining bolts (two on each side) through remaining bracket holes into anchors.
- Step 9:** Tighten all four bolts.
- Step 10:** Verify that HX unit is tightly secured and does not shake.

Refer to Figure 8 for HX WCS wall-mountable examples with additional MA2000 remote.

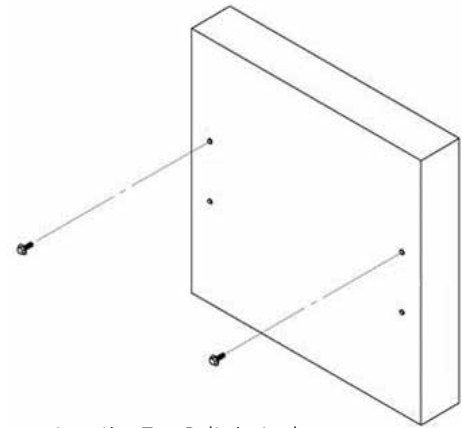


Figure 7. Inserting Two Bolts in Anchors

## 4. GROUNDING CONNECTIONS

### Required tools and components:

The following additional (not supplied) tools and components are required for connecting the system ground:

- Grounding wire should be sized according to local and national installation requirements. The provided grounding lug supports 14 to 10 AWG stranded copper (or 12 to 10 AWG solid) wire conductors.

*Note: The length of the grounding wire depends on the proximity to proper grounding facilities.*

- Phillips screwdriver
- Crimping tool to crimp the grounding wire to the grounding lug
- Wire-stripping tool to remove the insulation from the grounding wire

- Step 1:** Use a wire-stripping tool to remove approximately 0.4 in (10.9 mm) of the covering from the end of the grounding wire.
- Step 2:** Insert the stripped end of the grounding wire into the open end of the grounding lug.
- Step 3:** Crimp the grounding wire in the barrel of the grounding lug. Verify that the ground wire is securely attached to the ground lug by holding the ground lug and gently pulling on the ground wire.
- Step 4:** Prepare the other end of the grounding wire and connect it to an appropriate grounding point at the site to ensure adequate earth ground.

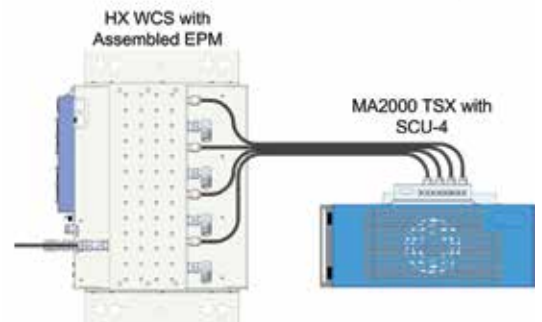
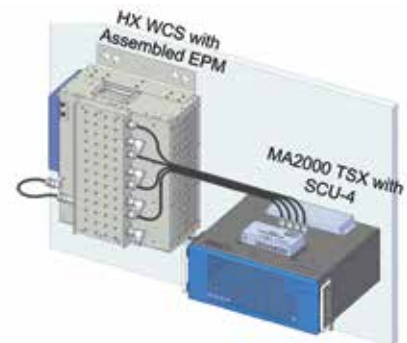


Figure 8. Example of HX WCS with Assembled EPM Alongside MA2000 TSX Remote

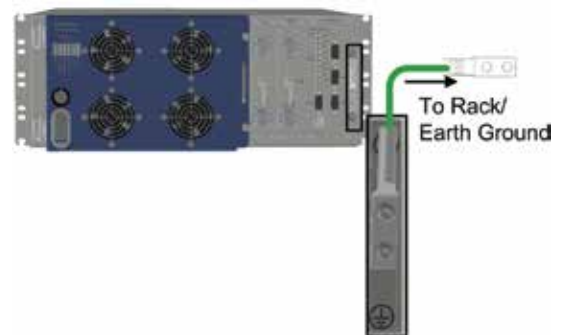


Figure 9. HX Rear – Grounding Lug Location

## 5. EXTERNAL ALARM CONNECTIONS

The HX WCS DB-9 “Ext. Alarm” connector supports up to four dry contact alarms for which the polarity field (normally open/normally close circuit) and severity are configured via the web management GUI (SC-450 v7.2 and higher). Refer to Figure 10 and Table 2 for connector pinout and description.

Pin	Description	Wire Color
1	+48 V Common	Red
2	Not connected	
3	Not connected	
4	Not connected	
5	Not connected	
6	-48 V Alarm Door	Black
7	-48 V Alarm HEX	Black
8	-48 V Alarm Future	Black
9	-48 V Exist Indication	Black

Table 2. External Alarm Connector Pinout Description

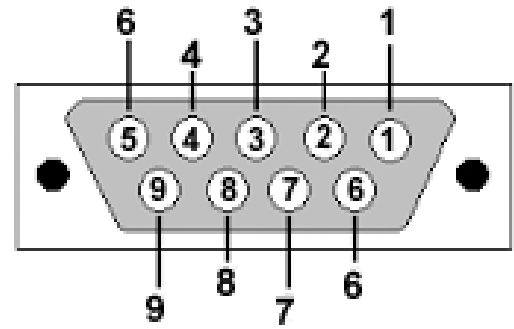


Figure 10. HX WCS External Alarm Connector Pinout



## 6. RF AND FIBER CONNECTIONS – WITH EXISTING HX

**Step 1:** Connect the HX WCS MUX “WB RU” 4.3-10-type duplexed RF port to the HX duplexed antenna port.

**Note:** For SISO installations, the connections are from HX WCS “ANT. 1 MUX” to HX “ANTENNA PORT 1.” For MIMO installations, additional connections are performed between HX WCS “ANT. 2 MUX” to HX “ANTENNA PORT 2.”

**Step 2:** Connect broadband antenna coax to ANT port of HX-WCS MUX module (two for MIMO models) and to broadband DAS antennas.

**Step 3:** Terminate any unused RF ports with a 50 Ohm termination load.

**Step 4:** Open the cabinet doors for both HX WCS and HX remotes to access optical fiber connection ports.

**Step 5:** Disconnect the fiber connection from the existing HX remote (from the base unit) and reconnect to the “From HE” SC APC optic port of the HX-WCS module (right ANT. 1 module for SISO and left ANT. 2 module for MIMO).

- Downlink: Connect the fiber optic cable pigtailed from splice box, which comes from the BU port, to the corresponding HX RU module (MIMO models include two service modules with fiber connections).
- Uplink: Connect the fiber optic cable pigtailed from splice box, which comes from the RU service module(s), to the uplink port that connects to the BU.

**Note:** Keep in mind the rules for handling and connecting fiber optic cables. The fiber optic cables will be connected to the associated BU in the communication room at a later phase.

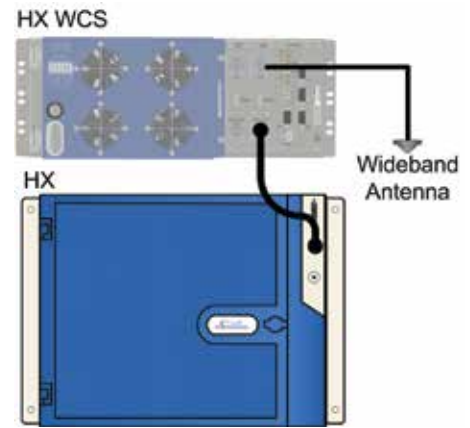


Figure 11. Example of RF SISO Connections Between HX WCS and Existing HX4

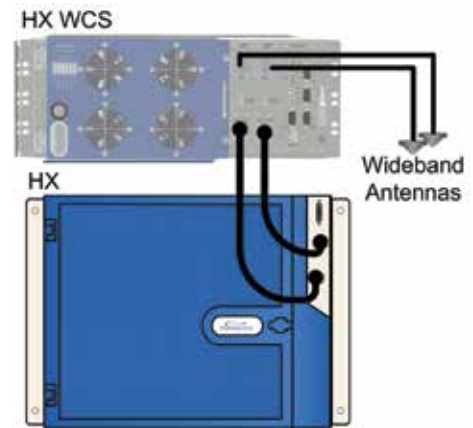


Figure 12. Example of RF MIMO Connections Between HX WCS and Existing HX4

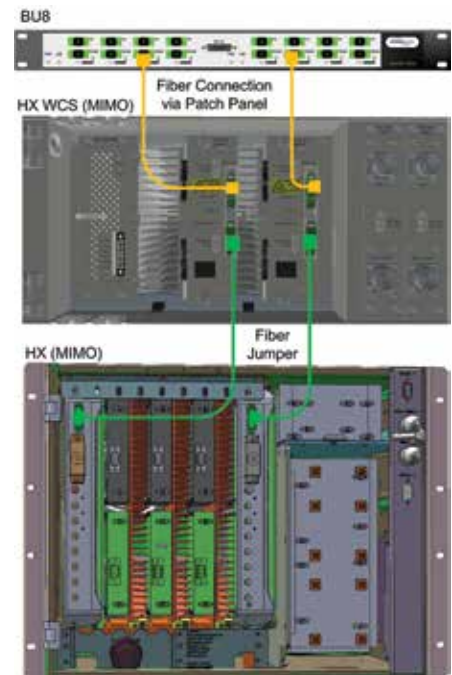


Figure 13. Example of HX WCS (MIMO) Fiber Connections to Existing HX

## 7. RF AND FIBER CONNECTIONS – WITH EXISTING MA1000/MA2000 REMOTE

*Note: The RF connections between the HX WCS unit and an MA1000/2000 remote require an EPM unit. Two EPMs are required for MIMO configurations (each one connects to an HX WCS “ANT.” Port).*

- Step 1:** Connect the HX WCS MUX “ANT” 4.3-10-type duplexed RF port to the EPM front panel high-band Mini DIN 4.3-10 input port. See Figure 14.
- Step 2:** Connect the four rear panel EPM low-band N-type input ports to the corresponding SCU N-type ANTENNA PORTS.
- Step 3:** Connect the four EPM rear panel Mini DIN 4.3-10 “ANT” output ports to the wideband antennas.
- Step 4:** Open cabinet door to access HX WCS module(s) with the fiber optic interface, route the DL and UL fibers through the front door slot (see Figure 16), and connect as follows:
- Optical fiber connections to/from headend (BU):
    - Downlink: Connect the fiber optic cable pigtailed from splice box, leading from the BU port, to the corresponding HX WCS module “From HE” SC APC optical port (MIMO models include two service modules with fiber connections).
    - Uplink: Connect the fiber optic cable pigtailed from splice box, which comes from the HX WCS service module(s), “From HE” SC APC uplink port to the BU.
  - Using fiber optic jumpers, connect the HX WCS module “To RU” SC APC optical to the SC APC optical port of the MA1000/2000 remote unit.
- IMPORTANT:** Keep in mind the rules for handling and connecting fiber optic cables.

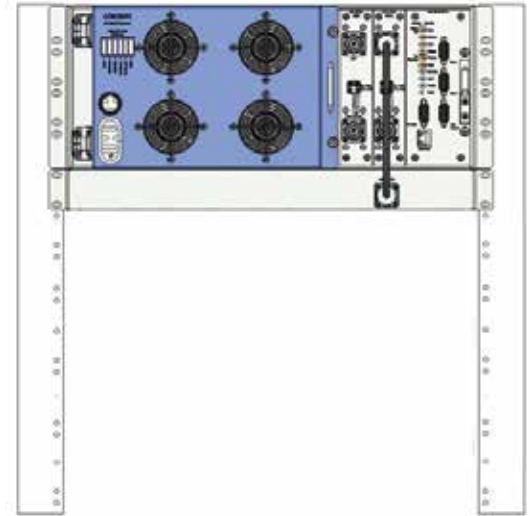


Figure 14. Example of Connection Between HX WCS and EPM

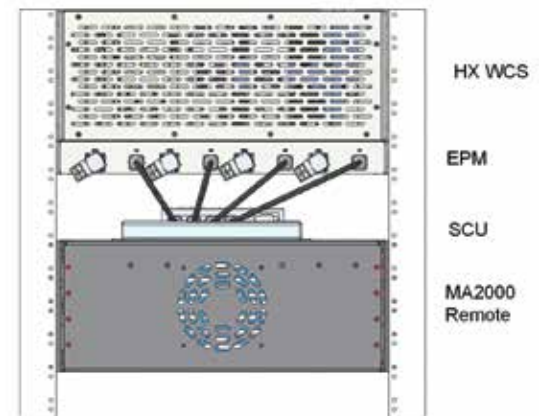


Figure 15. Example of Connection Between HX WCS and EPM

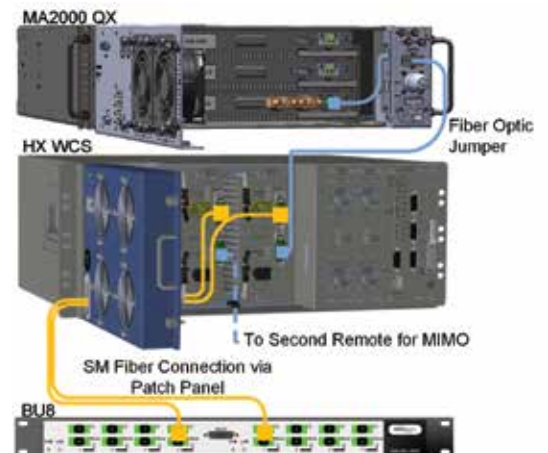


Figure 16. Example of HX WCS Fiber Optic Connections to BU and MA2000 Remote (MIMO)



## 8. POWER UP

**WARNING:** Before connecting or disconnecting ground or power wires to the chassis, ensure that power is disconnected from the DC circuit. To disconnect power, locate the circuit breaker on the panel board that services the DC circuit, and switch the circuit breaker to the OFF position. Verify zero voltage at the power terminals on the chassis before proceeding.

### DC power specifications

- Power source rating: 34-48 VDC
- Maximum consumption: SISO = 90 W; MIMO = 150 W
- Compatible wire size for plug: 30-12 AWG
- Number of required pairs: Minimum of two pairs (up to three)
- Maximum current consumption for connector: 20 AWG = 4.5 A (maximum 5 A)

**Step 1:** Make sure power switch is OFF!

**Step 2:** Open cabinet door, if not already open, to access power supply unit (PSU).

**Step 3:** Connect the DC wires leading from the power source to the Dinkle 2ESDFM terminal block plug according to indicated pinout on the PSU DC terminal block:

- Identify the positive and negative terminals on power source feed positions. The wiring sequence is positive to positive and negative to negative.
- Open the terminal block screw and insert appropriate feed into the terminal block plug.
- Torque the terminal block captive screw (above the installed wire lead) using a ratcheting torque screwdriver. Recommended torque is 0.49 N•m.
- Repeat above steps for all feeds.
- Insert the plug into HX WCS PSU DC terminal block.



Figure 17. RF and Power Connections

## 9. VERIFY NORMAL OPERATION STATUS OF HX VIA INTERNAL MODULES AND CABINET LEDs

Referring to Figure 18, verify that the HX LEDs appear as follows (indicating normal operation):

Module	LED	State
HX-WCS Module	BU Link	<p><b>Steady green</b> – optical link level is above normal threshold (optical link level is above -5 dBm)</p> <p><b>Blinking green</b> – low optical link level</p> <p><b>Off</b> – optical link level is below the no link threshold (optical link level is below -10 dBm)</p>
	Run	<p><b>Blinking green</b> – input power detected in module</p> <p><b>Off</b> – no power input</p>
	Remote Link <i>Note: Indicates link status between HX WCS and additional remote unit connected.</i>	<p><b>Off</b> – no optical link</p> <p><b>Blinking green</b> – low optical level</p> <p><b>Steady green</b> – normal optical level</p>
HX-WCS Power Supply Unit (PSU)	Run	<p><b>Steady green</b> – required power input detected</p> <p><b>Off</b> – no power input</p>
	PSU	<p><b>Off</b> – normal operation</p> <p><b>Steady red</b> – faulty PSU module; in more than 10 percent difference than the rated DC output, the red LED occurs</p>

Table 3. HX WCS PSU and Module LEDs

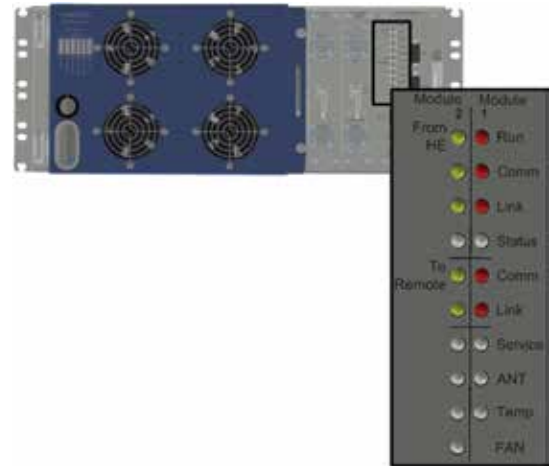


Figure 18. HX WCS (MIMO) Status LEDs

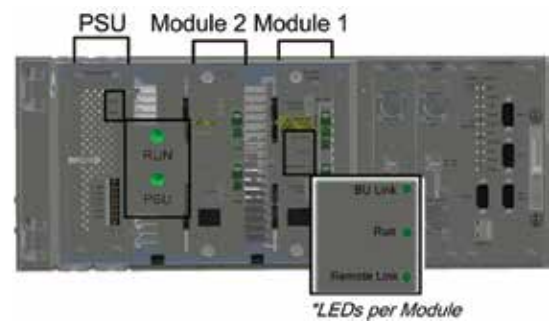


Figure 19. HX WCS PSU and Module LEDs

	LED	State	Description
From Headend (HE)	Run	Blinking green	Power input detected
		Off	Unit power is off
	Comm	Green	Short blink upon receiving FSK message (off at any other time)
		Steady green	Optical link level is above normal threshold
		Blinking green	Optical link level is lower than normal threshold but above no link threshold
Link	Off	Optical link level is below no link threshold	
	Status	Green/Yellow/Red	Color according to device's overall status
To Remote	Comm	Green	Short blink upon receiving FSK message (off at any other time)
		Steady green	Optical link level is above normal threshold
		Blinking green	Optical link level is lower than normal threshold but above no link threshold
	Link	Off	Optical link level is below no link threshold
Device	Service	Green	Service status is OK
		Red	Any service alarm is set
	Ant.	Green	VSWR alarm is clear
		Red	VSWR alarm is set
	Temp.	Green	Over Temp and Temperature Protection alarms are clear
		Red	Over Temp or Temperature Protection alarm is set
	Fan	Green	Fan alarm is clear
		Yellow	Fan alarm is set (minor) for first fan faulty
Red		Fan alarm is set (major)	

Table 4. HX WCS RCU Status LEDs

## 10. PERFORM ADJUSTMENT PROCEDURE VIA SC-450 WEB GUI

After the physical installation of the HX WCS is complete, it is recommended to perform the adjustment procedure.

*Note:* Refer to the SC-450 v7.2 user manual (and higher) for more details.

**IMPORTANT:** If the unit is installed using the existing fiber infrastructure, it is recommended to perform the adjustment procedure for the complete system and not only for the HX WCS unit.

**Step 1:** Open a web session to the SC-450 controller and click on the “Setup” main menu option (shown in Figure 20).

**Step 2:** Click “Next” in Welcome screen to continue to the “Select the type of commissioning” screen.

**Step 3:** Select the “New (recently added devices that have not been commissioned)” option to adjust the HX WCS only or “Full” option to adjust complete system. See Figure 21.

Click “Next” to continue to Service Selections step.

**Step 4:** Verify that all of the relevant services for commissioning are selected. See Figure 22.

Click “Next” to continue to “Service Conditioners” step.

**Step 5:** Define maximum input power for each BTSC/BDAC service type (default = maximum value).

BTSC WCS input power range is 0 to +36 dBm.

Click “Next” to continue to “Service Remotes” step.

**Step 6:** Define maximum output power for each of the remotes (default = maximum value). See Figure 24.

**Step 7:** For RIU-IM and RIU-4 BTSC/BDAC modules (except for 700 LTE conditioners) only - connect an external continuous wave (CW) signal generator for commissioning.

**Step 8:** Click “Next” to initiate adjustment procedure.



Figure 20. Main Menu “Setup” Option

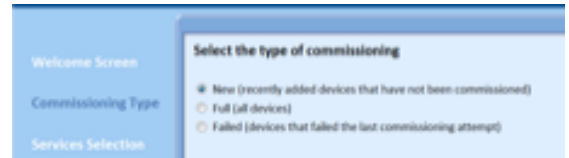


Figure 21. Commissioning Type Selection



Figure 22. Service Selection

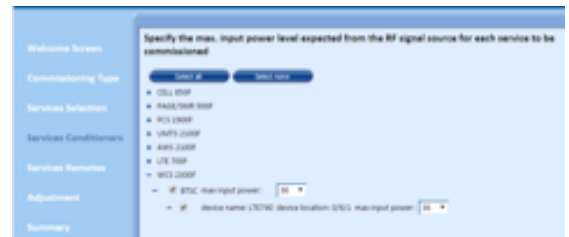
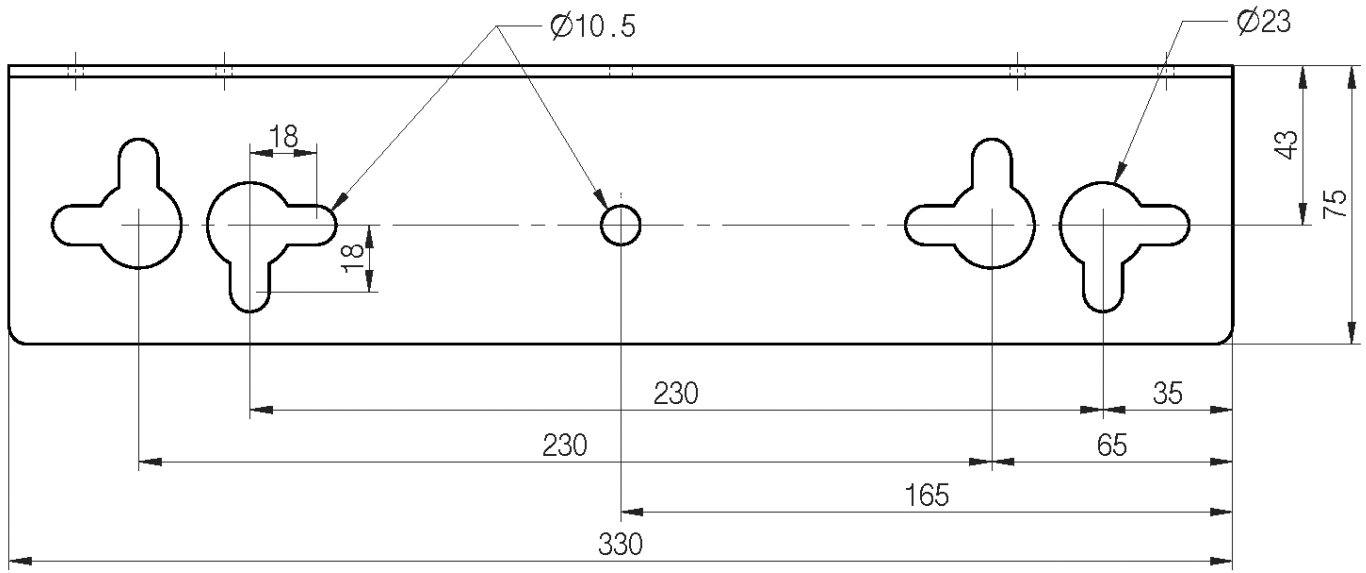


Figure 23. Conditioner Maximum Input Power Configuration



Figure 24. Remote Unit Maximum Output Power Configuration

## APPENDIX: WALL-MOUNTABLE BRACKET DIMENSIONS



---

**NOTES:**



---

**NOTES:**

---

## NOTES:

Corning Optical Communications LLC • PO Box 489 • Hickory, NC 28603-0489 USA  
800-743-2675 • FAX: 828-325-5060 • International: +1-828-901-5000 • [www.corning.com/opcomm](http://www.corning.com/opcomm)

Corning Optical Communications reserves the right to improve, enhance, and modify the features and specifications of Corning Optical Communications products without prior notification. A complete listing of the trademarks of Corning Optical Communications is available at [www.corning.com/opcomm/trademarks](http://www.corning.com/opcomm/trademarks). All other trademarks are the properties of their respective owners. Corning Optical Communications is ISO 9001 certified. © 2015, 2018 Corning Optical Communications. All rights reserved. CMA-447-AEN / February 2018

P/N 709C018404