



## Chassis, Power Supply, and Element Management

### C-COR® CHP Max5000

#### Converged Headend Platform

- Accelerate deployment of new, revenue generating advanced services
- Innovative technology creating converged high-density platform
- Investment protection through 2RU footprint
- Simplified installation and management
- Universal management through Craft interface, SNMP with HMS, or remote IP access



The CHP Max5000 Converged Headend Platform uses innovative technology to create a converged, high-density platform. The CHP Max5000 converges headend, hub, and digital transport onto a single 2RU scalable system allowing service providers to accelerate deployment of advanced services such as VOD, high speed data, and telephony.

The CHP Max5000 platform comprises a 2RU chassis offering 13 module slots. The chassis provides 10 module slots for application modules, 2 for isolated redundant power supplies, and 1 for a management module.

CHP Max5000 isolated, load-sharing, redundant power supplies are available with either auto-sensing (110 to 220 V) AC or DC (-72 to -36 Vdc) input. One power supply supports a completely loaded chassis, while two offer power redundancy eliminating service interruption if one power supply or line-in feed service fails.

The CHP Max5000 management module is available in two models. The Craft Management Module (CMM) offers local monitoring and configuration along with a PC compatible graphical user interface (GUI). The System Management Module (SMM) offers all the functionality of the CMM plus remote management using SNMP with HMS-compliant MIBs for use with an external element manager or remote access to the CMM interface using an IP connection through the Ethernet interface from the remote GUI software. Both management modules offer an RS-485 interface for interconnecting multiple chassis at one site for single point control from an SMM.

A standard 40RU rack holds up to 200 CHP Max5000 transmitters or 400 return receivers providing exceptional space efficiency to help MSOs relieve the pressure on precious headend space while reducing cooling and power costs.

## CHP Max5000 Chassis

The CHP Max5000 (2RU) chassis fits into a 19-inch or 23-inch rack with an optional bracket kit, holds 10 single-width application modules, and routes power and element management signals. Each chassis requires one power supply module and accepts a second for redundancy. Chassis CHP-CHASSIS-19S (rear fiber access) or CHP-CHASSIS-R-19S (front fiber access) has a backplane with higher current capability required if two or more eQAM modules are installed in the chassis.

Modules slide into the chassis from the front of the rack, and all RF and optical connections are at the rear. A fiber routing aperture offers front panel access to fiber if required. Separate interfaces built into the back panel of each chassis direct power to and convey element management information to/from installed modules. Universal slots accept the plug-in application modules in virtually any combination to accommodate a variety of service delivery requirements.

Designed for thermal efficiency, the CHP Max5000 chassis provides a wide operational temperature range for maximum reliability. A plenum with eight large fans create more airflow and offer better reliability than module-based fans; in the event of a fan failure, application modules—and the services you provide—remain in operation.

## Chassis Specifications

### Chassis Interfaces

SNMP Interface (Note 1)	Connector: RJ-45; Electrical Interface: 10BaseT Ethernet
Shelf Interconnect Interface	Connector: RJ-14; Electrical Interface: RS-485
Local Alarm Terminal Interface	Connector: Terminal block; Electrical Interface: NO, NC, or C (Note 2)

### Mechanical Specifications

Chassis Dimensions (W x H x D)	19 x 3.5 x 18 in. (48.3 x 8.9 x 45.7 cm)
Module Port Dimension, 1 wide (W x H x D)	1.25 x 3.0 x 15.7 in. (3.2 x 7.6 x 39.9 cm)
Weight, empty (Note 3)	15.5 lbs (7.0 kg)

### Environmental Specifications

Operational Temperature Range	32 to 122°F (0 to 50°C)
Storage Temperature Range	-40 to 158°F (-40 to 70°C)
Humidity, noncondensing, max	85%

#### Notes:

1. Requires use of system management module (SMM).
2. Dry contact closures. NO = Normally Open. NC = Normally Closed. C = Common.
3. Chassis enclosure and backplane without modules.

Specifications subject to change without notice

## CHP Max5000 Power Supply

The CHP Max5000 switched-mode AC power supplies, models CHP-PS/AC1-Q (246W), CHP-PS/AC1-HW (405W), or CHP-PS/AC1-SW (475W) accepts AC input from 85 to 264VAC (47 to 63Hz) and provides DC voltages to drive application modules. While one AC power supply produces either 246W, 405W, or 475W to power a fully-loaded chassis of application modules, each chassis accepts a second backup AC power supply for load sharing and redundancy. These power supplies are fully isolated, which eliminates a single point of power failure. The 405W or 475W power supply is required for redundant operation when two or more eQAM modules are installed.

The CHP Max5000 switched-mode DC power supplies, model CHP-PS/DC1-Q (246W) and CHP-PS/DC1-HW (405W), accepts DC input from -72 to -36VDC and produces 246W or 405W to power a fully-loaded chassis of application modules. Each chassis accepts a second backup DC power supply for load sharing and redundancy. These power supplies are fully isolated, eliminating a single point of power failure. The 405W power supply is required for redundant operation when two or more eQAM modules are installed.

CHP power supplies are located on the far right side of the chassis behind the Craft Management Module (CMM) or System Management Module (SMM). Isolated outputs allow the primary and redundant supplies to operate in a power-sharing configuration. Should the primary power source fail, a second power supply provides all necessary DC power. AC and DC power supplies should not be installed in the same chassis.

### CHP-PS/AC1-Q Specifications

Powering Specifications	CHP-PS/AC1-Q	CHP-PS/AC1-HW	CHP-PS/AC1-SW
Input Voltage, 47 to 63Hz	85 to 264VAC	85 to 264VAC	85 to 264VAC
Input Current Limit, continuous, RMS, max.	6.0A	10A	9A
Inrush Current Limit, peak, max.	30A	30A	40A
Input Transient, IEEE C62.41-1991 Category B 1.2, 50 $\mu$ s	4kV/0.13kA	4kV/0.13kA	4kV/0.13kA
Power Consumption, max.	402W	662W	769W
Input Connector	IEC 320-C14 plug	IEC 320-C14 plug	IEC 320-C14 plug
<b>Output Voltages and Current</b>			
12.0Vdc +0.35/-0.0Vdc	10A	22 A	24A
5.0Vdc +0.2/-0.05Vdc	22A	25 A	31A
-5.0Vdc +0.05/-0.2Vdc	1.8A	1.8 A	2A
3.5Vdc $\pm$ 0.1Vdc	2.2A	2.2 A	5A
Output Noise Ripple, RMS	25mV @ 12.0V output, 25mV @ 5.0V output 20mV @ -5.0V output, 20mV @ 3.5V output		
Efficiency, min.	68%	68%	68%
Power Factor	0.9	0.9	0.9
<b>Status Interface</b>			
Functions Monitored	All DC voltages, internal temperature, fan currents		
<b>Mechanical Specifications</b>			
External Dimensions (W x H x D)	3.9 x 1.57 x 14.46 in. (9.91 x 3.99 x 36.73 cm)		
Weight	2.75lbs (1.24kg)		
<b>Environmental Specifications</b>			
Operational Temperature Range	32 to 122°F (0 to 50°C)		
Storage Temperature Range	-40 to 158°F (-40 to 70°C)		
Humidity, noncondensing	5 to 95%		

Specifications subject to change without notice

## CHP-PS/DC1-Q Specifications

Powering Specifications	CHP-PS/DC1-Q	CHP-PS/DC1-HW
Input Voltage	-72 to -36Vdc	-72 to -36Vdc
Input Current Limit, max.	12.0A @ 36Vdc	15.0A @ 36Vdc
Inrush Current Limit, max.	40A (Note 1)	40A (Note 2)
Power Consumption, max.	379W	540W
Input Connector	3-pin male conn., mates with power plug (P/N MT0401)	
Output Voltages and Current		
12.0Vdc +0.35/-0.0Vdc	10A	16A
5.0Vdc +0.2/-0.05Vdc	22A	22A
-5.0Vdc +0.05/-0.2Vdc	1.8A	2A
3.5Vdc ± 0.1Vdc	2.2A	5A
Output Noise Ripple, RMS	25mV @ 12.0V output 25mV @ 5.0V output 20mV @ -5.0V output 20mV @ 3.5V output	
Output Noise Switching Spikes, peak to peak	100mV @ 12.0V output 100mV @ 5.0V output 60mV @ -5.0V output 60mV @ 3.5V output	
Efficiency, min. (Note 3)	65%	61%
<b>Status Interface</b>		
Functions Monitored	Input and all DC voltages, internal temperature, fan currents	
<b>Mechanical Specifications</b>		
External Dimensions (W x H x D)	3.9 x 1.57 x 14.46 in. (9.91 x 3.99 x 36.73 cm)	
Weight	2.75 lbs (1.24 kg)	
<b>Environmental Specifications</b>		
Operational Temperature Range	32 to 122°F (0 to 50°C)	
Storage Temperature Range	-40 to 158°F (-40 to 70°C)	
Humidity, noncondensing	10 to 95%, not to exceed 0.024 lbs of water/lb of dry air	
<b>Regulatory Requirements (Note 4)</b>		
UL60950 3rd Ed/CSA C22.2 number 60950 and EN60950		
EN50083-2		
EN300 386 V1.3.1		
FCC Part 15, Class A		
FCC Part 76, Subpart K		
EN55022, Class A		

### Notes:

1. Inrush current shall not trip a 15A mains external circuit breaker during a Hot Start condition. Hot Start occurs when a thermally stabilized power supply is removed and immediately reinserted.
2. Inrush current shall not trip a 20A mains external circuit breaker during a Hot Start condition. Hot Start occurs when a thermally stabilized power supply is removed and immediately reinserted.
3. When operating at 25°C over the input operating range with a full rated output load.
4. All emissions tests must be passed in two configurations: two power supplies operating redundantly and a single power supply installed in a chassis configured to provide maximum system load.

Specifications subject to change without notice

## CHP Max5000 Management Modules

The CHP Max5000 management module is available in two models. The Craft Management Module (CMM) offers local monitoring and configuration along with a provided PC compatible graphical user interface (GUI). The CHP Max5000 GUI simplifies system installation, provides monitoring on easy to read screens and displays all critical module information to assist in operational as well as inventory management. A complete equipment manual is also included in the Craft Management Software (CMS) bundle for access on a PC with either the Windows® 98 2nd ed., NT 4.0, 2000 SP1, or XP Professional operating system.

The System Management Module (SMM) offers all the functionality of the CMM plus remote management using SNMP with HMS-compliant MIBs through the Ethernet interface for use with an external element manager. The SMM also provides remote access to the CMM interface using an IP connection through the Ethernet interface from the remote GUI software without requiring the capital expenditure of SNMP element manager. Both management modules offer an RS-485 interface for interconnecting multiple chassis at one site for single point control from an SMM. The SMM provides SNMP access for remote management and monitoring of your CHP Max5000 headend equipment via both HMS public domain and enterprise MIBs. To monitor up to 10 chassis, install 1 CMM in up to 9 chassis and 1 SMM in a tenth chassis. Then, daisy-chain the chassis together and use an Ethernet connection to program, provision, monitor, and manage your CHP Max5000 equipment via an SNMP element manager. Managing more than 10 chassis is accomplished by using a 10baseT Ethernet hub or switch between the Remote Management System and the chassis containing the SMM module.

## CMM and SMM Specifications

RS-232	38.4kbps
RS-485 (Shelf Interconnect, RJ-14 connectors on chassis)	38.4kbps
Craft Interface Port (DB-9 female)	RS-232
RS-232 Debugging Port (SMM only)	19.2kbps
RJ-45 (Ethernet)	10Mbps
Serial Peripheral Interface Bus	480kbps
Operational Temperature	0 to 50°C (32 to 122°F)

Specifications subject to change without notice

# Chassis, Power Supply, and Element Management C-COR® CHP Max5000

## Ordering Information

### Platform Components

Component Type	Model Series	Description
Chassis	CHP-CHASSIS-19Q	Rear fiber access chassis and backplane with eight dual-speed fans for quieter operation.
	CHP-CHASSIS-19S	Same as above but has higher current capacity backplane required if eQAMs are installed.
	CHP-CHASSIS-R-19Q	Front fiber access chassis and backplane with eight dual-speed fans for quieter operation.
	CHP-CHASSIS-R-19S	Same as above but has higher current capacity backplane required if eQAMs are installed.
23-in External Bracket	CHP-EXTBKT-23	Bracket adapts 19-inch chassis to install in a 23-inch rack.
Power Supply	CHP-PS/AC1-Q	Isolated 250 Watt power supply accepting 110/220VAC input.
	CHP-PS/AC1-HW	Isolated 405 Watt power supply accepting 110/220VAC input. Required if eQAMs are used.
	CHP-PS/AC1-SW	Isolated 475 Watt power supply accepting 110/220VAC input. Required if eQAMs are used.
	CHP-PS/DC1-Q	Isolated 250 Watt power supply accepting –48VDC input.
	CHP-PS/DC1-HW	Isolated 405 Watt power supply accepting –48VDC input. Required if eQAMs are used.
Craft Mgmt. Module	CHP-CMM	Allows local monitoring and management via laptop computer connected to the RS-232 connector on the front of the CMM. CHP-CMM-1 includes autoconfiguration feature.
	CHP-CMM-1	
Craft Mgmt. Software	CHP-CMS-1	Software that provides graphical user interface (GUI) and enables local communication for module setup and monitoring of a CHP Max5000 shelf from a portable computer.
System Mgmt. Module	CHP-SMM	Provides all CMM functionality and SNMP port for remote management. SMM also provides remote access to the CMM interface using an IP connection through the Ethernet interface on the back of the shelf from the remote GUI software. CHP-SMM-1 includes autoconfiguration feature.
	CHP-SMM-1	

Contact your C-COR sales professional for data sheets on CHP application modules.



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