

Linking  
People  
Together



HelixNet Main Station (HMS-4X)

## Key Features and Benefits

### HelixNet System Operation

- 6 main stations can link over LAN & WAN
- Supports up to 64 endpoints on HelixNet system
- 12 partyline channels; expandable to 24 channels via optional license

### Main Station

- Easy to use CCM™ browser configuration
- Fast front panel control & configuration
- Plug-and-go with auto discovery
- Central upgrades from main station
- 4 Keysets assignable to channels
- All Talk, Stage Announce, RMK & Program Audio level controls

### Connectivity

- 2 Powerlines for distribution of Ethernet to HelixNet user stations via XLR cables
- 3 Expansion slots for HLI modules
- Program Audio input
- Stage Announce output
- 4 Contact closure inputs & outputs

### LQ Integration Options

- LQ® linking for high density 2-wire, 4-wire and GPIO expansion
- Station-IC™ and Agent-IC® as integrated via optional licenses
- SIP/VoIP integrated via optionally licensed LQ

HelixNet® is a networked partyline intercom with up to 24 channels and Program Audio over XLR, LAN or WAN.

## Description

The HelixNet Main Station (HMS-4X)<sup>2</sup> is a combination of a system host and an intercom user station with XLR Powerline connections to user stations. The main station hosts up to three HLI interface modules for external audio, intercom and network connectivity.

## System Architecture

HelixNet Main Station manages all endpoint connections and Ethernet routing of incoming audio to all listening user stations and interfaces where the audio is locally mixed. HelixNet's 12 channels of partyline intercom and Program Audio are available at any HelixNet user station or interface port regardless of where they connect to the system. Optional license expands the main station to 24 channels.

## Main Station

HelixNet Main Station features two XLR Powerlines each capable of supporting up to 10 user stations. Powerline allows digital connection using standard XLR cables and supports various cabling topologies and passive splitting, similar to analog partyline cabling. The main station supports endpoint connectivity over mix of main station built in Powerlines, HXII-DPL Powerline Devices and Ethernet with the optional HLI-ET2 Ethernet module. HelixNet main station supports up to 64 endpoints, user stations or interface ports. User stations may be added and removed dynamically without configuration and assigned to any channel without restrictions. The main station hosts firmware for endpoints and automatically matches versions upon endpoint connection.

## Linking

Up to five additional main stations can be linked to the system host main stations over Ethernet networks or fiber for a total of six linked main stations. Link groups of multiple main stations seamlessly form a distributed HelixNet system, allowing local connectivity using HLI interface modules and XLR Powerlines to user stations.

<sup>1</sup>CCM requires HLI-ET2

<sup>2</sup>HMS-4X is a legacy product

**Note:** HMS-4X and HLI modules are not used in Arcadia® hosted HelixNet systems. HMS-4X and HLI Modules are legacy products and not recommended for new system designs and specification. Existing HMS-4X units and HLI modules are supported under Clear-Com's Warranty Terms.

### User Station and System Configuration

HMS-4X front panel provides four keysets assignable to any intercom channel. The user station comes with a headset connection, gooseneck mic connector and a loudspeaker in addition to All Call, Stage Announce, Remote Mic Kill and Program Audio level controls. Expansion mode allows up to six main station or remote stations to be combined, with each expanded station having up to 24 channels.

The keysets form unique waterfall menus allowing tactile system management. Browser-based Core Configuration Manager™ (CCM) allows networked system management using the optional HLI-ET2 Ethernet module.

### HLI Interface Modules

HMS-4X can host three HLI interface modules for external analog audio and intercom connectivity, Ethernet linking and system control. HLI-modules include: HLI-ET2 network interface for system control, HMS-4X and LQ linking and user station connectivity, HLI-FBS 100Mb SFP for fiber networking, HLI-4W2 dual 4-wire analog line-level interfacing, and HLI-2W2 dual 2-wire interface for analog partyline cabling.

### LQ Integration

Clear-Com's LQ Series IP interfaces can be added to HelixNet Link Groups. Up to three LQ devices may be linked to a HelixNet system for a maximum total of six combined HMS and LQ in Link Group. LQ provides the system with 2-wire, 4-wire and GPIO interfaces, in addition to I.V. Direct (IVC Direct) connections to Eclipse® HX E-IPA/IVC and Arcadia Central Station, optionally licensed Station-IC and Agent-IC virtual clients and SIP/VoIP telephone clients.

## Technical Specifications

### Linking

HMS is required as the HelixNet Host. Link Group may include five additional HMS members, including up to three LQ devices for a maximum of six HMS/LQ in Link Group. HMS link using HLI-ET2 or HLI-FBS modules over LAN/WAN connections. Link Group supports up to 64 endpoints (station/port).

**Note:** HMS does not link to Arcadia or Gen-IC

### Channels

System provides 12 or 24 intercom channels assignable to any user station or port in the system. Four Channels can be assigned to station. Program Audio can be associated with any channel with independent endpoint level control.

### Roles

99 Roles for naming and dynamic configuration of user station settings. Role can be applied to multiple user stations

### Licenses

**Host:** HMS-4X

**Activation:** Generated to unique HMS-4X device System ID

**Transferable:** No, fixed to HMS-4X

**Recovery:** Yes, by Clear-Com Support or Service Center

### Permanent Licenses

**Part numbers:** HMS-24-UG

**Capability:** 24 Channels

**Validity:** Perpetuity

### Connectors

**XLR Powerline:** (2) 3-pin XLR-M/F

**Gooseneck Mic:** 3-pin Tuchel

**Headset:** 4-pin XLR-M

**Program Audio:** 3-pin XLR-F

**Stage Announce:** 3-pin XLR-M

**Hot Mic/IFB Interface:** 1/4" (6.35 mm) TRS Jack

**GPIO:** 25-pin D-type female (4 GPI, 4 GPO, 5V)

**USB:** Type A & Micro AB (factory service use)

**Input Power Connector:** IEC-C14

### Microphone Pre-amplifier

**Headset Mic Impedance:** 200Ω (Dynamic)

**Headset Mic Voltage:** 1.7V (Electret selectable)

**Limiters:** +23dB

Route to 4-wire output at 0dBu:

**Mic Gain:** 60dB (Dynamic), 45dB (Electret)

**Frequency Response:** 200Hz - 10 kHz ±3dB

**Distortion:** <0.2% THD @ 1kHz

**Noise:** <-55dBu (Dynamic), <-65dBu (Electret)

### Headphone Amplifier

**Load Impedance:** >32Ω

**Output Level:** +12dBu before clipping

**Sidetone:** -12dB (selectable)

Route from a 4-wire input at 0dBu:

**Max Gain:** 0dB

**Frequency Response:** 40Hz - 10kHz ±3dB

**Distortion:** <0.1% THD @ 1kHz

**Noise:** <-65dBu

**Headphone Limiter:** 0dB (selectable)

### Loudspeaker Amplifier

**Load Impedance:** 8Ω

**Output Level:** +18dBu before clipping

Route from a 4-wire input at 0dBu:

**Max Gain:** 18dB

**Frequency Response:** 200Hz - 10kHz ±3dB

**Distortion:** <0.1% THD @ 1kHz

**Noise:** <-50dBu

### Program Audio Line Input

**Maximum Level Before Clipping:** +18dBu

**Nominal Input Level:** 0dBu (selectable)

**Input Impedance:** >= 10KΩ

Route to 4-wire output at 0dBu:

**Frequency Response:** 20Hz - 10kHz ±3dB

**Distortion:** <0.2% THD @ 1kHz

**Noise:** <-65dBu

### Stage Announce Output

**Maximum Level Before Clipping:** +18dBu

**Nominal Output Level:** 0dBu (selectable)

**Output Impedance:** <= 100Ω

Route from a dynamic headset:

**Frequency Response:** 300Hz - 12kHz ±3dB

**Distortion:** <0.1% THD @ 1kHz

**Noise:** <-55dBu

### Hot Mic Output

**Maximum Level Before Clipping:** +12dBu

**Nominal Output Level:** 0dBu (selectable)

**Output Impedance:** <= 100Ω

Route from a dynamic headset:

**Frequency Response:** 300Hz - 12kHz ±3dB

**Distortion:** <0.2% THD @ 1kHz

**Noise:** <-55dBu

### Powerline

Two independent network XLR Powerlines

Frequency Modulated Ethernet - OFDM

**Output Voltage:** ±29.5V DC

**Output Current (Max):** 1.5A per Powerline

**Frequency:** 100kHz-25MHz

Requires shielding integrity between Powerlines

Support up to 10 beltacks each

Support up to 3-10 stations each

Use [HelixNet Cable Calculator](#) to validate load and cable distance.

### Logic Power Output

To power Logic Inputs

**Output Voltage:** 5V, separate pin

**Current (Max):** 1mA

### Logic Inputs - GPI

Assignable to talk, call, mic and headset keys

**Input:** 4

**Style:** Optically isolated

**Detection Voltage (Min):** 3V

**Input Voltage (Max):** 5V

### Logic Outputs - GPO/Relay

Assignable to talk, call, SA keys and channel events

**Outputs:** 4

**Style:** Power Relay

**Normalized:** Open or Closed, separate pins

**Switching Voltage (Max):** 30V

**Switching Current (Max):** 2A

### Power

**Input Voltage Range:** 100 - 240V AC

**Input Frequency Range:** 50 - 60Hz

**Power (Max):** 250W

**Input Power Connector:** IEC-C14

### Practical Power Range:

**Power (Normal):** 80-250W

**BTU (Normal):** 275-850BTU/hr

Dependent on hosted modules and powerline connected beltacks

### Environmental

32° - +104°F (0 - +40°C)

90% relative humidity

### Dimensions

1RU, 1.75 x 19 x 13in (HxWxD)

(44 x 483 x 320mm)

### Weight

5.83lbs (2.65kg)

## Network Specifications

(Firmware Version 4.5+)

### Network Protocols

Ethernet IPv4–Unicast Audio and Control  
mDNS–Multicast Device Discovery  
Layer 3 routable with mDNS function limitations  
HTTP–Management  
TFTP–File Transport Protocol  
NTP–Network Time Protocol  
Tinc - Virtual Private Network (VPN)  
I.V. Core–Decentralized Network Routing & Mixing  
IVP–Proprietary intercom Audio and Control  
WavPack–Audio Codec

### Network Ports

#### Unicast:

Port 69 UDP–Firmware File Server  
Port 80 TCP–Web Interface, System Management, Expansion  
Port 123 UDP–Time Stamps for Service Logs  
Port 655 TCP – Link Group Member Registration  
Port 655 TCP – Link Group Communication  
Port 655 UDP – Link Group Audio  
Port 6001 TCP–System Management  
Port 6001 UDP–Audio Streams

#### Multicast:

Port 5353 UDP–mDNS, Names, Discovery, Linking, Expansion  
Optional for device names and linking  
Mandatory for Expansion Mode

### Network Parameters

**HMS-4X/Link Group Endpoint Support:** 64  
Endpoints are user stations, active Interface ports, Program Audio inputs and LQ accounts.

### Bandwidth:

300 kbps each audio input linking between HMS/LQ  
Link Group audio sent dynamically between members  
300-600 (max) kbps from each endpoint audio input to HMS  
1200-2400 (max) kbps from HMS to each endpoint audio output

### Network Jitter Tolerance:

<= 128ms jitter buffer per audio stream receiver  
automatically adjusted to network performance

### QoS Tags:

DSCP=34, Assured Forwarding (AF=41)

### Link-Local Default IP Address Range:

169.254.0.0/16

### System Reserved IP Ranges:

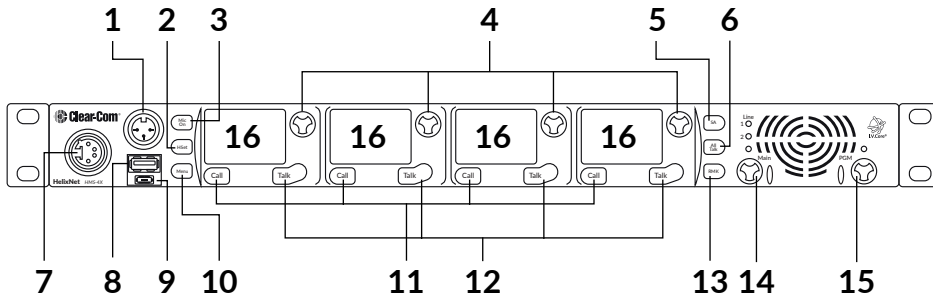
10.0.0.0/24 for endpoints  
172.23.0.0/16 for Link Group

### Recommended Ethernet Switches

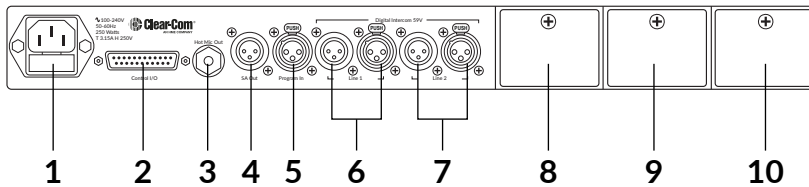
- Managed Ethernet Switch – Layer 3
- 100/1000 Base-T ports for endpoints
- 1000 Base IP Trunks between switches
- QoS Configuration
- Energy Efficient Ethernet bypass option
- IGMP Snooping bypass option

Please refer to the Clear-Com [HelixNet Network Guide](#) for additional switch settings and network characteristics

## Front Panel



## Back Panel



## Legend

### Front

1. Microphone connector
2. Headset Mic enabled
3. Mic Key enabled
4. Rotary Level/menu key
5. Stage Announce
6. All Talk
7. Headset connector
8. USB 2.0 connector
9. Micro USB 2.0 connector
10. Menu key
11. Call key
12. Talk key
13. Remote Mic Kill
14. Speaker/Headphone volume control
15. Program volume control
16. Menu keyset display

### Back

1. Universal Power Socket (fused)
2. GPIO DB25, control inputs and outputs
3. Hot Mic output - 1/4" TRS
4. Stage Announce line out
5. Program input
6. XLR Powerline 1
7. XLR Powerline 2
8. Option Module Slot 1
9. Option Module Slot 2
10. Option Module Slot 3

## Order Code

### HMS-4X

HMS-24-UG: 24-channel license

### Optional Interface Modules and SFPs (Sold Separately):

HLI-2W2: 2-wire module

HLI-4W2: 4-wire module

HLI-ET2: Ethernet module

HLI-FBS: Fiber module

HLI-MMFO: Multi-mode SFP - Legacy

HLI-SMFO: Single-mode SFP - Legacy

SFP-MMFO-100M-FX: Multi-mode SFP

SFP-SMFO-100M-LX: Single-mode SFP

