



LQ and LQ-R Devices



## LQ Interfaces

### LQ Series Interfaces

#### Key Features and Benefits

##### LQ IP Interface

- Networked interfaces devices  
Over: LAN, WAN, Internet
- Linked systems or standalone deployment
- Decentralized audio mixing & routing  
Provides: 24 Channels & Direct Connections  
Transports: Call, RMK, Logic, Panel & SIP

##### Link Group

- LQ devices form non-blocking Link Group:
  - Gen-IC Virtual Intercom
  - LQ IP Interface
  - HelixNet HMS-4X<sup>2</sup>

##### Analog Interface Hardware Options

- 2-Wire Clear-Com & TW with power, termination, & auto-nulling
- 4-Wire Line-Level Audio transformer isolated with Clear-Com data
- 4-Wire Line/Mic-Level Audio with GPIO transformer isolated with GPI & GPO

##### Virtual Interface Ports

- I.V. Direct/IVC Clear-Com Interface  
To: Eclipse E-IPA card, Arcadia  
Over: LAN, WAN, Internet
- SIP Client Interface Ports<sup>1</sup>  
To: 3rd party SIP telephone systems  
Dial Control: CCM or Eclipse

##### Virtual Client Host

- Agent-IC<sup>1</sup> Virtual Mobile Client  
For: Android, iOS
- Station-IC<sup>1</sup> Virtual Desktop Client  
For: Windows, MacOS

##### Configuration

- OLED front panel display
- CCM browser setup, configuration & monitoring
- Save & Restore

##### Hardware Options

- 2 Port Portable Unit
- 4 Port or 8 Port 1RU Rackmount Units
- Rugged & lightweight

LQ® Series devices provide hardware and virtual interface options for intercom and audio. Deployed standalone or in linked deployments over LAN, WAN or Internet, LQ enables routing, mixing and support for Clear-Com and 3rd party systems.

#### Description

LQ interfaces allow networked interfacing for intercom and audio using standalone devices or linked deployments of multiple decentralized devices over LAN, WAN or Internet infrastructures with audio routing, mixing and transport of specialized control signalling via up to 24 Channels and Direct connections using the Opus codec.

#### Technical Specifications

##### Capacity

(6) Link Group LQ/Gen-IC/HMS-4X Members  
(2-8) Analog Interface Ports per LQ  
(8) Virtual Interface Ports per LQ  
(8) Virtual Clients per LQ  
Capacity may be re-allocated using the LQ Resource Estimator tool

##### System Limits

(100) Virtual Client Roles per Link Group  
(24) Channels per Link Group  
(24) Directs per Link Group  
Limits are not enforced on Virtual Client, SIP, and I.V. Direct account info

##### Licensing

**Delivery:** License Ticket, may include multiple licenses

**License Host:** LQ, LQ-R

**Activation:** Via CCM, Online (recommended) or Offline

**Transferable:** No; fixed to the LQ the license has been applied to

**Recovery:** Contact Clear-Com

##### Perpetual SIP Client License

**Part Number:** SIP8-LQ

**Capability:** 8 SIP Clients on LQ

**Duration:** License does not expire

##### Perpetual Virtual Client License

**Part Numbers:** VIRTUAL-IC-LQ, VIRTUAL-IC8-LQ

**Capability:** +1 additional or 8 (max) Virtual Clients on LQ

**Duration:** Permanent for major version of Agent-IC or Station-IC (e.g. v2.x) connecting to LQ; License does not expire

<sup>1</sup>Requires optional license

<sup>2</sup>HMS-4X is a legacy product. LQ uses WavPack codec with fixed parameters when linked to HMS-4X

# LQ Interfaces

## LQ Series Interfaces

### Technical Specifications (Continued)

#### Connectors

**2-Wire I/O:** XLR-3F per port

**4-Wire I/O:** RJ45 etherCON per port

Audio Crossover Mode: Software selectable

**4-Wire GPIO:** DB9M (Audio I/O, GPIO) per port

**LAN:** (2) RJ45 etherCON bridged to work in daisy chain

**USB:** Type A

**DC Power Connector:** KPJX-4S-S (1 per LQ, 2 per LQ-R)

**Grounding Screw:** Terminal

#### Controls and Indicators

##### Front Panel:

(1) Yellow OLED Display

(5) Menu Navigation Buttons - Status backlit

##### Rear Panel:

(2) LAN RJ45 Link/Activity LEDs

2-Wire Power / Configuration Indicator LEDs per port

#### 4-Wire Line Level Interfaces

Transformer balanced input and output

##### Input:

**Nominal Level:** 0dBu (adjustable -12dB to +12dB)

**Maximum Level:** +18dBu

**Frequency Response:** 100Hz to 20kHz  $\pm 3$ dB

**Impedance:**  $\geq 10\text{K}\Omega$

##### Output:

**Nominal Level:** 0dBu (adjustable -12dB to +12dB)

**Nominal Level (set to Mic Level):** -50dBu (adjustable -12dB + 12dB)

**Maximum Level:** +18dBu

**Frequency Response:** 80Hz to 20kHz  $\pm 3$ dB

**Impedance:**  $1200\Omega + 10\%$

#### 2-Wire Partyline Interfaces

Unbalanced High-Impedance bridging

**Compatibility:** Clear-Com, RTS-TW with Call and Remote Mic Kill

**Termination:** Optional per pair (A/B or C/D)

**Nulling:** User initiated Auto-Calibration

**Null Depth:**  $> 60\text{dB}$  at 1kHz

**Nominal Level:** CC: -18dBu, RTS-TW: -12dBu (adjustable -3dB to +3dB)

**Headroom:** 18dB

**Frequency Response:** 50Hz to 10kHz.  $\pm 3$ dB

**Impedance:**  $\geq 10\text{K}\Omega$  bridging

**Total Harmonic Distortion (THD):**  $< 0.1\%$  THD @ 1 kHz

##### Power:

**LQ Powered by PoE:** 70mA optional

**LQ Powered by PSU:** 150mA optional

**LQ-R Powered by PSU:** 250mA optional per pair (A/B or C/D)

**Voltage:** 26V DC

Use [Encore Partyline Power Calculator](#) to validate power requirements of the analog partyline intercom system

#### Logic Inputs – GPI

Assignable to control events or call

**Input:** 1 per 4-Wire GPI Port

**Style:** Powered input, close contact to ground

**Input Voltage Range:** 0 - 12V DC or AC

**Input Current:**  $\geq 1\text{mA}$  required

#### Logic Outputs – GPO/Relay

Assignable to control events or call

**Outputs:** 1 per 4-Wire GPO Port

**Style:** SPDT / Power Relay

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

**Switching Voltage (Max):** 60V DC

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

#### Power - LQ Portable Unit

##### DC Power Input:

**Voltage:** 12V DC  $\pm 5\%$

**Current (Max):** 2A

**Power (Max):** 24W

**BTU (Max):** 82 BTU/h

**Input Power Connector:** KPJX-4S-S

LQ unit can be powered via DC input using:

##### AC Adapter - Plug-In:

**Type:** 453G028-1 (supplied with LQ)

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

**Input Current (Max):** 0.58A

**Input Frequency Range:** 47-63Hz

**Input Power Connector:** US, UK, Europe, AUS & China included

**Output Voltage:** 12V DC

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

**Output Power (Max):** 24W

**Output Power Connector:** KPPX-4-P

##### PoE - Power over Ethernet:

IEEE 802.3af-2003 - Class 0

**PSE:** 15.4W DC max @ Power Source Req.

**PD:** 12.95W DC max @ Powered Device Draw

#### Power LQ-R 1RU Rackmount Unit

##### (2) DC Power Input:

**Voltage:** 12V DC  $\pm 5\%$

**Current (Max):** 5A

**Power (Max):** 60W

**BTU (Max):** 205 BTU/h

**Input Power Connector:** KPJX-4S-S

LQ-R units can be powered via the (2) DC inputs using:

##### AC Adapter - Inline:

**Type:** 453G032-2 (supplied with LQ-R)

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

**Input Current (Max):** 1.4A

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

**Input Power Connector:** IEC-C14

**Output Voltage:** 12V DC

**Output Current (Max):** 5A

**Output Power (Max):** 60W

**Output Power Connector:** KPPX-4-P

### Technical Specifications (Continued)

#### Environmental

**Operating:** 32° to 104°F (0° to 40°C)

**Storage:** -67° to 158°F (-55° to 70°C)

**Humidity:** 90% Non-Condensing

#### Dimensions

##### LQ Portable Unit

6.8 x 1.79 x 8.45in (WxHxD)

(173 x 46 x 215mm)

##### LQ-R 1RU Rackmount Unit

19 x 1.79 x 8.8in (WxHxD)

(483 x 46 x 224mm)

#### Weight

##### LQ

1.83lbs (0.83kg)

##### LQ-R

4.29lbs (1.95kg)

# LQ Interfaces

## LQ Series Interfaces

### Network Specifications | Firmware Release 4.5+

LQ includes 2 physical LAN connections which can be bridged with all traffic types in use. Parameters for different use cases are displayed below.

#### Gen-IC & LQ Link Groups

For distributed LQ interfaces and use with Gen-IC Virtual Intercom

##### Network Protocols

Ethernet IPv4–Unicast Control  
Layer 3 Routable  
DNS - Domain Name Server  
HTTP & HTTPS - Management, Licensing  
NTP - Network Time Protocol  
Tinc - Virtual Private Network (VPN)  
I.V. Core - Decentralized Network Routing & Mixing  
IVP - Proprietary intercom Audio and Control  
Opus - Audio Codec

##### Network Ports

###### Unicast:

Port 80 TCP–Web Interface, System Management  
Port 123 UDP–Time Stamps for Service Logs  
Port 443 TCP - Secured Web interface, System Management  
Port 655 TCP - Link Group Member Registration  
Port 655 (...random from Gen-IC\*) TCP - Link Group Communication  
Port 655 (...random from Gen-IC\*) UDP - Link Group Audio  
Port 6001 (configurable) TCP - System Management  
Port 6001 (configurable) UDP - IVP Audio Streams  
Port 22350 TCP - Online Licensing Activation

###### Multicast:

None

##### Audio

**Resolution:** 12, 24 bit

**Sample Rate:** 24, 48kHz

**Frequency Response:** 100-12kHz or 100 - 20 kHz

**Audio Encoding:** Opus

##### Network Parameters

###### Bandwidth:

0.04-0.10Mb/s per output

Custom or preset settings

**Bit Rates:** 16, 32, 48, 64, 128kbps

**Packet Size:** 5, 10, 20, 40, 60ms

###### Network Jitter Tolerance:

Custom or preset settings

Jitter Buffers: 0-1000ms

###### QoS Tags:

DSCP=34, Assured Forwarding (AF-41)

**Link-Local Default IP Address Range:** 169.254.0.0/16

###### System Reserved IP Ranges:

127.0.0.0/8 Local Host

10.0.0.0/8 for Internal Systems

172.23.0.0/16 for Link Group

Above addresses cannot be assigned

#### LQ in HelixNet or HMS-4X<sup>3</sup> Link Groups

For Networked Partyline Intercom

##### Network Protocols

Ethernet IPv4– Unicast Audio & 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 HMS/HRM Expansion

##### Network Parameters

**HMS-4X/Link Group Endpoint Support:** 64

Endpoints are user stations, active interface ports, Program Audio inputs and LQ accounts.

###### Bandwidth:

300kbps 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:

127.0.0.0/8 Local Host

10.0.0.0/8 Internal Systems

172.23.0.0/16 Link Group

Above addresses cannot be assigned.

###### 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 options

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

\*Ports are automatically assigned upon system start

# LQ Interfaces

## LQ Series Interfaces

### Network Specifications | Firmware Release 4.5+ (Continued)

#### I.V. Direct

For Clear-Com Device Interfacing over LAN/WAN/Internet

##### Network Protocols

Ethernet IPv4-Unicast Audio & Control

Layer 3-IP Routable

DNS-Domain Name Server

IVP-Proprietary intercom Audio and Control

G722-Audio Codec

AES-128-Audio and Control Encryption

**Network Connectivity:** Ethernet, Wi-Fi, 3G, 4G, LTE (as available on 3rd-party infrastructure)

##### Network Ports

###### Unicast:

Ports 6001 (configurable as caller) TCP-System Management

Port 6001 (configurable as caller) UDP-IVP Audio Streams

###### Multicast:

No multicast ports are used for I.V. Direct

##### Audio

**Audio Encoding:** G.722 Fixed Wideband 7kHz within 64kbit/s

**Frequency Response:** 50Hz-7kHz

**Signaling:** Call Signal & Virtual GPIO when connecting to Arcadia or Eclipse

**Silence Suppression:** Optional in LAN & WAN modes. Enabled in Internet mode.

##### Network Parameters

###### Resource Use:

**Arcadia:** 1 Licensed Port

**Eclipse:** 1 Port on IPA/IVC card

**LQ:** 4 (See LQ Resource Estimator)

###### Bandwidth:

140 kbps to/from Arcadia

With far-end silence suppression & bi-directional forward error correction

###### Package size:

LAN: 8ms

WAN: 24ms

Internet: 40ms

**Network Jitter Tolerance:** Rx: Selectable

LAN: <=12ms

WAN: <= 120ms

Internet: <=200ms

**Forward Error Correction:** Enabled in Internet mode

**Encryption:** AES-128 enabled in WAN & Internet modes

**QoS Tags:** DSCP=34, Assured Forwarding (AF41)

**MAC Address Prefix:** 00:0e:98:....

**Link-Local Default IP Address Range:**

169.254.0.0/16

###### System Reserved IP Ranges:

127.0.0.0/8 Local Host

10.0.0.0/8 Internal Systems

172.23.0.0/16 Link Group

Above addresses cannot be assigned

#### SIP Client

For interfacing to 3rd party telephone systems

##### Network Protocols

Ethernet IPv4-Unicast/Multicast Audio & Control

Layer 3-IP Routable

DNS-Domain Name Server

SIP-Session Initiation Protocol

G722-Audio Codec

G711-Audio Codec

**Network Connectivity:** Ethernet, Wi-Fi, 3G, 4G, LTE (as available on 3rd-party infrastructure)

##### Network Ports

###### Unicast:

Ports 5060 (configurable) TCP-SIP Register/Proxy

Port 5060 (configurable) UDP-SIP Register/Proxy

Ports 4000-32767 (random) UDP RTP/RTCP communications (2 ports per call)

LQ 4.0 will use ports 4000-4015 able to connect to any RTP/RTCP port

###### Multicast:

No multicast ports are used for SIP

##### Audio

**Audio Encoding:** G.722 Fixed Wideband 7kHz, 64kbit/s

**Frequency Response:** 50Hz-7kHz

**Audio Encoding:** G.711 Narrowband 3.4kHz, 64kbit/s,  $\mu$ -law, A-law

**Frequency Response:** 300Hz-3.4kHz

**Connection Type:** UDP/TCP

##### Control

**LQ Default:** Auto-Answer to assigned Channel

**LQ Front Panel:** On-Hook Controls

**LQ CCM:** Dial-Out, On-Hook Controls

**Eclipse/Dynam-EC:** Full controls when Direct to Eclipse Port

##### Network Parameters

###### Resource Use:

**Eclipse:** 1 Port on MVX/IPA/IVC card if integrated

**LQ:** 5 (See LQ Resource Estimator)

###### Bandwidth:

0.105-0.165Mb/s/ to/from LQ per call

**MAC Address Prefix:** 00:0e:98:....

**Link-Local Default IP Address Range:**

169.254.0.0/16

###### System Reserved IP Ranges:

127.0.0.0/8 Local Host

10.0.0.0/8 for Internal Systems

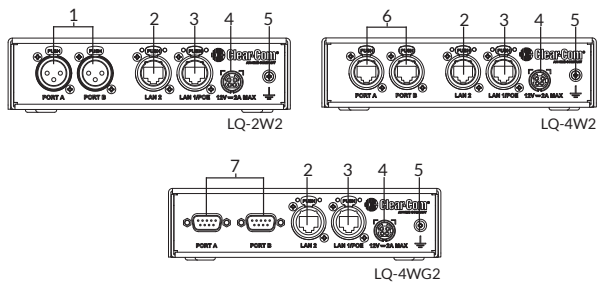
172.23.0.0/16 for Link Group

Above addresses cannot be assigned

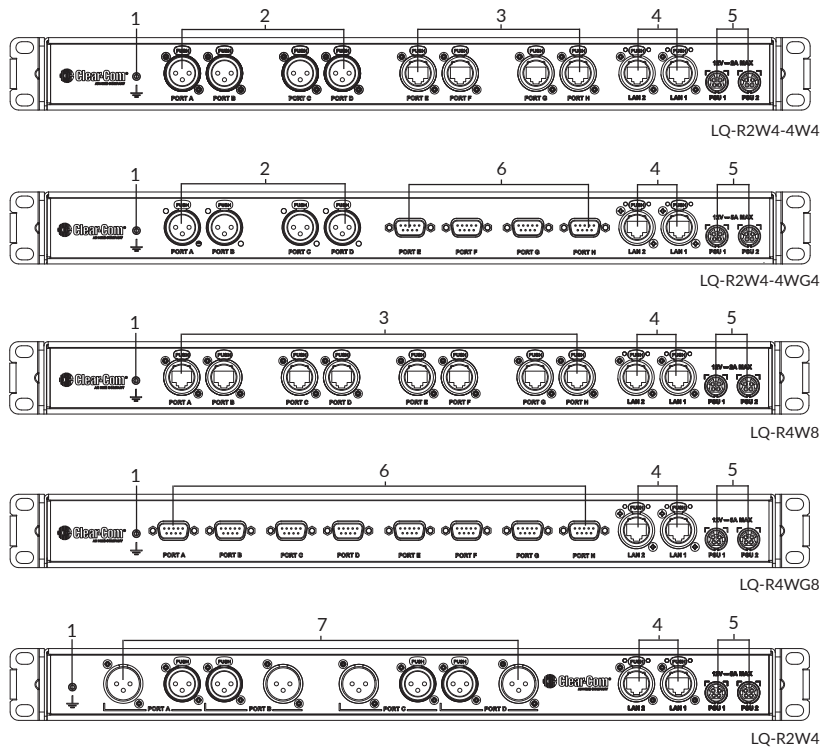
# LQ Interfaces

## LQ Series Interfaces

### LQ Back Panels



### LQ-R Back Panels



### Legend

#### LQ Back Panels

1. 2-wire connectors
2. Ethernet connector
3. Ethernet /PoE connector
4. Power connector
5. Ground screw
6. 4-wire connectors
7. 4-wire audio w/ GPIO connectors

#### LQ-R Back Panels

1. Ground Screw
2. 2-wire connectors
3. 4-wire connectors
4. Ethernet connectors
5. Power connectors
6. 4-wire audio w/ GPIO connectors
7. 2-wire connectors

### Order Codes

#### LQ Portable

**LQ-2W2:** Portable 2-port partyline interface

**LQ-4W2:** Portable 2-port 4-wire interface

**LQ-4WG2:** Portable 2-port 4-wire GPIO interface

**Include:** (1) 453G028-1 AC Adapter – Plug-In

#### LQ-R Rackmount

**LQ-R2W4:** 1RU 4-port partyline interface

**LQ-R4W8:** 1RU 8-port 4-wire interface

**LQ-R4WG8:** 1RU 8-port 4-wire with GPIO interface

**LQ-R2W4-4W4:** 1RU 8-port (4) 2-Wire, (4) 4-wire interface

**LQ-R2W4-4WG4:** 1RU 8-port (4) 2-Wire and (4) 4-wire with GPIO interface

**Include:** (2) 453G032-2 AC Adapter – Inline

#### Optional licenses

##### SIP Telephone Interface

**SIP8-LQ:** 8 SIP Client Ports

#### Virtual Client

**VIRTUAL-IC-LQ:** 1 user of Agent-IC or Station-IC

**VIRTUAL-IC8-LQ:** 8 users of Agent-IC or Station-IC

#### Station-IC Virtual Desktop Client

**S-IC-1W:** 1 user for 1 week

**S-IC-1M:** 1 user for 1 month

**S-IC-1Y:** 1 user for 1 year

**S-IC-8-1Y:** 8 users for 1 year

**S-IC-ADD1Y:** 1 user for +1 year

**S-IC-8-ADD1Y:** 8 users for +1 year

**Note:** S-IC license is for client computer, not LQ

