LQ Interfaces

LQ Series Interfaces

LQ and LQ-R Devices

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[2]

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[1]
  To: 3rd party SIP telephone systems
  Dial Control: CCM or Eclipse

Virtual Client Host

- Agent-IC[1] Virtual Mobile Client
  For: Android, iOS
- Station-IC[1] 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

Licenses

Delivery: License Ticket, may include multiple licenses
License Host: LQ, LQ-R
Activation: Via CCM, Online (recommended) or Offline
Transferable: No; fixed to LQ the license has been applied to
Recovery: Contact Clear-Com

Permanent Licenses

Part Number: SIP8-LQ
Capability: 8 SIP Clients on LQ
Validity: Perpetual; does not expire

Permanent LQ Licenses

Part Numbers: AGENT-IC-LQ, AGENT-IC8-LQ
Validity: Permanent for major version of Agent-IC connecting to LQ
Duration: For major feature release (e.g. v2.x). License does not expire

Subscription LQ Licenses

Part Numbers: A-IC-HX-1Y, A-IC-LQ-ADD1Y, A-IC-LQ8-1Y, A-IC-LQ8-ADD1Y
Validity: Duration of a Committed Subscription. Starts with Activation
Duration: 1 Year with Initiation, +1 Additional Year Extensions
Support: Duration of use or 7 years following purchase, whichever first
Note: Station-IC Virtual Desktop must use subscription client licenses when used with LQ

[1]Requires optional license
[2]HMS-4X is a legacy product. LQ uses WavPack codec with fixed parameters when linked to HMS-4X

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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 ±3dB
Impedance: >= 10KΩ

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 ±3dB
Impedance: 1200Ω + 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: >60dB at 1kHz
Nominal Level: CC: -18dBu, RTS-TW: -12dBu (adjustable -3dB to +3dB)
Headroom: 18dB
Frequency Response: 50Hz to 10kHz. ±3dB
Impedance: >= 10KΩ 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: >=1mA 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 ± 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 ± 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

LQ Interfaces

LQ Series Interfaces

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)

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Network Specifications | Firmware Release 4.5+

LQ includes 2 physical LAN connections which can are 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-4X³ 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
AES-128-Audio and Control Encryption

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, µ-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

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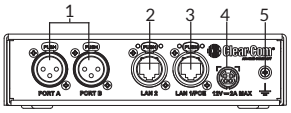
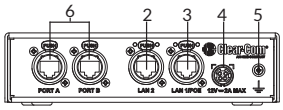
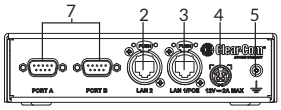
LQ Back Panels



LQ-2W2

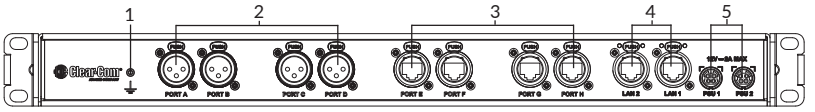


LQ-4W2

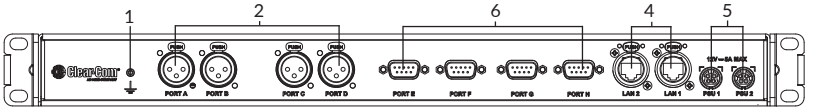


LQ-4WG2

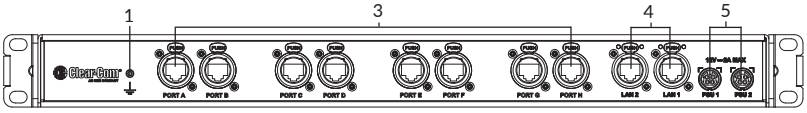
LQ-R Back Panels



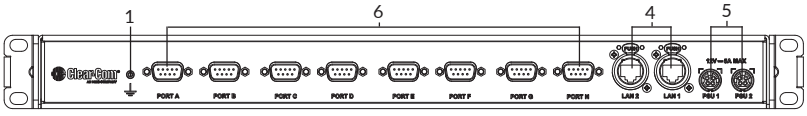
LQ-R2W4-4W4



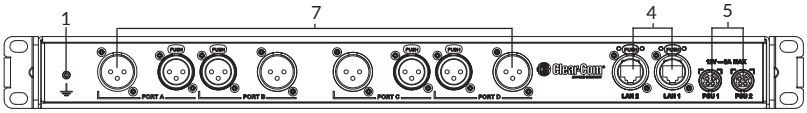
LQ-R2W4-4WG4



LQ-R4W8



LQ-R4WG8



LQ-R2W4

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

Agent-IC Virtual Mobile Client
Permanent for major version
AGENT-IC-LQ: 1 user
AGENT-IC8-LQ: 8 users
Subscription for ongoing use
A-IC-LQ-1Y: 1 user for 1 year
A-IC-LQ8-1Y: 8 users for 1 year
A-IC-LQ-ADD1Y: 1 user for +1 year
A-IC-LQ8-ADD1Y: 8 users for +1 year

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

Notice About Specifications While Clear-Com makes every attempt to maintain the accuracy of the information contained in its documentation, that information is subject to change without notice. Performance specifications included in this document are design-center specifications and are included for customer guidance and to facilitate system installation. Actual operating performance may vary.

WARNING: Cancer and Reproductive Harm - **www.P65Warnings.CA.Gov**

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