Arcadia Central Station

Integrated Platform

Linking People Together

Arcadia Central Station

Arcadia® Central Station is a scalable IP intercom platform integrating FreeSpeak® wireless and HelixNet® wired intercom user stations with Dante, 2-Wire and 4-Wire interfaces in a compact 1RU device.

Key Features and Benefits

Arcadia Central Station
- Combined Wired and Wireless Intercom
- Flexible Dante and Analog Interfacing
- Easy to use CCM™ browser configuration
- Scalable capacity licensing
- Fast front panel color touch screen with tactile encoders for control and configuration
- Plug-and-go with central discovery and pairing

Capacity
- FreeSpeak Wireless Intercom
  (10) E1 Transceivers (1.9*, 2.4 GHz)
  (16) IP Transceivers (1.9*, 5 GHz)
  (40) Beltpacks** (1.9*, 2.4, 5 GHz)
- HelixNet Wired Intercom
  (24) Enabled Channels**
  (64) Endpoints (HRM, HKB, HXII-BP)
- Dante Audio Network Interfaces
  (64) Dante Ports**

Configuration
- (128) Licensed Ports**
  - FreeSpeak Beltpack
  - HelixNet Enabled Channel
  - Dante Port
- (100) Channels
- (100) Groups
- (200) Roles for FreeSpeak & HelixNet

Connectivity
- (8) Four-Wire - 1 for PGM/SA
- (4) 2-Wire - 550mA per pair
- (2) GPI Optically Isolated
- (4) GPO Relay
- (2) FreeSpeak E1 - RJ45/SFP switchable
- (4) LAN - 2 x RJ45, 2 x SFP; Assignable to Management, AES67, HelixNet, Dante Primary and Secondary

Description

Arcadia Central Station is the centerpiece of a scalable IP networked intercom platform with support for more than 100 wired and wireless intercom user stations of various form factors, frequencies and connectivity. Coupled with Dante and analog interfacing of audio and control, Arcadia is suitable for any infrastructure. Arcadia's compact 1RU form factor is capable of mixing 180 audio signals, features front panel intercom user station, fast and easy setup, configuration and monitoring. With the future-proof ability to grow in capacity and features over time, Arcadia is the ideal intercom system.

FreeSpeak - Wireless Intercom

Arcadia supports the FreeSpeak family of wireless intercom, including 1.9 GHz, 2.4 GHz and 5 GHz frequency bands which can be concurrently deployed on an Arcadia system*. FreeSpeak antenna transceivers, connected via E1 CAT/Fiber plug and play cable connections or IP using AES67 capable networks, can be modularly added for coverage and capacity of beltpacks which can seamlessly roam between overlapping transceivers. FreeSpeak beltpacks can have their keys assigned to any Channel, Group or Interface Port on the system. Each FreeSpeak beltpack requires an Arcadia Licensed Port**.

HelixNet - Wired Partyline Intercom

Arcadia supports the HelixNet wired partyline intercom, including the HRM-4X Remote Station, the HKB-2X Speaker Station and the HXII-BP Beltpack. This is done by selectively enabling channels to be available to the decentralized mixing of intercom and Program Audio in HelixNet Endpoints, providing a high degree of operational elasticity to the Arcadia system. HelixNet user stations connect to Arcadia via an IP network and can have their keysets assigned to any HelixNet Enabled Channel on the Arcadia system. Each HelixNet Enabled Channel requires an Arcadia Licensed Port**.

Dante, Analog Audio & Control - Interfacing

Arcadia can interface to a variety of audio and intercom systems with audio interface ports assignable to any Channel, Group, FreeSpeak and Arcadia keyset on the system:

- Dante audio network interfaces allow any Dante input or output to connect to Arcadia. Each Dante port requires an Arcadia Licensed Port**.
- 4-Wire provides the ability to connect analog line-level audio inputs and outputs to Arcadia.
- 2-Wire Partyline allows interfacing to existing analog partyline intercom system infrastructures or to add Partyline user stations or interfaces using Arcadia's built in power supply.
- GPIO provides Inputs and Relay Outputs for system control. Inputs allow activation of audio crosspoints while Outputs can be activated upon key presses, audio crosspoints and or call signals configurable in Arcadia's Logic configurator.

*1.9 GHz beltpack cannot roam between E1 and IPT transceivers. 1.9 GHz E1 and IPT transceivers should not overlap on the same system.

**Requires Arcadia with sufficient number of Licensed Ports.

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Intercom User Station

Arcadia's front panel user station provides four keysets on large, high resolution, color touch screens, assignable to any Channel, Group, FreeSpeak beltpack, Program Audio or Stage Announce on the Arcadia system. The user station is provisioned with a headset connection, gooseneck mic connector and a loudspeaker in addition to All Call, Stage Announce and Remote Mic Kill.

System Configuration

Arcadia front panel menus provide the ability to configure the basic system configuration using an interface consisting of the easy to navigate color touch screens coupled with tactile rotary encoders and buttons. With the front panel, wireless beltpacks and transceivers can be added to the system, 2-Wire connections can be nulled and network addresses configured.

Arcadia's Core Configuration Manager™ (CCM) is an integrated, browser-based configuration utility enabling rapid setup, configuration and monitoring. The intuitive user interface has a consistent design for a quick and simple means of configuring an Arcadia based intercom system.

Licensed Ports - Scalable Capacity

Arcadia is a powerful hardware platform which allows capacity to be activated as customer requirements grow or features are developed for this dynamic platform. Arcadia's flexible licensing options allow right-sizing of the system required via Licensed Port Capacity. As the need for greater capacity grows or a new feature is needed, field deployable Licensed Port Upgrades can be used to increase Arcadia's intercom footprint.

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Technical Specifications

Capacity

FreeSpeak Wireless Intercom
(10) E1 Transceivers (1.9*, 2.4 GHz)
(16) IP Transceivers (1.9*, 5GHz)
(40) Beltpacks** (1.9, 2.4, 5GHz)

HelixNet Wired Intercom
(24) Enabled Channels**
(64) Endpoints (HRM, HKB, HXIIBP)

Dante Audio Network Interfaces
(64) Dante Ports**

Configuration

(128) Licensed Ports**
- FreeSpeak Beltpack
- HelixNet Enabled Channel
- Dante Port

(100) Channels
(100) Groups
(200) Roles for FreeSpeak & HelixNet

Licenses

Delivery: License Ticket, may include multiple licenses
License Host: Arcadia
Activation: Via CCM, Online (recommended) or Offline
Transferable: No, fixed to Arcadia
Recovery: Yes, by Clear-Com Support or Service Center

Permanent Licenses
Part number: ARCADIA-16P-LIC
Capability: Additional 16 Licensed Port Upgrade Option
Validity: Perpetuity. Does not expire

Note: Licensed Port capacity is ordered with Arcadia.
ARCADIA-16P-LIC allows upgrades of Arcadia capacity in the field.

Connectors

Headset: 4-pin XLR-M (X4), 5-pin XLR-F (X5)
Gooseneck Microphone: ¼" TRS Threaded
2-Wire I/O: (4) XLR-3F
4-Wire I/O: (8) RJ45
    Audio Crossover Mode: Software selectable
    Special use of Port #8 using provided cable;
    Program input/ Stage output: XLR-3F, XLR-3M
GPIO: (2) DB9F
FreeSpeakII E1 TCVR/SPL Ports: 2 x RJ45, 2 x SFP (RJ45 or SFP)
FSII DECT Synchronization: 2 x RJ45 (Input and Output)
LAN: 2 x RJ45, 2 x SFP (Function assignable)
AC Power Connector: IEC-C14
DC Power Connector: KPJX-4S-S
Grounding Screw: Terminal

Note: While mechanically identical, SFPs are designed with different properties for data rates, power and fiber cable type. Please refer to the Clear-Com SFP Compatibility Chart for compatible SFP transceivers.

*1.9 GHz beltpack cannot roam between E1 and IPT transceivers. 1.9 GHz E1 and IPT transceivers should not overlap on the same system.

**Requires Arcadia with sufficient number of Licensed Ports.

Controls and Indicators

Front Panel:
(2) 480 x 128 color TFT LED Touch Screen Displays
(2) Power Supply Status LED
(1) Mic mute button
(1) Headset/Gooseneck Mic Input Select button
(1) Menu Access Button
(1) FN Button – For future use
(4) Encoders for Menu & Level Control
(1) Reset button - for service use only
(1) Speaker Mute LED
(1) Main Listen Level LEDs

Rear Panel:
(2) LAN RJ45 Link/Activity LEDs
(2) FSII E1 TCVR RJ45 Link/Activity LEDs
(4) 2-Wire Power Indicator LEDs

Microphone Input

Input Type: Dynamic/Electret - Selectable
Headset Mic Voltage: 5V
Input Level (nominal): -45dBu
Input Level (max): -10dBu
Frequency Response: 200Hz to 12kHz ±3dB
Mic Limiter Threshold: -35dBu ±3dB
Mic Limiter Range: ≥ 20dB

Loudspeaker and Amplifier

Speaker: 1.6 x 2.8"
Load: 4Ω
Max Speaker Level: 87dB ± 2dB SPL A at 3ft/1m
Frequency Response: 100Hz – 10kHz
Max Output Level before 1% Distortion: 18dBu ± 2dB
Total Harmonic Distortion (THD): < 0.5% THD at 1kHz

4-Wire Line Level Interfaces:

Transformer balanced input and output

Input:
Nominal Level: 0dBu (selectable)
Maximum Level: +18dBu
Frequency Response: 80Hz to 20kHz ±3dB
Impedance: >= 10KΩ

Output:
Nominal Level: 0dBu (selectable)
Maximum Level: +18dBu
Frequency Response: 80Hz to 20kHz ±3dB
Impedance: 200Ω + 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: -18dBu (CC), -12dBu (RTS-TW)
Headroom: 18dB
Frequency Response: 200Hz to 12kHz. ±3dB
Impedance: >= 10KΩ bridging
Total Harmonic Distortion (THD): < 0.1% THD @ 1 kHz

Power: 560mA optional per pair (A/B or C/D)
Voltage: 25-28V DC

Use Encore Partyline Power Calculator to validate power requirements of the analog partyline intercom system

Frequency Response
Headset Mic: 200Hz to 12kHz
Gooseneck Mic: 200Hz to 12kHz
Speaker: 100Hz to 10kHz
Freespeak Edge: 200Hz – 12kHz
Freespeak II: 200Hz – 7.1kHz
HelixNet: 200Hz – 10kHz
2-Wire: 200Hz to 12kHz
4-Wire: 80Hz to 20kHz
Dante: 20Hz to 20kHz

Logic Inputs – GPI
Assignable to activation of audio crosspoints
Input: 2
Style: Optically isolated
Input Voltage Range: 4 - 30V DC or AC
Input Current: >=1.2mA required

Logic Outputs – GPO/Relay
Assignable to talk, call keys and audio crosspoints
Outputs: 4
Style: SPDT / Power Relay
Normalized: Open or Closed, separate pins
Switching Voltage (Max): 30V DC
Switching Current (Max): 1A

Power
AC Internal Power Supply:
Input Frequency Range: 100 - 240V AC
Input Frequency Range: 50 - 60Hz
Input Power (Max): 160W
BTU (Max): 545BTU/h
Input Power Connector: IEC-C14

DC Power Input:
Voltage: 12V DC ± 5%
Current (Max): 12A
Power (Max): 144W
BTU (Max): 491BTU/hr
Input Power Connector: KPJX-4S-S

This unit can be powered via DC input using:

AC Adapter - Inline:
Type: PSU-EXT-001 (supplied)
Mounting Bracket: 272G048 (optional)
Input Voltage Range: 100 - 240V AC
Input Frequency Range: 50 - 60Hz
Input Power Connector: IEC-C14
Output Voltage: 12V DC ± 5%
Output Current (Max): 12.5A
Output Power (Max): 150W
Output Power Connector: KPPX-4-P

Environmental
Operating: 32° to 113°F (0° to 45°C)
Storage: -22° to 158°F (-30° to 70°C)
Humidity: 20-90% Non-Condensing

Dimensions
1RU
19 x 1.7 x 13.9in (WxHxD)
(482.6 x 43.2 x 353.1mm)

Weight
7.3lbs (3.3kg)

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Network Specifications (Firmware Version 2+)

Arcadia includes 4 physical LAN connections (2 x RJ45, 2 x SFP) which can be assigned to different functions.
This allows various network setups, from converged to having physically separate network per function.

Administration
For CCM Management, Control and License Activation

Network Protocols
Ethernet IPv4–Unicast Control
mDNS–Multicast Device Discovery
HTTP–Management
HTTPS–Secured Management
NTP-Network Time Protocol

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 22350 TCP – Online License Activation

Network Parameters
MAC Address Prefix: 00:0e:98:....

Link-Local Default IP Address Range: 169.254.0.0/16

System Reserved IP Ranges:
10.0.0.0-7 Internal Systems
127.0.0.0/8 Local Host
169.254.0.0/16 Link Local
172.23.0.0/16 Link Group
224 -239.0.0.0/8 Multicast
Above addresses cannot be assigned.

Restrictions: Do not plug any two physical LAN ports on Arcadia into the same network/ VLAN. This can create a network loop affecting IP stability.

Recommended Ethernet Switches:
• Managed Ethernet Switch – Layer 3
• 100/1000 Base-T Ports
• 1000 Base IP Switch Trunks
• QoS Configuration
• Energy Efficient Ethernet bypass option
• IGMP Snooping options

AES67
For FreeSpeak IP Transceivers

Network Protocols
Ethernet IPv4–Unicast Audio & Control
mDNS–Multicast Device Discovery
Layer 3 routable with limitations
HTTP–Management
PCM–Audio Codec to TCVR
DiffServ–QoS
PTPv2–Synchronization
SAP-Session Announce Protocol
RTSP-Real Time Streaming Protocol

Network Ports
Unicast:
Port 80 TCP–Web Interface for service
Port 6001 UDP–Control
Multicast:
Port 15000 – 15256 UDP – Audio
Port 5353 UDP–mDNS, Names, Discovery, Pairing

Network Parameters
FS IP TCVR Endpoint Support: 16

Bandwidth:
FS II IPT TCVR: ~7 Mbps (max) each
FS Edge TCVR: ~ 9.6Mbps (max) each

Network Jitter Tolerance: < 1µs required for RF Synchronization

QoS Tags:
Clock: DSCP=46, Expedited Forwarding (EF)
Media: DSCP=41, Assured Forwarding (AF)
Management: DSCP=0, Best Effort (DF)

PTP Parameters:
PTP domain: 0
Priority 1: 127
Priority 2: 128
Announce interval: 1/2s
Sync rate: 8/s

IGMP: Enabled

Multicast: Enabled

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

Link-Local Default IP Address Range: 169.254.0.0/16

System Reserved IP Ranges:
10.0.0.0-7 Internal Systems
127.0.0.0/8 Local Host
169.254.0.0/16 Link Local
172.23.0.0/16 Link Group
224 -239.0.0.0/8 Multicast
Above addresses cannot be assigned.

Restrictions: Cannot be combined with Dante.
Cannot be on Management subnet unless on same physical LAN port.

Further Details: Refer to the AES67 Network Recommendations for further information.

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HelixNet
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
RTP–Audio Transport
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 6001 TCP–System Management
Port 6001 UDP–Audio Streams

Multicast:
Port 5353 UDP–mDNS, Names, Discovery, Pairing, Expansion
Optional for device names and pairing Mandatory for HRM Expansion

Network Parameters
HelixNet Endpoint Support: 64

Bandwidth:
300-600 (max) kbps from each endpoint audio input to Arcadia
1200-2400 (max) kbps from Arcadia to each endpoint audio output

Network Jitter Tolerance: <= 128ms jitter buffer per audio stream receiver automatically adjusted to network performance

QoS Tags: DSCP=41, Assured Forwarding (AF)

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

Link-Local Default IP Address Range: 169.254.0.0/16

System Reserved IP Ranges:
10.0.0.0-7 Internal Systems
127.0.0.0/8 Local Host
169.254.0.0/16 Link Local
172.23.0.0/16 Link Group
224 -239.0.0.0/8 Multicast
Above addresses cannot be assigned

Restrictions: Possible combinations on physical LAN ports is pending a future Arcadia release. Contact Clear-Com.

Further Details: Refer to the HelixNet Network Guide for further information

Dante (Firmware Version 4.2)
For 3rd Party Audio Networking

Network Protocols
Ethernet IPv4–Unicast/Multicast Audio & Control
mDNS–Multicast Device Discovery
PCM–Audio Codec
DiffServ–QoS
PTPv1 – Synchronization
SAP-Session Announce Protocol
RTP-Real Time Protocol for AES67

Network Ports
Unicast:
Ports 14336-14591 UDP-Audio
Port 4440 UDP-Audio Control
Port 4444 UDP-Audio Control
Port 4455 UDP-Audio Control
Port 8751 UDP-Dante Controller
Port 8800 UDP-Control & Monitoring

Multicast:
IP 224.0.0.251 Port 5353 UDP–mDNS, Names, Discovery
IP 224.0.1.129-132 Ports 319-320 UDP–PTP
IP 239.254.3.3 Port 9998 UDP-PTP
IP 239.255.0.0/16 Port 4321 UDP-Audio
IP 224.0.0.230-233 Ports 8700-8708 UDP-Control
IP 239.69/16 Port 5004 UDP (default) -RTP/AES67 Audio
IP 239.255.255.255 Port 9875 UDP-AES67 Discovery

Network Parameters
Audio: 24 bit, Linear, 48kHz

Bandwidth:
6 Mbps per 4 channel unicast flow
1.5 Mbps per multicast channel

Network Jitter Tolerance: Dependent on Dante latency configuration

QoS Tags:
Clock: DSCP=56, Control (CS7)
Media/Clock: DSCP=46, Expedited Forwarding (EF)
Other: DSCP=0, Best Effort (DF)

IGMP: Enabled for multicast use

Multicast: Enabled for multicast use
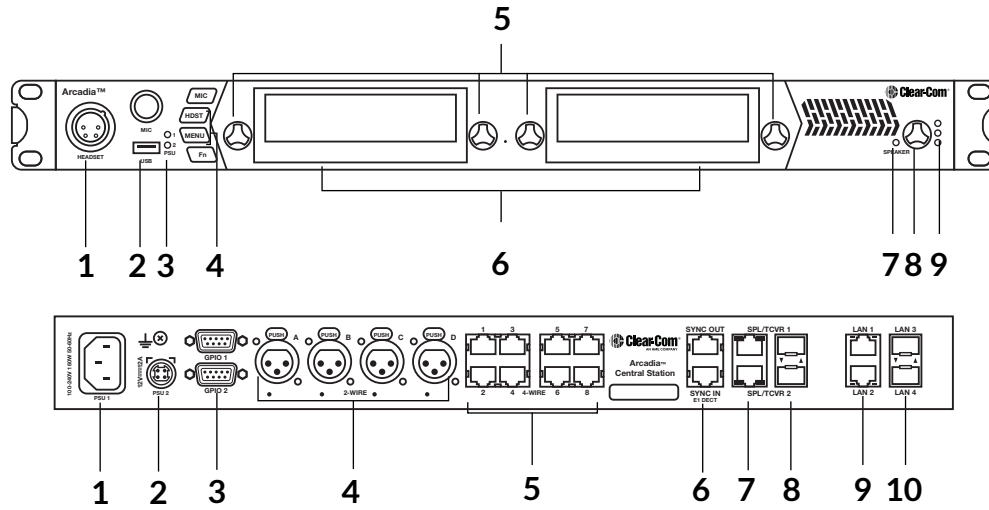
Link-Local Default IP Address Range:
169.254.0.0/16 Primary
172.32.0.0/16 Secondary

Restrictions:
Cannot be combined with AES67.
Primary and Secondary cannot be assigned to same physical LAN port.

Further Details:
Refer to documentation from Audinate for further information.

Legend

Front
1. XLR Headset Connector
   - 4-pin XLR-M (Arcadia-X4 only)
   - 5-pin XLR-F (Arcadia -X5 only)
2. USB A
3. PSU LED indicators
4. Microphone, Headset, Menu and Function keys
5. Rotary encoders
6. Touchscreen displays
7. Speaker mute LED
8. Main volume encoder
9. Main volume level LEDs

Rear
1. Power Input - AC
2. Power Input - DC
3. GPIO
4. 2-Wire ports
5. 4-Wire ports
6. DECT sync in & out
7. FSII E1 TCVR/SPL RJ45
8. FSII E1 SPL Fiber SFP
9. LAN ports
10. LAN SFP ports

Order Codes

Arcadia with 4-pin Headset Connector
ARCADIA-X4-32P
ARCADIA-X4-48P
ARCADIA-X4-64P
ARCADIA-X4-80P
ARCADIA-X4-96P
ARCADIA-X4-112P
ARCADIA-X4-128P

Arcadia with 5-pin Headset Connector
ARCADIA-X5-32P
ARCADIA-X5-48P
ARCADIA-X5-64P
ARCADIA-X5-80P
ARCADIA-X5-96P
ARCADIA-X5-112P
ARCADIA-X5-128P

Licensed Port Upgrades
ARCADIA-16P-LIC

Includes:
(1) Four-Wire PGM/SA Breakout Cable (CAB-RJ45-PGM-SA)
(1) External PSU (PSU-EXT-001)

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