GENERAL REQUIREMENTS

PURPOSE

The matrix is the audio router at the heart of the intercom system. The purpose of the intercom system is to allow multiple users to coordinate real-time production by establishing bi-directional audio paths between users. Each edge device shall connect to the matrix on an available port.

CAPACITY

A single matrix shall be 128 inputs by 128 outputs, non-blocking. It must have the ability to create up to 96 partylines with up to 80 users each. Up to 16 IFBs must be supported (Interruptible Fold-Back).

SCALABILITY

A single matrix shall be scalable from 16 ports up to 128 ports in a single unit. It shall be possible to interconnect up to 8 units to create a single intercom matrix with 1024 ports. The method for interconnecting matrices is specified below.

FORM FACTOR

A compact intercom matrix is required to fit in a one rack unit form factor, which means it can be mounted in a standard 19 inch equipment rack, in which the vertical spacing is 1.75 inches. Depth as measured from the front of the racks shall not exceed 350 mm.

AMBIENT OPERATING TEMPERATURE

The matrix shall have built-in cooling based on forced air circulation from multiple fans, to allow it to operate at an ambient temperature up to 50 degrees Celsius (122 degrees Fahrenheit). Fans shall be orientated so as to pull air into the unit from one side.

MECHANICAL STRUCTURE

The matrix shall have a front-panel user interface featuring a color display capable of displaying information about the unit, two rotary encoders with push-function, a full numeric keypad with backlight, front RJ45 connector for laptop running configuration software, and power switches. The rear of the unit shall have a set of connectors specified below. A rear support bracket shall be available as an option, to provide mechanical support in applications where the device is subjected to vibrations.

FRONT PANEL FEATURES

FRONT PANEL DISPLAY PROPERTIES

The display shall have the active area of at least 120 mm x 19 mm. Resolution must be at least 4.7 pixels per mm (approximately 120 dpi), with the ability to reproduce a minimum of 65536 colors. The luminance of the display shall be user-adjustable up to the maximum rating, which shall be no less than 12,500 Candela per square meter of display, when all pixels are set to show white. The display technology shall be TFT. Display viewing angle shall be a minimum of 80 degrees, vertically and horizontally.

FRONT PANEL DISPLAY GUI

The features of the matrix shall be available through an icon-driven Graphical User Interface (GUI) where individual user-configurable functions are selectable from hierarchically organized menus. Up to seven icons may be displayed on any single menu. It must be possible for the user to navigate through the menus and select individual items using the rotary knobs and/or the keypad.

FRONT PANEL KEYPAD

The keypad shall have all the digits from 0 to 9 plus two extra keys for additional functions. The keypad shall have blue or white backlight, to be selectable by the user.

FRONT PANEL RJ45 CONNECTOR

A single RJ45 connector shall be available to connect an Ethernet enabled laptop, to run configuration or setup software.

FRONT PANEL POWER SWITCHES

Two independent power switches shall be available on the front of the unit. Switches shall be flush mount and recessed below the surface when activated to prevent accidental contact from turning off power to the unit. The switches shall have illumination to indicate when they are in the on position. Each switch shall control a separate power supply, internal to the unit. Each power supply should be able to independently power the device.

REAR FEATURES

POWER CONNECTORS

Two independent power inputs for 100-240 V AC shall be available on the rear. The connectors shall support locking power cables, to prevent them from falling out.

Analog Input Output (AIO) connectors

Unit must have a minimum of sixteen (16) AIO connectors for analog keypanels. The format for the analog keypanel audio and data is specified separately.

Two-wire connectors

Unit must have a minimum of two (2) connectors for analog two-wire partyline. The connectors shall be 3-pin female XLR. Single- and dual-channel two-wire shall be supported. The RTS, Clear-Com, and

Audiocom wiring formats shall be supported. The two-channel Clear-Com and Audiocom formats do not have to be supported. The two partyline ports shall operate independently, and be able to operate in different modes.

GENERAL PURPOSE INPUT/OUTPUT

The device shall feature a GPIO connector for four general-purpose inputs and four relays. The inputs shall be opto-coupled, for an external power source rated 5-18 V DC. The relays shall have common, normally-open, and normally-closed contacts capable of 1.0 Amp at 30 V DC.

RS-485 SERIAL DATA CONNECTOR

An RJ45 connector for RS-485 serial data shall be available for external devices that require this data protocol. Bit rate shall be 76,800 bits per second.

FRAME-TO-FRAME CONNECTION

An optical high-speed communications link shall allow multiple units to be interconnected, to work as one single matrix. The interconnection shall use SFPs for single or multi mode laser. Using the interconnection it shall be possible to connect the matrices in a logical ring. The user shall have the option of having a redundant connection between the units. The data rate on the matrix interconnection shall be sufficient to support 1024 concurrent channels of uncompressed audio.

CONTROL CONNECTOR

A rear RJ45 Ethernet connector shall be available for connection of an external laptop to run configuration and setup software.

CONNECTOR FOR VOIP

There must be a dedicated RJ45 connector for Voice over IP. The format of the VoIP audio is specified separately.

EXTERNAL WORD CLOCK

The unit must have a BNC-style connector for external word clock. The matrix must be able to synchronize to an external word clock.

HIGH-QUALITY AUDIO OVER IP, RJ45 AND SFP

There must be a total of two (2) RJ45 connectors and two (2) provisions for SFP, to send and receive high-quality audio over IP (specified separately).

PROVISIONS FOR FUTURE ENHANCEMENTS

GLITCH-FREE AUDIO

The matrix must come with MAC-addresses pre-programmed to allow firmware enhancements to support glitch-free audio.

VOIP CODECS

The unit shall have sufficient processor capacity for up to sixteen (16) simultaneous VoIP channels in G.711 and G.729 codecs.

UNIT-LEVEL REDUNDANCY

The fiber-based frame-to-frame connection shall be designed to allow one matrix to act as a backup for another. In the case of a failure of a matrix, all the ports except the AIO-ports shall switch over automatically to the backup unit.