



# ECHO Digital Industrial Intercom Systems Engineering Specifications



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## Engineering Specification for ECHO Series Solutions

*Furnish a complete master-to-master digital duplex loud speaking intercom system as described herein and shown on the plans. System shall include, but not be limited to, fully electronic digital central exchange with power supplies, terminal blocks, and master stations, sub-stations and remote control units as necessary to provide a complete operating system. The system described herein is based on the Echo intercom system as manufactured by Federal Signal Corp/Ltd. The Echo System meets all requirements of the specification and shall be considered as the acceptable base bid. Alternate equipment shall be considered only when the following have been submitted and approved in writing by architect/engineer ten (10) days prior to opening of bid: A list of such alternate equipment and materials together with three (3) copies of working and shop drawings. The base bid shall be on the equipment as specified. Alternate equipment must be noted on a separate bid form with an add or deduct to the base bid. The equipment furnished under this specification shall be a standard product of a single manufacturer and shall be equal in performance and quality to the Echo System manufactured by Federal Signal Corp. Manufacturer shall have engaged in the design, manufacture and support of 5 or more microprocessor based voice communication products for a minimum of thirty (30) years. Each major component shall bear the manufacturers name and catalog number. The contractor shall furnish and install all equipment, accessories and materials necessary for a complete operating system in accordance with the specifications and applicable drawings. All components and the system as a whole shall meet or exceed the minimum standards issued by the EIA. All work in conjunction with this installation shall meet the provisions of the National Electrical Code (NEC) and conform to the current National Fire Protection Association (NFPA) standards. Additionally the product must have third party certifications on its central power supply including Underwriters Laboratories, CSA Canadian Standards, TUV, & CE. All stations used in hazardous or explosion proof atmospheres must be third party listed for the intended areas of use. Manufacturer shall warrant that equipment is free from defects in labor and materials and shall provide a minimum of five (5) years' warranty of its equipment.*

*The system shall be Federal Signal Echo series or an approved equal and shall provide at least the following features and functions: Fully digital, microprocessor controlled Central Exchange employing switched PCM encoded voice and data for interference-free communications. The system shall be capable of digital duplex, hands-free voice communication at both calling and called party stations as well as digital control of features. Speech channels throughout the Central Exchange and the transmission lines shall be completely digital to and from each call station, and shall eliminate adjustment prone analog type circuitry throughout. The system shall utilize digital signal processor technology. The system shall be expandable through the addition of a second control cabinet, or a higher capacity alternate cabinet used in its place. The system shall provide full feature station operation by means of single twisted pair of non-polar conductors between the Central Exchange and each station. Systems with stations requiring more than one single twisted pair for all feature operation including station LCD shall not be acceptable. The basic Central Exchange shall be modular and expandable from 8 to 48 station lines in increments of eight station lines. By networking Central Exchanges, it shall be possible to expand to a maximum capacity of 96 station lines. By use of other cabinet arrangements the central control shall be expandable to 9072 field stations. There shall be 30 non-blocking links in a Central Exchange. It shall be possible to configure a 60 capacity exchange for fully non-blocking operation. There shall be thirty (30) links between networked exchanges. System shall be capable of being networked through the interconnection of two Central Exchanges in a centralized or decentralized configuration for a maximum capacity of 96 station lines. Networked exchanges shall retain the same full feature operation as non-networked exchanges without the necessity of additional equipment. A full IP based option is required where by allowing the system to maintain full functionality over existing or dedicated LAN's / WAN's. Through the use of modular rack mount and decentralized cabinets the system shall be capable of up to 9072 intercom / field stations. The system shall have the capability to have Central Exchanges networked by utilizing fiber optic modems. The system shall also allow fiber optic modem connections for all station types equipped with an adapter. It shall be possible to partition a group of stations by program control and block calls between partitions to provide independent operation within partitions. There shall be up-to 99 partitions. It shall be possible to assign stations to a special partition (0), which allows access to all*

stations in all partitions. Touch dialing extension sequences may be two (2), three (3) or four (4) digits according to preference or system size. Extension number sequence assignment shall be under program control and not require rewiring or setting of switches. It shall not be required to dial codes or digits additional to the 2, 3 or 4-digit sequence to call between stations or to execute features in different Central Exchanges that have been networked (tie-lined). Systems requiring additional 4 digits or codes for networked exchanges shall not be acceptable. The system shall provide bi-directional serial data ports for external PC computer remote control of call features including placement, answering, system programming and modem interface as well as VDT, PLC, GUI and security integration software. The system shall have a multi-level call restriction capability to allow or deny access to features such as pre-empt, paging, and group call. Call restrictions shall be individually programmable for each station. Each master station (non-hazardous locations only) shall have the capability to provide plain English phrase LCD display of feature-in-progress including: BUSY, HOLD, TRANSFER, CONFERENCE, ALL-CALL, GROUP CALL, PAGE REPLY PROMPT, MESSAGE WAITING, CAMP-ON BUSY, CALLED and CALLING PARTY NAME ID, HELP MENU, NAME/NUMBER DIRECTORY, CALL FORWARD. Each master station shall have capability to display a unique directory of up to 20 frequently called extension numbers and names using a single key to scroll and a single key to dial displayed extension. It shall be possible for a Master station to set up a conference consisting of up to five (5) members. Conference calls shall be the hands-free loud speaking mode. Handset stations in conference shall be in full-duplex mode. A maximum of ten (10) simultaneous conferences shall be supported with a total maximum of 32 members. It shall be possible for any conferee to disconnect at any time. When the originator disconnects, all members shall disconnect. There shall be a display on the station LCD of each conferee showing the number of conference members. Each master station shall have the capability to establish calls to other stations in the two-way hands-free loud speaking mode. Each master station shall have the capability to camp-on when called station is busy and be answered automatically when the called station is idle. Busy station shall automatically place multiple camped-on stations in a prioritized queue and periodically alert busy station that calls are waiting. Each master station shall have the capability to leave a message on the LCD screen at a called station, requesting a return call. A reminder tone shall periodically sound at the called station. When a called station is busy, the calling master station shall have the capability to pre-empt (interrupt) an existing conversation. The preempted party shall be placed on hold and may be restored when the pre-empting conversation is terminated. Each master station shall have the capability to emergency all-call or priority pre-empt page to all stations simultaneously. With the capability to password protect if desired. Each master station shall have the capability to all-call or one-way voice page all non-busy stations simultaneously (including P.A. Page interface stations if so equipped). Each master station shall have the capability to group call with reply to all non-busy members of any of nine groups per partition. Each Master station, which has been paged, shall have the capability to reply to the master station that initiated the All or Group Call by pressing a single key as prompted by station LCD message display. When Master stations are connected either party shall have the capability to place the other party on hold and restore the connection. When Master stations are connected either party shall have the capability to place the other party on hold and restore the connection. Each master station shall have the capability to place a call on hold, dial and connect to a third party and restore the original connection. Each master station shall have the capability to transfer a call to another extension. Each master station user shall have the capability to automatically redirect or forward calls to a designated station. Each master station in the full private mode shall have the capability to have their calls forwarded to a designated station when there is no answer at the station. Each master station shall have the capability to call the last caller or redial the last number dialed with a single key entry. Each master station shall have the capability to direct speed dial any extension with one or two digit dialing. One and two digit speed dial sequences shall be programmable by the user at each Master station. Systems that do not permit user programmability of both one and two-digit speed dialing shall not be acceptable. Each master station shall have the capability to select from four modes of station privacy: Automatic Loud speaking Answer, Manual Answer, Full Privacy Ring and Do Not Disturb. Each master station shall have the capability to adjust its voice and ring tone volume using digital volume control keys. Stations requiring use of rotary or slide mechanisms for control of volume levels shall not be acceptable.

Tone signals shall be used to augment visual displays on station LCD displays for various functions including Call Pre-announce alert, Camp-on busy reminder, Message waiting alert and Full Privacy ring. Each master station shall have the capability to mute its local microphone for privacy by pressing a single key. Each master station shall have the capability to manually control speech direction (PTT) for noisy areas by pressing a single key. Each master station shall have the capability to remotely activate a sub-station relay for control of doors or cameras. The system shall be capable of including interfaces to allow each master station to access multiple channels of programmed audio information sources. The system shall be capable of including interfaces to allow each master station to access multiple voice page systems for paging through external amplifiers and overhead speakers. The system shall be capable of including an interface to allow each master station to access a radio pocket page system to allow tone signaling and display annunciation on individual pagers. The system shall be capable of including an interface to allow each master station to access a two-way radio system for two-way voice communications with groups of portable radios. The system shall be capable of including an interface to allow each master station to receive or place telephone calls through a PBX or CO lines. Substations shall be capable of placing calls to designated masters, other substations and to administrative masters by pressing a single button. Administrative masters shall be capable of all features of a standard master station as well as the capability to store and display calls from substations, scroll and answer substation calls out of order and display multiple levels of substation call status. It shall be possible to program multiple Administrative Masters to operate in a parallel mode. Access shall be restricted on a per-station basis for: All-call, Group Call, Partition, Pre-empt, Privacy and Emergency All-call through the program mode of a Master station. Time-out limits shall be programmable for paging, page reply, call ring, message tone interval and no-answer call forward. Pre announce tone shall be programmable on/off.

*The Echo Intercom shall provide as a minimum the following features.* Master Stations shall be capable of calling any other station in the system by touch dialing an extension number. When the calling party dials the extension, the digits and called party directory name shall display on the integral LCD display of the station and immediate communication shall be established with the idle called station. At the called party station, the number and directory name of the calling party shall display. After connecting, hands free communication may begin and both parties may converse naturally without pressing any buttons. Calls may be canceled by either party by pressing the "X" button or going on-hook. Incompletely dialed calls shall time-out automatically in five seconds. Stations shall be capable of being preset to any of four modes of privacy for receiving calls. Stations in Automatic Loud speaking Answer and Manual Answer mode both shall receive a pre-announce tone and shall automatically connect when called; a Manual Answer station microphone shall be muted until answered by keying "T" or going off-hook. Stations in Full Privacy Ring mode shall receive a ring tone and shall be answered by pressing "T" or going off-hook. Stations in Do-Not-Disturb mode shall appear busy to calling station. The volume for both voice and ring signal shall be adjusted by means of digital volume keys on the station keypad. The keypad volume keys shall independently control the volume for both handset and hands free operation. It shall be possible to remotely control relays on sub-stations where ancillary devices such as door releases, bells, lights or CCTV cameras may **be** activated by connecting to the station and dialing a single digit. A handset with coil cord shall be provided for private conversations on indicated stations. When the handset is lifted off-hook the panel speaker and microphone shall be disconnected and handset shall be enabled. Calls from handsets shall be full duplex. It shall be possible to use the keypad with the handset on or off-hook. A handset with stainless steel armored cord shall be provided for private conversations on indicated stations. When the handset is in use, its associated external speaker shall become muted and the handset shall be enabled. Calls from handsets shall be full duplex. It shall be possible to use the keypad with the handset on or off-hook. All hazardous location handsets shall have an integral ultra-bright LED light source indicating incoming call, off-hook, or emergency page. Additionally, an integral din rail mounted relay closure will activate during incoming call and priority page

conditions. Each sub-station call button shall place calls to a pre-programmed destination and have capability to be programmed to place two types of calls, Standard and Admin. It shall be possible to program any number of sub-stations to call the same master station. Sub-station buttons programmed as Standard shall place calls to masters or substations and shall be processed in the same manner as a call from a master station. Sub-station buttons programmed as Standard shall place calls to masters or substations and shall be processed in the same manner as a call from a master station. Sub-station buttons programmed as Standard shall place calls to masters or substations and shall be processed in the same manner as a call from a master station. Sub-station buttons programmed as Admin shall place calls to Administrative Masters where they shall be stored allowing multiple sub-stations to place simultaneous calls to the same master without receiving busy or being lost. Sub-station buttons set as Admin shall be capable of being programmed to place either Routine or Emergency level calls with selectable locking or Non-locking status. Admin calls shall be capable of being assigned any of ten programmable text messages and shall be capable of reporting to multiple masters. Administrative Master stations shall place and receive calls and shall have all the same features as a conventional master as well as a dedicated Tone Silence button. In addition to the basic master keypad, the Administrative Master station shall have seven additional keys, which shall be capable of being programmed to provide one-touch selection of standard functions. Administrative Masters shall have the capability to store multiple simultaneous Admin sub-station calls. It shall be possible to display and answer Admin calls out of sequence without using numeric touchpad or without losing calls. It shall be possible to display up to ten levels of substation call priority. LCD display shall provide an active call count display of up to ten stored calls. If more calls are waiting to be answered, the More Call LED shall illuminate. Multiple masters shall be capable of receiving Admin calls from the same sub-station. Masters shall be capable of operating in a parallel or independent mode or receive Admin calls from all substations. LED indicators on administration desk set shall be provided to indicate Admin call status of Routine and Emergency levels and More Calls. The LED indicator located on the hazardous and explosion proof stations indicate, off-hook, incoming call, and emergency page. LED indicators on administration desk set shall be provided to indicate Admin call status of Routine and Emergency levels and More Calls. The LED indicator located on the hazardous and explosion proof stations indicate, off-hook, incoming call, and emergency page. Program Distribution Interface station shall be accessed from a master station by dialing a code corresponding to the interface. It shall be possible to access multiple Program Interfaces from any master station. Calling to a station connected to a program source shall cause the program source to be put on Hold and restored at the end of the conversation. Overhead Page Interface station shall be accessed from a master station by dialing an access code corresponding to the interface. It shall be possible to access multiple Page Interfaces from any master station. It shall be possible to set a time limit for Overhead pages. Radio Pocket Page Interface station shall be accessed from a master station by dialing an access code. It shall be possible to transmit, in either the manual or automatic modes of operation, the calling station extension and directory name to be displayed on an alphanumeric display pager or groups of pagers. Two-way Radio Interface shall be accessed from a master station by dialing an access code and allow manual two-way conversation using the "T" button. PBX Telephone Interface shall be accessed from a master station by dialing an access code for outgoing calls. The exchange shall seize the first available line in a preassigned hunt group. Incoming calls may be directed to a specific extension or allowed to dial any extension.

The system supplied shall utilize a Federal Signal Corp. central control or approved equal consisting of a Digital Switch, up to six plug-in Line Card Module cards with plug-in field wiring terminal blocks, and necessary Power Supply for a complete operating system. The system power supply shall be Underwriters Laboratories listed (U.L.), Canadian Standards Agency approves (CSA), and CE certified for use in Europe. It shall be possible to network two ECHO control units by using ECHO-MC Modem cards, for a total capacity of up to 96 station lines. The system shall be further expandable through use of a modular cabinet in place of the standard cabinet. Total system capacity is 9072 field stations. Control cabinets can be separated by wire or by fiber optics. The system shall be fiber optics ready through the use of external fiber modems. It shall be possible to add an ECHO-CC Conference card to enable all conference features. It shall be possible to have 6 simultaneous 5 person conference calls or 30 two person simultaneous calls. Networking of Central

Exchanges shall require no more than two (2) metallic twisted pairs or two (2) fiber lines using fiber optic transceivers supporting G.703 and shall provide 30 links. Feature programming of stations shall be accomplished by utilizing a master station to access a password protected program mode or connecting a personal computer running the Windows\* based Model ECHO-SFW Software package at a central location without the necessity for system shutdown or interruption. Selections or changes are stored automatically in system non-volatile memory. Stations requiring the setting of dip-switches or jumpers to select or deselect features shall not be acceptable. Central Exchange shall employ Flash memory technology allowing future system upgrades for system features and functions as developed by Manufacturer to be made remotely via PC without the need for component replacement. Systems requiring removal or replacement of memory modules for program upgrade of any type shall not be acceptable.

All programmable system data including customized user changes (system configuration) shall be retained in non-volatile solid-state memory devices. Systems requiring battery back up to retain data in memory or requiring reprogramming in the event of a primary power failure shall not be acceptable. Each Central Exchange shall be powered by self-cooled, regulated 28Vdc power supplies. The input power to the supplies shall be 110-240Vac @ 50 - 60 Hz. The malfunction of one station or its connecting wire pair shall affect only that station and shall not propagate to other stations in the exchange. The malfunction of one station or its connecting wire pair shall affect only that station and shall not propagate to other stations in the exchange.

Each station shall be connected to the Central Exchange by means of a single, non-polar, twisted pair of conductors. For ease of installation, it shall be possible to reverse the connection polarity of the two station line conductors without affecting the station operating performance. Communication between stations and the Central Exchange shall be possible at a distance of 1.2 mi. (2km.). By specifying the "-EXT" option for station and line card Model ECHO-LC-X, it shall be possible to extend the distance to 2.4 mi. (4km.). Stations shall have the capability to interconnect to Central Exchange via fiber optic modem using optional interface Model ECHO-FOTI. Explosion Proof Handset Stations shall be Federal Signal Model E1-HND or approved equal and shall be equipped with the following controls: 16 button keypad shall include keys for digital volume, 10 numeric functions, cancel and connect. The keypad provides tactile and audible feedback for positive activation. Stations requiring use of rotary or slide adjustments for control of station volume or privacy shall not be acceptable. Overall frequency response shall be shaped by the internal Digital Signal Processor to conform to digital telephone standards. Faceplate thickness shall be .12 in. (3mm) brushed aluminum. Field wiring terminal shall be positive locking spring loaded for data wires. The data input terminal shall be capable of handling wires down to 26 Awg. Station wiring shall have a maximum of two conductors for full feature capability. Stations requiring more than two conductors for communications shall not be acceptable. Station shall employ Digital Signal Processors for natural speech quality in difficult acoustic conditions. Station will use internal din rail mounted terminal blocks, additional screw type terminal blocks will be available for control power of external devices if required. A din rail mounted relay module will be standard and will have an optical output indicating status. Explosion proof units shall be manufactured by Federal Signal. Handset versions will be Federal Signal model E1-HND. Hands free units will have varied lengths of microphones and will be Federal Signal E1-GM (1-3) or E1-SM stubby mic. Federal Signal Model E1-HDS will be used for hands free headset operation in high ambient noise environments. Outdoor enclosures and acoustical hoods will be optional but offered by equipment manufacturer. Hazardous location Handset Stations shall be Federal Signal Model E2-HND or approved equal and shall be equipped with the following controls: 16 button keypad shall include keys for digital volume, 10 numeric functions, cancel and connect. The keypad provides tactile and audible feedback for positive activation. Stations requiring use of rotary or slide adjustments for control of station volume or privacy shall not be acceptable. Overall frequency response shall be shaped by the internal Digital Signal Processor to conform to digital telephone standards. Enclosure thickness shall be .12 in. (3mm) Stainless Steel. Field wiring terminals shall be positive locking and spring loaded for data wires. The data input terminals shall be capable of handling wires down to 26 Awg.

Station wiring shall have a maximum of two conductors for full feature capability. Stations requiring more than two conductors for communications shall not be acceptable. Stations shall employ Digital Signal Processors for natural speech quality in difficult acoustic conditions. Stations will use internal din rail mounted terminal blocks, additional screw type terminal blocks will be standard for control power of external devices if required. A din rail mounted relay module will be standard and will have an optical output indicating status. Explosion proof units shall be manufactured by Federal Signal or equal. Handset versions will be Federal Signal model E2-HND or equal. Hands free units will have varied lengths of microphones and will be Federal Signal E2-GM (1-3) or E2-SM stubby mic. Federal Signal Model E2-HDS will be used for hands free headset operation in high ambient noise environments. Outdoor enclosures and acoustical hoods will be optional but offered by equipment manufacturer. Master Call Stations shall be Federal Signal Corp. E-IST or approved equal and shall be equipped with the following controls, display and speaker: 16 button keypad shall include keys for digital volume, directory scroll, 10 numeric functions, cancel and connect. The keypad provides tactile and audible feedback for positive activation. Stations requiring use of rotary or slide adjustments for control of station volume or privacy shall not be acceptable. LCD display shall be two lines of 16 characters each full alphanumeric English phrases for display of station status. Master stations not displaying alphanumeric station status in plain English or those using coded messages shall not be acceptable. Speaker shall be 2.5 in, 45 Ohm, 3 Watt moisture resistant with 92-dB sensitivity. Electret microphone shall have sensitivity of -70dB with S/N ratio greater than 60dB. Overall frequency response shall be shaped by the internal Digital Signal Processor to conform to digital telephone standards. Faceplate thickness shall be .12 in. (3mm) anodized aluminum with Mylar overlay for flush wall mount or surface mount using Model ECHO-SMB. Field wiring terminal shall be plug-in. Station wiring shall have a maximum of two conductors for full feature capability. Stations requiring more than two conductors shall not be acceptable. Station shall employ Digital Signal Processors for natural speech quality in difficult acoustic conditions. Master Call Station with Membrane Keypad shall be Federal Signal Corp. Model E-DSM or approved equal and shall be equipped with the same controls, display and transducers as Model E-IST except keypad shall be flush membrane type with spill proof overlay permitting frequent wipe-down. Handset Master Call Station shall be Federal Signal Model E-DSM or approved equal and shall be equipped with the following controls, display and transducers: Integral handset with coil cord for private conversations. Enclosure and handset shall be ash tone thermoplastic suitable for desk or surface wall mount. Panel speaker shall be 2.5in, 45 Ohm and microphone shall be electret. The keypad shall be flush membrane type for easy wipe-down, equipped with 16 buttons and provide tactile and audible feedback for positive activation. Keypad section shall be constructed to prevent liquid spills from damaging internal components. LCD display shall be 2 lines, 16 character/line. Master stations not displaying alphanumeric station status in plain English or those using coded messages shall not be acceptable. Field wiring terminal shall be plug-in. Station wiring shall be maximum of two conductors for full feature capability. Stations requiring more than two conductors shall not be acceptable. Station shall employ Digital Signal Processors for natural speech quality in difficult acoustic conditions. Federal Signal Model E-DST shall be identical except for tactile rubber keypad. Handset Master with gooseneck microphone replacing panel microphone shall be Federal Signal Model E-DSMG. Flush Wall Handset Master Station shall be Federal Signal Model E-MISM or approved equal and shall be equipped with the similar controls, display and transducers as Model E-DSM with an anodized aluminum faceplate permitting flush wall mount of the station in back box Model E-BB1. Flush Wall Handset with tactile rubber keypad shall be Federal Signal Model E-MIST. Single or Dual call Sub-stations shall be Federal Signal Models E-DD1 / E-DD2 / E-DD3 / E-DD4, or approved equals. These stations shall be equipped with a call-placed LED. Units shall be equipped with a relay with heavy-duty contacts for remote control. Each sub-station Call button shall be capable of calling a specific pre-programmed station. Faceplate shall be .12 in. (3mm) anodized aluminum with Mylar overlay for flush wall mount or surface mount using Federal Signal Model E-SMB (surface mount box). Field wiring terminal shall be plug-in.

High Security Single or Dual Call Sub-stations shall be Federal Signal Models E-SSMB1 (Mushroom Button) / E-SSSB1 (Stainless Steel Button) and shall be equipped with an 11ga, (.125 in. 3mm) thick stainless steel faceplate with a brushed finish, a solid metal tamper

resistant call switch (Model E-SSSB2 two Call switch) and tamper proof mounting fasteners. Model E-SSSB1KR shall also be equipped with a key reset switch. A Mylar moisture-resistant 2.5 in. speaker shall be shielded against tampering by internal protective plated steel baffles. The microphone is enclosed in a right angle tamper resistant housing. Surface back box shall be Federal Signal Model E-SSMB. Management Master Station shall be Federal Signal Model E-MDS or approved equal and shall be equipped with the following controls, display and transducers: Integral handset with coil cord for private conversations. Enclosure and handset shall be ash tone thermoplastic suitable for desk or surface wall mount. Flush membrane keypad shall be 24 button; 17 dedicated 7 programmable. The keypad provides tactile and audible feedback for positive activation. The keypad section shall be constructed to prevent liquid spills from damaging internal components. LCD display shall be 2 lines, 16 character/line. Master stations not displaying alphanumeric station status in plain English or those using coded messages shall not be acceptable. LED indicators shall be Routine, Emergency, More Calls and Call Engineer. There shall be an audible Alert with Tone Silence and Resound. Field wiring terminal shall be plug-in. Station wiring shall have a maximum of two conductors for full feature capability. Stations requiring more than two conductors shall not be acceptable. Station shall employ Digital Signal Processors for natural speech quality in difficult acoustic conditions. Master with gooseneck microphone replacing panel microphone shall be Federal Signal Model E-MDSMG.

Program Distribution Station shall be Federal Signal ECHO-BGM and shall be used to provide an isolated interface between the intercom stations and an audio program source. Field wiring terminals shall be plug-in. Public Page Station shall be Federal Signal Model ECHO-PAI and shall be used to provide an isolated interface between the intercom stations and a P.A. page amplifier and shall provide relay contacts for muting the background music channel on the amplifier. Field wiring terminals shall be plug-in. Radio Pocket Page Station shall be Federal Signal Model ECHO-PAI and shall be used to interface the intercom system with a radio page encoder and base station via an RS-232 serial data port. The interface shall support TAP and COMP 2 protocols. Two-Way Radio Station shall be Federal Signal Model ECHO-2WRI and shall be used to interface the intercom system with a two-way radio base station through an isolation transformer and shall provide control circuitry for relay contacts to function as PTT control. PBX Telephone Station shall be Federal Signal Model ECHO-PBXI and shall be used to interface the intercom system with a PBX analog port or CO line. It shall be possible to connect a VDT terminal to display exchange activity in real time. Call Placed, Connect, Quit and Busy events shall be displayed including Source and Destination extension numbers. An optional real time clock may be used to provide Y2K compliant date/time stamping of each event. Fiber Optic Station Interface shall be Federal Signal Model ECHO-FOTI permitting any ECHO Master or Sub-station to be linked with the Central Control over one fiber optic line using fiber optic transceivers.

Optional ancillary Graphical user screens for command control are to be available and integrated into the system by the manufacturer. These controls will have the capability to individually remove any field station with the push of a single dedicated touch screen button. The control touch screens can be customized to the application and shall be capable of interaction that indicates key presses have been made on the other touch screen control. The secondary control unit will have the additional capability to take the primary unit off line in the event of unauthorized access.

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