



N-8000
Network Intercom Systems
Architectural and Engineering
Specifications

1 Introduction

Welcome to the **TOA N-8000 Network Intercom** Architectural and Engineering Specification Guide!

This document is designed to help you easily specify the groundbreaking N-8000 Network Intercom System for your projects. If you need more information, please visit TOA on the web at <http://www.toaelectronics.com> where you'll find specification sheets, manuals, CAD files, software and more!

If you'd like a demonstration or a sample for evaluation, please contact a TOA Sales Representative at <http://www.toaelectronics.com/reps.asp>.

Please let me know if you have any comments on improving this guide or any suggestions for existing or new products.

Thank you for your support!

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3 General

Conditions and Requirements

Manufacturer

The manufacturer shall have been in the business of manufacturing microprocessor-based communication systems for more than ten years, and shall provide a minimum of two years limited warranty to the authorized installing dealer.

Contractor

The contractor shall only submit products for which they are factory authorized to sell, install and service. The contractor shall furnish all equipment, accessories and material. This shall be done in strict accordance with specifications and applicable drawings as required for a complete and working solid state microprocessor based intercom system. All material and /or equipment necessary for proper operation of the system not specified or described herein shall be deemed part of the specifications.

Qualifications

Any system substitution proposed as an equal to that herein specified shall be proven to be such by the contractor. The contractor shall send the name and model numbers of substitute equipment and material together with three copies of specifications and dimensional drawings to the architect no less than ten days prior to the bid date. The contractor shall obtain the Architect's approval in writing, by addendum, prior to bid date.

Standard Products

The equipment furnished under this specification shall be equal in every way to that manufactured by TOA Electronics Inc. Catalog and model numbers are intended to indicate type and quality of design and material, as well as exact operating features. All equipment shall be designed by the manufacturer to operate as a complete system, and shall be accompanied by the manufacturer's complete installation and operating instructions. Contractor shall provide drawings showing all system inter-connections.

Service Facilities

The contractor shall make available to the purchaser a local service agent for the manufacturer's equipment. This service agent shall stock the manufacturer's parts and shall provide maintenance during normal working hours at no cost to the purchaser for the warranty period of ____ years. Damage caused by misuse, abuse or accident is exempt from this warranty. On-site service provided outside of normal working hours shall be made available at the prevailing overtime labor rate.

4 System Features

General

The contractor shall furnish and install a TOA N-8000 Series Network-based Intercommunication System. The system shall be microprocessor controlled, and the operating system (software) shall be stored in EPROM memory. All user-programmable functions shall be stored in non-volatile memory. The system shall offer standard, programmable and optional features. Standard features are those available to all systems. Programmable features are those available by changing system programming. Optional features shall be made available by installing additional equipment.

System Programming

System programming shall be accessible by the contractor, or the end user, to allow restructuring of the system as needed. System programming shall be accessible from a Windows PC computer on the same Ethernet network as the intercom exchange, running the dedicated setup software. Limited programming features shall be available through a web browser running on the same IP network as the intercom exchange.

Dialing

Dialing a station number of two to six digits in length shall establish an immediate communications link between two stations within a system. The number of dialing digits shall be established using the system setup software.

Station Numbering and Naming

It shall be possible to assign or change station numbers and alphanumeric names via the setup software. A simple programming sequence shall be used without the need to open, disable or disassemble the system hardware.

Standard Features (No Programming Required)

Automatic Line Release

The system shall release the speech path if dialing is not completed within five seconds.

Camp on Busy

A calling party shall be able to wait or "camp-on" if the called station is busy. Once the called party becomes available, the camped-on party shall be automatically connected.

Push to Talk and Release to Listen

One way conversation shall be available by using the PUSH-TO-TALK key. Releasing the PUSH-TO-TALK key shall reverse the one way conversation. The PUSH-TO-TALK key shall have precedence over the voice switched mode.

Mic-Off

A Master Station's microphone shall be mutable during conversation. This function shall hold a call in progress without interruption and without forcing the user to re-establish the call.

Remote Response

A Master Station shall be able to seize a call placed to another station by entering a remote response code.

Single Digit Dialing

A Master Station shall have the ability to dial up to 20 digits by the touch of one button. The user shall be able to program these digits at each Master Station.

Redial

A Master Station shall be able to redial the last station called by pressing the Redial key.

Recall

A Master Station shall be able to redial the last conversation partner by pressing a designated key.

Ambient Noise Control

A Master Station shall be able to automatically adjust its voice switching threshold to compensate for ambient noise when a designated key is pressed.

Selectable Features (Enabled Through Programming)

Paging and Response

The system programming shall allow stations to be grouped into paging zones. Paging access shall be able to be restricted to Master Stations specified in programming. The paged party shall be able to respond to the paging party by dialing a paging response code at the nearest Master Station included in the paged zone.

PA (External) Paging and Response

Paging shall be available to external amplifiers for use with external PA system speakers, and may be responded to by dialing a paging response code at a Master Station in the paged zone.

Automatic Access to Paging

Master Stations programmed for this feature shall be able to initiate a Paging Call by pressing a designated single-digit dialing key.

Call Forwarding

Calls to a Master Station shall automatically forward to another Master Station when call forward is activated.

No Answer Call Forwarding

When No Answer Call Forwarding is enabled for a station, calls to that station shall automatically forward to another station if not answered within a designated number of seconds.

Busy Call Forwarding

When Busy Call Forwarding is enabled for a station, calls to that station shall automatically forward to another station if the called station is busy when the call is placed.

Time-Based Call Forwarding

When Time-Based Call Forwarding is enabled for a station, calls to that station shall automatically forward to another station during a designated time period.

Call Transfer

The system shall support call transfer, allowing a user to transfer a call from any Master Station to any other station.

Continuous Calling Tone - One Touch Response

A Master Station, programmed for continuous calling tone, shall be able to answer a call by touching any numeric key.

Continuous Calling Tone - Handset Response

A Master Station, programmed for continuous calling tone, shall be able to answer a call by lifting the handset. Handset conversations shall be full duplex.

Dial Operation

The following selections can be made to determine dialing sequences for station dialing and paging response.

- Station dialing numbers shall be independent of connected exchange number or other hardware configuration. Station numbering shall be programmable as two to six digits in length.
- Paging Zone Numbering shall be programmable as single, double or triple digit.
- Paging Response shall be accomplished by pressing the paging response key or by pressing the paging response key plus the zone number.

Group Blocking (Restricted Dialing)

The system shall support the inclusion of stations into any of 31 groups. These groups shall be prohibited from calling or paging each other unless specifically allowed via system programming.

Group Remote Response

The system shall support remote response groups. This feature shall enable stations so programmed to respond to calls to any station within the same remote response group.

Master/Sub Relationship

All Sub-Stations shall be able to call a designated Master Station by one touch operation.

Scan Monitor

The system shall support scan monitor groups. Each Master Station shall be able to select any one of up to four arbitrary groups of up to 16 preprogrammed stations per group for auditory monitoring. Setup Software shall allow the pre-programming of member stations and scan sequence for each scan monitor group and time interval for automatic scanning. The Master Station shall be able to select which group to scan and shall have the ability to pause the automatic scan sequence, manually step through the sequence forward and backward, and re-start the automatic scan sequence. Pressing the PTT key during scan monitor shall activate a speech path from the Master Station to the monitored station.

Executive Priority

When a called party is busy, the caller shall be able to interrupt the conversation. The original call shall be terminated once the new conversation is established. This function shall be selectable on a per station basis via the programming Master Station.

Programmable Station Numbers

Station dialing numbers shall be programmable and shall be independent of connected exchange number or other hardware configuration. Any number having the pre-selected number of digits (2-6), and not duplicated in the system, shall be useable.

Restricted Access

Access to All-Call Paging and Zone Paging shall be able to be restricted on a per station basis.

Time-Out of Conversation, Paging, or Unanswered Call

Time-out settings shall be available, per exchange, to optionally and independently limit the duration of conversations, paging announcements, and unanswered calls. The available settings shall range from 10 to 999 seconds in 10 second increments.

Optional features (Additional Equipment Required)

Choose the functions you want available, and ensure that the 'COMPONENTS' section (SECTION 3) of this specification includes the equipment listed "as required".

Annunciation

Dry Contact Closures

The system shall provide dry contact closures that can be controlled from the Master Stations, or activated upon call-in by designated Master Stations or Sub-Stations, for use in driving custom annunciator panels indicating calling party or hospital waiting status, to trigger CCTV camera call-up, or other custom functions. User shall have the choice of one-shot make or latching make/break operation when controlling the contact closures manually. Install TOA N-8000MI Multi-Interface Unit(s) as required.

Open Collector Outputs

The system shall provide open collector outputs at designated Master Stations for use in triggering annunciator lamps or related equipment to indicate a call incoming and in-use status. Install N-8020MS Master Station(s) as required.

Door Control

Dry Contact Closures

The system shall provide dry contact closures that can be controlled from the Master Stations for use in door remote control or other custom functions. User shall have the choice of one-shot make or latching make/break operation. Duration of one-shot make closure shall be software programmable from 1 to 9 seconds. Install TOA N-8000MI Multi-Interface Unit(s) as required.

Open Collector Outputs

The system shall provide open collector outputs at designated Door Stations for use in door remote control or other custom functions. Duration of door trigger shall be software programmable from 1 to 9 seconds. Install N-8050DS Door Station(s) as required.

BGM (Background music)

The system shall allow connection of up to eight BGM sources, and assigned Master Stations shall be able to access any of these sources. Install TOA N-8000MI Multi-Interface Unit(s) as required.

External audio source distribution

The system shall allow distribution of audio from external sources to system paging zones. Control inputs shall allow audio distribution to be activated by applying a dry contact closure. Install TOA N-8000MI Multi-Interface Unit(s) as required.

PBX Interface

Access to a PBX system shall be possible by dialing a programmable access code. Once access is gained, standard DTMF dial tones shall be available from within the intercom exchange to complete dialing and connect a full duplex conversation. Calls originating from the PBX system shall have access to intercom stations using the same station dialing numbers used by intercom Master Stations. Install TOA N-8000MI Multi-Interface Unit(s) as required.

5 System Configuration and Components

General

System Size

The intercom Exchange Unit shall support 16 station ports and 2 paging audio outputs (N-8000EX only). Connecting exchanges to a local area or wide area IP network (10BASE-T/100BASE-TX) shall permit the establishment of multiple-exchange systems supporting up to a maximum of 1280 station ports and a maximum of 160 paging zones. User dialed key sequences required for inter-exchange calling and paging shall be identical to those used for intra-exchange calling and paging. A single system shall support up to 80 total Exchange Units and Multi-Interface Units. Each 16-station exchange shall allow up to eight connected stations or paging ports to operate simultaneously in conversation with other stations (N-8000EX only).

Connection of External Equipment

The N-8000MI Multi-Interface unit shall support up to 2 audio (BGM) input sources, up to 2 audio output lines, up to 2 inter-system tie-lines for expansion of existing EXES-6000 and EXES-2000 intercom systems, or up to 2 PBX interface connections. The Multi-Interface Unit shall also allow simultaneous connection of up to 2 relay contact outputs, and up to 2 no-voltage make contact inputs. A single system shall support up to 80 total Exchange Units and Multi-Interface Units.

Wiring

Each station shall be connected to its associated exchange by means of a single, non-polarized, twisted-pair cable. Systems requiring more than one non-polarized, twisted pair cable shall not be acceptable.

Service Distances

The system Master Stations and Sub-Stations shall remain fully functional using the following wire gauge and distances: 26 gauge/1,870 ft; 24 gauge/2,950 ft; 22 gauge /4,920 ft; 19 gauge/9,500 ft.

Exchange Components

N-8000EX Exchange Unit

The Exchange Unit shall store and execute the system operating instructions, perform all call routing and power distribution functions for the connected stations and shall include an Ethernet/IP interface for connection to a standard 10BASE-T/100BASE-TX LAN or WAN network. The Exchange Unit shall also provide two paging audio outputs and two paging control outputs. Connection of each station shall be via one twisted pair cable terminated with supplied mini-clamp connector. Connection to the network shall be via standard CAT5 cable terminated with RJ-45 connector. Connection of paging audio and paging control outputs shall be via standard audio (shielded) and control (unshielded) cabling terminated with 4-pin removable terminal blocks. Connection to AC Mains power source shall be via removable IEC type Universal Power Cord. The Exchange Unit shall mount in a standard 19" equipment rack and occupy one vertical rack space (1.75"). Dimensions (W, H, D) shall be 16.53" x 1.74" x 13.75". Weight shall be 9.26 lbs.

N-8010EX Exchange Unit

The Exchange Unit shall store and execute the system operating instructions, perform all call routing and power distribution functions for the connected stations and shall include an Ethernet/IP interface for connection to a standard 10BASE-T/100BASE-TX LAN or WAN network. Connection of each station shall be via one twisted pair cable terminated with supplied mini-clamp connector. Connection to the network shall be via standard CAT5 cable terminated with RJ-45 connector. Connection to AC Mains power source shall be via removable IEC type Universal Power Cord. The Exchange Unit shall mount in a standard 19" equipment rack and

occupy one vertical rack space (1.75"). Dimensions (W, H, D) shall be 16.53" x 1.74" x 13.75". Weight shall be 9.26 lbs.

E-7000TB System Terminal Blocks

The contractor shall use a System Terminal Board for connection of the stations to the exchange. The System Terminal Board shall be the TOA E-7000TB.

Peripheral Interface Components

N-8000MI Multi-Interface Unit

The Multi-Interface Unit shall allow the connection of up to 2 audio (BGM) input sources, up to 2 audio output lines, up to 2 inter-system tie-lines for expansion of existing EXES-6000 and EXES-2000 intercom systems, or up to 2 PBX interface connections. The Multi-Interface Unit shall also allow connection of up to 16 relay contact outputs, and up to 16 no-voltage make contact inputs. The intercom system shall support up to 80 Multi-Interface Units. The Multi-Interface Unit shall mount in a standard 19" equipment rack and occupy one vertical rack space (1.75"). Dimensions (W, H, D) shall be 16.53" x 1.74" x 9.2". Weight shall be 6.2 lbs.

Station Components

N-8500MS IP Multifunction Master Station

The IP Multifunction Master Station shall incorporate a 10BASE-T/100BASE-TX network interface allowing intercom operation via a local area or wide area IP network and shall support Power-over-Ethernet (PoE) technology. The IP Multifunction Master Station shall be capable of hands-free full-duplex communication with all other intercom stations through a built-in speaker and condenser microphone and shall also have a handset for full-duplex private conversations. It shall be capable of supporting an external microphone and headset via a 1/8 inch mini-phone jack. The IP Multifunction Master Station shall have a 32 alphanumeric character LCD display, an in-use LED, 26 operating keys, plus 8 dedicated keys for programmable one-touch speed dialing. In the absence of call activity, the LCD display shall indicate the time of day and station number. During call activity, the LCD display shall indicate the calling or called station number, calling or called station name, and call status. This station shall be equipped with an RJ-45 Ethernet jack for connection to the network, a second RJ-45 Ethernet jack to allow connection of a PC to the connected network, a 2.25 inch speaker, and an external speaker output. Microphone sensitivity, speaker volume, and calling tone volume shall be software-adjustable. Speaker volume shall also be adjustable at the station. Power supply to the IP Multifunction Master Station shall be via Power-over-Ethernet (PoE) -capable switching hub or external AC adaptor. The station shall be capable of being desk or wall mounted and shall be constructed of ABS resin, with a dust proof rubber key pad. The IP Multifunction Master Station shall be the TOA N-8000MS. The optional 120 VAC power supply shall be the TOA AD-1210P. The optional wall-mount bracket shall be the TOA YC-280.

N-8540DS IP Door Station

The IP Door Station shall incorporate a 10BASE-T/100BASE-TX network interface allowing intercom operation via a local area or wide area IP network and shall support Power-over-Ethernet (PoE) technology. The IP Door Station shall provide a call switch and an in-use LED, and shall be capable of hands-free full-duplex communication with other stations through a built-in speaker and condenser microphone. The IP Door Station shall provide an open collector output for use in controlling a door-opening relay or other external equipment. Power supply to the IP Door Station shall be via Power-over-Ethernet (PoE) -capable switching hub or external AC adaptor. The IP Door Station faceplate shall be brushed stainless steel, #11 gauge and shall mount to a standard three-gang enclosure. Pressing and releasing the call button shall initiate call-in to a pre-programmed Master Station or Master Station Group. Microphone sensitivity, speaker volume, calling tone volume, and open-collector output duration shall be software-adjustable. The IP Door Station shall be a TOA N-8540DS. The optional 120 VAC power supply shall be the TOA AD-1210P. The optional flush-mount backbox shall be the TOA YC-150. The optional surface-mount backbox shall be the TOA YS-13A.

N-8000MS Multifunction Master Station

The Multifunction Master Station shall connect to the exchange mainframe via one unshielded twisted pair (UTP) cable. The Multifunction Master Station shall be capable of hands-free full-duplex communication with all other intercom stations through a built-in speaker and condenser microphone and shall also have a handset for full-duplex private conversations. It shall be capable of supporting an external microphone and headset via a 1/8 inch mini-phone jack. The Multifunction Master Station shall have a 32 alphanumeric character LCD display, an in-use LED, 26 operating keys, plus 8 dedicated keys for programmable one-touch speed dialing. In the absence of call activity, the LCD display shall indicate the time of day and station number. During call activity, the LCD display shall indicate the calling or called station number, calling or called station name, and call status. This station shall be equipped with a modular line jack, a 2.25 inch speaker, and an external speaker output. Microphone sensitivity, speaker volume, and calling tone volume shall be software-adjustable. Speaker volume shall also be adjustable at the station. The station shall be capable of being desk or wall mounted and shall be constructed of ABS resin, with a dust proof rubber key pad. The Multifunction Master Station shall be the TOA N-8000MS. The optional wall-mount bracket shall be the TOA YC-280.

N-8010MS Handset Master Station

The Handset Master Station shall connect to the exchange mainframe via one unshielded twisted pair (UTP) cable. The Handset Master Station shall be capable of hands-free full-duplex communication with all other intercom stations through a built-in speaker and condenser microphone and shall also have a handset for full-duplex private conversations. The Handset Master Station shall have an in-use LED and 20 operating keys. This station shall be equipped with a modular line jack, a 2.25 inch speaker, and software-adjustable microphone sensitivity, speaker volume, and calling tone volume controls. It shall be capable of being desk or wall mounted and shall be constructed of ABS resin, with a dust proof rubber key pad. The Handset Master Station shall be the TOA N-8010MS. The optional wall-mount bracket shall be the TOA YC-280.

N-8011MS Hands-Free Master Station

The Hands-Free Master Station shall connect to the exchange mainframe via one unshielded twisted pair (UTP) cable. The Hands-Free Master Station shall be capable of hands-free full-duplex communication with all other intercom stations through a built-in speaker and condenser microphone. The Hands-Free Master Station shall be equipped with an in-use LED, 20 operating keys, a modular line jack and a 2.25 inch speaker. Microphone sensitivity, speaker volume, and calling tone volume shall be software-adjustable. Speaker volume shall also be adjustable at the station. The station shall be capable of being desk or wall mounted and shall be constructed of ABS resin, with a dust proof rubber key pad. The Hands-Free Master Station shall be the TOA N-8011MS. The optional wall-mount bracket shall be the TOA YC-290.

N-8020MS Industrial-Use Master Station

The Industrial-Use Master Station shall connect to the exchange mainframe via one unshielded twisted pair (UTP) cable. The Industrial-Use Master Station shall be surface mounted and shall be splash and dust resistant. This station shall be capable of hands-free full-duplex communication with all other intercom stations through a built-in speaker and condenser microphone and shall also have a handset for full-duplex private conversations. The Industrial-Use Master Station shall be equipped with an in-use LED, 20 operating keys, a modular line jack and a 2.25 inch speaker. Microphone sensitivity, speaker volume, and calling tone volume shall be software-adjustable. Speaker volume shall also be adjustable at the station. The station shall be capable of being desk or wall mounted and shall be constructed of ABS resin, with a splash-proof key pad and weather-resistant seals covering all cable entry points. The Industrial-Use Master Station shall be the TOA N-8020MS. The optional wall-mount bracket shall be the TOA YC-280.

N-8031MS Flush-Mount Master Station

The Flush-Mount Master Station shall connect to the exchange mainframe via one unshielded twisted pair (UTP) cable. The Flush-Mount Master Station shall mount in a standard 5-gang

electrical box and shall be splash and dust resistant. This station shall be capable of hands-free full-duplex communication with all other intercom stations through a built-in speaker and condenser microphone. A handset option shall be available to enable private full-duplex conversations. The Flush-Mount Master Station shall be equipped with an in-use LED, 20 operating keys, a 2.25 inch speaker, and remote control connections for keys 7, 8, 9, and C to enable one-touch dialing of pre-assigned stations and call cancellation using a remote momentary-contact switch. Microphone sensitivity, speaker volume, and calling tone volume shall be software-adjustable. Speaker volume shall also be adjustable at the station. The station shall incorporate a stainless steel front panel, with a splash-proof key pad and speaker. The Flush-Mount Master Station shall be the TOA N-8031MS. The optional handset shall be the TOA RS-191. The optional flush-mount backbox shall be the TOA YC-241. The optional surface-mount backbox shall be the TOA YC-251.

N-8050DS Door Station

The Door Station shall connect to the exchange mainframe via one unshielded twisted pair (UTP) cable. The Door Station shall provide a call switch and an in-use LED, and shall be capable of hands-free full-duplex communication with other stations through a built-in speaker and condenser microphone. The Door Station shall provide an open collector output for use in controlling a door-opening relay or other external equipment. The Door Station faceplate shall be brushed stainless steel, #11 gauge and shall mount to a standard three-gang enclosure. Pressing and releasing the call button shall initiate call-in to a pre-programmed Master Station or Master Station Group. Microphone sensitivity, speaker volume, calling tone volume, and open-collector output duration shall be software-adjustable. The Door Station shall be a TOA N-8050DS. The optional flush-mount backbox shall be the TOA YC-150. The optional surface-mount backbox shall be the TOA YS-13A.