

Features

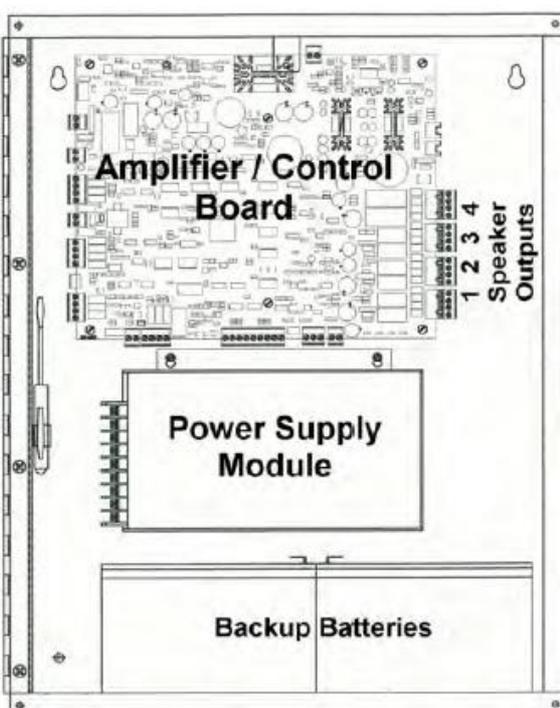
The ZT-MNS-100-BAS panel contains:

- A 100Watt , efficient Class D, Audio Amplifier
- 4 Selectable power- limited Speaker circuits
 - 3 x 25 Watt circuits
 - 1 x 60 Watt circuit
 - Continuous supervision of speaker circuits, even while activated
 - Class A or Class B wiring without the loss of Speaker circuits
 - Removable headers that accept up to 12AWG
- 8 Messages with over 6-1/2 minutes of total capacity
- Local recording of messages
- Activation and Supervision by a single NAC or Addressable Control Module from a Fire Panel
- Contact closure activation of secondary messages
- Power supply and backup battery charging and switch -over internal
- Local and Remote Microphone inputs
- Auxiliary Audio input for paging, or background music
- Supervised Auxiliary Audio input for remote command
- RS-232/485 Input/Output communications for control with external devices

System Configurations

The MNS-100 system fits between standard 16" OC studs.
See section 2, the Installation section, for directions and mounting options.

The Basic System VDOT-MNS-100BAS (shown below)
Contains the Amp/Controller Board – 100Watts and Zones, with the power supply and backup batteries.



System Installation

The cabinets can be surface or semi-flush mounted. All can fit between standard 16" on center (OC) studs, with mounting holes in the corners that accept up to #8 utility or wood screws.

There are numerous knockouts that provide a pathway for the field wiring into the cabinets.

- For semi-flush mount installations, the rough openings are 14-3/16"W x 31-5/8"H and 4" deep, for the large cabinet and 18-5/8"H for the small cabinet. On both there is about a 1" reveal that will protrude into the occupied area.
- If surface mounting is required, there are 2 Key-holes at the top that accept #8 utility screws to help hang the cabinet, with 2 holes near the bottom to secure the cabinet to a solid surface such as 2x4 studding, backboard, rails or a dry cement block / brick wall.

It is intended for indoor, dry locations only, with an environment of 32 to 120 degrees F, and 90% humidity non-condensing maximum. Care must be taken to avoid water infiltration or condensation. Do not mount directly on an exterior wall that could enhance condensation, use of a back board or rails is recommended.

Power Supply Connections

All high voltage and low voltage wiring must be completed in accordance with NFPA, NEC, local code standards and requirements, and others as directed by your AHJ.

Non-Power-Limited wiring (120VAC, battery connections, and external P.L. wires) must be separated from Power-Limited wiring by at least 1/4", and run in separate conduits and through separate knockouts.

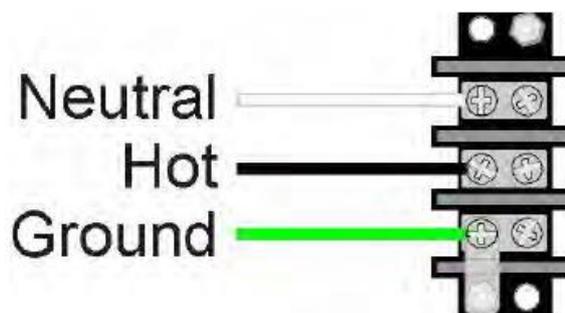
The primary (AC) power must be from a dedicated branch circuit, labelled to indicate that is part of the Fire Alarm or Emergency Communication System.

Use 14AWG minimum to connect the 120V, 5A 60Hz AC service to the panel, onto the terminal strip provided on the lower left side of the cabinet.

- Remove the plastic protective cover from the terminal block
- Connect the Neutral, Hot (line), and Ground from the AC circuit to the terminal block
- Replace the cover over the terminal block

A knockout at the bottom and lower left side of the cabinet are provided for running the AC power wiring. If the AC power is wired through the bottom knockout, metallic conduit must be used.

The AC power must be run separate from low voltage wiring by at least 1/4".



AC supply, Non-Power-Limited wiring

Must be separated from Power-Limited wiring by 1/4" and wired using separate knockout. Connect AC supply with over current protection using 14AWG (min) wire rated for 600V.

Connect the Ground terminal to a good earth ground.

Basic Connections

Input Connections

J4 NAC Activation Input: The primary activation input connection for the MNS-100 inputs is the Reverse-Polarity supervising Notification Appliance Circuit (NAC) input.

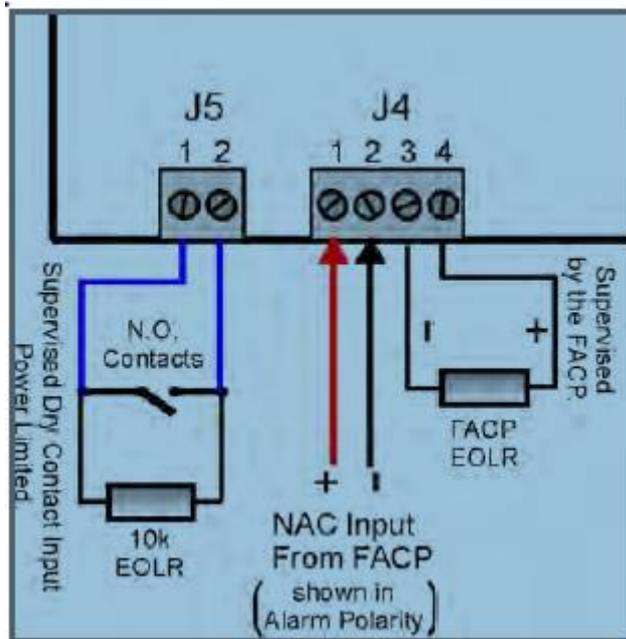
This input needs to be 10-30VDC, steady, non-coded, without synch-pulses.

The 4-pin connector J4 is the NAC input. The left connections pins 1 and 2 are attached to the FACP NAC out put. This connection activates and supervises the MNS-100. The End-Of-Line Resistor (EOLR) is placed on the right terminals 3 and 4. The NAC side is polarity sensitive with pin 1 being positive (+) in the Alarm mode. The internal MNS-100 Trouble Relay will open the connection to the EOLR if the MNS-100 system detects any fault within the panel, or with any of the supervised field wiring, such as Speaker Circuits, remote microphones or other supervised connections.

The NAC input is shown with a 2-wire Class-B connection. For a Class-A connection the connections 3 and 4 can be wired back to the FACP with pin 4 being the positive (+) return connection.

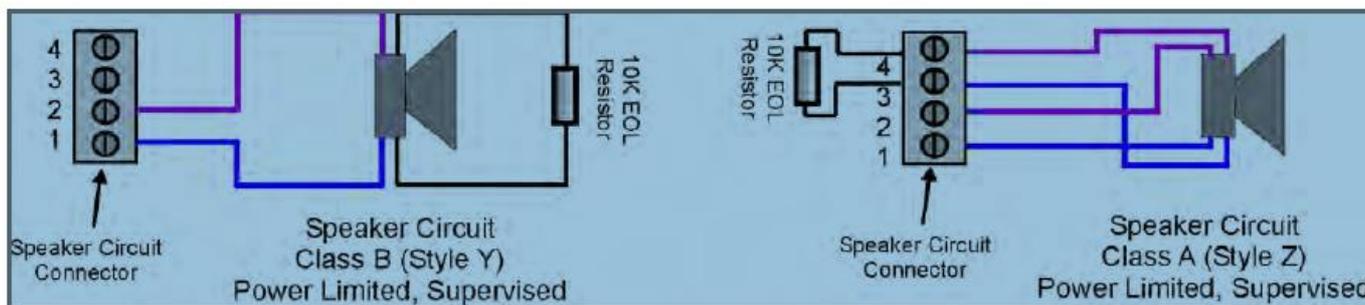
It should be noted that the AC Fail supervision with corresponding switch-over to back up batteries, will cause the MNS-100 to indicate a Fault but this will not open the EOLR on the NAC connection until a

period of time, (typically 6 hours) has lapsed while in battery backup operation. This allows time for the AC to restore, preventing nuisance troubles during short power interruptions.



Output Connections

Whether there is one or multiple speaker circuits connected to the MNS-100, all connect the same way. The Speaker outputs can be connected either Class-B or Class-A, without loss of any zones or circuits.



There are four Speaker Circuits (Zones) on the main board of the MNS-100. Output circuits 1, 2, 3, and 4 correspond to J14, 16, 18 and 19 respectively on the lower-right side of the board. On the optional 8-Zone expander board, outputs 5 through 12 have the corresponding J numbers or J5 through J12.

On all the connections, the pin 1 is the positive (+) output. There is an approximate 10 to 13VDC between pins 1 and 2 at all times, with the 10K EOLR attached. This is the supervision voltage, and is present during standby, supervisory mode or in alarm activated. During Alarm-Active condition, this DC voltage may be difficult for some Digital Multi-Meters (DMM) to read with the audio AC at the same time.

For Class-A connections, the return pins are 3 and 4, with 3 being the positive (+) connection. The 10K EOLR must be placed in the connector with the return wires.

Input Connections

Special Application Inputs Connections

J5 Contact Closure Activation: An alternative to the reverse-polarity NAC activation is a supervised contact closure input. Depending upon the position of the JP1 jumper, this can activate the system exactly the same as the NAC input. Refer to the drawing in section 4.1 to see the wiring connections to J5, the Contact Closure input. This is a Normally Open (N.O.) 'dry contact' input that can be from a switch, or relay with the 10K EOLR across the terminals for the switch etc. If the NAC input cannot be monitored by an NAC or supervisory module, then the optional external relay board can be used as a system supervisory connection. If there is nothing connected to the J4 NAC input, then the internal trouble contact between J4 pins 1 and 4 can be monitored for a Normally Closed (N.C.) connection of a trouble loop that will open the circuit during any MNS-100 fault condition. Note that during AC interruption and backup battery operation, this contact has a delayed action.

J1, J6 Auxiliary Audio Inputs: To provide for a way to broadcast audio from external sources through the Emergency Communication Speaker System, two Aux-Audio inputs are provided. Both have 1VRMS Audio inputs and contact closure activation. They can be connected to the local telephone system via a 'Line-Card' provided by the phone company, a Weather Radio that will automatically activate upon severe weather alerts or for connection to a wide area Mass Notification system.



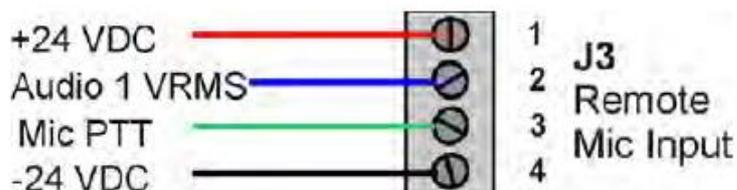
J6 is on the lower left-hand edge of the main board. **J1** is above it on the middle right edge.

On both, pins 1 and 2 are the Audio input, set standard for 1VRMS (0dBm, 2VPP) although other levels are available. To activate these inputs, a dry-contact N.O. switch or relay is closed across pins 3 and 4. This will set the system into Active, and the audio present at the associated input will be broadcast. This is a secondary use of the system, and any other activation NAC, message select, local microphone, or remote microphone will over-ride these inputs. **J1** is a supervised input for use primarily in Mass Notification systems, where these connections need to be maintained at all times. Loss of either EOLR will result in a trouble indication.

J3 Remote Microphone Input: A Remote Microphone may be placed in a convenient location for use by Emergency personnel, such as the front lobby.

The MNS-100 has a supervised input for the remote microphone. As shipped, there are two 'Dummy' EOLRs, one attached between to J3 pins 1 and 2, and another between 3 and 4. These 'Dummy' EOLRs are removed and stored upon installation of the Remote Microphone wiring.

There are 4-conductors between the MNS-100 and the Remote microphone. These are typically 16 to 22AWG, in a single jacket, with a length up to 200'. The cable doesn't need to be shielded unless it's run in the same conduit as the FACP- SLC, or other data lines.

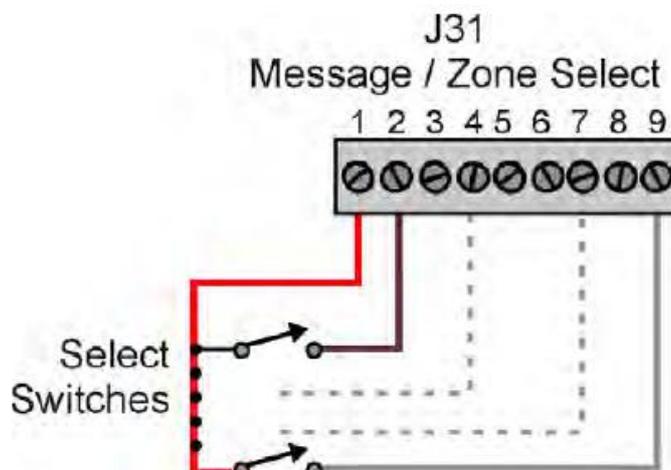


The connections are pin to pin from connector to connector. Such that pin one of the MNS-100 goes to pin 1 of the Remote mic, 2 to 2, 3 to 3, and 4 to 4. The Remote Microphone Installation Instructions show this and other information in greater detail.

J31 Message / Zone Select Input: To select messages and or zones (depending upon the system requirements and design) there are 8 hardwire inputs on the main board.

These inputs are activated by a +24VDC pull-up to the selected pin. The pull-up is from Pin 1 of the J31 Select Input connector. Using a 'dry contact' such as a switch or relay, the +24VDC is attached to the Commons with the N.O. contact attached to the input pin on J31. The front-panel select switches are connected in parallel to these connections.

Priority of messages, and the actual Zones (Speaker Circuits) select will depend upon the system design.



The standard factory setting is;

- Pin 1 is the common to all select switches
- Pins 2, 3, and 4 being Message-Selects, with a priority in the same order.
This corresponds to front panel switches 1,2 and 3
- Pins 5, 6, 7, 8 are Zone-Selects, and pin 9 being an All-Call Zone-Selection
These correspond to front panel switches 4,5,6,7 and 8

The Zone-select will allow any number of Zones to be selected simultaneously, but the Message-selects would be one at a time following the priority of the system design.

J8 High Level Audio Input: In addition to the low level (1VRMS) inputs of the Aux connectors, a high level (25VRMS or other) input such as a speaker line can be connected to J8. This input is transformer isolated to reduce grounding issues. Activation is via one of the Aux inputs which will vary depending upon the system design.

Standard factory setting will have this input not enabled.

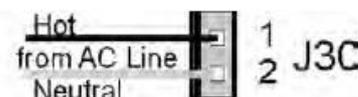
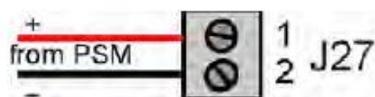
Pre-wired Power Connections

The connections for the power, battery, and AC monitoring are pre-wired to the main board at the factory.

J27 24VDC Input: J27 is the 24VDC input from the Power Supply Module.

J28 Battery Connection: The backup battery pack is attached to the main board via the J28 connector. This provides charging and monitoring, of the battery as well as the backup power input to the system.

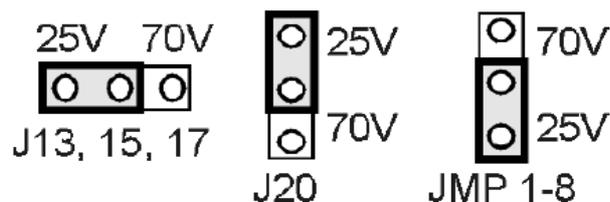
J30 AC Monitoring: Should the AC Main power fail, this connection is monitored and will signal for the switch over from AC provided power to the Battery provided power.



Optional Connections

J9, J10 The Speaker outputs are set for 25VRMS output. This is a Constant-Voltage speaker system that requires Fire-Listed speakers that have an input transformer to match this voltage, with a blocking capacitor to allow for DC supervision. Some speaker circuits, especially long runs (greater than 1000 feet) use 70.7VRMS as a voltage. To accommodate those systems, the MNS-100 uses an optional output transformer to convert the 25 to 70.7VRMS. The connectors J9 and J10 are the input and output connections for the externally mounted transformer.

To provide proper power limiting on the speaker circuits, different settings are required for the 25 or 70VRMS outputs. There are four 3-pin jumpers on the main board and eight more on the 8 Circuit Expander option board. These are factory set for 25VRMS as shown here: unless the 70V transformer has been pre-installed by the factory then they are already set for 70V.



To change the output limiting for the 70V option, move the jumpers from the 25V pins to the 70V pins.

J23 Serial RS-232 / 485: This is an input / output control signal for connection to other devices in the system such as a DTX Radio Master Box or a properly configured FACP.

This connector is normally not used unless the MNS-100 is part of a larger system that extends beyond the primary cabinet and uses a serial communications protocol that is recognized by the MNS-100.

J25 Internal (to the MNS-100) control bus: This is an I²C serial bus that connects optional modules inside the cabinet to the main board. There can be none, or many devices attached here depending upon the system complexity. The I²C bus does not extend beyond the main cabinet.

Indicators

The Amplifier-Controller Board includes 3 LED indicators that are visible through the front panel. The GREEN LED is a "Power" indicator that shows the presence of the 24VDC power input.

The YELLOW LED is a common "System Fault" indicator that turns on as a result of any fault in the system. The RED LED serves two purposes.

It is an indication that the system is "Active" when it is on solid, or it can flash to represent a code for a fault condition.

When the "System Fault" LED is on, the "Active" LED could flash one or more of the codes that are shown in the table below. The code sequence will repeat itself approximately every 6 seconds.

# Flashes	Status
1	AC Fail
2	Low Battery
3	Amplifier Fault
4	Charger Fault
5	Ground or Dry Contact Fault
6	Audio Fault
7	I ² C Fault
8	LOC Fault
9	Message Time Out
10	Input Board Fault
11	Serial Connection Fault



Note: In addition to the "System-FLT" LED, the Controller Board opens the contacts of the System Fault relay which opens the NAC circuit and puts the supervising FACP in a fault condition.

Other Yellow LEDs on the board could light along with the System Fault LED to determine the cause of the fault. These LEDs are:

- Amp Fault** This indicates there is a failure in the Amplifier circuit of the board
- Spkr4 Limit** Speaker Circuit (Zone) 4 power output limiting has been exceeded
- RM Fault** The Remote Microphone circuit has lost supervision
- Mic Fault** The Local Microphone is either un-plugged or a wire has broken
- Aux2 Fault** The Aux 2 Input has lost either audio or contact supervision
- Spkr Faults** There are 4 LEDs associated with a fault on each of the Speaker (Zone) outputs
These indicate either a short or open in the speaker circuit wiring

There are 4 Speaker Circuit (Zone) Active Red LEDs that indicate which output is activated. The outputs are controlled by the Zone Select Switches, or by external contact closures.

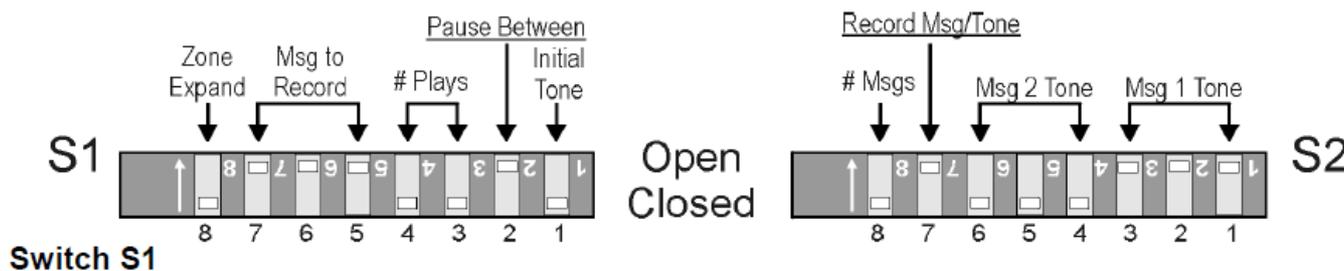
The output audio level is roughly indicated by a 4-LED bar graph. This is in the upper right corner of the board. Each LED corresponds to approximately 25% audio output level.

Settings

Switches

There are 2 banks of switches, S1 and S2, that set the message and tone options. These are generally acceptable by factory default setting; it is recommended that the system is running properly before making any changes.

The timing, duration, and tones, associated with the messages can be varied by changing the S1 and S2 switch setting according to the following illustration and tables. After any of these are changed, press the Reset button for about 1/2 second to enable the processor to re-read the switch settings.



Option \ Switch		8	7	6	5	4	3	2	1
Initial Tone	7 seconds								Open
	15 seconds								Closed
Between	0 seconds							Open	
	7 seconds							Closed	
Times to Play	0					Open	Open		
	3					Open	Closed		
	6					Open	Closed		
	Continuous					Closed	Closed		
Msg to Record	1		Open	Open	Open				
	2		Open	Open	Closed				
	3		Open	Closed	Open				
	4		Open	Closed	Closed				
	5		Closed	Open	Open				
	6		Closed	Open	Closed				
	7		Closed	Closed	Open				
	8		Closed	Closed	Closed				
MNS-8-Zone Expansion	Not Installed	Open							
	Installed	Closed							



Switch S2 (different tones may have been installed to system requirements)

Option \ Switch		8	7	6	5	4	3	2	1
Msg 1 Tone	Slow Whoop						Open	Open	Open
	HiLo						Open	Open	Closed
	1K Tone						Open	Closed	Open
	Chime						Open	Closed	Closed
	Wail						Closed	Open	Open
<i>Fire Only</i>	Hom						Closed	Open	Closed
	Temporal						<i>Closed</i>	<i>Closed</i>	<i>Open</i>
	1k						Closed	Closed	Closed
Msg 2 Tone	Slow Whoop			Open	Open	Open			
	HiLo			Open	Open	Closed			
	1K Tone			Open	Closed	Open			
	Chime			Open	Closed	Closed			
	Wail			Closed	Open	Open			
<i>Fire Only</i>	Hom			Closed	Open	Closed			
	Temporal			Closed	Closed	Open			
	1k			Closed	Closed	Closed			
Record	Message		Open						
	Tone		Closed						
# Messages	4	Open							
	8	Closed							

The Reset Switch SW2 is pressed after any changes are made to the S1 or S2 option switches. The SW1 switch is used in association with external programming, and is not covered in this document.

Jumpers

There are a number of Configuration Jumpers on the Amplifier – Control board that along with the switches, modify the way the unit is used in actual service.

Most are set at the factory to an acceptable initial installation configuration, and it is recommended that the system is running properly before making any changes. Then some of the jumpers may need to be moved to set the exact operation of the unit to the needs of the individual system.

The jumpers can be divided into three categories:

Normal Configuration Jumpers

These jumpers are the most likely to be needed to be changed. These add field attached options, such as Remote Microphones, or set parameters associated with basic operation.

- 3-Rel **JP8** Enables the MNS-3-REL option, when jumpered
- Ground Fault **J29** Enables the internal Ground Fault Detection when jumpered
- Alm All **JP6** When installed, ignores the Zone select inputs during an Activation and selects ALL outputs to be activated
- RM All **JP7** The Remote microphone(s) will broadcast in ALL Zones, Independent of Zone Select inputs

Optional Configuration Jumpers

These jumpers would need to be changed only if a major modification is made to the basic system, such as changing the output voltage from 25 to 70VRMS.

- Xform **JP2,** **3** If the optional, external 70VRMS transformer is needed. These jumpers are removed and the transformer is attached to the J9 and J10 connections
- 25/70 **J13,15** These jumpers are moved from the 25 to the 70 setting
- 17, 20, JP9** if the 70VRMS transformer is installed
- 25/70 **J7** This sets the Auxiliary Input level from 25 to 70VRMS, when attached to a speaker- level line. This is NOT associated with the output of this amplifier

Alm Select	JP1	When installed, this connects the contact closure input J5 to activate the system And message, the same as the NAC input J4, When removed, the contact closure will activate the second recorded message
Rec	JP5 USE THIS CAUTIOUSLY	installing this jumper will enable the recording of any Message from the local mic, or aux input Misuse will erase (over-write) the message selected by the S1 setting

Special Configuration Jumpers

These jumpers would never need to be changed unless instructed to do so by the factory.

Test	JP4	Sets a test tone into the amplifier, used for factory testing only
Audio Select	J11	Selects the audio source into the amplifier. Leave in the factory setting
232/485	J21, J22, J24	Determines the Serial communication either RS232 or RS485 - Change only if instructed to by factory

Message unit

Standard Message and Configuration

The MNS-100 has a number of messages and tones pre-loaded into memory. These generally contain a Fire evacuation message, and a Weather warning message. Other messages or tones may be pre-loaded per order.

The messages are prioritized via importance or urgency of the event. The Fire message is typically set to the highest priority by Fire code requirements. The local and remote microphones are the highest priority in the system, and will over-ride the message and tones. If the local or remote microphones are used during the message cycle, the message will NOT play again after mic un-key but revert to Alert Tone only until the system is reset.

The Bell (NAC) Input J4 activates the first message (#1), the message-1 (primary) Tone and has the top priority.

The other messages are activated by contact closures on J31. Up to 8 messages can be recorded, but this number may be less depending upon the system requirements and configuration. The Switch S2-7 and 8 set the maximum number of messages for the system. Do not change these unless instructed to do so. It can affect other parts of the system.

The first message on J31 is also the Fire message, but its Alert tone is the message-2 (secondary) tone, not the primary. Messages 2 through 8, all use the message-2 alert tone and are in numerical priority.

Read the section 5.1-J31 for details on the applications of the messages and or zones controlled by J31.

The details of how the message is played are controlled by the S1 and S2 switches. Each of these SIP-Switches has 8 small toggle switches. The individual switches control the type of tone, the timing of the tones, etc. The picture of the switches and the table depicting the settings are shown in Section 8.1 Switch settings

Initial Tone	S1-1	Time in seconds that the Alert tone plays before the Message starts This is the pre-Alert Tone
Pause between	S1-2	Time in seconds that the Alert tone plays between Messages repeats The tone is interspersed between the message plays
Times to Play	S1-3-4	The number of times the Message plays (repeats) until the Alert tone only sounds until the system is reset

Msg-1 Tone	S2-1-3	This selects the Alert tone for the First (Primary) Message Typically the Fire Alert tone, Temporal pattern by Code
Msg-2 Tone	S2-4-6	This selects the Alert tone for the Second (Secondary) Messages The tone for all the rest of the messages

Specifications

A.C. Power with internal Supply:	120VAC Nominal, 60Hz, 5A
D.C. Power Supply voltage:	
Built in power supply:	24VDC Regulated
External Power Supply:	24VDC Regulated from Listed for Fire Supply
Current from 24VDC:	5.25A at 100Watts output, Refer to Power Supply Calculation sheet
Output Audio Power:	100Watts from primary cabinet
Frequency Response:	600Hz to 3600Hz
Output Voltage:	25VRMS (70VRMS with optional transformer)
Speaker Circuits:	Class A (Style Z) or Class B (Style Y) 4-standard, (12 with optional expander board) 3 (11) Power Limited 25W, 1-Power Limited 60W 10K EOLR continuously monitored (# A10074) Removable headers that accept 18 to 12AWG
Activation Inputs:	Reverse Polarity (NAC) 9 to 30VDC, 10mA, steady, non-coded Contact closure supervised dry contact closure Contact closure for secondary (non-fire) messages
Remote Microphone:	1VRMS Audio, power limited 24VDC, 100ohms max line resistance
Auxiliary Audio Inputs:	1VRMS Audio, Contact Closure activation 1-Supervised with override priority (control station) 1-Unsupervised low priority (paging)
Ground Fault Impedance:	5k ohms

Power Supply Calculations

The MNS-100 is a modular system, such that there are multiple options available, each with their own Standby and Power requirements. The worksheets on the next page can be filled in to determine these requirements.

Power Supply Requirements

The power supply requirements are calculated for the 'worst-case'. That is when the system is active, with the maximum power being delivered to the speakers, and all lights, controls and other outputs on. To calculate the Active Total Current, add up the Active Currents of all the modules in the cabinet and any external draw on the system.

To use the **Active Worksheet**:

- Enter; the Quantity of each module in the cabinet
- Multiply; the module Quantity by the Active Current and enter that in the Module Total column
- Add; all the Module Totals down the column and fill in the Active Total box

If by adding the NAC outputs on the optional 8-Relay Module, the Active Total exceeds the 8Amp limit, then either the NAC output needs to be reduced or the Speaker power output needs to be reduced. The speaker load can be estimated by multiplying the total watts delivered by 0.05A and then add 0.30A.

$$\text{Active Current} = (\text{Watts} \times 0.05) + 0.30$$

Example: with a load of 50 watts, the Current for the Main Control/Amp board is:

$$\text{Active Current} = (50 \times 0.05 = 2.50\text{A}) + 0.30\text{A} = 2.80\text{A}$$

Use this number in place of the 5.250 in the worksheet Main Control/Amp Module total box.

Battery Requirements

To maximize the operating time of the backup battery, the MNS-100 utilizes low-power 'Battery Saver' techniques and circuitry. The majority of the battery's energy is taken during the standby or AC Failure operating time. To calculate the size of the backup battery, the standby current must first be calculated, and then added in proportion to the times required, to the Active Total current.

To use the **Standby Worksheet**:

- Enter; the Quantity of each module in the cabinet
- Multiply; the module Quantity by the Standby Current and Enter that in the Module Total column
- Add; all the Module Totals down the column and fill in the Active Total box

To use the **Battery Worksheet**:

- Enter; the Time (in Hours) of the Active and Standby modes
 - Typical Standby times are listed in minutes, to convert, divide the minutes by 60
 - i.e. 5 minutes = 0.083 hours, 15 minutes = 0.250 hours

- Copy; the Active and Standby Totals from their worksheets into the Calculated Totals boxes
- Multiply;; the Time by the Calculated Totals and enter in the Amp Hours Column
- Add; the Active and Standby Amp Hours to get the Battery Size required
- Multiply; the Battery Size by the de-rating or Safety Factor of 1.2 or 1.3 (20%, 30%)
- Enter; this into the Battery Size w/Safety Factor Box This is the size of the Battery Required.

If it is larger than 12Ah, then the batteries are mounted external to the cabinet.

The battery requirement for the basic system has been pre-calculated to be;

10Ah batteries for Fire Alarm use, 24 hours in Standby and 15 minutes in Alarm

18Ah batteries for use in ECS systems, with 48 hours in Standby and 1 hour in Alarm



Power Supply Requirements

Active Worksheet

Module	Quantity	x	Active Current	=	Module Total
Main control/amp (1 required)	1	x	5.250	=	5.250
MNS-8-Switch board (1 max)		x	0.020	=	
MNS-3-REL Module (1 max)		x	0.088	=	
MNS-BKP (1 max)		x	0.088	=	
MNS-8-Input Module (1 max)		x	0.025	=	
Inputs Active (8 max)		x	0.001	=	
MNS-8-Zone module (1 max)		x	0.140	=	
MNS-12-Switch Board (1 max)		x	0.040	=	
MNS-NAC/REL Module (2 max)		x	0.021	=	
Relays Active (16 max)		x	0.029	=	
NAC output (2Amps max)	-	-	-	=	
MNS-LOC Master (1 max)		x	0.032	=	
MNS-LOC Remote (15 max)		x	0.032	=	
		x		=	
Active Total				+	
<i>Not to exceed 8A</i>					

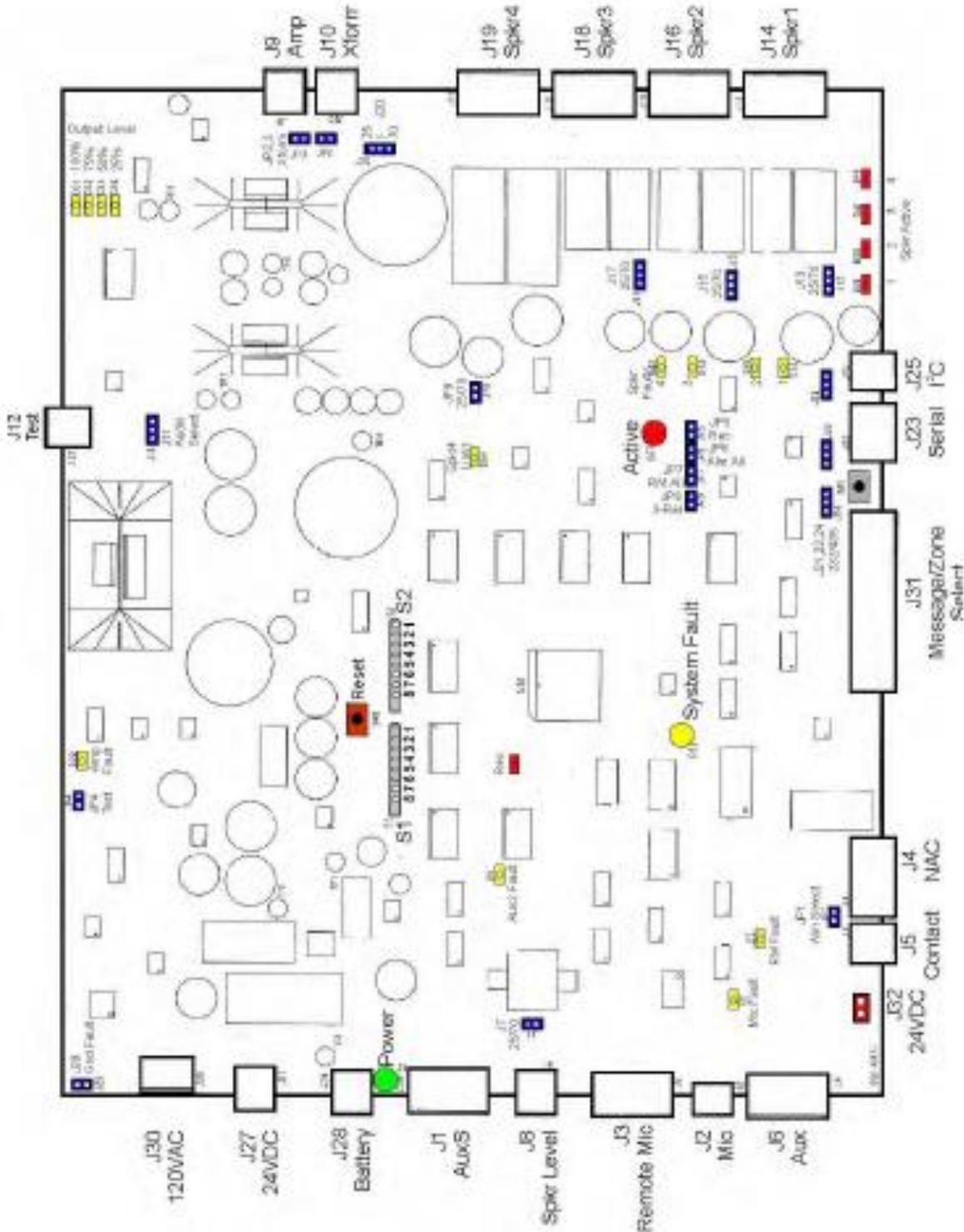
Standby Worksheet

Module	Quantity	x	Standby Current	=	Module Total
Main control/amp (1 required)	1	x	0.087	=	0.087
MNS-8-Switch board (1 max)		x	0.000	=	
MNS-3-REL Module (1 max)		x	0.012	=	
MNS-BKP (1 max)		x	0.012	=	
MNS-8-Input Module (1 max)		x	0.025	=	
Inputs Active (8 max)		x	0.001	=	
MNS-8-Zone module (1 max)		x	0.030	=	
MNS-12- Switch Board (1 max)		x	0.011	=	
MNS-NAC/REL Module (1 max)		x	0.021	=	
Relays Active (16 max)		x	0.029	=	
MNS-LOC Master (1 max)		x	0.030	=	
MNS-LOC Remote (15 max)		x	0.024	=	
		x		=	
Standby Total				+	

Battery Worksheet

Mode	Time (hours)	x	Calculated Totals	=	Amp hours
Active		x		=	
Standby		x		=	
5 minutes = 0.083 hours			Battery Size	+	
15 minutes = 0.250 hours					
20% multiply by 1.2			Battery Size w/ Safety Factor	x	
30% multiply by 1.3					

MNS-100 Board Layout



Limited Warranty

Velocity Detection over Time Zeta Alarms Ltd declares that this product is free from defects in material and workmanship and it will repair or replace any product or part thereof which proves to be defective in workmanship or material for a period of twelve (12) months from the date of purchase but not to exceed eighteen (18) months from the date of manufacture.

Please contact Velocity Detection over Time Zeta Alarms Ltd directly for a return merchandise authorization (RMA) number before returning goods under warranty. Shipment must be prepaid and Velocity Detection over Time Zeta Alarms Ltd will repair or replace the product if the failure was caused by a manufacturing defect.