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Technical Practice

Issue 3, June, 1997

MZ-1 PAGE CONTROLLER

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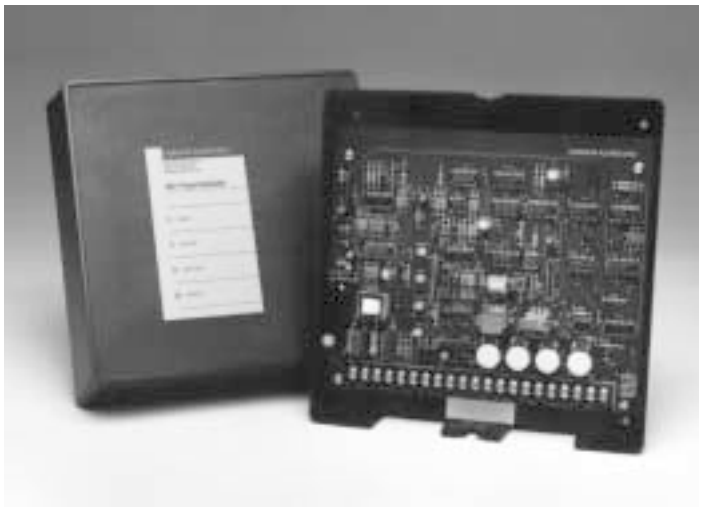

1. General Description

1.1 PRACTICE Issue 3 of the MZ-1 Technical Practice is released due to a correction to master cabinet cable J50.

1.2 PRODUCT OVERVIEW The MZ-1 is designed to provide a voice paging connection between a telephone system and one zone of a voice paging/background music system. Extensive capabilities have been implemented to provide a level of features, operating simplicity, and performance not found in other "page adapters."

1.3 PAGE OUTPUT The audio output is designed to directly connect to most audio amplifiers and/or amplified speakers. The output circuit utilizes a transformer, helping to minimize the chance of hum and noise pickup between the MZ-1 and associated paging equipment.

1.4 ANTI-NOISE CIRCUITRY A special circuit eliminates the extraneous clicks and pops commonly associated with page adapters. The MZ-1 smoothly routes page, background music, and night tone audio to provide great sonic and operational performance.

1.5 AUDIO LEVELING An audio compressor circuit automatically adjusts the level of the page audio to ensure that all pages will be intelligible. Differences in voice level will not interfere with page quality.

1.6 BACKGROUND MUSIC A source of background music can be connected: a tuner, tape deck, compact disc player, SCA music source, etc. During a page, the background music is muted. The MZ-1 contains a loudness compensation circuit to improve the sound of the background music. A control allows the BGM level to be adjusted.

1.7 NIGHT TONE Many PBXs and Centrex systems provide a 20/30Hz ringing signal in the form of a universal night answer (UNA) line. This UNA line can be connected to the MZ-1's integral "warble tone" night tone generator, providing an audio alert over the paging system. In addition to connecting a 20/30Hz ringing signal, a contact closure and logic signal can activate night tone. Controls allow the pitch and level of the night tone to be adjusted.

1.8 RELAY CONTACT A normally closed (shorted) and normally open (not shorted) relay contact allows connection to a wide variety of devices. The most frequent use of the normally open relay contact is to supply the paging equipment with a "page enable" contact closure.

1.9 ACCESS/ALERT TONE A short tone is sent to the user, via the trunk, each time the MZ-1 is accessed. This provides a confirmation that the paging system was accessed. An

envelope modified version of this tone can also be sent to the paging system if a "pre-page" alert tone is desired. A control allows the alert tone level to be adjusted.

1.10 OVERRIDE INPUT An advanced MZ-1 feature is the override input. This input allows other equipment, specifically other MZ-1s, to be connected to create sophisticated multi-zone systems.

1.11 LED STATUS INDICATORS Four LED status indicators are located on the MZ-1 circuit board and are visible with the cover on or off. These LEDs are of great assistance in determining the operating status of the MZ-1 during installation and maintenance.

1.12 CONNECTIONS All interconnections are made via a 21-position screw terminal strip.

1.13 POWERING The MZ-1 requires an external source of 24Vac or –24Vdc for operation. A 24Vac transformer is shipped with each MZ-1.

1.14 PHYSICAL DESCRIPTION The MZ-1 consists of a precision fabricated printed circuit board, and an injection molded base and cover. The thermoplastic material used for the housing conforms to industry recognized flame retardant standards. The MZ-1 measures 8.75 inches (22.23cm) square, 3.25 inches (8.26cm) deep, and weighs less than 1.6 pounds (0.73kg). The MZ-1 wall mounts with four #8 screws.

2. Applications

2.1 RANGE OF APPLICATIONS The MZ-1 is appropriate for a wide variety of paging applications, from a simple single-zone system, to a multi-zone specialized implementation. Please contact Gordon Kapes, Inc. for applications assistance.

2.2 DESIGN GOALS The MZ-1 contains a variety of standard features. These address the goal of serving all possible requirements that an installation technician is faced with. There are enough "nightmare" paging installations—miles of wire, unmarked boxes linked into other unmarked boxes; simply brutal! The MZ-1 was designed to add joy and happiness to the lives of technicians and end users alike! If the MZ-1 can make just one technician happy....(ugh!)

3. Installation

3.1 WORDS OF CAUTION As with any product, installing the MZ-1 requires a safety first approach.

Warning: Never install telephone wiring during a lightning storm. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Use caution when installing or modifying telephone lines.

3.2 CHECKING FOR DAMAGE The MZ-1 should be inspected for damage immediately upon receipt. A claim should be filed with the shipper if damage is found. A replacement should be ordered if necessary.

3.3 MOUNTING The MZ-1 wall mounts using four #8 pan head screws of the type appropriate for the wall material. The cover is secured by tightening the two screws located one on the top and one on the bottom of the cover.

Description	Legend	Terminal
AC Common/GND	1 Power	1
±24Vac/–24Vdc	2	2
PBX/Key System	T Trunk	3
Trunk Port	R	4
Night Tone Ring Input	T Trunk	5
	R	6
Night Tone Logic input	+ NTR	7
	–	8
Night Tone Contact Input	+ NTL	9
	–	10
Override Contact Input	+ ORC	11
	–	12
Override Audio Input	+ ORA	13
	–	14
BGM Input	+ BGM	15
	–	16
Audio Output	+ Audio Out	17
	–	18
NC Relay Contact	NC Relay	19
Common	COM	20
NO Relay Contact	NO	21

Table 1 MZ-1 Connection Diagram.

3.4 INTERCONNECTIONS All interconnections are made via 21-position terminal strip TS1. A complete, albeit cryptic, description of their functions is located adjacent to the terminal strip positions. Table 1, MZ-1 Connection Diagram, provides detailed connection information. Figure 1, at the end of this practice, shows a simplified single-zone installation.

3.5 TRUNK CONNECTION The MZ-1 links to a PBX via a loop start trunk port, or to a key system via a line position on the KSU.

3.6 MZ-1 TO PBX SYSTEM Connect the MZ-1's trunk connections to a PBX port that is designated to be used for paging. The trunk should be configured for loop start and pass audio in both directions as the MZ-1 returns audio tones to inform the user of paging status.

Be Careful: Some PBX's have a trunk parameter that configures the trunk for paging. Don't use this since a "Page Trunk" configuration may allow audio to pass only from the PBX to the MZ-1. This would prevent MZ-1 tones from being sent back to the PBX user.

3.7 MZ-1 TO A KEY SYSTEM Connect the trunk connections to a CO line position on the KSU. A line button on the key telephones will act as the page access button.

3.8 PRE-PAGE ALERT TONE The MZ-1 can be set to produce a pre-page tone each time the MZ-1 is accessed. If this feature is desired, place the AT switch to ON.

3.9 NIGHT TONE CONNECTION The MZ-1 contains an internal night tone generator. It produces a warble tone signal similar to that produced by electronic telephone sets. The night tone generator can be controlled by three different signals: standard 20/30Hz bridged ringing, logic signal, or a contact closure. This flexibility makes the MZ-1 compatible

with just about every system in the universe! Two switches are associated with the night tone function: The NT switch determines if the night tone function is selected for use. The HL switch controls the operating mode of the night tone logic input. The term "HL" represents logic high or logic low. HL will usually be left in the OFF (H or logic high) position.

3.10 NIGHT TONE RING INPUT The NTR T and R terminals are intended for connection to a standard telephone line with 20/30Hz ringing. The normal connection would be to a PBX UNA (universal night answer) line, or PBX extension designated for "night chime" operation. Activate night tone by setting the NT switch to ON; the HL switch should be set to OFF.

3.11 NIGHT TONE LOGIC INPUT The NTL connection allows a normally low or normally high logic signal to control the night tone generator. Activate the night tone function by setting the NT switch to ON.

Option	Switch	Setting	Operation
background Music	BGM	ON	Enables BGM Input
		OFF	Disables BGM Input
Alert Tone	AT	ON	Enables Pre-Page Alert Tone
		OFF	Disables Pre-Page Alert Tone
Night Tone	NT	ON	Enables Night Tone
		OFF	Disables Night Tone
Logic Level	HL	ON	Night Tone Active with Logic Low Input
		OFF	Night Tone Active with Logic High Input

Table 2 MZ-1 Switch Options.

The HL switch selects if a logic low or a logic high will activate the generator. Set HL to OFF if night tone will be activated when a logic high (usually 5 volts) is applied. Set HL to ON if night tone will be activated when a logic low (about 0 volts) is applied.

Watch Out: In most cases, the HL switch should be left in the OFF position. Leaving the switch in the ON position without having a normally logic high applied to the input, leaves the night tone "locked" in the ON position. Be certain to observe the correct polarity when connecting to the NTL + and – terminals.

3.12 NIGHT TONE LOGIC INPUT WITH ROLM REDWOOD® The ROLM Redwood Digital Telephone System provides a logic signal, called TTL1, that is logic high (5V) when idle, and logic low when night tone is requested. Connect master cabinet cable J50 Violet/Slate wire to NTL +, and J50 Slate/Violet wire to NTL –. Set the NT and HL switches to ON.

3.13 NIGHT TONE CONTACT INPUT The NTC input allows a normally open (not shorted) contact to activate the night tone generator. Some PBX and electronic key systems provide this signal. Night tone is activated whenever the NTC terminals are shorted (closed). Set the NT switch to ON and the HL switch to OFF.

Note: A closure to ground will not activate night tone.

3.14 BACKGROUND MUSIC INPUT If desired, connect a source of background music to the BGM terminals. The input is 30k ohms, balanced, transformer coupled which will work with virtually all sources that provide a nominal level of –10dBu. Set the BGM switch to the ON position to activate the BGM input.

3.15 OVERRIDE CONTACT INPUT The override contact (ORC) input allows a normally open (not shorted) contact to activate the override audio (ORA) input. This will be used in special applications, such as when multiple MZ-1s are used to create multiple paging zones.

Note: A closure to ground will not activate the override input.

3.16 OVERRIDE AUDIO INPUT The ORA input is 100k ohms, electronically balanced, capacitive coupled which will work with virtually all sources that provide a nominal level of –10dBu. This will be used in special applications, such as when multiple MZ-1s are used to create multiple paging zones.

3.17 AUDIO OUTPUT CONNECTION The audio output can be connected to all types of audio amplifier line level input channels: low or high impedance, balanced or unbalanced. Amplified speakers have become a popular method of providing a public address/background music system. The MZ-1's audio output can be connected directly to up to 20 amplified speakers. If more than 20 amplified speakers are required in any one zone, signal boosters can be obtained from the manufacturers of amplified speakers.

Beware: Do not connect the page output to an audio amplifier microphone level input. By connecting a line level signal, such as provided by the MZ-1, to a microphone input, distorted sound will be heard over the speakers. If absolutely necessary, an audio attenuator, or "pad" can be used to reduce the MZ-1's audio output level to correctly match a microphone input. The "pad" is installed between the audio output and the microphone input.

3.18 RELAY A normally open (not shorted) and normally closed (shorted) contact is provided. The normally open contact closes and the normally closed contact opens whenever a voice page, override input, or night tone is active. The most frequent use of the NO relay contact is with an audio amplifier or paging system that requires a contact closure during page or night tone operation. Some paging equipment refers to this as a page enable contact.

3.19 POWER CONNECTION The MZ-1 requires 24Vac or –24Vdc for operation. A 24Vac transformer and power cable are shipped with each unit. Using the cable, connect the transformer's load terminals to terminals 1 and 2 of TS1. There are no straps to cut or switches to set to designate AC or DC operation. If amplified speakers that require –24Vdc for operation are being used in conjunction with the MZ-1, it may be possible to use the same power supply for both. Ensure that the power supply can provide sufficient current for the speakers and the 170mA (maximum) required by the MZ-1. The power LED will light as soon as power has been connected. In most cases, the other LEDs will not light. Later sections will discuss the function of the other LEDs.

3.20 ZONE PAGING One of the great things about the MZ-1 is the ability to easily create zone paging installations. Figures 2 and 3 show two examples of how the MZ-1 can be used to create zone paging. *To install the example given in Figure 2, a four-zone with all call, you will need five MZ-1s and five trunks:* one trunk and an associated MZ-1 to access each zone, and a fifth trunk and MZ-1 for all call access.

- Follow the normal MZ-1 installation instructions and connect the trunks designated for individual zone access to four of the MZ-1s.
- On each of the four MZ-1s: connect the audio output and, if required, relay contact to the corresponding zone amplifier.
- Connect the trunk designated for all call to the remaining MZ-1.
- Next connect the audio output of the all call MZ-1 to the ORA inputs on the four MZ-1s.
- Connect the NC and COM relay contacts on the all call MZ-1 to the override contact inputs on the four MZ-1s. During an all call page, the all call MZ-1 will be accessing the four zones via the override audio and contact inputs on the four MZ-1s.
- If night tone or BGM is required, connect them to the individual zones, not to the all call unit.
- If a pre-page alert tone is required on an all call page, turn the AT switch on the all call MZ-1 to the ON position. A pre-page tone when paging an individual zone is controlled by the AT switch on the individual zone's MZ-1.

3.21 MULTIPLE MZ-1s

Night Tone Ring Input: In applications involving multiple MZ-1s, it is possible to parallel night tone ring (NTR) inputs. To determine how many can be connected in parallel you must first determine how many standard ringers your telephone line, e.g. UNA line, can support. Take this number and multiply by 1.25, round off the result; this is the number of NTR inputs that can be connected in parallel. For example, if your telephone line can support three ringers: multiply by 1.25 and you get 3.75. Round this off and you get 4 MZ-1's that can be connected in parallel.

Night Tone Logic Input: The night tone logic input (NTL) is designed so as to allow multiple MZ-1s to be connected in parallel. A standard logic output should be able to drive up to 20 MZ-1s. Be certain to observe the correct polarity when connecting the inputs together.

Night Tone Contact Input: A virtually unlimited number of MZ-1 night tone contact inputs (NTC) can be connected in parallel. Ensure that consistent polarity is maintained when connecting the units together.

BGM Input: The 30k ohm BGM input impedance is such that multiple inputs can be connected in parallel. The BGM switch on each of the MZ-1s must be set to ON.

4. Configuration and Operation

4.1 LED STATUS INDICATORS Four LED status indicators are located on the MZ-1 circuit board and are visible with the cover on or off. The power LED is lit when power is applied to the MZ-1. The off-hook LED is lit whenever the trunk is off-hook. The night tone LED displays the status of the night tone generator. The override LED displays the status of the override contact input.

4.2 CONFIRM SWITCH SETTINGS The four switches should have been previously set. Confirm that BGM, AT, NT, and HL are set correctly. Refer back to Table 2 in section 3 - Installation for a detailed description of the switch functions.

4.3 INITIAL OPERATION The MZ-1 can now be checked for correct operation. The power source should be connected; only the power LED should be lit. Continue by following the paragraph in this section that is applicable to your installation.

MZ-1 Connected to a PBX: Begin testing by using a PBX telephone to dial select the trunk that connects the PBX to the MZ-1. The MZ-1's off-hook LED should light and you should hear the MZ-1 access tone over the telephone's handset. The MZ-1 access tone lasts less than one second, after which you are connected to the audio output. If the off-hook LED does not light, or you don't hear the MZ-1 access tone, the connection to the trunk, or a software configuration on the PBX must be checked. A simple means of checking the MZ-1 is to connect a linepersons handset across the trunk T and R terminals. Draw MZ-1 access tone by going off-hook with the linepersons handset, and then, talking into the mouthpiece, you'll be heard over the paging system.

With some PBX systems you may not hear the access tone, even though you can still perform voice pages over the paging system. This is because some PBX systems have a long delay, over one second, between when a trunk is accessed (seized) and when the audio path is completed. This prevents the access tone from being heard, but should not interfere with normal paging operation. The MZ-1 is putting out the access tone—you just aren't allowed to hear it!

MZ-1 Connected to a Key System: Begin testing by using one of the key telephones to select the CO line button that connects the key system to the MZ-1. The MZ-1's off-hook LED should light and you should hear the MZ-1 access tone over the telephone's handset. The MZ-1's access tone lasts less than one second, after which you are connected to the audio output. If the off-hook LED does not light, or you don't hear the MZ-1 access tone, the connection to the key system should be checked. A simple means of checking the MZ-1 is to connect a linepersons handset across the MZ-1's trunk connections. Draw MZ-1 access tone by going off-hook with the linepersons handset, and then, talking into the mouthpiece, you'll be heard over the paging system.

4.4 AUDIO LEVEL AND PITCH ADJUSTMENTS The voice page and override audio levels are not adjustable and are intended to be the reference level for the BGM, alert tone, and night tone signals. The audio amplifier and/or amplified speakers should first be adjusted for the desired level during an MZ-1 voice page. Next adjust the background music, alert tone, and night tone levels. If night tone is utilized, the FREQ control should be adjusted to give the desired night tone pitch. Choosing a pitch different from that of the installed site's telephones can aid in discerning a night tone from that of an actual "ringing" telephone.

4.5 TESTING ZONE PAGING CONFIGURATIONS Follow this paragraph if override inputs on multiple MZ-1s are used. Begin testing by observing the LEDs. Only the power lights should be lit. Test the individual zone MZ-1s by following the previous paragraph. Test the all call MZ-1 by dial selecting the trunk that connects the PBX to the all call MZ-1. The all call MZ-1's off-hook LED should light and you should (unless your PBX is slow to pass audio) hear the MZ-1 access tone over the telephone's handset. The override lights on the individual zone MZ-1s should also light.

The audio from the all call MZ-1 should be heard over all the paging zones. Any page in progress on an individual zone will be disconnected when the all call starts. The disconnected user will hear a series of alert "beeps," then hear the all call audio; at least they'll know why they were so rudely interrupted! Upon ending the all call page, the override LEDs and the all call MZ-1's off-hook LED will stop lighting. Normal zone paging can now take place. Any interrupted party who stayed connected to an individual zone MZ-1 can again page. Confused: Don't worry—if you have problems or questions, call us. We're ready to help!

5. Circuit Description

5.1 GENERAL DESCRIPTION The circuit description is intended to familiarize you with the MZ-1 for engineering, applications, and curiosity purposes.

5.2 POWER SUPPLIES The incoming 24Vac or –24Vdc is rectified, filtered and then fed to a 3-terminal voltage regulator. This device produces 20Vdc which is used by the trunk interface, relay, LEDs, and fed to another regulator which produces 15Vdc. The 15Vdc powers all the analog and digital circuitry. One section of operational amplifier produces 7.5Vdc which is used by some of the analog circuitry as a center reference.

5.3 LOGIC CIRCUITRY The 4000-series CMOS gates are used to implement the MZ-1's logic. These devices are extremely low power and highly reliable.

5.4 TRUNK INTERFACE A conventional battery feed circuit with a split primary, 600 ohm to 600 ohm transformer is used. Two power resistors couple 20Vdc and MZ-1 ground to the transformer center taps, and then via the transformer windings to the tip and ring leads. An optocoupler, in series with the tip lead, is used by the logic circuitry to detect trunk off-hook status. The secondary of the transformers connects audio to the audio compressor and access tone/override tone sections.

5.5 AUDIO COMPRESSOR A voltage controlled amplifier integrated circuit is used to reduce the dynamic range of the voice input signals. This ensures that voice input levels from various individuals will not greatly vary in output level. Someone who speaks softly has the same chance of being heard as the brute who shouts into the telephone! The compressor does not change the character of the page signal but simply evens out the level. The output of the compressor is fed to the anti-click circuit.

5.6 ANTI-CLICK CIRCUIT A circuit combining logic based control signals and analog integrated circuits provide the "clean" connect and disconnect operation of the MZ-1. This circuit limits the transmission of unwanted audio signals over the paging/BGM music speakers, resulting in exceptionally smooth handling of audio by the MZ-1. A 51kHz clock generator is associated with the anti-click circuit. This clock is fed to divider integrated circuits to provide all MZ-1 timing signals, as well as creating the 400Hz signal used for the access and pre-page alert tone, and the 800Hz signal used as the override tone.

5.7 ACCESS/ALERT TONE The 400Hz signal is fed, by way of an analog switch and associated logic circuitry, to the trunk interface as the access tone. It is also used as the basis for the alert tone. A voltage controlled amplifier integrated circuit produces the chime-type decay envelope that is heard on the alert tones. The 400Hz signal is amplitude modified to give the desired wave form. One section of DIP switch controls status of the alert tone function.

5.8 OVERRIDE TONE The 800Hz signal is fed, by way of an analog switch and associated logic circuitry, to the trunk interface as the override tone. The override tone consists of four sequences of 150mSec on, 150mSec off.

5.9 AUDIO OUTPUT A high performance line driver circuit is used to couple MZ-1 audio to the outside world. One section of 5532-type operational amplifier integrated circuit drives a 600 ohm to 600 ohm coupling transformer. This combination of parts provides a signal that will correctly match, with great fidelity, all paging/background music systems. Using a transformer eliminates the chance of ground hum and noise pickup possible with directly coupled, unbalanced output circuits.

5.10 BGM INPUT A 10k ohm input impedance transformer couples the background music source to the MZ-1 circuitry. Two sections of operational amplifier, along with a loudness compensation filter acts as an input buffer. The loudness filter boosts the low and high frequencies, and leaves the middle frequencies at unity, increasing the perceived sound quality of the BGM output. The output of the buffer passes through one section of DIP switch before connecting to the remainder of the MZ-1 circuitry. The input impedance appears to an external device as approximately 30k ohms, allowing the BGM input connections on many MZ-1s to be connected in parallel. The components and circuit design of the MZ-1 allow for true "high-fi" BGM.

5.11 OVERRIDE AUDIO/OVERRIDE CONTACT INPUTS One section of operation amplifier integrated circuit, configured as a capacitive coupled, differential (balanced) input acts as the override audio input buffer. The output of the buffer passes through one section of DIP switch before connecting to other sections of MZ-1 circuitry. The buffer's input impedance is approximately 100k ohms, allowing the override audio input connections on many MZ-1s to be connected in parallel. One section of comparator integrated circuit acts as an override contact input buffer. This provides excellent noise and hazardous signal immunity for the logic circuitry. The impedance of the contact input is approximately 4.4k ohms, allowing the override contact input connections on many MZ-1s to be connected in parallel.

5.12 NIGHT TONE The heart of the night tone circuit is an integrated circuit warble tone generator. Potentiometers are provided for the installer to adjust the level and center frequency. A logic signal controls the state of the generator. Great care was taken so that the attack and decay of the signal is very sharp, giving the listener a very good perceived signal. A DIP switch selects if night tone operation is activated. The night tone generator is controlled by three different input signals. These inputs are provided so that the MZ-1 is compatible with every conceivable application. The ring input allows a 20/30Hz high voltage ringing signal to activate night tone. An optical coupler isolates the high voltage signal from the MZ-1. The logic input allows a logic signal to activate night tone. An optical coupler isolates the logic source from the MZ-1. A DIP switch selects if night tone operation will be active on logic high or logic low. The contact input allows a normally open (not shorted) contact to activate night tone.

One section of integrated circuit comparator is used to isolate the outside world from the MZ-1's logic circuitry. All three night tone inputs are high impedance, relative to their own domain. This allows the connection of multiple MZ-1 inputs in parallel, without excessively loading the signal sources.

5.13 RELAY A sealed, bifurcated form C contact is provided for use in installer selected applications. The relay is controlled by logic circuitry, by way of a relay driver integrated circuit. The relay is enabled during voice page, night tone, and override operation.

5.14 LED INDICATORS Four LED indicator lights are provided for assistance during installation, operation, and maintenance. The LEDs indicate power, trunk off-hook, night tone, and override operation.

6. Specifications

POWER REQUIREMENT
24Vac or –24Vdc, +10%/–5%, 170mA maximum

FCC REGISTRATION
The MZ-1 does not require FCC registration as it is not intended for connection to the public switched telephone network

RELIABILITY MTBF 21.5 years, per Method I of Bellcore TS-TSY-000332, Issue 2, July 1988

INTERCONNECTIONS
One 21-position screw terminal strip

ENVIRONMENT
0 to 50 degrees C, humidity to 95% (no condensation)

TRUNK INTERFACE PARAMETERS
Intended for connection to PBX loop start trunk port or key system central office line position
Impedance: 600 ohms
Loop Supply Voltage: 20Vdc
Loop Supply Current: 34mA with 200 ohm loop, 16mA with 800 ohm loop, 52mA with shorted Tip and Ring

NIGHT TONE RING INPUT
60 to 150Vac RMS, 20/30Hz, ringer Equivalence 0.8 (18k@20Hz, 12.5k@30Hz)

NIGHT TONE LOGIC INPUT
Active on logic low or logic high, switch selectable
Logic High: 0.5mA minimum, 20mA maximum, input current limited with 2.2K ohms resistor, up to 20 logic inputs can be driven by one "HC" type output

NIGHT TONE CONTACT INPUT
Night Tone active upon closure (short)
The contact connected to the contact input must be capable of handling 1mA at 28Vdc
Contact inputs on multiple MZ-1s can be bridged (connected in parallel)
Note: A closure to ground will not activate night tone

BGM INPUT
Input Level: –10dBu nominal
Input Impedance: approximately 30k ohm, balanced, transformer coupled
Frequency Response: Complies with loudness compensation curve for optimal low level listening; 8dB broad dip centered at 800Hz nominal
Distortion (THD): 0.4% (measured at 0dBu input, 1kHz, BGM control set at 50%)

OVERRIDE AUDIO INPUT
Input Level: –10dBu nominal
Input Impedance: 100K ohms, electronically balanced
Frequency Response: ±1dB, 50Hz to 10kHz
Distortion (THD): 0.2% (measured at 0dBu input, 1kHz)

OVERRIDE CONTACT INPUT
Override Input active upon closure (short)
The contact connected to the override contact input must be capable of handling 1mA at 28Vdc
Override contact inputs on multiple MZ-1s can be bridged (connected in parallel)
Note: A closure to ground will not activate override

AUDIO OUTPUT LEVEL (NOMINAL)
Voice: –10dBu normal, 0dBu maximum
Background Music: 0dBu maximum with –10dBu input, adjustable
Alert Tone: –6dBu maximum, adjustable
Night Tone: –5dBu maximum, adjustable

ACCESS TONE
0.6 seconds, 400Hz Square Wave

OVERRIDE TONE
Four 150mSec bursts of 800Hz Square Wave

ALERT TONE
Single tone of 0.6 seconds, 400Hz square wave, amplitude envelope modified to reproduce chime sound
Alert tone level is adjustable

NIGHT TONE
Two alternating tones, commonly referred to as a warble tone, similar in character to the ringing signal produced by electronic telephone sets
Center frequency and level adjustable

RELAY CONTACT
Form C (single pole double throw), break before make, bifurcated contact, 1A maximum at 30Vdc or 100Vac (resistive)

DIMENSIONS
8.75 inches high (22.23cm)
8.75 inches wide (22.23cm)
3.25 inches deep (8.26cm)

WEIGHT
1.6 pounds (0.73kG); shipping weight 3.6 pounds (1.64kG)

MOUNTING
Four #8 pan head screws of the type appropriate for the wall material

7. Incorrect Operation

7.1 REVIEW PRACTICE Should problems arise in the operation of the MZ-1, please review Section 3 - Installation of this practice. Ensure that all connections have been made properly. If another MZ-1 is available, substitute and retest.

7.2 LED INDICATORS The four LED indicators located on the MZ-1 circuit board can provide assistance in locating the source of trouble. The power LED should always be lit. The off-hook LED will help in determining whether a functioning PBX trunk or key system line position is actually connected to the MZ-1. The night tone LED displays when the night tone generator is active. The override LED displays when the override input has been activated.

7.3 SWITCH SETTINGS Ensure that the four switches have been set for the desired functions. If the HL switch is set to the ON position, without a logic signal connected, the night tone may be "locked" in the operate state.

7.4 ADJUSTMENTS Ensure that the three level controls, and the one frequency control have been set to the desired position.

7.5 MZ-1 TESTING A simple means of checking the MZ-1 is to connect a linepersons handset across the trunk connections. You can draw MZ-1 access tone and connect to the paging system by going off-hook with the linepersons handset. The linepersons handset will simulate the operation of a PBX trunk or key system line position.

8. Repair and Replacement

8.1 NOT SO FAST Statistically, most equipment returned to Gordon Kapes, Inc. for repair actually has nothing wrong with it. A telephone call to Gordon Kapes, Inc. technical support can often help to get the equipment operating correctly. We don't mind spending time with our customers getting a site up and running.

8.2 SEND IT BACK If you determine that the MZ-1 is defective, return for repair or replacement according to the Gordon Kapes, Inc. Warranty/Repair and Return policy.

8.3 ONLY WE FIX IT In the event repairs are ever needed on your MZ-1, they should be performed by Gordon Kapes, Inc. or an authorized representative. For further information, contact Gordon Kapes, Inc.

Specifications and information contained in this technical practice subject to change without notice.

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Figure 1 Single-Zone Installation for the MZ-1 Page Controller

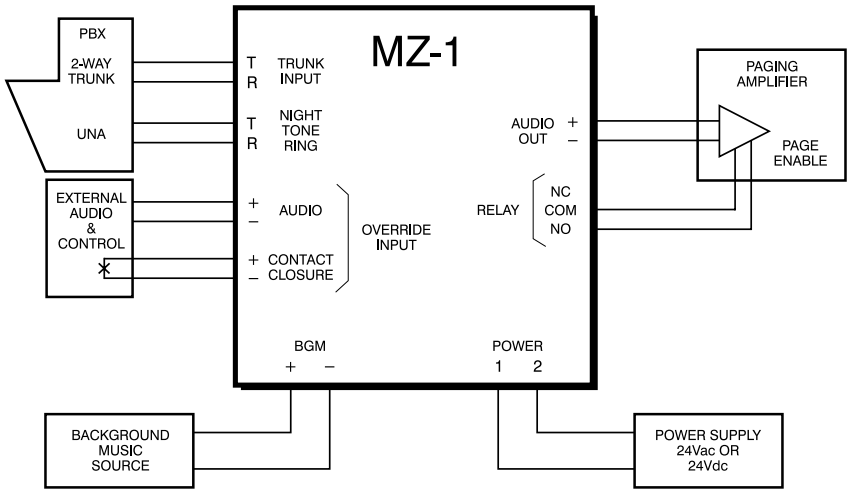

Figure 1 MZ-1 Page Controller as a single-zone page controller interfacing a PBX with a UNA line and a secondary source for override capability.

Figure 2 Five-Zone Installation for the MZ-1 Page Controller

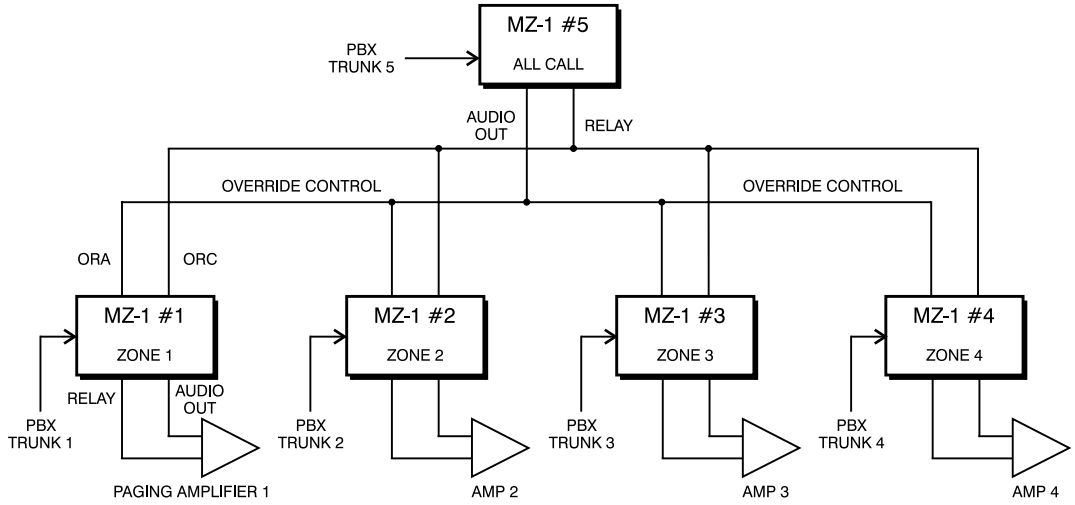

Figure 2 Five MZ-1 units providing a simple four-zone and all call paging network.

Figure 3 Nine-Zone Installation for the MZ-1 Page Controller

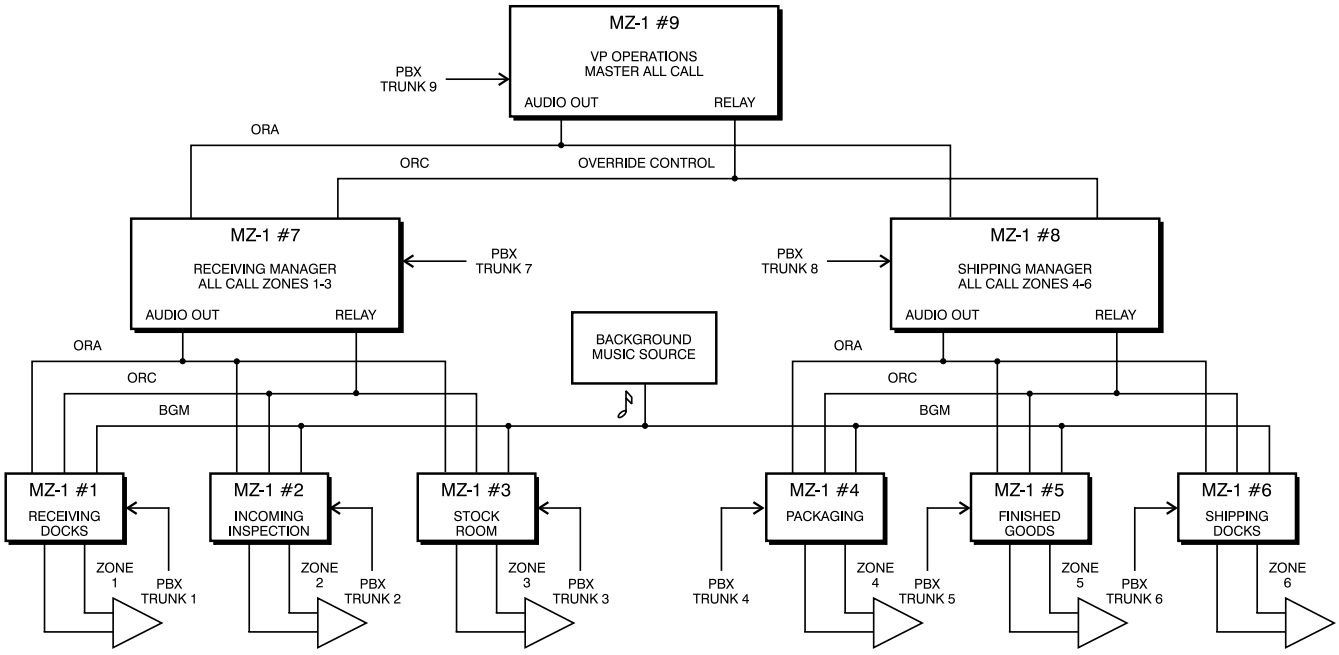

Figure 3 Nine MZ-1 units arranged in a hierarchical structure. All call feature allows managers to override pages in their respective departments (zones). The ninth unit gives priority over all zones and manager pages.