Technical Practice

Issue 4, November, 1995

MZ-8 PAGE CONTROLLER

Contents

1. General Description

1.1 PRACTICE Issue 4 of the MZ-8 Technical Practice is released to document several software changes and additions, as well as one hardware change. One or more of the eight paging zones now can be configured to be omitted from the dial-selected "all call" feature. Four paging groups are now available, allowing users direct access to four distinct configurations of the eight paging zones. The auxiliary tone feature has been extensively revised to better reflect the needs of field installations, especially issues of life-safety. The auxiliary audio input feature has been removed. In a nutshell: it was deemed that the feature was more trouble than it was worth!

1.2 PRODUCT OVERVIEW The MZ-8 is designed to provide a one-way voice paging connection between a PBX telephone system and up to eight zones of a voice paging/background music system. The MZ-8's hardware and software provide the features, operating simplicity, and performance simply not found in any other multiple-zone page adapters.

1.3 PRODUCT FEATURES The MZ-8 Page Controller contains a host of standard and programmable features. The MZ-8 allows the installer to configure more than a dozen system and zone features. But don't worry, programming the MZ-8 is not difficult, unlike trying to get your VCR to stop flashing "12:00, 12:00, 12:00!" All MZ-8 functions are configured using standard touch tone (DTMF) dialing. The selected configuration is stored in nonvolatile (permanent) memory.

1.4 TRUNK INTERFACES Two interfaces link the MZ-8 to the associated PBX telephone system. The PBX must provide two loop start trunk ports; the MZ-8's interfaces look like standard Central Office (CO) loop start trunks. The first MZ-8 interface (called Port 1) is used to access the MZ-8 and then dial select one or more of the eight zones. Upon off hook, Port 1 returns dial tone, notifying the user that the MZ-8 is ready to accept touch tone digits. The second interface (called Port 2) is used to provide an override or "priority" page connection to a preset group of zones. Usually all zones will be selected, providing an override "all call" function. Upon going off hook, Port 2 connects the user to the selected zones. Port 2 is extremely useful with PBX telephone systems that provide a page button on an operator's console. An operator can quickly execute an "all call" page.

1.5 ZONE SELECTION The MZ-8 incorporates a simple, yet flexible zone selection process. Using touch tones, a user can directly select any one of the eight zones, the four

pre-configured paging groups, and an "all call" function. Using extended dialing codes, any combination of the eight zones can be selected. Paging zones 1, 2, 5, and 8 is accomplished by dialing "*1258*"—easy huh? The operating procedures were designed to be consistent and simple. In general, any incorrect dialing sequence returns MZ-8 dial tone and allows the dialing to be started again. Much time was spent "human engineering" this device. Extensive testing by small children ensures that most adults should find the MZ-8 easy to use.

1.6 PAGE OUTPUTS The eight zone outputs directly connect to most audio amplifiers and/or amplified speakers. The output circuits provide a line level, low impedance audio signal that is compatible with most amplifiers' line or auxiliary inputs. Additionally, the MZ-8 is equipped with one 600 to 600 ohm transformer for applications requiring an electrically isolated signal. Using the isolation transformer can help in those rare cases where noise or hum pickup between the MZ-8 and the associated paging equipment is a problem. The installer connects the desired zone output to the transformer's input. The transformer's output is then connected to the input of the amplifier.

1.7 TWO OPERATING MODES The MZ-8 can operate in two modes: normal and one amplifier. In the normal mode, each page output is intended to connect to one audio amplifier or a group of amplified speakers. An eight zone system would require eight audio amplifiers or eight groups of amplified speakers. In the one amplifier mode, a single audio amplifier can be used to drive up to eight zones of speakers. The normal mode is superior in many ways and is the recommended operating mode. The one amplifier mode is useful in cases where equipment or budget limitations prevent using one amplifier for each of the page zones. Refer to Section 2—Applications and Limitations for details.

1.8 ANTI-NOISE CIRCUITRY A special circuit eliminates the extraneous touch tones, clicks, thumps, and pops commonly associated with zone page adapters. The MZ-8 smoothly routes voice page, background music, and night tone signals to provide great sonic and operational performance. Touch tones are simply not allowed to exit over the page audio outputs!

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

1.10 BACKGROUND MUSIC A source of background music can be connected. A programmable feature allows the music to be routed to any or all zone outputs. During paging, the background music is muted in the appropriate zone(s). The MZ-8 contains a loudness compensation circuit to improve the sound of the background music. Most tuners, tape decks, compact disc players, or music services are compatible with the MZ-8. A control allows the installer to adjust the level of background music.

1.11 NIGHT TONE The MZ-8 contains an integral "warble tone" night tone generator. Many PBX systems provide a universal night answer (UNA) line which can be connected to the MZ-8's night tone ring input. For those systems that don't provide a UNA line, the MZ-8's night tone generator also responds to a contact closure or logic level input. Programming the MZ-8 allows the night tone to be routed to any or all of the zone outputs. Night tone is muted in the appropriate zone(s) during a page. Two controls allow the installer to adjust the pitch and level of the night tone signal.

1.12 AUXILIARY TONE The MZ-8 provides a secondary audible tone function in addition to the night tone generator. This allows an external contact closure to activate an audio signal. Applications include allowing a time clock to generate break alerts, or a security office to initiate an emergency alert. The installer uses the programming function to select a number of auxiliary tone parameters, including the priority of the auxiliary tone, which zones receive the auxiliary tone, and the type of tone to be generated.

1.13 PRE-PAGE ALERT TONE A pre-page alert tone can be configured on a per-zone basis. The function is sophisticated enough so that an "all call" will produce alert tones only to the selected zones. Two alert tone types are available; a single tone and a triple tone sequence. The triple alert tone is similar in character to the sound heard in airports and railway stations in many parts of the world. An effective, as well as somewhat "continental," alert is produced by selecting the triple sequence.

1.14 PAGE LENGTH The maximum length of any single page is configurable, with eight time periods to choose from. The periods range from one minute to 60 minutes, with a factory default of two minutes. Upon reaching the time limit an error tone is returned to the user, followed by a two-second break in loop current on both interfaces. This will signal the PBX to release the MZ-8 connection, allowing other users to access the MZ-8.

1.15 ZONE RELAYS A normally open (not shorted) relay contact is associated with each of the eight page zones. The most frequent use of the zone relay contacts are with audio amplifiers or paging systems that require a "page enable" contact closure for correct operation. In the MZ-8's single amplifier mode the zone relays are used to switch the output of a single audio amplifier to as many as eight groups of speakers.

1.16 ANY ZONE ACTIVE CONTACT A normally open auxiliary relay contact is provided for special applications. The contact closes whenever a page is in progress for one or more of the zones. Applications include providing the attendant console location with a "page active" light. This would let the operator know when to perform an override page.

1.17 LED STATUS INDICATORS Eleven LED status indicators are located on the MZ-8 circuit board and are visible with the cover on or off. These LEDs greatly assist determining the operating status of the MZ-8 during installation, programming and maintenance.

1.18 CONNECTIONS For installer convenience, all interconnections are made via a 25-pair plug and two 6-position modular jacks.

1.19 POWERING The MZ-8 requires a standard 120Vac, 50/60Hz, grounded outlet for proper operation.

1.20 PHYSICAL DESCRIPTION The MZ-8 consists of a precision fabricated steel enclosure containing a printed circuit board. The MZ-8 measures 14.0 inches (35.6cm) high, 11.1 inches (28.2cm) wide, 2.6 inches (6.6cm) deep, and weighs 11.5 pounds (5.2kg). The MZ-8 wall mounts with four #8 screws.

1.21 SAFETY COMPLIANCE The MZ-8 is listed by Underwriters Laboratories Inc. under their UL1459 Telephone Equipment standard.

2. Applications and Limitations

2.1 PRIMARY APPLICATION The primary application for the MZ-8 is to provide users of a PBX telephone system with access to a multi-zone voice/background music system. The MZ-8 provides two one-way voice paths to access up to eight page zones. Port 1 allows touch tone dialing to select which zones receive the page audio. Port 2 pages a pre-configured group of zones, normally all eight, which are accessed immediately.

2.2 SYSTEM ACCESS The MZ-8 connects to the PBX via two loop start trunk ports. The MZ-8 is not intended for operation with PBX station ports or Centrex lines.

2.3 AUXILIARY TONE PRIORITY The auxiliary tone function can be used for such applications as alerting employees to an emergency situation or to sound a "break bell." The auxiliary tone feature is configured for one of two priority levels. When the auxiliary tone is in the high priority level, auxiliary tone is given precedence over all pages. In the high priority mode, the auxiliary tone is sent to all zones. Thus, the auxiliary tone zone selection feature is not applicable. If the auxiliary tone is set to the low priority level, individual zones can be configured to receive auxiliary tone. In the low priority level, voice pages take higher priority, and an auxiliary tone in progress is muted in all zones when either page interface goes off hook.

2.4 LIMITATION—ONE AMPLIFIER MODE The MZ-8 can operate in two modes: normal and one amplifier.

Normal Mode: In the normal mode, the eight zone audio outputs are intended to be connected to eight audio amplifiers or eight zones of amplified speakers. In this mode, the great performance of the MZ-8, specifically the background music feature, can be used.

One Amplifier Mode: In the one amplifier mode, several disadvantages arise. Since a speaker zone is connected to the amplifier only when its zone has been selected, background music cannot be provided. Also, clicks or pops may be created because the speakers are connected to the amplifier just prior to and just after each page. However, on the good side, the night tone and auxiliary tone features do operate in the single amplifier mode.

2.5 UNLIMITED APPLICATIONS With all of the features we packed into the MZ-8, it's like writing a novel trying to explain the application possibilities. We encourage you to give our support engineers a call.

3. Installation

3.1 CHECKING FOR DAMAGE Upon receipt, immediately inspect the MZ-8 for damage. If damaged, file a claim with the shipper. Order a replacement if necessary.

3.2 WORDS OF CAUTION As with any product, installing the MZ-8 requires a safety first approach.

Warning: Never install telephone wiring during a lightning storm. Never install telephone jacks in wet locations unless specifically designed for such locations. Never touch non-insulated telephone wires or terminals prior to disconnecting the line at the network interface. Use caution when installing or modifying telephone lines. Do not remove the MZ-8's internal power supply cover.

3.3 INSTALLATION KIT Included in each MZ-8 shipping carton is an installation kit. Each kit contains four #8 pan head screws.

3.4 THE COVER Remove the cover at this time. The cover is secured via two screws located on the front of the unit. To remove the cover loosen the bottom screw and remove the top screw. Lifting up on the cover will free it from the bottom screw.

3.5 MOUNTING The MZ-8 wall mounts using four #8 pan head screws. The type of screws and anchoring method must be appropriate for the specific wall surface. If appropriate, use the screws provided in the installation kit.

3.6 CONNECTIONS All connections, except power, are made via 25-pair plug P1 and 6-position modular jacks Port 1 and Port 2. The installer must provide a 25-pair cable with connector (female) to mate with P1, and two modular cables. Not to increase an installer's paranoia, but messed up pre-wired 25-pair connectors are found more often than one thinks. Do not be afraid to actually check what is normally assumed to be a "perfect" cable. Figure 1, located at the end of this practice, gives detailed connection information. Refer to this figure when reading the installation procedures.

3.7 PAGE INTERFACES The MZ-8 is equipped with two interface ports. The interfaces are configured to look like CO loop start trunks; supplying loop current and terminating on standard modular (RJ11-type) jacks. These interfaces are intended to connect to loop start trunk ports associated with a PBX system. Port 1 provides touch tone access to the eight page zones. Port 2 provides an override path that has priority over Port 1. In most cases, Port 2 will be configured to provide an "all call" function, connecting a user to all eight page zones. The PBX can be set up so that the attendant console will have immediate "all call" access via a single page button on the console.

Connect the two MZ-8 interfaces to two PBX trunk ports which have been configured for loop start operation. The PBX trunk ports must be set to pass audio in both directions because the MZ-8 returns progress tones to inform the users of page access status. For configurations not requiring the override paging feature connect one PBX trunk port to Port 1 on the MZ-8.

The MZ-8 can connect to a 1A2 or electronic key system via two CO line positions. Two line buttons on the key telephones will act as the page access buttons for both the dial select and override paging options.

3.8 INSTALLING AND TERMINATING THE 25-PAIR CONNECTOR Install the 25-pair cable mounted connector into plug P1. Ensure that the cable enters the MZ-8 cabinet via the access hole in the lower right corner. Secure the connector using the fastener strap that is attached to the plug. Terminate the cable (e.g., on a "66" type block).

3.9 NIGHT TONE CONNECTION The MZ-8 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 two input signals: standard 20/30Hz bridged ringing or a contact closure. Night tone is programmed to access one or more

of the eight zones. Refer to Section 4 for more information on programming.

3.10 NIGHT TONE RING INPUT The night tone ring input is intended to be connected to a standard telephone line with 20/30Hz ringing. The normal connection would be to a PBX UNA line, or PBX extension designated for "night chime" operation.

3.11 NIGHT TONE CONTACT INPUT The night tone contact input allows a contact closure to control night tone. Some PBX and electronic key systems provide a contact closure in lieu of a UNA line.

3.12 AUXILIARY TONE CONTACT INPUT The auxiliary tone contact input allows a contact closure to activate the auxiliary tone function. As an example, the contact input could be connected to a time clock, allowing its "break bell" function to activate the auxiliary audio tone. In a manufacturing environment, the auxiliary tone could be configured as an evacuation warning, controlled by a switch located in the security office. The internally generated tone can be configured for several modes of operation. These include the type of tone, the duration, and whether it is given a low or high priority. See Section 4 for programming details.

3.13 BACKGROUND MUSIC INPUT A source of background music can be connected to the background music (BGM) input. The BGM input is 10k ohms, balanced, transformer coupled which will work with virtually all sources that provide a nominal line level of –10dBm. Programming allows the assignment of BGM to the desired zones. Note: the BGM function is not intended for use when the MZ-8 is in the one amplifier mode.

3.14 ZONE OUTPUT CONNECTIONS The zone outputs can be connected to most types of audio amplifier line level input channels: low or high impedance, balanced or unbalanced. Do not connect the page outputs to audio amplifier microphone level input channels. Microphone level input channels expect to be connected to a very low-level microphone-type signal. Connecting a line level signal, such as provided by the MZ-8, to a microphone input will result in distorted sound being heard over the speakers. If necessary, an audio attenuator or "pad" can be used to reduce the MZ-8's output level to correctly match a microphone input. The "pad" is installed between the MZ-8 output and the microphone input.

Using amplified speakers has become a popular method of implementing a public address/background music system. The MZ-8's zone outputs can be directly connected to up to 20 amplified speakers per MZ-8 zone, i.e., the eight zone outputs in total can connect to 160 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.

Normal Mode: In the normal mode, the installer should connect the zone outputs to the inputs of up to eight zone amplifiers, or to eight groups of amplified speakers. Zone 1 would connect to amplifier number 1, or amplified speaker group 1. This would continue for the other zones.

One Amplifier Mode: In the one amplifier mode, the installer should connect page output zone 1 to the line input of the single audio amplifier. The output of the amplifier will connect to the speakers via the zone relay contacts. This is discussed in the next section. Zone outputs 2 through 8 remain active and can be used for special applications.

3.15 ZONE RELAYS Normally open (not shorted) contacts are provided for each of the eight page zones. The contact closes (shorts) whenever that zone is selected for a voice page, night tone, or auxiliary tone. As an example, If "all call" is selected, all of the eight normally open contacts close.

Normal Mode: The most frequent use of the zone relay contacts is with audio amplifiers or paging systems, e.g. Muzak® that require a contact closure during a page for correct operation. Some paging equipment refers to this as a page enable contact.

One Amplifier Mode: In the one amplifier mode the MZ-8's zone relays are used to switch the output of the single amplifier to the speaker groups. The common or ground connection of the amplifier output is connected to the common lead of all the speaker groups. The amplifier's output high or positive lead (e.g., 8 ohms or +70V output) is connected to COM terminals of all eight relay contacts. The normally open terminals are connected to the positive or high leads of the speaker groups; NO1 to speaker group 1, etc. Do not connect the output of the amplifier directly to any speakers. You must route all speakers through the zone relay contacts. Failure to heed this warning will lead to extraneous noise (MZ-8 dial tone, alert tones, etc.) being heard over the speakers that are directly connected to the amplifier.

3.16 ZONE ACTIVE RELAY CONTACT The zone active relay contact provides an indication that one or more of the eight zones are active. The contact closes (shorts) whenever any zone is active—be it through paging, night tone, or auxiliary tone activity. This can be useful in special applications, such as lighting a lamp on an attendant console, muting a music source, etc.

3.17 ISOLATION TRANSFORMER As an installer resource, the MZ-8 provides a 600 ohm to 600 ohm isolation transformer for site specific applications. It can be used to provide DC isolation and balancing for one of the page output zones. The transformer may be useful in eliminating hum or noise when connecting a zone output to an amplifier that is located a great distance away from the MZ-8. Connect the desired page zones' output leads to the transformer input; connect the transformer output to the amplifier input.

3.18 CONNECTING POWER Plug the power cord into a standard 120Vac, grounded outlet. As there is no power switch on the unit, it will begin operating as soon as the power cord is plugged in. The top LED, labeled POWER, will light.

3.19 AUXILIARY DC OUTPUT A source of power is provided on the last pair of plug P1. This is +26Vdc, current limited to 20mA nominally. It is provided specifically for use with the zone active relay contact to drive an LED indicator light. This LED would provide a visual indication at an attendant console that a page is taking place. This would assist the operator in performing override pages only when no other page is taking place. A really nice LED module that we like is the Tone Commander MIM-L Message Indicator Module, available from North Supply. The Auxiliary DC Output, via the zone active relay contact, can be directly connected to the MIM-L without using an external current limiting resistor.

4. System Programming

4.1 PROGRAMMING MODE Congratulations! You have now reached the point in the installation where you configure the system and zone operating features. To graduate from this section, we have armed you with a programming command table and a work sheet. Mark the work sheet with the operating features you desire. (It's helpful to photocopy the sheet first to accommodate future configurations.) The table is a complete list of all features and their code settings. Oh sure, you can operate the MZ-8 right now, but what fun would that be? Refer to Table 2 as you enter "the programming mode."

You will be using touch tones to program the MZ-8's features. Port 1, accessible via the modular jack labeled Port 1, is used for programming. This is the MZ-8 interface that allows you to dial select the page zones you wish to reach. The simplest means you have to access Port 1 is using one of the PBX telephones. Alternately, you can disconnect the path to the PBX and connect a 2500-type single line telephone into the Port 1 modular jack. Be sure you can easily view the MZ-8 zone LEDs. The LEDs display each feature's status, making programming much simpler.

4.2 ENTERING AND EXITING THE PROGRAMMING MODE For security, the programming mode can only be entered during the first 15 minutes after plugging in the unit. This keeps users from changing the MZ-8 configuration. If the 15 minutes has been exceeded, simply unplug the line cord momentarily to get another 15 minutes. Then, go off hook on Port 1. You should hear a pseudo-dial tone. Enter the programming mode by dialing "***" (a group of three touch tone "stars").

To exit the programming mode, touch tone dial "99" followed by a "*." This returns the MZ-8 to normal operation, and a new dial tone will be heard. If "#" is entered after 99, the exit code will be ignored and you will remain in the programming mode.

Upon entering the programming mode a 15-minute no activity timer starts. If no programming activity takes place (no touch tone digits received) for 15 minutes, the programming mode will automatically end.

Upon manually exiting the programming mode a 15-minute grace period allows reentry without repowering the unit. This 15-minute grace period allows repeated modification and testing of the MZ-8 "on-the-fly." In other words, you can continue programming until your customer is happy! As each feature code is accessed and/or altered, the "*" digit saves the change; the "#" digit will ignore the changes made.

4.3 PROGRAMMING HELP TONES In the programming mode, the MZ-8 indicates which feature code has been accessed by returning a coded tone sequence. Prior to a code selection, the system returns a single long beep that is repeated until a feature code is selected or the programming mode is exited or automatically terminated. The single, repeating beep sequence indicates that the user is in the main menu and the MZ-8 is ready to accept a feature code selection. The features may be configured in any order. Once a feature code is entered, the MZ-8 returns a tone sequence corresponding to that code. This tone sequence will repeat until the entry of "*" to save the change(s), or "#" to ignore the change(s). Entering the digit "9" is invalid except when exiting the programming mode or restoring the factory defaults. If "9" is selected after a feature code, the MZ-8 passes a short, error-type tone and then allows you to enter valid digits. Some system level features limit entry choices to one or two digits. All invalid digits entered for these features return error tone.

4.4 STATUS LEDS IN PROGRAMMING MODE While in the programming mode, several of the MZ-8's LEDs are used to indicate system status and zone feature selections. The illuminated power LED indicates that the system is powered. The Trunk 1 LED indicates the off-hook status of that interface. The zone LEDs show the zone and system level program settings. These visual indications, along with the programming tones, are helpful when programming MZ-8 features. Use Table 2 to determine the LED response to each programmable feature.

Now that we all understand the programming protocol, let's move into programming your desired configuration. Don't worry—it's easier for you to program the MZ-8 than it is for us to try to describe how to do it! If the MZ-8 is in the programming mode, proceed to the next paragraph. If not, enter the programming mode first, then proceed. This may require repowering the MZ-8. The work sheet you marked with your configuration can serve as a guide.

4.5 OVERRIDE PAGE To enable or disable the override page feature of each zone, dial "21" on the touch tone pad. The MZ-8 will return an audible sequence of two short beeps followed by one long beep indicating feature code 21 access. This tone sequence will continue to repeat until the feature is exited by dialing "*" to save changes or "#" to ignore changes. Next, note which zone LEDs are illuminated. Each zone LED that is "on" indicates that the zone is set to receive pages originated from Port 2, the override page trunk. The system default setting for this feature is that all zones receive override pages (all zone LEDs illuminated). Entering digits "1" through "8," as your configuration requires, "toggles" the setting of each zone and the state of its LED. Entering "0" disables all zones from receiving override pages. Once you are satisfied with your selection, dial "*" to save your change.

After saving or exiting without saving the changes, the MZ-8 returns you to the main programming menu for the next feature code selection.

4.6 BACKGROUND MUSIC Use feature code 22 to select which zones receive background music. A lit zone LED indicates that the zone is set to receive background music.

4.7 NIGHT TONE Use feature code 23 to select which zones receive night tone. A lit zone LED indicates that the zone is set to receive night tone.

4.8 PRE-PAGE ALERT TONE—PORT 1 Use feature code 31 to select which zones receive a pre-page alert tone for pages originated from Port 1. (Remember that Port 1 allows users to dial select which zone(s) they want to page.) A lit zone LED indicates that the zone is set to receive a pre-page alert tone.

4.9 SINGLE OR TRIPLE ALERT TONE SEQUENCE—PORT 1 Use feature code 32 to assign a single or triple pre-page alert tone sequence for each zone that is accessed via Port 1. Each zone LED that is "on" indicates a zone that is set to receive the triple alert tone sequence. Each zone LED that is "off" indicates a zone that is set to receive the single alert tone sequence.

4.10 PRE-PAGE ALERT TONE—PORT 2 Use feature code 33 to select which zones receive an override alert tone for pages originated from Port 2 (override port). A lit zone LED indicates that the zone is set to receive an override alert tone.
4.11 SINGLE OR TRIPLE ALERT TONE SEQUENCE—PORT 2 Use feature code 34 to assign a single or triple pre-page alert tone sequence for each zone that is accessed via Port 2 (override port). Each zone LED that is "on" indicates a zone that is set to receive the triple alert tone sequence. Each zone LED that is "off" indicates a zone that is set to receive the single alert tone sequence.
4.12 AUXILIARY TONE PRIORITY Use feature code 41 to set the auxiliary tone's system priority. In the high priority mode all zones will receive auxiliary tone. Choosing the high priority setting supersedes the settings for feature 42.
4.13 AUXILIARY TONE ZONE SELECTION Use feature code 42 to select which zones receive auxiliary tone. Each zone LED that is lit indicates that the zone is set to receive auxiliary tone. Remember that feature 41, when set to high priority, overrides this feature and sends auxiliary tone to all zones.
4.14 AUXILIARY TONE CONTACT RESPONSE AND AUDIO TYPE SELECTION Feature code 43 selects two parameters. The first is if the auxiliary tone output directly follows the state of the input contact closure, or provides a single burst of tone each time the contact closes. (If selected for burst operation, the burst length is set by feature code 44.) The second parameter selects whether the auxiliary tone is a steady or an intermittent tone.
4.15 AUXILIARY TONE BURST LENGTH Feature code 44 is applicable if the auxiliary tone has been selected to produce a burst of tone each time the input contact closes. Use this feature to select the burst length.
4.16 OPERATING MODE Feature code 51 selects if the MZ-8 will operate in the normal or one-amplifier mode. When the ZONE 1 LED is lit, it indicates that the one amplifier mode is selected.
4.17 PAGE LENGTH TIMER Use feature code 52 to set the time-out period for an active page. You can choose among eight time periods. Note that the time period is applied to both Port 1 and Port 2 page interfaces.
4.18 DIAL SELECT ALL-CALL ZONES Use feature code 53 to enable or disable zones from Port 1's touch tone selected "all call" function. (During operation, "all call" is accessed by dialing "0" via Port 1.)
4.19 PAGE GROUP 1 Use feature code 61 to add or remove zones from Port 1's Page Group 1. (During operation Page Group 1 is accessed by dialing "91" via Port 1.)
4.20 PAGE GROUP 2 Use feature code 62 to add or remove zones from Port 1's Page Group 2. (During operation page Group 2 is accessed by dialing "92" via Port 1.)
4.21 PAGE GROUP 3 Use feature code 63 to add or remove zones from Port 1's Page Group 3. (During operation Page Group 3 is accessed by dialing "93" via Port 1.)
4.22 PAGE GROUP 4 Use feature code 64 to add or remove zones from Port 1's Page Group 4. (During operation Page Group 4 is accessed by dialing "94" via Port 1.)
4.23 RETURNING TO FACTORY DEFAULTS Feature code 98 returns all MZ-8 features to their factory default settings. This "clean slate" option allows you to go back to the starting point of programming without manually reentering each default setting.

Enter code "98" and "*" to return to default settings. Entering "98" followed by "#" will ignore the request to return to default settings, keep you in the programming mode, and not alter any previous changes.
4.24 EXITING THE PROGRAMMING MODE After all system and zone features are set as desired, exit the programming mode by entering the exit code "99" followed by "*." The MZ-8 will return page dial tone, and is now ready to serve your every paging need using the new configuration. You have 15 minutes to reenter the programming mode by entering "***." After the 15-minute period, you'll have to momentarily unplug the unit before "***" will be recognized.

5. Initial Operation
5.1 INITIAL OPERATION The MZ-8 now can be checked for proper operation. Only the power LED should be lit. Begin testing by using one of the PBX system telephones to access the MZ-8's dial select page port (Port 1). The Trunk 1 OH LED will light and you should hear the MZ-8 dial tone coming over the telephone's handset. The MZ-8 dial tone doesn't sound like a normal dial tone. Some people have described it as a buzzing sound or a "funny noise!" Anyway, if the LED does not light, or you don't hear the MZ-8 dial tone, check the connection between the PBX and the MZ-8. Also ensure that the PBX's software configuration is set for loop start trunk two-way operation. A simple means of checking the MZ-8 is to plug a single line telephone directly into the modular jack for Port 1. You can draw MZ-8 dial tone by going off hook, and then touch tone dial selecting the page zones you want to test. The zone LEDs should light as you select the different zones.

If the PBX system is configured to allow an override page use a PBX station telephone to access the MZ-8's override port (Port 2). The override port allows a page to be sent immediately to the zones configured to receive the override page. The Trunk 2 OH and individual page zone LEDs should light as the MZ-8 is accessed.
5.2 AUDIO LEVEL AND PITCH ADJUSTMENTS Four level controls are provided on the MZ-8. Three controls allow adjustment of background music, pre-page alert tone/auxiliary tone, and night tone audio levels. As is evident, a single control adjusts the level of both the pre-page alert tone and the auxiliary tone functions. The one remaining control adjusts the pitch of the night tone signal. The page audio level is not adjustable, and is used as the reference level for the other adjustments. The MZ-8 was designed to minimize the chance of sending too much or too little signal to the paging/background music system. The audio amplifier(s) and/or amplified speaker(s) should first be adjusted for the desired level during a voice page from the MZ-8. Then adjust the background music, alert tone/auxiliary tone, and night tone levels. In the one amplifier mode, only alert tone/ auxiliary tone and night tone adjustments are relevant. Background music is not functional in the one amplifier mode.
5.3 SELECTING PAGE ZONES One, all, or groups of zones are easily selected using touch tones. In general, any incorrect dialing returns an MZ-8 dial tone. At the end of any page the user should dial "#," then hang up. Dialing "#" cleanly disconnects the telephone line audio from the active page

zone(s). The "#" touch tone does not appear in the audio output to the page zone(s). (A feature of the MZ-8 is that no touch tones will ever be sent out an MZ-8 audio output.) This procedure should be followed on both page ports for the "cleanest" page audio quality.

6. Circuit Description

6.1 GENERAL DESCRIPTION The circuit description is intended to familiarize you with the MZ-8 for engineering, applications, and curiosity purposes.

6.2 POWER SUPPLY The power supply section produces the four voltages required by the analog and digital circuitry. Nominal 120Vac enters the MZ-8 via a 3-conductor line cord. This voltage connects via a fuse to the primary of a step-down transformer. Rectifying and filtering the secondary of the transformer provides unregulated +13Vdc and +26Vdc. The unregulated +13Vdc is fed to a linear regulator to produce +5Vdc. This +5Vdc powers analog and digital circuitry. The unregulated +26Vdc powers several analog gates, the zone and loop current relays, zone LEDs, auxiliary DC output, and connects to two sections of voltage regulator circuitry. Two linear voltage regulator integrated circuits produce +18Vdc for the trunk loop current, and +10Vdc for the analog circuitry. A transistor-based circuit protects the auxiliary DC output, limiting the maximum current to 20mA.

6.3 MICROCOMPUTER At the heart of the MZ-8 is a Motorola 68HC05-series microcomputer (MCU). The MCU contains memory permanently loaded with the MZ-8 program software. In addition to program storage memory, the MCU contains clock, RAM memory, bidirectional ports, and timer circuitry. A 3.57MHz crystal provides the time base for the MCU. Complementing the MCU memory is an EEPROM used to store and retrieve the installer configured features. The MCU generates all audio tones provided to both page ports and zone audio outputs. The tones include dial tone, alert tone/auxiliary tone, and error tone. A serial port on the MCU communicates with a solid state cross point switch matrix that performs all MZ-8 audio routing.

6.4 MCU WATCHDOG TIMERS Two separate "watchdog" timers are used to prevent the MZ-8 from "locking up"—a common downside of using MCUs. Through gyrations known only to Tom the software engineer, the program software continuously checks itself. Potential program dead ends are caught and the program continues running. A hardware watchdog monitors pulses that come out of one of the MCU I/O pins. The pulses discharge an RC circuit connected to a comparator. If a power glitch, a static discharge, or some other condition "locks" the MCU, the pulses stop, the RC circuit charges, and the state of the comparator changes. The comparator output is connected to the reset pin of the MCU so that it can be reset once the comparator changes state.

6.5 INTERFACES Two identical interface circuits provide access to the MZ-8. Conventional battery feed circuits with a split primary, 600 ohm to 600 ohm transformer are used. Two power resistors couple 18Vdc and ground to the transformer center taps, and then through the transformer windings to the tip and ring leads. The 18Vdc used by both interfaces passes through one contact of the loop disconnect relay. This allows the MCU to disconnect the MZ-8 from the PBX's trunk ports by momentarily breaking loop current. An optocoupler detects the off-hook status. The secondary of each transformer connects audio to the DTMF decoder and audio compressor via an analog hybrid and audio routing circuit.

6.6 ANALOG HYBRID Upon Port 2 off-hook detection, logic circuitry redirects the path of page audio from Port 1 to Port 2. The analog hybrid couples Port 2 receive audio to Port 1's audio path. Port 1 will also receive override alert tone if any zone is configured to receive the alert tone.

6.7 TOUCH TONE DECODER As pulse dialing is not recognized, all dialing commands are sent to the MCU via a one-chip touch tone (DTMF) decoder.

6.8 TONE SOURCE One I/O pin of the MCU is used as an audio tone source. It produces the MZ-8 dial tone, error tone, and alert tone/auxiliary tone. A voltage-controlled amplifier integrated circuit produces the chime-type envelope that is heard on the alert tones. For ease of hearing, constant level audio tones are sent back to the calling party at the same time that the alert tones are sent over the page outputs.

6.9 AUDIO COMPRESSOR A second voltage-controlled amplifier integrated circuit is used to very effectively reduce the dynamic range of the voice input signals. This ensures that the page output will remain fairly consistent despite differences in the voice input levels. 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 audio but simply evens out the level.

6.10 ZONE RELAYS Eight relays, corresponding to the eight zones, are used to provide external contacts for use in installer-selected applications. The zone active relay contact is created by paralleling a second contact contained on each of the eight zone relays. The relays are controlled by MCU I/O pins via relay driver integrated circuits.

6.11 PAGE OUTPUTS Eight high-performance line driver circuits are used to couple MZ-8 audio to the outside world. 5532-type operational amplifier integrated circuits directly drive each zone output, providing a signal that will correctly match all paging/background music systems with great fidelity. The MZ-8 provides a single 600 ohm to 600 ohm coupling transformer for installer specified applications.

6.12 BGM INPUT The background music input provides a 10K ohm input impedance transformer that couples the external audio source to the MZ-8 circuitry. The BGM circuit uses two sections of an operational amplifier to create a loudness compensation filter. The loudness filter boosts the low and high frequencies and leaves the middle frequencies alone, increasing the perceived sound quality of the BGM output. The components and circuit design of the MZ-8 allow for true "hi-fi" BGM.

6.13 NIGHT TONE Night tone generation is controlled by two input signals: 20/30Hz high voltage ringing, or a contact closure. The high voltage ringing signal connects to an optocoupler circuit driving an operational amplifier (op amp) to provide a logic signal to the MCU. The contact input uses isolation resistors and an op-amp to interface a contact closure to the MCU. The MCU produces a control signal to drive a tone generator integrated circuit to produce the "warble tone." Potentiometers are provided to adjust the level and pitch. The warble tone is coupled to the MZ-8 zone outputs using the crosspoint switch.

6.14 AUXILIARY TONE The auxiliary tone contact input uses isolation resistors and an op-amp to safely interface a contact closure to the MCU. In response to this signal, the MCU produces a square wave "tone" which is fed to the cross point switch.

6.15 ANTI-CLICK CIRCUIT A circuit combining software-driven MCU control signals and analog integrated circuits provide the "clean" connect and disconnect operation of the MZ-8. This circuit limits the transmission of unwanted audio signals (e.g., touch tones, loop disconnect pops, etc.) over the paging/BGM system speakers, resulting in exceptionally smooth handling of audio by the MZ-8.

6.16 MODE SELECT When the MZ-8 is configured for the normal mode and a zone is accessed for a page, audio appears on its associated zone output, and its respective zone relay closes. A programming option allows the MZ-8 to be set in what is called the one amplifier mode. In the one amplifier mode, audio for pages to any zone(s) is sent out via the page output zone 1. The zone relays operate as in the normal mode. This allows one audio amplifier to drive speakers in all eight zones. As is covered in the installation section, page output zone 1 is connected to the input of the amplifier, and the output of the amplifier is routed through the zone relays.

7. Specifications

SAFETY COMPLIANCE
Underwriters Laboratories Inc. Listed Telephone Equipment

FCC REGISTRATION
The MZ-8 does not require FCC registration as it is not intended for connection to the public switched telephone network

RELIABILITY
MTBF 14.7 years, per Method 1 of Bellcore TS-TSY-000332, Issue 2, July 1988

POWER REQUIREMENT
120Vac, 0.25 Amps, 50/60Hz

FUSE
0.250A, type 312, not field replaceable

INTERFACE PARAMETERS
Impedance: 600 ohms
Loop Supply Voltage: 18Vdc
Loop Supply Current: 32mA with 200 ohm loop, 15mA with 800 ohm loop, 52mA with shorted tip and ring
On-Hook to Off-Hook Detection: minimum 35mSec break in loop current
Off-Hook to On-Hook Detection: minimum 35mSec break in loop current

NIGHT TONE RINGING SIGNAL REQUIREMENTS
40 to 150Vac RMS, 15.3 to 68Hz

NIGHT TONE CONTACT INPUT REQUIREMENT
The contact connected to the contact input must be capable of handling 0.15mA at 5Vdc

AUXILIARY TONE CONTACT INPUT REQUIREMENT
The contact connected to the contact input must be capable of handling 0.15mA at 5Vdc

BACKGROUND MUSIC SIGNAL
Input Level: –10dBm nominal
Input Impedance: 10k 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 –10dBm input and output, 1kHz, BGM control set fully CW)

PAGE OUTPUT LEVELS (NOMINAL)
Voice: –10dBm normal, –2dBm maximum
Background Music: 0dBm maximum with –10dBm input, adjustable
Alert Tone/Auxiliary Tone: –2dBm maximum, adjustable
Night Tone: –3dBm maximum, adjustable

DIAL TONE
175Hz Square Wave

PRE-PAGE ALERT TONES
Single Tone Sequence: 0.6 seconds, 580Hz square wave, amplitude envelope modified to reproduce chime sound
Three Tone Sequence: Two seconds, consisting of 290Hz, 434Hz, and 580Hz square wave, amplitude envelope modified to reproduce chime sound

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

AUXILIARY TONE
Type: 765Hz square wave, configurable for continuous or intermittent (0.5 sec. on/0.5 sec. off) duty, nominal
Duration: follows contact input or single burst, burst length configurable in 8 durations from 2 to 60 sec.

NO TOUCH TONE TIME-OUT
A time-out condition is reached if no touch tone digit is received during any one minute period when dial tone is active on Port 1. Upon reaching end of time period a five-second error tone is sent to user, followed by a two-second break in loop current on both interfaces.

PAGE LENGTH TIME-OUT
Maximum page length programmable for one of eight periods: 1, 2, 5, 10, 15, 20, 30, or 60 minutes. Upon reaching end of time period a five-second error is sent to user, followed by a two-second break in loop current on both interfaces.

RELAY CONTACTS
Type: normally open (not shorted)
Rating: 0.5A maximum at 60Vdc or 60Vac (resistive)

AUXILIARY DC OUTPUT
+26Vdc, short circuit protected, maximum current limited to 20mA

DIMENSIONS
14.0 inches high (35.6cm)
11.1 inches wide (28.2cm)
2.6 inches deep (6.6cm)

WEIGHT
11.5 pounds (5.2kg); shipping weight 12.5 pounds (5.7kg)

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

8. Incorrect Operation

8.1 REVIEW PRACTICE Should problems arise in the operation of the MZ-8, please review Section 3—Installation of this practice. Ensure that all connections have been made properly. If another MZ-8 is available, substitute and retest.

8.2 LED INDICATORS The 11 LED indicators located on the MZ-8 circuit board should provide assistance in locating the source of trouble. The power LED should always be lit. The Trunk 1 OH and Trunk 2 OH LEDs will help in determining whether the PBX is correctly accessing the dial select and override ports on the MZ-8. The eight zone LEDs show the zone(s) selected to receive a page.

8.3 ADJUSTMENTS Ensure that the three level controls and the one pitch control have been set to the desired position.

8.4 MZ-8 TESTING A simple means of checking the MZ-8 is to use a single line touch tone dial telephone to simulate a PBX trunk port. Connect a modular cord into the MZ-8 interface to be tested. With Port 1, you can draw MZ-8 dial tone by going off hook with the telephone, and then touch tone dial selecting the page zones you want to test. With Port 2, upon going off hook you'll hear an access tone, then will immediately connect to the designated (usually all eight) zones.

9. Repair and Replacement

9.1 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.

9.2 SEND IT BACK If you determine that the MZ-8 is defective, return it for repair or replacement according to the Gordon Kapes, Inc. Warranty/Repair and Return policy.

9.3 ONLY WE FIX IT In the event that repairs are ever needed on your MZ-8, they should be performed by Gordon Kapes, Inc. or our authorized representative. For further information, contact Gordon Kapes, Inc.

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

Figure 1 MZ-8 Page Controller Connection Diagram

P1 Pin Number	Wire Color	Description	
26	WH-BL	T	Night Tone Ring Input
1	BL-WH	R	(Nominal 90Vac, 20/30Hz)
27	WH-OR	+	Night Tone Contact Input
2	OR-WH	–	
28	WH-GN	+	Auxiliary Tone Contact Input
3	GN-WH	–	
29	WH-BR	+	Background Music Input
4	BR-WH	–	
30	WH-SL		
5	SL-WH		
31	RD-BL	OUT 1	Page Output Zone 1
6	BL-RD	COM	(Output for One Amplifier Mode)
32	RD-OR	OUT 2	Page Output Zone 2
7	OR-RD	COM	
33	RD-GN	OUT 3	Page Output Zone 3
8	GN-RD	COM	
34	RD-BR	OUT 4	Page Output Zone 4
9	BR-RD	COM	
35	RD-SL	OUT 5	Page Output Zone 5
10	SL-RD	COM	
36	BK-BL	OUT 6	Page Output Zone 6
11	BL-BK	COM	
37	BK-OR	OUT 7	Page Output Zone 7
12	OR-BK	COM	
38	BK-GN	OUT 8	Page Output Zone 8
13	GN-BK	COM	
39	BK-BR	NO1	Relay Contact Zone 1
14	BR-BK	COM1	
40	BK-SL	NO2	Relay Contact Zone 2
15	SL-BK	COM2	
41	YL-BL	NO3	Relay Contact Zone 3
16	BL-YL	COM3	
42	YL-OR	NO4	Relay Contact Zone 4
17	OR-YL	COM4	
43	YL-GN	NO5	Relay Contact Zone 5
18	GN-YL	COM5	
44	YL-BR	NO6	Relay Contact Zone 6
19	BR-YL	COM6	
45	YL-SL	NO7	Relay Contact Zone 7
20	SL-YL	COM7	
46	VI-BL	NO8	Relay Contact Zone 8
21	BL-VI	COM8	
47	VI-OR	NO-ZA	Zone Active Relay Contact
22	OR-VI	COM	
48	VI-GN	+	Isolation Transformer Input
23	GN-VI	–	
49	VI-BR	+	Isolation Transformer Output
24	BR-VI	–	
50	VI-SL	+	Auxiliary DC Output
25	SL-VI	–	(+26Vdc, Current Limited to 20mA)

Figure 2 Interfaces

Port 1 Jack

The jack labeled "Port 1" provides access to the MZ-8 interface that allows dial selection of the page zones. Port 1 appears as a standard CO loop start trunk, providing talk battery and progress tones. Connect the Port 1 jack to a loop start trunk port on a PBX system. The Port 1 jack is a 6-position modular jack designed to simulate a USOC RJ11 (tip on Pin 4, ring on Pin 3).

Port 2 Jack

The jack labeled "Port 2" provides access to the MZ-8 override interface. Upon this interface going off hook, immediate access to all zones is possible. Port 2 appears as a standard CO loop start trunk, providing talk battery and limited progress tones. Connect the Port 2 jack to a loop start trunk port on a PBX system. The Port 2 jack is a 6-position modular jack designed to simulate a USOC RJ11 (tip on Pin 4, ring on Pin 3).

Figure 3 Dialing Codes

Basic Dialing

Digit Dialed	Function
1	Selects Zone 1
2	Selects Zone 2
3	Selects Zone 3
4	Selects Zone 4
5	Selects Zone 5
6	Selects Zone 6
7	Selects Zone 7
8	Selects Zone 8
91	Selects Page Group 1
92	Selects Page Group 2
93	Selects Page Group 3
94	Selects Page Group 4
0	Selects "All Call" Group
#	Returns to MZ-8 Dial Tone

Extended Mode Dialing

Digits Dialed	
"*XXX*"	Starts and Ends Extended Mode

Two Examples of Extended Mode Dialing	
"*138*"	Selects Zones 1, 3, and 8
"*234567*"	Selects Zones 2, 3, 4, 5, 6, and 7

Figure 4 MZ-8 Page Controller Block Diagram

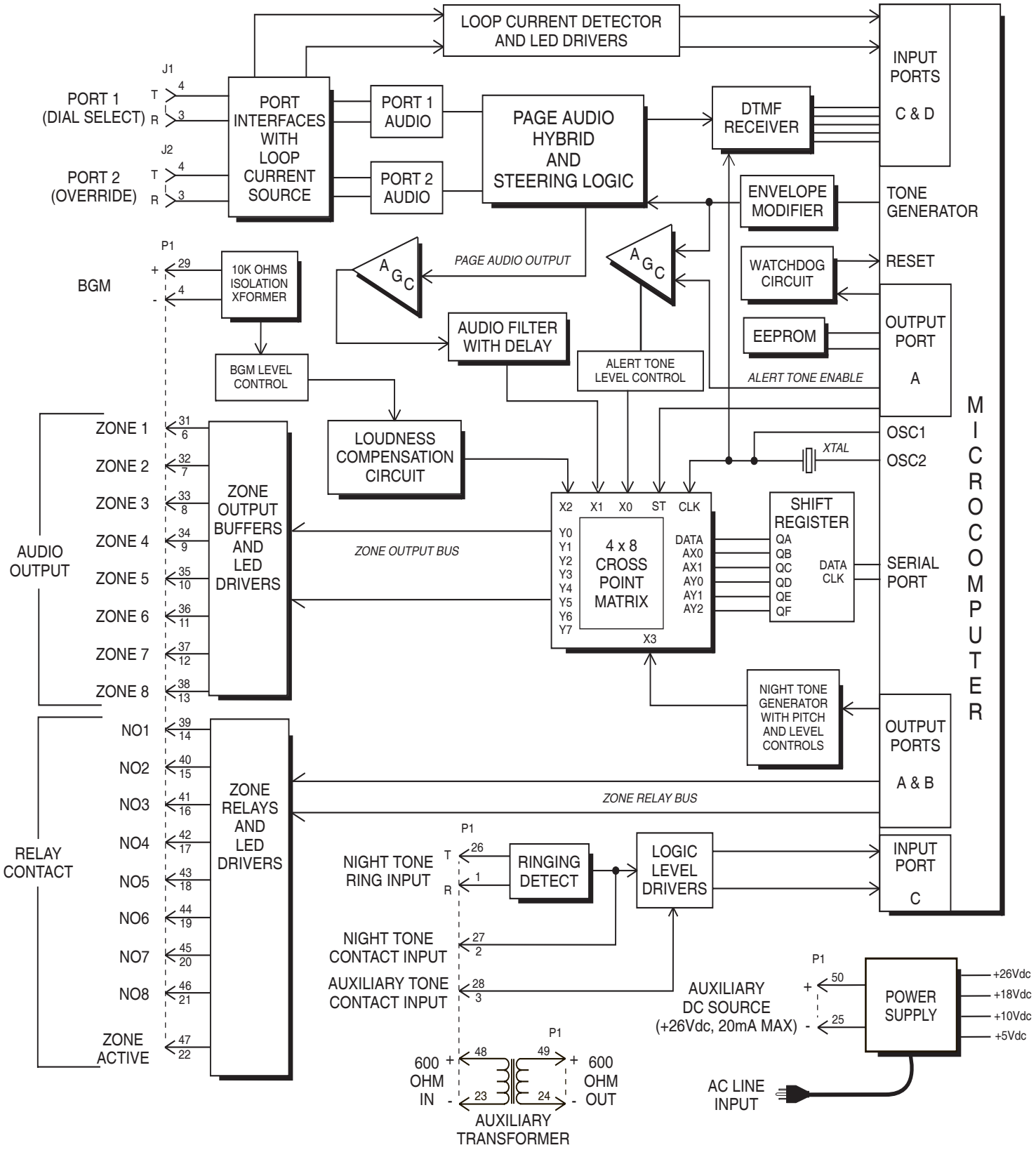

Table 1 MZ-8 Programming Command Codes

Code	Description	Valid Entries	LED Status
21	Selects zones to receive override page via Port 2. Default is all zones receive override page.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
22	Selects zones to receive background music. Default is no zones receive background music.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
23	Selects zones to receive night tone. Default is no zones receive night tone.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
31	Selects zones to receive pre-page alert tone for pages made via Port 1 (dial select). Default is no zones receive alert tone.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
32	Selects alert tone sequence for zones receiving pre-page alert tone via Port 1 (code 31). Default is single alert tone.	1-8 toggles zone setting 0 sets all zones to single	ON = Triple Tone OFF = Single Tone
33	Selects zones to receive alert tone for pages made via Port 2 (override). Default is no zones receive alert tone.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
34	Selects alert tone sequence for zones receiving pre-page alert tone via Port 2 (code 33). Default is single alert tone.	1-8 toggles zone setting 0 sets all zones to single	ON = Triple Tone OFF = Single Tone
41	Selects priority of auxiliary tone. Default is low priority. When high priority is selected, this function supersedes code 42 settings.	1 toggles setting for all zones 0 sets low priority	ZONE 1 ON = High ZONE 1 OFF = Low
42	Selects zones to receive auxiliary tone. Default is no zones receive auxiliary tone. Zones selected to receive auxiliary tone have lower priority than voice pages. Code 41, if selected for high priority, overrides this zone command.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
43	Auxiliary tone response to contact input. Provides tone burst or follows contact closure. Default is tone burst. Selects type of auxiliary tone. Provides steady or intermittent tone. Default is steady tone.	1 toggles response for contact input 2 toggles auxiliary tone type	ON = Follow OFF = Burst ON = Intermittent Tone OFF = Steady Tone
44	Auxiliary tone burst length. Default is 2 seconds. 1 = 2 sec. 2 = 4 sec. 3 = 6 sec. 4 = 8 sec. 5 = 10 sec. 6 = 15 sec. 7 = 30 sec. 8 = 60 sec.	1-8 toggles auxiliary tone burst time periods 0 not valid	1 of 8 zone LEDs ON as selected
51	Operating mode selection. Provides separate audio outputs for each zone (normal mode) or common audio output for a single amplifier (one amp mode). Default is normal mode.	1 toggles mode of operation 0 sets mode to normal	ZONE 1 ON = One Amp ZONE 1 OFF = Normal
52	Selects maximum page length time. Sets maximum page length for both page interfaces. Default is 2 minutes page length. 1 = 1 min. 2 = 2 mins. 3 = 5 mins. 4 = 10 mins. 5 = 15 mins. 6 = 20 mins. 7 = 30 mins. 8 = 60 mins.	1-8 selects page time periods 0 not valid	1 of 8 zone LEDs ON as selected
53	Selects zones to receive “all call” (dial 0) page from Port 1. Default is all zones receive “all call”.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable

Table 1 MZ-8 Programming Command Codes (continued)

Code	Description	Valid Entries	LED Status
61	Selects zones to be part of Page Group 1. Default is all zones part of group 1.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
62	Selects zones to be part of Page Group 2. Default is all zones part of group 2.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
63	Selects zones to be part of Page Group 3. Default is all zones part of group 3.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
64	Selects zones to be part of Page Group 4. Default is all zones part of group 4.	1-8 toggles zone setting 0 disables all zones	ON = Enable OFF = Disable
98	Restores MZ-8 default settings. Reprograms all zones to factory default settings. There are two valid entries after dialing 98: * = YES, restore factory default settings. # = NO, do not restore default settings, remain in the programming mode.		
99	Exit the programming mode. There are two valid entries after dialing 99: * = YES, exit the programming mode and save the changes made. # = NO, do not exit, remain in the programming mode.		
***	Enter the programming mode. Must be entered within 15 minutes of power-up or last exit of programming mode.		

Table 2 MZ-8 Programming Worksheet

Site Name _____

Use a photocopy of this worksheet to document MZ-8 operating parameters.

Programming Date _____

		Zone LEDs							
Code	**Description**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
21	Selects zones to receive override page via Port 2. Default is all zones receive override page.								
22	Selects zones to receive background music. Default is no zones receive background music.								
23	Selects zones to receive night tone. Default is no zones receive night tone.								
31	Selects zones to receive pre-page alert tone for pages made via Port 1 (dial select). Default is no zones receive alert tone.								
32	Selects alert tone sequence for zones receiving pre-page alert tone via Port 1 (code 31). Default is single alert tone. Triple tone when zone LED lit.								
33	Selects zones to receive alert tone for pages made via Port 2. Default is no zones receive alert tone.								
34	Selects alert tone sequence for zones receiving pre-page alert tone via Port 2 (code 33). Default is single alert tone. Triple tone when zone LED lit.								
41	Selects priority of auxiliary tone. Default is low priority. When high priority is selected, this function supersedes code 42 settings. High priority when Zone 1 LED is lit.								
42	Selects zones to receive auxiliary tone. Default is no zones receive auxiliary tone. Zones selected to receive auxiliary tone have lower priority than voice pages. Code 41, if selected for high priority, overrides this zone command.								
43	Auxiliary tone response to contact input. Provides tone burst or follows contact closure. Default is tone burst. Zone 1 LED lit for follow contact closure. Selects type of auxiliary tone. Provides steady or intermittent tone. Default is steady tone. Zone 2 LED lit for intermittent tone.								
44	Auxiliary tone burst length. Default is 2 seconds. Zone LED lit indicates length selected. 1 = 2 sec. 2 = 4 sec. 3 = 6 sec. 4 = 8 sec. 5 = 10 sec. 6 = 15 sec. 7 = 30 sec. 8 = 60 sec.								
51	Operating mode selection. Provides separate audio outputs for each zone (normal mode) or common audio output for a single amplifier (one amp mode). Default is normal mode. Zone 1 LED lit for one amp mode.								
52	Selects maximum page length time. Sets maximum page length for both page interfaces. Default is 2 minutes page length. Zone LED lit indicates length selected. 1 = 1 min. 2 = 2 mins. 3 = 5 mins. 4 = 10 mins. 5 = 15 mins. 6 = 20 mins. 7 = 30 mins. 8 = 60 mins.								
53	Selects zones to receive “all call” (dial 0) page from Port 1. Default is all zones receive “all call”.								
61	Selects zones to be part of Page Group 1. Default is all zones part of group 1.								
62	Selects zones to be part of Page Group 2. Default is all zones part of group 2.								
63	Selects zones to be part of Page Group 3. Default is all zones part of group 3.								
64	Selects zones to be part of Page Group 4. Default is all zones part of group 4.								