BOGEN®
COMMUNICATIONS, INC.

ZONE PAGE MODULES

ZPM-3 & ZPM-9

DESCRIPTION

The Bogen Models ZPM-3 and ZPM-9 are telephone-compatible zone paging modules with All-Call and talkback capabilities. The ZPM-3 provides up to three one- or two-way paging zones; the ZPM-9 provides up to nine one- or two-way paging zones. Both units feature field-programmable paging-zone groups (up to three zone groups, each group paging up to three separate zones), night ringer capability in all zones or in a zone group with up to three zones, and shift change tone or Emergency Call (with alert tone) to all zones or in a zone group with up to three zones.

Both units connect directly to Loop Start and Ground Start Trunks, and to PBX or KEY Paging Ports which provide a normally open contact closure. Connection to an analog station line (Station Port) is possible when used with a suitable telephone access module, i.e., Bogen Model TAM-B. For all applications, a 24-volt power supply is required. Terminals are provided for connection to a 48-volt power supply when 48V Talk Battery operation is required. (The Bogen PRS48 power supply is recommended.)

The ZPM can control self-amplified or central-amplified paging systems. Self-amplified systems require one- or two-way self-amplified speakers or horns (only one talkback amplified speaker/horn can be used per talkback zone). Central-amplified systems require an amplifier for one-way and All-Call paging (up to 100 watts) and a separate talkback amplifier for two-way paging. A third amplifier (for background music) may be required, depending upon the system configuration. Background music (BGM) sources may also be connected directly to the ZPM.

The night ringer is activated by a high voltage ring signal or contact closure. Field-programming of paging zone groups, night ringer zones and shift change/emergency zones is accomplished with a touch tone phone. An optional battery back-up feature retains field-programming in the event of a power failure.

FEATURES

- Three- (ZPM-3) or nine-zone (ZPM-9) switching plus All-Call
- Direct connection to page ports, loop- and ground-start trunks
- Rotary or tone decoding, through appropriate access lines or modules
- Background music (BGM) input with volume control
- Night ringer
- Shift change tone or Emergency Call; user-selected tones
- Three programmable paging-zone groups, night ringer zone group, shift change/Emergency Call zone group (zone group access and field-programming from touch tone phones only)
- Programmable All-Call inhibit
- May be linked for more zones
- Preannounce and confirmation tones
- Programmable privacy beep for talkback zones
- 24V and 48V Talk Battery options
- 100W total power handling ability
- Optional battery back-up
- Wall-mounting design
- Built-in 60-terminal punch block for fast installation
- DIP switch selection of zone type, talk battery, tone options
- Screwdriver-adjustable tone volume, night ringer volume

INSTALLATION

UNPACKING AND INSPECTION

The unit was carefully checked before leaving the factory. Inspect the unit and shipping container for evidence of improper handling. If damage is evident, save all packaging materials and place a claim with the distributor from whom the unit was purchased. If it was shipped directly to you, file a claim with the transportation carrier in accordance with Federal ICC regulations.

Printed in Korea 8902 54-5891-01

SPECIFICATIONS

GENERAL

Operating Voltage: .....24 VDC
Operating Current (max.): 350mA
Audio Power Capability: .....100 W (70VAC or 25VAC)

ZONE SELECTION

Dial Pulse
Pulse Speed: .....8 to 20 PPM
Percent Break: .....52 to 64%

DTMF Tones

Signal Level: .....-25dBm
Twist Limit: 10dB
Tone Duration (min.): 40ms
Interdigit Pause (min.): 40ms

ENVIRONMENTAL

Operating Temperature: .....0° - 125°F
Operating Humidity: .....0 to 95% noncondensing

DIMENSIONS (Overall): .....7-1/4"H x 9"W x 1-3/8"D

SHIPPING WEIGHT: .....3 lbs.

WALL-MOUNTING

The ZPM has mounting flanges with "keyhole" openings to facilitate installation. Use suitable hardware for the type of backboard used in installation.

TELEPHONE INTERFACES

All connections to the unit are via the 60-terminal punch block.

Loop Start Trunk

Figure 1 illustrates the connection of the ZPM to a Loop Start Trunk Port and optional night bell connections. See Figure 2 if the system requires a 48V talk battery.

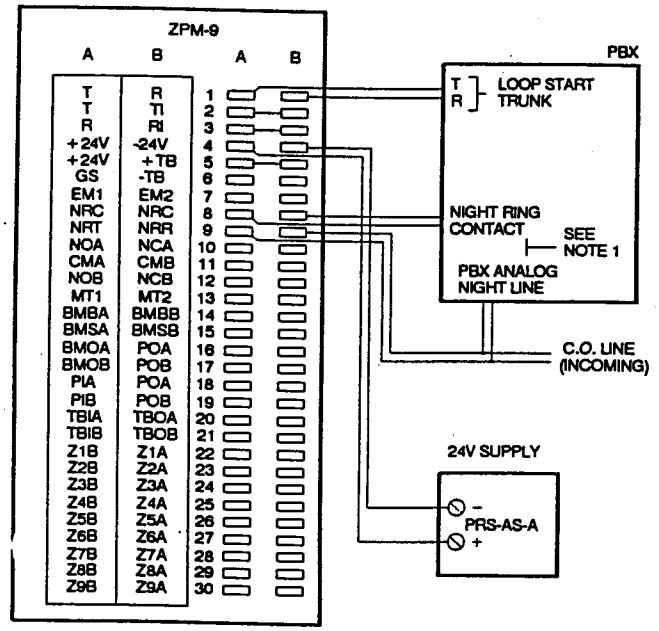


Figure 1 – Wiring Diagram, ZPM to Loop Start Trunk Port

Ground Start Trunk

Figure 3 illustrates the connection of the ZPM to a Ground Start Trunk Port and optional night bell connections. See Figure 2 if the system requires a 48V talk battery.

Note

The line from the GS terminal of the ZPM must be connected to the PBX ground (usually the PBX AC ground) for correct operation.

48V Compatibility

If it is necessary to supply 48V talk battery to the trunk port, a 48 VDC power supply (i.e., Bogen Model PRS-48) is also required. Connect power supplies as shown in Figure 2.

Paging Port

Figure 4 illustrates the connection of the ZPM to a Paging Port. It is important that the port provide an audio pair that does not suppress the DTMF information. Also, the port must provide a normally-open contact closure. When using the ZPM with the paging port, the talk battery and audio are separated, thus providing virtually noiseless switching.

Station Port

Figure 5 illustrates the connection of the ZPM to a Station Port. It is necessary to use a TAM-B access module in all station port applications. Refer to the TAM-B installation instructions to connect the TAM-B to a station port. The TAM-B does not require a power supply when operating in the station access mode; however, the ZPM requires a 24V supply. If the external contact closure of the TAM-B is in use for another function, connect the ZPM to the PT and PR terminals of the TAM-B as if it were a loop start trunk.

Note

To reduce system hang-up transients, it is preferable to connect as shown in Figure 5.

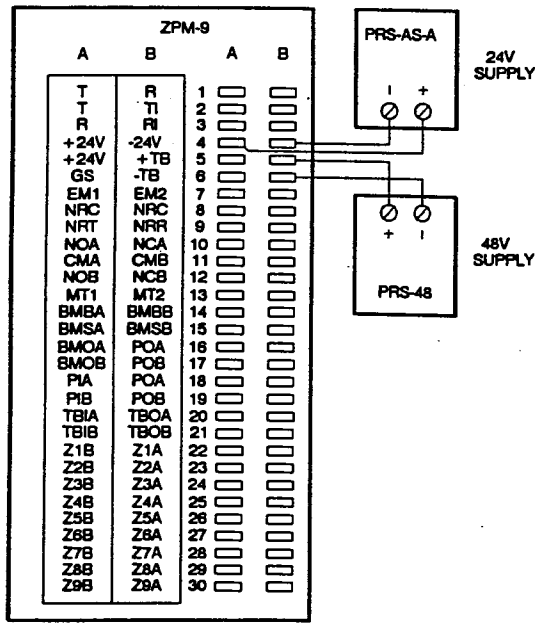
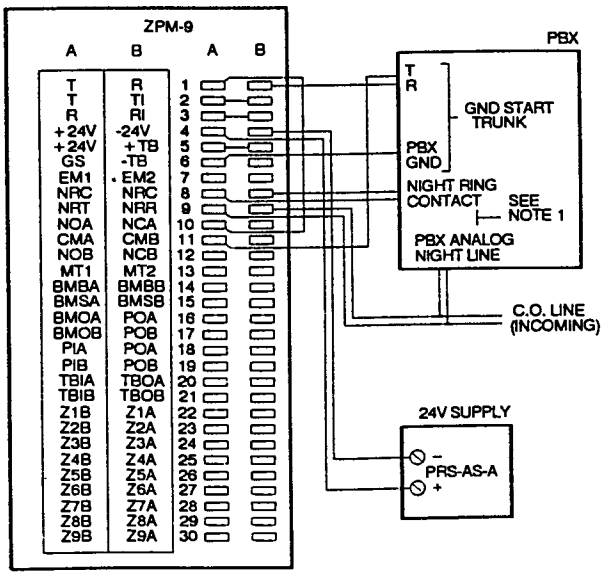


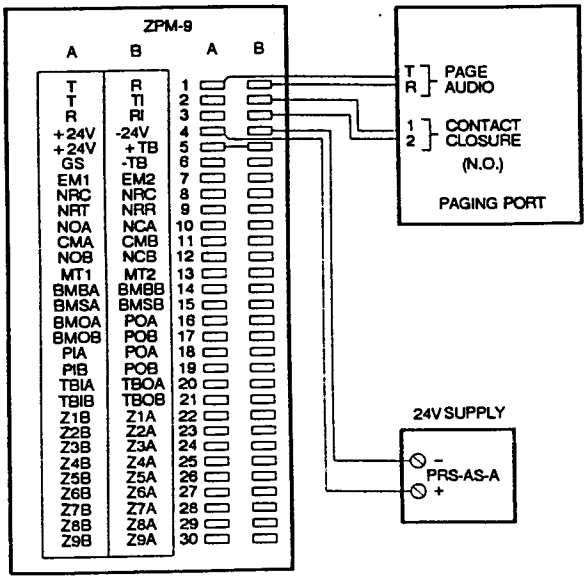
Figure 2 – Wiring Diagram, 48V Talk Battery



NOTE:

1. EITHER USE NIGHT RING CONTACT FROM PBX OR ACTUAL NIGHT LINE RING SIGNAL TO ACTIVATE ZPM NIGHT RING FUNCTION. USING BOTH IS NOT RECOMMENDED.

Figure 3 – Wiring Diagram, ZPM to Ground Start Trunk Port



NOTE:

1. T&R ARE A DRY AUDIO PAIR (NO DC VOLTAGE) CAPABLE OF PRODUCING DTMF TONES.

Figure 4 – Wiring Diagram, ZPM to Paging Port

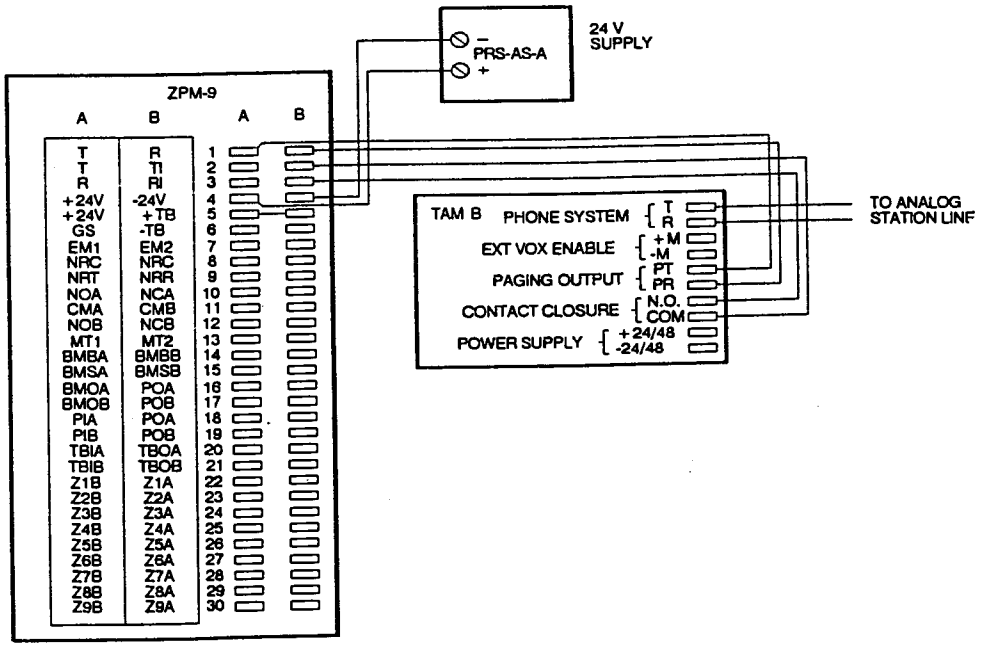


Figure 5 – Wiring Diagram, ZPM to Analog Station Line

PAGING SYSTEM CONFIGURATIONS

CENTRAL-AMPLIFIED TALK/TALKBACK SYSTEMS

Page-Muted BGM

The configuration illustrated in Figure 6 mutes BGM in all zones when a page is made. The installation requires a paging amplifier and, in a talkback system, a talkback amplifier. A background music source is connected directly to the ZPM and level adjustments are made using the BGM LEVEL control on the ZPM. The background music source must be able to supply approximately 0dBm (0.775vrms) across a 600-ohm load. Use shielded cable for all talkback amplifier connections and runs to talkback zones.

BGM to All Unpaged Zones During Pages

A second amplifier is required in the configuration illustrated in Figure 7, which mutes background music in the paged zone only (without muting music at any other zones). The BGM amplifier and paging amplifier should be of equal power. A talkback amplifier is necessary for two-way operation. Because of the high gain of the TBA-15 talkback channel, crosstalk from the high-voltage buss of the background music amplifier may be noticeable. To minimize crosstalk, use the 25V tap on the BGM amplifier and reduce high frequency BGM material by lowering the amplifier treble setting. If crosstalk is still significant, use the passive filter illustrated in Figure 7. Use shielded cable for all talkback amplifier connections and runs to talkback zones. Adjust the paging and BGM volume with volume controls on each amplifier (the ZPM's BGM LEVEL control is not used in this application).

Dedicated High-Power Zones

When a system requires more than 100 watts of output power, quite frequently one or two zones require more power than the others. Additional dedicated amplifiers can be installed on the output side of the ZPM for these zones; however, an attenuator pad (as shown in Figure 8) is required between the input of the amplifier(s) and the voltage output from the zone(s). Note that 70VAC or 25VAC is reduced to 0.7VAC.

AMPLIFIED SPEAKER SYSTEMS

Talk/Talkback with Constant BGM

Systems installed as shown in Figure 9 can use a mix of amplified one-way and two-way speakers. Background music is muted in the paged zone only. **Note that only one two-way (talkback) amplified speaker can be used per talkback zone.** The background music source in this system must have its own level control since the ZPM's BGM Level control is not used.

When there are more than 8 amplified speakers in the system, a low-output impedance buffer is required to drive the speaker load and reduce volume differences between single-zone pages and All-Call pages. The Bogen GA-2 (shown in Figure 9) is used for this purpose. The volume of the GA-2 should be set high enough to drive the speakers during an All-Call page but not so high as to overdrive the speaker's input and cause distortion When buffering is not necessary, jumpers are used to connect terminals PIA to POA, and PIB to POB.

Note

When using two-way amplified speakers, the mute lead of each speaker is connected to the B terminal of its zone output. These connections will ensure that speakers **not** *being accessed remain constantly in talk-only mode.*
Connect the BMBB and POB terminals to the +24V supply terminal of the speaker power supply. If using more than one power supply, connect the -24V terminals of all supplies together.

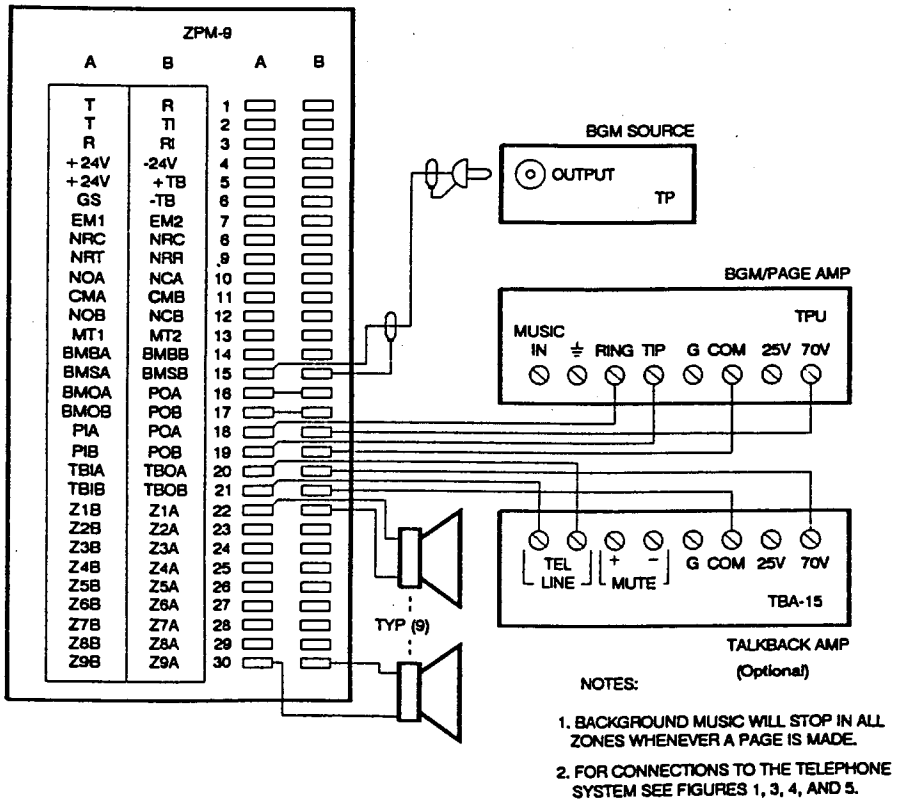


Figure 6 – Wiring Diagram, Central-Amplified System with Page-Muted BGM

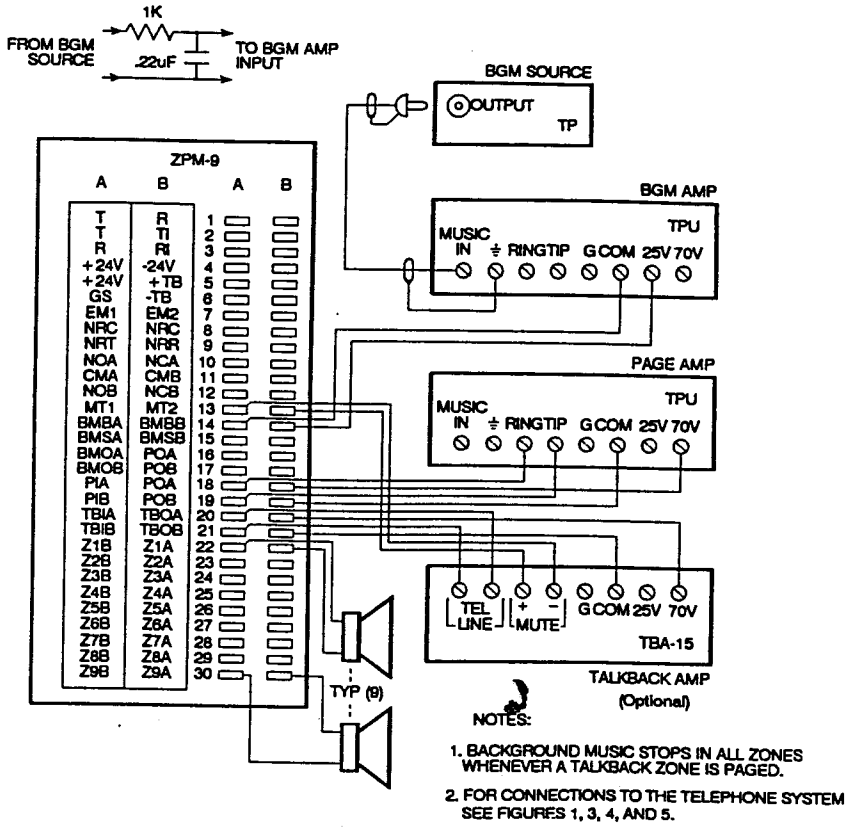


Figure 7 – Wiring Diagram, Central-Amplified System with BGM to All Unpaged Zones

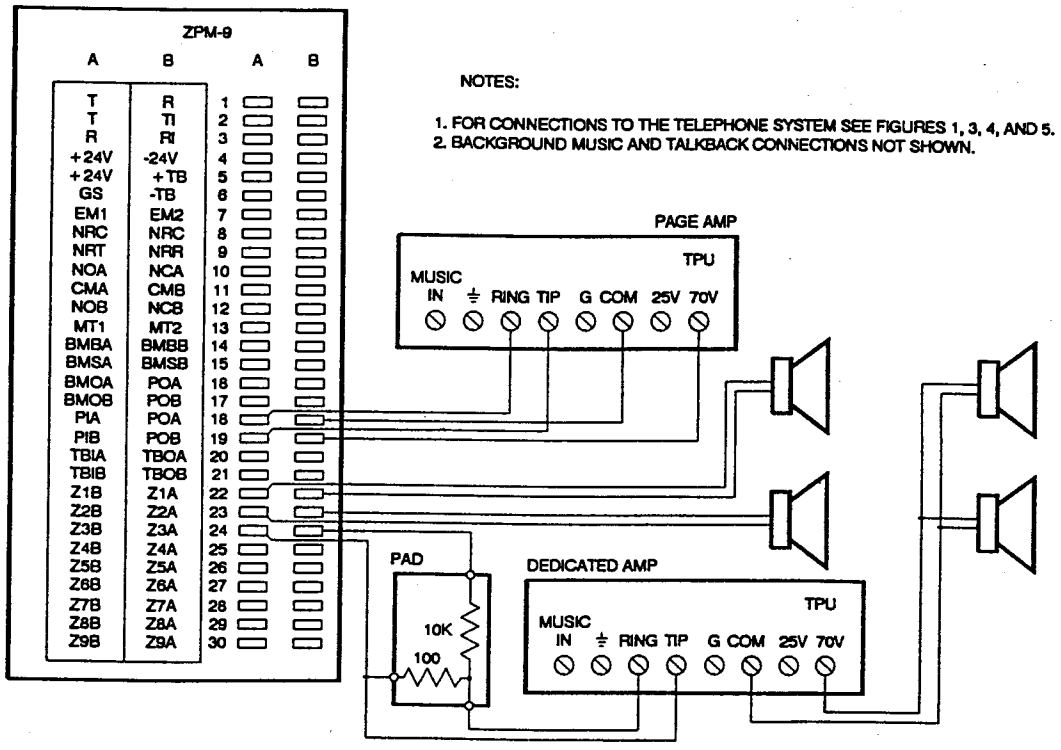


Figure 8 – Wiring Diagram, Central-Amplified System with Dedicated Amplifier for High-Power Zone

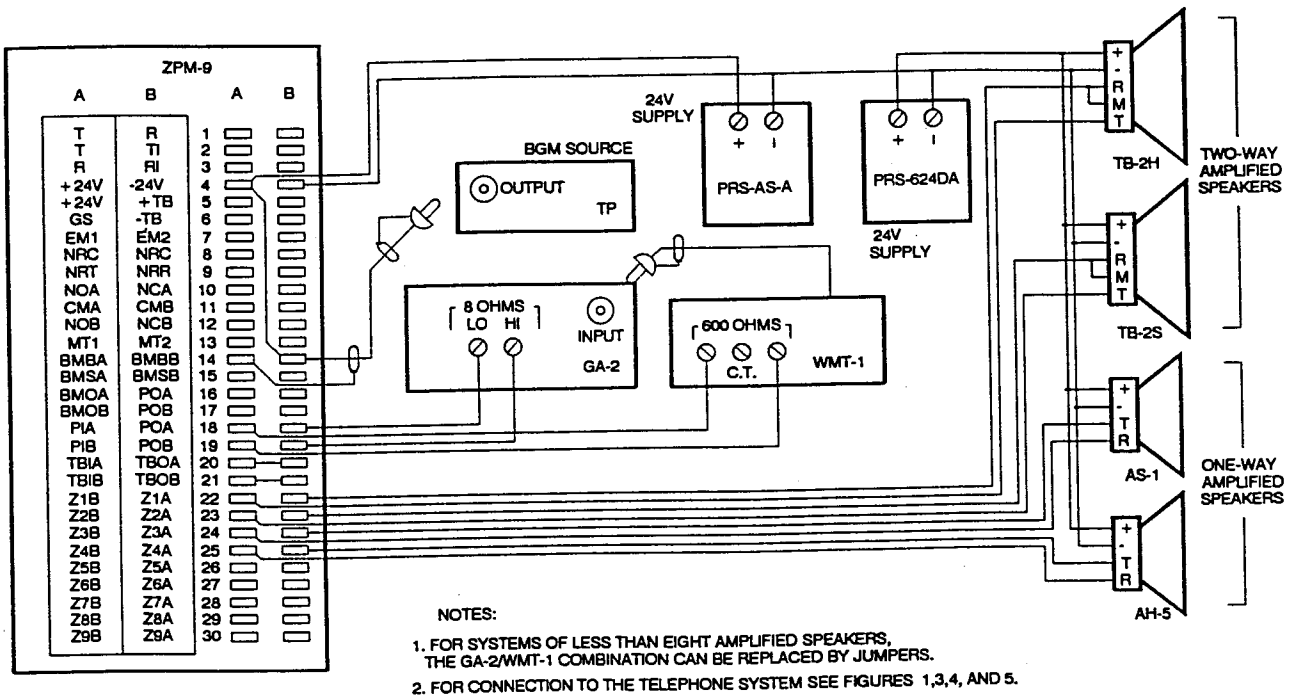


Figure 9 – Wiring Diagram, Self Amplified System

LINKING ZPM UNITS

ZPM units can be linked together to provide access to more zones. It is necessary to buffer the audio output of each ZPM unit (except the last level, depending on whether amplified speakers or constant-voltage speakers are used) in case an All-Call is requested. Figure 10 shows how to link the ZPM units.

Note that the external contact closure of the master unit (terminals NOA and CMA) is used to control the status of the next lowest ZPM unit. When the master controller goes off hook, it causes all other units to also go off hook. The first DTMF signal to the master ZPM connects an audio path from the telephone system to the ZPM unit on the next lowest level. The second DTMF signal instructs the lower ZPM unit to connect to a specific zone. This master/slave relationship can be carried on for a large number of levels, as long as proper buffering is used.

Talkback is possible with multiple levels of ZPM units, but all talkback zones should reside within the same zone on the master ZPM. For example: if zone 24 is a talkback zone, all other talkback zones should be accessed with numbers in the twenties, since zone 2 of the master ZPM is set to two-way to allow zone 24 to be talkback. When using multiple ZPM's, only the master ZPM should be set to supply the confirmation tone; slave ZPM units should be set to supply the preannounce tone, if desired.

AUXILIARY FEATURES AND CONTROLS

EMERGENCY CALL/SHIFT CHANGE

The ZPM includes an option to allow an Emergency Call (with preannounce tone) or a shift change tone in all zones or in a zone group containing up to three zones. The Emergency Call/shift change feature overrides the standard paging features of the ZPM. The type of tone is user-selectable and may consist of a one-second burst or two dual-tone bursts. (See Touch Tone Programming on page 9 to select and program the desired tone.) Figure 11 shows the connections for providing a shift change tone. For the Emergency Call, illustrated in Figure 12, note the use of the TPU-A paging amplifier with mic. input. The microphone used in this application is a desk type model with a push-to-talk switch. A contact closure (from a desk microphone or push-button switch) is required to trigger the Emergency Call. In the shift change application, the contacts energize an external relay which disconnects any current page and activates the shift change feature.

NIGHT BELLS

The ZPM night bell feature is triggered by either the high voltage ring signal or a contact closure. Figures 1 and 3 show the connections for contact closure and high voltage ring signal night bells. Use either the night ring contact from the PBX or actual night line ring signal to activate the ZPM night ring function. Using both is not recommended. Night bells can be directed to ring in all zones or a zone group containing up to three zones. See Touch Tone Programming (page 9) to select and program the night bell feature.

ALL-CALL INHIBIT

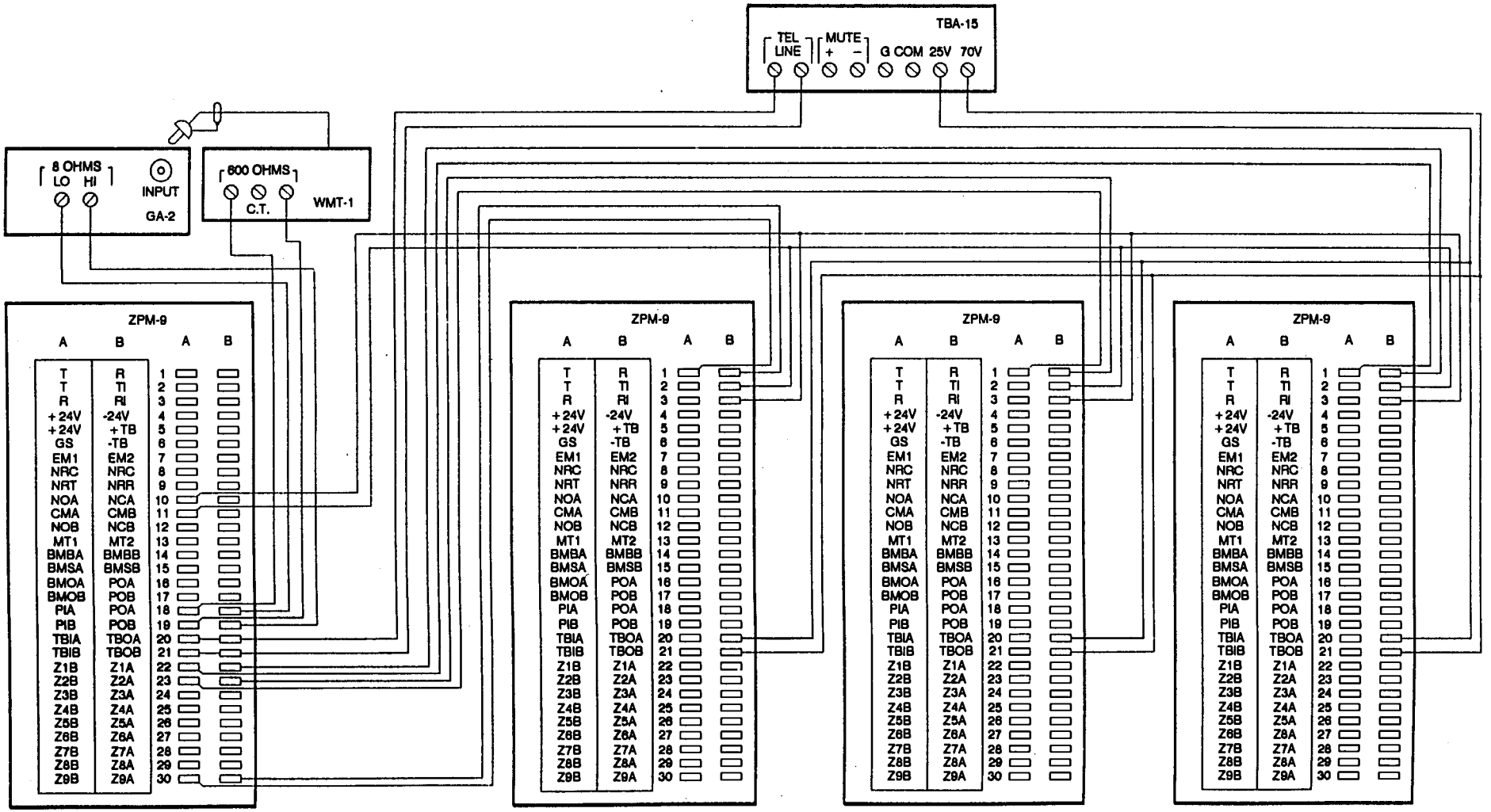
Access to the standard All-Call function may be inhibited if desired. This feature does not affect the Emergency Call function. See the section on Touch Tone Programming to inhibit access to All-Call.

PRIVACY BEEP

The privacy beep option introduces a 150ms tone every 15 seconds into the talk path of a two-way zone. Mute contacts MT1 and MT2 close for the duration of the tone. See the section on Touch Tone Programming to enable the privacy beep option.

VOLUME CONTROLS

The **TONE VOL** control adjusts the volume of the preannounce, confirmation, error, and shift change/Emergency Call tones. The **NIGHT RING VOL** control adjusts the level of the night ringer tone (if enabled). The **BGM VOL** control adjusts the volume of background music, when the music source is connected to the ZPM, as shown in Figure 6. All controls are screwdriver-adjustable.



NOTES:

1. FOR CONNECTIONS OF THE MASTER ZPM TO THE TELEPHONE SYSTEM SEE FIGURES 1, 3, 4, AND 5.
2. FOR CONNECTIONS OF THE SLAVES TO THE PAGING SYSTEM SEE FIGURES 6, 7, 8, AND 9.
3. TALKBACK AMP CONNECTED ONLY TO ZPM UNITS WITH TALKBACK ZONES ASSIGNED.

Figure 10 -- Wiring Diagram, Multi-ZPM Configuration

MUTE CONTACTS

A set of normally closed contacts (MT1 and MT2), that go to a normally open state whenever the ZPM is accessing a two-way zone are provided. This is used to operate the talkback muting function of talkback amplifiers.

EXTERNAL CONTACT CLOSURE

A DPDT contact set (terminals NOB, NCB, CMB) is available for operating external equipment and for use in ground start, shift change and Emergency Call applications. These contacts change state when the ZPM goes off-hook.

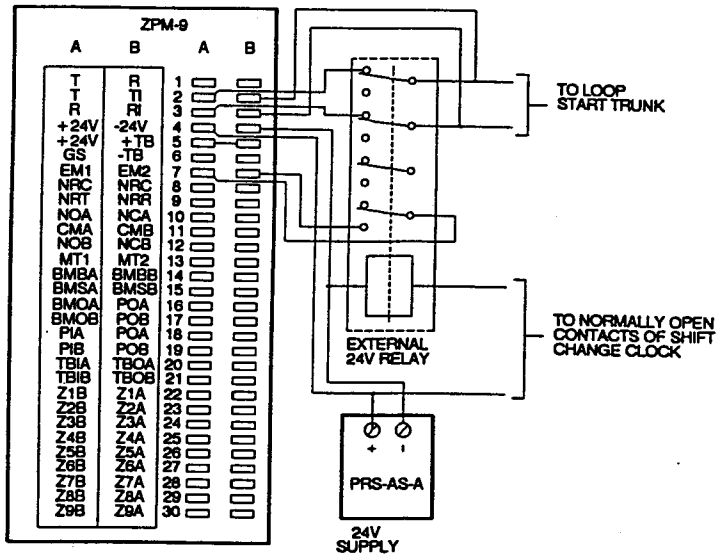
DIP SWITCH PROGRAMMING

DIP SWITCH CONFIGURATIONS

The ZPM-9 provides dip switches to allow programming of the unit's basic features, which are listed below. A label on the ZPM, next to the dip switches, provides a quick reference for dip switch programming.

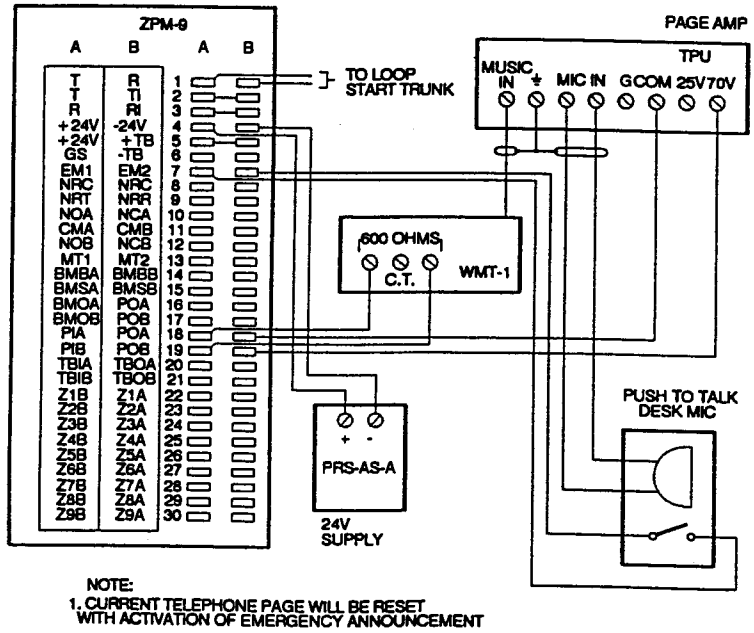
24/48V Talk Battery Selection

Dip switches 1 and 2 are set to match the type of talk battery supply that is being used. Both switches must be set in the identical position.



NOTE:
1. CURRENT PAGE WILL BE RESET WITH ACTIVATION OF THE SHIFT CHANGE FEATURE.

Figure 11 – Wiring Diagram, Shift Change Tone Feature



NOTE:
1. CURRENT TELEPHONE PAGE WILL BE RESET WITH ACTIVATION OF EMERGENCY ANNOUNCEMENT

Figure 12 – Wiring Diagram, Emergency Microphone Page

Subzone Lockout

The subzone lockout switch, dip switch 3, must be set to the O position when programming features through the telephone. When placed in the I position no additional programming can be done.

Confirmation Tone

Dip switch 4 turns the confirmation tone on (I) or off (O).

Preannounce Tone

Dip switch 5 turn the preannounce tone on (I) or off (O).

Talk/ Talkback Zone Selection

Dip switches 6 through 8 on the top bank of the ZPM-3 and ZPM-9 and the entire lower bank on the ZPM-9 are used to set the mode of the individual zones. Set the respective zone dip switch to I for one-way zones and O for two-way zones.

TOUCH TONE PROGRAMMING

The subzone lockout switch, dip switch 3, must be set to the off (O) position in order to program the following:

When power is first applied, the following default settings are loaded:

Paging Zone Groups 1, 2 and 3:	Cleared and produce no action when accessed
Night Bell Zones:	Set to All-Call
Shift Change/Emergency Call:	Set to Emergency Call
Shift Change/Emergency Tone:	Set to produce two dual-tone tone bursts
Privacy Beep Feature:	Disabled -- no privacy beep
All-Call Inhibit:	All-Call enabled

Note

If batteries are installed prior to powering up the unit, see the section on Resetting with Battery Back-up to reset the ZPM battery back-up in order to institute the default settings.

ZONE GROUPS

The ZPM allows for three *paging- zone groups* (Zone Group 1, 2, and 3), with a maximum of three zones in each group. The *night bell zone group* (Zone Group 4) rings the night bell in up to three zones. The *shift change zone group* (Zone Group 5) sounds the shift change/emergency tone in up to three zones. Use the following procedure to program zone groups.

1. Go off hook and wait for the confirmation tone (double beep), if enabled.
2. Press the # button and wait for the program tone (short beep).
3. Press digit 1, 2 or 3 for the paging zone group number. Press 4 if programming the night ringer zones. Press 5 if programming the shift change zones.
4. Press digits corresponding to the zones to reside under the zone group number; up to three zones.
5. Press the # button and wait for a short beep.
6. Hang up.

To program less than three zones in a zone group, follow the above steps but fill the unused zone group positions with the last zone selected. (Example: if paging zone group 2 is to contain only zones 7 and 9, then 9 should be programmed as both the second and third zones.) The ZPM records the last three zone selections chosen, no matter how many digits were pressed during the programming procedure. Thus, it is possible to override any incorrect zone selections made during the programming process. (Example: if zone group 2 is to be programmed with zones 1, 3, and 5 but zones 1, 3 and 6, are mistakenly entered, simply reenter 1, 3 and 5, to override the initial selection.) Incorrect selection of zones for a zone group can be changed during programming; the zone group number must be correctly selected from the start. If the programming procedure is started but you do not wish to complete it, hang up; if the # button was not pressed a second time, none of the selections will be committed to memory. If an illegal selection is made during the programming procedure, a beeping error tone will be heard in the handset. The ZPM must be put back on-hook and the programming process restarted. If the ZPM sounds an error tone immediately after pressing the # button for the first time, check to see that the subzone lockout switch is in the OFF (O) position.

Paging Zone Group Operation

To page a zone group, access the ZPM and wait for the confirmation tone (if enabled), then press * and the paging zone group number (1, 2, or 3).

Note

Zone groups 4 and 5 cannot be accessed through the telephone. These groups are only activated by the night bell and shift change/Emergency Call features, respectively.

PRIVACY BEEP PROGRAMMING

1. Go off hook and wait for the confirmation tone (double beep), if enabled.
2. Press the # button and wait for the program tone (short beep).
3. Enable the privacy beep by pressing 6, 1, 1.
4. Disable the privacy beep by pressing 6, 1, 0.
5. Press the # button and wait for a short beep.
6. Hang up.

SHIFT CHANGE/EMERGENCY ALL-CALL TONE

1. Go off hook and wait for the confirmation tone (double beep), if enabled.
2. Press the # button and wait for the program tone (short beep).
3. Select the one-second tone burst by pressing 6, 2, 1.
4. Select the two dual-tone bursts by pressing 6, 2, 0.
5. Press the # button and wait for a short beep.
6. Hang up.

ALL-CALL INHIBIT

1. Go off hook and wait for the confirmation tone (double beep), if enabled.
2. Press the # button and wait for the program tone (short beep).
3. Inhibit all-call paging by pressing 6, 3, 1.
4. Enable all-call paging by pressing 6, 3, 0.
5. Press the # button and wait for a short beep.
6. Hang up.

BATTERY BACK-UP SYSTEM

INSTALLATION

The battery back-up requires four (4) AA size nickel cadmium (NiCd) batteries, with an amp-hour rating of 450 mAhr or higher. To install the batteries, remove the four screws that secure the

cover of the unit. Use needle nose pliers to carefully squeeze in the locking tabs on the four plastic standoffs that mount the PC board. Gently pull the board off of each of the standoffs and place it aside. Insert the 4 batteries as shown on the battery holder. Check that the battery clip is securely attached to the battery holder. Align the main PC board with the 4 standoffs and carefully press the board until all 4 standoffs latch. Replace the cover and mount the unit.

CHARGING

New batteries should be fully charged before using the battery back-up feature. The ZPM provides a constant trickle charge which will fully charge batteries in approximately 48 hours (batteries should last 5-7 years). A green LED illuminates to indicate that the charging system is operative; it does not indicate the condition of the batteries. No damage will occur to the ZPM unit or the batteries if there should be a power outage during this initial charging period, but the integrity of the programmed features cannot be guaranteed. Remove all power before replacing batteries. Once the batteries have been removed, user-programmed features are erased.

Note

Batteries should be disconnected if the ZPM is to be left unpowered for more than one day.

RESETTING WITH BATTERY BACK-UP

If for some reason, such as extended power outages, it should become necessary to reset the ZPM, the following steps must be followed: Unplug the 24V supply to remove the primary power. Locate the battery back-up reset access hole at the top left of the unit. Using a suitable screwdriver press the small black button next to the green LED. Plug the power supply back in and re-program the user features.

SERVICE

Caution

There are no user serviceable parts within the unit. Removal of the cover can void the warranty. All repairs should be performed by Bogen personnel.

Part 68 of FCC Rules requires that repairs to registered equipment be performed by the manufacturer. If difficulty develops, return the unit to: Service Department, Bogen Communications, Inc., 50 Spring Street, P.O. Box 575, Ramsey, N.J. 07446. When shipping the unit, pack well, using the original shipping carton or similar container and filler material, to prevent damage in transit. Send the unit fully insured and prepaid. The unit will be promptly repaired and returned to you.

FCC REQUIREMENTS

WARNING: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

THE FOLLOWING INFORMATION IS REQUIRED BY PART 68 OF THE FCC RULES TO BE SUPPLIED TO THE PURCHASER OF REGISTERED EQUIPMENT.

This equipment complies with part 68 of FCC Rules and Regulations. A label on the front cover of this equipment contains the FCC registration number and ringer equivalence number (REN). You must, upon request, provide this information to your telephone company.

If this equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. If advance notice is not practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

This equipment is typically used as an adjunct device to other registered equipment (ie: PABX, 1A2 KEY, or ELECTRONIC KEY SYSTEM). If such equipment is leased, obtain permission of the owner prior to the installation of this equipment.

If you experience difficulty with this equipment, please contact the Service Department of Bogen Communications Inc., at 50 Spring Street, Ramsey, New Jersey 07446, telephone (201) 934-8500. Information will be provided regarding how to obtain service or repairs. The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

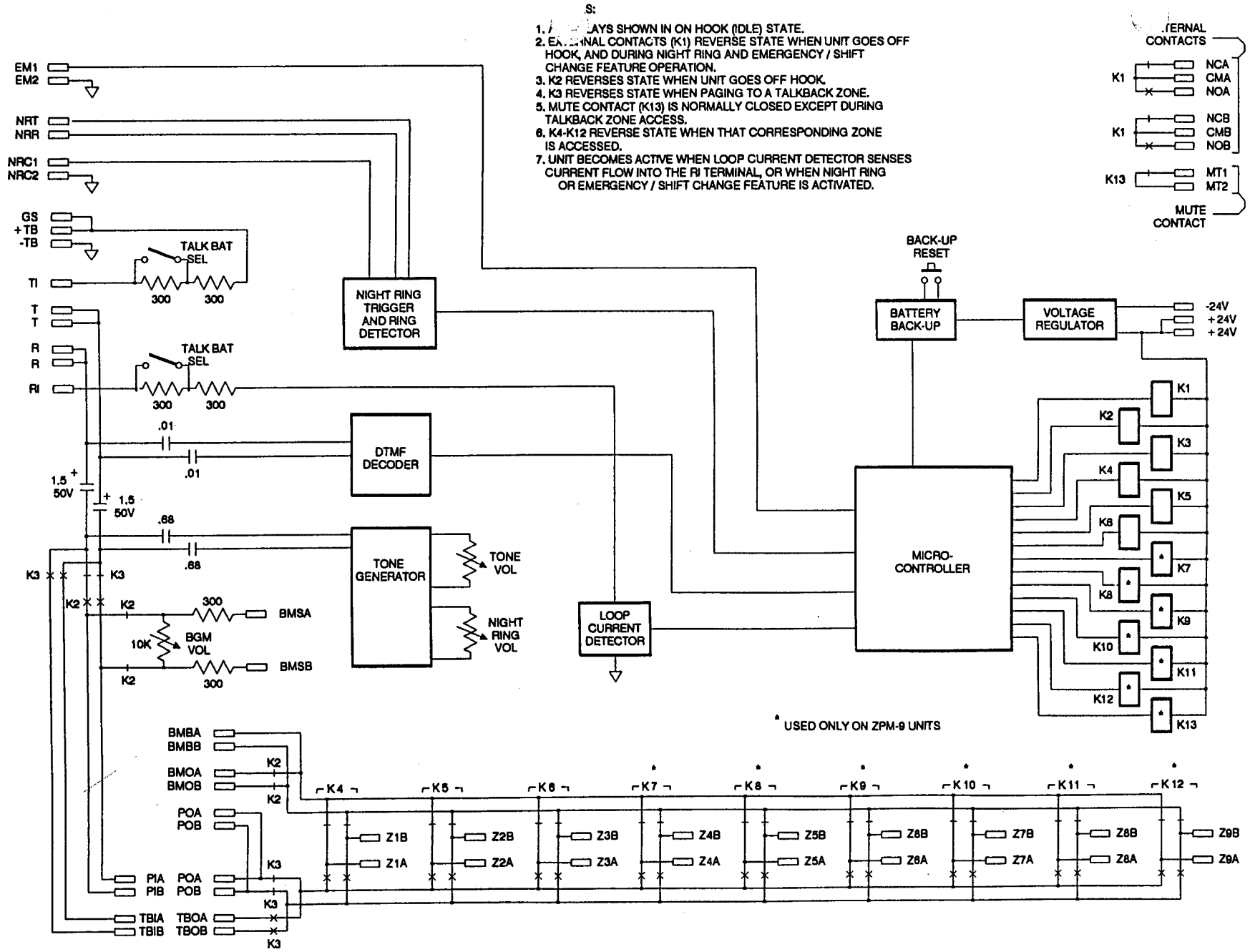


Figure 13 -- Functional Block Diagram, ZPM-3/-9