

INSTALLATION INSTRUCTIONS ZONE CONTROL MODULE (9 ZONES) MODEL NUMBER ZC-9

FCC REGULATIONS

This equipment complies with Part 68 of the FCC Rules. On the top of this equipment is a label that contains, among other information, the FCC Registration Number and the Ringer Equivalence Number (REN) for this equipment. You must, upon request provide this information to your telephone company.

The REN is also useful to determine the quantity of devices that you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the REN's of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices that you may connect to your line, you may want to contact your local telephone company.

Should the equipment cause harm to the telephone network, the telephone company shall, if possible, notify the customer that temporary discontinuance of service may be required. However, where prior written notice is not possible, the telephone company may temporarily discontinue service without notice, if such action is necessary under the circumstances. The telephone company may make changes in its communication facilities, equipment and operations procedures, where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of the Federal Communications Commission.

Do not attempt to repair or modify this equipment. Repairs to this product will be performed by Wheelock Inc. 273 Branchport Ave, Long Branch NJ 07740 in accordance with Wheelock Inc.'s published Terms and Conditions of Sale. This equipment should not be used on coin telephone lines. Connection to party line service is subject to state tariffs.

If trouble is experienced, disconnect this equipment from the telephone line to determine if it is causing the malfunction. If the equipment is determined to be malfunctioning, its use shall be discontinued until the problem has been corrected.

APPLICATION INFORMATION

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The ZC-9 Zone Control Module performs the central control, switching and signaling required to provide 9 separate zones of paging, All-Call, background music mute, and page alert tone signaling.

The Zone Control can be programmed to accommodate both one-way paging and Talkback zones. It can also be programmed to provide a wide variety of system amplifier configurations which can include various combinations of 25V/70V central and zone amplifiers, amplified one-way paging speakers, and Wheelock amplified Talkback speakers.

The ZC-9 is compatible with most EKSU, KSU (1A2) and PBX telephone systems. It connects to either an unused loop start CO port of a 600 chm low power audio page port. Note that the page port must transmit DTMF tones and must provide a dry contact closure.

Paging is accessed from any telephone by pressing the CO line button (EKSU & KSU), or dialing the number (PBX) assigned to paging. Individual zones are selected by pressing 1 thru 9 on the telephone's touchtone keypad. All Call is selected by pressing 0.

When any zone or All Call selection is made, a page alert tone will be heard at all of the speakers in the selected zone (all zones if All Call is selected). The tone will also be heard at the paging telephone to provide verification of connection to the selected speakers.

The ZC-9 is designed for use with touchtone (DTMF) systems only.

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A background music input can be selectively assigned to each of the 3 zone groups.

The ZC-9 consists of 3 zone groups, as shown in CHART 1.

GROUP	ZONES
1	1,2,3
2	4,5,6
3	7,8,9

CHART 1: ZONE GROUPS

The group functions are programmed with internally located group selector switches as described in CHART 2.

GROUP FUNCTION	CHOICES - PER GROUP
Amplifier Type	1. Central Amplifier: 25V or 70V audio output switched to
	speakers with line matching transformers.
	2. Zone Amplifiers:
	600 OHM audio input switched to separate zone amplifiers connected to speakers
	with 25V/70V line matching transformers,
	one-way amplified speakers, or Wheelock
	amplified talkback speakers and horns.
Background	1. Background music on.
Music	2. Background music off.

CHART 2: GROUP PROGRAMMABLE FUNCTIONS

If any or all of the zone groups require central amplification, then the choice of one or two central amplifiers is programmed for the system with an internally located system selector switch, as described in CHART 3.

FUNCTION	CHOICES - PER SYSTEM	
1 or 2 Central Amplifiers	 One Central Amplifier: For both paging and background music. Paging in any zone will mute music in all zones 	
	 Two Central Amplifiers: One for paging and one for background music. Music is muted only in the zone paged. 	

CHART 3: SYSTEM PROGRAMMABLE FUNCTION

The speech direction function is programmed on a per zone basis, with nine internally located zone selector switches, as shown in CHART 4.

FUNCTION	CHOICES - PER ZONE
Speech	1. One-way paging.
Direction	 Talkback (two-way communication with hands free reply).

CHART 4: ZONE PROGRAMMABLE FUNCTION

Depending upon system amplifier configuration, the amplifier functions and background music mute operation will vary, as shown in CHART 5.

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CONFIGURATION	FUNCTION	MUSIC MUTE OPERATION
(A) One (1) Central	Paging & Music	Paging any zone will mute music
Amplifier		in all zones.
(B) Two (2) Central	One for Paging	Music is muted only in the paged
Amplifiers	and	zone(s).
-	One for Music	

(C) Zone Amplifiers, Speaker Amplifiers, Talkback Speakers and horns.	Paging, Music and Talkback	Music is muted only in the paged zone(s).
(D) Mixed (A) & (C) Above	Paging, Music and Talkback	 Central Amplifier Zones: Paging mutes music in all zones. Zone Amplifier Zones: Music is muted only in the paged zone(s).
(E) Mixed (B) & (C) Above	Paging, Music and Talkback	Music is muted only in the paged zone(s).

CHART 5: SYSTEM AMPLIFIER CONFIGURATIONS, FUNCTIONS, AND MUSIC MUTE OPERATION

The application diagrams in Figures 1 thru 4 show the four basic system configurations of the ZC-9, all of which are possible with the appropriate programming switch selections.

FIGURE 1.

<u>One Central Amplifier</u> One amplifier for both paging and background music. System uses speakers with built-in line matching transformers. FIGURE 2. <u>Two Central Amplifiers</u> One amplifier for paging, and one amplifier for background music. System uses speakers with built-in line matching transformers.

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FIGURE 3. <u>Zone Amplifiers, 1 per zone</u> Each amplifier is for paging and background music in its own zone. System uses speakers with built-in line matching transformers. FIGURE 4. <u>Amplified Speakers</u> For one-way or talkback paging each amplifier is for paging and background music for its own speakers.

Existing system renovations and expansions often require different amplifier configurations in different zone groups. For example, an existing central amplifier paging system may be zoned, and then expanded by adding amplified speakers or zone amplifiers. With the appropriate programming switch selections, the following are some examples of mixed system possibilities.

A. FIGURE 1 and FIGURE 3B. FIGURE 1 and FIGURE 4C. FIGURE 2 and FIGURE 3D. FIGURE 2 and FIGURE 4E. FIGURE 3 and FIGURE 4

NOTE

In mixed systems, the different amplifier configurations must be installed in different zone groups. It is not possible to mix different amplifier configurations within the same zone group.

The ZC-9 maximum amplifier and speaker capability for each zone and the total system is shown in CHART 6.

NOTES

- See TBH-104 talkback Horn installation instructions for application of 2 horns in one location.
- For multiple talkback speakers or horns in the some location, see product bulletin # 52-88.
- The ZC-9 can switch an audio input from a central amplifier of up to 150W @ 70V, or 100W @ 25V. This <u>TOTAL SYSTEM</u> audio input can be distributed to up to 9 zone outputs, provided no single zone exceeds:
 (A) 70W @ 70V, leaving 80W for the remaining 8 zones

or

(B) 25W @ 25V, leaving 75W for the remaining 8 zones.

4. The ZC-9 can switch its preamplifier audio output to the 600 ohm inputs of up to 150 zone amplifiers or speaker-amplifiers. This <u>TOTAL SYSTEM</u> audio output can be distributed to up to 9 zone outputs, provided no single zone exceeds 25 amplifier inputs, which would leave 125 amplifier inputs for the remaining 8 zones.

	MAXIMUM CAPACITY	
AMPLIFIER	TOTAL	EACH ZONE
CONFIGURATION	SYSTEM	
Central Amplifier(s)	150W @ 70V	70W @ 70V
	100W @ 25V	25W @ 25V
		(See note 3)
Zone amplifiers, or	150 amplifier	25 amplifier
speaker-amplifiers	inputs	inputs
(one-way) paging		(see note 4)
Wheelock amplified	9 speakers or	1 speaker or horn
talkback speakers	horns (see Notes	(see notes 1 and 2)
and horns (TBM-101	1 and 2)	
and TBH-104)		

CHART 6: MAXIMUM AMPLIFIER AND SPEAKER CAPABILITY

MOUNTING INSTRUCTIONS:

The ZC-9 is designed for indoor surface wall mounting near the telephone system. Remove the ZC-9 cover from the base (containing the PC board assembly) by removing the screw on each side of the unit. Two keyholes and two circular holes are provided in the base for easy installation. A diagram for mounting screw hole locations is given in FIGURE 5. Recommended screw sizes are #6, #8, or #10 screws. Be sure to use mounting hardware suitable for the mounting surface.

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CAUTION: These devices are not intended for use in hazardous locations as defined by the National Electrical Code (NEC) and by the National Fire Protection Association (NFPA).

FIGURE 5. MOUNTING DIAGRAM

SPECIFICATIONS

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SUPPLY VOLTAGE RANGE	-21.6VDC to -26.4VDC
SUPPLY CURRENT (IDLE -BGM)	50mA
SUPPLY CURRENT (NOMINAL - 1 ZONE PAGE)	150mA
SUPPLY CURRENT (MAXIMUM - ALL CALL)	325mA
ALERT TONE FREQUENCY	680Hz +/-10%
ALERT TONE DURATION	450m sec. +/-10%
ALERT TONE LEVEL	-5dBm +/-10%
TIP AND RING INPUT LEVEL	-15dBm (0.1Vrms) to +10dBm (2.4Vrms)
MUSIC INPUT LEVEL	-15dBm (0.1Vrms) to +10dBm (2.4Vrms)
TIP AND RING INPUT IMPEDANCE	600 ohms
MUSIC INPUT IMPEDANCE	600 ohms
MAX. OUTPUT LEVEL TO AMPLIFIER 1	0.62 Vrms
MAX. OUTPUT LEVEL TO AMPLIFIER 2	0.62 Vrms
OUTPUT IMPEDANCE TO AMPLIFIER 1	4 ohms
OUTPUT IMPEDANCE TO AMPLIFIER 2	4 ohms
MAX. INPUT LEVEL FROM AMPLIFIER 1	100W @ 25V or 150W @ 70V (central amplifier
MAX. INPUT LEVEL FROM AMPLIFIER 2	output) See Note 2
AUDIO OUTPUT LEVEL (MAX PER ZONE)	
- ZONE AMPLIFIER SELECTED	0.62Vrms, 4 Ohms
AUDIO OUTPUT LEVEL (MAX PER ZONE)	25W @ 25V or 70W @ 70V (central amplifier
- CENTRAL AMPLIFIER SELECTED	output) See Note 2
OPERATING TEMPERATURE RANGE	0 to 55 degrees C
OPERATING HUMIDITY RANGE	0 to 85% RH
ZONE CONTROL ACCESS	Press CO line button, or touchtone dial
(See Note 1)	number assigned to page.
PAGE ZONE 1	Dial "1"
PAGE ZONE 2	Dial "2"
PAGE ZONE 3	Dial "3"
PAGE ZONE 4	Dial "4"
PAGE ZONE 5	Dial "5"
PAGE ZONE 6	Dial "6"
PAGE ZONE 7	Dial "7"
PAGE ZONE 8	Dial "8"
PAGE ZONE 9	Dial "9"
ALL CALL	Dial "0"
OFF-HOOK DETECTION SENSITIVITY	1850 Ohms DC Resistance (1400 to 2200 Ohms)

NOTES

1. PRESS CO LINE BUTTON: FOR EKSU AND KSU (1A2) KEY TELEPHONE SYSTEMS. DIAL NUMBER ASSIGNED: FOR PBX TELEPHONE SYSTEMS.

2. THE ZC-9 CAN SWITCH A TOTAL SYSTEM CENTRAL AMPLIFIER AUDIO INPUT OF UP TO 150W @ 70V, OR 100W @ 25V. THE TOTAL SYSTEM AUDIO INPUT CAN BE DISTRIBUTED TO UP TO 9 ZONE OUTPUTS, PROVIDED NO SINGLE ZONE EXCEEDS:

(A) 70W @ 70V, LEAVING 80W FOR THE REMAINING 8 ZONES.

-OR-

(B) 25W @ 25V, LEAVING 75W FOR THE REMAINING 8 ZONES.

FIGURE 6. SIMPLIFIED SINGLE LINE BLOCK DIAGRAM

WIRING INSTRUCTIONS (SEE FIGURE 7)

1. Make sure 24VDC power supply is disconnected from the 115VAC power source.

2. Connect Tip and Ring from the telephone system to TB4, terminals 5 and 6 respectively.

3. Connect the background music source to TB4, terminals 1 and 2.

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- 4. Connect the 24VDC power supply to the (-)24V and GND(+) terminals on TB4, terminals 4 and 3 respectively.
- 5. Connect the zone amplifier, speaker amplifiers, or Wheelock Talkback Module audio pair for zones 1 thru 9 to their respective terminals on TB1, TB2, and TB3. If any zones are equipped with a Wheelock Talkback Module, then connect the Inhibit (INH) terminals for those zones. If the ZC-9 and Wheelock Talkback Modules use separate power supplies, then also connect the ground (GND) terminals for those zones.
- 6. If Central Amplifiers are used:
 - A. Connect the input of central amplifier 1 (page/background music) to A1 OUT, terminals 5 and 6, on TB5. Connect the output of central amplifier 1 to A1 IN, terminals 1 and 2, on TB5.

B. Connect the input of central amplifier 2 (background music) to A2 OUT, terminals 7 and 8, on TB5. Connect the output of central amplifier 2 to A2 IN, terminals 3 and 4 on TB5. See Note.

7. Connect the 24VDC power supply to the 115VAC source.

NOTE

The use of central amplifier 2 is optional. If only central amplifier 1 is used, background music will be muted in all zones when a page is in progress. If both central amplifier 1 and central amplifier 2 are used, background music will be muted in only the paged zone.

PROGRAMMING INSTRUCTIONS (SEE FIGURE 7 OR INSIDE OF ZC-9 COVER)

- 1. Set the three "Zone Amplifier/Central Amplifier" select switches for each of groups 1, 2, and 3 as required. See switch symbol 1. If a group is using a zone amplifier, speaker amplifiers, or Wheelock Talkback Modules, then slide that group's switch to the left. If a group is using a central amplifier, then slide that group's switch to the right.
- 2. Set the "Central Amplifier Select Switch" as required. See Switch symbol 2 . If one central amplifier is used for both paging and background music, then the switch should be in the up position. If two central amplifiers are used, one for paging and one for background music, then the switch should be in the down position. If central amplifiers are not used, then the switch may be in either position.
- 3. Set the three "Background Music Select Switches" for each of groups 1, 2, and 3 as required. See switch symbol 3 . If background music is required in a zone group, then that group's switch should be in the up position. If background music is not required in a zone group, then that group's switch should be in the down position.
- 4. Set the nine "One-Way/Talkback" select switches for each of zones 1 thru 9, as required. See switch symbol 4 . If a zone is equipped with Wheelock Talkback Paging Modules, then that zone's switch should be in the up position. If a zone is equipped for one-way paging, then that zone's switch should be in the down position. <u>NOTE</u>: All zones in groups using (selected for) central amplifiers, are one-way paging zones. Hence the individual zone switches should be in the down position.

FIGURE 7. INSTALLATION, PROGRAMMING, AND VOLUME ADJUSTMENT DIAGRAM

The ZC-9 can be connected to an audio page port only if the audio page port provides:

- A. A 600 ohm, low power page output, capable of passing DC loop current.
- B. Transmission of DTMF touchtones.
- C. A dry contact that is normally open, closes when paging and reopens when the page is completed.

If these conditions are met, then connect Tip and Ring as shown in FIGURE 8.

NOTE

Check telephone system's manufacturer's installation instructions for any other audio page port connection considerations.

FIGURE 8. CONNECTING TO A 600 OHM AUDIO PAGE PORT

OPERATING INSTRUCTIONS:

- 1. Pick up the telephone handset and press the CO line button (EKSU, KSU) or number assigned to paging (PBX) to access the port assigned to paging. (Port to which the ZC-9 has been connected).
- 2. To initiate zone page, dial "1" thru "9" (on the telephone's touchtone keypad) to select zones 1 thru 9, respectively.
- 3. To initiate an All-Call page, dial "0" (on the telephone's touchtone keypad).
- 4. Sequential selections can be made from zone-to-zone, from All-Call to any zone, and from any zone to All-Call, by simply dialing the next digit. It is not necessary for selections to be in numerical sequence, nor is it necessary to "hang-up" between selections.
- 5. When paging, background music will be muted. At the conclusion of the page (i.e., phone "hangs-up, or another selection is made), the background music will automatically be restored.
- 6. When any page is initiated, an alert tone is heard both in the telephone receiver, and in all selected zones.
- 7. To conclude a page, simply hang-up the telephone handset.

VOLUME CONTROL ADJUSTMENT INSTRUCTIONS:

- 1. In the ZC-9, set the music volume control to minimum. If the system uses two central amplifiers, then set the ZC-9 music volume control midway between minimum and maximum.
- 2. In the ZC-9, set the page and tone volume controls midway between minimum and maximum.
- 3. If the system uses speaker amplifiers and/or Wheelock Talkback Modules, then page each zone and set each speaker's volume control for the required page level.
- 4. If the system uses speakers with line matching transformers, then connect the wattage selection tap on the transformer of each speaker for the required page volume.
- 5. If the system uses central or zone amplifiers, then overall system or zone (as applicable) page volume can be adjusted in accordance with the amplifier's installation instructions.
- 6. In the ZC-9, adjust the tone volume control to the desired level. Note the minimum setting turns the tone off.
- 7. In the ZC-9, adjust the music volume control for the desired background music level. If the system uses two central amplifiers, then adjust the volume control on amplifier 2 for the desired background music level. Additional music volume adjustments can be made at the music source.

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TROUBLE SHOOTING

- Zone page or all call page cannot be accessed
- 2. No background music.

3. No sound or low page volume.

- 4. The page alert tone is too high or too low.
- 5. Talkback does not function properly.

- 1. Telephone system must have touchtone (DTMF) dialing.
- 2. Check presence and polarity of voltage on -24VDC and GND terminals on TB4
- 1. Verify unit has released from last page.
- 2. Check program source, and adjust its volume control, as desired.
- Check presence of music audio input at "T" in and "R" in and if necessary also at the music source.
- Check presence of music audio input at MUSIC terminals on TB4, and if necessary also at speaker amplifier, or central or zone amplifier inputs.
- Check presence and level of audio input at Tip and Ring terminals on TB4, and if necessary also at the CO port. (or the Audio Page Port)
- Check presence and level of audio at the zone AUDIO output terminals on TB1, TB2, and TB3. If necessary also at speaker amplifier inputs, and central or zone amplifier inputs.
- 1. Set the page alert Tone Volume Control in the ZC-9, to the desired level.
- 1. Check to insure that the zone INH and GND terminals on TB1, TB2, and TB3 are properly connected to the Wheelock TBM-101 Talkback Speakers and/or TBH-104 Talkback Horns.
- 2. Check for proper programming of the zone's One-way/Talkback select switch.
- 3. Refer to the Wheelock TBM-101 and/or TBH-104 installation instructions.

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Limited Warranty Error! Bookmark not defined. Wheelock products must be used within their published specifications and must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with these instructions at the time of installation and at least twice a year or more often and in accordance with local, state and federal codes, regulations and laws. Specification, application, installation, operation, maintenance and testing must be performed by qualified personnel for proper operation in accordance with all of the latest National Fire Protection Association (NFPA), Underwriters' Laboratories (UL), National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA), local, state, county, province, district, federal and other applicable building and fire standards, guidelines, regulations, laws and codes including, but not limited to, all appendices and amendments and the requirements of the local authority having jurisdiction (AHJ). Wheelock products when properly specified, applied, installed, operated, maintained and operationally tested as provided above are warranted against mechanical and electrical defects for a period of one year from date of installation or 18 months from date of manufacture (as determined by date code), whichever first occurs. Correction of defects by repair or replacement shall be at Wheelock's sole discretion and shall constitute fulfillment of all obligations under this warranty. THE FOREGOING LIMITED WARRANTY SHALL IMMEDIATELY TERMINATE IN THE EVENT ANY PART NOT FURNISHED BY WHEELOCK IS INSTALLED IN THE PRODUCT. THE FOREGOING LIMITED WARRANTY SHALL IMMEDIATELY WARRANTY SPECIFICALLY EXCLUDES ANY SOFTWARE REQUIRED FOR THE OPERATION OF OR INCLUDED IN A PRODUCT. WHEELOCK MAKES NO REPRESENTATION OR WARRANTY OF ANY OTHER KIND, EXPRESS, IMPLIED OR STATUTORY WHETHER AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER MATTER.

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