ZETRON

Model ZMX DTMF Microphone
INSTRUCTION MANUAL

#025-9163F.1

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WARRANTY STATEMENT

Zetron's warranty is published in the current Zetron *United States Price Book*.

FEDERAL COMMUNICATIONS COMMISSION (FCC) REGULATIONS

To comply with FCC regulations, the following requirements must be met:

1. This device complies with Part 15 of the FCC rules for a Class A digital device. Operation is subject to the following two conditions:

   a. This device may not cause harmful interference.

   b. This device must accept any interference received, including interference that may cause undesired operation.

2. Repair work on this device must be done by Zetron, Inc. or a Zetron authorized repair station.

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TRADEMARKS

1. INTRODUCTION

GENERAL

The Zetron Model ZMX is a high quality multi-featured microphone compatible with most popular mobile radios. It is equipped with a backlit 12-key tone pad that allows the operator to easily dial access codes and telephone numbers.

The user will find this microphone rugged, and at the same time will find that it provides a high degree of sophistication in mobile radio control. Single-handed operation, backlit keypad, microprocessor control, and ease of use make this microphone a time-saving addition to virtually any mobile radio installation. A high quality coiled cord provides operation in a wide range of temperature environments, and is available with connectors that mate with popular radios.

FEATURES

* Installation setup via keypad. No need to open the mic.
* Backlit keypad for ease of use.
* May be powered from transmit audio bias voltage for plug-and-go installation.
* Programmable keyup delay and DTMF tone durations for reliable operation.
* PTT hold and audio muting while dialing.
* Timeout timer with alert tone prevents locked channels.
* Audible beeper follows keypad entry while dialing, just like a phone.
* Keypad beeper volume is selectable high, low, or off.
* Fourth column tones from manual dial and autodial.
* ANI can be sent when user keys or unkeys to find out who's on the airwaves.
* Popular mic emulation to reduce retraining of existing mic users.
* Separate connect and disconnect DTMF ANIs, with up to 17 digits.
* User programmable autodials for 9 frequently called phone numbers.
* Last number redial with "phantom dialer" remembered digit timing.
* Cellular phone style operating mode with automatic ANI selectable. Saves airtime.
* Pause or drop PTT between digit sequences and speed changes.
* Access and/or disconnect via hookswitch, only sends disconnect if needed.
* Selectable courtesy tone when unkeying tells other party when to speak.
* Selectable PTT pulse when lifting mic off hook for trunked radio systems.

TONE PAIRS GENERATED BY THE MIC

	1209	1336	1477	1633 Hz
697 Hz	1	A B C 2	D E F 3	A
770 Hz	G H I 4	J K L 5	M N O 6	B
852 Hz	P R S 7	T U V 8	W X Y 9	C
941 Hz	*	OPER 0	#	D

TYPICAL USES

The ZMX is one of the most user friendly and reliable microphones for use with any telephone interconnect (phone patch) system.

The ZMX can do DTMF paging using the store and forward mode.

The mic can be used with DTMF-controlled systems where access codes are required. The mic can generate all 16 DTMF tone pairs from either manual or autodial.

The mic can provide a timeout timer to older radios preventing blocked channels. If desired, the keypad can be disabled so that DTMF dialing is not user accessible, even though the mic has a keypad.

The ZMX can be used as a drop-in equivalent to specific manufacturer microphones.

To prevent misuse of the channel, the mic can be added to systems to provide an indication of who is talking. A DTMF ANI can be transmitted by the mic every time the user keys or unkeys and, in conjunction with a DTMF reader (Zetron Model 8), can identify the user. The mics will not send the ANI on unkey if the user just sent dialing digits. This feature prevents wrong number dialing.

To further prevent misuse of the channel, the mic can be restricted to a limited number of autodials. For example, in systems where delivery truck drivers require phone patch capability, but company management does not want drivers to call just anyone, the mic can be set up to allow autodialing to only a few phone numbers (such as the office and warehouse) and to not allow manual dialing.

2. OPERATION

VOICE TRANSMISSION

For normal voice transmission, the microphone should be held about two inches from the lips. Press the PTT button and speak clearly into the opening on the keypad. Release the PTT button to listen.

If while talking the microphone emits a continuous beep tone, the timeout timer has expired and the transmitter has been unkeyed. To resume transmitting, momentarily release then depress the PTT switch. If the PTT switch is not released, the beep tone will continue.

NOTE: ***The timeout timer is adjustable by the system operator.***

DTMF DIALING

The keypad is used to dial access codes or phone numbers. Due to the various programmable dialing modes of the ZMX mic, the dialing sequences may vary. Three main areas will be addressed concerning tone dialing sequences:

1. Single handed dialing
2. Dialing with PTT held
3. Automatic dialing (ANI and autodials)

Single Handed Dialing

The ZMX provides the capability for single handed dialing. This frees the operator from the need to press and hold the PTT switch while dialing. The ZMX takes care of keying the transmitter, waiting for a transmitter warm up duration, and inter-digit transmit hold time while dialing.

When the mic is configured for "store and forward" (cellular style) operation, single handed operation is easy. The user simply keys in the phone number, then presses the "send" key when ready to dial.

Dialing with the PTT Switch Held
The function of the keypad may be altered while the PTT switch is held. The operation of the keypad digits while PTT is held is as follows:

1. No dialing allowed: To avoid false digits from bumping the keypad while talking.

2. Normal dialing allowed: The * and # keys will be sent as single digits, NOT as the connect and disconnect ANI (if programmed).

3. Fourth column digits: The middle column is changed to encode the "fourth column" (ABCD) digits. The active keys are; 2, 5, 8, 0, *, and #. All other digits are muted.

1 No Tones	2 *DTMF "A"*	3 No Tones	Key 2 = DTMF "A"
4 No Tones	5 *DTMF "B"*	6 No Tones	Key 5 = DTMF "B"
7 No Tones	8 *DTMF "C"*	9 No Tones	Key 8 = DTMF "C"
* *DTMF "*"*	0 *DTMF "D"*	# *DTMF "#"*	Key 0 = DTMF "D"

ANIs
The ZMX includes two independently programmable DTMF ANI codes. These are typically used as the "connect" (off-hook or answer) and "disconnect" (on-hook or hangup) codes when using a phone patch. The connect ANI is normally accessed with the * key, and the disconnect ANI is normally accessed using the # key.

Examples:

1. * key could send "*123 pause 9".
2. * key could send "fast, 1234, unkey, pause, keyup, slow, *#ABCD".
3. # key could send "#123".
4. # key could send "1234##".

As shown by the examples, the connect and disconnect ANIs may be set to send any combination of DTMF digits, pauses, speed changes, or transmitter keying or unkeying.

ANI for vehicle identification
The ANI can be sent every time the PTT switch is pressed, let go, or both. This method can be used with a DTMF reader or printer (Zetron Model 8) to

identify who's using the channel to prevent misuse. To prevent dialing errors, the microphone will not send the ANI upon unkeying if DTMF dialing or a connect or disconnect ANI was previously sent. When the ANI is sent upon PTT press, a double-beep prompt tone may be sent to the user indicating when to begin speaking.

Autodials
The ZMX has 9 user programmable autodial numbers for frequently used DTMF sequences or phone numbers. The autodials are stored in locations 1 to 9 (corresponding to keypad digits 1 to 9) and are accessed in different ways depending upon the mode selected. The user may reprogram the autodials at any time. A special key sequence is required to access the autodial programming to eliminate accidental alteration of the stored numbers. The user may include the dealer installed ANI code in the autodials, but for system security, cannot reprogram the ANI.

A "last number redial" function is useful when a busy number is dialed. When using the last number redial function, the ZMX incorporates a "phantom dialer" method that duplicates the key depressions just as if the user dialed again. While the ZMX is redialing, the keypad beeper will follow the keys as if a ghost is dialing. This is valuable when specific digit timing is required to access equipment such as an answering machine or paging terminal.

OPERATING MODE DESCRIPTIONS

The following is a description of the 6 operating modes, which determine how the mic functions.

Mode 0 -- Manual dial only, no ANI or autodial functions
This is the most basic configuration of the mic. The * and # keys simply generate the DTMF * and DTMF # tones. No ANIs or Autodials are accessible.

Mode 1 -- Connect and disconnect ANIs
This mode allows the * key to be used to send the connect ANI, and the # key to send the disconnect ANI. This mode turns the ZMX into a simple ANI mic.

1. To send connect ANI, press "*" (without PTT)
2. To send disconnect ANI, press "#" (without PTT)
3. To manual dial, simply press the 0 to 9 digits
4. Dialing with PTT held may be enabled or disabled

Mode 2 -- Single digit autodials, manual dialing by holding PTT
This mode may be selected to allow users to dial only specific phone numbers. An example might be delivery trucks that require phone patch capability, but the company management does not want drivers to be able to call just anyone. The mic can be set up to allow autodialing of a few

phone numbers only, such as the office and warehouse, and no manual dialing to prevent misuse of the channel.

1. To send connect ANI, press "*" (without PTT)
2. To send disconnect ANI, press "#" (without PTT)
3. Autodial is accessed with single digit (1 to 9) without PTT
4. To manual dial, PTT must be held while pressing digits 0 to 9
5. Manual dialing (with PTT held) may be disabled for autodial only
6. Last number redial is accessed by pressing "0" without PTT

Mode 3 -- "*" + digit for ANI or autodial
This mode assigns the * key as a "function" key. When the * key is pressed, the following key will select the appropriate automatic dialing function. Manual dialing is possible for all digits except *, which requires the PTT switch held.

NOTE: ***The digit after the "*" must be pressed within 2.5 seconds!***

1. To send the connect ANI, press "**" without PTT
2. To send the disconnect ANI, press "*#" without PTT
3. Autodial is accessed with "*" plus a location digit (1-9) without PTT (*5 = location 5).
4. Manual dial by pressing digits 0 to 9 (with or without PTT)
5. Last number redial is accessed by pressing "*0" without PTT
6. To send "#" digit, just press "#"
7. To send "*" digit, press PTT + "*" (if keypad is enabled)

Mode 4 -- Store and forward
The store and forward mode is used to buffer up digits (store), then send them out the transmitter (forward). This mode may be used for DTMF paging, telephone interconnect, selective calling of mobiles, or to send DTMF access codes with specific digit timings.

To send a digit sequence, the user would enter the digits then press PTT within 6 seconds of the last digit.

If the channel is busy, or PTT is not pressed within 6 seconds of the last digit, the ZMX will not send the stored number with a momentary PTT. This feature prevents erroneous digits from being sent out by mistake. If, for example, a digit sequence is entered and the channel is busy, the user must wait some time before sending the digit sequence. A few moments later, a dispatch call may come over the radio for that user. When the user answers the dispatch call, it would be undesirable for the mic to send digits, since the user just wants to respond with voice. After the user is done with the dispatch call, simply press "0" then momentary PTT to send the digits.

1. Digits (without PTT) go into storage buffer (up to 50 digits).
2. Digits in buffer are sent by momentary PTT click.
3. Digits in buffer are cleared by pressing any key or PTT for 3 seconds. A double-beep will indicate cleared buffer.
4. To send the connect ANI, press first digit "*" (then PTT).
5. To send the disconnect ANI, press single digit "#" (then PTT).
6. Autodialing is accomplished by pressing a single digit 1 to 9 (then PTT).
7. To send ANI + autodial, press "*" and a single digit 1 to 9 (then PTT).
8. Manual live dialing is accessed by pressing digits with PTT (if keypad enabled).
9. Last number redial is accessed with single digit "0" (then PTT).
10. Auto-ANI may be enabled so the user simply enters phone number. This eliminates 1st digit "*" requirement.
11. Maximum time between entering digits is 6 seconds. The mic returns to PTT mode, and digits are held in last number redial memory.

Mode 4 examples

Keys hit	Output	Notes
*6441300(PTT)	ANI+6441300	1st digit "*" = ANI (ANI could be set to "*")
123*456(PTT)	123*456	"*" not ANI here
#(PTT)	Disconnect ANI	Single "#" for disconnect
#123(PTT)	#123	Not a disconnect code
3(PTT)	Autodial 3	Autodial only, no ANI
*3(PTT)	Connect ANI+Autodial 3	ANI then autodial location 3
4(PTT)	Autodial 4 (ANI+number)	Autodials can include ANI and phone number
0(PTT)	Last number redial	
*0(PTT)	Connect ANI+0	Not last number redial
---	Auto connect ANI and hookswitch disconnect --- --- (program modes 28 and 24) enabled ---	
6441300(PTT)	ANI+6441300	ANI goes out if not previously sent
1234(PTT)	1234	No ANI since it was just sent
#(PTT)	Disconnect ANI	
1234(PTT)	ANI+1234	ANI sent since last sequence was disconnect
Hangup	Disconnect ANI	Disconnect enabled when going back on-hook
*(PTT)	ANI	Phone to mobile call answer

Mode 5 -- "Send" and "end" keys, just like using a cellular phone
This mode causes the * and # keys to function like the "send" and "end" keys on a cellular phone. This is the most user friendly operating mode choice for telephone interconnect applications. The user simply keys in the phone number, then presses the "send" key. When the conversation is complete, the "end" key is pressed to terminate the call.

The "send" key will automatically send the connect ANI, then the dialing digits. The "end" key will send the disconnect ANI.

If an error is made during dialing, the "end" key will sound a double-beep and clear the send buffer.

Last number redial is accomplished by pressing the "send" key again.

Autodial numbers are accessed by pressing the autodial location (1-8) then the "send" key.

The "send" and "end" keys are dealer selectable; the * key may be send and the # key disconnect, or the # key may be send and the * key disconnect.

Manual live dialing may be accomplished by pressing and holding the PTT switch.

Using Mode 5, cellular phone type operation

1. The * and # keys are used for "send" and "disconnect." The keys are selectable using program mode command 29 such that the * key may be send and the # key disconnect, or the # key may be send and the * key disconnect.

2. The send key is used to initiate dialing or answer a call. The user will enter a phone number, then press the send key.

    a) The send key may be pressed again to redial the previous number.

    b) The connect ANI is sent automatically preceding the phone number.

    c) Autodial numbers may be accessed by pressing a single digit (1-8) then the send key.

    d) The operator may be called by pressing the digit zero then send.

    e) The connect ANI may be sent on every "send," or once until the "end" (disconnect ANI) has gone out (see program mode command 28).

f) Some systems may require the connect ANI be sent to answer a phone to mobile call. To send the connect ANI without dialing a phone number, use a "blank" autodial location. The autodial location 9 (for example) may be programmed as "blank" so that calls may be answered by pressing "9 send".

3. The disconnect key has two functions.

a) If an error is made while entering the phone number to dial, the disconnect key may be pressed to clear the entry. When pressed, a double-beep progress tone will be heard indicating the digits are cleared from the dialing buffer.

b) If no digits have been entered, the disconnect key will key the transmitter and send the disconnect ANI.

c) The disconnect ANI may be sent automatically when the mic is replaced on-hook (selected by program mode command 24).

Note: If the disconnect ANI was manually sent (using the disconnect key), the mic won't send the ANI when replaced on-hook.

4. Manual dialing may be accomplished by pressing and holding the PTT switch.

5. The PTT switch is active at all times. This allows dispatch calls to be initiated or answered while entering a phone number.

Mode 5 Examples

Keys hit	Output	Notes
8206363*	ANI+8206363	* key = send, dials a phone number
1234*	1234	No ANI since command 28 = 0
#	Disconnect ANI	# key = disconnect / clear
5551212*	ANI+5551212	New number dialed after disconnect
#	Disconnect ANI	# key = disconnect / clear
*	ANI+5551212	redial previous number
82064#	no dialing, double beep	# key = disconnect / clear
7*	ANI+autodial location 7	Autodial digits in location 7
0*	ANI+0	Dials "0", typically the operator
---- Command 28 set to "2", send connect ANI on each "send" ----		
8206363*	ANI+8206363	* key = send, dials a phone number
1234*	ANI+1234	ANI sent since command 28 = 2
#	Disconnect ANI	# key = disconnect / clear
---- Command 29 set to "0", # = send, * = end ----		
8206363#	ANI+8206363	# key = send, dials a phone number
1234#	ANI+1234	ANI sent since command 28 = 2
*	Disconnect ANI	* key = disconnect / clear

3. PROGRAMMING

DEALER PROGRAMMING

The ZMX is designed for ease of use, with maximum system flexibility in mind. To accomplish this, the mic is configured to the particular radio system by the dealer. Keypad programmable values are used by the dealer to configure system settings such as ANI, keyup delay, timeout timer, DTMF tone level, twist, digit timing, and operating mode. These settings ensure reliable system operation as well as maximum user friendliness.

For dealer programming of system settings, the program mode is accessed by holding the keypad digits 1, 2, and 3 down (with the power off), then supplying power to the mic (while holding the three keys down). A five-beep "chirp" will indicate access to program. All settings may be altered via dealer program mode access, including the autodial phone numbers. During programming, friendly prompt tones will be heard to indicate programming status. The tones and their meanings are as follows:

Prompt tone	Meaning
5-beep chirp	Ready for a new command (from the command list)
Double beep	Ready to input a programming value
Warble	Error, invalid command or out-of-range data

During programming, the * and # keys have special functions. The * key is used as a "clear" key, and will return to the "enter command" prompt. The # key is used as an "enter" key, and will process a command or store new data. The command syntax is demonstrated below:

Keys hit	Prompt	Notes
52#	chirp	Block setup for manual mode (no data to enter)
40#	bip-bip	Select keyup delay setting
75#	chirp	Set keyup delay to 750 milliseconds
40#	bip-bip	Select keyup delay setting (again)
*	chirp	Ignore setting, leave as is, return to command
98#	warble	Invalid command
40#	bip-bip	Select keyup delay setting (again)
400	warble	Invalid range (250 is maximum keyup setting)
22#	bip-bip	Select disconnect code
PTT+"#"		1st digit = # (see ANI Special Functions)
PTT+6		Select faster timing
123		Send digits 123
#	chirp	End of disconnect ANI (set to #123)
0#	chirp	Exit programming, return to operational mode

Refer to the following pages for specific command information.

USER PROGRAMMABLE AUTODIAL INSTRUCTIONS

The ZMX has 9 user programmable autodial numbers for frequently used DTMF sequences or phone numbers. The autodials are stored in locations 1 to 9 (corresponding to keypad digits 1 to 9) and are accessed in different ways depending upon the mode selected. To program the autodials, the user must simultaneously press the *, 0, and # keys. The program mode prompt tone will indicate access to the autodial programming. The command syntax is just like dealer mode (*=clear, #=enter), except the user can ONLY access the autodial commands 0 to 9. The special functions may be used to include an ANI connect code or other items in the autodials (refer to "Autodial Programming Instructions" at the end of this manual). To exit autodial programming, command 0 is used, just as with dealer mode.

BLOCK PROGRAMMING SETUP COMMANDS

Commands 50 to 53 are used to set the overall function of the microphone to some predefined settings. These allow quick setup to emulate existing microphones. Command 50 for example, sets all the timers and functions of the Zetron mic to emulate a Motorola "Palm Microphone." Command 51 sets the mic to function much like a normal microphone that has had a DTMF pad added to it for manual dialing. Command 52 sets the mic to some settings determined as most user friendly for manual dialing. Command 53 sets the mic to work similarly to a cellular phone "buffer then send" operation.

After using the "50-series" commands, any of the settings or timers may be modified to custom tailor the microphone for the system requirements.

NOTE: ***The 50-series commands can also be used to quickly reinitialize the microphone to known settings.***

CAUTION! ***The 50-series commands will delete any preprogrammed ANI settings, but will not affect the gain or installation settings.***

Items 50 - 53 set all values as follows (no data required):

- Item 50= Motorola compatible
- Item 51= Manual mic compatible
- Item 52= User friendly manual operation
- Item 53= Cellular style operation

PROGRAMMING COMMANDS

In the following programming command table, the columns have the following meanings:

CMD: The CMD column indicates the programming command. For example, CMD 40 is the command to set the keyup delay before sending DTMF. To program the keyup delay, the dealer would press "40#" meaning "command 40 ENTER."

RANGE: The RANGE column shows the acceptable range of data or values that can be entered. In the above example the acceptable range of data is from 0 to 250. Some values have multipliers required as with the keyup delay. The actual delay is multiplied by 10 milliseconds, meaning a value of 50 would produce a half second keyup delay (50 * 10ms = 500ms = 0.5 second).

FUNCTION: The FUNCTION column describes what is affected by the programming value.

See "Programming Command Descriptions" on the following pages.

PROGRAMMING COMMAND SUMMARY

CMD	RANGE	FUNCTION
0	No data	Exit programming mode
1	Digits	Autodial 1, can include ANI and special functions
2	Digits	Autodial 1, can include ANI and special functions
3	Digits	Autodial 1, can include ANI and special functions
4	Digits	Autodial 1, can include ANI and special functions
5	Digits	Autodial 1, can include ANI and special functions
6	Digits	Autodial 1, can include ANI and special functions
7	Digits	Autodial 1, can include ANI and special functions
8	Digits	Autodial 1, can include ANI and special functions
9	Digits	Autodial 9, can include ANI and special functions
20	0 - 5	Operating mode select Mode 0: No ANI or autodial, manual dial only Mode 1: *=Connect ANI, #=Disconnect ANI Mode 2: *=Con, #=Dis, 1-9=Autodial, 0=Redial, Manual dial w/PTT Mode 3: **=Con, *#=Dis, *0=Redial, *n=Autodial location n Mode 4: Store and Forward, enter digits then PTT to send, any key >3 sec=clear Mode 5: "Cellular", enter digits then #(*)=send/redial, *(#)=clear/disconnect
21	Digits	ANI connect digits, may include special functions
22	Digits	ANI disconnect digits and special functions
23	0 - 1	Auto connect ANI when lifting mic off hook (1=enabled)
24	0 - 1	Auto disconnect ANI when replacing mic on hook (1=enabled)
25	0 - 1	Auto PTT pulse when lifting mic off hook (1=enabled), for trunked radio
26	0 - 1	1kHz courtesy beep when PTT released (1=enabled)
27	0 - 1	DTMF duty cycle (0=50/50, 1=60/40)
28	0 - 2	Connect ANI sent automatically in modes 4 & 5 0 = no ANI sent automatically (user must press "*") 1 = ANI sent before first dialed digits, once until disconnect 2 = send ANI ahead of all dialed digits
29	0 - 1	Mode 5 * and # key functions: 0 sets: # = send, * = disconnect or clear, 0# = dial 0, 1-9# = autodial 1 sets: * = send, # = disconnect or clear, 0* = dial 0, 1-9* = autodial
30	0 - 2	Keypad operation while PTT is held (0=none,1=normal,2=ABCD*# 4th column)
31	0 - 1	Keypad buffer (1=enabled), disabled = live dialing only
33	0 - 5	Auto connect ANI via PTT, 1=release, 2=press, 3=both, 4&5 = same as 2&3 with beep
34	See text	Output level adjustment from keypad, 3=more gain, 6=less gain
36	0 - 2	Keypad beeper volume, 0=off, 1=low, 2=high
37	0 - 1	Hookswitch output polarity, 0=normal, 1=inverted
38	0 - 1	Low current mode, 0=normal, 1=low current disable

PROGRAMMING COMMAND SUMMARY
(Continued)

CMD	RANGE	FUNCTION
40	0 - 250	Keyup delay before sending 1st digit (times 10ms, 50=0.5 second)
41	0 - 250	Interdigit transmit hold time (* 10ms)
42	0 - 250	Max PTT active time (stuck mic, * 2 seconds, 0=no limit)
43	3 - 250	Minimum tone duration for digits 0-9 (* 10ms), sets shortest digit time
44	0 - 250	Maximum tone duration for digits 0-9 (* 10ms, 0=no limit)
45	3 - 250	Minimum tone duration for digits *,# (* 10ms)
46	0 - 250	Maximum tone duration for digits *,# (* 10ms, 0=no limit)
50	No data	Set values to Motorola mode
51	No data	Set values to manual mode
52	No data	Set values to Zetron user friendly mode
53	No data	Set values to cellular style operation (mode 5)
80	expert mode	EEPROM test, reset to factory defaults
81	expert mode	Tone generator distortion and 1kHz frequency test
82	expert mode	Hangup button and hookswitch output test
83	expert mode	PTT input and PTT output test
84	expert mode	DTMF gain selector test
85	expert mode	Composite audio output gain selector test
86	expert mode	DTMF twist test
87	expert mode	Tone frequency test
88	expert mode	Microphone mute switch test
89	expert mode	Expert mode level setting

PROGRAMMING COMMAND DESCRIPTIONS

Following is a detailed description of each programmable item in the mic. The items are in order by programming command number.

COMMAND 0 -- EXIT PROGRAMMING MODE [0#]
This command causes the ZMX to exit the programming mode and return to the operational mode.

COMMANDS 1-9 -- AUTODIAL NUMBER PROGRAMMING [1# nnn...#]
These commands are used to install the autodial phone numbers into the ZMX memory for user access. The autodial numbers may contain special functions using the PTT switch as a "shift" key. Refer to "Autodial Programming Instructions" at the end of this manual for detailed instructions. Commands 1 through 9 are accessible by either dealer programming mode or the user autodial programming mode.

COMMAND 20 -- OPERATING MODE AND AUTODIAL SELECT [20# n#]
The ZMX has 6 modes of operation. These determine how the ANI and autodial functions are accessed.

Prog steps	Operating modes (0 to 5);
20# 0#	No ANI or autodial, manual dial only. In this mode the keypad cannot access ANI's or autodials. The hookswitch may be programmed to generate the connect and disconnect ANI's automatically.
20# 1#	* = Connect ANI, # = Disconnect ANI, no autodials.
20# 2#	* = Connect ANI, # = Disconnect ANI, 1-9 = Autodial, 0 = Last number redial, Manual dial by pressing (and holding) the PTT switch.
20# 3#	** = Connect ANI, *# = Disconnect ANI, *0 = Last number redial, *n = Autodial the number stored in location "n" (1-9).
20# 4#	Store and forward paging mode, enter the digits, then click the PTT switch to send out the DTMF.
20# 5#	Cellular type mode, enter the phone number to dial then press # (or selectable as *) to "send" (connect ANI then digits), press * (or selectable as #) to "end" (disconnect ANI).

COMMANDS 21 AND 22 -- CONNECT AND DISCONNECT ANIs [21# nnn...#]
The ZMX includes two independently programmable DTMF ANI codes of up to 17 characters each. These are typically used as the "connect" (off-hook or answer) and "disconnect" (on-hook or hangup) codes when using a phone patch. The connect ANI is normally accessed with the * key, and the disconnect ANI is normally accessed using the # key.

The ANIs and autodial sequences may contain special functions such as timing changes and the "ABCD*#" digits. These special functions may be inserted by using the PTT switch as a "shift" key. The available functions are listed below. They are grouped logically to make them easy to remember. When any of these functions are used, they will each occupy two digit spaces in the autodial or ANI storage memory.

(PTT held)

1 Keyup and pause 2 seconds	**2** DTMF "A"	**3** Slower digit timing
4 Unkey and pause 2 seconds	**5** DTMF "B"	**6** Faster digit timing
7 Pause Wait for any key	**8** DTMF "C"	**9** Send Connect ANI
*** DTMF "*"	**0** DTMF "D"	**#** DTMF "#"

Command	Function
PTT + 1	Key the transmitter, then wait 2 seconds
PTT + 4	Unkey the transmitter, then wait 2 seconds
PTT + 7	Unkey the transmitter, wait for a key
PTT + *	DTMF * (star) digit
PTT + 2	DTMF A digit
PTT + 5	DTMF B digit
PTT + 8	DTMF C digit
PTT + 0	DTMF D digit
PTT + 3	Slow down the digit timing
PTT + 6	Speed up the digit timing
PTT + 9	Send connect ANI
PTT + #	DTMF # (pound) digit

ANI Programming Examples
Some typical ANI sequences are shown here as examples.

In the examples, the ^ character indicates a "shift" function, which means the following digit is entered while holding the PTT switch pressed.

Example: 123 ^* 456 (the PTT switch is held while pressing the * key)

Desired setup	Program mode key sequence
Connect ANI = *1234, 2 second pause	21# ^* 1234 ^1 #
Disconnect ANI = #1234	22# ^# 1234 #
Connect ANI = *1234, drop PTT 2 second (this may be used to let the mobile hear dial tone before continuing dialing)	21# ^* 1234 ^4 #
Connect ANI = A123*456B	21# ^2 123 ^* 456 ^5 #
Autodial 5 = ANI then 820-6363	5# ^9 8206363 #

ANI Recommendation: Put an "unkey and pause" (^4) at the end of the ANI sequence. This will allow the phone patch user to confirm dial tone when using the autodials or buffered dialing.

The unkey and pause at the end of the ANI will make it easier for the user to program autodials because a pause will already be included at the end of the ANI and the user will not be required to enter it before the phone number. Autodial programming would typically include the connect ANI ^9 character, then just the phone number.

COMMAND 23 -- AUTO CONNECT ANI USING HOOKSWITCH [23# n#]
The connect ANI sequence may be sent automatically whenever the mic is lifted off hook. For some applications, this may allow the mic to more closely emulate a telephone.

NOTE: ***The hookswitch hanger clip must be grounded!***

Programming steps	Function
23# 0#	No connect ANI when mic is lifted off hook
23# 1#	Auto connect ANI sent when mic is lifted off hook

COMMAND 24 -- DISCONNECT ANI USING HOOKSWITCH [24# n#]
With this feature the user may disconnect a phone call by simply placing the mic back on hook.

The ZMX will send the disconnect ANI only if the connect ANI was previously sent and the user did not manually disconnect the call (phone call in process).

NOTE: ***The hookswitch hanger clip must be grounded!***

Programming steps	Function
24# 0#	No disconnect ANI when mic is replaced on hook
24# 1#	Auto disconnect ANI when mic is replaced on hook

COMMAND 25 -- PTT PULSE WHEN LIFTING MIC OFF HOOK [25# n#]
With this feature a momentary transmit will occur when the mic is lifted off-hook. This may be desirable when used with certain trunking radios to gain automatic access to the system.

NOTE: ***The hookswitch hanger clip must be grounded!***

Programming steps	Function
25# 0#	No PTT pulse when mic is lifted off hook
25# 1#	PTT pulse enabled when mic is lifted off hook

COMMAND 26 -- COURTESY TONE SENT WHEN PTT IS RELEASED [26# n#]
A courtesy beep tone (1kHz) may be sent whenever the user unkeys the mic. Some possible uses for this feature are:

a) For telephone interconnect, to let the phone party know when to begin speaking. It is better for the mic to produce the beep than the phone patch since the phone patch can't know if the mobile unkeyed, or just faded out.

b) For use on "quiet" dispatch systems where squelch tail elimination is used. Sometimes users will wait for the repeater hold time to drop before speaking, rather than when the other user unkeys. The courtesy tone may be used to reduce airtime since the conversation may progress faster.

Programming steps	Function
26# 0#	Courtesy tone disabled
26# 1#	Courtesy tone sent when PTT is released

COMMAND 27 -- DTMF DUTY CYCLE (50/50 OR 60/40) [27# n#]

When the ZMX outputs DTMF for ANIs, autodials, or buffered dialing, the DTMF digit output timing duty cycle may be set for either 50% or 60%.

When set for 50/50, the tone duration will be the same as the gap. When set for 60/40, the tone duration will be greater than the gap. For most applications, using 60/40 duty cycle will increase the dialing speed without compromising decoding accuracy.

Example: Minimum DTMF duration set for 100 milliseconds:

50/50 duty cycle will produce 100 ms on, 100 ms gap. 

60/40 duty cycle will produce 100 ms on, 67 ms gap. 

Programming steps	Function
27# 0#	50% duty cycle for DTMF output
27# 1#	60/40 duty cycle for DTMF output

COMMAND 28 -- AUTOMATIC CONNECT ANI IN MODES 4 AND 5 [28# n#]
When using the modes 4 and 5, the connect ANI may be sent automatically by the mic before the dialed digits.

When the mic is used for telephone interconnect, the user's ANI must usually be sent to sign on to the system before dialing a phone number. This command may be used to cause the ZMX to automatically insert the connect ANI before the dialed digits.

The ZMX knows when to insert the ANI based on when the disconnect ANI is sent. If command 28 is set to "1", the mic will send the connect ANI only on the first "store/forward" transaction, and not again until the disconnect ANI has been sent. If command 28 is set to "2", the mic will send the connect ANI preceding all dialing.

Programming steps	Function
28# 0#	Do not insert the connect ANI, user must press "*"
28# 1#	Insert the connect ANI on the first dialed number
28# 2#	Insert the connect ANI before all dialed numbers

Examples:

Keys hit	Output	Notes
---- Command 28 set to "0" ----		
8206363	8206363	No ANI
1234	1234	No ANI
---- Command 28 set to "1", send connect ANI on each "send" ----		
8206363	ANI+8206363	New number dialed after disconnect
1234	1234	No ANI until after disconnect
---- Command 28 set to "2", send connect ANI on each "send" ----		
8206363	ANI+8206363	New number dialed after disconnect
1234	ANI+1234	ANI sent since command 27 = 2

COMMAND 29 -- MODE 5 * AND # KEY FUNCTIONS [29# n#]

When using operating mode 5 (cellular phone type mode), the * and # keys are used for "send" and "disconnect." The keys are selectable such that the * key may be send and the # key disconnect, or the # key may be send and the * key disconnect.

Programming steps	Function
29# 0#	# = "Send" * = "End" (disconnect)
29# 1#	* = "Send" # = "End" (disconnect)

Examples:

Keys hit	Output	Notes
---- Command 29 set to "0", # = send, * = end ----		
8206363#	ANI+8206363	# key = send, dials a phone number
*	Disconnect ANI	* key = disconnect / clear
---- Command 29 set to "1", * = send, # = end ----		
8206363*	ANI+8206363	* key = send, dials a phone number
#	Disconnect ANI	# key = disconnect / clear

COMMAND 30 -- KEYPAD OPERATION WHILE HOLDING PTT [30# n#]

The function of the keypad while the PTT switch is held may be selected using programming command 30. The operation of the keypad digits while PTT is held is selectable as follows:

Command 30 set to "0"
No dialing allowed, to avoid false digits from bumping the keypad while talking.

Command 30 set to "1"
Normal dialing allowed, the * and # keys will be sent as single digits and NOT as the connect and disconnect ANI (if programmed).

NOTE: ***The "interdigit transmit hold time" will not apply when dialing using PTT held.***

This feature allows the user to access voice mail, answering machines, or other DTMF controlled systems that may respond with voice very quickly after getting a DTMF digit. When the interdigit transmit hold time is used (dialing without PTT held), the radio user may miss the first few words sent back over the air.

Command 30 set to "2"
Fourth column digits. The middle column is changed to encode the "fourth column" (ABCD) digits. The active keys are: 2=A, 5=B, 8=C, 0=D, *=*, and #=#. All other digits are muted.

1 No Tones	2 DTMF "A"	3 No Tones
4 No Tones	5 DTMF "B"	6 No Tones
7 No Tones	8 DTMF "C"	9 No Tones
* DTMF "*"	0 DTMF "D"	# DTMF "#"

Prog steps	Function of the keypad while holding the PTT switch
30# 0#	No DTMF digits sent
30# 1#	Normal dialing (*Note: Interdigit hold time is disabled*)
30# 2#	*#ABCD digits available (see chart)

COMMAND 31 -- KEYPAD BUFFER ENABLE/DISABLE [31# n#]

The ZMX includes a feature called "buffered dialing." This allows the user to press the digit keys as fast as desired, while the ZMX takes care of keying the transmitter, providing a key-up delay duration (so that a clear talk path is fully secured), then sending the appropriate digits at a metered rate. What this means to the user is that the mic works just like dialing a telephone. No more worries about if the first digit is held down long enough, or if the digits are sent too long or too short, or whether the interdigit hold timer has let go. And no more waiting until the beep stops.

There is really no reason to disable the ZMX keypad buffer unless exact emulation of another (less user friendly) DTMF microphone is desired.

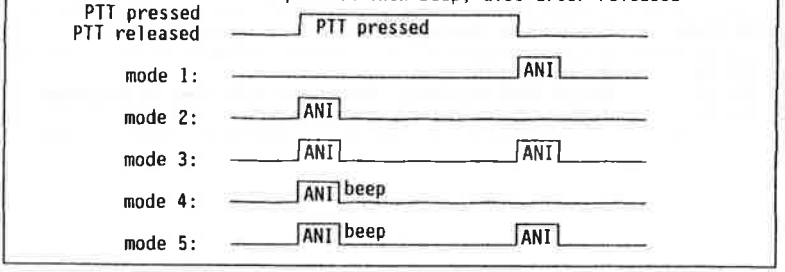
Programming steps	Function
31# 0#	Keypad buffer disabled
31# 1#	Keypad buffer enabled (preferred)

COMMAND 33 -- AUTO CONNECT ANI VIA PTT SWITCH [33# n#]

The PTT switch may be used to send the connect ANI. A possible application for this feature is where a unique DTMF ANI sequence is assigned for each radio to identify who is using the system. Many other uses are also possible.

The connect ANI may be sent whenever the PTT switch is pressed, released, or both. When sending the ANI upon PTT press, a beep tone may be sent to the user to indicate when to begin speaking. The selections are as follows:

Programming steps	Connect ANI sent when:
33# 0#	Normal PTT switch operation, no ANI sent using PTT
33# 1#	PTT switch is released
33# 2#	PTT switch is pressed
33# 3#	PTT switch is pressed and after released
33# 4#	PTT switch is pressed then beep
33# 5#	PTT is pressed then beep, also after released



COMMAND 34 -- AUDIO OUTPUT GAIN SET [34#]
This is an installation command to set the overall audio output gain of the microphone. See the installation section for instructions.

COMMAND 36 -- KEYPAD BEEPER VOLUME SET [36# n#]
The keypad beeper volume may be selected to fit the particular users preference. The selections are high, low, or off.

Programming steps	Keypad beeper volume
36# 0#	Disabled *(Note: Beeper will operate in prog mode)*
36# 1#	Low level beeps
36# 2#	High level beeps (normal)

COMMAND 37 -- HOOKSWITCH OUTPUT POLARITY [37# n#]
The ZMX automatically controls the hookswitch signal to the radio transceiver. The hookswitch hanger button on the back of the mic is not directly connected to the hookswitch output to the radio, so that the ZMX may better control the radio. The polarity of the hookswitch output is selectable in the ZMX. Some uses for this feature are:

a) Some radios require an inversion between the grounded hookswitch hanger and the hookswitch input. An example is a GE Phoenix or MLS radio. The hookswitch may be used to control the "Monitor" input of the radio, but the radio requires "ground" for monitor. Since the hangup clip is usually grounded, the ZMX may invert the hookswitch so that the radio sees a ground when the mic is off-hook, and no-connect when the mic is on the grounded hangup clip.

b) The hookswitch may be used to control "stop-scan" on some radios, and the proper hookswitch polarity is required.

c) When using the hookswitch to send the disconnect ANI (when replacing the mic on-hook after a call), some radios will not transmit while on hook. The ZMX will automatically take the radio off hook while performing any transmit functions.

Programming steps	Function
37# 0#	Hookswitch output polarity normal
37# 1#	Hookswitch output polarity inverted

COMMAND 38 -- LOW CURRENT DISABLE [38# n#]

This command allows the low current feature of the mic to be disabled. Some transceivers require very low transmit audio level and may pick up some digital noise from the mic. By disabling the low current feature, the noise may be eliminated.

Programming steps	Function
38# 0#	Normal operation, low current operation
38# 1#	Low current mode disable

COMMAND 40 -- KEYUP DELAY [40# n#]

A keyup delay may be selected in the ZMX to ensure the transmitter is fully keyed, and that a clear audio path is established to the equipment on the other end of the system. When a repeater or link is being used, system delays of at least 150 milliseconds are typical. The ZMX may be programmed so that the transmitter is keyed a fixed amount of time before sending any DTMF.

The keyup delay is programmable from 0 to 2.5 seconds, in 10 millisecond increments. Example: 50 = 0.50 seconds.

Programming steps	Function
40# n#	Keyup delay in 10 millisecond increments (n=0 to 250)

COMMAND 41 -- INTERDIGIT TRANSMIT HOLD TIME [41# n#]

An interdigit transmit hold time is available to keep the transmitter keyed while manually dialing, without holding down the PTT switch. It is typically set from between 1 and 2 seconds.

The interdigit transmit hold time is programmable from 0 to 2.5 seconds, in 10 millisecond increments. Example: 150 = 1.50 seconds.

The interdigit transmit hold time will not apply when dialing using PTT held. This is a feature that allows the user to access voice mail, answering machines, or other DTMF controlled systems that may respond with voice very quickly after getting a DTMF digit. When the interdigit transmit hold time is used (dialing without PTT held), the radio user may miss the first few words sent back over the air.

Programming steps	Function
41# n#	Interdigit transmit hold time in 10ms steps (0-250)

COMMAND 42 -- TIMEOUT TIMER [42# n#]

A timeout timer is included in the ZMX to prevent "locked channels" due to a stuck mic. If the mic is accidentally placed in a location that causes the PTT switch to be depressed, the mic will "time out" after a selectable time. When the timeout time is exceeded, the ZMX will unkey the transmitter and generate a continuous beep until the switch is released.

The timeout timer is programmable from 2 to 500 seconds (8 minutes, 20 seconds), or disabled, in 2 second increments. The timeout timer may also be disabled by entering "0".

Example: 90 = 180 seconds = 3 minutes.

Programming steps	Function
42# n#	Timeout time in 2 second increments (0-250) 0=disabled

COMMANDS 43 to 46 -- DIGIT TIMINGS [43# n#]

The ZMX is able to guarantee specific minimum and maximum DTMF digit timings. This produces very reliable dialing since the user need not worry about holding down a digit long enough for proper decoding.

The "minimum" digit duration sets the shortest possible DTMF tone timing. This value will set the duration for autodial and ANI digits. For example, if the minimum duration is set for one second, and the user presses a key for a quarter of a second, the DTMF digit will be encoded for a full second.

The minimum tone duration is selectable for two categories of digits: the digits zero thru nine, and the "star" and "pound" digits. This provides a method of generating extended digit timing for the "star" and "pound" digits, which may be required by some telephone interconnects.

The "maximum" digit duration sets the longest possible DTMF tone timing. This value sets the maximum duration that DTMF will be generated when a user holds a key down for an extended duration. As with the minimum time, two categories of digits are programmable: the digits zero thru nine, and the "star" and "pound" digits.

NOTE: ***The maximum digit duration may be set to zero, which will allow an unlimited digit length.***

Example: 43# 15# sets the minimum tone duration for digits 0-9 to 150 milliseconds.

Prog steps	Function
43# n#	Minimum duration, digits 0-9 (* 10ms), (3-250)
44# n#	Maximum duration, digits 0-9 (* 10ms), (0-250) 0=no limit
45# n#	Minimum duration, digits *,# (* 10ms), (3-250)
46# n#	Maximum duration, digits *,# (* 10ms), (0-250) 0=no limit

BLOCK PROGRAMMING SETUP COMMANDS

Commands 50 to 53 are used to set the overall function of the microphone to some predefined settings. These allow quick setup to emulate existing microphones. Command 50 for example, sets all the timers and functions of the Zetron mic to emulate a Motorola "Palm Microphone." Command 51 sets the mic to function much like a normal microphone that has had a DTMF pad added to it for manual dialing. Command 52 sets the mic to some settings determined as most user friendly for manual dialing. Command 53 sets the mic to work similarly to a cellular phone "buffer then send" operation.

After using the 50-series commands, any of the settings or timers may be modified to custom tailor the microphone for the system requirements.

NOTE: ***The 50-series commands can also be used to quickly reinitialize the microphone to known settings.***

CAUTION! ***The 50-series commands will delete any preprogrammed ANI settings, but will not affect the gain or installation settings.***

Items 50 - 53 set all values as follows (no data required):
- Item 50= Motorola compatible
- Item 51= Manual mic compatible
- Item 52= User friendly manual operation
- Item 53= Cellular style operation

Setting	Cmd	50	51	52	53
Operating mode select	20 =	0	0	1	5
Connect ANI digits	21 =	*	*	*	*
Disconnect ANI digits	22 =	#	#	#	#
Off-hook auto connect ANI	23 =	0	0	0	0
On-hook auto disconnect ANI	24 =	0	0	1	1
Off-hook trunking PTT pulse	25 =	0	0	0	0
Courtesy beep on PTT unkey	26 =	0	0	0	0
DTMF duty cycle, 0=50/50 1=60/40	27 =	0	0	1	1
Auto connect ANI in Mode 4/5	28 =	0	0	1	2
Mode 5 * and # key functions	29 =	0	0	0	0
Keypad function during PTT	30 =	0	1	1	1
Keypad buffer enable	31 =	0	0	1	1
ANI via PTT key or unkey	33 =	0	0	0	0
Keypad beeper volume	36 =	high	high	high	high
Hookswitch output polarity	37 =	0	0	0	0
Keyup delay, 10ms increments	40 =	50	0	50	50
Interdigit hold, 10ms each	41 =	100	100	100	100
Timeout limit timer, 2 sec each	42 =	0	90	90	90
0-9 min tone time, 10ms each	43 =	6	6	8	12
0-9 max tone time, 10ms each	44 =	12	0	0	0
*-# min tone time, 10ms each	45 =	6	6	50	100
*-# max tone time, 10ms each	46 =	50	0	0	0

4. INSTALLATION AND REPAIR

INSTALLATION

The ZMX may be ordered with specific radio interface cables. If your mic is prewired, check for any attached information concerning possible modifications required to the radio. Some transceivers may require modifications to supply continuous power to the mic. The Zetron supplied "pigtail" cables may have different color wires inside depending upon the style and number of conductors. Refer to the installation sheet shipped with the cable for wire color codes.

If your mic was shipped prewired for a specific radio, skip to the following "Turn-on and Adjustments" section.

Powering the Microphone
The ZMX requires DC voltage in order to operate. Some radios supply power to the microphone connector on a dedicated pin, other radios may provide some microphone bias voltage on the transmit audio wire. The microphone may be powered using either method, an internal jumper plug in the mic will select the power supply method.

Powering the microphone using audio bias voltage
When powered from the audio bias voltage, the microphone requires at least 5 volts DC, and at least 3 milliamps of current to operate. If this method is preferred, the following check may be made to verify adequate supply from the radio:

> Place a 1.5 kΩ resistor between the radio transmit audio and ground, with no mic connected. Measure the voltage across the resistor. It should read at least 5 volts DC.

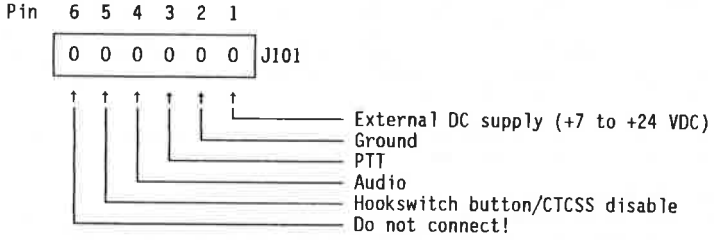
Any additional voltage or current will add to the brightness of the backlighting.

NOTE: ***The mic must be powered even while the radio is in receive (some radios remove the microphone bias voltage when not in transmit).***

Powering the microphone using a power wire
When powered from an external supply wire, the microphone requires a minimum of 7 volts DC, and will draw about 18 milliamps of current. It is best to use switched power from the radio, so that the mic is powered off with the radio.

Some transceivers may require technician modifications to get the proper power to the mic.

Connections inside the Mic
The microphone cord is attached to connector P2 in the mic. The connections are as follows:



Configuration Plug
A configuration jumper plug (J106) is inside the mic and is normally set at the Zetron factory prior to shipment. The plug will select proper hardware interface to specific radios. The functions available and jumper configurations are:

Power the mic using audio bias voltage
Short pin 1 to 2, short pin 7 to 8, and open pins 11 and 12 to power the mic from audio bias.

Power the mic using a dedicated 12 volts DC
Short pin 11 to 12, and open pins 1 and 2 when powering the mic from a dedicated 12 volts DC. The power should be supplied to the mic via J101 pin 1.

Flat audio output
Short pin 5 to pin 6 for normal flat microphone audio output.

Preemphasized audio output
For radios that do not provide preemphasis in the audio amplifier circuit, connect pin 3 to 4.

NOTE: ***Some newer radios do the preemphasis in the microphone cartridge rather than the radio.***

Hi/Low impedance
Short pins 7 and 8 for operation with low impedance radios.

Standard Communications GX-series radios
Some Standard Communications radios use the Tx audio line to control the hookswitch function (monitor, scan) in the radio. For these radios, connect J106 pin 9 to pin 10.

Turn-on and Adjustments

DTMF and microphone audio gain
Access the Dealer Setup Program Mode (described earlier in this manual). A 5-beep "chirp" should be heard. Access command number 34.

This command is used to set the microphone gain or radio deviation. When executed, the mic will key PTT causing the radio to transmit the DTMF digit 5. The keypad is used to step the gain up or down. The digits 1, 2, or 3 are used as "up" gain step (increase mic gain), and digits 4, 5, or 6 are used as "down" gain step (decrease mic gain). The keypad is used as a "rough" gain setting, the adjustment control accessed through the hole in the back is used as a "fine" setting.

The level of the DTMF digit 5 should be adjusted for 60% of full channel deviation (typically 3kHz).

When this mode is accessed, the DTMF twist setting is set to "flat," and the DTMF gain is set to 60%. For twist or DTMF level changes, use the "expert" mode via command 89.

The PTT switch may be used to turn off the DTMF digit and enable microphone audio to the transmitter. This may be used to check microphone transmit audio deviation. If the voice deviation is not acceptable in relation to the DTMF, set the gain for proper voice level, then use the "expert mode" commands to increase or decrease the DTMF gain (see command 89 instructions).

Command 34 DTMF gain quick reference:

1 Gain UP	2 Gain UP	3 Gain UP
4 Gain DN	5 Gain DN	6 Gain DN
7	8	9
* Save/Exit	0	# Save/Exit

Press "#" to save the settings, then "0#" to exit the dealer setup mode.

Hookswitch Output Polarity, CTCSS Disable Hang-up Clip
The ZMX uses the hookswitch button on the back of the mic for two functions:

1. To control the MONITOR input (receive CTCSS disable) to the radio.
2. To allow the mic to know if it is on hook or not.

The microphone hanger clip should be grounded so that when the mic is on hook, the button is at ground.

The microphone includes a "hookswitch output" wire that normally goes to the MONITOR input of the radio. Some radios (like GE) require a pull to ground (or logic low) to go into monitor, and since the hangup clip is grounded, it requires the microphone to invert the polarity of the hookswitch output.

Command 37 in the dealer setup mode is used to select the hookswitch output polarity (normal or inverted). When programming the hookswitch polarity, enter a "0" for normal, or "1" for invert.

NOTE: *If the ZMX is programmed to send a disconnect ANI when going on hook, the mic will leave the hookswitch output set to "off hook" while sending the disconnect ANI. This allows compatibility with radios that will not transmit when on hook.*

Expert Mode Diagnostic and Setup Commands
The following commands are used by the factory for initial product testing. They may be used by the dealer for testing or troubleshooting the microphone or attached radio.

Cmd	Function
80	EEPROM test. Sets up default configuration (same as command 52), tests EEPROM. A "go-ahead" tone indicates pass condition, "error" tone indicates fail.
81	Tone generator distortion and frequency test. Keys transmitter, outputs 1kHz sine wave on transmit audio output, full gain.
82	Hangup button test. HOOKSWITCH (hangup button) input is inverted and echoed to HOOKSWITCH output pin.
83	PTT input and output test. PTT input is echoed to PTT output pin.
84	DTMF gain selector test. Output 1kHz tone, increment through the four DTMF gain selections every time a key is pressed (* or # will exit). Note: Tx is not keyed.
85	Composite audio output gain selector test. Output 1kHz tone, increment through the four audio output gain selections every time a key is pressed (* or # will exit). Note: Tx is not keyed.
86	DTMF twist test. Output 697 Hz then 1633 Hz single frequency tones, increment through the three DTMF twist settings de-emphasized, flat, and pre-emphasized, every time a key is pressed (* or # will exit). Note: Tx is not keyed.
87	Tone frequency test. Outputs each of the eight single frequency tones, incrementing every time a key is pressed (* or # will exit). Note: Tx is not keyed.
88	Microphone mute switch test. Enable beeper, turn microphone mute switch on and off at a 0.5 second rate. Note: Tx is not keyed.

Expert Mode Diagnostic and Setup Commands (continued)

Cmd	Function
89	Expert mode level setting. In this mode, the keypad digits are reassigned to the following level set functions:

1 UP DTMF gain	2 UP DTMF twist	3 UP total gain
4 Down DTMF gain	5 Down DTMF twist	6 Down total gain
7 Reset DTMF twist	8 Output 1633 Hz	9 Reset DTMF twist
* Save/Exit	0 Output 697 Hz	# Save/Exit

NOTES:
1. PTT may be held to test audio gain, or generate a DTMF digit.
2. When digits 8 or 9 are pressed, the transmitter will key.
3. DTMF gain has 4 steps (20, 40, 60, or 80% of total deviation).
4. DTMF twist has 3 steps (deemphasized, flat, and preemphasized).
5. Total gain has 4 steps, the adjustment pot will attenuate.

REPAIR

The ZMX is designed for maximum performance and reliability. This is demonstrated by the use of very high quality components and manufacturing processes. Some examples are:

1. The PTT switch is rated at 30 Million cycles.
2. The keypad switch contacts are conductive rubber with gold plated contact pads.
3. The operating temperature rating is -40 to +80 °C.
4. The latest surface mount technology is used.

With normal use, the mic should not require servicing and does not contain any field serviceable parts. If the mic fails for any reason other than the interface cable, it should be returned to the Zetron factory for repair. Please call prior to sending a unit in for service, or enclose a detailed description of the reported problem with the mic.

5. QUICK REFERENCE

SPECIFICATIONS

GENERAL

Dimensions	3.5"H x 2.5"W x 1.5"D
Weight	6 oz.
Operating temperature	-40 to +80 °C (-40 to +176 °F)
Storage temperature	-40 to +85 °C (-40 to +185 °F)
Keyboard	Conductive rubber, tactile feedback, gold plated
PTT switch life	30 Million cycles
Microphone element	Electret
Audio frequency response	200 to 5000 Hz +-2dB
Coiled cord	Temperature stable synthetic rubber
Radio connector	Available for popular radios

ELECTRICAL

Voltage range	7 to 20 volts DC
Power source	May be powered by transmit audio bias voltage or dedicated DC power supply wire.
Current	3 mA minimum, 50 mA maximum (external DC)
Memory retention	EEPROM, no batteries or capacitors
Output impedance	600 ohms
Output level	0 to 1 volt pk-pk adjustable
Tone accuracy	0.1%
Tone distortion	2% typical
Twist	+6 dB, flat, or -6 dB selectable
Internal adjustments	Output level fine adj. pot, hole in back
Keypad beeper	2kHz/1kHz audio tone, selectable level

AUTODIAL PROGRAMMING INSTRUCTIONS

The ZMX has reprogrammable storage locations for up to 9 frequently called phone numbers or access codes. The numbers are stored in locations 1 thru 9 respectively, and may hold up to 17 digits each. The autodial programming is accessed by pressing the keypad digits *, 0, and #, all at the same time. A five-beep "chirp" will indicate programming access. User-friendly prompt tones will be heard to indicate programming status. The tones and their meanings are as follows:

Prompt tone	Meaning
5-beep chirp	Enter an autodial location to program, 1 to 9.
Double beep	Location selected, enter the autodial digits.
Warble	Error, invalid command or out-of-range data

During programming, the * and # keys have special functions. The * key is used as a "clear" key, and will return to the "enter location" prompt. The # key is used as an "enter" key. An autodial programming sequence is demonstrated below:

Keys hit	Prompt	Notes
3#	bip-bip	Program autodial location 3
8206363#	chirp	Set autodial #3 to phone number 820-6363
1#	bip-bip	Program autodial location 1
PTT+"9"		1st digit = Connect ANI (Special Functions)
PTT+6		Select faster timing
123456		Send digits 123456
#	chirp	"Enter," autodial 1 set for ANI then 123456
6#	bip-bip	Program autodial location 6
#	chirp	Erase autodial location 6
3#	bip-bip	Program autodial location 3
*	chirp	Ignore setting, leave as is, return to command
98#	warble	Invalid command
0#	chirp	Exit programming, return to operational mode

USER PROGRAMMABLE AUTODIAL SPECIAL FUNCTIONS

When programming the autodial sequences, special functions may be used. These are accessed by using the **PTT switch as a "shift" function key.** The available functions are listed below. They are grouped logically to make them easy to remember. When these functions are used, they each occupy two-digit spaces in the autodial or ANI storage memory.

(PTT held)

1 Keyup and pause 2 seconds	**2** DTMF "A"	**3** Slower digit timing
4 Unkey and pause 2 seconds	**5** DTMF "B"	**6** Faster digit timing
7 Pause Wait for any key	**8** DTMF "C"	**9** Send Connect ANI
* DTMF "*"	**0** DTMF "D"	# DTMF "#"

Command	Function
PTT + 1	Key the transmitter, then wait 2 seconds
PTT + 4	Unkey the transmitter, then wait 2 seconds
PTT + 7	Unkey the transmitter, wait for some action **
PTT + *	DTMF * (star) digit
PTT + 2	DTMF A digit
PTT + 5	DTMF B digit
PTT + 8	DTMF C digit
PTT + 0	DTMF D digit
PTT + 3	Speed up the digit timing
PTT + 6	Slow down the digit timing
PTT + 9	Send connect ANI
PTT + #	DTMF # (pound) digit

** ***NOTE:*** ***To continue, press any key or momentary press PTT. To exit dialing, hold PTT for 2.5 seconds (a double beep will be heard).***

DEALER PROGRAMMING FLOW CHART

The following is a programming flow chart to assist you in programming your new microphone. We recommend that before programming the microphone you read Section 3 and fully understand all the commands.

ENTER PROGRAMMING BY HOLDING
1,2,3 DIGITS WHILE POWERING UP

SELECT A BLOCK PROGRAMMING COMMAND: **[5n#]**

Commands 50 to 53 are used to set the overall function of the mic to predefined settings. These allow quick setup to emulate existing mics.

Command 50 for example, sets all timers and functions of the ZETRON mic to emulate a Motorola "Palm Microphone."

Command 51 sets the mic to function much like a normal microphone that has had a DTMF pad added to it for manual dialing.

Command 52 sets the mic to some settings determined as most user friendly for manual dialing.

Command 53 sets the mic to work similarly to a cellular phone "buffer then send" operation.

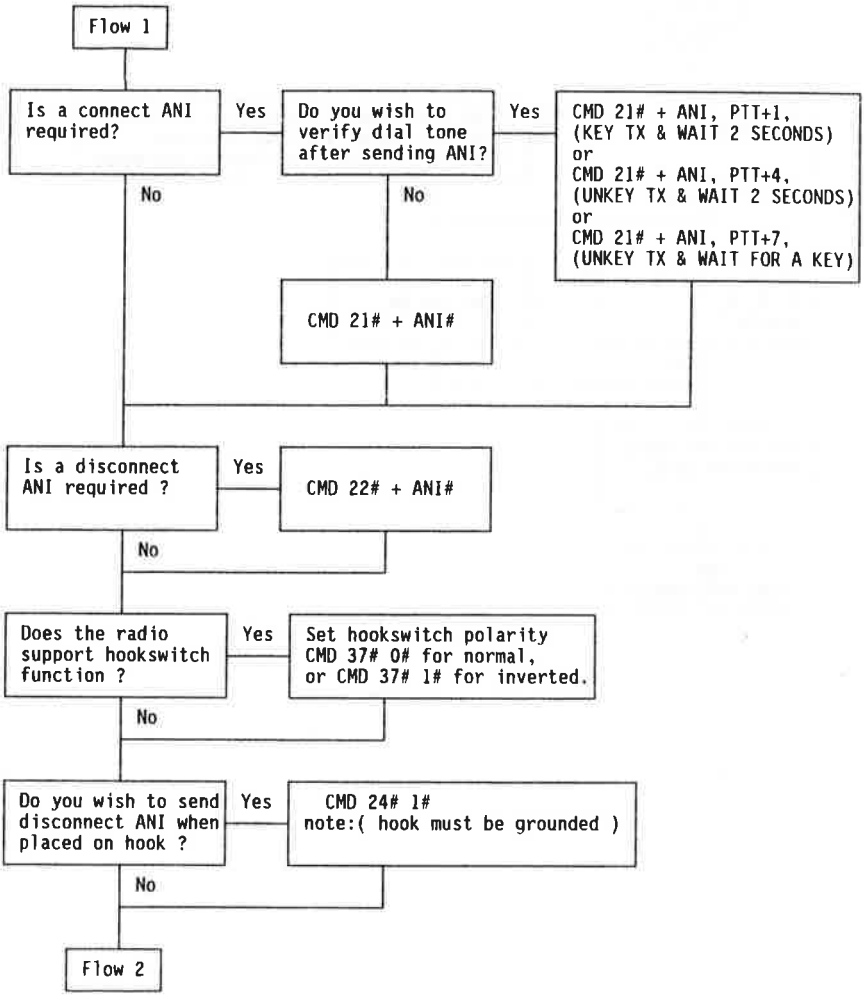
SELECT A OPERATING MODE: **[20# n#]**

The ZMX has 6 modes of operation. These determine how the ANI and autodial functions are accessed.

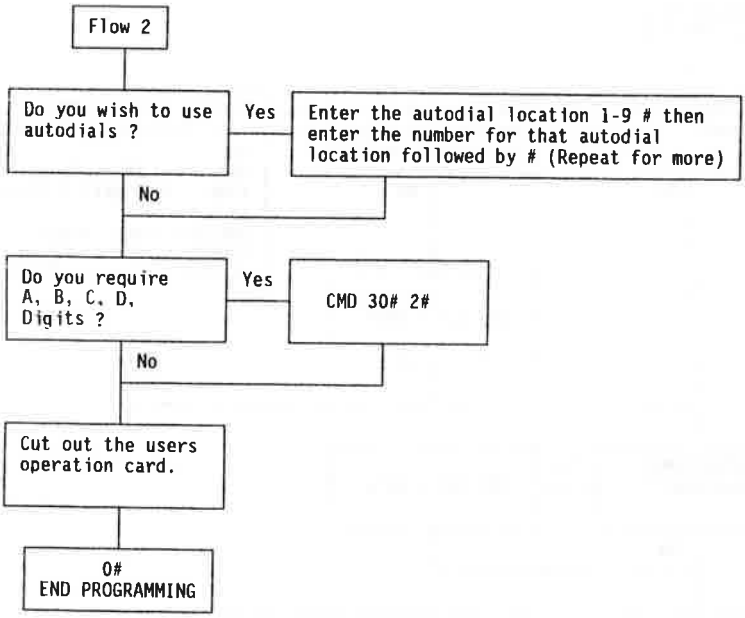
Mode 0	ANI or autodial, manual dial only. In this mode the keypad cannot access ANIs or autodials. The hookswitch may be programmed to generate the connect and disconnect ANIs automatically.
Mode 1	* = Connect ANI, # = Disconnect ANI, no autodials.
Mode 2	* = Connect ANI, # = Disconnect ANI, 1-9 = Autodial, 0 = Last number redial, manual dial by pressing & holding PTT
Mode 3	** = Connect ANI, *# = Disconnect ANI, *0 = Last number redial, *n = Autodial the number stored in location "n" (1-9).
Mode 4	Store and forward paging mode, enter the digits, then click the PTT switch to send out the DTMF.
Mode 5	Cellular type mode, enter the phone number to dial then press # (or selectable as *) to "send" (connect ANI then digits), press * (or selectable as #) to "end" (disconnect ANI).

Flow 1

DEALER PROGRAMMING FLOW CHART (Continued)



DEALER PROGRAMMING FLOW CHART (Continued)



PROGRAMMING EXAMPLES

CELLULAR STYLE EXAMPLE

Keys hit	Output	Notes
53#		Sets block values to emulate cellular phone.
1#	bip-bip	Program autodial location 1.
8206363#	chirp	Enters 820-6363 in autodial location 1.
2#	bip-bip	Program autodial location 2.
911#	chirp	Enters 911 as autodial number 2.
3#	bip-bip	Program autodial location 3.
5551212#	chirp	Enters 555-1212 as autodial number 3.
2#	bip-bip	Program autodial location 2.
#	chirp	Erase autodial location 2.
3#	bip-bip	Program autodial location 3.
*	chirp	Leave autodial as is, return to command.
21#	bip-bip	Program connect ANI.
PTT+*6792		Sets connect ANI as *6792 pause. This will
PTT+4 #	chirp	cause the transmitter to send the ANI, then pause 2 seconds before sending additional digits.
22#	bip-bip	Program disconnect ANI.
PTT+# #	chirp	Sets disconnect ANI as #.
29#	bip-bip	Program * and # key function.
1#	chirp	Sets * = send and # = disconnect.
0#	chirp	Exit programming, return to operational mode.

STAR STYLE DIALING EXAMPLE

Keys hit	Output	Notes
52#	bip-bip	Sets values to user friendly manual mode.
20#	bip-bip	Program operating mode.
3#	chirp	Select Star style dialing mode.
1#	bip-bip	Program autodial location 1.
5559035#	chirp	Enters 555-9035 in autodial location 1.
2#	bip-bip	Program autodial location 2.
8206363#	chirp	Enters 820-6363 in autodial location 2.
39#	warble	Invalid command.
3#	bip-bip	Program autodial location 3.
5559761#	chirp	Enters 555-9761 in autodial location 3.
21#	bip-bip	Program connect ANI.
*PTT+299#	chirp	Sets connect ANI to *A99.
22#	bip-bip	Program disconnect ANI.
PTT+#123#	chirp	Sets disconnect ANI to #123.
37#	bip-bip	Program hookswitch polarity.
1#	chirp	Inverts hookswitch polarity.
0#	bip-bip	Exit programming, return to operational mode.

QUICK REFERENCE PROGRAMMING COMMANDS

ITEM	RANGE	--PRESET CONFIGS--				FUNCTION
0	No Data					Exit programming mode
1	Digits					Autodial 1,
2	Digits					Autodial 2,
3	Digits					Autodial 3,
4	Digits					Autodial 4, can include
5	Digits					Autodial 5, ANI and
6	Digits					Autodial 6, "Special Functions"
7	Digits					Autodial 7,
8	Digits					Autodial 8,
9	Digits					Autodial 9,
20	0 - 5	0	0	1	5	Operating mode select Mode 0: No ANI or autodial, manual dial only Mode 1: *=Connect ANI, #=Disconnect ANI Mode 2: *=Con #=Dis 1-9=Autodial 0=Redial Manual dial w/PTT Mode 3: **=Con *#=Dis *0=Redial *n=Autodial location n (1-9) Mode 4: Store and Forward mode, enter digits PTT to send Mode 5: Cellular mode, enter digits then #(*)=send *(#)=disconnect
21	Digits	*	*	*	*	ANI connect code, up to 17 digits
22	Digits	#	#	#	#	ANI disconnect code, up to 17 digits
23	0 - 1	0	0	0	0	Auto connect ANI when lifting mic off hook (1=enabled)
24	0 - 1	0	0	1	1	Auto disconnect ANI when replacing mic on hook
25	0 - 1	0	0	0	0	Auto PTT pulse (300ms) when lifting mic off hook, trunked radio
26	0 - 1	0	0	0	0	1kHz courtesy beep when PTT released
27	0 - 1	0	0	1	1	DTMF duty cycle (0=50/50, 1=60/40)
28	0 - 2	0	0	1	2	Auto connect ANI sent in modes 4 and 5 0 = no ANI sent automatically (user must press "*") 1 = ANI sent before first dialed digits, once until disconnect 2 = send ANI ahead of all dialed digits
29	0 - 1	0	0	0	0	Mode 5 * and # key functions: 0 # = send, * = disconnect / clear 1 * = send, # = disconnect / clear

QUICK REFERENCE PROGRAMMING COMMANDS (Continued)

ITEM	RANGE	--PRESET CONFIGS--				FUNCTION
30	0 - 2	0	1	1	1	Keypad operation with PTT (0=none,1=normal,2=ABCD*#)
31	0 - 1	0	0	1	1	Keypad buffer (1=enabled)
33	0 - 6	0	0	0	0	Auto connect ANI via PTT, 1=release, 2=press, 3=both, 4&5=2&3w/bip
34	see text					Microphone audio output gain set, 3=more gain, 6=less gain
36	0 - 2	2	2	2	2	Keypad beeper volume, 0=off, 1=low, 2=high
37	0 - 1	0	0	0	0	Hookswitch output polarity, 0=normal, 1=inverted
38	0 - 1	0	0	0	0	Low current mode, 0=normal, 1=low current disable
40	0 - 250	50	0	50	50	Keyup delay (* 10ms), 50 = 0.50 seconds
41	0 - 250	100	100	100	100	Interdigit transmit hold time (*10ms) 100=1.00 sec
42	0 - 250	0	90	90	90	Timeout timer (* 2 sec, 0=no limit), 90 = 3 minutes
43	3 - 250	6	6	8	12	Min duration digits 0-9 (* 10ms), 8 = 0.08 seconds
44	0 - 250	12	0	0	0	Max duration digits 0-9 (* 10ms, 0=no limit)
45	3 - 250	6	6	50	100	Min duration digits *,# (* 10ms), 50 = 0.50 seconds
46	0 - 250	50	0	0	0	Max duration digits *,# (* 10ms, 0=no limit)
50	No data					Set values to Motorola mode, emulate "Palm Microphone"
51	No data					Set values to manual mode, emulate "dumb" keypad
52	No data					Set values to user friendly manual mode
53	No data					Set values to emulate cellular phone, store then send mode

PROGRAMMING CONFIGURATION LOG SHEET

Use this sheet to record the program settings installed in the microphone.

ITEM	RANGE	SETTINGS	FUNCTION
20	0 - 5		Operating mode select
		0 [ ]	Mode 0: No ANI or autodial, manual dial only
		1 [ ]	Mode 1: *=Connect ANI, #=Disconnect ANI
		2 [ ]	Mode 2: *=Con #=Dis 1-9=Autodial 0=Redial Manual dial w/PTT
		3 [ ]	Mode 3: **=Con *#=Dis *0=Redial *n=Autodial location n (1-9)
		4 [ ]	Mode 4: Store and forward mode, enter digits PTT to send
		5 [ ]	Mode 5: Cellular mode, enter digits then #(*)="send" *(#)="end"
21	Digits	_____	ANI connect code, up to 17 digits
22	Digits	_____	ANI disconnect code, up to 17 digits
23	0 - 1	0[ ] 1[ ] 2[ ]	Auto connect ANI when lifting mic off hook (1=enabled)
24	0 - 1	0[ ] 1[ ]	Auto disconnect ANI when replacing mic on hook
25	0 - 1	0[ ] 1[ ]	Auto PTT pulse (300ms) when lifting mic off hook, trunked radio
26	0 - 1	0[ ] 1[ ]	1kHz courtesy beep when PTT released
27	0 - 1	0[ ] 1[ ]	DTMF duty cycle (0=50/50, 1=60/40)
28	0 - 2	0[ ] 1[ ] 2[ ]	Auto connect ANI sent in modes 4 and 5 0 = no ANI sent automatically (user must press "*") 1 = ANI sent before first dialed digits, once until disconnect 2 = send ANI ahead of all dialed digits
29	0 - 1	0[ ] 1[ ]	Mode 5 * and # key functions: 0 # = send, * = disconnect / clear 1 * = send, # = disconnect / clear

PROGRAMMING CONFIGURATION LOG SHEET (Continued)

ITEM	RANGE	SETTINGS	FUNCTION
30	0 - 2	0[ ] 1[ ] 2[ ]	Keypad operation with PTT (0=none,1=normal,2=ABCD*#)
31	0 - 1	0[ ] 1[ ]	Keypad buffer (1=enabled)
33	0 - 6	_____	Auto connect ANI via PTT, 1=release 2=press 3=both 4&5=2&3 w/bip
36	0 - 2	0[ ] 1[ ] 2[ ]	Keypad beeper volume, 0=off, 1=low, 2=high
37	0 - 1	0[ ] 1[ ]	Hookswitch output polarity, 0=normal, 1=inverted
38	0 - 1	0[ ] 1[ ]	Low current mode, 0=normal, 1=low current disabled
40	0 - 250	_____	Keyup delay (* 10ms), 50 = 0.50 seconds
41	0 - 250	_____	Interdigit transmit hold time (*10ms) 100=1.00 sec
42	0 - 250	_____	Timeout timer (* 2 sec, 0=no limit), 90 = 3 minutes
43	3 - 250	_____	Min duration digits 0-9 (* 10ms), 8 = 0.08 seconds
44	0 - 250	_____	Max duration digits 0-9 (* 10ms, 0=no limit)
45	3 - 250	_____	Min duration digits *,# (* 10ms), 50 = 0.50 seconds
46	0 - 250	_____	Max duration digits *,# (* 10ms, 0=no limit)

6. USER QUICK REFERENCE CARDS (COPY FOR USER)

Cellular style

Cellular style on an LTR system

Dealer Mode 1

Dealer Mode 3

Dealer Mode 3 on an LTR system

ZMX MICROPHONE OPERATING INSTRUCTIONS (Cellular style)

To Place a Call:	Dial a phone number using the keypad. When ready to place the call, press *. To clear a mistake during dialing, press #.
Speed Dialing:	Enter a memory dial location (1-8), then press *. Example: 6 * will dial the number stored in location 6.
To Redial:	Press *
To Answer a Call:	Press 9 *
To Hang up:	Press #, or replace the microphone on hook.
To dial during a call:	Press and hold the PTT switch while dialing.

ZMX AUTODIAL INSTRUCTIONS

HOW TO STORE AUTODIALS

1. Press *,0,#, ALL AT THE SAME TIME (hear 5-beep chirp)
2. Enter the storage location 1-9, then press # (hear 2-beep chirp)
3. Enter telephone number, then press # (hear 5-beep chirp)
4. Repeat steps 2-4 to create more autodials
5. When done, press 0, then press # (hear 5-beep chirp)

WARBLE TONE: indicates an invalid entry and returns you to step 2.

TO CLEAR AN AUTODIAL: press # during step 3, without entering telephone number.

IF YOU MAKE AN ERROR: press * to return to step 2. Resume programming or perform step 5 to exit programming.

SPECIAL AUTODIAL FUNCTIONS

The following commands may be inserted into an autodial sequence to perform special functions. Each command takes up two digits worth of space in an autodial location with 17 digits maximum per autodial.

PTT+1 Keys transmitter and waits 2 seconds before transmitting next digit
PTT+4 Unkeys transmitter and waits 2 seconds before transmitting next digit
PTT+7 Unkeys transmitter and waits for any digit or momentary PTT from user before continuing with autodial sequence (2.5 seconds of PTT from user aborts sequence)
PTT+2 DTMF A digit
PTT+5 DTMF B digit
PTT+8 DTMF C digit
PTT+0 DTMF D digit
PTT+* DTMF * digit
PTT+# DTMF # digit
PTT+3 Slow down digit timing
PTT+6 Speeds up digit timing
PTT+9 send connect ANI

EXAMPLE: A stored autodial of PTT+9, and 8206363 will cause the microphone to key the transmitter, send the connect ANI then dial the telephone number 820-6363.

AUTODIAL REFERENCE

Autodial 1:_____
Autodial 2:_____
Autodial 3:_____
Autodial 4:_____
Autodial 5:_____
Autodial 6:_____
Autodial 7:_____
Autodial 8:_____
Autodial 9:_____

ZMX MICROPHONE OPERATING INSTRUCTIONS (Cellular style on an LTR system)

To Place a Call:	Key in the phone number to be called using the keypad. Press PTT to acquire dial tone, then press *. Note: To clear a mistake during dialing, press #.
Speed Dialing:	Press PTT to acquire dial tone. Enter a memory dial location (1-9), then press *. Example: **6 *** will dial the number stored in location 6.
To Redial:	Press PTT to acquire dial tone then press *.
To Hang up:	Press #, or replace the microphone on hook.
To dial during a call:	Press and hold the PTT switch while dialing.

ZMX AUTODIAL INSTRUCTIONS

HOW TO STORE AUTODIALS

1. Press *,0,#, ALL AT THE SAME TIME (hear 5-beep chirp)
2. Enter the storage location 1-9, then press # (hear 2-beep chirp)
3. Enter telephone number, then press # (hear 5-beep chirp)
4. Repeat steps 2-4 to create more autodials
5. When done, press 0, then press # (hear 5-beep chirp)

WARBLE TONE: indicates an invalid entry and returns you to step 2.

TO CLEAR AN AUTODIAL: press # during step 3, without entering telephone number.

IF YOU MAKE AN ERROR: press * to return to step 2. Resume programming or perform step 5 to exit programming.

SPECIAL AUTODIAL FUNCTIONS

The following commands may be inserted into an autodial sequence to perform special functions. Each command takes up two digits worth of space in an autodial location with 17 digits maximum per autodial.

PTT+1 Keys transmitter and waits 2 seconds before transmitting next digit

PTT+4 Unkeys transmitter and waits 2 seconds before transmitting next digit

PTT+7 Unkeys transmitter and waits for any digit or momentary PTT from user before continuing with autodial sequence (2.5 seconds of PTT from user aborts sequence)

PTT+2 DTMF A digit

PTT+5 DTMF B digit

PTT+8 DTMF C digit

PTT+0 DTMF D digit

PTT+* DTMF * digit

PTT+# DTMF # digit

PTT+3 Slow down digit timing

PTT+6 Speeds up digit timing

PTT+9 send connect ANI

EXAMPLE: A stored autodial of PTT+9, and 8206363 will cause the microphone to key the transmitter, send the connect ANI then dial the telephone number 820-6363.

AUTODIAL REFERENCE

Autodial 1:_____

Autodial 2:_____

Autodial 3:_____

Autodial 4:_____

Autodial 5:_____

Autodial 6:_____

Autodial 7:_____

Autodial 8:_____

Autodial 9:_____

ZMX MICROPHONE OPERATING INSTRUCTIONS (Dealer Mode 1)

To Place a Call:	Press * wait for dial tone, then dial a phone number.
To Answer a Call:	Press *
To Hang up:	Press #, or replace the microphone on hook.

ZMX AUTODIAL INSTRUCTIONS

HOW TO STORE AUTODIALS

1. Press *,0,#, ALL AT THE SAME TIME (hear 5-beep chirp)
2. Enter the storage location 1-9, then press # (hear 2-beep chirp)
3. Enter telephone number, then press # (hear 5-beep chirp)
4. Repeat steps 2-4 to create more autodials
5. When done, press 0, then press # (hear 5-beep chirp)

WARBLE TONE: indicates an invalid entry and returns you to step 2.

TO CLEAR AN AUTODIAL: press # during step 3, without entering telephone number.

IF YOU MAKE AN ERROR: press * to return to step 2. Resume programming or perform step 5 to exit programming.

SPECIAL AUTODIAL FUNCTIONS

The following commands may be inserted into an autodial sequence to perform special functions. Each command takes up two digits worth of space in an autodial location with 17 digits maximum per autodial.

PTT+1 Keys transmitter and waits 2 seconds before transmitting next digit
PTT+4 Unkeys transmitter and waits 2 seconds before transmitting next digit
PTT+7 Unkeys transmitter and waits for any digit or momentary PTT from user before continuing with autodial sequence (2.5 seconds of PTT from user aborts sequence)
PTT+2 DTMF A digit
PTT+5 DTMF B digit
PTT+8 DTMF C digit
PTT+0 DTMF D digit
PTT+* DTMF * digit
PTT+# DTMF # digit
PTT+3 Slow down digit timing
PTT+6 Speeds up digit timing
PTT+9 send connect ANI

EXAMPLE: A stored autodial of PTT+9, and 8206363 will cause the microphone to key the transmitter, send the connect ANI then dial the telephone number 820-6363.

AUTODIAL REFERENCE

Autodial 1:_____
Autodial 2:_____
Autodial 3:_____
Autodial 4:_____
Autodial 5:_____
Autodial 6:_____
Autodial 7:_____
Autodial 8:_____
Autodial 9:_____

ZMX MICROPHONE OPERATING INSTRUCTIONS (Dealer Mode 3)

To Place a Call:	Press * * wait for dial tone, then dial a phone number.
Speed Dialing:	Press * then the memory dial location (1-9). Example:* 6 will dial the number stored in location 6.
To Redial:	Press * 0. Note: During re-dial, the microphone simulates user keying in the digits. The mic will replay the digits at the same rate at which they were first dialed.
To Answer a Call:	Press * *
To Hang up:	Press * #, or replace the microphone on hook.

ZMX AUTODIAL INSTRUCTIONS

HOW TO STORE AUTODIALS

1. Press *,0,#, ALL AT THE SAME TIME (hear 5-beep chirp)

2. Enter the storage location 1-9, then press # (hear 2-beep chirp)

3. Enter telephone number, then press # (hear 5-beep chirp)

4. Repeat steps 2-4 to create more autodials

5. When done, press 0, then press # (hear 5-beep chirp)

WARBLE TONE: indicates an invalid entry and returns you to step 2.

TO CLEAR AN AUTODIAL: press # during step 3, without entering telephone number.

IF YOU MAKE AN ERROR: press * to return to step 2. Resume programming or perform step 5 to exit programming.

SPECIAL AUTODIAL FUNCTIONS

The following commands may be inserted into an autodial sequence to perform special functions. Each command takes up two digits worth of space in an autodial location with 17 digits maximum per autodial.

PTT+1 Keys transmitter and waits 2 seconds before transmitting next digit

PTT+4 Unkeys transmitter and waits 2 seconds before transmitting next digit

PTT+7 Unkeys transmitter and waits for any digit or momentary PTT from user before continuing with autodial sequence (2.5 seconds of PTT from user aborts sequence)

PTT+2 DTMF A digit

PTT+5 DTMF B digit

PTT+8 DTMF C digit

PTT+0 DTMF D digit

PTT+* DTMF * digit

PTT+# DTMF # digit

PTT+3 Slow down digit timing

PTT+6 Speeds up digit timing

PTT+9 send connect ANI

EXAMPLE: A stored autodial of PTT+9, and 8206363 will cause the microphone to key the transmitter, send the connect ANI then dial the telephone number 820-6363.

AUTODIAL REFERENCE

Autodial 1:_____

Autodial 2:_____

Autodial 3:_____

Autodial 4:_____

Autodial 5:_____

Autodial 6:_____

Autodial 7:_____

Autodial 8:_____

Autodial 9:_____

ZMX MICROPHONE OPERATING INSTRUCTIONS (Dealer Mode 3 on an LTR system)

To Place a Call:	Press PTT to acquire dial tone. Dial the phone number using the keypad.
Speed Dialing:	Press PTT to acquire dial tone. Press * then the memory dial location (1-9). Example: * 6 will dial the number stored in location 6.
To Redial:	Press PTT to acquire dial tone. Press * 0. Note: During re-dial, the microphone simulates a user keying in the digits. The mic will replay the digits at the same rate at which they were first dialed.
To Hang up:	Press #, or replace the mic on hook.

ZMX AUTODIAL INSTRUCTIONS

HOW TO STORE AUTODIALS

1. Press *,0,#, ALL AT THE SAME TIME (hear 5-beep chirp)
2. Enter the storage location 1-9, then press # (hear 2-beep chirp)
3. Enter telephone number, then press # (hear 5-beep chirp)
4. Repeat steps 2-4 to create more autodials
5. When done, press 0, then press # (hear 5-beep chirp)

WARBLE TONE: indicates an invalid entry and returns you to step 2.

TO CLEAR AN AUTODIAL: press # during step 3, without entering telephone number.

IF YOU MAKE AN ERROR: press * to return to step 2. Resume programming or perform step 5 to exit programming.

SPECIAL AUTODIAL FUNCTIONS

The following commands may be inserted into an autodial sequence to perform special functions. Each command takes up two digits worth of space in an autodial location with 17 digits maximum per autodial.

PTT+1 Keys transmitter and waits 2 seconds before transmitting next digit
PTT+4 Unkeys transmitter and waits 2 seconds before transmitting next digit
PTT+7 Unkeys transmitter and waits for any digit or momentary PTT from user before continuing with autodial sequence (2.5 seconds of PTT from user aborts sequence)
PTT+2 DTMF A digit
PTT+5 DTMF B digit
PTT+8 DTMF C digit
PTT+0 DTMF D digit
PTT+* DTMF * digit
PTT+# DTMF # digit
PTT+3 Slow down digit timing
PTT+6 Speeds up digit timing
PTT+9 send connect ANI

EXAMPLE: A stored autodial of PTT+9, and 8206363 will cause the microphone to key the transmitter, send the connect ANI then dial the telephone number 820-6363.

AUTODIAL REFERENCE

Autodial 1:_____

Autodial 2:_____

Autodial 3:_____

Autodial 4:_____

Autodial 5:_____

Autodial 6:_____

Autodial 7:_____

Autodial 8:_____

Autodial 9:_____

CHANGE INFORMATION

At Zetron, we continually strive to improve our products by updating hardware components and software as soon as they are developed and tested.

Due to printing and shipping requirements, this manual may include information about the latest changes on the following pages.