

Z E T R O N

**Model 7502 Mobile Dispatch Unit
Instruction Manual**

#025-9249A

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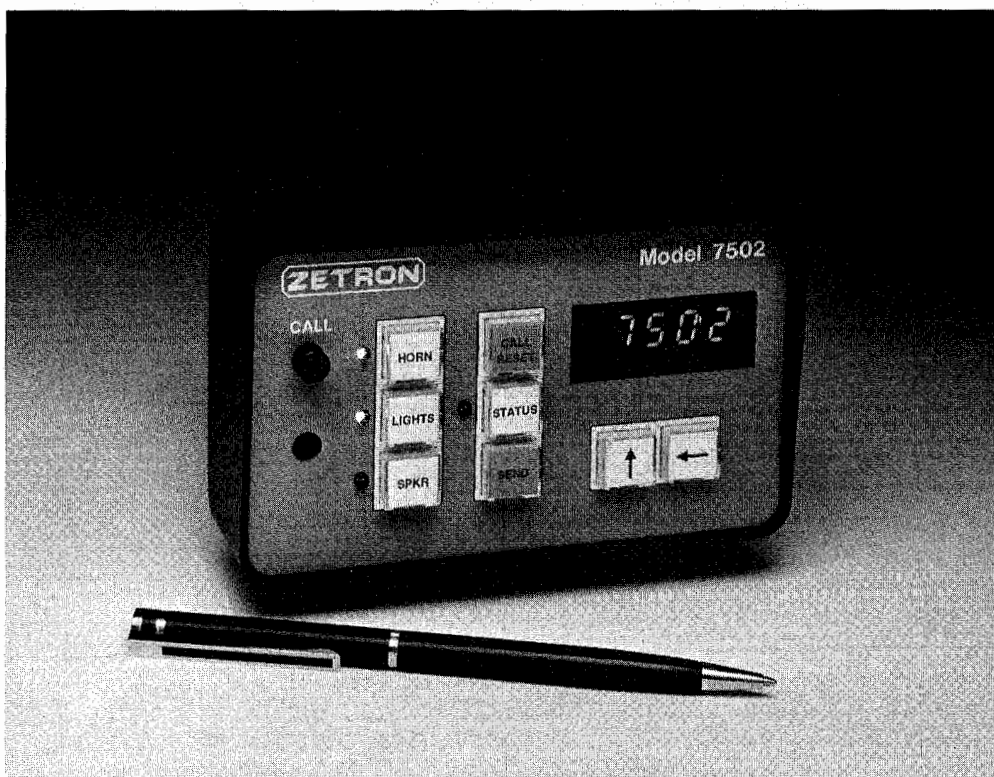
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1. INTRODUCTION



GENERAL

The Zetron Model 7502 Mobile Dispatch Unit is a DTMF encoder, decoder, and status transponder for mobile applications. The rugged and compact Model 7502 is an ideal solution for low-cost, versatile fleet management.

FEATURES

General

- Rugged metal case.
- Compact size (5"w x 3"h x 1.75"d) for easy installation.
- Interfaces easily to popular mobile radios.
- 8.5 to 16 VDC negative-ground power.
- 4-wire transformer-coupled balanced audio interfaces.
- Nonvolatile memory.
- Big, easily seen keys with LED status indicators.
- Four-digit LED display.
- Automatic adjustment of display and indicator brightness.
- Wide temperature range: -30 to +70 degrees Celsius.

SECTION 1 - INTRODUCTION

Encoder

- 0-10 digit ANI: Program unit ANI from 0 to 10 digits.
- 0-10 digit destination address keyed into front panel display.
- Encode modes (status digit is optional in all modes):
 - ANI/Status
 - Address/ANI/Status
 - Steer/ANI/Address/Status
 - ANI/Steer/Address/Status
- Optional status digit indicates one of two states set by the "STATUS" key (idle vs. busy, in-vehicle vs. away, etc.)
- "STATUS" key can be programmed to automatically encode an alert call after a timer expires (deadman timer).
- Alert timer can be set for 10 minutes to 4 hours.
- Digit timing: Program digit length and gap for 5 to 25 digits per second.
- Long first digit: Duration of first digit can be extended up to 500 milliseconds.
- Tx hold time: Programmable up to 2 seconds.
- Key-up delay: Programmable up to 2 seconds.

Decoder

- Individual, group, or all-call decode.
- 2-10 digit individual unit address.
- Wrong-digit reset or wrong-digit timed lockout.
- Bright call indicator lights upon decode.
- Transponds with tone or ANI upon individual address decode.
- Caller ANI is displayed on LED display.
- Timed audio call-alert beeper.
- Remote command reset.
- Remote unit disable.
- Remote status silent transpond.
- Timed horn relay with programmable duration, enable switch, and indicator.
- Vehicle lights control output with enable switch and indicator.
- Radio speaker mute relay with front panel unmute switch and indicator.
- Call reset switch.

Programming

- Front panel key access to programming mode.
- Programmed from front panel keys or over-the-air with hand-held radio and DTMF pad or service monitor.
- Programming does not require removal from the vehicle.

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2. SPECIFICATIONS

PHYSICAL

Power	8.5 to 16 VDC
Current	500 mA maximum
Temperature	-30 to +70 degrees Celsius
Humidity	5% to 90%, noncondensing
Size	5"w x 3"h x 1.75"d
Weight	12.5 oz

RADIO INTERFACE

Transmit Audio	Transformer isolated and DC voltage blocked 0 to 3 V p-p into 10 k Ω load (mic level audio) 0 to 1.4 V p-p into 600 Ω load
Receive Audio	Transformer isolated and DC voltage blocked 100 mV to 10V p-p, 50 k Ω minimum
All Inputs: COR, Aux, and Hookswitch	Active-low, contact closure to ground Input voltage range ± 50 V Input-high voltage +3.7 V minimum Input-high current (none, has pull-up to +12 V) Input-low voltage +1.2 V maximum Input-low current 250 μ A
Aux Output	Active-low, open-collector transistor Output-high current (none) Output-high voltage +25 V maximum Output-low current 500 mA maximum Output-low voltage +2.0 V maximum ($I_{ol} = 500$ mA)
PTT Output	Active-low, open-drain field-effect transistor Output-high current (none) Output-high voltage +50 V maximum Output-low current 75 mA maximum Output-low voltage +1.25 V maximum ($I_{ol} = 75$ mA)
Speaker Mute	Dry-contact relay, normally open, 1 A maximum

SECTION 2 - SPECIFICATIONS

VEHICLE INTERFACE

Lights Output	Active-low, open-collector transistor	
	Output-high current	(none)
	Output-high voltage	+25 V maximum
	Output-low current	500 mA maximum
	Output-low voltage	+2.0 V maximum ($I_{ol} = 500 \text{ mA}$)
Horn Output with Resistive or Clamped Inductive Load	Relay closure to ground	
	Output-high current	(none)
	Output-high voltage	+28 V maximum
	Output-low current	1 A maximum
	Output-low voltage	<1 V ($I_{ol} = 1 \text{ A}$)
Horn Output with Unclamped Inductive Load	Output-high current	(none)
	Output-high voltage	+120 V maximum
	Output-low current	500 mA maximum
	Output-low voltage	<0.5 V ($I_{ol} = 500 \text{ mA}$)

FRONT PANEL CONTROLS

"HORN" key and indicator	push on/push off
"LIGHTS" key and indicator	push on/push off
"SPKR" key and indicator	push on/push off
"STATUS" key and indicator	push on/push off
"CALL RESET" key	momentary
"SEND" key	momentary
Display and editing keys	Four-digit, 0.3-inch, seven-segment numeric LED display with two momentary contact display editing keys

DECODER FORMAT

The Model 7502 has only one basic decoding format: its individual address or remote-disable address followed by additional digits which define the call type.

<Individual address> <Call-Back address>
<Individual address> <Call-Reset digit>
<Individual address> <Silent-Transpond digit>
<Remote Disable address>

Any additional digits are ignored; however, the Model 7502 will not respond to the call until digits stop coming in for at least the programmed quiet time (programming item 8). This is to prevent the unit from transponding while the radio channel is busy.

The individual address is defined by programming item 1; individual digits of the individual address may be replaced by wild-card digits (programming item 4).

The maximum length of the call-back address is defined by programming item 24. The Model 7502 will ignore any digits past this limit.

The call-reset and silent-transpond digits are single digits defined by programming items 5 and 6.

The remote disable address is a second individual address defined by programming item 2. A Model 7502 will not decode a remote disable address containing wild-card digits.

ENCODER FORMATS

The Model 7502 has four basic encoding formats:

ANI/Status	}	
Address/ANI/Status	}	Status digit
Steer/ANI/Address/Status	}	is optional.
ANI/Steer/Address/Status	}	

ANI/Status sends the unit's ANI optionally followed by a status digit indicating the state of the front panel "STATUS" key or the state of the "deadman" timer.

Address/ANI/Status sends the destination address (either the encoder destination address or the call-back address if returning a call), followed by the Model 7502's ANI and optional status digit.

The last two formats are designed to work with the Zetron Model 7032 Radio Dispatch Switch. Steer is the Model 7032 steering digit as defined by programming item 7. If the steering digit is programmed to be blank, these two formats are the same.

In any of the call formats, the presence and definition of the status digit is programmable. Programming item 19 defines whether or not the status digit is appended. Programming item 20 defines how the "STATUS" key works and which status digit is sent.

3. OPERATION

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3. OPERATION

POWER-ON

Following installation by qualified radio service personnel, turn on power to the Model 7502. The display will show the software revision number for 1 second, then will display either the encoder destination address or decoder call-back address. The Model 7502 stores the destination address, call-back address, and front panel indicator states in nonvolatile memory and will display them upon power-up.

If the display shows "7502" with all indicators off after the display of the software revision, either the operating parameters stored in nonvolatile memory have been changed using the Programming mode or the nonvolatile memory has been corrupted and the Model 7502 has reset the operating parameters to the defaults.

HORN KEY

Pressing the "HORN" key turns the "HORN" indicator on and off. When the indicator is on, the vehicle horn will honk if a call is received. The duration of the honk is defined by programming item 9.

***** C A U T I O N *****

The "HORN" indicator should be turned off while driving so the horn will not sound if a call is received while en route.

LIGHTS KEY

Pressing the "LIGHTS" key turns the "LIGHTS" indicator on and off. When the indicator is on, the vehicle lights will light if a call is received.

***** N O T E *****

The "LIGHTS" indicator should be turned off while driving so the lights will not turn on if a call is received while en route.

SECTION 3 - OPERATION

SPEAKER KEY

Pressing the "SPKR" key turns the "SPKR" indicator on and off. When the indicator is off, speaker muting operates normally. The speaker is unmuted when a call is received or the microphone is taken offhook, and it is muted again when the call is reset or the microphone is onhook. When the "SPKR" indicator is on, the speaker is always unmuted. This can be used to monitor the radio channel or to unmute the speaker during an outgoing call if the microphone hookswitch is not used. Decoder operation is not affected by this key. The Model 7502 will still decode a call if the indicator is on.

STATUS KEY

The operation of the "STATUS" key and definition of the status digits depends on whether programming item 20 is set to key or deadman status.

In Key Status mode, the front panel "STATUS" key simply turns the "STATUS" indicator on and off. If the indicator is off, the status digit is DTMF 0. If the light is on, the status digit is DTMF 1. This can be used by the Model 7502 operator to indicate idle versus busy or any other two-state status.

In the Deadman mode, the front panel "STATUS" key operates a timer which must be periodically reset to show operator activity. If the "STATUS" indicator is off, pressing the "STATUS" key will turn it on and start the timer. Any keyboard activity while the timer is running indicates that the operator is active and all right, and it resets the timer. Five minutes before the timer expires, the Model 7502 begins to warn the operator to reset the timer. The warnings consist of three beeps on the Audio Alert and three honks of the vehicle's horn if the "HORN" indicator is lit. The Model 7502 sounds three of these warnings during the last 5 minutes of the timer's period. If the operator does not show any activity by pressing the "STATUS" key before the timer expires, the Model 7502 will send a call to the destination address with the status digit indicating the activity timer has expired.

The status digits in Deadman mode are:

- DTMF 0 - idle, timer not running
- DTMF 1 - timer is running but not expired
- DTMF 2 - timer has expired

The operator can turn the timer and "STATUS" indicator off by pressing the "STATUS" key twice in 2 seconds.

SENDING A CALL

To send a call, edit the destination address shown on the display using the Up-Arrow and Left-Arrow keys. Press either of these keys to place a cursor on the right-most digit. The cursor is indicated by a blinking digit. When the cursor is on a digit, that digit can be changed by the operator by pressing the Up-Arrow key. The digit increments in the following order: 1 2 3 4 5 6 7 8 9 0 * # <blank>. It may or may not be possible to set a digit

to blank depending upon how the Model 7502 is programmed. Once the digit has been set, other digits can be set by pressing the Left-Arrow key. Pressing the Left-Arrow key moves the cursor one digit to the left. If there are more than four digits to be edited, the digits will scroll to the right. Depending upon how it is programmed, the Model 7502 can handle up to ten destination address digits.

Any nonblank digits to the left of a blank digit are ignored. The cursor will time-out after 10 seconds and stop blinking. It is not necessary to wait for this to happen before pressing the "SEND" key.

Once the destination address is set, the "SEND" key is pressed to key-up the radio and make the call. When originating a call, the operator should press the "SPKR" key to illuminate the "SPKR" light and unmute the radio. If the Model 7502 is wired to the microphone hookswitch and programmed to use the hookswitch input, the speaker will automatically be unmuted if the microphone is taken offhook.

RECEIVING A CALL

Individual and Group Calls

When the Model 7502 receives an individual call, it blinks the "CALL" indicator, sounds the Audio Alert (if programmed), sounds the vehicle's horn (if the "HORN" indicator is on), turns on the vehicle's lights (if the "LIGHTS" indicator is on), unmutes the radio's speaker, and displays the call-back address. If programmed to do so, it will also key up the transmitter and transpond to acknowledge receipt of the call. The transpond can either be a single tone or can be the Model 7502's ANI plus an optional status digit.

Group calls are individual calls in which one or more of the individual address digits have been replaced with the wild-card digit (see programming item 4). Operation is the same as for an individual call except that the Model 7502 will not transpond.

After the conversation is over, the call can be cleared by pressing the "CALL RESET" key. If the operator is not in the vehicle when the call is received, the Model 7502 will continue to display the Call-Back address and blink the "CALL" indicator indefinitely. When the operator returns to the vehicle, the call can be returned by pressing the "SEND" key. This sends a call to the displayed call-back address. If the operator does not wish to return the call, it can be cleared by pressing the "CALL RESET" key.

The operator may also place a call to another destination address (see the preceding subsection, Sending a Call) before returning the call by pressing the Up-Arrow or Left-Arrow key. Doing so displays the destination address with a cursor on the right-most digit. If the "SEND" key is pressed while the destination address is displayed, a call will be placed to that destination address. The display will revert to the call-back address when the "SEND" key is pressed or when the cursor times out in 10 seconds.

SECTION 3 - OPERATION

Remote Call-Reset

A call can be cleared remotely by sending to the Model 7502 its individual address followed by the call-reset digit as defined by programming item 5. The "CALL" indicator, Audio Alert, and vehicle lights and horn will be turned off. The radio's speaker will be muted. The Model 7502 will transpond an individual remote call-reset, but it will not transpond a group remote call-reset.

Silent Transpond

A dispatcher can ask the Model 7502 what its status is by sending the individual address followed by the silent-transpond digit (programming item 6). The Model 7502 will transpond as programmed without registering a received call. This is probably most useful if the Model 7502 is programmed to transpond with ANI and status, though a tone transpond could be useful to determine if the Model 7502 is receiving calls.

Remote Disable

A Model 7502 in the field can be remotely set to a nonfunctional state by sending the Model 7502 its remote disable address. The remote disable address is a separate individual address set by programming item 2. A Model 7502 will not decode its remote disable address if it contains wild-card digits. Upon decoding the remote disable address, a Model 7502 will transpond as programmed, turn off all the front panel indicators, turn off the vehicle horn and lights, mute the radio's speaker, and display "dEAd" on its display. A disabled Model 7502 will not decode any further calls or respond to the keyboard.

A disabled Model 7502 can be returned to normal operation by going through the programming operation.

MODEL 7032-COMPATIBLE OPERATION

A Model 7502 can operate with a Zetron Model 7032 Radio Dispatch Switch if either the Steer/ANI or ANI/Steer encoding format is selected with programming item 25. There are a few operational differences when using these formats. The lengths of the call-back and encoder destination addresses are variable. When editing the destination address, it is possible to set a digit to blank to shorten the destination address or to set a blank digit to nonblank to lengthen the destination address. Programming item 24 is not used: the Model 7502 will store and display up to ten digits following its individual address to be used as the call-back address.

In the Model 7032 formats, pressing the "CALL RESET" key will send the Model 7502's ANI. The Model 7032 uses this to end the call.

At present, the Model 7032 has no mechanism for handling status digits, so the status digit should be disabled when using a Model 7502 with a Model 7032.

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4. INSTALLATION

CONNECTIONS TO RADIO AND VEHICLE

All connections to a Model 7502 are through a 15-pin connector on the back of the case. The connector is a common type employing 0.045-inch square pins on 0.156-inch centers. Many connector manufacturers make mating connectors. Two examples are Molex 09-50-3151 housing with 08-50-0106 or 08-50-0108 terminals, and AMP 1-640250-5 with 640707-1 contacts. Be sure to use the type of connector which has a locking ramp to help prevent the connector from vibrating loose.

It is best to use a shielded cable between the Model 7502 and the radio or control-head to minimize interference between the vehicle's electrical system and the audio signals in the cable. The transmit and receive audio signals are balanced pairs, and twisted-pair cabling can be used to further reduce interference.

Connector Pinout

<u>Pin</u>	<u>Function</u>
1	Receive +
2	Receive -
3	Transmit +
4	Transmit -
5	Mic Input
6	Push-To-Talk (PTT)
7	Lights
8	Aux Input/Output
9	Hookswitch
10	Horn
11	Speaker 1
12	Speaker 2
13	Carrier-Operated Relay (COR)
14	Ground
15	+12 VDC power

Pin 1 of the connector is the pin nearest the receive-level test point.

Signal Function

Ground: Ground is the ground return reference for all but the audio signals (Receive +/-, Transmit +/-, and Mic Input) that have their own grounds. Ground should be connected to the same ground the radio uses to minimize ground reference noise on the logic signals between the Model 7502 and the radio. If the audio grounds are tied to ground at the Model 7502 and share the ground connection to the radio, proper grounding is critical to minimize noise on the audio signals.

+12 VDC Power: +12 VDC power provides power to the Model 7502. It is simplest to connect it to a switched source of +12 volts within the radio so that the Model 7502 turns on and off with the radio.

SECTION 4 - INSTALLATION

It can also be connected to "accessory" or "ignition" sources of power from the vehicle. If the Model 7502 is connected to a power source other than the radio (so that the unit can be powered when the radio isn't), one thing to be aware of is that the pull-up resistors on the COR and hookswitch inputs to the Model 7502 can source as much as 250 μ A of current into the radio circuits to which they are connected. The potential problem is not damage to the radio, but the fact that current going into high-impedance logic circuits within the radio could produce enough voltage to prevent the radio from resetting properly when it is turned off.

+12 VDC power should NOT be connected to an unswitched "battery" power source since the Model 7502 display draws a significant amount of current and will discharge the vehicle's battery if the vehicle isn't used for an extended period of time.

Receive + and Receive -: Receive + and Receive - are a transformer-isolated, balanced-pair audio input, which connects to the radio discriminator or other source of un-de-emphasized receive audio. Flat, de-emphasized audio may also be used with some loss of sensitivity in marginal signal conditions. For the best immunity to vehicle electrical system noise, a twisted pair of wires can be used to connect these inputs to the radio. If a balanced input isn't needed, connect Receive - to ground (pin 14) and use Receive + as the unbalanced input.

Transmit + and Transmit -: Transmit + and Transmit - are a transformer-isolated, balanced-pair audio output, which connects to the radio's microphone input. In most cases, these signals can simply connect in parallel with the microphone; the Model 7502 has a low output impedance (≈ 600 ohm) while encoding and can generally overdrive a reasonably high-impedance microphone. In cases where this isn't true, the microphone can be connected to the Mic Input (pin 5). By means of a relay, the Model 7502 can disconnect the microphone when encoding. As is the case with the Receive inputs, the Transmit outputs should use a twisted pair for connection to the radio. If a balanced output isn't needed, connect Transmit - to ground and use Transmit + as the unbalanced output.

PTT: PTT (Push-To-Talk) is an open-drain field-effect transistor, active low output. It connects to the radio's microphone PTT circuit and will key the transmitter by pulling to Ground.

COR: COR (Carrier-Operated Relay) is an active-low input which can be connected to the radio's COR or Receiver Unsquelled signal to inform the Model 7502 when the radio is receiving. COR has an internal pull-up to +12 V and can be connected to circuits which provide open-collector or relay contact closure to ground. The Model 7502 can use COR for different purposes or may not need it at all. Refer to the following programming subsection.

Hookswitch: Hookswitch is an active-low input which can be connected to the radio's microphone hookswitch so the Model 7502 can see when the mic is offhook. It has an internal pull-up similar to COR and is designed to be pulled to ground when the microphone is onhook. The Model 7502 does not require this connection, but it adds some ease of use, especially when the Model 7502 is providing speaker muting.

Speaker 1 and Speaker 2: Speaker 1 and Speaker 2 provide a normally open, dry-contact relay which can be used to mute the radio's speaker between calls. The relay closes to unmute the speaker when a call is received, when the front panel "SPKR" indicator is lit, or when the microphone is offhook (if the Model 7502 is programmed to use the hookswitch input).

Aux Input/Output: Aux Input/Output is an extra pin which could be used as an input or output; it currently has no function.

Lights: Lights is an open-collector transistor, active-low output which can be used to activate the vehicle's lights relay to turn on the vehicle's lights when a call is received. The Lights output can sink up to 500 mA of current and has a built-in clamping circuit to protect the output transistor from voltage spikes generated by the relay coil. It is best to use a clamping diode located at the relay to reduce electrical noise generated by the relay coil and radiated by the wiring between the relay and the Model 7502.

Horn: Horn is a normally open, relay contact to ground which can be used to activate the vehicle's horn when a call is received. The relay can handle up to 1 ampere of current at up to 28 volts. If the horn requires less than 1 ampere, it can be switched directly; if the horn draws more than 1 ampere, an external horn relay should be used. If an external relay is used, it should have a clamping diode across the coil to reduce electrical noise and to prevent damage to the Model 7502's internal relay contacts. If an external clamp is not provided, the horn output can only handle 500 mA.

MOUNTING

Select a location near the driver or operator where it is convenient to place the Model 7502. If possible, mount the Model 7502 where sunlight will not shine directly on the front panel. An ambient light detector circuit will automatically brighten the display when needed, but the display will still wash out in direct sunlight.

***** C A U T I O N *****

To avoid obstructing the driver's view of the road, the Model 7502 should not be mounted on top of the dashboard!

It is easy to slide the Model 7502 into and out of its mounting bracket by loosening the two screws which attach the bracket to the Model 7502 case. It is not necessary to completely remove the screws. Attach the mounting bracket securely to the vehicle with appropriate hardware. Connect the cable to the 15-pin connector on the back of the Model 7502. Loosen the cable strain-relief on the back of the Model 7502 with a #1 Phillips screwdriver, slide the cable under the strain-relief, and tighten the strain-relief over the cable.

SECTION 4 - INSTALLATION

* * * * * N O T E * * * * *

Be sure to tighten the strain-relief even if it is not used. This ensures good thermal contact between the case and the internal voltage regulator.

* * * * *

Slide the Model 7502 into the slots in the mounting bracket. Note that the large washers must go between the mounting bracket and the Model 7502 case to help prevent damage to the Model 7502 case. Orient the Model 7502 in the bracket for the best viewing angle and tighten the two screws.

* * * * * C A U T I O N * * * * *

1. Tighten the screws only enough to keep the Model 7502 from moving; excessive torque will distort or damage the case!
2. If the original bracket mounting screws provided with the Model 7502 are replaced, make sure the new screws do not go more than 3/8-inch into the Model 7502 case, otherwise internal components could be damaged!

* * * * *

PROGRAMMING

The Model 7502 must be placed into programming mode using the front panel keys so the technician doing the programming must be with the unit. The Model 7502 can be programmed either from its front panel or over-the-air using DTMF. Over-the-air DTMF programming is provided as an alternative to entering a large amount of programming information using the Model 7502's limited front panel keys.

To place the Model 7502 into programming mode, press the "HORN", "SPKR", "STATUS", and Up-Arrow keys simultaneously. The Model 7502 will respond by displaying "Prog" and beeping the Audio Alert.

Programming is accomplished by selecting programming items from Table 4-1 and changing the digits or values associated with those items. This process is repeated till all items are set as desired, then programming item 0 is selected to write the new programming information into nonvolatile memory, and return the Model 7502 to normal operation.

The Model 7502 prompts for a programming item number by displaying "Prog" and doing five rapid beeps on the Audio Alert. At this point, the Model 7502 will accept input from either the front panel keys or over-the-air DTMF. If either the Up-Arrow or Left-Arrow key is pressed, the Model 7502 will illuminate the "HORN" indicator and display the current programming item number with a flashing cursor on the right digit.

SECTION 4 - INSTALLATION

The displayed programming item number can be changed from the front panel in the same way as the encode address is edited (refer to the Section 3 subsection, Sending a Call). When the display shows the desired programming item number, press the "SEND" key to accept it. The "CALL RESET" key can be used to abort editing the programming item number and go back to the "Prog" prompt.

The displayed programming item number may also be supplied via DTMF. In this case, the "HORN" indicator lights as above. The digits are displayed as they come in. DTMF # instructs the Model 7502 to accept the programming item number, and DTMF * can be used to abort editing the programming item number and go back to the "Prog" prompt.

Once the programming item number is entered, the Model 7502 prompts for a new value or digits for the programming item by displaying the current value, lighting the "LIGHTS" indicator, and doing two rapid beeps on the Audio Alert. The displayed current value can be edited using the Up-Arrow and Left-Arrow keys, or a new value can be supplied via DTMF.

If an error is made in entering a program item number, the Model 7502 flashes "Err" and prompts for a new program item number. If an error is made in entering a value, the Model 7502 flashes "Err" and prompts for a new value. If the Model 7502 accepts the value for the programming item, it flashes "YES" and prompts for a new item.

SECTION 4 - INSTALLATION

Table 4-1. Programming Item Chart

Item No.	Function Name	Description	Range	Units	Default
0	Exit Programming Mode	This command causes the Model 7502 to exit from Programming mode.			
1	Decoder Individual Address	This function sets the DTMF digit string that the Model 7502 recognizes. It can be up to ten digits.	String	0-9 * # A-D	1590
2	Decoder Remote-Disable Address	This function sets a second individual address, which causes the Model 7502 to disable itself when received. If not used, set to all blanks.	String	0-9 * # A-D	None
3	Encoder ANI	This function sets the DTMF digit string used by the Model 7502 to identify itself. In many systems, it is the same as the decoder individual address.	String	0-9 * # A-D	1590
4	Decoder Wild-Card Digit	This digit can be substituted for any decoder individual address digit and is accepted by the Model 7502 as a valid digit. If not used, set to blank.	Digit	0-9 * # A-D	None
5	Decoder Call-Reset Digit	This digit following the individual address performs a remote call-reset. If not used, set to blank. See Section 3, Remote Call-Reset.	Digit	0-9 * # A-D	None
6	Silent Transpond Digit	This digit follows the individual address to enable a dispatcher to ask a Model 7502 what its status is. If not used, set to blank. See Section 3, Silent Transpond.	Digit	0-9 * # A-D	None
7	Model 7032 Steering Digit	This digit is set to match the Model 7032 steering digit that selects manual dialing. If not used, set to blank.	Digit	0-9 * # A-D	None
8	Lockout Delay/Quiet Time	This value sets the minimum length of time between incoming DTMF digits that the Model 7502 recognizes as delimiting the beginning or end of a DTMF string. It is used by the decoder in Wrong Digit Lockout mode to distinguish the beginning of a DTMF string. It is also used by the decoder to wait for the end of an incoming DTMF string before transponding.	1-100	100 ms	5
9	Horn Relay/Audio Alert Beep Duration	This item controls how long the Audio Alert beeps and how long the vehicle horn honks when a call is decoded.	1-12	1 second	5
10	Deadman Time-Out	This value defines the deadman timer period. It can be set from 10 minutes to 4 hours.	1-24	10 minutes	12

Table 4-1. Programming Item Chart (Continued)

Item No.	Function Name	Description	Range	Units	Default
11	Transmitter Key-Up Delay	This value sets the length of time between PTT going active and the encoder beginning to send the first DTMF digit. It can be used to make sure the transmitter is up to power before digits are sent.	0-20	100 ms	10
12	First Digit Length	This value defines the tone-on time of the first encoded digit. Some decoders require a long first digit to identify the start of a DTMF string.	2-50	10 ms	6
13	Subsequent Digit Length	This value defines the tone-on time of all DTMF digits following the first one.	2-10	10 ms	6
14	Interdigit Time	This value defines the interdigit gap (tone-off time).	2-10	10 ms	6
15	Transmitter Hold Time	This value sets how long PTT stays active after the last digit is sent.	0-20	100 ms	2
16	Wrong Digit Reset/ Lock-out	This defines whether or not the individual address must be at the beginning of a received DTMF string. In Reset mode, any number of digits may precede the address; in Lockout mode, the address must be at the beginning.	0-1	0=wrong digit reset 1=wrong digit lockout	1
17	Audio Alert Enable	This programs whether or not the front panel Audio Alert sounds when a call is decoded.	0-1	0=disabled 1=enabled	1
18	DTMF Mapping	When enabled, this function does the following: 1. Maps the outgoing destination address, but not the ANI or status. Digits 0-3 are mapped to digits A-D respectively. 2. Maps the incoming call-back address, but not the individual address. 3. If no call-back address is available on an incoming call, the display continues to show the encoder destination address. 4. Limits the encoder destination address to digits 0-3.	0-1	0=disabled 1=enabled	1
19	Status Digit Enable	This item selects whether or not a status digit is appended to the encoded DTMF digit string (see programming items 20 and 25).	0-1	0=no status digit sent 1=status digit appended	0
20	Status Digit Definition	This item selects how the "STATUS" key works and the definition of the encoded status digit (see programming item 19 and Section 3, Status Key).	0-1	0=key status 1=deadman status	0
21	Hookswitch Input Enable	This item defines whether or not the Model 7502 uses the hookswitch input. If enabled, the speaker will automatically be unmuted when the microphone is taken offhook. If a call has been decoded, the vehicle lights and horn will be turned off and the call will be cleared when the microphone is placed back onhook, just as if the "CALL RESET" key had been pressed.	0-1	0=hookswitch input not used 1=use hookswitch	0

Table 4-1. Programming Item Chart (Continued)

Item No.	Function Name	Description	Range	Units	Default
22	COR Active to Decode	This item selects whether or not the COR input must be active to decode incoming DTMF.	0-1	0=decode without COR 1=COR must be active to decode	0
23	COR Inactive to Encode	This item selects whether or not the COR input must be inactive to send a call or transpond. If enabled, the Model 7502 waits until COR goes inactive before activating PTT. Use this option to keep the Model 7502 from interfering with other traffic on the radio channel.	0-1	0=encode without COR 1=COR must be inactive to encode/transpond	0
24	Encoder Destination Address Length	This value defines both 1.) the number of encoder destination address digits and 2.) the number of digits following the incoming individual address that should be saved and displayed for the call-back address. Any additional incoming digits following the call-back address are ignored by the decoder. This parameter is not used in Model 7032-compatible modes (see programming item 25). In these modes, both the encoder destination address and the call-back address are variable in length.	0-10	Number of encoder destination address digits and maximum number of call-back address digits stored.	4
25	Encode Mode	This value defines the format of an outgoing call. There are four different encoding formats with various combinations of ANI, destination address, steering digit, and status digit. ANI is defined by programming item 3. The length of the destination address is set by programming item 24; the destination address digits are set on the front panel display by the operator. The steering digit is defined by programming item 7. The status digit is defined by programming items 19 and 20 and the "STATUS" key and indicator on the front panel. Encode modes 2 and 3 (Steer/ANI and ANI/Steer) also select Model 7032-compatible operation. See Section 3, Model 7032-Compatible Operation.	0-3	0=ANI/Status 1=Address/ANI/Status 2=Steer/ANI/Address/Status 3=ANI/Steer/Address/Status Status digit is optional (see programming item 19)	1
26	Transpond Mode	This value determines how the Model 7502 transponds a decoded call. It can do nothing, send a single tone, or send its ANI. ANI transpond includes a status digit if enabled by programming item 19.	0-2	0=none 1=tone 2=ANI	1
27	Transpond Tone Frequency	This value selects which of 11 tones from 1000 to 2000 Hz are used for tone transpond (see programming item 26).	10-20	100 Hz	10
28	Transpond Tone Duration	This value defines how long the transpond tone lasts (see programming item 26). Default is 2 for software version 1.03 and later and 4 for previous versions.	1-15	1 second	2 or 4
29	Reset to Defaults	This command sets all programming items to the values indicated in the Default column of this table.			
30	Transmit 1-kHz Test Tone	This command instructs the Model 7502 to activate PTT and transmit a 1-kHz test tone, which can be used to set the transmit audio level. Press the "CALL RESET" or "SEND" key to end the test tone. See Section 4, Adjustments.			
31	Execute Test	This command invokes the Model 7502 internal test routines. The test requires a special test fixture, Zetron Part			

ADJUSTMENTS

There are two audio level adjustments on the Model 7502; both must be set for proper operation. A radio service monitor and an oscilloscope are required to make the adjustments.

Transmit Audio Level Adjustment

The transmit audio level is set by adjusting the top potentiometer on the back panel of the Model 7502 case. With the Model 7502 connected to the radio, go into programming mode by pressing the "HORN", "SPKR", "STATUS", and Up-Arrow keys simultaneously, then select programming item 30 (transmit 1-kHz test tone).

The Model 7502 will activate PTT and send a 1-kHz tone. Using the service monitor, adjust the potentiometer for desired transmitter deviation (usually 3.5 kHz).

Press either the "CALL RESET" or "SEND" key to stop the test tone.

Receive Audio Level Adjustment

The receive audio level is set by adjusting the bottom potentiometer on the back panel of the Model 7502 case. Connect an oscilloscope to the test point below the potentiometer; the oscilloscope ground can be connected to the Model 7502 case.

Using the service monitor, send a 1-kHz test tone to the radio and Model 7502 (usually at 3.5-kHz deviation). Adjust the potentiometer till the amplitude of the signal seen at the test point is between 1.0 and 1.5 volts peak-to-peak.

5. REPAIR

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