

Repeater Pal



FEATURES

- **Maximum capacity, 50 CTCSS and 104 DCS user groups**
- **ToneLock high performance decoding**
- **Remote programmable using DTMF radio**
- **Database and validation for 154 users**
- **Regenerated CTCSS/DCS and cross tone encode**
- **Vacant tones and codes can be reserved**
- **Selectable transmitter hold time and courtesy tone per user**
- **Programmable “stuck mic” repeater time-out**
- **Programmable Morse code station ID**
- **Repeat audio processing**
- **Proper operation with reverse burst and DCS turnoff code squelch tail elimination**

INTRODUCTION

The Model 37-MAX Repeater Pal is a high capacity, remotely programmable, community repeater controller. It provides individualized repeater service to up to 154 different customer groups using CTCSS tone and DCS digital coded squelch signaling.

The Repeater Pal connects to a receiver and transmitter providing CTCSS/DCS decode, regenerated CTCSS/DCS encode, repeat audio processing, selectable system and per-user functions. It will convert any station capable of duplex operation into a fully featured community repeater. The Repeater Pal is an ideal replacement for older tone panels, eliminating time consuming trips to remote repeater sites, as well as providing a high subscriber capacity growth path for the future.

The compact size of the Repeater Pal is ideal for low power repeater packages constructed from a pair of suitable mobile radios.

PERFORMANCE FEATURES

Up to 154 separate user groups may be placed on the channel, which is ideal for scan based trunking systems, roaming, or seasonal users.

ToneLock decoding, a Zetron exclusive, eliminates dropouts resulting from weak, fading signals, or high modulation levels. The usable range of the repeater will not be limited by the decode performance of the repeater tone panel when the Repeater Pal is in control.

The unit recognizes when a subscriber unkeys with reverse burst or DCS turnoff code, silently muting repeater receiver audio to prevent squelch tails. This ensures that listening radios are quieted instantly without an annoying noise burst.

High quality audio processing circuits in the Repeater Pal are designed to make the repeater sound its very best.

SPECIAL FEATURES

The Morse code Station ID feature automatically transmits the repeater call sign at the beginning of a transmission and at programmed intervals.

Courtesy beeps may be used to encourage unfamiliar radio users when to begin speaking.

The reserved user feature prevents a co-channel system operator from commandeering a temporarily unused tone or code. The Repeater Pal reserves a tone or code by transmitting an alert signal and muting repeat audio when it detects the tone or code.

Cross tone encoding gives the repeater added flexibility. This feature permits multiple repeaters at different locations to be placed on a single frequency. Mobiles may roam between two or more systems, accessing each individual repeater with a different tone or code and receiving on a common tone. The courtesy tone frequency may be set to a different pitch for each repeater to distinguish the repeater location or coverage.

PROGRAMMING AND CONTROL

Adding or removing customer groups is easily accomplished using a radio with DTMF encode, or a Zetron Model 8B Repeater Programmer/Timekeeper attached to a control station or mobile radio. Costly site visits to add or delete customers are eliminated with the Repeater Pal.

INSTALLATION AND SETUP

Easy installation and setup procedures ensure that a technician can install a Model 37-MAX in nearly any repeater or duplex station. Installers will appreciate the field proven application notes that take the guesswork out of the procedure. Application notes are included in the instruction manual for the most popular repeaters, some of which include:

GE:	MASTR III, MASTR II, Custom MVP, Exec II, MASTR PRO
ICOM:	IC-RP1510, IC-RP1520
EF Johnson:	Viking Universal Station, CR1010, CR1000,
Kenwood:	TKR720, TKR820
Kyodo:	KG110
Midland:	Basetech Repeater
Motorola:	GR300/GR500, R100, MSF5000, MSR2000, MICOR
RepcO:	Dimension
Regency/Wilson:	Microcomm
Standard:	RPT10, RPT21, RPT30
Tait:	T800 series, T300 series
Uniden:	ARU 251

Only seven connections are required in typical installations, and expert interface assistance is available from Zetron.

SPECIFICATIONS

GENERAL

Power	11-16 Volts DC, 100mA nominal
Operating Temperature	0 to 60 Degrees Celsius
Size	5.5"W x 6.25"D x 1.4"H
Weight	1.0 pound
Indicators	Status, Carrier, Transmit, Power
Programming	Via DTMF radio
Data Retention	Nonvolatile EEPROM

RADIO INTERFACE

Connections	12VDC, ground, Rx discriminator audio, Tx mic audio, Tx PTT, Rx carrier detect, CTCSS/DCS encode
PTT	FET pull to ground
Carrier Detector	External COR input with polarity and threshold adjustments
Tx audio	-40 to +6 dBm. Hi/Lo range selector 1K ohm output impedance
Rx audio	-40 to +10 dBm. Hi/Lo range selector. 25K ohm input impedance
CTCSS/DCS encode	-40 to +3 dBm. Hi/Lo range selector 600 ohm output impedance
CTCSS slope	Flat or de-emphasized output

PROGRAMMABLE ITEMS

GENERAL

Mode	Carrier repeat, or validated CTCSS/DCS users
Station ID	ID interval from 1 to 90 minutes. Call sign programmable up to 8 characters. Periodic ID or ID based on transmit activity.
Tx Timeout	1 to 9 minutes in 1 minute steps
Tx Hold Time	0 to 9 seconds in 1 second steps
Alternate Tx Hold Time	0 to 9 seconds in 1 second steps
Courtesy Tone Frequency	500, 1000, 1500 Hz selectable

USER SPECIFIC SELECTIONS

Number of users	155 database entries. User numbers are from a cross reference table based on CTCSS/DCS decode. 0 = Carrier repeat, 1-50 = CTCSS, 51-154 = DCS. Commands are available to program a single user, or globally all users.
User Status	Disabled, enabled, or reserved. Reserved users will actuate the transmitter and generate the proper CTCSS/DCS for dispatch, but will not pass repeat audio. Valuable for no-pay customers.
Regenerated CTCSS/DCS	Selectable encode may be any CTCSS or DCS per user
Tx Hold Time	Normal or Alternate transmit hold time selection
Tone in Tail	Enable or disable CTCSS/DCS encode during Tx hold time
Courtesy Tone	Enable or disable

INSTALLATION AIDS

DCS Polarity	Programmable data inverters for encode and decode
Program Mode Access Code	Five digit DTMF password selectable
Clear	Unit may be reset to all factory default settings
Tx Audio Test	Generates 1KHz audio tone for transmit deviation adjustment
Repeat Audio Test	Enables carrier repeat to adjust Rx audio for unity repeat gain
CTCSS Level Test	Keys transmitter with CTCSS tone
CTCSS Pre-emphasis Test	Verifies that CTCSS encode frequency response is flat