

### Repeater Patch



#### INTRODUCTION

The Model 48jr is a tone panel and interconnect that is integrated into a single, compact repeater module. Only 6.25 inches wide and 1.4 inches high, it fits into even the smallest repeater enclosure.

Interface cables are available for quick connection to popular radios, thus creating a full-featured, interconnected repeater.

The Model 48jr provides all 154 CTCSS (PL) tones and DCS (DPL) codes. This allows radio users to key up and talk within individual work groups in normal dispatch fashion. The Model 48jr also provides a telephone interface so authorized radio users can place and receive telephone calls into the public telephone network, or into a PBX.

Selective calling of individual radios is accomplished using CTCSS and DCS (PL and DPL) tones. This allows inexpensive handheld and mobile radios to be used and avoids expensive two-tone or DTMF decoders. Selective calling may be enabled both for phone-to-radio calls as well as for radio-to-radio calls.

All programming is accomplished by dialing into the unit from a Touch-Tone telephone or from a DTMF radio.

#### PHONE-TO-MOBILE, MOBILE-TO-PHONE CALLS

The telephone interconnect portion of the product enables radio users to place and receive phone calls. Each of up to 154 users may be allowed or denied access to the telephone line.

To place a mobile-to-phone call, a radio user typically keys up and enters **\***. Longer mobile access codes (up to 9 digits) may be used for increased security if desired. After dial tone is obtained, the user dials a phone number. The number is either accepted or rejected based upon the programmed toll restrictions. During a conversation, call-limit and mobile-activity timers ensure the call is properly processed and terminated.

#### FEATURES

- **Small, compact design** (6.25"W x 7.1"D x 1.4"H)
- **Dispatch (repeater) operation for up to 50 CTCSS and 104 DCS users**
- **Interconnect with CTCSS/DCS selective calling**
- **Phone-to-mobile, mobile-to-phone, and mobile-to-mobile calling**
- **Database for 154 users or groups**
- **Remote programmable via Touch-Tone phone or DTMF radio**
- **Toll restricts selectable per user**
- **Half- or full-duplex operation, with mobile privacy masking tone**
- **Squelch tail elimination**
- **10 speed-dial telephone numbers**
- **Dial click decoder for rotary telephone lines**

#### OPTIONS

- **Interface cables for popular radios**
- **Mounting kit for Motorola GR300, GR500, and GR1225 repeaters**

To initiate a phone-to-mobile call, the landline phone party first dials the telephone number of the 48jr. The caller can use either a Touch-Tone or rotary-dial telephone. When the 48jr answers the line and issues dial tone, the caller dials the three-digit number of the radio to be reached. Ringing tones are transmitted over the radio channel, accompanied by the target radio's CTCSS/DCS. The called radio user must enter a valid connect code to answer the call (1-9 digits, typically \*).

If the 3-digit number entered by the caller is programmed in the 48jr as a "talkback mobile", after a single ring on the radio channel, the caller may speak directly to the mobile user without the necessity of the mobile first answering the call. The called mobile may key up and answer without entering a connect code.

The 48jr can also be programmed to automatically ring out to a specific default CTCSS/DCS user whenever a ringing phone line is detected.

During a phone call, only the originating radio user may speak to the phone party. CTCSS/DCS validation is used to prevent other radio users or interference from being heard by the phone or mobile parties. A "half-privacy" masking tone may be enabled to prevent other mobiles from listening to the mobile side of a conversation.

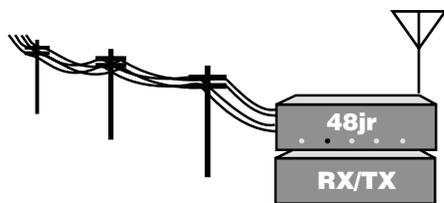
## MOBILE-TO-MOBILE CALLS

Mobile-to-mobile calls are placed in a similar manner as are mobile-to-phone calls. If the originating user dials a valid mobile number, ringout tones are broadcast on the channel with the appropriate CTCSS/DCS selective signaling. When the called mobile answers with a valid connect code, the two users may communicate. During the call, only the two mobiles (or groups) may communicate since cross-tone CTCSS/DCS encode and decode validation is processed. This prevents other radios or interference from being heard by the units involved in the conversation.

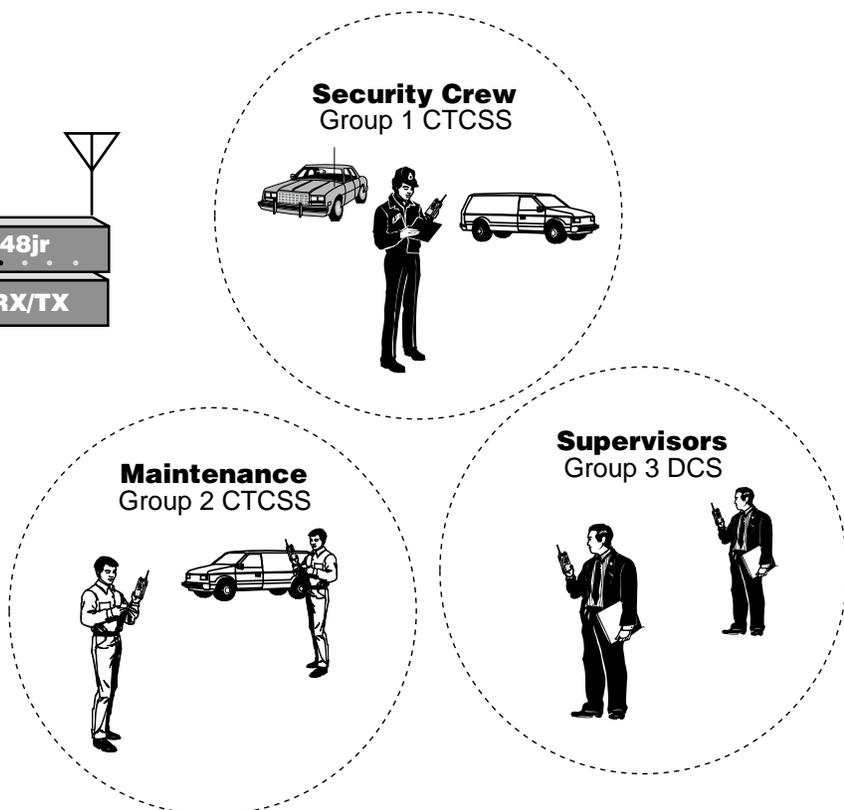
## DISPATCH (COMMUNITY REPEATER) OPERATION

Any of the 154 user groups (50 CTCSS, 104 DCS) may be programmed for dispatch operation. A dispatch user may simply key up and speak through the repeater to the rest of the user group, and other groups' radios remain silent. There is no need for connect codes and disconnect codes. In fact, DTMF pads are not necessary for dispatch operation. Regenerated CTCSS/DCS encode, repeat audio processing, squelch tail elimination, repeater time-out and hold timers are all employed to ensure quality repeater operation.

## EXAMPLE SYSTEM



The Model 48jr is ideal for commercial, customer, customer-owned systems where different work groups need to share the same interconnected repeater.



## PROGRAMMABLE ITEMS

### MOBILE INITIATED INTERCONNECT

Connect code	DTMF ANI, 1-9 digits, default is *
Disconnect code	DTMF ANI, 1-9 digits, default is #
Dialing mode	Regenerated DTMF or dial pulse
Toll restrict	First and second digit restrict, up to four numbers each. Total # of digits dialed
Hookflash	Enable / disable. Mobile may initiate hookflash with *0
Busy tone disconnect	Automatic disconnect on busy tones may be enabled for the first 20 seconds of a call, the entire call, or disabled
Autodials	10 speed dial numbers may be programmed for instant mobile access

### SELECTIVE CALLING

Telco rings before answer	1 to 10 rings or no phone to mobile allowed. Default is 1 ring
Selective calling mode	System can call a specific CTCSS/DCS user, or prompt caller to over dial the number of the mobile they wish to call
Ringout mode	Ringout on the channel for 15, 30, or 60 seconds, or ringout once then wait 60 seconds for the mobile to answer
Phone line	May be make busy (taken off-hook) during mobile to mobile calls

### DISPATCH MODE

Mode	Carrier repeat, or validated CTCSS/DCS users
Repeater hold time	0 to 9 seconds, default = 3
Anti-kerchunk filter	Enable / disable. Disables transmit hold time for short transmissions

### GENERAL

Station ID	Morse code call sign programmable. May be set to ID after dispatch or interconnect activity if the interval has expired, or every time the interval expires. Interval is programmable from 0 to 99 minutes, default is 15
Call limit timer	1 to 10 minutes, or disabled. Mobile time limit extend command may be enabled
Mobile activity timer	30 to 99 seconds. Will disconnect calls automatically during mobile inactivity
Connect switch mode	Front panel connect switch may initiate conversation mode or phone answer mode
Aux output	Programmable password to access aux output. The aux output may be set off or on remotely
Courtesy tone Morse code	Courtesy tone may be programmed to be any Morse code character or digit. Defaults to "E"

### USER SPECIFIC SELECTIONS

User numbers	155 database entries are programmable as follows; 0 = Carrier repeat, 1-50 = CTCSS, 51- 154 = DCS. User numbers are from a cross reference table based on CTCSS/DCS decode. Commands are available to program a single user, or globally all users
User mode	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
Dispatch	Enable / disable
Mobile-to-phone	Enable / disable
Mobile-to-mobile	Enable / disable
Toll restrict	Toll calls allowed or toll calls restricted.
Equipment type	Mobile or talkback pager
Audio mode	Full duplex, half duplex, or half privacy
Tone in tail	Enable CTCSS/DCS encode during Tx hold, or carrier only
Tone drop mode	Encode CTCSS/DCS during phone call, or disable when mobile answers
Courtesy tone	Enable / disable
Installation aids	Setup tests may be selected via DTMF phone DTMF radio or using the front panel switch
DCS polarity	Normal / invert
Program mode	Five digit password selectable
Reset	Unit may be reset to all factory default settings
Tx audio test	Generates 1 KHz audio tone for transmitter audio adjustment
Repeat audio test	Enables carrier repeat to adjust Rx audio for unity repeat gain
Hybrid test	Generates balance tones into telephone for hybrid adjustment
Dial click	Generates Morse code in response to dial click input
CTCSS/DCS level test	Selectively generates CTCSS codes and DCS code on transmit channel for level adjustment

## SPECIFICATIONS

### GENERAL

Power	11 - 16 Volts DC, 300mA nominal
Operating Temperature	0° to +60° Celsius. 95% relative humidity @ +50°C (non-condensing)
Size / weight	6.25" W x 7.1" D x 1.4" H, 1.6 lbs

### TELEPHONE INTERFACE

Line type	Touch-Tone or dial-click decode. End-to-End (B1), typical subscriber line
Connector	RJ11-C modular jack
Incoming call	Ring detection on tip-ring pair; programmable number of rings before answering line
Call answer	Off-hook, tip-ring current draw
Call disconnect	Phone party disconnect via DTMF "#0", mobile initiated disconnect, busy tone, call limit, and mobile activity timers
Call progress tones	Dial tone, ringing, double ring, busy, reorder
Hybrid	Dual transformer, high performance two to four wire converter for full duplex applications

### RADIO INTERFACE

Connections	+12 volts DC, Ground, Rx discriminator audio, Tx mic audio, CTCSS/DCS encode, Tx PTT, Rx carrier detect
Connector	10-pin molex
Adjustments	Tx mic audio, Tx CTCSS/DCS, Rx audio, VOX, Hybrid R/C, Carrier detect
Carrier detector	Internal noise squelch detector and external COR input with polarity and threshold adjustments
PTT	FET pull to ground
Tx audio	-40 to +6 dBm, Hi/Lo selector, 1 K ohm output impedance
Tx audio	-40 to +10 dBm, Hi/Lo selector, 50 K ohm input impedance
Aux output	FET pull to ground, DTMF code from phone or radio will activate

### ADDITIONAL SPECS

Indicators	Phone, Carrier, Transmit, Power
Switch	Manual Connect/Disconnect
Station ID	Morse code, fixed 1200 Hz frequency and programmable mode and call sign
Prompt tones	Progress tones, error tones and warning tones sent to the phone and mobile
Programming	Programmable via DTMF phone or radio
Data retention	Nonvolatile EEPROM

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005-1073E

July 2002