

RM-20 Repeater Maker *plus*

Applications

- CREATE A REPEATER USING TWO TRANSCEIVERS
- MAKE A SINGLE/CROSS BAND REPEATER
- PROVIDE A MULTI USER CTCSS REPEATER SERVICE
- PROVIDE A BACKUP REPEATER
- PROVIDE A 'PORTABLE' REPEATER

Features

- RUGGED CONSTRUCTION FOR HARSH ENVIRONMENTS
- CTCSS ENCODE/DECODE – 4 USER GROUPS
- TIME - OUT –TIMER WITH DISCONNECT BEEPS
- HANG TIME AND COURTESY BEEP
- CTCSS CROSS TONE ENCODING SUPPORTED
- OVER THE AIR OR LOCAL PROGRAMMING
- DIRECT CONNECTION FOR HALF OR FULL DUPLEX TELEPHONE INTERCONNECT
- PLUG IN COMPATIBLE WITH CES 4700VP TELEPHONE INTERCONNECT
- HIGH PASS FILTER FOR CTCSS ELIMINATION
- OPTION PLUG IN AUDIO VOICE DELAY BOARD
- LED INDICATORS FOR POWER, COR AND PTT
- PTT RELAY AND INTERNAL COR
- POWER AND REPEAT INHIBIT SWITCHES.
- REPEAT INHIBIT DIGITAL INPUT
- AUXILIARY RELAY FOR REMOTE CONTROL
- REVERSE POLARITY PROTECTED
- EXTREMELY LOW CURRENT IN IDLE MODE



INTRODUCTION

The **RM-20 Repeater Maker *plus*** is a high value, feature rich product which provides repeater control of two transceivers. The unit is provided in a rugged compact package and is suitable for a multitude of uses. Such applications include creating a radio repeater using two transceivers, providing a backup for critical continuous duty repeaters, making a single/cross band repeater, providing a “portable” repeater or as a CTCSS repeater tone panel.

Although typically used to provide standard repeater service, these units can be programmed and configured to cater for many different requirements. The **RM-20** has a wide range of programmable features and timers to choose from. For example, the device is provided with a CTCSS capability (4 user groups) and an auxiliary relay output which adds to its flexibility and control capabilities. The auxiliary relay can be used to activate site equipment for example.

The unit provides a “plug & play” interface to the CES 4700VP telephone interconnect and the CES voice audio delay modules, the VAD-1 and VAD-8. The unit is programmed locally using a DTMF telephone, or remotely “over the air”.

CES Wireless Technologies Corp.
925-122 S. Semoran Blvd
Winter Park, FL 32792 USA



Tel: 407-679-9440
Fax: 407-679-8110
Email: sales@ceswireless.com
Web Site: www.ceswireless.com

RM-20 -FEATURES & PROGRAMMING

Auxiliary Relay Command

The auxiliary relay can be activated or deactivated remotely. The DTMF tone string is programmable with up to 10 digits.

COR Source

The COR (carrier operated relay) source is user programmable to operate off the radio transceiver's COR (called external COR) or if the Repeater Maker plus is connected to the radio receiver's discriminator audio, then the RM-20's internal COR can be used. The external COR polarity is also programmable.

CTCSS

The RM-20 will decode up to 4 different programmable CTCSS tones and encode any 4 programmable tones. The selected tones are transmitted with repeat audio and if programmed, the repeater hang time. A different encode and decode tone can be selected for each user group.

Courtesy beeps

The courtesy beep feature can be turned ON or OFF, and is transmitted when COR and a valid CTCSS tone becomes inactive. A one second programmable delay can be inserted between when COR and a valid CTCSS tone become inactive and the beep is generated.

Voice Audio Delay

The optional CES voice delay modules, VAD-1 or the VAD-8 provide a 1 second or 8 second delay respectively and is a plug in option.

Repeater Hang Time

This is the amount of time between COR and CTCSS becoming inactive and the transmitter unkeying. This can be programmed from 0-9 seconds.

Morse ID

A Morse ID of up to 10 digits can be programmed and sent based on a timer, when COR and CTCSS are deactivated or both.

Over the Air Programming

The RM-20 can be programmed "over the air" by entering a preprogrammed sequence of up to 10 user selectable digits.

Time - out- Timer

The time-out-timer defines the amount of time the repeater will allow the transmitter to be active before disabling it. Courtesy beeps are generated 10 seconds before cutoff and are sent every 2 seconds prior to cutoff. Once time-out has occurred, the RM-20 cannot be used again by that user group until the penalty time has expired. The time-out-time can be programmed from 1-9 minutes and the penalty timer can be programmed for 0-45 seconds in 5 seconds increments.

Interconnect

The PTT IN can be enabled or disabled, and the polarity is programmable. COR OUT polarity is also programmable. The interconnect "active period", which is the amount of time after PTT IN becomes inactive that the interconnect mode is disabled, is programmable in 2 seconds intervals for between 0 - 18 seconds. When the RM-20 is in "interconnect" mode audio can be handled in two different ways. The audio can be programmed to mute or to generate a continuous beep when COR and CTCSS are active.

Radio Interface

Radio Interface Connections

Power	5.5 - 18 V DC, reverse polarity protected
Ground	To transceiver ground
PTT Relay	Normally open, closed and common, connected to microphone PTT
Auxiliary relay	Normally open, closed and common. For user application.
RX Audio	Connected to discriminator or to squelched audio if transceiver has a suitable COR, level adjustable.
TX Audio	Normally connected to microphone audio, level adjustable.
COR	Required only if receive audio is connected to squelched audio.
TX Disable	Optional logic input to disable the repeater

Interconnect Interface Connections

PTT, RX Audio, Ground, TX Audio, COR and 12V

Variable Potentiometers for level adjustments

Receive Audio, Transmit Audio, CTCSS Output, Courtesy Beep, COR Threshold

Specifications

Dimensions: 4 x 4 x 1.5 inches (10.16 x 10.16 x 3.8 cm)

Weight: 0.5lbs (0.23kg)

Voltage: 12 V DC

Current: Idle: 30.70mA Upon Tx: 90.00mA

Cabinet: Aluminum Extrusion

Interface: Cable: 6 ft shielded 9 conductor cable and RM-20 connectors provided

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