



9409 E. 55th Pl. S. * Tulsa, OK 74145 * (918) 622-7052 * Fax (918) 664-8557

RELAY INSTRUCTION MANUAL

Relays
MRLY and MSRY



All rights reserved. No part of this manual may be reproduced or utilized in any form or by any means, electronic or mechanical, without the prior written permission of Qual-Tron, Inc.

Relay Manual

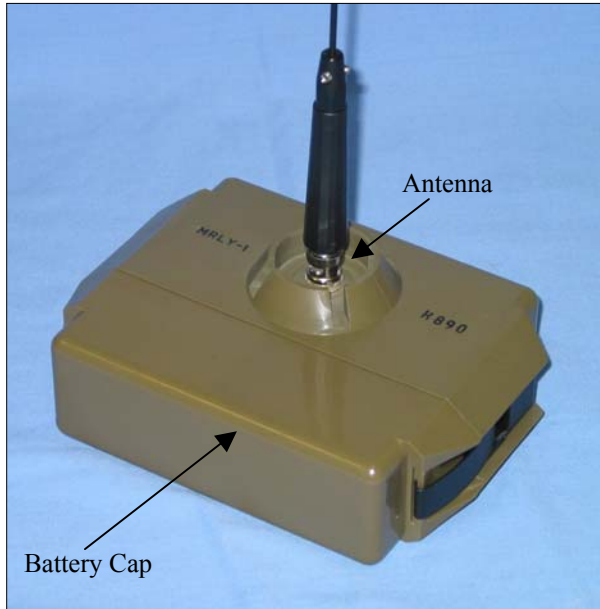
Table of Contents

Section 1:	MIDS Single Channel Relay (MRLY)	
Description	.....	Page 3
Features	.....	Page 3
Operation	.....	Page 3
RF Link	.....	Page 3
Emplacement Considerations	.....	Page 3
Section 2:	EMIDS Multi-Channel Relay (MSRY)	
Description	.....	Page 5
Features	.....	Page 5
Operation	.....	Page 6
Setup	.....	Page 6
Data Messages	.....	Page 6
RF Link	.....	Page 6
Emplacement Considerations	.....	Page 7
Battery	.....	Page 7
Section 3:	Frequency/Channel Calculations	
Channel to Frequency	.....	Page 8
Frequency to Channel	.....	Page 8
Section 4:	FCC Notice / RF Exposure	
FCC Notice	.....	Page 9
FCC Compliance Information	.....	Page 9
RF Exposure -MPE/SAR	.....	Page 9

Section 1: MIDS Single Channel Relay (MRLY)

Description

The MIDS MRLY is a single channel, fixed frequency relay that receives and re-transmits RF signals from a field of MIDS and EMIDS sensors. This field may be any combination of sensors, such as seismic, magnetic, IR, or break wire. A receiver, transmitter, and control electronics module are encapsulated in the Lexan plastic housing. The repeated signal will be on the same RF frequency as the signal that was received from the original detector.



Channel:	Factory Pre-Set Single Channel
Frequency Range:	138-174 MHz
ID Codes:	MIDS/EMIDS
Antenna:	Rod, ½ wave, 3 dB
Power Supply:	10 each 9 V DC batteries
Battery Life:	45 days in temperate climate. (Optional BPA battery pack – extends life to 120 days)
Transmission Output:	Minimum 2 Watts

Design Features

- Sealed battery compartment
- Repeated signal on same frequency
- Operational tilt switch
- Injection molded Lexan plastic case
- Metal battery cap clamps with heat welded metal inserts
- Sealed and potted electronic components
- Alternate power sources available (BPA Battery Pack Assembly/Solar panel 10-30 Watts)

A. Operation

Install the desired number of batteries and the antenna to make the MRLY operational. The MRLY should be placed between the transmitter and receiver.

B. Modes of Operation

The MRLY has two modes of operation. These modes are controlled by internal tilt switches.

Normal Operation – The MRLY may be put in normal mode by placing it with the antenna up on a flat level location.

Power Off – Power is turned off by tilting the unit in any direction past 15°. This mode is used to transport the relay to the development location to prevent transmission and battery power drain.



Operational Mode
Flat and Level



Power Off Mode
Tilted past 15°.

C. RF Link

The operational range of the RF link is dependent upon various conditions. The high frequency of the RF link works best under line of sight conditions. However, operation from gulches and around buildings or hills is possible for shorter ranges.

Retransmission ranges of 25 to 100 miles can be achieved.

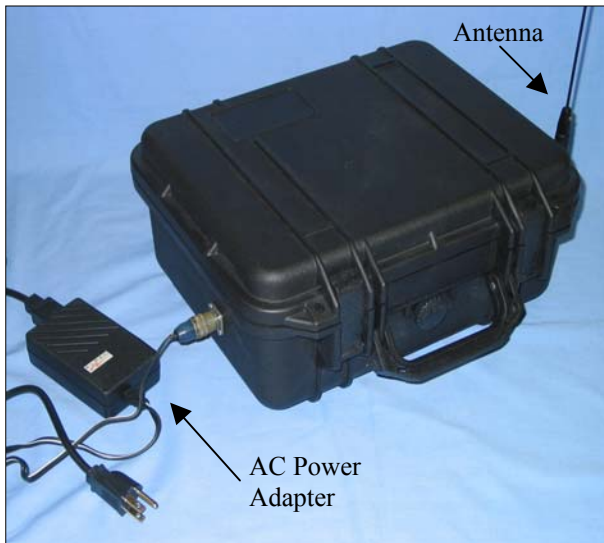
D. Emplacement Considerations

The MRLY must be placed within the transmission range of the sensor transmitter assembly. For the best results, place the relay half way between the transmitter and the receiver on a flat surface or at the top of a hill or building. Elevating the repeater antenna or using a toss up antenna will greatly increase the operational range.

Section 2: EMIDS Multi-Channel Relay (MSRY)

Description

The EMIDS multi-channel MSRY relay is a self-contained unit that will receive and retransmit RF signals from compatible transmitters. The MSRY relay is programmed using a PC and the supplied software. While programming the unit, the receiver channel, transmit channel, unit ID code, and voltage level from internal batteries are displayed. The unit will transmit a test message when the test button is activated. After programming, the unit may be deployed for operation. An external battery charger may be used to recharge the internal batteries. The MSRY has an external power connector for connection to an external power supply or solar panel.



Frequency:	<u>Range</u>	<u>Spacing</u>
	Low: 138-154 MHz	25 kHz
	Mid: 154-162 MHz	5 kHz
	High: 162-174 MHz	6.25 kHz
ID Codes:	0-999	
Antenna:	Rod, ½ wave, 3 dB	
Power Supply:	2 each 4 volt gelcell batteries	
Battery Life:	5 days in temperate climate (Battery life can be extended with solar panels or battery packs.)	
Transmission Output:	Minimum 2 Watts	

Design Features

- Pelican high impact plastic case
- Alternate power sources available (AC, solar, battery packs)
- RS232 data port for computer programming
- MSRY software
- Test button
- Status light
- Multi-channel programmable frequency via RS-232 port and computer

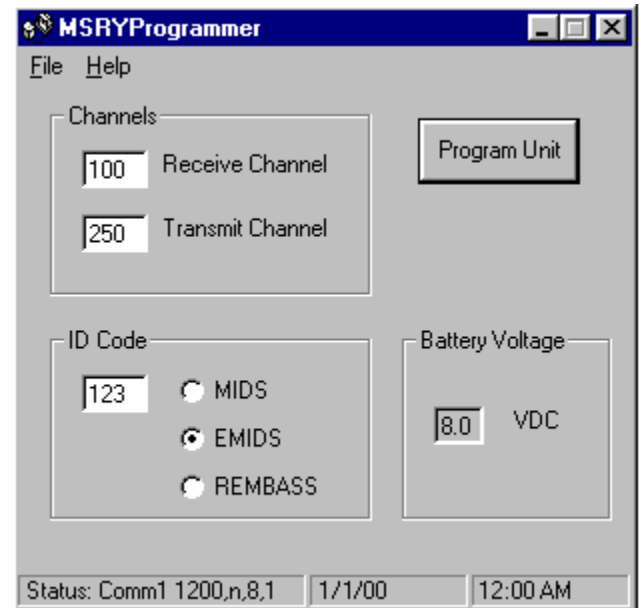
Operation

The MSRY must be programmed before being installed in the field. The MSRY is programmed using a computer and the supplied MSRY software. The MSRY connects to the PC by an RS232 9-pin data cable. NOTE: If the computer does not have an RS232 Serial Port, the purchase of an RS232 9-pin to USB conversion cable may be required. The receiver channel, transmit channel, format, and the MSRY ID code are set during the programming mode. The current voltage level from the internal batteries is also displayed.

Setup

The connection of the MSRY Relay to the computer must be performed in the following sequence or errors could occur.

1. Ensure MSRY Relay switch is in the “OFF” position.
2. Connect the serial port cable to the computer.
NOTE: If the computer has an RS232 9-pin female serial port, use this Comm port. If the computer only has a USB Comm port, the purchase of a USB to Serial cable will be required. For this cable to operate properly, it will require software installation that comes with the cable.
3. Connect the Serial cable 9-pin male connector to the MSRY Relay serial port.
4. Turn the MSRY Relay switch to the “ON” position.
5. Run “MSRY Programmer” on the computer.
6. Input the Receiver Channel, Transmit Channel, and ID Code.
7. Select “Program Unit”. Select “OK” when programming is complete.
8. Close “MSRY Programmer” and disconnect the serial cable from the computer and MSRY Relay.
9. Turn power off to MSRY Relay.



Data Messages

The MSRY Relay has a built in transmitter and receiver. However, it does not incorporate the same data message features as the MXMT or MMCT transmitters. It receives, stores, and transmits messages received from MIDS and EMIDS transmitters.

The only data message that can be sent by the MSRY Relay is a test message. When the test button is pressed, the Relay transmits a message that gives the MSRY ID Code and the data message “Test”. No other data messages apply to the MSRY Relay.

RF Link

The operational range of the RF link is dependent upon various conditions. The high frequency of the RF link works best under line of sight conditions. However, operation from gulches and around buildings or hills is possible for shorter ranges. Dry sand, heavy foliage, and non line-of-sight can all play a part in decreasing the retransmission range. Retransmission ranges of 25 to 100 miles can be achieved depending on terrain.

Emplacement Considerations

The MSRY must be placed within the transmission range of the transmitter (2-10 miles). For the best results place the relay half way between the transmitter and the receiver on flat surfaces, or at the top of a hill or building.

Battery

The MSRY Relay incorporates two each 4-volt, 4.5-amp hour rechargeable sealed lead-acid batteries. The batteries are fully charged at Qual-Tron prior to shipment to provide a minimum of 9 volts.

NOTE: Due to the self-discharge characteristics of this type of battery, it is imperative that they be charged periodically if placed in storage. Otherwise, permanent loss of capacity might occur as a result of sulfation. It is recommended that the batteries be charged every 2-3 months using the supplied PSEC AC/DC battery charger to prevent permanent damage to the battery. The PSEC AC/DC charger (13D0229-1) provides a 12-volt, 1.7-amp input. Use only the 12V PSEC to charge the batteries, as the 9V PSEC AC/DC adapter (13D0230-1) will not provide adequate charging. It is recommended that the MSRY batteries be charged for a minimum of 8 hours.

Section 3: Frequency/Channel Calculations

FREQUENCY RANGES					
FREQ. RANGE	FREQUENCY		CHANNEL STEPS	CHANNEL	
	MIN	MAX		MIN	MAX
LOW	138.025	154.000	25 kHz	001	640
MID	154.005	162.000	5.0 kHz	001	1600
HIGH	162.00625	174.000	6.25 kHz	001	1920

Channel to Frequency Calculation

Channel * Channel Step + Min Frequency = Frequency for Channel

Examples:

- Low Band Channel 20
- $20 * 0.025 + 138 = 138.5$ MHz
- Mid Band Channel 300
- $300 * 0.005 + 154 = 155.5$ MHz

Frequency to Channel Calculation

$(\text{Frequency} - \text{Minimum Frequency}) / \text{Channel Step} = \text{Channel for Frequency}$

Examples:

- Low Band 151.5 MHz
- $(151.5 - 138) / 0.025 = \text{Channel } 540$
- High Band 172.5 MHz
- $(172.5 - 162) / 0.00625 = \text{Channel } 1680$

Section 4 **FCC Notice / RF Exposure**

FCC Notices (U.S. Only)

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the manufacturer's instruction manual, may cause interference with radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separations between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or experience radio/TV technician for help.

FCC Compliance Information

The following information is provided on the device or devices covered in this document in compliance with FCC regulations:

- Model Number: QTIMIDSMRLY, QTIEMIDSRSY
- Company Name:
Qual-Tron, Inc.
9409 E. 55th Pl. S.
Tulsa, OK 74145-8157 USA
918-622-7052

RF Exposure – MPE / SAR

In order to comply with FCC RF Exposure requirements, this device must be installed and operated in such a way that a minimum separation distance of 20cm is always maintained between the antenna and all persons during normal operations.