REVISION RECORD			
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TITLE: MRLY OPERATIONAL/ TECHNICAL DESCRIPTION

INTRODUCTION

Qual-Tron, Inc. of Tulsa Oklahoma manufactures a full range of unattended ground sensors and monitoring systems used to detect intrusion activity. The mechanical and electrical sensors include Breakwire, Magnetic, Seismic, IR Break Beam, Passive IR Sensors and Hydrophones. These sensors are used in combination with the MIDS single channel system, MIDS-II (modified) single channel system and EMIDS Multi-channel system. These systems utilize transmitters, relays and receivers to provide digitally encoded messages of alarm activity. Qual-Tron also manufactures base station equipment, power supplies and auxiliary equipment to provide a complete functional system.

PURPOSE

The purpose of this document is to provide a brief description of the circuit functions of the MRLY MIDS Single Channel Relay along with a statement describing how the MRLY operates. A description of the ground system and antenna is also discussed.

MRLY OPERATIONS

The MIDS MRLY is a single channel, fixed frequency relay that receives and re-transmits RF signals from a field of MIDS or EMIDS transmitters. 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 a Lexan plastic housing.

CIRCUIT FUNCTIONS

BLOCK 1: The receiver is a single channel, low-power, dual conversion FM receiver. The 1st stage local oscillator is customer specified and factory installed. The receiver consists of an input antenna, a preamp and filter; the first mixer amplifies the signal and converts the RF input to 21.4 MHz. This IF signal is filtered and fed into the second mixer, which further amplifies the signal and converts it to a 455 KHz IF signal by mixing with the 2nd LO of 20.945 MHz. This signal is fed into a Low pass filter and then into the limiting amplifier and detection circuitry. The audio is recovered using

a conventional quadrature detector, converted to digital using a bitslicer circuit and then fed into a microprocessor.

BLOCK 2: The microprocessor decodes the received message and then sends the encoded message to the transmitter. The encoded message is a 1200 baud Manchester code that includes 8 bits of preamble, a start bit, the message type, the ID code and the rest of the received message. This encoded message is used to modulate an FSK transmitter.

BLOCK 3: The modulation input into the FSK modulator is used to provide deviation for the crystal Y1 +/- 333 Hz. The crystal range of Y1 for the low band is set per customer order in the range 15.333 MHz to 17.00 MHz. This modulated signal is then multiplied using two tripler circuits. This dual tripling multiplies the frequency by 9 to provide a 138 MHz – 154 MHz output with a deviation of +/- 3 KHz.

BLOCK 4: The signal is then fed into the RF Power Amp, which is set for 2 watt output. The antenna is a Rod, ½ wave, 3 dB BNC antenna. This antenna is normally used as a receive antenna and is switched to transmit using an RF switch before transmitting the encoded message. The RF switch is enabled by the microprocessor.

MODULATION SYSTEM DESCRIPTION

The modulation of this system employs Frequency Shift Keying at 1200 Baud. The transmission of data is typically event driven in short-bursts of 25 ms or less. The modulation uses a 20-bit Manchester code that includes 8-bits of preamble, a start bit, 4-bit message type, 6-bits of ID and a parity bit.