FOUR CHANNEL WIRELESS TRANSMITTER AND RECEIVER MODULE MANUAL

MT4
MR4A
MR4B

GLOLAB
CORPORATION

Thank you for buying our Wireless MT4 Transmitter and / or MR4A, MR4B Receiver module.

The goal of Glolab is to produce top quality electronic kits, products and components. All of our products are designed by Glolab engineers and tested in our laboratory. Mechanical devices, prototypes and enclosures are fabricated in our precision machine shop.

Technical help is available by email from lab@glolab.com.

SAFETY:

Although the relays used in the MR4B module have contacts rated to switch up to 250 volts AC, not more than 32 volts AC or DC should be applied to the PC board terminals. Power mains should not be connected to the PC board terminals. If high voltage power mains must be switched, a licensed electrician can install a class 2 circuit that can safely be connected to the MR4B PC board terminals.

NOTICE:

The Federal Communications Commission has not certified the MT4 and MR4A, MR4B modules. If these modules are used as part of a design that is to be sold as a product then that product must be sent to a testing laboratory and certified by the FCC before it is sold.

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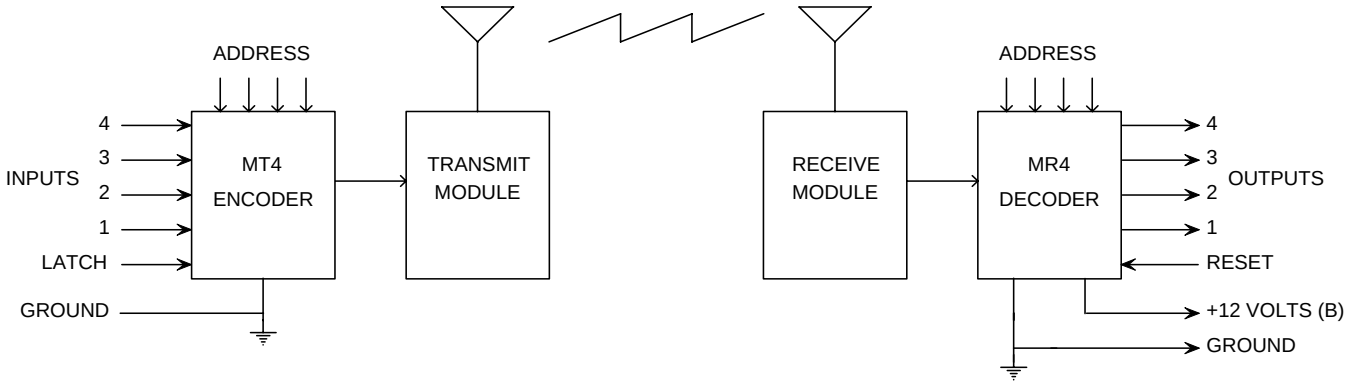
Introduction_____

The Wireless MT4 Transmitter and MR4A, MR4B Receiver modules send and receive data at 418 MHz where unlicensed operation is allowed. These modules have four data inputs and outputs. Four data bits can be transmitted individually or simultaneously and receiver data outputs can be momentary or individually latched and unlatched. The MR4A provides 0 to 5 volt output levels to drive logic circuits and the MR4B has single pole, double throw (SPDT) relay outputs that can switch up to 5 amperes.

Receiver modules are also available as MR4A-5 and MR4B-5 that are similar to the MR4A and MR4B but have momentary outputs that stay on for a minimum of five seconds even if the received signal is a short pulse. This is useful for special applications such as receiving a signal from a wireless motion detector or other device that transmits a short pulse.

The MT4 and MR4 are designed for remote control and annunciator applications only. They cannot send or receive video, audio or high speed serial data. 3.5 volts is the maximum that can be applied to any MT4 data input. The maximum data rate that can be fed into the MT4 transmitter is 20 transitions per second.

The modules are ready to use; just add a battery or other power source and a 6.7 inch long wire for an antenna. The antenna wire can be insulated or non insulated and can be rigid or flexible. A 50 ohm coaxial cable can also be connected to the antenna terminals to feed a remote antenna.



BLOCK DIAGRAM OF MT4/MR4

How it works_____

Encoder/Decoder

The MT4 transmitter module uses a microprocessor as an encoder. When no input data is being applied (no inputs grounded), the encoder automatically goes into a low power standby mode where it draws only one microampere. A power switch to turn the transmitter module off when it is not being used is therefore not required. The MR4 receiver module also uses a microprocessor as a decoder, however, the RF circuits must always be on waiting to receive a signal so a MR4 will draw about 7 milliamperes all of the time.

Addressing

Four position address switches in the MT4 and MR4 allow the selection of up to sixteen different addresses. Addresses must be set exactly the same in a transmitter and receiver pair in order for the receiver to produce an output when a signal is received from the transmitter. Addressing provides a way to control which receiver responds to a transmitter when multiple modules are used.

However, all modules operate at the same frequency of 418 MHz so transmission from more than one transmitter at a time is not allowed. Simultaneous transmissions will cause data corruption and no signals will be received.

Transmitter

The MT4 transmitter module Figure 1 has four data inputs numbered 1, 2, 3 and 4 on its terminal block. Each input is pulled up to +3.5 volts by an internal 200 microampere current source. A transmission starts when one or more data inputs is connected to the ground terminal labeled GND by an external switch, push button or other conducting device. Transmission continues as long as one or more inputs are grounded. *Caution* – damage to the circuits will result if more than 3.5 volts from an external voltage source is applied to any input.

The latch input labeled LAT on the terminal block is pulled up to +3.5 volts through a 10K resistor. If this input is grounded while a data input is also grounded, the corresponding output on a MR4A or MR4B receiver module will latch on. A receiver output can be unlatched by grounding its corresponding transmitter data input without also grounding the latch input. This feature provides for remote latching and un-latching of individual receiver outputs. It can be useful for applications such as turning lights on and off.

MR4A Receiver

The MR4A receiver module Figure 2 has four outputs directly from the decoder. Each output can source and sink up to 25 milliamperes. Outputs will be at 0 volts when no signal is received and will go high to +5 volts when a signal is received.

MR4A-5 momentary outputs will stay on for a minimum of five seconds when a signal is received. Grounding the terminal marked RES will simultaneously reset all latched outputs.

MR4B Receiver

The MR4B receiver module Figure 3 has four single pole, double throw (SPDT) relay outputs that can each switch up to 5 amperes. Light emitting diodes on the module indicate when a relay is energized. Relay contacts connect to a terminal block on the module. These relay contacts are completely isolated from all circuit board wiring. The relays will not provide power for a load; they will only switch an external power source on and off, similar to a wall switch that will turn a lamp on and off but will not itself provide power for the lamp.

Relay terminals are labeled C = common, NO = normally open, NC = normally closed.

12 volts regulated is available from the terminal marked +12 to power an external device such as a LED or piezo buzzer that can be switched on and off by one or more of the relays. The maximum allowable current drawn from this terminal is 60 milliamperes.

MR4B-5 momentary outputs will stay on for a minimum of five seconds when a signal is received. Grounding the terminal marked RES will simultaneously reset all latched outputs.

Power supply

The MT4 transmitter is powered by a 9 volt battery or any DC power source from 6 to 15 volts. A micropower low dropout voltage regulator IC2 drops and regulates the 9 volts from a battery down to 3.5 volts. This regulator has a standby current of only 1 microampere. Diode D1 protects against a reverse battery connection that would damage the regulator and other circuits. A 1 mfd bypass capacitor shunts transients to ground. The power source for a MT4 transmitter module should be connected to the PC board terminals marked + PWR and - PWR.

The MR4A receiver can be powered by a 9 volt 150 milliampere or more AC adapter or a battery or any power source of 7 to 24 volts DC. A 1 mfd filter capacitor C1 filters the DC before it feeds into regulator IC3 and a 10 mfd capacitor C2 provides bypassing to ground at the output of the regulator. The power source for a MR4A receiver module should be connected to the PC board terminals marked + PWR – .

The MR4B receiver can be powered by a 12 volt 200 milliampere or more AC adapter or a battery or any power source of 12 to 24 volts DC. A 1 mfd filter capacitor C1 filters the DC before it feeds into regulator IC2. A 10 mfd capacitor C2 filters the 12 volts that powers the relays and 1 mfd capacitor C3 provides bypassing to ground at the output of the 5 volt regulator IC3. Regulated 12 volts is brought out to a terminal block to power loads such as a piezo buzzer or LED. External loads connected to this terminal should not exceed 60 milliamperes. The power source for a MR4B receiver module should be connected to the printed circuit board terminals marked + PWR – .

Printed circuit board layouts are shown in figures 4, 5 and 6.

A 6.7 inch long antenna wire which is ¼ wavelength at 418 MHz should be connected to the antenna terminal of each module. A remote antenna fed through a 50 ohm coaxial cable can also be used. A ground terminal is provided for grounding the shield of the coaxial cable.

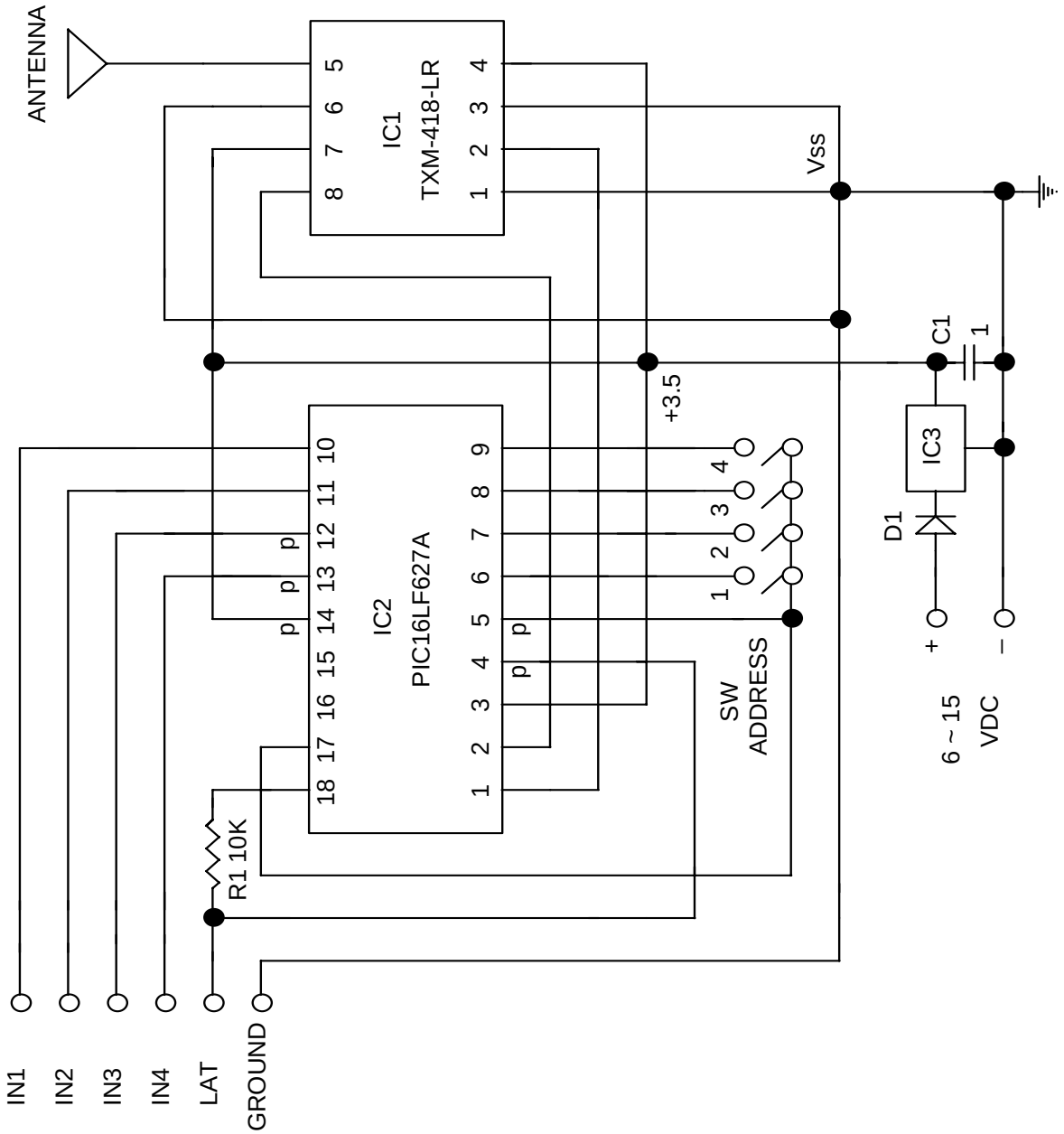


FIGURE 1 MT4 TRANSMITTER

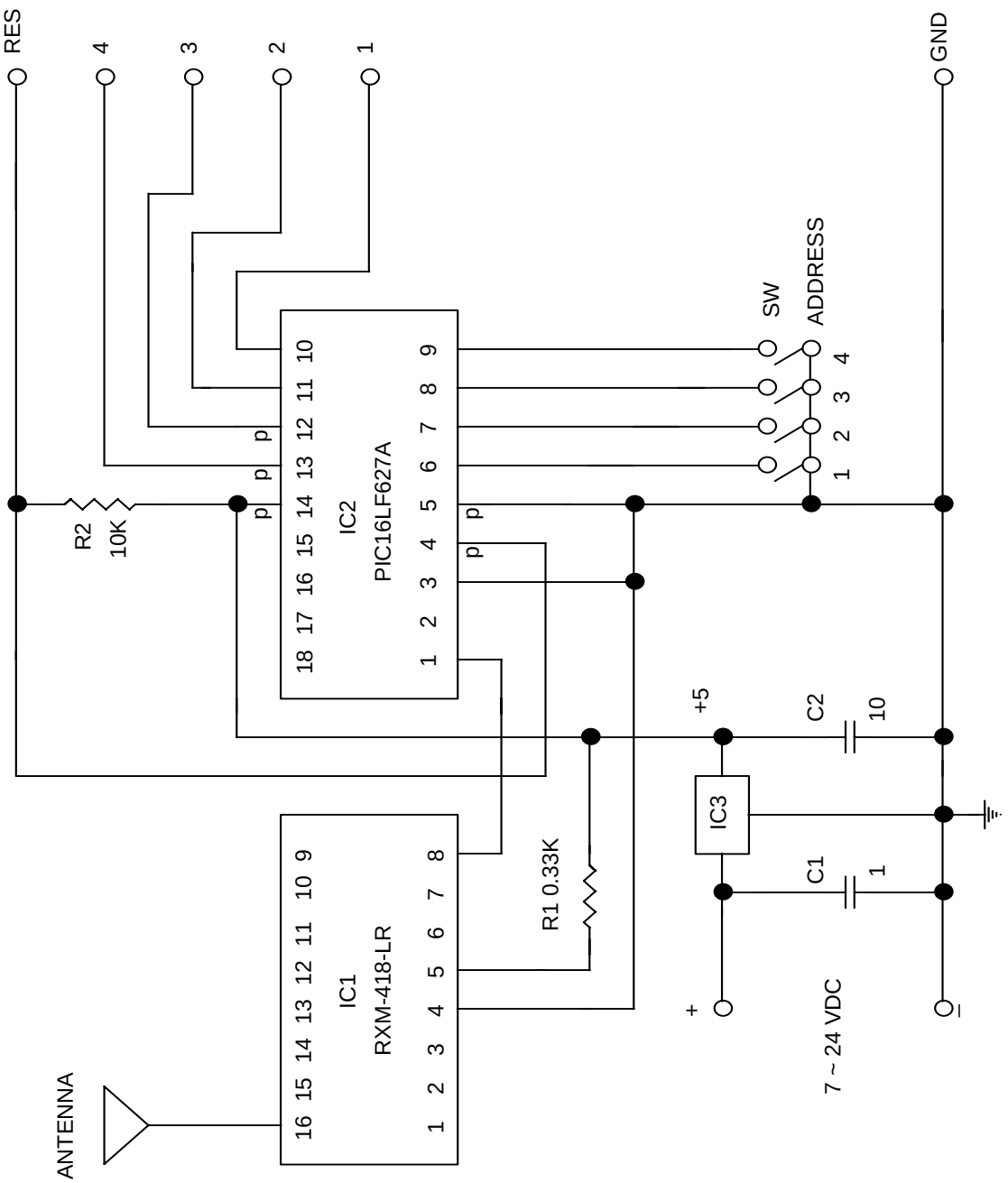


FIGURE 2 MR4A RECEIVER

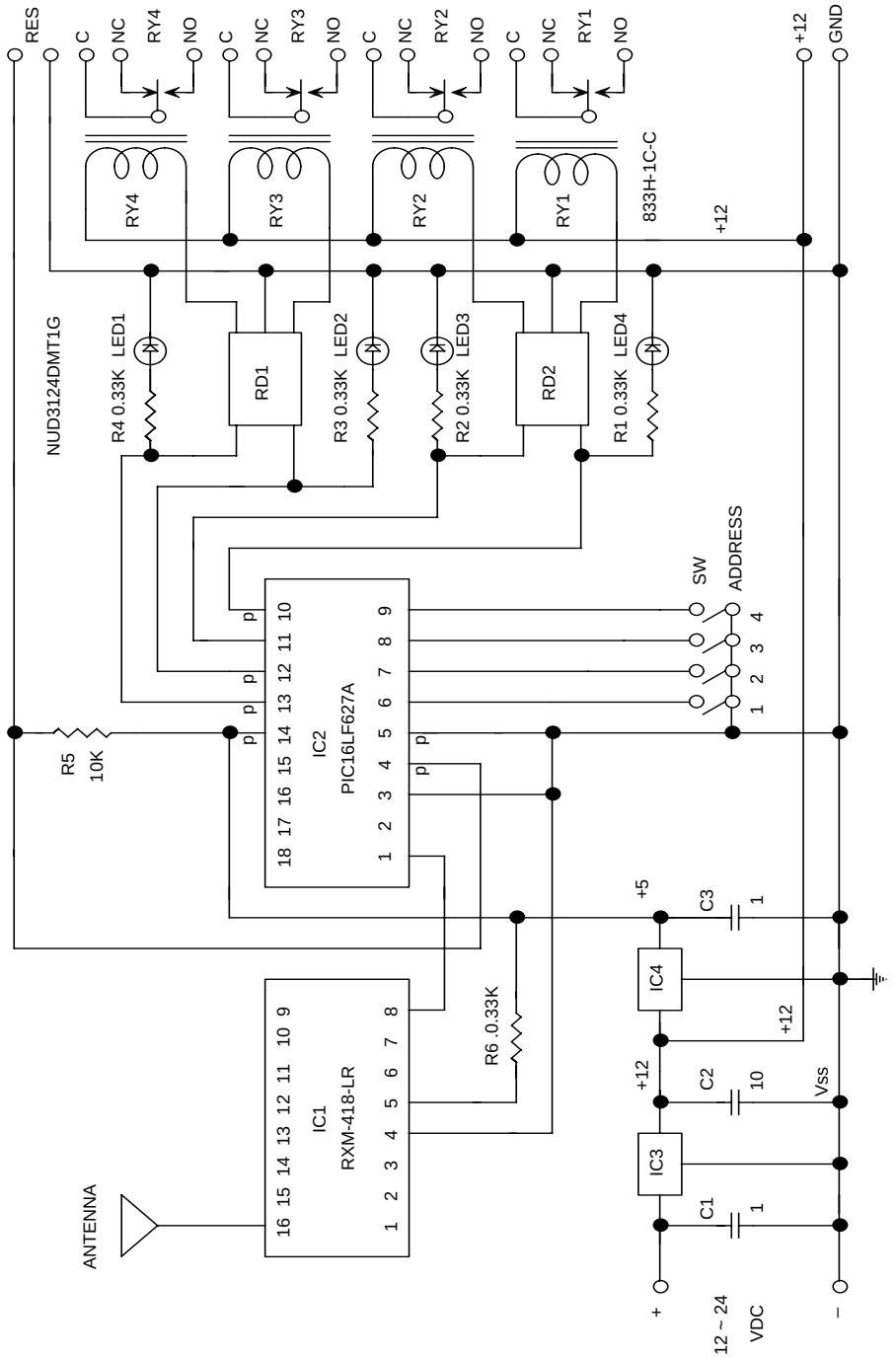


FIGURE 3 MR4B RECEIVER

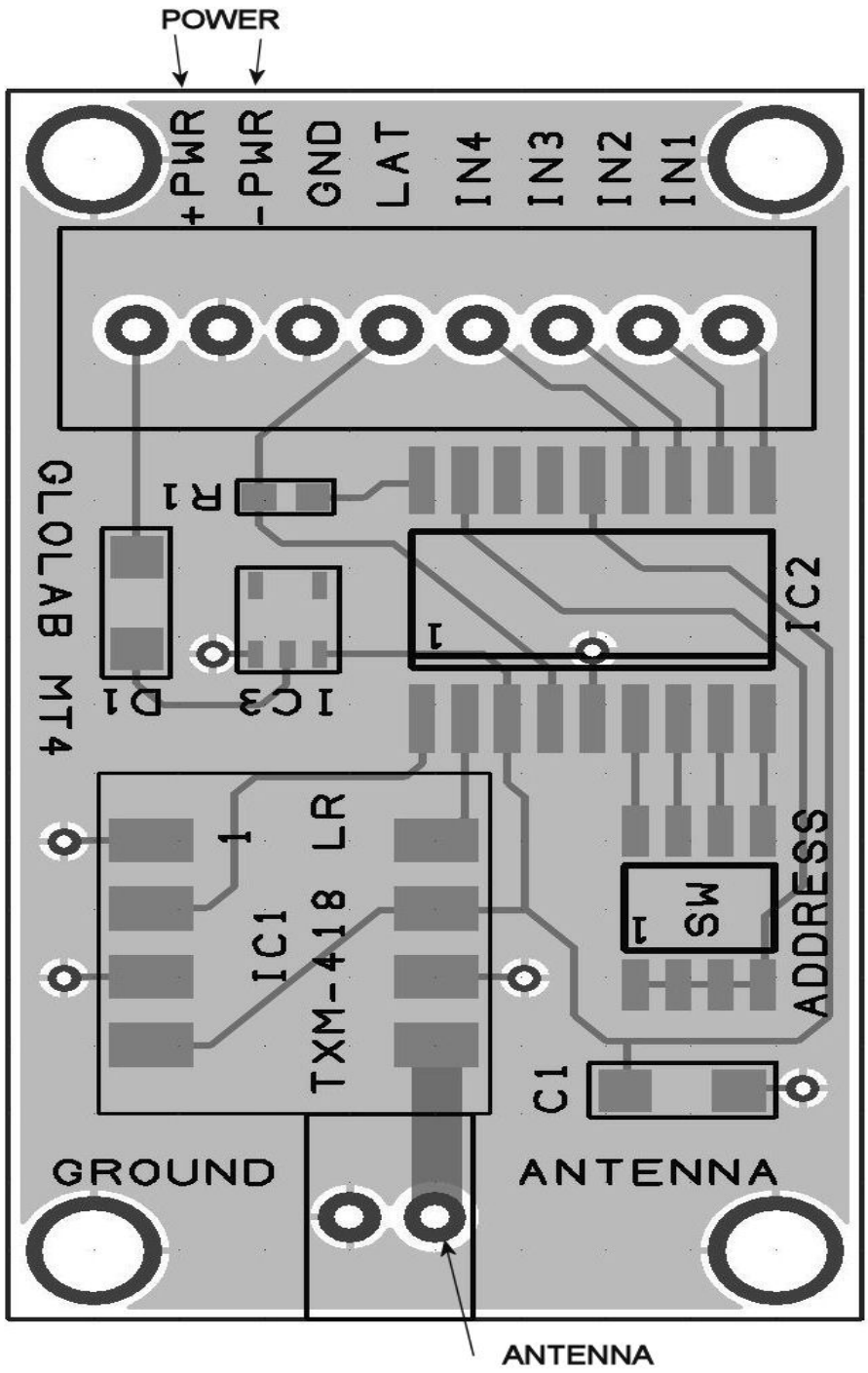


FIGURE 4

MT4 TRANSMITTER MODULE 1 X 1.8 INCHES

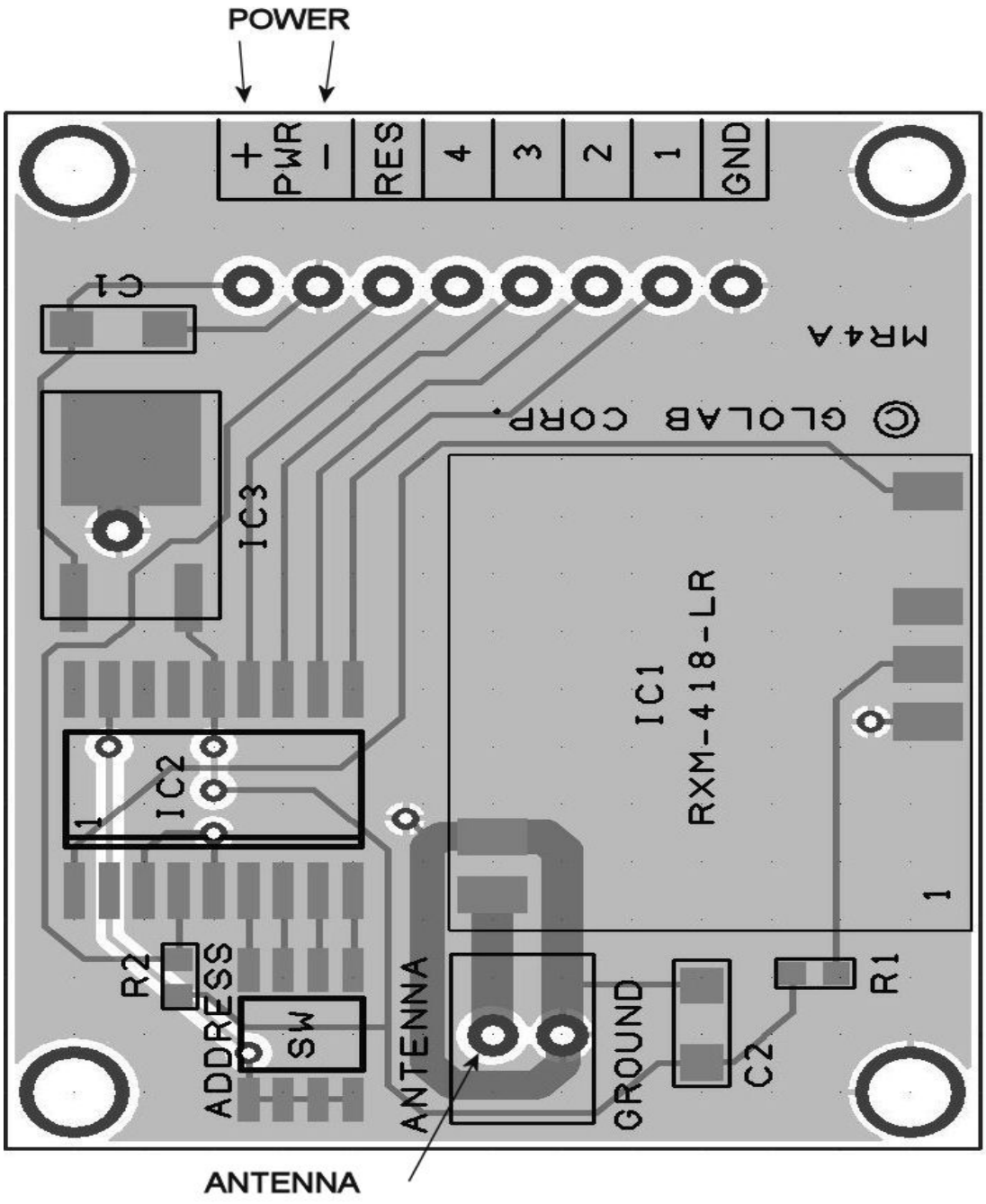


FIGURE 5

MR4A RECEIVER MODULE 1.4 X 1.8 INCHES

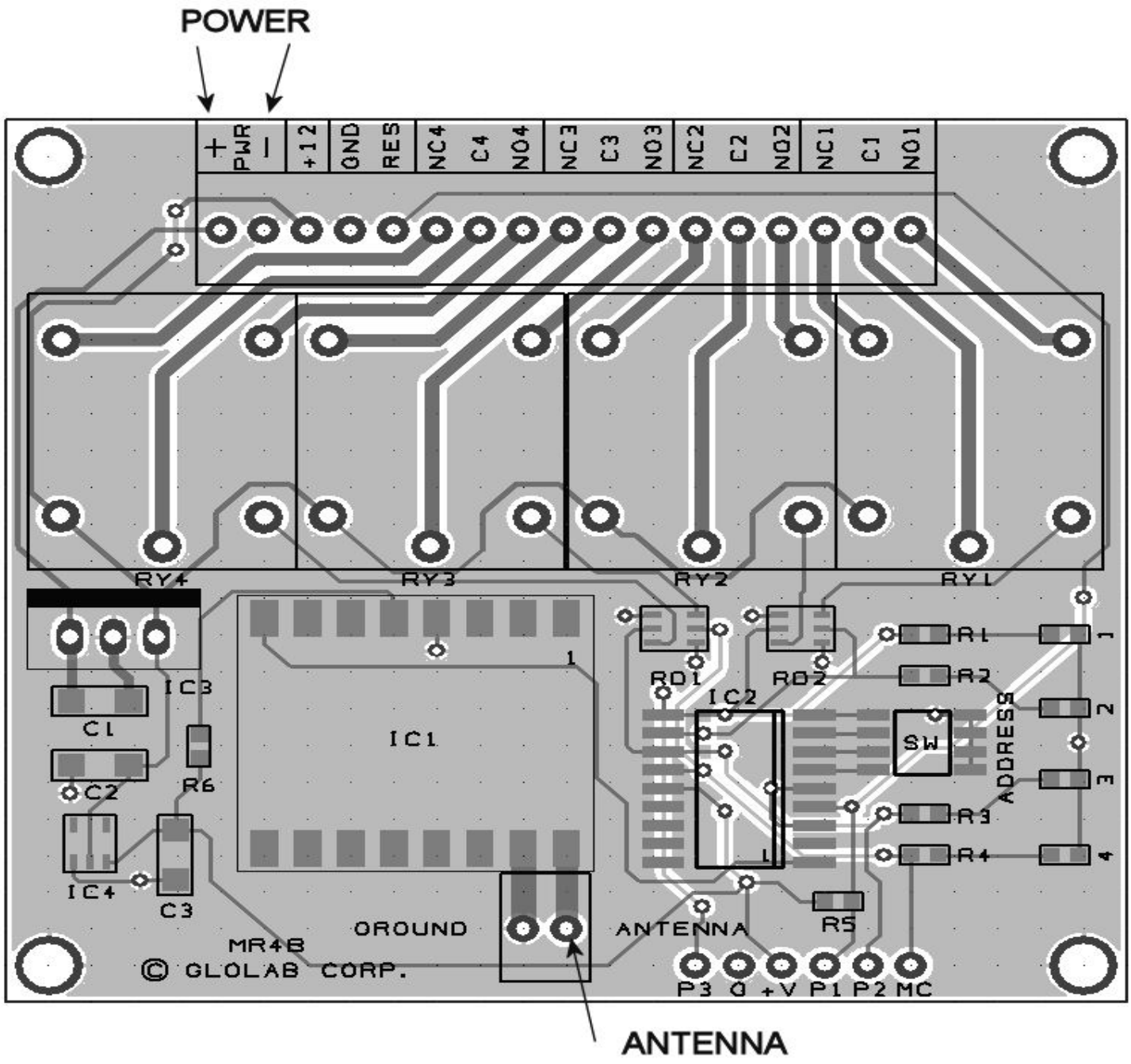


FIGURE 6

MR4B RECEIVER MODULE 2.4 X 2.6 INCHES

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