


PARTS LIST

	Parts list not available in the download version.
	Full schematic with order of kit or assembled board.
	Full embedded C and PC C++ source code with order.
	Kit or assembled board includes wired DB9 connector with 3" tinned leads for connection to rs232 input terminal. Wires can be easily de-soldered and longer wires added if desired.
	Large capacity screw terminal blocks for easy connection and disconnection of wires.

 1k – Brn, Blk, Red, Gold

 3.3k – Org, Blk, Org, Gold

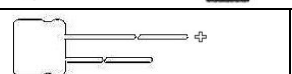
 1meg – Brn, Blk, Blk, Yel, Brn

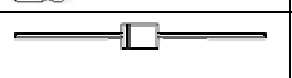
 100k – Brn, Blk, Blk, Org, Brn

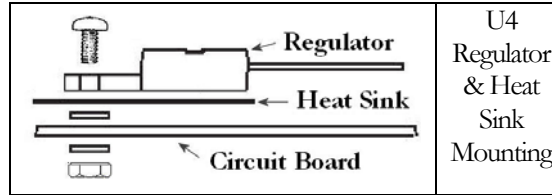
 Long lead Negative

 Long lead Positive

 Q1-Q8

 Capacitor C10 Long lead Positive

 Diodes D1-D9 Line is Negative



ASSEMBLY TIPS

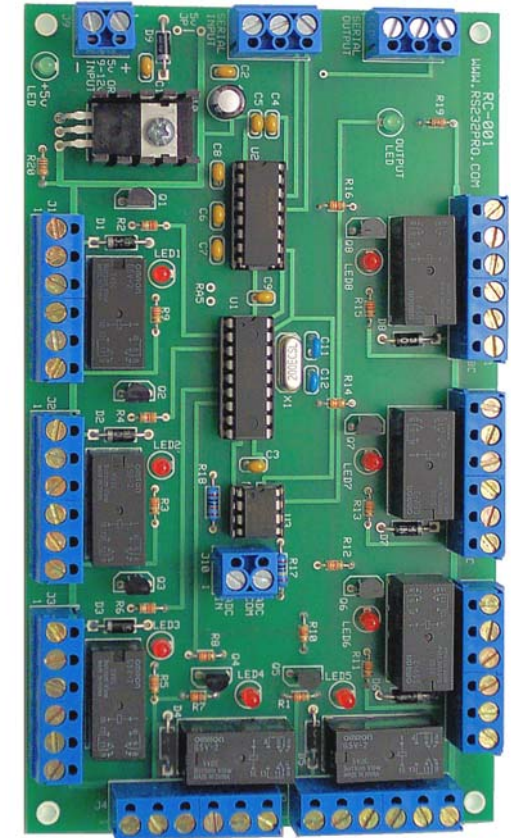
- If the board is to be mounted in an enclosure it can be used as a template before assembly.
- Assemble shorter components first.
- Make sure polarized components and IC sockets are placed correctly.
- Assemble U4 regulator last.

SPECIFICATIONS:

- 19200 Baud, 8DB, 1SB, NHS
- 9-12VDC or 5VDC Input.
- 600MA Input Current Max.
- Relay Contacts 0.50A at 125VAC, 2A at 30VDC.
- Relay Operate Time 7MS Max.
- Screw Terminal Block Capacity 2-3 20GA Wires (each connection).
- Analog Input 54VDC Max.*
- Analog Input Current 50UA Max.*
- Analog Input Impedance 1.10M.*

* R17=1M, R18=100K.

RC-001 RS232 8-DPDT RELAY / ANALOG INPUT PCB



Easy to use and reliable!

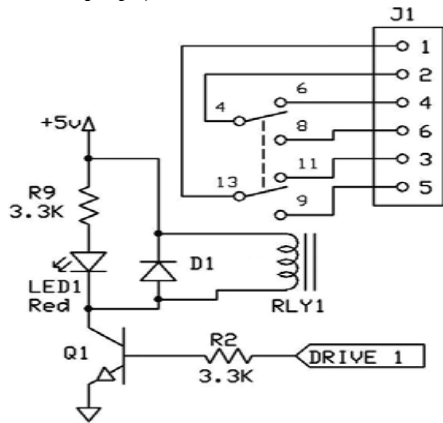
Virtual Integrated Design

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RELAY CIRCUITS

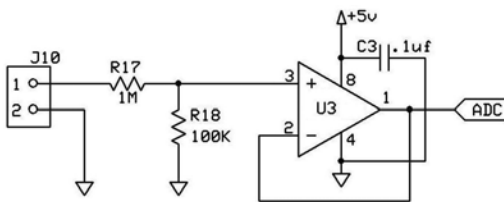
The image below shows one of eight relay circuits. The micro pin drives a transistor (Q1) which in turn activates the relay and lights the associated indicator led. All 8 relay circuits are connected to terminal blocks (J1-J8).



The relays are shown in their normally open state (turned off).

ANALOG INPUT

The analog input can be used to monitor voltages up to 54vdc (or more). By changing resistor R17 more resolution can be obtained although the max input voltage is changed. The circuit is shown below.



The following chart shows some possible values and results:

R17	R18	Max	Volts/Bit
2M	100K	105VDC	0.10254
1M	100K	54VDC	0.05371
499K	100K	29VDC	0.02925
100K	100K	10VDC	0.00977
1M	none	5VDC	0.00488

Removing R18 will create very high input impedance and draw very little current from the monitored circuit.

POWER CIRCUIT

DC voltages from 9v to 12v are regulated down to 5v for circuit operation. Or, for direct 5v operation, use the "5v JP" (not shown on schematic). If the 5v jumper is used, remove U4.

RS232 COMMUNICATION

Commands for setting the relays, reading the analog input and flashing the output led are sent as 6 byte strings. To send any command to the next board in line simply add 1 to the 4th byte in the string. The end of the string contains a 2 byte, 2's complement, LB/HB checksum. Here are some example commands and responses:

To set all the relays on the first board ON
01,10,FF,00,F0,FE – 01,10,FF,00,F0,FE
To set all relays on the #3 board ON
01,10,FF,02,EE,FE – 01,10,FF,01,EF,FE
To get analog on #1 board (average 100)
01,11,64,00,8A,FF – 01,11,d1b,dhb,csl,csh (data low byte, data hi byte, cs low, cs hi)
Flash output led 6 times on #2 board
01,12,06,01,E6,FF – 01,12,06,00,E7,FF

The checksums are created by adding the first 4 bytes into a 2 byte variable, inverting the bits (Not) and adding 1 to the result. If there is an error, one of the following codes might be returned:

"SB?"	53,42,3F	Bad start byte.
"CS?"	43,53,3F	Bad checksum.
"OV!"	4F,56,21	Buffer overrun.
"TO!"	54,4F,21	Return timeout.

MULTIPLE BOARDS

Up to 32 boards can be wired together in series to control up to 256 relays from one serial port.



The first board is connected to the PC as shown below:

DB9	RC-001 Terminal J12
Pin-2	J12-2 (TX)
Pin-3	J12-1 (RX)
Pin-5	J12-3 (Circuit Ground)

Each successive board's J12 is connected to the previous board's J11. Pin-3 of each connector must be tied together for a common ground. Connect J11-1 to J12-2 and J11-2 to J12-1.