

SX-28 Proto Board

by Rho Enterprises

Bill of Material

Item	Qty	Description	Ref desig
1	1	BOARD, SX-28 PROTO, DIP	-
2	2	CAP, MONO, 15PF, 100V, NPO	C8, 9
3	1	CAP, MONO, .010UF, 50V, .1 SPACE	C10
4	5	CAP, MONO, .10UF, 50V, .1 SPACE	C1-5
5	2	CAP, ELECT, 22UF, 25V	C6, 7
6	1	CONN, BATTERY CLIP, 9V	J1
7	1	CONN, D-SUB, DB9S, PC, RA	J7
8	1	CONN, HEADER, 6 PIN, SINGLE	J2
9	1	CONN, HEADER, 9 PIN, SINGLE	J8
10	1	CONN, HEADER, 14 PIN, STRAIGHT	J4
11	1	CONN, HEADER, 16 PIN, STRAIGHT	J3
12	1	CONN, MOLEX, 2 PIN, STRAIGHT	J1
13	1	CONN, PHONE, JACK, 3.5MM STEREO, PC	J5
14	1	CONN, RCA, JACK, PC	J6
15	1	DIODE, LED, RED, SMALL	LED1
16	1	IC, MICRO, SX28AC, 50MHZ	U2
17	1	IC, REGULATOR, LM7805, T0-220	U1
18	1	ROM 1K BIT, EEPROM 2 WIRE	U3
19	1	RES, 330 OHM 1/4W 5%	R3
20	1	RES, 1.0K, 1/4W 5%	R1
21	1	RES, 2.2K, 1/4W 5%	R4
22	1	RES, 1.0M 1/4W 5%	R2
23	1	RES, VAR, 10K, SIDE, 1/4'' SQ	RV1
24	1	SOCKET, DIP, 8 PIN	(U3)
25	1	SOCKET, DIP, 14 PIN, FULL/HALF OSC	(Y2)
26	1	SOCKET, DIP, 28 PIN, NARROW	(U2)
27	1	SOCKET, SIP, 3 PIN, MACHINED	(Y1)
28	1	TERMINAL, TEST POINT	TP1
29	1	XTAL, CERAMIC RESONATOR, 20MHZ	Y1
30	1	XTAL, COLOR, 14.31818MHZ, HC49/US	Y1
31	1	XTAL, OSC, 50.000MHZ, FULL	Y2

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Notes on using the SX-28 Proto Board

Programming connector

The Programming Connector (J2) has 4 pins. Only VSS, VDD, OSC1 and OSC2 are used by the SX-Key for In System Programming (ISP).

The Reset pin (RST) on the Programming Connector can be connected to an external reset circuit or button to aid debugging.

The Clock Enable pin (CKE) can be used to disable the on-board oscillator by applying a low level. This may improve ISP reliably by reducing the conflict between the programmer and the oscillator on the OSC2 pin.

Options for the oscillator circuit

Oscillator Type	Install	Do Not Install	Can Install
Ceramic Resonator	R2, Y1	Y2	C8, C9, C10, R3, R4
Crystal	C8, C9, R2, Y1	Y2	C10, R3, R4
Oscillator	C10, R3, R4, Y2	Y1	C8, C9, R2
Internal RC	---	---	C8, C9, C10, R2, R3, R4, Y1, Y2

The PCB will accept either full or half size oscillators. Choose an oscillator with output enable if the CKE pin on J2 is to be used. If the oscillator does not have output enable then R4 is not needed.

Options for the 5 volt regulator

For low power circuits, an LM78L05 in the T0-92 case can replace the LM7805 (T0-220 case). When this is done, install the 78L05 with the flat side nearest to the edge of the PCB.

For battery operated circuits where reverse polarity protection is desired, use an LM2931AZ-5.0 (T0-92 case) for low power or an LM2940CT-5.0 (T0-220 case) for higher power. C6 must also be replaced with a non-polarized capacitor. C7 may also need to be changed -- see the National Semiconductor data sheets for details.

The flat side of a heat sink can be bolted to the tab of the LM7805 or LM2940. It will rest against the edge of the PCB. This flat heat sink could be the back panel of a box in some applications.

LCD and EEPROM options

The EEPROM and LCD share signals on Port C. Because of this, Port C bit 7 is only available on pin 6 of U3, the EEPROM. Also, the LCD

Read/Write line is used as the data line of the EEPROM to save port pins.

Note that order of the data pins on the LCD connector are bit reversed.

The LCD module is intended to plug directly onto J4 using mating male and female headers. One header is on the component side of the SX-28 Proto Board and the mating header is on the back, non-display side, of the LCD module.

A ribbon cable can be used to remote the LCD module from the SX-28 Proto Board. When this is done, use a right angle header on the display side of the LCD module with the other header still on the component side of the proto board. (If this is not done the even and odd rows swap on the LCD).

When J6 is the RCA jack, its height prevents the LCD from plugging directly into J4. There may be similar problems with J7 and J8.

Using the ground plane

Scratch the solder mask away in the area that the ground is needed. This is what works best in speed critical circuits.

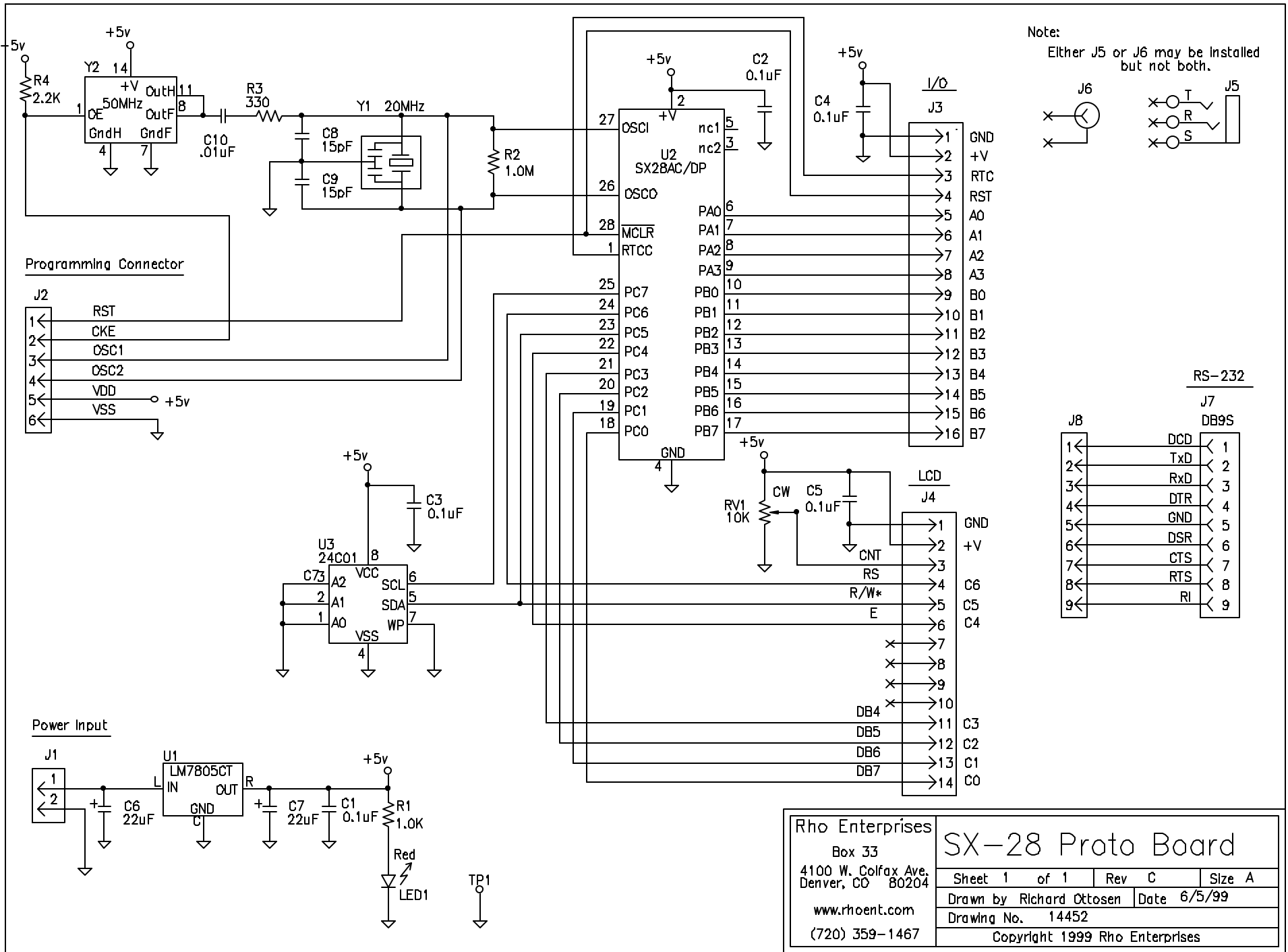
Use the unmasked strip along the edge of PCB. Carefully run bare wires between the +V pads. Bring the wire through a hole from the circuit to the component side near the edge of the board. Then run the over the bare wire over to the ground strip at the edge. Or bend the wire around the edge of the board from the circuit side to the component side.

Other things to consider

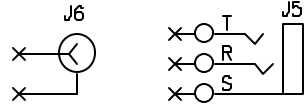
Don't forget to connect the RST and RTC pins on J3. It is convenient to jumper adjacent together. Connecting J3 pin 4 to J3 pin 2 ties the RST input to +V and connecting J3 pin 3 to J3 pin 1 grounds the RTC input.

Using 10K resistors in place of the jumpers allows driving the Reset and RTCC pins during debugging.

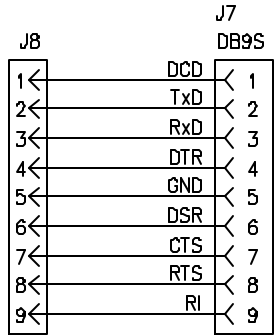
If the header for J3 is not installed then insert the resistors standing on end with the long leads exposed for access to connector pins 3 and 4.



Note:
Either J5 or J6 may be installed but not both.



RS-232



Rho Enterprises Box 33 4100 W. Colfax Ave. Denver, CO 80204 www.rhoent.com (720) 359-1467				SX-28 Proto Board			
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