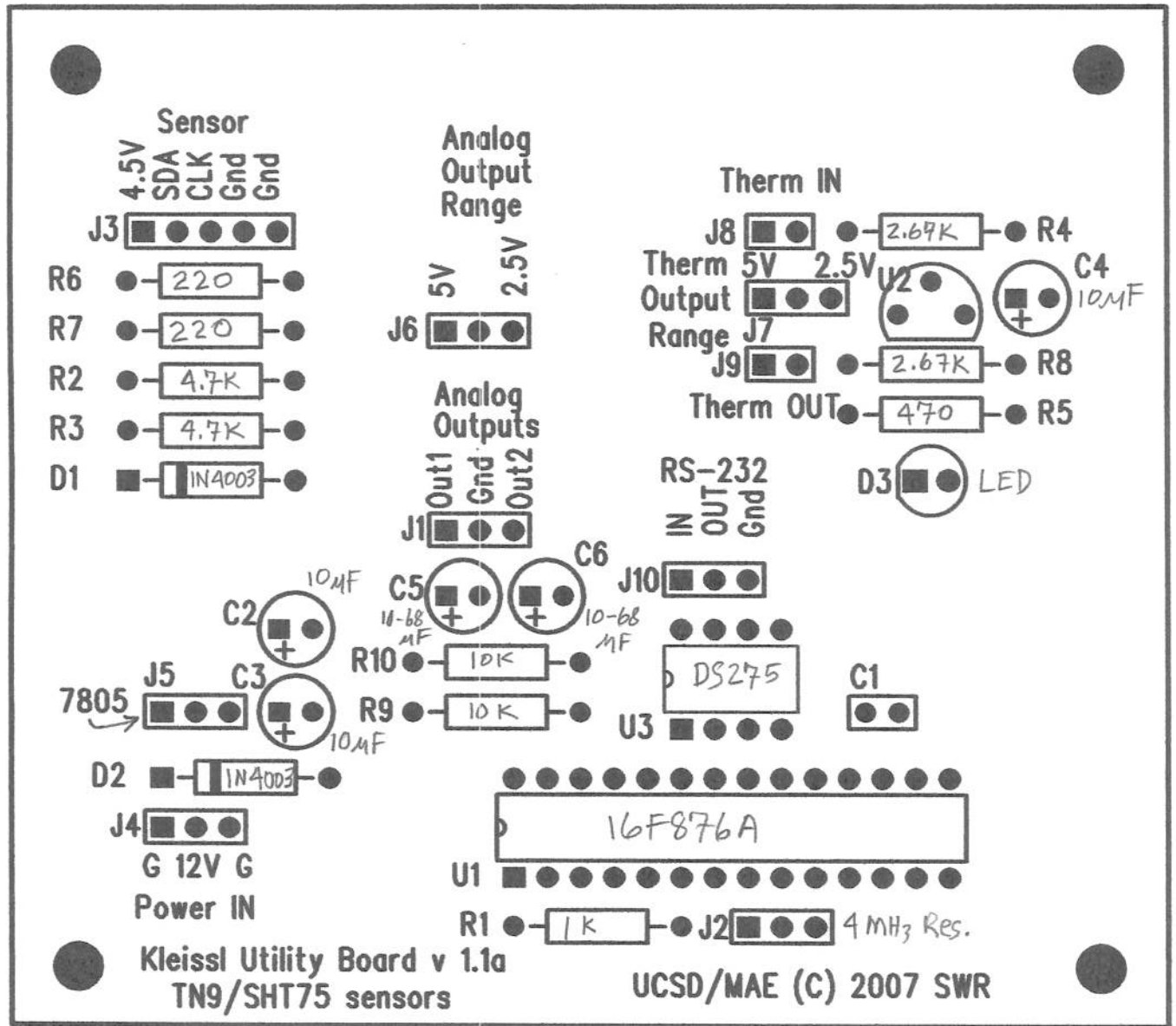


Jan

X4

X:

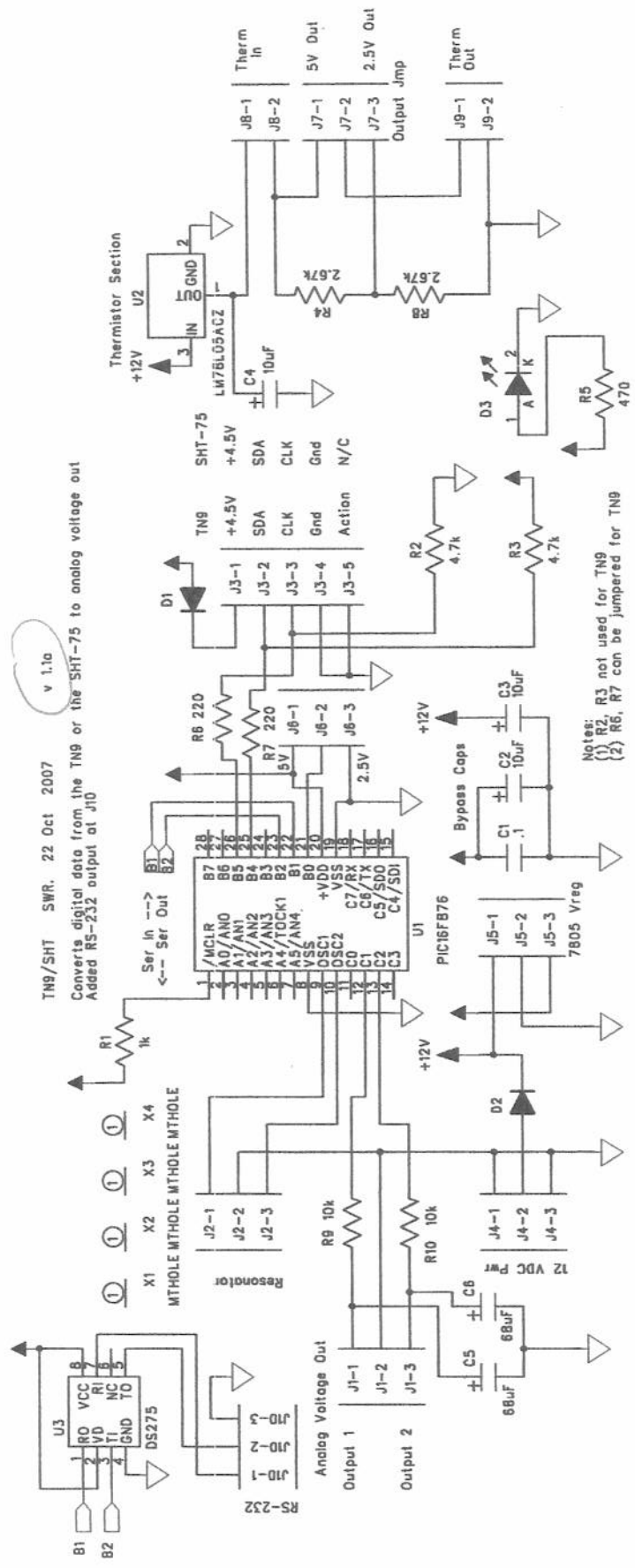


X1

X2

Item	Qty	Refere	VALUE	Part Name	Description
1	1	C1	.1	CAPCERSM	Ceramic Cap small .100 centers
2	1	C2	10uF	CAPTANT	DECOUP CAP RADIAL BODY:.270 X.130 CENTERS:.200
3	1	C3	10uF	CAPTANT	DECOUP CAP RADIAL BODY:.270 X.130 CENTERS:.200
4	1	C4	10uF	CAPTANT	DECOUP CAP RADIAL BODY:.270 X.130 CENTERS:.200
5	1	C5	68uF	CAPTANT	DECOUP CAP RADIAL BODY:.270 X.130 CENTERS:.200
6	1	C6	68uF	CAPTANT	DECOUP CAP RADIAL BODY:.270 X.130 CENTERS:.200
7	1	J8		CON-SIP-2P	GENERIC 2 PIN SIP HEADER .100 CENTERS
8	1	J9		CON-SIP-2P	GENERIC 2 PIN SIP HEADER .100 CENTERS
9	1	J1		CON-SIP-3P	GENERIC 3 PIN SIP HEADER .100 CENTERS
10	1	J2	4MHZ	CON-SIP-3P	4 MHZ resonator .100 CENTERS
11	1	J4		CON-SIP-3P	GENERIC 3 PIN SIP HEADER .100 CENTERS
12	1	J5	+5V	CON-SIP-3P	7805 +5V Voltage Reg .100 CENTERS
13	1	J6		CON-SIP-3P	GENERIC 3 PIN SIP HEADER .100 CENTERS
14	1	J7		CON-SIP-3P	GENERIC 3 PIN SIP HEADER .100 CENTERS
15	1	J10		CON-SIP-3P	GENERIC 3 PIN SIP HEADER .100 CENTERS
16	1	J3		CON-SIP-5P	GENERIC 5 PIN SIP HEADER .100 CENTERS
17	1	D1	1N4003	DIODE	GENERIC DIODE W ALTERNATE
18	1	D2	1N4003	DIODE	GENERIC DIODE W ALTERNATE
19	1	U3		DS275	RS-232 interface
20	1	D3		LED	LIGHT EMITTING DIODE
21	1	U2	+5V	LM78L05ACZ	5 VOLT, POSITIVE VOLTAGE REGULATOR
22	1	X1		MTHOLE	
23	1	X2		MTHOLE	
24	1	X3		MTHOLE	
25	1	X4		MTHOLE	
26	1	U1		PIC16F876	Microcontroller
27	1	R1	1k	RES-1/4W	RES BODY:100 CENTERS:500
28	1	R2	4.7k	RES-1/4W	RES BODY:100 CENTERS:500
29	1	R3	4.7k	RES-1/4W	RES BODY:100 CENTERS:500
30	1	R4	2.67k	RES-1/4W	RES BODY:100 CENTERS:500
31	1	R5	470	RES-1/4W	RES BODY:100 CENTERS:500
32	1	R6	220	RES-1/4W	RES BODY:100 CENTERS:500
33	1	R7	220	RES-1/4W	RES BODY:100 CENTERS:500
34	1	R8	2.67k	RES-1/4W	RES BODY:100 CENTERS:500
35	1	R9	10k	RES-1/4W	RES BODY:100 CENTERS:500
36	1	R10	10k	RES-1/4W	RES BODY:100 CENTERS:500

2 OCT 2007



TN9/SHT SWR. 22 Oct 2007 v 1.1a  
 Converts digital data from the TN9 or the SHT-75 to analog voltage out  
 Added RS-232 output at J10

Notes:  
 (1) R2, R3 not used for TN9  
 (2) R6, R7 can be jumpered for TN9

## Kleissl Utility Board – 22 October 2007

**Overview:** The Utility Board is powered by a nominal +12 VDC and can communicate with either a Sensirion SHT75 temperature/humidity sensor or a ZyTemp TN9 infrared thermometer module. Both these sensors produce two digital outputs. The TN9 produces a target temperature (the temperature of the surface at which it is aimed, emissivity = 0.95) and also the temperature of the TN9 circuit board itself. The SHT75 produces a relative humidity and a temperature. The utility board commands the sensor, and reads back the results from the sensor. These digital values are then converted to analog signals using a pulse width modulation approach followed by a filter. The resulting analog signals can be read by data loggers and other equipment with analog input capability. The analog outputs are jumper-selectable for a 0-2.5 or 0-5 volt output range. The board also has an input for a YSI type 44016 10k thermistor. The thermistor signal is conditioned to produce a jumper-selectable 0-2.5 or 0-5 volt output over a -20 to +80 degree C temperature range.

The board has a serial communications port which can be used to view the sensor outputs in physical units (degrees C and percent relative humidity).

**Connections:** Connections to the Utility Board headers are as follows:

Header ID	Function	Pin Definitions
J1	Analog Outputs	(SHT75): 1 = Temp, 2 = Ground, 3 = RH (TN9): 1 = T-target, 2 = Ground, 3 = T-board
J3	Sensor connection (TN9 or SHT75)	1 = Vdd, 2 = SDA, 3 = CLK, 4 = Gnd, 5 = Gnd
J4	Power In	1 = Gnd, 2 = +12 VDC, 3 = Gnd
J8	Thermistor In	Pin polarity is unimportant. Connect to pins 1&2.
J9	Thermistor Out	1 = Analog voltage out, 2 = Gnd
J10	Serial COM port	1 = data in to the board, 2 = data out, 3 = Gnd

Notes:

1. When identifying header connections on the circuit board, pin #1 is the pin with the square solder pad. The other pins (pins 2 and above) have round pads.
2. The thermistor input (J8) is not sensitive to pin orientation. However, the thermistor signal output (J9) is, and the J9 connection has the analog output on pin 1 and signal ground on pin 2.
3. A terminal program, such as Hyper Terminal on a PC, may be used to view sensor data using a serial port on the PC. The data format is 9600 baud, 8 data bits, 1 stop bit, no parity.