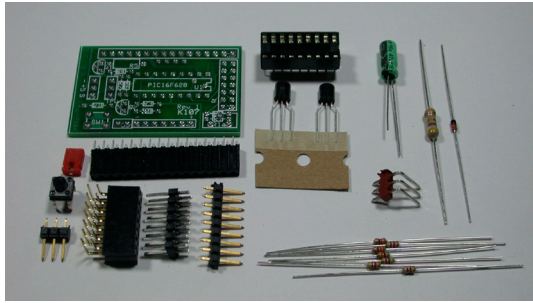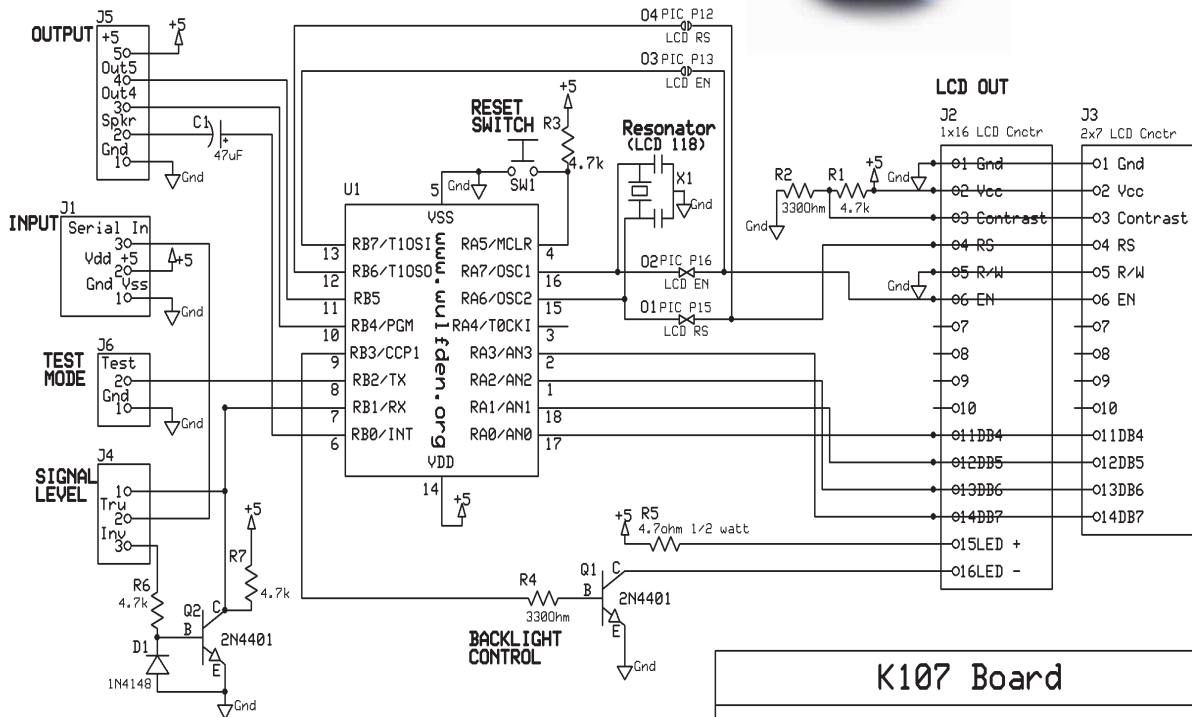# K107 LCD Controller Board (Rev 2)

A Flexible Serial Backpack Kit

Russ Ferguson (KD5MTN)
Brian Riley (N1BQ)
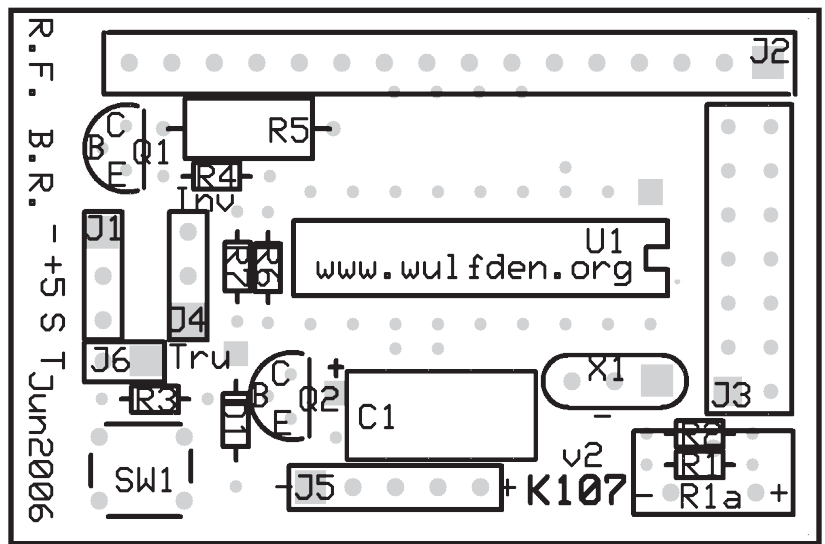
Wulfden at Hawk's Mountain

Ye Olde Disk Shoppe

PO Box 188

Underhill Center, VT 05490

<http://www.wulfden.org>

Schematic

OUTPUT — J5: +5, 5o Out5, 4o Out4, 3o Spkr, 2o Gnd, 1o

C1 47uF

INPUT — J1: Serial In 3o, Vdd +5 2o, Gnd Vss 1o

TEST MODE — J6: Test 2o, Gnd 1o

SIGNAL LEVEL — J4: 1o, Tru 2o, Inv 3o

R6 4.7k, Q2 2N4401, D1 1N4148, R7 4.7k

U1:
- 13 RB7/T1OSI — RA5/MCLR 4
- 12 RB6/T1OSO — RA7/OSC1 16
- 11 RB5 — RA6/OSC2 15
- 10 RB4/PGM — RA4/T0CKI 3
- 9 RB3/CCP1 — RA3/AN3 2
- 8 RB2/TX — RA2/AN2 1
- 7 RB1/RX — RA1/AN1 18
- 6 RB0/INT — RA0/AN0 17
- 5 VSS / VDD 14
- +5

RESET SWITCH SW1, R3 4.7k

Resonator (LCD 118) X1

O4 PIC P12 LCD RS
O3 PIC P13 LCD EN
O2 PIC P16 LCD EN
O1 PIC P15 LCD RS

R2 330Ohm, R1 4.7k, +5

BACKLIGHT CONTROL — R4 330Ohm, Q1 2N4401, +5 R5 4.7ohm 1/2 watt

LCD OUT
J2 1x16 LCD Cnctr / J3 2x7 LCD Cnctr:
- O1 Gnd
- O2 Vcc
- O3 Contrast
- O4 RS
- O5 R/W
- O6 EN
- O7
- O8
- O9
- O10
- O11 DB4
- O12 DB5
- O13 DB6
- O14 DB7
- O15 LED +
- O16 LED −

K107 Board
LCD Controller

Russ Ferguson	Rev 2 5/29/2006	Brian Riley

Full Documentation is available at:

<http://www.wulfden.org/k107/k107-1r2.pdf>

Preliminary 7/17/2006

Board layout

R.F. B.R. - +5 S T Jun2006

J2, R5, Q1 (C B E), R4, Inv, J1, U1 www.wulfden.org, J4, Tru, J6, R3, C2 (C B E Q2), C1, X1, J3, SW1, J5, v2 K107, R2 R1, R1a +

R1	4.7 Kohm - 1/8 watt resistor (see text)
R2	330 ohm - 1/8 watt resistor (see text)
R3,R6,R7	4.7 Kohm - 1/8 watt resistors
R4	330 ohm - 1/8 watt resistor
C1	47 uF Tantalum or electrolytic capacitor (see text)
R5	4.7 ohm - 1/2 watt resistor
D1	1N4148 OR 1N 914 diode
Q1, Q2	2N4401 - NPN transistor
U1	pre-programmed PIC 16F628/16F648A
S1	N.O. pushbutton switch (DigiKey P8006S-ND)
X1	4 MHz Resonator - used with Anderson 108/118
J1	.100 pin header right angle - 1x3
J2	.100 socket header - 1x16 (see text)
J3	.100 socket or pin header - 2x7 (see text)
J4	.100 pin header - 1x3
J5	.100 pin header - 1x5 (see text)
J6	.100 pin header - 1x2 (see text)
n/a	18 pin DIP socket for U1
n/a	push on jumper

Pin	Signal Input - J1 Description
1	Ground
2	+ 5 vdc
3	Data Input

Note - this pin arrangement was made specifically to permit easy use of a three wire black/red/white servo/lcd cable to connect the display controller to a project or breadboard. It is also the same convention used by Parallax Corp. to connect to its serial peripherals**.**

Selecting setup for #117 (9600 bd) or #118 (2400 bd) - As delivered, the board is setup for the #117 chip. To run the #118 chip, turn over the board solder side up and locate two pairs of pads adjacent to U-1 pins 15/16. Cut the two fine traces connecting these pads. Then locate a similar set of pads adjacent to U-1 pins 12/13 create a solder bridge or tack solde a short wire across this set of pad. Insert 4 MHz resonator into the holes next to U-1 marked "X1."

Pin	General Outputs - J5 Description
1	Ground
2	Piezo
3	General Output 4 (107,117)
4	General Output 5 (107,117)
5	+ 5vdc

Pin	Test Mode - J6 Description
1	Ground (TEST jumper 1-2)
2	U1 - pin 8 (normal - no jumper)

Pin	Signal Invert - J4 Description
1	to U1 - pin 7 (TRU jumper 1-2)
2	Data In from J1-3
3	to R8 (INV jumper 2-3)

Note - One good way to 'keep track' of the input configuration of the K107 is to use only a single jumper for J4 and J6. Placed on J6 the K107 is in Test Mode. Placed on J4 in one position or another it is in TTL **TRU** or RS232 **INV** input mode and you do not need to store the unused Test Mode jumper.