858 PLL IC

Ground pin 7 for 5K steps

SIP resistor: 10K x 8 (see text)

		$\overline{\text{RESET}}$	1	28	PC5 — Configuration link **(Warning: see text next page)**
1	Pin 13 — 1K —	PD0	2	27	PC4 — Ground to disable frequency change (i.e. on TX)
2	Pin 14 — 1K —	PD1	3	26	PC3 — Ground to jump straight to home (starting) channel
4	Pin 15 — 1K —	PD2	4	25	PC2 — Ground for FAST (10X) speed
8	Pin 16 — 1K —	PD3	5	24	PC1 — A
10	Pin 17 — 1K —	PD4	6	23	PC0 — B GND
		VCC	7	22	GND
		GND	8	21	AREF
		PB6	9	20	AVCC — Pin 1 (common)
		PB7	10	19	SCK
20	Pin 18 — 1K —	PD5	11	18	MISO
40	Pin 19 — 1K —	PD6	12	17	MOSI
80	Pin 20 — 1K —	PD7	13	16	PB2
100	Pin 21 — 1K —	PB0	14	15	PB1
200	Pin 22 — 1K —				

Atmel microcontroller ATMEGA8 (DIP28 package)

Rotary encoder switch

BLACK = Ground (Vss)
RED = +5V regulated
PINK = To programmer device

ORANGE = Input
BLUE = output

330 ohm   LED

Atmel BCD generator for uPD858:

Note #1: The SIP resistor is simply 8 resistors in one package, one end of each is connected to Pin 1 (Common).
If you don't have a SIP, eight individual resistors can be used, but it's not as neat. An equivalent circuit is shown below:.

SIP resistor: 10K x 8

Equivalent circuit:

1   9

1   9

8 x 10K resistors
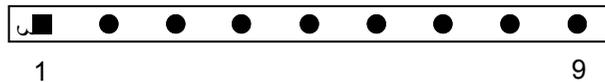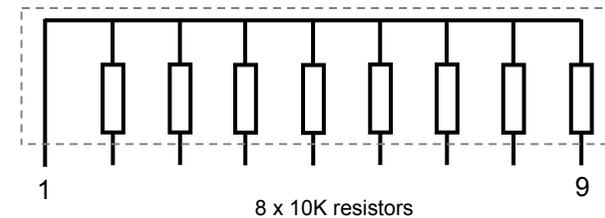
Note #2: The radios 5V regulator cannot supply the 75mA required for this circuit.   A separate 12V to 5V regulator should be used, a 78L05 on the board works well, as will a 7805 mounted off the board.

Note #3: Unless you have a good supply of Atmel ICs, mount in in a socket and check your regulator circuit is working before fitting the micro!   Voltages above 5V on any pin will send both it and the programmer straight to micro heaven.

Note #4: To prevent frequency changes when transmitting, use a transistor (BC548 or 2N2222, any small signal NPN, not critical) as a switch to isolate the 9V / 12K from the micro.   Connect the collector to pin 27, emitter to ground, base to 9VTX or 12VTX via a 10K resistor.   Connect another 10K resistor from base to ground.   Before plugging in the Atmel, make sure there is no voltage above 5V at pin 27 in RX, and no voltage above 1V in TX.

Note #5: The programmer needs **five** connections: RESET (RST), SCK, MOSI, MISO, and **ground**.   Don't forget the ground...

Note #6: Under normal running, the only connection to pin 28 should be the 10K resistor.   The LED will flash on only very quickly as the output changes when the encoder switch is turned.   Only connect pin 28 to ground when configuring the Atmel.

The NVRAM can only be written to a few thousand times, if this pin is permanently grounded you **will** kill the NVRAM!

When you have verified the board is working correctly, configure it as shown on the following page.

Configuring the encoder:

WARNING: Do not have the programmer connected when doing this!

1)   Disconnect all power (not just turned off at the radio, turn off the power supply / mains too).

2)   Connect pin 28 to ground.   Connect pin 17 to ground.
     Turn on the radio and use the encoder to select the <u>lowest</u> frequency desired.
     Wait 10 seconds, and turn off the radio at the power (full power down).

3)   Leave pin 28 to grounded.   Remove pin 17 from ground. Connect pin 18 to ground.
     Turn on the radio and use the encoder to select the <u>highest</u> frequency desired.
     Wait 10 seconds, and turn off the radio at the power (full power down).

4)   Leave pin 28 to grounded.   Remove pin 18 from ground. Connect pin 19 to ground.
     Turn on the radio and use the encoder to select the <u>home</u> frequency desired (this is the startup / home buttoned frequency).
     Wait 10 seconds, and turn off the radio at the power (full power down).

5)   Remove pins 28 and 18 from ground to return the radio to normal operation.

     Verify that the radio starts up on the home frequency and is limited to the limits you configured.

Note: When in configuration mode, the LED stays on and briefly flashes off as the output changes when the
 encoder switch is turned. This is to warn the installer that the NVRAM section of the micro is being written to.

This should only be done when installing - do not leave it in this condition for normal usage.

1K

STN