



## HF SuperPacker Pro 100W Amp Display Panel: HFSP PANEL-100 R2

Note: This board requires that the LEDs are spaced off the board the correct amount to be flush with the front panel windows. The assembly procedure will use the front panel and standoffs as spacing guides.

At the end of this assembly you will have the HFSP PANEL-100 R2 and front panel joined together for case assembly.

### Circuit Board Assembly

#### ***Install Capacitors***

3 each 0.1uF capacitors (104) at C1, C5, C6  
3 each 1000pF capacitor (102) at C2, C3, C4

#### ***Install Resistors***

3 each 470 ohm 1/8W 5% at R2, R3, R4  
1 each 75 ohm 3W at R14  
1 each 10K 1/8W 5% at R2

#### ***Install Socket and U1 IC***

Place 18-pin socket at U1 on the back side. Solder one pin to hold and then make certain flat against the circuit board by reheating pin and pressing part against panel (if needed). Install PIC16F88, U1 in the socket. Make certain that notch matches silk screen pattern.

#### ***Install U2, 74145***

Straighten pins and insert at the U2 location. Make certain that notch matches silk screen pattern. Solder.

#### ***Install Potentiometer, VR1***

The right angle adjustment screw should be towards the top of the display module. Solder.

#### ***Install Resistor Network, R1***

Insert the network to match the silkscreen outline. Bend two corner pins 45 degrees to retain the network in the socket. Solder.

#### ***Install Encoder***

Slip the encoder into the mounting holes but do not solder. The height will be adjusted after the panel is in place. No washer is needed or desired.



### ***Attach M/F Spacers to LCD***

Locate Item 19 (4 Male/Female spacers) and Item 9 (LCD Display).

The spacers are attached to the LCD from the back side. The holes are slightly undersize. You will need a 3/16 inch nut driver to thread the four corner mounting holes as you screw each spacer into the back side of the LCD. Do not over tighten. Stop when a spacer is flush with the bottom of the LCD.

### ***Attach LCD to Circuit Board***

Insert 16 x 1 header strip with short pins into the LCD Module. Insert the other end of the header into the circuit board. Attach the LCD Module to the circuit board at the four mounting points using a 4-40 x 1/4 screw and lock washer. Make certain that the header strip is flush against the LCD module. Solder header strip on the LCD and circuit board. Peel the protective membrane from the front of the LCD screen exposing the glass.

### ***Attach front panel spacers on the circuit board***

At each corner front side, install a nylon 4-40 washer (simulated panel thickness) and a 1/2 inch x .187 hex aluminum spacer. Secure with a 4-40 x 1/4 inch screw from the back side. This distance sets the proper spacing of the display board to the front panel. (Items 25-26). Place the screw through the hole. Put the nylon washer on the screw and thread the spacer on the screw. [the nylon washers will be removed when attaching the front panel to the chassis].

**Assembly Note:** The LEDs have a longer Anode lead which is oriented towards the middle of the four LED group columns. Do NOT solder until instructed after the proper spacing off the board has been achieved. Refer to the top view parts placement to determine which color LED goes where. This information also appears on the schematic and BOM reference IDs.

### ***Install LEDs.***

Insert the LEDs. Load the board with all the LEDs. It is important to keep the leads straight for ease of height adjustment to follow.

Insert 7 RED LED

Insert 6 YEL LED

Install 19 GRN LED

Inspect the back side of the board LED pins. Confirm that the long lead is towards the middle of the LED columns. **It is important to get this right.**



### ***Attach the front panel***

Use four 4-40 x ¼ inch flat head black screws. The front panel is now the alignment fixture for the LEDs. Place on a soft dry surface to prevent finish damage.

Insert LEDs into the windows. A set of tweezers may assist in placing the LEDs in the windows. After all the LEDs are in their stalls, confirm again you have the long lead for all LEDs towards the middle of the columns. Solder the outer pins. Clip flush and reflow. Solder the remaining pins. Clip flush and reflow.

### ***Finalize Installation of the Encoder***

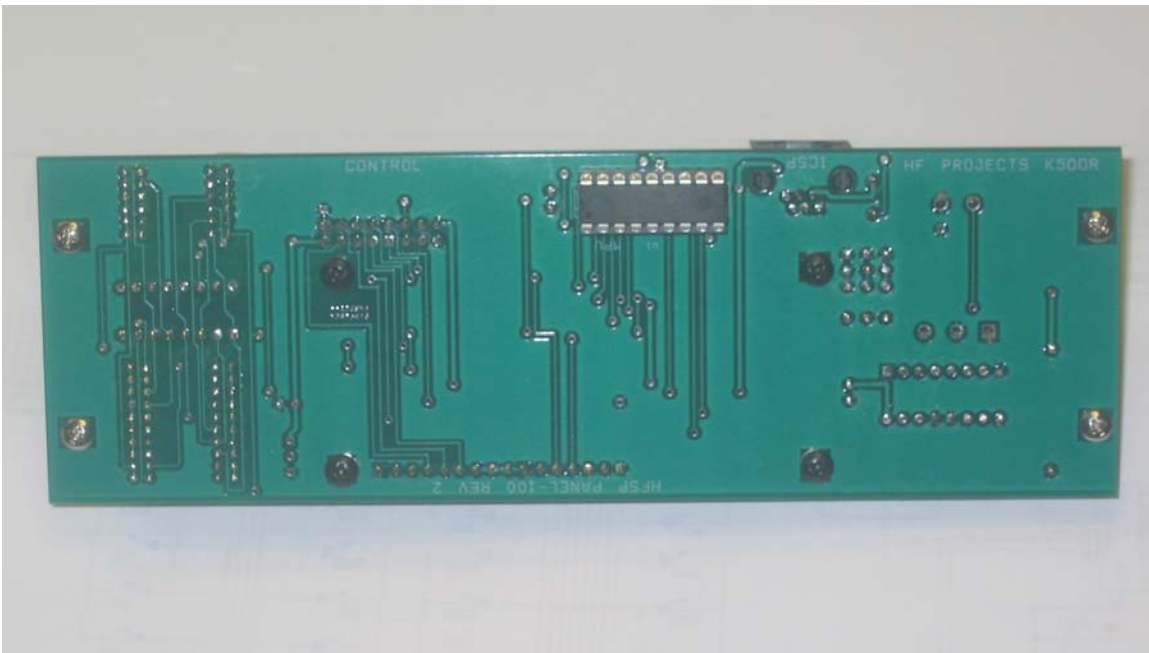
Attach the nut to the shaft of the encoder. Snug the encoder to the panel. Do not over tighten. Solder the 5 pins of the encoder on the back side of the circuit board.

## **Board Cleaning**

Use a controlled spot cleaning to prevent overspray. Use a paper towel. Spray a spot on the paper towel and then scrub areas need cleaning. Do this in a ventilated area.



Top Side View (ignore the washer on the encoder shaft)



Bottom Side View



## Operation

The HFSP PANEL-100 R2 Module connects to the MPU through a 16 pin flat cable. All signals and power are in this cable. The LCD is controlled directly from the MPU without further processing by the PANEL.

## Signal Inputs

A 2-wire signal bus enables the MPU to send data to the PANEL. A secure data transfer is sent each second.

## Signal Outputs

The PANEL updates the LED multiplexed display and routes encoder signals to the MPU.

## Computations

..The PANEL formats the information into bar graphs and status LEDs.

## Programming

The Module is provided with a pre programmed chip. It is installed in a socket. The chip can be removed for exchange. An in-circuit programmer connection is provided that is compatible with the Microchip ICD2. The cable or programmer is not supplied.



Finished Front Panel Assembly with HFSP PANEL-100 R2 Installed



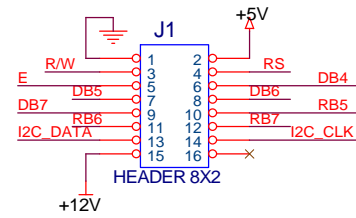
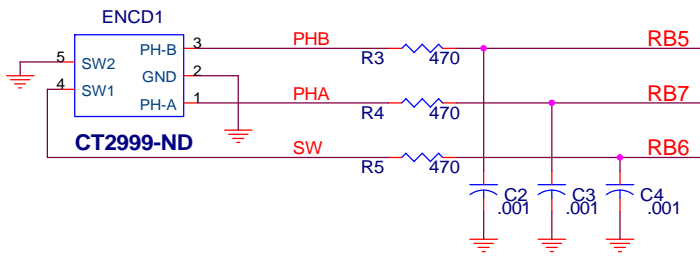
## Bill Of Materials

Item	Qty	Ref	Description
1	3	C1,C5,C6	Capacitor 0.1uF
2	3	C2,C3,C4	Cap, .001uF
3	7	D3,D13,D17,D21,D25,D26, D29	LED, RED 2MM X 5MM
4	19	D1,D5,D2,D6,D10,D14,D18 ,D22,D23,D27,D31,D4,D8, D12,D16,D20,D24,D28,D32	LED, GREEN 2MM X 5MM
5	6	D7,D9,D11,D15,D19,D30	LED, YELLOW 2MM X 5MM
6	1	ENCD1	ROT ENCODER 2BIT BIN W/SW VERT
7	1	J1	8 x 2 right angle header, gold contact area
8	1	J2	Modular Jacks RA 6/6 INVERTED low profile
9	1	LCD1	Module Parallel 16x1 LED Backlight
10	1	R1	DIP Thick Film Resistor Networks 330 OHM 16 PIN 2%
11	1	R2	Resistor 47K 1/8W 5%

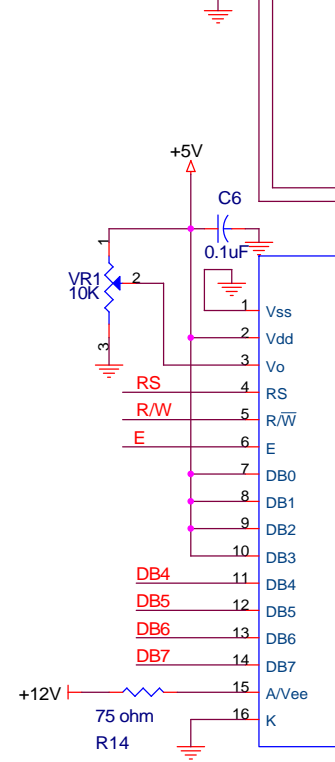
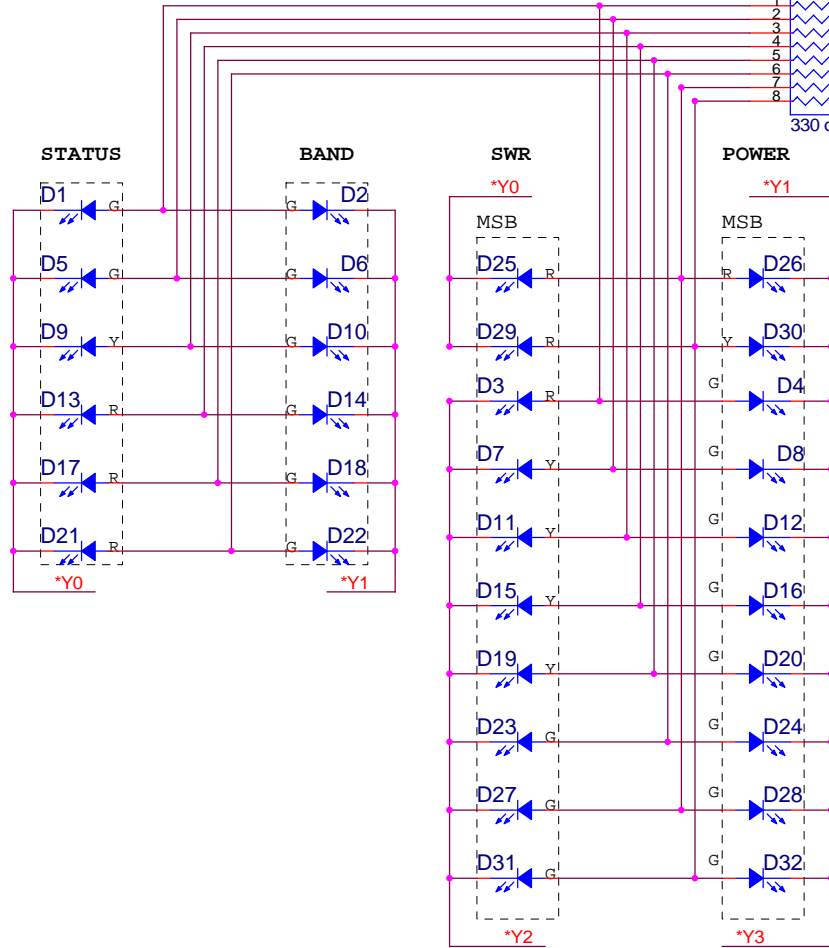
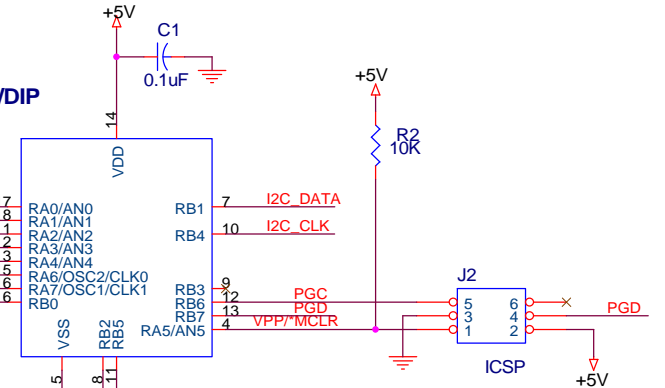


12	3	R3,R4,R5	Resistor 470 ohm 1/8W 5%
13	1	R14	Resistor, 75 ohm 3W 5%
14	1	U1	PIC16F88/DIP
15	1	U2	IC, 74145
16	1	VR1	Potentiometer 10K
17	1	U2	DIP Low Profile Sockets 18P TIN PIN GLD CONT
18	1	Circuit board Blank, HFSP PANEL-100 R2	Circuit Board Revision 2
19	2	LCD Mounting	spacer M/F .187 hex
20	8		screw 4-40 x ¼ binder head
21	0.03	P1	Cable MPU-DISPLAY, 1.5 inch
22	2	J1	Socket MPU-DISPLAY
23	1	LCD1 Header Strip	16 x 1 Header Strip
24	4	LCD1 Mounting	Lock Washer, #4
25	4	Nylon Washer #4	Used in LED spacing procedure
26	4	Spacer 4x40 threaded, ½ inch x .187 hex	Display Panel Mounting spacer





U1  
PIC16F88/DIP



LCD1  
LCD16X1



CIRCUIT BOARD REV 2

PWR	SWR
120	2.8
110	2.6
100	2.4
90	2.2
80	2.0
70	1.8
60	1.6
50	1.4
40	1.2
30	1.0

FILTER	STATUS
12-10	On
17-15	TX
30-20	ATN
60-40	SWR
80	AMP
160	FLT

HF PROJECTS K500R		
HFSP PRO LED/LCD DISPLAY		
Size	Document Number	Rev
B	2008 HFSP DISPLAY	0
Date:	Tuesday, December 16, 2008	1 of 1