



Fox Delta

Amateur Radio Projects & Kits

FD- SWM3-QRP

Tech. Information Document: Dual Channel LCD SWR Meter For QRP Radios: 10W HF

This project is developed for Amateur Radio Community by:

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10W LCD DUAL Channel SWR / POWER Meter: SWM3-QRP

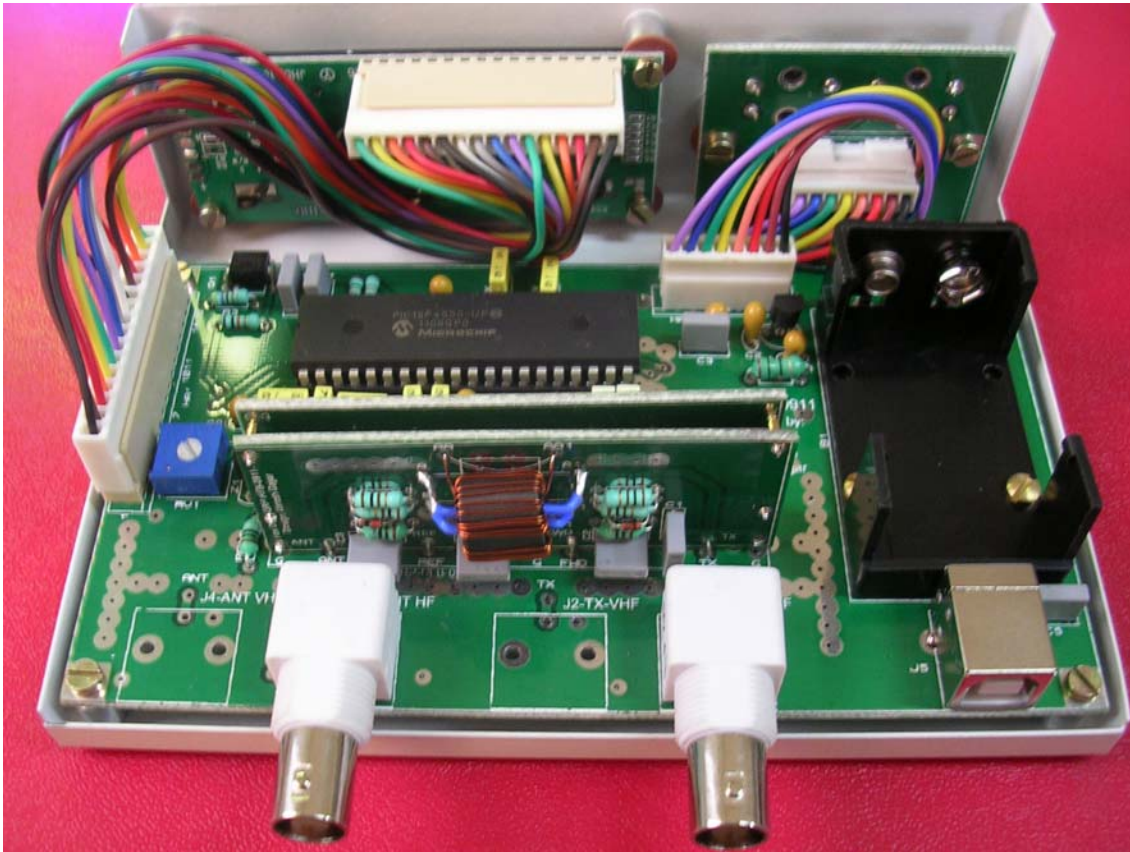


Front Panel Switches: Power ON/OFF (Left) Battery/USB Power (Right)

Following task achieved thru this new design:

1. Simple single micro controller with built-in A/D converter.
2. Dual Channel SWR Meter Firmware for 10W Measurement by [I2TZK](#)
3. USB Powered and 9V Battery operation.
4. Has enough space for a QRP HF Balanced on Top Side and space for future addition of a VHF Bridge (option) under the main PCB.
5. Back light control using an FET
6. SWR, FWD, POWER and Actual Power to antenna calculations.
7. Bar graph for SWR & Forward Power
8. Compact Design

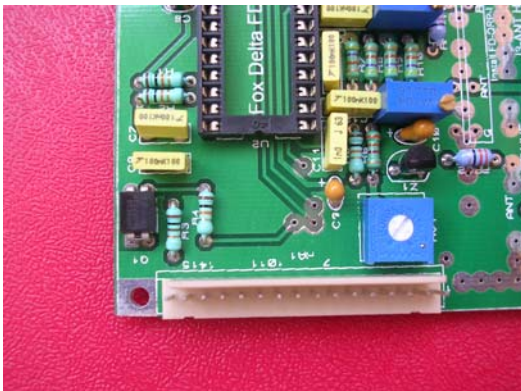
SWM3 Dual channel SWR Meter:



BNC connectors are for HF in-built bridge with two spare places available for for future add-on of VHF module. Kits include only two BNC connectors for HF Bridge.

A BNC Male to Male coupler and a 10W dummy load (DL10) is supplied with this kit.

HF Bridge is a “balanced” in design and do not require any adjustment to bridge.



A Contrast preset (RV1) is provided and must be adjusted until you see characters on LCD.



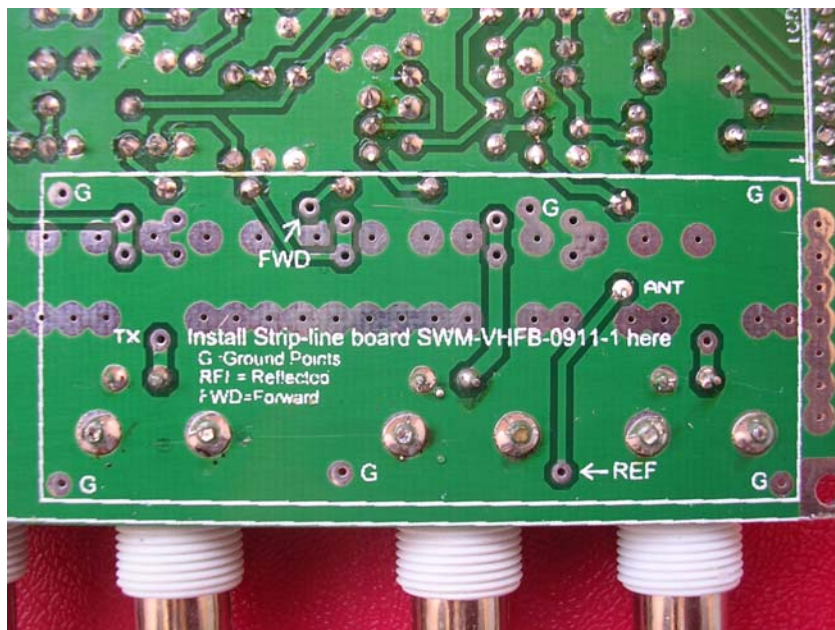
HA2 is where we connect 8 Wire Ribbon Cable going to Front Panel board. U1 is a 5V LDO.

Always ensure that PIN1 of 8 pin connector matches with PIN1 of Keyboard PCB.

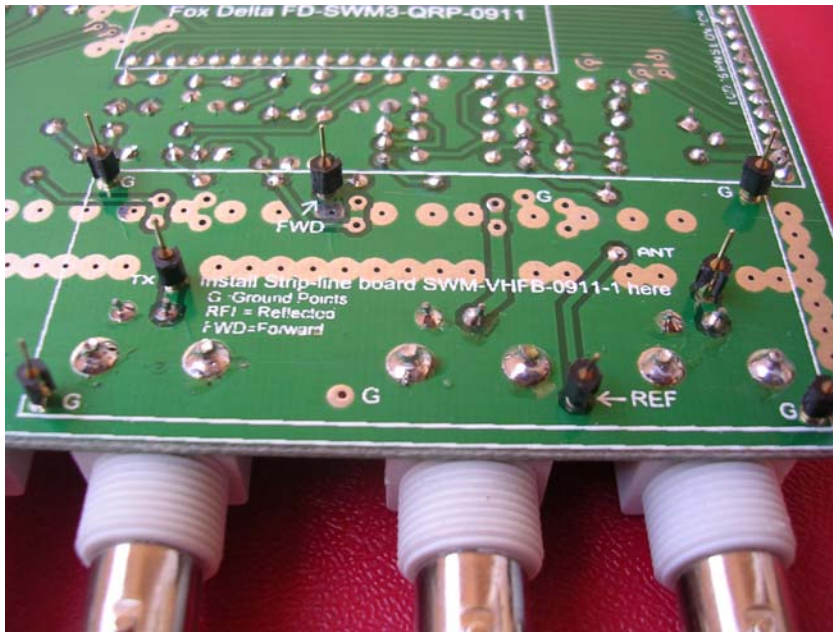
Although SWM3-QRP is basically designed for HF QRP RF Measurement, it has space and connections ready for a strip-line VHF Bridge which fits under the main PCB.

P1 and P2 are FWD/REF Presets for HF Bridge.
P3 and P4 are presets for VHF Bridge(Future add-on).

VHF Bridge (Future expansion) installation area at the bottom side of the board:



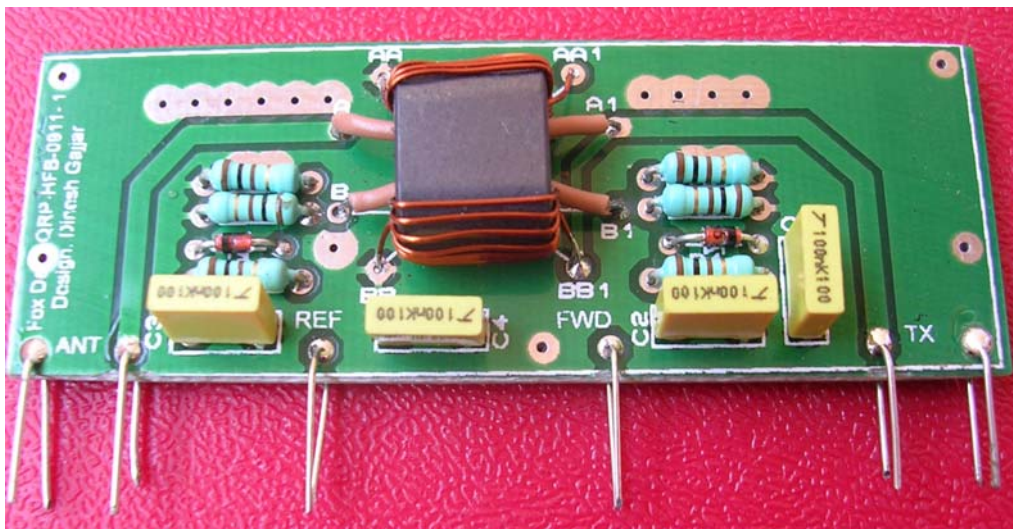
You may prepare pins for future VHF Bridge installation:



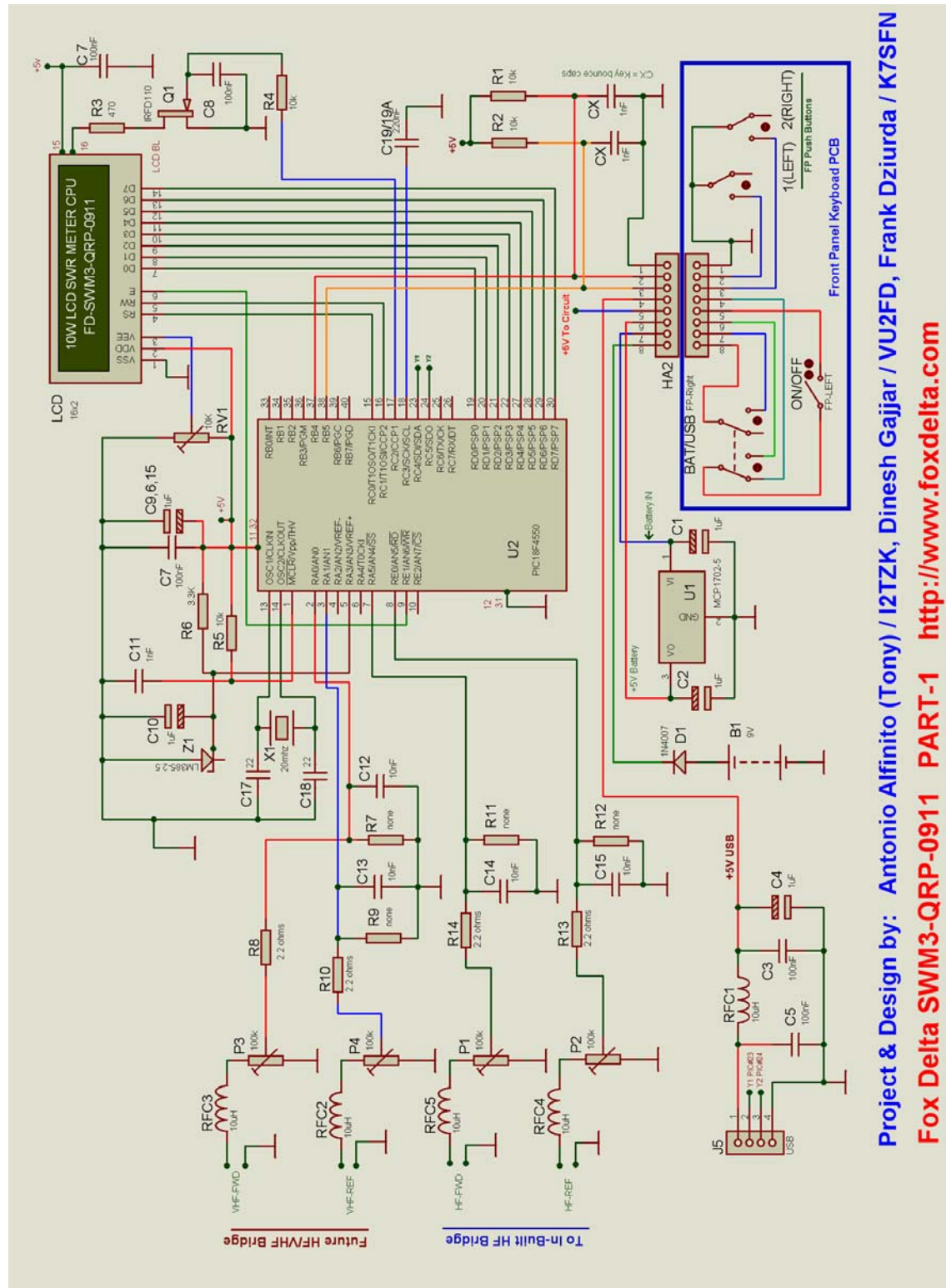
I intend to make a VHF bridge for this SWR meter. However, a second HF bridge may also fit at this space.

You may also make your own bridge and install here.

HF Balanced Bridge for 10W:



Schematic Dual Channel HF SWR Meter CPU Board: SWM3-QRP



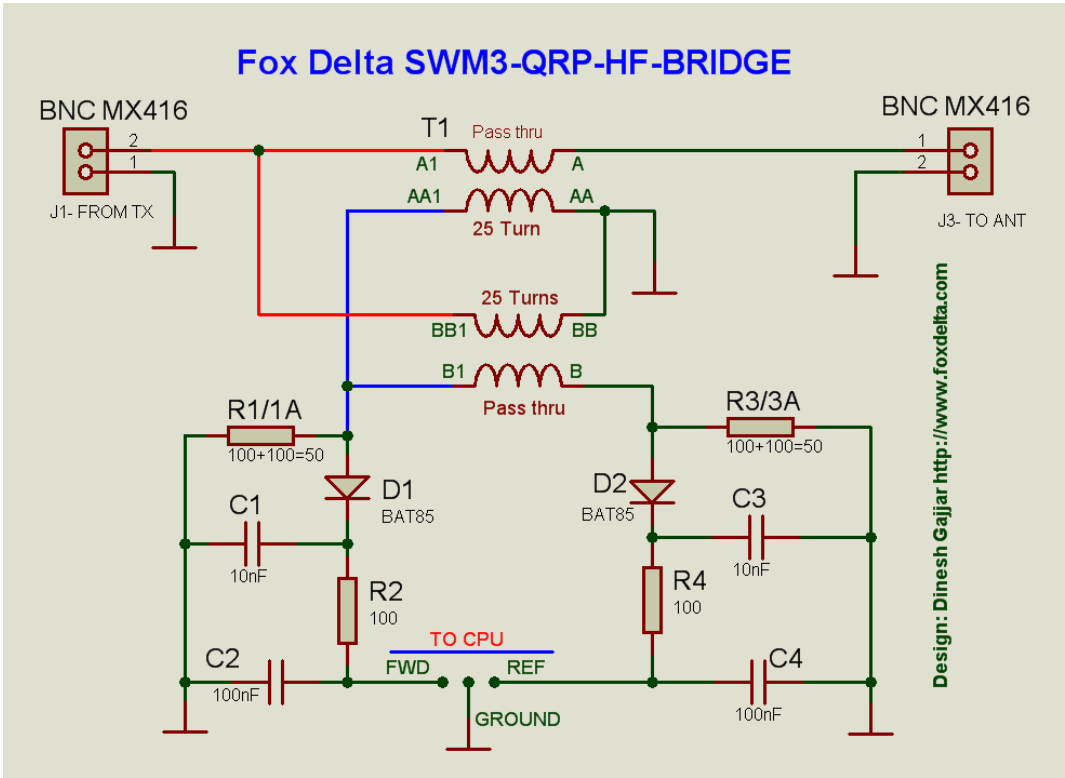
SWM3-QRP KIT Parts List:

Quantity	Part ID	Part Details
1	U2	PIC18F4550 Pre-Programmed DIP40 QRP V1.0
1	U1	MCP1702/5V TO92
1	Q1	IRFD110
1	Z1	LM385-2.5V
2	FP-Push Switch	ON/OFF Switches Front Panel
2	FP-Push Buttons	12mm Push Buttons for Front Panel KB
1	J5	USB R/A Socket
2	J1, 3	BNC R/A MX416
1	PCB-KB	Double Sided PTH PCB LED-KB-0911-1
1	PCB	Double Sided PTH PCB SWM3-QRP-0911
1	B1	Battery Case 9V Keystone 1294 (Option)
1	HA1	16PIN SIL Male and Ribbon for LCD
1	HA2	8PIN SIL Male and Ribbon for Keyboard
1	LCD	2x16 LCD with Backlight
1	RV1	10K Preset
1	X1	20MHZ Crystal in HC49U
1	D1	1N4007 Diode
1	40DIP	IC Socket
4	RFC2 - 5	10-33uH
1	RFC1	10uH
4	P1, 2, 3, 4	100K Bourns 3296 10T Presets
1	Set	Nut / Bolts for LCD and KB Mounting
1	Case	Free Powder Coated Metal Case
All Resistors 1/4 W 5%		
0	Not Used	R7, 9, 11, 12,
4	10K	R1, 2, 4, 5
1	3.3K	R6
1	470	R3
4	2.2 ohms	R8, 10, 13, 14
Capacitors		
7	1uf Tantalum/35V	C1, 2, 4, 6, 9, 10, 16
2	22pf	Ceramic – R17, 18
2	0.22uf Ploy	C19, 19A
4	0.1uf Poly	C5, 3, 7, 8,
3	0.001uf Poly	CX, CX, C11
4	0.01uf Poly	C12, 13, 14, 15

Following included with this kit:

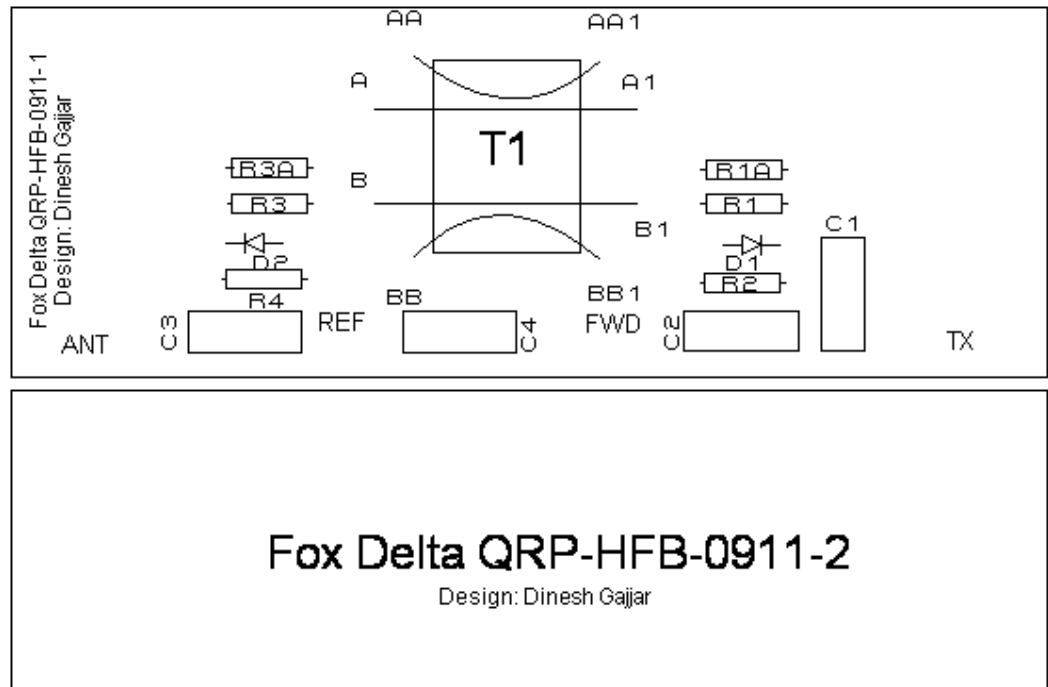
1. HF 10W Balanced Bridge
2. BNC Male to Male connector.
3. 10W Dummy load ([DL10](#))

HF Balanced Bridge Schematic:



Number of turns for this project: 11 turns on AA1-AA and BB1-BB

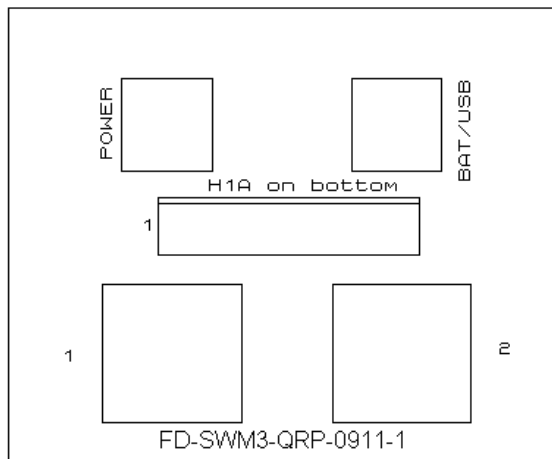
HF Bridge Silk:



HF Balanced Bridge PCB with all parts soldered:

Quantity	Part ID	Part Details
1	PCB	FD-QRP-HFB-0911 DSPTH Board
1	T1	Binocular #43 Core with #27 wire
2	D1, 2	BAT85
2	R2, R4	RFC 33uH
4	100	1/4w Resistors 5% R1, R1A, R3, R3A
4	0.1uf Poly	C1 to C4

Front Panel Keyboard:

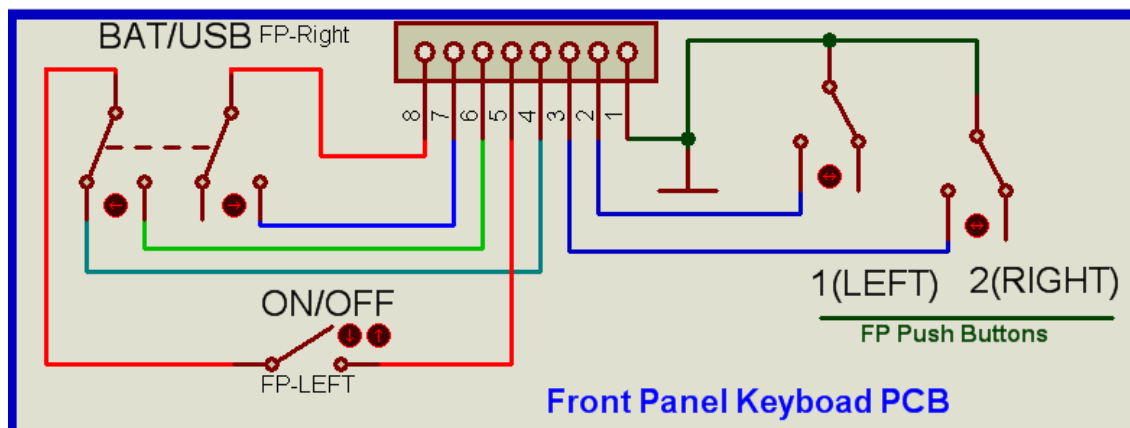


This is a small double-sided PTH PCB housing 2 push buttons and two Push ON/OFF switches.

Push Button functions are same as that used for SWM3.
Push ON/OFF switches:

Power ON/OFF
Battery / USB POWER

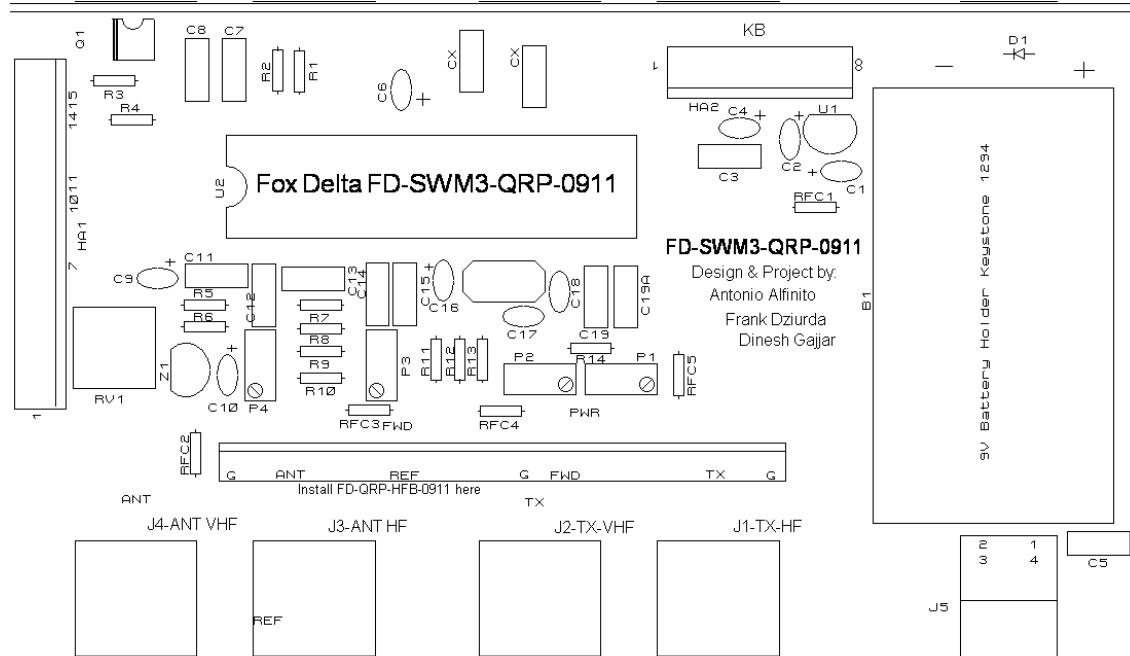
KB Schematic:



Front Panel Key Board Parts List:

Quantity	Part ID	Part Details
2	1, 2	12mm Push Buttons
2	DPDT	Switches Double pole push type
1	HA1	SIL8 connector
1	Set	PCB Mounting Hardware

Board TOP View:



73s

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For more details, please visit Project Page: <http://www.foxdelta.com>