



Fox Delta

Amateur Radio Projects & Kits

PA100M-CPU

Tech. Information Document: PIC18F4550 Dual Channel HF SWR Meter CPU

This project is developed for Amateur Radio Community by:

[Antonio Alfinito / I2TZK](#)

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HF POWER AMPLIFIER WITH 4x20 LCD & DUAL Channel SWR Meter:



Introduction:

PC Software / PIC Firmware V3.01 for SWM- 4x20 has:

1. Interface with PC using USB Port.
2. Backlight Control
3. Dual channel observation of INPUT FWD & OUTPUT FWD/REF on 4X20 LCD
4. 3 Different Manu for display, Including a Bar Graph
5. One Channel is assigned to read output FWD/REF/PWR/SWR of PA whereas Second channel reads FWD Input level from Transceiver.
6. Stand Alone mode or PC Software mode (for config & Monitoring)
7. Provision for RF Activated PTT
8. 10db INPUT attenuation available
9. Works on WIN XP, Win10.

Following task achieved thru this new RF AMP design:

1. Single chip SWR Meter using PIC18F4550.
2. Dual Channels for SWR measurement: CH1 & CH2
3. Back light control using an FET
4. Displays SWR, FWD, REF and POWER
5. Bar Graph Mode available
6. Includes DC 12V regulator and an FET switch for PA POWER "ON"
7. Two Button Menu operation
8. Front panel button for TEST PTT
9. LED Display of manually selected Band-LPF, PTT, Alarm etc
10. PC software and firmware for PIC18F4550 is Specially developed for this project by [Tony / I2TZK](#)

Project Bases:

PIC18F4550 is main controller for this dual channel SWR Meter. Controller uses a 2.5V stable reference for internal calculations.

Band information is not generated by this CPU but is manually created by a band switch. For this reason, we have named this amp as 100M

Ch 1 of SWR measurement is connected to Internal 100W Tandem Bridge located on PA100-BK (Back Panel Board)

CH 2 is used to read only Forward power of INPUT RF From Transceiver

PC CONNECTIVITY:

An USB port is provided to configure internal values of FW. Free PC software is available for download.

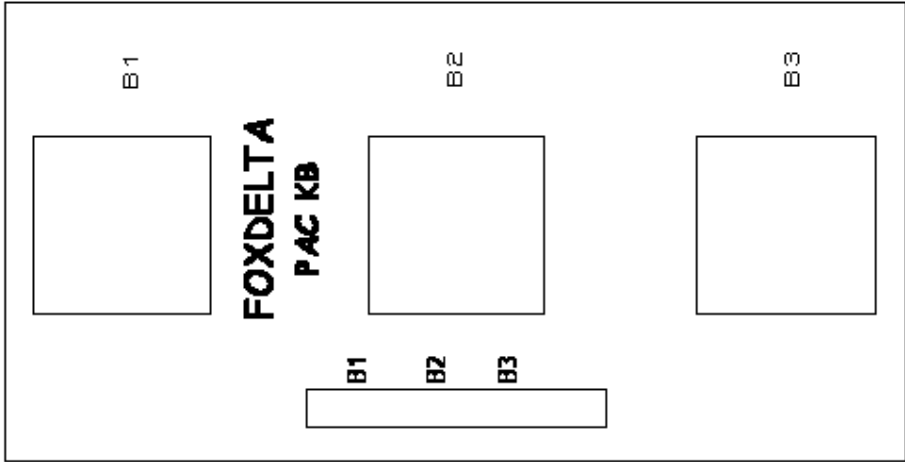
With USB config, one can set various parameters such as Power level for each channel, and other values.

USB port is available on this board as well as on Back Panel D9 Board.

PA100M - CPU SWR Meter Basic Display View:

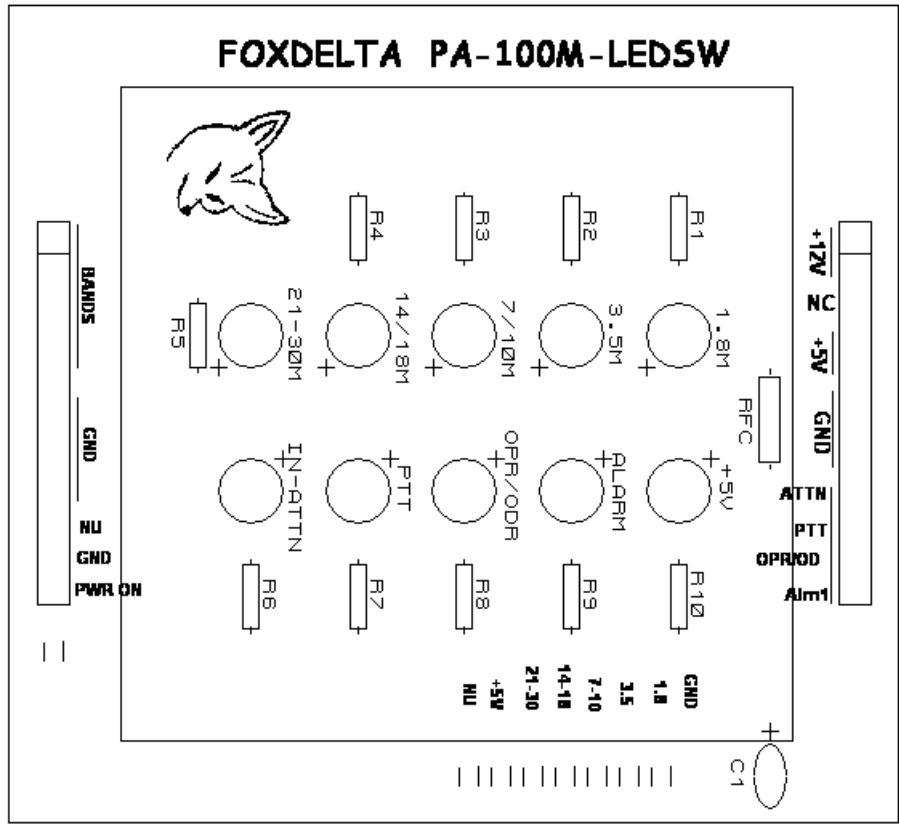


Front Panel keyboard Silk:

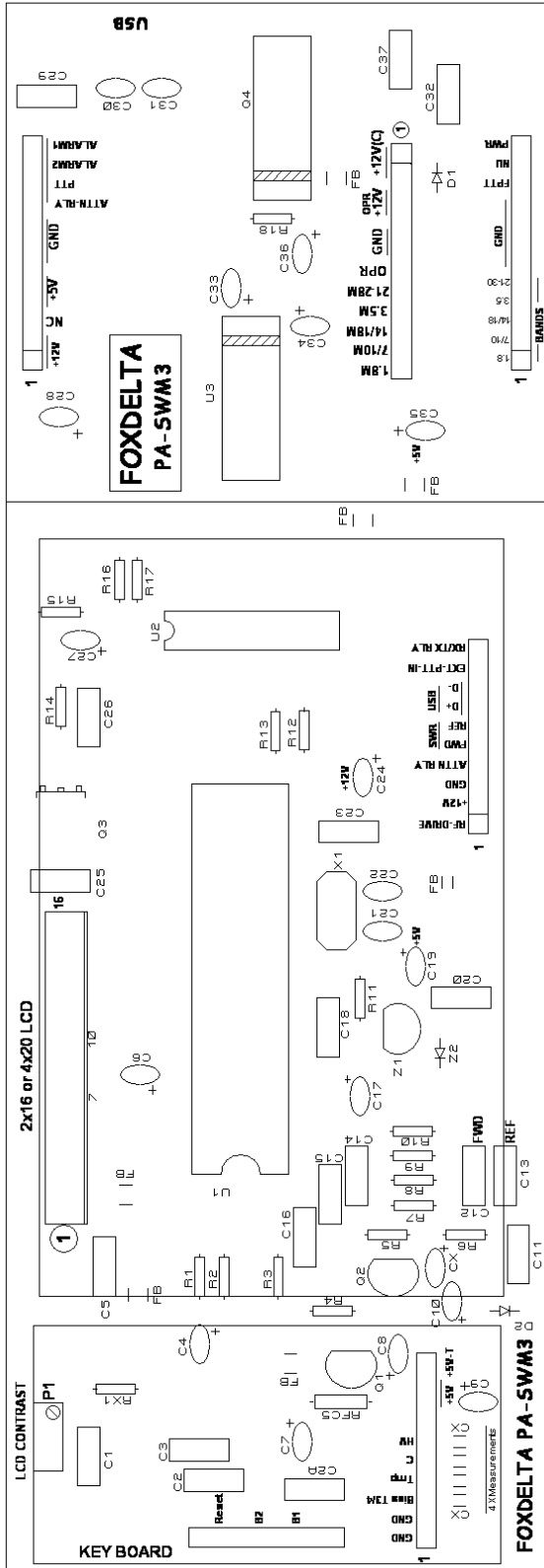


B1: Test PTT, B2: Menu Button, B3: Menu Button

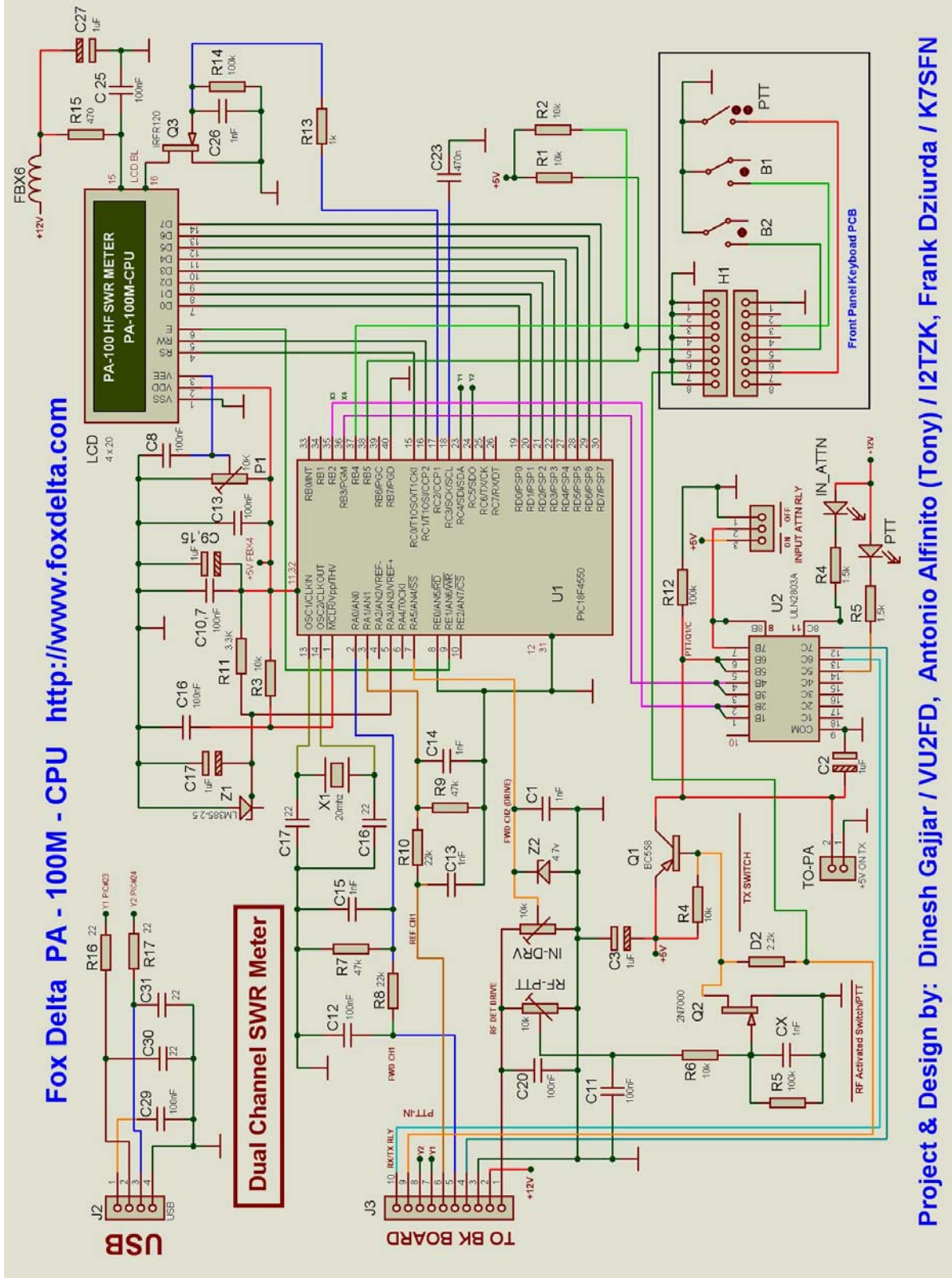
PA100-LED BOARD SILK:



PA100M CPU TOP Side Silk:



Schematic: PA100M CPU



Fox Delta PA - 100M - CPU <http://www.foxdelta.com>

Project & Design by: Dinesh Gajjar / VU2FD, Antonio Alfinito (Tony) / I2TZK, Frank Dziurda / K7SFN

PA100-CPU Complete Kit Parts List:

Qty	Part ID	Part Details
1	U1	PIC18F4550 Pre-Programmed DIP40 FW V3.01
1	U2	ULN2803A DIP18
1	Q3	IRFD120 SMT
1	Z1	LM385-2.5V TO92
3	SW1/2/3	12MM Push Buttons (KB)
1	PAC-KB	Double Sided PTH PCB KB PCB
1	PA100M-CPU	Double Sided PTH PCB PA100M-CPU
	PA100-LEDSW	Double Sided PTH LEDSW Board
1	Pair	16PIN SIL Male and Female for LCD
1	Pair	8PIN SIL Male and Female for Keyboard
1	LCD	4x20 LCD with Backlight
1	Pair	12PIN SIL Male/Female Header For LED BOARD
1	18DIP	IC Socket
1	Header	12PIN SIL Header for LPF Interconnect
1	Header	10PIN SIL Header for BK Board Interconnect
1	Header	3PIN for IN-ATTN Relay activation
1	40DIP	IC Socket
1	Q1	BC558 TO92
1	Q2	2N7000 TO92
1	U3	7805 TO220
1	Q4	IRF9520 TO220
1	X1	20MHZ HC49U
3	P1+	10K Presets: P1, IN-DRIVE, RF-PTT
1	USB	R/A USB PCB
7	FBX	1210 Ferrite Beads
1	Header	2Pin for +5V/T to PA
1	D1	1N4148
1	Z2	4.7V Zener
1	USB En	2X2 PIN Header to En USB Lines to BK board
1	RFC	RFC/FB
1	Hardware	Spacers, bolts etc for PCB, LCD, KB, LED Board Mounting

Capacitors		
12	C1, 2, 2A, 3, 5, 16, 18, 20, 25, 29, 32, 37	100nf Poly
13	C4, 7, 8, 6, 17, 19, 24, 27, 28, 33, 34, 35, 36	1uF Tan 35V
0	C9, 10, CX	NU
1	C23	0.47uf Poly
4	C21, 22, 30, 31	22pf Ceramic
6	C14, 15, 12, 13, 18, 26,	0.001uf Poly

All Resistors ¼ W 5%		
3	R1, 2, 3,	10K
6	R4, 5, 7, 9, 12, 18	47K
0	RX1	NU
2	R8,10	22K
1	D2	2.2K
2	R6, 13	1K
1	R11	3.3K
2	R16, 17	22 ohms
1	R15	33 ohms
1	R14	100K

LED BOARD PARTS LIST

Resistors, Capacitors, Rotary Switch & Push ON/OFF Switch		
10	3mm LED with 5mm spacers	Green/Red/Blue/YLW
1	SIL8 R/A socket for Rotary Switch	
1	SIL2 Socket for POWER ON SW	
9	R1, 2, 3, 4, 5, 6. 7. 8. 9.	470 ohms Res
1	R10	1K Res.
1	C1	1uF Tant Cap
1	RFC	RFC/FB
1	Rotary SW	5POS Switch
1	POWER SW	PUSH ON/OFF

73s

Dinesh Gajjar

24th February 2025

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