



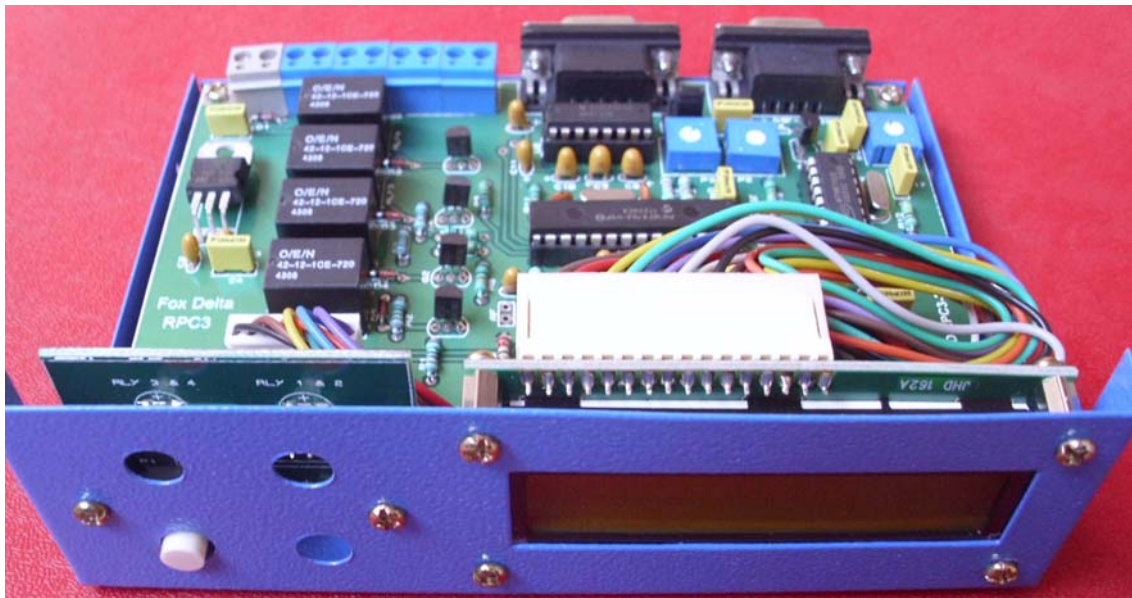
# Fox Delta

Amateur Radio Projects & Kits

FD- RPC3-1209

Technical Info Doc: PIC16F876A LCD DTMF Decoder by Max IK3SVW

## RPC3-1209: DTMF Remote/Repeater Controller



RPC3 ready to use in a metal case:



## **DTMF Remote / Repeater Controller by IK3SVW:**

Project is originally designed and published by Max IK3SVW.

As I had great interest in remote operation for repeaters atop mountains, I decided to make a good quality PCB and house in a metal case. This was done long back in Dec 2009!

Project document, firmware and software, are developed by Max/IK3SVW. I have only made an effort to produce economical kits for the Radio Amateurs

### **Following are interesting features:**

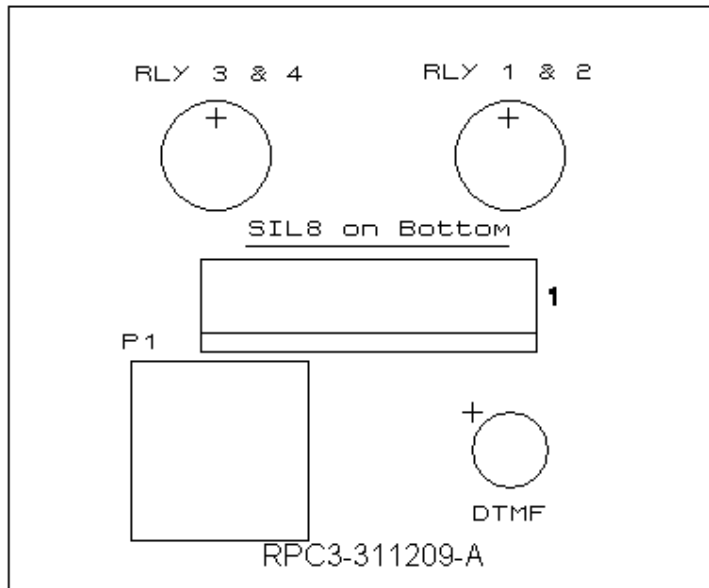
1. Uses PIC18F766A controller
2. Operates Four 12V Relays
3. Uses MT8870 DTMF Decoder
4. PC configuration SW connects thru RS232
5. Front Panel LCD for activity monitoring
6. Software and Hardware Documents by Max/IK3SVW
7. 12V operation.
8. Command transmitted by CW
9. Kit supplied in a powder coated metal case
10. Kits supplied with latest Firmware V3
11. Free download of V3 PIC WIN Software

### **Project Details:**

Project board is designed on a DSPTH FR4 Board measuring 14cm X 8cm. Small Keyboard PCB support Two Dual LED, One DTMF Led and a P1 Push button.

A free powder coated metal case is included with kits/assembled

### Silk View of Key Board:



#### Dual LED:

Two CA Dual LED gives relay status

#### P1:

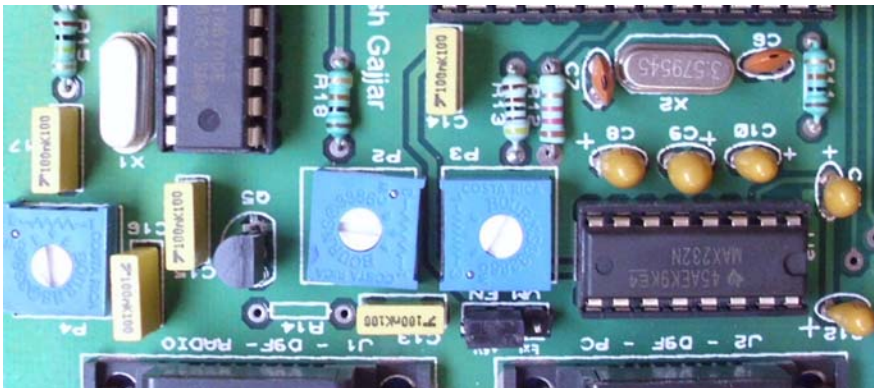
Pressing this button gives sequence stored in PIC flash memory.

#### DTMF LED:

Lights up on receipt of accepted DTMF tone pair

SIL8 Connector installs on Bottom side of KB PCB

### Volt Meter and R14:



#### VM:

Volt-meter function is enabled when this header is installed with a shorting pin at EN. Use P3 to adjust voltage to display on LCD.

#### R14:

Install this resistor only if you want MIC/PTT action together (Kenwood Type Radios)

### 5V Regulator:

U1 is a 1A 5V regulator. It powers the entire board except Relays. Relays are 12V and receive 12V DC directly from DC12V Connector.

### MIC AF adjust and Receiver Audio Presets:

P2 is MIC AF Out control.

P4 adjust the incoming receiver audio.

### LCD and P1 Front Panel Button:

Power ON Status:



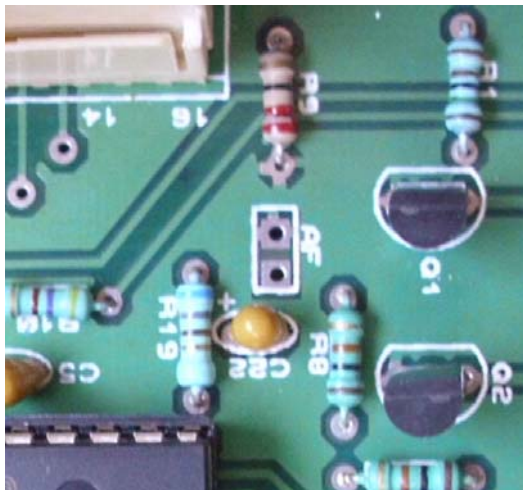
P1 pressed once:



P1 Pressed 2<sup>nd</sup> time:



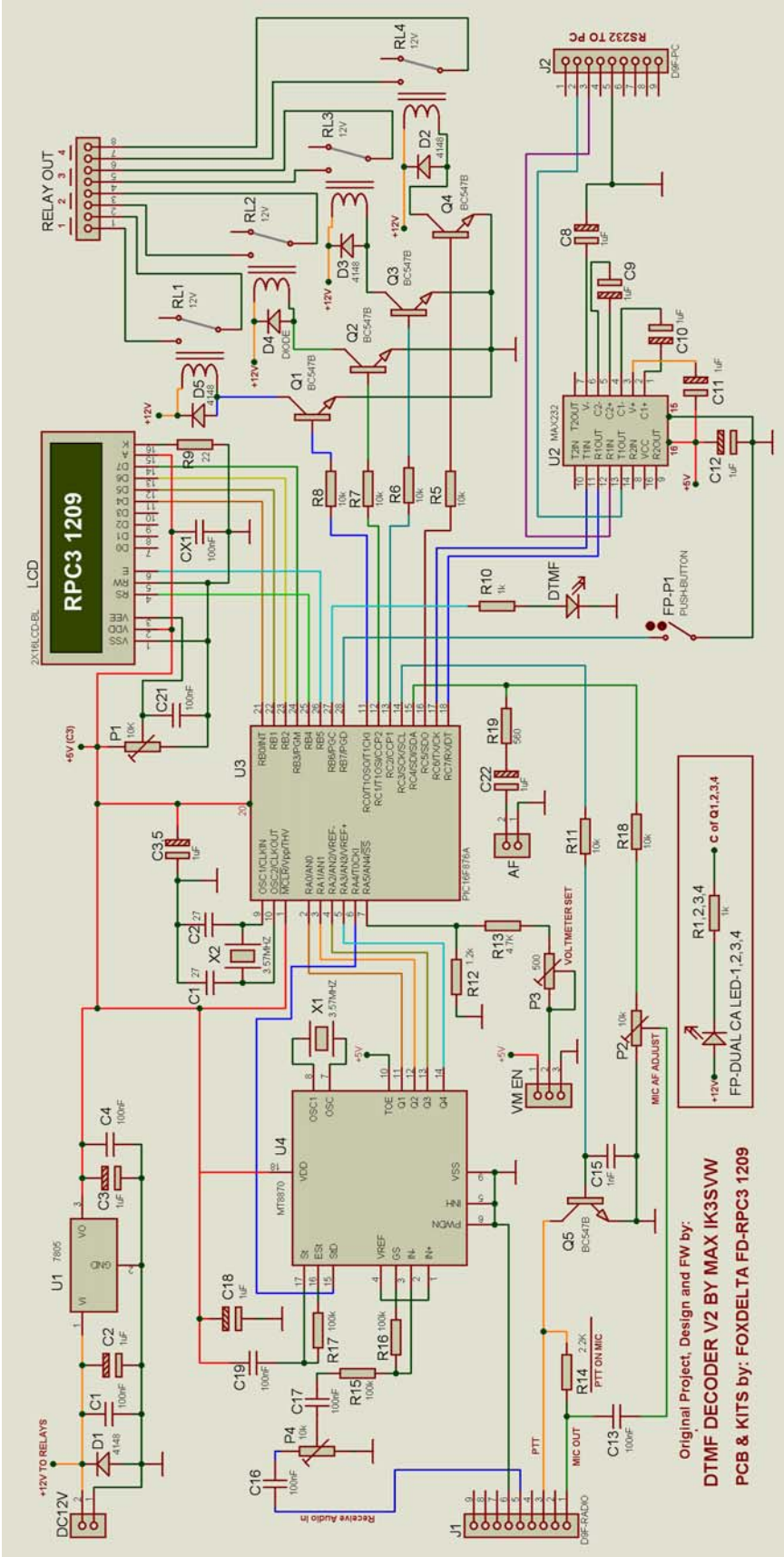
### Additional Audio Out:



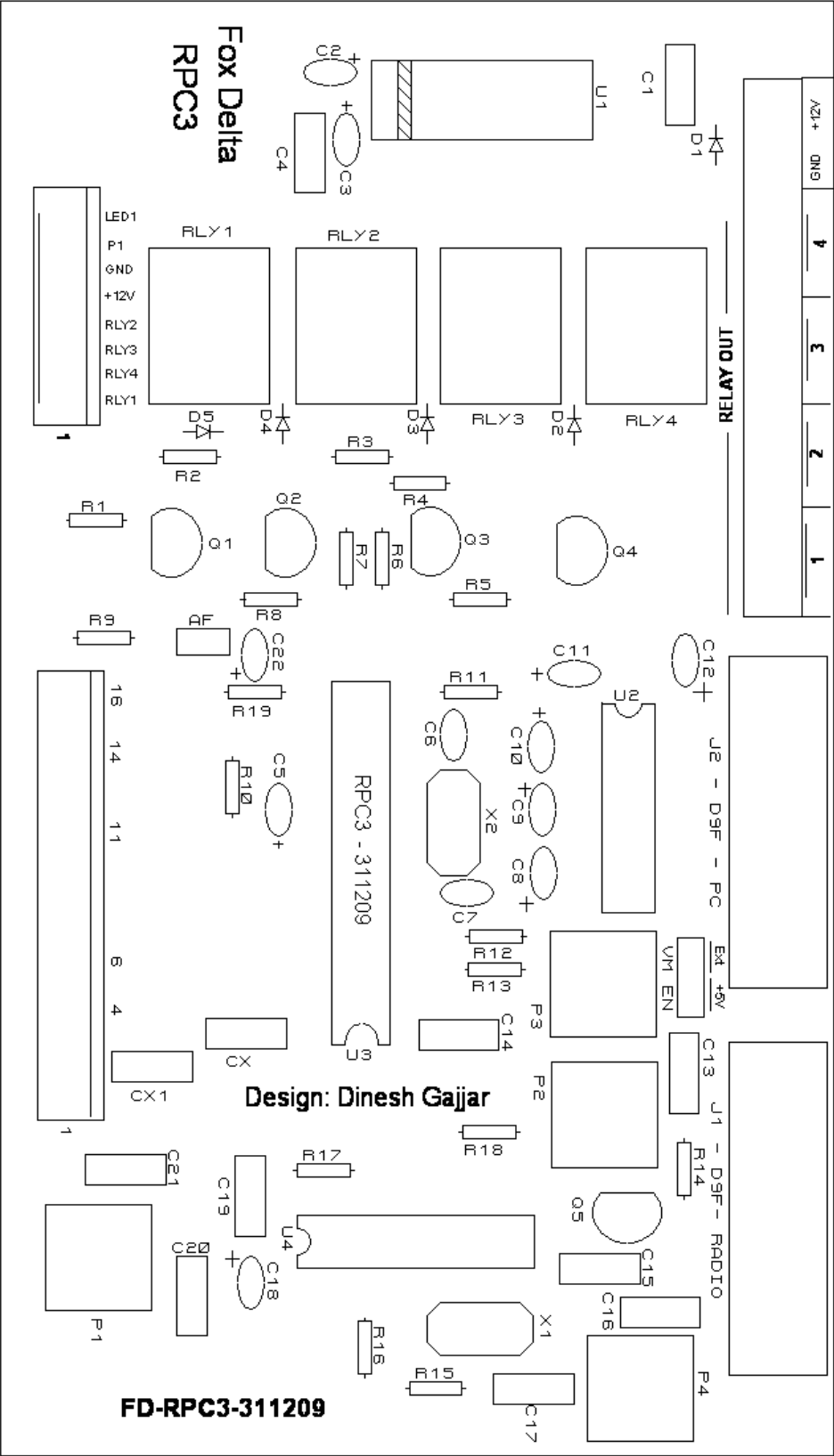
Lo-Z detected audio is available at points marked "AF"

May be used with a small amplifier to drive a speaker. Even tiny speaker may use connected directly

Schematic RPC3:



RPC3 TOP SIDE SILK:



**RPC3-1209 Kit Parts List:**

Quantity	Part ID	Details
1	U1	7805
1	U3	PIC16F876A Pre-programmed with FW by IK3SVW V3.00
1	U2	MAX232 DIP16
1	U4	MT8870 DIP18
4	RLY1-4	OEN42 12V Relays
5	D1, 2, 3, 4, 5	1N4148
5	Relay Out	2pin Screw terminals X 5
3	P1, P2, P4	10K Preset
1	P3	500 Ohms Preset (Volt Meter Adjust)
2	X1, X2	3.57MHZ HC49U Crystal
5	Q1, 2, 3, 4, 5,	BC547B
2	J1, J2	D9 Female PCB Connectors
1	LCD	2x16 with backlight
1	LED	3MM LED (DTMF on KB)
1	VM-En	3PIN Header
1	Set	SIL8 Male + Ribbon
1	Set	SIL16 Male (8+8) + 2 x 8Ribbon
1	Case	Powder Coated Metal case
1	Set	Hardware Keyboard
1	Set	Hardware Case
1	Set	Hardware LCD
1	KB Push Button	KB button 12MM
1+1	PCB	RPC3-1209 DSPTH PCB & KB PCB
2	KB LED	CA Dual LEDs
1	IC Socket	16PIN DIP (MAX232)
1	IC Socket	28PIN DIP Narrow (PIC876A)
1	IC Socket	18PIN DIP (8870)

### Resistors:

Quantity	Part ID	Details
5	R1, 2, 3, 4, 10	1K
1	R12	1.2K
1	R19	560 Ohms
1	R9	22 Ohms
1	R13	4.7K
6	R5, 6, 7, 8, 11, 18	10K
1	R14	2.2K
3	R15, 16, 17	100K

### Capacitors:

Quantity	Part ID	Details
10	C1, 4, 16, CX1, CX, 21, 19, 20, 17, 14	0.1uF Poly
1	C15	0.001uF Poly
10	C2, 3, 5, 8, 9, 10, 11, 12, 18, 22	1uF Tantalum
2	C6, 7	22pf Ceramic