FoxView2: Technical Information Doc: An APRS LCD Terminal & Tracker
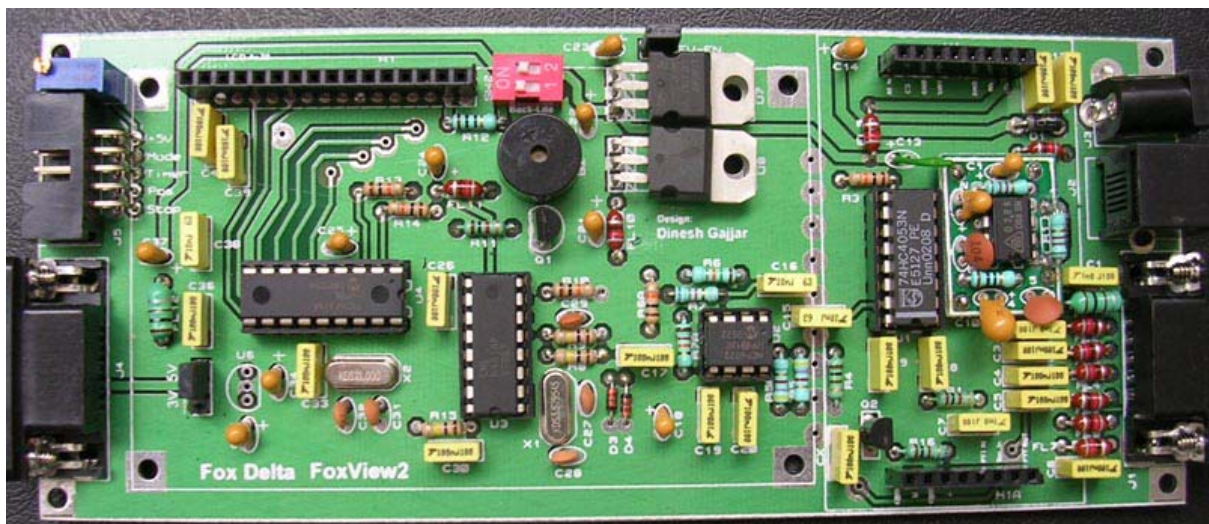
FoxView2: An LCD APRS Terminal for Radio Amateurs:

Completed FoxView2 with one of the Tracker Module installed:
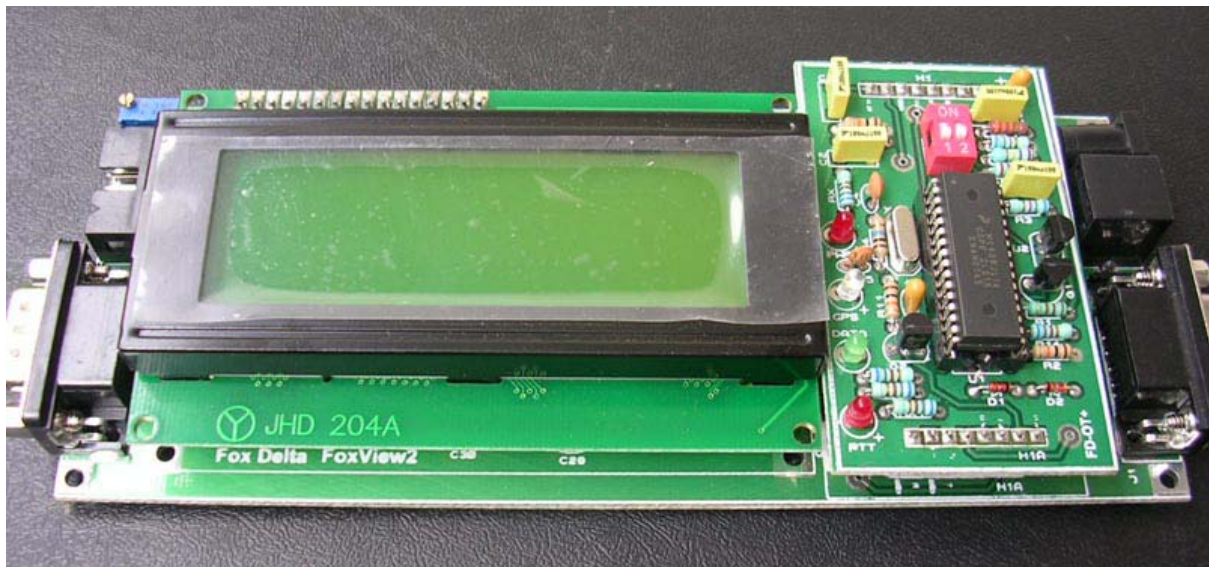
FoxView2 with LCD removed:

FOXVIEW was the first amateur radio project ever built for radio amateurs to view APRS packets without a PC or expensive APRS Enabled Radio Equipment.

FoxView2 is called an APRS Terminal. Intended for Base Station use, FoxView2 will do following for you:

1. **It's an LCD APRS Viewer with Filters.**

2. **A Tracker with GPS#**

3. **A GPS-less APRS Position encoder##**

4. **A stand-alone (No PC) Digipeater##**

5. **An advanced tracker with FD-OT+ tracker module***

6. **A Kiss TNC and 1 Wire APRS WX Station***

 # = With FoxTrak Module

##= With VixenTrak Module

* = With FD-OT+ module

Designed with a large 4x20 Characters Back-lite LCD Display, FoxView2 includes a Modem/TNC, an analog switch and a plug-in tracker module.

FoxView2 requires an audio input from your receiver or transceiver and a DC 12V supply. FoxView2 is basically designed as an APRS Terminal for your ham shack.

In addition to monitor APRS activities, it may be used as a kiss TNC or a home 1Wire APRS Weather Station. In either case, you can view data coming from your radio as well as coming from installed tracker, on large 4x20 LCD.

FoxView2 includes an effective active audio filter, an MX614 Modem Chip, an analog switch 74HC4053 and a PIC16F628A micro-controller. All chips are in DIP packages.

After all these goodies, it should not cost a fortune. In fact, with few components from here & there, you will be able to build this APRS Terminal yourself & enjoy APRS activities.

FoxView2 will be available in kits with a choice of a FoxTrak or VixenTrak module.

Additional option of FD-OT+ type of module may be available to those looking for better tracker functionality and 1Wire WX support.

Why GPS-less FoxView2?

Basic concept of providing a GPS-Less Module, which also works as a Digipeater, is to use this unit in an Amateur Base Station to monitor APRS activities all the day without a PC.

At present only way to monitor APRS Activity in your area is by way of either buying a Kenwood radio or use PC. Foxview2 removes both of the above requirements.

With GPS!!

FoxView2 works with GPS too. FoxTrak and OT+ modules works well for GPS operation. Normal GPS baud rate required is 4800. FoxTrak module is supplied with FoxView kits. OT+ module is offered as an option.

Digipeater!

With VixenTrak Module installed, you may have a GPS-less FoxView2 and a 1200baud digipeater. This is achieved by entering required parameters in VixenTrak's user data, generally configured by way of a Hyper Terminal.

Kiss TNC, 1Wire and more:

I made one more plug-in module using OT+ chip. With this we achieved all the capabilities of the OT+, which includes some of the following:

1. A Kiss TNC
2. 1Wire Weather Station (Connects to RJ12 of Foxview2 & Need firmware update)
3. A Tracker with or without GPS with many advanced features.

FoxView2 Connectors:

FoxView2 uses standard pinouts for connection to either a GPS or to your Radio. Means, its 1:1 compatible with your present tracker, like a FoxTrak, TinyTrak or OT+.

Power Connection:

FoxView2 may be powered from Radio Connector thru PIN#7. However, a DC connector is also provided for home station use.

1Wire Weather Station:

FoxView2 with FD-OT+ module becomes a 1-wire weather station. At the same time, it continues to read data coming from Radio or transmitted from installed tracker. Means, you always know what you are transmitting & what others are sending!

What is this U1: 74HC4053?

Job of the U1, an analog switch, is to feed audio from two different sources:

1. Install Tracker and
2. Connected Radio

In normal condition, this audio switch is connected to the Radio. What ever heard on radio will display on FoxView2.

Soon, your installed tracker module speaks up, U1 disconnect Audio coming from Radio and connects it to the Tracker audio output.

Why there are TWO 5V Regulators?

Although entire unit can easily run on one single 1A regulator, I am using two 7805 regulators.

One regulator is used only to power FoxView circuitry.
The second one power the Analog switch, tracker & GPS.

With this arrangement, we can switch off FoxView (LCD display and related foxview electronic) when its not needed (At night, perhaps).
Rest of the circuit will continue to work as its powered by another regulator.

GPS POWER:

If you wish to power your GPS, +5V is available at pin 4 of the Male D9 Connector.

The header with 3V / 5V need to be selected by installing a shorting pin to get either 5V or 3V.

If your GPS requires 3V (or 3.3V) you may buy U6, a 78L03. This is a three terminal regulator used to converts 5V to 3V. This part is not supplied in the FoxView2 kit as most radio amateurs use a 5V GPS.

SW2 is provided to switch off 5V to GPS if you wish to use a self-powered GPS.

LCD Back-light":

SW2, a 2 Way DIP switch is provided to switch off Back-light of LCD. This will reduce a consumption of over 90ma!!

Audio Boost Board:

A small board is installed on PCB near U1 containing a LM386 and few capacitors & resistors.

This was needed to boost MIC audio out from tracker to meet audio level for FoxView2 input.

All kits will be supplied with this board pre-soldered.

Configuration Remote:

A small PCB with a 2-way DIP switch and two push buttons is provided for configuration of FoxView (Data Viewer Section) for setting various filters etc. A ribbon cable is also supplied with 10PIN FRC sockets at both the ends.
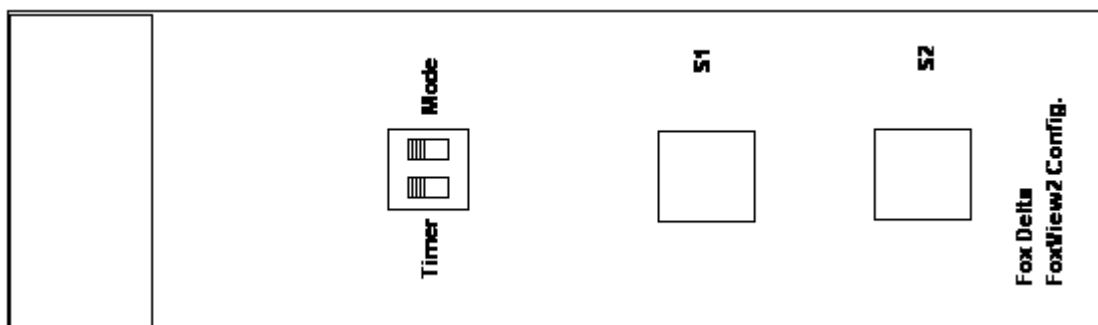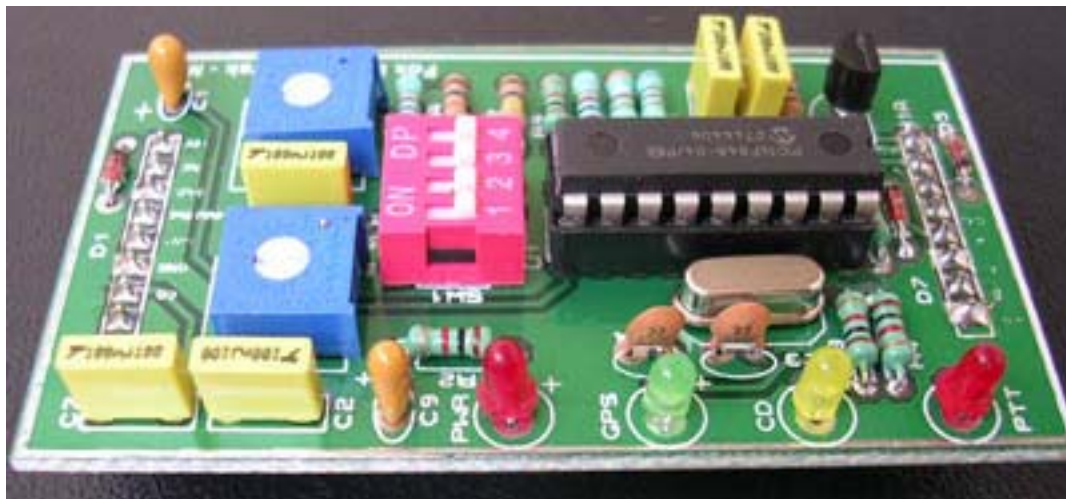
Tracker Modules for FoxView2:

Three tracker modules are available to meet your specific requirement. A comparison cart is given below:

Tracker/Function	FoxTrak	VixenTrak	OT+
GPS 4800	✔	✔	✔
Smart Beaconing	✔	No	✔
GPS-Less?	No	✔	✔
True RS232?	No	✔	No
Firmware Upgradeable?	No	No	✔
Digipeater	No	✔	✔
1 Wire Support	No	No	✔
Kiss TNC	No	No	✔
Micro	16F84A	16F88	MC908
Cost	Your choice of either module is Included with FoxView2		Option

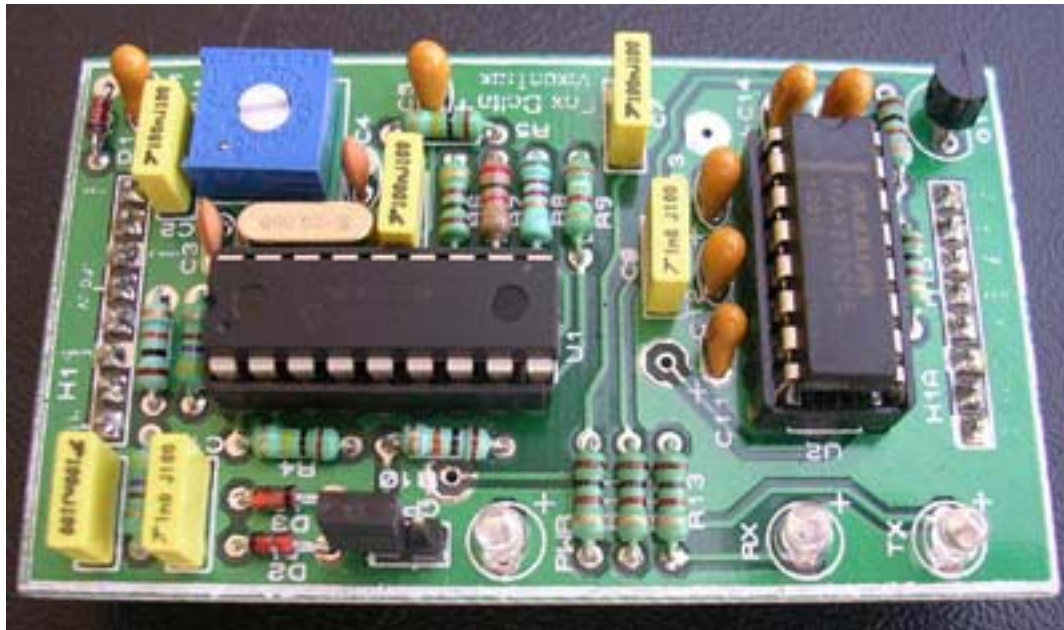**More information on Tracker Modules:**

Please visit related web pages for information on each of the tracker modules.

FoxTrak: http://www.foxdelta.com/products/foxtrak-M.htm

VixenTrak: http://www.foxdelta.com/products/vixentrak.htm

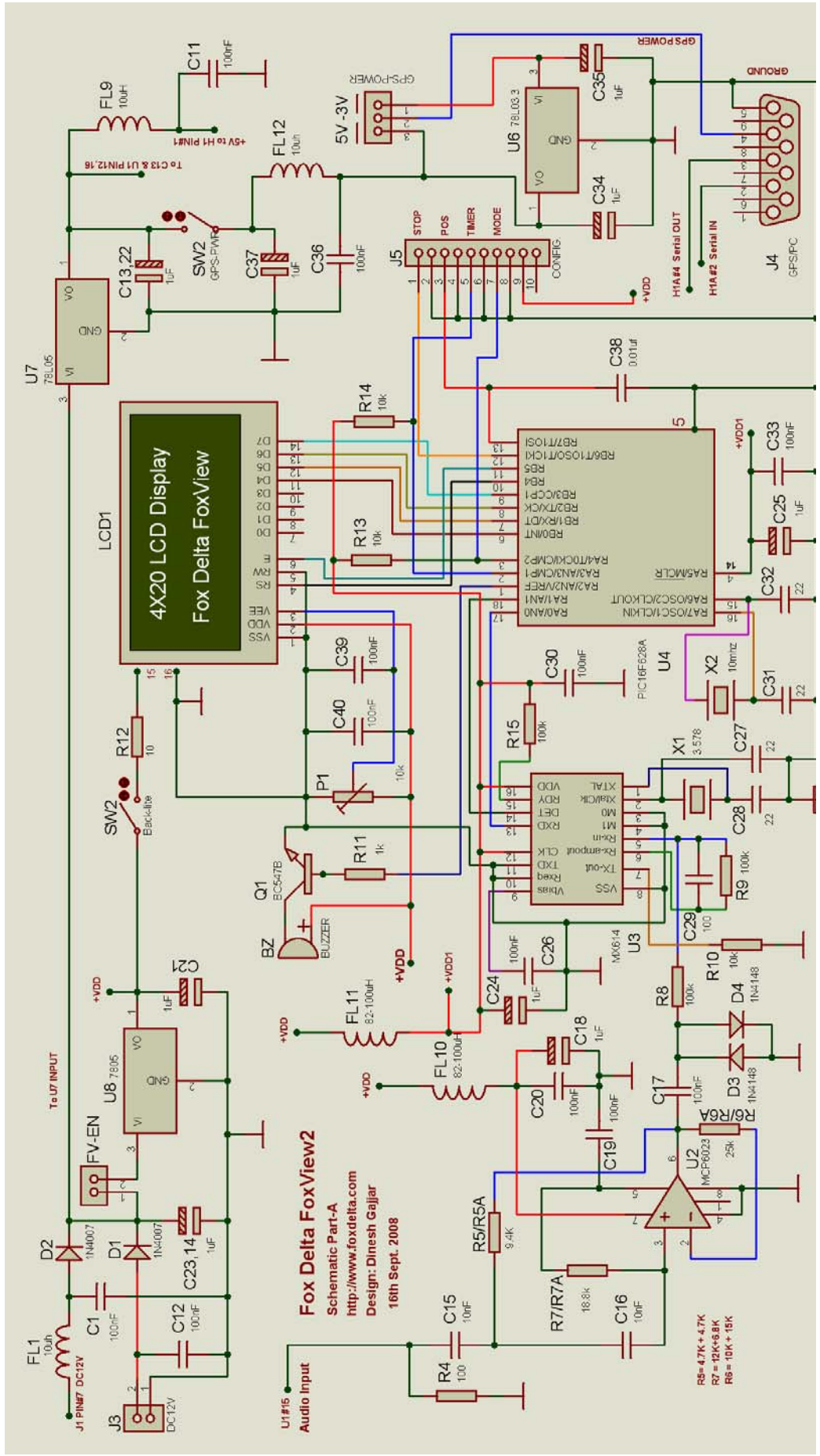**FD-OT+: http://www.foxdelta.com/products/otplus.htm**

All of the above tracker modules measure only 7x4CM and uses 0.1inch 8 pin headers for connection to FoxView2.
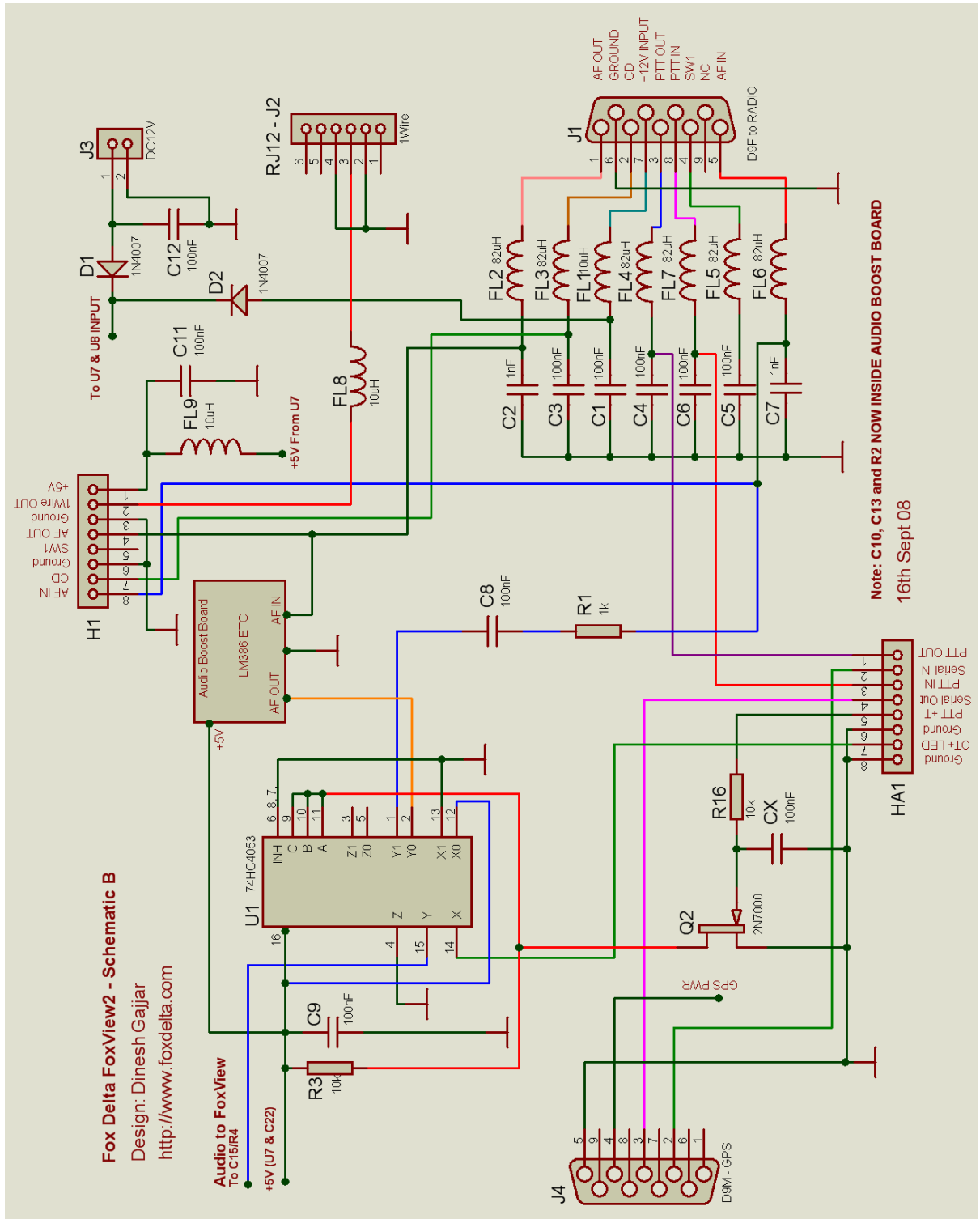
FoxView2 Parts List:

Quantity	Check	Part ID / Details
1		FoxView2 Double Sided PTH PCB
1		Radio Connector D9F (J1)
1		GPS Connector D9M (J4)
1		Config. Connector FRC10 R/A (J5)
1		DC Connector (J3)
1		1Wire Device Connector Socket RJ12 (J2)
2		1N4148 (D3, 4)
2		1N4007 (D1, 2)
1		PIC16F628A with firmware FoxView.hex DIP18 U4
1		MX614P DIP16 U3
1		MC74HC4053 (U1) 16DIP
1		MCP6023P DIP8 U2
1		18PIN IC Socket U4
2		16 PIN IC Sockets U3 & U1
1		8 PIN IC Socket U2
2		7805 U7 & U8
1		Crystal 10.000MHZ (X2)
1		Crystal 3.578MHZ (X1)
1		Transistor BC547B (Q1)
1		FET 2N7000 (Q2)
1		10k Presets 10T (P1)
4		RFC 10uh FL1, 8, 9, 12
8		RFC 82uh FL2, 3, 4, 5, 6, 7, 10, 11.
1		2 Position DIP Switch SW2
1Set		Config Remote (PCB+2way DIP+2xPush buttons & cable)
1		Buzzer
1		Set of header: 16pin Male/Female for LCD
1		Set: 2xNut, 2xBolt & 2xPlastic Spacers for LCD
1		LCD 4x20 with Back-Light

Quantity	Check	Part ID / Details
		Resistors
1		4.7K+4.7K = 9.4K R5/5A
1		12K+6.8K = 18.8K R7/7A
1		10K+15K = 25K R6/6A
2		1K (R1, 11)
5		10K (R3, 10, 13, 14, 16)
2		100K (R9, 8)
1		10 Ohms (R12)
1		100 Ohms (R4)
		Capacitors
18		0.1uf Poly (all those not listed below)
2		0.001uf Poly (C2, 7)
3		0.01uf Poly (C15, 16, 38)
4		22pf Ceramic (C27, 28, 31, 32)
11		1uf Tantalum
1		100pf Ceramic (C29)

FoxView2 Schematic: A

Fox Delta FoxView2

Schematic Part-A
http://www.foxdelta.com
Design: Dinesh Gajjar
16th Sept. 2008

R5=4.7K + 4.7K
R7 = 12K+6.8K
R6= 10K + 15K

FoxView2 Schematic: B

Fox Delta FoxView2 - Schematic B

Design: Dinesh Gajjar

http://www.foxdelta.com

Note: C10, C13 and R2 NOW INSIDE AUDIO BOOST BOARD

16th Sept 08

Dinesh Gajjar
16th Sept. 2008

Please visit project page at: http://www.foxdelta.com