



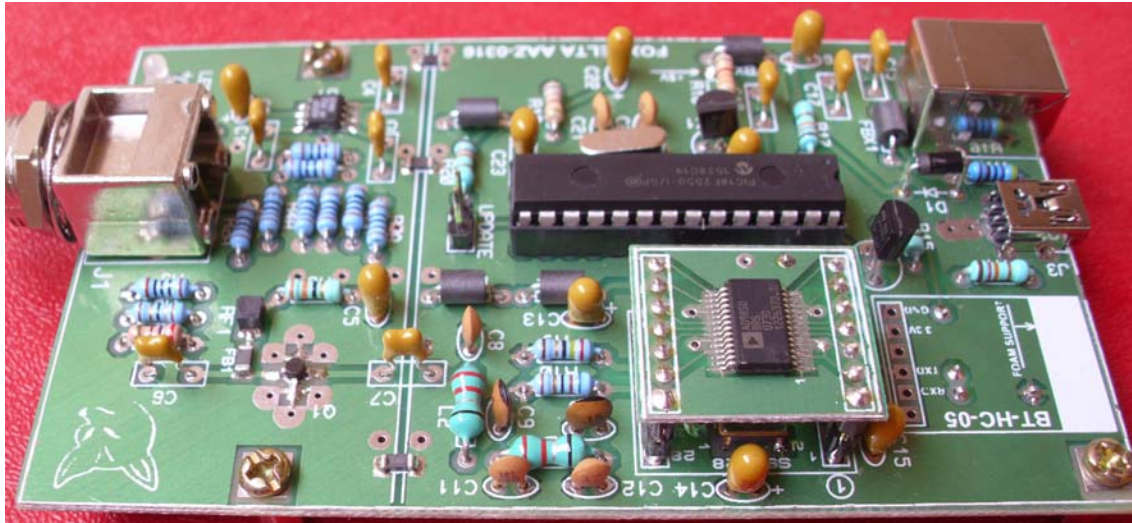
Fox Delta

Amateur Radio Projects & Kits

FD- AAZ-0616

Tech Info Doc: AAZ-0616 USB, Blue tooth 50MHZ Antenna Analyzer

AAZ- 0616 KIT: USB / Blue tooth 50MHZ* Antenna Analyzer



50MHZ Antenna Analyzer: AAZ-0616:

What is revised from AAZ-0914A?

1. Provided special Mini-USB socket to apply external power for field work
2. Auto power change over from USB to External power.
3. Auto activation of Bluetooth module when powered from Mini-USB

Most features same as AAZ-0914A:

1. No change in FW or software. Uses 6.02FW and V6.03 SW
2. Freq range from 1 to 55MHZ
3. Same board size and metal case
4. FW and SW by Tony/I2TZK

Design Basics:

AAZ-0616 is a simple single board antenna analyzer using DDS signal as a source and a return signal from antenna for measurement by a Log Amplifier AD8307. PIC18F2550 process the received data and send to PC or to /Blue tooth module for viewing on smart phones.

AAZ-0914A may be used as:

1. A Standalone USB Antenna Analyzer to 50MHZ
2. Antenna Analyzer for your Smart Phones (with Blue tooth Module Installed)
3. 1 to 50MHZ HF Signal Generator for testing.

5V Power Selection:

When power (5V) is applied to a small Mini-USB Connector, AAZ-0616 works on power coming from Mini-USB. However, if USB standard connector is connected to PC, power will be selected automatically from PC's USB port.

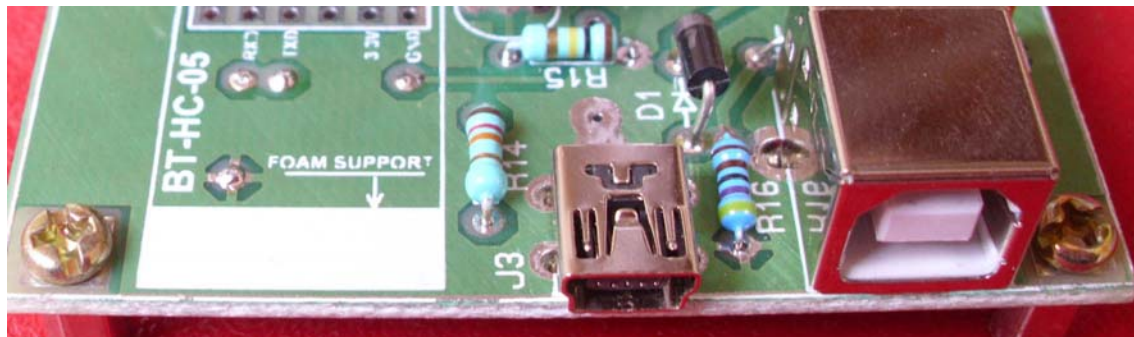
Blue tooth activation:

When Power bank or external +5V is supplied at Mini-USB connector, AAZ will get its power and Bluetooth function will be selected in processor. Means, data will start flowing to BT module and not to USB Standard connector.

USB Operation:

Connecting an USB cable (A to B) from your PC to AAZ-0616, will power analyzer and aaz data will flow to your PC. (SW 6.03 running on PC)

J2, J3 and BT HC05 area:



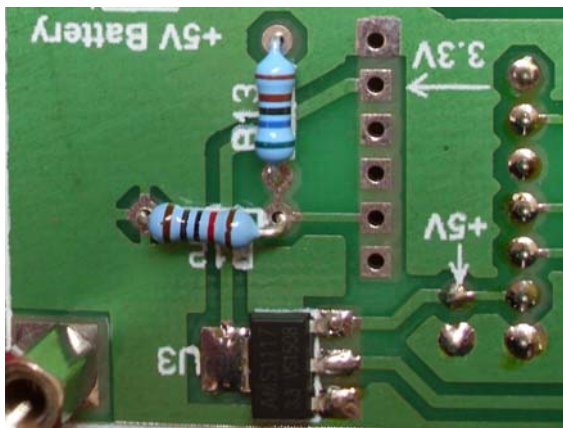
AD9850 DDS Assembly:



DDS: AD9850 or 9851 will be supplied with kits. (Pre-Soldered and fully tested)

Solid Pin Header Male/Female are supplied for easy removal of this module in case of damage.

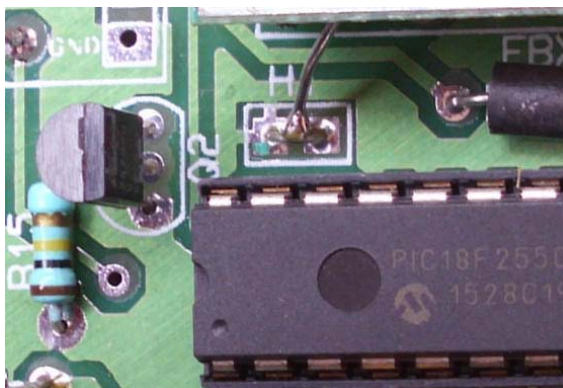
3.3V Power to 125MHZ OSC and Blue-tooth module:



AMS1117-3.3V is a 3.3V 1A LDO type regulator which supply power to 125MHZ SMT Oscillator and external Blue-tooth module

This regulator is pre-soldered for kits.

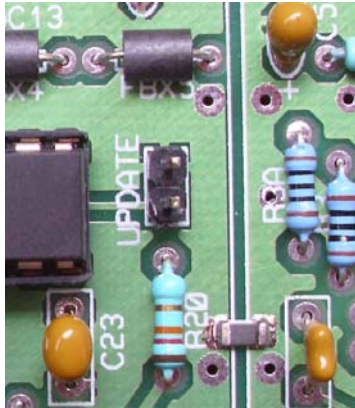
AD9850 / AD9851 Selection:



Header H1 selects: Ground = AD9850, Open = AD9851

A wire may permanently ground H1 when only AD9850 DDS chips decided to be used. (This kit)

FW Update Header:



AAZ-0616 kit is supplied with FW V6.02 pre-loaded on PIC18F2550.

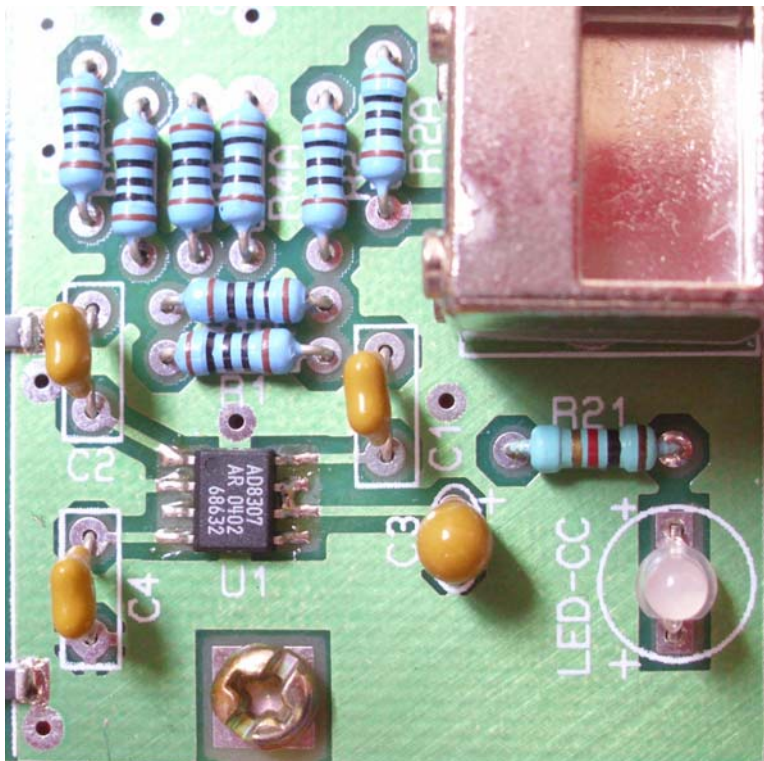
Firmware has a boot-loader built-in, which can be activated by shorting "Update" header to update PIC firmware (PIC Programmer is not required)

Do not place a shorting pin on this header for normal use.

SMT Ferrite Beads, RFCs and AD8307:

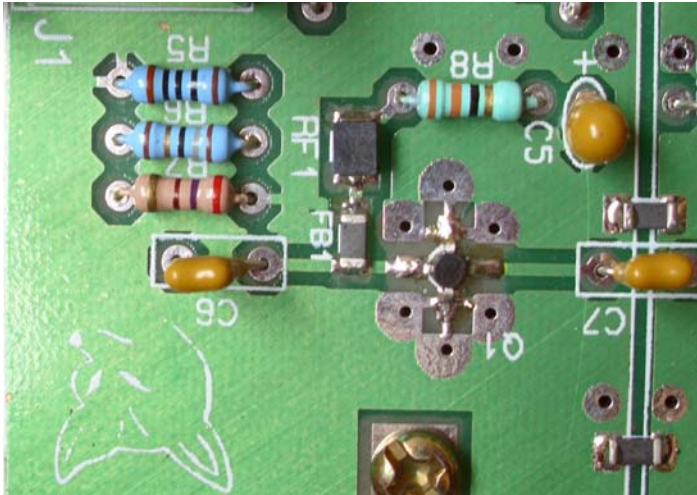
AAZ-0616 has 5 Ferrite beads in 1206 size and 2 RF1/RF2 SMT Inductors of 100uH each. AD8307 is in SO8. 125MHZ is in 5X7 package. Q1 is ERA3SM.

All SMT parts listed above are pre-soldered on PCB for kits.



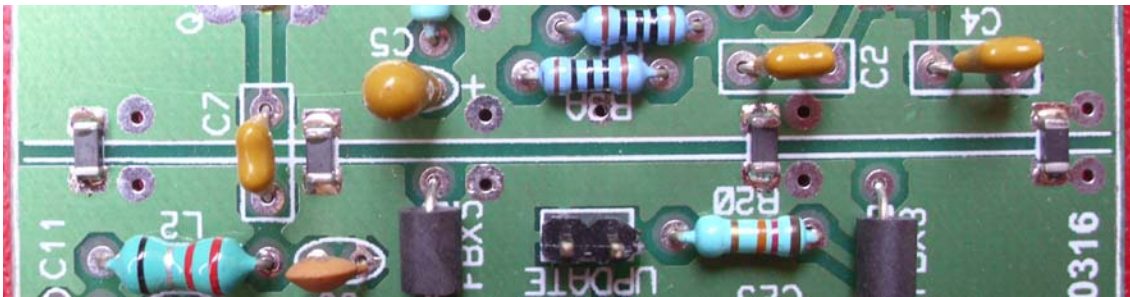
Kit has AD8307 Pre-Soldered on PCB.

Q1, Ferrite Bead and RF1:



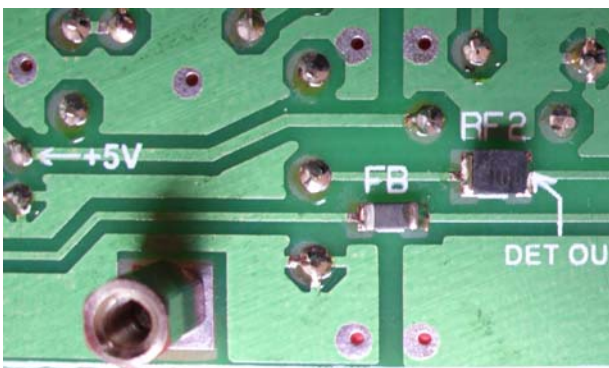
FB1 is a Ferrite Bead in size 1206/SMT. RF1 is a 100uH RFC. These three parts are pre-soldered on board for kits.

SMT Ferrite Beads used for ground plane saperation:



4 Ferrite beads are used as ground plane separator and are Pre-Soldered on PCB for kits

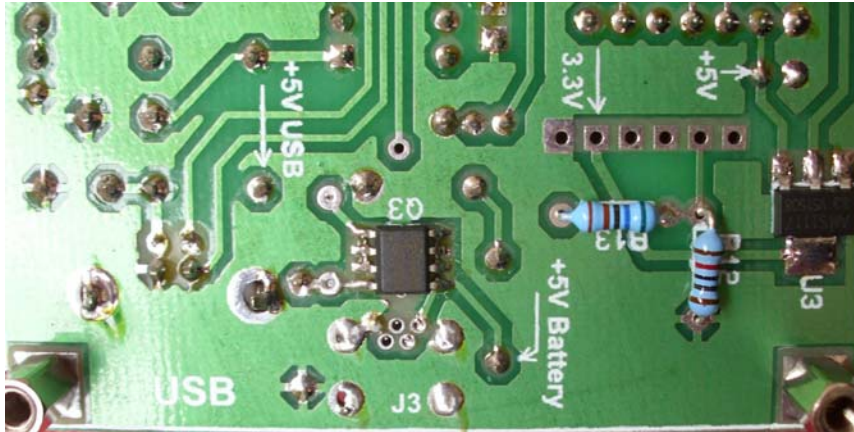
RF2 and FB at bottom of board:



Noise reduction parts, RF2 and FB at bottom side of board are SMT and pre-soldered on Board.

RF2 is a 100uH RFC and FB is in size 1206 (43 material bead)

Power Switch and Solder Side Resistors:

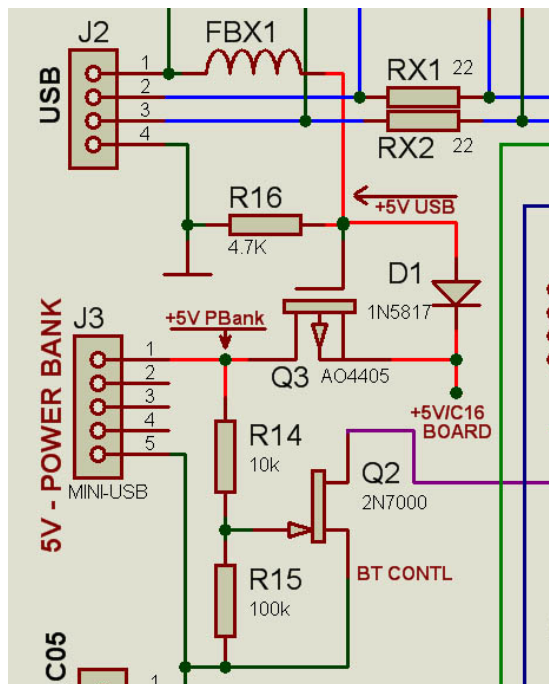


AO4405 PFET is used in association with a 1N5817 diode to auto switch +5V from USB and Mini-USB (External Power)

Only two power supply pins of Mini USB connector are used. Rest are left unconnected.

Two Resistors, R12 and R13 are placed on Solder Side of board.

Power Switch Schematic:



Q3, AO4405 is a P Ch FET. In normal condition, when powered from J2/USB, Board receives +5V from J2, thru D1. (Gate is High, Q3 is OFF)

When External power is applied at Mini USB – J3, +5V from J3 reach FET output as FET is “ON”. Under this situation, D1 blocks the Mini USB voltages from reaching J3/USB.

When power applied at J3, in addition to +5 supplied to board, Q2 gate is high and activates it to place PIC PIN 24 to LOW. This pin is to control PIC data flow relection: To PC or to BT.

PIN 24 LOW = Data to BT Module
PIN 24 High = Data sent to PC/USB

Please note:

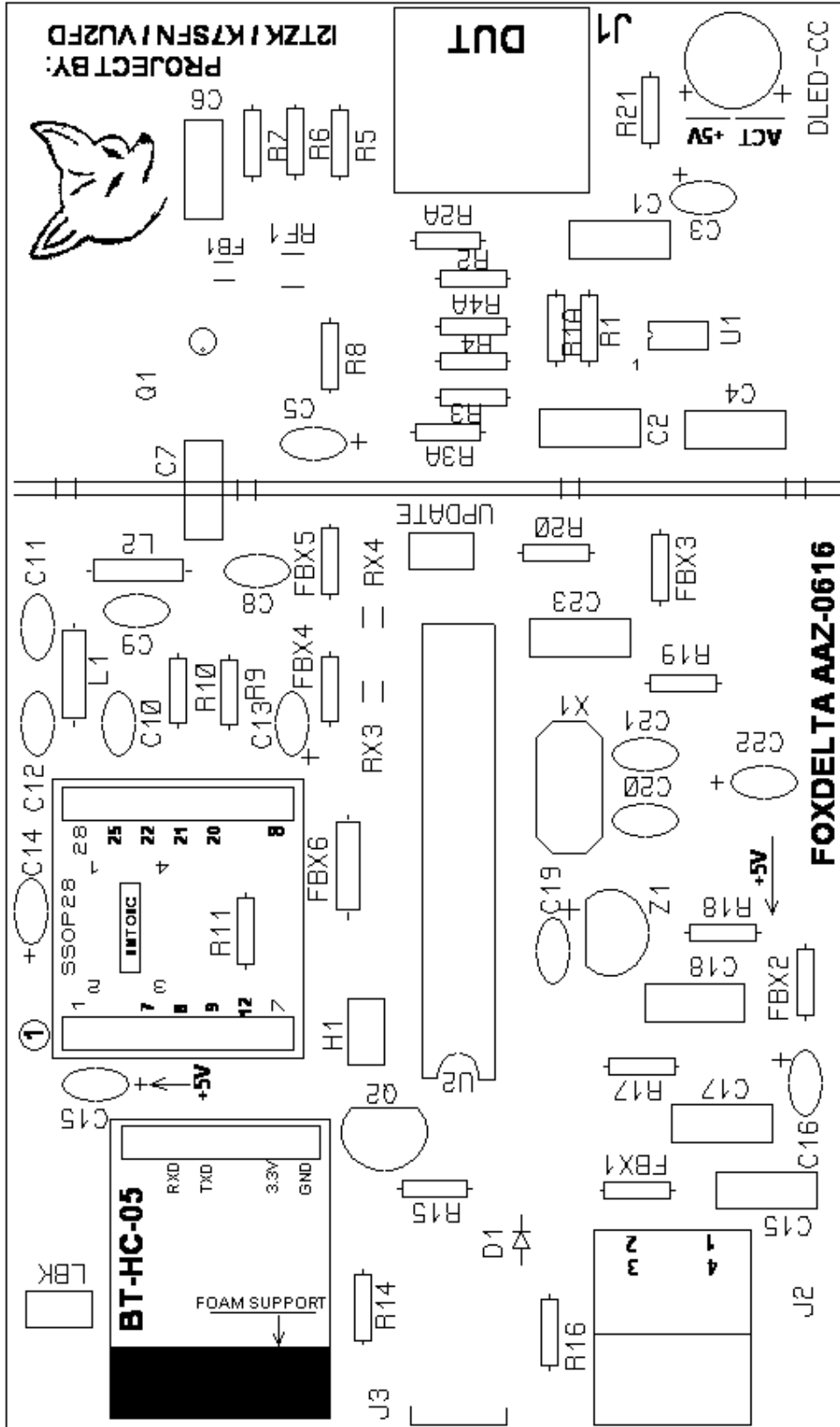
J2 has priority over J3. Means, if J2 is connected, AAZ is powered from J2. However, BT enable function can still be managed by using Mini USB power.

AAZ – 0616 KIT Parts List:

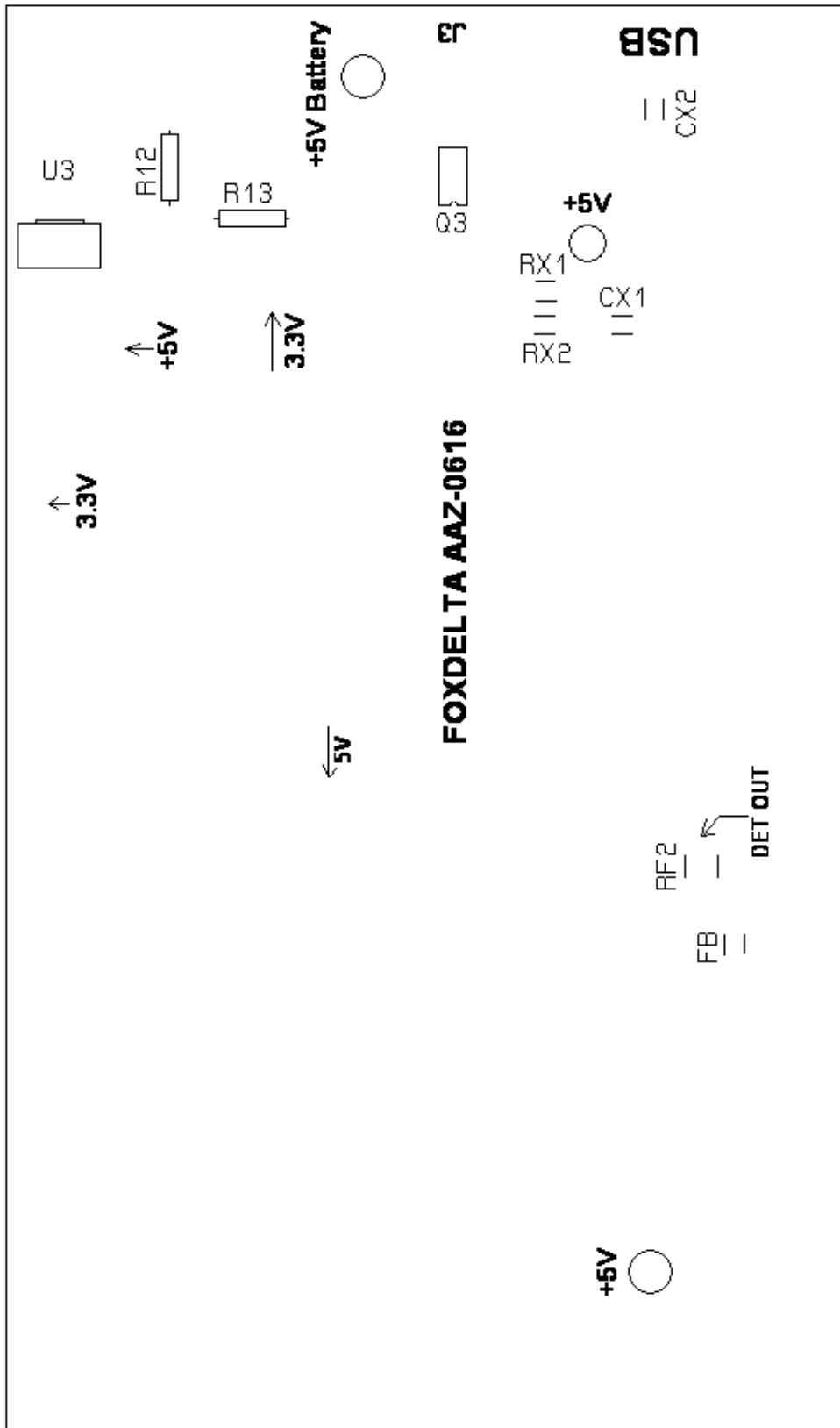
Quantity	Part ID	Part Details
1	U2	PIC18F2550 FW V6.02
1	AD9850 Adapter	AD9850 & SMT Caps
1	U1#	AD8307 SO8 Pre-Soldered on Board
1	OSC#	125MHZ SMT OSC 3.3V SMT
1	X1	20MHZ Crystal HC49
1+1	LED/Dual LED	3mm LED, Dual LED CC
1	Q1#	ERA3SM
1	Q2	2N7000
	Q3#	AO4405 (PNP Switch)
1	IC Socket	28PIN DIP
1	PCB	FD-AAZ-0616 DSPTH PCB
1	Z1	LM385-2.5V
1	U3#	AMS1117 – 3.3V
2	L1, 2	HF LPF Inductors 0.22uH
6	FBX1, 2, 3, 4, 5, 6	Ferrite Bead Inductors
2	RF1, FB2	100uH RFC
1	J2	USB Socket, R/A, PCB Type
1	J3	Mini USB R/A (Power bank INPUT)
5	*SMT Ferrite beads	Ferrite Beads 1206 SMT Pre-Soldered
1	J1	BNC R/A PCB
3	2PIN Headers	H1, Update, Loop back
1	D1	1N5718 Diode
	All Resistors ¼ W 5%	
1	R5	300 Ohms
1	R6	18 Ohms
1	R7	270 Ohms
8	R1/A, R2/A, R3/A, R4/A	100 Ohms
1	R8	33 Ohms
1	R9	24 Ohms
1	R10	51 Ohms
4	R12, 14, 17, 20	10K
2	R11, 13	5.6K
1	R18	3.3K
1	R19	680 Ohms
1	R21	1K
2	Rx1, RX2	1206 22 ohms
0	RX3, RX4	1206 15K (Not used in this kit)
	Capacitors	
1	C23	0.47uF
2	C17, 18	.001uf Poly
6	C15, 4, 2, 1, 6, 7,	.1uf Poly
6	C16, 22, 3, 5, 13, 15	1uf Tantalum
2	C20, 21	22pf
2	C 14, 19	10uF Tantalum
1	C8	82pf Ceramic
2	C9, 10	15pf Ceramic
1	C12	47pf Ceramic
1	C11	100pf Ceramic
2	CX1, CX2	15pf 1206

C15 is listed twice: refer to silk error details at the end of this doc.

AAZ-0914A COMPONENT SIDE SILK:

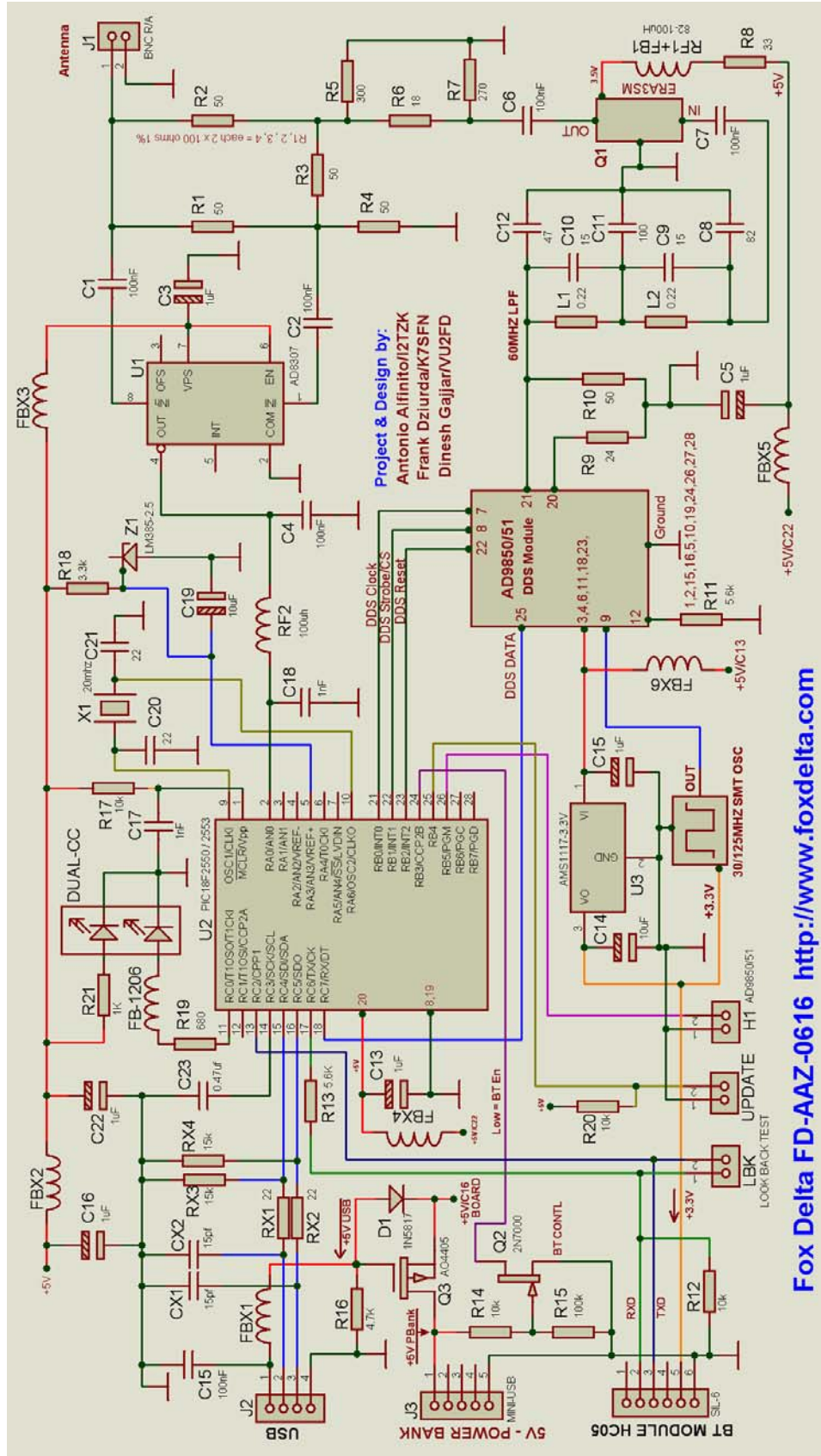


Component Side Silk:



We have few SMT parts on this side of board: U3, RX1, RX2 , CX1, CX2

AAZ-0616 Schematic:



Fox Delta FD-AAZ-0616 <http://www.foxdelta.com>

USB Protection components:

PC's USB ports are not always good and dump a lot of scrap into device attached. If your PC's USB port is not good for AAZ-0616, you may use a clamp-on ferrite beads on USB cables.

CX1, CX2, RX1, RX2, RX3, and RX4 are SMT parts used to reduce risk of USB port surge and reduce noise. RX3/4 are not used at moment and not required.

Bluetooth module: (Option)

AAZ-0616 kits are not supplied with this module. Reason: everything I import, I pay customs. To make things better, its better that kit builder buy this module from aliexpress or ebay. They are only 4 to 5 USD.

Although, A right angle connector HC05 module has a perfect space on board, any other HC05 type modules can be used. All that you need to see is:

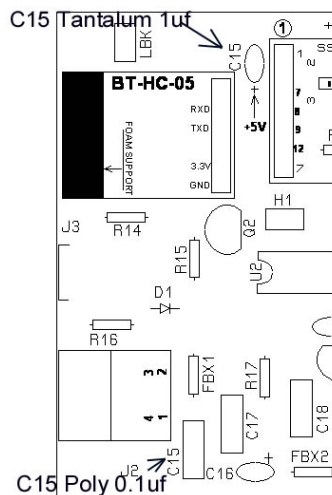
Ground, +3.3V, RX and TX.

You may place BT module HC05 away from AAZ-0616 board by using a 4 Core wire.

Alternatively, we can use these 4 wires and connect a WIFI module to make our AAZ-0616 transmitting data globally. But that it another story!!

Please note that due to many android versions and smart phone hardware permissions enabled/blocked by phone makers, it is impossible to give support for this add-on module. You will have to figure out how to configure and use it. Android app is fully tested on Samsung Tab3.

Silk Error Details:



C15 is twice on silk:

C15 near DDS module, with polarity, is 1uf Tantalum

C15 near J2, rectangle, is 0.1uf Poly

73s

Dinesh Gajjar

15th July 2016

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