REV 0.2

TECHNICAL DESCRIPTION

Fastrax Mini Evaluation kit

This document describes the electrical connectivity and main functionality of the Mini Evaluation kit hardware.

September 10th , 2007

Fastrax Ltd.

TRADEMARKS

CHANGE LOG

Rev.	Notes	Date
0.1	First Draft	2007-09-10
0.2	Block diagram changed, PPS output added	2007-10-10

CONTENTS

COMPLEMENTARY READING

The following Fastrax reference documents are complementary reading for this document. All operating and firmware related documentation is also available at the iSuite™ 3 SDK web site ***http://isuite.fastrax.fi***

Ref. #	File name	Document name
1		MEVKTB_driver installation

1. GENERAL DESCRIPTION

The Mini Evaluation kit is a small, compact, PCB meant for evaluating and testing of iTrax03, iTrax100, iTrax300 and uPatch Families. The basic idea of Mini Evaluation kit is the same as iTrax03 Evaluation Kit's, to provide a pc-interface for GPS-modules.

The Mini Evaluation kit is interfaced via USB cable and it's also powered from the USB so no external power is needed. The Evaluation Kit has the following connectivity:

- 40-pin socket for iTrax Application Boards
- uPatch130/uPatch300 connector
- Two USB connectors (Mini-B)
- Reset switch
- Programming switch for firmware upgrade
- PPS signal in pinheader
- General I/O lines can be probed from 40-pin socket- connector if needed

Figure 1 Mini Evaluation Kit with iTrax03s application board.

1.1 Block diagram

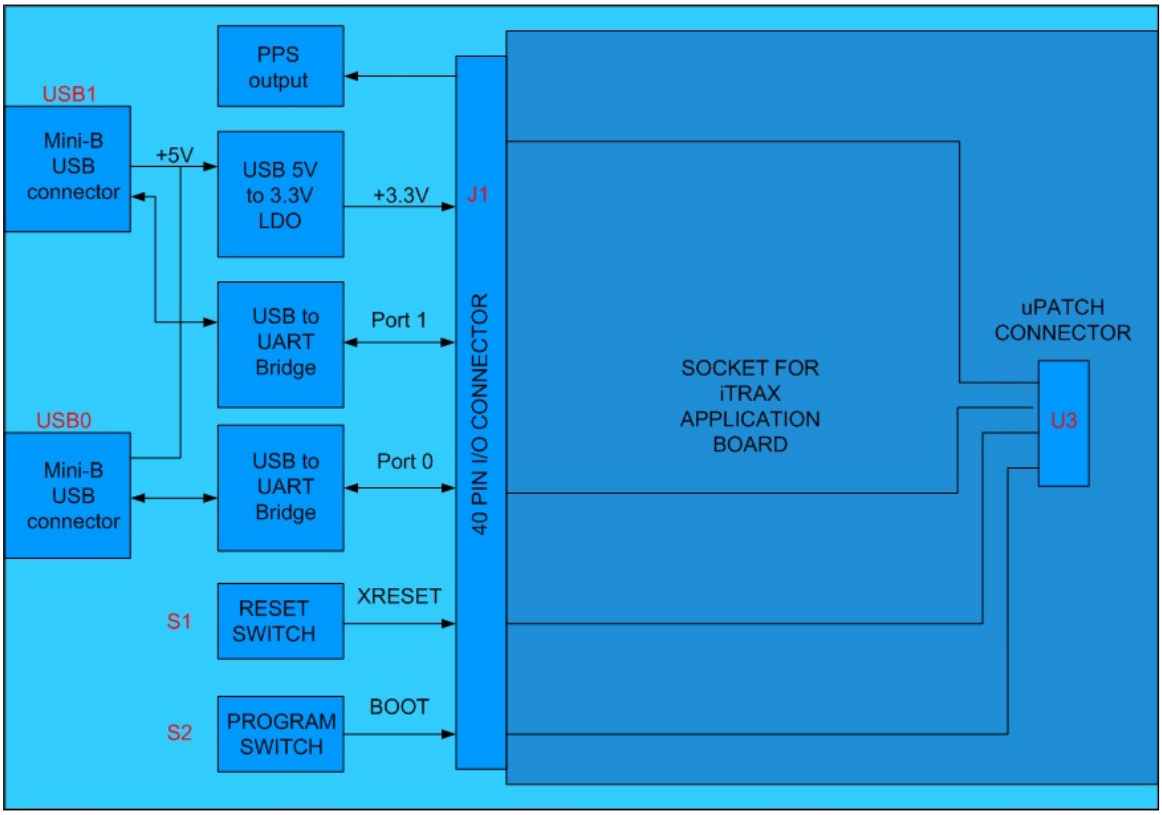

Figure 2 Block diagram

2. SPECIFICATIONS

2.1 General

Table 1 General Specifications

Supply voltage, VDD	+4.5V…+5.5 V (USB power)
Current consumption, VDD Depending from used module.	30-80 mA typical (without external Antenna current)
Antenna bias voltage	Same as internal VCC +3.3V
Antenna bias current	> 3mA, limited to max 50mA
Operating and storage temperature	-30ºC…+80ºC
Serial port configuration (default)	Port 0: NMEA Port 1: iTALK or SiRF Binary
Serial data speed (default)	NMEA: 4800 baud Italk binary: 115200 SiRF Binary: 57600
I/O signal levels	CMOS compatible: low state 0.0…0.3xVCC; high state 0.7…1.0xVCC
I/O sink/source capability	+/- 4 mA max.

2.2 Absolute maximum ratings

Table 2 Absolute maximum ratings

Item	Min	Max	unit
Operating temperature	-30	+80	ºC
Storage temperature	-40	+90	ºC
Power dissipation	-	900	mW
Supply voltage, VDD	-0.3	+5.5	V

3. CONNECTIVITY

3.1 Connection assignments

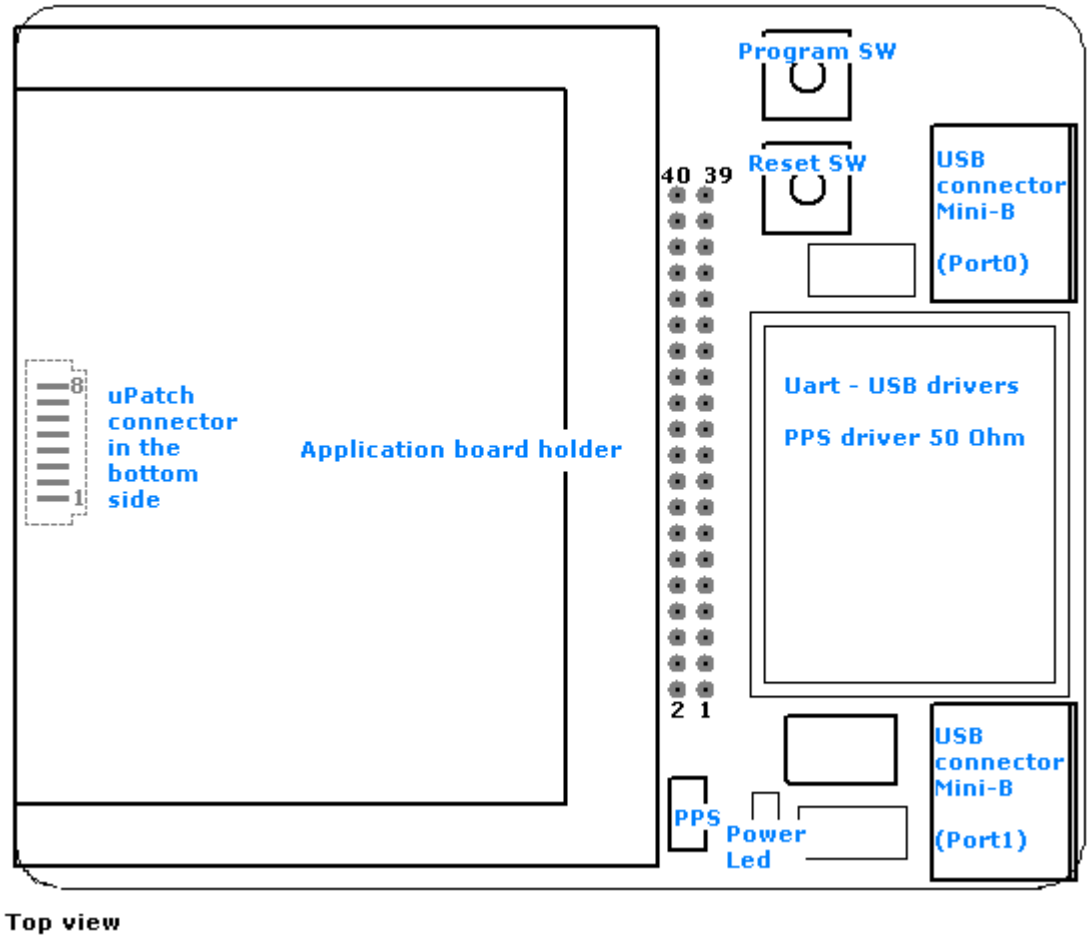

Figure 3 Overview of the Mini Evaluation Kit's card holder

The circuit board size is 72.0mm (width) x 61.2mm (length). General tolerance is ±0.3mm.

The uPatch connector is an 8-pin interface connector. The connector is from JST, type SM08B-SURS-TF. Mating connector is e.g. JST 08SUR-32S.

Table 3 describes the connectivity and signals of this connector.
Table 4 describes the connectivity and signals of the Application board holder

Table 3 Connections of uPatch connector

Contact	Signal name	I/O	Alternative signal name	Signal description
1	TXA	O	-	UART Port 0 async. Output
2	RXA	I	-	UART Port 0 async. Input. Pulled high internally with 10k resistor.
3	GND	-	-	Ground
4	VDD	I	-	Main power supply
5	BU	I	-	Backup battery supply
6	XRESET	I	-	Asynchronous system reset, active when low
7	UPDATE	I	EPORT2	Boot control input 1: 0=UART, 1=Internal flash memory. Pulled high internally with 10k resistor.
8	1PPS	O	-	1PPS signal output

Table 4 Connections of the Application board holder

Pin	Sign.Name	I/O	Description
1	TXD1	O	UART 1 async. output
2	GND	GND	Power and signal ground
3	RXD1	I	UART 1 async. input
4	GND	GND	Power and signal ground
5	TXD0	O	UART 0 async. output
6	GND	GND	Power and signal ground
7	RXD0	I	UART 0 async. input
8	GND	GND	Power and signal ground
9	VCC	I	Power input
10	GND	GND	Power and signal ground
11	PPS	O	1PPS signal output
12	GND	GND	Power and signal ground
13	XRESET	I	External Reset, Active Low
14	FCLK	O	Pre-divided clock output of UART 1
15	SPI2XCS2	I/O	Boot select 2nd input (SPI2 chip select2)
16	SPI2XCS3	I/O	Boot select input (SPI2 chip select3)
17	GND	GND	Power and signal ground
18	TCAP1	I	Timer TMG1 capture input
19	TIN0	I	Timer TMG0 external clock input

20	TIN1	I	Timer TMG1 external clock input
21	GND	GND	Power and signal ground
22	TCAP0	I	Timer TMG0 capture input
23	PM1	I	Pulse measurement input 1
24	PM0	I	Pulse measurement input 0
25	GND	GND	Power and signal ground
26	MMCCMD	I/O	UI indicator B output (MMC command bus)
27	SPI1XCS0	I/O	Power Good control input (SPI1 cs 0)
28	MMCCLK	O	MMC clock output
29	SPI1CLK	O	SPI1 clock
30	MMCDAT	I/O	UI indicator A output (MMC data bus)
31	GND	GND	Power and signal ground
32	SPI1SDO	O	SPI1 data output
33	GND	GND	Power and signal ground
34	SPI1SDI	I	SPI1 data input
35	GND	GND	Power and signal ground
36	SPI2CLK	I/O	SPI2 clock, output in master mode
37	GND	GND	Power and signal ground
38	SPI2SDI	I	ON/OFF control input (SPI2 data input)
39	GND	GND	Power and signal ground
40	SPI2SDO	O	UI indicator C output (SPI2 data output)

Table 5 Signals of the USB Mini-B connector

Contact Number	Signal Name	Typ. wiring assignment
1	VBUS	Red
2	D-	White
3	D+	Green
4	ID	Not connected
5	GND	Black
Shell	Shield	Drain Wire

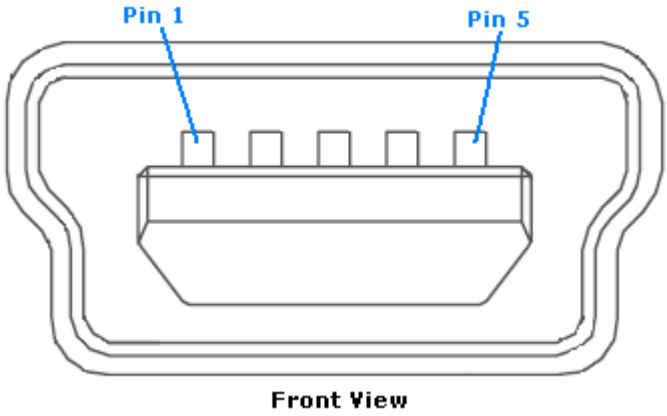

Figure 4 USB Mini-B type connector and pin assignments.

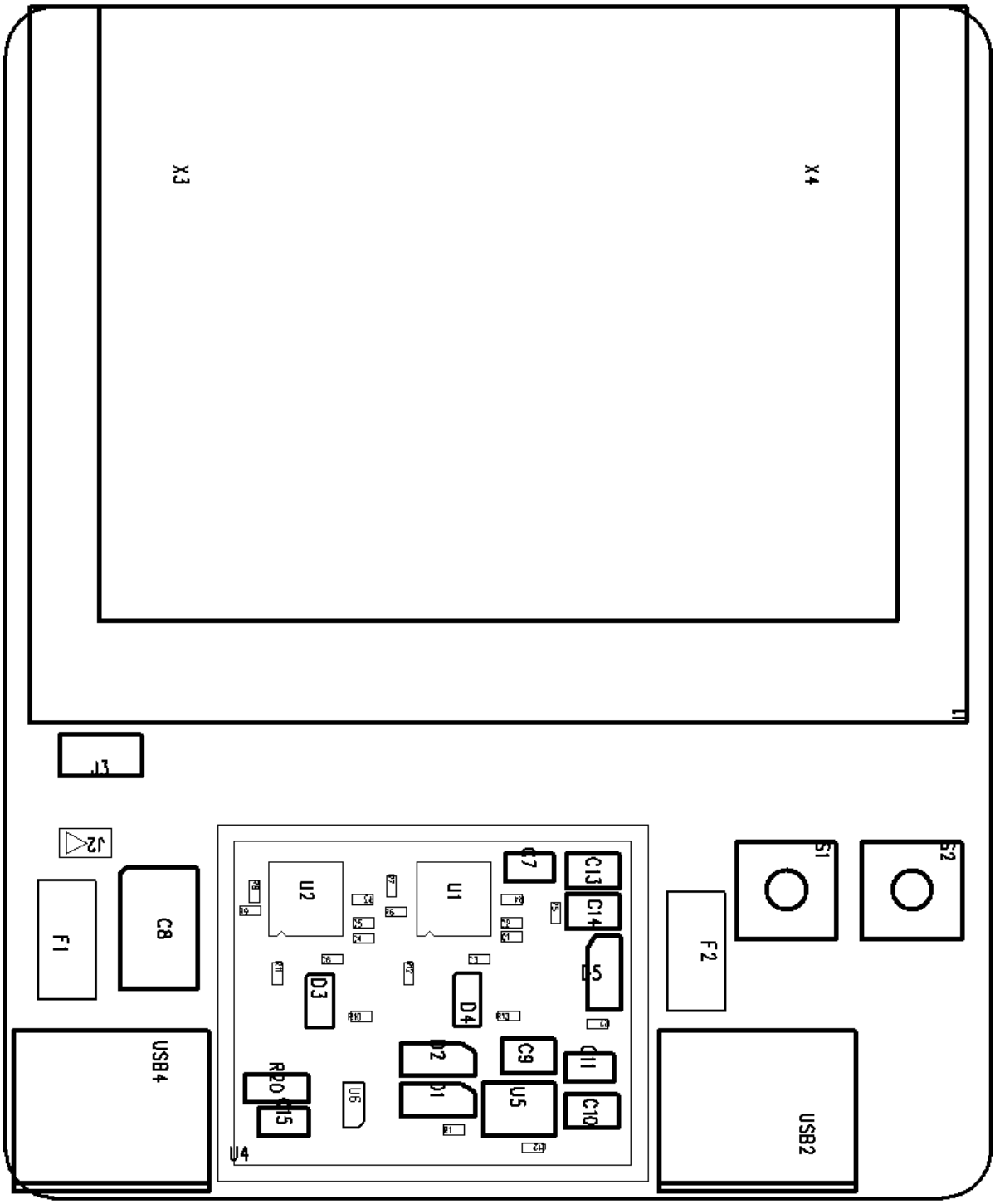

Figure 5 Assembly TOP

REF.	QTY	TECHNICAL DESCRIPTION	VALUE	PCB	Part Type
C1	1	Capacitor chip, 1uF 6.3V +-20% X5R 0402	1uF	C0402	C/0402/X5R/1U/6V3/T20
C2	1	Capacitor chip, 100nF 6.3V +-20% X5R 0402	100nF	C0402	C/0402/X5R/100N/6V3/T20
C3	1	Capacitor chip, 1uF 6.3V +-20% X5R 0402	1uF	C0402	C/0402/X5R/1U/6V3/T20
C4	1	Capacitor chip, 1uF 6.3V +-20% X5R 0402	1uF	C0402	C/0402/X5R/1U/6V3/T20
C5	1	Capacitor chip, 100nF 6.3V +-20% X5R 0402	100nF	C0402	C/0402/X5R/100N/6V3/T20
C6	1	Capacitor chip, 1uF 6.3V +-20% X5R 0402	1uF	C0402	C/0402/X5R/1U/6V3/T20
C7	1	Capacitor chip, 220nF 16V 10% X7R 0603	220nF 16V	C0603	C/0603/X7R/220N/16V
C8	1	Capacitor tantal, 100uF 10V 10% D	100uF 10V	TAJ_D	C/D/TANT/100U/10V
C9	1	Capacitor chip, 4,7uF 6,3V X5R 0805 +-20%	4u7F	C0805	C/0805/X5R/4U7/6V3/T5P
C10	1	Capacitor chip, 4,7uF 6,3V X5R 0805 +-20%	4u7F	C0805	C/0805/X5R/4U7/6V3/T5P
C11	1	Capacitor chip, 100nF 16V 10% X7R 0603	100nF/16V	C0603	C/0603/X7R/100N/16V/T20P
C12	1	Capacitor chip, 10nF 16V 10% X7R 0402	10nF	C0402	C/0402/X7R/10N/16V/T10P
C13	1	Capacitor chip, 4,7uF 6,3V X5R 0805 +-20%	4u7F	C0805	C/0805/X5R/4U7/6V3/T5P
C14	1	Capacitor chip, 4,7uF 6,3V X5R 0805 +-20%	4u7F	C0805	C/0805/X5R/4U7/6V3/T5P
C15	1	Capacitor chip, 220nF 16V 10% X7R 0603	220nF 16V	C0603	C/0603/X7R/220N/16V
D1	1	Diode 75V 225mA, BAT54J	75V 225mA	SOD323	D/75V/225MA/BAT54J
D2	1	Diode 75V 225mA, BAT54J	75V 225mA	SOD323	D/75V/225MA/BAT54J
D3	1	TVS Diode SOT23-6 Bidirectional,	ESDA6V1BC6	SUPERSOT6	D/ESDA6V1BC6
D4	1	TVS Diode SOT23-6 Bidirectional	ESDA6V1BC6	SUPERSOT6	D/ESDA6V1BC6
D5	1	Diode 75V 225mA, BAT54J	75V 225mA	SOD323	D/75V/225MA/BAT54J
F1	1	Fuse 1A	R452001.MRL	SMDLITTELFUSE	F/LITTELFUSE1A
F2	1	Fuse 1A	R452001.MRL	SMDLITTELFUSE	F/LITTELFUSE1A
J1	1	2x20 pin Flex Card Terminal	2x20	J/2x20/2P0_FLEX	FLEX_CARD_T
J2	1	LED BLUE	AP1608MBC	0603_KINGBRIGHT	D/LED/BLUE/AP1608MBC
J3	1	1x2 pin-header, straight, pitch 2.54mm	1x2P2.54	CON/2X1/2P54	J/1X2/0/2P54
L3	1	75R,+-25%@100MHz, 0R4@DC, 300mA	BLM15BB750	L0402	L/0402/BLM15BB750PN1D
L4	1	75R,+-25%@100MHz, 0R4@DC, 300mA	BLM15BB750	L0402	L/0402/BLM15BB750PN1D
L5	1	75R,+-25%@100MHz, 0R4@DC, 300mA	BLM15BB750	L0402	L/0402/BLM15BB750PN1D
L6	1	75R,+-25%@100MHz, 0R4@DC, 300mA	BLM15BB750	L0402	L/0402/BLM15BB750PN1D
L7	1	75R,+-25%@100MHz, 0R4@DC, 300mA	BLM15BB750	L0402	L/0402/BLM15BB750PN1D
L8	1	75R,+-25%@100MHz, 0R4@DC, 300mA	BLM15BB750	L0402	L/0402/BLM15BB750PN1D
L9	1	75R,+-25%@100MHz, 0R4@DC, 300mA	BLM15BB750	L0402	L/0402/BLM15BB750PN1D
L10	1	75R,+-25%@100MHz, 0R4@DC, 300mA	BLM15BB750	L0402	L/0402/BLM15BB750PN1D
R1	1	Resistor chip, 470R 5% 0402 63mW	470R	R0402	R/0402/470R/5P/G
R2	1	Resistor chip, 10k 5% 0402 63mW	10k	R0402	R/0402/10K/T5P/G
R3	1	Resistor chip, 10k 5% 0402 63mW	10k	R0402	R/0402/10K/T5P
R4	1	Resistor chip, 10k 5% 0402 63mW	10k	R0402	R/0402/10K/T5P
R5	1	Resistor chip, 2k2 5% 0402 63mW	2.2k, 5%	R0402	R/0402/2K2/T5P
R6	1	Resistor chip, 330R 5% 0402 63mW	330R	R0402	R/0402/330R/5P/G
R7	1	Resistor chip, 330R 5% 0402 63mW	330R	R0402	R/0402/330R/5P/G
R8	1	Resistor chip, 330R 5% 0402 63mW	330R	R0402	R/0402/330R/5P/G
R9	1	Resistor chip, 330R 5% 0402 63mW	330R	R0402	R/0402/330R/5P/G
R10	1	Resistor chip, 100R 5% 0402 63mW	100R	R0402	R/0402/100R/T5P/G
R11	1	Resistor chip, 100R 5% 0402 63mW	100R	R0402	R/0402/100R/T5P/G
R12	1	Resistor chip, 100R 5%0402 63mW	100R	R0402	R/0402/100R/T5P/G
R13	1	Resistor chip, 100R 5% 0402 63mW	100R	R0402	R/0402/100R/T5P/G
R20	1	47R 5% 0603 100mW 50V	47R	R0603	R/0603/47R/T5P/G
S1	1	Switch, SMD PUSH BUTTON	SW	SW/B3S-1000	SW/PUSHBUTTON
S2	1	Switch, SMD PUSH BUTTON	SW	SW/B3S-1000	SW/PUSHBUTTON
SC1	1	Rubber feet, RBS-27 BL	RBS-27 BL	RUBBER_FEET	SC/RBS-27BL
SC2	1	Rubber feet, RBS-27 BL	RBS-27 BL	RUBBER_FEET	SC/RBS-27BL
SC3	1	Rubber feet, RBS-27 BL	RBS-27 BL	RUBBER_FEET	SC/RBS-27BL
SC4	1	Rubber feet, RBS-27 BL	RBS-27 BL	RUBBER_FEET	SC/RBS-27BL
U1	1	USB /RS232 driver, CP2102	CP2102	QFN28_CP2101	U/USB/CP2102
U2	1	USB /RS232 driver, CP2102	CP2102	QFN28_CP2101	U/USB/CP2102
U3	1	Connector, SUR 0.8 pitch 8 pin	nichiatsu P1276	P1276_PCB_DECAL	J/P1276
U4	1	Shield,	SHIELD	SHIELD	SHIELD
U5	1	Reg. 3V3, 150mA	3V3, 150mA	SOT23-5	U/LP2985/3V3
U6	1	1.5A LDO Positive Regulator	NC7SZ125M5	SOT23-5	U/NC7SZ125
USB2	1	USB connector, SMD with plastic pegs	Molex	J/USB/67503_1020	J/USB/MOLEX_67503_1020
USB4	1	USB connector, SMD with plastic pegs	Molex	J/USB/67503_1020	J/USB/MOLEX_67503_1020

Figure 6 Bill of materials

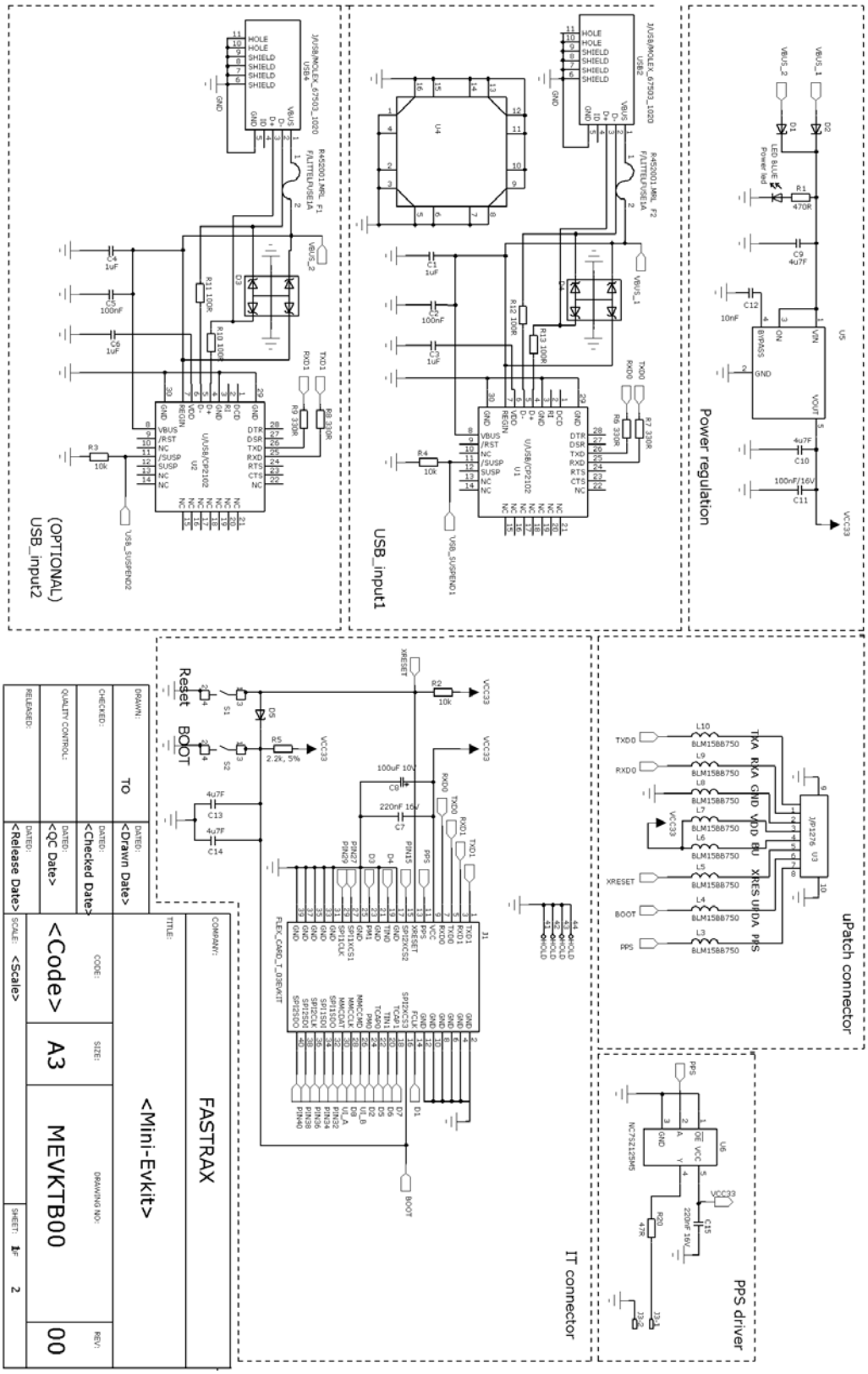

Table 6 Schematic