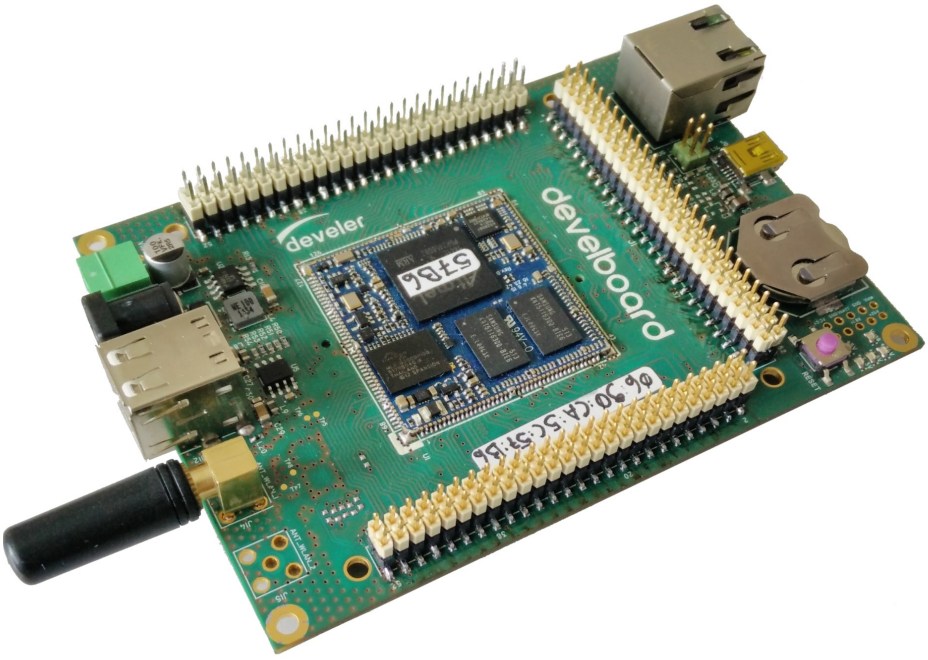
DevelBoard EVA

Evaluation Toolkit

DRAFT

USER MANUAL



Introduction

EVA is the best way to get started with DevelBoard, a powerful Linux-based SoM designed for embedded system beginners as well as heavy-duty industrial applications. This evaluation toolkit helps you design and prototype a wide range of real-world applications, providing easy access to DevelBoard's debug interface and its most common peripherals (Ethernet, Wi-Fi etc.).

October 2015

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1. Quick start

EVA is a easy-to-use evaluation board to quickly get started prototyping with DevelBoard.

For more information on DevelBoard, visit www.develboard.com.

Documentation and user guides are also available at docs.develboard.com.

2. Features

EVA offers the following features:

- DevelBoard SoM, featuring an Atmel ATSAMA5D44 ARM® Cortex® A5 core @ 528 MHz
- Up to 512 MiB of DDR2 RAM
- Up to 512 MiB of NAND Flash
- On-board serial debugging interface, both using a 4-pin header and a USB mini-A connector
- Hardware reset push-button
- Board power supply: through USB bus or using an external power supply
- External application power supply: 1.8V, 3.3V, 5V, 24V
- CR2032 battery slot for RTC and backup registers
- Electrical test points for each voltage level on the board
- Five LEDs: V_{USB}, +1.8V, +3.3V, +5V, +24V
- Two USB 2.0 High speed host ports
- Micro-SD card slot
- Ethernet 10/100 shielded connector
- Two antennas for WLAN 2.4GHz MIMO channel access, with support for 5GHz Bluetooth LE
- Three 26x2 52-pin extension headers for access to I/O pins on DevelBoard:
  - Almost all 152 GPIO pins (except for Ethernet and SDIO)
  - USB OTG High speed with host / device support
  - 24-bit LCD/TFT display controller

3. Hardware and Layout

This section describes the hardware layout and component placement on EVA, and how the peripherals map to the physical connectors on the board.

3.1. Board overview

EVA is designed around DevelBoard to integrate multiple peripherals and connectors.

Figure 3.1 shows the component placement on the board.

Figure 3.2 shows the top layout of the board.

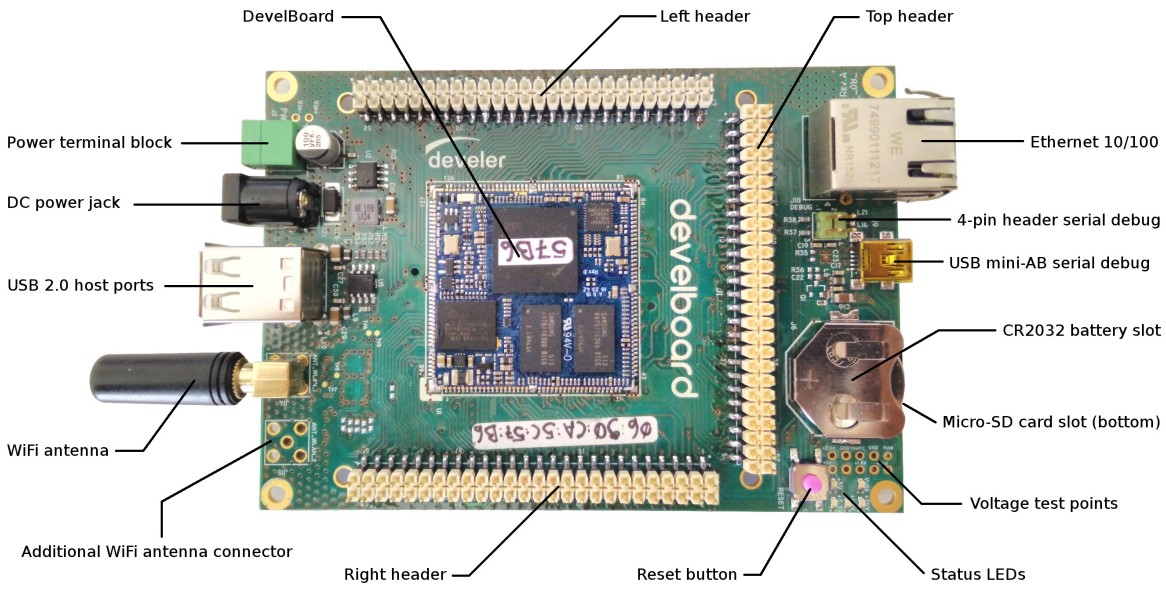


Figure 3.1. Component placement

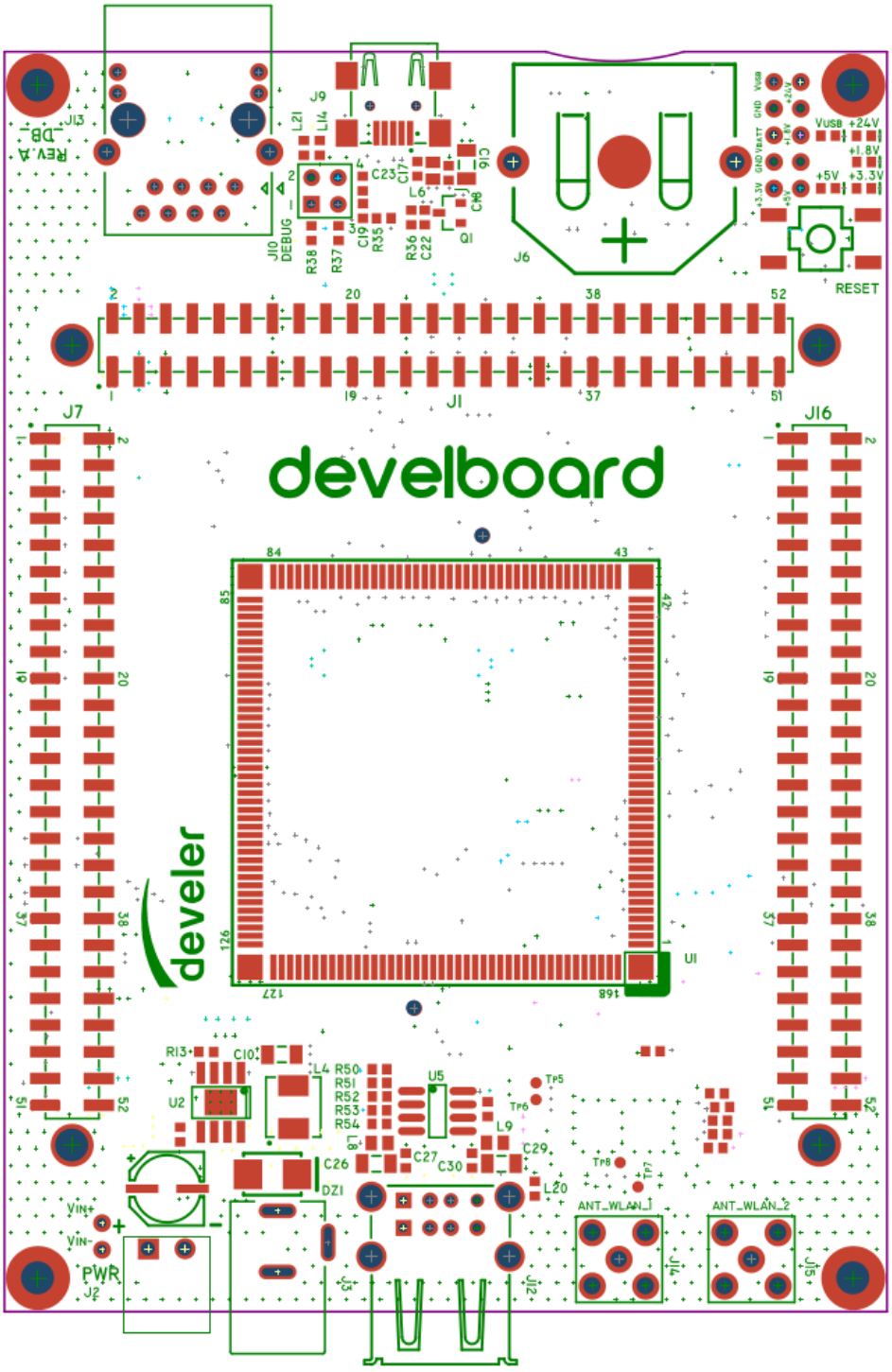


Figure 3.2. Top layout

3.2. Connectors

Table 3.1 describes the interface connectors on the board and the interface to which they are connected.

Identifier	Connector	Interfaces to
J2	3.5mm terminal block	Main power supply
J3	Power jack	Main power supply
J6	Battery slot	V_{bat} for RTC and backup registers
J1, J7, J16	52-pin header	General purpose I/O pins
J9	USB Mini-B	Serial debug interface (RTX3)
J10	4-pin header	Serial debug interface (RTX3)
J11	Micro-SD slot	SDIO port (MCI1A)
J12	USB Type A Dual	USB 2.0 Host interface
J13	Shielded RJ45	Ethernet 10/100 Mbps (GMAC0)
J14, J15	WLAN Antenna	SDIO port (MCI0B)

Table 3.1. Connector list

4. Electrical specifications

DevelBoard is designed to operate at 3.3V. EVA provides several means to power up DevelBoard without damaging it, provided that the following guidelines are observed.

4.1. Power source

Several connectors are available to power up the EVA board.

It can be:

- USB-powered through the USB mini-A connector (J9)
- Powered using the 3.5mm terminal block (J2). The polarity of the plug is not relevant.
- Powered through a 2.1mm DC plug via the power jack connector (J3). The polarity of the plug is not relevant.

Table 4.1 specifies the electrical characteristics of the power supply in order to power up EVA.

Electrical Parameter	Min	Typ	Max	Unit
USB input voltage	-	5	-	V
USB current draw	-	-	500	mA
Terminal block input voltage	7	-	30	V
Power jack input voltage	7	-	30	V
V_{BATT} input voltage	2.6	-	3.3	V

Table 4.1. Electrical parameters

4.2. Warnings

DevelBoard and EVA can be damaged by ESD. It is recommended that proper care is taken when handling electronic components. ESD damage can range from subtle performance degradation to complete device failure.

5. Mechanical drawings

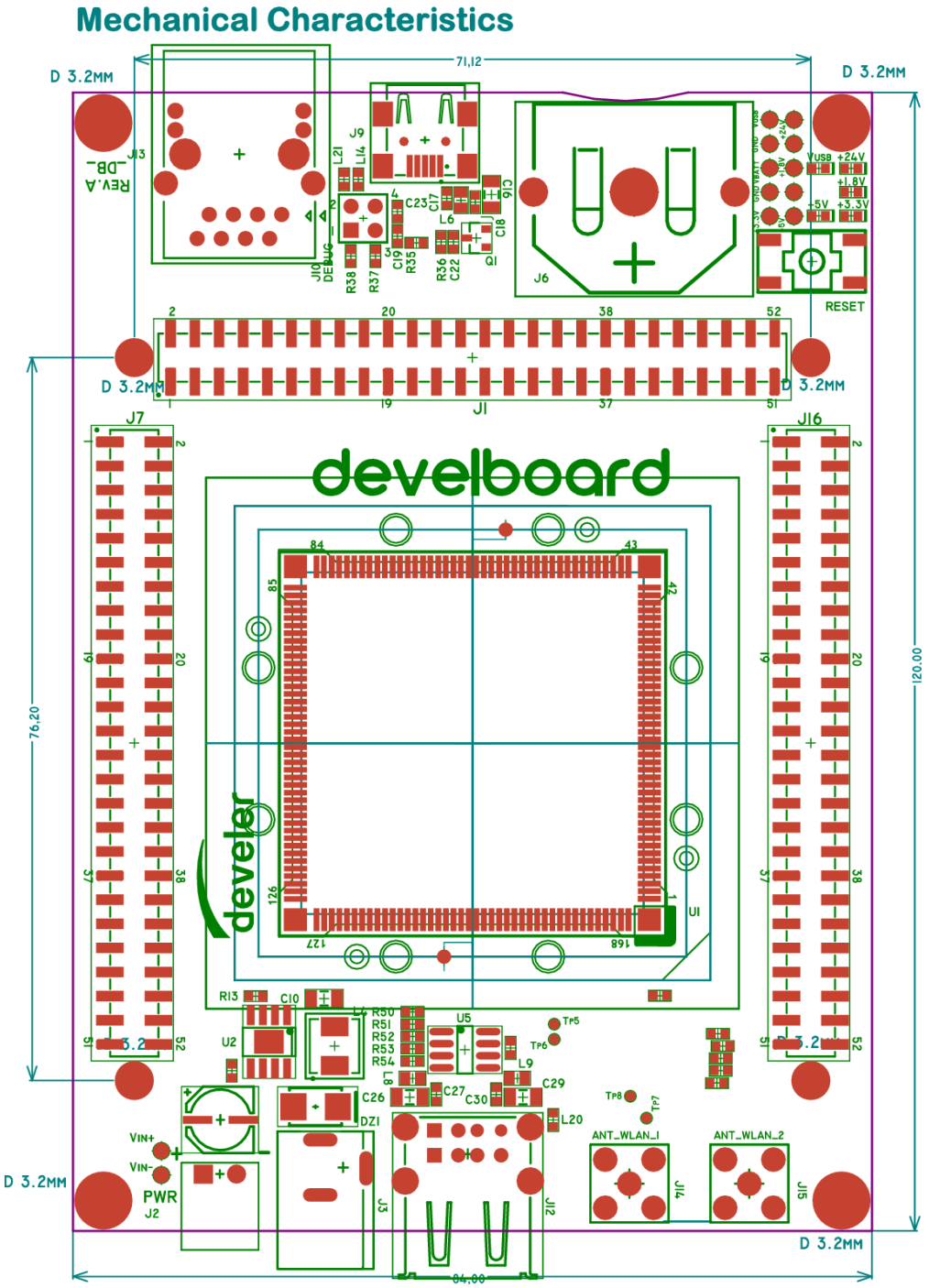
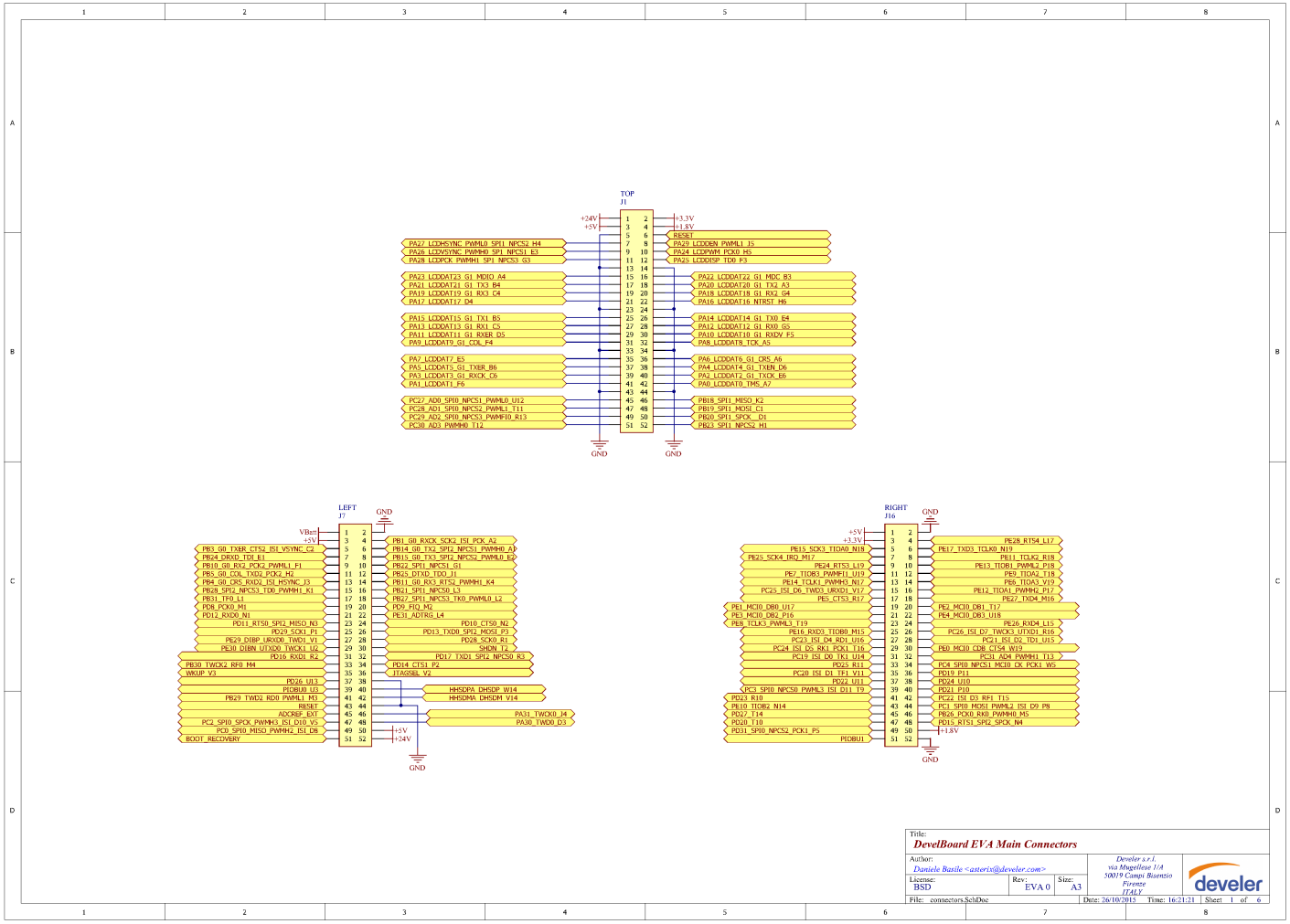
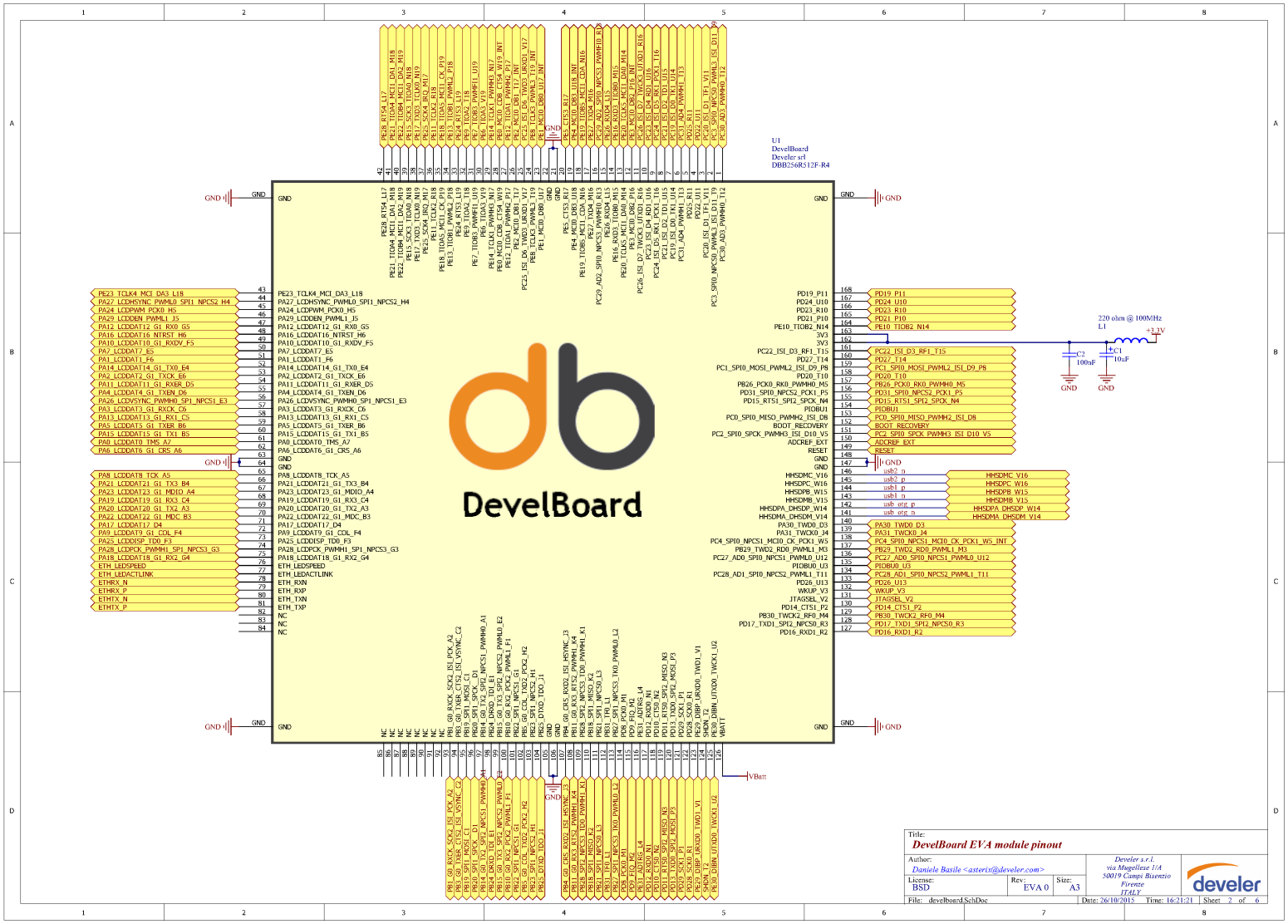
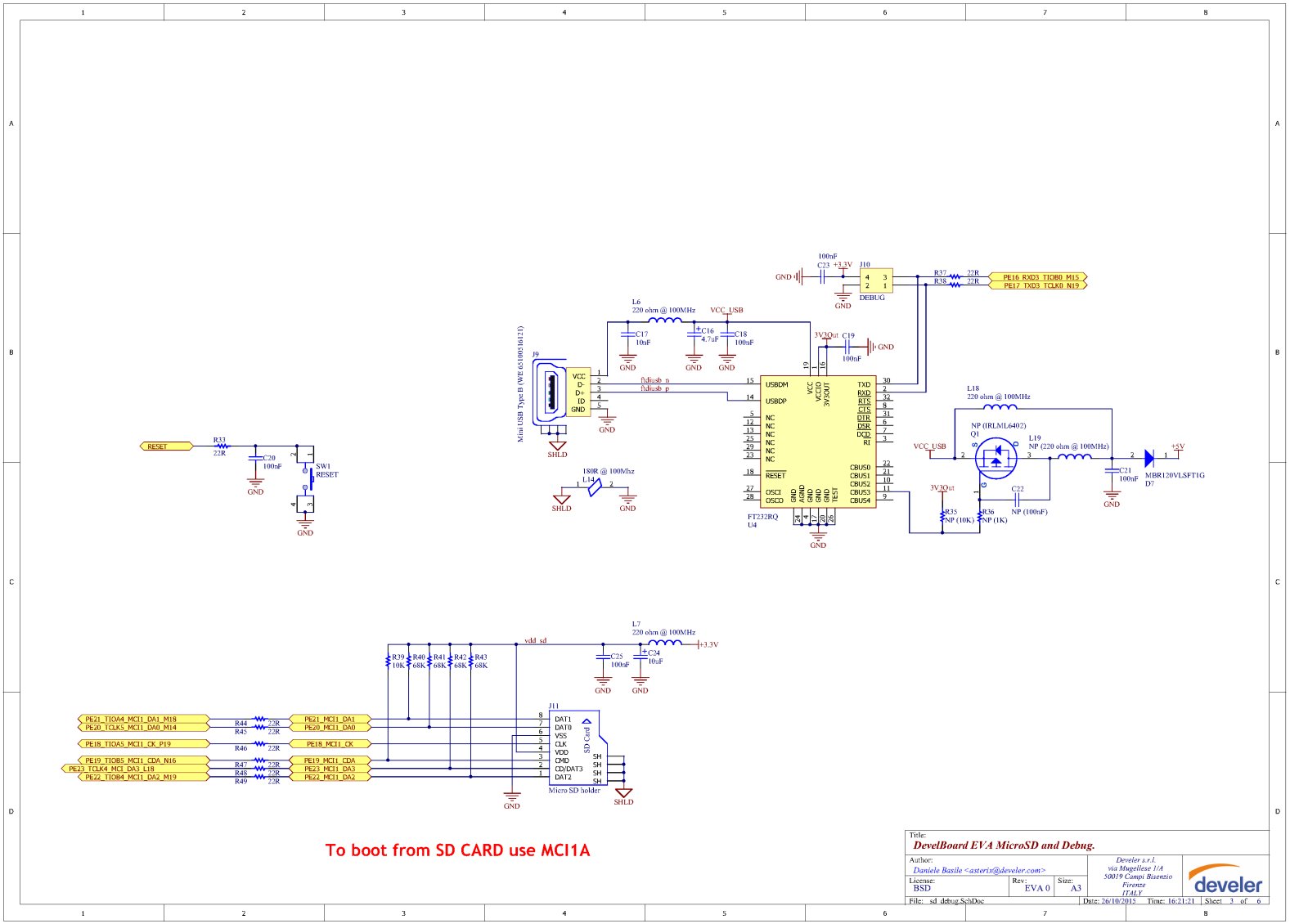


Figure 5.1. Mechanical drawing

6. Schematics




DevelBoard
U1
DevelBoard
Develer srl
DBB256R512F-R4
220 ohm @ 100MHz
L1
+1.2V
C2
100nF
C1
10uF
GND
VBatt
Title:
DevelBoard EVA module pinout
Author:
Daniele Basile <asterix@develer.com>
Develer s.r.l.
via Mugellese 1/A
50019 Campi Bisenzio
Firenze
ITALY
License:
BSD
Rev:
EVA 0
Size:
A3
File: develboard.SchDoc
Date: 26/10/2015
Time: 16:21:21
Sheet 2 of 6


RESET
R33
22R
C20
100nF
SW1
RESET
GND
J9
Mini USB Type B (WE 651005136121)
VCC
D-
D+
ID
GND
SHLD
L6
220 ohm @ 100MHz
C17
10nF
C16
4.7uF
C18
100nF
VCC_USB
ftdiusb_n
ftdiusb_p
180R @ 100Mhz
L14
C23
100nF
+3.3V
J10
DEBUG
R37
R38
22R
22R
PE16_RXD3_TIOB0_M15
PE17_TXD3_TCLK0_N19
3V3Out
C19
100nF
FT232RQ
U4
USBDM
USBDP
RESET
OSCI
OSCO
TXD
RXD
RTS#
CTS#
DTR#
DSR#
DCD#
RI#
CBUS0
CBUS1
CBUS2
CBUS3
CBUS4
L18
220 ohm @ 100MHz
NP (IRLML6402)
Q1
L19
NP (220 ohm @ 100MHz)
VCC_USB
C21
100nF
MBR120VLSFT1G
D7
+5V
C22
NP (100nF)
R35
NP (10K)
R36
NP (1K)
L7
220 ohm @ 100MHz
vdd_sd
R39
10K
R40
68K
R41
68K
R42
68K
R43
68K
C25
100nF
C24
10uF
J11
SD Card
Micro SD holder
DAT1
DAT0
VSS
CLK
VDD
CMD
CD/DAT3
DAT2
PE21_TIOA4_MCI1_DA1_M18
PE20_TCLK5_MCI1_DA0_M14
PE18_TIOA5_MCI1_CK_P19
PE19_TIOB5_MCI1_CDA_N16
PE23_TCLK4_MCI1_DA3_L18
PE22_TIOB4_MCI1_DA2_M19
R44
R45
R46
R47
R48
R49
22R
PE21_MCI1_DA1
PE20_MCI1_DA0
PE18_MCI1_CK
PE19_MCI1_CDA
PE23_MCI1_DA3
PE22_MCI1_DA2
To boot from SD CARD use MCI1A
Title:
DevelBoard EVA MicroSD and Debug.
Author:
Daniele Basile <asterix@develer.com>
License:
BSD
Rev:
EVA 0
Size:
A3
Develer s.r.l.
via Mugellese 1/A
50019 Campi Bisenzio
Firenze
ITALY
develer
File: sd_debug.SchDoc
Date: 26/10/2015
Time: 16:21:21
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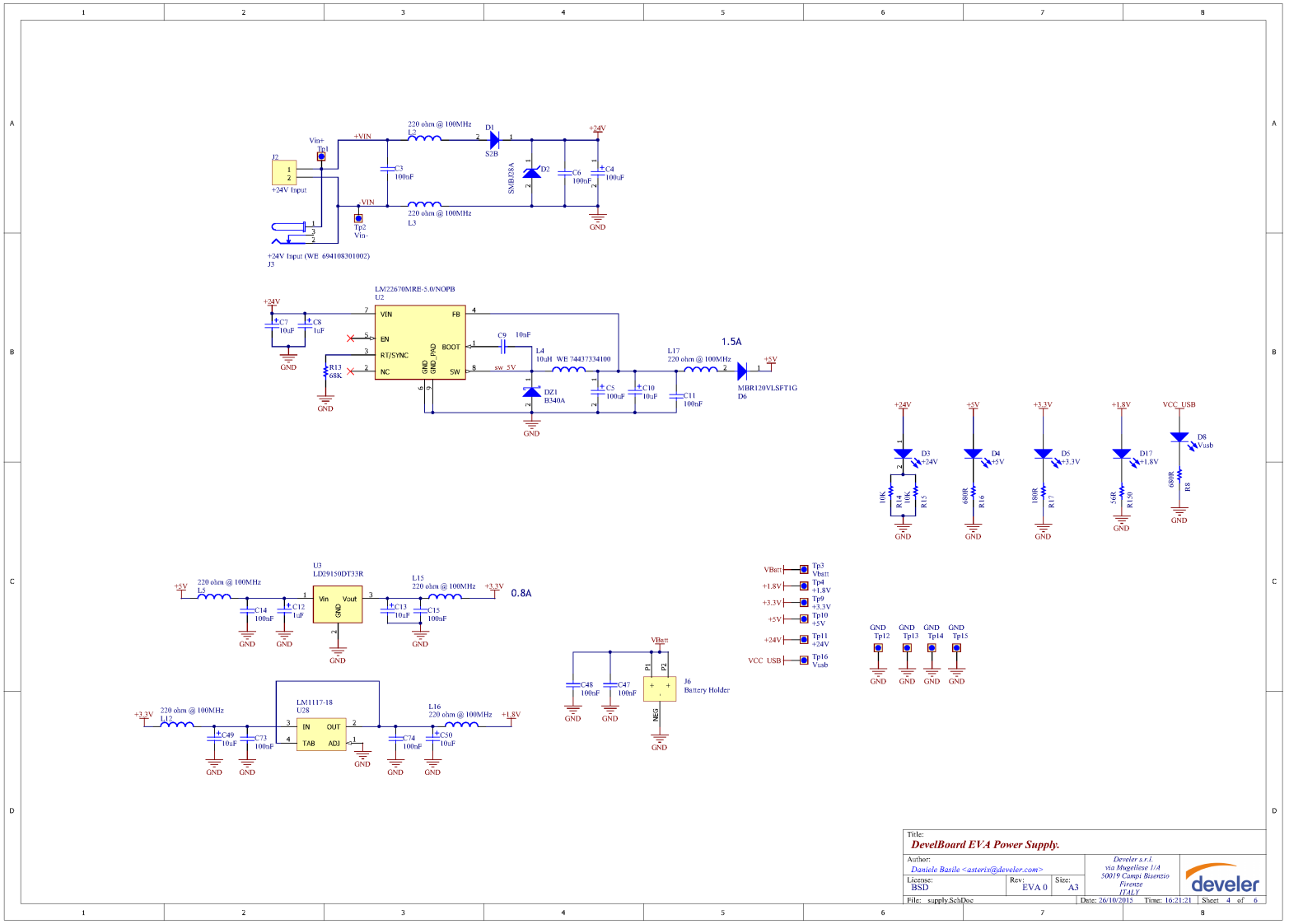
+24V Input
+24V Input (WE 694108301002)
J3
220 ohm @ 100MHz
L2
L3
D1
S2B
D2
SMBJ28A
C3
100nF
C4
100uF
C6
100nF
+VIN
Vin+
Vin-
Tp1
Tp2
GND
LM22670MRE-5.0/NOPB
U2
VIN
EN
RT/SYNC
NC
FB
BOOT
SW
GND_PAD
C7
10uF
C8
1uF
C9
10nF
R13
68K
L4
10uH WE 744373340100
sw_5V
DZ1
B340A
C5
100uF
C10
10uF
C11
100nF
L17
220 ohm @ 100MHz
1.5A
MBR120VLSFT1G
D6
D3
+24V
D4
+5V
D5
+3.3V
D17
+1.8V
D8
Vusb
10K
R14
R15
680R
R16
180R
R17
56R
R150
R8
U3
LD29150DT33R
Vin
Vout
L5
L15
C14
100nF
C12
1uF
C13
10uF
C15
100nF
0.8A
LM1117-18
U28
IN
OUT
TAB
ADJ
L12
L16
C49
10uF
C73
100nF
C74
100nF
C50
10uF
C48
100nF
C47
100nF
J6
Battery Holder
P1
P2
NEG
VBatt
Tp3
Vbatt
Tp4
+1.8V
Tp9
+3.3V
Tp10
+5V
Tp11
+24V
Tp16
Vusb
VCC_USB
Tp12
Tp13
Tp14
Tp15
Title:
DevelBoard EVA Power Supply.
Author:
Daniele Basile <asterix@develer.com>
Develer s.r.l.
via Mugellese 1/A
50019 Campi Bisenzio
Firenze
ITALY
License:
BSD
Rev:
EVA 0
Size:
A3
File: supply.SchDoc
Date: 26/10/2015
Time: 16:21:21
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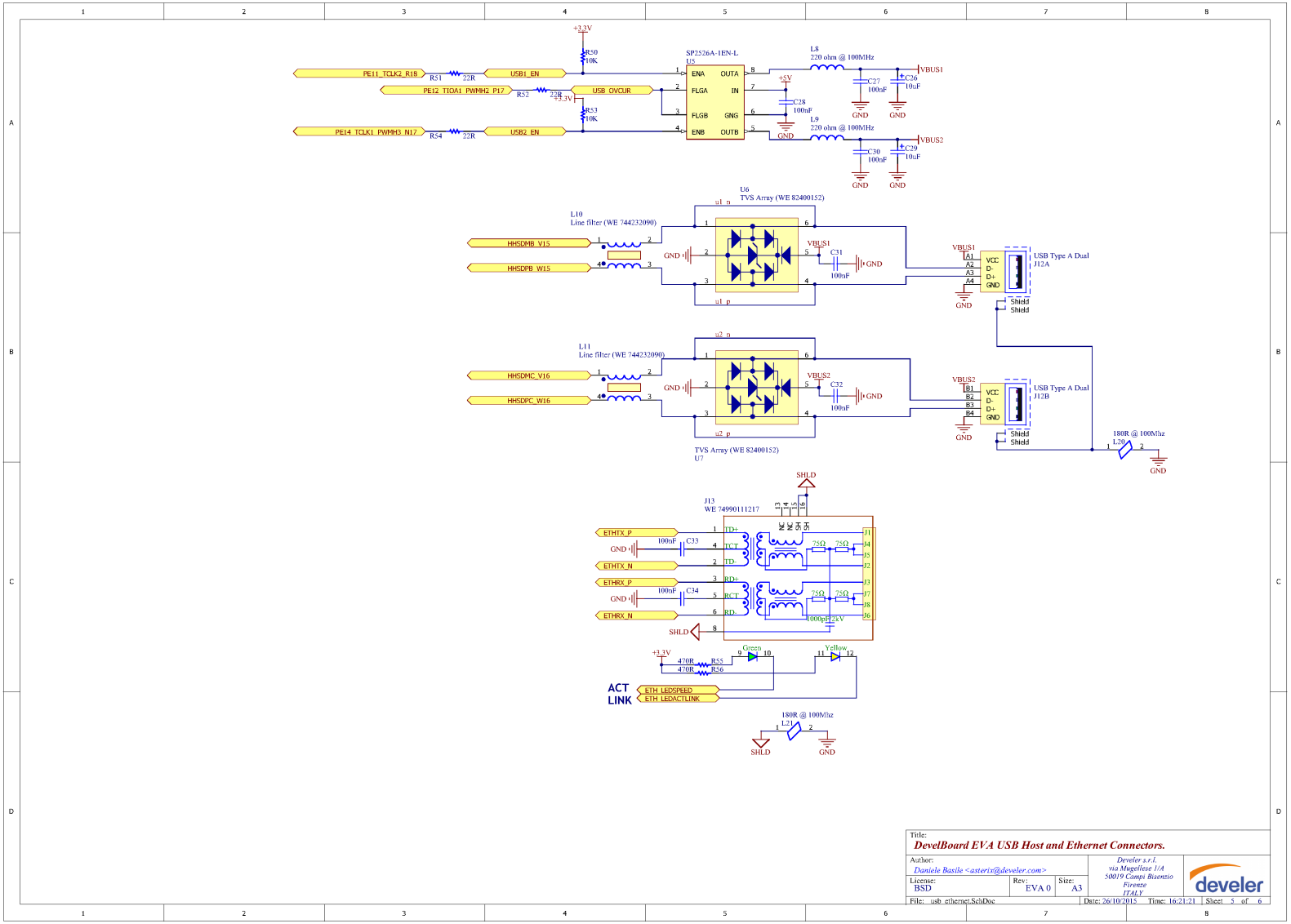
+3.3V
R50
10K
PE11_TCLK2_R18
R51
22R
USB1_EN
PE12_TIOA1_PWMH2_P17
R52
22R
USB_OVCUR
R53
10K
PE14_TCLK1_PWMH3_N17
R54
22R
USB2_EN
SP2526A-1EN-L
U5
ENA
OUTA
FLGA
IN
FLGB
GNG
ENB
OUTB
+5V
C28
100nF
L8
220 ohm @ 100MHz
L9
220 ohm @ 100MHz
C27
100nF
C26
10uF
C30
100nF
C29
10uF
VBUS1
VBUS2
GND
U6
TVS Array (WE 82400152)
L10
Line filter (WE 744232090)
HHSDMB_V15
HHSDPB_W15
C31
100nF
USB Type A Dual
J12A
L11
Line filter (WE 744232090)
HHSDMC_V16
HHSDPC_W16
C32
100nF
J12B
Shield
180R @ 100Mhz
L20
U7
SHLD
J13
WE 74990111217
ETHTX_P
ETHTX_N
ETHRX_P
ETHRX_N
C33
100nF
C34
100nF
75Ω
1000pF/2kV
470R
R55
R56
Green
Yellow
ACT
LINK
ETH_LED2SPEED
ETH_LEDACTLINK
L21
Title:
DevelBoard EVA USB Host and Ethernet Connectors.
Author:
Daniele Basile <asterixt@develer.com>
Develer s.r.l.
via Mugellese 1/A
50019 Campi Bisenzio
Firenze
ITALY
License:
BSD
Rev:
EVA 0
Size:
A3
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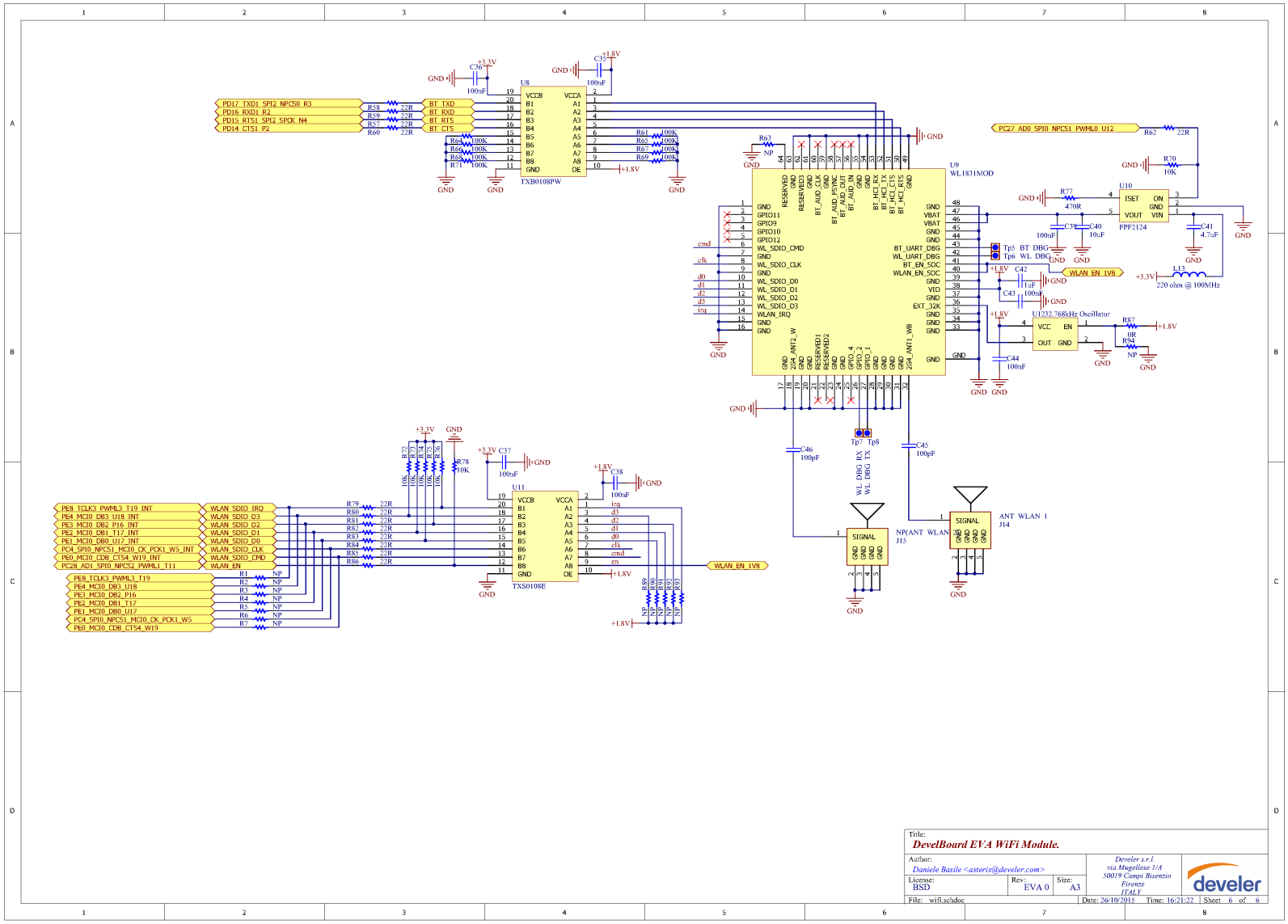
Title:
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Author:
Daniele Basile <asterix@develer.com>
License:
BSD
Rev:
EVA 0
Size:
A3
Develer s.r.l.
via Mugellese 1/A
50019 Campi Bisenzio
Firenze
ITALY
develer
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Date: 26/10/2015
Time: 16:21:22
Sheet 6 of 6
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WL1831MOD
U8
TXB0108PW
U11
TXS0108E
U10
FPF2124
U12 32.768kHz Oscillator
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J14
NP(ANT WLAN
J15
WLAN_EN_1V8
PG27_AD0_SPI0_NPCS1_PWML0_U12