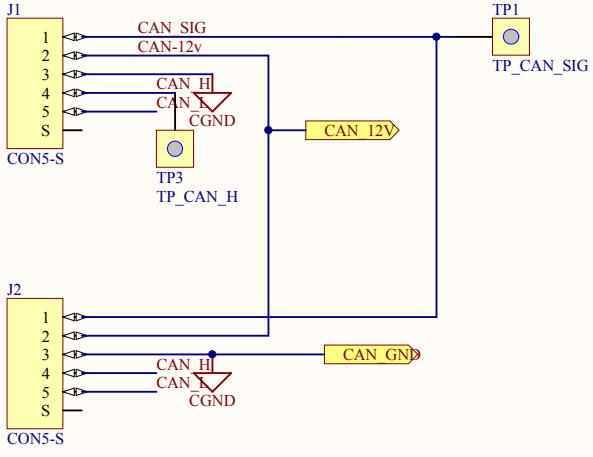
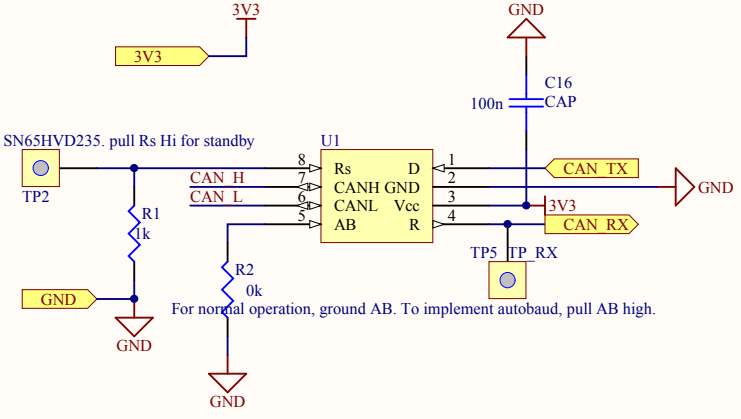
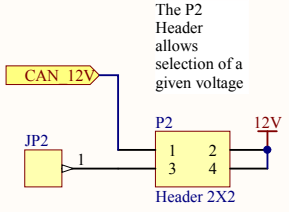
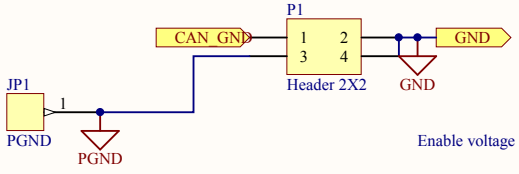




3. This circuit has been taken from can-node project.
However, the CAN on the CAN-node has not been tested.

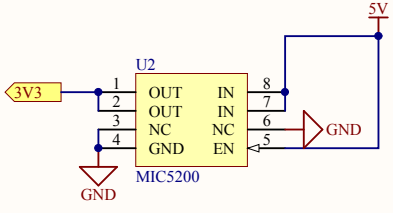
Title		
Size: A4	Number	Revision
Date: 19/06/2013		Sheet of
File: C:\Users\..\can.SchDoc		Drawn By:



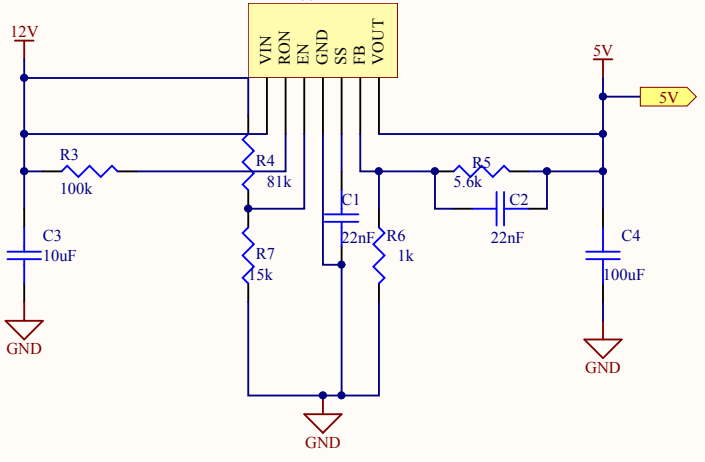


Based on the application circuit of LMZ12001, the following simple switchers are being used for DC-DC conversion. The advantage of using LMZ12001 is the lack of external inductors. Using the application circuit from the LMZ12001 datasheet, we can obtain 3.3V and 5V output. The 12V input is taken from an external mini-anderson connector.
Another mini-anderson connector provides the ground voltage.

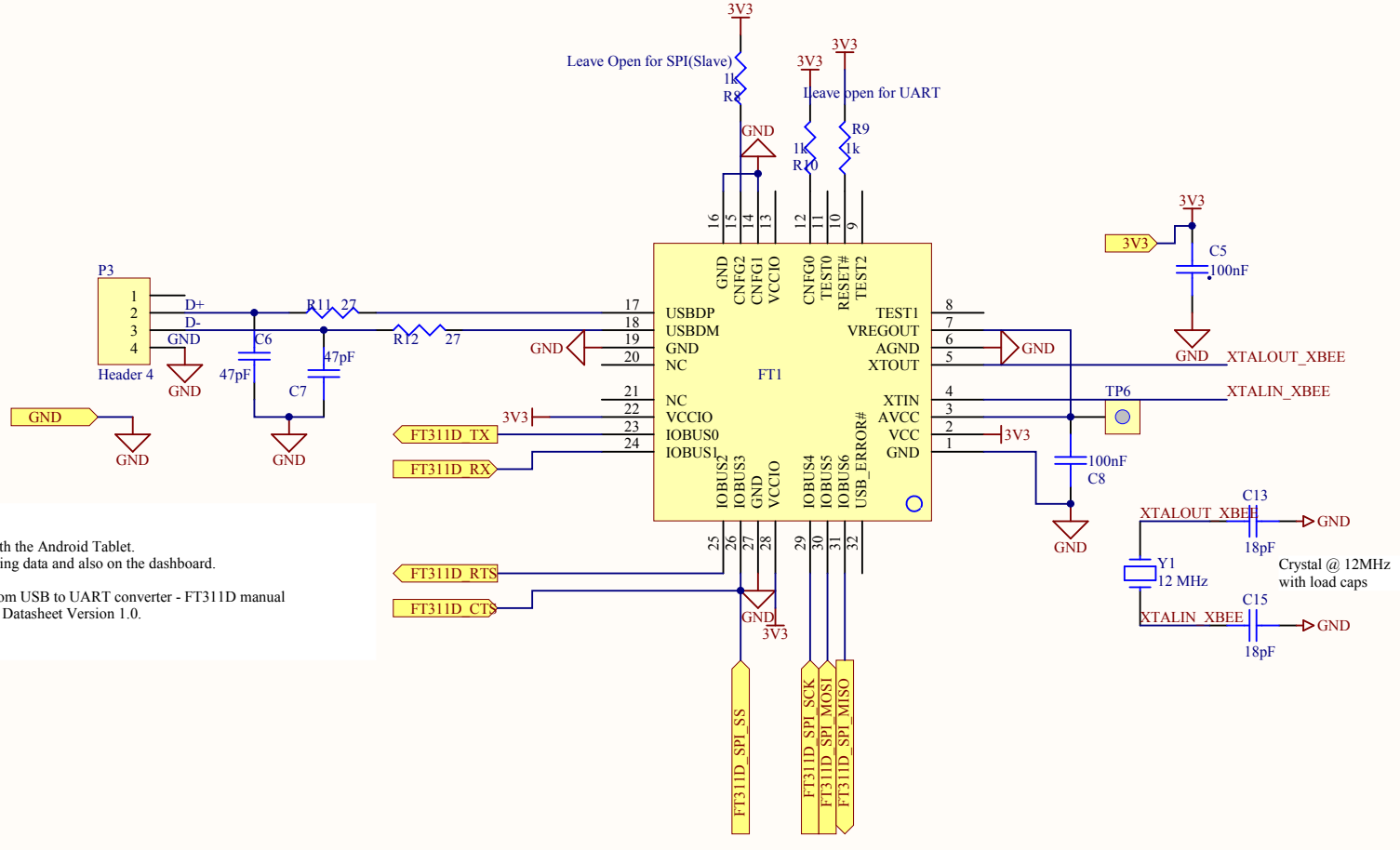
The 12V and GND voltage can also be supplied via the CAN connectors.



Enable voltage divided to ensure regulator switched on for a min input voltage of 7.5V



Title		
Size: A4	Number	Revision
Date: 19/06/2013		Sheet of
File: C:\Users\..\dc-dc.SchDoc		Drawn By:

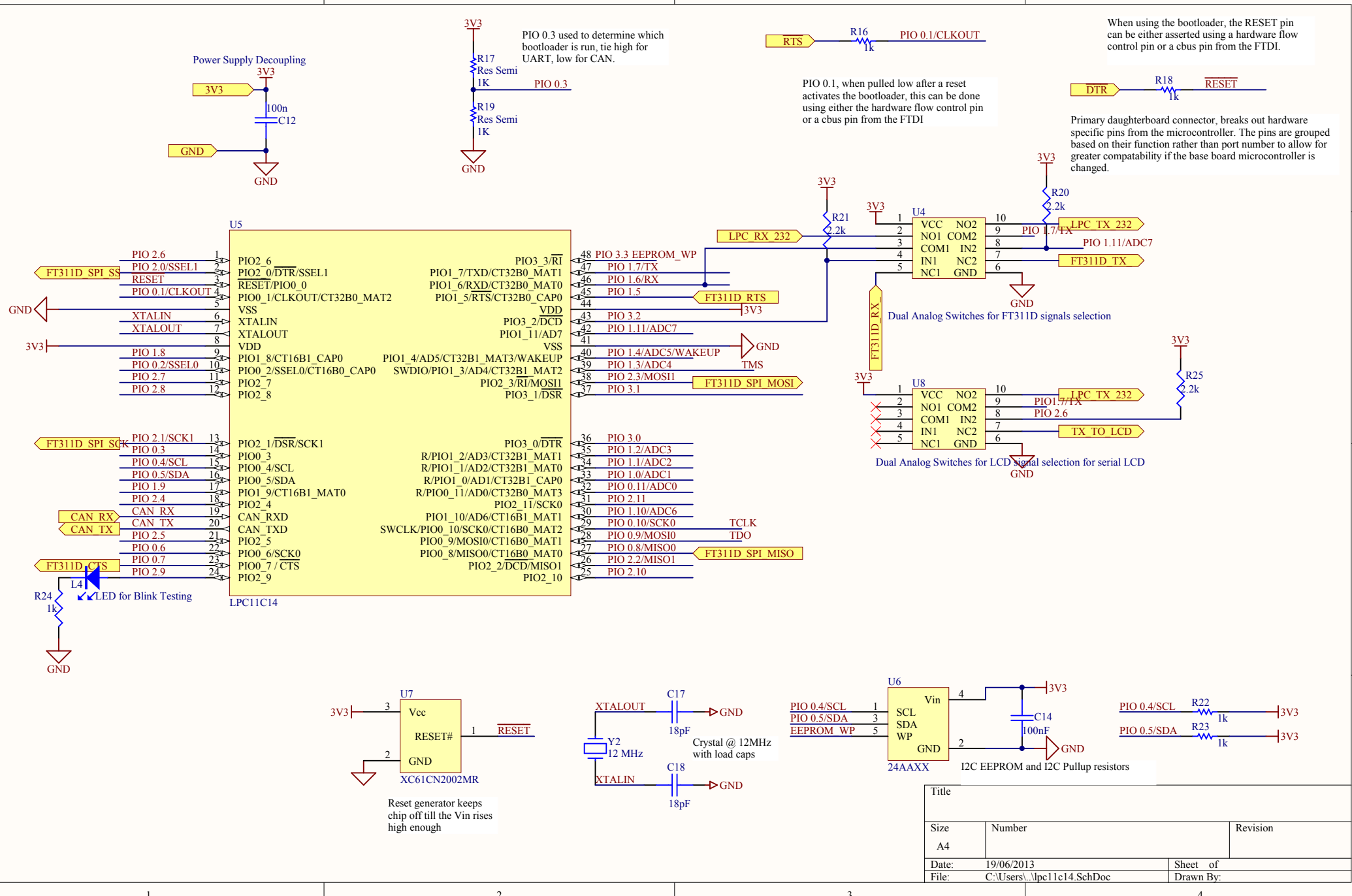


Power supply for FT311D is 3.3V

FT311D can be used to communicate with the Android Tablet.
The Android Tablet can be used for logging data and also on the dashboard.

The application circuit has been taken from USB to UART converter - FT311D manual
DS_FT311D USB ANDROID HOST IC Datasheet Version 1.0.

Title		
Size: A4	Number	Revision
Date: 19/06/2013		Sheet of
File: C:\Users\..\ft311d.SchDoc		Drawn By:


Power Supply Decoupling
3V3
100n
C12
GND
PIO 0.3 used to determine which bootloader is run, tie high for UART, low for CAN.
R17
Res Semi
1K
PIO 0.3
R19
Res Semi
1K
RTS
R16
1k
PIO 0.1/CLKOUT
PIO 0.1, when pulled low after a reset activates the bootloader, this can be done using either the hardware flow control pin or a cbus pin from the FTDI
When using the bootloader, the RESET pin can be either asserted using a hardware flow control pin or a cbus pin from the FTDI.
DTR
R18
1k
RESET
Primary daughterboard connector, breaks out hardware specific pins from the microcontroller. The pins are grouped based on their function rather than port number to allow for greater compatability if the base board microcontroller is changed.
U5
LPC11C14
PIO 2.6
PIO 2.0/SSEL1
RESET
PIO 0.1/CLKOUT
XTALIN
XTALOUT
PIO 1.8
PIO 0.2/SSEL0
PIO 2.7
PIO 2.8
PIO 2.1/SCK1
PIO 0.3
PIO 0.4/SCL
PIO 0.5/SDA
PIO 1.9
PIO 2.4
CAN_RX
CAN_TX
PIO 2.5
PIO 0.6
PIO 0.7
PIO 2.9
PIO2_6
PIO2_0/DTR/SSEL1
RESET/PIO0_0
PIO0_1/CLKOUT/CT32B0_MAT2
VSS
XTALIN
XTALOUT
VDD
PIO1_8/CT16B1_CAP0
PIO0_2/SSEL0/CT16B0_CAP0
PIO2_7
PIO2_8
PIO2_1/DSR/SCK1
PIO0_3
PIO0_4/SCL
PIO0_5/SDA
PIO1_9/CT16B1_MAT0
PIO2_4
CAN_RXD
CAN_TXD
PIO2_5
PIO0_6/SCK0
PIO0_7 / CTS
PIO2_9
PIO3_3/RI
PIO1_7/TXD/CT32B0_MAT1
PIO1_6/RXD/CT32B0_MAT0
PIO1_5/RTS/CT32B0_CAP0
VDD
PIO3_2/DCD
PIO1_11/AD7
VSS
PIO1_4/AD5/CT32B1_MAT3/WAKEUP
SWDIO/PIO1_3/AD4/CT32B1_MAT2
PIO2_3/RI/MOSI1
PIO3_1/DSR
PIO3_0/DTR
R/PIO1_2/AD3/CT32B1_MAT1
R/PIO1_1/AD2/CT32B1_MAT0
R/PIO1_0/AD1/CT32B1_CAP0
R/PIO0_11/AD0/CT32B0_MAT3
PIO2_11/SCK0
PIO1_10/AD6/CT16B1_MAT1
SWCLK/PIO0_10/SCK0/CT16B0_MAT2
PIO0_9/MOSI0/CT16B0_MAT1
PIO0_8/MISO0/CT16B0_MAT0
PIO2_2/DCD/MISO1
PIO2_10
PIO 3.3 EEPROM_WP
PIO 1.7/TX
PIO 1.6/RX
PIO 1.5
PIO 3.2
PIO 1.11/ADC7
PIO 1.4/ADC5/WAKEUP
PIO 1.3/ADC4
PIO 2.3/MOSI1
PIO 3.1
PIO 3.0
PIO 1.2/ADC3
PIO 1.1/ADC2
PIO 1.0/ADC1
PIO 0.11/ADC0
PIO 2.11
PIO 1.10/ADC6
PIO 0.10/SCK0
PIO 0.9/MOSI0
PIO 0.8/MISO0
PIO 2.2/MISO1
PIO 2.10
FT311D_SPI_SS
FT311D_SPI_SCK
FT311D_CTS
FT311D_RTS
FT311D_SPI_MOSI
FT311D_SPI_MISO
TCLK
TDO
TMS
L4
LED for Blink Testing
R24
1k
LPC_RX_232
R21
2.2k
U4
VCC NO2
NO1 COM2
COM1 IN2
IN1 NC2
NC1 GND
R20
2.2k
LPC_TX_232
PIO 1.7/TX
PIO 1.11/ADC7
FT311D_TX
FT311D_RX
Dual Analog Switches for FT311D signals selection
U8
PIO1.7/TX
PIO 2.6
TX_TO_LCD
R25
2.2k
Dual Analog Switches for LCD signal selection for serial LCD
U7
Vcc
RESET#
GND
XC61CN2002MR
Reset generator keeps chip off till the Vin rises high enough
XTALOUT
XTALIN
C17
C18
18pF
Y2
12 MHz
Crystal @ 12MHz with load caps
U6
Vin
SCL
SDA
WP
GND
24AAXX
C14
100nF
I2C EEPROM and I2C Pullup resistors
PIO 0.4/SCL
PIO 0.5/SDA
EEPROM_WP
R22
1k
R23
1k
Title
Size
A4
Number
Revision
Date:
19/06/2013
Sheet of
File:
C:\Users\..\lpc11c14.SchDoc
Drawn By:

This is a can-node which consists of an LCD connector. This board will be connected to the CAN bus from which important CAN messages will be read and displayed on the LCD to be mounted on the driver dashboard.

The FT311D - USB Android Host IC is located on the PCB for tablet connection.

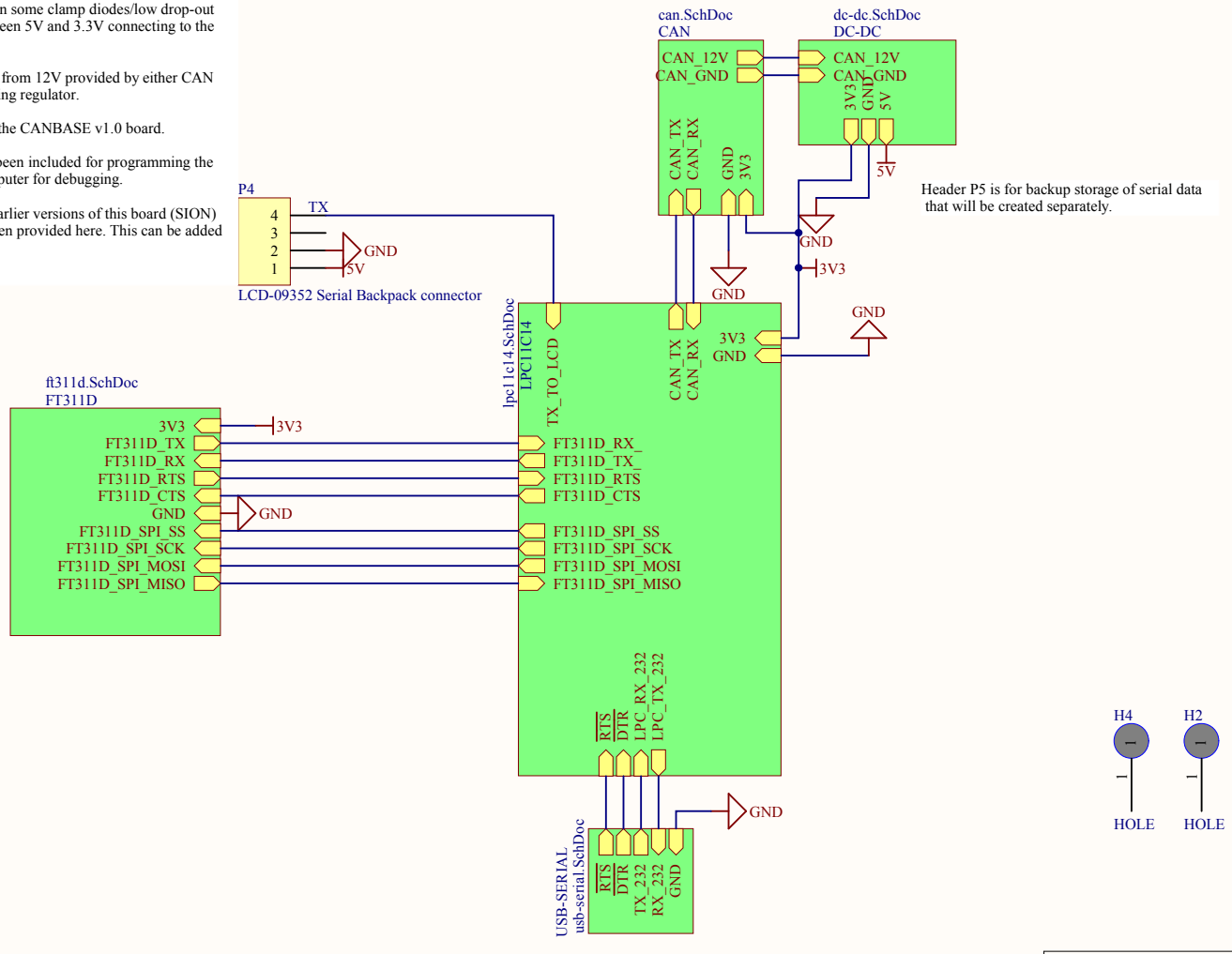
The parallel port LCD will be connected via one 1x20 IDC ribbon cables and hence 20 individual connections. These will connect to a small veroboard/simple PCB which will contain some clamp diodes/low drop-out diode connections for level shifting between 5V and 3.3V connecting to the LCD.

The board is powered off 3V3 generated from 12V provided by either CAN or mini-anderson cable through a switching regulator.

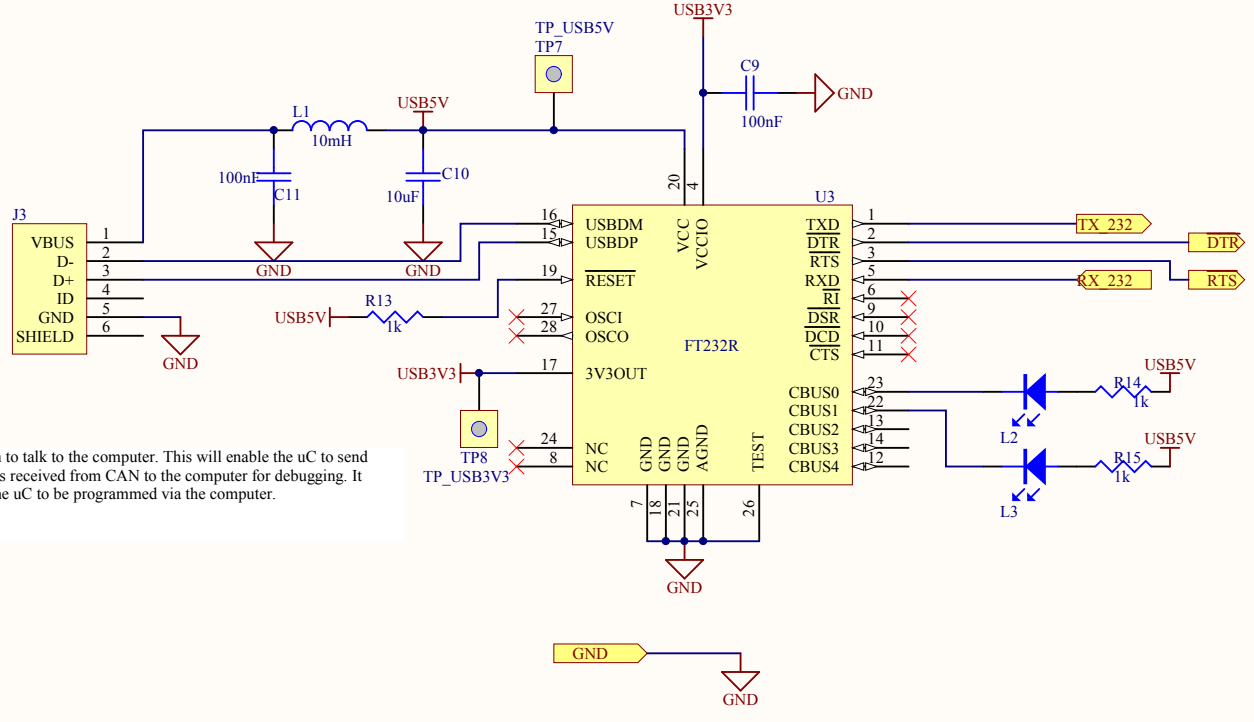
The CAN interface has been taken from the CANBASE v1.0 board.

The USB-Serial connection has already been included for programming the bootloader and communicating to a computer for debugging.

P4 is for backup storage of serial data. Earlier versions of this board (SION) consisted of a SD Card which has not been provided here. This can be added at a later date.

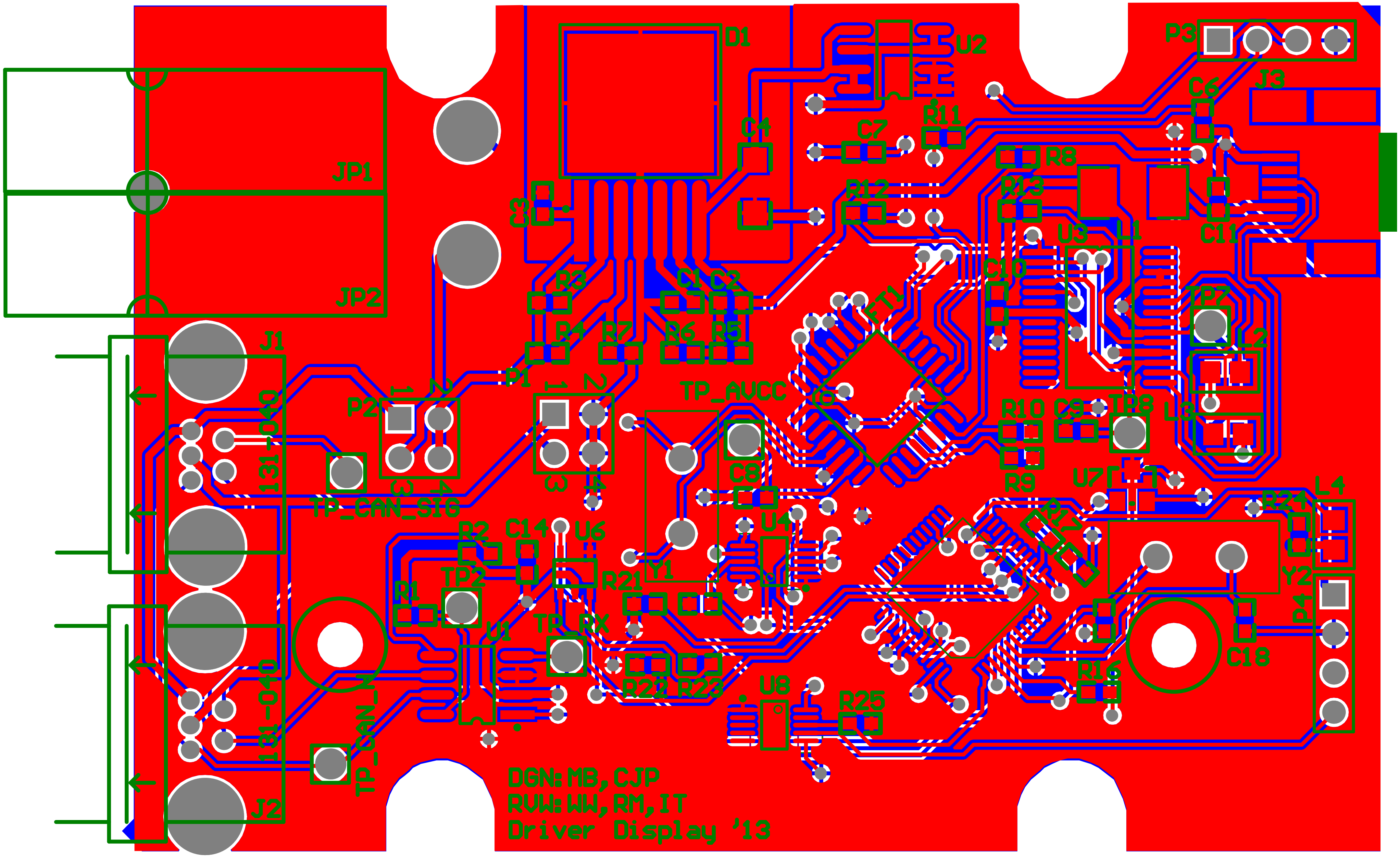


Title		
Size: A4	Number:	Revision:
Date: 19/06/2013		Sheet of
File: C:\Users\..\main-sch.SchDoc		Drawn By:



FT232 connection to talk to the computer. This will enable the uC to send the same messages received from CAN to the computer for debugging. It will also enable the uC to be programmed via the computer.

Title		
Size: A4	Number	Revision
Date: 19/06/2013		Sheet of
File: C:\Users\..\usb-serial.SchDoc		Drawn By:


D1
U2
P3
J3
C6
C4
C7
R11
R8
R12
R13
U3
L1
C11
JP1
JP2
R3
C1
C2
C10
P7
J1
R4
R7
R6
R5
L2
TP_AVCC
R10
C9
TP8
L3
P2
P1
C8
R9
U7
L4
TP_CAN_SIG
R24
R2
C14
U6
U4
Y2
R1
TP2
R21
Y1
P4
U1
TP_RX
C18
R16
R22
R23
U8
R25
TP_CAN_L
J2
DGN:MB,CJP
RVW:WW,RM,IT
Driver Display '13

GND CAN12V

ANDROID

LCD TEST LED

USB-SERIAL

Bill of Materials

<Parameter Title not found>

Source Data From: addl.PrjPcb
Project: addl.PrjPcb
Variant: None

Creation Date: 19/06/2013 12:25:01 AM
Print Date: 41444 41444.01743

Footprint	Comment	LibRef	Designator	Description	Quantity
0603	CAP	CAP, CAP1	C1, C2, C3, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18	Capacitor	17
1206	CAP	CAP	C4	Capacitor	1
PFM-7	DC-DC SWITCHER	lmz12001	D1	DC-DC SWITCHER	1
QFP32	FT311D	FT311D	FT1	USB ANDROID Host IC	1
M2.5	HOLE	HOLE	H2, H4	Hole	2
TRIAD5F	CON5-S	CON5-S	J1, J2	Connector, 2 pin, with shield @ S	2
USBMINIB	USB_MINIB	USB_miniB_SMT	J3	USB Mini B Connector	1
POWERPOLE25A	PGND	CON1	JP1	Power Ground (currently assumed that it is provided through a min-anderson connector)	1
POWERPOLE25A	CON1	CON1	JP2	Currently assumed that the mini-anderson connector provides 12V	1
1812	INDUCTOR	INDUCTOR	L1	Inductor	1
0805LED	LED	LED	L2, L3		2
0805LED	LED for Blink Testing	LED	L4		1
HDR2X2	Header 2X2	Header 2X2	P1, P2	Header, 2-Pin, Dual row	2
HDR1X4	Header 4	Header 4	P3, P4	Header, 4-Pin	2
0603	RES1	RES1	R1, R3, R4, R5, R6, R7, R9, R12, R13, R14, R15, R20, R21, R24, R25	Resistor	15
0603	For normal operation, ground AB. To implement autobaud, pull AB high.	RES1	R2	Resistor	1
0603	Leave Open for SPI(Slave)	RES1	R8	Resistor	1
0603	Leave open for UART	RES1	R10	Resistor	1
0603	27	RES1	R11	Resistor	1
0603	Res Semi	Res Semi	R16, R17, R18, R19, R22, R23	Semiconductor Resistor	6
TESTPOINT	TP_CAN_SIG	TEST	TP1	TEST POINT for 12V on CAN	1
TESTPOINT	TEST	TEST	TP2	TEST POINT	1
TESTPOINT	TP_CAN_H	TEST	TP3	TEST POINT	1
TESTPOINT	TP_RX	TEST	TP5	TEST POINT	1
TESTPOINT	TP_AVCC	TEST	TP6	TEST POINT	1
TESTPOINT	TP_USB5V	TEST	TP7	TEST POINT	1
TESTPOINT	TP_USB3V3	TEST	TP8	TEST POINT	1
SO8	SN65HVD235. pull Rs Hi for standby	SN65HVD235	U1	3.3V CAN XCVR W/STANDBY	1
SO8	MIC5200	MIC5200	U2	MIC5200 - SO8	1
SSOP28w	FT232R	FT232R	U3		1
Micro10	Dual Analog Switches for FT311D signals selection	NLAS4684	U4	Ultra-low resistance dual SPDT Analog switch	1
QFP48	LPC11C14	LPC11C14_Full	U5	NXP LPC11C14 Microcontroller	1
SOT23-5	24AAXX	24AAXX	U6	I2C EEPROM for SOT23-5 package	1
SOT23-3	XC61CN2002MR	XC61F	U7	SOT23 reset generator	1
Micro10	Dual Analog Switches for LCD signal selection for serial LCD	NLAS4684	U8	Ultra-low resistance dual SPDT Analog switch	1
HC49/4H	12 MHz	CRYSTAL	Y1, Y2	Crystal	2
					77

Approved **Notes**