APEXAR EMBEDDED SOLUTION

APEXAR PRO
PRODUCTION MODULE

CONTENT

1 OBJECTIVE

This manual presents all the characteristics and features of the APEXAR PRO family modules.

2 SCOPE

Applies for all the APEXAR PRO family modules.

3 REFERENCE

[1] ENG_APX_020_002_DOG_001 (Grabado y actualización de software).

4 OVERAL DESCRIPTION

We start with a global overview of the APEXAR PRO modules, in this secction you find the operational requirements, dimensions and key features.

Then we will explore the main board of the APEXAR PRO module allowing you to get more famillíar with the available connectors.

The APEXAR PRO module was designed not only to be integrated with other hardware but also to be expanded and customized. In the mechanical data section and expansion connector section along with the module schematics you find all you need to build an expansion card if it's needed.

5 OVERVIEW

The APEXAR PRO family modules offer you flexibility and outstanding features in a compact hardware. With scalable capabilities.

APEXAR PRO 4.3” Production Module running a demo.

5.1 Operation Requirements

Power	9 a 24 VDC
Temperature	Operation: -10 a +50 ºC
	Storage: -40 a +85 ºC
Relative Humidity	0 a 90 %

Table 1 – Operation Requierments.

Power consumptions are listed in the following table along with the mesurement condition for each case.

Power Consumption		
Minimum	**Light**	**Heavy**
2.5 W	5 W	10 W
Measurment conditions		
No external devices were connected.	Two USB devices + Ethernet + Audio Speaker.	In reference with the main voltage regulator power limit.

Table 2 – Power consumption.

5.2 Key Features

Conectivity	USB Host x 2	
	USB on the go x 1	
	Ethernet (10/100 Mbits/s) x 1	
	Serial RS485 x 1	
	Serial TTL x 3	
	serial RS232 x 1	
	serial DEBUG x 1	
	SPI x 1 (3.3V logic)	
	I2C x 1 (3.3V logic)	
	GPIO's 4 (default) – 17 (max) (3.3V logic)	
Display	4.3” with resistive touchscreen	
	8” with resistive touchscreen	
Storage	microSD (hinged Lid)	
Audio	Inputs	Line In, Microphone (MONO)
	Outputs	Speaker (1.5W), Line Out/Headphones

Table 3 – Key features.

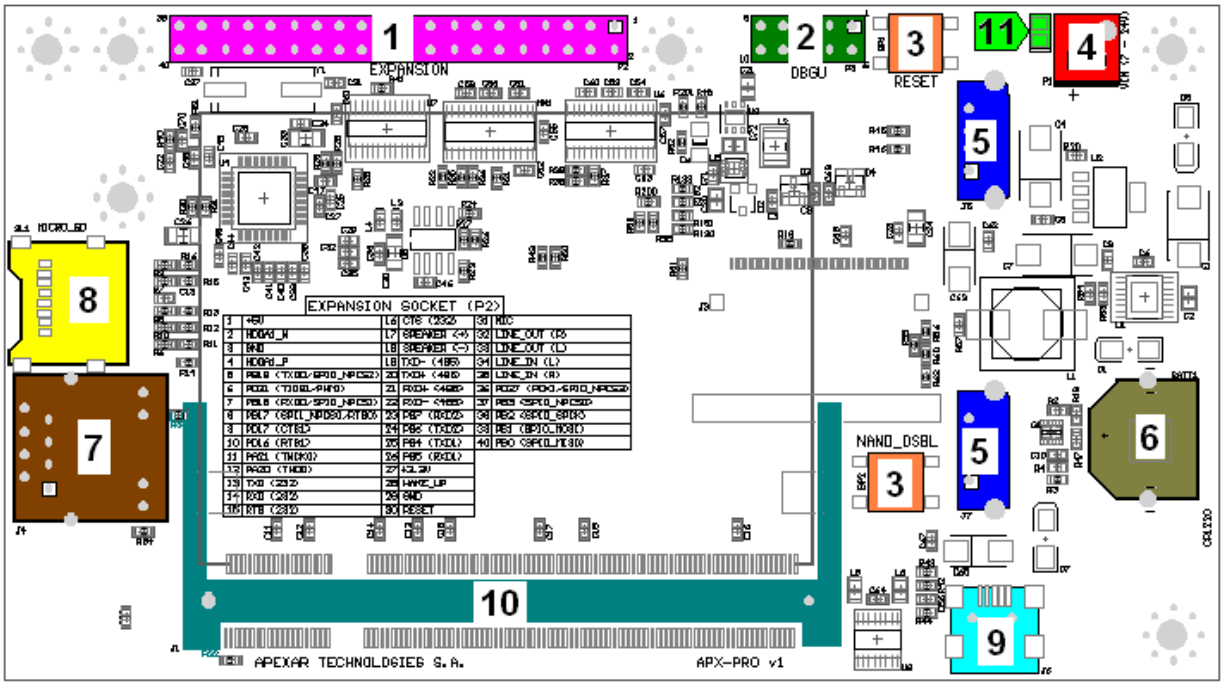
5.3 Dimensions

Display size	heigth x width x depth
4.3”	135 mm x 75 mm x 27.5 mm
8”	205 mm x 156 mm x 38 mm

Table 4 – Physical dimensions.

6 OVERAL DESCRIPTION

In this section we introduce the main connectors, push buttons and battery holder available in the mainboard of the APEXAR PRO.

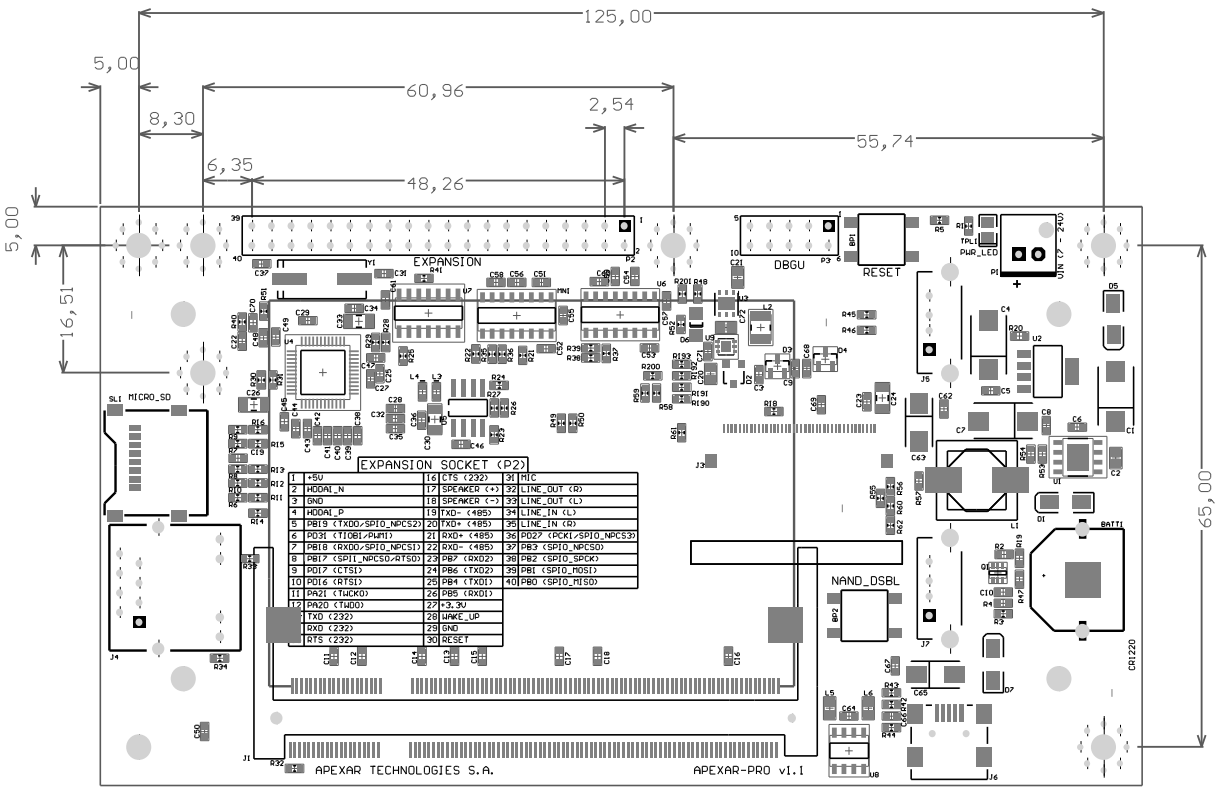


A closeup to the APEXAR PRO module mainboard.

	1	Expansion connector	P2
	2	Debug serial connector	P3
	3	RESET and NAND_DISABLE buttons	BP1/BP2
	4	Power connector	P1
	5	USB (host) connector	J5/J7
	6	3V Battery (CR1220) holder	BATT1
	7	Ethernet RJ45 connector	J4
	8	microSD memory slot	SL1
	9	USB (on the go) connector	J6
	10	APEXAR SOM slot	J1
	11	Power LED	TPL1

Table 5 – Mainboard overview.

7 MECHANICAL SPECIFICATIONS



Anchoring holes diameter: 3.25

All sizes are in mm.

8 EXPANSION CONNECTOR PIN ASSIGNMENT

Pin#	Signal		*Direct pins (1)*
1	+5V		
2	HDDA (-)		
3	GND		
4	HDDA (+)		
5	PB19	TXD0/SPI0_NPCS2	√
6	PD31	TI0B1/PWM1	√
7	PB18	RXD0/SPI0_NPCS1	√ (default GPIO)
8	PB17	RTS0	√ (default GPIO)
9	PD17	CTS1	√ (default GPIO)
10	PD16	RTS1	√ (default GPIO)
11	PA21	TWCK0	√
12	PA20	TWD0	√
13	TXD 232		
14	RXD 232		
15	RTS 232		
16	CTS 232		
17	SPEAKER OUT (+)		
18	SPEAKER OUT (-)		
19	TXD 485 (-)		
20	TXD 485 (+)		
21	RXD 485 (+)		
22	RXD 485 (-)		
23	PB7	RXD2	√
24	PB6	TXD2	√
25	PB4	TXD1	√
26	PB5	RXD1	√
27	+3.3V		
28	WAKE_UP		
29	GND		
30	RESET		
31	MIC		
32	LINE OUT (Right)		
33	LINE OUT (Left)		
34	LINE IN (Left)		
35	LINE IN (Right)		
36	PD27	SPI0_NPCS3	√
37	PB3	SPI0_NPCS0	√
38	PB2	SPI0_SPCK	√
39	PB1	SPI0_MOSI	√
40	PB0	SPI0_MISO	√

Table 6 – Expansion connector pin assigment.

(1) These signals come strait from the microprocesor of the APEXAR SOM module.

9 SERIAL INTERFACES

The APEXAR PRO offers four serial ports with different features:

Name	Default electrical levels supported	Connector	Components to be removed for TTL levels support
DGBU (Debug)	RS232	P3	-
Port 0	RS485	P2	R25
Port 1	RS232	P2	R21, R22
Port 2	TTL	P2	-

Table 7 – Serial interfaces.

All the signals that belong to the ports 0, 1 and 2 are mapped to the expansion connector. The debug port has it own dedicated connector.

By default the APEXAR PRO module serial ports are configured to operate according to the level standards described above. However, TTL levels signals are available also for port 0 and port 1. This change can be accomplished by removing from the PCB the associated components listed above.

WARNING: When using a serial port you must not use any of the other signals associated with it for any other purpose.

Example: Consider the case you are using the serial port 1 thru the RS232 interface (pins: 13, 14, 15, 16). Then you **can not** use the pins intended for the TTL interface (pins: 9, 10, 25, 26).

9.1 Serial Port signals grouped by port

PORT	P2 Pin#	Signal
0	5	TXD0
	7	RXD0
	8	RTS0
	19	TXD 485 (-)
	20	TXD 485 (+)
	21	RXD 485 (+)
	22	RXD 485 (-)
1	9	CTS1
	10	RTS1
	25	TXD1
	26	RXD1
	13	TXD 232
	14	RXD 232
	15	RTS 232
	16	CTS 232
2	23	RXD2
	24	TXD2

Table 8 – Serial port signals.

9.2 SPI and I2C signals

Port	P2 pin#	Signal
SPI	36	SPI0_NPCS3
	37	SPI0_NPCS0
	38	SPI0_SPCK
	39	SPI0_MOSI
	40	SPI0_MISO
I2C	11	TWCK0
	12	TWD0

Table 9 – SPI and I2C signals.

9.3 The debug port

Pin#	Signal
2	Serial data output (TXD)
3	Serial data input (RXD)
5	Signal ground
7*	RTS (output)
8*	CTS (input)
1,4,6,9,10	NC

Table 10 – Debug port signals.

(*) This signal is connected to a fixed logic levels (for more details refer to the comunication interfaces schematic).

10 THE RESET SIGNAL

This signal is connected to the reset line of the microprocessor present at the APEXAR SOM. Driving it to a HI state will reboot the system.

This signal is available in the expansion connector (see expansion connector pin assignment).

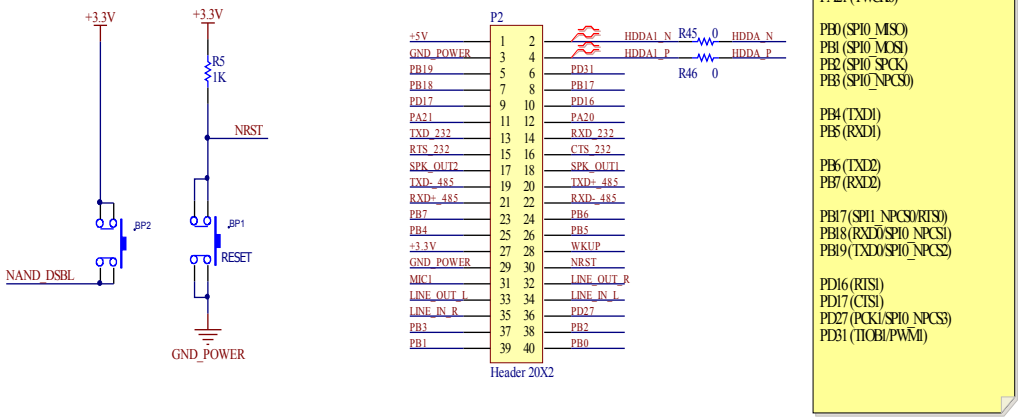
You can generate a reset event by pressing the reset button located at the mainboard of the APEXAR PRO module.

11 THE NAND DISABLE BUTTON

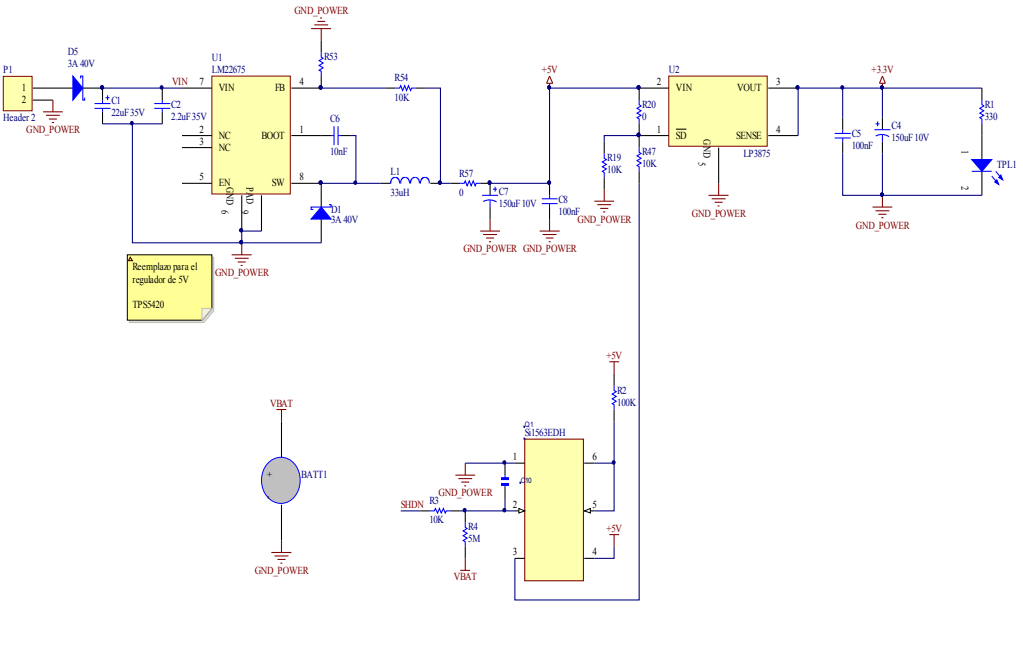
By holding this button the nand flash memory present at the APEXAR SOM will be disabled. This procedure is necessary when the developer/production user wants to upload data to the nand flash, this includes the bootstrap, the u-boot, the kernel and the root file system [1].

WARNING: Pressing or holding the nand disable button while the module is operational may crash the system and also may corrupt some data loaded in the NAND flash.

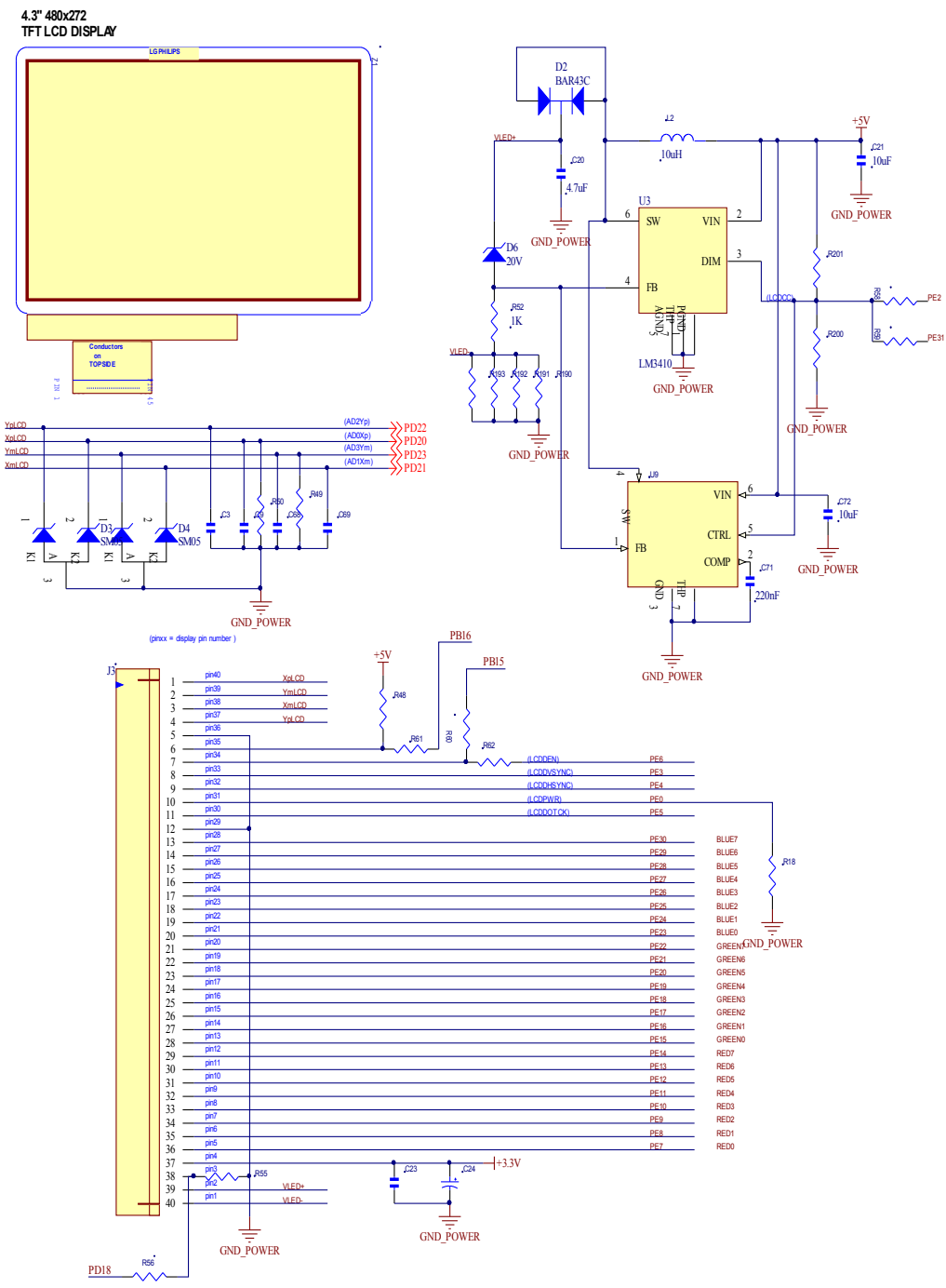
12 MAINBOARD SCHEMATICS



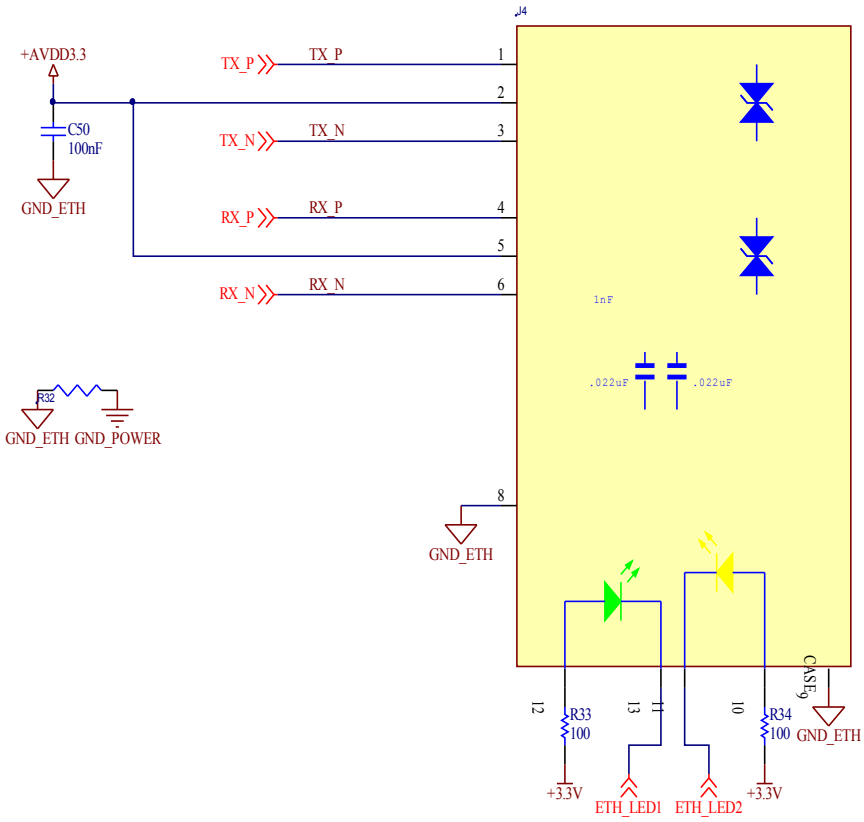
Expansion connector; RESET and NAND_DISABLE switches.



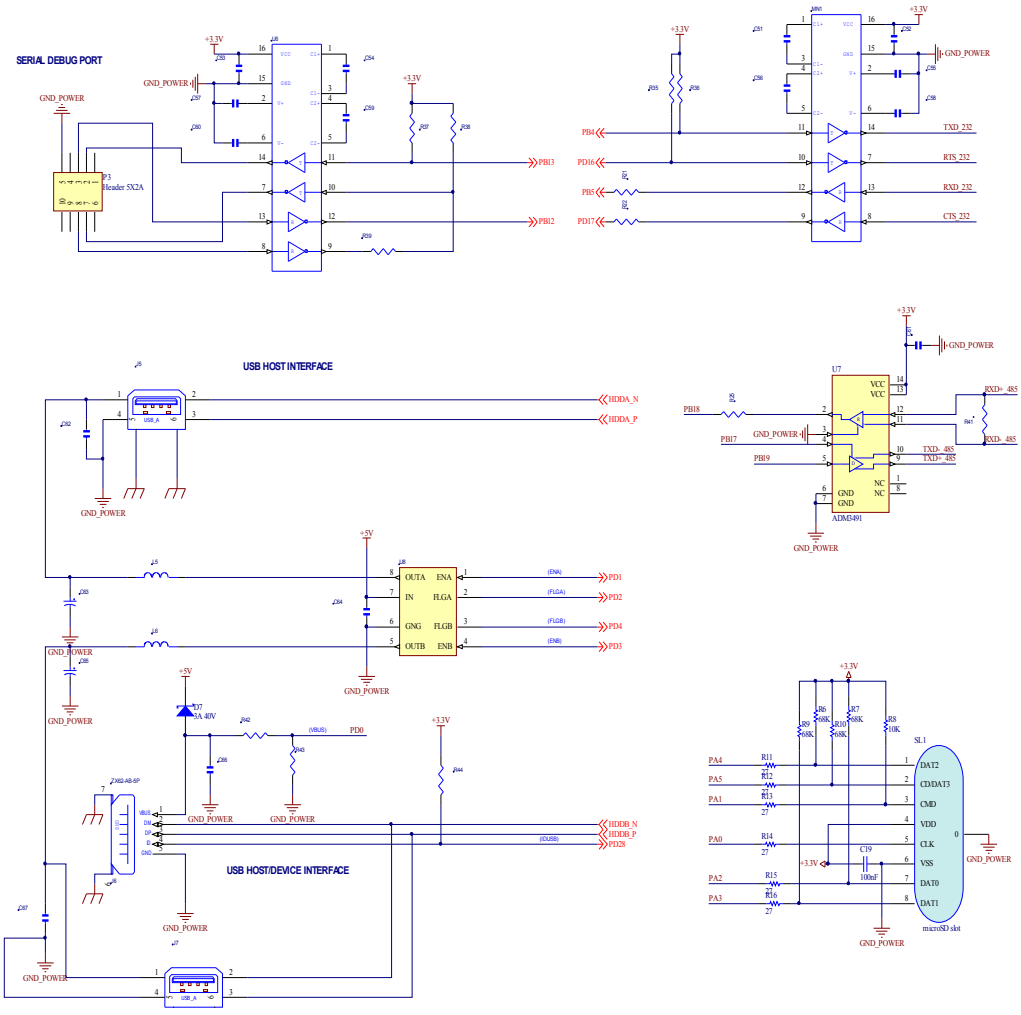
Voltage regulators and 3V battery.



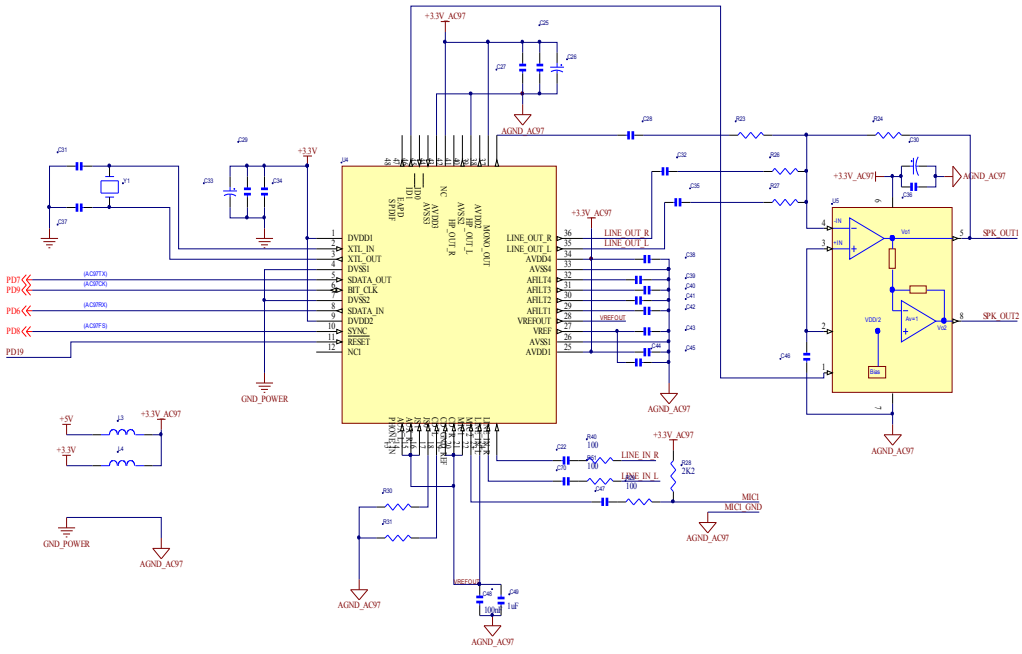
Dispaly circuit.



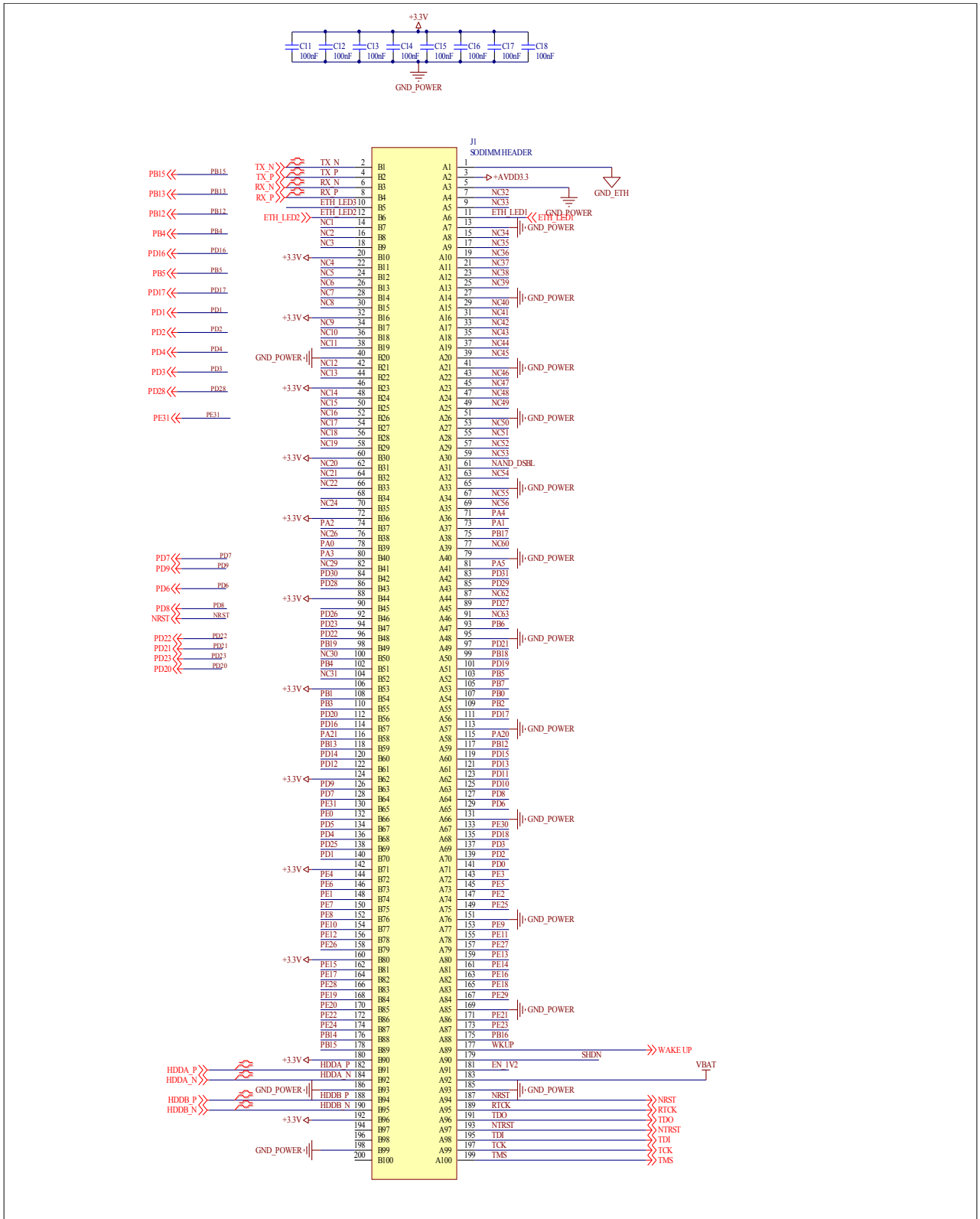
Ethernet circuit.



Comunication interfaces and microSD interface circuit.



Audio circuit.



APX-SOM signals.

NOTES

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