BroachLink Noah Router Motherboard

Quick Hardware Manual

V1.0.4

Revision history

Rev	Date	Notes
1.0.4	December 2020	Update J2 definition
1.0.3	October 2020	Revised JVGA1 pin assignment
1.0.2		
1.0.1		

Chapter 1 Introduction

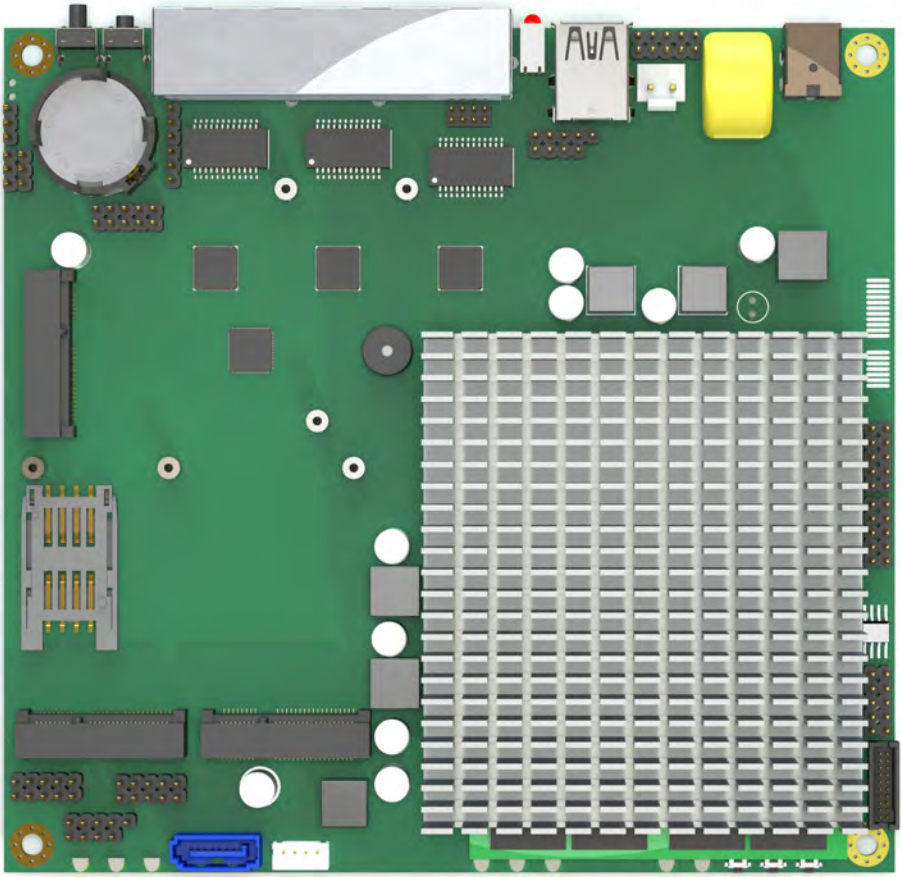
1.1 About Noah

Noah is a true fanless motherboard for router, firewall, VPN, IPBX, IoT gateway, etc. Fully electronic, mechanical and software optimized, it runs flawlessly on a variety of open source software platforms such as CentOS, OpenBSD, OPNsense and FreeBSD. Ideal for open source community users and geek users. The optimized electronic design makes this product ultra-low power consumption which is 20% lower than the competition. The enhanced thermal design allows the product to have significant stability advantages in small enclosures, especially in closed enclosures. The rich extensions allow end users to be flexible in a variety of communication scene.

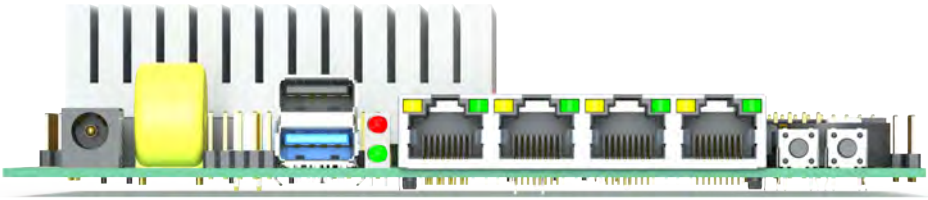
1.2 Specification

Processor System	CPU: Intel Atom E3845
	Core: 4
	Frequency: 1.91GHz
	L2 Cache: 2MB
	BIOS: AMI 64 Mbit
	AES: AES-NI
Memory	Technology: DDR3L 1333MHz
	Max. Capacity: 8 GB (Should be installed in factory)
	Socket: 1 x 204 pin SODIMM
Display	VGA Maximum Resolution: up to 2560x1600 at 60 Hz
Ethernet	Interface: Up to 3
	Controller: Intel I211
	Connector: RJ45
WatchDog Timer	Output: System reset
	Internal Watchdog timer: (programmable 1-255s,1-255min, disable)
Storage	mSATA: 1 x full size mSATA

	eMMC: 1 (eMMC 4.5, Support Broachlink eMMC Module)
	SATA: 1 x SATAII (Max. Data Transfer Rate up to 3.0 Gb/s)
Internal I/O	Up to 3 Serial: 1 x RS-232 ,2xTTL (Transfer rate up to 1 Mbit/s)
	Ethernet: Up to 3 GbE
	VGA: 1
	Reset Button: 2
	Power Button: 2 (For system wake)
	USB: 3 x USB2.0 + 1 x USB3.0
	GPIO: 24-bit GPIOs
Expansion	Full-size Mini PCIe: 3 slots MSATA1 slot has SATA,LPC signal. MINI_PCIE1 slot has PCIe,SIM,USB signal. MINI_PCIE2 slot has PCIe signal.
	PCIe x1 Golden Finger: 1 (Optimized for VoIP cards,Quickly build Voice PBX)
	Msata: 1
Power	Power input: 12V ±10% only
	Power Consumption (Typical,Minimum system) Noah with E3845: 0.5A @ 12V (5.28W)
	Power Consumption (Max, test in pfSense) Noah with E3845: 1A @ 12V (12W)
Environment	Operating 0 ~ 60° C (32 ~ 140° F) (Operating humidity: 40° C @ 95% RH non-condensing)
	Non-Operating -40° C ~ 85° C and 60° C @ 95% RH non-condensing
Physical Characteristics	Dimensions (L x W): 160 x 152 mm (6.3" x 5.99")
	Weight: 0.45 kg (0.99 lb) (with heatsink)
	Total Height: (with cooler + PCB + Bottom) 33mm



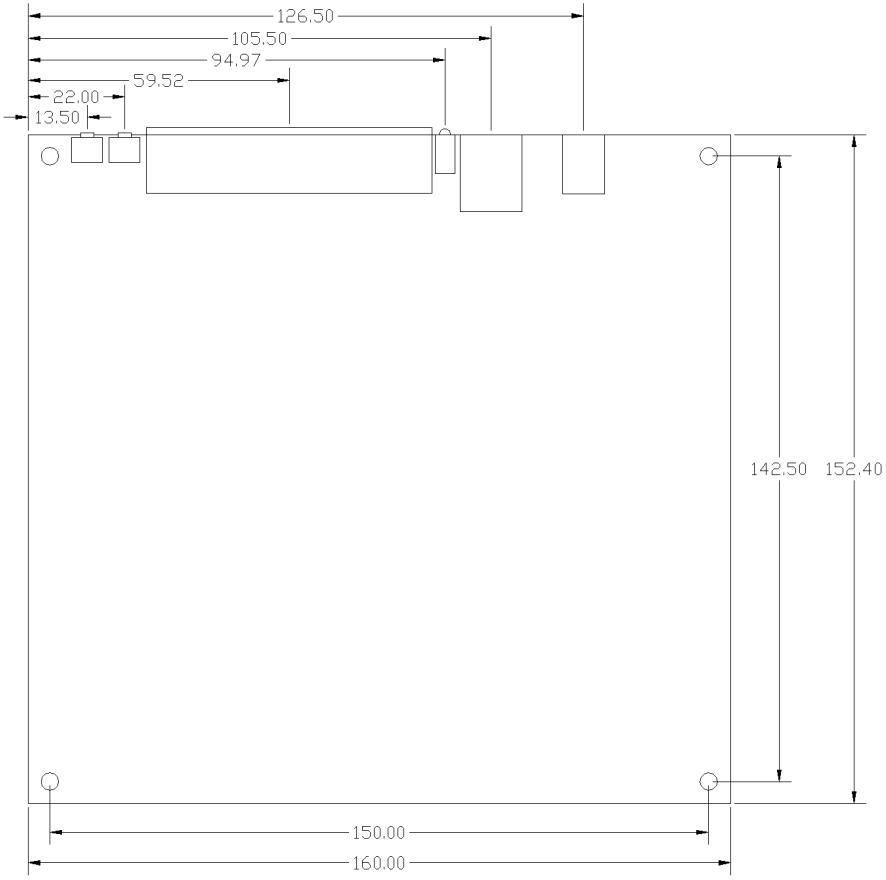
Topview



I/O Layout

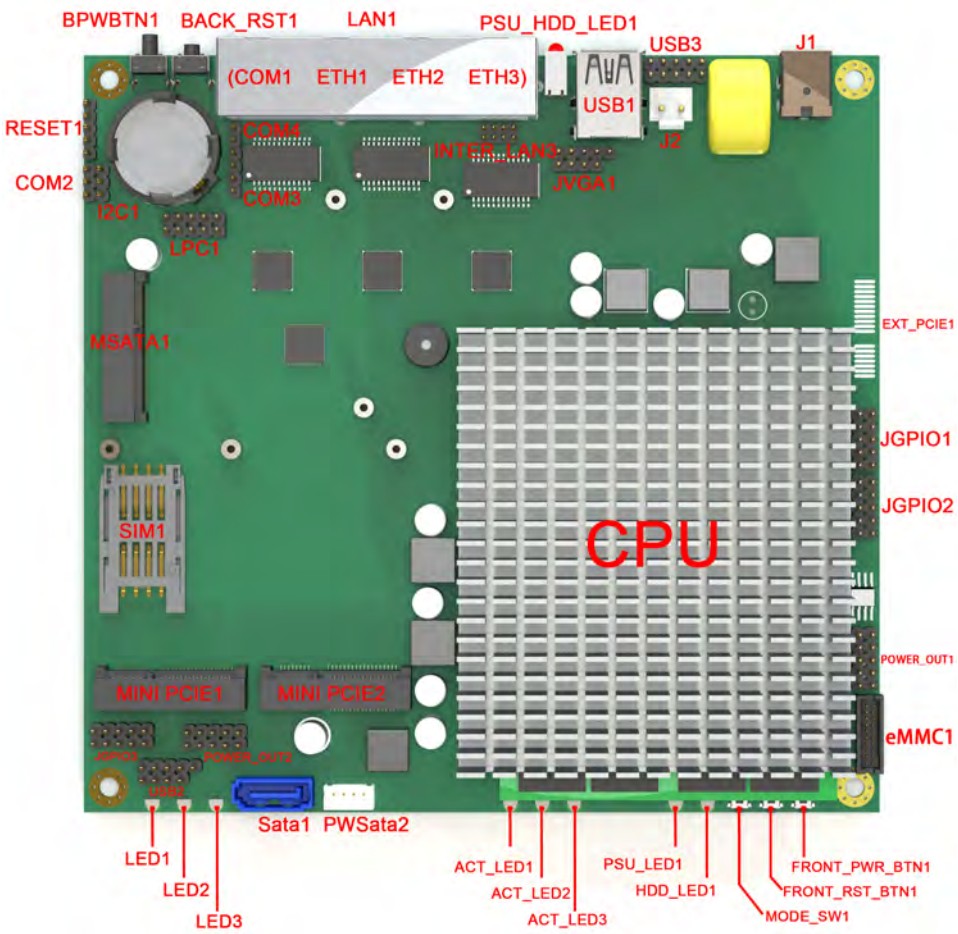
Chapter 2

2.1 Dimension



NOAH Dimension

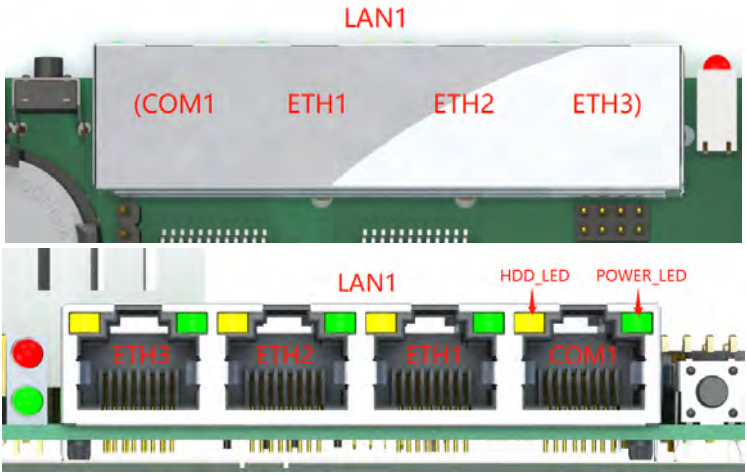
2.2 Noah Connector Layout



NOAH Connector Layout

Connector List

LAN1



ETH1-ETH3

LAN1(ETH1/ETH2/ETH3) Definition:

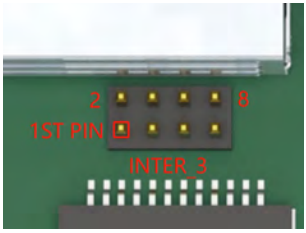
PIN	NAME	PIN	NAME
1	MDI_0+	2	MDI_0-
3	MDI_1+	4	MDI_2+
5	MDI_2-	6	MDI_1-
7	MDI_3+	8	MDI_3-

COM1 Definition:

PIN	NAME	PIN	NAME
1	RTS	2	DTR
3	TXD	4	GND
5	GND	6	RXD

7	DSR	8	CTS

INTER_LAN3



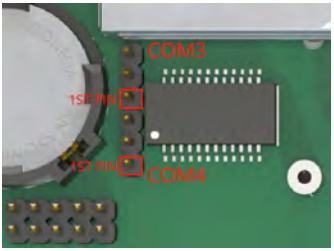
INTER_LAN3 Definition:

PIN	NAME	PIN	NAME
1	MDI_0+	2	MDI_0-
3	MDI_1+	4	MDI_1-
5	MDI_2+	6	MDI_2-
7	MDI_3+	8	MDI_3-

COM2 Definition:(Copy of RJ45 serial port COM1,RS232 level)

PIN	NAME
1	TXD
2	RXD
3	GND

COM3\COM4 Definition:(TTL level)



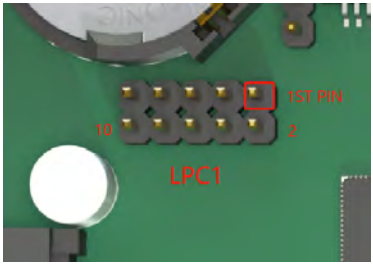
PIN	NAME
1	TXD
2	RXD
3	GND

I2C1

I2C1 Definition:

PIN	NAME
1	DATA
2	CLK
3	GND

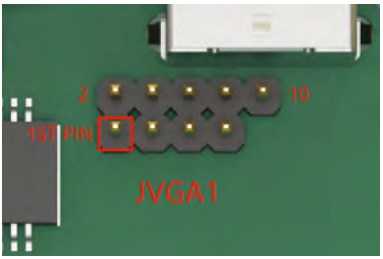
LPC1



LPC1 Definition :

PIN	NAME	PIN	NAME
1	LPCCLK	2	GND
3	LAD0	4	LAD1
5	LAD2	6	LAD3
7	LFRAME_N	8	LPCRST_N
9	SIRQ	10	3VSB

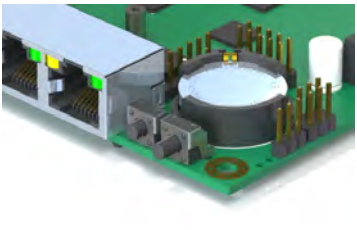
VGA Definition (**JVGA1**)



JVGA1 Definition :

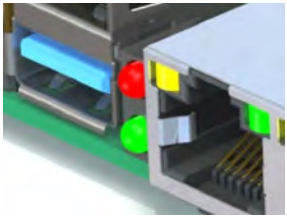
PIN	NAME	PIN	NAME
1	R	2	GND
3	G	4	DDC_SDA
5	B	6	HSYNC
7	VCC	8	VSYNC
9		10	DDC_SCL

POWER BUTTON



PIN	NAME
BPWBTN1	POWER BUTTON
NACK_RST1	RESET BUTTON

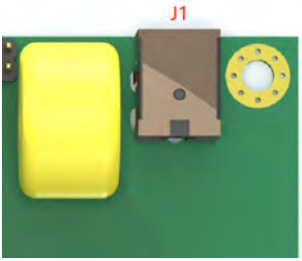
PSU_HDD_LED1

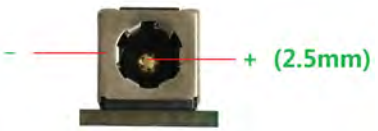


PIN	NAME
RED	HDD activity
GREEN	PSU_POWER Status

Power In

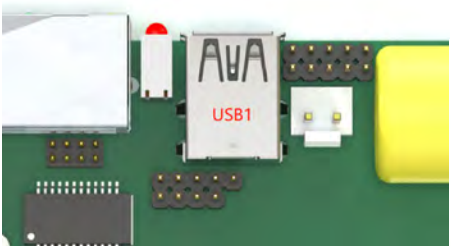
J1 Definition :

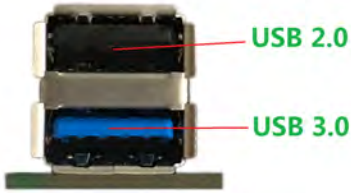




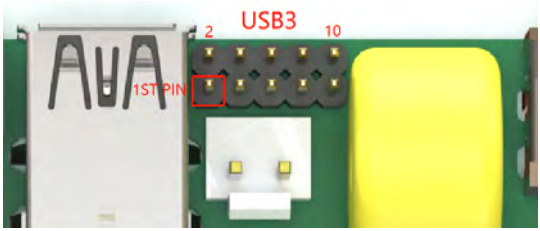
PIN	NAME
+	+12V
-	GND

2.6.6 USB Connector (RACK USB1,USB1)



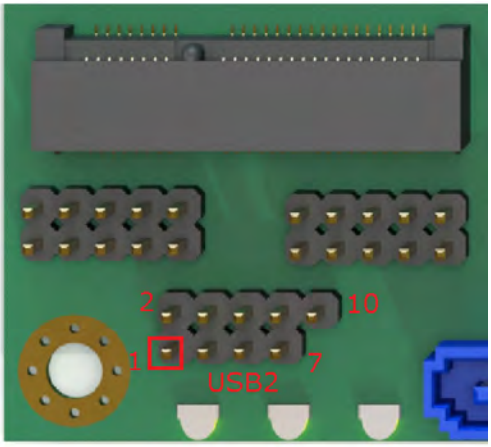


USB3:



USB3 Definition :

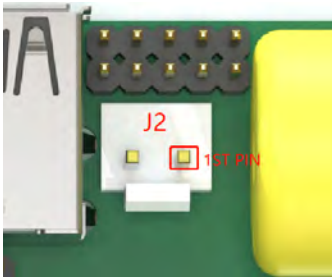
PIN	NAME	PIN	NAME
1	VCC	2	USB3_RXP0
3	USB_N0	4	USB3_RXN0
5	USB_P0	6	GND
7	GND	8	USB3_TXP0
9	GND	10	USB3_TXN0



USB2 Definition :

PIN	NAME	PIN	NAME
1	VCC	2	VCC
3	D0-	4	D1-
5	D0+	6	D1+
7	GND	8	GND
9	/	10	GND

J2

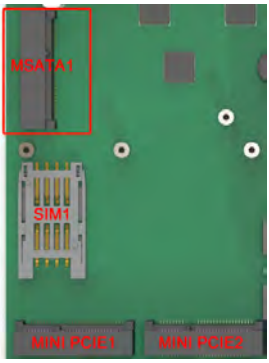


J2 Definition :

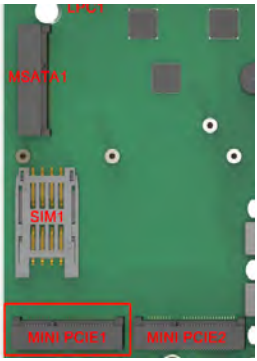
PIN	NAME
1	+12V
2	GND

Mini-PCIe Slot (MiniPCIe1, mSATA1, MiniPCIe2)

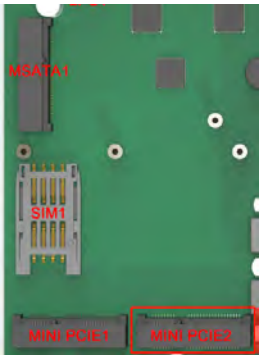
Full-size Mini PCIe: 3



mSATA1 for mSATA/miniPCIe option (should be configured in factory)

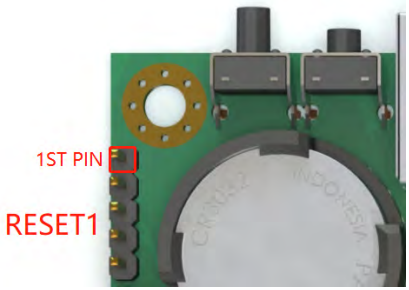


MiniPCIe1 for MiniPCIe/3G/4G Module with SIM card holder



MiniPCIe2 for normal MiniPCIe

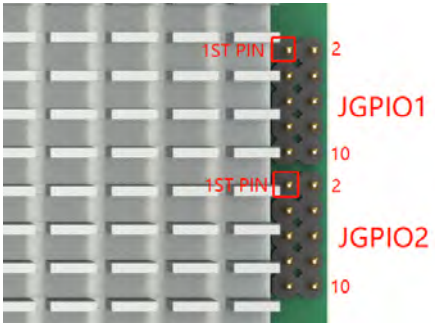
RESET1



RESET1 Definition:

PIN	NAME	PIN	NAME
1	Power button	2	GND
3	GND	4	RESET#
5	Watchdog_trigger#		

Short 4-5 means the watchdog will trigger a system reset after WDT timeout.



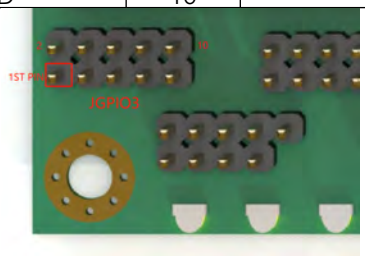
GPIO1 Definition: (SOC source)

PIN	NAME	PIN	NAME
1	GP0	2	VCC3
3	GP1	4	GP6
5	GP2	6	GP7
7	GP3	8	GP8
9	GND	10	GP9

GPIO2 Definition: (SOC source)

PIN	NAME	PIN	NAME
1	GP22	2	VCC3
3	GP23	4	GP27

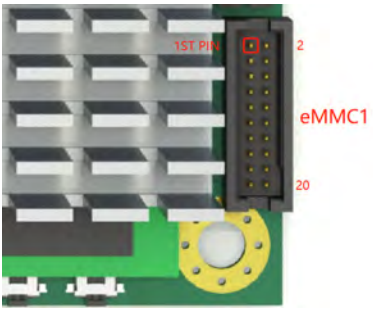
5	GP24	6	GP28
7	GP25	8	GP29
9	GND	10	GP30

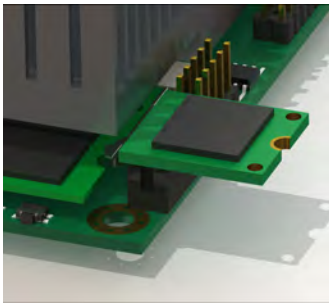


GPIO3 Definition: (Super I/O source)

PIN	NAME	PIN	NAME
1	GP52	2	3.3V
3	GP51	4	GP56
5	GP37	6	GP57
7	GP36	8	GP60
9	GND	10	GP61

eMMC1





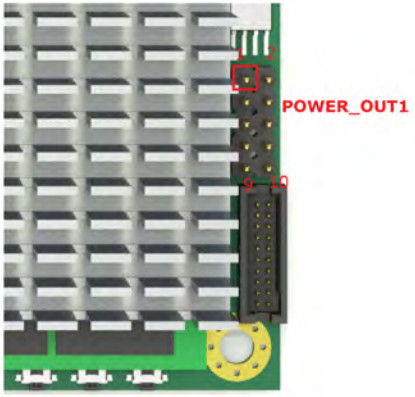
eMMC1 Definition:

PIN	NAME	PIN	NAME
1	eMMC_D0	2	eMMC_D1
3	eMMC_D2	4	eMMC_D3
5	eMMC_D4	6	eMMC_D5
7	eMMC_D6	8	eMMC_D7
9	NC	10	GND
11	eMMC_CMD	12	eMMC_CLK

13	3.3VSB	14	GND
15	1.8VSB	16	1.8VSB
17	eMMC_RESET	18	3.3VSB
19	GND	20	GND

Appendix:

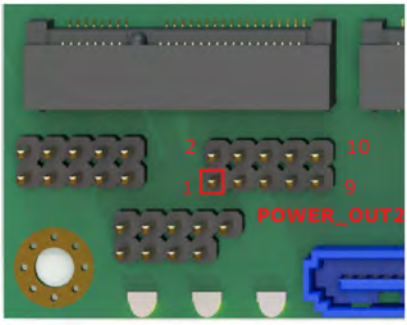
POWER_OUT1 (No soldering pin header)



POWER_OUT1 Definition: (No soldered pin header)

PIN	*NAME*	*PIN*	*NAME*
1	*12V_S*	*2*	*GND*
3	*12V_S*	*4*	*GND*
5	*5V*	*6*	*GND*
7	*5V*	*8*	*GND*
9	*5V*	*10*	*GND*

POWER_OUT2



POWER_OUT2 Definition:

PIN	NAME	PIN	NAME
1	12V_S	2	GND
3	12V_S	4	GND
5	5V	6	GND
7	5V	8	GND
9	5V	10	GND