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VisionCB-RT1176-STD v.1.2 Datasheet and Pinout

Rev. 20240709120309

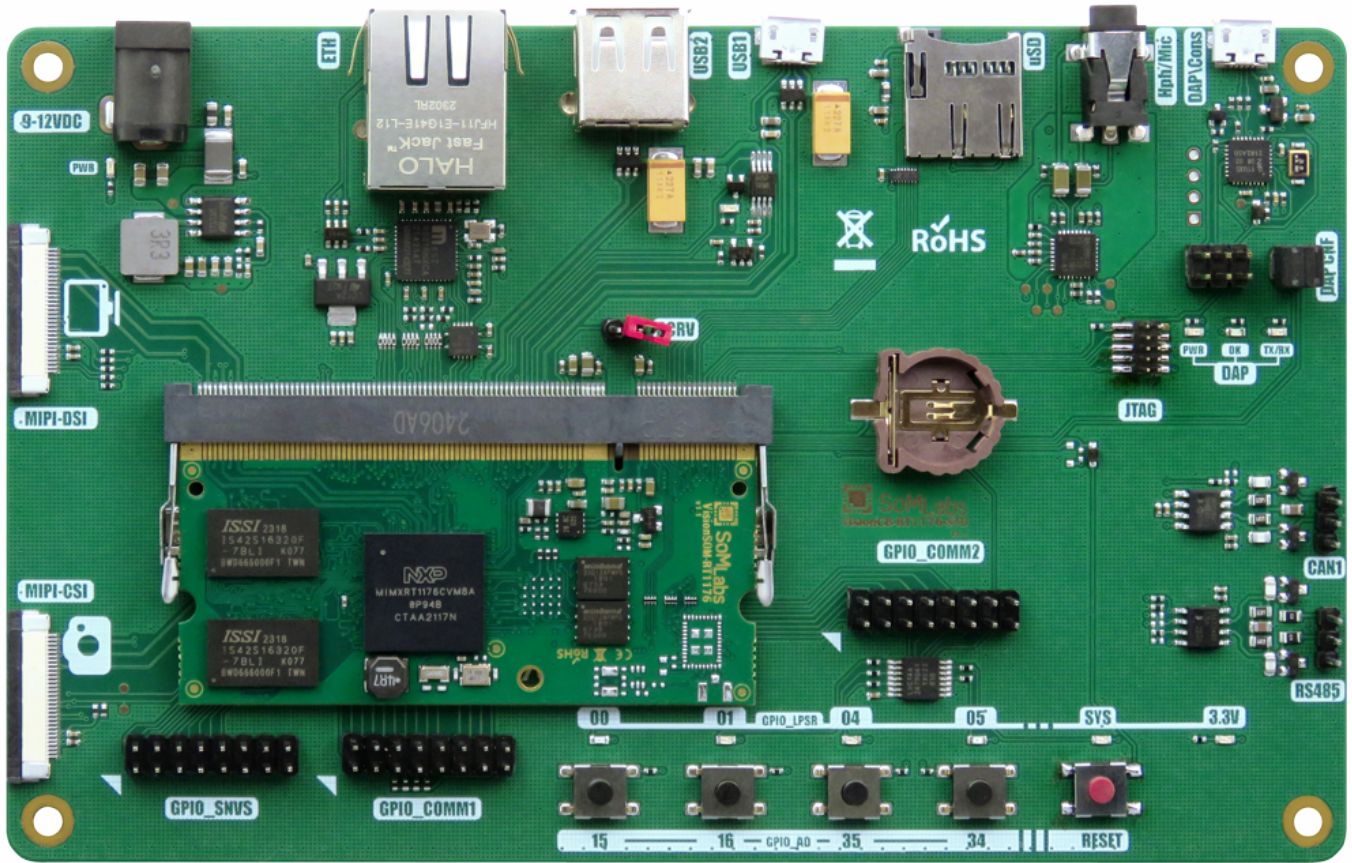
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VisionCB-RT1176-STD v.1.2 Datasheet and Pinout

General description



VisionCB-RT1176-STD is a carrier board for the VisionSOM-RT1170 family of computer-on-modules, which are powered by NXP i.MX RT117x application processors. The carrier board, together with a System on Module (SoM), makes a complete development platform similar to SBC. The carrier board houses the most common interfaces such as audio codec, USB, Ethernet, UART, RS485, CAN etc. A large variety of interfaces allows to use it as both a complete development platform or as a stand-alone end-product.

The carrier board connects with the SoM via a standard SODIMM connector.

Applications

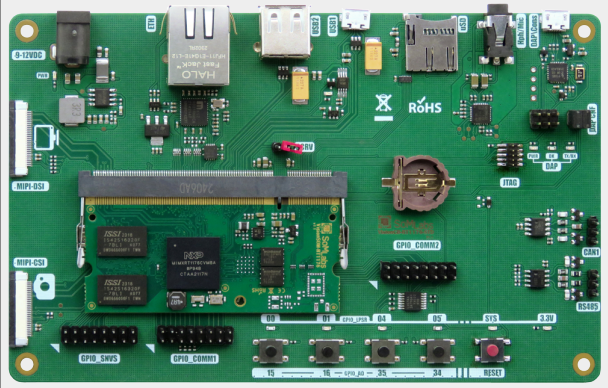
- Industrial embedded RTOS computer
- Home Appliances
- Air Conditioning
- Building Security
- Fleet Management
- Heat Metering
- Home Automation - Smart Home
- Human-machine Interfaces (HMI)
- Motor Drives
- Cash Register

- Intermediate Flight Controller
- Smart grid Infrastructure
- IoT gateways
- Residential gateways
- Smart Lock
- Robotics
- Toys and Board Games

Features

- Carrier Board (Base Board) compatible with the VisionSOM family of modules based on NXP i.MX RT117x application processors
- SoM connector: SODIMM200
- Expansion Connectors:
 - GPIO-SNVS, GPIO-COMM1, GPIO-COMM2 2x16 Pin Headers (Male)
 - MicroSD socket
- Audio:
 - 24-bit codec audio with headphones and microphone Jack connector
- Communication Connectors:
 - 1x JTAG connector
 - RS485 half-duplex
 - CAN single channel
 - 1x Ethernet 10/100/1000 Mbit/s, RJ45
 - 1x USB Host Type A connectors
 - 1x USB-OTG Micro AB connector
 - 1x Console MicroUSB B connector (Mbed SWDAP debug probe based on LPC11U35FHI33/501)
- Display Interface: 30-pin FFC/FPC MIPI-DSI
- Camera Interface: 30-pin FFC/FPC MIPI-CSI
- User Interface:
 - 5 Pushbuttons
 - 5 LEDs
- Recovery jumper
- Power Supply
 - DC connector: Input Voltage 9-12V DC (5.5x2.1 connector)
 - CR2032 battery socket for RTC
- Temperature Range: 0 to +70°C
- Board Size: 160mm x 100mm x 22mm

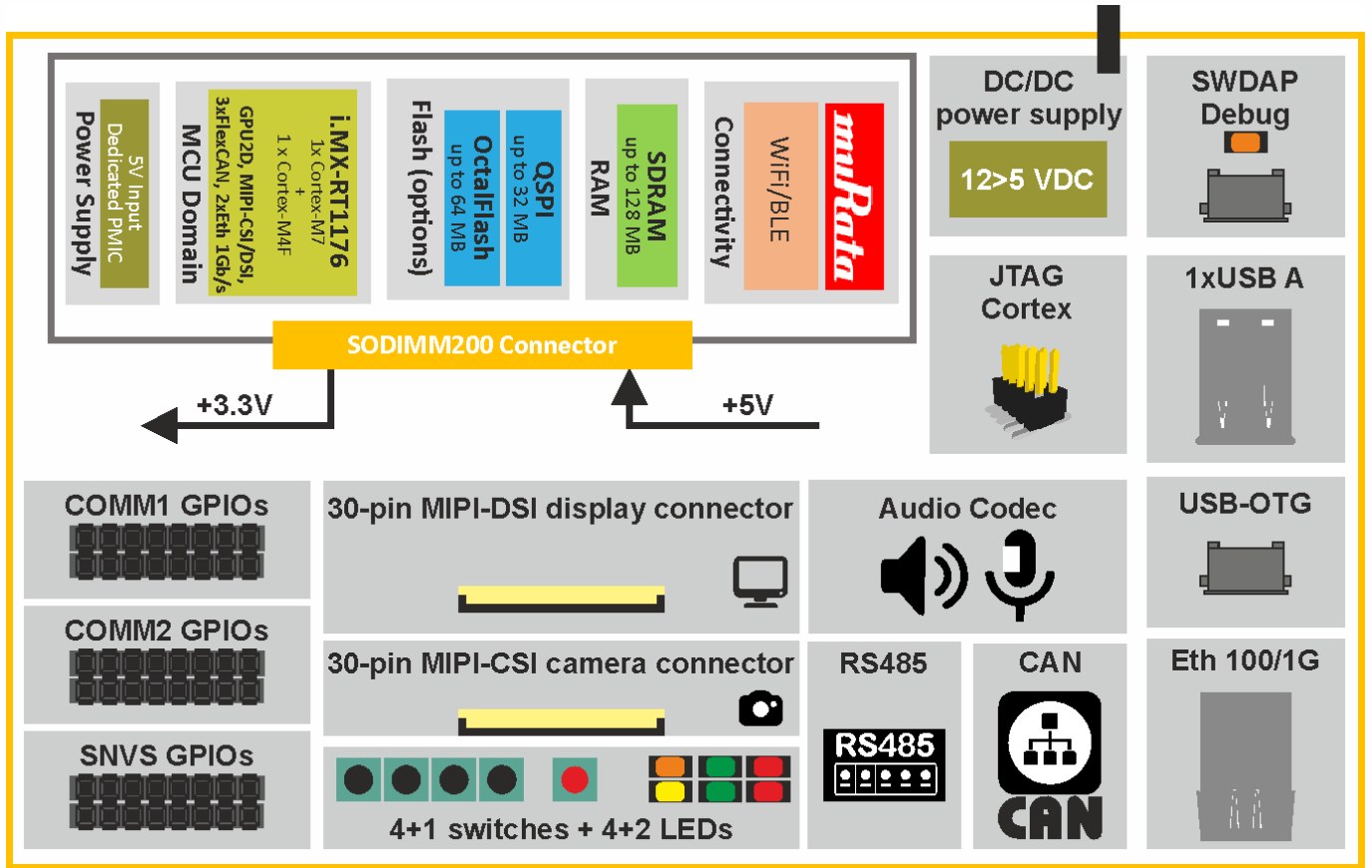
Pictures of VisionCB-RT1176-STD v1.2 board

Version	Photo
<p>VisionCB-RT1176-STD v1.2 board with attached SOM</p>	

Ordering info

VisionCB-RT1176-STD v1.2

Block Diagram



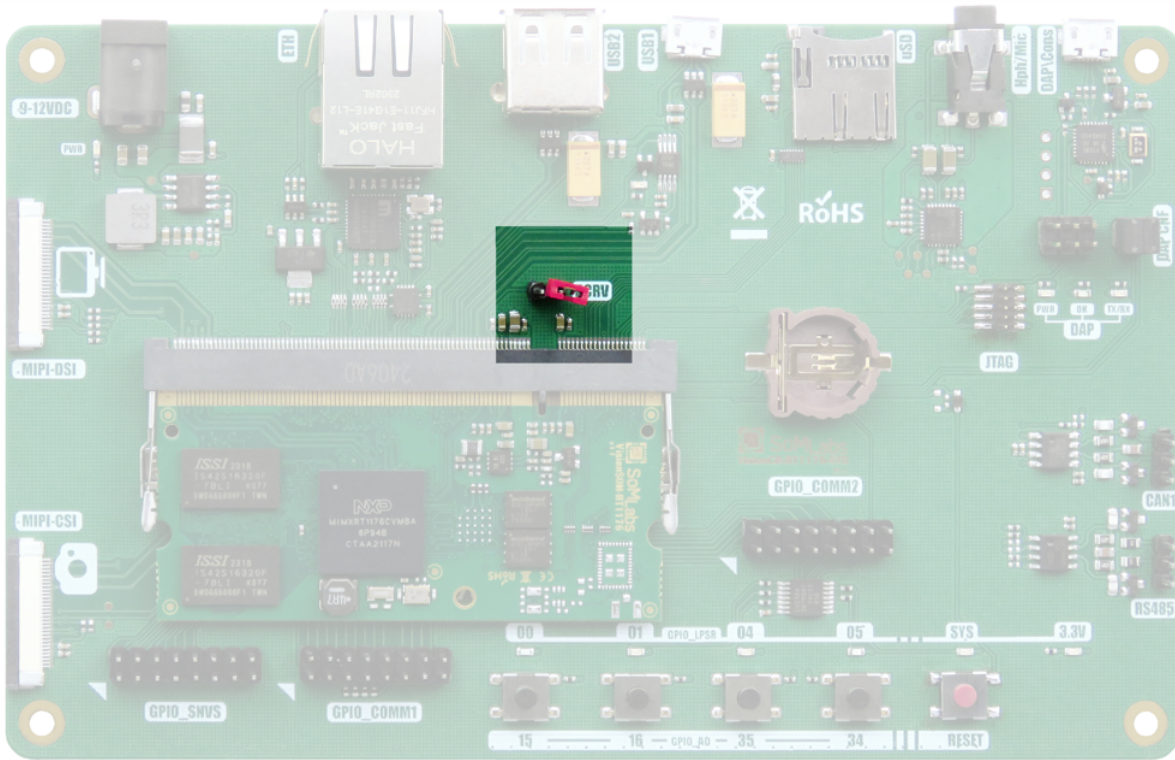
Electrical parameters

Parameter	Value			Units	Comment
	Min.	Typ.	Max.		
Power Supply (J100 input)	9.0	12.0	15.0	V	Positive pole on central connector of J200
Supply current	-	-	0.13	A	Excluding LCD, USB and antoher external loads
Output voltage (VDD-3V3)	-	3.3	-	V	Generated by internal DC/DC converter on SoM
Output VDD-3V3 current	-	-	80	mA	Generated by internal DC/DC converter on SoM
Input GPIO COMM1/COMM2 voltage (J801 ¹ and J802)	0	-	3.3	V	-
Input GPIO SNVS voltage (J800)	0	-	1.8	V	-
JTAG/SWD interface voltage (J900)	0	-	3.3	V	-
DAC output voltage range (J801)	0	-	1.8	V	-
MicroSD Card power supply voltage	-	-	3.3	V	-

Note:

1. Excluding DAC output (pin 14 of J801, maximum allowable voltage 1.8V)

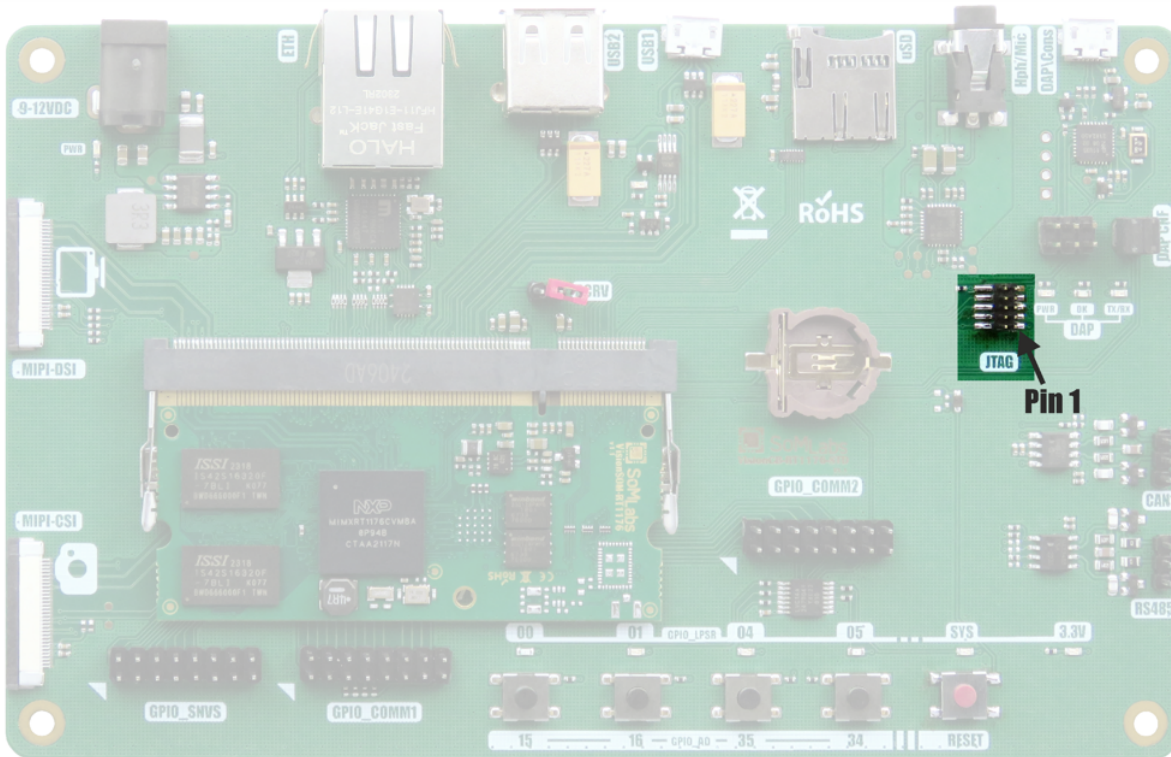
Recovery Jumper/MCU Boot Configuration



RECOVERY is the boot mode selector. If:

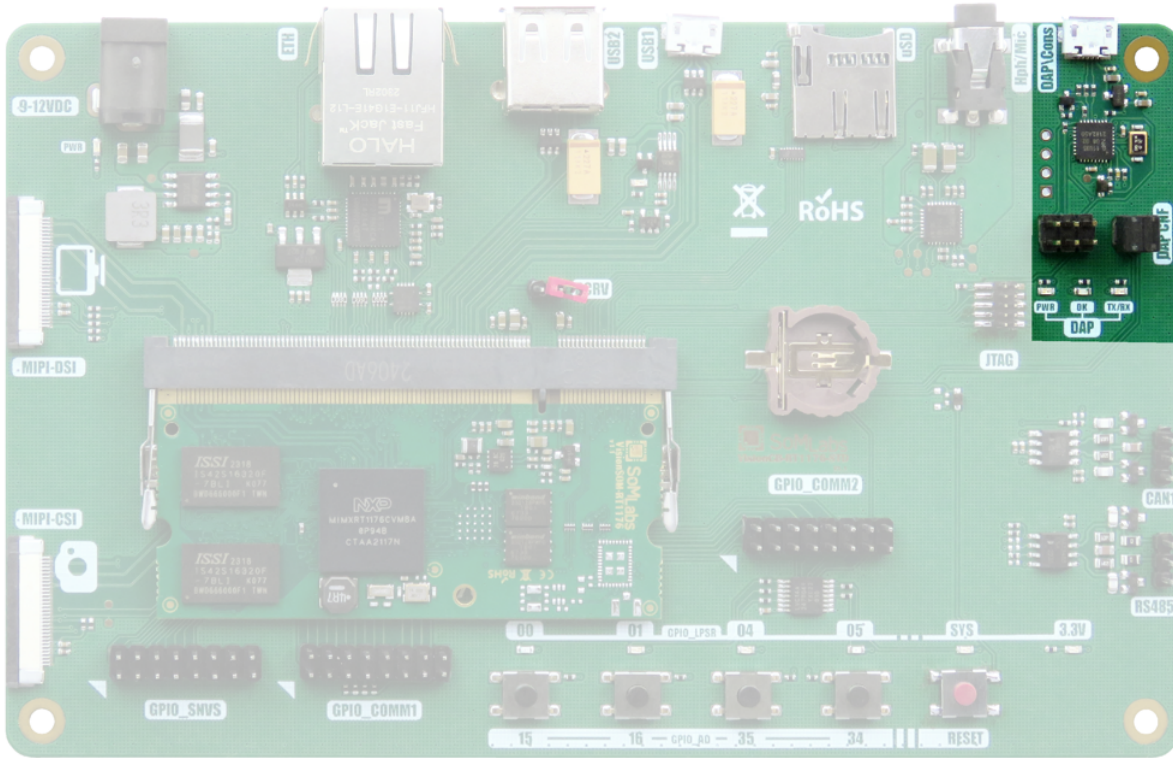
- RECOVERY = 0 (jumper installed) then BOOT-MODE0 = 1, as a result serial loader starts
- RECOVERY = 1 (jumper is not installed) or open then BOOT-MODE0 = 0, as a result MCU boots from fuses

External JTAG Connector



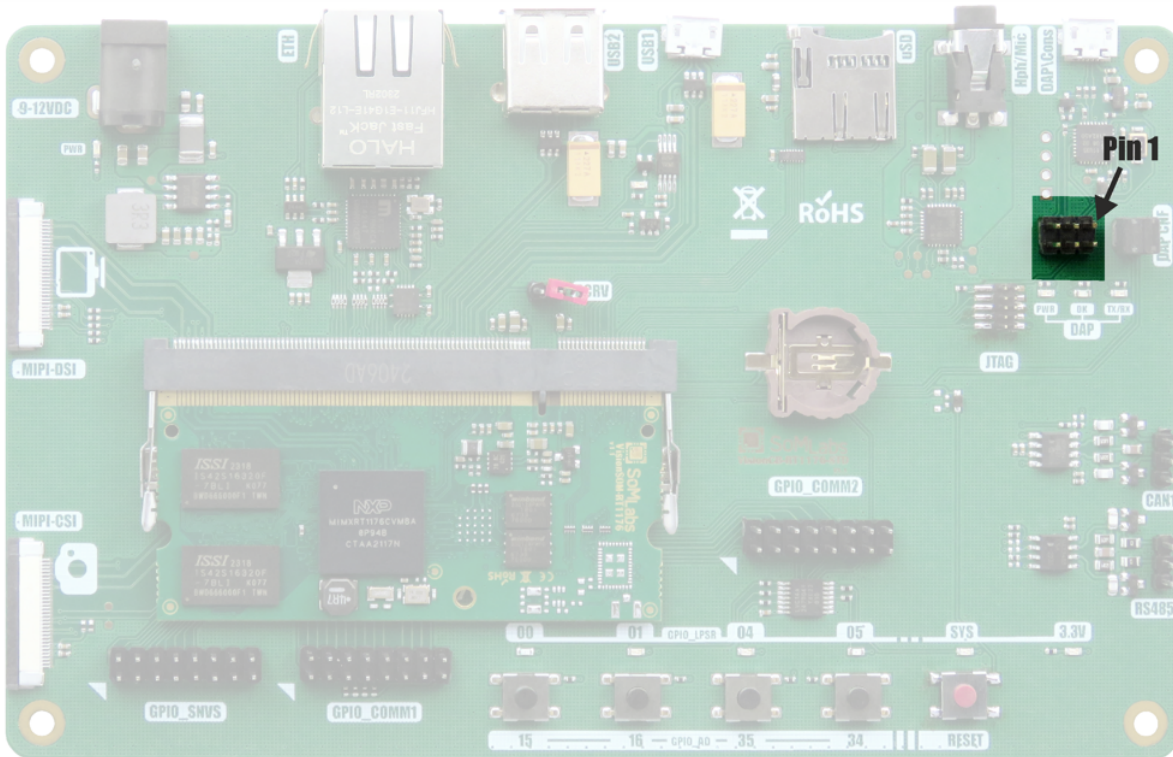
JTAG Connector	Default function name	MCU pin name
1	+3V3	-
2	TMS	GPIO_LPSR_15
3	GND	NA
4	TCK	GPIO_LPSR_14
5	GND	NA
6	TDO	GPIO_LPSR_11
7	-	-
8	TDI	GPIO_LPSR_12
9	GND	GPIO_AD_B0_07
10	nRES/TRST	GPIO_LPSR_10

DAP Debug Interface



The DAP debug interface is based on LPC11U35FHI33/501 and converts USB into two-lines SWD debug interface. The DAP debug interface also serves as an vCOM (on USB) interface for optional UART console port.

SWDIO DAP Connector

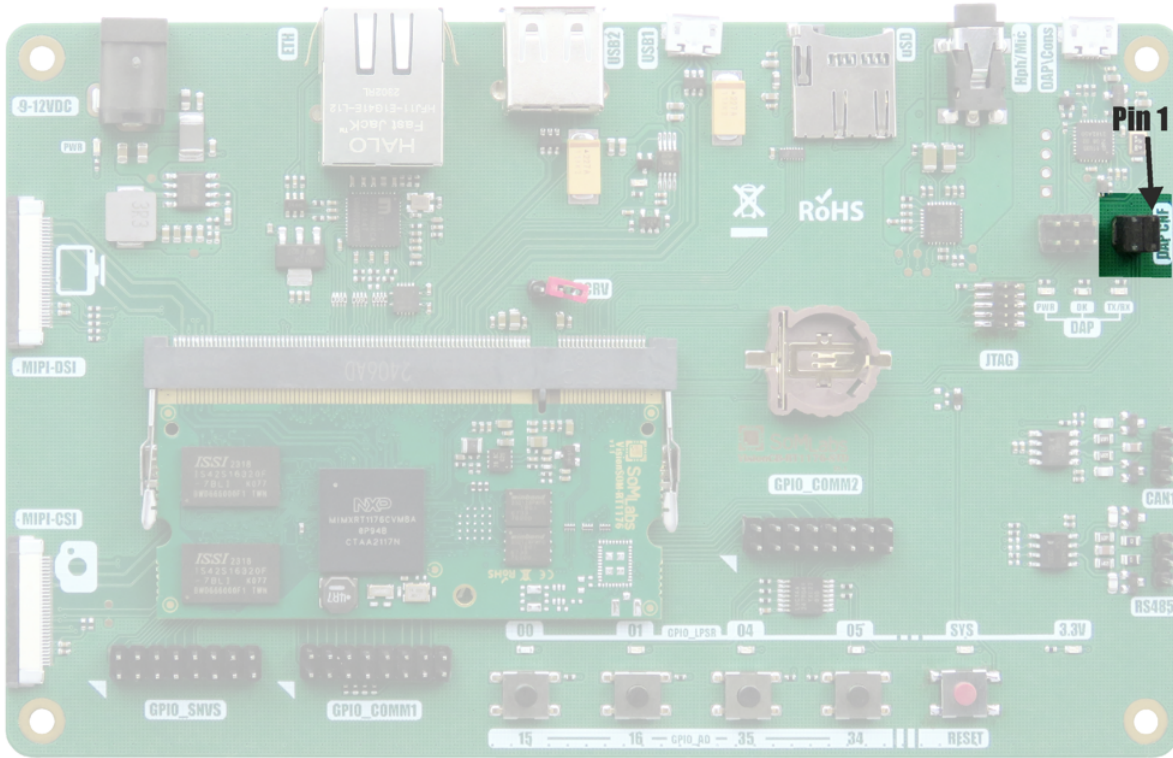


DAP Connector	Function name	Source: DAP/SoM
1	nRES	DAP
2	nRESET	DAP
3	SWCLK	DAP
4	TCK	SoM
5	SWDIO	DAP
6	TMS	SoM

Note:

1. During normal use, it is recommended to connect pin pairs: 1-2, 3-4, 5-6.

Console DAP Connector

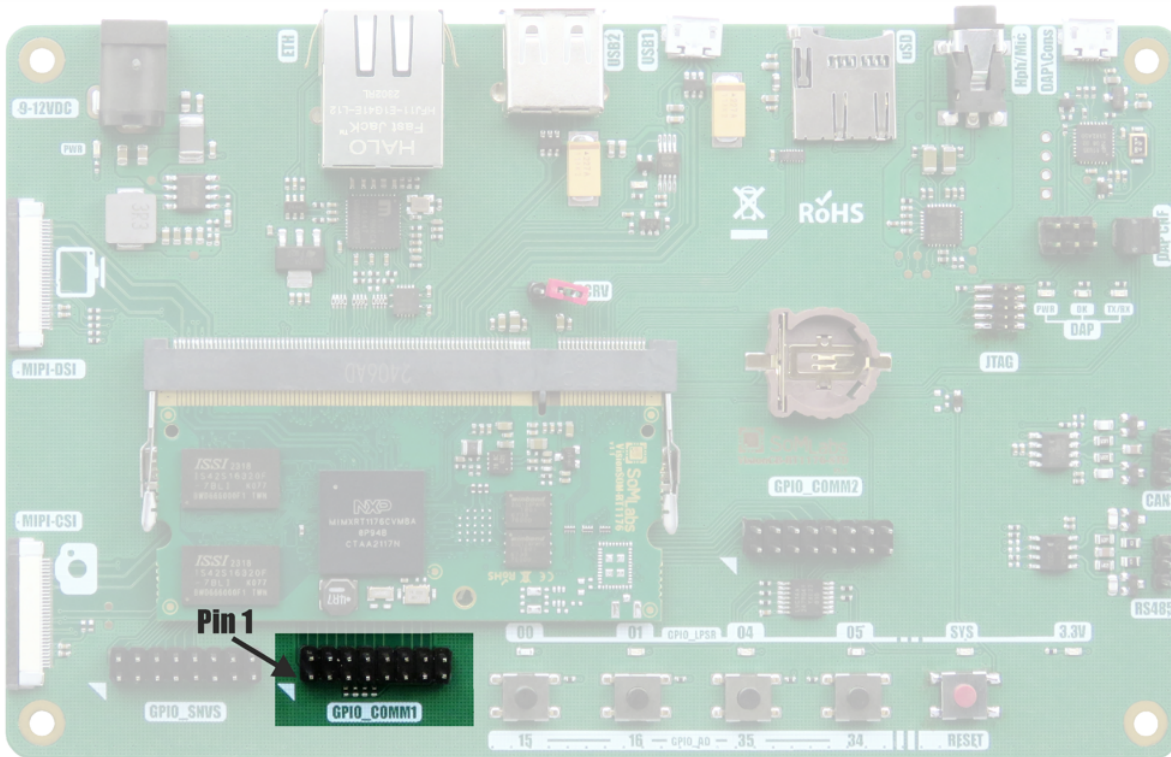


DAP Connector	Function name	MCU pin name	Signal Source
1	RxD	-	DAP
2	UART2.RxD	GPIO_DISP_B2_11	SoM
3	TxD	-	DAP
4	UART2.TxD	GPIO_DISP_B2_10	SoM

Note:

1. During normal use, it is recommended to connect pin pairs: 1-2, 3-4.

GPIO COMM1 I/O header (J802)

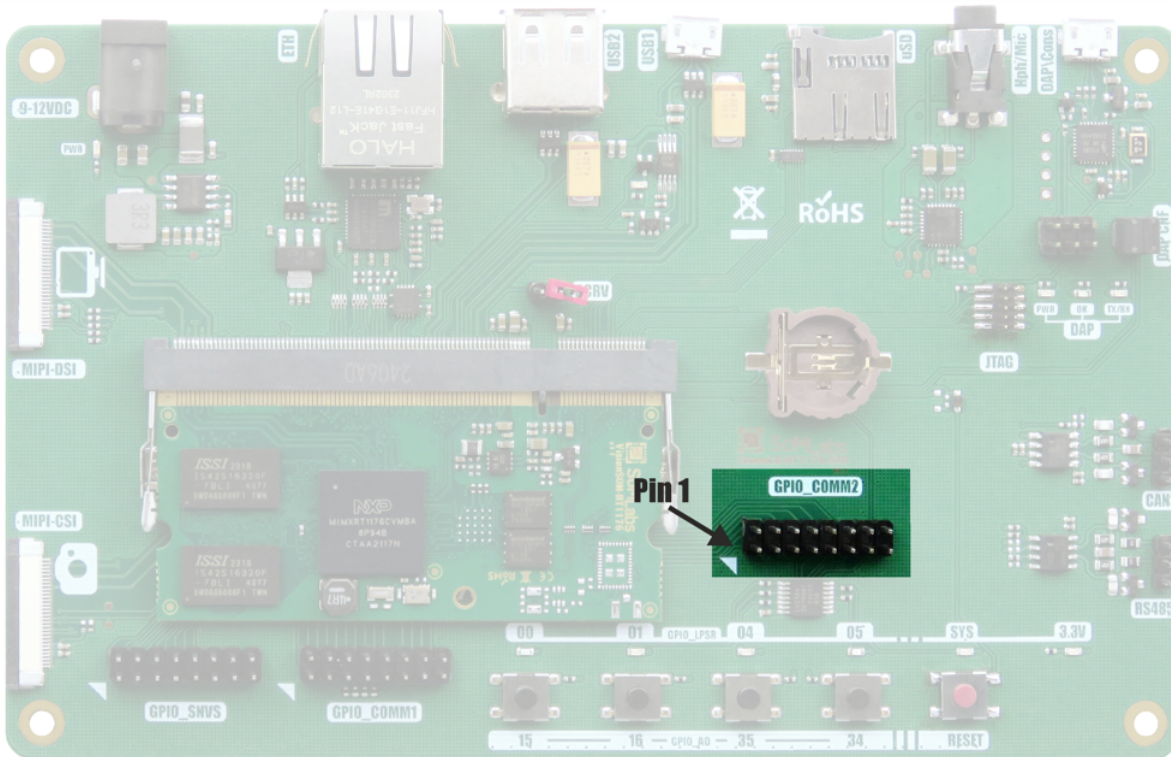


J802 Pin	Default function name	MCU pin name	Description
1	SPI4.SCK	GPIO_DISP_B2_12	3.3V logic levels
2	SPI4.OUT	GPIO_DISP_B2_14	3.3V logic levels
3	SPI4.IN	GPIO_DISP_B2_13	3.3V logic levels
4	SPI4.CS0	GPIO_DISP_B2_15	3.3V logic levels
5	I2C1.SDA	GPIO_AD_33	4,7kOhm pull-up resistor
6	I2C1.SCL	GPIO_AD_32	4,7kOhm pull-up resistor
7	I2C2.SDA	GPIO_AD_19	4,7kOhm pull-up resistor
8	I2C2.SCL	GPIO_AD_18	4,7kOhm pull-up resistor
9	CAN2.TX	GPIO_AD_00	3.3V logic levels
10	CAN2.RX	GPIO_AD_01	3.3V logic levels
11	UART1.RXD	GPIO_AD_25	Available to the user as GPIO only in SoM without 1DX radio modules.
12	UART1.TXD	GPIO_AD_24	Available to the user as GPIO only in SoM without 1DX radio modules.
13	UART1.CTS	GPIO_AD_26	Available to the user as GPIO only in SoM without 1DX radio modules.
14	UART1.RTS	GPIO_AD_27	Available to the user as GPIO only in SoM without 1DX radio modules.
15	+3V3	NA	-
16	GND	NA	-

Notes:

1. NA - not available.

GPIO COMM2 I/O header (J801)

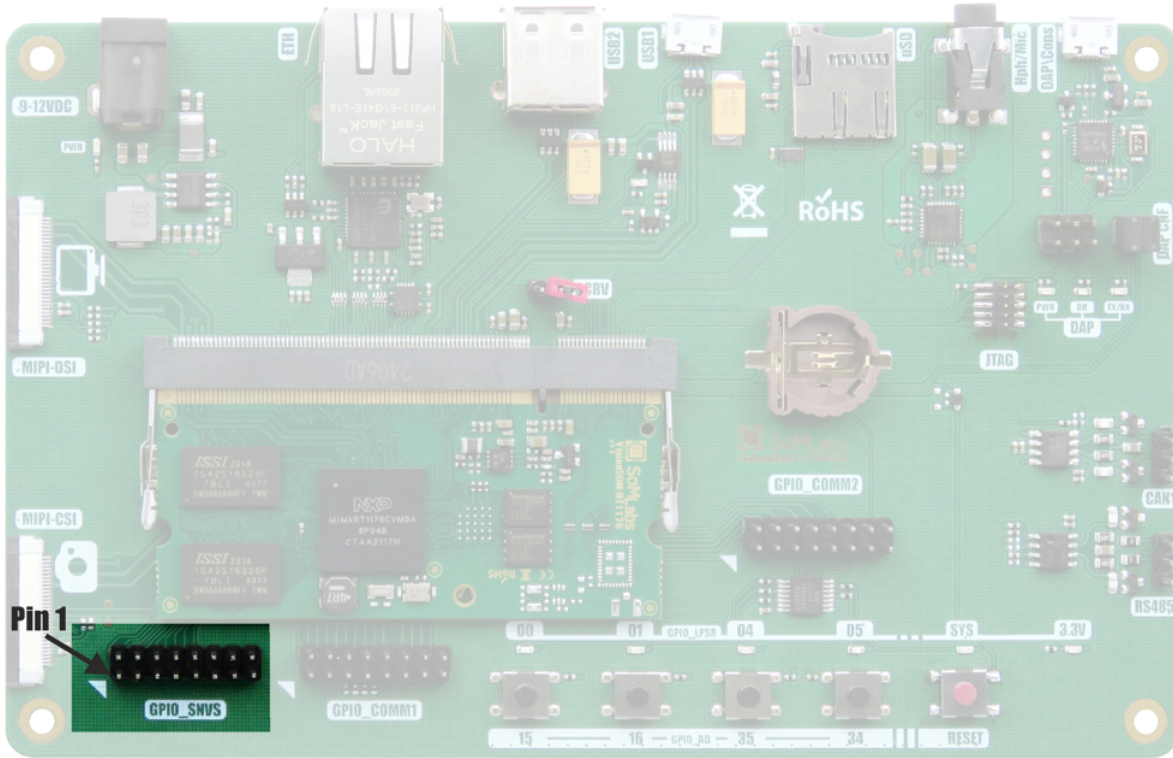


J801 Pin	Default function name	MCU pin name	Description
1	UART5.TXD	GPIO_AD_28	3.3V logic levels
2	UART3.TXD	GPIO_AD_30	3.3V logic levels
3	UART5.RXD	GPIO_AD_29	3.3V logic levels
4	UART3.RXD	GPIO_AD_31	3.3V logic levels
5	UART10.TXD	GPIO_AD_15	Pushbutton S804 is connected to this line.
6	UART12.TXD	GPIO_LPSR_00	GPIO_LPSR00 LED is connected to this line (through logic inverter).
7	UART10.RXD	GPIO_AD_16	Pushbutton S803 is connected to this line.
8	UART12.RXD	GPIO_LPSR_01	GPIO_LPSR01 LED is connected to this line (through logic inverter).
9	UART10.RTS	GPIO_AD_35	Pushbutton S802 is connected to this line.
10	UART12.RTS	GPIO_LPSR_04	GPIO_LPSR04 LED is connected to this line (through logic inverter).
11	UART10.CTS	GPIO_AD_34	Pushbutton S801 is connected to this line.
12	UART12.CTS	GPIO_LPSR_05	GPIO_LPSR05 LED is connected to this line (through logic inverter).
13	NC	-	-
14	DAC-OUT	DAC-OUT	12-bit DAC voltage output (range 0-1.8V).
15	+3V3	NA	-
16	GND	NA	-

Notes:

1. NA - not available.
2. NC - not connected.

GPIO SNVS I/O header (J800)



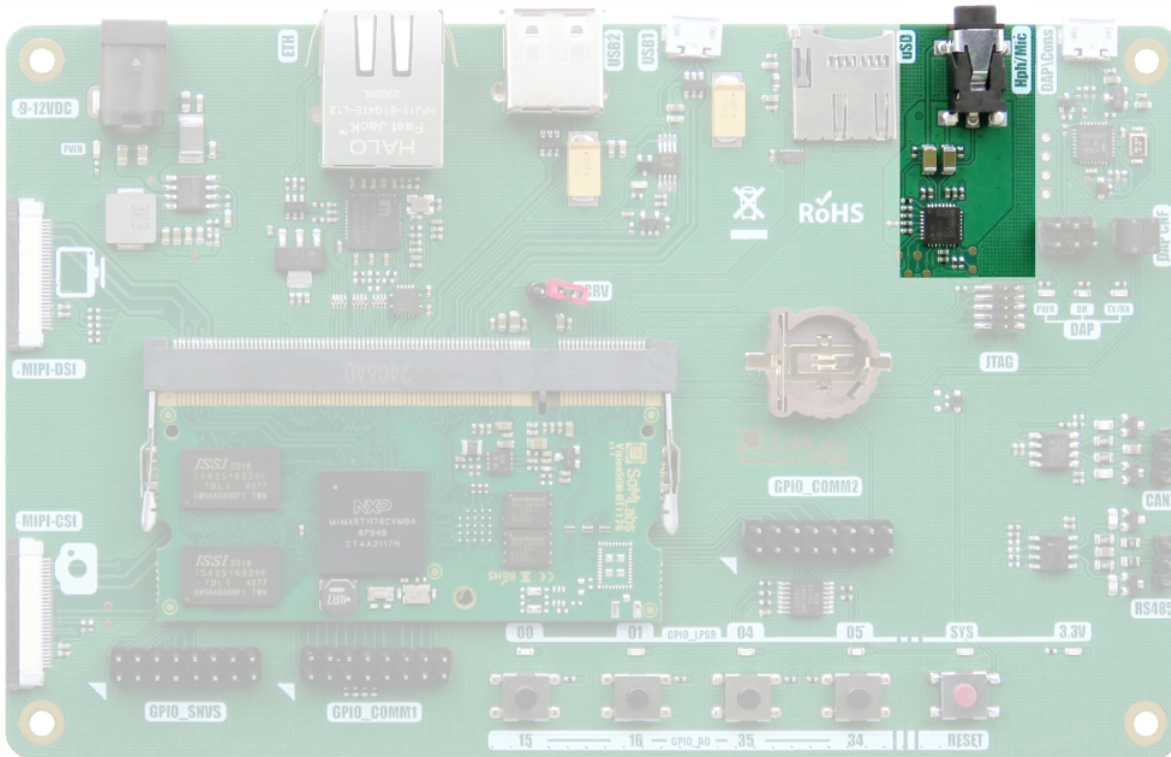
J800 Pin	Default function name	MCU pin name	Description
1	GPIO-SVNS.9	GPIO_SNVS_09	1.75V VDD_SNVS_ANA power domain
2	GPIO-SVNS.8	GPIO_SNVS_08	1.75V VDD_SNVS_ANA power domain
3	GPIO-SVNS.7	GPIO_SNVS_07	1.75V VDD_SNVS_ANA power domain
4	GPIO-SVNS.6	GPIO_SNVS_06	1.75V VDD_SNVS_ANA power domain
5	GPIO-SVNS.5	GPIO_SNVS_05	1.75V VDD_SNVS_ANA power domain
6	GPIO-SVNS.4	GPIO_SNVS_04	1.75V VDD_SNVS_ANA power domain
7	GPIO-SVNS.3	GPIO_SNVS_03	1.75V VDD_SNVS_ANA power domain
8	GPIO-SVNS.2	GPIO_SNVS_02	1.75V VDD_SNVS_ANA power domain
9	GPIO-SVNS.1	GPIO_SNVS_01	1.75V VDD_SNVS_ANA power domain
10	GPIO-SVNS.0	GPIO_SNVS_00	1.75V VDD_SNVS_ANA power domain
11	PMIC-STBY-REQ	PMIC-STBY-REQ	1.75V VDD_SNVS_ANA power domain.
12	RESET	RESET	POR-B of MCU line (resets all of the chip except the Secure Non-Volatile Storage (SNVS) block), active low. 1.75V VDD_SNVS_ANA power domain.
13	WAKEUP	-	A GPIO powered by SNVS domain power supply which can be configured as wakeup source in SNVS mode. 1.75V VDD_SNVS_ANA power domain.

14	ON-OFF	ON-OFF	A brief connection to GND in the OFF mode causes the internal power management state machine to change the state to ON. In the ON mode, a brief connection to GND generates an interrupt intended to be a software-controllable power-down). Approximately five seconds (or more) to GND causes a forced OFF. Both boot mode inputs can be disconnected. 1.75V VDD_SNVS_ANA power domain.
15	+1V8	NA	Reference voltage for 1V8 peripherals.
16	GND	NA	-

Notes:

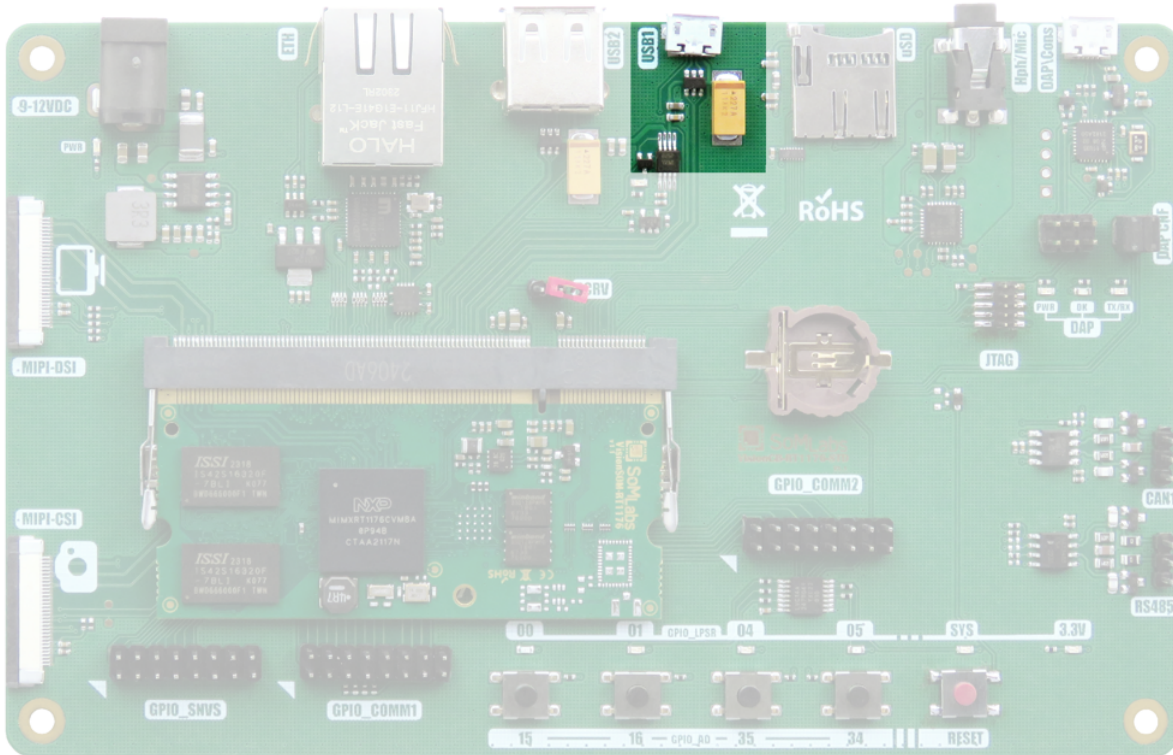
1. NA - not available.

Audio codec



PCB designation	MCU pin name	Description
SAI1.MCLK	GPIO_DISP_B2_03	Audio interface MCLK signal
SAI1.BCLK	GPIO_DISP_B2_05	Audio interface BCLK signal
SAI1.FSYNC	GPIO_DISP_B2_04	Audio interface FSYNC signal
SAI1.TX	GPIO_DISP_B2_07	Audio interface TX signal
SAI1.RX	GPIO_DISP_B2_06	Audio interface TX signal
I2C5.SCL	GPIO_LPSR_09	Codec configuration SCL line of I2C5 interface 4,7kOhm pull-up resistor
I2C5.SDA	GPIO_LPSR_08	Codec configuration SDA line of I2C5 interface 4,7kOhm pull-up resistor

USB-OTG

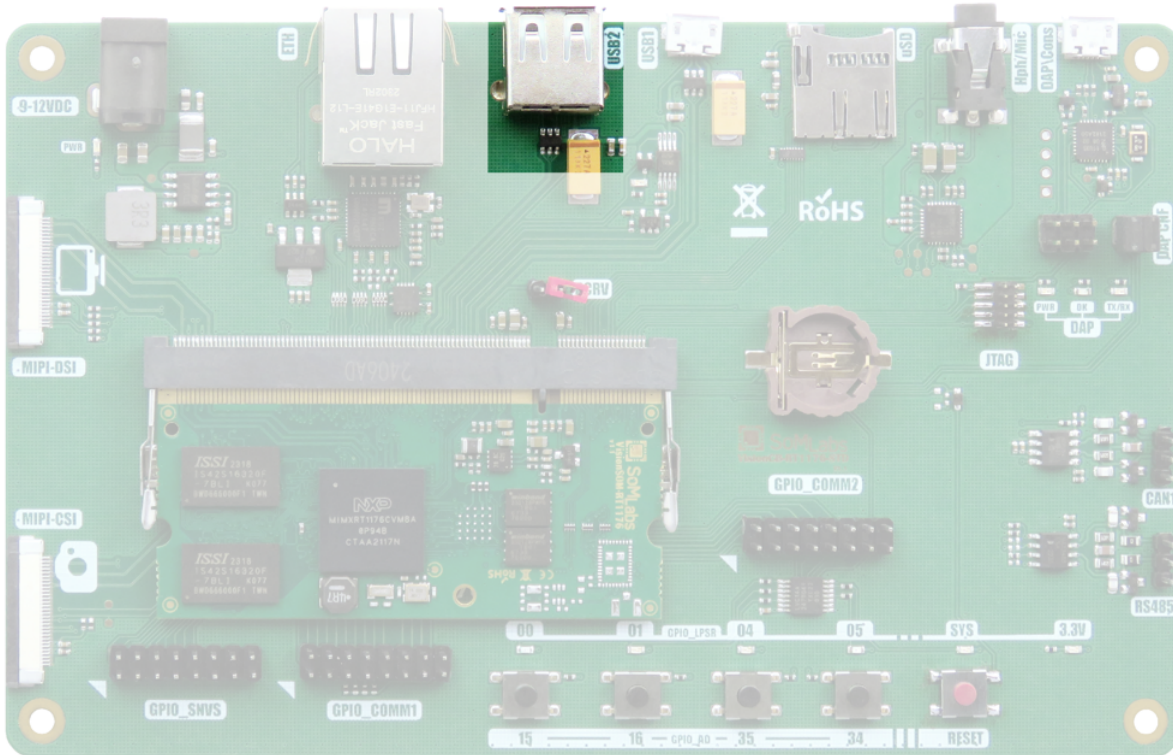


PCB designation	MCU pin name	Description
USB1.EN	GPIO_AD_12	Power enable signal connected to USB power switch (STMP2252).
USB1.OC	GPIO_AD_10	Over-current signal input (from USB power switch STMP2252).
USB1.ID	GPIO_AD_09	USB device identification input.

Notes:

1. USB-OTG is connected to USB1 interface of MCU.
2. D+/D-/VBUS signals are connected to dedicated analog MCU pins.
3. USB1.OC controls OverCurrent red LED (D300).

USB host

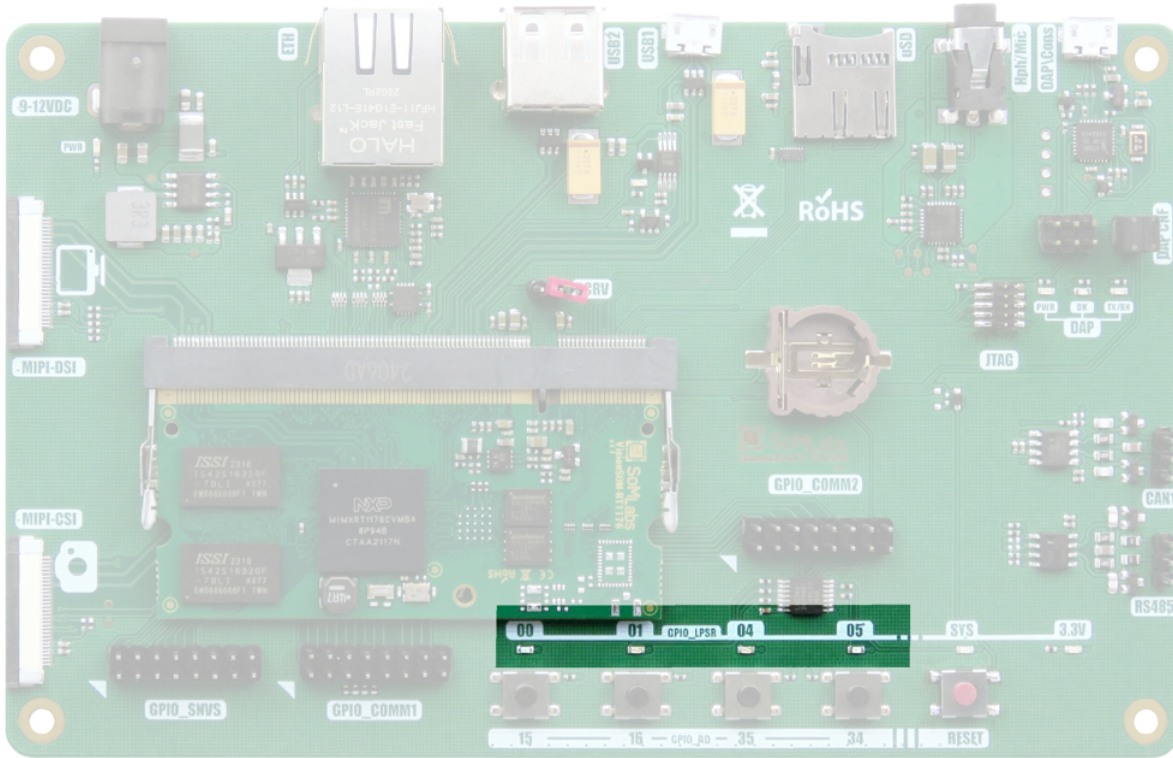


PCB designation	MCU pin name	Description
USB2.EN	GPIO_AD_12	Power enable signal connected to USB power switch (STMPS2252).
USB2.OC	GPIO_AD_13	Over-current signal input (from USB power switch STMPS2252).

Notes:

1. USB Host is connected to USB2 interface of MCU.
2. D+/D-/VBUS signals are connected to dedicated analog MCU pins.
3. USB2.OC controls OverCurrent red LED (D300).

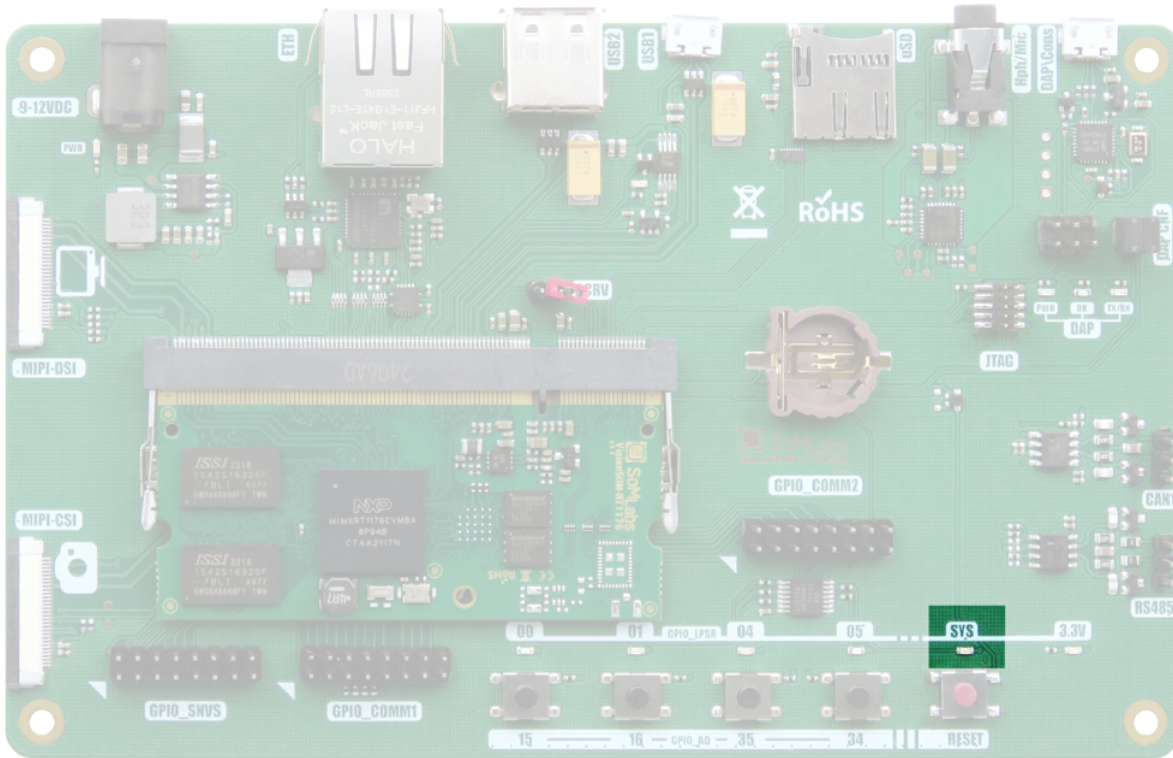
User LEDs connections



LED	PCB designation	MCU pin name	Description
D804	SYS	JTAG.MOD	JTAG.MOD input with internal pull-down by 10 kOhm resistor.
D803	GPIO_LPSR_00	UART12.TXD	Line connected to J801 (GPIO COMM2).
D802	GPIO_LPSR_01	UART12.RXD	Line connected to J801 (GPIO COMM2).
D801	GPIO_LPSR_04	UART12.RTS	Line connected to J801 (GPIO COMM2).
D800	GPIO_LPSR_05	UART12.CTS	Line connected to J801 (GPIO COMM2).

Notes:

1. LEDs are switched on by logic „1” set at the GPIO outputs.
2. LEDs are controlled by current drivers and do not load the GPIOs.

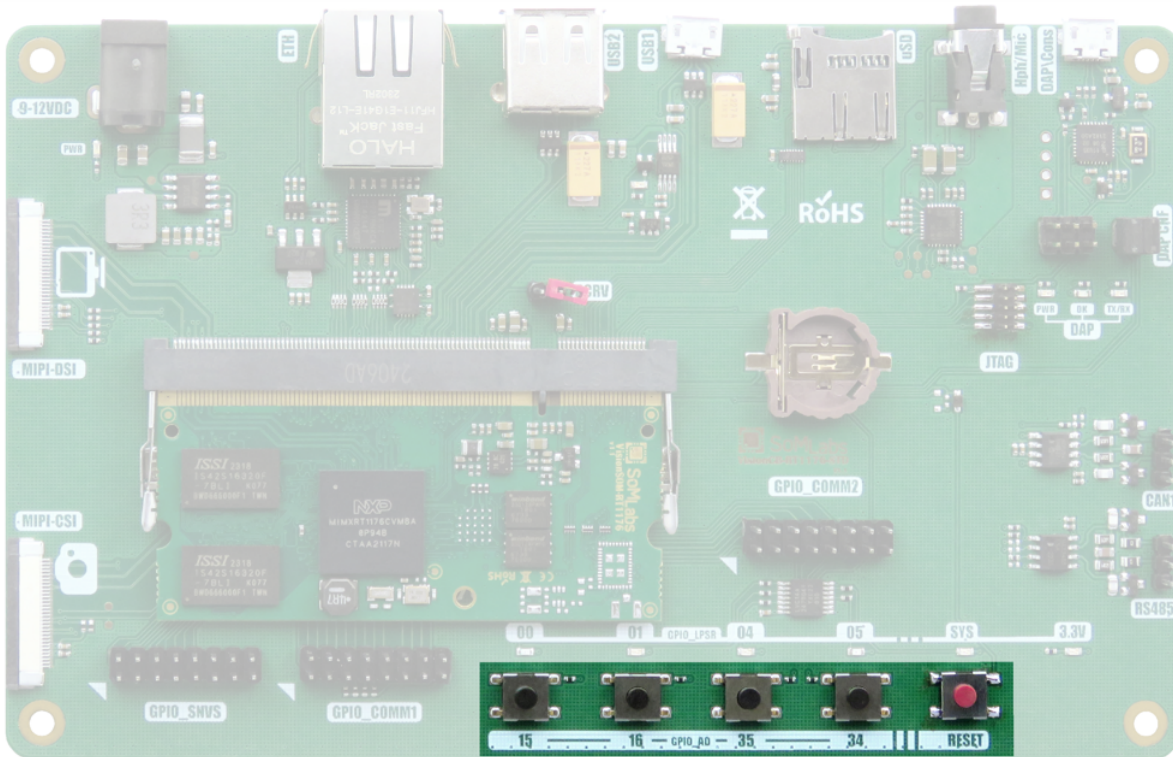


LED	PCB designation	MCU pin name	Description
D804	SYS	JTAG.MOD	JTAG.MOD input with internal pull-down by 10 kOhm resistor.

Notes:

1. LED is switched on by logic „1” set at the GPIO outputs.
2. LED is controlled by current drivers and do not load the GPIO.

User switches connections

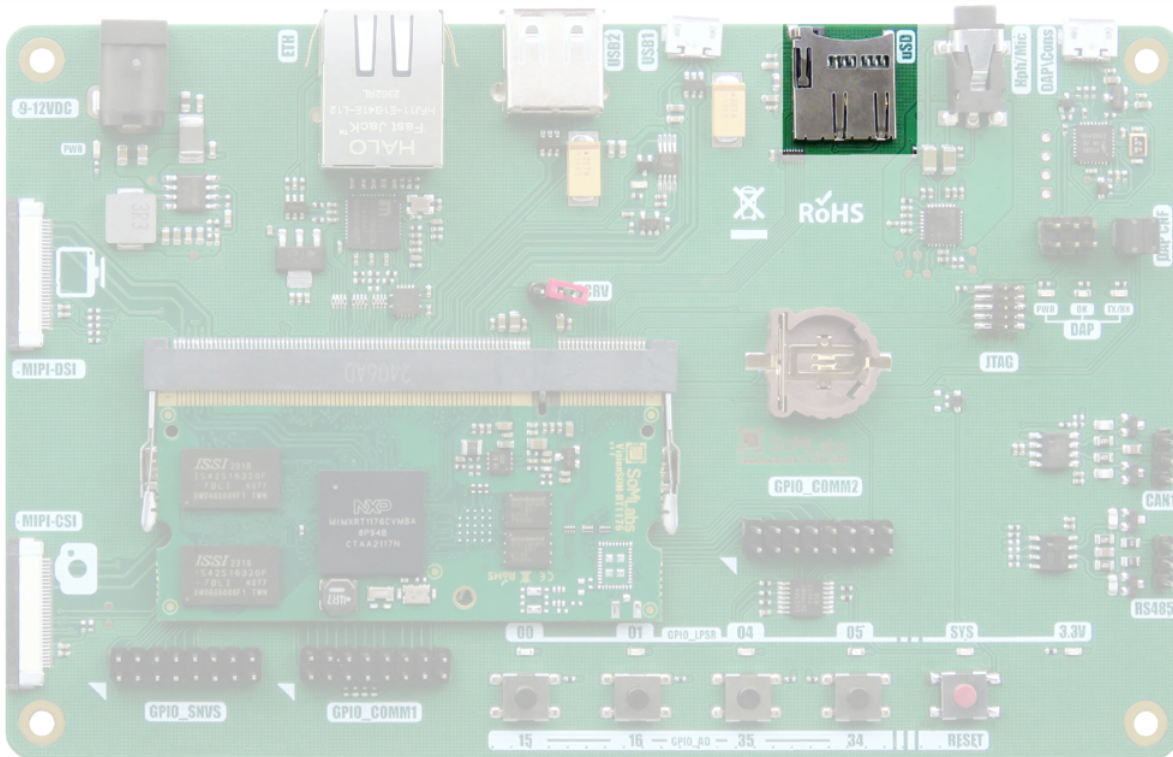


Switch	PCB designation	MCU pin name	Description
S804	UART10.TXD	GPIO_AD_15	Line connected to J801 (GPIO COMM2) connector.
S803	UART10.RXD	GPIO_AD_16	Line connected to J801 (GPIO COMM2) connector.
S802	UART10.RTS	GPIO_AD_35	Line connected to J801 (GPIO COMM2) connector.
S801	UART10.CTS	GPIO_AD_34	Line connected to J801 (GPIO COMM2) connector.

Notes:

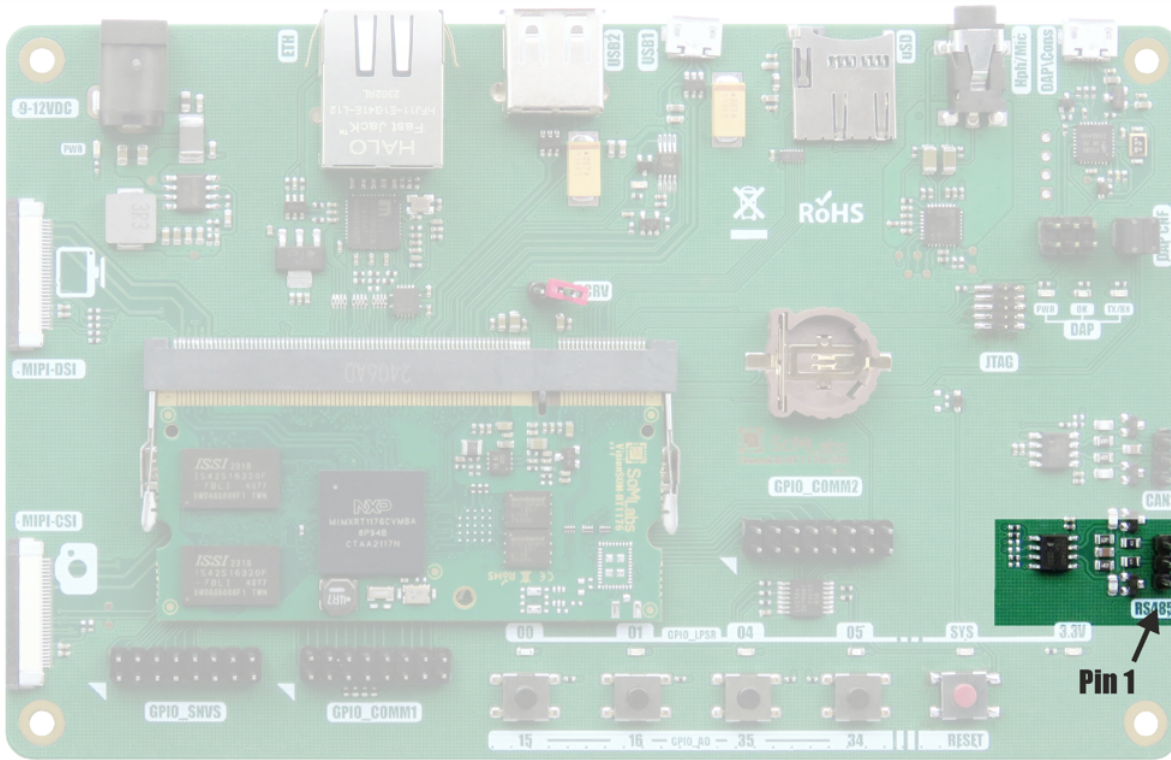
1. After button pressing on GPIO lines are set to „0”.
2. GPIO lines connected to switches are separated from board’s environment by 100R resistors.
3. The function of red pushbutton is main system reset (connected to RESET-IN SoM input).

MicroSD card socket



Socket pin	PCB designation	MCU pin name	Description
1	SD1.DATA2	GPIO_SD_B1_04	Available to the user as GPIO only in modules without 1DX radio modules
2	SD1.DATA3	GPIO_SD_B1_05	Available to the user as GPIO only in modules without 1DX radio modules
3	SD1.CMD	GPIO_SD_B1_00	Available to the user as GPIO only in modules without 1DX radio modules
4	VDD (3V3)	-	-
5	SD1.CLK	GPIO_SD_B1_01	Available to the user as GPIO only in modules without 1DX radio modules
6	GND	-	-
7	SD1.DATA0	GPIO_SD_B1_02	Available to the user as GPIO only in modules without 1DX radio modules
8	SD1.DATA1	GPIO_SD_B1_03	Available to the user as GPIO only in modules without 1DX radio modules

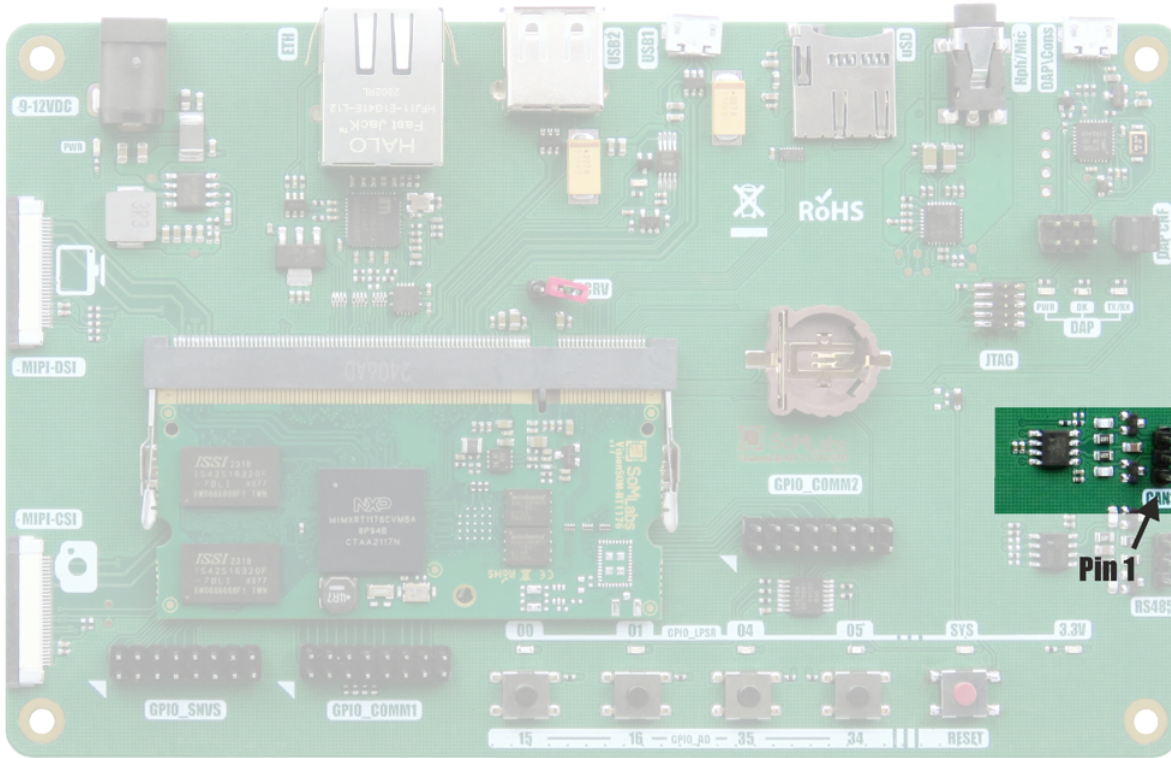
RS485 interface



Pin connector (J701)	PCB designation	Description
1	GND	-
2	A	RS485 transceiver "A" line (half-duplex interface)
3	B	RS485 transceiver "B" line (half-duplex interface)

PCB designation	MCU pin	Description
UART8.RXD	GPIO_AD_03	MCU UART input from RS485 PHY transceiver
UART8.TXD	GPIO_AD_02	MCU UART output to RS485 PHY transceiver
UART8.RTS	GPIO_AD_05	Connected to nRE and DE pins of RS485 PHY transceiver

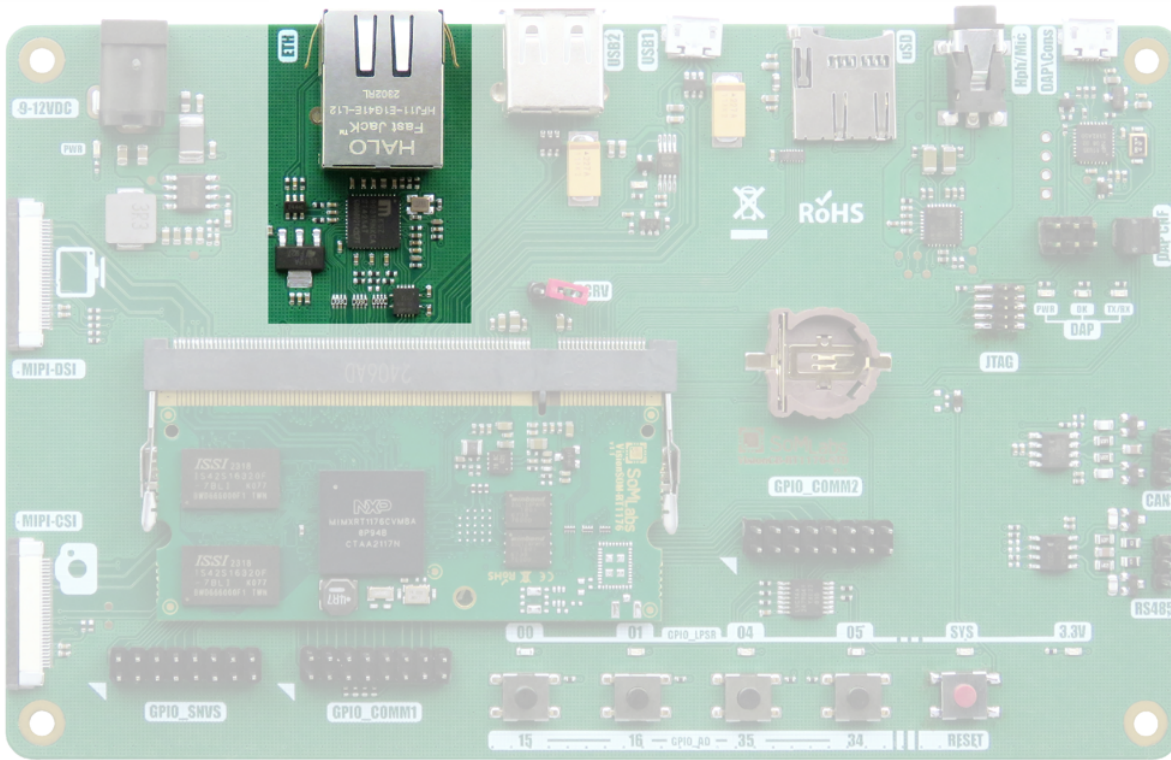
CAN interface



Pin connector (J700)	PCB designation	Description
1	GND	-
2	CANL	CAN transceiver L data line
3	CANH	CAN transceiver H data line

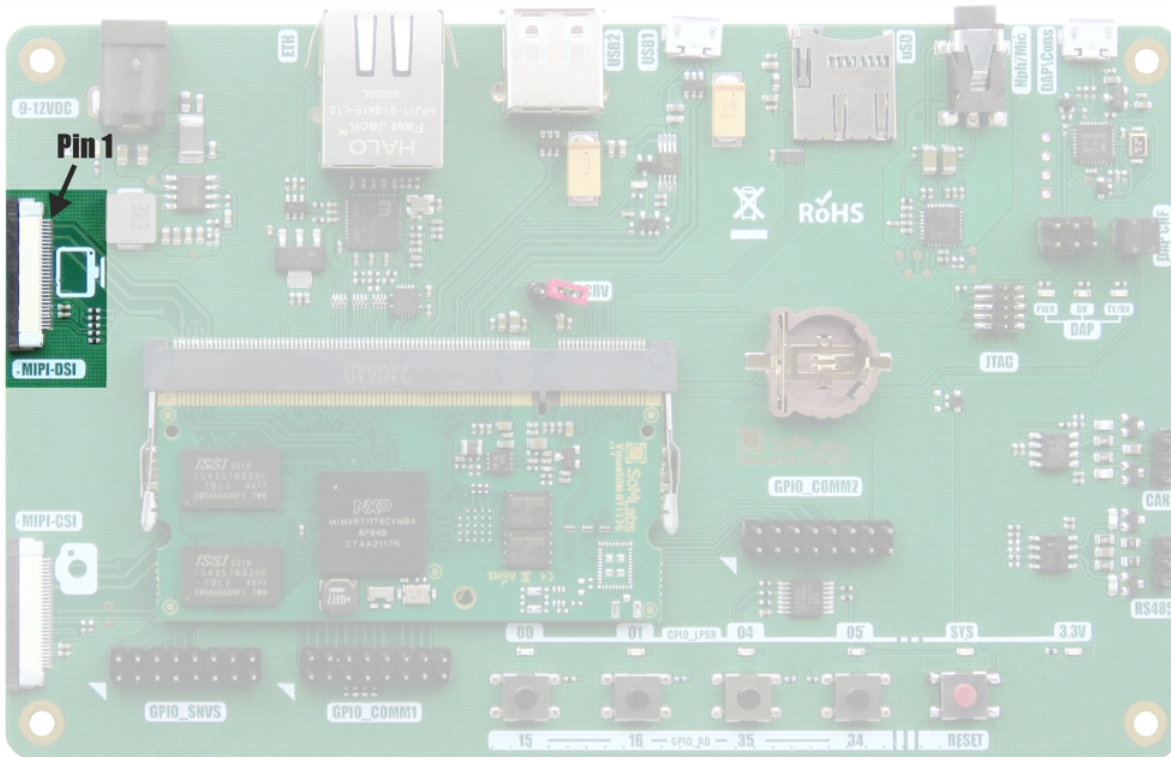
PCB designation	MCU pin	Description
CAN1.TX	GPIO_AD_06	MCU CAN data output
CAN1.RX	GPIO_AD_07	MCU CAN data input
GPIO3-21	GPIO_AD_22	Connected to STB input of CAN PHY (MCP2542FD) 10kOhm pull-down resistor

Ethernet socket



PCB designation	MCU pin name	Description
ENET.RXD0	GPIO_DISP_B1_02	ENET-QOS.RXD0
ENET.RXD1	GPIO_DISP_B1_03	ENET-QOS.RXD1
ENET.RXD2	GPIO_DISP_B1_04	ENET-QOS.RXD2
ENET.RXD3	GPIO_DISP_B1_05	ENET-QOS.RXD3
ENET.TXD0	GPIO_DISP_B1_09	ENET-QOS.TXD0
ENET.TXD1	GPIO_DISP_B1_08	ENET-QOS.TXD1
ENET.TXD2	GPIO_DISP_B1_07	ENET-QOS.TXD2
ENET.TXD3	GPIO_DISP_B1_06	ENET-QOS.TXD3
ENET.TXC	GPIO_DISP_B1_11	ENET-QOS.TXC
ENET.TXC-CTL	GPIO_DISP_B1_10	ENET-QOS.TX-CTL
ENET.RXC	GPIO_DISP_B1_01	ENET-QOS.RXC
ENET.RXC-CTL	GPIO_DISP_B1_00	ENET-QOS.RXC-CTL
ENET.MDC	GPIO_EMC_B2_19	ENET-QOS.MDC
ENET.MDIO	GPIO_EMC_B2_20	ENET-QOS.MDIO
ENET.INT	GPIO_EMC_B1_40	ENET-QOS.INT
ENET.RST	GPIO_EMC_B1_41	ENET-QOS.RST

MIPI-DSI LCD connector (J501)



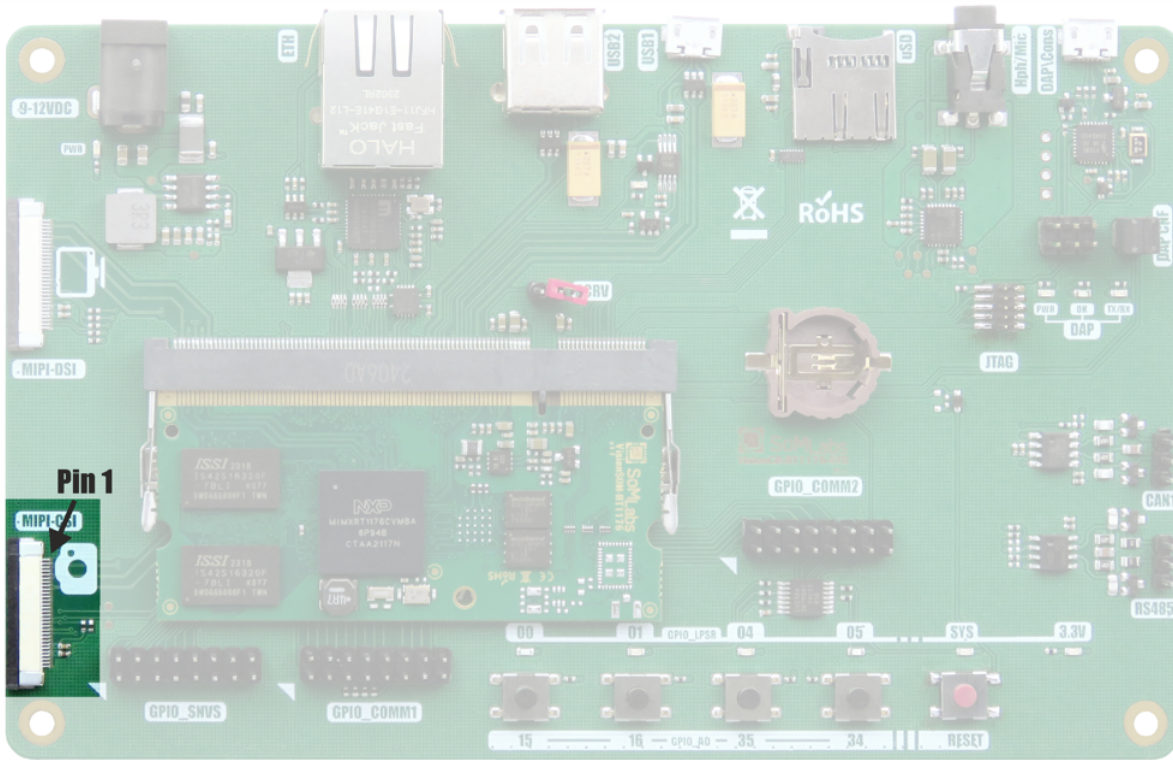
J501 pin	Default function name	MCU pin name
1	GND	-
2	DSI.CLK_P	MIPI_DSI_CKP
3	DSI.CLK_N	MIPI_DSI_CKN
4	GND	-
5	DSI.DATA0_P	MIPI_DSI_DP0
6	DSI.DATA0_N	MIPI_DSI_DN0
7	GND	-
8	DSI.DATA1_P	MIPI_DSI_DP1
9	DSI.DATA1_N	MIPI_DSI_DN1
10	GND	-
11	NC	-
12	NC	-
13	GND	-
14	NC	-
15	NC	-
16	GND	-
17	I2C6.SCL ^{1,3}	GPIO_LPSR_07
18	I2C6.SDA ^{1,3}	GPIO_LPSR_06
19	GND	-
20	DSI-DISP-RST ²	GPIO5-09 (GPIO_DISP_B2_08)
21	TP-INT ²	GPIO5-02 (GPIO_DISP_B2_01)

22	TP-RST ²	GPIO5-01 (GPIO_DISP_B2_00)
23	GND	-
24	VDD-3V3	-
25	VDD-3V3	-
26	VDD-5V0	-
27	VDD-5V0	-
28	DSI-BL-PWM ²	GPIO3-13 (GPIO_AD_14)
29	DSI-BL-EN ²	GPIO5-10 (GPIO_DISP_B2_09)
30	GND	-

Notes:

1. Both lines pull-upped to 3.3V with 4,7kOhm resistors.
2. In series - between GPIO lines and connector pins - 100 Ohm resistors are included.
3. The I2C6 interface is shared with CSI input.

MIPI-CSI camera connector (J500)



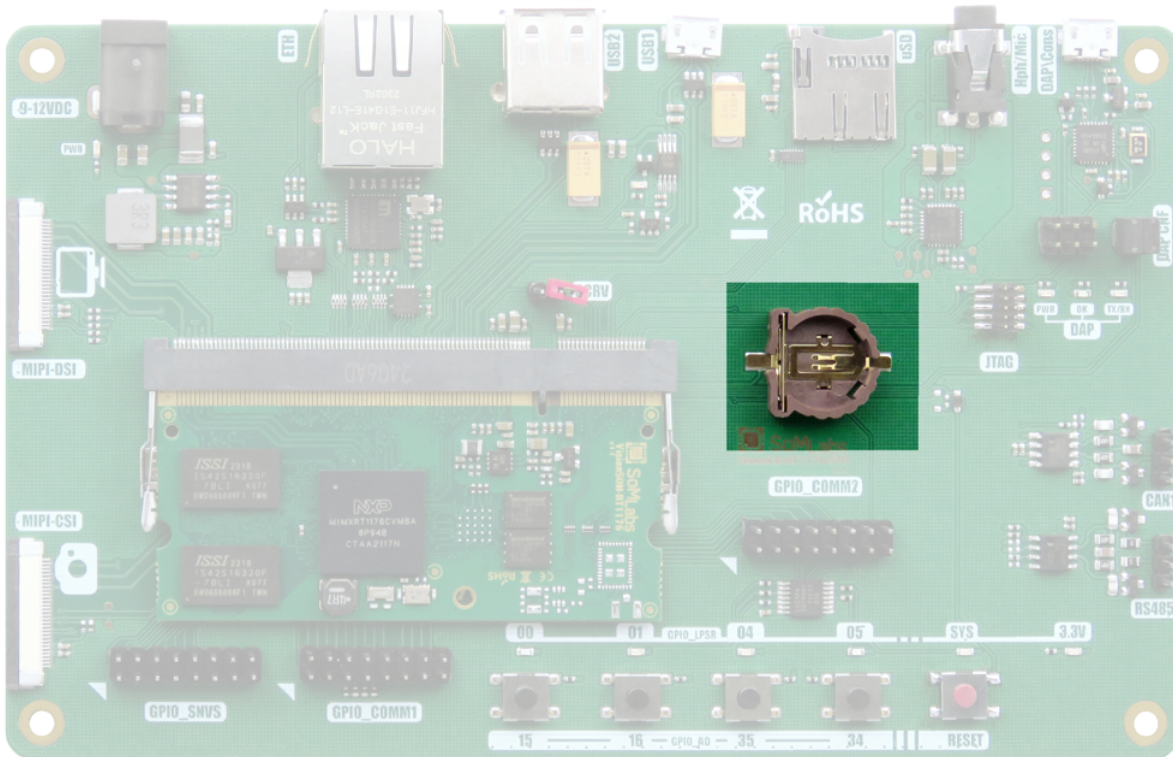
J500 pin	Default function name	MCU pin name
1	GND	-
2	CSI.CLK_P	MIPI_CSI_CKP
3	CSI.CLK_N	MIPI_CSI_CKN
4	GND	-
5	CSI.DATA0_P	MIPI_CSI_DP0
6	CSI.DATA0_N	MIPI_CSI_DN0
7	GND	-
8	CSI.DATA1_P	MIPI_CSI_DP1
9	CSI.DATA1_N	MIPI_CSI_DN1
10	GND	-
11	NC	-
12	NC	-
13	GND	-
14	NC	-
15	NC	-
16	GND	-
17	I2C6.SCL ^{1,2}	GPIO_LPSR_07
18	I2C6.SDA ^{1,2}	GPIO_LPSR_06
19	GND	-
20	CAM-RES	GPIO5-03 (GPIO_DISP_B2_02)
21	CAM-PWR-DN	GPIO3-22 (GPIO_AD_23)

22	-	-
23	GND	-
24	VDD-3V3	-
25	VDD-3V3	-
26	VDD-5V0	-
27	VDD-5V0	-
28	-	-
29	-	-
30	GND	-

Notes:

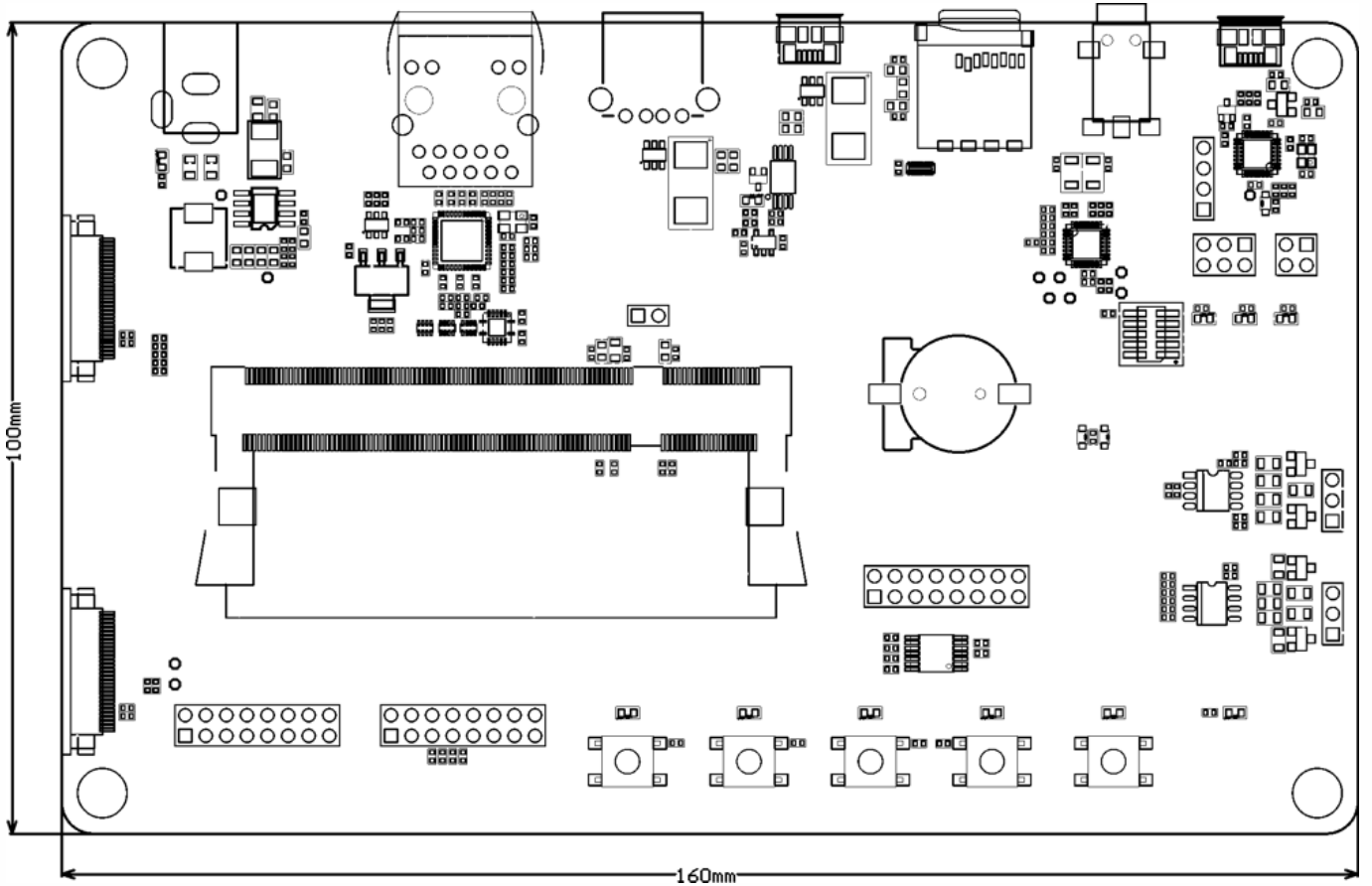
1. Both lines pull-upped to 3.3V with 4,7kOhm resistors.
2. The I2C6 interface is shared with DSI output.

RTC/SNVS battery socket (J101)



Optional 3V cell (CR2032 or CR2025) for SNVS MCU backup power domain (VDD-COIN-3V).

Dimensions





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