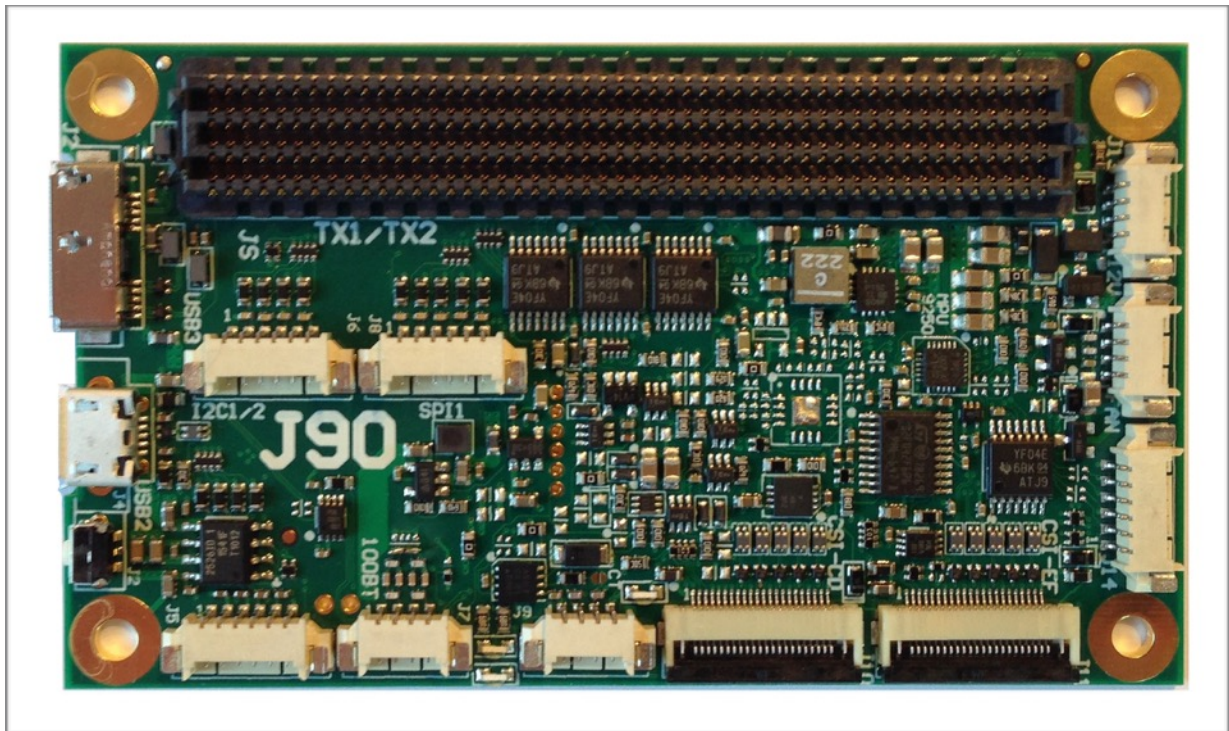


J90 Technical Reference

38255-x

Version 1.2



Preliminary

June 2017

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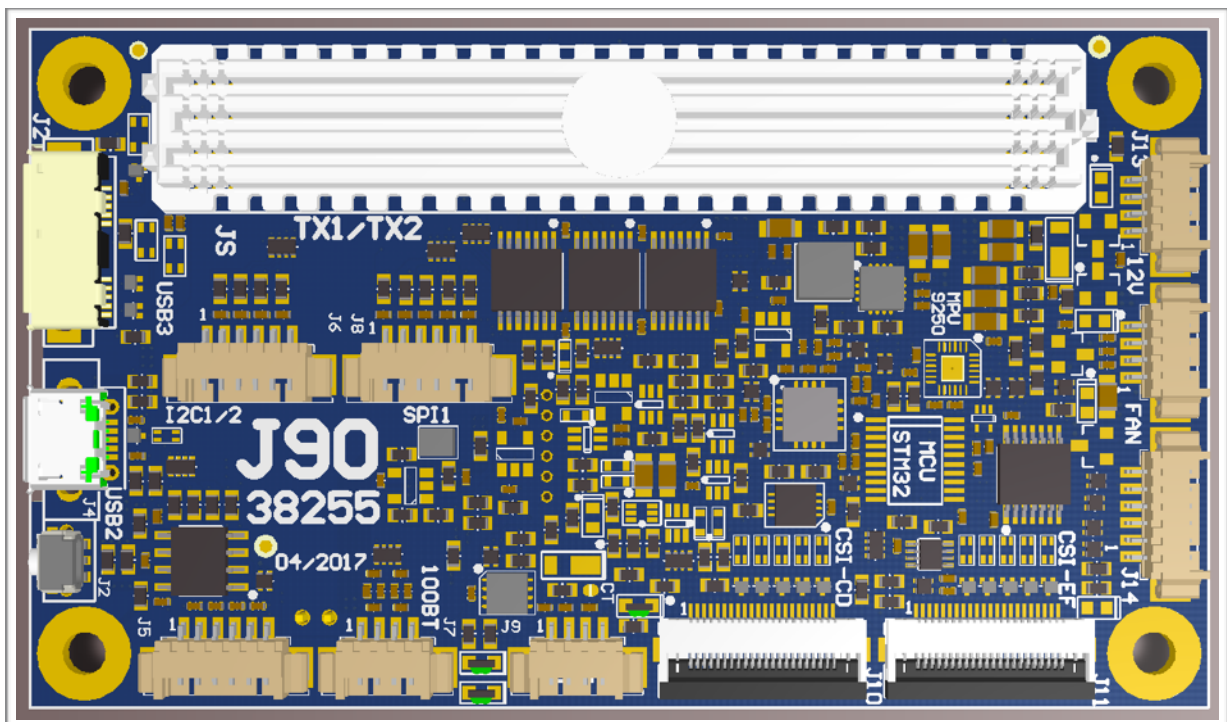
Features

J90 carrier board for the NVIDIA® Jetson™ TX1 and TX2

The J106 carrier board has the same form factor and size as the TX compute module. It is plugged in below the TX1 and brings out many interfaces on connectors. The vertical size is minimised as there are no components on the bottom side of the J90 module. Two versions are available.

The J90-LC is only €99 net and features: UART, CSI-2, 100BT Ethernet, I2C, SPI, GPIO, USB 2.0 and 3.0. Optional Raspberry Pi like GPIO header on the bottom side.

The J90 is fully populated and adds fan, 2nd CSI-2, CAN, IMU, and watchdog (MCU).



Technical details

- carrier board for one NVIDIA® Jetson™ TX1 or TX2 compute module
- standalone (minimised size)
- two 4 lane CSI-2 (15 pin FPC 1.0mm pitch) - B101/B102, Raspberry Pi camera or other cameras
- one USB3 type A (10 pin micro USB3)
- UART 0 (3.3V TTL) (6 pin) - console access
- CAN (TX2 only) (4 pin)
- 100BT Ethernet with RC network for short cable connections
- switches (power, force recovery, sleep, reset) (6 pin)
- fan connector (4 pin)
- power button (J2)
- two 3.3V I2C (device 1 and 2) (6 pin)
- two 3.3V SPI (SPI1 with CS0 and CS1) (6 pin)
- IMU - 9 axis sensor MPU-9250 (connected via SPI0)
- MCU for voltage monitoring and watchdog (tunnels UART 0 from TX1/TX2) - C source code on request

- power: 12V (4 pin) - range: 7V to 17V
- size: 50 x 87 mm (same size as TX1 or TX2)
- height: 16 mm (incl. TX1 without heatsink)
- weight: ? grams (just the J90)
- TX1 weight: 144 grams (TX1 with heatsink), 75 grams (TX1 w/o heatsink)
- mounting: 4 M3 holes with 3.2mm each (42 x 79 mm spacing - 4 mm from each edge)
- model: 38255 (J90)

Feature	J90-LC	J90
CSI-2 (4 lanes) - 22 pin with 0.5mm pitch	CSI-EF (1)	CSI-CD and CSI-EF (2)
UART	UART 0 and 2 (2)	UART 0 and 2 (2)
fan control (4 pin)	-	✓
CAN transceiver (4 pin)	-	✓
100BT Ethernet (for short connections)	✓	✓
switch connector (4 switches)	✓	✓
micro USB 2.0 (USB0)	✓	✓
micro USB 3.0 (USB1)	✓	✓
power button	✓	✓
automatic power up	-	✓
2 I2C (3.3V - device 1 and 2)	✓	✓
2 SPI (3.3V - SPI1)	✓	✓
onboard 5V power supply (3A)	✓	✓
onboard 3.3V power supply	300mA	1000mA
optional 40 pin GPIO header (bottom)	✓	✓
9 axis IMU (MPU-9250)	-	✓
MCU for watchdog (STM32F042)	-	✓
size	50x87mm	50x87mm
12V power in	7 .. 17V	7..17V
reverse voltage protection (diode)	✓	-
reverse voltage protection and in-rush current limiting (2 MOSFETs) - and MCU power control	-	✓

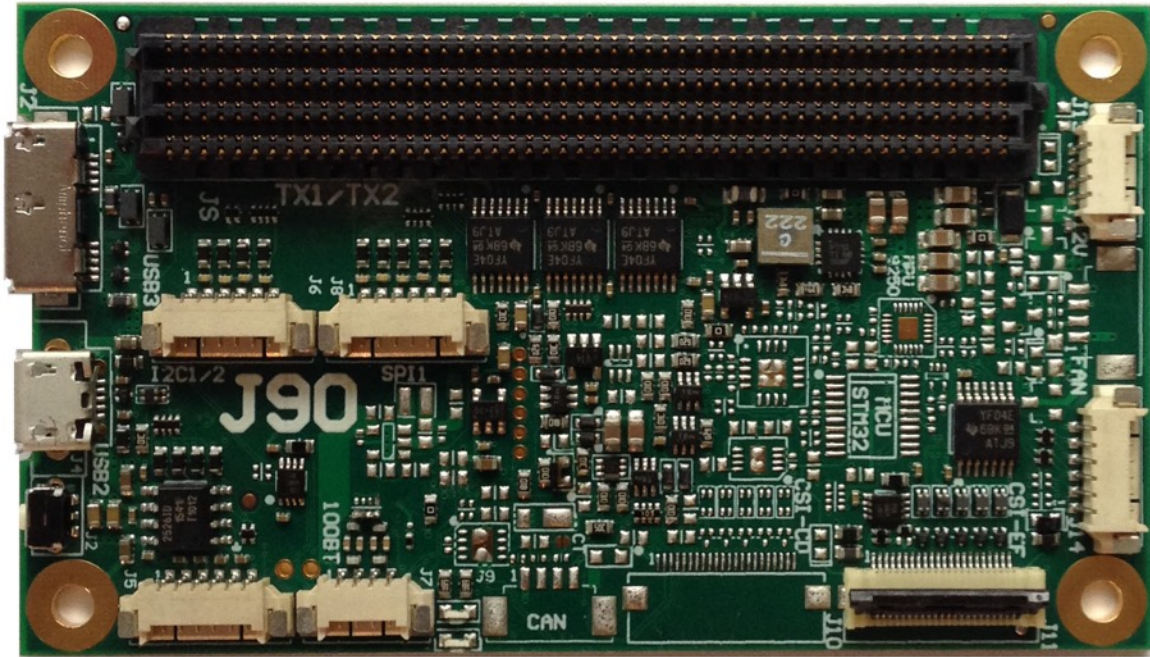


Image 1: J90-LC - only a subset of features is populated

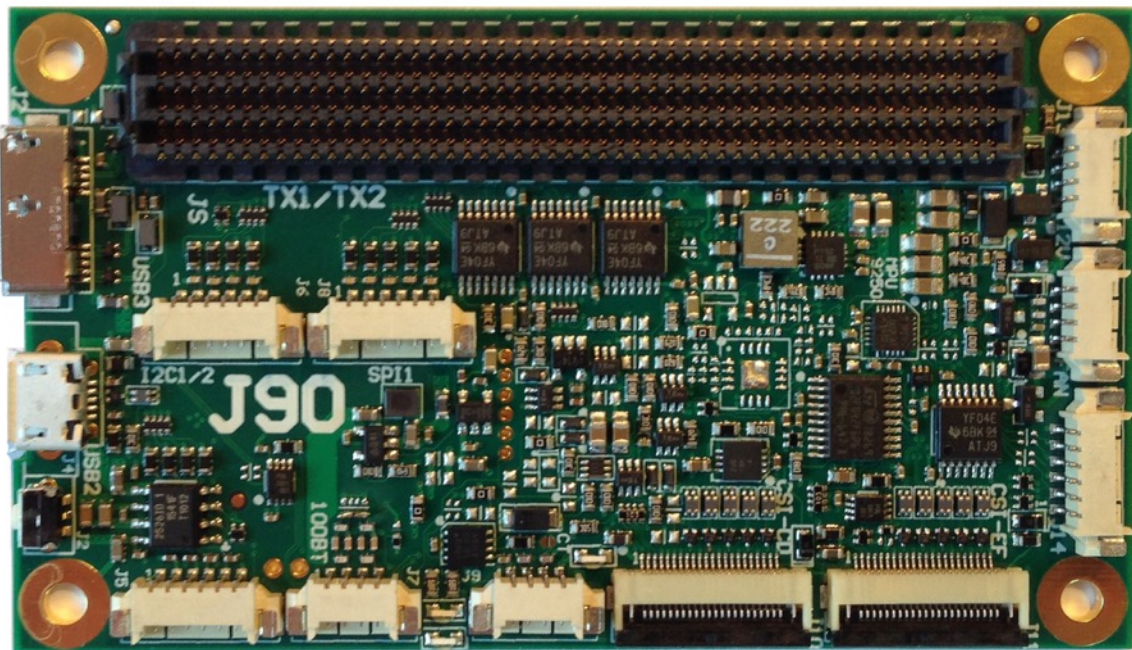


Image 2: J90 - fully populated

Rev 1 (38255)

- first revision of the J90. Limited distribution. With 100BT Ethernet patch.
- CSI-2 GPIO and MCLK not compatible to J100 and J120 (device tree changes may be required)
- J90: MCU firmware version v1.1 (baudrate set to 38400)

Rev 2 (38255-2)

- micro USB 3.0 connector moved inwards by 0.5mm
- July 2017

Getting started

Applying power

The J90 is powered by the on-board power connector (J13) with a regulated 12V power supply. Each pin is designed for a current of 1A. If the TX1/TX2 is highly loaded it is recommended to use 2 wires for ground and 2 wires for 12V. Optionally a power adapter cable is available. It features the 4 pin connector on one side and a 5.5/2.5mm jack on the other side, so one of the standard power adapters can be plugged in.

Auto start

The J90 automatically powers up the TX1 or TX2 with a digital one shot which pulls the POWER-BTN input of the TX1 low for approximately 1 second after power is applied. When the TX1/TX2 raises the CARRIER_PWR (A48) line, the 5V, 3.3V and 1.8V power supplies on the J90 are powered up. This is indicated by lighting up the green power LED between the CAN and 100BT connectors. The J90-LC must be powered on manually by pressing the power button.

The auto start logic is powered by the 12V power input. For auto start to work, please power down the TX1 for at least 2 seconds. This allows time for the 12V supply to drain and the enable auto start, when power is applied again.

Console access

The console port of the TX1/TX2 is UART 0. The J90 converts this UART port to standard 3.3V TTL levels. So a standard USB to TTL serial converter may be used to connect to the console. Just connect TXD, RXD and GND to the USB converter. Make sure that you connect TXD to the RXD input of the USB TTL converter. Standard baud rate is 115200. Settings: 8/1/N. On the J90-LC the UART 0 is directly connected to connector J14. On the J90 UART 0 is tunneled through the on-board micro controller (MCU) and then connected to J14. This allows the MCU to monitor the UART 0 communication for watchdog applications.

Firmware upgrade of the TX1/TX2

The J90 does support a direct firmware upgrade of the TX1/TX2.

Outputs (GPIOs, I2S, SPI) on the J90

The J90 converts the 1.8V level output signals to 3.3V. It uses a bidirectional level converter, which automatically detects the direction of the signal. For the level conversion to work properly, caution must be taken, if there is a pull-up resistor on any output. This applies to all outputs including GPIOs and special function outputs like SPI, I2S. If there are any pull-up resistors on these outputs, they must have more than 50 kOhm. If there is a pull-up resistor with a lower value, than the level converter may determine that the signal is driven from the outside, and that this pin should be treated as input.

Inputs (GPIOs, I2S, SPI) on the J90

The J90 converts the 1.8V level input pins to 3.3V. It uses a bidirectional level converter, which automatically determines the direction of the signal. This requires a signal driver with 2mA min.

Test mode

The power supplies on the J90 only power up, when the Jetson asserts the CARRIER_PWR_ON (A48) signal. If no Jetson module is installed the jumper pins PWR MAN may be shorted to power up the power supplies manually. Please use the voltage measurement pins to check the voltages. Please be careful not to short any pins.

Devices

IMU (MPU-9250)

A 9 axis sensor is connected to the SPI0 bus of the TX1. Pin 8 (VddIO) of the IMU is connected to 1.8V. Please set the INT output of the IMU by software to „totem pole“ mode as there is no pull-up on the INT output.

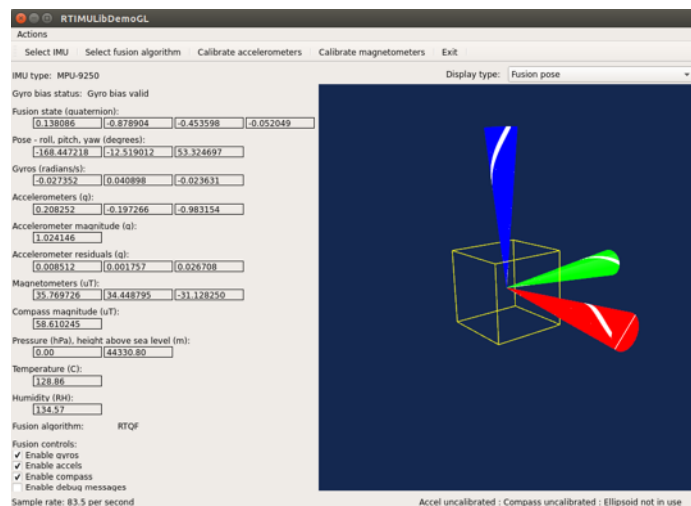
This IMU is optional. Only the J90 model are equipped with this function.

Pin	Function	Jetson TX1	Description
9	AD0/SDO	E4	SPI0_MISO (1.8V)
24	SDA/SDI	F4	SPI0_MOSI (1.8V)
23	SCL/SCLK	E3	SPI0_CLK (1.8V)
22	/CS	F3	SPI0_CS0 (1.8V)
12	INT	G14	INT is inverted and connected to GPIO9_MOTION_INT (1.8V)

Test of the IMU with the RTIMULibDemo

This demo may be downloaded from Github. Please install qtcreator first. Next please make sure that the spidev3.0 device in /dev is loaded. Edit the RTIMULibDemo.ini file with the SPI settings for the IMU (bus 3, select 0). Start the demo as root so it gets access to the SPI bus.

The IMU chip is located on the top side. It is clearly marked. Please note that other carrier boards like the J100 and J120 have the IMU on the booth side. This changes the sensor direction. It is marked on the bottom side.



J90: I2C busses of the Jetson TX1

The Jetson TX1/TX2 features 7 I2C devices: I2C0 to I2C6. The table below lists how these I2C devices are used. Device 0 and 2 have level translators (3.3V). Optionally a resistor may be moved to change the voltage to 1.8V.

Bus	device	physical bus	Use
I2C0	0	I2C0	CSI-CD (3.3V)
I2C1	1	I2C1	I2C connector J6 (3.3V)
I2C2	2	I2C_PM	CSI-EF and I2C connector J6 (3.3V)
I2C3	3	?	
I2C4	4	?	
I2C5	5	?	
I2C6	6	I2C_CAM	

Example

A B101/B102 module is connected to the CSI-EF connector. The Toshiba TC358743 HDMI to CSI-2 converter chip is on the 7 bit I2C address 0x0F, as it can be seen in the terminal output below. Please use the -r option to show the device.

Cameras like the Raspberry Pi camera 2.1 (with IMX219 sensor) use pin 6 of the 22 pin camera connector as active high power enable. The pin 6 of both CSI-2 connectors are connected together and are driven by the TX1 pin H7 (GPIO3_CAM0_RST). This pin must be set high to enable the camera module. A low pulse performs a power on reset.

Now it needs to be determined how this GPIO pin can be controlled by software. The file gpio_names.h lists all pin names and relates them to a number.

GPIO2/CAM1_RST = GPIO 148

Please execute the instructions below at power up to configure this pin as GPIO output and to toggle it low briefly, so the cameras are reset properly at power up.

```
root@tegra-ubuntu:~# echo 148 > /sys/class/gpio/export
root@tegra-ubuntu:~# echo out > /sys/class/gpio/gpio148/direction
root@tegra-ubuntu:~# echo 1 > /sys/class/gpio/gpio148/value
root@tegra-ubuntu:~# echo 0 > /sys/class/gpio/gpio148/value
root@tegra-ubuntu:~# echo 1 > /sys/class/gpio/gpio148/value
root@tegra-ubuntu:~# sudo i2cdetect -y -r 2
   0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
10:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
20:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
30:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
40:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
50:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
60:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
70:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
```

Connectors

Auvideo supplies cable kits for the connectors with 1.25 mm pitch. Please check the website for details. These are Molex PicoBlade 1.25mm compatible.

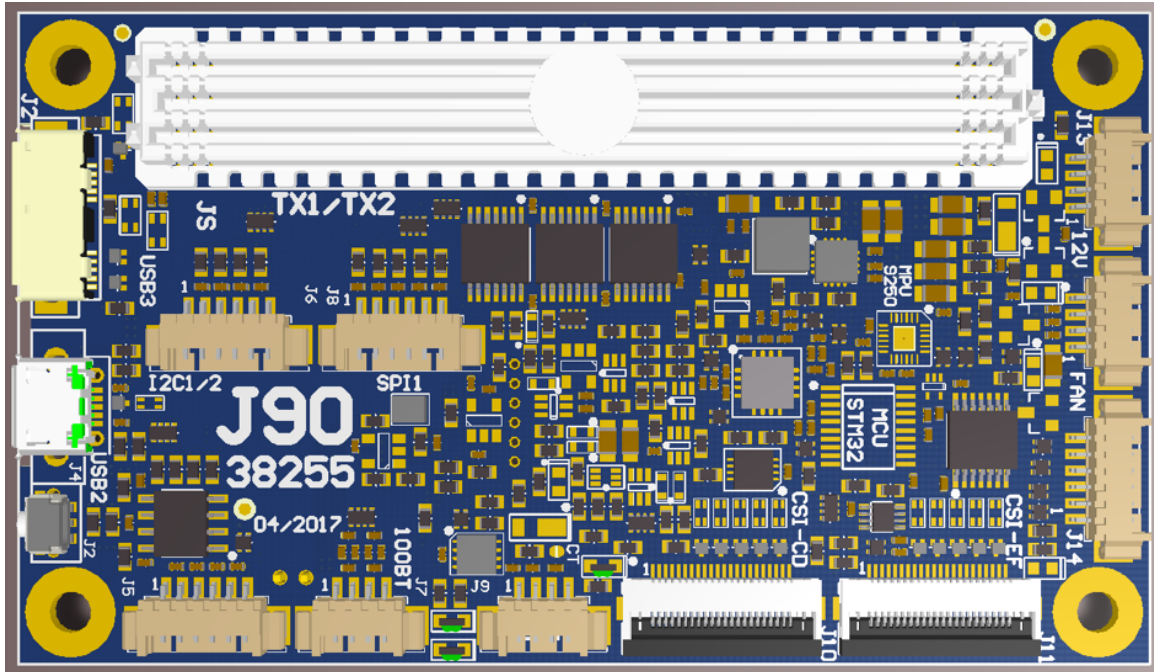


Figure 1: connectors on the top side

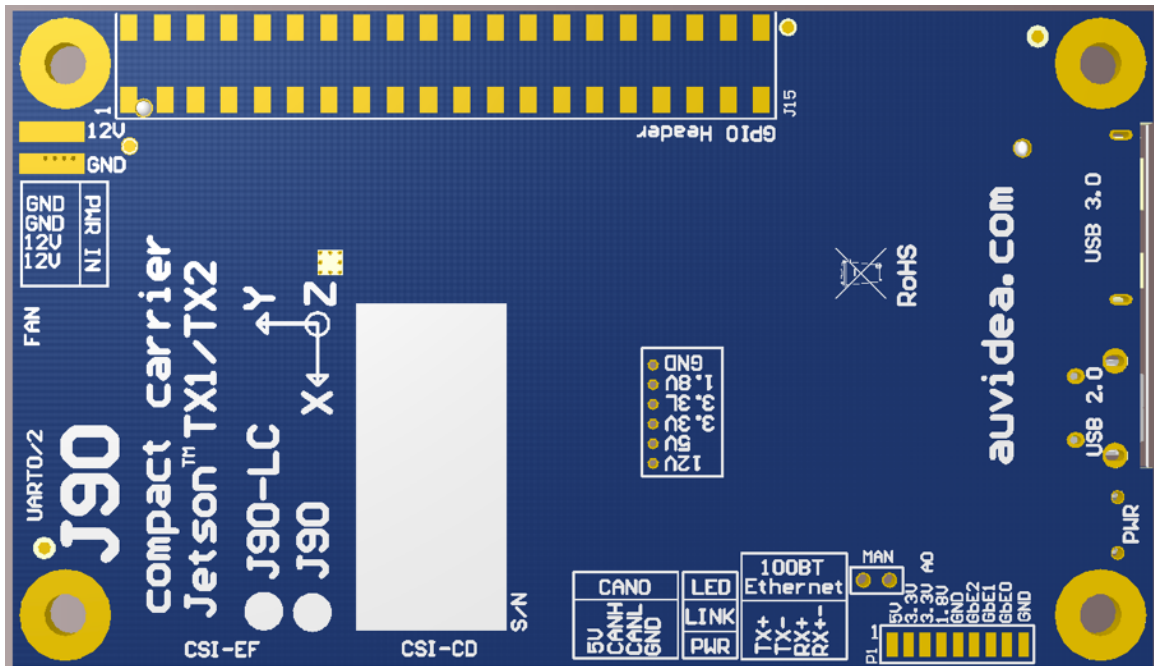


Figure 2: optional 40 pin connector on the bottom side

USB3 (J3)

This is a micro USB 3.0 connector (Amphenol GSB343K33HR). To get a standard USB 3.0 type A connector please use a cable like DeLOCK 83469 (http://www.delock.de/produkte/G_83469/merkmale.html?setLanguage=en).

Pin	Function	Jetson TX	Description
1	5V	-	5V power controlled by USB1_EN_OC (A19) - max. 900 mA
2	USB1-D-	A39	USB 2.0 data
3	USB1-D+	A38	USB 2.0 data
4	USB ID	-	not connected
5	GND	-	Ground
6	USB3_RX1-	F44	USB 3.0 receive data
7	USB3_RX1+	F43	USB 3.0 receive data
8	GND	-	Ground
9	USB3_TX1-	C44	USB 3.0 transmit data
10	USB3_TX1+	C43	USB 3.0 transmit data

USB2 (J4)

This is a micro USB 2.0 connector for USB peripherals like mouse or keyboard or for firmware upgrade (OTG mode).

Pin	Function	Jetson TX	Description
1	5V	B37	5V power controlled by USB0_EN_OC (A17) - max. 900 mA - connects also to USB0_VBUS_DET (B37)
2	USB0-D-	B40	USB 2.0 data
3	USB0-D+	B39	USB 2.0 data
4	USB0_OTG_ID	A36	10k pullup to 1.8V - connects to USB0_OTG_ID
5	GND	-	Ground

This connector may be used for a firmware upgrade of the TX1/TX2. Please check the firmware installation guide (www.auvidea.com/firmware).

CSI-CD (J10)

This is a 22 pin 4 lane CSI-2 connector with 0.5mm pitch (Wuerth 687122149022). To open the connector and to release the cable just lift the brown lid upwards. This connector has the same pinout as the CSI-2 connector on the Raspberry Pi compute module carrier board. The contacts are on the bottom.

Pin	Function	Jetson TX	Description
1	3.3V	-	3.3V power supply
2	I2C0_DAT	D15	3.3V level (converted from 1.8V of the Jetson TX1)
3	I2C0_CLK	E15	3.3V level (converted from 1.8V of the Jetson TX1)
4	GND	-	Ground
5	CAM2_MCLK	E7	CAM2_MCLK
6	CAM3_GPIO	H7	GPIO3_CAM1_RST (rev 1: GPIO0_CAM0_PWR - G8)
7	GND	-	Ground
8	CSI-D_D1+	E24	CSI-2 bus D lane 0
9	CSI-D_D1-	E23	CSI-2 bus D lane 1
10	GND	-	Ground
11	CSI-D-D0+	C25	CSI-2 bus D lane 0
12	CSI-D-D0-	C26	CSI-2 bus D lane 0
13	GND	-	Ground
14	CSI-C_CLK+	G25	CSI-2 bus C clock
15	CSI-C_CLK-	G24	CSI-2 bus C clock
16	GND	-	Ground
17	CSI-C-D1+	H24	CSI-2 bus C lane 1
18	CSI-C-D1-	H23	CSI-2 bus C lane 1
19	GND	-	Ground
20	CSI-C-D0+	F26	CSI-2 bus C lane 0
21	CSI-C-D0-	F25	CSI-2 bus C lane 0
22	GND	-	Ground

CSI-EF (J11)

This is a 22 pin 4 lane CSI-2 connector with 0.5mm pitch (Wuerth 687122149022). To open the connector and to release the cable just lift the brown lid upwards. This connector has the same pinout as the CSI-2 connector on the Raspberry Pi compute module carrier board. The contacts are on the bottom.

Pin	Function	Jetson TX	Description
1	3.3V	-	3.3V power supply
2	I2C_PM_DAT	B6	3.3V level (converted from 1.8V of the Jetson TX1)
3	I2C_PM_CLK	A6	3.3V level (converted from 1.8V of the Jetson TX1)
4	GND	-	Ground
5	CAM2_MCLK	E7	CAM2_MCLK (same clock as CSI-CD)
6	CAM3_GPIO	H7	GPIO3_CAM1_RST (same GPIO as CSI-CD)
7	GND	-	Ground
8	CSI-F_D1+	E21	CSI-2 bus F lane 0
9	CSI-F_D1-	E20	CSI-2 bus F lane 1
10	GND	-	Ground
11	CSI-F-D0+	C23	CSI-2 bus F lane 0
12	CSI-F-D0-	C22	CSI-2 bus F lane 0
13	GND	-	Ground
14	CSI-E_CLK+	G22	CSI-2 bus E clock
15	CSI-E_CLK-	G21	CSI-2 bus E clock
16	GND	-	Ground
17	CSI-E-D1+	H21	CSI-2 bus E lane 1
18	CSI-E-D1-	H20	CSI-2 bus E lane 1
19	GND	-	Ground
20	CSI-E-D0+	F23	CSI-2 bus E lane 0
21	CSI-E-D0-	F22	CSI-2 bus E lane 0
22	GND	-	Ground

UART 0 (J14)

This is a 6 pin connector with 1.25 mm pitch. Please connect to USB TTL serial converter (3.3V TTL level). Normally just connect TXD, RXD, and GND. Swap data lines. Default speed: 115200 bps.

Pin	Function	Jetson TX	Description
1	5V	-	5V power output (3.3V, if carrier board is not powered up)
2	UART0_TXD	H12	UART 0 console port (3.3V TTL level): transmit data output J90 with MCU: tunnelled through MCU
3	UART0_RXD	G12	UART 0 console port (3.3V TTL level): receive data input J90 with MCU: tunnelled through MCU
4	UART2_TXD / SWCLK	B16	UART 0 console port (3.3V TTL level): transmit data output (RN24 must be installed) J90 with MCU: SWCLK
5	UART2_RXD / SWDIO	B15	UART 0 console port (3.3V TTL level): receive data input (RN24 must be installed) J90 with MCU: SWDIO
6	GND	-	Ground

FAN (J12)

This is a 4 pin connector with 1.25 mm pitch. This is the same pinout as the fan connector on the Jetson TX1 development kit. With the J90 the fan is on by default. Use the „fan disable“ feature to turn off the fan.

Please note, that the „fan disable“ requires a software change when compared to the dev kit. On the dev kit „fan disable“ is controlled by an I2C port expander line. On the J100 „fan disable“ is connected to GPIO19_AUD_RST (through an inverting MOSFET). Pull the GPIO19 high to disable the fan (pin 4 becomes low). A low or floating signal on GPIO19 will not disable the fan.

Pin	Function	Jetson TX	Description
1	GND	-	Ground
2	5V	-	5V power supply to the fan
3	FAN_TACH	B17	tachometer from the fan (open drain input with 100k pull-up to 1.8V)
4	FAN_PWM	C16	PWM control to the fan (open drain output: controlled by FAN_PWM and „disable fan“ with GPIO19)

Power (J11)

This is a 4 pin connector with 1.25 mm pitch. Power in 1 and power in 2 are shorted together. The J90-LC provides a simple reverse voltage protection with a 2A Schottky diode. The J90 provides reverse voltage protection and in-rush current limiting with 2 MOSFETs.

Pin	Function	Jetson TX	Description
1	power in 1	-	power input: typical 12V (range: 7V to 17V)
2	power in 2	-	power input: typical 12V (range: 7V to 17V)
3	GND	-	power ground
4	GND	-	power ground

CAN0 (J9)

The J90 features 1 CAN interface. There is no SPI CAN controller on the J90. The CAN controller is integrated in the TX2. Pin 2 and 3 are the outputs of the the TJA1051 CAN transceiver. The input of the transceiver is connected to the CAN controller of the TX2: CAN0_TX (D19) and CAN0_RX (D18). The CAN transceiver is enabled by CAN0_STBY (E17).

Pin	Function	Jetson TX	Description
1	5V	-	5V power for the CAN bus (same as USB2 power)
2	CAN_H	-	CAN data high
3	CAN_L	-	CAN data low
4	GND	-	Ground (0V)

100BT Ethernet (J7)

The J90 features a 4 pin connector with the 100BT TX and RX signals. Because of space limitations the J90 does not have the standard Ethernet magnetics for high signal isolation. As alternative it implements an RC network for signal isolation. The maximum isolation voltage is 50V. Therefore only short cable connections with a system or a room are allowed.

There is one green network LED on the top side of the J90. It is located behind the power LED between the CAN and 100BT connectors.

LED	Function	Jetson TX	Description
GBEO	GBE_LINK_ACT*	E47	Ethernet activity LED

Optionally a 4 pin to RJ45 converter is available.

Pin	Function	Jetson TX	RJ45	Description
1	GBE_MDI1_N	F48	6	100BT receive data (-)
2	GBE_MDI1_P	F47	3	100BT receive data (+)
3	GBE_MDIO_N	E49	2	100BT transmit data (-)
4	GBE_MDIO_P	E48	1	100BT transmit data (+)

Buttons (J5)

6 pin connector with 1.25 mm pitch.

Pin	Function	Jetson TX	GPIO	Description
1	Vdd_RTC	A50	-	Realtime clock power input from backup battery or super cap Do not connect if super cap or Lithium cell (J60) is populated on the J120. (rev 1: connected to GND)
2	power	B50	GPIO3_PX.05	power button (connect to GND)
3	sleep	E2	GPIO3_PY.00	sleep button (connect to GND)
4	force recv.	E1	GPIO3_PX.06	force recovery button (connect to GND)
5	reset	A47	-	reset in button (connect to GND)

Pin	Function	Jetson TX	GPIO	Description
6	GND	-	-	Ground

SPI (J8)

This is a 6 pin connector with 1.25 mm pitch.

Pin	Function	Jetson TX1	GPIO	Description
1	SPI1_CS0	E14	GPIO3_PC.03	SPI1_CS0 (level shifted to 3.3V)
2	SPI1_CS1	E13	GPIO3_PC.04	SPI1_CS1 (level shifted to 3.3V)
3	SPI1_CLK	G13	GPIO3_PC.02	SPI1_CLK (level shifted to 3.3V)
4	SPI1_MOSI	F13	GPIO3_PC.00	SPI1_MOSI (level shifted to 3.3V)
5	SPI1_MISO	F14	GPIO3_PC.01	SPI1_MISO (level shifted to 3.3V)
6	GND	-	-	Ground

I2C (J6)

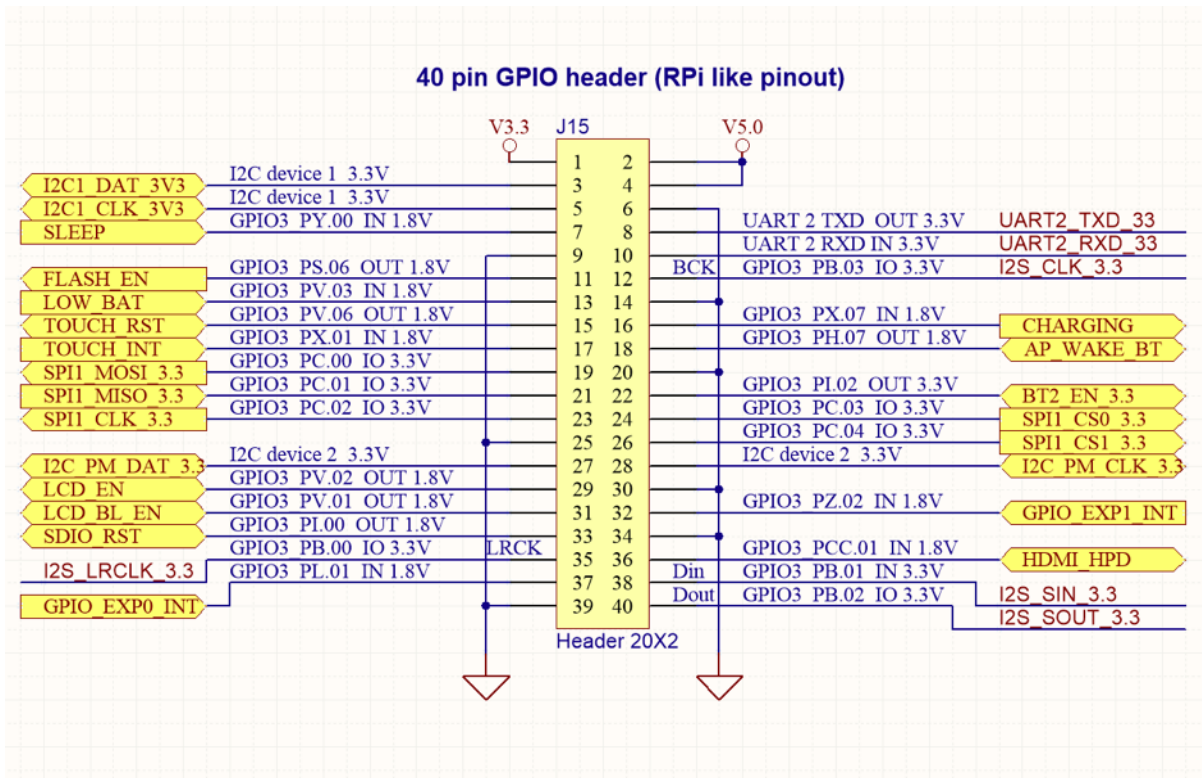
This is a 6 pin connector with 1.25 mm pitch.

Pin	Function	Jetson TX1	GPIO	Description
1	5V	-	-	5V power (same as USB2 power)
2	I2C1_CLK	A21	-	I2C device 1 (3.3V)
3	I2C1_DAT	A20	-	I2C device 1 (3.3V)
4	I2C_PM_CLK	A6	-	I2C device 2 (level shifted to 3.3V)
5	I2C_PM_DAT	B6	-	I2C device 2 (level shifted to 3.3V)
6	GND	-	-	Ground

GPIO header

40 pin GPIO connector on the bottom side (J15)

Optional 40 pin DIY 2.54mm pitch surface mount pin header. This connector is Raspberry Pi style. Please note that some signals are only 1.8V tolerant. This connector carries 2x I2C, UART, I2S (digital audio)



MCU

The J90 features an on-board micro controller (MCU: STM32F042F6P6) with 32 kByte Flash and 6kByte RAM.

MCU pin description

MCU Pin	Name	Type	Function	Description
1	PB8/BOOT0	-	-	10k pull down
2	PF0	OD	POWER	1: inactive, 0: press power button
3	PF1	PP	RESET	1: press reset button (10k pull down), 0: inactive
4	NRST	-	-	hardware power on reset of MCU (RC circuit)
5	VddA	-	-	analog 3.3V supply (by always on LDO)
6	PA0	Ain0	V12_IN	measure input voltage (voltage divider: 100k up/10k down)
7	PA1	PP	PWR_ON	1: enable power to J90 (10k pull down), 0: power off
8	PA2	AF	UART0_RX	UART 0 to TX1/TX2
9	PA3	AF	UART0_TX	UART 0 to TX1/TX2
10	PA4	PP	LED	0: LED off, 1: LED on (default MCU heartbeat)
11	PA5	AIN5	V3.3_IN	measure 3.3V rail (voltage divider: 10k up/10k down)
12	PA6	AIN6	V5_IN	measure 5.0V rail (voltage divider: 10k up/10k down)
13	PA7	OD	SLEEP	0: press sleep button (R30 must be installed), 1: inactive
14	PB1	Ain9	V1.8_IN	measure 1.8V rail (direct connection)
15	GND	-	-	Ground
16	VddA	-	-	digital 3.3V supply (by always on LDO)
17	PA9/PA11	AF	UART_TX	UART_TX to J14 connector (pin 2)
18	PA10/PA12	AF	UART_RX	UART_RX to J14 connector (pin 3)
19	PA13	-	SWDIO	SWD programming interface (J14 pin 5)
20	PA14	-	SWCLK	SWD programming interface (J14 pin 4)

Pin types:

PP - push/pull output
 OD - open drain output
 Ain - analog input
 AF - alternate function

The power supply to the MCU is supplied by a 3.3V LDO regulator which is always on. So the MCU is powered as soon as power is applied to the power input on J13. This allows the MCU to manage whether power should be applied to the carrier board (with pin 7).

The MCU tunnels the console UART interface to the TX1/TX2. Some instructions are intercepted by the MCU and executed by it. These instructions are not forwarded to the TX1/TX2.

MCU command set

mcu --adc read the 4 voltage rails (power in, 5V, 3.3V, and 1.8V)
mcu --reset reset TX1/TX2
mcu --poweron power on TX1/TX2
mcu --shutdown power off TX1/TX2
mcu --version display firmware version
mcu --help display list of command available

MCU firmware upgrade

The C source code for the MCU is available on request (Attolic TrueStudio project). Please contact us. The MCU may be programmed with the ST/LINK programming adapter (SWCLK, SWDIO, GND). We recommend the use of the STM32VLDISCOVERY discovery kit for STM32F100 Value line. It is available in the Auvideo online shop and at digkey.com (497-10633-ND). To connect to the J90, please remove the 2 CN3 jumpers and connect SWCLK, SWDIO and GND to the 4 pin CN2 header.

MCU firmware v1.1

This version of the MCU is limited to a UART baud rate of 38400 baud max. Please set the TX1/TX2 to 38400. Please edit the file `/boot/extlinux/extlinux.conf`. Please replace 115200n8 by 38400n8.

```
TIMEOUT 30
DEFAULT primary

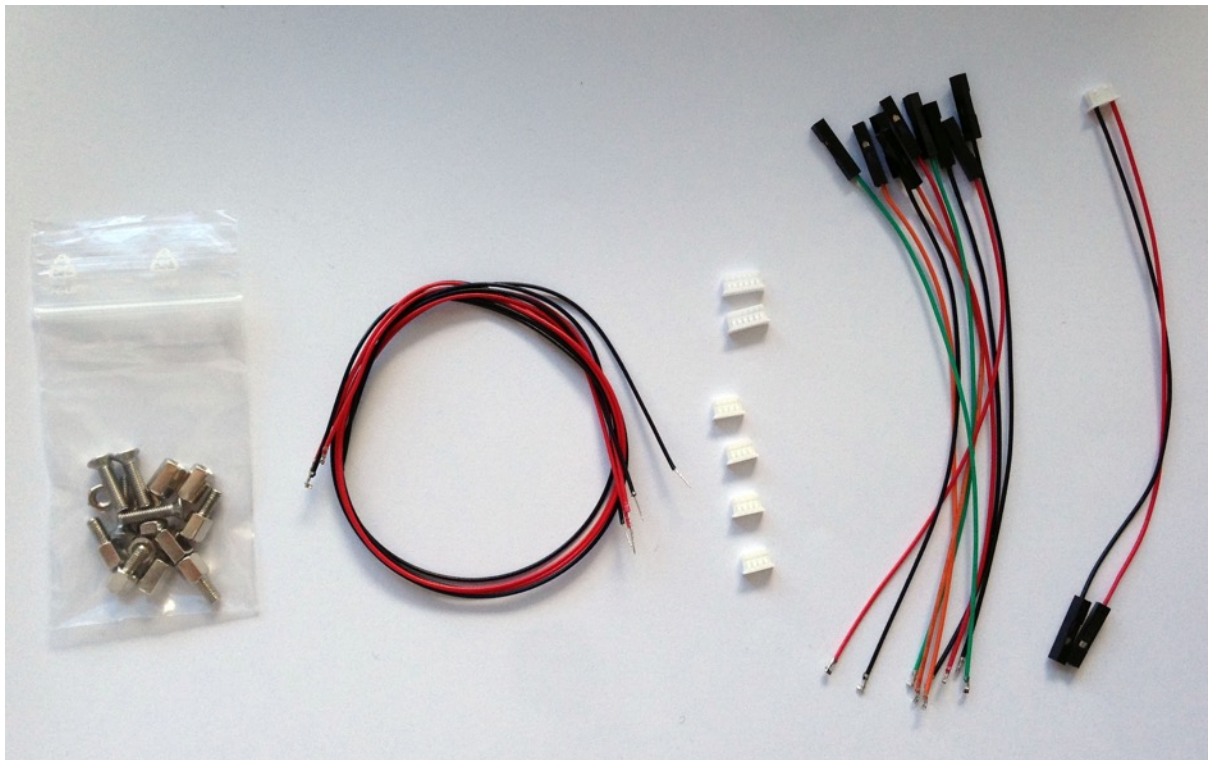
MENU TITLE p2371-2180 eMMC boot options

LABEL primary
    MENU LABEL primary kernel
    LINUX /boot/Image
    INITRD /boot/initrd
    FDT /boot/tegra210-jetson-auvideo-j90.dtb
    APPEND fbcon=map:0 console=tty0 console=ttyS0,115200n8
```

Cable/mechanical kit

A complimentary assessor kit with the following components is included (from left to right - please refer to the picture below):

- mechanical set with 4 countersunk screws (M3x12), 4 M3 hex nuts, 4 hex spacers (M3x7, 2 inside threads) and 4 hex spacers (M3x7+6, 1 inside thread) to mount the J90 with the TX1/TX2 CVM and its heatsink
- 2 AWG28 wire leads red 300mm (one side pre-crimped for housing)
- 2 AWG28 wire leads black 300mm (one side pre-crimped for housing)
- 4 4-pin housings
- 2 6-pin housings
- 9 AWG28 wire leads (red, green, orange, black) 130mm (one side pre-crimped, the other side with single 2.54mm female header)
- power cable with 2 AWG28 wires (red, black) 130mm, single 2.54mm female header pins



FAQ

1. to be added

Disclaimer

Thank you for reading this manual. If you have found any typos or errors in this document, please let us know.

This is the preliminary version of this data sheet. Please treat all specifications with caution as there may be any typos or errors.

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