

StarSOM-STM32V8 Datasheet and Pinout

Rev. 20260811113407

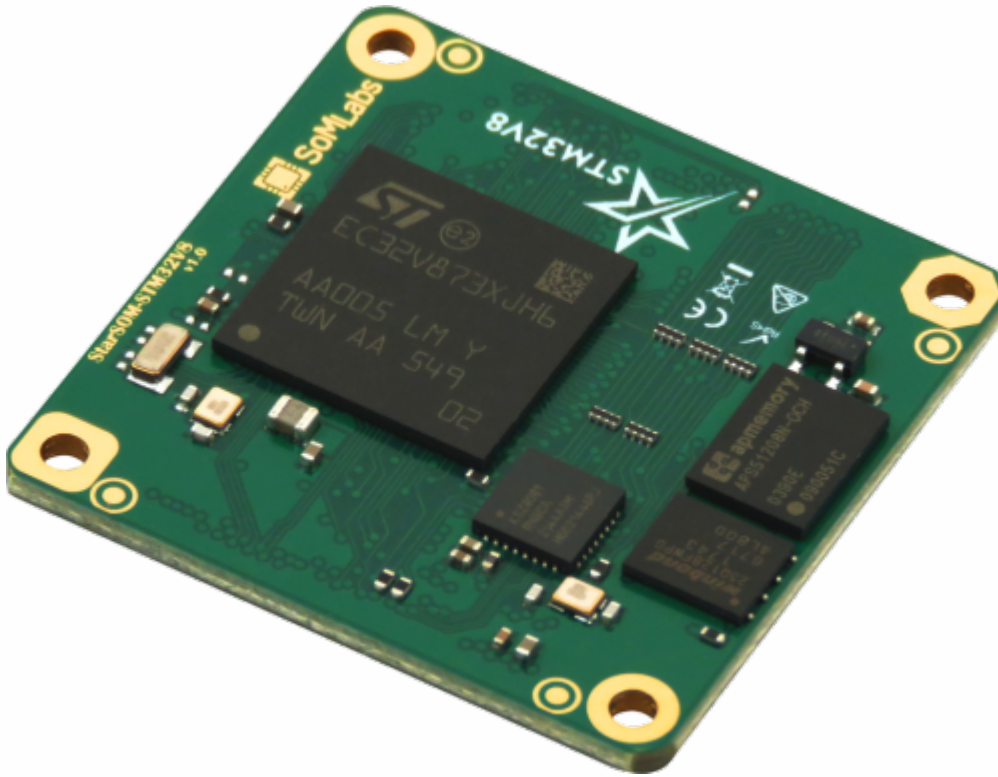
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StarSOM-STM32V8 Datasheet and Pinout

General description



The StarSOM-STM32V8 is a compact, high-performance System-on-Module based on the STM32V873 microcontroller, designed for demanding real-time, industrial, Edge AI and signal-processing applications. Powered by the next-generation Arm® Cortex®-M85 architecture running at up to 800 MHz, the module combines high processing performance with deterministic real-time operation, fast interrupt response and direct access to MCU peripherals and I/O resources.

With Arm Helium™ / M-Profile Vector Extension (MVE), advanced DSP capabilities and hardware acceleration for machine-learning workloads, the StarSOM-STM32V8 is particularly well suited for applications requiring intensive local data processing without the complexity of a Linux-based application processor.

Integrated Ethernet PHY enables deterministic, high-speed industrial communication, while the broad range of MCU interfaces allows straightforward connection of sensors, actuators, communication modules and application-specific electronics.

By integrating the STM32V873 together with external memories, power-management circuitry and other essential components, the StarSOM-STM32V8 significantly reduces hardware design complexity and accelerates development of new embedded products.

The module can be integrated directly into a customer-designed baseboard or used together with a dedicated Carrier Board (StarCB-STM32V8), creating a complete and ready-to-use development platform.

Applications

- Industrial automation
- PLC and industrial controllers
- Robotics
- Motion and motor control
- Real-time control systems

- Industrial Ethernet and TSN devices
- Edge AI applications
- Machine-learning inference
- Sensor fusion
- Smart sensors
- Digital signal processing
- Audio processing
- Condition monitoring
- Predictive maintenance
- Machine vision preprocessing
- Advanced Human-Machine Interfaces
- Measurement and instrumentation systems
- Medical and laboratory equipment
- Communication gateways
- High-performance embedded control systems

Features

- STM32V873 high-performance MCU
- Arm® Cortex®-M85 core running at up to 800 MHz
- Arm Helium™ / M-Profile Vector Extension (MVE)
- High-performance DSP and signal-processing capabilities
- Hardware acceleration for Edge AI and machine-learning workloads
- Deterministic real-time operation
- Gigabit Ethernet
- Time-Sensitive Networking (TSN) support
- Advanced embedded memory architecture based on PCM technology
- Broad range of communication interfaces and MCU peripherals
- Direct access to processor buses and I/O resources
- Compact System-on-Module architecture
- Dedicated power-management circuitry
- Designed for integration with custom carrier boards
- Compatible with a dedicated SoMLabs Carrier Board
- Suitable for both prototyping and mass-production applications
- Reduced hardware-development effort and shorter time-to-market

Pictures of SOM versions

Version	Photo
QSPI, PSRAM DDR and Ethernet PHY on-board	 The image shows a green printed circuit board (PCB) for the StarSOM-STM32V8. It features a central STM32V8 microcontroller with the text '8A2EW1S' and a star logo above it. To the left of the microcontroller, the text 'StarSOM-STM32V8' and 'v1.0' is visible. To the right, there are two memory modules: a QSPI Flash labeled 'apmemory AP55128M-QCH' and a PSRAM labeled '0380E 090051C'. The board has four orange circular mounting holes at the corners and various surface components like capacitors and resistors.

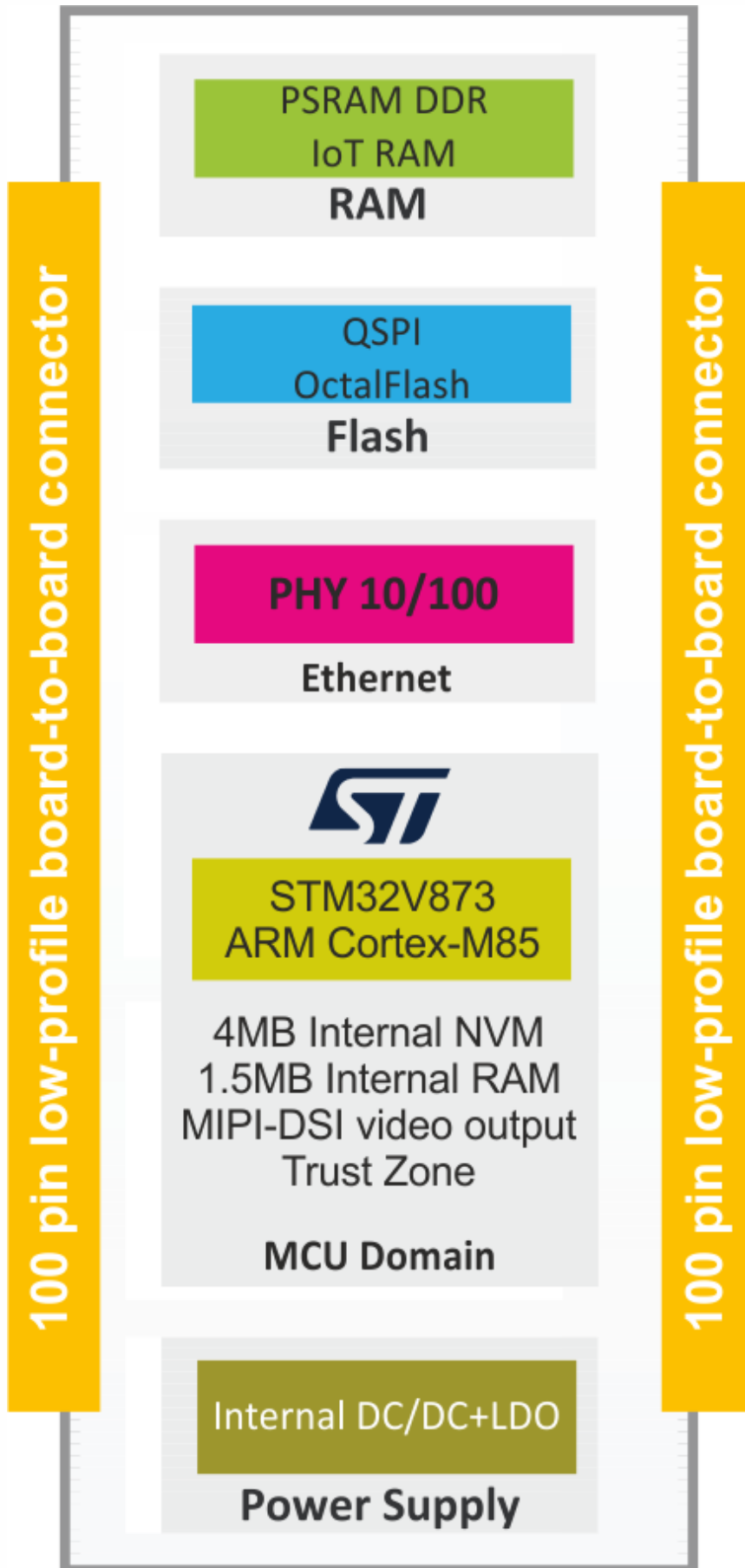
- Ethernet PHY 10/100 is available as an options.
- External QSPI Flash and PSRAM memories are available as options.

Ordering info

SLSN H757 CpuType _Clock_ RamSize _FlashSize_ SF _TEMP

SLS	Product type SLS - System on Module
N	SOM Name 0 - StarSOM
H757	CPU Family 5 - STM32H757XI
CpuType	CPU Type H757 - Dual core STM32H757XI
Clock	CPU Clock Speed 480C - Cortex-M7 @480MHz/Cortex-M4 @240MHz
RamSize	SDRAM Size 0R - No external SDRAM 32R - 32MB
FlashSize	QSPI Flash Size 0QSPI - no external Flash 4QSPI - 4MB QSPI Flash 16QSPI - 16MB QSPI Flash 32QSPI - 32MB QSPI Flash
SF	Special Features 0SF - No Special Features 1WB - Built-in Murata 802.11b/g/n WiFi/BLE5.1 2ET - Built-in Microchip 100Mb Ethernet PHY 3WE - Built-in Murata 802.11b/g/n WiFi/BLE5.1 and Microchip 100Mb Ethernet PHY
TEMP	Operating Temperature E - Extended: -30 to +70 C I - Industrial: -40 to +85 C

Block Diagram



Operating ranges

Parameter	Value	Unit	Comment
Power Supply	3.3	V	Connected to VDD-3V3 pins
Input GPIO voltage	3.3	V	-
Environment temperature ¹	-40...+85	°C	Industrial range w/o WiFi module
	0...+70		Consumer range

Note:

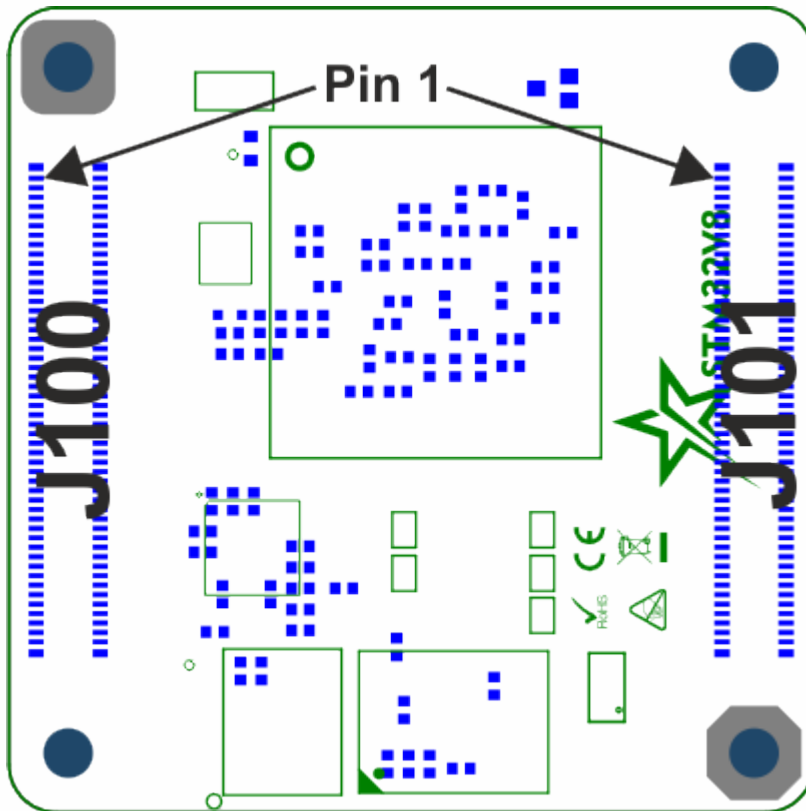
1. Maximum MCU junction temperature is +140°C.

Electrical parameters

SOM signal name	Parameter	Value			Units
		Min.	Typ.	Max.	
VDD-3V3	Supply Voltage	3.15	3.3	3.45	V
$I_{VDD-3V3}$	Total Supply Current	-	TBD	-	mA
VGPI0	GPIO Input Voltage	0	3.3	3.6	V
VBAT	SNVS Backup Battery Supply	1.2	-	3.6	V

SOM pinout

- StarSOM-STM32V8 board-to-board connectors view (top view)
- StarSOM-STM32V8 connectors type: Hirose DF40C100DP04V51



SoM pin number	Default function	GPIO	TFBGA273 ball	Notes
J100				
1	GND	-	-	
2	GND	-	-	
3	USB2.VBUS	PM1	B9	
4	VBAT	-	B1	MCU VBAT power supply input
5	USB2.D_N	PM2	A10	Optional USB2 transceiver line
6	PORTB.10	PB10	A2	
7	USB2.D_P	PM3	A9	Optional USB2 transceiver line
8	PORTD.13	PD13	B5	
9	GND	-	-	
10	PORTD.14	PD14	C4	
11	USB2.ID	PM0	C10	
12	PORTD.15	PD15	D5	
13	PORTE.9	PE9	B6	
14	PORTE.14	PE14	B2	
15	PORTE.12	PE12	B3	
16	PORTE.15	PE15	E4	
17	PORTE.13	PE13	F6	

18	PORTC.13	PC13	F4	
19	PORTA.12	PA12	C7	
20	POCRTC.10	PC10	H2	
21	PORTA.11	PA11	D8	
22	POCRTC.9	PC9	H4	
23	PORTF.2	PF2	E2	
24	PORTC.11	PC11	H3	
25	PORTF.1	PF1	E1	
26	PORTA.0	PA0	H1	
27	PORTF.0	PF0	E3	
28	PORTA.1	PA1	J3	
29	PORTD.12	PD12	J1	
30	I2C3.SDA	PG5	M13	
31	PORTD.11	PD11	J2	
32	I2C3.SCL	PG6	R17	
33	PORTE.1	PE1	M4	
34	GND	-	-	
35	USB1.VBUS	PM8	B11	
36	LCD.CLK	PA5	T1	
37	USB1.D_N	OTG1_DM	A13	USB1 transceiver line
38	GND	-	-	
39	USB1.D_P	OTG1_DP	A12	USB1 transceiver line
40	LCD.VSYNC	PE11	C5	
41	GND	-	-	
42	LCD.HSYNC	PA6	R2	
43	USB1.ID	PM9	B10	
44	LCD.DE	PB14	K2	
45	USBPD.CC1	PM6	B8	USB CC1 interface line
46	GND	-	-	
47	USBPD.CC2	PM7	C8	USB CC2 interface line
48	LCD.R7	PB8	T17	
49	PORTE.0	PE0	M13	
50	LCD.R6	PD8	N3	
51	PORTG.2	PG2	P4	
52	LCD.R5	PA15	A6	Optionally JTAG-TDI (by default not connected to JTAG)
53	PORTG.1	PG1	R3	
54	LCD.R4	PG3	P15	
55	PORTG.0	PG0	P1	
56	LCD.R3	PA4	P2	
57	GND	-	-	
58	LCD.R2	PD2	C14	
59	ETH.LED0	-	-	LED0/nWAYEN of KSZ8081RNBCA (on-board PHY) - active with on-board PHY only
60	LCD.R1	PC3	U15	
61	ETH.LED1	-	-	LED1/SPEED of KSZ8081RNBCA (on-board PHY) - active with on-board PHY only

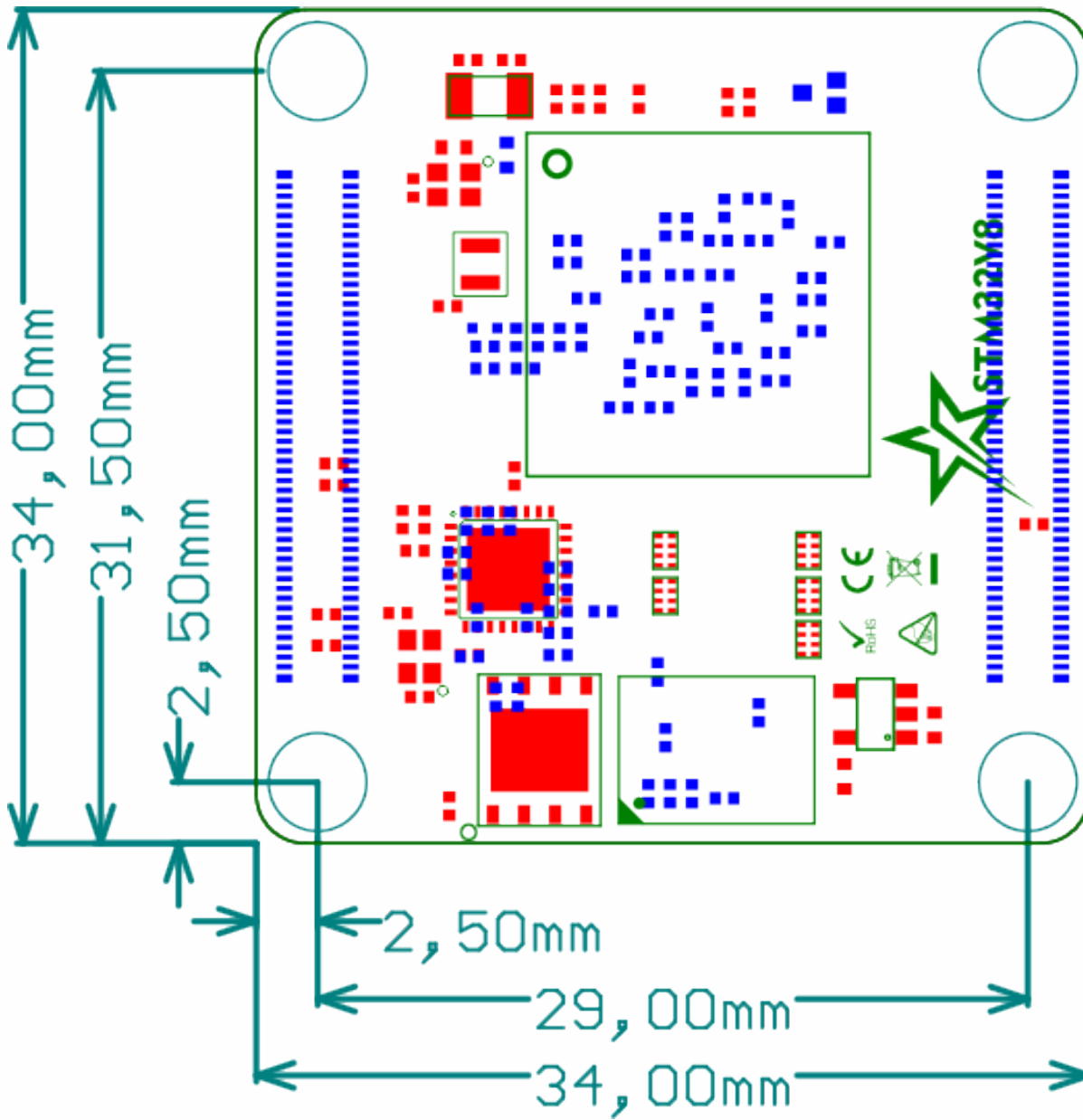
62	LCD.R0	PC0	R13	
63	GND	-	-	
64	GND	-	-	
65	ETH.TX_P	-	-	TXP output of KSZ8081RNBCA (on-board PHY) - active with on-board PHY only
66	LCD.G7	PB15	L2	
67	ETH.TX_N	-	-	TXN output of KSZ8081RNBCA (on-board PHY) - active with on-board PHY only
68	LCD.G6	PB11	E5	
69	GND	-	-	
70	LCD.G5	PB12	K4	
71	ETH_RX_P	-	-	RXP input of KSZ8081RNBCA (on-board PHY) - active with on-board PHY only
72	LCD.G4	PB13	L1	
73	ETH_RX_N	-	-	RXN input of KSZ8081RNBCA (on-board PHY) - active with on-board PHY only
74	LCD.G3	PD6	A3	
75	GND	-	-	
76	LCD.G2	PB1	R6	
77	GND	-	-	
78	LCD.G1	PE3	C16	
79	GND	-	-	
80	LCD.G0	PE2	E14	
81	VDD-3V3	-	External power supply	
82	GND	-	-	
83	VDD-3V3	-	External power supply	
84	LCD.B7	PE7	C15	
85	VDD-3V3	-	External power supply	
86	LCD.B6	PD9	N4	
87	VDD-3V3	-	External power supply	
88	LCD.B5	PD5	D6	
89	VDD-3V3	-	External power supply	
90	LCD.B4	PE4	D15	
91	VDD-3V3	-	External power supply	
92	LCD.B3	PC4	M12	
93	VDD-3V3	-	External power supply	
94	LCD.B2	PE8	C6	
95	VDD-3V3	-	External power supply	
96	LCD.B1	PD3	B15	
97	VDD-3V3	-	External power supply	
98	LCD.B0	PC12	T2	
99	VDD-3V3	-	External power supply	
100	GND	-	-	
J101				
1	GND	-	-	
2	GND	-	-	
3	USART1.TXD	PF15	C12	

4	RECOVERY	BOOT0	A4	If RECOVERY is open then BOOT0="0" If RECOVERY is connected to GND then BOOT0="1"
5	USART1.RXD	PF14	B13	
6	RESET	nRST	D4	
7	PORTF.12	PF12	C13	
8	GND	-	-	
9	PORTF.13	PF13	B14	
10	JTAG.TRST	PB4	T6	By default not connected, optionally (using on-board jumper R401) connected to PB4/NJTRST
11	PORTF.11	PF11	A15	
12	JTAG.TDI	PA15	A6	By default not connected, optionally (using on-board jumper R400) connected to JTDI
13	CAN1.RX	PD0	A16	
14	JTAG.TDO	PB3	U6	JTAG TDO/SWO debugging line
15	CAN1.TX	PD1	D14	
16	JTAG.TCK	PA14	B7	JTAG TCK/SWCLK debugging line
17	I2C1.SDA	PM4	C9	
18	JTAG.TMS	PA13	A7	JTAG TMS/SWDIO debugging line
19	I2C1.SCL	PM5	D9	
20	GND	-	-	
21	GND	-	-	
22	SDMMC1.D7	PI7	H16	
23	I2S6.MCK	PA3	R1	
24	SDMMC1.D6	PI6	J16	
25	GND	-	-	
26	SDMMC1.D5	PI5	J15	
27	I2S6.SDO	PG14	D16	
28	SDMMC1.D4	PI4	L15	
29	I2S6.SDI	PG12	F14	
30	GND	-	-	
31	I2S6.CK	PG13	E15	
32	SDMMC1.D2	PI2	L16	
33	I2S6.WS	PG8	N15	
34	SDMMC1.D3	PI3	K15	
35	GND	-	-	
36	SDMMC1.CMD	PK1	K17	
37	PORTK.2	PK2	K16	
38	SDMMC1.CLK	PK0	G16	
39	PORTK.3	PK3	H15	
40	SDMMC1.D0	PI0	J17	
41	PORTK.4	PK4	L14	
42	SDMMC1.D1	PI1	G15	
43	PORTK.5	PK5	F15	
44	GND	-	-	
45	GND	-	-	
46	GND	-	-	

47	PORTI.8	PI8	G17	
48	GND	-	-	
49	PORTI.9	PI9	F17	
50	DCAM.D0	PC6	M2	
51	PORTI.10	PI10	F16	
52	DCAM.D1	PC7	M3	
53	PORTI.11	PI11	N17	
54	DCAM.D2	PC8	N2	
55	PORTI.12	PI12	N16	
56	DCAM.D3	PG11	D17	
57	PORTI.13	PI13	M17	
58	DCAM.D4	PD10	P3	
59	PORTI.14	PI14	M15	
60	DCAM.D5	PE10	B4	
61	PORTI.15	PI15	M16	
62	DCAM.D6	PC1	T13	
63	GND	-	-	
64	DCAM.D7	PE6	B17	
65	PORTG.10	PG10	E16	
66	DCAM.PCLK	PF8	R5	
67	PORTG.15	PG15	C17	
68	DCAM.HSYNC	PD4	B12	
69	PORTE.5	PE5	B16	
70	DCAM.VSYNC	PB4	T6	Optionally (using on-board jumper R401) connected to JTAG.TRST
71	PORTG.7	PG7	P16	
72	GND	-	-	
73	PORTG.9	PG9	M14	
74	GND	-	-	
75	PORTC.2	PC2	R14	
76	GND	-	-	
77	PORTC.5	PC5	P13	
78	PORTA.10	PA10	U14	ENET.TXD1 - not available as GPIO if on-board PHY is mounted
79	PORTG.4	PG4	R16	
80	PORTA.9	PA9	T14	ENET.TXD0 - not available as GPIO if on-board PHY is mounted
81	GND	-	-	
82	PORTA.7	PA7	P14	ENET.TXEN - not available as GPIO if on-board PHY is mounted
83	PORTB.9	PB9	T16	
84	PORTB.0	PB0	T5	ENET.RST - not available as GPIO if on-board PHY is mounted
85	PORTF.9	PF9	U16	
86	PORTA.8	PA8	R12	ENET.REF-CLK - not available as GPIO if on-board PHY is mounted
87	PORTF.10	PF10	T15	

88	PORTB.5	PB5	R15	ENET.CRS-DV - not available as GPIO if on-board PHY is mounted
89	PORTF.3	PF3	U2	
90	PORTB.6	PB6	U12	ENET.RXD0 - not available as GPIO if on-board PHY is mounted
91	PORTF.4	PF4	T3	
92	PORTB.7	PB7	T12	ENET.RXD1 - not available as GPIO if on-board PHY is mounted
93	PORTF.5	PF5	R4	
94	PORTB.2	PB2	U5	ENET.INT - not available as GPIO if on-board PHY is mounted
95	PORTF.6	PF6	U3	
96	PORTD.7	PD7	E6	ENET.MDC - not available as GPIO if on-board PHY is mounted
97	PORTF.7	PF7	T4	
98	PORTA.2	PA2	J4	ENET.MDIO - not available as GPIO if on-board PHY is mounted
99	GND	-	-	
100	GND	-	-	
Internal system connections				
	XSPIM2.NCS1	PJ0	U11	PSRAM Interface
	XSPIM2.IO0	PJ1	U9	PSRAM + QSPI Interface
	XSPIM2.IO1	PJ2	T11	PSRAM + QSPI Interface
	XSPIM2.IO2	PJ3	T7	PSRAM + QSPI Interface
	XSPIM2.IO3	PJ4	R8	PSRAM + QSPI Interface
	XSPIM2.CLK	PJ5	U8	PSRAM + QSPI Interface
	XSPIM2.NCLK	PJ6	T8	PSRAM Interface
	XSPIM2.DQS0	PJ7	T10	PSRAM Interface
	XSPIM2.IO4	PJ8	R7	PSRAM Interface
	XSPIM2.IO5	PJ9	T9	PSRAM Interface
	XSPIM2.IO6	PJ10	R10	PSRAM Interface
	XSPIM2.IO7	PJ11	R11	PSRAM Interface
	XSPIM2.NCS2	PJ12	P8	PSRAM + QSPI Interface
	OSC32_IN	PC14	C2	32kHz crystal
	OSC32_OUT	PC15	C1	32kHz crystal

Dimensions



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