MOD5441X

Single & Dual Port Ethernet Core Module

MOD54415 (100 Version with RJ-45 | 200 Version with 10-pin header)
MOD54417 (100 Version with 2 X RJ-45 | 200 Version with 20-pin header)



DATASHEET

Key Points

- Use as a high-performance single board computer or add Ethernet connectivity to a new or existing design
- Industrial temperature range (-40°C to 85°C)
- MOD54417 can function as a switch or as two independent ports, each with its own MAC address
- Customize with development kit

Device Connectivity

- Up to two 10/100Mbps Ethernet
- 8 UARTs, 4 I²C, 2 CAN, 3 SPI, and 1-Wire® support
- SD/MMC and MicroSD flash card ready
- 42 digital I/Os and 2 additional digital inputs
- 16-bit address and data bus with 5 chip selects
- Eight 12-bit analog-to-digital converters (ADC)
- Two 12-bit digital-to-analog converters (DAC)
- Five pulse width modulators (PWM)

Performance and memory

• 32-bit 250 MHz Processor

64MB DDR2 RAM and 32MB Flash

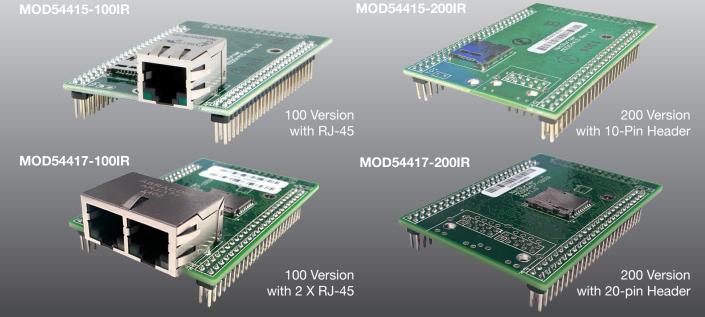
Companion development kit

The following is available with the development kit:

- Customize any aspect of operation including web pages, data filtering, or custom network applications
- Development software: NB Eclipse IDE, Graphical debugger, deployment tools, and examples
- Communication software: TCP/IP stack, HTTP web server, FTP, E-mail, and flash file system
- System software: uC/OS RTOS, ANSI C/C++ compiler and linker

The following optional software modules are not included with kit and are sold separately:

- Embedded SSL & SSH Security Suite (Module License Version)
- SNMP



MOD5441X



Specifications

Processor and Memory

32-bit Freescale ColdFire 54415 or 54417 running at 250MHz with 64MB DDR2 RAM and 32MB Flash

Network Interface

10/100 BaseT with RJ-45 connector (MOD54415-100ir Version)

10-pin header (MOD54415-200ir Version)

Two 10/100 BaseT with RJ-45 connector (MOD54417-100ir Version)

Two 20-pin header (MOD54417-200ir Version)

Data I/O Interface (J1)

- Up to 8 UARTs
- Up to 4 I²C
- Up to 2 CAN 2.0b controllers
- Up to 3 SPI
- Up to 42 digital I/O + 2 digital inputs
- Up to eight 12-bit analog-to-digital converters (ADC)
- Up to two 12-bit digital-to-analog converters (DAC)
- Up to 5 pulse width modulators (PWM)
- Up to 4 external timer in or outputs
- MicroSD flash card ready
- 1-Wire® interface

Flash Card Support

FAT32 support for SD Cards up to 32GB (requires exclusive use of one SPI port).

Serial Configurations

The UARTs can be configured in the following way:

- 8 TTL ports
- Add external level shifter for RS-232
- Add external level shifter for RS-422/485 (up to two ports)

Note: UART 0/1 also provides RTS/CTS hardware handshaking signals.

LEDs

Link and Speed (100 Version only, on RJ-45)

Physical Characteristics

Dimensions (inches): 2.95" x 2.00"

Weight: 1 oz.

Mounting Holes: 3 x 0.125" dia.

Power

MOD54415 module

3.3VDC @ 410 mA with Ethernet | 3.3VDC @ 360 mA without Ethernet

MOD54415 module mounted on MOD-DEV-70

3.3VDC @ 450 mA with Ethernet | 3.3VDC @ 400 mA without Ethernet

MOD54417 module

3.3VDC @ 520mA with Ethernet | 3.3VDC @ 450 mA without Ethernet

MOD54417 module mounted on MOD-DEV-70

3.3VDC @ 530 mA with Ethernet | 3.3VDC @ 520 mA without Ethernet

MOD5441X



Environmental Operating Temperature

-40° to 85° C

RoHS Compliance

The Restriction of Hazardous Substances guidelines ensure that electronics are manufactured with fewer environment harming materials.

Part Numbers

MOD54415 Ethernet Core Module (100 Version, with RJ-45)

Part Number: MOD54415-100IR

MOD54415 Ethernet Core Module (200 Version, with 10-pin header)

Part Number: MOD54415-200IR

MOD54415 Development Kit

Part Number: NNDK-MOD54415-KIT

Kit includes all the hardware and software you need to customize the included platform hardware. See NetBurner Store product page for package contents.

MOD54417 Ethernet Core Module (100 Version, with 2 X RJ-45)

Part Number: MOD54417-100IR

MOD54417 Ethernet Core Module (200 Version, with 20-pin header)

Part Number: MOD54417-200IR

MOD54417 Development Kit

Part Number: NNDK-MOD54417-KIT

Kit includes all the hardware and software you need to customize the included platform hardware. See NetBurner Store product page for package contents.

Embedded SSL & SSH Security Suite (Module License Version)

Part Number: NBLIC-SSL-MODULE

Only required if you are using a development kit.

SNMP V1 (Module License Version)

Part Number: NBLIC-SNMP

Available as an option if you are using a development kit.

Ordering Information

E-mail: sales@netburner.com Online Store: www.NetBurner.com Telephone: 1-800-695-6828

Pinout and Signal Description

The 200 version board has a 10-pin header instead of an RJ-45 jack. This header enables you to relocate the jack to another location or to add a different jack with power over ethernet (PoE) capabilities to your module. Table 1 provides descriptions of pin function of the 10-pin header.

Table 1: Pinout and Signal Descriptions for JP1 & JP2 Header (1)

Pin	Signal	Description
-	Ϋ́L	Transmit -
2	¥	Transmit +
က	VCC1	3.3V
4	RX+	Recieve +
2	RX-	Recieve -
9	VCC1	3.3V
7	GND	Ground
ω	N/C	Not Connected
0	LED	Link LED
10	LED	Speed LED

. 0 10

Alternate Monitor Boot Jumper

The boot jumper is the unpopulated header 'TP1'. It can be used to recover from a software or configuration fault.

Ethernet magnetics center tap voltage provided by NetBurner device

The module has two dual in-line 50 pin headers which enable you to connect to one of our standard NetBurner Carrier Boards, or a board you create on your own. Table 1 provides descriptions of pin function of the module header.

Table 2: Pinout and Signal Descriptions for J1 Connector (1)

					J1 Connector		
Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
-		GND				Ground	1
2		GND				Ground	,
ъ	E16	VSTBY				Input power 3.3 VDC	3.3VDC
4	G2	R/W				Data Bus - Read / NOT Write	3.3VDC
2	E	<u>CS1</u>		NFC_CE	PB4	Data Bus - Chip Select 1 or NAND Flash Controller Chip Enable	3.3VDC
9	B1	<u>CS4</u>	DREQ1		PB5	Data Bus - Chip Select 4 or External DMA Request 1	3.3VDC
7	F2	<u>CS2</u>	DACK1		PB6	Data Bus - Chip Select 5 or External DMA Acknowledge 1	3.3VDC
ω	Ε	<u>OE/RE</u>				Data Bus - Output Enable / Read Enable or Burst Transfer Indicator / Read Enable	3.3VDC
о	F4	<u>BE0</u>	FB_TSIZE0		PA0	Byte Enable 2 for D16 to D23 (8 bits) or FlexBus Transfer Size 0	3.3VDC
10	D1	<u>BE1</u>	FB_TSIZE1		PA1	Byte Enable 3 for D24 to D31 (8 bits) or FlexBus Transfer Size 1	3.3VDC
Ξ		TIP Generated				Data Bus - Transfer in Progress ²	3.3VDC
12	A5	D16				Data Bus - Data 16	3.3VDC
13	H3	ĭ <u></u>		NFC_R/B	PA4	Data Bus - Transfer Acknowledge or NAND Flash Controller Flash Ready / NOT Busy	3.3VDC
4	D5	D18				Data Bus - Data 18	3.3VDC
15	C6	D17				Data Bus - Data 17	3.3VDC
16	A6	D20				Data Bus - Data 20	3.3VDC
17	B6	D19				Data Bus - Data 19	3.3VDC
18	A7	D22				Data Bus - Data 22	3.3VDC
19	De	D21				Data Bus - Data 21	3.3VDC
20	B7	D24				Data Bus - Data 24	3.3VDC

- Active low signals, such as RESET, are indicated with an overbar.

 The TIP signal is the logical AND of *CS1, *CS4 and *CS5. TIP can used to control an external data bus buffer for the data bus signals. An example circuit design can be found on the Module Development Board schematic. An external data bus buffer is recommended for any designs that use data bus signals D16-D31.

					J1 Connector (continued)	(per	
Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
21	C7	D23				Data Bus - Data 23	3.3VDC
22	A8	D26				Data Bus - Data 26	3.3VDC
23	D7	D25				Data Bus - Data 25	3.3VDC
24	B8	D28				Data Bus - Data 28	3.3VDC
25	D8	D27				Data Bus - Data 27	3.3VDC
26	89	D30				Data Bus - Data 30	3.3VDC
27	A9	D29				Data Bus - Data 29	3.3VDC
28	K15	RESET				Processor Reset Input	3.3VDC
29	B3	D31				Data Bus - Data 31	3.3VDC
30	L16	RSTOUT				Processor Reset Output	3.3VDC
31	G G	CLK			PB7	Internal Bus Clock ²	3.3VDC
32	£3	AO				Data Bus - Address 0	3.3VDC
33	22	A1				Data Bus - Address 1	3.3VDC
34	B2	A2				Data Bus - Address 2	3.3VDC
35	A2	A3				Data Bus - Address 3	3.3VDC
36	E3	A4				Data Bus - Address 4	3.3VDC
37	D3	A5				Data Bus - Address 5	3.3VDC
38	E4	A6				Data Bus - Address 6	3.3VDC
39	g	A7				Data Bus - Address 7	3.3VDC
40	B3	A8				Data Bus - Address 8	3.3VDC
41	9	A9				Data Bus - Address 9	3.3VDC
42	CS	A10				Data Bus - Address 10	3.3VDC
43	B4	A11				Data Bus - Address 11	3.3VDC
44	D4	A12				Data Bus - Address 12	3.3VDC
45	A3	A13				Data Bus - Address 13	3.3VDC
46	A 4	A14				Data Bus - Address 14	3.3VDC
47	B5	A15				Data Bus - Address 15	3.3VDC
48		VCC3V				Input power 3.3 VDC	3.3VDC
49		GND				Ground	1
20		GND				Ground	1
0+0							

Note:

^{1.} Active low signals, such as RESET, are indicated with an overbar.
2. Internal bus clock is one-half the core/system clock f_{sys/2}

 $\mathsf{Tab/e}\ 3$: Pinout and Signal Descriptions for J2 Connector $^{(1)}$

Part					J2 Connector		
Handle H		 Function 1	Function 2	Fuction 3	General Purpose I/O	Description	Max Voltage
NOCCON N		GND				Ground	1
B10 UARTO RX IZC4 SDA SPP2 SOUT PF3 UARTO Transmit or PC4 Serial Data Data Intra-3 and UARTO Transmit or PC4 Serial Data Out ²³ ADDITION J1 VDDA, DAC ADC SPP2 SOUT PF3 UARTO Transmit or PC4 Serial Data Data Intra-3 and UARTO Transmit or PC4 Serial Data Out ²³ J1 ADC, ING ADC, ING ADC, ING ADDITION And ING S4 ADC, INS DACO, OUT ARBOG TO Digital Converter 1 Input K4 ADC, INS DAC1, OUT ARBOG TO DIGITAL Converter 2 Input K4 ADC, INS DAC1, OUT ARBOG TO DIGITAL Converter 3 Input K4 ADC, INS DAC1, OUT ARBOG TO DIGITAL Converter 3 Input K5 ADC, INS DAC1, OUT ARBOG TO DIGITAL Converter 3 Input K8 ADC, INS ADC, INS ARBOG TO DIGITAL Converter 3 Input K8 ADC, INS ADC, INS ADC, INS K8 SSIO, DACK		VCC3V				Input power 3.3 VDC	3.3VDC
D11 UARTO TX 2C4_SCL SPI2_SOUT PF3 UARTO Tanasmir or PC4 Sorial Clock or SPI2 Serial Data Out*** J4 NDDA_DAC ADC ADC_IND ADC_I		UART0_RX	I2C4_SDA	SPI2_SIN	PF4	UART 0 Receive or I ² C 4 Serial Data or SPI 2 Serial Data In ^{2,3}	3.3VDC
Mail MDDA DAC, ADC Mail Analog to Digital Converter of Input Analog Converter of Input Analog to Digital Converter of Input Analog Converter of Input Analog to Digital Converter of Input Only NSSA, DAC, DAC, DAC, SSA, DAC, DAC, SSA, DAC, DAC, SSA, DAC, DAC, SSA, DAC, DAC, DAC, SSA, DAC, DAC, DAC, DAC, DAC, DAC, DAC, DA		UART0_TX	I2C4_SCL	SPI2_SOUT	PF3	UART 0 Transmit or I ² C 4 Serial Clock or SPI 2 Serial Data Out ^{2,3}	3.3VDC
H ADC_INO		VDDA_DAC_ADC				ADC and DAC Reference Voltage (required when using ADC or DAC)	3.3VDC
Analog to Digital Converter 1 input		ADC_IN0				Analog to Digital Converter 0 Input	3.3VDC
J2 ADC INZ Analog to Digital Converter 2 Input K4 ADC INS DACO. INS AAnalog to Digital Converter 2 Input G4 ADC INS ADC OLT Analog to Digital Converter 4 Input J3 ADC INS Analog to Digital Converter 4 Input K3 ADC INS Analog to Digital Converter 5 Input K3 ADC INS Analog to Digital Converter 4 Input K3 ADC INS Analog to Digital Converter 5 Input K3 ADC INS Analog to Digital Converter 7 Input on Digital to Analog Converter 1 Output K3 AND INSA ADC Analog to Digital Converter 7 Input on Digital to Analog Converter 1 Output K3 ANSA DAC ADC Analog to Digital Converter 7 Input on Digital to Analog Converter 1 Output M1 VSSA ADC ADC ANT 7 Receive or SIM 1 Clock A12 SSIO BCLK SIM1 PD A13 SSIO BCLK SIM1 PD A14 L7+ USBD DM A15 SSIO BCLK SIM1 POWN A16 SSIO BCLK SIM1 POWN A17 SSIO BCRIA MASSIN POWN SSIO Serial Brace or SIM 1 Power Sup		ADC_IN1				Analog to Digital Converter 1 Input	3.3VDC
Mail of Digital Converter 3 input or Digital to Analog Coverter 0 Output Analog to Digital Converter 6 input Analog Coverter 1 Dutput of Analog to Digital Converter 6 input Analog Converter 7 input of DAC1_OUT Analog to Digital Converter 6 input Analog Converter 7 input of DAC1_OUT Analog to Digital Converter 6 input Analog Converter 7 input of DAC1_OUT Analog to Digital Converter 6 input Analog Converter 7 input of DAC1_OUT Analog to Digital Converter 7 input of DAC1_OUT Analog to Digital Converter 7 input of DAC1_OUT Analog to Digital Converter 7 input of DAC1_OUT Analog Converter 7 input of DAC1_OUT Analog to Digital Converter 7 input of DAC1_OUT Analog to Dac2_DAC2_DAC2_DAC2_DAC2_DAC2_DAC2_DAC2_DAC		ADC_IN2				Analog to Digital Converter 2 Input	3.3VDC
G4 ADC_IN4 Ancilot ADC_IN4 Ancilot Ancilot Ancilot Ancilot Ancilot Digital Converter 4 Input J3 ADC_IN5 ADC_IN6 Ancilot	7 4	ADC_IN3	DAC0_OUT			Analog to Digital Converter 3 Input or Digital to Analog Coverter 0 Output	3.3VDC
J3 ADC_IN5 Analog to Digital Converter 5 Input H2 ADC_IN6 ADC_IN6 Analog to Digital Converter 5 Input H2 ADC_IN6 ADC_IN7 ADC_IN7 H3 VSSA_ADC_ADC ADC_IN7 J5 VSSA_ADC_ADC ADC_IN7 A12 SSI0_ACLKIN SIM1_CLK A13 SSI0_BCLK UART7_RX A14 I.7+ USBA_DAC_ADC A15 SSI0_BCLK UART7_RX A14 I.7+ USBA_DM A15 SSI0_BCLK PH3 A16 I.7+ USBA_DM A17 USBA_DM PH3 B14 I.7+ USBA_DM B15 SSI0_RX Input only B16 I.7+ USBA_DM B17 SSI0_RX Input only B18 I.7+ USBA_DM B18 III Input only B18 III INPUT SSI0_RX B18 III INPUT SSI0_RX III		ADC_IN4				Analog to Digital Converter 4 Input	3.3VDC
H2 ADC_ING Analog to Digital Converter 6 Input Analog to Digital Converter 7 Input or Digital to Analog Converter 1 Output H3 VSSA_DAC_ADC SSI_CLKIN SIM1_CLK PH4 SS oserial Master Clock or SSI Clock Input or Digital to Analog Converter 1 Output A13 VSSA_DAC_ADC SSI_CLKIN SIM1_CLK PH4 SS oserial Master Clock or SSI Clock Input or SIM 1 Clock A14 1.7+ USBO_DMCLK SIM1_CLK PH4 SS oserial Bit Clock or UART 7 Receive or SIM 1 Card Insertion Detect A14 1.7+ USBO_DMC SIM1_CLK PH4 SS oserial Bit Clock or UART 7 Receive or SIM 1 Power Supply Enable A14 1.7+ USBD_DM SIM1_CKN PH7 Signal* A15 1.6 SSIO_TX Input only USB - On-the-Go (default configuration) B14 1.7+ USBD_DP NA Signal* B14 1.7+ USBD_DP NA Signal* B14 1.7+ USBD_DP NA Signal* B15 SSIO_TX INCC_SSIO_S SSIO_S Sarial Fransmit or PC 2 Serial Data or SiM 1 Bidirectional Transmit		ADC_IN5				Analog to Digital Converter 5 Input	3.3VDC
K3 ADC_INT DACI OUT Analog to Digital Converter 7 Input or Digital to Analog Converter 1 Output H5 VSSA_ADC SSI CLKIN SIM1_CLK PH4 SSI 0 Serial Master Clock or SSI Clock Input or SIM 1 Clock A12 SSIO_MCLK SSI_CLKIN SIM1_CLK PH4 SSI 0 Serial Master Clock or SSI Clock Input or SIM 1 Clock A13 SSIO_MCLK SSIO_MCLK SSIO_MCLK SSIO_MCLK SSIO_MCLK A14 L7+ USBO_DM UART7_RX SIM1_PD PH3 SSIO_Gerial Bit Clock or UART7 Receive or SIM 1 Clock more configuration) A15 L7+ USBO_DM SIM1_VEN PH7 SSIO_Gerial Meceive or FC 2 Serial Data or SIM 1 Power Supply Enable C12 L6 SSIO_TX IZC2_SCA SIM1_DATA PH6 SSIO_Gerial Transmit or PC 2 Serial Data or SIM 1 Power Supply Enable C12 L6 SSIO_TX IZC2_SCA SIM1_DATA PH6 SSIO_Gerial Transmit or PC 2 Serial Data or SIM 1 Reset Signal* C13 L6 SSIO_TX PWM_B3 SSII_TX PH3 Image and the Clock or SIM 1 Reset Signal* C1 SSIO_TX PWM_B3		ADC_IN6				Analog to Digital Converter 6 Input	3.3VDC
H5 VSSA_ADC ADC and DAC Reference Ground (required when using ADC or DAC) J2 SSI_OBCLK SSI_CLKIN SIM1_CLK PH4 SSI_0 Serial Master Clock or SSI Clock Input or SIM 1 Clock A13 SSI_OBCLK UART7_RX SIM1_PD PH3 SSI_0 Serial Bit Clock or UART 7 Receive or SIM 1 Card Insertion Detect A14 1.7+ USBU_DM NAT1_PD PH3 SSI_0 Serial Bit Clock or UART 7 Receive or SIM 1 Card Insertion Detect A15 1.7+ USBU_DM NAT1_PD PH3 SSI_0 Serial Bit Clock or UART 7 Receive or SIM 1 Power Supply Enable B14 1.7+ USBU_DM NAT1_PD NPT SSI_0 Serial Bit Clock or UART 7 Receive or SIM 1 Power Supply Enable B14 1.7+ USBU_DM NPT SSI_0 Serial Receive or PC 2 Serial Data or SIM 1 Receive or SIM 1 Power Supply Enable B14 1.7+ USBU_DM NPT SSI_0 Serial Receive or PC 2 Serial Data or SIM 1 Redectional Transmit or PC 2 Serial Clock or SIM 1 Bidirectional Transmit or SIM 1 Receive or PC 2 Serial Data or SIM 2 Serial Clock or SIM 2 Serial Clock or SIM 2 Serial Clock or SIM 2 Ser		ADC_IN7	DAC1_OUT			Analog to Digital Converter 7 Input or Digital to Analog Converter 1 Output	3.3VDC
A12 SSIO MCLK SSI OLARIN SIM1_CLK PH4 SSI O Serial Master Clock or SSI Clock Input or SIM 1 Clock A13 SSIO_BCLK UART7_RX SIM1_PD PH3 SSIO_BSRIA BIT Clock or UART 7 Receive or SIM 1 Card Insertion Detect A14 1.7+ USBD_DM SSIO_RX SIM1_VEN PH7 SIGNAR C12 1.6 SSIO_RX LCC_SDA SIM1_LAFN PH7 SIGNAR B14 1.7+ USBD_DP SSIO_RX LOS-FILED NP47 SIGNAR B14 1.7+ USBD_DP SSIO_RX SSIO_SENTAR NP47 SIGNAR B14 1.7- USBD_DP SSIO_LAR SIM1_DATA PH6 SSIO_SENTAR NP60 SPIO_SENTAR C13 1.6 SSIO_TX IZCZ_SCL SIM1_RST PH6 Receive or PCZ_Sental Clock or SIM 1 Bidirectional Transmit or PWM B3 Output Signal/Input Capture or SIN 1 Sental Data or SIN 3 Sental Data or SIN 1 Sental Clock or SIN 1 Sental Clock or SIN 1 Sental Clock C10 UART1_G		VSSA_ADC VSSA_DAC_ADC				ADC and DAC Reference Ground (required when using ADC or DAC)	
A14 1.7+ USBC_DML UART7_RX SIM1_PD PH3 SSI0 Serial Bit Clock or UART 7 Receive or SIM 1 Card Insertion Detect A14 1.7+ USBC_DML USBC_DML USB_On-the-Go (default configuration) USB_On-the-Go (default configuration) C12 1.6 SSI0_RX IZC2_SDA SIM1_VEN PH7 SSI0_RS - On-the-Go (default configuration) B14 1.7+ USBB_ODP SIM1_DATA PH7 SSi0_RS - On-the-Go (default configuration) B14 1.7+ USBB_ODP SIM1_DATA PH6 SSI0_RS - On-the-Go (default configuration) B14 1.7+ USBB_ODP SIM1_DATA PH6 SSI0_RS - On-the-Go (default configuration) B15 1.6 SSI0_TX IZC2_SCL SIM1_DATA PH6 SSI0_RS - On-the-Go (default configuration) B15 SSI0_TX IZC2_SCL SIM1_RST PH6 SSI0_RS - On-the-Go (default configuration) B15 SSI0_TX IZC2_SDA SIM1_RST PH6 SSI0_RS - On-the-Go (default configuration) B16 SSI0_TX IZC5_SDA SPI3_SON PH5 SS		SSI0_MCLK	SSI_CLKIN	SIM1_CLK	PH4	SSI 0 Serial Master Clock or SSI Clock Input or SIM 1 Clock	3.3VDC
A14 (1.7+) USBO_DM (1.7+) USBO_DM (1.2-SDA) Input only (1.8-Host) USB- On-the-Go (default configuration) USB- Host (see approach for host mode configuration) C12 (1.6) SSIO_RX I2C2_SDA SIM1_VEN PH7 Signal (1.7-Host) USB- Host (see approach for host mode configuration) B14 (1.7+) USBU_DP USBU_DP USBH_ON-the-Go (default configuration) USBH_ON-the-Go (default configuration) C13 (1.6-) SSIO_TX I2C2_SCL SIM1_DATA PH6 Receive Data Signals C13 (1.6-) SSIO_TX I2C2_SCL SIM1_RST PH6 Receive Data Signals C13 (1.6-) SSIO_FS UART7_TX SIM1_RST PH5 SSIO_Serial Framsmit or PWM B3 Output Signal/Input Capture or SSI 1 Serial C14 (1.7-) UART1_TR I2C5_SCA SPI3_SOUT PF7 UART1 Transmit or I2C 5 Serial Data or SPI 3 Serial COCK or SPI 3 Serial Data or SPI 3 Seria		SSI0_BCLK	UART7_RX	SIM1_PD	PH3	SSI 0 Serial Bit Clock or UART 7 Receive or SIM 1 Card Insertion Detect Signal ²	3.3VDC
C12 1.6 SSI0_RX I2C2_SDA SIM1_VEN PH7 SSI0_Serial Receive or PC2 Serial Data or SIM 1 Power Supply Enable Signal B14 1.7+ USBQ_DP NAT		USBO_DM USBH_DM			Input only	USB- On-the-Go (default configuration) USB- Host (see appnote for host mode configuration)	3.3VDC
B14 USBO_DP Input only USB+ On-the-Go (default configuration) USB+ On-the-Go (default configuration) C13 1.6 SSIO_TX I2C2_SCL SIM1_DATA PH6 SSI O Serial Transmit or I2C 2 Serial Clock or SIM 1 Bidirectional Transmit/Receive Data Signal N2 UARTZ_TX SIM1_DATA PH6 SSI O Serial Transmit or PWM B3 Output Signal/Input Capture or SSI 1 Serial N2 UARTZ_TX SIM1_RST PH5 SSI O Serial Frame Sync or UART 7 Transmit or SIM 1 Reset Signal/Receive or I2C 5 Serial Data or SPI 3 Serial Clock or SPI 3 Seri	C12	SSI0_RX	I2C2_SDA	SIM1_VEN	PH7	SSI 0 Serial Receive or PC 2 Serial Data or SIM 1 Power Supply Enable Signal ³	3.3VDC
C131.6SSIO_TXI2C2_SCLSIM1_DATAPH6SSI 0 Serial Transmit or PWM B3 Output Signal Input Capture or SSI 1 SerialN2UART2_TXPWM_B3SSI1_TXPE3UART2_Transmit or PWM B3 Output Signal/Input Capture or SSI 1 SerialE15SSI0_FSUART7_TXSIM1_RSTPH5SSI 0 Serial Frame Sync or UART 7 Transmit or SIM 1 Reset Signal/Input Capture or SSI 1 SerialC9UART1_RXI2C5_SDASPI3_SINPE0UART1 Transmit or I2C5 Serial Data or SPI 3 Serial Data or SPI 3 Serial Data or SPI 3 Serial Data Output Signal/Input or SPI 3 Serial Clock or SPI 3 Serial Clock or SPI 3 Serial ClockD10UART1_RTSUART5_RXSPI3_PCS0PE1/RGPI0UART1 Transmit or SPI 3 Serial Clock?C10UART1_CTSUART5_TXSPI3_SCKPE2/RGPIOUART1 Clear To Send or UART 5 Transmit or SPI 3 Serial Clock?C10UART1_CTSUART5_TXSPI3_SCKPG5SDHC Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock		USBO_DP USBH_DP			Input only	USB+ On-the-Go (default configuration) USB+ Host (see appnote for host mode configuration)	3.3VDC
N2 UART2_TX PWM_B3 SSI1_TX PE3 UART2_Transmit or PWM B3 Output Signal/Input Capture or SSI 1 Serial E15 SSI0_FS UART7_TX SIM1_RST PH5 SSI 0 Serial Frame Sync or UART 7 Transmit or SIM 1 Reset Signal? C9 UART1_RX I2C5_SDA SPI3_SIN PE0 UART1 Transmit or I²C 5 Serial Data or SPI 3 Serial Data In².³ D9 UART1_RX I2C5_SCL SPI3_SOUT PF7 UART1 Transmit or I²C 5 Serial Data or SPI 3 Serial Data Out².³ D10 UART1_RTS UART5_RX SPI3_PCS0 PE1/RGPIO UART1 Transmit or I²C 5 Serial Clock or SPI 3 Serial Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock C10 UART1_CTS UART5_TX PE2/RGPIO UART1 Clear To Send or UART5 Transmit or SPI 1 Serial Clock C10 UART1_CTS PWM_A0 SPI1_SCK PG5 SDHC Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock	C13	SSI0_TX	I2C2_SCL	SIM1_DATA	9НА	SSI 0 Serial Transmit or I ² C 2 Serial Clock or SIM 1 Bidirectional Transmit/ Receive Data Signal ³	3.3VDC
E15 SSI0_FS UART7_TX SIM1_RST PH5 SSI 0 Serial Frame Sync or UART 7 Transmit or SIM 1 Reset Signal* C9 UART1_RX I2C5_SDA SPI3_SIN PE0 UART1 Receive or I²C 5 Serial Data or SPI 3 Serial Data In²³ D9 UART1_TX I2C5_SCL SPI3_SOUT PF7 UART1 Transmit or I²C 5 Serial Clock or SPI 3 Serial Data Out²³ D10 UART1_RTS UART5_RX SPI3_PCS0 PE1/RGPIO UART1 Request To Send or UART 5 Receive or SPI 2 Peripheral Select 0 C10 UART1_CTS UART5_TX SPI3_SCK PE2/RGPIO UART1 Clear To Send or UART 5 Transmit or SPI 3 Serial Clock? A10 SDHC_CLK PWM_A0 SPI1_SCK PG5 SDHC Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock		UART2_TX	PWM_B3	SSI1_TX	PE3	UART 2 Transmit or PWM B3 Output Signal/Input Capture or SSI 1 Serial Transmit²	3.3VDC
C9UART1_RXI2C5_SDASPI3_SINPE0UART 1 Receive or I²C 5 Serial Data or SPI 3 Serial Data In²³D9UART1_TXI2C5_SCLSPI3_SOUTPF7UART 1 Transmit or I²C 5 Serial Clock or SPI 3 Serial Data Out²³D10UART1_RTSUART5_RXSPI3_PCSOPE1/RGPIOUART 1 Request To Send or UART 5 Receive or SPI 2 Peripheral Select 0C10UART1_CTSUART5_TXSPI3_SCKPE2/RGPIOUART 1 Clear To Send or UART 5 Transmit or SPI 3 Serial Clock²A10SDHC_CLKPWM_A0SPI1_SCKPG5SDHC Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock		SSI0_FS	UART7_TX	SIM1_RST	PH5	SSI 0 Serial Frame Sync or UART 7 Transmit or SIM 1 Reset Signal ²	3.3VDC
D9UART1_TXI2C5_SCLSPI3_SOUTPF7UART 1 Transmit or I²C 5 Serial Clock or SPI 3 Serial Data Out²³D10UART1_RTSUART5_RXSPI3_PCS0PE1/RGPIOUART 1 Request To Send or UART 5 Receive or SPI 2 Peripheral Select 0C10UART1_CTSUART5_TXSPI3_SCKPE2/RGPIOUART 1 Clear To Send or UART 5 Transmit or SPI 3 Serial Clock²A10SDHC_CLKPWM_A0SPI1_SCKPG5SDHC Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock		UART1_RX	I2C5_SDA	SPI3_SIN	PE0	UART 1 Receive or I ² C 5 Serial Data or SPI 3 Serial Data In ^{2,3}	3.3VDC
D10UART1_RTSUART5_RXSPI3_PCS0PE1/RGPIOUART 1 Request To Send or UART 5 Receive or SPI 2 Peripheral Select 0C10UART1_CTSUART5_TXSPI3_SCKPE2/RGPIOUART 1 Clear To Send or UART 5 Transmit or SPI 3 Serial Clock*A10SDHC_CLKPWM_A0SPI1_SCKPG5SDHC Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock	-	UART1_TX	I2C5_SCL	SPI3_SOUT	PF7	UART 1 Transmit or I ² C 5 Serial Clock or SPI 3 Serial Data Out ^{2,3}	3.3VDC
C10 <u>UART1_CTS</u> UART5_TX SPI3_SCK PE2/RGPIO UART 1 Clear To Send or UART 5 Transmit or SPI 3 Serial Clock ² A10 SDHC_CLK PWM_A0 SPI1_SCK PG5 SDHC Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock		UART1_RTS	UART5_RX	SPI3_PCS0	PE1/RGPIO	UART 1 Request To Send or UART 5 Receive or SPI 2 Peripheral Select 0 Chip²	3.3VDC
A10 SDHC_CLK PWM_A0 SPI1_SCK PG5 SDHC Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock		<u>UART1_CTS</u>	UART5_TX	SPI3_SCK	PE2/RGPIO	UART 1 Clear To Send or UART 5 Transmit or SPI 3 Serial Clock ²	3.3VDC
		SDHC_CLK	PWM_A0	SPI1_SCK	PG5	SDHC Clock or PWM A0 Output Signal/Input or SPI 1 Serial Clock	3.3VDC

					J2 Conned	J2 Connector (continued)	
Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
26 M1	M	IRQ3	SPI0_PCS3	USBH_VBUS_EN	PC3	External Interrupt 3 or SPI 0 Chip Select 3 or USB Host VBUS Enable	3.3VDC
27 (C11	SDHC_CMD	PWM_B0	SPI1_SIN	PG6	SDHC Command Line or PWM B0 Output Signal/Input Capture or SPI 1 Serial Data In	3.3VDC
28	B12	SDHC_DAT0	PWM_B2	SPI1_SOUT	G7	SDHC DAT0 Line or PWM B2 Output Signal/Input or Serial Data Out	3.3VDC
29	E13	UART0_CTS	UART4_TX	SPI2_SCK	PF6/RGPIO	UART 0 Clear To Send or UART 4 Transmit or SPI 2 Serial Clock ²	3.3VDC
30	B13	SDHC_DAT3	PWM_A1	SPI1_PCS0	PF2	SDHC DAT3 Line / Card Detection or PWM A1 Output Signal/Input Capture or SPI 1 Chip Select 0	3.3VDC
31	P1	UART2_RX	PWM_A3	SSI1_RX	PE4	UART 2 Receive or PWM A3 Output Signal/Input Capture or SSI 1 Serial Receive ²	3.3VDC
35	G13	T3IN/PWM_ EXTA3	T3OUT	USBO_VBUS_EN	PD2/RGPIO	Timer Input 3 / Alternate PWM control signal 3 or Timer Output 3 or USB On-The- Go VBUS Enable	3.3VDC
33	H14	T2IN/PWM_ EXTA2	T2OUT	SDHC_DAT2	PD1/RGPIO	Timer Input 2 / Alternate PWM control signal 2 or Timer Output 2 or SDHC DAT2 Line / Read Wait	3.3VDC
34	H13	T1IN/PWM_ EXTA1	T10UT	SDHC_DAT1	PD0/RGPIO	Timer Input 1 / Alternate PWM control signal 1 or Timer Output 1 or SDHC DAT1 Line / Interrupt Detect	3.3VDC
35	D12	SDHC_DAT1	PWM_A2	SPI1_PCS1	PF0	SDHC DAT1 Line or PWM A2 Output Signal/Input Capture or SPI Chip Select 1	3.3VDC
36	H15	TOIN/PWM_ EXTA0	TUOOT	USBO_VBUS_OC	PE7/RGPIO	Timer Input 0 / Alternate PWM control signal 0 or Timer Output 0 or USB On-The-Go VBUS Over-Current	3.3VDC
37 1	N11	OW-DAT	<u>DACK0</u>		PD3/RGPIO	1-Wire Data Signal or DMA Acknowledge 0	3.3VDC
38	B11	UARTO_RTS	UART4_RX	SPI2_PCS0	PF5/RGPIO	UART 0 Request To Send or UART 4 Receive or SPI 2 Chip Select 01	3.3VDC
39 (G14	I2C0_SDA	UART8_RX	CAN0_RX	PB1	¹² C 0 Serial Data or UART 8 Receive or CAN 0 Receive ^{2,3}	3.3VDC
40	E14	SDHC_DAT2	PWM_B1	SPI1_PCS2	PF1	SDHC DAT2 Line / Read Wait or PWM B1 Output Signal/Input Capture or SPI 1 Chip Select 2	3.3VDC
41 D15	D15	CAN1_RX	UART9_RX	I2C1_SDA	PC7	CAN 1 Receive or UART 9 Receive or I ² C 1 Serial Data ^{2,3}	3.3VDC
42 (G15	I2C0_SCL	UART8_TX	CAN0_TX	PB2	I ² C 0 Serial Clock or UART 8 Transmit or CAN 0 Transmit ^{2,3}	3.3VDC
43	M2	IRQ2	SPI0_PCS2	USBH_VBUS_OC	PC2	External Interrupt 2 or SPI 0 Chip Select 2 or USB Host VBUS Over-Current	3.3VDC
4	D14	CAN1_TX	UART9_TX	I2C1_SCL	PB0	CAN 1 Transmit or UART 9 Transmit or I ² C 1 Serial Clock ^{2,3}	3.3VDC
45	F13	<u>IRQ1</u>			PC1	External Interrupt 1	3.3VDC
46		GND				Ground	,
47	Ę	<u>IRQ6</u>		USB_CLKIN	PC5	External Interrupt 6 or USB Clock In	3.3VDC
48	F12	IRQ7			PC6	External Interrupt 7	3.3VDC
49		GND				Ground	,
20		VCC3V				Input power 3.3 VDC	3.3VDC
Note:							

Active low signals, such as RESET, are indicated with an overbar.
 Each UART can be clocked from an internal or external source. For external clocks, each UARTn can be clocked by the corresponding DTn_IN vnput pin.
 If using I2C, the module must add pull-up resistors to SDA/SCL.