

NANO54415

Ethernet Core Module

200 Version



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)
- Customize with development kit

Device connectivity

- 10/100Mbps Ethernet
- 8 UARTs, 4 I²C, 2 CAN, 3 SPI, 1-Wire® and SSI support
- SD/MMC and MicroSD flash card ready
- 30 digital I/Os
- Six 12-bit analog-to-digital converters (ADC)
- Two 12-bit digital-to-analog converters (DAC)
- Eight pulse width modulators (PWM)

Performance and memory

- 32-bit 250 MHz processor
- 64MB DDR2 RAM and 8MB Flash

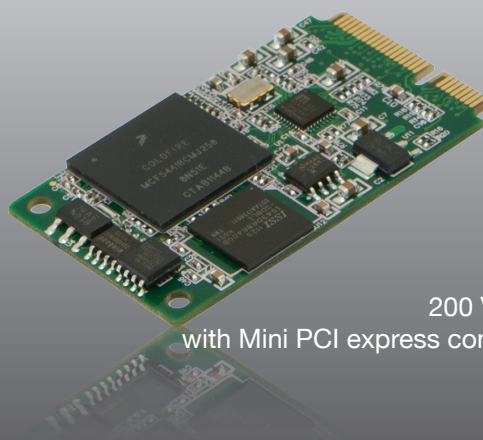
Companion development kit

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



200 Version
with Mini PCI express connector

Specifications

Processor and Memory

32-bit Freescale ColdFire 54415 CPU running at 250MHz with 64MB DDR2 RAM and 8MB Flash

Network Interface

10/100 BaseT

Data I/O Interface (P1)

- Up to 8 UARTs
- Up to 4 I²C
- Up to 2 CAN 2.0b controllers
- Up to 3 SPI
- Up to 30 digital I/O
- Up to six 12-bit analog-to-digital converters (ADC)
- Up to two 12-bit digital-to-analog converters (DAC)
- Up to 8 pulse width modulators (PWM)
- Up to 4 external timer in or outputs
- MicroSD flash card ready
- 1-Wire® interface
- Synchronous Serial Interface (SSI)

Flash Card Support

FAT32 support for SD Cards up to 8GB (requires exclusive use of SPI signals). Card types include SD/MMC (up to 2GB) and SDHC.

Serial Configurations

The UARTs can be configured in the following way:

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

Note: UART 0/1/2 also provides RTS/CTS hardware handshaking signals.

Physical Characteristics

Dimensions (inches): 2.00" x 1.1875"

Weight: 1 oz.

Power

DC Input Voltage: 3.3V @ 500mA typical

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.

Agency Approvals

UL, C/UL, CE, FCC



Part Numbers

NANO54415 Ethernet Core Module (200 Version, with PCIeMini Connector)

Part Number: NANO54415-200IR

NANO Break out Board

Part Number: NANO-BOB-200IR

NANO54415 Development Kit

Part Number: NNDK-NANO54415-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

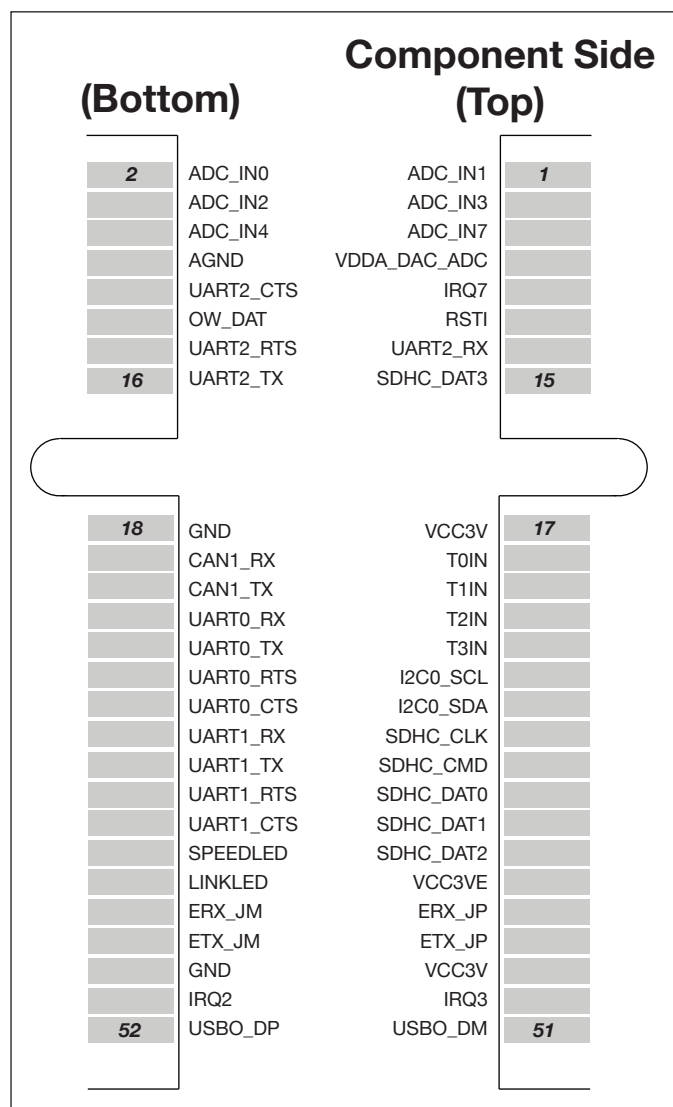
Online Store: www.NetBurner.com

Telephone: 1-800-695-6828

Pinout and Signal Description

The module has one 52-pin Mini PCI express connector that is designed to interface with a standard 52-pin mini PCI Express socket. Figure 1 shows the location of pin one and primary function. Table 1 provides a connector pinout and detailed primary and alternate function descriptions. Reference Freescale Manual for additional CPU pin function details.

Figure 1: Edge Connector Pinout for P1 Connector



Alternate Monitor Boot Jumper

The boot jumper is a pair of circular pads located near the middle line of the board near the connector. It can be used to recover from a software or configuration fault.

Table 1: Pinout and Signal Descriptions for P1 Connector ⁽¹⁾

P1 Connector							
Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
1	J1	ADC_IN1				Analog to Digital Converter 1 Input	3.3VDC
2	H1	ADC_IN0				Analog to Digital Converter 0 Input	3.3VDC
3	K4	ADC_IN3	DAC0_OUT			Analog to Digital Converter 3 Input or Digital to Analog Converter 0 Output	3.3VDC
4	J2	ADC_IN2				Analog to Digital Converter 2 Input	3.3VDC
5	K3	ADC_IN7	DAC1_OUT			Analog to Digital Converter 7 Input or Digital to Analog Converter 1 Output	3.3VDC
6	G4	ADC_IN4				Analog to Digital Converter 4 Input	3.3VDC
7	J4	VDDA_DAC_ADC				ADC and DAC Reference Voltage (required when using ADC or DAC)	3.3VDC
8	H5 J5	AGND				ADC and DAC Reference Ground (required when using ADC or DAC)	-
9	F12	IRQ7			PC6	External Interrupt 7	3.3VDC
10	M4	UART2_CTS	UART6_TX	SSI1_BCLK	PE6/RGPIO14	UART 2 Clear To Send or UART 6 Transmit or SSI 1 Serial Bit Clock ²	3.3VDC
11	K15	RSTI				Processor Reset Input	3.3VDC
12	N11	OW_DAT	DACK0		PD3/RGPIO0	1-Wire Data Signal or DMA Acknowledge 0	3.3VDC
13	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
14	M3	UART2_RTS	UART6_RX	SSI1_FS	PE5/RGPIO15	UART 2 Request To Send or UART 6 Receive or SSI 1 Serial Frame Sync ²	3.3VDC
15	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
16	N2	UART2_TX	PWM_B3	SSI1_TX	PE3	UART 2 Transmit or PWM B3 Output Signal/Input Capture or SSI 1 Serial Transmit ²	3.3VDC
17		VCC3V				Input power 3.3 VDC	3.3VDC
18		GND				Ground	-
19	H15	T0IN	T0OUT	USBO_VBUS_OC	PE7/RGPIO4	Timer Input 0 or Timer Output 0 or USB On-The-Go VBUS Over-Current	3.3VDC
20	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
21	H13	T1IN	T1OUT	SDHC_DAT1	PD0/RGPIO3	Timer Input 1 or Timer Output 1 or SDHC DAT1 Line / Interrupt Detect	3.3VDC
22	D14	CAN1_TX	UART9_TX	I2C1_SCL	PB0	CAN 1 Transmit or UART 9 Transmit or I ² C 1 Clock ^{2,3}	3.3VDC
23	H14	T2IN	T2OUT	SDHC_DAT2	PD1/RGPIO2	Timer Input 2 or Timer Output 2 or SDHC DAT2 Line / Read Wait	3.3VDC

Note:

- Active low signals, such as $\overline{\text{RESET}}$, 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 Tn_IN vnpin pin.
- If using I2C, pull-up resistors must be added to open drain SDA/SCL signals.

P1 Connector (continued)							Max Voltage
Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	
24	B10	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
25	G13	T3IN	T3OUT	USBO_VBUS_EN	PD2/RGPIO1	Timer Input 3 or Timer Output 3 or USB On-The-Go VBUS Enable	3.3VDC
26	D11	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
27	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
28	B11	UART0_RTS	UART4_RX	SPI2_PCS0	PF5/RGPIO6	UART 0 Request To Send or UART 4 Receive or SPI 2 Chip Select 0 ²	3.3VDC
29	G14	I2C0_SDA	UART8_RX	CAN0_RX	PB1	I ² C 0 Serial Data or UART 8 Receive or CAN 0 Receive ^{2,3}	3.3VDC
30	E13	UART0_CTS	UART4_TX	SPI2_SCK	PF6/RGPIO5	UART 0 Clear To Send or UART 4 Transmit or SPI 2 Serial Clock ²	3.3VDC
31	A10	SDHC_CLK	PWM_A0	SPI1_SCK	PG5	SDHC Clock or PWM A0 Output Signal/Input Capture or SPI 1 Serial Clock	3.3VDC
32	C9	UART1_RX	I2C5_SDA	SPI3_SIN	PE0	UART 1 Receive or I ² C 5 Serial Data or SPI 1 Serial Data In ^{2,3}	3.3VDC
33	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
34	D9	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
35	B12	SDHC_DAT0	PWM_B2	SPI1_SOUT	PG7	SDHC DAT0 Line / Busy-State Detect or PWM B2 Output Signal/Input Capture or SPI 1 Serial Data Out	3.3VDC
36	D10	UART1_RTS	UART5_RX	SPI3_CS0	PE1/RGPIO8	UART 1 Request To Send or UART 5 Receive or SPI 3 Chip Select 0 ²	3.3VDC
37	D12	SDHC_DAT1	PWM_A2	SPI1_CS1	PF0	SDHC DAT1 Line / Interrupt Detect or PWM A2 Output Signal/Input Capture or SPI 1 Chip Select 1	3.3VDC
38	C10	UART1_CTS	UART5_TX	SPI3_SCK	PE2/RGPIO7	UART 1 Clear To Send or UART 5 Transmit or SPI 3 Serial Clock ²	3.3VDC
39	E14	SDHC_DAT2	PWM_B1	SPI1_CS2	PF1	SDHC DAT2 Line / Read Wait or PWM B1 Output Signal/Input Capture or SPI 1 Chip Select 2	3.3VDC
40		SPEEDLED				Ethernet Speed LED	3.3VDC
41		VCC3VE				Ethernet magnetics provided by module	3.3VDC
42		LINKLED				Ethernet Link LED	3.3VDC
43		ERX_JP				Ethernet Receive +	3.3VDC
44		ERX_JM				Ethernet Receive -	3.3VDC
45		ETX_JP				Ethernet Transmit +	3.3VDC
46		ETX_JM				Ethernet Transmit -	3.3VDC
47		VCC3V				Input power 3.3 VDC	3.3VDC
48		GND				Ground	-
49	M1	IRQ3	SPI0_CS3	USBH_VBUS_EN	PC3	External Interrupt 3 or SPI 0 Chip Select 3 or USB Host VBUS Enable	3.3VDC
50	M2	IRQ2	SPI0_CS2	USBH_VBUS_OC	PC2	External Interrupt 2 or SPI 0 Chip Select 2 or USB Host VBUS Over-Current	3.3VDC
51	A14	USBO_DM				USB On-the-Go D- output	3.3VDC
52	B14	USBO_DP				USB On-the-Go D+ output	3.3VDC

Note:

1. Active low signals, such as RESET, are indicated with an overbar.
2. Each UART can be clocked from an internal or external source. For external clocks, each UARTn can be clocked by the corresponding Tn_IN vnpin pin.
3. If using I2C, pull-up resistors must be added to open drain SDA/SCL signals.

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