NANO54415

Ethernet Core Module

200 Version

NetBurner

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, and 1-Wire® 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

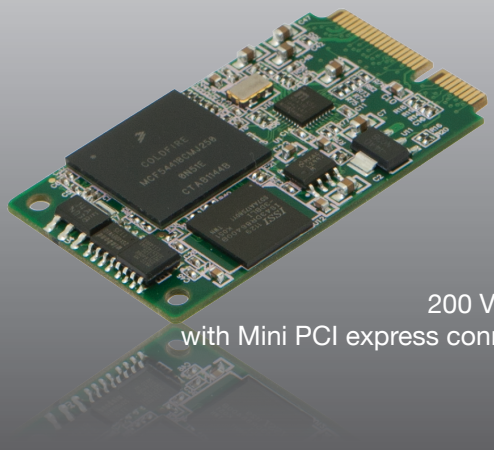
Companion development kit

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

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.

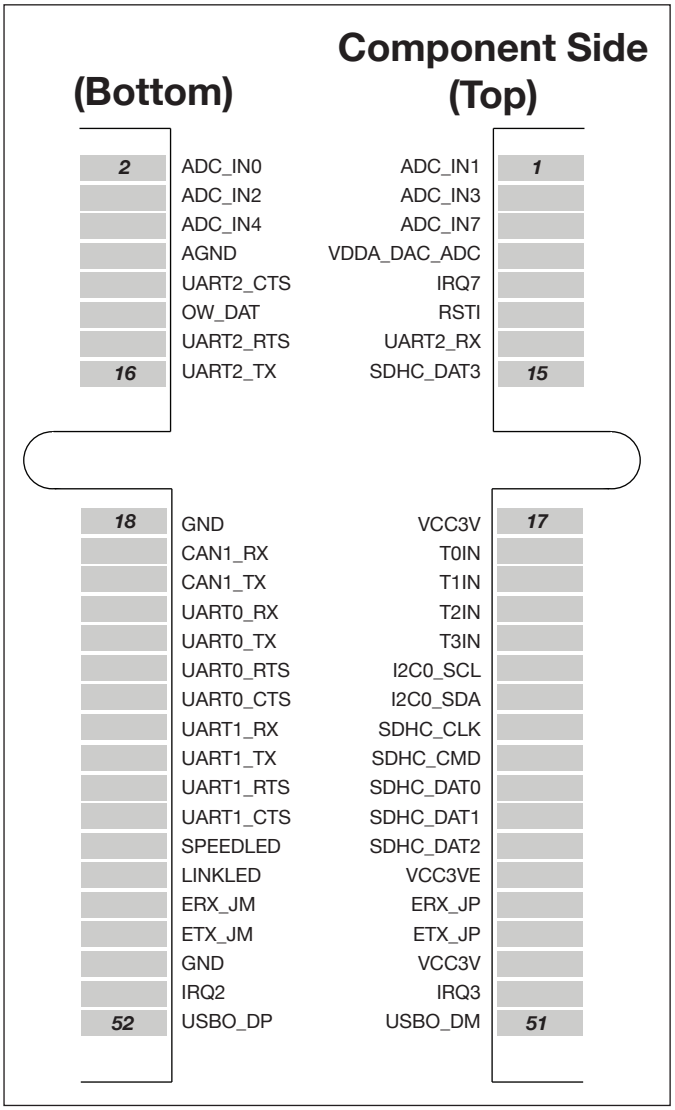
Ordering Information

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**	**Fuction 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 Supply Voltage 3.3V@24mA, By default VDDA_DAC_ADC is used as the analog reference. If you wish to use a different reference voltage value, the Iternate References inputs are: ADC_IN0 for ADC_IN1-3, ADC_IN4 for ADC_IN5-7	3.3VDC
8	H5 J5	AGND				ADC and DAC Reference Ground (required when using ADC or DAC)	-
9	F12	$\overline{\text{IRQ7}}$			PC6	External Interrupt 7	3.3VDC
10	M4	$\overline{\text{UART2\_CTS}}$	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	$\overline{\text{RSTI}}$				Processer Reset Input	3.3VDC
12	N11	OW_DAT	$\overline{\text{DACK0}}$		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 I²C 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 I²C 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:
1. Active low signals, such as $\overline{\text{RESET}}$, 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 vnput pin.
3. If using I2C, pull-up resistors must be added to open drain SDA/SCL signals.

P1 Connector (continued)							
Pin	CPU Pin	Function 1	Function 2	Fuction 3	General Purpose I/O	Description	Max Voltage
24	B10	UART0_RX	I2C4_SDA	SPI2_SIN	PF4	UART 0 Receive or I²C 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 I²C 4 Serial Clock or SPI 2 Serial Data Out[2,3]	3.3VDC
27	G15	I2C0_SCL	UART8_TX	CAN0_TX	PB2	I²C 0 Serial Clock or UART 8 Transmit or CAN 0 Transmit[2,3]	3.3VDC
28	B11	$\overline{\text{UART0\_RTS}}$	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	I²C 0 Serial Data or UART 8 Receive or CAN 0 Receive[2,3]	3.3VDC
30	E13	$\overline{\text{UART0\_CTS}}$	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 I²C 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 I²C 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	$\overline{\text{UART1\_RTS}}$	UART5_RX	SPI3_CS0	PE1/RGPIO8	UART 1 Request to Send or UART 5 Recieve 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	$\overline{\text{UART1\_CTS}}$	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 Recieve +	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	$\overline{\text{IRQ3}}$	SPI0_CS3	USBH_VBUS_EN	PC3	External Interrupt 3 or SPI 0 Chip Select 3 or USB Host VBUS Enable	3.3VDC
50	M2	$\overline{\text{IRQ2}}$	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

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