MOD5234

Ethernet Core Module

100 Version with RJ-45 | 200 Version with 10-pin header

NetBurner

DATASHEET

Key Points

- Use as a high-performance single board computer or add Ethernet connectivity to a new or existing design
- The included eTPU is essentially an independent microcontroller designed for timing control, I/O handling, serial communications, motor control and engine control applications.
- Industrial temperature range (-40°C to 85°C)
- Customize with development kit

Device Connectivity

- 10/100Mbps Ethernet
- 3 UARTs, I²C, CAN, and SPI
- SD/MMC flash card ready
- 49 digital I/Os
- 16-bit address and data bus with 3 chip selects
- eTPU

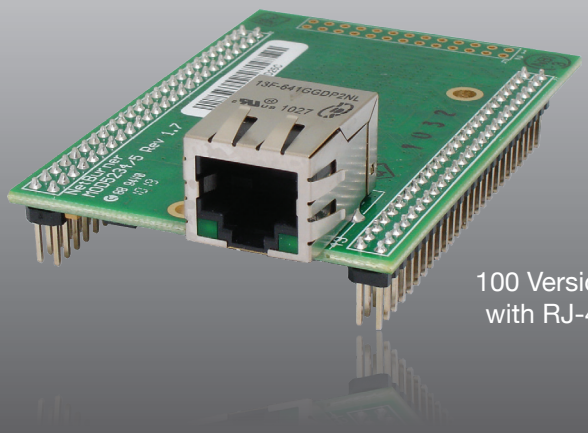
Performance and memory

- 32-bit 147.5 MHz Processor
- 8MB SDRAM and 2MB Flash

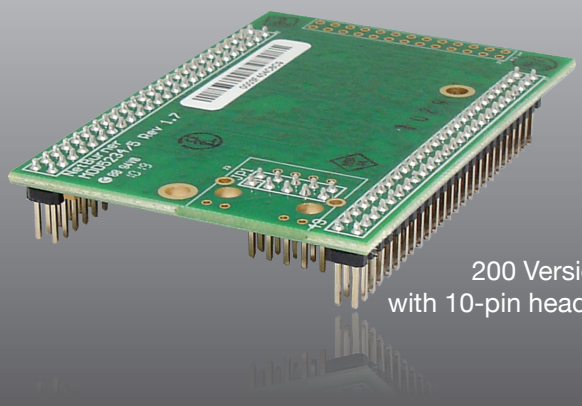
Companion development kit

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, SSL/TLS 1.3, HTTP web server, FTP, E-mail, and flash file system
- System software: NBRTOS, ANSI C/C++ compiler and linker



100 Version with RJ-45



200 Version with 10-pin header

Specifications

Processor and Memory
32-bit Freescale ColdFire 5234 running at 147.5MHz with 8MB SDRAM and 2MB Flash

Network Interface
10/100 BaseT with RJ-45 connector (100 Version)
10-pin header (200 Version)

eTPU
The programmable I/O controller has its own core and memory system, enabling it to perform complex timing and I/O management independently of the primary CPU. The eTPU is essentially an independent microcontroller designed for timing control, I/O handling, serial communications, motor control and engine control applications.

Data I/O Interface (J1 and J2)
- Up to 3 UARTs
- Up to 49 digital I/O
- Up to 2 external timer in and up to 3 timer outputs
- Up to 4 external IRQs
- I^2C interface
- CAN 2.0b controller
- SPI interface
- SD/MMC flash card ready
- eTPU

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:
- 3 TTL ports
- Add external level shifter for RS-232
- Add external level shifter for RS-422/485 (up to three ports)
- UART0 with RTS/CTS
- UART1 or UART2 with RTS/CTS

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

Physical Characteristics
Dimensions (inches): 2.95” x 2.00”
Weight: 1 oz.
Mounting Holes: 2 x 0.125” dia.

Power
DC Input Voltage: 3.3V @ 380mA 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.

Part Numbers

MOD5234 Ethernet Core Module (100 Version, with RJ-45)
Part Number: MOD5234-100IR

MOD5234 Ethernet Core Module (200 Version, with 10-pin header)
Part Number: MOD5234-200IR

MOD5234 LC Development Kit
Part Number: NNDK-MOD5234LC-KIT
Kit includes all the hardware and software you need to customize the included platform hardware. See NetBurner Store product page for package contents. Note: Includes the MOD-DEV-70 development board.

MOD5234 Development Kit
Part Number: NNDK-MOD5234-KIT
Kit includes all the hardware and software you need to customize the included platform hardware. See NetBurner Store product page for package contents. Note: Includes the MOD-DEV-100 development board.

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.

Refer to the application note, “Adding an External Ethernet RJ-45 Connector and PCB Layout Guidlines for NetBurner -200 Version Modules”, for details and examples.

Table 1: **Pinout and Signal Descriptions for JP2 Header** [1]

Pin	Signal	Description
1	TX-	Transmit -
2	TX+	Transmit +
3	TXCT[1]	Transmit Data Center Tap
4	RX+	Receive +
5	RX-	Receive -
6	RXCT	Receive Data Center Tap
7	GND	Ground
8	N/C	Not Connected
9	LED	LED control sink, link/activity
10	LED	LED control sink, speed

Note:
1. 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 2 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**	**General Purpose I/O**	**Description**	**Max Voltage**
1		GND			Ground	-
2		GND			Ground	-
3		VCC3V			Input power 3.3 VDC	3.3VDC
4	L16	R/$\overline{W}$			Read / NOT Write	3.3VDC
5	B13	$\overline{CS1}$		PCS1	Chip Select 1[2]	3.3VDC
6	D12	$\overline{CS2}$	$\overline{SD\_CS0}$	PCS2	Chip Select 2[2] or SDRAM Chip Select 0	3.3VDC
7	B12	$\overline{CS3}$	$\overline{SD\_CS1}$	PCS3	Chip Select 3[2] or SDRAM Chip Select 1	3.3VDC
8	T7	$\overline{OE}$			Output Enable	3.3VDC
9	B9	$\overline{BS2}$	$\overline{CAS2}$		Byte Strobe for D16 to D23 (8 bits)[1] or Column Address Strobe 2[1]	3.3VDC
10	C9	$\overline{BS3}$	$\overline{CAS3}$		Byte Strobe for D24 to D31 (8 bits)[1]or Column Address Strobe 3[1]	3.3VDC
11		$\overline{TIP}$			Transfer in Progress[2]	3.3VDC
12	R1	D16			Data Bus - Data 16[2]	3.3VDC
13	K14	$\overline{TA}$		PBUSCTL6	Transfer Acknowledge	3.3VDC
14	P2	D18			Data Bus - Data 18[2]	3.3VDC
15	P1	D17			Data Bus - Data 17[2]	3.3VDC
16	N2	D20			Data Bus - Data 20[2]	3.3VDC
17	N1	D19			Data Bus - Data 19[2]	3.3VDC
18	M2	D22			Data Bus - Data 22[2]	3.3VDC
19	M1	D21			Data Bus - Data 21[2]	3.3VDC
20	L1	D24			Data Bus - Data 24[2]	3.3VDC
21	M3	D23			Data Bus - Data 23[2]	3.3VDC
22	L3	D26			Data Bus - Data 26[2]	3.3VDC
23	L2	D25			Data Bus - Data 25[2]	3.3VDC

Note:

1. Active low signals, such as $\overline{RESET}$, are indicated with an overbar.
2. The TIP signal is the logical AND of *CS1, *CS2 and *CS3. 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)							
Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
24	K1	D28				Data Bus - Data 28[2]	3.3VDC
25	L4	D27				Data Bus - Data 27[2]	3.3VDC
26	K3	D30				Data Bus - Data 30[2]	3.3VDC
27	K2	D29				Data Bus - Data 29[2]	3.3VDC
28	T15	$\overline{\text{RESET}}$				Processor Reset Input	3.3VDC
29	K4	D31				Data Bus - Data 31[2]	3.3VDC
30	T14	$\overline{\text{RSTOUT}}$				Processor Reset Output	3.3VDC
31	M16	CLK_OUT				Buffer Clock Out (CLKOUT-73.728 Mhz)[3]	3.3VDC
32	H13	A0				Data Bus - Address 0	3.3VDC
33	H14	A1				Data Bus - Address 1	3.3VDC
34	H15	A2				Data Bus - Address 2	3.3VDC
35	H16	A3				Data Bus - Address 3	3.3VDC
36	G13	A4				Data Bus - Address 4	3.3VDC
37	G14	A5				Data Bus - Address 5	3.3VDC
38	G15	A6				Data Bus - Address 6	3.3VDC
39	F13	A7				Data Bus - Address 7	3.3VDC
40	F14	A8				Data Bus - Address 8	3.3VDC
41	F15	A9				Data Bus - Address 9	3.3VDC
42	E13	A10				Data Bus - Address 10	3.3VDC
43	E14	A11				Data Bus - Address 11	3.3VDC
44	E15	A12				Data Bus - Address 12	3.3VDC
45	E16	A13				Data Bus - Address 13	3.3VDC
46	D14	A14				Data Bus - Address 14	3.3VDC
47	D15	A15				Data Bus - Address 15	3.3VDC
48		VCC3V				Input power 3.3 VDC	3.3VDC
49		GND				Ground	-
50		GND				Ground	-

Note:

1. Active low signals, such as $\overline{\text{RESET}}$, are indicated with an overbar.
2. The TIP signal is the logical AND of *CS1, *CS2 and *CS3. 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.
3. The CLKOUT signal is 1/2 the system frequency of 147.456 MHz.

Table 3: **Pinout and Signal Descriptions for J2 Connector** [1]

J2 Connector							
Pin	**CPU Pin**	**Function 1**	**Function 2**	**Fuction 3**	**General Purpose I/O**	**Description**	**Max Voltage**
1		GND				Ground	-
2		VCC3V				Input power 3.3 VDC	3.3VDC
3	G2	UART0_RX			PUARTL0	UART 0 Receive[2]	3.3VDC
4	H2	UART0_TX			PUARTL1	UART 0 Transmit[2]	3.3VDC
5	A6	TPUCH1			ETPU1	eTPU Channel 1	3.3VDC
6	A7	TPUCH0			ETPU0	eTPU Channel 0	3.3VDC
7	B4	TPUCH3			ETPU3	eTPU Channel 3	3.3VDC
8	A4	TPUCH2			ETPU2	eTPU Channel 2	3.3VDC
9	B3	TPUCH5			ETPU5	eTPU Channel 5	3.3VDC
10	A3	TPUCH4			ETPU4	eTPU Channel 4	3.3VDC
11	B2	TPUCH7			ETPU7	eTPU Channel 7	3.3VDC
12	A2	TPUCH6			ETPU6	eTPU Channel 6	3.3VDC
13	C2	TPUCH9			ETPU9	eTPU Channel 9	3.3VDC
14	B1	TPUCH8			ETPU8	eTPU Channel 8	3.3VDC
15	D2	TPUCH11			ETPU11	eTPU Channel 11	3.3VDC
16	C1	TPUCH10			ETPU10	eTPU Channel 10	3.3VDC
17	E2	TPUCH13			ETPU13	eTPU Channel 13	3.3VDC
18	D1	TPUCH12			ETPU12	eTPU Channel 12	3.3VDC
19	F2	TPUCH15			ETPU15	eTPU Channel 15	3.3VDC
20	E1	TPUCH14			ETPU14	eTPU Channel 14	3.3VDC
21	A11	UART1_RX	CAN0_RX		PUARTL4	UART 1 Receive[2] or CAN 0 Receive	3.3VDC
22	A12	UART1_TX	CAN0_TX		PUARTL5	UART 1 Transmit[2] or CAN 0 Transmit	3.3VDC
23	B11	$\overline{\text{UART1\_RTS}}$	$\overline{\text{UART2\_RTS}}$		PUARTL6	UART 1 Request To Send[2] or UART 2 Request to Send[2]	3.3VDC
24	C11	$\overline{\text{UART1\_CTS}}$	$\overline{\text{UART2\_CTS}}$		PUARTL7	UART 1 Clear To Send[2] or UART 2 Clear to Send[2]	3.3VDC
25	B8	SPI_CLK	I2C_SCL		PQSPI2	SPI Clock or I²C Serial Clock[3]	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 DTn_IN vnput pin.
3. If using I²C, the module must add pull-up resistors to SDA/SCL.

J2 Connector (continued)							
Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
26	F1	TCR_CLK			PETPU2	eTPU Time Base Clock	3.3VDC
27	C8	SPI_DIN	I2C_SDA		PQSPI1	SPI Data In or I²C Serial Data[3]	3.3VDC
28	D8	SPI_DOUT			PQSPI0	SPI Data Out	3.3VDC
29	G1	$\overline{\text{UART0\_CTS}}$			PUARTL3	UART 0 Clear To Send[2]	3.3VDC
30	D9	SPI_CS0			PQSPI3	SPI Chip Select 0	3.3VDC
31	G4	T0IN	$\overline{\text{DREQ0}}$		PTIMER1	Timer Input 0 or DMA Request 0	3.3VDC
32	J13	UTPUODIS			PETPU1	eTPU Channel Output Disable Signal (Upper)	3.3VDC
33	R10	T2OUT	DACK2		PTIMER4	Timer Output 2 or DMA Acknowledge 2	3.3VDC
34	R7	T1OUT	DACK1		PTIMER2	Timer Output 1 or DMA Acknowledge 1	3.3VDC
35	J14	LTPUODIS			PETPU0	eTPU Channel Output Disable Signal (Lower)	3.3VDC
36	G3	T0OUT	DACK0		PTIMER0	Timer Output 0 or DMA Acknowledge 0	3.3VDC
37	P7	T1IN	$\overline{\text{DREQ1}}$	T1OUT	PTIMER3	Timer Input 1 or DMA Request 1 or Timer Output 1	3.3VDC
38	H3	$\overline{\text{UART0\_RTS}}$			PUARTL2	UART 0 Request To Send[2]	3.3VDC
39	L15	I2C_SDA	CAN0_RX		PFECI2C0	I²C Serial Data[3] or CAN 0 Receive	3.3VDC
40	B10	$\overline{\text{SPI\_CS1}}$	SD_CKE		PQSPI4	SPI Chip Select 1 or SDRAM Clock Enable	3.3VDC
41	D10	UART2_RX			PUARTH0	UART 2 Receive[2]	3.3VDC
42	L14	I2C_SCL	CAN0_TX		PFECI2C1	I²C Serial Clock[3] or CAN 0 Transmit	3.3VDC
43	N10	$\overline{\text{IRQ1}}$			PIRQ1	External Interrupt 1	3.3VDC
44	D11	UART2_TX			PUARTH1	UART 2 Transmit[2]	3.3VDC
45	R9	$\overline{\text{IRQ3}}$			PIRQ3	External Interrupt 3	3.3VDC
46		GND				Ground	-
47	N9	$\overline{\text{IRQ5}}$			PIRQ5	External Interrupt 5	3.3VDC
48	R8	$\overline{\text{IRQ7}}$			PIRQ7	External Interrupt 7	3.3VDC
49		GND				Ground	-
50		VCC3V				Input power 3.3 VDC	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 DTn_IN vnput pin.
3. If using I²C, the module must add pull-up resistors to SDA/SCL.