

# MOD5234

## Ethernet Core Module

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



## 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, I<sup>2</sup>C, 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

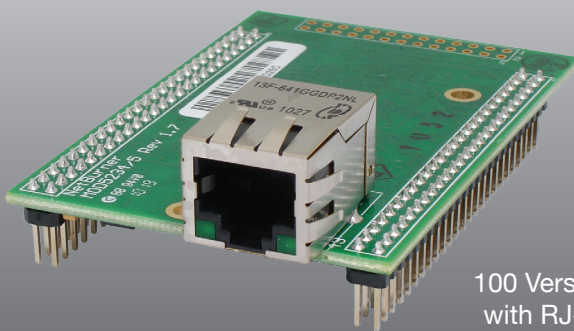
### Companion development kit

*The following is available with the development kit:*

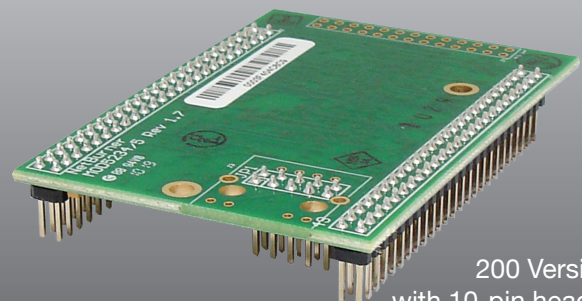
- Customize any aspect of operation including web pages, data filtering, or custom network applications
- Development software: NB Eclipse IDE, Graphical debugger, deployment tools, and examples
- Communication software: TCP/IP stack, HTTP web server, FTP, E-mail, and flash file system
- System software: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



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<sup>2</sup>C 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)

Note: UART 0/1/2 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: 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.

### **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](mailto:sales@netburner.com)

Online Store: [www.NetBurner.com](http://www.NetBurner.com)

Telephone: 1-800-695-6828

# MOD5234

## 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 JP2 Header <sup>(1)</sup>

Pin	Signal	Description
1	TX-	Transmit -
2	TX+	Transmit +
3	VCC <sup>1</sup>	2.5V
4	RX+	Recieve +
5	RX-	Recieve -
6	VCC <sup>1</sup>	2.5V
7	GND	Ground
8	N/C	Not Connected
9	LED	Link LED
10	LED	Speed LED

Note:

1. Ethernet magnetics center tap voltage provided by NetBurner device

# MOD5234

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 <sup>(1)</sup>

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	CS $\overline{1}$		PCS1	Chip Select 1 <sup>2</sup>	3.3VDC
6	D12	CS $\overline{2}$	SD_CS $\overline{0}$	PCS2	Chip Select 2 <sup>2</sup> or SDRAM Chip Select 0	3.3VDC
7	B12	CS $\overline{3}$	SD_CS $\overline{1}$	PCS3	Chip Select 3 <sup>2</sup> or SDRAM Chip Select 1	3.3VDC
8	T7	O $\overline{E}$			Output Enable	3.3VDC
9	B9	BS $\overline{2}$	CAS $\overline{2}$		Byte Strobe for D16 to D23 (8 bits) <sup>1</sup> or Column Address Strobe 2 <sup>1</sup>	3.3VDC
10	C9	BS $\overline{3}$	CAS $\overline{3}$		Byte Strobe for D24 to D31 (8 bits) <sup>1</sup> or Column Address Strobe 3 <sup>1</sup>	3.3VDC
11		TIP			Transfer in Progress <sup>2</sup>	3.3VDC
12	R1	D16			Data Bus - Data 16 <sup>2</sup>	3.3VDC
13	K14	TA		PBUSCTL6	Transfer Acknowledge	3.3VDC
14	P2	D18			Data Bus - Data 18 <sup>2</sup>	3.3VDC
15	P1	D17			Data Bus - Data 17 <sup>2</sup>	3.3VDC
16	N2	D20			Data Bus - Data 20 <sup>2</sup>	3.3VDC
17	N1	D19			Data Bus - Data 19 <sup>2</sup>	3.3VDC
18	M2	D22			Data Bus - Data 22 <sup>2</sup>	3.3VDC
19	M1	D21			Data Bus - Data 21 <sup>2</sup>	3.3VDC
20	L1	D24			Data Bus - Data 24 <sup>2</sup>	3.3VDC
21	M3	D23			Data Bus - Data 23 <sup>2</sup>	3.3VDC
22	L3	D26			Data Bus - Data 26 <sup>2</sup>	3.3VDC
23	L2	D25			Data Bus - Data 25 <sup>2</sup>	3.3VDC

Note:

1. Active low signals, such as RESET, are indicated with an overbar.
2. The TIP signal is the logical AND of \*CS1, \*CS2 and \*CS3. TIP can be 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.

# MOD5234

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 <sup>2</sup>	3.3VDC
25	L4	D27				Data Bus - Data 27 <sup>2</sup>	3.3VDC
26	K3	D30				Data Bus - Data 30 <sup>2</sup>	3.3VDC
27	K2	D29				Data Bus - Data 29 <sup>2</sup>	3.3VDC
28	T15	RESET				Processor Reset Input	3.3VDC
29	K4	D31				Data Bus - Data 31 <sup>2</sup>	3.3VDC
30	T14	RSTOUT				Processor Reset Output	3.3VDC
31	M16	CLK_OUT				Buffer Clock Out (CLKOUT-73.728 Mhz) <sup>3</sup>	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:

- Active low signals, such as RESET, are indicated with an overbar.
- The TIP signal is the logical AND of \*CS1, \*CS2 and \*CS3. TIP can be 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.
- The CLKOUT signal is 1/2 the system frequency of 147.456 MHz.

Table 3: Pinout and Signal Descriptions for J2 Connector <sup>(1)</sup>

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 <sup>2</sup>	3.3VDC
4	H2	UART0_TX			PUARTL1	UART 0 Transmit <sup>2</sup>	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 <sup>2</sup> or CAN 0 Receive	3.3VDC
22	A12	UART1_TX	CAN0_TX		PUARTL5	UART 1 Transmit <sup>2</sup> or CAN 0 Transmit	3.3VDC
23	B11	<u>UART1_RTS</u>	<u>UART2_RTS</u>		PUARTL6	UART 1 Request To Send <sup>2</sup> or UART 2 Request to Send <sup>2</sup>	3.3VDC
24	C11	<u>UART1_CTS</u>	<u>UART2_CTS</u>		PUARTL7	UART 1 Clear To Send <sup>2</sup> or UART 2 Clear to Send <sup>2</sup>	3.3VDC
25	B8	SPI_CLK	I2C_SCL		PQSPI2	SPI Clock or I <sup>2</sup> C Serial Clock <sup>3</sup>	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 UART<sub>n</sub> can be clocked by the corresponding DT<sub>n</sub>\_IN vnput pin.
- If using I<sup>2</sup>C, the module must add pull-up resistors to SDA/SCL.

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J2 Connector (continued)						Max Voltage
Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	
26	F1	TCR_CLK			PETPU2	eTPU Time Base Clock
27	C8	SPI_DIN	I2C_SDA		PQSPI1	SPI Data In or I <sup>2</sup> C Serial Data <sup>3</sup>
28	D8	SPI_DOUT			PQSPI0	SPI Data Out
29	G1	UART0_CTS			PUARTL3	UART 0 Clear To Send <sup>2</sup>
30	D9	SPI_CS0			PQSPI3	SPI Chip Select 0
31	G4	T0IN	DREQ0		PTIMER1	Timer Input 0 or DMA Request 0
32	J13	UTPUODIS			PETPU1	eTPU Channel Output Disable Signal (Upper)
33	R10	T2OUT	DACK2		PTIMER4	Timer Output 2 or DMA Acknowledge 2
34	R7	T1OUT	DACK1		PTIMER2	Timer Output 1 or DMA Acknowledge 1
35	J14	LTPUODIS			PETPU0	eTPU Channel Output Disable Signal (Lower)
36	G3	T0OUT	DACK0		PTIMER0	Timer Output 0 or DMA Acknowledge 0
37	P7	T1IN	DREQ1	T1OUT	PTIMER3	Timer Input 1 or DMA Request 1 or Timer Output 1
38	H3	UART0_RTS			PUARTL2	UART 0 Request To Send <sup>2</sup>
39	L15	I2C_SDA	CAN0_RX		PFECI2C0	I <sup>2</sup> C Serial Data <sup>3</sup> or CAN 0 Receive
40	B10	SPI_CS1	SD_CKE		PQSPI4	SPI Chip Select 1 or SDRAM Clock Enable
41	D10	UART2_RX			PUARTH0	UART 2 Receive <sup>2</sup>
42	L14	I2C_SCL	CAN0_TX		PFECI2C1	I <sup>2</sup> C Serial Clock <sup>3</sup> or CAN 0 Transmit
43	N10	IRQ1			PIRQ1	External Interrupt 1
44	D11	UART2_TX			PUARTH1	UART 2 Transmit <sup>2</sup>
45	R9	IRQ3			PIRQ3	External Interrupt 3
46		GND				Ground
47	N9	IRQ5			PIRQ5	External Interrupt 5
48	R8	IRQ7			PIRQ7	External Interrupt 7
49		GND				Ground
50		VCC3V				Input power 3.3 VDC

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 DTn\_IN vnpin pin.
3. If using I<sup>2</sup>C, the module must add pull-up resistors to SDA/SCL.



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