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Understanding Embedded - Microcontroller, Microprocessor, FPGA Modules

Embedded - Microcontroller, Microprocessor, and FPGA Modules are fundamental components in modern electronic systems, offering a wide range of functionalities and capabilities. Microcontrollers are compact integrated circuits designed to execute specific control tasks within an embedded system. They typically include a processor, memory, and input/output peripherals on a single chip. Microprocessors, on the other hand, are more powerful processing units used in complex computing tasks, often requiring external memory and peripherals. FPGAs (Field Programmable Gate Arrays) are highly flexible devices that can be configured by the user to perform specific logic functions, making them invaluable in applications requiring customization and adaptability.

Applications of Embedded - Microcontroller,

Details	
Product Status	Active
Module/Board Type	MCU, Ethernet Core
Core Processor	ColdFire 5282
Co-Processor	-
Speed	66MHz
Flash Size	512KB
RAM Size	8.064MB
Connector Type	RJ-45, 2x50 Header
Size / Dimension	2.6" x 2" (66.04mm x 50.8mm)
Operating Temperature	-40°C ~ 85°C
Purchase URL	https://www.e-xfl.com/product-detail/netburner/mod5282-100ir

MOD5282

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
- Customize with a development kit and begin writing application code immediately!
- Industrial temperature range (-40°C to 85°C)

Device Connectivity

- 10/100Mbps Ethernet
- 3 UARTs, I²C, CAN and SPI
- SD/MMC flash card ready
- 50 digital I/Os
- Eight 10-bit analog-to-digital converters (ADC)
- 16-bit address and data bus with 3 chip selects

Performance and memory

- 32-bit 66 MHz Processor
- 8MB SDRAM and 512KB Flash

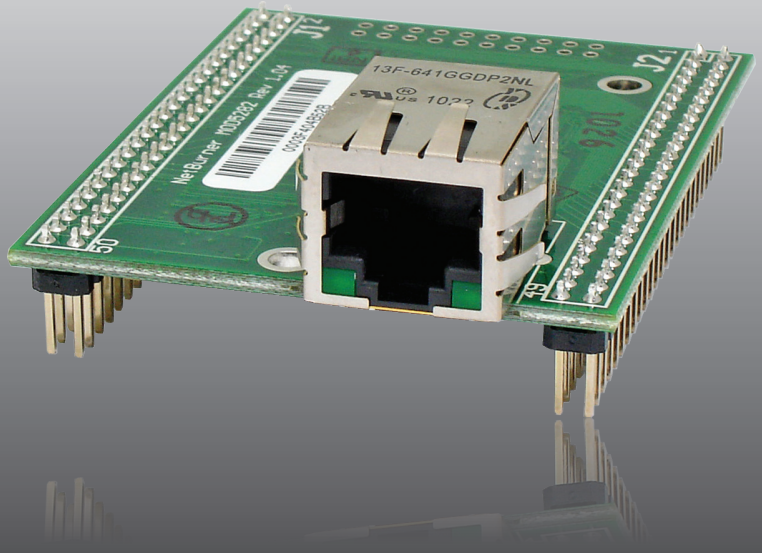
Companion development kit

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:

- SNMP



Specifications

Processor and Memory
32-bit Freescale ColdFire 5282 running at 66MHz with 8MB SDRAM, 512KB Flash, and 64Kb SRAM.

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

Data I/O Interface (J1 and J2)
- Up to 3 UARTs
- Up to 50 digital I/O
- Up to 6 PWM outputs (via general purpose timers)
- Up to eight 10-bit analog-to-digital converters (ADC) with an input range of 0 - 5V
- 16-bit address bus and 16-bit data bus with 3 chip selects
- Up to 4 external timer in and up to 4 timer outputs
- Up to 8 external general purpose timers
- Up to 4 external IRQs
- I^2C interface
- SPI interface
- CAN interface
- SD/MMC flash card ready

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 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): 2.60” x 2.00”
Weight: 1 oz.
Mounting Holes: 2 x 0.125” dia.

Power
DC Input Voltage (with Ethernet):
3.3V @ 380mA typical
3.3V @ 630mA max

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

MOD5282 Ethernet Core Module (100 Version, with RJ-45)
Part Number: MOD5282-100IR

MOD5282 Ethernet Core Module (200 Version, with 10-pin header)
Part Number: MOD5282-200IR

MOD5282 Development Kit
Part Number: NNDK-MOD5282-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.

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 JP2 Header** (1)

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

Note:

1. The 2.5V pins are used for the magnetics taps and LED power.

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 2-3 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 3.3V	3.3VDC
4	N15	R/$\overline{W}$		PE4	Read / NOT Write[1]	3.3VDC
5	L14	$\overline{CS1}$		PJ1	Chip Select 1[1]	3.3VDC
6	L15	$\overline{CS2}$		PJ2	Chip Select 2[1]	3.3VDC
7	L16	$\overline{CS3}$		PJ3	Chip Select 3[1]	3.3VDC
8	N16	$\overline{OE}$		PE7	Output Enable[1]	3.3VDC
9	T15	$\overline{BS2}$			Byte Strobe for D16 to D23 (8 bits)[1]	3.3VDC
10	P14	$\overline{BS3}$			Byte Strobe for D24 to D31 (8 bits)[1]	3.3VDC
11	M14	$\overline{TIP}$	SYNCB	PE0	Transfer in Progress[1] or GP Timer B Synchronization Input	3.3VDC
12	K3	D16			Data Bus - Data 16	3.3VDC
13	P16	$\overline{TA}$		PE6	Transfer Acknowledge[1]	3.3VDC
14	K1	D18			Data Bus - Data 18	3.3VDC
15	K2	D17			Data Bus - Data 17	3.3VDC
16	J3	D20			Data Bus - Data 20	3.3VDC
17	J4	D19			Data Bus - Data 19	3.3VDC
18	J1	D22			Data Bus - Data 22	3.3VDC
19	J2	D21			Data Bus - Data 21	3.3VDC
20	H3	D24			Data Bus - Data 24	3.3VDC
21	H4	D23			Data Bus - Data 23	3.3VDC
22	H1	D26			Data Bus - Data 26	3.3VDC
23	H2	D25			Data Bus - Data 25	3.3VDC
24	G3	D28			Data Bus - Data 28	3.3VDC
25	G4	D27			Data Bus - Data 27	3.3VDC

Note:
1. Active low signals, such as $\overline{RESET}$, are indicated with an overbar.

J1 Connector (continued)					
Pin	CPU Pin	Function	General Purpose I/O	Description	Max Voltage
26	G1	D30		Data Bus - Data 30	3.3VDC
27	G2	D29		Data Bus - Data 29	3.3VDC
28	R11	$\overline{\text{RESET}}$		Processor Reset Input[1]	3.3VDC
29	F3	D31		Data Bus - Data 31	3.3VDC
30	P11	$\overline{\text{RSTOUT}}$		Processor Reset Output[1]	3.3VDC
31	N7	CLK_OUT		Clock Out (CLKOUT-66.355 Mhz)	3.3VDC
32	F2	A0		Data Bus - Address 0	3.3VDC
33	F1	A1		Data Bus - Address 1	3.3VDC
34	E4	A2		Data Bus - Address 2	3.3VDC
35	E3	A3		Data Bus - Address 3	3.3VDC
36	E2	A4		Data Bus - Address 4	3.3VDC
37	E1	A5		Data Bus - Address 5	3.3VDC
38	D4	A6		Data Bus - Address 6	3.3VDC
39	D3	A7		Data Bus - Address 7	3.3VDC
40	D2	A8		Data Bus - Address 8	3.3VDC
41	D1	A9		Data Bus - Address 9	3.3VDC
42	C3	A10		Data Bus - Address 10	3.3VDC
43	C2	A11		Data Bus - Address 11	3.3VDC
44	C1	A12		Data Bus - Address 12	3.3VDC
45	B2	A13		Data Bus - Address 13	3.3VDC
46	B1	A14		Data Bus - Address 14	3.3VDC
47	A2	A15		Data Bus - Address 15	3.3VDC
48		VCC3V		Input power 3.3V	3.3VDC
49		GND		Ground	-
50		GND		Ground	-

Note:

1. Active low signals, such as $\overline{\text{RESET}}$, are indicated with an overbar.

Table 3: **Pinout and Signal Descriptions for J2 Connector** (1)

J2 Connector							
Pin	**CPU Pin**	**Function 1**	**Function 2**	**Function 3**	**General Purpose I/O**	**Description**	**Max Voltage**
1		GND				Ground	-
2		VCC3V				Input power 3.3V	3.3VDC
3	N6	UART0_RX			PUA1	UART 0 Receive[4]	3.3VDC
4	T7	UART0_TX			PUA0	UART 0 Transmit[4]	3.3VDC
5		ADVCC				ADVCC	5V
6	R1	ADC_IN3			PQB3	Analog to Digital Converter Input 3	5V
7	R2	ADC_IN1			PQB1	Analog to Digital Converter Input 1	5V
8	T2	ADC_IN2			PQB2	Analog to Digital Converter Input 2	5V
9	R3	ADC_IN56			PQA4	Analog to Digital Converter Input 56	5V
10	T3	ADC_IN0			PQB0	Analog to Digital Converter Input 0	5V
11	T4	ADC_IN53			PQA1	Analog to Digital Converter Input 53	5V
12	R4	ADC_IN52			PQA0	Analog to Digital Converter Input 52	5V
13	P3	ADC_IN55			PQA3	Analog to Digital Converter Input 55	5V
14		GND				Ground	-
15	T13	GPTA3			PTA3	General Purpose Timer A3	3.3VDC
16	T12	GPTB3			PTB3	General Purpose Timer B3	3.3VDC
17	R13	GPTA2			PTA2	General Purpose Timer A2	3.3VDC
18	R12	GPTB2			PTN2	General Purpose Timer B2	3.3VDC
19	P13	GPTA1			PTA1	General Purpose Timer A1	3.3VDC
20	P12	GPTB1			PTB1	General Purpose Timer B1	3.3VDC
21	R7	UART1_RX			PUA3	UART 1 Receive[4]	3.3VDC
22	P7	UART1_TX			PUA1	UART 1 Transmit[4]	3.3VDC
23	N13	GPTA0			PTA0	General Purpose Timer A0	3.3VDC
24	N12	GPTB0			PTB0	General Purpose Timer B0	3.3VDC
25	F14	SPI_CLK			PQS2	SPI Clock	3.3VDC

Note:
1. Active low signals, such as $\overline{\text{RESET}}$, are indicated with an overbar.
2. If using I^2C, pull-up resistors must be added to SDA/SCL.
3. The third UART (UART2) can be routed to either of the two pin configurations: replacing CAN RX andTX, or I^2C SDA and SCL.
4. TIN0, TIN1 and TIN2 can be used as external baud rate clocks for UART0, UART1 and UART2

J2 Connector (continued)							
Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
26	G14	$\overline{\text{SPI\_CS3}}$			PQS6	SPI Chip Select 3	3.3VDC
27	E16	SPI_DIN			PQS1	SPI Data In	3.3VDC
28	F13	SPI_DOUT			PQS0	SPI Data Out	3.3VDC
29	K14	T2IN	$\overline{\text{UART1\_CTS}}$	$\overline{\text{UART0\_CTS}}$	PTC1	Timer 2[4] Input or UART 1 Clear to Send[4] or UART 0 Clear to Send[4]	3.3VDC
30	F15	SPI_CS0			PQS3	SPI Chip Select 0	3.3VDC
31	J14	T0IN	$\overline{\text{UART1\_CTS}}$	$\overline{\text{UART0\_CTS}}$	PTD1	Timer 0[4] Input or UART 1 Clear to Send[1,4] or UART 0 Clear to Send[1,4]	3.3VDC
32	K15	T3OUT	$\overline{\text{UART1\_RTS}}$	$\overline{\text{UART0\_RTS}}$	PTC2	Timer 3 Output or UART 1 Request to Send[1,4] or UART 0 Request to Send[1,4]	3.3VDC
33	K13	T2OUT	$\overline{\text{UART1\_CTS}}$	$\overline{\text{UART0\_CTS}}$	PTC0	Timer 2 Output or UART 1 Clear to Send[1,4] or UART 0 Clear to Send[1,4]	3.3VDC
34	J15	T1OUT	$\overline{\text{UART1\_RTS}}$	$\overline{\text{UART0\_RTS}}$	PTD2	Timer 1 Output or UART 1 Request to Send[1,4] or UART 0 Request to Send[1,4]	3.3VDC
35	G13	SPI_CS2			PQS5	SPI Chip Select 2	3.3VDC
36	J13	T0OUT	$\overline{\text{UART1\_CTS}}$	$\overline{\text{UART0\_CTS}}$	PTD0	Timer 0 Output or UART 1 Clear to Send[1,4] or UART 0 Clear to Send[1,4]	3.3VDC
37	J16	T1IN	$\overline{\text{UART1\_RTS}}$	$\overline{\text{UART0\_RTS}}$	PTD3	Timer 1[4] Input or UART 1 Request to Send[1,4] or UART 0 Request to Send[1,4]	3.3VDC
38	K16	T3IN	$\overline{\text{UART1\_RTS}}$	$\overline{\text{UART0\_RTS}}$	PTC3	Timer 3 Input or UART 1 Request to Send[1,4] or UART 0 Request to Send[1,4]	3.3VDC
39	E14	I2C_SDA	UART2_RX		PAS1	I²C Serial Data[2] or UART 2 Receive[3,4]	3.3VDC
40	F16	SPI_CS1			PQS4	SPI Chip Select 1	3.3VDC
41	D16	CAN_RX	UART2_RX		PAS3	CAN Receive or UART 2 Receive[3,4]	3.3VDC
42	E15	I2C_SCL	UART2_TX		PAS0	I²C Serial Clock[2] or UART 2 Transmit[3,4]	3.3VDC
43	D15	$\overline{\text{IRQ1}}$			PNQ1	External Interrupt 1[1]	3.3VDC
44	E13	CAN_TX	UART2_TX		PAS2	CAN Transmit or UART 2 Transmit[3,4]	3.3VDC
45	C16	$\overline{\text{IRQ3}}$			PNQ3	External Interrupt 3[1]	3.3VDC
46		GND				Ground	3.3VDC
47	C14	$\overline{\text{IRQ5}}$			PNQ5	External Interrupt 5[1]	3.3VDC
48	B15	$\overline{\text{IRQ7}}$			PNQ7	External Interrupt 7[1]	3.3VDC
49		GND				Ground	-
50		VCC3V				Input power 3.3V	3.3VDC

Note:
1. Active low signals, such as $\overline{\text{RESET}}$, are indicated with an overbar.
2. If using I²C, pull-up resistors must be added to SDA/SCL.
3. The third UART (UART2) can be routed to either of the two pin configurations: replacing CAN RX andTX, or I²C SDA and SCL.
4. TIN0, TIN1 and TIN2 can be used as external baud rate clocks for UART0, UART1 and UART2