PK70 EX

Embedded Control Device

100 Version

Key Points

- **The design of a finished product:** Metal enclosure, customizable logo, built-in power supply
- **The flexibility of a module:** design your own internal board or use a NetBurner Personality Blade
- **The power of the NetBurner's development suite:** Customize with a development kit and begin writing application code immediately

Device Connectivity

- 10/100Mbps Ethernet
- UART, I²C, and SPI
- SD/MMC flash card support
- 14 digital I/Os
- 5-bit address bus and 8-bit data bus with 3-chip selects

Performance and memory

- 32-bit 147.5 MHz Processor
- 8MB SDRAM and 4MB 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

Specifications

Processor
32-bit Freescale ColdFire 5270 CPU running at 147.5 MHz

Storage
SD/MMC Flash Card Interface with SDHC support (requires exclusive use of SPI signals)

Network Interface
10/100 BaseT with RJ-45 connector

Data I/O Interface (P1)
- UART
- I²C
- SPI
- 14 digital I/O

- 2 external timer in or 3 external timer outputs
- SD/MMC flash card ready
- 5-bit address bus and 8-bit data bus with 3 chip selects
- 3 external IRQs

Serial Configurations
The UART can be configured in the following way:
- 1 TTL port
- Add external level shifter for RS-232

Note: Additional baud rates and higher serial speeds possible with blade boards

DEBUG Serial Port
RS-232 with up to 115,200 baud

LEDs
Link, Speed/Data, Power

Physical Characteristics
Dimensions (inches): 4.4" x 3.9" x 1.2"

Power
DC Input Voltage: 12V@150mA, 7-24V
+5V, +3.3V and raw input voltage are available for use by blade boards
Note: The PK70 current is exclusive of the Personality Blade Board.

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

PK70 EX Embedded Control Device
Part Number: NBPK70EX-100IR

DIN Rail Mounting Kit (100 Version, double sided)
Part Number: DIN-100

DIN Rail Mounting Kit (200 Version, single sided)
Part Number: DIN-200

PK70 Development Kit
Part Number: NNDK-NBPK70EX-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:
The kit does NOT include a NetBurner Personality Blade Board.

Embedded SSL & SSH Security Suite (Module License Version)
Part Number: NBLIC-SSL-MODULE

Available as an option 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.

Personality Blades

The PK70 EX can be customized to add additional functionality with one of the standard NetBurner Personality Blades, or you can create your own. The Personality Blades are installed inside the PK70 EX enclosure.

FPGA Blade Board
Part Number: NBPK**X500**-100CR
Personality Blade board with a a Xilinx Spartan 3E FPGA.

Note:
1. FPGA part type: 3CS500EPQF208
2. FPGA Digikey/Xilinx Part Number: 122-1520-ND/XC3S500E-4PQG208C

Features:
- Hardware layout featuring access to the Xilinx Spartan 3E FPGA 500K 208-PQFP
- Parallel interface between the Spartan 3E and a PK70 EX device
- High Density 62-pin connector
- Program the FPGA anytime with the JTAG connector or at runtime from a NetBurner application
- Code examples demonstrating how to load an FPGA binary file at runtime

For additional details, please see the NetBurner FPGA Blade Board Manual.

Multi-I/O Blade Board
Part Number: NBPKB**M**-100CR
Personality Blade board with 8 analog to digital converters (ADC), 2 digital to analog converters (DAC), and 16 digital I/O.

Features:
- Eight 12-bit ADC have programmable voltage range of +/-10V, 0 to 10V, +/-5V and 0 to 5V
- 16 digital I/O lines are jumper selectable to 3.3 or 5V
- Two 16-bit DAC has 0 to 4.096V outputs

For additional details, please see the NetBurner Multi-I/O Blade Board Reference Guide.

Programmable Xilinx Digital I/O Blade Board
Part Number: NBPKB**D**-100CR
Personality Blade board with 32 channels of general purpose I/O and a Xilinx CPLD.

Features:
- 32 channel digital I/O board
- Each channel is individually programmable to be Hi, Low, Hiz, or input
- Each channel has its own 74HCT125
- driver for 20Ma of drive
- Jumper selectable to be 3.3 or 5V out, and 5V tolerant input
- Includes programmable Xilinx CPLD

Quad UART Blade Board (232 Version)
Part Number: NBPKB**U**-232CR
Personality Blade board with 4 RS-232 serial ports.

Features:
- RS-232 serial device support
- Source code for the factory application is included with any PK70 EX development kit. It includes

support for TCP/UDP/Telnet modes, DHCP/Static IP modes, and custom serial packetization options.
- Four serial ports

For additional details, please see the PK70EX232 Users Manual and PK70ex232 Datasheet.

Quad UART Blade Board (485 Version)
Part Number: NBPKB**U**-485CR
Personality Blade board with 4 RS-485 UARTs.

Features:
- RS-485 serial device support
- Source code for the factory application is included with any PK70 EX development kit. It includes

support for TCP/UDP/Telnet modes, DHCP/Static IP modes, and custom serial packetization options.
- Four serial ports

For additional details, please see the PK70EX485 Users Manual and PK70ex485 Datasheet.

Quad UART Blade Board (232/422/485 Multi Mode Serial Version)
Part Number: NBPKB**U**-MMSCR
Personality Blade board with 4 RS-232 or RS-485 UARTs.

Features:
- RS-232/422/485 serial device support
- Source code for the factory application is included with any PK70 EX development kit. It includes

support for TCP/UDP/Telnet modes, DHCP/Static IP modes, and custom serial packetization options.
- Four serial ports

For additional details, please see the PK70EXMMS Users Manual and PK70exMMS Datasheet.

NTP Time Server with GPS Blade Board
Part Number: NBPKB**G**-100CR
Personality Blade board with NTP Network Time Server

Features:
- Network Time Protocol (NTP) time server
- Precision GPS time reference keeps the system clock accurate
- Web page configuration
- High performance GPS receiver and antennae connector

For additional details, please see the GPS Blade Board Users Manual and NTP Time Server Users Manual.

Prototype Blade Board
Part Number: NBPKB**P**-100CR
Personality Blade board with a prototype area, 40-pin dual row right angle header, and DB-37 female connector.

Features:
- Prototype area
- 40-pin dual row right angle header
- DB-37 Female Connector

For additional details, please see the Bare Personality Blade Board Mechanical Drawing.

NetBurner Personality Blade Development Program
The NetBurner PK70 product can be easily customized to suit your application requirements by creating a custom "Personality Blade". NetBurner has created a prototype and production design service to design and build Personality Blades at a very low cost, with free Non-Recurring Engineering (NRE) hardware design costs for production orders.

Features:
- NetBurner Engineers work with you on the design concept
- Prototypes and low level software
- drivers will be delivered to you
- We can then build production units, or you can build your custom Personality Blade at your own facility

For additional details, please see the PK70 Personality Blade Development Program Datasheet.

Ordering Information
E-mail: sales@netburner.com
Online Store: www.Netburner.com
Telephone: 1-800-695-6828

The Internal Personality Blade Connector

An internal connector enables you to quickly and easily add additional functionality with one of our standard NetBurner Personality Blades, or a blade board you create on your own. Table 1 provides descriptions of pin function of internal NetBurner Personality Blade interface connector. Refer to Figure 1-2 for the appropriate connector pin assignments.

Table 1: **Internal NetBurner Personality Blade Board Interface Connector Signal Descriptions** [1]

Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
1		VCC3V				Available power 3.3V@750mA	3.3V
2		GND				Ground	-
3	J13	R/$\overline{W}$				Read / NOT Write	3.3V
4	N6	$\overline{OE}$				Output Enable	3.3V
5	N13	$\overline{RESET}$				Processor Reset Input	3.3V
6	H11	$\overline{TA}$			PBUSCTL6	Transfer Acknowledge	3.3V
7		BUFCLK				Buffer Clock Out (CLKOUT-73.728 Mhz)[2]	3.3V
8	P13	$\overline{RSTOUT}$				Processor Reset Output	3.3V
9	J1	DB25				Data Bus - Data 25	3.3V
10	J2	DB24				Data Bus - Data 24	3.3V
11	H3	DB27				Data Bus - Data 27	3.3V
12	H4	DB26				Data Bus - Data 26	3.3V
13	H1	DB29				Data Bus - Data 29	3.3V
14	H2	DB28				Data Bus - Data 28	3.3V
15	G1	DB31				Data Bus - Data 31	3.3V
16	G2	DB30				Data Bus - Data 30	3.3V
17	G12	3VA1				Data Bus - Address 1[3]	3.3V
18	G13	3VA0				Data Bus - Address 0[3]	3.3V
19	F14	3VA3				Data Bus - Address 3[3]	3.3V
20	G11	3VA2				Data Bus - Address 2[3]	3.3V

Note:
1. Active low signals, such as $\overline{RESET}$, are indicated with an overbar
2. The CLKOUT signal is 1/2 the system frequency of 147.456 MHz.
3. Address lines (3VAx) are 3.3V only.

Pin	CPU Pin	Function 1	Function 2	Function 3	General Purpose I/O	Description	Max Voltage
						J1 Connector (continued)	
21	B10	$\overline{CS1}$			PCS1	Chip Select 1	3.3V
22	F13	3VA4				Data Bus - Address 4[2]	3.3V
23	A9	$\overline{CS3}$	SD_CS1			Chip Select 3	3.3V
24	C9	$\overline{CS2}$	SD_CS0			Chip Select 2	3.3V
25	J12 D8	I2C_SDA	UART1_RX		PFECI2C1	I²C Data Line[3] or UART 1 Receive	3.3V
26	J11 D9	I2C_SCL	UART1_TX		PFECI2C0	I²C Clock Line[3] or UART 1 Transmit	3.3V
27	L6 C8	T1IN	T1OUT	$\overline{DREQ1}$	PTIMER3	Timer Input 1 or Timer Output 1 or DMA Request 1	3.3V
28	G14	TOUT3	SPI_CS3		PTIMER6	Timer Out 3 or SPI Chip Select 3[5]	3.3V
29	L8	$\overline{IRQ1}$			PIRQ1	External Interrupt 1[4]	3.3V
30	N8	$\overline{IRQ3}$			PIRQ3	External Interrupt 3[4]	3.3V
31	N7	$\overline{IRQ7}$			PIRQ7	External Interrupt 7[4]	3.3V
32	A6	$\overline{SPI\_CS0}$			PQSPI3	SPI Chip Select 0[5]	3.3V
33	B5	SPI_DIN	I2C_SDA		PQSPI1	SPI Data In[5] or I²C Serial Data[3]	3.3V
34	A5	SPI_DOUT			PQSPI0	SPI Data Out[5]	3.3V
35	C5	SPI_CLK	I2C_SCL		PQSPI2	SPI Clock[5] or I²C Serial Clock[3]	3.3V
36	M9	T2IN	T2OUT	$\overline{DREQ2}$	PTIMER5	Timer Input or Timer 2 Output 2 or DMA Request 2	3.3V
37		VCC5V				Available Power 5V@1A	5V
38		GND				Ground	-
39		VCCRAW				DC Input Voltage Power[6]	3.3V
40		GND				Ground	-

Note:
1. Active low signals, such as $\overline{RESET}$, are indicated with an overbar
2. Address lines (3VAx) are 3.3V only.
3. If using I²C, pull-up resistors must be added to open drain SDA/SCL signals.
4. IRQ's pulled up to 3.3V with 4.7K resistor.
5. No pull-ups/down on SPI signals.
6. Same voltage rail that is used to power the device externally.