# NetBurner's Network Development Kit

# PK70 Hardware Manual

**Revision 1.2**
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# 1. Introduction

NetBurner is your single source for hardware, software, development kits, tools, technical support, and custom design services. These elements are combined in a unique package that lets you concentrate on developing your product instead of reinventing network protocols and designing hardware. NetBurner solutions also allow you to reduce risk and improve functionality with a complete proven design, including hardware, TCP/IP Stack, RTOS and all necessary tools. NetBurner is indeed the fastest way to network enable your product.

Whether you want to design your own hardware, or are looking for a standard off-the-shelf network solution, NetBurner provides the software, hardware and tools to get your product to market in the shortest possible time. NetBurner offers a full line of services from board level designs and hourly consulting to complete turnkey systems. NetBurner also offers a Royalty-Free License option. Please contact our **Sales** Department for more information on any of these options.

Please ensure that your NetBurner PK70 Network Development Kit is registered by going to our **Support** site now to set up your account. Registration is quick and easy. The registration data stored on NetBurner's server will **not** be sold, exchanged or knowingly released to third parties **without** prior written permission from the individuals affected.

# 2. Additional Documentation

- PK70 (Hard Copy) Quick Start Guide
- NNDK User's Manuals are located (by default) in your C:\Nburn\docs directory
- NNDK Programmer's Guide (PDF) is located (by default) in your C:\Nburn\docs directory
- NBEclipse Getting Started Guide (PDF) is located (by default) in your C:\Nburn\docs directory
- NetBurner Dev C++ Quick Start Guide (PDF) is located (by default) in your C:\Nburn\devcpp\Help directory
- HCC-Embedded - Embedded Flash File System Implementation Guide
  - o  All EFFS Documentation are located (by default) in your C:\Nburn\docs\files directory
- All License Information is located (by default) in your C:\Nburn\docs directory

# 3. Overview

The NetBurner PK70 Network Development Kit enables rapid creation of custom production ready network aware hardware products. With the introduction of the PK70, NetBurner has redefined the way design engineers build embedded products. By shifting the developer's focus away from extensive hardware, software, and enclosure design; the developer is left to focus on building the customer's application specific hardware and software component.  The NetBurner PK70 combines the design of a finished product, the flexibility of a network module, and the power of the NetBurner development suite into a ready to use platform for use in both prototype and/or production. The primary advantage of the PK70 is that the electronics are in a professional grade enclosure with a power supply.

Ideal for professional design engineers, the PK70 includes a unique NetBurner Personality Blade interface which can be used to add custom hardware (that fits the specific hardware requirements of each individual product). Embedded design engineers can focus their on creating their own custom Personality Blades to add product specific peripherals. NetBurner has also made available a set of standard NetBurner Personality Blades which includes the most common peripherals used in commercial and industrial applications. These Personality Blades are installed inside the PK70 enclosure. For example, the NBPKBM-100CR Multi-I/O Personality Blade includes analog-to-digital, digital-to-analog, and general purpose I/O.

## 3.1.   Block Diagram
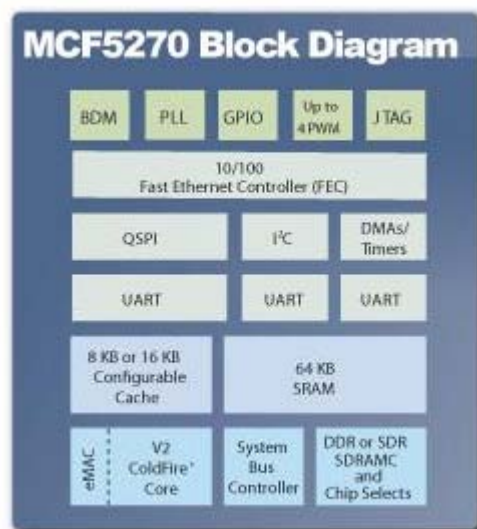


For additional information on the **MCF5270**, please go to **Freescale**.

# 4. Hardware Features

- 147MHz ColdFire 5270 32-bit Processor
- 4 MB Flash and 8 MB SDRAM
- 10/100 Ethernet Port with RJ-45 connector
- DB9 RS-232 Serial Port
- SD Flash Card Interface
- 2 Ethernet Status LEDs and 1 Power Status LED
- 2 User-Programmable Red/Green Bicolor LEDs
- 40-pin dual row expansion connector for custom hardware or NetBurner Personality Blades.
  - o 8-bit data bus
  - o 3 Chip selects
  - o 3 Interrupt inputs
  - o I2C
  - o SPI with chip select
  - o 2 Timer inputs, 1 Timer output
  - o System clock
  - o Transfer acknowledge, read/write, output enable/read
  - o Reset in and Reset out
  - o 5VDC @ 1A, 3.3VDC @ 750mA, Unregulated raw input voltage
- Switching power supply with 7-24VDC input voltage range
- Operating Temperature: 0 to 70 C
- RoHS Compliant

# 5. Memory Map

| Memory Region | Address Range | Description |
|---|---|---|
| Undefined | 0x00000000 to 0x01FFFFFF | Undefined Area to Catch NULL Pointers |
| SDRAM | 0x02000000 to 0x027FFFFF | The 8 MB of SDRAM |
| Unused | 0x02800000 to 0x1FFFFFFF | Available to Programmer |
| VBR | 0x20000000 to 0x200003FF | The PK70 Vector Base Register |
| RAMBAR | 0x20000000 to 0x2000FFFF | The PK70 Internal SDRAM. First 0x400 bytes are used for Vectors. |
| Unused | 0x20010000 to 0x3FFFFFFF | Available to Programmer |
| IPSBAR | 0x40000000 to 0x7FFFFFFF | The PK70 Internal Device Registers. These are accessible using the sim structure defined in sim5270.h |
| Unused | 0x80000000 to 0xFF7FFFFF | Available to Programmer |
| Start of Flash Memory | 0xFF800000 | Start of 4MB of Flash Memory |
| Flash Monitor | 0xFF800000 to 0xFF80FFFF | The Boot Monitor, 64k |
| Monitor Params | 0xFF810000 to 0xFF81FFFF | Monitor Parameter Storage, 64k |
| User Params | 0xFF820000 to 0xFF82FFFF | User Parameter Storage, 64k |
| Application Code | 0xFF830000 to.... | Compressed Application Code |
| End of Flash Memory | 0xFFBFFFFF | End of 4MB of Flash Memory |

# 6. Connectors

## 6.1.  Expansion Connector, 40-Pin, J1

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | 3.3VDC, 750mA maximum | 2 | GND |
| 3 | R/*W, Read / Write | 4 | OE/*RD, Output Enable / Read |
| 5 | *RSTI, Reset input | 6 | *TA, Transfer acknowledge |
| 7 | CLK, 147.456 MHz system clock | 8 | *RSTO, Reset out |
| 9 | D25, D = Data bus | 10 | D24 |
| 11 | D27 | 12 | D26 |
| 13 | D29 | 14 | D28 |
| 15 | D31 | 16 | D30 |
| 17 | A1, A = Address bus | 18 | A0 |
| 19 | A3 | 20 | A2 |
| 21 | *CS1, Chip select 1 | 22 | A4 |
| 23 | *CS3, Chip select 3 | 24 | *CS2, Chip select 2 |
| 25 | SDA, I2C data | 26 | SCL, I2C clock |
| 27 | TIN1, Timer input 1 | 28 | DTOUT3, DMA timer output 3 |
| 29 | *IRQ1, Interrupt input 1 | 30 | *IRQ3, Interrupt input 3 |
| 31 | *IRQ7, Interrupt input 7 | 32 | *QSPI CS0, QSPI chip select 0 |
| 33 | QSPI Data input | 34 | QSPI Data output |
| 35 | QSPI Clock | 36 | TIN2, Timer input 2 |
| 37 | 5VDC, 1A maximum | 38 | GND |
| 39 | Vin Raw, Unregulated input | 40 | GND |

**Notes**

1. The '*' character denotes an active low signal
2. Freescale processors use the upper data signals D31-D26 for the low order byte.
3. OE/*RD is the inverse of R/*W.
4. DMA Timers can be used as general timers (not limited to DMA).
5. Interrupts are edge sensitive.
6. Interrupt input 7 is non-maskable.
7. Vin Raw is the unregulated input voltage to the PK70. The input voltage range is from 7-24VDC.

## 6.2.  RJ-45 Connector

LED 1: Ethernet speed: 10 MB (off) or 100 MB (on)
LED 2: Link/Activity
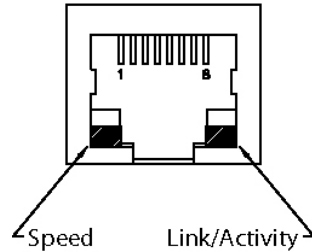


| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | TX+ | 2 | TX- |
| 3 | RX+ | 4 | n/c |
| 5 | n/c | 6 | RX- |
| 7 | n/c | 8 | n/c |

## 6.3.  DB-9 RS-232 Serial Connector

The DB9 on the front of the PK70 provides a RS-232 serial port from UART0 on the 5270 microprocessor. In the default software configuration, UART0 is the serial debug port, and can be used as a serial terminal interface.

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | n/c | 2 | TX |
| 3 | RX | 4 | n/c |
| 5 | GND | 6 | n/c |
| 7 | RTS | 8 | CTS |
| 9 | n/c | | |

## 6.4.   Power Connector

The Power LED is illuminated while power is applied. There are two input power connectors:

- A standard 2.1mm P5 input jack. The center is positive and the outer shell is negative.

| Pin | Signal |
|--------|----------|
| Center | Positive |
| Shell | Negative |

- A 2-pin quick-disconnect terminal block

| Pin | Signal |
|-----|----------|
| 1 | Negative |
| 2 | Positive |

## 6.5.   SD/MMC Flash Card Interface

The SD/MMC Flash card interface can be used with flash cards that support the native SPI communication mode. This interface does not support SDIO communication mode.

| Pin | Signal | Pin | Signal |
|-----|----------------|-----|--------------|
| 1 | *Chip Select | 2 | QSPI Din |
| 3 | GND | 4 | 3.3V |
| 5 | QSPI CLK | 6 | GND |
| 7 | QSPI Dout | 8 | n/c |
| 9 | n/c | 10 | *Card Detect |
| 11 | *Write Protect | 12 | GND |
| 13 | GND | | |

# 7. Life Support Disclaimer

NetBurner's PK70 is **not** authorized for use as a critical component in life support devices or systems, **without** the express written approval of NetBurner, Inc. **prior** to use. As used herein:

1.  Life support devices or systems are devices or systems that (**a**) are intended for surgical implant into the body or (**b**) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.

2.  A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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