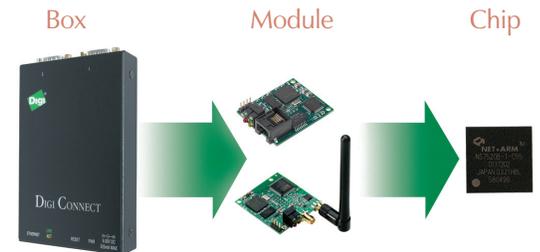


# Digi Connect EM™ Family

Wired and Wireless Embedded Modules



The Digi Connect EM and the Digi Connect Wi-EM™ are the industry's first interchangeable secure embedded modules, delivering wired and wireless Ethernet network connectivity that is cost-effective and easy to implement.



Seamless migration to total integration

Future proof protection - software development migrates fully to chip solutions.

## Features/Benefits

- Interchangeable and pin-compatible single-component solution based on 32-bit NET+ARM processor
- 4 MB Flash and 8 MB RAM on board
- Two high-speed TTL serial interfaces
- Serial Peripheral Interface (SPI)
- Wireless Ethernet network interface
  - 802.11b network interface with data rates up to 11 Mbps
  - WPA security and WEP encryption
  - Dual diversity antenna setup
  - FCC module approval improves time-to-market
- Wired Ethernet network interface
  - Auto-sensing 10/100Base-T network interface
- Nine shared GPIO port options
- Low power consumption and industrial temperature range
- Population options for design flexibility
- Strong SSL/TLS encryption for security sensitive environments
  - NIST Certified AES encryption
- Plug-and-play firmware option eliminates embedded software development effort
- Easy-to-use and royalty-free NET+Works development platform for custom application development

## Overview

Wireless technology creates a new dimension in a rapidly emerging world of ubiquitous networking collaboration in which billions of networked electronic devices work invisibly and jointly with each other and with people. Making the right network technology decisions is a key factor for market success and defines the competitive edge of your products.

The Digi Connect EM family of embedded modules enables original equipment manufacturers to keep pace with ever-evolving networking technology by delivering complete and versatile embedded network connectivity solutions. They are cost-effective and easy to implement in existing and new product designs, while powerful enough to meet your future product performance needs.

Based on a unique common platform design approach, the Digi Connect EM and Digi Connect Wi-EM embedded modules offer complete “drop-in” integration. This allows you to build future-proof products based on a single design supporting 10/100Base-T wired and 802.11b wireless Ethernet connectivity. Digi Connect EM embedded modules make all of this possible without the traditional complexities of hardware and software integration work, and at a fraction of the time and cost required to create custom solutions.

The Digi Connect EM and Digi Connect Wi-EM embedded modules feature a variety of connectivity options, such as two high-speed serial ports, an SPI master mode interface and nine General Purpose Input/Output (GPIO) port options. For additional integration flexibility, they are available in two low-profile population options, with or without onboard LED array and an Ethernet connector. Additional customer-specific population options are available on request.

Built on leading NetSilicon® 32-bit NET+ARM technology, Digi Connect™ embedded modules combine true plug-and-play functionality with the freedom and flexibility of complete software customization. The proven NetSilicon NET+Works® development platform provides a seamless migration path to a fully integrated NetSilicon system-on-chip solution.

Please contact us at 1-877-OEM-DIGI or 952-912-3444 for additional information or to discuss your specific application requirements.



[www.digi.com](http://www.digi.com)

Making  
**DEVICE NETWORKING**  
easy™

# Plug-and-Play Modules

The Digi Connect EM and Digi Connect Wi-EM embedded modules with plug-and-play firmware deliver instant and completely transparent wired and wireless device server networking functionality. They significantly reduce time to market by completely eliminating the need for additional embedded hardware or software development.

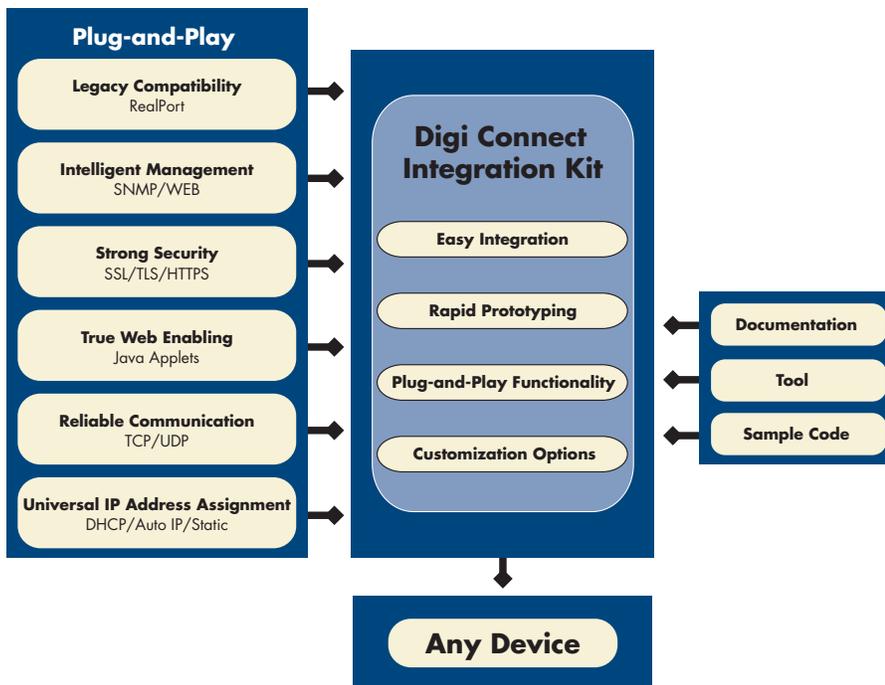
Unique and industry-leading features such as a robust TCP/IP stack, universal IP address assignment, integrated web server with user file system, fully customizable web user interface, custom Java applet support, enhanced security with strong DES/3DES/AES encryption based on the SSL/TLS standard, intelligent device management via SNMP, and patented RealPort® COM/TTY port redirection make it an ideal solution for any application that requires versatility and performance.

The Digi Connect Integration Kit provides a platform for evaluation, rapid prototyping, and integration of Digi Connect embedded modules with plug-and-play firmware. It offers the tools, sample code, and documentation that make easy product integration and web-based product customization possible.



## SOFTWARE FEATURES

- Robust on-board TCP/IP stack with built-in web server
  - TCP, UDP, DHCP, SNMP, SSL/TLS, Telnet, Rlogin, RFC 2217, LPD, HTTP/HTTPS, SMTP, ICMP, IGMP, ARP
- Universal IP address assignment
  - Static IP, DHCP, Auto-IP
- Secure web-based configuration (HTTP/HTTPS) with context-sensitive online help
- Pre-defined and custom device profiles
- Customizable web interface option with support for Java applets
  - File system w/512 kb user space
- Telnet Command Line Interface
- Modem Emulation
- Low-level serial configuration interface (RCI)
- User-defined network service/port configuration
  - HTTP/HTTPS, Telnet, Rlogin, ADDP, SNMP, RealPort, SSL/TLS, TCP/UDP
- TCP/UDP forwarding characteristics
  - Bytes, Idle Time, Data Pattern
- User-configurable TCP/UDP Socket ID string
- Event notification via E-mail/SNMP traps
  - GPIO Status, Data Pattern
- Port logging
- Intelligent SNMP device management
  - RFC 1213/1215/1316/1317
- Strong SSL v3.0/TLS v1.0 based encryption
  - DES (56-bit), 3DES (168-bit), AES (128/256-bit)
- Patented RealPort COM/TTY port redirection with encryption for Microsoft Windows, UNIX, and Linux environments



# Customizable Modules



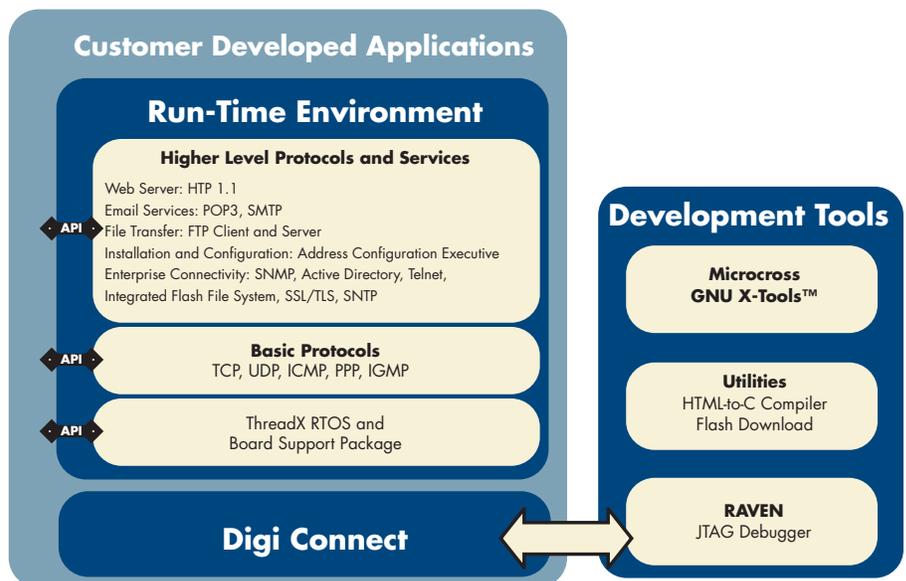
Removing the complexities of traditional hardware design efforts, the customizable versions of the Digi Connect EM and Digi Connect Wi-EM embedded modules enable customers to quickly and cost-effectively implement and deploy application-specific and future-proof embedded software solutions for wired and wireless network environments.

Based on the easy-to-use and royalty-free NetSilicon NET+Works development platform, the Digi Connect Development Kit delivers a complete out-of-the-box solution for embedded software development including all the integrated building blocks that are required to quickly and cost-effectively create secure and fully network-enabled product solutions.

The common NetSilicon development platform provides a seamless migration path to a fully integrated NetSilicon system-on-chip solution using the award-winning family of network-enabled NET+ARM processors. It also minimizes design risk and significantly accelerates the overall embedded software development process.

## DEVELOPMENT KIT FEATURES

- Digi Connect embedded module w/JTAG
- Development board
- Macraigor Raven JTAG debugger
- Microcross™ GNU X-Tools with command line and visual GDB debugger
- ThreadX Realtime Operating System with picokernel™ architecture
  - Requires less than 25 kb kernel code space
- Fusion™ TCP/IP stack with full networking protocol and extended network services support
  - TCP, UDP, ICMP, IGMP, DNS, SNMPv2, LDAP, POP, SMTP, PPP, FTP, SNMP, Telnet, FastIP, Fast Sockets, Multi-Homing
- Universal IP address assignment through Address Configuration Executive (ACE)
  - Static IP, DHCP, BOOTP, Auto-IP, RARP, ARP-Ping
- Allegro Software embedded web server
- SSL 3.0/TLS 1.0 with strong encryption
  - DES, 3 DES, AES
- Flexible and robust file system supporting RAM and Flash (with wear leveling)
- SMIcng MIB Compiler
- Micro XML SAX Parser
- Additional utilities
  - HTML-to-C Compiler
  - Flash download
  - Sample code
- Documentation
  - Hardware reference manual
  - Programmer's guide
  - API reference
  - Advanced web server toolkit



# Features/Specifications

## HARDWARE

- 32-bit NET+ARM high-performance RISC processor (NS7520 @ 55 MHz)
- On-board memory 4 MB Flash and 8 MB RAM
- On-board power supervisor
- Two high-speed TTL serial interfaces
  - Throughput up to 230 Kbps
  - Full signal support for TXD, RXD, RTS, CTS, DTR, DSR and DCD on port 1
  - TXD / RXD signals support on port 2
  - Hardware and software flow control
- Serial Peripheral Interface (SPI)
- Nine shared General Purpose Input/Output (GPIO) ports
- Wave-solderable design (no clean flux process)

## REGULATORY APPROVALS

- FCC, Part 15 Class B
- EN 55022, Class B
- EN 61000-3-2 and EN 61000-3-3
- ICES-003, Class B
- VCCI, Class II
- AS 3548
- FCC Part 15 Subpart C Section 15.247
- IC (Industry Canada) RSS-210 Issue 5 Section 6.2.2(o)
- EN 300 328
- EN 301 489-3
- UL 60950-1
- EN 60950 (European Union)
- CSA C22.2, No. 60950
- EN 55024

## NETWORK INTERFACE

- Digi Connect EM**
- Standard: IEEE 802.3
  - Physical Layer: 10/100Base-T
  - Data rate: 10/100 Mbps (auto-sensing)
  - Mode: Full or half duplex (auto-sensing)
  - Connector: RJ-45 or pin header
- Digi Connect Wi-EM**
- Standard: IEEE 802.11b
  - Frequency: 2.4 GHz
  - Data rate: Up to 11 Mbps with automatic fallback
  - Modulation: CCK (11/5 Mbps), DQPSK (2 Mbps), DBPSK (1 Mbps)
  - Transmit power: 16 dBm typical
  - Receive sensitivity: -82 dBm @ 11 Mbps
  - Antenna connector: 2 x RP-SMA

## ENVIRONMENTAL

- Digi Connect EM**
- Operating temperature: -40° C to +85° C (-40° F to +185° F)
  - Relative humidity: 5% to 90% (non-condensing)
  - Altitude: 12,000 ft (3657.6 m)
- Digi Connect Wi-EM**
- Operating temperature: -20° C to +85° C (-4° F to +185° F)
  - Relative humidity: 5% to 90% (non-condensing)
  - Altitude: 12,000 ft (3657.6 m)

## LEDS

- Link integrity
- Diagnostic
- Serial activity
- Network activity

## PINOUTS

Pin	Signal	Description
1	3.3V	Power (Input)
2	GND	Ground
3	RXD/GPIO7	#1 RXD (Input)/GPIO
4	TXD/GPIO6	#1 TXD (Output)/GPIO
5	RTS/SPI_CLK/GPIO4	#1 RTS (Output)/GPIO/SPI
6	DTR/GPIO5	#1 DTR (Output)/GPIO
7	CTS/GPIO2	#1 CTS (Input)/GPIO
8	DCD/SPI_EN/GPIO1	#1 DCD (Input)/GPIO/SPI
9	DSR/GPIO3	#1 DSR (Input)/GPIO
10	RESET	Reset (Input)
11	RXD2/GPIO9	#2 RXD (Input)/GPIO
12	TXD2/GPIO8	#2 TXD (Output)/GPIO

## POWER REQUIREMENTS

- Digi Connect EM**
- 3.3VDC @ 270 mA max (891 mW)
- Digi Connect Wi-EM**
- 3.3VDC @ 400 mA max (1.32 W)

## DIMENSIONS

- Digi Connect EM**
- Length: 1.935 in (49.149 mm)
  - Width: 1.575 in (40.005 mm)
  - Height: 0.803 in (15.621 mm) (Fully Populated Model)
  - Height: 0.670 in (17.018 mm) (Pin Header Model)
- Digi Connect Wi-EM**
- Length: 1.935 in (49.149 mm)
  - Width: 1.855 in (47.117 mm)
  - Height: 0.785 in (19.939 mm) (Fully Populated Model)
  - Height: 0.653 in (16.586 mm) (Pin Header Model)

## MODEL ..... PART NUMBERS

Model	North America	International
<b>Custom Application</b>		
Digi Connect EM Development Kit	DC-EM-02T-GN	DC-EM-02T-GN
Digi Connect Wi-EM Development Kit	DC-WEM-02T-GN	DC-WEM-02T-GN
<b>Plug-and-Play Firmware</b>		
Digi Connect EM Integration Kit	DC-EM-02T-KT	DC-EM-02T-KT
Digi Connect Wi-EM Integration Kit	DC-WEM-02T-KT	DC-WEM-02T-KT

Bulk packs and customer-specific packaging for individual units available. Population options available. Please visit our website for a complete list of part numbers.

## WIRELESS SECURITY

- Wired Equivalent Privacy (WEP)
  - 64/128-bit encryption (RCA)
- Wireless Protected Access (WPA)
  - 128-bit TKIP encryption
  - 802.1x EAP authentication
    - PEAP (Protected EAP) w/EAP-MS-CHAPv2
  - Pre-shared key mode (PSK)

## DIGI SERVICE AND SUPPORT

You can purchase with confidence knowing that Digi is here to support you with expert technical support and a strong five-year warranty. <http://support.digi.com>

### Digi International

11001 Bren Road E.  
 Minnetonka, MN 55343 USA  
 PH: 877-912-3444  
 952-912-3444  
 FX: 952-912-4952  
 Email: [info@digi.com](mailto:info@digi.com)  
[www.digi.com](http://www.digi.com)

### Digi International GmbH

Joseph-von-Fraunhofer Str. 23  
 D-44227 Dortmund  
 Germany  
 PH: +49-231-9747-0  
 FX: +49-231-9747-111  
[www.digi.de](http://www.digi.de)

### Digi International (HK) Limited

Suite 1703-05, 17/F.,  
 K Wah Centre  
 191 Java Road  
 North Point, Hong Kong  
 PH: +852-2833-1008  
 FX: +852-2572-9989  
[www.digi.cn](http://www.digi.cn)

### NetSilicon

411 Waverley Oaks Road #304  
 Waltham, MA 02452 USA  
 PH: 800-243-2333,  
 781-647-1234  
 FX: 781-893-1338  
 Email: [info@netsilicon.com](mailto:info@netsilicon.com)  
[www.netsilicon.com](http://www.netsilicon.com)



© 2004-2005 Digi International Inc.

Digi, Digi International, the Digi logo, the Making Device Networking Easy logo, Digi Connect, Digi Connect EM, Digi Connect Wi-EM, RealPort, NetSilicon, NET+Works and NET+ are trademarks or registered trademarks of Digi International, Inc. in the United States and other countries worldwide. ARM is a trademark of ARM Limited. All other trademarks are the property of their respective owners.

91001257  
 A7/205