Connectware™

NetSilicon
A Digi International Company

Digi Connect ME
Hardware Reference

Seamless migration to total integration.

Making **DEVICE NETWORKING** *easy* ™

Contents

■ ■

About This Document

Objective

The purpose of this document is to enable developers to integrate the Digi Connect ME embedded module with other devices, enabling these devices to make use of the module's rich networking features.

Audience

This document is written for hard- and software developers who are responsible for designing networked devices.

About the Digi Connect ME Module

▪▪

C H A P T E R   1

Overview

The Digi Connect ME embedded module provides fully transparent device connectivity over industry-standard Ethernet connections and allows both equipment manufacturers and systems integrators to network-enable products at a fraction of the time and cost required to develop a custom solution. It is a highly flexible and compact single component solution with a serial port, GPIO ports, and a robust on-board TCP/IP stack and 10/100 BASE-T Ethernet support.

From medical systems to building control and industrial automation, in virtually any application where embedded device connectivity over Ethernet is needed, the Digi Connect ME embedded module is the ideal choice, delivering high-performance functionality.

This chapter provides information about the module hardware and contains the following topics:

- "Types of modules" on page 2

- "Dimensions" on page 3

- "Recommended PCB layout" on page 4

- "Connectors: power and device interface" on page 5

- "Connectors: Ethernet interface" on page 7

- "LEDs" on page 8

Types of modules

■ ■

The type of module that you will use for hardware integration depends on the kit you are using. If you are using an integration kit, you will be using a module without a JTAG interface. If you are using a development kit, you will be using a module with a JTAG interface.

Note JTAG is a commonly used term that is also referred to as IEEE 1149.1, an industry standard test protocol. JTAG is an abbreviation for the European Joint Test Action Group, which invented the first versions of the IEEE 1149.1 interface. The JTAG interface, along with the other development tools, enables you to download, run and debug programs on the module.

The following figures show the two types of modules.
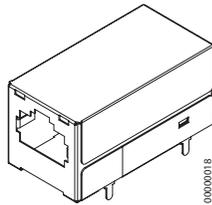
Module without JTAG Interface
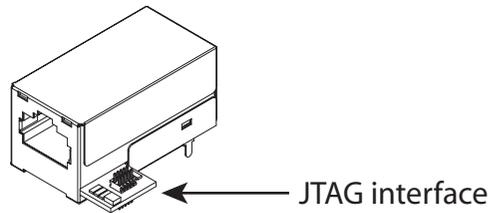
Module with JTAG Interface

Dimensions

The following figures show the dimensions of Digi Connect ME embedded module.
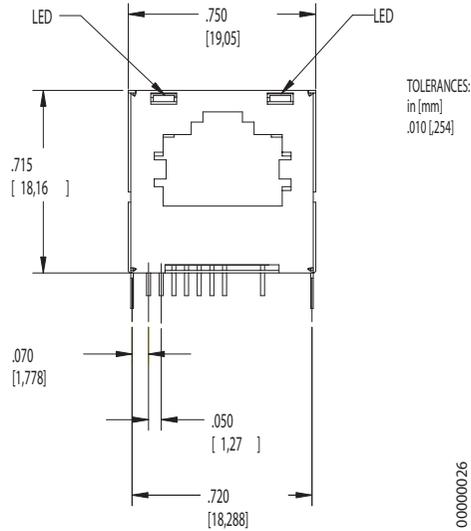
Dimensions: Front View
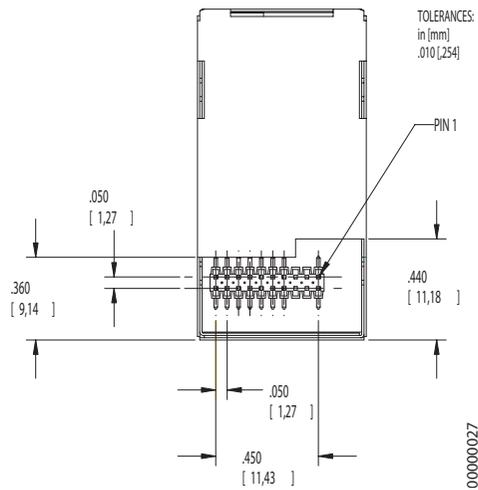
Dimensions: Bottom View

Dimensions: Side View

Recommended PCB layout

The following figure shows the recommended PCB (printed circuit board) layout of the Digi Connect ME embedded module.
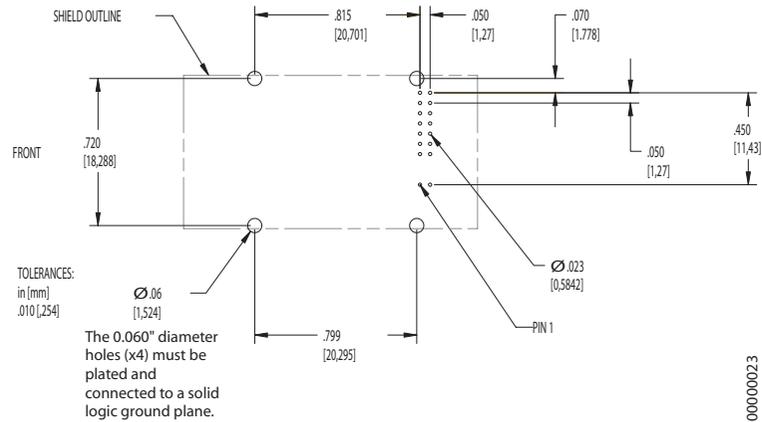
Recommended PCB Layout

Connectors: power and device interface

The module has a 20-pin male connector that supports a serial interface with data rates up to 230,400 bps and full-modem control, and GPIO ports. See the following figure for pin orientation and the table for pin assignments.

Note Digi recommends 100 pF capacitors to ground on all inputs and outputs to the module for ESD immunity. This does <u>not</u> apply to the power pass-thru pins.
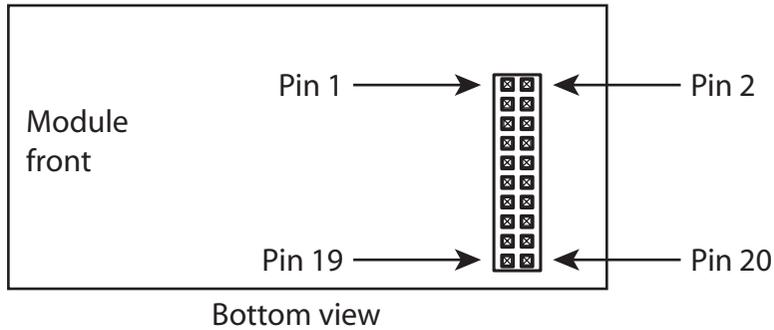
Power and Device Interface Connector

Pin	Signal	Description	Pin	Signal	Description
1	VETH+	Power Pass-Thru +	11	CTS / GPIO 2	Clear to Send (Input) / GPIO
2	VETH-	Power Pass-Thru -	12	DSR / GPIO 3	Data Set Ready (Input) / GPIO
3	—	Position Removed	13	DCD / GPIO 1	Data Carrier Detect (Input) / GPIO
4	—	Position Removed	14	RESET	Reset
5	—	Position Removed	15	+3.3V	Power
6	—	Position Removed	16	GND	Ground
7	RXD	Receive Data (Input)	17	—	Reserved. Do not connect.
8	TXD	Transmit Data (Output)	18	—	Reserved. Do not connect
9	RTS / GPIO 4	Request to Send (Output) / GPIO	19	—	Reserved. Do not connect
10	DTR / GPIO 5	Data Terminal Ready (Output) / GPIO	20	/INIT	GPIO--See "Digi Connect ME GPIO pin use" on page 31 and "Reset" on page 33.

Power and Device Interface Connector Pin Assignments

Connectors: Ethernet interface

The Ethernet connector is an 8-wire RJ-45 jack that meets the ISO 8877 requirements for 10/100BASE-T. See the following figure and table for pin orientation and pin assignments.

Note Pin orientation and assignments are the same for modules with or without a JTAG connector.

Pin 8

Pin 1
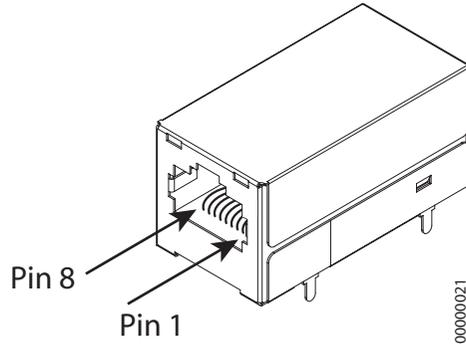
Ethernet Interface Pin Orientation

Pin	Signal	Description	Pin	Signal	Description
1	TXD+	Transmit Data +	5	EPWR+	Power from Switch +
2	TXD-	Transmit Data -	6	RXD-	Receive Data -
3	RXD+	Receive Data +	7	EPWR-	Power from Switch -
4	EPWR+	Power from Switch +	8	EPWR-	Power from Switch -

Ethernet Interface Pin Assignments

LEDs

The module has two LEDs that are located near the upper corners of the Ethernet port (see the following figure). The following table describes the LEDs.

Note The LEDs are the same for a module with or without a JTAG connector.

Network Link   Network Activity/ Diagnostic
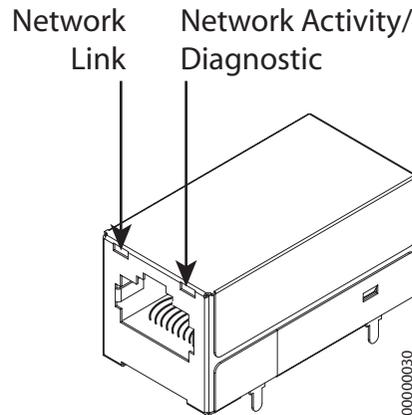
LED Locations

LED	Color	Description
Network Link (left-upper)	Yellow	Network Link is operational: On (continuously) indicates that an Ethernet connection is made.
Network Activity/Diagnostic (right-upper)	Green	Network Activity: On when network traffic detected; off when no network traffic detected.
		Diagnostic: Flashes three times in even duration during power up or reset, indicating successful startup.

LED Descriptions

About the Development Board

■■

C H A P T E R   2

Overview

■■

The development board is a hardware platform from which you can determine how to integrate the Digi Connect ME embedded module into your design. The board consists of the following main features:

■　Socket for connecting the Digi Connect ME embedded module

■　JTAG connection (for use with the development kit only)

■　GPIO switches

■　Serial and GPIO ports

■　Power input

This chapter provides information on development board components and contains the topics listed below. For more detailed information on the development board, see the schematic and mechanical drawings on the CD that accompanies your integration kit or development kit. (If you have installed the integration kit or development kit, you can access the schematic from the Start menu.)

■   "Test points" on page 27

Note The development board contains some components that are used with other
Digi embedded products and are noted as such in this document.

Basic description

. . . .

The development board contains connectors, switches, and LEDs for use while integrating
the Digi Connect ME embedded module into your design. See the following figure for the
location of the connectors, switches, and LEDs. Additionally, the board provides test points
(not shown on the figure). For more information about test points, see "Test points" on page
27.
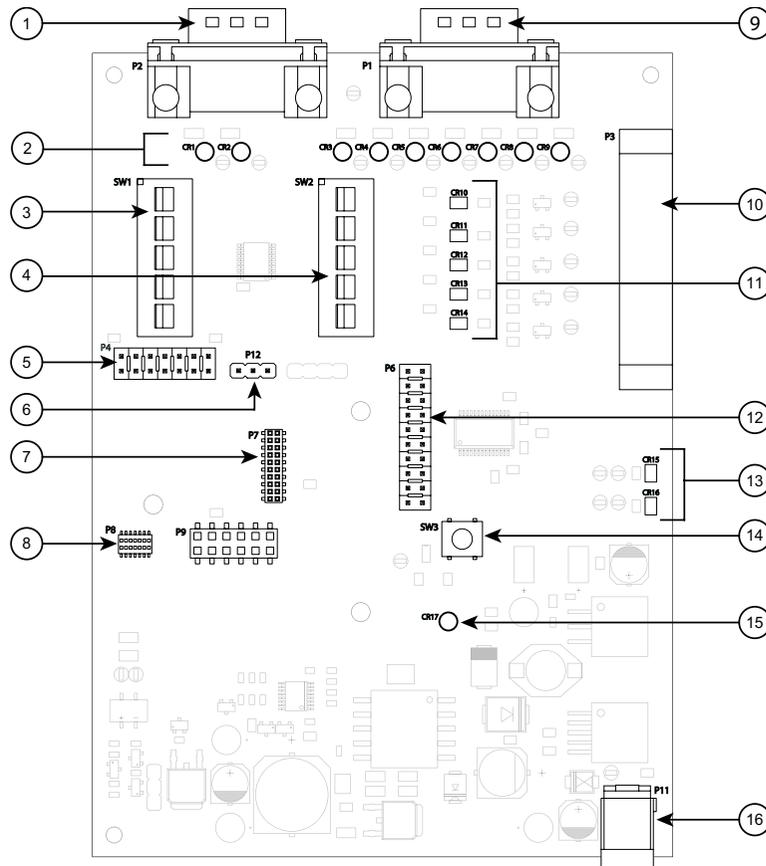
Basic Description: Connectors, Switches and LEDs

#	Description	#	Description
1	Secondary Serial Port, P2	9	Primary Serial Port, P1
2	LEDs, CR1 through CR9	10	GPIO Port, P3
3	GPIO Switch Bank, SW1	11	LEDs, CR10 through CR14
4	GPIO Switch Bank, SW2	12	Digital Signal Monitor Jack, P6
5	JTAG Header, P4	13	LEDs, CR15 and CR16
6	Jumper Block, P12 (Reserved)	14	Reset Switch, SW3
7	Digi Connect ME embedded module Connector, P7	15	LED, CR17
8	Digi Connect ME embedded module JTAG Connector, P8	16	Power Jack, P11

Connectors, Switches and LEDs

Caution When handling the development board, wear a grounding wrist strap to avoid ESD damage to the board.

For more detailed information on connectors, switches and LEDs, see the following:

- ■ "Port descriptions" on page 12
- ■ "Connectors and blocks" on page 16
- ■ "Switches" on page 21
- ■ "LEDs" on page 23
- ■ "Power jack" on page 26

The development board accepts either of the following modules:

- ■ Module without JTAG connector—for use with an integration kit

■ Module with JTAG connector—for use with a development kit

See the following figures for placement of either module onto the development board.

Module with JTAG connector

Development board

Module connector

Module JTAG connector

00000015
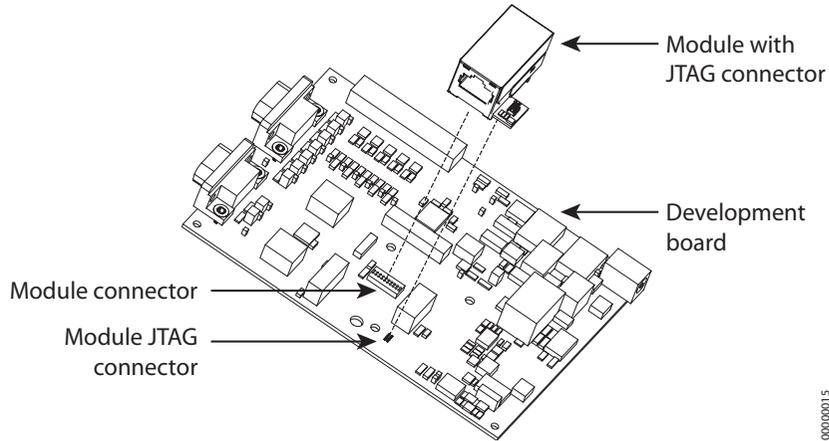
Placement of Module

Caution If you handle the module, wear a grounding wrist strap to avoid ESD damage.

Port descriptions

The development board provides the following ports:

■ Primary serial port, P1

■ Secondary serial port, P2

■ GPIO port, P3

See the figure titled "Basic Description: Connectors, Switches and LEDs" on page 11 for the location of the ports. The following sections describe the ports.

Primary serial port, P1

The Primary Serial Port is a DB-9 male connector that is labeled as P1 on the development board. The port is used with the integration kit and the development kit. See the following figure for pin orientation; see the following table for pin assignments.

Pin 1   Pin 5

Pin 6   Pin 9
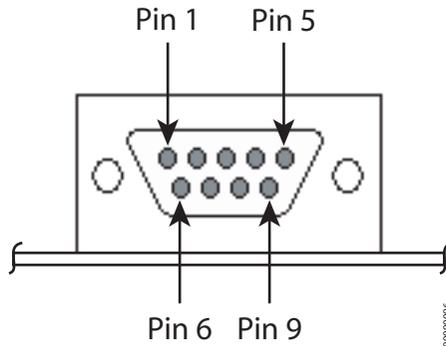
Primary Serial Port Pin Orientation

Pin	Signal	Description
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal/Chassis Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	—	—

Primary Serial Port Pin Assignments

Secondary serial port, P2

The Secondary Serial Port is a DB-9 male connector that is labeled as P2 on the development board. The port is used only with the Digi Connect ME modules with JTAG interfaces (in the development kit) for debugging purposes. See the following figure for pin orientation; see the following table for pin assignments.
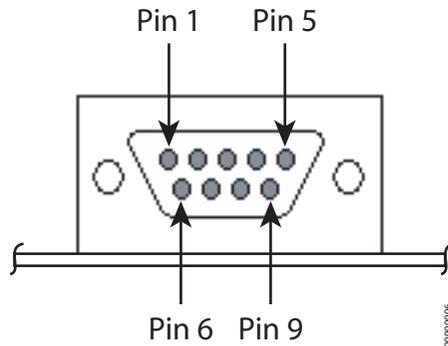
Secondary Serial Port Pin Orientation

Pin	Signal	Description
1	—	—
2	RXD	Receive Data
3	TXD	Transmit Data
4	—	—
5	GND	Signal/Chassis Ground
6	—	—
7	—	—
8	—	—
9	—	—

Secondary Serial Port Pin Assignments

GPIO port, P3

The GPIO port is a 10-pin male right-angle connector that is labeled as P3 on the development board. The port is used with the integration kit and the development kit. See the following figure for pin orientation; see the following tables for pin assignments. For input and output threshold specifications, see "DC characteristics" on page 37.

Note The development board is shipped with a 10-pin screw-flange plug attached to the GPIO port.
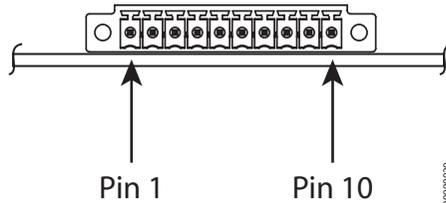
GPIO Port Pin Orientation

Pin	Signal Name	Pin	Signal Name
1	GND	6	GPIO-3
2	GPIO-5	7	GND
3	GND	8	GPIO-2
4	GPIO-4	9	GND
5	GND	10	GPIO-1

GPIO Port Pin Assignments

Connectors and blocks

The development board provides the following connectors and blocks:

- Digi Connect ME embedded module connector, P7

- Module JTAG interface connector, P8

- JTAG debugger connector, P4

- Jumper block, P12

- Digital Signal Analyzer Header, P6

See the figure titled "Basic Description: Connectors, Switches and LEDs" on page 11 for the location of the connectors and blocks. The following sections describe the connectors and blocks.

Digi Connect ME embedded module connector, P7

The Digi Connect ME embedded module Connector is a 20-pin female vertical header that is labeled P7 on the development board. The connector is used with the integration kit and the development kit. See the following figure for pin orientation; see the following table for pin assignments.

> Note: The figure shows the connector using the same orientation as shown in the figure titled "Basic Description: Connectors, Switches and LEDs" on page 11.

Pin 19 ──────▶ ◀────── Pin 20

Pin 1 ──────▶ ◀────── Pin 2
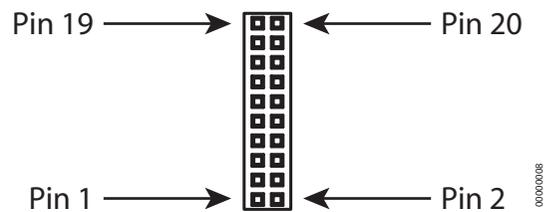
Module Connector Pin Orientation

Pin	Signal	Description
1	VETH+	Power Pass-Thru +
2	VETH-	Power Pass-Thru -
3	—	Position Removed
4	—	Position Removed
5	—	Position Removed
6	—	Position Removed
7	RXD	Receive Data (Input)
8	TXD	Transmit Data (Output)
9	RTS / GPIO-4	Request to Send (Output) / GPIO
10	DTR / GPIO-5	Data Terminal Ready (Output) / GPIO
11	CTS / GPIO-2	Clear to Send (Input) / GPIO
12	DSR / GPIO-3	Data Set Ready (Input) / GPIO
13	DCD / GPIO-1	Data Carrier Detect (Input) / GPIO
14	RESET	Reset
15	+3.3V	Power
16	GND	Ground
17	—	Reserved. Do not connect.
18	—	Reserved. Do not connect.
19	—	Reserved. Do not connect.
20	/INIT	GPIO--See "Digi Connect ME GPIO pin use" on page 31 and "Reset" on page 33

Module Connector Pin Assignments

Module JTAG interface connector, P8

The Module JTAG Interface Connector is a 14-pin female vertical header that is labeled P8 on the development board. The connector mates with the JTAG connector on the Digi Connect ME embedded module. The Module JTAG Connector pins are tied to the JTAG debugger Connector (see "JTAG debugger connector, P4").

Note Because there is no direct connection to the Module JTAG Interface Connector, pin orientation and pin assignments are not described for the connector.

JTAG debugger connector, P4

The JTAG debugger connector is a 14-pin male vertical header that is labeled P4 on the development board. The connector mates with a JTAG debugger plug (for example, a Macraigor Raven). The connector is used with the development kit only. See the following figure for pin orientation. See the following table for pin assignments.

Note The figure shows the connector using the same orientation as shown in the figure titled "Basic Description: Connectors, Switches and LEDs" on page 11.
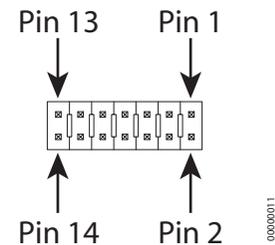
JTAG Debugger Connector Pin Orientation

Pin	Signal	Pin	Signal
1	VCC+	8	GND
2	GND	9	TCKRXD
3	/TRST	10	GND
4	GND	11	TDO
5	TDI	12	ICETRST
6	GND	13	VCC+
7	TMS	14	GND

JTAG Debugger Connector Pin Assignments

Jumper block, P12

This jumper block is reserved for future use.

Digital Signal Analyzer Header, P6

The Digital Signal Analyzer Header is a 16-pin male vertical header that is labeled P6 on the development board. The header is for connecting a digital signal analyzer (for example, a logic analyzer) to the development board. The header is used with the development kit only. See the following figure for pin orientation; see the following table for pin assignments.

Note The figure shows the connector using the same orientation as shown in the figure titled "Basic Description: Connectors, Switches and LEDs" on page 11.
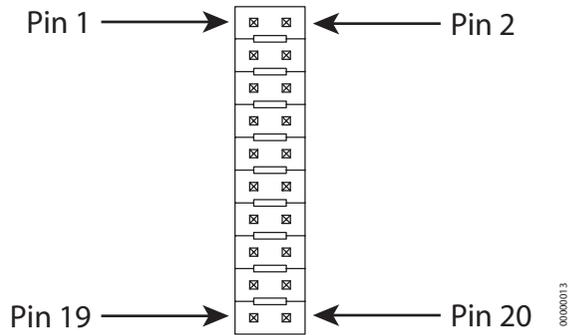
Digital Signal Analyzer Header Pin Orientation

Pin	Signal	Pin	Signal
1	Not connected	11	GPIO-5
2	Not connected	12	TXD2
3	Not connected	13	GPIO-4
4	Not connected	14	RXD2
5	Not connected	15	GPIO-3
6	Not connected	16	TXD
7	Not connected	17	GPIO-2
8	Not connected	18	RXD
9	/RST	19	GPIO-1
10	Not connected	20	GND

Digital Signal Analyzer Header Pin Assignments

Switches

The development board provides the following switches:

- GPIO switch bank 1, SW1

- GPIO switch bank 2, SW2

- Reset, SW3

See the figure titled "Basic Description: Connectors, Switches and LEDs" on page 11 for the location of the switches. The following sections describe the switches.

GPIO switch bank 1, SW1

GPIO Switch Bank 1, labeled SW1, is a set of five slide switches that allows the Digi Connect ME embedded module to use either serial signals or GPIO signals to communicate with a device. The switch is used with the Digi Connect ME embedded module Integration Kit and the Digi Connect ME embedded module Development Kit. In addition, the switch is used in conjunction with GPIO Switch Bank 2, SW2. See the following table for switch definitions of GPIO Switch Bank 1.

Switch Number	Left Position	Right Position
1	DCD	GPIO-1
2	CTS	GPIO-2
3	DSR	GPIO-3
4	RTS	GPIO-4
5	DTR	GPIO-5

GPIO Switch Bank 1 Settings

GPIO switch bank 2, SW2

GPIO Switch Bank 2, labeled SW2, is a set of five slide switches that set GPIO inputs to logic levels of high (switch to left) or low (switch to right).

If the GPIO port is configured as an output, then the switch should always be to the left. If there is an external device connected to P3, the switch should always be set to the left.

Each GPIO port can be used independently.

Notes

1   These switches do <u>not</u> determine whether the GPIO is an input or output. That is determined by the module software.

2   If GPIO is set to an output by software, switch SW2 <u>must</u> be set to the left (high).

3   These switches are used with the integration kit and the development kit and in conjunction with GPIO Switch Bank 1, SW1.

Reset, SW3

The Reset switch is a push button switch labeled SW3 on the development board. Pressing the switch holds the Digi Connect ME embedded module in reset. When the push button is released, the module reboots.

LEDs

The development board contains 17 LEDs that are labeled CR1 through CR17. The following table lists and describes the LEDs.

Board Label	Description	Color or State	Indication
CR1	TXD, Secondary Serial Port	Flickering	Serial activity
		Green	Inactive
CR2	RXD, Secondary Serial Port	Flickering	Serial activity
		Green	Inactive
CR3	CTS, Primary Serial Port	Yellow	Active
		Green	Inactive
		Off	Not connected or signal not being driven
CR4	DTR, Primary Serial Port	Yellow	Active
		Green	Inactive
		Off	Not connected or signal not being driven
CR5	TXD, Primary Serial Port	Flickering	Serial activity
		Green	Inactive
CR6	RXD, Primary Serial Port	Flickering	Serial activity
		Green	Inactive

Board Label	Description	Color or State	Indication
CR7	RTS, Primary Serial Port	Yellow	Active
		Green	Inactive
		Off	Not connected or signal not being driven
CR8	DCD, Primary Serial Port	Yellow	Active
		Green	Inactive
		Off	Not connected or signal not being driven
CR9	DSR, Primary Serial Port	Yellow	Active
		Green	Inactive
		Off	Not connected or signal not being driven
CR10	GPIO-1 Input/Output	On	Logic high
		Off	Logic low
CR11	GPIO-2 Input/Output	On	Logic high
		Off	Logic low
CR12	GPIO-3 Input/Output	On	Logic high
		Off	Logic low
CR13	GPIO-4 Input/Output	On	Logic high
		Off	Logic low

Board Label	Description	Color or State	Indication
CR14	GPIO-5 Input/Output	On	Logic high
		Off	Logic low
CR15	3.3V Indicator	On	Power on
		Off	Power off
CR16	5V Indicator	On	Power on
		Off	Power off
CR17	EPWR, Powered Ethernet Enabled	On	Ethernet power present from external powered Ethernet connector (Ethernet hub or switch)
		Off	No powered Ethernet voltage

LED Descriptions

Power jack

The Power Jack is a barrel connector that accepts 9 to 30 VDC +/- 5%. The jack is labeled as P11 on the development board. The following table shows the polarity of the power jack.

Contact	Polarity
Center	+9 to +30 VDC
Outer	Ground

Power Jack Polarity

The following figure schematically represents the polarity of the power jack.
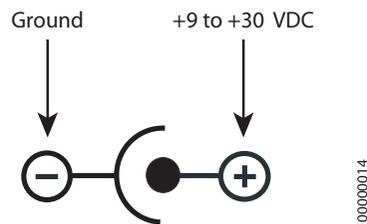
Power Jack Polarity, Schematic

Test points

The development board provides 24 test points that can be identified by board label or test point number. The board labels are adjacent to each test point on the board. The test point numbers are in the development board schematic drawings. The following table lists the test point number, board label, and a brief description of each test point.

Test Point	Board Label	Description	Test Point	Board Label	Description
TP1	RI	RI (test point supported only)	TP13	GPIO3	GPIO-3
TP2	TX	TXD-2, Transmit, Secondary Serial Port	TP14	GPIO4	GPIO-4
TP3	RX	RXD-2, Receive, Secondary Serial Port	TP15	GPIO5	GPIO-5
TP4	CTS	CTS, Primary Serial Port	TP16	GND	Ground
TP5	DTR	DTR, Primary Serial Port	TP17	3.3V	3.3V Supply
TP6	TX	TXD, Primary Serial Port	TP18	GND	Ground
TP7	RX	RXD, Primary Serial Port	TP19	5V	5.0V Supply
TP8	RTS	RTS, Primary Serial Port	TP20	RESET	Reset (active low)
TP9	DCD	DCD, Primary Serial Port	TP21	E+	Ethernet Power +
TP10	DSR	DSR, Primary Serial Port	TP22	E-	Ethernet Power -
TP11	GPIO1	GPIO-1	TP23	V-IN	9-30 VDC Input
TP12	GPIO2	GPIO-2	TP24	GND	Ground

Test Point Descriptions

Programming Considerations

■ ■

C H A P T E R   3

Overview

■ ■

This chapter provides information programmers may require to make use of some Digi Connect ME hardware resources. It provides information on the following topics:

- "GPIO" on page 30

- "LEDs" on page 32

- "Reset" on page 33

- "Flash" on page 34

- "Memory" on page 34

GPIO

■■■

General information

The NS7520 processor supports 16 general purpose I/O (GPIO) lines, some of which are reserved for specific functions and some of which can be customized. These GPIO lines fall into three categories:

■   Those labeled "Reserved" in the following table are reserved for a specific use and must <u>not</u> be reprogrammed, or the unit might not operate correctly. Often, these lines are not connected to external interfaces.

■   Those labeled "Allocated" in the following table are exposed to an external interface and allocated to a specific use by the software, but can be customized safely with code modifications.

■   Those labeled "Available" are exposed to an external interface, not controlled directly by the software, and can be customized.

Two registers govern the 16 GPIO lines. These registers are named PORTA and PORTC. Each GPIO pin has four bits which completely describe its behavior, and each register is responsible for eight GPIO pins. The four bits that describe the GPIO behavior are its mode (CMODE), its direction (CDIR), its special function (CSF--only applicable to PORTC), and the data value. The first three bits describe the functionality of the GPIO pin. The "data" bit provides the current value of the pin when read and allows one to control the value of an output pin when written.

In order to configure any GPIO pin as a GPIO input, the corresponding bit positions in the appropriate register must be configured as: `CMODE = 0 CDIR = 0 CSF = 0`

In order to configure any GPIO pin as a GPIO output, the corresponding bit positions in the appropriate register must be configured as: `CMODE = 0 CDIR = 1 CSF = 0`

Since each register controls 8 GPIO lines, it is safest to read the full 32 bit register, modify the bits corresponding to the GPIO line of interest, and then write the full 32 bits back. In this way, the behavior of the other GPIO lines will be preserved. For more information regarding the format and programming of the GPIO registers, see the *NS7520 Hardware Reference*.

Digi Connect ME GPIO pin use

Name	Register Bit	Category	External Interface	Description
Serial transmit	PORTA7	Allocated	Pin 8 on the 20 pin header	Used for serial transmit. It could be reassigned as GPIO input or output and used for a general purposes.
DTR/ GPIO5	PORTA6	Allocated	Pin 10 on the 20 pin header	Used for the serial DTR signal. It can be reassigned as either GPIO input or output and used for a general purpose. If used in conjunction with the development board, this pin maps to GPIO5.
RTS/ GPIO4	PORTA5	Allocated	Pin 9 on the 20 pin header.	Used for the serial RTS signal. It could be reassigned as either GPIO input or output and used for a general purpose. If used in conjunction with the development board, this pin maps to GPIO4.
NA	PORTA4	Reserved	NA	NA
Serial receive	PORTA3	Allocated	Pin 7 on 20 pin header,	Used for serial receive. It could be reassigned as either GPIO input or output and used for a general purpose.
DSR/ GPIO3	PORTA2	Allocated	Pin 12 on 20 pin header	Used for the serial DSR signal. It could be reassigned as either GPIO input or output and used for a general purpose. If used in conjunction with the development board, this pin maps to GPIO3.
CTS/ GPIO2	PORTA1	Allocated	Pin 11 on 20 pin header	Used for the serial CTS signal, but could be reassigned as either GPIO input or output and used for a general purpose. If used in conjunction with the development board, this pin maps to GPIO2.
DCD/ GPIO1	PORTA0	Allocated	Pin 13 on 20 pin header.	Used for the serial DCD signal, but could be reassigned as either GPIO input or output and used for a general purpose. If used in conjunction with the development board, this pin maps to GPIO1.
NA	PORTC7	Reserved	NA	NA

Name	Register Bit	Category	External Interface	Description
Green LED	PORTC6	Allocated	Connected to the green LED	Used as the Ethernet activity LED, but could be reassigned as a general purpose LED. It must remain a GPIO output for the LED to operate correctly. The LED is lit when the signal is a logic low.
/INIT	PORTC5	Available	Pin 20 on 20 pin header	Can be configured for either GPIO input or GPIO output
NA	PORTC4 - PORTC0	Reserved	NA	NA

LEDs

General information

The Digi Connect ME has two types of LEDs:

- An LED connected directly to GPIO pins on the processor and controlled directly in software

- An LED connected to other hardware components (normally the Ethernet hardware) and not directly programmable by the operating system

The development kit, by default, correctly configures the GPIO connected to the LED (PORTC6) as an output and then uses this LED to represent Ethernet activity. For more information regarding the control of LEDs, see the *Net+Works with GNU Tools BSP Porting Guide*.

About Digi Connect ME LEDs

LED	Description
Yellow	This is wired directly to Ethernet hardware and provides an indication of link.
Green	This software programmable LED is wired to processor GPIO register bit PORTC6 and is wired to be lit when low. The default behavior is to blink on Ethernet activity.

Reset

Hard reset

The Digi Connect ME supports a hardware reset via pin 14 of the 20-pin header. The unit is forced into a hard reset when this pin is pulled low. When plugged into a development board, this pin is wired to the push button at SW3. As a result, this switch acts as a hard reset button.

Soft reset

Net+OS provides an internal facility to enact a soft reset, but it is the responsibility of a specific implementation to choose a reasonable trigger to invoke it. One choice is to use a GPIO pin as a signal to trigger a soft reset. The Digi Connect ME has one GPIO pin named "/INIT" (PORTC5) that is not normally assigned to any other task. It is an ideal candidate for a soft reset. The signal is exposed via pin 20 on the 20-pin header, so it can be controlled by an embedded host. When plugged into the development board, the /INIT signal is pulled high, unless a jumper is placed across pins 2 and 3 of jumper block P12. In this way, placing the jumper simulates pressing a soft reset button.

The naresetapp example application demonstrates a simple mechanism for monitoring a GPIO pin and then initiating a soft reset when the pin achieves a particular value.

Flash

▪ ▪

General information

Logical regions with Digi Connect ME flash are assigned to particular uses. As a result, its use for general purposes in development kit applications is limited.

In particular, the flash file system region can be used for general purposes if the BSP is <u>not</u> configured to create the flash files system, and all but the first sector of the NVRAM region can be used since the Net+OS NVRAM parameters currently (easily) fit into one sector. See the table that follows for specific information.

Note The Boot, POST, and Reserved sections should not be touched.

Digi Connect ME flash mappings

Region	Sector	Size	Region	Sector	Size
Boot	0 - 4	128KB	NVRAM	23 - 25	192KB
POST	5 - 6	128KB	File system	26 - 33	512KB
Image	7 - 22	1MB	Reserved	34	64KB

Memory

▪ ▪

Digi Connect ME has 8 MB of SDRAM memory, which is controlled by chip select 1, located at 0x00000000 in the processor address space and aliased at 0x04000000 and 0x08000000. The application program (EOS) is loaded at address 0x08080000.

Module Specifications

Mechanical

- Length: 1.445 in. (36.703 mm)

- Width: 0.75 in. (19.05 mm)

- Height: 0.735 in. (18.669 mm)

- Device/serial interface connector: 20-pin micro header (10-pin double row) with .50-inch (1.27-mm) pitch (Samtec P/N FTS-110-01-F-DV-TR or similar). Positions 3 through 6 are removed.

Environmental

- Ambient Temperature: -40^{0}F to 185^{0}F (-40^{0}C to 85^{0}C)

- Storage Temperature: -40^{0}F to 257^{0}F (-40^{0}C to 125^{0}C)

- Humidity: 5% to 90%

- Altitude: 12,000 feet (3657.60 meters)

Network interface

- RJ-45 connector (8-pin)
- 10/100BASE-T
- Half-duplex and full-duplex support
- Cable: A shielded RJ-45 cable must be used to connect the module to the network. The shield must make contact with the tabs of the RJ-45 enclosure on the module.

Serial interface

One TTL serial interface (CMOS 3.3v) with full modem control signals (DTR, DSR, DCD, RTS, CTS).

Data rates (bps)

50, 110, 134, 150, 200, 300, 600, 1200, 2400, 3600, 4800, 9600, 19200, 38400, 57600, 115200, 230400

Flow control options

RTS/CTS, XON/XOFF, None

GPIO

Five GPIO (General Purpose Input/Output) ports are selectable between modem control and GPIO as follows:

- RTS/GPIO 4
- DTR/GPIO 5
- CTS/GPIO 2
- DCD/GPIO 1
- DSR/GPIO 3

DC characteristics

The following tables provide DC characteristics for operating conditions, inputs, and outputs.

Symbol	Description	Min	Typ	Max	Unit
V_{CC}	Supply Voltage	3.14	3.3	3.45	V
I_{CC}	Supply Current	—	250	300	mA
I_{IL}	Input Current as "0" (no pull-up)	10	—	10	µA
I_{IH}	Input Threshold (no pull-up)	-10	—	10	µA
I_{OZ}	HighZ Leakage Current	-10	—	10	µA
I_{OD}	Output Drive Strength	—	—	2	mA
C_{IO}	Pin Capacitance (V_O=0)	—	—	4	pF

Operating Conditions

Symbol	Description	Min	Typ	Max	Unit
V_{IH}	Input High Voltage	2	—	3.45	V
V_{IL}	Input Low Voltage	V_{SS}-0.3	—	0.2^*V_{CC}	V

Inputs

Symbol	Description	Min	Typ	Max	Unit
V_{OH}	Output High Voltage	2.4	—	3.45	V
V_{OL}	Output Low Voltage	0	—	0.4	V

Outputs

Certifications

■ ■

A P P E N D I X   B

This product complies with the following standards.

FCC Part 15 Class B

■ ■

Radio frequency interference (RFI)(FCC 15.105)

The Digi Connect ME embedded module has been tested and found to comply with the limits for Class B digital devices pursuant to Part 15 Subpart B, of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Labeling requirements (FCC 15.19)

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Modifications (FCC 15.21)

Changes or modifications to this equipment not expressly approved by Digi may void the user's authority to operate this equipment.

Industry Canada

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class B prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada."

Declaration of Conformity

= =

(In accordance with FCC Dockets 96-208 and 95-19)

Manufacturer's Name:	Digi International
Corporate Headquarters:	11001 Bren Road East Minnetonka MN 55343
Manufacturing Headquarters:	10000 West 76th Street Eden Prairie MN 55344

Digi International declares, that the product:

Product Name:	Digi Connect ME embedded module
Model Numbers:	50000866-01 50000866-02

to which this declaration relates, meets the requirements specified by the Federal Communications Commission as detailed in the following specifications:

- Part 15, Subpart B, for Class B Equipment

- FCC Docket 96-208 as it applies to Class B personal

- Computers and Peripherals

The product listed above has been tested at an External Test Laboratory certified per FCC rules and has been found to meet the FCC, Part 15, Class B, Emission Limits. Documentation is on file and available from the Digi International Homologation Department.

International EMC standards

The Digi Connect ME embedded module meets the following electromagnetic emissions standards:

- EN55022: 1998
- EN55024: 1998
- VCCI
- AS 3548

Safety standards

The Digi Connect ME embedded module meets the following safety standards:

- UL 60950
- CSA 22.2 No. 60950
- EN60950

NetSilicon
A Digi International® Company