

# ConnectCard™ for i.MX28

Compact Core Module with Wireless and Wired Connectivity

Cost-effective small-footprint System-on-Module solution delivers performance, low-power operation and integrated 802.11a/b/g/n, Bluetooth 4.0 and Ethernet connectivity.



## Overview

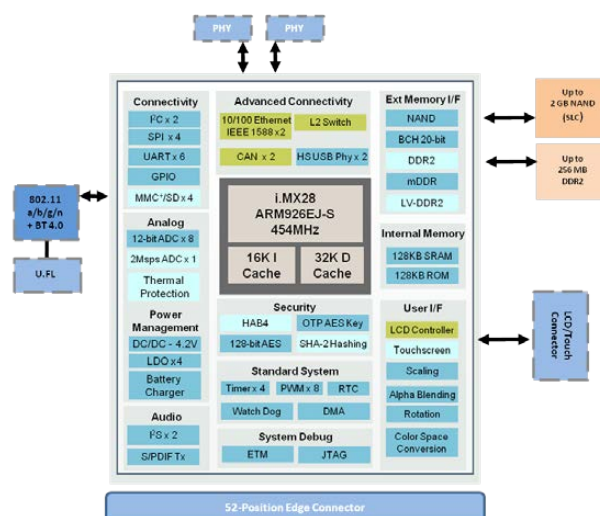
Based on the Freescale i.MX28 processor family, the ConnectCard for i.MX28 is an ideal embedded platform solution for connected applications in medical and healthcare, energy, transportation and industrial/building automation.

It offers easy design integration and unique peripheral/interface flexibility in an extremely compact and cost-effective form factor. This module is suitable for a wide range of different devices, including battery powered product designs.

The module is equipped with a highly integrated 32-bit ARM core running at up to 454 MHz, on-chip power management, dual Ethernet and 802.11a/b/g/n networking options, Bluetooth 4.0 connectivity, dual FlexCAN options, GPIO, ADC, UART, USB high-speed, SPI, I<sup>2</sup>C, I2S, 1-Wire, PWM and JTAG/ETM.

The Digi JumpStart® Kits for Digi Embedded Linux provides a complete turnkey embedded development solution allowing immediate and successful product development with significantly accelerated time-to-market and reduced design risk.

## Block Diagram



## Features/Benefits

- Cost-effective design in compact form factor
- 32-bit ARM processor at up to 454 MHz
- Single/dual 10/100 Ethernet connectivity options
- Pre-approved 802.11a/b/g/n Wi-Fi + Bluetooth 4.0
  - Includes Wi-Fi® Access Point mode + Wi-Fi Direct™
  - Support for Bluetooth 3.0 + HS and Bluetooth LE
  - Ready for Cisco CCX and Wi-Fi Logo certification
- Digi Embedded Linux platform
  - Digi Device Cloud enabled
  - Includes complete Digi BSP source code
- Long-term product availability
- Additional ZigBee®, 802.15.4, cellular and satellite connectivity options (off-module)

## Related Items



Design Services



Accessory Kits



Support



Supported Software Platforms



## Digi JumpStart Kit® Overview

### Digi JumpStart Kit for Digi Embedded Linux

Built on a standard Linux 2.6 kernel distribution, the Digi JumpStart Kit for Embedded Linux is tailored to the specific needs of embedded Linux product development and provides an easy-to-use, complete off-the-shelf embedded development platform. It integrates all relevant software components required to build secure network-enabled products, including extended capabilities such as fast system startup, secure boot, enterprise-grade Wi-Fi security, Wi-Fi Direct, Wi-Fi Access Point mode, Bluetooth stack (with HDP), Sun Java SE for Embedded, HAPI HL7 parser and fully integrated Device Cloud support for remote device management and web services for cloud based applications.

The Digi JumpStart Kit for Digi Embedded Linux also provides Digi ESP™ for Embedded Linux, a fully Linux-hosted Integrated Development Environment (IDE) based on the open Eclipse™ framework. Ideal for new and powerful enough for experienced Linux developers, Digi ESP significantly improves the overall software design productivity by accelerating and greatly simplifying driver and application development through a user-friendly and graphically oriented development environment.

- Complete Linux development platform for embedded systems
- Royalty-free and with optimized 2.6 kernel and services support
- Linux-based Digi ESP IDE for rapid product development
- Full Linux and Digi Board Support Package (BSP) source code included

### Development Kit Contents

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module            | Freescall i.MX287, up to 454 MHz, 256 MB NAND flash (SLC), 256 MB DDR2, Dual Ethernet, 802.11a/b/g/n + BT 4.0, dual CAN Bus, on-module LCD + touchscreen connector, JTAG/ETM                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Development Board | 4 serial ports (2 x RS-232 Tx/Rx, 2 x TTL Tx/Rx), 2 FlexCAN (DB9), VGA connector, external LCD/Touchscreen connectors, user/application connectors, Ethernet RJ-45 connectors, Wi-Fi/Bluetooth antenna connectors (RP-SMA), MicroSD slot, USB OTG connector (micro-B), 1 x USB Host (Type A), I²C/SPI/ADC/PWM headers, 1-Wire connector, Audio: line in/out and headphone in (3.5 mm), user push-buttons, user LEDs, Digi XBee® module sockets (SMT and through-hole) with antenna connector option, 802.3af (PoE) module socket (PoE module sold separately), JTAG connector, 9-30VDC power supply, battery connector, power switch |
| CD/DVD            | Digi Embedded Linux with Live DVD support, Eclipse-based Digi ESP IDE, Linux and platform specific source code, Universal boot loader source code (U-Boot), sample code, documentation                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Documentation     | Quick start guide, Digi Embedded Linux users guide, hardware reference manual, development board schematics and BOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Accessories       | External wall power supply with interchangeable outlet adapters (North America, EU, UK, Australia), Ethernet cable, antennas and serial cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Part Numbers      | CC-WMX28-LX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Specifications

### ConnectCard™ i.MX28

### ConnectCard™ Wi-i.MX28

|                      |                             |
|----------------------|-----------------------------|
| Processor            |                             |
| Processor Models     | Freescall® i.MX280, i.MX287 |
| Speed Grade          | Up to 454 MHz               |
| Core Type            | ARM926EJ-S                  |
| Cache Memory         | 16k I-Cache, 32k D-Cache    |
| Internal RAM         | 128 KB SRAM                 |
| Internal ROM (OCOTP) | 1,280 Bits                  |
| Memory               |                             |
| Flash                | Up to 2 GB NAND flash       |
| RAM                  | Up to 256 MB DDR2           |
| Debug                |                             |
| JTAG                 | •                           |
| ETM/ETB              | •                           |

| Specifications                   |                                                                                                                          | ConnectCard™ i.MX28 | ConnectCard™ Wi-i.MX28 |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------|
| Power Management                 |                                                                                                                          |                     |                        |
| Power Modes                      | Run, Standby, Deep Sleep                                                                                                 |                     |                        |
| Wake-up Events                   | RTC, GPIO, CAN, USB, Ethernet                                                                                            |                     |                        |
| Auto Slow                        | •                                                                                                                        |                     |                        |
| Li-Ion Battery Charger / Monitor | •                                                                                                                        |                     |                        |
| Clock and Watchdog               |                                                                                                                          |                     |                        |
| Real-Time Clock                  | •                                                                                                                        |                     |                        |
| Alarm                            | •                                                                                                                        |                     |                        |
| Watchdog                         | •                                                                                                                        |                     |                        |
| Security                         |                                                                                                                          |                     |                        |
| Data Co-Processor (DCP)          | 128-bit AES encryption<br>SHA-1 / SHA256 hashing                                                                         |                     |                        |
| Fusebox (OCOTP)                  | 1280 bits                                                                                                                |                     |                        |
| High-Assurance Boot (HAB4)       | •                                                                                                                        |                     |                        |
| Secure Boot                      | 128-bit AES decryption                                                                                                   |                     |                        |
| Peripherals                      |                                                                                                                          |                     |                        |
| UART                             | Up to 4 channels with bit rates up to 3.25 Mbps (AUART)<br>Up to 1 channel with bit rate up to 115 kbps (DUART)          |                     |                        |
| CAN Bus                          | Up to 2 channels, CAN Bus 2.0B, bit rates up to 1 Mbps, 64 message buffers (0-8 bytes), low-power modes with wake-up     |                     |                        |
| SPI                              | Up to 2, master/slave modes                                                                                              |                     |                        |
| I2S                              | Up to 1                                                                                                                  |                     |                        |
| I²C                              | Up to 2 channels, master/slave (7-/10-bit addressing),<br>standard (100 kbps) and fast (400 kbps) mode                   |                     |                        |
| SD/SDIO/MMC                      | Up to 4 ports, 1-/4-/8-bit modes, up to 48 MHz                                                                           |                     |                        |
| USB 2.0 High-Speed               | Up to 1 USB 2.0 High-Speed Host (with PHY)<br>Up to 1 USB 2.0 OTG port (with PHY)                                        |                     |                        |
| 1-Wire                           | Maxim DS2482-100+                                                                                                        |                     |                        |
| PWM                              | Up to 4                                                                                                                  |                     |                        |
| ADC                              | HSADC: Up to 1 channel, up to 2 Mbps sample rate, 8-/10-/12-bit resolution<br>LRADC: Up to 6 channels, 12-bit resolution |                     |                        |
| GPIO                             | Up to 128 GPIOs, selectable voltage (1.8/3.3V), interrupt capable                                                        |                     |                        |
| Display                          |                                                                                                                          |                     |                        |
| Resolution                       | 800x480 (WVGA)                                                                                                           |                     |                        |
| Refresh Rate                     | Up to 60 Hz                                                                                                              |                     |                        |
| Color Depth                      | 8/16/24 bpp                                                                                                              |                     |                        |
| Modes                            | RGB/DOTCK/SYSTEM                                                                                                         |                     |                        |
| Color Space Conversion           | •                                                                                                                        |                     |                        |
| Scaling                          | •                                                                                                                        |                     |                        |
| Rotation                         | •                                                                                                                        |                     |                        |
| Touch Screen                     |                                                                                                                          |                     |                        |
| Touch Screen Controller          | 4-/5-wire (LRADC)                                                                                                        |                     |                        |

| Specifications                                         |                                                                                                                                                                                                                  | ConnectCard™ i.MX28                                                                                                                               | ConnectCard™ Wi-i.MX28 |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Ethernet                                               |                                                                                                                                                                                                                  |                                                                                                                                                   |                        |
| Physical Layer                                         | 10/100Base-T                                                                                                                                                                                                     |                                                                                                                                                   |                        |
| Data Rates                                             | 10/100 Mbps, auto-sensing                                                                                                                                                                                        |                                                                                                                                                   |                        |
| Duplex Mode                                            | Full or half duplex, auto-sensing                                                                                                                                                                                |                                                                                                                                                   |                        |
| IEEE 1588                                              | • (i.MX287 only)                                                                                                                                                                                                 |                                                                                                                                                   |                        |
| Power over Ethernet (802.3af)                          |                                                                                                                                                                                                                  |                                                                                                                                                   |                        |
| Power over Ethernet                                    | Development board ready for 802.3af PoE application kit (sold separately)                                                                                                                                        |                                                                                                                                                   |                        |
| Wi-Fi²                                                 |                                                                                                                                                                                                                  |                                                                                                                                                   |                        |
| Standard                                               | N/A                                                                                                                                                                                                              | 802.11a/b/g/n                                                                                                                                     |                        |
| Antenna Connectors                                     | N/A                                                                                                                                                                                                              | 2 x U.FL                                                                                                                                          |                        |
| Dual Diversity                                         | N/A                                                                                                                                                                                                              | •                                                                                                                                                 |                        |
| Frequency Bands                                        | N/A                                                                                                                                                                                                              | 2.412 - 2.484 GHz<br>4.900 - 5.850 GHz                                                                                                            |                        |
| Data Rates                                             | N/A                                                                                                                                                                                                              | 802.11b: 1, 2, 5.5, 11 Mbps<br>802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>802.11n: 15, 30, 45, 60, 90, 120, 135, 150 Mbps<br>(HT40, MCS 0-7) |                        |
| Modulation                                             | N/A                                                                                                                                                                                                              | DBPSK, DQPSK, CCK, BPSK, QPSK, 16-QAM, 64-QAM                                                                                                     |                        |
| Transmit Power (±2 dBm)                                | N/A                                                                                                                                                                                                              | 802.11b: 17 dBm typical<br>802.11g/n: 15 dBm typical<br>802.11a/n: 12 dBm typical                                                                 |                        |
| Security                                               | N/A                                                                                                                                                                                                              | WEP, WPA-PSK/WPA2-Personal, WPA/WPA2 Enterprise, 802.11i                                                                                          |                        |
| Wi-Fi Logo Certification                               | N/A                                                                                                                                                                                                              | Ready                                                                                                                                             |                        |
| CCXv4 ASD                                              | N/A                                                                                                                                                                                                              | Ready                                                                                                                                             |                        |
| Bluetooth²                                             |                                                                                                                                                                                                                  |                                                                                                                                                   |                        |
| Modes                                                  | N/A                                                                                                                                                                                                              | Bluetooth 4.0<br>(Bluetooth 2.1 + EDR, Bluetooth 3.0 + HS 802.11 AMP, Bluetooth Low Energy)                                                       |                        |
| Class                                                  | N/A                                                                                                                                                                                                              | 1.5                                                                                                                                               |                        |
| Profiles                                               | N/A                                                                                                                                                                                                              | GAP, SPP, HSP, HFP, FTP, PAN, OPP, HID, A2DP, AVRCP, HDP                                                                                          |                        |
| Coexistence                                            | N/A                                                                                                                                                                                                              | •                                                                                                                                                 |                        |
| Power Requirements (Use-Case Estimates)                |                                                                                                                                                                                                                  |                                                                                                                                                   |                        |
| Wi-Fi 2.4 GHz Transmit, CPU 454 MHz @ 50%, UART active | 406mA @ 5V                                                                                                                                                                                                       |                                                                                                                                                   |                        |
| Wi-Fi 2.4 GHz Receive, CPU Idle (Auto Slow)            | 100mA @ 5V                                                                                                                                                                                                       |                                                                                                                                                   |                        |
| Wi-Fi Standby (Sleep), CPU Standby (IRQ)               | 8mA @ 5V                                                                                                                                                                                                         |                                                                                                                                                   |                        |
| Wi-Fi Standby (Host off), CPU Deep Sleep (RTC)         | 112µA @ 5V                                                                                                                                                                                                       |                                                                                                                                                   |                        |
| Module Variants¹                                       |                                                                                                                                                                                                                  |                                                                                                                                                   |                        |
| Population Options                                     | Processor models (i.MX280, i.MX281, i.MX283, i.MX285, i.MX286, i.MX287), flash, RAM, Single 10/100 Ethernet, dual 10/100 Ethernet w/1588, 802.11a/b/g/n Wi-Fi with Bluetooth 4.0, 1-Wire, LCD connector, CAN bus |                                                                                                                                                   |                        |

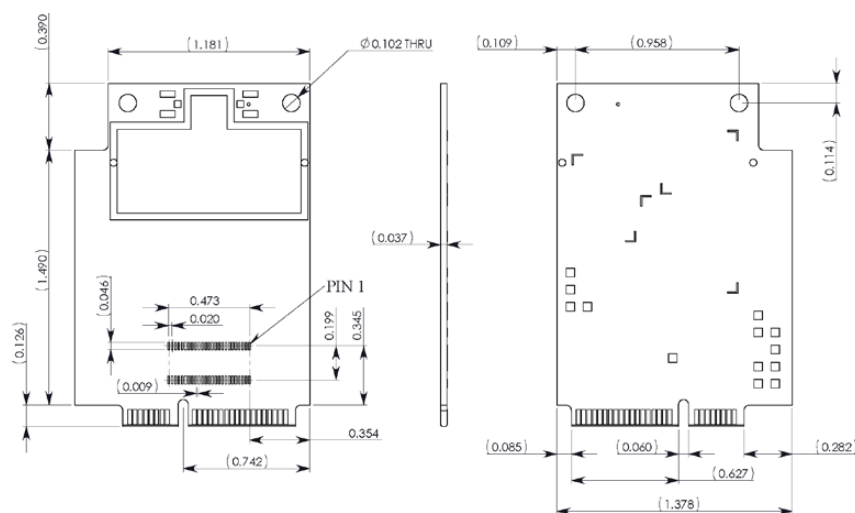
<sup>1</sup> All options available on development module. Production modules may require custom variants. Contact your local distributor or Digi sales office for details.

<sup>2</sup> Transmit power and channel availability depending on regulatory requirements and corresponding module variants.



| Specifications                                |                                                                                                                                                                                                                                      | ConnectCard™ i.MX28 | ConnectCard™ Wi-i.MX28 |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------|
| Mechanical                                    |                                                                                                                                                                                                                                      |                     |                        |
| Dimensions (L x W x H) w/o JTAG/LCD connector | 51 mm x 35 mm x 2.6 mm                                                                                                                                                                                                               |                     | 51 mm x 35 mm x 3 mm   |
| Mating Connector for Module                   | Molex, P/N 67910-5700<br>Tyco, P/N 2041119-x                                                                                                                                                                                         |                     |                        |
| Retaining Clip for Module (Optional)          | Molex, P/N 480995701<br>Tyco, P/N 1717832                                                                                                                                                                                            |                     |                        |
| JTAG/LCD Connector on Module (Optional)       | FCI, P/N SFV31R-1STE1LF<br>Tyco, P/N 3-1734839-1                                                                                                                                                                                     |                     |                        |
| Environmental                                 |                                                                                                                                                                                                                                      |                     |                        |
| Operating Temperature                         | -40° C up to +85° C (-40° F to +185° F)<br>Upper temperature ceilings may require active and/or passive thermal management such as lower clock speed, thermal pads, airflow, etc.                                                    |                     |                        |
| Storage Temperature                           | -40° C up to +85° C (-40° F to +185° F)                                                                                                                                                                                              |                     |                        |
| Relative Humidity                             | 5% to 90% (non-condensing)                                                                                                                                                                                                           |                     |                        |
| Altitude                                      | 12,000 feet (3,658 meters)                                                                                                                                                                                                           |                     |                        |
| Approvals and Certifications                  |                                                                                                                                                                                                                                      |                     |                        |
| Emissions                                     | FCC Part 15 Class B, EN 55022 Class B, EN 61000-3-2, 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 301 489-17 |                     |                        |
| Immunity                                      | EN 55024, EN 301 489-3                                                                                                                                                                                                               |                     |                        |
| Safety                                        | UL/UR, or equivalent                                                                                                                                                                                                                 |                     |                        |
| Radio                                         | US, Canada, EU, Japan, Australia/New Zealand                                                                                                                                                                                         |                     |                        |
| Temperature                                   | IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-78                                                                                                                                                                                         |                     |                        |
| Vibration/Shock                               | IEC 60068-2-6, IEC 60068-2-64, IEC 60068-2-27                                                                                                                                                                                        |                     |                        |
| Design Test                                   | HALT                                                                                                                                                                                                                                 |                     |                        |

••Module Feature



You can purchase with confidence knowing that Digi is always available to serve you with expert technical support and our industry leading warranty. For detailed information visit [www.digi.com/support](http://www.digi.com/support)

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