DIGI™

CONNECTCORE®
FOR i.MX53

High-end Cortex-A8 System-on-Module solution delivers industry-leading performance, low-power operation, and fully integrated 802.11a/b/g/n + Ethernet networking

The network-enabled ConnectCore for i.MX53 module family is a highly integrated and future-proof System-on-Module (SoM) solution based on the new Freescale® i.MX53 application processor. It offers a high-performance 1 GHz ARM® Cortex™-A8 core, wired and wireless connectivity options, powerful 1080p/720p video encoding/decoding capabilities and a complete peripheral set.

The ConnectCore for i.MX53 family builds on the successful ConnectCore for i.MX51 modules by providing a form factor compatible option with significantly improved processing, memory, video and connectivity capabilities. It is a scalable and energy-efficient module family, ideal for medical devices, security/surveillance equipment, industrial applications and digital signage.

Complete and cost-efficient Digi JumpStart Kits® for Digi Embedded Linux, Timesys LinuxLink, Android and Microsoft Windows Embedded Compact 7 allow immediate and professional embedded product development with dramatically reduced design risk and time-to-market.

BLOCK DIAGRAM

180-Pin Connector

SECURITY
- SAHARA v4
- TrustZone
- RTIC
- SCC v2
- SRTC

MULTIMEDIA
- OpenGL ES 2.0 + VG1.1
- 1080p Video Decoder / 720p Video Encoder
- HD1080p @ 60 Hz TV-Out

MEMORY
- ROM 32 KB
- RAM 96 KB

TIMERS
- Timer x3
- PWM x2
- Watch Dog x2

2 x U.FL

802.11 a/b/g/n + BT 4.0

PHY

10/100 Ethernet MAC

Dialog DA9053 PMIC

ARM CORE
- 800 MHz / 1 GHz Cortex-A8
- 32 KB I-Cache | 32 KB D-Cache | 256 KB L2-Cache
- Neon | ETM
- Vector Floating Point Unit

SYSTEM CONTROL
- Secure JTAG
- Power Mgmt
- PLL x 3
- Clock Reset
- Temp Monitor

External Memory Interface DDR2/DDR3 @ 400 MHz SLC/MLC NAND

Up to 8 GB NAND (SLC)

Up to 2 GB DDR2

3-Axis Accelerometer

- Fast IrDA
- 1-Wire
- I²C x3
- GPIO
- Keypad
- CAN x2
- MLB50
- ESAI
- ASRC
- PHY | USB OTG HS
- PHY | USB HS Host
- USB HS Host x2
- Fuse Box

AXI / AHB Switch Fabric

Smart DMA

IMAGE PROCESSING UNIT
- Dual-Display Controller
- VGA Out | Parallel UXGA | LVDS UXGA
- Image Signal Processor
- Resizing and Blending
- Inversion/Rotation
- Image Enhancement
- Dual-Camera Interface

- eMMC 4.4
- eMMC 4.3/SD 2.1 x4
- SSI/I²S x3
- UART x5
- PATA/SATA
- CSPI HS x2 / LS x1
- SPDIF Tx
- 10/100 Ethernet w/IEEE1588

PHY

180-Pin Connector

BENEFITS

- High-performance 32-bit System-on-Module
- Long-term product availability solution
- Single and dual 10/100 Mbit Ethernet networking
- Pre-certified 802.11a/b/g/n Wi-Fi interface
- High-performance 2D/3D Graphics Processing Unit
- Hardware video processing with 1080p decoding
- Low-emission design with FCC Class B compliance
- ZigBee, cellular and satellite connectivity options
- Industrial operating temperature support
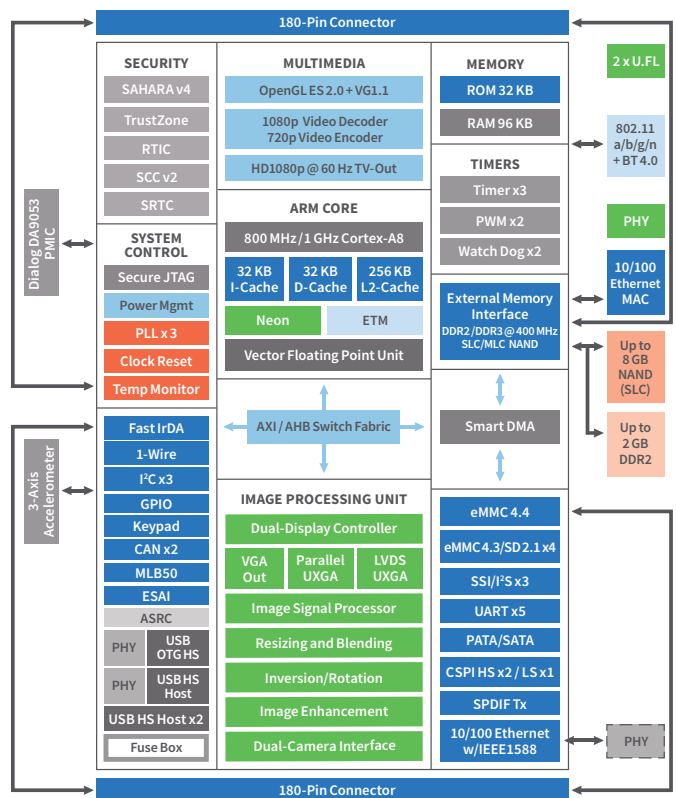
RELATED PRODUCTS
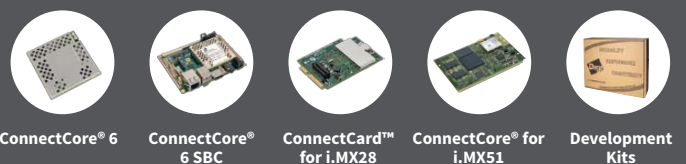
ConnectCore® 6

ConnectCore® 6 SBC

ConnectCard™ for i.MX28

ConnectCore® for i.MX51

Development Kits

DIGI JUMPSTART KITS OVERVIEW

DIGI JUMPSTART KIT FOR EMBEDDED LINUX	DIGI JUMPSTART KIT FOR MICROSOFT WINDOWS COMPACT 7	DIGI JUMPSTART KIT FOR ANDROID

Built around a standard Linux 2.6 kernel distribution, the Digi JumpStart Kit for Embedded Linux is tailored to the specific needs of embedded Linux development and provides an easy-to-use, complete off-the-shelf embedded development platform. It includes all components that are required to build secure network-enabled products based on the ConnectCore for i.MX53.

The kit includes Digi ESP™ for Embedded Linux, a powerful and fully Linux-hosted Integrated Development Environment based on the open Eclipse™ framework. Ideal for new and experienced Linux developers, Digi ESP improves software design productivity by accelerating and greatly simplifying driver and application development through a user-friendly graphical interface.

- Complete Linux development platform for embedded systems
- Royalty-free and with optimized 2.6.35 kernel and services support
- Linux-based Digi ESP IDE for rapid product development
- Full Linux and Digi Board Support Package (BSP) with source code included

Microsoft Windows Embedded Compact 7 is a highly componentized operating system, offering pre-tested technology components designed to create sophisticated embedded applications with minimized design effort and risk. It includes a wide range of ready-to-use components such as a graphical user interface, networking, web browser and multimedia. The professional Microsoft Visual Studio 2008 development tools also support native and managed code applications using various programming languages.

The Digi JumpStart Kit for Microsoft Windows Embedded Compact 7 provides a complete kit with all hardware and software components needed to start immediate software development on the ConnectCore for i.MX53 modules. This includes support for all processor platform features such as power management, multimedia interfaces and other peripherals.

- Complete kit for immediate Windows Embedded Compact 7 development
- Seamless integration into Microsoft Windows Embedded Compact environment
- Full Digi Board Support Package (BSP) with source code
- Includes 180-day Visual Studio 2008 and Windows Embedded Compact 7 eval kit

Android is an ideal software platform to create professional and feature-complete products with significantly reduced software development effort and improved overall time-to-market. The Digi Application Development Kit for Android builds on the strong Android software foundation and its rich eco-system by providing a complete and easy-to-use Android application development solution that is designed to meet the specific needs of embedded developers.

Ready to use right out of the box, the kit supports the hardware capabilities of Digi's ConnectCore for i.MX module family with Digi extensions for Android allowing customers to design Android based products without the typically complex and often difficult low-level system development effort.

- Complete out-of-box Android application development
- Embedded specific API extension for Android
- Digi ESP IDE for Windows and Linux based app development
- Including kernel and rootfs customzation option (Linux only)

SOFTWARE PLATFORM	DIGI EMBEDDED LINUX	MICROSOFT WINDOWS EMBEDDED COMPACT 7	ANDROID
MODULE	1 GHz ConnectCore Wi-i.MX53 (i.MX535) with 512 MB NAND flash, 512 MB DDR2, dual Ethernet, accelerometer		
DEVELOPMENT BOARD	3 serial ports (1 x RS-232/422/485, 1 x RS-232 Tx/Rx, 1 x TTL), VGA connector, HDMI connector, LCD/Touchscreen connectors, external camera connectors, user/application connectors, Ethernet RJ-45 connector (primary), Ethernet header (secondary), WLAN antenna connectors (RP-SMA), SD/MMC slot, MicroSD slot, CAN bus, SATA, USB OTG, 4 x USB Host, I2C/SPI headers, 1-Wire connector, audio: line in/out and microphone in (3.5 mm), Digi XBee® module socket (module sold separately), GPIO screw terminal, user push-buttons, user LEDs, battery, 802.3af (PoE) module socket (module sold separately), JTAG connector, 9-30VDC power supply, 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	Digi Windows Compact 7 CD: Microsoft Windows Embedded Compact 7 BSP w/source code, UniBoot Loader (U-Boot) source code, sample code, documentation; Microsoft Windows Embedded Compact 7 evaluation DVD: 180-day trial of Microsoft Embedded Compact 7, Platform Builder, Visual Studio 2008	Android 2.3.4 (Gingerbread), Eclipse-based Digi ESP IDE w/ADT extensions (Windows/Linux), Universal boot loader source code (U-Boot), Kernel and rootfs customzation option (Linux), sample code, documentation
DOCUMENTATION	Quick start guide, Digi Embedded Linux user's guide, hardware reference manual, development board schematics	Quick start guide, Digi Windows Compact 7, BSP user's guide, hardware reference manual, development board schematics	Getting started guide, Digi Android API extensions, hardware reference manual, development board schematics
ACCESSORIES	7" WVGA Sharp LCD (LQ070Y3DG3B) with touch screen, External wall power supply with interchangeable outlet adapters (North America, EU, UK, and Australia), Ethernet cable, antennas, serial cable		

Please refer to the feature specs on the Digi website for detailed information about the specific software platform capabilities.
Additional platform support for Timesys LinuxLink available. Please contact Digi or Timesys directly.

SPECIFICATIONS	ConnectCore® i.MX53	ConnectCore® Wi-i.MX53

PROCESSOR

PROCESSOR MODEL	Freescale® i.MX53 (i.MX535/i.MX537)
SPEED GRADES	800/1000 MHz
CORE TYPE	ARM® Cortex™-A8
CACHE MEMORY	32k L1 I-Cache, 32k L1 D-Cache, 256k L2-Cache (unified)
INTERNAL RAM	128 KB (secure/non-secure)
VECTOR FLOATING POINT	Yes
NEON MEDIA ACCELERATION	Yes

MEMORY

FLASH	Up to 8 GB NAND flash
RAM	Up to 2 GB DDR2

DEBUG

SECURE JTAG	Yes
ETM/ETB	Yes

POWER MANAGEMENT

POWER MODES	Run, Wait, Stop, Low-power screen refresh
WAKE-UP EVENTS	GPIO, keypad, RTC (day/time of day), SD card/USB cable insertion, battery/charger attach
DYNAMIC VOLTAGE AND FREQUENCY SCALING	Yes
BACKLIGHT DRIVERS	3
BATTERY MANAGEMENT	Yes

REAL-TIME CLOCK

BATTERY BACKUP (EXTERNAL)	Yes

SECURITY

HARDWARE ENCRYPTION/DECRYPTION	AES, DES/3DES, RC4, C2; RSA, ECC; MD5, SHA-1/224/256
RANDOM NUMBER GENERATOR	Yes
RUN TIME INTEGRITY CHECKER	Yes
SECURE RAM (INTERNAL)	Yes
FUSE BOX (E-FUSES)	64 Bits (application-specific use)
PHYSICAL TAMPER DETECTORS	Yes

TIMERS

GENERAL PURPOSE TIMER	32-bit up-counter with clock source selection; 2 input capture channels; 3 output compare channels, forced compare
ENHANCED PERIODIC INTERRUPT TIMER	32-bit down-counter with clock source selection; Set-and-forget/free-running modes; Precision interrupt generation
WATCHDOG	Yes

THERMAL MANAGEMENT

TEMPERATURE MONITOR	On-chip sensor, precision 0 to 135°C ±5°C; Software support for thermal-aware Dyamic Frequency and Voltage Scaling (DFVS)

CONNECTIVITY

UART	Up to 3 channels with bit rates up to 4 MHz, IrDA 1.0 support
IRDA INFRARED	Medium InfraRed (0.576/1.152 Mbps), Fast InfraRed (4 Mbps)
CAN	CAN 2.0b, up to 2 channels, up to 1 Mbps each (available on i.MX537 variant)
CSPI	Master and slave mode; Bit rate up to 25 Mbps (master)
ECSPI	Up to 2 eCSPI channels, master and slave mode; Bit rates up to 66.5 Mbps (master)
I2C	Up to 3 channels, master/slave (7-/10-bit addressing); All: Standard (100 kbps) and fast (400 kbps) mode
SD/SDIO/MMC/EMMC	Up to 4 ports, 1-/4-/8-bit modes; MMC: Up to 416 Mbps (8-bit mode), SD/SDIO: Up to 200 Mbps (4-bit mode) eMMC 4.4: Ultra high speed, up to 832 Mbps
P-ATA	Up to 66 MB/s data rate ; PIO mode (0,1,2,3,4), multi-word DMA mode (0,1,2), Ultra DMA mode (0,1,2,3,4,5)
SATA	SATA II, up to 1.5 Gbps
USB 2.0 HIGH-SPEED	Up to 3 USB 2.0 High-Speed Host ports, one with integrated PHY; Up to 1 USB 2.0 OTG port with integrated PHY
MEDIA LOCAL BUS (MLB)	MOST (Media Oriented Systems Transport) interface, up to 50 Mbps
1-WIRE	Yes
ISO 7816 (SIM/SMART CARD)	Yes

SPECIFICATIONS ConnectCore® i.MX53 | ConnectCore® Wi-i.MX53

CONNECTIVITY - CONTINUED

KEYPAD	8x8 keypad matrix	
PWM	2	
ADC (10-BIT)	Up to 4 channels	
GPIO	Up to 128 GPIOs	
EXTERNAL MEMORY BUS	16-bit data/28-bit address in non-multiplexed address/data mode 16-bit or 32-bit data/28-bit address in multiplexed address/data mode	

MULTIMEDIA

CAMERA	Two parallel camera ports, up to 20-bit, up to 120 MHz peak
DISPLAY	5 interfaces available - with total rate of all interfaces up to 180 Mpixels/sec, 24 bpp Up to 2 displays can be driven simultaneously (screen refresh) Concurrent asynchronous access to 2 additional devices, e.g. display controllers and smart displays Parallel: 2 24-bit display ports, up to 165 Mpixels/sec, e.g. UXGA @ 60 Hz LVDS: 1 port up to 165 Mpixels/sec or 2 ports up to 85 Mpixels/sec, e.g. WXGA @ 60 Hz 1 TV-out/VGA port, up to 150 Mpixels/sec, e.g. 1080p60
IMAGE PROCESSING UNIT	Image enhancements, video/graphics combining, resizing, rotation/inversion, color conversion/correction
VIDEO PROCESSING UNIT	MPEG-4, H.263, H.264, MPEG-2, VC-1, DivX, RV10, MJPEG; 1080p30 decode, 720p30 encode
GPU (2D/3D)	33 million triangles/sec, 200 million pixels/sec raw; OpenVG 1.0, OpenGL ES Common Profile v1.0/v1.1/Direct3D Mobile, OpenGL ES Profile v2.0
TOUCHSCREEN INTERFACE (4-WIRE)	Yes
SPDIF (TX)	Yes
I²S/AC97/SSI	Up to 3 channels
ESAI	Multi-channel digital audio, up to 1.4 Mbps each channel
ASRC	Yes

ETHERNET

PHYSICAL LAYER	10/100Base-T
DATA RATES	10/100 Mbps, auto-sensing
DUPLEX MODE	Full or half duplex, auto-sensing
IEEE 1588	Yes, primary interface only (available on i.MX537 variant)

POWER OVER ETHERNET (802.3AF)

POWER OVER ETHERNET	Development board ready for 802.3af PoE application kit (sold separately)

ACCELEROMETER

THREE AXIS ACCELEROMETER	±2g/±4g/±8g Three Axis Low-g; Freescale MA7455L

WIRELESS LAN

STANDARD	N/A	802.11a/b/g/n (2.4/5 GHz)
ANTENNA CONNECTORS	N/A	2 x U.FL
DUAL DIVERSITY	N/A	Yes
FREQUENCY BANDS	N/A	2.412 - 2.484 GHz; 4.900 - 5.850 GHz
DATA RATES	N/A	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps (MCS 0-7)
MODULATION	N/A	DBPSK, DQPSK, CCK, BPSK, QPSK, 16-QAM, 64-QAM
802.11N FEATURES	N/A	A-MPDU / A-MSDU, PSMP, MTBA, STBC, Greenfield Preamble, RIFS
TRANSMIT POWER (±2 DBM)	N/A	802.11b: 17 dBm typical; 802.11g/n: 15 dBm typical; 802.11a: 12 dBm typical
SECURITY	N/A	WEP, WPA-PSK/WPA2-Personal, WPA/WPA2 Enterprise, 802.11i
QOS	N/A	WMM, WMM-PS, 802.11e
ROAMING ENHANCEMENTS	N/A	802.11k/r
EXTENDED RANGE (802.11N)	N/A	Yes
RADIO CERTIFICATIONS	N/A	USA, Canada, EU, Japan

POWER REQUIREMENTS[1]

TYPICAL / IDLE	700 mA @ 3.75 V / 200 mA @ 3.75 V

1   Baseline power consumption based on standard use case without WLAN and Ethernet. See Hardware Reference Manual for more detailed information.
2   Contact your local distributor or Digi sales office for details.

DIGI

| SPECIFICATIONS	ConnectCore® i.MX53	ConnectCore® Wi-i.MX53
MECHANICAL		
DIMENSIONS (L X W X H)	82 mm x 50 mm x 6.5 mm	82 mm x 50 mm x 8 mm
MODULE CONNECTORS	2 x 180-pin board-to-board connectors, 0.8 mm pitch (Mating connector FCI P/N 61083-184409LF or similar)	
ENVIRONMENTAL		
OPERATING TEMPERATURE	-40°C to +85°C (i.MX537 variant, 800 MHz); -20°C to +70°C (i.MX535 variant, 1 GHz)	
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)	
TEMPERATURE / CLIMATE TESTS	IEC 60068-2-1 (Ab/Ad Cold: 16 h with -40°C), IEC 60068-2-2 (Bb/Bd: Dry heat: 16 h with +85°C), IEC 60068-2-78 (Damp heat steady state: 16h with +40°C and 93%rH)	
VIBRATION / SHOCK TESTS	IEC 60068-2-6 Method Fc, IEC 60068-2-64 Method Fh, IEC 60068-2-27 Method Ea	
REGULATORY APPROVALS		
FCC PART 15 CLASS B	Yes	
FCC PART 15 SUB C SECTION 15.247	Yes	
IC RSS-210 ISSUE 5 SECTION 6.2.2(O)	Yes	
EN55022:2006 CLASS B	Yes	
ICES-003, CLASS B	Yes	
VCCI, CLASS B	Yes	
EN55024:1998 +A1:2001, A2:2003	Yes	
EN61000-3-2:2006	Yes	
EN61000-3-3:1995 +A1:2001, A2:2005	Yes	
EN60950-1:2001 (UL60950-EQUIVALENT)	Yes	
CSA C22.2, NO. 60950	Yes	

BOTTOM View

SIDE View
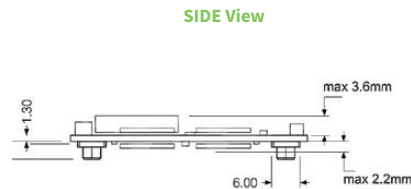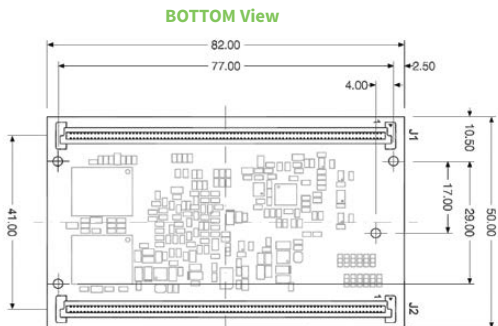
PART NUMBERS	DESCRIPTION
CC-WMX53-LX	ConnectCore for i.MX53 JumpStart Kit for Digi Embedded Linux, installation and setup support package, 7" WVGA LCD panel w/touchscreen
CC-WMX-KD69-VK	ConnectCore Wi-i.MX53 module, 1 GHz, 512 MB Flash, 512 MB RAM, 2x Ethernet, 802.11abgn, single pack
CC-WMX-KD69-VK-B	ConnectCore Wi-i.MX53 module, 1 GHz, 512 MB Flash, 512 MB RAM, 2x Ethernet, 802.11abgn, 25-piece bulk pack
CC-WMX-KD69-VM	ConnectCore Wi-i.MX53 module, 1 GHz, 512 MB Flash, 512 MB RAM, 1x Ethernet, 802.11abgn, single pack
CC-WMX-KD69-VM-B	ConnectCore Wi-i.MX53 module, 1 GHz, 512 MB Flash, 512 MB RAM, 1xEthernet, 802.11abgn, 25-piece bulk pack
CC-WMX-KD79-VK	ConnectCore Wi-i.MX53 module, 1 GHz, 512 MB Flash, 1 GB RAM, 2x Ethernet, 802.11abgn, single pack
CC-WMX-KD79-VK-B	ConnectCore Wi-i.MX53 module, 1 GHz, 512 MB Flash, 1 GB RAM, 2x Ethernet, 802.11abgn, 25-piece bulk pack
CC-MX-LD6A-ZM	ConnectCore i.MX53 module, 800 MHz, 1 GB Flash, 512 MB RAM, 1x Ethernet, Industrial Temp, single pack
CC-MX-LD6A-ZM-B	ConnectCore i.MX53 module, 800 MHz, 1 GB Flash, 512 MB RAM, 1x Ethernet, Industrial Temp, 25 pack
CC-MX-LD79-ZK	ConnectCore i.MX53 module, 800 MHz, 512 MB Flash, 1 GB RAM, 2x Ethernet, Industrial Temp, single pack
CC-MX-LD79-ZK-B	ConnectCore i.MX53 module, 800 MHz, 512 MB Flash, 1 GB RAM, 2x Ethernet, Industrial Temp, 25-piece bulk pack

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