By default, serial port 1 signals are configured as GPIO signals.

Serial Port 3, TTL Interface, X19

The serial (UART) port 3 interface is a TTL interface connected to a 2x5 pin, 2.54mm connector, X19. The connector supports only TTL level signals.

The serial port 3 interface is connected to i.MX51 UART port 3.

Serial port 3 pins are allocated as shown:

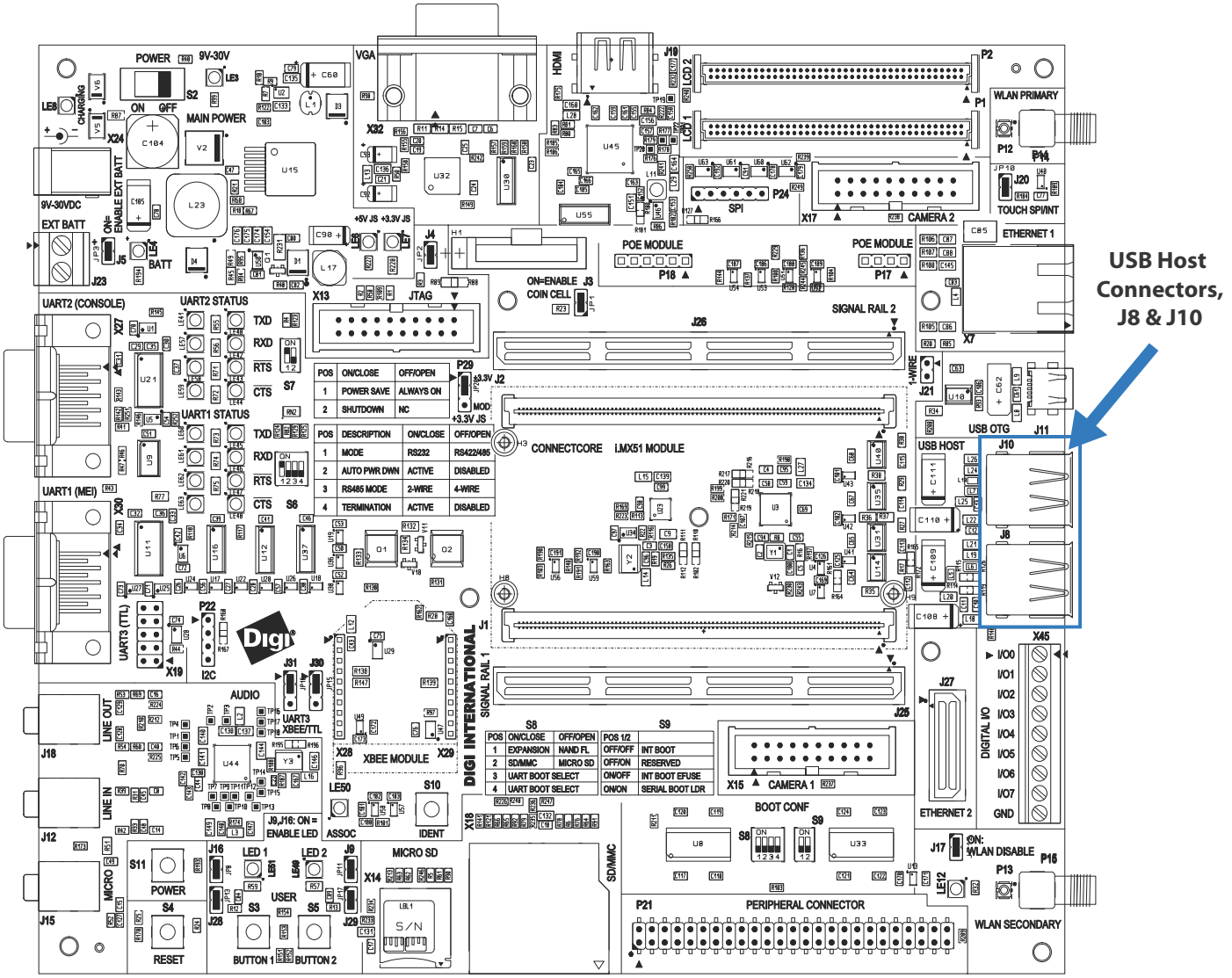
Pin	Function	Defaults to
1	NC	-
2	NC	-
3	RXD	GPIO1_22
4	RTS#	KEY_COL4
5	TXD	GPIO1_23
6	CTS#	KEY_COL5
7	NC	-
8	NC	-
9	GND	-
10	+3.3V	-

By default, serial port 3 signals are configured to their respective GPIO or KEY_COL signals.

Serial port 3 is connected to the X19 connector and to the XBee module socket. Two jumpers (J30 and J31) are used in the development board to select the connector where serial port 3 will be available. Refer to the “Jumpers” section of this document for more information.

By default serial port 3 CTS# signal is not connected to X19. A 0Ω resistor, R44, must be manually populated to connect this signal to the X19 connector.

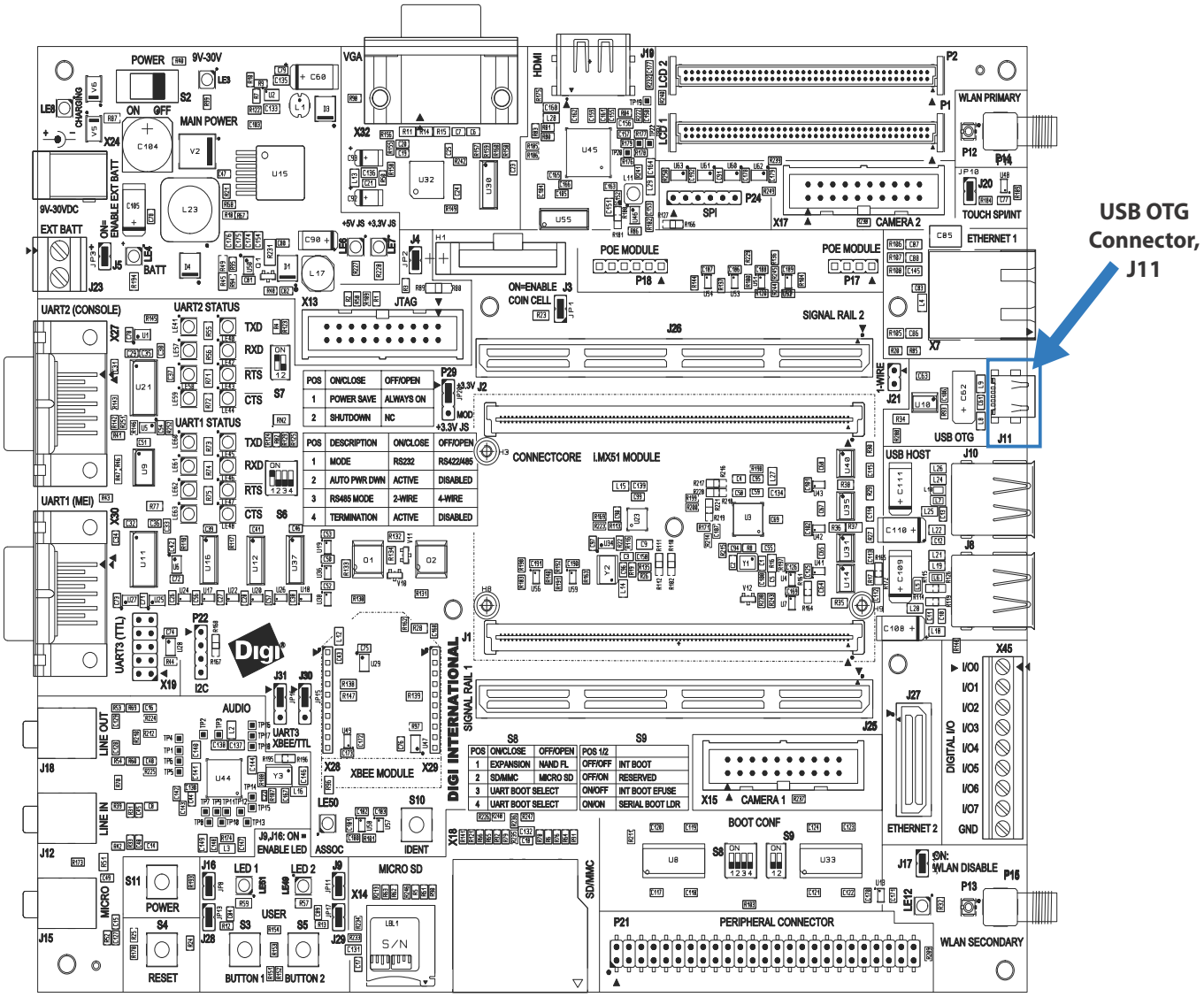
USB Host Interface



USB Host Connectors, J8 and J10

The development board provides four standard type A receptacles for a USB host connection. A 4-Port USB hub is used in the development board to convert the USB host port 1 of the module into four USB host ports. The module supports low, full and high speed USB 2.0 connectivity.

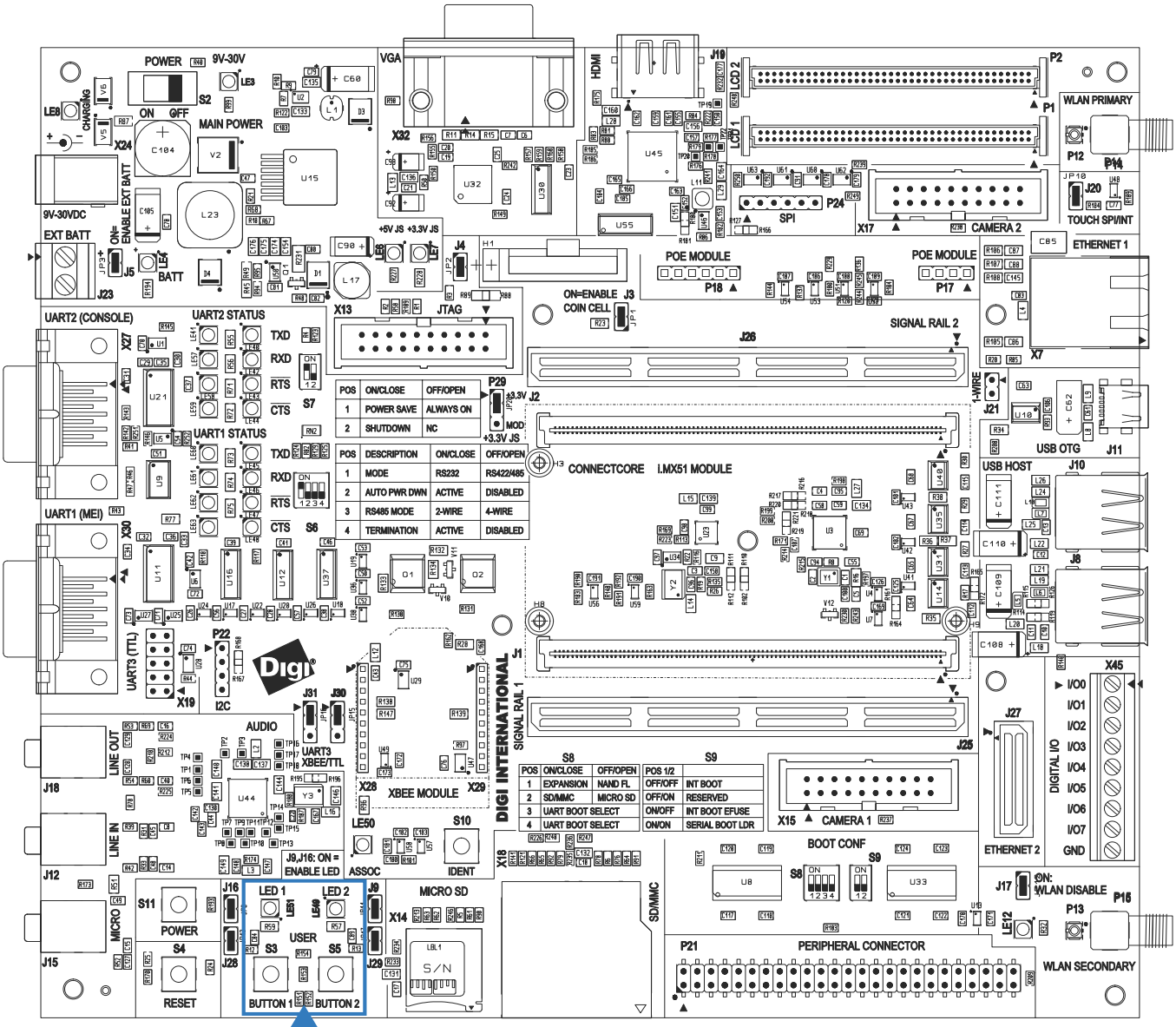
USB OTG Interface



USB OTG Connector, J11

The development board provides a standard mini-AB type receptacle for a USB OTG connection. The module supports full and high speed USB2.0 connectivity.

User Interface



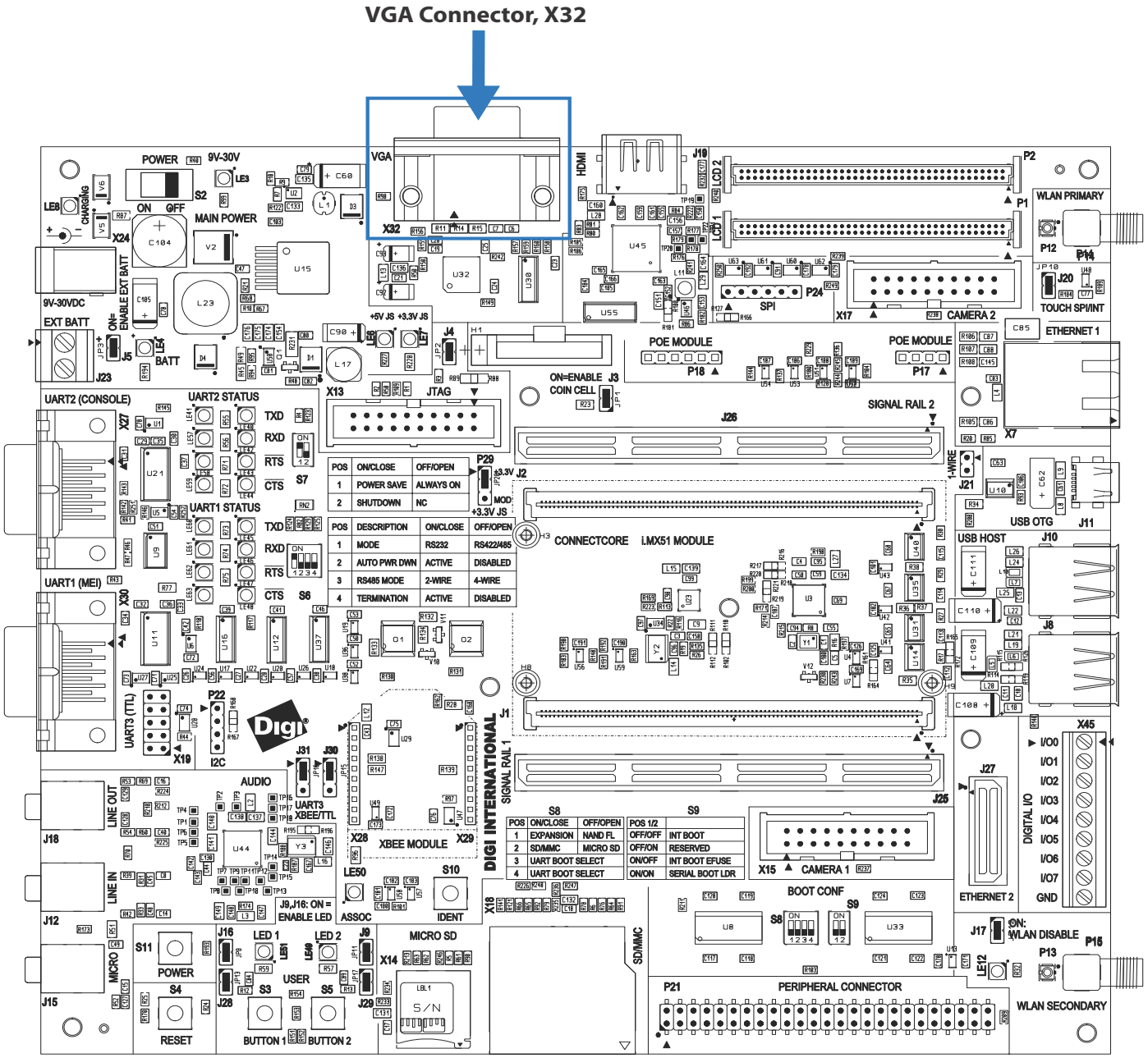
The development board provides two user buttons and two user LEDs connected to GPIO signals of the i.MX51.

The user buttons and the user LEDs can be enabled or disabled by correctly setting the corresponding jumpers.

The table below shows the GPIO signal assigned to the user interface, and the jumpers used to enable/disable the buttons and LEDs:

Signal	GPIO	Jumper	Comment
USER_BUTTON1	GPIO3_6	J28	10K pull-up to +2.775V on the development board
USER_LED1#	GPIO3_10	J16	
USER_BUTTON2	GPIO1_1	J29	10K pull-up to +2.775V on the development board
USER_LED2#	GPIO3_9	J9	

Analog Video Interface



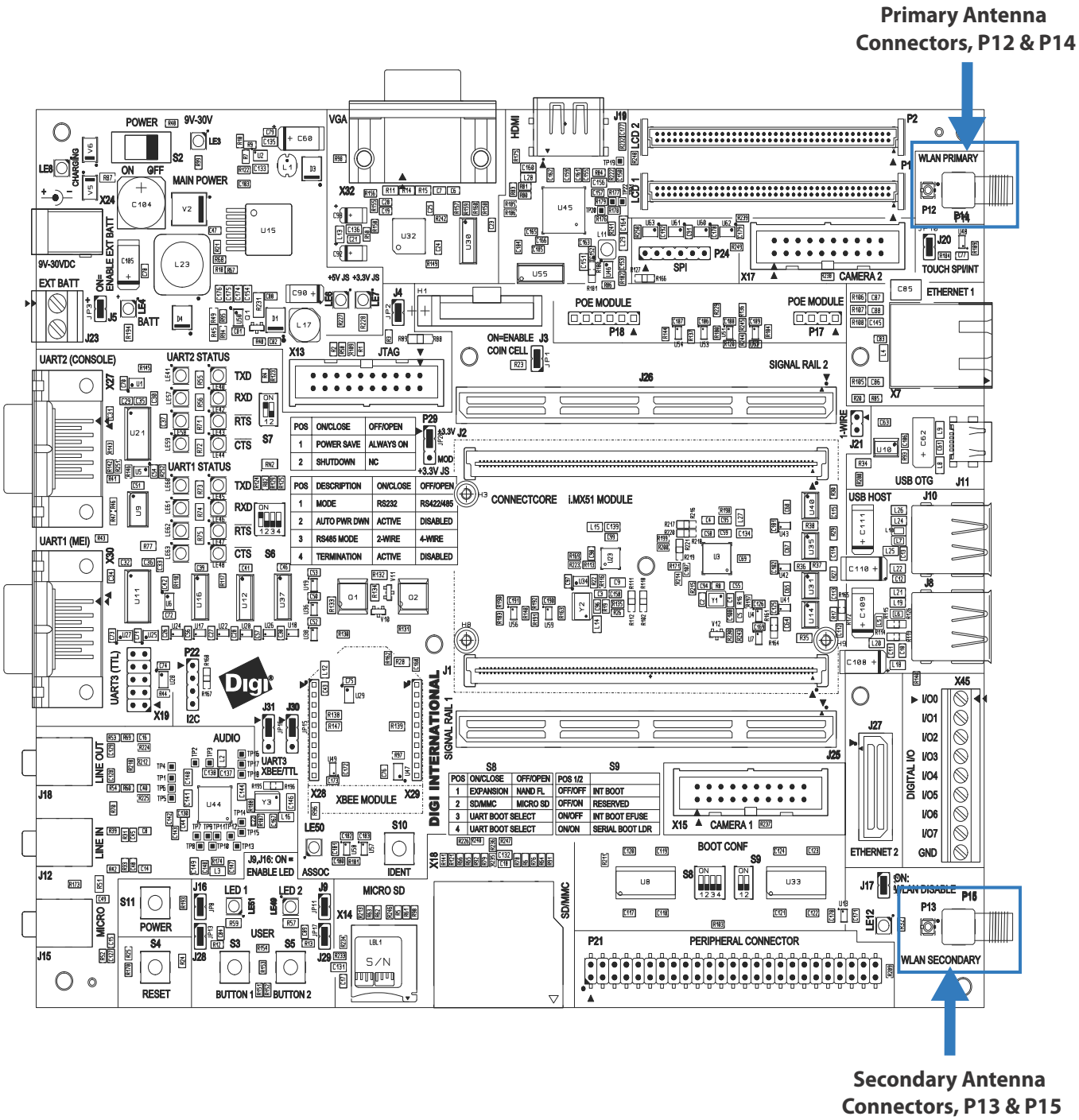
Analog Video Connector, X32

The development board provides an Analog Video connector. This connector is a 15-pin female connector, labeled X32. The Analog Video interface is connected to the Display 1 interface of the i.MX51 CPU.

The table below shows the pinout of the Analog Video connector.

Pin	Signal
1	VGA_RED
2	VGA_GREEN
3	VGA_BLUE
4	NC
5	GND
6	RED_RETURN
7	GREEN_RETURN
8	BLUE_RETURN
9	NC
10	GND
11	NC
12	NC
13	HSYNC#
14	VSYNC#
15	NC

WLAN Interface

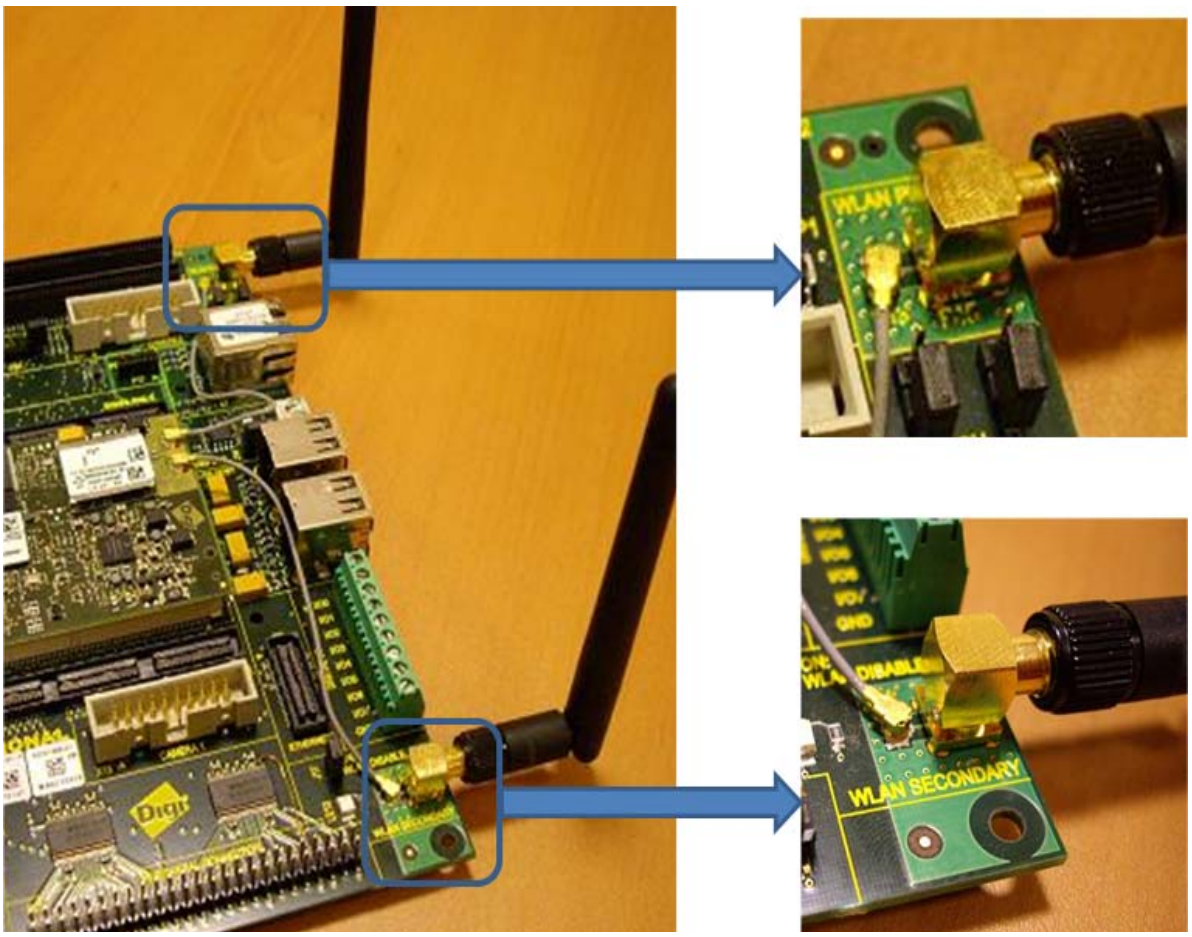


Antenna Connectors (WLAN)

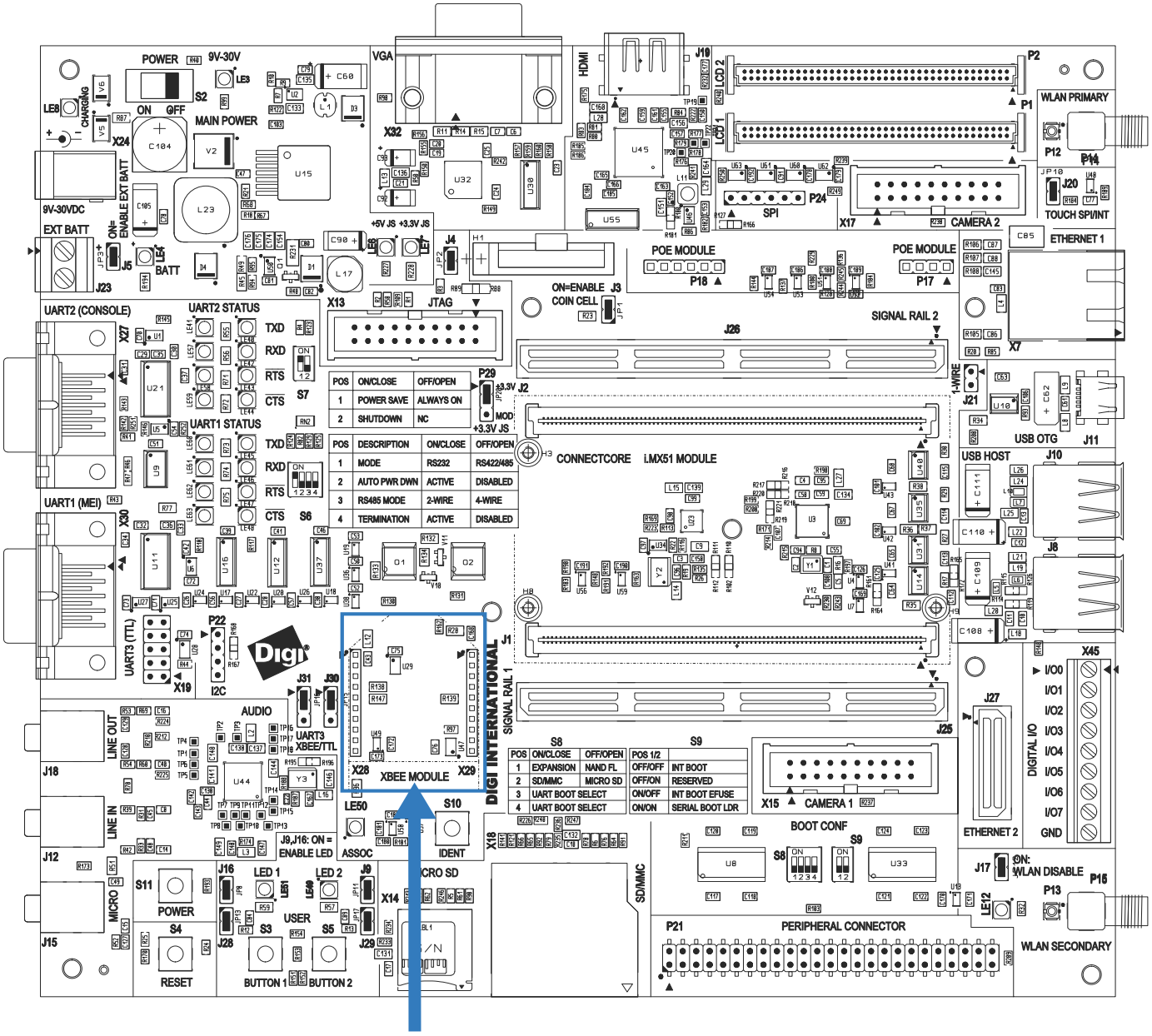
The development board provides the following connectors for the WLAN interface:

- P12 and P13: these two UFL connectors are used to connect the WLAN interface of the ConnectCore for i.MX51 to the development board. Two coaxial cables are used for this connection.
- P14 and P15: these two RP-SMA connectors are used to connect two (primary and secondary) WLAN antennas

The following picture shows the WLAN antenna connections.



Digi XBee ™ Interface



Digi XBee
Connectors, X28 & X29

Digi XBee™ Module Connectors, X28 and X29

The development board provides two 10-pin, 2.0mm connectors, X28 and X29, supporting a Digi XBee module.

The XBee serial port is shared with UART port 3 on the development board. Two jumpers (J30 and J31) are used in the development board to select the connector where serial port 3 will be available. Refer to the "Jumpers" section of this document for more information.

The table below shows the pinout of the XBee module connectors.

Pin	Signal	Pin	Signal
X28-1	+3.3V	X29-1	IDENT
X28-2	XBEE_DOUT	X29-2	
X28-3	XBEE_DIN	X29-3	
X28-4	NC	X29-4	
X28-5	XBEE_RESET#	X29-5	XBEE_RTS#
X28-6	-	X29-6	ASSOC
X28-7	-	X29-7	
X28-8	-	X29-8	ON/SLEEP#
X28-9	XBEE_SLEEP_RQ	X29-9	XBEE_CTS#
X28-10	GND	X29-10	

Module Specifications

APPENDIX A

This appendix provides ConnectCore for i.MX51 module specifications.

Mechanical Specifications

■ Length:	82 mm (3.228 inches)
■ Width:	50 mm (1.968 inches)
■ Height :	
– PCB:	1.40 mm (0.055 inches)
– Top side part:	3.60 mm (0.142 inches)
– Bottom side part:	2.20 mm (0.087 inches)

Environmental Specifications

■ Operating temperature:	600MHz variant: -40ºC to +85ºC (-40ºF to +185ºF) 800MHz variant: 0ºC to +70ºC (32ºF to +158ºF)
■ Storage temperature:	-40ºC to +125ºC (-40ºF to +257ºF)

Network Interface

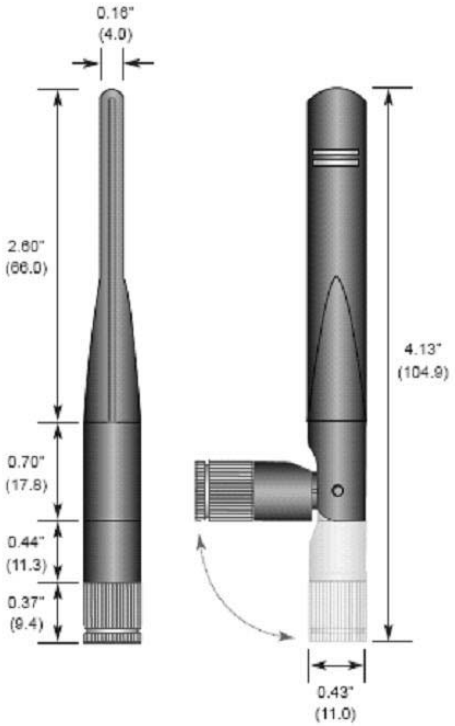
Antenna specifications: 802.11 a/b/g antenna

Attributes

Attribute	Band 1	Band 2
Frequency	2.4 ~ 2.4835 GHz	5.15 ~ 6 GHz
Bandwidth	120MHz	875MHz
Wavelength	1/4 Wave	1/4 Wave
Impedance	50 Ohm	50 Ohm
VSWR	< 19 typ. Center	< 19 typ. Center
Connector	RP-SMA	RP-SMA
Gain	2.3dBi	3.6dBi
Dimension	See measurements in the drawing after this table	
Part Number	ANT-DB1-RAF-RPS	

Dimensions

Note: Dimensions are provided for reference purposes only. The actual antenna might vary.



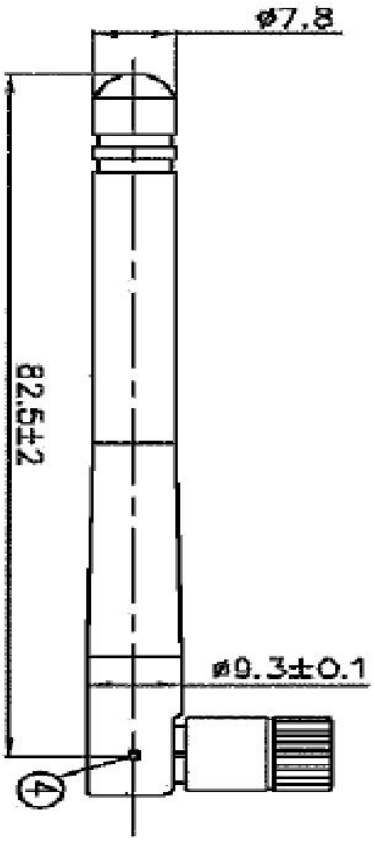
Antenna Specification: 802.11b/g antenna

Attributes

Attribute	Property
Frequency	2.4 ~ 2.5GHz
Power Output	2W
DB Gain	2dBi
VSWR	< or = 2.0
Dimension	108.5 mm % 10.0mm
Weight	10.5g
Temperature Rating	-40 °to +80° C
Part Number	DG-ANT-20DP-BG

Dimensions

Note: Dimensions are provided for reference purposes only. The actual antenna might vary.



Ethernet 1

- Standard: IEEE 802.3/802.3u
- Physical layer: 10/100Base
- Data rate: 10/100 Mbps
- Mode: Full or half duplex

Ethernet 2

- Standard: IEEE 802.3/802.3u
- Physical layer: 10/100Base
- Data rate: 10/100 Mbps
- Mode: Full or half duplex

WLAN

Standard

- IEEE 802.11a/b/g/e/i/h/j standards
- Single-stream IEEE 802.11n

Frequency Band

- 2.400 - 2.500 GHz (Low Band)
- 4.900 - 5.850 GHz (High Band)

Data Rates

- 802.11n :6.5, 13, 19.5, 26, 39,52 , 58.5, 65 Mbps
- 802.11a/g :6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11b :1, 2, 5.5, 11 Mbps

Media Access Control

- Dynamic selection of fragment threshold, data rate and antenna depending on the channel statistics
- WPA, WPA2 and WMM support

Wireless Medium

- 802.11b/g : Direct Sequence-Spread Spectrum (DSSS) and Orthogonal Frequency Divisional Multiplexing (OFDM)
- 802.11a/n : OFDM

DFS Client

- This module supports the DFS Client only between 5.25 and 5.35GHz bands. It does not support being DFS Master, or can it be connected to an Ad hoc network in these bands.

Modulation DSSS

- Differential Binary Shift Keying (DBPSK) @ 1 Mbps
- Differential Quadrature Phase Shift Keying (DQPSK) @2 Mbps
- Complementary Code Keying (CCK) @ 5.5 Mbps and 11 Mbps
- BPSK @ 6 and 9 Mbps
- QPSK @ 12 and 18 Mbps
- 16-Quadrature Amplitude Modulation (QAM) @24 and 36 Mbps
- 64-QAM @ 48 and 54 Mbps

Frequency Bands

- 2.412 to 2.472 GHz (ETSI)
- 2.412 to 2.462 GHz (FCC)
- 5.150 to 5.250 GHz (ETSI) ISM Band 1
- 5.250 to 5.350 GHz (ETSI) ISM Band 2 excluding TPC and DFS Client
- 5.470 to 5.725 GHz (ETSI) ISM Band 3 excluding TPC and DFS Client
- 5.150 to 5.250 GHz (U-NII-1)
- 5.250 to 5.350 GHz (U-NII-2)
- 5.470 to 5.725 GHz (U-NII Worldwide)
- 5.725 to 5.825 GHz (U-NII-3)

Available Transmit Power Settings (Typical +- (2 dBm)@25°C)

(Maximum power settings will vary according to individual country regulations.)

- IEEE 802.11b (~16mW ETSI) (~37mW FCC 15.247)
  @ 1, 2, 5.5 and 11 Mbps
- IEEE 802.11g (~ 10mW ETSI) (~72mW FCC 15.247)
  @ 6, 12, 18, 24, 36 and 54Mbps
- IEEE 802.11n 2.4GHz Band (~12.5mW ETSI) (~83mW FCC 15.247)
- IEEE 802.11a & IEEE 802.11n
  (~15mW ETSI)

  (5.150 to 5.250 GHz ~17mW FCC 15.407)

(5.250 to 5.350 GHz ~17mW FCC 15.407)

(5.470 to 5.725 GHz ~22mW FCC 15.407)

(5.725 to 5.850 GHz ~28mW FCC 15.247)

@ 6, 12, 18, 24, 36 and 54Mbps and

@ 6.5, 13, 19.5, 26, 39,52 , 58.5, 65 Mbps

Receive Sensitivity

Data Rate (bg Mode)	Typical Sensitivity (+ / - 1.5 dBm)
1 Mbps	-94.0 dBm (< 8% PER)
2 Mbps	-89.0 dBm (< 8% PER)
11 Mbps	-86.0 dBm (< 8% PER)
6 Mbps	-89.0 dBm (< 10% PER)
54 Mbps	-74.0 dBm (< 10% PER)
645Mbps	-71.0 dBm (< 10% PER)

Data Rate (a Mode)	Typical Sensitivity (+ / - 1.5 dBm)
6 Mbps	-88.0 dBm (< 10% PER)
54 Mbps	-72.0 dBm (< 10% PER)

Data Rate (bg Mode)	Typical Sensitivity (+ / - 1.5 dBm)
65 Mbps	-69.0 dBm (< 10% PER)

Electrical Characteristics

Supply Voltages

Parameter	Symbol	Min	Typ	Max	Unit
Battery Input	VLIO	3.4	3.7	4.8	V
Charger Input	VCHRG	3.4	5	20	V
Coin cell Input for RTC	VCC_COINCELL	2.5	3	3.6	V

Supply Current

The following table provides current draw guidance utilizing the power management capabilities of the module. The module variant used for the measurements works at 800MHz, with 512 MB NAND Flach, 512 MB DDR2, dual Ethernet, WLAN, and accelerometer. A Windows Embedded CE kernel with power management capabilities has been used to make the current consumption measurements. A different kernel (Linux or Windows CE) with a different driver configuration will show different current consumption values.

The ConnectCore for 1.MX51 module can be powered from an external battery (VLIO) or from a battery charger (VCHRG). Current drawn by the modules is different depending on the supply voltage used. The following tables show the current drawn by the module from the two power supplies.

The current drawn by the module is highly dependent on the number and type of interfaces used. To make some current measurements three different interface configurations have been defined:

Interface Configuration	Interfaces Used
Minimum	Console, Ethernet. +3.3V of development board drawn from external power supply.
Typical	VGA, USB Host (two devices connected), Audio, Ethernet, Console. +3.3V of development board drawn from module.
Maximum	Display1, Display2, Camera1, Camera2, USB OTG, USB Host (four devices connected), Audio, Ethernet, Console, WLAN, SD Card, microSD™ Card. +3.3V of development board drawn from module.

The ConnectCore for 1.MX51 supports several power modes. The current drawn by the module is highly dependent on the power modes. To make some current measurements five different power modes have been defined:

Interface Configuration	Interfaces Used
Full Load	System running at 100% CPU load.
Normal	Normal operating state. User interacting with the device.
User Idle	After a long period of user inactivity some devices are turned off.
System Idle	In this state the user is not using the system, even passively, and devices that are not actively doing work are turned off.
Suspend	This is the sleep state, no threads are running, the CPU is idle, the peripherals are turned off, and the system can wake up only by means of hardware wake-source interrupt.

The tables below show the current drawn by the module for the different power modes and the different interface configurations.

Current measurement in Minimum configuration

Power Mode	Power Supply	Current Draw	Comments
Full load	+3.7V Battery	700mA	
	+5V supply to charger	680mA	
ON	+3.7V Battery	420mA	
	+5V supply to charger	410mA	
User Idle	+3.7V Battery	420mA	
	+5V supply to charger	410mA	
System Idle	+3.7V Battery	380mA	
	+5V supply to charger	390mA	
Suspend	+3.7V Battery	145mA	
	+5V supply to charger	170mA	

Current measurement in Typical configuration

Power Mode	Power Supply	Current Draw	Comments
Full load	+3.7V Battery	1450mA	
	+5V supply to charger	1250mA	
ON	+3.7V Battery	1150mA	
	+5V supply to charger	950mA	
User Idle	+3.7V Battery	1075mA	
	+5V supply to charger	890mA	
System Idle	+3.7V Battery	350mA	
	+5V supply to charger	350mA	
Suspend	+3.7V Battery	145mA	
	+5V supply to charger	170mA	

Current measurement in Maximum configuration

Power Mode	Power Supply	Current Draw	Comments
Full load	+3.7V Battery	2100mA	
	+5V supply to charger	1850mA	
ON	+3.7V Battery	1900mA	
	+5V supply to charger	1700mA	
User Idle	+3.7V Battery	1800mA	
	+5V supply to charger	1650mA	
System Idle	+3.7V Battery	1600mA	
	+5V supply to charger	1250mA	
Suspend	+3.7V Battery	420mA	
	+5V supply to charger	490mA	

On-Module Power Supplies

The following table provides the on-module power supplies available in the module connectors, used to supply the components integrated on a customer baseboard.

Supply	Source	Output Voltage	Load Capacity	Comments
+2.775V	PMIC VIOHI LDO	+2.775V	100mA max	Used on module to power IPU, Peripheral interfaces, Accelerometer, I^2C, and bootstraps
+1.8V	PMIC Buick Switcher	+1.8V	800mA max	Used on module to power EMI, JTAG and boot configuration
+3.3V	DC/DC Converter	+3.3V	1A max	Used on module to power WLAN, Ethernet and MII PHY
+3.15V	PMIC VGEN2 LDO	+3.15V	350mA maz	Used on module to power NAND Flash SD1 and fuse interface
SWBST	PMIC +5V Boot Switcher	+5V	300mA max	

I/O DC Parameters

This section includes the DC parameters of the following I/O types:

- General Purpose I/O and High-Speed General Purpose I/O (GPIOxx/HSGPIOxx)
- Low Voltage I/O (LVIO)
- Ultra High Voltage I/O (UHVIOxx)
- WLAN
- PMIC_GPO, PMIC_PWRON, PMIC_STDBY, PMIC_INT, PMIC_PWDRV, PMIC_SE, PMIC_CHRGLED, and PMIC_LED
- Ethernet (ETH)
- Analog RGB
- ADC subsystem (ADIN)
- Digital and analog USB (DIG_USB, AN)USB)

The I/O type associated to each I/O signal of the module is shown in the paragraph “Module Pinout” of Chapter 1.

The following table shows the General Purpose I/O and High-Speed General Purpose I/O (GPIOxx/HSGPIOxx) DC parameters. The "xx" reference signifies the supply voltage level.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD				
	xx = 18	1.65	1.8	1.95	V
	xx = 27	2.5	2.775	3.1	
	xx = 33	3.0	3.3	3.6	
High-level output voltage	Voh	VDD-0.15	-	VDD+0.3	V
	(Vol USB)	VDD-0.43	-	VDD+0.3	
Low-level output voltage	Vol	-		0.15	V
	(Vol USB)	-	--	0.43	
High-level output current	Ioh		-	-	mA
	- Low drive	-1.9			
	- Medium drive	-3.7			
	- High drive	-5.2			
	- Max drive	-5.6			
Low-level output current	Iol		-	-	mA
	- Low drive	1.9			
	- Medium drive	3.7			
	- High drive	5.2			
	- Max drive	5.6			
High-level input voltage	VIH	0.7 x VDD	-	VDD	V
Low-level input voltage	VIL	0	-	0.3 x VDD	V
Input Current (no/pull)	Iin	-	-	2	µA
Input Current (22kΩ/pull-up)	Iin	-	-	161	µA
Input Current (47kΩ/pull-up)	Iin	-	-	76	µA
Input Current (100kΩ/pull-up)	Iin	-	-	36	µA
Input Current (100kΩ/pull-down)	Iin	-	-	36	µA
Keeper circuit resistance	-	-	17	-	kΩ
Output driver impedance	Rout				Ω
	- Low drive	80	104	250	
	- Medium drive	40	52	125	
	- High drive	27	35	83	
	- Max drive	20	26	62	

The following table shows the LVIO DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	1.65	1.8	1.95	V
High-level output voltage	Voh	VDD-0.15	-	-	V
Low-level output voltage	Vol	-	-	0.15	V
High-level output current	Ioh		-	-	
	- Low drive	-2.1			mA
	- Medium drive	-4.2			
	- High drive	-6.3			
	- Max drive	-8.4			
Low-level output current	Iol		-	-	
	- Low drive	2.1			mA
	- Medium drive	4.2			
	- High drive	6.3			
	- Max drive	8.4			
High-level input voltage	VIH	0.7 x VDD	-	VDD	V
Low-level input voltage	VIL	0	-	0.3 x VDD	V
Input Current (no/pull)	Iin	-	-	1	µA
Input Current (22kΩ/pull-up)	Iin	-	-	161	µA
Input Current (47kΩ/pull-up)	Iin	-	-	76	µA
Input Current (100kΩ/pull-up)	Iin	-	-	36	µA
Input Current (100kΩ/pull-down)	Iin	-	-	36	µA
Keeper circuit resistance	-	-	17	-	kΩ
Output driver impedance	Rout				
	- Low drive	80	150	250	Ω
	- Medium drive	40	75	125	
	- High drive	27	51	83	
	- Max drive	20	38	62	

The following table shows the Ultra-High Voltage I/O (UHVIOxx) DC parameters. The "xx" reference signifies the supply voltage level.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD				
	xx = 31	3.0	3.15	3.6	V
	xx = 33	3.0	3.3	3.6	
High-level output voltage	Voh	VDD-0.15	-	VDD-0.15	V
	(USB, WLAN)	VDD-0.43	-	VDD-0.43	
Low-level output voltage	Vol	-		0.15	V
	(USB, WLAN)	-	--	0.43	
High-level output current	Ioh		-	-	
	- Low drive	-5.1			mA
	- Medium drive	-10.2			
	- High drive	-15.3			
Low-level output current	Iol		-	-	
	- Low drive	5.1			mA
	- Medium drive	10.2			
	- High drive	15.3			
High-level input voltage	VIH	0.7 x VDD	-	VDD	V
Low-level input voltage	VIL	0	-	0.3 x VDD	V
Input Current (no/pull)	Iin	-	-	10	µA
Input Current (22kΩ/pull-up)	Iin	-	-	202	µA
Input Current (75kΩ/pull-up)	Iin	-	-	61	µA
Input Current (100kΩ/pull-up)	Iin	-	-	47	µA
Input Current (360kΩ/pull-down)	Iin	-	-	5.7	µA
Keeper circuit resistance	-	-	17	-	kΩ
Output driver impedance	Rout				
	- Low drive	114	135	206	Ω
	- Medium drive	57	67	103	
	- High drive	38	45	69	

The following table shows the WLAN DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	3.0	3.3	3.6	V
High-level output voltage	Voh	2.4	-	VDD	V
Low-level output voltage	Vol	-	-	0.4	V
High-level input voltage	VIH	2	-	5.5	V
Low-level input voltage	VIL	-0.3	-	0.8	V
Input Leakage Current	I1K	-	-	10	µA

The following table shows the PMIC_GPO DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	2.5	2.775	3.1	V
High-level output voltage	Voh	VDD-0.2	-	VDD	V
Low-level output voltage	Vol	-	-	0.2	V
Output driver impedance	Rout	200	-	500	Ω

The following table shows teh PMIC_PWRON DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	-	1.5	3.1	V
High-level input voltage	Vih	1	-	VDD	V
Low-level input voltage	Vil	-	-	0.3	V
Input pull-up impedance	Rup	-	200	-	kΩ

The following table shows the PMIC_STDBY DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
High-level output voltage	Voh	1	-	3.6	V
Low-level output voltage	Vol	-	-	0.3	V
Input pull-down impedance	Rdw	-	36	-	MΩ

The following table shows the PMIC_INT DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	2.5	2.775	3.1	V
High-level output voltage	Voh	VDD-0.2	-	VDD	V
Low-level output voltage	Vol	-	-	0.2	V
Output driver impedance	Rout	200	-	500	Ω

The following table shows the PMIC_PWGTDRV DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
High-level output voltage	Voh	5	5.4	5.4	V
Low-level output voltage	Vol	-	-	0.1	V
Load Current	Iout	-	-	100	nA

The following table shows the PMIC_LED DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
Input current	Iled	0	-	21	mA

The following table shows the PMIC_SE DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	2.5	2.775	3.1	V
High-level output voltage	Voh	1	-	VDD	V
Low-level output voltage	Vol	-	-	0.3	V
Input pull-up impedance	Rup	-	100	-	kΩ

The following table shows the Ethernet DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
Differential Output Voltage High 100BASE-Tx	Vpph	950	-	1050	mV
Differential Output Voltage Low 100BASE-Tx	Vppl	-950	-	-1050	mV

Parameter	Symbol	Min	Typ	Max	Unit
Tx Differential Output Voltage 10BASE-T	Vout	2.2	2.5	2.8	V
Rx Differential Squelch Threshold 10BASE-T	Vds	300	420	585	mV

The following table shows the Analog RGB DC parameters.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	2.69	2.75	2.91	V

The following table shows the DC parameter of the ADC subsystem. The ADC subsystem is used by the touch interface and by the three analog input signals (ADIN).

Parameter	Symbol	Min	Typ	Max	Unit
Input Voltage range	VI	0	-	2.4	V
Input Buffer offset	Voff	-5	-	5	mV
Conversion Current	Iin	-	1	-	mA
Source Impedance	Rin	-	-	5	kΩ

The following table shows the DC parameter of the digital USB.

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	2.25	2.5	2.75	V
High-level output voltage	Voh	VDD-0-.43	-	VDD	V
Low-level output voltage	Vol	-	-	0.43	V
High-level input voltage	VIH	0.7 x VDD	-	VDD	V
Low-level input voltage	VIL	0	-	0.3 x VDD	V
Current consumption	I	-	-	22	mA

The following table shows the DC parameter of the Analog USB.

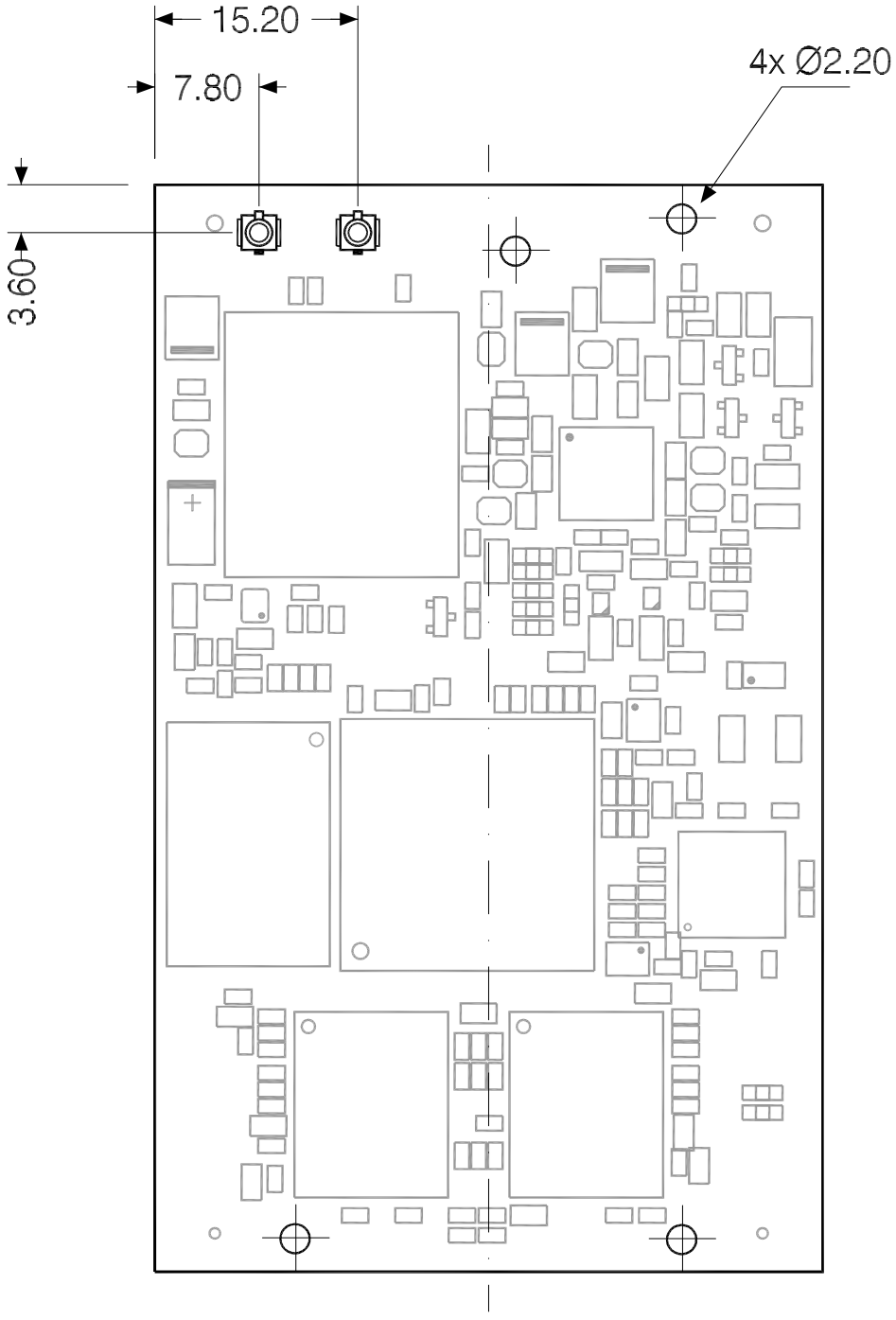
Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	3.0	3.3	3.6	V
Current consumption	I	-	-	6	mA

Module Dimensions

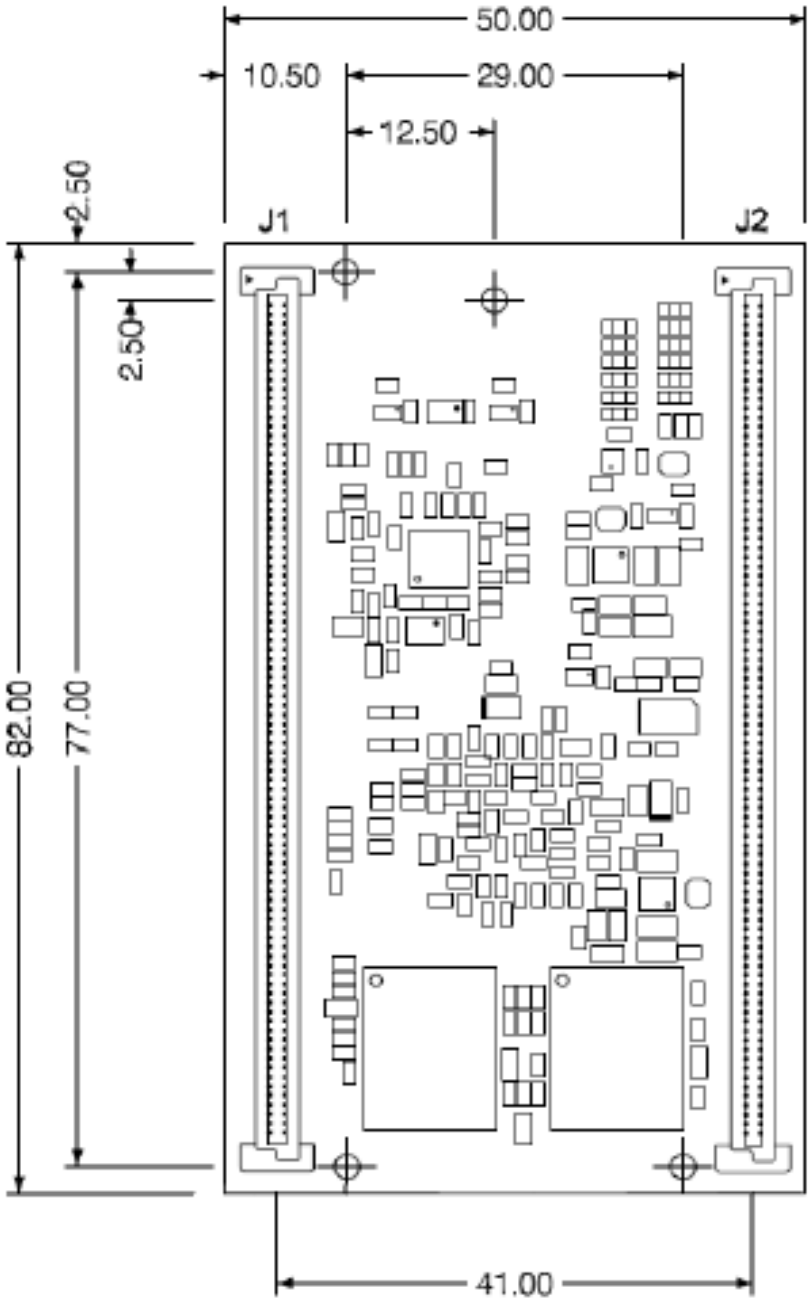
APPENDIX B

This appendix shows the dimensions of the ConnectCore for i.MX51 module, dimensions are in millimeters.

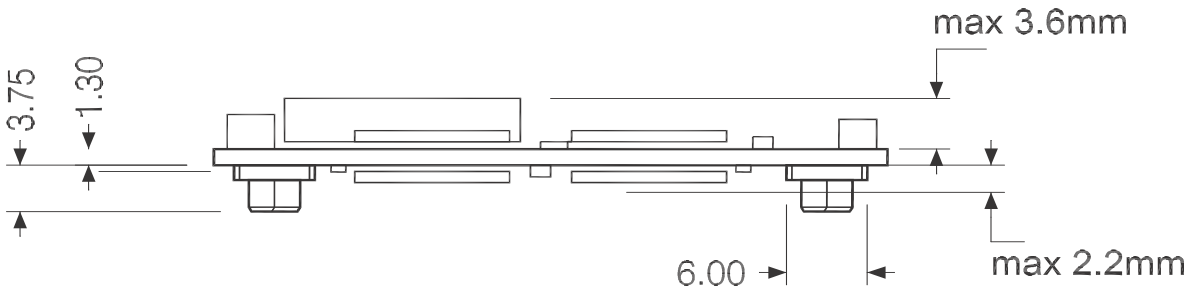
Top View



Bottom View



Side View



Connectors

The ConnectCore for i.MX51 module uses two Berg/FCI connectors. The following table shows the reference number of the connectors used in the module and the reference number of the connectors used in the development board. The mated height of the module and the development board is 5mm.

Device	Berg/FCI Connector
ConnectCore for i.MX51 module	61082-181409LF
ConnectCore for i.MX51 development board	61083-184409LF

Certifications

APPENDIX C

The ConnectCore for i.MX51 product complies with the following standards.

FCC Part 15 Class B

Radio Frequency Interface (RFI) (FCC 15.105)

The ConnectCore for i.MX51 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 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.

If the FCC ID is not visible when installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed

module FCC ID. THis exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: MCQ-50M1699/ IC: 1846A-50M1699”.

RF Exposure

RF Exposure considerations require that a 20 cm separation distance between users and the installed antenna location shall be maintained at all times when the module is energized. OEM installers must consider suitable module and antenna installation locations in order to assure this in 20cm separation, and end users be also be advised to the requirement.

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.

The maximum antenna gain permitted in the bands 5250-5350 MHz and 5470-5725 MHz to comply with the e.i.r.p limit is, according to RSS-210 section A9.2(2)

- 250mW conducted power
- 1.0W max EIRP

This limit is met with the highest gain antenna listed, antennafactor ANT-DB1-RAF-RPS.

The maximum antenna gain permitted in the band 5725-5825 MHz to comply with the e.i.r.p limit specified for non point-to-point operation is, according to RSS-210 section A9.2(3):

- 1W conducted power
- 4.0W max EIRP

This limit is met with the highest gain antenna listed,antennafactor ANT-DB1-RAF-RPS.

OEM installers and users are cautioned to take note that high-power radars are allocated as primary users (meaning they have priority) of the bands 5250-5330 MHz and 5650-5850 MHz and these radars could cause interference and /or damage to devices operating in these frequency bands.

Indoor/Outdoor

When the ConnectCore for i.MX51 module is installed in devices that can be used outdoors, the channels in the band 5150-5250 MHz must be disabled to comply with US and Canadian regulatory requirements. The OEM users are encouraged to inform end users of this restriction as well.

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	ConnectCore for i.MX51
Model Number:	50001699-xx

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
- 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 ConnectCore for i.MX51 meets the following standards:

Standards	ConnectCore for i.MX51
Emissions	FCC Part 15 Subpart B IS-003
Immunity	EN 55022 EN 55024
Safety	UL 60950-1 CSA C22.2, No. 60950-1 EN 60950-1

Change Log

APPENDIX D

The following changes were made to this document in the revisions listed below.

Revision A

- Initial release.

Revision B

- Updated mechanical drawings (additional mounting holes, increased height of WLAN variant).

Revision C

- Updated document structure.
- Updated "About the module" chapter.
- Updated "About the Development board" chapter.
- Updated "module specifications" appendix.
- Updated mechanical drawings.

Revision D

- Updated module pinout tables.
- Updated “power” section.
- Updated GPIO table.
- Updated development board figures.
- Updated “Switches and push-buttons,” “Jumper,” and “LEDs” sections.
- Updated development board interfaces.
- Updated several sub-sections to Appendix A.
- Added electrical characteristics.
- Updated the figures in Appendix B.

- Renamed “Appendix C: Change Log” to “Appendix D: Change Log.”
- Added Appendix C: Certifications.
- Added the Cable Specification: U.FL/W.FL to Chapter 2.
- Added the Antenna specifications: 802.11 a/b/g antenna and Antenna specifications: 802.11 b/g antenna sections to Appendix A.
- Added several sub-sections to the WLAN section of Appendix A.