Migration Guide

AirPrime MC73xx

SIERRA WIRELESS®

4114147
2.1
November 27, 2014

Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless modem are used in a normal manner with a well-constructed network, the Sierra Wireless modem should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless modem, or for failure of the Sierra Wireless modem to transmit or receive such data.

Safety and Hazards

Do not operate the Sierra Wireless modem in areas where cellular modems are not advised without proper device certifications. These areas include environments where cellular radio can interfere such as explosive atmospheres, medical equipment, or any other equipment which may be susceptible to any form of radio interference. The Sierra Wireless modem can transmit signals that could interfere with this equipment. Do not operate the Sierra Wireless modem in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Sierra Wireless modem **MUST BE POWERED OFF**. When operating, the Sierra Wireless modem can transmit signals that could interfere with various onboard systems.

Note:	*Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. Sierra Wireless modems may be used at this time.*

The driver or operator of any vehicle should not operate the Sierra Wireless modem while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

Limitations of Liability

This manual is provided "as is". Sierra Wireless makes no warranties of any kind, either expressed or implied, including any implied warranties of merchantability, fitness for a particular purpose, or noninfringement. The recipient of the manual shall endorse all risks arising from its use.

The information in this manual is subject to change without notice and does not represent a commitment on the part of Sierra Wireless. SIERRA WIRELESS AND ITS AFFILIATES SPECIFICALLY DISCLAIM LIABILITY FOR ANY AND ALL DIRECT, INDIRECT, SPECIAL, GENERAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXEMPLARY DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUE OR ANTICIPATED PROFITS OR REVENUE ARISING OUT OF THE USE OR INABILITY TO USE ANY SIERRA WIRELESS PRODUCT, EVEN IF SIERRA WIRELESS AND/OR ITS AFFILIATES HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR THEY ARE FORESEEABLE OR FOR CLAIMS BY ANY THIRD PARTY.

Notwithstanding the foregoing, in no event shall Sierra Wireless and/or its affiliates aggregate liability arising under or in connection with the Sierra Wireless product, regardless of the number of events, occurrences, or claims giving rise to liability, be in excess of the price paid by the purchaser for the Sierra Wireless product.

Customer understands that Sierra Wireless is not providing cellular or GPS (including A-GPS) services. These services are provided by a third party and should be purchased directly by the Customer.

SPECIFIC DISCLAIMERS OF LIABILITY: CUSTOMER RECOGNIZES AND ACKNOWLEDGES SIERRA WIRELESS IS NOT RESPONSIBLE FOR AND SHALL NOT BE HELD LIABLE FOR ANY DEFECT OR DEFICIENCY OF ANY KIND OF CELLULAR OR GPS (INCLUDING A-GPS) SERVICES.

Patents

This product may contain technology developed by or for Sierra Wireless Inc.

This product includes technology licensed from QUALCOMM®.

This product is manufactured or sold by Sierra Wireless Inc. or its affiliates under one or more patents licensed from InterDigital Group and MMP Portfolio Licensing.

Copyright

Trademarks

Sierra Wireless®, AirPrime®, AirLink®, AirVantage®, WISMO® and the Sierra Wireless and Open AT logos are registered trademarks of Sierra Wireless, Inc. or one of its subsidiaries.

Watcher® is a registered trademark of NETGEAR, Inc., used under license.

Windows® and Windows Vista® are registered trademarks of Microsoft Corporation.

Macintosh® and Mac OS X® are registered trademarks of Apple Inc., registered in the U.S. and other countries.

QUALCOMM® is a registered trademark of QUALCOMM Incorporated. Used under license.

Other trademarks are the property of their respective owners.

Contact Information

Sales Desk:	Phone:	1-604-232-1488
	Hours:	8:00 AM to 5:00 PM Pacific Time
	Contact:	http://www.sierrawireless.com/sales
Post:	Sierra Wireless 13811 Wireless Way Richmond, BC Canada V6V 3A4	
Technical Support:	support@sierrawireless.com	
RMA Support:	repairs@sierrawireless.com	
Fax:	1-604-231-1109	
Web:	http://www.sierrawireless.com/	

Consult our website for up-to-date product descriptions, documentation, application notes, firmware upgrades, troubleshooting tips, and press releases: www.sierrawireless.com

Document History

Version	Date	Updates
1.0	April 17, 2013	Creation
1.1	April 18, 2013	Updated section 3.4 Power Supply
2.0	November 13, 2014	Updated product name from MC78xx to MC73xx; included migration information from MC5728v and MC870x
2.1	November 27, 2014	Added 3.8 Thermal Considerations
		Updated: • 3.2 RF Connectors • Table 18 AirPrime MC5728v, MC77xx, MC870x and MC73xx Regulatory Compliance and Industry Certification

Contents

List of Figures

List of Tables

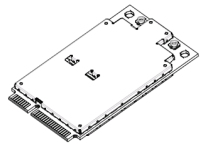
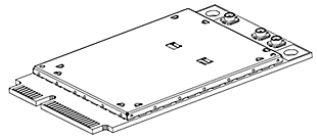
1. Introduction

This document enumerates and summarizes the differences between the AirPrime MC5728v, MC77xx (with variants MC7700, MC7710 and MC7750) and MC870x (with variants MC8704 and MC8705) with the AirPrime MC73xx (with variants MC7304, MC7330, MC7350 and MC7354) and aims to provide guidance with migrating applications from using the MC5728v, MC77xx and MC870x to using the MC73xx.

2. Features Comparison

The table below enumerates the features available in each mini card variant.

Table 1. Features Comparison

MC5728v	MC7700	MC7710	MC7750	MC8704	MC8705	MC7304	MC7330	MC7350	MC7354
									
Dual band CDMA gpsOne Stand-alone GPS	Quad band GSM EDGE Tri band UMTS HSDPA and HSUPA Dual band LTE Stand-alone GPS	Tri band GSM EDGE Dual band UMTS HSDPA and HSUPA Penta band LTE Stand-alone GPS	Dual band CDMA Single band LTE Stand-alone GPS	Quad band GSM EDGE Penta band UMTS HSDPA, HSUPA and HSPA+ gpsOneXTRA Stand-alone GPS A-GPS	Quad band GSM EDGE Penta band UMTS HSDPA, HSUPA and HSPA+ gpsOneXTRA Stand-alone GPS A-GPS	Quad band GSM EDGE Quad band UMTS HSDPA and HSUPA Penta band LTE Stand-alone GPS and GLONASS A-GPS A-GNSS gpsOneXtra	Quad band GSM EDGE Penta band UMTS HSDPA and HSUPA Tri band LTE Stand-alone GPS and GLONASS A-GPS A-GNSS gpsOneXtra	Tri band CDMA Tri band LTE Stand-alone GPS and GLONASS A-GPS A-GNSS gpsOneXtra	Quad band GSM EDGE Penta band UMTS HSDPA and HSUPA Tri band CDMA Hexa band LTE Stand-alone GPS and GLONASS A-GPS A-GNSS gpsOneXtra

MC5728v	MC7700	MC7710	MC7750	MC8704	MC8705	MC7304	MC7330	MC7350	MC7354
1 x UART 1 x USB (full speed) 2 x Antenna connector 1 x Analog audio 1 x Digital audio (PCM) 4 x Digital I/O 1 x Flash LED	1 x USB (full speed/high speed) 1 x SIM (1.8V or 3V) 3 x Antenna connector 4 x GPIO 1 x Flash LED	1 x USB (full speed/high speed) 1 x SIM (1.8V or 3V) 3 x Antenna connector 4 x GPIO 1 x Flash LED	1 x USB (full speed/high speed) 1 x SIM (1.8V or 3V) 3 x Antenna connector 4 x GPIO 1 x Flash LED	1 x USB 2.0 (high speed) 1 x USIM (1.8V or 3V) 2 x Antenna connector 1 x Digital audio (I^2S) 5 x GPIO 1 x Flash LED	1 x USB 2.0 (high speed) 1 x USIM (1.8V or 3V) 2 x Antenna connector 1 x Flash LED	1 x USB (full speed/high speed) 1 x SIM (1.8V or 3V) 3 x Antenna connector 1 x Digital audio (PCM or I^2S) 4 x GPIO 1 x Flash LED 1 x I^2C	1 x USB (full speed/high speed) 1 x SIM (1.8V or 3V) 3 x Antenna connector 1 x Digital audio (PCM or I^2S) 4 x GPIO 1 x Flash LED 1 x I^2C	1 x USB (full speed/high speed) 1 x SIM (1.8V or 3V) 3 x Antenna connector 1 x Digital audio (PCM or I^2S) 4 x GPIO 1 x Flash LED 1 x I^2C	1 x USB (full speed/high speed) 1 x SIM (1.8V or 3V) 3 x Antenna connector 1 x Digital audio (PCM or I^2S) 4 x GPIO 1 x Flash LED 1 x I^2C
Operating temperature range: -30°C to +60°C	Operating temperature range: -25 °C to +60 °C	Operating temperature range: -25 °C to +60 °C	Operating temperature range: -25 °C to +60 °C	Operating temperature range: -25 °C to +60 °C	Operating temperature range: -25 °C to +60 °C	Operating temperature range: -30 °C to +70 °C	Operating temperature range: -30 °C to +70 °C	Operating temperature range: -30 °C to +70 °C	Operating temperature range: -30 °C to +70 °C
Length: 51 mm Width: 30 mm Thickness: 4.5 mm Weight: 12 g	Length: 50.95 mm Width: 30 mm Thickness: 4.75 mm Weight: 10 g	Length: 50.95 mm Width: 30 mm Thickness: 4.75 mm Weight: 10 g	Length: 50.95 mm Width: 30 mm Thickness: 4.75 mm Weight: 10 g	Length: 50.85 mm Width: 29.85 mm Thickness: 4.38 mm Weight: 11 g	Length: 50.85 mm Width: 29.85 mm Thickness: 4.38 mm Weight: 11 g	Length: 50.95 mm Width: 30 mm Thickness: 2.75 mm Weight: 8.6 g	Length: 50.95 mm Width: 30 mm Thickness: 2.75 mm Weight: 8.6 g	Length: 50.95 mm Width: 30 mm Thickness: 2.75 mm Weight: 8.6 g	Length: 50.95 mm Width: 30 mm Thickness: 2.75 mm Weight:8.6 g

3. Hardware Compatibility

3.1. RF Band

The MC5728v, MC77xx, MC870x and MC73xx mini cards are currently available in footprint compatible GSM, EDGE, CDMA, HSPA and LTE versions. The following table shows the RF capabilities of each mini card variant.

Table 2. Supported RF Bands

Variant	RF Band	Data Rates/Bandwidth
MC5728v	Dual band CDMA 800 / 1900 MHz, Diversity (800 / 1900 MHz) GPS, Voice or Data	IS-95A/B and CDMA 1X Release 0/A; data rates up to 153 kbps (simultaneously in each direction – downlink and uplink) IS-856 1xEV-DO Revision A; data rates up to 3.1 Mbps forward channel and 1.8 Mbps reverse channel
MC7700	Quad band GSM EDGE UMTS 800 / 850 / 1900 / 2100 MHz, Diversity (800 / 850 / 1900 / 2100 MHz) LTE 700 / 1700 (AWS) / 2100 MHz GPS, Data only	EDGE Class 12 HSDPA 14.4 Mbps, HSUPA 5.76 Mbps LTE Category 3 (100 Mbps downlink, 50 Mbps uplink)
MC7710	GSM EDGE 900 / 1800 / 1900 UMTS 900 / 2100 MHz, Diversity (900 / 2100 MHz) LTE 800 / 900 / 1800 / 2100 / 2600 MHz GPS, Data only	EDGE Class 12 HSDPA 14.4 Mbps, HSUPA 5.76 Mbps LTE Category 3 (100 Mbps downlink, 50 Mbps uplink)
MC7750	CDMA 800 / 1900 MHz LTE 700 MHz GPS, Data only	IS-856 (1xEV-DO Rev. A) data rates up to 3.1 Mbps forward channel and 1.8 Mbps reverse channel HSPA+ 42 Mbps downlink, 5.76 Mbps uplink
MC8704	Quad band GSM EDGE 850 / 900 / 1800 / 1900 MHz Penta band UMTS 800 / 850 / 900/ 1900 / 2100 MHz Diversity (800 / 850 / 900 / 1900 / 2100 MHz) GPS, Voice or Data	EDGE Class 12, HSPA+ 21.1Mbps, HSUPA 5.76Mbps
MC8705	Quad band GSM EDGE 850 / 900 / 1800 / 1900 MHz Penta band UMTS 800 / 850 / 900 / 1900 / 2100 MHz Diversity (800 / 850 / 900 / 1900 / 2100 MHz) GPS, Data only	EDGE Class 12, HSPA+ 21.1Mbps, HSUPA 5.76Mbps
MC7304	Quad band GSM EDGE UMTS 850 / 900 / 1900 / 2100 MHz, Diversity (850 / 900 / 1900 / 2100 MHz) LTE 800 / 900 / 1800 / 2100 / 2600 MHz GPS, Voice or data	GPRS Class 10, EDGE Class 12 HSDPA 42 Mbps, HSUPA 5.76 Mbps LTE Category 3 (100 Mbps downlink, 50 Mbps uplink)
MC7330	Quad band GSM EDGE UMTS 800 / 850 / 2100 MHz, Diversity (800 / 850 / 2100 MHz) LTE 850 / 1500 / 2100 MHz GPS, Voice or data	GPRS Class 10, EDGE Class 12 HSDPA 42 Mbps, HSUPA 5.76 Mbps LTE Category 3 (100 Mbps downlink, 50 Mbps uplink)

Variant	RF Band	Data Rates/Bandwidth
MC7350	CDMA 800 (cellular and secondary) / 1900 MHz LTE 700 / 1700 (AWS) / 1900 MHz GPS, Voice or data	CDMA IS-2000; up to 153 kbps, simultaneous forward and reverse channel CDMA IS-856 (1xEV-DO Release A); up to 3.1 Mbps forward channel, up to 1.8 Mbps reverse channel HSPA+ 42 Mbps downlink, 5.76 Mbps uplink
MC7354	Quad band GSM EDGE UMTS 850 / 900 / 1700 (AWS) / 1900 / 2100 MHz, Diversity (850 / 900 / 1700 (AWS) / 1900 / 2100 MHz) CDMA 800 (cellular and secondary) / 1900 MHz LTE 700 / 850 / 1700 (AWS) / 1900 MHz GPS, Voice or data	EDGE Class 12 HSDPA 42 Mbps, HSUPA 5.76 Mbps CDMA IS-2000; up to 153 kbps, simultaneous forward and reverse channel CDMA IS-856 (1xEV-DO Release A); up to 3.1 Mbps forward channel, up to 1.8 Mbps reverse channel LTE Category 3 (100 Mbps downlink, 50 Mbps uplink)

3.2. RF Connectors

The MC5728v and MC870x only have two RF connectors – a main RF connector and a diversity RF connector; while the MC77xx and MC73xx have three RF connectors – a main RF connector, a diversity/MIMO connector and a GPS/GNSS connector.

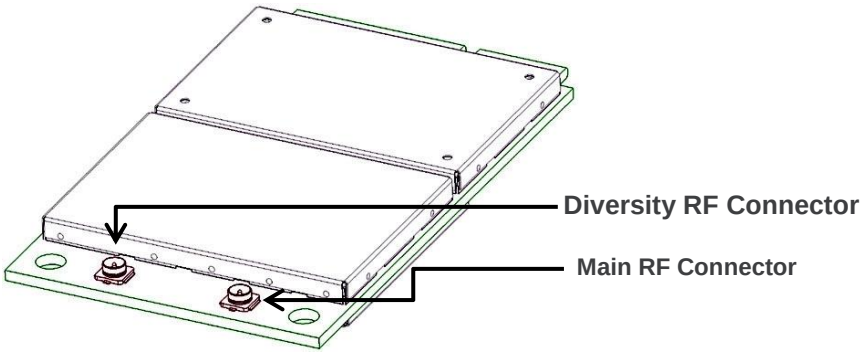


Figure 1. AirPrime MC5728v Mini Card RF Connectors

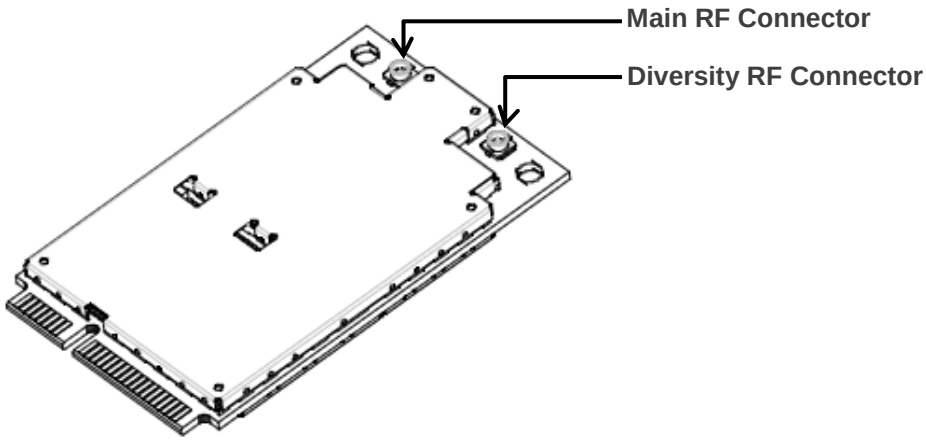


Figure 2. AirPrime MC870x Mini Card RF Connectors

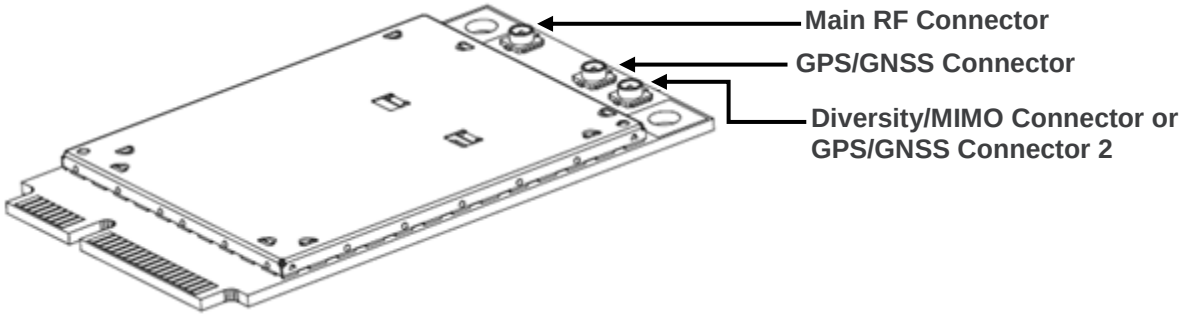


Figure 3. AirPrime MC77xx and MC73xx Mini Card RF Connectors

Although the MC73xx mini cards also support three antenna connectors, not all variants support using the diversity connector as a secondary GNSS antenna. Refer to the table below for more information.

Table 3. Secondary GNSS Connector Support on the Diversity Connector

MC73xx Variant	Secondary GNSS Antenna Support	Active Bias on Dedicated GNSS Connector
MC7304	No	Yes
MC7330	Yes	Yes
MC7350	No	Yes
MC7354	Yes	Yes

3.3. Temperature Range

The MC5728v, MC77xx, MC870x and MC73xx mini cards have different operating temperature ranges. Refer to the following table for more information.

Table 4. Operating Temperature Range

Mini Card Series	Operating Temperature Range
MC5728v	-30 °C to +60 °C
MC77xx, MC870x	-25 °C to +60 °C
MC73xx	-30 °C to +70 °C

3.4. Power Supply

The MC870x mini card has a slightly different operating voltage range. Although the nominal voltage across all modules is 3.3V, the MC870x has a higher minimum voltage. Refer to the following table for more information.

Table 5. Operating Voltages of the MC77xx and MC73xx Mini Cards

Mini Card Variant	V_{in} Minimum	V_{in} Nominal	V_{in} Maximum
MC5728v, MC77xx, MC73xx	3.0 V	3.3 V	3.6 V
MC870x	3.2 V	3.3 V	3.6 V

3.5. Application Design Limitation

3.5.1. UART Interface

Although the MC5728v supports a UART interface, the MC73xx does not.

Table 6. UART Interface

Pin #	MC5728v		MC73xx	
	Signal Name	Function	Signal Name	Function
44	DCD	UART data carrier detect	ANT_CTRL2 / GPIO3	Antenna switch control / General purpose I/O
45	CTS1_N	UART clear to send	PCM_CLK / I2S_CLK	PCM / I^2S clock
46	DSR	UART data set ready	DPR / GPIO4	Dynamic power control / General purpose I/O
47	RTS1_N	UART request to send	PCM_DOUT / I2S_DOUT	PCM / I^2S data out
48	DTR	UART data transmit ready	NC	No connect
49	RXD1	UART receive data	PCM_DIN / I2S_DIN	PCM / I^2S data in
51	TXD1	UART transmit data	PCM_SYNC / I2S_WS	PCM synchronization / I^2S word select

3.5.2. USB Interface

Except for the MC5728v which only supports full speed USB, the MC77xx, MC870x and MC73xx all support both full speed (12Mbps) and high speed (480 Mbps) USB 2.0 connections.

Table 7. USB Interface

Pin Number	Signal Name	Function
36	USB_D-	USB Data negative
38	USB_D+	USB Data positive

3.5.3. SIM Interface

Except for the MC5728v which doesn't support a SIM interface, the MC77xx, MC870x and MC73xx mini cards all support one 1.8V or 3V SIM (Subscriber Identity Module).

Table 8. SIM Interface

Pin Number	Signal Name	Function	SIM Contact Number*	Description
8	USIM_PWR	SIM voltage	1	Power supply for SIM
10	USIM_DATA	Data I/O	7	Bi-directional SIM data line
12	USIM_CLK	Serial clock	3	Serial clock for SIM data

Pin Number	Signal Name	Function	SIM Contact Number*	Description
14	USIM_RST	Reset	2	Active low SIM reset
	USIM_GND	Ground	5	Ground reference (common to module ground)

* See Figure 4 SIM Card Contacts (Contact View) for SIM card contact pin numbers.

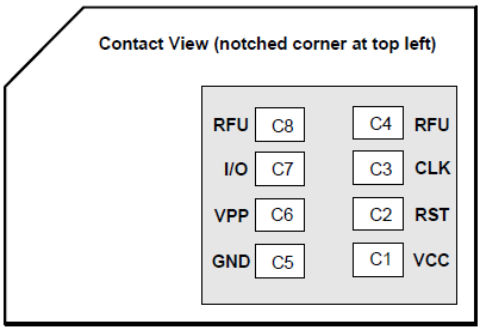


Figure 4. SIM Card Contacts (Contact View)

3.5.4. GPIO

The MC73xx supports 4 GPIOs and is fully compatible with the GPIO interface of the MC77xx. Although the MC5728v also supports 4 GPIOs, they are available on different pins; and while the MC8704 supports up to 5 GPIOs, only two of these can be used compatibly with the MC73xx (pins 44 and 46); and the MC8705 does not support a GPIO interface at all.

Table 9. GPIO Interface

Pin #	MC5728v Signal Name	MC77xx Signal Name	MC8704 Signal Name	MC8705 Signal Name	MC73xx Signal Name
3	MIC_N	GPIO1	NC	NC	GPIO1
5	SPK_P	GPIO2	NC	NC	GPIO2
6	DIO_1	NC	INDICATE_ ENUMERATION	NC	NC
16	DIO_2	NC	GPIO_1	NC	NC
28	DIO_3	NC	GPIO_2	NC	NC
30	DIO_4	NC	I2C_CLK	NC	I2C_CLK
44	MIO 44 / DCD	GPIO3	GPIO_3	NC	ANT_CTRL2 / GPIO3
46	DSR	GPIO4	GPIO_4	NC	DPR / GPIO4
48	DTR	NC	GPIO_5	NC	NC

3.5.5. Voltage Reference

A voltage reference output is available on the MC5728v, MC8704 and MC73xx. This pin is marked as NC (no connect) on the MC77xx and MC8705.

Table 10. Voltage Reference

Pin Number	Signal Name	Function
11	VCC_MSM26_DIG (MC5728v)	2.6V VCC reference for all digital signals
	VCC_MSM18_DIG (MC8704 and MC73xx)	1.8V voltage reference

3.5.6. Audio Interface

3.5.6.1. Analog Audio

Although the MC5728v supports analog audio, the MC73xx does not.

Table 11. Analog Audio Interface

Pin #	MC5728v		MC73xx	
	Signal Name	Function	Signal Name	Function
1	MIC_P	Microphone positive	WAKE_N	Wake host
3	MIC_N	Microphone negative	ANT_CTRL0 / GPIO1	External switch control / General purpose I/O
5	SPK_P	Speaker positive	ANT_CTRL1 / GPIO2	External switch control / General purpose I/O
7	SPK_N	Speaker negative	NC	No connect

3.5.6.2. Digital Audio

The MC73xx supports a digital audio interface (either PCM or I^2S) while the MC5728v supports PCM only, and the MC8704 supports I^2S digital audio only. The MC77xx and MC8705, on the other hand, do not support digital audio at all.

Table 12. Digital Audio Interface on the MC5728v, MC8704 and MC73xx

Pin #	MC5728v		MC8704		MC73xx	
	Signal Name	Function	Signal Name	Function	Signal Name	Function
45	CTS1_N / PCM_CLK	UART clear to send / PCM clock	I2S_SCLK	I^2S clock	PCM_CLK / I2S_CLK	PCM / I^2S clock
47	RTS1_N / PCM_DIN	UART request to send / PCM data in	I2S_DIN	I^2S data in	PCM_DOUT / I2S_DOUT	PCM / I^2S data out

Pin #	MC5728v		MC8704		MC73xx	
	Signal Name	Function	Signal Name	Function	Signal Name	Function
49	RXD1 / PCM_DOUT	UART receive data / PCM data out	I2S_DOUT	I^2S data out	PCM_DIN / I2S_DIN	PCM / I^2S data in
51	TXD1 / PCM_SYNC	UART transmit data / PCM synchronize	I2S_WS	I^2S word select	PCM_SYNC / I2S_WS	PCM synchronize / I^2S word select

3.5.7. Digital Control Signal

3.5.7.1. Wake Host

The MC77xx and MC73xx mini cards use the WAKE_N signal (pin 1) to wake the host when specific events occur. The MC5728v uses the RI signal (pin 32) to wake the host device upon ring, restoration of radio coverage, or receipt of SMS. The MC870x on the other hand, does not have a wake host feature.

For more information about this signal, refer to the corresponding product specification listed in section 7.1 Hardware Reference Documents.

3.5.7.2. Wireless Disable

The MC5728v, MC77xx, MC870x and MC73xx mini cards have a wireless disable signal, W_DISABLE# on the MC5728v and MC870x, W_DISABLE_N on the MC77xx and MC73xx (pin 20), that is used to enable or disable WWAN or radio modem.

For more information about this signal, refer to the corresponding product specification listed in section 7.1 Hardware Reference Documents.

3.5.7.3. System Reset

The MC5728v, MC8704 and MC73xx support a system reset signal, MDL_RESET_N on the MC5728v and MC8704, SYSTEM_RESET_N on the MC73xx (pin 33) that allows for the mini card to be reset.

For more information about this signal, refer to the corresponding product specification listed in section 7.1 Hardware Reference Documents.

3.5.7.4. Flash LED

The flash LED output of the MC5728v, MC77xx, MC870x and MC73xx is fully compatible (pin 42; LED_WWAN# on the MC5728v and MC870x, WLAN_LED_N on the MC77xx and MC73xx). This provides an open drain output which allows the LED to be directly connected to the mini card.

For more information about this signal, refer to the corresponding product specification listed in section 7.1 Hardware Reference Documents.

3.6. New Features on the MC73xx

The following sub-sections enumerate new features available on the MC73xx that were not previously available on the MC5728v, MC77xx or MC870x.

3.6.1. I^2C Interface

The MC73xx supports a 2-wire I^2C bus interface.

Table 13. I^2C Interface

Pin #	Signal Name	Function
30	I2C_CLK	I^2C clock
32	I2C_DATA	I^2C data

3.6.2. Active Antenna Control

The MC73xx supports active antenna control through three dedicated antenna control signals.

Table 14. Active Antenna Control

Pin #	Signal Name	Function
3	ANT_CTRL0 / GPIO_1	External switch control for multiple antennas / General purpose I/O
5	ANT_CTRL1 / GPIO_2	External switch control for multiple antennas / General purpose I/O
44	ANT_CTRL2 / GPIO_3	External switch control for multiple antennas / General purpose I/O

3.6.3. Dynamic Power Control

Dynamic power reduction is supported in the MC73xx through a dedicated signal, DPR (pin 46).

Table 15. Dynamic Power Control

Pin #	Signal Name	Function
46	DPR / GPIO_4	Dynamic power control / General purpose I/O

3.7. Mechanical Differences

Refer to the following table for the thickness and weight of the MC5728v, MC77xx, MC870x and MC73xx mini cards.

Table 16. Mechanical Specifications (typical values)

Measurement	MC5728v	MC77xx	MC870x	MC73xx
Thickness	4.5 mm	4.75 mm	4.38 mm	2.75 mm
Weight	12 g	10 g	11 g	8.6 g

For detailed mechanical drawings, refer to the specific product specification of each mini card variant as listed in section 7.1 Hardware Reference Documents.

3.8. Thermal Considerations

Additional heat dissipation techniques are highly recommended on the MC73xx mini cards to ensure that they function properly. These could include:

- Adding a heat sink that mounts the mini card to the main PCB (thermal compound or pads must be used between the mini card and the heat sink).
- Active cooling to pull heat away from the mini card.

For detailed information about additional thermal considerations on the MC73xx mini card, refer to the product specification of each MC73xx variant as listed in section 7.1 Hardware Reference Documents.

4. Device Identification

The MC5728v, MC77xx, MC870x and MC73xx mini cards use a USB interface for communication with the host device. Although they all use the same USB VID – 0x1199, they have different PIDs. Refer to the following table for each variant's PID.

Table 17. AirPrime MC5728v, MC77xx, MC870x and MC73xx PIDs

Mini Card Variant	PID
MC5728v	0x0028
MC7700	0x68A2 (QMI) 0x68A3 (Direct IP) 0x68AA (Direct IP, carrier specific)
MC7710	0x68A2 (QMI) 0x68A3 (Direct IP) 0x68AA (Direct IP, carrier specific)
MC7750	0x68A2 (QMI)
MC8704	0x68A3 (Direct IP)
MC8705	0x68A3 (Direct IP)
MC7304	0x68C0
MC7330	0x68C0
MC7350	0x68C0
MC7354	0x68C0

For more information about each variant's USB compositions and descriptors, refer to the USB driver developer's guides listed in section 7.3 USB Reference Documents.

5. Regulatory Compliance and Industry Certifications

The following table enumerates the regulatory compliance and industry certification of each mini card variant. For detailed information, refer to the corresponding product specification listed in section 7.1 Hardware Reference Documents.

Table 18. AirPrime MC5728v, MC77xx, MC870x and MC73xx Regulatory Compliance and Industry Certification

Regulatory Compliance / Industry Certification	MC5728v	MC7700	MC7710	MC7750	MC8704	MC8705	MC7304	MC7330	MC7350	MC7354
CE			✓		✓	✓	✓			
FCC	✓	✓		✓	✓	✓	✓		✓	✓
GCF			✓	✓	✓	✓	✓			
IC	✓	✓		✓	✓	✓			✓	✓
MIC		✓						✓		
NCC		✓	✓	✓	✓	✓	✓	✓	✓	✓
PTCRB		✓			✓	✓				✓
Carrier-Specific Certification										
Aeris	✓									TBD
AT&T		✓				✓				✓
Bell		✓			✓	✓				✓
Rogers		✓				✓				✓
Sprint	✓								✓	✓
Telstra					✓	✓	✓			
Telus						✓				✓
Verizon Wireless	✓			✓					✓	✓
Vodafone							TBD			

6. AirPrime MC5728v, MC77xx, MC870x and MC73xx Pin Out

Table 19. AirPrime MC5728v, MC77xx, MC870x and MC73xx Pin Assignments

Pin #	MC5728v		MC77xx		MC8704		MC8705		MC73xx	
	Signal Name	Function	Signal Name	Function	Signal Name	Function	Signal Name	Function	Signal Name	Function
1	MIC_P	Microphone positive	WAKE_N	Wake host	NC	No connect	NC	No connect	WAKE_N	Wake host
2	+3.3V	3.3 V supply	VCC	3.3 V supply	VCC	3.3V supply	VCC	3.3V supply	VCC	Power supply
3	MIC_N	Microphone negative	GPIO1	General purpose I/O	NC	No connect	NC	No connect	ANT_CTRL0/ GPIO1	Customer-defined external switch control for multiple antennas / General purpose I/O
4	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
5	SPK_P	Speaker positive	GPIO2	General purpose I/O	NC	No connect	NC	No connect	ANT_CTRL1/ GPIO2	Customer-defined external switch control for multiple antennas / General purpose I/O
6	DIO_1	Digital IO channel 1	NC	No connect	INDICATE_ENUMERATION	USB enumeration complete indicator	NC	No connect	NC	No connect
7	SPK_N	Speaker negative	NC	No connect	NC	No connect	NC	No connect	NC	No connect

Pin #	MC5728v		MC77xx		MC8704		MC8705		MC73xx	
	Signal Name	Function	Signal Name	Function	Signal Name	Function	Signal Name	Function	Signal Name	Function
8	Reserved	Reserved	USIM_PWR	SIM VCC supply	USIM_PWR	USIM VCC supply	USIM_PWR	USIM VCC supply	USIM_PWR	SIM VCC supply
9	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
10	Reserved	Reserved	USIM_DATA	SIM I/O pin	USIM_DATA	USIM I/O pin	USIM_DATA	USIM I/O pin	USIM_DATA	SIM I/O pin
11	VCC_MSM26_DIG	VCC reference for all GPIO digital signals	NC	No connect	VCC_MSM18_DIG	1.8 V reference voltage	NC	No connect	VCC_MSM18_DIG	1.8V reference voltage output
12	Reserved	Reserved	USIM_CLK	SIM clock	USIM_CLK	USIM clock	USIM_CLK	USIM clock	USIM_CLK	SIM clock
13	NC	No connect	NC	No connect	NC	No connect	NC	No connect	NC	No connect
14	Reserved	Reserved	USIM_RST	SIM reset	USIM_RESET	USIM reset	USIM_RESET	USIM reset	USIM_RST	SIM reset
15	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
16	DIO_2	Digital IO channel 2	NC	No connect	GPIO_1	General purpose I/O	NC	No connect	NC	No connect
17	NC	No connect	NC	No connect	NC	No connect	NC	No connect	NC	No connect
18	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
19	NC	No connect	NC	No connect	NC	No connect	NC	No connect	NC	No connect
20	W_DISABLE#	Wireless disable	W_DISABLE_N	Wireless disable (main RF radio)	W_DISABLE#	Wireless disable	W_DISABLE#	Wireless disable	W_DISABLE_N	Wireless Disable (main RF radio)
21	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
22	AUXV1	Auxiliary voltage1 – ADC input	NC	No connect	AUXV1	Auxiliary voltage 1	NC	No connect	NC	No connect
23	NC	No connect	NC	No connect	NC	No connect	NC	No connect	NC	No connect
24	+3.3V	3.3V supply	VCC	3.3 V supply	VCC	3.3 V supply	VCC	3.3 V supply	VCC	Power supply
25	NC	No connect	NC	No connect	NC	No connect	NC	No connect	NC	No connect

Pin #	MC5728v		MC77xx		MC8704		MC8705		MC73xx	
	Signal Name	Function	Signal Name	Function	Signal Name	Function	Signal Name	Function	Signal Name	Function
26	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
27	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
28	DIO_3	Digital IO channel 3	NC	No connect	GPIO_2	General purpose I/O	NC	No connect	NC	No connect
29	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
30	DIO_4	Digital IO channel 4	NC	No connect	I2C_CLK	I^2C serial bus clock	NC	No connect	I2C_CLK	I^2C serial bus clock
31	NC	No connect	NC	No connect	NC	No connect	NC	No connect	NC	No connect
32	RI	Ring indicator. Supports the Wakeup Enable function.	NC	No connect	I2C_DATA	I^2C serial bus data	NC	No connect	I2C_DATA	I^2C serial bus data
33	MDL_RESET_N	Module reset input	NC	No connect	MDL_RESET_N	Reset	NC	No connect	SYSTEM_RESET_N	Reset
34	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
35	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
36	USB_D-	USB data negative	USB_D-	USB data negative	USB_D-	USB data negative	USB_D-	USB data negative	USB_D-	USB data negative
37	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
38	USB_D+	USB data positive	USB_D+	USB data positive	USB_D+	USB data positive	USB_D+	USB data positive	USB_D+	USB data positive
39	+3.3V	3.3 V supply	VCC	3.3 V supply	VCC	3.3 V supply	VCC	3.3 V supply	VCC	Power supply
40	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
41	+3.3V	3.3 V supply	VCC	3.3 V supply	VCC	3.3 V supply	VCC	3.3 V supply	VCC	Power supply
42	LED_WWAN#	LED driver	WLAN_LED_N	LED driver	LED_WWAN#	LED driver	LED_WWAN#	LED driver	WAN_LED_N	LED driver
43	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground

Pin #	MC5728v		MC77xx		MC8704		MC8705		MC73xx	
	Signal Name	Function	Signal Name	Function	Signal Name	Function	Signal Name	Function	Signal Name	Function
44	MIO 44/DCD	UART DCD	GPIO3	General purpose I/O	GPIO_3	General purpose I/O	NC	No connect	ANT_CTRL2 / GPIO3	Customer-defined external switch control for multiple antennas / General purpose I/O
45	CTS1_N/ PCM_CLK	UART clear to send / PCM clock	NC	No connect	I2S_SCLK	I2S clock	NC	No connect	PCM_CLK / I2S_CLK	PCM/I^2S clock
46	DSR	UART DSR	GPIO4	General purpose I/O	GPIO_4	General purpose I/O	NC	No connect	DPR / GPIO_4	Dynamic power control / General purpose I/O
47	RTS1_N / PCM_DIN	UART Request to send / PCM data input	NC	No connect	I2S_DIN	I^2S data in (speaker input via DAC)	NC	No connect	PCM_DOUT / I2S_DOUT	PCM / I^2S data output
48	DTR	UART DTR	NC	No connect	GPIO_5	General purpose I/O	NC	No connect	NC	No connect
49	RXD1 / PCM_DOUT	UART receive data / PCM data out	NC	No connect	I2S_DOUT	I^2S data out (microphone output via ADC)	NC	No connect	PCM_DIN / I2S_DIN	PCM / I^2S data input
50	GND	Ground	GND	Ground	GND	Ground	GND	Ground	GND	Ground
51	TXD1 / PCM_SYNC	UART transmit data / PCM synchronize	GPS_EN_N	Wireless disable (GPS radio)	I2S_WS	I^2S word select	NC	No connect	PCM_SYNC / I2S_WS	PCM sync / I^2S word select
52	+3.3V	3.3 V supply	VCC	3.3 V supply	VCC	3.3 V supply	VCC	3.3 V supply	VCC	Power supply

7. References

7.1. Hardware Reference Documents

[1] AirPrime MC5728v Mini Card Product Specification

Reference: 4114353

[2] AirPrime MC7700 Product Technical Specification

Reference: 2400088

[3] AirPrime MC7710 Product Technical Specification

Reference: 2400089

[4] AirPrime MC7750 Product Technical Specification

Reference: 2400074

[5] AirPrime MC8704 Product Technical Specification and Customer Design Guidelines

Reference: 2400059

[6] AirPrime MC8705 Product Technical Specification and Customer Design Guidelines

Reference: 2400057

[7] AirPrime MC7304 Product Technical Specification and Customer Design Guidelines

Reference: 4114634

[8] AirPrime MC7330 Product Technical Specification and Customer Design Guidelines

Reference: 4114225

[9] AirPrime MC7350 and MC7350-L Product Technical Specification and Customer Design Guidelines

Reference: 4114103

[10] AirPrime MC7354 Product Technical Specification and Customer Design Guidelines

Reference: 4114635

7.2. AT Command Guides

For **MC5728v:**

[11] AirCard/AirPrime AT Command Reference

Reference: 2130620

For **MC77xx and MC870x:**

[12] AirCard/AirPrime UMTS Devices Supported AT Command

Reference: 2130617

For **MC73xx:**

[13] AirPrime MC73xx – MC8805 AT Command Reference

Reference: 4114486

7.3. USB Reference Documents

[14] AirCard/AirPrime USB Driver Developer's Guide
Reference: 2130634

[15] AirPrime MC73xx USB Driver Developer's Guide
Reference: 4114988

7.4. Glossary

Term	Definition
GND	Ground
IP	Internet Protocol
NC	Not Connected When a pin is marked as not connected, it means that no connection should be made from the pin to the application board.
PID	Product ID
QMI	Qualcomm MSM Interface
Reserved	When a pin is marked as Reserved, it means that no connection should be made from the module pin to the application board; and that there might be a connection to the pin from within the module.
USB	Universal Serial Bus
VID	Vendor ID

SIERRA
WIRELESS®