

EM12 Pin Assignment and Description

LTE-A Module Series

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About the Document

History

Revision	Date	Author	Description
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1 Pin Assignment

The following figure shows the pin assignment of EM12 module.

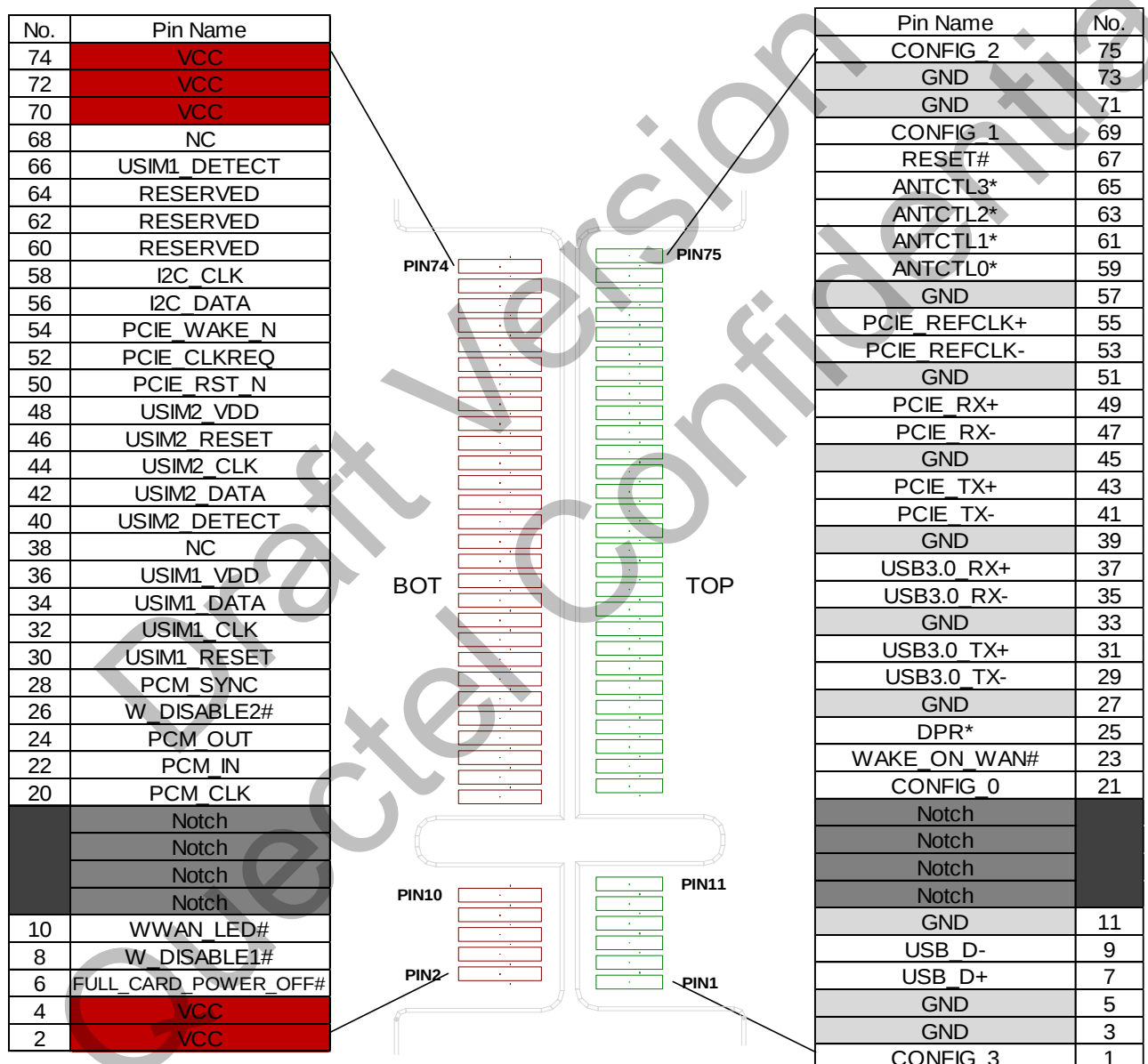


Figure 1: Pin Assignment (Top View)

NOTE

1. Keep all RESERVED pins and unused pins unconnected.
2. * In development

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2 Pin Description

The following tables show the pin definition and description of EM12 module.

Table 1: I/O Parameters Definition

Type	Description
IO	Bidirectional
DI	Digital input
DO	Digital output
PI	Power input
PO	Power output
AI	Analog input
AO	Analog output
OD	Open drain
OC	Open collector
PU	Digital input (internal pull up)
PD	Digital input (internal pull down)

Table 2: Pin Description

Power Supply					
Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
VCC	2, 4, 70, 72, 74	PI	Power supply for the module.	Vmax=4.4V Vmin=3.135V Vnorm=3.7V	
GND	3, 5, 11, 27, 33, 39, 45, 51, 57, 71, 73		Ground		

Turn on/off

Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
Full_Card_Power_Off#	6	DI	Turn on/off the module	V _{IH} max=4.4V V _{IH} min=0.7V V _{IL} max=0.5V V _{IL} min=-0.3V	Low level for turning off the module. High level for turning on the module.
WAKE_ON_WAN#	23	OC	Wake up the host by WWAN device	V _{OL} min=0V V _{OL} max=0.1V	Active low.
RESET#	67	DI	Reset the module	V _{IL} min=-0.30V V _{IL} max=0.63V	Active low.

Status Indication

Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
WWAN_LED#	10	OC	LED driver signal for indicating the network status of the module.	V _{OL} min=0V V _{OL} max=0.15V	Active low.

USB Interface

Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
USB_D+	7	AI/AO	USB differential data bus - plus	Compliant with USB 2.0 standard specification.	Require differential impedance of 90 ohm.
USB_D-	9	AI/AO	USB differential data bus - minus		
USB3.0_TX+	31	AO	USB super speed transmission - plus	Compliant with USB 3.0 standard specification.	Require differential impedance of 90 ohm.
USB3.0_TX-	29	AO	USB super speed transmission - minus		
USB3.0_RX+	37	AI	USB super speed receiving - plus		
USB3.0_RX-	35	AI	USB super-speed receiving - minus		

PCIE Interface

Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
PCIE_RST_N	50	IO	PCIE reset	V _{IL} min=0V V _{IL} max=0.15V V _{IH} min=2.9V	Active low.

				$V_{IHmax}=3.3V$	
PCIE_CLKREQ	52	IO	PCIE clock request	$V_{ILmin}=0V$ $V_{ILmax}=0.15V$ $V_{IHmin}=2.9V$ $V_{IHmax}=3.3V$	
PCIE_WAKE_N	54	IO	PCIE wake on	$V_{ILmin}=0V$ $V_{ILmax}=0.15V$ $V_{IHmin}=2.9V$ $V_{IHmax}=3.3V$	Active low.
PCIE_TX-	41	AO	PCIE transmission - minus		
PCIE_TX+	43	AO	PCIE transmission - plus		
PCIE_RX-	47	AI/AO	PCIE receiving - minus	Compliant with PCIE standard specification.	Require differential impedance of 95 ohm.
PCIE_RX+	49	AI/AO	PCIE receiving - plus		
PCIE_REFCLK-	53	AI/AO	PCIE reference clock - minus		
PCIE_REFCLK+	55	AI/AO	PCIE reference clock - plus		

(U)SIM Interface

Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
USIM1_VDD USIM2_VDD	36 48	PO	Power supply for (U)SIM card	For 1.8V (U)SIM: $V_{max}=1.85V$ $V_{min}=1.75V$ For 3.0V (U)SIM: $V_{max}=3.1V$ $V_{min}=2.9V$	Either 1.8V or 3.0V is supported by the module automatically.
USIM1_DATA USIM2_DATA	34 42	IO	Data signal of (U)SIM card	For 1.8V (U)SIM: $V_{ILmax}=0.35V$ $V_{IHmin}=1.17V$ $V_{OLmax}=0.40V$ $V_{OHmin}=1.35V$ For 3.0V (U)SIM: $V_{ILmax}=0.6V$ $V_{IHmin}=2.1V$ $V_{OLmax}=0.4V$ $V_{OHmin}=2.55V$	

USIM1_CLK	32	DO	Clock signal of (U)SIM card	For 1.8V (U)SIM: $V_{OLmax}=0.45V$ $V_{OHmin}=1.35V$
USIM2_CLK	44			For 3.0V (U)SIM: $V_{OLmax}=0.45V$ $V_{OHmin}=2.55V$
USIM1_RESET	30	DO	Reset signal of (U)SIM card	For 1.8V (U)SIM: $V_{OLmax}=0.45V$ $V_{OHmin}=1.35V$
USIM2_RESET	46			For 3.0V (U)SIM: $V_{OLmax}=0.45V$ $V_{OHmin}=2.55V$
USIM1_DETECT	66	DI	(U)SIM card insertion detection	Connect to GND (0V): (U)SIM is not present. Open circuit: (U)SIM is present.
USIM2_DETECT	40			

PCM Interface

Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
PCM_DIN/ I2S_D0	22	DI	PCM data input/ I2S data input	$V_{ILmin}=-0.3V$ $V_{ILmax}=0.63V$ $V_{IHmin}=1.17V$ $V_{IHmax}=2.1V$	1.8V power domain. If unused, keep it open.
PCM_DOUT/ I2S_D1	24	DO	PCM data output/ I2S data output	$V_{OLmax}=0.45V$ $V_{OHmin}=1.35V$	1.8V power domain. If unused, keep it open.
PCM_SYNC/ I2S_WS	28	IO	PCM data frame synchronization signal/ I2S word selection	$V_{OLmax}=0.45V$ $V_{OHmin}=1.35V$ $V_{ILmin}=-0.3V$ $V_{ILmax}=0.63V$ $V_{IHmin}=1.17V$ $V_{IHmax}=2.1V$	1.8V power domain. In master mode, it is an output signal. In slave mode, it is an input signal. If unused, keep it open.
PCM_CLK/ I2S_CLK	20	IO	PCM clock/ I2S clock	$V_{OLmax}=0.45V$ $V_{OHmin}=1.35V$ $V_{ILmin}=-0.3V$ $V_{ILmax}=0.63V$ $V_{IHmin}=1.17V$ $V_{IHmax}=2.1V$	1.8V power domain. In master mode, it is an output signal. In slave mode, it is an input signal. If unused, keep it open.

I2C Interface

Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
I2C_CLK	58	IO	I2C serial clock. Used for external codec.	V _{OL} max=0.45V V _{OH} min=1.35V V _{IL} min=-0.3V V _{IL} max=0.63V V _{IH} min=1.17V V _{IH} max=2.1V	External pull-up resistor is required. 1.8V only. If unused, keep it open.
I2C_DATA	56	IO	I2C serial data. Used for external codec.	V _{OL} max=0.45V V _{OH} min=1.35V V _{IL} min=-0.3V V _{IL} max=0.63V V _{IH} min=1.17V V _{IH} max=2.1V	External pull-up resistor is required. 1.8V only. If unused, keep it open.

Control Pins

Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
W_DISABLE#1	8	DI	Disables the main RF radio.	V _{IL} max=0.4V	3.3V/1.8V Active low
W_DISABLE#2	26	DI	Disables the GNSS radio receiver	V _{IL} max=0.4V	3.3V/1.8V Active low
ANTCTL0*	59	DO	External switch control for multiple antennas	V _{OL} max=0.45V V _{OH} min=1.35V V _{OH} max=1.8V	In development If unused, keep them open.
ANTCTL1*	61	DO			
ANTCTL2*	63	DO			
ANTCTL3*	65	DO			
DPR*	25	DI	Dynamic power control	V _{IL} min=-0.30V V _{IL} max=0.63V V _{IH} min=1.17V V _{IH} max=2.10V	In development If unused, keep it open.
CONFIG_3 CONFIG_2	1, 75	DO	Configured as the WWAN-PCIE, USB3.0. default is USB3.0		NC is the default module configuration.
CONFIG_0 CONFIG_1	21, 69	DO			GND is the default module configuration.

RESERVED Pins

Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
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RESERVED	60, 62, 64		Reserved		Keep these pins unconnected.
NC Pins					
Pin Name	Pin No.	I/O	Description	DC Characteristics	Comment
NC	38, 68		Not connected		Keep these pins unconnected.

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