# Differences between Selected Cinterion Modules

## Hardware Migration Guide

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Technical Documentation

# Contents

# 1 Applicability Table

Table 1: Applicability Table

| Product | Variant | As of Release (Revision) |
|---|---|---|
| MV31-W | USB 3.1 | Rel.1.1 (v01.009) |
| | USB 3.1 and eUICC | |
| | PCIe | |
| | PCIe and eUICC | |
| MV32-W-A | USB 3.1/PCIe and eUICC | Rel.1 (v01.000) |
| MV32-W-B (mmWave) | USB 3.1/PCIe and eUICC | Rel.1 (v01.000) |

# 2 Introduction

## 2.1 Scope

This document0F  compares the Telit Cinterion® PCIe® M.2 cards MV31-W, MV32-W-A, and MV32-W-B. It lists hardware related differences between these products.

The aim of the document is to provide guidance on how to migrate between any of the above products. Chapter 4 gives advice on designing one common hardware platform for smooth transition between all described products..

## 2.2 Audience

This document is intended for system integrators that are using the Telit XX123Z4 module in their products.

## 2.3 Contact Information, Support

For technical support and general questions, e-mail:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
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Alternatively, use: https://www.telit.com/contact-us/

Product information and technical documents are accessible 24/7 on our website: https://www.telit.com

## 2.4 Conventions

Note: Provide advice and suggestions that may be useful when integrating the module.

Danger: This information MUST be followed, or catastrophic equipment failure or personal injury may occur.

ESD Risk: Notifies the user to take proper grounding precautions before handling the product.

Warning: Alerts the user on important steps about the module integration.

All dates are in ISO 8601 format, that is YYYY-MM-DD.

## 2.5 Terms and conditions

Refer to https://www.telit.com/hardware-terms-conditions/.

## 2.6 Disclaimer

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# 3 Software Related Differences

Generally, AT commands are identical between MV31-W, MV32-W-A, and MV32-W-B - except for some additional/extended commands valid for MV32-W-A and MV32-W-B only. For a complete overview of all AT commands and differences between MV31-W, MV32-W-A, and MV32-W-B please refer to the respective AT Command Specifications (see [2]).

# 4 Hardware Related Differences

The focus of this chapter is on hardware differences between MV31-W and MV32-W-A/ MV32-W-B.

## 4.1 Feature Overview

Table 2: Feature overview (differences in bold)

| Feature/Property | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| General Properties | | |
| Form factor | M.2 3042 S3 Key B | |
| Application connector | PCI Express® M.2 Card system connector (75 pin golden finger, Key ID B)<br>For pin assignments see Chapter 4. | |
| Power supply | 3.3V (typical, min. 3.14V,max. 4.8V) | 3.3V (typical, min. 3.14V,max. 3.63V) |
| Operating temperature (board temperature) | Normal operation: -30°C to +70°C<br>Extended operation: -40°C to +85°C<br>Storage: -40°C to +85°C | Normal operation: -30°C to +70°C<br>Extended operation: -40°C to +85°C<br>Storage: -40°C to +85°C |
| Dimensions | 42 x 30 x 2.6mm | 42 x 30 x 2.6mm |
| 3GPP technology | 3G / 4G / 5G (Rel. 15) | 3G / 4G / 5G (Rel. 16 incl. 5G SA) |
| Frequency bands 3G | For supported frequency bands please refer to Section 0. | |
| Frequency bands 4G | | |
| Frequency bands 5G | | |
| Output Power | 3G:<br>All bands: +23.5 +1/-1dBm<br>4G:<br>B30: 22dBm ±1dBm<br>B39: 20dBm (typical), 22.7dBm (maximum) for Japan region<br>B41: 25.5dBm +1.5/-1.5dBm (HPUE)<br>B42: 21 ±1dBm for US region<br>B48: 21 +1dBm/-0.7dBm<br>B1, B2, B3, B4, B7, B25, B34, B38, B40, B66: 23dBm ±1dBm<br>B5, B8, B12, B13, B14, B17, B18, B19, B20, B26, B28, B71: 23.5dBm ±1dBm<br>5G: | 3G:<br>Bands 1, 2, 4, 5, 8: 23.5dBm ±1dB<br><br>4G:<br>1, 2, 3, 4, 7, 25, 34, 38, 39, 40, 41, 42, 66: 23dBm ±1dB<br>5, 8, 12, 13, 14, 17, 18, 19, 20, 26, 28, 71: 23.5dBm ±1dB<br>30: 22dBm ±1dB<br>41(HPUE): 26dBm ±1dB<br>48: 21dBm ±1dB. |

| Feature/Property | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| Output power | n41, n77, n78, n79: 25.5dBm +1.5/-1dB (HPUE)<br>All other bands: 23dBm ±1dB | 5G:<br>FR1 (Sub 6G):<br>n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n26, n28, n38, n40, n41, n53,<br>n66, n71, n77, n78, n79: 23dBm ±1dB<br>n30: 22dBm ±1dB<br>n41, n77, n78, n79(HPUE): 26dBm ±1dB<br>n48: 21dBm ±1dBFR2 (mmWave): TBD. |
| Data throughput (max. theoretical) | DL 3.88Gbps (max. theoretical: 4.14 Gbps) at EN-DC: DC_3C-1A-7C-n78A with LTE 5CA 4x4 MIMO (20 Layers) + Sub6G 4x4 MIMO<br>UL 632 Mbps (max theoretical: 660 Mbps) at (EN-DC: DC_7C-n78A with LTE UL CA + Sub6G SISO) | DL 3.5Gbps, UL 900Mbps<br>DL 4.1Gbps, UL 2.2Gbps. |
| Interfaces | | |
| USB | Hardware variant:<br><br>USB 3.1 Gen.2 SuperSpeed+ (10Gbps)<br>Plus an additional USB 2.0 for debug/factory mode only | USB 3.1 Gen.2 SuperSpeed+ (10Gbps)<br>Plus an additional USB 2.0 for debug/factory mode only |
| PCIe® | Hardware variant:<br><br>Supports Endpoint and Root Complex, Gen 3, 2 lanes | Supports Endpoint and Root Complex, Gen 3, 2 lanes, or Gen 4, 1 lane |
| UICC | Dual SIM 1.8V and 3.0V supported | Dual SIM 1.8V and 3.0V supported |
| eUICC | Hardware variant:<br>Supported (DSSA) | On board:<br>Supported (DSSA) |
| Antenna | 4 x MHF4 RF connectors 50Ω | 4 x MHF4 RF connectors 50Ω<br>MV32-W-B only:<br>4 x mmWave antenna connectors |
| Other interfaces | | |

| Feature/Property | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| GPIO interface | Reserved for future use. | Reserved for future use, including fast shutdown pin (FST_SHDN) |
| Status | Supported status indication interface | Supported status indication interface |
| Dynamic power reduction | Supported interface to reduce power dynamically(SAR) | Supported interface to reduce power dynamically (SAR) |
| WWAN/WIFI coexistence control | Reserved for future use. | Reserved for future use. |
| Tuneable antenna interface | Supported MIPI interface for external antenna tuner application | Supported MIPI interface for external antenna tuner application |
| Add-in card configuration | Supported to report communication interface (WWAN, USB, PCIe®) | Supported to report communication interface (WWAN, USB, PCIe®) |
| Control signals | Supported:<br>Power:<br>FULL_CARD_POWER_OFF#<br>WWAN: W_DISABLE1#,<br>WAKE_ON_ WWAN#<br>GNSS: W_DISABLE2#<br><br>Not supported:<br>Reset: RESET# | Supported:<br>Power: FULL_CARD_POWER_OFF#<br>WWAN: W_DISABLE1#<br>GNSS: W_DISABLE2#<br><br>Not supported:<br>Reset: RESET#<br>WAKE_ON_WWAN# |
| GNSS | Supported | Supported |
| Driver software | Windows(TM) 10, Windows(TM) 11<br>Linux Kernel 5.13<br>Android 11 | Windows(TM) 11 only<br>Linux Kernel 5.15<br>Android 12 |
| MBIM | Supported | Supported (incl. MBIMEx 3.0) |
| Software | For software related differences please refer to Software Related Differences | |

## 4.2 General Properties

### Frequency Bands

Table 3: Frequency bands (5G FR1 - plus FR2 for MV32-W-B only)

| Product | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| Frequency bands | | |
| n1 2100MHz | x | x |
| n2 1900MHz | x | x |
| n3 1800MHz | x | x |
| n5 850MHz | x | x |
| n7 2600MHz | x | x |
| n8 900MHz | x | x |

| Product | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| n12 700MHz | x | x |
| n20 800MHz | x | x |
| n25 1900MHz | - | x |
| n28 700MHz | x | x |
| n38 2600MHz | x | x |
| n40 2300MHz | - | x |
| n41 2600MHz | x | x |
| n48 3600MHz | - | x |
| n66 AWS-3 | x | x |
| n71 600MHz | x | x |
| n77 3700MHz | x | x |
| n78 3500MHz | x | x |
| n79 4700MHz | x | x |
| n257 28GHz | - | x (MV32-W-B only) |
| n258 26GHz | - | x (MV32-W-B only) |
| n260 39GHz | - | x (MV32-W-B only) |
| n261 28GHz | - | x (MV32-W-B only) |

Table 4: Frequency bands (4G)

| Product | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| Frequency bands | | |
| B1 2100MHz | x | x |
| B2 1900MHz | x | x |
| B3 1800MHz | x | x |
| B4 AWS-1 | x | x |
| B5 850MHz | x | x |
| B7 2600MHz | x | x |
| B8 900MHz | x | x |
| B12 700MHz | x | x |
| B13 700MHz | x | x |
| B14 700MHz | x | x |
| B17 700MHz | x | x |
| B18 800MHz | x | x |
| B19 800MHz | x | x |
| B20 800MHz | x | x |
| B25 1900MHz | x | x |
| B26 850MHz | x | x |
| B28 700MHz | x | x |
| B29 700MHz | x | x |
| B30 2300MHz | x | x |
| B32 1500MHz | x | x |
| B34 2000MHz | x | x |
| B38 2600MHz | x | x |
| B39 1900MHz | x | x |

| Product | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| B40 2300MHz | x | x |
| B41 2600MHz | x | x |
| B42 3500MHz | x | x |
| B46 (LAA; DL only) | x | x |
| B48 3600MHz | x | x |
| B66 AWS-3 | x | x |
| B71 600MHz | x | x |

Table 5: Frequency bands (3G)

| Product | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| Frequency bands | | |
| Bd.I 2100MHz | x | x |
| Bd.II 1900MHz | x | x |
| Bd.IV 1700MHz | x | x |
| Bd.V 850MHz | x | x |
| Bd.VI 800MHz | x | - |
| Bd.VIII 900MHz | x | x |
| Bd.IX 1800MHz | x | - |
| Bd.XIX 850MHz | x | - |

Reference:

- "Hardware Interface Description": Section "Key Features at a Glance

# Dimensions

Table 6: Dimensions

| Product | Length x Width mm] | Hight [mm] | Weight | Pin count |
|---|---|---|---|---|
| MV31-W | 42 x 30 | 2.6 | ~8g | 75 |
| MV32-W-A / MV32-W-B | 42 x 30 | 2.6 | ~8g | 75 |

Reference:

- "Hardware Interface Description": Section "Mechanics" and "Pad Assignment"

# Operating Temperature

Table 7: Board / battery temperatures [°C]

| Parameter | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| Operating temperature | -30°C ... +70°C | |
| Extended temperature | -40°C ... +85°C | |
| Automatic shutdown at board temperature | <-40°C and >+85°C | |

Reference:

- "Hardware Interface Description": Section "Operating Temperatures"

# Power Supply Ratings

Power supply ratings differ between the modules. Please refer to the respective module's Hardware Interface Description for power supply ratings specified with regard to additional features available with these products (i.e., LTE, UMTS, USB, GNSS).

Reference:

- "Hardware Interface Description": Section "Power Supply Ratings"

## 4.3 Application Interface

The following sections list the various application interfaces available via the PCI Express® M.2 Card system connector. The available interfaces are identical between MV31-W, MV32-W-A, and MV32-W-B. For further details please refer to the Hardware Interface Description of these products (see 0).

### USB

MV31-W, MV32-W-A, and MV32-W-B have six interface lines for USB, i.e., two lines for USB 2.0 and four lines for USB 3.1, and is acting as peripheral.

USB Design General Guidelines:

- Reserve choke on all the USB signals in platform for noise debug.
- Reserve 0.1uF capacitor on USB3.1 TX/Rx paths.
- Co-layout USB3 choke and 0.1uF capacitor on module side for noise debug

Note: All the above components should be covered by shielding cover.

The USB 3.1 interface is compliant to the USB Specification 3.1 Generation 2 with SuperSpeed+ (10Gbps). It is the main interface for data communication, AT command, NMEA stream from/to MV31-W and MV32-W-A.

The USB 2.0 interface (USB_D+, USB_D-) as part of the 75-pin application connector is for debug/factory mode only.

Note: With MV31-W usage of the interface pins as either USB 3.1 interface or 2nd PCIe lane depends on a dedicated hardware variant whereas with MV32-W-A and MV32-W-B it is configurable via AT command.

Reference:

- "Hardware Interface Description": Section "USB Interface"

### PCIe®

MV31-W, MV32-W-A, and MV32-W-B provide a PCI Express® Interface compliant to the PCI Express® Card Electromechanical Specification 1.1.

Note: With MV31 usage of the interface pins as either 2nd PCIe lane or USB 3.1 interface depends on a dedicated hardware variant whereas with MV32x it is configurable via AT command.

PCIe® Design General Guidelines:

- All sensitive/high high-speed signals and circuits must be protected from PCIe® corruption, e.g. noisy signal, crosstalk and RF.
- Pay extra attention to crosstalk, ISI, and intra-lane skew and impedance discontinuities.
- Each trace needs to be adjacent to a ground plane.
- PCIe® PERx0/1, PETx0/1, REFCLK: 90 Ohm differential, +/ -10% trace impedance.
- AC coupling capacitor should be added in an application board: 220nF

- Place 220nF capacitors on PCIe® PETx0/1 paths at module side (already included in MV31-W and MV32-W-A)
- Place 220nF capacitors on PCIe® PETx0/1 paths at platform side.

- Reserve choke on all the PCIe® signals in platform for noise reduction
- Tx differential pair length matching < 0.5mm.
- Rx differential pair length matching < 0.5mm.

Reference:

- "Hardware Interface Description": Section "PCI Express® Interface"

## UICC

MV31-W, MV32-W-A, and MV32-W-B provide a SIM/UICC interface at the 75-pin application connector compliant to the ISO/IEC 7816-3 specification. The SIM interface is intended for 1.8V and 3V SIM cards in accordance with GSM 11.12 Phase 2.

The lines of a second SIM interface are internally connected to an embedded SIM (eUICC) with the MV31-W eUICC hardware variant, as well as with MV32-W-A and MV32-W-B. Via an optional, dedicated MV32-W-AMV32-W-Ahardware SKU a second SIM interface can be made available externally instead of the eUICC.

Reference:

- "Hardware Interface Description": Section "SIM/UICC Interface"

## eUICC

Dedicated variants of MV31-W as well as MV32-W-A and MV32-W-B support a WLCSP eUICC. The WLCSP eUICC is located under the shielding, and is internally connected to the specific module pads that are alternatively available as an optional second SIM interface. It has no physical connections with other circuits inside the module.

Reference:

- "Hardware Interface Description": Section "eUICC Interface"

## GPIO

The GPIO interface is reserved for future use.

## Status

MV31-W, MV32-W-A, and MV32-W-B have a status LED_1# signal that is provided to enable wireless communication add-in cards to provide status indications to users via system provided indicators.

Reference:

- "Hardware Interface Description": Section "eUICC Interface"

## Dynamic Power Reduction

MV31-W, MV32-W-A, and MV32-W-B support optional DPR signals to assist in meeting regulatory SAR (Specific Absorption Rate) requirements for RF exposure.

DPR_1 can be implemented for 3G/4G/5G ANT Tx. DPR_2 can be implemented for 5G FR1 ANT Tx only in case DPR_1 is for 3G/4G ANT Tx.

Reference:

- "Hardware Interface Description": Section "Dynamic Power Reduction"

## WWAN/WIFI Coexistance Control

MV31-W, MV32-W-A, and MV32-W-B provide the signals COEX_RXD, COEX_TXD, LAA_n79_Tx_EN and WLAN_Tx_EN to allow the implementation of wireless coexistence solutions between the card's radio(s) and other off-card radio(s). These other radios can be located on another M.2 Card located on the same host platform or as alternate radio implementations.

The signals COEX_RXD, COEX_TXD are reserved for future use.

Reference:

- "Hardware Interface Description": Section "WWAN/WIFI Coexistance Control"

## Tunable Antenna Interface

MV31-W, MV32-W-A, and MV32-W-B provide a MIPI interface (MIPI_DATA (RFFE2_DATA) and MIPI_CLK (RFFE2_CLK)) for external antenna tuner applications to allow the implementation of antenna tuner solutions, e.g. with QAT3555 antenna impedance tuner.

In addition, the ANT_TUNER_CONFIG pin gives the possibility to optimize the FR1 low band performance. The configuration is mainly for mobile devices with integrated antennas.

Reference:

- "Hardware Interface Description": Section "Tunable Antenna Interface"

## Add-in Card Configuration

MV31-W, MV32-W-A, and MV32-W-B have CONFIG_x signals to report the communication interface (PCIe® or USB 3.1 Gen2) to the application host, as well as the port configuration according to PCI Express M.2 Specification 1.1.

Reference:

- "Hardware Interface Description": Section "Add-in Card Configuration"

## Control Signals

MV31-W, MV32-W-A, and MV32-W-B support the following control signals:

- Power: FULL_CARD_POWER_OFF# to power on/off the modem card
- WWAN: W_DISABLE1# to disable/enable the WWAN part
- GNSS: W_DISABLE2# to disable/enable the GNSS part

Currently not supported are the following control signals:

- Reset: RESET#
- WAKE_ON_WWAN#

Reference:

- "Hardware Interface Description": Section "Control Signals"

# 4.4 Antenna Interface

## RF/GNSS Antennas

MV31-W and MV32-W-A have four RF connectors (MHF4 type). The four RF connectors include for 5GNR Sub 6G & UMTS/LTE primary transmitter/receiver port, diversity receiver and 4x4 MIMO receiver port. MV32 modules also come with 2x2 MIMO uplink port.

Out of the four RF antenna interfaces ANT0, ANT1, ANT2, and ANT3, the two interfaces ANT1 and ANT3 also support GNSS (L1, L5).

Note that, for GNSS, L1 L5 are only on one antenna port which is ANT3 and ANT1 for MV32. MV31 L1 and L5 are divided on ANT1 and ANT3

The GNSS characteristics between MV31-W and MV32-W-A/MV32-W-B may differ, but are not yet available for MV32-W-A/MV32-W-B.

Reference:

- "Hardware Interface Description": Section "Antenna Interface"

## mmWave Antennas (MV32-W-B only)

In addition to the four RF antenna connectors, MV32-W-B has four mmWave antenna connectors (ANT4, ANT5, and ANT6 on the top side of the modem card, and ANT7 on bottom side of card). The mmWave antennas additionally allow 5G FR2 band support.

Reference:

- "Hardware Interface Description": Section "Antenna Interface"

# 5 Digital Common Application Connector

To support a possible common application design, this chapter assembles the pin assignments for MV31-W, MV32-W-A, and MV32-W-B at the common application connector, i.e., the PCI Express® M.2 Card system connector (75 pin golden finger, Key ID B).

The colour scheme for the below pin assignment table is as follows:

| | |
|---|---|
| | = Connected lines (various) |
| | = Power supply lines |
| | = Ground lines (GND) |
| | = PCIe® variant – Dedicated hardware (MV31-W) or AT command configurable (MV32-W-A/MV32-W-B) |
| | = USB 3.1 variant – Dedicated hardware (MV31-W) or AT command configurable (MV32-W-A/MV32-W-B) |
| | = Reserved for future use |
| white | = Not connected lines (nc); do not use |

The few pin numbers where the assignments between products differ are marked in bold.

| Pin No. | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| 1 | CONFIG_3 | CONFIG_3 |
| 3 | GND | GND |
| 5 | GND | GND |
| 7 | USB+ | USB+ |
| 9 | USB- | USB- |
| 11 | GND | GND |
| Key ID B | | |
| 21 | CONFIG_0 | CONFIG_0 |
| 23 | WAKE_ON_WWAN# | WAKE_ON_WWAN# |
| 25 | DPR_1 | DPR_1 |
| 27 | GND | GND |
| 29 | USB3.1-Tx- | USB3.1-Tx- |
| | PETn1 | PETn1 |
| 31 | USB3.1-Tx+ | USB3.1-Tx+ |
| | PETp1 | PETp1 |
| 33 | GND | GND |
| 35 | USB3.1-Rx- | USB3.1-Rx- |
| | PERn1 | PERn1 |

| Pin No. | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| 37 | USB3.1-Rx+ | USB3.1-Rx+ |
| | PERp1 | PERp1 |
| 39 | GND | GND |
| 41 | PETn0 | PETn0 |
| 43 | PETp0 | PETp0 |
| 45 | GND | GND |
| 47 | PERn0 | PERn0 |
| 49 | PERp0 | PERp0 |
| 51 | GND | GND |
| 53 | REFCLKn | REFCLKn |
| 55 | REFCLKp | REFCLKp |
| 57 | GND | GND |
| 59 | mmWave_Enable_1 | mmWave_Enable_1 (MV32-W-A) |
| | | mmWave_Enable_1 (MV32-W-B) |
| 61 | mmWave_Enable_2 | mmWave_Enable_2 (MV32-W-A) |
| | | mmWave_Enable_2 (MV32-W-B) |
| 63 | mmWave_Enable_3 | mmWave_Enable_3 (MV32-W-A) |
| | | mmWave_Enable_3 (MV32-W-B) |
| 65 | mmWave_1P85 | mmWave_1P85 (MV32-W-A) |
| | | mmWave_1P85 (MV32-W-B) |
| 67 | RESET# | RESET# |
| 69 | CONFIG_1 | CONFIG_1 |
| 71 | GND | GND |
| 73 | GND | GND |
| 75 | CONFIG_2 | CONFIG_2 |
| 2 | 3V3 | 3V3 |
| 4 | 3V3 | 3V3 |
| 6 | FULL_CARD_POWER_OFF# | FULL_CARD_POWER_OFF# |
| 8 | W_DISABLE1# | W_DISABLE1# |

| Pin No. | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| 10 | LED_1# | LED_1# |
| Key ID B | | |
| 20 | nc | mmWave_Enable_4 (MV32-W-A) |
| | | mmWave_Enable_4 (MV32-W-B) |
| 22 | ANT_TUNER_CONFIG | ANT_TUNER_CONFIG |
| 24 | ANT_TUNER_POWER | ANT_TUNER_POWER |
| 26 | W_DISABLE2# | W_DISABLE2# |
| 28 | DPR_2 | DPR_2 |
| 30 | UIM_1_RESET | UIM_1_RESET |
| 32 | UIM_1_CLK | UIM_1_CLK |
| 34 | UIM_1_DATA | UIM_1_DATA |
| 36 | UIM_1_PWR | UIM_1_PWR |
| 38 | WLAN_Tx_EN | WLAN_Tx_EN |
| 40 | SIM DETECT_2 | SIM DETECT_2 |
| 42 | UIM_2_DATA | UIM_2_DATA |
| 44 | UIM_2_CLK | UIM_2_CLK |
| 46 | UIM_2_RESET | UIM_2_RESET |
| 48 | UIM_2_PWR | UIM_2_PWR |
| 50 | PERST# | PERST# |
| 52 | CLKREQ# | CLKREQ# |
| 54 | PEWAKE# | PEWAKE# |
| 56 | MIPI_DATA | MIPI_DATA |
| 58 | MIPI_CLK | MIPI_CLK |
| 60 | LAA_n79_Tx_EN | LAA_n79_Tx_EN |
| 62 | COEX_RXD | COEX_RXD |
| 64 | COEX_TXD | COEX_TXD |
| 66 | SIM DETECT_1 | SIM DETECT_1 |
| 68 | GPIO | GPIO (reserved as fast shutdown pin (FST_SHDN) |
| 70 | 3V3 | 3V3 |

| Pin No. | MV31-W | MV32-W-A / MV32-W-B |
|---|---|---|
| 72 | 3V3 | 3V3 |
| 74 | 3V3 | 3V3 |

Reference:

- “Hardware Interface Description”: Section “Pad Assignment and Signal Description”

# 6 Acronyms and Abbreviations

Table 8: Acronyms and Abbreviations

| Acronym | Definition |
|---|---|
| ADC | Analog – Digital Converter |
| CLK | Clock |
| CMOS | Complementary Metal – Oxide Semiconductor |
| CS | Chip Select |
| DAC | Digital – Analog Converter |
| DTE | Data Terminal Equipment |
| ESR | Equivalent Series Resistance |
| GPIO | General Purpose Input Output |
| HS | High Speed |
| HSDPA | High-Speed Downlink Packet Access |
| HSIC | High-Speed Inter Chip |
| HSUPA | High-Speed Uplink Packet Access |
| I/O | Input Output |
| MISO | Master Input – Slave Output |
| MOSI | Master Output – Slave Input |
| MRDY | Master Ready |
| PCB | Printed Circuit Board |
| RTC | Real-Time Clock |
| SIM | Subscriber Identification Module |
| SPI | Serial Peripheral Interface |
| SRDY | Slave Ready |
| TTSC | Telit Technical Support Centre |
| UART | Universal Asynchronous Receiver Transmitter |
| UMTS | Universal Mobile Telecommunication System |
| USB | Universal Serial Bus |
| VNA | Vector Network Analyzer |
| VSWR | Voltage Standing Wave Radio |
| WCDMA | Wideband Code Division Multiple Access |

# 7 Related Documents

Refer to https://dz.telit.com/ for current documentation and downloads.

Table 9: Related Documents

| S.no | Book Code | Document Title |
|---|---|---|
| 1 | | Hardware Interface Description for the appropriate Cinterion® product |
| 2 | | AT Command Set for the appropriate Cinterion® product |

# 8 Document History

Table 10: Document History

| Revision | Date | Changes |
|---|---|---|
| 1 | 2023-09-13 | Default Access Level set to Confidential<br>Updated styles<br>• TC . List Paragraph<br>• TC Balloon Text<br>• TC Caption<br>• TC Closing<br>• TC Comment subject<br>• TC . Comment Text<br>• TC Code update<br>• TC . Hyperlink<br>• TC . Heading 4 |
| 0 | 2023-05-25 | Initial release |

From Mod.0818 Rev.11