



Mobile Computing Solutions

Vehicle Telematics Computer NRM307

User Manual

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Note: The manual is subject to change without notice

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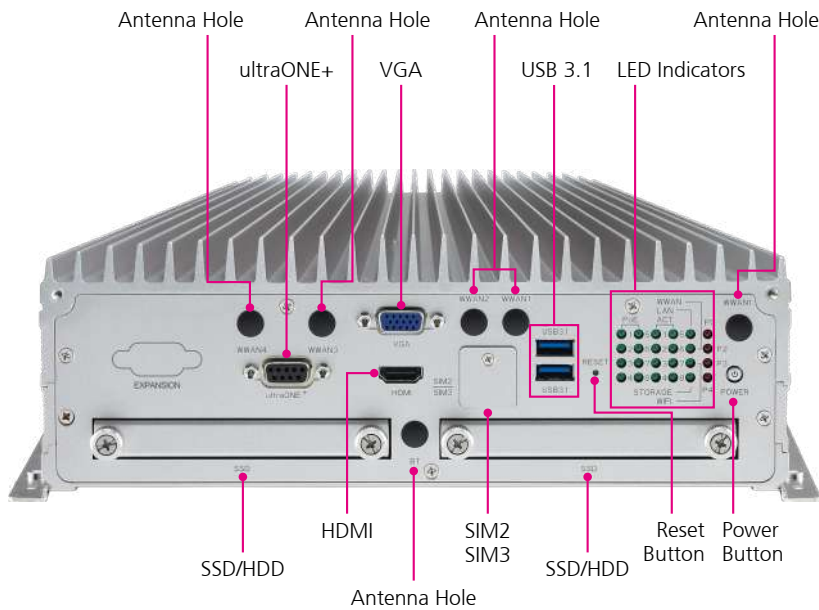
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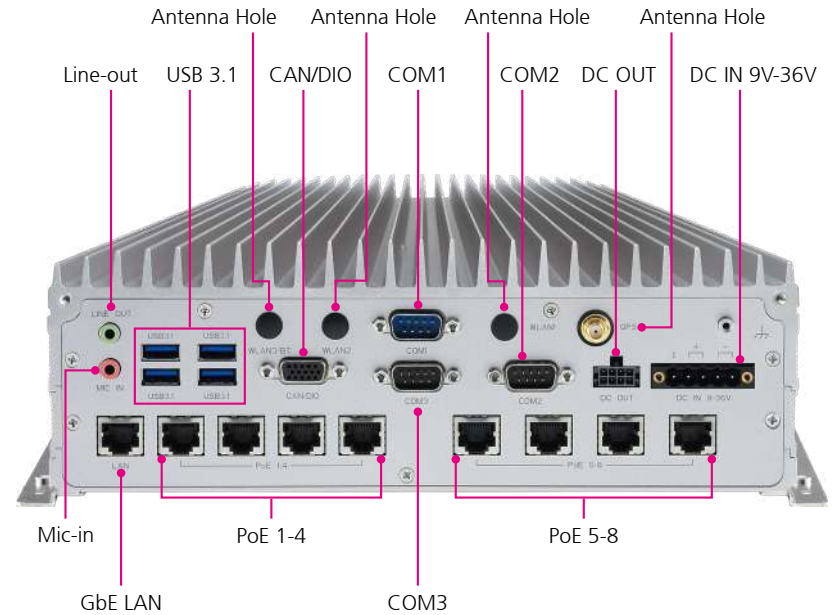
CHAPTER 1: PRODUCT INTRODUCTION

Physical Features

Front View

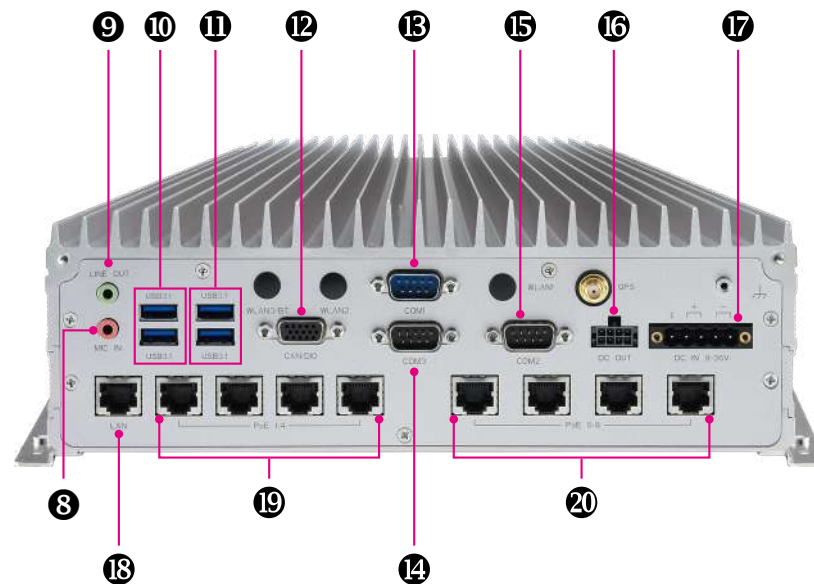
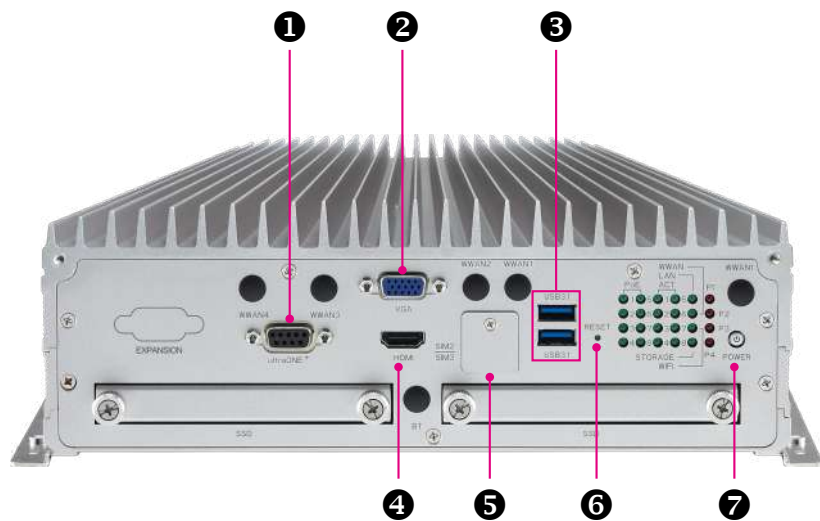


Rear View



Connector Numbering

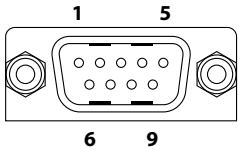
The following diagrams indicate the numbers of the connectors. Use these numbers to locate the connectors' respective pinout assignments on chapter 2 of the manual.



CHAPTER 2: EXTERNAL CONNECTORS PINOUT DESCRIPTION

ultraONE+ Connector

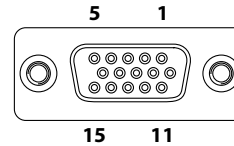
Connector number: 1



Pin	Definition	Pin	Definition
1	USB D-	2	GND
3	FPT LINKIII D-	4	POWER BUTTON
5	24V	6	USB D+
7	FPT LINKIII D+	8	24V ENABLE DETECT
9	GND		

VGA Connector

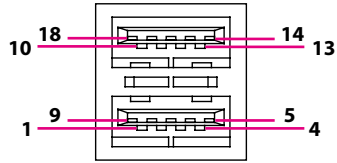
Connector number: 2



Pin	Definition	Pin	Definition
1	VGA_RED	2	VGA_GREEN
3	VGA_BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	+5V	10	GND
11	NC	12	VGA_DATA
13	VGA_HS	14	VGA_VS
15	VGA_CLK		

Dual USB 3.1 Port

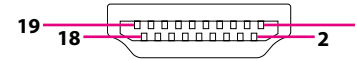
Connector number: 3



Pin	Definition	Pin	Definition
1	5V	2	USB_1N
3	USB_1P	4	GND
5	USB3_RX1N	6	USB3_RX1P
7	GND	8	USB3_TX1N
9	USB3_TX1P	10	5V
11	USB_2N	12	USB_2P
13	GND	14	USB3_RX2N
15	USB3_RX2P	16	GND
17	USB3_TX2N	18	USB3_TX2P

HDMI Connector

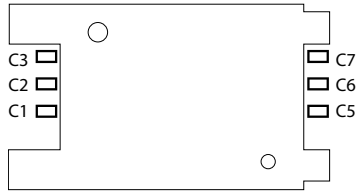
Connector number: 4



Pin	Definition	Pin	Definition
1	HDMI_TX2P	2	GND
3	HDMI_TX2N	4	HDMI_TX1P
5	GND	6	HDMI_TX1N
7	HDMI_TX0P	8	GND
9	HDMI_TX0N	10	HDMI_CLK_P
11	GND	12	HDMI_CLK_N
13	NC	14	NC
15	HDMI_SCL	16	HDMI_SDA
17	GND	18	HDMI_P5V
19	HDMI_HPD		

SIM2 and SIM3 Sockets

Connector number: 5



SIM2

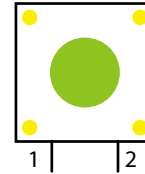
Pin	Definition	Pin	Definition
C1	UIM_PWR	C5	NC
C2	UIM_RST	C6	UIM_DAT
C3	UIM_CLK	C7	NC

SIM3

Pin	Definition	Pin	Definition
C1	UIM_PWR	C5	NC
C2	UIM_RST	C6	UIM_DAT
C3	UIM_CLK	C7	SIM SELECT

Reset Button

Connector number: 6



Pin	Definition
1	GND
2	RST_BTN#

Power Button

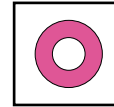
Connector number: 7



Pin	Definition	Pin	Definition
1	GND	2	HW_BT#
3	HW_BT#	4	GND
A1	PWRLED_A	C1	PWRLED_C

Mic-in Connector

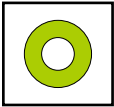
Connector number: 8



Pin	Definition	Pin	Definition
1	GND	2	MIC RIGHT
3	GND	4	MIC DETECT
5	MIC LEFT		

Line-out Connector

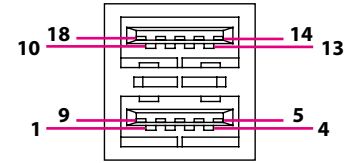
Connector number: 9



Pin	Definition	Pin	Definition
22	FRONT OUT RIGHT	23	GND
24	FRONT OUT DETECT	25	FRONT LEFT

Dual USB 3.1 Port

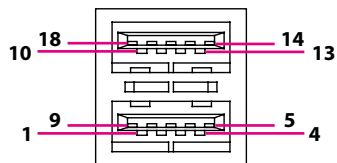
Connector number: 10



Pin	Definition	Pin	Definition
1	5V	2	USB_5N
3	USB_5P	4	GND
5	USB3_RX5N	6	USB3_RX5P
7	GND	8	USB3_TX5N
9	USB3_TX5P	10	5V
11	USB_6N	12	USB_6P
13	GND	14	USB3_RX6N
15	USB3_RX6P	16	GND
17	USB3_TX6N	18	USB3_TX6P

Dual USB 3.1 Port

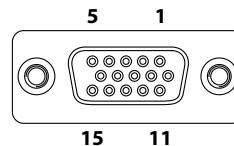
Connector number: 11



Pin	Definition	Pin	Definition
1	5V	2	USB_3N
3	USB_3P	4	GND
5	USB3_RX3N	6	USB3_RX3P
7	GND	8	USB3_TX3N
9	USB3_TX3P	10	5V
11	USB_4N	12	USB_4P
13	GND	14	USB3_RX4N
15	USB3_RX4P	16	GND
17	USB3_TX4N	18	USB3_TX4P

CAN/DIO Multiport Connector

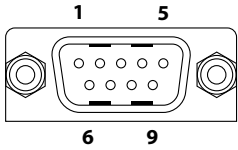
Connector number: 12



Pin	Definition	Pin	Definition
1	CAN H	2	ODOMETER
3	GPO3	4	GPI1
5	GPO0	6	CAN L
7	DIRECTION	8	GND
9	GPI2	10	GPO1
11	CAN GND	12	GND
13	GPI3	14	GPO2
15	GPI0		

COM1 RS232 Connector

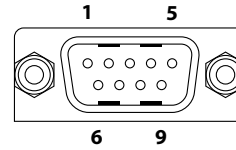
Connector number: 13



Pin	Definition	Pin	Definition
1	GND	2	DTR1
3	TXD1	4	RXD1
5	DCD1	6	RI1
7	CTS1	8	RTS1
9	DSR1		

COM3 RS-232/RS422/RS485 Connector

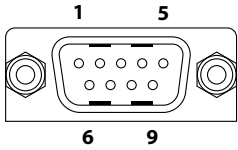
Connector number: 14



Pin	Definition	Pin	Definition
1	RS232 DCD#/RS422 TX-	2	RS232 RX/RS422 TX+
3	RS232 TX/RS422 RX+	4	RS232 DTR#/RS422 RX-
5	RS232 DCD#/RS422 TX-	6	GND
7	DSR#	8	RTS#
9	CTS#		

COM2 RS232 Connector

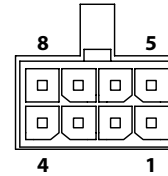
Connector number: 15



Pin	Definition	Pin	Definition
1	GND	2	DTR2
3	TXD2	4	RXD2
5	DCD2	6	RI2
7	CTS2	8	RTS2
9	DSR2		

DC Out Connector

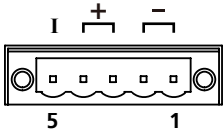
Connector number: 16



Pin	Definition	Pin	Definition
1	RESET BUTTON##	2	SLEEP BUTTON##
3	GND	4	GND
5	RS232 TX	6	RS232 RX
7	POWER BUTTON#	8	12V

9V-36V DC Power Input

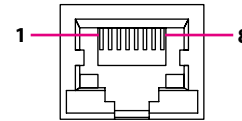
Connector number: 17



Pin	Definition	Pin	Definition
1	GND	2	GND
3	VIN	4	VIN
5	IGNITION		

LAN Port

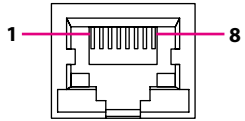
Connector number: 18



Pin	Definition	Pin	Definition
1	LAN_MDI_0P_R	2	LAN_MDI_0N_R
3	LAN_MDI_1P_R	4	LAN_MDI_1N_R
5	LAN_MDI_2P_R	6	LAN_MDI_2N_R
7	LAN_MDI_3P_R	8	LAN_MDI_3N_R

PoE1 to PoE4 Ports

Connector number: 19

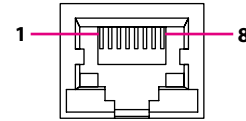


Pin	Definition	Pin	Definition
1	LAN X _MDI_0P	2	LAN X _MDI_0N
3	LAN X _MDI_1P	4	LAN X _MDI_2P
5	LAN X _MDI_2N	6	LAN X _MDI_1N
7	LAN X _MDI_3P	8	LAN X _MDI_3N

Red 'X' denotes the port number.

PoE5 to PoE8 Ports

Connector number: 20



Pin	Definition	Pin	Definition
1	LAN X _MDI_0P	2	LAN X _MDI_0N
3	LAN X _MDI_1P	4	LAN X _MDI_2P
5	LAN X _MDI_2N	6	LAN X _MDI_1N
7	LAN X _MDI_3P	8	LAN X _MDI_3N

Red 'X' denotes the port number.

CHAPTER 3: JUMPERS AND SWITCHES

This chapter describes how to set the jumpers on the VTC 7250 motherboard.

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
 - A Philips screwdriver
 - A flat-tipped screwdriver
 - A set of jewelers screwdrivers
 - A grounding strap
 - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on the computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

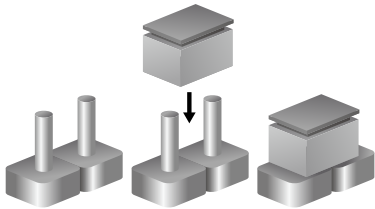
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

Jumper Settings

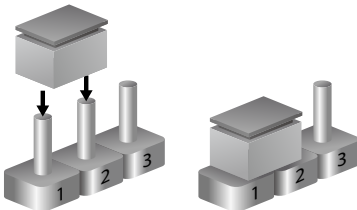
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is open.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)



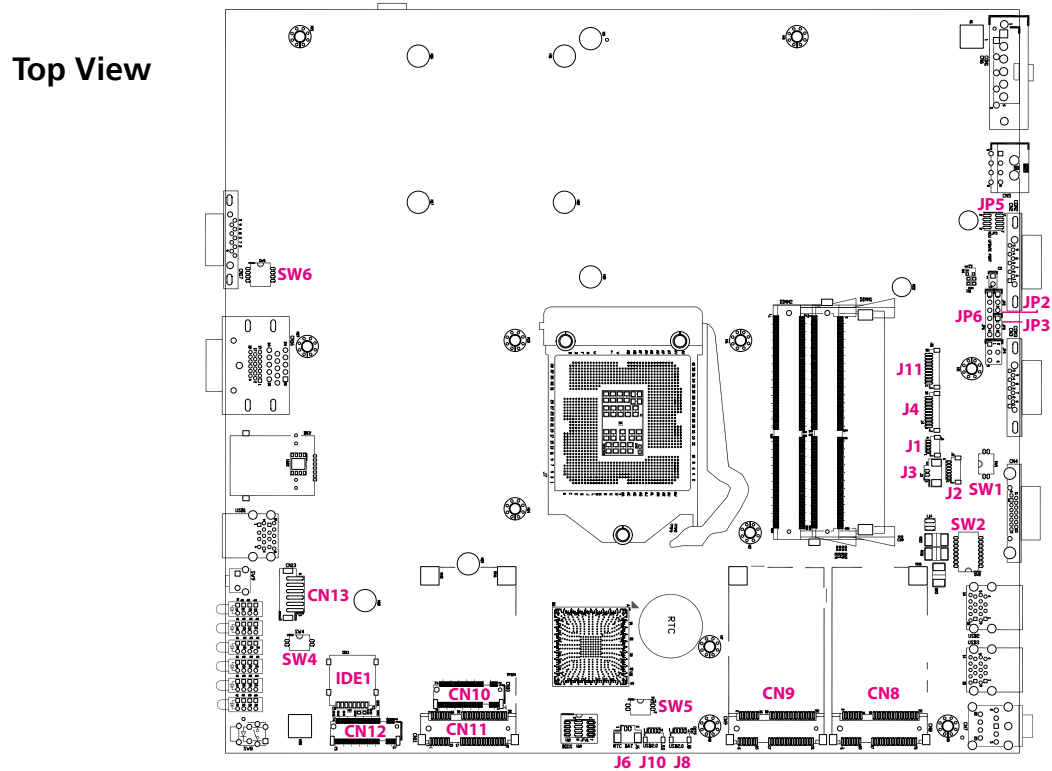
Three-Pin Jumpers: Pins 1 and 2 are Short



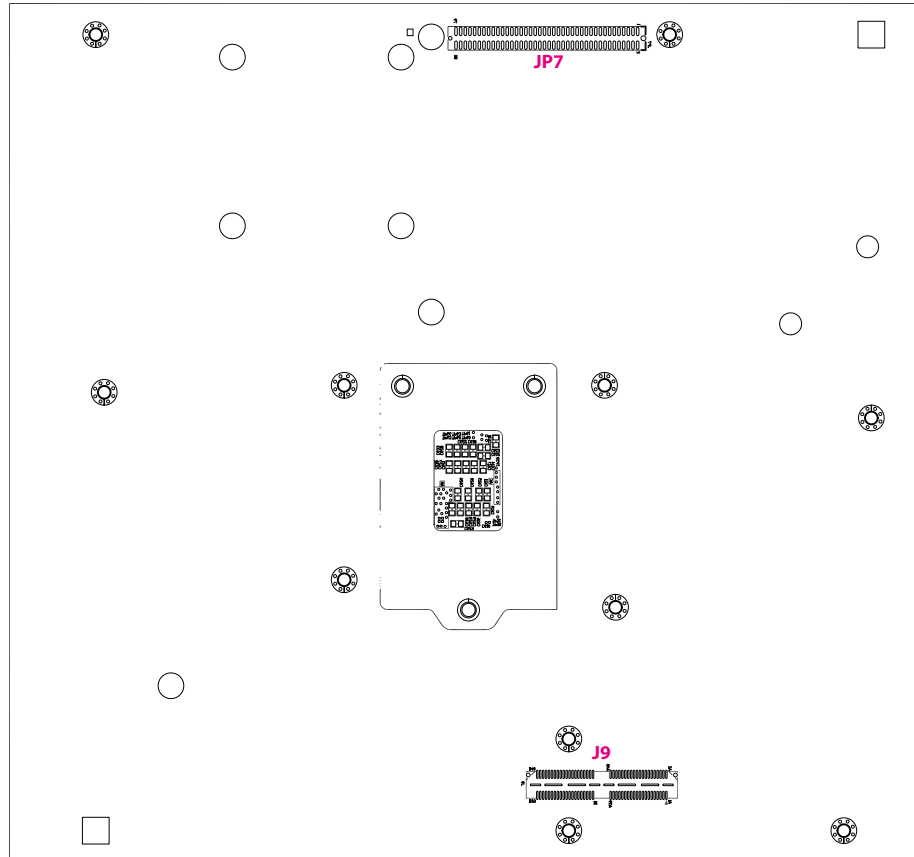
VTC 7250 System Components

The VTC 7250 consists of a motherboard and PoE board. This chapter describes the location and pinout assignment of the jumpers and connectors on each component.

Locations of the Jumpers and Connectors for the Motherboard



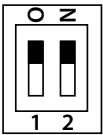
Bottom View



DIP Switch Settings

RTC Clear Selection

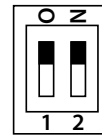
Connector location: SW5



SW	RTC (Pin1)	SRTC/ME (Pin2)
OFF	Normal	Normal
ON	Clear CMOS	Clear ME

CAN Bus Impedance Control

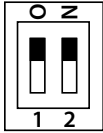
Connector location: SW1



SW	RTC (Pin1)	SRTC/ME (Pin2)
1~2 ON	120 OHM	1~2 ON
1~2 OFF	Non	1~2 OFF

Input Voltage Setup Selection

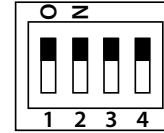
Connector location: SW4



POWERSW (Pin1)	12V24V (Pin2)	Result
OFF	OFF	12V
OFF	ON	24V
ON	ON	9~36V

LVDS Resolution Control

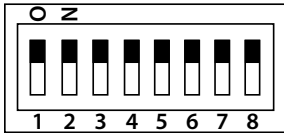
Connector location: SW6



SW [3:0]	Function
0000	800 x 600 18-bit Single Port
0001	1024 x 768 18-bit Single Port
0010	1024 x 768 24-bit Single Port
0011	1280 x 768 18-bit Single Port
0100	1280 x 800 18-bit Single Port
0101	1280 x 960 18-bit Single Port
0110	800 x 480 18-bit Single Port
0111	1366 x 768 18-bit Single Port
1000	1366 x 768 24-bit Single Port

GPIO Pull High Selection Switch

Connector location: SW2



Pin	ON	OFF
1	GPI1 Internal Pull High (Default)	External Pull High
2	GPI2 Internal Pull High (Default)	External Pull High
3	GPI3 Internal Pull High (Default)	External Pull High
4	GPI4 Internal Pull High (Default)	External Pull High
5	GPO1 Internal Pull High (Default)	External Pull High
6	GPO2 Internal Pull High (Default)	External Pull High
7	GPO3 Internal Pull High (Default)	External Pull High
8	GPO4 Internal Pull High (Default)	External Pull High

Internal Connectors

COM1 RS232 DB9 Connector

Connector size: 1 x 10 = 10-pin header (1.0mm)

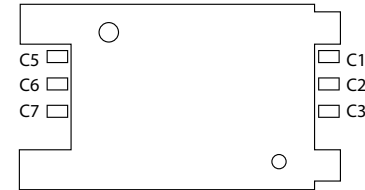
Connector location: J11



Pin	Definition	Pin	Definition
1	GND	2	GND
3	CTS1	4	DSR1
5	DTR1	6	RXD1
7	RI1	8	RTS1
9	TXD1	10	DCD1

SIM Card Slot

Connector location: IDE1

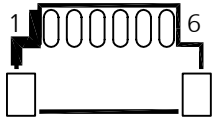


Pin	Definition	Pin	Definition
C1	UIM_PWR	C5	NC
C2	UIM_RST	C6	UIM_DAT
C3	UIM_CLK	C7	NC

GPS Wire to Board Connector

Connector size: 1 x 6 = 6-pin header

Connector location: J2

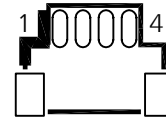


Pin	Definition	Pin	Definition
1	3.3V	2	GPS LED
3	TX	4	RX
5	GND	6	3.3V

GPS Wire to Board Connector

Connector size: 1 x 4 = 4-pin header

Connector location: J1

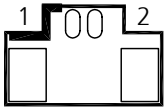


Pin	Definition	Pin	Definition
1	GND	2	NC
3	ODOMETER	4	DIRECTION

GPS Battery Connector

Connector size: 1 x 2 = 2-pin header

Connector location: J3

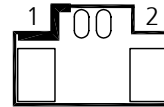


Pin	Definition
1	GND
2	VBAT

RTC Battery Connector

Connector size: 1 x 2 = 2-pin header

Connector location: J6

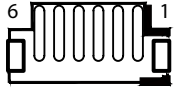


Pin	Definition
1	GND
2	VBAT

RTC Battery Connector

Connector size: 1 x 6 = 6-pin header

Connector location: CN13

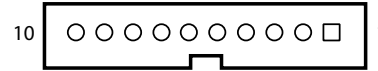


Pin	Definition	Pin	Definition
1	GND	2	FAN1 CONTROL
3	FAN1 SPEED	4	GND
5	FAN2 SPEED	6	FAN2 CONTROL

Debug 80 Port Connector

Connector size: 1 x 10 = 10-pin header (1.0mm)

Connector location: J4

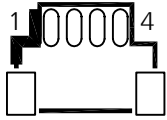


Pin	Definition	Pin	Definition
1	GND	2	PCIRST#
3	33M_CLK	4	LPC_FRAME#
5	LPC_AD3	6	LPC_AD2
7	LPC_AD1	8	LPC_AD0
9	VCC3	10	VCC3

USB Connectors (Reserved)

Connector size: 1 x 4 = 4-pin header (1.0mm)

Connector location: J8 and J10

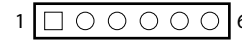


Pin	Definition	Pin	Definition
1	VCC	2	D-
3	D+	4	GND

CAN-MCU Update Port

Connector size: 1 x 6 = 6-pin header (2.54mm)

Connector location: JP6



Pin	Definition	Pin	Definition
1	3.3V	2	SWDIO
3	SWDCLK	4	SWO
5	RESET#	6	GND

CAN-MCU Debug Port

Connector size: 1 x 3 = 3-pin header (2.54mm)

Connector location: JP3



Pin	Definition
1	TX
2	RX
3	GND

MCU Debug Port

Connector size: 1 x 3 = 3-pin header (2.54mm)

Connector location: JP2

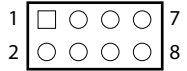


Pin	Definition
1	TX
2	RX
3	GND

MCU Download Port

Connector size: 2 x 4 = 8-pin header (1.27mm)

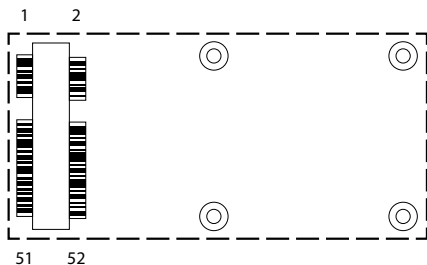
Connector location: JP5



Pin	Definition	Pin	Definition
1	3.3V	2	MCU_TRST
3	MCU_TCK	4	MCU_TDO
5	MCU_RST	6	MCU_TDI
7	MCU_TMS	8	GND

Mini-PCIe for USB/PCIe/mSATA

Connector location: CN8

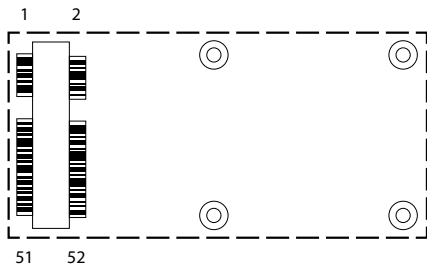


Pin	Definition	Pin	Definition
1	NC	2	+V3.3_MINI_2
3	NC	4	GND
5	NC	6	+V1.5S_MINI_2
7	CLKREQ#2	8	NC
9	GND	10	NC
11	MINICARD2_CN	12	NC
13	MINICARD2_CP	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	MINIPCI2_DIS#
21	GND	22	MINIPCI2_RST#
23	PCIE_RXP17_SATA_RXP4_R	24	+V3.3_MINI_2
25	PCIE_RXN17_SATA_RXN4_R	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+V1.5S_MINI_2
29	GND	30	W_SM2_C
31	PCIE_TXN17_SATA_TXN4_C	32	W_SM2_D
33	PCIE_TXP17_SATA_TXP4_C	34	GND
35	GND	36	USB_10N_T
37	GND	38	USB_10P_T
39	+V3.3_MINI_2	40	GND
41	+V3.3_MINI_2	42	NC
43	GND	44	MINIPCI2_WLAN_LED#_R
45	NC	46	NC
47	NC	48	+V1.5S_MINI_2
49	NC	50	GND
51	SSD4_DETECT	52	+V3.3_MINI_2

Mini-PCIe for USB/PCIe

Connector location: CN9



Pin	Definition	Pin	Definition
1	NC	2	+V3.3_MINI_3
3	NC	4	GND
5	NC	6	+V1.5S_MINI_3
7	CLKREQ#3	8	NC
9	GND	10	NC
11	PCIE_CN3	12	NC
13	PCIE_CP3	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	MINIPCI3_DIS#
21	GND	22	MINIPCI3_RST#
23	PE_RX18N_R	24	+V3.3_MINI_3
25	PE_RX18P_R	26	GND

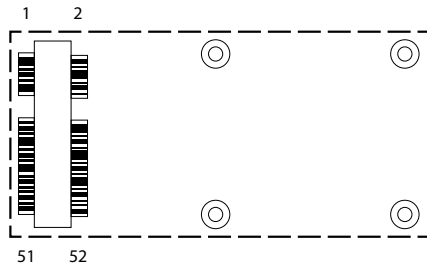
Pin	Definition	Pin	Definition
27	GND	28	+V1.5S_MINI_3
29	GND	30	W_SM3_C
31	PE_TX18N_C	32	W_SM3_D
33	PE_TX18P_C	34	GND
35	GND	36	USB_11N_T
37	GND	38	USB_11P_T
39	+V3.3_MINI_3	40	GND
41	+V3.3_MINI_3	42	NC
43	GND	44	MINIPCI3_WLAN_LED#_R
45	NC	46	NC
47	NC	48	+V1.5S_MINI_3
49	NC	50	GND
51	MBT_DIS#_R	52	+V3.3_MINI_3

Mini-PCIe for USB

Connector location: CN11

SIM socket: SIM 2 (default)

SIM socket: SIM 3



Pin	Definition	Pin	Definition
1	NC	2	+3.3V
3	NC	4	GND
5	NC	6	+1.5V
7	PCIE CLOCK REQUEST#	8	NC
9	GND	10	NC
11	PCIE_CLKN3	12	NC
13	PCIE_CLKP3	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	PCIE3 DISABLE#
21	GND	22	PCIE3 RESET#
23	PCIE_RXP3	24	+3.3V
25	PCIE_RXN3	26	GND

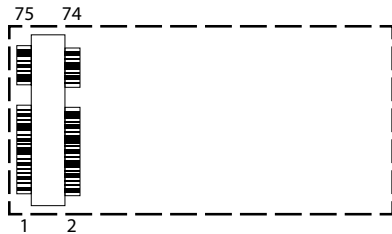
Pin	Definition	Pin	Definition
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PCIE_TXN3	32	SMB_DATA
33	PCIE_TXP3	34	GND
35	GND	36	USB_5N
37	GND	38	USB_5P
39	+3.3V	40	GND
41	+3.3V	42	NC
43	GND	44	PCIE3_WLAN_LED#
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	BT DISABLE#	52	+3.3V

M.2 B-Key for USB 3.0 + USB 2.0 (Reserved)

Connector location: CN10

SIM socket: SIM 2 (default)

SIM socket: SIM 3



Pin	Definition	Pin	Definition
1	CONFIG3	2	3.3V
3	GND	4	3.3V
5	GND	6	POWER_OFF#
7	USB_9P_T	8	W1_DIS#
9	USB_9N_T	10	MINICARD1_WWAN_LED#
11	NC	20	NC
21	CONFIG0	22	NC
23	SMS_RI_3.5G_R	24	NC
25	NC	26	W2_DIS#
27	GND	28	NC
29	USB3_RXN9_T	30	SW2_RST
31	USB3_RXP9_T	32	SW2_CLK
33	GND	34	SW2_DAT
35	USB3_TXN9_T	36	SW2_PWR
37	USB3_TXP9_T	38	NC
39	GND	40	NC
41	NC	42	NC

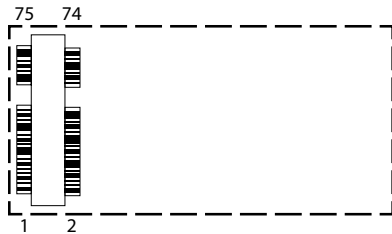
Pin	Definition	Pin	Definition
43	NC	44	NC
45	GND	46	NC
47	NC	48	NC
49	NC	50	NC
51	GND	52	NC
53	NC	54	NC
55	NC	56	SMB_DATA
57	GND	58	SMB_CLK
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	RESET#	68	NC
69	CONFIG1	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	CONFIG2		

M.2 B-Key for USB 3.0 + USB 2.0

Connector location: CN12

SIM socket: SIM 1 (default)

SIM socket: SIM 2

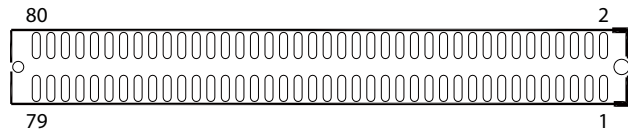


Pin	Definition	Pin	Definition
1	CONFIG3	2	3.3V
3	GND	4	3.3V
5	GND	6	POWER_OFF#
7	USB_7P_T	8	W1_DIS#
9	USB_7N_T	10	LTE_LED_PH
11	NA	20	NA
21	CONFIG0	22	NA
23	NA	24	NA
25	NA	26	W2_DIS#
27	GND	28	NA
29	USB3_PXN7_T	30	SW1_RST
31	USB3_PXP7_T	32	SW1_CLK
33	GND	34	SW1_DAT
35	USB3_TXN7_T	36	SW1_PWR
37	USB3_TXP7_T	38	NA
39	GND	40	NA
41	NA	42	NA

Pin	Definition	Pin	Definition
43	NA	44	NA
45	GND	46	NA
47	NA	48	NA
49	NA	50	NA
51	GND	52	NA
53	NA	54	PEWAKE#
55	NA	56	SM1_D
57	GND	58	SM1_C
59	NA	60	NA
61	NA	62	NA
63	NA	64	NA
65	NA	66	NA
67	RST#	68	SUSCLK_R
69	CONFIG1	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	CONFIG2		

PoE Power & Low Speed Signal Connector

Connector location: JP7

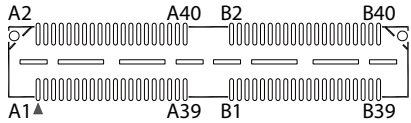


Pin	Definition	Pin	Definition
1	GND	2	VIN_M
3	GND	4	VIN_M
5	GND	6	VIN_M
7	GND	8	VIN_M
9	GND	10	VIN_M
11	GND	12	VIN_M
13	GND	14	VIN_M
15	GND	16	VIN_M
17	NC	18	NC
19	NC	20	NC
21	GND	22	V3.3ALW
23	MCU_I2C1_SCL	24	V3.3ALW
25	MCU_I2C1_SDA	26	EXP_ID_1
27	GND	28	EXP_ID_2
29	PCH_SMB_CLK	30	EXP_ID_3
31	PCH_SMB_DATA	32	EXP_ID_4
33	GND	34	SLP_S3#
35	VCC3_POK	36	SLP_S5#
37	VCC_EN	38	EXP_POE_POK
39	MB_MCU_PSE_PWREN	40	WAKE_ON_LAN_EN

Pin	Definition	Pin	Definition
41	MB_MCU_PSEA_RST	42	LAN_WAEK_N
43	MB_MCU_PSEB_RST	44	PLTRST#_POE
45	IO_USB_PWR_EN	46	GND
47	LAN_POE_LED0	48	LAN10G_ACTIVE_LED0
49	LAN_POE_LED1	50	LAN_ACTIVE_LED1
51	LAN_POE_LED2	52	LAN_ACTIVE_LED2
53	LAN_POE_LED3	54	LAN_ACTIVE_LED3
55	LAN_POE_LED4	56	LAN_ACTIVE_LED4
57	LAN_POE_LED5	58	LAN_ACTIVE_LED5
59	LAN_POE_LED6	60	LAN_ACTIVE_LED6
61	LAN_POE_LED7	62	LAN_ACTIVE_LED7
63	POE_PW_ERR#	64	V3P3_LAN1
65	NC	66	LAN_ACTIVE_LED8
67	POE_INSERT#	68	GND
69	SIO_AGND	70	USB_13N
71	POE_THER	72	USB_13P
73	GND	74	GND
75	USB_12N	76	USB_14N
77	USB_12P	78	USB_14P
79	GND	80	GND

PoE High Speed Signal Connector

Connector location: J9

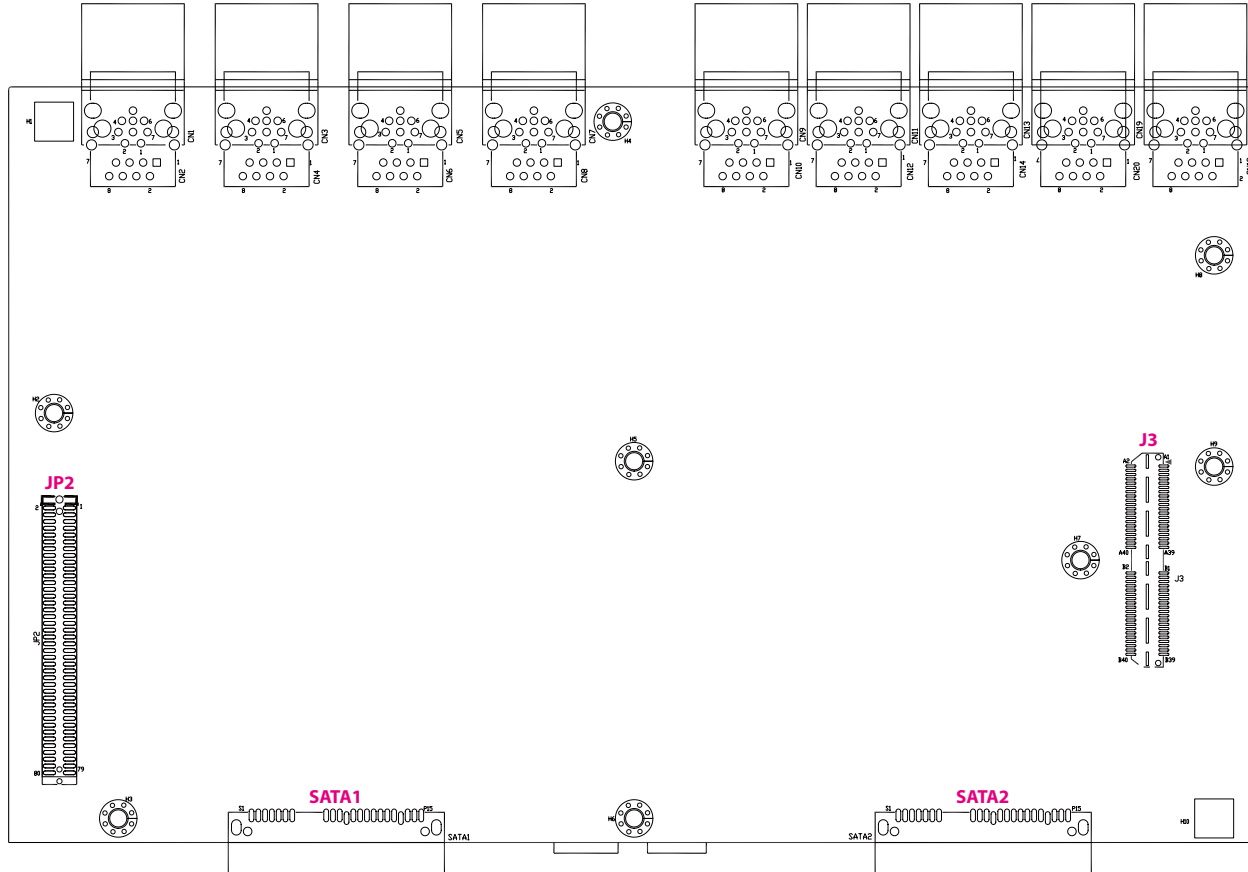


Pin	Definition	Pin	Definition
A1	PCIE_RXP5	A2	PCIE_TXP5
A3	PCIE_RXN5	A4	PCIE_TXN5
A5	GND	A6	GND
A7	PCIE_RXP6	A8	PCIE_TXP6
A9	PCIE_RXN6	A10	PCIE_TXN6
A11	GND	A12	GND
A13	PCIE_RXP7	A14	PCIE_TXP7
A15	PCIE_RXN7	A16	PCIE_TXN7
A17	GND	A18	GND
A19	PCIE_RXP8	A20	PCIE_TXP8
A21	PCIE_RXN8	A22	PCIE_TXN8
A23	GND	A24	GND
A25	PCIE_RXP14	A26	PCIE_TXP14
A27	PCIE_RXN14	A28	PCIE_TXN14
A29	GND	A30	GND
A31	PCIE_RXP15	A32	PCIE_TXP15
A33	PCIE_RXN15	A34	PCIE_TXN15
A35	GND	A36	GND
A37	PCIE_RXP16	A38	PCIE_TXP16
A39	PCIE_RXN16	A40	PCIE_TXN16

Pin	Definition	Pin	Definition
B1	PCIE_RXP21	B2	PCIE_TXP21
B3	PCIE_RXN21	B4	PCIE_TXN21
B5	GND	B6	GND
B7	PCIE_RXP22	B8	PCIE_TXP22
B9	PCIE_RXN22	B10	PCIE_TXN22
B11	GND	B12	GND
B13	PCIE_RXP23	B14	PCIE_TXP23
B15	PCIE_RXN23	B16	PCIE_TXN23
B17	GND	B18	GND
B19	PCIE_RXP24	B20	PCIE_TXP24
B21	PCIE_RXN24	B22	PCIE_TXN24
B23	GND	B24	GND
B25	PCIE_CLKP5	B26	PCIE_CLKP14
B27	PCIE_CLKN5	B28	PCIE_CLKN14
B29	GND	B30	GND
B31	SATA_TXP0B	B32	SATA_TXP0A
B33	SATA_TXN0B	B34	SATA_TXN0A
B35	GND	B36	GND
B37	SATA_RXN0B	B38	SATA_RXN0A
B39	SATA_RXP0B	B40	SATA_RXP0A

Locations of the Jumpers and Connectors for the PoE Expansion Module (VIOB-POE8-03)

Top View

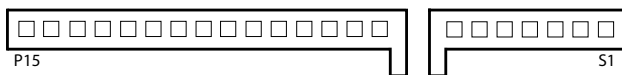


Internal Connectors

SATA Connectors (7-pin and 15-pin)

Connector type: Standard Serial ATA 7P and 15P

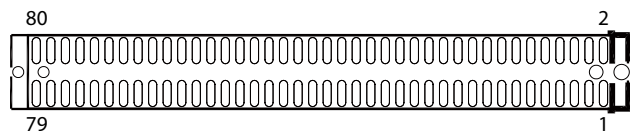
Connector location: SATA1 & SATA2



Pin	Definition	Pin	Definition
S1	GND	S2	SATA_TXP
S3	SATA_TXN	S4	GND
S5	SATA_RXN	S6	SATA_RXP
S7	GND	P1	NC
P2	NC	P3	NC
P4	GND	P5	GND
P6	GND	P7	VCC5
P8	VCC5	P9	VCC5
P10	GND	P11	NC
P12	GND	P13	NC
P14	NC	P15	NC

Low Speed Board to Board Connector

Connector location: JP2

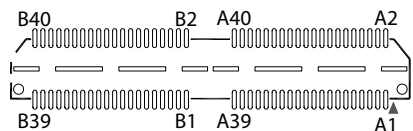


Pin	Definition	Pin	Definition
1	VIN_M(9-36V)	2	GND
3	VIN_M(9-36V)	4	GND
5	VIN_M(9-36V)	6	GND
7	VIN_M(9-36V)	8	GND
9	VIN_M(9-36V)	10	GND
11	VIN_M(9-36V)	12	GND
13	VIN_M(9-36V)	14	GND
15	VIN_M(9-36V)	16	GND
17	NC	18	NC
19	NC	20	NC
21	+V3.3ALW	22	GND
23	+V3.3ALW	24	MCU_I2C3_SCL_M
25	EXP_ID_1	26	MCU_I2C3_SDA_M
27	EXP_ID_2	28	GND
29	EXP_ID_3	30	SMB_CLK
31	EXP_ID_4	32	SMB_DATA
33	PM_SLP_S3#	34	GND
35	PM_SLP_S5#	36	VCC3_POK
37	EXP_POE_ALLPOK	38	VCC_EN
39	WAKE_ON_LAN_EN	40	MB_MCU_PSE_PWREN

Pin	Definition	Pin	Definition
41	LAN_WAEK_N	42	MB_MCU_PSEA_RST
43	PMU_PLTRST#	44	MB_MCU_PSEB_RST
45	GND	46	IO_USB_PWR_EN
47	LAN_10G_ACT#	48	POE1_LED#
49	LAN1_1G_ACT#	50	POE2_LED#
51	LAN2_1G_ACT#	52	POE3_LED#
53	LAN3_1G_ACT#	54	POE4_LED#
55	LAN4_1G_ACT#	56	POE5_LED#
57	LAN5_1G_ACT#	58	POE6_LED#
59	LAN6_1G_ACT#	60	POE7_LED#
61	LAN7_1G_ACT#	62	POE8_LED#
63	V3P3_LAN1	64	POE_ERRLED#
65	NC	66	NC
67	GND	68	GND
69	USB_13N	70	X550_THERM-DN
71	USB_13P	72	X550_THERM-DP
73	GND	74	GND
75	USB_14N	76	USB_15N
77	USB_14P	78	USB_15P
79	GND	80	GND

High Speed Board to Board Connector

Connector location: J3



Pin	Definition	Pin	Definition
A1	PCIE_RXP5	A2	PCIE_TXP5
A3	PCIE_RXN5	A4	PCIE_TXN5
A5	GND	A6	GND
A7	PCIE_RXP6	A8	PCIE_TXP6
A9	PCIE_RXN6	A10	PCIE_TXN6
A11	GND	A12	GND
A13	PCIE_RXP7	A14	PCIE_TXP7
A15	PCIE_RXN7	A16	PCIE_TXN7
A17	GND	A18	GND
A19	PCIE_RXP8	A20	PCIE_TXP8
A21	PCIE_RXN8	A22	PCIE_TXN8
A23	GND	A24	GND
A25	PCIE_RXP14	A26	PCIE_TXP14
A27	PCIE_RXN14	A28	PCIE_TXN14
A29	GND	A30	GND
A31	PCIE_RXP15	A32	PCIE_TXP15
A33	PCIE_RXN15	A34	PCIE_TXN15
A35	GND	A36	GND
A37	PCIE_RXP16	A38	PCIE_TXP16
A39	PCIE_RXN16	A40	PCIE_TXN16

Pin	Definition	Pin	Definition
B1	PCIE_RXP21	B2	PCIE_TXP21
B3	PCIE_RXN21	B4	PCIE_TXN21
B5	GND	B6	GND
B7	PCIE_RXP22	B8	PCIE_TXP22
B9	PCIE_RXN22	B10	PCIE_TXN22
B11	GND	B12	GND
B13	PCIE_RXP23	B14	PCIE_TXP23
B15	PCIE_RXN23	B16	PCIE_TXN23
B17	GND	B18	GND
B19	PCIE_RXP24	B20	PCIE_TXP24
B21	PCIE_RXN24	B22	PCIE_TXN24
B23	GND	B24	GND
B25	PCIE_CLKP5	B26	PCIE_CLKP14
B27	PCIE_CLKN5	B28	PCIE_CLKN14
B29	GND	B30	GND
B31	SATA_TXP1	B32	SATA_TXP0
B33	SATA_TXN1	B34	SATA_TXN0
B35	GND	B36	GND
B37	SATA_RXP1	B38	SATA_RXP0
B39	SATA_RXN1	B40	SATA_RXN0

CHAPTER 4: SYSTEM SETUP

Removing the Chassis Cover



Prior to removing the chassis cover, make sure the unit's power is off and disconnected from the power sources to prevent electric shock or system damage.

1. Remove the screws on the front panel.



2. Remove the screws on the rear panel.



3. Remove the mounting bracket screws on the bottom of the enclosure.



4. After removing the brackets, loosen the screws on the bottom then remove the chassis top cover.



Removing the CPU

1. Locate the CPU socket and unlock the socket by pushing the load lever down, moving it sideways until it is released from the retention tab; then lift the load lever up.



Load Lever

Retention Tab

2. Lift the load plate up and remove the CPU from the socket.



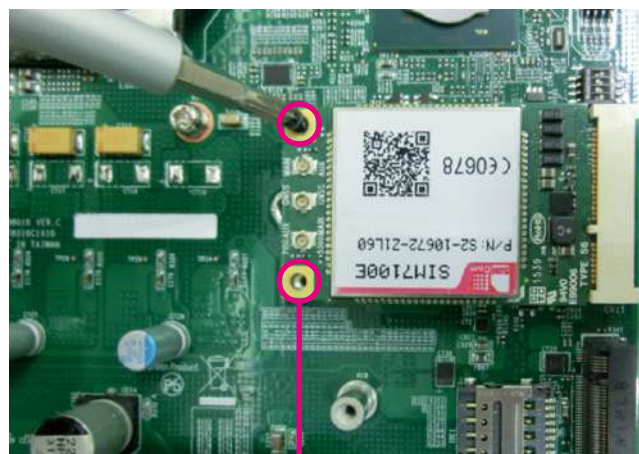
Removing the Memory Module

1. Push the ejector tabs which are at the ends of the socket outward. Then lift up the module and remove it from the socket.



Installing a WWAN Module (Mini-PCle)

1. Locate the WWAN Mini PCI Express slot (CN11). Insert the module into the Mini PCI Express slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot. Then fasten screws into the mounting holes to secure the module.



**Mounting
Screws**

Installing a WWAN Module (M.2)

1. Locate the M.2 slot (CN10). Insert the module into the M.2 slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot. Then fasten a screw into the mounting hole to secure the module.



**Mounting
Screw**

Installing a WLAN Module (Half Mini-PCIe)

1. Locate the WLAN Mini PCI Express slot (CN9). Insert the module into the Mini PCI Express slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot. Then fasten a screw into the mounting hole to secure the module.



**Mounting
Screw**

Installing a SIM Card

1. Remove the SIM card cover.



2. Insert the SIM card into the SIM card slot.



3. Close the cover and secure it to the original position.

Installing a SSD/HDD Drive

1. The SSD/HDD bays on the front are used to install 2.5" hard drives. Loosen the thumb screws and remove the cover.



**Thumb
Screws**

2. Place the storage drive into the drive bay with the SATA data and power connector facing towards the end. Align the storage drive's mounting holes with the mounting holes on the drive bay, and use the provided screws to secure the storage drive in place.



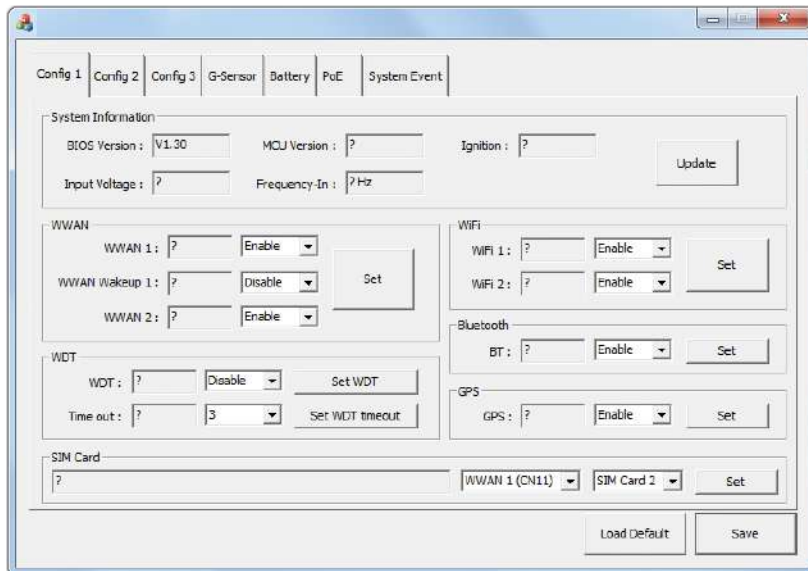
3. Insert the drive bay back to its original position and secure the thumb screws.



APPENDIX A: SOFTWARE DEMO UTILITY FOR I/O PORTS OF FUNCTION CONTROL

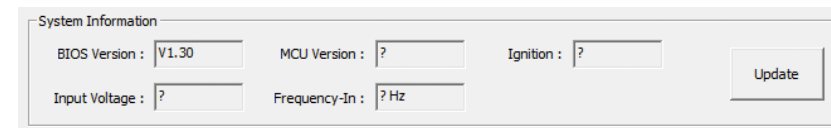
Menu Screen

1. Config1



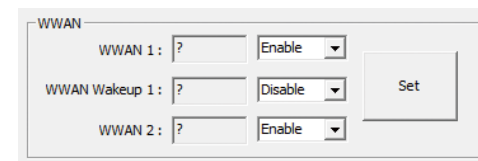
1.1 System Information

Displays basic information of the system.



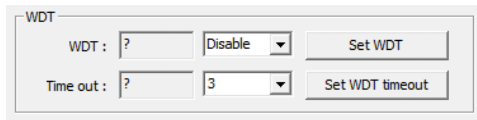
1.2 WWAN

Enables or disables the WWAN function and the wake-up function.



1.3 WDT

Enables or disables the watchdog function. WDT timeout timer can be configured.



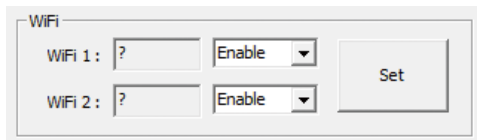
WDT

WDT : ? [Disable] [Set WDT]

Time out : ? 3 [Set WDT timeout]

1.4 WiFi

Enables or disables the WiFi function.



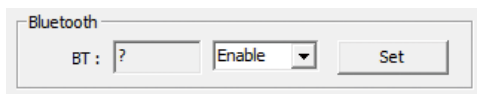
WiFi

WiFi 1 : ? [Enable] [Set]

WiFi 2 : ? [Enable]

1.5 Bluetooth

Enables or disables the Bluetooth function.

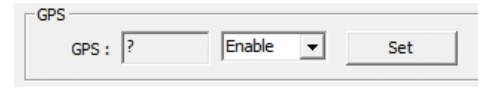


Bluetooth

BT : ? [Enable] [Set]

1.6 GPS

Enables or disables the GPS function.

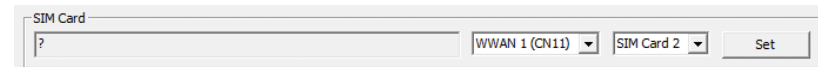


GPS

GPS : ? [Enable] [Set]

1.7 SIM Card

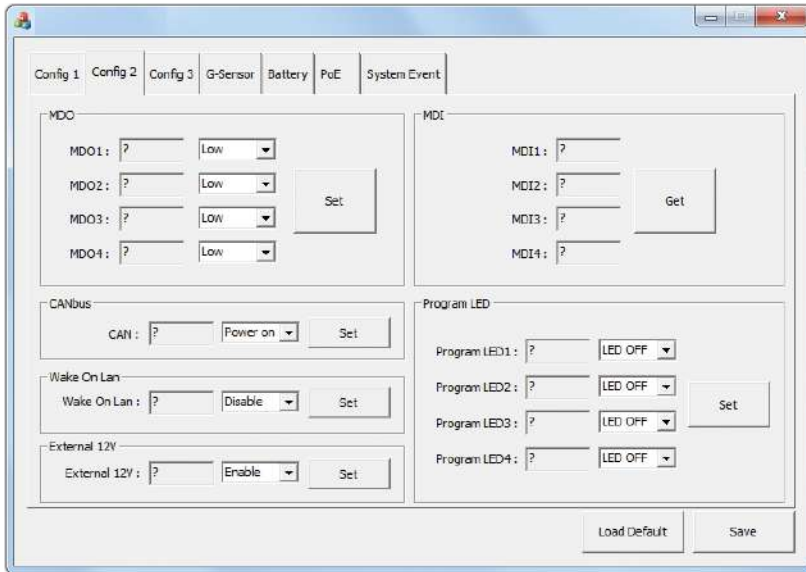
Selects the SIM Card for WWAN.



SIM Card

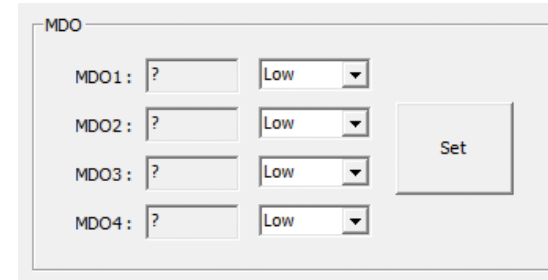
[?] [WWAN 1 (CN11)] [SIM Card 2] [Set]

2. Config2



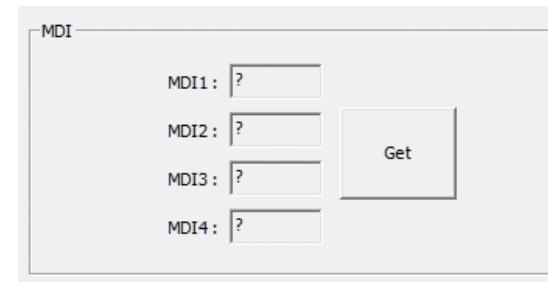
2.1 GPO

Configures GPO as high voltage level or low voltage level.



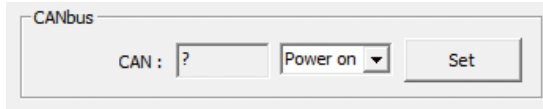
2.2 GPI

Reads the status (voltage level) of GPI.



2.3 CAN Bus

Enables or disables the CAN Bus function.



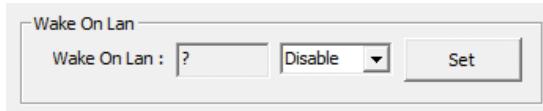
CANbus

CAN : ? Power on Set

The CANbus configuration panel features a title bar 'CANbus'. Below it, the text 'CAN : ?' is followed by a dropdown menu currently set to 'Power on' and a 'Set' button.

2.4 Wake On LAN

Enables or disables the Wake On LAN function on LAN.



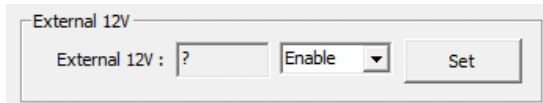
Wake On Lan

Wake On Lan : ? Disable Set

The Wake On Lan configuration panel has a title bar 'Wake On Lan'. It contains the text 'Wake On Lan : ?' followed by a dropdown menu set to 'Disable' and a 'Set' button.

2.5 External 12V

Enables or disables the 12VDC power output.



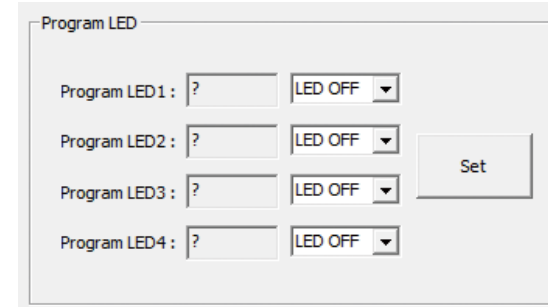
External 12V

External 12V : ? Enable Set

The External 12V configuration panel has a title bar 'External 12V'. It shows 'External 12V : ?' with a dropdown menu set to 'Enable' and a 'Set' button.

2.6 Programmable LED

Turns On/Off LED light.



Program LED

Program LED1 : ? LED OFF Set

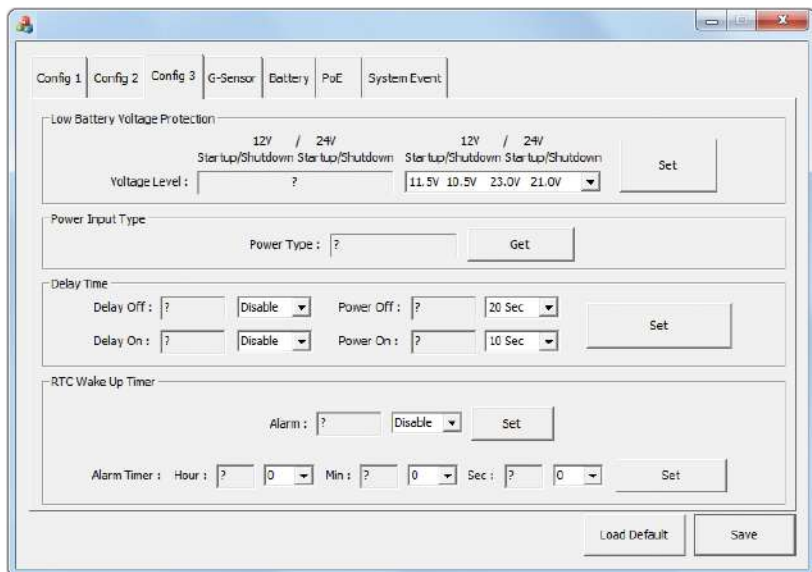
Program LED2 : ? LED OFF

Program LED3 : ? LED OFF

Program LED4 : ? LED OFF

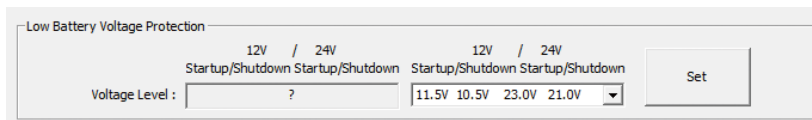
The Program LED configuration panel has a title bar 'Program LED'. It contains four rows, each with a label 'Program LED1' through 'LED4', a text input field containing '?', and a dropdown menu set to 'LED OFF'. A 'Set' button is positioned to the right of the LED3 row.

3. Config3



3.1 Low Battery Voltage Protection

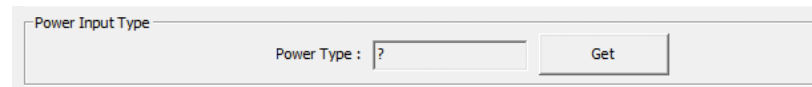
Enables or disables low battery voltage protection function. Once it is enabled, one of 4 types of voltage levels can be selected.



3.2 Power Type

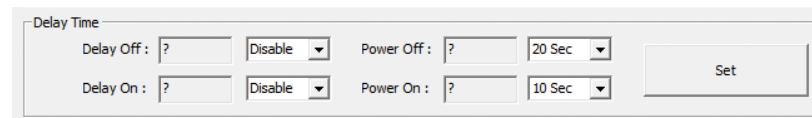
Shows one of the following power types for input voltage:

- 12VDC
- 24VDC
- 9~36VDC



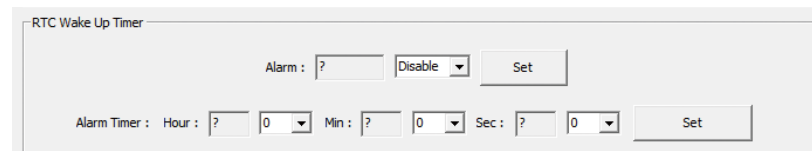
3.3 Delay On/Off Timer

Enables or disables the Delay On/Off function. Once this function is enabled, the delay timer can be configured.

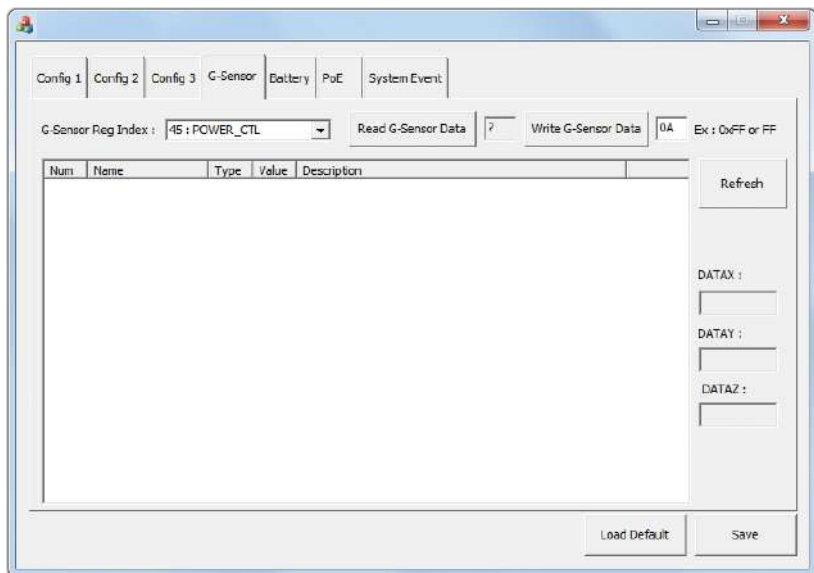


3.4 RTC Wake Up Timer

Enables or disables the RTC Wake Up function. Once this function is enabled, the timer can be configured.

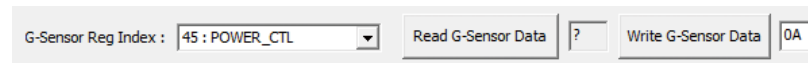


4. G-Sensor



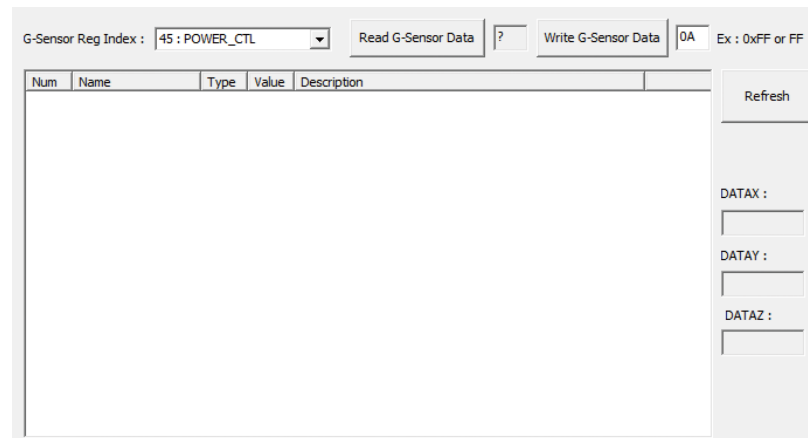
4.1 G-Sensor Registers

Selects the registers inside G-Sensor to read or write the data.

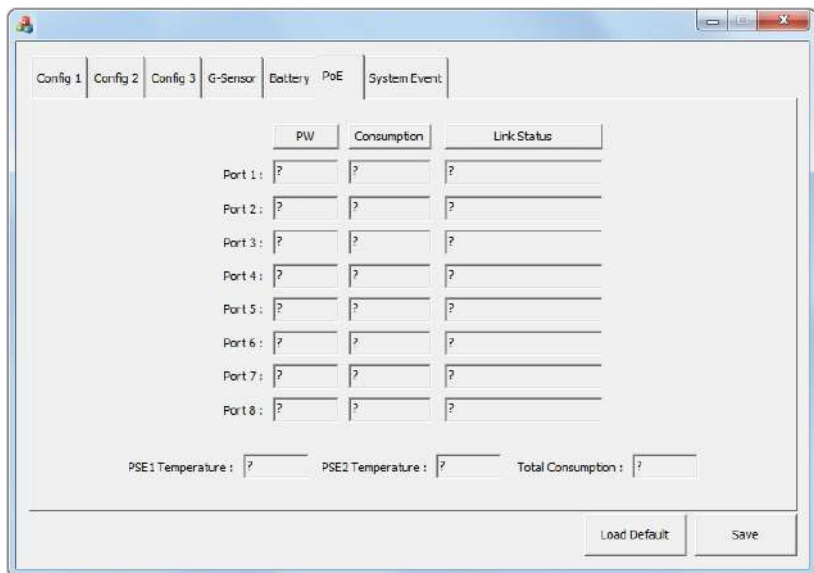


4.2 Register Table

Shows the value of all registers in G-Sensor, once the Refresh button is pressed.



5. PoE



5.1 PoE

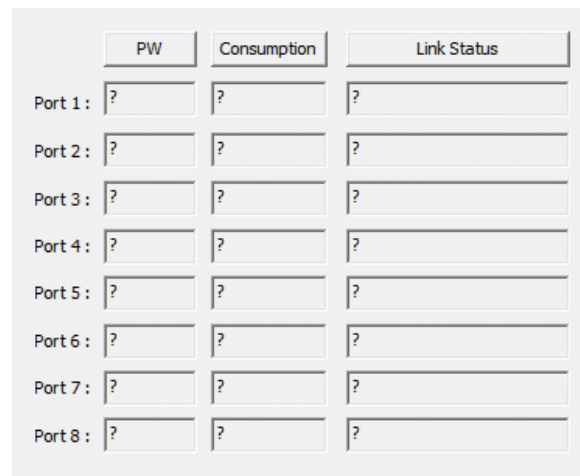
Shows the status of PoE power output.

5.2 Output (W)

Shows the power output of each PoE port.

5.3 Link Status

Shows the status of PoE link.

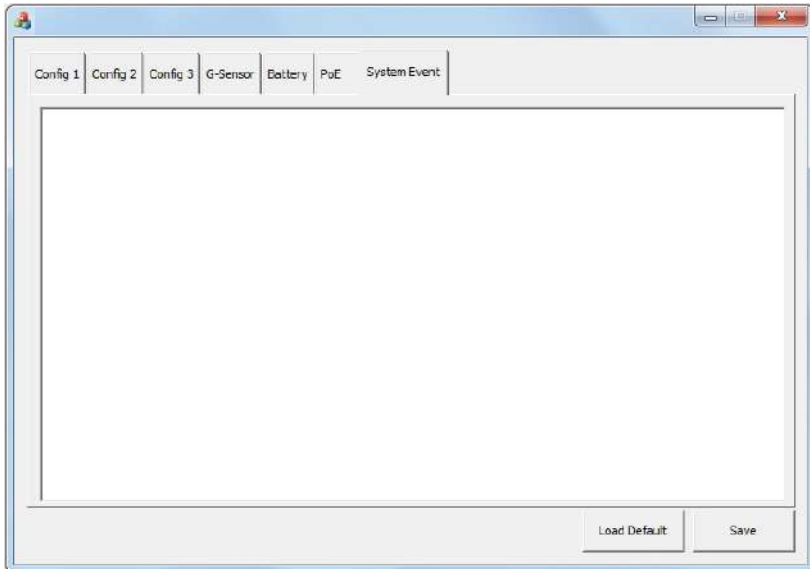


5.4 Total Output (W)

Shows the total power output of all PoE ports.



6. System Event



The System Event tab shows the following alarm messages:

1. Over voltage alarm
2. Lower voltage alarm
3. Over temperature alarm
4. Lower temperature alarm
5. Fan error alarm

APPENDIX B: GPS FEATURE

uBlox-NEO M8 Overview

The NEO-M8 series of standalone concurrent GNSS modules is built on the exceptional performance of the u-blox M8 GNSS (GPS, GLONASS, Galileo, BeiDou, QZSS and SBAS) engine in the industry proven NEO form factor.

The NEO-M8 series provides high sensitivity and minimal acquisition times while maintaining low system power. The NEO-M8M is optimized for cost sensitive applications, while NEO-M8N and NEO-M8Q provide best performance and easier RF integration. The NEO form factor allows easy migration from previous NEO generations. Sophisticated RF-architecture and interference suppression ensure maximum performance even in GNSS-hostile environments.

The NEO-M8 combines a high level of robustness and integration capability with flexible connectivity options. The future-proof NEO-M8N includes an internal Flash that allows simple firmware upgrades for supporting additional GNSS systems. This makes NEO-M8 perfectly suited to industrial and automotive applications.

The DDC (I²C compliant) interface provides connectivity and enables synergies with most u-blox cellular modules. For RF optimization the NEO-M8N/Q features an additional front-end LNA for easier antenna integration and a front-end SAW filter for increased jamming immunity.

u-blox M8 modules use GNSS chips qualified according to AEC-Q100, are manufactured in ISO/TS 16949 certified sites, and fully tested on a system level. Qualification tests are performed as stipulated in the ISO16750 standard: “Road vehicles – Environmental conditions and testing for electrical and electronic equipment”.

Technical Specifications

Features

Receiver type	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1 SBAS L1 C/A: WAAS, EGNOS, MSAS Galileo-ready E1B/C (NEO-M8N)		
Nav. update rate¹	Single GNSS: up to 18 Hz Concurrent GNSS: up to 10 Hz		
Position accuracy	2.0 m CEP		
		NEO-M8N/Q	NEO-M8M
Acquisition	Cold starts:	26 s	27 s
	Aided starts:	2 s	4 s
	Reacquisition:	1 s	1 s
Sensitivity	Tracking & Nav:	-167 dBm	-164 dBm
	Cold starts:	-148 dBm	-147 dBm
	Hot starts:	-156 dBm	-156 dBm
Assistance	AssistNow GNSS Online AssistNow GNSS Offline (up to 35 days) AssistNow Autonomous (up to 6 days) OMA SUPL & 3GPP compliant		
Oscillator	TCXO (NEO-M8N/Q), Crystal (NEO-M8M)		
RTC crystal	Built-in		
Noise figure	On-chip LNA (NEO-M8M). Extra LNA for lowest noise figure (NEO-M8N/Q)		

Features cont.

Anti jamming	Active CW detection and removal. Extra onboard SAW band pass filter (NEO-M8N/Q)
Memory	ROM (NEO-M8M/Q) or Flash (NEO-M8N)
Supported antennas	Active and passive
Odometer	Travelled distance
Data-logger	For position, velocity, and time (NEO-M8N)

¹ For NEO-M8M/Q

Electrical data

Supply voltage	1.65 V to 3.6 V (NEO-M8M) 2.7 V to 3.6 V (NEO-M8N/Q)
Power consumption²	23 mA @ 3.0 V (continuous) 5 mA @ 3.0 V Power Save Mode (1 Hz, GPS only)
Backup Supply	1.4 to 3.6 V

² NEO-M8M

Interfaces

Serial interfaces	1 UART 1 USBV2.0 full speed 12 Mbit/s 1 SPI (optional) 1 DDC (I ² C compliant)
Digital I/O	Configurable timepulse 1 EXTINT input for Wakeup
Timepulse	Configurable 0.25 Hz to 10 MHz
Protocols	NMEA, UBX binary, RTCM

VIOB-GPS-02 Module Connector Pin Definitions



J2 (GPS Side)



J9 (PC Side)

J2 Pin Definition

Pin	Definition	Pin	Definition
1	GPS_3V3	2	GND
3	GPS_TXD_M	4	GPS_RXD_M
5	NC	6	+V3.3ALW

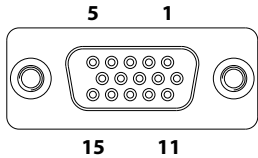
J9 Pin Definition

Pin	Definition	Pin	Definition
1	GPS_BAT	2	GPS_LED#
3	GPS_TX	4	GPS_RX
5	GND	6	VCC3_GPS

COM Port for GPS: COM 4
Baud Rate: 9600

APPENDIX C: SIGNAL CONNECTION OF MCU DI/DO

GPIO Pinout Description



Pin	Definition	Pin	Definition
1		2	
3	GPO3	4	GPI1
5	GPO0	6	
7		8	
9	GPI2	10	GPO1
11		12	
13	GPI3	14	GPO2
15	GPI0		

Digital Input

CN12 connector for GPI signal (digital signal input). The CN12 connector has 4 digital input channels by default.

Wet Contact (default)

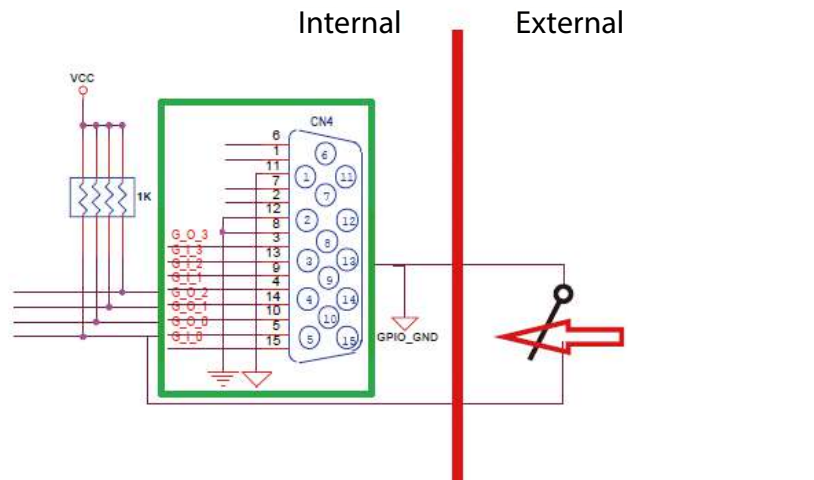
The SW2 switch needs to switch to "ON" state. The GPI signals have a pull up resistor to Vin Voltage internally.

The figure below shows how to connect an external source to one of the input channels.

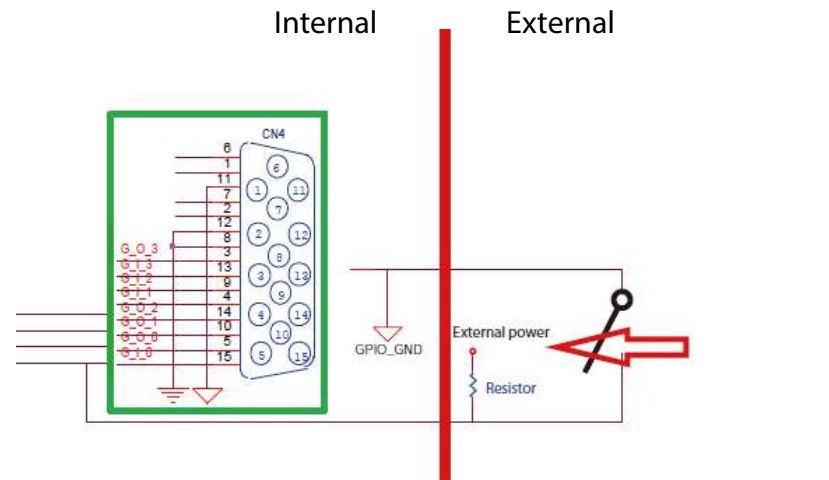
Dry Contact:

The SW2 switch needs to switch to "Low" state. The GPI signal will not have a pull up resistor internally.

The figure below shows how to connect an external source to one of the input channels.



External Switch	Port	GPI Register
ON (Short)	GND	0
OFF (Open)	OPEN	1



External Switch	Port	GPI Register
ON (Short)	GND	0
OFF (Open)	HIGH	1

Digital Output

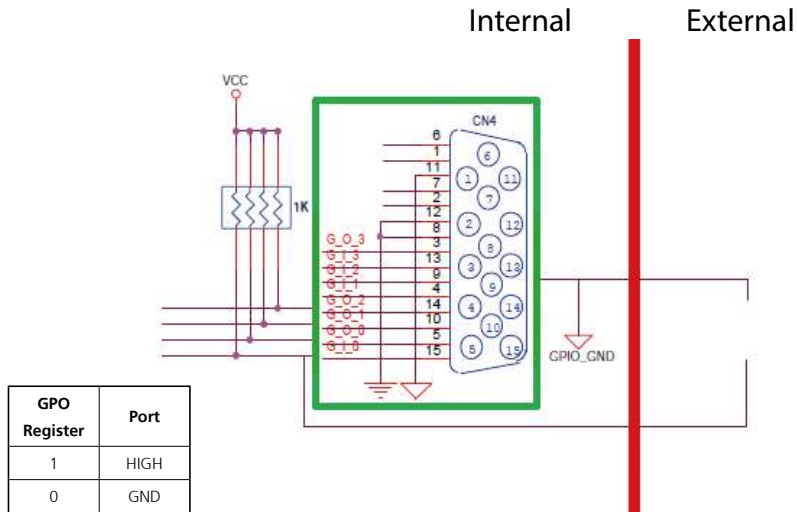
CN12 connector for GPO signal (digital signal output). The CN12 connector has 4 digital output channels by default.

The signal connection of CN12 supports two connected methods for output signal type. One is Low level (driven to 0V from GPO signal) other is High level (high voltage is provided from external device).

Wet Contact (default)

The SW2 switch needs to switch to “ON” state. The GPO signal will have a pull up resistor to Vin Voltage internally.

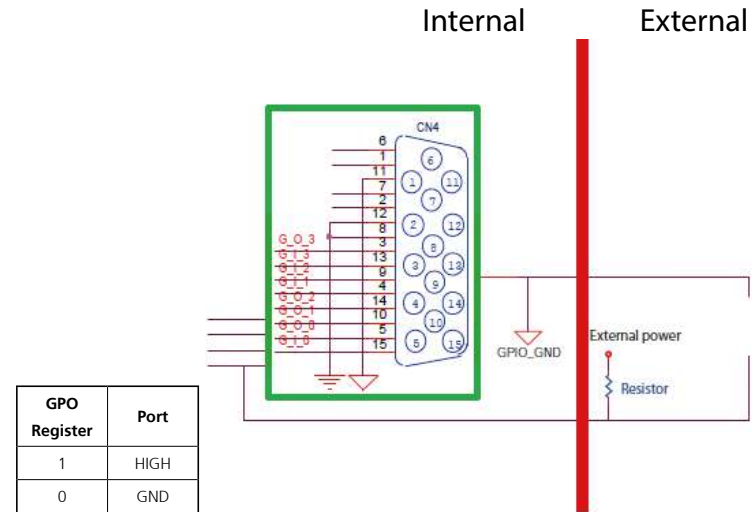
The figure below shows how to connect an external source to one of the output channels.



Dry Contact

The SW2 switch needs to switch to “Low” state. The GPO signal will not have a pull up resistor internally.

The figure below shows how to connect an external source to one of the output channels.



APPENDIX D: VEHICLE POWER MANAGEMENT SETUP

Startup and Shutdown Voltage Setting

Set the startup voltage to 11.5V or 23V and the shutdown voltage to 10.5V or 21V

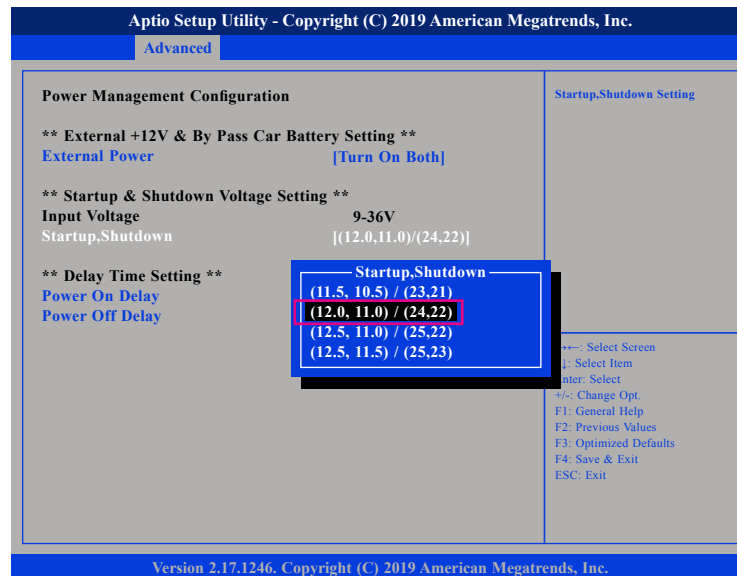
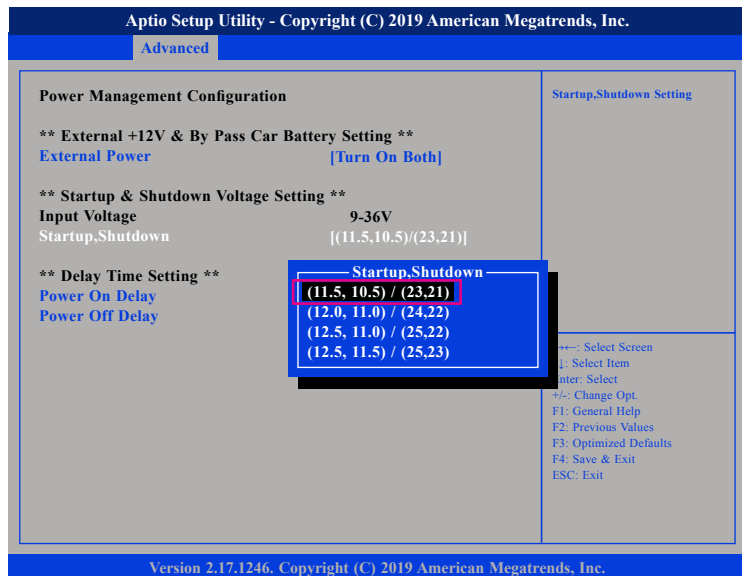
If the input voltage is 12V: the startup voltage to 11.5V and the shutdown voltage to 10.5V.

If the input voltage is 24V: the startup voltage to 23V and the shutdown voltage to 21V.

Set the startup voltage to 12.0V or 24V and the shutdown voltage to 11.0V or 22V

If the input voltage is 12V: the startup voltage to 12V and the shutdown voltage to 11V.

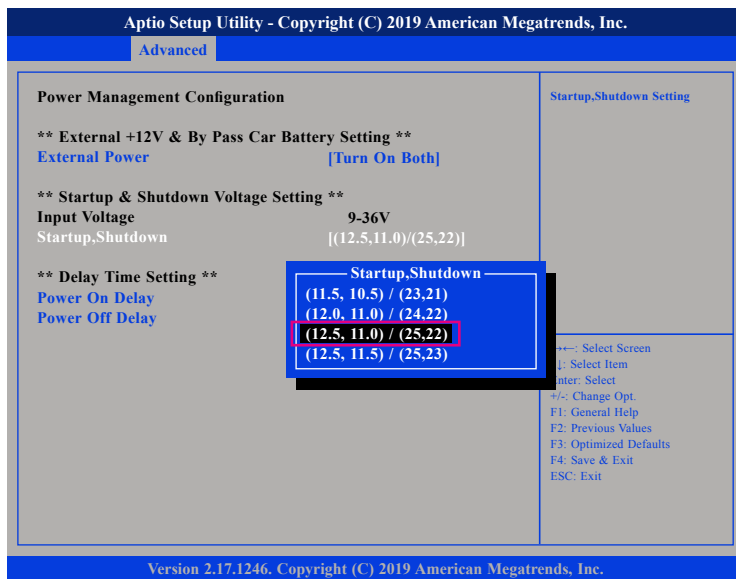
If the input voltage is 24V: the startup voltage to 24V and the shutdown voltage to 22V.



Set the startup voltage to 12.5V or 25V and the shutdown voltage to 11.0V or 22V

If the input voltage is 12V: the startup voltage to 12.5V and the shutdown voltage to 11V.

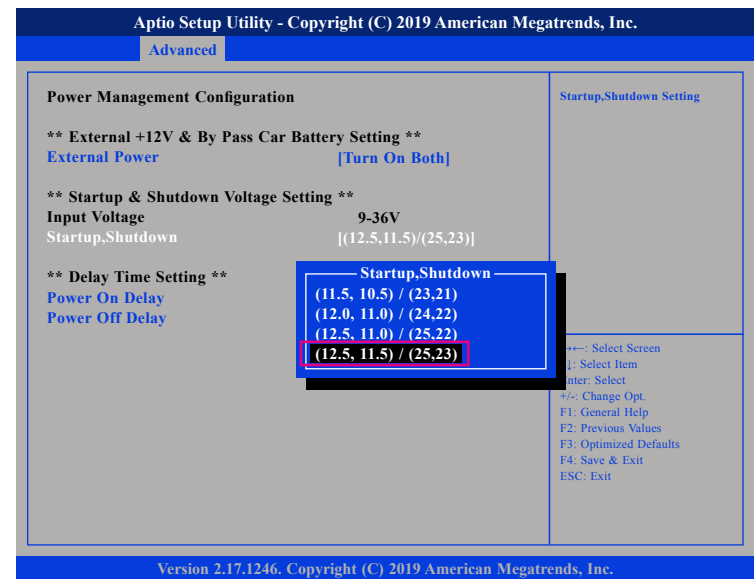
If the input voltage is 24V: the startup voltage to 25V and the shutdown voltage to 22V.



Set the startup voltage to 12.5V or 25V and the shutdown voltage to 11.0V or 22V

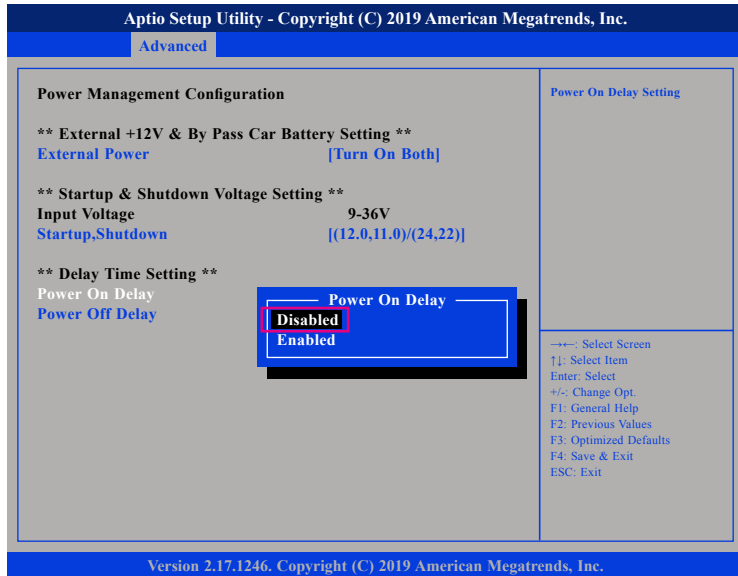
If the input voltage is 12V: the startup voltage to 12.5V and the shutdown voltage to 11.5V.

If the input voltage is 24V: the startup voltage to 25V and the shutdown voltage to 23V.



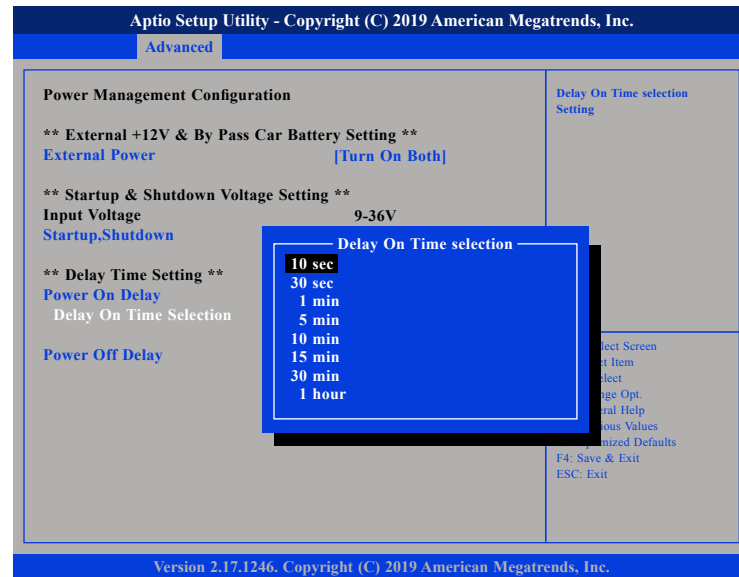
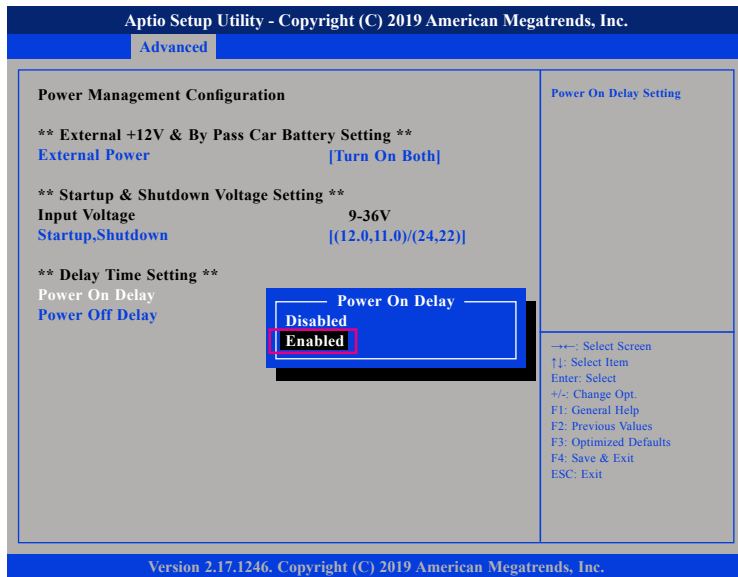
Power-on Delay Setting

Disable Power-on Delay



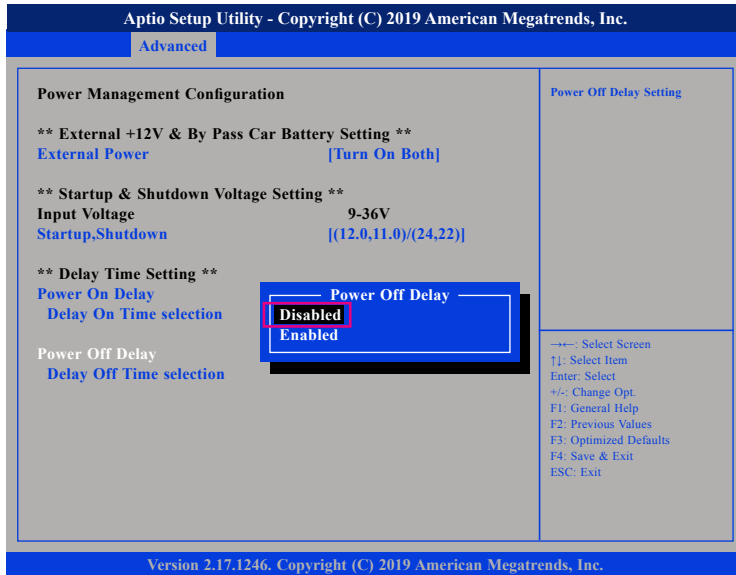
Enable Power-on Delay

Delay time can be set at 10sec/30sec/1min./5min./10min./15min./30min./1hour.



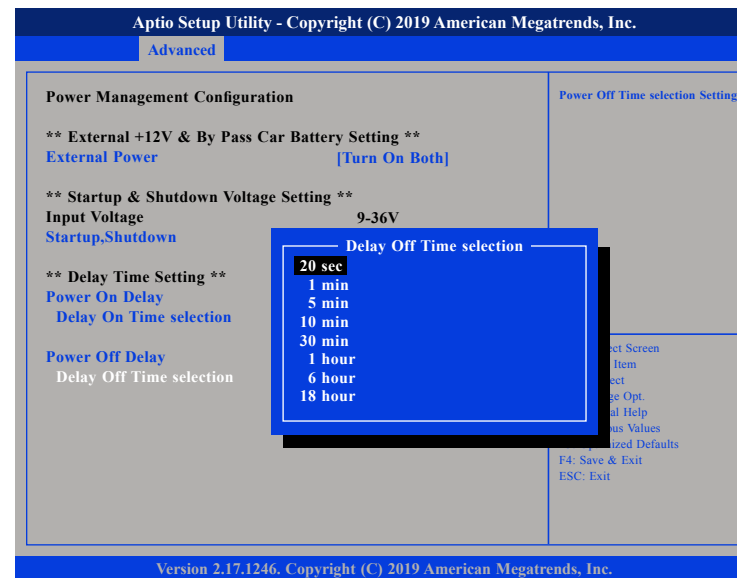
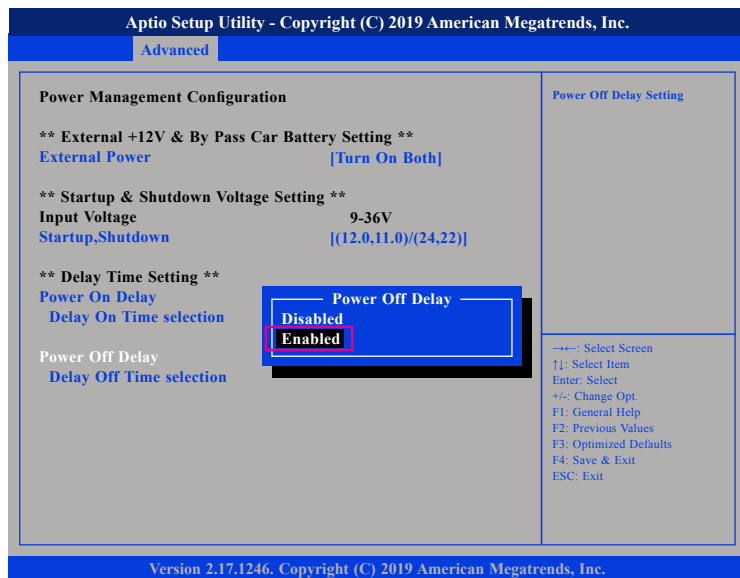
Power-off Delay Setting

Disable Power-off Delay



Enable Power-off Delay

Delay time can be set at 20sec/1min./5min./10min./30min./1hour/6hour/18hour.



APPENDIX E: POWER CONSUMPTION

OS: Windows 10

Burn-in Software

Device:

Idle: Into OS + Display x3 (HDMI + VGA + ultraONE) + All module (unlink) + keyboard & mouse + speaker

Full State: Into OS + Display x3 (HDMI + VGA + ultraONE) + Burn In 100% + module (link) + play video + keyboard & mouse + speaker + COM transmit + GPS link

Full State + Loading: Full state + USB Load (5V/1A) x 4 + DC out (12V/2A) + COM PWR load (12V/1A) + POE (15W) x4

Item	Device	Test Case	Result		
			Current(A)	Watt(W)	
1	S0 State	Idle State	12V	4.27	51.24
			24V	2.27	54.48
			36V	1.65	59.4
		Full State	12V	8.29	99.48
			24V	4.31	103.44
			36V	3.22	115.92
		Full State + Loading	12V	14.3	171.6
			24V	7.09	171.16
			36V	4.90	176.4
		Full State + Loading (PoE_60W)	12V	20.41	244.92
			24V	9.73	233.52
			36V	6.60	237.6
2	S3 State	Full State Sleep Mode	12V	0.9A	
3	IGN OFF	Full State IGNITION OFF	12V	10mA	
			24V	10mA	