Neousys Technology Inc.

MezIO™ Technical Reference Guide

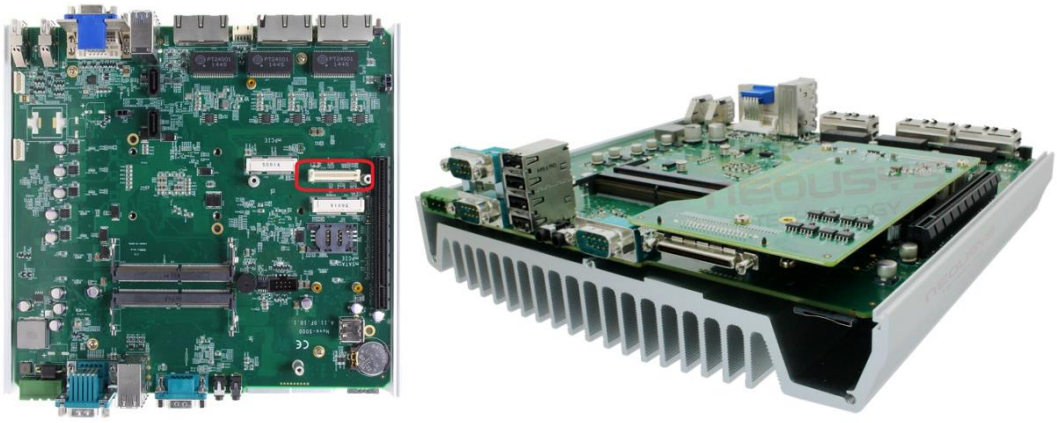
Preliminary Version

Contents

Chapter1 Introduction

1.1 Overview: MezIO™ Interface

MezIO™ is an innovative interface designed for integrating application-oriented I/O functions into an embedded system. It offers computer signals, power rails and control signals via a high-speed connector. MezIO™ is also mechanically reliable benefited from its 3-point mounted mezzanine structure. A MezIO™ module can leverage these signals to implement comprehensive I/O functions.

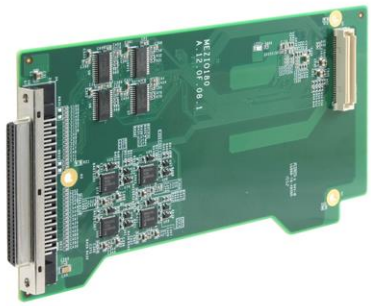
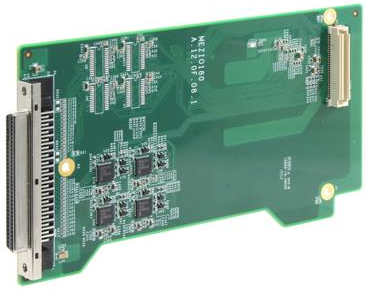
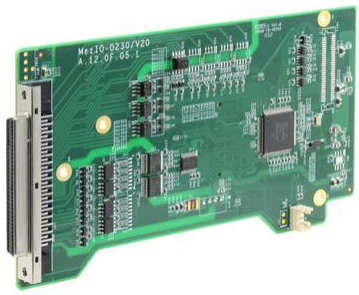
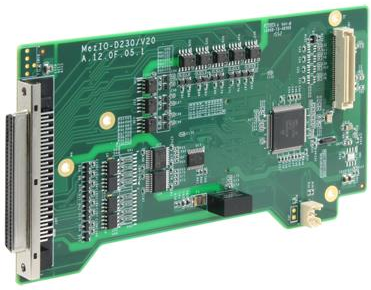
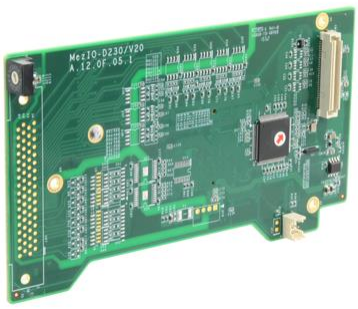


Nuvo-5000 Series and POC-120MZ incorporates MezIO™ interface and universal mechanical design to accommodate Neousys' standard MezIO™ modules. For customers who want to develop their own MezIO™ module, Neousys provides MezIO™ design documents on a NDA basis. Please contact Neousys for further information.

1.2 MezIO Module Overview

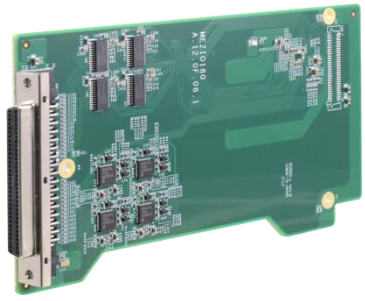
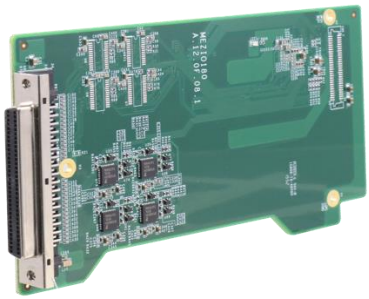
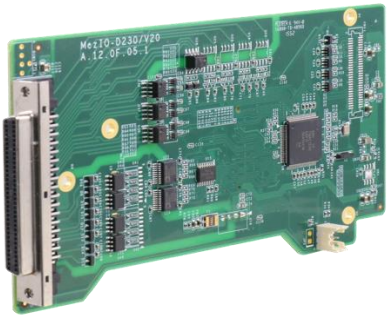
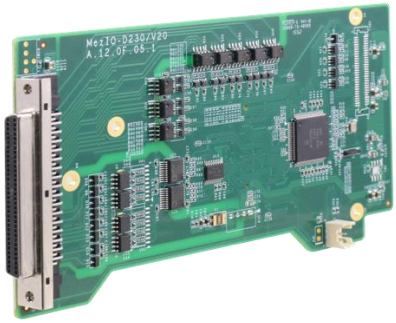
1.2.1 MezIO™ Module for Nuvo-5000 Series

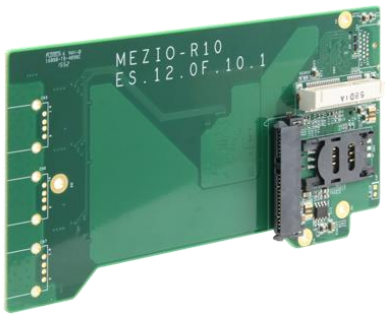
Neousys offers standard MezIO™ modules to expand I/O functions for Nuvo-5000 series. Currently you can have more RS-232/422/485 ports, isolated digital I/O or ignition power control by installing the following module into your Nuvo-5000 controller. Neousys will continuously develop MezIO™ modules with versatile features for Nuvo-5000 series and other embedded products.

Model	Description	Product Photo
MezIO-C180-50	4-port RS-232/422/485 and 4-port RS-232 MezIO™ module	
MezIO-C181-50	4-port RS-232/422/485 and 4-port RS-422/485 MezIO™ module	
MezIO-D220-50	8-CH isolated DI and 8-CH isolated DO MezIO™ module	
MezIO-D230-50	16-CH isolated DI and 16-CH isolated DO MezIO™ module	
MezIO-V20	16-mode ignition power control MezIO™ module (Nuvo-5000LP only)	

1.2.2 MezIO™ Module for POC-120MZ

Neousys offers standard MezIO™ modules to expand I/O functions for POC-120MZ. Currently you can have more RS-232/422/485 ports, isolated digital I/O or SATA signal by installing the following module into your POC-120MZ controller. Neousys will continuously develop MezIO™ modules with versatile features for POC-120MZ and other embedded products.

Model	Description	Product Photo
MezIO-C180-12	4-port RS-232/422/485 and 4-port RS-232 MezIO™ module	
MezIO-C181-12	4-port RS-232/422/485 and 4-port RS-422/485 MezIO™ module	
MezIO-D220-12	8-CH isolated DI and 8-CH isolated DO MezIO™ module	
MezIO-D230-12	16-CH isolated DI and 16-CH isolated DO MezIO™ module	

MezIO-R10	2.5” SATA HDD/SSD and Mini-PCIe accommodation MezIO™ module	

Chapter2 MezIO™ Series Introduction

2.1 MezIO-C180/ MezIO-C181

2.1.1 Specification of MezIO-C180

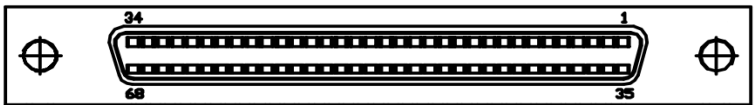
# of Port	4x RS-232/422/485 4x RS-232
Baud Rate	50 bps to 921600 bps
FIFO	256-byte TX and RX FIFOs
ESD Protection	15Kv
Interface Signals	RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND RS-422: TxD+, TxD-, RxD+, RxD-, GND RS-485: Data+, Data-, GND
Connector	68-pin SCSI-II female connector
OS Support	Windows 7/8/8.1/10 and Linux kernel 2.6.32 or later

2.1.2 Specification of MezIO-C181

# of Port	4x RS-232/422/485 4x RS-422/485
Baud Rate	50 bps to 921600 bps
FIFO	256-byte TX and RX FIFOs
ESD Protection	15Kv
Interface Signals	RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND RS-422: TxD+, TxD-, RxD+, RxD-, GND RS-485: Data+, Data-, GND
Connector	68-pin SCSI-II female connector
OS Support	Windows 7/8/8.1/10 and Linux kernel 2.6.32 or later

2.1.3 Pin-out of SCSI68

Please refer to the following pin-out of SCSI68 of corresponding version of MezIO board.



Signal	MezIO-C180	MezIO-C181
UART0	RS-232/422/485	RS-232/422/485
UART1	RS-232/422/485	RS-232/422/485
UART2	RS-232/422/485	RS-232/422/485
UART3	RS-232/422/485	RS-232/422/485
UART4	RS-232	RS-422/485
UART5	RS-232	RS-422/485
UART6	RS-232	RS-422/485
UART7	RS-232	RS-422/485

Board Side: RS232 Pin-out of SCSI68											
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	RxD6	**13**	DCD4	**25**	TxD2	**37**	RI7	**49**	RI5	**61**	TxD1
2	CTS6	**14**	RTS4	**26**	GND	**38**	RTS7	**50**	CTS5	**62**	DSR1
3	RI6	**15**	RI4	**27**	TxD0	**39**	DCD7	**51**	RxD5	**63**	DTR1
4	RI6	**16**	CTS4	**28**	DSR0	**40**	DTR7	**52**	RxD3	**64**	DCD1
5	DCD6	**17**	RxD4	**29**	DTR0	**41**	DSR7	**53**	CTS3	**65**	RTS1
6	DTR6	**18**	RxD2	**30**	DCD0	**42**	TxD7	**54**	RI3	**66**	RI1
7	DSR6	**19**	CTS2	**31**	RTS0	**43**	GND	**55**	RTS3	**67**	CTS1
8	TxD6	**20**	RI2	**32**	RI0	**44**	TxD5	**56**	DCD3	**68**	RxD1
9	GND	**21**	RTS2	**33**	CTS0	**45**	DSR5	**57**	DTR3		
10	TxD4	**22**	DCD2	**34**	RxD0	**46**	DTR5	**58**	DSR3		
11	DSR4	**23**	DTR2	**35**	RxD7	**47**	DCD5	**59**	TxD3		
12	DTR4	**24**	DSR2	**36**	CTS7	**48**	RTS5	**60**	GND		

Board Side: RS-422 Pin-out of SCSI68											
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	TXD6+	**13**	N/A	**25**	RXD2+	**37**	N/A	**49**	N/A	**61**	RXD1+
2	TXD6-	**14**	N/A	**26**	GND	**38**	N/A	**50**	TXD5-	**62**	N/A
3	N/A	**15**	N/A	**27**	RXD0+	**39**	N/A	**51**	TXD5+	**63**	RXD1-
4	N/A	**16**	TXD4-	**28**	N/A	**40**	RXD7-	**52**	TXD3+	**64**	N/A
5	N/A	**17**	TXD4+	**29**	RXD0-	**41**	N/A	**53**	TXD3-	**65**	N/A
6	RXD6-	**18**	TXD2+	**30**	N/A	**42**	RXD7+	**54**	N/A	**66**	N/A
7	N/A	**19**	TXD2-	**31**	N/A	**43**	GND	**55**	N/A	**67**	TXD1-
8	RXD6+	**20**	N/A	**32**	N/A	**44**	RXD5+	**56**	N/A	**68**	TXD1+
9	GND	**21**	N/A	**33**	TXD0-	**45**	N/A	**57**	RXD3-		
10	RXD4+	**22**	N/A	**34**	TXD0+	**46**	RXD5-	**58**	N/A		
11	N/A	**23**	RXD2-	**35**	TXD7+	**47**	N/A	**59**	RXD3+		
12	RXD4-	**24**	N/A	**36**	TXD7-	**48**	N/A	**60**	GND		

Board Side: RS-485 Pin-out of SCSI68											
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	TXD6+/RXD6+	**13**	N/A	**25**	N/A	**37**	N/A	**49**	N/A	**61**	N/A
2	TXD6-/RXD6-	**14**	N/A	**26**	GND	**38**	N/A	**50**	TXD5-/RXD5-	**62**	N/A
3	N/A	**15**	N/A	**27**	N/A	**39**	N/A	**51**	TXD5+/RXD5+	**63**	N/A
4	N/A	**16**	TXD4-/RXD4-	**28**	N/A	**40**	N/A	**52**	TXD3+/RXD3+	**64**	N/A
5	N/A	**17**	TXD4+/RXD4+	**29**	N/A	**41**	N/A	**53**	TXD3-/RXD3-	**65**	N/A
6	N/A	**18**	TXD2+/RXD2+	**30**	N/A	**42**	N/A	**54**	N/A	**66**	N/A
7	N/A	**19**	TXD2-/RXD2-	**31**	N/A	**43**	GND	**55**	N/A	**67**	TXD1-/RXD1-
8	N/A	**20**	N/A	**32**	N/A	**44**	N/A	**56**	N/A	**68**	TXD1+/RXD1+
9	GND	**21**	N/A	**33**	TXD0-/RXD0-	**45**	N/A	**57**	N/A		
10	N/A	**22**	N/A	**34**	TXD0+/RXD0+	**46**	N/A	**58**	N/A		
11	N/A	**23**	N/A	**35**	TXD7+/RXD7+	**47**	N/A	**59**	N/A		
12	N/A	**24**	N/A	**36**	TXD7-/RXD7-	**48**	N/A	**60**	GND		

2.1.4 Pin-out of device connector

Pin-out of DB9 connector			
Pin	**RS-232**	**RS-422**	**RS-485**
1	DCD	N/A	N/A
2	RxD	422 TXD+	485 TXD+/RXD+
3	TxD	422 RXD+	N/A
4	DTR	422 RXD-	N/A
5	GND	GND	GND
6	DSR	N/A	N/A
7	RTS	N/A	N/A
8	CTS	422 TXD-	485 TXD-/RXD-
9	N/A	N/A	N/A

2.2 MezIO™-D220/ MezIO™-D230

2.2.1 Specification of MezIO-D230

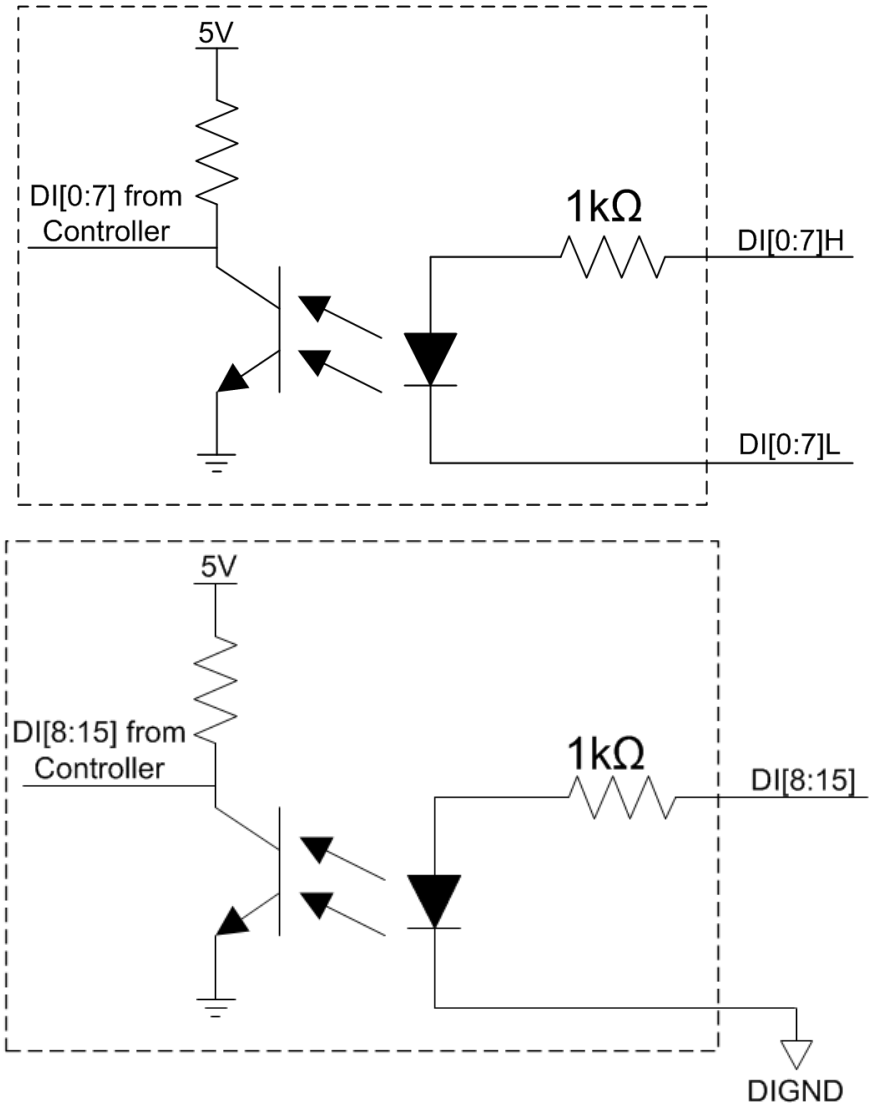
Isolated Digital Input	
# of Channel	16
Wiring Type	Sink/Source Type (only for ch0 to ch7) Sink Type (only for ch8 to ch15)
Interface	Unipolar photo-coupler
Isolation Voltage	3750 Vrms
Rated Input Voltage	24VDC
Max. Input Voltage	24VDC
Logic High Voltage	5 to 24VDC
Logic Low Voltage	5 to 1.5VDC
Operation Mode	Polling
Isolated Digital Output	
# of Channel	16
Wiring Type	Sink Type
Interface	MOSFET, open drain
Isolation Voltage	3750 Vrms
Operation Voltage	24VDC
Max. Driving Voltage	30VDC
Driving Current	500mA for each channel (100% duty)
Operation Mode	Polling
Isolated 5V Output	
Rate Driving Current	100mA
Note	Isolated 5V is used for supplying DO internal chipset ONLY, please make sure it is not driven to external device.

2.2.2 Specification of MezIO-D220

Isolated Digital Input	
# of Channel	8
Wiring Type	Sink/Source Type (only for ch0 to ch7)
Interface	Unipolar photo-coupler
Isolation Voltage	3750 Vrms
Rated Input Voltage	24VDC
Max. Input Voltage	24VDC
Logic High Voltage	5 to 24VDC
Logic Low Voltage	5 to 1.5VDC
Operation Mode	Polling
Isolated Digital Output	
# of Channel	8
Wiring Type	Sink Type
Interface	MOSFET, open drain
Isolation Voltage	3750 Vrms
Operation Voltage	24VDC
Max. Driving Voltage	30VDC
Driving Current	500mA for each channel (100% duty)
Operation Mode	Polling
Isolated 5V Output	
Rate Driving Current	100mA
Note	Isolated 5V is used for supplying DO internal chipset ONLY, please make sure it is not driven to external device.

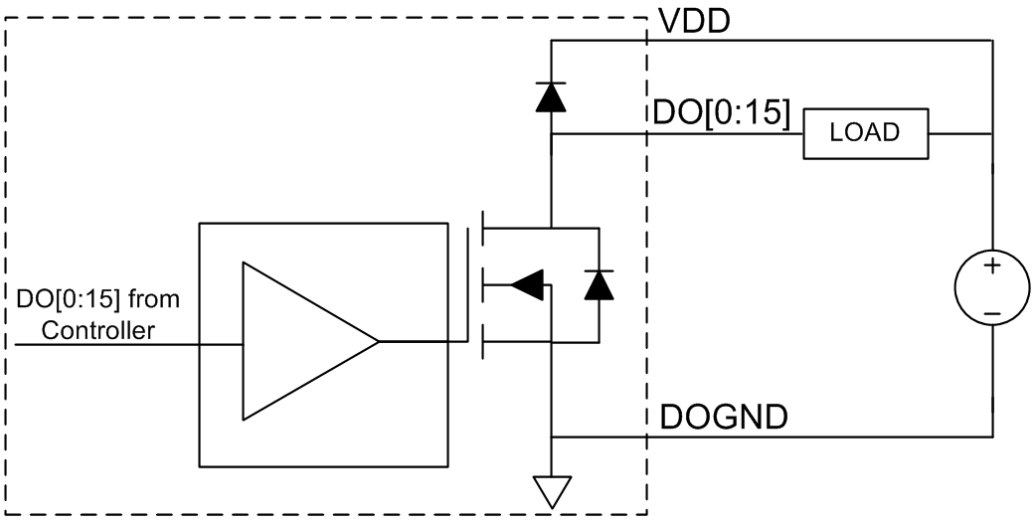
2.2.3 Wiring for Isolated DIO

The digital input function of MezIO-D220/D230 series is implemented using a photo-coupler with an internally series-connected 1kΩ resistor. You need to provide a voltage to specify the logic high/low state. The input voltage for logic high is 5~24V, and the input voltage for logic low is 0~1.5V. In the MezIO-D220/D230, these channels from 0 to 7 support sink/source type (NPN/PNP) which are individual wiring. These channels from 8 to 15 are only support sink type which are shared common DIGND.



The digital output function of the MezIO-D220/D230 series is implemented using Power MOSFET + Analog Device iCoupler® component. The DO channels are configured as NO (normally-open) configuration. When you turn on system, all DO channels have a deterministic state of logic 0 (circuit disconnected from GND return). When logic 1 is specified, MOSFET is activated and GND return path is established. The digital output function on MezIO-D220/D230 series supports sinking current connection. It also

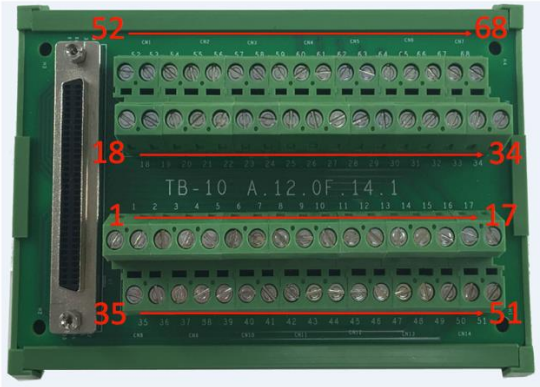
implemented circuit protection, one diode is connected across DO channel and VDD to prevent voltage spike caused by inductive load and long wiring. The following diagrams are the allocated wiring for DO:



2.2.4 Pin-out of MezIO-D230

Signal	N/A	DI0H	DI1H	DI2H	DI3H	DI4H	DI5H	DI6H	DI7H	DI8	DIGND	DI10	DIGND	DI12	DIGND	DI14	DIGND
Pin	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**
Pin	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**
Signal	N/A	DI0L	DI1L	DI2L	DI3L	DI4L	DI5L	DI6L	DI7L	DI9	DIGND	DI11	DIGND	DI13	DIGND	DI15	DIGND
Signal	DO0	DOGND	DO2	DOGND	DO4	DOGND	DO6	DOGND	VDD	DOGND	DO8	DOGND	DO10	DOGND	DO12	DOGND	DO14
Pin	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
Pin	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**
Signal	DO1	DOGND	DO3	DOGND	DO5	DOGND	DO7	DOGND	ISO5V	DOGND	DO9	DOGND	DO11	DOGND	DO13	DOGND	DO15

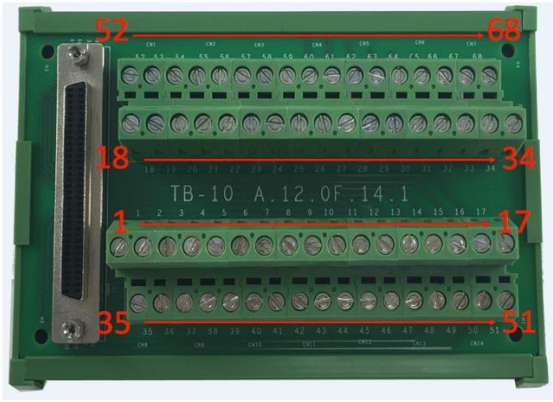
***Note: Terminal board is the accessory provided by Neousys for easily using digital I/O function**



2.2.5 Pin-out of MezIO-D220

Signal	N/A	DI0H	DI1H	DI2H	DI3H	DI4H	DI5H	DI6H	DI7H	N/A	DIGND	N/A	DIGND	N/A	DIGND	N/A	DIGND
Pin	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
Pin	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Signal	N/A	DI0L	DI1L	DI2L	DI3L	DI4L	DI5L	DI6L	DI7L	N/A	DIGND	N/A	DIGND	N/A	DIGND	N/A	DIGND
Signal	DO0	DOGND	DO2	DOGND	DO4	DOGND	DO6	DOGND	VDD	DOGND	N/A	DOGND	N/A	DOGND	N/A	DOGND	N/A
Pin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Pin	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Signal	DO1	DOGND	DO3	DOGND	DO5	DOGND	DO7	DOGND	ISO5V	DOGND	N/A	DOGND	N/A	DOGND	N/A	DOGND	N/A

***Note: Terminal board is the accessory provided by Neousys for easily using digital I/O function**



2.2.6 DIO Function Reference

- **InitDIO**

Syntax

BOOL InitDIO(void);

Description

Initialize the DIO function. You should always invoke InitDIO() before write/read any DIO port/channel.

Parameter

None

Return Value

Returns TRUE if initialization successfully, FALSE if initialization is failed.

Usage

BOOL bRet = InitWDT()

DIReadLine

Syntax

BOOL DIReadLine(BYTE ch);

Description

Read a single channel of isolated digital input.

Parameter

ch

BYTE value specifies the DI channel to be read. Valid values are 0~3.

Return Value

The status (TRUE or FALSE) of the specified DI channel.

Usage

```
BYTE ch=3; //DI channel #3
BOOL DIChValue = DIReadLine(ch); //read DI channel #3
```

DIReadPort

Syntax

WORD DIReadPort(void);

Description

Read the entire isolated digital input port (8 channels).

Parameter

None

Return Value

A WORD value indicates the status of DI port. Return value are 0~255.

Usage

```
WORD DIPortValue = DIReadPort ();
```

● DOWriteLine

Syntax

void DOWriteLine(BYTE ch, BOOL value);

Description

Write a single channel of isolated digital output.

Parameter

ch

BYTE value specifies the DO channel to be written. Valid value are 0~7.

value

BOOL value (TRUE or FALSE) specifies the status of DO channel.

Return Value

None

Usage

```
BYTE ch=3; //DI channel #3
BOOL DOChValue=TRUE;

DOWriteLine(ch, DOChValue); //write DO channel #3 as TRUE
```

● DOWritePort

Syntax

void DOWritePort(WORD value);

Description

Write the entire isolated digital output port (8 channels).

Parameter

value

WORD value specifies the status of the DO port. Valid values are 0~255.

Return Value

None

Usage

```
WORD DOPortValue=0XFF; //11111111b
DOWritePort(DOPortValue); //write DO port as 11111111b
```

● DOWriteLineChecked

Syntax

void DOWriteLineChecked(BYTE ch, BOOL value);

Description

Write a single channel of isolated digital output and read-back the value of DO register. Note that this function is not returned until the DO register is checked and identical to the written value.

Parameter

ch

BYTE value specifies the DO channel to be written. Valid values are 0~7.

value

BOOL value (TRUE or FALSE) specifies the status of DO channel.

Return Value

None

Usage

```
BYTE ch=3; //DI channel #3
BOOL DOChValue=TRUE;

DOWriteLineChecked(ch, DOChValue); //write DO channel #3 as TRUE
```

● DOWritePortChecked

Syntax

void DOWritePortChecked(WORD value);

Description

Write the entire isolated digital output port (8 channels) and check it has been done. Note that this function is not returned until the write value has been checked the same with the device registry.

Parameter

value

WORD value specifies the status of the DO port. Valid values are 0~255.

Return Value

None

Usage

```
WORD DOPortValue=0XFF; //11111111b
DOWritePortChecked(DOPortValue); //write DO port as 11111111b
```

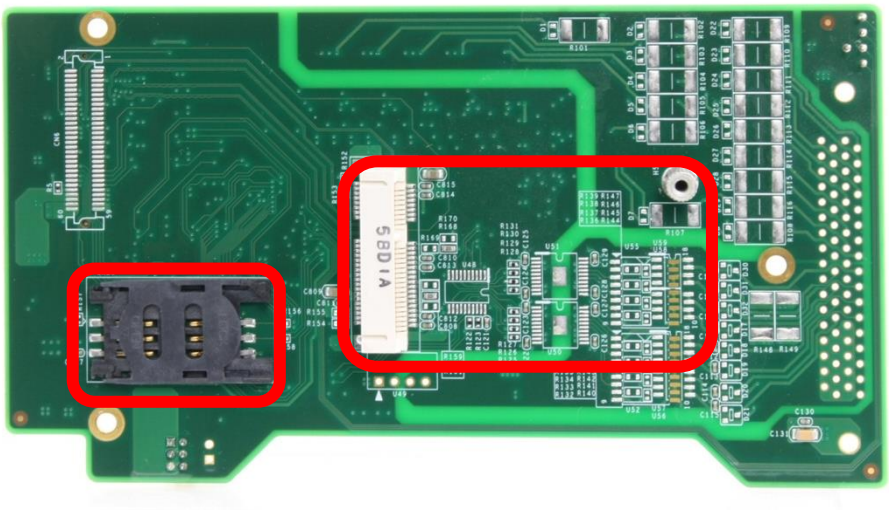
2.3 MezIO™-V20 (Only for Nuvo-5000LP)

Nuvo-5000 series with MezIO-V20 implements the feature of ignition power control module for in-vehicle applications. It's a MCU-based implementation that monitors the ignition signal and reacts to turn on/off the system according to predefined on/off delay. Its built-in algorithm supports further features such as ultra-low standby power, battery-low protection, system hard-off and etc. In this section, we'll illustrate the principle of ignition power control and operations modes on Nuvo-5000 series with MezIO-V20.

2.3.1 Specification of MezIO-V20 (for Nuvo-5000LP only)

Ignition Control	Ignition power control with 15 predefined on/off delay modes
Expansion Bus	
Mini-PCI-E	1x full-size mini PCI Express socket (USB signal only)

2.3.2 Internal I/O function

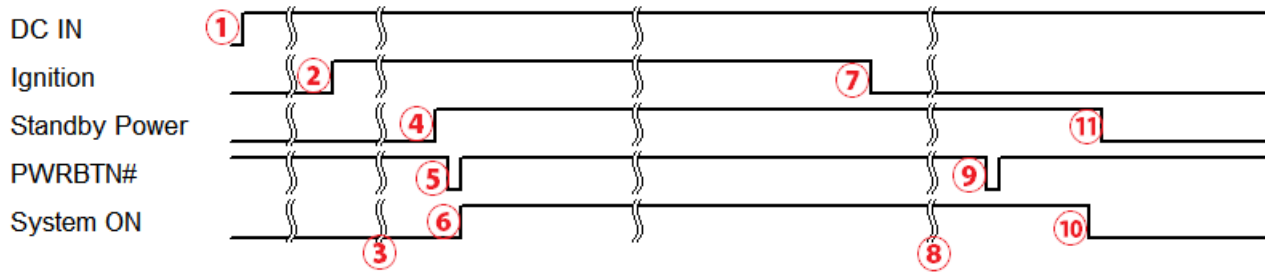


MezIO-V20 provides one mini-PCIe connectors. The full-size mini-PCIe connector provides USB signals only with a SIM socket support. It is designed for installing off-the-shelf LTE/3G/4G/GPRS/GPS module. With SIM card installed, it is capable to connect your system to Internet in wide territory through telecom operator's GPRS/3G/4G network.
The following table describes the pin definition of USB signals of mini-PCIe socket.

Pin #	Signal	Pin #	Signal
1	WAKE#	**2**	+3.3Vaux
3	N/A	**4**	GND
5	N/A	**6**	+1.5V
7	N/A	**8**	UIM_PWR
9	GND	**10**	UIM_DATA
11	N/A	**12**	UIM_CLK
13	N/A	**14**	UIM_RESET
15	GND	**16**	UIM_VPP
17	N/A	**18**	GND
19	N/A	**20**	W_DISABLE#
21	GND	**22**	N/A
23	N/A	**24**	+3.3Vaux
25	N/A	**26**	GND
27	GND	**28**	+1.5V
29	GND	**30**	N/A
31	N/A	**32**	N/A
33	N/A	**34**	GND
35	GND	**36**	USB_D-
37	GND	**38**	USB_D+
39	+3.3Vaux	**40**	GND
41	+3.3Vaux	**42**	LED_WWAN#
43	GND	**44**	LED_WLAN#
45	Reserved	**46**	LED_WPAN#
47	Reserved	**48**	+1.5V
49	Reserved	**50**	GND
51	Reserved	**52**	+3.3Vaux

2.3.3 Principle of Ignition Power Control

The basic concept of ignition power control module is to control the timing correlation between ignition signal and system power status. A typical timing correlation can be described in following diagram.



1) When DC input is supplied to Nuvo-5000 series with MezIO-V20, MCU starts to periodically detect ignition signal. Note that only MCU is working at this moment and the overall power consumption is less than 2 mW.
2) Ignition signal is active. (Both 12VDC and 24VDC ignition signals are accepted)
3) MCU starts to count a pre-defined power-on delay.
4) Once power-on delay expired, MCU turns on necessary standby power for Nuvo-5000 series (3.3VSB & 5VSB).
5) A PWRBTN# pulse is then issued to turn on the system (a similar behavior as you press the power button on the front panel).
6) Nuvo-5000 series is booting up and running.
7) After a period of time, the ignition signal is inactive.
8) MCU starts to count a pre-defined power-off delay.
9) Once power-off delay expired, another PWRBTN# pulse is issued to perform a soft-off for the system (ex. a normal shutdown process for Windows system).
10) Nuvo-5000 series is completely shut down.
11) As MCU detects system is off, it turns off the standby power for Nuvo-5000 series, and then operates in low power mode again (< 2mW power consumption).

In addition to the typical timing correlation, the ignition power control module offers some further features to make Nuvo-5000 series more reliable for in-vehicle applications.

1. Low battery detection

   The ignition power control module is capable to continuously monitor the voltage of DC input when system is running. If input voltage is less than 9V (for 12VDC input) or less than 18V (for 24VDC input) over 60 second duration, it will shut down the system automatically.

2. Guarded power-on/power-off delay duration

   If ignition signal goes inactive during the power-on delay duration, the ignition power control module will cancel the power-on delay process and go back to idle status. Likewise, if ignition signal goes active during the power-off delay duration, the ignition power control module will cancel the power-off delay process and keep the system running.

3. System hard-off

   In some cases, system may be failed to normally shutdown via a soft-off operation due to system/application halts. The ignition power control module on Nuvo-5000 series with MezIO-V20 offers a mechanism called “hard-off” to handle this unexpected condition. By detecting the system status, it can determine whether the system is normally shutdown. If not, the ignition power control module will compulsively cut off the system power 10 minutes after the power-off delay duration.

4. Smart off-delay

   The ignition power control module on Nuvo-5000 series offers two modes (mode 6 & mode 7) which have very long power-off delay duration for applications require some off-line processing after vehicle is stopped. In these two modes, the ignition power control module will automatically detect the system status during the power-off delay duration. If the system is shutdown (by the application software) in prior to power-off delay expired, it will cut off the system power immediately to prevent further consumption of battery power.

2.3.4 Wiring Ignition Signal

To have ignition power control for in-vehicle usage, you need to supply IGN signal to Nuvo-5000 series with MezIO-V20. The IGN input is located on the back panel via a 3-pin pluggable terminal block (shared with DC power input). Here is a general wiring configuration for in-vehicle deployment.

1. Connect car Battery+ line (12V for sedan, 24V for bus/truck) to V+.
2. Connect car Batter-/GND line to GND.
3. Connect ACC line to IGN.

Note

1. *Please make sure your DC power source and IGN signal share the same ground.*
2. *IGN input of Nuvo-5000 series accepts 8~35VDC. Supply a voltage higher than 35VDC may damage the system.*

2.3.5 Operation Modes of Ignition Power Control

If the option of ignition power control modules is available, you can use the rotary switch on rear panel and that should unscrew hex bolts to configure the operation mode. Nuvo-5000 series with MezIO-V20 offers 15 operation modes with different power-on/power-off delay configurations.

Ignition Mode Selections for MezIO-V20

- **Mode 0**

  Mode 0 is the ATX mode without power-on and power-off delay. User can only use the power button on the front panel to turn on or turn off the Nuvo-5000 series system.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
0	N/A	N/A	N/A

- **Mode 1**

  If Mode 1 is specified, the system automatically turns on the system when DC power is applied. A retry mechanism is designed to repeat the power-on cycle if the system is failed to boot up.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
1	N/A	N/A	N/A

- **Mode 2**

  Mode 2 is a special mode designed to support remote on/off control. User can use an external latched switch to connect the DC source (8~35V) and IGN input. When the switch is closed, IGN signal is asserted to initiate a power on operation. When the switch is opened, IGN signal is de-asserted and system shutdown operation is initiated. Neither power-on delay nor power-off delay is supported in this mode.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
2	N/A	N/A	N/A

- **Mode 3 ~ Mode 12**

  Mode 3 ~ Mode 12 are ignition power control modes with various power-on delay and power-off delay. Each mode supports a hard-off timeout of 10 minutes.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
3	10 seconds	10 seconds	10 minutes
4	10 seconds	1 minute	10 minutes
5	10 seconds	5 minutes	10 minutes
6	30 seconds	1 minute	10 minutes
7	30 seconds	5 minutes	10 minutes
8	30 seconds	10 minutes	10 minutes
9	3 minutes	1 minute	10 minutes
10	3 minutes	10 minutes	10 minutes
11	3 minutes	30 minutes	10 minutes
12	10 minutes	30 minutes	10 minutes

- **Mode 13 / Mode 14**

  Mode 13 and Mode 14 are ignition power control modes with very long power-off delay. Both modes support the feature of “smart off-delay”, which automatically detect system status during power-off delay duration and cut off system power if system is off in prior to power-off delay expired.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
13	30 seconds	2 hours	10 minutes
14	3 minutes	2 hours	10 minutes

2.4 MezIO™-R10 (Only for POC-120MZ)

2.4.1 Specification of MezIO-R10 (for Nuvo-5000LP only)

Storage Interface	
SATA HDD	1x internal SATA port for 2.5” HDD/SSD
Expansion Bus	
Mini PCI-E	1x full-size mini-PCIe port with SIM socket (mini-PCIe and USB signals)

2.4.2 Internal I/O Functions

MezIO™-R10 provides additional useful features via its board-to-board connector, such as SATA ports, mini-PCIe sockets, etc. In this section, we’ll illustrate these internal I/O functions.

1. SATA Port for Internal HDD/SSD

MezIO™-R10 provides internal SATA ports to accommodate one 2.5” HDD/SSD.

2. Full-Size Mini-PCIe Connector (with SIM Socket)

MezIO-R10 mini-PCIe and

USB signals. This mini-PCIe socket is designed with SIM card support. With a SIM card installed, it's capable to connect your system to Internet in wide territory through telecom 3G/4G network. For WIFI/3G/4G communication, Nuvo-5000 series provides multiple SMA antenna apertures on the front and back panel for multi-antenna configuration.

The following table describes the pin definition of mini-PCIe socket.

Pin #	Signal	Pin #	Signal
1	WAKE#	**2**	+3.3Vaux
3	COEX1	**4**	GND
5	COEX2	**6**	+1.5V
7	CLKREQ#	**8**	UIM_PWR
9	GND	**10**	UIM_DATA
11	REFCLK-	**12**	UIM_CLK
13	REFCLK+	**14**	UIM_RESET
15	GND	**16**	UIM_VPP
17	Reserved* (UIM_C8)	**18**	GND
19	Reserved* (UIM_C4)	**20**	W_DISABLE#
21	GND	**22**	PERST#
23	PERn0	**24**	+3.3Vaux
25	PERp0	**26**	GND
27	GND	**28**	+1.5V
29	GND	**30**	SMB_CLK
31	PETn0	**32**	SMB_DATA
33	PETp0	**34**	GND
35	GND	**36**	USB_D-
37	GND	**38**	USB_D+
39	+3.3Vaux	**40**	GND
41	+3.3Vaux	**42**	LED_WWAN#
43	GND	**44**	LED_WLAN#
45	Reserved	**46**	LED_WPAN#
47	Reserved	**48**	+1.5V
49	Reserved	**50**	GND
51	Reserved	**52**	+3.3Vaux

Note

Some off-the-shelf mini-PCIe 4G modules are not compliant to standard mini-PCIe interface. They use 1.8V I/O signals instead of standard 3.3V I/O, and may have signal conflict on certain pins. Please make sure your 4G module has the correct pin definition or consult Neousys for the compatibility. Installing an incompatible 4G module may damage the system or the module itself may be damaged.