

## **Neousys Technology Inc.**

## **SEMIL-1700 Series**

### **User Manual**

**Revision 1.5** 

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# **Legal Information**

All Neousys Technology Inc. products shall be subject to the latest Standard Warranty Policy

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Before installing any software, applications or components provided by a third party, customer should ensure that they are compatible and interoperable with Neousys Technology Inc. product by checking in advance with Neousys Technology Inc.. Customer is solely responsible for ensuring the compatibility and interoperability of the third party's products. Customer is further solely responsible for ensuring its systems, software, and data are adequately backed up as a precaution against possible failures, alternation, or loss.

For questions in regards to hardware/ software compatibility, customers should contact Neousys Technology Inc. sales representative or technical support.

To the extent permitted by applicable laws, Neousys Technology Inc. shall NOT be responsible for any interoperability or compatibility issues that may arise when (1) products, software, or options not certified and supported; (2) configurations not certified and supported are used; (3) parts intended for one system is installed in another system of different make or model.

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# **Declaration of Conformity**

FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

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# **Safety Precautions**

- Read these instructions carefully before you install, operate, or transport the system.
- Install the system or DIN rail associated with, at a sturdy location
- Install the power socket outlet near the system where it is easily accessible
- Secure each system module(s) using its retaining screws
- Place power cords and other connection cables away from foot traffic. Do not place items over power cords and make sure they do not rest against data cables
- Shutdown, disconnect all cables from the system and ground yourself before touching internal modules
- Ensure that the correct power range is being used before powering the device
- Should a module fail, arrange for a replacement as soon as possible to minimize down-time
- If the system is not going to be used for a long time, disconnect it from mains (power socket) to avoid transient over-voltage

## **Battery Warning**

- Batteries are at risk of exploding if incorrectly installed
- Do not attempt to recharge, force open, or heat the battery
- Replace the battery only with the same or equivalent type recommended by the manufacturer





# **Service and Maintenance**

- ONLY qualified personnel should service the system
- Shutdown the system, disconnect the power cord and all other connections before servicing the system
- When replacing/ installing additional components (expansion card, memory module, etc.), insert them as gently as possible while assuring connectors are properly engaged

# **ESD Precautions**

- Handle add-on module, motherboard by their retention screws or the module's frame/ heat sink. Avoid touching the PCB circuit board or add-on module connector pins
- Use a grounded wrist strap and an anti-static work pad to discharge static electricity when installing or maintaining the system
- Avoid dust, debris, carpets, plastic, vinyl and 9tyrofoam in your work area.
- Do not remove any module or component from its anti-static bag before installation

## **Restricted Access Location**

The controller is intended for installation only in the certain environment where both these condition apply:

- Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken
- Access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location

## **About This Manual**

This manual introduces Neousys Technology SEMIL-1700 series, a 2U half-rack IP67 waterproof extreme-rugged fanless computer. It features workstation-grade Intel® chipset and offers excellent passive thermal performance with M12 connectors for robust and cost-effectiveness.

#### Applicable systems

Model No.	Description
SEMIL-1704	Half-rack IP67 waterproof computer including Intel® Xeon® E or 9th / 8th-Gen Core <sup>TM</sup> processor with 4x M12 PoE+ ports
SEMIL-1704-10G	Half-rack IP67 waterproof computer including Intel® Xeon® E or 9th / 8th-Gen Core <sup>TM</sup> processor with 4x M12 PoE+ ports and 10GbE port
SEMIL-1708	Half-rack IP67 waterproof computer including Intel® Xeon® E or 9th / 8th-Gen Core <sup>TM</sup> processor with 8x M12 PoE+ ports
SEMIL-1708-10G	Half-rack IP67 waterproof computer including Intel® Xeon® E or 9th / 8th-Gen Core <sup>TM</sup> processor with 8x M12 PoE+ ports and 10GbE port
SEMIL-1714J	Half-rack IP67 waterproof computer including Intel® Xeon® E or 9th / 8th-Gen Core <sup>TM</sup> processor with 4x M12 PoE+ ports and 2500 watt-second SuperCAP UPS
SEMIL-1714J-10G	Half-rack IP67 waterproof computer including Intel® Xeon® E or 9th / 8th-Gen Core <sup>TM</sup> processor with 4x M12 PoE+ ports, 2500 watt-second SuperCAP UPS and 10GbE port
SEMIL-1718J	Half-rack IP67 waterproof computer including Intel® Xeon® E or 9th / 8th-Gen Core <sup>TM</sup> processor with 8x M12 PoE+ ports and 2500 watt-second SuperCAP UPS
SEMIL-1718J-10G	Half-rack IP67 waterproof computer including Intel® Xeon® E or 9th / 8th-Gen Core <sup>TM</sup> processor with 8x M12 PoE+ ports and 2500 watt-second SuperCAP UPS and 10GbE port

## 

Installing after-sales internal modules on your own may affect its waterproof capabilities and is not recommended. If you must install internal modules after purchase, please consult your sales representative as you may need to return the system to Neousys Technology or an authorized SEMIL distributor for processing.

## **Revision History**

Version	Date	Description
1.0	May. 2023	Initial release
1.1	May. 2023	Updated mini-PCIe specifications
1.2	Jun. 2023	Updated the unit for screw torque range, for securing the
		enclosure panel
1.3	Nov. 2023	Updated ignition power control, supercapacitor
		configuration, and optional 10G Ethernet descriptions
1 /	lan 2024	Updated "PB2500J Parameter Configurer" connection
1.4	Jan. 2024	setting to COM5 port
1.5	Sep. 2024	Updated EMC certifications

# **1** Introduction

SEMIL-1700 series is a 2U half-rack extreme-rugged IP67 waterproof capable computer that features an Intel® work-station grade chipset to power a Xeon or 9<sup>th</sup>/ 8<sup>th</sup>-Gen Core<sup>™</sup> processor. Coupled with M12 connectors, the system is design to meet the ever changing harsh environmental conditions that can no longer be met by traditional industrial computers.

### 1.1 SEMIL-1700 Series Overview

SEMIL-1700 series is one of the world's first IP67-rated, waterproof and dustproof inference server. It takes industrial computing to a new level of robustness for rugged edge AI solutions. Coupled with Intel® Xeon® E or 9th/ 8th-Gen Core™ CPU, the system is capable of delivering excellent CPU performances for advanced edge AI applications in extreme environmental settings. With Neousys patented architecture, it guarantees -40 °C to 70°C fanless operation in a rack or wall-mountable 2U half-rack 19" enclosure.



Featuring a sophisticated thermal design, it effectively dissipates the heat in high-temperature environments. Its enclosure is a corrosion-proof, stainless steel/ aluminum chassis with molded O-rings plus patented fusion mechanism design to offer extraordinary durability and watertight construction. SEMIL-1700 series offers a variety of I/O connectivity, including 802.3at Gigabit PoE+, VGA, USB, COM ports and optional 10G Ethernet, all using M12 connectors for water-proof and extreme-rugged connectivity. Additionally, it features M.2 for NVMe SSD, 2.5" SATA storage accommodation, 8-48V wide-range DC input with ignition power control and is in compliance with MIL-STD-810G and EN 50155.

## 1.2 SEMIL-1704 Specifications

System Platform		
	Supporting Intel® Xeon® E and 9 <sup>th</sup> / 8 <sup>th</sup> -Gen CPU (LGA1151 socket)	
	- Xeon E 2176G (6C/12T) / 2278GE (8C/16T) / 2278GEL (8C/16T)	
Processor	- Intel® Core™ i7-9700TE/ i7-9700E/ i7-8700T/ i7-8700	
	- Intel® Core™ i5-9500TE/ i5-9500E/ i5-8500T/ i5-8500	
	- Intel® Core <sup>™</sup> i3-9100TE/ i3-9100E/ i3-8100T/ i3-8100	
Chipset	Intel® C246 platform	
Graphics	Integrated Intel® HD Graphics 630	
Memory	2x 260-pin SO-DIMM sockets, up to 64GB DDR4 2666/ 2400MHz SDRAM	
AMT	Supports AMT 12.0	
ТРМ	Supports TPM 2.0	
I/O Interface		
	1x IEEE 802.3at (25.5W) Gigabit PoE+ ports by Intel® I219 (M12 X-coded)	
POE+	3x IEEE 802.3at (25.5W) Gigabit PoE+ ports by Intel® I210 (M12 X-coded)	
10 GbE Port		
(Build	Optional: 1x 10 GbE port by Intel® X550AT controller (M12 X-coded)	
Option)		
Native Video	1x VGA (M12 A coded) supporting 1020 x 1200 resolution	
Port	TX VGA (MTZ A-coded), supporting 1920 x 1200 resolution	
Serial Port	2x 3-wire RS-232 ports COM1 & COM2 (M12 A-coded)	
LISB	2x USB 2.0 (M12 A-coded)	
000	1x USB 2.0 (internal)	
Audio	NA	
Storage Interface		
SATA HDD	2x internal SATA ports for 2.5" HDD/ SSD installation, supporting RAID 0/ 1	
mSATA	2x full-size mSATA ports (mux with mini-PCIe)	
M.2	1x M.2 2280 M key socket (PCIe Gen3 x4) for NVMe SSD	
	or Intel® Optane™ memory installation	
Expansion Bus		
Mini PCI-E	2x full-size mini PCI Express sockets (mux with mSATA)	
Power Supply	/	
DC Input	8 to 48V DC input (M12 S-coded)	
Ignition	Built-in ignition power control	
Control	(IGN/ GND signal via M12 serial port connector)	

Max. Power	Intel® Xeon® E-2278GE (max.TDP) - 108.96W(24V) - 114.24W(48V)	
Consumption	Intel® Xeon® E-2278GE (35 W) - 72.96W(24V) - 76.32W(48V)	
Mechanical		
Dimension	220mm (W) x 310mm (D) x 90.5mm (H)	
Weight	5.8 kg	
Mounting		
Method	Rack-mount and waii-mount	
Environmental		
Operating	With 35W CPU	
Temperature	-40°C ~ 70°C **/ ***	
	With >= 65W CPU	
	-40°C ~ 70°C **/ *** (configured as 35W TDP mode)	
	-40°C ~ 50°C **/ *** (configured as 65W TDP mode)	
Storage	-40°C ~85°C	
Temperature		
Humidity	10%~90%, non-condensing	
Vibration	Operating, MIL-STD-810G, Method 514.7, Category 4	
Shock	Operating, MIL-STD-810G, Method 516.7, Procedure I	
ГМС	EN 50121 (EN 50155 EMC)	
	CE/FCC Class A, according to EN 55032 & EN 55035	

\*\* For Xeon E 2176G/ 2278GE, i7-9700E, and i7-8700 running at 65W mode, the highest operating temperature shall be limited to 50°C and thermal throttling may occur when sustained full-loading applied. Users can configure the CPU TDP in BIOS to obtain higher operating temperature. \*\*\* For sub-zero operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.

## 1.3 SEMIL-1708 Specifications

System Platform		
Processor	Supporting Intel® Xeon® E and 9th/8th-Gen CPU (LGA1151 socket	
	- Xeon E 2176G (6C/12T) / 2278GE (8C/16T) / 2278GEL (8C/16T)	
	- Intel® Core™ i7-9700TE/ i7-9700E/ i7-8700T/ i7-8700	
	- Intel® Core™ i5-9500TE/ i5-9500E/ i5-8500T/ i5-8500	
	- Intel® Core™ i3-9100TE/ i3-9100E/ i3-8100T/ i3-8100	
Chipset	Intel® C246 platform	
Graphics	Integrated Intel® HD Graphics 630	
Memory	2x 260-pin SO-DIMM sockets, up to 64GB DDR4 2666/ 2400MHz SDRAM	
AMT	Supports AMT 12.0	
ТРМ	Supports TPM 2.0	
I/O Interface		
	1x IEEE 802.3at (25.5W) Gigabit PoE+ ports by Intel® I219 (M12 X-coded)	
POE+	7x IEEE 802.3at (25.5W) Gigabit PoE+ ports by Intel® I210 (M12 X-coded)	
10 GbE Port		
(Build	Optional: 1x 10 GbE port by Intel® X550AT controller (M12 X-coded)	
Option)		
Native Video	1x VCA (M12 A godod) supporting 1020 x 1200 resolution	
Port	TX VGA (MTZ A-coded), supporting 1920 x 1200 resolution	
Serial Port	2x 3-wire RS-232 ports COM1 & COM2 (M12 A-coded)	
USB	4x USB 2.0 (M12 A-coded)	
000	1x USB 2.0 (internal)	
Audio	1x mic-in and speaker-out (M12 A-coded)	
Storage Interface		
SATA HDD	2x internal SATA ports for 2.5" HDD/ SSD installation, supporting RAID 0/ 1	
mSATA	2x full-size mSATA ports (mux with mini-PCIe)	
M.2	1x M.2 2280 M key socket (PCIe Gen3 x4) for NVMe SSD	
	or Intel® Optane™ memory installation	
Expansion Bus		
Mini PCI-E	2x full-size mini PCI Express sockets (mux with mSATA)	
	2x full-size mini PCI Express sockets	
Power Supply		
DC Input	8 to 48V DC input (M12 S-coded)	
Ignition	Built-in ignition power control (IGN/ GND signal via M12 serial port connector)	

Control		
Max. Power	Intel® Xeon® E-2278GE (max.TDP) - 108.96W(24V) - 114.24W(48V)	
Consumption	Intel® Xeon® E-2278GE (35 W) - 72.96W(24V) - 76.32W(48V)	
Mechanical		
Dimension	220mm (W) x 310mm (D) x 90.5mm (H) (excluding rack-mount bracket)	
Weight	5.9 kg	
Mounting	Rack-mount and wall-mount	
Method		
Environment	al	
Operating	With 35W CPU	
Temperature	-40°C ~ 70°C **/ ***	
	With >= 65W CPU	
	-40°C ~ 70°C **/ *** (configured as 35W TDP mode)	
	-40°C ~ 50°C **/ *** (configured as 65W TDP mode)	
Storage	-40°C ~85°C	
Temperature		
Humidity	10%~90%, non-condensing	
Vibration	Operating, MIL-STD-810G, Method 514.7, Category 4	
Shock	Operating, MIL-STD-810G, Method 516.7, Procedure I	
EMC	EN 50121 (EN 50155 EMC)	
ENIC	CE/FCC Class A, according to EN 55032 & EN 55035	

\*\* For Xeon E 2176G/ 2278GE, i7-9700E, and i7-8700 running at 65W mode, the highest operating temperature shall be limited to 50°C and thermal throttling may occur when sustained full-loading applied. Users can configure the CPU TDP in BIOS to obtain higher operating temperature. \*\*\* For sub-zero operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.

## 1.4 SEMIL-1714J Specifications

System Platform		
Processor	Supporting Intel® Xeon® E and 9 <sup>th</sup> / 8 <sup>th</sup> -Gen CPU (LGA1151 socket	
	- Xeon E 2176G (6C/12T) / 2278GE (8C/16T) / 2278GEL (8C/16T)	
	- Intel® Core™ i7-9700TE/ i7-9700E/ i7-8700T/ i7-8700	
	- Intel® Core™ i5-9500TE/ i5-9500E/ i5-8500T/ i5-8500	
	- Intel® Core <sup>™</sup> i3-9100TE/ i3-9100E/ i3-8100T/ i3-8100	
Chipset	Intel® C246 platform	
Graphics	Integrated Intel® HD Graphics 630	
Memory	2x 260-pin SO-DIMM sockets, up to 64GB DDR4 2666/ 2400MHz SDRAM	
AMT	Supports AMT 12.0	
ТРМ	Supports TPM 2.0	
I/O Interface		
DeF	1x IEEE 802.3at (25.5W) Gigabit PoE+ ports by Intel® I219 (M12 X-coded)	
POE+	3x IEEE 802.3at (25.5W) Gigabit PoE+ ports by Intel® I210 (M12 X-coded)	
10 GbE Port		
(Build	Optional: 1x 10 GbE port by Intel® X550AT controller (M12 X-coded)	
Option)		
Native Video	$1 \times 1/2 \wedge (M12 \wedge added)$ supporting 1020 $\times 1200$ resolution	
Port	TX VGA (MTZ A-coded), supporting 1920 x 1200 resolution	
Serial Port	2x 3-wire RS-232 ports COM1 & COM2 (M12 A-coded)	
LISB	2x USB 2.0 (M12 A-coded)	
000	1x USB 2.0 (internal)	
Audio	NA	
Storage Interface		
SATA HDD	2x internal SATA ports for 2.5" HDD/ SSD installation, supporting RAID 0/ 1	
mSATA	2x full-size mSATA ports (mux with mini-PCIe)	
M.2	1x M.2 2280 M key socket (PCIe Gen3 x4) for NVMe SSD	
	or Intel® Optane™ memory installation	
Expansion Bus		
Mini PCI-E	2x full-size mini PCI Express sockets (mux with mSATA)	
Power Supply		
DC Input	8 to 48V DC input (M12 S-coded)	
Ignition	Built-in ignition power control	
Control	(IGN/ GND signal via M12 serial port connector)	

Power Backup		
Capacity	2500 watt-second	
Max. Power	Intel® Xeon® E-2278GE (max.TDP) - 108.96W(24V) - 114.24W(48V)	
Consumption	Intel® Xeon® E-2278GE (35 W) - 72.96W(24V) - 76.32W(48V)	
Mechanical		
Dimension	440mm (W) x 310mm (D) x 90.5mm (H) (excluding rack-mount bracket)	
Weight	6 kg	
Mounting	Rack-mount and wall-mount	
Method		
Environmenta	al	
Operating	With 35W CPU	
Temperature	-40°C ~ 70°C **/ ***	
	With >= 65W CPU	
	-40°C ~ 70°C **/ *** (configured as 35W TDP mode)	
	-40°C ~ 50°C **/ *** (configured as 65W TDP mode)	
Storage	40%0 85%0	
Temperature	-40 C ~65 C	
Humidity	10%~90%, non-condensing	
Vibration	Operating, MIL-STD-810G, Method 514.7, Category 4	
Shock	Operating, MIL-STD-810G, Method 516.7, Procedure I	
FMC	EN 50121 (EN 50155 EMC)	
	CE/FCC Class A, according to EN 55032 & EN 55035	

\*\* For Xeon E 2176G/ 2278GE, i7-9700E, and i7-8700 running at 65W mode, the highest operating temperature shall be limited to 50°C and thermal throttling may occur when sustained full-loading applied. Users can configure the CPU TDP in BIOS to obtain higher operating temperature. \*\*\* For sub-zero operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.

## 1.5 SEMIL-1718J Specifications

System Platform		
	Supporting Intel® Xeon® E and 9 <sup>th</sup> / 8 <sup>th</sup> -Gen CPU (LGA1151 socket	
Processor	- Xeon E 2176G (6C/12T) / 2278GE (8C/16T) / 2278GEL (8C/16T)	
	- Intel® Core™ i7-9700TE/ i7-9700E/ i7-8700T/ i7-8700	
	- Intel® Core™ i5-9500TE/ i5-9500E/ i5-8500T/ i5-8500	
	- Intel® Core™ i3-9100TE/ i3-9100E/ i3-8100T/ i3-8100	
Chipset	Intel® C246 platform	
Graphics	Integrated Intel® HD Graphics 630	
Memory	2x 260-pin SO-DIMM sockets, up to 64GB DDR4 2666/ 2400MHz SDRAM	
AMT	Supports AMT 12.0	
ТРМ	Supports TPM 2.0	
I/O Interface		
	1x IEEE 802.3at (25.5W) Gigabit PoE+ ports by Intel® I219 (M12 X-coded)	
POE+	7x IEEE 802.3at (25.5W) Gigabit PoE+ ports by Intel® I210 (M12 X-coded)	
10 GbE Port		
(Build	Optional: 1x 10 GbE port by Intel® X550AT controller (M12 X-coded)	
Option)		
Native Video	1x VCA (M12 A coded) supporting 1020 x 1200 recelution	
Port	TX VGA (MTZ A-coded), supporting 1920 x 1200 resolution	
Serial Port	2x 3-wire RS-232 ports COM1 & COM2 (M12 A-coded)	
LISB	2x USB 2.0 (M12 A-coded)	
036	1x USB 2.0 (internal)	
Audio	1x mic-in and speaker-out (M12 A-coded)	
Storage Interface		
SATA HDD	2x internal SATA ports for 2.5" HDD/ SSD installation, supporting RAID 0/ 1	
mSATA	2x full-size mSATA ports (mux with mini-PCIe)	
M.2	1x M.2 2280 M key socket (PCIe Gen3 x4) for NVMe SSD	
	or Intel® Optane™ memory installation	
Expansion Bu	JS	
Mini PCI-E	2x full-size mini PCI Express sockets (mux with mSATA)	
	2x full-size mini PCI Express sockets	
Power Supply		
DC Input	8 to 48V DC input (M12 S-coded)	
Ignition	Built-in ignition power control (IGN/ GND signal via M12 serial port connector)	

Control			
Power Backup			
Capacity	2500 watt-second		
Max. Power	Intel® Xeon® E-2278GE (max.TDP) - 108.96W(24V) - 114.24W(48V)		
Consumption	Intel® Xeon® E-2278GE (35 W) - 72.96W(24V) - 76.32W(48V)		
Mechanical			
Dimension	220mm (W) x 310mm (D) x 90.5mm (H) (excluding rack-mount bracket)		
Weight	6.2 kg		
Mounting	Pack mount and wall mount		
Method			
Environmenta	Environmental		
Operating	With 35W CPU		
Temperature	-40°C ~ 70°C **/ ***		
	With >= 65W CPU		
	-40°C ~ 70°C **/ *** (configured as 35W TDP mode)		
	-40°C ~ 50°C **/ *** (configured as 65W TDP mode)		
Storage	40%0 95%0		
Temperature	-40 C ~65 C		
Humidity	10%~90%, non-condensing		
Vibration	Operating, MIL-STD-810G, Method 514.7, Category 4		
Shock	Operating, MIL-STD-810G, Method 516.7, Procedure I		
EMC	EN 50121 (EN 50155 EMC)		
	CE/FCC Class A, according to EN 55032 & EN 55035		

\*\* For Xeon E 2176G/ 2278GE, i7-9700E, and i7-8700 running at 65W mode, the highest operating temperature shall be limited to 50°C and thermal throttling may occur when sustained full-loading applied. Users can configure the CPU TDP in BIOS to obtain higher operating temperature. \*\*\* For sub-zero operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.

## 1.6 Dimension



### 1.6.1 Superior View



### 1.6.2 Front Panel View



220.0

86.46

### 1.6.3 Side View



### 1.6.4 Bottom View



### **1.7 Dimensions with Wall Mount Bracket**



### 1.7.1 Front View



### 1.7.2 Bottom View



333.0

# 2 System Overview

Upon receiving and unpacking your system, please check immediately if the package contains all the items listed in the following table. If any item(s) are missing or damaged, please contact your local dealer or Neousys Technology.

### 2.1 SEMIL-1700 Packing List

System Pack	SEMIL-1700	Qty
1	SEMIL-1700 system	1
1	(If you ordered CPU, RAM, HDD etc., please verify these items)	1
	Accessory box, which contains	
2	CPU bracket	1
	Neousys Drivers & Utilities DVD	1
	Wall-mounting bracket	2

## 2.2 SEMIL-1700 Front Panel

No.	ltem	Description			
1	DC input	8V to 48V DC input (M12 S-coded)			
		The M12 X-coded Power over Ethernet (PoE) ports provide both			
		data connection and electric power to devices (eg. IP camera).			
2	PoE+ GbE	SEMIL-1704	1x IEEE 802.3at GbE+ port via Intel® I219		
2	<u>ports</u>	SEMIL-1714J	3x IEEE 802.3at GbE+ port via Intel® I210		
		SEMIL-1708	1x IEEE 802.3at GbE+ port via Intel® I219		
		SEMIL-1718J	7x IEEE 802.3at GbE+ port via Intel® I210		
		The USB 2.0 ports a	The USB 2.0 ports are backward-compatible with USB 1.1 / 1.0.		
	<u>USB 2.0 port</u>	SEMIL-1704			
3		SEMIL-1714J			
		SEMIL-1708	4 x USP2 0 (M12 A coded)		
		SEMIL-1718J	4 x USB2.0 (M12 A-coded)		
4	VGA port	VGA output support	s resolution up to 1920x1200@60Hz		
F	Audio port	SEMIL-1704/ 1714J	: Not applicable		
5	Audio port	SEMIL-1714J/ 1718J: 1x mic-in and speaker-out (M12 A-coded)			
6	COM ports	COM 1 & 2 are RS-232 ports via an M12 A-coded connector			
7	Power button	Use this button to turn on or force shutdown the system.			
10GbE	Optional 10Gb	Optional 10Gb The optional 10GbE is backwards compatible with 5Gb, 2.5G			
Ethernet		connections.			

### 2.2.1 DC-IN Connector



The system accepts a wide range of DC power input from 8 to 48V via a M12 S-coded connector. The M12 S-coded connectors offer COTS availability and ultra-rugged connection reliability when wiring DC power.

### 

Please make sure the voltage of DC power is correct before you connect it to the system. Supplying a voltage over 48V will damage the system.

### **Connector Pin Definition**



Panel side

Cable connector end

Signal	M12 panel side	M12 cable connector end	Wire color
V+	3	3	
GND	2	2	
V+	1	1	
GND	PE	PE	



### 2.2.2 PoE+ Gigabit Ethernet Port

The system offers PoE+ GbE ports via M12 X-coded connectors on the front panel. The port marked in **green** is implemented using Intel<sup>®</sup> I219-LM controller that supports Wake-on-LAN and is also compatible with Intel<sup>®</sup> AMT (Active Management Technology) to support advanced features such as remote SOL desktop and remote on/ off control. Power over Ethernet (PoE) supplies electrical power and data on a CAT-5/CAT-6 Ethernet cable. Acting as a PoE PSE (Power Sourcing Equipment), compliant with IEEE 802.3at, each PoE port delivers up to 25.5W to a Powered Device (PD). PoE can automatically detect and determine if the connected device requires power or not, so it is compatible with standard Ethernet devices as well.

Each port has one dedicated PCI Express link for maximum network performance.

PoE+ ports Model No.	Port description
SEMIL-1704 SEMIL-1714J	1x IEEE 802.3at GbE+ port via Intel® I219 (port 1) 3x IEEE 802.3at GbE+ port via Intel® I210 (port 2 to 4)
SEMIL-1708	1x IEEE 802.3at GbE+ port via Intel® I219 (port 1)
SEMIL-1718J	7x IEEE 802.3at GbE+ port via Intel® I210 (port 2 to 8)

The number of ports for each SEMIL-1700 model v	variant is listed below:
---	--------------------------

### **Connector Pin Definition**



Panel side

Cable connector end

Signal	M12 panel side	M12 cable connector end	Wire color
LAN P0	1	1	
LAN N0	2	2	
LAN P1	3	3	
LAN N1	4	4	
LAN P3	5	5	
LAN N3	6	6	
LAN N2	7	7	
LAN P2	8	8	

### 2.2.3 USB Port



The USB2.0 ports are implemented via native xHCI (eXtensible Host Controller Interface) controller and are backward compatible with USB 1.1 and USB 1.0 devices. Legacy USB support is also provided so you can use USB keyboard/mouse in DOS environment.

### **Connector Pin Definition**





	Panel side	Cable connector end	
Signal	M12 panel side	M12 cable connector end	Wire color
D1+	1	1	
D1-	2	2	
VCC_USB	3	3	
GND	4	4	
GND	5	5	
VCC_USB	6	6	
D2-	7	7	
D2+	8	8	

### 2.2.4 VGA Port



VGA connector is the most common video display connection. The VGA output supports up to 1920x1200@60Hz resolution. To support VGA display output and achieve best VGA output resolution in Windows, you need to install corresponding graphics drivers. Please refer to section <u>OS Support and Driver Installation</u> for details.

### **Connector Pin Definition**



Signal	M12 panel side	M12 cable connector end	Wire color
Red	1	1	
GREEN	9	9	
BLUE	7	7	
GND	6	6	
GND	8	8	
GND	10	10	
GND	12	12	
GND	13	13	
GND	14	14	
GND	11	11	
GND	16	16	

GND	15	15	
P5V_VGA	17	17	
VGA_SDA	5	5	
HSYNC_CN	3	3	
VSYNC_CN	2	2	
VGA_SCL	4	4	



Please make sure your VGA cable includes SDA and SCL (DDC clock and data) signals for correct communication with monitor to get resolution/timing information. A cable without SDA/SCL can cause blank screen on your VGA monitor due to incorrect resolution/timing output.



### 2.2.5 Audio Port (SEMIL-17x8 Models Only)

The M12 A-coded audio port accepts microphone voice input and headphone speaker sound output. To utilize the audio function in Windows, you need to install corresponding drivers for both motherboard and audio.

#### **Pin Definition**





Cable side

Signal	M12 Socket end	M12 cable side
Left channel	4	4
Right channel	5	5
Microphone	7	7
Ground	8	8

### 2.2.6 COM1/ COM2 Port



The system provides two COM ports via an M12 A-coded connector for communicating with external devices. These COM ports are 3-wire RS-232 specifications and provide up to 115200 bps baud rate.

### **Connector Pin Definition**





	Panel side	Cable cor	nnector end
Signal	M12 panel side	M12 cable connector end	Wire color
TXD1	1	1	
RXD1	2	2	
NC	3	3	х
PWR_IGN	4	4	
GND	5	5	
NC	6	6	х
RXD2	7	7	
TXD2	8	8	



### 2.2.7 Power Button



The power button is a non-latched switch for ATX mode on/off operation. To turn on the system, press the power button and the PWR LED should light-up green. To turn off the system, issuing a shutdown command in OS is preferred, or you can simply press the power button. To force shutdown when the system freezes, press and hold the power button for 5 seconds. Please note that there is a 5-second interval between on/off operations (i.e. once the system is turned off, there is a 5-second wait before you can power-on the system).

### 2.2.8 Optional 10Gb Ethernet



The system offers an optional 10Gb Ethernet via M12 X-coded connector (in **green**) implemented using Intel® X550AT controller on the front panel. The port is backwards compatible with 5Gb, 2.5Gb, and Gb Ethernet connections.



#### **Connector Pin Definition**



Panel side		C	Cable connector end	
Signal	M12 panel side	M12 cable connector end	Wire color	
LAN P0	1	1		
LAN N0	2	2		
LAN P1	3	3		
LAN N1	4	4		
LAN P3	5	5		
LAN N3	6	6		
LAN N2	7	7		
LAN P2	8	8		
### 2.3 Internal I/Os

# 

Installing after-sales internal modules on your own may affect its waterproof capabilities and is not recommended. If you must install internal wireless modules after purchase, please consult your sales representative as you may need to return the system to Neousys Technology or an authorized SEMIL distributor for antenna installation.

In addition to connectors on the enclosure panel, the system also provides internal expansion slots such as for hard drives, mini-PCIe, and access to ignition control rotary switch.



### 2.3.1 mini-PCIe Expansion Slot (mux with mSATA)

#### SEMIL-17x4 models

SEMIL-17x8 models

The system has two mini-PCIe sockets mux with mSATA. There are plenty of off-the-shelf mini-PCIe modules with versatile capabilities. By installing a mini-PCIe module, your system can have expanded features such as 5G/4G, WIFI, GPS, CAN bus, analog frame grabber, etc.

If the module is installed after initial purchase, you may need to return the unit to Neousys Technology or an authorized SEMIL distributor for SMA antenna installation.

N N					
	51 49 47 45 43	41 39 37 35 33 31 29	27 25 23 21 1	9 17 15 13 11 9 7 5	3 1
-	52 50 48 46 44	42 40 38 36 34 32 30	28 26 24 22 20	1 18 16 14 12 10 8 6	4 2
	Pin #	Signal	Pin #	Signal	1
	1	WAKE#	2	+3.3Vaux	l
	3	COEX1	4	GND	l
	5	COEX2	6	+1.5V	l
	7	CLKREQ#	8	UIM_PWR	l
	9	GND	10	UIM_DATA	l
	11	REFCLK-	12	UIM_CLK	l
	13	REFCLK+	14	UIM_RESET	l
	15	GND	16	UIM_VPP	l
	Mechanical K		10		l
	17	Reserved <sup>*</sup> (UIIVI_C8)	18		l
	19		20	DEDST#	l
	21	PFRn0	22	+3 3\/aux	1
	25	PERp0	26	GND	l
	27	GND	28	+1.5V	l
	29	GND	30	SMB_CLK	l
	31	PETn0	32	SMB_DATA	1
	33	PETp0	34	GND	l
	35	GND	36	USB_D-	l
	37	GND	38	USB_D+	l
	39	+3.3Vaux	40	GND	l
	41	+3.3Vaux	42	LED_WWAN#	l
	43	GND	44	LED_WLAN#	l
	45	Reserved	46	LED_WPAN#	I
	47	Reserved	48	+1.5V	I
	49	Reserved	50	GND	l
	51	Reserved	52	+3.3Vaux	

### mini-PCle slot definition



### 2.3.2 mini-PCIe Expansion Slot (SEMIL-17x8 Models Only)

The SEMIL-17x8 systems have two mini-PCIe slots. There are plenty of off-the-shelf mini-PCIe modules with versatile capabilities. By installing a mini-PCIe module, your system can have expanded features such as WIFI, GPS, CAN bus, analog frame grabber, etc.

#### mini-PCIe Slot Pin Definition

51 49 47	45 43 41 39 37 35 33 31 29 27	25 23 21	19 17 15 13 11 9 7 5 3 1	
52 50 48	46 44 42 40 38 36 34 32 30 28 3	26 24 22	20 18 16 14 12 10 8 6 4 2	
Pin #	Signal	Pin #	Signal	
1	Reserved	2	+3.3Vaux	
3	Reserved	4	GND	
5	Reserved	6	+1.5V	
7	Reserved	8	UIM_PWR	
9	GND	10	UIM_DATA	
11	Reserved	12	UIM_CLK	
13	Reserved	14	UIM_RESET	
15	GND	16	UIM_VPP	
Mechani	cal Key			
17	17 Reserved		GND	
19	Reserved		W_DISABLE#	
21	GND		PERST#	
23	23 Reserved		+3.3Vaux	
25	Reserved	26	GND	
27	GND	28	+1.5V	
29	GND	30	Reserved	
31	Reserved	32	Reserved	
33	Reserved	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 Ignition Control Rotary Switch

The ignition power control switch features multiple modes for pre and post ignition settings. Please refer to the section <u>Ignition Power Control</u> for details.

# 3 Installation

## 3.1 mini-PCIe Module Installation



Installing after-sales internal modules on your own may affect its waterproof capabilities and is not recommended. If you must install internal wireless modules after purchase, please consult your sales representative as you may need to return the system to Neousys Technology or an authorized SEMIL distributor for antenna installation.

To install or replace mini-PCIe modules in the system, please refer to the following instructions:

- 1. Disconnect all cable connections and shut down the system.
- 2. Turn the system upside-down and place it on a flat sturdy surface.
- 3. Unscrew the indicated screws in descending order.



4. Gently lift the panel and you will see the internal components.



5. It is recommended that you disconnect the cables to better access and install components. Only SEMIL-17xxJ models will have PB supercap UPS module.





Unplug the DB9 connection to the PB unit

Unplug the 4-pin ATX connector



Disconnect the 4-pin power connector



Disconnect from the motherboard side

 If hard drives are installed, disconnect the SATA/ power connector. Pull using the connector body, **DO NOT** pull on the cable!



7. Identify the slot locations of the mini-PCIe slots and their respective SIM slots.



SEMIL-17x4 models



SEMIL-17x8 models

8. If you are installing 5G/ 4G mini-PCIe modules, please install the respective SIM cards first.



Slide and lift SIM card holder

Insert SIM card with pins facing up



### Secure the SIM card by sliding the holder

9. To install mini-PCIe module, simply insert the module into the slot on a 45 degree angle, press down and secure with a screw.



Insert into slot on a 45 degree angle



Secure the module with a screw

10. Refer to the module's manual and connect the antenna.



- If the module is installed after initial purchase, you may need to return the unit to Neousys Technology or an authorized SEMIL distributor for SMA antenna installation.
- 12. Reconnect the cables for the PB module.



**Connect the DB9 connection** 



Plug in the 4-pin ATX connector



Connect the 4-pin power connector



Connect from the motherboard side

13. Make sure the O-ring seal is properly seated in the groove.





14. Gently tug all the cables into the enclosure and shut the bottom panel back on.

15. Secure the indicated screws at a torque range of 6.3 – 7.7kgf-cm in ascending order to complete the HDD installation procedure.



### 3.2 Hard Drive Installation

# ΝΟΤΕ

Installing after-sales internal modules on your own may affect its waterproof capabilities and is not recommended. If you must install internal wireless modules after purchase, please consult your sales representative as you may need to return the system to Neousys Technology or an authorized SEMIL distributor for antenna installation.

To install or replace hard drives in the system, please refer to the following instructions:

- 1. Disconnect all cable connections and shut down the system.
- 2. Turn the system upside-down and place it on a flat sturdy surface.
- 3. Unscrew the indicated screws in descending order.



4. Gently lift the panel and you will see the internal components.



5. It is recommended that you disconnect the cables to better access and install components.



Unplug the DB9 connection to the PB unit



Unplug the 4-pin ATX connector



Disconnect the 4-pin power connector



Disconnect from the motherboard side

 If you are replacing existing HDD, disconnect the SATA/ power connector. Pull using the connector body, **DO NOT** pull on the cable!





Disconnect the SATA/ power connector

Remove screws on both sides of the hard drive

 Place the hard drive in between the brackets and secure with screws on both sides. Repeat this step if you are installing a second HDD.



Place hard drive in between brackets



Secure hard drive with screws on both sides

8. Connect the SATA/ power cable onto the HDDs.



Connect the bottom hard drive first



Then connect the hard drive on top (if installed)

9. Reconnect the cables for the PB module.



**Connect the DB9 connection** 



Plug in the 4-pin ATX connector



Connect the 4-pin power connector



Connect from the motherboard side



10. Make sure the O-ring seal is properly seated in the groove.

- 11. Gently tug all the cables into the enclosure and shut the bottom panel back on.

 Secure the indicated screws at a torque range of 6.3 – 7.7 kgf-cm in ascending order to complete the HDD installation procedure.



### 3.3 Wall-mount Bracket Installation

The system comes with four wall-mount installation brackets. The four brackets are interchangeable and can be installed on any of the four locations designated for bracket installation. Please follow the procedures below to install the brackets.

- 1. Remove the four brackets and sixteen screws from the accessory box.
- 2. To install the bracket (in red), simply secure it using the screws (in blue) provided.



### Left side bracket

### Left side view

3. Repeat the same bracket installation on the other side of the enclosure.



Rear 45 degree view

**Right side view** 

# 3.4 Rack-mount Bracket Installation (Optional

## Accessory)

The system comes with optional rack-mount brackets. The two brackets can be installed so the system can be mounted into a standard 19" server cabinet. Please follow the procedures below to install the brackets.

- There are two brackets (in red), two grips (in green) and eight screws (in blue) for this kit.
- 2. The larger-sized bracket (in **red**) is to be installed on the left side (next to the COM port side) of the enclosure with the screws (in blue) supplied.



#### Left side bracket

#### Screws securing the bracket

 Secure the smaller bracket (in red) with the four screws (in blue) supplied. The grips (in green) are an optional accessory. They can be installed by securing the screws from the back of the bracket.



Rear view

# **4** Ignition Power Control

The ignition power control module for in-vehicle applications is 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 other features such as ultra-low power standby, battery-low protection, system hard-off, etc. In this section, we'll illustrate the principle of ignition power control and operation modes.

### 4.1 Principles 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 is described in following diagram.



- When DC power is supplied to the system, 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.
- Once power-on delay expired, MCU turns on necessary standby power for the system (3.3VSB & 5VSB).
- 5. A PWRBTN# pulse is then issued to turn on the system (equivalent to one pressing the power button on the front panel).
- 6. The system is booting and becomes operational.
- 7. After a period of time, the ignition signal becomes 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. The system is completely shut down.
- 11.As MCU detects system is off, it turns off the standby power for the system, and operates in low power mode again (< 2mW power consumption).

### 4.2 Additional Features of Ignition Power Control

In addition to the typical timing correlation, the ignition power control module offers additional features to provide additional reliability for in-vehicle applications.

#### 1. Low battery detection

The ignition power control module continuously monitors the voltage of DC input when the system is operational. If input voltage is less than 11V (for 12VDC input) or less than 22V (for 24VDC input) over a 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 fail to shutdown via a soft-off operation due to system/ application halts. The ignition power control module offers a mechanism called "hard-off" to handle this unexpected condition. By detecting the system status, it can determine whether the system is shutting down normally. If not, the ignition power control module will force cut-off the system power 10 minutes after the power-off delay duration.

### 4. Smart off-delay

The ignition power control module offers two modes (mode 13 & mode 14) which have very long power-off delay duration for applications require additional off-line time to process after the vehicle has 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 has shutdown (by the application software) prior to power-off delay expiring, it will cut off the system power immediately to prevent further battery consumption.

# 4.3 Wiring Ignition Signal



### **Connector Pin Definition**

Signal	M12 panel side	Wire color
TXD1	1	
RXD1	2	
NC	3	x
PWR_IGN	4	
GND	5	
NC	6	x
RXD2	7	
TXD2	8	

To have ignition power control for in-vehicle usage, you need to supply IGN signal to the system. The IGN input is located on Pin 4, within the M12 A-coded COM1/2 port. Below is the typical wiring configuration for in-vehicle applications.

- 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.

### 4.4 Configure your Windows system

When applying ignition power control to your system, please make sure you've configured your Windows system to initiate a shutdown process when pressing the power button. By default, Windows 7/ 8/ 10 goes to sleep (S3) mode when power button is pressed. As sleep (S3) is not a complete shutdown behavior, the ignition control function does not recognize the finish of a normal shut down process and thus users will encounter a system hard-off (power cut-off after 10 minutes). Please configure "When I press the power button" to "Shut down" in your Windows system settings.

Power button settings



When I press the power button:

Shut down	
Do nothing	
Sleep	
Hibernate	
Shut down	

## 4.5 Accessing the Rotary Switch

To access the rotary switch, please refer to the section Disassembling the System.

 Please power off the system and disconnect all cables connected to the system. Place the system upside-down on a steady surface. Remove the ten (10) screws indicated, and safe keep for later use. Please separate the backplate from the system's enclosure.



2. The ignition control rotary switch can be located on the motherboard, shown below.



### 4.6 Operation Modes of Ignition Power Control



You can use the rotary switch to configure the operation mode. The system offers 16 (0~15) operation modes with different power-on/power-off delay configurations.

• 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 system.

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

Mode 1

Mode 1 is AT mode without power-on and power-off delay. The system automatically turns on when DC power is applied. A retry mechanism is designed to repeat the power-on cycle if the system fails 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 designed to have a very minor power on/ off delay of 160ms for applications that requires the system to start up almost at the same as the rest of the equipment it is working in collaboration with.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
2	160ms	160ms	10 minutes



10 minutes

### Mode 3 ~ Mode 12

6

7

8

9

10 (A)

11 (B)

12 (C)

	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		

1 minute

5 minutes

10 minutes

1 minute

10 minutes

30 minutes

30 minutes

Mode 3 ~ Mode 12 have various power-on delay and power-off delay. Each mode

### Mode 13 (D) / Mode 14 (E)

30 seconds

30 seconds

30 seconds

3 minutes

3 minutes

3 minutes

10 minutes

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 (D)	30 seconds	2 hours	10 minutes
14 (E)	3 minutes	2 hours	10 minutes
15 (F)	Reserved		

## 4.7 Reinstalling the Backplate

- 1. Once you have configured the ignition rotary switch, you are ready to re-secure the backplate.
- 2. Before doing so, please make sure the O-ring is properly seated in the groove around the chassis edges.
- 3. Please attached the backplate, and secure the plate using the original ten screws in the following incremental order, and at the torque force specified.



The recommended torque range for screws is 6.3 to 7.7 kgf-cm



O-ring seated properly in the groove



Attach the backplate, incremental screw order, and at a specified torque range (6.3 to 7.7 kgf-cm)

## 4.8 Ignition Control Setup

The following procedure demonstrates how to remove the backplate of a SEMIL-17XX series to gain access to the ignition control rotary switch.

Please power off the system and disconnect all cables connected to the system.
 Place the system upside-down on a steady surface. Remove the ten (10) screws indicated, and safe keep for later use. Please separate the backplate from the system's enclosure.



4. The ignition control rotary switch can be located on the motherboard, shown below.



5. Operation Modes of Ignition Control

You can use the rotary switch to configure the operation mode. The system offers 16 (0~15) operation modes with different power-on/power-off delay configurations.

#### Mode 0

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

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

#### Mode 1

Mode 1 is AT mode without power-on and power-off delay. The system automatically turns on when DC power is applied. A retry mechanism is designed to repeat the power-on cycle if the system fails 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 designed to have a very minor power on/ off delay of 160ms for

applications that require the system to start-up almost at the same as the rest of the equipment it is working in collaboration with.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
2	160ms	160ms	10 minutes

#### Mode 3 ~ Mode 12

Mode 3 ~ Mode 12 have various power-on delays and power-off delays. 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 (A)	3 minutes	10 minutes	10 minutes
11 (B)	3 minutes	30 minutes	10 minutes
12 (C)	10 minutes	30 minutes	10 minutes

#### Mode 13 (D) / Mode 14 (E)

Mode 13 and Mode 14 are ignition power control modes with very long power-off delays. 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 the system is off before the power-off delay expires.

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

### Mode 15 (F)

Reserved

- 6. Once you have configured the ignition rotary switch, you are ready to re-secure the backplate.
- 7. Before doing so, please make sure the O-ring is properly seated in the groove around the chassis edges.
- 8. Please attached the backplate, and secure the plate using the original ten screws in the following incremental order, and at the torque force specified.



The recommended torque range for screws is 6.3 to 7.7 kgf-cm



O-ring seated properly in the groove



Attach the backplate, incremental screw order, and at a specified torque range (6.3 to 7.7 kgf-cm)



# **5** System Configuration

# 5.1 BIOS Settings

The system is shipped with factory-default BIOS settings meticulously programmed for optimum performance and compatibility. In this section, we'll illustrate some of BIOS settings you may need to modify. Please always make sure you understand the effect of change before you proceed with any modification. If you are unsure of the function you are changing, it is recommended to change one setting at a time to see its effect(s).

nain Advanced Security Power Boot	EXIT		
BIOS Version Build Date	NV73A001. Build2004 04/13/2020	13	This is the help for the hour, minute, second field. Valid range is from 0 to
Processor Type System Bus Speed System Hemory Speed Cache RAM Total Memory System Time System Date	Intel(R) Core(TM) 100 HHz 2133 HHz 2048 KB 16384 HB [16:17:06] [11/25/2020]	i7-9700E CPU @ 2.60GHz	23, 0 to 59, 0 to 59. INCREASE/REDUCE : +/
F1Help1/1 SelEsc Exit+/+ Sel	ect Item ect Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit



Not all BIOS settings will be discussed in this section. If a particular setting/ function you are after requires specific BIOS settings but is not discussed in this section, please contact Neousys Technical Support staff.

### 5.1.1 COM Port Configuration

The system's <u>COM1/ COM2</u> ports support RS-232 (full-duplex) mode. Another option in BIOS called "*Slew Rate*" defines how sharp the rising/falling edge is for the output signal of COM1.

Advanced			
Peripheral Configuration			Set COM1 as RS-232 (Full-Duplex), RS422
COM1 HS Mode Set COM1 as Slew Rate RS-422/485 Termination	<enabled> <disabled> <rs-232> <low> <disabled></disabled></low></rs-232></disabled></enabled>		(Full-Duplex) or KS-405 (Half-Duplex).
COM2 HS Mode Set COM2 as Slew Rate RS-422/485 Termination	<enabled> <disabled> <rs-232> <low> <disabled></disabled></low></rs-232></disabled></enabled>		
COM3 HS Mode	<enabled> <d i="" sabled=""></d></enabled>	Set COM1 as	
COH4 HS Mode	<enabled> <d i="" sabled=""></d></enabled>	RS-422 RS-485	
COM5 (for Mez10) HS Mode	<enab led=""> <d i="" led="" sab=""></d></enab>		
COM6 (for Mezl0)	<disabled></disabled>		
HD Audio	<enabled></enabled>		
F1 Help Esc Exit	1/↓ Select Item +/→ Select Item	F5/F6 Change Values Enter Select ▶ SubMenu	F9 Setup Defaults F10 Save and Exit

#### To set COM port operating mode:

- 1. Press **F2** when the system boots up to enter the BIOS setup utility.
- 2. Go to [Advanced]  $\rightarrow$  [Peripheral Configuration].
- 3. Set the **[Set COM1 Mode as]** option to the desired mode.
- 4. Once set, press **F10** to save setting and exit.

#### 5.1.2 COM Port High Speed Mode

The high speed mode of each COM port effectively allows for the port's baud rate generator to operate at 8x the speed with an effective baud rate of 921,600 bps (115,200 x 8). Please refer to the following instructions on how to enable the high speed mode for your COM port (COM1 used as an example).

Advanced			
Peripheral Configuration			Enable/Disable high-speed mode for COM1.
COM1	(Enabled)		when enabled, input clock for badd rate
HS Mode	<pre>chaldesid&gt;</pre>		Consequently band rate configured in
Set CON1 as	CDS-2325		user's annication uill actually operate
Slev Rate	slines		at 8x sneed. This ontion allows a
RS-422/485 Termination	<d i="" led="" sab=""></d>		maximal baud rate of 921,600 bps
			(115, 200 x 8) for COH1.
COM2	<enabled></enabled>		
HS Hode	<disabled></disabled>		
Set COM2 as	<rs-232></rs-232>		
Slew Rate	<low></low>		
RS-422/485 Termination	<disabled></disabled>		
COM3	<enabled></enabled>		
HS Mode	<disabled></disabled>	HS Mode	
COM4	<enabled></enabled>	Disabled	
HS Hode	<disabled></disabled>	Enabled	
COM5 (for Hezlo)	<enabled></enabled>		
HS Mode	<disabled></disabled>		
COM6 (for Hezlo)	<disabled></disabled>		
HD Audio	<enabled></enabled>		
F1			
FI Help Esc Exit	F/→ Select Item	F57F6 Change Values	FV Setup Defaults
	VERGE FILLI		IN VOIC ON LAIL

#### To set COM port high speed mode:

- 1. Press **F2** when the system boots up to enter the BIOS setup utility.
- 2. Go to [Advanced] > [Peripheral Configuration].
- 3. Enable or set the [Set COM1 Mode as] option to the desired mode.
- 4. Highlight **[HS Mode]** and press ENTER to bring up options, highlight **[Enable]** and press ENTER.
- 5. Once set, press **F10** to save setting and exit.

### 5.1.3 Delay for PEG Initialization

This setting offers delay in milliseconds for PEG port initialization and PCI enumeration. By increasing the delay value, it may eliminate compatibility issue(s) with some PCIe add-on cards.

Advanced		
PEG Port Configuration		Delay in milli-seconds for PEG port
x8 PEG Port	Not Present	Increasing this value may beln to
Enable Root Port	<enabled></enabled>	eliminate compatibility issue with some
May Link Speed	Auto	DC lo add-on carde
	shu to?	
v8 PEG Port	Not Present	
Enable Root Port	<enabled></enabled>	
May Link Sneed		
	shu tor	
Delay for PEG Init	[100]	
	[Yes] [No]	
F1 Help	t Item F5/F6 Change Values	F9 Setup Defaults
Esc Exit +/+ Select	t Item Enter Select ► SubMenu	F10 Save and Exit

#### To set PEG delay in milliseconds:

- 1. When system boots up, press F2 to enter BIOS setup utility.
- Go to [Advanced] > [System Agent (SA) Configuration] > [PEG Port Configuration] > [Delay for PEG Init] and press ENTER.
- 3. A small window appears and you may enter a maximum delay value of up to 30,000ms.
- 4. When done, press F10 to "Exit Saving Changes"

### 5.1.4 SATA Configuration

The SATA controller of your system supports two (2) operating modes: AHCI and Intel RST Premium With Intel Optane System Acceleration mode. The AHCI mode, which exposes SATA's advanced capabilities such as hot swapping and native command queuing, is supported in several later version of operating systems. The Intel RST Premium With Intel Optane System Acceleration mode allows the user to greatly accelerate SATA hard drive read/ write speeds by installing an Optane memory into the M.2 slot. Please refer to the section "Intel RST Premium With Intel Optane System Acceleration" for details.

Advanced				
SATA And RST Configuration				Determines how SATA controller(s)
SATA Controller(s) SATA Mode Selection	د د	<enabled> <ahcl></ahcl></enabled>		operate.
SATA Port #1 Port Enable/Disable SATA Device Type SATA Port #2 Port Enable/Disable Hot Plug SATA Device Type	E	Empty SEnabled> SHard Disk Drive> Empty SEnabled> Oisabled> SHard Disk Drive>		
mSATA Port Enable/Disable SATA Device Type M.2 2242 B-key Port Enable/Disable SATA Device Type	AHCI Intel R	SATA Hode ST Premium With Inte «Solid State Drive»	e Selection el Optane System Acceler	ration
M.2 2280 H-key Port Enable/Disable SATA Device Type	E	Empty ≪Enabled> «Solid State Drive>		
F1 Help Esc Exit	1/1 Select   +/+ Select	l tem I tem	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

Recommended SATA controller mode settings:

- If you're using Windows 10, or Linux with kernel 4.15.18 or later, you can select
  AHCI mode for better performance.
- If you are looking for faster hard drive read/ write performance, please install an SSD (M.2, mPCIe, SATA) or install an Intel<sup>®</sup> Optane<sup>™</sup> memory for hard drive acceleration.

#### To set SATA controller mode:

- 1. When system boots up, press F2 to enter BIOS setup utility.
- 2. Go to [Advanced] > [SATA Configuration].
- 3. Highlight the SATA, mSATA or M.2 port you wish to set and press ENTER to bring up setting options. Scroll to and highlight the setting you wish to set and press ENTER.

Advanced				
SATA And RST Configuration				Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
SATA Controller(s) SATA Mode Selection		Enabled> AHCl>		
SATA Port #1 Port Enable/Disable SATA Device Type SATA Port #2	E	impty Enabled> Hard Disk Drive>		
Hot Plug SATA Device Type	• •	Enabled> Disabled> Hard Disk Drive>		
mSATA Port Enable/Disable SATA Device Type	E	Empty Enabled> SATA Solid Stat	Device Type	
M.2 2242 B-key Port Enable/Disable SATA Device Type	E	Empty Solid Enabled> Solid State Drive	State Drive	
M.2 2280 M-key Port Enable/Disable SATA Device Type	E	mpty ∉nabled> Solid State Drive	>	
F1 Help Esc Exit	1/↓ Select +/→ Select	ltem ltem	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

- 4. Repeat step 3 to set other SATA ports.
- 5. Press F10 to "Exit Saving Changes".

### 5.1.5 TPM Availability

Trusted Platform Module (TPM) is a hardware-based cryptoprocessor to secure hardware by integrating cryptographic keys into devices. The system is designed with on-board TPM 2.0 module. As TPM 2.0 requires 64-bit Windows 10 with UEFI boot mode, it is enabled in BIOS by default.

Main Advanced Security Power Boot	Exit	
Current TPM Device TPM State TPM Active PCR Hash Algorithm TPM Hardware Supported Hash Algorithm BlOS Supported Hash Algorithm TrEE Protocol Version TPM Availability TPM Operation Clear TPM	<tpm (ftpm)="" 2.0=""> All Hierarchies Enabled, Owned SHA1, SHA256 SHA1, SHA256 SHA1, SHA256, SM3_256 &lt;1.1&gt; <available> <no operation=""> [ ]</no></available></tpm>	When Hidden, don't exposes TPM to O
Supervisor Password	Not Installed	
Set Supervisor Password	TPH Availability Available Hidden	
F1 Help 1/4 Selec	t Item F5/F6 Change Values	F9 Setup Defaults
Esc Exit +/+ Selec	t Item — Enter Select ▶ SubMenu	FIO Save and Exit

To enable TMP availability:

- 1. When system boots up, press F2 to enter BIOS setup utility.
- 2. Go to **[Security] > [TPM Availability]**, press Enter to bring up Options, Available/ Hidden.
- 3. Highlight your selection, press Enter and press F10 to "Exit Saving Changes".
#### 5.1.6 Auto Wake on S5

When the system is set to operate in S5 state, the user can specify a time to turn on the system, daily or monthly.



Highlight your selection, press ENTER and press F10 to "Exit Saving Changes".

#### 5.1.7 Power On After Power Failure Option

This option defines the behavior of system series when DC power is supplied.

Main Advanced Security	Power Boot Exit		
▶CPU Configuration ▶Power & Performance			Specify what state to go to when power is re-applied after a power failure (G3 state).
PoE Enable Vake on LAN Auto Vake on S5	<enabled> <disabled <disabled< td=""><td>&gt;</td><td></td></disabled<></disabled </enabled>	>	
Power On after Power Failur	e <\$5 - Pow	er Off>	
	Po SO SS	wer On after Power Failure - Power On - Power Off	
F1 Help Esc Exit	1/↓ Select Item ←/→ Select Item	F5/F6 Change Values Enter Select ト SubMenu	F9 Setup Defaults F10 Save and Exit
Value	Description		
S0 – Power On	System is power	ed on when DC power is	supplied.
S5 – Power Off	System is kept ir	n off state when DC powe	er is supplied.

To set "Power On after Power Failure" option:

- 1. When system boots up, press F2 to enter BIOS setup utility.
- 2. Go to [Power] > [Power On after Power Failure].
- Scroll down to highlight [Power On after Power Failure], press ENTER to bring up setting options, S0 – Power On or S5 – Power Off, and press ENTER to select the setting.
- 4. Press F10 to "Exit Saving Changes".

#### 5.1.8 Power & Performance (CPU SKU Power Configuration)

The system supports various 8th Gen Coffee Lake LGA1151 CPUs. A unique feature, **"SKU Power Config**" is implemented in BIOS to allow users to specify user-defined SKU power limit. Although the system is designed to have best thermal performance with CPUs of 35W TDP, you can install a 65W CPU and limit its SKU power (to 35W) to obtain more computing power. This feature gives you the flexibility of CPU selection and great balance between computing power and operating temperature range.

Flower		
Power & Performance	Late1(D) Cove(TH) :7-0700E CDU 0 2 60CUz	Configure SKU power limit according to performance consideration and operating conviruement
Package TDP Linit	65 W	environment.
SKU Power Config	<Мак. TDP>	
PCPU - Pover & Performance Control PGT - Power & Performance Control	SKU Pover Config Hax. TDP 45 W 35 W 25 W 15 W	
F1 Help t/4 Select	: Item F5/F6 Change Values	F9 Setup Defaults
Esc Exit +/+ Select	t Item — Enter Select⊁SubMenu	F10 Save and Exit

To configure the CPU SKU power limit:

- 1. When the system boots up, press F2 to enter BIOS setup utility.
- 2. Go to [Power]  $\rightarrow$  [Power & Performance].
- 3. Select a proper value of SKU power limit for [SKU Power Config] option.
- 4. Press F10 to "Exit Saving Changes".

#### 5.1.9 Wake on LAN Option

Wake-on-LAN (WOL) is a mechanism which allows you to turn on your System series via Ethernet connection. To utilize Wake-on-LAN function, you have to enable this option first in BIOS settings. Please refer "<u>Powering On Using Wake-on-LAN</u>" to set up the system.



To enable/disable "Wake on LAN" option:

- 1. When system boots up, press F2 to enter BIOS setup utility.
- 2. Go to [Power] > [Wake on LAN].
- 3. Press Enter to bring up setting options, scroll to the setting you desire and press Enter to set.
- 4. Press F10 to "Exit Saving Changes.

#### 5.1.10 Boot Menu

The Boot menu in BIOS allows you to specify the system's boot characteristics by setting bootable device components (boot media) and method. Or, you may press F12 upon system start up and select a device you wish boot from.

Hain Advanced Security	Power Boot Exit		
Boot Type Quick Boot Quict Boot Network Stack PXE Boot Capability Add Boot Options ACP1 Selection USB Boot EF1 Device First Timeout Automatic Failover WDT for Booting PLegmoy	<ul> <li>Clual Boot</li> <li>Cnabled&gt;</li> <li>Clisabled&gt;</li> <li>Clisabled&gt;</li> <li>Clisabled&gt;</li> <li>Clast&gt;</li> <li>Capi5.0&gt;</li> <li>Cnabled&gt;</li> <li>Clisabled&gt;</li> <li>(3)</li> <li>(0) sabled&gt;</li> <li>(3) sabled&gt;</li> <li>(4) sabled&gt;</li> <li>(3)</li> <li>(4) sabled&gt;</li> </ul>	fyne>	Legacy Boot Order Settings
Fl Help Esc. Exit	1/1 Select item +/4 Select item	F5/F6 Change Values Enter Select > Subhenu	F9 Setup Defaults F10 Save and Exit
F1 Help Est Exit	1/1 Select Iten +/4 Select Iten Option	F5/F6 Change Values Enter Select * Subferio Description	F9 Setup Defauits F10 Save and Exit
F1     Help       Est Exit       Value       Boot Type	1/1 Select 1ter       +/4 Select 1ter       Option       Dual Boot Type	F5/F6 Change Values       Enter Select > Subtemu       Description       Both legacy and EFI b	F9 Setup Defaults F10 Save and Exit
El Heip Esc Exit Value Boot Type	1/1 Select 1 ten       -/- Select 1 ten       Option       Dual Boot Type	Ef5/F6 Change Values Enter Select > Subtem           Description           Both legacy and EFI to approved as boot mer	59 Setup Defaults F10 Save and Exit
F1     Heip       Esc. Exit       Value       Boot Type	1/1: Select 1 tes       Option       Dual Boot Type       Legacy Boot	Ef5/F6 Change Values Enter Select * Subtem           Description           Both legacy and EFI Is approved as boot med           Only legacy boot med	P9 Setup Defaults F10 Save and Exit
Fl Help Esc Exit Value Boot Type	1/1: Select 1 tes       Option       Dual Boot Type       Legacy Boot       Type	Ef5/F6 Change Values Enter Select * Subtem         Description         Both legacy and EFI k approved as boot meet Only legacy boot meet boot media.	P9 Setup Defaults F10 Save and Exit
Value Boot Type	1/1: Select 1 test         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type	Ef5/F6 Change Values Enter Select * Subtem         Description         Both legacy and EFI k approved as boot med Only legacy boot med boot media.         Only UEFI boot medi	P9 Setup Defaults F10 Save and Exit
Value Boot Type	1/1: Select 1 tes         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type	Effect Change Values         Enter Select > Subleme         Description         Both legacy and EFI Is         approved as boot media         Only legacy boot media.         Only UEFI boot media         boot media.	P9 Setup Defaults F10 Save and Exit
Eac. Exit         Value         Boot Type         Quick Boot	1/1: Select 1 ten         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type         Enabled	Description         Both legacy and EFI to approved as boot media.         Only legacy boot media.         Only UEFI boot media.         The system starts up	P9       Setter Defaults         F10       Save and Exit         cooot media listed are         dia.         dia listed are approved as         a listed are approved as         faster because BIOS skips
Ext Here         Value         Boot Type         Quick Boot	1/1: Select 1 ten         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type         Enabled	ISING Change Values Enter Select > Subtem         Description         Both legacy and EFI to approved as boot med         Only legacy boot media.         Only UEFI boot media         boot media.         The system starts up various hardware fun	P9 Setter Defaults F10 Save and Exit poot media listed are dia. dia listed are approved as a listed are approved as faster because BIOS skips ction tests
Ext Boot         Value         Boot       Type         Quick       Boot	1/1: Select 1 test         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type         Enabled         Disabled	ISING Change Values Enter Select > Subtem         Description         Both legacy and EFI k approved as boot meet Only legacy boot meet boot media.         Only UEFI boot medi boot media.         Only UEFI boot medi boot media.         The system starts up various hardware fun         The system starts up	P9       Setter Defaults         F10       Save and Exit         cooot media listed are         dia.         dia listed are approved as         a listed are approved as         faster because BIOS skips         ction tests         slower because BIOS goes
Ext Boot         Value         Boot       Type         Quick       Boot	1/1: Select 11ee         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type         Enabled         Disabled	E5/F6 Change Values Enter Select > Subition         Description         Both legacy and EFI I         approved as boot media         Only legacy boot media.         Only UEFI boot media         boot media.         The system starts up         various hardware fun         The system starts up         through various hardware	P9 Setep Defaults F10 Save and Exit Dooot media listed are dia. dia listed are approved as a listed are approved as faster because BIOS skips ction tests slower because BIOS goes ware functions tests
Value         Boot Type         Quick Boot         Quick Stack	1/1: Select 11ee         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type         Enabled         Disabled         Enabled	ISING Change Values Enter Select > Subtem         Description         Both legacy and EFI Is approved as boot med boot media.         Only legacy boot med boot media.         Only UEFI boot medi boot media.         The system starts up various hardware fun         The system starts up through various hardware         The system starts up         The system is availab	P9       Setter Defaults         F10       Save and Exit         cooot media listed are       dia.         dia.       dia listed are approved as         a listed are approved as       faster because BIOS skips         ction tests       slower because BIOS goes         ware functions tests       ole for network access
Fill Heim         Value         Boot Type         Quick Boot         Quick Boot         Network Stack	1/1: Select 11ee         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type         Enabled         Disabled         Enabled	ISING Change Values Enter Select > Subtem         Description         Both legacy and EFI I         approved as boot med         Only legacy boot med         boot media.         Only UEFI boot medi         boot media.         The system starts up         various hardware fun         The system starts up         through various hardware         The system is availab         using UEFI.	P9 Setep Defaults F10 Save and Exit Dooot media listed are dia. dia listed are approved as a listed are approved as faster because BIOS skips ction tests slower because BIOS goes ware functions tests ole for network access
Value         Boot Type         Quick Boot         Network Stack	1/1: Select 1 test         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type         Enabled         Disabled         Enabled         Disabled	IS/F6 Change Values Enter Select > Subtem         Description         Both legacy and EFI to approved as boot media         Only legacy boot media.         Only UEFI boot media         Donly UEFI boot media.         The system starts up various hardware fun         The system starts up through various hardware fun         The system is availab         using UEFI.         The system is not availab	P9       Setter Defaults         F10       Sever and Exit         cooot media listed are       dia.         dia.       dia         dia listed are approved as       a         a listed are approved as       faster because BIOS skips         ction tests       slower because BIOS goes         ware functions tests       ole for network access         ailable for network access       ailable for network access
Value         Boot Type         Quick Boot         Network Stack	1/1: Select 1 test         Option         Dual Boot Type         Legacy Boot         Type         UEFI Boot Type         Enabled         Disabled         Disabled         Disabled	IS/F6 Change Values         Description         Both legacy and EFI I         approved as boot meet         Only legacy boot meet         boot media.         Only UEFI boot medi         boot media.         The system starts up         various hardware fun         The system starts up         through various hardware fun         The system is availab         using UEFI.         The system is not availab         using UEFI.	P9 Setter Defaults F10 Save and Exit poot media listed are dia. dia listed are approved as a listed are approved as faster because BIOS skips ction tests slower because BIOS goes ware functions tests ble for network access

capability		eXecution Environment (PXE) is not supported
	Enabled	By enabling the PXE boot, one can choose to
		boot via I219 Only/ I210 Only or All NICs.
Add Boot Options	First	Newly detected boot media are placed at the top
		of the boot order.
	Last	Newly detected boot media are placed at the
		bottom of the boot order.
ACPI Selection	1.0B/ 3.0/ 4.0/	Advanced Configuration and Power Interface
	5.0/ 6.0	allows the operating system to control system
		power management
USB Boot	Enabled	Allow boot from bootable USB devices.
	Disabled	Does not allow boot from bootable USB devices
EFI Device First	Enabled	Set to boot bootable EFI media first.
	Disabled	Will not boot bootable EFI media first.
Timeout	1, 2, 3, etc (in	Boot delay time in seconds to give the user time
	seconds)	to activate the hotkey to access the BIOS
Automatic	Enabled	Automatically checks for the next bootable
Failover		device when the set default device fails.
	Disabled	Will only boot from the designated device.
WDT for	Disabled, 1, 3, 5,	WDT ensures a successful system boot by
<u>booting</u>	10 (minutes)	specifying a timeout value

#### 5.1.11 Boot Type (Legacy/ UEFI)

The system supports both Legacy and Unified Extensible Firmware Interface (UEFI) boot modes. UEFI is a specification proposed by Intel to define a software interface between operating system and platform firmware. Most modern operating systems, such as Windows 7/ 8/ 10 and Linux support both Legacy and UEFI boot modes. The Legacy boot mode uses MBR partition for disk and VBIOS for video initialization, the UEFI boot mode uses GPT partition which supports greater than 2TB partition size and GOP driver for faster video initialization.



# **NOTE**

If you choose Legacy mode, you will not be able to create disk partitions greater than 2TB or use TPM 2.0 function.

To configure Boot Type:

- 1. When system boots up, press F2 to enter BIOS setup utility.
- Go to [Boot]>[Boot Type], press Enter to bring up options, Dual Boot (Legacy+UEFI), Legacy Boot Type, UEFI Boot Type.
- 3. Highlight your selection and press Enter.
- 4. Press F10 to "Exit Saving Changes".

#### 5.1.12 Boot Option for Newly Added Device

The "Add Boot Options" allow you to determine whether a newly added device (eg. USB flash disk) is to boot as the first device to boot or the last in the boot sequence.

To set the newly-installed boot device as the first or last boot device:

- 1. Press **F2** when the system boots up to enter the BIOS setup utility.
- 2. Go to [Boot] > [Add Boot Options] menu.
- 3. Select [First] or [Last] for your newly-added boot device and press ENTER.

Hain Advanced Security Power	Boot Exit	
Hain Advanced Security Power Boot Type Quick Boot Quiet Boot Network Stack PXE Boot capability Add Boot Options Add Boot Options AdPI Selection USB Boot EFI Device First Timeout Automatic Failover VDI for Booting PLegacy	Boot Exit <dual boot="" type=""> <enabled> <disabled> <disabled> <cisabled> <acpi5.0> <enabled> <enabled> <i ast=""> <acpi5.10> <enabled> <i ast=""> <acpi5.10> <enabled> <i ast=""> <acpi5.10> <enabled> <i ast=""> <acpi5.10> <enabled> <i ast=""> <i ast=""></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></enabled></acpi5.10></i></enabled></acpi5.10></i></enabled></acpi5.10></i></enabled></acpi5.10></i></enabled></enabled></acpi5.0></cisabled></disabled></disabled></enabled></dual>	Position in Boot Order for Shell, Network and Renovables
WDT for Booting PLegacy	<disabled> Add Boot Option First Last Auto</disabled>	
F1 Help 1 Esc Exit +	//Selectitem F5/F6Ch /≯Selectitem EnterSe	ange Values F9 Setup Defaults lect ► SubHenu F10 Save and Exit

4. Highlight your selection and press Enter, press F10 to "Exist Saving Changes".

#### 5.1.13 Watchdog Timer for Booting

The watchdog timer secures the boot process by means of a timer. Once the timer expires, a reset command is issued to initiate another booting process. There are two options in BIOS menu, "*Automatically after POST*" and "*Manually after Entering OS*". When "*Automatically after POST*" is selected, the BIOS automatically stops the watchdog timer after POST (Power-On Self Test) OK. When "*Manually after Entering OS*" is selected, the user must stop the watchdog timer once booted into the OS. This guarantees the system can always boot into the OS, otherwise another booting process will be initiated. For information about programming watchdog timer, please refer to <u>Watchdog Timer & Isolated DIO</u>.

Hain Advanced Security Pow	wer Boot Exit		
Boot Type Quick Boot Quiet Boot Network Stack PXE Boot capability Add Boot Options ACP1 Selection USB Boot EFI Device First Tinecout Automatic Failover VDT for Booting PLegacy	<ul> <li>Oual Boot Tyy</li> <li>Enabled&gt;</li> <li>Chabled&gt;</li> <li>Oisabled&gt;</li> <li>Oisabled&gt;</li> <li>Clast&gt;</li> <li>Acpi5.0&gt;</li> <li>Chabled&gt;</li> <li>I31</li> <li>Oisabled&gt;</li> <li>Oisabled&gt;</li> <li>I31</li> <li>Oisabled&gt;</li> <li>Oisabled&gt;</li> </ul>	WDI for Booting Disabled 1 Hin. 3 Hin. 10 Hin.	Disable/Set watchdog timer for system booting. If the system can not boot up successfully within the given timer value, watchdog timer will reset the system for anothing booting process.
F1 Help Esc Exit	1/1 Select Item +/→ Select Item	F5/F6 Change Values Enter Select ► SubMenu	F9 Setup Defaults F10 Save and Exit

To set the watchdog timer for boot in BIOS:

- 1. When system boots up, press F2 to enter BIOS setup utility.
- 2. Go to [Boot] menu.
- 3. Disable or select timeout value for **[WDT for Booting]** option.
- 4. Once you give a timeout value, the **[WDT Stop Option]** option appears. You can select *"Automatically after POST"* or *"Manually after Entering OS"*.
- 5. Press F10 to "Exit Saving Changes.

#### 5.1.14 Selecting Legacy/ UEFI Boot Device

When you wish to set a designated boot device, you may set it as the first device to boot in Legacy or UEFI Boot Device setting. Or if you wish to manually select a boot device, you may do so by pressing F12 when the system boots up.

	Boot		
Boot Device Priority			List the boot option by device type or
Boot Menu	<by device<="" td=""><td>&gt;</td><td>by device.</td></by>	>	by device.
USB FLASH DRIVE	[X]		
		Boot Menu By Device Type By Device	
F1 Help Esc Exit	1/1 Select Item	F5/F6 Change Values	F9 Setup Defaults F10 Save and Exit

To set boot order for devices in UEFI Boot Device:

- 1. When system boots up, press F2 to enter BIOS setup utility
- 2. Go to [Boot] > [UEFI Boot Device]
- Highlight the device you wish to make boot order changes to and press F5/ F6 or +/
  to change device boot order.

To select boot order for devices in Legacy Boot Device:

- 1. When system boots up, press F2 to enter BIOS setup utility
- Go to [Boot] > [Legacy Boot Device], you can choose the type of device to boot list by selecting "By Device" or "By Device Type".
- Highlight the device or device category you wish to make boot order changes to and press F5/ F6 or +/ - to change device boot order.

# 5.2 AMT Configuration

Intel® AMT (Active Management Technology) is a hardware-based technology for remotely managing target PCs via Ethernet connection. The system supports AMT function via its Ethernet port implemented with Intel I219-LM. Prior to using AMT to remotely control the system, you need to configure AMT password and network settings.

1. Connected Ethernet cable to I219-LM port (indicated in green).



2. When the system boots up, press F10 to enter the MEBx configuration menu.

Intel(R) Management Eng Copyright(C)	jine BIOS Extension v11.0.0.0005/1 2003-15 Intel Corporation. All R	ntel(R) ME v11.0.25.3001 lights Reserved
	MAIN MENU	
MEBx Login > Intel(R) ME General Settings > Intel(R) AMT Configuration MEBx Exit		
Intel(R) ME Password		
[†↓]=Move Highlight	[Enter]=Select Entry	[Esc]=Exit

3. Highlight MEBx Login and press Enter, a prompt will appear asking for password. The default password is "admin". For further MEBx configuration details, please refer to <u>Intel® MEBX User Guide</u>.

# 5.3 RAID Volume Configuration

To set up a RAID 0 or 1 volume in Legacy or UEFI mode, you need to have at least two hard drives or SSDs installed. The system supports RAID configurations in RAID 0 (striping) or RAID 1 (mirror) mode. Users can select the configuration that best suit their needs with RAID 0 (striping) mode offering better hard drive read/ write performances while RAID 1 (mirror) offers better data security.

# 

Please back up hard drive data before you create or modify RAID volume(s) as the process may cause irreversible data deletion. When creating a RAID volume, it is also recommended to use hard drives from the same batch (same brand, model, capacity, rpm rate, etc.) to avoid performance or capacity allocation issues.

#### 5.3.1 Legacy Mode RAID Configuration

To set up RAID configuration, you need to pre-configure the SATA mode setting in the BIOS. Please refer to the following steps:

- 1. When system boots up, press **F2** to enter BIOS setup utility.
- Go to [Advanced] > [SATA And RST Configuration] > [SATA Mode Selection] > highlight [Intel RST Premium With Intel Optane System Acceleration] and press ENTER.



3. Go to [Boot] > highlight [Legacy Boot Type] and press ENTER to set boot type.



- 4. Press F10 to "Exit Saving Changes" and reboot the system.
- 5. When the system reboots, press **[Ctrl + I]** to enter the RAID configuration utility.
- 6. Once you're in the Configuration Utility, highlight [Create RAID Volume] and press ENTER.

Intel(R) Ra Copyrigi	ipid Storage Technolo it (C) Intel Corporat	gy - Option ROM - 16.7.0.3513 ion. All rights reserved.
1. Create 2. Delete 3. Reset I RAID Volumes: None defined	RAID Volume RAID Volume Jisks to Non-RAID DISK/VOLUME	4. Recovery Volume Options 5. Acceleration Options 6. Exit INFORMATION J
Physical Devices: ID Device Model Ø Samsung SSD 85 1 Samsung SSD 85	Serial # 50 S39FNCAJ401483A 50 S39FNCAJ401481T	Size Type/Status(Vol ID) 476.9GB Non-RAID Disk 476.9GB Non-RAID Disk

The following screen allows you to enter the Name of the RAID volume you wish to create.
 Enter a name and press ENTER to access the RAID Level setting.

Intel(R) Rapid Storage Copyright (C) Intel [ C	Technology - Option ROM - 16.7.0.3513 Corporation. All rights reserved. REATE VOLUME MENU ]
Name: RAID Level: Disks: Strip Size: Capacity: Sync:	Dolume1 RAID0(Stripe) Select Disks 64KB 953.9 GB N/A Create Volume
Enter a unique volume na 16	[ HELP ] me that has no special characters and is characters or less.

 For RAID Level, use the up and down arrow key to select between RAID0 (Stripe) or RAID1 (Mirror) settings. Select a RAID mode and press ENTER to access Stripe Size setting (not applicable to Mirror mode).

Intel(R) Rapid Storage Copyright (C) Intel [ C	Technology - Option ROM - 16.7.0.3513 Corporation. All rights reserved. REATE VOLUME MENU ]	
Name: RAID Level: Disks: Strip Size: Capacity: Sync:	Volume1 RAIMG(Stripe) Select Disks 64KB 953.9 GB N/A Create Volume	
	E HELP ]	
RAID 0: Stripes data (performance).		

For Stripe Size, use the up and down arrow key to select between 4KB, 8KB, 16KB, 32KB, 64KB, 128KB for your RAID volume stripe size and press ENTER to access the Capacity setting.

Intel(R) Rapid Storage Technology - Option ROM - 15.7.0.3513 Copyright (C) Intel Corporation. All rights reserved. [CREATE VOLUME MENU] Name: Volume1 RAID Level: RAID0(Stripe) Disks: Select Disks Strip Size: Capacity: 953.9 GB Sync: N/A Create Volume [HELP] The following are typical values: RAID0 - 128KB RAID10 - 64KB RAID5 - 64KB

\*RAID1(Mirror) does not offer Stripe Size options.

10. You may enter the RAID volume capacity you wish to create at this step and press the Enter key to complete your RAID settings. By default, the maximum capacity will be applied. Once you have entered a capacity, press ENTER to confirm.



11. Reviewed your settings and if you wish to change any setting(s), you will need to press [ESC] and start again from Step 5. If all settings are correct and you wish to continue, with "Create Volume" highlighted, press ENTER to begin creating the RAID volume.



12. A data deletion warning will appear, enter "Y" to continue and "N" to stop the volume creation process.

Intel(R) Rapid Storage Technology - Option ROM - 16.7.0.3513 Copyright (C) Intel Corporation. All rights reserved. [ CREATE VOLUME MENU ]	
Name: Volume1 RAID Level: RAIDO(Stripe) Disks: Select Disks Strip Size: 128KB Capacity: 953.9 GB Sync: N/A	
HARNING: ALL DATA ON SELECTED DISKS WILL BE LOST. Are you sure you want to create this volume? (Y/N):	
Press ENTER to create the specified volume.	

13. Once the RAID volume has been created, the configuration utility will bring you back to the main screen showing the RAID volume and their member disks.



14. The above process was to create a RAID-0 volume. If you wish to create a RAID-1 volume, please perform steps 5 to 13 in this section and select RAID-1 during step 8.

#### 5.3.2 UEFI Mode RAID Configuration

To enable RAID functionality in UEFI mode:

- 1. When system boots up, press F2 to enter BIOS setup utility.
- Go to [Advanced] > [SATA And RST Configuration] > [SATA Mode Selection] > highlight [Intel RST Premium With Intel Optane System Acceleration] and press ENTER.

Advanced			
SATA And RST Configuration			Determines how SATA controller(s)
SATA Controller(s) SATA Hode Selection	< <u>Enabled</u> > <intel prenium<br="" rst="">System Acceleration</intel>	With Intel Optane	uper a te.
▶Software Feature Mask Configuration			
SATA Port #1 Port Enable/Disable SATA Device Type SATA Port #2	Empty <enabled> <hard disk="" drive=""> Empty</hard></enabled>		
Hot Plug	<disabled></disabled>		
SATA Device Type mSATA Port Enable/Disable A SATA Device Type	SATA Nor HCI ntel RST Premium With In	le Selection tel Optane System Accele	ration
H.2.2242 B-key Port Enable/Disable SATA Device Type	Enpty <enabled> &lt;\$olid \$tate Drive:</enabled>	,	
M.2 2280 M-key Port Enable/Disable SATA Device Type	Empty <enabled> <solid drive≥<="" state="" th=""><th>×</th><th></th></solid></enabled>	×	
F1 Help Esc Exit+/+ \$	elect Iten elect Iten	F5/F6 Change Values Enter Select ▶ SubMenu	F9 Setup Defaults F10 Save and Exit

3. Go to [Boot], highlight [UEFI Boot Type] and press ENTER to set boot type.



- 4. Press F10 to "Exit Saving Changes" and reboot the system.
- 5. When the system reboots, press [F3] to enter the Configuration Utility.
- 6. Once you're in the Configuration Utility, highlight [Intel® Rapid Storage Technology] and press ENTER.



 The following screen shows Non-RAID physical disks and the option "Create RAID Volume". Highlight "Create RAID Volume" and press ENTER to begin creating your RAID volume.



8. The Name option allows you to name your RAID volume. Press ENTER when ready to go to the next option.

	Intel(R) Ra	pid Storage Technology	
Intel(R) Rapid Storage Technology			
Create RAID Volume			Enter a unique volume name that has no special characters and is 16 characters .
Name:	Volune 1		or less.
RAID Level:	<raido (stripe)<="" th=""><th>0</th><th></th></raido>	0	
Select Disks:			
SATA 0. 0, Samsung SSD 850 PR0 51266	} <>		
SATA 0.1. Samsung SSD 850 PR0 512G			
\$39FNCAJ401481T, 476.9GB			
Strin Size:	<16KB>		
Capacity (MB):	[0]		
▶Create Volume			
Select at least two disks			
F1 Help 1/4	Select Item	F5/F6 Change Values	F9 Setup Defaults
Esc Exit +/+	Select Item	Enter Select 🕨 SubMenu	F10 Save

 The RAID Level option allows you to select RAID-0 (stripping) or RAID-1 (mirror) for your RAID volume. Press ENTER when ready.

Intel(R) Rapid Storage Technology       Create RAID Volume       Name:     Volume1       MID Level: <raidd (stripe)="">       Select Disks:     Sansang SD 850 PR0 5120B     &lt; &gt;       SGPRCA.M01483A, 476.90B     &lt; &gt;       Strip Size:     &lt;18KB&gt;       Capacity OBD:     101       PCreate Volume     RAIDD Level:       Select at least two disks     Intel Centrol       Recovery     Raid Centrol</raidd>		IntelO	R) Rapid Storage Technology	
Create KAID Volume     Select RAID Level       Name:     Volume1       AAID Level:     cAAIDD (Stripe)>       Select Disks:     SAIA 0.0, Sansang S50 850 PR0 5126B     < >       SGFKCAAUA0433A, 476.90B     < >       Strip Size:     c16KB>       Capacity OBD:     101   Preate Volume Select at least two disks       Select at least two disks     RAID Level:   RAID Chrimop Recovery Et help 1/4 Select Itm For Part Part Part Part Part Part Part Par	Intel(R) Rapid Storage Technology			
Name:     Volume1 dAID0 (Stripe)>       Sefect Disks:     dAID0 (Stripe)>       Safa 0.0, Sansung SSD 850 PR0 5126B     < >       SafA 0.1, Sansung SSD 850 PR0 5126B     < >       SafA 0.1, Sansung SSD 850 PR0 5126B     < >       SafA 0.1, Sansung SSD 850 PR0 5126B     < >       SafA 0.1, Sansung SSD 850 PR0 5126B     < >       SafA 0.1, Sansung SSD 850 PR0 5126B     < >       SafA 0.1, Sansung SSD 850 PR0 5126B     < >       Strip Size:     < 16KB>       Capacity OffB1:     101       PCreate Volume     RAID Level:       Select at least two disks     RAID Citripe)       Recovery     Recovery	Create RAID Volume			Select RAID Level
Select Disks:       SATA 0. 0, Sansung SSD 850 PR0 5126B       < >         S39FNCA.401483A, 476.96B       < >         Strip Size:       < 10KB>         Capacity (HB):       101         *Create Volume       RAID Level:         Select at least two disks       RAID (Strips)         Recovery       RAID (Strips)         Recovery       Recovery	Name: RAID Level:	<mark>Volume1</mark> ⊲RAIDO (Sti	ripe)>	
Strip Size:       <10KB>         Capacity (HB):       [0]         PCreate Volume       RAID Level:         Select at least two disks       RAID (Kirror)         RCOVEry       RECOVERY	Select Disks: SATA 0.0, Samsung SSD 850 PR0 5126 S39FNCAJ401483A, 476.968 SATA 0.1, Samsung SSD 850 PR0 5126 S39FNCAJ401481T, 476.968	B <>		
PCreate Volume       RAID Level:         Select at least two disks       RAID (String) RAIDI (Hirror) Recovery         RAID Level:       RAID (Hirror) Recovery         Elect at least two disks       F5/F6 Change Values         F1       Help         1/1 Select Itom       F5/F6 Change Values         F3       Setup Defaults	Strip Size: Capacity (HB):	<16KB> [0]		
Select at least two disks     RAIDO (Stripe) RAIDI (Kirror) Recovery       Recovery	▶Create Volume		RAID Level:	
F1 Help 1/4 Select Item F5/F6 Change Values F9 Setup Defaults	Select at least two disks		RAIDO (Stripe) RAIDI (Hirror) Recovery	
Lee Frit	F1 Help 1/4	Select Iten	F5/F6 Change Values	F9 Setup Defaults

10. The Select Disks option allows you to select disk drives for your RAID volume. Highlight a drive and press ENTER, use up/ down arrow keys to highlight "x" and press ENTER to confirm the selection. A minimum of two disk drives must be selected for RAID-0 or RAID-1 configuration. Press ENTER when ready.

	Intel(R) R	apid Storage Technology	
Intel(R) Rapid Storage Technology			
Create RAID Volume			X - to Select Disk
Name: RAID Level:	Volume1 <raido (stripe<="" td=""><td>)&gt;</td><td></td></raido>	)>	
Select Disks: SATA 0.0, Samsung SSD 850 PRO 512GB S39FNCAJ401483A, 476.9GB	<>>		
SATA U.T, Samsung SSD 850 PRO 512GB S39FNCAJ401481T, 476.9GB	<x></x>		
Strip Size: Capacity (HB):	<64KB> [976768]		
SATA	0.1, Samsung SSD 8	50 pro 512gb s39Fncaj401481t,	476.9GB
F1 Help 1/4 Se	lect Item	F5/F6 Change Values	F9 Setup Defaults

11. The Stripe Size option allows you to configure the stripe size of your RAID volume. Available stripe sizes are 4KB, 8KB, 16KB, 32KB, 64KB, 128KB, use the up and down arrow keys to highlight and press ENTER to confirm the stripe size selection.

\*RAID1(Mirror) does not offer Stripe Size options.

Intel(R) Rapid Storage Technology	Intel(R) Rapid Storage Technology	
Create RAID Volume		Strip size help
Nane: RAID Level:	Volune1 <raido (stripe)=""></raido>	
Select Disks: SATA 0.0, Sansung SSD 850 PRO 5126B S39FNCAJ401483A, 476.96B SATA 0.1, Sansung SSD 850 PRO 5126B S39FNCAJ401481T, 476.96B	ф ф	
Strip Size: Capacity (HB): ≻Create Volume	<pre></pre>	
F1 Help	lect Item F5/F6 Change Values lect Item Enter Select ► SubH	F9 Setup Defaults enu F10 Save

12. The Capacity (MB) option allows you to configure the storage capacity of your RAID volume. By default, the full storage capacity will be applied. Once you have entered a capacity, press ENTER to confirm.

	Intel(R) Rapid Storage Technology	
Intel(R) Rapid Storage Technology		
Create RAID Volume		Capacity in MB
None: RAID Level:	Yolume1 <raido (stripe)=""></raido>	
Select Disks: SATA 0.0, Samsung SSD 850 PRO 51268 S39FNCAJ401483A, 476.9GB SATA 0.1, Samsung SSD 850 PRO 51268 S39FNCAJ401481T, 476.9GB	<	
<mark>Strip Size:</mark> Capacity (MB):	< <mark>64KB&gt;</mark> [976768]	
⊧Create Volume	976768 [Yes] [No]	
F1 Help t/1 Sele Esc Exit +/+ Sele	ct iten F5/F6 Change Values ct iten Enter Select ► SubHenu	F9 Setup Defaults F10 Save

 The Create Volume option is the final step in the volume creation process. Highlight "Create Volume" and press ENTER to begin creating your RAID volume base on the settings you just configured.

Intel(R) Rapid Storage Technology	Intel(R) Rapid Sto	prage Technology	
Create RAID Volume			Create a volume with the settings specified above
Name: RAID Level:	Volume1 <raido (stripe)=""></raido>		
Select Disks: SATA 0.0, Samsung SSD 850 PR0 51268 S39FNCAJ401483A, 476,968 SATA 0.1, Samsung SSD 850 PR0 51268 S39FNCAJ401481T, 476,968	<x> <x></x></x>		
Strip Size: Capacity (HB):	<64KE> [976768]		
⊬Create Volume			
F1 Help t/L Sele	ctiten Fi	/F6 Change Values	F9 Setup Defaults

14. A summary and status of the RAID volume will be shown when the RAID volume is successfully created.



15. Press F10 to save and Esc to exit the Intel® Rapid Storage Technology configuration page.



# **6** OS Support and Driver Installation

# 6.1 Operating System Compatibility

The system support most operating system developed for Intel® x86 architecture. The following list contains the operating systems which have been tested by Neousys Technology.

- Microsoft Window 10 (x64)
- Fedora 29\*\*
- Ubuntu 6.04.5 LTS\*\* & Ubuntu18.04.0 LTS\*\*

### 🂫 NOTE

For other Linux OS, Linux kernel should upgrade to 4.15.18.

\*For Linux system, user may need to manually compile and install the driver for Intel graphics or I210 GbE controller if the driver is not embedded in kernel. You can visit Intel website for further information.

\*\*For distributions, graphics driver and RAID function may not be completely implemented in its kernel. You may encounter restrictions when using these features, such as triple independent display and RAID. For optimum operation, it is the users' responsibility to manually check for new drivers and upgrades!

Neousys may remove or update operating system compatibility without prior notice. Please contact us if your operating system of choice is not on the list.

## 6.2 Install Drivers Automatically

The system comes with a "Drivers & Utilities" DVD that offers "one-click" driver installation process. It automatically detects your Windows operating system and installs all necessary drivers for you system with a single click.

#### 6.2.1 Install Drivers Automatically

To install drivers automatically, please refer to the following procedures.

 Insert the "Drivers & Utilities" DVD into a USB DVD-drive connect to your system. A setup utility launches and the following dialog appears.



 Click on "Automatic Driver Installation" and the setup utility will automatically detect your Windows operating system and install all necessary drivers. The installation process takes about 6~8 minutes depending on your Windows version. Once driver installation is done, the setup utility reboots your Windows and you may begin using your system.

## 6.3 Install Drivers Manually

You can also manually install each driver for the system. Please note when installing drivers manually, you need to install the drivers in the following sequence mentioned below.

#### 6.3.1 For Windows 10 (x64)

The recommended driver installation sequence is

- 1. C hipset driver (x:\Driver\_Pool\Chipset\_CFL\Win\_10\_64\SetupChipset.exe)
- 2. Graphics driver (x:\Driver\_Pool\Graphics\_CFL\_SKL\_APL\Win\_10\_64\igxpin.exe)
- 3. Audio driver (x:\Driver\_Pool\Audio\_ALC262\Win\_ALL\_64\Setup.exe)
- 4. LAN driver (x:\Driver\_Pool\GbE\_I210\_I350\Win\_10\_64\_CFL\APPS\PROSETDX\Winx64\DxSe tup.exe)
- 5. ME driver (x:\Driver\_Pool\ME\_CFL\Win\_10\_64\SetupME.exe)

## 6.4 Driver Installation for Watchdog Timer Control

Neousys provides a driver package which contains function APIs for watchdog timer, digital I/ O, per-port PoE power on/off control and other platform-related functions. You should install the driver package (WDT\_DIO\_Setup.exe) in prior to use these functions.

#### Windows 10 (x64)

Please execute the driver setup program in the following directory.

x:\Driver\_Pool\WDT\_DIO\Win7\_8\_10\_64\WDT\_DIO\_Setup\_v2.2.9.x(x64).exe

#### Windows 10 (WOW64)

Please execute the driver setup program in the following directory.

x:\Driver\_Pool\WDT\_DIO\Win7\_8\_10\_WOW64\WDT\_DIO\_Setup\_v2.2.9.x(wow64).exe

# 6.5 Intel<sup>®</sup> Optane<sup>™</sup> Memory BIOS Setup and Driver Installation

The system is compatible with Intel<sup>®</sup> Rapid Storage Technology that supports the installation of Intel<sup>®</sup> Optane<sup>™</sup> memory to significantly boost traditional hard disk drive read and write performances. Intel<sup>®</sup> Optane<sup>™</sup> memory is Intel<sup>®</sup> RST's latest system acceleration solution featuring a dual-media/disk combination (ultrafast media for file and block caching + slow media for storage capacity) that is presented to the host OS as a single SSD. The ultrafast media utilizes PCIe NVMe SSDs that are based on Intel<sup>®</sup> Optane<sup>™</sup> technology with read speed of up to 3000Mb/ sec and write speed of up to 2000Mb/ sec.

To setup Intel<sup>®</sup> Optane<sup>™</sup> memory, please perform the following steps:

- 1. Press the power button to startup your system (please restart if your system is already up and running) and press F2 to enter BIOS.
- 2. Go to "Advanced > SATA And RST Configuration".



 Go to "SATA Mode Selection", press the Enter key to bring up options, select "Intel RST Premium With Intel Optane System Acceleration" and press ENTER to select the option.

	Nuvo-7000 Ser	ies Setup Utility	Rev. 5.0
Advanced			
SATA And RST Configuration			Determines how SATA controller(s) operate.
SATA Controller(s)	<enabled></enabled>		
SATA Mode Selection	<intel 1<="" premium="" rst="" td=""><td>∦ith Intel Optane</td><td></td></intel>	∦ith Intel Optane	
PSoftware Feature Mask Configuration	System Acceleration:	>	
SATA Port #1	Empty		
Port Enable/Disable	<enabled></enabled>		
энти вечтве туре	Sharu DTSK DETVEZ		
SATA Port #2	Empty		
Port Enable/Disable	<enabled></enabled>		
HOT Plug SATA Device Type	<u i="" led="" sab=""></u>		
on the type	SATA Mode	e Selection	
nSATA			
Port Enable/Disable	HUI ntel DST Drenium Vith Inte	el Antane System Acceler	ation
Н. 2	Empty		
Port Enable/Disable	<enabled></enabled>		
онти речтре туре	SOLID STOLE DI MEN		
Fl Help	elect Item	F5/F6 Change Values	F9 Setup Defaults
Esc Exit +/+ Si	elect Item	Enter Select ► SubMenu	F10 Save and Exit

4. Go to "M.2 2280 NVMe Storage Device" and press the Enter key to bring up the selection, select "RST Controlled" and press the Enter key to select the option.



- 5. Press F10 to save and exit, and allow the system to boot into Windows.
- 6. In Windows, download Intel® RST driver if you don't already have it on hand.

Right-click on the SetupOptaneMemory.exe

administrator" to execute the setup file.



and left-click on "Run as

7. Follow the 6 step setup procedure as instructed.



 Check the "I accept the terms in the License Agreement" box and click on "Next >" to continue the installation process.

Intel® Optane™ Memory Step: 3/6 ™ELED WARKANTIES OR CONSEQUENTIAE OR INCIDE	(	100-00
	Let a let	intel
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☑ I accept the terms in the License Agreement.		
ntel Corporation	< Back Next >	Cance
Intel® Installation Framework		)
Intel® Optane™ Memory Step: 4/6	(	intel
You are about to install the following components:		
Intel® Optane™ Memory		
Click 'Next' to install to the default folder, or click 'Change	' to choose another destinatio	n folder.
C:\Program Files\Intel\Intel(R) Optane Memory		
	c	hange
intel		
-------		

9. When done, click on "Finish" and restart the system.

Intel®	Installation Framework	×
Intek Step:	® Optane™ Memory 6/6	intel
	You have successfully installed the following product:	
	Please restart your PC to implement these changes. Would you like to r	estart vour PC
	Yes, I want to restart this computer now.	
	○ No, I will restart this computer later.	
	Note: A restart (not 'Shut down') is required to complete the installation	process.
10		
Intel Co	rporation	Finish

10. Upon system restart, the following initialization screen will appear. Click on Next to continue.



11. In the Setup section, you will see your Intel® Optane<sup>™</sup> memory drive and compatible drive(s) that can be accelerated. Click on the downward arrow to bring up a selection of drives to be accelerated. Click on "Enable" when ready.

😳 Setup	Status		
📌 Pinning 🔷 🗸	Intel® Optane™ memory is disabled.		
Z Statistics	Select fast intel® Optane* memory drive:		
0	16 GB Intel® Optane™ memory (Controller 3, Port 0)	~	
About	Select a compatible drive to be accelerated:		
	HGST HTS54505087E660 (Controller 0, Port 0) (System)	~	
		Enable	

12. The data backup warning will appear, please backup any data you may have stored on your Intel® Optane<sup>™</sup> memory module before proceeding. Check the box "Erase all data on Intel® Optane<sup>™</sup> memory module" and click on Continue.



 When the Intel® Optane<sup>™</sup> memory module has been enabled, the installation window and a notification window at the bottom right corner will prompt you to restart the system.



×
plete the process.
Restart

 Upon system restart, a successful enablement message will appear to indicate the Intel® Optane<sup>™</sup> memory module has been enable successfully.



15. Once enabled, the RST software Setup section should show your configuration information.



# 7 CAP Energy Management Technology ~ Power Backup Parameter Configurer

By controlling fundamental techniques such as charge/ discharge control, active load balance and DC/ DC regulation, Neousys is able to design and create a reliable ultracapacitor-based power backup system. However, the real challenge is how to get the most out of the capacitor energy while ensuring the system shuts down safely during a power blackout.

## 7.1 CAP Energy Management Technology

The patented architecture (R.O.C. patent I598820) incorporates a microprocessor along with supercapacitors and charge/ discharge controller. The proprietary firmware embedded in the MCU not only monitors energy level continuously, it also automatically initiates soft-shutdown to prevent data loss/ corruption.



By providing sophisticated real-time energy monitoring, high/ low voltage protection and auto/ manual shutdown control, the dedicated interface help users better manage and efficiently utilize their PB standalone module. The software can also extend the lifespan of supercapacitors up to 4.8x by controlling charge/ discharge cycles.

# 7.2 Power Backup Parameter Configurer

### 7.2.1 Executing PB2500J Parameter Configurer

The PB2500J Parameter Configurer is an application that allows the user to monitor and manage the connected PB2500J-PCIe/ CSM.

Once you have installed PB2500J-PCIe/ CSM and have connected it to the host controller COM5 port (configured in RS-232 mode). You may copy the "PB2500J\_Configurer" executable (.exe) file on the Utility DVD to your computer desktop and run it by right-clicking on the exe file and select to "Run as administrator" from your desktop (installation not required).





# 7.2.2 PB-2500J Parameter Configurer

EAN Vers	ion	-DC Voltage	CAP	Energy
T/W VEIS		DC Voltage	CAF	
1	C16.18	20.0	V	2533.1 W
arameter (	Configurer -			
Aut	o-start 3		C applied	Buzzer on
Behavior	for DC Loss	(< 9 V)	1.62	
~ · · ·	~		0 1	
• Aut	o Us	er-defined Shutdow	n after   30	seconds
Shutdow	n at Low Volt	age		
🔽 Ena	ble Low Li	mit: 10 V	Delay: 10	
		1.0	000011120	
Shutdow	n at High Voli	tage		
	and on the second of	imit: 32 V	Delay: 10	seconds
🔽 Ena	ible High L	West were and a second s		
Ena SuperCA	ible High L P Lifetime Ex	tension		
SuperCA	ible High L P Lifetime Ex	tension		
Final SuperCAI	ible High L P Lifetime Ex 1.5x	tension2.2x	3.3x	4.8x
Final SuperCAP	ible High L P Lifetime Ex 1,5x er Control	tension2.2x	3.3x Shutdov	4.8x
♥ Ena SuperCAI 」 1x Paramete	ible High L P Lifetime Ex 1.5x er Control	tension 2.2x	3.3x	4.8x
I Ena SuperCAI ↓ 1x Paramete	ible High L P Lifetime Ex 1,5x er Control — Update Par	ameters	3.3x	4.8x vn Control Re-train

Item		Description			
F/W Version		Shows the firmware version of your PB-2500J			
DC Voltage		Shows the current input voltage of your PB-2500J			
CAP Energy		Shows the current charged energy status (rated 2500Ws Max.)			
	Auto-start _ seconds after DC applied	The time delay (in seconds) to start PB-2500J once your computer has been powered on.			
	Behavior for DC Loss (<9V)	This allows you to set the delay time (in seconds) to shutdown when DC voltage drops below 9V.			
Parameter Configurer	Shutdown at Low Voltage	This allows you set the low voltage limit and delay time (in seconds) to shutdown (Note: DO NOT set voltage lower than 10V)			
	Shutdown at High Voltage	This allows you set the high voltage limit and delay time (in seconds) to shutdown (Note: DO NOT set voltage higher than 32V)			
	SuperCAP Lifetime Extension	This setting allows you to extend the lifespan of the Supercapacitors on your PB-2500J. Lifespan extension settings are approximate figures and may not exactly reflect real world applications.			
	Parameter Control	<ul><li>Update Parameters: Click on this button for new parameters to take effect.</li><li>Get Parameters: Click on this button to acquire current parameters.</li><li>Load Default: Clicking on this button to load default parameters.</li></ul>			
	Shutdown Control	<ul> <li>Re-train: This button will re-train PB-2500J to be customized to the system's required shutdown time.</li> <li>Reset: This button will reset (erase) previous Re-train shutdown settings.</li> </ul>			

# 7.2.3 Auto-start

F/W Version	16.18	DC Voltage -		AP Energy 2533.1 Wi
rameter Con	figurer			
Auto-s	tart 3	seconds afte	DC applied	Buzzer on
Shutdown at	Low Volta Low Lin	ge nit: 10 V	Delay: 1	) seconds
🔽 Enable	High Lin	nit: 32 1	Delay: 10	) seconds
SuperCAP Li	fetime Exte	ension		
1x	1.5x	2.2x	3.3x	4.8x
Parameter C	ontrol		Shutd	lown Control
	pdate Para	meters		Re-train
9				

#### **Auto-start Settings**

Auto-start _	If the "Auto-start" box is checked, the system will start	
seconds after seconds after the 3-pin pluggable terminal block is plugge		
DC applied	into the system (DC applied).	
	If the "Auto-start" box is not checked, once you have plugged	
	in the 3-pin pluggable terminal block, you will need to press the	
	power button to turn the system on.	
Buzzer on	If the "Buzzer on" box is checked, a buzzer sound will sound	
	as soon as the supercapacitors start to discharge (supplying	
	power to the system).	
	If the "Buzzer on" box is not checked, no buzzer sound will be	
	made when the supercapacitors start to discharge.	

#### 

# 7.2.4 Behavior for DC Loss (<9V)

F/W Vers	on C16.18	DC Voltage -	.0 V	Energy 2533.1 We
rameter ( V Aut	Configurer	seconds afte	r DC applied	I Buzzer on
Behavior (• Aut	for DC Loss ( o C Usi	(< 9 V) er-defined Shute	lown after 30	seconds
Shutdowr 🔽 Ena	n at Low Volta ble Low Lir	nit: 10	V Delay: 10	seconds
Shutdowr	n at High Volt ble High Li	age mit: 32	V Delay: 10	seconds
Super CAP	Lifetime Ext	ension		
1x	1.5x	2.2x	3.3x	4.8x
Paramete	r Control		Shutdov	vn Control
	Update Par	ameters		Re-train

#### Behavior for DC Loss (<9V) Settings

Auto	If the " <b>Auto</b> " box is selected, the delay shutdown time will be pre-determined by the MCU when you "Re-train" PB-2500J.
User-defined	If the "User-defined Shutdown after _ seconds" is selected,
Shutdown after _	when the input voltage drops below 9V, the shutdown process
seconds	will be initiated by the user defined time in seconds.

# 🖗 ΝΟΤΕ

## 7.2.5 Shutdown at Low Voltage

2500J Stat	us				
F/W Versio	n	DC Voltage	-	CAPE	inergy
	C 16.18	1	20.0 V		2533.1 W
rameter Co	onfigurer —				
Auto	-start 3	seconds at	fter DC app	lied [	✓ Buzzer on
Behavior fi	or DC Loss (	< 9 V)			
· Auto	C Use	er-defined Shu	itdown afb	er 30	 seconds
Shutdown	at Low Volta				and the second second
	or corr voice	nge		1.0	Torrestore
M Enab	e Low Lir	mit:   10	V Dela	y:   10	seconds
Shutdown	at High Volt	age			
🔽 Enab	le High Lir	mit: 32	V Dela	y: 10	seconds
SuperCAP	Lifetime Ext	ension			
-					
1x	1.5x	2.2	t i	3.3x	4.8x
arameter	Control		11	Shutdown	n Control
			1		
	Update Para	ameters		R	e-train

#### Shutdown at low voltage settings

Enable	If the "Enable" box is checked, the shutdown process will be			
	determined by the Low Limit: _ V and Delay: _ seconds			
	settings.			
Low Limit: _ V	If the "Enable" box is checked, the shutdown process will be			
	initiated by low voltage limit setting (Low Limit: $\_$ V) and the			
	Delay: _ seconds.			
Delay: _ seconds	If the "Enable" box is checked, the shutdown process will be			
	initiated in _ seconds (Delay: _ seconds) when the low voltage			
	limit setting (Low Limit: _ V) is reached.			

# 

## 7.2.6 Shutdown at High Voltage

2500J Statu	s			
F/W Version		DC Voltage	CAPI	Energy
C	16.18	20.0	v	2533.1 Ws
rameter Cor	figurer			
Auto-s	tart 3	seconds after D	C applied	Buzzer on
Behavior for	DC Loss (<	9 V)		
· Auto	C Liser-	defined Shutdow	after 30	seconde
Plate	- Coci		100	seconds
Shutdown a	t Low Voltage	2		
🔽 Enable	Low Limit	: 10 V	Delay: 10	seconds
Shutdown a	t High Voltag	e		
Enable	High Limit	H 32 V	Delay: 10	
	right carrie	a 1 1	ocidit	Decerned
SuperCAP Li	retime Exten	sion		
1x	1.5x	2.2x	3.3x	4.8x
Parameter C	Control		Shutdow	n Control
		1		1
U	pdate Param	eters	R	e-train
				1

#### Shutdown at high voltage settings

Enable	If the "Enable" box is checked, the shutdown process will be
	determined by the High Limit: _ V and Delay: _ seconds
	settings.
High Limit: _ V	If the "Enable" box is checked, the shutdown process will be
	initiated by high voltage limit setting (High Limit: $\_$ V) and the
	Delay: _ seconds.
Delay: _ seconds	If the "Enable" box is checked, the shutdown process will be
	initiated in _ seconds (Delay: _ seconds) when the high
	voltage limit setting (High Limit: _ V) is reached.

# 🖗 ΝΟΤΕ

# 7.2.7 SuperCAP Lifetime Extension

or rouge		M.
20.0 V	25	39.2 W
seconds after DC a	pplied 🔽 Bi	uzzer on
9 V)		
defined Shutdown at	fter 30 s	econds
	1.5.5	
10 V De	lay: 10 s	econds
32 V De	lay: 10 s	econds
sion		
2.2x	3.3x	 4.8x
18 B	Shutdown Cor	trol
		. 1
eters	Re-tra	in
		-
	seconds after DC a v) tefined Shutdown at 10 V De 32 V De ion 2.2x eters	seconds after DC applied seconds after DC applied by) defined Shutdown after 30 s 10 V Delay: 10 s 32 V Delay: 10 s ion 2.2x 3.3x Shutdown Cor aters Re-tra

#### SuperCAP lifetime extension settings

The SuperCAP lifetime extension setting is an automated setting when users only need to click on the bar, drag it to the desired lifetime extension setting, click on the "Update Parameters" and follow procedure instruction for settings to take effect.



### 7.2.8 Update Parameters

F/W Version -	DC	Voltage	CAP E	inergy
Ci	5.18	20.0 V		2533.1 W
rameter Confi	gurer			
Auto-sta	rt 🛐 se	conds after DC	applied	Buzzer on
Behavior for D	C Loss (< 9 V)	)		
· Auto	← User-def	ined Shutdown	after 30	seconds
Shutdown at L	ow Voltage			
🔽 Enable	Low Limit:	10 V D	elay: 10	seconds
Shutdown at H	ligh Voltage			
🔽 Enable	High Limit:	32 V D	elay: 10	seconds
SuperCAP Life	time Extension	1	<i>20</i>	
1				
1x	1.5x	2.2x	3.3x	4.8x
	ntrol		Shutdown	n Control
Parameter Co			R	e-train
Parameter Co Upi	date Paramete	30	1.0	

Whenever you enter/ adjust a new parameter or parameters, for the new settings to take effect, you must perform the following steps:

1. Click on the "Update Parameters" button and the following dialogue will appear.



- 2. Click on yes, manually shutdown your system by going to "Start > Shut down".
- 3. Once the system has shut down, unplug the 3-pin pluggable terminal block.
- 4. Wait for 5~10 seconds, plug in the 3-pin pluggable terminal block and start up your system for the new settings to take effect.

## 7.2.9 Get Parameters

F/W Versi	on	DC Voltage		Energy
1	C16.18	20.0	v I	2533.1 W
arameter C	onfigurer —			
Auto	o-start 3	seconds after DC	applied	Buzzer on
Behavior	for DC Loss («	< 9 V)		
Auto	C Use	r-defined Shutdown	after 30	seconds
Shutdown	at Low Volta	ge		
🔽 Enal	ble Low Lim	nit: 10 V	Delay: 10	
Shutdown	at High Volta	ge		
🔽 Enal	ole High Lin	nit: 32 V	Delay: 10	seconds
SuperCAP	Lifetime Exte	ension		
-		2000 CH 2	225	
	1.5x	2.2x	3.3x	4.8x
1x	Control		Shutdown	n Control
1x Paramete			1	
1x Paramete			D	Contraction of the second seco
1x Paramete	Update Para	meters	R	e-train

Click on "Get Parameters" to manually acquire the current PB-2500J status for F/W version, DC voltage and current stored CAP energy.

## 7.2.10 Load Default

F/W Version	DC Voltage	CAP	Energy
C16.18	20.0	v F	2533.1 W
rameter Configurer -			
I Auto-start 3	seconds after DC	applied	I ⊎uzzer on
C LOSS	(< 9 V)	0. [	-
(• Auto ( U	ser-defined Shutdown	after   30	seconds
Shutdown at Low Vol	tage		
Finable Low L	Limit: 10 V	Delay: 10	seconds
Shutdown at High Vo	Itage		
Shutdown at High Vo	Itage	Delaws 10	- escande
Shutdown at High Vo	ltage Limit: 32 V	Delay: 10	seconds
Shutdown at High Vo F Enable High I SuperCAP Lifetime Ex	Itage Limit: 32 V xtension	Delay: 10	seconds
Shutdown at High Vo	Itage Limit: 32 V ktension 2.2x	Delay: 10	seconds
Shutdown at High Vo F Enable High I SuperCAP Lifetime E 1x 1.5x Parameter Control	Itage Limit: 32 V xtension 2.2x	Delay: 10 3.3x	seconds 4.8x
Shutdown at High Vo	Itage Limit: 32 V xtension 2.2x	Delay: 10 3.3x Shutdow	seconds 4.8x
Shutdown at High Vo	Itage Limit: 32 V extension 2.2x arameters	Delay: 10 3.3x Shutdow	seconds 4.8x n Control
Shutdown at High Vo	Itage Limit: 32 v extension 2.2x arameters	Delay: 10 3.3x Shutdow	seconds 4.8x n Control

You may set PB-2500J back to the original settings by clicking on "Load Default" to reset all changes you have made previously.

#### 7.2.11 Re-train

-		DC V-lk-		-
F/W Version		DC Voltage	CAP	Energy
C C	16.18	20.0	v	2533.1 W
rameter Con	nfigurer —			
Auto-s	tart 3		applied	Buzzer on
Behavior for	DC Loss (	< 9 V)		
( Auto	Cilico	r defeed Shutdowr	after 20	
ALLO	, Use	a denned and down	anter   50	seconds
Shutdown at	t Low Volta	ige		
I Enable	Low Lin	nit: 10 V	Delay: 10	seconds
Chutdown ai	t Liloh Valta			
Summon a	Chigh volta			
-		and the second		
✓ Enable	High Lin	nit: 32 V	Delay:   10	seconds
Enable	High Lin	nit: 32 V ension	Delay:   10	seconds
F Enable	: High Lin fetime Exte	nit: 32 V ension	Delay:   10	seconds
F Enable SuperCAP Lif	High Lin fetime Exte 1.5x	nit:   32 V ension 2.2x	3.3x	seconds 4.8x
F Enable SuperCAP Lif 1x Parameter C	High Lin fetime Exte 1.5x	nit: 32 V ension 2.2x	3,3x	4.8x
Frable SuperCAP Lif IX Parameter C	High Lin fetime Exte 1, 5x Control	nit: 32 V ension 2.2x	3, 3x	4.8x
F Enable SuperCAP LI J 1x Parameter C	High Lin fetime Exte 1.5x Control	nit: 32 V ension 2.2x ameters	3.3x	4.8x
F Enable SuperCAP Lin J Ix Parameter C	High Lin fetime Exte 1, 5x Control	nit: 32 V ension 2.2x ameters	3.3x	4.8x 4.8x In Control

The Re-train function is to customize the PB-2500J to your system's required shutdown time! By clicking on "Re-train", a shutdown action will be initiated so the time required to shutdown can be memorized.

#### 7.2.12 Reset

F/W Vers	ion — D	C Voltage	-CAP E	nergy
	C16.18	20.0 V	<b>_</b>	2533.1 W
rameter (	Configurer			
🔽 Aut	o-start 3 s	econds after DC a	pplied R	Buzzer on
Behavior	for DC Loss (< 9 \	0		
<ul> <li>Aut</li> </ul>	o 🤆 User-de	fined Shutdown a	fter 30	seconds
Shutdowr	n at Low Voltage			
🔽 Ena	ble Low Limit:	10 V De	lay: 10	seconds
Shutdowr	n at High Voltage -			
🔽 Ena	ble High Limit:	32 V De	lay: 10	seconds
SuperCA	P Lifetime Extensio	n		
ıx	1.5x	2.2x	3.3x	4.8x
Paramete	er Control	. 1	Shutdown	Control
	Update Paramet	ers	Re	-train
	1			

By clicking on Reset, it will erase all previous Re-train settings and hence result in immediate shutdown when a command is issued.

# Appendix A: Using WDT & DIO

The watchdog timer (WDT) function to ensure reliable system operation. The WDT is a hardware mechanism to reset the system if the watchdog timer is expired. Users can start the WDT and keeping resetting the timer to make sure the system or program is running. Otherwise, the system shall be reset.

In this section, we'll illustrate how to use the function library provided by Neousys to program the WDT functions. Currently, WDT driver library supports Windows 10 x64 and WOW64 platform. For other OS support, please contact Neousys Technology for further information.

#### Installing WDT\_DIO Library

The WDT\_DIO function library is delivered in the form of a setup package named **WDT\_DIO\_Setup.exe**. In prior to program WDT, you should execute the setup program and install the WDT library. Please use the following WDT\_DIO\_Setup packages according to your operating systems and application.

- For Windows 10 64-bit OS with 64-bit application (x64 mode), please install WDT\_DIO\_Setup\_v2.3.0 (x64).exe or later version.
- For Windows 10 64-bit OS with 32-bit application (WOW64 mode), please install WDT\_DIO\_Setup\_v2.3.0 (wow64).exe or later version.

# WDT and DIO Library Installation

To setup WDT & DIO Library, please follow instructions below.

1. Execute WDT\_DIO\_Setup.2.3.0.exe and the following dialog appears.



 Click "Next >" and specify the directory of installing related files. The default directory is C:Weousys\WDT\_DIO.

Select D	estination Location			
Where	should Neousys Nuvo/Nu d?	vis/POC Series WDT	& DIO 64-bit Libra	ry be
L	Setup will install Neous) into the following folder	ys Nuvo/Nuvis/POC S '.	eries WDT & DIO (	54-bit Library
To con	tinue, dick Next. If you w	ould like to select a d	ifferent folder, die	k Browse.
C:We	ousys\WDT_DIO(x64)			Browse
At leas	t 13.1 MB of free disk spa	ce is required.		

3. Once the installation has finished, a dialog will appear to prompt you to reboot the system. The WDT & DIO library will take effect after the system has rebooted.



4. When programming your WDT or DIO program, the related files are located in

Header File:	\Include
Library File:	\Lib
Function	\Manual
Reference:	
Sample Code:	\Sample\WDT_Demo (Demo for Watchdog Timer)
	\Sample\DIO_Demo (Demo for DIO Control)
	\Sample\COS_Demo (Demo for change-of-state DI)
	\Sample\CAN_Demo (Demo for CAN bus manipulation)
	\Sample\IGN_Demo (Demo for ignition status manipulation)
	\Sample\POE_Demo (Demo for PoE per-port on/off control)

# **WDT Function Reference**

#### InitWDT

-	
Syntax	BOOL InitWDT(void);
Description:	Initialize the WDT function. You should always invoke InitWDT() before set or start watchdog timer.
Parameter	None
Return Value	TRUE: Successfully initialized
	FALSE: Failed to initialize
Usage	BOOL bRet = InitWDT()

#### SetWDT

Syntax	BOOL SetWDT(WORD tick, BYTE unit);
Description	Set timeout value and unit for watchdog timer. When InitWDT()
	is invoked, a default timeout value of 255 seconds is assigned.
Denemerten	tick
Parameter	WORD value (1 ~ 65535) to indicate timeout ticks.
	unit
	BYTE value (0 or 1) to indicate unit of timeout ticks.
	0 : unit is minute
	1: unit is second
Determ Malue	If value of unit is correct (0 or 1), this function returns TRUE,
Return value	otherwise FALSE.
lleene	WORD tick=255;
Usage	BYTE unit=1; //unit is second.
	BOOL bRet = SetWDT(tick, unit); //timeout value is 255
	seconds

### StartWDT

Syntax	BOOL StartWDT(void);
Description	Starts WDT countdown. Once started, the WDT LED indicator will begin blinking. If ResetWDT() or StopWDT is not invoked before WDT countdowns to 0, the WDT expires and the system resets.
Parameter	None
Return Value	If the timeout value is given in correct format (WDT started), this function returns TRUE, otherwise FALSE
Usage	BOOL bRet = StartWDT()

#### ResetWDT

Syntax	BOOL ResetWDT(void);
Description	Reset the timeout value to the value given by SetWDT().If ResetWDT() or StopWDT is not invoked before WDT countdowns to 0, the WDT expires and the system resets.
Parameter	None
Return Value	Always returns TRUE
Usage	BOOL bRet = ResetWDT()

# StopWDT

Syntax	BOOL StopWDT(void);
Description	Stops the countdown of WDT. When WDT has stopped, the WDT LED indicator stops blinking.
Parameter	None
Return Value	Always returns TRUE
Usage	BOOL bRet = StopWDT()

# **Appendix B: PoE On/ Off Control**

The system offers 802.3at PoE+ ports with a unique feature to allow users manually turn on or off the power supply of each PoE port. This can be function can be useful in power device (PD) fault-recovery or power reset.

The function APIs are encapsulated in Neousys WDT\_DIO driver package. Please follow the instructions in <u>Appendix B Watchdog Timer & Isolated DIO</u> to install the driver package prior to programming PoE on/off control function.

#### **GetStatusPoEPort**

Syntax	BYTE GetStatusPoEPort (Byte port);
Description	Get current on/off status of designated PoE port.
Parameter	port
	BYTE value specifies the index of PoE port. Please refer to the
	following illustration, <i>port</i> should be a value of 1 ~ 8.
Return Value	BYTE value indicating PoE on/off status
	0 if port is disabled (off)
	1 if port is enabled (on)
Usage	BYTE bEnabled = GetStatusPoEPort (3); //Get on/off status of
	PoE Port#3
FULL	
Ę	

#### **EnablePoEPort**

Syntax	BOOL EnablePoEPort (BYTE port);
Description	Turn on PoE power of designated PoE port.
Parameter	port
	BYTE value specifies the index of PoE port. Please refer to the
	following illustration, <i>port</i> should be a value of 1 ~ 8.
Return Value	TRUE if enabled success
	FALSE if fail to enable.

Usage



## DisablePoEPort

Syntax	BOOL DisablePoEPort (BYTE port);
Description	Turn off PoE power of designated PoE port
Parameter	port
	BYTE value specifies the index of PoE port. Please refer to the
	following illustration, <i>port</i> should be a value of $1 \sim 8$
Return Value	TRUE if disabled success
	FALSE if fail to disable
Usage	BOOL bRet = DisablePoEPort (3); //Turn off PoE Port#3

