NEOSYS Nuvis-7306RT Series Intel 9th Machine Vision Computer Installation Guide

Contents

NEOSYS Nuvis-7306RT Series Intel 9th Machine Vision Computer

Warning

- Only qualified service personnel should install and service this product to avoid injury.
- Observe all ESD procedures during installation to avoid damaging th e equipment.

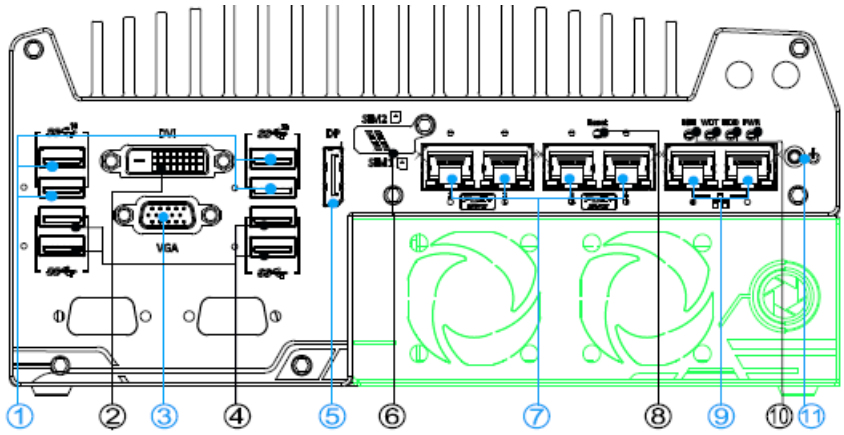
Preparing tools

Unpack the equipment and make sure the following tools are available and delivered contents are correct before you begin the installation procedure.

1. 1. User-provided tools
    - Anti-static wrist wrap
2. 1- 2. Packing List

Item	Description	Quantity
01	Nuvis-7306RT series system	1
02	Drivers & utilities disc	1
03	CPU bracket	1
04	Wall-mount bracket	2
05	Foot pad	4
06	3-pin pluggable terminal block	1
07	2.5″ HDD/SSD thermal pad (if not installed)	1
08	PORON form strip, 91x12x10mm	4
09	Rubber spacer (barebone system only)	4
10	Fan 40x40x10mm	2
11	TB-10	1
12	SCSI-68 male to SCSI-68 male cable	1

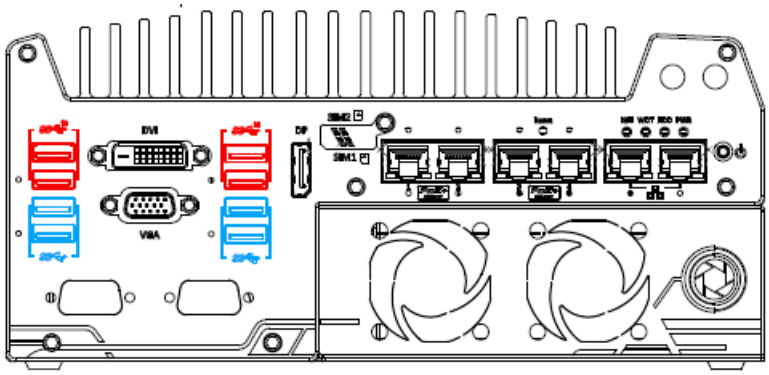
Overview – Front Panel



No.	Item	Description
1	USB3.1 Gen 2 port	USB3.1 Gen 2 port (SuperSpeed+) offers up to 10Gbps, twice the bandwidth over existing SuperSpeed USB3.1 Gen. 1 connection. It is also backwards compatible with USB3.0 and USB2.0
2	USB3.1 Gen 1 port	USB3.1 Gen 1 offers up to 5Gbps of data-throughput performance
3	DVI port	DVI-D output supports resolution up to 1920x1200@60Hz and is compatible with other digital connections via an adapter.
4	VGA port	VGA output supports resolution up to 1920x1200@60Hz
5	DisplayPort	Support display resolutions up to 4096 x 2304. Compatible with HDMI/ DVI via respective adapter/ cable (resolution may vary).

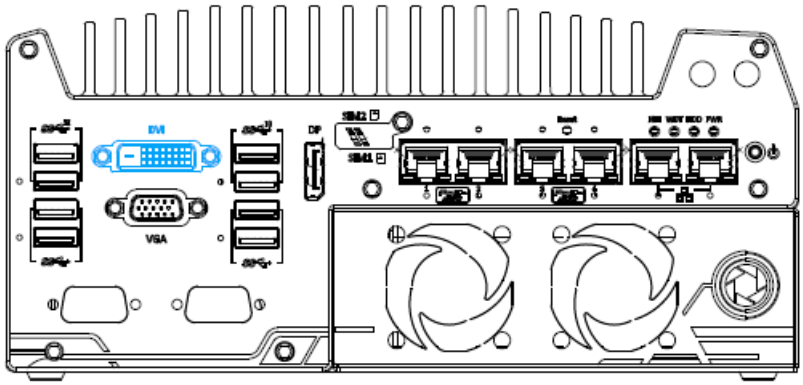
6	SIM 1 & 2	Install a 3G/ 4G module and insert a SIM card to access the operator's network.
7	PoE+ GbE ports	Power over Ethernet (PoE) port can provide both data connection and electric power to devices (eg. GbE camera).
8	Reset button	Use this button to manual restart the system.
9	GbE ports	Gigabit Ethernet ports offer fast network access.
10	System status LEDs	Four system LEDs, Ignition control (IGN), Watchdog Timer (WDT), Hard Disk Drive (HDD) and Power (PWR).
11	Power button	Use this button to turn on or force shutdown the system.
Area in Green	Cassette Enclosure	The cassette enclosure offers a separate compartment to manage thermal conditions and reduce installation complications of an add-on card.

USB3.1 Gen2 & USB3.1 Gen1



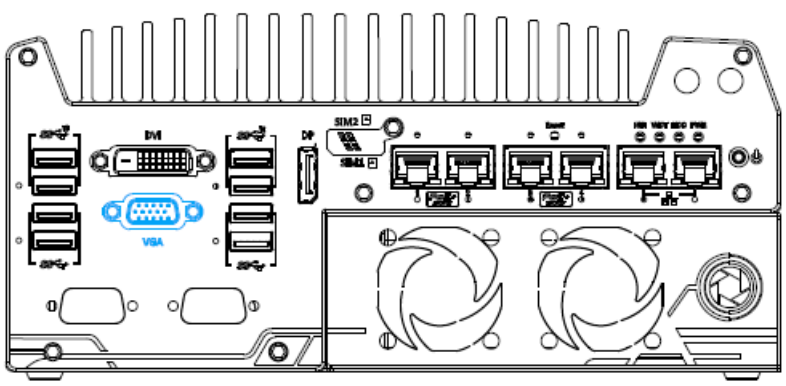
The system's USB 3.1 Gen 2 (10Gbps) and USB3.1 Gen1 (5Gbps) ports are implemented via native xHCI (eXtensible Host Controller Interface) controller and are backward compatible with USB3.1 Gen.1 USB 2.0, USB 1.1 and USB 1.0 devices. Legacy USB is also supported so you can use USB keyboard/ mouse in DOS environment
xHCI driver is supported natively in Windows 10, therefore you do not need to install the xHCI driver prior to utilizing USB functions.

DVI Port



DVI-D transmits graphics data in digital format and therefore can deliver better image quality at high resolution. The DVI connector on the front panel can either output DVI signals or other digital signals (via an adapter/ cable) depending on the display device connected. It supports resolutions up to 1920×1200@60Hz.
The system supports triple independent display outputs by connecting display devices to VGA, DVI and DisplayPort connection. To support multiple display outputs and achieve best DVI output resolution in Windows, you need to install corresponding graphics driver.

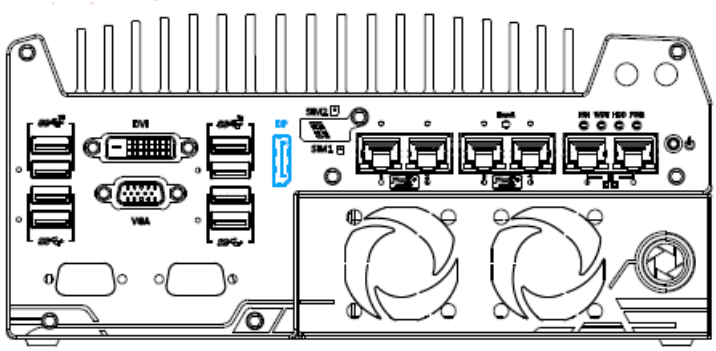
VGA Port



VGA connector is the most common video display connection. The VGA output supports up to 1920×1200@60Hz resolution.
The system supports triple independent display outputs by connecting display devices to VGA, DVI and DisplayPort connection. To support multiple display outputs and achieve best VGA output resolution in Windows, you need to install corresponding graphics drivers.

note: 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.

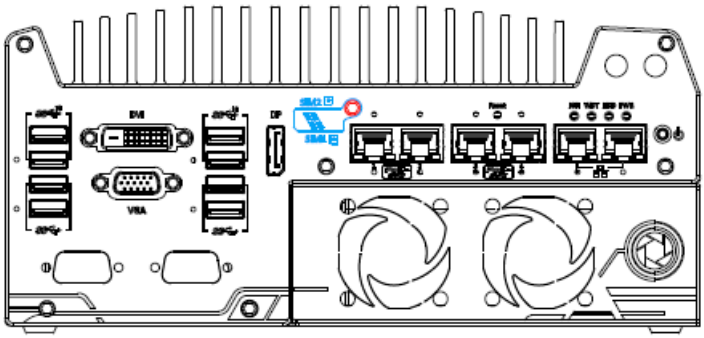
DisplayPort



The DisplayPort (DP) is a digital display interface that connects video source and carry audio to a display device. When connecting a DP, it delivers up to 4K UHD (4096 x 2304) in resolution. Designed to support passive DP adapter/ cable, it can connect to other display devices using DP-to-HDMI cable or DP-to-DVI cable

DP-to-HDMI DP-to-DVI

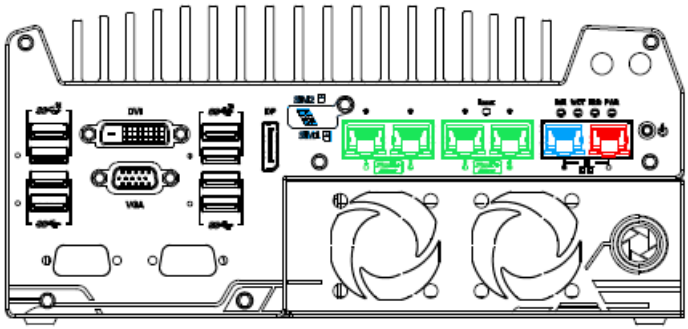
Micro-SIM (3FF) 1 & 2 Slots



On the front panel, there are two panel-accessible Micro-SIM sockets. By installing 3G/ 4G modules onto the internal M.2 slot, you can access the internet via telecom operator's network. The Micro-SIM slots can be accessed by loosening the screw (indicated in) that holds the Micro-SIM slot cover and Micro-SIM cards are secured into the sockets via push-push type mechanisms. The push-push mechanism means the SIM card is push-to-install and push-toretrieve. Please note that the SIM1 micro-SIM card must be inserted upsidedown (gold fingers facing upward) while SIM2 micro-SIM must be inserted rightside up (gold fingers facing downward).

note: The dual SIM card functionality is only available when Sierra Wireless EM7455/ 7430 solution is installed. For other M.2 4G add-on solutions, SIM card 1 slot is the default functioning slot.

Gigabit Ethernet/ PoE+ Port



The system offers two GbE ports (in and) and four additional PoE (Power over Ethernet) ports marked in on the front panel. The port marked in is implemented using Intel® I219-LM controller that supports Wake-on-LAN and is also compatible with Intel Active Management Technology (AMT) to support advanced features such as remote SOL desktop and remote on/ off control. PoE supplies electrical power and data on a standard 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 25W to a Powered Device (PD). Please refer to the table below for LED connection statuses.

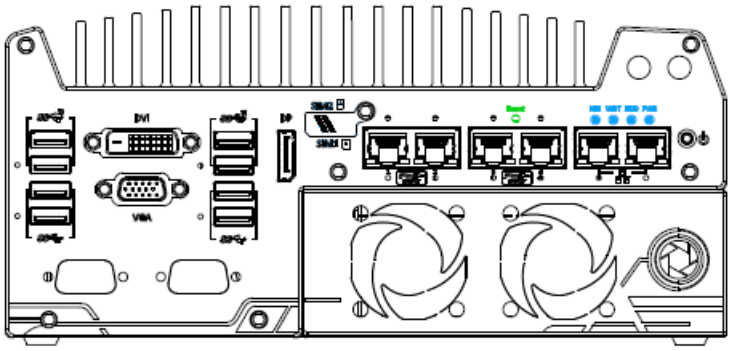
Active/Link LED (Right)

LED Color	Status	Description
Yellow	Off	Ethernet port is disconnected
	On	Ethernet port is connected and no data transmission
	Flashing	Ethernet port is connected and data is transmitting/receiving

Speed LED (Left)

LED Color	Status	Description
Green or Orange	Off	10 Mbps
	Green	100 Mbps
	Orange	1000 Mbps

Reset Button & LED Indicator

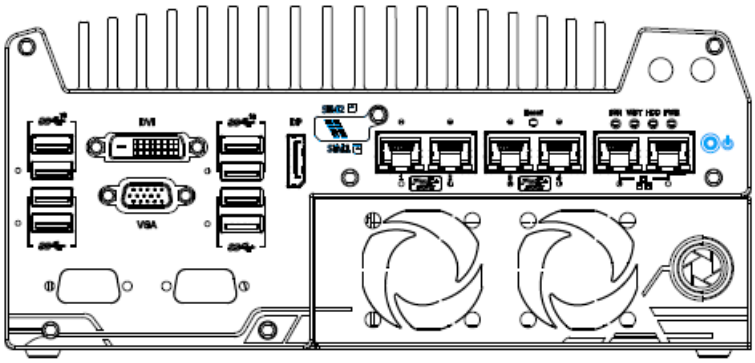


The reset button is used to manually reset the system in case of system halt or malfunction. To avoid unexpected reset, the button is purposely placed behind the panel. To reset, please use a pin-like object (eg. tip of a pen) to access the reset button.

There are four LED indicators on the I/O panel: IGN, WDT, HDD and The descriptions of these four LED are listed in the following table.

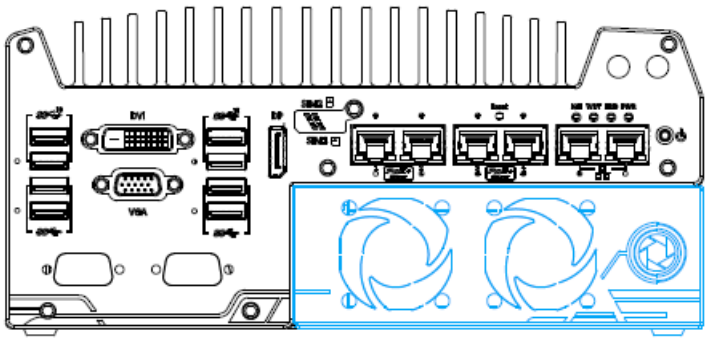
Indicator	Color	Description
IGN	Yellow	Ignition signal indicator, lid when IGN is high (12V/ 24V).
WDT	Yellow	Watchdog timer LED, flashing when WDT is active.
HDD	Red	Hard drive indicator, flashing when hard disk drive is active.
PWR	Green	Power indictor, lid when system is on.

Power Button



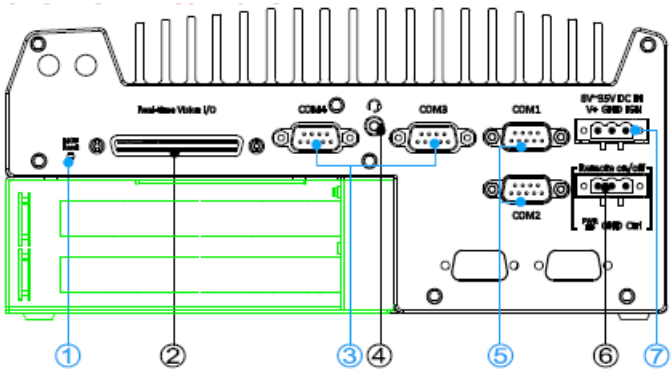
The power button is a non-latched switch for ATX mode on/off operation. To turn on the system, press the power button and the PWR LED should light-up green. To turn off the system, issuing a shutdown command in OS is preferred, or you can simply press the power button. To force shutdown when the system 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).

Cassette Module



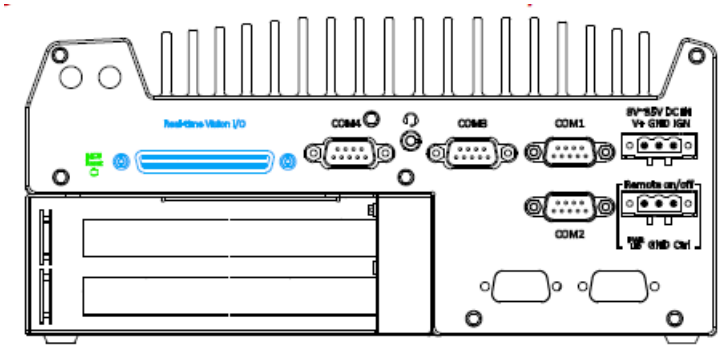
Neousys' patented expansion Cassette (R.O.C. Patent No. M456527) is an innovation design for fanless controller. It provides a separated compartment to accommodate an add-on card. It effectively manages thermal conditions of both the system and the add-on card. The modular concept brought by Cassette also reduces the complexity of installing and replacing an add-on card in the fanless controller. The Cassette enclosure itself incorporates an innovative mechanical design to effectively deal with the heat generated by GPU. This patented architecture (R.O.C. Patent No. M534371) creates a sealed wind tunnel to bring in cold air to the GPU and expels hot air via a system fan. The design offers the system extreme stability and reliability when operating at 60°C with the GPU under 100% load. The expansion Cassette enclosure

Overview – Rear Panel



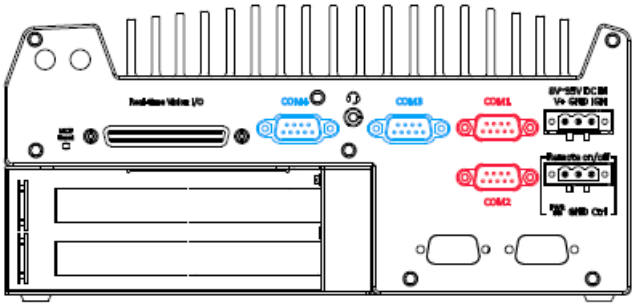
No.	Item	Description
1	MCU reset button	Press the button to reset the MCU.
2	Real-time Vision I/O	Vision specific trigger/ strobe control input/ output for vision/ imagery purposes.
3	COM 3 & 4 ports	COM ports 3 and 4 are RS-232 ports
4	4-Pole 3.5mm headphone/ microphone jack	The 4-pole 3.5mm jack accepts microphone voice input and headphone speaker sound output.
5	COM 1 & 2 ports	COM ports 1 & 2 are software programmable RS-232/ 422/ 485 ports
6	3-pin terminal block (DC/ ignition input)	Compatible with DC power input from 8~35V, the terminal block is also used for ignition signal input.
7	3-pin Remote on/ off control	Allows for external switch extension when the system is placed inside a cabinet.
Area in green	Cassette enclosure	The panel opening of the cassette enclosure. When an expansion card is installed, connectors are accessible on this panel.

MCU Reset Button & Real-time Vision I/O



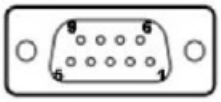
- You may use the to manually reset the MCU without resetting the whole system. To avoid unexpected resets, the button is purposely placed behind the panel. To reset, please use a pin-like object (eg. tip of a pen) to access the reset button. MCU reset button
- Real-time vision I/O is managed by Neousys' patented MCU-based architecture and DTIO/ NuMCU firmware for microsecond-scale realtime I/O control. It also supports various machine vision peripherals such as CC/ CV lighting controller, quadrature encoder input, PWM output, isolated DI/ DO, 12V camera trigger output etc.

COM Ports



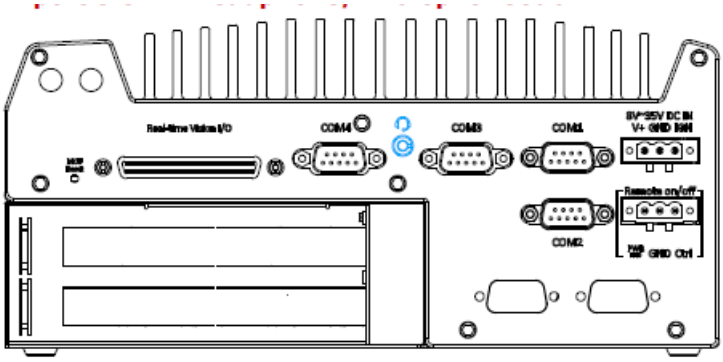
- The system provides four COM ports for communicating with external devices. These COM ports are implemented using industrial-grade ITE8786 Super IO chip (-40 to 85°C) and provide up to 115200 bps baud rate.
- COM1 and COM2 (in red) are software-configurable RS-232/422/485 ports. COM3 and COM4 (in blue) are standard 9-wire RS-232 ports. The operation mode of COM1 and COM2 can be set in BIOS setup utility. The following table describes the pin definition of COM ports

COM Port Pin Definition



	COM1 & COM2			COM3 & COM4
Pin#	RS-232 Mode	RS-422 Mode	RS-485 Mode (Two-wire 485)	RS-232 Mode
1	DCD			DCD
2	RX	422 TXD+	485 TXD+/RXD+	RX
3	TX	422 RXD+		TX
4	DTR	422 RXD-		DTR
5	GND	GND	GND	GND
6	DSR			DSR
7	RTS			RTS
8	CTS	422 TXD-	485 TXD-/RXD-	CTS
9	RI			RI

4-pole 3.5mm Headphone/ Microphone Jack



The system audio function uses high definition audio Realtek ALC262 codec. There is a female 4-pole audio jack for headphone (speaker) output and microphone input. To utilize the audio function in Windows, you need to install corresponding drivers for both Intel® Q370 chipset and Realtek ALC262 codec

3-pin Terminal Block (DC/ Ignition Input) & Remote On/ Off

The system accepts a wide range of DC power input from 8 to 35V via a 3-pin pluggable terminal block, which is fit for field usage where DC power is usually provided. The screw clamping mechanism on the terminal block offers connection reliability when wiring DC power. In addition to DC power input, this terminal block can also accept ignition signal input (IGN) when ignition control module (eg. MezIO-V20-EP) is installed for in-vehicle applications.

Warning
Please make sure the voltage of DC power is correct before you connect it to the system. Supplying a voltage over 35V will damage the system.

The Remote On/ Off 3-pin connection allows for external switch extension. It is useful when the system is placed in a cabinet or a not easily accessed location. You may connect an external status LED (20mA) indicator by connecting to PWR LED and GND.

Vision Specific I/O: TB-10 Pin Connector

Signal						ISOGND	PHA	PHB	ISOGND	DI4L	DI4H	DI5L	DI5H	DI6L	DI6H	DI7L	DI7H
Pin	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
Pin	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Signal						ISOGND	IDX			DI0L	DI0H	DI1L	DI1H	DI2L	DI2H	DI3L	DI3H

Signal	LED0+	LED0-	LED1+	LED1-	DOGND	DO0	DOGND	DO1	DOGND	DO2	DOGND	DO3	VDD	DOGND	TRIG0	DOGND	TRIG1
Pin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Pin	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Signal	LED2+	LED2-	LED3+	LED3-	DOGND	DO4	DOGND	DO5	DOGND	DO6	DOGND	DO7	ISO5V	DOGND	TRIG2	DOGND	TRIG3

Signal	Function Description
LED0+/ LED0- LED1+/ LED1- LED2+/ LED2- LED3+/ LED3-	**LED driving output** LED0~LED3 are used to directly drive LED lights in the vision system. Each channel can be configured to output 24V constant voltage or user-programmable, up to 2A constant current to drive either CV or DC LED light using DTIO or NuMCU library. The LED driving output also supports digital dimming control by adjusting duty cycle from 0 to 100%. When connecting LED lights, wire LED+ to positive polarity (anode) and LED- to negative polarity (cathode). **Note** *Total power budget for four LED output channels is limited to 80W. Users shall cautiously program the LED outputs and make sure all connected LED lights consume less than 80W at the same time.*
DO0/ DOGND DO1/ DOGND DO2/ DOGND DO3/ DOGND	**Isolated digital output (high-current)** DO0~DO3 are open-drained DO channels designed to control external actuator devices, such as relay, valve and motor. Each channel can carry up to 24VDC, 500mA rated current.
DO4 (PWM0)/ DOGND DO5 (PWM1)/ DOGND DO6 (PWM2)/ DOGND DO7 (PWM3)/ DOGND	**Isolated digital output (high-speed) or PWM output** DO4~DO7 are open-drained DO channels implemented using Darlington transistors. It offers <1us propagation delay and is ideal for high-speed signals such as triggers. Users can also configures these channels as PWM function in DTIO or NuMCU to generate PWM signals (external voltage source required). Each channel can carry up to 24VDC, 50mA rated current.
TRIG0/ DOGND TRIG1/ DOGND TRIG2/ DOGND TRIG3/ DOGND	**12V camera trigger output** TRIG0~TRIG3 are camera trigger output channels that offer isolated 12V output (push-pull DO). Users can simply wire TRIGx and DOGND to camera's trigger-in/GND directly without the need of external voltage source. Each channel can offer maximal 80mA current output with <1us propagation delay.

DI0H/DI0L DI1H/DI1L DI2H/DI2L DI3H/DI3L DI4H/DI4L	DI5H/DI5L DI6H/DI6L DI7H/DI7L	**Isolated digital input** DI0~DI7 are opto-isolated channels for digital input. Each channel has separated ground pin so users shall wire DI signal to DIxH and DIxL. The isolated DI is logic low when input voltage is 0~1.5V and logic high when input voltage is 5~24V.
PHA PHB IDX ISOGND		**Quadrature encoder input** PHA, PHB and IDX are pins for quadrature encoder input. It support either single-ended encoder or differential encoder by jumper selection. Please refer to the following table for correctly wire your quadrature encoder.

Single-ended encoder		Differential encoder	
Pin#	Wire to encoder's	Pin#	Wire to encoder's
57	GND	57	A-
58	A	58	A+
59	B	59	B+
60	GND	60	B-
23	GND	23	Z-
24	Z	24	Z+

Documents / Resources

	**NEOSYS Nuvis-7306RT Series Intel 9th Machine Vision Computer** [pdf] Installation Guide Nuvis-7306RT Series, Intel 9th Machine Vision Computer, Nuvis-7306RT Series Intel 9th Machine Vision Computer