



Embedded simulation for a safer world

**CETRAC INTERCONNECT SYSTEM SOLUTIONS**  
-  
**QUICK-START-GUIDE-BABELYA**  
-



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## Package Contents

- CETRAC IND-1U-8TX1GE / A664P7
- Off-line USB Key
- Two Power Connectors
- This Quick Start Guide

## Package Options

CETRAC Kit name	Reference
• CETRAC Flat Surface Toolkit	700611A
• CETRAC Solo Rack Mounted Toolkit	700609A
• CETRAC Dual Rack Mounted Toolkit	700610A
• CETRAC 10Gbps Backbone Toolkit	700642A
• CETRAC IRIG daughter board	700641A
• CETRAC GPS daughter board	700441A

# 1 Welcome

Thank you for choosing the SILKAN CETRAC IND-1U-8TX1GE / A664P7 Managed Switch, a SILKAN System Interconnect Network device.

This guide familiarize you with the layout of the real time and deterministic managed switch and describes how to deploy the device in your network. For additional information, please refer to <http://www.cetrac.io/>

## 2 BEFORE YOU BEGIN

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Make sure that you have the following equipment:

- A PC with Linux OS or Windows OS
  - Windows 7 (32bits), Ubuntu 14.04 64bits , Debian 8.6 64 bits
- Network RJ45 cables to connect computers, or other network devices(from 2 to 8 cable)
- Optional:
  - One or Two 10Gbps monomode fiber Transceivers
  - Network mono-mode 10Gbps fiber cables to connect computers, or other network devices

### 3 GETTING TO KNOW THE CETRAC IND-1U-8TX1GE/A664P7

This section describes the exterior of the managed CETRAC switch.

#### 4 FRONT PANEL

From the front panel, there is access to the communication ports as well as LEDs information.

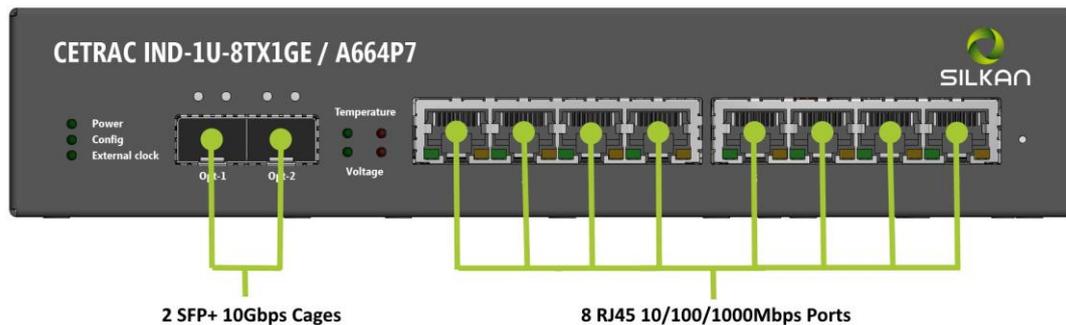


Figure 1 - Front CETRAC view

##### 1.1.1 The communication ports

The CETRAC switch is composed of eight Ethernet ports. Each one can address the following speeds: 10/100/1000Mbps.

These ports are intended to be connected to any type of Ethernet equipment following the standard IEEE802.3 or ARINC664 Part 7.

Optionally it is possible to get more than one CETRAC switch within the same network, to do so it is asked to perform the connection between each CETRAC switches using the dedicated redundant 10Gbps fiber ports.

 <b>NOTE</b>	One or Two 10Gbps transceivers are to be inserted in each cage. These transceivers are proposed in Option within the CETRAC 10Gbps Backbone Toolkit. Any network topology can be built using the 10Gbps redundant fiber ports
--	--

##### 4.1.1 The LEDs

The LEDs are located on the front panel of the switch as shown [upper](#)

It is possible to organize the LEDs into two groups, LEDs to inform the user about communication status and LEDs that allow user to get an understanding about the status at Equipment level.

LEDs dedicated to communication status are:

- Two LEDs per copper Ethernet ports
- Two LEDs per 10Gbps Ethernet Fiber ports (wave length = 1310 nm)

LEDs dedicated to equipment information are:

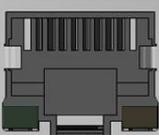
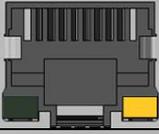
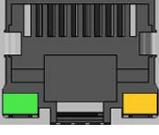
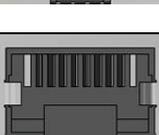
- One LED for power
- One LED for Configuration
- One LED for External Clock
- Two LEDs for Temperature
- Two LEDs for Voltage

### 4.1.2 Communication LEDs Information

➤ 10/100/1000Mbps RJ45 Ethernet ports

The CETRAC Switch provides relevant information to allow user to identify the status of each 10/100/1000Mbps ports.

The table below describes the provided information that are valid and identical for each of the eight Ethernet ports.

Picture	Left LED (Green)	Right LED (Yellow)	Description	Comment
	OFF	OFF	Port ready and not connected	
	Flashing LED at 1Hz	OFF	SGMII Configuration issue	Please Contact Support
	OFF	Flashing LED at 1Hz	MDIO Configuration issue	Please Contact Support
	Flashing LED at 1Hz	Flashing LED at 1Hz	Both LEDs are Flashing simultaneously: SGMII and MDIO Configuration issue	Please Contact Support
	Flashing LED at 1Hz	Flashing LED at 1Hz	LEDs are Flashing alternately: Target Speed and Link Speed are not the same	Please cross-check the configuration content
	OFF	ON (common Ethernet indication)	A 10Mbps data bit rate communication in process.	Take benefit to real time communication
	ON (common Ethernet indication)	OFF	A 100Mbps data bit rate communication in process.	Take benefit to real time communication
	ON (common Ethernet indication)	ON	A 1000Mbps data bit rate communication in process.	Take benefit to real time communication

**Figure 2 – Information provided by Ethernet ports according to LED status**

**Important Note :** When the CETRAC Switch goes out of reset, all the Ethernet LEDs blink at 1 Hz, until they are ready for operation.

➤ 10 Gbps Backbone ports

The 10Gbps redundant backbone is intended to be used to interconnect CETRAC switches together to extend the network.

The table below describes the provided information at backbone level:

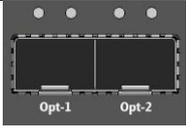
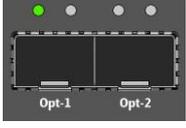
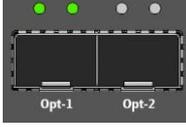
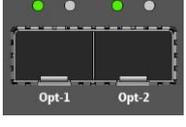
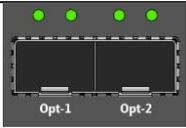
Picture	Left LED	Right LED	Description	Comment
	Opt-1: OFF Opt-2: OFF	Opt-1: OFF Opt-2: OFF	The CETRAC is either switch off or the calibration phase failed	Please contact support in case of failed calibration
	Opt-1: ON Opt-2: OFF	Opt-1: OFF Opt-2: OFF	Optical port 1 backbone port is calibrated and clock is locked	This port is ready to be configured
	Opt-1: ON Opt-2: OFF	Opt-1: ON Opt-2: OFF	Optical port 1 Backbone link configured	Data transfer is ready to be performed on Opt-1 port.
	Opt-1:ON Opt-2:ON	Opt-1: OFF Opt-2: OFF	Both Optical port 1 and 2 backbone ports are calibrated and clocks are locked	Ports are both ready to be configured
	Opt-1:ON Opt-2:ON	Opt-1:ON Opt-2:ON	Both Optical port 1 and 2 are configured	In ring network topology and for safety reasons it is advised to use both Optical links

Figure 3 – Information at backbone level

### 4.1.3 Equipment LEDs Information

Seven LEDs are present in the front panel to inform the user about system status.

If the CETRAC switch is switch off and powered by at least one power supply, the front panel is as below:



Figure 4 - Power OFF

After powering on of the CETRAC switch, the Power led should be on and both temperature and voltage should be ok with a green led for each.



Figure 5 - Power ON; Temperature Ok and Voltage Ok

In the current version of the CETRAC switch, the config led blinks constantly. In future versions of CETRAC switch the config led will be asserted once the config is successfully done.

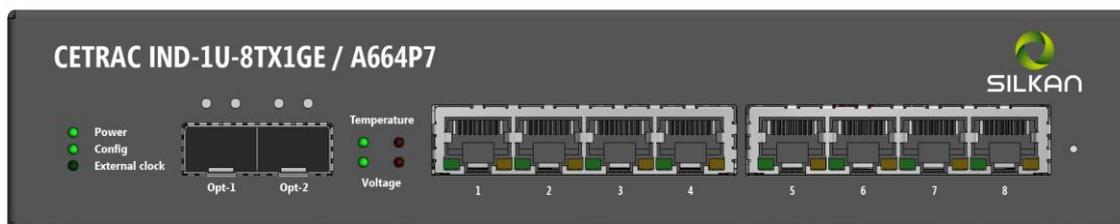


Figure 6 - Power ON, Configuration performed, Temperature Ok and Voltage Ok

 <b>NOTE</b>	<p>It is mandatory to configure the entire switch CETRAC, i.e configuration of all ports even those unused in order to get the config LED on.          The none used port shall be configured in “blocked mode”</p>
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In order to inform the user that the CETRAC switch is synchronized with an external grand master clock, the LED External clock is on.

The equipment can receive the external master clock from one of the following sources:

- The IRIG CETRAC daughter board inserted at the back of the switch
- The GPS CETRAC daughter board inserted at the back of the switch
- Any Equipment through one CETRAC switch Ethernet port



**Figure 7 - Power ON, Configuration performed, Master Extern Clock connected, Temperature and Voltage Ok**

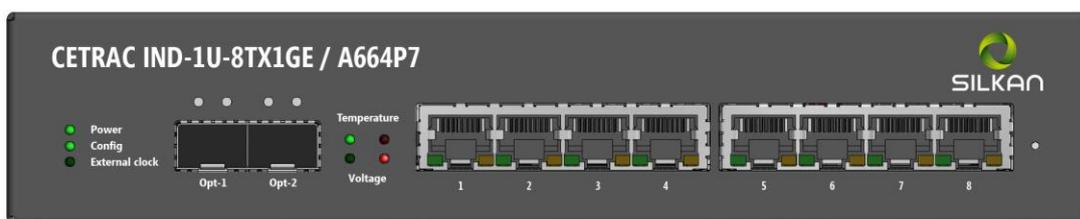
The LED for Temperature goes RED if the temperature overheated.



**Figure 8 - Power ON, Configuration Performed, High Temperature, Voltage OK**

 <b>CAUTION</b>	<p>It is recommended to verify that the ambient temperature is not too high.(See specification chapter)</p>
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The LED for voltage goes RED if the voltage is above or below the authorized range of voltage specified in the product specification.(see specification chapter)



**Figure 9 - Power ON, Configuration performed, Temperature Ok, High or Low Voltage**

 <b>NOTE</b>	<p>Verify the integrity of the power supply. if not already done, add a second and independent power supply connected to the second power connector to increase power supply integrity.</p>
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In this last example, both temperature and voltage are not in the authorized range.



Figure 10 - Power ON, Configuration performed, Temperature too high and Voltage too low or high

 <b>WARNING</b>	<p>At this stage, it is recommended to switch off the Switch and contact support if the root cause is not identified</p>
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### 1.1.2 The reset button

At the very right of the front panel a reset button is available. Prior to press this button, it is advised to switch on the CETRAC switch and reconfigure the CETRAC switch.

This button has to be pressed in last resort: only if your CETRAC switch is in a deadlock situation.

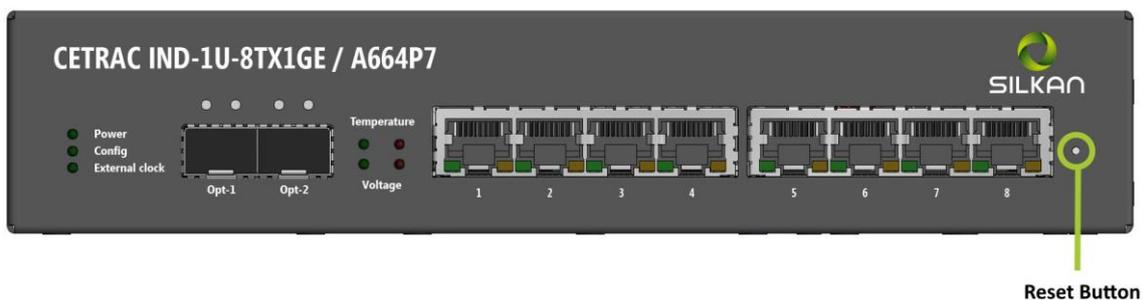


Figure 11 - Reset button location

 <b>NOTE</b>	<p>Press and hold the reset button for five seconds while the equipment is switched on.</p>
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## 5 BACK PANEL

The back panel is composed of:

- One Power on/off button
- Two 24VDC power supply connectors
- Two slots for optional CETRAC daughter boards, two types of CETRAC daughter board exist:
  - CETRAC IRG board
  - CETRAC GPS board

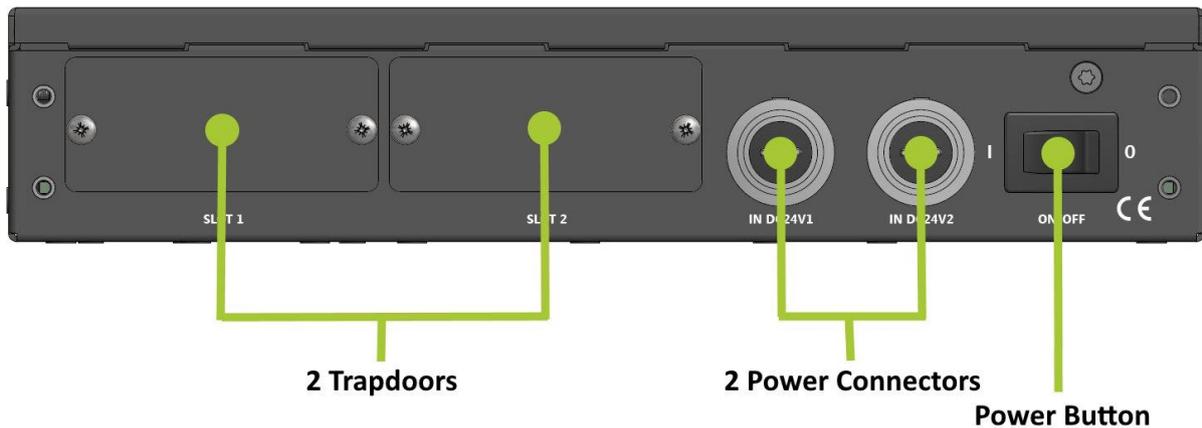


Figure 12 - CETRAC Back panel

To insert a daughter board, remove the two screws present at the trapdoor marked SLOT1 and insert the CETRAC daughter board.

## 6 SIDE PANEL

At both sides of the panel, holes are present to allow a correct ventilation.

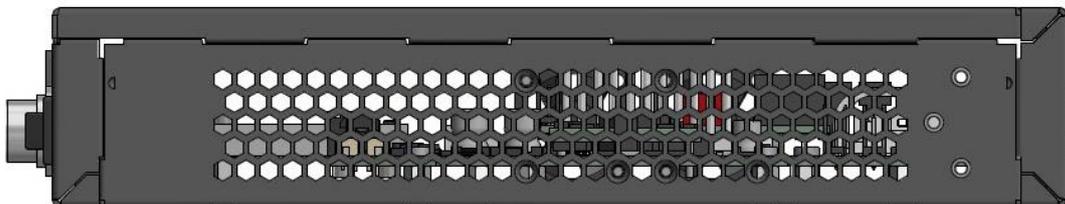


Figure 13 - CETRAC left side panel

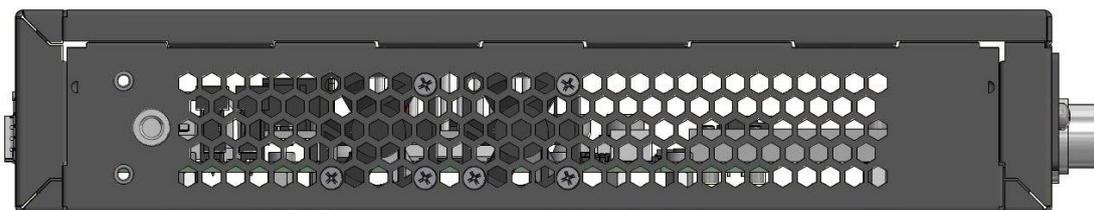


Figure 14 - CETRAC right side panel with fans



Keep free of obstructions the ventilation at all times to allow the device to be cooled when in operation.  
Make sure that fans placed inside the equipment next to the holes are functional

## 7 BOTTOM PANEL

Please have a look on the bottom panel of the CETRAC Switch.  
Four holes are present at each side of the panel for screw insertion, they are required if the CETRAC switch is intended to be placed on a table or any other plane and stable environment.

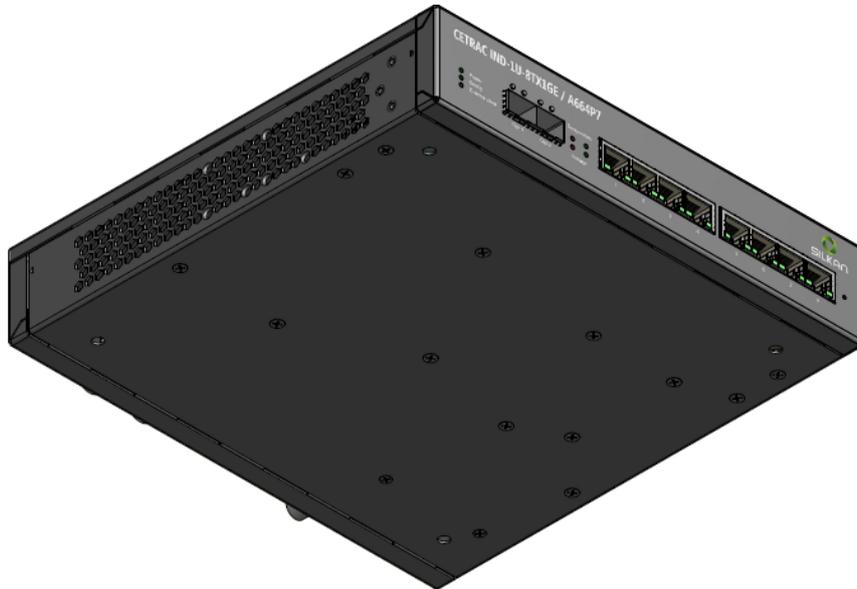


Figure 15 - CETRAC switch Bottom view



**NOTE**

Four pads and screw are available as optional kit.

## 8 INSTALLING THE CETRAC IND-1U-8TX1GE/A664P7

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The managed switch can be placed on a flat surface or rack mounted (not included in this kit). Do not deploy the device in a location where any of the following conditions exist:

**High Ambient Temperature** – The ambient temperature must not exceed +40 degrees Celsius (104 degrees Fahrenheit)

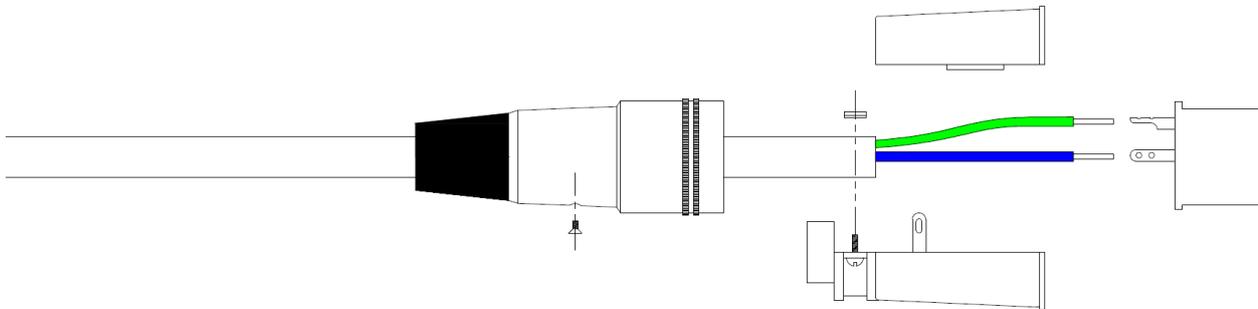
**Reduced Air Flow** – Both side panels must be unobstructed to prevent overheating.

**Mechanical Overloading** – The device should be level, stable, and secure to avoid it sliding or shifting out of position.

## 9 POWER CABLE CONNECTION

The CETRAC Switch shall be connected to a power supply with 24V and 2.5A.

Two power connectors are delivered, it is up to the user to provide the power cable as well as plug and socket. The socket must be wired as described here under.



Cable section : 3x 0.75mm<sup>2</sup>  
Connector : LUMBERG KV30

Figure 16 - Socket connexion to power cable

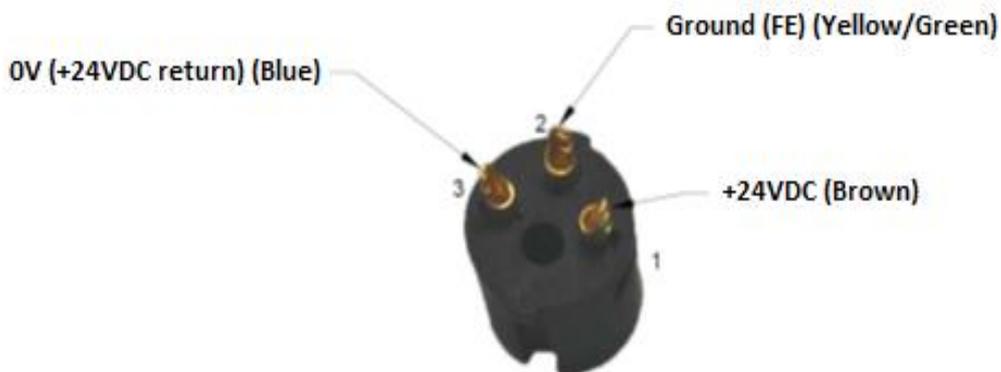


Figure 17 - Zoom in socket connexion

When done, it is possible to insert the plug into either the DC24V1 power connector or the DC24V2 power connector.



This step has to be processed twice in case of use of a dual redundant and independent power supply.



SILKAN is not responsible for damages incurred by wrong power wiring



## 10 FLAT SURFACE INSTALLATION

To deploy the device on a desktop or other flat surface, please follow these following steps:

<b>STEP 1</b>	Make sure to get the optional CETRAC Flat Surface Toolkit
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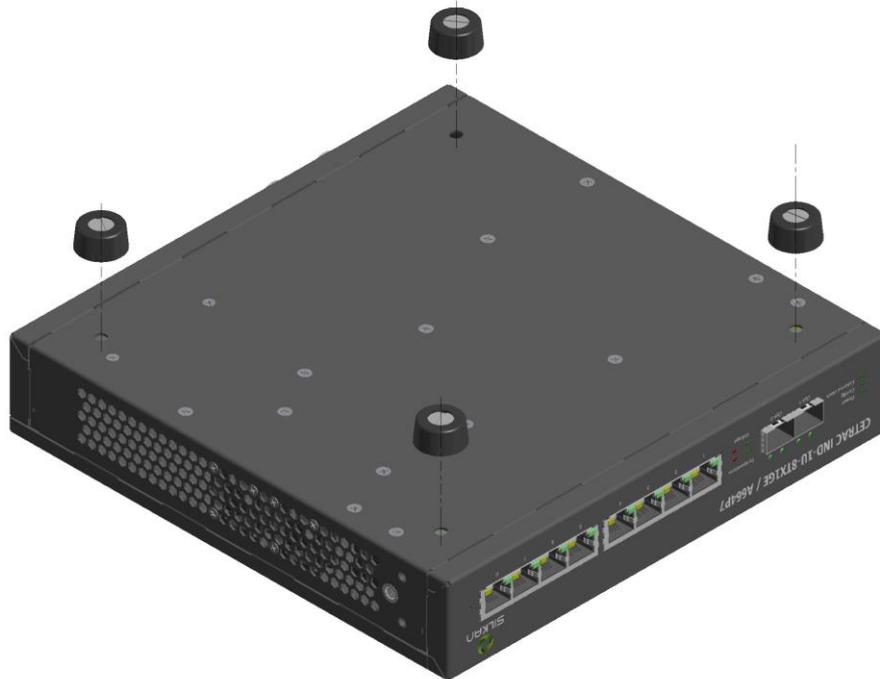


Figure 18 – Bottom side

<b>STEP 2</b>	Tip over the CETRAC switch
<b>STEP 3</b>	Place the four elements available in the optional CETRAC Flat Surface Toolkit, into their dedicated final position
<b>STEP 4</b>	Tip back the CETRAC switch
<b>STEP 5</b>	Place the CETRAC managed switch on a desktop near an AC power source Optional: Place it near two independent AC power sources
<b>STEP 6</b>	Connect the CETRAC managed switch to the other devices, as described in the “connecting the Equipment” section

## 11 RACK MOUNTED

As the CETRAC switch has a 1U ½ 19” form factor, it is perfectly possible to insert it into a rack. There are two options whether one or two CETRAC switches are to be inserted into the rack.

### 11.1.1 Insert one CETRAC Switch in a Rack

If user wants to insert the CETRAC switch within a rack it is advised to get the optional CETRAC Solo Rack Mounted Toolkit, and mount the CETRAC switch as shown below.

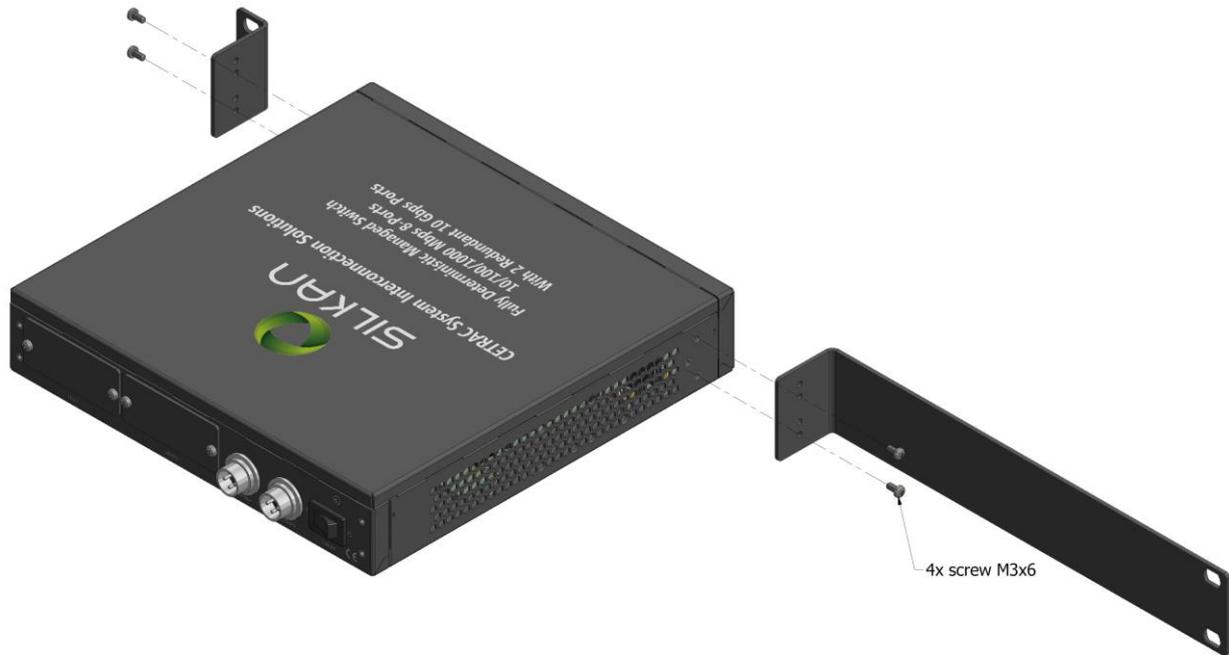


Figure 19 CETRAC Solo Rack Mounted Toolkit

 <p><b>NOTE</b></p>	<p>optional CETRAC Solo Rack Mounted Toolkit is available</p>
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### 11.1.2 Insert two CETRAC switches in the same rack

It is possible to insert two CETRAC switches in a rack



**Figure 20** Insertion of 2 CETRAC switches

 <b>WARNING</b>	SILKAN is not responsible for damages incurred by insecure rack mounting
---	--

To mount the CETRAC managed switch in a rack:

<b>STEP 1</b>	Determine where you want to mount the managed switch. Verify that the surface is smooth, flat, dry and sturdy.
<b>STEP 2</b>	CETRAC IND-1U-8TX1GE/A664P7: screws should be 63.5 mm (2.5 inches) apart

 <b>NOTE</b>	Optional CETRAC Dual Rack Mounted Toolkit is available
--	--

## 12CONNECTING THE EQUIPMENT

This section describes the process for connecting the devices to the network.

<b>STEP 1</b>	It is advised to power down all the devices you want to connect to the switch
<b>STEP 2</b>	Connect the Ethernet cable to the Ethernet port of a PC or other network device

 <b>NOTE</b>	We recommend using <b>Cat6</b> or better cable. Also, do not exceed the maximum cabling distance of 100 meters (328 feet) per segment
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<b>STEP 3</b>	Connect the other end of the network Ethernet cable to one of the numbered managed switch Ethernet ports
<b>STEP 4</b>	Repeat <b>STEP 2</b> and <b>STEP 3</b> for each device you want to connect to the CETRAC managed switch

 <b>CAUTION</b>	Make sure you use the power adapter included with the switch. Using a different power connector might damage the CETRAC switch
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<b>STEP 5a</b>	Connect the power connector to at least one of both power ports located on the back panel of the CETRAC managed switch
<b>STEP 5b</b>	If a high level of reliability is required, it is advised to connect the second power connector to a second and independent power supply
<b>STEP 6</b>	Power up the devices connected to the switch using the power up button located at the back of the switch. The LEDs power, temperature and voltage are green
<b>STEP 7</b>	Verify that any of the eight Ethernet LEDs are not blinking. If yes, please contact the support.
<b>STEP 8 (optional)</b>	One 10Gbps LED per port have to be green too. This step can be skipped if you are not using anyone of the 10Gbps backbone ports

 <b>NOTE</b>	The CETRAC switch configuration can be performed either with a CETRAC board or any other Ethernet Card available in the market.
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## 13 SPECIFICATIONS

The following table lists the specifications for the CETRAC IND-1U-8TX1GE/A664P7 Switch.

Item	Specification
Model	CETRAC IND-1U-8TX1GE/A664P7 Gigabit ARINC664 Part 7 Switch with guaranteed QoS
Standards	ARINC664 Part 7 1Gbps ARINC664 Part 7
Ports	Eight RJ-45 10/100/1000 Mbps ports Two redundant 10Gbps Ethernet ports
Cabling Type	Category 6 Ethernet
LEDs	System: Power, Configuration, External Clock, Health temperature, Health voltage Communication: Link/Act for port 1 through 8, Alive/Config for 10G port 1 through 2.
10G Optical wave length	1310 nm
Security Feature	Security Slot
Dimensions	55*235*225 mm (Height by Width by Depth)
Unit Weight	1.4 kg
Form factor	1U 1/2 19"
Power	24VDC (+/-10%)
Certification	CE
Operating Temperature	0°C to +40°C
Storage Temperature	-55° to +85°C

**Figure 21 –Characteristics table**

## 14BEST PRACTICE

When using a SFP+ 10Gbps transceiver, it is advised to plug the protection as soon as there is no use of this port.



Figure 22 - Transceiver with protection

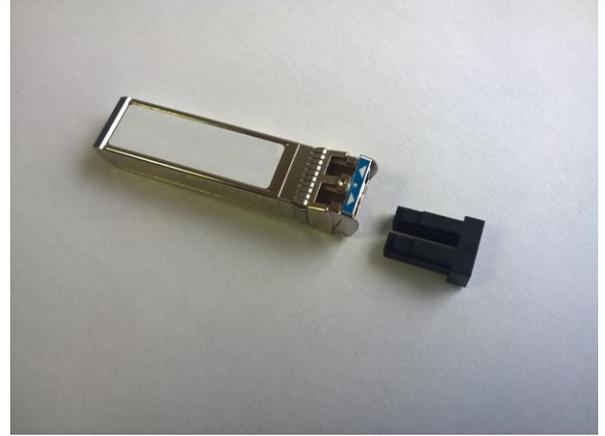


Figure 23 - Transceiver with removed protection