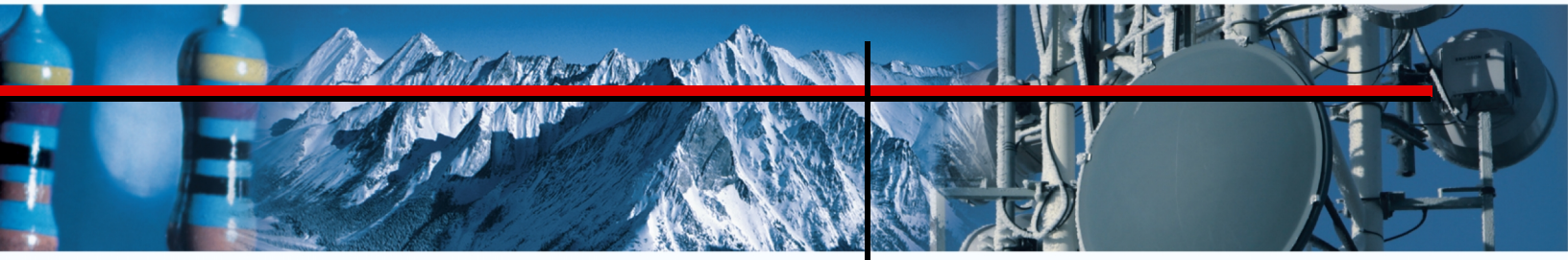
davicom
Site Monitoring Systems by Comlab



Cortex Series Remote Site Management System	Version 1.0 **September 2019**
Reference Guide	MAN1028

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Warranty

Comlab Telecommunications Inc. (Comlab) warrants all its products to be free from any defect in manufacture for a period of two years after delivery to the original purchaser. All warranty returns must be authorized by a Comlab representative.

The limitation of liability under this warranty shall be to repair or replace any part of the product which proves to be defective after inspection by Comlab. This warranty shall not apply to any Comlab product that has been disassembled, modified, physically or electrically damaged, inappropriately installed, or any product that has been subjected to the conditions exceeding the applicable specifications or ratings.

This warranty is the full extent of obligation and liability assumed by Comlab with respect to its products. Comlab neither makes nor authorizes any person or company to make any other guarantee or warranty concerning its products.

Disclaimer

Comlab assumes no liability for any direct, indirect or consequential injury, loss, economic loss, damage, fines or penalties incurred through the use, or inability to use Comlab products.
Comlab products are not intended for use in medical, life-saving, life-sustaining or critical applications. Comlab customers using or selling Comlab products for use in such applications do so at their own risk and agree to fully indemnify Comlab for any damages resulting from such improper use or sale.

Comlab reserves the right to make design changes to its products without incurring any obligation to make the same changes to previously sold units.

Safety information

The Davicom unit should be installed by qualified technical personnel only. Installation of this device by an unqualified person could result in hazardous conditions to the installer or other personnel, and/or damage to the unit or other equipment. Ensure that proper safety precautions have been taken before installing this unit and any associated equipment.

The Davicom unit is designed to meet standard safety requirements, and it is extremely important that it not be modified in any way. Modification of this equipment will void the warranty and could pose a hazard to the user of this equipment or to maintenance personnel.

Service of the Davicom should be performed by qualified technical personnel who are familiar with the unit. Note that the Davicom unit is designed for indoor use in a dry location. Installation and operation in other locations could be hazardous.

Depending on your installation, the Davicom unit may contain HIGH VOLTAGES. Exercise caution when working in and around the unit if it is connected to your site wiring. To ensure proper lightning and power surge protection, make sure that the grounding terminal on the rear of the Davicom units is securely connected to the ground wiring at the equipment site.

Regulatory Compliance

FCC (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference
(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: 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 his own expense.

Changes or modifications not expressly approved by Comlab may void the user's authority, as granted by the FCC, to operate this device and should not be made.

ISED (Canada)

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

EC Declaration of Conformity

In accordance with EN ISO 17050:2010

We	Comlab Telecommunications Inc
of	2272 Leon-Harmel St Quebec, Quebec, Canada, G1N 4L2

declare that:

Equipment	Davicom, DV Telemetry System
Type	Cortex 360 and Cortex 320

in accordance with the following Directive(s):

2014/35/EU	The Low Voltage Directive and its amending directives
2014/30/EU	The Electromagnetic Compatibility Directive and its amending directives
2014/53/EU	The Radio Equipment Directive and its amending directives

has been designed and manufactured to the following specifications:

EN 55032: 2015	*Electromagnetic compatibility of multimedia equipment. Emission requirements. Class B*
EN 55035: 2017	*Electromagnetic compatibility of multimedia equipment. Immunity requirements.*
EN 203 021: 2006 Parts 1-3	*Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017.*
EN 62368-1:2014	*Audio/Video, information and communication technology equipment. Safety requirements.*

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable essential requirements of the Directives.

Signed by: .....

Name:	John Ahern
Position:	President
Done at	Quebec City, Canada
On	2018-07-17

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1. Introduction

1.1. Overview

The Cortex Series is the 3rd generation of Davicom Remote Site Management Systems. It is the core of the Davicom remote control systems upon which different modules can be attached in order to easily expand monitoring and control capabilities.

An HTML5-based engine is at the center of the Cortex providing a sleek and modern way to visualize and access screens and menus. Current users of previous generation of Davicom units will easily find their way, while new users will find the presentation attractive and intuitive.

This Reference Guide is an introductory manual intended to get users started with the Davicom Cortex unit. More information will be added to the manual as it becomes available.

1.2. What's a Remote Management System?

Remote management refers to monitoring, control and operation of electronic or mechanical equipment located at a remote location from a central station called a NOC (Network Operation Center). Remote management applications are almost limitless. At the core of the remote management process is the Remote Telemetry Unit (RTU), a device with communication, measurement and control capabilities. From managing a remote mountain-top telecommunication or broadcast transmitter, an HVAC system in a building or water pumps in the middle of a city, an RTU finds application almost everywhere.

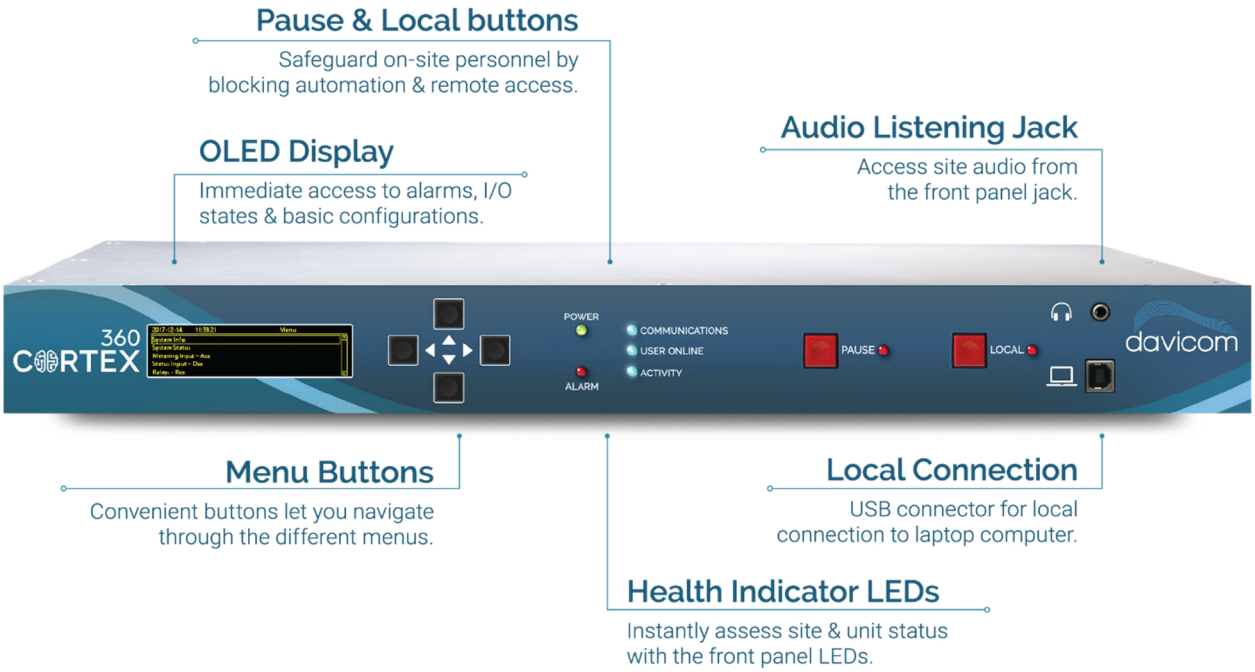
The RTU is usually installed at each site where monitoring, reporting and control is required. It collects all relevant data from other equipment, analyzes it, sends alarm to the NOC or to the user and performs actions based on specific rules defined by the user.

1.3. Specifications

	CORTEX 320	CORTEX 360
On-board Metering (Analog) Inputs	12 (Single Ended/Unipolar)*	8 (Differential/Bipolar)
On-Board Status (Digital) Inputs	4	16
Audio inputs for remote listening	1	2
On-Board Outputs (Command Relays)	6	8
Local Access Port	1	1
Internal Modem	1	1
USB Ports	2	4
Ethernet Ports	1	4
Power Supply Inputs	1	2 (For Redundancy)
Virtual Logic Gates	128	128
Virtual Relays	128	128
Event Schedulers	64	128
Network Pings	32	64
Up/Down Counters	16	32
Activity Monitoring	16	32
Math Functions	16	32
SNMP Manager	Cost Option Available	Yes
SNMP GET/SET/TRAP Commands	0 included (Up to 256 Optional)	128 of each (Up to 1024 Optional)
SNMP Agent	Yes	Yes
ModBus SLAVE	Up to 8	8 included (Up to 32 Optional)
Maximum Expandable I/Os	256 Analog Inputs 256 Status Inputs 256 Relay Outputs	256 Analog Inputs 256 Status Inputs 256 Relay Outputs
Protocol Supported	HTTP, HTTPS, SNMP, FTP, DHCP, SMTP, DNS, NTP, ModBus	HTTP, HTTPS, SNMP, FTP, DHCP, SMTP, DNS, NTP, ModBus
Alarm Transmission Mode	Voice, SMS, E-Mail (with HTML & XML attachments), SNMP TRAP, Smartphone Notification, Pager, FAX, DavNet (Dial-up, Serial/RF & IP).	Voice, SMS, E-Mail (with HTML & XML attachments), SNMP TRAP, Smartphone Notification, Pager, FAX, DavNet (Dial-up, Serial/RF & IP).

1.3.1. Front panel (CORTEX 360)

The Cortex front panel provides easily accessible site and equipment-status information without requiring the use of a computer.



CORTEX-360 front panel

OLED Display - Under normal operation, the display is blank to conserve power. To turn it on, push any of the four menu buttons.

Menu buttons - Four push buttons allow navigation through the different OLED menus.

POWER LED- Indicates status of the unit's power. It is on when the unit is under rated power.

ALARM LED- Shows the Alarm status. If there is one or many alarms, the LED will be on.

COMMUNICATIONS - Shows the unit's call-out status. It will turn on every time the unit makes an outside call (telephone, email, SNMP Trap, etc.)

USER ONLINE - Indicates if one or more users are connected to the unit.

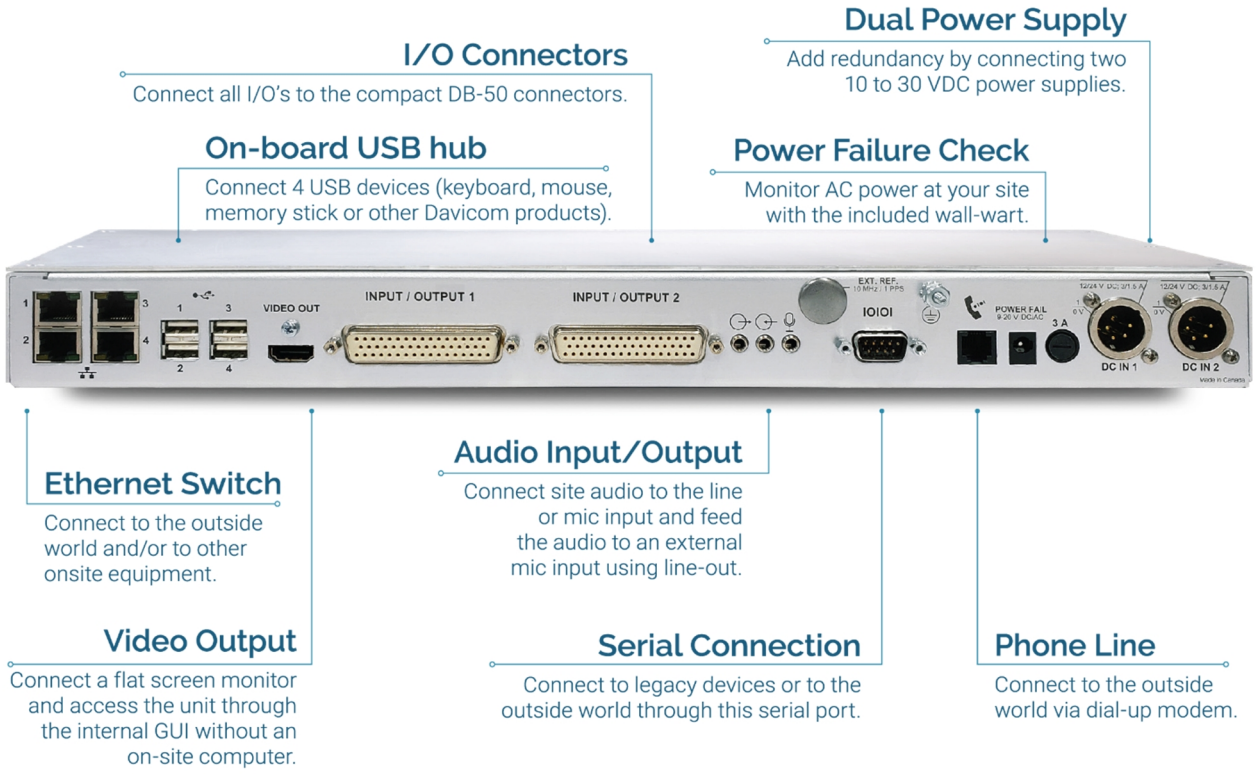
ACTIVITY - Indicates the health status of the CPU. This "heartbeat" flashes at a rate of one (1) pulse per second when the unit is operating correctly.

PAUSE and **LOCAL** buttons- The PAUSE button stops transmission of Alarms to the outside, while the LOCAL button blocks outside actions and control when staff is on-site for maintenance or repair work.

Headphone jack- Provides audio for monitoring purposes. It is active when audio is applied on the unit's rear connector audio input pins. A powered speaker can also be connected to this port.

USB port - Provides a means of connecting to the unit using a computer with the DavLink 6 software.

1.3.2. Rear panel (CORTEX 360)



CORTEX 360 Rear Panel

Ethernet Port (CORTEX 320) or Switch (CORTEX 360) – The CORTEX 360 has an embedded 4-port network switch gives networking flexibility and versatility while the CORTEX 320 has single Ethernet port. Along with providing IP access to the unit, these ports can also be used to connect Davicom expansion modules, networked equipment, or networked accessories. Of particular interest is the connection of on-site SNMP-enabled equipment. This switch is powered by the Cortex's 12 VDC power which should remain active during a site power-failure.

USB ports – An embedded 4-port USB hub (CORTEX 360) or 2-port USB (CORTEX 320) allows connection of USB accessories like memory sticks, a mouse, a keyboard, Davicom Expansion devices or Modbus-compatible equipment and accessories.

Video Out (CORTEX 360 only) – Digital video output to view the unit's GUI on an external monitor.

INPUT / OUTPUT connectors - Two 50-pin connectors (CORTEX 360) or 25-pin connectors (CORTEX 320) provide interconnection from the unit to the outside world. They allow access to the unit's physical inputs and outputs (Metering, Status, Relays). They also provide auxiliary supply outputs (+5 Volts and +12 Volts) for sensors and accessories.

Audio jacks - The first audio jack outputs whatever audio has been selected for audio monitoring, or the audio that will be fed to the PTT type of alarm. The second audio jack is an input and is for audio streaming over IP or via dial-up. The third audio jack is a microphone input that can be used to remotely listen to site noises such as equipment fans. Note that the CORTEX 320 offers a single line-in audio jack.

Clock input – This future option will allow connection of GPS clock-type signals for ultra-precise RTC control.

IOIOI - The IOIOI 9-pin male connector is a serial port that can be used for an external modem, for equipment reach-through, for Modbus interfacing as well as for serial backhaul communications. It can be configured for RS-232 or RS-485 operation.

Ground screw terminal – This terminal is used to connect the unit to the site's electrical ground. It is of utmost importance to provide an excellent ground to the unit in order to avoid or limit damage caused by lightning strikes or electrical problems.

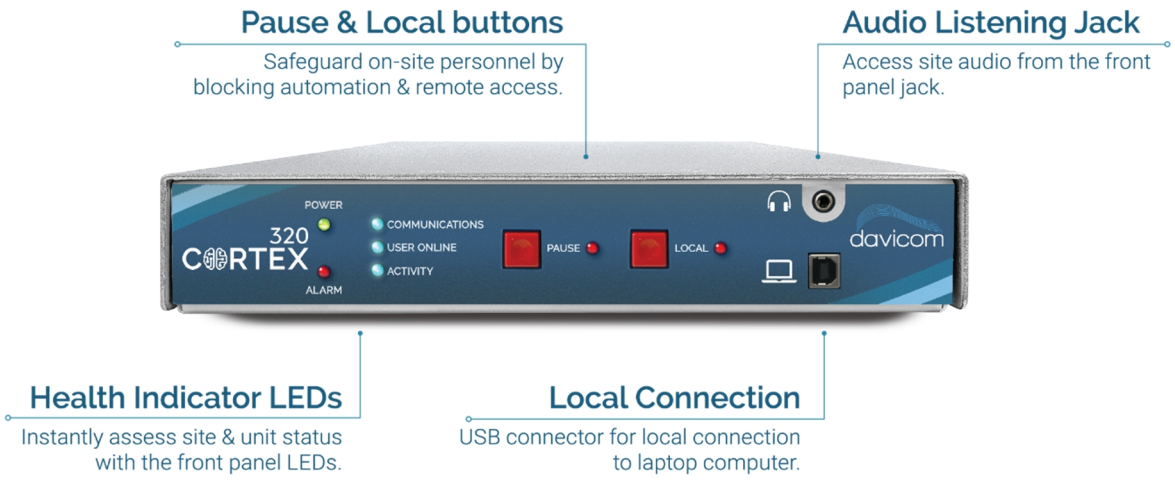
Telephone line (requires a Davicom modem installed inside the unit) - Connects the unit to a phone line for remote access by computer or by using DTMF tones. It also allows the unit to send alarm calls by modem or voice.

Power Fail (P.F.) - Monitors the presence of the main AC utility power through the use a small external AC adapter. When the voltage derived from the main AC utility power falls below a specific level, this input will change level from normal to active. It can be set to trigger alarms and advise users that a power outage occurs at the site. **THIS IS NOT THE UNIT'S POWER SUPPLY INPUT.**

Protection fuse - 3-amp fuse protection on power supply inputs.

DC input power jacks – Redundant 4-pin XLR connectors provide power to the unit. Any one of the two inputs can be used at any time to power the unit, or both at the same time. These two power inputs allow for power redundancy. The power rating is either 12 VDC @ 3 Amps, **OR** 24 VDC @ 1.5 Amps, but any voltage between 10 and 30 VDC can be used. ***VERY IMPORTANT***: Do not mix different power supplies on these inputs (for example, do not use 12 volt and 24 volt power supplies at the same time). Only use power supplies having the same output voltage.

1.3.3. Front panel (CORTEX 320)



CORTEX-320 front panel

POWER LED- Indicates status of the unit's power. It is on when the unit is under rated power.

ALARM LED- Shows the Alarm status. If there is one or many alarms, the LED will be on.

COMMUNICATIONS - Shows the unit's call-out status. It will turn on every time the unit makes an outside call (telephone, email, SNMP Trap, etc.)

USER ONLINE - Indicates if one or more users are connected to the unit.

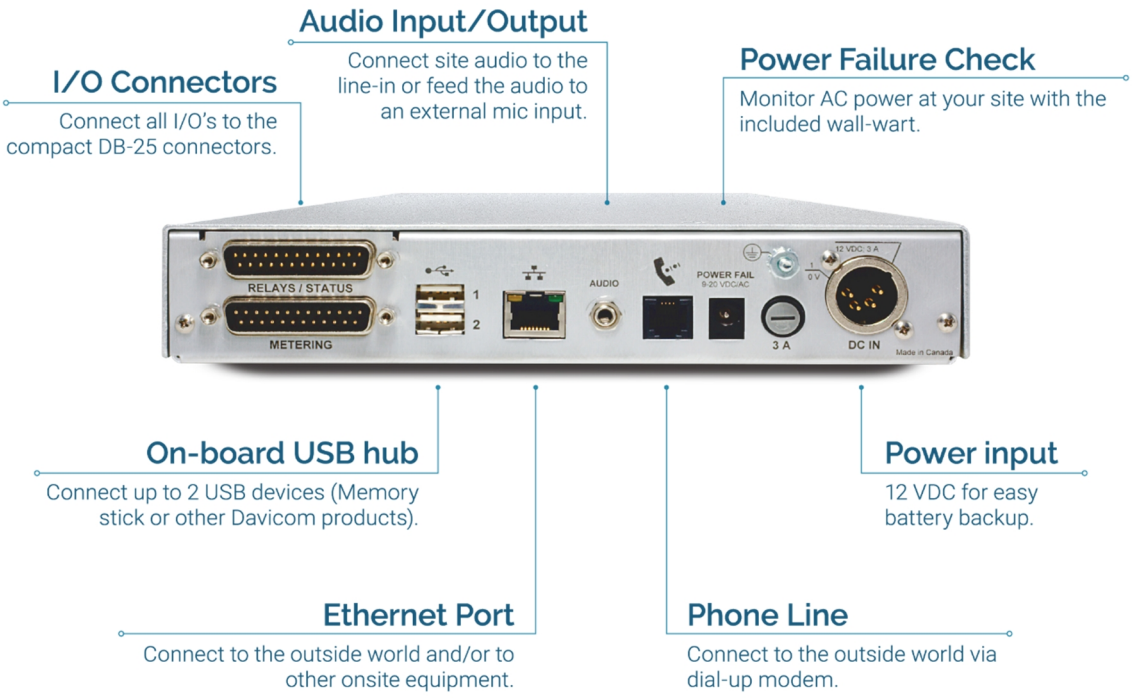
ACTIVITY - Indicates the health status of the CPU. This “heartbeat” flashes at a rate of one (1) pulse per second when the unit is operating correctly.

PAUSE and **LOCAL** buttons- The PAUSE button stops transmission of Alarms to the outside, while the LOCAL button blocks outside actions and control when staff is on-site for maintenance or repair work.

Headphone jack- Provides audio for monitoring purposes. It is active when audio is applied on the unit’s rear connector audio input pins. A powered speaker can also be connected to this port.

USB port - Provides a means of connecting to the unit using a computer with the DavLink 6 software.

1.3.4. Rear panel (CORTEX 320)



CORTEX 320 Rear Panel

Ethernet Port – Provides IP access to the unit. Expansion modules can also be added to the CORTEX 320 by connecting this port to an external Ethernet switch (sold separately).

USB ports – An embedded 2-port USB hub allows connection of USB accessories like memory sticks, Davicom Expansion devices or Modbus-compatible equipment and accessories.

INPUT / OUTPUT connectors - Two 25-pin connectors provide interconnection from the unit to the outside world. They allow access to the unit’s physical inputs and outputs (Metering, Status, Relays). One of the connectors also provides auxiliary supply outputs (+5 Volts and +12 Volts) for sensors and accessories.

Audio jack - The audio jack can be configured as an input (line-in) or output (line-out) using on-board jumpers inside the unit.

Ground screw terminal – This terminal is used to connect the unit to the site's electrical ground. It is of utmost importance to provide an excellent ground to the unit in order to avoid or limit damage caused by lightning strikes or electrical problems.

Telephone line (requires a Davicom modem installed inside the unit) - Connects the unit to a phone line for remote access by computer or by using DTMF tones. It also allows the unit to send alarm calls by modem or voice.

Power Fail (P.F.) - Monitors the presence of the main AC utility power through the use a small external AC adapter. When the voltage derived from the main AC utility power falls below a specific level, this input will change level from normal to active. It can be set to trigger alarms and advise users that a power outage occurs at the site. **THIS IS NOT THE UNIT'S POWER SUPPLY INPUT.**

Protection fuse - 3-amp fuse protection on power supply input.

DC input power jack – An XLR connector provides power to the unit. The power rating is either 12 VDC @ 3 Amps, but any voltage between 10 and 15 VDC can be used.

2. Setting-up and connecting to the unit

2.1. Rack mounting the unit

The Cortex-360 unit can easily be rack-mounted with the supplied rack-mount brackets and screws. Just install the brackets on the side of the unit by selecting the mounting holes that match with your rack-rail position.

The Cortex-320 can be installed in the equipment rack by using the Davicom Rackmount Tray (P/N DRMT-01), sold separately.

2.2. Power Requirements

Specifications	**Cortex-320**	**Cortex-360***
Operating Voltage	12 Vdc	10 to 30 Vdc
Current consumption	Typically 200 mA (275 mA with all relays energized)	Typically 300 mA @ 12 Vdc

*The Cortex 360 features a dual-input system that allows for power supply redundancy: two power supplies can be connected at the same time in order to provide automatic fail-over switching in case one of the power supplies fails.

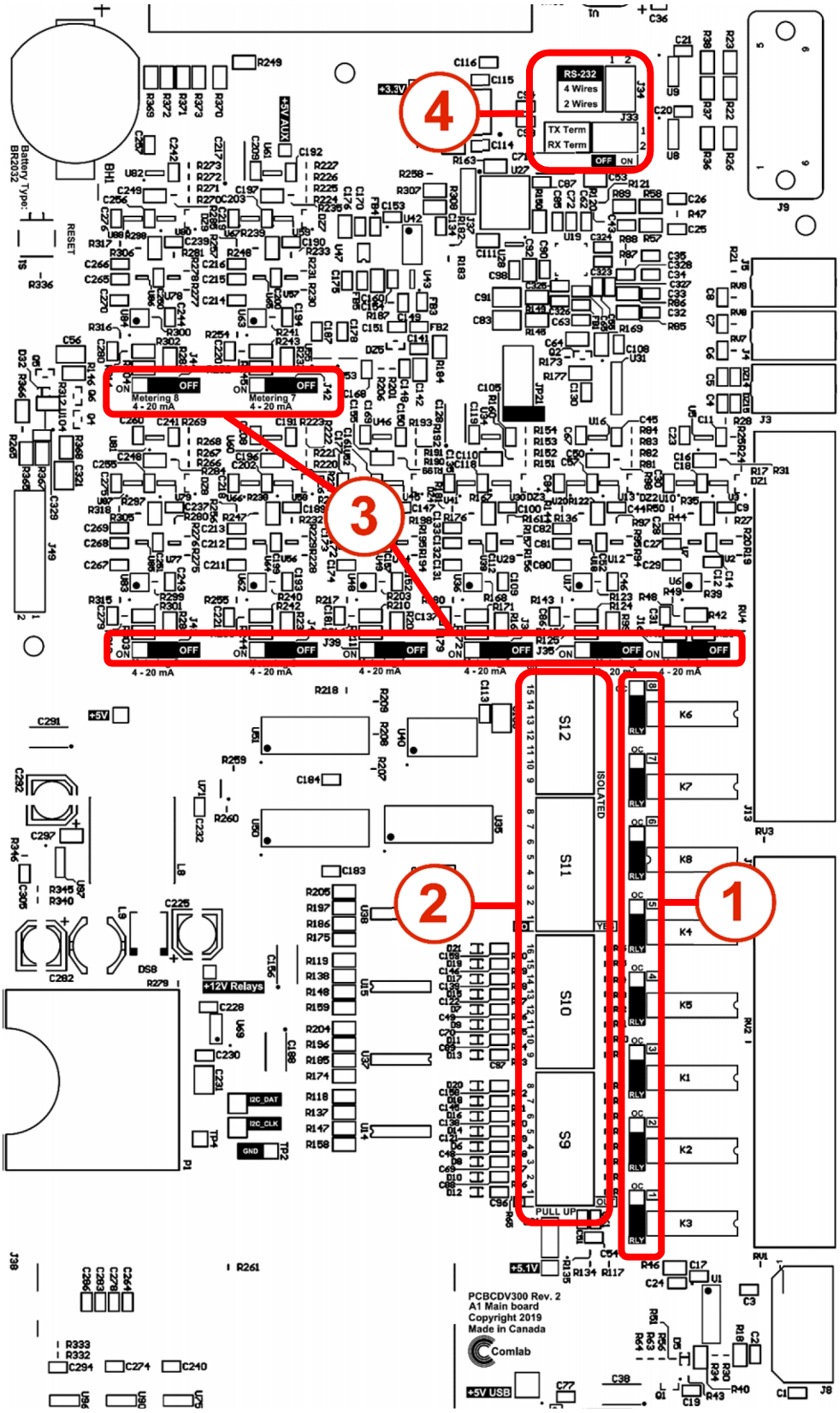
The Cortex uses a 4-pin XLR connector for the power supply: male on the Cortex and female on the power supply side.

2.3. Connecting the Power Supply Unit

If you did not purchase your PSU from Davicom, you will want to make your own supply cable with the XLR pigtail supplied with your Cortex unit. The pinout is indicated directly on the back panel (Pin 1: GND, Pin 4: +V).

2.4. Setting Internal Jumpers and DIP Switches

2.4.1 Jumpers for the Cortex-360

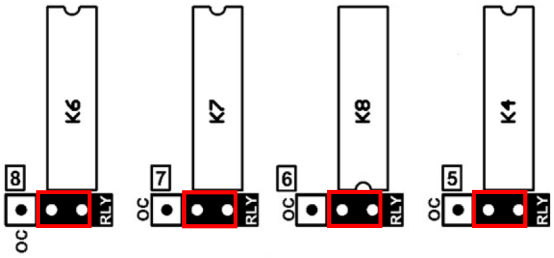


Jumpers and switches location on the Cortex-360 main board

1 – **Relay/open-collector outputs**

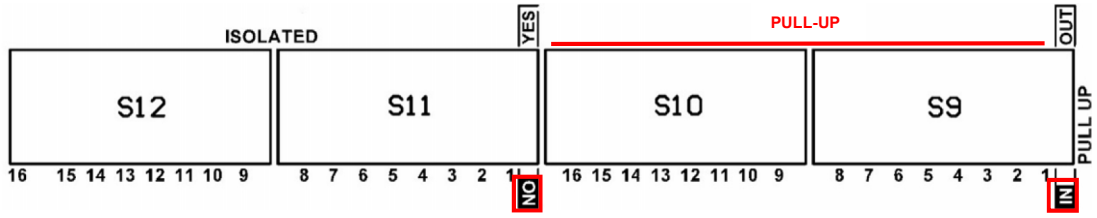
The Cortex-360 can control its physical relays, or the transistors acting as relay drivers (open-collector mode).

By default, the eight relay jumpers are set for direct relay operation (RLY position). If you need open-collectors, change the jumpers of the desired relays to OC Mode.



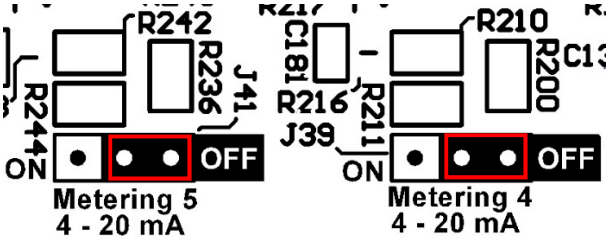
2 – **Status input**

The status inputs can all be individually set for separate grounds or for internal grounds with pull-up resistors. DIP Switches S11 and S12 select isolated grounds mode (Default is NO on all 16 inputs). DIP switches S9 and S10 select pull-up resistor mode (it is IN by default on all 16 inputs).



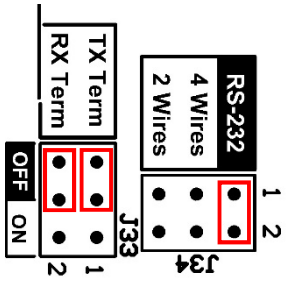
3 – **Metering input**

The Cortex-360 metering inputs can be configured for 4-20 mA operation. To select this mode, place the jumper for the desired metering input in the ON position. By default, the metering input jumpers are set for voltage measurement (OFF position).

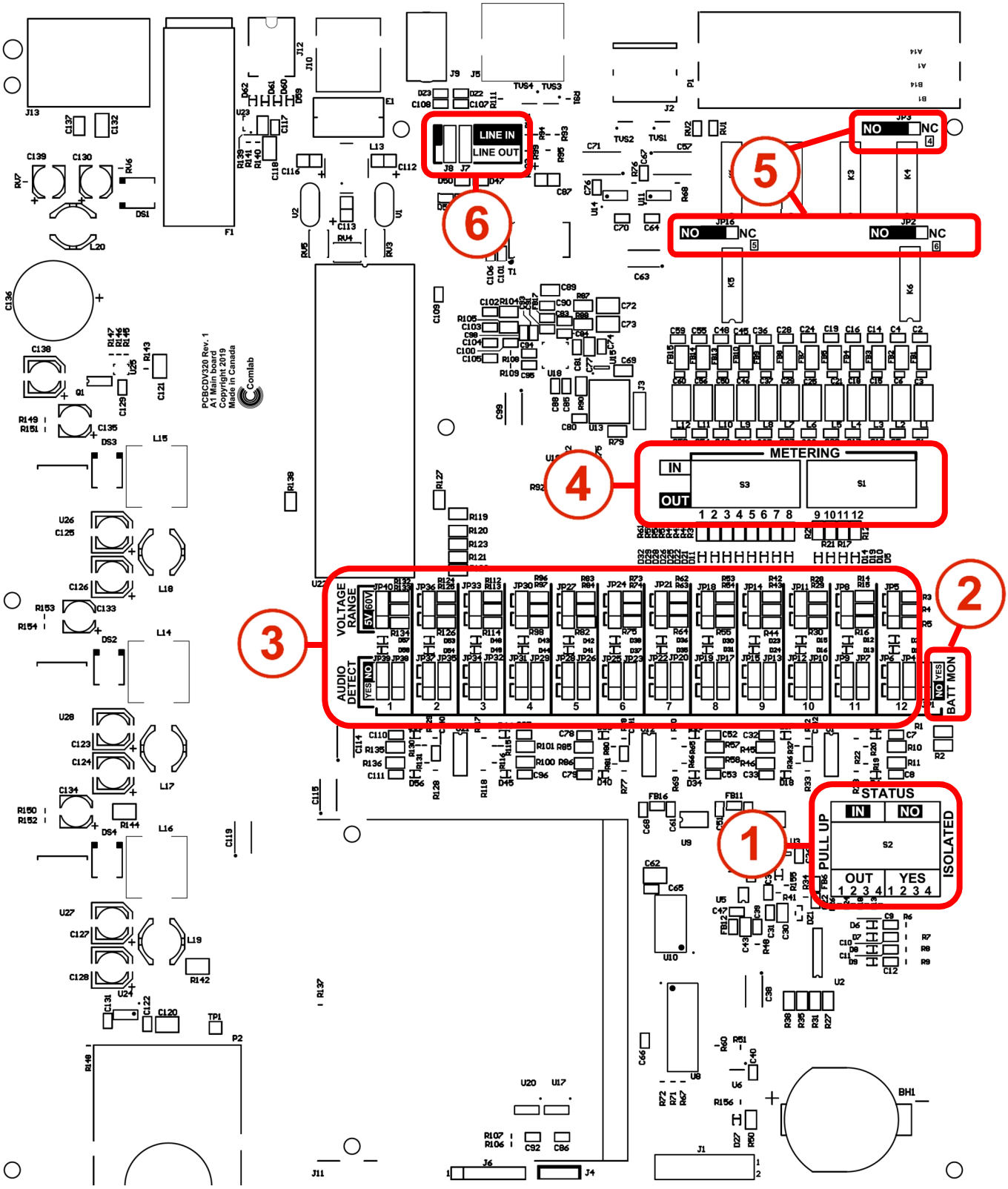


4 – **IOIOI**

This serial port can be configured for RS-232, RS-422 or RS-485 operation. By default, the jumpers are set for RS-232 operation.



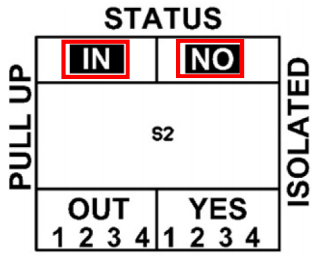
2.4.2 Jumpers for the Cortex-320



Jumpers and switches location on the Cortex-320 main board

1 – **Status input**

The status inputs can all be individually set for separate grounds or for internal grounds with pull-up resistors. The factory default DIP switches position is in the both pull-up mode (IN position on all 4 inputs) and the internal ground mode (NO position all 4 inputs).



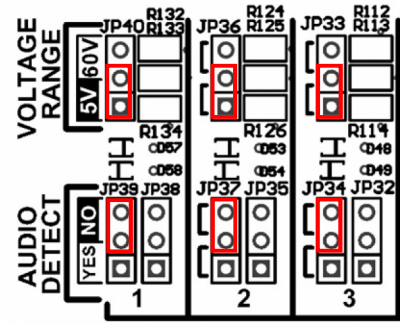
2 – **Battery monitoring**

The Metering Input 12 has a jumper (JP1) that allows measurement of the RTC battery voltage when in position YES. To display the correct battery voltage, the voltage range of the metering input 12 must be in the 5V position. Furthermore, the metering input ABC parameters must be set to: A=0, B=1, C=0, D=0 in the input's configuration screen.

3 – **Metering input**

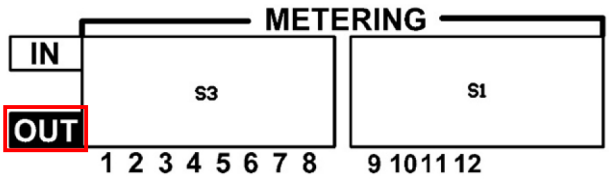
To configure the metering input in 0-5V or 0-60V voltage range, place the VOLTAGE RANGE jumper in the desired voltage range position (5V or 60V) and the AUDIO DETECT jumper in the NO position. By default, the metering input jumpers are set 0-5V.

If you want to use a metering input as an audio rectifier, place the AUDIO DETECT jumper in the YES position and the VOLTAGE RANGE jumper in the 5V position.



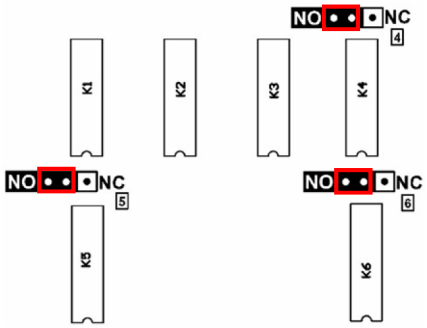
4 – **Digital mode for metering input**

The DIP switches S3 and S1 set an internal pull-up resistor on the metering input. When the METERING DIP Switches are in the IN position, the selected metering inputs are now usable as status input. To work properly, it's necessary to place the VOLTAGE RANGE jumper of the selected metering inputs in the 5V position. When the selected inputs are open circuit, the metering inputs show approximately 2V (High).



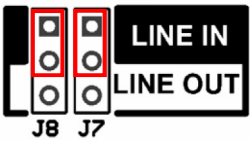
5 – **Relays**

Relays 4, 5 and 6 can be SPST Form A or B. Place the jumper in NO position to have an SPST Form A relay or in NC position to have an SPST Form B relay. By default, the three relay jumpers are in NO position.



6 – **Audio IN/OUT**

These two jumpers configure the back-panel audio connector as either an input or an output. By default, the two jumpers are set for input operation.



2.5. Boot-up

Once power is applied to the Cortex, the unit takes about 50 seconds to boot-up and be ready. During this period, the Cortex-360 front panel display will be blank most of the time, but “DAVICOM” will appear about 40 seconds in, and then the display will go blank again. About 15 to 20 seconds after the Cortex is powered, the 3 blue LED’s will light at the same time for a few seconds. The unit is ready once the “ACTIVITY” heartbeat light starts blinking.

2.6. Connecting your computer to the Cortex360

Communications with Davicom’s Cortex for configuration and control can be achieved via an Ethernet connection or over a USB port. The Cortex 360 interface uses HTML 5 in both cases because DavLink 6 also embeds this technology. DavLink 6 is backward compatible with legacy DV-200 series.

The Cortex allows up to 4 users to connect at the same time. Of these 4 users, only one at a time can be in control.

When another user with enough privilege connects to a unit and takes control, a pop up message saying “**You have lost control**” will appear. When this user disconnects from the unit, a pop up message saying “**A user has disconnected**” will appear. You must re-take control manually if you want to resume control.

2.6.1. Connecting by IP with your web browser

The Cortex factory-default IP address is **192.168.1.210** and you can connect to any of the rear-panel Ethernet ports (4 on Cortex-360 and 1 on Cortex-320). If this address is not within the address range of your network or computer, please refer to your network administrator to change the settings of your computer, or use DavLink 6 as explained later.

You can use one of the browsers listed below, but note that compatibility may vary over time as new updates are released for these browsers. Always see the “About” section in the Cortex menu to get the most current compatibility listing, or contact the Davicom technical support.

Microsoft Internet Explorer 10.0+
Google Chrome 26+
Mozilla Firefox 20+
Opera 15+
Apple Safari 5.0+
iOS 6.0+

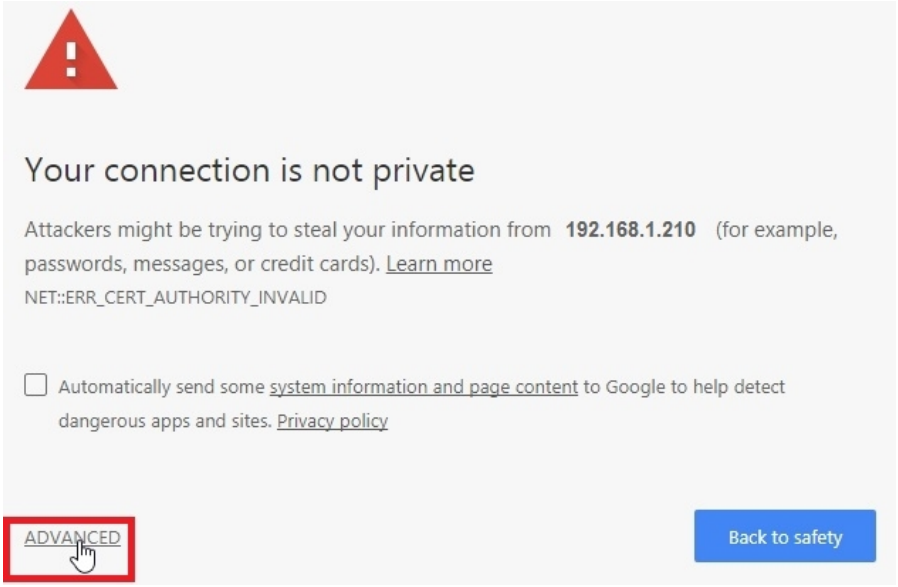
2.6.2. Connecting using Google Chrome

Since Google Chrome is by far the most popular web browser (as of July 2018), we will explain the connection process using this browser only.

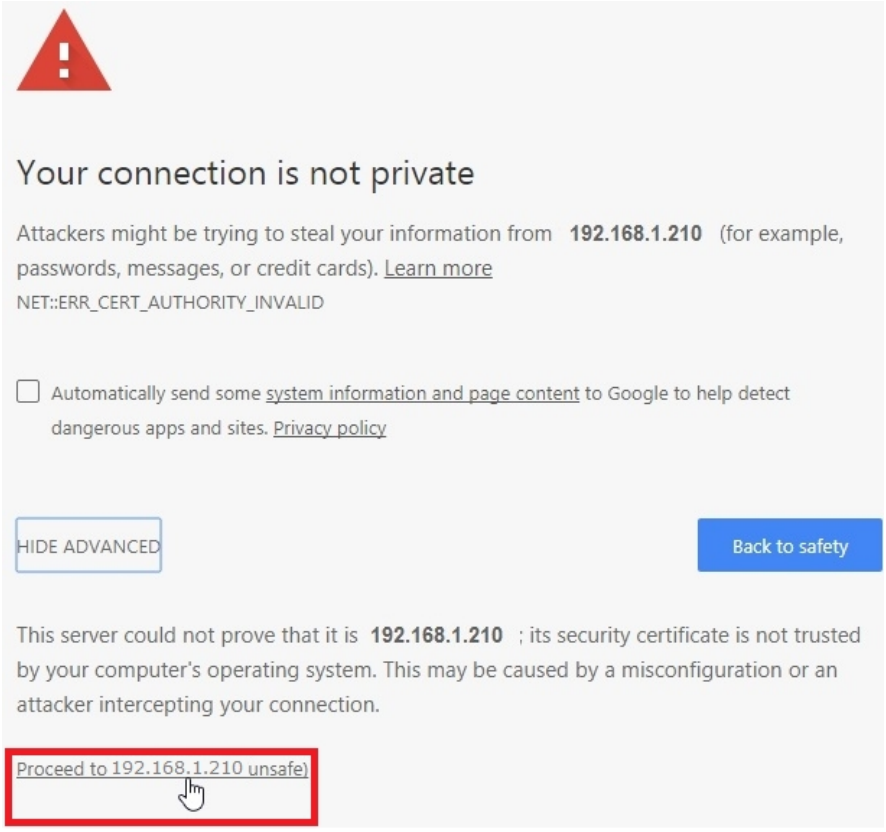
Launch Chrome and enter **192.168.1.210** in the URL box, then hit enter. Wait until you see the screen shown below.

Note that despite this warning message, there is absolutely no danger in connecting to the unit. The message relates to the Cortex web server’s security certificate which can’t be verified by the browser at this point.

Click on “**ADVANCED**”.

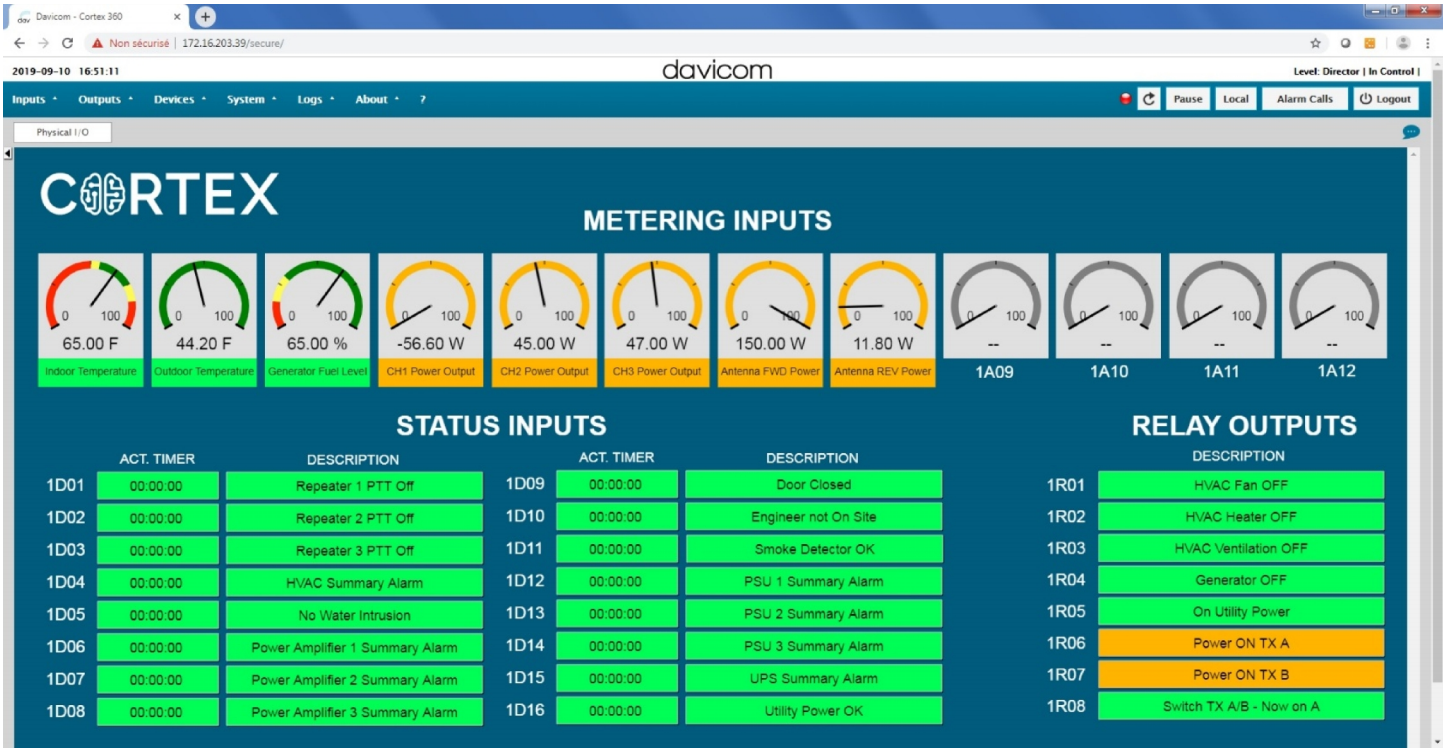


Next, click on "**Proceed to 192.168.1.210 (unsafe)**". There is no problem with accessing the unit this way.



The following login screen will show up. Enter "**super01**" for the Username, and enter "**ssssssss**" for the Password. See section 4.2.6 for more details on default users and passwords.

You should now be connected to the unit and viewing the main dashboard as shown below (the actual dashboard may look different).



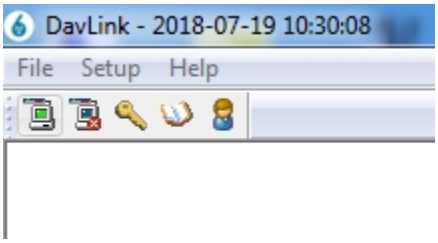
One important difference between the new Cortex family and legacy Davicom units is that the workspaces (GUI displays) now reside within the unit's memory and not in the user's PC with the DavLink application.

2.6.3. Connecting using DavLink 6 via the USB port

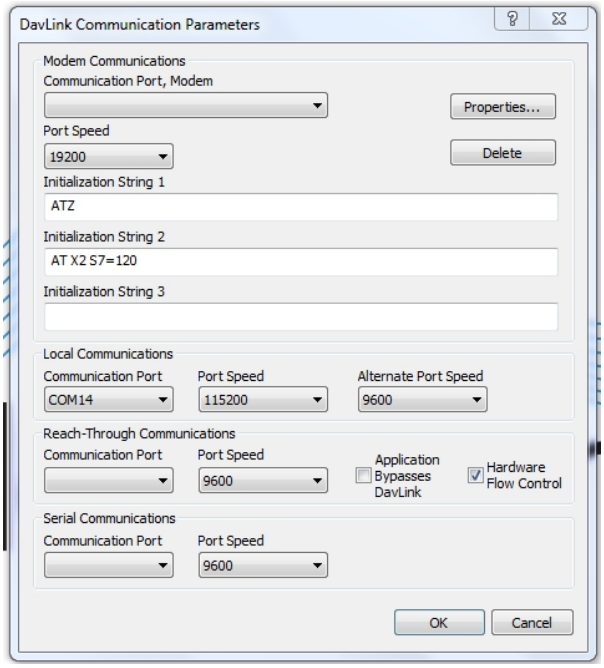
In order to connect to the Cortex through the local USB port, via telephone or over a narrowband radio or serial link, DavLink 6 is required. For the USB connection, Davicom's USB driver is also required. It is included on the installation CD or it can also be found on our website at www.davicom.com.

Once you have installed the USB driver, please connect your computer to the Cortex's front-panel USB port and then start DavLink.

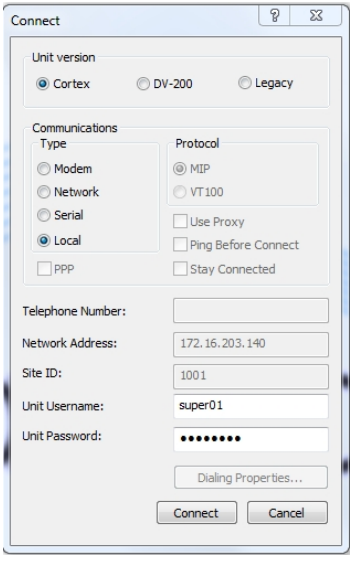
Once started, DavLink will display its main screen. Go to the upper left of this screen to see:



Select ***Setup-Communications*** and you will see the following screen, go to the ***Local Communications*** section and select the Communication Port that corresponds to the USB port where you have connected the Cortex (COM14 in this example).

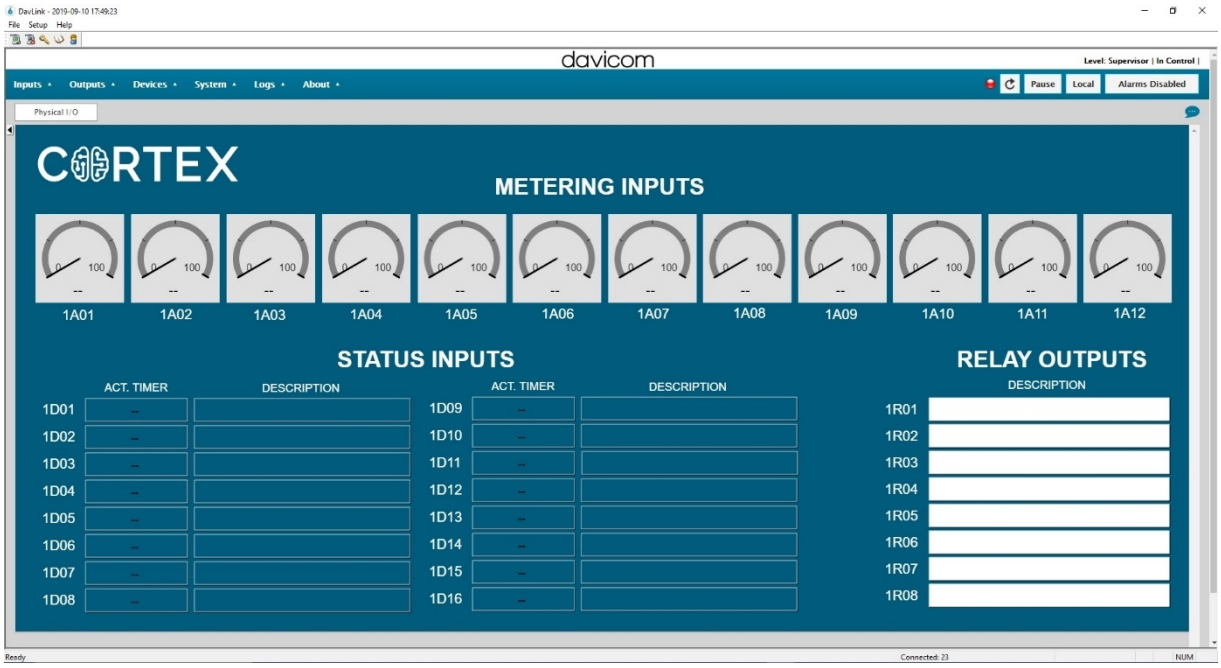


Click OK and then click on the small green computer Icon at the top left of the DavLink main screen. The following window will open:



Select Cortex, Local and then enter the Username and Password (super01 and ssssssss) into the fields.

You should then be connected to the Cortex GUI.



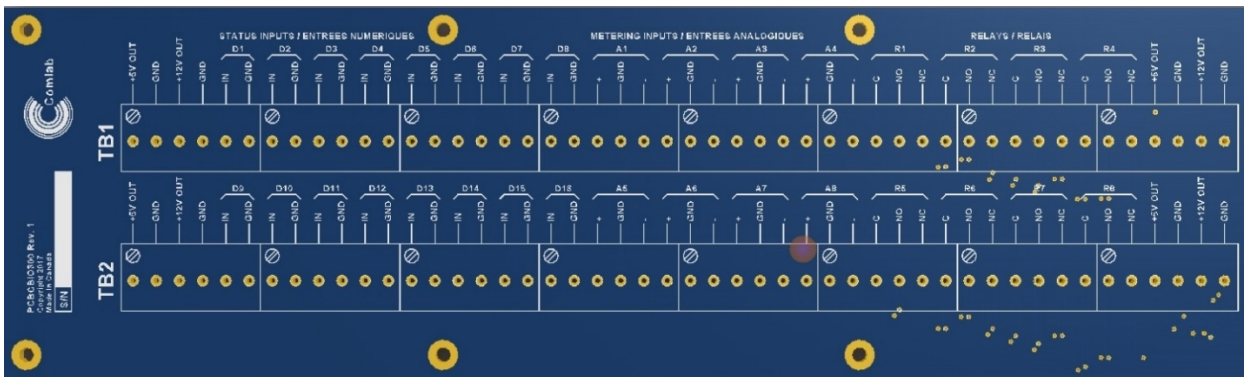
When you are finished, you can logout from the Cortex with the  Icon at the top left.

Special note for DavLink:
Contrary to operation through a web browser, in DavLink, workspaces can only be used locally. This means that DavLink does not download the workspace from the Cortex unit when it connects, but instead loads it internally from the computer's memory. DavLink has been configured this way to allow operation over narrow-band data channels like slow satellite links, narrowband radio channels or RS-232 multi-drop lines.

2.7.1 Connecting Physical I/O to the Cortex-360

The most convenient way to connect physical I/O to the Cortex-360 is through Davicom's MIOP300 screw-terminal I/O panel.
This rack-mount panel provides complete connection options for the auxiliary DC outputs (+12V and +5V), the differential metering inputs, the internal or external-ground status inputs as well as the Form-C relay outputs.

The panel's layout is shown below.



Specifications for the Metering inputs are:

- 12-bit resolution
- Bipolar/Differential inputs (up to 80V common mode rejection) with 1 MΩ input impedance
- Selectable input ranges of 0.5, 2.5, 5, 10, 20, 40 & 80 VDC
- Jumper-selectable 4-20mA input mode
- Software selectable signal rectifier on all inputs

Specifications for the Status inputs are:

- Independent grounds on each input
- Opto-isolated
- Impedance > 22 kΩ
- Detection Levels: -12 to 0.8 VDC (low), +2.4 to +12 VDC (high)

Specifications for the relays are:

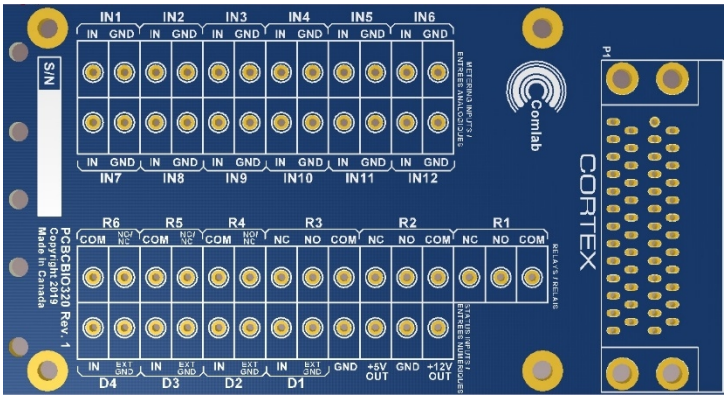
- 70 VAC @ 0.4A, 30 VDC @ 2A, or open collector (100 mA)

Depending on your requirements and setup, you must also remember to connect the telephone line, the Power Fail detector wall-wart, the network and most importantly, to ground the unit with an appropriate ground wire or strap.

2.7.2 Connecting Physical I/O to the Cortex-320

The most convenient way to connect physical I/O to the Cortex-320 is through Davicom's DVIO320 screw-terminal I/O board. This board provides complete connection options for the auxiliary DC outputs (+12V and +5V), the metering inputs, the internal or external-ground status inputs as well as the relay outputs.

The panel's layout is shown below.



Specifications for the Metering inputs are:

- 12-bit resolution
- Single-ended input with 1 MΩ input impedance
- Selectable input ranges of 5 & 60 VDC
- Audio rectifier jumper selectable on all inputs
- Useable as Status Inputs also with selectable internal pull-up resistor

Specifications for the Status inputs are:

- Independent grounds on each input
- Opto-isolated
- Impedance > 22 kΩ
- Detection Levels: -12 to 0.8 VDC (low), +2.4 to +12 VDC (high)

Specifications for the relays are:

- 70 VAC @ 0.4A, 30 VDC @ 2A, or open collector (100 mA)

Depending on your requirements and setup, you must also remember to connect the telephone line, the Power Fail detector wall-wart, the network and most importantly, to ground the unit with an appropriate ground wire or strap.

3. User interface & menus

3.1. User interface

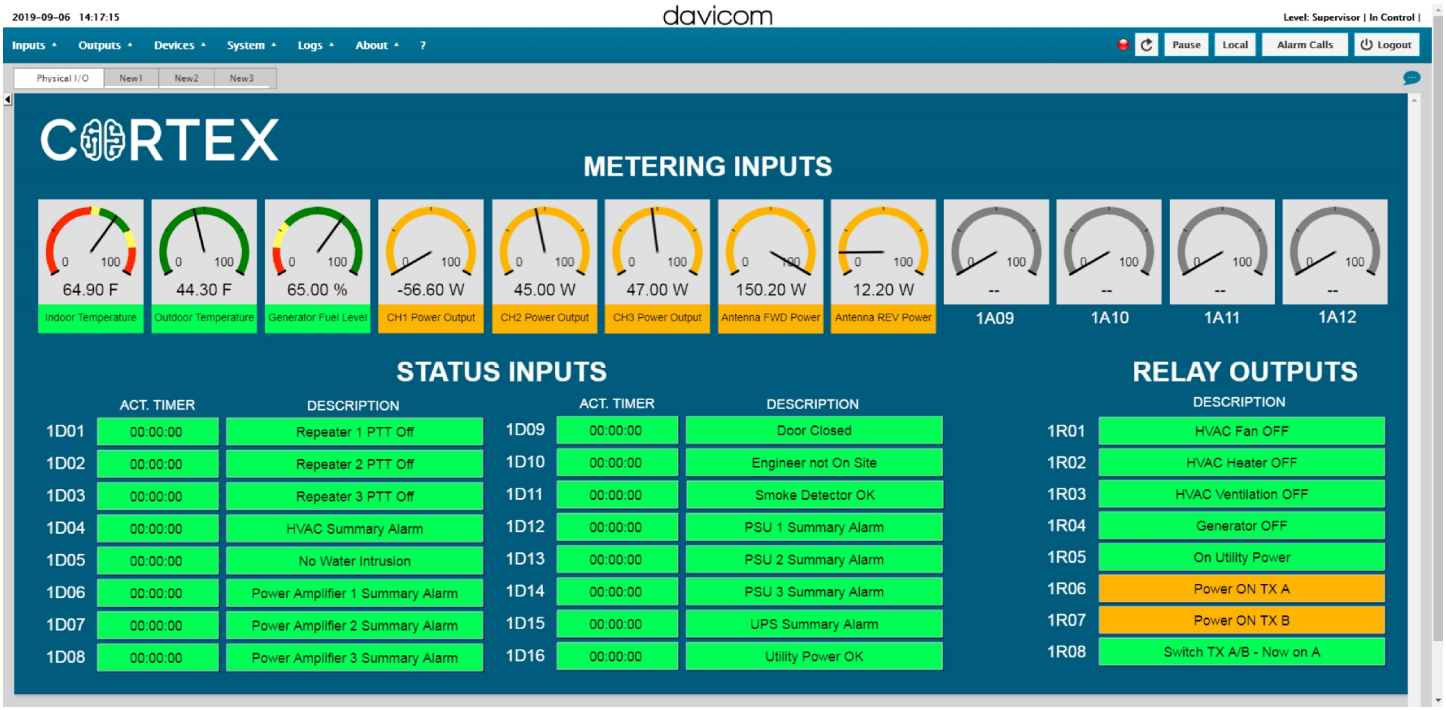
The Cortex user interface (or dashboard) is accessible using a web browser or DavLink 6. It is highly customizable and can be tailored to suit user needs and preferences. Menus are accessible by mouse clicks or right-clicks.

The actual user interface (where all the graphic elements are disposed) is called the workspace. A workspace can contain many screens, and each screen has its own tab. These tabs are called panels. The workspace can reside inside the remote unit, but it can easily be transferred to your PC and shared among units or uploaded back to the original unit.

IMPORTANT: In order for the on-screen I/O boxes and meters to be “live” showing colors, text, and measurement values, the actual I/O’s must first be configured. Otherwise, they will appear as empty or grayed-out.

MORE IMPORTANT: The Cortex menus and screens are dynamic, meaning they will show more or less items based on a user’s access level, and if the user is in control of the unit or not. Therefore, if you note that configuration buttons or control/command buttons seem to be missing, first check if you are (still) in control, or make sure you have proper access levels/rights.

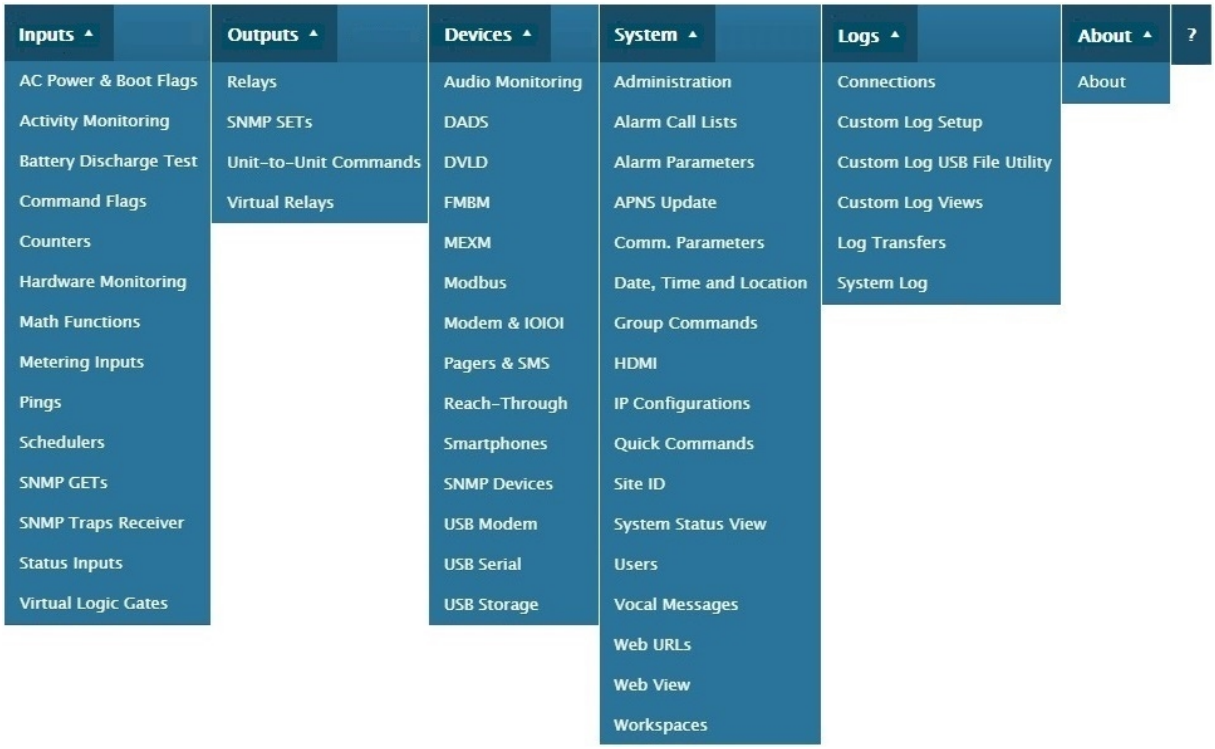
The screen-shot below shows the display with a typical configuration and the default workspace. Depending on your actual model number, the display may be different.



3.2. Menus

The main menu is at the top upper left. It provides access to all of the unit's configuration, settings, and views.

Each of the 6 top menu categories gives access to visualization screens for: **Inputs**, **Outputs**, **Devices**, **System**, **Logs**, and **About**. Within each of these visualisation screens, a configuration icon allows direct access to the item's setup screen.



INPUTS - Everything that is considered or defined as an ***input*** is found here: Metering (or analog) inputs, Status (or digital) inputs, Virtual Logic Gates (VLG), SNMP GET (read), SNMP Traps (receive), Math Functions, Pings (receive), Schedulers (timers), Commands Flags inputs (to receive UUC's or Unit to Unit Commands), as well as several others.

OUTPUTS - Everything that is considered or defined as an ***output*** is found here: Relays, Virtual Relays, SNMP SET (write), and Unit-to-Unit Commands.

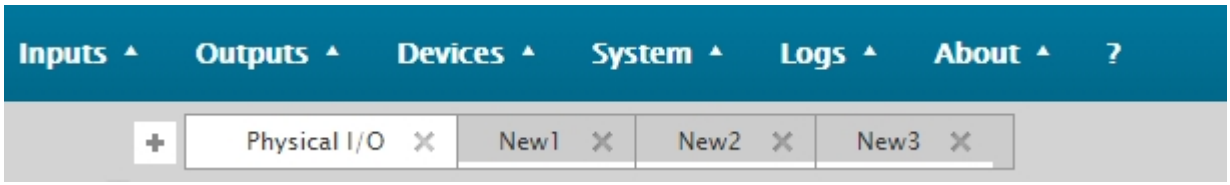
DEVICES - This section provides access to the setup of external equipment, accessories, and I/O expansion that can be connected to a Cortex unit.

SYSTEM - This section allows administration and management of settings such as: access, views, rights, and commands related to the unit itself and to its users.

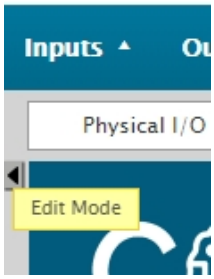
LOGS – This section contains everything for setting up, managing and viewing the different logs as well as the current user connections.

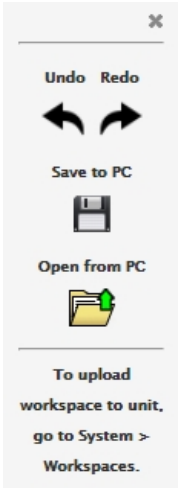
ABOUT - Provides the unit's software and hardware version.

The other menu line, just below the Main menu contains the workspace tabs from which the different panels can be accessed (note that this menu may be absent if you don't have any workspace panels configured, or if you are scrolled down on the page). This is usually where all the I/O activity is visualized. Each and every workspace panel can display any I/O or Flag using different shapes and colors. Screens can easily be added, edited, or removed. Below is an example:

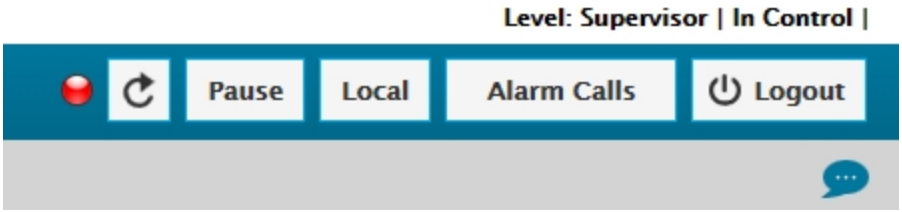


At the very left of your screen, right below the menus above, a small arrow is visible. Clicking on this arrow pulls-out the **Edit** toolbar, allowing access to graphic tools for building custom workspaces. The Workspace transfer window may also appear. If it doesn't, just click on the Gear icon.





The upper right corner menu shows an general alarm-status LED, a data-download refresh button (not to be confused with the web-page update button (F5 function) on the browser), two buttons to put the unit into Pause or Local modes, an alarm-call enable/disable button, and a button to logout of the unit. Your current user-level and Control status are also shown. This last information is important because without control, a user cannot access several areas of the GUI.



The small  bubble icon at the bottom of this part of the screen opens a Chat window so that different connected users can exchange information. This feature is particularly useful when a technician is working at the site, with no cell-phone or other communications channels available, and there is a need to exchange information with another person at the NOC or studio for example.

4. Unit configuration and programming

Before setting inputs or outputs, some basic system settings should be reviewed or configured. These settings are mostly found under the ***System*** tab.

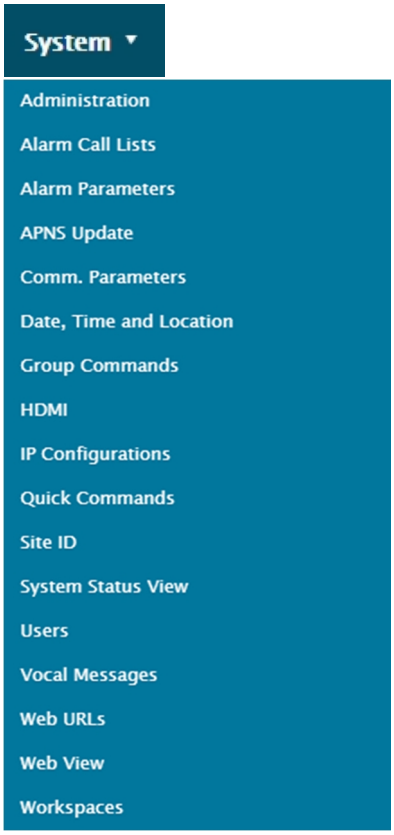
Several icons appear regularly in the Cortex menus. They are:

4.1. Menus and option accessibility

Some of the commands listed in the different menus require users to have sufficient access rights, the appropriate access level, or to be in control of the unit in order for these commands to be available. Commands that are not available will show-up as grayed out or not appear at all.

4.2. System menu

The **System** menu contains settings that are mostly related to the way the unit is accessed, how it calls out or how it logs information. In this manual, we will cover only the most important points to quickly get a system up and running.



4.2.1. Administration

The **Administration** menu gives access to critical controls that, if misused, could cause loss of communications with the Cortex, and require a trip to the remote site to fix.

User-rights apply to some of the following commands. You must be logged-on as a Supervisor or higher to see these menu options.

1 – **TAKE CONTROL**
Allows a user with the proper access rights to take control away from another user.

2 – **UPDATE CERTIFICATE**
Regenerate the unit's HTTPS certificate. Might be required in some situations where a unit's IP address is changed.

3 – **FEATURE KEY**
Used for installation of paid options such as SNMP upgrade packages.

4 – **FACTORY RESET**
Reset the unit to the factory default settings.
5 – **DAVICOM TO PC**
Transfer the configuration file from the unit to the computer.
6 – **CURRENT FIRMWARE**
Version number of the current firmware running in the unit.
7 – **PREVIOUS FIRMWARE**
Version number of the firmware that was previously running in unit. This firmware version is stored in unit and is available for reload.
8 – **REBOOT**
Restart the unit.
9 – **FACTORY TEST**
Factory use only and not available to users.

10 – **CALIBRATION**
Calibrate the Metering Inputs by nulling out any offsets. Originally done at factory. Usually not required by users, but might be needed in some particular circumstances. Disconnect all I/O cables before doing a calibration.

11 – **ERASE CONFIG**
Erase the unit's configuration (IP settings are not affected).
12 – **PC TO DAVICOM**
Transfer the configuration file from the computer to the unit.
13 – **UPGRADE**
Upgrade the unit to another firmware version.
14 – **LOAD PREVIOUS**
Load the previous firmware version stored in the unit.
15 – **REFRESH**
Refresh the screen content.
16 – **EXIT**
Exit menu.

4.2.2. Alarm-Call Lists

Although Davicom units can be programmed to automatically perform commands and actions when a problem occurs at the site, alarm calls to on-duty personnel remain an extremely important feature.

Understanding alarm calls, priorities and sequence

The Cortex and the other Davicom units can be programmed so that specific events trigger different alarms. Each unit has 16 possible alarm lists composed of 8 Majors (1 through 8, red) and 8 Minors (1 through 8, yellow). Each of the 16 alarms have a dedicated multi-recipient Alarm-Call List (ACL). Major Alarms are higher priority and will therefore be processed before Minor Alarms. Each ACL can contain up to 10 recipients, and each recipient can be notified using one of several different means (email, voice, fax, SMS (may require the use of a cellular modem with a data plan), smartphone (requires the Dav2You App), pager, etc.).

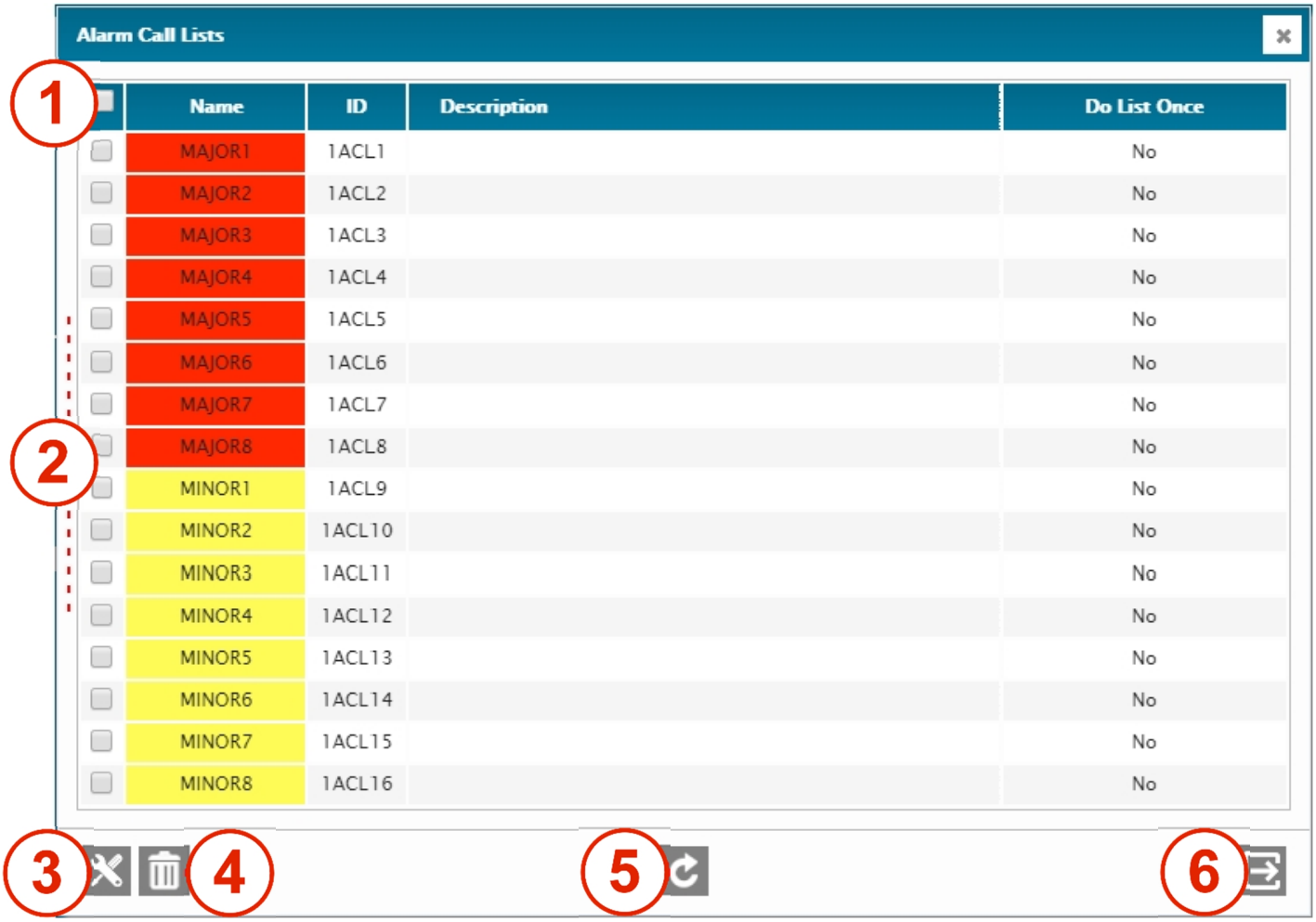
The ACL setup menu allows setting the means by which the alarms go out, and to whom they go.

To edit a list, right-click on any one (or make a multiple selection), then click on the **Setup** button that appears.

NOTE: When doing bulk editing, some fields may not be available (grayed-out), meaning these settings are not available for bulk edition. To gain access to any grayed-out field, edit only one list at a time.

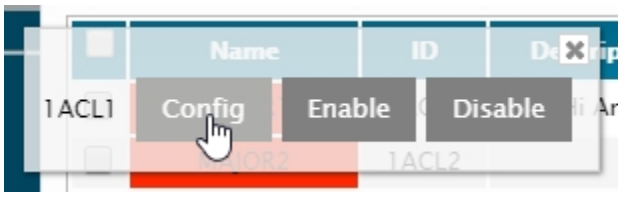
Alarm-Call List management

To edit an Alarm-Call List, select one (or many) from the list menu.



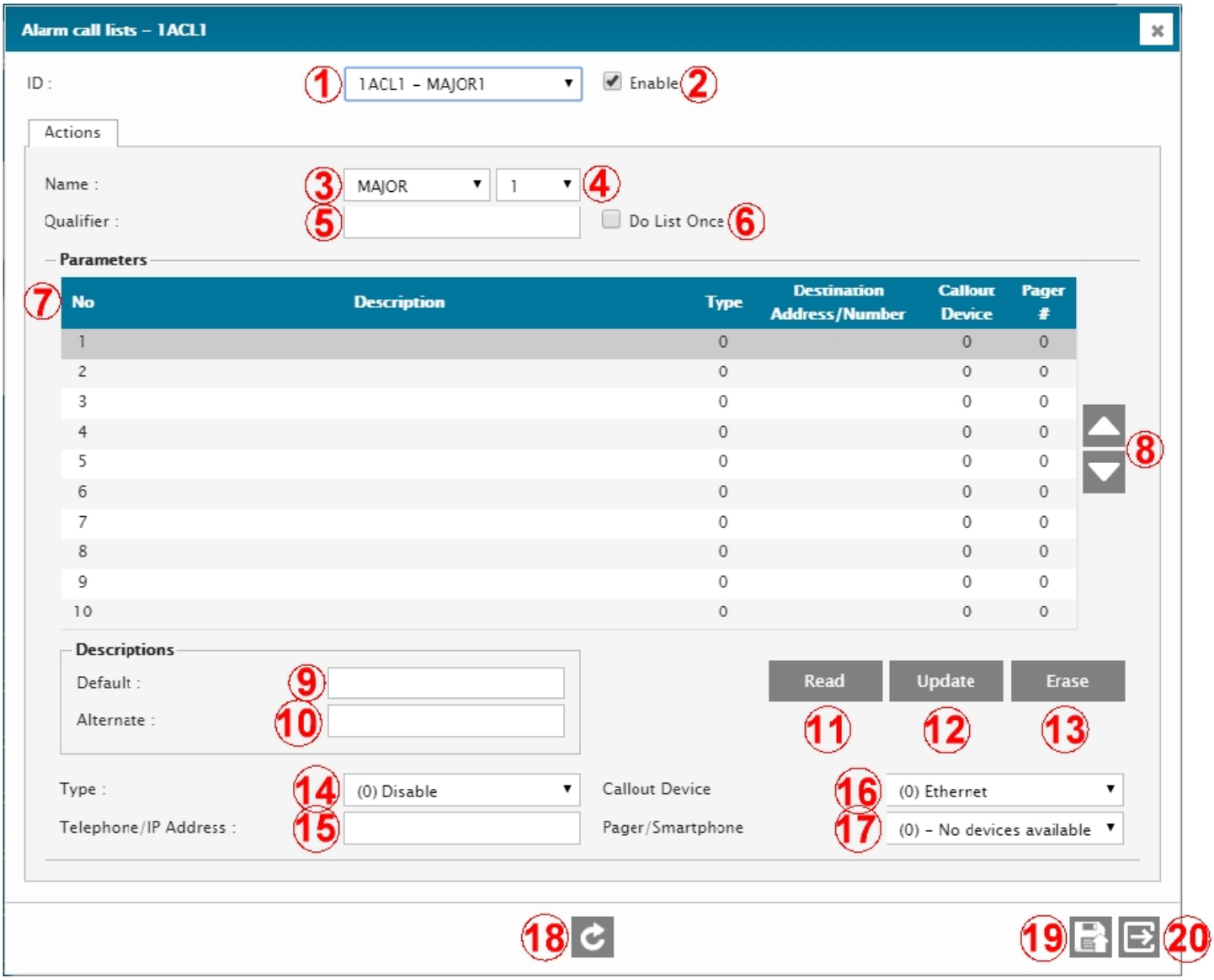
1 – **SELECT ALL**
Select all 16 lists at once.
2 – **INDIVIDUAL SELECTION**
Select one or multiple lists.
3 – **SETUP**
Setup menu for the selected list(s).
4 – **DELETE**
Erase the content of the selected list(s).
5 – **REFRESH / READ**
Refresh / read the screen content.
6 – **EXIT**
Exit menu.

The Alarm-Call List (ACL) Right-Click menu gives access to the setup (Config) screen, but also allows immediate access to temporarily **Disable** or **Enable** any list.



Please configure your list(s) as required for your operations as described below.

Alarm-Call List (ACL) configuration menu



1 – **ID**
ID of the current ACL.

2 – **ENABLE**
Enable / disable the current ACL.

3 – **NAME**
ACL Name. Allows to set the ACL with a pre-defined name. Available names are: CRITICAL, MAJOR, ALERT, SEVERE, ERROR, WARNING, MINOR, NOTICE, NOTIFICATION, INFO, INFORMATION. This name will appear in the alarm title when received.

4 – **NUMBER**
ACL number. Select the desired ACL number (1 through 8).

5 – **QUALIFIER**
Lock / unlock the ACL based on the status of an input, output, or flag. When the given qualifier is HIGH, or ACTIVE, or ON, the ACL is enabled. When the Qualifier is LOW, or NORMAL, or OFF, the ACL is disabled.

6 – **DO LIST ONCE**

Set the ACL to call-out only once each of the ACL recipients.

7 – **CALL-OUT SEQUENCE NUMBER**

Order into which the listed recipients will be called. 1 is first, 10 is last.

8 – **MOVE UP & DOWN**

Change the calling order of a recipient. Highlight a recipient, then move it up or down the list.

9 – **DEFAULT DESCRIPTION**

Recipient's description. Allows to give a description to a recipient. Examples: *Mike's Office, John's cell, Night technician, email*, *Chief Engineer cellphone*, *Firefighter Pager*, *Studio FAX*, *Manager's email*, etc.

10 – **ALTERNATE DESCRIPTION**

Non-unicode text description. Used for FAX and SMS only (a cellular modem with is required to send SMS directly from the Cortex).

11 – **READ**

Read the screen content (select the ACL to be read from the top menu ID box).

12 – **UPDATE**

Update the screen content after changes have been made.

13 – **ERASE**

Erase or delete any screen content.

14 – **TYPE**

Type of alarm output (Email, voice, FAX…). Note that this field will determine what type of information will need to be entered into the Telephone/IP address field.

15 – **TELEPHONE / IP ADDRESS**

Telephone number or email address of the recipient.

16 – **CALLOUT DEVICE**

Means by which the alarms will go out (Ex. Ethernet (IP), Modem (FAX, Voice), etc.)

17 – **PAGER / SMARTPHONE**

Indicates whether a smartphone or Pager is registered in the unit.

18 – **REFRESH / READ**

Refresh / read the screen content.

19 – **SAVE**

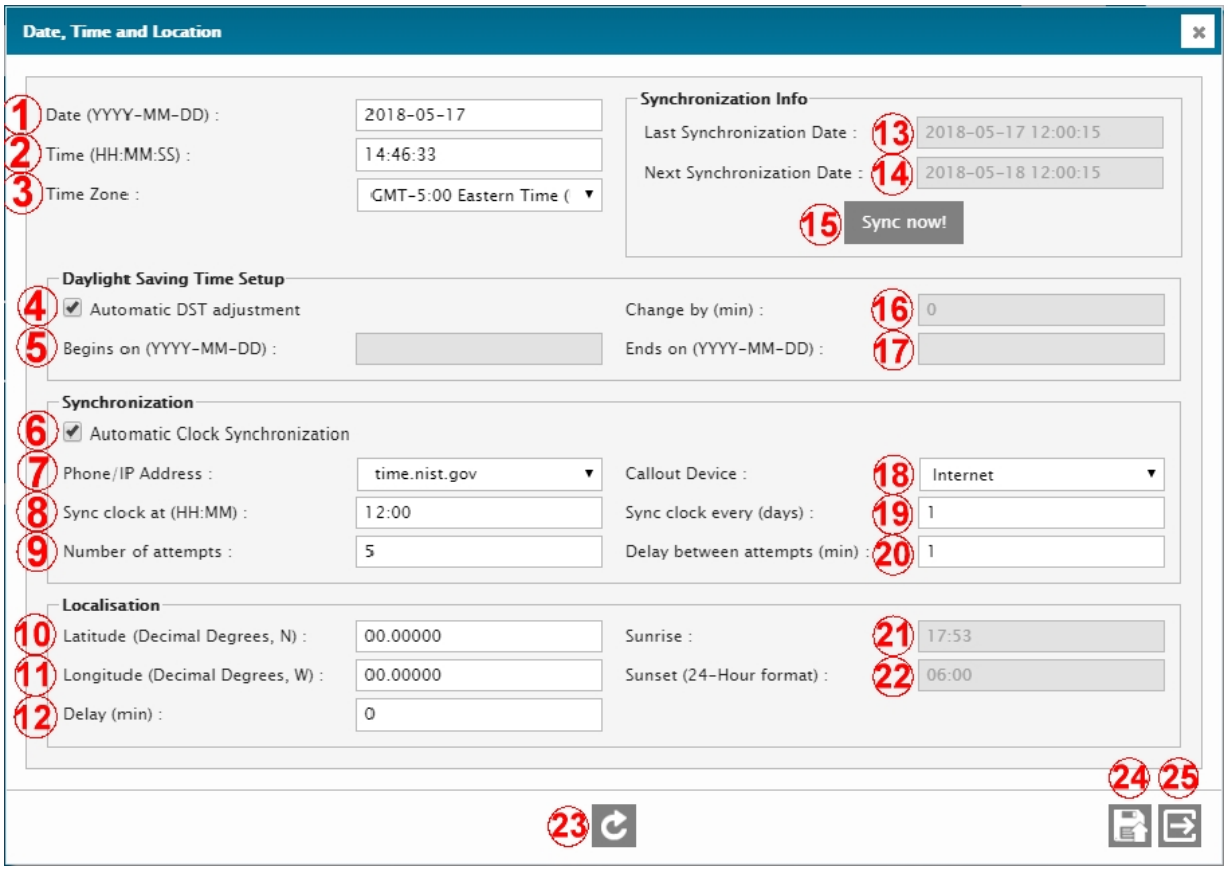
Save the screen content.

20 – **EXIT**

Exit menu.

4.2.3. Date, Time, and Location

This screen contains all the settings that relate to time, time-zone, date, and location of the unit.



1 – **DATE**
Current date of the unit.
2 – **TIME**
Current time of the unit.
3 – **TIME ZONE**
Current time zone of the unit.
4 – **AUTOMATIC DST AJUSTMENT**
Automatically activate / deactivate the Daylight Saving Time on the legally set dates and times.
5 – **BEGINS ON**
Date at which the Daylight Saving Time period begins.
6 – **AUTOMATIC CLOCK SYNCHRONIZATION**
Set the clock to synchronize automatically on an external time synchronization service.
7 – **PHONE / IP ADDRESS**
Means by which the Automatic Clock Synchronization will take place, either by phone (internal modem required) or by IP.
8 **– SYNC CLOCK AT**
Daily clock sync time.
9 – **NUMBER OF ATTEMPTS**
Number of attemps the unit will try to sync its clock in the event of a sync failure.
10 – **LATITUDE**
North or south latitude location of the unit, in decimal degrees.
11 – **LONGITUDE**

East or west longitude location of the unit, in decimal degrees.

12 – **DELAY**

Delay by which the Sunrise/Sunset action flag can be delayed so that it does not occur at a critical time (such as during the morning news bulletin at the top of the hour).

13 – **LAST SYNCHRONIZATION DATE**

Date and time at which the last successful clock synchronization occurred.

14 – **NEXT SYNCHRONIZATION DATE**

Date and time at which the next clock synchronization will occur.

15 – **SYNC NOW**

Perform a manual clock synchronization immediately.

16 – **CHANGE BY**

Amount of offset time that applies to the AUTOMATIC DST AJUSTMENT when it activates.

17 – **ENDS ON**

Date at which the Daylight Saving Time period ends (switching back to Standard Time).

18 – **CALLOUT DEVICE**

Physical mean by which the clock synchronization will take place (IP / Ethernet or phone / modem).

19 – **SYNC CLOCK EVERY**

Number of days between clock synchronizations.

20 – **DELAY BETWEEN ATTEMPTS**

Amount of wait time between the clock synchronization attemps in the event of faillures.

21 – **SUNRISE**

Calculated Sunrise time based on the geographical coordinates. To change this time, change the coordinates accordingly.

22 – **SUNSET**

Calculated Sunset time based on the geographical coordinates. To change this time, simply change the coordinates accordingly.

23 – **REFRESH / READ**

Refresh / read the screen content.

24 – **SAVE**

Save the screen content.

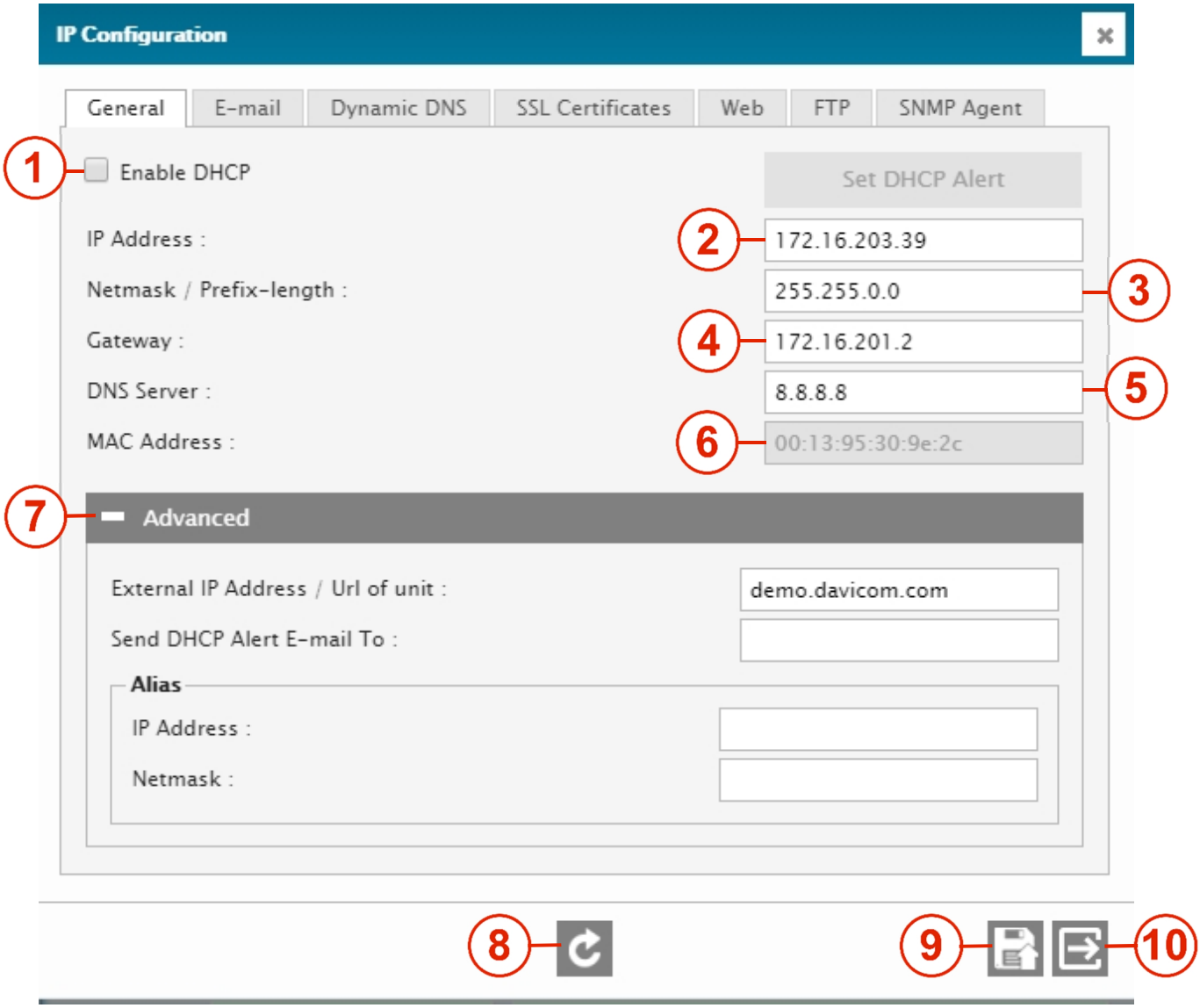
25 – **EXIT**

Exit menu.

4.2.4. IP Configuration

The IP configuration menus set all the IP-related parameters required for the Cortex to communicate via network connection.

4.2.4.1. IP Configuration – General tab



1 – **ENABLE DHCP**
Enable / disable the DHCP feature.

2 – **IP ADDRESS**
IP address of the unit.

3 – **NETMASK**
Netmask of the unit.

4 – **GATEWAY**
IP address of a Gateway. It is very important to set a gateway, otherwise, the unit may not communicate successfully with the network.

5 – **DNS SERVER**
IP address of a Domain Name Server.

6 – **MAC ADDRESS**

MAC address of the Cortex unit.

7– **ADVANCED**

Access the advanced IP settings that are used to:

- Give the unit a Hostname that will appear on an internal network
- Set the IP port used by default for DavLink
- Set the email address to which the DHCP “change-of-address” alerts will be sent.

8 – **REFRESH / READ**

Refresh / read the screen content.

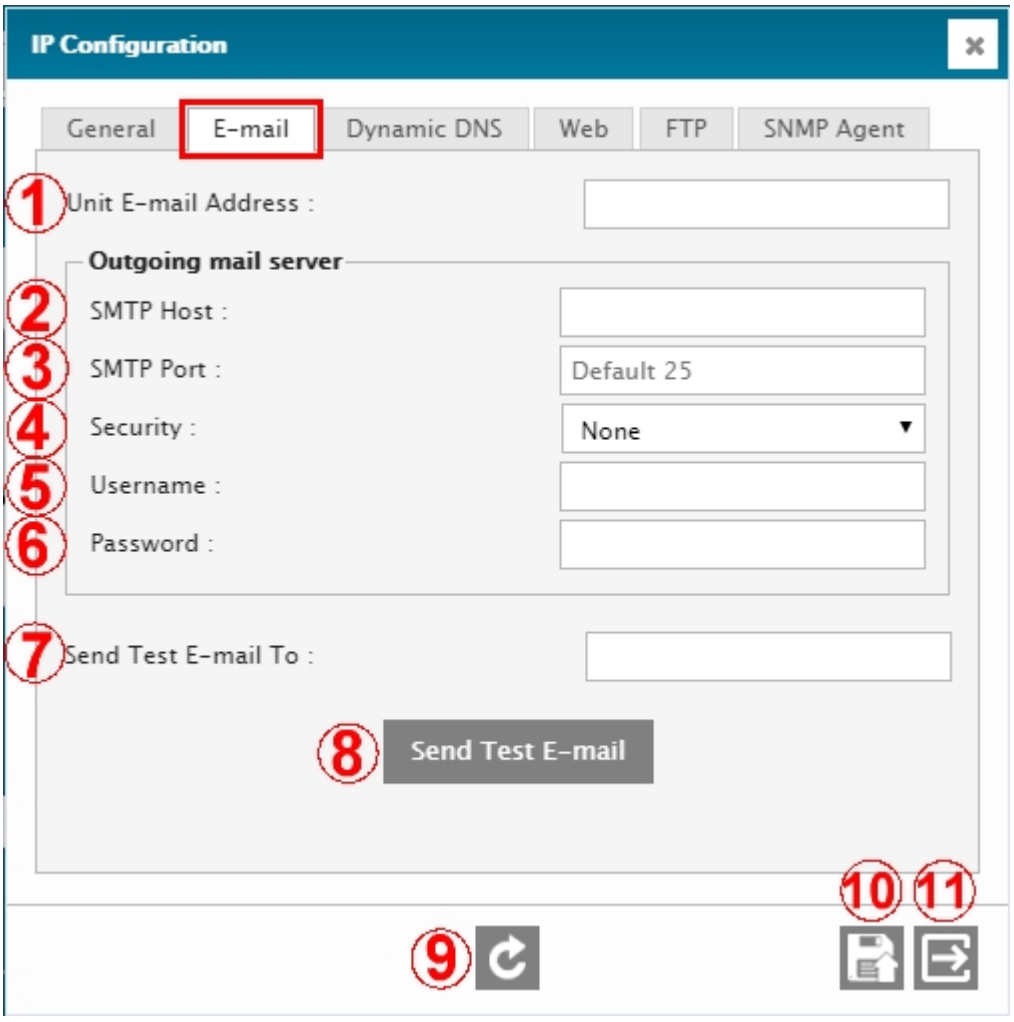
9 – **SAVE**

Save the screen content.

10 – **EXIT**

Exit menu.

4.2.4.2. IP Configuration – E-mail tab



1 – **UNIT E-MAIL ADDRESS**

Mandatory email address of the unit (required by some email servers) even if the unit cannot receive email communications. Depending on the email server, there may be no need for it to be a valid email, it only needs to be fomatted as such. Examples: mountain_top@gmail.com, remote_site@earthlink.com, davicom@radio.com.

2 – **SMTP HOST**

IP address (or name) of the SMTP email server.

3 – **SMTP PORT**

IP Port of the SMTP email server.

4 – **SECURITY**

Authentication type of the email server.

5 – **USERNAME**

Username of the email account.

6 – **PASSWORD**

Password of the email account.

7 – **SEND TEST EMAIL TO**

Valid recipient email for email transmission test.

8 – **SEND TEST EMAIL**

Generate a test email in order to verify IP and email settings.

9 – **REFRESH / READ**

Refresh / read the screen content.

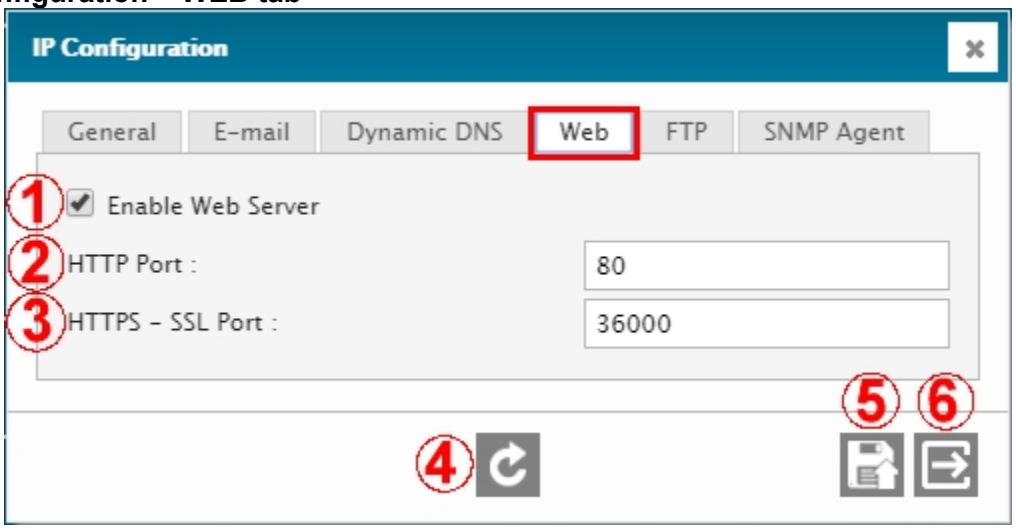
10 – **SAVE**

Save the screen content.

11 – **EXIT**

Exit menu.

4.2.4.3. IP Configuration – WEB tab



1 – **ENABLE WEB SERVER**

Enable / disable the unit's web server. ***CAUTION: if the web server is disabled, the only means of communicating with the Cortex will be via DavLink.***

2 – **HTTP PORT**

HTTP port number for web access.

3 – **HTTPS – SSL PORT**

HTTPS port number for SSL access.Usually port 443, but it is recommended to use another port.

4 – **REFRESH / READ**

Refresh / read the screen content.

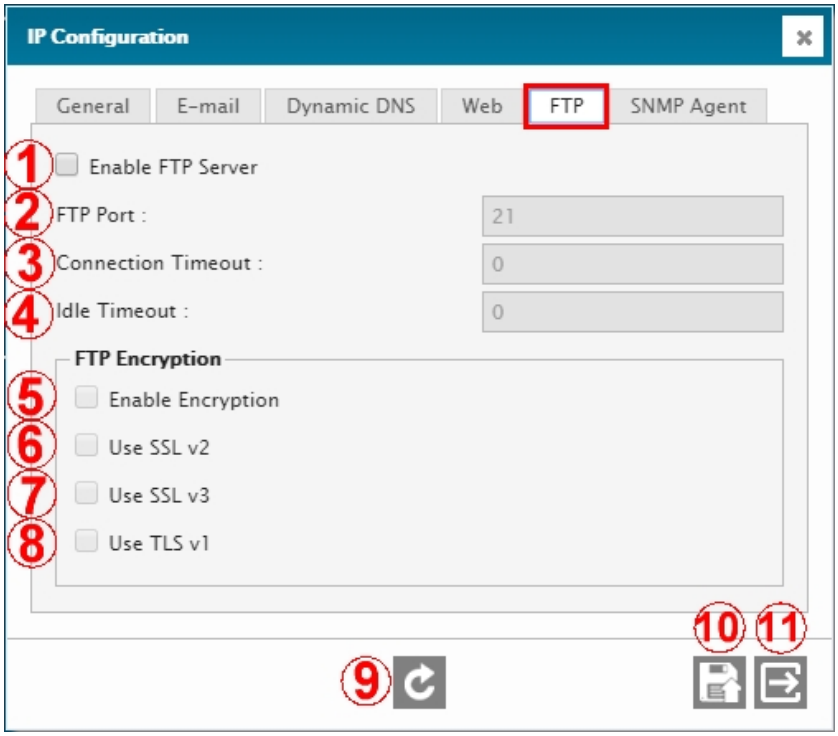
5 – **SAVE**

Save the screen content.

6 – **EXIT**

Exit menu.

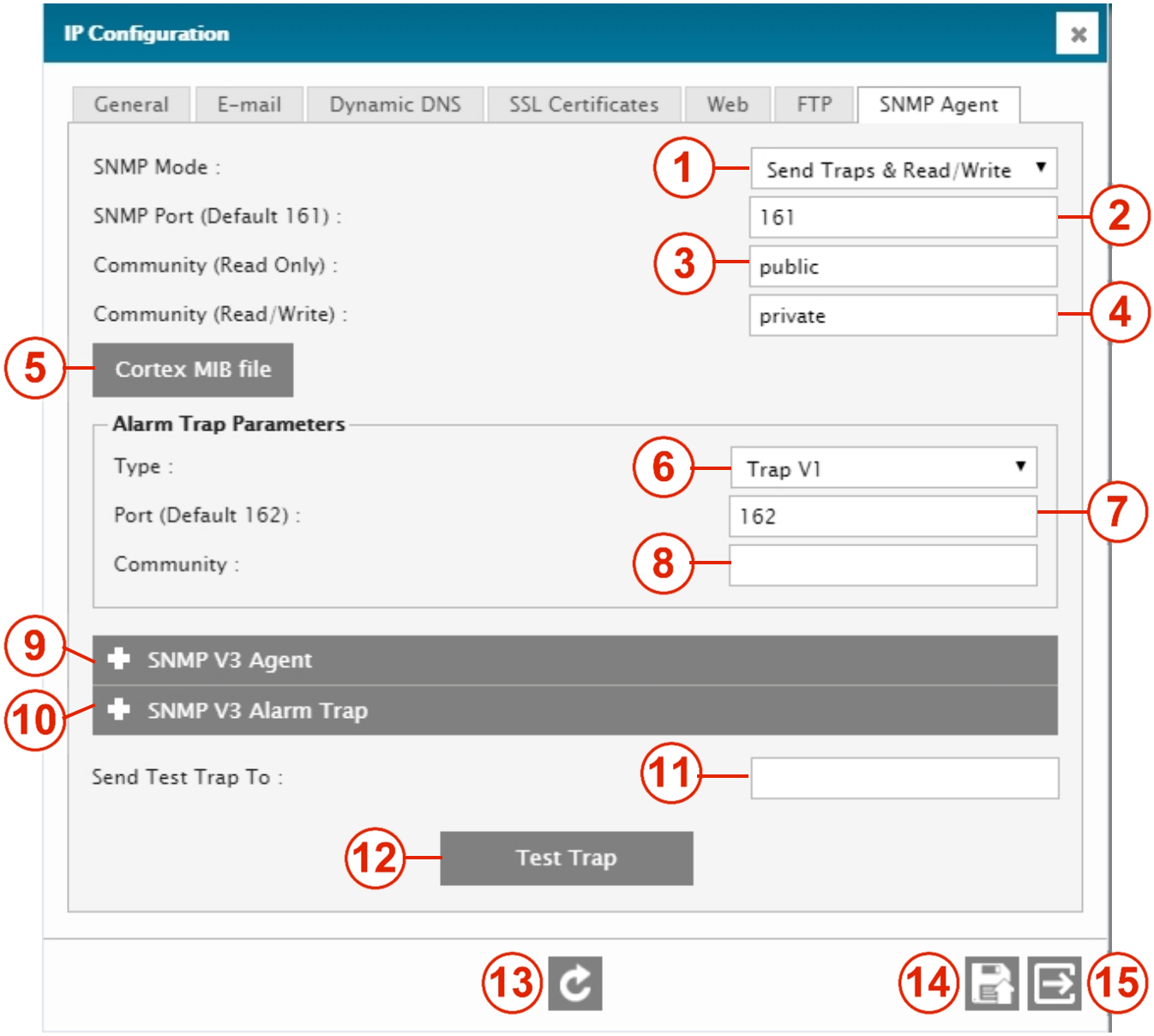
4.2.4.4. IP Configuration – FTP tab



1 – **ENABLE FTP SERVER**
Enable / disable the FTP server.
2 – **FTP PORT**
IP port of the FTP server.
3 – **CONNECTION TIMEOUT**
This setting is the absolute maximum time (in munites) after which the FTP server will disconnect.
4 – **IDLE TIMEOUT**
This setting is the time (in minutes) after which the FTP server will disconnect following no activity (idle).
5 – **ENABLE ENCRYPTION**
Enable / disable the FTP encryption.
6 – **USE SSL V2**
Use SSL version 2 for FTP encryption.
7 – **USE SSL V3**
Use SSL version 3 for FTP encryption.
8 – **USE TLS V1**
Use TLS version 1 for FTP encryption.
9 – **REFRESH / READ**
Refresh / read the screen content.
10 – **SAVE**
Save the screen content.
11 – **EXIT**
Exit menu.

4.2.4.5. IP Configuration – SNMP Agent tab

The Cortex's SNMP Agent allows the unit to be monitored and controlled by a remote SNMP Manager program. This agent is different from the Cortex's SNMP Manager, which is used to monitor and control other on-site equipment.



1 – **SNMP MODE**
Selects the types of SNMP actions allowed (Traps only, Traps and GETs or Traps, GETs and SETs)
2 – **SNMP PORT**
IP port used for SNMP commands. Default is 161, but can be changed as required.
3 – **COMMUNITY - READ ONLY**
Name of the community (kind of password) for the SNMP read-only commands (GETs).
4 - **COMMUNITY - READ / WRITE**
Name of the community for the SNMP read and write commands.
5 – **CORTEX MIB FILE**
Clicking this button downloads the Cortex MIB file to your computer
6 – **TYPE**

Version of the SNMP alarm Traps: Trap V1, Trap V2, Inform V2

7 – **PORT**
IP Port of the SNMP Traps. Default is 162, but can be changed as required.

8 – **COMMUNITY**
Name of the community for the SNMP Traps.

9 – **SNMP V3 AGENT SETTINGS**
To come.

10 – **SNMP V3 ALARM TRAP SETTINGS**
To come.

11 – **SEND TEST TRAP TO**
Sends a trap to the device's IP adress specified in this field.

12 - T**EST TRAP**
Generate a Trap for test purposes.

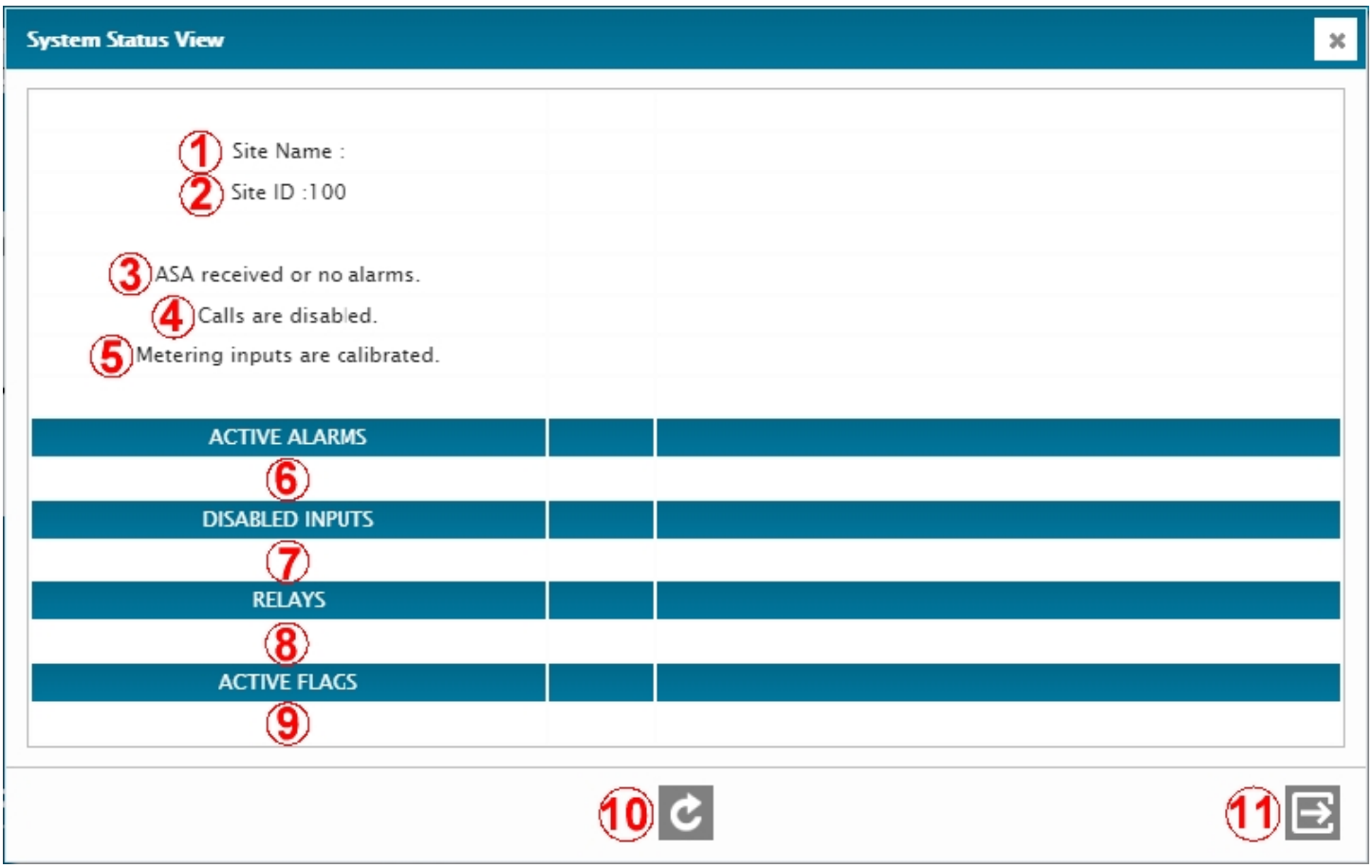
13 – **REFRESH / READ**
Refresh / read the screen content.

14 – **SAVE**
Save the screen content.

15 – **EXIT**
Exit menu.

4.2.5. System Status View

The System Status View is a screen that shows information and overall status of different settings and I/O's at the site.It shows, at a glance, the general status of the site and whether any alarms are active or inputs disabled.



1 – **SITE NAME**
Name of the site.
2 – **SITE ID**
ID number of the site.
3 – **ASA RECEIVED or NO ALARMS**
Message that shows current status such as Alarm, Waiting for Alarm Acknowlege…
4 – **ALARM CALLS ARE DISABLED**
Indicates whether the Alarm-Calls are enable or disabled.
5 – **METERING INPUTS ARE CALIBRATED**
Shows the calibration state of the Metering Inputs.
6 – **ACTIVE ALARMS**
Lists all active alarms.
7 – **DISABLED INPUTS**
Lists every disabled input.
8 – **RELAYS**
Lists every energized relay.
9 – **ACTIVE FLAGS**
Lists every active flag.
10 – **REFRESH / READ**
Refresh / read the screen content.
11 – **EXIT**
Exit menu.

4.2.6. User access

This menu is where all of the user rights are managed. Cortex users can be added, deleted and their access rights can be precisely customized.

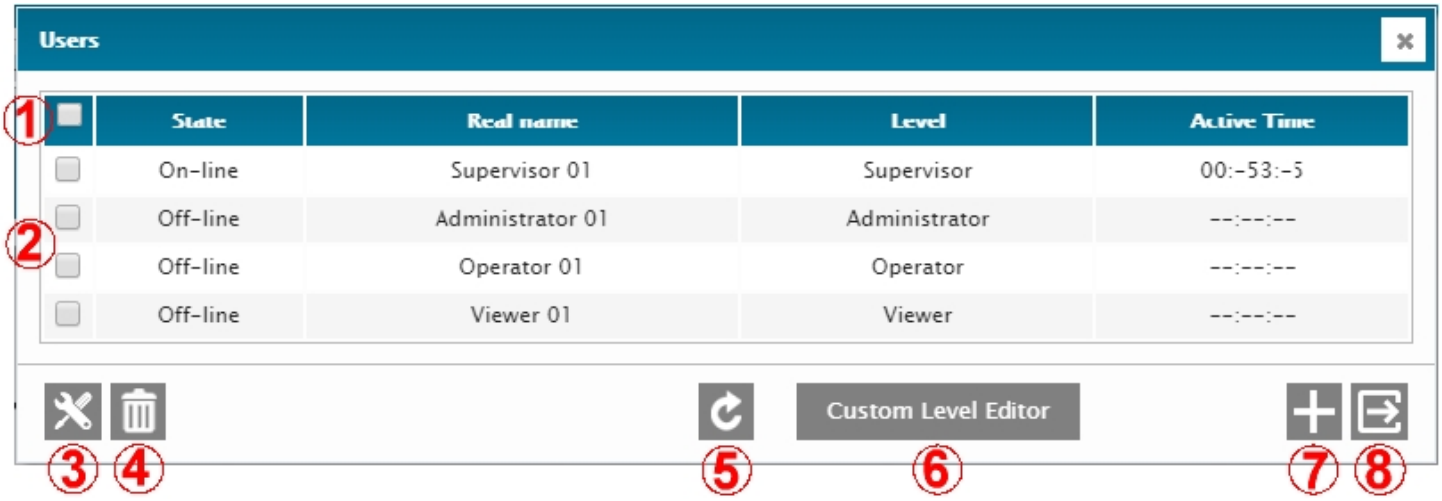
Note that many settings can be edited “in Bulk”. This feature can make configuring much quicker for system administrators. When doing bulk editing, some setting boxes might show-up as grayed-out: this means that these settings are not available for bulk edition. To access any grayed-out setting, edit users one at a time.

The table below shows the default users for the system along with their passwords.

Username	***Level***	***Password***
viewer01	Viewer	vvvvvvvv
oper01	Operator	oooooooo
admin01	Administrator	aaaaaaaa
super01	Supervisor	ssssssss
direc01	Director	mocivad9

It is VERY IMPORTANT that you change these default usernames and passwords, (and save your new settings in a secure location) to prevent unauthorized access to your Davicom unit! If you lose your passwords, Davicom’s support department will not be able to help you, short of performing a factory reset on the unit. Davicom does not have back-door passwords or special access privileges.

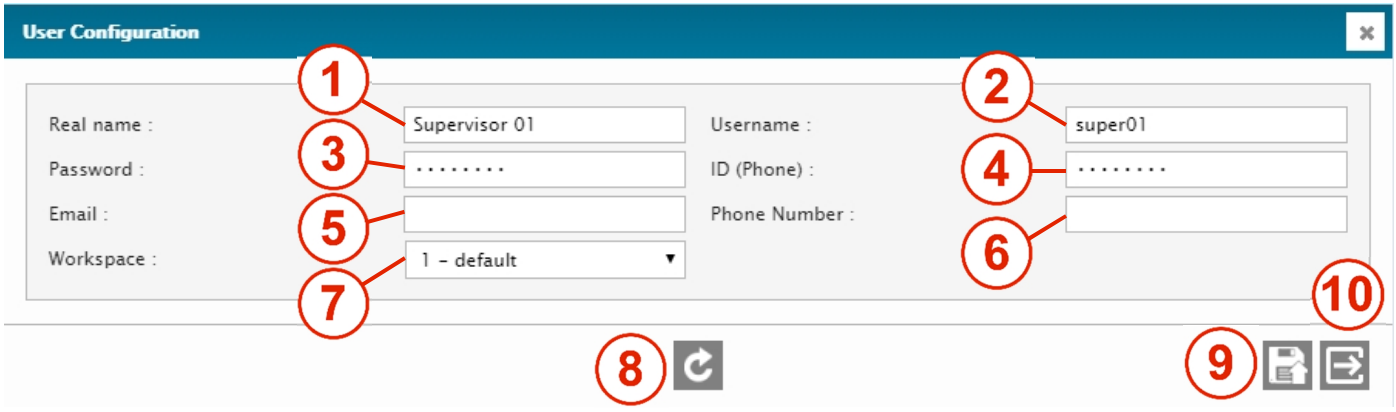
The screen below shows the Users management window.



1 – **SELECT ALL**
Select all users.
2 – **INDIVIDUAL SELECTION**
Select one or many users.
3 – **SETUP**
Requests the User configuration menu for the selected users (bulk edition is allowed).
4 – **DELETE**
Deletes the selected users.
5 – **REFRESH / READ**
Refresh / read the screen content.
6 – **CUSTOM LEVEL EDITOR**
Access the custom level editor menu to create, edit or delete custom access levels.
7 – **ADD**
Add a new user.
8 – **EXIT**
Exit menu.

Once you have selected a user, or decided to add one with the “+”, you access the **User Configuration** menu

The User Configuration menu allows setting the information for each user.



1 – **REAL NAME**
Usual name of the user. For system documentation only, this is NOT the User name.

2 – **USERNAME**

Username of the user's account. Required to connect to the unit.

3 –**PASSWORD**

Password of the user's account. Required to connect to the unit.

4 – **ID (Phone)**

An *Identification Number* associated to the user and used for phone access. This ID is used in place of a usual username and password, which simplifies login and alarm acknowlegement by telephone.

5 – **EMAIL**

Email of the user.

6 – **PHONE NUMBER**

Phone number of the user.

7 – **WORKSPACE**

Specific workspace associated to the user's account (the workspace will load automatically upon connection).

8 – **REFRESH / READ**

Refresh / read the screen content.

9 – **SAVE**

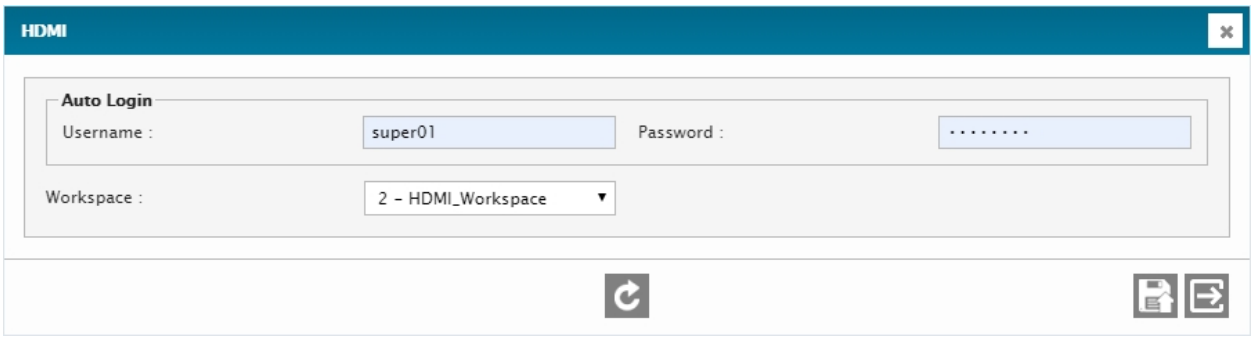
Save the screen content.

10 – **EXIT**

Exit menu.

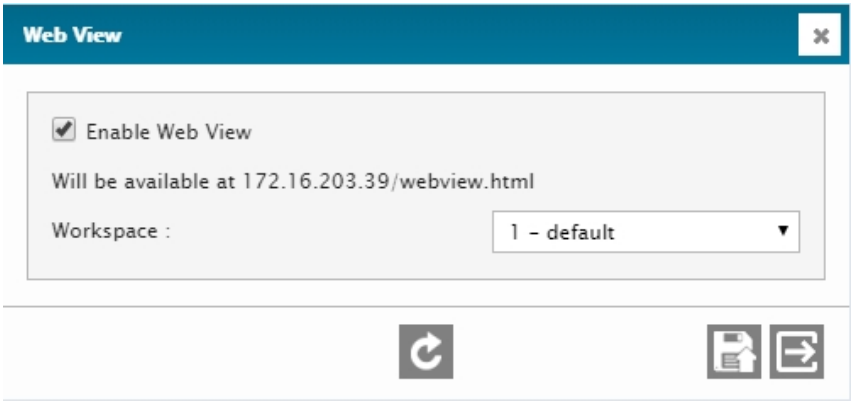
4.2.7. HDMI (Cortex 360 only)

The Cortex 360 has an HDMI video output on its back panel, and the menu below shows how to set up access to this display functionality. The HDMI output is intended for local display of site information in more detail than what is possible on the front-panel OLED display. It can be used as a simple live site-status display, or used with a keyboard and mouse (connected to the Cortex 360's USB hub) to control site equipment. The site information shown on this display is presented in a special dedicated Workspace called the HDMI Workspace. It is selected in the Workspace field shown below. The window below also allows the HDMI username and Password to be entered. This last information is important to prevent unwarranted access to control functions by unauthorized on-site personnel.



4.2.8. Web Views

The Cortex units can be configured to display a control-less Web page that will automatically appear when a user accesses the unit's IP address with a Web browser. This basic Web page is used to display site information to view-only users, and must be activated since it is off by default. The Workspace that will be displayed in this mode must also be selected, as shown in the screen below.

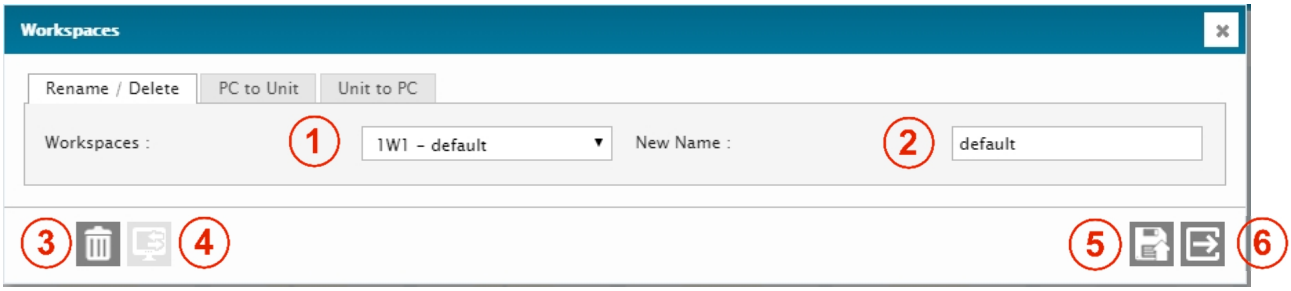


4.2.9. Workspaces

This menu is for Workspace management. The workspaces can be renamed, transferred from the Cortex to a computer, and from a computer to the Cortex.

There are 32 Workspace slots in the Cortex (Identified as 1W1 to 1W32). Each slot can be assigned to a different user, or the same slot can be assigned to more than one user, or even to all users. Two slots have special functions where they can be assigned for display on the HDMI output, or on the Web view as explained in Sections 4.2.7 and 4.2.8 above.

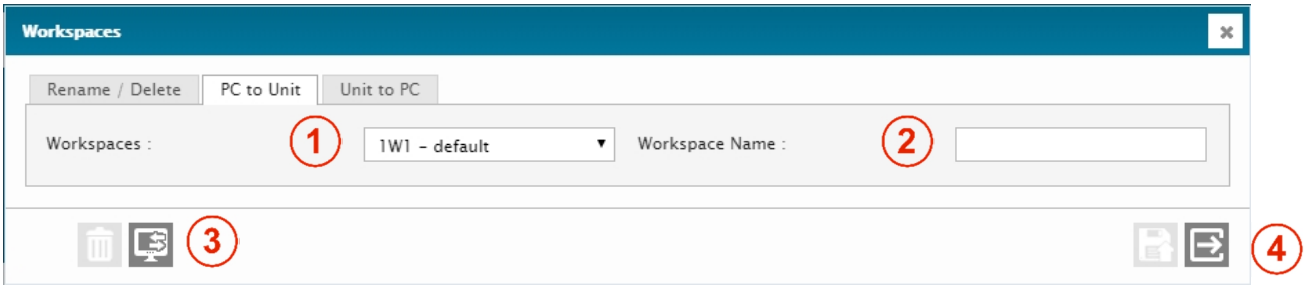
The **Workspace Rename/Delete** tab of the **Workspaces** menu allows Workspaces to be (surprise) renamed and deleted. Deleting a Workspace means that the content of the corresponding slot is erased, the slot itself always remains. Renaming a Workspace slot allows for easier management. For example, 1W10 can be assigned for use on Andrew's iPhone, so it could be called Andrew-iPhone



(some icons may appear greyed-out, depending on which menu selection you have made).

1 – **WORKSPACES**
Selects a Workspace slot. There are 32 possible Workspace slots in the Cortex.
2 – **WORKSPACE NAME**
Workspace name edition box.
3 – **DELETE**
Delete the selected workspace from the slot
4 – **TRANSFER**
Transfers the selected workspace from the PC to the Cortex, or vice-versa. *Only available when in the PC to Davicom or Davicom to PC Tabs.*
5 – **SAVE / WRITE**
Saves the Workspace name to the Cortex's corresponding Workspace slot.
6 – **EXIT**
Exit menu.

The PC to Davicom Tab allows you to transfer workspaces from your PC to the Davicom unit.



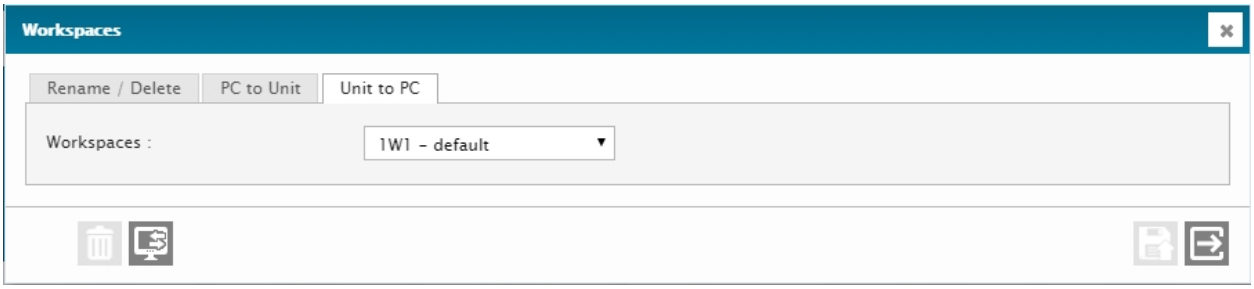
1 – **WORKSPACES**
Selects a workspace slot. There are 32 possible Workspace slots in the Cortex.

2 – **WORKSPACE NAME**
Workspace name edition box. Note that you must enter the name you wish to give to the slot ***before*** you transfer the file from your PC to the Cortex unit.

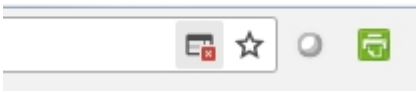
3 – **TRANSFER**
Transfers the selected workspace from the PC to the Cortex. When you press on this button, a File Explorer window will open on your computer to allow you to select the file you wish to transfer from your computer.

4 – **EXIT**
Exit menu.

The Unit to PC Tab is similar. The Transfer button will initiate the download of a .zip file to your PC's download folder.



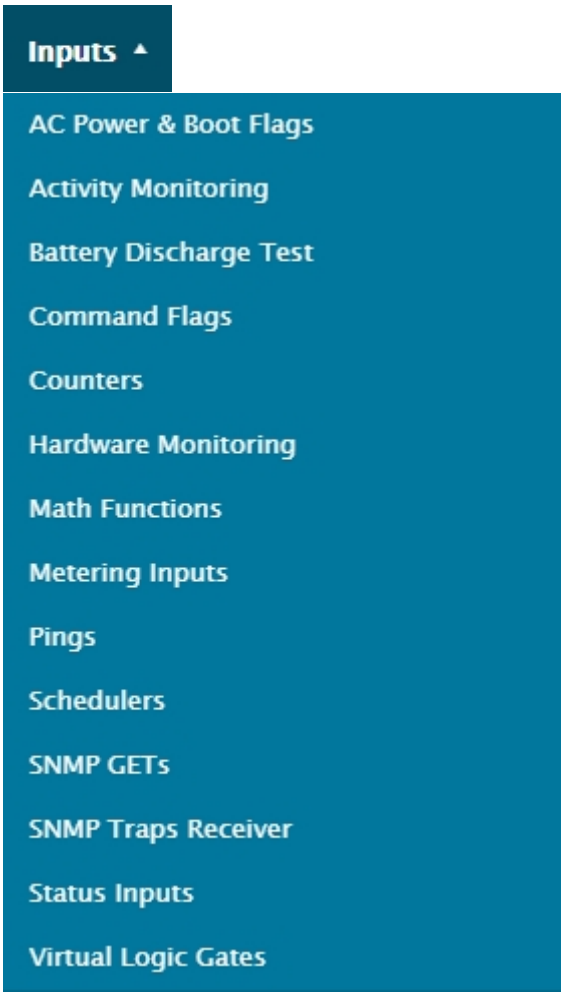
Note that your web browser may block these downloads, so you may have to enable them by clicking on the small red x in Chrome's address bar as shown below:



See Section 6 for more details on Workspace management and creation.

4.3. Inputs menu

***VERY IMPORTANT*:** The Cortex menus and screens are dynamic and user-dependent, meaning they will show more or less information based on a user's access level, and whether a user is in control of the unit or not. If you notice that certain buttons or control/command settings seem to be missing or are greyed-out, first check if you are (still) in control, or make sure you have proper access level / access rights.



4.3.1. Generic Input Menus

The Cortex inputs have 3 very similar-looking menu screens which recur frequently. This section provides information on these 3 generic screens. They are explained here to avoid repetition, but particularities will be mentioned when applicable.

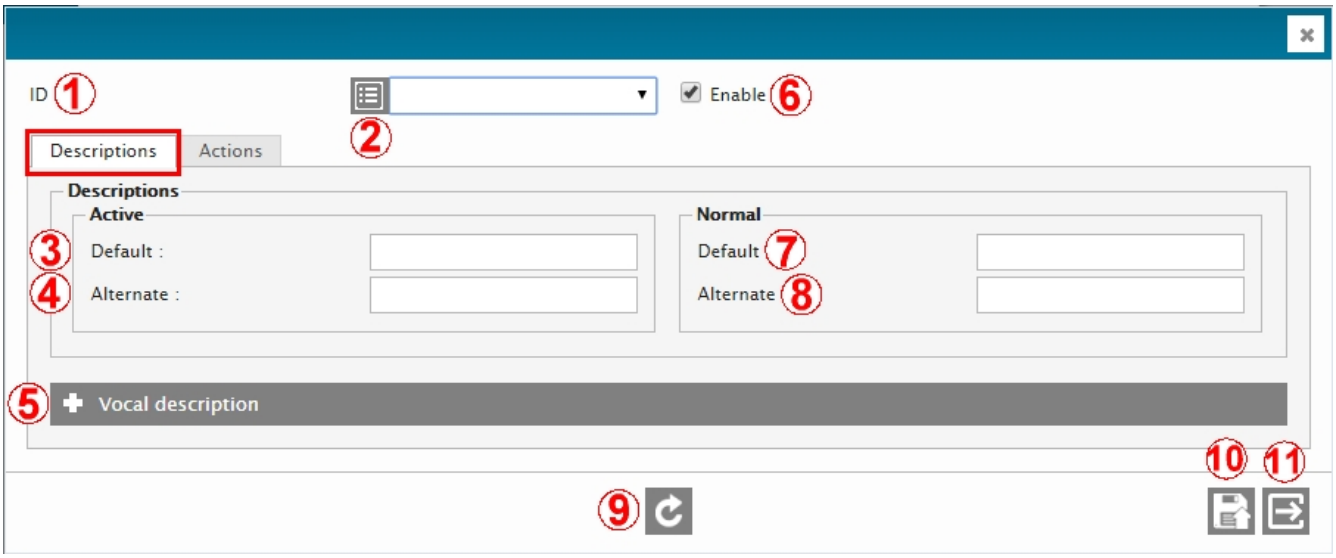
Most screens initially appear empty and will fill-up as entries are added, while some others come with items already listed.

4.3.1.1. Main Screen

The first generic input menu screen is the ***Main*** screen. At any time, to add an entry, click on the **+** button. If the screen already contains entries, right-click on any one in order to access its configuration menu.

4.3.1.2. Description Screen

The second generic input menu screen is the **Description** screen.



1 – **ID**

A label to indicate that Field 2 is the I/O Identifier. Selection from the drop-down menu in 2

2 – **DESCRIPTION RETRIEVAL**

Click to retrieve and display the current normal description of that ID. Normally hidden to minimize data transfers on low speed or high fee data connections.

3 – **DEFAULT ACTIVE DESCRIPTION**

Description of the input when it is active (alarm condition). Up to 68 charaters are allowed. Examples: High indoor temperature, Low fuel level, Door is open, Smoke!, High water level, etc.

4 – **ALTERNATE ACTIVE DESCRIPTION**

18-character non-unicode text description of the input when it is active. Used for FAX and SMS only.

5 – **VOCAL DESCRIPTION**

Access the vocal description menu.

6 – **ENABLE**

Enable / disable the input. Useful to deactivate an input, without losing all its settings, when the input is causing intermittent problems or nuisance alarms

7 – **DEFAULT NORMAL DESCRIPTION**

Description of the input when it is normal. Up to 68 characters are allowed. Examples: Indoor temperature OK, Fuel level OK, Door is closed, No smoke, Water level OK, etc.

8 – **ALTERNATE NORMAL DESCRIPTION**

18-character non-unicode text description of the input when it is normal. Used for FAX and SMS only.

9 – **REFRESH / READ**

Refresh / read the screen content.

Copying settings from one input into another input

When configuring many inputs with identical or closely-matching settings, it is possible to "copy" the settings from an input and "paste it" into another input, saving configuration time and minimizing possible typing errors. First, select the source input ID from the menu, then click the ***Refresh / Read button*** (#9), then go select the destination input ID from the menu, and click the ***Save / Write*** button (#10).

10 – **SAVE / WRITE**

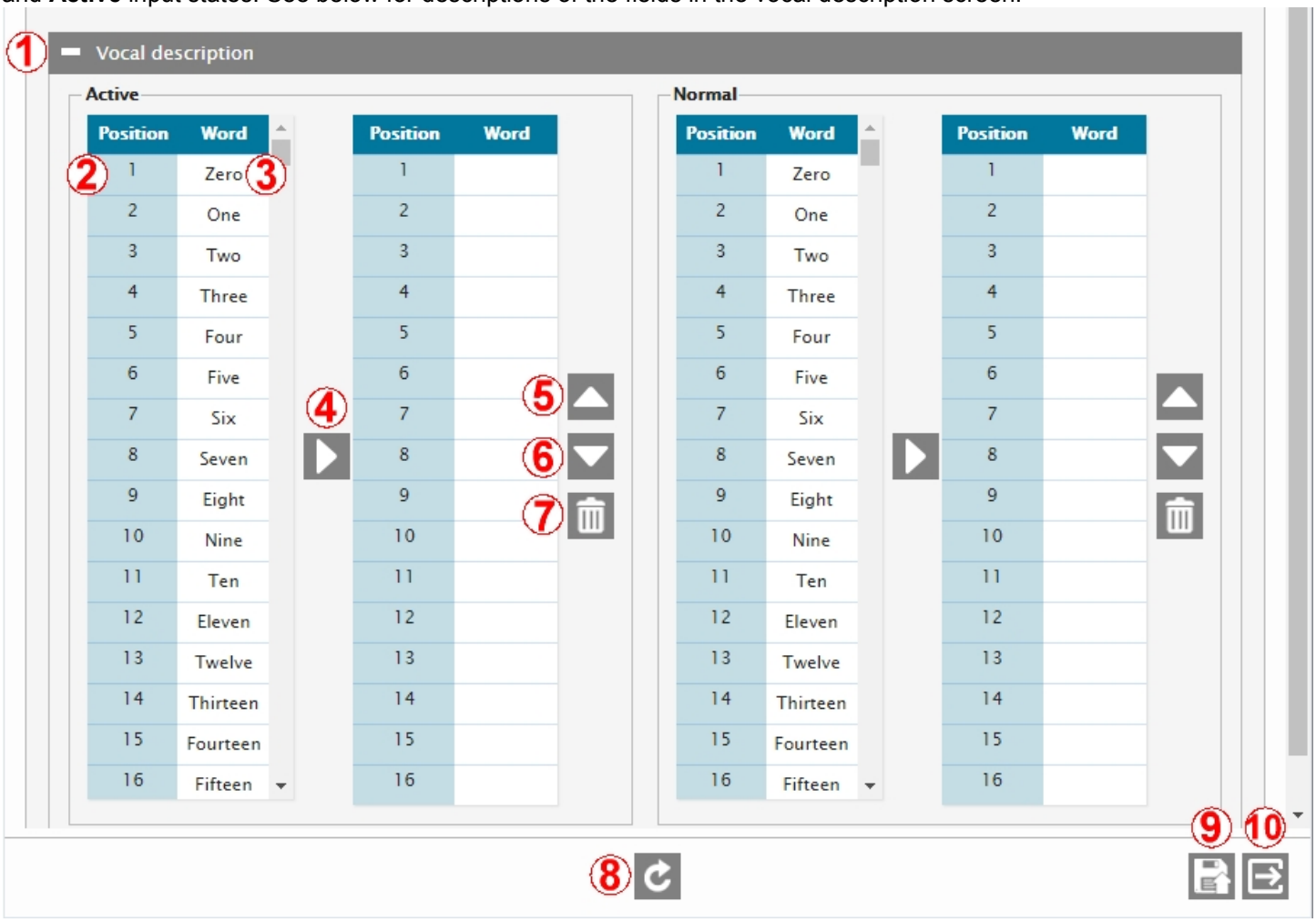
Save the screen content.

11 – **EXIT**

Exit menu.

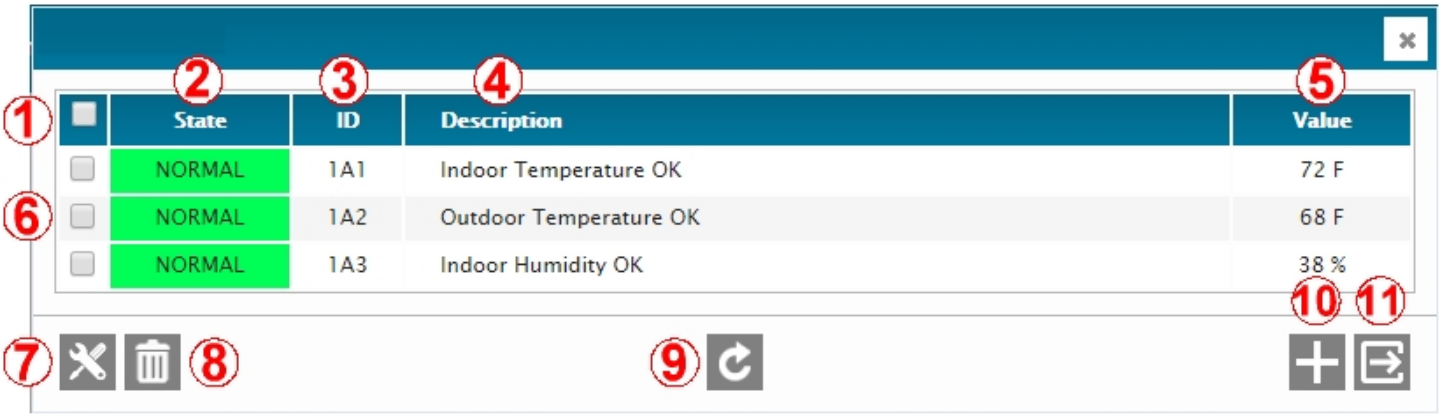
4.3.1.3. Vocal Description Screen

The third generic input menu screen is the **Vocal Description** screen. It allows you to build sequences of words in order to create phrases, which will then be sent by the Cortex when it calls with vocal alarms. A phrase can be built for both **Normal** and **Active** input states. See below for descriptions of the fields in the vocal description screen.



1 – **OPEN / CLOSE**
Open / close the Vocal description menu.
2 – **POSITION**
Position number - used for reference only, one for each word. Allows to quickly go back to any specific word without having to search through the whole list.
3 – **WORD**
Selection of available words from which the phrase is built.
4 – **SELECT / ADD**
Select words to add to build the phrase. Up to 16 words are allowed per phrase. A phrase begins with the word at position 1 and goes on through the last word, up to the 16th position.
5 – **UP**
Move word up in the phrase.
6 – **DOWN**
Move word down in the phrase.
7 – **DELETE**
Delete selected word from the phrase.
8 – **REFRESH / READ**
Refresh / read the screen content.
9 – **SAVE / WRITE**
Save the screen content.
10 – **EXIT**
Exit menu.

Once an entry has been added, the ***main screen*** will reappear (actual content will differ from what is shown here). In this screen, inputs can be added, deleted, or edited. All inputs that have been added will appear in the list. To edit an input, right-click anywhere on the desired input line. To exit this menu, click on the exit button (#11).



1 – **SELECT ALL**
Select / unselect all boxes at once (for bulk editing).
2 – **STATE**
Current state of the inputs (normal, active, minor, major).
3 – **ID**
ID of the input.
4 – **DESCRIPTION**
Description of the inputs, based on their current status (normal or active).
5 – **VALUE**
Show current value of the inputs.
6 – **INDIVIDUAL SELECTION**
Select / unselect one or many inputs.
7 – **CONFIGURATION**
Access the configuration menu of the selected inputs. Bulk edition is allowed. It is also possible to quickly access any input menu by right-clicking anywhere on an item's line This will bring-up a small popup window, from which you can directly configure, enable or disable an input.

Bulk edition feature.

Multiple inputs can be edited at the same time. This feature can save considerable configuration time and help minimize typing errors. Select all desired inputs, then click on the CONFIGURATION button. All settings that are common to the selected inputs and that can be bulk-edited will be available, while the other fields will be grayed-out.

8 – **DELETE**
Delete selected inputs.
9 – **REFRESH / READ**
Refresh / read the screen content.
10 – **ADD**
Add an input.
11 – **EXIT**
Exit menu.

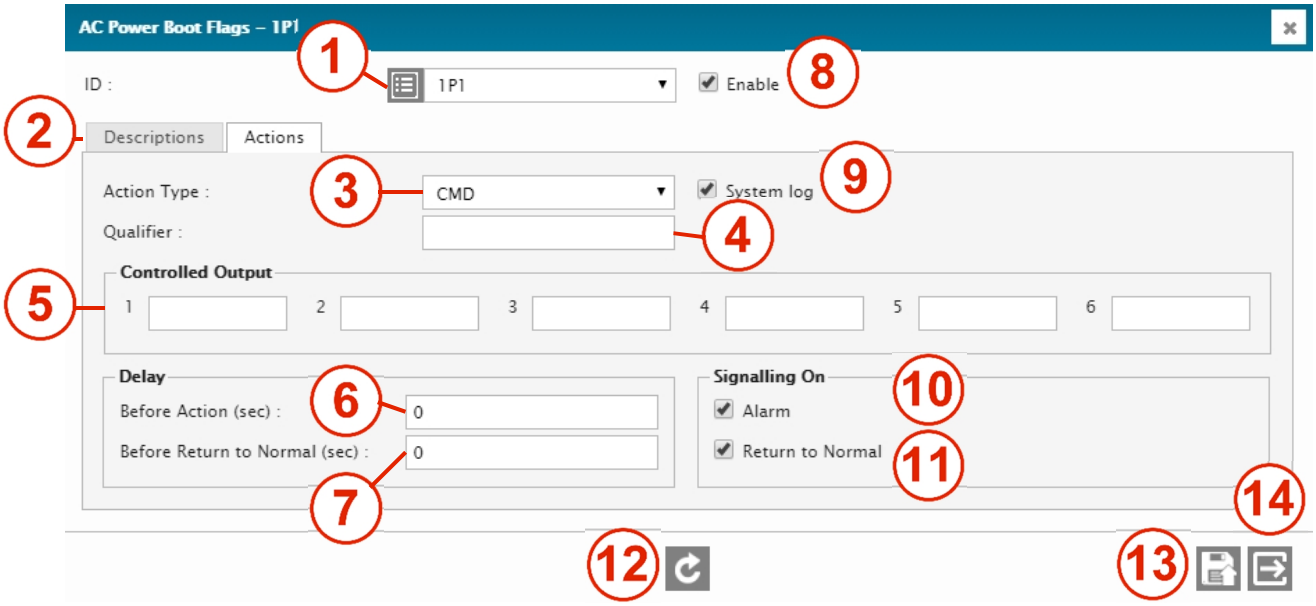
4.3.2. AC Power Fail and boot flags

The AC Power Fail input provides a way to monitor the main AC utility power through small wallwart power supply (included with your Cortex unit). If the utility power fails, the input becomes active and an alarm can be generated (if it has been so configured).

The AC Power fail input is associated with the flag Identifier named 1P1.

Please see Section 4.3.1 for details about the generic ***Main*** screen, ***Description*** screen and ***Vocal Description*** screen.

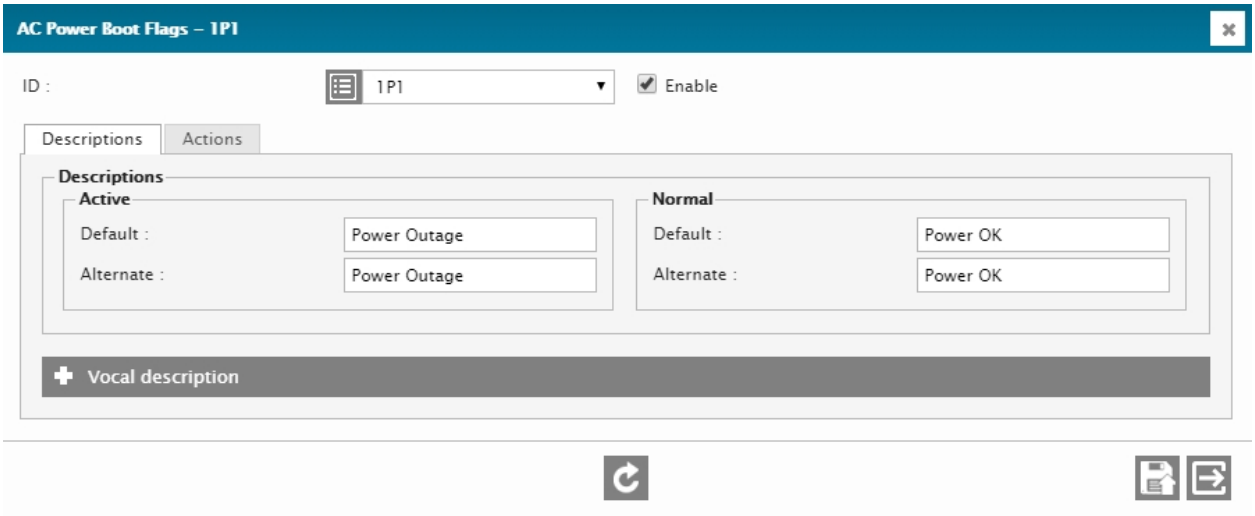
Below is the **Actions** menu screen of the AC Power Fail input.



1 – **ID**
ID of this Input (1P1)

2 – **I/O DESCRIPTION RETRIEVAL**

Click to retrieve and display the current normal description of that ID. Normally hidden to minimize data transfers on low speed or high fee data connections. The Descriptions window for the AC Power flag is shown below :



3 – **ACTION TYPE**

Selects the action type that will happen when an out-of-limit condition occurs. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms.

4 – **QUALIFIER**

Qualifying element (operand) which can be any input, output, flag, timer, SNMP GET, Logic Gate, etc. Essentially any ID in the Cortex can be used to mute or unmute the input to prevent it from taking any action. When the Qualifier is active, the input will be monitored and be able to generate alarms. When the qualifier is non-active (or normal), the input will be muted and it will not be able to generate an alarm. To invert the Qualifier's level, simply put a ! in front of its ID. For example, use !1D01 to invert it. Leave the Qualifier field blank for a "don't care" condition.

5 – **CONTROLLED OUTPUT**

Outputs to be controlled (on/off) based on the state of this input. The two output types allowed are relays (both physical and virtual) and SNMP SETs. For the relays, adding a P suffix will Pulse the relay (ex: 1R01P), L will Latch it and R will Release it.

6 – **DELAY BEFORE ACTION**

Delay before the input changes into an active state when an out-of-limit condition occurs. Prevents glitches from setting-off any alarms.

7 – **DELAY BEFORE RETURN TO NORMAL**

Delay before the input returns to a normal state once an out-of-limit condition is over. Prevents too-brief returns-to-normal from causing multiple repeated alarms.

8 – **ENABLE**

Enable / disable the input. Useful to deactivate an input, without losing all its settings, when the input is causing intermittent problems or nuisance alarms.

9 – **SYSTEM LOG**

Log the input's activity in the System Log. Useful when inputs do not need to be logged, but are required for day-to-day operation.

10 – **SIGNALLING ON – ALARM**

Enables / disables alarm signalling. When checked, any out-of-limit condition will automatically generate an alarm. When unchecked, no alarm will be triggered when an out-of-limit condition occurs.

11 – **SIGNALLING ON – RETURN TO NORMAL**

Enables / disables ***Return To Normal*** signalling. When checked, a notification will be generated when the input changes back to its normal state after an out-of-limit alarm condition. When unchecked, no notification will be sent when the initial alarm condition returns to normal.

12 – **REFRESH / READ**

Refresh / read the screen content.

13 – **SAVE / WRITE**

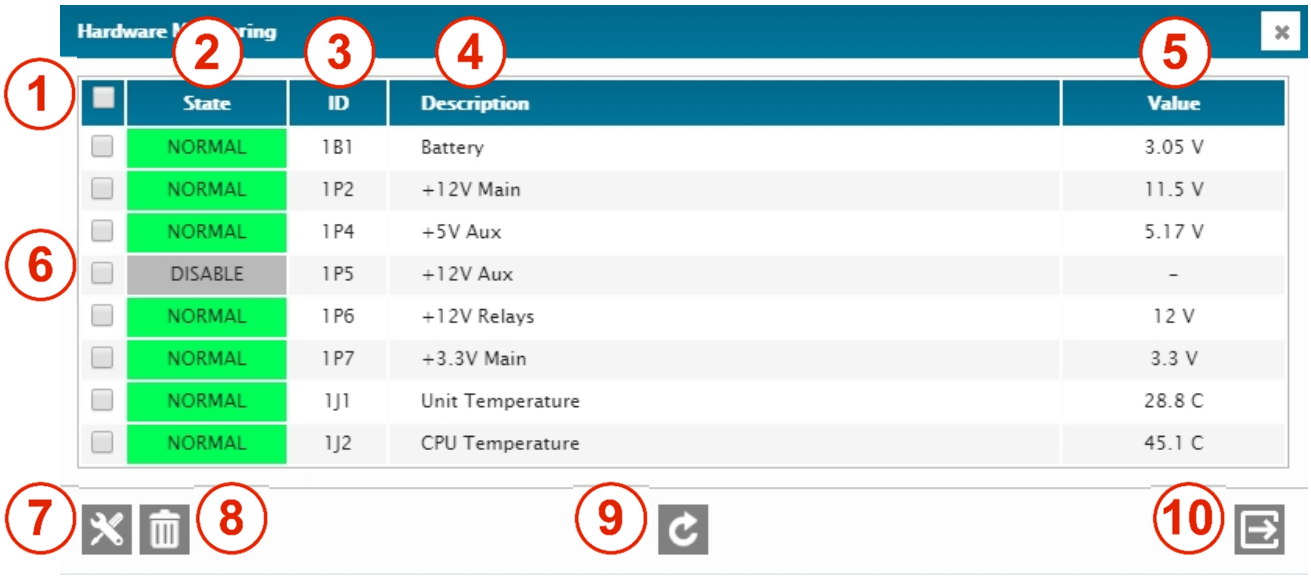
Save the screen content.

14 – **EXIT**

Exit menu.

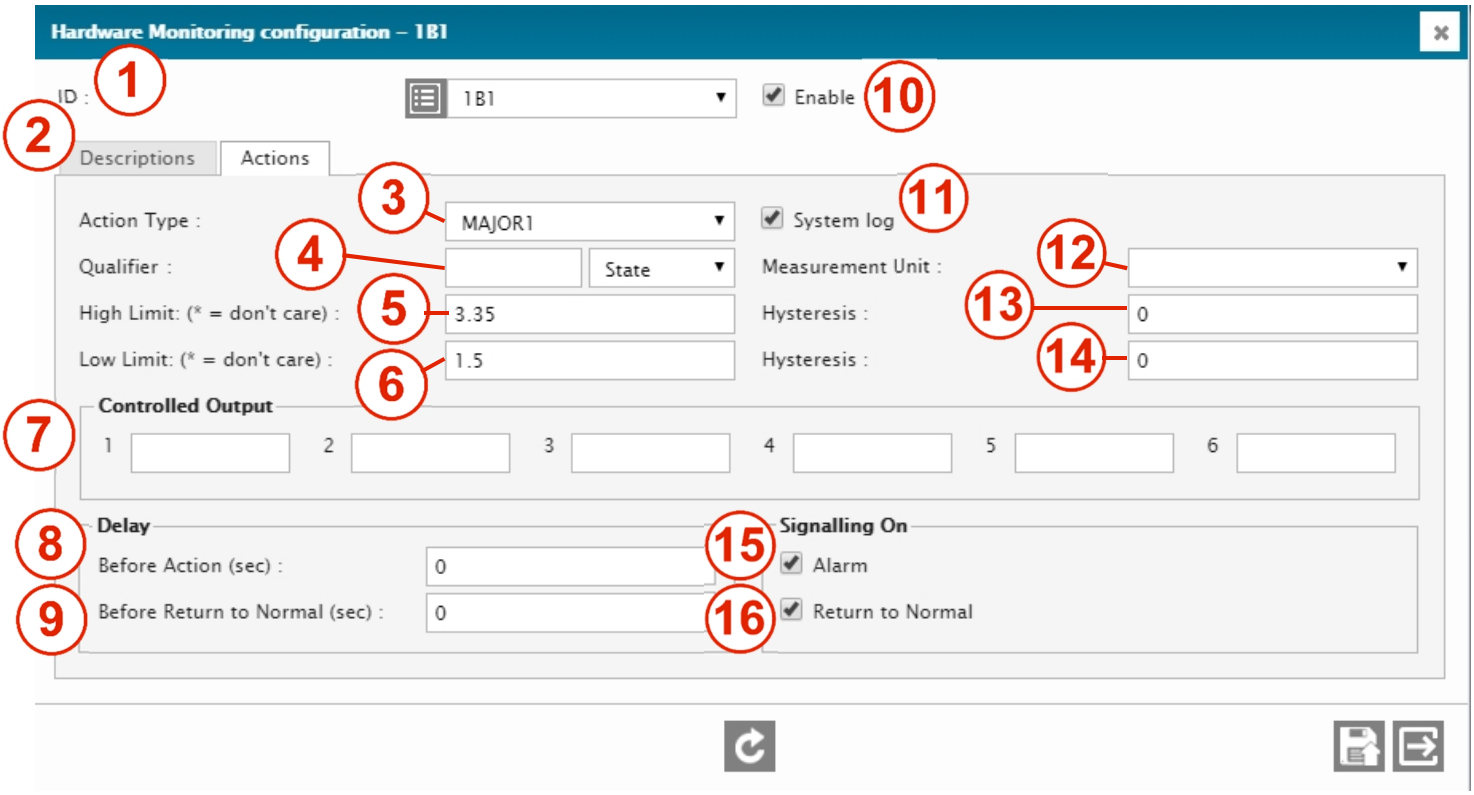
4.3.3. Hardware Monitoring (CORTEX 360 ONLY)

The Hardware Monitoring screen provides information on several internal parameters of the Cortex 360. Each parameter has its own setup menu and offers different user-definable settings.



1 – **SELECT ALL**
Select / unselect all inputs at once.
2 – **STATE**
Current state of the inputs (normal, active, minor, major).
3 – **ID**
ID of the inputs.
4 – **DESCRIPTION**
Description of the inputs. Factory suggested descriptions, but modifiable by user.
5 – **VALUE**
Shows current value of the inputs.
6 – **INDIVIDUAL SELECTION**
Select / unselect one or more inputs.
7 – **CONFIGURATION**
Brings up the configuration menu of the selected inputs. Bulk edition is allowed, see at the beginning of this section for more details. Menu can also be directly accessed by right-clicking anywhere on an input line.
8 – **DELETE**
Delete selected inputs.
9 – **REFRESH / READ**
Refresh / read the screen content.
10 – **EXIT**
Exit menu.

Typical configuration screen of a hardware monitoring input.



1 – **ID**

ID of the selected input. Select from the drop-down menu (1B1 in this case).

2 – **I/O DESCRIPTION RETRIEVAL**

Click to retrieve and display the current normal description of that ID. Normally hidden to minimize data transfers on low speed or high fee data connections.

3 – **ACTION TYPE**

Selects the action type that will happen when an out-of-limit condition occurs. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms.

4 – **QUALIFIER AND QUALIFIER STATE - DATA**

Qualifying element (operand) which can be any input, output, flag, timer, SNMP GET, Logic Gate, etc. Essentially any ID in the Cortex can be used to mute or unmute the input to prevent it from taking any action. When the Qualifier is active, the input will be monitored and be able to generate alarms. When the qualifier is non-active (or normal), the input will be muted and it will not be able to generate an alarm. To invert the Qualifier's level, simply put a ! in front of its ID. For example, use !1D01 to invert it. Leave the Qualifier field blank for a "don't care" condition.

STATE (default setting): the State (Normal or Active) of the input being qualified can change only when the Qualifier is active. Readings from the input (Current Value) continue to be updated periodically independently from the Qualifier state.

DATA: Same as the STATE mode, but in this case the readings from the input (Current Value) remain frozen at their latest values, as long as the Qualifier is not active. This mode is used like a "Sample-and-Hold" for the readings from the input.

5 – **HIGH LIMIT**

Voltage value above which the input state will switch from normal to active. Factory-set but changeable by user.

6 – **LOW LIMIT**

Voltage value below which the input state will switch from normal to active. Factory-set but changeable by user.

7 – **CONTROLLED OUTPUT**

Outputs to be controlled (on/off) based on the state of this input. The two output types allowed are relays (both physical and virtual) and SNMP SETs. For the relays, adding a P suffix will Pulse the relay (ex: 1R01P), L will Latch it and R will Release it.

8 – **DELAY BEFORE ACTION**

Delay before the input changes into an active state when an out-of-limit condition occurs. Prevents glitches from setting-off any alarms.

9 – **DELAY BEFORE RETURN TO NORMAL**

Delay before the input returns to a normal state once an out-of-limit condition is over. Prevents too-brief returns-to-normal from causing multiple repeated alarms.

10 – **ENABLE**

Enable / disable the input. Useful to deactivate an input, without losing all its settings, when the input is causing intermittent problems or nuisance alarms.

11 – **SYSTEM LOG**

Log the input's activity in the System Log. Useful when inputs do not need to be logged, but are required for day-to-day operation.

12 – **QUALIFIER – STATE or DATA**

13 – **MEASUREMENT UNIT**

Select desired measurement unit, or enter your own. Maximum of 3 characters.

14 – **HYSTERESIS - HIGH LIMIT**

Gap value which must be exceeded, when the input voltage returns from a high out-of-range state, before the input can actually switch back to a normal state.

15 – **HYSTERESIS - LOW LIMIT**

Gap value which must be exceeded, when the input voltage returns from a low out-of-range state, before the input can actually switch back to a normal state.

16 – **SIGNALLING ON – ALARM**

Enables / disables alarming. When checked, any out-of-limit condition will automatically generate an alarm. When unchecked, no alarm will be triggered when an out-of-limit condition occurs.

17 - **SIGNALLING ON – RETURN TO NORMAL**

Enables / disables ***Return To Normal*** signalling. When checked, a notification will be generated when the input changes back to its normal state after an out-of-limit alarm condition. When unchecked, no notification will be sent when the initial alarm condition returns to normal.

18 – **REFRESH / READ**

Refresh / read the screen content.

19 – **SAVE / WRITE**

Save the screen content.

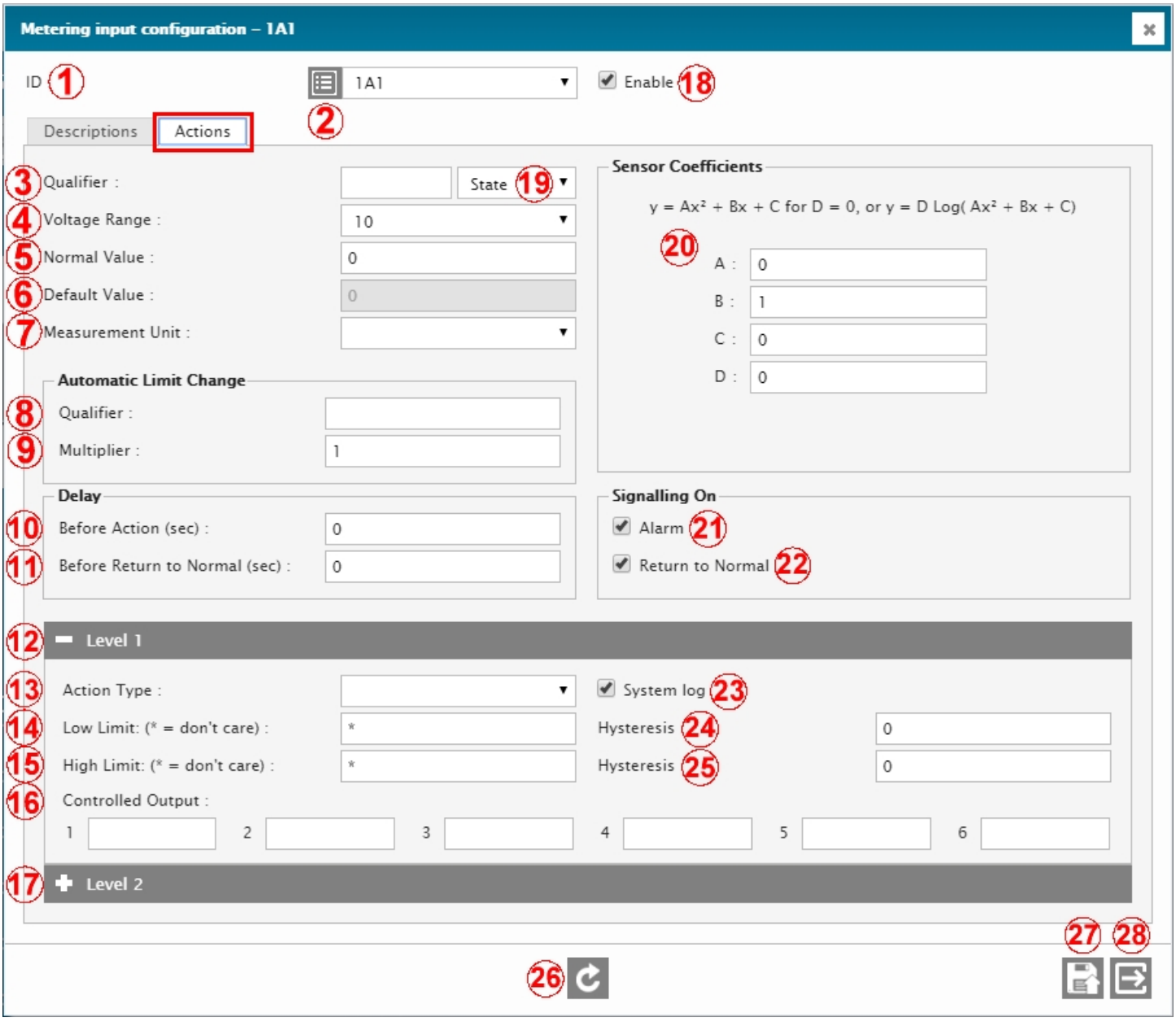
20 – **EXIT**

Exit menu.

4.3.4. Metering (Analog) Inputs

The Metering inputs are used to process and measure analog signals. They are bipolar, differential inputs with common-mode rejection of up to 80V. They can be configured for signal detection (pseudo RMS) an also for 4-20mA modes.

Please see Section 4.3.1 for details about the generic ***Main*** screen, ***Description*** screen and ***Vocal Description*** screen.



1 – **ID**

ID of the selected input. Select from the drop-down menu.

2 – **I/O DESCRIPTION RETRIEVAL**

Click to retrieve and display the current normal description of that ID. Normally hidden to minimize data transfers on low speed or high fee data connections.

3 – **QUALIFIER**

Qualifying element (operand) which can be any input, output, flag, timer, SNMP GET, Logic Gate, etc. Essentially any ID in the Cortex can be used to mute or unmute the input to prevent it from taking any action. When the Qualifier is active, the input will be monitored and be able to generate alarms. When the qualifier is non-active (or normal), the input will be muted and it will not be able to generate an alarm. To invert the Qualifier's level, simply put a ! in front of its ID. For example, use !1D01 to invert it. Leave the Qualifier field blank for a "don't care" condition.

4 – **VOLTAGE RANGE**

Voltage measuring range of the input. Select a range value which is higher than the maximum voltage expected on the input. If the input voltage exceeds this value, saturation or signa clipping will occur. On the other hand, be sure to use a range that is not too high because signal resolution will be lost.

5 – **NORMAL VALUE**

Expected normal operating value for the input. During operation, a user can click on the corresponding input's meter or display box and this value will appear.

6 – **DEFAULT VALUE**

For inputs from MEXM (Expansion) units only. Default value that the input will take if the Cortex loses communications with the MEXM.

7 – **MEASUREMENT UNIT**

Select desired measurement unit, or enter your own. Maximum of 3 characters.

8 – **AUTOMATIC LIMIT CHANGE QUALIFIER**

ID of an input that will trigger a limit change condition. For example, if a site has a backup transmitter with 50% of the power of a main transmitter, and ID 1D01 indicates that the site is now operating on the backup^, then this condition will trigger the application of the Change Multiplier (next item below).

9 – **AUTOMATIC LIMIT CHANGE MULTIPLIER**

In the example above, the multiplier would be 0.5. This factor is automatically applied to all the alarm limits set in this Metering input, thereby saving the user the trouble of having to go through all the limits and adjusting them for the new, lower, power. Very useful to reduce the number of false or nuisance alarms, while still being in full control of the transmission site. Multiplier can be any number between 0 and 9999.

10 – **DELAY BEFORE ACTION**

Delay before the input changes into an active state when an out-of-limit condition occurs. Prevents glitches from setting-off any alarms.

11 – **DELAY BEFORE RETURN TO NORMAL**

Delay before the input returns to a normal state once an out-of-limit condition is over. Prevents too-brief returns-to-normal from causing multiple repeated alarms.

12 – **LEVEL 1**

Close / open the Level 1 menu. Metering inputs can be set up with 2 alarm levels. Typically a minor alarm for when a level drops slightly and then a major alarm when it drops significantly.

13 – **ACTION TYPE**

Selects the action type that will happen when an out-of-limit condition occurs. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms.

14 – **LOW LIMIT**

Voltage value below which the input state will switch from normal to active. * is a "don't care" condition.

15 – **HIGH LIMIT**

Voltage value above which the input state will switch from normal to active. * is a "don't care" condition.

16 – **CONTROLLED OUTPUT**

Outputs to be controlled (on/off) based on the state of this input. The two output types allowed are relays (both physical and virtual) and SNMP SETs. For the relays, adding a P suffix will Pulse the relay (ex: 1R01P), L will Latch it and R will Release it.

17 – **LEVEL 2**

Open / close the Level 2 menu. Same as Level 1.

18 – **ENABLE**

Enable / disable the input. Useful to deactivate an input, without losing all its settings, when the input is causing intermittent problems or nuisance alarms

19 – **QUALIFIER - STATE or DATA**

STATE (default setting): the State (Normal or Active) of the input being qualified can change only when the Qualifier is active. Readings from the input (Current Value) continue to be updated periodically independently from the Qualifier state.

DATA: Same as the STATE mode, but in this case the readings from the input (Current Value) remain frozen at their latest values, as long as the Qualifier is not active. This mode is used like a "Sample-and-Hold" for the readings from the input.

20 – **SENSOR COEFFICIENTS**

Virtual curve-fitting feature that allows compensation for gain, offset, inversion and even 2nd-order non-linearity of input sensors. A is the 2nd-order compensation, B is the gain (and inversion) while C is the offset. When D is 1, then a base 10 Log is applied to calculate decibels. Default values are A=0, B=1, C=0 and D=0, giving a direct 1 to 1 relation between the measured voltage or current and the sensor's output. Davicom has a sensor curve fitting utility Excel file that can help you calculate the required coefficients. Please contact Davicom's technical support department for more information on how to obtain and use this file.

21 – **SIGNALLING ON – ALARM**

Enables / disables alarming. When checked, any out-of-limit condition will automatically generate an alarm. When unchecked, no alarm will be triggered when an out-of-limit condition occurs.

22 - **SIGNALLING ON – RETURN TO NORMAL**

Enables / disables ***Return To Normal*** signalling. When checked, a notification will be generated when the input changes back to its normal state after an out-of-limit alarm condition. When unchecked, no notification will be sent when the initial alarm condition returns to normal.

23 – **SYSTEM LOG**

Log the input's activity in the System Log. Useful when inputs do not need to be logged, but are required for day-to-day operation.

24 – **HYSTERESIS - LOW LIMIT**

Gap value which must be exceeded, when the input voltage returns from a low out-of-range state, before the input can actually switch back to a normal state.

25 – **HYSTERESIS - HIGH LIMIT**

Gap value which must be exceeded, when the input voltage returns from a high out-of-range state, before the input can actually switch back to a normal state.

26 – **REFRESH / READ**

Refresh / read the screen content.

27 – **SAVE / WRITE**

Save the screen content.

28 – **EXIT**

Exit menu.

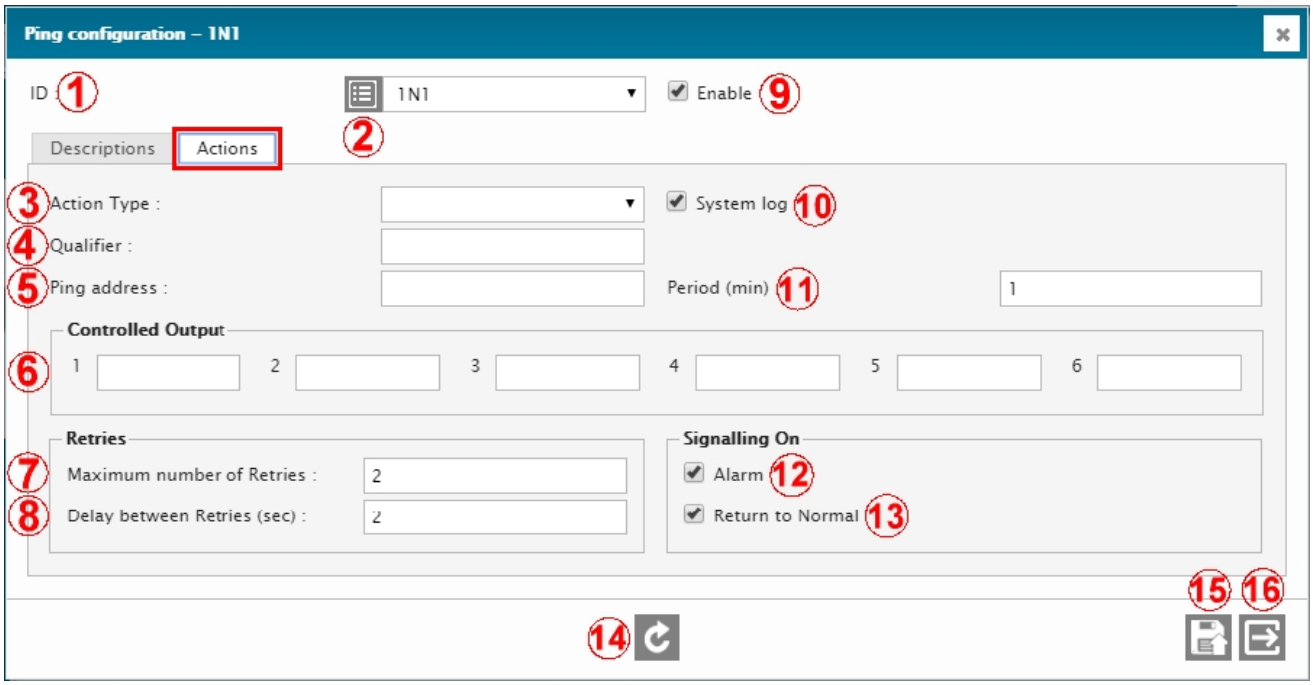
4.3.5. Ping Commands

The Cortex can monitor the state of IP networks and IP-connected device through the use of 64 configurable Ping commands on the CORTEX 360 and 32 Ping commands on the CORTEX 320. The input identifier (ID) of these commands is 1N, 1N2, 1N3…etc.

For any ping request that is configured and that does NOT receive a proper ping reply, the corresponding Identifier will become active (high). This input can then be used to generate alarms, log events, or take action such as pulsing a relay to power-cycle a network device. The commands can also be useful to automatically diagnose problems in multi-branch networks.

Please see Section 4.3.1 for details about the generic ***Main*** screen, ***Description*** screen and ***Vocal Description*** screen.

Below is the **Actions** configuration menu screen of the Ping Command inputs.



1 – **ID**

ID of the selected input. Select from the drop-down menu.

2 – **I/O DESCRIPTION RETRIEVAL**

Click to retrieve and display the current normal or active description. Normally hidden to minimize data transfer on low speed or high fee data connections.

3 – **ACTION TYPE**

Selects the action type that will happen when an out-of-limit condition occurs. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms.

4 – **QUALIFIER**

Qualifying element (operand) which can be any input, output, flag, timer, SNMP GET, Logic Gate, etc. Essentially any ID in the Cortex can be used to mute or unmute the input to prevent it from taking any action. When the Qualifier is active, the input will be monitored and be able to generate alarms. When the qualifier is non-active (or normal), the input will be muted and it will not be able to generate an alarm. To invert the Qualifier's level, simply put a ! in front of its ID. For example, use !1D01 to invert it. Leave the Qualifier field blank for a "don't care" condition.

5 – **PING ADDRESS**

IP address that will be Pinged and monitored.

6 – **CONTROLLED OUTPUT**

Outputs to be controlled (on/off) based on the state of this input. The two output types allowed are relays (both physical and virtual) and SNMP SETs. For the relays, adding a P suffix will Pulse the relay (ex: 1R01P), L will Latch it and R will Release it.

7 – **MAXIMUM NUMBER OF RETRIES**
Number of times a Ping Command will try to ping a non-responsive IP address before it turns to an active (high) state. Maximum is 5 times.
8 – **DELAY BETWEEN RETRIES**
Amount of time between retries (see #7). Maximum is 9 seconds.
9 – **ENABLE**
Enable / disable the Ping Command.
10 – **SYSTEM LOG**
Log the input's activity in the System Log.
11 – **PING PERIOD**
Amount of time between each ping request when normal. Maximum is 9999 seconds (about 2 hours and 45 minutes).
12 – **SIGNALLING ON – ALARM**
Enables / disables alarming. When checked, any out-of-limit condition will automatically generate an alarm. When unchecked, no alarm will be triggered when an out-of-limit condition occurs.
13 – **SIGNALLING ON – RETURN TO NORMAL**
Enables / disables ***Return To Normal*** signalling. When checked, a notification will be generated when the input changes back to its normal state after an out-of-limit alarm condition. When unchecked, no notification will be sent when the initial alarm condition returns to normal.
14 – **REFRESH / READ**
Refresh / read the screen content.
15 – **SAVE / WRITE**
Save the screen content.
16 – **EXIT**
Exit menu.

QUICK-ACCESS MENU

A quick-access menu is available by right-clicking on any Ping Command input line in the main relay menu screen. This quick-access menu offers several manual commands, including one that is only available here, the **Ping Test**.

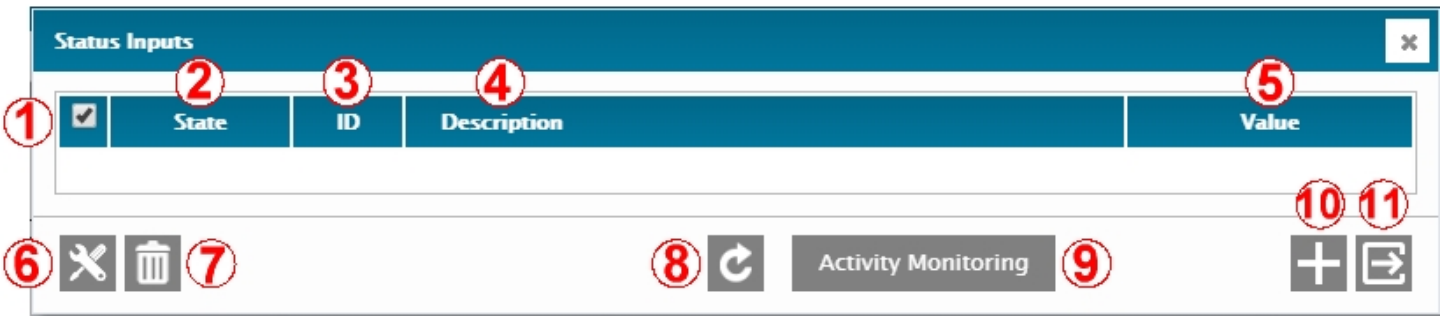
1 – **CONFIG**
Access the configuration menu of the selected Ping Command. Bulk configuration is possible.
2 – **PING TEST**
Manually generate a ping request for test purposes.
3 – **ENABLE**
Enable the selected Ping Command input.
4 – **DISABLE**
Disable the selected Ping Command input.

4.3.7. Status (Digital) Inputs

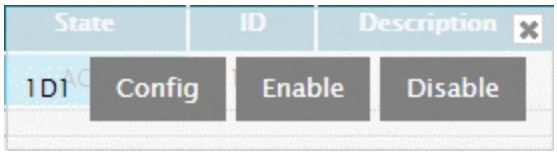
Status inputs monitor digital input signals. These can be relay contacts, TTL logic levels or higher voltage logic levels. The inputs are all individually opto isolated and can also be set for internal pull-up resistors with internal signal returns, or totally external signals.

When configuring the Cortex for the first time, the main Status input menu screen will be empty, like the one shown below, but entries will show-up as inputs are added.

Please see Section 4.3.1 for details about the generic ***Main*** screen, ***Description*** screen and ***Vocal Description*** screen.

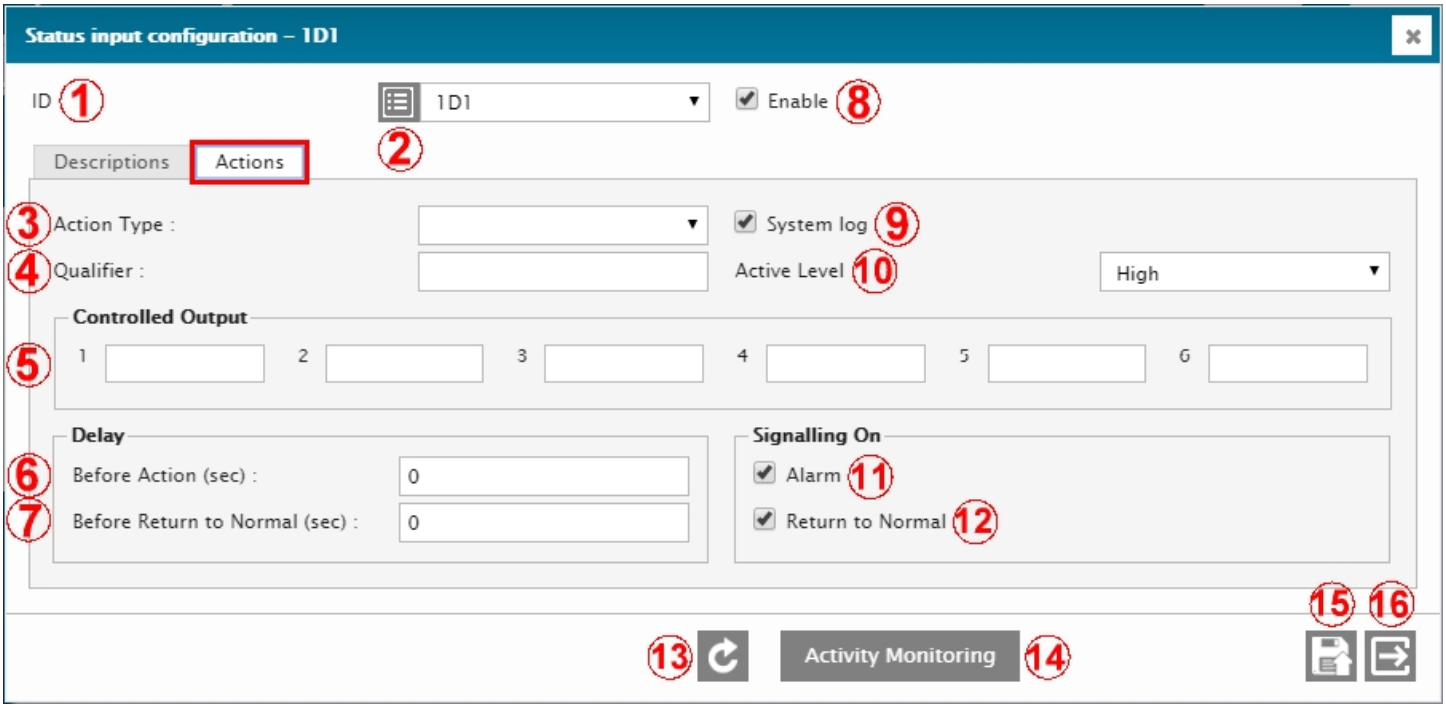


1 – **SELECT ALL**
Select / unselect all inputs at once.
2 – **STATE**
Current state of the inputs (normal, active, minor, major).
3 – **ID**
ID of the inputs.
4 – **DESCRIPTION**
Description of the inputs.
5 – **VALUE**
Shows current value of the inputs, either High (H) or low (L).
6 – **CONFIGURATION**
Access the configuration menu of the selected inputs. Bulk edition is allowed. A configuration and control popup menu like the one shown below can also be accessed by right-clicking anywhere on an input line.



7 – **DELETE**
Delete selected inputs.
8 – **REFRESH / READ**
Refresh / read the screen content.
9 – **ACTIVITY MONITORING**
Access the Activity Monitoring menu.
10 – **ADD**
Add an input.
11 – **EXIT**
Exit menu.

Status input configuration menu



1 – **ID**

ID of the selected input. Select from the drop-down menu.

2 – **I/O DESCRIPTION RETRIEVAL**

Click to retrieve and display the current normal description of that ID. Normally hidden to minimize data transfers on low speed or high fee data connections.

3 – **ACTION TYPE**

Selects the action type that will happen when an out-of-limit condition occurs. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms.

4 – **QUALIFIER**

Qualifying element (operand) which can be any input, output, flag, timer, SNMP GET, Logic Gate, etc. Essentially any ID in the Cortex can be used to mute or unmute the input to prevent it from taking any action. When the Qualifier is active, the input will be monitored and be able to generate alarms. When the qualifier is non-active (or normal), the input will be muted and it will not be able to generate an alarm. To invert the Qualifier's level, simply put a ! in front of its ID. For example, use !1D01 to invert it. Leave the Qualifier field blank for a "don't care" condition.

5 – **CONTROLLED OUTPUT**

Outputs to be controlled (on/off) based on the state of this input. The two output types allowed are relays (both physical and virtual) and SNMP SETs. For the relays, adding a P suffix will Pulse the relay (ex: 1R01P), L will Latch it and R will Release it.

6 – **DELAY BEFORE ACTION**

Delay before the input changes into an active state when an out-of-limit condition occurs. Prevents glitches from setting-off any alarms.

7 – **DELAY BEFORE RETURN TO NORMAL**

Delay before the input returns to a normal state once an out-of-limit condition is over. Prevents too-brief returns-to-normal from causing multiple repeated alarms.

8 – **ENABLE**

Enable / disable the input. Useful to deactivate an input, without losing all its settings, when the input is causing intermittent problems or nuisance alarms.

9 – **SYSTEM LOG**

Log the input's activity in the System Log. Useful when inputs do not need to be logged, but are required for day-to-day operation.

10 – **ACTIVE LEVEL**

Level of the input signal that will bring the status input into an Active state. Can be set to high or low, so it is easy to invert the logic should a wiring error have been made during site installation.

11 – **SIGNALLING ON – ALARM**

Enables / disables alarming. When checked, any out-of-limit condition will automatically generate an alarm. When unchecked, no alarm will be triggered when an out-of-limit condition occurs.

12 - **SIGNALLING ON – RETURN TO NORMAL**

Enables / disables ***Return To Normal*** signalling. When checked, a notification will be generated when the input changes back to its normal state after an out-of-limit alarm condition. When unchecked, no notification will be sent when the initial alarm condition returns to normal.

13 – **REFRESH / READ**

Refresh / read the screen content.

14 – **ACTIVITY MONITORING**

Access the Activity Monitoring menu. See next section for details.

15 – **SAVE / WRITE**

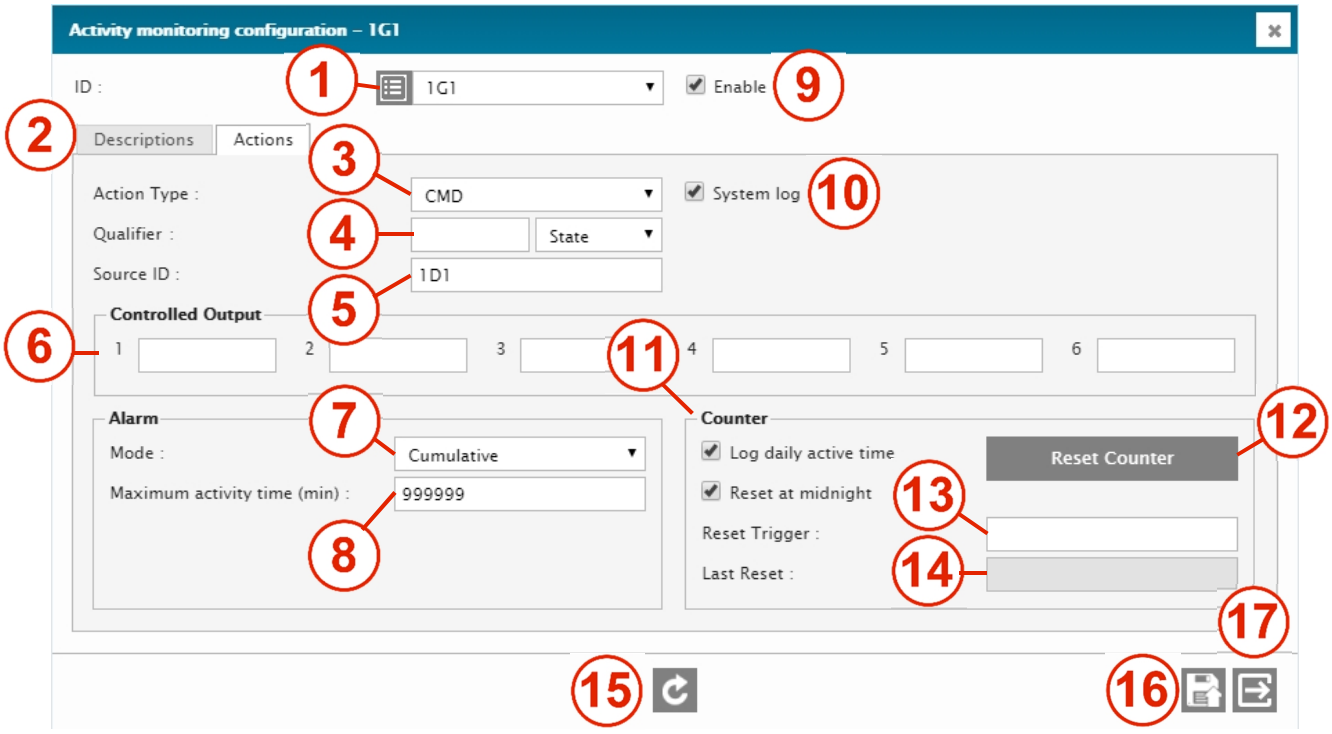
Save the screen content.

16 – **EXIT**

Exit menu.

4.3.8. Activity Monitoring

This general menu is used to configured the monitoring of any input's activity (Metering, Status, etc…) A counter starts counting as soon as an input becomes active, and stop counting when it becomes inactive. It can be used to count and log the cumulative on-time of generator, the time the temperature inside the site's shelter exceeded a preset limit, etc.



1 – **ID**

ID of the selected input. Select from the drop-down menu.

2 – **I/O DESCRIPTION RETRIEVAL**

Click to retrieve and display the current normal description of that ID. Normally hidden to minimize data transfers on low speed or high fee data connections.

3 – **ACTION TYPE**

Selects the action type that will happen when an out-of-limit condition occurs. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms.

4 – **QUALIFIER AND QUALIFIER STATE or DATA**

Qualifying element (operand) which can be any input, output, flag, timer, SNMP GET, Logic Gate, etc. Essentially any ID in the Cortex can be used to mute or unmute the input to prevent it from taking any action. When the Qualifier is active, the input will be monitored and be able to generate alarms. When the qualifier is non-active (or normal), the input will be muted and it will not be able to generate an alarm. To invert the Qualifier's level, simply put a ! in front of its ID. For example, use !1D01 to invert it. Leave the Qualifier field blank for a "don't care" condition.

STATE (default setting): the State (Normal or Active) of the input being qualified can change only when the Qualifier is active. Readings from the input (Current Value) continue to be updated periodically independently from the Qualifier state.

DATA: Same as the STATE mode, but in this case the readings from the input (Current Value) remain frozen at their latest values, as long as the Qualifier is not active. This mode is used like a "Sample-and-Hold" for the readings from the input.

5 – **SOURCE ID**

The identifier of the input on which activity monitoring will be performed (Metering, Status, etc…)

6 – **CONTROLLED OUTPUT**

Outputs to be controlled (on/off) based on the state of this input. The two output types allowed are relays (both physical and virtual) and SNMP SETs. For the relays, adding a P suffix will Pulse the relay (ex: 1R01P), L will Latch it and R will Release it.

7 – **ALARM MODE – CONSECUTIVE or CUMULATIVE**

Method used for the time-based activity / inactivity alarms of the Status inputs. The calculation method takes into account the ***Maximum Activity Time*** value and/or ***Maximum Inactivity Time*** value (see #7 and #8 below).

CONSECUTIVE (default): Timer counts the amount of time the input has been at its **current level.** It resets every time the input level toggles.

CUMULATIVE: Timer cumulates the amount of time the input is active. An alarm is set if this cumulated time exceeds the threshold (more detail below).

8 – **MAXIMUM ACTIVITY TIME**

Total amount of active time that must be reached by the counter before the Timer is turned on. A time value of 0 to 9999 minutes can be set. Default setting is 0, for which no automatic action will happen.

9 – **ENABLE**

Enable / disable the input. Useful to deactivate an input, without losing all its settings, when the input is causing intermittent problems or nuisance alarms.

10 – **SYSTEM LOG**

Log (or not) the input's activity in the System Log. Useful when inputs do not need to be logged, but are required for day-to-day operation.

11 – **COUNTER**

The counter starts counting as soon as an input becomes active, and stop counting when it becomes inactive.

LOG DAILY ACTIVE TIME

Log the daily active time in the System Log.

RESET AT MIDNIGHT

Reset counter at midnight every day.

12 – **RESET COUNTER**

Manual counter reset.

13 – **RESET TRIGGER**

Operand-based automatic reset. Reset can be generated automatically by any input ID in the Cortex.

14 – **LAST RESET**

Date and time at which the last reset occurred.

15 – **REFRESH / READ**

Refresh / read the screen content.

16 – **SAVE / WRITE**

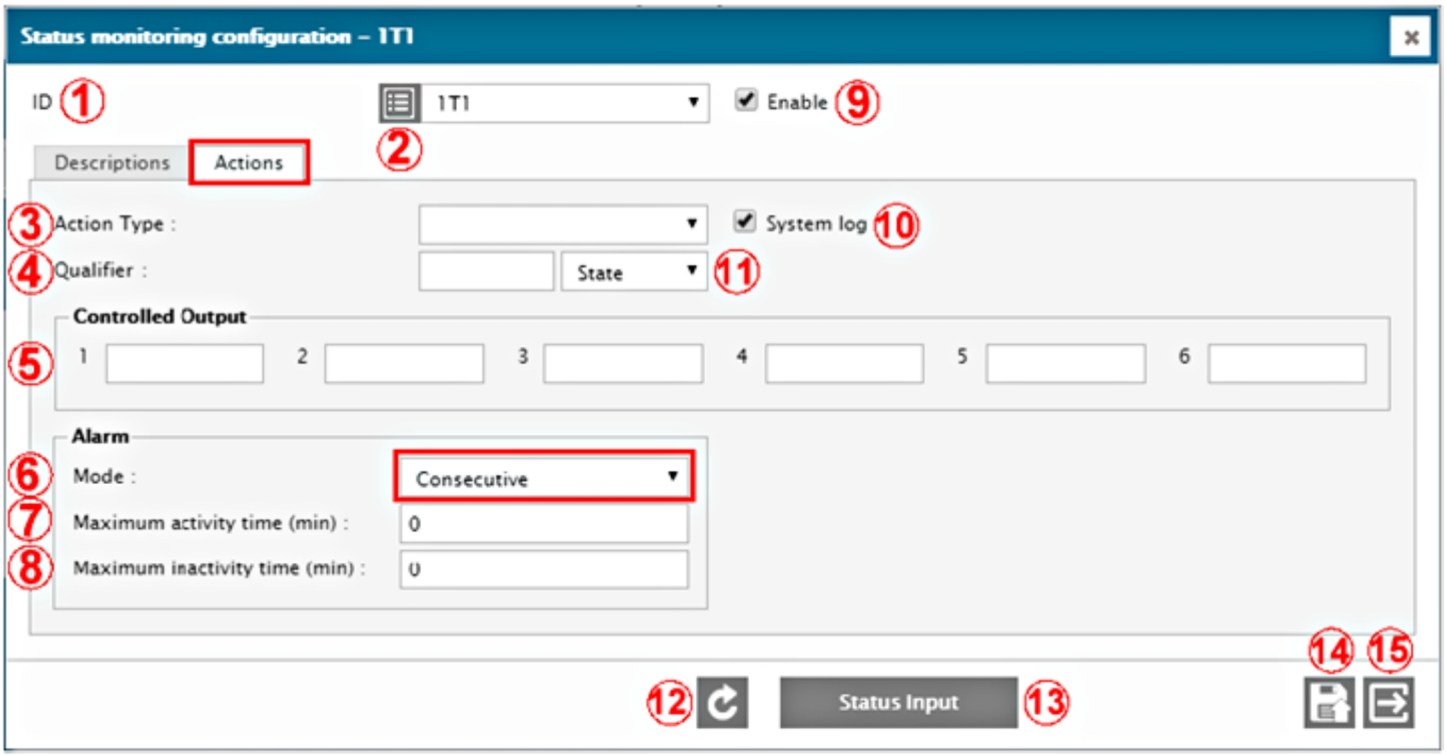
Save the screen content.

17 – **EXIT**

Exit menu.

4.3.9. Status inputs activity monitoring

Similar to Activity Monitoring, except these are dedicated to monitoring the activity on the Status Inputs.
This feature is maintained for legacy compatibility purposes. ***The Activity Monitoring (1G1...) function can also be used in place of this (1T1...) function.***
The Activity Monitoring is a feature of the Status inputs that uses built-in timers to monitor for activity that is too long, inactivity that is too long, or simply to count and log the cumulative activity time on an input. Useful to monitor things like generator tests, compressor duty cycle and other time-critical parameters.



1 – **ID**

ID of the selected input. Select from the drop-down menu.

2 – **I/O DESCRIPTION RETRIEVAL**

Click to retrieve and display the current normal description of that ID. Normally hidden to minimize data transfers on low speed or high fee data connections.

3 – **ACTION TYPE**

Selects the action type that will happen when an out-of-limit condition occurs. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms.

4 – **QUALIFIER**

Qualifying element (operand) which can be any input, output, flag, timer, SNMP GET, Logic Gate, etc. Essentially any ID in the Cortex can be used to mute or unmute the input to prevent it from taking any action. When the Qualifier is active, the input will be monitored and be able to generate alarms. When the qualifier is non-active (or normal), the input will be muted and it will not be able to generate an alarm. To invert the Qualifier's level, simply put a ! in front of its ID. For example, use !1D01 to invert it. Leave the Qualifier field blank for a "don't care" condition.

5 – **CONTROLLED OUTPUT**

Outputs to be controlled (on/off) based on the state of this input. The two output types allowed are relays (both physical and virtual) and SNMP SETs. For the relays, adding a P suffix will Pulse the relay (ex: 1R01P), L will Latch it and R will Release it.

6 – **ALARM MODE – CONSECUTIVE or CUMULATIVE**

Method used for the time-based activity / inactivity alarms of the Status inputs. The calculation method takes into account the ***Maximum Activity Time*** value and/or ***Maximum Inactivity Time*** value (see #7 and #8 below).

CONSECUTIVE (default): Timer counts the amount of time the input has been at its **current level.** It resets every time the input level toggles.

CUMULATIVE: Timer cumulates the amount of time the input is active. An alarm is set if this cumulated time exceeds the threshold (more detail below).

7 – **MAXIMUM ACTIVITY TIME**

Total amount of active time that must be reached by the counter before the Timer is turned on. A time value of 0 to 9999 minutes can be set. Default setting is 0, for which no automatic action will happen.

9 – **ENABLE**

Enable / disable the input. Useful to deactivate an input, without losing all its settings, when the input is causing intermittent problems or nuisance alarms.

10 – **SYSTEM LOG**

Log (or not) the input's activity in the System Log. Useful when inputs do not need to be logged, but are required for day-to-day operation.

11 – **QUALIFIER - STATE or DATA**

STATE (default setting): the State (Normal or Active) of the input being qualified can change only when the Qualifier is active. Readings from the input (Current Value) continue to be updated periodically independently from the Qualifier state.

DATA: Same as the STATE mode, but in this case the readings from the input (Current Value) remain frozen at their latest values, as long as the Qualifier is not active. This mode is used like a "Sample-and-Hold" for the readings from the input.

12 – **REFRESH / READ**

Refresh / read the screen content.

13 – **STATUS INPUT**

Brings-up the Status Input configuration menu screen.

14 – **SAVE / WRITE**

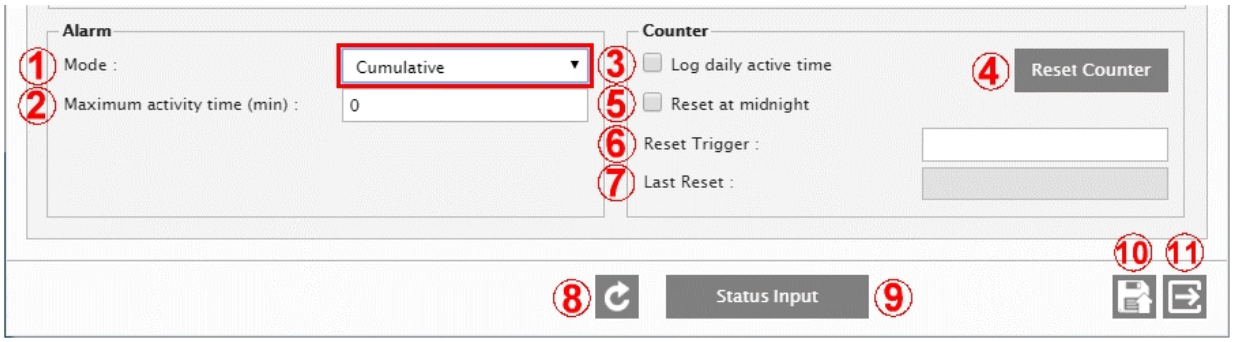
Save the screen content.

15 – **EXIT**

Exit menu.

ALARM MODE – CUMULATIVE

This mode of operation is best explained with the example of logging generator run-time to know when to schedule oil changes. If 1D01 is set to go high every time the generator runs, this run time can be logged in the Cortex. If a maximum activity time is set at 100 hours (6000 minutes), the Cortex will send a Generator Oil Change alarm after 100 hours. A site operator can then log in to the unit and manually reset the counter after the oil has been changed. Alternatively, another input, such as 1D02, could be used to automatically reset the counter if, for example, the oil cap is removed.



1 – **ALARM MODE – CUMULATIVE**

Counter cumulates the amount of time the input has been at its **active level**. (The reset options are listed below).

2 – **MAXIMUM ACTIVITY TIME**

Total amount of active time that must be reached by the counter before the Timer is turned on. A time value of 0 to 9999 minutes can be set. Default setting is 0, for which no automatic action will happen.

3 – **LOG DAILY ACTIVE TIME**

Log the daily active time in the System Log.

4 – **RESET COUNTER**

Manual counter reset.

5 – **RESET AT MIDNIGHT**

Reset counter at midnight every day.

6 – **RESET TRIGGER**

Operand-based automatic reset. Reset can be generated automatically by any input ID in the Cortex.

7 – **LAST RESET**

Date and time at which the last reset occurred.

8 – **REFRESH / READ**

Refresh / read the screen content.

9 – **STATUS INPUT**

Bring the Status input configuration menu screen.

10 – **SAVE / WRITE**

Save the screen content.

11 – **EXIT**

Exit menu

4.3.10. Virtual Logic Gates

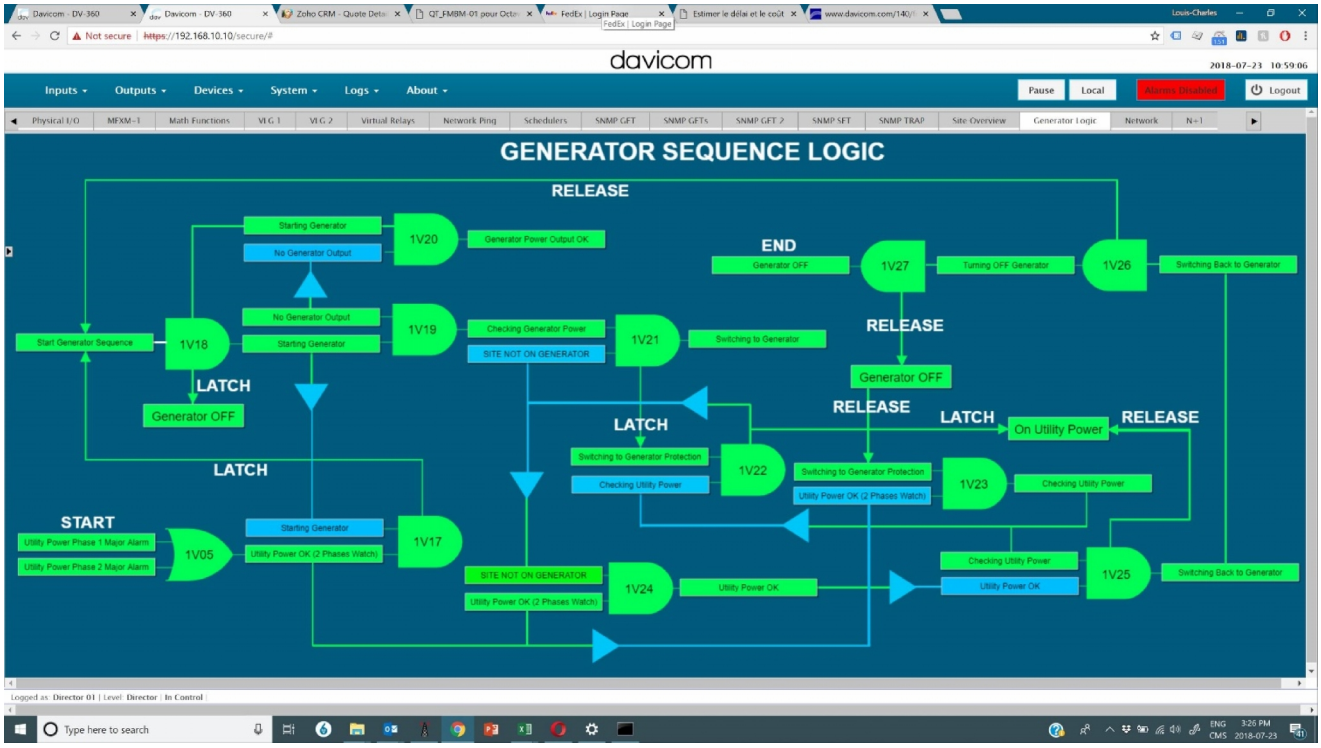
The Cortex's **Virtual Logic Gates** (VLG's) are at the heart of its problem detection, decision making and problem resolution powers. The concept of VLG's is a bit different from coding Macro commands in a programming language. Each VLG is more like a single neuron that connects different I/O's like metering inputs, status inputs, relays, alarm-call lists, schedulers, timers, SNMP commands and hardware flags together and combined in myriad ways to create specific user-defined actions and controls.

The results of these logic functions can dictate automatic actions to be performed by the Davicom upon very specific events, or can be used to qualify other inputs. VLGs can also be used to display a specific result on a workspace object or beside an I/O State LED. Each virtual logic gate is set individually according to its use and function, but one of the most important characteristics of VLGs is that they can be cascaded and nested.

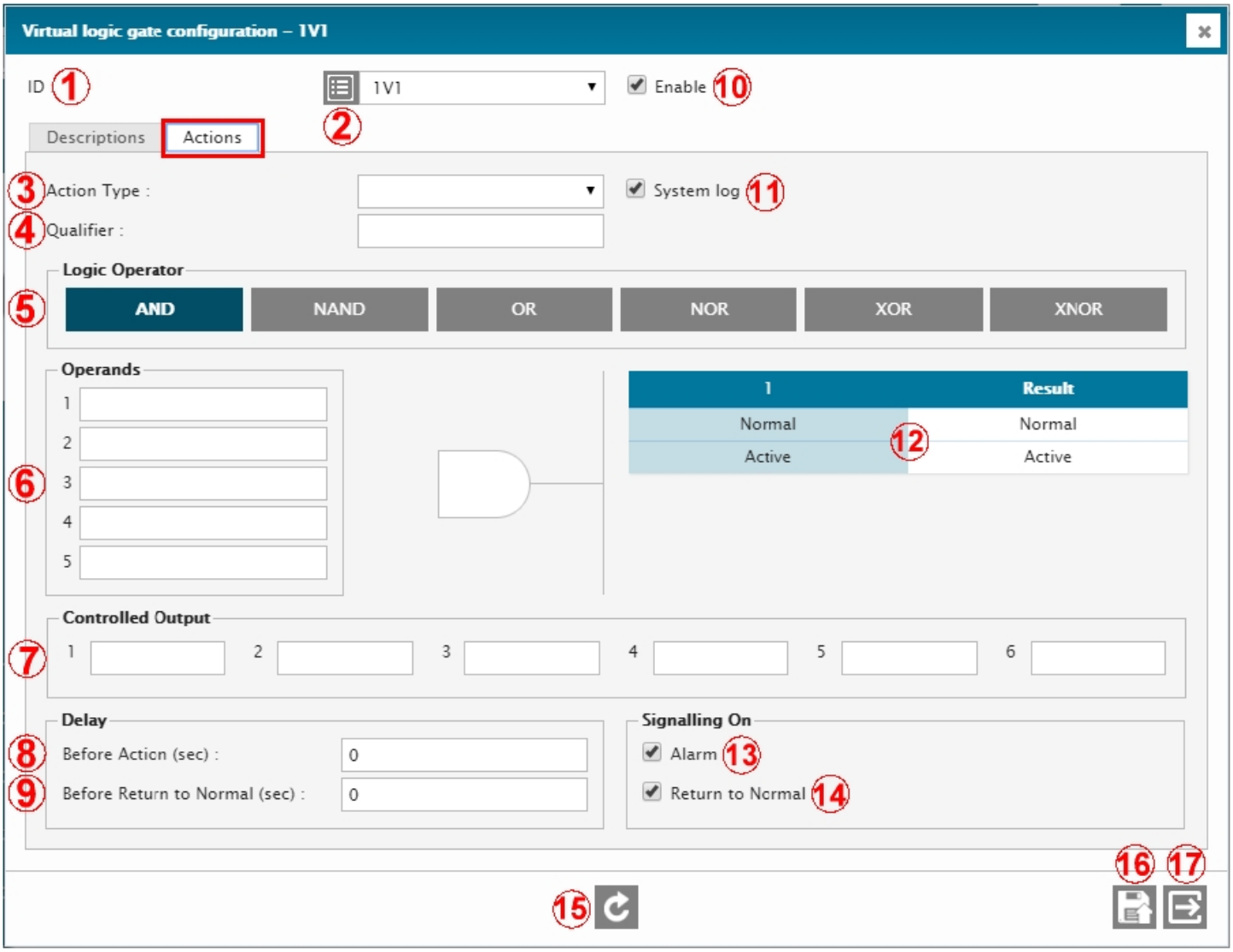
VLGs allow you to program Davicom units so they act according to y our needs. For example, you may not want the Davicom to call you during the night to tell you that the utility power is off, and the Generator is running OK. But if the power is off and the Generator did not start, then you may want to be woken-up. You can create VLG Neurons to do just that.

VLG's can be one of any 6 types of logic gates: AND, NAND, OR, NOR, XOR, XNOR and each VLG can have up to 6 inputs from which one output is generated. For easier reference, the configuration screen also shows the standard logic tables for each type of gate.

The screenshot below shows a typical workspace with many VLG's configured.



See Section 4.3.14.3 for details about the generic ***Main*** screen, ***Description*** screen and ***Vocal Description*** screen.



1 – **ID**

ID of the selected input. Select from the drop-down menu.

2 – **I/O DESCRIPTION RETRIEVAL**

Click to retrieve and display the current normal or active description. Normally hidden to minimize data transfers on low speed or high fee data connections.

3 – **ACTION TYPE**

Selects the action type that will happen when an out-of-limit condition occurs. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms.

4 – **QUALIFIER**

Qualifying element (operand) which can be any input, output, flag, timer, SNMP GET, Logic Gate, etc. Essentially any ID in the Cortex can be used to mute or unmute the input to prevent it from taking any action. When the Qualifier is active, the input will be monitored and be able to generate alarms. When the qualifier is non-active (or normal), the input will be muted and it will not be able to generate an alarm. To invert the Qualifier's level, simply put a ! in front of its ID. For example, use !1D01 to invert it. Leave the Qualifier field blank for a "don't care" condition.

5 – **LOGIC OPERATOR**

There are six different logic gate types to choose from. Each has its own logical behavior and the truth table (#12) shows the resulting outputs..

6 – **OPERANDS**

Inputs and outputs that can be used as logic signal sources for the VLG. Can be status inputs, metering inputs, relays, timers, flags, other VLG's, SNMP Traps, SNMP GETs. Essentially, any Identifier (ID) that exists in the Cortex

can be used as an input for the VLG's. An exclamation mark (!) can be put in front of the operand in order to invert its logic state, for example !1D01 will be Active if 1D01 is Normal.

7 – **CONTROLLED OUTPUT**

Outputs to be controlled (on/off) based on the state of this input. The two output types allowed are relays (both physical and virtual) and SNMP SETs. For the relays, adding a P suffix will Pulse the relay (ex: 1R01P), L will Latch it and R will Release it.

8 – **DELAY BEFORE ACTION**

Delay before the input changes into an active state when an out-of-limit condition occurs. Prevents glitches from setting-off any alarms.

9 – **DELAY BEFORE RETURN TO NORMAL**

Delay before the input returns to a normal state once an out-of-limit condition is over. Prevents too-brief returns-to-normal from causing multiple repeated alarms.

10 – **ENABLE**

Enable / disable the input. Useful to deactivate an input, without losing all its settings, when the input is causing intermittent problems or nuisance alarms.

11 – **SYSTEM LOG**

Log the input's activity in the System Log. Useful when inputs do not need to be logged, but are required for day-to-day operation.

12 – **TRUTH TABLE**

Dynamic table showing the logic state (***Result***) of the VLG for every possible condition of its operands (***1 to 5***). Normal is comparable to a logic low or logic 0, while Active is comparable to a logic high or logic 1.

1	2	3	4	5	Result
Normal	Normal	Normal	Normal	Normal	Normal
Normal	Normal	Normal	Normal	Active	Normal
Normal	Normal	Normal	Active	Normal	Normal
Normal	Normal	Normal	Active	Active	Normal
Normal	Normal	Active	Normal	Normal	Normal
Normal	Normal	Active	Normal	Active	Normal

13 – **SIGNALLING ON – ALARM**

Enables / disables alarming. When checked, any out-of-limit condition will automatically generate an alarm. When unchecked, no alarm will be triggered when an out-of-limit condition occurs.

14 - **SIGNALLING ON – RETURN TO NORMAL**

Enables / disables ***Return To Normal*** signalling. When checked, a notification will be generated when the input changes back to its normal state after an out-of-limit alarm condition. When unchecked, no notification will be sent when the initial alarm condition returns to normal.

15 – **REFRESH / READ**

Refresh / read the screen content.

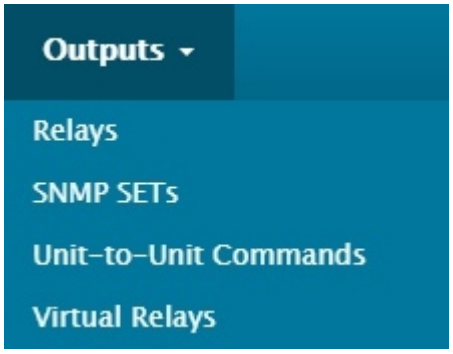
16 – **SAVE / WRITE**

Save the screen content.

17 – **EXIT**

Exit menu.

4.4. Outputs Menu

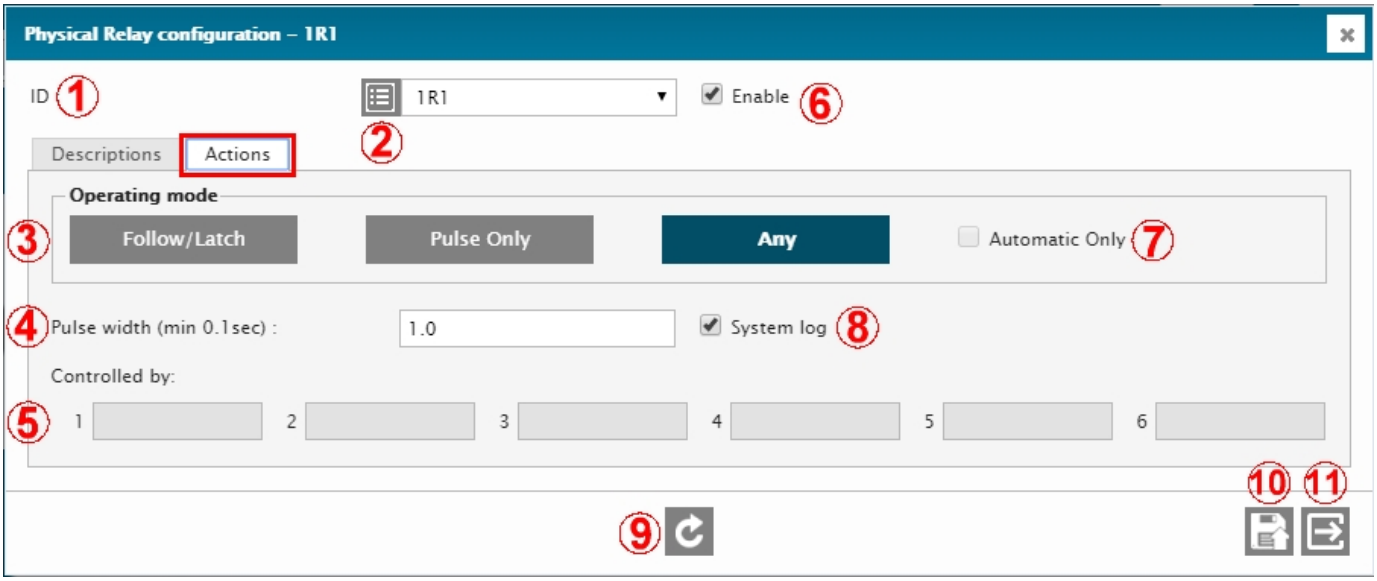


4.4.1. Physical Relays

The Cortex relays provide a way to physically control low-power equipment. The relays are Form C (SPDT) and can handle AC current up to 400mA at 70 volts, or DC current up to 2 Amps at 30 volts.

The control of equipment running at higher voltages or powers requires external relays.

Please see Section 4.3.1 for details about the generic ***Main*** screen, ***Description*** screen and ***Vocal Description*** screen.



1 – **ID**
ID of the selected input. Select from the drop-down menu.
2 – **I/O DESCRIPTION RETRIEVAL**
Click to retrieve and display the current normal or active description. Normally hidden to minimize data transfers on low speed or high fee data connections.
3 – **OPERATING MODE**
Select the desired relay operating mode. See the ***Relay Operation Modes*** below for details.

4 – **PULSE WIDTH**

Select the active (energized) duration of a relay when it is pulsed. Duration is settable from 0.1 sec to 9999 seconds, in 0.1 second steps.

5 – **CONTROLLED BY**

Display of the 6 first inputs currently set to control the relay. If more than 6 inputs actually control the relay, all will be taken into account, but only the first 6 inputs to have been configured will be displayed. This field is not user-settable, it is system-generated from unit's configuration file.

6 – **ENABLE**

Enable / disable the relay. Useful to deactivate the relay, without losing all its settings.

7 – **AUTOMATIC ONLY**

Set relay to operate under control of the Cortex only. Manual control of the relay is not allowed. Prevents user-error for critical relays such as those used for antenna switches.

8 – **SYSTEM LOG**

Log the relay activity in the System Log.

9 – **REFRESH / READ**

Refresh / read the screen content.

10 – **SAVE / WRITE**

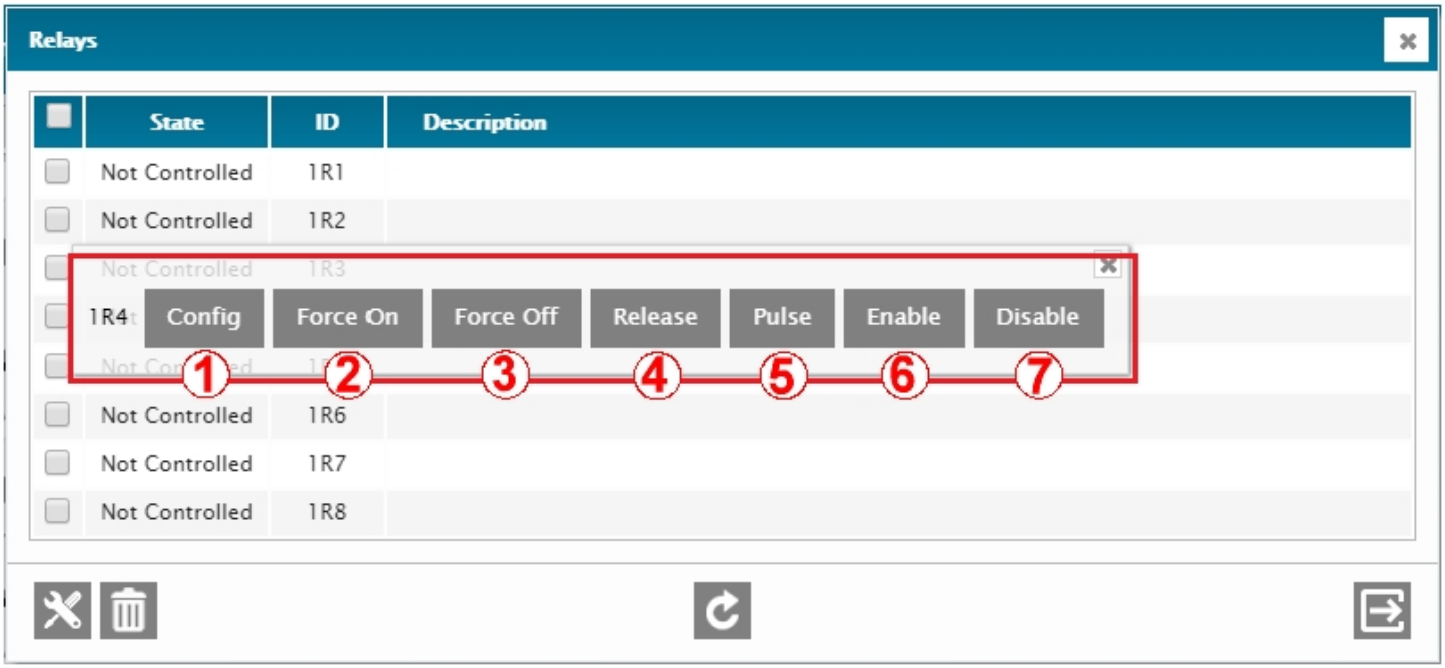
Save the screen content.

11 – **EXIT**

Exit menu.

RELAY QUICK-ACCESS MENU

A quick-access menu is available by right-clicking on any relay line in the main relay menu screen. This quick-access menu offers manual commands that are only available here, like **Force On**, **Force Off**, **Release**, and **Pulse**.



1 – **CONFIG**

Access the configuration menu of the selected relay. Bulk configuration is possible.

2 – **FORCE ON**

Manually force-on (energize) the selected relay. **IMPORTANT**: When a relay is forced- on, it will **stay on** for as long as it is not **manualy released** – and no automatic action can clear it. If the relay had previously been set for Automatic Only, this command would not be available.

3 – FORCE OFF

Manually force-off (de-energize) the selected relay. **IMPORTANT**: When a relay is forced-off, it will **stay off** for as long as it is not **manualy released** – and no automatic action can energize it. If the relay had previously been set for Automatic Only, this command would not be available.

4 – **RELEASE**

Release any forced-on or forced-off relay. A manual release of any forced relay is required in order for the Cortex to recover automatic control on the relay.

5 – **PULSE**

Pulse the selected relay (will pulse for the amount of time set in the relay's configuration menu).

6 – **ENABLE**

Enable the selected relay.

7 – **DISABLE**

Disale the selected relay.

RELAY OPERATING MODES

An operating mode defines how a relay will work. Four (4) modes are available: **FOLLOW/LATCH**, **PULSE ONLY, ANY OR AUTOMATIC ONLY.** These modes, among other things, represent safety measures to prevent relays from behaving incorrectly, either from automatic control or from human intervention.

FOLLOW / LATCH

This operating mode only allows a relay to be controlled **either** as a follower or as a latching relay.

Follow: Relay activation follows the state of the input that controls it.

Latch: Relay activates and stay activated for as long as a **Release** command (manual or automatic) is not sent by the input that controls it.

PULSE ONLY

This operating mode only allows a relay to pulse. It will pulse for the time duration set in its configuration menu. Default duration is 1 second.

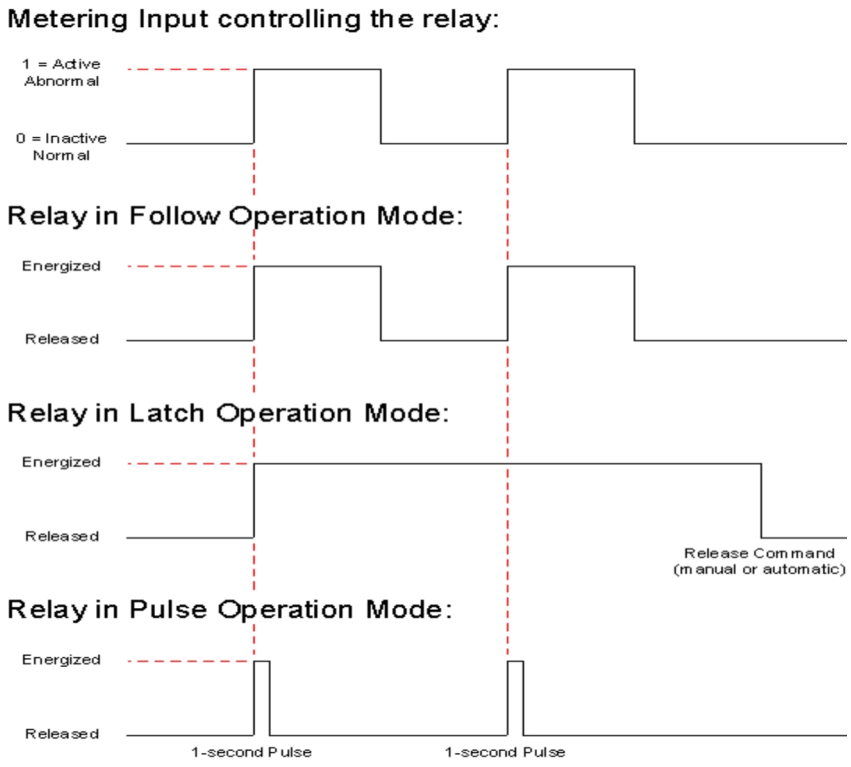
ANY

Relay is permitted be activated in all modes: follow, latch, pulse, and manual activation.

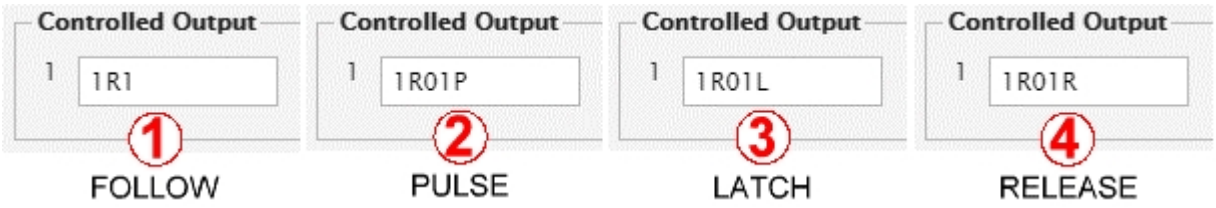
AUTOMATIC ONLY

The relay will exclusively be controlled by the Cortex, no manual control is allowed (The 3 other operating modes can still apply).

The graph below shows operation mode examples in relationship to a Metering Input as the controlling source.



The Cortex relays are controlled from fields called **Controlled Output**, as seen below. These boxes are found in many of the Cortex menus, particularly in the inputs.



To control a relay in one of the 4 ways listed above, use the following schemes:

1 – To command a relay as a follower, use the plain relay ID.
2 – To command a relay to pulse, add the letter P at the end of the relay ID.
3 – To command a relay to latch, add the letter L at the end of the relay ID (the relay must be RELEASED before it can be activated again).
4 – To command a relay to be released: add the letter R at the end of the relay ID.

Important notes about relays

Any relay can individually be set with its own operating mode.

When a relay is set with a mode (other than ANY), the relay will only work for the mode for which it has been set. For example, if a relay is set to Pulse Only, it would not be possible to latch it or force it on. One example of this setting could be the Power-Up and Power-Down inputs on a high-power transmitter. If the transmitter can be damaged by applying a constant voltage to these inputs, it would be wise to set the relays driving these inputs as Pulse-Only.

If you wish to use this safety feature, and not leave the relays as ANY, certain constraints must be considered. When a relay is controlled by one or more inputs, the relay's operating mode may not be changed other than by deleting the relay from every input that controls it, then changing the relay mode, and finally reassigning the relay to the controlling inputs. Therefore, when controlling relays from inputs, always begin by setting the relay's operating mode according to system requirements, and then using the relay as required from the inputs.

It is not possible to change the operating mode of an energized relay. To do so, turn off the relay.

When latching a relay, remember to later have a release command sent, otherwise stay latched forever (as long as the Cortex is powered-up).

Before sending a command to a relay, make sure its operating mode has been set accordingly, otherwise an error message will appear.

The screen refresh rate of the Cortex GUI on your computer is about two (2) seconds, therefore when looking at relay states (and their associated colors) on your screen, it may not be apparent that the relay has pulsed or changed states. Keep in mind that the Cortex's operating cycle is very quick at about 100mS.

4.4.2. Virtual Relays

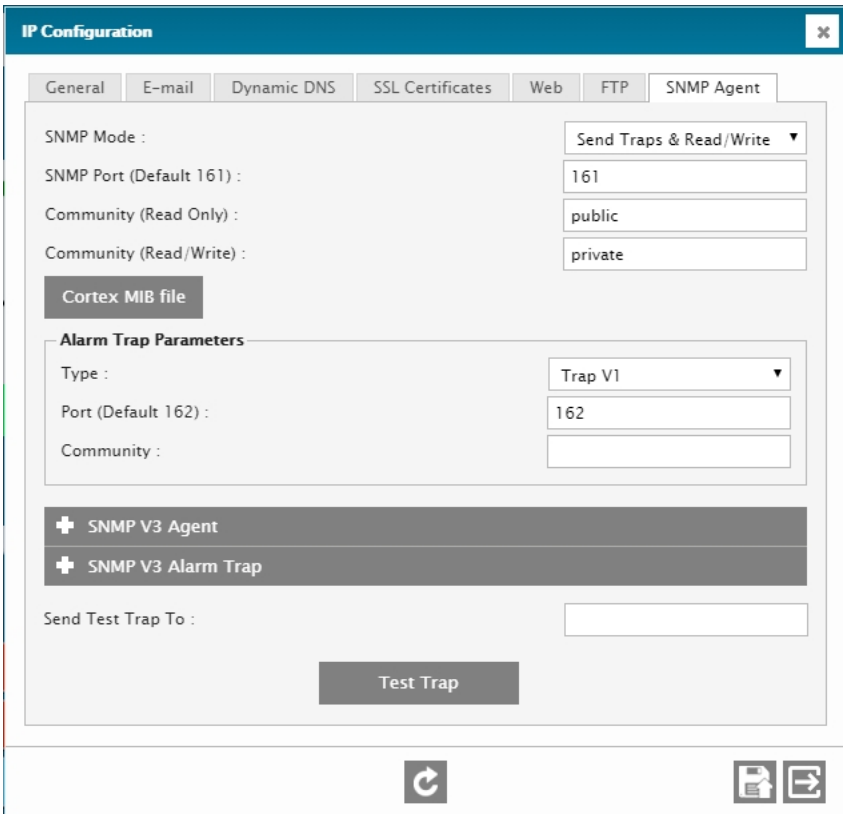
Virtual Relays behave - and are configured - exactly like Physical Relays, but there are two differences: their ID uses a different letter ("O"), and the number of virtual relays available is 128.

Virtual Relays are ID'ed from 1O1, 1O2, 1O3, up to 1O128. The letter O stands for Output, even though it is "virtual".

5. SNMP

The Simple Network Monitoring Protocol (SNMP) is a machine to machine control and monitoring protocol .that was developed as a means to monitor and control devices in an Internet Protocol (IP) network. SNMP has been used for many years in computer and networking environments and is becoming popular in broadcast equipment.

Davicom Cortex units have an on-board SNMP agent that allows them to interface with external SNMP management systems. In addition, this agent can be used to transform non-SNMP readings from legacy devices into SNMP-compatible data that can be used by the remote SNMP management system. The Cortex's SNMP MIB is available for download directly from the unit under the SNMP Agent Tab in the System-IP Configuration menu.

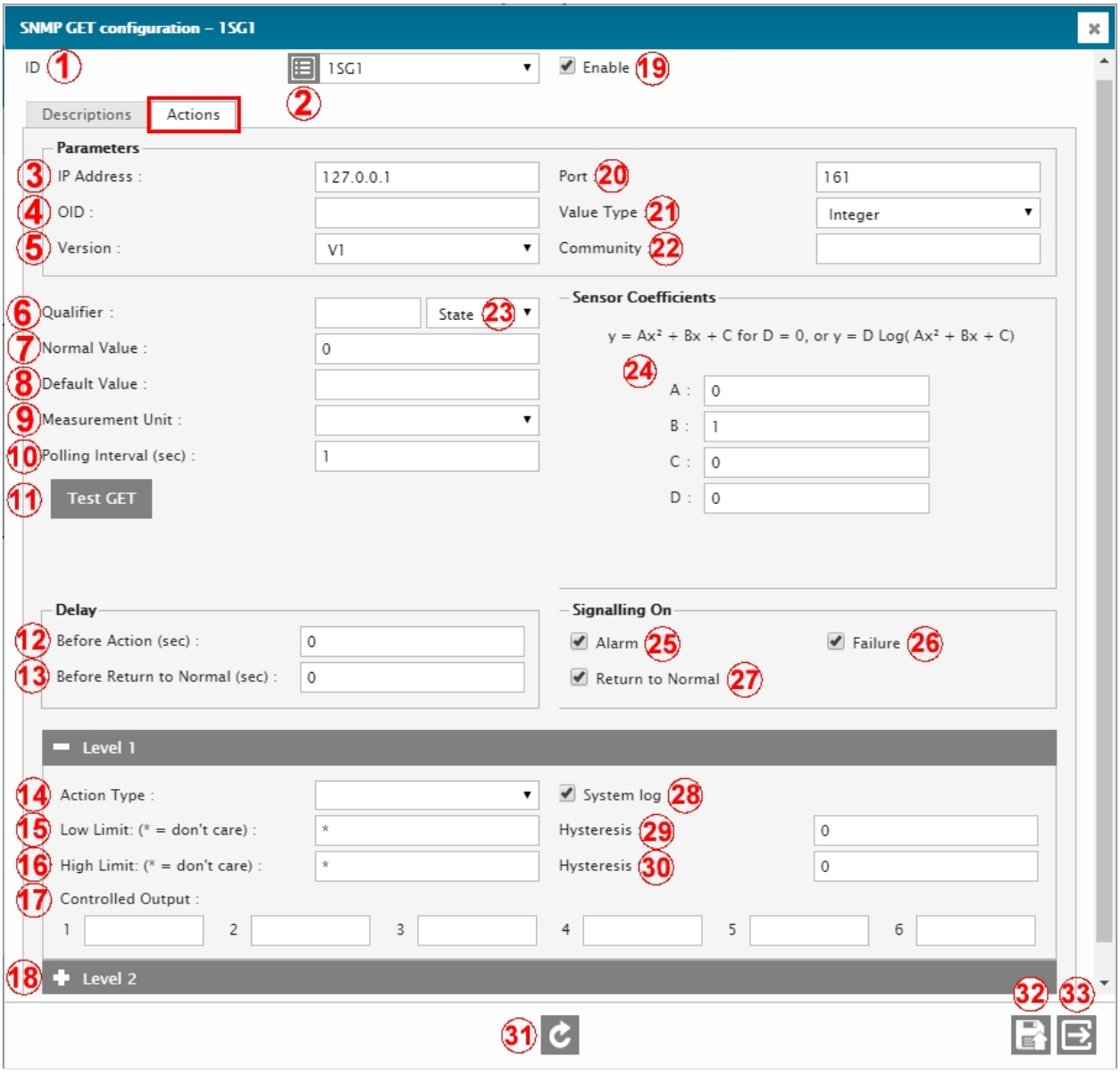


5.1.1. SNMP GET

The SNMP GET inputs are used to process and measure readings obtained digitally, by IP, from SNMP-enabled equipment

Please see Section 4.3.1 for the details about the generic ***Main*** screen, ***Description*** screen and ***Vocal Description*** screen. These same basic screen structures are used in the SNMP GET section.

The SNMP GET Configuration Advanced Actions screen and tab are shown below.



1 – **ID**

ID of the selected SNMP GET input. Select from the drop-down menu.

2 – **I/O DESCRIPTION RETREIVAL**

Click to retrieve and display the current normal description of that ID. Normally hidden to minimize data transfers on low speed or high fee data connections.

3 – **IP ADDRESS**

IP address of the polled equipment.

4 – **OID**

OID of the measurement point (output) in the polled equipment.

5 – **VERSION**

Version number of the SNMP used. Must be the same version as the one used in the polled equipment.

6 – **QUALIFIER**

Qualifying element (operand) which can be any input, output, flag, timer, SNMP GET, Logic Gate, etc. Essentially any ID in the Cortex can be used to mute or unmute the input to prevent it from taking any action. When the Qualifier is active, the input will be unlocked and function normally. When the qualifier is non-active (or normal), the input will be locked (or muted). To invert the Qualifier's level, simply put a ! in front of its ID. For example, use !1D01 to invert it. Leave the Qualifier field blank for a "don't care" condition.

7 – **NORMAL VALUE**

Expected normal operating value for the input. During operation, a user can click on the corresponding input's meter or display box and this value will appear.

8 – **DEFAULT VALUE**

For inputs from MEXM (Expansion) units only. Default value that the input will take if the Cortex looses communications with the MEXM.

9 – **MEASUREMENT UNIT**

Select desired measurement unit, or enter your own. Maximum of 3 characters.

10 – **POLLING INTERVAL**

Amount of time between each SNMP GET polling request.

11 – **TEST GET**

Manually generate a GET request (for testing purpose) to the configured IP address and OID.

12 – **DELAY BEFORE ACTION**

Delay before the input changes into an active state when an out-of-limit condition occurs. Prevents glitches from setting-off any alarms.

13 – **DELAY BEFORE RETURN TO NORMAL**

Delay before the input returns to a normal state once an out-of-limit condition is over. Prevents too-brief returns-to-normal from causing multiple repeated alarms.

14 – **ACTION TYPE**

Selects the action type that will happen when an out-of-limit condition occurs. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms.

15 – **LOW LIMIT**

Voltage value below which the input state will switch from normal to active. * is a don't care condition.

16 – **HIGH LIMIT**

Voltage value above which the input state will switch from normal to active. * is a don't care condition.

17 – **CONTROLLED OUTPUT**

Outputs to be controlled (on/off) based on the state of this input. The two output types allowed are relays (both physical and virtual) and SNMP SETs. For the relays, adding a P suffix will Pulse the relay (ex: 1R01P), L will Latch it and R will Release it.

18– **LEVEL 2**

Open / close the Level 2 menu. Same as Level 1.

19 – **ENABLE**

Enable / disable the input. Useful to deactivate an input, without losing all its settings, when the input is causing intermittent problems or nuisance alarms.

20 – **PORT**

SNMP IP port number of selected SNMP GET input. Default is 161.

21 – **VALUE TYPE**

Type of value to be read (polled) from the equipment. Different types are available, like Integer, Display String, Gauge, Truth Value, etc. Must match the value type of the polled output of the equipment.

22 – **COMMUNITY**

SNMP community name. Must match the community name of the polled equipment.

23 – **QUALIFIER - STATE or DATA**

STATE (default setting): the State (Normal or Active) of the input being qualified can change only when the Qualifier is active. Readings from the input (Current Value) continue to be updated periodically independently from the Qualifier state.

DATA: Same as the STATE mode, but in this case the readings from the input (Current Value) remain frozen at their latest values, as long as the Qualifier is not active. This mode is used like a "Sample-and-Hold" for the readings from the input.

24 – **SENSOR COEFFICIENTS**

Virtual curve-fitting feature that allows compensation for gain, offset, inversion and even 2nd-order non-linearity of input sensors. A is the 2nd-order compensation, B is the gain (and inversion) while C is the offset. When D is 1, then a base 10 Log is applied to calculate decibels. Default values are A=0, B=1, C=0 and D=0, giving a direct 1 to 1 relation between the measured voltage or current and the sensor's output.

25 – **SIGNALLING ON – ALARM**

Enables / disables alarming. When checked, any out-of-limit condition will automatically generate an alarm. When unchecked, no alarm will be triggered when an out-of-limit condition occurs.

26 – **FAILURE**

Generates an alarm opon SNMP GET reading failure. Many factors can prevent a reading from taking place. The ***Parameters*** section of the SNMP Get menu screen is particularly important. Check for any erronous or missing

data (IP address, OID, SNMP version, port number, value type, community name, etc.). Check also that a good IP link exists between the Cortex and the polled equipment. Check router settings, and also check the IP settings and SNMP settings of the remote equipment. SNMP settings of the both the Cortex and the remote equipmenent must match.

27 - **SIGNALLING ON – RETURN TO NORMAL**

Enables / disables ***Return To Normal*** signalling. When checked, a notification will be generated when the input changes back to its normal state after an out-of-limit alarm condition. When unchecked, no notification will be sent when the initial alarm condition returns to normal.

28 – **SYSTEM LOG**

Log the input's activity in the System Log. Useful when inputs do not need to be logged, but are required for day-to-day operation.

29 – **HYSTERESIS - LOW LIMIT**

Gap value which must be exceeded, when the input voltage returns from a low out-of-range state, before the input can actually switch back to a normal state.

30 – **HYSTERESIS - HIGH LIMIT**

Gap value which must be exceeded, when the input voltage returns from a high out-of-range state, before the input can actually switch back to a normal state.

31 – **REFRESH / READ**

Refresh / read the screen content.

32 – **SAVE / WRITE**

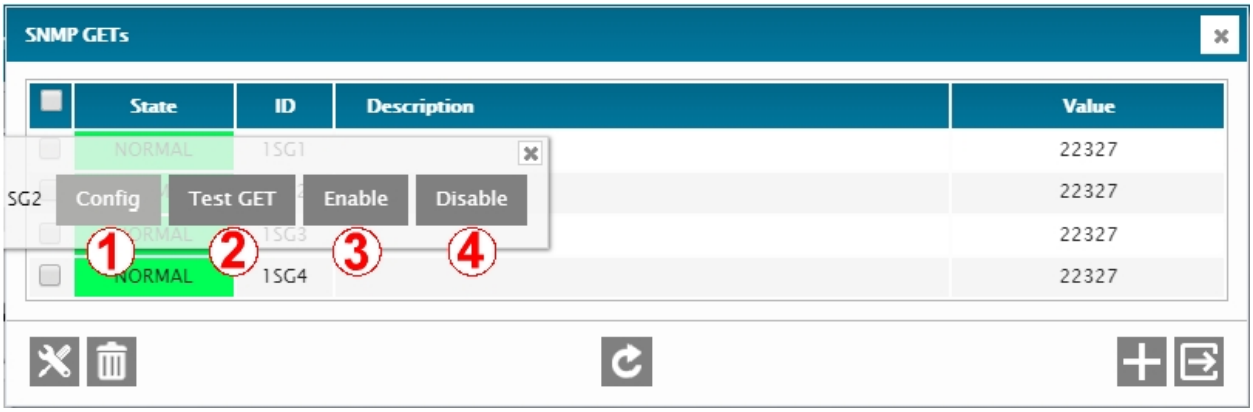
Save the screen content.

33 – **EXIT**

Exit menu.

QUICK-ACCESS MENU

A quick-access menu is available by right-clicking on any GET input line in the main menu screen.



1 – **CONFIG**

Access the configuration menu of the selected GET inputs. Simultaneous multiple-inputs configuration is possible, see at the beginning of this section for more details.

2 – **TEST GET**

Manually generate a GET request (for testing purpose).

3 – **ENABLE**

Enable the selected GET input.

4 – **DISABLE**

Disable the selected GET input.

5.1.2. SNMP SET

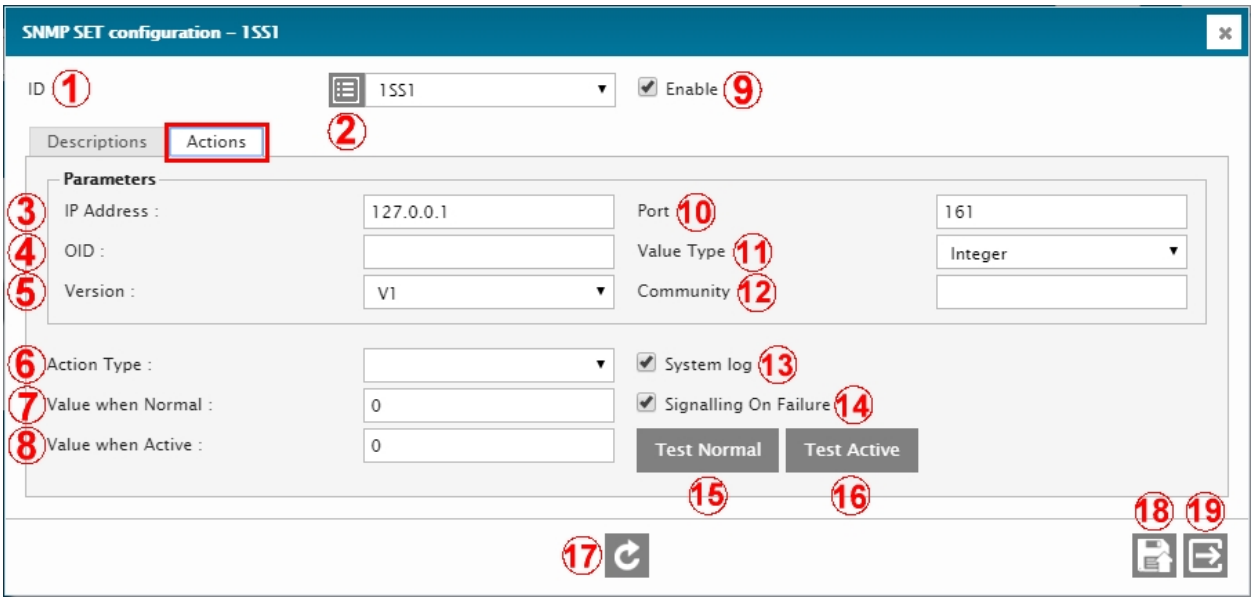
The SNMP SET is a write (output) command that allows control of SNMP-enabled equipment by sending them specific commands over an IP network.

The Davicom SNMP SET commands behave much like SPDT relays since they send one of two values, normal and active, but also because the Cortex controls (activates) SNMP SETs in the exact same way as it controls its relays, using boxes called “Controlled By” found in most of the Cortex’s input menus.

SNMP SET commands are ephemeral (momentary), meaning that each send (or write) is unique and doesn’t repeat.

For each SNMP SET command sent, the Cortex nevertheless waits and listens for an acknowledgement message from the remote device. This acknowledgement message provides information on the success or failure of the SET command sent. In the event that this message contains a failure notice, or if no message at all is received, the Cortex can be set to generate an alarm (see #14 in the menu screen below) in order to advise users that a particular SET command did not attain its destination.

Please see Section 4.3.14.3 for the details about the generic ***Main*** screen, ***Description*** screen and ***Vocal Description*** screen.



1 – **ID**

ID of the selected SNMP SET output. Select from the drop-down menu.

2 – **I/O DESCRIPTION RETREIVAL**

Click to retrieve and display the current normal description of that ID. Normally hidden to minimize data transfers on low speed or high fee data connections.

3 – **IP ADDRESS**

IP address of the SNMP device.

4 – **OID**

OID of the control point in the SNMP device.

5 – **VERSION**

Version number of the SNMP used by the Cortex for the selected SET command. Must be of the same version as the one used in the SNMP device.

6 – **ACTION TYPE**

Selects the action type that will happen when a SET command fails to activate in the remote device or equipment. 3 types are available: Major alarm, Minor alarm, and Command (CMD). On CMD, no alarm will be triggered. Use this Action when you want to take actions without triggering any alarms (like building logic to re-send the command).

7 – **VALUE WHEN NORMAL**

Value to write into the SNMP device and which will be considered as the normal value. This normal value will be written into the device everytime the SNMP SET toggles from an active state to a normal state. More information is provided further below.

8 – **VALUE WHEN ACTIVE**

Value to write into the SNMP device and which will be considered as the active value. This value will be written into the device everytime the SNMP SET toggles from a normal state to an active state.

9 – **ENABLE**

Enable / disable the SNMP SET output. Useful when wanting to temporarily stop the output from controlling a device without deleting and losing its configuration settings.

10 – **PORT**

SNMP port number of the selected SNMP SET output. Default is 161.

11 – **VALUE TYPE**

Type of value to be written in the SNMP device. Different types are available, like Integer, Display String, Gauge, Truth Value, etc. This value type must match the one of the device's controlled I/O..

12 – **COMMUNITY**

SNMP community name. Must be an **exactly** match of the community name set in the remote SNMP device.

13 – **SYSTEM LOG**

Log the input's activity in the System Log. Useful when outputs do not need to be logged, but are required for day-to-day operation.

14 – **SIGNALING ON FAILURE**

Generate alarm upon SNMP SET failure. See explanations above. **NOTE**: The reset of a failure alarm will happen after the next successful SET command.

15 – **TEST NORMAL**

Manually generate a SET command using the normal value.

16 – **TEST ACTIVE**

Manually generate a SET command using the active value.

17 – **REFRESH / READ**

Refresh / read the screen content.

18 – **SAVE / WRITE**

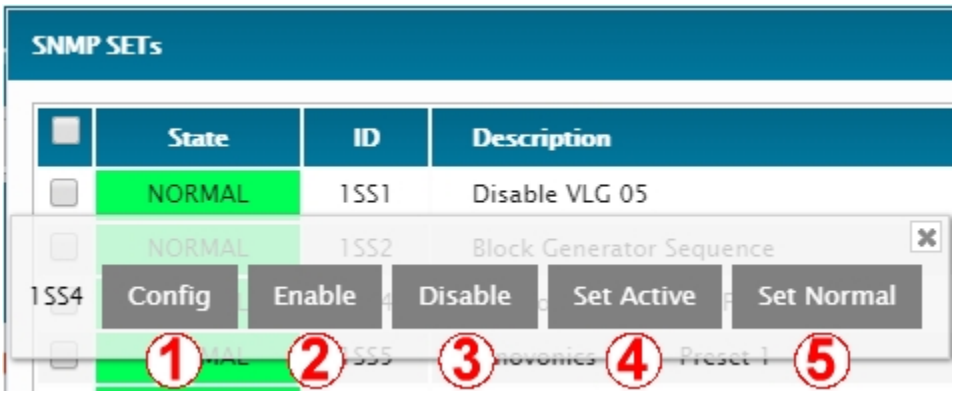
Save the screen content.

19 – **EXIT**

Exit menu.

QUICK-ACCESS MENU

A quick-access menu is available by right-clicking on any GET input line in the main menu screen.



1 – **CONFIG**

Access the configuration menu of the selected SET outputs. Bulk configuration is possible if multiple inputs are selected.

2 – **ENABLE**

Enable the selected SET output.

3 – **DISABLE**
Disable the selected SET output.
4 – **SET ACTIVE**
Manually generate a SET command using the active value.
6 – **SET NORMAL**
Manually generate a SET command using the normal value.

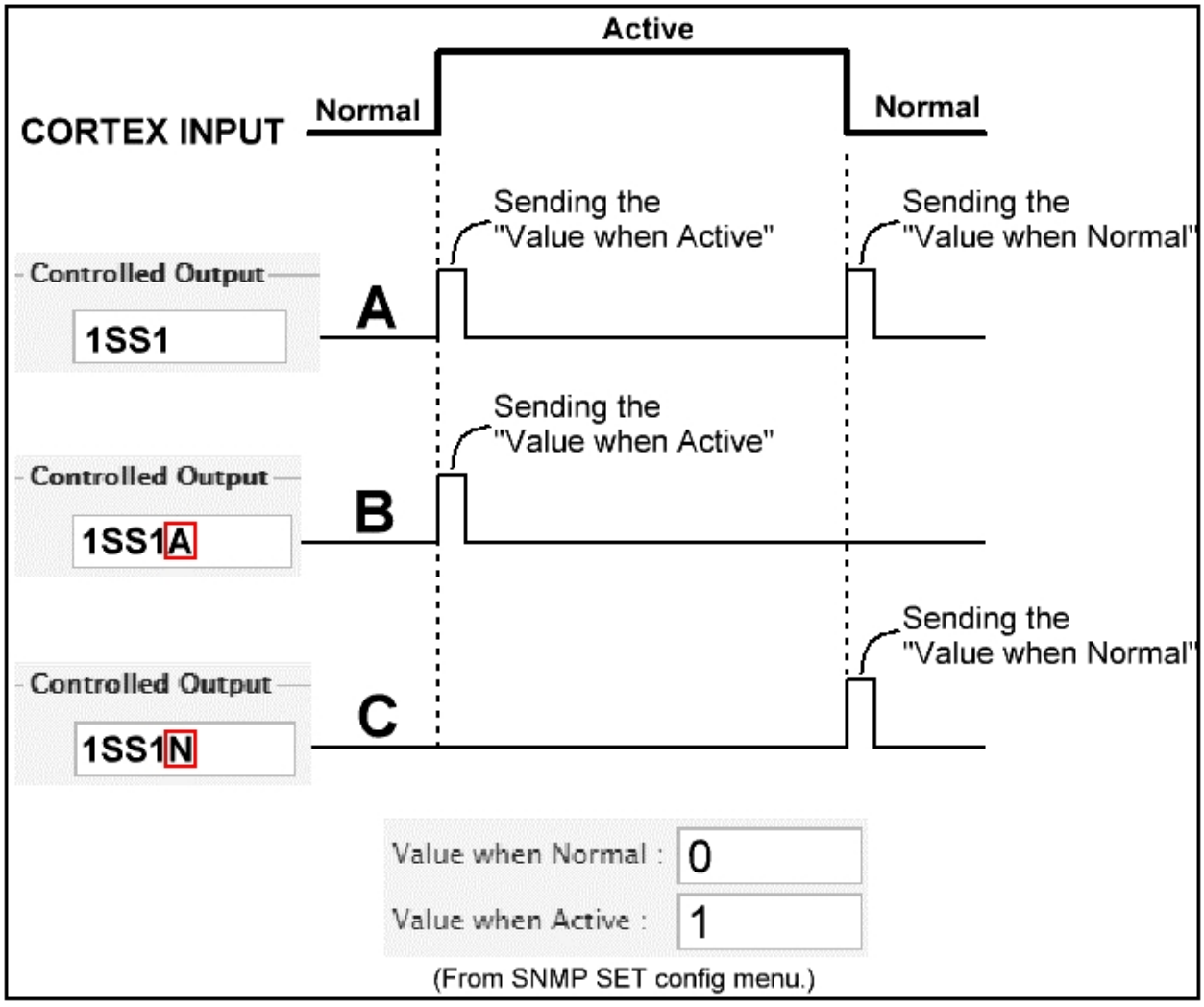
Supplementary information on SNMP SET usage

As mentioned previously, the SNMP SET commands are controlled (driven) by Cortex inputs which toggle between two states, active and normal, which in turn generate the SNMP SET commands to send their respective (active or normal values). This behavior is illustrated in line **A** of the image below.

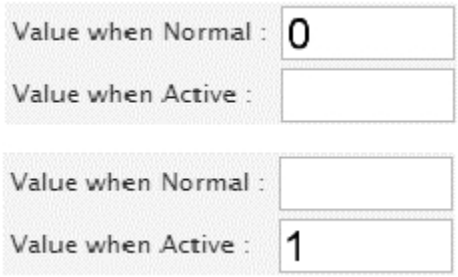
In some situations, it may be required to send only one value or the other, but not to have the SET follow the input that controls it. For these situations, a ***specific suffix letter*** can be used to tell the Cortex which value to send. This is illustrated in lines B and **C** of the image below.

Suffix “A“ (for Active) will only allow the active value to be sent when the controlling input toggles into an active state, while the letter “N“ (for Normal) will only allow the normal value to be sent when the controlling input returns to a normal state.

Based on a particular equipment’s SNMP I/O requirements, it may be necessary to use different values for the “Value when Normal” and the “Value when Active” in order to make the proper setting in this equipment.



Lastly, it is also possible to have a specific value sent by entering only one value instead of two in the configuration menu of the SNMP SET output, as seen below for example.



The Cortex gives you practically unlimited flexibility to control other devices.

6. Workspace Management

Workspaces are GUI display templates that can be configured to display the state and/or value of any Input, Output, or Flag that exists in the Cortex unit. Workspaces can show different content, based on a user's preferences, or display device. For example, specific workspaces can be set up for site information display on smartphones, tablets, laptops or large-screen monitors. Separate tabs can be programmed, for example, to separate HVAC information from RF information from site access status. Graphics and photos of site equipment can also be integrated into Workspaces.

6.1. Workspace files versus Configuration files

The ***Workspace*** is the view or Graphic User Interface (GUI) that is created by users to make the site information easier to visualize and understand. Workspaces can be saved to your computer with file names like Eagle-Mtn-iPad-View.dvw. When uploading the Workspace files to a Cortex, they can be sent with the .dvw extension OR with a .zip extension (to save data bandwidth, if necessary). The Cortex can process both types of files.

The ***Configuration*** is made up of the different settings, addresses and commands that tell the Cortex what it has to do and in what order. It also is saved as a computer file, with a name like Site123.cfg. This file is also downloaded as a .zip file to conserve bandwidth.

NOTE: In Davicom's Cortex series, contrary to the previous generation of products, Workspaces can now reside in the Cortex unit itself. This feature not only eliminates the obligation of managing workspace sharing among users of a unit, but it also allows any (authorized) user to connect and have a readily-available workspace that can be matched to his requirements. It is nevertheless strongly suggested to make backup copies of workspaces (and unit configurations) in your PC to avoid losses in case of unit failure or of a site catastrophe. See ***Saving Workspaces*** below for information on saving workspaces.

6.2. Pre-loaded workspace

The Cortex comes with one pre-loaded workspace that can be used right away to help you get started. It can be used as a base and modified or cloned to customize your own GUI.

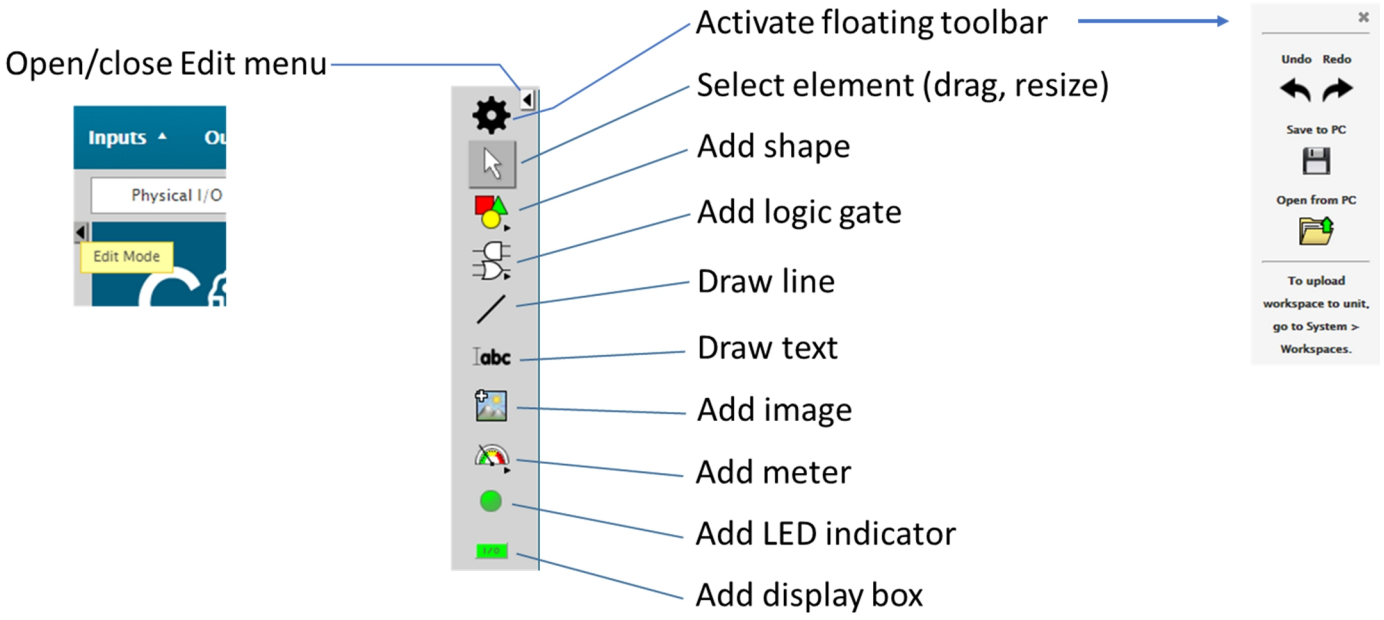
6.3. Editing and creating workspaces

You can create or modify workspaces using the built-in graphic design capabilities of the Cortex. Here are some of the unit's capabilities:

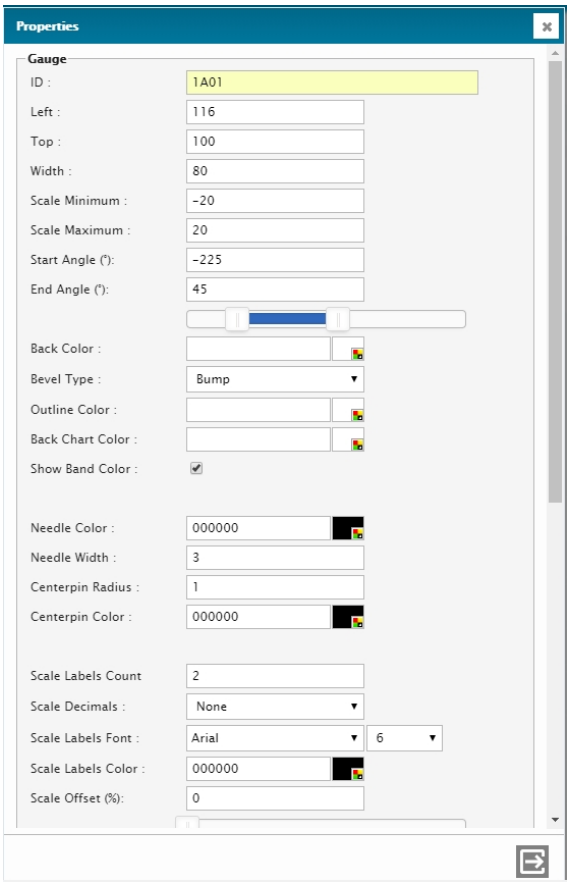
- Bulk edit grouped graphic elements
- Rotate graphic elements at 1° increments
- Activate (***turn on***) or deactivate (***turn off***) two images based on an I/O's ***Normal*** and ***Active*** states
- ***Set-to-front*** and ***Set-to back*** stack levels for images, graphic elements, and text
- Associate any I/O with any image, graphic element, or text
- Use of the most standard image formats (jpg, gif, png, bmp, svg, etc.)
- Use transparent ("cut-out") images
- Use a background image
- Resize of graphic elements and images, with no loss of quality (vectorization)
- Simple and easy "Drag & Drop" and "Copy - Paste"

To edit a workspace, you must be logged-in to a Cortex, but it is not required to be in control of the unit.

To create or edit a workspace, click on the small arrow found on the left side of the screen: this will activate the ***Edit Mode***. An edition menu will appear. This menu contains the tools you need to built workspaces.



Once you have added an object, right-click on it and then open the Object Edit menu. You can then complete the fields as required, the most important one being the ID field where you must enter the Input ID of the reading in the Cortex that you wish to connect to this graphic object.

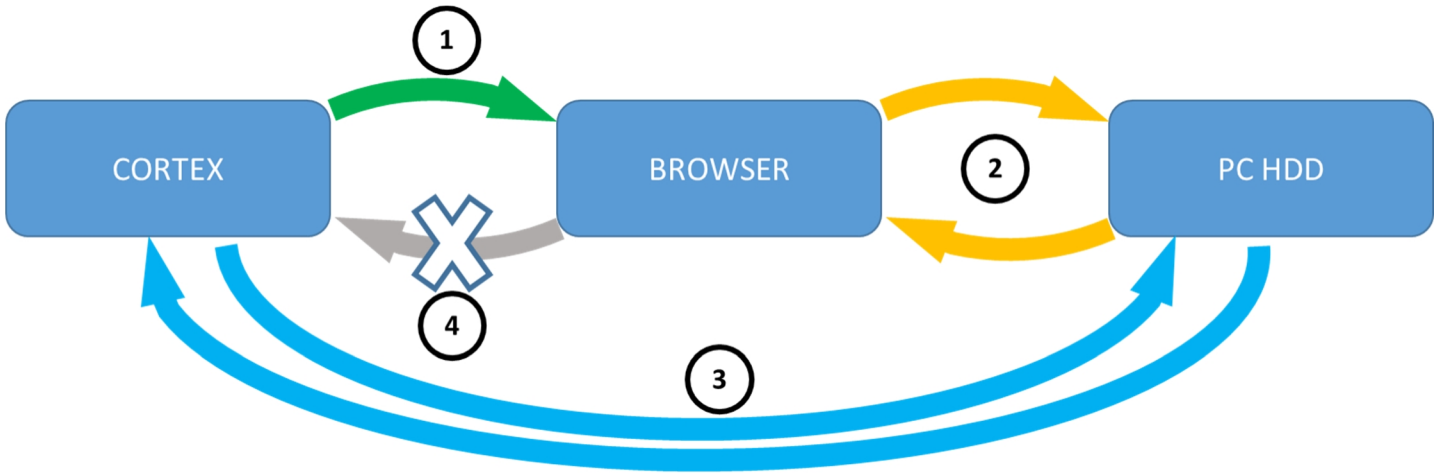


6.4. Workspace Transfers

The illustration below shows the relationship between the different locations where Workspaces can be stored and how they are transferred between the different elements of the system.

Upon initial connection to a Cortex unit, the Workspace is automatically downloaded to your PC's Web browser. The actual Workspace is selected from your user profile in the Cortex when you log-in. This process is similar to what happens when you connect to a remote web site and the site's Web Server sends the web pages for display on your computer. The Cortex's Web Server sends you your personal page. This is shown by (1) in the illustration. Note that it is NOT possible to transfer a workspace directly from your browser to the Cortex as shown by (4).

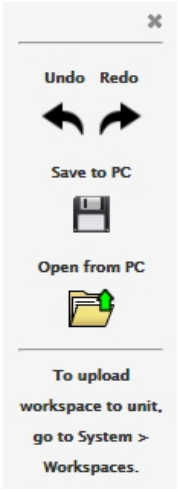
While working with Cortex units and customizing a Workspace, the Workspace itself will reside within the Web Browser's active memory (or in DavLink, if you aren't using a browser). This is the "live" view you see when connected to a Cortex or editing a Workspace. You can save workspaces to your computer's disk drive (HDD or SSD) for archiving and eventual transfer to a Cortex. You can also load a workspace from your computer disk into your browser. This process is shown by (2). This locally-loaded Workspace can even replace the Workspace initially sent to you by the Cortex in (1). Note that upon a subsequent re-connection to a Cortex, or following a Browser Refresh command (F5), your active Workspace will be downloaded from the Cortex once again, and your locally-originated Workspace will be overwritten. So loading (2) will overwrite (1) in your browser.



Workspaces are uploaded and downloaded between your computer and the Cortex through the **System-Workspace** drop-down menu that was explained in Section 4.2.7.

6.5. Saving Workspaces

When creating a workspace, it is not actually being built in the Cortex itself, but rather both from the Cortex's webserver and the computer's web browser. ***It is therefore important to periodically save the workspace as it is being built.*** If the browser (or DavLink 6) is closed without previously saving the workspace, the workspace creation/edition work will be lost. Once the design is completed, the workspace can be uploaded to the Cortex unit.



To save a workspace, it must first be saved to your PC from the Floating Toolbar. If this Toolbar is not visible, activate it with the Gear Icon on the Edit Menu.

This ***Save to PC*** function is actually a Browser download function and will automatically download a file called default(#).dvw to your PC's download location. If you wish to change this location, you can do so in your browser settings.
For example, in Chrome:

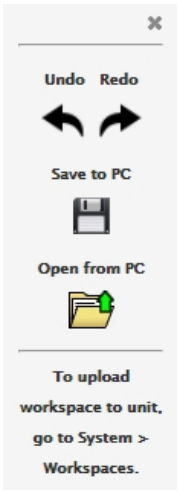
- At the top right, clink on the 3 dots
- Click on Settings
- At the bottom, click Advanced.
- Under the "Downloads" section, adjust your download settings: To change the default download location, click Change and select where you'd like your files to be saved.

Note that you can change the filename to ensure easier management of your records.

Once files are stored on your computer, they can be transferred to the Cortex with the ***System/Workspace*** menu as described in Section 4.2.7.

6.6. Loading a Workspace

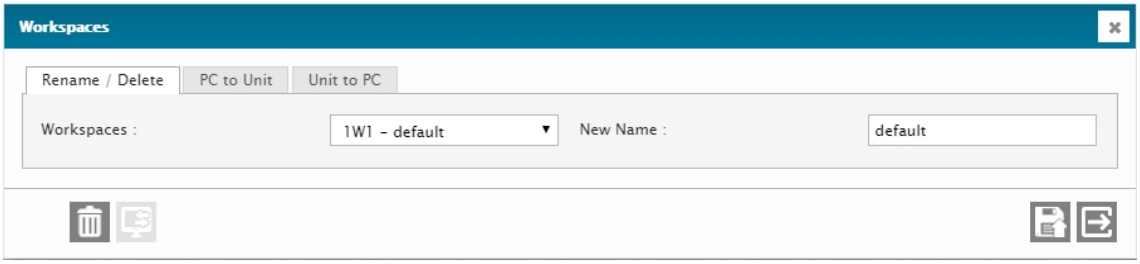
To load a Workspace from your PC, use the ***Open from PC*** button on the Floating Toolbar.

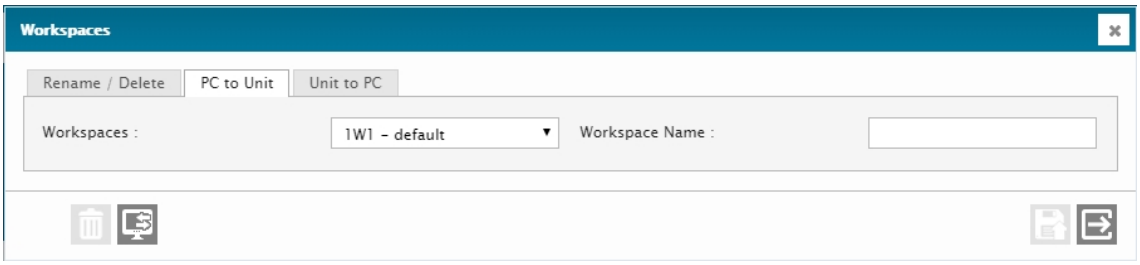


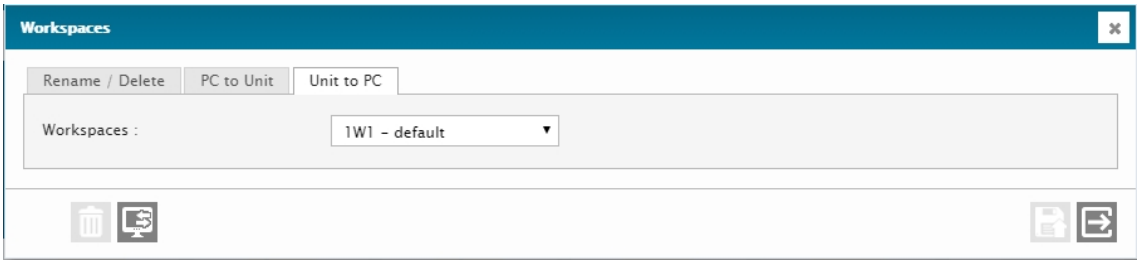
You will be asked if you wish to merge this new Workspace with the one already being used. If you answer yes, the new Workspace will be added as new Tabs in the browser's display.
After being asked if you wish to merge your Workspace, you will be asked to select the file that you wish to open from your computer's file browser. Select the file and it will then be loaded into the browser for display.

6.7. Uploading and Downloading Workspaces to and from a Cortex

The **System>Workspaces** drop-down menu has previously been explained in section 4.2.9







Appendix A Factory Reset

In the event that a reset of the unit to factory default settings should be required or desired, follow the procedure corresponding to your Cortex:

Cortex-360

1) Power cycle the unit

2) Once you have reconnected the power wait for about 15-20 seconds until the 3 blue LED's light up. At this point, press and hold the LOCAL button until a reset menu appears on the LCD display.

3) Follow the instructions from there.

Cortex-320

1) Power cycle the unit

2) Once you have reconnected the power wait for about 15-20 seconds until the 3 blue LED's light up. At this point, press the LOCAL button until the activity LED blinks rapidly.

3) Press the Local button repeatedly to toggle between communication, user online and activity LED's and stop when the communication LED is on. At this point, press the PAUSE button to start the factory reset. The LOCAL LED will blink for a few seconds to confirm the reset operation has succeeded.

Appendix B Contact Information

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