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LMR & Public Safety Buyer's Guide

Rev. June 2024

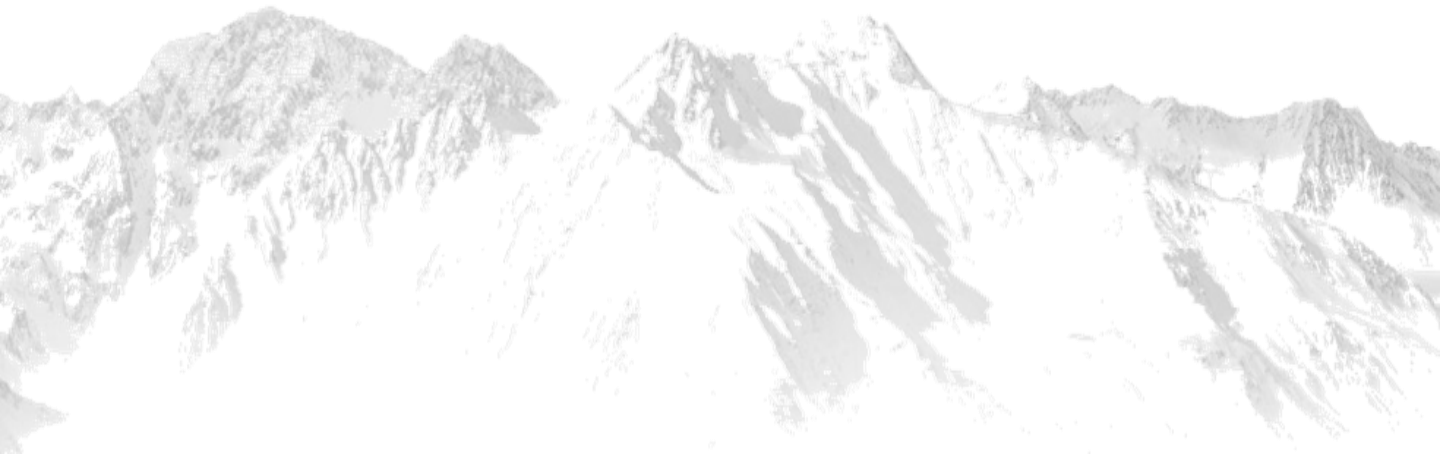

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Table of Contents

The guide is organized into 9 sections plus an Annex as described below:

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AXON

Smart, Stand-Alone I/O Modules With Alarms, Web GUI & SNMP Agent

Ideal for the following cost-effective GPIO applications:

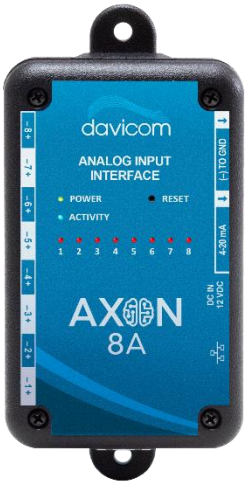
- Small sites that require minimal monitoring and/or control (For example small remote cabinets)
- Distributed and more granular monitoring such as environmental monitoring in multiple rooms of a building
- Single-repeater monitoring and/or control
- Conversion of legacy devices or sensors to add SNMP capability
- Smart automation by measuring analog voltages and controlling relays.
- I/O expansion of CORTEX units

AXON-8D

8 Digital Input Interface

AXON-8A

8 Analog Input Interface



AXON-5R

5 Relay Output Interface

Comes with:

12 VDC
Locking-Barrel
Power Supply

DIN rail
Mounting Bracket
(Specify if Required)

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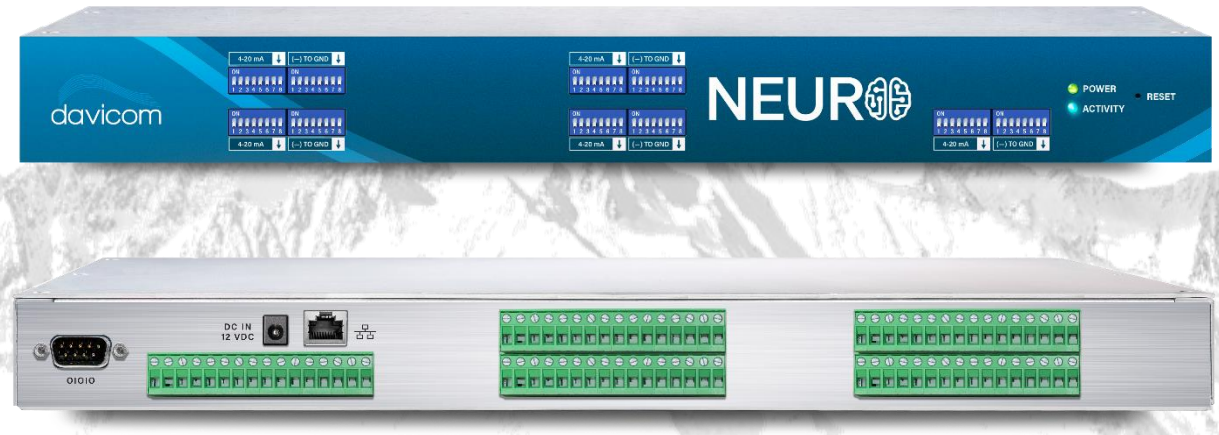
NEURO

Smart, Stand-Alone Telemetry Unit
With Customizable Input & Output Configuration

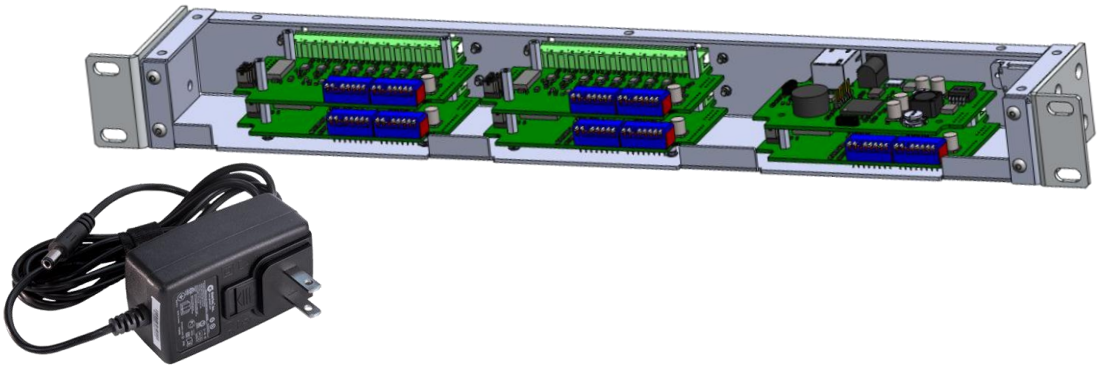


Ideal for the following GPIO Applications:

- Extensive I/O requirements for your repeater site monitoring. (Larger capacity than AXON units).
- Send text messages to supported radios to alert security agents or personnel that an alarm has occurred.
- Environmental monitoring through weather sensors
- Multiple Repeater monitoring and/or control
- Conversion of legacy devices or sensors to add SNMP capability
- IO Expansion of CORTEX units

To configure a NEURO, you need the base unit, which includes:

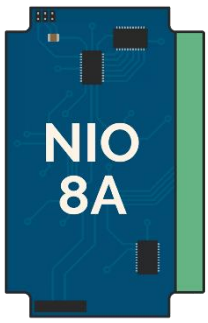
NEURO Chassis + Processing Unit + Power Supply



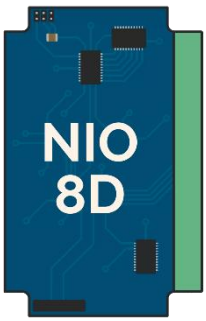
Then choose up to 5 NIO boards between the 3 following types of I/O boards*:

**Maximum of 2 Relay cards per NEURO

NIO-8D
8 Digital Input Board



NIO-8A
8 Analog Input Board



NIO-5R
5 Relay Output Board

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320 CORTEX

Complete Remote Site Management Solution With Customizable GUI, GPIO Interface, SNMP Manager & MODBUS Master

Advanced Site Management Solutions for:

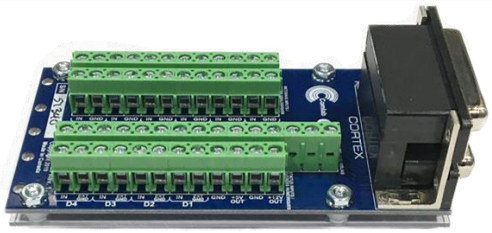
- Repeater sites where SNMP and/or Modbus monitoring and control are required. (Ex: Generators, UPS, Microwave Radios, etc)
- Transmission of pre-recorded audio messages through radios or local speakers during alarm situations
- Advanced Lightning storm awareness
- IP network monitoring with PINGs
- Powerful and customizable automation & troubleshooting
- Customizable user rights & workspaces per user

CORTEX-320-2/P

- 12 Versatile Inputs, 4 Opto-Isolated Inputs, 6 Relays
- Expandable with AXON & NEURO
- Up to 256 GETs, 256 SETs & 256 TRAPs *Add-on Purchase Required
- Up to 8 Modbus Devices

Comes with:

ILPS-5012N 12 VDC Power Supply with Neutrik Connector



DVIO320 I/O Board
2 x DB-25 Connectors

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360 CORTEX

4. The Most Powerful and Flexible SNMP Appliance. Monitor your complete network from a single location

High-end Management solution for:

- Very large sites where extensive monitoring, control and automation are required.
- Network Operations Centers to monitor and control any remote SNMP agent, including AXONs, NEUROs & other CORTEX devices,
- Advanced Lightning storm awareness.
- IP network monitoring with PINGs
- Transmission of pre-recorded audio messages through radios or local speakers during alarm situations
- Powerful and customizable automation & troubleshooting
- Customizable user rights & workspaces per user

CORTEX-360-2/P

- 8 Analog Inputs, 16 Opto-Isolated Digital Inputs, 8 Relays (Expandable with AXON/NEURO)
- Up to 1024 GETs, 1024 SETs & 5012 TRAPs *Add-on Purchase Required
- Up to 32 Modbus Devices

Comes with:

ILPS-5012N 12 VDC Power Supply with Neutrik Connector

DVIOK2 I/O Panel With 2 DB-50 cables, 2-meter length

Davicom Products Comparison Chart

Specifications	AXON	NEURO	CORTEX 320	CORTEX 360
Metering (Analog) Inputs	**AXON-8A:** 8, bipolar, differential, 12 bit resolution, ±0.5. ±2.5. ±5, ±10, ±20, +40 or -40 V, 1 MΩ, 4-20 mA mode.	Up to 40, see AXON specs	**12 Versatile Inputs** : Single-ended, 12 bits resolution, 0-5 or 0-60VDC, Can be used as Audio Rectifier or status input (Jumper selectable):	**8, bipolar, differential**, 12 bit resolution, ±0.5. ±2.5. ±5, ±10, ±20, ±40 +80 or -80 V, 1 MΩ, 4-20 mA mode
Status (Digital) Inputs	**AXON-8D:** 8 with separate internal or external grounds. Max input : ±65 V, 10 kΩ.	Up to 40, see AXON specs	**4 inputs**, with separate internal or external grounds. Max input : ±65 V, 22 kΩ.	**16 inputs**, see Cortex 320 specs
Outputs (Relays)	**AXON-5R:** 5, Form C. 70 VAC @0.4 A, 30 VDC @2A	Up to 10, see AXON specs	**6 Relays** (3 Form C and 3 Form A/B Relays with individually-selectable NO/NC dry contacts)	**8 Relays**, Form C. 70 VAC @0.4 A, 30 VDC @2A
Expandable?	No	No	Yes (up to 256A, 256D, 256R)	Yes (up to 256A, 256D, 256R)
Audio Inputs/Outputs	0	0	**1 Audio Input/Output** Back-panel audio connector can be configured as either an input (for remote listening via dial-up & IP streaming), or as an output for audio alarm message transmission. Streaming sampling rate: 8kS/s to 48kS/s;	**2/1** streaming Via dialup & IP. Streaming sampling rate: 8kS/s to 48kS/software selectable. Impedance: Line-in:29k Ω, Mic in:2.9k Ω
Alarms	Email/SNMP TRAP/INFORM	Email/SNMP TRAP/INFORM/Radio	Voice/SMS/E-Mail (with TXT & XML attachments)/SNMP TRAP/Smartphone Notification/Pager/ FAX/DavNet (Dial-up & IP).	
Auxiliary DC Outputs	Optional*		5 VDC @ 500mA max, 12VDC @ 500mA max	
Alarm Call Lists	5		10	
Protocols (OSI Layers)	1 : EIA RS-232, 10BASE-T, 100BASE-T 2 : Ethernet , MAC 3 : ARP, ICMP, IPv4 4 : TCP, UDP 5 : Raw Socket 6 : DTLS, TLS 1.2, TLS 1.3, SSL 7 : CoAP over DTLS, DNS, HTTP, HTTPS, Modbus/TCP, SMTP over SSL/TLS, SNMP Agent v1/v2c/v3, SNTP		HTTP, HTTPS, SNMP, FTP, DHCP, SMTP, DNS, NTP, MODBUS	
Backhaul Modes	Ethernet, Cellular-data, Satellite		Dial-up, Ethernet, Cellular-data, Satellite, 2-way radio link	
Dial Up Modem	No		Yes (Optional)	

Specifications	AXON	NEURON	CORTEX 320	CORTEX 360
Jobs	4		No	
Virtual Logic Gates	Integrated in Math Functions (8)		128	
Virtual Relays	No		128	
Event schedulers	8		64	128
Math Functions	8		16	32
Remote Commands (Outbound)	8		128	128
Counters	8		16	32
Activity Monitoring	8		16	32
Network Pings	0		32	64
SNMP Agent	Yes (v1/v2c/v3)		Yes (v1/v2c/v3)	
SNMP Manager	No		Yes	Yes
GET/SET/TRAP Commands	No		8 included (Up to 256 Optional)	128 included (Up to 1024 Optional)
Modbus Slave Mode	Yes		No	
Modbus Master	No		Yes (up to 8 Slaves)	Yes, 8 included (Optional up to 32 Slaves)
Ethernet ports	1		1	4
USB Ports	No		2	4
Power Supply Inputs	1 (2.1 mm locking barrel connector)		1	2 (Redundant)
Power Supply	8-30 VDC. Typ 110 mA @ 12DVC. Max 190 mA with 5 relays energized @ 12 VDC.	8-30 VDC. Typ 150 mA @ 12DVC. Max 300 mA with 10 relays energized @ 12 VDC.	12VDC, 200mA Typical. 275 mA with all relays energized. 24 or 48 VDC options available.	8-30 VDC. Dual inputs. Typically 300mA with all relays energized. . 48 VDC option available
Serial I/O	No	Yes	Yes	Yes
Operating Temperature	0° to -70° C	-40° to +70° C	0-70°C (32°F to +158°F) (optional:-40°C to +80°C (-40°F to +176°F) range)	-40 to + 80°C (-40°F to +176°F) range)
Dimensions (W x H x D)	3" x 6" x 2"	19" x 12" x 1.75"	9.5" x 1.75" x 12"	19" x 1.75" x 10"
Mounting	Direct wall mount or DIN rail	19" Rack, 1 U	Half Rack-Width, 1 U	Rack mount, 1U
Weight	1 lbs	4 lbs	4 lbs	6 lbs

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AXON & NEURON

Basic Repeater Site Management Packages

- The HTML 5 Web GUI Allows Easy Configuration & Status List View
- Send Alarms via Email or SNMP TRAPs to an SNMP Manager
- Complete SNMP v1/v2c/v3 Agent to work with most NMS Systems
- Build Onboard Automation with Jobs, Schedulers & Math Functions
- Use Remote Commands to Control Relays on any Other Davicom Products
- Send alarm messages on KENWOOD NXDN radios

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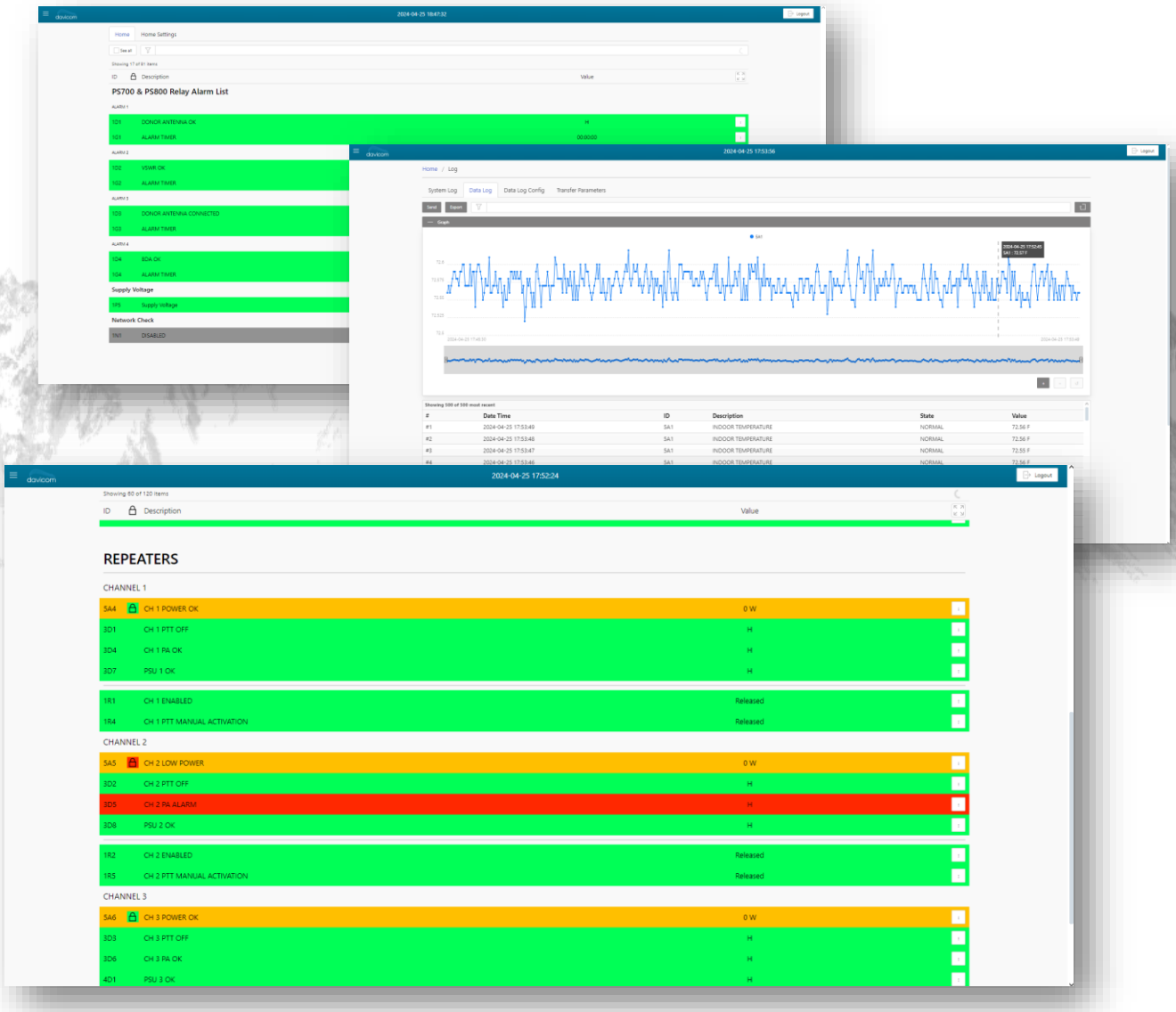
AXON & NEURON

GUI Examples



Single Repeater & Antenna VSWR Monitoring Package

This Solution Offers:

- Real-time Calculation of VSWR
- FWD Power Monitoring conditioned to when the Repeater is transmitting. ***Must Connect PTT Qualifier pin from Repeater.*
- Conversion of Repeater HI/LO status voltage to SNMP
- Transmission of Emails and SMS to Field Technicians
- Pre-Configuration, *Note that on-site VSWR sensor calibration is required*

AXON-1CH/VSWR

8 Analog Input Interface

1 x BPS-1050*

** 30-500MHz Bidirectional Power Sensor*

Antenna VSWR ONLY Monitoring Packages

These Solutions Offer:

- Real-time Calculation of VSWR
- SNMPv3 Agent & TRAP Alarms
- Transmission of Emails and SMS to Field Technicians
- Pre-Configuration, *Note that on-site VSWR sensor calibration is required*

AXON-VSWR-1

Single Antenna VSWR Monitoring

AXON-8A + 1 x BPS-1050*

AXON-VSWR-2

2 Antenna VSWR Monitoring

AXON-8A + 2 x BPS-1050*

AXON-VSWR-3

3 Antenna VSWR Monitoring

AXON-8A + 3 x BPS-1050*

AXON-VSWR-4

4 Antenna VSWR Monitoring

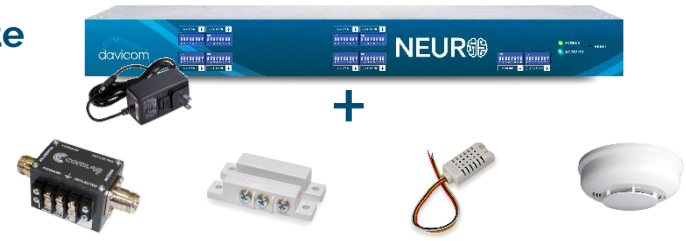
AXON-8A + 4 x BPS-1050*

** 30-500MHz Bidirectional Power Sensor*

Repeater Site Management Packages

Single Channel Site NEURO-1CH/P

NEURO + NIO-8A + NIO-8D + NIO-5R



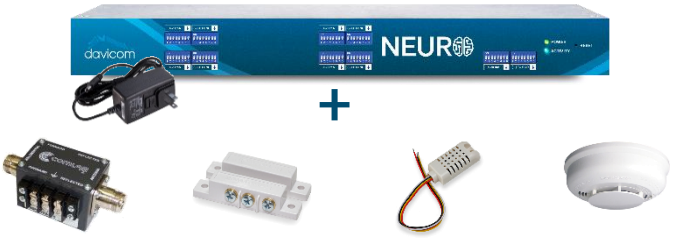
1 x BPS-1050* 1 x SMDC-1** 1 x THS-KIT*** 1 x PSA-1****

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion Smoke, AC Voltage

Two Channel Site NEURO-2CH/P

NEURO + NIO-8A + NIO-8D + NIO-5R



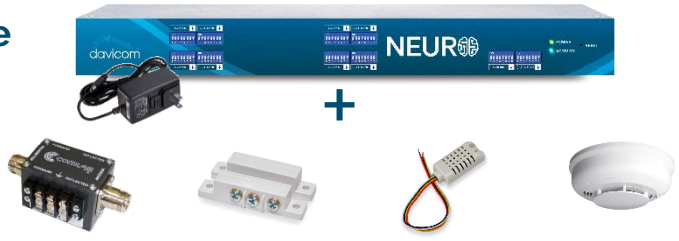
3 x BPS-1050* 1 x SMDC-1** 1 x THS-KIT*** 1 x PSA-1****

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion Smoke, AC Voltage

Three Channel Site NEURO-3CH/P

NEURO + NIO-8A + 2 x NIO-8D + NIO-5R



4 x BPS-1050* 1 x SMDC-1** 1 x THS-KIT*** 1 x PSA-1****

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion Smoke, AC Voltage

Additional Information

Auto Enable/Disable OR Transmit Tests can be achieved in Conventional mode

All Package come with a Basic Pre-Configuration

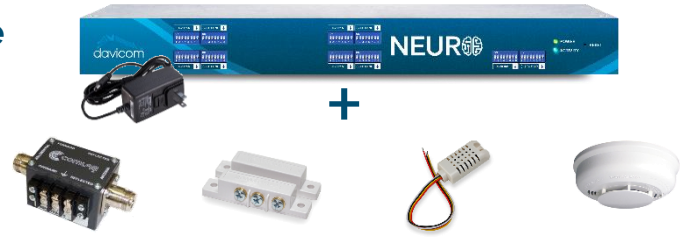
** BPS-1050 - 30-500MHz Bidirectional Power Sensor*
*** SMDC-1 - Surface-Mount Door Contact*
**** THS-KIT - Temperature & Humidity Sensor Kit*
***** PSA-1 - Photoelectric Smoke Alarm*

NEURO

Repeater Site Management Packages

Four Channel Site NEURO-4CH/P

NEURO + 2 x NIO-8A + 2 x NIO-8D + NIO-5R



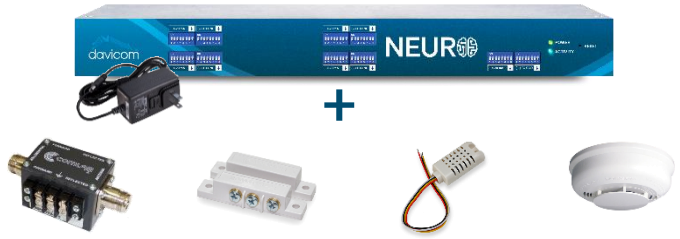
5 x BPS-1050* 1 x SMDC-1** 1 x THS-KIT*** 1 x PSA-1****

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion, Smoke, AC Voltage

Five Channel Site NEURO-5CH/P

NEURO + 2 x NIO-8A + 2 x NIO-8D + NIO-5R



6 x BPS-1050* 1 x SMDC-1** 1 x THS-KIT*** 1 x PSA-1****

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion Smoke, AC Voltage

Additional Information

Auto Enable/Disable OR Transmit Tests can be achieved in Conventional mode

All Package comes with a Basic Pre-Configuration.

** BPS-1050 - 30-500MHz Bidirectional Power Sensor*
*** SMDC-1 - Surface-Mount Door Contact*
**** THS-KIT - Temperature & Humidity Sensor Kit*
***** PSA-1 - Photoelectric Smoke Alarm*

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8

SERIES

CORTEX

Advanced Repeater Site Management Packages with SNMP & Modbus

Cortex Units Offer:

- A Completely Customizable HTML 5 GUI
- A Powerful SNMP Manager & Modbus Master
- Network Monitoring with PINGs
- Design automation without a single line of code!
- A Complete SNMP v1/v2c/v3 Agent to work with most NMS Systems
- Up to 32 pre-recorded audio files to broadcast on radios & local speakers
- Plus much more

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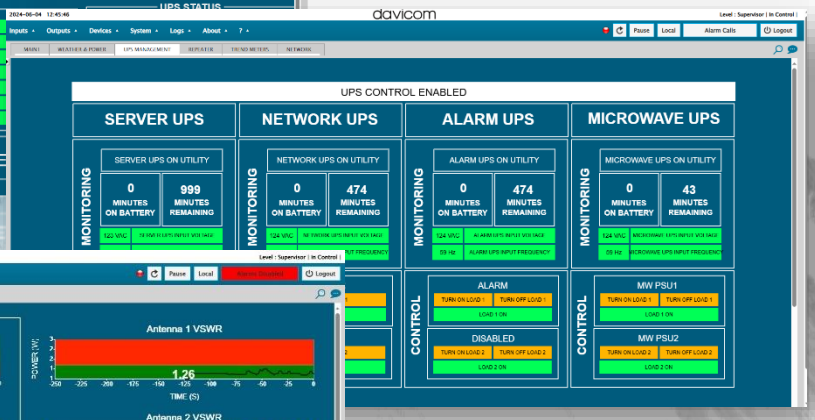
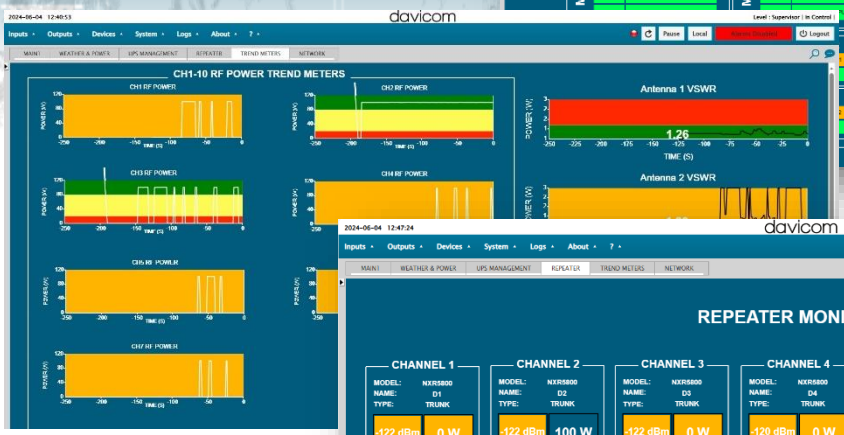
8

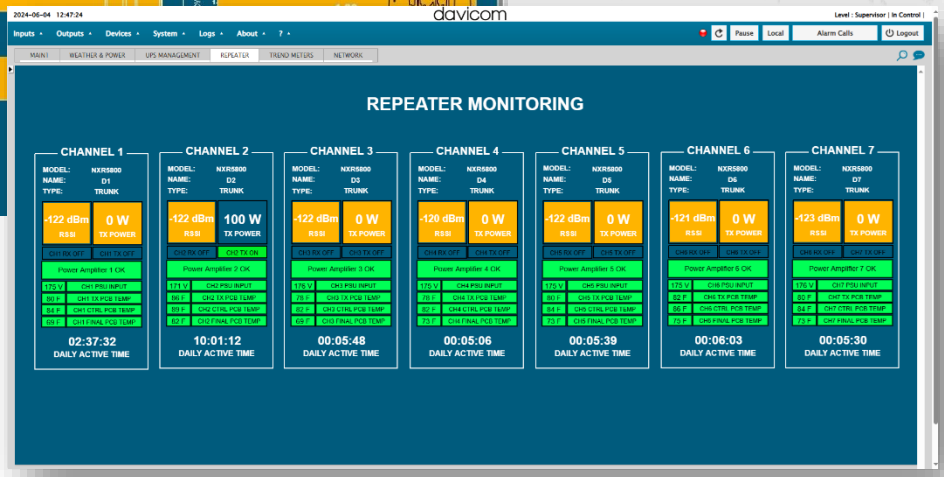
SERIES

CORTEX

GUI Examples







CORTEX

Advanced Repeater Site Management Packages

CORTEX-320-2/P & AXON-8D

Three Channel Site
CORTEX-3CH/P

3 x SDPM-1050
1 x BPS-1050

1 x SMDC-1** | 1 x THS-KIT*** | 1 x PSA-1****

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion, Water Leak, Smoke, AC Failure

CORTEX-320-2/P & AXON-8D

Four Channel Site
CORTEX-4CH/P

4 x SDPM-1050*
1 x BPS-1050*

1 x SMDC-1** | 1 x THS-KIT*** | 1 x PSA-1*

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion, Water Leak, Smoke, AC Failure,

CORTEX-320-2/P & NEURO + 2 x NIO-8D

Five Channel Site
CORTEX-5CH/P

5 x SDPM-1050
1 x BPS-1050

1 x SMDC-1 | 1 x THS-KIT | 1 x PSA-1

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion, Water Leak, Smoke, AC Failure,

Additional Information

Auto Enable/Disable OR Transmit Tests can be achieved in Conventional mode

All Package comes with a Basic Software Pre-Configuration. Ask Davicom if you need more advanced/specific pre-configuration or SNMP integration

** BPS-1050 - 30-500MHz Bidirectional Power Sensor*
** SDPM-1050 – Single Direction Power Sensor*
*** SMDC-1 - Surface-Mount Door Contact*
**** THS-KIT - Temperature & Humidity Sensor Kit*
***** PSA-1 - Photoelectric Smoke Alarm*

Rack Mount Tray, Power Supply & IO Interface included.

CORTEX

Advanced Repeater Site Management Packages

CORTEX-320-2/P & NEURO + 2 x NIO-8D

Six Channel Site
CORTEX-6CH/P

+


6 x SDPM-1050*
1 x BPS-1050*


1 x SMDC-1**


1 x THS-KIT***


1 x PSA-1****

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion, Water Leak, Smoke, AC Failure,

CORTEX-320-2/P & NEURO + 2 x NIO-8A + 2 x NIO-8D + NIO-5R

Ten Channel Site
CORTEX-10CH/P

+


10 x SDPM-1050*
2 x BPS-1050*


1 x SMDC-1**


1 x THS-KIT***


1 x PSA-1****

This solution offers:

PTT Qualifier, FWD Power, Ant. REV Power, VSWR, DC Voltage for PSUs Temp, Humidity, Intrusion, Water Leak, Smoke, AC Failure,

OPTIONAL ADD-ON

SNMP-PLUS Upgrade
Upgrade GET/SET/TRAPs from 8 to 64

SNMP PLUS

Additional Information

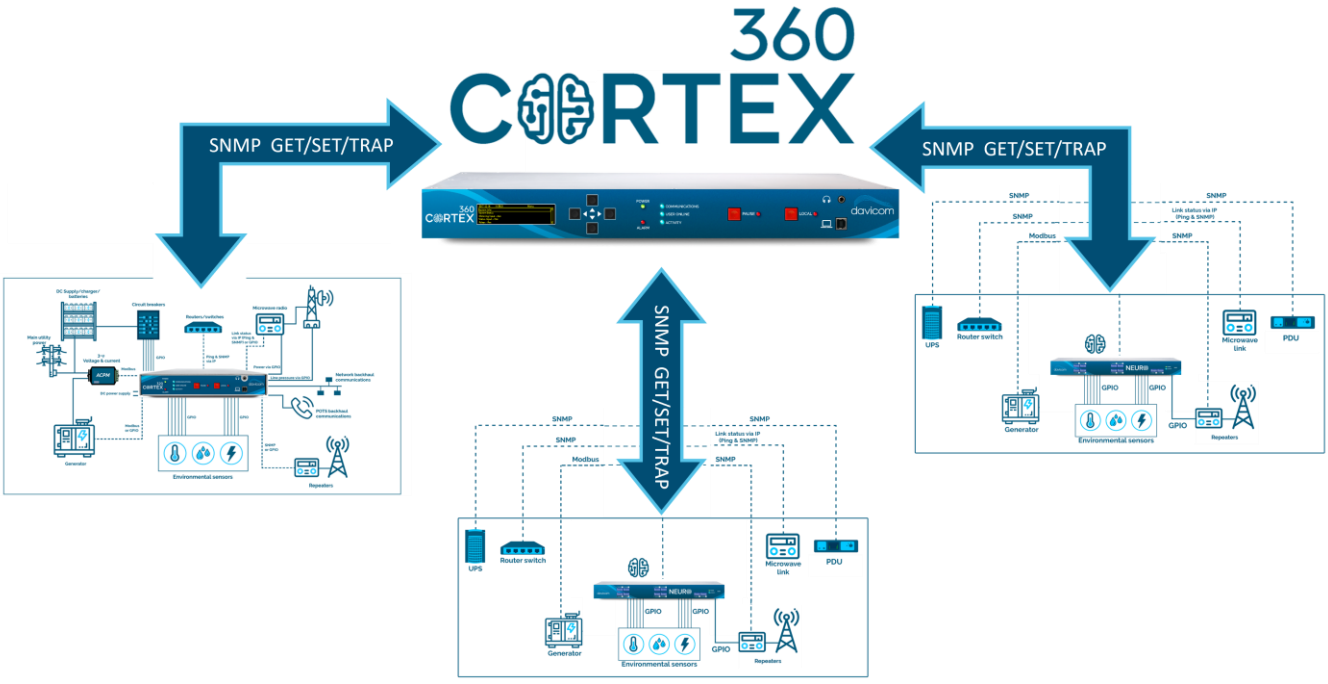
Auto Enable/Disable OR Transmit Tests can be achieved in Conventional mode

All Packages come with a Basic Software Pre-Configuration. Ask Davicom if you need more advanced/specific pre-configuration or SNMP integration

** BPS-1050 - 30-500MHz Bidirectional Power Sensor*
** SDPM-1050 – Single Direction Power Sensor*
*** SMDC-1 - Surface-Mount Door Contact*
**** THS-KIT - Temperature & Humidity Sensor Kit*
***** PSA-1 - Photoelectric Smoke Alarm*

Rack Mount Tray, Power Supply & IO Interface included.

Network Operations Center (NOC) SNMP Appliance with the CORTEX 360

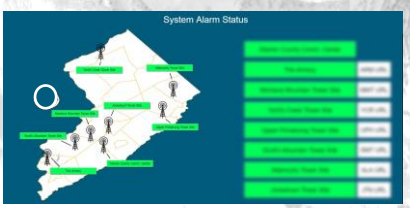


Cortex 360 Units Offer:

- All previously shown features in section 4
- A Complete SNMP v1/v2c/v3 Manager Capable of Monitoring up to 1024 GETs/SETs/TRAP Receivers.
- Up to 32 different user accounts with customizable access levels
- Up to 32 user-assignable visual workspaces
- Visualize all data from a single monitoring unit

Network Operations Center (NOC)
SNMP Appliance with the CORTEX 360

CORTEX-360-2 + PSU



*** *Ask Davicom for pre-configuration help or SNMP equipment integration*

Add-ons

SNMP-PLUS Upgrade
Upgrade GET/SET/TRAPs from 128 to 256

SNMP PLUS

SNMP-PRO Upgrade
Upgrade GET/SET/TRAPs from 256 to 512

SNMP PLUS

SNMP-ULTRA Upgrade
Upgrade GET/SET/TRAPs from 512 to 1024

SNMP PLUS

Additional Sensors

Forward RF Power
Monitor FWD Power Of Repeaters (30-500 MHz)

Forward RF Power
Monitor FWD Power Of Repeaters (500-950 MHz)

Bi-Directional RF Power
Monitor VSWR at the Antenna Level (30-500 MHz)

Bi-Directional RF Power
Monitor VSWR at the Antenna Level (500-950 MHz)

Lightning Detector
Estimate Storm Distance

Lightning Counter
Count Lightning Strikes on Tower

3 Phase AC Voltage
For Utility Power & Generator

Fuel Level 1.5m
Measure Remaining Diesel Fuel in Tanks

Single Phase AC Voltage
For Utility Power & Generator

ANNEX

Field Application

NEUR

Repeater Monitoring

Two-way radio repeaters are unique and complex pieces of equipment. They sometimes aren't used for days or even weeks on end, but when they're needed, they must start-up instantly and retransmit the incoming radio signals. If lightning strikes, or the antenna gets damaged by a falling branch or ice during the repeater's off-period, the problem won't become apparent until the repeater is solicited for operation.

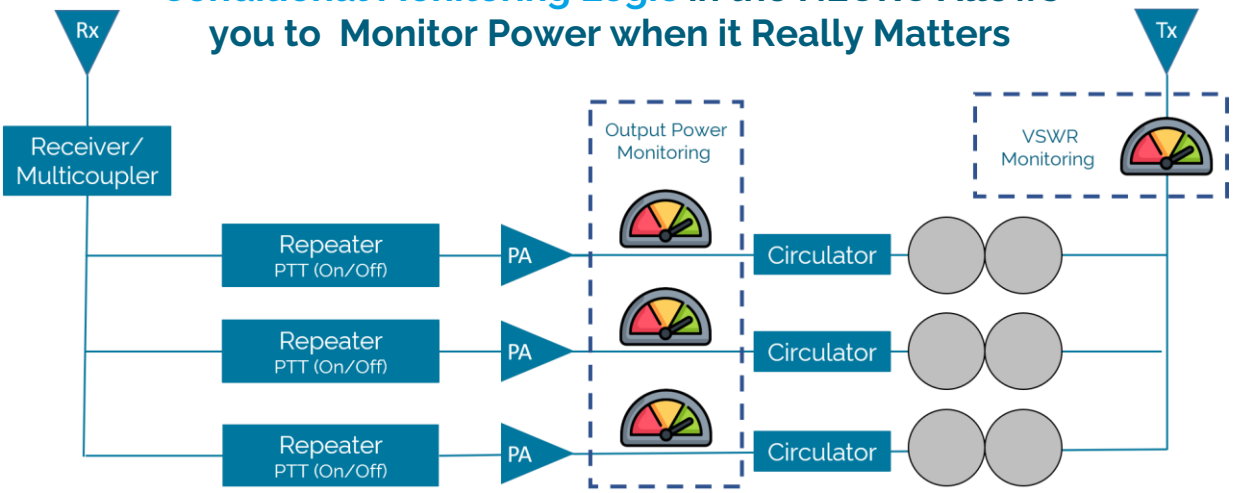
Compatible With The Best in the Industry

CODAN COMMUNICATIONS
L3HARRIS FAST. FORWARD.
ICOM
KENWOOD
MOTOROLA SOLUTIONS
tait communications

*Logos are the property of their respective owners

Kenwood NXR-5800

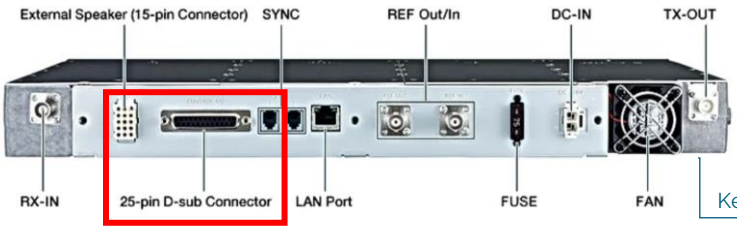
Conditional Monitoring Logic in the NEURO Allows you to Monitor Power when it Really Matters



Since a repeater isn't constantly transmitting, it is important to have the necessary logic to allow RF power monitoring only when the repeater is transmitting. We recommend 1 power sensor per repeater, and another one per antenna if the signal is combined for VSWR monitoring.

To achieve this, you need to locate or manually program a PTT Qualifier Pin on the repeater and connect it to a status input on the NEURO system.

Comlab RF Power Sensor

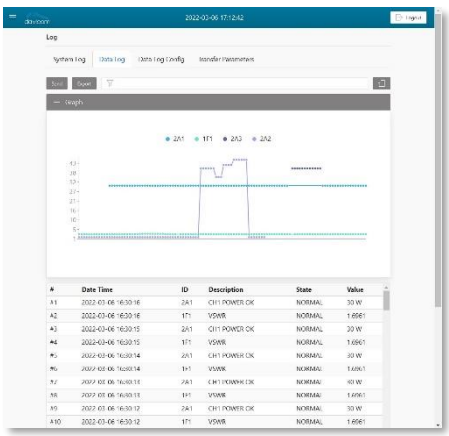


Most repeaters have the PTT status pin available on a rear-panel connector.

Kenwood NXR-5800

Data Logging Ensures Rigorous Tracking of Repeater Performances

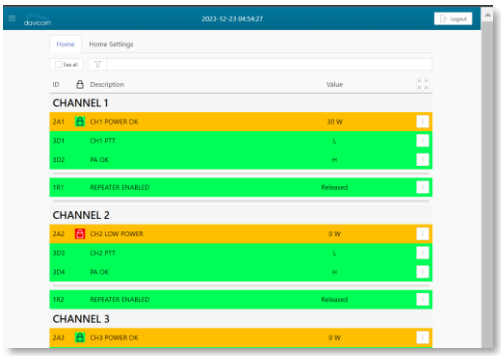
Conditional Logic is also available for data logging. Every NEURO system has a data logging capacity (buffer) of up to 4000 samples. The on-board graph utility allows you to visualize this data directly from the web browser, only showing you detailed sampling of the power when the repeater was transmitting. This way you can be sure the 4000 samples aren't populated with useless readings. Automatic log transfers can be configured to be sent to you by email when the 4000 sample buffer is close to maximum capacity.



The Detailed List View GUI Gives you Quick & Easy Knowledge About your Repeaters

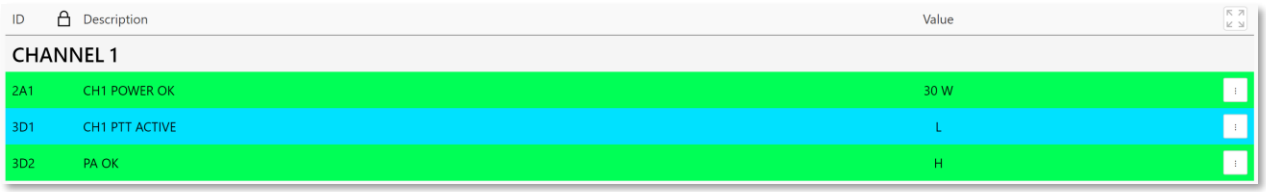
Group Information per Channel

Customize the list view to group your different channels with every monitoring point, such as the PTT qualifier, the PA's summary alarm, PSU status and Forward power. Furthermore, you can add a relay output card to any NEURO system to manually or automatically disable a channel when it fails.



What you see when a Channel Transmits

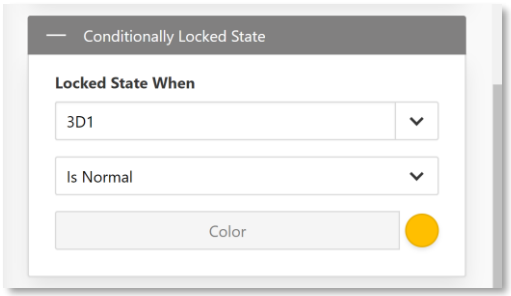
When transmitting, the PTT signal from the repeater enables power monitoring. The NEURO then makes sure the power doesn't fall below or rise above user defined threshold levels. If it does, color will change to red and the NEURO can be configured to send an alarm.



What you see when a Channel Doesn't Transmit

When not transmitting, the state of the channel's power will become locked by condition with a user defined color and display of the last transmission state, thanks to the color Lock Icon beside each input description.

Easy Configuration. Without a single Line of Code.



The PTT qualifier mechanism is very easy to implement in a NEURO system, thanks to our code free configuration approach. Simply go to the configuration of the analog input where the RF sensor is connected, and then go to the conditionally locked state section. Once the section is expanded, choose the status input where the PTT qualifier is connected, and it's ready to operate!