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Site Monitoring Systems by Comlab

DADS-01 AES/EBU Audio Detector Switcher	**Version 4.1** September 2015
Reference Manual	**MAN1026**

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AES/EBU Audio Detector Switcher

Reference Manual

www.davicom.com

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1 General Information

1.1 Limited Warranty

Comlab Telecommunications Inc. warrants all its products to be free from manufacturing defects 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 conditions exceeding the applicable specifications or ratings.

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 purchased units.

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.

1.2 Safety

The Davicom DADS-01 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 the DADS-01 or other equipment. Ensure that proper safety precautions have been taken before installing this DADS-01 and any associated equipment.

The DADS-01 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 DADS-01 should be performed by qualified technical personnel who are familiar with the unit. Note that the Davicom DADS-01 is designed for indoor use in a dry location, Installation and operation in other locations could be hazardous.

Depending on your installation, the DADS-01 may contain HIGH VOLTAGES. Exercise caution when working in and around the unit if it is connected to your site wiring.

1.3 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, and
(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.

2 Introduction

Davicom's AES/EBU Audio Detector Switcher (DADS-01) is designed to be used as an automatic or manual switch for AES/EBU digital audio signals. It offers all the necessary inputs and outputs so it can be controlled and monitored by other equipment such as the Davicom monitoring and control units (RTU). It can also be used as a standalone device.

The DADS-01 has sophisticated audio level detection algorithms that enable thresholds with delays to be programmed on each of its three input sources (2 digital, 1 analog).

The DADS-01 offers the following features:

- Normal and Low Level threshold settings on all input sources (0-99dBFS)
- Normal and Low Level delay on all input channels (0-99 s)
- Automatic or manual operation
- Rear panel monitoring and control I/Os
- USB port for connection to a PC or a Davicom RTU(DV-Micro, DV-Mini or DV-208/216)
- 2 digital audio inputs, 1 analog audio input, 1 digital audio output
- Test Tone -20 dBFS (1 kHz on Left channel, 400 Hz on Right channel)
- Audio pass-through in case of power supply failure
- Hardware Reset from rear panel connector
- Auto reset on low voltage supply detection
- Jumper selectable bypass on power-fail (AES IN1 or AES IN2 to AES OUT)
- Jumper selectable sampling rate on analog input (32 kHz to 192 kHz)
- Jumper selectable sensitivity on analog input

2.1 Specifications

Digital audio inputs	Type	Balanced
	Input impedance	110 Ω
	Connector	XLR (F)
	Suggested mating connector for EMC compliance	Neutrik NC3MXCC
Analog audio input	Type	Balanced or single-ended
	Input impedance	10kΩ or 600 Ω (internal onboard jumpers)
	Connector	Pluggable screw terminal
	Sensitivity	+24 or+20dBu at full scale
Digital audio output	Type	Balanced
	Load impedance	110Ω
	Connector	XLR (M)
	Level	3 Vp-p in 110 Ω
	Cable Type	STP (Shielded Twisted Pair)
	Suggested mating connector for EMC compliance	Neutrik NC3FXCC
Rear panel outputs	Level	TTL

	Connector	Pluggable screw terminal
	Output functions	Source selection
		Fault
Analog input sampling rates	Jumper selectable	32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz and 192 kHz
Supported sampling rates on AES inputs	Automatic detection	16 kHz, 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz and 192 kHz
Source switching	Manual or Automatic with prioritization	Priority assigned from rear terminals. Manual selection from front-panel buttons or through the USB port
USB interface	Function	Allows remote control and continuous alarm monitoring through a compatible Davicom RTU
Software remote control	Through Davicom RTUs	Source selection (1, 2 or 3)
		Normal/Low Level Limit
		Normal/Low Level Delay
		Manual/Auto Mode Selection
Manual control	Via front panel pushbuttons	Manual operation can be activated locally for debugging purposes
Power Fail Bypass	Function	AES IN1 or AES IN2 passively routed to the output
Power Supply	Voltage, Current	11-14 Vdc, 250 mA@12 V
Dimensions		1 RU: 8.5" x 1.5" x 12" half-rack unit (tray available)
Weight		1.0 kg (2.2 lbs)

Table 1. Specifications

3 Description, Installation & Connections

3.1 Hardware

3.1.1 Front panel

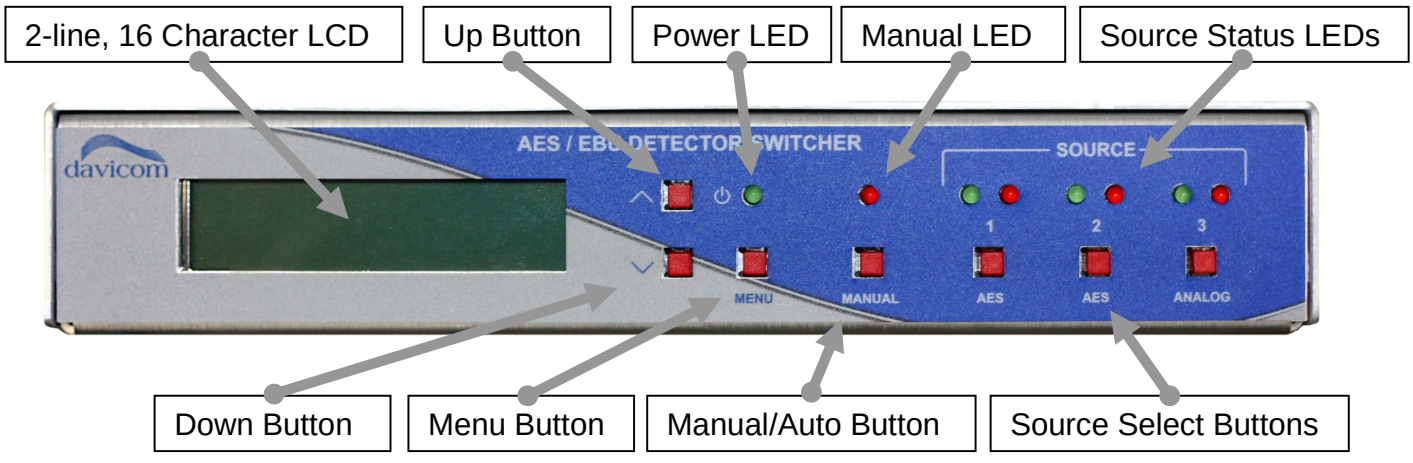


Figure 1. Front Panel

- 2-Line, 16 Character LCD: Backlit display shows input levels for each input source in Default Mode and displays menu settings in Menu Mode.
- Up Button ∧: scrolls forward through configuration menu in Menu Mode.
- Down Button ∨: scrolls backward through configuration menu in Menu Mode.

- Power LED: Indicates that unit is powered-up.
- Menu Button: Shifts to Menu mode when in Default mode and selects menu item when in Menu mode.
- Manual Button: Toggles between Manual and Automatic mode.
- Manual Mode LED: the red led is ON when in Manual Mode.
- 1,2,3 Buttons: In Manual Mode, selects one of the three input sources for output.
- Status LED: a green LED indicates the source that is currently selected (1, 2 or 3). A red LED indicates a fault with the corresponding source. Note that when the internal test tone is activated all green LEDs are OFF.

3.1.2 Rear panel & screw-terminal pinout

The DADS-01's rear panel has XLR female/male connectors for the digital audio input/output signals and screw terminals for the analog audio input and the source selection/fault out signals.

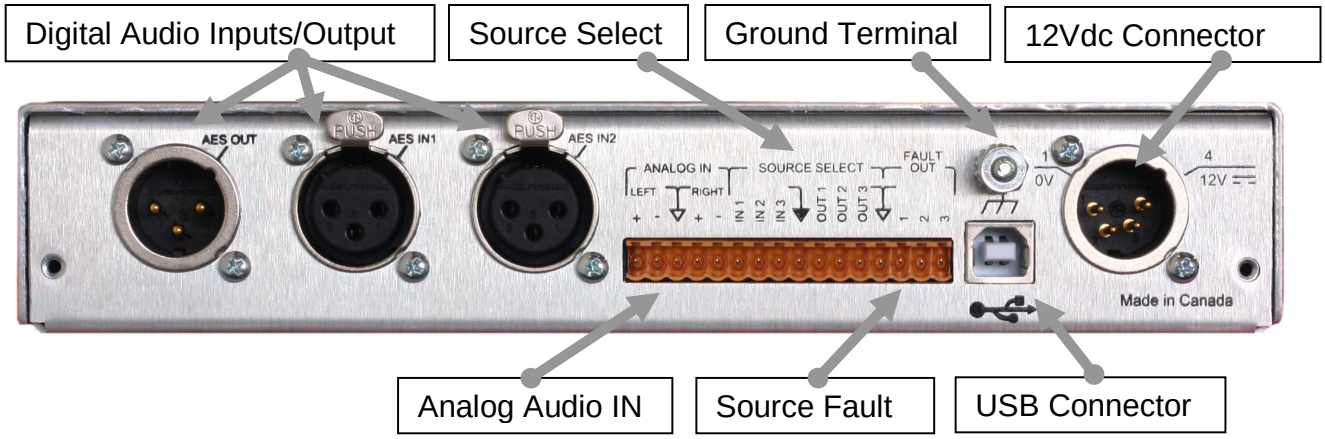


Figure 2. Rear Panel

- Digital Audio Inputs/Output: 3-pin XLR. The AES IN 1 and AES IN 2 inputs use balanced signals on STP (Shielded Twisted Pair). For maximum product performance, it is recommended to use the NC3FXCC or NC3MXCC shielded connector from Neutrik.

- Source Select In: In Manual Mode, a positive pulse on any of these inputs will select the corresponding source (1, 2 or 3). The Source Select In inputs are EIA compatible and opto-isolated. (-12 to 0.8 V = Low, 2.4 to +12 V = High). An internal pull-up can be put in circuit with a jumper for dry contact operation. The ground can be set to internal or external (isolated). The inputs are detailed in Figure 3.

  In Auto Mode, signals on these inputs can be used to change the sequencing order of the AES/ANALOG sources in case of signal loss. Normal sequence is: AES IN1, AES IN2 and ANALOG IN3. If a positive pulse is applied to IN2, the DADS will assign the highest priority to the AES IN2 input, then to AES IN1 and finally to ANALOG IN3.

Please refer to Table 2 for more details. However, automatic operation via the USB port only use the normal sequence.

	Source Sequencing order		
Pulse on Source select	**AES IN1**	**AES IN2**	**ANALOG IN3**
IN1	1	2	3
IN2	2	1	3
IN3	2	3	1

Table 2. Input sequencing order in case of signal loss

The IN1, IN2 and IN3 select inputs can also be used to issue a firmware/hardware reset to the DADS-01 when a positive pulse is applied simultaneously to the three inputs.

- Source Select Out: These outputs provide a level Low (0V) for the selected source (1, 2 or 3) and a level High (5V) for the other sources. The Source Select Out and Source Fault outputs share the same internal ground.
- Source Fault: These outputs provide a level Low (0V) when an input source is at fault.
- Ground Terminal: Chassis ground lug.
- 12Vdc Power Connector: Davicom standard XLR power connector. The corresponding female XLR connector is supplied with the DADS-01's accessories.
- USB Communications (Type B) Connector: Connector for interface to a Davicom RTU or to a PC.

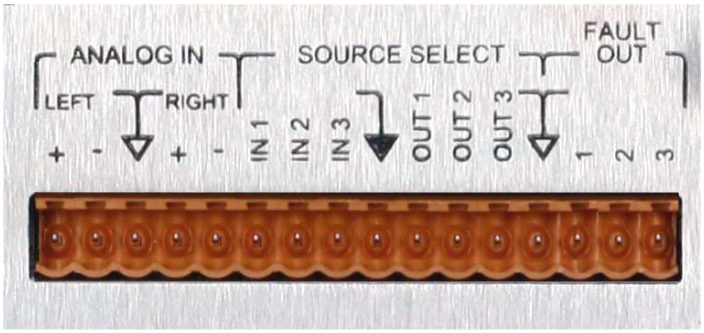


Figure 3. Audio and Monitoring/Control connections

- Analog Audio In: Plug-in screw terminal. Balanced audio input for Left and Right audio signals. Input impedance can be set to either 600 Ω or 10 kΩ with internal jumpers.

3.1.3 Cables, connections and accessories

Standard accessories include a USB cable, a 4-pin female XLR connector for 12Vdc power (+12V is on Pin 4 and Ground is on Pin 1) and one plug-in screw-terminal (16 positions) for the other signal connections.

3.1.4 Power supply

The DADS-01 operates from any standard 12Vdc Power Supply, such as the Davicom ILPS5012N, that can source up to 1A.

3.2 Hardware settings

Configuration of certain I/Os and operating parameters can be changed by means of internal jumpers. Although default settings should satisfy most requirements, it is recommended to check that these settings are appropriate for user's needs.
Refer to Figure 4 for jumper locations.

Analog Audio sampling rate

Default= 48 kHz

The analog input sampling rate can be set using jumpers JP18, JP19 and JP20 according to the following table:

SAMPLING RATE	JP18	JP19	JP20
32 kHz	0	0	0
44.1 kHz	0	0	1
48 kHz	0	1	0
88.2 kHz	0	1	1
96 kHz	1	0	0
176.4 kHz	1	0	1
192 kHz	1	1	0
48 kHz	1	1	1

Table 3. Jumper settings for the Analog Audio sampling rate

ANALOG IN configuration

Default position is: Differential

Left and Right channels of the ANALOG IN input can be configured as differential or single-ended inputs. Differential inputs are obtained by setting JP7 and JP10 to position "DIFF" and single-ended inputs with jumpers set to position "SE".

ANALOG IN impedance

Default position is: 10 kΩ

JP8 and JP11 are used to set input impedance (Zin) of the ANALOG IN channels to either 10kΩ or 600Ω. The impedance values are clearly indicated beside the jumpers.

ANALOG IN full-scale level

Default position is: +24dBu= 0dBFS

Full-scale levels of +24 or +20dBu are settable using jumpers JP12 to JP15. Level values are clearly indicated beside the jumpers.

Pull-up resistors on SOURCE SELECT inputs

Default position is: pull-up in

JP2, JP4 and JP6 are used to add an internal pull-up resistor on the Source Select inputs so that dry contacts can be used to prioritize the input source in automatic mode.

Ground for SOURCE SELECT inputs

Default position is: Internal

The ground for the SOURCE SELECT inputs can be set to internal or external using JP5. The external ground setting can provide complete ground isolation since the terminals are opto-coupled.

Power-fail AES bypass

Default position is: AES IN1

In case of power supply failure either one of the two AES inputs can be routed to the AES OUT connector. JP16 and JP17 are used to select AES IN1 or AES IN2 respectively.

Language

Default position is: English

JP9 is used to set the default language (English or French) for the LCD menu and the VT100 interface.

3.3 Software

The included CD contains the USB driver for the DADS-01 and an electronic version of this manual.The DADS-01 itself requires no other special software installation. It is normally delivered with its operating firmware pre-installed.

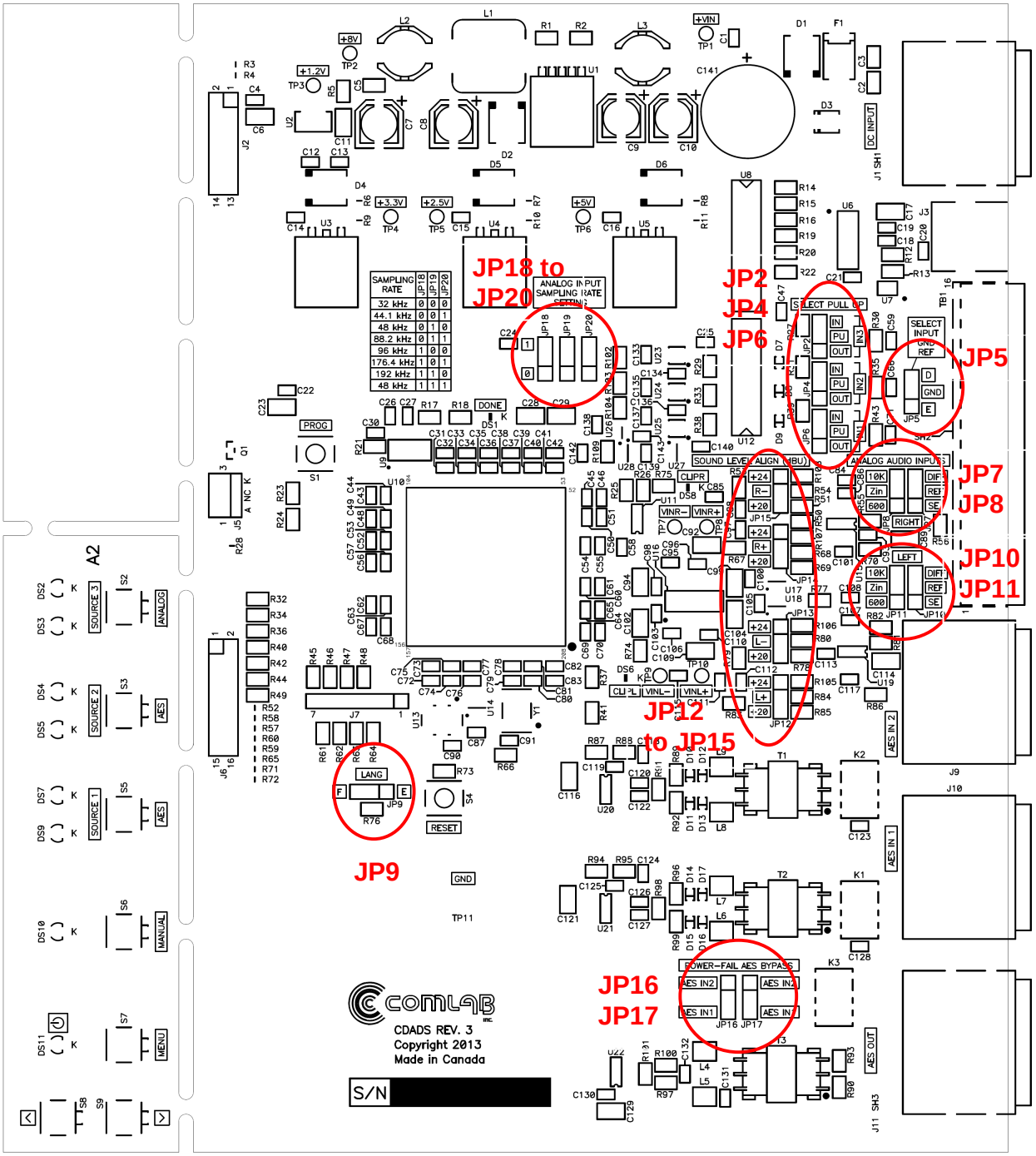


Figure 4. Printed Circuit Board Layout and Jumper Locations

4 Operation

The DADS-01 is an intelligent AES switcher that can route any of its AES inputs or its analog input (converted to the AES standard), to its AES output. Switching can be performed automatically or can be controlled remotely. The DADS-01 always scans all inputs (DIGITAL 1, 2 and ANALOG 3), checks the signal levels against the preset parameters and updates the status LEDs/Outputs accordingly.

In automatic mode, the input of highest priority is selected and if this input fails, the DADS-01 automatically switches to the next valid input. The DADS-01 switches back to the previous inputs when they return to normal.

The DADS-01 can be operated locally or can be remotely controlled either using its rear-panel I/Os or its USB port. It is important to mention that remote operation via the USB connector requires Davicom RTUs running firmware version 5.48 or higher. To update your firmware version, please go to the www.davicom.com website.

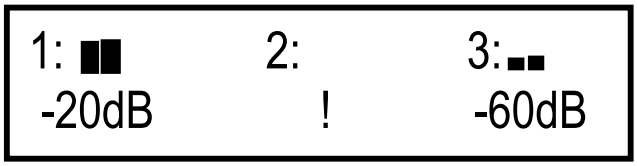
In case of power failure, all the settings are preserved except those regarding input prioritization in automatic mode. The DADS-01 is also equipped with a relay bypass by which one the two AES inputs is passively switched to the output according to JP16 and JP17 settings.

4.1 Local operation with front-panel display & buttons

4.1.1 Default display

This mode uses the front-panel LCD and 7 control buttons. This is for stand-alone operation where the DADS-01 status outputs are connected to external alarm monitoring inputs.

After the splash screen, the screen below shows the display that would typically appear on the DADS-01 during normal operation. The first line displays the input source numbers (1 and 2 for digital and 3 for analog) as well as a simple vertical bar graph indicator showing the levels of the left and right channel on each source.



The second line shows the highest audio level that can be found on the left or right channel for each input source. The minimum value that can be displayed for the digital inputs (1 and 2) is -140 dBFS and the minimum value for the analog input is approximately -105 dBFS.

The exclamation mark is used to indicate a problem with the associated digital input source. This happens in the case of an invalid stream or in the case of no signal.

4.1.2 Menu selection mode

Pressing the MENU button once will display the first menu item. Pressing the UP (or DOWN) button after the first MENU press scrolls to the next (or preceding) menu item. Pressing a second time selects that menu item and allows it to be modified by pressing the UP or DOWN buttons. The desired value being set, pressing MENU again will activate the setting and display the main menu. The table below presents the menu items in their order and their possible settings.

UP/DOWN steps	First press on MENU	Description / Value	
1	Test Tone	Activates test tone	Off or ON
2	CH1 Low Level	CH1 Low level threshold	0 to -99 dBFS
3	CH1 Normal Level	CH1 Normal level threshold	0 to -99 dBFS
4	CH1 Low Lvl Dly	CH1 Low Level Delay	0 to 99 s
5	CH1 Norm Lvl Delay	CH1 Normal Level Delay	0 to 99 s
6	CH2 Low Level	CH2 Low level threshold	0 to -99 dBFS
7	CH2 Normal Level	CH2 Normal level threshold	0 to -99 dBFS
8	CH2 Low Lvl Dly	CH2 Low Level Delay	0 to 99 s
9	CH2 Norm Lvl Delay	CH2 Normal Level Delay	0 to 99 s
10	CH3 Low Level	CH3 Low level threshold	0 to -99 dBFS
11	CH3 Normal Level	CH3 Normal level threshold	0 to -99 dBFS
12	CH3 Low Lvl Dly	CH3 Low Level Delay	0 to 99 s
13	CH3 Norm Lvl Delay	CH3 Normal Level Delay	0 to 99 s
14	Exit Menu		

Table 4. Menu items and description

1- Test Tone: outputs two signal tones, one at 1 kHz on the left channel and one at 400 Hz on the right channel.

2- CHX Low Level: signal level below which the input source will be considered in error (no audio).

3- CHX Normal Level: signal level above which the input source will be considered normal.

4- CHX Low Level Delay: the time the signal level must be below the low level threshold before declaring a fault.

5- CHX Normal Level Delay: the time the signal level must be above the normal level threshold before clearing a fault.

6- Exit Menu: exits the Menu selection mode and returns to the default display.

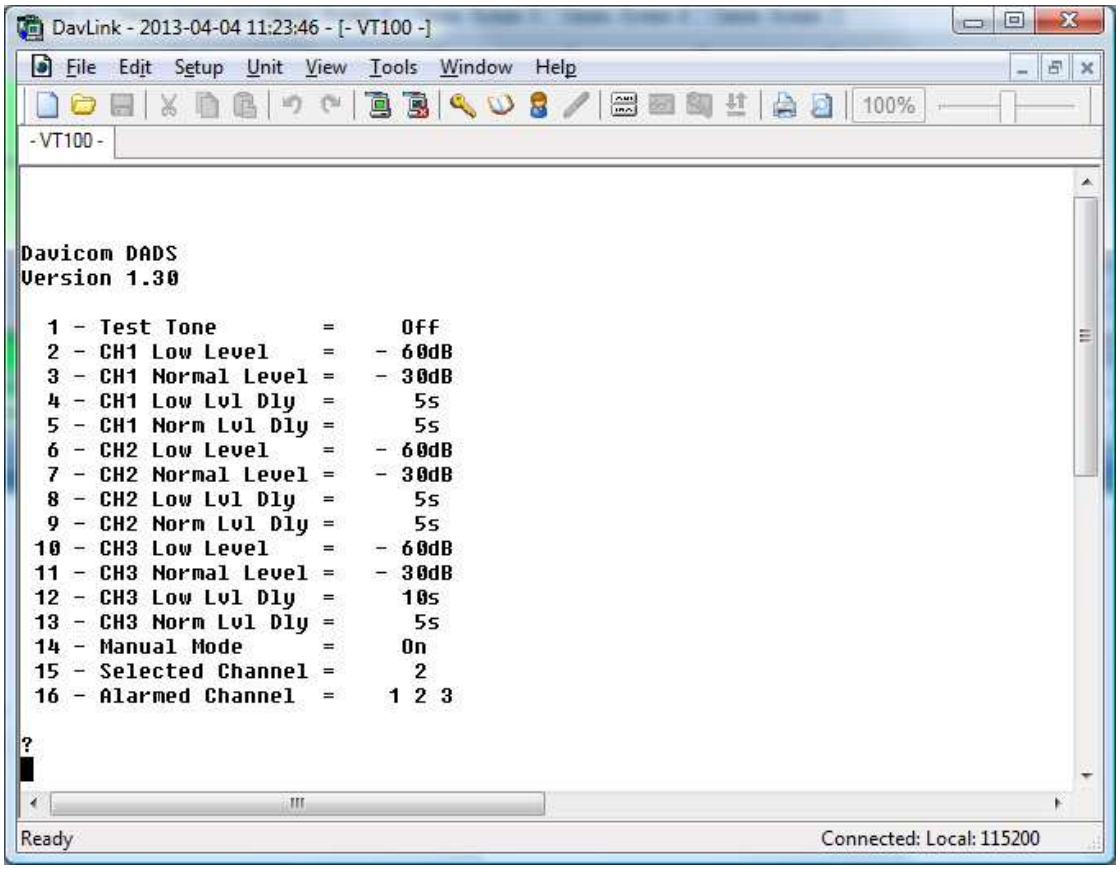
When the source does not meet its settings, an alarm notification is obtained from the corresponding status LED (red) on the front panel and from the SOURCE FAULT terminal associated to the source.

4.2 Local operation with a PC

The DADS-01 can also be operated locally through its rear-panel USB interface. This requires using a PC with a USB Port and a communications program such as HyperTerminal that is supplied with the Windows XP OS. Other equivalent terminal-type programs like TeraTerm can also be used. This mode of operation is known as the VT-100 mode.

You must also have previously installed the DADS-01's USB driver so that your PC can communicate with the DADS-01. This driver is included in the software package found on the CD supplied with the DADS-01 (see section 3.2).

The communications parameters that must be set in your communications program (HyperTerminal or equivalent) are: 115200 baud, No parity, 8 bits, 1 stop bit, no flow control and the appropriate COM port. Also make sure that the New Line Character is set to CR+LF in your communication program. Once communications is established, press any key and the following screen will appear.



To change any of the first 15 displayed parameters, enter the corresponding line number followed by “Enter”. Next, type the desired value for that parameter followed by “Enter”. The menu then refreshes itself displaying the updated value. Note: only positive numbers can be entered for line items 2,3,6,7,10 and 11 (without the – sign). Line items 1 and 14 toggle On or Off simply by typing the line number. Channels in alarm are shown on line 16.

4.3 Remote operation via rear-panel I/Os

Legacy Davicom RTUs or those running firmware version preceding 5.48 can be remotely interfaced thanks to the SOURCE SELECT and FAULT OUT terminals (those running version 5.48 or higher could also be interfaced in the same manner). Refer to section 3.1.2 for terminal function assignments.

In this mode, the DADS-01 has been designed to operate in automatic mode. Even if it is left locally in manual mode, the DADS-01 will revert to automatic mode after an 8-hour delay.

Note: The 8-hour timer is not factory activated for units destined to be operated via the USB port. Consult factory if this mode of operation does not satisfy your requirements or if your requirements have changed over time.

4.4 Remote operation via the USB port

Using the supplied cable, connect your DADS-01’s USB port to the rear-panel USB Port on any Davicom RTU (DV-Micro, DV-Mini, DV-208/216). As mentioned above, the monitoring units MUST be running Firmware Version 5.48 or higher.

Power-up the DADS-01 and wait a few seconds for it to automatically sync with the Davicom RTU. To connect to the DADS-01 through the RTU, first connect to the RTU in your usual way, start-up DavLink and log-on to your Davicom RTU.

Once logged-on, click on the Configuration icon in the DavLink Toolbar:

The following configuration window will appear. Select the Devices Tab

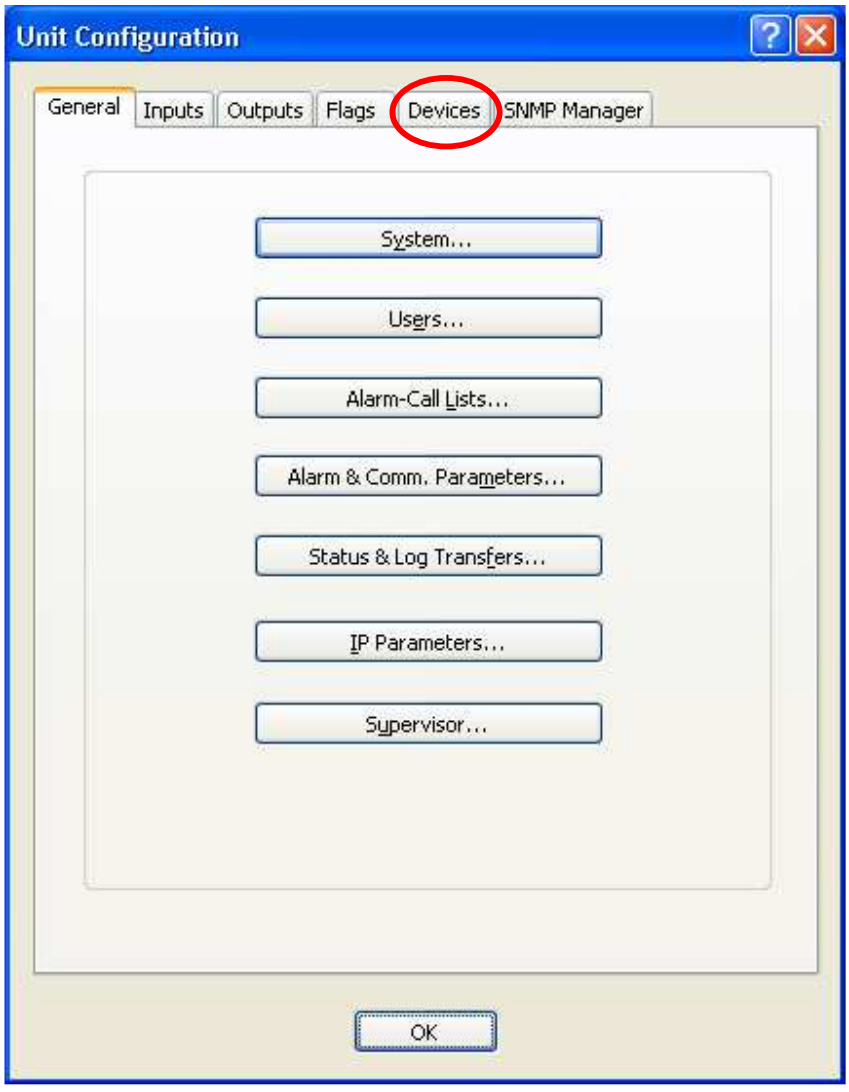


Figure 5. Davicom Configuration Window

Then click on the “Davicom Expansions” button as shown in Figure 6 below.

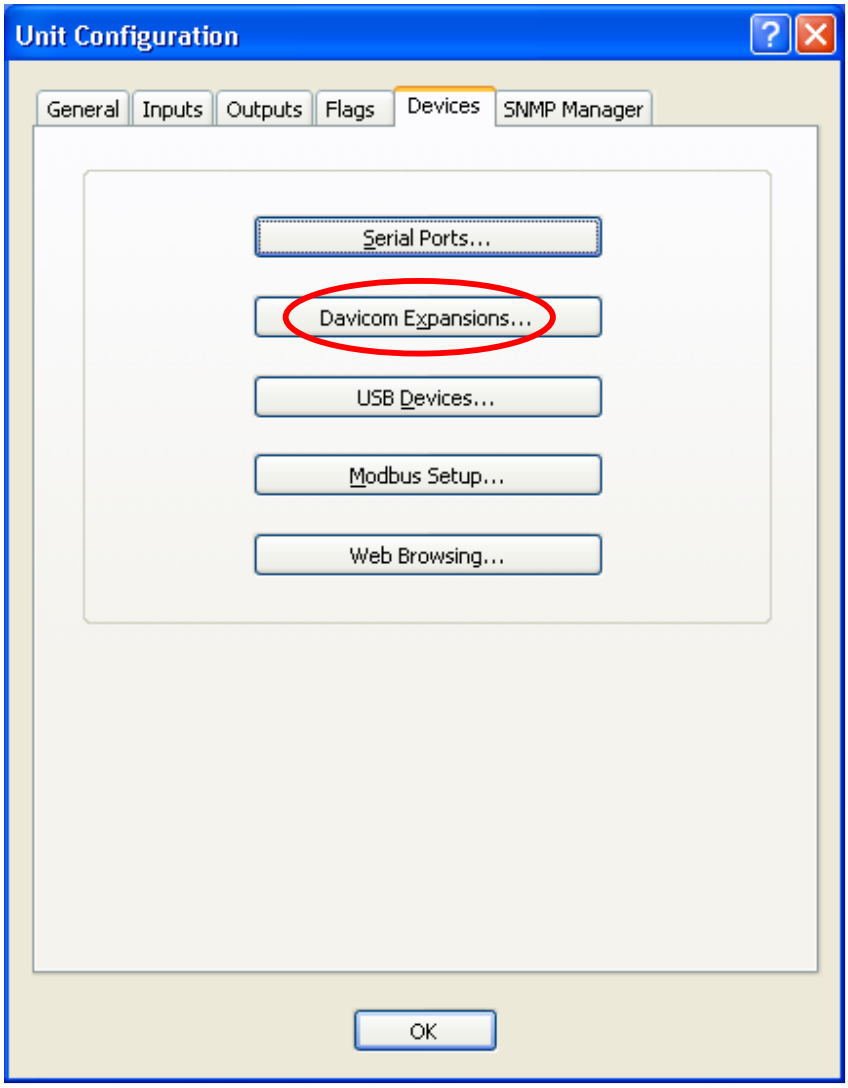


Figure 6. Devices Window

Clicking on the “Davicom Expansions” button brings-up the window of Figure 7 which allows configuration of the DADS-01 and all its settings:

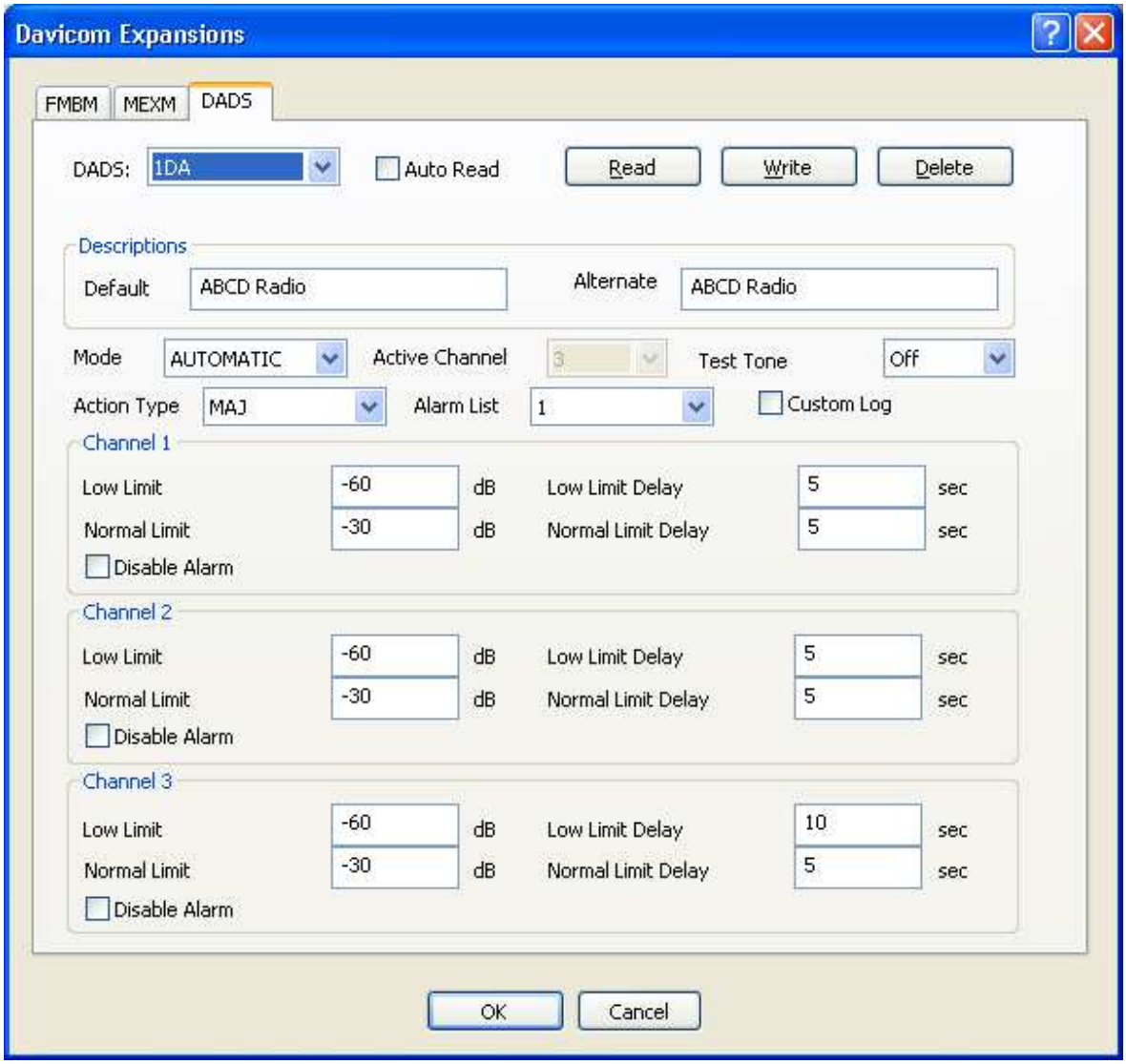


Figure 7. DADS-01 Configuration Window

If the DADS-01 was not connected or had not been detected by the RTU, a message at the top of the window would have indicated that no DADS-01 unit was connected.

DADS-01 drop-down list

The Davicom RTU can accommodate up to 4 DADS-01 units which are selected through the DADS-01 drop-down list.

Auto Read

Checking the Auto Read box ensures that the readings displayed in the DADS-01 screen are automatically refreshed every time a different unit is selected from the DADS-01 drop-down

list. Otherwise, the Read button must be pressed to refresh the display with the latest readings from the corresponding DADS-01.

Read & Write
Clicking on these buttons reads the data from the DADS-01, or writes data to the DADS-01 following any changes made in the configuration screen. The Write operation is necessary because changes made to the settings displayed on the screen are only present in your PC and aren't transferred to the connected DADS-01 until the Write button is pressed.

Descriptions (Default and Alternate)
These descriptions are used to identify the DADS-01 whenever alarms are sent or events are logged in the System Log. The Default description is in Unicode and can accommodate any compatible international alphabet. The Alternate description is in ASCII and is generally used for an English description. The RTU automatically copies the Default into the Alternate description if the Alternate field is empty and if the language is ASCII compatible.

Mode
Selects the Automatic or Manual mode

Active Channel
Indicates the currently selected input

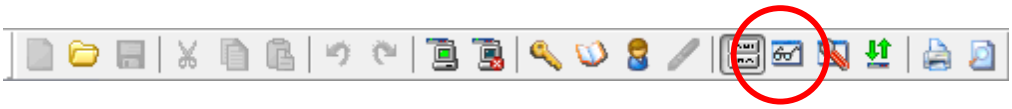
Test Tone
Turns the test tone On or Off.

Action Type
Defines which type of action will be performed when an alarm is declared (MAJ, MIN,CMD or QLF)

Alarm List
Defines which contact list (1 through 8) will be used when an alarm is declared.

Low limit, Normal Limit, Low Limit Delay, Normal Limit Delay
Refer to section4.1.2 for a complete description of these settings.

To view the current levels and alarm states of the DADS-01, go back to the DavLink main screen and click on the “View” (eyeglasses) icon as shown below.



This will display the screen as shown in Figure 8 below.

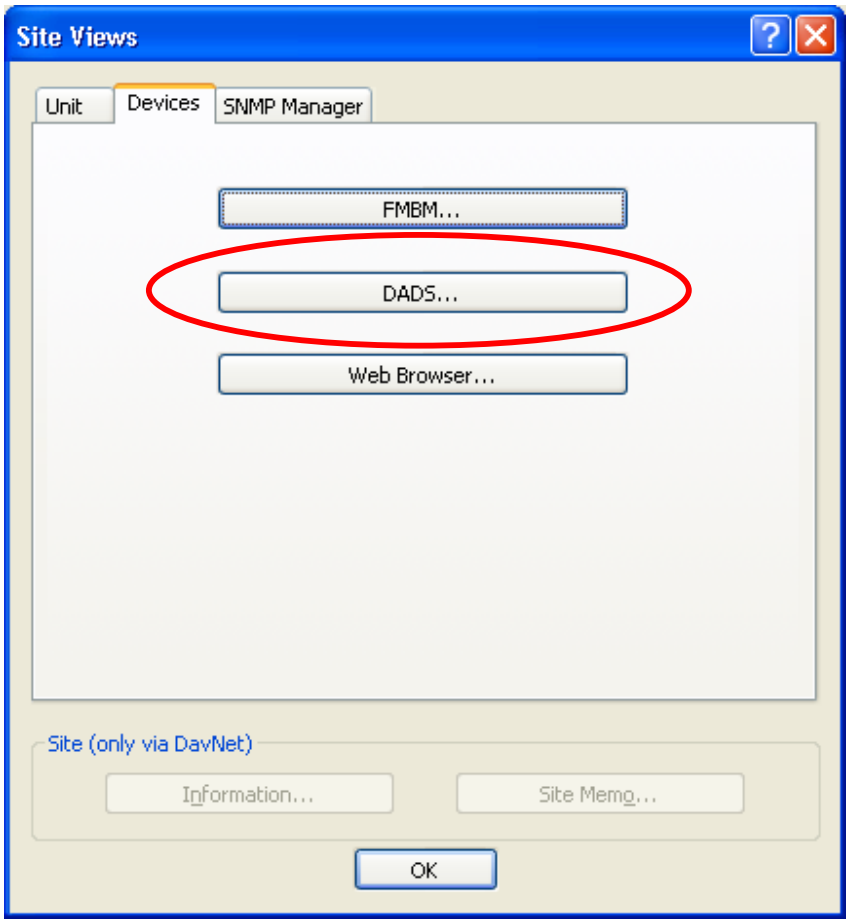


Figure 8. Davicom/Site Views Screen

Click on the DADS… button, this will display the screen shown in Figure 9.

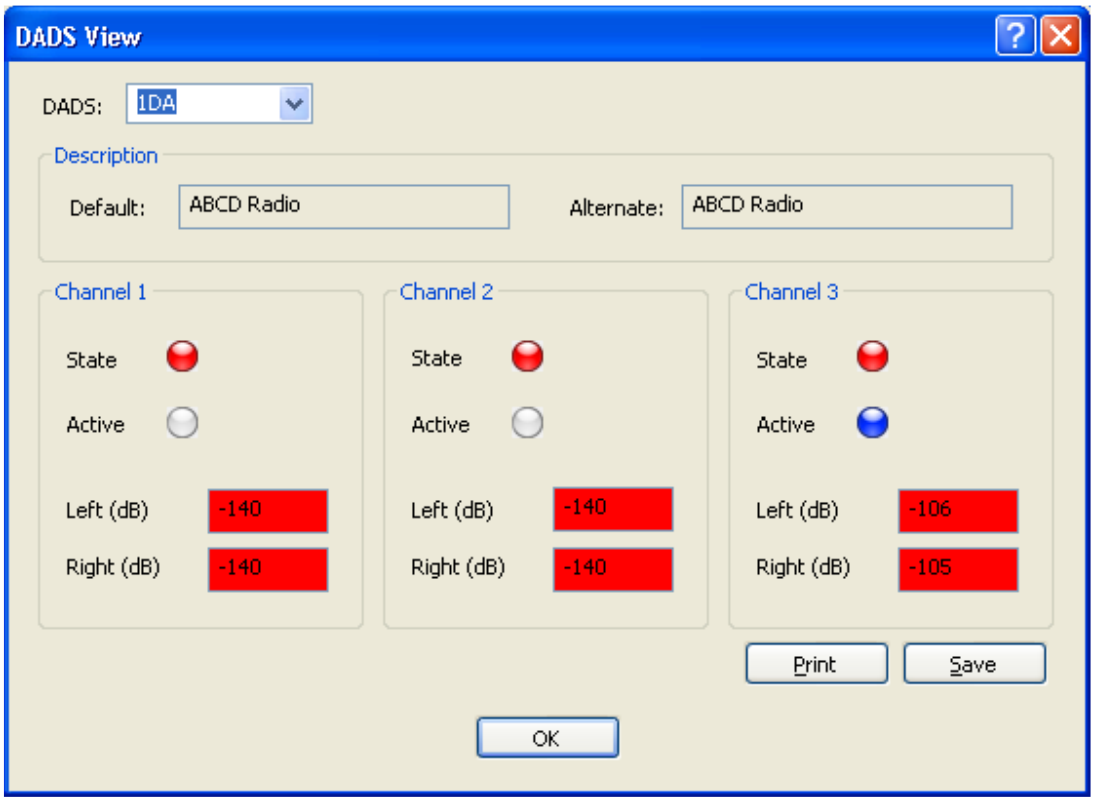


Figure 9. DADS-01 Visualization Window

5 Support/Contact

For technical support concerning this product, please consult the www.davicom.com web site or contact us:

- By telephone at 1-877-282-3380 (toll-free in North America) or at +1-418-682-3380 from elsewhere.
- Through our web site at www.davicom.com/contact

Davicom's address is:

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2300 Leon-Harmel, Suite 220
Quebec City, Quebec
Canada, G1N 4L2