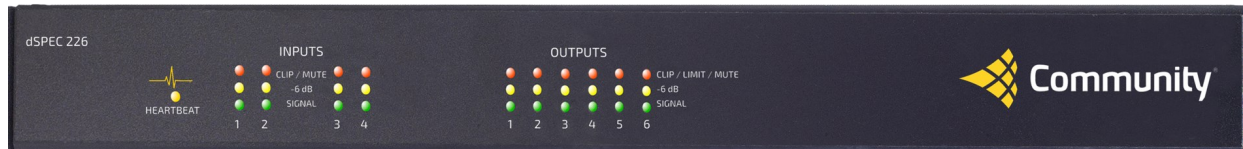# dSPEC Hardware Manual

digital **S**peaker **P**rotection **E**nhancement & **C**ontrol

INTRODUCTION

This Manual provides a basic description of **dSPEC**™ and explains how to interface the various dSPEC models to your sound system components.

dSPEC has no front panel controls, but instead is operated by **Resyn®**, an application developed by Community that runs under Windows®. The **Reference Manual,** included with Resyn software, describes how to access dSPEC's many unique features, and provides much valuable additional information. Consult the **Reference Manual** to install and use Resyn, and for a detailed description of how to harness the power of dSPEC for your system installations.

DESCRIPTION

dSPEC is a loudspeaker processor/controller that typically is inserted as the last device in the signal chain, just before the power amplifiers. **dSPEC** stands for **d**igital **S**peaker **P**rotection **E**nhancement & **C**ontrol. It offers superior sonic quality, a unique *Engineered Workflow* to simplify usage, and numerous other advanced features. Chief among them is *Uniform Response (UR)*, a means of flattening the frequency response of a loudspeaker based on Acoustic Power rather than SPL measurements. UR employs 1024 *minimum phase* FIR filters to provide a response correction that dramatically improves the sonic quality of Community loudspeakers. It's like having 1024 bands of parametric equalization that are automatically, and expertly, set for you.

Three dSPEC models offer a selection of Input and Output options. They include the **dSPEC226** base model with 2 Analog Inputs x 6 Analog Outputs, the **dSPEC226AN** with 4 IN x 6 OUT configuration and the **dSPEC226AE** that adds 4 additional AES3 signal inputs for 6 IN x 6 OUT architecture. Instructions for connecting these models are provided in this Manual.

DSPEC FIXED-CHAIN SIGNAL ARCHITECTURE

Although each dSPEC model features a different Input/ Output topology, _all_ models share the same 4 Input x 6 Output *fixed-chain architecture.* So while you can select up to 6 *Signal Inputs* in the dSPEC226AE, a maximum of 4 *Signal Inputs* at any one time may be routed to the four internal DSP *Input Processing Blocks.*

Signal Outputs are more simple. The 6 DSP *Output Processing Blocks* are directly routed to the 6 discreet *Signal Outputs.*

The ability to select among different *Signal Inputs*, and quickly change their assignments by calling up *User Presets*, makes it possible to use dSPEC as a signal router. This topic is covered in detail in the dSPEC Reference Manual.

AUDIO CONNECTIONS

There are two possible ways to feed audio signals to dSPEC depending on which model you are using. They include line level analog and AES3 digital.

Analog

Analog Input and Output connections are made by means of solderless Euroblock connectors, also called Phoenix connectors, located on the rear panel (see diagrams on Page 4). Analog Inputs and Outputs are *balanced line level* and all Euroblock connectors are detachable, thus permitting wiring terminations to be made without requiring the actual dSPEC device to be present.

Terminations are made by stripping back the wire to the appropriate length, inserting *only* the bare end of the conductor into the Euroblock receptacle, then firmly tightening the pressure screw to secure the wire in place. After a few moments, it is advisable to re-tighten the pressure screw to compensate for the natural 'flow' of the soft conductor material. Analog connections should be wired as described on the next page:

Analog Connections (continued)

- The positive or 'hot' conductor should be connected to the plus (+) terminal on the left of the Euroblock connector.
- The negative or 'cold' conductor should be connected to the negative (-) terminal on the right of the Euroblock connector.
- The shield conductor (sometimes called ground, drain, or earth) should be connected to the ground terminal in the center of the Euro-bock connector.

Normal practice is to connect the shields at both ends of the signal chain. However, in the event that hum or buzz is present, the shield wires may be connected directly to the chassis ground by means of the Philips head screws located directly above the Euroblock connectors. In such case, it is recommended that the shield wires first be terminated to a spade lug or ring lug by crimping or soldering, and then affixing the lug to the chassis screw.

Unbalanced Connections

- If an unbalanced analog audio signal is connected to a dSPEC Input, the negative or 'cold' conductor should be connected to the ground terminal of the Euroblock connector in parallel with the shield. The positive or 'hot' conductor should be connected to the plus (+) terminal of the Euroblock connector.
- If a dSPEC Output is connected to the unbalanced input of an amplifier or other device, the negative or 'cold' conductor should always be left floating (not connected to shield).

Digital AES3 Inputs

AES3 is a professional standard for interconnecting digital audio devices such as mixers, recorders, power amplifiers and others. AES3 uses the same three-conductor wiring as balanced analog inputs and outputs, but each three-wire cable carries two channels of digital audio. dSPEC units configured with the optional AES3 Digital Input card will contain 4 AES3 digital inputs and 2 analog inputs. Connections to the analog inputs and to the AES3 digital inputs are made exactly as described above. Sample rates are automatically accommodated from 44.1 kHz to 96 kHz.

S/PDIF OUTPUT TO AES3 INPUT

While It's technically possible to drive the AES3 inputs with an unbalanced S/PDIF source from a consumer-grade mixer or other product, it's important to be aware that device-dependent difficulties may occur. However, passive and active adapters are commercially available to convert S/PDIF to AES3, and it's also possible to construct a simple passive network that will reduce the likelihood of problems arising.

Control Port Connections

All dSPEC models are equipped with 6 built-in Control Ports that permit remote operation. This capability is one of the most powerful features that dSPEC offers.

Each Control Port can be connected to either (1) a simple external switch closure that calls up an associated *User Preset*, or (2) an external pot (potentiometer) that can adjust the level of one or more Inputs, one or more Outputs, or Inputs and Outputs simultaneously. We provide attractive remote Control Switches and remote Volume Knobs that fit standard single-gang electrical boxes, for a reasonable cost.

User Presets

Each *User Presets* calls up a stored *snapshot* of all adjustable parameters of a dSPEC device. A User Preset can be as simple as making a change to the delay time on a single output to accommodate the re-location of a podium in a banquet hall, or as involved as a complete restructuring of the input patches, output patches, EQ settings, protection levels, and all other dSPEC parameters to accommodate the needs of complex systems.

What's more, multiple dSPECs may be controlled by closing a single remote switch that can be located almost anywhere. This feature permits the design of highly complex systems, at a cost level that has never before been possible.

dSPEC external control follows a simple protocol; if more than one Control Port is activated at the same time, the lowest Port number takes precedence over the others. This feature makes it impossible to damage a dSPEC device by connecting multiple control switches, nor will the use of multiple switches result in unpredictable or erratic behavior.

In addition to remote switch closures, dSPEC permits the use of remote potentiometers. Each of the 6 Control Ports may be configured to function as a remote *Volume Knob*. Remote pots can be assigned to control the level of one or more Inputs, or Outputs, or one or more Inputs and Outputs simultaneously. Additionally, the range of permissible levels can be set so that users cannot exceed pre-determined minimum or maximum values. This feature is very useful for systems that are installed in bars, pubs, or other venues where professional operators are not usually present and abuse is common. Programming details are available in the dSPEC **Reference Manual.** Wiring instructions are included when you purchase a remote Switch Assembly or Volume Knob from Community, and are also available in the Reference Manual for those who wish to use their own switches or potentiometers.

AMPLIFIER CALIBRATION PORT

dSPEC provides a quick and simple means of calibrating each amplifier in the system to match the power handling capability of the loudspeakers they will be used with. By temporarily connecting each amplifier's output to the AMP CAL IN Port, and activating a test routine in Resyn, dSPEC sends a signal to the amplifier that increments in level while simultaneously measuring the amplifier's output voltage. When non-linearity is detected between the test signal and the amplifier's output, dSPEC then calculates the proper values for the protective limiters to keep the amplifier from clipping. The calculations also include the power handling of each model of Community loudspeaker, previously chosen from a menu in Resyn. The result is that dSPEC has precisely set optimal limiter levels that provide solid protection, without squashing the sonic quality with overly-aggressive limiting.

! Note: The "AMP CAL: calibration routine should never be used while a loudspeaker is connected to an amplifier output — it will damage the loudspeaker.

USING dSPEC WITH NON-COMMUNITY LOUDSPEAKERS

Although dSPEC has been optimized for use with Community loudspeakers, it is perfectly possible to utilize many of the features with non-Community loudspeaker products. dSPEC provides a full suite of low-pass, high-pass, band-pass, phase, shelving and all-pass filters, along with a unique set of under-damped filters for requirements such as creating a B6 Thiele-Small LF alignment.

dSPEC's AMP CAL feature can be used with non-Community loudspeakers as well, simply by entering the power handling data of each driver into the appropriate boxes in Resyn, and then measuring the out put of the amplifiers.

The only feature that is *not* available for use with non-Community loudspeakers is our Uniform Response option. The sophisticated equipment we use at the factory to acquire the Acoustic Power Frequency Response of our loudspeakers is not part of dSPEC. Only the resultant *correction curves* are stored in dSPEC's library of Community loudspeakers.

ABOUT RESYN SOFTWARE

Community's innovative Resyn software is divided into five separate screens that greatly assist the system designer to logically work through the process of planning and commissioning a sound system. We refer to this as *Engineered Workflow.* The screens are briefly described below:

design System. This screen allows you to name Inputs and Outputs, and to select the Community loudspeakers you'll be using in the system. You can also choose generic single-amped, bi-amped, tri-amped, quad-amped and other configurations for non-Community loudspeakers.

Protection. Accesses the AMP CAL routine and allows you to enter the power handling parameters for non-Community loudspeakers to accurately set dSPEC's multi-stage limiters.

Enhance. Allows you to apply filters, delay, adjust levels and alter factory settings, if you choose.

Control. Assigns Control Ports to User Presets and selects between Remote Switch Closures and Remote Volume Knobs.

Administer. Permits password protection, firmware upgrades, network management, and related tasks.

LEARNING MORE

This Hardware Manual is intended to introduce dSPEC and Resyn, and explain how to interface dSPEC to your sound system. Please consult the Reference Manual for detailed operating information. It's supplied on CD-ROM with each dSPEC, and may also be downloaded from our website: www.communitypro.com.
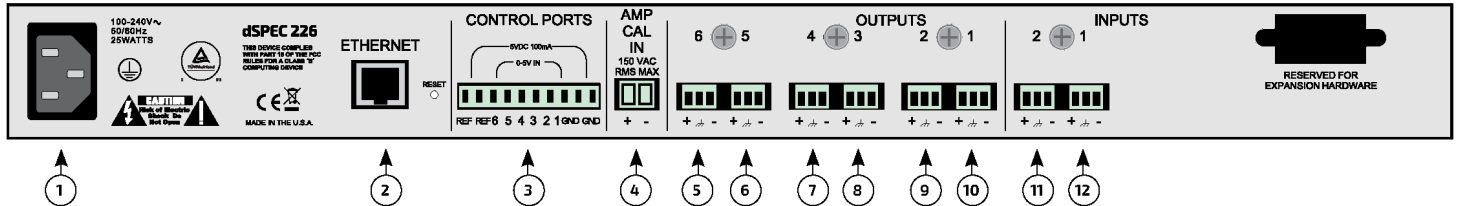
dSPEC FRONT PANEL
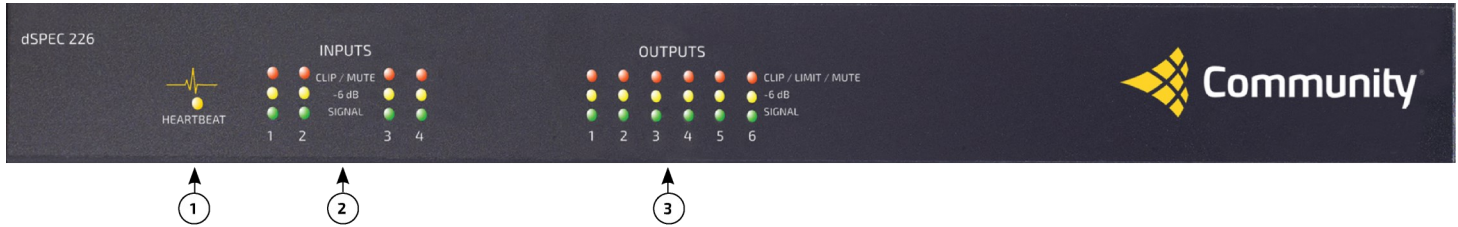
1. Heartbeat flashes to indicate that **dSPEC** is functioning. Alterations in the speed or pattern can assist in troubleshooting problems that arise. **2.** Input LEDs indicate Signal Presence, Input Clipping, and Mute state. **3.** Output LEDs indicate Signal Presence, Output Clipping, and Mute state.
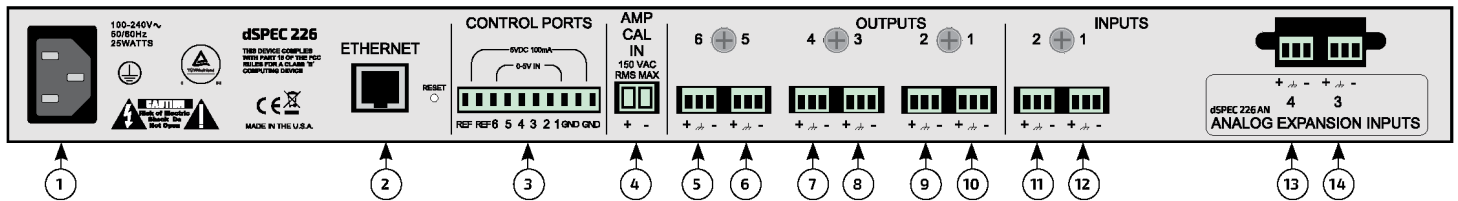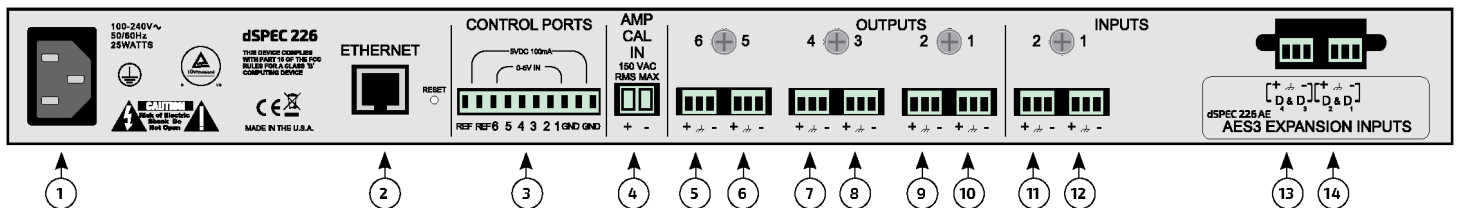
dSPEC REAR PANELS

dSPEC226

1. AC Mains Inlet (100-240VAC 50/60 Hz 25W) **2.** Ethernet connection. **3.** Control Ports for 6 remote switches or 6 volume knobs (any combination). **4.** AMP CAL IN Port for setting protective limiter levels. **5 – 10.** Balanced line Analog Outputs. **11, 12.** Balanced line Analog Inputs. **13.** Expansion Port accepts 2 additional Analog Inputs, or 4 AES3 Digital Inputs.

dSPEC226AN

1. AC Mains Inlet (100-240VAC 50/60 Hz 25W) **2.** Ethernet connection. **3.** Control Ports for 6 remote switches or 6 volume knobs (any combination). **4.** AMP CAL IN Port for auto-setting protective limiter levels. **5 – 10.** Balanced line Analog Outputs. **11, 12.** Balanced line Analog Inputs. **13.** Added Balanced line Analog Input #4. **14.** Added Balanced line Analog Input #3.

dSPEC226AE

1. AC Mains Inlet (100-240VAC 50/60 Hz 25W) **2.** Ethernet connection. **3.** Control Ports for 6 remote switches or 6 volume knobs (any combination). **4.** AMP CAL IN Port for auto-setting protective limiter levels. **5 – 10.** Balanced line Analog Outputs. **11, 12.** Balanced line Analog Inputs. **13.** AES3 Digital Inputs 3 & 4. **14.** AES3 Digital Inputs 1 & 2.

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