ASG Tech Note: Connecting and Communicating with DSA:

This technical note is intended to help connect and communicate with the DSA loudspeaker. In general, the process for connecting and operating a DSA loudspeaker should be as follows:

1. Read the manual.

2. Download the latest version of the DSA Pilot software from the EAW Website (http://www.eaw.com/docs/8_Software).

3. If your computer *has* an on-board RS-232 serial port, use a B&B Electronics RS232 - 485, half-duplex, port-powered converter to connect between your computer and the DSA.

4. If your computer *does not have* an on-board RS-232 serial port, use the recommended B&B Electronics USB-to-RS485 converter (available for purchase directly from EAW).

5. Once physically connected, launch DSA Pilot and select the appropriate communications port. Go 'Online', add your clusters and assign your DSA modules.

6. EQ and Steer the DSA Cluster(s) as necessary.

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1. Please read the manual:
http://www.eaw.com/docs/1_Current_Products/DSA

In the manual, you will find all the specifics of DSA, including: how it works, how to connect with DSA, how to wire the DSA, all the available features, and some nifty tricks.   A thorough review of the manual will provide you with a comprehensive overview of the DSA and how it functions. If you have questions, please call ASG @ 1-800-992-5013 before you connect with the DSA.

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2. Download the latest version of our DSA Pilot software:

http://www.eaw.com/docs/8_Software

The latest version is always available on the EAW website. After you download the .zip file from the website, extract it to your desktop and run the installer. Let the program to its default location on your hard drive; do not change directories.

The installation process will put a short cut icon on your desktop. Double-click on this icon to launch DSA Pilot. EAW suggests checking the website periodically for updated versions of DSA Pilot, especially prior to connecting to a DSA.

Note*:*
You can work offline within DSA Pilot. This is helpful to see how DSA will work for coverage of an area. By entering information in the respective fields and clicking on 'Apply', you will see how a DSA cluster will work in a given space by referencing the SPL chart at the bottom of the window.

3. Only use a B&B Electronics 232 – 485, half-duplex, port-powered converter.

DSA is extremely picky with communication. You will experience communication errors if you are not using the correct connection hardware. We have found the B&B Electronics converter to be the most reliable and have had no reported communication errors when using either of the following converters:

1. B&B 485SD9TB: (http://www.bb-elec.com/bb-elec/literature/485sd9tb-3803ds.pdf)
2. B&B 485BAT3: (http://www.bb-elec.com/bb-elec/literature/485bat3-3903ds.pdf)

You may purchase these converters directly from B&B Electronics on their website: (http://www.bb-elec.com/product_family.asp?FamilyId=15&TrailType=Sub&Trail=12)

Note: *If you are able to connect and program the DSA using any other brand of converter, please contact us at asg@eaw.com so we may add it to the list.*

3A. Setting up and wiring your 232-485 converter:

Note: You must use a standard 9 pin serial (232-232) cable between your computer and the 232-485 converter. Null modem cables will not work.

B&B 485D9TB Converter: The 485SD9TB converter is the easiest to set up. Just wire it to the DSA and start communicating!

To wire the 485SD9TB:
- [B] is wired to + on DSA.
- [A] is wired to – on DSA.
- [GRD] is wired to Ground/Shield on DSA.

B&B 485BAT3 Converter: The 485BAT3 is a more robust converter, but requires additional set up to work properly.

To set up the 485BAT3:
- For runs under 300': Make sure the 'Battery Power' switch is in the <u>OFF</u> position. Do not put a battery in the converter.
- Make sure the 'ECHO' switch is in the <u>OFF</u> position.
- Make sure the 'RS-485' switch (above the ECHO switch) is in the RS-485 position.

To wire the 485BAT3:
- [RD B] is wired to + on DSA.
- [RD A] is wired to – on DSA.
- Make a small jumper and jump [RD B] to [TD B] on the converter.
- Make a small jumper and jump [RD A] to [TD A] on the converter.
- [GRD] is wired to Ground/Shield on DSA.

Note about 485BAT3: *For normal, short runs, external wall wart power or battery power is not necessary. For communication runs in excess of 300', you can use external or battery power for the converter. Also, if you made your own 232 serial cable, not from 9-wire cable, you will need external or battery power.*

4. Using the recommended B&B Electronics USB-485 Converter:

The B&B Electronics USPTL4-LS converter has been thoroughly tested for compatibility with DSA, both for overall control and to update firmware. The converter includes a thorough 'Quick Start Guide', which guides the user through software installation. EAW stocks these converters (EAW model name ACC-USB485DSA, part number 2040889).

Note: It is critical that you install the USPTL4-LS software *prior* to initial connection to the computer's USB port. Follow steps #1-3 of the USPTL4-LS Quick Start Guide. Note the COM port to which the USB-485 adapter is mapped.

Ensure the converter's dip switches (located on the underside of the unit) are configured as follows:

Switch	Correct Orientation	Setting
1	On/Right	RS-485
2	On/Right	ECHO OFF
3	On/Right	2-Wire
4	On/Right	2-Wire

Wire the converter's terminals as follows:

Terminal	Connected To	Purpose
TDA(-)	Not Connected	Unused
TDA(+)	Not Connected	Unused
RDA(-)	DSA RS-485 Negative (-)	Data A Input/Output
RDB(+)	DSA RS-485 Positive (+)	Data B Input/Output
GND	DSA RS-485 Ground	Ground
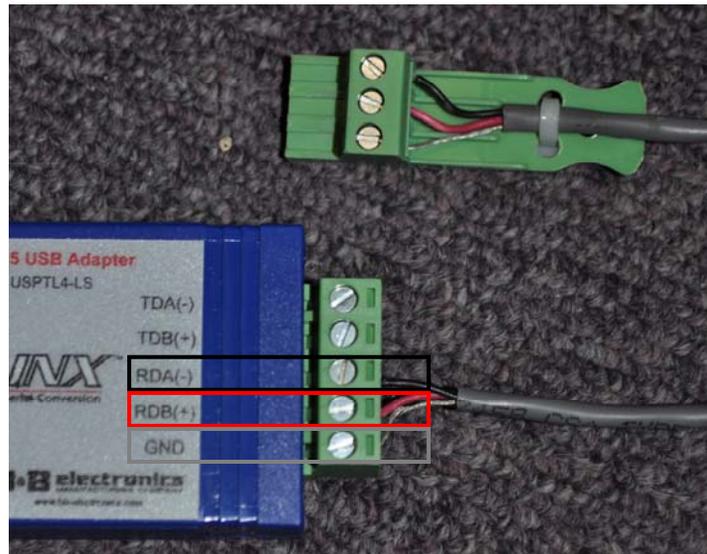
On the DSA, ensure that the "EIA-485 Terminate" switch is in the "On" position for the *last* DSA in the RS-485 chain (farthest from the computer). If only one DSA is connected to the computer, this switch should be in the "On" position.

Within DSA Pilot, select "Com Settings" under the "Tools" menu. Ensure that "Analog Audio/EIA-485 control" is selected under "Type", and the correct COM Port is selected under "Properties". Once you have done this, you are ready to proceed to step 5A.

NOTE: No other USB converters (including USB-to-232 converters with 232-485 adapters) should be used to upgrade DSA firmware. Doing so can result in a firmware update failure. Supplemental steps will then be required to restore functionality of the DSA.

4C: Troubleshooting:

What if I already tried to communicate and upgrade firmware with a USB – 232 adapter? USB – 232 adaptors are not stable enough for the type of data transfer needed for a firmware upgrade. When the DSA Pilot software for DSA is upgrading firmware, it performs a system of checks and balances whereby the software erases one part of the existing firmware, uploads the new firmware information, verifies a successful upgrade, and moves to the next part of the upgrade. Because of the unstable transfer rate of the USB – 232 converter, DSA and DSA Pilot Software may hang while trying to upgrade and verify, resulting in a loop. At this point in the upgrade, most users choose to "force quit" the process, or physically unplug the connection to DSA; possibly causing the LED on the front may start to blink constantly.

This hard quit/disconnection causes the DSA to completely lose all firmware. You must now "Force New Firmware" to restore functionality.

How do I perform a "Force New Firmware"?

To perform a "Force New Firmware" you must follow the steps below:

Step 1: Get the proper 232 serial connection from your computer. See Section 3 above.

Step 2: Reconnect to DSA.

Step 3: Go online (see Section 6 below) – this should call up the DSA module you were upgrading firmware.

Step 4: Right click on that DSA module in the 'Unassigned Modules' section and select 'Upgrade Firmware'

Step 5: In the window that opens, you will see the detected firmware version, the available firmware version (current version is always the last one on the list – it is also listed in the 'Diagnostic' window), and a box to 'Retain Settings'. Uncheck the 'Retain Settings' box.

Step 6: Click the 'Update to Firmware Version' button. This will force new firmware onto DSA.

Step 7: Let DSA Pilot work to force new firmware. This process should take no more than 15-20 minutes. If it is taking longer than 20 minutes, you have an improper connection. Confirm your connections via Section 3 above.

Step 8: When the firmware update is complete, verify that you are at the current firmware by right clicking on the DSA module, and then clicking on ' Diagnostics'. This will show you the detected version of firmware.

Step 9: While still in the diagnostic window, click on the 'Set to Defaults' button to bring the DSA module back to factory default settings.

Step 10: After setting back to factory default, click on the 'Warm Reboot' button to reboot the DSA module.

At this point, the DSA module should be reset to factory default with the latest firmware.

5. Communicating with DSA

5A. Go 'Online'
Once you have the proper connection to the DSA module, launch DSA Pilot and click the 'Online' button. This will poll your network and find the unassigned DSA modules. These will appear in the 'Unassigned Modules' section of DSA Pilot. Individual DSA loudspeakers will be referred to as 'Modules' when not assigned to a cluster.
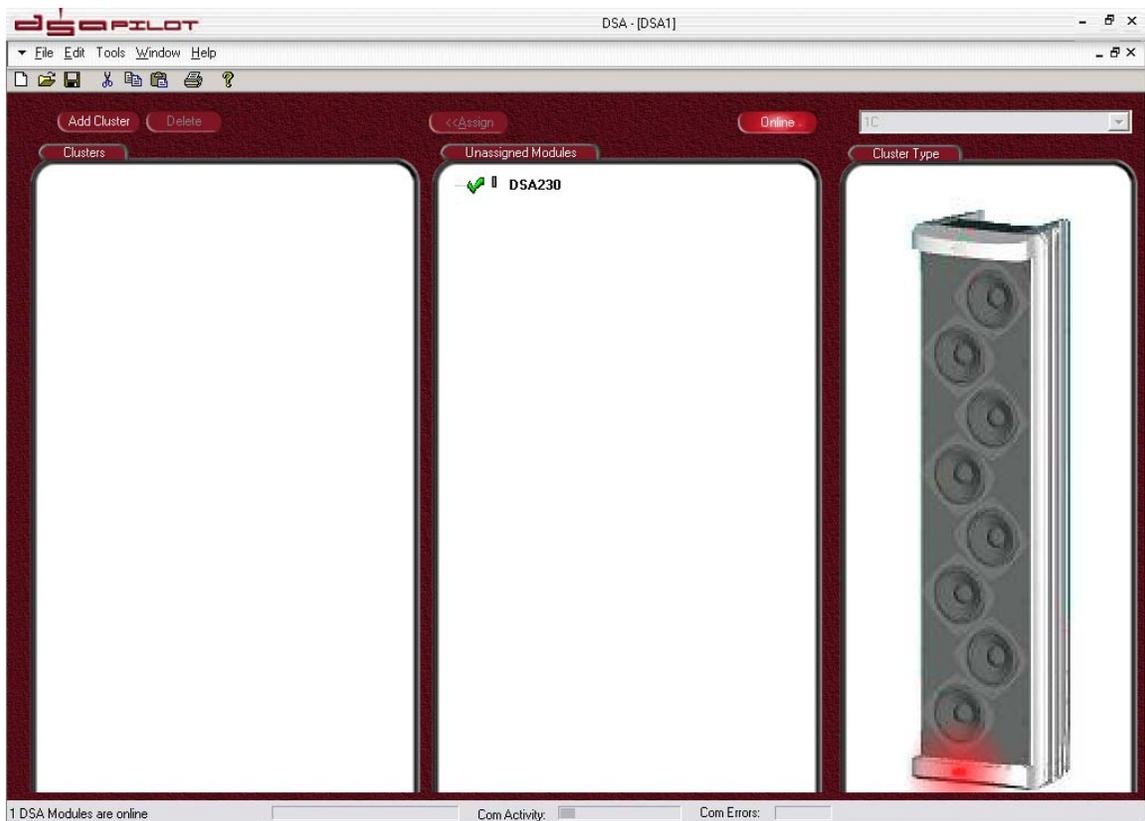
Clicking on an individual DSA module will light up its respective LED on the front. It is here you can right click on the individual DSA module and run diagnostics, as well as rename the individual DSA module and upgrade firmware.

5B. Adding DSA Cluster(s).

Click 'ADD CLUSTER'. This will add an 'Unnamed Cluster' in the "Clusters" window in DSA Pilot and engage the drop down menu for choosing your cluster type, as well as bring up a picture of what that cluster type looks like. Using the drop down menu, choose the cluster type you will be working with.
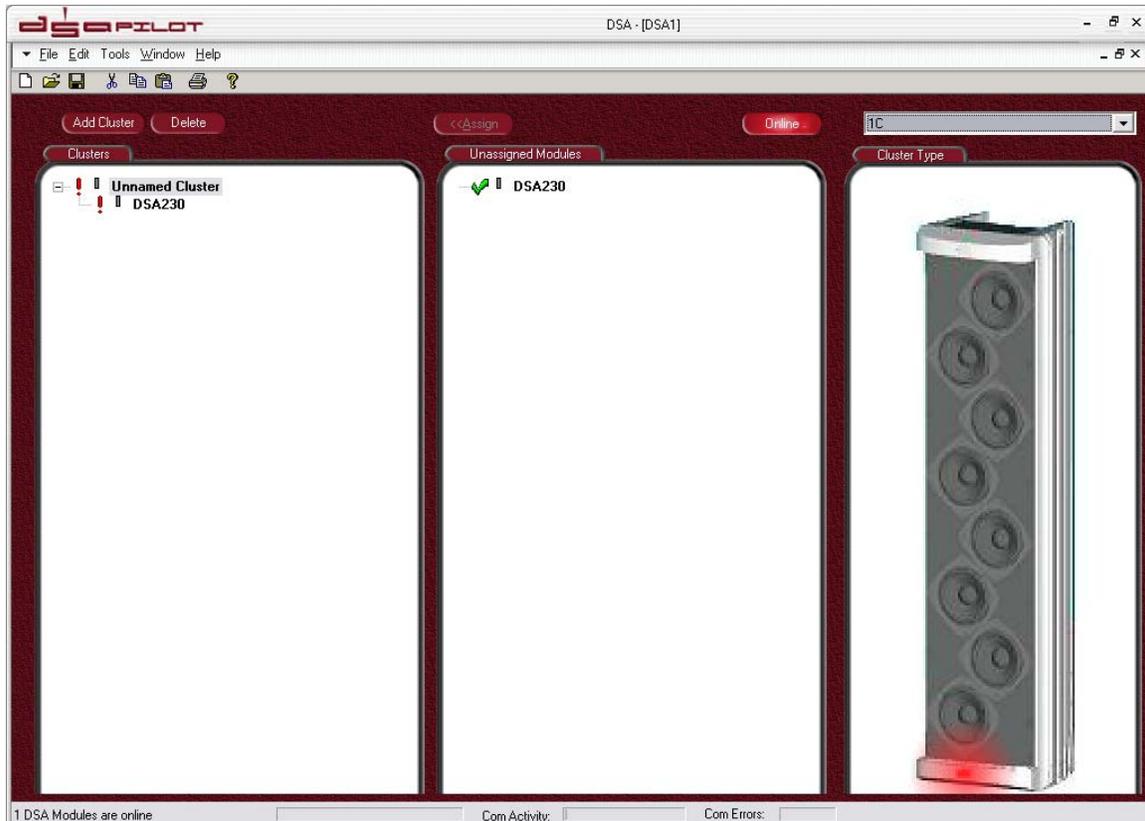
Note: All currently available clusters are in this drop down menu. This menu supersedes the printed DSA Manual.

Note the position of LED's in the pictures of clusters. This is helpful in making sure that the DSA modules within the cluster(s) you install on the wall are in fact in the correct orientation.

As you can see from the diagram below, the 1A, 1B and 1C clusters are made up of single enclosures only. A 1A cluster is a DSA250, "HF down", and a 1B cluster is a DSA250, "HF up". The LED you will see is opposite where the HF section is located. A 1C cluster is a single DSA230, LED at the bottom (shown above). There is no cluster for a DSA230 with the LED at the top.
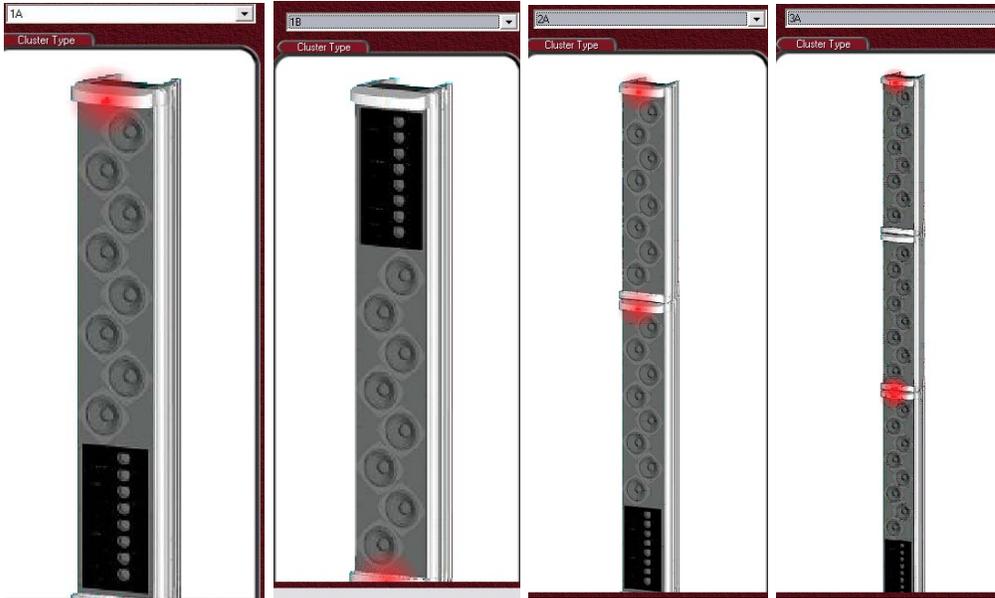
5C. Assign Your DSA Modules to Their Respective Clusters.

Once you have added the cluster you will be working on, you will need to assign individual DSA modules to its respective cluster. This is done by left clicking the individual DSA module so it grays out, clicking the 'ASSIGN' button (the button will light up, a stylus will now appear where your cursor/arrow was), then left clicking on the respective DSA module under the cluster you wish to assign that module to.

For example, if you were using a 1C cluster (single DSA230, LED at bottom), you would left click on the DSA230 in the 'Unassigned Module' window so it grays out, click on the 'ASSIGN' button, then left click on the DSA230 shown under the Unnamed Cluster, which is your 1C cluster.

When you assign a DSA module for the first time, from a new DSA Pilot window, you should be able to connect immediately. However, if there is a mismatch – if the DSA module has information in it – you will get a window prompt asking you what you want to do:

WRITE SETTINGS TO THE LOUDSPEAKER: If you want to start clean and reset your DSA module to factory settings, click this.

READ SETTINGS FROM THE LOUDSPEAKER: If you are connecting to an existing installed DSA module, need to see how a DSA is set up, or any application where **you do not wish to erase the steering and EQ settings of your DSA,** click this.

ABORT. DON'T CONNECT. If you are unsure about your connection, or you do not wish to connect with that individual DSA loudspeaker, click this.

Once you click on your choice, the DSA in the 'Unassigned Modules' section will go away, and you will get a green check next to where that module is assigned within the cluster. Once all modules are assigned to a cluster, the cluster will also get a green check next to it.
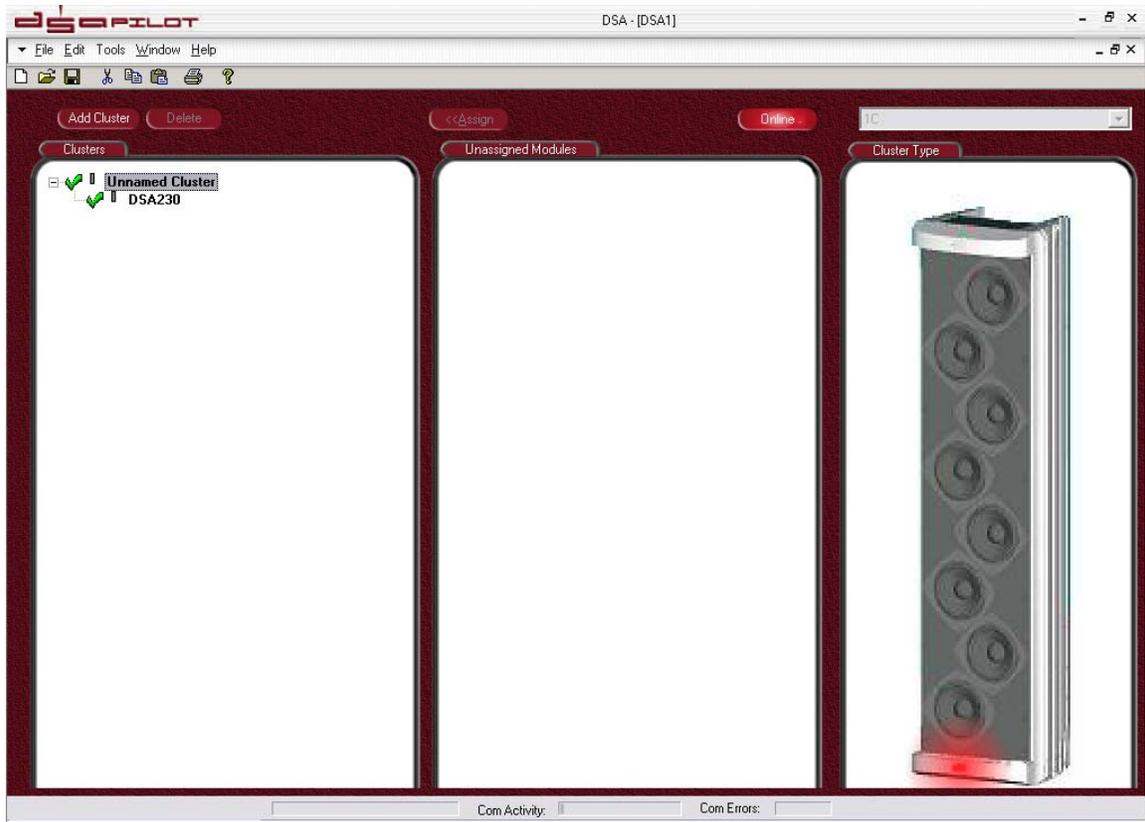
Left clicking once on the cluster name will light up the LED's for entire cluster (all modules). Left clicking on the individual DSA modules within that cluster will light up the individual LED's on those DSA modules. This is helpful in making sure the correct DSA modules are assigned properly, and that the orientation of the DSA modules is correct.

6. EQ and Steer the DSA Cluster(s).

Once connected, you can EQ and Steer your DSA cluster. It is important to realize that individual DSA modules are never steered or EQ'd – only clusters are steered and EQ'd. You can get to the steering and EQ windows either through the "Tools" drop down menu, or by right-clicking once on the cluster you wish to steer or EQ.

In the EQ section, you should start off with your input gain at –10dB (default for firmware version 58 and higher). This may be increased or decreased as needed depending on the system's gain-staging.

In the steering section, you want to switch from 'Specify Coverage Pattern' (which is default) to 'Match Coverage to Listening Area'.

DSA is a loudspeaker system – processing, amplifiers, and loudspeakers. In a DSA250, there are sixteen drivers, sixteen channels of DSP, sixteen channels of amplification. There is the possibility of some amp noise commonly referred to as "hiss" if the DSA loudspeaker is not properly gain staged with the rest of the system, especially if the signal feeding DSA is low, and the input gain on DSA is being used to compensate.

Placement of DSA is also a consideration. Unlike traditional column loudspeakers (which DSA physically resembles), DSA is not limited to low physical positioning (anything under 10'), and we have found that performance generally improved with mounting heights over 10'. The reason traditional column loudspeakers need to be low is due to their inherent narrow vertical dispersion, centered on the vertical axis of the loudspeaker. The low positioning allows those traditional loudspeakers to 'skim' the heads of the listening audience, such that the most distant seats are on-axis, with nearer seats becoming progressively more off-axis as you approach the column. This limitation does not apply to DSA, which can form complex beams that are *not* centered on the vertical axis of the loudspeaker.

If you have any further questions on connection or operation of the DSA, call the EAW ASG Group at 1-800-992-5013 **BEFORE** you connect to the DSA.

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