DSLA II

Getting Started

Revision 2.1

Malden Electronics Ltd

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Introduction

This section explains what a DSLA II is and how it is used. It also describes what is inside a DSLA.

What is a DSLA Unit?

DSLA (Digital Speech Level Analyser) II provides a pair of stable, high quality analogue interfaces to a telephone network to enable you to test a wide range of telephony products, including the following:

- Telephone lines
- Telephone handsets
- Mobile phones
- Microphones or earpieces

Two applications provide a graphical user interface to the DSLA II:

- MultiDSLA Controller that communicates with a number of DSLA units
- The DSLA application that communicates with a single DSLA

You plug the DSLA into a telephone network or network element and the DSLA plays telephone signals into that network. The DSLA has two channels so that you can connect one end of a telephone call into one channel and the other end of the call into the other channel.

One DSLA or Several DSLAs?

If you want to carry out local testing of one telephone conversation at any one time you need only one DSLA, with one end of the telephone call connected to one channel and the other end of the call connected to the other channel.

To measure the quality of telephone calls between two different places, for example London and New York, you need one DSLA in one place and one in the other.

If you want to test a number of telephone conversations at the same time, you can use multiple DSLAs connected to the telephone network. Another reason to join multiple DSLAs together is if you want to test a conference bridge where several units are connected together as part of one conference.

Inside the DSLA

This section explains the internal components of the DSLA that you need to know about. A simplified block diagram of the DSLA is shown below:
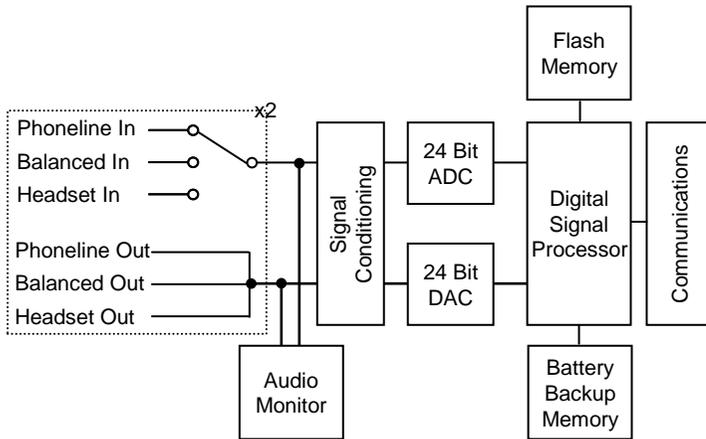
Input Circuitry

The DSLA has two channels. From the user interface application, the DSLA application or MultiDSLA, each channel can be switched to use one of three connector types:

- Phoneline

- Balanced

- Handset

When a connector type is selected the input is switched, whereas all outputs transmit the output signal. Isolation circuits and signal conditioning are included between the connector terminals and the analogue/digital converters.

Analogue/Digital Converters

The DSLA has 24-bit analogue to digital converters (ADC) and 24-bit digital to analogue converters (DAC). This provides approximately 104 dB of dynamic range. The converters are optimally placed to ensure signals have enough head room (avoid clipping) and a low enough noise floor. When working with very small signals you can adjust the positioning of the ADC range from within the controlling application by changing the ADC gain setting.

Audio Monitor

From the user interface you can configure the audio monitor to select what you want to monitor in terms of:

- Channel

- Input/output

- Level

It is recommended that for most applications you monitor the incoming signal rather than the outgoing signal.

Battery Backup Memory

Inside every DSLA II is around four megabytes of battery backup memory in which are stored speech files, such as the Artificial Speech Test Stimulus (ASTS) files and the current version of the firmware.

For each DSLA node that is added to a test system, a set of standard ASTS files must be copied from the folder **/Program Files/MultiDSLA/Phonytalk** on the PC into the memory of the DSLA to run standard tests. Each time you add to your system a DSLA node for which sound files have not already been uploaded, MultiDSLA uploads the sound files automatically, but for the DSLA application you need to upload the sound files manually. For more information refer to the online help for the DSLA application.

Flash Memory (Firmware)

The original version of the firmware in held in flash memory. The latest version of the firmware is always available from the website. For more information, refer to the section Upgrading the Firmware below.

Digital Signal Processor (DSP)

DSLA incorporates bespoke software to provide command and control functionality as well as real-time signal detection and processing. The processing required to perform speech quality processing is divided between the DSP and the host processor of the controlling application.

Before You Start

When you receive your DSLA unit(s) and software, you need to do the following:

1. Unpack the DSLA unit(s) and power supply.

2. Connect the DSLA unit directly to a PC or to a LAN and connect the power supply.

3. Install the application software.

4. Check that the DSLA is powered.

5. Familiarise yourself with the DSLA signal connections

6. Connect the device or network you want to test to the DSLA.

7. Start running basic tests and reports.

This section explains how to do the following:

- Check the power supply
- Connect the DSLA to a PC or a LAN

Notes:

- Refer to the Getting Started Guides for information on how to install the application software.

- DSLA can be placed on separate LANs and communicate back to a central controller over any IP connection. International networks of DSLA units are used by a number of Malden customers.

Checking the DSLA Power Supply

Note: When unpacking the DSLA unit(s), check that the units are undamaged.

Each DSLA II is shipped with a universal AC adapter and power cable.

1. Connect the power supply jack to the jack socket on the rear panel of each DSLA.

   A red LED on the front panel will light when power is applied to the unit.

2. Connect the mains power lead to the power supply unit.

   The AC adapter automatically adjusts to any voltage from 90 to 260 volts and any frequency from 50 to 60Hz.

The DSLA requires a DC voltage between 9 and 18 volts and uses 12 watts.

Note: If the mains power connector on the end of the power cord is not appropriate for connection to the type of socket in use the power cord may be changed.

Mounting in a 19-inch Rack

The DSLA II design allows two DSLAs to be placed next to each other on a 19-inch shelf. The DSLA II fits in a 2U high space.

Communicating with the DSLA

To control the DSLA, the DSLA must be connected to your PC, either directly or through an Ethernet connection (LAN, WAN, or the Internet).

Connecting to the PC or Network

The way in which you connect to the PC or network depends on the graphical user interface application you are using:

- With **MultiDSLA,** you connect using an Ethernet TCP/IP connection. If a DHCP server is present, the DSLA is assigned an IP address through DHCP. If your LAN does not use a DHCP server, you must manually assign an IP address to the DSLA.

- With the **DSLA application**, you connect through the serial port connection or the Ethernet connection.

Notes:

- The Ethernet and serial port connections are on the back panel of the DSLA.

- The Ethernet connection is the recommended method to communicate with the DSLA.

To connect a DSLA using Ethernet:

1. Turn off the power supply to the DSLA.

2. Do one of the following;

   - Connect the DSLA to your LAN using a standard Ethernet lead (not supplied).
   - Connect the DSLA directly to your PC using the crossed Ethernet lead (supplied).

3. If your LAN does not use a DHCP server, manually assign an IP address as explained below. The way in which you do this varies according to whether you are using MultiDSLA or the DSLA application as your user interface application.

4. Power up the DSLA.

To manually assign an IP Address to the DSLA (MultiDSLA):

1. .Browse to **Program Files/MultiDSLA/Utilities** and start **medslaipconfig.exe**. The **DSLA IP Configurator** window opens, as shown in the figure below.

DSLA IP Configurator
IP address of this PC is 192.168.2.3
What would you like to do?
○ Browse LAN for DSLA
○ Check DSLA's status
○ Restart DSLA
○ Enable DHCP
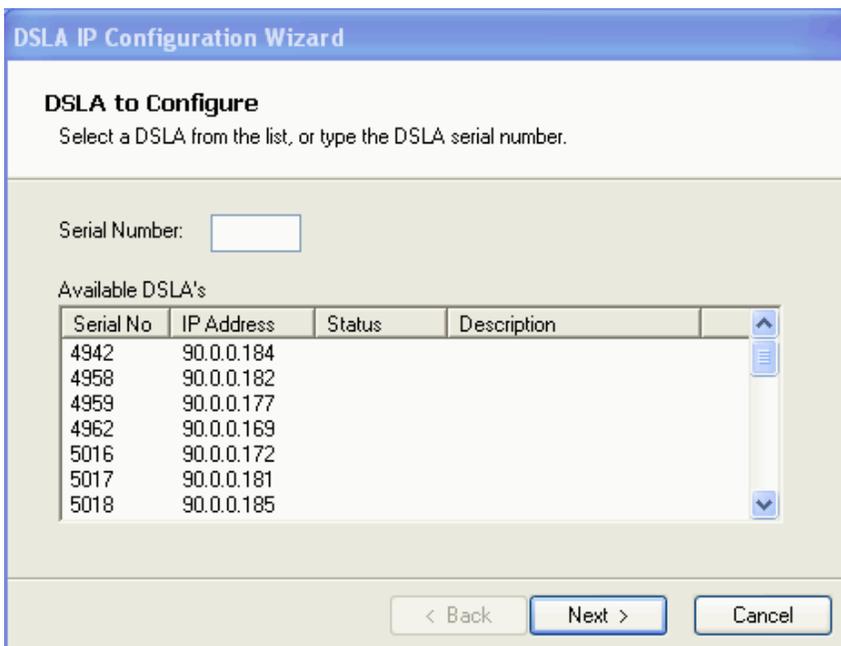● Set IP address (no DHCP)
○ Update firmware

DSLA connected to
● Ethernet
○ Serial

Enter serial number or IP address
4693

Enter fixed IP address
192.168.2.7

Help

(c) Malden Electronics Ltd 2006   Go   Close
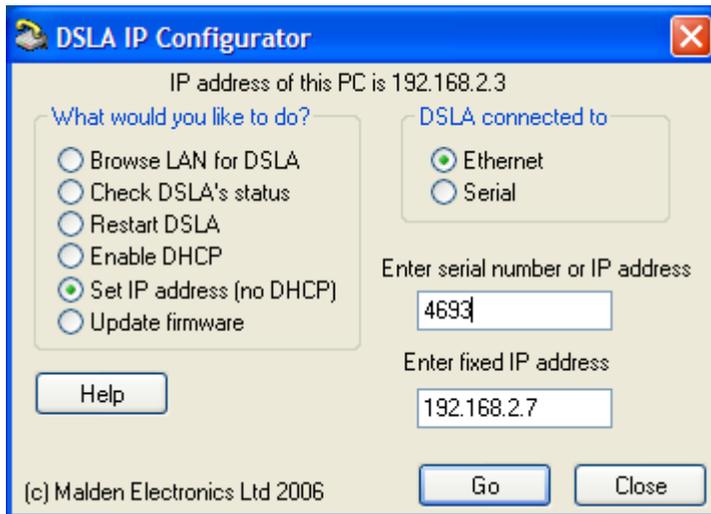
2. Select the checkbox **Set IP address (no DCHP)**.

3. In the **Enter serial number or IP address** field, enter the serial number of the DSLA or the old IP address you want to replace.

4. In the **Enter fixed IP Address** field, enter the new IP address you want to assign to the DSLA.

To manually assign an IP Address to the DSLA (DSLA application):

1. Start the DSLA application.

2. From the toolbar, select **Tools-Options**. The **Options** window opens.

3. Click on the **IP Configuration** button. This starts the DSLA IP Configuration wizard.

4. Click **Next**. The **DSLA to configure** window opens as shown in the figure below.

DSLA IP Configuration Wizard

DSLA to Configure
Select a DSLA from the list, or type the DSLA serial number.

Serial Number:

Available DSLA's

Serial No	IP Address	Status	Description	
4942	90.0.0.184			
4958	90.0.0.182			
4959	90.0.0.177			
4962	90.0.0.169			
5016	90.0.0.172			
5017	90.0.0.181			
5018	90.0.0.185			

< Back   Next >   Cancel

5. Do one of the following:
   - In the **Serial Number** field, enter the serial number of the DSLA to which you want to assign an IP address.
   - Select a DSLA from the list.
6. Click **Next**. The **DSLA IP Configuration** window opens, as shown in the figure below.
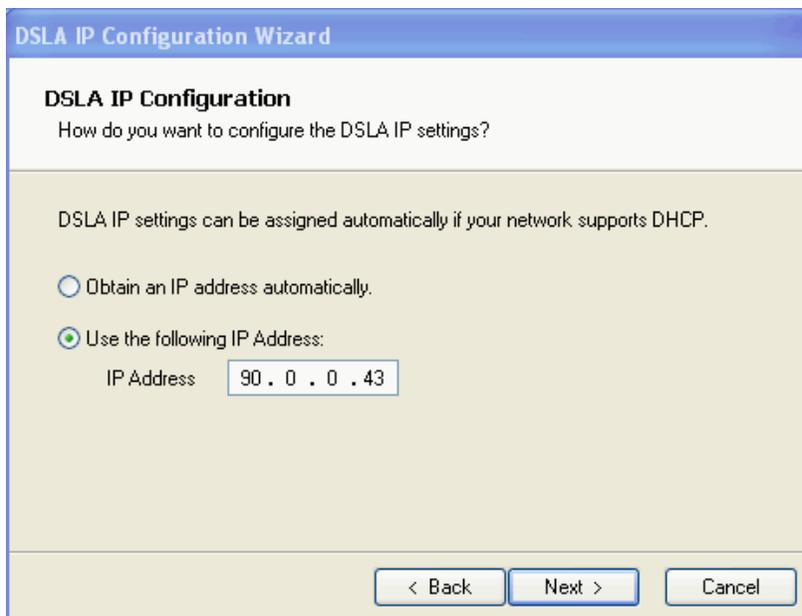
7. In the **IP Address** field, enter the IP address to be assigned to the DSLA and click **Next**.

Note: When entering the IP address, you need to click separately in each field of the address. If you make a mistake when entering a number, right-click on the number and select **Undo** to delete the number.

8. If the IP address has been successfully assigned a message tells you that your DSLA IP configuration has been successfully updated. Click **Finish**.
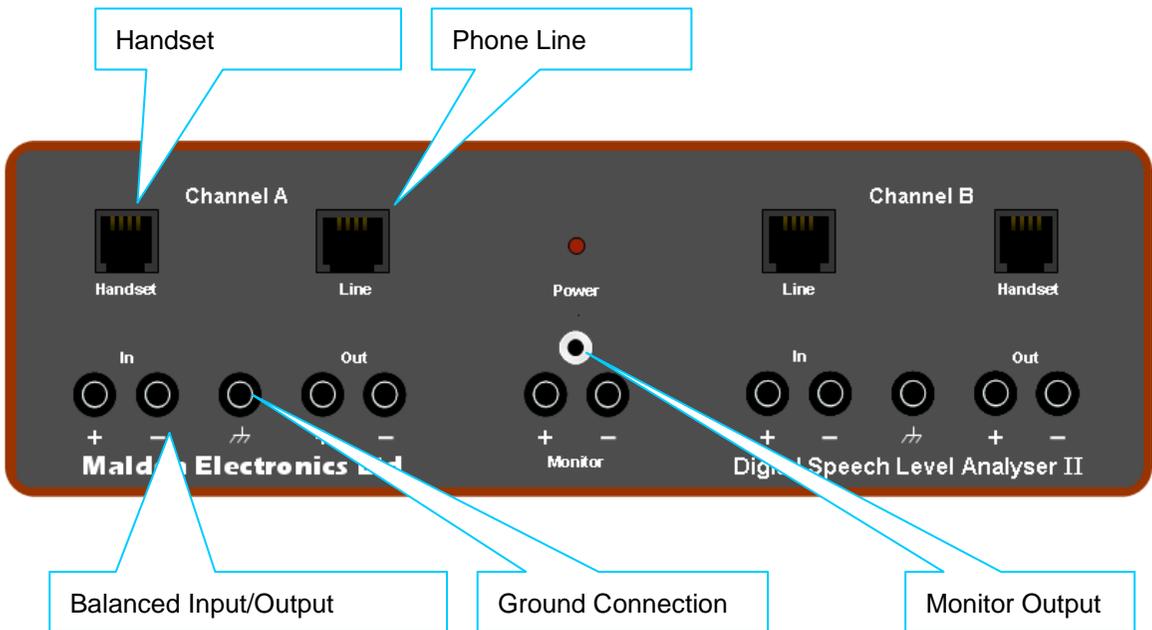
DSLA Connections

This section explains the connections on the front and back panels of the DSLA.

Connectors on the Front Panel

The connectors on the front panel of the DSLA are shown below.

The DSLA has two measurement channels. Each channel has an identical set of signal connections.

The connections are described in the table below.

Connection	Description
Handset	Connects to any type of microphone or earpiece, including: ■ Digital telephone (IP phone) handset ■ Mobile phone hands-free port ■ PC microphone in/line out To connect a telephone to the DSLA, you disconnect the handset from the coiled lead and plug the coiled lead into the handset port. You will normally need an adapter to plug a mobile phone hands-free port or a PC microphone connection into the handset port. For more information see the section Connecting to the Handset Port below.

Connection	Description
Phone Line	Connects to the telephone network.
	The telephone jacks enable the DSLA to behave as a telephone; thus it can do the following:
	■ Go off-hook
	■ Dial DTMF strings
	■ Generate speech output
	■ Measure the incoming signal
Balanced	A 4-wire balanced connection. Connects to a PC sound card line in/line out or an Acoustic Test System (Head and Torso Simulator; Artificial Ear and Mouth). The 4mm connectors have accurate 600 ohm terminations.
	The central connector is a ground connection.
Monitor Output	The monitor sums any of the chosen input or output signals to a mono signal. This allows you to hear the signals being generated and received by the DSLA, which is useful for debugging purposes. The 3.5mm stereo jack monitor connection is an unbalanced 25 ohm impedance output suitable for connection to headphones or PC speaker systems. The 4mm banana connectors are available if required.

Connecting a DSLA Balanced to Balanced

Connecting one DSLA channel to the other is the simplest connection you can make. You can connect a DSLA in this way for testing purposes. Make the following connections:

■ Connect Channel A output to Channel B input.

■ Connect Channel A input to Channel B output.

Examples of Connectors and Cables

The table below gives examples of signal connectors.

DSLA Port	Analogue Connection	Connector Types
Telephone	Telephone Network	RJ11
Handset	Telephone Handset Port	RJ22
	PC Sound Card Microphone In / Line Out	2 x 3.5mm male jack to 1 x 3.5mm male jack A RJ-22 plug to 3.5mm female jack

| DSLA Port	Analogue Connection	Connector Types
Handset	Mobile Phone	RJ-22 plug to 3.5mm female jack Plus a suitable hands-free/3.5mm adaptor available from mobile accessory retailers
Balanced	PC Sound Card Line In / Line Out	4 x 4mm plug to 2 x 3.5mm male jack
	Acoustic Test System (Head and Torso Simulator; Artificial Ear and Mouth)	Depends on specific equipment in use
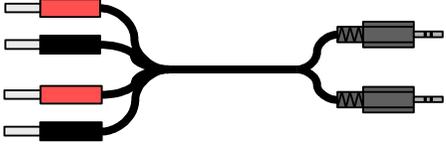
Connecting to the Handset Port

The three pieces of equipment most commonly connected to the handset port of the DSLA are:

- A POTS or digital telephone handset lead
- The hands-free kit of a mobile phone
- PC sound card microphone or line out

The DSLA Handset Port is an RJ22 connector. The connections are presented as shown in the diagram below:
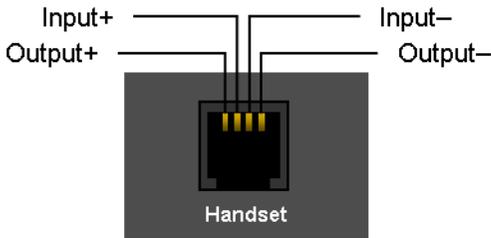
Taking the handset lead from a telephone and connecting it to the handset port of the DSLA is a quick and easy way to measure the speech quality and performance of a telephone network.

Testing Mobile Phones

When testing mobile phones, you need to bear in mind the following:

- The test results will be affected by the radio conditions at the mobile and the codecs employed. You may detect transient effects on speech quality such as mobile handover and fade conditions.
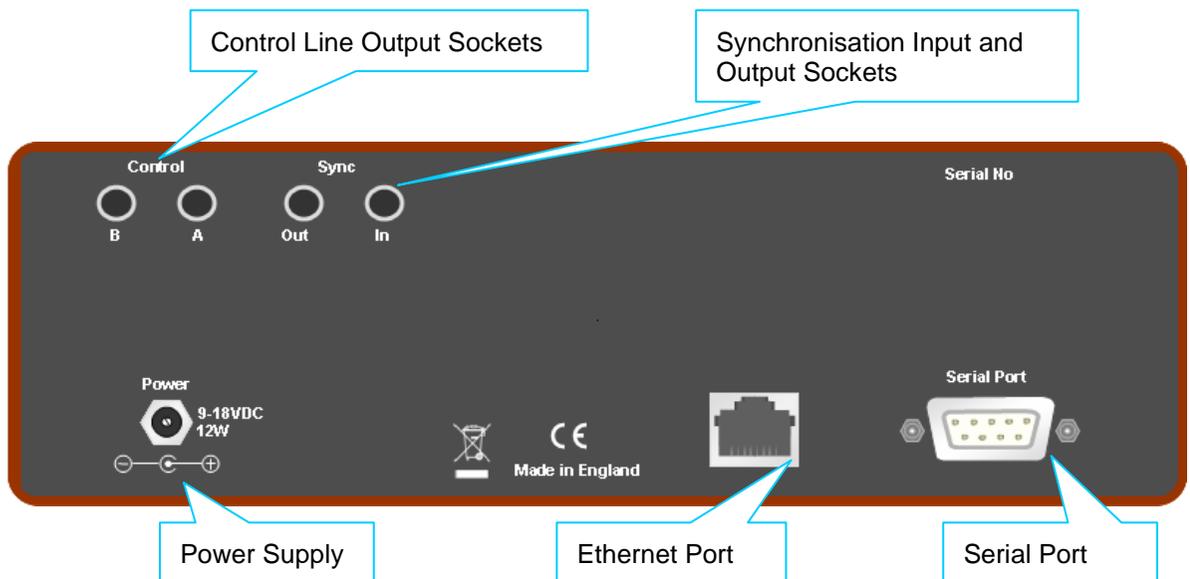
■ To automatically answer a call, a DSLA adapter can be constructed to include push-button call answering for mobile hands-free kits. MultiDSLA can be scripted to wait for a signal of a certain level (say -40dBm) to identify that the mobile is ringing and can then switch the Control Line.

Note: You are recommended to check the hands-free kit earpiece to ensure that the listener can hear the ring tone. Sometimes it is necessary to place the phone in silent mode to enable ringing in the earpiece.

■ To automatically initiate a call from the mobile is more difficult:

- Some mobiles support a call-again facility using a single push-button. If the number to call is programmed into the mobile phone, then this call-again function will be sufficient to initiate the call.

- Other mobiles support voice-activated dialling. In this case the DSLA can generate the speech to initiate the calling sequence.

■ Some mobiles use a second button on the hands-free kit to implement push-to-talk (PTT). A DSLA adaptor can simulate the function of pushing to talk. MultiDSLA can be scripted to use the Control Line to turn on PTT, followed by a wait of say 250msec. Following the speech sequence, PTT must be turned off.

Connectors on the Back Panel

The connectors on the back panel of the DSLA are shown below.

These connectors are explained in the table below.

Control	Description
Power Supply	Requires DC supply in the range 9 to 18V. Mains adapter supplied accepts any AC mains supply in range 90 to 260 volts, 50 or 60 Hz.
Ethernet Port	Connects to a PC running MultiDSLA or a Ethernet connection.
Serial Port	Connects to a PC running DSLA or to a GPS device if required.
Control Line Output Sockets	The control lines provide you with a switch capability from the DSLA which can be programmed to occur during a test. Each control line contains two independent switch capabilities. Control lines can be used, for example, to operate the switch on a mobile phone hands-free port. This has the same effect as manually pressing the button on the hands-free kit.
Synchronisation Input Socket	You can use the Sync-In socket with a GPS device to achieve absolute start times for tests. This allows the timings of tests to be synchronised over any geographical distance and accurate one-way delay measurements to be recorded. **Note:** Accurate one-way delay measures do not require GPS if testing using a single DSLA
Synchronisation Output Socket	You can programme the Sync-Out socket within a tasklist to send a synchronisation pulse. An example of its application is to daisy chain together DSLA units to start them all speaking at the same time. **Note:** This is not currently supported by MultiDSLA.

Control and Synchronisation Socket Connections

The connection details for the three sockets are given in the table below.

Connection	Tip	Ring	Sleeve	Specification
Control Jack	Control 1	Control 2	Common	Stereo 3.5mm jack 9 volts maximum between control and common 3mA max current.
Synchronisation Input	Sync In	Common	Not connected	Stereo 3.5mm jack Requires pulse of at least +2 volts and 0.5ms duration. Triggers on leading edge.
Synchronisation Output	Sync Out	Common	Not connected	Stereo 3.5mm jack Produces +4 volt pulse and drives minimum load of 100 ohms.

Running Tests and Reports

Now that you have installed and set up the DSLA and installed the graphical user interface application, you can start to run tests and generate reports. For more information on how to do this refer to the Getting Started manual for MultiDSLA or the online help for MultiDSLA or the DSLA application as appropriate.

Upgrading the Firmware

The DSLA firmware is updated regularly to support the development of new features. The latest version is always available from the Malden Electronics Ltd. website www.malden.co.uk.

To upgrade your DSLA firmware:

1. From the home page, click **Support**.

2. On the **Support** page, click **Downloads**.

3. From the **Downloads** page, select the product **DSLAII**.

4. From the **DSLAII** page, select to save the firmware file to the folder **../Program Files/MultiDSLA/Firmware** or **../Program Files/DSLA/Firmware**, as appropriate.

Notes:

- The firmware file has the file extension **.epr**.

- If you have uploaded an incorrect version of the firmware by mistake, then you must restore the DSLA unit to its factory settings. See the section Troubleshooting below.

- You are strongly recommended that all your DSLAs run the same version of the firmware.

Troubleshooting

If there is a problem and your DSLA unit stops responding, the first thing to do is carry out a power cycle. If the DSLA fails to respond when you reconnect it you can restore the DSLA unit to its factory settings.

To restore the DSLA unit to factory settings, power up the DSLA and insert the tip of a ballpoint pen into the small hole on the underside of the unit.

If you have downloaded the wrong version of the firmware then restore the unit to factory settings before downloading the correct firmware as described in Upgrading the Firmware above.

Note: In the MultiDSLA Node Manager, the **Version** column shows the current version of the firmware or software, as applicable, for each node. When the DSLA has been restored to factory settings, the firmware version numbers have the letter **F** next to them. The DSLA User Interface shows the firmware revision in Help|About.

Calibration

The Calibration Cycle

The DSLA has a three year calibration cycle. Calibration can be performed only by Malden Electronics Ltd. Contact your supplier or us to arrange the return of the unit. We will test and re-calibrate the unit if necessary. A new calibration certificate will be returned with the unit.

Checking that a DSLA is Still In Calibration

The DSLA is a true RMS voltmeter, so there are two ways to check that a DSLA is still in calibration:

- Compare the DSLA's measurements of a sinusoidal waveform with those of another measuring instrument that is in calibration.
- Verify the sine wave output levels and frequencies with a known good instrument.

The software that measures the speech level is based on the signals observed at the A/D converter. If the sine wave measurements are correct then the speech level measurements must also be correct.

DSLA Hardware Features

The hardware features of the DSLA are listed below:

- Test Interfaces
  - Telephone (x2)
    - Connector RJ11
    - Impedance 600ohms or Complex
    - DTMF or Pulse dialling
  - Handset (x2)
    - Connector RJ22
    - Input Impedance 10Kohms
    - Output Impedance 25ohms
    - Frequency response 10…15000Hz
    - Maximum Output Level -18dBm
  - Signal Balanced (x2)
    - Connector 4mm sockets
    - Input Impedance 600ohms or 2Mohms
    - Output Impedance 600ohms
    - CMR >60dB
    - Frequency response 10…15000Hz
    - Maximum Output Level +10dBm
- Control Interfaces
  - Ethernet 10/100
  - RS232 Serial
- Measurement Capability
  - Delay to 1ms accuracy
  - Speech Level Range -65…+5dBm
  - Max Measurable Input +19dBm or 7Vrms
  - Min Measurable Input -75dBm
- Power supply
  - External 9-18VDC or
  - Universal mains power cube 90-264VAC 50/60Hz
- Audio Monitor Output
  - 13dB to 25dB below input
  - +6dBm maximum output
  - 25ohm output impedance

- Local Storage - 4MB
- Calibration Cycle - 3 years
- Operating Temperature - 2 to 40 ˚C (35 to 104˚ F)
- Dimensions (H x W x D) - 77 x 220 x 200mm (3.0 x 8.7 x 8.0 inches)
- Weight - 3kg (6.6 lb)

Conformance with Directives and ITU-T Recommendations

ROHS and WEEE Directives

The DSLA comprises materials that are considered safe. It is compliant with ROHS requirements.

The DSLA can be recycled. It contains a lithium battery which you should remove and dispose of separately. The instructions for disassembly and removal of the battery are given below.

Removing the Top Cover and Base Plate

Top Cover & Base Plate Disassembly
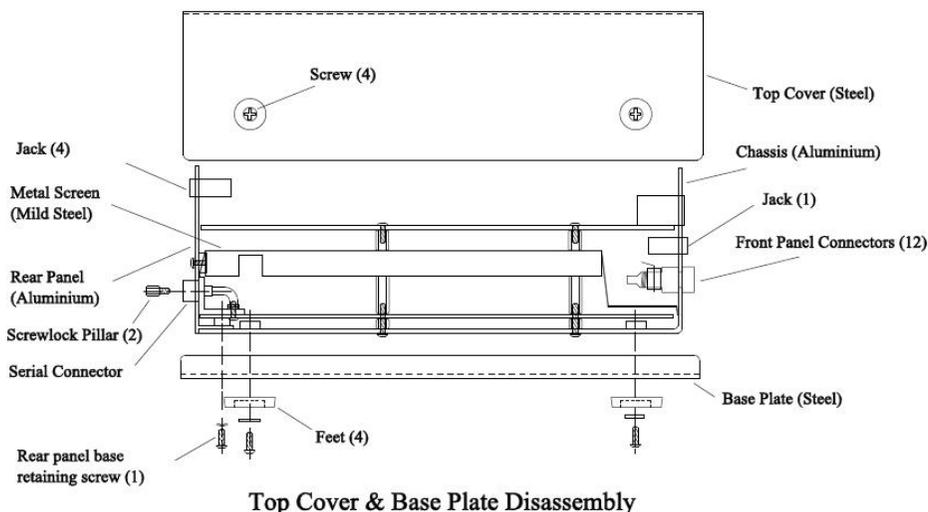
1. Remove 4 screws, 2 on each side of the DSLA, and remove the top cover.
2. Remove 4 jacks from rear panel and disconnect the panel from I.O. PCB.
3. Remove 1 screw from the centre rear of base plate.
4. Remove 2 screws from the rear panel.
5. Remove 2 screw lock pillars from the serial socket.

Removing the PCB and Screen
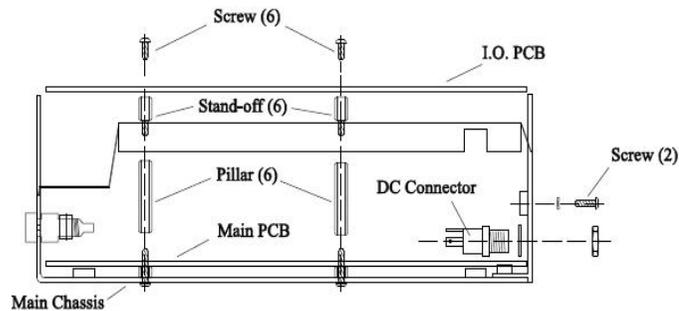
PCB & Screen Disassembly (S/No 4976 onwards)

1. Remove 6 screws holding the I.O. PCB and remove 3 ribbon cable plugs from their sockets.

2. Lift up the I.O. PCB and remove 5 white plugs from the headers.

3. Remove the I.O. PCB.

4. Remove 6 stand-offs above the metal screen

5. Remove the screen by pulling upwards and backwards.

6. Cut copper tape from around Ethernet socket and pull rear panel away from chassis.

7. Remove hex nut from the power socket on rear panel.

8. Remove 6 hex pillars holding Main PCB in place and remove Main PCB from chassis.

9. The Lithium battery, identified as BAT1 at the rear of the Main PCB, can now be unsoldered and removed from the board.

Note: At the end of its useful life, the DSLA can be returned to Malden Electronics or your supplier for disposal. Check the website for the return address and other contact details.

Other Directives and Specifications

The DSLA complies with the requirements of:

- Council Directive 89/336/EEC(EMC)
- Council Directive 2006/95/EC(Safety/LVD)

The DLSA conforms to the following specifications:

Safety:

- EN 60950-1:2001, + A11 2004 First Edition

EMC:

- EN 55022:1998 + A1:2000 + A2 2003
- EN 55024:1998 + A1:2001 + A2 2003
- EN 61000-3-2:2000
- EN 61000-3-3:1995 +A1:2001

USA:

- Volume 47 Code of Federal Regulations Part 15:2004 Class B
- ANSI C63.4:2003

Russian Federation:

- Federal Communications Agency, Moscow, Russian Federation Declaration of Conformity registered number ДТ-589

ITU-T Recommendations

- ITU-T Recommendation P.56 Method B

Frequently Asked Questions

Q. **What type of cable is required to directly connect my PC to the DSLA?**

A. You need to use a 'straight through' (extension) serial cable or a crossed Ethernet cable, both supplied with the DSLA.

Q. **What are the minimum pin connections required for the serial cable?**

A. Refer to the table below.

PC (9-way)	PC (25-way)	DSLA)
2	3	2
3	2	3
5	7	5

Q. **How is the power lead wired?**

A. The mains power lead has three cores. Ensure that the correct connections are made to the mains power connector, as explained in the table below.

Core	Colour	Connect to:
Live	Brown	Live supply or terminal marked **L**
Neutral	Blue	Neutral or the terminal marked **N**
Earth	Green/yellow	Earth or the terminal marked **E** or with the earth symbol

Q. **How do I connect a DSLA to a PSTN connection?**

A. You must always use a two-line phone cable, or a modem cable. Some countries, for example the United Kingdom, use a three-line system to connect telephones to the PSTN. The third line is not required by the DSLA; using a three-line cable will stop tests from working.

Q. **How does the DSLA unit measure speech?**

A. A DSLA is a true RMS voltmeter which measures the mean active speech level in accordance with ITU-T Recommendation P.56 Method B. This technique provides accurate and repeatable measurements of the energy or amplitude of complex discontinuous signals found in telecommunications and signal processing applications.

Q. **Why can I not specify an IP network mask for DSLA?**

A. The DSLA does not initiate a communication as such it does not require a network mask. Network masks are used to determine if a destination is in a local or non-local network in order to decide if packets should be sent directly to the destination, or out via the default gateway/router. Since the DSLA always responds to an incoming connection it is able to automatically determine this information without the need for you to specify it.

Q. What is the maximum mean active speech level generated by the DSLA?

A. The peak to mean ratio of speech is typically 15-18dB so the DSLA will generate speech at the mean active speech level of 0dBm, with some headroom. The balanced outputs on each channel provide a clean signal at these (and lower) levels.

The telephone connections apply the signal directly to the network which clips around +8dBm (or less). Typically the mean active speech level on the network is about –26dBm, depending upon the country and specific network types.

The DSLA can generate a –20dBm mean active speech level signal, which will appear on the network at an appropriate level depending upon the network loss plan.

Q. What is a typical mean active speech level for a network?

A. The telephone connections apply the signal directly to the network which clips around +8dBm (or less). The mean active speech level on the network is about –26dBm, depending on the country and specific network types. The DSLA can generate a –20dBm mean active speech level signal, which will appear on the network at an appropriate level depending upon the network loss plan.

Q. How much speech material can I store on a DSLA?

A. You can store approximately 4.5 minutes of speech recorded at 8K sample rate, or 2.25 minutes of speech recorded at 16k sample rate. If you have speech recordings at both 8k and 16k, the maximum amount of speech material you can store will vary between the two values above.

Q. How can I use longer speech files than I can store on the DSLA?

A. When setting up a playlist, if you elect to use a speech file that is not local or that is too long to be stored in the DSLA memory, the file will be streamed. To stream a file, you need to have the requisite bandwidth available. The DSLA streaming buffer can handle approximately 16 seconds of speech material at 8k sample rate.

Q. I have uploaded the wrong firmware, can I reset the DSLA?

A. For more information on how to do this, refer to the section Troubleshooting above.

Q. Why do I see slightly different levels in a network when connected to different telephone line?

A. The exact level played into a network depends on the impedance match between DSLA and the network. The DSLA telephone connectors are 600 ohm terminated. However, the signal developed across the phone line depends on the impedance presented by the phone line and line card at the switch. The impedance of the phone line is proportional its length. The line-card in the switch compensates for the line length to deliver nominal 600 Ohm impedance but this compensation is not complete. These difference will introduce a variation in the actual level received by the network.

Q. What are the impedance settings for the handset port?

A. The output impedance of the transformer-coupled handset port is 25 ohms. Its output level is 28dB below the level defined in the playlist or tasklist event. This optimises the dynamic range of the signal being fed to a microphone input amplifier in an IP phone or mobile phone.

The input impedance is 10k ohms.

Q. What does the complex impedance setting give?

A. 270 ohms in series with 150nF paralleled with 750 ohms, unless ordered with different values.

Q. Which edge triggers the Synchronisation Input

A. The Synchronisation Input socket requires a pulse of at least +2 volts and 0.5msec duration. The pulse initiates a measurement or speech event. The leading edge triggers the input.

Glossary of Terms and Abbreviations

ADC	Analogue to Digital Converter
ASTS	Artificial Speech Test Stimulus
DAC	Digital to Analogue Converter
dB	Decibels
dBm	Decibels referred to 1 milliwatt into 600 ohms
DHCP	Dynamic Host Configuration Protocol
DSLA	Digital Speech Level Analyser
DSP	Digital Signal Processor
DTMF	Dual Tone, Multi-frequency
GPS	Global Positioning System
Hz	Hertz
ISDN	Integrated Services Digital Network
LAN	Local Area Network
PCB	Printed Circuit Board
POTS	Plain Old Telephone System
ms	milliseconds
RJ	Registered Jack
RJ11	A four-wire connector used primarily to connect telephone equipment in the United States and elsewhere.
RJ22	A four-position modular jack that is typically used for connecting telephone handsets to telephone instruments; RJ22 jacks are usually wired with four conductors.
ROHS	Removal of Hazardous Substances
TCP/IP	Transport Control Protocol/Internet Protocol
WEEE	Waste Electrical and Electronic Equipment

Contacting Malden Electronics

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Software Updates

The current releases of the DSLA firmware is always available from the website.

Technical Support

Before contacting Technical Support, you should check this manual and online help. If you still cannot solve the problem, you can obtain product support in the following ways:

- If you purchased your DSLA through a distributor then contact your supplier.

- If you purchased your DSLA directly from Malden Electronics Ltd then either contact us by telephone or email Technical Support at support@malden.co.uk. You will receive a reply by email.