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DSU500 V2

adpcm compact audio player

Manual iss1.01 12-04-18



Features

- Cost effective
- Highly efficient 25W Class D amplifier
- Compact unit with integral fixing points
- Screw terminals for ease of installation
- Line out for driving external amplifiers
- 4 direct access trip inputs
- USB port for drag and drop data transfer
- Power Supply included
- On board memory
- USB powered for programming
- Random and Sequential Tripping
- Variable Lockout Timers

www.goldingaudio.co.uk

Quick start.

4. Encode your audio to Microsoft ADPCM MONO .wav files and save as '001Track1.wav' etc
5. Connect the USB lead to the PC and replace the test files already preloaded on the DSU500 with your new files.
6. EJECT the DSU500 from Windows.
1. Connect DSU500 to 12-24v power source.
2. Connect speaker.
3. Connect external switches to trip inputs.
7. Disconnect USB and start playing.
- 8.

Files.

Before operating the DSU500, it has to be loaded with sound files and control files as listed below.

All sound files are stored in a directory (folder) named 'AUDIO'.

The INIT.txt file and DS2_500v2_00.hex files are stored at the root of the drive.

```
INIT.txt
DS2_500V2_00.hex
AUDIO\
001Track1.wav
002Track2.wav
003Track3.wav
004Track4.wav
```

Audio files.

The four files listed above that end with '.wav' are the audio files and must be encoded as Microsoft ADPCM MONO files with a sample rate of either 48KHz, 44.1KHz, 32KHz or 16KHz.

For sounds with high frequency components, we recommend using either 44.1KHz or 48KHz sample rates.

We suggest a program such as Adobe Audition to create the ADPCM audio files from your original audio files.

Stereo files will not playback, please ensure you convert stereo files to MONO before encoding to Microsoft ADPCM.

The audio files must be placed in the 'AUDIO' folder.

INIT.TXT

The 'INIT.txt' file is a control file and configures the DSU500's various features such as how the trip inputs operate.

This file must only be edited with a pure text editor such as 'Notepad' in Windows.

The INIT.txt file contains the following data:

```
/Debounce           =50;      Debounce time in mS
/Invert             =0000;    Normally closed bits, inverts trips '1234'
/Oneshot            =0000;    One shot bits '1234'
/Interrupt           =1;
/TripPol             =0;      0 = active low trips, 1 = active high trips

/Seqtrip1           =0;      Set to 1 to sequence messages on trip1. Name tracks 101, 102 etc
/Seqtrip2           =0;      Set to 1 to sequence messages on trip2. Name tracks 201, 202 etc
/Seqtrip3           =0;      Set to 1 to sequence messages on trip3. Name tracks 301, 302 etc
/Seqtrip4           =0;      Set to 1 to sequence messages on trip4. Name tracks 401, 402 etc

/RNDMIN             =10;      Random timer minimum time (1 to 36000 seconds)
/RNDMAX             =120;     Random timer maximum time (1 to 36000 seconds)
/RNDTRIP            =0;      Random timer triggers sequencer or trip input (set to 0-4)

/TIMER              =30;      Fixed timer time (set to 1 to 36000 seconds)
/TIMTRIP            =0;      Fixed timer triggers sequencer or trip input (set to 0-4)

/LCKOUT1            =0;      lockout timer, prevents new trig on trip 1 for n seconds
                        (set to 0 - 3600 seconds)
/LCKOUT2            =0;      lockout timer, prevents new trig on trip 2 for n seconds
                        (set to 0 - 3600 seconds)
/LCKOUT3            =0;      lockout timer, prevents new trig on trip 3 for n seconds
                        (set to 0 - 3600 seconds)
/LCKOUT4            =0;      lockout timer, prevents new trig on trip 4 for n seconds
                        (set to 0 - 3600 seconds)

/AMPDIS             =0;      0 = Amplifier enabled, 1 = amplifier disabled (for line level out use)
```

@

Help:

Interrupt values:

```
0      No interrupts allowed
1      Lower trips interrupt higher ones playing
2      Any trip can interrupt any other one playing
3      Self-interrupting allowed as well as any other interrupt
```

Description of commands.

/Debounce =50;

This command configures the time that the trip inputs have to be valid and stable before the DSU500 will respond. A value of 50 means the trip has to valid for 50mS. You may set any value from 10mS up to 5000mS. (5 seconds)

This can normally be left at 50 but if a particularly electrically noisy environment is causing false triggers, then raise this value to try and fix the problem.

/Invert =0000;

This command allows you to invert the operation of any or all of the trip inputs so that the trip is active when the trip line is open circuit.

For example:

```
/Invert =1000;           Trip 1 is inverted. Message 1 plays when Trip 1 is open circuit.
```

The above example could be used when the DSU500 is connected to a standard PIR sensor which has a normally closed contact output that opens when the PIR detects movement.

The numbers following the '=' sign can only be '1' or '0'

Trip 1 is the first digit, Trip 2 is the second digit etc

For example I wish to invert trips 3 & 4, I would set the command as follows:

```
/Invert = 0011;           Trips 3 & 4 inverted
```

/Oneshot = 0000;

This command configures the trip inputs individually to allow one shot triggering.

One shot triggering is used to prevent a track playing continuously even if the Trip remains active at the end of the sound track.

To re-trigger the track, the Trip must be released and then re-applied after the sound track has finished playing.

This would normally be used when triggering from a contact that remains closed for longer than the sound track such as certain PIR sensors and timer switches.

For example:

```
/Oneshot =1000;   Trip 1 is one shot enabled.
```

The numbers following the '=' sign can only be '1' or '0'

Trip 1 is the first digit, Trip 2 is the second digit etc

So for example I wish to one shot trips 1 & 4, I would set the command as follows:

```
/Oneshot = 1001;   Trips 1 & 4 one shot enabled
```

/Interrupt = 0;

This command configures how the DSU500 responds when another trip comes in while playing.

The four options are:

```
/Interrupt = 0;           No interrupt
```

While a track is playing, all trips are ignored.

```
/Interrupt = 1;           Priority interrupt
```

While a track is playing, trips of a lower value will be accepted and the current track will be cancelled.

```
/Interrupt = 2;           Any other interrupt
```

While a track is playing, any other trip will be accepted and the current track will be cancelled.

If two trips are active at the same time, the lowest one will take priority.

`/Interrupt = 3;` Any and self-interrupt

While a track is playing, any other trip will be accepted and the current track will be cancelled. If the same trip is released and then re-applied, the track will be restarted from the beginning. If two trips are active at the same time, the lowest one will take priority. More options will become available in the near future.

`/TripPol = 0;` Trip Polarity

This command sets the polarity of the four trip inputs.

The trip inputs can be configured to activate when switched to ground (default Active low) or activated when supplied with a voltage (active high).

`/TripPol = 0;`

Active low trips with internal 10k pull-up to 5v. Pull trip to ground (0v) to activate. The trip must be pulled down to <1.2v to activate.

`/TripPol = 1;`

Active high trips with internal 10k pull-down to 0v. Feed the trip input with a DC voltage >1.5v to activate. The trip inputs will safely accept up to 24v.

Sequence trips

`/Seqtrip1 = 0;` Enable sequencer on trip 1

`/Seqtrip2 = 0;` Enable sequencer on trip 2

`/Seqtrip3 = 0;` Enable sequencer on trip 3

`/Seqtrip4 = 0;` Enable sequencer on trip 4

Set any of the four items above to '1' to enable a sequencer on that trip input.

The audio files need to be numbered as follows:

Trip 1 sequencer, 101name.wav, 102name.wav, 103name.wav, 104name.wav etc

Trip 2 sequencer, 201name.wav, 202name.wav, 203name.wav, 204name.wav etc

Trip 3 sequencer, 301name.wav, 302name.wav, 303name.wav, 304name.wav etc

Trip 4 sequencer, 401name.wav, 402name.wav, 403name.wav, 404name.wav etc

The sequencer will reset back to the first number when a file is not found in the sequence.

All four sequencers are totally independent and can be used with different quantities of files.

You may have up to 99 audio tracks per sequencer.

The interrupt priority (`/INTERUPT=?;`) works on the trip numbers, NOT the audio file numbers.

If a trip is held on after the end of the audio track, that same track will LOOP. To prevent this, set the ONE-SHOT bits in the init file.

DO NOT USE INTERRUPT MODE 3 IF USING SEQUENCER AS THIS CAUSES EVERY OTHER FILE TO BE SKIPPED.

Random timer.

/RNDMIN=10; Random timer minimum time (1 to 36000 seconds)
/RNDMAX=120; Random timer maximum time (1 to 36000 seconds)
/RNDTRIP=0; Random timer triggers sequencer or trip input (set to 0-4)

This random timer can be used to trigger one of the four trip inputs which in turn can also activate a sequencer on that trip.

The random timer is set up with a minimum time and a maximum time with the commands above.

The timer will then operate between those values. As soon as the timer times out, it will restart with a new random value.

The /RNDTRIP command is used to define the trip input to activate. Set it to 1 to activate trip input 1 or 2 to activate trip input 2 etc. Set to 0 to disable the timer.

If a sequencer is configured then the Timer will trigger the sequencer.

The 'PLAY' led (blue) will flash if the timer is timing and no audio is playing.

Fixed Timer

/TIMER =30; Fixed timer time (set to 1 to 36000 seconds)

This command defines the running time of the fixed timer. If enabled, the timer will reload with the value defined above as soon as it times out.

/TIMTRIP =0; Fixed timer triggers sequencer or trip input (set to 0-4)

This command defines the trip input to activate. Set it to 1 to activate trip input 1 or 2 to activate trip input 2 etc. Set to 0 to disable the timer.

If a sequencer is configured then the Timer will trigger the sequencer.

The 'PLAY' led (blue) will flash if the timer is timing and no audio is playing.

Lockout Timers.

/LCKOUT1=0; lockout timer, prevents new trig on trip 1 for n seconds (set to 0 - 3600 seconds)

This command is used to lock out the actual hardware trip input 1 from accepting another trigger while this timer is running. It starts when the trip input is received from the external input.

The timer will not operate if the command is set to '0'.

/LCKOUT2=0; lockout timer, prevents new trig on trip 2 for n seconds (set to 0 - 3600 seconds)

This command is used to lock out the actual hardware trip input 2 from accepting another trigger while this timer is running. It starts when the trip input is received from the external input.

The timer will not operate if the command is set to '0'.

/LCKOUT3=0; lockout timer, prevents new trig on trip 3 for n seconds (set to 0 - 3600 seconds)

This command is used to lock out the actual hardware trip input 3 from accepting another trigger while this timer is running. It starts when the trip input is received from the external input.

The timer will not operate if the command is set to '0'.

/LCKOUT4=0; lockout timer, prevents new trig on trip 4 for n seconds (set to 0 - 3600 seconds)

This command is used to lock out the actual hardware trip input 4 from accepting another trigger while this timer is running. It starts when the trip input is received from the external input.

The timer will not operate if the command is set to '0'.

If using one shot inputs, the trip input must be deactivated and reactivated after the lockout timer has expired to be able to re-trigger the input.

These lockout timers do NOT lockout the fixed timer or random timer triggers, they only work on the hardware (external) trip inputs.

Note: The 'PLAY' led (blue) will NOT flash when the lockout timer is timing.

/AMPDIS = 0;

0 = Amplifier enabled

1 = amplifier disabled (for line level out use)

This command disables the built in power amplifier if you wish to use an external amplifier from the 'Line out' connection. This will reduce power consumption and possible high frequency interference from the amplifier.

Notes:

1. The DSU500v2 will default to standard settings if the INIT.txt file is corrupt or missing
2. All commands start with '/' and end with ';'.
3. Any text allowed after the ';' on the same line only
4. Upper case or lower case characters allowed
5. Tabs and spaces are allowed within the command line for clarity
6. The last command must be followed with the '@' symbol.
7. Any text may be written after the '@' symbol

DS2_500v2_00.hex

This file contains the operating firmware of the DSU500v2 and is used to perform a firmware update for new features or bug fixes. This file will be available from time to time on our website.

The DS2_500v2_00.hex should always be present otherwise the DSU500 will take several seconds to be operational due to error codes being displayed.

The file is named DS2_500V2_00.hex which describes the following:

DS2_500	Hardware version
V2_0	Firmware Version 2.0
.HEX	Intel hex format of the data within the file

Connections.

Power

The DSU500v2 operates on 9 to 28v DC only such as from a regulated power supply or battery. Connect the power supply to the terminals marked +12-24V and GND observing correct polarity. The DSU500v2 has a reverse protection diode in the event of the polarity be incorrectly connected. You should use an external T2Amp fuse also.

Output

Connect a speaker with impedance of 4 to 16 Ohms to the terminals marked Spkr + and Spkr-. For maximum output, use a 4 Ohm speaker. You may alternatively connect an external amplifier to the Line out terminal and GND if the internal amplifier is insufficient. If using the Line out, disable the internal amplifier by setting `/AmpDis=1`;

Trips

The four trips can be connected to external volt free contacts and the common GND if configured as active low trip inputs `/TripPol = 0`;
Alternatively the trips can be fed with a voltage to trigger the unit if set to active high trips.
`/TripPol = 1`;

These trip inputs are used to initiate playback of the audio files or sequencers by momentarily activating relevant the trip input.

The trip inputs have internal pull-up resistors to 5v or pull-down resistors to GND depending on `/TripPol = ?`; in the INIT.txt file.

Note:

The trip inputs can safely accept up to 26v and can be driven from PLC's or 24v PNP sensors without damage.

Run out

This output can be used to control an external device such as a relay.

The output will pull to ground when an audio track is playing and will be open circuit when no audio is playing.

If driving a relay, you must fit a diode across the relay coil to suppress back emf.

See diagram!

Maximum capacity is 30v at 500mA.

USB port

This mini USB port is only used for loading the files onto the DSU500v2.

Always use the Windows Eject command before disconnecting the DSU500 from the PC.

Indicator LED's

Play led (Blue)

This led will be lit under the following conditions:

Normal operation.

This led will be lit when audio tracks are playing.

This led will flash if either the random or fixed timer is running while no audio is playing.

File loading.

The Play LED will light when the USB port is transferring data to the DSU500. The USB cable should not be disconnected while this led is lit and for 5 seconds after the led has gone off.

Firmware update.

The Play LED will light while the firmware is being written to the internal flash memory.

Error during Boot phase.

Will flash a code along with the red led.

Status led (Red)

This led will normally be lit steady when the power is on.

This led will flash a number of times to indicate an error code under certain conditions.

Primary error codes. (Red Led only flashing)

1. Not used.
2. File not found. (check naming is correct)
3. Incorrect file format. (Not Microsoft ADPCM)
4. File not encoded as MONO
5. No data chunk in file
6. Bits per sample wrong, must be 4
7. Sample rate above 48KHz
8. tbc
9. Not formatted

Loading the files.

To load the files onto the DSU500v2, you will need the following:

DSU500v2

USB to mini USB lead (Golding Audio can provide this)

PC or laptop

Power supply

ADPCM audio files to put onto the DSU500

The DSU500 will appear as another hard disc drive when connected to the PC and you will use standard windows drag and drop or cut and paste commands to move files between the PC and the DSU500.

Backing up the DSU500.

The DSU500 will be supplied pre-programmed with four test audio files as well as the 'INIT.txt' and 'DS2_500v2_00.hex' files.

Please make a backup of these files before loading your own files by following these instructions.

1. Create a folder on your PC named 'DSU500 backup' to save the DSU500 files into.
2. Connect the USB lead to the PC and to the DSU500.
Your PC will automatically load a mass storage driver for the DSU500 and after a few seconds, a window will appear prompting you what to do next.
3. Select 'Open folder to view files using Windows Explorer'
Note, If the prompt window does not appear, navigate to 'My Computer' and double click on the drive named 'DSU500 V2' to open the Explorer window for the DSU500v2.
You should now see the 2 files and a folder named AUDIO listed above.
4. Select and copy them to the folder made earlier as a backup.

Loading audio files onto DSU500

You should now select the audio files (.wav) on the DSU500 and delete them before copying your own files onto the DSU500.

Ensure that the audio files that you wish to load are named with the first three characters as numbers to indicate to the DSU500 which trip input will trigger them.

Example:

Trip input	Audio file
1	001 Track1.wav
2	002 Canon.wav
3	003 Fire .wav
4	004 dog.wav

As you can see, the first three characters must always be '001' to '004' but the rest of the file name can be whatever you like. The extension must be '.wav'

The audio files MUST be encoded as Microsoft ADPCM (4 bit) in mono only and with a sample rate of either 8KHz, 16KHz, 32KHz, 44.1KHz or 48KHz.

No other formats will work.

Either copy and paste or drag and drop your new audio files into the AUDIO folder on the DSU500v2.

The play led (blue) will light while the DSU memory is being programmed. You should not disconnect the DSU500 while the play led is lit during loading. It may take a while!

Wait for the files to copy over to the DSU500 and check that the blue play led has gone out.

If you need to alter the INIT.txt file to enable one shot trips or normally closed trips etc, it is best to make a copy of the 'init.txt' file located in your backup directory and save it with a different name such as: 'INIT sfx1.txt' so that you maintain a copy on your PC.

The first four characters must be 'INIT' and the extension must be .txt

Delete the current file on the DSU500 and then copy over the new one with the modified name.

Re-formatting.

In the unlikely event that the memory on the DSU500 becomes corrupt and you can no longer see the files under Windows Explorer, you will have to re-format the flash memory as follows.

NB. DO NOT use the Windows format utility, it won't work.

Unplug the USB lead if connected.

Disconnect power to the DSU500

Fit a wire link from Trip 3 and Trip 4 to GND on the main connector

While activating trip 3 & 4, insert the USB plug into the DSU500. This will power up the DSU500 from the PC and will automatically re-format the flash memory. If successful, a blank window will appear on the PC. Remove the trip3 & 4 wire link.

You may now drag and drop your files back onto the DSU500.

Firmware update procedure.

From time to time, Golding Audio will release new firmware for the DSU500 to add more features or fix minor bugs if found. This new firmware will be available via email directly from Golding Audio on request.

1. Obtain the new 'DS2_500V2?_?.hex' from Golding Audio.
2. DO NOT feed any power into the DSU500.
3. Connect the DSU500 to the PC via the usb port, this should power up the DSU500 and show the contents of the unit..
4. Delete the existing 'DS2_500.hex' file from the DSU500 and copy across the new .hex file.
5. Wait for the Blue LED to go out and then 'eject' the DSU500 from within Windows.
6. Disconnect the USB lead.
7. Now power up the DSU500 from a 12-24v DC source and you should see both RED and BLUE Leds flash error code 1 four times then the firmware will update.

Secondary error codes

These secondary codes are shown when in bootloader and updating firmware.

Both RED and BLUE leds flash together.

1. Firmware update about to start.
2. Firmware update successful.
3. Programmed firmware is missing or corrupt.
4. No .HEX file exists in flash memory to update firmware.
5. .HEX file is corrupt.
6. Firmware update failed.
7. Watchdog fired. (Activate trip 1 to skip)
8. tbc
9. Not formatted

Exporting audio file from Audacity to Microsoft ADPCM wav

1. Ensure that your audio file is Mono with the correct sample rate that you require.
If not you can find the options in the Tracks menu.
2. Click on File, then Export Audio.
3. In the Save as type option box select Other uncompressed files.
4. Now click on the Options button (This step is not needed with version 2.1.2 and above).
5. Select the following for the 2 options
Header: WAV (Microsoft)
Encoding: Microsoft ADPCM
6. Now click on the OK button.
7. Give your file a name as per the instructions (ensure the file extension is .wav)
and click on the Save button.
8. Click the OK button if the Edit Metadata screen appears.

Electrical specification.

Voltage	12-28V DC
Current	2.5A peak, 100mA standby
Trips	Four active low or active high inputs with de-bounce Individual normally open or normally closed Individual one shot options
Priority options	Non interruptible Any other trip interrupt Lower trip priority Self interrupt
Run output	1 x open drain, 500mA max at 30vdc
USB input	For loading audio and control files only
Audio format	Microsoft ADPCM (MONO only)
Sample rates	48KHz, 44.1KHz, 32KHz, 16KHz, 8KHz
Memory	On board 32Mbyte flash
Storage time	Approx 20 Minutes at 48KHz sample rate ADPCM Approx 32 minutes at 32KHz sample rate ADPCM Approx 65 minutes at 16KHz sample rate ADPCM
Number of audio files	up to 400
Digital resolution	16bit
Speaker output	Class D amplifier push pull 13W into 4 Ohms @ 12v input 25W into 4 Ohms @ 24v input
Line output	Variable to +3dB
Volume control	On board screwdriver adjustable control (now logarithmic)
Blue led for status	On when playing. Flashing while timer running. On when loading files. On when updating firmware. Flashes a code to indicate any errors while in Bootloader.
Red led for power status	On when powered. Flashes a code to indicate any errors.
Dimensions (WxDxH)	117mm x 75mm x 25mm