

<https://www.diyaudio.com/forums/class-d/325826-design-log-neat-2x170w-i2s-i2c-controlled-integrated-dsp-amp-tas3251.html>

Description

TAS Configuration management

This software is designed to ease development of a target use case of the TAS3251 without the TI EVM board. As the TAS is highly configurable and contains hundreds of registers to setup, development will mainly consist of designing and tuning the configuration of the DSP of the TAS, which will involve many design/tests/updates cycles: changing many times the hundreds of registers of the DSP.

Designing and tuning DSP is easily feasible with TI PPC3 software, but without TI EVM board, PPC3 can't connect to the TAS and interact with it. But PPC3 can produce an output file which content has to be loaded into TAS registers. This is a text file (a C .h header file). The board software allows to upload via a serial link the file coming from PPC3, process it and store it in the board EEPROM. The board software allows to store many files and to choose the one to play in order to do some comparisons.

PPC3 generated file contains 5 main blocs, only 3 are used :

- first bloc is C code example (ignored),
- second bloc is configuration data for the TAS,
- third bloc is DSP configuration data : FilterSet data for the TAS,
- fourth bloc is swap command required by the DSP to activate the Filterset data (ignored),
- fifth bloc is additional configuration data.

While uploading file, the software catch the configuration data and store them in one of the eight Configuration data memory in the EEPROM. It also catch the FilterSet data and store them in one off the eight FilterSet data memory in the EEPROM. Thus Configuration and FilterSet data are dissociated, this allows software to play any combination on the two. Config data contains clocking setup, audio stream parameter (I2S, TDM,..., # of bits, etc...), error detection, reset management, etc..., those are mainly in & out interface data and DAC data. The FilterSet data contains DSP data: the various coefficients.

In order to catch Config and FilterSet data, the software parse on line by line basis the incoming file while receiving it. It uses the following commands or marker to take actions. Commands are group of 4 characters or emptyline:

Command				Action
@	c	f	n	Name of the Config in memory
@	f	l	n	Name of the FilterSet in memory
/	/	w	r	Start of Filterset data bloc
c	f	g	_	Start of first Config data bloc
{		0	x	Load a couple register - data
/	/	s	w	Start of bloc 4 (swap command)
Emptyline				End of FilterSet data bloc

Typical usage is:

- Generate a file with PPC3,
- Edit the file

- before bloc 2 add @cfn [name on 12 char] and @fln [name on 12 char] commands to name the preset in board EEPROM (otherwise file name will be used)
- within bloc 2 add a register-data couple to set the number of bit of your data stream if it's not 24bits.
- Use as is or customize the file by changing / adding registers values.
- Upload it to NeatAmp.

At first startup, or when an issue is encounter with EEPROM, EEPROM is reinitialized. By default the software contains no configuration data and is not able to initialize the TAS. NeatAmp should be loaded with a configuration file in order to start TAS.

Housekeeping

The software also manage volume, balance, mono/stereo, left-right swap and TAS faults.

There's a basic UI with a rotary encoder, a push button and a multicolour led.

A serial monitor implement various serial commands.

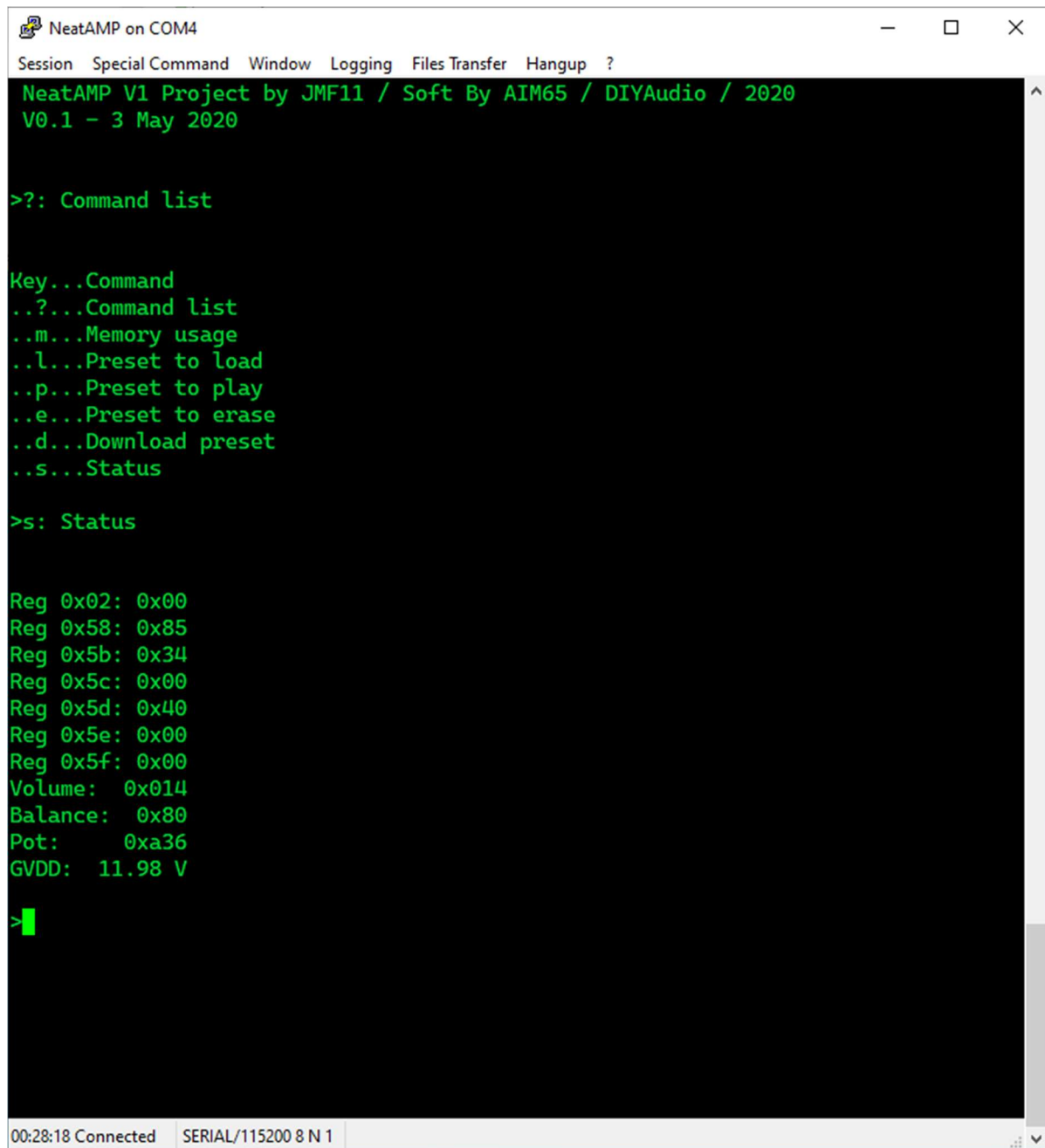
Configuration

- Serial link configuration: 115 200 bauds, 8bits, 1 Stop, No parity, No flow control
- File transfer protocol : YMODEM
- Terminal tested: Ok with ExtraPuTTY (www.extraputty.com) but KO with Tera Term.
 - Enable VT100
 - Set screen size to 80*40

Screenshots

Screens produced by the serial commands.

Startup screen + Command List (?) + Status (s)



```
NeatAMP V1 Project by JMF11 / Soft By AIM65 / DIYAudio / 2020
V0.1 - 3 May 2020

>?: Command list

Key...Command
..?...Command list
..m...Memory usage
..l...Preset to load
..p...Preset to play
..e...Preset to erase
..d...Download preset
..s...Status

>s: Status

Reg 0x02: 0x00
Reg 0x58: 0x85
Reg 0x5b: 0x34
Reg 0x5c: 0x00
Reg 0x5d: 0x40
Reg 0x5e: 0x00
Reg 0x5f: 0x00
Volume: 0x014
Balance: 0x80
Pot: 0xa36
GVDD: 11.98 V

>
```

00:28:18 Connected SERIAL/115200 8 N 1

Display memory usage (m)

```
NeatAMP on COM4
Session Special Command Window Logging Files Transfer Hangup ?
NeatAMP V1 Project by JMF11 / Soft By AIM65 / DIYAudio / 2020
V0.1 - 3 May 2020

>m: Memory usage

Config#      Free  Name
-----
  1          N  4W_48k_32b_V  - Active
  2          N  4W_48k_16b_V
  3          N  4W_48k_24b_V
  4          Y
  5          Y
  6          Y
  7          Y
  8          Y

Filter Set#  Free  Name
-----
  1          N  Basic_Volume  - Active
  2          Y
  3          Y
  4          Y
  5          Y
  6          Y
  7          Y
  8          Y

>
```

00:34:47 Connected SERIAL/115200 8 N 1

Choose memory to download (I)

```
NeatAMP on COM4
Session Special Command Window Logging Files Transfer Hangup ?
NeatAMP V1 Project by JMF11 / Soft By AIM65 / DIYAudio / 2020
V0.1 - 3 May 2020

>l: Preset to load

Config#      Free  Name
-----
1           N   4W_48k_32b_V - Active
2           N   4W_48k_16b_V
3           N   4W_48k_24b_V
4           Y
5           Y
6           Y
7           Y
8           Y

Filter Set#  Free  Name
-----
1           N   Basic_Volume - Active
2           Y
3           Y
4           Y
5           Y
6           Y
7           Y
8           Y

Choose where to store downloaded file.

Press 'a' to cancel
Choose Config memory (1-8) : 4

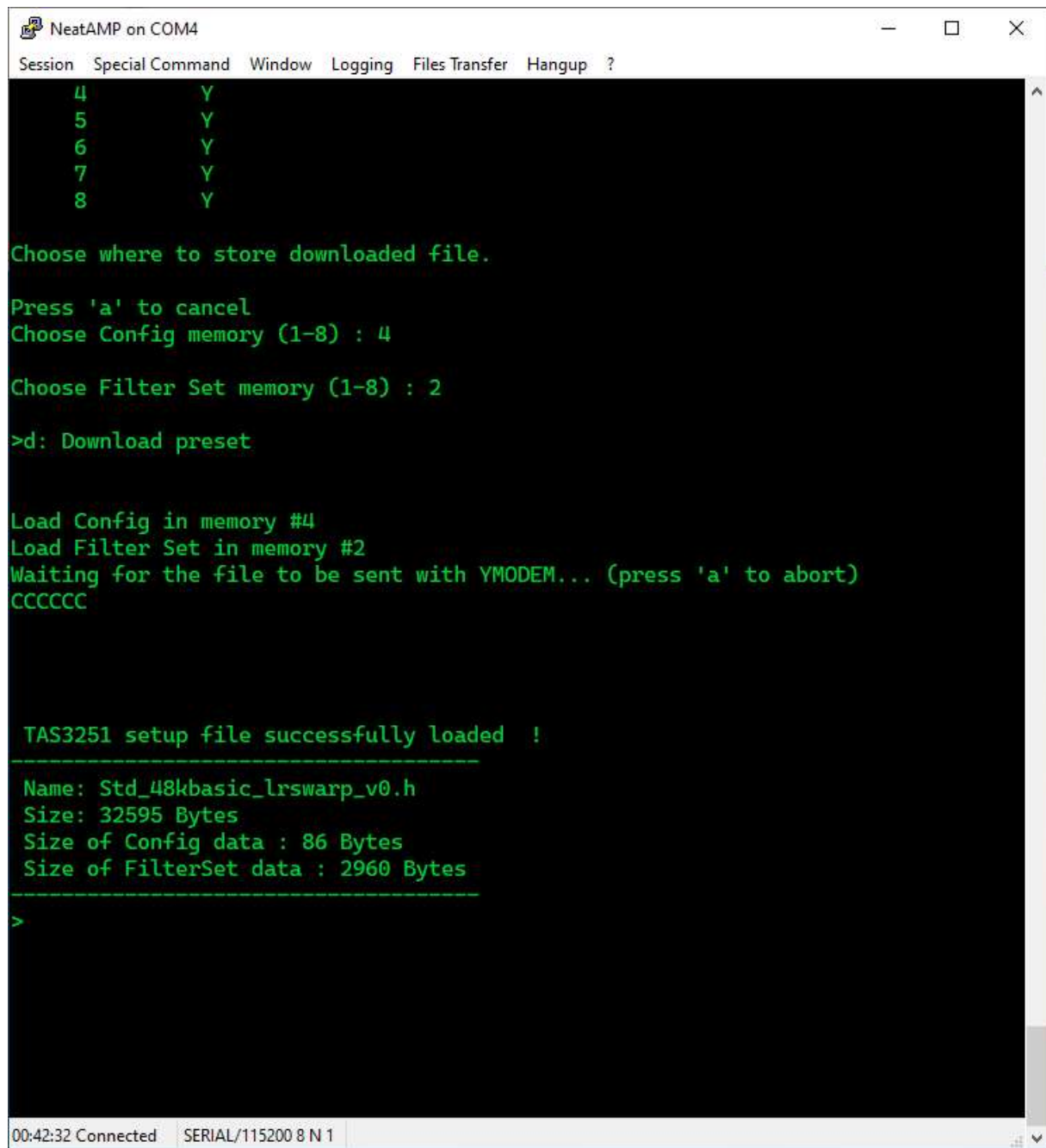
Choose Filter Set memory (1-8) : 2

>
```

00:33:36 Connected SERIAL/115200 8 N 1

Active is the one currently load in the TAS

Download a file command (d)



```
NeatAMP on COM4
Session  Special Command  Window  Logging  Files Transfer  Hangup  ?

  4      Y
  5      Y
  6      Y
  7      Y
  8      Y

Choose where to store downloaded file.

Press 'a' to cancel
Choose Config memory (1-8) : 4

Choose Filter Set memory (1-8) : 2

>d: Download preset

Load Config in memory #4
Load Filter Set in memory #2
Waiting for the file to be sent with YMODEM... (press 'a' to abort)
CCCCC

TAS3251 setup file successfully loaded !

-----
Name: Std_48kbasic_lrswarp_v0.h
Size: 32595 Bytes
Size of Config data : 86 Bytes
Size of FilterSet data : 2960 Bytes
-----

>
```

00:42:32 Connected SERIAL/115200 8 N 1

Choose preset to load in the TAS (p)

```
NeatAMP on COM4
Session Special Command Window Logging Files Transfer Hangup ?
4 Y
5 Y
6 Y
7 Y
8 Y

>p: Preset to play

Config# Free Name
-----
1 N 4W_48k_32b_V - Active
2 N 4W_48k_16b_V
3 N 4W_48k_24b_V
4 N ppc3_lrswap
5 Y
6 Y
7 Y
8 Y

Filter Set# Free Name
-----
1 N Basic_Volume - Active
2 Y
3 Y
4 Y
5 Y
6 Y
7 Y
8 Y

Choose setup to use for TAS

Choose Config memory (1-8) : 4

Choose Filter Set memory (1-8) : 1

>
```

00:53:25 Connected SERIAL/115200 8 N 1

Erase a preset (e)

```
NeatAMP on COM4
Session Special Command Window Logging Files Transfer Hangup ?

-----
1      N      Basic_Volume  - Active
2      N      ppc3_straigh
3      Y
4      Y
5      Y
6      Y
7      Y
8      Y

>e: Preset to erase

Config#   Free   Name
-----
1         N      4W_48k_32b_V  - Active
2         N      4W_48k_16b_V
3         N      4W_48k_24b_V
4         N      ppc3_lrswap
5         Y
6         Y
7         Y
8         Y

Filter Set# Free   Name
-----
1         N      Basic_Volume  - Active
2         N      ppc3_straigh
3         Y
4         Y
5         Y
6         Y
7         Y
8         Y

Press C# or F# (C1, F8,...) to delete a preset
Everything else will cancel : F2
>
```

00:51:07 Connected SERIAL/115200 8 N 1