Mp3Stamp
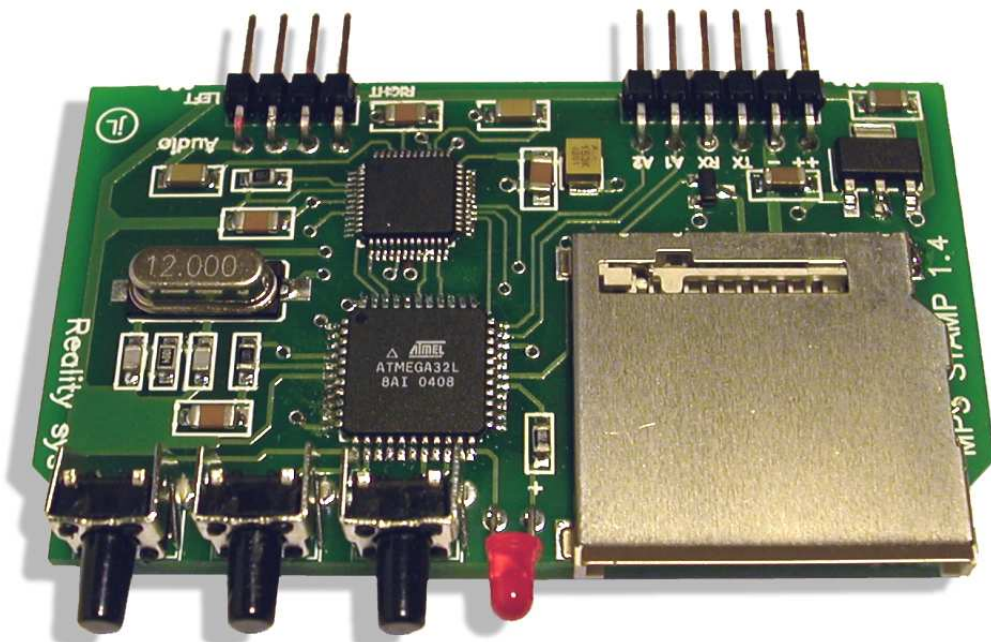# User's guide

Reality Sys

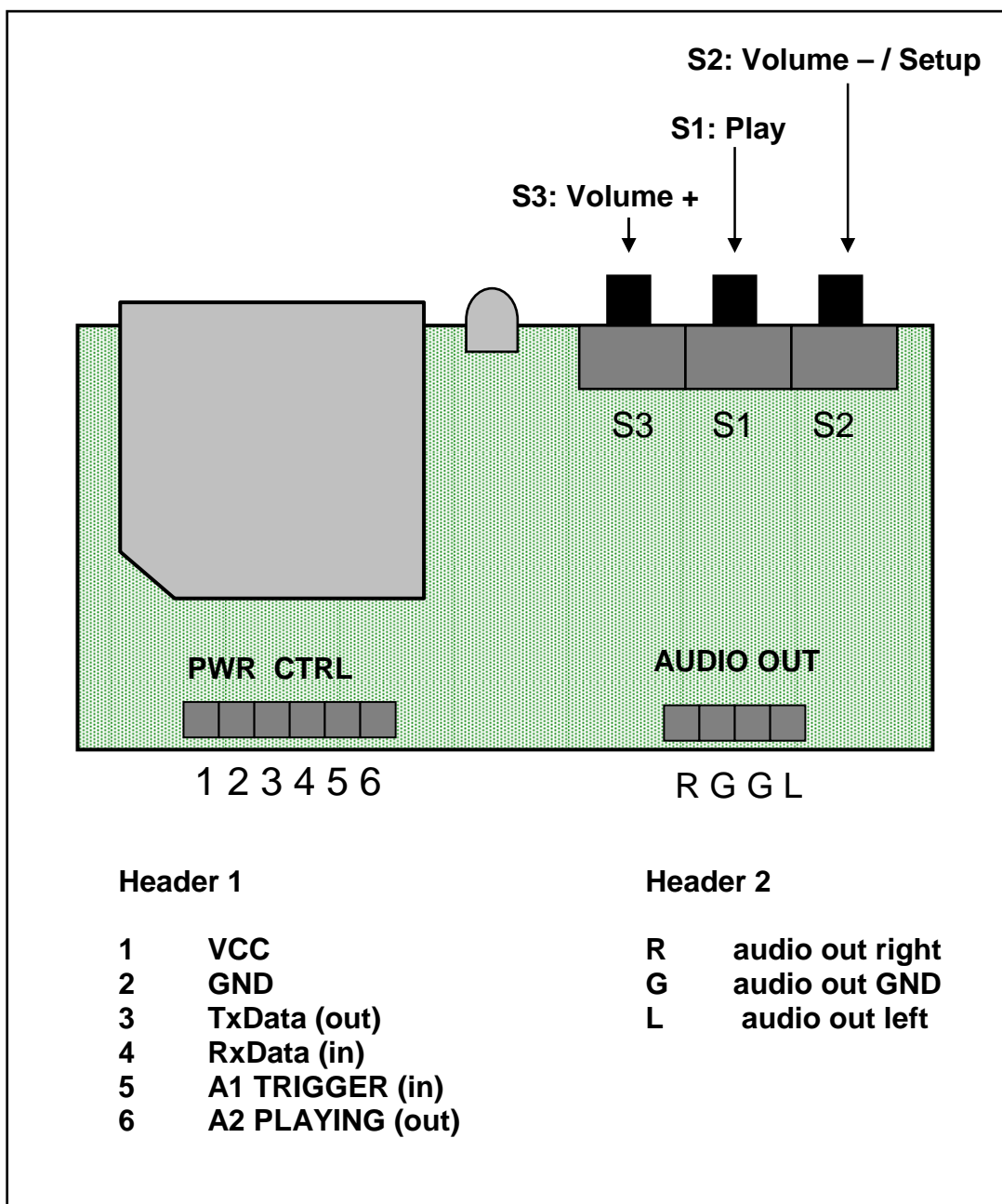# *Mp3Stamp*   # User's guide

Mp3Stamp has been designed as a sound module component to be integrated into any system that needs an audio stereo-hifi solution.
It just requires a single power supply and connections to operate.

The module can also interact with host device through serial communication or digital levels triggers and status

This document describes the electrical interfaces and the operation of the module

Connectors

Mp3Stamp is connected by 2 groups of headers with a 2.54mm pitch

S2: Volume – / Setup

S1: Play

S3: Volume +

S3   S1   S2

PWR CTRL   **AUDIO OUT**

1 2 3 4 5 6   R G G L

Header 1   **Header 2**

1	VCC		R	audio out right
2	GND		G	audio out GND
3	TxData (out)		L	audio out left
4	RxData (in)			
5	A1 TRIGGER (in)			
6	A2 PLAYING (out)			

POWER SUPPLY (1-2)

The module is powered by a DC voltage source in the range 5.5V to 12 volts.
Connect supply to pins 1 (+Vcc) and 2 (Gnd).
ATTENTION, polarity reversal may destroy the module.
Supply current for the module at 5.5V, is lower than 40mA. It may increase
depending on MMC card used.
MMC suply current depends of MMC size and type and may be from 20 to over
100mA.

AUDIO OUTPUT

It is possible to connect the module to a mono or stereo amplifier or to PC style
active speakers. Best results are obtained with input impedance for the amplifier
over 1kΩ and below 10kΩ.
It is also possible to directly connect headphones with high impedance (>32Ω)
into the audio output. Lower impedance should not be used directly, long-term
use could damage the audio outputs.
For lowest noise, use short connections to the amplifier and keep audio ground
apart from digital ground.

*Connecting power supply and audio output is enough to operate the module in
stand-alone mode. Play and stop of the audio tracks can be started with the
switches.*

TRIGGER INPUT

In single message applications, the start of the message can be triggered with
input A1 being driven low (0v). The A1 pulse minimum duration is 20ms, input
should be back to high state before the end of the track. Depending on the
configuration, it is possible to avoid that a second pulse on A1 while a track is
playing does re-start the track.
A1 has an internal pull-up to 3.3V, it should be controlled with a switch connecting
to ground, or with a device with an open-collector output.

A2 OUTPUT

A2 is an output indicating that a track is playing, a host device can pool this output
to be informed that the track is terminated.

A2 high = device playing
A2 low = stop

High = 3.3V
Low = gnd

A1

A2

audio
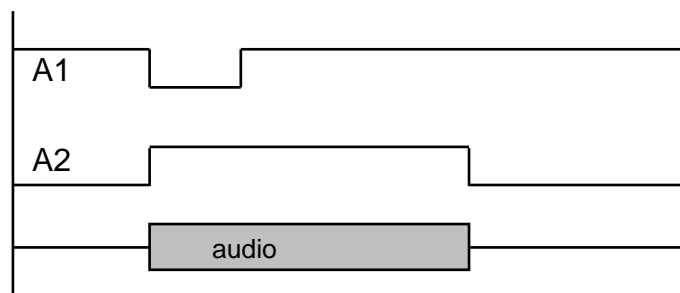
SERIAL PORT (3-4)

A lot more is possible with communication through this port.

Mp3Stamp has an asynchronous serial port. It can be connected directly to a microcontroller. The signals are of "UART" type at 0-3.3V levels. In the absence of data, the signal is at high level, a start bit is a transition from 3.3V towards 0V.

Pin 3 TxData is the output of the module and should be connected to Rx input of the host controller.
Pin 4 RxData is the input of the module and should be connected to TX from host.

To be connected to a PC serial port, a RS232 level shifter is required (ex: MAX232).

The interface must be configured with 9600 bauds, 8 data bits, no parity, 1 or 2 stop bits.

The module can be controlled and configured by this interface; PC/Windows utility demo software is available for this purpose.

The protocol is simple to implement and run on any platform, it can be used in one-way to send commands like play, stop, pause, goto track, volume…, or in bi-directional mode. In this case, the controller can obtain status informations such as the track's name, the duration remaining before the end of a track.

For a complete description of command set, please refer to document «Mp3Stamp Programmer's Guide».

ALTERNATE PIN CONFIGURATION

There is an alternate pin configuration that is available on request. In this mode, all four pins 3-4-5 and 6 are trigger inputs. This is the mode used with the io extender. Serial communication is not available in this mode.

MMC memory card

All sound files played by the mp3Stamp are mp3 files that are stored one the MMC memory card.
Audio files have to be encoded in mp3 format at a rate chosen by the user from 32 to 256kbits/s. Variable bit rate may also be used (VBR).
The hardware does include the license for decoding mp3 streams.

Once the files are available in mp3 encoding, there is no special software neded for preparing the card. On a blank card, just copy the mp3 files.
If the card is not empty, carry out a formatting (fast format option).

The module support FAT16 (<=32MB) and FAT32 file systems.
The maximum size for a file is 32MB.
Files must be copied into the root of MMC card, do not create folders.
In default mode, mp3 files will be played in the same order that they were copied to the MMC card.

Tip: to know the real order in which the files are stored on the card, on windowsXP explorer, use chose detail (in display) and select modification date, then sort on this column.

Check your files by playing them on the PC directly from MMC card.
Do not withdraw MMC card of its reader before the copy is fully completed, with a right click on the icon representing the card reader, choose "Eject".

AUDIO TEST and SETUP

With the power supply switched off, introduce MMC card into the slot, label up (gold contacts down and inside)

Switch on power supply. The led must light on for a couple of seconds, the module is doing a self test and reading files list, then led should go off. The module is waiting for a command.

Push on the center switch « PLAY », the first track should start. Led is flashing during the reading. Another pressure will play the next track if present, or loop back to first.

Using the switches VOL- and VOL+ you can adjust the sound volume. Each pressure increases or decreases volume. The settings are stored and restored after a power off.

It's possible to replace memory card without shutting off the device, for that remove MMC card, press on the center's button, the led must remain lit (no card). Insert the new card and press once again on the center's button, led must light on then off, the module is ready to play.
To stop playing press simultaneously on the S2 and S3 buttons.

OPERATING MODE SETUP

For stand-alone applications (without a host controller) it is possible to configure the Mp3Stamp to work in one of the 3 following modes:

MODE 1   *CONTINUOUS PLAYER (repeater)*

On powering ON, the device plays the first track, at the end of this one, it starts again or continue to the following track if other tracks are present on the memory card. At the end of the last track it starts again with the first.
The device never stops.
A pressure on the PLAY button or an external starting command causes the immediate skip to the next track.

MODE 2   *SINGLE TRACK PLAYER (triggered)*

On powering ON, the device is on standby, waiting for a command. On an external trigger command, Mp3Stamp plays the track corresponding to the trigger, and stops at the end of the track.

MODE 3   *LOOP + SINGLE TRACK*

On powering ON, the module plays the first track, and loop on it indefinitely. On a trigger command, Mp3Stamp plays the track corresponding to the trigger, at the end of that it starts again to loop on track 1.

Selecting the mode of operation

Switch off power supply
Switch on power supply while holding S2 (VOL-) switch inserted.
The device must emit a continuous beep. Now, release the button the device emits repetitive beeps and the led light is flashing.

Press then on one of the 3 switches:

    S1 (TEST)   for MODE 1 - *CONTINUOUS PLAYER*
    S2 (VOL-)   for MODE 2 - *SINGLE TRACK PLAYER*
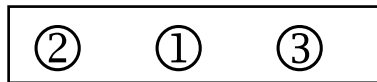   S3 (VOL+)   for MODE 3 - *LOOP + EVENT*

Device confirms by 1, 2 or 3 « beeps » upon your choice.

The setup is stored into permanent memory and will be used at each power on.

SETUP WITH SWITCHES

SHUT DOWN THE POWER

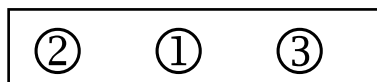RESTART THE POWER WHILE HOLDING A SWITCH PRESSED

| ②   ①   ③ |

👆   MODE SETUP

Wait beep then RELEASE THE SWITCH

led flashes, beep…beep…beep

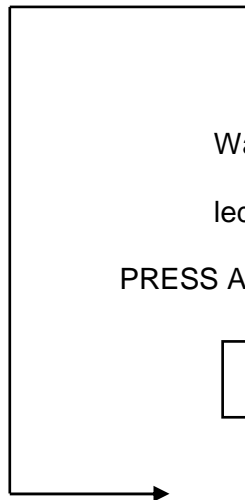PRESS A SWITCH AGAIN TO CHOSE *A **MODE SETUP***

| ②   ①   ③ |

👆MODE 2, single track

👆MODE 1, continuous player

👆MODE 3, loop and event

Additional parameters available by external configuration*
* With serial interface.

RETRIGGER LOCK

It's possible to prevent that a sequence is stopped during playing.

VOLUME LOCK

It's possible to prevent buttons (S2, S3) use for volume modification.

INDEXED FILES

In standard mode, the file which will be played on "play 1" command is the first copied on the MMC card, "play 2" the second file and so on.
The name of the file may be whatever you want.

When you drag and drop several files at once towards a MMC card, it is not guaranteed that Windows will copy in the order of displayed in explorer.
To avoid this problem, the "indexeded file mode" uses predefined mp3 files names format.

In this mode, each file <u>must</u> be named like: ANNNNXYZ.MP3

E.G.:

      A0001XIT.MP3
      A0025.MP3
      A0011DEB.MP3

The first character must be capital letter "A", then 4 digits representing the number followed if needed by useful characters (3 maximum) to describe the file and finally the extension "MP3" (! MAC).

Firmware upgrade

It's possible to change the software operating inside the mp3stamp.
Different software are available and can be customized for specific applications.
The new software is loaded into the mp3Stamp from an MMC memory card.
Call RealitySys for more information on this feature.

IN CASE OF TROUBLE

The LED on the module gives indications on its operation.

At powering ON, the led lights on and remains lit during initialization of the module and MMC card. If the memory card is not recognized or it does not contain valid files, led remains lit at the end of initialization. During playing, led is flashing, rate depends on the bitrate.

LED do not light on.

Check power supply

On starting, MP3stamp emits a « beep », LED lights on and do not light off.

Is MMC card well inserted ?
Are there mp3 files on the card ? (see Preparation of the MMC memory card)
If using "Indexed file mode", are the files well named upon convention ANNNNXYZ.MP3 ?

After a trigger or play command, the led flash slowly but no sound is heard.
Check the volume level and audio connexions.

Instead of hearing the sound of a file, there is simple "a beep"

When the module meets a file which does not contain mp3 data, it emits a brief "beep", then go to the next file if it's in the mode tracks after track (mode 1).
Check that your card does not contain hidden files, or not mp3 files. It's frequent with the cards recordeded with Apple MAC.

When the sounds are very weak, a whirr is perceived.

Power supply should be better filtered.Improve decoupling of your power supply.
If the distance is long between the audio output of the module and the amplifier, use shielded cables.
If you can adjust the volume of your amplifier, preferably choose a high level at the MP3stamp output and less gain from the amplifier.

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Technical specifications

Recording Format :	Digital mp3, 32->256kbs + vbr,
Sample frequency :	22khz or 44khz, mono or stereo.
Bandwith (-3db):	20 – 20khz
Output impedance :	> 1KΩ
Separate stereo :	> 58db
S/N :	> 92db
Track access time :	< 100ms
Output Level at 0DB 10K :	700mv
Interfaces :	Serial port and logical levels
Connectors	2 headers SIL 2.54mm
Processors :	2 (CPU RISC + DSP)
Recording media:	Flash MMC « MultiMediaCard »
Power Supply :	5.5VDC-12VDC
Start playing :	By closing contact
Communication :	Serial asynchronous 9600,8,N,1

Recording duration:

MMC Card	comments	+ music	« CD » quality
16MB	60 min	45 min	20 min
32MB	2 h	90 min	40 min
64MB	4 h	3 h	80 min
128MB	8 h	6 h	160 min
256MB	16 h	12 h	5h 30 min
512MB	32 h	24 h	11 h
1GB	64 h	48 h	22 h