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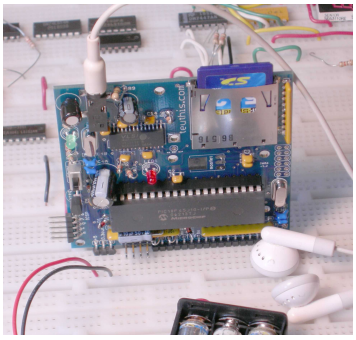
Daisy

v1.4 May. 2009



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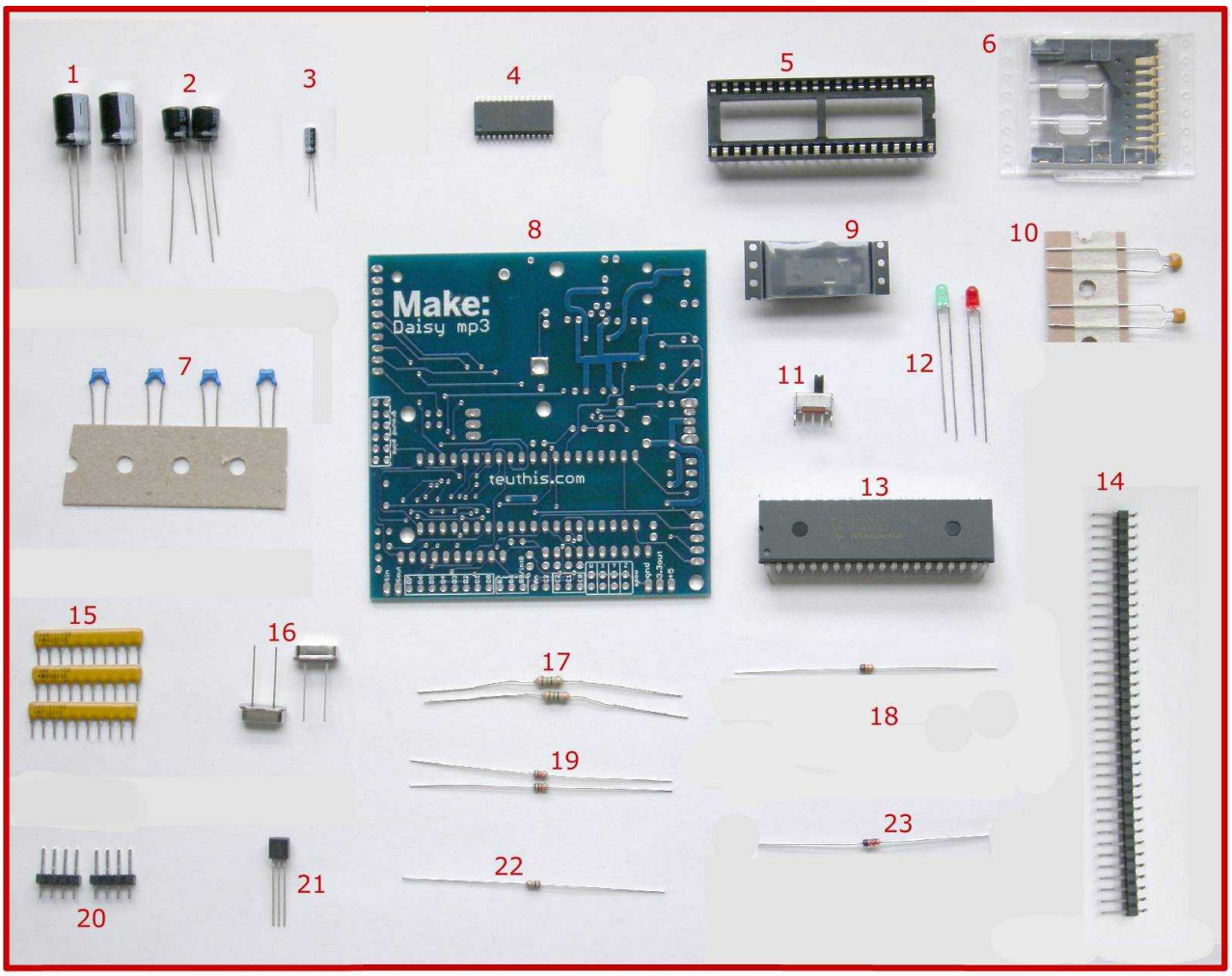


1: 2200uF capacitor
2: 100uF capacitors
3: 10uF low ESR capacitor
4: VS1011 decoder chip
5: 40 pin DIP socket
6: SD/MMC socket
7: 22 pF capacitors
8: printed circuit board
9: headphone jack
10: .1uF capacitors
11: slide switch
12: LEDs
13: PIC18F45j10
14: pin headers
15: 10K resistor networks
16: crystals
17: 15 ohm resistors
18: 10K resistor
19: 1K resistors
20: pin headers
21: voltage regulator
22: 1M resistor
23: diode

Soldering: Start with the decoder chip. Then do the stereo jack and the MMC/SD socket. Then all the resistors and resistor networks. Follow that with the 40 pin socket and all the remaining components. Remember that the LEDs, diodes, resistor networks, voltage regulator, and the four large capacitors are polarized, so they all have to be put in the right way. Also be absolutely sure to place the chips in the right direction. They have a dot or a notch on the end that has pin 1. On the parts placement diagram, all orientations are noted. The crystals, resistors, small capacitors (.1uF and 22pF) and the slide switch are not polarized, so they can go in either way.

Remember to put the resistor networks in the right direction! Note the dot on the resistor networks, it corresponds to pin 1 on the PCB.

.1 uF c1, c5,

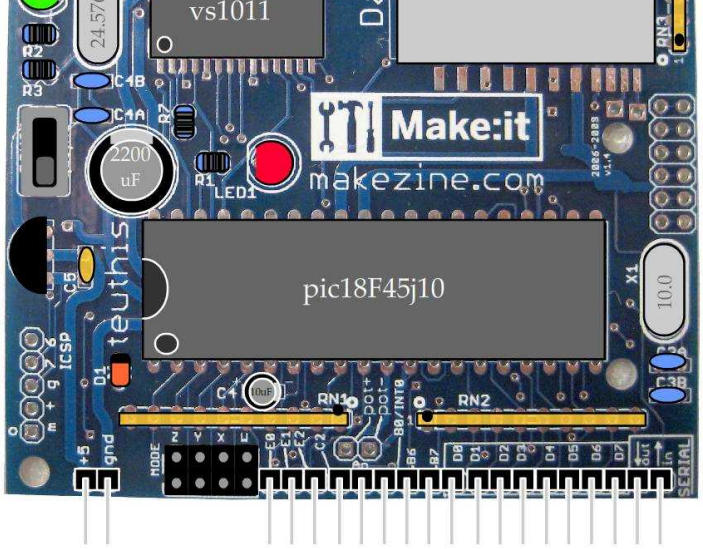
22 pF c3A, c3B, c4A, c4B

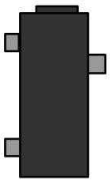
100uF For headphone outputs. These are the medium ones. c_L and c_R

2200uF,
For power filtering.
The large ones. c6, c7

low ESR 10uF,
For pic internal voltage regulator. It's the small sized one. c4

diode



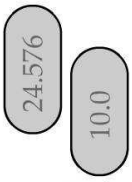


headphone jack

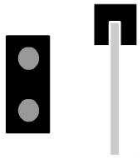
10K resistor network (note the dot!)

resistors:

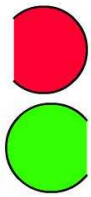
r1, r2:	1K	(brown, black, red, gold)
r3:	1M	(brown, black, green, gold)
r8, r9:	15ohm	(brown, green, black, gold)
r7:	10K	(brown, black, orange, gold)



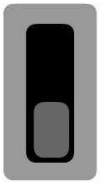
crystals



jumper and header pins



LEDs



power switch

3.3 volt regulator

Daisy mp3 Operating Instructions v1.4

For tech support: raphael@teuthis.com www.teuthis.com

At this point you should have assembled the kit and loaded some music onto and MMC or SD card. The card has to be formatted FAT32 for the Daisy to read it. FAT16, HFS, NTFS, EXT3, and anything other than FAT32 will not work. Most cards come formatted as FAT16, so you should reformat them yourself. All the files have to be in the ROOT directory, which means that the mp3 files can't be in folders. Be sure there are ".mp3" file extensions on the filenames! The decoder can handle any type of mp3 file. Variable bitrate, high and low bitrates, mono, etc. are all fine.

Looking at the component side of the board with the large header pointing down, there are three power pins on the left, separate from the rest of the header. Hook anything from 3.6 to 6 volts onto the pin that says "+5" and hook the minus of your power supply to "GND". Make sure you don't have any of the jumpers on yet (all empty). Pop in a card and headphones and GO! You should have a steady power light (green) and a randomly flickering status light (red). Music should be coming out of the headphones at this point, assuming that the files on the card are all ok. The chip is programmed and tested, you don't need to re-flash it.

Not working yet? 99% of the time it's the soldering! Most likely there is a tiny little bit of solder bridging two pins, or maybe there is a cold joint somewhere. Re-apply heat to suspicious pins and use solder wick to clean up messy joints. Hold the board up to a bright light and use the shadows that go through to see if there's anything wrong. Use a good magnifying glass. Be patient!

Status Pin

While a song is playing, pin C2 will go high. When there isn't a song playing, it will go low. You may use this status pin for feedback with a microcontroller, or attach an LED with a resistor, for visual feedback. Or a transistor to turn on a load such as a motor.

Analog Volume Control

In Buttons, Shuffle, and Pin To Play modes:
If you keep pin E0 grounded, volume will be controlled by a voltage on the AN pin. The voltage can be obtained from a simple potentiometer set up as a resistor divider. Connect the outer pins to "pot+" and "pot-" and connect the middle pin to "An". Use a great big silly looking knob!

NOTE: Serial, Four Four and Parallel modes do not accept analog volume control.

Auto Advance Pin (Buttons and Shuffle modes only)

If pin E1 is held low during operation, the player will finish a track and then stop until further user input. If E1 is left floating or held high, the player will continue on to the next track automatically (default).

Jumpers

There are 6 modes, selectable by three jumpers labeled X, Y and Z. Jumper W selects either high speed SPI or low speed SPI for the MMC/SD card. The player only checks the jumpers at startup. After changing them, you will need to do a power cycle.

Jumper W: On = high speed, empty = low speed.

Try high speed first. It works with most cards, but not all. You may want to try all your cards out at high speed so we have an idea of just how compatible it is. If your song plays all choppy and weird, try high speed. If the player doesn't do anything at all, try low speed. Newer cards are usually compatible with high speed.

"Simple" Modes

The next two modes do not require any special file naming as long as they have a ".mp3" or ".wav" file extension:

BUTTONS MODE

Jumpers: X, Y and Z off

This is default, hand held mp3 player mode.

Momentarily grounding these pins controls things:

pin D0 = TRACK UP
pin D1 = TRACK DOWN
pin D2 = VOLUME UP
pin D3 = VOLUME DOWN
pin D4 = PAUSE
pin D5 = ZERO and STOP (this goes to track 1 and sets the volume to something reasonable)

This is easy with a joystick or buttons!

SHUFFLE MODE
Jumpers: Y on, Z and X off

Port D is a binary volume control. When momentarily grounded, pin B0/INT0 skips to the next randomly selected track. This mode uses analog noise and some simple algorithms to achieve truly random results, but with a buffer of about 10 songs so it won't play the same thing twice without at least a few songs between.

Wikipedia has an excellent article on the subject of randomness, and it was very useful in the development of this kit.

"Interface" Modes

For the following modes, the songs have to have a 5 digit numeral for the first five characters in their filename, with any amount of random information after that, and then a ".mp3" or ".wav" file extension.

Like this: "nnnnnx...x.yyy"

Above, "nnnnn" is a track number up to 65000, with leading zeroes, and "x...x" is a bunch of optional characters that the player will ignore. The ".yyy" is either ".wav" or ".mp3" and is not case sensitive. The limit on file name length is 65 characters, including the leading number and the trailing file extension.

Here are some examples of working file names:

"00001.mp3" = track 1
"00002.MP3" = track 2
"00003goblettygook and spaces too.mP3" = track 3
"20007canyoubelieveit_icant.Mp3" = track 20,007
"23430*&^@%$#!if your OS can do this, then so can I.WAV" = track 23,430
"00001000_this_reads_as_track_one__NOT_1000.mp3" = track 1
"00001so does this02.mp3" = track 1

These will NOT work:
"1.mp3" - not enough zeroes
"0001.mp3" - not enough zeroes
"gooofer00001.mp3" - non numerical characters before numbers

FOUR-FOUR MODE

Jumpers: X and Y on, Z off

This will play songs 00000 through 00015.

To use: Port D, labeled "D0" - "D7", is split into two groups of four, one group controls volume, and the other controls the track number. The "B0/INT0" pin is used to strobe in the track selection.

Pins d0-3 select the track number. You have a 4 bit nibble so that gives you 16 songs to choose from. Select the track number, then momentarily bring B0/INT0 low.

Pins d4-7 select the volume level. You have a 4 bit nibble so that gives you 16 levels to choose from. No need to use the strobe line.

PARALLEL PORT MODE

Jumpers: Y and Z on, X off

This will play songs 00000 through 00255.

To set the track number, use port D pins 0-7 as a binary byte. Leave E0 either floating or pull high. Once these are set up, momentarily pull B0/INT0 down. The track you select should start right up.

To set the volume level, use port D pins 0-7 as a binary byte. Pull E0 low. Once these are set up, momentarily pull B0/INT0 down. The volume will change.

PIN TO PLAY

Jumpers: X, Y and Z all on

This will play songs 00000 through 0007.

No digital volume control, you need to use the volume control on your amp, or an in-line control on your headphone line. Or analog volume control as described above.

Momentarily pull one of the port D pins low and the track corresponding to that pin will play. Pull down D3 and track "00003xxx.mp3" will play. If you pull down a pin during playback, the current song stops and the new one immediately starts. Response time is about 1/2 second.

FULL SERIAL MODE

Jumpers: Z on, X and Y off

The following mode uses an rs232 style serial port. The port is set up for 9600 baud, 8N1 format. You may or may not need inverters and drivers depending on your system configuration. A Basic Stamp, a PIC an AVR, or almost any other micro can communicate over this kind of link.

Full Serial Mode takes either one, two or three byte commands. The commands are case sensitive.

To set track number: send an ascii "t" and then two bytes, high byte then low byte. The second two bytes are not ascii, they are just pure bytes. So sending an ascii "0" is actually sending a 0x30 (decimal 48). Be careful in your code! Values up to 65000 are accepted, so this mode is capable of addressing much more of the card than any other mode.

To set the volume of the left speaker: send an ascii "l" (lowercase L) and then one non-ascii value byte from 0 to 255.
To set the volume of the right speaker: send an ascii "r" and then one non-ascii value byte from 0 to 255.
To set the volume of both speakers: send an ascii "v" and then one non-ascii value byte from 0 to 255.
To set looping mode OFF send an ascii "a". (default mode)
To set looping mode ON send an ascii "b".
To toggle pause, send an ascii "p".
The "song kill all stop no pause" command is ascii "k".

As in all modes, while a song is playing pin C2 will go high. When there isn't a song playing, it will go low. You may use this for feedback with a microcontroller, or attach an LED for visual feedback.