

Main: RetroCadeMegaWing

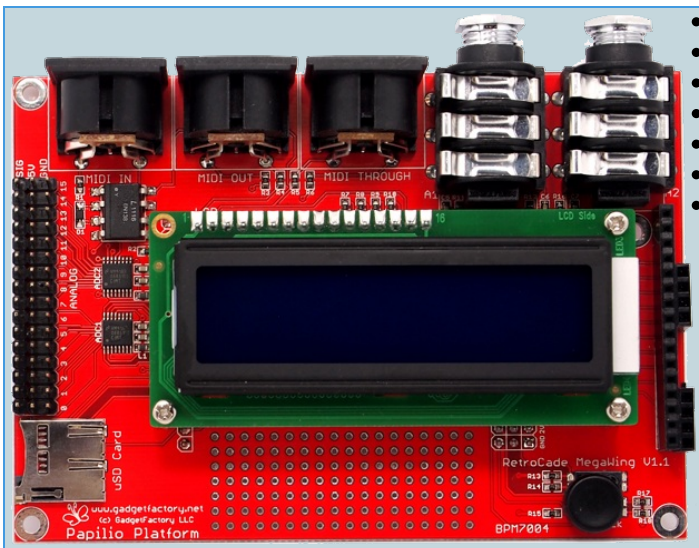
Hardware | Hardware Overview - RetroCade MegaWing - Papilio Pro

RetroCade MegaWing

The Open Source RetroCade MegaWing provides all of the audio hardware needed to make sweet retro music in one convenient and easy to connect circuit board. It snaps into the Papilio Pro and gives it the necessary hardware resources to communicate with the outside world. Continue reading for more information about each hardware section of the RetroCade MegaWing.

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- 2 – 1/4” Stereo Audio Jacks with 18 bit Delta Sigma DAC
- MIDI – In, Out, Through
- uSD Card for MOD, MIDI, YM, SID, and config files
- MicroJoystick – 4 directions, Select
- 2x16 LCD Display
- 16 Analog inputs for sliders and knobs
- 16 Digital inputs for switches and peripherals

MegaWing MIDI

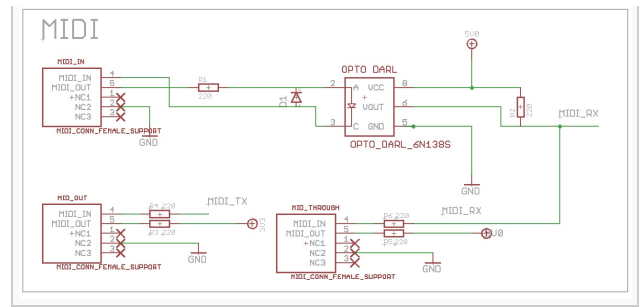


The Midi section of the RetroCade MegaWing implements three MIDI jacks; MIDI IN, MIDI OUT, and MIDI THROUGH. MIDI In is used to connect MIDI instruments such as a MIDI Keyboard, MIDI control board, or MIDI sequencer to the RetroCade synth to send MIDI notes and Control Changes that tell the RetroCade what audio to output. MIDI Through is connected to the MIDI In port and passes everything that comes in over the MIDI In port back out so MIDI devices can be daisy chained together. MIDI Out can be used by the RetroCade to output

MIDI data such as timing, change control's or notes.

Name	Function	Direction	Arduino Pin	Papilio Wing Pin	Papilio Pro Pin	Papilio One Pin
MIDI TX	MIDI Out Connector	Output	32	C0	P114	P91
MIDI RX	MIDI In Connector	Input	33	C1	P115	P92

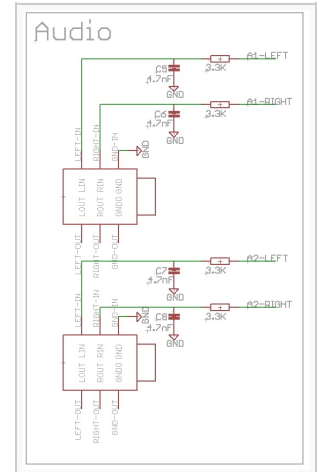
Technical Details The RetroCade MIDI implementation is closely patterned after the recommended MIDI circuit implementation provided by the MIDI Manufacturers Association. The only deviation from the recommended design is the use of a 3.3V power connection instead of 5V on the MIDI Out connector. This is necessary since the Papilio Pro uses 3.3V voltage levels instead of 5V levels.



MegaWing Sound

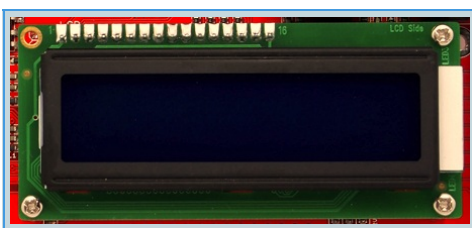


Since sound is the most important aspect of the RetroCade Synth we have gone all out with the audio section. Two top of the line 1/4" Neutrik audio jacks (datasheet) are used to ensure solid high quality audio connections. A low pass filter combined with a high speed Delta-Sigma DAC, as outlined in Xilinx App Note 154, allows high quality audio output to be realized. The high speed of the FPGA clock allows the FPGA to do the heavy lifting of the Digital to Analog conversion.



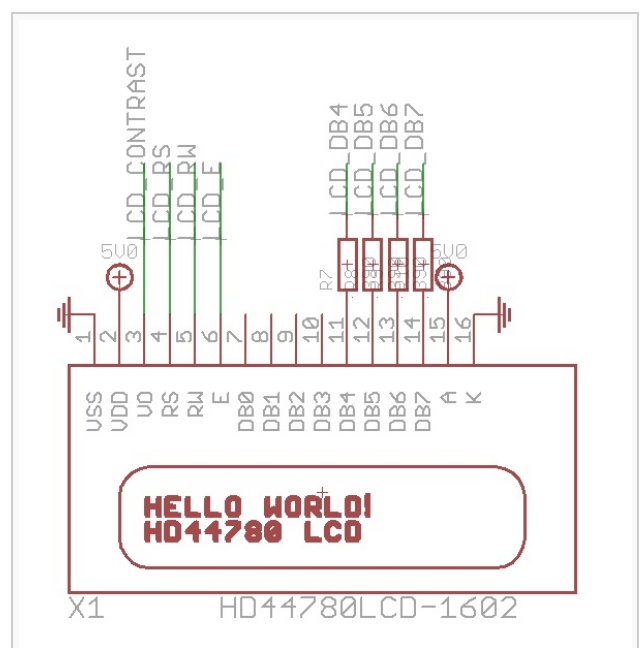
Name	Function	Direction	Arduino Pin	Papilio Wing Pin	Papilio Pro Pin	Papilio One Pin
A1-Left	Audio Jack 1 Left Channel	Output	17	B1	P97	P83
A1-Right	Audio Jack 1 Right Channel	Input	16	B0	P99	P85
A2-Left	Audio Jack 2 Left Channel	Output	18	B2	P92	P78
A2-Right	Audio Jack 2 Right Channel	Input	19	B3	P87	P71

MegaWing Character LCD



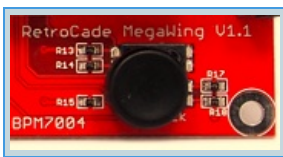
A 16x2 HD44780

compatible Character LCD is used to provide standalone control and feedback for the RetroCade. A standard backlight is provided for easy visibility in low light situations.

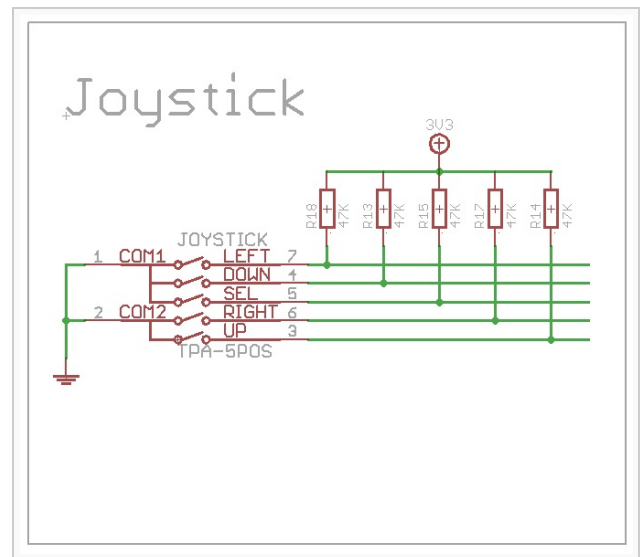


Name	Function	Direction	Arduino Pin	Papilio Wing Pin	Papilio Pro Pin	Papilio One Pin
LCD_Contrast	Contrast adjustment	Output	46	C14	P133	P16
LCD_RS	Register Select (RS). RS=0: Command, RS=1: Data	Output	26	B10	P62	P41
LCD_RW	Read/Write (R/W). R/W=0: Write, R/W=1: Read	Output	25	B9	P95	P54
LCD_E	Clock (Enable). Falling edge triggered	Output	24	B8	P74	P58
LCD_DB4	Bit 4	Output	23	B7	P78	P61
LCD_DB5	Bit 5	Output	22	B6	P80	P63
LCD_DB6	Bit 6	Output	21	B5	P82	P66
LCD_DB7	Bit 7	Output	20	B4	P84	P68

MegaWing Joystick



A really slick TPA511GLFS digital joystick is included to make navigating menu's a snap. It provides four directions and select in a compact fingertip controlled form factor.

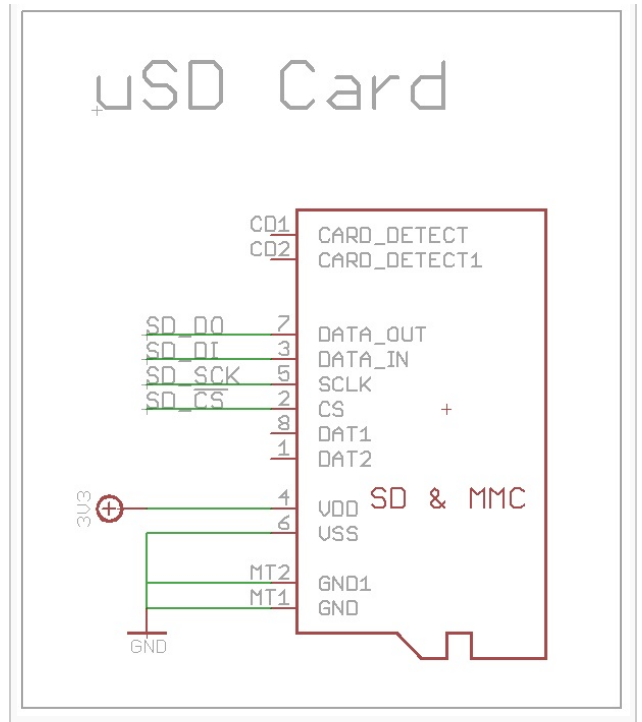


Name	Function	Direction	Arduino Pin	Papilio Wing Pin	Papilio Pro Pin	Papilio One Pin
Joy_Left	Joystick Left	Input	28	B12	P57	P34
Joy_Down	Joystick Down	Input	29	B13	P55	P32
Joy_Select	Joystick Select	Input	31	B15	P47	P22
Joy_Right	Joystick Right	Input	27	B11	P59	P36
Joy_Up	Joystick Up	Input	30	B14	P50	P25

MegaWing MicroSD



The MicroSD (Secure Digital) socket expands the RetroCade with GigaBytes worth of storage space for your audio and configuration files. SD Fat libraries over the standard SPI interface allows files to be copied directly from your computer's filesystem onto an uSD card that can be read by the RetroCade.



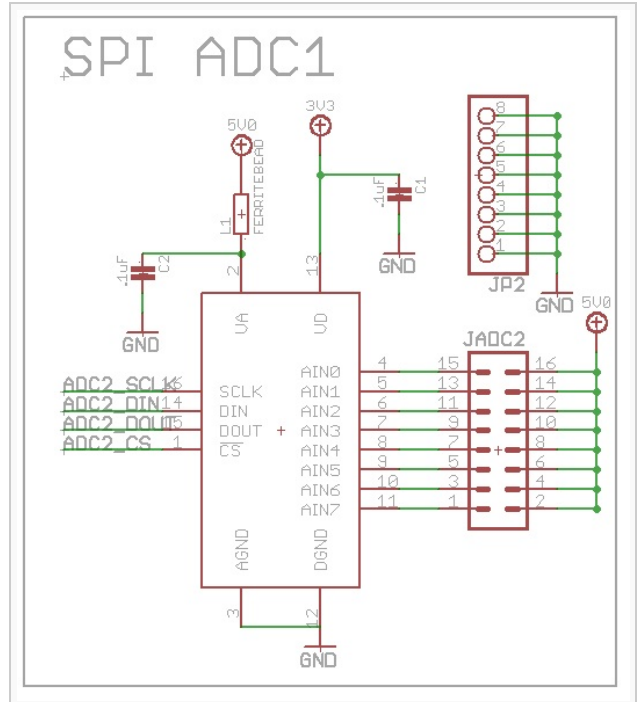
Name	Function	Direction	Arduino Pin	Papilio Wing Pin	Papilio Pro Pin	Papilio One Pin
SD_DO	Data Out [MISO]	Input	42	C10	P126	P10
SD_DI	Data In [MOSI]	Output	44	C12	P131	P12
SD_SCK	Clock [SCLK]	Output	43	C11	P127	P11
SD_nCS	Card Select (Active Low)	Output	45	C13	P132	P15

MegaWing Analog Input



16 Analog inputs allow the RetroCade to be turned into a custom controller to implement your wildest controllerism ideas. The Analog header allows you to connect up to sixteen analog devices such as sliders, knobs, and analog joysticks. The header is even compatible with the Seeed Studio analog Grove devices when used with a Grove to Brick adapter. Easily add Grove Sliders, Grove Joysticks, or any other Analog Grove device.

The 16 analog channels are implemented with two ADC088S102CIMTX 8-bit, 8 Channel, SPI ADC's that are capable of sampling at speeds up to 1MSPs.



Name	Function	Direction	Arduino Pin	Papilio Wing Pin	Papilio Pro Pin	Papilio One Pin
ADC1_SCLK	Clock [SCLK]	Output	34	C2	P116	P94
ADC1_DIN	Data In [MOSI]	Output	36	C4	P118	P98

ADC1_DOUT	Data Out [MISO]	Input	35	C3	P117	P95
ADC1_nCS	Card Select (Active Low)	Input	37	C5	P119	P2
ADC2_SCLK	Clock [SCLK]	Output	38	C6	P120	P3
ADC2_DIN	Data In [MOSI]	Output	40	C8	P123	P5
ADC2_DOUT	Data Out [MISO]	Input	39	C7	P121	P4
ADC2_nCS	Card Select (Active Low)	Input	41	C9	P124	P9

License



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RetroCade MegaWing copyright Jack Gassett, Gadget Factory.

Links

RetroCade MegaWing Design Files

[RetroCade MegaWing EAGLE Design Files](#)

[RetroCade MegaWing Schematic \(PDF\)](#)

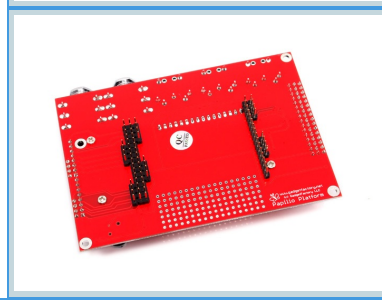
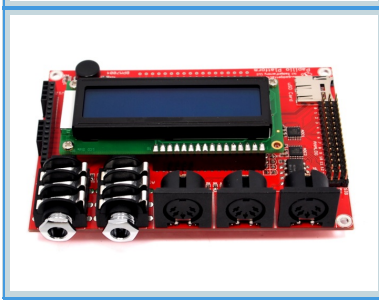
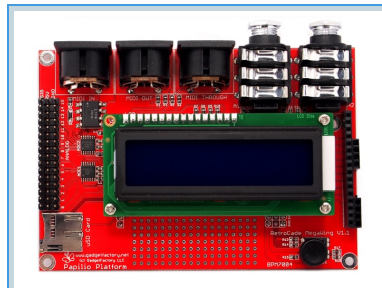
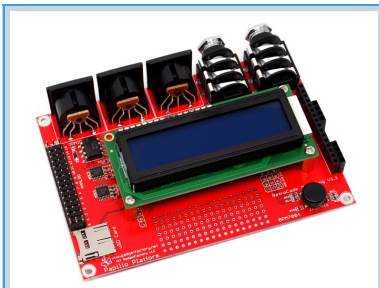
Community Links

[RetroCade MegaWing Project Showcase](#)

[RetroCade MegaWing Forum](#)

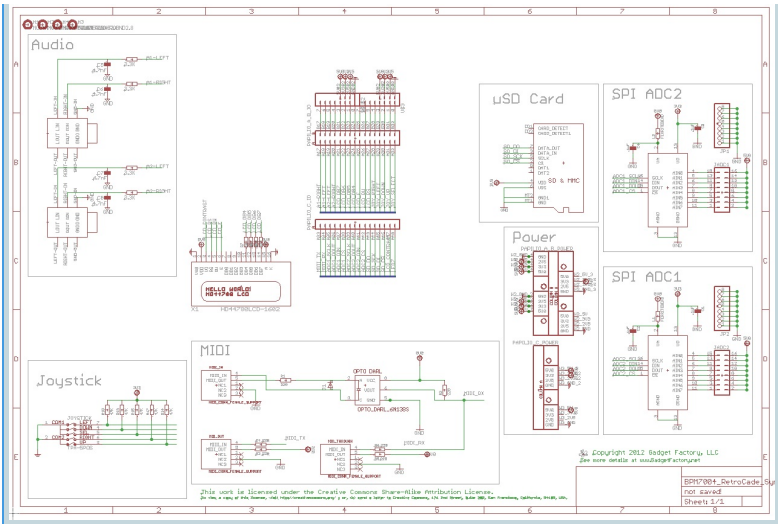
[RetroCade MegaWing Downloads](#)

Images



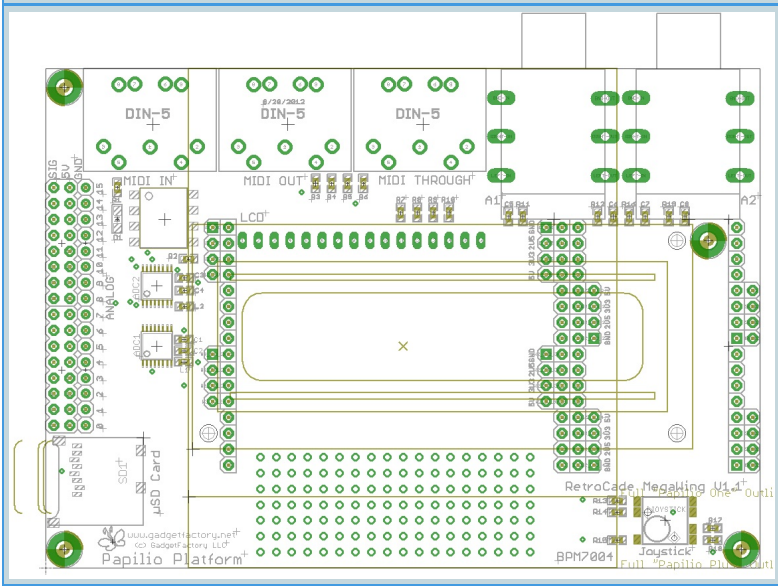
RetroCade MegaWing

Click the images for full size hi-resolution views of the RetroCade MegaWing.



RetroCade MegaWing Schematic

Click the image to load a PDF version of the RetroCade MegaWing Schematic



Assembly View

Click the image for a full size view of the boards part layout.