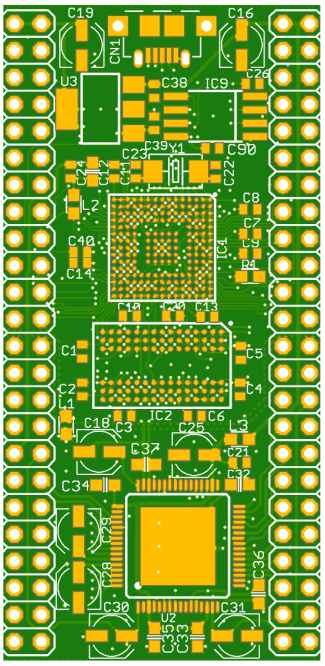
Xibeca Overview

Xibeca is the name of our latest digital board, comprising the following components:

- STM32H7 ARM Cortex M7 microcontroller, 480 MHz with 1 Mbyte RAM
- PCM3168A 6 in / 8 out audio codec, 24 bits, up to 96/192kHz
- 32 or 64 Mbyte SDRAM
- 8 Mbyte QSPI FLASH

The form factor is dual double-row pin headers on 0.1" (2.54mm) pitch, with 96 pins, plus a 10-pin SWD JTAG programming header on the back. There is also a USB micro A/B connector.



Xibeca is powered by 5V and has an onboard 3.3V regulator for all digital supplies, plus power conditioning and filtering for analog supplies.

Power consumption depends on how many audio channels are in use. With all channels enabled, the codec uses 230mA. The microcontroller and other components use up to 180mA, giving a total of up to 410mA @ 5V.

Available on the 96 pin headers are 50 microcontroller pins including SPI, I2C, USART, timers, quadrature encoders, ADC, DAC and two USB peripherals. There are also differential inputs and outputs for the audio channels, along with ADC and DAC reference voltages.

- Board size 30 x 62 mm
- Two dual row 2x24 pin headers @ 2.54mm pitch
- Row spacing 1000 mil / 25.4mm

OWL Platform

The OWL platform provides an abstraction layer between DSP and firmware development, without sacrificing DSP performance. At least 98% of total microcontroller clock cycles can be used by the DSP process, without any audio drop outs, while firmware and interface functions are executed without delay by leveraging hardware interrupts and background DMA transfers.
Between the DSP process (referred to as the patch or user program) and the firmware there is a binary interface: the program vector. User interactions are abstracted as parameters, buttons, audio and MIDI streams.

Patch Development

We provide tools to develop patches in any of the following languages:

- C++
- FAUST
- Pure data
- Max gen~
- SOUL
- Maximilian

Patches can be compiled offline, with a Makefile system, or using our online compiler. In addition to producing the ARM binary, the tools can also compile and run, or debug, a native version. Optionally Javascript WebAssembly output can be generated and tested in a web browser.
Thanks to dynamic patch loading, the firmware doesn't have to be compiled and flashed each time the patch changes. Instead the patch binary is packaged as MIDI SysEx, sent by USB to the device, and dynamically loaded and executed.
In summary, the OWL platform allows for fast prototype, development and test cycles, with no dependency on specific hardware features.

Firmware Development

Xibeca is supported by the OpenWare firmware framework, which allows a custom firmware to be efficiently developed, with many advanced features available out of the box.
The custom firmware will be tailored to specific hardware and user interface functions such as knobs, buttons, screen, etc. Features (all optional) available in the framework include:

- Class compliant USB Audio Device (up to 4 channels in and out, 16 bit, 48kHz)
- Class compliant USB MIDI Host and Device
- Serial (DIN or TRS) MIDI
- Rotary quadrature encoders
- ADC and DAC
- GPIO Hardware interrupts
- Class compliant USB MIDI bootloader
- Support for several OLED and TFT displays
- Background tasks and operational modes

Pin Mappings

Primary Functions

Pin	A	B	Pin
1	+3V3	+3V3	2
3	EXTI2	EXTI10	4
5	EXTI9	EXTI8	6
7	EXTI13	EXTI11	8
9	EXTI14	EXTI0	10
11	EXTI4	EXTI15	12
13	EXTI7	EXTI3	14
15	GND	GND	16
17	LPTIM1CH1	LPTIM1CH2	18
19	TIM2CH1	TIM2CH2	20
21	TIM3CH1	TIM3CH2	22
23	TIM4CH1	TIM4CH2	24
25	ADC1	ADC5	26
27	ADC2	ADC6	28
29	ADC3	ADC7	30
31	ADC4	ADC8	32
33	AGND	ADCREF	34
35	AIN1P	AIN1N	36
37	AIN2P	AIN2N	38
39	AIN3P	AIN3N	40
41	AIN4P	AIN4N	42
43	AIN5P	AIN5N	44
45	AIN6P	AIN6N	46
47	AGND	AGND	48

Pin	C	D	Pin
95	+5V	+5V	96
93	USBD_VBUS	USBH_VBUS	94
91	USBD_DM	USBH_DM	92
89	USBD_DP	USBH_DP	90
87	USBD_ID	USBH_ID	88
85	GND	GND	86
83	UART5_TX	UART7_TX	84
81	UART5_RX	UART7_RX	82
79	SPI6_SCK	SPI3_SCK	80
77	SPI6_MISO	SPI3_MISO	78
75	SPI6_MOSI	SPI3_MOSI	76
73	I2C1_SCL	I2C1_SDA	74
71	AGND	AGND	72
69	DAC1	DAC2	70
67	AGND	DACREF	68
65	AOUT1P	AOUT1N	66
63	AOUT2P	AOUT2N	64
61	AOUT3P	AOUT3N	62
59	AOUT4P	AOUT4N	60
57	AOUT5P	AOUT5N	58
55	AOUT6P	AOUT6N	56
53	AOUT7P	AOUT7N	54
51	AOUT8P	AOUT8N	52
49	AGND	AGND	50

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