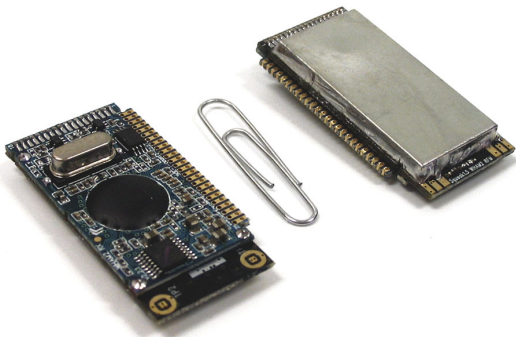# High–Performance 2.4 GHz Digital Wireless Audio Solution

GENERAL DESCRIPTION

The Squeak 1.5 WHAM2 (Wireless HiFi Audio Module) is a highly integrated module package that provides a complete solution for wireless audio. Squeak 1.5, using the Micro Linear ML2724 radio transceiver front end and the XInC2 wireless processor, is ideal for high performance wireless audio applications such as home theater, stereo and outdoor speakers, and microphones. Squeak 1.5 is available in either a 25 or 50 meter indoor range WHAM2 module.

The WHAM2 digitizes a 2-channel stereo input signal, sends it across a robust 2.4 GHz radio frequency link, and converts the signal back to a stereo analog signal for use at a remote location. WHAM2 is also available with a Digital Audio Serial Interface (DASI) port that can be configured to interface with any SPI supporting device (I^2S, left- or right-justified), including ADCs, DACs, digital audio streams such as S/P-DIF or USB. A development kit is required to modify the DASI port and/or to modify application source code firmware.
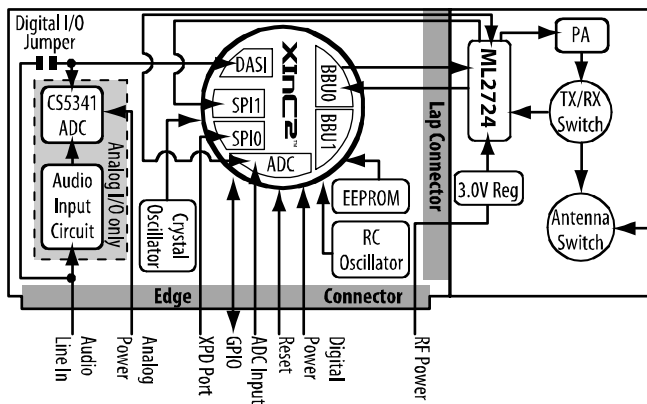
FEATURES

- Analog or Digital Audio Input/Output
- 48 kHz, 16-bit digital, stereo audio transmission
- Digital volume control, manual mute
- Auto mute (when signal lost), digital noise gate
- 2.4 GHz wireless at 1.536 Mbps
- Robust Quality of Service (QoS)
- Advanced error protection protocols with hardware forward error correction, adaptive frequency hopping, and walking frequency diversity
- 25 or 50 meter indoor range
- Up to 6 transmitters in specified range area
- Low latency; firmware selectable 15 – 64 ms
- Duplex utility control channel at 1.5 kbps
- Programmable for custom features (with development kit)
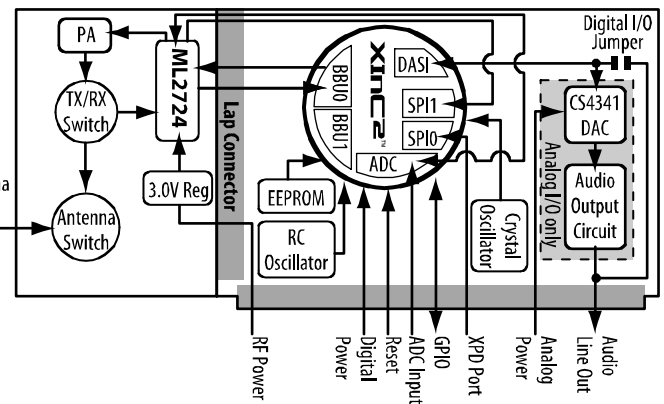
ORDERING INFORMATION

		25 meter	50 meter
Analog I/O	TX	WH4924	WH4928
	RX	WH4925	WH4929
Digital I/O	TX	WH4926	WH4930
	RX	WH4927	WH4931
Evaluation Kit	2-node	EV4931	EV4937
	Add-on node	EV4933	EV4939
Dev. Kit	Upgrade from any eval. kit		DK4909

BLOCK DIAGRAM

Squeak 1.5 WHAM2 TX

Squeak 1.5 WHAM2 RX

DO4918 — Squeak 1.5 WHAM2 Preliminary Datasheet (rev. 3.0) 2006-04-06

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WHAM2 Receiver Pinout
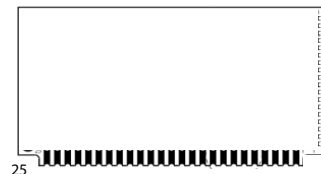
Pin#	Pin Name	Analog I/O Default	Digital I/O Default	Description
1	RFVCC	RFVCC	RFVCC	RF Voltage Power Input
2	RFGND	RFGND	RFGND	RF Ground
3	GND	GND	GND	Digital Ground
4	VCC	VCC	VCC	Digital Power Input
5	/RESET	/RESET	/RESET	Reset input (active low)
6	PB1	PB1	PB1	SPI0 Chip Select (CS0) PB1
7	MISO0/ PG0	MISO0	MISO0	SPI0 Master Data Input MISO0 (FW default), or GPIO port PG0
8	MOSI0/ PG1	MOSI0	MOSI0	SPI0 Master Data Output MOSI0 (FW default), or GPIO port PG1
9	SCK0/ PG2	SCK0	SCK0	SPI0 Clock output SCK0 (FW default), or GPIO port PG2
10	PF0/ SDIO1	PF0	PF0	General Purpose IO port PF0 (FW default), or Digital Audio Serial Interface1 (DASI)
11	PF1/ SDIO2	PF1	PF1	General Purpose IO port PF1 (FW default), or Digital Audio Serial Interface2 (DASI)
12	PC7	PC7	PC7	General Purpose IO port PC7
13	PC6	PC6	PC6	General Purpose IO port PC6
14	PC5	PC5	PC5	General Purpose IO port PC5
15	PC4	PC4	PC4	General Purpose IO port PC4
16	PC0/ MCLK	PC0	MCLK	General Purpose IO port PC0, or MCLK output
17	PC1/ AN2	PC1	PC1	General Purpose IO port PC1 (HW default), or XInC2 ADC Analog Input #2
18	PI0/ BB1CLK/ AN1	PI0	PI0	General Purpose IO port PI0 (HW & FW default), or Baseband Unit1 Clock, or XInC2 ADC Analog Input #1
19	PI1/ BB1O/ LRCK	PI1	LRCK	General Purpose IO PI1, or Baseband Unit1 Output, or Left-Right Clock (LRCK)
20	PI2/ BB1I	PI2	PI2	General Purpose IO PI2 (HW & FW default), or Baseband Unit1 Input
21	AGND	AGND	GND	Analog Ground
22	AOUTR/ SDIO0	AOUTR	SDIO0	Audio line-out for Right Channel AOUTR, or Serial DASI Data input/output SDIO0
23	AOUTL/ BCLK	AOUTL	BCLK	Audio line-out for Left Channel AOUTL, or Serial DASI Bit Clock output BCLK
24	AGND	AGND	GND	Analog Ground
25	AVDD	AVDD	(no connect)	Analog Power Input

Table 6 – WHAM2 RX Pinouts

1.4 ADVANCED PINOUT CONFIGURATION

The WHAM2 pinout can be configured differently than above for certain applications. This customization can be performed at the time of production or during product assembly.

The following two diagrams and two tables describe how to configure the WHAM2 for different operations by changing jumpers and components on the modules themselves.
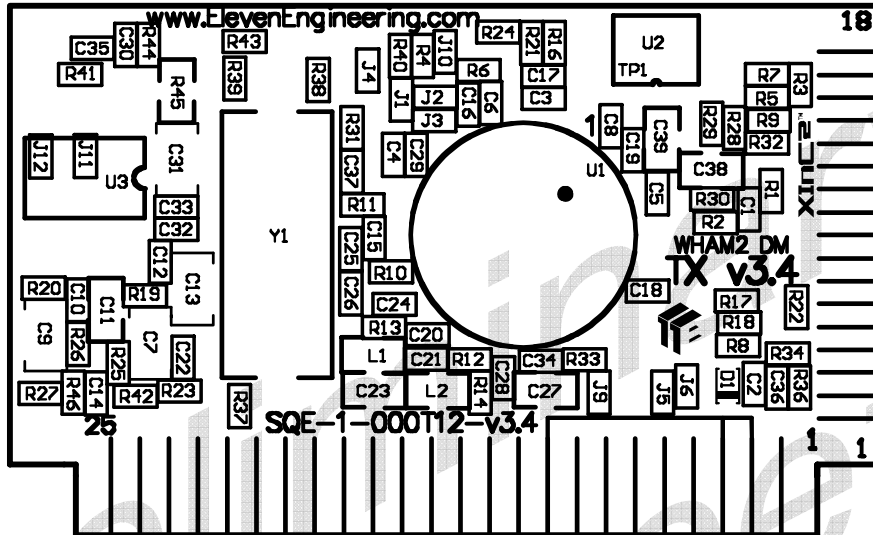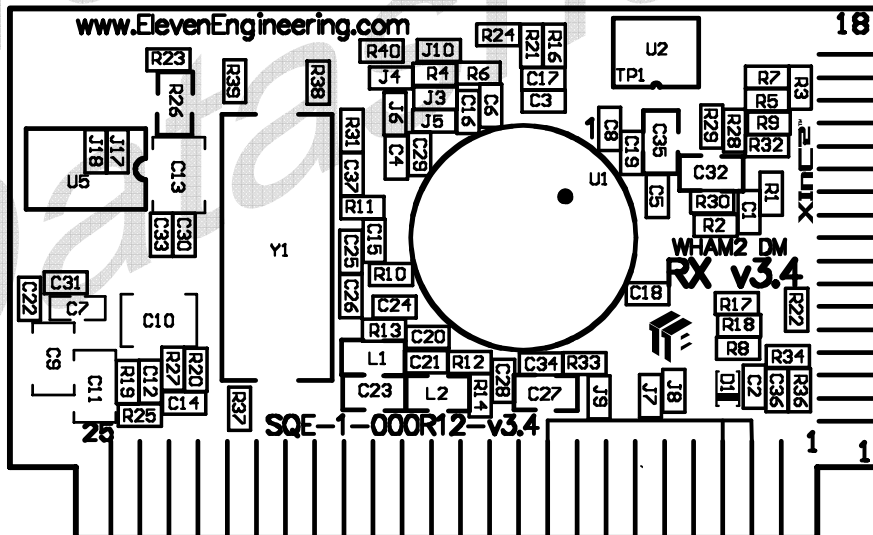

Figure 1 – WHAM2 Transmitter DM Layout

Figure 2 – WHAM2 Receiver DM Layout

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WHAM2 RX Jumpers and Options

Pin Name	Jumpers/ Components	Pin Function	WH4925/29 Default config.	WH4927/31 Default config.
Edge pin-16	J3 = 0R J4 = DNP	Pin 16 is GPIO port pin PC0 (FW configurable as input or output.)	★	
	J3 = DNP J4 = 0R	Pin 16 is MCLK (output) (FW programmable frequency: typically 12.288, 24.576, or 49.152 MHz.)		★
Edge pin-17	J5 = 0R J6 = DNP	Pin 17 is GPIO port pin PC1 (FW configurable as input or output)	★	★
	J5 = DNP J6 = 0R	Pin 17 is AN2 (XInC2 muxed analog input #2.) (Input voltage range of ADC is 0V to 1.8V.)		
Edge pin-18	J7 = 0R J8 = DNP	Pin 18 is FW selectable as either GPIO port pin PI0 or baseband unit #1 clock pin BB1CLK. (PI0 is FW configurable as input or output.)	★	★
	J7 = DNP J8 = 0R	Pin 18 is AN1 (XInC2 muxed analog input #1.) (Input voltage range of ADC is 0V to 1.8V.)		
Edge pin-19	J9 = 0R J10 = DNP	Pin 19 is FW selectable as either GPIO port pin PI1 or baseband unit #1 data input/output pin BB1O. (PI1 is FW configurable as input or output.)	★	
	J9 = DNP J10 = 0R	Pin 19 is Left-Right Clock pin LRCK (output)		★
Edge pins 22 & 23	J17, J18 = DNP U5 = CS4341, R19, R20 = 10K, R23 = 47K, R25, R27 = 100R, R26 = 0R, C7 = 1uF, C9, C13 = 10uF, C12, C14 = 8200pF, C22, C30, C31 = 0.1uF, C33 = 470pF.	Pin 22 is Right channel Analog Audio Output: AOUTR Pin 23 is Left channel Analog Audio Output: AOUTL	★	
	J17, J18 = 0R U5 = DNP, R19, R20, R23 = DNP, R25-R27 = DNP, C7 = DNP, C9, C13 = DNP, C12, C14 = DNP, C22, C30, C31 = DNP, C33 = DNP	Pin 22 is serial digital data I/O port pin SDIO0 Pin 23 is Serial digital audio clock SCLK		★

Table 8 – WHAM2 RX Jumper Configurations