

DWAM81
Digital Wireless Audio Transceiver
Module
User's Manual

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1 DWAM81 Module

1.1 Product Description

The DWAM81 is an OEM module (42mx42m) based on the STS DARR-81. It is an uncompressed wireless digital audio transceiver operating in the 2.4GHz ISM band. The wireless audio link supports up to 4 uncompressed high quality and low latency stereo channels in various network topologies. A unique set of protocols and algorithms provides extreme wireless robustness, capable of dealing with multiple interference sources as present in the 2.4GHz band. In addition, a wireless bi-directional data channel is available (e.g. to control the volume of the receiver from the transmitter). The module integrates all functionality for a wireless digital audio connection, comprising;

- DARR-81 Wireless Audio Processor
- 2.4GHz RF Transceiver
- Embedded Antennas or Dual Antenna Connector
- Digital audio interface (I2S and/or S/PDIF)
- I²CControl interface
- 26 pins interface connector (FFC) for power, digital audio and control interface and GPIOs

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE MANUFACTURER FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT

The following sentence has to be displayed on the outside of the device in which the transmitter module is installed:

"Contains FCC ID: ASIV5X004

"CAUTION: This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. End user cannot modify this transmitter device. Any unauthorized modification made on the device could avoid the user's authority

to operate this device."

1.2 Basic Features

- Secure, wide band, scrambled digital wireless link in the world-wide license exempt 2400-2483.5 MHz ISM-band
- The module is a reconfigurable platform and can host many applications, including features such as automated TX/RX swapping
- Optimal digital audio performance:
 - Up to 4 stereo uncompressed audio channels (44.1ksps, 48ksps or 96ksps, 16 or 24bit)
 - or optional proprietary low latency compression algorithm
 - Tight inter-speaker synchronization
 - Active TX-RX audio clock synchronization
 - Low latency (configurable from 10...20ms) to support e.g. lip-synced applications
 - Bi-directional data channel for metadata or control data (up to 100kbps)
 - Simultaneous I²S and S/PDIF input/output (incl. S/PDIF detection)
 - Programmable digital audio gain
 - Soft audio muting under poor link circumstances
 - Sample rate converter, including automatic sample rate detection, to support 32ksps, 44.1sps and 48ksps with a single audio crystal
- Optimal wireless coexistence and robustness:
 - Advanced dedicated base band controller to provide an optimal level of coexistence with all kinds of other wireless applications (e.g. WLAN, BT, MWO, GSM, DECT)
 - Automatic frequency allocation with seamless RF channel switching
 - WLAN sniffer continuously for enhanced WLAN co-existence
- Optimal wireless performance:
 - In-room or multi-room usage (point to multi-point is also supported)
 - Indoor range of up to 50m
 - Automatically controlled receiver/transmitter antenna spatial diversity minimizes fading and multipath effects
- Other features:
 - Wireless S/PDIF data pipe application to support e.g. wireless DTS
 - Wirelessly accessible registers (e.g. RF channel switching, audio volume) and GPIO (e.g. use control switched and LED indicators)

- Compliance with applicable US American laws, especially FCC Part 15.247 (FCC ID:ASIV5X004)
- I²C Control bus
- Power Down Duty Cycle mode: If no link is established, modules (both TX and RX) will enter PDDC mode. In this mode the module periodically tries to re-establish the link maintaining minimum power consumption.
- Pairing Function: All units in the same wireless audio network are provided with a 16 or 24 bit network ID, shielding the network from neighbor audio networks.
- Single 3.3 Vdc power supply
- Backwards compatible with DARR-80 and DARR-79 based products

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2. DWAM81 Specifications

System Specifications				
ID	Parameter	Value	Unit	Remarks
RF Characteristics				
	RF Frequency Range	2400-2483.5	MHz	
	Number of RF channels	3		
Air framing				
	Addressing	24	Bit	
	Data message size	8,16 or 32	Byte	Application dependent
	CRC	16,24 and 32	Bit	Hybrid
Control				
	Control interface	I2C		Compliant with the I2S protocol (slave), 0...400kbps. Base address 0x80, can be offset by A0 and A1 HW pins.
Data				
	Data Bandwidth	100	Kbps	Bi-directional wireless data channel
	Data latency	5	ms	Minimum under good RF link conditions for applications that support the 100kbps data rate
Interference Robustness				
	Fixed frequency devices (e.g. WLAN, microwave oven)			Fully coexistent
	Frequency hopping devices (e.g. Bluetooth, 2.4GHz cordless phones)			Fully coexistent
Audio Interface				
	Available Interface Types	I2S S/SPIF		Can be used simultaneously Incl. S/SPIF detection.
	Number of stereo audio	1,2,3 or 4		Bidirectional, incl. audio

	output channels on Module Unit			loop
	Number of stereo audio output channels on Central Unit	1,2,3 or 4		Bidirectional, incl. audio loop
Audio Quality				
	Sample rate	44.1, 48 or 96	Ksps	
	Sample width	16 or 24	bit	
	Latency	20	ms	Configurable from 10 to 20ms, depending on the application.
	Dynamic Range	98	dB	16 bit 48ksps, A-weighted
		146	dB	24 bit 48ksps, A-weighted
	THD+D	-96	dB	16 bit 48ksps
		-143	dB	24 bit 48ksps
	Frequency response	0	dB	20Hz...22kHz
Dimensions				
	Board dimensions	42 x 42	mm	