HSDWAM83 user manual

1. Product Description

HSDWAM83 Hansong own module which is base on the Microchip DWAM83 module with its own PCB antenna or the module external antenna.

It is an uncompressed wireless digital audio transceiver operation in the 2.4GHz, 5.2GHz and 5.8GHz bands. The wireless audio link supports up to 4 stereo audio streams and comes together with additional features such as: data encryption, Automatic Frequency Allocation and support Kleernet.

The Basic Features

- High Quality Audio
- Networking and Connectivity
- Power Management
- Integrated 8052MCU
- Digital Audio Clock Synchronization
- Sample Rate Converter(SRC)+ Sample Rate Detector
- Kleenet

2. Product parameter

2.1 Module Specifications

System Specifications				
ID	**Parameter**	**Value**	**Unit**	**Remarks**
RF Characteristics				
	RF frequency range	2400 – 2483.5 5150 - 5250 5725 - 5875	MHz MHz MHz	
	Number of RF channels	3		In each Frequency band.
Air framing				
	Addressing	24	Bit	
	Data message size	32	Byte	Application dependent
	CRC	16, 24 and 32	Bit	Hybrid
Control				
	Control interface	I²C		Compliant with the I²C protocol (slave), 0…400kbps. Base address 0x80.
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[1]
	Frequency hopping devices (e.g. 5.8GHz cordless phones)			Fully coexistent[1]

Audio Interface				
	Available Interface Types	I²S S/PDIF		Can be used simultaneously Incl. S/PDIF detection.
	Number of stereo audio output channels on Mobile Unit	1, 2, 3 or 4		Bidirectional, incl. audio loop
	Number of stereo audio input 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 23.6ms, depending on the application.
	Dynamic Range	98 146	dB dB	16 bit 48ksps, A-weighted 24 bit 48ksps, A-weighted
	THD+N	-96 -143	dB dB	16 bit 48ksps 24 bit 48ksps
	Frequency response	0	dB	20Hz…22kHz [2]
Dimensions				
	Module dimensions	35 x 35 x 4.3	mm	

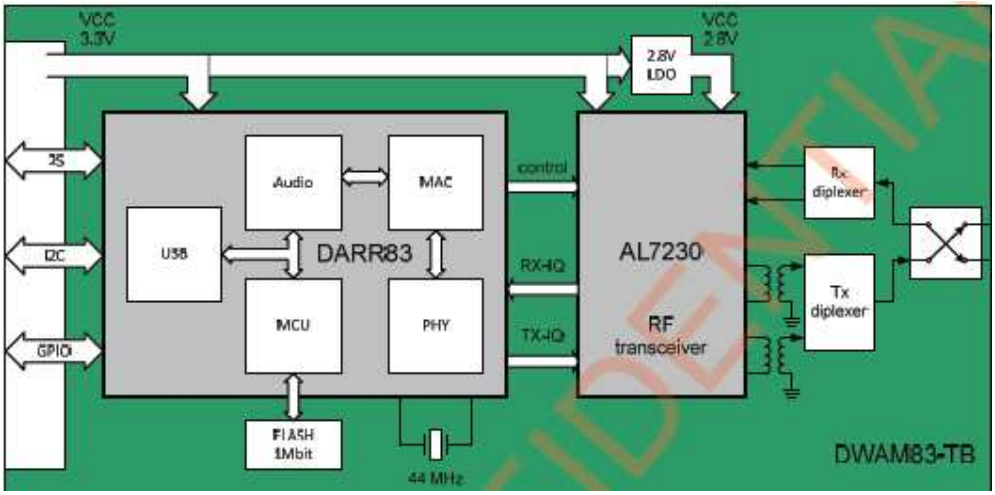
2.1 Absolute Maximum Rating

Symbol	Parameter	Min.	Typ	Max	Unit
VCC	Supply Voltage			3.8	V
$T_{storage}$	Storage Temperature	-25	–	85	℃
V_{ESD}	ESD Contact Discharge	-2	–	+2	kV

2.2 Recommended Operating Conditions

Symbol	Parameter	Min.	Typ	Max	Unit
VCC	Supply Voltage	3.1	3.3	3.5	V
VCC Ripple	Peak to Peak Ripple (in circuit)	–	0	100	mV
T_{amb}	Operating Temperature	-10	25	60	℃

2.3 module Block Diagram



2.4 Power Consumption

(Vcc=3.3V, 25℃, Audio Clock:12.288MHz).

Application*	2.4GHz		5.2GHz		5.8GHz	
	MU (in mA)	CU (in mA)	MU (in mA)	CU (in mA)	MU (in mA)	CU (in mA)
Standby mode*	21	21	21	21	21	21
1 Stereo NACK	31	98	36	96	36	96
2-1 Stereo NACK BiDir	81	155	82	145	82	146
2 ACK	60	140	65	124	65	127
TX Continuous mode (peak current)	-	390	-	300	-	300

Current consumption measurements based on External MCU using EVK. Standby mode can be wake up by CU

2.5 RF performance

Vcc=3.3V, 25℃)

Parameter		Condition	Min.	Typ.	Max	Units
RF Frequency Range			2400	–	2483.5	MHz
Number of RF-channels		Carriers in the spectrum	–	3	–	
Transmission Power[3]				14		dBm
Channel Frequency (dynamic or fixed allocation)	CH1 CH2 CH3		–	2412 2438 2464	–	MHz
Channel Spacing			–	26	–	MHz
RF Bandwidth		Null-to-null	–	22	–	MHz
Rx sensitivity			–	-83	–	dBm
Antenna Diversity		TX/RX	–	ON	–	

For 5.2GHz application (Vcc=3.3V, 25℃)

Parameter		Condition	Min.	Typ.	Max	Units
RF Frequency Range			5150	–	5250	MHz
Number of RF-channels		Carriers in the spectrum	–	3	–	
Transmission Power[3]		Depending on antenna design		9		dBm
Channel Frequency (dynamic or fixed allocation)	CH1 CH2 CH3		–	5180 5210 5240	–	MHz
Channel Spacing			–	30	–	MHz
RF Bandwidth		Null-to-null	–	22	–	MHz
Rx sensitivity			–	-81	–	dBm
Antenna Diversity		TX/RX	–	ON	–	

For 5.8GHz application (Vcc=3.3V, 25℃)

Parameter		Condition	Min.	Typ.	Max	Units
RF Frequency Range			5725	–	5875	MHz
Number of RF-channels		Carriers in the spectrum	–	3	–	
Transmission Power[3]		Depending on antenna design		9		dBm
Channel Frequency (dynamic or fixed allocation)	CH1 CH2 CH3		–	5736 5762 5814	–	MHz
Channel Spacing			–	26	–	MHz
RF Bandwidth		Null-to-null	–	22	–	MHz
Rx sensitivity			–	-81	–	dBm
Antenna Diversity		TX/RX	–	ON	–	.

3. Product antenna

The module uses embedded PCB track Tri-Band antennas. Or you can use the module with external PCB antenna or the coaxial antenna with reverse-SMA male connector.

Antenna Type: module embedded PCB track antenna,
module external PCB antenna(PIFI),
module external mono antenna with reverse-SMA connector

Antenna Gain: module own PCB antenna, 2.4G: 1.5dBi; 5G: 1.5 dBi
External PCB antenna (PIFI), 2.4G: 4.2 dBi; 5G: 4.5dBi
External mono antenna with reverse-SMA male connector: 2.4G: 3.6dBi;
5G: 3.8 dBi

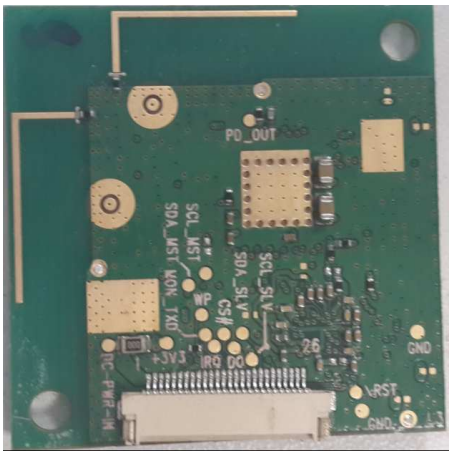
Modulation: QPSK; data rate: 100Kbps

4. Product picture

4.1 module embedded antenna

Top view:

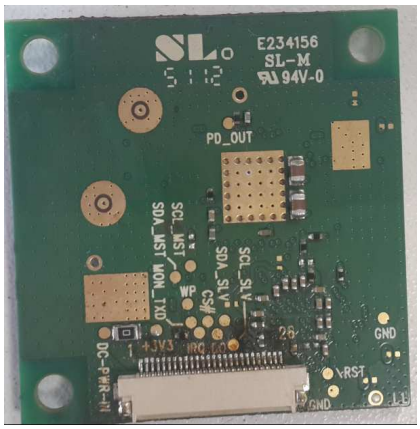
Bottom view



4.2 module without embedded antenna

Top view:

Bottom view



5. Caution:

This device complies with Part 15 of the FCC Rules / Industry Canada licence-exempt RSS standard(s). 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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Only for detachable antennas:
This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Gain of antenna: 2.4GHz: 4.2 dBi max; 5GHz: 4. 5 dBi max.
Type of antenna: Omni-directional, PCB antenna (PIFI)
Impedance of antenna: 50ohm
OR,
Gain of antenna: 2.4GHz: 3.6 dBi max; 5GHz: 3.8 dBi max.
Type of antenna: Omni-directional, mono antenna
Impedance of antenna: 50ohm

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Gain d'antenne: 2.4GHz 4.2dBi maximal; 5GHz 4. 5 dBi maxial

Type d'antenne: 50 ohm, Omni-directionnel, PIFI

OR,

Gain d'antenne: 2.4GHz 3.6 dBi maximal; 5GHz 3.8 dBi maxial

Type d'antenne: 50 ohm, Omni-directionnel, mono

MPE Reminding

To satisfy FCC / IC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

Les antennes installées doivent être situées de facon à ce que la population ne puisse y être exposée à une distance de moin de 20 cm. Installer les antennes de facon à ce que le personnel ne puisse approcher à 20 cm ou moins de la position centrale de l' antenne. La FCC des éltats-unis stipule que cet appareil doit être en tout temps éloigné d'au moins 20 cm des personnes pendant son functionnement.

Information for the OEM Integrators

This device is intended for OEM integrators only. Please see the full grant of equipment document for restrictions.

Label Information to the End User by the OEM or Integrators

If the FCC ID of this module is not visible when it is installed inside another device, then the outside of the device into which the module is installed must be label with "Contains FCC ID: XCO-HSDWAM83 and IC: 7756A-HSDWAM83".