WISP50S Module:

USER Manual

Product Name	**:** Three View Audio Module
Model Name	**:** WISP50S

1. Product Description

The WISP50S module is a wireless audio module (60X21mm)) based on the SMSC DARR83. This module can used to build an uncompressed wireless digital audio transceiver operating in the 2.4GHz, 5.2GHz and 5.8GHz bands.

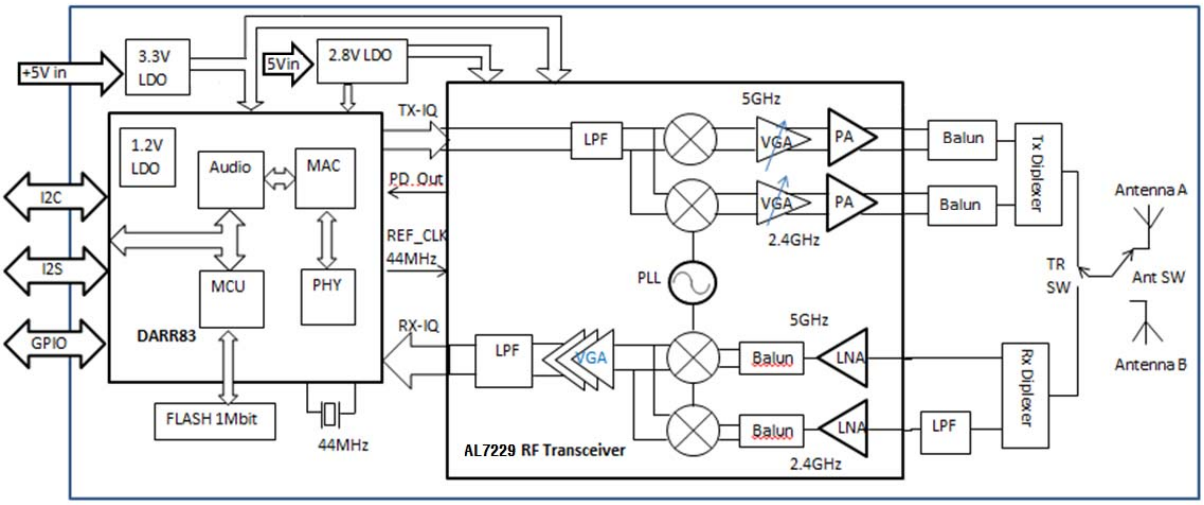
The wireless audio link supports up to two stereo audio streams and comes together with additional features such as: data encryption, pairing functionality, bi-directional control data messages, low power audio snooze mode, WLAN detection and Automatic Frequency Allocation.

The DARR83 chip itself provides the basic functions of Audio Processing and buffering, Data Link Layer and Physical Layer. The WISP50S module integrates all functionality for a wireless digital and analog audio connection, comprising:

2. Features

- DARR83 Wireless Audio Processor
- 2.4GHz/ 5.2GHz/ 5.8 GHz RF Transceiver
- Embedded Antennas
- Digital audio interfaces (I^2S)
- Integrated 24 bit stereo Audio DAC + Headphone AMP
- Integrated 16 bit Audio ADC + Microphone AMP
- Built-in SPI interface Flash
- 9 pins interface connector for power, audio output, control interface and GPIOs
- Regulated 5V supply

3. WISP50S Block Diagram



4. Description of operations

4.1 Operating Conditions (5 V ⎓ 450 mA)

Symbol	Parameter	Min.	Typ	Max	Unit
VCC	Supply Voltage	4.7	5.0	5.25	V
Temp	Operating Temperature	0	25	60	°C

4.2 RF Information

Parameter	Value	Unit
Modulation	QPSK	
RF Frequency range (band)	2400 – 2483.5 5150 – 5250 5725 – 5875	MHz
RF Frequency	Ch1 – 2412 Ch2 – 2436 Ch3 – 2464 Ch4 – 5180 Ch5 – 5210 Ch6 – 5240 Ch7 – 5736 Ch8 – 5726 Ch9 – 5814	MHz
Audio Latency	20ms	
Audio Bit Resolution	16bit	
Audio Sampling Rate	48ksps	

Note: Country/ Region dependent.

4.3 Receive mode

In receive mode, antenna diversity is supported. The single ended output of the TR switch is connected to the RF LNA input through Diplexer and matching networks. Filtering and amplification is all performed by the radio transceiver. The gain setting is controlled by the BB. The analog IQ outputs are sampled by the BB by its integrated 22Msps dual channel 8bit ADC. This received data is demodulated and fed to the audio processing engine controlling the audio function.

4.4 Transmit mode

In transmit mode, the audio engine transforms the audio data into packetized digital IQ signals. These are in turn pulse-shaped before conversion by a 10bits 44Msps DAC to match to the analog IQ inputs of the radio IC. The radio IC has programmable baseband filters to lower the RF spectrum side lobes

and to suppress the DAC image and the DAC spurious. The output power is programmable. A power detector (PD_out) on the radio IC enables close-loop TX power control. The differential RF PA outputs are connected via a baluns and Diplexer to a transmit/receive switch with TX diversity option to the RF connectors.

5. Clock and synthesizer frequencies

The main crystal is connected to the Baseband IC crystal oscillator. This in turn buffers this 44MHz and feeds it to the radio IC.

In standard configurations, the DARR83 based DWPCIe83 module's RF section runs at the following frequencies:

2.4GHz Band: The RF oscillator runs at 2 times the programmed RF output frequency.

Channel	RF frequency (in MHz)	VCO frequency (in MHz)
1	2412	4824
2	2438	4876
3	2464	4928

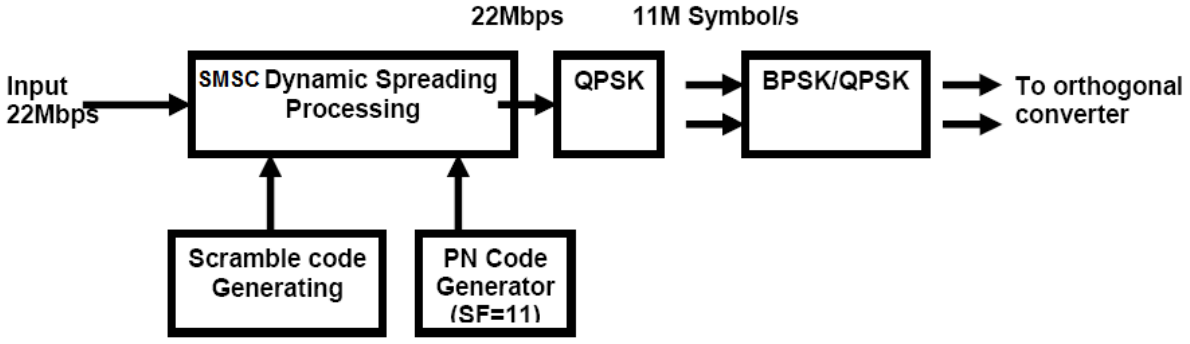
5.2GHz Band: The RF oscillator runs at 2/3 times the programmed RF output frequency.

Channel	RF frequency (in MHz)	VCO frequency (in MHz)
1	5180	3453.33
2	5210	3473.33
3	5240	3493.33

5.8GHz Band: The RF oscillator runs at 2/3 times the programmed RF output frequency.

Channel	RF frequency (in MHz)	VCO frequency (in MHz)
1	5736	3824
2	5762	3841.33
3	5814	3876

6. Modulation Diagram



7. Pin out interface connector

Pin information.

Pin Number	Pin Name	I/O	Description
1	5V	PWR	Regulated 4.7V to 5.2V input
2	5V	PWR	Regulated 4.7V to 5.2V input
3	GPIO_2	I/O	PWM_RST#
4	GPIO_13	I/O	MUTE
5	GPIO_14	I/O	POWER_CTL
6	/RESET(DARR_RST)	I	Reset Darr83
7	I^2C_SCL_SLV	I/O	I^2C serial clock Slave
8	I^2C_SDA_SLV	I/O	I^2C serial data Slave
9	I^2C_SCL_MST	I/O	I^2C serial clock Master
10	I^2C_SDA_MST	I/O	I^2C serial data Master
11	MCLK	I/O	12.288MHz audio clock I/O
12	GND	GND	GND
13	BCK_W	I/O	I^2S port W Bit Clock
14	LRCK_W	I/O	I^2S port W Left Right Clock
15	GPIO_5	I/O	DAT_W
16	GPIO_11	I/O	DAT_X
17	MON_TXD	I/O	Serial sync Data, for test purposes
18	GIPO_6	I/O	FW_SEL
19	GPIO_12	I/O	IR_RST#
20	GPIO_3	I/O	ID_SET#
21	GPIO_15	I/O	RED_LED
22	GPIO_4	I/O	BLUE_LED (UART_RXD)
23	GPIO_7	I/O	IR_SD#(HW_MUTE)
24	GND	GND	GND

8. Installation

This module must be installed in a device and not allow the user to replace nor modify it.

And the location of installation is as follows Figure 6-1.

Figure 6-1 The location of installation

9. Notice

FCC Statement

Federal Communication Commission Interference Statement
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 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.

FCC Caution:
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:
The final end product must be labeled in a visible area with the following " Contains FCC ID: A3LWISP50S ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

IC Statement

This Class B digital apparatus complies with Canadian ICES-003.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe B est conforme á la norme NMB-003 du Canada.
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.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

The device could automatically discontinue transmission in case of absence of information to transmit, or operational failure. Note that this is not intended to prohibit transmission of control or signaling information or the use of repetitive codes where required by the technology.

IMPORTANT NOTE:
IC Radiation Exposure Statement:
This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour unenvironnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is still responsible for the IC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the IC RSS-102 radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:
In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. IC statement is required to be available in the users manual: This Class B digital apparatus complies with Canadian ICES-003. 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.

LABEL OF THE END PRODUCT:
The final end product must be labeled in a visible area with the following " Contains IC : 649E-WISP50S ".

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only.