Description:

The Product BT465 is an Audio Streaming module based on the APM8262 Chip from APM.
The specified profiles are preloaded in the memory. Necessary communication with the Host processor will be done with a few UART commands.

1. Pin Assignment and Interface description

The connector is a standard 20pin 2 Row 2.54mm Header:

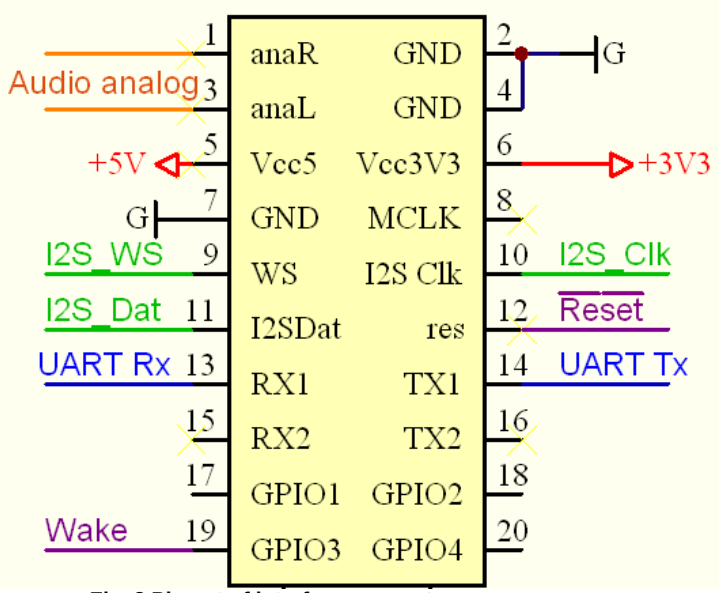


Fig. 3 Pin out of interface connector

Pin	Name	Function	If not used
1	ana R	Analog Audio right out isn't supported yet - leave vacant	lv.
2	GND	GND	mandatory
3	ana L	Analog Audio left out isn't supported yet - leave vacant	lv.
4	GND	GND	mandatory
5	Vcc5	For future purpose (analog audio out) - leave vacant	lv.
6	Vcc3V3	Supply 3.3V - decouple with 10nF / 100nF Ceramic Cap	mandatory
7	GND	GND	mandatory
8	MLK	Not supported - leave vacant	lv.
9	WS	I2S L/R Clock	lv.
10	I2S Clk	I2S Bit clock	lv.
11	I2SDat	I2S Data	lv.
12	res	Reset active low resets the BT module - connect to MCU	lv.
13	RX1	UART RX - connect to TX of MCU	lv.
14	TX1	UART TX - connect to RX of MCU	lv.
15	RX2	Not supported by FW - leave vacant	lv.
16	TX2	Not supported by FW - leave vacant	lv.
17	GPIO1	Not supported by FW - leave vacant	lv.
18	GPIO2	Not supported by FW - leave vacant	lv.
19	GPIO3	Wake signal -- during an active BT connection this Signal will be periodically triggered. This signal can be used to wake the Host system from StBy.	lv.
20	GPIO4	Not supported by FW - leave vacant	lv.

2. Electrical Specifications

2.1 Absolute Maximum Ratings:

Description	Min.	Typ.	Max.	Units
Storage Temperature	-40	--	+85	℃
Supply Voltage: Vcc3V3	-0.4	--	3.6	V
Supply Voltage: Vcc5	-0.4	--	6.0	V
All digital Controls	-0.4	--	3.7	V

* Absolute maximum ratings indicate limits beyond which damage to the device may occur

2.2 Recommended Operating Conditions:

Description	Min.	Typ.	Max.	Units
Operating Temperature	-10	--	+70	℃
Supply Voltage: Vcc3V3	2.7	3.3	3.6	V
Supply Voltage: Vcc5	4.0	--	5.5	V
All digital controls high level	Vcc3V3 x 0.7	--	Vcc3V3 + 0.3	V
All digital controls low level	GND		Vcc3V3 x 0.3	V

2.3 Electrical Characteristics:

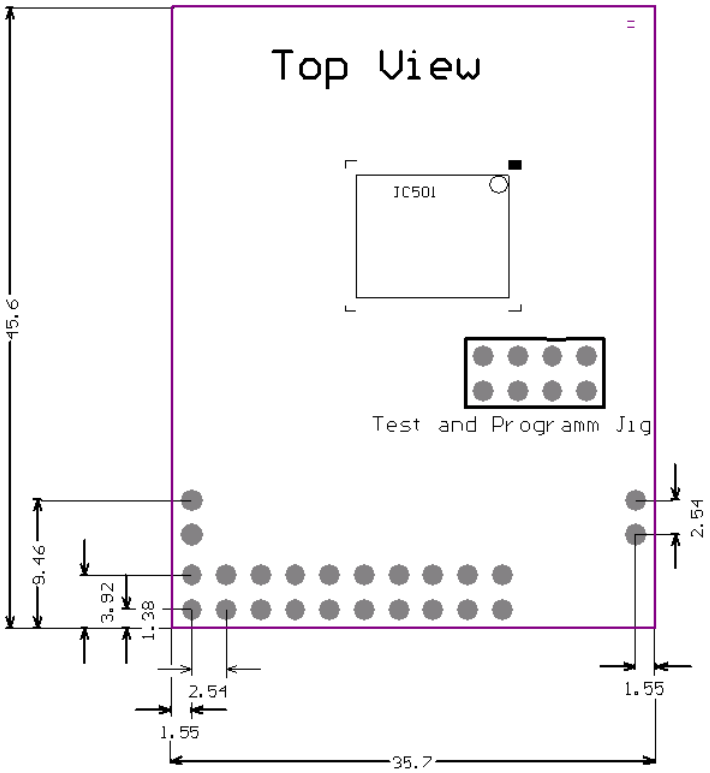
Current Consumption	Condition		Units
VCC3V3	ACL connection (no traffic)	8.2	mA
VCC3V3	Stereo Audio streaming	26	mA
Vcc5	No Audio	tbd.	mA
Vcc5	Full level Audio	tbd.	mA

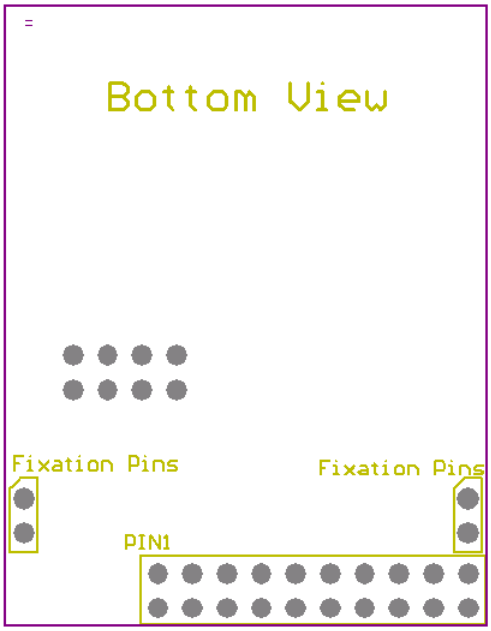
2.4 Main RF Specification:

Specification		Value	Unit
Operating frequency range		2400 ... 2483,5	MHz
Channel numbers		79	Channels
Carrier frequency		2402 … 2480	MHz
Modulation method and Data rates	GFSK	1	Mbps
	π/4	2	Mbps
	8DQPSK	3	Mbps
Hopping	adaptive	1600	hops/s
Antenna	PIFA	-3	dBi
Transmission power (EIRP)		2	dBm
Receiver sensitivity		<-89 dBm	dBm
Compliance		Bluetooth specification, version 2.1 + EDR EN300328	

- for further information refer to APM 8262 Datasheet:
  apm8282 8262 Bluetooth Audio Module Datasheet v2.2

3. Mechanical Drawings





4. Specification UART

The UART Interface is a simple 2wire RX / TX without handshake.
The UART Interface will run at 38,4kBaud 8 Databits 1 Stopbit and none Parity.

Command character	Function	Complete frame Type : length : payload
Commands to BT Module		
'z'	Start smartphone pairing	82h 03h 7ah
'y'	Stop/Cancel smartphone pairing procedure	82h 03h 79h
Responses from BT Modul		
'x'	Pairing successful	83h 03h 78h
'w'	Pairing cancelled or timeout	83h 03h 77h

5. Bluetooth Pairing

- A BT device must be paired once before it's able to connect to the BT465 module.
- After receiving the UART Pairing command (82h 03h 7ah) the BT465 module will be visible for BT devices for app. 1minute.

Visibility of 465BT module:

Time /s	0	1	2	3	4	5	6	7	8	9	65	66	……	300	301	302
Pairing signal							**P**									
Pairing mode active							x	x	x	x	x					
BT device																

- Is there a Pairing request during visibility, the Pairing algorithm will be done.
  The 465-BT module supports two modes:
  a) Legacy Pairing through Pin "1817"
  b) Simple Secure Pairing without any Pin
  Mode selection depends of the BT Standard of the device.

Time /s	0	1	2	3	4	5	6	7	8	9	65	66	……	300	301	302
Pairing signal							**P**									
Pairing mode active							x	x	x							
BT device																

Pin or Simple Pairing

6. A2DP Streaming

For Audio transmission BT profile A2DP is used. Audio decoding is done via SBC codec or AAC if supported by the broadcast.
During an active A2DP connection the audio data will be immediately transmitted to the Audio I2S Interface.
Volume must be regulated at the Broadcast side.
The BT module supports only one active A2DP connection.
During an active A2DP connection further A2DP requests will be rejected.

7. FCC / IC Compliance and Indication

7.1. Compliance

This device complies with Part 15 of FCC Rules and Industry Canada license-exempt RSS standard(s). 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

7.2. FCC Indication

If the FCC ID written in the label which is stuck on the surface of the device can not seen from out side when it's installed in a customer's product, following indication is necessary to be showed on the product in which the device is installed.
And the indication is also necessary to be written in a user manual of the customer's product.
"Contains FCC ID: 2AA7R465BT01"

7.3. IC Indication

If the IC Number written in the label which is stuck on the surface of the device can not seen from out side when it's installed in a customer's product, following indication is necessary to be showed on the product in which the device is installed. And the indication is also necessary to be written in a user manual of the customer's product.
"Contains IC: 11431A-465BT01"

7.4. Co-Location with another transmitter

Co-locating with another transmitter may require some consideration for RX Exposure.

7.5. FCC WARNING

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

Note:
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.
- This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

7.6 IC Statement

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.