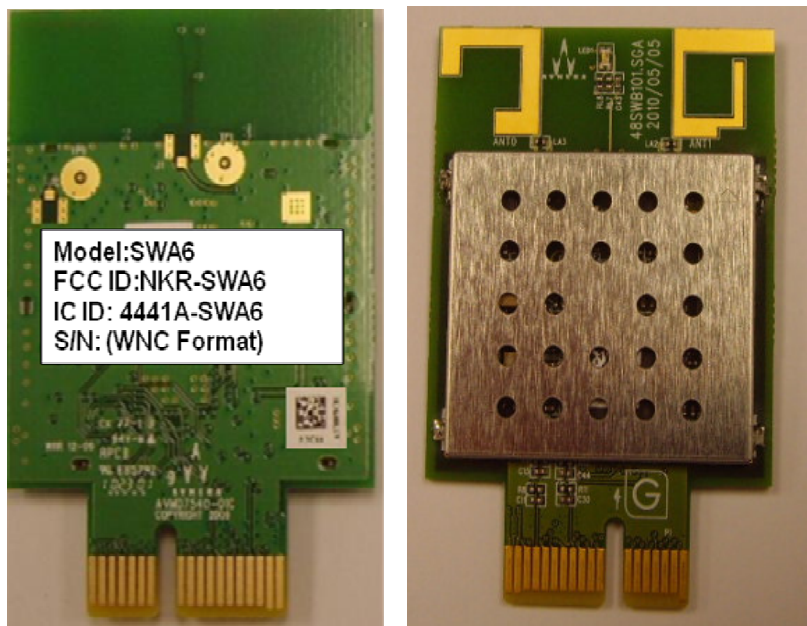


Product Specification

Model Name: AVMD7540-SWA6
(AV7540 +16dBm module with Printing Antenna)

Revision: 1.0

Issue Date: 2010/09/20



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Revision History

| Edition # | Reason for revision | Issue date | Author |
|------------------|----------------------------|-------------------|---------------|
| 0.1 | Draft (Initial Revision) | 2010/07/23 | Amy Tu |
| 1.0 | Add FCC Descripti | 2010/9/20 | Amy Tu |
| | | | |
| | | | |
| | | | |

1. General Description

The AVMD7540-SWA6 module is a complete radio module solution containing all the necessary HW and FW to provide a system-integration ready, multichannel wireless HD audio solution.

The module is comprised of a AV7540 IC combined with RF front-end circuits (RF PA + balun + filter + RF switch), flash memory, crystal, and passive components. The module provides a convenient set of digital I/O interfaces for digital audio through an I2S port, host MCU control through an SPI or I2C interface and optional GPIO for various control and indicator functions.

The module is a card edge style using the 36 pin PCIe card edge connection method to save space and cost in connecting to the main board.

FCC & IC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the exemption from the routine evaluation limits in section 2.5 of RSS 102.

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters from user and bystanders.

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102

2. Features

✓ **Complete, Integrated Wireless Module**

- AV7540 IC
- RF front-end
- Flash memory

✓ **High Performance Audio and RF solution**

- 16 bit, 48kHz to 24 bit, 96kHz digital audio
- 120dB SNR Digital Audio Path
- Fixed Low Latency solution
- +16dBm transmit RF output power
- -82dBm receive RF sensitivity
- Support for 30m/100m range NLOS/LOS

✓ **Digital interfaces and Audio**

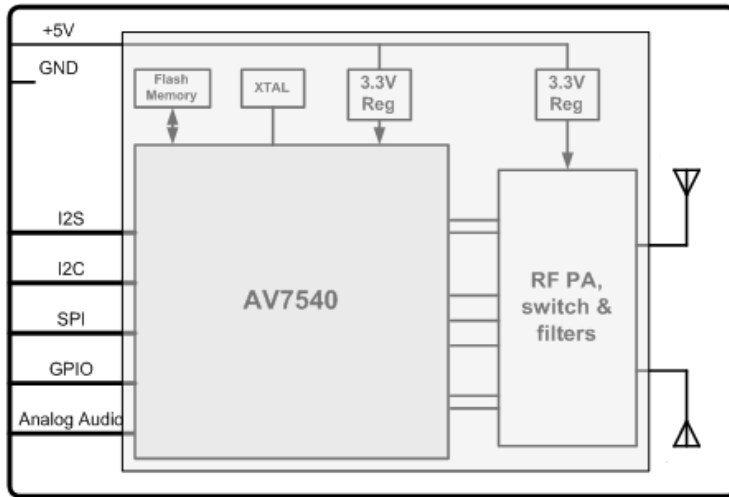
- 8 channel digital audio I/O (4 I2S ports)
 - Configurable as input or output
- Stereo audio DAC output
- 4-wire SPI slave interface or 2-wire I2C-compatible communication with the host MCU

✓ **Package and connections**

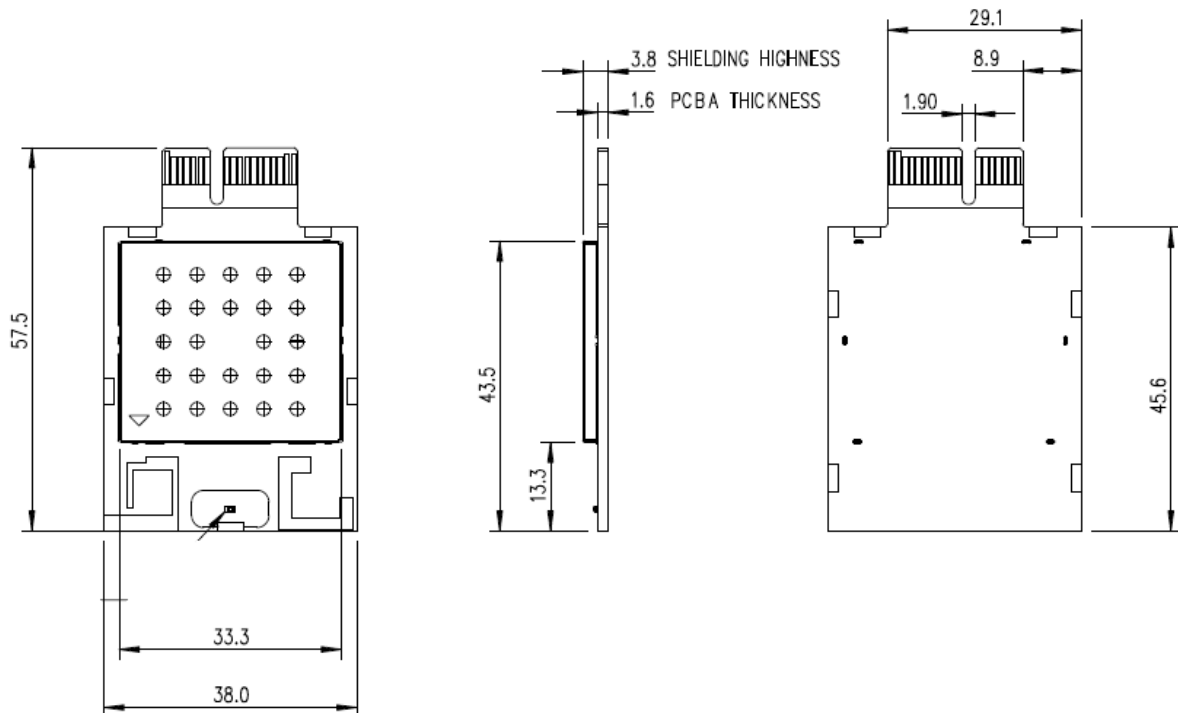
- Compact size
- 36 pin (2x18) PCIe card edge connector
- diversity antenna capability

3. Block Diagram

AVMD7540 Module



4. Module Outline



5. Pin Configuration and Definition

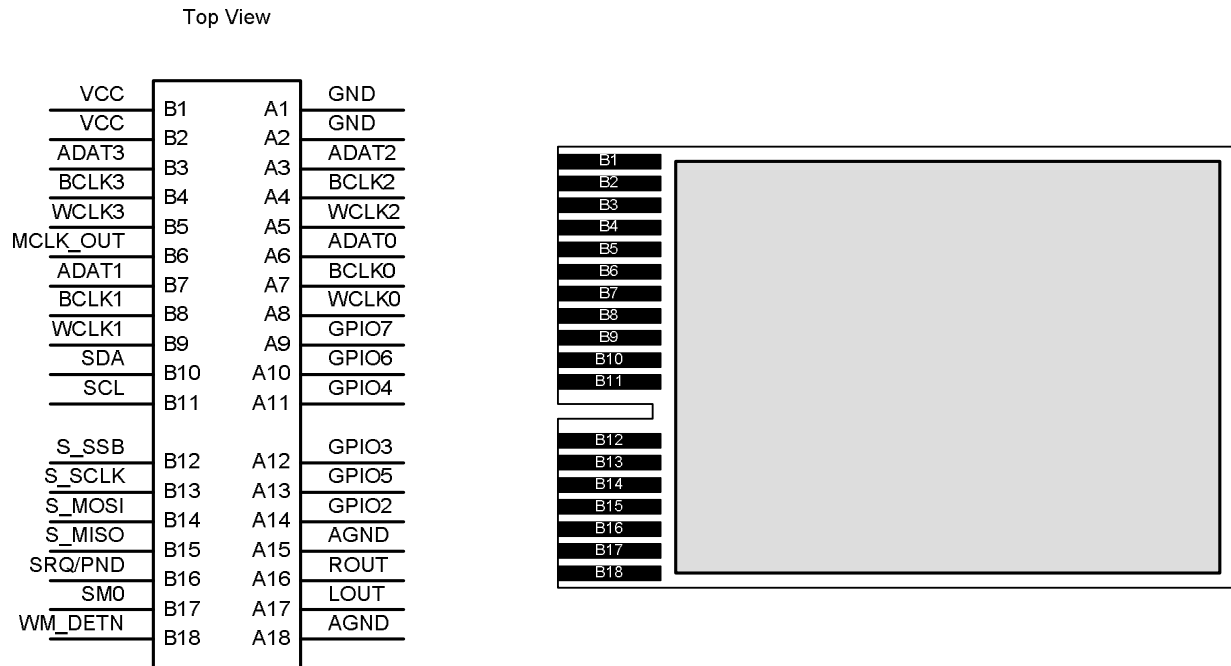


Figure 1-1 – AVMD7540-SWA6 module pin configuration

Table 錯誤! 所指定的樣式的文字不存在文件中。 -1 AVMD7540-SWA6 pin description

| # | Pin Name | Pin Type | Description |
|-----|-------------|----------------|--|
| A1 | GND | Analog | Module ground |
| A2 | GND | Analog | Module ground |
| A3 | WCLK2 | Digital I/O | I2S Word clock, AV75xx physical I2S I/O # 2 – input/output |
| A4 | BCLK2 | Digital I/O | I2S Bit clock, AV75xx physical I2S I/O # 2 – input/output |
| A5 | ADAT2 | Digital I/O | I2S audio data, AV75xx physical I2S I/O #2 – input/output |
| A6 | WCLK0 | Digital I/O | I2S Word clock, AV75xx physical I2S I/O # 0 – input/output |
| A7 | BCLK0 | Digital I/O | I2S Bit clock, AV75xx physical I2S I/O # 0 – input/output |
| A8 | ADAT0 | Digital I/O | I2S audio data, AV75xx physical I2S I/O # 0 – input/output |
| A9 | SPI/TWI_SEL | Digital I/O | SPI / TWI interface selection (SPI = 0, TWI = 1) |
| A10 | GPIO6 | Digital I/O | GPIO #6 |
| A11 | GPIO4 | Digital I/O | GPIO #4 |
| A12 | GPIO3 | Digital I/O | GPIO #3 |
| A13 | GPIO5 | Digital I/O | GPIO #5 |
| A14 | reserved | Digital I/O | reserved |
| A15 | AGND | Analog | Audio ground |
| A16 | ROUT | Analog | Audio DAC right channel output |
| A17 | LOUT | Analog | Audio DAC left channel output |
| A18 | AGND | Analog | Audio ground |
| | | | |
| B1 | VCC | Analog | +5V supply voltage input |
| B2 | VCC | Analog | +5V supply voltage input |
| B3 | ADAT3 | Digital I/O | I2S audio data, AV75xx physical I2S I/O # 3 – input/output |
| B4 | BCLK3 | Digital I/O | I2S Bit clock, AV75xx physical I2S I/O # 3 – input/output |
| B5 | WCLK3 | Digital I/O | I2S Word clock, AV75xx physical I2S I/O # 3 – input/output |
| B6 | MCLK_OUT | Digital Output | MCLK for I2S audio data |
| B7 | ADAT1 | Digital I/O | I2S audio data, AV75xx physical I2S I/O # 1 – input/output |
| B8 | BCLK1 | Digital I/O | I2S Bit clock, AV75xx physical I2S I/O # 1 – input/output |
| B9 | WCLK1 | Digital I/O | I2S Word clock, AV75xx physical I2S I/O # 1 – input/output |
| B10 | SDA | Digital I/O | I2C compatible serial data I/O |
| B11 | SCL | Digital I/O | I2C compatible serial clock I/O |
| B12 | S_SSB | Digital I/O | SPI Slave – slave select (active low) |
| B13 | S_SCLK | Digital I/O | SPI Slave – serial clock |
| B14 | S_MOSI | Digital I/O | SPI Slave – master out slave in |
| B15 | S_MISO | Digital I/O | SPI Slave – master in slave out |
| B16 | SRQ/PND | Digital Output | Notification signal to host (pending notification) |
| B17 | SM0 | Digital Input | Serial Mux control (for flash programming) and module reset (active low) |

6. Electrical Specifications

6.1. Absolute Maximum Ratings

The Absolute Maximum Rating (AMR) corresponds to the maximum value that can be applied without leading to instantaneous or very short-term unrecoverable hard failure (destructive breakdown). Absolute Maximum Ratings are stress ratings only. Permanent damage to the device may be caused by continuously operating at or beyond these limits. Device functional operating limits and guaranteed performance specifications are given under Electrical Characteristics at the test conditions specified.

Table 6-1 6-2 AVMD7540-SWA6 Absolute Maximum Ratings

| CONDITION | MIN | MAX | Units |
|--|------------|------------|--------------|
| Supply (relative to GND) | | | |
| +5V | -0.3 | 6.0 | V |
| | | | |
| Input Voltage Range – Digital Inputs | -0.3 | 3.6V | V |
| Short circuit to GND (any pin) | --- | continuous | |
| Storage Temperature | -40 | +100 | °C |
| Lead Temperature (10s) | -- | +225 | °C |
| ESD Voltage Rating – Human Body Model test | | 2000 | V |

6.2. DC Electrical Characteristics

Operating Conditions: +5V_IN = 5.0V ±10%, T_A=0°C to +50 °C; RF Chan. Freq. = 2412MHz to 2462MHz. All specifications are referenced to the AVMD7540-SWA6 edge connector pins and RF connectors, unless otherwise specified. Typical specifications at 5.0V and 25 °C.

Table 6-2 6-3 AVMD7540-SWA6 DC Electrical Characteristics

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|--|---|-----|-----|-----|------|
| Input supply voltage | Driven by an external regulator | 4.5 | | 5.5 | V |
| Supply Current – (Note 1) | RESET | | | 10 | mA |
| | RX mode: 1 stereo output I2S | | 100 | | mA |
| CMOS I/O Logic Levels – 3.3V I/O | | | | | |
| Input Voltage Logic Low, V _{IL} | Internal regulator = 3.3V | | | 0.6 | V |
| Input Voltage Logic High, V _{IH} | Internal regulator = 3.3V | 2.0 | | | V |
| Output Voltage Logic Low, V _{OL} | Internal regulator = 3.3V; I _{LOAD} =1mA | | | 0.4 | V |
| Output Voltage Logic High, V _{OH} | Internal regulator = 3.3V; I _{LOAD} =1mA | 2.9 | | | V |

Note 1: The operating states are defined as:

RESET = AVMD7540-SWA6 is held in reset by holding SM0 low

RX mode: AVMD7540-SWA6 is operating in a link as a client node receiving 1 stereo channel of 16bit, 48kHz audio.

6.3. Electrical Characteristics – RF Receiver

Operating Conditions: +5V_IN = 5.0V ±10%, T_A=0°C to +50 °C; RF Chan. Freq. = 2412MHz to 2462MHz. All specifications are referenced to the AVMD7540-SWA6 edge connector pins and RF connectors, unless otherwise specified. Typical specifications at 5.0V and 25 °C.

Table 6-3 -4 AVMD7540-SWA6 Electrical Characteristics – RF Receiver

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|----------------------------|----------------------|------|-----|------|------|
| RF Channel Frequency Range | | 2412 | | 2462 | MHz |
| Sensitivity (Note 1) | T _A =25°C | | -80 | | dBm |
| Max Input Signal (Note 1) | | | -5 | | dBm |
| Spurious RF outputs | 2400-2483.5 MHz | | | -47 | dBm |
| | <2400 MHz | | | -60 | dBm |
| | >2483.5 MHz | | | -60 | dBm |
| LO leakage | | | | -47 | dBm |

Note 1: Sensitivity and max signal level are defined as the onset of 1% BLER Block Error Rate.

6.4. Electrical Characteristics – RF Transmitter

Operating Conditions: +5V_IN = 5.0V ±10%, T_A=0°C to +50 °C; RF Chan. Freq. = 2412MHz to 2462MHz. All specifications are referenced to the AVMD7540-SWA6 edge connector pins and RF connectors, unless otherwise specified. Typical specifications at 5.0V and 25 °C.

Table 6-5 -5 AVMD7540-SWA6 Electrical Characteristics – RF Transmitter

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|---|------|-----|------|------------|
| RF Performance | | | | | |
| RF Channel Frequency Range | | 2412 | | 2462 | MHz |
| Output Power | T _A =25°C, OFDM signal, 16MHz channel BW | | +16 | | dBm |
| Harmonics (Note 1) | 2 nd harmonic | | | -45 | dBm |
| | 3 rd harmonic | | | -45 | dBm |
| Conducted RF Spurious signals | 800-1000MHz | | | -45 | dBm |
| | 2000-2390MHz | | | -45 | dBm |
| | 2483.5- 3000MHz; RBW=1MHz | | | -45 | dBm |
| | 3000-4000MHz ; RBW=1MHz 4.0-26.5GHz; RBW=1MHz | | | | |
| Radiated Spurious RF signals | 30-88MHz, | | | 34 | dBuV/ m |
| | 88-216MHz | | | 37 | dBuV/ m |
| | 216-960MHz | | | 40 | dBuV/ m |
| | >960MHz | | | 48 | dBuV/ m |
| LO leakage | Relative to power in a 100kHz BW **, after DC offset correction | | | -20 | dBc |

Note 1: Measured at TX output power = +16dBm

Note 1: Measured at TX output power = +16dBm

6.5. Electrical Characteristics – RF Channel Frequency

Operating Conditions: +5V_IN = 5.0V ±10%, T_A=0°C to +50 °C; RF Chan. Freq. = 2412MHz to 2462MHz. All specifications are referenced to the AVMD7540-SWA6 edge connector pins and RF connectors, unless otherwise specified. Typical specifications at 5.0V and 25 °C.

Table 6-5 -6 AVMD7540-SWA6 Electrical Characteristics – RF Transmitter

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------------------|-----------------------|-----|------|-----|------|
| RF Performance | | | | | |
| Channel Frequency | AM2G system channel 1 | | 2412 | | MHz |
| | AM2G system channel 2 | | 2438 | | MHz |
| | AM2G system channel 3 | | 2462 | | MHz |

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------------|---------------|-----|-----|--------|------|
| Frequency Error | 16MHz crystal | | | +/- 20 | ppm |

6.6. Electrical Characteristics – End-to-end Audio Characteristics

Operating Conditions: +5V_IN = 5.0V ±10%, TA=0°C to +50 °C; RF Chan. Freq. = 2412MHz to 2462MHz. All specifications are referenced to the AVMD7540-SWA6 edge connector pins and RF connectors, unless otherwise specified. Typical specifications at 5.0V and 25 °C.

Table 6-6 -7 AVMD7540-SWA6 Electrical Characteristics – End-to-end Audio Characteristics

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|----------------|-------------------------------------|-----|-----|-----|-------|
| End-to-end SNR | I2S in to I2S out, no interference; | | | | |
| | 16bit / 48kHz mode | 96 | | | dB |
| | 24bit / 48kHz mode | 120 | | | dB |
| | 16bit / 96kHz mode | 97 | | | dB |
| Latency | 24bit / 96kHz mode | 120 | | | dB |
| | 48kHz, interleaving level = 0 | | | 11 | ms |
| | 48kHz, interleaving level = 1 | | | 15 | ms |
| Bandwidth | 48kHz, interleaving level = 2 | | | 19 | ms |
| | +/-0.5dB flatness, 48Khz modes | 20 | | 20k | Hz |
| | +/-0.5dB flatness, 96Khz modes | 20 | | 40k | Hz |

6.7. Electrical Characteristics – MCLK Characteristics

Operating Conditions: +5V_IN = 5.0V ±10%, TA=0°C to +50 °C; RF Chan. Freq. = 2412MHz to 2462MHz. All specifications are referenced to the AVMD7540-SWA6 edge connector pins and RF connectors, unless otherwise specified. Typical specifications at 5.0V and 25 °C.

Table 6-7 AVMD7540-SWA6 Electrical Characteristics – MCLK Characteristics

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|------------------------|--------------------------------------|-----|-------|-----|-------|
| MCLK frequency | “24MHz” mode (256MHz divide by 10.5) | | 24.38 | | MHz |
| | “12MHz” mode (256MHz divide by 21) | | 12.19 | | MHz |
| MCLK output duty cycle | | 40 | | 60 | % |

7. Package Information

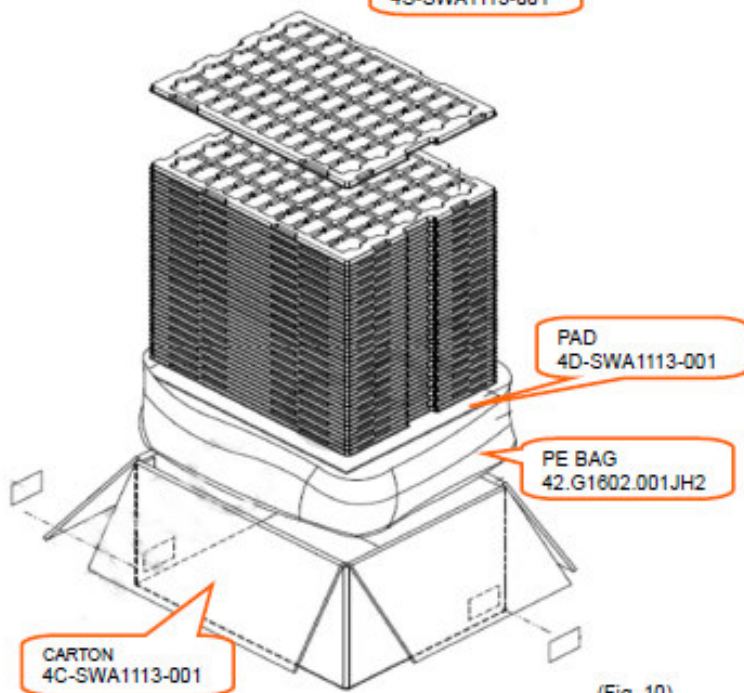


(Fig. 8)



(Fig. 9)

TRAY
4S-SWA1113-001



(Fig. 10)