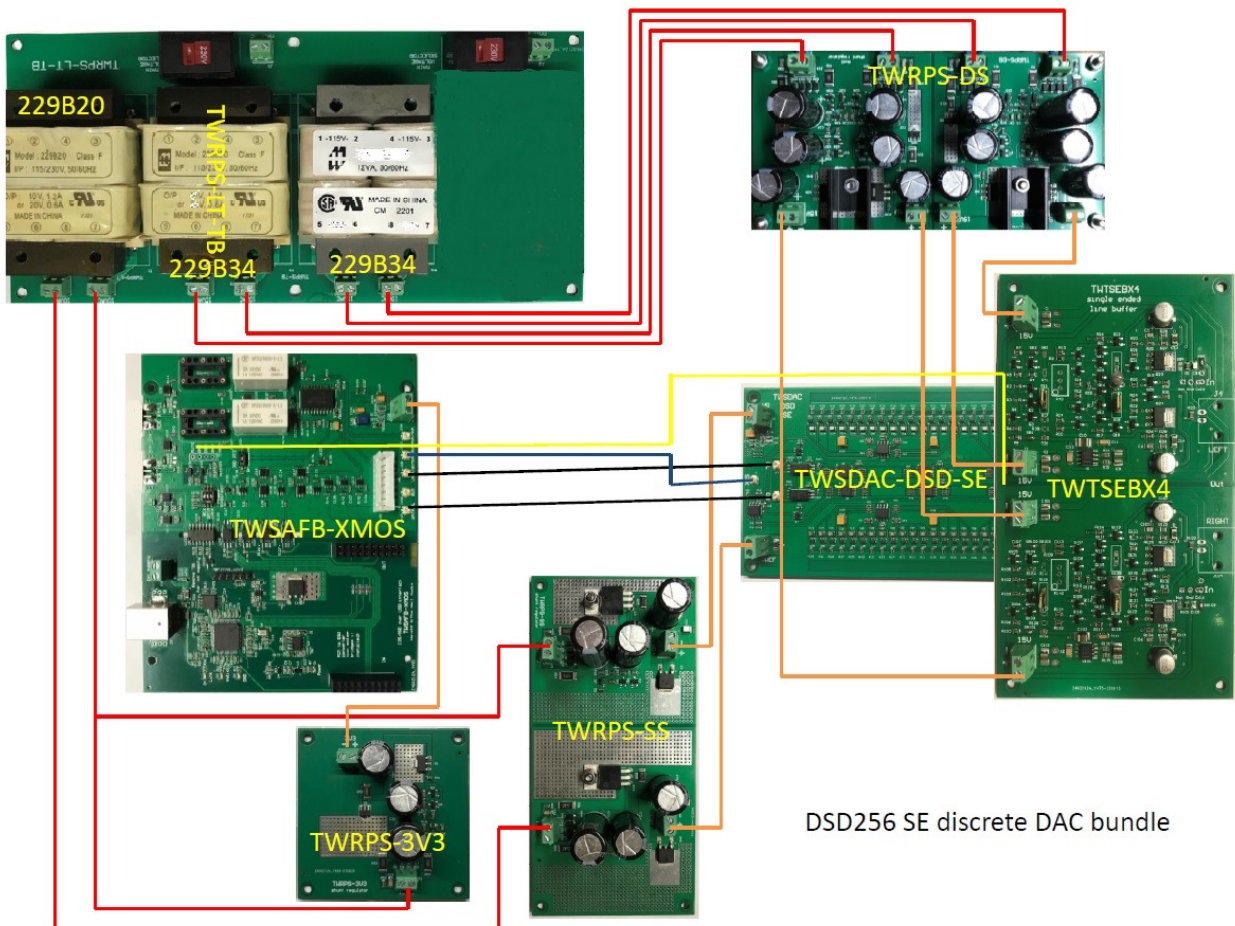


# TWSDAC-DSD-SE The Well Segmented DAC (DSD-SE) bundle



The TWSDAC-DSD-SE-BNDL is the DSD256 single ended discrete DAC bundle. The bundle includes the following boards:

1. TWSAFB-XMOS I2S/DSD over USB finished board ([https://www.thewellaudio.com/wp-content/uploads/TWSAFB-XMOS\\_User\\_Manual.pdf](https://www.thewellaudio.com/wp-content/uploads/TWSAFB-XMOS_User_Manual.pdf))
2. TWSDAC-DSD-SE Single Ended discrete DAC finished board ([https://www.thewellaudio.com/wp-content/uploads/TWSDAC-DSD-SE\\_User\\_Manual.pdf](https://www.thewellaudio.com/wp-content/uploads/TWSDAC-DSD-SE_User_Manual.pdf))
3. TWTSEBX4 Single Ended line buffer with mute circuit finished board ([https://www.thewellaudio.com/wp-content/uploads/TWTSEBX4\\_User\\_Manual.pdf](https://www.thewellaudio.com/wp-content/uploads/TWTSEBX4_User_Manual.pdf))
4. TWRPS-LT-TB transformers bank bare board ([https://www.thewellaudio.com/wp-content/uploads/TWRPS-LT-TB\\_User\\_Manual.pdf](https://www.thewellaudio.com/wp-content/uploads/TWRPS-LT-TB_User_Manual.pdf))
5. TWRPS-3V3 low noise power supply for USB receiver finished board ([https://www.thewellaudio.com/wp-content/uploads/TWRPS-3V3\\_User\\_Manual.pdf](https://www.thewellaudio.com/wp-content/uploads/TWRPS-3V3_User_Manual.pdf))
6. TWRPS-SS low noise power supply for DSD DAC SE finished board ([https://www.thewellaudio.com/wp-content/uploads/TWRPS-SS\\_User\\_Manual.pdf](https://www.thewellaudio.com/wp-content/uploads/TWRPS-SS_User_Manual.pdf))

7. TWRPS-DS low noise power supply for Line buffer finished board  
([https://www.thewellaudio.com/wp-content/uploads/TWRPS-DS\\_User\\_Manual.pdf](https://www.thewellaudio.com/wp-content/uploads/TWRPS-DS_User_Manual.pdf))

See the User Manual of each board for specifications and connections.

The following items has to be sourced to complete the DAC:

- through hole components to populate the TWRPS-LT-TB transformers bank
- enclosures for DAC (1)
- 22.5792/24.576 MHz or 45.1584/49.152 MHz oscillators if not supplied

Features:

**Input format:** DSD (and PCM with PCM2DSD interface installed)

**Inputs:** 1 x USB port

**Format:** up to DSD256 (DSD256 in RTZ mode)

**Architecture:** single ended discrete 32 taps FIRDAC

**Clock mode:** continuous clock

**RTZ logic:** Return to Zero logic available (selectable by dip-switch on board)

**Output phase:** direct or reversed (dip-switches on board)

**Master clock:** 22.5792/24.574 MHz or 45.1584/49.152 MHz up to DSD256 (DSD256 in RTZ mode)

**Output:** voltage output 1.4V rms in RTZ mode

**Configuration:** all settings on board

**Master Clock selection:** T-switch configuration relay to select the sample rate family instead of multiplexers

**Optical isolation:** all output signals are optically isolated from the XMOS processor to avoid interferences from the source

**External Master Clock:** SMA connectors can be installed for external clocks

**Optional:** PCM2DSD interface connectors on board

**Phase noise:** very low phase noise outputs (SCK)

**Power supply:** low noise linear and shunt regulators (without transformers)

**Note:** all finished boards (without RCA connectors and transformers)

## Placing and wiring the DAC boards

1. Populate the TWRPS-LT-TB transformers bank as noted in the User Manual. You have to source the 3 Hammond transformers (1 x 229B20 + 2 x 229B34) and the other components listed in the BOM
2. Be careful to place the TWSDAC-DSD-SE close to the TWSAFB-XMOS USB receiver in order to connect the boards using the supplied u.fl cables (200 mm length)
3. Wire the main AC to the TWRPS-LT-TB transformers bank (J1)
4. Be careful selecting the appropriate 115/230 Main AC Voltage (SW2)
5. Wire the AC outputs of the TWRPS-LT-TB to the regulators:
  - J3, 10 VAC connect to J51 of TWRPS-3V3 and to J1 of TWRPS-SS
  - J4, 10 VAC connect to J11 of TWRPS-SS
  - J6, 17 VAC connect to J23 of TWRPS-DS
  - J5, 17 VAC connect to J21 of TWRPS-DS
  - J7, 17 VAC connect to J1 of TWRPS-DS
  - J8, 17 VAC connect to J3 of TWRPS-DS
6. Wire the DC outputs of the TWRPS-3V3 to the TWSAFB-XMOS USB receiver:
  - J46, regulated +3V3DC connect to J101-3V3 of TWSAFB-XMOS
7. Wire the DC outputs of the TWRPS-SS to the TWSDAC-DSD board:
  - J2, regulated +4VDC connect to J5-VD of TWSDAC-DSD
  - J6, regulated +4VDC connect to J12-VRef of TWSDAC-DSD
8. Wire the DC outputs of the TWRPS-DS to the TWTSEBX4 board:
  - J2, regulated +15VDC connect to J2 of TWTSEBX4
  - J4, regulated -15VDC connect to J3 of TWTSEBX4
  - J22, regulated +15VDC connect to J102 of TWTSEBX4
  - J24, regulated +15VDC connect to J103 of TWTSEBX4
9. Install (on board) or wire (panel) the RCA connectors to the TWTSEBX4:
  - J4, Left analog output
  - J104, Right analog output
10. Configure the TWTSEBX4:
  - use option 2 - DC servo disabled, manual offset setting enabled
  - remove RJPL and RJPR solder bridges
  - If you want to bypass the series 100 ohm resistors when muting is disabled to get lower output impedance you have to short the RLCL and RLCR solder bridges
11. Fits the TWTSEBX4 Line buffer to the TWSDAC-DSD-SE
12. Connect the mute control of the TWSAFB-XMOS (J104, Mute-Gnd) to the TWTSEBX4 (J201, Mute-Gnd) board using a 2 poles flat cable (not supplied)
13. Connect the TWSAFB-XMOS USB receiver to the TWSDAC-DSD-SE board using the supplied u.fl coaxial cables:
  - J107, TWSAFB-XMOS DATA/DR connect to J3-DR of TWSDAC-DSD-SE
  - J108, TWSAFB- XMOS LRCK/DL connect to J1-DL of TWSDAC-DSD-SE
  - J113, TWSAFB- XMOS MCK/SCK connect to J1-SCK of TWSDAC-DSD-SE
14. Install 22.5792/24.574 MHz or 45.1584/49.152 MHz oscillators (like Accusilicon or Crystek) if not supplied on the TWSAFB-XMOS USB receiver
15. Optionally remove SB101-SB102-SB103 solder bridges and plug the PCM2DSD interface into the TWSAFB-XMOS using the on board connectors .

## Configuring the TWSAFB-XMOS

In order to get the DAC working, the TWSAFB-XMOS has to be configured as below:

1. Set the solder bridges SB104-SB105-SB107-SB107 according to the frequencies of the installed oscillators:
  - a. solder SB104-SB106 for 22.5792/24.574 MHz
  - b. solder SB105-SB107 for 45.1584/49.152 MHz
2. Set the phase of the digital signals by the on board dip-switches:
  - a. BCK, don't care
  - b. DATA, off=reversed
  - c. LRCK, off=reversed
3. Set the DSD RTZ dip switch as desired (On=Enabled recommended)
4. Remove SB101-SB102-SB103 if PCM2DSD interface has to be installed
5. Set the DC offset of the TWTSEBX4 line buffer:
  - a. provide digital input signal to the USB receiver (LED D3 Valid has to be light on)
  - b. connect a DMM to the Left analog output and turn R40 to get 0VDC
  - c. connect a DMM to the Right analog output and turn R140 to get 0VDC

## Warning

The DAC does include a simple 6dB/octave low pass filter at its output, 2.2 nF capacitor (C97 and C98). You can replace these capacitors with others in the range 1 nF to 4.7 nF as on your taste.

The TWTSEBX4 Line buffer has a little DC offset drift, AC coupled preamp/amp is recommended.