**Audio System TTK Guide**

**ADVANCED: USB Audio to Speakers over a Transmission Line**

1. **Description**

This guide will walk through the basics of setting up four Tiny Tool Kits (TTK) to create a full audio system. This system streams audio from a PC over USB and then uses the DIT4192 TTK to send the audio over a transmission line (Coax/Optical/etc.) to the DIR9001 TTK. This receiver TTK converts the audio into I2S to be sent to the PCM1789 TTK (DAC) to turn into an analog signal. This analog signal is then connected to an amplifier for listening over stereo speakers.

1. **Board Descriptions**

For more information on the four designs involved, please see their TTK guides.

1. **Connections**

There are two subsystems that can either be used in conjunction or separately. They are the transmitter (Section 4) and the receiver (Section 5).

|  |  |
| --- | --- |
| **Transmitter Connections** | |
| **USB to I2X TTK** | **DIT4192 TTK\*\*** |
| SDOUT (J2) | SDATA (J1) |
| SCLK (J2) | SCLK (J1) |
| LRCLK (J2) | SYNC (J1) |
| MCLK (J2) | MCLK (J3)\* |
| GND (J2) | GND (J1) |

|  |  |
| --- | --- |
| **Receiver Connections** | |
| **DIR9001 TTK** | **PCM1789 TTK** |
| SCKO (J1) | SCKI (J1) |
| DOUT (J2) | DIN (J1) |
| BCK (J2) | BCK (J1) |
| LRCK (J2) | LRCK (J1) |
| GND (J2) | GND (J1) |

Transmitter to Receiver

Connections

TX+ > RXIN

TX- > GND

*\* The DIT4192 TTK MCLK Jumper setting must be in the 2-3 position.*

*\*\* The DIT4192 TTK must be put into slave mode.*

*This is done by connecting the M/S pin (J1, pin 12) to ground.*

In addition to the above connection tables:

* The USB to I2X board must be connected to a PC with the appropriate drivers installed.
* Each of the TTK boards must be appropriately powered based on the specifications of their TTK guides.
* The connections between the two subsystems can be any type of transmission line, for testing purposes, two wires may be used.

When the above configuration is used with the correct hardware settings, the PCM1789 differential outputs (OUTR+/OUTR- and OUTL+/OUTL-) are then ready to be amplified for listening.

1. **Transmitter**

The transmitter uses the USB to I2X TTK and the DIT4192 TTK to stream audio from a USB port and transmit the signal. The USB to I2X TTK uses a micro-USB port for power and communication. After successful communication with the PC, the LOCK LED will light up. The USB to I2X TTK converts the audio signal from the USB into an I2S digital audio signal which, following the above connection table is sent to the DIT4192 TTK. The DIT4192 TTK converts the I2S signal into two pins, TX+ and TX-, this can be connected to a coax cable, or sent to an optical driver for use with an optical cable.

1. **Receiver**

The receiving subsystem uses the DIR9001 TTK to receive the transmitted audio data, either through the 2 header pins or the optical connector. The DIR9001 TTK synchronizes with the signal and when it locks on, the LOCK LED will light up. The DIR9001 converts the signal into an I2S digital audio signal. This signal is sent to the PCM1789 TTK which converts the digital signal into an analog signal to be amplified.