

Theory of Operation

The 'Tangara' device from 'cool tech zone' consists of two printed circuit assemblies; a 'mainboard' and a 'faceplate'.

The mainboard and faceplate are connected via soldered Molex FFC connectors and a removable FFC cable.

The device is powered primarily by a 3.7V LiPo pouch battery, and secondarily by a 5V USB-C connection. The battery is connected to the mainboard through a soldered JST-PH connector. The device implements load sharing between its power sources, regulating its supply voltage both to -5V and in the range of 1V8 to 5V.

The device uses USB power to charge the battery up to a maximum of 4V2, with a charge current of no more than 1A. The device will not drain the battery below 3V.

The main processing unit is an Espressif ESP32. The 40 MHz crystal oscillator drives the base of it. It is a 2.4GHz transceiver with Bluetooth transceiver. Others bands embody on the schematics are closed by the software by manufacturer. It is implemented using an Espressif ESP32-WROVER-E module that is configured with 16MiB of flash and 8MiB of RAM. The 2.4GHz frequency range is from 2402MHz to 2480MHz, transmitting antenna is PCB Antenna.

The secondary processing unit is a Microchip ATSAMD21, configured with 256KiB of flash and 32KiB of RAM.

The mainboard includes a digital-to-analogue converter, amplifier, and, and 3.5mm TRS jack for connecting headphones. Audio signals produced by this circuitry are generally in the range of 20Hz to 20kHz, and a low pass filter in the signal path attenuates signals over approximately 100kHz.

The device runs user-flashable open source software written primarily by cool tech zone. The source code for the software is available freely online.

Tangara is housed within a polycarbonate enclosure.

Technical Characteristics of EUT	
Bluetooth Version:	V4.2 (BR/EDR mode)
Frequency Range:	2402-2480MHz
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Quantity of Channels:	79
Channel Separation:	1MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	3.92dBi