



Tap Point Device

Circuit Overview

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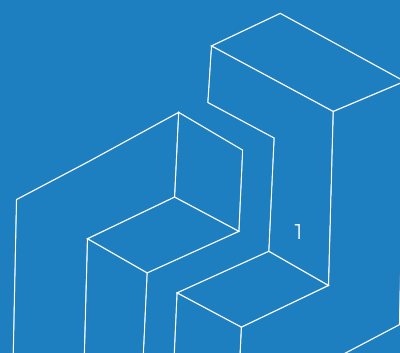


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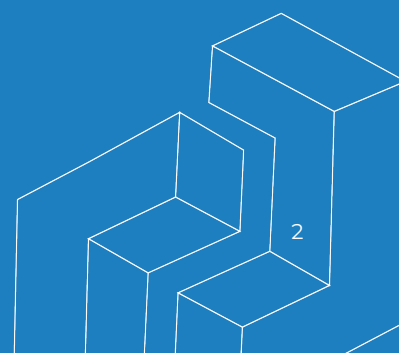
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1. Device Description

This document provides a brief overview of the Tap Point device, which comprises five distinct printed circuit boards (PCBs). The device is designed to enable users to scan RFID tags.

2. Device Components

The Tap Point consists of the following boards:

- Smart Layer PCB
- Integration Layer PCB
- Antenna PCB
- LED Ring PCB
- Power Injector PCB

2.1. Smart Layer

Primary Role: Process data received from the UHF module and relay it to the PC, and relay the lighting patterns received from the DMX controller to the LED ring.

Key Components: STM32, isolated DMX circuitry

2.2. Integration Layer

Primary Role: Generate and modulate the RF signal, process and decode the received signal, and relay it via serial to the Smart Layer.

Key Components: Novanta M7e module

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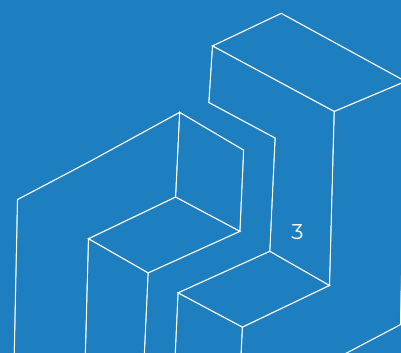
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2.3. Antenna Board

Primary Role: Radiate and capture RF signals.

Key Components: SMA antenna

2.4. LED Ring

Primary Role: Play the lighting patterns commanded by the Smart Layer.

Key Components: 16x APA102 LEDs

2.5. Power Injector

Primary Role: From a separate source, step down 24V to 5V to power the Tap Point, and communicate the USB 2.0 data pair from the Tap Point to the computer.

Key Components: Step-down converter.

3. Interconnections

- Between the Smart Layer and the Integration Layer: Through headers
- Between the integration Layer and the Antenna Board: uFL cable
- Between the Smart Layer and LED Ring: 4-pin cable
- Between the Power Injector and the Smart Layer: Through a 5-pin cable

4. Modulation

The Tap Point utilizes PR-ASK (Phase Reversal Amplitude Shift Keying) modulation, with a 180° phase shift, and a rated power output of 24 dBm $\pm$ 1 dBm.

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