Design and Implementation of USB Type–C Audio Adapter Accessory
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ABSTRACT
The fundamental target of this venture is to outline a sort C sound connector which gives the answer for interfacing simple sound through the developing USB Sort C interface. This plan shows how simple sound transmitted to framework peripherals utilizing the USB Sort C standard's sound connector extra mode. This permits plans to expel the substantial 3.5 mm jack, and supplant it with a 85% small USB Sort C connector. The USB Sort C simple sound multiplexer board controls the exchanging between simple sound exchanged through the USB Sort C connector and information will be exchanged through the USB Sort C connector. The USB Sort C to 3.5 mm jack connector board gives the required draw down resistors for the USB Sort C nearness identify rationale on CC1 and CC2 that implies a sound connector is being utilized. The connector additionally permits clients to test sound with existing sound gadgets that utilization the 3.5 mm jack interface.

KEY WORDS: Analog Audio, Jack, USB Type-C adapter, USB Type-C connector.

1. INTRODUCTION
The USB Sort C connectors interface with both hosts and gadgets, supplanting different Sort B and Sort connectors and links with a standard intended to be future-verification (Vijayprasath, 2015). The 24-stick twofold sided connector is comparable in size to the smaller scale B connector, with a USB Sort C port measuring 8.4 millimeters (0.33 in) by 2.6 millimeters (0.10 in) (Palanivel Rajan, 2010). The connector gives four power/ground and two differential sets for non-Super Speed information (however just a single match is populated in a USB Sort C link), four sets of control/ground for rapid information transport, two "sideband utilize" pins, and two design pins for link introduction identification, committed biphase check code (BMC) arrangement information station, and VCONN +5 V control for dynamic links (Gayathri, 2015).

Interfacing a more seasoned gadget to a host with a USB Sort C repository requires a link or connector with a Sort A or Sort B fitting or container toward one side while a USB Sort C plug on the flip side. Legacy connectors with a USB Sort C container are "not characterized or permitted" by the detail; because they are having the capacity to make "many invalid and possibly risky" link mixes (Renuka, 2013). The type–c connector additionally permits clients to test sound with existing sound gadgets that utilization the 3.5 mm jack interface (Mohanapriya, 2013). The TS5USBA224: Purpose: The TS5USBA224 is utilized to multiplex between the USB 2.0 information and simple sound with a specific end goal to shield the USB PHY from negative voltages swings from the simple sound. In Figure.2, the sound source might be created through a PC, while the sound sink might be a speaker to tune in to the sound. The above block diagram shows the TIDA00565 functional block diagram.

2. METHODS & MATERIALS
Working: The USB Sort C sound connector configuration is made out of two sheets; a USB Sort C simple sound multiplexer board and a USB Sort C connector to a 3.5 mm jack connector (Palanivel Rajan, 2012). The USB Sort C simple sound multiplexer board in the sort–c sound connector adornment controls the exchanging between simple sound both sound and information exchanged through the USB Sort C connector. The USB Sort C port to 3.5 mm jack connector board gives the required draw down resistors for the USB Sort C nearness recognize rationale on CC1 and CC2 that implies a sound connector is being utilized (Sundaravadivu, 2013).
At the point when a simple sound flag is on the USB D+ and D-lines, the flag may swing up to –2 to 2 Vpp. This negative swing in voltage can make harm parts in the flag chain that will most likely be unable to deal with a negative swinging sign. The TS3A227E is utilized especially to consequently recognize and situate the MIC and GND signs of the 3.5 mm jack to bolster the capacity depicted in the USB Sort C standard above. The USB Sort C to 3.5 mm dongle is on the sink side of the framework, accordingly, the framework client may associate speakers or an earphone set to tune in to the sound. Earphones frequently accompany a 4-post jack, who implies the MIC and GND of the jack must be steered appropriately.

**Features:** Acts as a High-Speed USB Switch as well as audio switch.

**Applications:**
- Smart Phones
- Transportable Instruments
- Transportable Navigation Devices

![Image](image_url)

**Figure 2. Diagram of TS5USBA224**

**TS3A227E:**

**Purpose:** The TS3A227E is a programmed sound extra recognition and setup switch that identifies 3-shaft or 4-post sound embellishments and arranges inward changes to course the signs in like manner. The inside ground FETS of the TS3A227E have a ultra-low RON of 60 mho to limit crosstalk affect.

The ground FETs are additionally intended to pass FM signals, making it conceivable to utilize the ground line of the sound adornment as a FM reception apparatus in versatile applications (Palanivel Rajan, 2016). Inner detachment switches permit the TS3A227E to evacuate the snap/pop commotion that can be produced amid and addition or expulsion of a sound adornment. Notwithstanding that consumption FETs keep a gliding ground while the gadget is unpowered, evacuating the murmuring commotion show when leaving embellishments connected to an unpowered framework (Palanivel Rajan, 2015). The real elements of this TS3A227E are incorporated key press recognition for distinguishing up to 4 keys with press and discharge bolster. The TS3A227E has been allowed by manual I2C control to adapt to application needs by providing control over de-bounce settings and switch states.

**Features:**
- Supply Range of 2.5 V to 4.5 V
- Accessory Insertion/Removal Detection
- Key Press Detection for Up to 4 Keys
- Ultra Low Ground FET and Power Off Noise Removal

**Applications:**
- Mobile Phones
- Tablets
- Notebooks and Ultra books
- Anywhere a 3.5 mm Audio Jack is Used

**TUSB32X / TPS65982:**

**Purpose:** The TUSB32X or TPS65982 gadget empowers USB Sort C sound connector ports with the design channel (CC) rationale required for USB Sort C biological communities (Kavitha, 2015). The TUSB32X/TPS65982 gadget utilize the CC pins to decide the sort of gadget embedded into the USB Sort C connector. At the point when the TUSB32X/TPS65982 gadget sees a sound frill (by detecting the R a 1k pull down resistors on the embellishment) it can utilize one of its GPIOs to flip the TS5USBA224 rationale control pins to choose the sound way of the TS5USBA224 (Kavitha, 2013).

**Features:**
- USB Power Delivery (PD) Controller
- USB Type-C Specification Compliant
- Detect USB Cable Plug Attach
Applications (Vivek, 2016)
- Notebook, Tablet and Ultrabook Computers
- Docking Systems, Monitors and TVs
- AC-DC Charger Adapters
- USB PD Sources, Sinks, and Dual-Role Ports.

Summary: Simple sound headsets are upheld by multiplexing the four simple sound signs onto sticks in the USB Sort C connector when in the sound connector frill mode (Palanivel Rajan, 2013). The sort – c sound connector embellishment mode is announced to the host by setting two (Ra) pull down resistors on the CC1 and CC2 pins. These resistors on the CC lines are directed by the USB Sort C determination.

The four simple sound signs are a similar which is being utilized by a customary 3.5 mm headset jack. This connector makes it conceivable to interface existing simple headsets with a 3.5 mm to Sort C connector for this show. The connector likewise gives a couple of 1k ohm (Ra) pull down resistors (Palanivel Rajan, 2014). The accompanying chart demonstrates the case schematics of an aloof 3.5 mm jack to the Sort C connector (Rau, 2005).

Figure 3. Pin Diagram

3. CONCLUSION

This project describes the design and implementation of USB Type-c audio adapter accessory which allows smart phones to be small in size and reduces the thickness of the smart phones. We have implemented Xpedition Enterprise tool in an innovative way to exhibit the workings of the type – c audio adapter accessory mode in a PCB layout. If this proposed system gets implemented then it will hold the future vision of supporting various services like replacing the 3.5 mm audio jack which automatically reduces the thickness of the smart phones.

REFERENCES
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