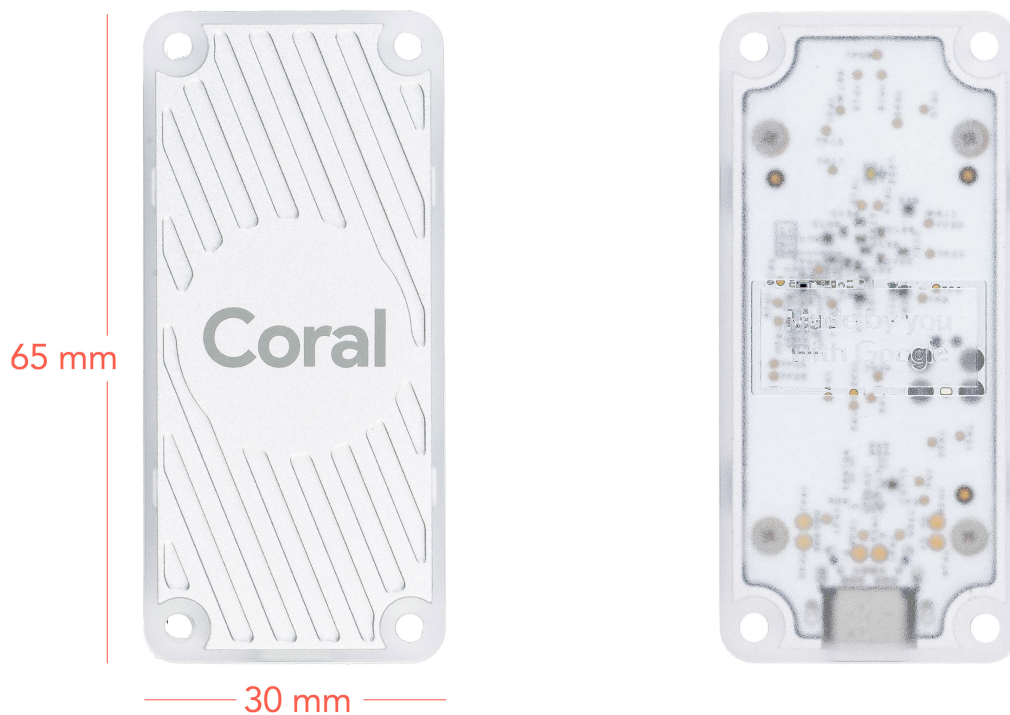


Coral

# USB Accelerator Datasheet

Version 1.0



# Features

- Google Edge TPU ML accelerator coprocessor
- USB 3.0 Type-C socket
- Supports Debian Linux on host CPU

## Overview

The Coral USB Accelerator is a USB device that adds an Edge TPU coprocessor to your system. It includes a USB socket so you can connect it to any Linux-based system to perform accelerated ML inferencing.

The on-board Edge TPU is a small ASIC designed by Google that provides high performance ML inferencing with a low power cost. For example, it can execute state-of-the-art mobile vision models such as MobileNet v2 at 400 FPS, in a power efficient manner.

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# System requirements

The Coral USB Accelerator must be connected to a host computer with the following specifications:

- Any Linux computer with a USB port
  - Debian 6.0 or higher, or any derivative thereof (such as Ubuntu 10.0+)
  - System architecture of either x86-64 or ARM32/64 with ARMv8 instruction set

# Components overview

The Coral USB Accelerator is a small PCB that provides an Edge TPU coprocessor for your host CPU system.

**Table 1.** USB Accelerator components and features

Feature	Details
ML accelerator	
Edge TPU	<ul style="list-style-type: none"><li>• ASIC designed by Google that provides high performance ML inferencing for TensorFlow Lite models</li></ul>
Connections	
USB	<ul style="list-style-type: none"><li>• USB 3.1 (gen 1) port and cable (SuperSpeed, 5Gb/s transfer speed)</li><li>• Included cable is USB Type-C to Type-A and 300 mm long (12 in)</li></ul>

## Product dimensions

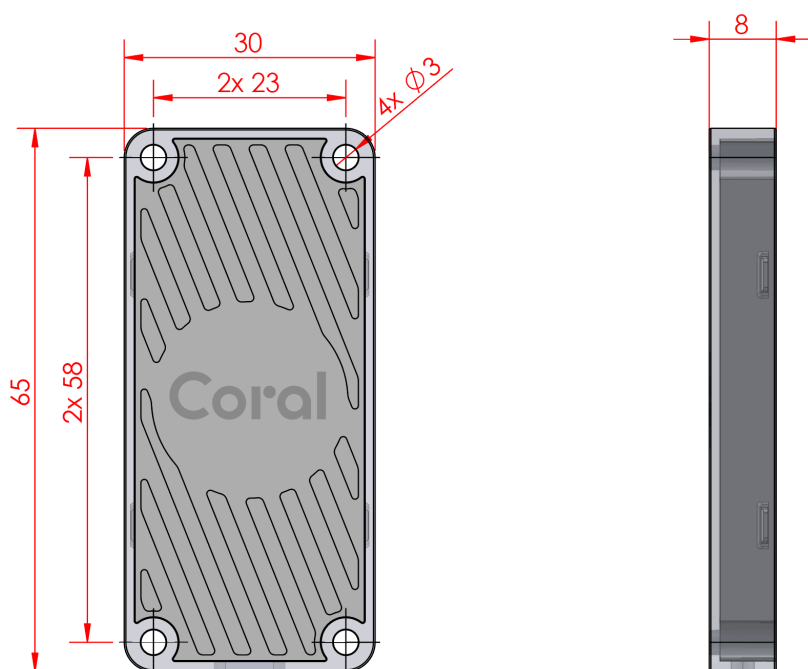


Figure 1. Device dimensions and mounting hole details

USB cable length: 300mm +/- 20 mm

## Software and operation

The USB Accelerator doesn't require any software installed, but the host computer to which it's attached must install the Edge TPU runtime and API library. For instructions, see the [Get Started guide](#).

For information about how to create models and run inferences the Edge TPU, read [TensorFlow models on the Edge TPU](#).

## Performance settings

When you first [set up the USB Accelerator](#), you can select whether to use the default or maximum clock frequency. The maximum clock frequency runs at 2x the default setting, which increases the inferencing speed, but also increase power consumption.

**Caution:** If you enable the maximum operating frequency, the USB Accelerator becomes very hot to the touch during operation and might cause burn injuries. Either keep the device out of reach when using with the maximum frequency or instead use the default clock frequency to avoid injury.

To change this setting, simply install the alternate runtime, as per the instructions to [install the Edge TPU runtime](#).

## LED behavior

The USB Accelerator includes an LED that lights up according to the current system state, as indicated in the following table.

**Table 2.** LED behavior and meaning

System state	LED behavior
Edge TPU initialized	On (solid)
Edge TPU running	Pulse (breathe)

## Power specifications

The Coral USB Accelerator is powered by 5V from USB interface (USB\_VBUS) through on board power management chip (PMIC).

The device should be connected to a host computer with a USB cable that provides at least 500mA at 5V.

## Recommended operating conditions

During normal operation, the Coral USB Accelerator may heat up, depending on the computation workloads and operating frequency. Touching the metal part of the device after it has been operating for an extended period of time may lead to discomfort and/or skin burns. As such, we recommend the following operating temperature ranges, depending on the operating frequency you've selected.

**Table 3.** Operating conditions

Operating frequency	Max ambient temperature
Default	35°C
Maximum	25°C

Google does not accept any responsibility for any loss or damage if the device is operated outside of the recommended ambient temperature range.

## Environmental and electrical reliability tests

Table 4. Verified results for environmental and electrical reliability tests

Test	Conditions	Verified
Heat soak	Non-op: 60°C/90%RH	72hrs
Temp cycling	Non-op: -20°C/60°C	300 cycles
Short term survivability	Non-op: 85°C/20%RH, 18hrs	18 hours
Long-term operational stress (LTOS)	Op: 40°C/90%RH	1000 hours
ESD - Air discharge	15~35°C, 30~60% RH	12 kV
ESD - Contact discharge	15~35°C, 30~60% RH	8 kV

## Mechanical reliability tests

Table 5. Verified results for mechanical reliability tests

Test	Conditions	Verified
0.5m controlled drop on wood	6 faces, 12 edges, 3/4" wood	18 drops
0.5m tumble	Impact surface: steel plate > 3 mm thick	50 drops
Repetitive drop	75 mm drop on plywood, six faces	50 drops
Vibration	3 axes (X, Y and Z), 15 minutes per axis, 10-500Hz. Amplitude: 2.16 Grms	45 minutes
USB-C connector cycling	Manual plug/ unplug	1000 cycles
USB-C connector side load 2.5kg	2.5 kgf load, 15 mm from the plug, 2 orientations	50 cycles
Pressure & squeeze - 50kg	50 kgf, 100 mm rubber pad	10 cycles
Pressure & squeeze - 5kg	5 kgf, 10 mm rubber pad	10 cycles
USB cable 120° bend	60° CW + 60° CCW, 453 gf tension, 42 rpm	100 cycles

# Certifications

Table 6. USB Accelerator certifications

Market	Certifications
USA	FCC
European Union	CE
Japan	VCCI
Korea	KCC

# Document revisions

Table 7. History of changes to this document

Version	Changes
1.0 (September 2019)	<ul style="list-style-type: none"><li>Updated information about performance settings</li></ul>
Beta (March 2019)	Initial release