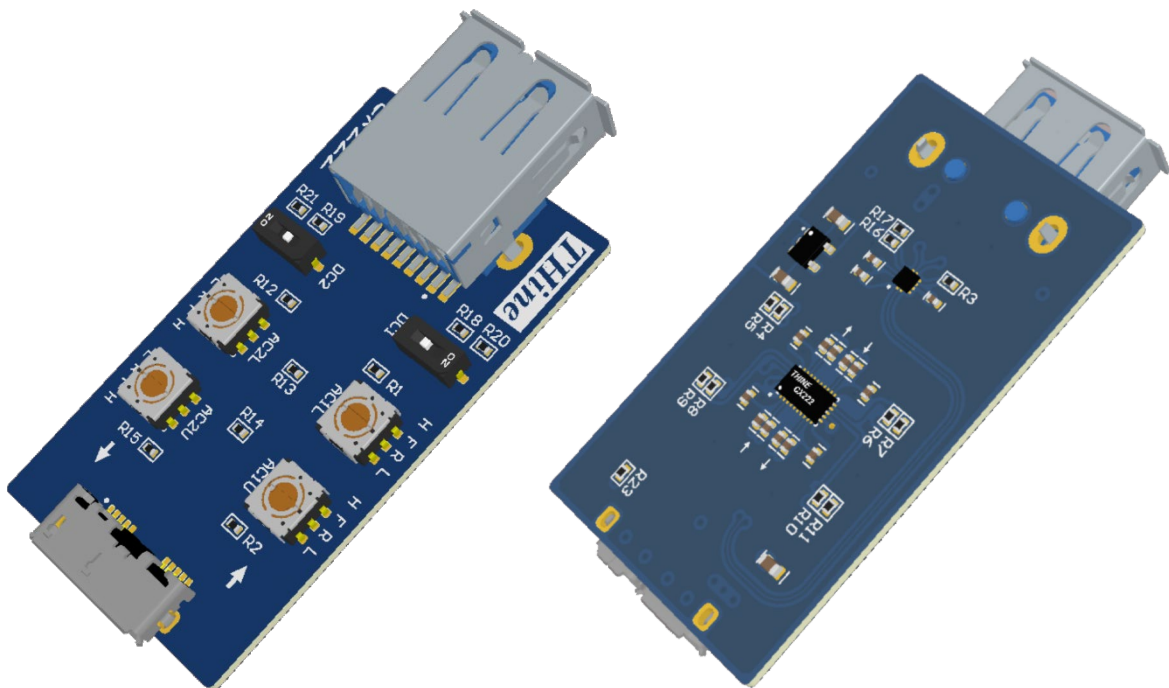# AC578G1
## USB 3.1 Gen1 Active Adaptor for Micro-B to TYPE-A

Introduction

AC578G1 is a high performance bi-directional active adaptor for USB 3.0/3.1 Gen1 up to 5Gbps and features a continuous time linear equalizer (CTLE) to provide a boost up to +11.6 dB.   It opens an input eye due to inter-symbol interference (ISI) induced by long distance cable or thin wire cable.

Feature3

- Supported USB Standard   :   USB 3.0 / USB3.1 Gen1 up to 5Gbps
- Interface Connector   :   TYPE-A (RECEPTACLE) ⇔ TYPE-A (RECEPTACLE)
- Re-driver IC   :   THCX222R05, THine Electronics, Inc.
- Adjustable AC Gain   :   8 levels adjustment by rotary switch up to +11.6dB
- Adjustable DC Gain   :   2 levels adjustment by slide switch
- Power Supply   :   VBUS 5V
- Power Consumption   :   0.4W typical, Ultra Low-Power Architecture
- Temperature Range   :   0°C to 70°C
- Module Size   :   width 25mm * length 53mm (including connector)

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Block Diagram

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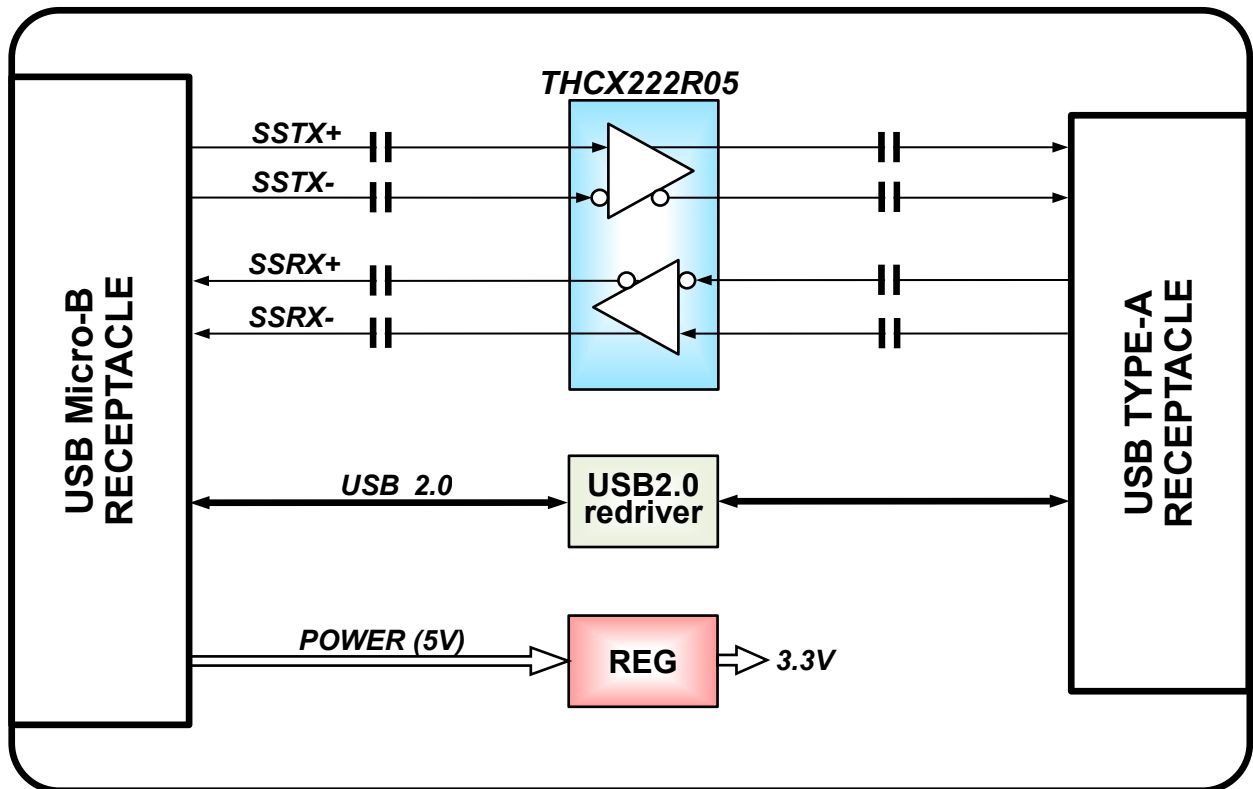
Condition

	Specification
Model	AC578G1
Supply Voltage	VBUS DC5V±10％
Power Consumption	0.4W Typ. (Reference data)
Operating Temperature	0℃～70℃
Storage Temperature	-40℃～125℃
Flammability	UL94V-0
Module Size	25mm * 53mm
PCB Color	Blue

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How to use

Please attach your cable to AC578G1. AC578G1 recover attenuated signal via the cable.

Please adjust equalizer settings by your cable characteristics using AC&DC gain adjustment function.

AC gain can adjust by rotary switch and DC gain can adjust by slide switch.

Source Signal   **Attenuated Signal**   **Compensated Signal**

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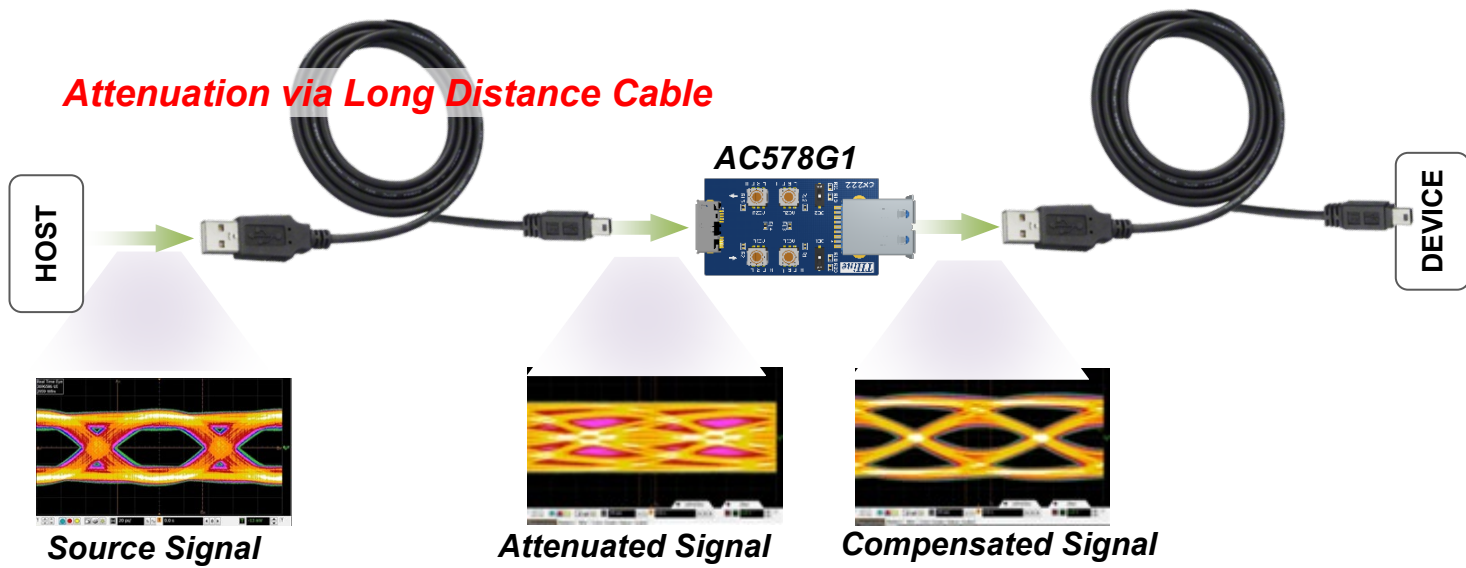
GAIN ADJUSTMNET

AC578G1 has two kinds of gain settings (AC gain & DC gain) for each channel TX/RX.

They can be adjusted by rotary and slide switches as below.
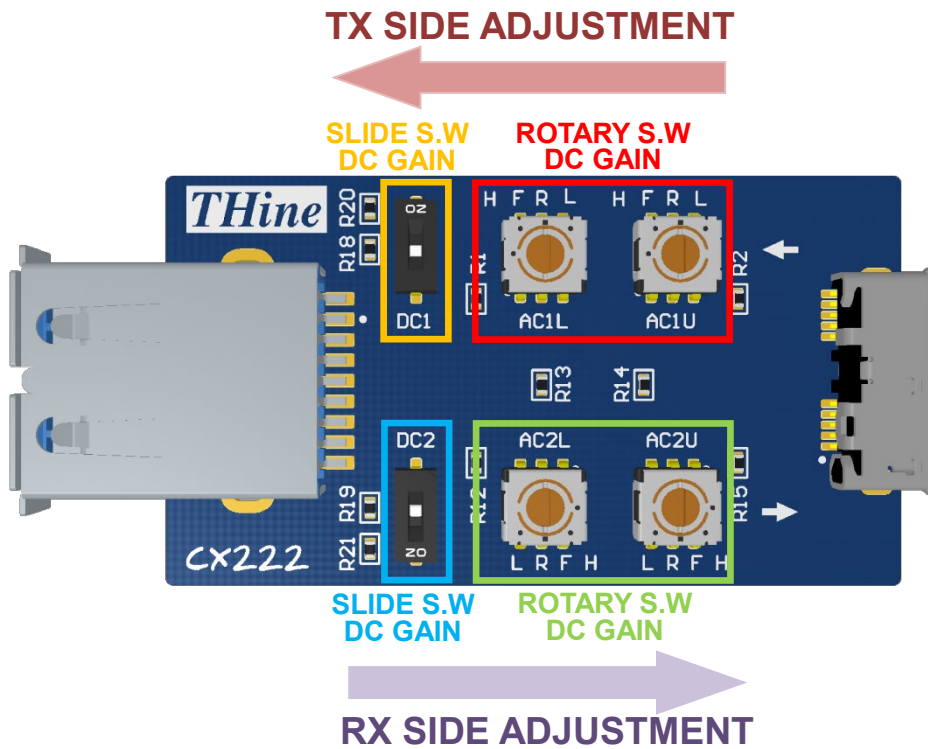
AC GAIN SETTING

AC GAIN is a function to recover high frequency characteristics of USB signal.

Please adjust the AC GAIN to open eye diagram enough using 8 levels gain setting as below.

Input signal   **AC Gain : +3.7dB (LEVEL 3)**   **AC Gain : +5.6dB (LEVEL 5)**   **AC Gain : +8.0dB (LEVEL 7)**
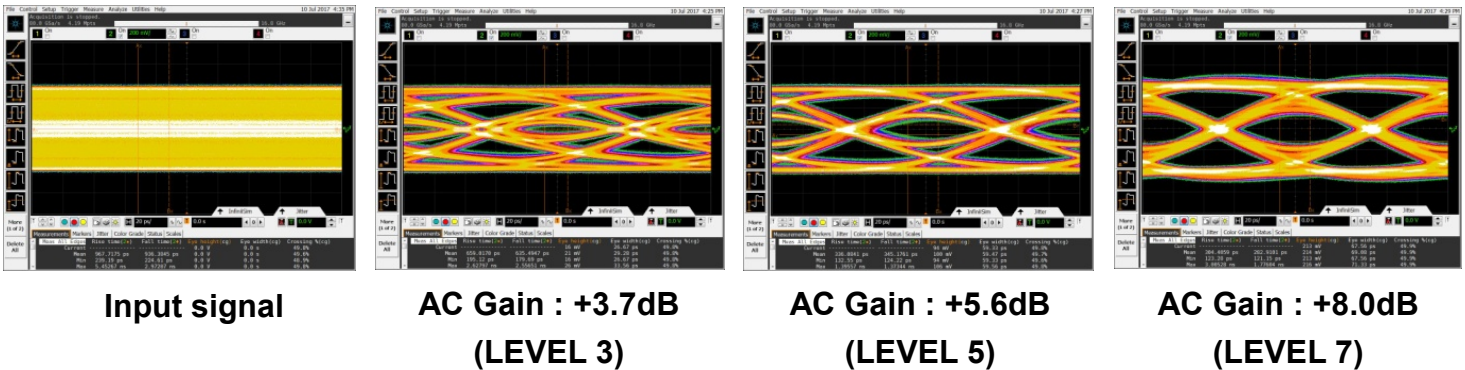
SETTING TABLE for AC GAIN

LEVEL	GAIN [dB]	SETTING	
		ACxU	ACxL
1	1.5	L	L
2	2.7	L	R
3	3.7	L	F
4	4.8	L	H
5	5.6	R	L
6	6.7	R	R
7	8.0	R	F
8	8.9	R	H

DC GAIN SETTING

DC GAIN is an adjustment function for DC LEVEL.

Please adjust the DC GAIN to be eye-shaped diagram.
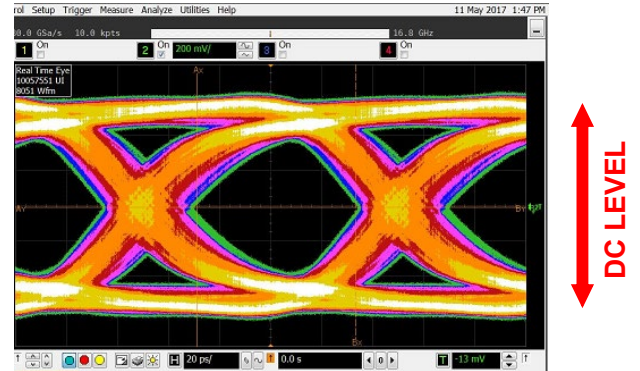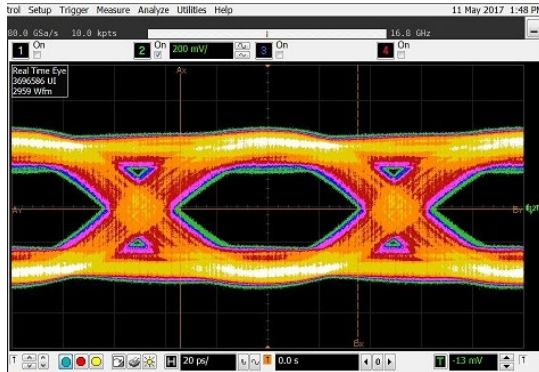
SETTING TABLE for DC GAIN

DC GAIN [dB]	SLIDE S.W.
-1.3	ON
+0.1	OFF

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Simulation Result for "Frequency Response"

A simulation result of "frequency response" is indicated as below.

X-AXIS is FREQUENCY [unit:MHz] and Y-AXIS is MAGNITUDE [unit:dB].

"Insertion Loss" is an attenuation characteristics of cable.

On the other hand, "Gain Curve" is an amplitude characteristic of Active Plug AC578G1.

"Compensated Curve" indicates a compensation characteristics of 5m cable and it is an addition result of "Insertion Loss" and "Gain Curve".

The compensated curve is flat characteristics until 5Gbps frequency range and it indicates the compensated cable can transmit signal without any attenuation.

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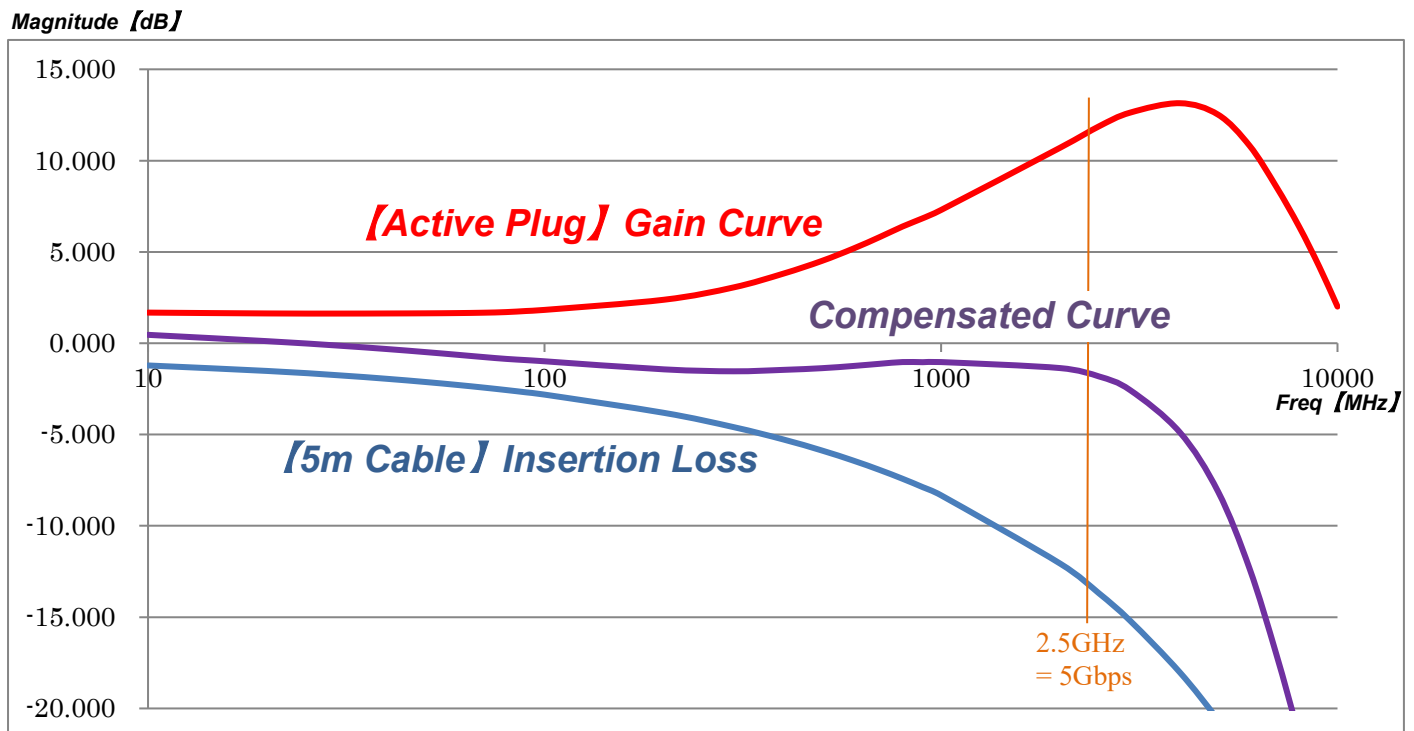
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