

November 15th, 2022**Media Contact:**

Corporate Strategy Office

Nuvoton Technology Corporation Japan

NTCJ_PR@nuvoton.com**Starting Mass Production of Re-Timer IC for USB4® Devices**

Kyoto, Japan – Nuvoton Technology Corporation Japan (“NTCJ”) will start mass production of Re-Timer ICs that incorporate the world's first e-Marker and comply with the latest USB4®, USB 3.2, Thunderbolt™ 3, DisplayPort™ 2.0 DisplayPort™ Alt Mode standards.

World's first* built-in e-Marker

*According to our research as of Nov 15th, 2022**Benefit**

1. The industry's top-class high-performance equalizer function [1] and emphasis function [2] realize USB4-equipped devices with interconnectivity (“interoperability”) between various devices.
2. Proprietary cable thinning transmission technology [3] eases strict constraints on cable design and manufacturing, making it easy to create thin, long, and flexible USB4 cables.
3. The world's first built-in e-Marker [4] eliminates the need to develop e-Marker control software.
4. Through the above, it contributes to the cost reduction of the entire value chain [5] covering the development, manufacturing, and maintenance of USB4 cables.

•Please check here for product details :

<https://www.nuvoton.com/products/high-speed-interface/usb4-re-timer/>**Market background and issues**

1 : Signal deterioration due to speed up

With the rapid development of the IoT society, the amount of data to be handled is increasing, and the communication technology required for data transfer is required to be even faster.

USB4 has a maximum communication speed of 40 Gbps, which is double that of the conventional USB 3.2. However, higher communication speeds result in lower signal quality due to increased transmission loss due to board wiring and cable impedance.

Conventionally, to address this problem, waveform shapers such as Re-Driver IC [6] and Re-Timer IC [7] have been installed in equipment and cables to improve signal quality. However, with USB4, it is difficult to match design conditions with conventional waveform shapers, making development and manufacturing more difficult, and manufacturing yields are expected to deteriorate due to insufficient signal margins.

2 : Increased software development costs due to speed up

In order to safely perform rapid power supply, which has been in high demand in recent years, USB cables (Type-C® cables compatible with USB 3.1 or higher) are registered with information

such as current carrying capacity and manufacturer information called e-Marker. An integrated IC is mounted to ensure the safety and reliability of power supply. USB4 also requires e-Marker implementation, but with faster USB4, new software development is required for the linked operation of e-Marker and Re-Timer IC, which lengthens the development period. The problem of cost increase is expected.

What this product solves

Our Re-Timer IC is equipped with a high-performance equalizer and emphasis function based on the low-noise, high-speed transmission/reception analog technology of high-speed interface ICs that we have cultivated for over 20 years, enabling interoperability between various devices.

Re-Timer ICs for cables use our unique cable thinning transmission technology to improve manufacturing yields by relaxing strict constraints on cable design and manufacturing, and realize cables that achieve both high connection quality and ease of use. In addition, the world's first built-in e-Marker that stores cable identification information, etc., can reduce BOM, manufacturing, and procurement costs and shorten the software development period.

We also have a development environment such as an evaluation board, a firmware rewriting tool, and a reference paddle card [8] that shorten the customer's development and support period, so we will contribute to the reduction of the total development cost through innovative improvements in the entire value chain covering customer development, manufacturing, procurement and maintenance.

Technological Features

Re-Timer IC has the following features.

1. Supports USB4 Type-C bi-directional multi-protocol, realizing high interoperability that enables transmission and reception of up to 40 Gbps.
2. Supports USB4 backward compatibility and peripheral standards.
USB4, USB 3.2, Thunderbolt3, DisplayPort 2.0 and DisplayPort Alt Mode
3. Equalizer that compensates for signal loss of up to 35dB on the receiving side and an emphasis circuit that compensates for up to 15dB on the transmitting side make it possible to compensate for signal attenuation due to substrates and cables and restore the signal.
4. Restrictions on Intra-Pair Skew [9] required at the input end of Re-Timer can be greatly relaxed*.

*only KM864742

Part number USB4 Re-Timer IC (KM86474X series)
KM864741/KM864742

Applications KM864741 : PC, Tablet Monitor, Smartphone, Game, Dongle
KM864742 : USB4 cable

Spec

Number	KM864741	KM864742
Supported standards	USB4 (Gen2, Gen3) / USB 3.2 (Gen1x1, Gen1x2, Gen2x1, Gen2x2) /Thunderbolt3/ DisplayPort 2.0 (UHBR20) /DisplayPort Alt mode	
Equalizer function	35dB	
Emphasis function	15dB	
e-Marker	-	Built-in
Power supply	0.9V/3.3V	
Package	VFBGA-81pin 0.5mm pitch (5mm x 5mm)	



Mass production start time January, 2023

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Definition of Terms

[1] Equalizer function :

Compensates for frequency components lost due to the low-pass filter characteristics of the transmission line by amplifying them on the receiving side

[2] Emphasis function :

A function that adjusts the transmission waveform in advance considering the attenuation in the transmission line on the transmission side

[3] Cable thinning technology :

Technology that realizes thinning by applying a unique transmission method inside the cable (patent pending)

[4] e-Marker :

The IC chip built into the USB Type-C cable that supports USB 3.1 or higher registers the current carrying capacity and manufacturer information.

[5] Value chain:

A series of steps that create value when a manufacturer commercializes a product (Planning, development, manufacturing, procurement, production control, maintenance)

[6] Re-Driver IC:

Wave shaper that performs equalizer function and noise removal in analog circuit.

[7] Re-Timer IC:

In addition to the equalizer function, a wave shaper that performs digital filtering, gain adjustment, and clock recovery.

[8] Paddle card

A small circuit board built into the cable.

[9] Intra-Pair Skew

Transmission time difference between differential signal lanes.

About Nuvoton Technology Corporation Japan

Nuvoton Technology Corporation Japan (“NTCJ”) joined Nuvoton Group in 2020. As a global manufacturer specializing in semiconductors, NTCJ provides technology and various products that have been cultivated over more than 60 years since its establishment, as well as spatial sensing solutions and battery application solutions that optimally combine them. By valuing our relationships with our customers and partners and providing added value that exceeds expectations, we are acting as a global solution company that solves various problems in society, industry, and people's lives.

For more information, please visit <https://www.nuvoton.co.jp/en/>.

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