Application Note Cable Lengths

Contents

1. Introduction

This document describes i3-Technologies's position related to maximum cable lengths for different types for use with their **i3TOUCH** and **i3SIXTY** display series.
i3-Technologies can only take responsibility for the correct functioning with the cables supplied with the deliveries.

2. Power cables

Generally speaking there are no practical maximum cable length for power cables, as long as the local electrical regulations are being followed. As the voltage level in AC power cables can be dangerous, it is important to follow local safety requirements as well as exercise care when handling & repairing power cables.

3. Network cables

Network cables come in a variety of types and quality levels.

Maximum cable lengths need to be respected. However signal (and hence communication) quality in practice highly dependence on the quality of the connectors (and how the connections are being made) as well as the interconnectivity.

Furthermore network design and network switching gear (routers, switches, hubs, …) actively contribute to robust communication between devices.

i3-Technologies strongly suggests to use industry best practices with our displays.

4. HDMI cables

HDMI cables are used for video and audio transfers from source to destination.

HDMI cables of decent quality are quite robust for communication. Cables from reputable suppliers allow to transfer 4K display information at 60Hz with audio over 5m and more.

In order to preserve the quality of the video & audio transfer it is suggested to avoid, or minimize the use of patch panels, daisy-chained cables or other extender solutions. If these connections or pass-throughs cannot be avoided, it is critical that components of high-quality are being sourcing and installation is done with great care for detail and connectivity. Bad connections in table plates or wall plates account for the majority of video and audio quality issues, even for shorter distances.

5. USB CABLES

5.1. UNIVERSAL COMMUNICATION

The USB (Universal Serial Bus) communication protocol can be used to transfer a multitude of data types (even simultaneously) as well as power. This universal character makes it very powerful, yet at the same time represents its biggest challenge.

USB data communication is being used for different data types. User input data (keyboard, mouse, touchscreen) still represent a very common use-case, yet uses limited data rates. Local file transfers are another use-case. Also video & audio (e.g. for video conference cameras) have become popular users of USB, with increasing resolution and refresh rates and hence increased bandwidths. Recently also monitor video can be transferred over USB protocol, e.g. DP (Display Port) using Type-C connectors.

5.2. VERSION EVOLUTION

Over time and generations/version, the supported USB data rates have increased dramatically with the different data types and use-cases. And with this increase in bandwidth came increased requirements on cable quality as well as reductions in (guaranteed) maximum cable length to support these higher frequencies.
In parallel, the supported levels of power transfers have gone up as well.

USB thanks its popularity as well on the ubiquity of the common bi-directional Type-C connector. Yet, for the common Type-C connector to support this plethora of protocol versions and generations as well as different capability levels, a lot of initial handshaking and configuration prior to actual communication is needed among the involved components: the sender & receiver chips as well as the cable, making it more sensitive to signal integrity.

5.3. CABLE LENGTH

The Type-C cables supplied with the i3-Technologies's displays have been tested and qualified to provide maximum interoperability with 3rd party systems. For one of the latest USB versions, 3.2 Gen2 x2, the maximum cable length in the standard is set at 3 m to guarantee performance at high data rates. This is also the length of the cable supplied with the **I3TOUCH X2** displays.

It is possible though that a cable with a greater length work with some combinations on **I3TOUCH** displays or other displays. As there are a lot of factors involved in the interoperability, a minor change (different source computer, different cable, production variation) can cause the combination to become non-functional. Interoperability is rather digital, it works or it doesn't; there is little to none graceful degradation.

i3-Technologies prefers to offer its customers robust interoperability and do not provide or commit to risky longer Type-C cable lengths. If display content is to be shared over longer distances, i3-Technologies suggests the use of HDMI and or use digital screen sharing products like **I3ALLSYNC**.

NOTICE

i3-Technologies's products are constantly evolving to improve customer functionality and user experience. This means that the effectively used cloud services and servers might evolve over time. Efforts have been made to check that information provided here to be correct and complete at the time of publication, subject to change without prior notice.