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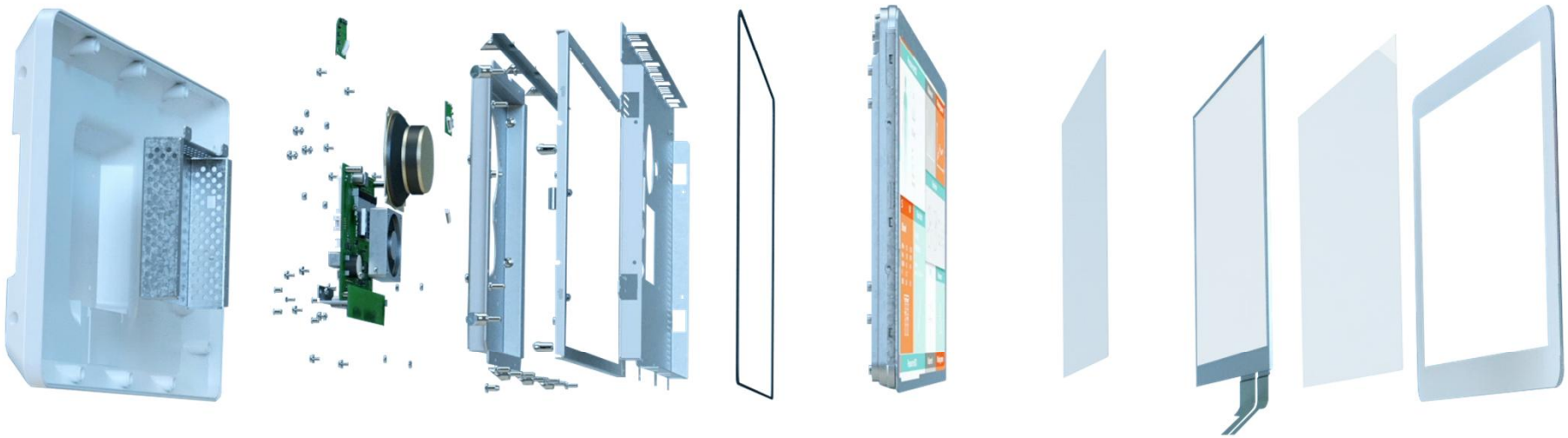

Markus Mahl – April 2018

EMBEDDED
CONFERENCE FINLAND
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New Display Driving Solutions

- USB Type C: The perfect „one cable does it all“ solution for HMI displays

- Flat Panel PC Solutions with new Embedded SBC Format

Markus Mahl, Head of Product Marketing Embedded Solutions

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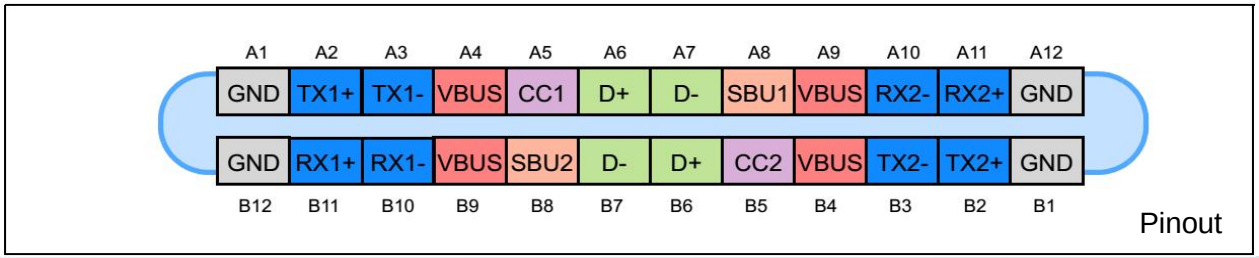
AGENDA

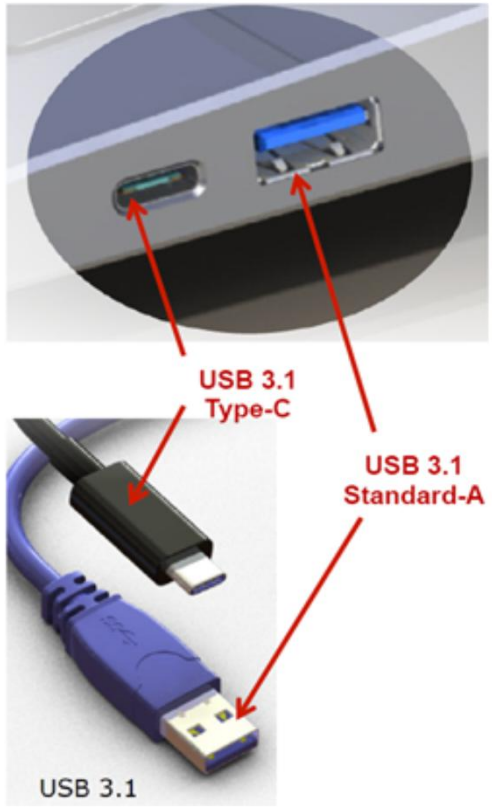
- Overview USB Type C
- HMI monitor without & with USB Type C input
- Data Modul eMotionUSB scaler board
- New SBC Format for Flat Panel PCs
- Data Modul eDM-SBC-iMX6-PPC

Overview USB Type C

- Type C connector has 24 pins, is slim and reversible (fits in both positions)
- Host and client devices use same receptacle
- USB 3.1 Gen 1 (5Gbps) & Gen 2 (10Gbps) support
- One cable can transfer up to 100W (Power Delivery) in both directions
- In addition video signals can be transferred using the „Alternate Mode“: E.g. DisplayPort, HDMI, MHL

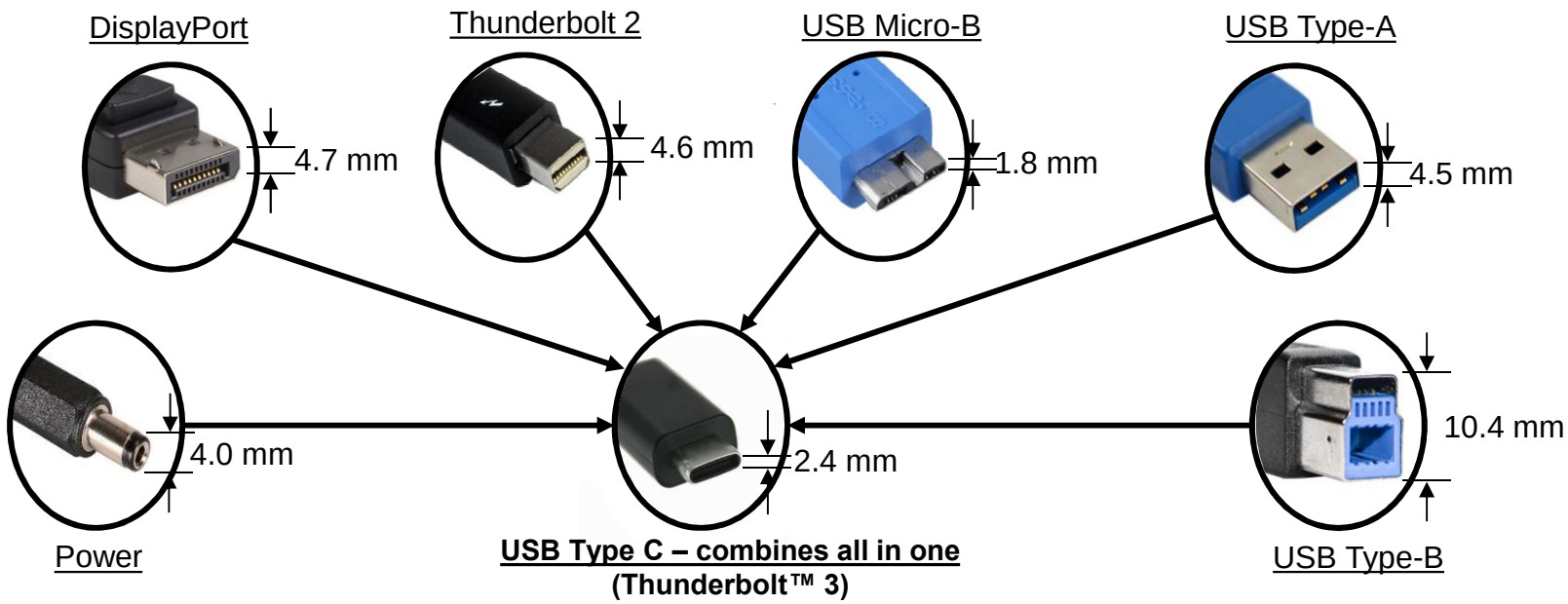


Pinout



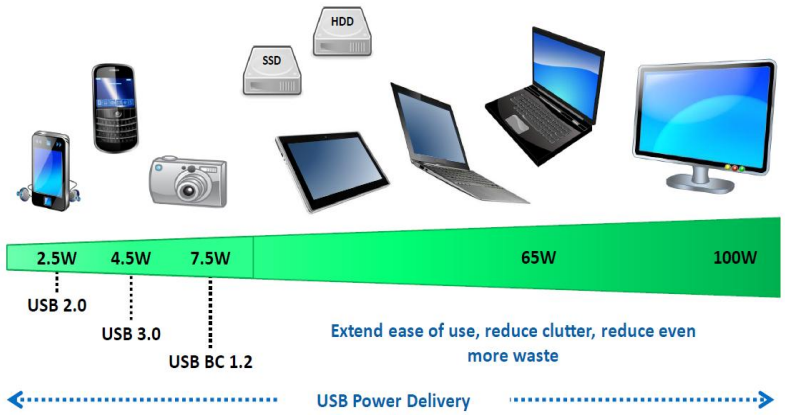
Overview USB Type C

- Type C: The future-proof all in one 100W connector



USB Type C: Power Delivery (USB-PD)

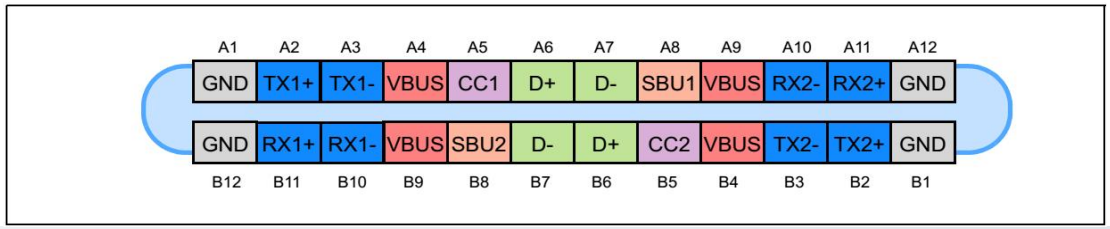
- Up to 100W can be transferred, depending on capabilities of host, device & cable
- The PD function is used to enable charging and to power external devices
- Host and device communicate via the CC lines and define together voltage, current and direction of the power which has to be transferred



PROFILE 0 Reserved	
PROFILE 1 5V @ 2A	10W Default start-up profile
PROFILE 2 5V @ 2A, 12V @ 1.5A	18W
PROFILE 3 5V @ 2A, 12V @ 3A	36W
PROFILE 4 5V @ 2A, 12V, 20V @ 3A	60W Limit for Micro-B/AB connector
PROFILE 5 5V @ 2A, 12V, 20V @ 5A	100W Limit for Standard A/B connector

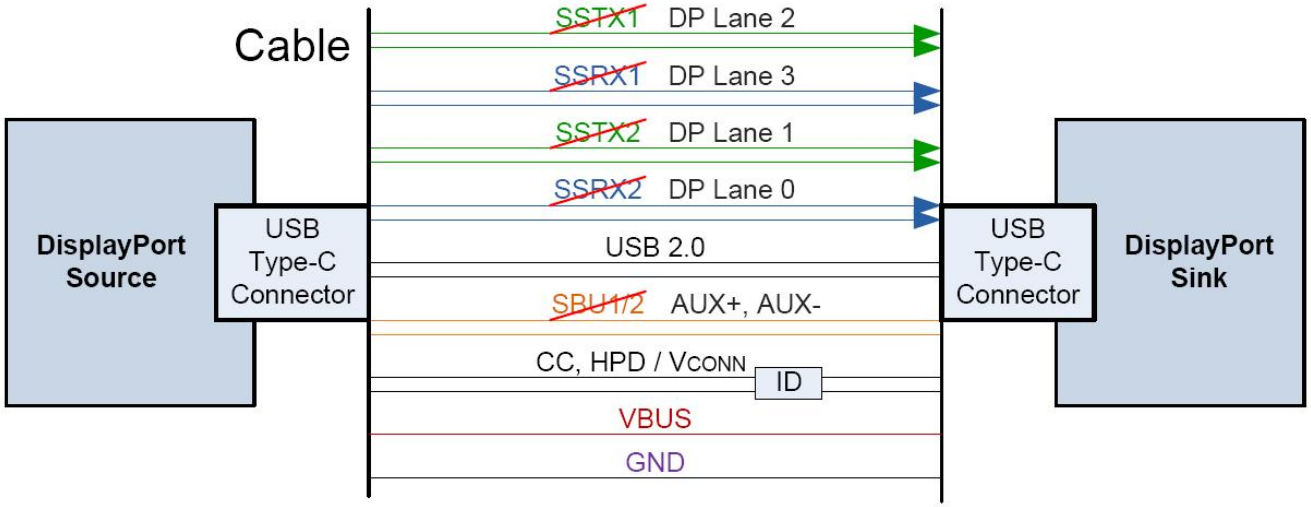
USB Type C: Alternate Mode

- DisplayPort 1.2, HDMI 2.0, MHL can be transferred
- One cable can handle up to 4 DisplayPort lanes; with DP 1.2 up to 4K @ 60Hz, with DP1.1 up to FullHD @120Hz can be transferred; see next page
- When 4 lanes are used for video, all USB 3.1 high speed pairs are needed to transfer video. No USB 3.1 mode available!
- When using only 2 lanes for video, the remaining 2 high speed pairs can be used for USB 3.1
- As dedicated wires are used USB 2.0 and power delivery are always available



USB Type C: Alternate Mode

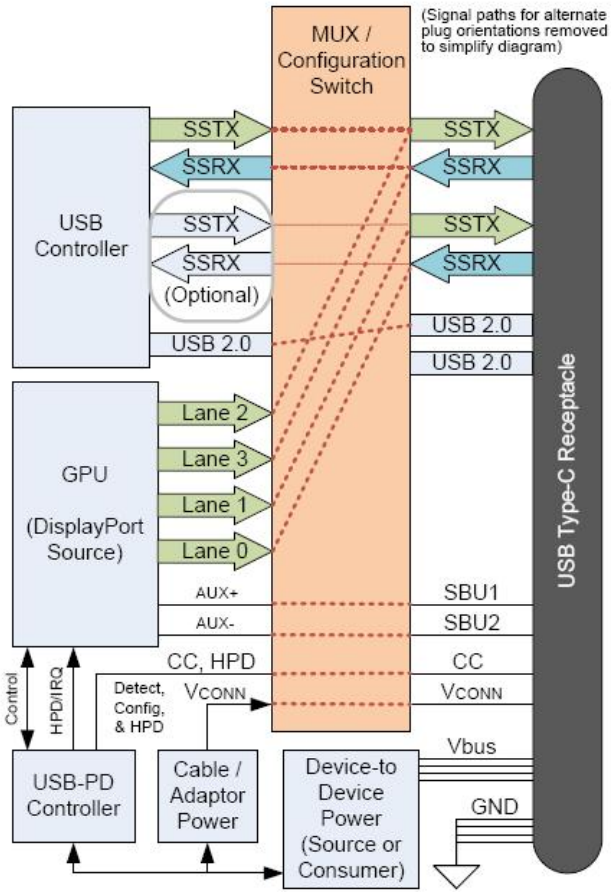
- Signal routing in DisplayPort mode with 4 lanes



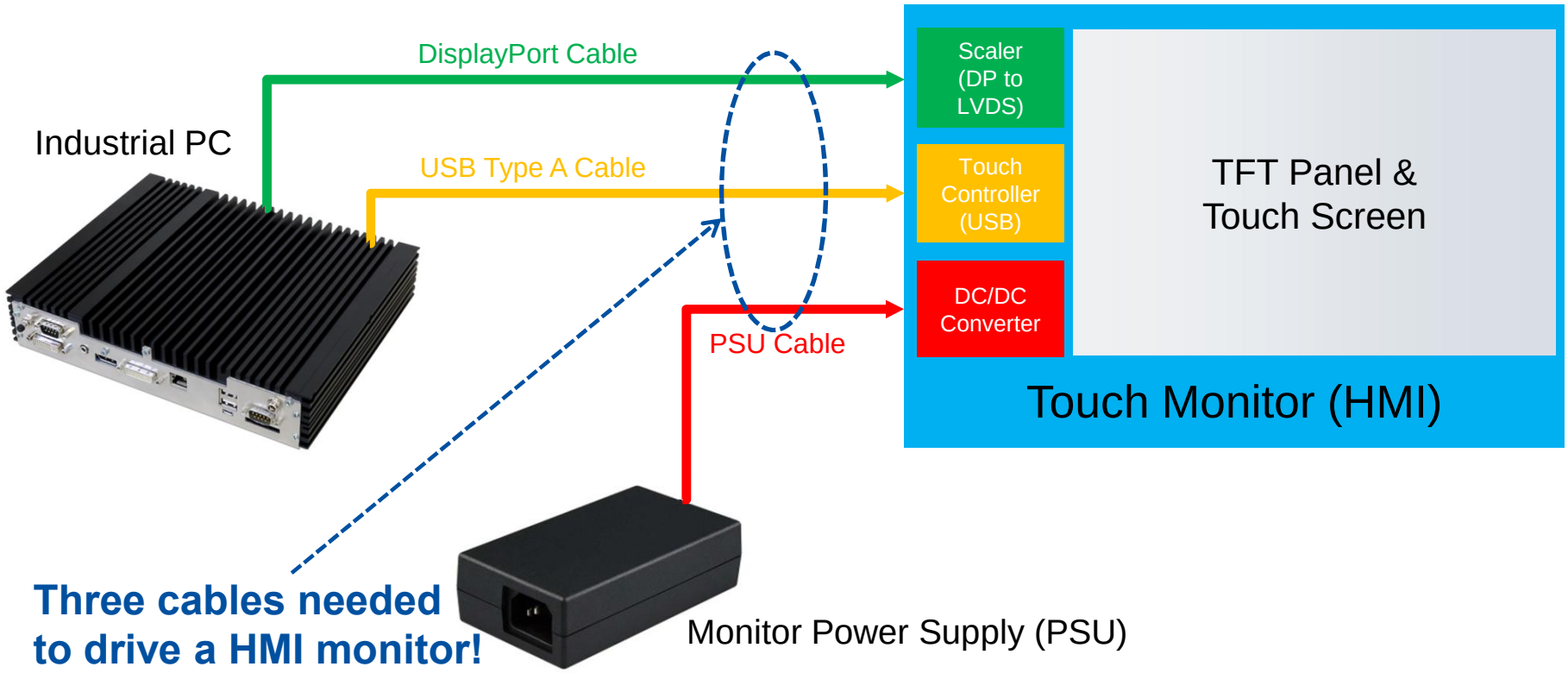
- The DisplayPort AUX channel uses the SBU pins, HPD/IRQ is transmitted over the CC pin (using USB-PC protocol)
- USB 2.0 is available in all configurations, can be used for a touch panel …

USB Type C: Alternate Mode

- Example for signal routing on the host side with 4 DP lanes (embedded PC)
- MUX and USB-PD controller needed on the PC side



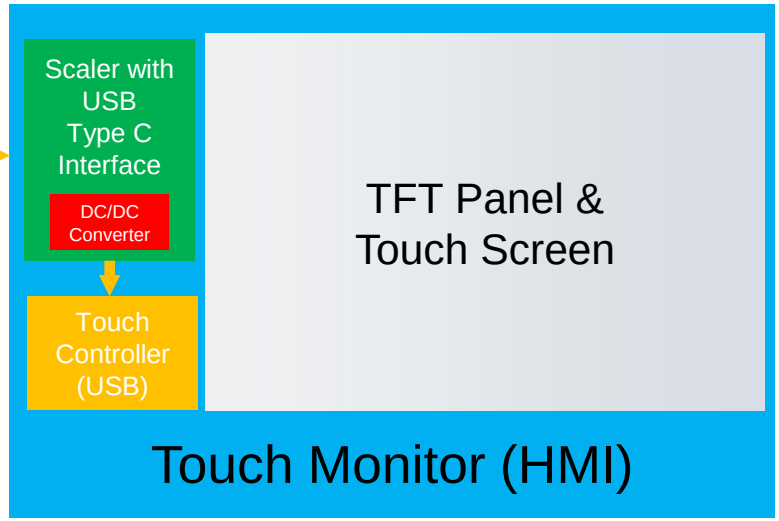
Traditional HMI monitor (without USB Type C interface)



HMI monitor with USB Type C interface (eMotionUSB)

e.g. Intel® NUC-Kit NUC7i5BNH

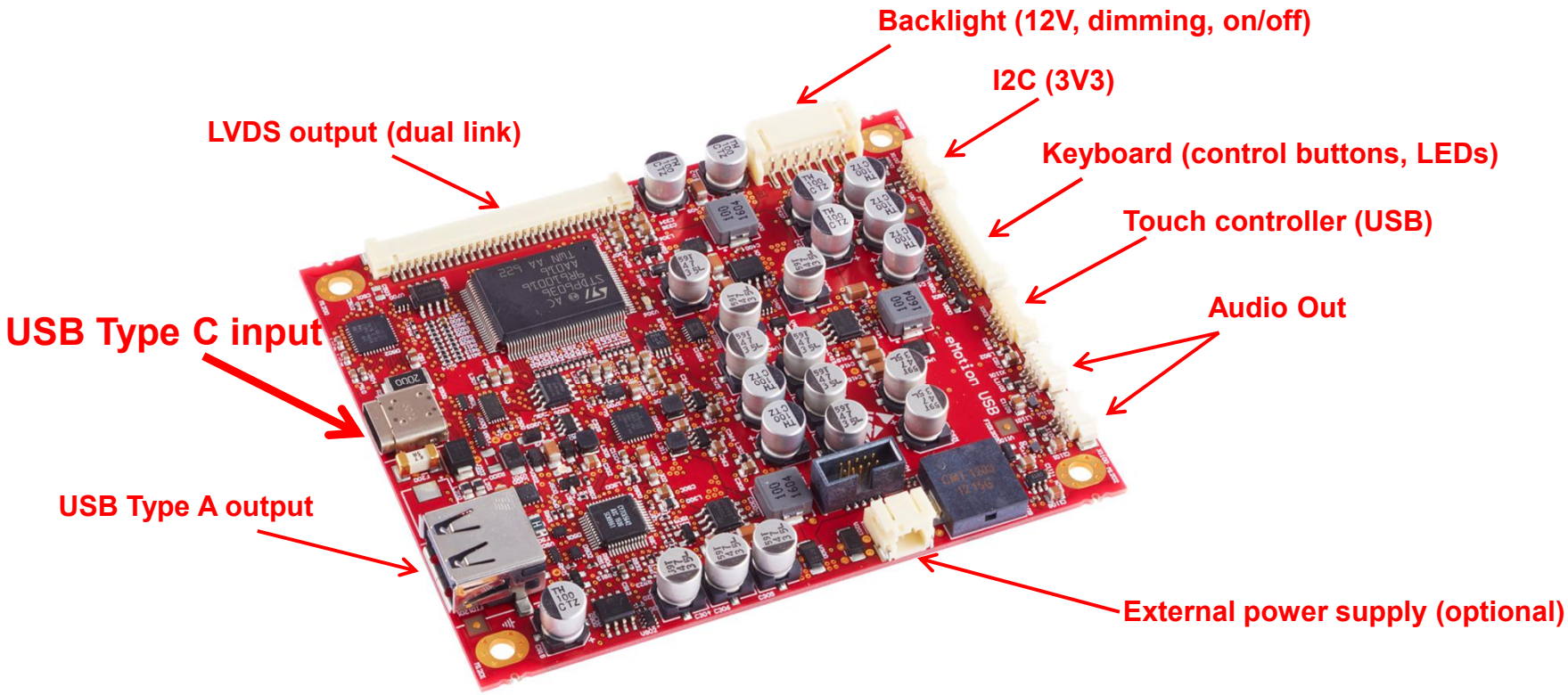
USB Type C Cable



Only one cable needed,
no extra PSU for the monitor needed!

Cost reduction,
reduction of complexity!

Monitor interface for USB Type C: Data Modul eMotionUSB

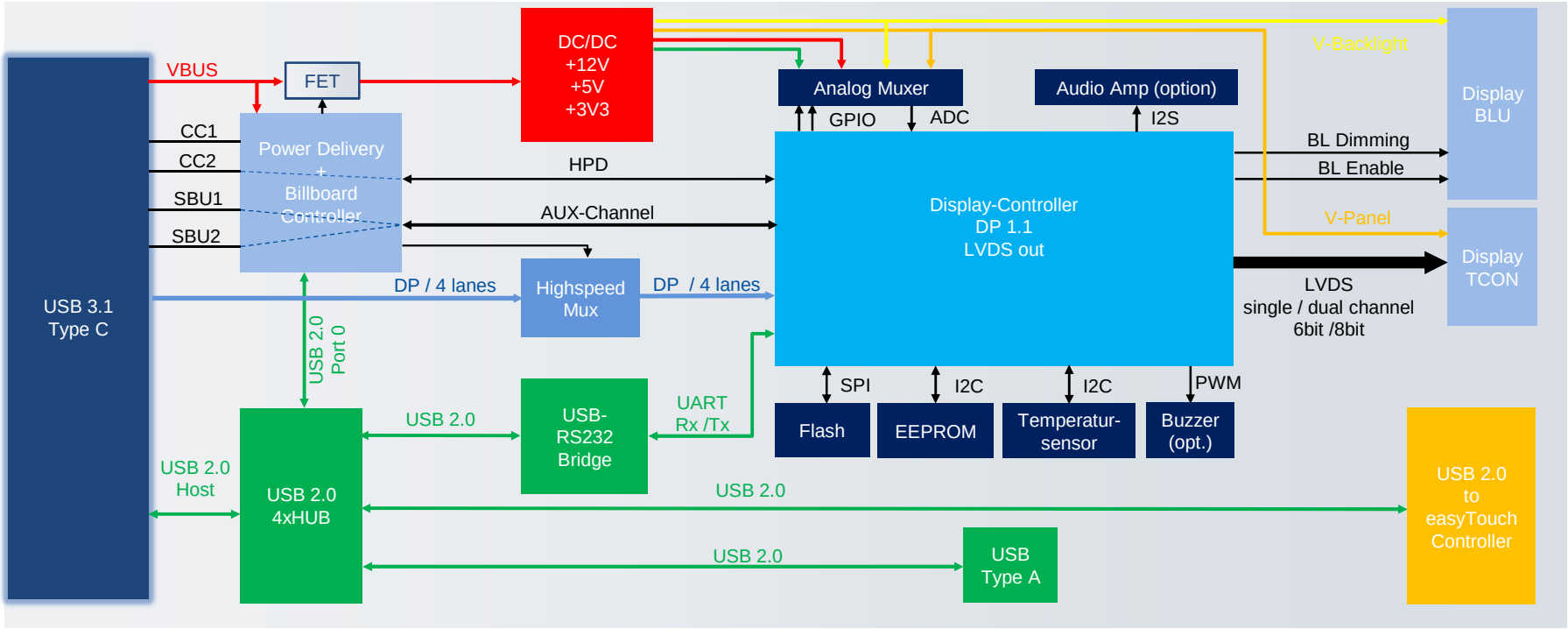


Monitor interface for USB Type C: Data Modul eMotionUSB

- Key features of the board
  - a) LVDS output (up to 1920x1200, 60Hz)
  - b) VBUS support for 5V/3A, 12V/3A and 20V/3A
  - c) Integrated audio amplifier for external speaker (3.2W@4 Ω / 1.8W@8Ω)
  - d) Internal USB 2.0 interface for touch panels
  - d) USB Type A connector for external devices (e.g. keyboard or mouse)
  - e) Scaler board settings (e.g. backlight brightness) can be controlled via DDC/CI (DisplayPort) or via USB 2.0 (embedded in Type C cable)
  - e) Compact size (80x100x10mm³)

Monitor interface for USB Type C: Data Modul eMotionUSB

- Block diagram



Why a new SBC Format for Flat Panel PCs?

- Driven from the Cunsumer Market with Tablet PCs, there is a big demand to offer a flat industrial Design as well.
- Preferred Display sizes: 7“, 10,1“, 12“ and 15,6“.
- The target was to develop an ARM based Single Board Computer to adapt applications faster, more efficient and more stylish in a the requested „Slim-Design“
- Existing standard Formats like Embedded NUC or pITX have been considered

Embedded NUC for 7”TFT

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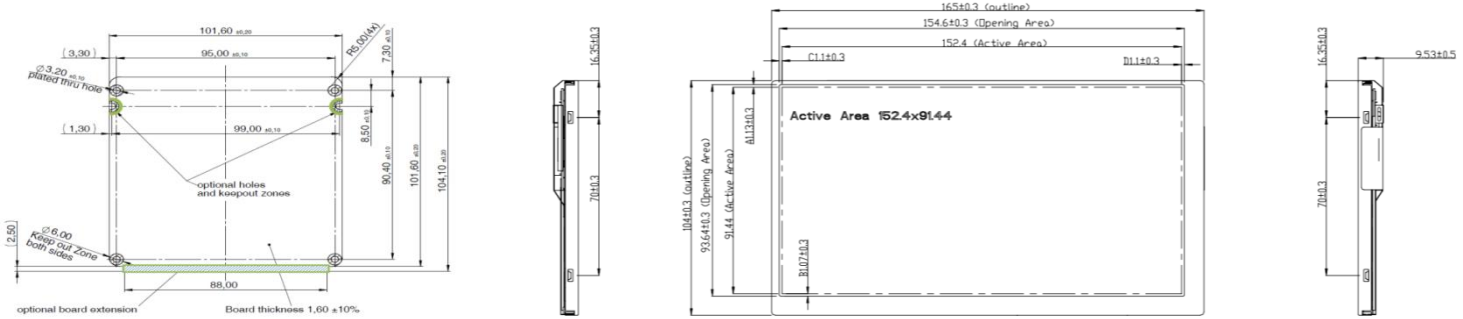

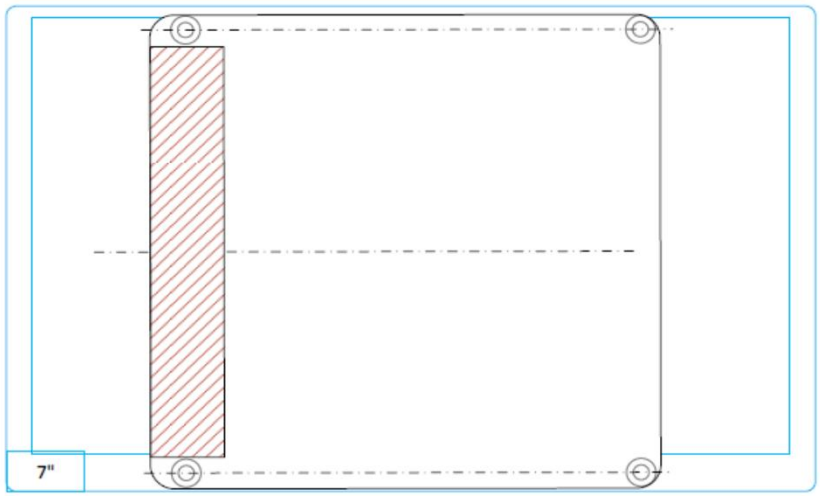

- not fitting from outline dimensions
- Panel PC Design have to be larger than TFT outline

pITX for 7”TFT

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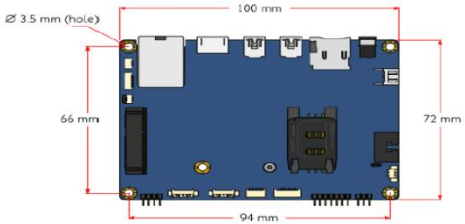
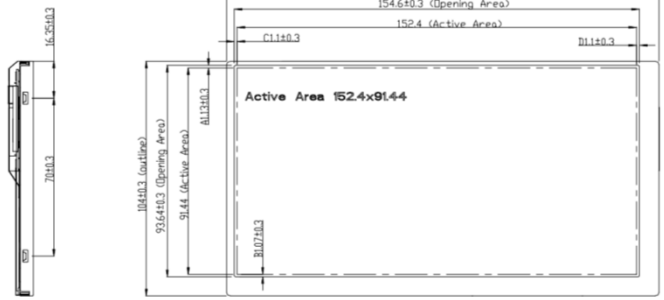
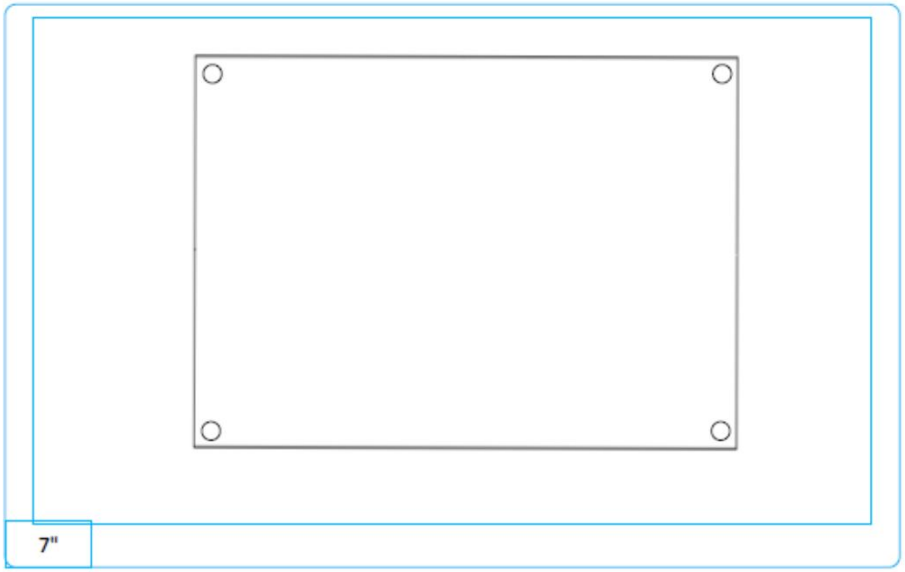


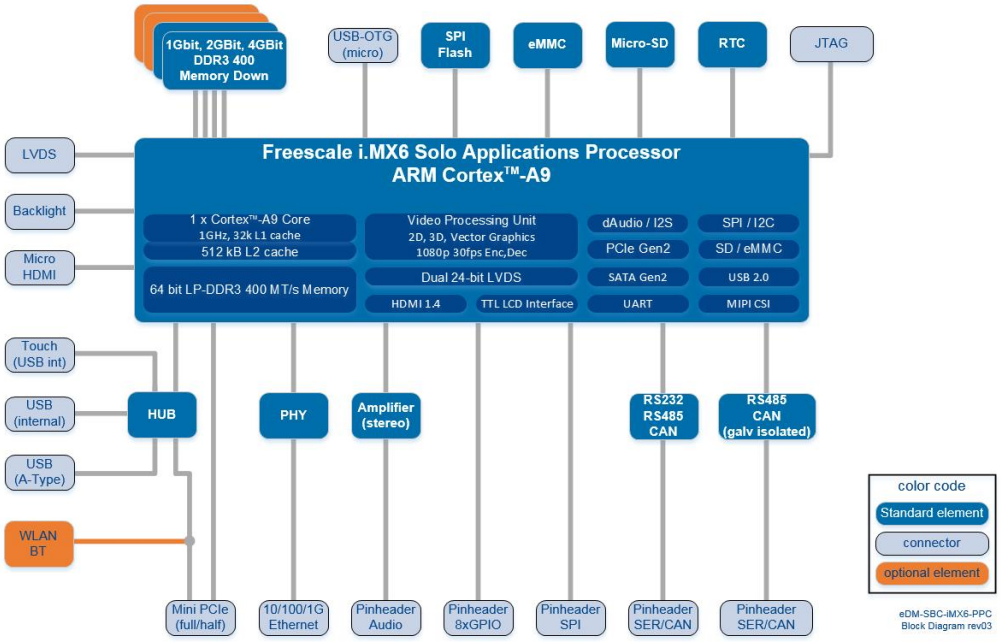


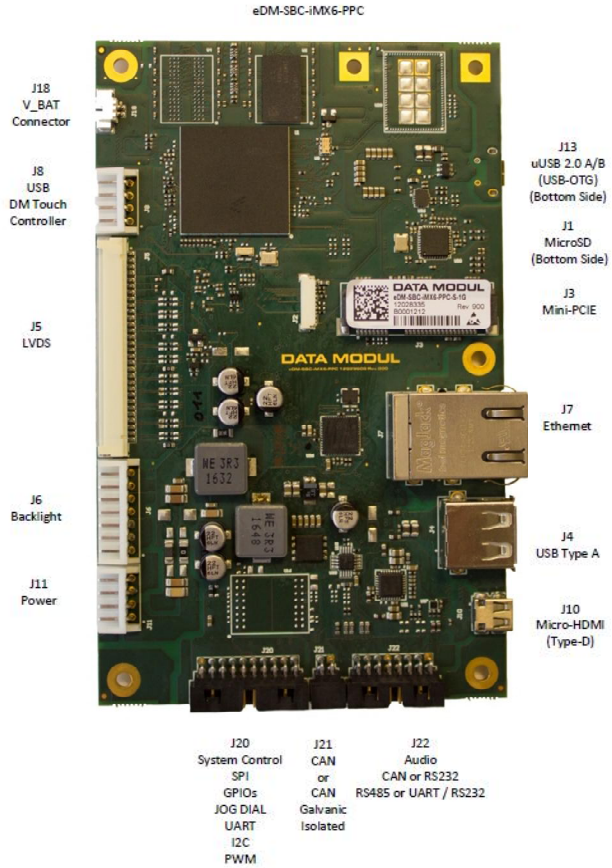


- fitting from outline dimensions
- Panel PC Design can´t be very flat, because of the height of the standard connectors

eDM-SBC-iMX6-PPC

- SBC based on NXP i.MX6 ARM Cortex A9 CPU (130mm x 80mm)
- scalable – Solo / Dual / Quad Core





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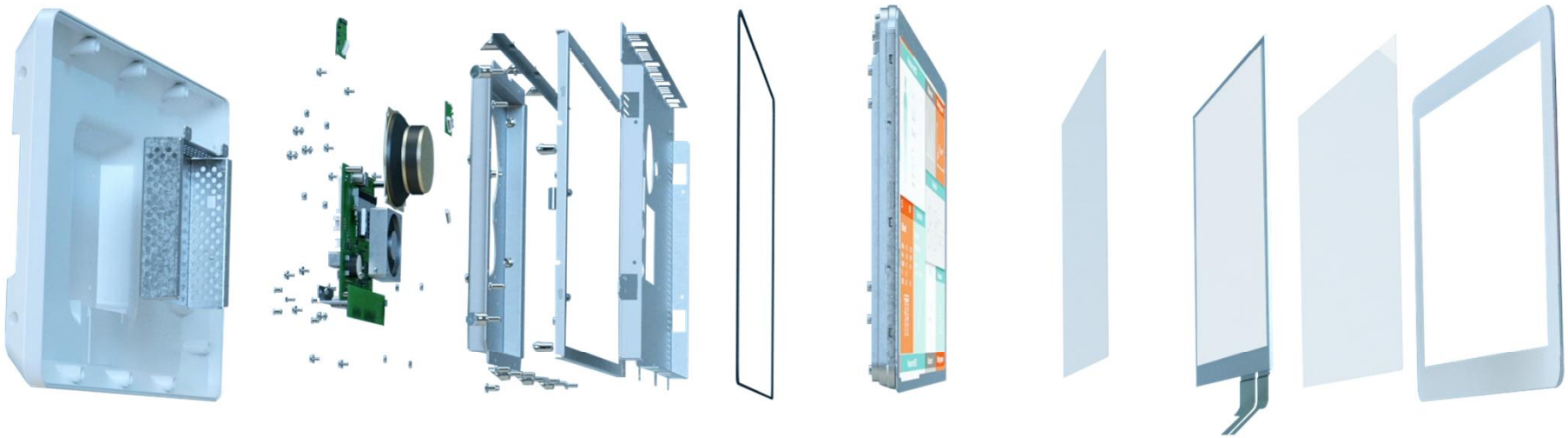

Thank you!

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