IEEE P802.3cg 10 Mb/s Single Twisted Pair Ethernet Task Force (10SPE)

MDI update

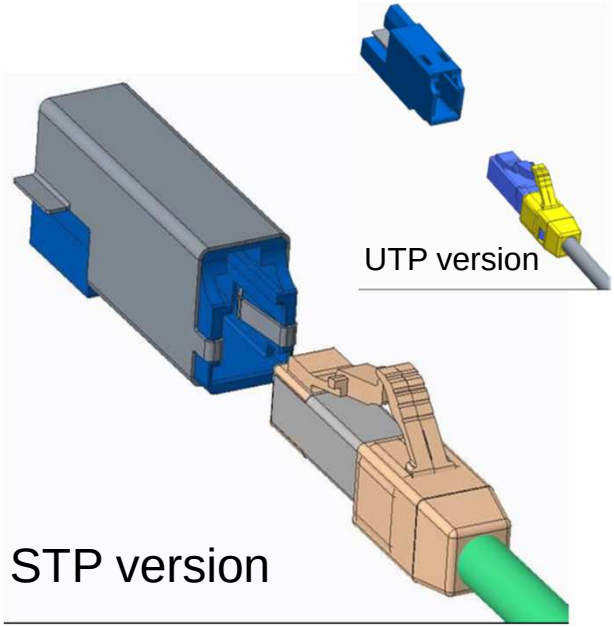
Matthias Fritsche, Rainer Schmidt – HARTING Technology Group

Supported by:
Yvan Engels – Leoni AG,
Dr. Dieter Schicketanz –Reutlingen University
…

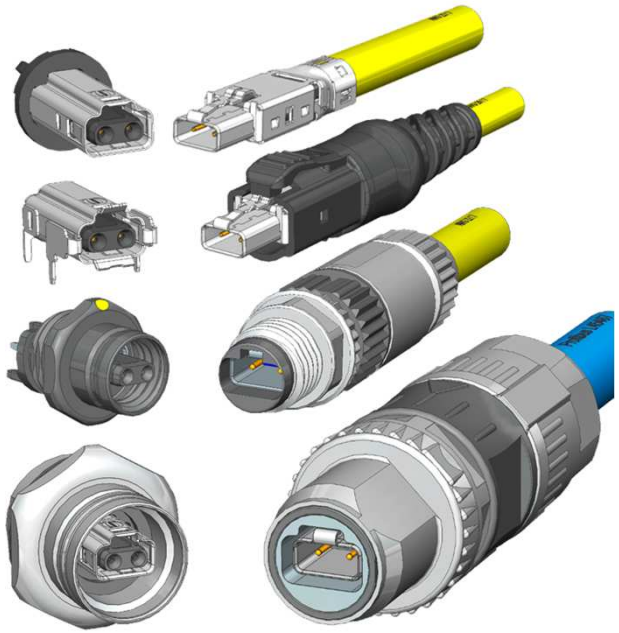
JTC 1/SC 25/WG 3
Generic Cabling according ISO/IEC 11801

SP connector mating face selection process results:

Variant 1 – LC style for $M_1I_1C_1E_1$ acc. IEC 63171-1 ed 1



Variant 2 – Industrial style for $M_3I_3C_3E_3$ acc. IEC 61076-3-125



SP mating face selection process - Impact

Variant 1 and variant 2 SP connector mating face

- will go into the ISO/IEC 11801 documents part 3 and part 6
- recommendation for a SPE MDI was going out to IEEE
- will go via IEC SC65C JWG10 into the IEC 61918 documents by an amendment
  - will go into the IEC 61784-5-x series
- will go into the ISO/IEC 11801-1 documents requested mating interface for SP cabling at the communication outlet (TO, AO, EO…)
- will be the offer to the industry for implementing any SP service including remote power into devices or cabling solutions …
- IEC 61076-3-125 CDV is in preparation and will be discussed next week in SC48B in Milano

Variant 2 SPE Solution

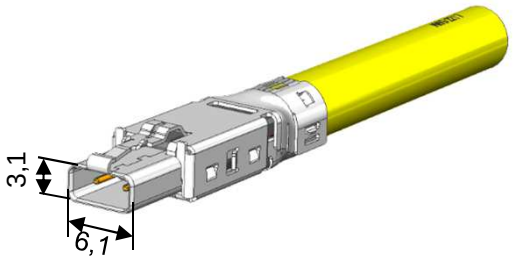
based on the IEC 61076-3-125 project in IEC SC48B

Connector type	Locking mechanism
1 pair core container same container used in all MICE3 connector housings with stainless steel shielding	n.a.
IP20 jack and plug for cables AWG26 up to AWG22 (18) (solid and stranded) Cable diameter 4 – 6 mm	metal latch
IP65/67 jack and plug in M8 housing for cables 26AWG up to AWG22 (18) (solid and stranded) Cable diameter 4 – 6 mm	locking screw, optional: PushPull* *compatible to the locking screw
IP65/67 jack and plug in M12 housing for cables AWG26 up to AWG16 – esp. for IEEE802.3cg (solid and stranded) Cable diameter 4 – 12 mm	locking screw, optional: PushPull* *compatible to the locking screw

2018-04

Single Pair Connector - Facts

Technical Parameters

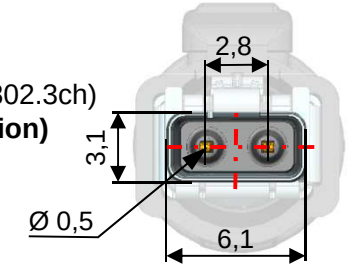


Electrical performance

- **Rated voltage: 60V DC**
- **Rated current: 4A@55°C, 1,5A@85°C**
- **Voltage proof* 1000V pin-to-pin and 1500V pin-to-shield,** (*not for the hybrid version within IEC61076-3-125)

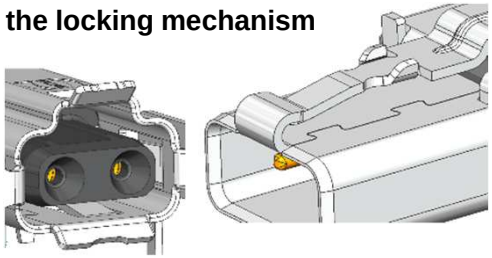
HF performance

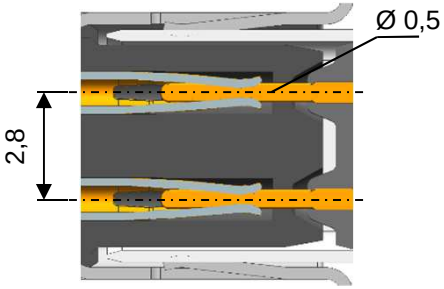
- **Bandwidth up to 600MHz* for up to 1Gbit/s**
  *pin design and size optimized for frequencies up to 3GHz for possible multi gig applications (in discussion by IEEE802.3ch)
- **Fully symmetrical design of contacts in relation to the screen for optimal HF performance (coupling attenuation)**
- **Fully shielded 1 pair core container (360° stainless steel shielding shell)**



Mechanical performance

- **Typical industrial pin-socket contact design for high reliability and mating security (2 contact points)**
- **Minimum 1000 mating cycles for the core element and the IP20 version.**
  For the M8 and M12 versions >100 mating cycles based on the locking mechanism
- **Polarization met by design**





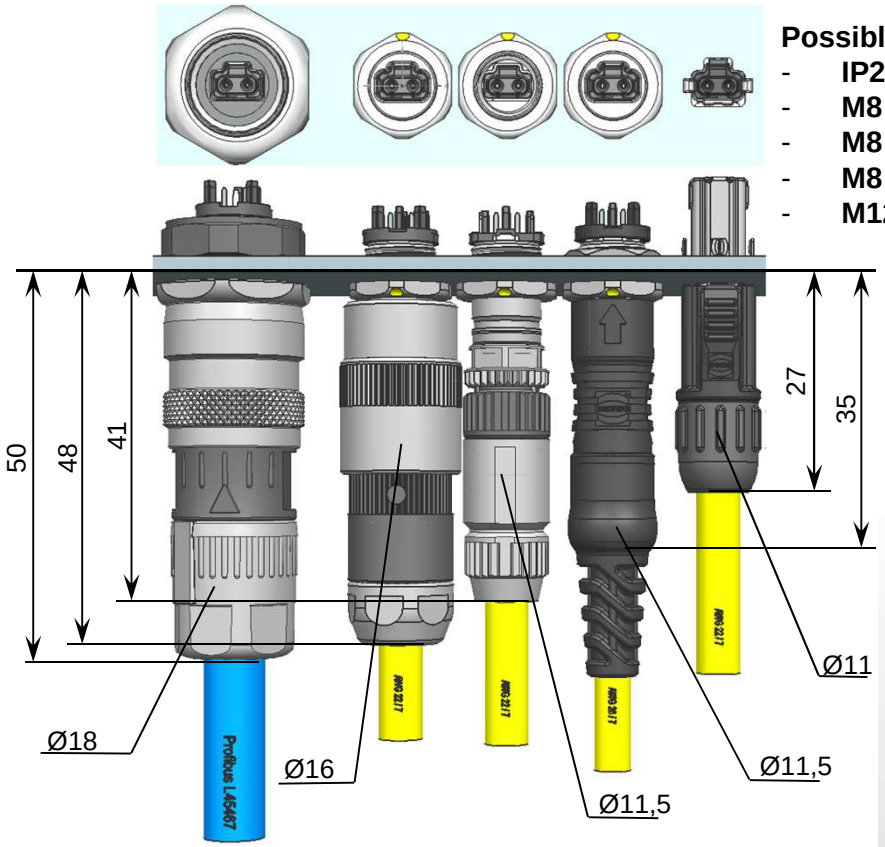
MICE3 performance

- **Temperature range -40°C up to +85°C**
- **IP degree from IP20 to IP65/67**
- **EMC resistant according to E_3 for all connector versions**

for further technical details pls. refer to IEC61076-3-125 on the IEC website

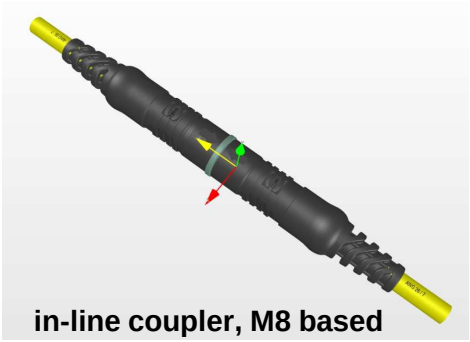
2018-04

Single Pair Connector - Demonstration



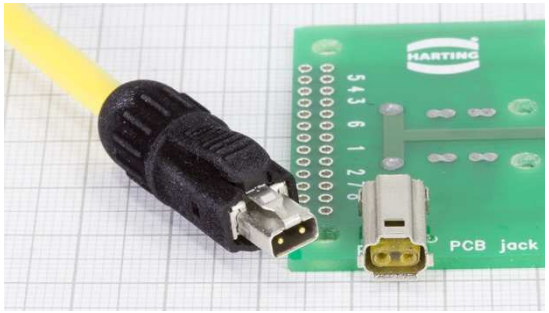
Possible variants from right to left:

- **IP20 style**
- **M8 SnapInn**
- **M8 Screw locking**
- **M8 PushPull locking**
- **M12 Screw locking**



in-line coupler, M8 based

Prototype M8 style, plug overmolded and straight PCB THT jack with housing



Prototype IP20 style, plug and angled PCB THT jack

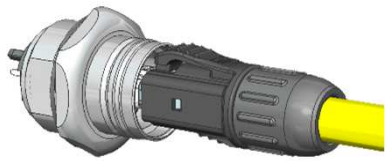
2018-04

MICE3 Single Pair Connector at a Glance

The industrial style balanced Single Pair Copper Connector based on IEC61076-3-125

- **Delivers best HF performance and head room for remote powering (up to 1000mtrs.)**
- **Future-proof → prepared for higher bandwidths and bigger loads**
- **Using existing and already standardized housings/dimensions and locking mechanisms → simple implementation, cost effective new device design**
- **IP20 interface pluggable with locking to IP65/67 M8 and M12 connector versions for testing and configuration set ups (usually non permanent use)**

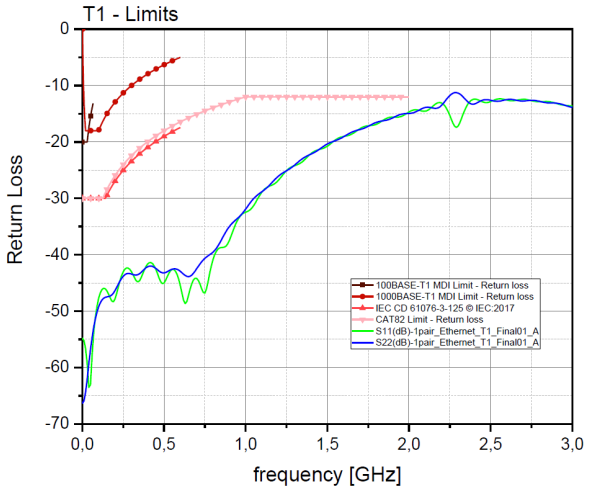
IP20 SPE plug mated with M12 SPE jack

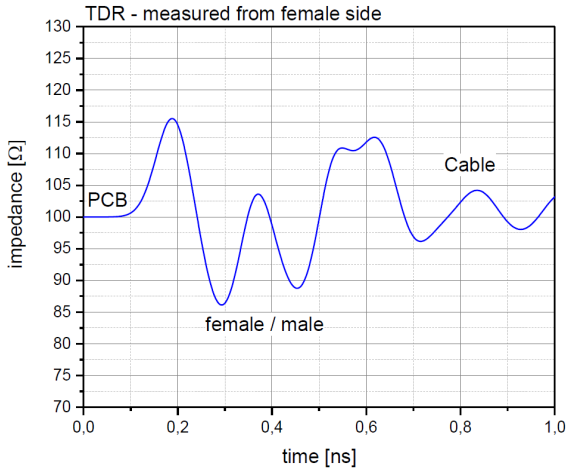


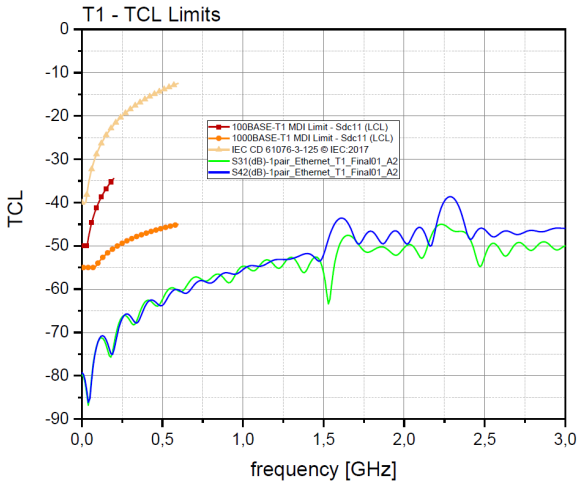
- **Prototypes and test results for this single pair copper connector available**
- **Connector standard is expected to be published in 2019**
- **First SPE connectivity products are expected to be launched in 2019**

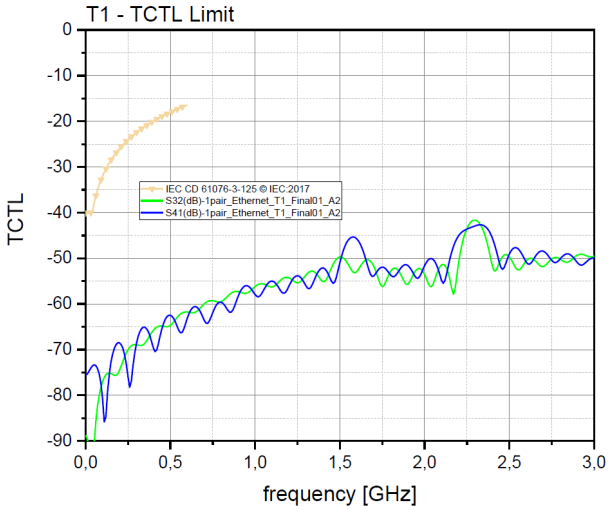
2018-04

HF simulation results for IEC 61076-3-125 variant



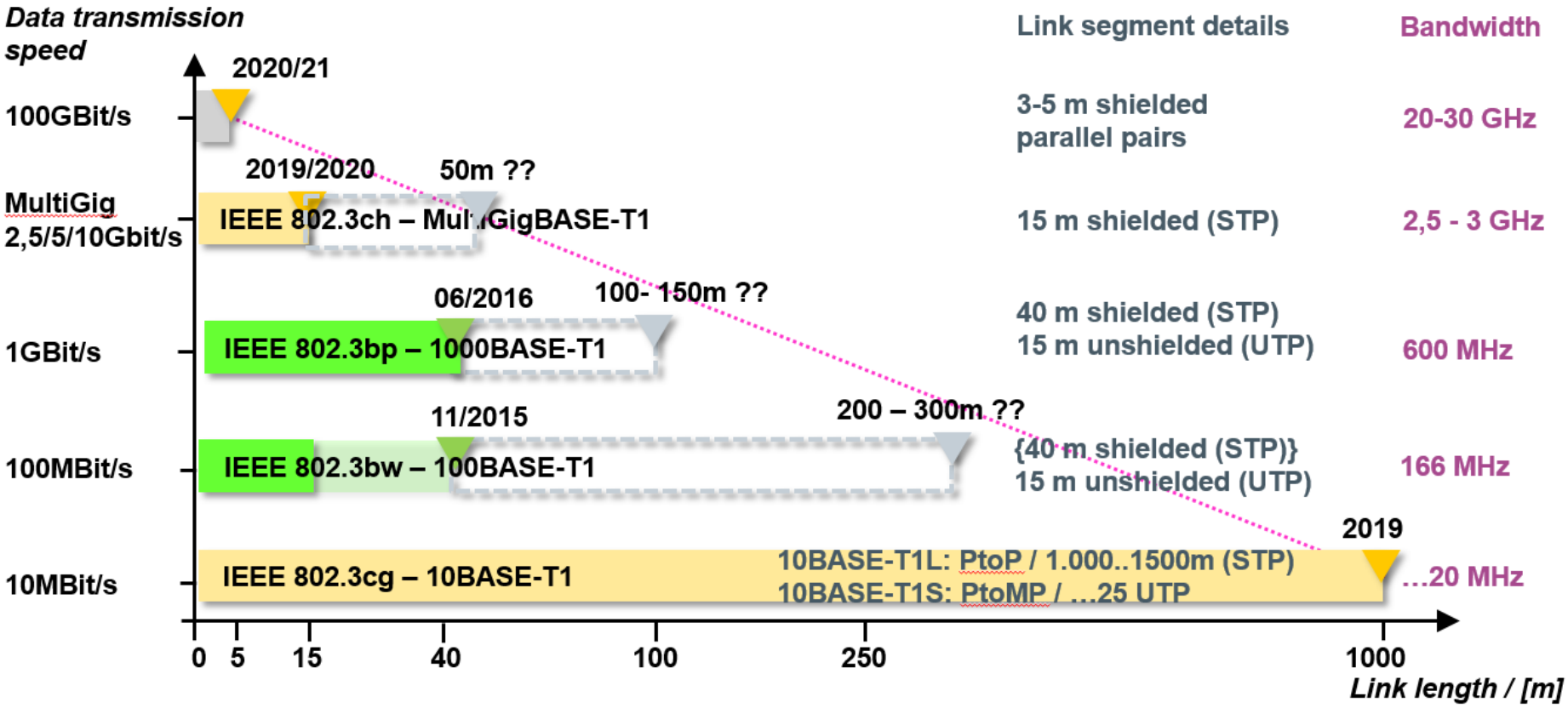






JTC 1/SC 25/WG 3
Generic Cabling according ISO/IEC 11801

Generic SP cabling approach driven by the 11801 SPE adhoc



Summary

Variant 2 connector mating face

- according to IEC 61076-3-125 will be suitable from 802.3cg up to 802.3ck
- wide range of possible variants for different cable diameters and special applications
- design is open for advanced transmission features up to 3GHz needed for IIoT
- IP free connector standard supporting the variety of SPE applications (will be published in 2019)

Questions?

Thank you!