

# Twinax for USB3.0 Extended Length

## CONSTRUCTION TYPES

## LEGACY TWISTED PAIR CABLE CONSTRUCTION.

The vast majority of digital data transmission cables are comprised of twisted pair (TP) elements.

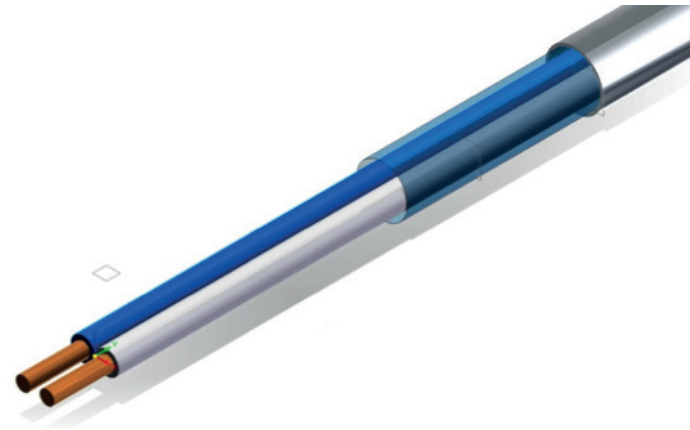
Differential signalling (putting equal but opposite signals on each of the wires) ensures that noise effects are significantly reduced.



## PARALLEL **TWINAXIAL (TWINAX)** CONSTRUCTION.

The pairs are laid parallel to each other, rather than twisted around each other, to ensure that lay length is identical.

Such constructions are used in very high bandwidth applications like telecoms switching systems and backplane interconnects.



# TWINAX V. TWISTED PAIRS

## ELECTRICAL PERFORMANCE

TP constructions reach their limit at ~ 2-4 Gbps, depending on technology / protocol. High performance, low latency computing applications such as InfiniBand, or low latency copper storage applications, like Fibre Channel do not therefore use TP.



## ADVANTAGES OF TWINAX

- Better precision of characteristic impedance
- Better control of skew performance within the pair and from pair to pair
- Lower attenuation (because twisted pairs require the signal to travel a longer distance)
- Finer control of the 'suck out' / notch frequency if spiral shielding tapes are used on the pairs
- Good for 2 Gbps and higher applications, and especially good at 5 Gbps+.
- We have twinax solutions working to 25 Gbps / channel

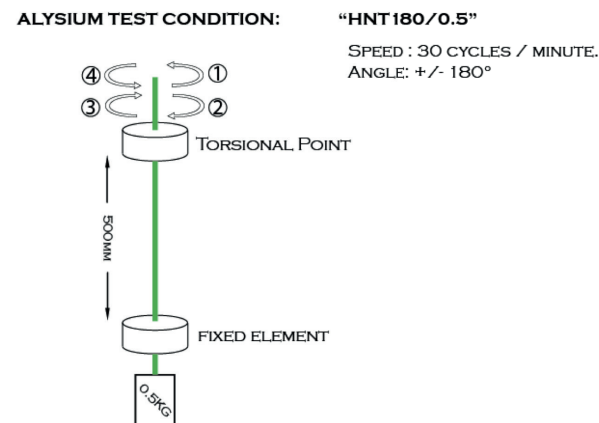
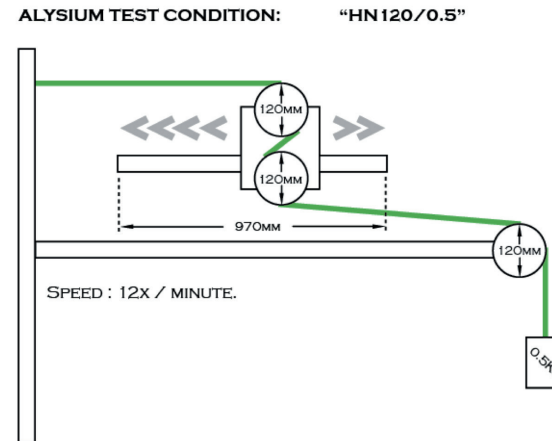
# MECHANICAL PERFORMANCE

Twinax is not flexible, especially at larger gauge sizes. HighFlex designs cannot therefore employ the electrical advantages of twinax cabling.

TP is therefore necessary for applications like industrial robots.

### Application Note:

Certain designers of robotic / industrial vision applications will stay with twisted pair designs to squeeze every bit of performance out of the pair. On the other hand, designers of high speed communication applications that will be installed once and rarely moved will consider twinax at perhaps lower speeds, even though twisted pairs may work.





## COST PERFORMANCE

TP has a lower cost than twinax.

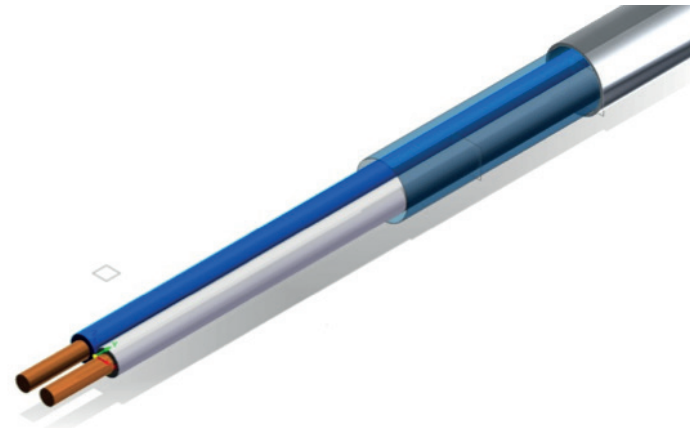
**Twinax has a lower cost (and higher reliability)  
than active cabling solutions.**

## CONCLUSION

## TWINAX USE IN USB3.0

Alysium uses:

- TP cable construction to 3M assembly lengths.
- Twinax designs from 3+ to 12M\* assemblies  
[\*depending on system set-up].
- Active Optical solutions for 8 to 15M assemblies  
(power supplied over cable).
- TP high flex designs to 8M\*  
[\*depending on system set-up].



Thank You!