

Far Detector Data/Control Fibers

- Need to determine data/control fiber cross section in order to size cable tray(s).

Optical Fiber estimate for DUNE-SP

From note I
wrote
14JUNE2018

Total~21,900
fibers

Wire Readout:

Qty (21) 12 ribbon fibers per detector Feedthrough

150 APAs /75 feedthroughs

#fibers wire readout = $21 \times 75 =$ qty (1,575) 12 Fiber ribbons

Data Optical Fibres and Connections: Data signals are carried on multi-mode fibres, compatible with either the OM2 or OM4 standard depending on the chosen data transmission speed and the total fibre length. Wherever possible fibers will be formed into ribbons with 12 fibres and terminated into MTP12 connectors. Ribbons may be merged into fibre trunks (1 trunk contains 12 fibre ribbons, or 144 individual fibres) near the chimneys on the top of the cryostat. The fibre trunks (or the fiber ribbons if the merging is not done) run from the top of the detector and terminate in the CUC where they are again split into ribbons, which are then connected to the the DAQ/trigger system.

PD Readout (not as much specified yet – estimate based on ProtoDUNE):

18 fibers per APA

#fibers PD readout = $150 \times 18 =$ 2,700 Fibers MMF

Ethernet connections to racks

Assume 4 ethernet connections per detector feedthrough

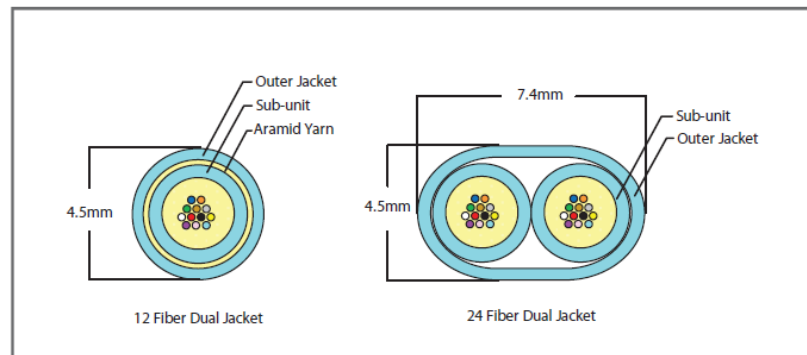
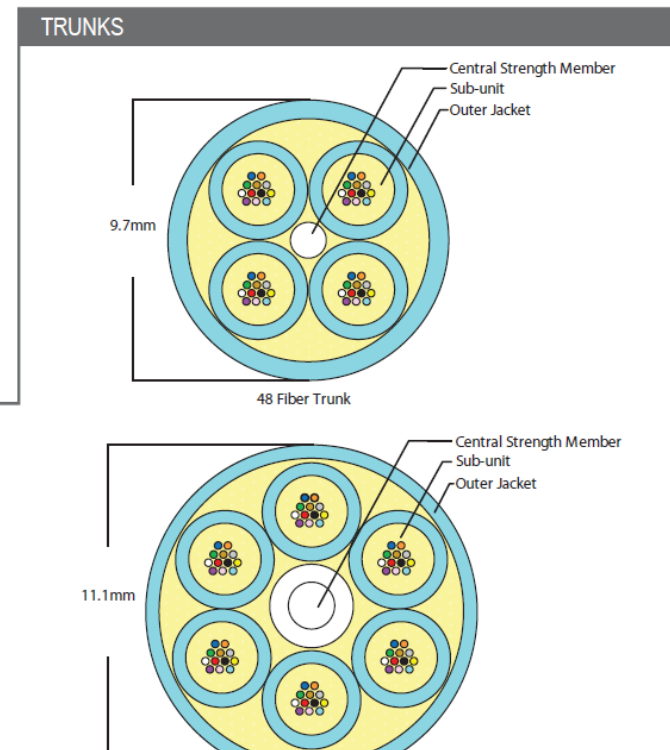
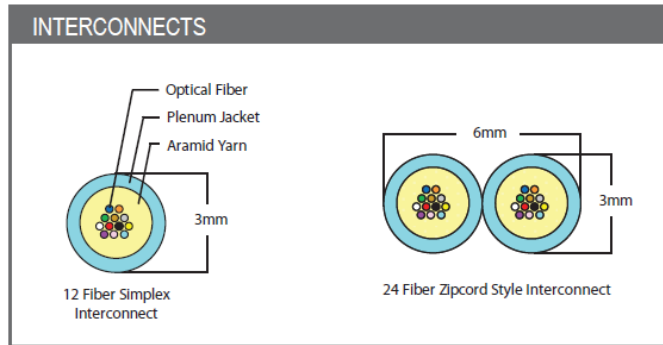
#fibers for ethernet = $75 \times 8 =$ 300 Fibers MMF

Far Detector Data/Control Fibers

MTP® PRODUCT DATA SHEET

Interconnects, Assemblies & Cassettes

Tactical Deployment Systems LLC



Far Detector Data/Control Fibers

- Need to determine data/control fiber cross section in order to size cable tray(s).
- Assume 12 fibers per 9 mm².
- Total area assuming 100% packing
 $21,900/12 * 9\text{mm}^2 = 16425 \text{ mm}^2 = .18 \text{ sq ft}$

with 40% packing factor we get ~0.45 sq ft

I believe present plan shows a single 24"x6" cable tray for both detectors.