

Fermilab CD/DCI Tech Note

Cable, UTP-TN-006.02

The following are construction requirements for Fermilab Computing Division Data Communication's unshielded twisted pair (UTP) Enhanced [Category 5e \(Cat5e\)](#) and [Category 6 \(Cat6\)](#) jack cords. Users should purchase cords from recommended vendors only, to ensure compliance with tech notes. Call Fermi CD/Data Comm. for a list of qualified vendors or visit our web page at <http://computing.fnal.gov/dci/Document-pdf-Files/Cable-Assy-Houses.pdf>.

Use the Fermi part number(s) on Purchase Requests when ordering cables, unless directed otherwise. *(Red sidebar indicates most recent change to this Tech Note. Orange sidebar indicates previous change.)*



1. CABLE

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a.) Solid-Wire

- 1.) Standard **riser rated** (PVC) solid-wire Category 6 jack cords must be made with green [Belden 7851A](#) cable.
- 2.) Standard **plenum rated** (PLN) solid-wire Category 6 jack cords must be made with green [Belden 7852A](#) cable.



2. CONNECTORS

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a.) Jack Modules

- 1.) Standard RJ45 jacks for Cat6 solid-wire must be **green** Panduit Mini-Com TX6 PLUS part number CJ688TP**GR**.
- 2.) When requested, RJ45 jacks for Cat6 solid-wire shall be **green** [Siemon 10GMX](#).



3. DESIGN

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a.) Straight-Through (Strait-Thru)

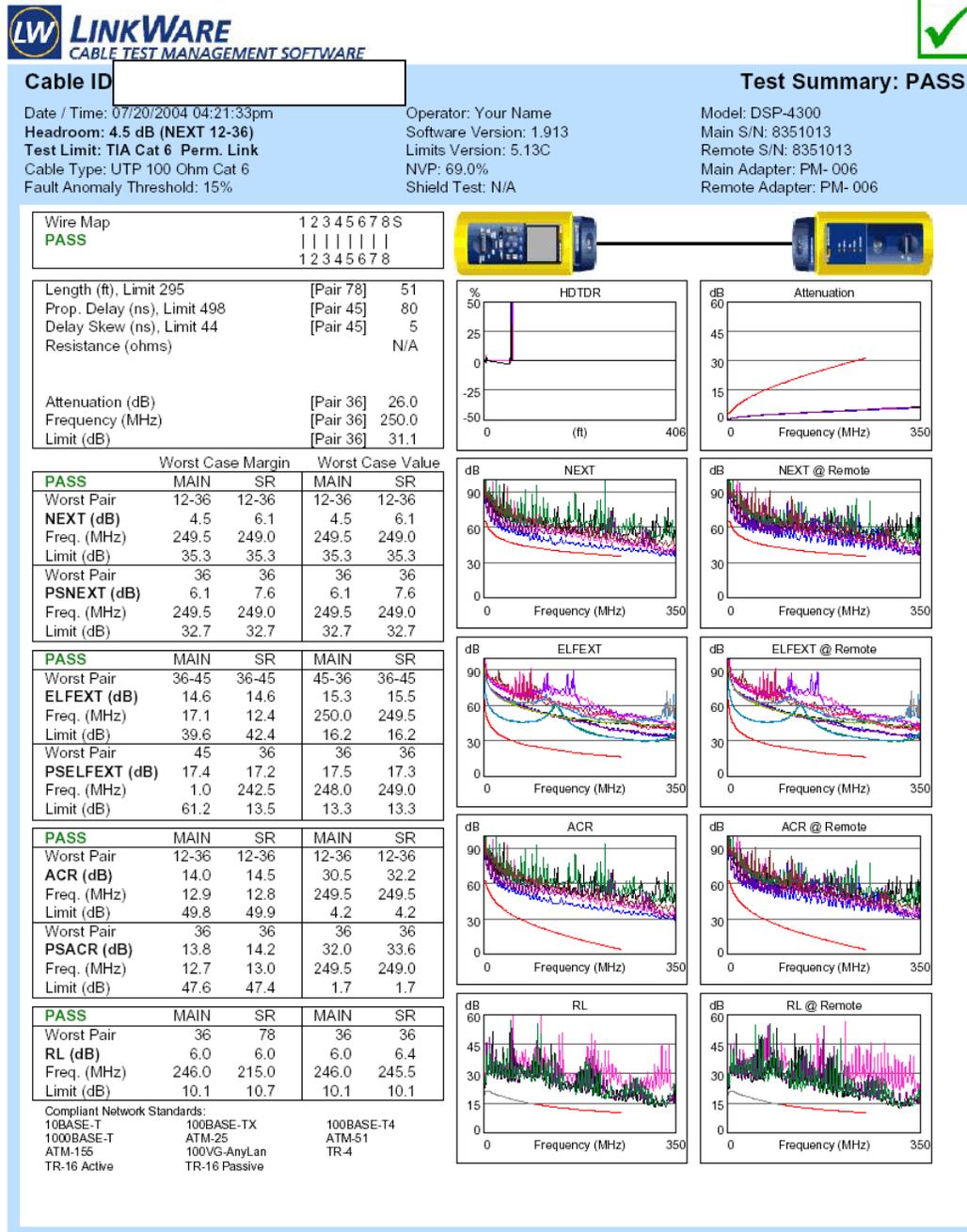
- 1.) A straight-through jack cord wired EIA568A must have RJ45 pins 1, 2, 3, 4, 5, 6, 7, & 8 on one end connected to pins 1, 2, 3, 4, 5, 6, 7, & 8 on the other end respectively. Pins 1 & 2, 3 & 6, 4 & 5 and 7 & 8 must be twisted pairs end-to-end with white-blue on pin 5, blue-white on pin 4, white-orange on pin 3, orange-white on pin 6, white-green on pin 1, green-white on pin 2, white-brown on pin 7 and brown-white on pin 8.
- 2.) A straight-through jack cord wired EIA568B must have RJ45 pins 1, 2, 3, 4, 5, 6, 7, & 8 on one end must connect to pins 1, 2, 3, 4, 5, 6, 7, & 8 on the other end respectively. Pins 1 & 2, 3 & 6, 4 & 5 and 7 & 8 must be twisted pairs end-to-end with white-blue on pin 5, blue-white on pin 4, white-orange on pin 1, orange-white on pin 2, white-green on pin 3, green-white on pin 6, white-brown on pin 7 and brown-white on pin 8.

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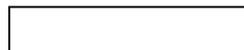
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4. PERFORMANCE

- a.) All Cat6 jack cords must meet (within 10%) all ANSI/TIA/EIA-568-B.2-1 performance specifications shown below, when tested with a Fluke DSP4300 by Fermilab.



Site: Client Name



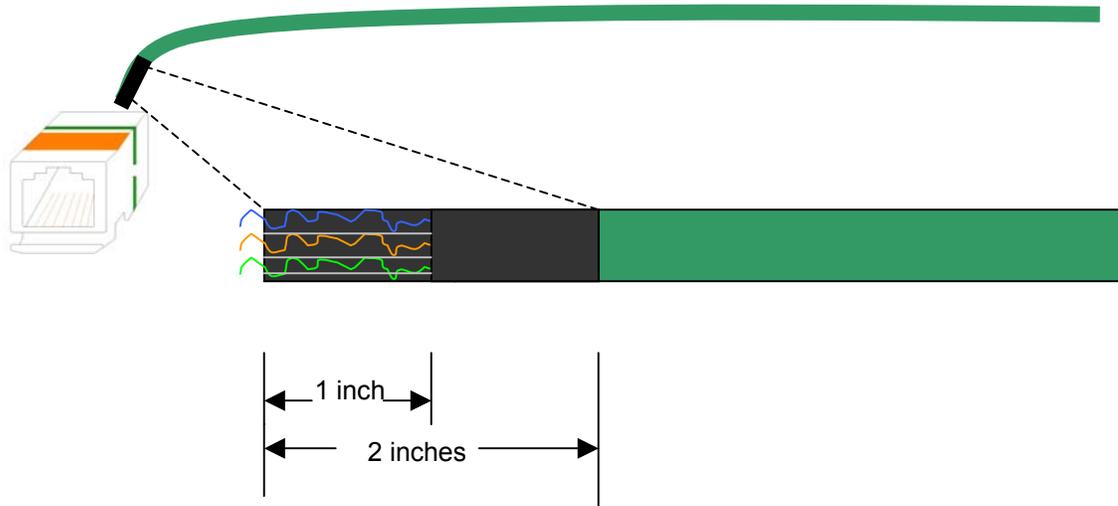
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5. MECHANICAL

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- a.) **Panduit:** must adhere to Installation Instructions PN307C <http://www.panduit.com/products/InstallationInstructions/068772.pdf>. Pair bonding must be preserved to the maximum extent possible when lacing the conductors. Pair bonding should only be split at the point where the conductors diverge into their respective “top” and “bottom” hold-notches. Pair separation should not occur below the surface of the conductor hold-notch plane. Pair twisting pattern from the manufacturer should be preserved at all times up to the hold-notch plane.
- b.) **Siemon:** jacket should be cut-back 1” from stuffer cap. Shrink sleeve should cover exposed twisted pairs, restoring them in spline. Shrink sleeve should overlap end of jacket to stuffer cap as shown below. Pair bonding must be preserved to the maximum extent possible when lacing the conductors.



6. LABELING

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- a.) Cords must be labeled flag-style, three inches from the RJ45 connector, on both ends.
- b.) All cord labels must contain the following information: the vendor name, the vendor part number and a unique serial number. Serial numbers must be in one of the following formats:
 - 1.) Purchase Orders
The serial number shall be derived from the Purchase Order number and be in the following format: XXX-YYYYYY, where XXX is a number that begins from 001 and increments by 1 up to the total number of cords being made by that vendor for that Purchase Order (regardless of whether the Purchase Order includes other assembled cords which are not Cat6 cords) and YYYYYY is the Purchase Order number.

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2.) Procard Orders: Computing Division

The serial number shall be derived from the ProCard number and be in the following format: SN: XXX-PRNZZZZZ, where XXX is a number that begins from 001 and increments by 1 up to the total number of cables being made by that vendor for that ProCard Order (regardless of whether the ProCard Order includes other assembled cables which are not Cat6 cords); ZZZZZ is the PRN number of the ProCard order.

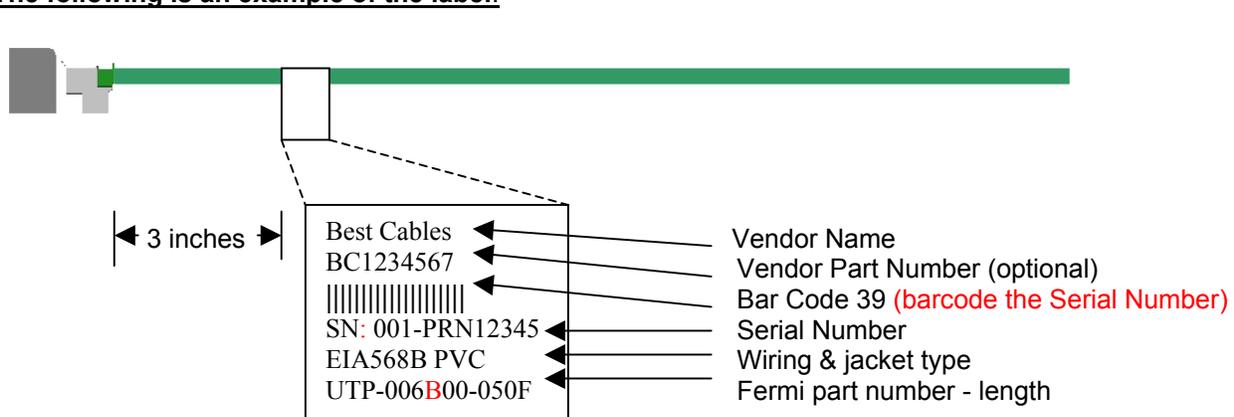
3.) Procard Orders: Non-Computing Division

The serial number shall be derived from the ProCard number and be in the following format: SN: XXX-ZZZZ-MMDDYY, where XXX is a number that begins from 001 and increments by 1 up to the total number of cables being made by that vendor for that ProCard Order (regardless of whether the ProCard Order includes other assembled cables which are not Cat6); ZZZZ are the last four digits of the ProCard number and MMDDYY is the month, day and year of the ProCard order.

c.) Vendors shall keep track of order numbers so that they do not get reused in future serial numbers, thereby preventing any two cords from having the same serial number.

d.) The label shall also include the cord's wiring and category, i.e. "EIA568A Cat6" (or "EIA568B Cat6") and the appropriate part number, Fermi number - length of the cord in feet (F) or meters (M).

The following is an example of the label:



e.) The labels must be Kroy 2556701, Panduit LS5-10 or equivalent.

f.) The labels must be laminated such that the information on the labels does not smear, fade or become unreadable under normal handling and installation conditions.

g.) The font size **must** be 8-point or greater. Tiny, blotchy, smeared or otherwise unreadable characters will not be accepted.

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7. FERMI PART NUMBERS

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Fermilab#	Description
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UTP-006A00	Cable,UTP,RJ45-RJ45, Jacks, EIA568A,Solid,Cat6,PVC (Cable: 1.a.1. Connectors: 2.a.1. Design: 3.a.1 Mech: 5.a)
UTP-006A01	Cable,UTP,RJ45-RJ45, Jacks, EIA568A,Solid,Cat6,PLN (Cable: 1.a.2. Connectors: 2.a.1. Design: 3.a.1 Mech: 5.a)
UTP-006A02	Cable,UTP,RJ45-RJ45, Jacks, EIA568A,Solid,Cat6,PVC (Cable: 1.a.1. Connectors: 2.a.2. Design: 3.a.1 Mech: 5.b)
UTP-006A03	Cable,UTP,RJ45-RJ45, Jacks, EIA568A,Solid,Cat6,PLN (Cable: 1.a.2. Connectors: 2.a.2. Design: 3.a.1 Mech: 5.b)
UTP-006B00	Cable,UTP,RJ45-RJ45, Jacks, EIA568B,Solid,Cat6,PVC (Cable: 1.a.1. Connectors: 2.a.1. Design: 3.a.2 Mech: 5.a)
UTP-006B01	Cable,UTP,RJ45-RJ45, Jacks, EIA568B,Solid,Cat6,PLN (Cable: 1.a.2. Connectors: 2.a.1. Design: 3.a.2 Mech: 5.a)
UTP-006B02	Cable,UTP,RJ45-RJ45, Jacks, EIA568B,Solid,Cat6,PVC (Cable: 1.a.1. Connectors: 2.a.2. Design: 3.a.2 Mech: 5.b)
UTP-006B03	Cable,UTP,RJ45-RJ45, Jacks, EIA568B,Solid,Cat6,PLN (Cable: 1.a.2. Connectors: 2.a.2. Design: 3.a.2 Mech: 5.b)