TX6A™ 10Gig™ SHIELDED COPPER CABLING SYSTEM with TX7000™ SHIELDED MARINE COPPER CABLE TESTING PROCEDURE PN546

Introduction

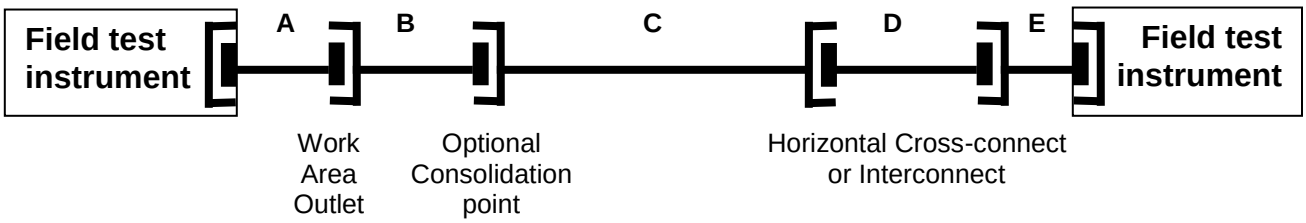
Copper cabling transmission performance depends on cable characteristics, connecting hardware, patch cords and cross-connect wiring, the total number of connections, and the care with which they are installed and maintained. To qualify for a Panduit System Warranty, post-installation performance testing must be completed using Panduit approved field test instruments to verify that the installed cabling will meet or exceed the performance requirements of the designated classification defined in the Commercial Building Telecommunication Standards. These standards based test results should then be submitted to the Panduit Warranty Department for review.

Panduit offers warranty on the TX6A™ 10Gig™ Copper Cabling System for the current standards, or ANSI/TIA-568-C.2 to channel performance Category 6A, or ISO 11801 Amendment 1 Class E_A Ch AMD1.

Channel Test Configuration

The channel test configuration is to be used by system designers and users of data communications systems to verify the performance of the overall channel. Channel performance is the most critical to the end user, as this is how their network will perform. The channel includes up to 90 m (295 ft) of horizontal cable, a work area equipment cord, a telecommunications outlet/connector, an optional transition/consolidation connector, and two connections in the telecommunications room. TIA/EIA recommends and ISO requires that the consolidation point be located at least 5 m (16.4 ft) from the telecommunications room to reduce the effect of multiple connections in close proximity on NEXT loss and return loss. Per the TIA standard, the total length of equipment cords, patch cords or jumpers and work area cords shall not be more than 10 m (32.8 ft). If total patch cords are longer than 10 meters, the entire channel length must be de-rated by the length exceeding 10 meters depending either by 20% or 50% depending on the patch cord cable type used. The connections to the equipment at each end of the channel are not included in the channel definition. The channel definition does not apply to those cases where the horizontal cabling is cross-connected to the backbone cabling. A schematic representation of a channel can be found below.

ANSI/TIA-568-C.2



Maximum length
B + C = 90 m (295 ft)
A + D + E = 10 m (32.8 ft)

For Technical Support: ***www.panduit.com/resources/install_maintain.asp***

Panduit System Warranty

Panduit has different types of warranties. These include the Certification Plus™ System Warranty and the Pan-Net™ Performance Guarantee. Each warranty is standards based. Panduit will typically provide a system warranty in the following way:

Channel Warranty is based on passing channel test results. (It is recommended to keep the patch cords installed after testing as there may be variations between patch cords)

As stated previously, passing test results must be obtained using an approved field test instrument. Panduit places each handheld test instrument thru an evaluation before approving it for use in the field. This ensures the integrity of the test data submitted for warranty.

Current field testers approved for Category 6A:

- Fluke DTX-1800
- Agilent Wirescope Pro N2640A

Testing Required for TIA/EIA Category 6A Channel Operation Warranty

Panduit requires that internal channel performance be verified for each link to obtain the warranty. Panduit does not require that field alien crosstalk testing be performed, as the TX6A™ 10Gig™ Copper Cabling System has been thoroughly lab tested and verified to meet alien crosstalk requirements under worse case conditions of 6-around-1 tightly bundled configuration. The customer may wish to perform optional alien testing and this procedure is included for reference.

Fluke DTX-1800 Series Digital Cable Analyzer

Panduit has evaluated the Fluke DTX-1800 Series Digital Cable Analyzer and approves the use of this tester for the certification of installed Category 6A cabling channels. In order to verify that the installed cabling will meet or exceed the performance requirements of the designated classification defined in the ANSI/TIA/EIA Category 6A standard, it is important that the following steps are followed.

Channel Testing

1) Verify that your DTX-1800 Series tester has the most up-to-date software (software version 2.24 or better is required). The latest software updates can be found on the Fluke website at: http://www.flukenetworks.com/fnet/en-us/supportAndDownloads/downloadsAndUpdates/?pid=50004

Turn on the unit and wait for initialization to complete.

2) Perform a Set Reference procedure in the special functions prior to testing. Fluke Networks recommends that a Set Reference procedure be performed every 30 days to ensure the maximum accuracy of the test results.

For detailed instructions on Set Reference procedure, refer to Fluke Network's *DTX-1800 Series Users Manual* page 20, on "Setting the Reference for Twisted Pair Cabling". The link for the User's Manual is:
http://www.flukenetworks.com/fnet/en-us/techdocs/Manuals.htm?pid=50004

Note: Fluke Networks also recommends factory calibration once a year to ensure that the test tool meets or exceeds the published accuracy specifications.

3) Select the Fluke Channel Adapter (# DTX-CHA002) and attach them to the DTX-1800 Series Main and Remote unit.

4) Turn the main function dial from 'Autotest' one step clockwise to the setting entitled 'Setup'.

5) Under Twisted Pair, set the appropriate Standard Limit to apply different standards,

Select from the following Fluke Test Limits, for which warranty is desired:

- **TIA Cat 6A Channel**
- **ISO11801 Channel Class E_A**

Note – this is the only step that has to be carried out differently for S/FTP cabling from the steps that would be required for testing of a UTP solution

6) In the scroll down menu, click onto 'Cable Type', select and click Cat 6A. Scroll down to, Cat 6A FTP and click, and then Shield Test – Enable. This option will ensure that the continuity of the shielding is verified end to end for the complete channel.

Scroll to manufacturer and select accordingly, Scroll to outlet configuration (T568A or B) for your test. Under tab 2 enable HDTDX/HDTDR for all tests.

Under Instrument Settings tab 1, set Store Plot Data to Extended. Under tab 2, enter operator site and company info. Under tab 3 make sure Date and time are set correctly.

Set the main function dial back to Autotest

7) For channel testing, install all patch cords prior to testing.

Note: Panduit recommends for installers to install and test a few channels before completing the entire system.

8) Begin testing your installed channels with the Fluke DTX-1800 Series Digital Cable Analyzer and save all test results.

9) Troubleshoot and repair any failing channels. Channels resulting in a PASS* are considered a PASS and will be acceptable for warranty.

Note: The Fluke HDTDX analyzer and HDTDR test are very helpful when troubleshooting failing channels. Both can be found on the SINGLE TEST menu and will also run automatically when a failure occurs. Also make sure that Store Plot Data is set to Extended under Setup/Instrument settings.

10) Submit electronic channel test reports to the Panduit Warranty Department with all required warranty paperwork. A channel warranty will then be given based on passing test results.

Note: Panduit recommends for installers to install and test a few channels before completing the entire system.

Alien crosstalk testing is not needed for shielded cable systems.

Approved Test Leads For Panduit ® Mini-Com® TX6A™ 10Gig™ Jack Modules and DP6A™ 10Gig™ Patch Panels

Channel

	Firmware Version	Software Version	Calibration Equipment	Autotest	Test Leads	Personality Module	Comments
Fluke: Networks DTX-1800 Series Cable Analyzer Fluke Networks Website	Software: V2.24 or later	Linkware Software V6.0 or later	-	TIA Cat6A Channel	Part # DTX-CHA002 Cat6A / Class E Channel Adapter	N/A	1. Consult Fluke Networks' website for the latest Firmware and Software Version. 2. It is **STRONGLY RECOMMENDED** that the tester is calibrated prior to testing
Agilent: WireScope Pro N2640A Agilent Technologies Website	WireScope Pro Software 3.0.53 or later	WireScope Pro (ScopeData Pro II) Software 3.0.53 or later	-	Cat6A Channel	Part # N2644A-100 Universal Cat6A Channel SmartProbe	N/A	1. Consult Agilent's website for the latest Software Version. 2. Calibration with the Precision Calibration is **STRONGLY RECOMMENDED**. 3. Tester holds last calibration. Tester must be recalibrated if using a different DualRemote, upgrading the software, when transitioning from Cat7/Class F copper cable test to Cat6A/Class E or lower performance categories, or after 30 days. 4. Universal Cat6A Channel SmartProbes should be in optimal condition. See owner's manual.

Appendix A

Typical Installation and Testing Equipment Required

- Fluke DTX1800 Test Set
- 4 corresponding Category and short length Patch cords to be used e.g. Category 6A 3 meter
- Walkie Talkies?
- Typical tool kit for Network Technician. As well as commonly available tools, ensure the kit contains:
  - 110 type punchdown tools for pairs (PDT110) and for blocks (PDT110M),
  - GP6™ Punchdown tools for pairs (GPST), for blocks (GPDTM), and base for jacks (AVPDB),
  - Panduit wire strippers (CJAST),
  - Flush cutters (CWST),
  - Terminating tools (EGJT + CGJT)
- Flashlight – smallest (5 to 6-inch) narrow body maglight
- Digital Camera (memory card and batteries)
- Laptop with Excel and Visio, and latest Fluke test set software
- Spare Batteries / power supply / adapters for all the equipment
- Drawing Materials (graph paper), markers and Clip Board

Testing

Fluke DTX 1800

Punchdown Termination

110+GP6 single pair

110+GP6 Multi-pair

Punchdown Base

Multi Pair for CP blocks

Modular Termination

CJAST Stripper

CGJT Termination Tool for TP Jacks

EGJT Termination Tool for TG Jacks

CWST Flush Cutters

5" Flashlight

Appendix B

Standards Limits

ANSI/TIA-568-C.2 Category 6A Channel

Freq. (MHz)	Insertion Loss (db)	NEXT (dB)	PSNEXT (dB)	Return Loss (dB)	ACR-F (dB)	PS ACR-F (dB)	ACR-N (dB)	PSACR-N (dB)
1	3	65.0	62.0	19.0	63.3	60.3		
4	4.2	63.0	60.5	19.0	51.2	48.2		
8	5.8	58.2	55.6	19.0	45.2	42.2		
10	6.5	56.6	54.0	19.0	43.3	40.3		
16	8.2	53.2	50.6	18.0	39.2	36.2		
20	9.2	51.6	49.0	17.5	37.2	34.2		
25	10.2	50.0	47.3	17.0	35.3	32.3		
31.25	11.5	48.4	45.7	16.5	33.4	30.4		
62.5	16.4	43.4	40.6	14.0	27.3	24.3		
100	20.9	39.9	37.1	12.0	23.3	20.3		
200	30.1	34.8	31.9	9.0	17.2	14.2		
250	33.9	33.1	30.2	8.0	15.3	12.3		
350	40.6	30.3	27.3	6.6	12.4	9.4		
500	49.3	26.1	23.2	6.0	9.3	6.3		

ISO Class E_A Ch AMD1

Freq. (MHz)	Insertion Loss (db)	NEXT (dB)	PSNEXT (dB)	Return Loss (dB)	ACR-F (dB)	PS ACR-F (dB)	ACR-N (dB)	PSACR-N (dB)
1	4	65.0	62.0	19.0	63.3	60.3	61	58.0
4	4.2	63.0	60.5	19.0	51.2	48.2	58.9	56.4
8	5.8	58.2	55.6	19.0	45.2	42.2	52.4	49.8
10	6.5	56.6	54.0	19.0	43.3	40.3	50.1	47.5
16	8.2	53.2	50.6	18.0	39.2	36.2	45.0	42.4
20	9.2	51.6	49.0	17.5	37.2	34.2	42.5	39.8
25	10.2	50.0	47.3	17.0	35.3	32.3	39.8	37.1
31.25	11.5	48.4	45.7	16.5	33.4	30.4	36.9	34.2
62.5	16.4	43.4	40.6	14.0	27.3	24.3	28.0	24.2
100	20.9	39.9	37.1	12.0	23.3	20.3	19.0	16.2
200	30.1	34.8	31.9	9.0	17.2	14.2	4.7	1.8
250	33.9	33.1	30.2	8.0	15.3	12.3	-0.8	-3.7
350	40.6	30.6	27.6	6.6	12.4	9.4	-10.0	-13.0
500	49.3	27.9	24.8	6.0	9.3	6.3	-21.4	-24.5

Panduit TX6A™ 10Gig™ Copper Cabling System Product List

Part Number	Description
Jack Modules	
CJS6X88TGY	Mini-Com® TX6A™ 10Gig™ Shielded Jack Module
Cable	
PSM7004IG-KED	TX7000™ Marine Rated S/FTP Category 7 Shielded Copper Cable
Patch Cords	
STP6X**	TX6A™ 10Gig™ STP Patch Cords
Modular Panels	Mini-Com® All Metal Shielded Modular Patch Panels
CP16BLY	16 port, 1 RU
CP24BLY	24 port, 1 RU
CP48BLY	48 port, 1 RU
CP72BLY	72 port, 1 RU
CP16WSBLY	16 port, 1 RU, with strain relief bar
CP24WSBLY	24 port, 1 RU, with strain relief bar
CP48WSBLY	48 port, 1 RU, with strain relief bar

** - denotes additional characters required for complete part number