Government of Prince Edward Island
Structured Cabling Standards
April 28, 2015

Emerging technologies dictate that it is no longer allowable to simply integrate various manufacturers' components into a building's structured cabling. In order to guarantee network performance, a single manufacturer's "system" of matched components is required. Our standard is Belden IBDN System 4800, GigaFlex Category 6.

It is also paramount that all new or renovated construction utilizes the latest available technology, eliminating the need and costly process of network infrastructure replacement, in the future.

The following standards apply to all network cabling installations:

1. All installers shall be familiar with and follow these industry standard documents:

   ANSI/TIA/EIA-569-A (CSA T530)
   ANSI/TIA/EIA-607 (CSA T527)
   ANSI/TIA/EIA-568-B.1, B.2, B.2-1 & B.3
   ANSI/TIA/EIA-606A
   ANSI/TIA/EIA-862
   TSB-155, IEEE 802.3an

2. The entire system shall meet or exceed the current day **Category 6** standard specifications, which includes four-pair, 23 gauge, copper cabling performance of 300 MHz. Only matched components from one manufacture`s system shall be used to provide an end -to-end solution. Provide complete system consisting of outlet boxes, cover plates, patch panels, patch cords, and cable, etc. The contractor shall verify that all system parts received meet specification, prior to installation.

3. 4-port angled face plates shall be for MDVO style jacks, with 3 ports used in each instance (2 data, 1 telephone). The upper ports are to be used for data terminations and the lower for voice, unless otherwise stated. The MDVO jacks in angled face plates are to be installed as designed by the manufacturer, which in this case has the printing inverted. This allows the release tab on the data cable to be facing upwards, making it easier to remove from the jack.

4. Each horizontal cable, data outlet, and patch panel port shall bear the same identifying number. The numbering scheme for the building data outlets shall be assigned in a logical, sequential manner. Numbering on the plates shall be *viewable from both in front and above*. A contractor must assign these jack numbers on the floor plans, prior to pulling in any cable.

5. Patch panels shall be Belden Category 6 Flex, for GigaFlex MDVO style jacks, for mounting in 19 inch floor mounted rack. Panels to be a matched components of the cabling system being installed; 24-port one rack unit high; 48-port two rack units high. Allow for 25% spares.

6. Patch cords shall be Category 6 Belden GigaFlex. Two patch cords required for each data line. Cable jacket and boots to match system color code:
   "Green" jacket and boots for Belden/CDT GigaFlex System
   "Blue or Grey" jacket and boots for Standard Cat5 UTP cable

7. Contractor to supply patch cords at both the main data rack and in the individual rooms. Number of patch cords required shall be determined by the number of data outlets shown on the Drawings. Patch cord length required in these amounts:
   - 4 feet, 70% of total count.
   - 7 feet, 20% of total count.
   - 10 feet, 10% of total count.

8. The installer shall be responsible for providing to IT Shared Services:
   - a map of the data outlet numbering and cable pathways on a copy of the building floor plan(s)
   - test results for each channel with a Level IV meter, using the standard specifications for Category 6.

9. All cable terminations shall be installed and tested to the T-568A wiring standard.

10. The contractor shall guarantee that all aspects of their installation shall be free from defects, and shall warranty workmanship and materials for a period of one (1) year from the date of inspection and acceptance by the representative of Provincial Treasury, IT Shared Services. The contractor shall assume all costs associated with repair or replacement; any form of cable trauma will be considered a defect and shall require replacement.

11. Category 6 data cabling shall meet or exceed specifications for Category 6, be 4 pair, 23 AWG, with FT4 rated insulation. Accepted systems are color-coded to uniquely identify the individual system horizontal cabling. For cabling:
   Green Belden/CDT (Nordx) System (4812LX)
   Blue Standard Cat5 UTP cable
   White All telephone copper cable
   Cabling for telephone shall be of Category 6 type (Belden 2412)

12. If an installed base of a manufacturer's Category 5E or 6 system is already installed, consult with the IT Shared Services representative for the specification of product to be installed. If there are any deficiencies, anomalies, link length issues, design flaws, fit up problems regarding to the structured cabling system, the Contractor shall contact the IT Shared Services representative for clarification and/or resolution, before proceeding.

13. All Cat6 T-568A MDVO's shall bear the following colors for ease of identification, in the event of their usage:

Green	Belden/CDT (Nordx) Cat6 GigaFlex Data jacks
Blue	Regular Cat5 data jacks
White	Voice cable termination jacks GigaFlex
Black	Fax cable termination jacks GigaFlex

14. Patch panels shall only be mounted in IT Shared Services approved equipment racking device(s). This shall be in accordance with the attached Rack or Cabinet Package Documents. No substitutions.

15. Attachment of panels and devices to specified racks and cabinets shall use only 10-32 Robertson rack mounting screws; accepted - Middle Atlantic part # HS.

16. The Installer shall leave a minimum of 12" of excess UTP cable on the data outlet termination to facilitate future re-termination. The excess cable is to be stored in a sweeping "S" pattern; coils are <u>not</u> permitted.

17. The Installer shall leave a minimum of 3 meters of excess UTP cable on the patch panel end to facilitate future repositioning of panels on the rack unit. The excess cable is to be stored in a sweeping "S" pattern; coils are <u>not</u> permitted.

18. Where applicable, the rear outside of vertical cable management troughs shall be used to control cables attaching to the racking unit. This shall be in accordance with a document supplied to the installer, detailing the type and configuration of such device.

19. Where physical security is of concern, all network cables shall be enclosed in continuous conduit from the workstation outlet to the secure telecommunications room. The conduit shall be of sufficient size to meet the maximum forty (40) percent fill ratio and turn radius specifications.

20. Horizontal cabling shall be installed to the manufacturer's specifications, including but not limited to, the minimum bend radius. The contractor shall be responsible for proper bundling (with velcro wraps) and handing of all cables (with cable trays, Caddy Fasteners and/or "J" hooks) between the telecommunication closets and the workstation MDVOs, in common pathways (above corridors); the "home run" method is not permitted. Cable bundles should be supported at 2 foot intervals.

21. Each workstation outlet plate shall be configured with a minimum of 2 data drops plus telephone service if required. Data drops shall only be used to deliver data services and shall not be used for any other service to the workstation.

22. **Installer shall be trained by the manufacturer of the cabling system being installed, following methods demonstrated in that training, and shall pocess a valid Certificate of Completion from the manufacturer, for the courses taken. Training must have been taken within the previous three (3) years, to be considered "valid". Certificates must be made available to the IT Shared Services representative for review, upon request.**

23. Before deviating from these methods, contact the Department of Provincial Treasury IT Shared Services representative.

24.

Belden IBDN System 4800 components include:

4812 005 1000	GigaFlex 4812, 4-pair, 23 AWG, CMR, Cat 6, Green, 1000 ft.
AX101070	CAT6+ Modular Jacks, for Data
AX101065	CAT6+ Modular Jacks, for Voice
AX101066	CAT6+ Modular Jacks, for Fax
AX350056	Belden GigaFlex PS6+ patch cables 4 feet, green
AX350057	Belden GigaFlex PS6+ patch cables 7 feet, green
AX350058	Belden GigaFlex PS6+ patch cables 10 feet, green
AX101456	Flex Patch Panel, 1U , 24-port, black
AX101458	Flex Patch Panel, 2U, 48-port, black
A0645269	MDVO Angled Entry Faceplate
AX101437	Interface Plate, Flush, 4-port, White

25.

Relay Rack Package Components

PART: Description	Product Code/Ordering #	Manufacturer	Quantity per pkg
Relay Rack Package - no substitutions			
Relay rack with 2 vertical cable management, black	DRR-44 + 2 DRCC-44CAN	Middle Atlantic	1
Power strip for rack	PB-12-IS/6FTCRD	Electron Metal	1
Horizontal Cable Manager, 1U, Black	HCM-1D	Belden IBDN	6
Horizontal Cable Manager, 2U, Black	HCM-2D	Middle Atlantic	4
Rack Drawer, 3U	UD3	Middle Atlantic	1
Universal Rackshelf, 1U, frontmount	U1	Middle Atlantic	1
Vented Center mount shelf, 2U	U2MS	Middle Atlantic	2
Formed blank panel 1U, black	EB1	Middle Atlantic	4
Formed blank panel 2U, black	EB2	Middle Atlantic	6
Heavy Duty Sliding Shelf	SS	Middle Atlantic	1
10-32 Pan Head Rack mounting screws and washers	HS	Middle Atlantic	100
IEC Power Cord, 12 inch, 4 per pkg	IEC-12X4	Middle Atlantic	1
IEC Power Cord, 18 inch, 4 per pkg	IEC-18X4	Middle Atlantic	1
IEC Power Cord, 24 inch, 4 per pkg	IEC-24X4	Middle Atlantic	1
Velcro Roll, 75 feet	99-050-QT-1	Polygon	1
Cable Ties, 7 inch, bag of 100	TY-525-MX	Thomas & Betts	1
Homaco 1U Horizontal Cable Fiber Manager	FCM-19-1SRC	Ortronics	1

26. Acceptable Conduit Runs
    - Achieve the best direct route (e.g., usually parallel to building lines) with no bend greater than 90 degrees or an aggregate of bends in excess of 180 degrees between pull points or pull boxes.
    - No continuous sections longer than 30.5 m (100 ft).
    - Be bonded to ground on one or both ends in accordance with national or local requirements.
    - Withstand the environment to which they will be exposed.
    - For runs that total more than 30.5 m (100 ft) in length, pull points or pull boxes should be inserted so that no segment between points/boxes exceeds the 30.5 m (100 ft) limit.
    - Total conduit runs should be kept to 45.8 m (150 ft) or less (including the sections through pull boxes).

27. Conduit Capacity
    - cable capacity of horizontal pathway conduits that have no more than two 90 degree bends (180 degrees total) and are no longer than 30.5 m (100 ft).

    The table shows the conduit fill ratio guidelines for horizontal cables; however, the number of cables that can be installed is actually limited by the allowed maximum

		Cable Outside Diameter mm (in)							
Inside Diameter (mm)	Trade Size	3.3 (0.13)	4.6 (0.18)	5.6 (0.22)	6.1 (0.24)	7.4 (0.29)	7.9 (0.31)	9.4 (0.37)	13.5 (0.53)
16	1/2	1	1	0	0	0	0	0	0
21	3/4	6	5	4	3	2	2	1	0
27	1	8	8	7	6	3	3	2	1
35	1-1/4	16	14	12	10	6	4	3	1
41	1-1/2	20	18	16	15	7	6	4	2
50	2	30	26	22	20	14	12	7	4
63	2-1/2	45	40	36	30	17	14	12	6
78	3	70	60	50	40	20	20	17	7
91	3-1/2	—	—	—	—	—	—	22	12
100	4	—	—	—	—	—	—	30	14

pulling tensions of the cables. Maximum conduit fill ratio is 40%.

28. Maximum Category 6 cable lengths apply to all horizontal distribution cables; from the Horizontal Cross-connect (patch panel) to the telecommunications outlet (workstation end), maximum cable length is 90 meters, (295 feet) including slack requirements. BAS horizontal link lengths are also limited to 90 meters, independent of the media type.

29. Maximum fiber optic cable lengths are as follows:

Subsystem	Backbone lengths up to:	Data rates up to:
Campus backbones (OM1 fiber)	2 km (1.2 mi)	155 Mb/s
Campus backbones (OM2 fiber)	550 m (1804 ft)	1 Gb/s
Building backbones (OM2 fiber)	300 m (984 ft)	1 Gb/s
Building backbones (OM3 fiber)	300 m (984 ft)	10 Gb/s
Campus/building backbones (OS1 fiber)	2000 m (6560 ft)	10 Gb/s

As a general guideline in premises applications for backbone cabling, OM1, 62.5/125 µm; OM2, 50/125 µm; or OM3, laser optimized 50/125 µm optical multimode fiber is recommended for applications supported for these lengths and data rates. Single mode fiber may also be required for premises applications.

30. Fiber optic backbone requirements shall be supplied on a separate design document.