



CI-0704

**TAB 7: TECHNICAL DISCIPLINES**  
Communications

**FARE HANDLING SYSTEMS**

**BASIS OF CRITERIA**

Fare handling machines are proprietary equipment and will be provided and installed by the appropriate supplier. Consultants shall meet with GO Transit staff to ensure the required facilities needed to operate these machines, e.g., power, are provided.

- > “Interac”, etc. (including data polling, Station Control Computer (SCC), Debit and Credit equipment
- > Smart Card equipment Presto
- > Ticket Vending Machines (TVMs)
- > Network Clock



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### TAB 7: TECHNICAL DISCIPLINES

#### Communications

## DESIGN REQUIREMENTS

### PRESTO OVERVIEW

Presto Fare Handling System is a smartcard-based fare payment system designed to support the use of one common fare card for fare payment on various participating public transit systems. PRESTO equipment is proprietary, provided and installed by the appropriate supplier, and comprises:

- > SPOS (Station Point of Sale) – located on the Service Counters
- > SFTP (Station Fare Transaction Processor)
- > CQD (Card Query Device)
- > HCR (Handheld Card Reader ) and the HCR Cradles – located in Safety Systems Offices
- > WAP (Wireless Access Points) – located at bus facilities
- > CC (Concentrator Complex) – installed in main racks.

Refer to Standard Drawings PRES-001, Detail 1-Presto System Architecture.

## STATIONS AND BUS TERMINALS

### PRINCIPLES OF DEVICE PLACEMENT

Devices may be located either in the station building, on the platforms, at access points to platforms (tunnels, pedestrian bridges, walkways, stairs, ramps, etc), as directed by Station Services, Field Services and/or Fare Systems.

#### **General:**

- > Placement of devices and way-finding signage is site specific.
- > Devices shall be placed to avoid work within the Structure Clearance Envelope on/or beside Railway Track (refer to Tab 8 Heavy Rail, Section CI-0807 Structure Interface) to reduce the need for flagging.
- > Bus Terminal locations require CQDs and SPOSs only; all fare collecting equipment is located on the bus.
- > Minimum clearance of 500 mm between two adjacent devices shall be maintained.
- > Devices shall be placed in accessible routes and shall not impede accessible clearances.

#### **SFTP**

- > Devices shall be placed at all rail platform access points. Devices shall be placed maximum 75 m apart at locations with direct parking lot to rail platform access.



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Communications

- > Devices shall be placed along passenger natural flow, at clear and visible locations, and shall be readily accessible by Cardholders for fare payment.
- > Remote locations shall be provided with two (2) devices on different circuits, to provide redundancy in case of power failure.

**CQDs**

- > Shall be located outside the passenger flow, near TVM and/or Information Board/Digital Station Information Signs

**Communications Conduits**

Conduits designated for Presto equipment data wiring shall be clearly identified and shall be installed well clear of power conduits. Conduit size shall depend on location with a minimum size of 21 mm. Acceptable conduit type as per Design Requirements Manual Tab 7 Section CI-0703 Electrical.

**ELECTRICAL CONNECTIVITY AND WIRING**

**General**

Wiring and circuit protection will be sized to suit the total wattage on circuit, to address potential voltage drops, and de-rating requirements for multiple circuits run in the same conduit. The following table provides an estimate of the maximum wattage that each device requires. Table 1. shows power requirements for each device.

Device	Watts
SPOS (Station Point of Sale)	200
SFTP (Station Fare Transaction Processor)	35
CQD (Card Query Device)	35
HCR (Handheld Card Reader) Cradles	120

Table 1: Power Requirements

For Electrical wiring specifications, refer to Tab 7 Section CI-0703 Electrical

**Communications Rack**

In the Communications Room, the required receptacles, each fed from dedicated power circuits from a local non UPS (generator backed up if available), shall be provided at each CC Rack.

The types of receptacles required at the different locations are as follows:



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Main CC Rack – Two (2) dedicated NEMA L5-20R (120V, 20A) mounted on cable tray fed from two (2) 15A breakers on different circuits, providing two (2) extension cords from the two (2) locked receptacles to reach bottom of the CC rack. The two extension cords shall include one (1) L5-20P plug each at top end of cords to plug into the twist lock receptacles and one (1) NEMA 5-20R receptacle each at bottom of cord (which accepts both NEMA 5-15P and NEMA 5-20P for plugging PRESTO UPS which is supplied by PRESTO supplier).

Main CC Rack if Transit Safety is included – In addition to Main CC Rack requirements, One (1) dedicated NEMA L6-20R (208V, 20A) mounted on the cable tray fed from One (1) 20A breaker, providing an extension cord from the locked receptacle to reach bottom of CC rack with one (1) NEMA L6-20P plug at top end to plug into twist lock receptacle and one (1) L6-20R receptacle at bottom of CC Rack (for plugging PRESTO UPS which is supplied by PRESTO supplier).

Secondary CC Rack - Two (2) dedicated NEMA L5-20R (120V, 20A) mounted on cable tray fed from two (2) 15A breakers on different circuits, providing two (2) extension cords from two (2) locked receptacles to reach bottom of the CC rack. The two extension cords shall include one (1) L5-20P plug each at top end of cords to plug into the twist lock receptacles and one (1) NEMA 5-20R receptacle each at bottom of cord (which accepts both NEMA 5-15P and NEMA 5-20P for plugging PRESTO UPS which is supplied by PRESTO supplier).

**PRESTO Devices**

Each **SPOS** (at Service Counter) is locally backed-up by PRESTO UPS (provided by PRESTO equipment supplier) and the PRESTO UPS requires a separate NEMA 5-20R (120V, 20A) receptacle fed from a 15A breaker on a dedicated non UPS power circuit (generator backed up if available). The power outlet shall be located within a maximum 2 m of the service position and labeled with PRESTO.

**SFTP** and **CQD** devices require dedicated power circuits from UPS located in the CC Rack (UPS provided by PRESTO equipment supplier). Power for up to four (4) devices (SFTP and CQD) can be daisy-chain connected to the UPS in the CC Rack. If devices are daisy-chained, they shall be staggered such that devices in close proximity to each other will be fed on separate circuits. Each such circuit shall be protected by a circuit breaker which will also serve as an isolation point near the CC rack (see Standard Drawing PRES-002 Detail 3 for power wiring termination details at CC Rack location).





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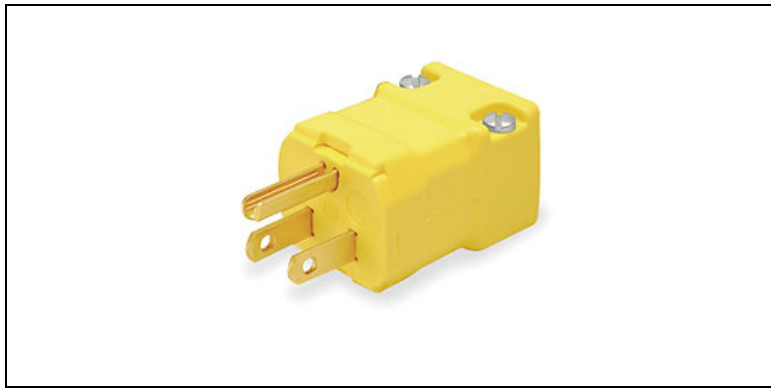
### TAB 7: TECHNICAL DISCIPLINES

#### Communications

An individual ground wire for each SFTP and CQD shall be run and terminated in the copper ground bus at power junction box at CC Rack location.

At the CC rack end the plugs for the SFTP and CQD must be SOW Service Cord complete with Commercial specification grade (straight blade valise type as shown below) plugs to be connected to the PRESTO System UPS in CC Rack.

Example of PRESTO Device plugs (for illustration purposes only):



In order to facilitate operations and maintenance, the power cables that are connected to the PRESTO system UPS must be clearly labeled to indicate which device is connected to each receptacle, following Design Requirements Manual labeling guidelines.

An **HCR** cradle has an input voltage of 120V AC and will require a NEMA 5-20R receptacle in the Transit Safety Office.

#### **DATA CONNECTIVITY AND WIRING**

The main CC Rack shall be placed in the communications room close to the demarcation point.

##### **Demarcation Location**

1 Cat6 (telephone) cable (required for PRESTO out of band modem) shall be terminated in patch panel (and labeled). From the patch panel to be run to the Bell demarcation point terminated with male RJ11 male connector at demarcation end. (Leave 1 meter coiled).

1 Cat6 cable (required for PRESTO router) shall be terminated in patch panel (with label) and run to Bell demarcation point terminated with male RJ 45 male connectors at demarcation end. (Leave 1 meter coiled).



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### TAB 7: TECHNICAL DISCIPLINES

#### Communications

#### Patch Panel in CC Rack

These panels are to terminate the cabling coming from the field PRESTO devices and also to terminate the cabling that connects the PRESTO rack switch to the Bell demarcation point.

These patch panels are to be a minimum of 24 port type.

All Cat6 and fiber optic distribution panels will be flat type and supplied and installed by electrical trade. These patch panels are to be installed just below the middle shelf of the GO Network/PRESTO CC rack.

Refer to DRM IT Appendix Section 5.3.1 for patch panel details.

#### PRESTO Devices

Ethernet data cable (Cat6) for **SPOS** shall be terminated into 8P8C (RJ-45) wall jack at device end and 8P8C (RJ-45) female connectors into patch panel at CC Rack (see Standard Drawing PRES-002, Detail 4 for data wiring termination details at CC Rack location).

Where possible, **SFTP** and **CQD** devices will be aggregated such that wired distances do not exceed 90 m (300 ft.) from the CC rack. For distances within 90 m, Ethernet cable (Cat 6) shall be used and terminated with 8P8C (RJ-45) male connectors leaving 1 meter coiled at the device end and RJ45 female end into patch panel (installed by electrical trade) at the CC rack end.

The required amounts of Cat6 RJ45 male ends patch cables to be supplied by electrical trade.

The **HCR** cradles will connect to the Transit Safety CC in the Main Rack using Ethernet Cable (Cat6) for a distance of up to 90m. The cabling shall be terminated into 8P8C (RJ-45) wall jack at the HCR cradle end and 8P8C (RJ-45) female end into the patch panel in main rack. Vendor to provide patch cables.

If the device is more than 90 m from the CC rack, Fiber will be required.

#### FIBER

Fiber optic cable shall be used for distances exceeding 90 m for connection to Fiber Transceiver (installed by PRESTO contractor).

At least 2 fiber strands are required to be pulled for each transceiver, since the fiber media transceiver switch uses 2 strands of fiber.

Fiber optic cable shall be as per DRM IT Appendix, Section 5.2.1.

Fiber optic cable shall be converted into Cat 6 cable through a transceiver (provided by PRESTO equipment supplier) close to device locations at stations. Each transceiver is equipped with 4 - 8 Ethernet outputs to serve 4 - 8 devices. An enclosure to house a fiber transceiver shall be provided by electrical trade (see Standard Drawing PRES-002 Detail 5 for transceiver enclosure detail) at Stations.

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Communications

The power for the Fiber Transceiver shall be run by electrical trade from the Fiber Transceiver NEMA enclosure to the CC rack. Grounding wire shall be connected to the enclosure and door of the enclosure. A power disconnect shall be mounted on the inside of Fiber Transceiver enclosure leaving power cord from disconnect for termination by PRESTO contractor. A din rail is also required. See example below.

Rack to Fiber Transceiver - Multimode fiber that can extend up to 2 km shall be employed and shall be terminated with LC connectors at CC rack patch panel (installed by electrical trade) and terminated with SC connectors into a patch panel (installed by electrical trade) in Fiber Transceiver enclosure (Stations). Required amounts of SC – SC fiber patch cables to be supplied by electrical trade in Fiber Transceiver enclosure and LC-LC fiber patch cables to be supplied by electrical trade in the CC rack.

Rack to Rack – Multimode fiber that can extend up to 2 km shall be employed and shall be terminated with LC connectors at main CC rack patch panel (installed by electrical trade) and terminated with LC connectors in secondary CC rack fiber patch panel (installed by electrical trade). Required amounts of LC – LC fiber patch cables to be supplied by electrical trade in each CC rack.



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**SECTION:**

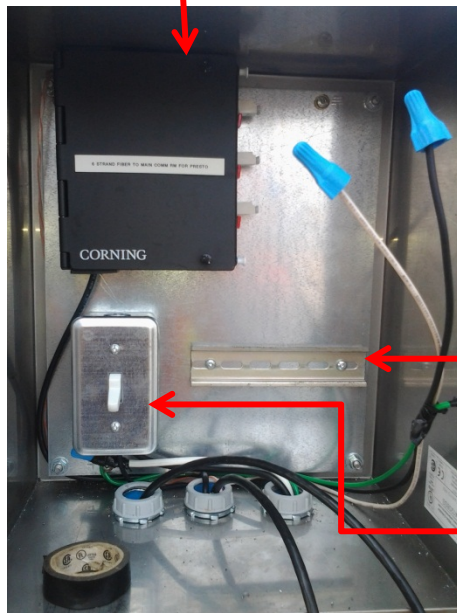
Tab 7:Fare Handling Systems

**FIGURE:**

Example of a Fiber Transceiver enclosure with requirement by electrical trade.

Fiber patch panel supplied and installed by electrical trade.

Fiber Patch cord to be supplied by electrical trade. (SC – SC connectors not shown in this example).



Din Rail installed by electrical trade (minimum 6 inches long).

Power disconnect installed by electrical trade.





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### TAB 7: TECHNICAL DISCIPLINES

#### Communications

#### CC Rack

At all new rail stations and bus terminals, PRESTO and Network equipment will share the same rack; (supplied by construction contract); Please see DRM IT Appendix, Section 4.8.3.1 for IT Rack requirements.

All Metrolinx equipment is to be installed above the middle shelf and all PRESTO equipment is to be installed below middle shelf.

If the space is limited at existing facilities, a wall mounted CC Rack may be used and installed. The maximum capacity of the rack and weight shall be stamped on the rack for future information and mounting requirements.

#### **DEVICE (SFTP/CQD) MOUNTING**

SFTPs/CQDs are designed for both stand and wall mounting.

Wall mounted devices do not require any special boxes and will be mounted directly on the wall as shown on Standard Drawing PRES-003, Detail 2.

Custom made Base Boxes are required to mount SFTP and CQD devices when using 'stand mounting' method. Stainless steel two-piece base box under SFTP and CQD shall be supplied and installed by contractor. Box manufactured by Commex Group Manufacturing Inc. (905-890-0077).

Refer to Drawings PRES-001 for Box Details. Consultant to verify lead time from manufacturer as times may vary with a custom designed box.

See Standard Drawings PRES-002 Detail 6 and 7, PRES-003 Detail 1, 2 and 3 for fare device (SFTP and CQD) installation details.

#### **DEVICE (SFTP/CQD) SIGNAGE**

Standard signage for SFTPs and CQDs shall be provided; refer to Static Signage Catalogue and Design Requirement Manual (DRM) for design, material and installation details on signage.

#### **SERVICE COUNTER MODIFICATIONS TO ACCOMDATE SPOS**

All required modifications shall be performed in service counter millwork, including adequate ventilation provisions, to accommodate the SPOS equipment.

The SPOS dimensions of the central unit and its peripherals are shown in Table 2:



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<i>Components</i>	<i>Physical dimensions (Width x Height x Depth)</i>
Computer	177 x 400 x 530 mm
Touch screen	434 x 430 x 238 mm (Including base)
CID (Card Interface Device)	151 x 37 x 191 mm
Receipt Printer	147 x 148 x 213 mm
UPS	147 x 236 x 419 mm
PID (Process Identifier)	Base: 220 x 41 x 110 mm Display Head: 260 x 70 x 60 mm Overall Height: 291 ~ 426mm

Table 2: SPOS Required Component Dimensions

A monitor bracket shall be provided and installed by the construction contract at each service position to the right of the desk, one for the SPOS. Bracket shall be provided to suit monitor. Final location of bracket shall be confirmed by Station Services.

**OPERATIONAL SUPPORT FACILITIES**

**ELECTRICAL CONNECTIVITY AND WIRING**

**General**

Wiring and circuit protection will be sized to suit the total wattage on circuit, to address potential voltage drops, and de-rating requirements for multiple circuits run in the same conduit. The following table provides an estimate of the maximum wattage that each device requires. Table 1 shows power requirements for each device.

<b>Device</b>	<b>Watts</b>
SPOS (Station Point of Sale)	200
SFTP (Station Fare Transaction Processor)	35
CQD (Card Query Device)	35
HCR (Handheld Card Reader) Cradles	120

Table 1: Power Requirements



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For Electrical wiring specifications, refer to Tab 7 Section CI-0703 Electrical

#### Communications Rack

In the Communications Room, the required receptacles each fed from dedicated power circuits from a local non UPS (generator backed up if available), shall be provided at each CC Rack.

The types of receptacles required at the different locations are as follows:

Main CC Rack if Station EUT is included – One (1) dedicated NEMA L5-20R (120V, 20A) mounted on cable tray fed from one (1) 15A breaker on different circuits, providing an extension cord from locked receptacle to reach bottom of the CC rack. The extension cord shall include one (1) L5-20P plug at top end of cord to plug into the twist lock receptacle and one (1) NEMA 5-20R receptacle at bottom of cord (which accepts both NEMA 5-15P and NEMA 5-20P for plugging PRESTO UPS supplied by PRESTO supplier).

Main CC Rack if Transit Safety is included - One (1) dedicated NEMA L6-20R (208V, 20A) mounted on the cable tray fed from One (1) 20A breaker, providing an extension cord from the locked receptacle to reach bottom of CC rack with One (1) NEMA L6-20P at top end to plug into twist lock receptacle and One (1) L6-20R at bottom of CC rack (for plugging PRESTO UPS supplied by PRESTO supplier).

Main CC Rack if Station Staging Area is included – Two (2) dedicated NEMA L5-20R (120V, 20A) mounted on cable tray fed from two (2) 15A breakers on different circuits, providing two (2) extension cords from Two (2) locked receptacles to reach bottom of the CC rack. The two extension cords shall include one (1) L5-20P plug each at top end of cords to plug into the twist lock receptacles and one (1) NEMA 5-20R each at bottom of cord (which accepts both NEMA 5-15P and NEMA 5-20P for plugging PRESTO UPS supplied by PRESTO supplier).

#### PRESTO Devices

In EUT (End User Training) environment:

**SFTP** and **CQD** devices in a EUT environment will be equipped with a plug and will require NEMA 5-20R receptacles in the EUT office.

Each **SPOS** (in EUT office) requires a NEMA 5-20R (120V, 20A) receptacle fed from a 15A breaker on a different circuit. The power outlet shall be located within a maximum 2 m of the device.

In Transit Safety office:

An **HCR** cradle has an input voltage of 120V AC and will require a NEMA 5-20R receptacle in the Transit Safety office.



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### TAB 7: TECHNICAL DISCIPLINES

#### Communications

In IT Staging office:

**SFTP** and **CQD** devices in a Staging environment will be equipped with a plug and will require NEMA 5-20R receptacles in the Staging office.

Each **SPOS** (in Staging office) requires a NEMA 5-20R (120V, 20A) receptacle fed from a 15A breaker on a different circuit. The power outlet shall be located within a maximum 2 m of the device.

#### **DATA CONNECTIVITY AND WIRING**

The main CC Rack shall be placed in the communications room close to the demarcation point.

##### **Demarcation Location**

1 Cat6 (telephone) cable (required for PRESTO out of band modem) shall be terminated in patch panel (and labeled). From the patch panel to be run to the bell demarcation point terminated with male RJ11 male connector at demarcation end. (Leave 1 meter coiled)

1 Cat6 cable (required for PRESTO router) shall be terminated in patch panel (with label) and run to bell demarcation point terminated with male RJ 45 male connectors at demarcation end. (Leave 1 meter coiled)

##### **Patch Panel in CC Rack**

These panels are to terminate the cabling coming from the field PRESTO devices and also to terminate the cabling that connects the PRESTO rack switch to the Bell demarcation point.

These patch panels are to be a minimum of 24 port type.

All Cat6 and fiber optic distribution panels will be flat type and supplied and installed by electrical trade. These patch panels are to be installed just below the middle shelf of the GO Network/PRESTO CC rack or at top of Bus Facility PRESTO CC rack.

Refer to DRM IT Appendix Section 5.3.1 for patch panel details.

##### **PRESTO Devices**

In Station EUT (End User Training) environment:

**SFTP** and **CQD** devices will be aggregated such that wired distances do not exceed 90 m (300 ft) from the CC rack. For distances within 90 m, Ethernet cable (Cat 6) shall be used and terminated into 8P8C (RJ-45) wall jack at the device end and 8P8C (RJ-45) female end into patch panel (installed by electrical trade) at the CC rack end.



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### TAB 7: TECHNICAL DISCIPLINES

#### Communications

Ethernet data cable (Cat6) for **SPOS** shall be terminated into 8P8C (RJ-45) wall jack at device end and 8P8C (RJ-45) female connectors into patch panel at CC Rack (see Standard Drawing PRES-002 Detail 4) for data wiring termination details at CC Rack location).

#### In Transit Safety office:

The **HCR** cradles will connect to the Transit Safety CC in the Main Rack using Ethernet Cable (Cat6) for a distance of up to 90m. The cabling shall be terminated into 8P8C (RJ-45) wall jack at the HCR cradle end and 8P8C (RJ-45) female end into the patch panel in main rack. Vendor to provide patch cables.

#### In IT Staging office:

**SFTP** and **CQD** devices will be aggregated such that wired distances do not exceed 90 m (300 ft) from the CC rack. For distances within 90 m, Ethernet cable (Cat 6) shall be used and terminated into 8P8C (RJ-45) wall jack at the device end and 8P8C (RJ-45) female end into patch panel (installed by electrical trade) at the CC rack end.

Ethernet data cable (Cat6) for **SPOS** shall be terminated into 8P8C (RJ-45) wall jack at device end and 8P8C (RJ-45) female connectors into patch panel at CC Rack (see Standard Drawing PRES-002 Detail 4) for data wiring termination details at CC Rack location).

In the Bus IT staging environment the BFTP come attached to a plywood board (Supplied by PRESTO). Each BFTP has an input voltage of 120V AC and will each require a NEMA 5-20R receptacle in the IT staging office.

#### FIBER

Fiber optic cable shall be used for distances exceeding 90 m for connection to Fiber Transceiver (installed by PRESTO contractor). At least 2 fiber strands are required to be pulled for each transceiver, since the fiber media transceiver switch uses 2 strands of fiber.

Fiber optic cable shall be as per DRM IT Appendix, Section 5.2.1.2

Fiber optic cable shall be converted into Cat 6 cable through a transceiver (provided by PRESTO equipment supplier) close to device locations. Each transceiver is equipped with 4 - 8 Ethernet outputs to serve 4 - 8 devices.

An enclosure to house a fiber transceiver shall be provided by electrical trade (see Standard Drawing PRES-002 Detail 5 for transceiver enclosure detail).

The power for the Fiber Transceiver shall be run by electrical trade from the Fiber Transceiver NEMA enclosure to the CC rack. Grounding wire shall be connected to the enclosure and door of the enclosure. A power disconnect shall be mounted on the inside of Fiber Transceiver enclosure leaving power cord from disconnect for termination by PRESTO contractor. A din rail is also required.



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### TAB 7: TECHNICAL DISCIPLINES

#### Communications

Rack to Fiber Transceiver - Multimode fiber that can extend up to 2 km shall be employed and shall be terminated with LC connectors at CC rack patch panel (installed by electrical trade) and terminated with SC connectors into a patch panel (installed by electrical trade) in Fiber Transceiver enclosure (Stations). Required amounts of SC – SC fiber patch cables to be supplied by electrical trade in Fiber Transceiver enclosure and LC-LC fiber patch cables to be supplied by electrical trade in the CC rack.

Rack to Rack – Multimode fiber that can extend up to 2 km shall be employed and shall be terminated with LC connectors at main CC rack patch panel (installed by electrical trade) and terminated with LC connectors in secondary CC rack fiber patch panel (installed by electrical trade). Required amounts of LC – LC fiber patch cables to be supplied by electrical trade in each cc rack.

#### **CC Rack**

At all new operational support facilities, PRESTO and Network equipment will share the same rack; (supplied by construction contract); Please refer to DRM IT Appendix, Section 4.8.3.1 for IT Rack requirements.

All Metrolinx equipment is to be installed above the middle shelf and all PRESTO equipment is to be installed below middle shelf.

If the space is limited at existing facilities, a wall mounted CC Rack may be used and installed. The maximum capacity of the rack and weight shall be stamped on the rack for future information and mounting requirements

#### **DEVICE (SFTP/CQD) MOUNTING**

SFTPs/CQDs are designed for a stand mounting.

Custom made Base Boxes are required to mount SFTP and CQD devices when using ‘stand mounting’ method. Station Ops West will have these cement bases made for the EUT and staging SFTPs and CQDs to mount to.

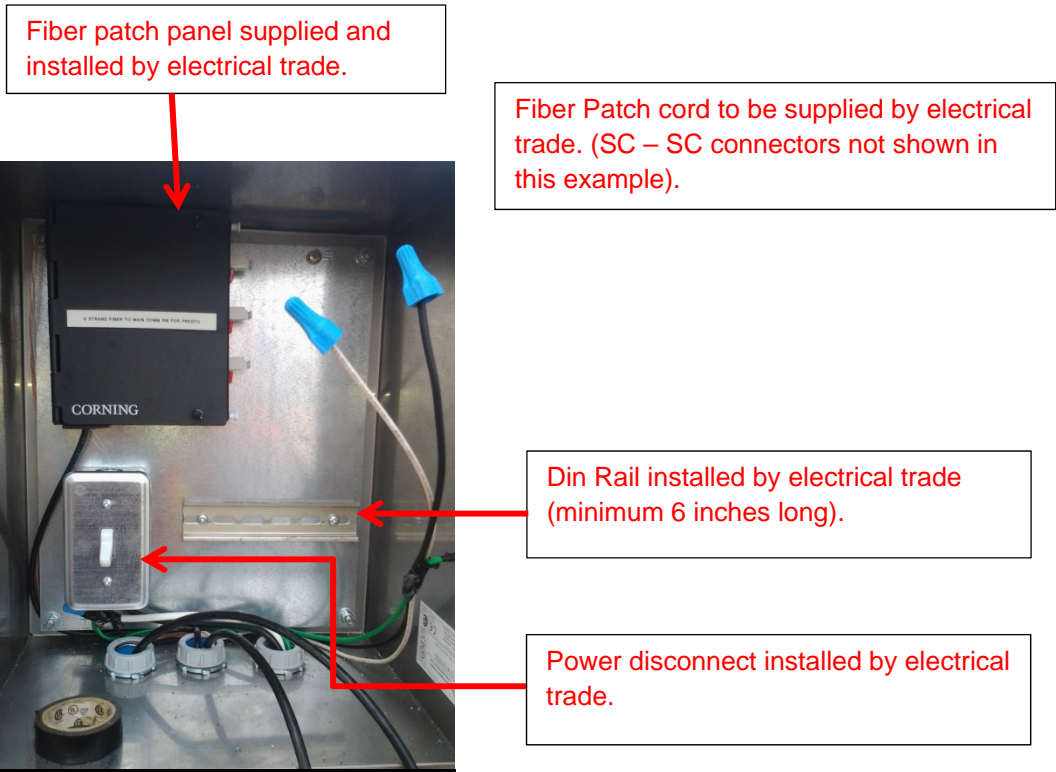


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**TAB 7: TECHNICAL DISCIPLINES**  
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**SECTION:**  
Tab 7:Fare  
Handling  
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**FIGURE:**  
Example of a  
Fiber  
Transceiver  
enclosure  
with  
requirement  
by electrical  
trade.





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**TAB 7: TECHNICAL DISCIPLINES**  
Communications

**BUS MAINTENANCE FACILITIES**

**ELECTRICAL CONNECTIVITY AND WIRING**

**General**

Wiring and circuit protection will be sized to suit the total wattage on circuit, to address potential voltage drops, and de-rating requirements for multiple circuits run in the same conduit. The following table provides an estimate of the maximum wattage that each device requires.

Table 1 shows power requirements for each device.

Device	Watts
SPOS (Station Point of Sale)	200
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HCR (Handheld Card Reader) Cradles	120

Table 1: Power Requirements

**Communications Room**

In the Communications Room, the required receptacles each fed from dedicated power circuits from a local non UPS (generator backed up if available), shall be provided at each CC Rack.

The types of receptacles required at the different locations are as follows:

Main CC rack for Bus WLAN Solution – One (1) dedicated NEMA L6-20R (208, 20A) mounted on cable tray fed from One (1) 20 A breaker, providing an extension cord from locked receptacle to reach bottom of CC rack. The extension cord shall include one (1) NEMA L6-20P at top end to plug into twist lock receptacle and one (1) L6-20R at bottom of CC rack (for plugging PRESTO UPS supplied by PRESTO supplier) and One (1) dedicated NEMA L5-30R (120, 30A) mounted on cable tray fed from one (1) 30A breaker, providing an extension cord from locked receptacle to reach bottom of CC rack. The extension cord shall include one (1) NEMA L5-30P at top end to plug into twist lock receptacle and one (1) L5-30R at bottom of CC rack (for plugging PRESTO UPS supplied by PRESTO supplier).

Main CC rack when Transit Safety is included – In addition to Bus WLAN solution above, One (1) dedicated NEMA L6-20R (208V, 20A) mounted on cable tray fed from One (1) 20A breaker on different circuit, providing an extension cord from the locked receptacle to reach bottom of CC Rack. The extension cord shall include one (1) NEMA L6-20P at top end of cord to plug into twist lock receptacle and an L6-20R at bottom of CC rack for plugging PRESTO UPS supplied by PRESTO supplier).





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#### Communications

Main CC rack when Bus EUT is included - In addition to Bus WLAN solution above, One (1) dedicated NEMA L5-20R (120V, 20A) mounted on cable tray fed from One (1) 15A breaker on different circuit, providing an extension cord from the locked receptacle to reach bottom of CC Rack. The extension cord shall include one (1) NEMA L5-20P at top end of cord to plug into twist lock receptacle and an L5-20R at bottom of CC rack (which accepts both NEMA 5-15P and NEMA 5-20P for plugging PRESTO UPS supplied by PRESTO supplier).

Main CC Rack if Station Staging Area is included – Two (2) dedicated NEMA L5-20R (120V, 20A) mounted on cable tray fed from two (2) 15A breakers on different circuits, providing two (2) extension cords from two (2) locked receptacles to reach bottom of the CC rack. The two extension cords shall include one (1) L5-20P each at top end of cords to plug into the twist lock receptacles and one (1) NEMA 5-20R each at bottom of cord (which accepts both NEMA 5-15P and NEMA 5-20P for plugging PRESTO UPS supplied by PRESTO supplier).

Secondary CC rack for Bus WLAN Solution – One (1) dedicated NEMA L5-30R (120V, 30A) installed beside rack for each secondary rack (secondary rack locations determined during RF Survey completed by PRESTO equipment supplier).

#### **PRESTO Devices**

In Bus EUT (End User Training) environment:

In the Bus EUT environment the BFTP come on a cart. Each BFTP has an input voltage of 120V AC and will require a NEMA 5-20R receptacle in the EUT office.

In Transit Safety office:

An **HCR** cradle has an input voltage of 120V AC and will require a NEMA 5-20R receptacle in the Transit Safety office.

In IT Staging office:

**SFTP** and **CQD** devices in a Staging environment will be equipped with a plug and will require NEMA 5-20R receptacles in the Staging office.

Each **SPOS** (in Staging office) requires a NEMA 5-20R (120V, 20A) receptacle fed from a 15A breaker on a different circuit. The power outlet shall be located within a maximum 2 m of the device.

In the Bus IT staging environment the **BFTP** come attached to a plywood board (Supplied by PRESTO). Each BFTP has an input voltage of 120V AC and will each require a NEMA 5-20R receptacle in the IT staging office.

#### **DATA CONNECTIVITY AND WIRING**

The main CC Rack shall be placed in the communications room close to the demarcation point.



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### TAB 7: TECHNICAL DISCIPLINES

#### Communications

#### Demarcation Location

1 Cat6 (telephone) cable (required for PRESTO out of band modem) shall be terminated in patch panel (and labeled). From the patch panel to be run to the bell demarcation point terminated with male RJ11 male connector at demarcation end. (Leave 1 meter coiled)

1 Cat6 cable (required for PRESTO router) shall be terminated in patch panel (with label) and run to bell demarcation point terminated with male RJ 45 male connectors at demarcation end. (Leave 1 meter coiled)

#### Patch Panel in CC Rack

These panels are to terminate the cabling coming from the field PRESTO devices and also to terminate the cabling that connects the PRESTO rack switch to the Bell demarcation point.

These patch panels are to be a minimum of 24 port type.

All Cat6 and fiber optic distribution panels will be flat type and supplied and installed by electrical trade. These patch panels are to be installed just below the middle shelf of the GO Network/PRESTO CC rack or at top of Bus Facility PRESTO CC rack.

Refer to DRM IT Appendix Section 5.3.1 for patch panel details.

#### PRESTO Devices

##### In Transit Safety Office:

The **HCR** cradles will connect to the Transit Safety CC in the Main Rack using Ethernet Cable (Cat6) for a distance of up to 90m. The cabling shall be terminated into 8P8C (RJ-45) wall jack at the HCR cradle end and 8P8C (RJ-45) female end into the patch panel in main rack. Vendor to provide patch cables.

##### In IT Staging office:

**SFTP** and **CQD** devices will be aggregated such that wired distances do not exceed 90 m (300 ft) from the CC rack. For distances within 90 m, Ethernet cable (Cat 6) shall be used and terminated into 8P8C (RJ-45) wall jack at the device end and 8P8C (RJ-45) female end into patch panel (installed by electrical trade) at the CC rack end.

Ethernet data cable (Cat6) for **SPOS** shall be terminated into 8P8C (RJ-45) wall jack at device end and 8P8C (RJ-45) female connectors into patch panel at CC Rack (see Standard Drawing PRES-002, Detail 4 for data wiring termination details at CC Rack location).

**BFTP** are wireless and may require an WAP to be installed. See AP section below.



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**TAB 7: TECHNICAL DISCIPLINES**  
Communications

**DEVICE (SFTP/CQD) MOUNTING**

SFTPs/CQDs are designed for a stand mounting.

Custom made Base Boxes are required to mount SFTP and CQD devices when using ‘stand mounting’ method. Station Ops West will have these cement bases made for the EUT and IT staging SFTPs and CQDs to mount to.

The **AP** (Access Points) for the WLAN solution at Bus Facilities shall be connected to the BUS CC rack in the main rack or secondary rack using Ethernet cable (Cat6) for distances of up to 90m. The cabling shall be terminated with 8P8C (RJ-45) male connectors leaving 10 meter coiled at the AP end and 8P8C (RJ-45) female ends into patch panel in rack.

**FIBER**

Fiber optic cable shall be used for distances exceeding 90 m for connection to Fiber Transceiver (installed by PRESTO). AT least 2 fiber strands are required to be pulled for each transceiver, since the fiber media transceiver switch uses 2 strands of fiber.

Fiber optic cable shall be as per DRM IT Appendix, Section 5.2.1.2

Rack to Rack – Multimode fiber that can extend up to 2 km shall be employed and shall be terminated with LC connectors at main CC rack patch panel (installed by electrical trade) and terminated with LC connectors in secondary CC rack patch panel (installed by electrical trade)

At Bus Facilities, secondary racks shall be provided by PRESTO equipment providers to house the network switch with fiber for the APs. Cat 6 cables shall be run from the secondary CC rack to the AP terminated with 8P8C (RJ-45) male ends in the rack patch panel.

**BUS MAINTENANCE FACILITY TYPES AND CC RACKS**

At bus maintenance and storage facilities, the PRESTO equipment shall be in a separate CC Rack from GO Network rack. These CC racks will be supplied by the PRESTO equipment providers but shall be installed by the electrical trade.

Type A facilities - The rack is installed in the main communications room and is typically an HP Rack 10636 G2 36U or equivalent with the following dimensions: H x D x W: 68.6 x 39.691 x 24 in (173.5 x 101.5 x 59.7 cm) Any secondary racks will be installed in the Garage area and is typically an APC NetShelter WX 13U w/vented frond door or equivalent with the following dimensions: HxDxW: 26 x 24.5 x 23 in (654 x 622 x 584 mm)

Type B facilities - In the main communications room and are typically an HP Rack 10636 G2 36U or equivalent with the following dimensions:

HxDxW: 68.6 x 39.691 x 24 in (173.5 x 101.5 x 59.7 cm)



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### TAB 7: TECHNICAL DISCIPLINES

#### Communications

Any secondary racks required will be installed in the Garage area and is typically an APC NetShelter WX 13U w/vented front door or equivalent with the following dimensions:

HxDxW: 26 x 24.5 x 23 in (654 x 622 x 584 mm)

Type C facilities – In the main communications room and is typically an HP Rack 10636 G2 22U or equivalent with the following dimensions:

HxDxW: 43 x 39.37 x 24 in (1092 x 1000 x 600 mm)

Expansion of PRESTO system at facilities that are live, may require upgrading the existing CC Rack to a larger size or addition of a new rack.

Refer to DRM IT Appendix, Section 5.3.1 for patch panel details.

#### **HVAC**

The operating temperature range for the Concentrator Complex is 0°C - 40°C.

#### **TESTING**

Upon completion of the installation, the Contractor shall perform complete copper and fiber optic cable certification tests, according to all manufacturer's requirements for warranty and all testing including, but not limited to:

- > Copper Data Cable
- > Continuity checks on each cable, checking for opens and shorts.
- > Cable length (Channel and Permanent Link).
- > Correct pair polarity.
- > Correct cable labeling at both ends.
- > Tests shall be performed with connectors installed.

#### **FIBER OPTIC CABLE**

All cable testing shall be conducted by an experienced technician using a Microtest Simplifiber meter or equivalent tester. Test all fiber (100%) using a power meter in both directions and provide following in the report:

- > Fiber cable number
- > Fiber length.
- > Attenuation (loss in dB).
- > Test date
- > Tester make and model no.
- > Tester calibration date.

**CI-0704****TAB 7: TECHNICAL DISCIPLINES**

Communications

**INSTALLATION COMPLETION**

Installation and Testing of PRESTO system infrastructure (conduit, wiring, bases, etc) as described in this document and shown on standard drawings shall be completed at least six(6) to eight(8) weeks prior to new area/device/station opening to allow for device installation and testing by supplier. These design requirements shall be also read in conjunction with the PRESTO installations guidelines provided by Metrolinx Fare Systems department.

**SERVICE COUNTER TALK THRU SYSTEMS****BASIS OF CRITERIA**

The talk-thru system provides instant 2-way voice communication between the public and station attendants through the glass divider at the station service counter.

**DESIGN REQUIREMENTS****FUNCTION**

The talk-thru unit provides hands free and effective duplex communication between the station operator and the passengers. The voice switching function is automatically biased in the direction from the passenger to the operator. Noise cancelling and omni-directional microphones will be mounted on the passenger and service attendant sides respectively, of the booth glass divider. Two rotary encoded controllers will be provided to adjust the volume of each microphone. The operator's boom microphone will automatically override the passenger microphone when activated. Provision will be made for inter speech pause time.

**COMPONENTS**

- > Microphone Override Pushbutton
- > Power On/Off L.E.D. Switch
- > Noise Cancelling Microphone
- > Seller's Mike-Off Switch

**WIRING**

- > Conduits and 120 volt A/C source power outlets for each voice link assembly.