



*UNIVERSITY OF NORTH CAROLINA*  
**CHARLOTTE**

**APPENDIX**

**49ER CARD SYSTEMS**

University of North Carolina at Charlotte Design Standards and Guidelines  
Appendix 49er Card Systems

**UNC CHARLOTTE 49ER CARD SYSTEM INSTALLATION AND CONTRACTOR  
REQUIREMENT SCOPE OF WORK:**

The following information pertains to the installation and contractor requirements to install the UNC Charlotte 49er card system devices.

The 49er Card devices to be installed on this project will encompass the following:

- Door Access at all residence halls:  
2 Belden 8723 cables, 1 to card swipe, 1 to 4x4 box as shown on illustration #3
- Laundry Centers at all residence halls:  
2 CAT 6 Network drops per Laundry Reader, Belden 8723 cables required in each of these rooms also. Quantity determined by amount of machines required in each laundry room.
- Vending at all locations:  
2 CAT 6 Network drops per machine
- Cash Registers at all locations:  
4 CAT 6 network drops per register location

**DOOR ACCESS REQUIREMENTS (at all residence halls):**

The door access module enclosure for the SA3000 to be mounted in the telecom rooms for this facility will require the following infrastructure:

- 1: A minimum 3/4" home run conduit installed from the card swipe location ("CR" location) to the closest telecommunications cable tray system as shown in illustration # 2.
- 2: Card swipe mounting locations will require a minimum of a single gang back box with proper extension mounting rings installed flush to face of exterior finish where card swipes are to be mounted. All height for the box locations should be installed to comply with ADA standards and UNCC's more stringent mounting height.
- 3: A minimum of a 1" conduit from the SA3000 door access controller enclosure (to be located in telecom room) to the 4 X 4 junction box shown in illustration # 3. This conduit does not have to be run in a home run fashion. The conduit can leave the telecom room and go to the cable tray outside the telecom room. Then from the 4 X 4 junction box located at door hardware control devices back to the closest cable tray. Preferably by the 3/4" conduit for the card swipe cable.
- 4: In telecom rooms where the SA3000 door access controller enclosures are to be installed will require a 120 Volt circuit installed to this enclosure. This electrical circuit will need to be a dedicated 20 AMP circuit, no emergency power required. This is shown in illustration # 4. The power will need to be landed on the SA 3000 power supply by the contractor.

**CONTRACTOR REQUIREMENTS for 49er Card door access controller:**

- 1: UNC Charlotte will place the order to purchase the SA3000 door access controller and enclosures in quantities approved by housing when they are notified of the date

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needed. The 49er card office requires a three month notice to place orders for 49er associated enclosures and devices. This will allow sufficient time for the devices to be delivered to the GC or CM at risk for installation when they are ready based on the building schedule. The enclosures with power supplies will be turned over to the GC or electrical contractor on the project for mounting in the telecom rooms. This is necessary so the electrical contractor can install the required conduits and power into the enclosure. And to also terminate the power circuit on the power supply located in the 49er door access controller enclosure as shown in illustration # 4.

- 2: The telecommunications or electrical contractors will be responsible for installing two (2) Belden 8723 cables from the SA3000 enclosure located in the telecom rooms to the card swipe and door control electronics as shown in illustration # 3. Contractor is responsible for connections to all ADA systems
- 3: The Belden 8723 cable to the door opening electronics enclosure will be utilized as an open/close (Make contact) relay cable from the SA3000. This will interface to the electronics card for the door opening hardware and will be the responsibility of the door hardware installer to make this termination on their electronics card.

NOTE: Some door access points in facilities require an ADA access system to be installed. The door hardware installer will be responsible for making all necessary connections so the SA3000 will work in conjunction with the exterior ADA door opener paddle. The SA3000 Card swipe will have to activate the door lock release first before the exterior ADA door opener paddle can be energized. If not and the exterior ADA paddle is energized all the time without a valid card swipe it would operate and try to open a locked door causing damage to the ADA opening system.

All that will be provided from the SA3000 is an open/close, dry contact, to unlock the door with a valid card swipe. It will be the responsibility of the door hardware installer to provide all equipment, electronics, contact closures, dual time relays, etc... to make the doors function properly utilizing a card swipe. This would include ADA doors and non ADA doors.

Some telecom rooms may require more than one SA3000 door access controller enclosure. The 120 volt circuit that is required to feed each enclosure can be multiplied up to three enclosures. If more than three enclosures become necessary then the fourth enclosure would require a dedicated 120 volt circuit that could then be multiplied to another two enclosures, and so on.

UNC CHARLOTTE ITS RESPONSIBILITIES for 49er Card door access readers:

- 1: The UNC charlotte ITS technician will install the card swipes at all doors specified to have 49er Card access. The ITS technician will terminate the contractor installed Belden 8723 cable to the card swipe.
- 2: The ITS technician will install the electronics circuit board into the contractor Mounted SA3000 enclosure in each telecom room after the 110 volt circuit has been installed and terminated on the power supply in the enclosure. The ITS technician will be responsible for terminating the Belden 8723 cables and network cables on the electronics card that will be installed in the SA300 enclosure located in the telecom rooms.
- 3: The ITS 49er Card technician, when it becomes available, will coordinate delivery of all required SA3000 equipment with the GC

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***A three month notice is necessary to order this equipment from Bb to insure there will be no problems with backorders or delivery.***

Some telecom rooms may require more than one enclosure depending on how many doors that particular telecom closet may serve. Each controlled door requires one SA3000.

- 4: The ITS 49er Card technician will suggest coordinate, and advise and provide Bb documentation to contractors as required for proper installation of the required contractor installed components of the 49er card system.

The 49er technician will also be responsible for bringing all 49er card devices on line and testing for proper operation. If there are issues beyond the 49er technician responsibilities that cause a device to not function it will be the responsibility of the contractor that installed the components under their scope of work to address any issues. The 49er technician will be available to test the 49er equipment once any issues have been determined and repaired by contractor if this becomes necessary.

**LAUNDRY CENTER REQUIREMENTS (at all residence halls):**

Infrastructure requirements:

- 1: Within each laundry room a deep device double gang back box with double gang plaster ring will be required behind where each Laundry Room 49er card controller would be mounted. In this box a splitter will be required because both a 110 volt circuit has to be brought thru this box to the power supply in the controller and all the Belden 8723 cables from each laundry machine have to be brought into the controller enclosure. See illustrations 5 and 6.
- 2: A minimum of a 1-1/4" conduit is to be installed into the split double gang back box to bring the Belden 8723 cables from each machine thru the back box and into the laundry controller enclosure. Each Belden 8732 cable needs to be labeled at each at the controller and machine end in legible text so it can easily be identified by the installer. This conduit is to be stubbed above the accessible ceiling within the laundry room. Do not take this conduit out to the hallway cable tray system.

The conduit for the 120 volt circuit will have to be sized as required by the electrical contractor to be installed into the split double gang back box.

- 3: Behind each laundry machine a single gang back box with a single gang plaster ring is to be installed. A single gang outlet is required behind each machine. Do not try to multiple individual machines from one outlet. These outlets are to be at the same height as the power outlets will be installed. Typically these outlets are installed higher on the wall behind each machine than a standard electrical outlet. Roughly 30" AFF.
- 4: A 3/4" conduit is required from each of the single gang back boxes to be stubbed to above accessible ceiling within the laundry room. Do not install these conduits to the cable tray system in the hallways.
- 5: A single gang stainless steel faceplate with a minimum of a 3/4" LFNC conduit attached with a 90 degree connector to the face of the wall faceplate is to be installed behind each laundry machine. The laundry machine end of the LFNC will have a straight fitting. The LFNC should be a minimum 6.5' end to end and the Belden 8723 cable should extend 4' beyond the end of LFNC connector. The LFNC conduit will be

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attached to each laundry machine by the laundry machine installer. The LFNC is used to protect and convey the Belden 8723 cable from the outlet to the laundry machine.

**CONTRACTOR RESPONSIBILITIES:**

- 1: The project is responsible for installing all infrastructure items listed above in infrastructure requirements.
- 2: The electrical contractor will be responsible for installing the 110 volt circuit thru the split double gang back box located behind the laundry room 49er card controller. Electrical contractor responsible for mounting the laundry room 49er controller enclosure over the double gang split back box and terminating the 110 volt circuit on the power supply that is located within the enclosure. See illustrations 5 and 6.
- 3: The telecommunications or electrical contractor will be responsible for installing all Belden 8723 cabling within each laundry room. Each laundry machine will require one Belden 8723 cable. Leave a slack coil of no less than 4' out of the end of each LFNC conduit that is to be installed behind each laundry machine. See illustration 7.
- 4: Bring all the Belden 8723 cables from each laundry machine down the 1-1/4" conduit installed to the split double gang back box. Route the cables thru the back box and into the laundry room controller enclosure. Leave a 10' slack coil on the cables. See illustration 5 and 6. These illustrations show the larger knock out in the enclosure where the Belden 8723 cables are to be brought into the enclosure from the double gang back box mounted behind the enclosure.
- 5: Telecommunications contractor to install two CAT 6 network drops from the nearest telecom room to the laundry room 49er card controller enclosure. These cables are to be terminated on the UNCC data patch panels to be located in the telecom rooms.

At the laundry room 49er card controller enclosure the CAT 6 cables are to be brought down the same 1-1/4" conduit as the Belden 8723 cables installed within the laundry room. Leave approximately 1' of slack on the CAT 6 cables and terminate a CAT 6 jack on the end of the cables. Leave the cables hanging out of the enclosure with the other Belden 8723 cables. Test the CAT 6 cables same as all other network drops within the facility. Provide a label on the cables as industry standards dictate for proper identification of the cables.

**UNC CHARLOTTE RESPONSIBILITIES for laundry rooms:**

- 1: The 49er technician will provide the laundry room 49er card controller enclosures with power supplies to the electrical contractor for installation in each laundry room.
- 2: 49er technician will terminate all Belden 8723 cables to the electronics card that will be installed in each laundry room controller.
- 3: 49er technician will connect the network drops to the electronics card in each laundry controller.
- 4: 49er technician will be responsible for coordinating with the laundry equipment installer to connect the 3/4" flex conduits from the outlets behind each laundry machine to the machines.
- 5: 49er technician will be responsible for coordinating with the laundry equipment installer to bring the contractor installed Belden 8723 cables into each laundry machine and make the appropriate connections within each machine.

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6: 49er technician will be responsible for bringing the laundry room 49er card controller on line. And to also coordinate with the laundry equipment installer to test each machine tied to the reader for proper operation.

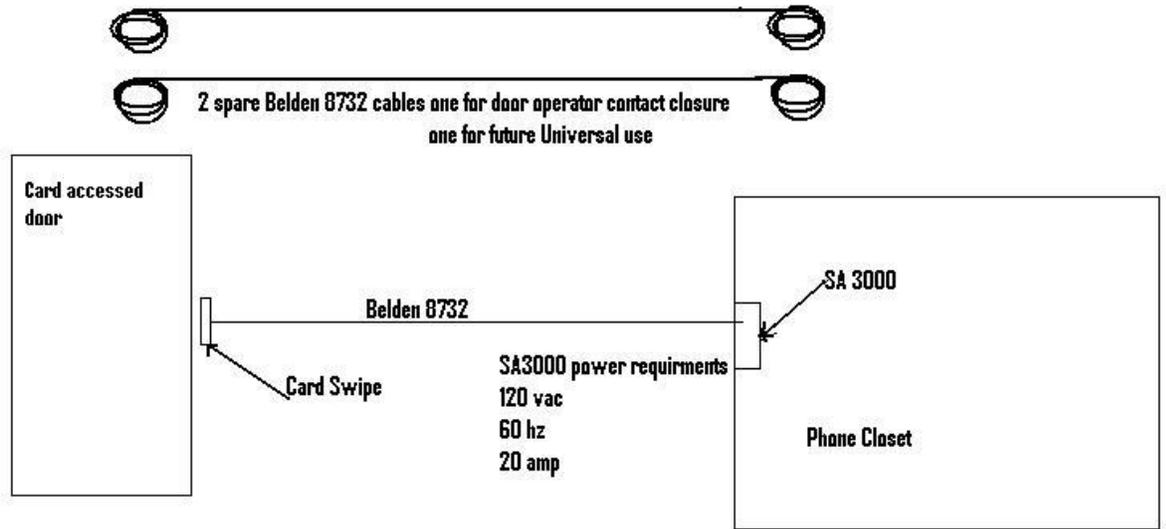
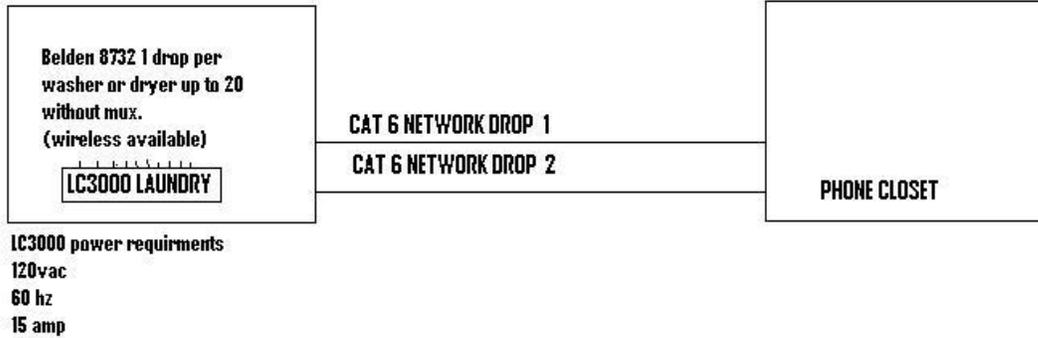
If a machine will not operate properly and the trouble is deemed to be in any contractor installed portion as required in contractor responsibilities. It will be the responsibility of the contractor that performed the install of the component to repair. The 49er technician will be available to test after repairs have been made by contractor.

**VENDING and CASH REGISTERS (at all locations):**

Vending (Snack, Drink) use a regular CAT 6 jack but require the data and 120 v receptacles be 78" AFF. The readers are pre mounted in each vending machine by the vending machine providers. The cash registers are installed by the 49er technician where required on any specific project and should be coordinated with the 49er Card Office.

## Drawings for Bb Laundry and Secure access Wiring

Illustration #1



Note: SA3000 mounted in Phone closet to aid in conversion to Universal

Belden

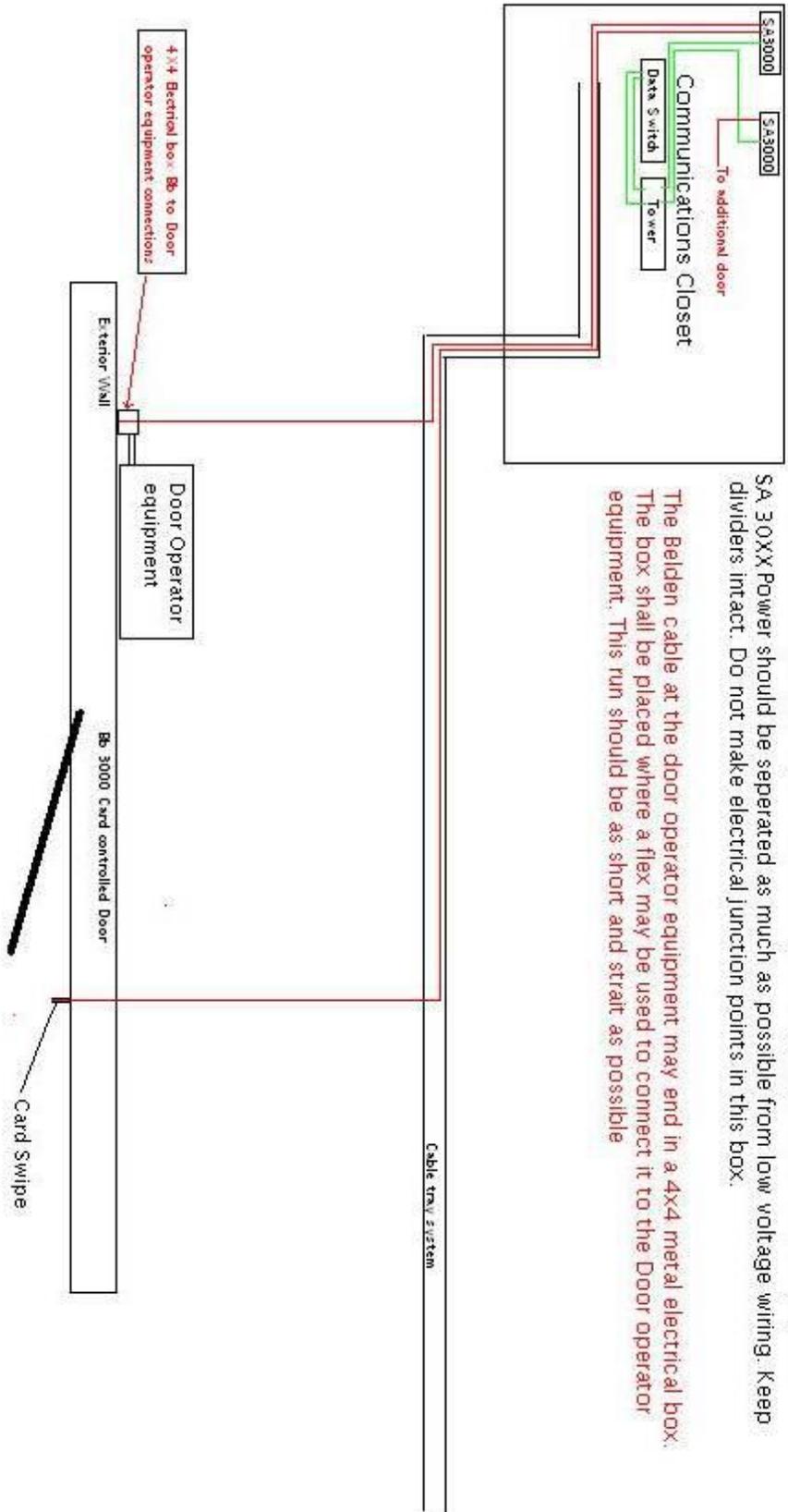
## Bb Door Access SA30XX

Block diagram

## Illustration #2

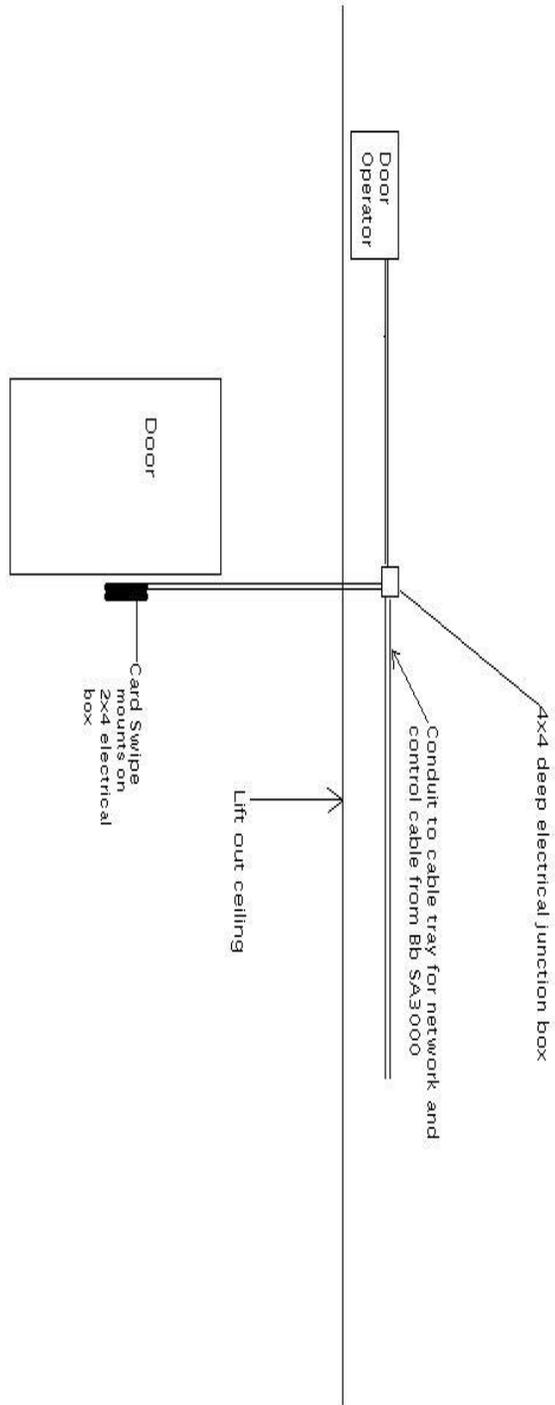
Green = Campus Network, Cat 6 cable 25x.  
 Red = Belden 9723, 5502UE or equivalent (400' max.)

Note; all card swipes must be installed ADA compliant access and height  
 Conduits must be installed, where necessary for support, back to Cable Tray System.  
 SA 30XX Power should be separated as much as possible from low voltage wiring. Keep  
 dividers intact. Do not make electrical junction points in this box.  
 The Belden cable at the door operator equipment may end in a 4x4 metal electrical box.  
 The box shall be placed where a flex may be used to connect it to the Door operator  
 equipment. This run should be as short and strait as possible



SA3000 Door Access

**Illustration # 3**



**SA3000 INSTALLATION**

Illustration #4

**Mount the Power Supply/Enclosure**

- 1 Protect Power Supply from debris while mounting the enclosure.
- 2 Remove knockouts from the Enclosure that will be used for wiring.

*AC Power should enter the Enclosure's upper-left corner to help provide 1/4" separation from other wiring.*

- 3 Secure the Enclosure to a wall using hardware appropriate for the wall material.

*Mounting holes accept up to 1/4" hardware.*

**Install Conduit and Pull Wire**

- 1 Install conduit from Controller for Power, Card Readers, Door Accessories, and network communications.
- 2 Pull wire through conduit.

**Connect Power to Power Supply/Enclosure**

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*Disconnect external AC power when installing any wiring.*

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*Connect to 120 VAC @ 60 Hz. Connect only to a 20A maximum branch circuit protection or equivalent.*

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- 1 Strip back the insulation on the AC wire .28" so no bare wire is exposed when installed in the AC terminal block.
- 2 Install the appropriate wires into the AC terminal block, as shown in Figure 4, and tighten the screws to 5 - 7 in-lbs.
- 3 Re-connect external AC power.

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*Maintain 1/4" separation from AC wiring to other wiring.*

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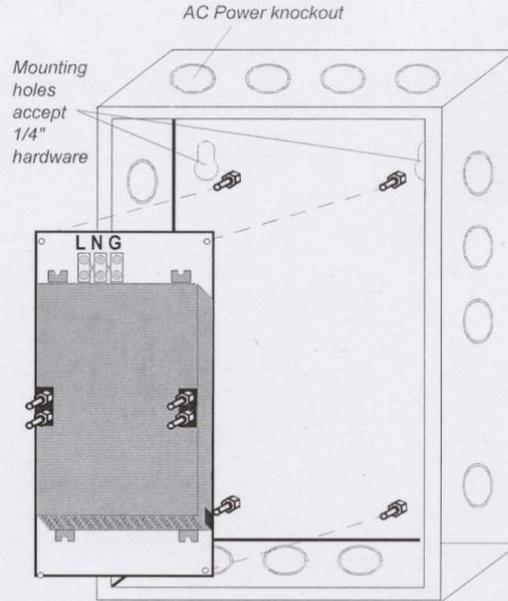


Figure 3: Power Supply Installation

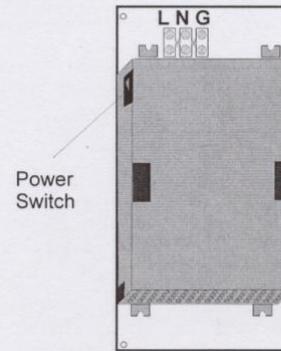


Figure 4: Power Supply Assembly

## LC3000 LAUNDRY READER INSTALLATION Illustration #5

The LC3000 Laundry Reader must be mounted on a wall in a location that is convenient to cardholders and wiring requirements.

### LC3000 Mounting Location Considerations

- 120 VAC power availability  
*Connect to 120 VAC @ 60 Hz. Connect only to a 15A maximum branch circuit protection or equivalent. Use a circuit breaker or switch to disconnect power when installing or removing the LC3000.*
- Network communications availability (RS-485 or 10/100 Base T)
- Wiring distance limitations
  - RS-485 Communications 4000' total per loop
  - 10/100 Base-T Communications 300' from the network switch port
- Ease of cable routing to laundry machines (if wired configuration)
- Installation height regulations
- Cardholder convenience

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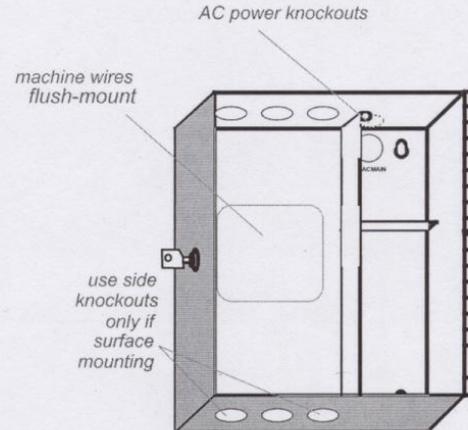
*Mounting hardware required: .25" appropriate to surface.*

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### Prepare Enclosure

The Reader can be mounted flush to the wall with wiring behind the wall; or it can be surface-mounted with wiring in conduit exterior of the wall. Before mounting the enclosure, remove knockouts necessary for routing wires and/or attaching conduits. Remove only the knockouts required for your installation.

- AC power knockouts accept 1/2" conduit fittings.
- All other knockouts accept 3/4" conduit fittings.  
**Flush-mount:** route machine wires, if wired, through the 3" x 3" cutout.  
**Surface-mount:** Remove conduit knockouts on the top and bottom of the enclosure for routing wire to machines.
- Two power knockouts are provided in the upper right.  
**Flush-mount:** Remove the knockout on the back side.  
**Surface-mount:** Remove the knockout on the top.



**FIGURE 3:** Mounting & Knockouts

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**Install the LC3000 Enclosure**

**Illustration #6**

- 1 Inside the LC3000, remove the power supply cover to access the upper right mounting hole.  
*Protect power supply from debris while mounting the enclosure.*
- 2 Secure enclosure to a wall using hardware appropriate to wall material.  
*Mounting holes accept up to 1/4" hardware.*

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*Disconnect external AC power when installing wiring.*

---

- 3 Strip back insulation on AC wire .28" to prevent bare wire exposure when installed in AC terminal block.

- 4 Install wires into the AC terminal block as shown in Figure 5, tighten the screws to 5 - 7 in-lbs., and replace power supply cover.

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*Ensure 120VAC wiring is confined within power supply compartment when cover is reinstalled to maintain UL compliance.*

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- 5 Reconnect external AC power.

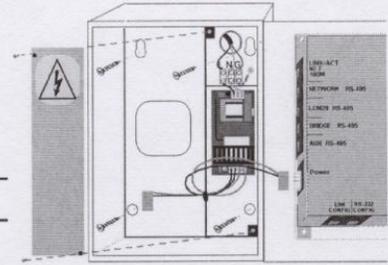
- 6 Connect to Network.

*The LC3000 provides for both 10/100 Base-T, TCP/IP and RS-485 BbTS network connections.*

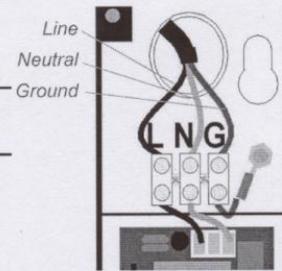
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*Once you connect the LC3000 to the network, configure the LC3000 for the network (LC3000 Laundry Reader Configuration (page 7).)*

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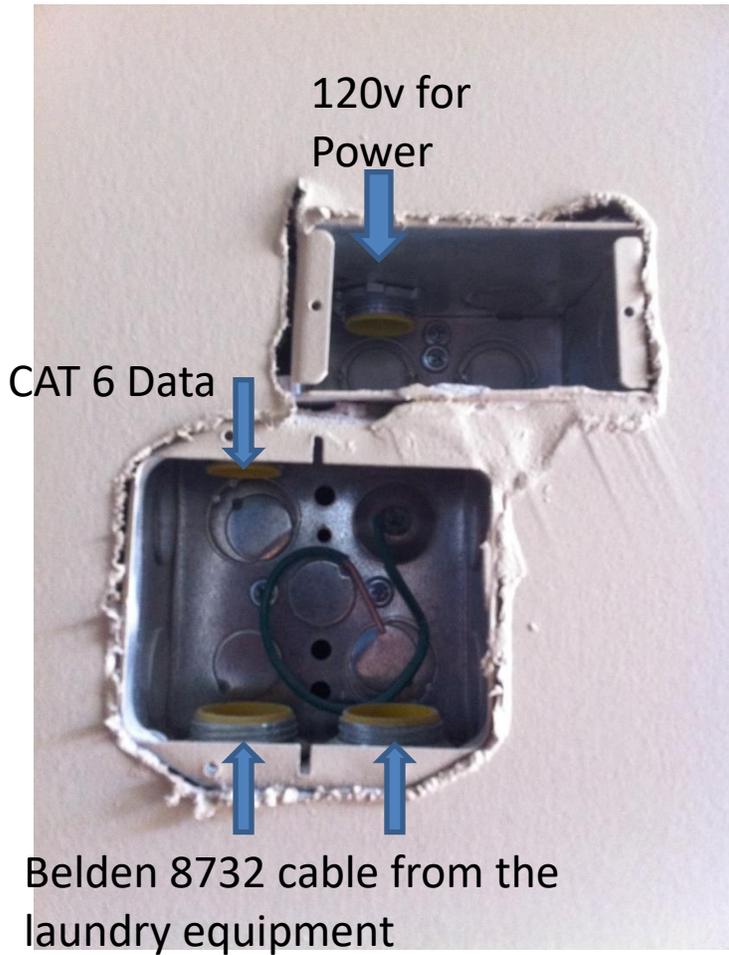
**FIGURE 4:** Power Installation



**FIGURE 5:**Power Connections

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Conduit and box layout behind the LC3000 laundry controller  
Installed to comply with ADA standards



LC3000 installed over the conduit



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LFNC conduit from wall to laundry machine



## Bb Laundry Center LC30XX

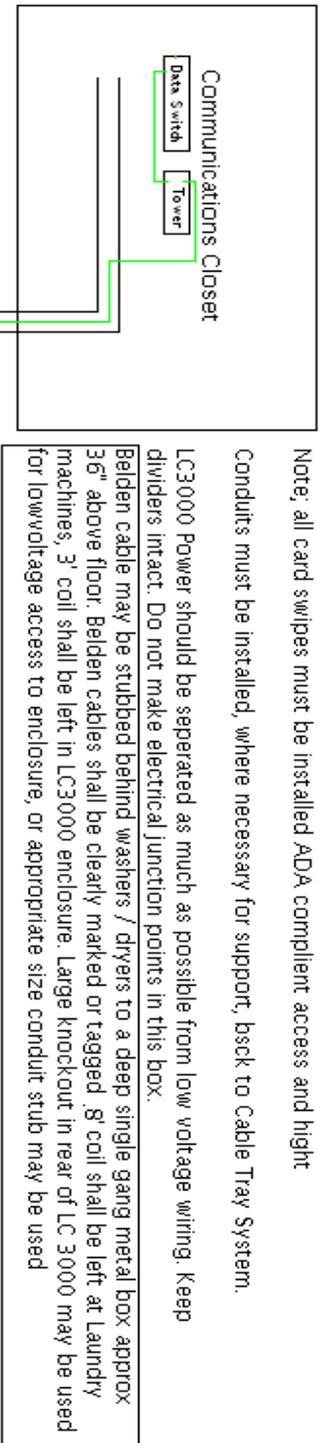
## Illustration #7

Block Diagram



Green = Campus Network Cat 6 cable 25% per Laundry Center

Red = Belden 8723, 5502UE or equivalent (400' max.)

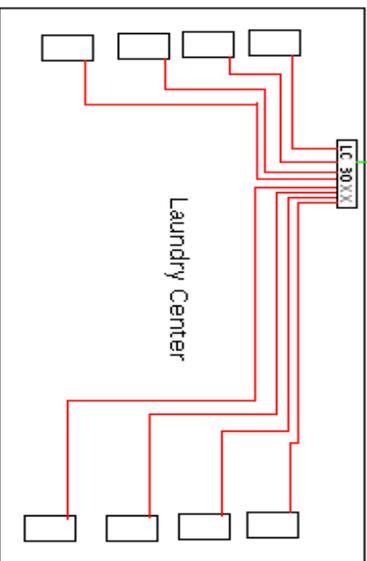


Note: all card swipes must be installed ADA compliant access and height

Conduits must be installed, where necessary for support, back to Cable Tray System.

LC3000 Power should be separated as much as possible from low voltage wiring. Keep dividers intact. Do not make electrical junction points in this box.

Belden cable may be stubbed behind washers / dryers to a deep single gang metal box approx 36" above floor. Belden cables shall be clearly marked or tagged. 8' coil shall be left at Laundry machines, 3' coil shall be left in LC3000 enclosure. Large knockout in rear of LC 3000 may be used for lowvoltage access to enclosure, or appropriate size conduit stub may be used



## Exterior Views

Installed to comply with ADA standards



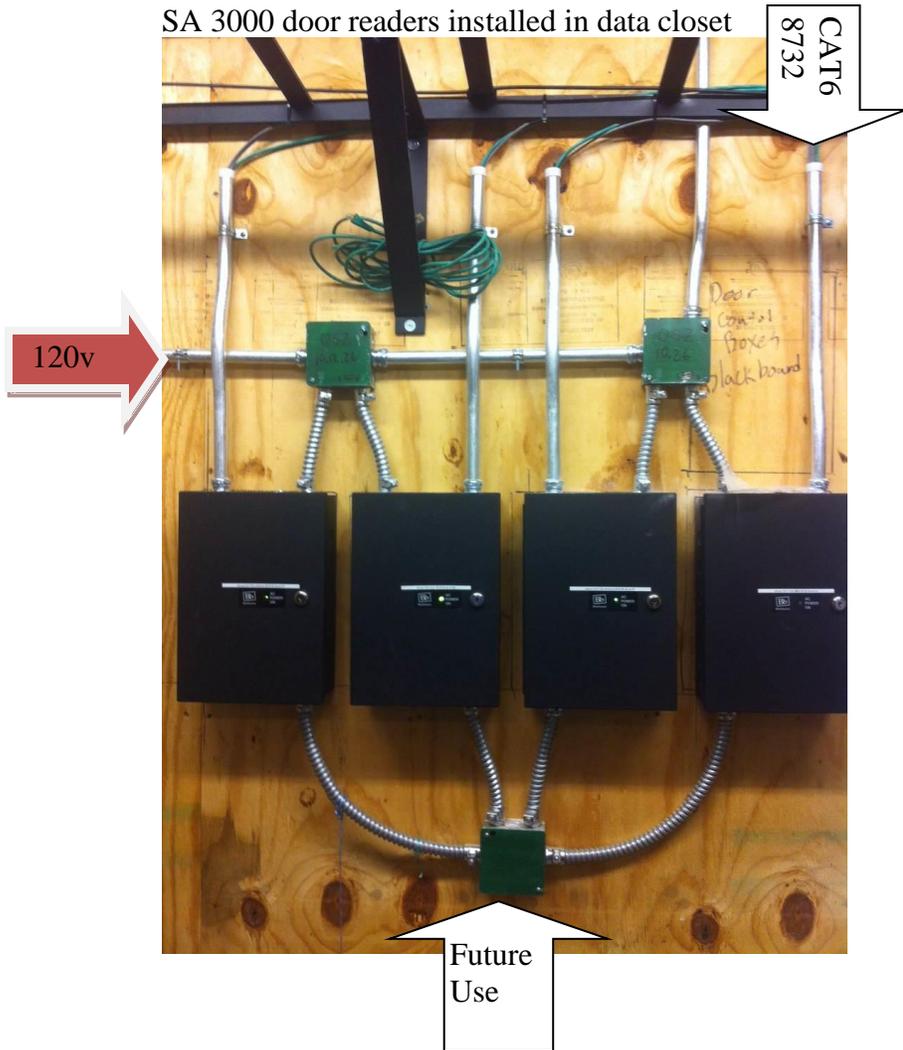
Exterior door swipe Belden 8732 control wire

Completed installation



Interior in data closet

SA 3000 door readers installed in data closet





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