

# WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS

## DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

### SECTION 282500 – ELECTRONIC CARD ACCESS CONTROL SYSTEM/SPECIFICATIONS

#### PART 1 - GENERAL

- 1.1 Any deviances from the following instructions must be approved during design by WVU Facilities Management Personnel.
- 1.2 DEFINITIONS
- A. Information Technology Services (ITS)
  - B. University Police Department (UPD)
- 1.3 This document is the General Design Guidelines and Specifications for the WVU Electronic Card Access Control System. It is intended to address issues that relate directly to access control installations.
- A. Introduction
    - 1. The WVU card access system for electronic locks is a one card system by CBORD called CS Gold utilizing Mifare DesFire EV1 cards with magnetic stripes. This system is under the administration of ITS.
  - B. Qualifications
    - 1. All General Contractors and their subcontractors working on campus shall meet the following qualifications at a local level and must submit evidence accordingly. The General Contractor shall have:
      - a. Licensed Electricians to install all the CBORD equipment, conduit, power supplies, and work boxes with terminal strips. Photocopy of license shall be submitted with response package.
      - b. Certified/Licensed Low Voltage Electricians working with low voltage to pull wires and make all final connections. Photocopies shall be submitted with response package as proof of Certification/Licensing. The following are accepted by WVU as proof:
        - 1) Copy of Company certificate stating Low Voltage Electrician being certified.
        - 2) Copy of West Virginia Stat license in Low Voltage
        - 3) Documentation of training course completion
  - C. General Requirements and Notes
    - 1. WVU has obtained and installed the CBORD server software, database and licensing exclusively. The University has completed installation of door access hardware components at existing campus locations. The CBORD system has been established in a decentralized manner where the departments administrate and monitor assets that they own and the database/server/software configuration are administrated by ITS. The WVU ITS and WVU Facilities Management Lock Shop will have final approval of door hardware, wiring, and electronic devices/controllers used in construction where work has been subcontracted to 3<sup>rd</sup> parties. ITS will specify what CBORD

# **WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS**

## **DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

equipment is used. It is the intent of WVU to empower General Contractors or Subcontractors to have primary responsibility of access control installations in accordance with these specifications and guidelines.

- a. All CBORD equipment must be purchased directly from CBORD to prevent future service fees. WVU will no longer accept the purchase of CBORD material from Schlage or any other distributor.
2. It is the responsibility of the bidder/General Contractor to generate an equivalent equipment list prior to bidding or installation that denotes exception taken with door hardware schedules, components or designs being used with may hamper their ability to provide a secure and compliant access control product.
3. WVU ITS, Facilities Planning, Design & Construction Services, General Contractor, and the Architect will review designs for access control on new construction and existing structures.
4. A final door walkthrough will take place with the General Contractor, ITS and Lock shop representative, project managers and customer prior to acceptance of any access control work. All doors must be functioning properly in the field as well as within the access control software.
5. Coordination and hardware review meetings will be setup by the design firm, between the WVU ITS, Lock Shop representative, the door hardware consultant and the access control designer prior to bidding of projects.
6. WVU Facilities Management Lock Shop and WVU ITS shall review all submittals related to electronic card access system in conjunction with the architect.
7. Electronic card access control system shall be utilized on all exterior doors, data closets, main janitorial support area, mechanical rooms (rooms that contain Air Handling Units, Pumps, Boilers, etc.), and mechanical penthouse for new construction and major renovation projects.
8. WVU requires at a minimum that all exterior doors be prepped with card access or electronic door position monitoring.
9. All locks must be keyed into the University existing Great, Great Grand Master key system and WVU Lock Shop will provide this information.
10. Consider prepping for Video surveillance System by running conduit and placing junction boxes for future camera installation. The UPD is responsible for assessing and approving the locations of all access control devices. UPD determines the feasibility of the location of equipment and advises on the needs related to equipment. UPD is responsible for monitoring and responding to all University access control and security issues. UPD reviews all phases of the access control documentation for compliance with device locations and standard equipment.
11. Project Manager will make a request for temporary consultant contractor ID card from WVU ITS. Contractor will go to ITS to take his/her picture and obtain temporary ID card.

### D. Base Specifications

1. The system shall fully and completely integrate with the WVU's door access system purchased from CBORD.
2. Allow proper egress in emergency situations such that no special knowledge or card is required to exit a space.
3. Must comply with WVU ADA Standards.
4. All hardware mounted in exterior locations shall be weather resistant and designed to maintain the aesthetic beauty of the campus. The finish of the access control hardware should match the finish of the other door hardware.
5. Hardware must be durable enough to withstand high traffic locations without frequent failure.

**WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS**  
**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

6. All 24V wiring runs for CBORD and locking equipment shall be no more than 200 feet.
7. All data wiring runs from CBORD to the door shall be no more than 2000 feet.
8. All aluminum door stiles shall be 5' wide.
9. Run data lines and electrical wires in separate conduit.
10. Upon finishing the job, the General Contractor should properly label panel boards marking what power supply and locks it controls.
11. Upon finishing the job, the General Contractor should properly label the power supply for locks marking which room it controls.
12. Follow manufacturer's installation guidelines.

E. Reference Standard

1. Finish Hardware – Division 08, Section 087100

**PART 2 - PRODUCTS**

2.1 WVU ONLINE AND OFFLINE LOCKS

A. WVU uses the following online locks for securing outside and inside doors

1. Exit devices (panic bars) Rim type devices
2. Mortise Locks
3. Cylindrical Locks
4. Magnetic Locks (retrofitting only)
5. Electric Strikes (retrofitting only)

2.2 DOOR LOCKS & CBORD STANDARDIZED HARDWARE

A. The following hardware is the required hardware for access control integrations. These are commonly used and stocked by the University Warehouse for the campus maintenance contract. Door and locking hardware substitutions for CBORD will be brought to the attention of the ITS and Lock Shop for approval.

1. Controllers: CBORD Components
  - a. V-1000
  - b. V-100
  - c. V-200
  - d. V-300
  - e. RS485 PIM
  - f. RS485 Hub
  - g. BLE Gateway for NDE and Control Locksets (GWE)
2. Readers: CBORD
  - a. AD300/AD400
  - b. NDE/LE
  - c. MTMS15/MTMSK15

# WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS

## DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

### 2.3 LOCKS

- A. The following are WVU standard locks used in online card swipe locks. All locks are 24 V, US26D is the standard finish. All locks and cylinders must accept Best 7 pin cores TB keyway. All locks must meet all codes for the opening. All Locks must have RX & LX options.
1. Panic Bars and Trims
    - a. Sargent 8800/8888 series with ETJ trim
    - b. Von Duprin 99 with #03 lever
  2. Mortise Locks
    - a. Sargent 8200 series with LNJ trim
    - b. Schlage L series with #03 trim
  3. Cylindrical Locks
    - a. Sargent 10 line with LNJ lever
    - b. Schlage D series with TRL lever
  4. Lock Manufacturers
    - a. Panic Bars
      - 1) Von Duprin 98/99 Series
      - 2) Sargent 8800/8888 Series
    - b. Mortise Locks
      - 1) Sargent 80 Series
      - 2) Schlage L Series
    - c. Cylindrical Locks
      - 1) Sargent 10 Line
      - 2) Schlage D Series
- B. All locks and locking devices must have Request To Exit (REX). REX switches will be built-in to locking devices and door locking hardware on all new construction and when possible on existing structures. If REX switches are not built into lock, surface mount Bosch #DS 150i REX.
- C. Electric Strikes: this option is used only in retrofitting situations and not in new construction.
1. Sargent HES 9500 LBSM Series for Panic Bars
  2. Strikes for Mortise (1006 LBSM Series) and Cylindrical Locks (7000 or 7500 LBSM Series)
  3. Magnetic Locks: All Magnetic Locks should be Schlage and must have Magnetic Bond Sensor (MBS), Door Position Sensor (DPS), and Relock Time Delay (RTD).
- D. Electric Power Transfer
1. Securitron (Sargent) #cept-10
  2. Von Duprin #EPT-2 or -10

# **WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS**

## **DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

3. Electrical Hinges must be 8 wire hinge and used only in retrofitting situations
- E. Power Supplies and Batteries must be 12 amperes
1. Power supply for locks only: perform calculations based on how many doors should be connected to a single power supply. It cannot max 60% of the power supply.
    - a. Altronix # AL1012ULACMCB
    - b. 12 hour battery backup
  2. Altronix Batteries
    - a. Altronix BT 12/12 12VDC/12AH
    - b. [www.altronix.com](http://www.altronix.com)
  3. Power Supply for locks only: perform calculations based on how many doors should be connected to a single power supply. It cannot max 60% of the power supply.
    - a. Altronix # AL1024ULACMCB
    - b. 12 hour battery backup
- F. Relays
1. Altronix Relay
    - a. Altronix RB1224
    - b. Altronix RBR1224
    - c. [www.altronix.com](http://www.altronix.com)
- G. Closing Devices
1. LCN Closers
    - a. LCN Series surface mount closers 4040 Series
    - b. <http://www.lcnclosers.com>
    - c. ADA closer low energy LCN 4600 series unless otherwise required by application
  2. Sargent 281 or 351 Series
- H. Cabling
1. Belden 6120 UL, 14 AWG
  2. Belden 6306FE, 8 Conductors
  3. Belden 6302FE, 4 Conductors
  4. Electrolynx QC-C300 (All connections need to be company, plug-in, or tab connections)
  5. Electrolynx QC-C1500 (All connections need to be company, plug-in, or tab connections)
- I. Emergency Push Button Covers w/Horn (must have timer)
1. Safety Technology Incorporated (STI)

# **WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS**

## **DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

### J. Network Topography

1. WVU uses a star configuration with each access/alarm point being a 'home run' back to the access control panel from the junction box located above the door. The cabling between the junction box and the access control panel will be the cabling outlined in section 4.10. All communication and power to the individual doors will come from the access control panel location. An exception to this will be made when specific hardware requires a localized power supply. When possible a trunk conduit/raceway should be established in common hallways to accommodate multiple 'home run' composite cables.

## **PART 3 - EXECUTION**

### 3.1 Installation Requirements

#### A. Controllers

1. Panel and any network device server will be wired through power supply with battery backup.
2. Power is to be hardwired to access control panels.
3. Access control panel and power supplies will be on isolated circuit(s).
4. Circuit from Fire Alarm panel to each access control panel.
5. Access control panels are to be installed in network or electrical closets that are between 42 degrees and 120 degrees F.
6. Each panel will be named according to the WVU ITS posted outside the panel door.
7. Each panel will have a list of readers (university door numbers) connected to it located inside the panel.
8. Installation of network connection drop is to be coordinated through ITS. Drop termination is to be inside of access control panel to prevent tampering.
9. The MAC address and IP address for each panel/device will be posted on the outside panel door (Provided by ITS)
10. IP addressing information can be obtained by contacting the WVU ITS.
11. All panel boxes are to have functioning locking hardware with keys. Keys will be submitted to the WVU ITS upon completion of install.
12. Necessary devices will be password protected.
13. All access control panels and unused conduit are to be removed prior to installation of new access control panel(s) (retrofitting only).

#### B. Wiring and Conduit

1. All communication and power to the individual doors will come from the access control panel location. An exception to this will be made when specific hardware requires a localized power supply. When possible a trunk conduit/raceway should be established in common Hallways to accommodate multiple 'home run' composite cables.
2. All wiring run will 'home run' from door junction box to control panel location.
3. Devices must be hardwired, with all wiring installed in conduit in accordance with National Electrical Code (NEC) and written University standards for conduit and system installation for class 2 fire protection, signaling control devices.
4. Wire connection to the access control panel are to be clearly labeled.

**WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS**  
**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

5. Wiring which contacts metal edges will be buffered with bushings or rubber grommets to prevent damaged wires and shorts. Examples include wiring meeting conduit ends, panel and junction box holes.
6. Conduit must be strapped within 24" of junction boxes.
7. All junction boxes must be covered and contents labeled when appropriate (ex. Junction box with relay for handicap button).
8. Junction boxes must match device being mounted.
9. Both setscrew conduit fitting and Compression fitting are allowed.
10. Minimum conduit size is ¾ inch.
11. Conduit can be 40% full of square inch capacity
12. The conduit system and cabling installed must be distinct and separate from the wire way/conduit system housing voice/data cables in campus buildings.
13. Connections to devices must be secured, so that no cords may be easily disconnected from the devices and no cords are left exposed to unauthorized tampering.
14. All low voltage wiring cable to be plenum rated, stranded, and color coded.
15. Wire nuts are not permissible. WVU prefers crimp connectors.
16. Crimp connectors should be installed with appropriate crimping tools.
17. All wiring shall be installed in a protective housing such as conduit or wire mold.
18. When necessary use cable ties to bundle cables.
19. Use the attached wiring chart for ElectroLynx systems.

C. Door & Frames:

1. Prepped door frames shall have continuous conduit from junction box above door frame to termination box in frame.

D. Header Mounted Door Position Switch:

1. Door switches will be flush mounted on the door header from the strike side of the doorframe approximately 4" from Jam.
2. Surface mount switches will have armored cable between the switch and the cable entrance hole in the door.
3. The holes for flush mounted door switches must be drilled the exact size for the switch being used. A tight friction fit must be achieved.

E. Door Hardware

1. Door hardware will be fail-secure with mechanical manual egress from the secured side unless fire spec says it needs to be fail-safe.
2. Door switching and power will reside in the access control panel location. In the case of an electrified exit device (such as a Von Duprin EL crash bar) power supply is to be located no more than 50 feet from door.
3. Power supply will be connected to building emergency circuits when possible
4. Power supplies will have a 12amp hour battery backup or higher.
5. Facilities Lock Shop and ITS will be notified of location of power supplies when located away from access control panel via As-Built drawings.
6. No more than 65% Amps in power supply with exit devices per independent 24v power supply.
7. Request to exit switches will be built-in to exit devices and door locking hardware on all new construction and when possible on existing structures.

**WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS**  
**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

8. Door hardware is to be set so that 'dogging' functionality is not possible.
9. Door hardware will have key override and capable of accepting small Best format interchangeable core.
10. Door hardware power supplies will have locking junction box.

F. Readers

1. Door access readers must read an identifying number from the University ID card.
2. The ITS should be consulted during design to identify the appropriate type of readers used for the location. Readers will never hang or have overlapping edges from the device that they are mounted on.
3. Handicap operator will be wired so that a valid card reader enables push button. Multiple relays including a timer relay are required for this configuration (see diagram).
4. If the card reader uses a RJ 11 termination, the cable run should be stripped and terminated in RJ 11 connector per manufacturing instruction instead of using the enclosed pig-tail.

G. Plans

1. Drawings and Specifications

- a. The Access Control System shall have dedicated detail drawings in Section E of the construction plans. The detail drawings shall include:
  - 1) Control panel location
  - 2) Security door matrix which includes door number, door size, hardware set/schedule, location, and drawing number.
  - 3) Door detail and elevation for each security door (Examples are located in sections 7.3 & 7.4)

H. Process

1. WVU ITS will be responsible for software programming. Programming work shall be coordinated with WVU ITS in advance of project completion.

I. Building Requirements

1. Campus network is used for connectivity. WVU ITS makes a request for several ports. ITS provides the right port and Contractor runs a patch cable from the port.

**END OF SECTION 282500**