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Foreword

Keyscan systems are designed for use in various environments and applications. As such, care must be exercised to ensure proper cable, power, ground, and environment specifications are followed for reliable and safe operation of the equipment.

Approved Standards

Keyscan CA 200, CA 4000 and CA 8000 access control units conform to the following approved standards:

- UL STD 294 – Access Control Systems Units
- CSA STD C22.2 No. 205-M1983 – Signal Equipment

Product Listings

The certification record can be viewed at http://directories.csa-international.org.
Enter 110441_0_000 in the File Number box.

About This Guide

This Technical Guide is designed to provide general information for installing Keyscan access control systems. This guide assumes the installer has knowledge of electrical, electronic, mechanical, and computer concepts, as well as having familiarity with access control systems and associated components. The guide is divided into 4 sections:

- Requirements
- Installation Guidelines
- Mounting and Connecting System Components
- Appendices

We have tried to organize the technical guide in a manner that allows for quick referencing based on installation tasks with pertinent diagrams.
Requirements

The following is a review of power, cable, and ground requirements for the access control system.

Power

Each access control unit requires two dedicated Class 2 transformers. The following transformers are acceptable:

- 16V 40VA transformer
- 16.5V 37VA transformer

Any deviation from a specified transformer or the use of a single transformer to power multiple access control units will cause faulty system operation. All warranties are voided if non CLASS 2 transformers or incorrect voltages are used.

Standby batteries with their duration times for access control and reader power are listed on page 18.

Important

The power supply included with each access control unit is for the exclusive use of the ACU circuit boards and the readers. It should not be used to power external devices such as door strikes or magnetic locks.

Electrical Precautions

Be sure that all circuit breakers powering the system are switched off before commencing installation or modifying wiring connections. Do not apply power before the installation is completed otherwise damage to the equipment may result. Connect earth grounds to all enclosures ensuring proper and safe operation of the system.

Tools

We recommend having the following tools on hand to complete the installation of the access control system:

- Digital Voltmeter
- Wire Cutters & Needle Nose Pliers
- Soldering Iron & Tape
- Set of Screwdrivers
- Drill & Drill Bits
- Laptop Computer (optional)
Cables

The following table outlines system cable requirements. Please be sure to review grounding guidelines for safe system operation. Avoid running access control system cables parallel with AC wires or across florescent light fixtures. This can cause AC induction or transmission interference.

<table>
<thead>
<tr>
<th>Standard Device Wiring</th>
<th>Signal Protocol</th>
<th>Maximum Distance</th>
<th>Cable Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readers to ACU</td>
<td>Wiegand</td>
<td>500 ft 152.4 m</td>
<td>3 pairs shielded 22AWG</td>
<td>Overall shielded cable accepted. CAT5 cable not acceptable with Wiegand signal protocol.</td>
</tr>
<tr>
<td>(includes HID iClass – Rev B)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exception Readers to ACU –</td>
<td>Wiegand</td>
<td>500 ft 152.4 m</td>
<td>3 pairs shielded 18AWG</td>
<td>Overall shielded cable accepted. CAT5 cable not acceptable with Wiegand signal protocol.</td>
</tr>
<tr>
<td>PX-620, HID-5375, MR-10, MR-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20, HID-iClass (Rev A), and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>elevator readers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door Strikes &amp; Electro</td>
<td>n/a</td>
<td>500 ft 152.4 m</td>
<td>1 pair 18AWG</td>
<td>Shielded wire not required.</td>
</tr>
<tr>
<td>Magnets to ACU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contacts &amp; Exit Devices</td>
<td>n/a</td>
<td>500 ft 152.4 m</td>
<td>1 pair 22AWG</td>
<td>Shielded wire not required.</td>
</tr>
<tr>
<td>Motion Sensors (PIR)</td>
<td>n/a</td>
<td>500 ft 152.4 m</td>
<td>2 pairs 22AWG</td>
<td>Shielded wire not required.</td>
</tr>
<tr>
<td>CB-485</td>
<td>RS485</td>
<td>2000 ft 609 m</td>
<td>CAT5 – 2 twisted pairs</td>
<td>Maximum distance @ 9600 BPS between units</td>
</tr>
<tr>
<td>CB-485M</td>
<td>RS485</td>
<td>2000 ft 609 m</td>
<td>CAT5 – 3 twisted pairs</td>
<td>Maximum distance @ 9600 BPS between units</td>
</tr>
<tr>
<td>CPB-10 (9600 baud)</td>
<td>EIA/TIA-562</td>
<td>2000 ft 609 m</td>
<td>4 conductors shielded 22AWG</td>
<td>Overall shielded cable accepted. CAT5 cable not acceptable with EIA/TIA-562 signal protocol. Maximum distance between units. Overall maximum is 4000 ft (1219.2 m)</td>
</tr>
<tr>
<td>Not recommended for use with</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rev. 11 boards.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPB-10 (19200 baud)</td>
<td>EIA/TIA-562</td>
<td>200 ft 61 m</td>
<td>4 conductors shielded 22AWG</td>
<td>Overall shielded cable accepted. CAT5 cable not acceptable with EIA/TIA-562 signal protocol. Maximum between units and overall distance.</td>
</tr>
<tr>
<td>Not recommended for use with</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rev. 11 boards.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACU/PC/Modem/CB-485/NETCOM/</td>
<td>RS-232 (9600 BPS)</td>
<td>100 ft 30 m</td>
<td>5 conductors shielded 22AWG</td>
<td>Overall shielded cable accepted. CAT5 cable not acceptable with RS-232 signal protocol.</td>
</tr>
<tr>
<td>CPB-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMMEX Extender Kit (PC</td>
<td>n/a</td>
<td>4000 ft 1219.2 m</td>
<td>CAT 5 - 2 twisted pairs</td>
<td>Shielded wire not required. Kit includes 1 transmitter &amp; 1 receiver.</td>
</tr>
<tr>
<td>Extender)</td>
<td></td>
<td></td>
<td>communication</td>
<td></td>
</tr>
<tr>
<td>WIEEX Extender Kit (Wiegand</td>
<td>n/a</td>
<td>4000 ft 1219.2 m</td>
<td>CAT 5 – 1 twisted pair</td>
<td>If powering transmitter locally, 18 AWG power wiring is not required. Kit includes 1 transmitter &amp; 1 receiver.</td>
</tr>
<tr>
<td>Protocol Extender)</td>
<td></td>
<td></td>
<td>communication. 1 pair</td>
<td></td>
</tr>
<tr>
<td>CWIEEX Extender Kit (Coax</td>
<td>n/a</td>
<td>500 ft 152.4 m</td>
<td>RG59U</td>
<td>Coax cable required. Kit includes 1 transmitter &amp; 1 receiver.</td>
</tr>
<tr>
<td>Extender)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Grounding

Ground all access control units and shielded cables to a cold water pipe. For multiple access control units, all shielding should be connected to a single point earth ground.

It is important to ground the shields of the readers and communication cables to a single point cold water pipe at the access control panel. Failing to ground the shields or using incorrect cables may cause noise or interference and result in improper card reads.

Figure 1 - Grounding Access Control Units and Cables with CB-485s

Note
Connect ground lug to single cold water pipe ground point

Note
CB-485’s support linear topology only. Do not connect using star topology.
Figure 2 - Grounding Access Control Units and Cables with CPB-10s

Note
Connect ground lug to single cold water pipe ground point

Reader

Tape back travel shield

Wiegand Reader Signal

ACU 1

Earth GND on ACU Power Terminal

Main Circuit Board

CPB-10

G T R G R T B

Shield

ACU 2

Earth GND on ACU Power Terminal

Main Circuit Board

CPB-10

G R T B

Shield

ESI/TIA-562

ACU 3

Earth GND on ACU Power Terminal

Main Circuit Board

CPB-10

G R T B

Shield

RS232

40-2322 Data Cable

Tape back shield

Tape back shield at end of line
General Installation Guidelines

Mounting Access Control Units and Components

Identify and mount all hardware including access control units and power supplies in a convenient and suitable location. Do not mount access control units close to high voltage equipment. Comply with all local and regional codes.

Each access control unit requires two dedicated Class 2 transformers. The following transformers are acceptable:

- 16V 40VA transformer
- 16.5V 37VA transformer

Record the serial number and the model number listed on the ACU’s main circuit board. The serial number is a required entry in the Client software.

Mounting Readers and Door Hardware

Install all door hardware. Be sure to position readers on the door latch side and at a convenient height. Using a battery for power, ensure the door operates properly – alignment, holding, activation, de-activation – before connecting to the Keyscan access control unit. Where applicable, comply with all fire and safety codes for the installation of door strikes and magnetic locks.

If a door/reader is located beyond the maximum cable length to the ACU, use a Keyscan WIEEX Extender Kit to a maximum distance of 4000 feet (1219.2 m).

Cables

Run all cables between components. Label cables as they are installed. Do not connect cables at the ACU until all hardware has been tested and is operating correctly. Cable routes should avoid potential sources of electrical noise from fluorescent light fixtures, high voltage equipment, high voltage lines, and radio transmission equipment that may impede access control system communications.

Be sure to comply with proper cable types and do not exceed maximum distances.

Elevators

Elevator installations require licensed 3rd party technicians. Not all readers operate properly in elevators. Use suitable readers.

Terminate Wiring at the ACU

Terminate reader, lock, input, elevator floor, and elevator input wiring to the designated input terminals on the appropriate ACU circuit boards.
All Keyscan circuit board relays use Form C contacts rated at 5 Amps, 24VAC or 32VDC maximum. Use a separate power supply for door locking devices. The DPS12 power supply included with ACU/ECU is intended for powering the circuit boards and readers.

Be sure to ground the shields of reader and communication cables to a single point cold water pipe ground at the ACU enclosure. See Grounding on page 12. Failing to ground the shields may result in incorrect card reads caused by noise or interference.

Jumpers

Keyscan factory defaults all circuit board jumper settings before they are shipped. As such no adjustments are required with the exception of momentarily shorting jumper J1 which is reviewed in the power up instructions. In the case of card reader retro-fits, however, you may have to adjust jumper settings so the circuit boards are in tune with system components.

Communication

Communication must be established between the personal computers (PCs) with the Keyscan software and the ACUs. Communication is divided into 2 segments:

- Single panel communication
- Multiple panel communication

Test the communication ports on the PC(s) before connecting to the access control system.

When the span between the PC and the ACU is greater than the maximum allowable cable distance, use a Keyscan COMMex extender kit.

Power Up and Test Voltages

Be sure that all necessary power supplies have been installed. The DPS12 power supply powers only the ACU main circuit board and the readers. A separate power supply must be used for door lock devices. Before applying power, verify all cable connections, ensure no short circuits exist when measuring voltages, and verify DC polarity is correct for all equipment.
Mounting ACUs/Circuit Boards/Power Supplies

The following sub-sections review mounting access control units, circuit boards, and power supplies:

- mounting the access control unit – page 16
- mounting power supplies – page 18
- mounting circuit boards – page 19

UL STD 294 and CSA STD C22.2

To be in compliance with UL STD 294 and CSA STD C22.2 standards, please adhere to the following practices:

- use the Keyscan enclosure with the CSA label on the inside of the panel cover
- mount circuit boards with the standoffs supplied
- secure the enclosure cover with the 4 screws supplied
- connect tamper switch to an auxiliary input on the main circuit board
- use Keyscan power supply DPS-12 to power access control unit and readers
- Keyscan power supply DPS-12 requires 2 x 16V 40VA transformers or 2 x 16.5V 37VA transformers
- transformers must be located within 30 feet (9.144 m) of Keyscan power supply DPS-12
- do not use Keyscan power supply DPS-12 to power door strikes or auxiliary equipment
- use standby battery with sufficient amp hours (minimum is 12V 7.0 Ah) connected to the Keyscan power supply DPS-12
- connect proper ground wire from ground lug inside enclosure to a cold water pipe ground (earth ground)
- connect the ACU enclosure ground strap to the designated studs on the ACU cover and ACU enclosure (CSA 22.2)

Any deviations or alterations will result in non-compliance of these standards.

Mounting the Access Control Unit

The ACU has 4 pre-drilled holes for mounting the enclosure to the wall. Connect the unit's ground lug to a true earth ground. Ensure the unit is not close to high voltage equipment and the cables will not exceed maximum distances when locating mounting areas. Door ACU models – CA 200, CA 4000, and CA 8000 – can be mixed and matched in one communication loop.
Stand Offs

Use the stand offs when mounting power supplies and circuit boards to the ACUs. Stand offs are pre-mounted on most power supplies and circuit boards. In cases where stand offs are not pre-mounted, insert the double pronged end of the stand off in the enclosure hole first. Then mount the circuit board to the stand offs.

Figure 4 - Stand Off
Mounting Power Supplies

A 13.5VDC dual linear regulated power supply rated at 2 x 1.2 amps maximum is provided to power the access control unit circuit boards and the readers. This power supply requires one of the following CLASS 2 CSA/UL approved transformers and a standby battery with sufficient amp hours.

- 2 x 16V 40VA
- 2 x 16.5V 37VA

The purpose of two transformers is to comply with UL STD 294 and CSA STD C22.2 and charge the battery circuit. The transformers must be located within 30 feet of the Keyscan power supply. All warranties are voided if non CLASS 2 transformers or incorrect voltages are used. The system may operate erratically if the voltage is lower than 12VDC.

Power supplies are mounted inside at the top left or bottom left of the ACU enclosure as shown on page 19. For power supply connections refer to Figure 78 on page 99.

The DC Common must be connected to a cold water pipe ground (earth ground).

**Important**

Do not use this supply to power door strikes or auxiliary equipment.

Select a battery with enough amp hours to operate the system for the total hours specified. The following table lists power duration times:

**Table 2 - Battery Duration Times**

<table>
<thead>
<tr>
<th>Amp-hour Battery</th>
<th>Amps</th>
<th>Power Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0</td>
<td>1.4</td>
<td>5.71 hours</td>
</tr>
<tr>
<td>7.5 *</td>
<td>1.4</td>
<td>5.36 hours</td>
</tr>
<tr>
<td>7.0 *</td>
<td>1.4</td>
<td>5.00 hours</td>
</tr>
</tbody>
</table>

* Indicates the two most commonly used backup batteries.
Mounting Circuit Boards

The following diagrams illustrate the mounting positions for access control models CA 200, CA 4000, CA 8000, EC 1000 and EC 2000 units. Illustrations also show mounting positions for communication boards and output control boards (OCB-8), where applicable.
Important
Do not mount access control units close to high voltage equipment.

Figure 6 - CA 200 with Circuit Board Mounting Positions

Front View - Cover not shown

Parts
1 x CA 230 circuit board
1 x OCB-8
1 x DPS-12 power supply
1 x metal enclosure

Figure 7 - CA 4000 with Circuit Board Mounting Positions

Front View - Cover not shown

Parts
1 x CA 4300 circuit board
1 x OCB-8
1 x DPS-12 power supply
1 x metal enclosure
Figure 8 - CA 8000 with Circuit Board Mounting Positions

Front View - Cover not shown

Parts
1 x CA 8300 circuit board
2 x OCB-8
1 x DPS-12 power supply
1 x metal enclosure

Figure 9 - EC 1000 with Circuit Board Mounting Positions

Front View - Cover not shown

Parts
1 x EC 1300 circuit board
1 x OCB-8
1 x DPS-12 power supply
1 x metal enclosure
Figure 10 - EC 2000 with Circuit Board Mounting Positions

Front View - Cover not shown

Parts
1 x EC 2300 circuit board
2 x OCB-8
1 x DPS-12 power supply
1 x metal enclosure

NETCOM or CB-485 or CB-485M or MC9600 or CPB-10

Wireless NETCOM antenna
Power Supply
Wireless NETCOM or NETCOM

Ground Lug
Optional OCB-8 Locations
EC2300 Main Circuit Board
OCB-8
OCB-8

Power Supply
Tamper Switch

1 x EC 2300 circuit board
2 x OCB-8
1 x DPS-12 power supply
1 x metal enclosure
ACU Enclosure Ground Strap

Ensure that the ACU Enclosure Ground Strap is connected to the designated studs on both the ACU cover and ACU enclosure. Be sure the cable lug is positioned between two star washers and securely tightened with a nut as illustrated in the diagram below.

Figure 11 - ACU Enclosure Ground Strap Connection

Use enclosed star washers and nuts to secure both ends of cable to studs as shown below.
Figure 12 - Securing the Enclosure Cover

Front View of Enclosure with Cover

Optional locations for cover locking screws

Cover Locking Screw
3/8" x 4

Optional locations for cover locking screws
Mounting Readers & Door Hardware

The following sub-sections review door components and related diagrams. Refer to the lock manufacturer's documentation for more detailed information on mounting door hardware. Some jurisdictions require a qualified locksmith for installation of lock hardware. Consult with local authorities.

- door lock hardware – page 26
- door contacts, exit buttons, auxiliary inputs – page 27
- readers – page 28

The following diagram shows a single conduit to the access control unit. For high voltage readers greater than 150mA, avoid running the communication cables in the same conduit with the door lock cables.

Figure 13 – Typical Door Layout
Door Lock Hardware

Consult with the manufacturer's documentation for mounting door lock hardware. For instructions on terminating the lock hardware connections at the access control unit, refer to Terminate Lock Wiring on page 29.

The lock must be appropriate for the barrier and meet all applicable fire and safety codes. If necessary, consult with local officials such as the fire department to ensure the installation conforms to municipal, state, or provincial safety regulations. Permits may be required before installing magnetic locks.

Use a battery for temporary power to ensure the door operates properly – alignment, holding, activation, de-activation – before connecting to the Keyscan access control unit.

Figure 14 - Typical Door Strike Connection

![Figure 14 - Typical Door Strike Connection]

Figure 15 - Typical Door Maglock Connection

![Figure 15 - Typical Door Maglock Connection]
Door Contacts, Exit Buttons, Auxiliary Inputs

The following diagram illustrates the door contacts, exit buttons, PIRs, and auxiliary inputs. See the manufacturer's documentation for mounting instructions. Avoid running cables parallel with AC wiring or across florescent light fixtures. This causes AC induction and transmission interference.

Figure 16 - Door Contacts, Exit Buttons, PIRs, & Auxiliary Inputs

Exit Push Button

PIR
RTE - 1/4 second pulse
(Request To Exit)

Auxiliary Input

NO = Normally Open
NC = Normally Closed
Readers

Never mount readers close to high voltage equipment. For convenient entry, readers should be mounted on the latch side of doors. When mounting proximity readers for monitoring in and out activity at the same door, space the readers at a distance greater than the combined radio signal read ranges.

As an example, if the read range is 4 inches, mount the two readers at a distance greater than 8 inches from each other.

For mounting readers to a metal surface, consult with the manufacturer's documentation.

**Figure 17 - Door Reader Connection**
Terminate Wiring at the ACU

The following sub-sections review terminating system wiring at the access control units:

- terminate lock wiring – page 29
- terminate input wiring – page 35
- terminate elevator floor wiring – page 40
- terminate floor input wiring – page 43
- terminate reader wiring – page 44
- terminate auxiliary outputs with hardware/alarms – page 46

Terminate Lock Wiring

A separate power supply must be used for door strikes and other 12VDC equipment. The power supply should have battery backup for continued operation during a power failure. When adding equipment to an existing system, be sure the power supply can withstand the increased current consumption.

To calculate total current requirements for power supplies, use the following formula which includes a 30% tolerance factor:

- Total Current = (Device A amps + Device B amps + Device C amps, etc.) x 1.30

Example

An installation calls for 1 magnetic lock and 3 door strikes requiring 12VDC:

Mag Lock 100mA + Door Strike A 200mA + Door Strike B 200mA + Door Strike C 200mA x 1.30 = 910mA

In this example, a separate 1-amp power supply is sufficient.

Important

The total current of the devices must not be greater than the current of the power supply.

Relay Status Jumpers

Relay boards have jumpers that may be set to “Normal” or “Reversed”. Each relay has an LED that indicates the relay status:

- Normal – LED on circuit board is not illuminated when door is locked
- Reversed – LED on the circuit board is illuminated when door is locked

Diodes are supplied with Keyscan access control panel(s). Diodes must be installed across all D.C. door strikes as shown in Figure 21 on page 33. The anode of the diode is connected to the positive side of the strike at the door. The cathode of the diode is connected to the common return wire.

Diodes must be installed for proper operation.
Fail Safe/Fail Secure Lock Devices

The power supply's positive output must be connected to the common door relay outputs, which are labeled on the relay board.

For ‘fail-safe’ and ‘fail-secure’ door strikes, observe the following relay connections:

- ‘Fail-Safe’ – Connect the positive terminal on the door strike to the ‘Normally Closed’ position on the board relay. Connect the return wire to the Common on the DC power supply via the ground lug on the ACU enclosure.
- ‘Fail-Secure’ – Connect the positive terminal on the door strike to the ‘Normally Open’ position on the board relay. Connect the return wire to the Common on the DC power supply via the ground lug on the ACU enclosure.

Figure 18 - Lock State - Fail Safe Device
Figure 19 - Lock State - Fail Secure Device

Warning
Before securing any exit, please ensure all wiring to electrical door hardware conforms to federal, state, provincial, or municipal fire and building codes.
Figure 20 - Terminate Lock Wiring CA 230

Output Control Board (OCB-8)

When OCB-8 connected to CA230
 Relay 5 = Aux Output 3 or HC Output 1
 Relay 6 = Aux Output 4 or HC Output 2
 Do not use relays for both functions.

CA 230 to OCB-8 Cable Connection

* Connect ribbon cable from H1 terminal on OCB-8 to Control 1 (right) terminal on CA 230 circuit board.
** OCB-8 relay board is powered through ribbon cable when J9 is on ACU PWR.

Door # 1
12 VDC Maglock
Fail Safe
- requires power to lock

J1 to J8
Normal
Reversed
Reversed position flips relay lock status.
Figure 21 - Terminate Lock Wiring CA 4300

Output Control Board (OCB-8)

---

** Connect ribbon cable from H1 terminal on OCB-8 to Control 1 (right) terminal on CA 4300 circuit board.

** OCB-8 relay board is powered through ribbon cable when J9 is on ACU PWR.
Figure 22 - Terminate Lock Wiring CA 8300

Output Control Board (OCB-8)

CA 8300 to OCB-8 Cable Connection

OCB-8 ribbon cable may be connected to HL1 (left side) on CA 8300 circuit board. Set J9 to Ext Pwr. Connect OCB-8 12V/Gnd to Auxiliary side of power supply. OCB-8s may be connected to HL1 and HR1 simultaneously.

* Connect ribbon cable from H1 terminal on OCB-8 to Control 1 (right) terminal on CA 8300 circuit board.

** OCB-8 relay board is powered through ribbon cable when J9 is on ACU PWR.
Terminate Input Wiring

The following sub-topics review termination of door, exit, and auxiliary alarm input wiring.

Door Monitoring Connections
A normally-closed door contact is for monitoring door security. Door inputs are shunted during the door relay unlock time.

Exit Device Connections
A normally-open exit device contact unlocks its assigned door for its defined door relay unlock time and overrides the alarm input during its defined door held open time. Examples of exit devices are exit push buttons or motion sensors (PIR) etc.

Keyscan recommends a PIR with a pulse output of ¼ second and suited to its environment.

Security Monitoring Connections
A normally-closed device may be connected to an auxiliary alarm input for monitoring stairwell or interior doors, or windows. The auxiliary alarm inputs may be connected to infrared sensors or to an existing alarm system with a normally-closed auxiliary output relay contact.
Figure 23 - Terminate Input Wiring – Door Contacts CA 230 / CA 4300 / CA 8300

Note: Diagram illustrates CA 8300. Connections also apply to CA 230 & CA 4300.

- CA 230 – up to 2 door contacts
- CA 4300 – up to 4 door contacts
- CA 8300 – up to 8 door contacts

J18 – pins 5 & 4 set supervision type (Jumper setting applies to all Door Contact, Request to Exit, and Supervised Auxiliary inputs.)
Figure 24 - Terminate Input Wiring – RTE Push Button CA 230 / CA 4300 / CA 8300

Cut View of CA 8300

J18 – pins 5 & 4 set supervision type (Jumper setting applies to all Door Contact, Request to Exit, and Supervised Auxiliary inputs.)

Diagram illustrates CA 8300. Connections also apply to CA 230 & CA 4300:
- CA 230 – up to 2 Request To Exits
- CA 4300 – up to 4 Request To Exits
- CA 8300 – up to 8 Request To Exits

Notes
- RTE Push Button
- NO = Normally Open
- Single end of line supervision
  - J18 – Jumper 5 = Off
  - Jumper 4 = On
- to Request to Exit
- to Common Return
- Double end of line supervision
  - J18 Jumper 5 & 4 = On
  - to Request to Exit
  - to Common Return
Figure 25 - Terminate Input Wiring – RTE PIR Motion Sensor CA 230 / CA 4300 / CA 8300

Cut View of CA 8300

Door Contacts | Request to Exit | 16 Supervised Auxiliary Alarm Inputs
1 2 3 4 5 6 7 8 | 1 2 3 4 5 6 7 8 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Non-supervised
J18 – Jumper 5 & 4 = Off

PIR (Request To Exit)
NO = Normally Open

Notes
Diagram illustrates CA 8300. Connections also apply to CA 230 & CA 4300.
- CA 230 – up to 2 Request to Exits
- CA 4300 – up to 4 Request to Exits
- CA 8300 – up to 8 Request to Exits

Single end of line supervision
J18 – Jumper 5 = Off
Jumper 4 = On

Double end of line supervision
J18 Jumper 5 & 4 = On

J18 – pins 5 & 4 set supervision type (Jumper setting applies to all Door Contact, Request to Exit, and Supervised Auxiliary inputs.)
Figure 26 - Terminate Input Wiring – Auxiliary/Supervised Inputs CA 230 / CA 4300 / CA 8300

**J18** – pins 5 & 4 set supervision type (Jumper setting applies to all Door Contact, Request to Exit, and Supervised Auxiliary inputs.)

---

**Cut View of CA 8300**

<table>
<thead>
<tr>
<th>Door Contacts</th>
<th>Request to Exit</th>
<th>16 Supervised Auxiliary Alarm Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8</td>
<td>1 2 3 4 5 6 7 8</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16</td>
</tr>
</tbody>
</table>

NC = Normally Closed

Notes
Diagram illustrates CA 8300.
Connections also apply to CA 230 & CA 4300.
- CA 230 – up to 8 Supervised Auxiliary Alarm Inputs
- CA 4300 – up to 16 Supervised Auxiliary Alarm Inputs
- CA 8300 – up to 16 Supervised Auxiliary Inputs

---

**Single end of line supervision**
J18 – Jumper 5 = Off
Jumper 4 = On

**Double end of line supervision**
J18 Jumper 5 & 4 = On

Key: 1K – Single end of line supervision
3K – Double end of line supervision
NC – Normally Closed
COM – Common Return
Terminate Elevator Floor Wiring

If the elevator control unit (ECU) regulates more than 8 floors, multiple output control boards (OCB-8) are required. See the following table for ribbon cable elevator/floor assignments from the OCB-8 terminal to the ECU terminal.

**OCB-8 Jumper Settings**

- J1 to J8 set to Reversed position
- J9 set to EXT PWR

**Note**

Verify all floor hardware conforms to federal, state, provincial or municipal fire codes.

Table 3 – OCB-8 to EC 1300 Ribbon Cable Connections

<table>
<thead>
<tr>
<th>OCB Terminal</th>
<th>ECU Terminal</th>
<th>Elevator</th>
<th>Floors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st OCB-8 – H1</td>
<td>Control 1</td>
<td>1</td>
<td>1 – 8</td>
</tr>
<tr>
<td>*2nd OCB-8 – H1</td>
<td>Control 2</td>
<td>1</td>
<td>9 – 16</td>
</tr>
<tr>
<td>*3rd OCB-8 – H1</td>
<td>Control 3</td>
<td>1</td>
<td>17 – 24</td>
</tr>
<tr>
<td>*4th OCB-8 – H1</td>
<td>Control 4</td>
<td>1</td>
<td>25 – 32</td>
</tr>
<tr>
<td>*5th OCB-8 – H1</td>
<td>Control 5</td>
<td>1</td>
<td>33 – 40</td>
</tr>
</tbody>
</table>

Table 4 – OCB-8 to EC 2300 Ribbon Cable Connections

<table>
<thead>
<tr>
<th>OCB Terminal</th>
<th>ECU Terminal</th>
<th>Elevator</th>
<th>Reader</th>
<th>Floors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st OCB-8 – H1</td>
<td>Control 1</td>
<td>1</td>
<td>1</td>
<td>1 – 8</td>
</tr>
<tr>
<td>*2nd OCB-8 – H1</td>
<td>Control 2</td>
<td>1</td>
<td>1</td>
<td>9 – 16</td>
</tr>
<tr>
<td>3rd OCB-8 – H1</td>
<td>Control 3</td>
<td>2</td>
<td>2</td>
<td>1 – 8</td>
</tr>
<tr>
<td>*4th OCB-8 – H1</td>
<td>Control 4</td>
<td>2</td>
<td>2</td>
<td>9 – 16</td>
</tr>
</tbody>
</table>

* Optional OCB-8's must be purchased separately.
**Figure 27 - Terminate Floor Wiring EC 1300**

- **EC 1300** to **OCB-8 Cable Connection**
  - EC 1300 Terminal
  - OCB-8 Terminal

- Connect ribbon cable from H1 terminal on OCB-8 to control terminals on EC 1300 as follows:
  - Control 1 - Floors 1 - 8
  - Control 2 - Floors 9 - 16
  - Control 3 - Floors 17 - 24
  - Control 4 - Floors 25 - 32
  - Control 5 - Floors 33 - 40

- **Set J1 - J8 to Reversed position / J9 to Ext Pwr**

- **Connect** ribbon cable from H1 terminal on OCB-8 to control terminals on EC 1300 as follows:
  - Control 1 - Floors 1 - 8
  - Control 2 - Floors 9 - 16
  - Control 3 - Floors 17 - 24
  - Control 4 - Floors 25 - 32
  - Control 5 - Floors 33 - 40

- **Connect to common on elevator control circuit**

- **Connects to floor call circuit**

- **Elevator Button**

- **Sets J1 - J8 to Reversed position / J9 to Ext Pwr**

- **Fire Contact**
  - N.C.
  - Normal
  - Reversed

- **12VDC Aux Out of DPS12**

- **Gnd 12V**

- **Connect to**

- **J1 to J8**

- **Connect to common on elevator control circuit**

- **Connects to floor call circuit**

- **Elevator Button**

- **Sets J1 - J8 to Reversed position / J9 to Ext Pwr**

- **Fire Contact**
  - N.C.
  - Normal
  - Reversed

- **12VDC Aux Out of DPS12**

- **Gnd 12V**
* Connect ribbon cable from H1 terminal on OCB-8 to control terminals on EC 2300 as follows:

Control 1 - Elevator 1/Reader 1  Floors 1 - 8
Control 2 - Elevator 1/Reader 1  Floors 9 - 16
Control 3 - Elevator 2/Reader 2  Floors 1 - 8
Control 4 - Elevator 2/Reader 2  Floors 9 - 16

Set J1 - J8 to Reversed position / J9 to Ext Pwr
Terminate Floor Input Wiring

The EC 1000 with 5 output control boards can regulate up to 40 floors; however, the maximum number of floors monitored is 32.

The EC 1000 and EC 2000 do not have floor status with supervision.

Figure 29 - Terminate Floor Input Wiring EC 1300
Terminate Reader Wiring at ACU

The reader cable should be 3 pair 22AWG shielded or a cable with overall shielding. 18 AWG is acceptable for current demanding readers such as the Indala PX620 or the HID5375. The shielding wire from each pair must be connected to the earth ground lug at the ACU and isolated and taped at the reader. The maximum reader distance is 500 feet (152.4 m) from the controller when transmitting a Wiegand signal protocol. If the distance is greater than 500 feet (152.4 m), install one WIEEX per reader, which extends the distance to 4000 feet (1219.2 m). See Appendix F – Wiegand Extenders WIEEX and CWIEEX on page 133.

Reader Wiring

- Red – Positive DC Power. Each reader port is fused at 12VDC at 120 mA. For readers that draw more current, connect the red wire directly to the power supply.
- Black – Ground (GND)
- Brown – Light Emitting Diode (LED) on reader
- Green – Data output bit 0
- White – Data output bit 1

For specific reader wiring review the appendices listed in the Table of Contents.
Figure 31 - Terminate Reader Wiring

LED D1 (White) D0 (Green) PWR (Red) GND (Black)

Shield not connected. Isolate with electrical tape.

3 pair shielded 22 AWG or 18 AWG 500' maximum

Proximity Reader

LED D1 (White) D0 (Green) PWR (Red) GND (Black)

Shield

AUX RDR PWR IN

+ DC Supply - Black

12VDC+ Red

POWER FAIL DETECT

ACU Supply 12VDC Input Auxiliary Supply 12VDC Input

Reader 1

LED BRN WHT GRN RED BLK
Terminate Auxiliary Outputs with Hardware/Alarms

Door and auxiliary inputs can be programmed to trip auxiliary output relays on an alarm event. This excludes pre-alert relays. Auxiliary output relays can be connected to alarm panels, CCTV systems etc.

As an example, a forced entry detected by a door input could be programmed to trip an auxiliary output which initiates a CCTV system to record the intrusion at the door.

Auxiliary output relays may also be used to control hardware with an associated time zone, such as scheduling the locking/unlocking of a door, which does not have a reader, to a defined time zone.

Important

Do not assign a time zone to an auxiliary output if the output has previously been assigned to an alarm event. The alarm has priority over the time zone.
When OCB-8 connected to CA 230
Relay 5 = Aux Output 3 or HC Output 1
Relay 6 = Aux Output 4 or HC Output 2
Do not use relays for both functions.

**ACU Pwr**

*Connect ribbon cable from H1 terminal on OCB-8 to Control 1 (right) terminal on CA 230 circuit board.

** OCB-8 relay board is powered through ribbon cable when J9 is on ACU PWR.
Figure 33 - Terminate Auxiliary Outputs CA 4300

Cut View - Output Control Board (OCB-8)

Elements:
- **J1 to J8**: Time zone lock/unlock and alarm panel input or CCTV input.
- **H1**: 'Normally Closed' position or 'Normally Open' position on relay.
- **Relay 5, Relay 6, Relay 7, Relay 8**: Normally reversed, lock status flips relay lock status.
- **J9**: Ext Pwr, Gnd, 12V, ACU Pwr

CA 4300 to OCB-8 Cable Connection

- **Control 1, H1, HR1, red stripe**: Connection points for CA 4300 to OCB-8.
- **OCB-8 ribbon cable may be connected to HL1 (left side) on CA 4300 circuit board. Set J9 to Ext Pwr. Connect OCB-8 12V/Gnd to Auxiliary side of power supply. OCB-8s may be connected to HL1 and HR1 simultaneously.**
Figure 34 - Terminate Auxiliary Output CA 8300

Output Control Board (OCB-8)

- H1
- J9
- J1 to J8
- Relay 1 to Relay 8
- Aux Output 1 to Aux Output 8
- Relay 5
- Relay 6
- Relay 7
- Relay 8

- N.C. (Normally Closed) position on relay
- N.O. (Normally Open) position on relay
- ' Normally Closed position on relay
- 'Normally Open position on relay

- Connect ribbon cable from H1 terminal on OCB-8 to Control 2 (right) terminal on CA 8300 circuit board.
- OCB-8 ribbon cable may be connected to HL2 (left side) on CA 8300 circuit board.
- Set J9 to Ext Pwr. Connect OCB-8 12V/Gnd to Auxiliary side of power supply. OCB-8s may be connected to HL2 and HR2 simultaneously.

CA 8300 to OCB-8 Cable Connection

- Control 2
- CA 8300 Terminal
- OCB-8 Terminal
- H1
- OCB-8s may be connected to HL2 and HR2 simultaneously.

- OCB-8 relay board is powered through ribbon cable when J9 is on ACU PWR.
ACU/ECU Jumper Settings

The following sub-sections outline jumper settings on ACU and ECU circuit boards:

- communications, card name storage, reader LEDs, card count, SI inputs jumper J16 – page 50
- software version selection jumper J17 – page 53
- reader technology selection jumper J3 – page 54
- address / external jumper J18 – page 57
- clear ACU memory jumper J1 – page 60

System Settings – Jumper J16

The following outlines configurations for system settings jumper J16.

Figure 35 - System Jumper J16

Modem Communication with Multiple ACUs

On the ACU that is connected to the modem, set the main circuit board's communication jumpers to the correct modem baud rate. On the remaining ACUs connected by CPB-10s, set communication jumpers to serial with a baud rate that corresponds to the modem's baud rate. You can only have one ACU dial-out modem on a communication bus otherwise you will experience communication difficulties.

Table 5 - System Jumper J16 Settings

<table>
<thead>
<tr>
<th>Jumper Name</th>
<th>Jumper Function</th>
<th>Jumper #</th>
<th>Jumper Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Jumpers</td>
<td>Baud</td>
<td>1 &amp; 2 &amp; 6</td>
<td>Off = 0, On = 1</td>
</tr>
<tr>
<td>9600</td>
<td>Serial</td>
<td>0 0 0</td>
<td></td>
</tr>
<tr>
<td>19200</td>
<td>Serial</td>
<td>0 1 0</td>
<td></td>
</tr>
<tr>
<td>Not supported on CPB-10</td>
<td>Serial</td>
<td>0 0 1</td>
<td></td>
</tr>
<tr>
<td>Not supported on CPB-10 or CB-485</td>
<td>Serial</td>
<td>0 1 1</td>
<td></td>
</tr>
<tr>
<td>Communication Jumpers</td>
<td>Baud</td>
<td>1 &amp; 2 &amp; 6</td>
<td></td>
</tr>
<tr>
<td>9600</td>
<td>Modem</td>
<td>1 1 0</td>
<td></td>
</tr>
<tr>
<td>Jumper Name</td>
<td>Jumper Function</td>
<td>Jumper #</td>
<td>Jumper Settings</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
<td>---------</td>
<td>----------------</td>
</tr>
<tr>
<td>Not supported with CPB-10</td>
<td>19200 Modem</td>
<td>1 &amp; 2 &amp; 6</td>
<td>1 0 0</td>
</tr>
<tr>
<td>For future use</td>
<td></td>
<td>1 &amp; 2 &amp; 6</td>
<td>1 1 1</td>
</tr>
<tr>
<td>For future use</td>
<td></td>
<td>1 &amp; 2 &amp; 6</td>
<td>1 0 1</td>
</tr>
<tr>
<td>Card Name Storage in ACU Option (Prom version 6.2.X or higher)</td>
<td>System V or VII software - names stored in ACU - 24,000 card capacity</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>System V or VII software – names not stored in ACU – 32,000 card capacity (Disaster recovery utility unable to retrieve names from ACU in the event database is lost or corrupted when this option selected)</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Reader LED (condition on door lock status)</td>
<td>Red &amp; Green LED type reader (board revs 9.8b or higher)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Red LED type reader</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Enable/Disable Temporary Card Countdown</td>
<td>Enable Temporary Card Countdown (Prom version 6.07 or higher)</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Disable Temporary Card Countdown</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Enable/Disable SI Inputs</td>
<td>Disable IOCB1616</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Firmware 7.30 to 8.11 &amp; greater</td>
<td>Enable IOCB1616</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Firmware 6.07 to 7.04 (does not support IOCB1616)</td>
<td>Enable AL32/64</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Disable AL32/64</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Firmware 7.11 to 7.25 (custom)</td>
<td>Enable IOCB1616</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Enable AL32/64</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Firmware 7.05 to 7.10 (custom)</td>
<td>Enable IOCB1616</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Disable IOCB1616</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>
Figure 36 - System Jumper J16 Location on ACU/ECU Circuit Boards
Software Selection – Jumper J17

Jumper J17 selects the Keyscan software. If jumper J17 is altered, you must clear memory to reset ACU board settings. In the event of a software version upgrade, jumper J17 does not have to be changed. Refer to the table below for jumper settings.

**Important**

When installing the ACU/ECU circuit board or changing jumper J17, you must clear the ACU memory by momentarily shorting Clear Memory jumper J1.

**Figure 37 - Software Jumper J17**

![Software Jumper J17](image)

<table>
<thead>
<tr>
<th>Jumper Settings</th>
<th>Jumper Off</th>
<th>Jumper On</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Off = 0</td>
<td>On = 1</td>
</tr>
</tbody>
</table>

**Table 6 - Software Jumper J17**

<table>
<thead>
<tr>
<th>Software Version</th>
<th>PROM Version</th>
<th>ACU/ECU Version</th>
<th>Jumper Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>System V or System VII</td>
<td>7.4.0 or higher</td>
<td>Rev. 11.x</td>
<td>0</td>
</tr>
<tr>
<td>System V or System VII</td>
<td>7.x.x to 7.3.9</td>
<td>Rev. 10.x</td>
<td>0</td>
</tr>
<tr>
<td>System V or System VII</td>
<td>6.5.0</td>
<td>Rev.10.x</td>
<td>1</td>
</tr>
<tr>
<td>System V or System VII</td>
<td>6.11 to 6.22</td>
<td>Rev. 9.x</td>
<td>0</td>
</tr>
</tbody>
</table>

Current ACU hardware no longer supports System 3 or 3 Plus software. Please contact Keyscan technical support.

**Figure 38 - Software Jumper J17 Location on CA & EC boards**
Reader Formats – Jumper J3

Jumper J3 sets the ACU or ECU main circuit board to the corresponding reader format. The table below lists the reader format, the corresponding jumper setting and the security level of the card/reader format.

26-bit cards and tags are not secure. Duplicate card numbers exist in this format so a facility is vulnerable to unauthorized access. KEYSCAN assumes no responsibility for liability should any 26-bit card format be enabled in a KEYSCAN system. Further, Keyscan assumes no responsibility for liability for any other format except Keyscan's proprietary 36-bit format.

KEYSCAN systems are factory default to use KEYSCAN's proprietary 36-bit Wiegand format cards and tags. KEYSCAN’s 36-bit proprietary Wiegand format ensures no duplicate cards or tags exist offering a high level of security.

Waiver of Liability

Installing dealers should have an authorized end-user sign a waiver of liability before enabling 26-bit cards. Keyscan has enclosed a Waiver of Liability on page 57.

Figure 39 - Reader Type Jumper J3

<table>
<thead>
<tr>
<th>Reader Type</th>
<th>Jumper Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumper Off</td>
<td>Off = 0</td>
</tr>
<tr>
<td>Jumper On</td>
<td>On = 1</td>
</tr>
</tbody>
</table>

Note

Reader formats apply to PROM version 2.23 or greater. Keyscan 36 bit format is a proprietary format.

Table 7 - Reader Type Jumper J3

<table>
<thead>
<tr>
<th>Ref #</th>
<th>Reader Format</th>
<th>Security Level</th>
<th>Jumper Settings Pins 6 - 1</th>
<th>Batch Code Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Keyscan 36 bit only</td>
<td>High</td>
<td>0 0 0 0 0 0</td>
<td>Batch code and facility code are the same for cards or tags</td>
</tr>
<tr>
<td></td>
<td><strong>Formats Not Recommended</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Standard 26 bit &amp; Keyscan 36 bit</td>
<td>Low</td>
<td>0 0 0 0 1</td>
<td>&quot;</td>
</tr>
<tr>
<td>Ref #</td>
<td>Reader Format</td>
<td>Security Level</td>
<td>Jumper Settings Pins 6-1</td>
<td>Batch Code Notes</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------------------------------------</td>
<td>----------------</td>
<td>--------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>2</td>
<td>Northern 34 bit, Standard 26 bit &amp; Keyscan 36 bit</td>
<td>Low</td>
<td>000010</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Corby 30 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>000011</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Kantech 32 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>000100</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>DSX 33 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>000101</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Intercon 32 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>000110</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Chubb 36 bit (5 &amp; 6 digit cards) &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>000111</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Keyscan 36 bit with zero batch number</td>
<td>Medium</td>
<td>001000</td>
<td>The batch number is programmed with 0 to ignore the card facility code.</td>
</tr>
<tr>
<td>9</td>
<td>Standard 26 bit &amp; Keyscan 36 bit</td>
<td>Low</td>
<td>001001</td>
<td>The 36 bit batch number is the card facility code. The 26 bit batch number is programmed with 0 to ignore the card facility code.</td>
</tr>
<tr>
<td>10</td>
<td>Northern 34 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>001010</td>
<td>The 36 bit batch number is the card facility code. The 34 bit batch number is programmed with 0 to ignore the card facility code.</td>
</tr>
<tr>
<td>11</td>
<td>Corby 30 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>001011</td>
<td>The 36 bit batch number is the card facility code. The 30 bit batch number is programmed with 0 to ignore the card facility code.</td>
</tr>
<tr>
<td>12</td>
<td>Casi – Rusco Prox-Lite 40 bit</td>
<td>Medium</td>
<td>001100</td>
<td>The 40 bit batch number is the card facility code.</td>
</tr>
<tr>
<td>13</td>
<td>Keyscan 36 bit &amp; 37 bit</td>
<td>Medium</td>
<td>001101</td>
<td>Batch code and facility code are the same for cards or tags</td>
</tr>
<tr>
<td>14</td>
<td>Keyscan England 36 bit with no manufacturer's code check</td>
<td>Low</td>
<td>001110</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>HID 35 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>001111</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>HID Computrol 34 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>010000</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Unassigned</td>
<td></td>
<td>010001</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Chubb 36 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>010010</td>
<td>No parity check on Chubb card.</td>
</tr>
<tr>
<td>19</td>
<td>Honeywell 40 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>010011</td>
<td>Batch code and facility code are the same for cards or tags</td>
</tr>
<tr>
<td>20</td>
<td>Unassigned</td>
<td></td>
<td>010100</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Unassigned</td>
<td></td>
<td>010101</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>ITI 29 bit &amp; 26 bit &amp; Keyscan 36 bit</td>
<td>Low</td>
<td>010110</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Standard 26 bit &amp; Keyscan 36 bit &amp; 37 bit</td>
<td>Low</td>
<td>010111</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Kantech XSF 36 bit &amp; KeyScan 36 bit</td>
<td>Medium</td>
<td>011000</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>CardKey 34 bit &amp; Keyscan 36 bit</td>
<td>Medium</td>
<td>011001</td>
<td></td>
</tr>
<tr>
<td>Ref #</td>
<td>Reader Format</td>
<td>Security Level</td>
<td>Jumper Settings Pins</td>
<td>Batch Code Notes</td>
</tr>
<tr>
<td>-------</td>
<td>-------------------------------------------------------------</td>
<td>----------------</td>
<td>----------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>26</td>
<td>Keyscan 36 bit &amp; 26 bit with no parity checking format</td>
<td>Low</td>
<td>0 1 1 0 1 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Example Keri part # SM-2000X, 05454-030)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Modern 30 bit &amp; 26 bit &amp; Keyscan 36 bit</td>
<td>Low</td>
<td>0 1 1 0 1 1</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Intercon 32 bit &amp; Keyscan 36 bit &amp; Standard 26 bit</td>
<td></td>
<td>0 1 1 1 0 0</td>
<td>Both batch and card require programming</td>
</tr>
<tr>
<td>29</td>
<td>Indala 27 bit (format 10251) &amp; Keyscan 36 bit</td>
<td></td>
<td>0 1 1 1 0 1</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Cards between 26 bit &amp; 40 bit read as 26 bit card location with parity check</td>
<td>Very Low</td>
<td>0 1 1 1 1 0</td>
<td>Batch or facility codes are read as a 26 bit batch location</td>
</tr>
<tr>
<td>31</td>
<td>Diagnostic - evaluates cards between 26 bit &amp; 40 bit for Keyscan engineers only.</td>
<td>Display Only</td>
<td>0 1 1 1 1 1</td>
<td>Cards do not unlock door relays. Evaluation mode only.</td>
</tr>
</tbody>
</table>

For other custom Wiegand protocol firmware or development, contact Keyscan technical support.

**ACU/ECU Circuit Board LED Wiegand Bit Counters**

ACU & ECU circuit boards have Wiegand bit counter LEDs – L1 and L2 – for determining card binary bits. To verify the binary bits, present the card or tag at the reader. You must be able to observe the ACU/ECU circuit board when you present the card or tag at the reader. Count the number of times each LED blinks.

- L1 counts the 1st binary digit
- L0 counts the 2nd binary digit

**Example**

If L1 blinks 2 times and L0 blinks 6 times, the card has 26 binary bits (26 bit Wiegand card).

**Figure 40 - Reader Format Jumper J3 and Wiegand Bit Counter LEDs**

(For all CA & EC control panels)
Liability Warning – 26 Bit Wiegand Card Format

KEYSCAN systems are factory defaulted for KEYSCAN’s proprietary 36-bit Wiegand format cards.

KEYSCAN systems can be modified to recognize a wide range of additional access card formats. Some of these formats are proprietary to other system manufacturers. Some other formats, notably 26-bit Wiegand, are “open”. This means that card manufacturers will supply any card number sequence requested. The “open” 26-bit format means duplicate cards exist.

Installing dealers and end-users should be aware of the risk. Because the 26-bit format is unregulated, duplicated card numbers can be easily obtained and could be used to gain unauthorized access to a facility.

KEYSCAN strongly recommends that installing dealers apprise the end user customer of the risks posed by 26-bit cards and have the end user customer acknowledge they understand the risk by signing the “Waiver of Liability”.

Waiver of Liability

Keyscan system end user (End User Name - ) acknowledges that he/she has been advised that the KEYSCAN system installed by (Dealer Name - ) in the end-user premises has been modified from the factory original settings to accept Wiegand 26 bit format cards.

End user acknowledges that he/she is aware that duplicate cards may exist in this format and that a duplicate card could be used to gain illegal access to his/her facility.

(Dealer Name - ) SHALL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL, CONTINGENT, SPECIAL OR INCIDENTAL DAMAGES whatsoever, except as specifically set forth in the LIMITED WARRANTY, caused by illegal use of duplicate 26 bit access cards.

<table>
<thead>
<tr>
<th>DEALER NAME:</th>
<th>END USER NAME:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PER:</th>
<th>PER:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGNED:</td>
<td>SIGNED:</td>
</tr>
<tr>
<td>DATED:</td>
<td>DATED:</td>
</tr>
</tbody>
</table>
This page is intentionally blank.
Address/External Jumper J18

Pins 5 and 4 on jumper J18 on the ACU circuit boards currently set the input supervision type. Please note that J18 – pins 5 & 4 – set the input type universally for door contacts, request to exits, and auxiliary/supervised alarm inputs on each controller. All inputs must be the same type.

Figure 41 - Address/External Jumper J18

Table 8 - J18 Jumper Settings

<table>
<thead>
<tr>
<th>Supervised Input Selection</th>
<th>Jumper Settings</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-supervised input or digital input</td>
<td>0 0</td>
<td>Pins 3, 2, 1, C, D &amp; E are for future use.</td>
</tr>
<tr>
<td>Single end of line supervision</td>
<td>0 1</td>
<td></td>
</tr>
<tr>
<td>Double end of line supervision</td>
<td>1 1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alternate Panel Serial # Selection</th>
<th>Pins A – B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default Serial #</td>
<td>0 0</td>
</tr>
<tr>
<td>Alternate Serial # 1</td>
<td>0 1</td>
</tr>
<tr>
<td>Alternate Serial # 2</td>
<td>1 0</td>
</tr>
<tr>
<td>Alternate Serial # 3</td>
<td>1 1</td>
</tr>
</tbody>
</table>

Figure 42 - Jumper J18 Location – CA 230 / CA 4300 / CA 8300
Clear ACU Memory – Jumper J1

The purpose of clearing the memory is to factory load the circuit boards.

To clear ACU memory, momentarily short the two pins on jumper Clear Memory J1 while the ACU is powered.

Figure 43 - Clear Memory Jumper J1 - All CA & EC boards
Communication – Single & Multiple ACUs

This section outlines ACU to PC communication and ACU to ACU communication. Keyscan supports the following connectivity modes:

- Serial
- USB (USB 1.1 & USB 2.0 supported)
- Network (TCP/IP)
- Wireless Network (TCP/IP)
- Modem

Communication is divided into 2 parts:

- Single ACU Communication
- Multiple ACU Communication

Each section reviews the supported communication modes, applicable communication devices and connection diagrams.

**Important**

Do not mix CPB-10 boards with CB-485 boards on the same communication loop.

Refer to page 50 for setting communication ACU baud rates. Be sure the correct baud rate of the PC's communication port is set in the Client software. Verify the PC communication port is active and is dedicated for access control communication.

**Modem Communication**

Modem communication requires independent analog phone lines and modems at both the PC and the remote ACU location.

We recommend using either the CB-485M or MC9600 and the MC33H modem because they are manufactured by Keyscan specifically for our access control systems. Setup strings for the modems are defaulted in the Keyscan software. Other 3rd party modems may be used; however, you may encounter problems.

Do not connect a CB-485M, MC9600 or MC33H modem to a digital phone line. If digital phone lines are in use, contact your phone service provider for converter equipment.
## Single ACU Communication

The following table reviews supported communication modes, devices, and applicable wiring diagrams/parts list.

### Table 9 - Single ACU Communication

<table>
<thead>
<tr>
<th>Mode</th>
<th>Devices</th>
<th>Wiring Diagram/Parts List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial</td>
<td>Direct serial connection to PC</td>
<td>Figure 44</td>
</tr>
<tr>
<td>Serial</td>
<td>CB-485</td>
<td>Figure 45</td>
</tr>
<tr>
<td>Serial</td>
<td>CPB-10</td>
<td>Figure 46</td>
</tr>
<tr>
<td>USB</td>
<td>USB Adaptor</td>
<td>Figure 47</td>
</tr>
<tr>
<td>USB</td>
<td>USB Adaptor/CB-485 (RS-232)</td>
<td>Figure 48</td>
</tr>
<tr>
<td>USB</td>
<td>USB Adaptor/CB-485 (RS-485)</td>
<td>Figure 49</td>
</tr>
<tr>
<td>USB</td>
<td>USB Adaptor/CPB-10</td>
<td>Figure 50</td>
</tr>
<tr>
<td>Network (TCP/IP)</td>
<td>NETCOM2P or NETCOM6P/CB485</td>
<td>Figure 51</td>
</tr>
<tr>
<td>Network (TCP/IP)</td>
<td>NETCOM2 or NETCOM6/CB-485</td>
<td>Figure 52</td>
</tr>
<tr>
<td>Network (TCP/IP)</td>
<td>NETCOM2 or NETCOM6/ACU (direct connection)</td>
<td>Figure 53</td>
</tr>
<tr>
<td>Network (TCP/IP)</td>
<td>NETCOM2 or NETCOM6/CPB-10</td>
<td>Figure 54</td>
</tr>
<tr>
<td>Wireless Network (TCP/IP)</td>
<td>NETCOM2WH or NETCOM6WH/CB-485</td>
<td>Figure 55</td>
</tr>
<tr>
<td>Wireless Network (TCP/IP)</td>
<td>NETCOM2WH or NETCOM6WH/CPB-10</td>
<td>Figure 56</td>
</tr>
<tr>
<td>Wireless Network (TCP/IP)</td>
<td>NETCOM2WH or NETCOM6WH/ACU (direct connection)</td>
<td>Figure 57</td>
</tr>
<tr>
<td>Modem</td>
<td>CB-485M/MC33H</td>
<td>Figure 58</td>
</tr>
<tr>
<td>Modem</td>
<td>MC9600/MC33H</td>
<td>Figure 59</td>
</tr>
<tr>
<td>Modem</td>
<td>MC9600/MC33H/CPB-10</td>
<td>Figure 60</td>
</tr>
</tbody>
</table>
Figure 44 - Single ACU Communication - Direct Serial

Parts List
- RS-232 Data Cable
- ACU
- PC (requires serial port)

ACU Circuit Board (Rev. 11)

RS-232
22AWG
shielded cable
100 FT (30 M)
maximum

Data Cable Pin Assignment (RS-232)
Pin 1 - White
Pin 2 - Black
Pin 3 - Red
Pin 4 - Brown
Pin 5 - Green
Pin 6 - Shorted to Pin 7
Pin 7 - Shorted to Pin 6

Communication 2

CB-485 Connection

Communication GND TD RD DCD DTR CTS

Short with jumper

Brown & White not used and taped back separately.
Figure 45 - Single ACU Communication – Serial CB-485

Parts List
- RS-232 Data Cable
- ACU
- CB485
- PC (requires serial port)

ACU Circuit Board (Rev. 11)

Connect CB485 ribbon cable to H1 on ACU

Communication terminal inactive when ribbon cable connected to H1

Jumper ON J1

Current Draw - 110 mA

RS-232 IN
RS-232 OUT

RS485 IN
RS485 OUT

Current Draw - 110 mA

Jumpers ON
Run
Program

GND
Black
Red
White
Green
Shield

Brown & White not used and taped back.

Shield & Green

RS - 232 22 AWG shielded cable 100ft (30 m) maximum

PC with Communication Manager

- RS-232 Data Cable
- ACU
- CB485
- PC (requires serial port)
Figure 46 - Single ACU Communication - Serial CPB-10

Parts List
- RS-232 Data Cable
- ACU
- CPB-10
- PC (requires serial port)

ACU Circuit Board (Rev. 11)

Connect CPB-10 ribbon cable to H1 on ACU

Communication terminal inactive when CPB-10 connected to H1

Current Draw - 40 mA

Jumper ON J1

Brown & White not used and taped back.

PC with Communication Manager

RS - 232
22 AWG shielded cable
100ft (30 m) maximum

TX LED
RX LED

Brown
Red
Black
Green
Shield
Figure 47 – Single ACU Communication - USB Adaptor

**Parts List**
- USB Adaptor (USB-SER)
- RS-232 Data Cable
- ACU
- PC (requires USB port)
- USB extension cable optional

**ACU Circuit Board (Rev. 11)**
- Short with jumper

**CB-485 Connection**
- GND
- TD
- RD
- DCD
- DTR
- CTS

**Communication 2**
- Green
- Black

**Note**
USB communication is slower than direct serial or NETCOM communication. Do not connect USB adaptor to modem.

**PC with Communication Manager**
- To USB port on PC (may require USB extender cable)

**485 terminal block not used**

**Use**
- 3 loose RS232 wires

**Tape back shield**

**Unused conductors are taped back separately.**

**RS-232 22 AWG shielded cable**
- 100 FT (30 M) maximum
Figure 48 - Single ACU Communication - USB Adaptor/CB-485 (RS232)

To USB port on PC (may require USB extension cable)

PC with Communication Manager

Note
USB communication is slower than direct serial or NETCOM communication. Do not connect USB adaptor to modem.

Parts List
- USB Adaptor (USB-SER)
- RS-232 Data Cable
- CB485
- ACU
- PC (requires USB port)
- USB extension cable optional

Communication terminal inactive when CB-485 connected to H1

ACU Circuit Board
(Rev. 11)

Connect CB-485 ribbon cable to H1 on ACU

Parts List
- USB Adaptor (USB-SER)
- RS-232 Data Cable
- CB485
- ACU
- PC (requires USB port)
- USB extension cable optional

Communication 2

CB-485 Connection

RS485 IN RS485 OUT M
+ + - + -
485 OUT

CB-485

TX LED
RX LED

Run Program

Jumpers ON
Run

Current Draw - 110 mA

RS485 IN RS485 OUT
BRN WH WHT GRN WHT GRN WHT BRN WHT BLU
BRN WHT THR

Jumper ON J1

Use 3 loose RS232 wires

Unused conductors are taped back separately.

Tape back shield

RS - 232 22 AWG shielded cable 100 FT (30 M) maximum

Black
Red
Green

Shield & Green
Black
Red

Unused conductors are taped back separately.

BRNWHTGRNWHT BLUWHT
Figure 49 - Single ACU Communication - USB Adaptor/CB-485 (RS485)

To USB port on PC (may require USB extension cable)

USB communication (RS485) is slower than direct serial or NETCOM communication. Do not connect USB adaptor to modem.

CAT 5 2000 ft (609 m) maximum @ 9600 BPS

Parts List
- USB Adaptor (USB-SER)
- CAT 5 Cable - 2 twisted pairs
- CB-485
- ACU
- PC (requires USB port)
- USB extension cable optional

ACU Circuit Board (Rev. 11)

Connect CB-485 ribbon cable to H1 on ACU

Communication 2

CB-485 Connection

H1

Communication terminal inactive when CB-485 connected to H1

Current Draw - 110 mA

Jumper ON

J1

Isolate and tape the 3 loose RS232 wires on the USB adaptor.

Parts List

Note

USB communication (RS485) is slower than direct serial or NETCOM communication. Do not connect USB adaptor to modem.

Parts List

USB communication (RS485) is slower than direct serial or NETCOM communication. Do not connect USB adaptor to modem.
Figure 50 - Single ACU Communication - USB Adaptor/CPB-10 (RS232)

To USB port on PC  
(may require USB  
extension cable)

PC with  
Communication  
Manager

Note  
USB communication is slower  
than direct serial or NETCOM  
communication.  
Do not connect USB adaptor to  
modem.

Parts List
  - USB Adaptor (USB-SER)  
  - RS-232 Data Cable  
  - CPB-10  
  - ACU  
  - PC (requires USB port)  
  - USB extension cable optional

ACU Circuit Board  
(Rev. 11)

RS - 232  
22 AWG  
shielded cable  
100 FT (30 m)  
maximum

Use 3 loose  
RS232  
wires

Connect CPB-10 ribbon  
cable to H1 on ACU

The communication  
terminal inactive  
when CPB-10  
connected to  
H1

Jumper  
ON  
J1

Current Draw 40 mA

Unused conductors  
are taped back  
separately.

 Communications

To USB port on PC  
(may require USB  
extension cable)

Parts List
  - USB Adaptor (USB-SER)  
  - RS-232 Data Cable  
  - CPB-10  
  - ACU  
  - PC (requires USB port)  
  - USB extension cable optional

ACU Circuit Board  
(Rev. 11)

RS - 232  
22 AWG  
shielded cable  
100 FT (30 m)  
maximum

Use 3 loose  
RS232  
wires

Connect CPB-10 ribbon  
cable to H1 on ACU

The communication  
terminal inactive  
when CPB-10  
connected to  
H1

Jumper  
ON  
J1

Current Draw 40 mA

Unused conductors  
are taped back  
separately.

Communications

USB communication is slower  
than direct serial or NETCOM  
communication.  
Do not connect USB adaptor to  
modem.

Unused  
conductors  
are taped back  
separately.
Figure 51 - Single ACU Communication - NETCOM2P or NETCOM6P/CB-485

**Parts List**
- PC
- 10/100 Base-T Cable
- ACU
- CB-485
- NETCOM2P or NETCOM6P

**ACU Circuit Board (Rev. 11)**

Connect CB-485 ribbon cable to H1 on ACU

Current Draw 250 mA

Jumper ON J1

Communication terminal inactive when CB-485 connected to H1

Jumper ON Run

Host PC with Communication Manager to network

10 or 100 Base-T
Figure 52 - NETCOM2 or NETCOM6/CB-485

Parts List
- RS-232 Data Cable
- ACU
- PC
- CB-485
- NETCOM2 or NETCOM6
- 10/100 Base-T Cable

LED Legend
- RS232 indicates 9-pin terminal connected
- RX LED indicates PC polling ACU/ECU
- TX LED indicates ACU/ECU replying to PC
- ON LED indicates unit receiving power

Use either the 9-pin connector or the terminal block. Do not use both to connect to the CB-485.

ACU Circuit Board (Rev. 11)
Connect CB-485 ribbon cable to H1 on ACU

RS-232
22 AWG shielded cable 100 FT (30 m) maximum

Brown & White not used and taped back.
Figure 53 - Single ACU Communication - NETCOM2 or NETCOM6

**Parts List**
- RS-232 Data Cable
- ACU
- PC
- NETCOM2 or NETCOM6
- 10/100 Base-T Cable

**LED Legend**
- RS-232 indicates 9-pin terminal connected
- RX LED indicates PC polling ACU/ECU
- TX LED indicates ACU/ECU replying to PC
- ON LED indicates unit receiving power

**ACU Circuit Board (Rev. 11)**
- Short with jumper

**CB-485 Connection**
- Communication
  - GND TO RD DCD DTR CTS

**RS-232 22 AWG shielded cable**
- 100 FT (30 m) maximum

**Current Draw**
- 270 mA

**12VDC Power Adaptor (NETCOM2H or NETCOM6H)**
- to network

**12VDC to DPS12 (NETCOM2 or NETCOM6)**
- via shielded 6-wire cable

**MAC Address**
- 00-20-4A-00-5T-D1

**Use either the 9-pin connector or the terminal block. Do not use both to connect to the ACU.**
Figure 54 - Single ACU Communication - NETCOM2 or NETCOM6/CPB-10

**Parts List**
- RS-232 Data Cable
- ACU
- PC
- CPB-10
- NETCOM 2 or NETCOM6
- 10/100 Base-T Cable

**LED Legend**
- RS232 indicates 9-pin terminal connected
- RX LED indicates PC polling ACU/ECU
- TX LED indicates ACU/ECU replying to PC
- ON LED indicates unit receiving power

**ACU Circuit Board** (Rev. 11)
- CB-485 Connection
- Communication terminal inactive when CPB-10 connected to H1
- Connect CPB-10 ribbon cable to H1 on ACU

**Current Draw**
- 270 mA
- 40 mA

**RS-232**
- 22 AWG shielded cable
- 100 FT (30 m) maximum

**Shield & Green**
- Brown & White not used and taped back.
Figure 55 - Single ACU Communication NETCOM2WH or NETCOM6WH / CB-485

Parts List
- PC with connection to network
- ACU
- CB-485
- RS-232 data cable
- NETCOM2WH or NETCOM6WH
- Wireless network access point

ACU Circuit Board (Rev. 11)

Host PC with Communication Manager

to network

NETCOM2WH or NETCOM6WH

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

ACU Circuit Board

Current Draw 350 mA

RS-232 22AWG shielded data cable 30 m (100') max @ 9600 BPS

Green & Shield
Red
Black

Internal LED Legend
- RS232 indicates 9-pin terminal connected
- RX indicates PC polling ACU/ECU
- TX indicates ACU/ECU replying to PC
- ON indicates unit receiving power

Current Draw 110 mA

Jumper ON J1

Connect CB-485 ribbon cable to H1 on ACU

Communication terminal inactive when CB-485 connected to H1

Communication 2 CB-485 Connection

RS-485 IN
RS-485 OUT

Jumpers ON Run

Program

RS485 IN BROWN OR YEL OR GRN OR ORANGE OR WH BLU OR WHT
RS485 OUT BROWN OR YEL OR GRN OR ORANGE OR WH BLU OR WHT

MAC Address
Lantronix WiPort 00-20-4A-96-49-BC

Antenna

9-pin Male Connector

9-pin Male Connector

RX LED
TX LED

Host PC with Communication Manager

to network

Jumper ON J1

Current Draw 350 mA

RS-232 22AWG shielded data cable 30 m (100') max @ 9600 BPS

Green & Shield
Red
Black

Internal LED Legend
- RS232 indicates 9-pin terminal connected
- RX indicates PC polling ACU/ECU
- TX indicates ACU/ECU replying to PC
- ON indicates unit receiving power

Current Draw 110 mA

Jumper ON J1

Connect CB-485 ribbon cable to H1 on ACU

Communication terminal inactive when CB-485 connected to H1

Communication 2 CB-485 Connection

RS-485 IN
RS-485 OUT

Jumpers ON Run

Program

RS485 IN BROWN OR YEL OR GRN OR ORANGE OR WH BLU OR WHT
RS485 OUT BROWN OR YEL OR GRN OR ORANGE OR WH BLU OR WHT

MAC Address
Lantronix WiPort 00-20-4A-96-49-BC

Antenna

9-pin Male Connector

9-pin Male Connector

RX LED
TX LED

Host PC with Communication Manager

to network

Jumper ON J1

Current Draw 350 mA

RS-232 22AWG shielded data cable 30 m (100') max @ 9600 BPS

Green & Shield
Red
Black

Internal LED Legend
- RS232 indicates 9-pin terminal connected
- RX indicates PC polling ACU/ECU
- TX indicates ACU/ECU replying to PC
- ON indicates unit receiving power

Current Draw 110 mA

Jumper ON J1

Connect CB-485 ribbon cable to H1 on ACU

Communication terminal inactive when CB-485 connected to H1

Communication 2 CB-485 Connection

RS-485 IN
RS-485 OUT

Jumpers ON Run

Program

RS485 IN BROWN OR YEL OR GRN OR ORANGE OR WH BLU OR WHT
RS485 OUT BROWN OR YEL OR GRN OR ORANGE OR WH BLU OR WHT

MAC Address
Lantronix WiPort 00-20-4A-96-49-BC

Antenna

9-pin Male Connector

9-pin Male Connector

RX LED
TX LED
Figure 56 - Single ACU Communication - NETCOM2WH or NETCOM6WH / CPB-10

**Parts List**
- RS-232 Data Cable
- ACU
- PC with connection to network
- CPB-10
- NETCOM2WH or NETCOM6WH
- Wireless Network Access Point

**Internal LED Legend**
- RS232 indicates 9-pin terminal connected
- RX indicates PC polling ACU/ECU
- TX indicates ACU/ECU replying to PC
- ON indicates unit receiving power

**ACU Circuit Board (Rev. 11)**
- Connect CPB-10 ribbon cable to H1 on ACU

**RS - 232**
22 AWG shielded cable
100 FT (30 m) maximum @ 9600 BPS

**Current Draw**
- CPB-10
  - Current Draw
  - 40 mA

**Current Draw**
- NETCOM2WH or NETCOM6WH
  - Current Draw
  - 350 mA

**Antenna**
Internal LED Legend
- RS232 indicates 9-pin terminal connected
- RX indicates PC polling ACU/ECU
- TX indicates ACU/ECU replying to PC
- ON indicates unit receiving power

**MAC Address**
Lantronix WiPort
00-20-4A-96-49-BC

**12VDC Power Adaptor**

**Maximum wireless range**
100 m (328 ft) based on indoor open air installation.
Figure 57 - Single ACU Communication - NETCOM2WH or NETCOM6WH / ACU

Parts List
- RS-232 Data Cable
- ACU
- PC with connection to network
- NETCOM2WH or NETCOM6WH
- Wireless network access point

Internal LED Legend
- RS232 indicates 9-pin terminal connected
- RX indicates PC polling ACU/ECU
- TX indicates ACU/ECU replying to PC
- ON indicates unit receiving power

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.
Figure 58 - Single ACU Communication - CB-485M/MC33H

Parts List
- RS-232 Modem Cable
- ACU
- CB-485M
- MC33H Modem
- PC (requires serial port)
- Dedicated Analog Phone Line

ACU Circuit Board
(Rev. 11)

Connect CB-485M ribbon
cable to H1 on ACU

Communication 2
CB-485 Connection

Communication terminal inactive when CB-485M connected to H1

12 VDC Adaptor
RS232 Modem Cable

MC33H Modem

MC33H - DCE

RJ 11 Terminal
- connect to analog phone line

PC with Communication Manager

Parts List

- RS-232 Modem Cable
- ACU
- CB-485M
- MC33H Modem
- PC (requires serial port)
- Dedicated Analog Phone Line

CB-485M

TX LED
RX LED

Jumper ON J1

Jumper ON Run

Jumper ON Program

Current Draw - 360 mA

RS485 IN  RS485 OUT
BRN WHN GRN WHT GRN WHT BK WHT

Communication 2

Run

ACU Circuit Board
(Rev. 11)
Figure 59 - Single ACU Communication - MC9600/MC33H

PC with Communications Manager

12VDC Adaptor plug on reverse.

MC33H jumper - DCE

to analog phone line

to MC33H terminal

Parts List

- RS-232 Modem Cable
- ACU
- MC9600
- MC33H Modem
- PC (requires serial port)
- Dedicated Analog Phone Line

Parts List

Set jumper to DTE

12VDC ACU power supply

to 12VDC ACU power supply

RS-232

Communication 2

CB-485 Connection

Communication

GND TO RD DCD DTR-CTS

Green & Black

Red, White, Brown

ACU Circuit Board
(Rev. 11)

Short with jumper

MC9600

300 mA

9-pin Male Connector

MC33H

External Host Modem

to analog phone line

GND

Communication

GND TO RD DCD DTR-CTS

12VDC

to Com Port

RS-232 Modem Cable

to 12VDC ACU power supply

Set jumper to DTE

RS-232

22AWG shielded cable

100 FT (30 M) maximum
Figure 60 - Single ACU Communication - MC9600/MC33H/CPB-10

Parts List
- RS-232 Modem Cable
- RS-232 Data Cable
- ACU
- MC9600
- MC33H Modem
- CPB-10
- PC (requires serial port)
- Dedicated Analog Phone Line

ACU Circuit Board
(Rev. 11)

MC9600
Current Draw
300 mA

Set jumper to DTE

MC33H jumper - DCE

RS-232 Modem Cable

RC-232

PC with Communications Manager

12VDC Adaptor plug on reverse.

RJ 11
External Host Modem

to analog phone line

12VDC ACU power supply

TX LED

RX LED

Current Draw
40 mA

Connect CPB-10 ribbon cable to H1 on ACU

Parts List:
- RS-232 Modem Cable
- RS-232 Data Cable
- ACU
- MC9600
- MC33H Modem
- CPB-10
- PC (requires serial port)
- Dedicated Analog Phone Line
Multiple ACU Communication

The following table reviews supported communication modes, devices, and applicable wiring diagrams/parts list for multiple ACU communication loops.

Table 10 - Multiple ACU Communication

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**CPB-10**

The CPB-10 does not have optical isolation protection and should not be used between two or more buildings. Other options such as a fiber modem, or short haul modem with optical isolation should be used between buildings.

**MAC Address**

Record the MAC address listed on the NETCOM or NETCOMP serial to TCP/IP convertor. This number is required when programming the device with the Keyscan utility software.
Figure 61 – Multiple ACU Communication – CB-485

Parts List
- PC (with serial port)
- CAT5 Cable - 2 twisted pairs
- ACU
- CB-485
- RS232 Data Cable

CAT5
- RS485 cable maximum 2000 ft (609 m) @ 9600 BPS between CB-485s
- may substitute equivalent to CAT 5 - 2 twisted pairs
- maximum baud rate is 56,000 BPS
Figure 62 – Multiple ACU Communication – CPB-10

Parts List
- PC (with serial port)
- 22 AWG 4 conductors shielded cable
- ACU
- CPB-10
- RS232 Data Cable

ACU Circuit Board (Rev. 11)
Communication terminal inactive when CPB-10 connected to H1
Connect CPB10 ribbon cable to H1 on ACU

Legend
EIA/TIA 562 Signal
GND = Ground
R = Rx
T = Tx
B = Busy Line

CPB-10
- supports parallel and star communication
(diagram shows CPB-10 in parallel communication)
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOMM2 for inter-building communication on a CPB-10 communication loop

RS-232
22 AWG shielded cable
100 FT (30 m)
maximum
@ 9600 BPS

Brown & White not used. Tape back separately.

Current Draw
40 mA

Jumper ON J1
(First & Last CPB10)

Jumper OFF J1

Current Draw
40 mA

Current Draw
40 mA

Current Draw
40 mA

Current Draw
40 mA

Tape back shield

Shield
**Figure 63 – Multiple ACU Communication – USB Adaptor/CB-485 (RS-232)**

- **Parts List**
  - PC (with USB port)
  - CAT5 Cable - 2 twisted pairs
  - ACU
  - CB-485
  - USB Adaptor (USB-SER)
  - RS232 Data Cable
  - USB extension cable optional

**Note**

USB (RS232) communication is slower than direct serial or NETCOM communication. Do not connect USB adaptor to modem.

**ACU Circuit Board (Rev. 11)**

- Communication terminal inactive when CB-485 connected to H1
- Connect CB-485 ribbon cable to H1 on ACU

**CAT5**

- RS485 cable maximum 2000 ft (609 m) @ 9600 BPS between CB-485s
- may substitute equivalent to CAT 5 - 2 twisted pairs
- maximum baud rate is 56,000 BPS

**CB-485**

- Current Draw - 110 mA
- Jumpers ON: Run–Program
- Jumpers OFF: J1 (First & Last CB-485)

**CAT5 – RS485 cable maximum 2000 ft (609 m) @ 9600 BPS between CB-485s – may substitute equivalent to CAT 5 - 2 twisted pairs – maximum baud rate is 56,000 BPS**
Figure 64 - Multiple ACU Communication - USB Adaptor/CB-485 (RS-485)

- Connect CB-485 ribbon cable to H1 on ACU
- Isolate and tape the 3 loose RS232 wires on USB adaptor.

**Note**
USB (RS485) communication is slower than direct serial or NETCOM communication. Do not connect USB adaptor to modem.

**Parts List**
- PC (with USB port)
- CAT5 Cable - 2 twisted pairs
- ACU
- CB-485
- USB Adaptor (USB-SER)
- USB extension cable optional

**CAT5**
- RS485 cable maximum 2000 ft (609 m) @ 9600 BPS between CB-485s
- may substitute equivalent to CAT 5 - 2 twisted pairs
- maximum baud rate is 56,000 BPS

**Communication terminal inactive when CB-485 connected to H1**

**Jumpers**
- ON
- OFF

**ACU Circuit Board (Rev. 11)**

- Connect CB-485 ribbon cable to H1 on ACU

**Parts List**
- PC (with USB port)
- CAT5 Cable - 2 twisted pairs
- ACU
- CB-485
- USB Adaptor (USB-SER)
- USB extension cable optional
Figure 65 - Multiple ACU Communication - USB Adaptor/CPB-10

**Parts List**
- PC (with USB port)
- 22 AWG 4 conductors shielded cable
- ACU
- CPB-10
- USB Adaptor (USB-SER)
- USB extension Cable optional

**Note**
USB (RS232) communication is slower than direct serial or NETCOM communication. Do not connect USB adaptor to modem.

**CPB-10**
- supports parallel and star communication (diagram shows CPB-10 in parallel communication)
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOMM2 for inter-building communication on a CPB-10 communication loop

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- B = Busy Line

**Key Points**
- Connect CPB-10 ribbon cable to H1 on ACU
- PC with Communication Manager
- RS-232 22 AWG shielded cable
- 100 FT (30 m) maximum @ 9600 BPS
- Unused conductors taped back separately.
- Green, black, tape back shield.
- Brown & White not used. Tape back separately.
- Jumper ON J1 (First & Last CPB10)
- Jumper OFF J1

**Current Draw**
- 40 mA
Figure 66 - Multiple ACU Communication - NETCOM2P or NETCOM6P/CB-485

Parts List
- PC
- CAT5 Cable - 2 twisted pairs
- ACU
- CB-485
- NETCOM2P or NETCOM6P
- 10/100 Base-T cable

Connect CB-485 ribbon cable to H1 on ACU

Jumper ON J1
(First & Last CB-485)

Jumper OFF J1

CAT5
- RS485 cable maximum 2000 ft (609 m) @ 9600 BPS between CB-485s
- may substitute equivalent to CAT 5 - 2 twisted pairs
- maximum baud rate is 56,000 BPS

ACU Circuit Board (Rev. 11)

Communication terminal inactive when CB-485 connected to H1

Connect CB-485 ribbon cable to H1 on ACU

Parts
- TX LED
- RX LED
- RJ45 Terminal Jack
- Jumpers ON Run
- Jumpers ON Run
- Jumpers ON Run
- CAT5

Host PC with Communication Manager
to network
to network
**Figure 67 - Multiple ACU Communication - NETCOM2 or NETCOM6/CPB-10**

**Parts List**
- PC
- 22 AWG 4 conductors shielded cable
- ACU
- CPB-10
- NETCOM2 or NETCOM6
- RS232 Data Cable

**LED Legend**
- RS232 indicates 9-pin terminal connected
- RX LED indicates PC polling ACU/ECU
- TX LED indicates ACU/ECU replying to PC
- ON LED indicates unit receiving power

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- B = Busy Line

**Parts List for CPB-10**

**ACU Circuit Board** (Rev. 11)
- Communication 2
- CB-485 Connection
- Communication terminal inactive when CPB-10 connected to H1
- Connect CPB10 ribbon cable to H1 on ACU

**CBP-10**
- supports parallel and star communication
  (diagram shows CPB-10 in parallel communication)
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOR2 for inter-building communication on a CPB-10 communication loop

**RS-232**
- 22 AWG shielded cable
- 100 FT (30 m) maximum @ 9600 BPS

**12VDC Power**
- Adaptor (NETCOM2H or NETCOM6H)
- Current 270 mA

**12VDC to DPS12**
- NETCOM2 or NETCOM6

**PC with Communication Manager**
- TX LED
- RX LED
- Current Draw 40 mA

**Legend**
- J1 OFF
- Green & Shield
- Red

**MAC Address**
00-20-4A-00-5T-D1

**12V Power Adaptor**
- 12VDC to NETCOM2 or NETCOM6

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**Communication Manager**
- RS-232 on ACU

**Current Draw**
- 270 mA

**10/100 Base-T**
- to network

**12VDC Power Adaptor**
- 12VDC to NETCOM2 or NETCOM6

**Current Draw**
- 270 mA

**RS232 Data Cable**
- to network

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**CPB-10**
- supports parallel and star communication
  (diagram shows CPB-10 in parallel communication)
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOR2 for inter-building communication on a CPB-10 communication loop

**RS-232**
- 22 AWG shielded cable
- 100 FT (30 m) maximum @ 9600 BPS

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**Communication Manager**
- RS-232 on ACU

**Current Draw**
- 270 mA

**10/100 Base-T**
- to network

**12V Power Adaptor**
- 12VDC to NETCOM2 or NETCOM6

**Current Draw**
- 270 mA

**RS232 Data Cable**
- to network

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**CPB-10**
- supports parallel and star communication
  (diagram shows CPB-10 in parallel communication)
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOR2 for inter-building communication on a CPB-10 communication loop

**RS-232**
- 22 AWG shielded cable
- 100 FT (30 m) maximum @ 9600 BPS

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**Communication Manager**
- RS-232 on ACU

**Current Draw**
- 270 mA

**10/100 Base-T**
- to network

**12V Power Adaptor**
- 12VDC to NETCOM2 or NETCOM6

**Current Draw**
- 270 mA

**RS232 Data Cable**
- to network

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**CPB-10**
- supports parallel and star communication
  (diagram shows CPB-10 in parallel communication)
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOR2 for inter-building communication on a CPB-10 communication loop

**RS-232**
- 22 AWG shielded cable
- 100 FT (30 m) maximum @ 9600 BPS

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**Communication Manager**
- RS-232 on ACU

**Current Draw**
- 270 mA

**10/100 Base-T**
- to network

**12V Power Adaptor**
- 12VDC to NETCOM2 or NETCOM6

**Current Draw**
- 270 mA

**RS232 Data Cable**
- to network

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**CPB-10**
- supports parallel and star communication
  (diagram shows CPB-10 in parallel communication)
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOR2 for inter-building communication on a CPB-10 communication loop

**RS-232**
- 22 AWG shielded cable
- 100 FT (30 m) maximum @ 9600 BPS

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**Communication Manager**
- RS-232 on ACU

**Current Draw**
- 270 mA

**10/100 Base-T**
- to network

**12V Power Adaptor**
- 12VDC to NETCOM2 or NETCOM6

**Current Draw**
- 270 mA

**RS232 Data Cable**
- to network

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**CPB-10**
- supports parallel and star communication
  (diagram shows CPB-10 in parallel communication)
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOR2 for inter-building communication on a CPB-10 communication loop

**RS-232**
- 22 AWG shielded cable
- 100 FT (30 m) maximum @ 9600 BPS

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**Communication Manager**
- RS-232 on ACU

**Current Draw**
- 270 mA

**10/100 Base-T**
- to network

**12V Power Adaptor**
- 12VDC to NETCOM2 or NETCOM6

**Current Draw**
- 270 mA

**RS232 Data Cable**
- to network

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**CPB-10**
- supports parallel and star communication
  (diagram shows CPB-10 in parallel communication)
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOR2 for inter-building communication on a CPB-10 communication loop

**RS-232**
- 22 AWG shielded cable
- 100 FT (30 m) maximum @ 9600 BPS

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection

**Communication Manager**
- RS-232 on ACU

**Current Draw**
- 270 mA

**10/100 Base-T**
- to network

**12V Power Adaptor**
- 12VDC to NETCOM2 or NETCOM6

**Current Draw**
- 270 mA

**RS232 Data Cable**
- to network

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- NC = No Connection
Figure 68 - Multiple ACU Communication - NETCOM2P or NETCOM6P/CB-485 (1 to 1)

Parts List
- PC
- ACU
- CB-485
- NETCOM2P or NETCOM6P
- 10/100 Base-T cable

Host PC with Communication Manager

to network

10/100 Base-T

Jumpers
ON
Run

ACU Circuit Board
(Rev. 11)

Communication terminal inactive when CB-485 connected to H1

Connect CB-485 ribbon cable to H1 on ACU
Figure 69 - Multiple ACU Communication - NETCOM2 or NETCOM6 (1 per ACU)

LED Legend
- RS232 indicates 9-pin terminal connected
- RX LED indicates PC polling ACU/ECU
- TX LED indicates ACU/ECU replying to PC
- ON LED indicates unit receiving power

Parts List
- PC
- 10/100 Base-T Cable
- ACU
- NETCOM2 or NETCOM6
- RS232 Data Cable

ACU Circuit Board (Rev. 11)

Current 270 mA

RS-232 RX TX ON LEDs
GND TD RD NC NC NC

NETCOM2 or NETCOM6

12VDC Power Adaptor (NETCOM2H or NETCOM6H)

12VDC to DPS12 (NETCOM2 or NETCOM6)

12V/100 Base-T

12VDC to network

10/100 Base-T
to network

MAC Address

00-20-4A-00-ST-D1

RS-232

22 AWG shielded cable
100 FT (30 m) maximum @ 9600 BPS

ACU Circuit Board (Rev. 11)

Short with jumper CB-485 Connection

GND RD DC DTRCTS

CB-485 Connection

Brown & White not used. Tape back separately.
Figure 70 - Multiple ACU Communication - NETCOM2WH or NETCOM6WH/CB-485s

**LED Legend**
- RS232 indicates 9-pin terminal connected
- RX LED indicates PC polling ACU/ECU
- TX LED indicates ACU/ECU replying to PC
- ON LED indicates unit receiving power

**Parts List**
- PC with network access
- CAT5 Cable - 2 twisted pairs
- ACU
- CB-485
- NETCOM2WH or NETCOM6WH
- RS-232 Data Cable
- Wireless Network Access Point

**ACU Circuit Board (Rev. 11)**

Connect CB-485 ribbon cable to H1 on ACU

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

CAT5
- RS485 cable maximum 2000 ft (609 m) @ 9600 BPS between CB-485s
- may substitute equivalent to CAT 5 - 2 twisted pairs
- maximum baud rate is 56,000 BPS

CB-485
Current Draw - 110 mA

MAC Address
Lantronix WiPort 00-20-4A-96-49-BC

RS-232 shielded 22AWG cable
30 m (100') max @ 9600 BPS

**Antenna**

Communication terminal inactive when CB-485 connected to H1

**Host PC with Communication Manager**
Figure 71 - Multiple ACU Communication - NETCOM2WH or NETCOM6WH/CPB-10s

**Parts List**
- PC with network connection
- 22 AWG 4 conductors shielded cable
- ACU
- CPB-10
- NETCOM2WH or NETCOM6WH
- RS232 Data Cable
- Wireless network access point

**Legend**
- GND = Ground
- R = Rx
- T = Tx
- B = Busy Line

**CPB-10**
- supports parallel and star communication
- maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- maximum distance between CPB-10s - 2000 ft (609 m)
- see MISCOMM2 for inter-building communication on a CPB-10 communication loop

**ACU Circuit Board (Rev. 11)**
- Communication terminal inactive when CPB-10 connected to H1
- Connect CPB10 ribbon cable to H1 on ACU

**LED Legend**
- RS232 indicates 9-pin terminal connected
- RX LED indicates PC polling ACU/ECU
- TX LED indicates ACU/ECU replying to PC
- ON LED indicates unit receiving power

**Maximum wireless range**
- 100 m (328 ft)
- based on indoor open air installation.

**Current Draw**
- 350 mA

**MAC Address**
- Lantronix WiPort
- 00-20-4A-96-49-BC

**RS-232**
- Supports parallel and star communication
- 9-pin Male Connector
- Maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- Maximum distance between CPB-10s - 2000 ft (609 m)
- See MISCOMM2 for inter-building communication on a CPB-10 communication loop

**Antenna**
- 22 AWG shielded cable
- 100 FT (30 m) maximum @ 9600 BPS

**Legend**
- RS232 indicates 9-pin terminal connected
- RX LED indicates PC polling ACU/ECU
- TX LED indicates ACU/ECU replying to PC
- ON LED indicates unit receiving power

**Current Draw**
- 40 mA

**Tape back**
- Brown & White not used
- Shield

**EIA/TIA 562**
- Signal

**Connect CPB10 ribbon cable to H1 on ACU**
Figure 72 - Multiple ACU Communication - NETCOM2WH or NETCOM6WH / 1 per ACU

Parts List
- PC with network connection
- ACU
- NETCOM2WH or NETCOM6WH
- RS232 Data Cable
- Wireless Network Access Point

Host PC with Communication Manager

12VDC Power Adaptor

NETCOM2WH or NETCOM6WH

Current Draw 350 mA

Brown & White not used. Tape back separately.

Green & Shield

Red

Black

Host PC with Communication Manager

ACU Circuit Board (Rev. 11)

RS-232

22 AWG shielded cable

100 FT (30 m) maximum

@ 9600 BPS

MAC Address

Lantronix WiPort

00-20-4A-96-49-BC

Antenna

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

LED Legend
- RS232 indicates 9-pin terminal connected
- RX LED indicates PC polling ACU/ECU
- TX LED indicates ACU/ECU replying to PC
- ON LED indicates unit receiving power

Communication 2

Short with jumper.

CB-485 Connection

GND TD RDDCDDTRCTS

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

9-pin Male Connector

NETCOM2WH or NETCOM6WH

Current Draw 350 mA

Brown & White not used. Tape back separately.

Green & Shield

Red

Black

ACU Circuit Board (Rev. 11)

RS-232

22 AWG shielded cable

100 FT (30 m) maximum

@ 9600 BPS

MAC Address

Lantronix WiPort

00-20-4A-96-49-BC

Antenna

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

9-pin Male Connector

NETCOM2WH or NETCOM6WH

Current Draw 350 mA

Brown & White not used. Tape back separately.

Green & Shield

Red

Black

Communication 2

Short with jumper.

CB-485 Connection

GND TD RDDCDDTRCTS

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

9-pin Male Connector

NETCOM2WH or NETCOM6WH

Current Draw 350 mA

Brown & White not used. Tape back separately.

Green & Shield

Red

Black

Communication 2

Short with jumper.

CB-485 Connection

GND TD RDDCDDTRCTS

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

9-pin Male Connector

NETCOM2WH or NETCOM6WH

Current Draw 350 mA

Brown & White not used. Tape back separately.

Green & Shield

Red

Black

Communication 2

Short with jumper.

CB-485 Connection

GND TD RDDCDDTRCTS

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

9-pin Male Connector

NETCOM2WH or NETCOM6WH

Current Draw 350 mA

Brown & White not used. Tape back separately.

Green & Shield

Red

Black

Communication 2

Short with jumper.

CB-485 Connection

GND TD RDDCDDTRCTS

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

9-pin Male Connector

NETCOM2WH or NETCOM6WH

Current Draw 350 mA

Brown & White not used. Tape back separately.

Green & Shield

Red

Black

Communication 2

Short with jumper.

CB-485 Connection

GND TD RDDCDDTRCTS

Maximum wireless range is 100 m (328 ft) based on indoor open air installation.

9-pin Male Connector
Figure 73 - Multiple ACU Communication - CB-485M/CB-485/MC33H

- Connect CB-485 ribbon cable to H1 on ACU

**Parts List**
- PC
- CAT5 Cable - 3 twisted pairs
- ACU
- CB-485
- CB485M
- MC33H Modem
- RS232 Modem Cable
- Dedicated Analog Phone Line

**CAT5**
- RS485 cable maximum 2000 ft (609 m) @ 9600 BPS between CB-485s
- may substitute equivalent to CAT 5 - 3 twisted pairs
- maximum baud rate is 19,200 with CB-485M
Figure 74 - Multiple ACU Communication - MC9600/CPB-10/MC33H

Important - see Communication Jumper J16 for Multiple ACUs with Modem/CPB-10 Configuration on next page.

Connect CPB10 ribbon cable to H1 on ACU
- PC (with serial port)
- 22 AWG 4 conductors shielded cable
- ACU
- CPB-10
- RS232 Modem Cable
- MC9600 Modem
- MC33H Modem
- Dedicated Analog Phone Line

Parts List
- PC (with serial port)
- 22 AWG 4 conductors shielded cable
- ACU
- CPB-10
- RS232 Modem Cable
- MC9600 Modem
- MC33H Modem
- Dedicated Analog Phone Line

ACU Circuit Board (Rev. 11)
- Supports parallel and star communication (diagram shows CPB-10 in parallel communication)
- Maximum distance 1st to last CPB-10 - 4000 ft (1219 m)
- Maximum distance between CPB-10s - 2000 ft (609 m)
- See MISCOMM2 for inter-building communication on a CPB-10 communication loop
Communication Jumper J16 for Multiple ACUs with CB-485M/CB-485 Configuration

On the ACU that is connected to the CB-485M (modem), set the main circuit board's communication to 9600 (pins 1 & 2) or 19,200 (pin 1) Keyscan Modem. On the remaining ACUs connected by CB-485s, set communication to the equivalent Keyscan serial baud rate.

CB-485M @ 9600 BPS

<table>
<thead>
<tr>
<th>J16 - Pins 1 &amp; 2</th>
<th>J16 - Pins 1 &amp; 2</th>
<th>J16 - Pins 1 &amp; 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>Main Circuit Board</td>
<td>Main Circuit Board</td>
<td>Main Circuit Board</td>
</tr>
<tr>
<td>CB-485M ACU</td>
<td>CB-485 ACU</td>
<td>CB-485 ACU</td>
</tr>
</tbody>
</table>

CB-485M @ 19200 BPS

<table>
<thead>
<tr>
<th>J16 - Pin 1</th>
<th>J16 - Pin 2</th>
<th>J16 - Pin 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>Main Circuit Board</td>
<td>Main Circuit Board</td>
<td>Main Circuit Board</td>
</tr>
<tr>
<td>CB-485M ACU</td>
<td>CB-485 ACU</td>
<td>CB-485 ACU</td>
</tr>
</tbody>
</table>

Communication Jumper J16 for Multiple ACUs with Modem/CPB-10 Configuration

On the ACU that is connected to the modem, set the main circuit board's communication to 9600 Keyscan Modem. On the remaining ACUs connected by CPB-10s, set communication to 9600 Keyscan Serial.
Communication LEDs

The CA 230, CA 4300, CA 8300, EC 1300, EC 2300, CB-485, and CPB-10 have on-board communication LEDs for diagnostic and troubleshooting. The table below outlines the LED and its diagnostic function. When calling Keyscan for technical support, indicating the state of the LED will assist our technicians in isolating potential difficulties.

**Table 11 - Communication LEDs**

### All CA & EC boards

<table>
<thead>
<tr>
<th>LED</th>
<th>State of LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green LED – TD</td>
<td>Flashing: Normal – Replying to PC</td>
</tr>
<tr>
<td></td>
<td>Not Illuminated – No response</td>
</tr>
<tr>
<td></td>
<td>Illuminated – Power or wiring fault</td>
</tr>
<tr>
<td>Red LED – RD</td>
<td>Flashing: Normal – Polling PC</td>
</tr>
<tr>
<td></td>
<td>Not Illuminated – No response</td>
</tr>
<tr>
<td></td>
<td>Illuminated – Power or wiring fault</td>
</tr>
</tbody>
</table>

### CB-485/CPB-10

<table>
<thead>
<tr>
<th>LED</th>
<th>State of LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green LED – TX</td>
<td>Flashing: Normal – Replying to PC</td>
</tr>
<tr>
<td></td>
<td>Not Illuminated – No response</td>
</tr>
<tr>
<td></td>
<td>Illuminated – Power or wiring fault</td>
</tr>
<tr>
<td>Red LED – RX</td>
<td>Flashing: Normal – Polling PC</td>
</tr>
<tr>
<td></td>
<td>Not Illuminated – No response</td>
</tr>
<tr>
<td></td>
<td>Illuminated – Power or wiring fault</td>
</tr>
</tbody>
</table>

| Red LED – B   | Not Illuminated – Normal                                                     |
|              | Illuminated – One of the following conditions exists:                       |
|              | a) Alarm in queue                                                           |
|              | b) Communication Manager's Unit Diagnostics communicating with PC           |
|              | c) Modem is dialing out                                                     |
Figure 75 - Communication LEDs CA & EC boards

![Diagram of communication LEDs on CA & EC boards]

Figure 76 - Communication LEDs on CB-485

![Diagram of communication LEDs on CB-485]

Figure 77 - Communication LEDs on CPB-10

![Diagram of communication LEDs on CPB-10]
Power-up and Test Voltages

Power Supply Specifications
The power supply for the ACUs and ECUs is a dual power supply with 2 linear DC outputs. Each output is rated at 12VDC – 1.2 Amp.

Wiring Connections
Before connecting power to the ACU, be sure to observe the following points:

- check the cable and wire connections
- ensure no short circuits exist when measuring voltages
- verify the DC polarity is correct for all equipment

Following the above guidelines ensures each device will function properly and not be damaged.

System Power-up Steps
1. Connect 12VDC power, Power Fail Detect, and Earth Ground to the ACU circuit board.
2. Connect backup battery.
3. Connect 2 x 16V 40VA or 16.5V 37VA Class 2 transformers. Must be CSA/UL approved transformers.
4. Repeat battery and transformer connections for additional power supplies.
5. After power is applied to the ACU, check ACU voltage test points. Refer to Table 12 and Table 13.
6. Load factory default settings by momentarily shorting the 2 pins on Clear Memory Jumper J1 on the ACU main circuit board while the ACU is powered. Do not short Jumpers J6 or J8 otherwise the factory default settings will not load properly and result in communication difficulties.
7. When all voltage and current measurements are verified as correct, you are ready to upload the database to the ACUs. Refer to the Client on-line help.

Notes
ACU's DC power input x 2.

For battery circuit and auxiliary power output to function, 2 transformers must be connected.

If any reader exceeds 150mA, connect reader red wire directly to separate DC supply's positive (+) terminal.

For monitoring an auxiliary power failure, the Auxiliary Power Fail Output terminal can be connected to an Auxiliary Input on the ACU's main circuit board.
Figure 78 - Power Supply Wiring

ACU Ground Lug

Aux Rdr Part In

12VDC

EARTH GND

12VDC

Power Fail Detect
ACU Power IN

Reader Terminal

ACU/ECU Circuit Board

ACU DC

Yellow

Red

Black

Reader/Auxiliary DC

Auxiliary Power Fail Output to Aux. Input

Primary 110 VAC

ACU 16V 40VA or ACU 16.5V 37VA Transformer

Aux/Rdr Supply 1.2 A max

Relay

Dual Power Supply

DPS R2A

C1 C3

Secondary

ACU Supply 1.2 A max

ACU 12V LED

AC 12V Power

Primary 110 VAC

ACU 16V 40VA or ACU 16.5V 37VA Transformer

12V Battery

Black

Red

Black

Red

Green

ACU Ground Lug

U1
Controller Voltage Test Points

The following table outlines the correct voltages for the test points on the ACU main circuit boards. Be sure to review the notes opposite the appropriate voltage test points to comply with proper measuring techniques or special circumstances.

Voltmeter Connections

- Voltmeter set to VDC
- V-Ω to test points
- Com to ground lug in ACU enclosure

Table 12 - Controller Test Points - Voltages

<table>
<thead>
<tr>
<th>Board Test Point</th>
<th>Voltage</th>
<th>Instructions/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reader Terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1 WHT</td>
<td>(+) 5VDC</td>
<td>White data 1</td>
</tr>
<tr>
<td>D0 GRN</td>
<td>(+) 5VDC</td>
<td>Green data 0</td>
</tr>
<tr>
<td>PWR RED</td>
<td>(+) 12VDC</td>
<td>Red DC Out</td>
</tr>
<tr>
<td>Reader Power Input</td>
<td>(+) 13.5VDC</td>
<td>Measure the + contact</td>
</tr>
<tr>
<td>ACU Power Input</td>
<td>(+) 13.5VDC</td>
<td>Measure the + contact</td>
</tr>
<tr>
<td>TP1</td>
<td>(+) 5VDC</td>
<td></td>
</tr>
<tr>
<td>TP2</td>
<td>(+) 12VDC</td>
<td></td>
</tr>
<tr>
<td>TP3</td>
<td>(-) 11VDC</td>
<td>TP3 voltage (-) 11VDC</td>
</tr>
</tbody>
</table>
| TP4             | (+) 5VDC| Measure TP4 for 1 minute.  
                    |        | If voltage constant at 5VDC, board processor OK 
                    |        | If voltage fluctuates or drops to 0VDC, board processor faulty. |
| TP5             | (+) 5VDC|                    |
| B1 – Lithium Battery | (+) 3VDC| Voltmeter V-Ω contact to metallic circle of lithium battery |

Input Points

- Input points with open circuit (+) 5VDC
- Input points shorted to common return 0VDC
Figure 79 - Controller Test Points – Voltages

**Reader Power / ACU Power**
- reader power input +13.5 VDC
- ACU power input +13.5VDC

Connect voltmeter common to ACU ground lug.

**Test Points**
- as indicated
- B1 Lithium Battery 3V

**Input Contacts**
- with no hardware connected 5VDC
- shorted to Common Return 0VDC
Controller Test Points – Communication Terminal

The following table outlines the correct voltages for the test points on the communication terminal on the ACU, the CB-485 or the CPB-10.

**Table 13 – Communication Voltage Test Points**

<table>
<thead>
<tr>
<th>Communication Test Point</th>
<th>Voltage</th>
<th>Instructions/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACU Communication Terminal</strong></td>
<td></td>
<td>Connect Voltmeter COM to GND on ACU Communication terminal block or green on data cable.</td>
</tr>
<tr>
<td>RS-232 connected to ACU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TD</td>
<td>(-) 9VDC</td>
<td>TD is an ACU generated voltage</td>
</tr>
<tr>
<td>RD</td>
<td>(-) 10VDC</td>
<td>RD is a PC generated voltage</td>
</tr>
<tr>
<td>DCD</td>
<td></td>
<td>Used for modems only</td>
</tr>
<tr>
<td>DTR</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>CTS</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td><strong>CB-485</strong></td>
<td></td>
<td>Connect Voltmeter COM to GND on ACU Communication terminal block or green on data cable.</td>
</tr>
<tr>
<td>At all ACUs</td>
<td></td>
<td>Remove jumper to plug in ribbon</td>
</tr>
<tr>
<td>GND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRN+</td>
<td>3.5VDC</td>
<td></td>
</tr>
<tr>
<td>WHT-</td>
<td>1.5VDC</td>
<td></td>
</tr>
<tr>
<td>BRN+</td>
<td>3.5VDC</td>
<td></td>
</tr>
<tr>
<td>WHT-</td>
<td>1.5VDC</td>
<td></td>
</tr>
<tr>
<td>TD</td>
<td>(-) 7VDC</td>
<td>TD is an ACU generated voltage</td>
</tr>
<tr>
<td>RD</td>
<td>(-) 7VDC</td>
<td>RD is a PC generated voltage</td>
</tr>
<tr>
<td><strong>Important</strong></td>
<td></td>
<td>When a CB-485 is used, the Communication terminal block on the ACU main circuit board is in-active. Measure only the CB-485 Communication terminal.</td>
</tr>
<tr>
<td><strong>CPB 10</strong></td>
<td></td>
<td>Connect Voltmeter COM to GND on ACU Communication terminal block or green on data cable.</td>
</tr>
<tr>
<td>At all ACUs</td>
<td></td>
<td>Remove jumper to plug in ribbon</td>
</tr>
<tr>
<td>GND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>12.8VDC</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>12.8VDC</td>
<td></td>
</tr>
<tr>
<td>TD</td>
<td>(-) 11VDC</td>
<td>TD is an ACU generated voltage</td>
</tr>
<tr>
<td>RD</td>
<td>(-) 10VDC</td>
<td>RD is a PC generated voltage</td>
</tr>
<tr>
<td><strong>Important</strong></td>
<td></td>
<td>When a CPB-10 is used, the Communication terminal block on the ACU main circuit board is in-active. Measure only the CPB-10 Communication terminal.</td>
</tr>
</tbody>
</table>
Figure 80 – ACU Communication Test Points

Figure 81 - CB-485 Communication Test Points
Figure 82 - CPB-10 Communication Test Points

Main Circuit Board

Communication 2

CB-485 Connection

H1

Communication terminal inactive when CPB-10 connected to H1

Ribbon cable connects from CPB-10 to main circuit board - H1

red stripe

CPB-10 Circuit Board

CPB-10 Terminal

GND TD RD DCD GND R T B DTR CTS

CPB-10 Circuit Board - Communication Terminal
Appendix A – HID Reader Connections

Appendix A reviews typical HID reader connections for the following models:

- Keyscan K-PROX2 (HID compatible 125 KHz) – page 107
- Keyscan K-VAN (HID compatible 125 KHz) – page 108
- Keyscan K-KPR (HID compatible 125 KHz) – page on page 109
- HID-5395 – page 108
- HID-5365 – page 111
- HID-6005 – page 111
- HID 5355 – page 112
- HID-5375 – page 113
- HID-5355KP – page 114
- HID iClass KEYR10 – page 115
- HID iClass KEYR40 – page 116
- HID iClass KEYRW400 – page 117
- HID iClass KEYRK40 – page 118

Power Specifications

The following table outlines HID reader power specifications:

Table 14 - HID Reader Power Specifications

<table>
<thead>
<tr>
<th>Reader</th>
<th>Power</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-PROX &amp; K-PROX SG (125 KHz HID compatible)</td>
<td>12VDC, 80mA</td>
<td></td>
</tr>
<tr>
<td>K-VAN</td>
<td>12VDC, 90mA</td>
<td></td>
</tr>
<tr>
<td>K-KPR</td>
<td>12VDC, 115mA + 20mA Interface = 135mA</td>
<td></td>
</tr>
<tr>
<td>HID-5365</td>
<td>12VDC, 50mA</td>
<td></td>
</tr>
<tr>
<td>HID-5395</td>
<td>12VDC, 50mA</td>
<td></td>
</tr>
<tr>
<td>HID-6005</td>
<td>12VDC, 50mA</td>
<td></td>
</tr>
<tr>
<td>HID-5355</td>
<td>12VDC, 155mA</td>
<td></td>
</tr>
<tr>
<td>HID-5355KP</td>
<td>12VDC, 155mA + 20mA Interface = 175mA</td>
<td></td>
</tr>
<tr>
<td>HID 5375</td>
<td>24VDC, 1.2A</td>
<td>Requires 18 AWG cable. Connect to separate 24VDC 2 Amp linear power supply. (Not supplied with ACU)</td>
</tr>
<tr>
<td>HID iClass – Rev A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID iClass KEYR10</td>
<td>12VDC, 225mA</td>
<td>Connect to separate 12VDC 4 Amp linear power supply (not supplied with</td>
</tr>
</tbody>
</table>
### Reader Power Notes

<table>
<thead>
<tr>
<th>Reader</th>
<th>Power</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(HID label – 6100AKN0010 – Rev A)</td>
<td></td>
<td>ACU kit) for CA8000 when connecting 8 readers. For all other ACU models connect power (red) of iClass reader directly to DPS-12 power.</td>
</tr>
<tr>
<td>HID iClass KEYR40</td>
<td>12VDC, 260mA</td>
<td>See note HID iClass KEYR10 – Rev A</td>
</tr>
<tr>
<td>(HID label – 6120AKN0010 – Rev A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID iClass KEYRK40</td>
<td>12VDC, 260mA + 20mA Interface = 280mA</td>
<td>See note HID iClass KEYR10 – Rev A</td>
</tr>
<tr>
<td>(HID label – 6130AKN001000 – Rev A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID iClass KEYRW400</td>
<td>12VDC, 260mA</td>
<td>See note HID iClass KEYR10 – Rev A</td>
</tr>
<tr>
<td>(HID label 6121AKN0010 – Rev A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID iClass – Rev B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID iClass KEYR10</td>
<td>12VDC, 75mA</td>
<td></td>
</tr>
<tr>
<td>(HID label – 6100BKN0010 – Rev B)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID iClass KEYR40</td>
<td>12VDC, 75mA</td>
<td></td>
</tr>
<tr>
<td>(HID label – 6120BKN0010 – Rev B)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID iClass KEYRK40</td>
<td>12VDC, 244mA + 20mA Interface = 264mA</td>
<td>Connect to separate 12VDC 4 Amp linear power supply (not supplied with ACU kit) for CA8000 when connecting 8 readers. For all other ACU models connect power (red) of iClass reader directly to DPS-12 power.</td>
</tr>
<tr>
<td>(HID label – 6130BKN001000 – Rev B)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HID iClass KEYRW400</td>
<td>12VDC, 75mA</td>
<td></td>
</tr>
<tr>
<td>(HID label – 6121BKN0010 – Rev B)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Installation Notes on Proximity Readers

Do not run reader cables in same conduit with AC power or signal cables.

Keep reader cables at a minimum distance of 12 inches or 30 centimetres from AC, computer data, telephone data, or electric lock device cables.

Do not install readers within 3.5 feet or 1.1 metres of computer CRTs.

Do not install readers in areas where broad spectrum EMI noise may be present. Devices such as motors, pumps, generators, and AC switching relays can create EMI noise.

Readers mounted on a metal surface can reduce the read range.

See HID manual for full operational details and recommendations.

### Important

The following diagrams illustrate HID readers with dual LEDs. On models 5365, 5395, and 6005 do not use the brown wire with "00" LED. If readers are single LED type "06", substitute the brown wire in place of the orange wire.

- S16 – 5 ON dual LED = 00
- S16 – 5 OFF single LED = 06
Figure 83 - Keyscan K-PROX2 (125 KHz HID compatible)

Orange not used. Isolate with electrical tape.

Blue - used for pre-alert option or isolate with electrical tape.

Shield not connected. Isolate with electrical tape.

ACU Ground Lug

Reader port on ACU main circuit board

3 pair shielded 22 AWG 500’ maximum

K-PROX2 shown with switch plate.
Figure 84 - Keyscan K-VAN Proximity Reader (125 KHz HID compatible)

Orange not used. Isolate with electrical tape.

Blue - used for pre-alert option or isolate with electrical tape.

Shield not connected. Isolate with electrical tape.

ACU Ground Lug

LED (Brown)

D1 (White)

D0 (Green)

PWR (Red)

GND (Black)

3 pair shielded 22 AWG

500' maximum

Reader port on ACU main circuit board
Figure 85 - Keyscan K-KPR Keypad / Proximity Reader (125 KHz HID compatible)

Shield not connected. Isolate with electrical tape.

Keypad – 8 Bit Burst Format
Figure 86 - HID-5395 Wiring

HID-5395 with 00 LED
Example 5395CG100

Shield not connected. Isolate with electrical tape.

3 pair shielded 22 AWG 500' maximum

Reader port on ACU main circuit board
Figure 87 - HID 5365 / 6005 Wiring

LED (Orange)  
D1 (White)  
D0 (Green)  
PWR (Red)  
GND (Black)  

HID-5365  
HID-6005  
with 00 LED  
Examples  
5365EGP00  
or  
6005BGB00  

Shield not connected. Isolate with electrical tape.  

3 pair shielded  
22 AWG  
500' maximum  

ACU Ground Lug  

Reader port on ACU main circuit board
Figure 88 - HID 5355 Wiring

Notes on HID 5355
Suitable for indoor and outdoor use. Maximum read range at 12VDC – ProxCard II card is 9” (22 cm) – ISOProxII card is 8” (20 cm).
Figure 89 - HID 5375 Wiring

Notes on HID 5375

Use separate DC power supply 24VDC.

Do not use HID-5375 readers in elevators.

For dual LEDs, set SW1 – switch 6 to OFF or for a single LED, set SW1 – switch 6 to ON.

For reader to beep on card presentation, set SW1 – switch 4 to ON.

For Wiegand output set switches and jumpers as follows:

- SW1 – switches 1, 2, 3 to ON
- SW5 – switches 3, 4, 5 to OFF
- P3 – jumpers to 1-2
- P4 – jumpers to 1-2

Connect LED to TB2-4
Note on HID 5355 KP
Reader/Keypad/LED ordered as 00 (4 bit burst) example 5355AGK00 (Red/Green colour)
Figure 91 - HID iClass KEYR10

Diagram illustrates connections and cables for Rev A.

**Note**
Rev B does not require separate power supply. Connect Red wire to PWR RED terminal on ACU reader port. Connect shield to ACU ground lug. 18 or 22 AWG shielded cable acceptable.
Diagram illustrates connections and cables for Rev A.

Note
Rev B does not require separate power supply. Connect Red wire to PWR RED terminal on ACU reader port. Connect shield to ACU ground lug. 18 or 22 AWG shielded cable acceptable.

Isolate with electrical tape.

3 pair shielded 18 AWG
500' maximum

ACU Ground Lug

Reader port on ACU main circuit board
Diagram illustrates connections and cables for Rev A.

Note
Rev B does not require separate power supply. Connect Red wire to PWR RED terminal on ACU reader port. Connect shield to ACU ground lug. 18 or 22 AWG shielded cable acceptable.

VDC + -

ACU Ground Lug

Shield

LED (Orange)

Black

Red

3 pair shielded 18 AWG
500' maximum

Reader port on ACU main circuit board
**Figure 94 - HID iClass KEYRK40**

![Diagram of HID iClass KEYRK40](image)

**Reader ACU Connections**
- +DC - Red
- Ground - Black
- Data 0 - Green
- Data 1 - White
- Green LED - Orange

**Shield**
- Shield not connected.
- Isolate with electrical tape.

**Reader/Keypad/LED**
- Reader/Keypad/LED ordered as 00 (4 bit burst) – example 6131AKN00100 (Red/Green colour)

**Note on HID iClass KEYRK40**
Reader/Keypad/LED ordered as 00 (4 bit burst) – example 6131AKN00100 (Red/Green colour)
Appendix B – Indala Reader Connections

Appendix B reviews typical Indala proximity reader connections for the following models:

- PX 603 – page 120
- PX 605 – page 120
- PX 610 – page 121
- PX 620 – page 122
- PXK 501 – page 123

Power Specifications

The following table outlines Indala reader power specifications:

### Table 15 - Indala Reader Power Specifications

<table>
<thead>
<tr>
<th>Reader</th>
<th>Power</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PX 603</td>
<td>12VDC, 100mA</td>
<td></td>
</tr>
<tr>
<td>PX 605</td>
<td>12VDC, 100mA</td>
<td></td>
</tr>
<tr>
<td>PX 610</td>
<td>12VDC, 150mA</td>
<td>Requires additional power supply when connected to CA 8100 circuit board.</td>
</tr>
<tr>
<td>PX 620</td>
<td>24VDC, 1.2A</td>
<td>Requires 18 AWG cable. Connect to separate 24VDC 2 Amp linear power supply. (Not supplied with ACU kit.)</td>
</tr>
<tr>
<td>PXK 501</td>
<td>12VDC, 100mA + 20mA Interface = 120mA</td>
<td>Current consumption includes interface circuit board</td>
</tr>
</tbody>
</table>

Installation Notes on Proximity Readers

Do not run reader cables in same conduit with AC power or signal cables.

Keep reader cables at a minimum distance of 12 inches or 30 centimetres from AC, computer data, telephone data, or electric lock device cables.

Do not install readers within 3.5 feet or 1.1 metres of computer CRTs.

Do not install readers in areas where broad spectrum EMI noise may be present. Devices such as motors, pumps, generators, and AC switching relays can create EMI noise.

Readers mounted on a metal surface can reduce the read range. See the Indala manual for recommendations.
Figure 95 - Indala PX 603 and PX 605 Wiring

LED (Brown)
D1 (White)
D0 (Green)
PWR (Red)
GND (Black)

Shield not connected.
Isolate with electrical tape.

3 pair shielded
22 AWG
500' maximum

LED BRN
D1 WHT
D0 GRN
PWR RED
GND BLK

ACU Ground Lug

Reader port on ACU main circuit board
Figure 96 - Indala PX610 Wiring

PX 610
12 VDC
3 pair shielded
22 AWG
500' maximum

Shield not connected. Isolate with electrical tape.

ACU Ground Lug

Black -

to separate DC power supply

Read port on ACU main circuit board

LED BRN WHT GRN RED BLK

Red +

White Green Red + Black 2

Black 1 & 2

White

Brown

Green

Red

Black 1
Important
Do not mount an Indala PX 620 reader in an elevator car. The environment is unsuitable and causes the reader to malfunction.

The PX 620 is factory tuned. If a PX 620 requires tuning, tune only once. Excessive tuning may cause the reader to permanently malfunction. Refer to the Indala documentation for instructions on tuning.
Figure 98 - Indala PXK 501 Wiring

Note on Indala PXK 501 Wiring
Reader/Keypad/LED ordered as 8 bit burst – example FP5061B-8 Bit Burst (Red only)
Appendix C – Keyscan WSSKP1 Connections

Appendix C reviews typical Keyscan WSSKP-1 keypad connections and keypad/reader combination connections:

- WSSKP-1 – page 125
- WSSKP-1 and reader combination – page 126

Table 16 - Keypad Power Specifications

<table>
<thead>
<tr>
<th>Reader</th>
<th>Power</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSSKP-1 (No digital output)</td>
<td>12VDC, 20mA</td>
<td>Orange wire not connected.</td>
</tr>
<tr>
<td>WSSKP-1 (Digital output)</td>
<td>12VDC 530mA</td>
<td>Orange wire connected.</td>
</tr>
</tbody>
</table>

Installation Notes on Keypads

Do not run keypad cables in same conduit with AC power or signal cables.

Keep keypad cables at a minimum distance of 12 inches or 30 centimetres from AC, computer data, telephone data, or electric lock device cables.

Do not install keypads within 3.5 feet or 1.1 metres of computer CRTs.

Do not install readers in areas where broad spectrum EMI noise may be present. Devices such as motors, pumps, generators, and AC switching relays can create EMI noise.

Important

Keypads made by other manufacturers may not have the necessary Wiegand interface. Hence these keypads will not operate in dual card and PIN modes; they will only operate in card/reader simulation.
Diagram Notes on WSSKP-1

Orange wire in keypad is used for negative digital trigger for a third party device such as a relay or a lock. If using the orange wire, it is triggered from local PIN stored in keypad memory. The keypad memory stores 28 Personal Identification Numbers. If orange wire is not used, tape back. See instructions with WSSKP-1 keypad for connections with third party devices.
Diagram Notes on WSSKP-1/Reader Combination

The above diagram generally applies to a retro-fit where either a reader or keypad is already installed. If a reader/keypad combination is required on a new installation consider such readers as a HID 5355KP or an Indala PXK501.
Appendix D – RXPROX Receiver / Transmitter Activation

Appendix D reviews typical RXPROX transmitter connections and TX2PRX and TX4PRX transmitter button activation.

<table>
<thead>
<tr>
<th>Table 17 - RXPROX (RF) Receiver Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
</tr>
<tr>
<td>Output Signal</td>
</tr>
<tr>
<td>Relays</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Internal Circuit RF side</td>
</tr>
<tr>
<td>RF Output – idle</td>
</tr>
<tr>
<td>RF Output – during read</td>
</tr>
<tr>
<td>RF Output – peak</td>
</tr>
</tbody>
</table>

Installation Notes on RXPROX Receiver

Do not mount 2 RF receivers within range of each other when using the same transmitter buttons. Assign different transmitter buttons for each RF receiver.

Do not run receiver cable in conduit with AC power or signal wiring. Keep receiver wiring at a minimum of 12" (30cm) from AC wiring.

If receivers exceed the number buttons on the transmitter, do not mount receivers within RF ranges. Minimum distance should be 200 feet.

Reset RXPROX Receiver

The following outlines steps to initiate the receiver for transmitter button activation. This resets the RXPROX receiver.

1. Ensure all receiver DIP switches are OFF.
2. Turn DIP switches 5 and 8 ON.
3. Press and hold the RESET button and apply power.
4. Release the RESET button and wait 5 seconds.
5. Turn DIP switch 5 and 8 to OFF.
6. Configure the receiver DIP switches as noted in TX2PRX and TX4PRX Transmitter Button Activation.
TX2PRX and TX4PRX Transmitter Button Activation

The RXPROX receiver has a set of 8 DIP switches. Switches 1 to 4 assign specific buttons on the TX2PRX and TX4PRX transmitters to activate the RXPROX receiver. All transmitter buttons may be active. Switches 5 to 8 must remain OFF.

The number on the back of the transmitter is the card number that is entered in the cardholder record form in the System V Client software.

**TX2PRX Transmitter DIP Switch Assignment**

- Receiver DIP switch 1 ON – activates transmitter button 1
- Receiver DIP switch 2 ON – activates transmitter button 2

![TX2 PRX](image)

**TX4PRX Transmitter DIP Switch Assignment**

- Receiver DIP switch 1 ON – activates transmitter button 1
- Receiver DIP switch 2 ON – activates transmitter button 2
- Receiver DIP switch 3 ON – activates transmitter button 3
- Receiver DIP switch 4 ON – activates transmitter button 4

![TX4 PRX](image)
Figure 101 - RXPROX Receiver Connections

- Black = position of DIP switch head
- ACU Ground Lug
- Shield
- Reader port on ACU main circuit board
- DIP Switches
- Reset Push Button
- LED
- Fuse
- GND 12VDC
- Red 12VDC
- White 12VDC
- Green Data 0
- White Data 1
- Data 0
- Data 1
- White GND
- Red 12VDC
- Green Data 0
- Red 12VDC
- Black GND
- Green 12VDC
- White 12VDC
- Red 12VDC
- Black 12VDC
- DIP Switches
- LED
- D1 D0 PWR GND BRN WHT GRN RED BLK
- Reader port on ACU main circuit board
Appendix E – Keyscan COMMex

Appendix E reviews typical COMMex connections to extend communication distances from PCs to access control units.

- COMMex overview – page 131
- COMMex connections – page 132

The Keyscan COMMex kit includes two circuit boards. Use one COMMex circuit board as the transmitter and the other as the receiver. Both circuit boards are identical with the exception that one of the circuit boards is mounted in a black case. The circuit board in the black case can be mounted in proximity to the PC or removed from the case if it is to be mounted in a remote enclosure. The maximum distance from the PC is 100 feet.

Table 18 - COMMex Power Specifications

<table>
<thead>
<tr>
<th>Unit</th>
<th>Power</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMex kit</td>
<td>12VDC, 300mA</td>
<td></td>
</tr>
</tbody>
</table>

Table 19 - COMMex Communication and Cables

<table>
<thead>
<tr>
<th>Communication Type</th>
<th>Maximum Distance</th>
<th>Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS232</td>
<td>100 feet</td>
<td>Minimum 18 AWG or 22AWG 3 conductor shielded</td>
</tr>
<tr>
<td>RS485</td>
<td>4000 feet</td>
<td>CAT 5 – 2 twisted pairs</td>
</tr>
</tbody>
</table>

Installation Notes on COMMex

From the COMMex circuit board that connects to the PC, insert the female socket end of data cable 40-2322 into a COM port. Be sure to connect the shield to an earth ground.
Figure 102 - COMMex Overview

PC to COM port

RS-232
100' maximum

COMMex Receiver

Mounted in black case

RS-485
4000' maximum

COMMex Kit
1 Transmitter & 1 Receiver

RS-232
100' maximum

COMMex Transmitter

Access Control Unit
Figure 103 - COMMex Connections

ACU or CPB-10 or CB-485 Communication Terminal

Connect to ACU power supply

Connect AC transformer at PC end

Connect shield to earth ground

40-2322 female cable end connects to PC COM port.
Appendix F – Wiegand Extenders WIEEX and CWIEEX

Appendix F reviews general information, installation guidelines, and connection diagrams for Keyscan RS485 Wiegand Extenders (WIEEX) and COAX Wiegand Extenders (CWIEEX). Wiegand extenders are used for doors and readers that exceed the 500 feet maximum distance from the ACU.

Diagrams can be found on the following pages:
- WIEEX/CWIEEX overview – page 135
- WIEEX-connections – page 136
- CWIEEX-connections – page 137
- WIEEX to OCB4 cable connections – page 138

Each type of Wiegand extender includes 1 transmitter and 1 receiver. The following additional components may be required to complete the installation of Wiegand extenders:
- 12VDC 1Amp power supply with battery backup
- mounting interface enclosure

Table 20 - WIEEX/CWIEEX Power Requirements

<table>
<thead>
<tr>
<th>Unit</th>
<th>Power</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIEEX Transmitter (Tx)</td>
<td>12VDC, 50mA</td>
<td></td>
</tr>
<tr>
<td>WIEEX Receiver (Rx)</td>
<td>12VDC, 50mA</td>
<td></td>
</tr>
<tr>
<td>CWIEEX Transmitter (Tx)</td>
<td>12VDC, 50mA</td>
<td></td>
</tr>
<tr>
<td>CWIEEX Receiver (Rx)</td>
<td>12VDC, 50mA</td>
<td></td>
</tr>
<tr>
<td>OCB-8</td>
<td>12VDC, 230mA</td>
<td>Optional – An OCB8 is required when not switching a 12VDC door lock or gate operator. See Figure 107 - WIEEX to OCB-8 Cable Connection on page 138.</td>
</tr>
</tbody>
</table>

Table 21 - WIEEX/CWIEEX Cables and Distances

<table>
<thead>
<tr>
<th>Unit Connections</th>
<th>Maximum Distance</th>
<th>Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIEEX Transmitter (Tx) to Reader</td>
<td>500 feet</td>
<td>Refer to Table 1 - Cable Requirements - Readers</td>
</tr>
<tr>
<td>WIEEX Transmitter (Tx) to Receiver (Rx)</td>
<td>4000 feet</td>
<td>CAT 5 - 1 twisted pair (communication)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 pair 18AWG power if no local independent power supply</td>
</tr>
<tr>
<td>WIEEX Receiver (Rx) to ACU</td>
<td>500 feet</td>
<td></td>
</tr>
<tr>
<td>CWIEEX Transmitter (Tx) to Reader</td>
<td>500 feet</td>
<td>Refer to Table 1 - Cable Requirements – Readers</td>
</tr>
<tr>
<td>CWIEEX Transmitter (Tx) to Receiver (Rx)</td>
<td>500 feet</td>
<td>RG59U</td>
</tr>
<tr>
<td>CWIEEX Receiver (Rx) to ACU</td>
<td>500 feet</td>
<td></td>
</tr>
</tbody>
</table>
**Installation Notes WIEEX (RS485)**

Existing 22AWG UTP can be used between a WIEEX transmitter and receiver provided it is in good condition without breaks or high impedance splices. Nominal resistance for 22AWG UTP is approximately 18 ohms/1000 feet.

Short J1 on the WIEEX transmitter and receiver.

Connect the WIEEX transmitter (Tx) to the reader, door contact, request to exit device, auxiliary input, and door lock, whichever are applicable.

Connect the WIEEX receiver (Rx) to the appropriate ACU terminals.

Power the transmitter with a 12VDC 1Amp power supply, if a local power supply is required and not sourced from the ACU.

The Door Unlock Output (RA2/OC) is defaulted for 'fail safe'. If 'fail secure' is required, connect a jumper wire from the RB4 terminal to the GND terminal on the transmitter.

The WIEEX transmitter (Tx) can control a lock device or relay to a maximum of 12VDC 500mA.

**Installation Notes CWIEEX (COAX)**

Existing coaxial cable can be used between a CWIEEX transmitter and receiver provided it is in good condition without breaks or high impedance splices.

Connect the WIEEX transmitter (Tx) to the reader, door contact, request to exit device, auxiliary input, and door lock, whichever are applicable.

Connect the WIEEX receiver (Rx) to the appropriate ACU terminals.

The Door Unlock Output (RA2/OC) is defaulted for 'fail safe'. If 'fail secure' is required, connect a jumper wire from the RB4 terminal to the GND terminal on the transmitter.

The CWIEEX transmitter (Tx) can control a lock device or relay to a maximum of 12VDC 500mA.
Figure 105 - WIEEX RS485 Transmitter/Receiver Connections

Reader

+12 VDC

Data GND

LED

White Data 1

Green Data 0

+5V

RA2 OC

RA1 D1

RA0 D0

RB5

RB4

DCD

DTR

RX

TX

GND

LED BRN

D1 WHT

D0 GRN

Data GND

12VDC

Connect H1 to OCB-II

WIEEX-Tx

Transmitter

WIEEX-Rx

Receiver

Failed Secure Lock

Door Unlock Output

Request to Exit Input N.O.

Door Contact Input N.C.

Auxiliary Input N.C.

Maximum 4000'

Connect H1 to OCB-II

J1 (shorted)

Trigger for Transmitter RA2 OC

D1 White

D0 Green

GND Black

Trigger for Transmitter RA2 OC

D1 White

D0 Green

GND Black

Request to Exit

Auxiliary Input

connect to open Auxiliary Input

Door Contact

Door Unlock Output

Maximum 4000'

Door 1212 1234

Exit  Auxiliary

Request to Exit

Door Contact

Auxiliary Input

for Communications Failure Output

connect to open Auxiliary Input

Failed

Secure

Lock

ACU Inputs

ACU Reader Port

ACU Lock Relay

DC Supply

+12 VDC

DC Supply (local)

COM
Figure 106 - CWIEEX - Coaxial Transmitter/Receiver Connections

Reader Port LED Brown
D1 White
D0 Green
GND Black

DC Supply (local)

Request to Exit Input N.O.
Door Contact Input N.C.
Auxiliary Input N.C.
Door Unlock Output

Request to Exit
Door Contact
Auxiliary Input for Communications Failure Output connect to an open Auxiliary Input

ACU Inputs

Door 1 2 Exit Auxiliary

12VDC

BLK GND
LED +
BRN LED
White Data 1
Green Data 0

Red +5V
RA2 OC
RA1 D1
RA0 D0
RB5
RB4
GND

+12VDC

Data GND
Red +12VDC

12VDC

CWIEEX-Tx Transmitter

CWIEEX-Rx Receiver

ACU Reader Port

PWR Red
GND Black
DC Supply

Maximum 500'

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Figure 107 - WIEEX to OCB-8 Cable Connection

WIEEX-Tx Transmitter

WIEEX-Rx Receiver

OCB-8

Relay 1 - Door Output
Relay 2 - Follows RB5 input state on Rx Receiver
Relay 3 - Follows RB4 input state on Rx Receiver
Relay 4-8 - Not Used

Cable connects to WIEEX transmitter.

12VDC Power Supply

- Connect to GND RB4/RB5 with switch to change OCB-8 relay 2/3 connected on WIEEX-Tx
- Follows RB5 input state on Rx Receiver
- Follows RB4 input state on Rx Receiver
- Not Used

Note: Relays 4 to 8, set jumper J4-J8 to reversed state
Appendix G – Handicap Accessibility Relay Option

The handicap accessibility relay is designed to connect with an accessibility operator that mechanically opens and closes a door. Presenting a card with the Handicap Accessibility designation at a valid door pulses a handicap (HC) output relay. The HC output relay pulses the accessibility operator and the system monitors the door contact based on the Handicap Door Held Open Time set in the System V software. To use the Handicap Relay option on CA 4300 and CA 8300 circuit boards, an additional OCB-8 is required.

Table 22 - OCB8 Power Specifications

<table>
<thead>
<tr>
<th>Unit</th>
<th>Power</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCB-8</td>
<td>12VDC, 230mA</td>
<td></td>
</tr>
</tbody>
</table>

Handicap Relays

Ensure that the HC Output Relay matches the Door Output as indicated below.

Table 23 - Handicap Relay/ Door Assignment

<table>
<thead>
<tr>
<th>Main Circuit Board/Output Control Board</th>
<th>Door # /HC Relay #</th>
<th>Ribbon Cable Connection to Main Circuit Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA 230/OCB-8</td>
<td>Door 1/HC Relay 5</td>
<td>Connect ribbon from OCB-8 to Control 1 (right terminal) on CA 230</td>
</tr>
<tr>
<td></td>
<td>Door 2/HC Relay 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relay 7 and 8 reserved for Pre-alert.</td>
<td></td>
</tr>
<tr>
<td>CA 4300/OCB-8 (optional)</td>
<td>Door 1/HC Relay 1</td>
<td>Connect ribbon on OCB-8 to Control 4 (right terminal) on CA 4300.</td>
</tr>
<tr>
<td></td>
<td>Door 2/HC Relay 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Door 3/HC Relay 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Door 4/HC Relay 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relays 5 to 8 not used.</td>
<td></td>
</tr>
<tr>
<td>CA 8300/OCB-8 (optional)</td>
<td>Door 1/HC Relay 1</td>
<td>Connect ribbon on OCB-8 to Control 4 (right terminal) on CA 8300.</td>
</tr>
<tr>
<td></td>
<td>Door 2/HC Relay 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Door 3/HC Relay 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Door 4/HC Relay 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Door 5/HC Relay 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Door 6/HC Relay 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Door 7/HC Relay 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Door 8/HC Relay 8</td>
<td></td>
</tr>
</tbody>
</table>
Figure 108 - Handicap Relay CA 230/OCB-8 Connections

Output Control Board (OCB-8)

When not used as HC outputs, relay 5 can be used as Aux Output 3 and relay 6 as Aux Output 4. Do not use relays for both functions.

* Connect ribbon cable from H1 terminal on OCB-8 to Control 1 (right) terminal on CA 230 circuit board.

** OCB-8 relay board is powered through ribbon cable when J9 is on ACU PWR.

OCB-8 ribbon cable may be connected to HL1 (left side) on CA 230 circuit board. Set J9 to Ext Pwr. Connect OCB-8 12V/Gnd to Auxiliary side of power supply. OCB-8s may be connected to HL1 and HR1 simultaneously.
Figure 109 - Handicap Relay CA 4300/OCB-8 Connections

Output Control Board (OCB-8)

To door accessibility operator

CA 4300 to OCB-8 Cable Connection

* Connect ribbon cable from H1 terminal on OCB-8 to Control 4 - HR4 terminal (right side) on CA 4300 circuit board. Set J9 to Ext Pwr. Connect OCB-8 12V/Gnd to Auxiliary side of power supply. OCB-8s may be connected to HL4 and HR4 simultaneously.

** OCB-8 relay board is powered through ribbon cable when J9 is on ACU PWR.
**Figure 110 - Handicap Relay CA 8300/OCB-8 Connections**

Output Control Board (OCB-8)

- Connect ribbon cable from H1 terminal on OCB-8 to Control 4 - HR4 terminal (right side) on CA 8300 circuit board.

**CA 8300 to OCB-8 Cable Connection**

- **OCB-8** relay board is powered through ribbon cable when J9 is on ACU PWR.

* Connect ribbon cable from H1 terminal on OCB-8 to Control 4 - HR4 terminal (right side) on CA 8300 circuit board.

** OCB-8 relay board is powered through ribbon cable when J9 is on ACU PWR.**

OCB-8 ribbon cable may be connected to HL4 (left side) on CA 8300 circuit board. Set J9 to Ext Pwr. Connect OCB-8 12V/Gnd to Auxiliary side of power supply. OCB-8s may be connected to HL4 and HR4 simultaneously.
Appendix H – Pre-alert Relay Option

The pre-alert relay advises when a door remains open at the half interval of the Door Held Open Time. This function is a feature within the panel and must be wired to an external device to function. To use the Pre-alert Relay option on CA 4300 or CA 8300 circuit boards, an additional OCB-8 is required.

Table 24 – OCB-8 Power Specifications

<table>
<thead>
<tr>
<th>Unit</th>
<th>Power</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCB-8</td>
<td>12VDC, 230mA</td>
<td></td>
</tr>
</tbody>
</table>

Pre-alerts

Depending on the number of doors and type of controller, ensure that the Pre-alert Relay on the output control board matches the correct Door Contact as indicated in the following table.

Table 25 - Pre-alert Relay to Door Assignments

<table>
<thead>
<tr>
<th>Main Circuit Board/Output Control Board</th>
<th>Number of Pre-alert Outputs</th>
<th>Pre-alert Relay # on OCB</th>
<th>Door Contact#</th>
<th>Ribbon Cable Connection to Main Circuit Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA 230/OCB-8</td>
<td>2</td>
<td>Relay 7</td>
<td>Door 1</td>
<td>Connect ribbon from OCB-8 to H1 on CA 230</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 8</td>
<td>Door 2</td>
<td></td>
</tr>
<tr>
<td>CA 4300/OCB-8 (optional)</td>
<td>4</td>
<td>Relay 5</td>
<td>Door 1</td>
<td>Connect ribbon on OCB-8 to Control 2 (right terminal) on CA 4300.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 6</td>
<td>Door 2</td>
<td>(Relays 1 to 4 for Auxiliary Outputs 5 to 8.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 7</td>
<td>Door 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 8</td>
<td>Door 4</td>
<td></td>
</tr>
<tr>
<td>CA 8300/OCB-8 (optional)</td>
<td>8</td>
<td>Relay 1</td>
<td>Door 1</td>
<td>Connect ribbon on OCB-8 to Control 3 (right terminal) on CA 8300.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 2</td>
<td>Door 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 3</td>
<td>Door 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 4</td>
<td>Door 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 5</td>
<td>Door 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 6</td>
<td>Door 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 7</td>
<td>Door 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay 8</td>
<td>Door 8</td>
<td></td>
</tr>
</tbody>
</table>

Important

All relays on the OCB-8 board are dedicated as Pre-alert output relays when used on the CA 8300 circuit board.
**Figure 111 - Pre-alert Relay CA 230/OCB-8 Connections**

**CA 230 to OCB-8 Cable Connection**

- Connect ribbon cable from H1 terminal on OCB-8 to Control 1 (right) terminal on CA 230 circuit board.

- OCB-8 ribbon cable may be connected to HL1 (left side) on CA 230 circuit board. Set J9 to Ext Pwr. Connect OCB-8 12V/Gnd to Auxiliary side of power supply. OCB-8s may be connected to HL1 and HR1 simultaneously.

---

* Connect ribbon cable from H1 terminal on OCB-8 to Control 1 (right) terminal on CA 230 circuit board.

** OCBC-8 relay board is powered through ribbon cable when J9 is on ACU PWR.
**Figure 112 - Pre-alert Relay CA 4300/OCB-8 Connections**

1. **Connect ribbon cable from H1 terminal on OCB-8 to Control 2 - HR2 (right) terminal on CA 4300 circuit board.**
2. **OCB-8 ribbon cable may be connected to HL2 (left side) on CA 4300 circuit board. Set J9 to Ext Pwr. Connect OCB-8 12V/Gnd to Auxiliary side of power supply. OCB-8s may be connected to HL2 and HR2 simultaneously.**

**Pre-alert device mounted at door**

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Figure 113 - Pre-alert Relay CA 8300/OCB-8 Connections

Output Control Board (OCB-8)

Pre-alert Output

Relay 8  Relay 7  Relay 6  Relay 5

J1  J2  J3  J4

Relay 1  Relay 2  Relay 3  Relay 4

J5  J6  J7  J8

Pre-alert device mounted at door

CA 8300 to OCB-8 Cable Connection

CA 8300 Terminal

OCB-8 Terminal

H1

HL3  HR3

red stripe

Connect ribbon cable from H1 terminal on OCB-8 to Control 3 - HR3 terminal (right side) on CA 8300.

OCB-8 ribbon cable may be connected to HL3 (left side) on CA 8300 circuit board. Set J9 to Ext Pwr. Connect OCB-8 12V/Gnd to Auxiliary side of power supply. OCB-8s may be connected to HL3 and HR3 simultaneously.

* OCB-8 relay board is powered through ribbon cable when J9 is on ACU PWR.
Appendix I – MISCOMMM2 Communication between Buildings on a CPB-10 Loop

For ACU communication between two buildings on a CPB-10 loop, we recommend using one of the following devices: dial-up modem, fiber optic modem, short haul modem or an asynchronous line driver with optical isolation.

When using a fiber optic modem, short haul modem, or an asynchronous line driver with optical isolation, a Miscellaneous Communication Board (MISCOMMM2) is required.

The MISCOMMM2 consists of two boards that are modified CPB-10s. One board connects to the ACU via a ribbon cable and the second connects via a terminal block to the fiber optic modem, short haul modem, or asynchronous line driver with optical isolation. The following table and diagrams illustrate voltages and installation connections for a single ACU and multiple ACUs.

- MISCOMMM2 inter-building communication to a single ACU – page 148
- MISCOMMM2 connections – to a single ACU – page 149
- MISCOMMM2 inter-building communication to multiple ACUs – page 150
- MISCOMMM2 connections to multiple ACUs – page 151

Important
We do not recommend using two CPB-10s for inter-building communication as the potential for a ground loop surge exists which may damage equipment.

Ground Loops
A ground loop is a current across a cable created by a difference in potential between two grounded points, as may exist with two buildings connected by a long run of EIA/TIA-562, RS485 or other data cables. When two devices are connected with potential ground differences, voltage flows from high to low through the data cable, even the ground wire. If the voltage potential is large enough, the equipment is unable to handle the excess voltage and as a result the communication ports are damaged. Even small ground loop voltages cause transmission errors with data signals riding on top of the ground loop current.

Table 26 - MISCOMMM2 Voltages

<table>
<thead>
<tr>
<th>Board</th>
<th>Contact</th>
<th>Voltage</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MISCOMMM2</td>
<td>7 (GND) to 1</td>
<td>(+) 12VDC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 (GND) to 2</td>
<td>(-) 8 to (-) 12VDC</td>
<td>line driver generated</td>
</tr>
<tr>
<td></td>
<td>7 (GND) to 3</td>
<td>(-) 8 to (-) 12VDC</td>
<td>pin 3 generated</td>
</tr>
<tr>
<td></td>
<td>7 (GND) to 5</td>
<td>(-) 10VDC</td>
<td></td>
</tr>
</tbody>
</table>
Figure 114 - MISCOMM2 – Inter Building Communication to a single ACU
Figure 115 - MISCOMM2 Connections – to a single ACU

Building 1 - last ACU in communication loop

- Connect to H1 on ACU
- Connect to CPB10 terminal
- Red stripe

RS232 from PC, modem, or TCP/IP Building 1

RS232

RS232 from Line Driver or Fiber Modem

Legend
G = Green
T = Black
R = Red
B = White
Figure 116 - MISCOMM2 Inter Building Communication to Multiple ACUs

Building 1

ACU 1
- Main Circuit Board
- CPB-10
- RS232
- EIA/TIA 562

ACU 2
- Main Circuit Board
- Ribbon Cable
- Terminal Block
- MISCOMM2

Building 2

ACU 2
- Main Circuit Board
- CPB-10
- EIA/TIA 562

ACU 1
- Main Circuit Board
- CPB-10
- RS232 in from Building 1

via Line Driver or Fiber Modem

RS232 out
Figure 117 - MISCOMM2 Connections to Multiple ACUs

Building 1 - last ACU in communication loop

- Connect to H1 on ACU
- Connect to CPB10 terminal
- MISCOMM2
- EIA/TIA 562

From CPB-10 in previous ACU in Building 1

Red stripe

RS232 to Line Driver with optical isolation or Fiber Modem connecting with Building 2

Factory wired

Legend:
- G = Green
- T = Black
- R = Red
- B = White

Building 2

Connect to H1 on ACU

ACU 1

ACU 2

RS232 from Line Driver or Fiber Modem

EIA/TIA 562

CPB-10 Terminals

Gnd TD RD DCD Gnd R B DTR CTS

Gnd TD RD DCD Gnd R B DTR CTS
Appendix J – Telephone Entry Systems

Keyscan access control systems interface with two types of telephone entry systems:

- Phone Bill – requires a dedicated telephone line
- No Phone Bill – requires relay control equipment

Supported Telephone Entry Systems

Keyscan systems interface with the following major brands of telephone entry systems, which have a communication port and transmit visitor activity information:

- Enterphone 2000, Electra, Axess, and Crusader
- Select Engineered Systems (SES), TEC, and CAT
- Sentex Infinity

Keyscan Telephone Interface Kits

Keyscan offers the following 3 interface kits:

- VIS100 SES interface kit used with Enterphone Electra or SES, TEC and CAT series entrance panels. These panels require an OPTKSERIAL communications interface board from the manufacturer. See page 154 for connections.
- VIS100 STX interface kit used with Sentex Infinity series entrance panel. See page 155 for connections.

Test Mode

Terminal RB7/D1 on the interface is used for testing Wiegand output wiring and board operation. To test, connect a wire from RB7/D1 to ground and apply power to the interface board. The interface board outputs card number 12345, batch 000 in test mode. To exit test mode, remove the wire from RB7/D1.

Entering Access Codes in Client Software

Each suite or tenant must be given a record that is created in the Cardholder form from the Keyscan Client software as follows:

- First Name field – suite number or suite name
- Last Name field – last name of tenant
- Card Number – entry code or relay number
- Batch field – 255

Refer to the Client on-line help for setting access levels, time zones etc.
Figure 118 - VIS100 - ENT Connections

Telephone Entry System with Serial Port
(Viscount 2000 - no phone bill control unit)
Entry Code = Card #

Serial Port

RS-232 signal
4 conductor
shielded cable
100' maximum

Wiegand signal
5 conductor
shielded cable
500' maximum

RS-232 Transmitted [ASCII]
- 9600 baud
- 8 bit
- no parity
- serial string
At the prompt, type: [12345] as instructed below
[12345] (then press the Enter key)

* RB7/D1 - Test Mode
Figure 119 - VIS100 SES Connections

Telephone Entry System with Serial Port
Select Engineered Systems
TEC or CAT Entry Systems and
Enterphone Electra 2 TEC2
require OPTKSERIAL
Entry Code = Card #

Serial Port

RS-232 signal
4 conductor
shielded cable
100' maximum

VIS100-SES
(formally ELK-100)
Interface
12 Volts DC 150 mA Input

Wiegand signal
5 conductor
shielded cable
500' maximum

RS232 Transmitted [ASCII]
- 9600 baud
- 8 bit
- no parity
- serial string
At the prompt, type: CODE 123 OPEN as instructed below

CODE (insert a space)123 (insert 2 spaces)OPEN (insert a space and then press the Enter key)
Figure 120 - VIS100 STX Connections

- **Telephone Entry System with Serial Port**
- **Sentex Infinity Entry Code**
  - Single Line LCD
  - Large LCD
- **Comport B on board**
- **Short RTS + CTS**

*RB7/D1*: Test Mode

**VIS100-STX Interface**
- 12 Volts DC 150 mA Input

**RS-232 Transmitted [ASCII]**
- 4800 baud
- 8 bit
- no parity
- serial string

At the prompt, type: `[PHONE ENTRY 12345 GRANTED]` as instructed below

[(insert a space) PHONE (insert a space) ENTRY (insert 2 spaces) 12345
(insert 2 spaces) GRANTED] (press the Enter key)
Appendix K – 'MISC-BRC' Barcode Reader Interface

The MISC-BRC barcode reader interface is a customized interface for EZBarcode or BR-7 barcode readers manufactured by TimeKeeping Systems. Most barcode symbologies are supported including the following bar code types:

- Code 39
- Interleaved 2 of 5
- Codebar
- UPC-A
- UPC-E
- EAN
- Code 11
- Code 93
- Code 128
- MSI

The MISC-BRC barcode reader interface, based on client requests, is customized for truncating large numbers to a Wiegand protocol. The interface board has a custom project number printed on a white label on the central processing chip. Please do not remove this label; it may be required as a reference by our technical support department for potential troubleshooting.

**Test Mode**

Terminal RB7/D1 on the interface is used for testing Wiegand output wiring and board operation. To test, connect a wire from RB7/D1 to ground and apply power to the interface board. The interface board outputs card number 12345, batch 000 in test mode. To exit test mode, remove the wire from RB7/D1.

**Figure 121 - Bar Code Card Placement Specifications**
Figure 122 - MISC-BRC Barcode Reader Interface Connections

Barcode Reader

- Black
- Orange
- Brown
- Red
- Green

RS-232 Signal
5 conductor shielded cable
100' maximum

VIS100-WZ/485 Interface R3
Power requirements
12 VDC 150 mA

Project number

Wiegand Signal
4 conductor cable
500' maximum

12VDC Power Supply

*RB7/D1 terminal used for test mode
### Table 27 - CA 230 Quick Reference

<table>
<thead>
<tr>
<th>Function</th>
<th>Location</th>
<th>Instructions/Notes</th>
<th>Additional Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>The DPS12 power supply included has sufficient output for 1 ACU and 5 OCB-8 circuit boards.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounding</td>
<td>GND terminal</td>
<td>Connect ground lug in ACU to cold water pipe ground.</td>
<td>See Figure 78.</td>
</tr>
</tbody>
</table>
| Input Reader Power| (+) and (-) 12VDC right side terminals - AUX RDR PWR IN | (-) Black to (-) AUX Alarm on power supply  
(+ Red to (+) AUX Alarm on power supply | See Figure 78. |
| Input Board Power | (+) and (-) 12VDC left side terminals - AUX RDR PWR IN | (-) Black to (-) Power ACU on power supply  
(+ Red to (+) Power ACU on power supply | See Figure 78. |
| Reader 1 and 2    | Data 0, Data 1 | Wiegand Signal                                                                     | See Figure 31. |
| Reader Port Fuses | F1 – Reader 1  
F2 – Reader 2 | To reset fuse, disconnect reader from terminal. Fuse automatically resets. Reconnect reader to terminal. | |
| Setting Jumpers   | J16 – System Settings | Sets Communications and System Settings | See page 50. |
|                   | J1 – Clear ACU Memory | Momentarily short jumper            | See page 60. |
|                   | J3 – Reader Types | Sets system to specific reader types. | See page 54. |
|                   | J18 – Address/External Settings | Sets the input supervision type | See page 57. |
| Wiegand LED bit counters | L1, L0 | L1 counts first binary digit  
L0 counts the second binary digit | See page 56. |
| Relay Status Jumpers (OCB-8 Circuit Board) | JR1 – JR8 | Right side – Normal  
Left side – Reversed | See page 29. |
<p>| Communication     | CB-485 Connection | When CB-485 Connection terminal is in use – CPB-10 or CB-485, the main circuit board Communication block is deactivated. | Main circuit board is RS232. |
| Communication 2   | Reserved |                                                                                   |                      |
| Controller Test Voltages |                                                                                   | See Table 12 on page 100. |
| Communication Test Voltages |                                                                                   | See Table 13 on page 102. |</p>
<table>
<thead>
<tr>
<th>Function</th>
<th>Location</th>
<th>Instructions/Notes</th>
<th>Additional Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ribbon Cable Connection to OCB-8</td>
<td>Control 1 (right terminal block)</td>
<td>Connect ribbon cable to H1 on OCB-8 Terminal. Relay 1 and 2 are Door Outputs Relay 3 and 4 are Auxiliary relays (Relays 5 &amp; 6 may be used as Auxiliary relays if not assigned as Handicap relays.) Relay 5 and 6 are Handicap relays. Relay 7 and 8 are Pre-alert relays.</td>
<td>See Figure 20 on page 32. See Figure 20 on page 32. See Figure 32 on page 47. See Figure 108 on page 140. See Figure 111 on page 144.</td>
</tr>
</tbody>
</table>
Figure 124 - CA 4300 Circuit Board

Key Points
- **ACU Power In**: Indicates ACU power input.
- **12V/DC EARTH**: Shows Earth connection for 12VDC power.
- **Test Points**: TP1, TP2, TP3, TP4 for various voltages and connections.
- **Reader Port LED**: Reader Port LED D1, D0, Par, Gnd, Bm, Wh, Gr, Rd, Bl.
- **Reader Type**: Reader Type 1, Reader Type 2, Reader Type 3.
- **Reader Port**: Reader Port 5V Normal, Reader Port 5V TX, Reader Port 5V RX.
- **IOCB 3216**: IOCB Circuit Board 3216.
- **U43**: U43 Part in Circuit.
- **CA R11**: CA RA 11 Circuit.
- **Request to Exit**: N.O. for request to exit.
- **16 Supervised Auxiliary/Alarm Inputs**: N.C. for 16 supervised auxiliary/alarm inputs.
- **Communication 2**: CB 485 Connection.

Additional Details
- **Current Consumption**: 140 mA MAX for ACU current consumption.
- **Address | Ext Jmp**: Binary addresses for external jumps.
- **Request to Exit N.O.**: Request to exit in normal open (N.O.) state.
- **Communication**: GND, TD, RD, DB9 connector for communication.
- **Common Return**: Connections for common return.

Components
- **Lithium Battery**: B1, 5V power supply for lithium battery.
- **R11**: R11 part in circuit.
- **Reader Type**: Reader type with pinouts.
- **System Prom**: System PROM with pinouts.
- **Clock Chip**: Clock chip with pinouts.
- **IOCB**: IOCB circuit board with connections and pinouts.
- **F11**: F11 part in circuit with pinouts.
- **Reader Prom**: Reader PROM with pinouts.
- **Reader Reset**: Reader reset function.
- **Clear Memory**: Clear memory function with pinouts.

Legend
- **12V/DC +12V / -12V**
- **Power In 12VDC**
- **Power Fail Detect**
- **ACU Power IN**
- **5V Lithium Battery**
- **L1 L0 Reader Reset**
- **J3 Reader Type**
- **TP1 TP2 TP3 TP4 Reader Port**
- **IOCB 3216**
- **U43**
- **CA R11**
<table>
<thead>
<tr>
<th>Function</th>
<th>Location</th>
<th>Instructions/Notes</th>
<th>Additional Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>The DPS12 power supply included has sufficient output for 1 ACU and 5 OCB-8 circuit boards.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounding</td>
<td>GND terminal – AUX RDR PWR IN</td>
<td>Connect ground lug in ACU to cold water pipe ground</td>
<td>See Figure 78.</td>
</tr>
<tr>
<td>Input Reader Power</td>
<td>(+) and (-) 12VDC upper terminals - AUX RDR PWR IN</td>
<td>(-) Black to (-) AUX Alarm on power supply&lt;br&gt;(+) Red to (+) AUX Alarm on power supply</td>
<td>See Figure 78.</td>
</tr>
<tr>
<td>Input Board Power</td>
<td>(+) and (-) 12VDC lower terminals - AUX RDR PWR IN</td>
<td>(-) Black to (-) Power ACU on power supply&lt;br&gt;(+) Red to (+) Power ACU on power supply</td>
<td>See Figure 78.</td>
</tr>
<tr>
<td>Readers 1 to 4</td>
<td>Data 0, Data 1</td>
<td>Wiegand Signal</td>
<td>See Figure 31.</td>
</tr>
<tr>
<td>Reader Port Fuses</td>
<td>F1 – Reader 1&lt;br&gt;F2 – Reader 2&lt;br&gt;F3 – Reader 3&lt;br&gt;F4 – Reader 4</td>
<td>To reset fuse, disconnect reader from terminal. Fuse automatically resets. Reconnect reader to terminal.</td>
<td></td>
</tr>
<tr>
<td>Setting Jumpers</td>
<td>J16 – System Settings&lt;br&gt;J1 – Clear ACU Memory&lt;br&gt;J17 – Software Selection&lt;br&gt;J3 – Reader Types&lt;br&gt;J18 – Address/External Settings</td>
<td>Sets Communications and System Settings&lt;br&gt;Momentarily short jumper&lt;br&gt; Sets system software/PROM versions&lt;br&gt; Sets system to specific reader types.&lt;br&gt; Sets the input supervision type</td>
<td>See page 50.&lt;br&gt;See page 60.&lt;br&gt;See page 53.&lt;br&gt;See page 54.&lt;br&gt;See page 57.</td>
</tr>
<tr>
<td>Wiegand LED bit counters</td>
<td>L1, L0</td>
<td>L1 counts first binary digit&lt;br&gt;L0 counts the second binary digit</td>
<td>See page 56.</td>
</tr>
<tr>
<td>Communication</td>
<td>CB-485 Connection</td>
<td>When CB-485 Connection terminal is in use – CPB-10 or CB-485, the main circuit board Communication block is deactivated.</td>
<td>Main circuit is RS232.</td>
</tr>
<tr>
<td>Communication 2</td>
<td>Reserved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controller Test Voltages</td>
<td></td>
<td></td>
<td>See Table 12 on page 100.</td>
</tr>
<tr>
<td>Communication Test Voltages</td>
<td></td>
<td></td>
<td>See Table 13 on page 102.</td>
</tr>
<tr>
<td>Function</td>
<td>Location</td>
<td>Instructions/Notes</td>
<td>Additional Reference</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>--------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Ribbon Cable Connection to OCB-8</td>
<td>1st OCB 8</td>
<td>H1 on OCB-8 to Control 1 (right terminal) CA 4300 (red stripe on bottom)</td>
<td>See Figure 21 on page 33.</td>
</tr>
<tr>
<td>2nd OCB 8 (optional)</td>
<td></td>
<td>H1 on OCB 8 to Control 2 (right terminal) CA 4300 Use Control 2 for Pre-Alert relays (red stripe on bottom)</td>
<td>See Figure 112 on page 145.</td>
</tr>
<tr>
<td>Control 3 not used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd OCB 8 (optional)</td>
<td></td>
<td>H1 on OCB 8 to Control 4 (right terminal) CA 4300 Use Control 4 for Handicap Accessibility relays. (red stripe on bottom)</td>
<td>See Figure 109 on page 141.</td>
</tr>
<tr>
<td>Control 5 not used</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This page is intentionally blank.
Figure 125 - CA 8300 Circuit Board
### Table 29 - CA 8300 Quick Reference

<table>
<thead>
<tr>
<th>Function</th>
<th>Location</th>
<th>Instructions/Notes</th>
<th>Additional Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>The DPS12 power supply included has sufficient output for 1 ACU and 5 OCB-8 circuit boards.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounding</td>
<td>GND terminal – AUX RDR PWR IN</td>
<td>Connect ground lug in ACU to cold water pipe ground</td>
<td>See Figure 78.</td>
</tr>
</tbody>
</table>
| Input Reader Power     | (+) and (-) 12VDC upper terminals - AUX RDR PWR IN | (-) Black to (-) AUX Alarm on power supply  
                        |                                  | (+) Red to (+) AUX Alarm on power supply                                            | See Figure 78.      |
| Input Board Power      | (+) and (-) 12VDC lower terminals - AUX RDR PWR IN | (-) Black to (-) Power ACU on power supply  
                        |                                  | (+) Red to (+) Power ACU on power supply                                            | See Figure 78.      |
| Readers 1 to 8         | Data 0, Data 1                   | Wiegand Signal                                                                      | Main circuit board is RS232. |
| Reader Port Fuses      | F1 – Reader 1                    | To reset fuse, disconnect reader from terminal. Fuse automatically resets. Reconnect reader to terminal. |
|                        | F2 – Reader 2                    |                                                                                     |                      |
|                        | F3 – Reader 3                    |                                                                                     |                      |
|                        | F4 – Reader 4                    |                                                                                     |                      |
|                        | F5 – Reader 5                    |                                                                                     |                      |
|                        | F6 – Reader 6                    |                                                                                     |                      |
|                        | F7 – Reader 7                    |                                                                                     |                      |
|                        | F8 – Reader 8                    |                                                                                     |                      |
| Setting Jumpers        | J16 – System Settings            | Sets Communications and System Settings                                              | See page 50.         |
|                        | J1 – Clear ACU Memory            | Momentarily short jumper                                                            | See page 60.         |
|                        | J17 – Software Selection         | Sets system software/PROM versions                                                 | See page 53.         |
|                        | J3 – Reader Types                | Sets system to specific reader types.                                              | See page 54.         |
|                        | J18 – Address/External Settings  | Sets the input supervision type                                                    | See page 57.         |
| Wiegand LED bit counters | L1, L0                          | L1 counts first binary digit  
                         |                                  | L0 counts the second binary digit                                                  | See page 56.         |
| Relay Status Jumpers   | JR1 – JR8                        | Right side – Normal  
<p>| Communication          | CB-485 Connection                | When CB-485 Connection terminal is in use – CPB-10 or CB-485, the main circuit board Communication block is de-activated. |                      |
| Communication 2        | Reserved                         |                                                                                     |                      |</p>
<table>
<thead>
<tr>
<th>Function</th>
<th>Location</th>
<th>Instructions/Notes</th>
<th>Additional Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller Test Voltages</td>
<td></td>
<td>See Table 12 on page 100.</td>
<td></td>
</tr>
<tr>
<td>Communication Test Voltages</td>
<td></td>
<td>See Table 13 on page 102.</td>
<td></td>
</tr>
<tr>
<td>Ribbon Cable Connection to OCB 8</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; OCB 8</td>
<td>H1 on OCB 8 to Control 1 (right terminal) CA 8300 Use Control 1 for Door Outputs (red stripe on bottom)</td>
<td>See Figure 22 on page 34.</td>
</tr>
<tr>
<td></td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; OCB 8</td>
<td>H1 on OCB 8 to Control 2 (right terminal) CA 8300 Use Control 2 for Aux. Alarm Outputs. (red stripe on bottom)</td>
<td>See Figure 34 on page 49.</td>
</tr>
<tr>
<td></td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; OCB 8 (optional)</td>
<td>H1 on OCB 8 to Control 3 (right terminal) CA 8300 Use Control 3 for Pre-Alerts (red stripe on bottom)</td>
<td>See Figure 113 on page 146.</td>
</tr>
<tr>
<td></td>
<td>4&lt;sup&gt;th&lt;/sup&gt; OCB 8 (optional)</td>
<td>H1 on OCB 8 to Control 4 (right terminal) CA 8300 Use Control 4 for Handicap Relays (red stripe on bottom)</td>
<td>See Figure 110 on page 142.</td>
</tr>
</tbody>
</table>

Control 5 not used
This page is intentionally blank.
<table>
<thead>
<tr>
<th>Function</th>
<th>Location</th>
<th>Instructions/Notes</th>
<th>Additional Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td>The DPS12 power supply included has sufficient output for 1 ACU and 5 OCB-8 circuit boards.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounding</td>
<td>GND terminal – AUX RDR PWR IN</td>
<td>Connect ground lug in ACU to cold water pipe ground</td>
<td>See Figure 78.</td>
</tr>
<tr>
<td>Input Reader Power</td>
<td>(+) and (-) 12VDC upper terminals - AUX RDR PWR IN</td>
<td>(-) Black to (-) AUX Alarm on power supply&lt;br&gt;(+) Red to (+) AUX Alarm on power supply</td>
<td>See Figure 78.</td>
</tr>
<tr>
<td>Input Board Power</td>
<td>(+) and (-) 12VDC lower terminals - AUX RDR PWR IN</td>
<td>(-) Black to (-) Power ACU on power supply&lt;br&gt;(+) Red to (+) Power ACU on power supply</td>
<td>See Figure 78.</td>
</tr>
<tr>
<td>Reader 1</td>
<td>Data 0, Data 1</td>
<td>Wiegand Signal</td>
<td>See Figure 31.</td>
</tr>
<tr>
<td>Reader Port Fuses</td>
<td>F1 – Reader 1</td>
<td>To reset fuse, disconnect reader from terminal. Fuse automatically resets. Reconnect reader to terminal.</td>
<td></td>
</tr>
<tr>
<td>Setting Jumpers</td>
<td>J16 – System Settings</td>
<td>Sets Communications and System Settings</td>
<td>See page 50.</td>
</tr>
<tr>
<td>J1 – Clear ACU Memory</td>
<td>Momentarily short jumper</td>
<td></td>
<td>See page 60.</td>
</tr>
<tr>
<td>J17 – Software Selection</td>
<td>Sets system software/PROM versions</td>
<td></td>
<td>See page 53.</td>
</tr>
<tr>
<td>J3 – Reader Types</td>
<td>Sets system to specific reader types.</td>
<td></td>
<td>See page 54.</td>
</tr>
<tr>
<td>Wiegand LED bit counters</td>
<td>L1, L0</td>
<td>L1 counts first binary digit&lt;br&gt;L0 counts the second binary digit</td>
<td>See page 56.</td>
</tr>
<tr>
<td>Communication</td>
<td>CB-485 Connection</td>
<td>When CB-485 Connection terminal is in use – CPB-10 or CB-485, the main circuit board Communication block is deactivated.</td>
<td></td>
</tr>
<tr>
<td>Communication 2</td>
<td>Reserved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controller Test Voltages</td>
<td></td>
<td></td>
<td>See Table 12 on page 100.</td>
</tr>
<tr>
<td>Communication Test Voltages</td>
<td></td>
<td></td>
<td>See Table 13 page 102</td>
</tr>
<tr>
<td>Ribbon Cable Connection to OCB 8</td>
<td>1st OCB 8&lt;br&gt;Floors 1 to 8</td>
<td>H1 on OCB 8 to Control 1 (right terminal) EC 1300&lt;br&gt;(red stripe on bottom)</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Location</td>
<td>Instructions/Notes</td>
<td>Additional Reference</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------</td>
<td>--------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>2\textsuperscript{nd} OCB 8 (optional)</td>
<td>Floors 9 to 16</td>
<td>H1 on OCB 8 to Control 2 (right terminal) EC 1300 (red stripe on bottom)</td>
<td></td>
</tr>
<tr>
<td>3\textsuperscript{rd} OCB 8 (optional)</td>
<td>Floors 17 to 24</td>
<td>H1 on OCB 8 to Control 3 (right terminal) EC 1300 (red stripe on bottom)</td>
<td></td>
</tr>
<tr>
<td>4\textsuperscript{th} OCB 8 (optional)</td>
<td>Floors 25 to 32</td>
<td>H1 on OCB 8 to Control 4 (right terminal) EC 1300 (red stripe on bottom)</td>
<td></td>
</tr>
<tr>
<td>5\textsuperscript{th} OCB 8 (optional)</td>
<td>Floors 33 to 40</td>
<td>H1 on OCB 8 to Control 5 (right terminal) EC 1300 (red stripe on bottom)</td>
<td></td>
</tr>
</tbody>
</table>
This page is intentionally blank.
EC 2300 Quick Reference

Figure 127 - EC 2300 Circuit Board

ACU
Current Consumption
140 mA MAX

TP1 5V
TP2 +12V
TP3 -10V
TP4 Reset 5V Normal
TP5 5V
GND

B1
Lithium Battery

PWR

5 4 3 2 1 A B C D E

SYS
JMP
J18

Reader Prom

Reader Type

6 5 4 3 2 1

J3

Reader Port

LED D1 D0 Par Gnd
Bl Wht Grn Red Blk

Reader 2
Reader 1

Clear
Memory

System Prom

Clock Chip

Communication 2

IOCB

3216

U43

CA R11

Elevator 1 - Floor Inputs 1 - 16
Elevator 2 - Floor Inputs 1 - 16
CB 48S Connection

Door Contacts N.C.
Request to Exit N.O.
16 Supervised Auxiliary/Alarm Inputs N.C.

Communication
## Table 31 - EC 2300 Quick Reference

<table>
<thead>
<tr>
<th>Function</th>
<th>Location</th>
<th>Instructions/Notes</th>
<th>Additional Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>The DPS12 power supply included has sufficient output for 1 ACU and 5 OCB-8 circuit boards.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounding</td>
<td>GND terminal – AUX RDR PWR IN</td>
<td>Connect ground lug in ACU to cold water pipe ground</td>
<td>See Figure 78.</td>
</tr>
</tbody>
</table>
| Input Reader Power        | (+) and (-) 12VDC upper terminals - AUX RDR PWR IN | (-) Black to (-) AUX Alarm on power supply 
                          |                                                   | (+) Red to (+) AUX Alarm on power supply | See Figure 78. |
| Input Board Power         | (+) and (-) 12VDC lower terminals - AUX RDR PWR IN | (-) Black to (-) Power ACU on power supply 
                          |                                                   | (+) Red to (+) Power ACU on power supply | See Figure 78. |
| Readers 1 and 2           | Data 0, Data 1                      | Wiegand Signal                                         | See Figure 31.      |
| Reader Port Fuses         | F1 – Reader 1                       | To reset fuse, disconnect reader from terminal. Fuse automatically resets. Reconnect reader to terminal. |
| Setting Jumpers           | J16 – System Settings               | Sets Communications and System Settings                 | See page 50.        |
|                          | J1 – Clear ACU Memory               | Momentarily short jumper                                 | See page 60.        |
|                          | J17 – Software Selection            | Sets system software/PROM versions                      | See page 53.        |
|                          | J3 – Reader Types                   | Sets system to specific reader types.                   | See page 54.        |
| Wiegand LED bit counters  | L1, L0                              | L1 counts first binary digit 
                          |                                                   | L0 counts the second binary digit | See page 56 |
| Relay Status Jumpers      | JR1 – JR8                           | Right side – Normal 
<pre><code>                      |                                                   | Left side – Reversed | See page 29. |
</code></pre>
<p>| (OCB -8 Circuit Board)    | CB-485 Connection                   | When CB-485 Connection terminal is in use – CPB-10 or CB-485, the main circuit board Communication block is de-activated. |
| Communication Test Voltages | Reserved                            | See Table 12 page 100                                  |
| Communication Test Voltages | Reserved                            | See Table 13 page 102                                  |
| Ribbon Cable Connection to OCB 8 | 1st OCB 8 Elevator 1 Floors 1 to 8 | H1 on OCB 8 to Control 1 (right terminal) EC 2300 (red stripe on bottom) |
|                          | 2nd OCB 8 Elevator 2 Floors 1 to 8  | H1 on OCB 8 to Control 3 (right terminal) EC 2300 (red stripe on bottom) |</p>
<table>
<thead>
<tr>
<th>Function</th>
<th>Location</th>
<th>Instructions/Notes</th>
<th>Additional Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd OCB 8 (optional)</td>
<td>Elevator 1</td>
<td>H1 on OCB 8 to Control 2 (right terminal) EC 2300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Floors 9 to 16</td>
<td>(red stripe on bottom)</td>
<td></td>
</tr>
<tr>
<td>4th OCB 8 (optional)</td>
<td>Elevator 2</td>
<td>H1 on OCB 8 to Control 4 (right terminal) EC 2300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Floors 9 to 16</td>
<td>(red stripe on bottom)</td>
<td></td>
</tr>
</tbody>
</table>
# Relay States

## Table 32 – List of Relay States

<table>
<thead>
<tr>
<th>Device</th>
<th>Relay Jumper</th>
<th>Status</th>
<th>Possible TZ Status</th>
<th>LED State</th>
<th>N.C. Relay State</th>
<th>N.O. Relay State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door Relay</td>
<td>Normal</td>
<td>Unlocked</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>Locked</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door Relay</td>
<td>Reversed</td>
<td>Unlocked</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reversed</td>
<td>Locked</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Relay</td>
<td>Normal</td>
<td>Door Held</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Relay</td>
<td>Normal</td>
<td>Alarm</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Relay</td>
<td>Reversed</td>
<td>Door Held</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Relay</td>
<td>Reversed</td>
<td>Alarm</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Relay</td>
<td>Normal</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Relay</td>
<td>Normal</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Relay</td>
<td>Reversed</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Relay</td>
<td>Reversed</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-alert Relay</td>
<td>Normal</td>
<td>Activated</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-alert Relay</td>
<td>Normal</td>
<td>Normal</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-alert Relay</td>
<td>Reversed</td>
<td>Activated</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-alert Relay</td>
<td>Reversed</td>
<td>Normal</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility Relay</td>
<td>Normal</td>
<td>Activated</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility Relay</td>
<td>Normal</td>
<td>Normal</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device</td>
<td>Relay Jumper</td>
<td>Status</td>
<td>Possible TZ Status</td>
<td>LED State</td>
<td>N.C. Relay State</td>
<td>N.O. Relay State</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------</td>
<td>-------------</td>
<td>--------------------</td>
<td>-----------</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Accessibility Relay</td>
<td>Reversed</td>
<td>Activated</td>
<td>-</td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility Relay</td>
<td>Reversed</td>
<td>Normal</td>
<td>-</td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevator Relay</td>
<td>Normal</td>
<td>Unsecured</td>
<td>ON</td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevator Relay</td>
<td>Normal</td>
<td>Secured</td>
<td>OFF</td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevator Relay</td>
<td>Reversed</td>
<td>Unsecured</td>
<td>ON</td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevator Relay</td>
<td>Reversed</td>
<td>Secured</td>
<td>OFF</td>
<td>⚫</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend**

- ⚫ LED – Off
- ⚫ LED – On
- □ Manual Output Control – Aux Status Off (Red)
- ✔ Manual Output Control – Aux Status On (Green)
- ⬞ Relay State Open
- ⬟ Relay State Closed
- ☐ OCB8 – Relay Jumper in Normal Position
- ☑ OCB8 – Relay Jumper in Reversed Position
Warranty

Limited Warranty

Keyscan warrants that all Keyscan manufactured products shall be free of defects in materials and workmanship under normal use for a period of two years from the date of purchase. In fulfillment of any breach of such warranty, Keyscan shall, at its option, repair or replace defective equipment upon return to its facilities. This warranty applies only to defective parts or workmanship. This warranty does not apply to damage that occurred during shipping or handling, or damage due to causes beyond the control of Keyscan such as lightning, excessive voltage, mechanical shock, water damage, or damage arising out of abuse, alteration or improper application of the equipment.

This warranty does not extend to products distributed by Keyscan that are manufactured by 3rd parties. The original equipment manufacturer's warranty shall apply.

The foregoing warranty shall apply only to the original buyer and is and shall be in lieu of any and all other warranties, whether expressed or implied and of all other obligations or liabilities on the part of Keyscan. This warranty contains the entire warranty. Keyscan neither assumes, nor authorizes any other person purporting to act on its behalf to modify or to change this warranty, nor to assume for it any other warranty or liability concerning this product.

In no event shall Keyscan be liable for any direct, indirect, or consequential damages, loss of anticipated profits, loss of time or any other losses incurred by the buyer in connection with the purchase, installation, or operation or failure of this product.

WARNING – Keyscan recommends that the entire system be completely tested on a regular basis. However, despite frequent testing and due to, but not limited to, criminal tampering or electrical disruption, it is possible for this product to fail to perform as expected.

Seller's Right of Possession

In addition to all remedies Keyscan may possess, Keyscan shall have the right at any time for credit reasons or because of buyer’s defaults, to withhold shipments in whole or in part, to recall goods in transit, retake same and repossess all goods which may be stored, without the necessity of taking any other action.

Buyer consents that all merchandise so recalled, retaken, or repossessed shall become the absolute property of Keyscan provided that buyer is promptly notified of such action and is given full credit therefore.

Product Installation and Operation

Buyer assumes all responsibility for the proper selection, installation, operation, maintenance and adherence to any and all federal, state/provincial and municipal building and fire codes of the merchandise purchased from Keyscan. Keyscan SHALL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL, CONTINGENT, SPECIAL OR INCIDENTAL DAMAGES whatsoever, except as specifically set forth in the LIMITED WARRANTY.
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