Controller Modules
WIEGAND CLUSTER

Part of the 3rd Generation, Access Portal range of products from Impro Technologies, the **Impro Wiegand Cluster** consists of the Cluster Controller Module (CCM) and one or more Wiegand Reader Modules (WRM) that can be clustered together.

This modular approach to access control makes is very easy to adapt and grow your system to suit the changing needs of your organisation.

With the Cluster Controller configured for Access Portal Lite, this Wiegand Cluster functions as a web-configurable, stand-Alone system, offering full Anti Pass-back (APB) access control, and/or Single Entry Access Control in any combination to suit your application.

When configured for Access Portal Pro, the Cluster Controller Module hosts a 100 000 event buffer and memory sufficient for 10 000 tags.

The modules don't have to be plugged together – they may also be linked via S-Bus, which allows the Wiegand Reader Modules to be installed in different locations (up to 150m away from the Cluster Controller Module), should the installation site require it.

Expansion potential
Should you wish to grow the system, you may add Expansion Modules (more modules, just like the Wiegand Reader Module), plugging them together to grow the cluster. A maximum of 8 clustered Expansion Modules (16 fixed addresses), PLUS an additional 8 addresses (connected via S-Bus), allowing a total of 24* addresses served by one Cluster Controller Module

Access Portal Lite has a 16-address total limit.

Much greater expansion is possible – this is covered in the Access Portal System literature.

Key Features – Cluster Controller Module

General Features

- An excellent user interface consisting of 8 LED "Diagnostic Indicators", four of which are externally visible with the plastic housing closed
- 3-Year Warranty on Hardware
- Cost effective solution that fits seamlessly into legacy Systems
- A Software utility to upgrade Firmware while installed on-site, without removal of the Cluster Controller.

When the Cluster Controller is configured as a Door Controller

- Support for the following Terminal Communication options:
    - Ethernet—Connect to your chosen System Controller using the existing IP infrastructure.
    - RS485—an ultra-reliable method (not affected by network problems) of connecting to your chosen System Controller.

- On-board intelligence allowing the Door Controller Cluster to run off-line from the System Controller.
- The Cluster Controller (configured as a Door Controller) stores up to 100 000 Transactions.
- A maximum of 16 fixed addresses by plugging Expansion Modules together into the Cluster Controller (as a "Cluster") and a further 8 fixed addresses via S-Bus

When the Cluster Controller is configured as an Access Portal Lite Controller

- A maximum total of 16 Fixed Addresses:
    - Up to 8 Clustered Expansion Modules (max 16 addresses)
    - Another 8 addresses (if remaining) may be served by S-Bus, with the Expansion Modules mounted up to 150 m away from the Cluster Controller.
    - The remainder of 16 addresses may be routed via RS485 from other (Door Controller) Clusters, or to legacy Impro (iTT) Intelligent Twin Reader Terminals and Impro (iTRT) Intelligent Twin Reader Terminals

- Including connection via RS485 to other (Door Controller) Clusters, or to the legacy Impro (iTT) Intelligent Twin Reader Terminal and Impro (iTRT) Intelligent Twin Reader Terminal
- Up to 8 Impro Expansion Modules may be plugged together as a cluster with the Cluster Controller, or up to 8 fixed addresses may be connected via S-Bus and mounted up to 150 m away from the Cluster Controller.
- Buffers up to 100 000 Transactions
- Uses AES 128-bit Encryption through a Diffie Hellman key exchange to ensure secure communications
- A TCP/IP Bus which links the Cluster Controller to the Host PC with a standard Ethernet Cable
- Support for up to 18 Holidays
- Daylight Savings Support
- Support for up to 3 Tags per Tagholder
- Support for up to 8 Tagholder Access Groups
- Allows for Batch Loading of Tags
- User configurable Tag loading Template
- When used with a Keypad Reader System support includes:
    - Reason Codes
    - Personal Access Codes (PAC)
    - PIN-codes

- Stores all information locally on the Cluster Controller
- Offers the following Reports:
    - Access Report
    - Status Report
    - Audit Report
    - Hours Worked Report

- The AP Lite Web UI runs on any HTML 5 compliant web browser
- The AP Lite Web UI allows export of CSV data from the Web browser
- A Software utility to upgrade Firmware while installed on-site, without removal of the Cluster Controller.

When the Cluster Controller is configured as an Access Portal Pro Controller

- Maximum total of 64 Fixed Addresses via each Access Portal Pro Controller:
    - Up to 8 Clustered Expansion Modules (max 16 addresses)
    - Up to 8 addresses may be served by S-Bus, with the Expansion Modules (or other S-Bus Devices) mounted up to 150 m away from the Cluster Controller.
    - The remainder of 64 addresses may be routed via RS485 OR IP from other (Door Controller) Clusters, or to legacy Impro (iTT) Intelligent Twin Reader Terminals and Impro (iTRT) Intelligent Twin Reader Terminals
- Up to 10 000 Tags and up to 100 000 buffered Transactions
- Communication options with Host include Ethernet and RS485

NOTE: Not all models support Ethernet Consult the Ordering Information on page 4

NOTE: Note that the communications bandwidth available on S-Bus is limited to 9600 baud.

Key Features – Wiegand Reader Module (WRM)

- Cost effective, modular solution that offers:
    - **Scaling** to the size requirement of the application
    - **Expansion** - Quick and convenient (plug-in) should needs increase
    - **Zero System Downtime** - (When plugged into the Cluster Controller) - Replacing a WRM only requires downtime on the doors associated with the Expansion Modules that are disconnected (the Tag memory and Transaction Buffer reside in the Cluster Controller).
    - **Hot Swappable** - No need to power down when plugging, unplugging and wiring of modules.

- 3-Year Warranty on Hardware
- A Software utility to upgrade Firmware while installed on-site, without removal of the WRM. (This only applies to Clustered WRMs)
- Flexibility in installation – The WRM may be:
    - Plugged (together with other Expansion Modules into the CCM, forming part of a "Cluster" of Impro Controller Modules
    - Installed up to 150 away from its CCM (connected via S-Bus)
    - Installed (as a PCB Card) in an IPS enclosure

- The WRM Interfaces to the following Impro Readers:
    - Impro Multi-discipline Readers
    - Impro Wiegand Reader
    - Impro Multi-mode Readers

- Each WRM:
    - Offers full Wiegand Support
    - Connects up to two Readers or Third-party Devices
    - Allows Relaxed or Full Anti-passback (APB) access on a single Door or single entry on two Doors
    - Has end-of-line (EOL) Sensing on Door Open Sensor (DOS) Inputs
    - Has eight status LEDs, (two visible with the housing closed) providing concise diagnostic indication
    - Interfaces to the legacy Impro IR, Impro RF, and Third-party Wiegand Readers

- Two 10 A independent single-pole, double-throw (SPDT) Relay Outputs that allow you to interface to door strikes, magnetic locks and other third party devices (for example alarm panels or lighting).
- Four Digital Inputs including two Door Open Sensor (DOS) and two Request to Exit (RTE) Inputs.

ACCESS CONTROL

SABS
ISO 9001

Impro Wiegand Cluster

HCW900-0-0-GB-XX   HCW901-0-0-GB-XX   HCW902-0-0-GB-XX   HCW910-0-0-GB-XX
HCW911-0-0-GB-XX   HCW912-0-0-GB-XX   HCW920-0-0-GB-XX   HCW921-0-0-GB-XX
HCW930-0-0-GB-XX   HCW931-0-0-GB-XX

Physical Specifications

Cluster Controller Module in plastic housing

Length	:	185.5 mm (7.3 in)
Width	:	78.5 mm (3.88 in)
Height	:	57 mm (2.28 in)
Approximate Weight	:	211 g (7.44 oz.)
Housing Material	:	Polycarbonate
Colour	:	Black

Wiegand Reader Module in plastic housing

Length	:	185.5 mm (7.3 in)
Width	:	78.5 mm (3.88 in)
Height	:	57 mm (2.28 in)
Approximate Weight	:	280 g (7.87 oz.)
Housing Material	:	Polycarbonate
Colour	:	Black

Environmental Specifications

Operating Temperature	:	-25℃ to +60℃ (-13°F to +140°F)
Storage Temperature	:	-40℃ to +80℃ (-40°F to +176°F)
Humidity Range	:	0 to 75% relative humidity at +40℃ (+104°F) non-condensing

Approvals

Dust & Splash Resistance	:	Designed to work in an indoor (dry) environment similar to IP40. Impro Cluster Modules are not sealed against water
Drop Endurance	:	1 m (3.28 ft.) drop (in packaging).

Electrical Specifications – Cluster Controller

Power

Input Voltage	:	12 V DC to 15 V DC

Power Requirements		Current (mA)	Power (W)
12 V DC with no peripherals connected	:	140	1.7

Power Input Protection	:	Reverse polarity and over-current protection are provided.

Peripheral Communications Ports

Clustering Feature (Baud Rate 115 200)	:	Up to 8 Expansion Modules may be plugged side-to-side and into the Cluster Controller.
S-Bus (Host) (Baud Rate 7 600)	:	This allows Expansion Modules (Like the WRM) and other S-Bus Devices to be installed up to 150m from the Cluster Controller. A maximum of eight devices may be connected via S-Bus.
Host Computer	:	Standard Ethernet RJ45 connector. 10/100 Base T, half or full duplex, Proprietary Protocol
RS485 Door Controller Maximum 64 Addresses	:	RS485, 38 400 Baud, 8 data bits, no parity, 1 stop bit, Secure Communications Protocol Provision is made for line termination
RS485 System Controller Maximum 64 Addresses (Only in IXP220 mode.)	:	RS485, 38 400 Baud, 8 data bits, no parity, 1 stop bit, Secure Communications Protocol Provision is made for line termination

Real Time Clock Backup Battery (RTC)

Battery Type	:	1 x 3 V, CR2032, Lithium cell battery.
Battery Life	:	2 Years with power OFF 5 years with power ON 5 years storage with Battery Tab in place.

Processor

Type	:	32-bit ARM Cortex M3 Operating at 180 MHz
Total RAM	:	200 K Byte.
Flash	:	16 M Byte.

Other

Anti-tamper Switch	:	1 PCB Mounted Micro-lever Switch.

Electrical Specifications – Wiegand Module

Power

Input Voltage	:	12 V DC to 15 V DC, polarity sensitive.

Power Requirements		Current (mA)	Power (W)
12 V DC with no peripherals connected and relays off	:	37	0.44

Power Input Protection	:	Reverse polarity and over-current protection are provided on the Module.
Relay Power Requirements	:	An additional ~0.4 W per Relay used

Communications

Direct (Baud Rate 115 200)	:	When the WRM is plugged (side-by-side) directly into a cluster, or in the IPS Housing option.
S-Bus (Baud Rate: 7600)	:	S-Bus allows for the remote installation of the WRM, up to 150m away from its Cluster Controller.
Module Status	:	Slave

Digital Inputs

Input Type	:	2 Dry-contact inputs with End-of-line (EOL) Sensing and 2 Dry-contact inputs without End-of-line (EOL) Sensing
Detection Resistance Range	:	< 2 kΩ
Protection Range	:	+15 V continuous

Relays

Relay Output	:	2 Relays, Form C, each with NO, COM and NC contacts
Contact Ratings	:	10 A at 28 V DC 5 A at 220 V AC 10 A at 120 V AC
Operations	:	100 000 Minimum
Power Consumption (per Relay)	:	~ 0.4 W

Processor

Type	:	ARM Cortex M0 operating at 45MHz
Total RAM	:	4 K Byte
Flash	:	48 K Byte

Other

Anti-tamper Switch	:	1 PCB Mounted Micro-lever Switch

www.pmtronics.com

ACCESS CONTROL

SABS
ISO 9001

User Interfaces – Cluster Controller

Diagnostic Indicator LEDs

Status	:	Continuous Red, flashing during fault (Visible through closed housing)
Ethernet Link	:	Continuous Red (Visible through closed housing)
Ethernet Speed	:	Red LED on for 100 MHZ, off for 10 MHz (Visible through closed housing)
Data	:	Flashes green During Communication (Visible through closed housing)
RS485 System Controller TX	:	Red while transmitting data
RS485 System Controller RX	:	Green while receiving data
RS485 Door Controller TX	:	Red while transmitting data
RS485 Door Controller RX	:	Green while receiving data

User Interfaces – Wiegand Reader Module

LED Status and Diagnostic Indicators

Status LED	:	Continuous Red, flashing during fault (Visible through closed housing)
Data LED	:	Flashes green During Communication (Visible through closed housing)
Relay 1	:	Continuous Red on activation of the Relay
Relay 2	:	Continuous Red on activation of the Relay
Reader 1, RTE	:	Continuous Green on detected contact closure
Reader 1, DOS	:	Continuous Green on detected contact closure
Reader 2, RTE	:	Continuous Green on detected contact closure
Reader 2, DOS	:	Continuous Green on detected contact closure

Reader Options – Wiegand Reader Module

Reader 1 Wiegand and Reader 2 Wiegand allow connection to the following hardware:

- Impro Multi-discipline Readers
- Impro Multi-mode Remotes
- Wiegand Readers

The function is selectable via the DIP-switches.

Power Output	:	12 V DC OR 5 V DC (selectable) at maximum 200 mA
Modes Supported	:	Tag + PIN-code or Reason Code
Baud Rate	:	7 600
Data Format	:	8 data bits, no parity, 1 stop bit
Electrical Interface	:	Wiegand
Communications Protocol	:	Impro Proprietary Protocol

Related Information

For extra information relating to these modules refer to the following Manuals:

HMW300-0-0-GB-XX	:	Impro (WRM) Wiegand Reader Module Hardware Installation Manual
HCM320-0-0-GB-XX	:	Impro (CCM) Cluster Controller Module Hardware Installation Manual

NOTE: *Because of the way standard Wiegand Readers handle HID Tag codes, Access Portal Lite Sites using standard Wiegand Readers can only support one of two options: HID Tags only or other 125 kHz Tag types (such as Slim Tags, Omega Tags, Philips HITAG™1 and Philips HITAG™ 2 depending on the Reader). For HID Tags only, set the DIP-switch to Wiegand Open Format and the Wiegand Reader to HID Raw Mode. For any other Tag type, set the DIP-switch to Wiegand 26-bit/44-bit. For more information refer to the Installation Manual for the Wiegand Reader Module. If you need a combination of HID Tags and other Tag types, make use of the Impro Multi-discipline Readers.*

Ordering Information

Order the Impro Wiegand Cluster using the following Part Numbers:

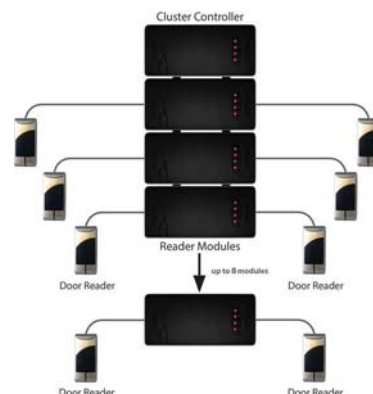|		
HCW900-0-0-GB-XX	:	2 Reader - Plastic Housing - RS485 Only
HCW901-0-0-GB-XX	:	4 Reader - Plastic Housing - RS485 Only
HCW902-0-0-GB-XX	:	6 Reader - Plastic Housing - RS485 Only
HCW910-0-0-GB-XX	:	2 Reader - Plastic Housing - TCP/IP & RS485
HCW911-0-0-GB-XX	:	4 Reader - Plastic Housing - TCP/IP & RS486
HCW912-0-0-GB-XX	:	6 Reader - Plastic Housing - TCP/IP & RS489
HCW920-0-0-GB-XX	:	2 Reader - IPS Housing - RS485 Only
HCW921-0-0-GB-XX	:	4 Reader - IPS Housing - RS485 Only
HCW930-0-0-GB-XX	:	2 Reader - IPS Housing - TCP/IP & RS485
HCW931-0-0-GB-XX	:	4 Reader - IPS Housing - TCP/IP & RS486

A cluster is made up of one Cluster Controller Module and anything from 1 to 8 Expansion Modules
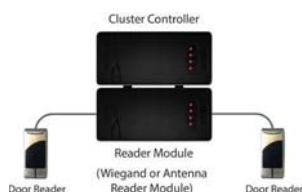
Figure 1: Entry level Cluster with 1 Expansion Module

Figure 2: Up to 8 Expansion Modules can be Clustered with the Cluster Controller Module

ACCESS CONTROL

SABS
ISO 9001
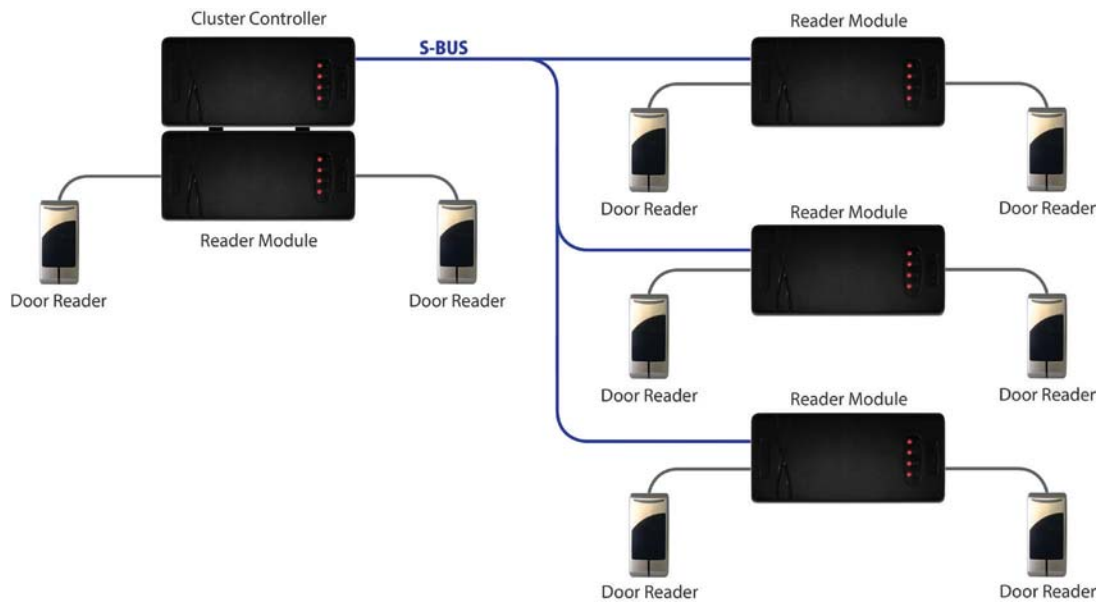
Figure 3: Combinations of Clustered and S-Bus connected Expansion Modules are possible
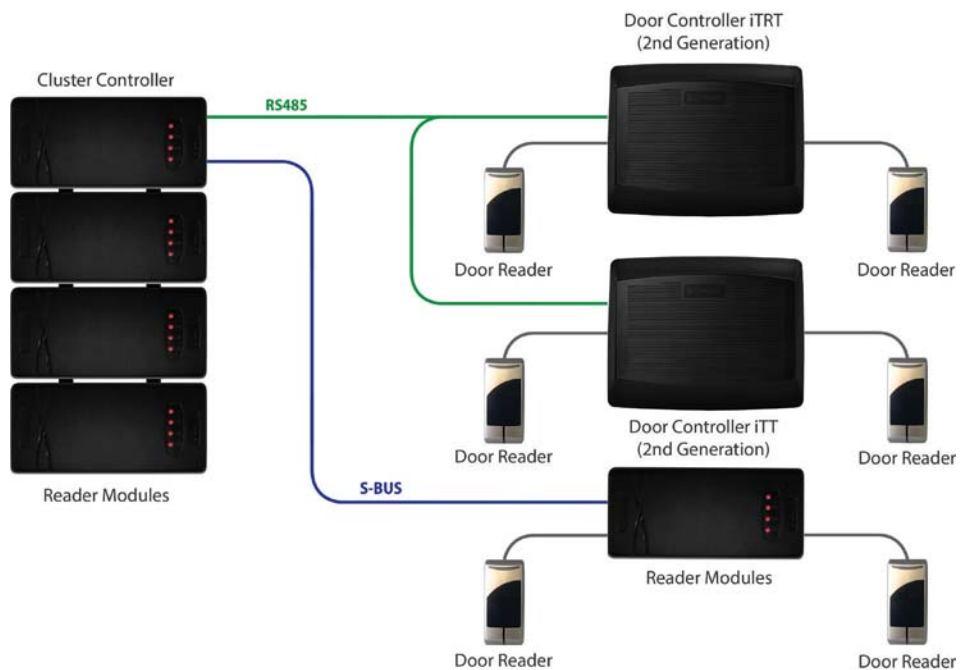
Figure 4: Combinations of clustered, S-Bus connected Expansion Modules PLUS RS485 connected Legacy iTT / iTRT are possible

www.pmtronics.com