



# Controller Module ANTENNA CLUSTER

Part of the 3<sup>rd</sup> Generation, Access Portal range of products, the **Impro Antenna Cluster** consists of the Cluster Controller Module (CCM) and one or more Antenna Reader Modules (ARM) 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 Antenna Cluster functions as a 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 Antenna Reader Modules to be installed in different locations (up to 150m away from the Cluster Controller Module), should the installation site require it.

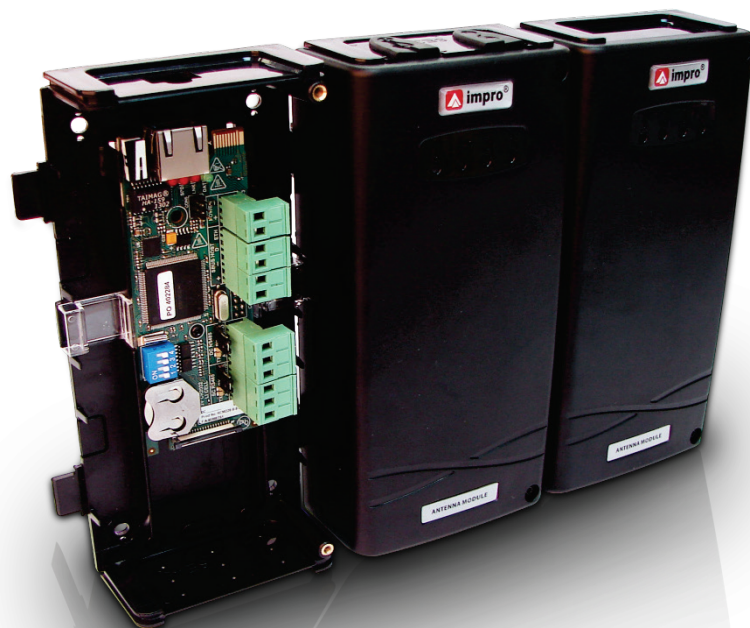
## Expansion potential

Should you wish to grow the system, you may add Expansion Modules (more modules, just like the Antenna 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.

Product specification  
**CATALOGUE**



## 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, and 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 – Antenna Reader Module (ARM)

- Cost effective, modular solution that allows for:
  - **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 an ARM 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 the modules.
- A Software utility to upgrade Firmware while installed on-site, without removal of the ARM. (This only applies to Clustered ARMs)
- Flexibility in installation – The ARM 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 ARM supports the following tags:
  - Impro Tags (Read only)
  - Slim Tags (Read only)
  - Omega Tags (Read Only)
  - Philips HITAG™ 1 and Philips HITAG™ 2 (Read/Write)
  - HID 125 kHz Tags (Read Only).

NOTE: *HID is a registered trademark of HID Global Corporation (an ASSA ABLOY Group Brand).*

- 16-step Auto-tune that allows for increased cable distances of up to 25 m (82 ft.) for Non-keypad Antenna Readers and up to 16 m (53 ft.) for Keypad Antenna Readers.
- End-of-Line (EOL) Sensing on Door Open Sensor (DOS) Inputs.
- Connection to up to two Antenna Readers per ARM, allowing Relaxed or Full Anti-passback (APB) access.
- An excellent user interface consisting of 8 LED “Diagnostic Indicators”.
- Two independent single-pole, double-throw (SPDT) Relay Outputs which let you interface to door strikes, magnetic locks and other third-party devices (for example alarms panels or lighting).
- Four Dry Contact Digital Inputs including two Door Open Sensor (DOS) and two Request to Exit (RTE) Inputs.
- Use in an IXP220 or ImproNet System
- Relay functions are user configurable.

- Digital Inputs are user configurable and can perform specific tasks such as:
  - Door Open Sensing
  - Request to Exit
  - Scanner Inhibit
  - Alarm Interface
  - Action Request

#### Impro Antenna Cluster

HCL900-0-0-GB-XX	HCL901-0-0-GB-XX	HCL902-0-0-GB-XX	HCL910-0-0-GB-XX
HCL911-0-0-GB-XX	HCL912-0-0-GB-XX	HCL920-0-0-GB-XX	HCL921-0-0-GB-XX
HCL930-0-0-GB-XX	HCL931-0-0-GB-XX		

### Physical Specifications

#### Cluster Controller Module (CCM) in plastic housing

Length	: 185.5 mm (7.3 in)
Width	: 98.5 mm (3.88 in)
Height	: 57 mm (2.28 in)
Approximate Weight	: 211 g (7.44 oz.)
Housing Material	: Polycarbonate
Colour	: Black

#### Antenna Reader Module (ARM) in plastic housing

Length	: 185.5 mm (7.3 in)
Width	: 98.5 mm (3.88 in)
Height	: 57 mm (2.28 in)
Approximate Weight	: 266 g (9.38 oz.)
Housing Material	: Polycarbonate
Colour	: Black

### Electrical Specifications – CCM

#### Power

Input Voltage	: 10 to 15 V DC
(Polarity Sensitive)	: (13.8V Battery powered application)
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 CCM.
S-Bus (Host) (Baud Rate 9 600)	: This allows Expansion Modules (like the ARM) and other S-Bus Devices to be installed up to 150m from the CCM. 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.
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### Electrical Specifications – Antenna Reader Module

#### Power

Input Voltage	: 12 V DC to 15 V DC, (polarity sensitive) when powered separately as necessary for a remote, S-Bus installation	
Power Requirements	Current (mA)	Power (W)
Input Voltage 12 V DC with no Antennas attached	: 50	0.6
Input Voltage 12 V DC with Antennas attached	: 200	2.4
Power Input Protection	: Reverse polarity, and Transient voltage protection is provided	
Relay Power Requirements	: An additional ~0.4 W per Relay in use	

#### Communications

Direct (Baud Rate 115 200)	: When the ARM is plugged (side-by-side) directly into a cluster, or in the IPS Housing option.
S-Bus (Baud Rate: 9600)	: S-Bus allows for the remote installation of the ARM, up to 150m away from its CCM.
Module Status	: Slave

#### Reader Options

Antenna Port	: 2 Fully functional Antenna Reader Ports.
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#### 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 Independent, single-pole, double-throw (SPDT) Relays, each with NO, COM and NC contacts.
Contact Ratings	: 10 A at 28 V DC 5 A at 220 V AC 12 A at 120 V AC
Operations	: 100 000 Minimum

#### Processor

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

#### Other

Anti-tamper Switch	: 1 Internal Switch
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## User Interfaces – CCM

### Diagnostic Indicators

System Controller RS485 (SC-TX)	:	LED (RED)
System Controller RS485 (SC-RX)	:	LED (GREEN)
Door Controller RS485 (DC-TX)	:	LED (RED)
Door Controller RS485 (DC-RX)	:	LED (GREEN)
Status (STAT)	:	LED (RED)
Ethernet Link (LNK)	:	LED (RED)
Ethernet Speed (SPD)	:	LED (RED)
Data (DAT)	:	LED (GREEN)

**NOTE:** Because of the way standard Wiegand Readers handle HID Tag codes, IXP20 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 IXP20 Controller (iTRT Platform). If you need a combination of HID Tags and other Tag types, make use of the Impro Multi-discipline Readers.

## User Interfaces – ARM

### LED Status and Diagnostic Indicators

Status LED	:	Continuous Red for Normal Operation Flashing Red During Firmware Upgrade Off when Supply Voltage outside limits
Data	:	Flashing Green as per outgoing data.
Relay [2]	:	Continuous Red on activation of the Relay.
Relay [1]	:	Continuous Red on activation of the Relay.
Reader 2, RTE [2]	:	Continuous Green on detected contact closure.
Reader 2, DOS [1]	:	Continuous Green on detected contact closure.
Reader 1, RTE [2]	:	Continuous Green on detected contact closure.
Reader 1, DOS [1]	:	Continuous Green on detected contact closure.

## Environmental Specifications

Operating Temperature	:	-25°C to +60°C (-13°F to +140°F)
Storage Temperature	:	-40°C to +80°C (-40°F to +176°F)
Humidity Range	:	0 to 95% relative humidity at +40°C (+104°F) non-condensing

### Approvals

Dust & Splash Resistance (XRT910)	:	Designed to work in an indoor (dry) environment similar to IP20. Impro Controller Modules are not sealed against water
Drop Endurance	:	1 m (3.28 ft.) drop (in packaging).

## Related Information

For extra information relating to these modules refer to the:

HML300-0-0-GB-XX	:	Impro (ARM) Antenna Reader Module Hardware Installation Manual
HCM320-0-0-GB-XX	:	Impro (CCM) Cluster Controller Module Hardware Installation Manual

## Ordering Information

Order the Impro Antenna Cluster using the following Part Number:

HCL900-0-0-GB-XX	:	2 Reader - Plastic Housing - RS485 Only
HCL901-0-0-GB-XX	:	4 Reader - Plastic Housing - RS485 Only
HCL902-0-0-GB-XX	:	6 Reader - Plastic Housing - RS485 Only
HCL910-0-0-GB-XX	:	2 Reader - Plastic Housing - TCP/IP & RS485
HCL911-0-0-GB-XX	:	4 Reader - Plastic Housing - TCP/IP & RS486
HCL912-0-0-GB-XX	:	6 Reader - Plastic Housing - TCP/IP & RS487
HCL920-0-0-GB-XX	:	2 Reader - IPS Housing - RS485 Only
HCL921-0-0-GB-XX	:	4 Reader - IPS Housing - RS485 Only
HCL930-0-0-GB-XX	:	2 Reader - IPS Housing - TCP/IP & RS485
HCL931-0-0-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

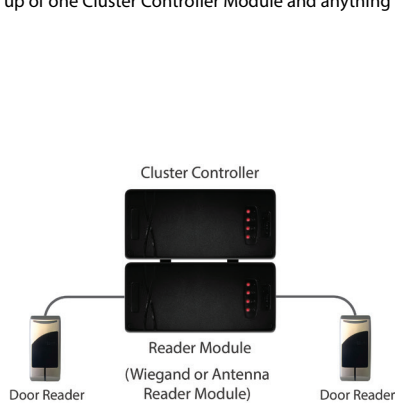


Figure 1: Entry level Cluster with 1 Expansion Module

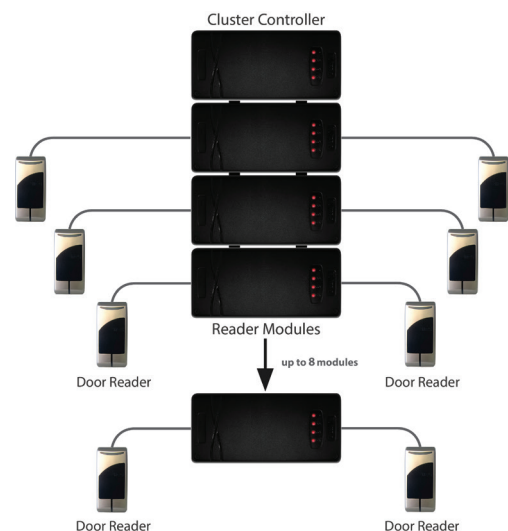
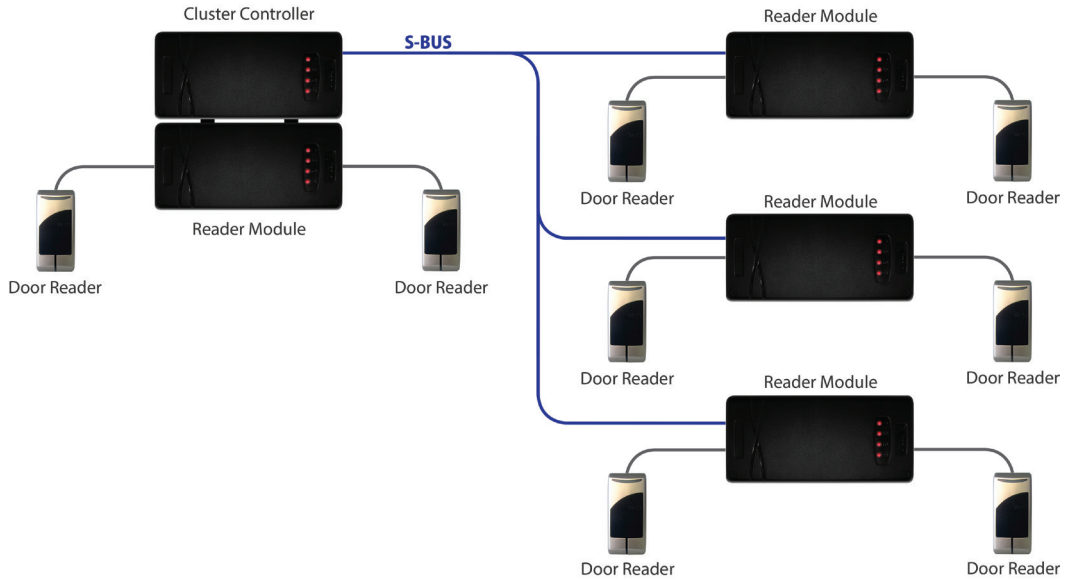
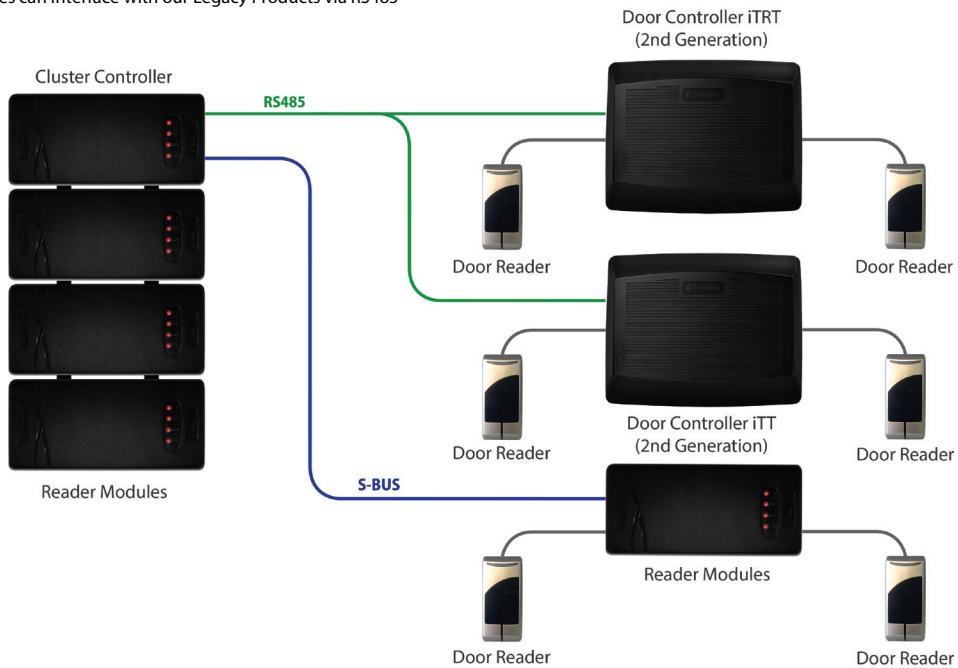


Figure 2: Up to 8 Expansion Modules can be Clustered with the Cluster Controller Module



**Figure 3: Combinations of Clustered and S-Bus connected Expansion Modules are possible**

Cluster Controller Modules can interface with our Legacy Products via RS485



**Figure 4: Combinations of clustered, S-Bus connected Expansion Modules PLUS RS485 connected Legacy iTT / iTRT are possible**

This Product Specification Catalogue applies to the Impro Antenna Cluster, HCL900-0-0-GB-01, HCL901-0-0-GB-01, HCL902-0-0-GB-01, HCL910-0-0-GB-01, HCL911-0-0-GB-01, HCL912-0-0-GB-01, HCL920-0-0-GB-00, HCL921-0-0-GB-00, HCL930-0-0-GB-00, HCL931-0-0-GB-00 (The last two digits of the Impro stock code point to the issue status of the document or product).			
HCL350-0-0-GB-00	Issue 1	October 2013	Impro\Access Portal\COMBOS\ANTCLSTR\English Manuals\LATEST ISSUE antcltr-psc-01-Draft 04.pdf