Antenna Reader Module

Impro (ARM) Antenna Reader Module

INSTALLATION MANUAL

Specifications

The ARM is a Cluster Expansion Module that works in conjunction with an Impro (CCM) Cluster Controller Module; offering an Antenna Reader Interface solution that is adaptable and scalable, while also accommodating legacy hardware and software suites.

Working Environment

Plastic Housing........................... **(HML700)**	Designed to work in an indoor (dry) environment similar to IP20, the Module is not sealed against water.
PCB Card for IPS enclosure .... **(HML701)**	Designed to work in an indoor (dry) environment similar to IP20, the Card is not sealed against water.

Power

	Current (mA)	Power (W)
Input Voltage................................	12 V DC to 15 V DC, polarity protected.	
Power Requirements	**Current (mA)**	**Power (W)**
Input Voltage 12 V DC with no Antennas attached, relays off.	50	0.6
Input Voltage 12 V DC with Antennas attached and both relays activated	200	2.4
Relay Power Requirements	~0.4 W per Relay in use.	

Communication with the Cluster Controller Module

Direct Communications .... When the ARM is clustered (plugged side-by-side) directly into the Cluster Controller Module, or into an existing Cluster, or installed as a PCB Card in a 19" Rack Installation.

Electrical Interface.................. Propriety Cluster-Bus

Baud Rate 115 200

Encryption .... AES Encryption

S-Bus Device Port

Electrical Interface.................. Propriety S-Bus

Baud Rate 9600

Encryption .... AES Encryption

NOTE: *The Antenna Reader Module (being a Twin Reader) can make use of TWO S-Bus Addresses; this must be borne in mind when connecting these modules via S-Bus. No more than eight Addresses should share an S-Bus. See page 13 for Address usage with one Antenna connected.*

Peripheral Interfaces

Antenna Reader Ports .... 2 Fully functional Antenna Reader Ports.

Relays

Relay Output .... 2 Independent, single-pole, double-throw (SPDT) Relays, each with NO, COM and NC contacts.

Relay Contact Ratings................. 10 A at 28 V DC,
5 A at 220 V AC,
12 A at 120 V AC.

Operations.................................... 100 000 Minimum.

Digital Inputs

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.

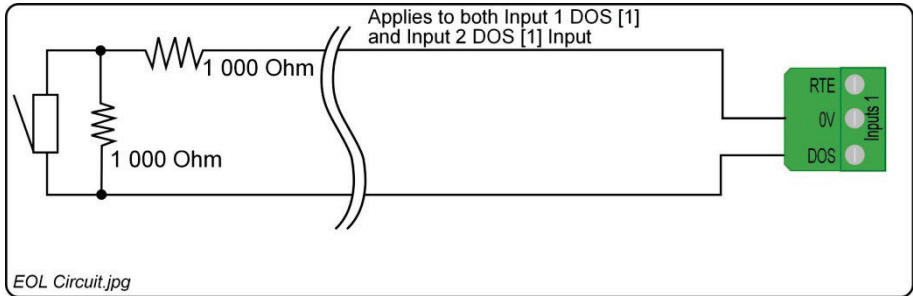**Protection Range** .... +15 V continuous.

Figure 1: End-of-Line (EOL) Sensing Circuit

NOTE: *End-of-Line (EOL) Sensing enables the ARM to raise an alarm when somebody tampers with the circuit (that is, cutting or shorting the wires) between either Reader 1 Inputs DOS [1] or Reader 2 Inputs DOS [1] and GROUND (GND).   In other words the Module distinguishes between tampering on the circuit, and the door being in an actual 'Normally Open' state.*

By placing Resistors into the circuit between Reader 1 Inputs DOS [1] or Reader 2 Inputs DOS [1] and GROUND (GND), the ARM's Digital Input monitors a constant resistance through the circuit.   When the circuit is tampered with, the Resistors are bypassed; the ARM detects the resistance change and raises an alarm.

LED Status and Diagnostic Indicators

Status LED (RED)

    Supply Voltage Status .... Off when supply voltage is too high, or too low

    Upgrade Mode .... Flashing at a steady rate during upgrade

    Communications Failure .... Two brief flashes, repeating

Data LED (GREEN) Flashing Green during communication

Digital Inputs (1-4) .... Continuous Green on detected contact closure

Relays (1 and 2) .... Continuous Red on activation of the Relay

INSTALLATION INFORMATION

Accessories

Find the following when unpacking the ARM:

CAUTION: **DO NOT use the Metal-oxide Varistors (25 Vrms, 500 A, 77 V max clamping) with mains power applications.**

Plastic Housing (HMW700)

An Impro (ARM) Antenna Reader Module is supplied in a Customisable Black, ABS Plastic housing with the following features/components:

- Housing, consisting of a Base, a Cover and a selection of Cable Entry Gland Plates.
- The Housing Base has:
    - Two slots to hold the User-Selectable Cable Entry Plates
    - Six knock-out Cable Entry Points
    - Four Drill-out Cable Entry Points
- The Housing Cover and Base are held together with two Allen Head Screws (M4 x 10 mm) through the cover of the housing.
- Five Ziploc bags, containing the following:
    - Four Stand-Offs (for spacing the ARM away from the mounting surface) and two Cluster Connector Covers (for closing off the cluster connectors when not in use.)
    - Two Metal-Oxide Varistors 25 Vrms, 500 A, 77 V max clamping.
    - A 2mm Allen Key and a spare Hex Head Screw
    - Two extra gland plates
    - An extra Fixed Address Label, for installation site mapping

NOTE: *The installer needs to obtain fasteners (< 5 mm Diameter to fit through the supplied Stand-Offs) that are suitable for securing the Module to the mounting surface – these are NOT supplied in the kit.*

PCB Card for IPS Housing (HML701)

Included in the packaging is:

- Impro Antenna Reader PCB Card on a Base Plate.
- An extra Fixed Address Label, for installation site mapping

General

Remember the following when installing the Antenna Reader Module:

Clustering

Clustering allows for the easy addition or replacement of Modules, it saves on wiring and requires only one DC Power Supply connection for the Cluster.

The following applies:

- The ARM may be plugged directly into its associated Cluster Controller Module, or into an existing Cluster consisting of a Cluster Controller Module and other Expansion Modules.
- No more than eight Expansion Modules can be clustered with their associated Cluster Controller Module.
- The ARM is powered and controlled via its Cluster Connector.
- Clustering with the Cluster Controller Module is recommended where **Offline Validation** is a high priority, as the ARM will have reliable access to the Tag Buffer and Memory on board the Cluster Controller Module.

S-Bus

S-Bus is useful when it would be convenient to install ARMs some distance from their Cluster Controller Module. The following applies:

- The maximum S-Bus Cable length from the Cluster Controller Module to the ARM is 150 m (490 ft.).
- The S-Bus cable should be dual core and at least 0.21 mm2 (AWG24). Screened cable is recommended where interference rejection may be necessary in electrically noisy sites – and to provide SOME MEASURE* of resistance to damage from nearby lightning strikes.
- Ensure that the total number of connected addresses does not exceed eight.
- Remotely mounted ARMs will also require a suitable Isolated DC Power supply, as they are no longer plugged into the Cluster Controller Module.
- In the event of the S-Bus cable breaking, the ARM will stop working.

NOTE: *NOTHING can survive a direct lightning strike. Impro Technologies does NOT claim that its products are lightning proof.

A more detailed chapter on S-Bus is included in the Impro (CCM) Cluster Controller Module Installation Manual: HCM300-0-0-GB-XX

Antenna Reader Distance

- The ideal cable distance between the ARM and its Non-keypad Antenna Reader ranges between 2 m to 25 m (7 ft. to 82 ft.).
- The ideal cable distance between the ARM and its Keypad Antenna Reader ranges between 2 m to 16 m (7 ft. to 53 ft.).

Optimal performance is not guaranteed outside of this range. Achieve optimal performance using a good quality shielded multi-strand 3-pair twisted cable. The cable individual conductor cross-sectional area should not be less than 0.2 mm^2 (0.0003 in^2). Ensure that your cable specifications are similar to the following:

- Conductor Resistance: < 2 Ω
- Capacitance, Core to Earth: < 160 pF/m
- Capacitance, Core to Core: < 100 pF/m

Distance between Antenna Readers from the SAME ARM

To avoid mutual interference, install the Antenna Readers alongside each other at least 150 mm (6 in) apart.

Distance between Antenna Readers from DIFFERENT ARMs

To avoid mutual interference, install the Antenna Readers alongside each other at least 500 mm (20 in) apart.

EARTH Connection

Connect the Impro ARM ("ETH" Terminal) to a good EARTH point. Mains EARTH can be used, but electrical noise may exist.

Arc Suppression

Snubber devices are recommended for EMF Flyback and Arc Suppression when driving an inductive load with the Relay, see Figure 2.
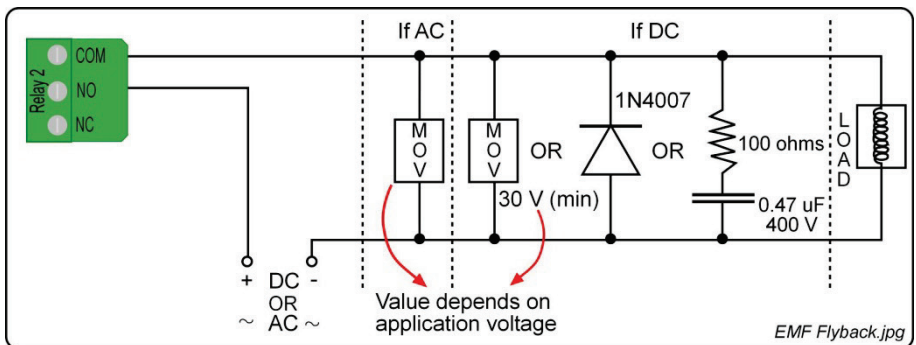

Figure 2: EMF Flyback and Arc Suppression

CAUTION: Make certain that you mount the ARM on a vibration-free surface.

NOTE: The ARM can be mounted onto virtually any surface including metal.

Clustering

Provided there are less than eight other Expansion Modules already clustered with the Cluster Controler Module, you may add the ARM to an existing Cluster:

- Remove the Housing Cover from the ARM and plug the ARM into the Cluster Socket on the right hand side of the Cluster Controller – or that of the outermost Expansion Module in the cluster.
- Holding the ARM square against its neighbouring Module, mark the mounting hole locations through the mounting holes in the back of the Housing Base.
- Remove the ARM, drill the mounting holes.
- Use the plastic Stand-Offs to provide space for cables behind the cluster, or if the other modules in the Cluster are already mounted with stand-offs.
- Mount the ARM Housing Base firmly to the mounting surface using fasteners (not included) appropriate for the mounting surface material.
- Select the gland plates that best suit the installation and/or knock out the cable entry points as needed.
- Connect the reader cables, the digital inputs and the relay terminals as necessary for the installation
- Commission the ARM (and its readers) via the menu options on the Access Control Application.
- Replace the ARM Housing Cover and fasten closed with the two Allen head screws provided.

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Remote Mounting

When it is advantageous to mount an ARM near to the relevant door (and some distance from the Cluster Controller Module), the ARM may be connected to the Cluster Controller Module using an S-Bus cable up to a maximum of 150 m (490 ft.) long. The procedure is as follows:

- Check to see how many other Device Addresses are already connected to the S-Bus Host "D" Terminal of the Cluster Controller Module. No more than eight Device Addresses should be connected to an S-Bus.
- Obtain a suitable Isolated DC Power supply to power the ARM and any Antennas and magnetic locks, etc., that may be connected to the ARM.
- Remove the Housing Cover from the ARM and try the ARM against the proposed mounting surface, considering accessibility, routing of cables, the visibility of the LEDs and the possibility of adding further hardware in any future expansion of the system.
- Secure the ARM Housing Base to the mounting surface, using suitable screws and wall plugs, nuts and bolts or rivets. Use the Stand-Offs if rear clearance will assist for cable entry or coping with an uneven mounting surface.
- Select the gland plates and Quick Click Glands that best suit the installation and/or knock out the cable entry points as needed.
- Connect the reader cables, the digital inputs and the relay terminals as necessary for the installation.
- Power up the ARM and its peripherals
- Replace the ARM Housing Cover and fasten closed with the two Allen head screws provided.

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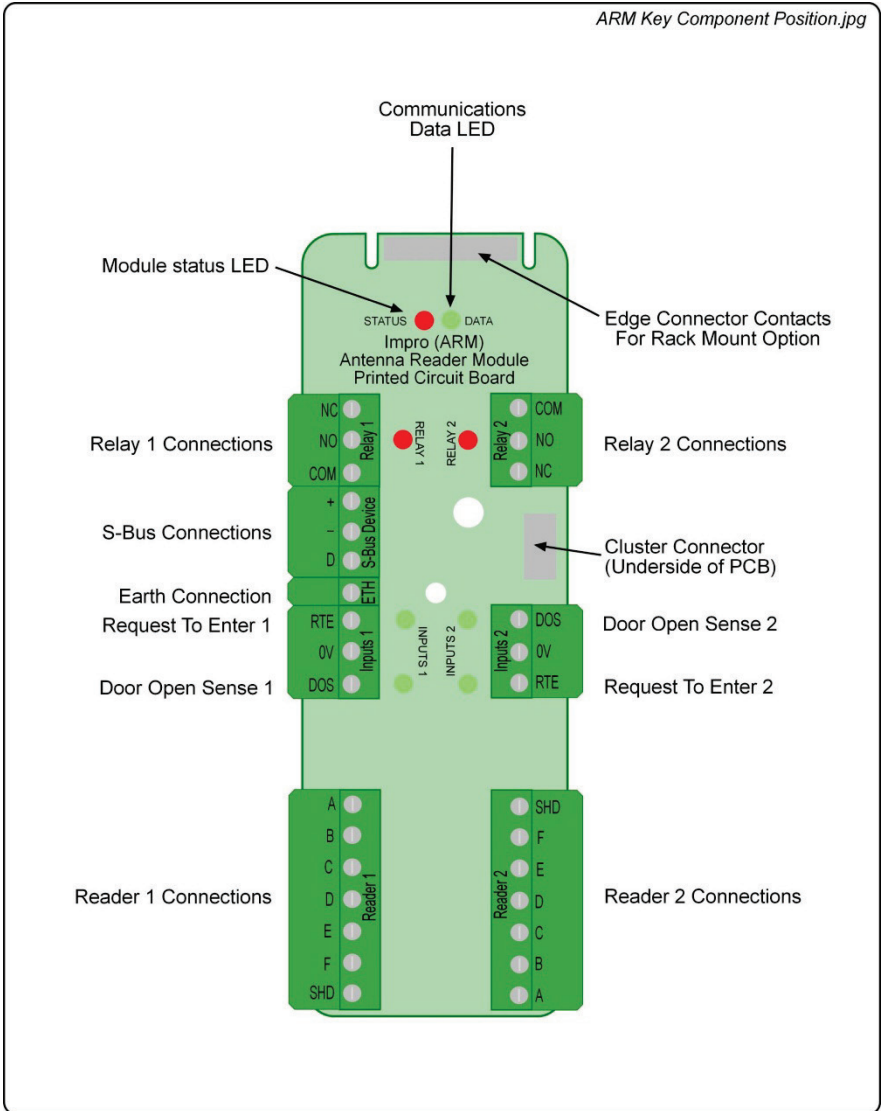
ELECTRICAL CONNECTIONS

Key Component Positions

ARM Key Component Position.jpg

Communications Data LED

Module status LED

STATUS ● DATA ●

Impro (ARM)
Antenna Reader Module
Printed Circuit Board

Edge Connector Contacts
For Rack Mount Option

Relay 1 Connections — NC NO COM — Relay 1 — RELAY 1 — RELAY 2 — Relay 2 — COM NO NC — Relay 2 Connections

S-Bus Connections — + − D — S-Bus Device

Cluster Connector
(Underside of PCB)

Earth Connection — ETH

Request To Enter 1 — RTE 0V — Inputs 1 — INPUTS 1 — INPUTS 2 — Inputs 2 — DOS 0V — Door Open Sense 2

Door Open Sense 1 — DOS — RTE — Request To Enter 2

Reader 1 Connections — A B C D E F SHD — Reader 1 — Reader 2 — SHD F E D C B A — Reader 2 Connections

Figure 3: Key Component Positions

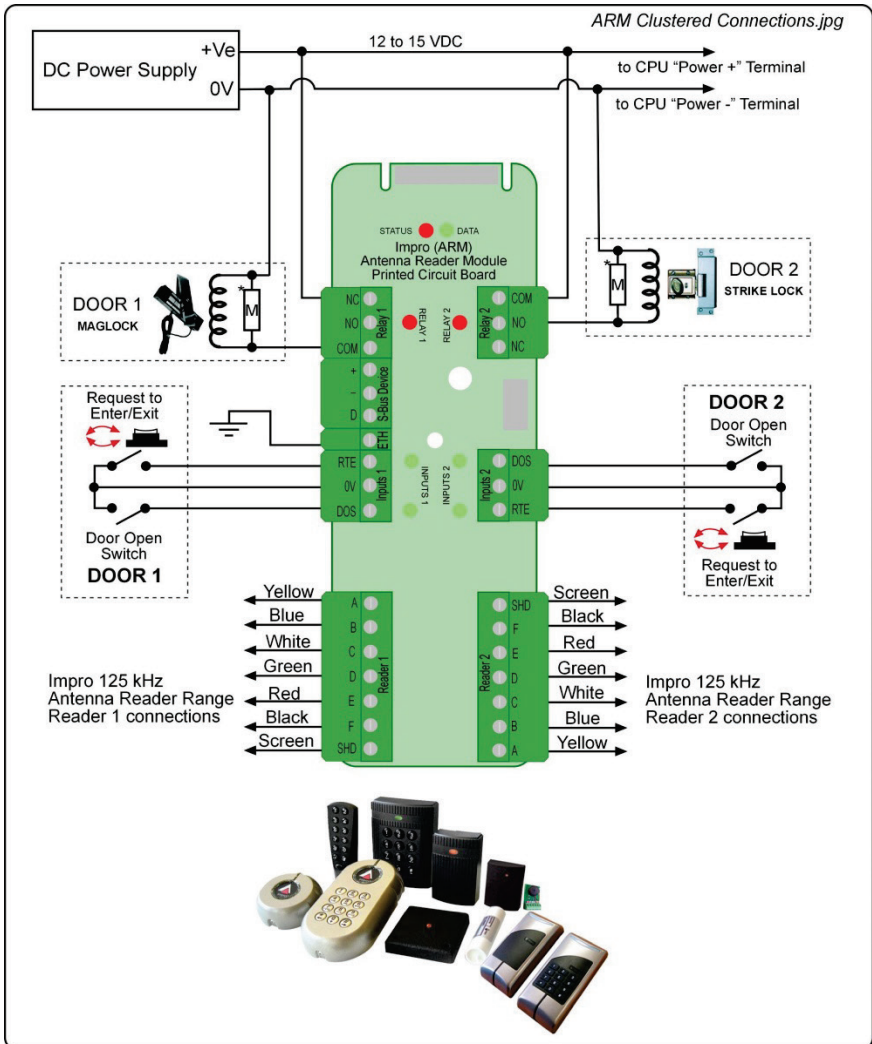Figure 4 shows a detailed electrical connection diagram for the (Clustered) ARM.

Figure 4: Typical (Clustered) ARM Electrical Connections

*NOTE: * Refer to Figure 2 for Arc Suppression details*

(See further Notes on the next page)

NOTE: *Connection details remain the same for the majority of Antenna Readers. Note, however that the Impro MMA only uses connections C, D, E and F.*

NOTE: *The ideal cable distance between the ARM and its Non-keypad Antenna Reader ranges between 2 m to 25 m (7 ft. to 82 ft.). The ideal cable distance between the ARM and its Keypad Antenna Reader ranges between 2 m to 16 m (7 ft. to 53 ft.).*

NOTE: ***Figure 4*** *shows typical connections to the ARM in the Plastic Cluster Housing – AND for the PCB Card model when it is installed in a 19" Rack System. The ARM will get its power supply from the Cluster Connection, or the edge-connector, respectively.*

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Figure 5 shows a detailed electrical connection diagram for the remotely installed ARM, which needs an isolated DC power source and an S-Bus connection with its Cluster Controller Module.
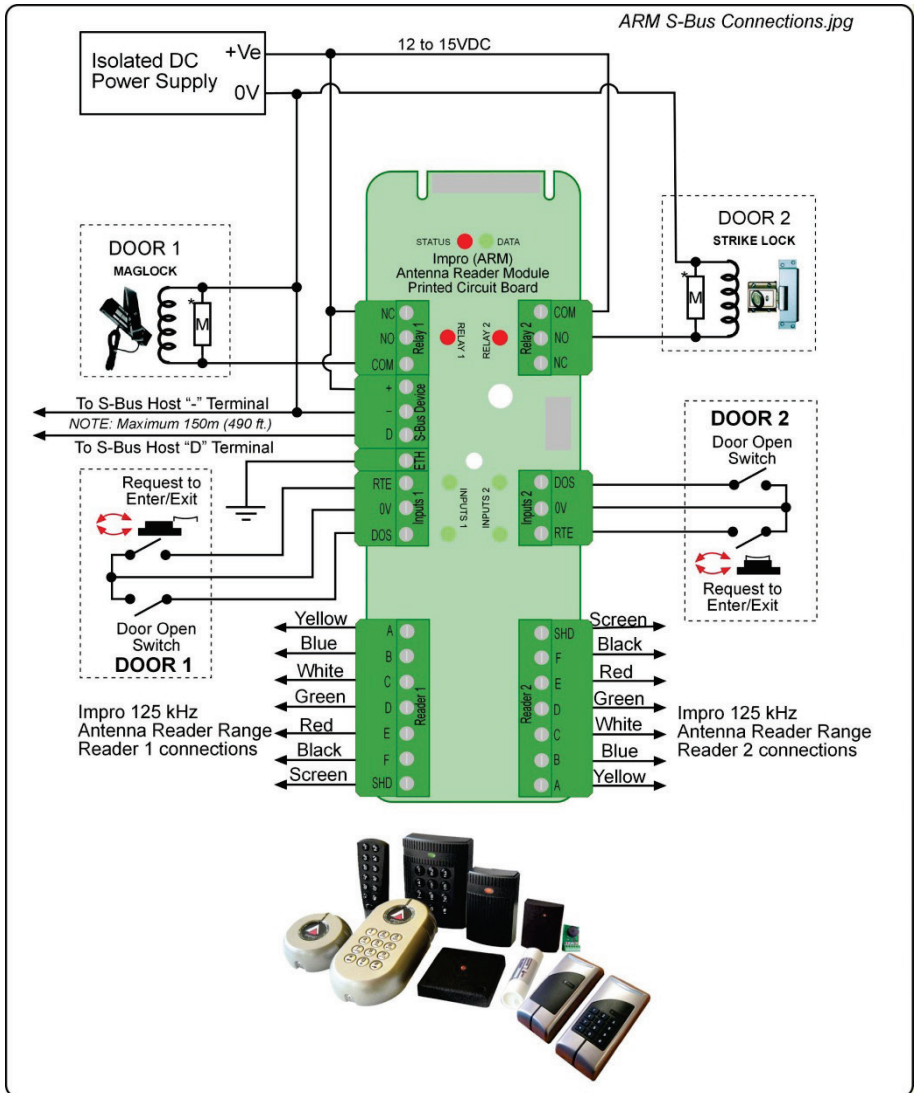

Figure 5: Typical Remotely located ARM Electrical Connections

Power-on Self-test

The Power-on Self-test tests the RAM and Flash Checksums.

If any parameter in the Self-test fails, the ARM will cause its Antenna Reader Units to emit a continuous beep for 2 seconds before the 2 short start-up beeps.

When the ARM passes the Self-test, there will be two short beeps, each 200 ms in duration, separated by a 200 ms inter-beep pause.

ARM Address Information

Each Impro (ARM) Antenna Reader Module is, in fact, two Reader Interfaces in one. The first Fixed Address is associated with Reader [1], and the second with Reader [2].

NOTE: *If you are only using one Antenna Reader then use Antenna Reader 1. The ARM will then reveal only one Fixed Address. In all other arrangements the ARM reveals two Fixed Addresses.*

Fixed Address Label

Once the installation is complete, do the following:

- Sketch a rough site plan.
- Attach the loose additional Fixed Address Label, packaged with the ARM, in the position of the ARM on the sketched site plan.
- When the system installation is complete and all the modules are represented on the site plan by their Fixed Address Labels, file the site plan for future reference.

USER NOTES

USER NOTES

USER NOTES

GUARANTEE OR WARRANTY

CAUTION: **We reserve the right to nullify the products guarantee or warranty where you have not properly installed the Metal-oxide Varistors.**

This product conforms to our Guarantee or Warranty details placed on our Web Site, to read further please go to www.impro.net.

This manual is applicable to the Impro (ARM) Antenna Reader Module, HML700-1-0-GB-01 and HML701-1-0-GB-00. (The last two digits of the Impro stock code indicate the issue status of the product).			
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