# SATO VICINITY

# User Manual

## MDR-4330AT (MLC6)

## Desktop Reader-Writer



**Document Number: 83-00-001-DOC-3**

**Last Changed: 19 November 2017**

# Contents

Please read and understand this document before using Sato Vicinity's Readers. If you have any questions, comment or suggestions about the User Manual please contact Sato Vicinity Technology

➢ **Important Information**

⓪ **Installation Environment**

Indoor use only, in accordance with the recommended temperature and humidity levels specified in section 3.2.1 of this document.

Must not stored or operated in an environment containing corrosive, flammable or explosive agents or be subject to rapid changes in temperature, direct vibration or shock.

⓪ **Installation**

Sato Vicinity's RFID reader-writers communicate with data carriers (RFID inlets, labels and tags) using the 13.56 MHz High Frequency (HF) band. Some industrial devices can generate unwanted noise which may degrade communication. Make sure that other equipment is properly installed, grounded and at a reasonable distance.

Wireless communication can be degraded by high-voltage and high-current lines and other sources of strong electric and magnetic fields. Installation in such locations should be avoided.

⓪ **Maintenance**

All Sato Vicinity's RFID readers-writers are low maintenance equipment. Except for the externally accessible fuse there are no user-serviceable parts. There is no requirement to remove the cover of the Reader.

| **!** | Removal of the Reader cover by unauthorised personnel will void the product warranty |
|---|---|

*Do not attempt to clean internally. Periodic cleaning of external case parts with a damp cloth is advisable. Turn off the Reader before cleaning. Do not use solvents of any kind!*

| ⚠ | In order to avoid electric shock do not remove the Reader cover or attempt to repair. The equipment must be maintained by authorised, qualified and service-trained personnel only |
|---|---|

| 🗑 | For disposal purposes Readers should be treated as industrial waste. |
|---|---|

*This symbol on the Reader or on its packaging indicates that this Reader shall not be treated as household waste. Instead it shall be disposed of an appropriate collection point for the recycling of electrical and electronic equipment. By ensuring this Reader is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this Reader, please contact your local city office, your household waste disposal service or your SATO regional sales office.*

# 1. Introduction

Thank you for your purchase of a Sato Vicinity RFID reader-writer.

This User Manual will provide you with information needed to install the Reader hardware and Reader Manager Software and get the Reader running so you can rapidly adapt SATO Vicinity's PJM technology to your needs,
Refer to the Reader Manager User Manual (40-01-006-DOC) for a description of the various tools and advanced options available in Reader Manager.
Programming is covered in the Programmer Guide (40-01-000-DOC).

## 1.1   Regulation and Standards

RFID equipment is subject to national and international regulations.

The FCC regards RFID equipment as low-power transmitting devices and, therefore, does not require users of RFID devices to obtain a license to operate them.

### FCC Radio Frequency Interference Statement (USA)

These devices comply with Part 15 of the FCC rules. Operation is subject to the following two conditions:
1. These devices may not cause harmful interference, and
2. These devices must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limit for a Class A digital device and intentional radiator, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense

➢ **FCC ID: 2ACXQ-MDR-4330ATE**

| ! | Any changes or modifications to the equipment that are not expressly approved by the party responsible for compliance could void the user's authority granted under FCC Rules to operate this equipment. |
|---|---|

| ! WARNINIG | This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures |
|---|---|

### ISO/IEC 18000 – 3 Mode 2 (Air Interface at 13.56 MHz) Compliance

Sato Vicinity's Readers fully complies with the ISO/IEC 18000 Part 3 Mode 2 (Information technology – Radio frequency identification for item management. Part 3: Parameters for air interface communications at 13.56 MHz) published in August, 2004

## 1.2 Warranty

Sato Vicinity's products are warranted against defects in design, materials and workmanship for a period of 1 year from the date of purchase by the original owner

Any liability with respect to components including purchased or free issued items and other materials used in the manufacture of products are covered by, and limited to, any warranty provided by the original manufacturer

## 1.3 Limitation of Liability

Sato Vicinity's warranty excludes products that have been improperly installed or maintained, modified or misused. Notification of claims must occur within the warranty period.

End-users should contact the company from whom they purchase the products for replacement, repair or refund.

If purchases the Reader directly from Sato Vicinity, contact Sato Vicinity for a Return Merchandise Authorization (RMA) before shipment

## 1.4 Changes in Product Family, Specifications and User Manuals

This document is subject to change without notice in future editions. Sato Vicinity reserves the rights to change its product design, specifications and product range.

## 1.5 Meaning of Alert Symbols and Signal Words

| | |
|---|---|
| | Notes and Tips. Application Notes |
| **!** | This part of the Manual requires your attention |
| ⚠ | In order to avoid electric shock follow the instructions provided |
| **! CAUTION** | Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury. Can cause property damage. |
| **! WARNINIG** | Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Can cause significant property damage. |

## 1.6 Glossary of Terms and Abbreviations

| | |
|---|---|
| D/C | Date Code (month/year) |
| HF | High Frequency |
| LED | Light Emitting Diode |
| MLC | Machine Level Control |
| OEM Label | Original Equipment Manufacture label is located on the back of the equipment. It includes the Model Number, P/N, D/C, S/N and MLC |
| PJM™ | Phase Jitter Modulation or PJM™ is a registered Trade Mark of Sato Vicinity |
| PJM StackTag® | Registered Trade Mark for Sato Vicinity's StackTag tags |
| P/N | Part Number |

| | |
|---|---|
| RMA | Return Merchandise Authorisation |
| Reader | Sato Vicinity's RFID reader/writer |
| Reader Manger | Graphical user application for Windows/Linux which provides a platform for testing, demonstrations and application development |
| ReaderServer | Embedded application that provides the standard Application Programmer Interface to serve end-user applications. This application runs on the Reader |
| RFID | Radio Frequency Identification |
| RFID inlet | A RFID device comprising a microchip and a printed antenna (copper/aluminium/conductive inks) on a flexible substrate (PET plastic film) |
| RFID Label | RFID inlet with adhesive backing (sticky label) |
| RFID Tag | Generic name for RFID inlet and label |
| RFID reader | Device for reading and writing to RFID tags |
| S/N | Serial Number |
| LAN | Local Area Network |

# 2 Product Overview

The MDR-4330AT desktop reader represents a breakthrough in 3 dimensional antenna technology, allowing full orientation insensitive read and write capability. Large numbers of tagged items can be quickly and accurately identified, regardless of their orientation on the reader surface.

The MDR-4330AT desktop reader is a standalone device which is fitted with full ferrite shielding and uses field cancellation techniques to ensure there is no operational interference from surrounding objects (such as metal shelving or other electronic equipment) and it will not interrupt operation of any other nearby sensitive equipment.

The MDR-4330AT offers connection to a PC via Ethernet or USB and is simple to set up and use, straight out of the box. It is supplied with our Reader Manager software which provides a platform for reader setup, configuration, demonstration, testing and application development.

The MDR-4330AT has been successfully adopted across various industries ranging from the medical field, Document, diamond and precious gem tracking. It is suitable for any application where few or many tightly packed tagged items need to be read/written to quickly and accurately irrespective of their orientation.

The communication protocol used by the MDR-4330AT Reader is compliant with ISO/IEC 18000 - 3 Mode 2 (Air Interface at 13.56 MHz).

## 2.1 MDR-4330AT

- Desktop reader-writer

- Multi-axis antenna providing 3 dimensional operation

- 2 communication reply channels

- Line reading functionality



MDR-4330AT (MLC4.1) Reader

# 3 Getting Started

## 3.1 Unpacking and Inspection

When you receive your reader, inspect it for any obvious damage that may have occurred during shipment. If there is damage, notify the shipping carrier and the supplier of the equipment or Sato Vicinity if purchased directly from Sato Vicinity

Until you have checked the reader, save the shipping carton and packaging materials in the event the unit has to be returned.

Included with the MDR-4330AT should be the following components:

- Reader-writer
- Power adaptor - 12VDC output
- Quick Start Guide & Test Results sheet
- Reader Manager CD-ROM

**The CD-ROM will contain the following 4 files:**

| | |
|---|---|
| *Autorun.inf* | Will automatically launch the *Reader Manager-Install.exe* |
| *Documentation Folder* | Contains various PDF documents including User Manuals & Programmer information |
| *CD-ReadMe,txt* | Text file describing all the files on the CD |
| *Reader Manager-Install.exe* | The GUI application for configuration and demonstration of all readers |

A power cable is not included with the supply. End-users should purchase a power cable suitable for the country of use

Ethernet & USB cables are not included with the reader. Sato Vicinity recommends CAT5 Ethernet cable and a screened USB cable.

- An RFID tag will be (required for Hardware Functionality and Communication Testing)

**! CAUTION** Only power cables and adaptors that are compliant with the regulations in the country of use may be connected to Sato Vicinity's equipment.

**!** USB cable should be USB 2.0, screened & no longer than 3m

**!** Shielded cables (USB or Ethernet) are generally required in order to comply with EMC emissions limits, only shielded communication cables should be used.

# 3.2 Before You Begin

## 3.2.1 Installation Environment

Sato Vicinity's Readers are designed to operate in indoor environments where temperature and humidity are controlled unless otherwise specified.

For standard Readers the operating temperature range is from $0^{\text{o}}$C to +45$^{\text{o}}$C. The humidity range is from 10% to 80% (non-condensing humidity).

| ! WARNINIG | Do not operate this reader in an environment containing corrosive, flammable or explosives agents or conductive dust, or where rapid changes in temperature or vibration or shock are likely |
|---|---|

Sato Vicinity's RFID readers communicate with data carriers (RFID inlets, labels and tags) using the 13.56 MHz High Frequency (HF) band. Some industrial devices can generate unwanted noise which may degrade communication. Make sure that other equipment is properly installed, grounded and are at a reasonable distance.

Wireless communication can be degraded by high-voltage and high-current lines and other sources of strong electric and magnetic fields. Installation in such locations should be avoided.

| ⚡ | In order to avoid electric shock do not remove the Reader cover or attempt to repair. Sato Vicinity's reader-writers are to be maintained by authorised, qualified and service-trained personnel only. |
|---|---|

| ! | Removal of the Reader cover by unauthorised personnel will void the product warranty. |
|---|---|

## 3.2.2 Working with Tags

| ☞ | ① Multiple-axis Readers are tag orientation insensitive, with the exception of the Line Read function which is necessary orientation specific.<br><br>① Reading and writing speeds depend on reader-tag communication speeds and channel numbers (communication protocol), amount of information to be read and/or written and number of tags presented at a time. Additional numbers of tags and information to be read/written slow down read-write communication. If you require further information specific to your application please consult Sato Vicinity or your support organisation.<br><br>① Please note that tags and Readers can be incompatible with each other. Bigger tags can typically work with all types of Readers. Smaller tags require higher field strengths to communicate with a Reader and as a result they may not communicate with some Readers or have to be closer to a Reader antenna to function. If you require further information specific to your application please consult Sato Vicinity or your support organisation. |
|---|---|

### 3.2.3 Installation Requirements

The MDR-4330AT is a stand-alone peripheral desktop device that does not require special installation or tuning of an internal antenna.

Power supply requirements:

| Mains input: | 110 - 240 VAC @ 50/60 Hz |
|---|---|
| Low voltage input (MDR-4330AT): | 12 VDC @ 2.5A |

### 3.2.4 Tag to Reader Orientation

As the MDR-4330AT is a three axis reader providing a three dimensional field so it is orientation insensitive and the RFID tags can be presented in any orientation, vertical, horizontal, parallel or at any angle to the reader surface, with the exception of the Line Read function which is necessary orientation specific.
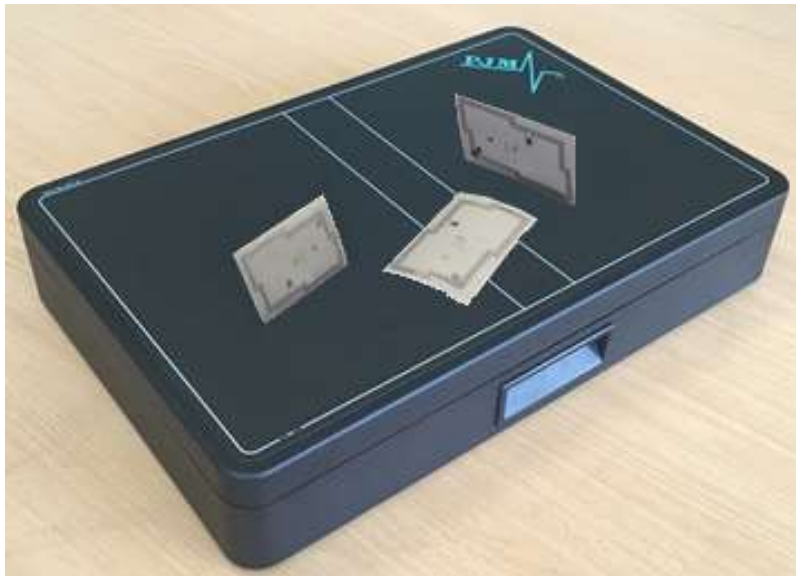


Tag Orientation Insensitive reading

# 3.3 Hardware Installation



MDR-4330AT User Interface Panel

## Step 1.  Connect the supplied 12VDC power supply to the reader

Power for the reader is provided by the low voltage 12VDC power supply.



MDR-4330AT with power connected

## Step 2. Plug the power supply into the AC mains power

When power is applied to an MDR-4330AT Reader and the reader power switch is switched on, the status LEDs should operate as follows:

- The red LED "A" and green LED "B" will immediately illuminate then both LEDs will be switched off after approximately 9 seconds



MDR-4330AT with red & green LED's illuminated

- The red LED will illuminate again after approximately 1 minute indicating that the unit is in an operational state

- Once the unit is in an operational state the red LED will remain permanently illuminated

- The LED's are controlled by the MDR-4330AT Reader software

**Step 3. Test the Reader with a known working RFID tag. The green LED's 1 & 2 will randomly illuminate when an RFID tag is successfully read.**

## 3.3.1 Connecting a Reader to a Computer using USB

Connect the MDR-4330AT Reader to a host computer using a USB data communication cable by plugging the USB cable into the MDR-4330AT "USB Device" port and the host computer USB port. Switch the reader on. It can take up to 4 minutes for windows to load the USB drivers for the reader on some computers. Once the USB driver has loaded the reader will be listed under Network adapters as a "Linux USB Ethernet/RNDIS Gadget".

*Windows operating systems may occasionally load the incorrect USB drivers for the reader. If you experience an issue with the incorrect driver loading refer to Magellan Technology Technical Bulletin 0009 (TB-0009), Available from Sato Vicinity or your local reseller.*



MDR-4330AT with power & USB cables connected

## 3.3.2 Connecting a Reader to a Computer using Ethernet

Any number of Readers can be connected to a local network using an Ethernet hub/switch. Plug the Ethernet communication cable into the MDR-4330AT RJ45 socket (Ethernet port) and Ethernet Hub (Do not use a cross over cable). All readers on the local area network (LAN) will be accessible by all PC's on the same LAN.



MDR-4330AT with power & Ethernet cables connected

## 3.4   Reader Manager Software Installation

Reader Manager is a graphical application for Windows. It provides a platform for reader setup, configuration, demonstrations, testing and application development. When it is run, Reader Manager can connect to a single reader at one time, it can switch between multiple readers. Multiple copies of Reader Manager can be run, each of which can be connected to different reader. The program provides a set of *tools*, each of which runs in a particular demonstration, test or diagnostic window, all windows can be resized. This will be saved, so the next time you run the Reader Manager, all windows will retain the size you set previously. The position of the application on the Windows desktop is also retained.

## 3.4.1 Software Installation and Functionality Test

### Step 1. Insert the CD supplied with the reader into the CD-ROM.

The installer should start automatically, if it does not simple open the CD directory and run the *Reader Manager-Install.exe*. This contains the Python interpreter, support libraries and the application itself. Python is the development language used by Reader Manager.
The installer looks on the system to determine which components are already present. Ticks will appear next to the items that are not currently installed. The Python interpreter and libraries will automatically install if required. In this case, the following window is shown: Click *"OK"*
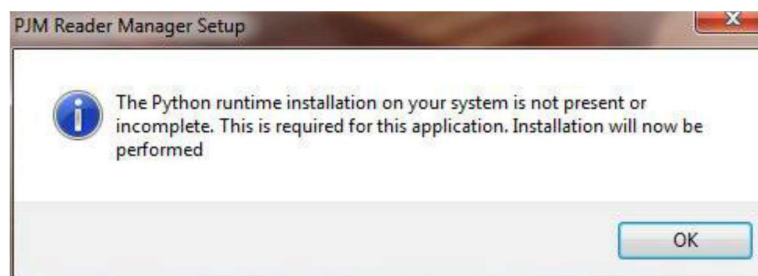


PJM Reader Manager Setup Python runtime installation popup

You will be prompted for the directory to install the Python system as shown below. In most cases, the default directory is the best choice. Click *"Install"*
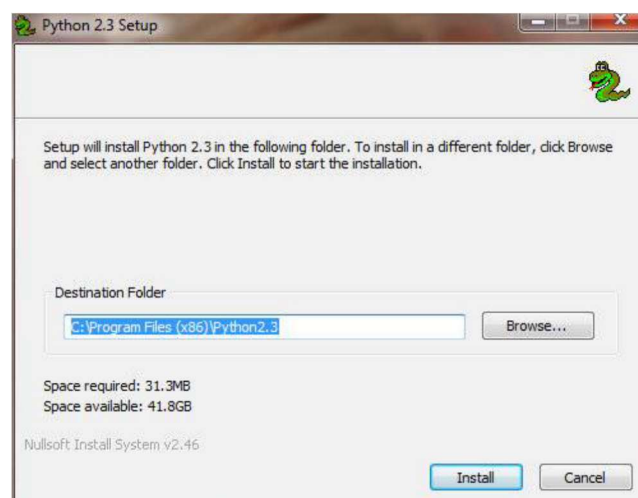


Python installation Destination folder selection window

You will be presented with the license agreement. Click "*I Agree*" to continue to the component selection window (shown below).

By default the installer will install only a basic set of tools. The user will be limited to only viewing tags and reader messages. This is a safe default, as it prevents users from using tools or demonstrations and disrupting operating readers. Users who require more functionality should enable the checkboxes as needed. Once you have made your selections click *"Next >"*
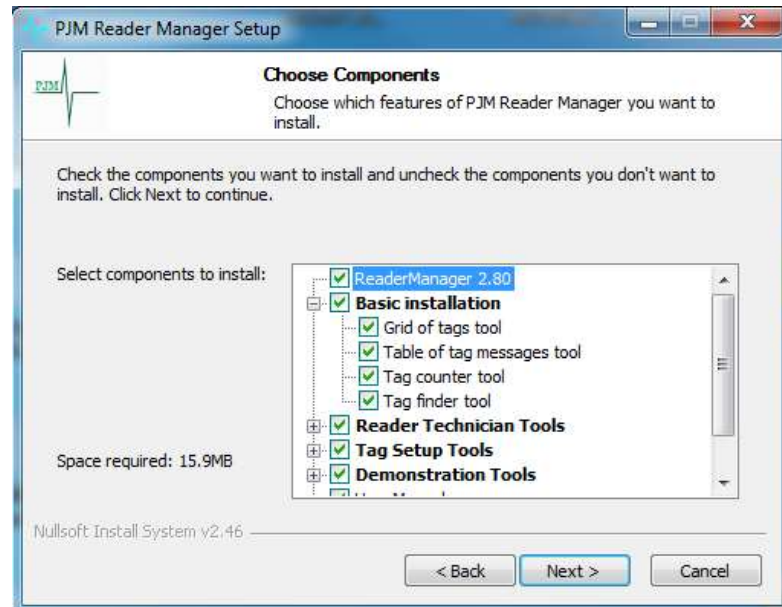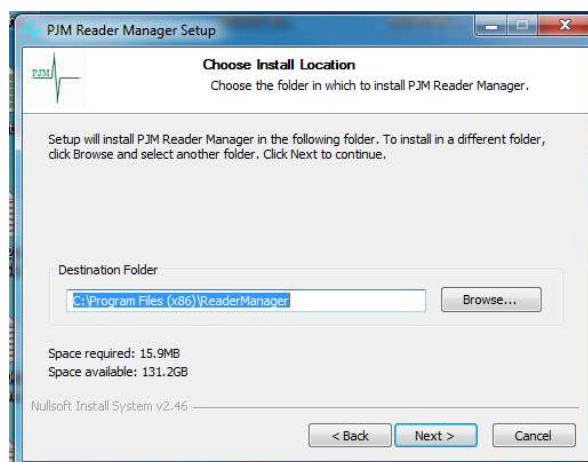


Reader Manager Setup window

*If the installer finds that Reader Manager has already been installed with the current version, you can force a reinstall by manually ticking the checkbox "Next" to the application.*

You will be prompted for the directory to install Reader Manager. The default location is the best choice but you may change the location as required, click *"Next >"*



Reader Manager Installation Destination folder selection window

You are prompted for the Start menu folder. The default is PJM Reader Manager, we recommend not changing this (as shown below). Click *"Install"*

*Should the installation fail, click the Show Details button. Highlight the installation detail text and press the right mouse button to select Copy Details to Clipboard. Paste the details into an Email and Email this to your technical support contact.*
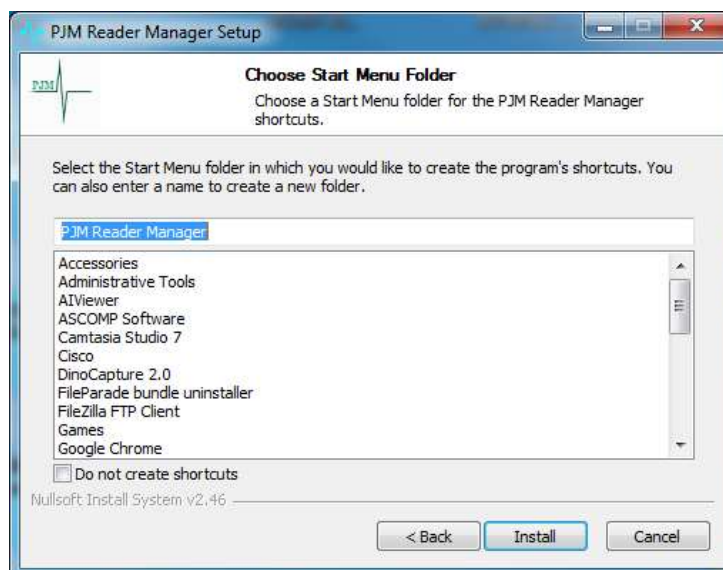


Reader Manager Start Menu selection window

## 3.4.2 Connecting to a Reader

A Reader provides Ethernet and USB device interfaces to allow for client connection. The USB interface uses TCP/IP networking over USB as the protocol. This allows you to connect to a reader as if it was a normal network. So all the usual services, such as telnet and FTP are available.

**Step 1. Ensure the reader is switched on with the communication cable connected**

When a Reader is connected to a network for the first time using either an Ethernet cable or connected to a host computer using a USB cable, the Reader is identified by its Model Name-Serial Number (recommended to keep the serial number as a reference).

| | ① Customers can add additional information to the reader such as a physical location in the customer ID number field. Refer to section 3.4.4 Changing the Reader's System Configuration of this User Manual.<br><br>② Change made to the Reader's System Configuration will only take affect once the reader is restarted<br><br>③ Tip: If you want to use the new name immediately, simply switch the reader off the on again to view the new name on the Connection menu list. |
|---|---|

When a Reader is connected to a host computer for the first time using a USB cable, the drivers should automatically load, if they do not (Perhaps due to an older Windows OS) the *Found New Hardware Wizard* will appear, perform the following steps.

1. In *Found New Hardware Wizard* tick "*Yes*", *this time only* to search for software and press "*Next*".

2. In what do you want wizard to do? Tick "Install" the software automatically and press "Next".

3. Wait while the wizard installs the software: Linux USB Ethernet/RNDIS Gadget. Ignore other message and press "Continue anyway".

4. Press "*Finish*".

5. Open the *Connection* menu to see a list of Readers and the new Reader identified by Model Name-Serial Number on the list.

6. If you cannot find the new Reader on the list simply unplug the USB cable and plug it again into the Reader USB device port. This time you should be able to see the Reader's Model Name-Serial Number.


## Step 2. Start Reader Manager to view Readers found on the LAN

Reader Manager will use network broadcasts to look for active readers via USB and Ethernet. All readers found on the LAN will be listed in the Dynamic Reader List as shown in the image below.
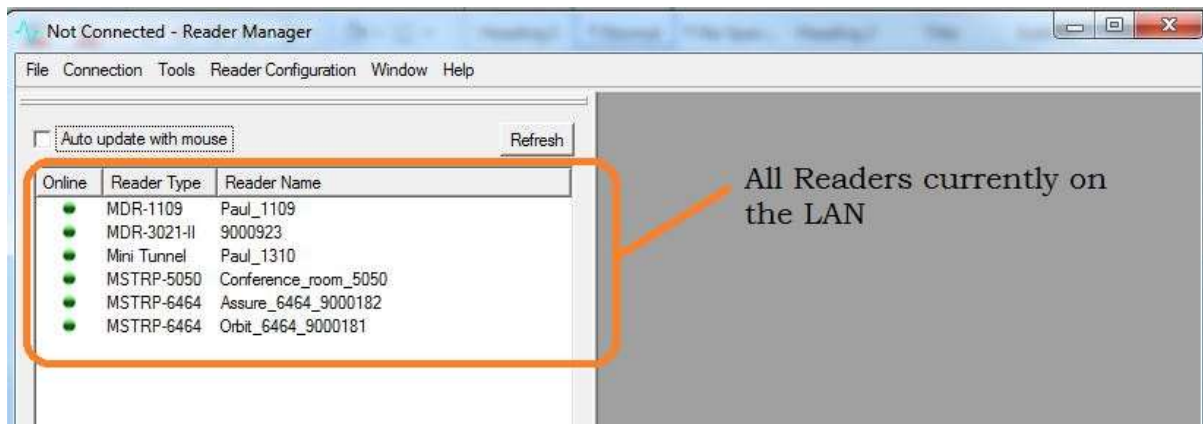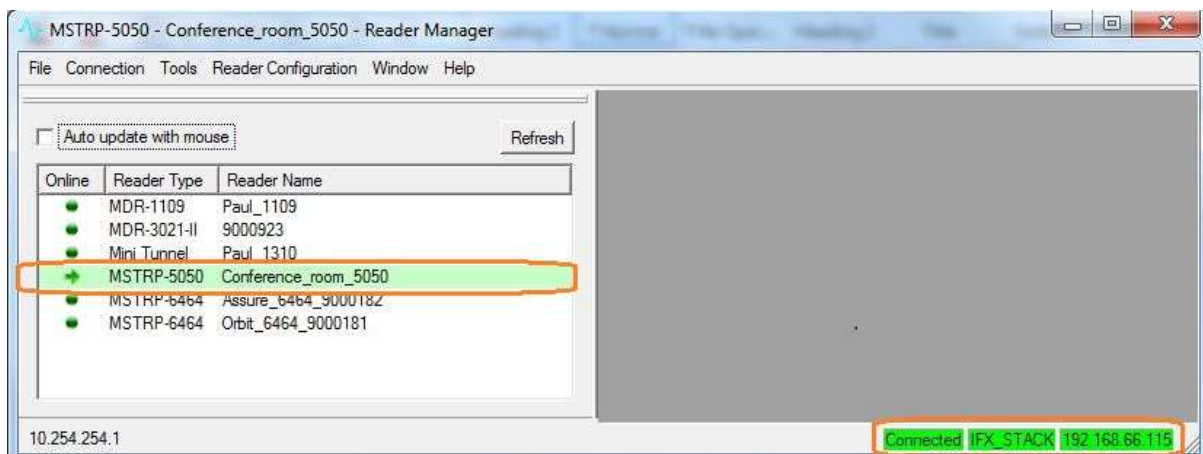
Dynamic Reader List in Reader Manager

## Step 3. Connecting to the desired Reader from the *Dynamic Reader List*

Locate the desired reader in the Dynamic Reader List & move your mouse pointer over any field of the reader & double click your left mouse button. You will notice that the green status bubble to the left of the reader turns into a green arrow & the IP address of the reader will be displayed in the bottom right corner of the Reader Manager window.
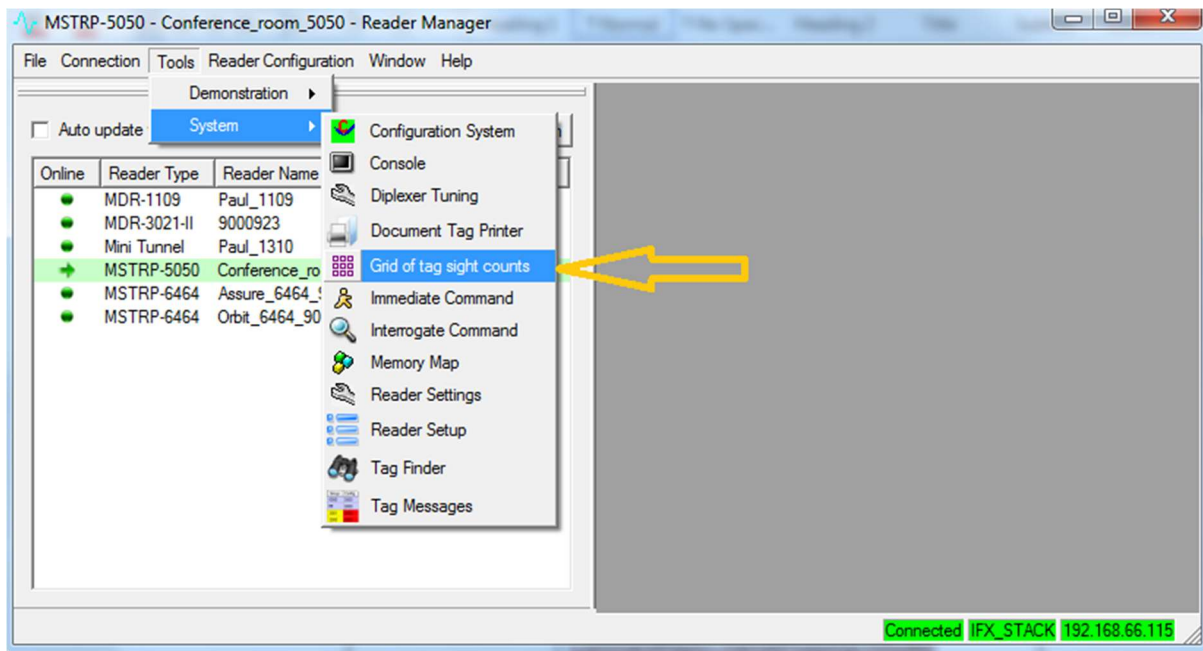


Dynamic Reader List with reader connected

To setup static IP address connections to readers refer to the Reader Manager User Manual (40-01-006-DOC).
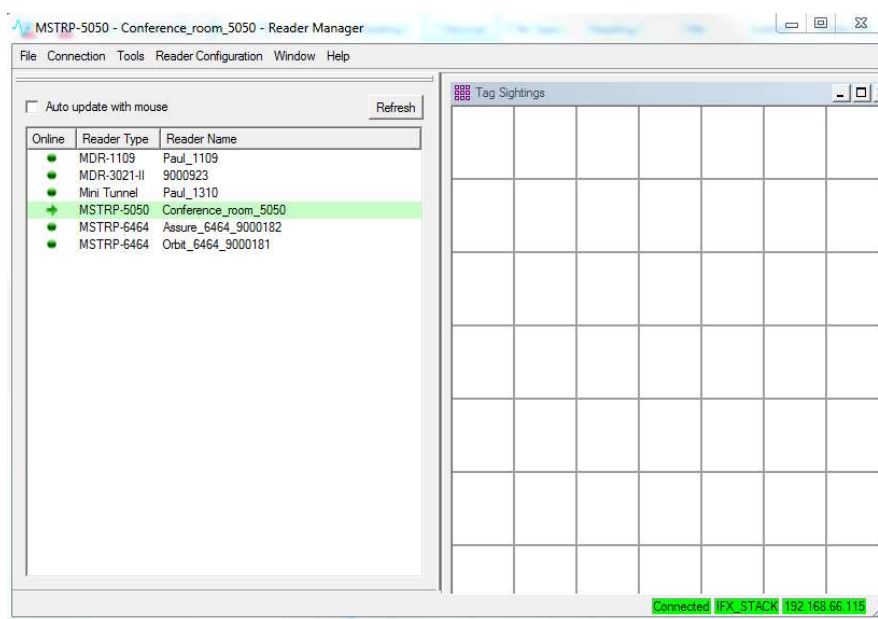
## 3.4.3 Communication Test

From the *Tools* menu, select *System* then *Grid of tags sight count.* See Image below

*Grid of tag sight counts* tool selection

The Grid of tags will now be visible in the right panel of the Reader Manager window as shown in the image below



Reader Manager with Tag Sightings window open

Place a tag on the Reader. The first square in the grid should change from white to blue and display the tag's ID number and the number of times the tag was sighted, should be one (1). An example of this is shown below.

The Addition of more tags cause more squares to progressively populate with the tag's ID number and the number of times the tag was sighted. Removing a tag will cause the tag to "Expire" turning the relevant square on the grid to turn dark grey (the data will be preserved). Placing the same tag back on the reader will cause the relevant square to change from grey back to blue & the tag count to increment to two (2), with each successive tag removal & replacement the count will increment by one (1).
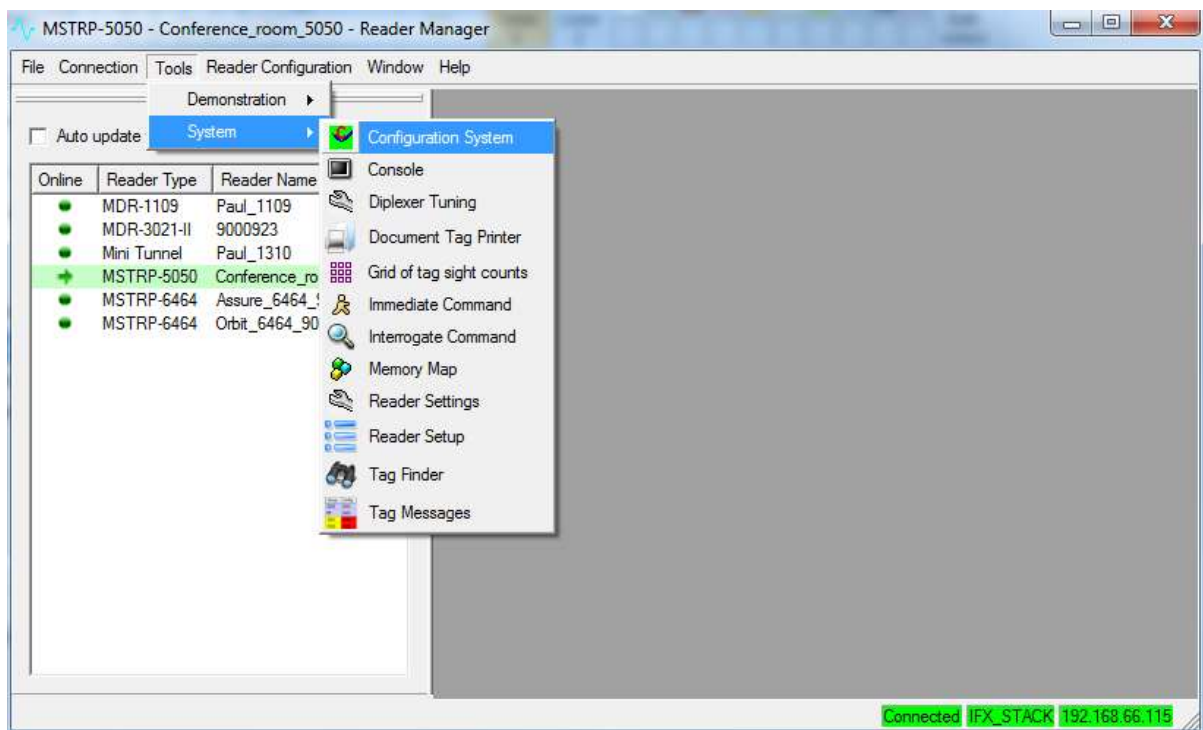
This simple test has confirmed the Reader & LAN/USB connection is working.
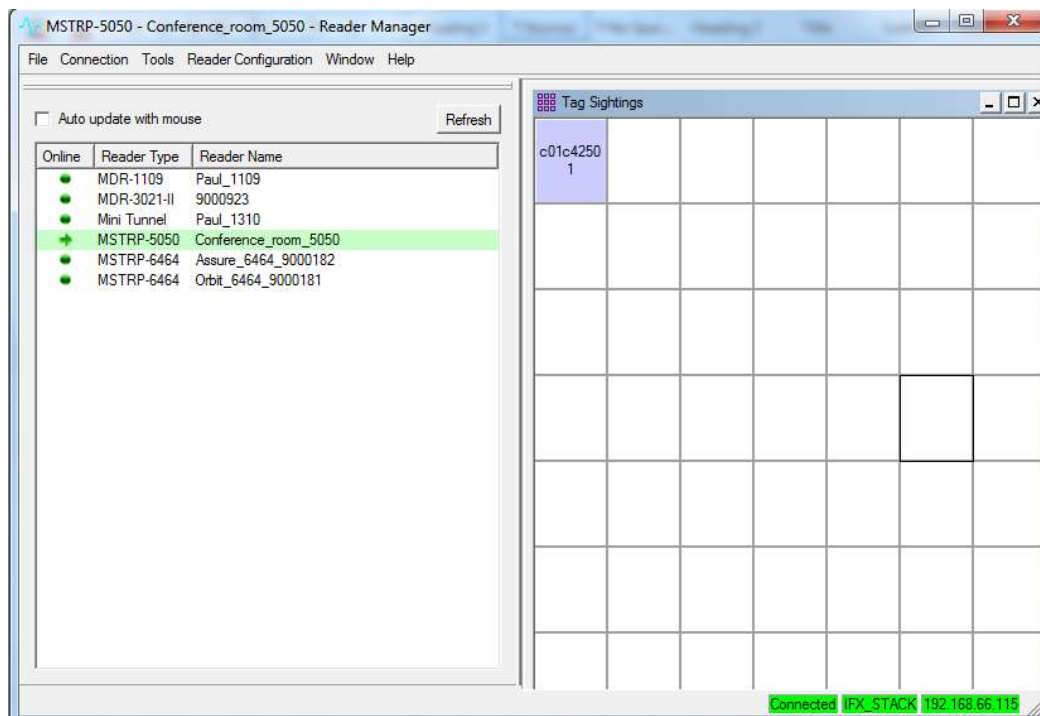
Tag Sightings window showing 1 tag on the reader

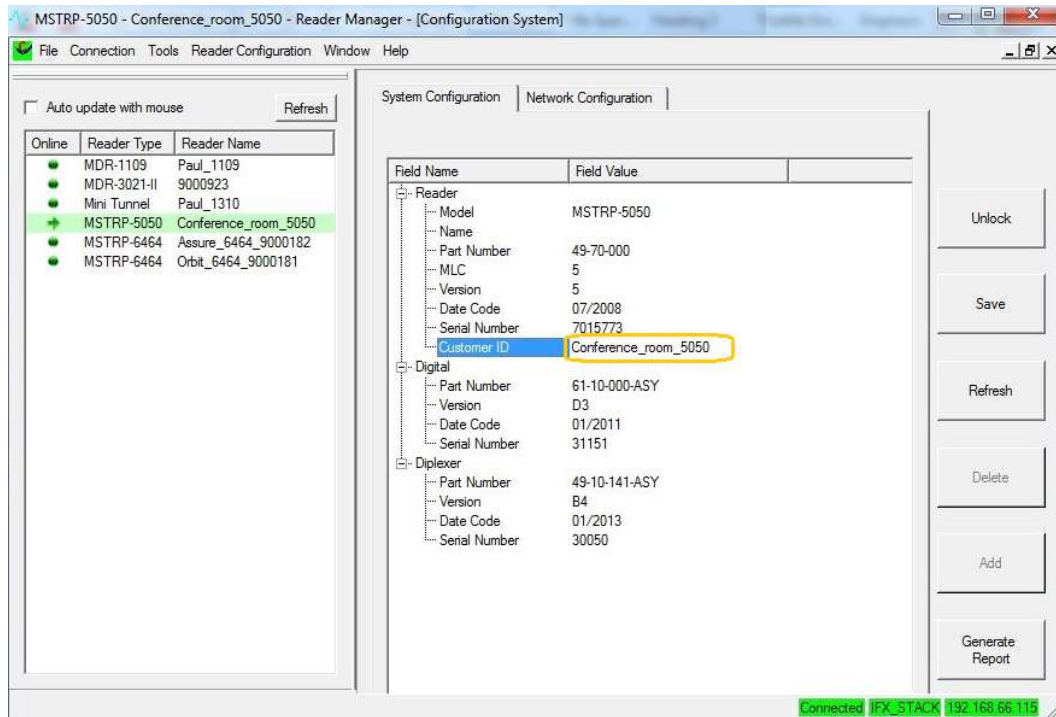## 3.4.4 Changing the Reader System Configuration

Ensure the Reader is connected as described above. From the Tools menu, select System then Configuration System as shown below. The Configuration System window will open.



Configuration System tool selection

The user configurable field is the *Customer ID,* you can enter the name you would like the Reader to be identified *as (This is useful in a large reader networks where you may need to manage many readers)*. The name entered in the *Customer ID* field is the name that will appear on the Reader Manager *Connection* menu for that reader. Power cycle the reader for the change to be reflected in Reader Manager.

Once you have entered the desires reader name press the "Enter" key on your keyboard then Click the "*Save*" button to the right to save your changes to the reader.



System Configuration window

## 3.4.5  Changing the Reader's Network Setup

Ensure the Reader is connected as described above. From the Tools menu, select System then Configuration System as shown in section 3.3.4. The Configuration System window will open. Select the *"Network Configuration"* tab as shown below. By default the reader is set to obtain an IP address from a DHCP server. If this is not desired un-tick the "Obtain an IP address automatically" check box and enter the required IP Address, Subnet mask & Default Gateway. Press the "Enter" key on your keyboard then Click the "*Save*" button to the right to save your changes to the reader. Power cycle the reader for the change to take effect.
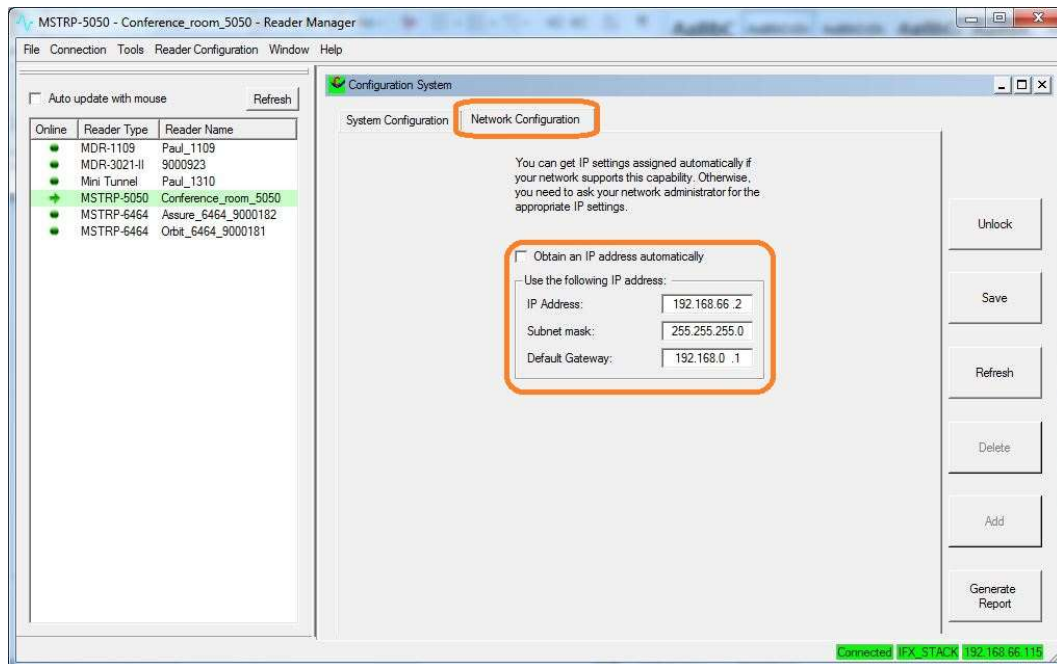
Configuration System "Network Configuration" window

| ! | ⓘ Ensure the IP address allocated to the reader is recorded for future reference. Applying a label to the reader showing the allocated IP address is ideal. |
| | ⓘ Tip: If you make an error in the reader Network configuration the reader may no longer be visible on the network (wrong IP range for example). If this happens you can connect to the reader using a USB cable & correct the issue |

# 4. Line Reading

## 4.1 Line Reading Functionality

All MDR-4330AT readers from MLC 4.1 onward have native Line Reading capability which allows users to quickly locate a specific item within a large tag population.

**How the Line Reading functionality works**

The Line Read functionality is native to the reader and is controlled via the client application software, the Line Read works in two distinct stages as follows:-

### Stage 1) Initial item location within a large tag population

When searching for a single specific item you may or you may not know the container in which the item is located, in either situation you will enter the details of the item you are searching for into your application, this will set the reader to seek mode. If you do know the container in which the item is located you can simply place the container on the reader & the reader it will confirm it has identified the RFID tag associated with the item you are searching for, the reader can now be set to Line Read mode via the application. If you do not know the container in which the item is located you can simply place your containers on the reader surface, one by one until the reader confirms it has identified the RFID tag that is associated

with the item you are searching for. The reader can now be set to Line Read mode via your application.

**Stage 2) Item location within the container**

Once you have identified the specific container in which an item is located, the Line Read function will very quickly help you narrow down the location of the item within the container. This is achieved by simply moving the container across the clearly marked Line Read area on the Reader (See "Line Read Area" image below)



Line Read Area

The Item you are searching will only be identified when it is presented to the narrow Line Read area, you can then very quickly drill down on the small number of items with the Line Read Area to locate the required item. Once the item has been confirmed as located the user will acknowledge this in the application and the reader will be set back to normal operation.

In the example below (see Tray of gems undergoing Line Read image) we can see a tray of gemstones being moved from right to left, as soon as the required item is identified within the Line Read area the user is notified enabling quick item location. In the example below the item is located in the right most row of items.



Tray of gems undergoing Line Read

# 5. Troubleshooting

| Issue | Cause | Solution |
|---|---|---|
| No Power – All LED's are off | Power cable not connected | Ensure the power cable is connected correctly to both the mains power and to the Reader |
| | Power Cable faulty | Replace the cable |
| | Power Adaptor faulty | Replace the power adaptor. |
| | Reader Faulty | Contact your local supplier for support |
| | Fuse blown | Replace fuse with an equivalent 5 x 20mm 3A 250VAC rated fuse |
| Absence of the flashing green LED's during tag reading | Faulty tag/tags | Replace tag/tags. Do not use tags with a black dot or black square marking (faulty tags). |
| | The *Powering Field* is off | Ensure the powering field is on. Go to *Tools> System>Reader Setting.* Tick the *Powering Field* box. |
| | USB or Ethernet connection is not functioning | Ensure the Ethernet/USB cable is working correctly, try using an alternative cable. Power cycle the Reader & restart the host computer. |
| | The tag type is incompatible with the reader | Use the appropriate tag type for the reader, contact your local supplier to help with tag compatibility information |
| | Reader faulty | Contact your local supplier for support |
| Cannot find and connect to the reader as the reader is not shown on the *Dynamic Reader List* | The reader is not connected | Ensure the Ethernet/USB cable is connected properly to both the reader & host computer |
| | Invalid Network configuration | The computer IP address on the computer running Reader Manager must be in the same subnet as the reader |
| | USB drivers still loading | USB connected readers may take some time to negotiate an address. Check the *Network Connections* window in the *Control Panel* to confirm that a connection has been established |
| | Data Cable | Test USB/Ethernet cable |
| | Reader faulty | Contact your local supplier for support |

# 6. Document Revision History

| Version | Date | Person | Change |
|---------|------|--------|--------|
| Ver 1.0 | 17 Nov 2014 | Steve Antonio | Initial Release of 83-00-001-DOC |
| Ver 2.0 | 23 Nov 2017 | Steve Antonio | Update to MLC4.1 with line read 83-00-001-DOC-2 |
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# 7. Appendix

## 7.1 MDR-4330AT Product Specification

| Electrical | |
|---|---|
| Operating Frequency | 13.56 MHz |
| ISO/IEC Compliance | ISO/IEC 18000-3 Mode 2 |
| Command Data Rate | 424 kbit/s |
| Reply Data Rate | 106 kbit/s per channel |
| Number of Reply Channels | 2 |
| Number of Axes | 3 |
| Operating Range | Marked read/write area |
| Power Supply | 12 VDC |
| DC Power Supply Connector | 2.5 mm DC centre pin positive |
| Power Consumption | 42W |
| **Performance** | |
| Identification rate | Up to 150 tags/s |
| **Host** | |
| Host Interface | USB, Ethernet |
| Minimum Host Requirements | Windows 7 or later |
| **Environmental** | |
| Operating Environment | Indoor use |
| Temperature Range | 0°C to +45°C ambient |
| Humidity | 10% to 80% (non-condensing) |
| Reader Placement | Can be placed next to each other |
| **Mechanical** | |
| External Dimensions: (L x W x H) | 440 x 290 x 84 mm |
| Net Weight | 7.85 kg |
| Net Volume | 0.00074 m3 |
| **Certifications** | |
| USA | TBA |
| **Other Features** | |
| Operation | Powerful processing platform allowing for stand-alone reader operation |
| Calibration and Tuning | No manual calibration or tuning required |
| Shielding Methods | Ferrite and Field Cancellation |
| Line Reading Functionality | RFID field unaffected by liquids |