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APPENDIX N
OF
TEST REPORT T080316_F

READER MANAGER GUIDE

FCC ID: TVN-MARS-24E
Manufacturer: Magellan Technology Pty Limited
Test Sample: MARS-24 RFID Desktop Reader
Model: MARS-24E
Serial Number: 7014360
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Magellan
Reader Manager
Guide

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Reference Documents

Document Number	Description	Date	Version
40-01-000-DOC	Applications Programmer's Guide For Version 3 Reader Server	27 June 2006	
45-00-001-SPC	BT and ST Chip Logical Specification	30 June 2003	Ver 2

Document History

Date	Version	Change Description	Author
14 Dec 2005	1	Jeff Gray original document	Jeff Gray
6 Sep. 06	2.00	Changed formatting, updated to show new tools.	Daryl Dusheiko
14 Sep. 06	2.01	Added more instructions to the axis test section.	Daryl Dusheiko

Table of Contents

1   Introduction

The ReaderManager is a graphical application for Windows and Unix. It provides a platform for reader setup, configuration, demonstrations, testing and application development.

When it is run, the ReaderManager can connect to a single reader at one time. It can switch between multiple readers.

Multiple copies of ReaderManager can be run, each of which can be connected to different readers.

The program provides a set of *tools*, each of which is a particular demonstration, test or diagnostic window.

All windows can be resized. This will be saved, so the next time you run the ReaderManager, all windows will retain the size you set the last time. The position of the application on the Windows desktop is also retained.

2 Frequently asked Questions

This section provides a list of commonly asked questions.

2.1 How do I install or upgrade ReaderManager?

1. Run the install program *ReaderManager-Install*.exe. This can be downloaded from the Magellan website www.magtech.com.au, or run from the CD supplied with your reader.

2. If you already have ReaderManager installed run the program *ReaderManager-Upgrade.exe*.

3. Follow the installation instructions given in section **3 Installation**.

2.2 How to connect ReaderManager to a reader?

1. Connect an Ethernet cable or USB cable to the reader as described in reader manual. Apply power to the reader.

2. Wait about 40 seconds for the reader to start up.

3. Either select the reader from the *Dynamic Reader* list on the *Connection* menu as described in **5.1.2 Opening a Dynamic Connections**, or create a static connection as described in section **5 Managing Connections**.

2.3 I have a new reader, what do I do now?

1. You will need the following equipment to setup a reader.

   - DC Voltmeter
   - Antenna tuning block and trim tool.
   - Normal powered tag.

2. Open the *Reader Setup* tool as described in section **6.8 Reader Setup.**

3. Follow instructions provided by the wizard selecting and configuring the number of axis Groups, selecting, tuning and testing the antennas used with the reader. Save the configuration to the reader.

2.4 How do I change the network settings on a reader?

1. Open the *Configuration System* tool as descried in section **6.1 Configuration System**.

2. Changing the *Customer ID* field will change the name of the reader as displayed on the dynamic connections menu.

3. Click the *Network Settings* tab to set a fixed IP address or to obtain an IP address from a DHCP server.

2.5 How do I set a tag to Normal Powered mode?

1. Open the *Console*. Right click in the *Message log* area and ensure that *Show Tag Replies* is ticked.

2. Place a tag on the reader, you should see a response from the tag.

3. From the *Reader Configuration* menu select *Config_Normal_Powered_Tag*.

4. You should get a response from the reader with the **data value equal to 6000**. A typical response looks as follows:

Info,Reply:Timestamp 7fff, LockPointer 0004, Manufacturing e005, SpecificID 000f8ff5, GroupID 2000, ConditionalID ffff, Configuration 6000, ReadAddress 0006, **Data: 6000**

5. Remove the tag from the antenna.

6. From the *Reader Configuration* menu select *ClearAll.*

2.6   How do I restore the reader to its default settings?

1. Open the *Reader Settings* tool.

2. Click the *Clear Saved Settings* button.

3. Power the reader off then on.

2.7   How do I get the ReaderServer version of my Network based reader?

- Open the Console tool.

- Type *Version()* in the Command Entry area.

- The ReaderServer and operating system will be shown in the Message Log area.

3   Installation

This section describes how to install, upgrade and start ReaderManager and how to get ReaderManager updates.

Installation instructions are only given for installation on a computer running Microsoft Windows, for installation on computers running Linux please contact Magellan Technology.

3.1   New Installation

All that needs to be done is to run *ReaderManager-Install.exe*. This contains the Python interpreter, the PyQt and Twisted libraries and the application itself. When it is run, the window shown as Figure 1 appears.
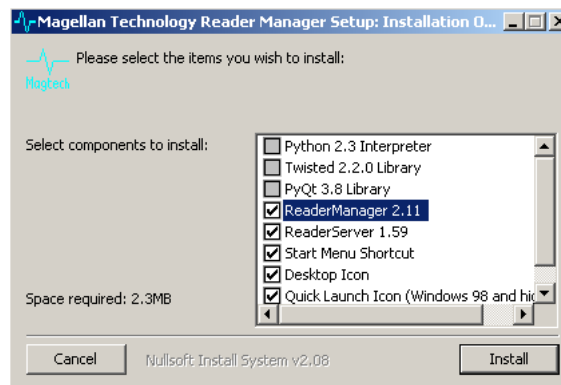

Figure 1

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, PyQt and Twisted libraries will automatically install if required.

The version numbers of the components are shown next to their names.

If the installer finds that ReaderManager has already been installed with the current version, the user can force a reinstall by manually ticking the checkbox next to the application.

The only directory selection that you are ever offered is when you install Python (which is part of *ReaderManager-Install.exe*). It offers a default directory of *C:\Python23*. This can be changed to *C:\Program Files\Python23*, for example, but you can put it anywhere you like.

When the ReaderManager application is installed, it is placed inside the Python directory. This is determined automatically by the installer.

3.2   Upgrading ReaderManager software

Most of the time, software upgrades will not involve a change in the version of Python, PyQt and Twisted libraries. In this case, all that needs to be done is to get the new version of *ReaderManager-Upgrade.exe* and run this file. This file is much smaller than the full installation. The upgrade window is shown in Figure 2.
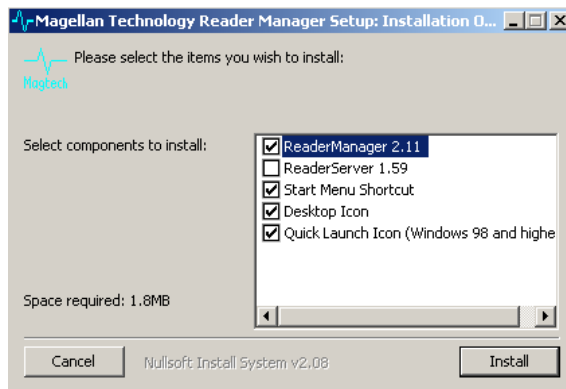
Figure 2

Like the *-Install* version, this installer will check the currently installed application versions and un-tick already installed components accordingly. The user can manually tick an application to force reinstallation.

If the version of the Python, PyQt libraries or Twisted libraries is not present, is damaged or has changed, the installer will indicate that a full install is required. In this case it will be necessary to follow these steps:

1. Run the *Control Panel* and select the *Add Or Remove Programs* item.

2. Uninstall *Magellan ReaderManager* if it is present.

3. Uninstall *Python, PyQt and Twisted* if it is present.

4. Close the *Control Panel*.

5. Using a file manager, such as *My Computer*, delete the Python directory if it remains.

6. Follow section **3.1 New Installation** to install the full version.

3.3 Starting ReaderManager

The installer will put an icon on the Windows desktop and add an application folder to the programs start bar.

- To start ReaderManager from the desktop icon, double click the icon .

- To start Reader Manage from the Windows start menu; click *Start* then *All Programs*, then *Magellan Technology*, then click *Reader Manager*.

3.4 Getting Software Upgrades

Magellan Technology releases periodic software updates via their Web site.

Users can use our Web site to get software update files. You will need to be running a browser such as Mozilla or Internet Explorer, then follow these steps:

1. The updates are stored on our Web site at the address http://www.magtech.com.au/downloads/
   A username and password is required to access the downloads page. Please contact Magellan or the supplier of the equipment to arrange for an account to be setup. Once connected, click the link, *Click here to continue to the page from which you came.* You will see a list of files. Follow these steps for each file to download it.
2. Point the mouse at the file you want. This is shown as a disk icon .
3. Press the right mouse button, so the context menu pops up.
4. Select the *Save Target As...* menu item.
5. A file save dialog box will then appear. Change directories to where you want to save the file. It does

not matter where you save it. Just note which directory it is in. Click the *Save* button to complete this action.

Installation files can be run from any directory, even directly off a CD-ROM.

4 The ReaderManager Desktop

This section gives a brief overview of the main ReaderManager elements, such as the menu bar, desktop and status bar.

The ReaderManager desktop is shown in Figure 3 and consists of several items:

1. The menu bar, providing the primary user interface to ReaderManager.

2. The main window, which can contain one or more tool windows open at any given time.

3. A status line at the bottom used to show connection information between ReaderManager and the reader.
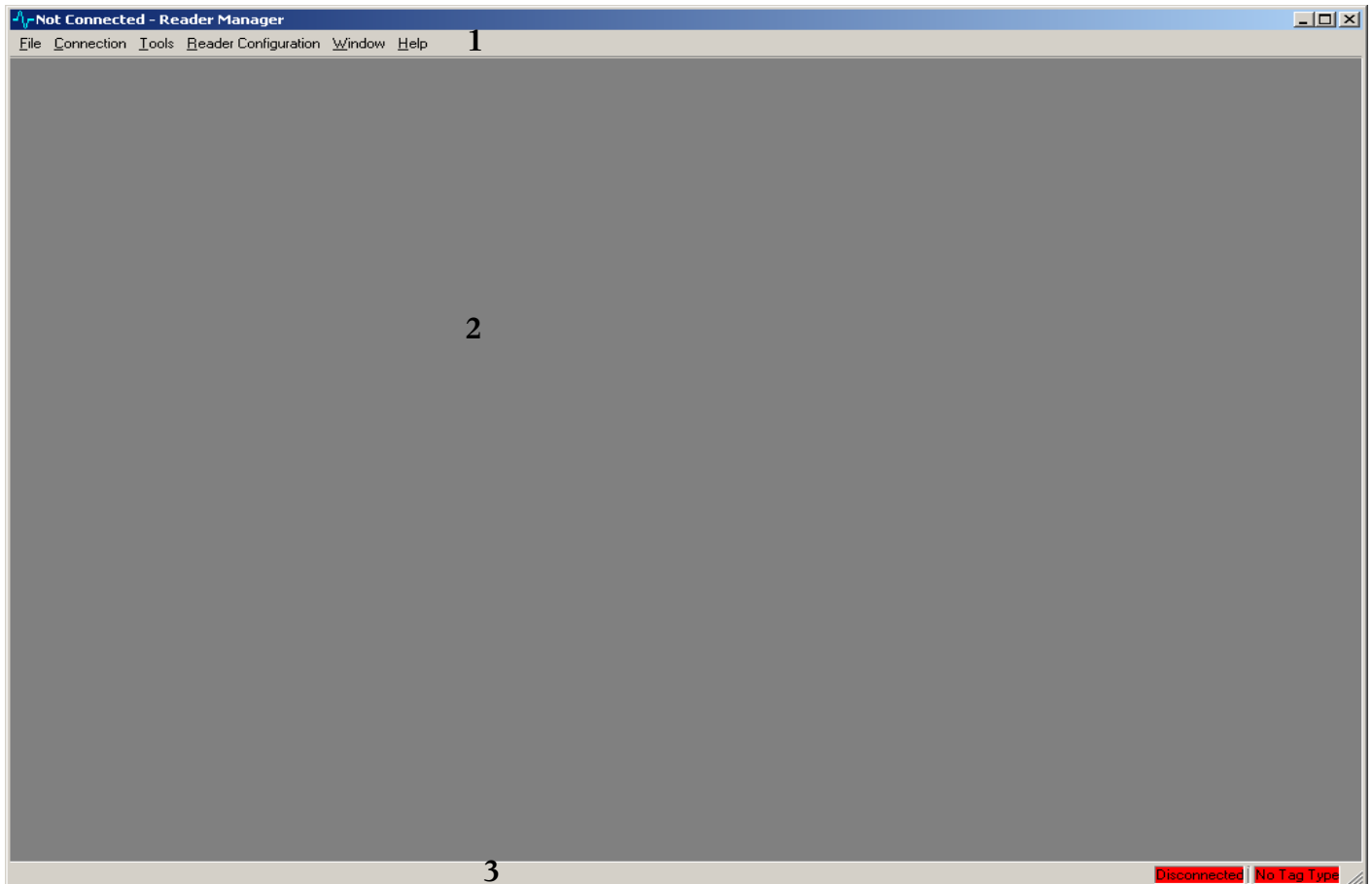

Figure 3

4.1 ReaderManager Menu Bar

The ReaderManager menu bar consists of the following main menus items; *File*, *Connection*, *Tools*, *Reader Configuration*, *Window* and *Help*. These menu items are explained in more detail below.

4.1.1 File Menu

To show the file menu click *File* on the main ReaderManager menu.

The File menu items are described in Table 1.

Sub Menu	Description
Preferences	Opens a dialog box which allows the user to change the font, user level, language and upgrade directory.
Print	For tools which support this function, allows the user to print a text representation of the active tool.
Print Preview	For tools which support this function, allows the user to preview a text representation of the active tool which can be printed.
Upgrade	There are two options available: Upgrade AVR readers – opens a dialog window which allows the user to upgrade the firmware or FPGA on an AVR type reader. Upgrade DSB or x86 readers – opens a dialog window which allows the user to upgrade network based readers.
Quit	Exit the application.

Table 1

4.1.2   Connection Menu

To show the connection menu click *Connection* from the main ReaderManager menu.

The connection menu shows all readers which can be connected to using ReaderManager. The menu also provides options to edit static connections and close the connection to the reader.

The Connection menu options are shown in Figure 4, the menu items are described in Table 2.
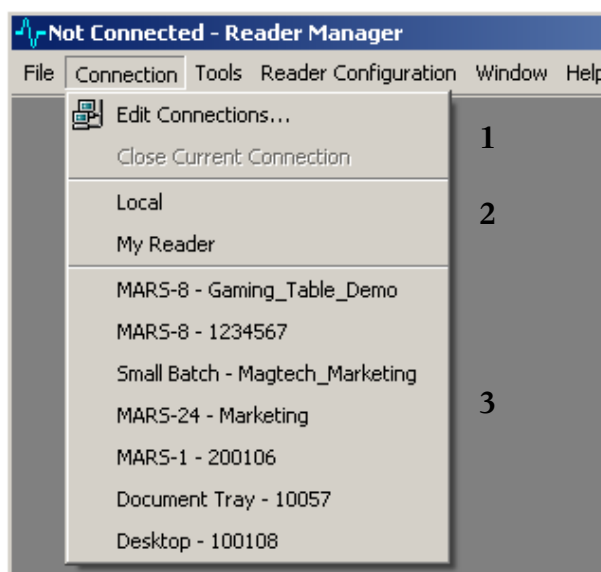
Figure 4

Index	Description
1	*Edit Connections* - Allows the user to create and edit static connections to reader.
1	*Close current connection* - Disconnect ReaderManager from the currently connected reader.
2	Static connections area - This section shows static connections created using the *Edit Connections* menu option. Static menu options are saved when ReaderManager is closed.
3	Dynamic connection area - ReaderManager automatically detects readers connected on a network. These readers are shown in the dynamic connection area. This menu may look different on your installation.

Table 2

4.1.3   Tools Menu

From the main ReaderManager menu click *Tools*.

If ReaderManager is not connected to a reader only the *Console* tool is shown in this menu. When ReaderManager is connected to a reader there will be two sub menu items, *Demonstrations* and *System*. This document will only describe the *System* menu options. A detailed description of all System tools is given in section **6 Tools**. The System tools menu is shown in Figure 5.
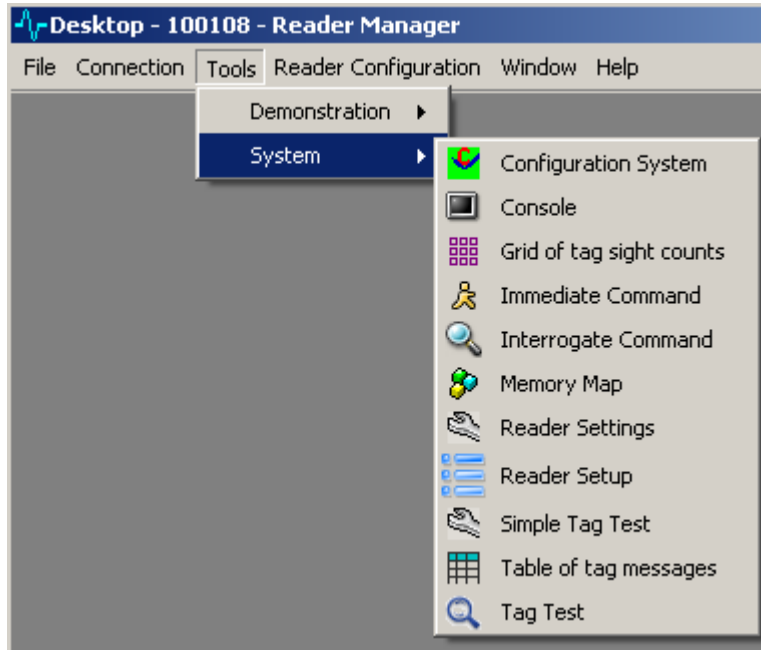
Figure 5

Sub Menu	Description
Configuration System	Allows the user to view reader module part numbers, versions and serial numbers. Also provides an interface to change the readers networks setup.
Console	Use this tool to send commands to the reader and view all reader messages.
Grid of tag sight counts	Use this tool to graphically view all tags sighted by the reader.
Immediate Command	Use this tool to construct an Immediate command.
Interrogate Command	Use this tool to construct an Interrogate command.
Memory Map	Use this tool to show and change tag memory.
Reader Settings	Use this tool to view and change various reader operating parameters.
Reader Setup	Use this tool to configure the reader to work with various antennas and to tune and test each antenna.
Simple Tag Test	Provides a tool used to read and write to various memory locations and verifies the data is written correctly.
Table of Tag messages	This tool displays a table of tag related messages received from the reader sorted by a timestamp.
Tag Test	More advanced tags test. Used mainly by tag and chip manufactures.

Table 3

4.1.4   Reader Configuration

From the main ReaderManager menu click *Reader Configuration*. This menu item provides access to all user defined scripts and commands. The menu also provides an item to open a form which is used to create and edit scripts. The default menu is shown in Figure 6:
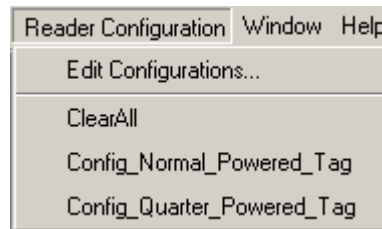
Figure 6

Sub Menu	Description
Edit Configurations	Provides an interface to create and edit custom scripts and tag commands.
Clear All	Clears Interrogate and Immediate commands.
Config_Normal_Powered_Tag	This script sets an Action command to write 2000 to the configuration word. Use this script to set all the tags placed on a reader to Normal Powered Mode.
Config_Quarter_Powered_Tag	This script sets an Action command to write 4000 to the configuration word. Use this script to set all the tags placed on a reader to Quarter Powered Mode.

Table 4

4.1.5   Window

This menu option allows the user to arrange various tools on the desktop.

4.1.6   Help

This menu allows the user to get the version number of Reader Manager and Qt.

To get the Reader Manager version click Help then click About ReaderManager .

To get the Qt library version click About Qt .

4.2   Reader Manager Status Bar

The status bar indicates various reader connection states and displays the active tag type. It is divided into four areas, these are shown in Figure 7 and described in Table 5.

Figure 7

Index	Description
1	This area shows the following information:

Index	Description
	The MAC address and IP address when the mouse is moved over a reader name in the dynamic connection menu.
	Shows connection status – Connecting -> Getting Settings -> Connected -> Disconnected.
2	Indicates reader manager is connected / disconnected to / from the Reader Server.
3	On AVR reader indicates if the reader server is connected to the reader. On all other readers shows the tag type.
4	On AVR readers shows the tag type. On all other readers shows the IP address of the connected reader

Table 5

5   Managing Connections

This section details how to create static connection profiles, how to connect or disconnect ReaderManager from a reader.

The ReaderManager is capable of connecting to a variety of readers. Each reader is distinguished by a number of parameters which give it a unique address. The set of all these parameters is referred to as a *connection profile*.

This includes connections to all kinds of readers across the network or AVR Series readers that are running on the same PC as the ReaderManager.

There are two ways to connect to a reader:

1. Defining a static connection or,

2. Using the dynamic reader discovery feature in ReaderManager.

5.1   Defining a Static Connection

To access the *Edit Connections* dialog, select *Connections->Edit Connections.*

When you first start ReaderManager, you only have the *Local* connection configured, which is a default AVR Series reader connection. You may want to connect to a ReaderServer somewhere else on the network, or another local reader.

The connection dialog is shown in Figure 8, its elements are described in Table 6.
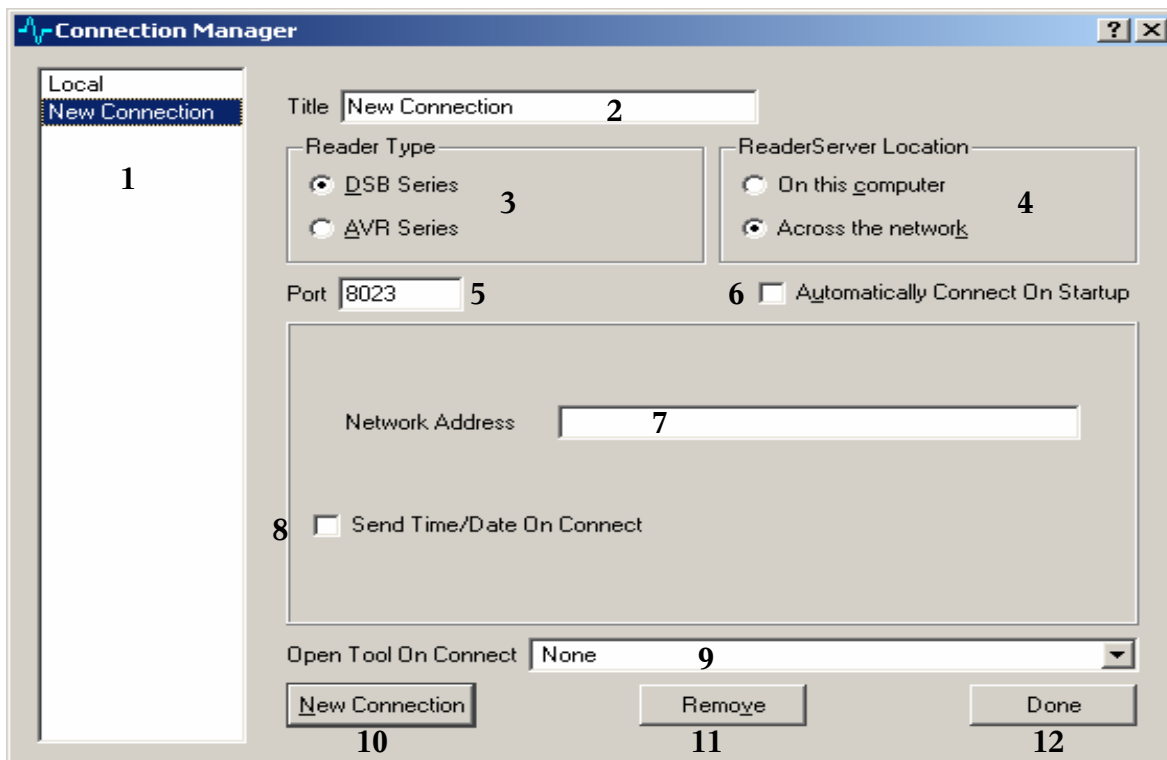
Figure 8

Index	Description
1	Shows the names of already defined static connections. To edit an already defined connection, click on the name and change the required fields on the right hand side of the dialog.
2	*Title* is the text that will appear in the *Connection* menu and in the list of connections in this dialog. This can be any name that can act as a brief summary of the reader being connected to. For example, the reader type, network address shortcut or location can be used.
3	For network based readers select *DSB Series*. For AVR type readers select *AVR series*.
4	For network based readers select *Across the network*. For AVR type readers select *On this computer*. The selection for this item will adjust the options that appear in the middle portion of this window.
5	This field defines the TCP port used to connect to the reader server. It should be left as 8023.
6	*Automatically Connect On Startup* can only be ticked for a single connection in the list. It defines which connection will be opened automatically when the ReaderManager is run. This can be convenient if only a single reader is ever used with this application.
7	When across a network is selected, *Network Address* is the address of the ReaderServer, either as a domain name or an IP address. e.g. 192.168.0.25.
8	*Send Time/Date On Connect* if ticked will generate a command to set a remote reader to the current time and date of the computer that ReaderManager is being run on. This is useful for readers that do not retain time and date information when powered off.
9	*Open Tool On Connect* will automatically open the specified item from the *Tool* menu that is selected when this program connects to this reader. Different connections may open different tools. This is convenient if a particular tool is commonly used with a given reader.
10	Click this button to create a new connection profile
11	Click this button to remove a connection profile.
12	Click this button to complete the connection editing or creation process. Connection as saved when you exit the ReaderManager application.

On AVR readers the following items are displayed in the middle portion of the form:

	When on this computer is selected, *Location of ReaderServer* shows where the ReaderServer application can be found. It should automatically load the correct directory in most cases. If not, click on the *Find ReaderServer...* button and go to the *<PythonPath>\Lib\ReaderServer\DTRHF* directory. You do not need to select a file, just this directory.
	The *Serial Port* drop down list allows the name of the serial port that the reader is connected to be selected. It is also possible to edit this line to enter a custom name.

Table 6

5.1.1   Opening a Static Connection

Select *Connection* from the main ReaderManager menu. The connection menu is shown in Figure 9.
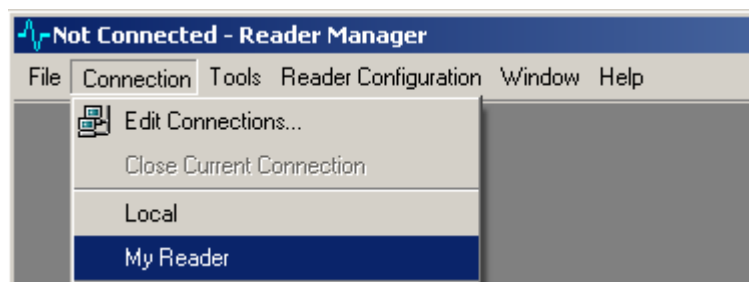
Figure 9

Select the connection profile you would like to connect to. Statically defined connection profiles are shown below the *Close Current Connection* item.

The message on the right of the status bar will change to *Connected* in green if the ReaderManager successfully connected to the reader.

For connections to a ReaderServer on the same computer, a status message will indicate that the server is being started automatically. This takes a little longer than a network connection because of this activity.

5.1.2   Opening a Dynamic Connections

ReaderManager uses multicast addressing to discover readers on a network. Figure 10 shows a typical connection menu showing various readers detected on a network. It is not necessary to define a profile for readers to be discovered on a network.
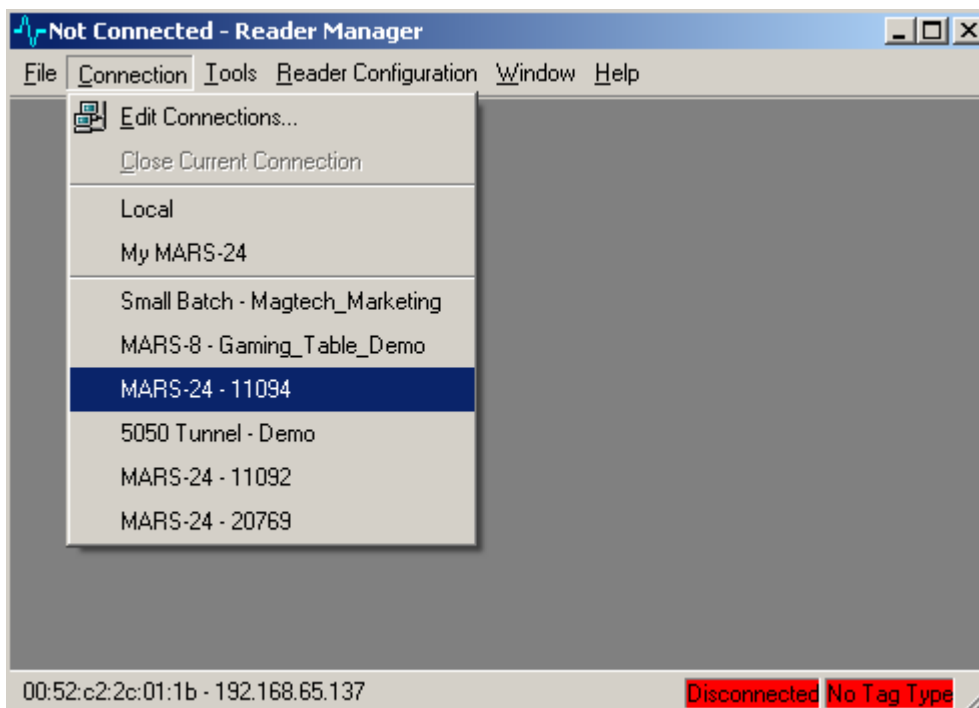
Figure 10

Readers are labelled as either:

<Reader Type> - <Serial Number> or as,

<Reader Type> - <User defined name> or as,

<Mac Address> - <IP address>.

When the menu item is highlighted the MAC and IP address is shown on the status bar.

5.2   Closing a Connection

When connected to a reader, the menu item *Close Current Connection* can be selected in the *Connection* menu. If a local ReaderServer has been automatically started when the connection was established, it will be automatically shutdown as well.

6 Tools

This section gives a more detailed explanation of the *System* tools available in the *Tools* menu.

It is possible to open more than one tool at the same time. They are shown overlapped in the main window area.

The *Window* menu contains options which allow the open windows to be cascaded or tiled. Also, any open tool can be selected, so it can be seen in the foreground.

Some tools will issue commands to the reader to change its operating state. Because of this, some tools cannot be used at the same time because they operate by expecting a particular mode of operation.

In this case, closing the window or ReaderManager will not solve the problem, because the reader is still operating in whatever mode it was told to. If you think the reader has become confused in a case like this, the best way to resolve it is to shut down the ReaderManager and the reader, then start from scratch.

Fortunately, most windows are passive and do not cause problems like this.

6.1 Configuration System

This tool is used to view the reader's hardware module part numbers and version numbers. The tool is also used to set the networks settings and to change the name of the reader as seen on the network.

To access this tool, select *Tools->System->Configuration System.*

The configuration system tool consists of two tab items:

1. System configuration – shows part and version numbers of various components which make up a reader.

2. Network configuration – shows the current reader network settings.

6.1.1 System Configuration Tab

The configuration system tool is shown in Figure 11. Your section names, part and version numbers may be different to what is shown in this document, depending on what type of reader, ReaderManager is connected to.

Most fields in the configuration system require a password to change the field value. The *CustomerID* field does not require a password and is provided for the user to assign a descriptive name to the reader. This name will appear in the multicast messages from the reader and will be shown in the dynamic connection area on the *Connection* menu. Table 7 describes the various elements of the tool.
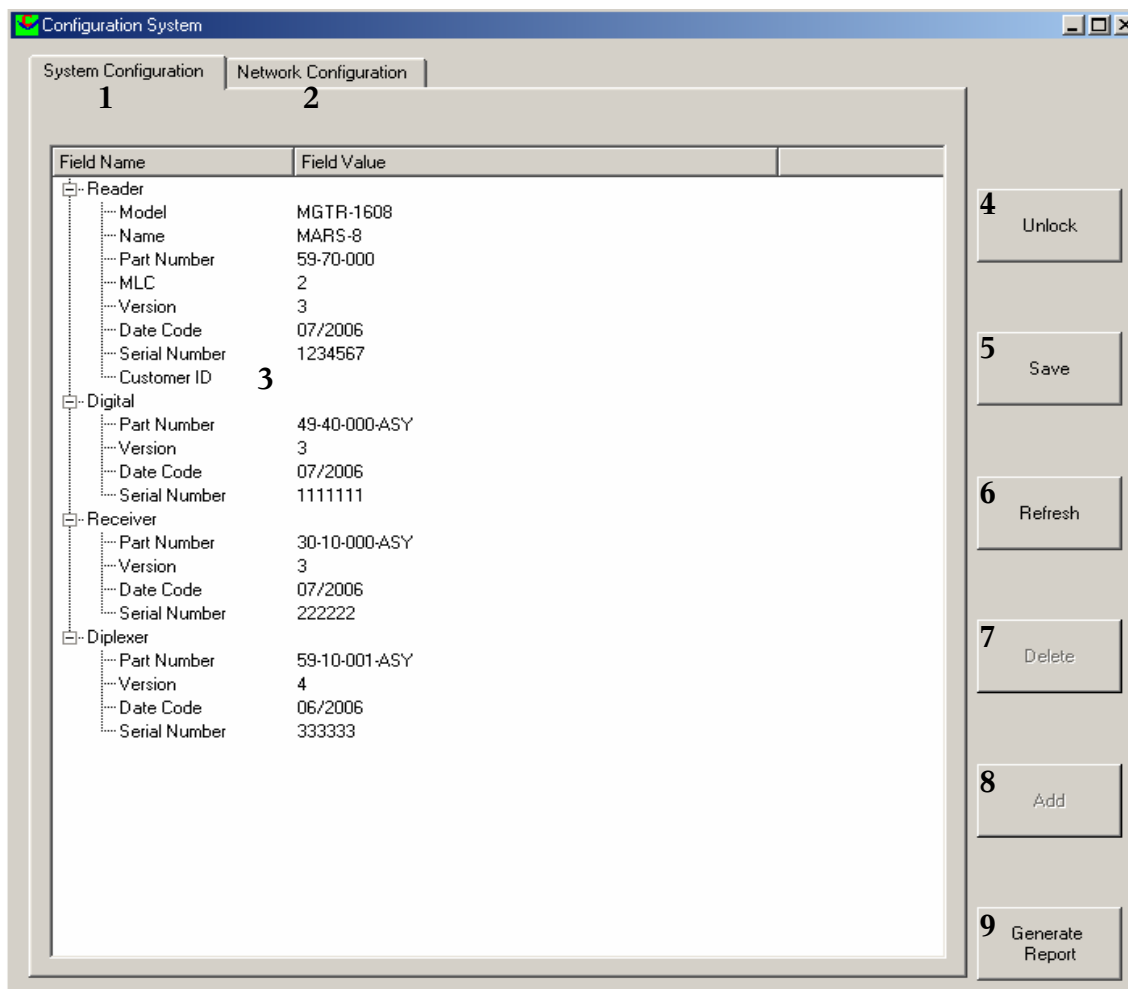
Figure 11

Index	Description
1	Click this tab to show the part numbers and version numbers of various components which make up a reader.
2	Click this tab to show the reader's network settings.
3	This field allows the user to give the reader a descriptive name. This name will appear on the dynamic connection list and will be the hostname of the reader on the network. 1. Click the field column opposite *Customer ID*. 2. Enter the name you would like assigned to the reader. 3. Press *Enter*.
4	Click this button to unlock the password protected fields. The user will be prompted to enter a password.
5	Click this button to save any changes to the reader.
6	Click this button to refresh the list from the last saved values.
7	Click this button to delete a custom field. Only custom fields can be deleted.
8	Click this button to add a custom field name and value to any reader section.
9	Click this button to create a packing report prior to shipping a reader.

Table 7

6.1.2 Network Configuration Tab

The *Network Configuration* tab provides fields for the user to setup the reader to get an IP address from a DHCP server to use a static IP address. The network configuration tab is shown in Figure 12.
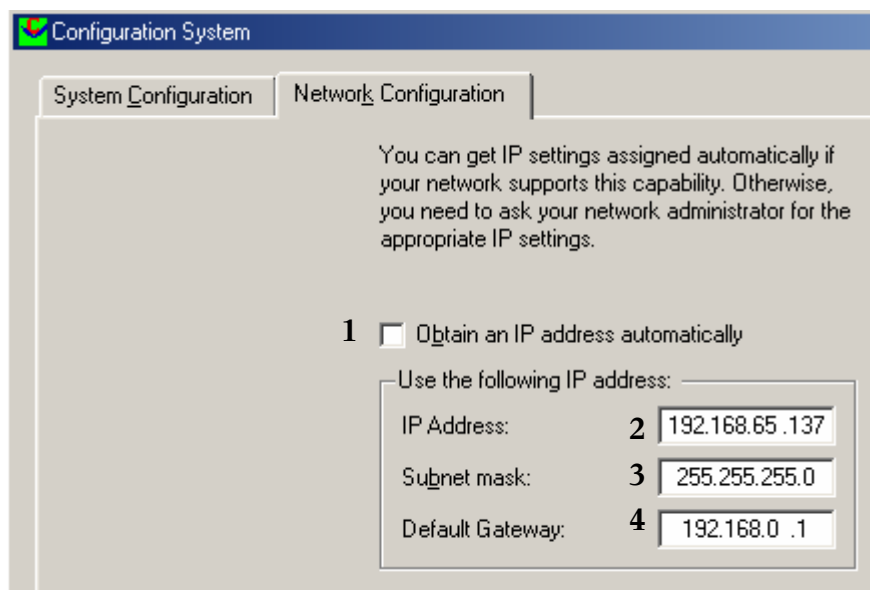
Figure 12

Index	Description
1	Tick this to set the reader to get an IP address from a DHCP server.
2	If (1) is not ticked enter the IP address used by the reader.
3	Enter the subnet mask based on the IP address entered in (2)
4	Enter the default gateway IP address. (Optional)

Table 8

6.2   Console

The console dialog provides a command line interface to a reader. Reader commands are described in the Application Programmers Guide (40-01-000-DOC). The *Command Entry* area also accepts Python code. The console tool is shown in Figure 14. Table 8 describes the various elements of the Console tool.

To access this tool select, *Tools->System->Console.*
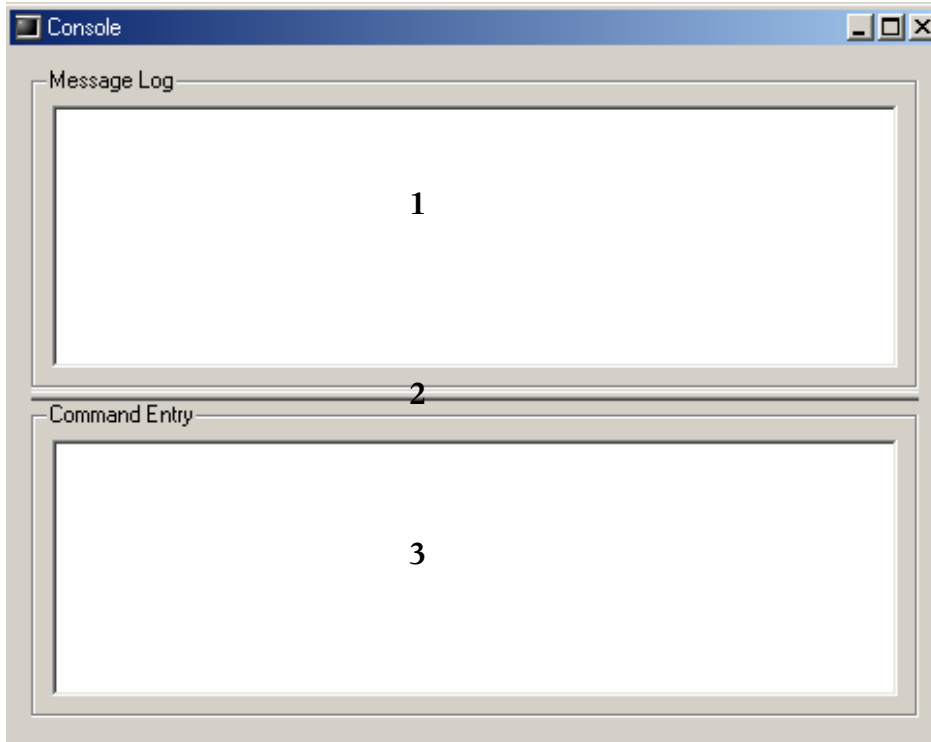
Figure 13

Index	Description
1	*Message Log* window shows all message received from the reader.
2	Window size adjustment bar. Use this to change the size of the *Message Log* and *Command Entry* windows.
3	*Command Entry* window provides an area to enter command to send to the reader.

Figure 14

Clicking the right mouse button in the *Message Log* brings up a menu. This is the means of controlling the behaviour of the console.

- If text has been selected in the *Message Log* window, it can be copied into the clipboard for pasting elsewhere.

- *Clear* will remove all the text in this window.

- *Show Tag Replies* enables the display of tag messages and tag expired message. By default, this is turned off, because in applications where large numbers of tags are being processed, it will bring the application to a halt updating this window with tag messages. Each time this option is selected, it will turn this option on or off.

- *Show Commands Sent* if ticked will enable the display of all commands sent from this application in any window to the reader. This is an excellent diagnostic tool if you are seeing error messages from the reader in response to a command or you just want to see how the various tools work by looking at what they send.

- *Show Messages* enables the display of all other messages that the reader sends. This includes error messages, so normally it is advisable to never turn this option off.

- *Open Log File...* controls the facility to record all the text that appears in this window into a file. When this option is selected, a file open dialog will appear, allowing you to select the directory and filename to use.

If the log filename you have selected already exists, you will be prompted to either *Replace* (overwrite) or *Keep* (append to the end of the file) the log file. This message also shows how large the file currently is in bytes.

While the log file is open, this menu item will change to *Close Log File(xxxx)* with the name of the log file shown within the parenthesis. Selecting this option will close the log file. When running this application under Windows, the log file contents will not appear complete if viewed with an outside application until the file is closed or the application exited. This is the behaviour of Windows itself with open files. This does not occur when run under Unix systems.

Note that if a log file is open when the ReaderManager is exited, it will be reopened when it is started the next time.

6.3   Grid of Tag Sight Counts

This tool shows a graphical representation of tag sighted by the reader.

To access this tool select, *Tools->System->Grid of tag sight counts.*

This tool is shown in Figure 15.

When a tag is placed on the reader the cells turn light blue and shows the specific ID. The tool can also be setup to show the number of times the tag has been sighted and show data read from the tag. Expired tags are shown as a grey cell.

Right click on the grid to bring up a menu which provides several options to configure the grid, these are:
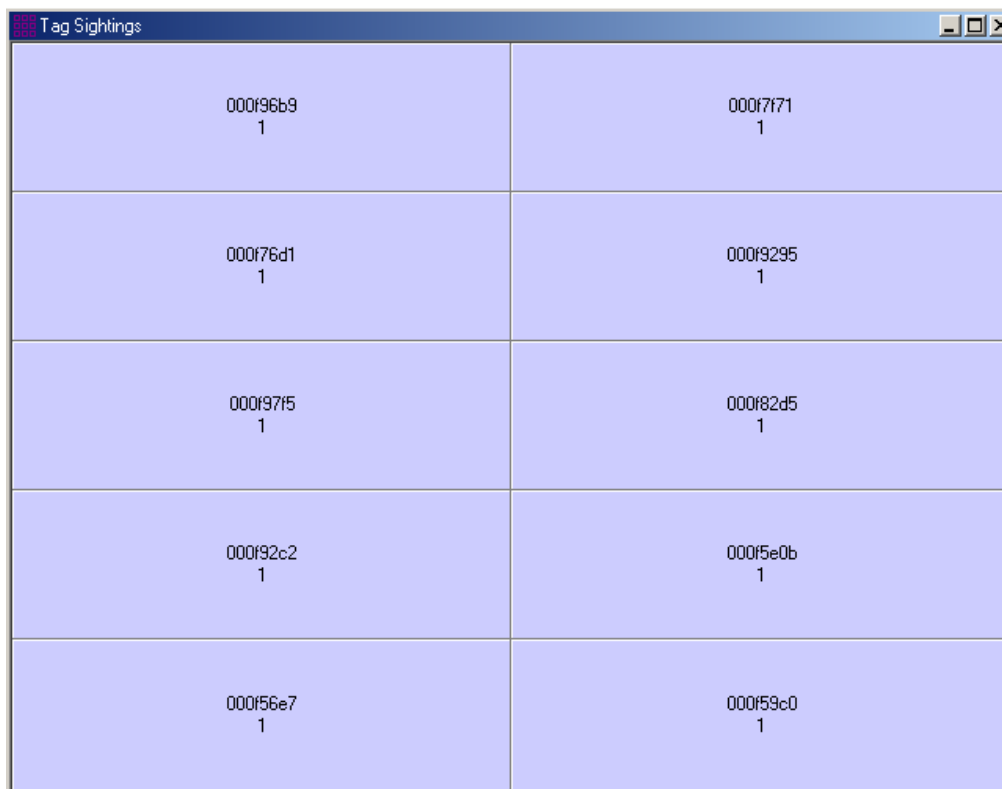
Clear: - Allows the user to clear the table and select preferences. Note that *Del* can be used as a shortcut to clear the table.

Show Counter: - When ticked shows the number of times a tag has been sighted.

Show Data: - When ticked shows the data reader from the last command the tag responded to.

Rows and Columns: - Provides a dialog to set up the number or rows and column in the grid.

Font: - Shows a dialog which can be used to change the font.

Figure 15

6.4   Immediate Command

This tool is useful to construct an Immediate command.

To access this tool, select *Tools->System->Immediate Command.*

Immediate commands are sent to tags after the initial interrogate cycle. These commands can be sent to specific tags or to groups of tags. A more detailed of description of immediate commands is given in the Application Programmer's Guide (40-01-000-DOC).

The tool is shown in Figure 16, the elements are described in Table 9.

Figure 16

Index	Description	Index	Description
1	The *Command* group box is used to select if the command is a read command or a read and write command.	10	Click to preview the complete Immediate Command. No command is sent to the reader.
2	Not used	11	Click this to send the command to the reader.
3	The *Reply* group box is used to select if the reply is a *Short* reply or a *Normal* reply. Normal replies contain more detailed information about the tag being read.	12	Select the channel on which the reply will be received.
4	Enter the start address being read from the tag. This field accepts a single word decimal value.	13	Enter the command number sent with the Immediate command. This value is returned in the Timestamp field of the reply. This field accepts a single word hexadecimal value.
5	Enter the number of words to read. This field accepts a single word decimal value	14	Enter the Specific ID of the tag being read from or written to. Leaving this field blank means all tags will respond to the command. This field accepts a two word hexadecimal value. This is useful to read or write to a single tag in a stack of tags.

Index	Description	Index	Description
6	Enter the start write address or used the scroll arrows to set the start write address.	15	Enter the Group ID of tags you would like to be affected by the command. Only tags with a matching Group ID will respond to the command. Leaving this field blank means all tags will respond to the command. This field accepts a single word hexadecimal value.
7	Enter the data to write to the tag. The number of data fields depends on the start address. Write data should be entered from left to write. It is not necessary to enter data into all the fields. Entering no data will set the lock pointer.	16	Enter the Conditional ID used in the command. Only tags with a Conditional ID equal to or less than the value in this field will respond. Leaving this field blank means all tags will respond. This field accepts a single word hexadecimal value.
8	Select this option to write ASCII text.	17	This field is used to enter a password for tags which are password protected. This field should be left blank for tags which are not password protected. This field accepts a three word hexadecimal value.
9	Select this option to write hexadecimal data.		

Table 9

Typical usage of this tool is as follows:

To read two words from address 10 do the following:

1. Select *Read* in the *Command* group box.

2. Select *Short reply* in the *Reply* group box.

3. Enter *10* in the *Address* field in the *Read* group box.

4. Enter *2* in the *Length* field in the *Read* group box.

5. Click *Send*.

To write two hexadecimal words 1234 and 5678 to address 12 and 13 and read the response do the following:

1. Select *Read/Write* in the *Command* group box.

2. Select *Short reply* in the *Reply* group box.

3. Enter *12* in the *Address* field in the *Read* group box.

4. Enter *2* in the *Length* field in the *Read* group box.

5. Enter *12* in the *Address* field in the *Write* group box.

6. Select the *Hex* option button in the *Write* group box.

7. Enter *1234* in the *Data* field under the *12 label*, enter *5678* in the data field under the *13 label*. Leave all other value as ####.

8. Click *Send*.

6.5 Interrogate Command

This tool used to set the Interrogation command.

To access this tool, select *Tools->System->Interrogate Command*

This tool is shown in Figure 17.

This is the command that is sent continuously in an effort to identify new tags entering the reader. If you do not want to specify a read address and length, then put an address of 10 (for example) and a length of 0 (zero).

Once the settings are made, press *Send* to transmit the command to the reader.

The fields operate in the same way as the fields on the *Immediate command* tool. There are two additional fields, namely *Pre Script* and *Post Script*. These fields are used to define Python scripts which are run before the command (*Pre Script*) and after the command (*Post Script*).

Figure 17

6.6   Memory Map

This tool allows the entire memory of tags to be examined and changed. It also supports creation of tag configurations that define a series of writes that can be applied to any tag.

To access this tool, select *Tools->System->Memory Map*

Whenever a tag is clicked once, the memory panes will be updated to reflect that tag.

This tool is shown in Figure 18, its elements are described in Table 10.
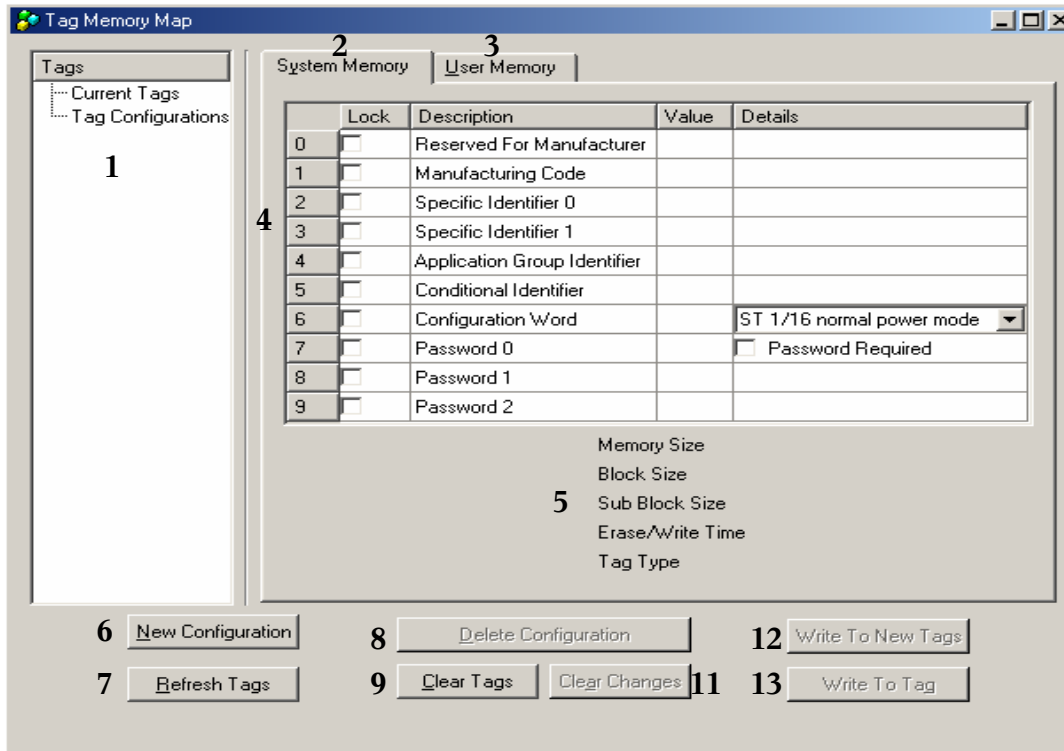
Figure 18

Index	Description
1	List of all current tags and tag configurations. Whenever a new tag is placed on the reader, it will appear in this list. Each tag is identified by its specific ID. The colour of this ID changes according to context: • *Green* for a new tag. It will remain in this colour until all the tag's memory has been read. • *Blue* for a tag that has been completely read. This is an active tag that is ready to be written to. • *Grey* when a tag has expired. This indicates the tag has left the field or has been muted indefinitely. • R*ed* when writes to the tag are being attempted. Usually, a tag will remain in this state for a short time while the writes are being performed.
2	Select this tab to view / change tag system memory.
3	Select this tab to view / change tag user memory.

Index	Description
4	Shows system tag memory: • The *Lock* column shows the position of the lock pointer. If the check box is ticked the address is locked. **Once changed the *Lock* pointer can't be undone.** • To change the data at a system memory address, edit the number in the *Value* column. • To change the *Configuration* word, select the configuration from drop down list in the details column at address 6. • To set the *Configuration* word to set the tag to password protected, check the *Password Required* checkbox.
5	Shows various information about the selected tag.
6	If there is a need to write the same data to multiple tags, then configurations make this easy. Click *New Configuration* to enter the name to remember this configuration by. Then click on the configuration. All the memory is shown as *FFFF*. Simply change the memory locations required. To apply these changes to a real tag, click on the configuration name, keeping the mouse button held down, move the mouse and drag it over the tag you wish to apply the changes to. When the mouse button is released, the changes will be applied to the tag. They will not be writen to the tag, but changes the tag representation so that the changes are represented in red as if the user had manually entered them. Click buttongs (13) or (14) to write to the tag.
7	Click this to refresh the tag list – all tags will be re-sighted.
8	Click this button to delete the selected configuration.
9	Click this to clear the tag list.
10	Click this to revert to the selected tags current state.
11	Click this to write to all tags in the tag list.
12	Click this to write only to the selected tag.

Table 10

To change the value of a memory location, click once on any cell in *User Memory* or the *Value* column of *System Memory* and edit the hexadecimal value. Any changed value from what is on the tag will be shown in red.

It is also possible to enter text in the *As Text* column of *User Memory*, though this should be used with caution. Only plain text can be entered in this way and care must be taken to move to the correct address.

When changes to a tag are complete, make sure the tag is in the reader field, then click *Write To Tag*. After a brief period in red while the writes are occurring, the tag memory should change to black for all the changed values indicating success. If the user decides not to write to the tag, *Clear Changes* will revert to the tag's current state. *Clear Tags* will remove all current tags from the list.

6.7   Reader Settings

This tool provides controls for the user to change operating parameters on the reader.

To access this tool, select *Tools->System->Reader Settings*

The tool has two tabs *User Settings* and *System Settings*.

The user settings form is shown in Figure 20 and the various controls described in Table 10. The system settings form is shown in Figure 21 and the various controls described in Table 11.

The parameter values are reader dependent the forms shown in this document may be different to what is shown on your reader.

Changing reader settings incorrectly could cause the reader to malfunction or operate below normal efficiency. If you are unsure what you are doing contact Magellan Technology for advice.

To restore the reader is its default settings click the *Clear Saved Settings* button, and then power cycle the reader.

The reader commands which are affected by the controls on the settings tool are shown in **bold**, the reader commands are described in the Programmers API document (40-10-000-DOC).

When changing a text field, enter the value in the text box then press *Enter* to send the command to the reader.

6.7.1 User Settings

Figure 19

Index	Description / Command	Index	Description / Command
1	When multiple groups have been defined this drop down list can be used to display the settings for a specific group.	20	**ShowExpired()** Tick this to enable tag expired message to be sent from the reader.
2	**GroupPriority()** Drop down list provides options for the user to change the *Group Priority* for the current group. Selecting disabled indicates that this group will only be polled manually.	21	**AgeTags()** Tick this to enable tag aging on the reader.
3	Shows the axis ports which are part of the group selected in (1). This field is read only. Use the *Reader Setup* tool to edit axis groups.	22	**AutoMute()** Tick this to enable mute commands to be sent to tags after all the action commands have been completed by the reader.
4	Click this tab to select the *User Settings* form.	23	**TagType()** Use this drop down list to select the tag type being used on the reader.
5	Click this tab to select the *System Settings* form.	24	**Power()** Tick this to enable the powering field on the reader.

Index	Description / Command	Index	Description / Command
6	**ToggleReaderID()** Tick this enable the reader to change the *Reader ID* periodically.	25	**AxisPeriod()**[1] Sets the number of milliseconds to spend on an axis.
7	**TimeStamp()** Change the *TimeStamp* sent to the reader.	26	**AxisOffPeriod()** Sets the minimum number of milliseconds to switch the power off between axes.
8	**InterrogateBreak()**[1] Set the number of small power breaks to send to the reader when operating in stack mode.	27	**AxisCount()** Use this drop down list to select the number of axes used by the reader.
9	**UnmuteCount()** Set the number *Interrogate Commands* per break to unmute tags during the unmute phase of an ID cycle.	28	**IDCycleExpiryCount()** Sets the number of axis ID cycles to wait before expiring a tag.
10	**ReaderID()** Change the *ReaderID* sent to the reader in an interrogate command. Only valid when *Toggle Reader ID* is disabled.	29	**TagTimeout()**[1] Set the number of milliseconds to wait before timing out the tag.
11	**TimeStampScalingFactor()** Set the rate at which the timestamp field of the command number in the interrogation command changes.	30	**CurrentAxis() and AxisLabels()** To change the current axis: 1. Uncheck the Switching checkbox (35) 2. Select the axis you would like to power using the drop down list. To change the axis name: 1. Select the axis you would like to rename from the dropdown list 2. Delete the current name and enter the new axis name. 3. Press enter when done.
12	**InterrogateCount()** Sets the number of interrogate commands sent per break. The sliding check box should be left ticked.	31	**AxisMinPeriod()** Set the minimum number of milliseconds to spend on an antenna. Settings this parameter to zero means operate at the fastest possible speed.
13	**BreakCount()** Sets how many small power breaks are sent when the reader is operating in stack tag mode.	32	**AxisMaxPeriod()** Set the maximum number of milliseconds to spend on an antenna. Settings this parameter to zero means operate with no maximum.
14	**DefaultReplyActions()** If ticked sets default actions for post scripts.	33	**NoReplyAxisCount()**[1] Sets the number of axis periods with no replies before performing the necessary actions.
15	**FullReplyFormat()** If ticked the reply includes extra information related to the tags configuration and reply channel.	34	**AxisColdPowerUp()** Not used
16	**ShowHardCode()** If ticked tag replies will include the tags *HardCode* value.	35	**Switching()** If ticked will enable axis switching.

Index	Description / Command	Index	Description / Command
17	**WithTime()** If ticked the time and date will be added to the tags reply.	36	Refresh the displayed settings
18	**FastReplyDecode()** If ticked the reader will decode all tag replies as soon as they are received. In most cases this should be left un-ticked.	37	Clear the settings on the reader which are loaded when the reader is powered. When the reader is next powered up it will load the factory default settings.
19	**TagReplyMode()** To add a reply mode: 1. Click the mode you would like to add from the left list. 2. Click the right pointing arrow. To remove a reply mode: 1. Click the mode you would like to remove from the right list. 2. Click the left pointing arrow. To change the order of the active reply mode parameters: 1. Click the mode you would like to re-order from the right list. 2. Click the up arrow to move the mode to the top of the list. 3. Click the down arrow to move the mode to the end of the list.	38	Save the current settings to the reader. These settings will be loaded when the reader is powered on.

Figure 20

Notes:

1. For AVR readers only.

6.7.2   System Settings
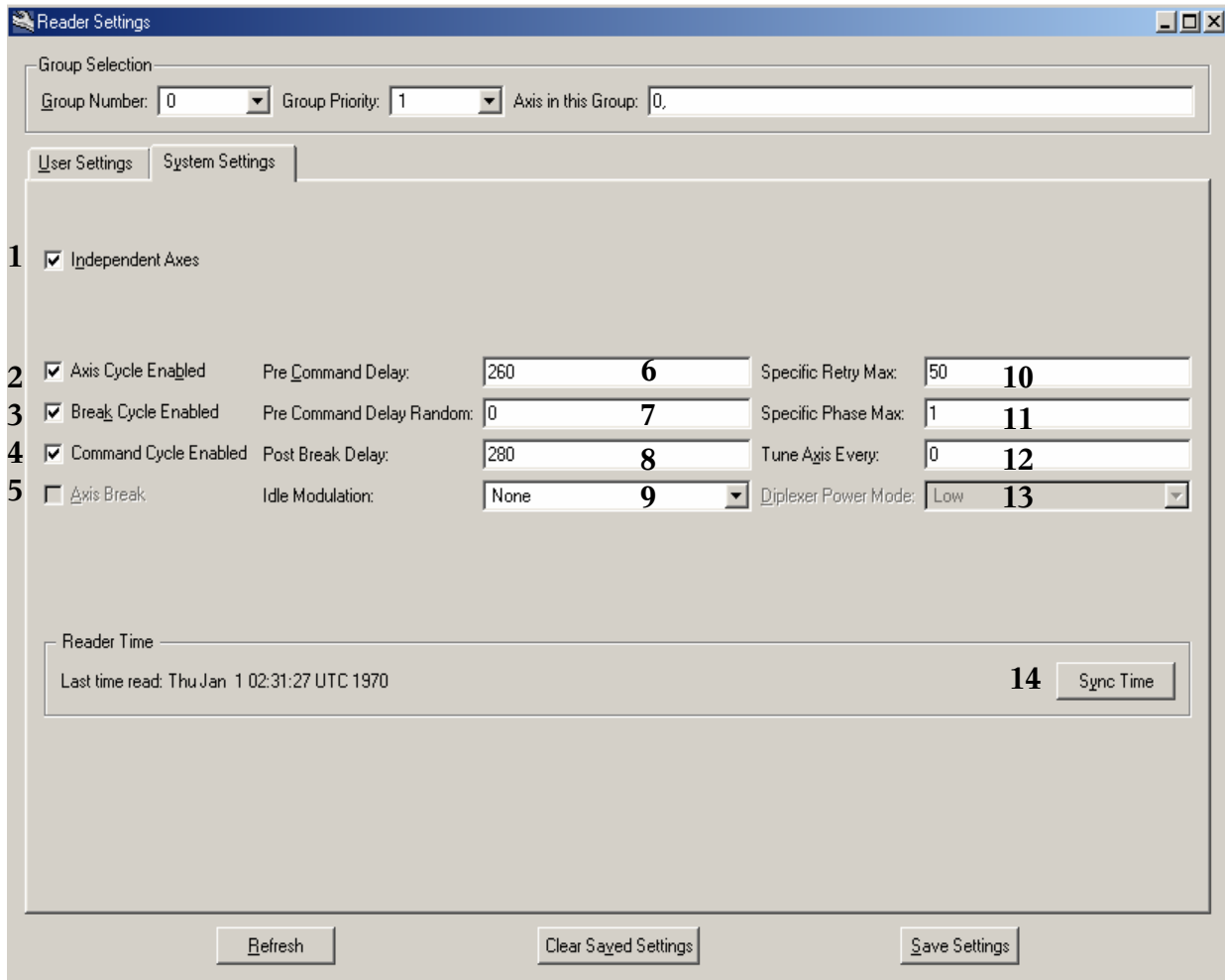
Figure 21

These settings should be left at their default values.

Index	Description / Command	Index	Description / Command
1	**IndependentAxis()** Tick this to make all axes in a group behave as separate antennas. If not ticked, antennas in the same group are treated as one antenna – tags will not expire when moved between them.	8	**PostBreakDelay()** Sets the delay between a small power break in the command sent to a tag.
2	**AxisCycleEnabled()** When ticked the reader will power off periodically and switch axes. This setting should always be ticked.	9	**IdleModulation()** On readers which support this command it changes what bits are sent to the reader when no command is sent.
3	**BreakCycleEnabled()** When ticked the reader will send small power breaks to stack tags. In *Item Tag* mode this is disabled otherwise it should always be ticked.	10	**SpecificRetryMax()** Sets how many times to send a tag specific command when no reply is received.

Index	Description / Command	Index	Description / Command
4	**CommandCycleEnabled()** When ticked the reader will send tag commands. This should always be ticked.	11	**SpecificPhaseMax()** Sets how many tag specific commands are sent per interrogate / break phase.
5	**AxisBreak()**[1] When ticked the reader will power off periodically and switch axes. The setting should always be ticked.	12	**TuneAxisEvery()**[2] Controls how frequently the reader runs the auto tune sequence.
6	**PreCommandDelay()** This is the fixed delay after an axis start before the command is sent.	13	**DiplexerPowerMode()**[1] Sets the power field level.
7	**PreCommandDelayRandom()** This behaves like the *PreCommandDelay* function except that the time before the first command is variable and causes the tag to randomly hop to a different channel.	14	**Time()** Sets the reader system time.

Table 11

Notes:

1. For AVR readers only.
2. For readers which have a diplexer with an auto tune circuit.

6.8   Reader Setup

This tool provides a wizard which is used to:

- Create, edit and delete axis groups
- Configure axis groups
- Select the antennas which are connected to each axis port.
- Configure each axis.
- Tune each antenna.
- Test each antenna.
- Report the antenna configuration.

Readers can not be used reliably without correct antenna setup. It is vital for correct operation that this tool is used to setup a reader and the setup is saved to the reader.

Equipment required:	
Quantity	Description
1	Antenna tuning block.
1	Voltmeter - Must be able to measure DC volts between 100mV and 12V.
1	Trim tool.
1	Stack tag configured in Normal Powered mode. See section 2.5 How do I set a tag to Normal Powered mode? for details on how to configure this tag.

To access this tool, select *Tools->System->Reader Setup*

The flow chart shown in Figure 22 describes the typical setup steps which must be followed when using this tool.

This setup flow chart makes the following assumptions:
1. The settings in the reader are set to the factory default.
2. Only one axis group is required.
3. ReaderManager is connected to the reader.

Before starting the setup procedure ensure you have the following:
1. DC voltmeter able to measure 100mV to 12V.
2. Tuning block.
3. Trim tool.
4. A stack tag set to Normal Powered Mode

Select
Tools->System->Reader setup

Tick *Use Wizard*
Click *Go*

Select
Load settings from the Reader.
Click
Load Settings

Acknowledge setting have been
loaded
Click *OK*

Click
Edit groups

Ensure only one
group is shown.

Click
Configure groups

Ensure
• Independent Axes is ticked.
• Toggle Reader ID is ticked.
• Group Priority is 1.
• Tag Reply Mode is set to
  the readers default setting.

Click
Configure axis

From the *Antenna Type* list select
the antenna which is connected to
the *Axis* port shown at the top of
the form.

Is this the last
axis?   N → Click *Next* to setup the next Axis.

Y

Click
Save Configuration

Click
Save to Reader

Save the settings to the reader by
clicking *Yes*

Acknowledge setting have been
saved
Click *OK*

Click
Tune Axis

Follow the tuning instructions
displayed on the form

Is this the last
axis?   N → Move the tuning block to the next
antenna.
Click *Next* to setup the next Axis.

Y

Click
Test axis

Place a Normal powered stack tag
on the antenna.
Click *Start*

Does the test
PASS   N → Consult the trouble shooting
section in the your Reader's user
guide and in the antenna tuning
guide.

Y

Is this the last
axis?   N → Move the tag to the next antenna
Click *Next* to setup the next Axis.

Y

Click
Display summary

End

Figure 22

The reader setup tool is designed to take the user through a sequence of steps to setup a reader. Each step must be completed for all axes / antennas before the next step is started. When a setup stage is complete a green tick is shown next to the setup stage description in the Reader setup progress frame. Ensure the *Use Wizard* check box is ticked, then click *Go*.

6.8.1 Load Configuration

This form is used to initialise the tool by loading the current reader configuration from the reader or by loading a previously saved configuration from a file saved on disk.

The configuration must be loaded each time this tool is opened.

The *Load a configuration* form is shown in Figure 23 and the various elements are described in Table 12.
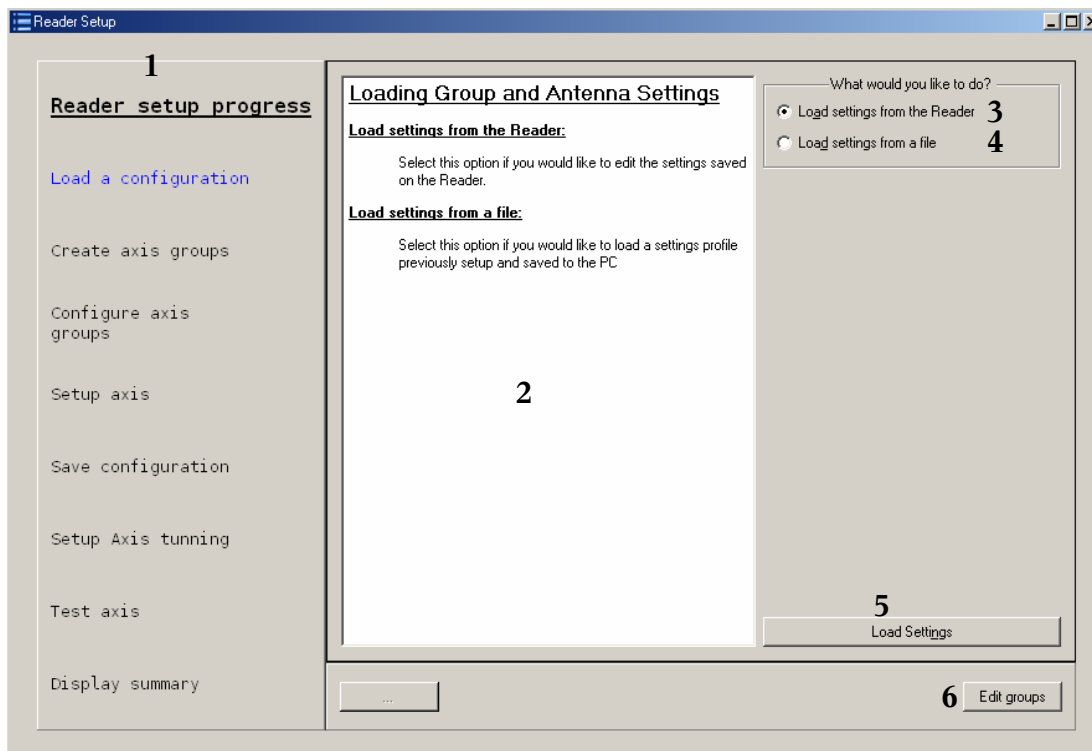
Figure 23

Index	Description
1	Setup progress
2	Form instructions
3	Select this to initialise the tool from the current reader configuration.
4	Select this to initialise the tool from a file saved on the disk
5	Click this to load the selected configuration.
6	Once the configuration is loaded click this to go to the next form.

Table 12

Typically the sequence of events when using this form is:

1. Select the configuration you want to load.

2. Click *Load settings*.

3. Acknowledge the configuration has been loaded when the message box is shown.

4. Click *Edit groups*.

6.8.2 Create axis groups

This form provides an interface for users to create or delete axis groups and to move antennas between groups. Groups are used to define different behaviours for groups of antennas. The concept of grouping antennas is described in more detail in the Programmers Guide (40-00-000-DOC). In most cases one group containing all antennas is sufficient.

The *Create axis group* form is shown in Figure 24 and the elements are detailed in Table 13.
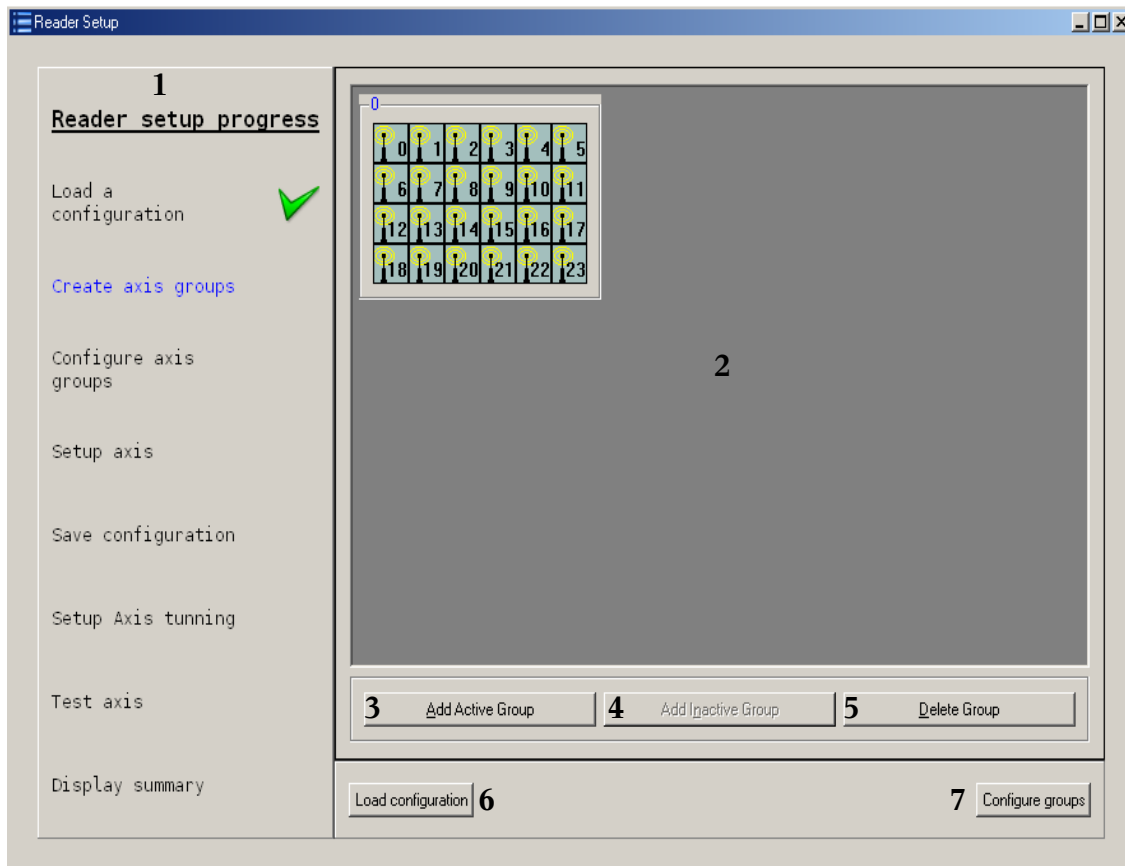
Figure 24

Index	Description
1	Setup progress – should show *Load a configuration* as being complete.
2	Axis group workspace. When more than one group is defined, click on an antenna icon then drag and drop it onto the group box.
3	Create a new empty group.
4	Not used.
5	Delete an empty group
6	Go back to the *Load a configuration* form. The tool configuration will be cleared and a new configuration will need to be loaded.
7	Go to the *Configure axis* group form.

Table 13

Typical the sequence of events when using this form is (when more than one group is needed):

1. Click *Add Active Group.*

2. Move antennas from group 0 into the new group.

3. Click *Configure groups.*

6.8.3   Configure axis groups

This form is used to configure reader settings for the groups created in the previous step.

The following group parameters are setup using this form.

- *Independent axis* – ticked if the antennas in the group do not operate as one axis.

- *Toggle reader ID* – Ticked if the reader ID is toggled when the reader polls the axes in this group.

- *Group Priority* – Set the group priority for all axes in this group. The group priority determines how often the antennas in this group are polled. Setting the group to disabled will result in none of the antennas in this group being polled during the normal axis switching cycle. The Programmers Guide (40-01-000-DOC) describes how to manually poll axes in a disabled group.

- *Tag Reply Mode* – Set the reply mode for all axes in this group.

The Configure axis groups form is shown in Figure 25, its elements are described in Table 14.
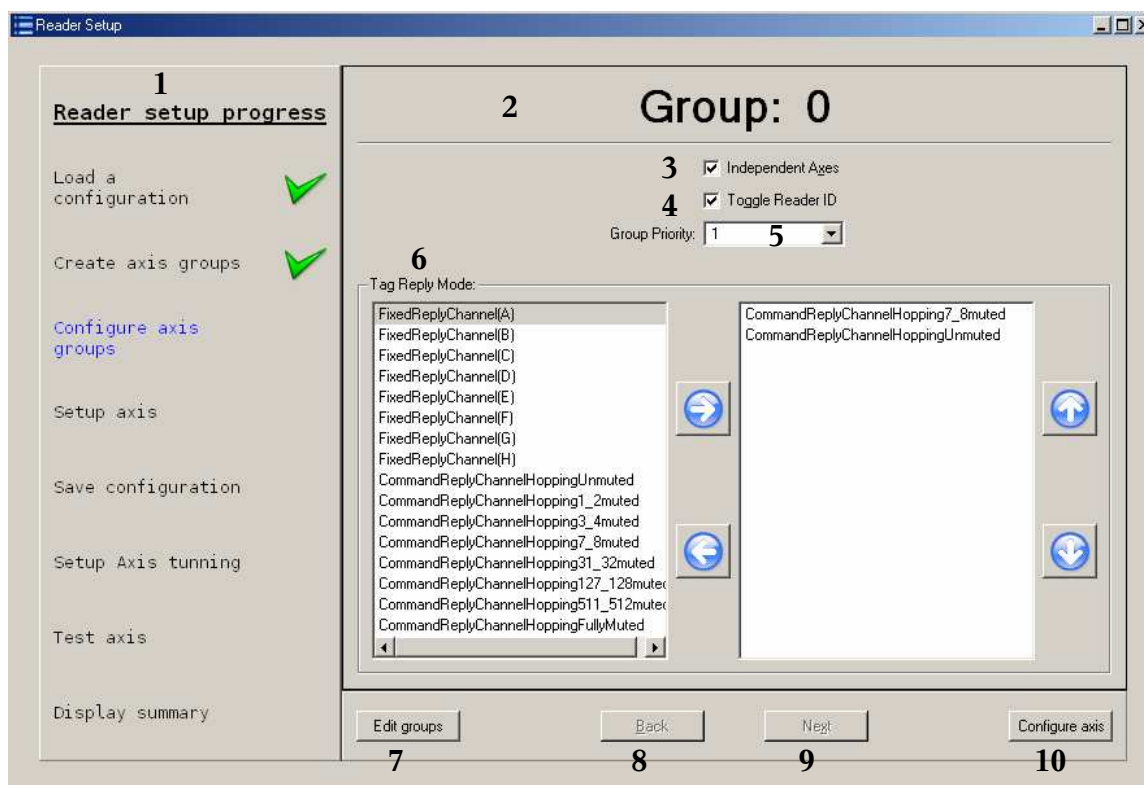
Figure 25

Index	Description
1	Setup progress – should show *Create axis groups* as being complete.
2	Current group indicator.
3	Tick this to enable *Independent axis* setting for this group
4	Tick this to enable *Toggle Reader ID* for this group.

Index	Description
5	Select the *Group priority* or disable all axis selections for axes in this group.
6	Set the reply mode for all axes in this group. To add a reply mode: 1. Click the mode you would like to add from the left list. 2. Click the right pointing arrow. To remove a reply mode: 1. Click the mode you would like to remove from the right list. 2. Click the left pointing arrow. To change the order of the active reply mode parameters: 1. Click the mode you would like to re-order from the right list. 2. Click the up arrow to move the mode to the top of the list. 3. Click the down arrow to move the mode to the end of the list.
7	Click *Edit groups* to go back to the previous form and edit the groups.
8	Click this to configure the previous group's settings.
9	Click this to go to the next group and edit its group's settings.
10	Click this to go to the *Setup axis* form.

Table 14

The typical usage of this form is as follows:

1. Set *Independent axis*, *Toggle Reader ID*, *Group Priority* and *Tag Reply Mode* to the required settings, the default settings are normally sufficient.

2. Click *Next* to edit the next group's settings.

3. Click *Configure axis*.

6.8.4   Setup axis

This form provides an interface for the user to select what type of antenna is connected to each reader axis port.

> This step in the setup is crucial for correct reader operation. If the correct antenna is not selected reader performance can be significantly degraded.

The Setup axis form is shown in Figure 26, its elements are detailed in Table 15.
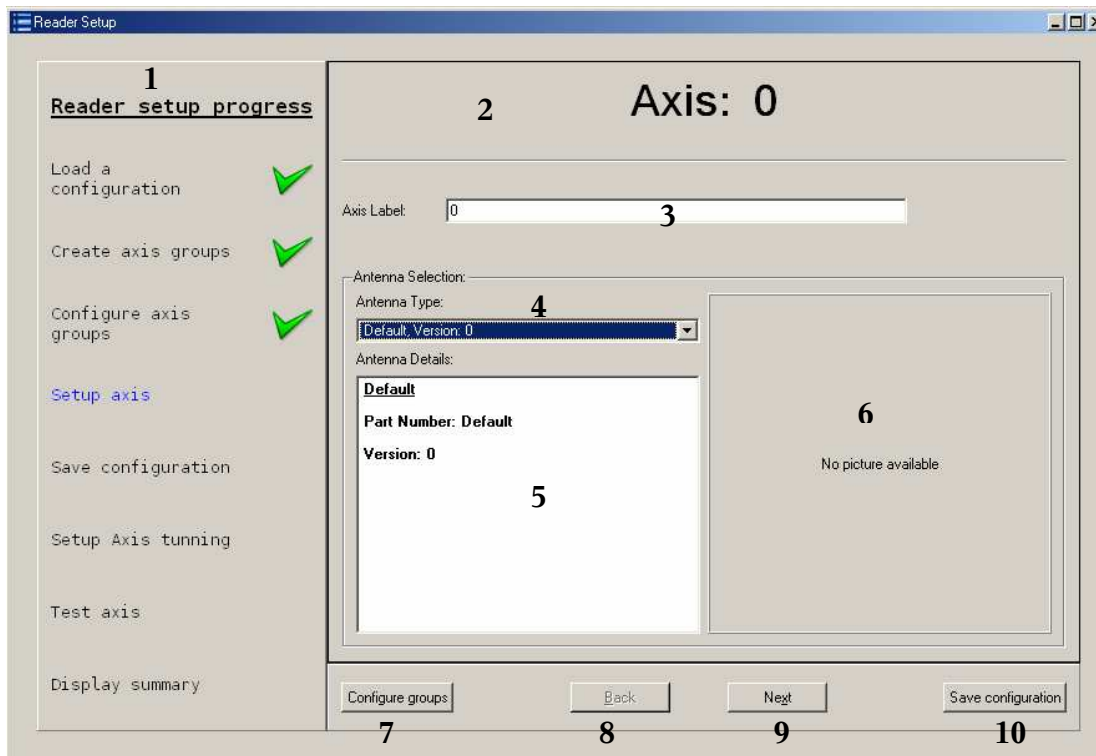
Figure 26

Index	Description
1	Setup progress – should show *Configure axis groups* as being complete.
2	Current axis indicator.
3	Enter the label for this axis.
4	Drop down list showing antennas which are compatible for the reader being configured. The version number indicated the minimum version which is compatible.
5	Selected antenna details shows: the part number, description and version.
6	Go back to the *Configure axis group* form.
7	Click this to setup the previous axis.
8	Click this to setup the next axis.
9	Click this to go to the *Save configuration* form.

Table 15

The typical usage of this form is as follows:

1. Select the antenna connected to the current port from the *Antenna type* drop down list.

2. Click *Next* to setup the next axis.

3. Repeat until all axis ports are configured with an antenna.

If less than the available axis ports are used setting the antenna to default is a safe configuration to use. It is still necessary to iterate through all antennas.

6.8.5   Save configuration

This form is used to write the configuration to the reader and also to save the configuration to disk. Saving the configuration to disk provides a way to setup other readers to use the same antenna configuration.

No configuration is written to the reader until this point.

If you click *Save Configuration* to save the configuration as a file on the hard disk, you must also click *Save to Reader* to write the configuration to the reader.

If you do not click *Save to Reader* the reader will remain in an un-configured state.

This form is shown in Figure 28 and the elements are described in Table 15.
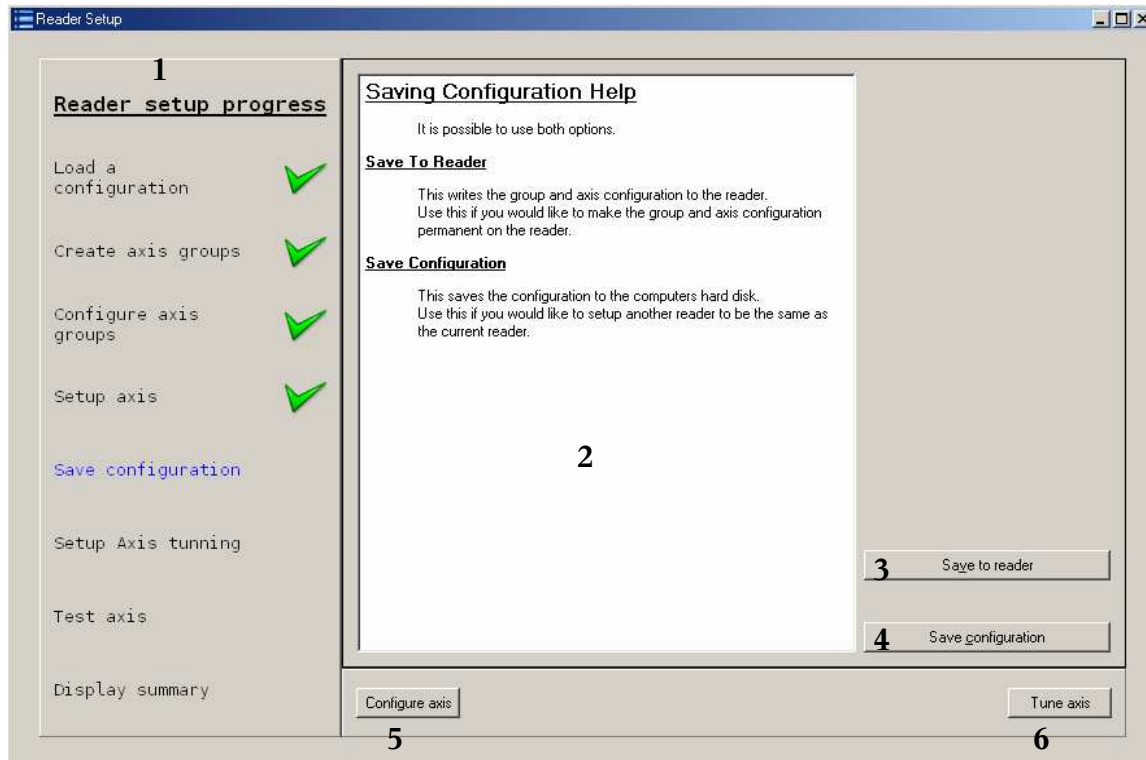
Figure 27

Index	Description
1	Setup progress – should show *Setup axis* as being complete.
2	Form instructions.
3	Click this to write the configuration to the reader.
4	Click this to save the configuration to a file which is saved on the hard disk.
5	Click this to go back to the *Setup axis* form.
6	Click this to go to the *Setup tuning* form.

Figure 28

The typical usage of this form is as follows:

1. Click *Save to Reader*.

2. Click *Yes* when asked to save to the reader.

3. Acknowledge the configuration has been saved when the message box is shown.

4. Click *Tune Axis*.

6.8.6 Setup axis tuning

This form provides instructions for tuning the antenna connected to each axis port.

The Setup axis tuning form is shown in Figure 29 and its elements are detailed in Table 16.
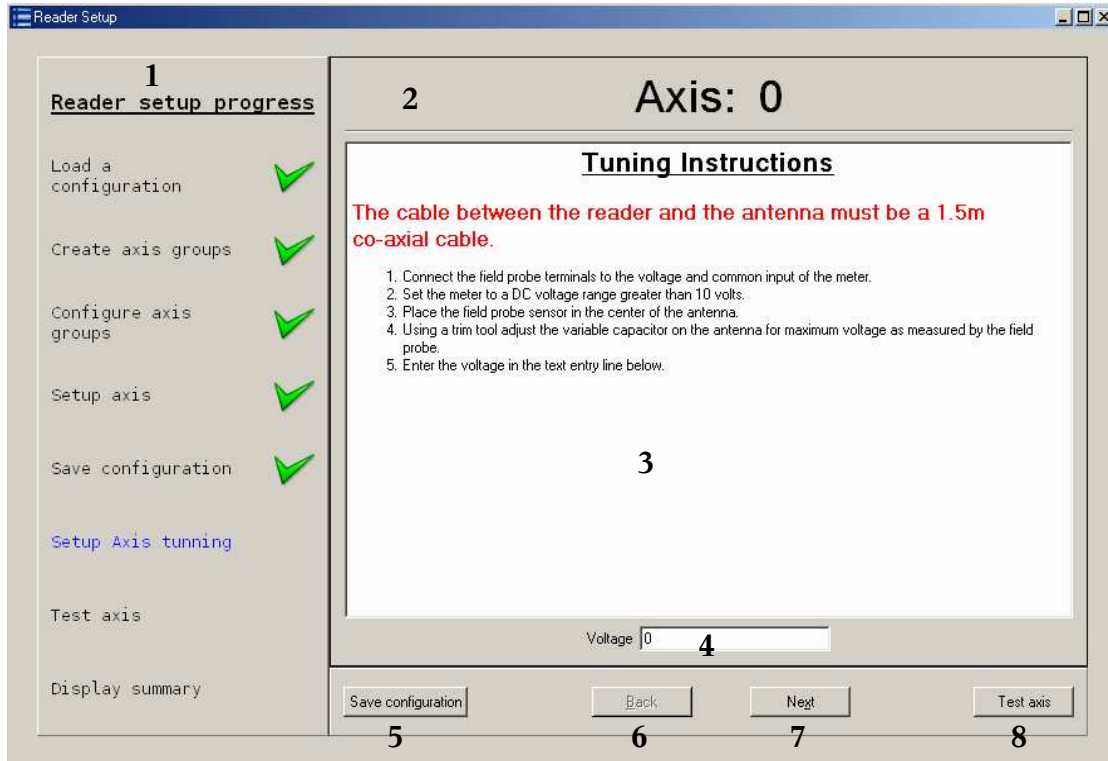
Figure 29

Index	Description
1	Setup progress – should show *Save configuration* as being complete.
2	Current axis indicator.
3	Tuning instructions for the current axis / antenna.
4	Enter the voltage measured on the tuning block. This is not saved to the reader or to disk it is included only as information which is shown on the final summary form.
5	Click this to go back to the *Save configuration* form.
6	Click this to setup the previous axis.
7	Click this to setup the next axis.
8	Click this to go to the *Test axis* form.

Table 16

Typical usage of this form is:

1. Follow the tuning instructions.

2. Enter the maximum voltage measured when tuning the antenna.

3. Click *Next* to tune the next switch to the next antenna.

4. Repeat until all antennas have been tuned.

5. Click *Test Axis*.

6.8.7   Test axis

This form shows how well each axis / antenna pair is working. The test sends 10 tag commands and expects all commands to be received on each receiver stream.

Readers such as the Mars-24 and Mars-8 have eight receiver streams; the axis test expects to receive replies on all eight streams. The form shown in Figure 30 shows the results of a successful antenna test for an eight stream reader.

Readers such as the Mars-1, Mars-2, Mars-4, Mars-6 and MDR-1109 have two receiver steams, for these types of readers' only receiver streams *G* and *H* should show replies. Channel *G* should show 10 replies and channel *H* should show more than 7 replies the other channels can be ignored. The form shown in Figure 31 shows the results of a successful test for a two steam reader.

The form elements are described in Table 17.

- This test must be done using a single tag placed on the antenna under test.

- The tag must be configured as a Normal powered tag.

- For all antenna types except the panel antenna we recommend using a 25mm round tag or one of equivalent size. For panel antennas we recommend using a credit card sized antenna.

If your reader does not pass this test it will not read and write to tags reliably. Check there are no metal other sources of interference near the antenna.

It is important that the test is stopped before this window is closed as this test configures the reader to operate in a different mode to what it would be set to when just reading and writing to tags. If the form is closed by accident disconnect ReaderManager from the reader and power cycle the reader.
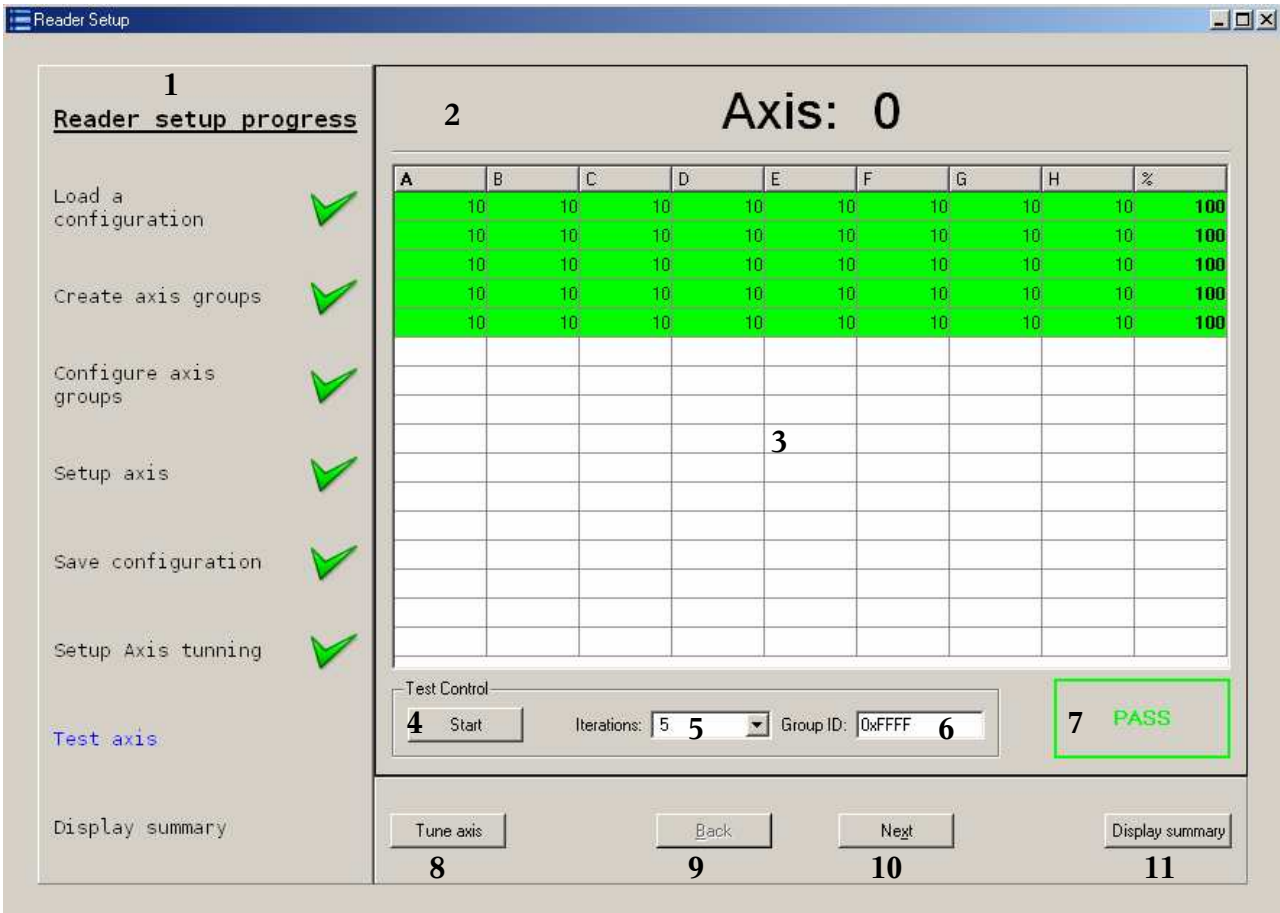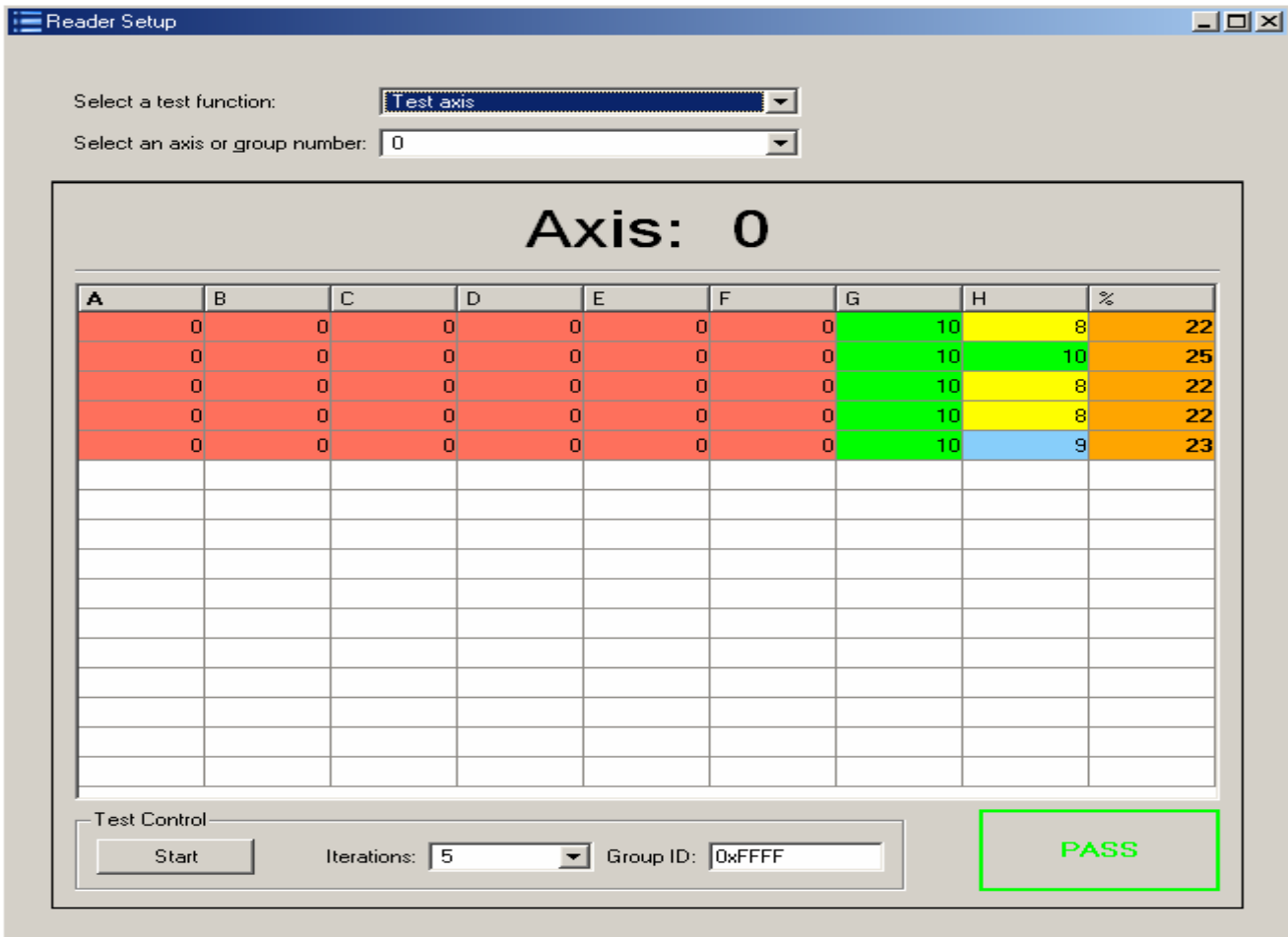
Figure 30

Figure 31

Index	Description
1	Setup progress – should show *Setup axis tuning* as being complete.
2	Current axis indicator.
3	The table shows the number of replies received per channel. Each cell shows how commands have been received on that channel. All cells should be green and should show 10 replies received. The column on the right shows the total percent received for all channels.
4	Click this button to start or stop a test.
5	Select the number of test iterations. Select continuous to run the test until the stop button is clicked.
6	Enter the group ID of the tag used to preform the test. Leaving the group ID set to 0xFFFF will allow any tag to respond to test commands. This option is used when there is more than one tag on the antenna and the test tag has been configured with a group ID which is different to the other tags group IDs.
7	Test result indicator. This will display PASS at the end of the test if all replies are received.
8	Click this to go back to the *Tune axis* form
9	Click this to test the previous axis.
10	Click this to test the next axis.
11	Click this button to go to the Display summary form.

Table 17

The typical usage of this form is:

1. Place the test tag on the antenna under test.

2. Click the *Start* button.

3. Wait for the test to complete and indicate a pass.

4. Move the tag to the next antenna, click the *Next* button.

5. Repeat until all antennas have been tested.

6.8.8   Display summary

This form displays the reader setup, tuning and test results for each axis / antenna. The left column shows the group configuration, the right column displays all the axes in the group, antenna details, tune voltage and test results. This form is shown in Figure 32, the form elements are shown in Table 18.
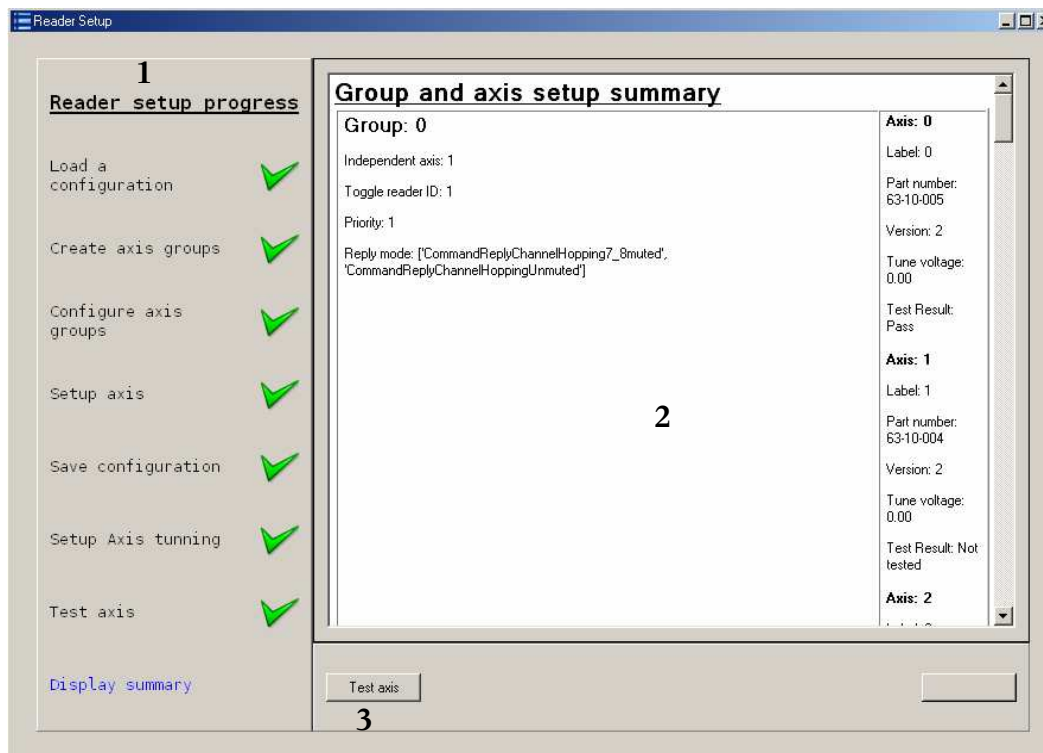
Figure 32

Index	Description
1	Setup progress – should show *Test axis* as being complete.
2	Show group and axis setup details.
3	Click this to go back to *Test axis*.

Table 18

This form can be printed by selecting print from the file menu on the main reader manager menu.

6.9   Simple Tag Test

This tool is provided to test a number of tags.

To access this tool, select *Tools->System->Simple Tag Test*

The test writes a checker board pattern from address 10 to 31 to each tag sighted by the reader. All data is read and verified. All tests must be read and written to and verified within 20 seconds for the test to pass.

This tool is shown in Figure 33, the tool elements are described in Table 19
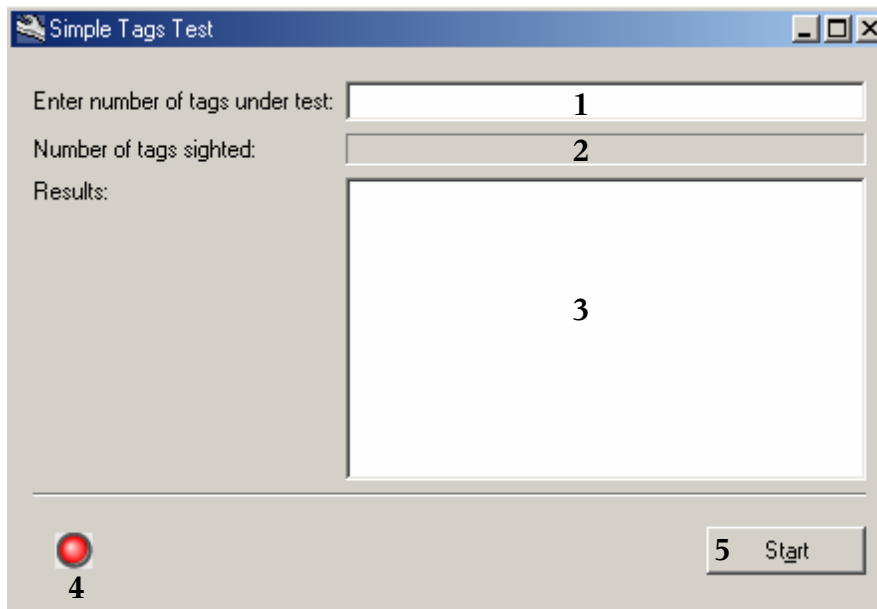
Figure 33

Index	Description
1	Enter the total number of tags placed on all antennas.
2	Shows the number of tags sighed on all antennas.
3	Shows any fail messages at the end of the test
4	Test result indicator. *Green* – Test pass *Yellow* – Test in progress *Red* – Test failed.
5	Click this to start or stop the test.

Table 19

6.10 Table of Tag Messages
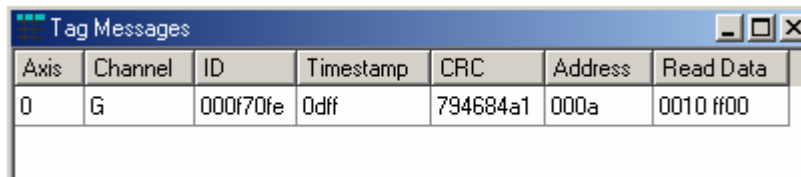
Shows the tag messages that come from the reader in a table.

To access this tool, select *Tools->System->Table of tag messages*

The columns in the table depend on the message received by the reader. Figure 34 shows a typical response to an InterrogateAction command which reads two words from address.

InterrogateAction(readAddress=10, readLength=2)

A tag reply field will be placed under the corresponding table label and a column number. Only the columns that receive data will be displayed, thus creating an auto-adjusting table.

Figure 34

6.11 Tag Test

The tag test tool can be used to test the reliability of tags.

To access this tool, select *Tools->System->Tag Test*

This is of use to tag manufacturers only. All tags in the field will have already been through this process. Each tag is sent 10 read commands and the number of replies is counted. If the tag passes a threshold, then a write command is sent. There are also optional additional write commands to configure the tag's behaviour. This tool is shown in Figure 35 and its controls described in Table 20.
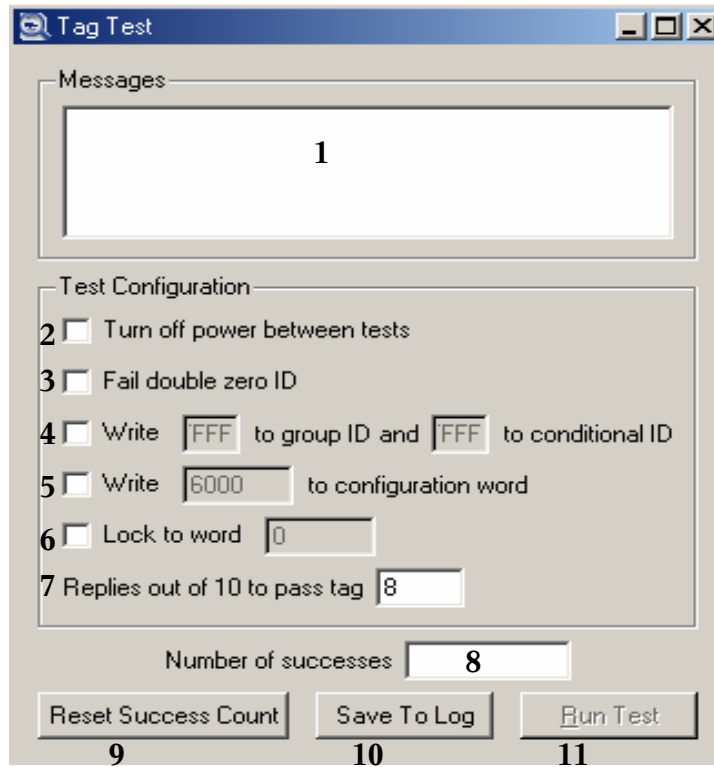
Figure 35

Index	Description
1	Shows tag messages as they are being tested. It is advisable to resize the window so that a complete test of a single tag can be seen at once.
2	Turn off power between tests will keep reader power off, except when a tag is being tested. This is useful for cases where the tag must be positioned before the test is performed. In this case, the Run Test button is enabled. This must be clicked each time a test is to be run.
3	*Fail double zero ID* if ticked will reject tags with 00 for the lower byte of the specific ID. This was needed to handle a batch of tags that accidentally included 2 tags with the same ID of 00 in every batch of 256 tags. This is not needed for all tags other than those with this problem.
4	Write to group ID and conditional ID writes values to 2 common tag configuration areas. The values are in hexadecimal.
5	*Write to configuration word* writes to the tag configuration. See 3.7 of *Chip Logical Specification* document for details.
6	*Lock to word* sets the tags lock pointer.
7	*Replies out of 10 to pass tag* controls the pass/fail criteria. In most cases, the default 8/10 is a good value to use.
8	The *Number of successes* field shows how many tags have been tested and passed successfully. This count can be reset by the *Reset Success Count* button.

Index	Description
9	Resets the test success counter.
10	The *Save To Log* button opens a dialog to save the messages displayed to a log file
11	When *Turn off power between tests* is ticked, click this to start the test.

Table 20

7 Reader Configurations

This section describes ReaderManager's script building tool. It is provided for users to create custom scripts and commands which are accessed from the main ReaderManager menu.

A *reader configuration* is a collection of a combination of the following items:

- A script which is run immediately. This is a number of any valid API commands and Python syntax.

- A number of tag commands, which may be applied to interrogation, specific or immediate actions.

- A number of action scripts, which may be applied to interrogation, specific or immediate actions.

A given configuration may consist of just a single instance of one of these 3 things, or it may be a complex application involving multiple scripts and commands.

This menu is used to create, edit and run reader configurations. It is intended to act as an aid for programmers who are building applications, by making the development process much easier. Building up complex scripts, in particular, can be a tricky process.

It can also be used by anyone working with a reader to build up a set of custom commands and scripts which can be sent to the reader to put it into a particular operating mode.

As reader configurations are defined, they are added to this menu, in a similar fashion to the way the *Connection* menu works.

7.1 Edit Configurations Dialog

The first item in the *Reader Configuration* menu is *Edit Configurations...*, which opens up a dialog window where reader configurations can be created and edited.

It shows a list of titles of reader configurations that have currently been defined. Pressing the right mouse button makes a local menu appear. Some of the items in this menu are specific to the configuration that was clicked on, while others apply generally.

- *New Configuration* creates a new reader configuration. You will be prompted which tag type this configuration applies to. You will then be taken to an empty Reader Configuration window.

- *New Folder* creates a new subdirectory into which configurations may be created. This allows them to be grouped into sub categories that make management easier if there are a lot of scripts.

- *Edit* opens the Reader Configuration window for the currently selected item.

- *Cut, Copy & Paste* allows you to make copies of existing configurations under a new name. This is very useful is there are a number of configurations that are very similar.

- *Rename* opens up a small dialog that allows you to rename the currently selected configuration.

- *Delete* deletes the currently selected configuration.

7.2 Reader Configuration Dialog

The Reader Configuration dialog has 4 tabs that can be selected along the top. *Reader Configuration* is the overview, *Scripts* and *Tag Commands* defines the pieces that go to make up the configuration, and *Assembly* ties the pieces together into the order desired.

The *Reader Configuration* tab shows the title, tag and reader types for this configuration. Note that the tag type cannot be changed because this affects other parts of the configuration in ways that are difficult to automate.

The *Preview* button opens a window showing the complete configuration as it would be sent to the reader. Lines wraparound so long commands don't get hard to read.

The *Scripts* tab shows a list of titles of all of the Python scripts that have been defined for this configuration. Click on a title to view it. Right click and *Edit...* to change the script contents.

The scripts used may contain optional markers of the form `%(Parameter)s` indicating the location of a parameter to be substituted. The user will be asked to provide parameter values when running the script. This is done through a dialog which has a list of parameter name and value pairs. The values entered are substituted into the scripts before it is sent to the reader.

The *Tag Commands* tab shows a list of titles of commands that have been defined for this configuration.

The *Assembly* tab allows all the scripts and tag commands that have been defined to be tied together in the desired way.

The Title field of these items is used in combo boxes to identify the item in question. With the *Immediate Configuration Change* the script is sent to the reader in raw format with real newline characters. The *Interrogation command* sets the action tuple for the interrogation command.

The Tag Specific Actions table shows 3 columns headed Pre Script, Tag Command & Post Script. This declares the action list to take with new tag. This list will be compiled and placed in an *Actions()* construct.

The *Add* and *Delete* buttons allows the user to add and remove configurations, scripts and tag commands.

The *Save* button starts disabled and is only enabled when a change is made. When it is clicked, the configuration details are saved in the configuration file.

8   Upgrading Reader software

Upgrading AVR type readers is described in section **13.1 Upgrading An AVR Series Reader**.

8.1   Upgrading ARM and x86 Readers

This form is used to update the reader server or operating system on network based readers.

The Upgrade form is accessed from the File menu item on the main reader manager menu. From the main reader manager menu, select *File->Upgrade->Upgrade AReaderManager or x86 Readers*. The upgrade form is shown in Figure 36. The form elements are shown in Table 21.

The upgrade is applied to the reader when the reader is power cycled or the reader is reset. When a reader is applying the upgrade the start up time will be longer than normal, it could take up to two minutes for the reader to restart.

> **DO NOT REMOVE THE POWER TO THE READER WHILE AN UPDATE IS IN PROGRESS.**

> If both an operating system and reader server upgrade is required it is recommended to upgrade the operating first, reset the reader and then do the reader server upgrade.

The upgrade form uses package files saved in the *Upgrade* directory. The default path for the *Upgrade* directory is a sub-directory under the Reader Manager install directory. To change the default Upgrade path use the Preferences menu item in the file menu (See section **4.1.1 File Menu**).

There should only be one package file per upgrade component. When an upgrade is released delete the older package file in the upgrade directory and replace with the new package file.

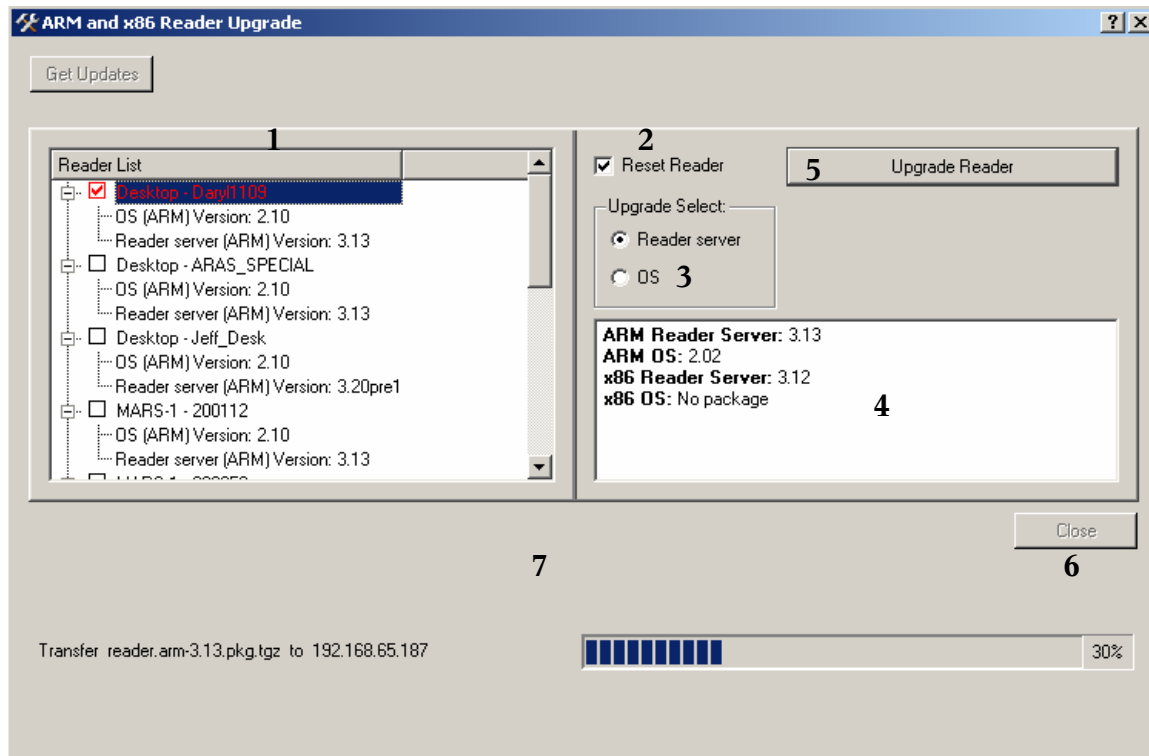| Typical package names are:	
Filename	**Description**
os.magtiny.arm-2.02.pkg.tgz	Arm reader operating system version 2.02 upgrade package file.
os.x86-2.03.pkg.tgz	X86 reader operating system version 2.03 upgrade package file.
reader.arm-3.13.pkg.tgz	Arm reader server version 3.13 upgrade package file.
reader.x86-3.12.pkg.tgz	X86 reader server version 3.13 upgrade package file.

Figure 36

Index	Description
1	This frame shows all x86 and ARM based readers detected on the network. If ReaderManager is connected to a reader, this reader will be shown as the first item in the list and will be highlighted in red. ReaderManager does not need to be connected to a reader to use this dialog, multiple readers can be upgraded at the same time.
2	Tick this to reset the reader after the upgrade package is copied to the reader. If this is ticked when the package is transferred to the reader, ReaderManager will be disconnected from the reader.
3	Select the package to transfer to the reader. Select *Reader server* to upgrade the reader server application, select *OS* to upgrade the operation system.
4	This text box shows the available upgrades to apply to the reader. If the package shows *None* as the version number there is no package available. Check the package filenames in the *Upgrade* directory.
5	Click this to start the upgrade
6	Once the upgrade is complete, click this to close the form and return to ReaderManager.
7	Status area shows upgrade states and transfer progress. Error message are also displayed in this area.

Table 21

9 Troubleshooting

9.1 Can't see my reader on the dynamic connection list

- The computer IP address on the computer running ReaderManager must be in the same subnet as the reader.
- The reader must be running ReaderServer 3.xx or better.
- AVR readers can not be discovered on the network.

9.2 My reader is behaving strangely or tags are timing out.

- Have you setup the reader to use the antenna you are using? Use the *Reader Setup* tool.
- Is the antenna tuned correctly and has the antenna passed the antenna test in the *Reader Setup* tool?
- Restore the reader to its default settings using the *Reader Settings* tool.

9.3 My antenna is not in the Reader Setup tool antenna list.

- Log onto the Magellan Technology website, get and install the latest versions of ReaderManager and ReaderServer. If your antenna is still not in the list then the antenna is not meant to be used with the type of reader you are using.

10   Reporting a Problem

If you are having a problem with the ReaderManager, you will need to send a report describing your problem. To make diagnosis easier, please try and supply this information with any problem report.

- Have you tried connecting to the reader with a different PC?

- Have you successfully installed the ReaderManager application?

- In the ReaderManager, select the *Help/About ReaderManager* menu item and record what version numbers are shown in the window that appears.

- What type of reader are you using?

- Has the reader worked in the past and has just stopped working?

- Please be a descriptive as possible:

  - Saying, "I've placed a stack of 10 gaming chip tags on antenna XX four tags timeout every 3 seconds." is better than saying, "My tags timeout."

- Send as much information about the reader as possible, please do the following:

  - Connect to the reader.

  - Open the *Console.*

  - Type *Settings()* then press enter.

  - Type *Settings()* then press enter.

  - Type *config.data* then press enter.

  - Type *AntennaSettings()* then press enter.

  - Right click in the *Message Log* area of the *Console* and click *Select All.*

  - Right click in the *Message Log* area of the *Console* and click *Copy.*

  - Paste all the information into an email and send it to Magellan Technology.

11 Minimum System Requirements

This section defines the minimum computer system recommended to run ReaderManager.

Computer / Processor	133 MHz or higher Pentium-compatible CPU.
Memory	At least 64 megabytes (MB) of RAM
Hard Disk	50 MB.
Optical Drive	Required for installation only.
Display	1024 x 768 resolution or better.
Keyboard	Required
Mouse	Required
Ethernet	10/100 Mbps
USB	1.10
Operating System	Windows 2000 SP4, or Windows XP professional with SP2.

12   Getting more information

If you require any further information about a reader or associated software, please contact Magellan, or the supplier of the equipment.

Magellan's contact details are:

Magellan Technology Pty Limited
65 Johnston Street
Annandale
Sydney NSW 2038
AUSTRALIA

Phone: ....+61 2 9562 9800
Fax: ....+61 2 9518 7620
Email: ....info@magtech.com.au
Website: ....www.magtech.com.au

13   Appendix A – AVR Options

13.1   Upgrading An AVR Series Reader

To upgrade the firmware in the reader, follow this sequence of steps:

- Make sure that the ReaderServer is NOT running. In most environments, just disconnect and the server will be shut down. If you have selected *Start server when computer boots* in the Connection settings or manually started it, closing the connection will not close the ReaderServer. In this case, connect and type *Exit()* into the console window and press Enter to terminate the server and close the connection.

- Select the *File* menu then select the *Upgrade AVR Readers...* menu option. The upgrade window appears.

- The previous serial port used in this window is automatically reselected. If this is the first time this application has been run, the first available port detected will be used. Make sure the correct serial port for the reader is selected from the drop down list of serial port names. If you do not know which serial port number to use, see SS. Ports detected by Windows are shown with a + next to them. Note that Windows sometimes reports ports that are not actually there.

- Unplug the power from any AVR Series Reader, which is most simply done by removing the power jack plug from its socket in the cover plate on the underside of the unit.

- Plug the power in and the software should indicate the connection has been made When the connection has been established, the icon changes and the text changes in the middle of the window and on the status line. If this does not happen, check the port number being used and make sure the serial cable is correctly plugged in.

- Click on the *Firmware Upgrade* tab. Follow step 1 and select the file to upload. For current AVR Series readers, it is *40-70-016-SFW_Firmware.hex*. To get this file, see SS. The file can be located anywhere on the system.

- Click on *Program* under step 2. The loading process will begin, with progress being continuously displayed in a progress bar on the screen, and indicated by rapid flickering of the green LED on the reader.

- When the upload has finished, close the upgrade window. Remove power from the reader and reapply to reset it. The ReaderServer can now be started and connection with the upgraded reader established.

The *Altera Upgrade* tab follows a similar procedure to upgrade the programmable logic device on the board. There are a number of data files that can be used depending on the type of reader being used. Check with technical support that the correct RBF file has been supplied for the reader.

There are a number of other controls on this window, but they are primarily for testing and manufacturing purposes.

13.2   Opening A Connection Using The Command Line

The *Automatically Connect On Startup* option works well if only a single copy of ReaderManager needs to run at the same on a single computer. But if there is a need to run multiple copies, then the software doesn't know which connection to make automatically with each copy that is started.

To resolve this dilemma, ReaderManager can accept the connection name as a command line parameter. For example, this could be put in a batch/script file:

```
python ReaderManager.py "New 1310"
```

This application will not return to the command prompt until the ReaderManager has exited. To run multiple copies, it is necessary to run each from separate command windows (or batch files).

In this example, python is given without a path, but in many cases, it will be necessary to supply the path to the Python interpreter, for example, *C:\Program Files\Python23\Python*.

This command line execution must always be run in the directory where the ReaderManager.py file resides, which on Windows is *<Python>\Lib\ReaderManager*.

The connection names given in this example must exactly match the name that appears in the *Connection* menu, including case. If the connection name contains spaces, it must be surrounded by quotes as shown.

13.3   Trouble shooting AVR problems

When reporting problems with a Reader, it is important to be able to say what the version of software is used for the ReaderManager, the ReaderServer, and if using an AVR series reader, the firmware.

To find out, select the *Help/About Reader Manager* menu item. It should open a window that contains multiple application version numbers, depending on the kind of reader being used.

In this example, the top two lines show the version numbers of the currently installed ReaderManager and ReaderServer applications. The next line shows the version of the reader that is currently connected. If it is a local ReaderServer, as in this example, the version number will be the same as the installed ReaderServer. Finally, the embedded reader firmware version is shown if it is an AVR Series reader.

If the numbers do not appear as expected, shutdown the ReaderManager, turn the reader off, then on and restart the application. Then try this procedure again. Starting A Local ReaderServer Problem When the ReaderServer is started, a log file is generated. It is called reader.log and is saved in the *<PythonPath>\Lib\ReaderServer\DTRHF* directory.

If there is no problem, the log file is not shown, but if there is a problem, it is automatically shown to the user after timing out.

For example, a typical log file for a successful connection would look like this:

```
Magellan Monitor Server started on port 8023
Incoming monitor connection from 127.0.0.1:1296 on channel 1900
```

While an unsuccessful start could generate an error message like this:

```
An error has occurred. Please copy this message and submit with a problem
report
Traceback (most recent call last):
  File "DTRHF.py", line 17, in ?
    ApplicationEntry(tagName) # run the main application entry point
  File "../DTR\DTRApplication.py", line 223, in ApplicationEntry
    application._Initialise()
  File "../DTR\DTRApplication.py", line 78, in _Initialise
    Globals.serial.Enable()
IOError: Unable to open serial port : Access is denied.
```

Sometimes the final line of this error report can give a clue as to the nature of the problem. In the above example, another application had opened the serial port, so the ReaderServer was unable to gain access to it.

In an error message is received and you believe it indicates a bug or some problem whose nature is not clear, send the error message in an email to your technical support contact.

Notes: