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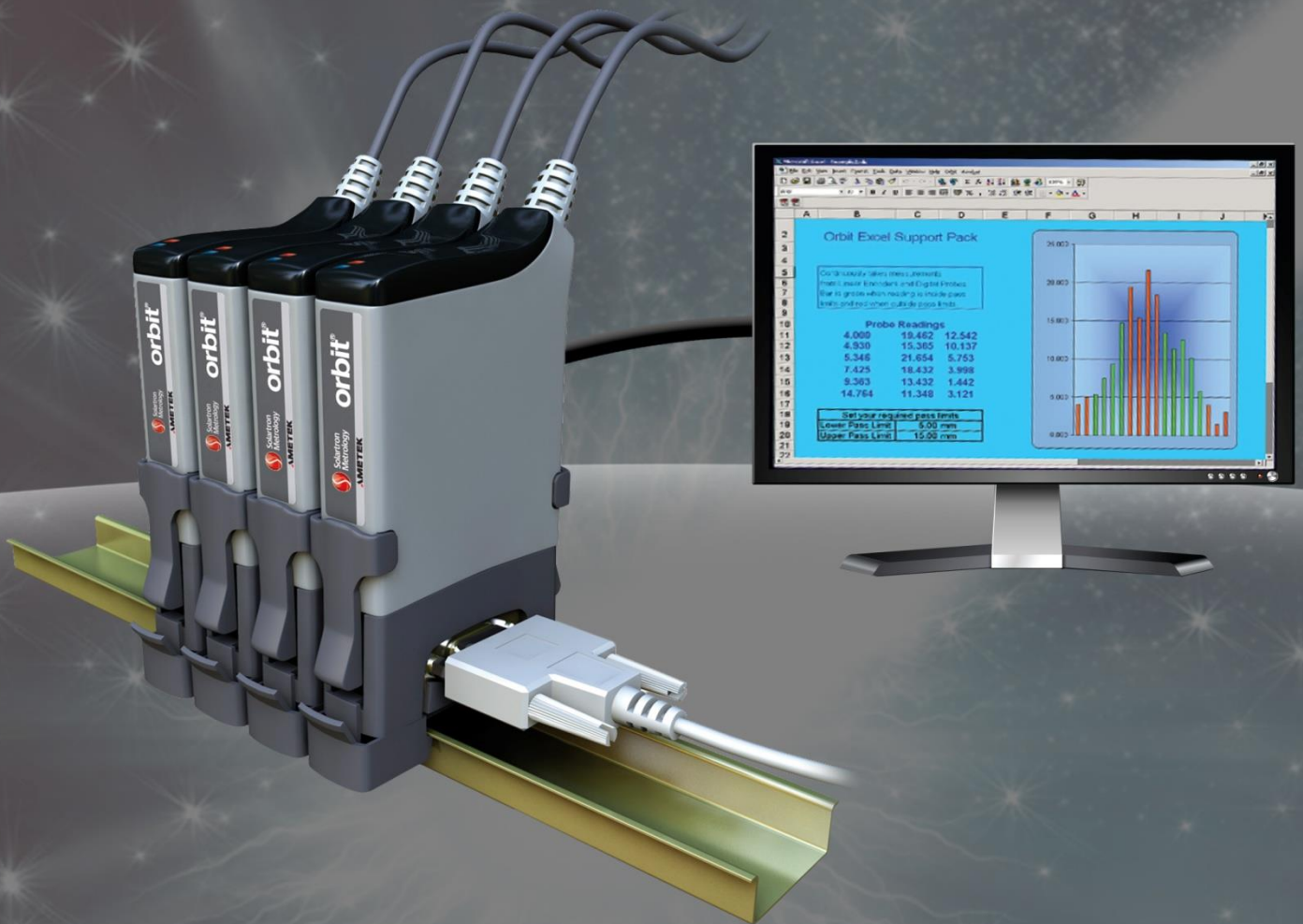
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Orbit3 Excel® Add-in User Manual



AMETEK®
ULTRA PRECISION TECHNOLOGIES

503292 - Orbit3 Excel® Add-in

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1. Introduction

The Orbit3 Excel® Add-in enables you to take readings from Orbit Modules forming an Orbit Network and place them in cells of a Microsoft® Excel® spreadsheet.

It also takes readings from Solartron wireless devices, via a Wireless Connection Module (WCM).

It works with all Solartron Orbit3 Controllers.

1.1. This manual

This manual describes the installation and configuration and also provides information and guidance on using the software.

1.2. Guidelines

- The Add-In uses the Orbit Library, which (by design) can only be connected to one application at a time. Thus two spreadsheets are not allowed to operate at the same time.
- Configuration settings for the add-in are stored in the spreadsheet, so it is not recommended to have two spreadsheets open at the same time; otherwise, settings may be taken from the wrong spreadsheet.
- The Add-In uses a hidden sheet in the spreadsheet to store configuration settings. Therefore, if the 'Show sheet tabs' option is unchecked (in 'Excel Options/Advanced/Display options for this workbook') - thereby hiding the tabbed pages, the add-in will not function correctly. The solution is to ensure that the work sheet tabs are always visible.
- The Add-in will only work with Office 2007 onwards. Please see the [Windows OS and Office compatibility](#) for more details.
- The add-in is only designed to work with Orbit3 products. Please see the [Orbit Modules](#) & [Orbit Controllers](#) compatibility sections for details.

2. Documentation cross reference

520439	Orbit3 Support pack for Windows: <i>Contains both software and manuals for the Orbit system</i>
502990	Orbit3 System manual: <i>Contains Orbit 3 system hardware information</i>
502914	Orbit3 Module manual: <i>Contains Orbit 3 Module information</i>

3. Glossary

Terms used in this manual:

Add-In	Components that can be installed on your computer to add commands and functions to Microsoft Excel
Spreadsheet Configuration dialogue box	Allows you to change how and where the readings are placed in the Excel worksheet
Orbit module	Any device which connects to the Orbit Network and communicates using the Orbit Network protocol
Orbit module ID	Each Orbit Module has a unique 10-character ID to identify it on the Orbit Network
Orbit Network controller	A device that can communicate with Orbit modules using the Orbit Network protocol. See Orbit System manual. Current Orbit Network controllers are: <ul style="list-style-type: none">• Orbit USB Interface Module - single channel module for any device with a USB port• Orbit RS232 Interface Module - single channel module for any device with an RS232 port.• Orbit Ethernet Interface Module - single channel module for any device with an Ethernet port• Orbit Wireless Interface Module - single channel module for any device with a Bluetooth2 port
Orbit Network Configuration dialogue Box	Allows addition and removal of modules on the Orbit Network

4. Installation

4.1. PC System Requirements

4.1.1. PC Hardware Requirements

- Personal computer with a processor running at 1GHz or faster with 2GB or more RAM.
- An available USB, COM or Ethernet port.

4.1.2. PC Software Requirements

- Microsoft Windows® operating system (Windows® XP, or later)
- Microsoft® Excel® 2007 or later.
 - See the [Windows OS and Office compatibility](#) section for more details.
- Solartron Orbit3 Support Pack for Windows.
- .NET Framework 4.0 (installation not required for Windows 8 or later)
(installed by prerequisite if internet connection is available)
- Visual C++ 2010 SP1 x86 (MFC Security Update)
(installed by prerequisite if internet connection is available)
- Visual Studio 2010 Tools for Office Runtime
(installed by prerequisite if internet connection is available)

Note: If internet connection is unavailable,

.NET 4.0 is available at:

<https://www.microsoft.com/EN-US/DOWNLOAD/confirmation.aspx?id=17718>

Visual C++ 2010 SPI x86 (MFC Security Update) is available at:

http://download.microsoft.com/download/1/6/5/165255E7-1014-4D0A-B094-B6A430A6BFFC/vcredist_x86.exe

Visual Studio 2010 Tools for Office Runtime is available at:

<https://www.microsoft.com/en-GB/download/details.aspx?id=48217>

4.2. Overview

This section will guide you through the steps required to complete a successful installation of the Orbit3 Excel® add-in.

Confirm Excel 2007(or newer) is installed



[Install the Orbit3 Support Pack for Windows® software](#)



[Install the Orbit3 Excel® Add-in](#)



[Install the Orbit controller](#)



[Connect the Orbit Modules](#)



Configure & run the Orbit3 Excel® Add-in

4.3. Installing the Orbit3 Support Pack for Windows® software

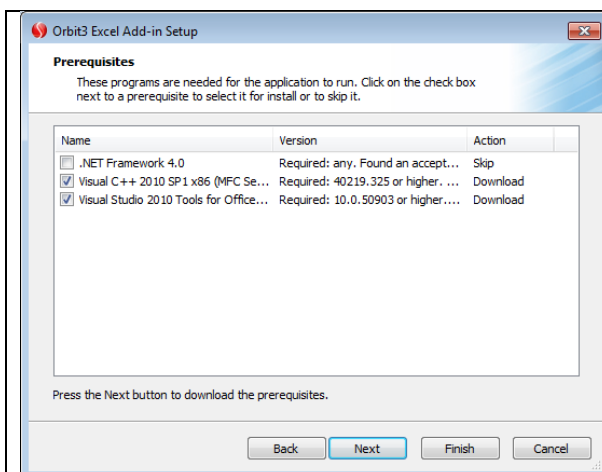
Important! Please ensure that you have Administrative access rights for installing this software.

Before you can use the Orbit3 Excel® Add-in, you must have the Orbit3 Support Pack for Windows® software installed on your computer; this is freely available from the Solartron website (<http://www.solartronmetrology.com>).

If required, refer to the Orbit3 System Manual for Orbit3 Support Pack for Windows® (ORBIT CONTROLLER INSTALLATION AND USE section) for more details on installing the support pack.

4.4. Installing the Orbit3 Excel® Add-in

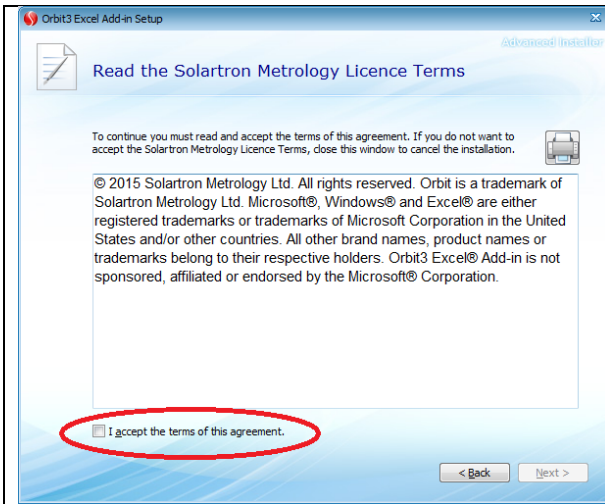
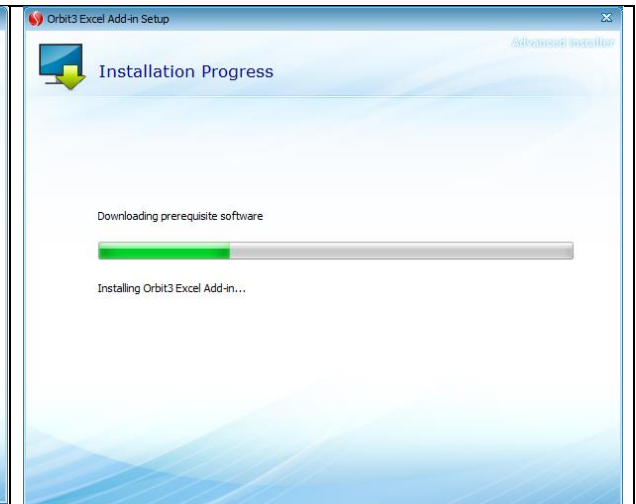
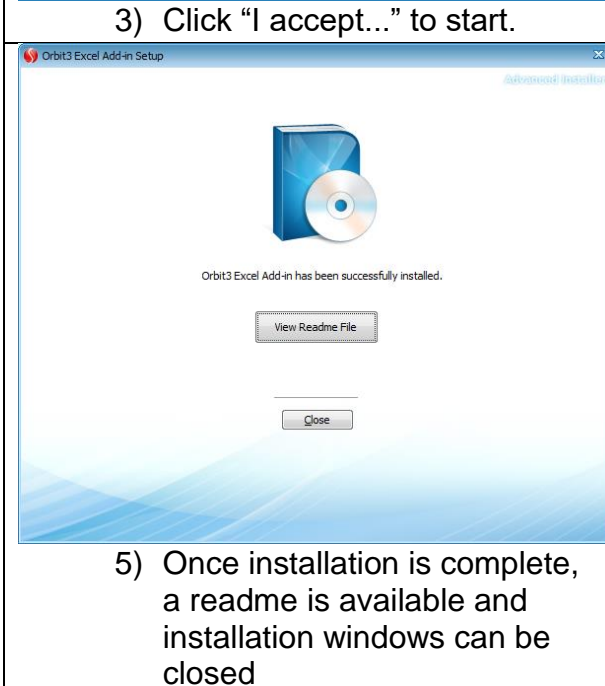
- **Important!**
 - Ensure that you have Administrative access rights for installing this add-in.
 - The Add-In is installed on a 'Per User' basis. This means that for each *user login*, a separate install of the Orbit3 Excel® Add-in will be required.
- The Add-in is supplied as a Windows install.
 - To install the add-in, simply run (double click) the file: “setup.exe” and follow the instructions, next.



1) Prerequisite, install required software before continuing to Orbit3 Excel® Add-in installation, see [PC Software Requirements](#).

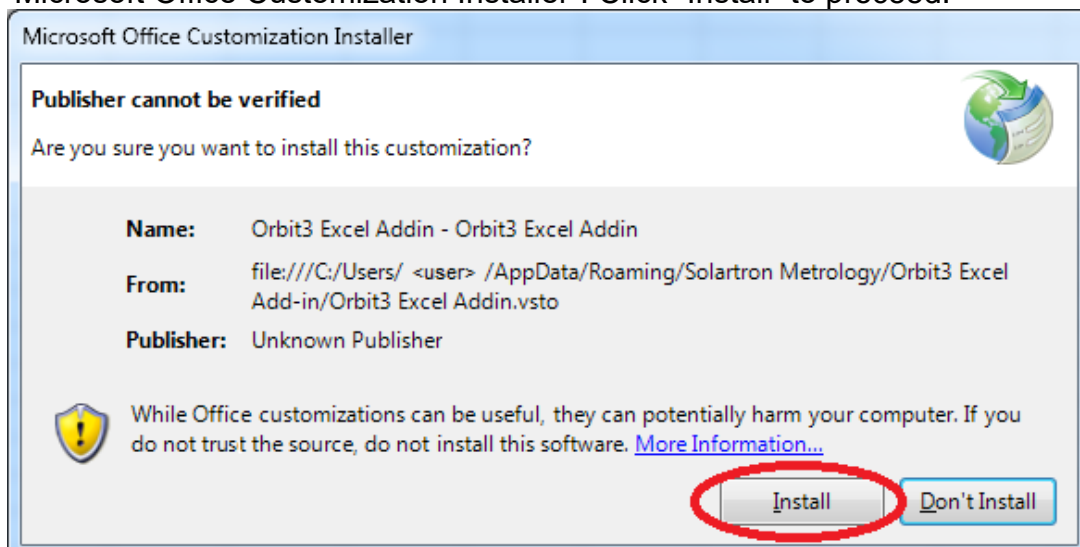


2) Welcome Screen

 <p>3) Click "I accept..." to start.</p>	 <p>4) Install Orbit3 Excel® Add-in</p>
 <p>5) Once installation is complete, a readme is available and installation windows can be closed</p>	

Launching Excel

- The first time that Excel is opened after installation has completed will bring up the "Microsoft Office Customization Installer". Click "Install" to proceed.



Note that this only happens on the first time that the current user launches Excel.

- The software has now been loaded as an Excel Add-in. This can be accessed via the Orbit menu buttons on the Excel Add-Ins Menu tab.
- This will install this Orbit3 for Excel manual and associated [example](#) spreadsheets to the current user's "My Documents" area. Shortcuts are provided in the start menu in folder: "Orbit3 Excel Add-in".
- After the Orbit3 Support Pack for Windows® and Orbit3 Excel® Add-in have been successfully installed by an Administrator, a standard user may install the Add-in for their own use, however Administrator access rights will be required if Excel® requires any additional updates.

4.5. Installing the Orbit controller

The desired Orbit controller (e.g. USBIM) needs to be connected to the host PC. For details on this, please refer to the Orbit3 System Manual (502990).

4.6. Connecting the Orbit Modules

Connect the modules that will form the Orbit Network to the Orbit controller. The connection depends on the type of Orbit Controller used. Please refer to the Orbit3 System Manual (502990).

4.7. Disabling/Enabling the Orbit3 Excel® Add-in

If no longer required, the Orbit3 Add-in can be disabled.



*To disable the Orbit3 Add-In & remove the Orbit menu from the Excel toolbar: In Excel, select **Excel Options, Add-Ins, Manage COM Add-ins** & uncheck the **Orbit3 Excel Addin** check box.*

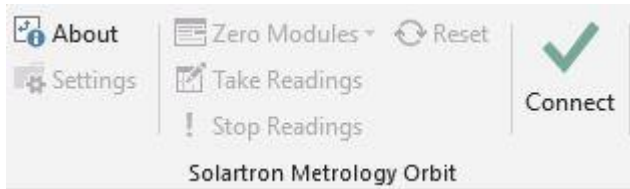


*To re-enable the Orbit3 Add-In and add the Orbit menu (having disabled it from the Excel toolbar): In Excel, select **Excel Options, Add-Ins, Manage COM Add-ins** & check the **Orbit3 Excel Addin** check box.*

5. Configuring the Orbit3 Excel® Add-in

5.1. Accessing the Add-in

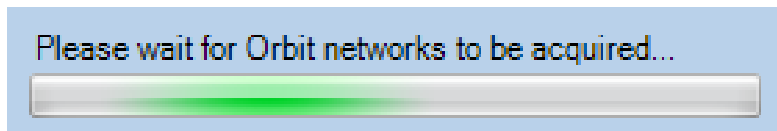
- Open Excel
- Select **Add-Ins** from the Excel ribbon.
 - The Orbit3 Add-in should be visible as:



5.2. Connecting to Orbit

Before editing settings and taking readings are allowed, the “Connect” button should be clicked. This will connect to available Orbit networks.

Whilst connecting, the following dialogue is displayed:

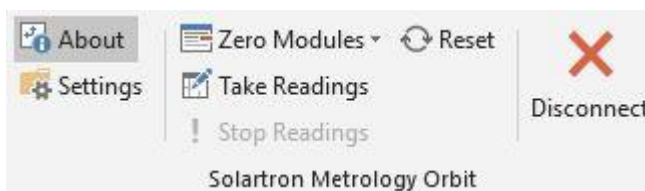


After connecting the button changes to “Disconnect”.

Before taking readings is allowed, configuration settings need to be in place.

5.3. Tool Bar Buttons explained

The tool bar displays the following buttons:



- Disconnect
 - This button disconnects from the Orbit networks (previously connected). Note this occurs automatically when the Add-in / Excel exits.
- About
 - Displays an About Box with the program version.
- Settings
 - Displays the configuration dialogue box (see [Editing Settings](#)).
- Take Readings
 - Starts reading Orbit modules (see [Taking Readings](#)).
- Zero Modules

- Zeros selected or all the configured module reading(s) to zero. All subsequent readings will be referenced to this zero datum. Clicking the button again will remove this zero.
- **Reset**
 - Clicking the Reset button will set the current destination cell address to the initial cell address that was set via the Configuration dialogue box. Also resets the number of readings taken to zero.

5.4. Editing Settings

When **Settings** is selected, the *Configuration* dialogue box opens. This dialogue box has two tabs:

- The Spreadsheet tab; configures how and where readings are placed in the Excel worksheet.
- The Orbit Networks tab; configures which Orbit controller and Modules are to be used



The Configuration Settings are saved with the workbook. Ensure you save the workbook to preserve your current setup.

5.5. Spreadsheet Configuration

Configuration

Spreadsheet Orbit Networks

Spreadsheet Settings

Worksheet Name: Sheet1

Initial Cell Address: A1

Place Next Reading: NextRow

Continuous Readings: ☐

Stop After: 20 Readings

Sample On: Spacebar

Delay: 0.05 Seconds

Units of Measure for Modules of Type DP: mm

☒ Enable Hints ☒ Display Module ID Headings

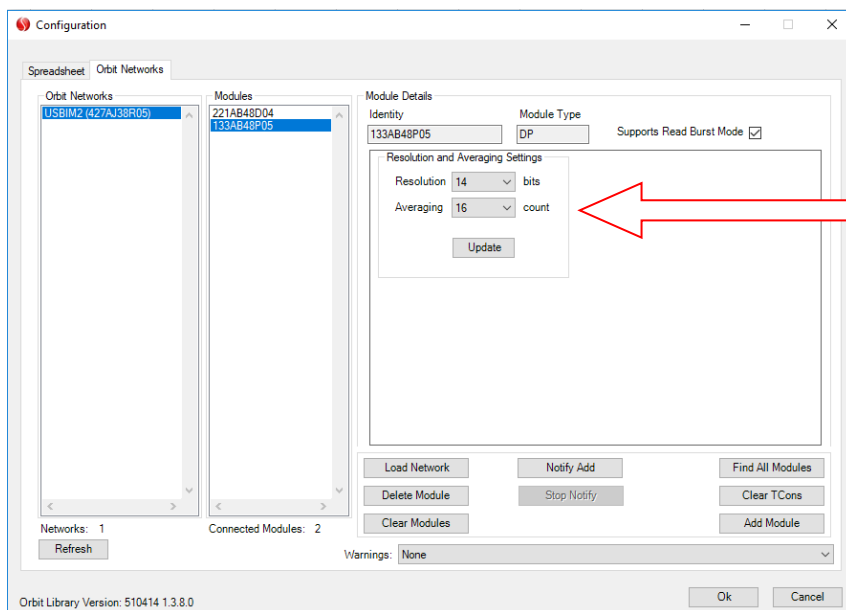
☒ Enable Time Stamping ☐ Buffer Readings

Orbit Library Version: 510414 1.1.10.2

Ok Cancel

Worksheet Name	Lists the names of the available worksheets in the active workbook. Use this control to select the destination worksheet for your Orbit readings		
Initial Cell Address	Sets the cell in which the first of the Orbit readings is to be placed. The address format can be for example: A1, \$A\$1 or 'Name' format		
Place next reading	Use this control to select where subsequent readings will be placed. The choices are next row, next column, same row or same column		
Stop after X readings	Sets the number of readings to take before automatically stopping taking readings		
Continuous Readings	Use this control to take readings until requested to stop.		
Units	Sets the unit of measure for all the Orbit readings placed on the spreadsheet		
Sample On	Selects the event that triggers Orbit readings.	SPACEBAR	Using keyboard functions
		ENTER	
		ENTER (num-pad)	
		TIMER	Automatically, using the PC system timer
		DIOM	Using DIOM / DIOM2 'Sample On' pin. The edge is selected via DIOM / DIOM2 module settings.
Delay (seconds)	Sets the delay (in seconds e.g. 1.25) between subsequent readings when Sample On is set to TIMER . Note that this time setting has a minimum resolution of 0.05 seconds. Note that due to hardware, Operating System and Microsoft Excel constraints, a smaller resolution than 0.05 seconds was not achievable. For higher reading rates, the Buffer Readings option is recommended.		
Enable Hints	Use this to choose whether <i>tool tips</i> are shown when hovering over control items.		
Display Module Id's as headers	Enables the recording of the Orbit module ID numbers as spreadsheet headings. These will be placed according with the <i>Initial Cell Address</i> .		
Enable Time Stamping	Enables a time stamp to be taken, alongside the readings. The time is displayed in seconds, since 'Take Readings' was started. The start date and time is also logged. These time stamps are placed on the worksheet according with the <i>Initial Cell Address</i> .		
Buffer Readings	When this option is checked, readings are taken from the configured Orbit modules as quickly as possible, stored to a buffer and processed onto the Excel worksheet (according with the <i>Initial Cell Address</i>) afterwards. This allows the fastest reading rates to be obtained. The number of readings to take is set by the "Stop after X readings" setting. Note. Due to the Excel timing constraints, selecting a high number of readings will take a great amount of time to process. Thus it is not recommended to set the "Stop after X readings" above 2500.		

5.6. Orbit Network Configuration



[Module Specific Settings](#)

This dialogue box allows you to add and remove Orbit modules on an Orbit Network. The modules in this list are the modules that will be read from Excel (in the same order as they appear on the list). Refer to the Orbit System manual for more details on configuring an Orbit network.

- Select the Orbit Network you wish to use from the Orbit Networks list.
- Add the Orbit modules that you wish to use by using one of the following buttons:

Button	Function
Notify Add	This adds the module whose probe reading changes (e.g. by moving the tip of a Digital Probe). Click "Stop Notify" to halt this process.
Find All Modules	This automatically polls the Orbit Network and adds any modules detected.
Add Module	This adds an individual Orbit module by its identity.
Load Network	This finds any modules stored in a previous configuration (stored in 'hotswap' T-Con memory).
Delete Module	This deletes the selected module from the Module list.
Clear Modules	This clears all modules from the Module list.
Clear TCons	Clears the 'hotswap' T-Con memory.

Added modules will appear in the 'Modules' list. Select an individual module from the list to view its details and available settings.

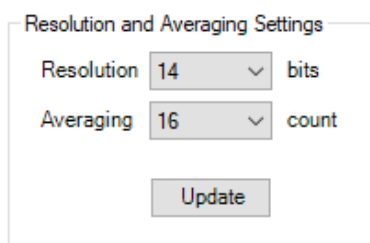
Note that the order of modules in this list can be changed using '*drag and drop*'.

5.6.1. Module Specific Settings

Once the modules have been added, their specific settings can then be altered. Note that different module types have different settings.

5.6.1.1.Digital Probes, AIMS and LT/LTH lasers

The following settings are available for configuring these modules:



Resolution and Averaging Settings

Resolution: 14 bits

Averaging: 16 count

Update

Button / Control	Function
Resolution	Select the module's resolution
Averaging	Select the module's averaging
Update	Updates the module with resolution & averaging selections

5.6.1.2.DIOMs

Digital I/O Modules (DIOMs) can be directly used with the Add-in.

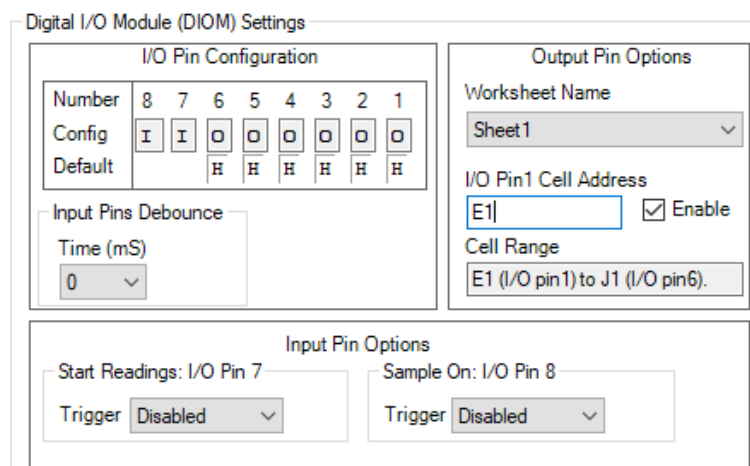
The DIOM is configured to have its 8 I/O lines **fixed** as:

- I/O Pins 1 to 6 are outputs (labelled as Config = 'O')
 - These can be mapped to Excel Worksheet cells to provide alarm outputs from a set of readings. See [Controlling DIOM Outputs](#) for details.
 - If multiple DIOMs are on the Orbit network, each module should not be configured to have I/O output pin mapping cells that overlap with another (i.e. two output pins that map to the same Excel cell).
- I/O Pins 7 & 8 are inputs (labelled as Config = 'I')

If more I/O pins are required, multiple DIOMs can be added to the Orbit network.

- However, if multiple DIOMs are used, ensure only one module is configured for the 'Start Reading' trigger and 'Sample On' trigger.

The following settings are available for DIOM modules:



Digital I/O Module (DIOM) Settings

I/O Pin Configuration

Number	8	7	6	5	4	3	2	1
Config	I	I	O	O	O	O	O	O
Default			H	H	H	H	H	H

Input Pins Debounce
Time (mS): 0

Output Pin Options

Worksheet Name: Sheet1

I/O Pin1 Cell Address: E1 ☒ Enable

Cell Range: E1 (I/O pin1) to J1 (I/O pin6).

Input Pin Options

Start Readings: I/O Pin 7
Trigger: Disabled

Sample On: I/O Pin 8
Trigger: Disabled

Button / Control	Function
Output Pin Configuration Default	Toggle the DIOM output pin's default state, by clicking the desired pin's Default state: high (H) or low (L).
Input Pins Debounce	Select the module's Input Pins Debounce time – see Orbit3 module manual for further details.
Output Pin Worksheet Name	The worksheet name to be used for DIOM output pin mapping
Output I/O Pin1 Cell Address	The Excel worksheet cell address for I/O Output Pin1. The other cells are listed in the "Cell Range"
Output Pin Enable Check Box	Enable the Output Pin functionality
Start Readings: I/O Pin 7	Disabled – off
	Low to High – a low to high edge on the I/O pin 7 will start readings
	High to Low – a high to low edge on the I/O pin 7 will start readings
Sample On: I/O Pin 8	Disabled – off
	Low to High – a low to high edge on the I/O pin 8 will sample a reading
	High to Low – a high to low edge on the I/O pin 8 will sample a reading

5.6.1.3.DIOM2

Digital I/O V2 Modules (DIOM2) can be directly used with the Add-in. These are an enhanced version of the [DIOM](#)

The DIOM2 differs from the DIOM in that it has **fixed** IO that provides:

- 6 inputs
 - labelled as Config = 'I'
- 4 outputs
 - labelled as Config = 'O'
 - These can be mapped to Excel Worksheet cells to provide alarm outputs from a set of readings. See [Controlling DIOM Outputs](#) for details.
 - If multiple DIOMs are on the Orbit network, each module should not be configured to have I/O output pin mapping cells that overlap with another (i.e. two output pins that map to the same Excel cell).

If more I/O pins are required, multiple DIOM2s can be added to the Orbit network.

- However, if multiple DIOM2s are used, ensure only one module is configured for the 'Start Reading' trigger and 'Sample On' trigger.

The following settings are available for DIOM2 modules:

Digital I/O Module (DIOM2) Settings

I/O Pin Configuration <table border="1"> <tr> <td>Number</td> <td>i6</td><td>i5</td><td>i4</td><td>i3</td><td>i2</td><td>i1</td> <td>o4</td><td>o3</td><td>o2</td><td>o1</td> </tr> <tr> <td>Config</td> <td>I</td><td>I</td><td>I</td><td>I</td><td>I</td><td>I</td> <td>O</td><td>O</td><td>O</td><td>O</td> </tr> </table>		Number	i6	i5	i4	i3	i2	i1	o4	o3	o2	o1	Config	I	I	I	I	I	I	O	O	O	O	Output Pin Options Worksheet Name Sheet1 I/O Pin1 Cell Address E1 <input type="checkbox"/> Enable Cell Range E1 (I/O pin1) to H1 (I/O pin4).
Number	i6	i5	i4	i3	i2	i1	o4	o3	o2	o1														
Config	I	I	I	I	I	I	O	O	O	O														
Input Pins Debounce Time (mS) 0																								
Input Pin Options Start Readings: I/O Pin i1 Trigger Disabled		Sample On: I/O Pin i2 Trigger Disabled																						
Active States <table border="1"> <tr> <td></td> <td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td>Inputs</td> <td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Outputs</td> <td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td> </tr> </table>			5	4	3	2	1	0	Inputs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Outputs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	I/O Configuration Output mode PNP	
	5	4	3	2	1	0																		
Inputs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																		
Outputs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																		

Button / Control	Function
I/O Pin Configuration Default	Displays the DIOM2 pin configuration
Input Pins Debounce	Select the module's Input Pins Debounce time – see Orbit3 module manual for further details.
Output Pin Worksheet Name	The worksheet name to be used for DIOM output pin mapping
Output I/O Pin1 Cell Address	The Excel worksheet cell address for I/O Output Pin1. The other cells are listed in the "Cell Range"
Output Pin Enable Check Box	Enable the Output Pin functionality
Start Readings: I/O Pin i1	Disabled – off
	Low to High – a low to high edge on Input pin 1 will start readings
	High to Low – a high to low edge on Input pin 1 will start readings
Sample On: I/O Pin i2	Disabled – off
	Low to High – a low to high edge on the Input pin 2 will sample a reading
	High to Low – a high to low edge on the Input pin 2 will sample a reading
Active States	Enable the active states (HIGH = checked, LOW = un-checked) for each input and output pin
Output Mode	Sets the output 'drive' for all outputs. Choose between NPN, PNP and TTL (logic). Refer to the Orbit3 module manual (DIOM2) for more details.

5.6.1.4.WCMs

WCM attached devices (e.g. Wireless Hand Tool) can be directly read via the add-in. The WCM Configurator application (part of the Orbit Support Pack for Windows) should be used to set up the WCM. Refer to the Orbit Module Manual (WCM Configurator Software section) for more details.

The WCM's device settings are viewed (as read only) as illustrated, next

Devices

#	Orbit Identity	Type	Name (up to 20 chars)
1	255ZK04308	WHT	
2		None	
3		None	
4		None	
5		None	
6		None	

Use WCM Configurator software (part of the Orbit Support Pack for Windows) to set up the WCM devices

This simply shows which devices are configured. If more devices are required, additional WCMs can be used.

Note that the WCM Disconnect Period setting is advised to be set at 0 (never disconnect). Refer to the Orbit Module Manual (WCM Configurator Software section) for more details.

See [Using WCMs](#) section for more details.

6. Using the Orbit3 Excel® Add-in

Please refer to [Examples](#) for typical usage.

6.1. Taking Readings

- Once the configuration settings have been chosen, select the 'Take Readings' button on the tool bar to start receiving readings from modules on the Orbit Network. The reading will be taken according to the configured [Sample On](#) setting.

- Click “Stop Readings” to stop, once already started.

6.2. Sample On

- If ‘Sample On’ has been set to ‘Timer’, or if the ‘Buffer Readings’ option has been selected, readings will automatically start once ‘Take Readings’ has been clicked.
 - Otherwise the selected keypress or DIOM / DIOM2 input will start the readings.

6.3. Controlling DIOM Outputs

If configured, a DIOM / DIOM2 output can be triggered directly from an Excel cell’s value. This can be from the result of a set of readings (e.g. to set a Limit alarm output).

For example, if I/O Pin 1 is mapped to cell “E1”, then setting the value of “E1” will cause I/O Pin 1 to change as follows:

Cell Value	Action
0	The DIOM / DIOM2 output will be set LOW
>0	The DIOM / DIOM2 output will be set HIGH
Empty	The DIOM / DIOM2 output will be set HIGH
Non-integer	A format error will be displayed.

Adjacent I/O Pins are mapped to adjacent cells. For example, if I/O Pin 1 is mapped to cell “E1”, then I/O Pin 2 is mapped to cell “F1”, I/O Pin 3 is mapped to cell “G1” – and so on.

See [Example5](#) and [Example6](#)

6.4. Using WCMs

The WCM can be configured to communicate with up to 6 wireless devices. Each device has a number of channels (e.g. 1 for a WHT). See [WCM Module Specific Settings](#) for configuration details.

When [Taking Readings](#), each configured device channel will use one column on the Excel spreadsheet. Therefore, the more devices & channels configured, the more Excel columns will be utilised.

If the channel is currently off-line (e.g. Tool off / battery flat / out of signal range), then the reading will be returned as “unavailable”.

Note that the WCM module has no reading itself (since it is a ‘gateway’ to the wireless devices) and is not displayed on the worksheet when taking readings.

7. Examples

The Orbit3 Excel Add-in install contains examples to help you get started. These examples are designed to show different aspects of the Add-In. After loading the example you will need to set-up the Orbit module(s) (refer to Orbit Network configuration).

Example 1

- Takes 5 readings from an Orbit module. A new reading is taken each time the spacebar is pressed.
- The individual readings are displayed in a table, together with the mean. The reading values are also displayed on a bar graph.

Example 2

- Automatically takes readings from any two Orbit modules every second.
- The readings are then placed in a worksheet called 'Reading', and a two column graph is shown on a worksheet called 'Graph'.

Example 3

- Automatically takes continuous readings from an Orbit module.
- The reading is placed in a cell in the worksheet. The Limits table allows you to enter your upper and lower limits. The graph shows a simple column display that changes colour (from red to green) when the reading is within limits.

Example 4

- A copy of the functionality of Example 1, with an added VBA macro button to save results. Note that this example is saved as a macro enabled workbook (.xlsm).
- The macro stores results to the MyDocuments area as a text file (Example4.txt)
- The macro code can be viewed in the Visual Basic editor.
- The visual basic editor is an integral part of Excel in the 'developer' tab. This tab needs to be enabled via a check box in 'Excel Options'.
- Note that because this spreadsheet uses macros, Excel may need its macro security changed.

Example 5

- A copy of the functionality of Example 3, with an added DIOM output (see [Controlling DIOM Outputs](#)) linked to the Alarm (Limit Error) calculation.
- The DIOM I/O pin1 goes HIGH if the mean reading is outside of limits (Alarm = 1) and LOW if OK.
- I/O pin1 could be wired to LED to indicate a pass / fail

Example 6

- A further example of using DIOM outputs (see [Controlling DIOM Outputs](#)) linked to the Limit Error calculations on the worksheet. This example illustrates some useful Excel spreadsheet functions .
- One DP module and a DIOM are used in this example. Two of the DIOM output pins are mapped to Excel cells.
- A set of readings (of the DP and DIOM) is taken. The DP readings are compared against a set limit.
- I/O Pin1 will track the **latest** reading to indicate greater than Limit. This is an example of **TRACKING** the Limit error status.
- I/O Pin2 will process **all** readings to indicate if any are greater than the Limit. This is an example of **LATCHING** the Limit error status.

8. VBA Access to the Add-in

It is possible to access some of the Add-in functions through the VBA (Visual Basic for Applications) Com interface. The available functions are detailed below. However, it is necessary to firstly set up the Orbit network via the Add-in's Settings as described in the [Editing Orbit Settings](#) section.

8.1. Available Functions

The following functions are available to VBA through the COM interface:

- **Connect** - Connect to Orbit – equivalent to clicking the “Connect” button.
- **Disconnect** – Disconnect from Orbit - equivalent to clicking the “Connect” button.
- **TakeReadings** - equivalent to clicking the “Take readings” button - this causes the reading set to start (As well as the keyboard interface, the application can be triggered by a COM Trigger Reading function).
- **StopReadings** - Stop collecting the set of data - equivalent to clicking the “Stop Readings” Button
- **TriggerReading** – programmatical alternative to trigger event in take readings mode (similar to space bar for triggering) - Note this will only work if not editing a cell.
- **Reset** - Resets the display of readings to the user configured start cell.
- **ZeroAllAsButton** - Zero all - equivalent to clicking “zero all” - this toggles the zero state.
- **ZeroAll(bool ClearZero)** - Zero all modules - this doesn't toggle. Instead, it requires a parameter identifying whether zeroing or clearing modules (true clears zero, false applies zero).
- **ZeroOne_ByNetAndIdx(int NetIdx, int ProbIdx, bool ClearZero)** - Zero (or clear zero) one Module addressed by its orbit network index and probe index (note 0 based not 1 based).
- **ZeroOne_ByIdx(int ProbIdx, bool ClearZero)** - Zero (or clear zero) One Module addressed as a module is a list of all modules.
Example, if there were two Orbit networks. Network 0 has 3 modules on it and network 1 has 2 modules on it. Thus, there are 5 modules in total. In order to clear the first module on network 1, it would be necessary to provide a list index of 3 (as the parameter is 0 based, not 1 based).
- **ZeroOne_ById(String OrbitID, bool ClearZero)** - Zero (or clear zero) One Module addressed by its Orbit ID
- **Int GetNumberOfModules()** - Returns the integer number of Orbit Modules available (set-up) on all Orbit Networks.
Example, if there were two Orbit networks. Network 0 has 3 modules on it and network 1 has 2 modules on it. Thus, there are 5 modules in total.
- **String GetModuleIdByListIdx(int ProbIdx)** - Returns a string containing the Orbit Identity of the Orbit module at the desired list index.
Example, if there were two Orbit networks. Network 0 has 3 modules on it and network 1 has 2 modules on it. Thus, there are 5 modules in total. In order to obtain the Orbit Identity of the first module on network 1, it would be necessary to provide a list index of 3 (as the parameter is 0 based, not 1 based).

8.2. How to access the functions in VBA

Functions within the Add-in can be accessed through the VBA interface by getting a reference to the com object. An example of the VBA code is shown, next:

```
Sub CallVSTOMethod() 'procedure call
    Dim addIn As COMAddIn 'Storage object for the COM Assembly
    Dim automationObject As Object 'COM interface class which contains the functions
    Set addIn = Application.COMAddIns("Orbit3 Excel Add-in") 'Get Reference to the assembly
```

```
Set automationObject = addIn.Object 'Get reference to instance of class with the orbit functions
automationObject.Connect 'Call functions in the library (Connect to orbit)
automationObject.TakeReadings 'Call functions in the library (Start Taking Readings)
automationObject.TriggerReading 'Call functions in the library (Trigger a read of a set of data)
```

End Sub

Notes

- Ensure that the *exact* name shown in this section is used:
 - Application.COMAddIns("Orbit3 Excel Add-in") – otherwise, the add-in will not be found and a Visual Basic error will occur.
- Multiple calls to the 'Application.COMAddIns' will not result in multiple instances, only references to the original object.

9. Compatibility

9.1. Windows OS and Office Versions

This table details which versions of Windows and Excel work with the Orbit3 Excel Add-in.

Windows OS Version	Office 2003 ¹	Office 2007	Office 2010	Office 2013 & later
Windows 7, 32-bit	✗	✓	✓	✓
Windows 7, 64-bit	✗	✓	✓	✓
Windows 8.x, 32-bit	✗	✓	✓	✓
Windows 8.x, 64-bit	✗	✓	✓	✓
Windows 10, 32-bit	✗	✓	✓	✓
Windows 10, 64-bit	✗	✓	✓	✓

1. Microsoft support for Office 2003 ended April 8th 2014
2. Office 2013 and later not supported on this Operating System

9.2. Orbit Modules

This table details which Orbit Module Types work (and their associated functionality) with the Orbit3 Excel Add-in.

Module	Reading	Zeroing	Extra Functionality ¹	Not implemented Functionality ²
Digital Probe	✓	✓	Resolution & Averaging	-
Orbit LT Lasers	✓	✓	Resolution & Averaging	Laser Beam off/on
Orbit LTH Lasers	✓	✓	Resolution & Averaging	Laser Beam off/on, Low pass filter ³ , Level cut time ³
Linear Encoder (LE)	✓	✓	-	Preset, Reference Mark
Digital Input Output Module (DIOM)	✓	✗	Input & Output functionality. Input Debounce	-
Digital Input Output Module V2 (DIOM2)	✓	✗	Input & Output functionality. Input Debounce	-
Digimatic Input Module (DIM)	✓	✗	-	ReadOnSwitch, ReadOnSample Read Modes
Encoder Input Module (EIM)	✓	✗	-	RefAction, Quadrature and Encoder Modes
AIM (Voltage / Current)	✓	✓	Resolution & Averaging	-
AIM (PT100)	✓	✓	Resolution & Averaging	-
Wireless Connection Module (WCM)	✓	✓	Channel Readings	WCM Configuration

- 1 This column details the modes / functionality of this Orbit Module type that **are** available via the Excel Add-in.
- 2 This column details the modes / functionality of this Orbit Module type that are **not** available via the Excel Add-in.
- 3 These settings for the LTH type lasers can be set via OrbitLibraryTest software (part of the Orbit3 Support Pack for Windows). Note that these settings are non-volatile (i.e. still retained after a power off/on cycle).

9.3. Orbit Controllers

This table details which Orbit3 Controllers work with the Orbit3 Excel Add-in.

Controller	Compatibility with Excel Add-in
USBIM	✓
RS232IM	✓
ETHIM	✓
WIM	✓

10. Differences between the Orbit3 and original Orbit Excel Add-ins

10.1. Introduction

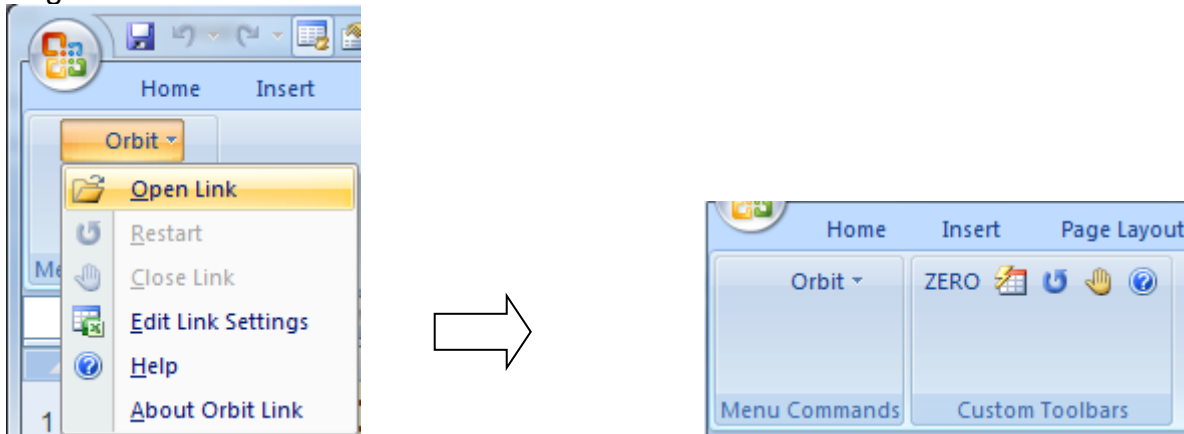
This section is only relevant for users familiar with the original Orbit Excel Add-in. It details a list of the differences between the two versions.

At its core, the Orbit3 Add-in uses the Orbit Library, rather than the legacy (no longer supported) Orbit dll that is used by the original Orbit Add-in.

10.2. User interface

The user interface has changed considerably. The older add-in used a two-stage tool-bar menu system:

Original Orbit Add-in:



The Orbit3 version has one menu:



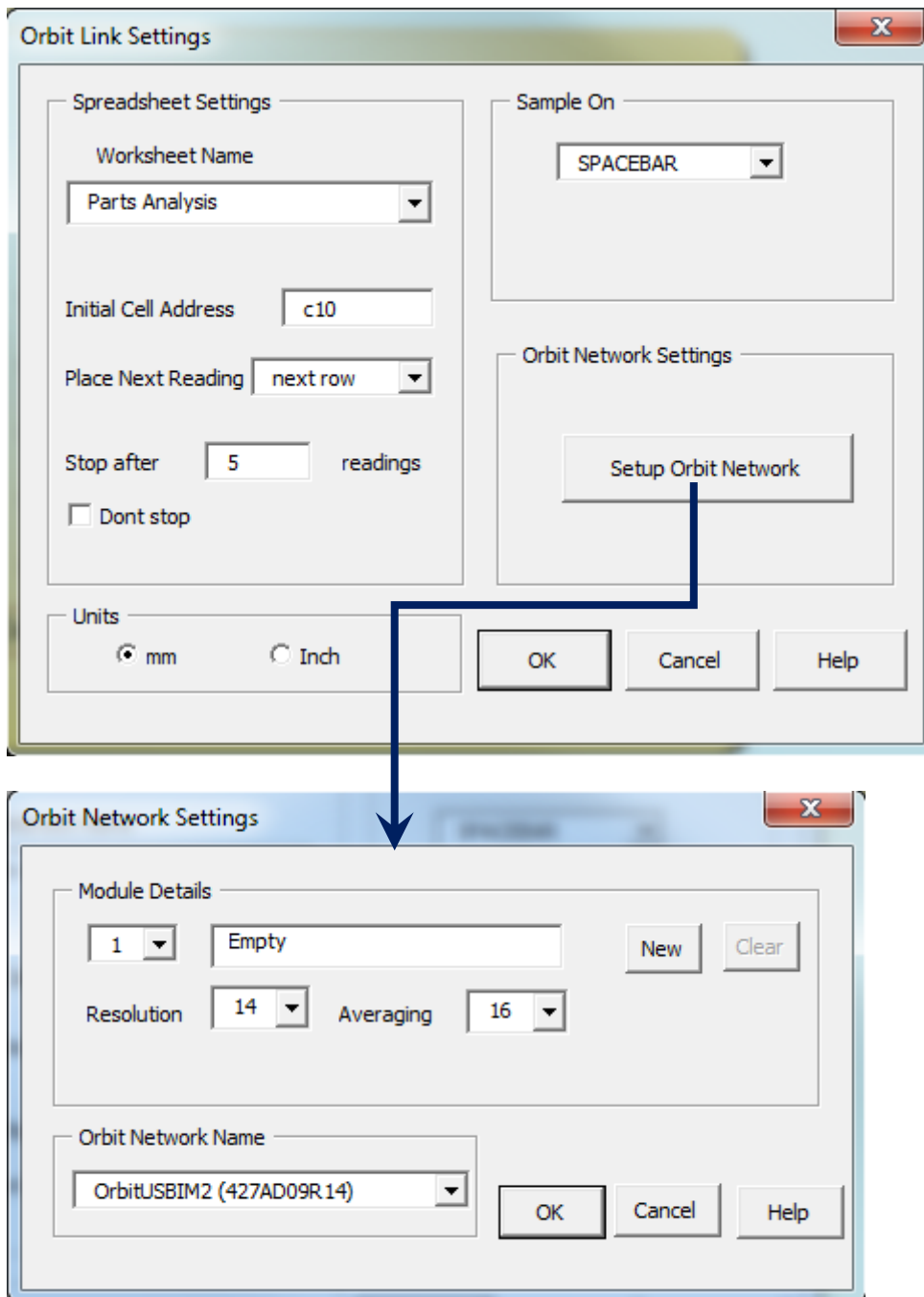
The functionality is the same but we no longer have the concept of a 'Link'. The user clicks on the Connect button which causes the application to search for available Orbit networks and modules.

The new add-in no longer has a help button. Where required there are hints that appear when the mouse is moved over an item.

10.3. Changing settings

Both versions of the Excel add-in have similar Windows dialogs for making configuration changes:

10.3.1.Original Excel Add-in



10.3.2.Orbit3 Excel Add-in

The new Excel Add-in uses tabbed pages to switch between spreadsheet and Orbit network configuration settings (as detailed in the [Configuration](#) section)

Whereas the Excel Spreadsheet settings screen is very similar to the older Excel add-in, the Orbit Networks settings screen offers an easier view of all available Orbit networks and the modules on each of them. This information is displayed within two adjacent list boxes that resize with the window. Additionally, there exists a splitter bar between the two lists allowing the user to adjust the width of both to suit the contents.

New functionality added here:

- When a module is added to an Orbit network, its type is displayed in the Module Type box that also updates to reflect the module type of the currently selected module from the module list.
- A tick box indicates if the selected module supports Read Burst mode.
- Read Burst mode is now supported and will be used by default unless one or more modules on a network don't support it, in which case this Excel add-in will revert to a more compatible Read method.
- A drop-down box has been added where warning messages may be displayed. Warnings will typically be an indication that a certain mode of operation such as Read Burst mode is not supported by one or more modules on a specific Orbit network. With no issues the word "None" will be displayed. The first warning in the list will be displayed; others may be viewed by clicking on the down arrow.
- 'Find All Modules', 'Load Network', 'Clear TCons' and 'Add Module' buttons have been added to perform the specified actions.
- To change the order of modules on a network a drag and drop mechanism has been implemented. First click anywhere within the Module list and then click and hold the left mouse button on the module to be moved. All the time the mouse button is pressed, the selected item may be dragged to the desired position in the list. Releasing the mouse button will perform the actual move - provided that the mouse pointer is within the module list. Note: Pressing the *Escape* key will cancel the drag and drop operation.
- The Update button, when clicked will write the 'Resolution' and 'Averaging' values (selected by using the two drop-down boxes) to the currently selected module. As per the older add-in, these values are stored in the worksheet settings and are re-applied when this is re-opened (after being saved). The currently selected module's resolution and averaging values are selected and displayed in the respective drop-down boxes.
- The counts of both the available Networks and the modules connected to these networks are displayed underneath the respective lists. Any configured modules not found (i.e., not plugged in) are marked as "unavailable" and do not contribute to the connected count.
- The Delete Module button allows the user to remove the selected module from the currently selected Orbit network. This matches the functionality of the Clear button in

the older add-in, but has a more descriptive label to differentiate it from the Clear Modules button described next. As per the older add-in, the user may undo this delete by clicking on the Cancel button.

- The Clear Modules button prompts the user if they wish to remove all modules from the currently selected Orbit network. As per the older add-in, the user may undo this delete by clicking on the Cancel button.
- The Refresh button will update the list of modules to reflect the current status. This is useful if modules are either connected to Orbit networks or disconnected from them whilst within this settings dialog window. For example, modules unplugged whilst in this dialog window will have their descriptions updated with the word “unavailable” after this Refresh button has been pressed. Closing the Configuration dialog window and re-opening it will have the same effect.
- It is now possible to display the Orbit Module Ids as headers of the reading rows/columns.
- For informational purposes, the version of the software Orbit Library being used is displayed at the bottom left of the dialog window.

The new add-in has a set of buttons much the same as the older Excel add-in:



The main difference is that they have a textual description and the Connect button acts as a toggle to switch between connect and disconnect.

10.4. Other improvements/differences

- If the user is editing a spreadsheet cell i.e., the cell is in edit mode, this prevents any of the add-in buttons for the old Excel add-in from responding. The new add-in will take the cell out of edit mode and respond to the button press.
- Handling of Orbit networks (e.g. USBIM's) either not plugged in or identified by the computer is handled differently with the new add-in. The old add-in can crash under certain conditions such as clicking on the Ok button instead of the Cancel button, and if no networks are connected it can just crash altogether. The new add-in will display a list of missing networks and give the user the option to remove them from the configuration if they are no longer required. Missing network modules not removed from the configuration will be marked as “unavailable” in the network list.
- Option to connect to WIM Orbit controllers included.
- The 31 module limit per network does not apply to the new add-in.

- The new add-in does not display error codes for faulting module conditions. Instead, textual descriptions of the issues are displayed in the cell where a module's reading would have been placed.
- The new Excel Add-in does not use the VBA project object model. This means there are no requirements to set macro settings in Excel's Trust Center or to save workbooks as Excel Macro-Enabled (*.xlsm) files.
- Creating a chart on a separate Excel tabbed page by selecting a range of worksheet values and pressing the F11 key causes the legacy VBA add-in to close. The new add-in works as expected.
- Configuration Options to include Module Identity Headings, Time Stamps and Buffer Readings added – see [Spreadsheet Configuration](#) section.

11. Revision History

REVISION	DATE	COMMENTS
1	10/07/15	Initial issue
2	23/07/15	Orbit Modules & Orbit Controllers Compatibility tables added.
3	04/08/15	Added Documentation cross reference , WIM controller connection and updated Installing the Orbit3 Excel® Add-in section
4	29/09/15	Added Date/time stamp and Buffer readings options in Spreadsheet Configuration section . Updated Installing the Orbit3 Excel® Add-in section.
5	19/05/16	Added VBA Access to the Add-in section.
6	25/10/16	Updated Installing the Orbit3 Excel® Add-in .
7	22/10/18	Added DIOMs & Examples 5 & 6
8	15/11/18	Added WCMS
9	06/03/18	Added DIOM2