

# Instruction Manual Installation of new nodes

Part Number Instruct-Nodes

Revision				
Number	<b>Revision</b> Date	Approved by	Signed off by	Comments
Rev 0	20 <sup>th</sup> Mar 2016	JMA	MAS	
Rev 1	16 <sup>th</sup> Sept 2016	JMA	MAS	Change part number of demo kit to 30150 to 35150. Removed myUserMain.py from list of bullet items to be saved in Portal. Changed document header



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#### **1.0** Preparing new nodes to be entered onto the network

Install Portal onto the PC or laptop – information on how to obtain Portal and how to install it can be found in two manuals;

Instruction Manual - Demonstration Kit - Part Number 35150 Instruction Manual - Portal – Part Number Portal GUI

Ensure the site controller has been configured prior to starting the following procedure and is connected to the network.

Setting Up Site Controller Manual – Part Number 30500

Start-up Portal and connect a snap stick to the PC or laptop as described in the Portal Manual.

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The site controller will be visible in the Node View window, as shown above 'RebootState'. This could have a different name so check the network ID of the device to ensure it is the site controller. The name of the site controller can be changed at any time by going to the 'Rename Node' to the left of the red X in the Node Info window.



The external nodes can now be programmed through Portal.



Make a note of the type of node it is (example Model: SM220).

Make a note of the last six digits of the MAC address of the node you wish to connect to the network and is to be reprogramed.

The MAC address in this case;

001C2C1B2606A7AB

The node address for the network is the last six digits of the MAC address; In this case – '06A7AB'

As the nodes are programmed check the site controller ':~\$ nodes' folder to check for the correct network address and ':~\$ revNodes' for the correct designation and network address which the nodes have been allocated. This will be covered later in the manual.

For node designations see section 'Examples of Device Designations'

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### 2.0 Finding a Node

If the node does not appear automatically in the Node View window of Portal, use the Broadcast PING icon to locate the node(s) on the network.

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Once the node has been correctly identified, in this case *Node* 8 with a network address of *06A7AB* the programming can commence.

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In the above screen shot, there is no entry in the 'Device Image' section of the 'Node View' window – no snappyImage has been load yet. A snappyImage is the program that contains the instruction code for the node.

Only when a '*snappy Image*' has been loaded into the node will there be an entry in this column, this will be covered in the next section – '*Load a Snappy Image*'.

The Line Quality is the signal strength reading of the node to the Snap Stick, this should always be as high as possible. The percentage rating can be changed to a dBm reading – see *Instruction Manual - Portal – Part Number Portal GUI* for customisation

#### Note:

By using AMEREX Integrated Signal Strength meter a LQ reading in the field during the site survey will determine where the nodes can be situated and installed.

See Instruction Manual - Demonstration Kit - Part Number 35150 on the use of the AMEREX Integrated Signal Strength Meter.



#### 3.0 Load a *Snappy Image*

Go to <u>www.Amerex-Monitoring.com/documents/Downloads/Portal</u> to download the following files which should be saved in; '.....\Documents\Portal\snappyimages' folder of the PC you are using.

- Amerex.py
- myLQRanger.py
- SMswitch.py

Save the following files on your desktop – for later use

- Info.txt (this file contains information on the various files above and need not be saved in the SnappyImages folder.)
- myUserMain.py

To load a Snappy Image onto a node, go to the 'Node Info' window and click on the icon with a scroll and upward pointing arrow. This is the Upload Snappy Image icon.

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Click on the icon and new window will appear showing all the Snappy Images which have been loaded in the Portal when installed.



The downloaded snappyImages from our web site must be loaded into the snappyImages folder which can be found at (for example)

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If you have written a new Snappy Image which you wish to install in the node ensure it has been saved in the correct location

.....\Documents\Portal\snappyImages

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The address ...\Portal\snappyImages will be different on other PC's and laptops.

If you are unable to locate the folder Snappy Image, carry out a search using the Windows Search facility.



With snappyImage window open select the Snappy Image you wish to down load by clicking on the snappyImage (in this case SMswitch2.py) and press OK

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Once you have pressed OK the down load window shall appear showing the progress of the download

After the download has been completed the Node Info window will show the Snappy Image with a 'Device Image' name, in this case is SMswitch2.

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On the right hand side of the 'Node Info' window drop down menus show the programs that have been downloaded for this particular snappyImage.

In the Node View window – left side of the above screen shot, the Device Image has been up dated to the Node Info window (SMswitch2).



#### 4.0 Naming and Loading the Node into the system

To add a node to the system.

Click on the node in Node View, then select the gear wheel icon in the command line of the Node Info window you wish to interrogate.

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RT001	06.A7.98		67%	None	2016-03-29 12:40:27	NV PARAM Node5	Mesh	Routine 5000			attorm:	SM220	AMET-GEUSTICA		
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					2016-03-29 12:40:28						_		0) Builde		
					2016-03-29 12:40:28	Device Type									
					2016-03-29 12:40:28	Feature Bits	0x001F								
					2016-03-29 12:40:28	t.					200				
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						•		0x0020 Enable external pos	wer-down output	ut					
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						Platform	SM220								-Batt
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eavy		-				www.	sympose-wirele	ISA.WIII				CO IN QUEVERY	Connected: Steep Sticke (Solide	ć	

Click the gear wheel icon and a window shall appear requesting the node details. Select 'Device' tab.Enter the node name, in this case DS010 and enter

<b>(</b> )				Synapse Portal: d	efault.swn -	Workspace	C:\Users\Joh	Martin\Docu	uments\Por	tal		- D' ×	
File View Options	Network Help												
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Node Views					DS2	- Configurat	tion Paramete	rs		<			
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Node	Network Address	Device Image	Link Qual	Vendor Config Bits	0x0010								
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SnapStick	05.F5.47	SnapStick	70%	Davise Name							SM220	<u>amerex2</u>	
The second secon	06.A7.A8	SMswitch2	76%	Device Ivanie	DS2					ddres	ss: 06.A7.A8	BuiltIn	
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the Device Type, in this case SM220.



If you wish to add a new device name ensure the device two letter designation has been set up in the site controller. This is covered in 'Setting up the Site Controller' manual.

If the node has an external antenna click on click the 'Vendor Config Bits' line and enter '0x0010'. We recommend the 'Reboot After Apply' tick box is ticked at all times and for every node.

Press 'OK' and return to the main Portal screen. If the node does not have an external antenna close the window and return to the main Portal window.

(See location of external antenna connection below)





### 5.0 To assign a new device designation

Tera Tera File Education	Term - [disconnected] VT <b>dit Setup Control Window Help</b>									÷	- 6	a x
		Tera Term: New connection					×					
		● TCP/IP	Host: Service:	172.16.12.248 ☑ History ○ Telnet	TCP po SSH version Protocol:	ort#: 22 : SSH2 UNSPEC	>					
		○ Serial	Port: OK	Cancel	Help		~					
												~
	Search the web and Windows		<b>()</b> ()	x I	🖳 😋 🧔	1	95%	<b>• •</b> •	<i>(</i> [, c]))		ENG US	12:12 30/03/2016

To set a new designation in the site controller connect the PC or laptop to the site controller as previously described in 'Setting up Site Controller'

Log-on to the site controller via Tera Term com port or via the IP address and login to the site controller in the example above we have chosen to connect via the IP address. Press OK





Your PC/Laptop is now connected to the site controller.

Remember to use the Supervisor stop and restart command prior to changing, adding or modifying the site controller programming.

sudo /etc/init.d/supervisor stop

To create a new designation simply decide the two letter designation. We suggest the new designation is relevant to the device being added for example, a Hose Reel - HR.





Enter the following 'sudo nano HR' and press enter. The Tera Term editor window will appear. Type in 'ddd' and or 'a' which are required for this new designation. The data string entered here will depend on the type of node you are using for the particular application.



The 'd' is for a digital input on/off and 'a' is for an analogue input 4-20mA. For example 'ddd' which would be for the hose reel - door open, pressure ok and the hose activated, this makes three digital inputs.

#### **Data String Matrix**

Board type	Part No.	Description			Data	string p	ossibilities	
AME1	30112	3 digital inputs	d	d,d	d,d,d			
AME7	30110	1 analogue and 3 digital inputs	а	a,d	a,d,d	a,d,d,d		
AME4	30109	2 analogue and 4 digital inputs	а	a,a	a,a,d	a,a,d,d	a,a,d,d,d	a,a,d,d,d,d
AME5	20115	5 analogue and 8 digital inputs	Any	comb	ination	of 5 analo	gue and 8 d	ligital inputs

Possible combinations of analogue and digital inputs for each board type.





Continue this process for any and all new device designations.

Once all the designations have been saved in the site controller and all changes have been made restart 'supervisor'

sudo /etc/init.d/supervisor restart

#### **Populating the Site Controller**

Once a node has been set-up in Portal (example DS010) click on DS010 and go to 'Node Info' window. On the right hand side of the 'Node Info' window click on the '+' beside the '<u>SMswitch2</u>'. A drop down menu will appear, click on '<u>getData(asciisrc)</u>'.

A small window will appear asking for the ID of the node enter the node ID for the device. Type in the Network address in our example '06a7ab'. It must have the ' ' in the window at the start and end of the node ID. Press OK.



Once the all the nodes, or if it is a large system, a portion of the nodes have been loaded, check via *sudo filechecker.py* in Tera Term there is no error in the number of files between '*nodes*' and '*revNodes*'.

If there is an error check the '*nodes*' and '*revNodes*' folders either by WinSCP or Tera Term to locate the problem. Check the number in each folder, their two letter designation and number, for example DS010 (these reside in revNodes) and their Network ID / Address, for example 06a7ab (these reside in nodes)

Resume the up-loading of the node information once the issue has been resolved.

Repeat the above procedure for all the nodes you wish to connect to the mesh network. The site controller will automatically write the node name and other information to various folders and associated folders.

As the nodes are programmed check the site controller folders; ':~ \$ nodes' to check for the correct network address and ':~ \$ revNodes' for the correct designation and network address you shall be allocating the nodes.

Once the nodes and site controller(s) have been configured they are ready for deployment into the field as per the results of the site survey.



#### Family of Boards.

AMEREX Integrated have a family of nodes, the most popular being;

Part Number 30112			
Three Digital Node	3 x Digital inputs		
	1 x Relay (Dry contacts) output		
	1 x LED		
Part Number 30110			
Single Analogue Node	1 x Analogue input (4-20mA)		
	2 x Digital inputs		
	1 x Monitored Digital input		
	1 x Relay (Dry contacts 200mA) output		
	1 x LED		
Part Number 30109			
Dual Analogue Node	2 x Analogue (4-20mA)		
-	2 x Digital inputs		
	2 x Monitored Digital input		
	4 x Relay (Dry contacts 3 Amps d.c.)		
	output		
Part Number 30114			
Dual Analogue Node	5 x Analogue (4-20mA)		
	8 x Digital inputs		
	16 x Relay (Dry contacts3 Amps d.c.)		
	output		

Note – Not all the inputs need to be used, if they are not required do not enter any 'a's or 'd's in the data line.

When contacting AMEREX Integrated regarding a new designation please state the following;



#### **Digital - Example of device information using 30112**

Designation Letters	HR
Range of devices	1 to 999
Data	ddd

#### Analogue - Example of device information using 30110

Designation Letters	GD
Range of devices	1 to 999
Data	addd

#### Analogue and Digital - Example of device information using 30109

Designation Letters	
Range of devices	
Data	

FT 1 to 999 aadddd

#### Analogue and Digital - Example of device information using 30115

Designation Letters Range of devices Data PH 1 to 999 aaaaadddddddd

The number of data points will depend on the module being employed.



### 6.0 Command Codes used in Tera Term/Site Controller

Some of the codes require the prefix '*sudo*' prior to the command instruction. The following commands will include the prefix if required. The commands are case sensitive.

Useful Commands		
Command Code	Description	
sudo python myUserMain.py	Runs the main program for the entire	
	system and sends data back to the	
	AMEREX-Integrated server.	
sudo nano 'filename' example	Creates a file 'filename' and launches	
sudo nano EN001	program editor.	
sudo touch 'filename' example	Creates a file 'filename'	
sudo touch EN001		
cat 'filename' cat EN001	Reads the data within the specified	
-	filename.	
ls	Lists the files and or folders within the	
	current folder.	
ifconfig	Shows information on the state of the site	
1	controller and connection to the internet.	
cd	Steps back one folder (remember the space	
. 1	between the cd and the double dots).	
cd ~	Return the user back to the nome directory	
cd Tolder name	Changes the folder or directory to folder	
audo mu 'filonomo'	This deletes the fileneme	
sudo miliename	This deletes the Intename.	
sudo mkdir folder name	Makes a folder.	
sudo rindir Tolder name	Kemoves folder.	
cd/media/ramorive	Looks at the data that has been sent to the	
Amou up and amou down	These laws ship through the last commands	
Arrow up and arrow down	intered	
audo /ata/init d/aunamigar ston	Stong 'supervisor' program to allow the	
sudo /etc/init.d/supervisor stop	user to modify the site controller program	
sudo /atc/init d/supervisor restart	Restarts 'supervisor' program to after the	
sudo /etc/mit.u/supervisor restart	user modified the site controller program	
sudo en 'filename' /folder	Moves folders in Tera Term if access is	
nath/file name	denied in Win SCP	
Example sudo en suprise gif		
/usr/share/monkey/sunrise oif		
Example sudo cp sunrise.gif /usr/share/monkey/sunrise.gif		



#### 7.0 Specifications – Site Controller

OS	Ubuntu 14.04 LTS, Linux kernel 3.10.17
CPU	Freescale i.MX 6 featuring ARM® Cortex-A9
architecture (800 MHz)	
Flash	4GB eMMC
RAM	512M DDR3, 400MHz
Network	10/100 Ethernet, WiFi, SM220
USB host	USB 2.0 Type A (host)
USB client	1 micro B – Serial USB - SiLabs CP2102
Operating Temperature	-40C to 70C* UL certified for 65C maximum
operating temp	
Board Size	15.5cm x 9cm x 2cm
Input Voltage	11-26V DC from an approved FM panel
	AC power supply sold separately – non-FM
approved system	
Options	
Cellular Option	Internal cell modem
Storage Expansion	uSD –internal
LEDs / Buttons	4 (programmable)
LEDs	3 Buttons (programmable)

\*When running an application that demands unusually intensive CPU/Memory resources at 70C, the temperature on the processor core might reach up to 90C resulting in performance degradation. For more information, see http://cache.freescale.com/files/32bit/doc/app\_note/AN4579.pdf.

Barrel or DC Input	Min	Typical	Max	Units
Input Voltage (DC)	11		26	V
Input Current	0.13		1	Α
USB A Port (output)				
Supply Voltage	4.75	5	5.25	V
Supply Current			500	mA





#### 8.0 Examples of device designations

Item No.	Description of node	Designation ID	Node data
			d=digital
			a=analogue
1	Fire \Extinguisher	FE	dd
2	Gas detector	GD	add
3	Priority (ZV example for Sprinkler Valve	ZV	d
4	Clean agent	CA	addd
5	Alarm panel	AP	ddd
6	Door switch	DS	d
7	AMEREX Integrated Camera	TV	ddd
8	OS&Y valve	OS	ddd
9	Fire Alarm Panel	AP	ddd
10	Post indicator valve	PO	dd
11	Carbon Dioxide	CO	add
12	Foam monitoring	FM	aaddd
13	Fire tank	FT	aadddd
14	Hydrant	HY	dd
15	Skid	SK	aadddd
16	Pull switch	PU	d
17	Remote fire extinguisher	EN	dd
18	Novec monitoring (control room)	NM	dd
19	Butterfly Valve	BV	dd
20	Fire Water Tank	FT	aadddd
21	Fire Hydrant	HY	d
22	Remote Skid	SK	aadddd
23	Pump House	PH	aaaaadddddddd
24	Chiller	СН	dd
25	Electrical Switch Board	SB	dddd
26	Air Conditioning Unit	AC	dd
		d=dig	gital a=analogue

The above is a list of example designations, if the type of equipment is not on the list above please notify <u>jallison@amerex-fire.com</u> and the new designation will be added to our data base.