SMA Cluster Controller

Inverter summary

Inverter Manufacturer	SMA
Inverter Model	All Modbus models
Inverter Size	All sizes
RS485 Interface	None
Maximum number of inverters connected to a single SPLASH Monitoring STREAMbox	75 (assumes CLCON-10)

List of parts required for connection of inverter to SPLASH Monitoring

To enable you to connect the above inverter to SPLASH Monitoring you will need a SPLASH Monitoring STREAMbox and connection cables, these parts are listed below:

Part description	Part number
Cluster Controller Model	CLCON-10 or CLCON-S-10
SPLASH Monitoring STREAMbox	SBoxS2
Connection cable STREAMbox to Cluster Controller	None
Connection cable STREAMbox to clients router or LAN	Part numbers SM CAT5 1m – 1m CAT5 cable SM CAT5 2m – 2m CAT5 cable SM CAT5 5m – 5m CAT5 cable SM CAT5 10m – 10m CAT5 cable
USB Serial Adapter (Splash model)	None

Installation Guidelines

We have found that the most reliable long-term results are achieved when the STREAMbox, and its power supply is installed well away from daily operational areas. The problem is that the loss of the Splash Monitoring service is not immediately obvious, so it can be many days or weeks before someone realises that their system is not being updated. We are in the process of developing a mechanism to detect the loss of communication which optionally sends an email alert to one or more nominated recipients, but it is always prudent to minimise the risk of disruption by following these guidelines:

- If possible install the equipment and power supplies well away from daily operational areas such as someone's desk or work bench.
- Try and secure the equipment by attaching it to a wall or shelf with screws, Velcro or double sided tape. This should prevent it from slipping and becoming disconnected.
- Always secure the STREAMbox power cord to the STREAMbox using the P clip supplied. The P clip should be located on the side of the STREAMbox using the mounting pannel screw, as illustrated:

- Always ensure the LAN cables you use are in sound condition with their retaining clips intact, and make sure they are securely fitted to the equipment by giving them a gentle tug.
- Always ensure that all cables are secured using cable ties to protect them from accidental snagging.
- Never stretch cables to the point where any movement could cause them to become dislodged.
- The equipment and power supplies should be labelled 'DO NOT SWITCH OFF', but you should inform people with access to the installation area that this equipment should not be turned off; for example cleaning and maintenance personnel.

Setting Up Your STREAMbox and Cluster Controller

This section is intended as a quick guide to setting up Splash Monitoring and assumes your inverter is already connected to the PV panels and grid/batteries, and where necessary programmed according to your requirements. For more details please refer to the Inverter User Manual.

Basic Connectivity

New Schematic Needed

The diagram above shows the connectivity between the various devices. The connections are:
1 – CAT5 or CAT6 LAN cable between the Cluster Controller and your Network Access Device
2 – CAT5 or CAT6 LAN cable between the STREAMbox and your Network Access Device

Network Access Device: This may be a Router, ADSL Modem, Switch or other network device connected to the Internet.

NOTE: If you connect the Speedwire module from inverter n to the Speedwire module on inverter n+1 and then to the Cluster Controller (ie. daisy-chain the inverters and Cluster Controller together, aka "line topology") you will not be able to detect the data from any inverter that is down stream from any inverter that is shut down for whatever reason. So for those inverter types that shut down when there is insufficient solar energy, they will shut down the daisy chain to all other inverters down stream of it. See "SMA SPEEDWIRE FIELDBUS" document for further details.

You should NOT connect any part of the Speedwire network to your LAN.

Setting Up Your STREAMbox

Unless the STREAMbox has already been configured according to your specifications, it will be configured to acquire a DHCP IP address from your router or DHCP server. For most domestic applications this will work without any modification. However, if you do need to change its settings see below for guidance.

Setting Up Your Cluster Controller

Please refer to the Cluster Controller manual for instructions on how to change the settings.

The Cluster Controller must be assigned a fixed IP address within the Router's network range, but outside its DHCP range. For domestic routers their IP addresses are often in the range 192.168.1.1 to 192.168.1.254 or 192.168.0.1 to 192.168.0.254 and very ofter the Router itself occupies either 192.168.1.1 or 192.168.1.254 and the DHCP range is ofter 192.168.1.100 to 192.168.1.199 (in the 192.168.1 range).

So in the above example we would set the Cluster Controller's IP address to 192.168.1.210, and both its Gateway and DNS address to the Router's IP address.

It is very likely we will have already spoken to you about this and set up the STREAMbox to look for the fixed IP address assigned to the Cluster Controller. If not you will need to set up the STREAMbox on your LAN and call us to configure it remotely.

Trouble Shooting:

"No Stream Found" on the SM Web site:
This is because the web site hasn't received any data from the STREAMbox.

- Some SMA inverters will not respond if there is no DC power from the PV panels, so setting up your STREAMbox for the first time at night will not work.

- Allow at least 10 minutes after powering up the STREAMbox before starting your diagnostic checks.

- Check the connections between the STREAMbox and your router and ensure you have a solid green light at the top right of the RJ45 LAN socket and a flashing green light at the top left of the socket.

- No solid green light could indicate: the STREAMbox is switched off, check the power lights on the front of the STREAMbox, both top and bottom LEDs should be illuminated.

- Check the router is powered up; the LAN cable is connected to the router; the LAN cable isn't faulty. To eliminate the LAN cable and router, connect the LAN cable to a known working device like your laptop or PC and if you can get a web session, then the LAN connectivity is OK.

- Check the connection between the Cluster Controller and the Router, and in particular check the LAN cable is plugged into either port X13 or X14. This can be particularly confusing since there are may other RJ45 LAN style ports on the Cluster Controller.

- Check the CAT5/CAT6 connection from the Speedwire Data Module on the inverter(s) is connected to either port X9 or X10. Again this can be particularly confusing since there are may other RJ45 ports on the Cluster Controller

- Try power cycling the STREAMbox – switch it off, wait 5 sec, switch it back on.

- Try logging on to the STREAMbox: enter "splash" in your web browser's address line, or if your STREAMbox has a fixed IP address, enter that into your web browser. For instructions on how to use the STREAMbox's 'Web Information Page' go to http://www.splashmonitoring.com/assets/SM-STREAMbox-Web-Information-Page.html

- The most common issue we encounter is the site's network firewall not allowing outbound traffic. This is rarely an issue with domestic routers, but very common in managed commercial networks. Unless you have someone you can ask (like a network administrator) a good way to detect this issue is to log onto the STREAMbox and run a 'Healthcheck' report. This will give you lots of information including whether the STREAMbox can 'see' the internet.

- The STREAMbox is not able to work with a proxy server. If you have a proxy server you will need to make special arrangements with your network administrator to have the STREAMbox circumnavigate it by issuing a fixed IP address with appropriate privileges.

Model Numbers:

Because the STREAMbox can currently transmit only numbers we have had to code the model numbers so that the number before the decimal point represents the SMA device class, followed by the numerical model variant after the decimal point . The numerical code is derived from the following table:

SMA Device Classes:

Class	Device
1	Solar inverters
2	Wind turbine inverter
3	Battery inverter
4	Consumer
5	Sensor system in general
6	Electricity meter
7	Communication products

Type	model number
1	STP 10000TL-10
	STP 12000TL-10
	STP 15000TL-10
	STP 17000TL-10
2	SB 3000TL-21
	SB 4000TL-21
	SB 5000TL-21
	SB 3600TL-21
3	SB 3500TL-JP-22
	SB 4500TL-JP-22
4	STP 20000TLEE-10
	STP 15000TLEE-10
5	SB 2500TLST-21
	SB 3000TLST-21
6	STP 12000TL-US-10
	STP 15000TL-US-10
	STP 20000TL-US-10
	STP 24000TL-US-10
7	SB 3000TL-US-22
	SB 3800TL-US-22
	SB 4000TL-US-22
	SB 5000TL-US-22
8	Sunny Island 6.0H
	Sunny Island 8.0H
	Sunny Island 3.0M
	Sunny Island 4.4M
9	SB 5000SE-10
	SB 3600SE-10
10	STP 10000TLEE-JP-10
	STP 20000TLEE-JP-11
	STP 10000TLEE-JP-11
11	STP 20000TL-30
	STP 25000TL-30
12	SB1.5-1VL-40
	SB2.5-1VL-40

So, for example, if you have an SB 5000TL-21 the model number will show up as "1.2"

or, conversely, if you see a model number "1.11" it means you have either an STP 20000TL-30 or STP 25000TL-30

Status Codes:

There are many variants and meanings of the various status codes, please see separate SMA document explaining these. However, There are two codes having specific meanings:

<table>
<tr><td>Global Status:</td><td>0</td><td>OK</td></tr>
<tr><td></td><td>1</td><td>Warning condition exists</td></tr>
<tr><td></td><td>2</td><td>Error condition exists</td></tr>
<tr><td></td><td>3</td><td>Device is off</td></tr>
</table>

If you see "-1" in the Global Status this means the inverter did not respond. Bear in mind some SMA inverters stop responding when there is no DC input, ie. when there is little or no sunlight. Under these circumstances any previously gathered cumulative data will show up, such as Energy Lifetime, but instantaneous values will be missing, such as PV Power etc.

<table>
<tr><td>Recommended action:</td><td>0</td><td>none</td></tr>
<tr><td></td><td>1</td><td>contact the installer</td></tr>
<tr><td></td><td>2</td><td>contact the manufacturer</td></tr>
<tr><td></td><td>3</td><td>invalid</td></tr>
</table>