

F@ST PLUG 500 PREMIUM

USER GUIDE



SAGEMCOM

Dear customer,

You have just acquired a new generation Sagemcom PLC adapter (Power Line Communication) and thank you for placing your confidence in us.

This device has been manufactured with the utmost care. If you should have difficulties in operating it, we recommend that you consult this user manual.

This product follows a strategy of continuous development. We reserve the right to make changes without notice, modifications and improvements to the products described in this user manual.

To operate the device safely and easily, please read carefully the paragraph “Recommendations and safety instructions”, page 3.

CE The CE label confirms that the product complies with the 1999/5/EC regulations of the European Union Parliament regarding wireless systems and telecommunications.

The declaration of compliance may be looked up on the **www.sagemcom.com** website section «Support», or can be obtained from the following address :

**Sagemcom Broadband SAS
250, route de l'Empereur
92848 Rueil-Malmaison Cedex - France**

Recommendations and safety instructions

This device is intended to be connected to the AC power line. For installation instructions, please refer to the installation section of this guide.

The following precautions should be taken when using this product.

- Read all instructions including the safety leaflet before installing and operating this product.
- Follow all warnings and instructions marked on the product.
- Unplug the device from the wall outlet before cleaning. Use a damp cloth for cleaning.
- Do not use liquid cleaners or aerosol cleaners.
- Do not operate this product near water.
- This product should never be placed near or over a radiator or heat register.
- Do not use an extension cord between the device and the AC power source.
- Only a qualified technician should service this product. Opening or removing covers may result in exposure to dangerous voltage points or other risks.
- Do not plug the device into a power strip or surge protector because these devices may consist of filter and impair signal.
- Avoid plugging the device right next to noisy sources such as cell phone charger, Halogen lamps, vacuum cleaner, etc. These cases result in sub-optimal transmission speed.
- Unplug the device from the wall outlet and refer the product to qualified service personnel for the following conditions:
 - If liquid has been spilled into the product
 - If the product has been exposed to rain or water
 - If the product does not operate normally when the operating instructions are followed
 - If the product exhibits a distinct change in performance

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Discover...

Box Content

A diagram showing the contents of a box. On the left is an open cardboard box with arrows pointing to the items. The items are arranged in a 2x2 grid:

- Top-left: A circular icon containing a line drawing of the F@ST PLUG 500 PREMIUM device.
- Top-right: A circular icon containing a green Ethernet cable.
- Bottom-left: A circular icon containing a Quick Start guide with numbered steps.
- Bottom-right: A circular icon containing a warning symbol (exclamation mark in a triangle).

2 x - F@ST PLUG 500 PREMIUM

2 x - RJ45 Ethernet cable

1 x - Quick Start guide

1 x - Safety Leaflet

Applications

The **F@ST PLUG 500 PREMIUM** is a pass-through PLC adapter.

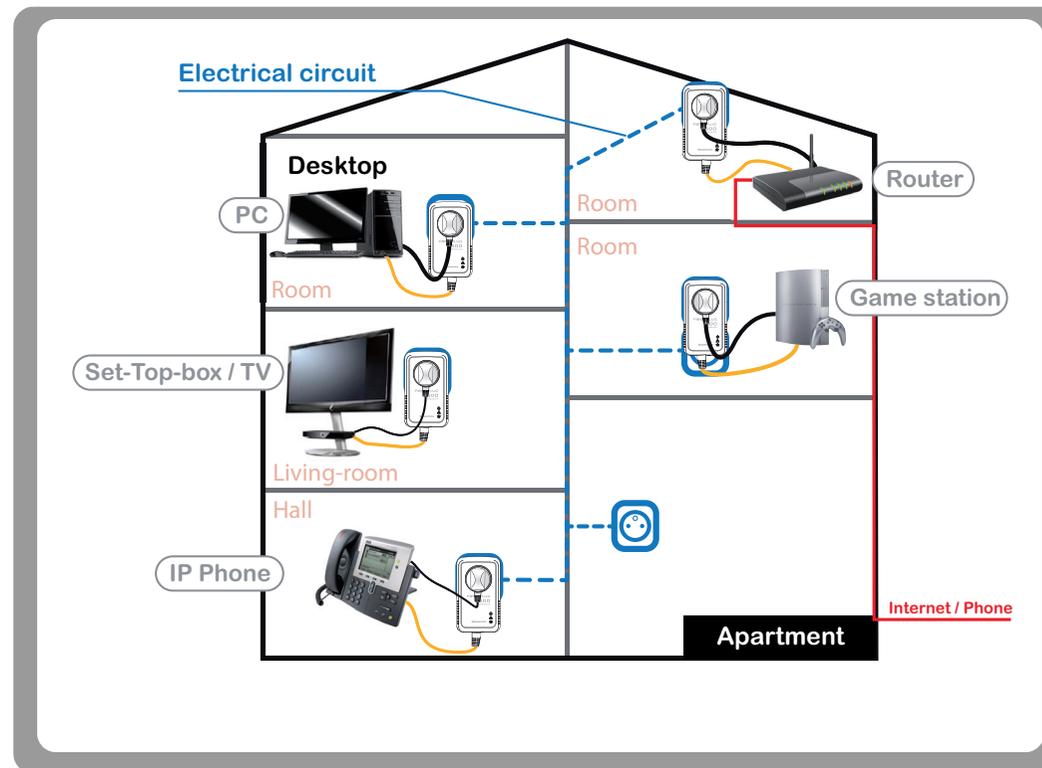
It relies on the household power line to transmit data over your Local Area Network (LAN).

It can be plugged directly into the power socket and therefore requires no additional wiring or special installation procedure. The device also provides a female socket in which you can directly connect your equipment or a power strip, allowing you to save a socket space.

The **F@ST PLUG 500 PREMIUM** adapters are the ideal solution to help you establish a high-speed network that supports video, voice and data without wiring and drilling.

They are suitable for a wide range of both residential (at home) and commercial (offices, apartments, hotels, warehouses...) network applications.

The **F@ST PLUG 500 PREMIUM** adapters can reduce their consumption automatically by entering power save mode when they are not in use.



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Getting to Know the Adapter

The Ethernet Interface

Ethernet: The Ethernet port connects to an Ethernet network cable. The other end of the cable connects to your computer or other Ethernet-enabled network device.

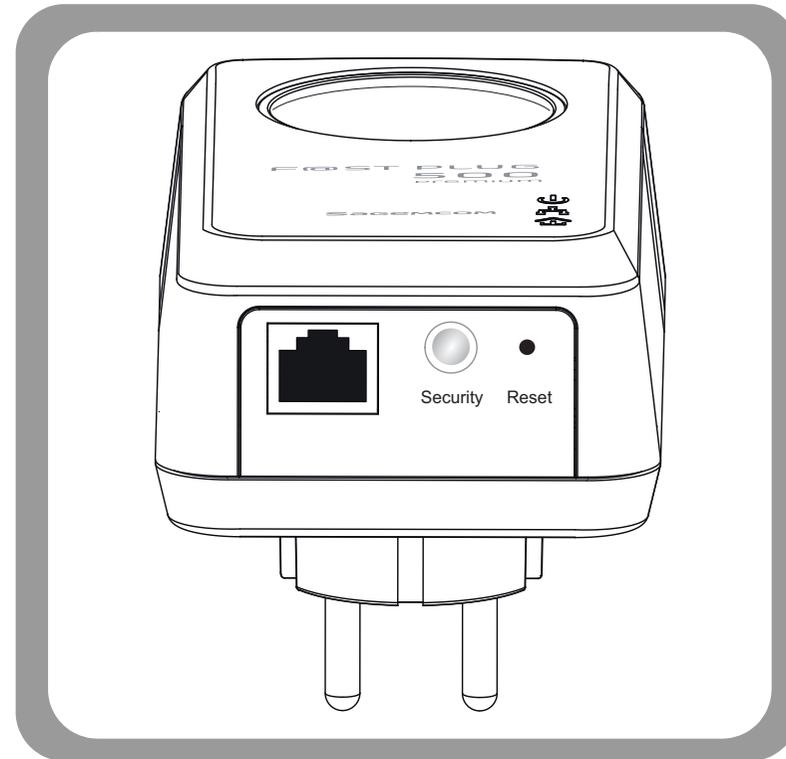
The Adapter's Buttons

The following figure shows the adapter's buttons.

Security Button: To join or leave a HomePlug AV Logical Network (AVLN).

- Pressing and holding the Security button for less than 2 seconds makes the adapter a member of the existing AVLN (refer to the “Joining an existing HomePlug AV logical network” section on page 15).
- Pressing and holding the Security button for more than 10 seconds randomizes the encryption keyword (refer to the “Leaving an AV logical network” section on page 16).

Reset: Restore the settings to the factory default.



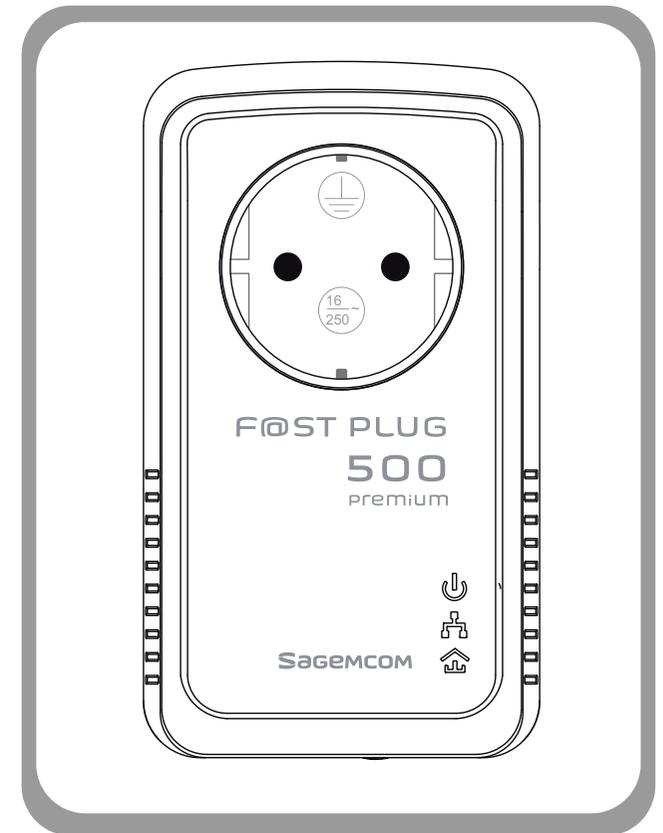
The Adapter's LEDs

All adapters' LEDs are located on the front panel.

There are 3 LEDs to indicate the adapter's status.

The following table describes the LEDs on the device.

Note The **F@ST PLUG 500 PREMIUM** devices will wake-up automatically from the power saving mode when network activity is detected.



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Power

LED	Color	Behavior	Description
		On	System runs normally.
		Flashing	System enters the power saving mode (blinks every 15s) or, System is resetting or, System is in the process of password synchronization (blinks every 1s).
		Off	The PLC adapter is powered off.

Ethernet

LED	Color	Behavior	Description
		On	Ethernet connection has been established.
		Flashing	Data is being transmitted.
		Off	No Ethernet connection.

Data

LED	Color	Behavior	Description
		On	Connection is suitable for full HD & 3D video streaming.
			Connection is suitable for HD video streaming and online gaming
			Connection is suitable for simple data transfer and Internet access.
		Flashing	When the device is scanning other PLC devices, the Data indicator blinks quickly.
		Off	The PLC adapter is not connected to the power line network or is in powersaving mode.

2

Set up a network...

This section describes how to add new devices, or remove old devices from a power line network named HomePlug AV logical network (AVLN).

Both actions can be accomplished by using the **Security** button.

Operation progress and outcome can be monitored by observing the behavior of the Power  and Data  LEDs.

Note **F@ST PLUG 500 PREMIUM** devices are shipped by pair and therefore have been already associated. These devices will remember that they have been already paired together.

Therefore, if you do not already have PLC adapters in your home, both devices should connect automatically and no additional steps are required.

However, it is strongly recommended to randomizes the encryption keyword of the devices and manually form a new HomePlug AV logical network in order to secure it:

- 1 Plug the devices to the power line.
- 2 press the **Security** button of all devices more than 10 seconds until all LEDs reset.
- 3 form a new HomePlug AV logical network (“Forming a new HomePlug AV logical network with 2 devices”, page 13).

The role of the Security Button

Communications between **F@ST PLUG 500 PREMIUM** devices are encrypted with a 128 bit AES mechanism.

This encryption relies on a keyword which is identical for all **F@ST PLUG 500 PREMIUM** devices when leaving the factory.

Important To be part of a power line network named HomPlug AV logical network, all devices must have the same keyword.

Only devices that are part the of the same AV logical network can communicate with each other.

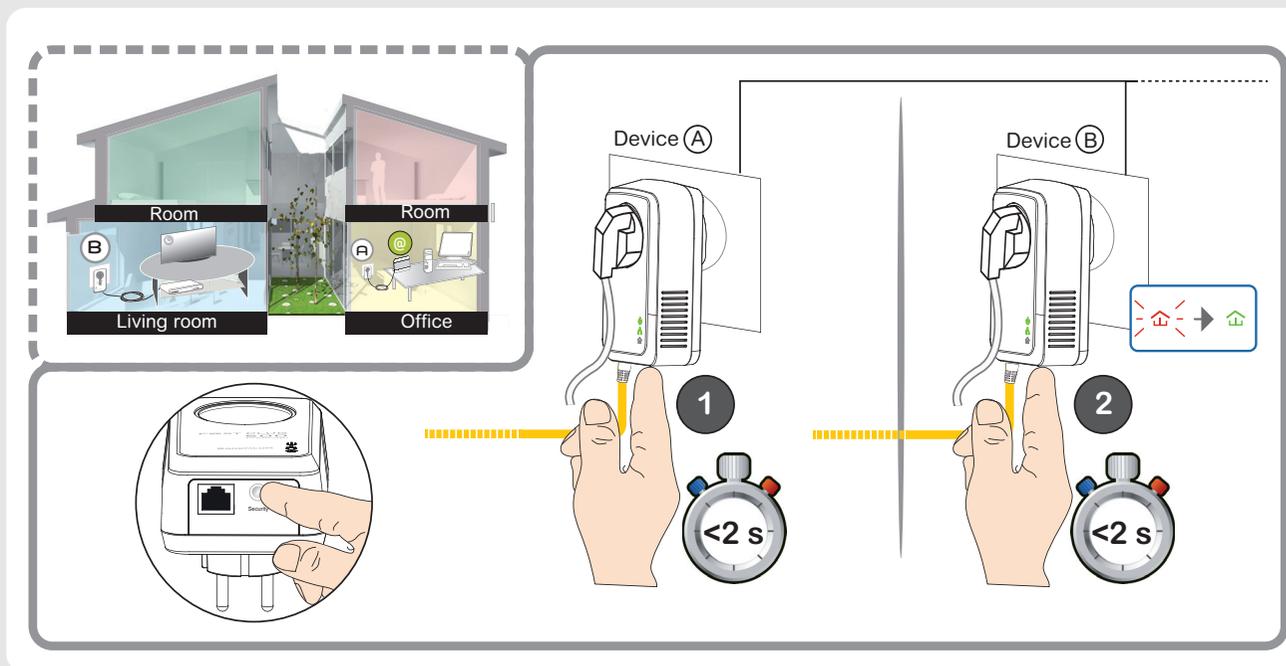
Devices in power save mode cannot enter the pairing mode.

The **Security** button allows:

- When pressed less than 2 seconds, the adapter will enter pairing mode during 2 minutes. During this mode, the Power LED  will blink every second. While in pairing mode, the adapter will be able to pair with another device that is also in pairing mode.
- When pressed and held for more than 10 seconds it will randomize this encryption keyword. This will result in the considered device being excluded from its current network until it can be paired again.

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Forming a new HomePlug AV logical network with 2 devices



When two devices with different encryption keywords are connected to the same power line, proceed as follows to form a HomePlug AV logical Network:

- 1 Plug HomePlug A to the power line.
- 2 Press the **Security** button for at least 1 second but less than 2 seconds to enter pairing mode on HomePlug A.
- 3 Plug the HomePlug B to the power line.

- 4 Press the **Security** button for at least 1 second but less than 2 seconds to enter pairing mode on HomePlug B.
- 5 Wait for the pairing to complete.

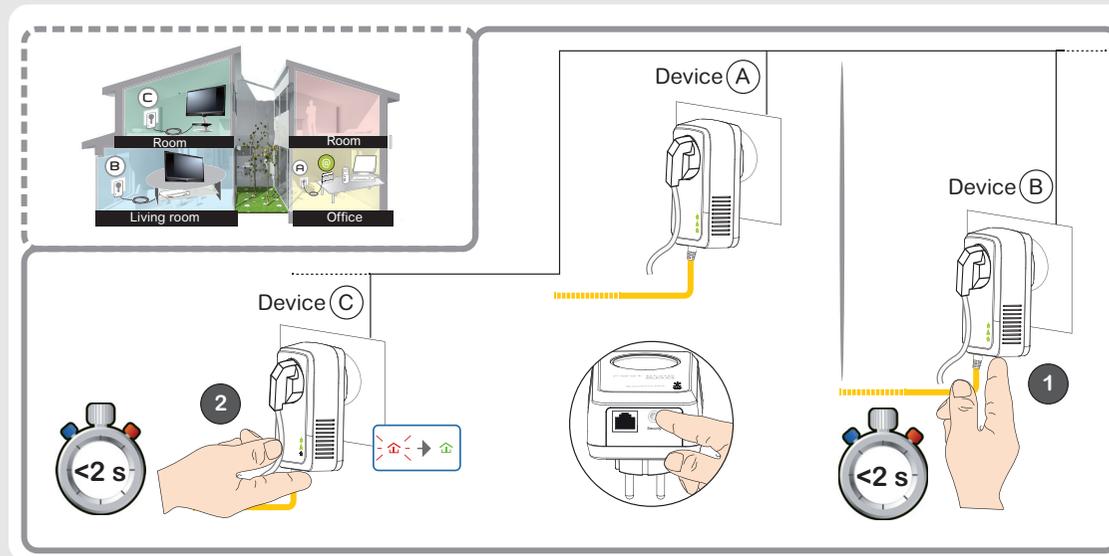
During the pairing, the LED  flashes red  and switches to green  when the device is paired.

Important Note :HomePlug B must be switched in pairing mode (Step 4) within 2 minutes after HomePlug A is switched in pairing mode(Step 2).
The pairing mode automatically stops after 2 minutes.

If you encounter some difficulties, please refer to the “Troubleshooting” section on page 22.

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Joining an existing HomePlug AV logical network



In this scenario, there is an existing HomePlug AV logical network formed by devices A & B.

The two devices A and B are already plugged into the to the wall power socket and are not in power saving mode.

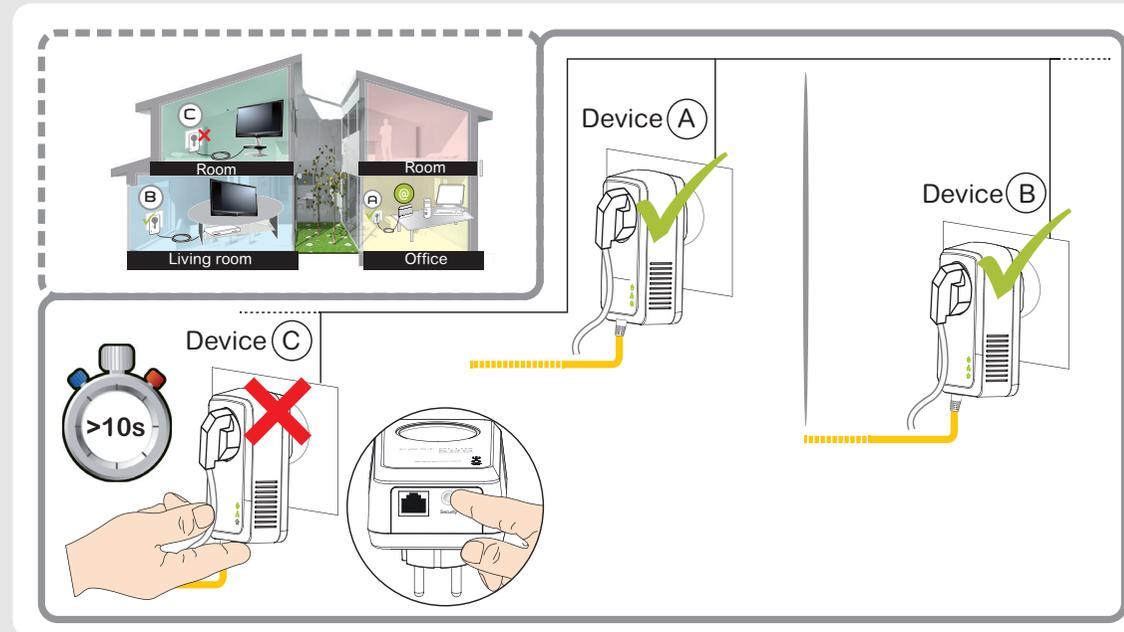
To add a new device HomePlug C to the existing network:

- 1 Plug the HomePlug C to the power socket.
- 2 Press the **Security** button for at least 1 second but less than 2 seconds to enter pairing mode on HomePlug C.
- 3 Press the **Security** button for at least 1 second but less than 2 seconds to enter pairing mode on HomePlug A or HomePlug B. This must be done within 2 min after the previous step (Step 2).
- 4 During the pairing, the LED  flashes red  and switches to green  when the device is paired.

Important Note : HomePlug A or B must be switched in pairing mode (Step 3) within 2 minutes after HomePlug C is switched in pairing mode (Step 2).
The pairing mode automatically stops after 2 minutes.

if you encounter some difficulties, please refer to the “Troubleshooting” section on page 22.

Leaving an AV logical network



Assuming an AV logical network already exists and you want to remove one device from this network.

- 1 Simply press the **Security** button of the device you want to disconnect from the network (for instance device C) more than 10 seconds until all LEDs reset.
- 2 Wait for reset to complete. The  (Power),  (Ethernet) and  (Data) indicators blink when the device is powered on.
At that moment, the Power and Ethernet indicators are green, and the Data indicator is orange.

Once the process completes, you may disconnect the device from the medium or join it to another logical network on the same medium.

3

Tips & Tricks

Quick install

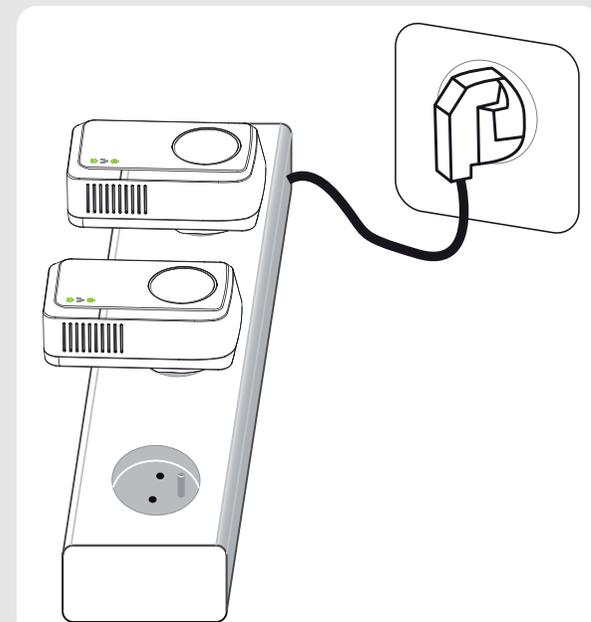
Your **F@ST PLUG 500 PREMIUM** devices are shipped by pair and therefore have been already associated. These devices will remember that they have been already paired together.

The purpose of this troubleshooting is to easily check if devices are properly associated.

For a normal use, the devices should not be plugged directly in a multiple socket power extension cord.

Please refer to recommendations on page 21.

- 1 To check the pairing of the devices, plug each device in a socket of the multiple socket extension. The  (Power),  (Ethernet) and  (Data) indicators flash once when the device powers on.
- 2 The Data LED  flashes red  for few seconds and then turn green .



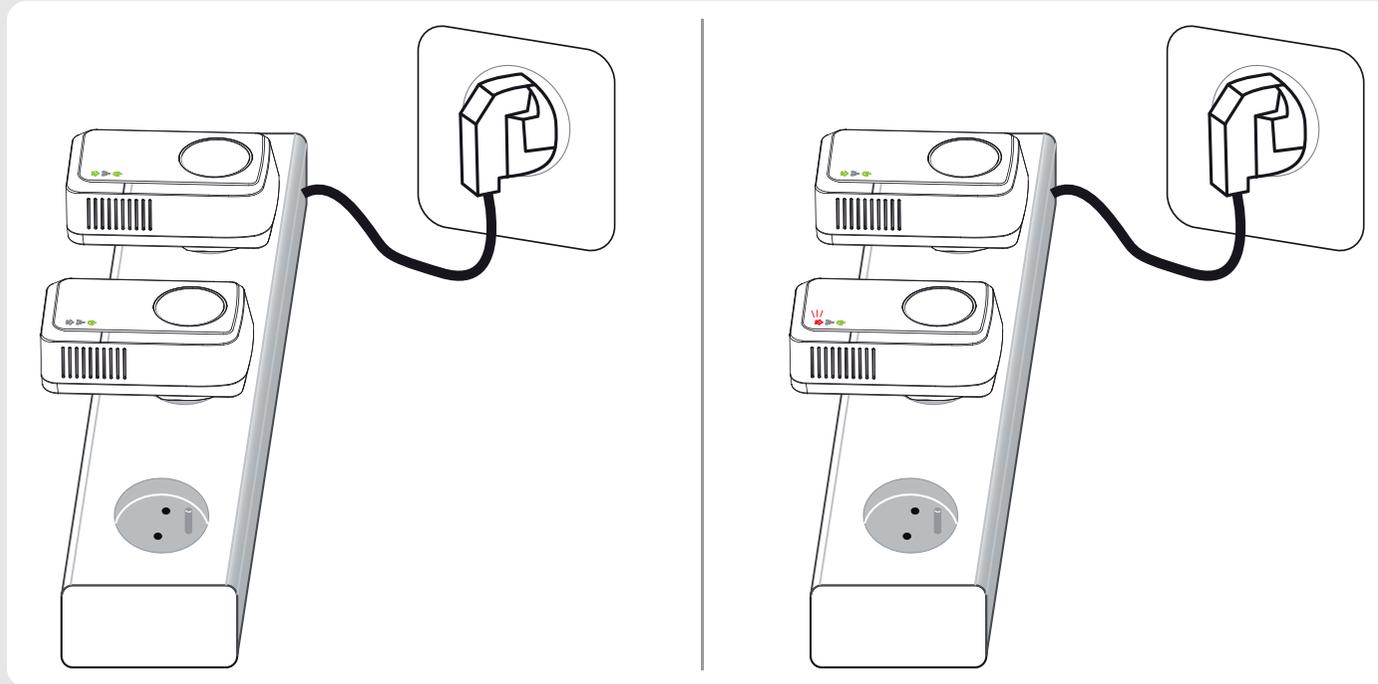
In case of problem

If you are confused or if the LED  blinks red  for a long time or remains turned off while the power LED is on.

1 Press **Reset** button on the devices.

- OR -

2 Form a new AV logical network (refer to the “Forming a HomePlug AV logical network with 2 devices” section on page 21.).



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Using Other Powerline Devices

Compatibility & Coexistence

F@ST PLUG 500 PREMIUM devices are compatible with other HomePlug AV Powerline Devices (200 Mbps and 500 Mbps).

However, HomePlug 1.0 is not compatible with Homeplug AV. So **F@ST PLUG 500 PREMIUM** devices are not compatible with older HomePlug 1.0 Powerline devices (85 mbps and 14 mbps).

Both HomePlug AV devices and HomePlug 1.0 can coexist on the same electrical network but they will not be able to communicate with each other and therefore cannot associate into a single AV Logical Network (AVLN).

Creating a single HomePlug AV Logical Network with existing Powerline Devices

IMPORTANT Existing devices that are still using the default factory configuration, may associate automatically with the **F@ST PLUG 500 PREMIUM** devices. You only have to plug device on the power network.

If this is not the case, please proceed with the below indications :

You can create a single AV Logical network using existing HomePlug AV Powerline devices and **F@ST PLUG 500 PREMIUM** devices.

But before doing so, you must ensure that each of your existing device is no longer part of a HomePlug AV logical Network.

Even if you only have a single existing device, it may have been part of another HomePlug AV Logical Network in the past.

- If your existing device(s) is (are) already **F@ST PLUG 500 PREMIUM** device(s) : Please read section 2 “Leaving an AV logical network”, page 16 or perform a reset of the product.
- If your existing device(s) is (are) from another manufacturer, please refer to your devices's manufacturer documentation.

However, here are a few suggestions that may, or may not apply to your situation:

- Some devices that have a security button but lack a reset button, may be reset or removed from their current AVLN by a long press of the security button.
- The duration of the required long press may vary across manufacturers, it is often between 10 and 15 seconds.
- The use of a stopwatch is often recommended as not all devices display an event to indicate that the device has left the AVLN or been reset.
- Some devices may have neither a security button nor a reset button; the use of a software utility provided by the manufacturer may be required to alter the status of the existing devices.
- Once your existing devices have been removed from their HomePlug AV Logical Network or Reset, they can be associated to your new **F@ST PLUG 500 PREMIUM** devices.

Please refer to the section “Joining an existing HomePlug AV logical network”, page 15 for more details.

Power Saving Mode

F@ST PLUG 500 PREMIUM devices have a power saving feature.

When there is no activity on the Ethernet port (for instance Ethernet cable is unplugged) and devices are left idle for 2 minutes, they will enter power saving mode.

All LEDs will turn off and the power LED  will blink every 15 seconds.

In this mode, devices cannot be paired or reset.

To leave the power saving mode, device must be unplugged or network activity must resume on the Ethernet port.

IMPORTANT Plugging a new powerline device onto the network will not cause other devices on the same network to leave their power saving mode.

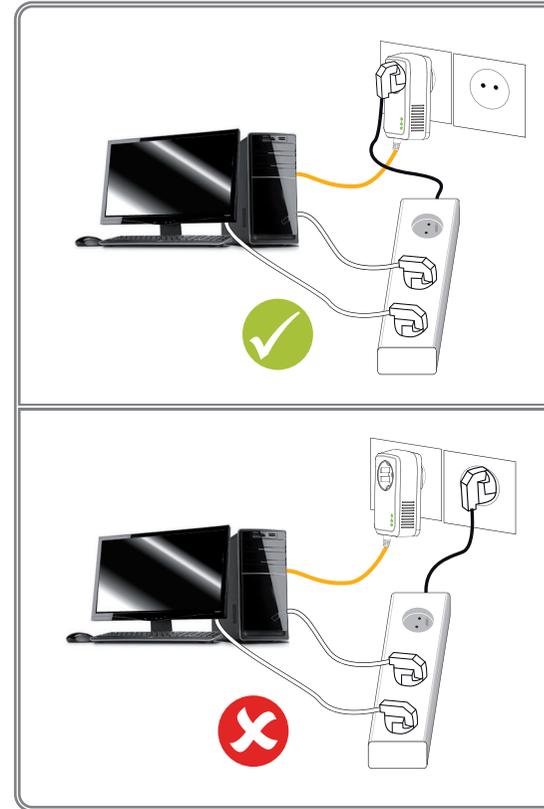
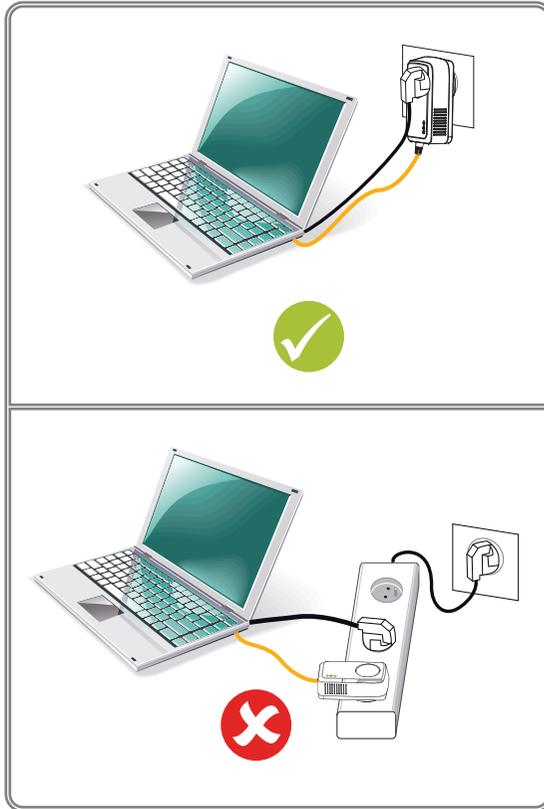
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Improve the Transmission Capacity

IMPORTANT It is important to follow the guidelines below in order to ensure optimal performance of your HomePlug AV logical network.

Plug your equipment directly into the electrical socket integrated into the **F@ST PLUG 500 PREMIUM** as shown in "Figure 1".

If you need extra power sockets, please ensure your multiple socket power extension cord is plugged directly into the device as shown in "Figure 2".



Troubleshooting

Problem	Reason	Solution
The LED flashes Red  for a long time.	Error occurs during pairing the devices. - OR - New device has an other encryption key	Press Reset button on the device to add and pair it again.
Power LED  doesn't blink when activating pairing mode.	Press on Security button is too short (< 1s). Press on Security button is too long (> 2s).	Press Security button for 1 to 2 second.
Ethernet LED  is OFF.	Ethernet cable is disconnected or broken the device connected to the HomePlug is powered off.	Verify ethernet connection. Try another Ethernet cable. Ensure that the connected device is powered on.

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Environnement

Environmental protection and sustainable development is an important priority for Sagemcom.

Sagemcom has a policy of using environmentally- friendly systems and makes environmental protection an essential part of the life-cycle of its products – from the manufacturing, to the installation, operation and disposal.

Packaging



The logo (green point) on the packaging means that a fee is paid to an authorised national organisation to improve packaging recycling and the recycling infrastructure. Follow the local sorting regulations for this type of waste product in order to improve recycling.

The product



The crossed out dustbin displayed on the product signifies that it belongs to the electrical and electronic equipment group. The European regulations request you to carry out your own selective recycling collection at:

- the sales outlet when you buy a similar new device.
- the collection points available in your area (recycling centres, sorting points, etc).

This means you participate in the recycling and valorisation of used electric and electronic goods which would otherwise have a negative impact on the environment and health.

Appendix

Specifications

Chipset	Intellon INT7400
Protocol	HomePlug AV 1.1, IEEE1901
Co-exists with existing HomePlug 1.0	
PLC Rate	500Mbps
Modulation Band	2~68MHz
Modulation Schemes	Supports 1024/256/64/16/8-QAM, QPSK, BPSK and ROBO
Encryption	128 AES
Outlet Current	220VAC 16A Maximum, 110VAC 20A Maximum
Filter characteristics	-22 dB to -45 dB
LED's	Power Ethernet: Ethernet link and activity Data: PLC link and activity

Push Button	Reset: Restore the factory default settings Security: Set the network password automatically
Consumption	5W
Operating Temperature	0°C to 45°C
Storage Temperature	-20°C to 70°C
Operating Humidity	10% to 90%, non-condensing
Storage Humidity	5% to 95%, non-condensing
Input Rating	100-240 VAC, 50/60Hz
Certifications	CE, UL, FCC Part 15 Class B
Green Standard	RoHS
Physical Dimension	L×W×H: 122mm×70mm×41mm
Weight	256g

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Default CAP

The 'Default CAP' group allows for default priority mapping of packets that do not have a VLAN TAG. The settings are available for Unicast (directed to a host).

- IGMP - (default CAP 3) - sets the channel access priority for IGMP frames - these are the group management frames, not the stream data.
- Unicast - (default CAP 1) - sets the default channel access priority for unicast frames not matching any other classification or mapping.
- IGMP managed Multicast Stream (Fixed to CAP 2) - sets the default channel access priority for stream data belonging to a snooped IGMP multicast group.
- Multicast/Broadcast - sets the default CAP for multicast frames not in a snooped group and for broadcast frames.

VLAN Tag User Priority	Default CAP Priority	TOS Bit User Priority	Default CAP Priority
0	CAP1	0	CAP1
1	CAP0	1	CAP0
2	CAP0	2	CAP0
3	CAP1	3	CAP1
4	CAP2	4	CAP2
5	CAP2	5	CAP2
6	CAP3	6	CAP3
7	CAP3	7	CAP3

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