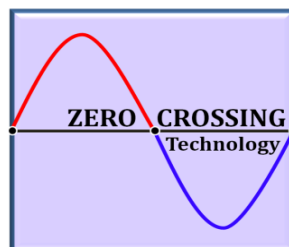
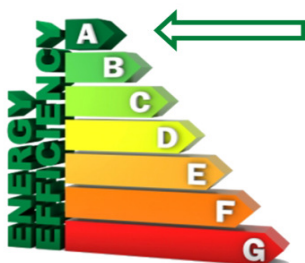


# SYNERGY 2

All in ONE POWER SOLUTION:

SAFECOM  
WWW.SAFECOM.TV

- FULL SYNERGY Unlimited Power Backup.
- POWER BOOSTER.
- 60/ 87V -15A AC/AC Stabilizer -Zero Crossing technology & RF-PASS 1-GHz.
- Dual Power Inserter build-in.
- Monitoring Online Voltage & Current & status.



## Safecom SYNERGY-2

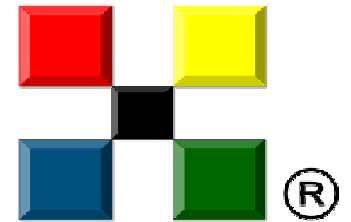
Installation Manual  
OCT-2012  
SAFECOM Patented

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# Synergy-2 (Patent p) All in ONE

- ❑ Full Synergy Unlimited backup Power solution.
- ❑ Power Booster + Voltage stabilizing.
- ❑ Dual Power inserter.
- ❑ Monitoring online current & voltage.



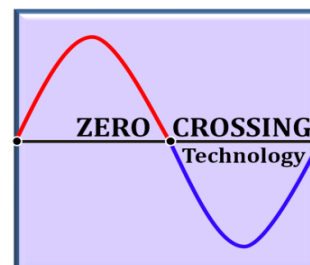
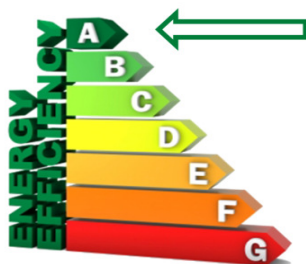
## The Concept and Challenge:

Safecom's SYNERGY-2 was designed to provide unlimited backup power, without using batteries. Instead, it uses alternative available remote powering sources in the cable TV plant. The internal Power Booster enables automatic recovery of the original voltage level from local or remote powering sources, thereby maintaining stable voltage levels.

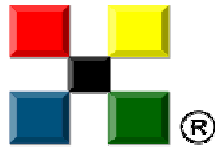
## Overview:

SYNERGY-2 is a new ALL IN ONE power backup unit, which exploits Smart power Grid technologies for HFC and FTTC/ FTTH networks. Safecom's proven technology turns existing coax or power cable lines into a synergy backup powering grids that provide the ultimate low cost alternative to common UPS & battery. Based on the strategic placing of intelligent power management devices throughout the network, in the event of a power outage Synergy-2 draws power from the nearest available source over existing coax or power cables. By utilizing breakthrough step-up & stabilizing voltage technologies the units provides original and optimal voltage levels – even over long distances. This way SYNERGY-2 replaces the old and inefficient UPS & Battery backup, and helps Operators reduce capital and operational network expenditures.

Thanks to its patented **power booster technology**, the SYNERGY-2's advanced electronic controller automatically monitors and compensates for any changes to line voltage from local or remote P.S. SYNERGY-2 is designed to work at full power capacity in a wide range of temperatures and humidity levels without requiring maintenance. Safecom's T-Formers undergo rigorous quality testing - 100% of the units are repeatedly tested.

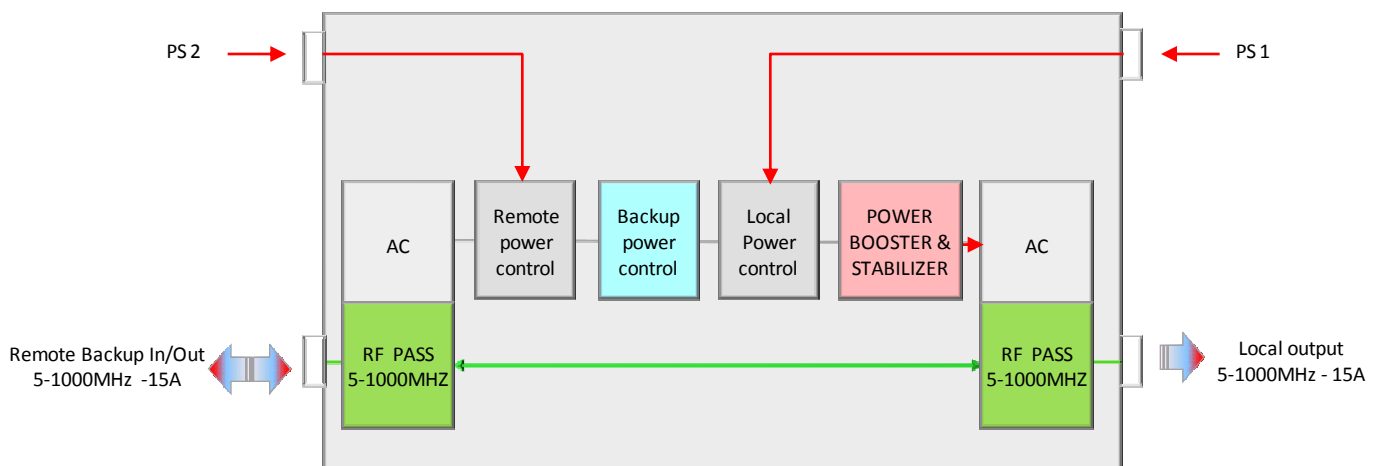


# • Technology



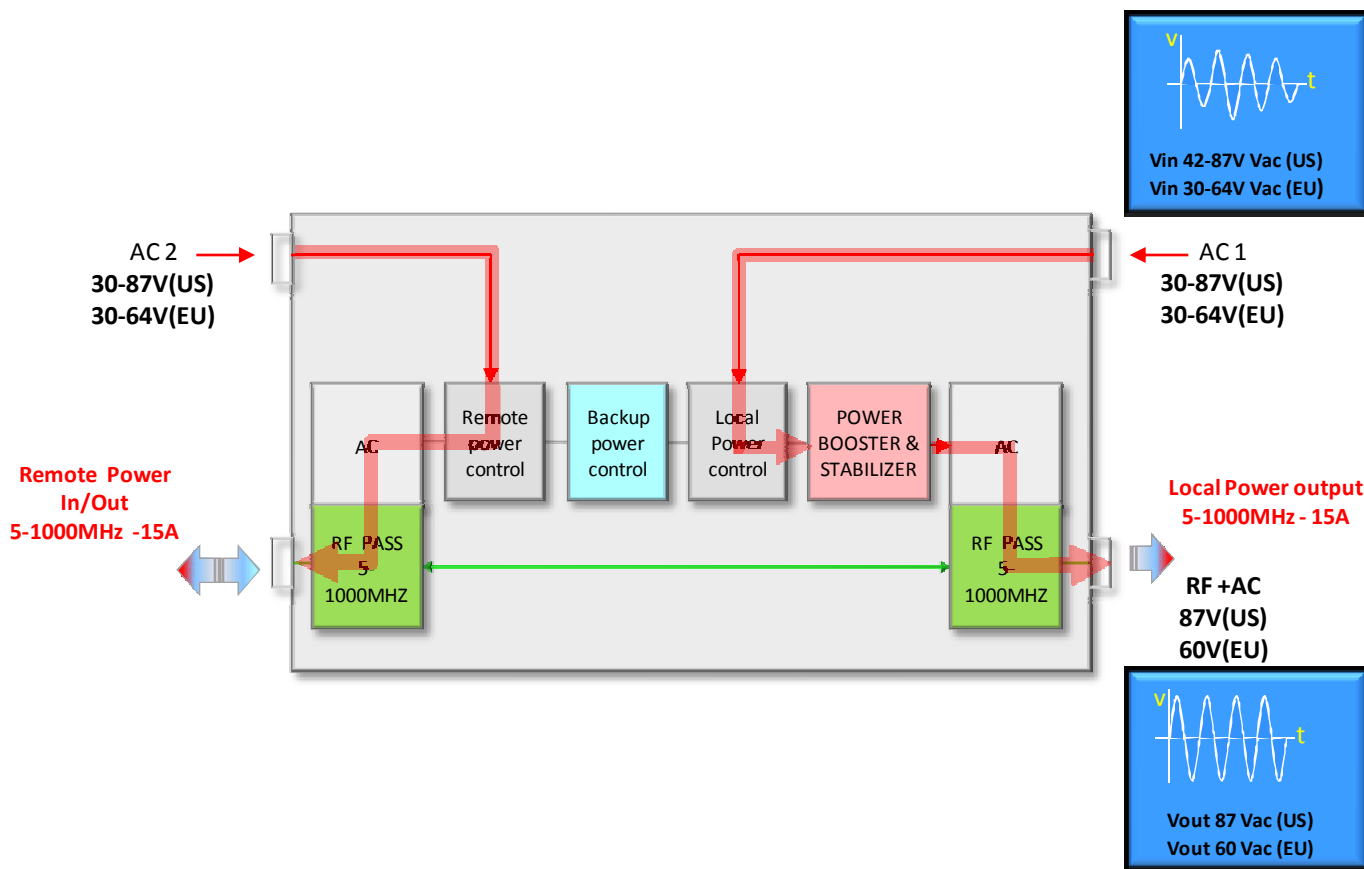
- SYNERGY ALL-IN-ONE unit presents new upgrades & improvements to previous models of DPSV4 units & Power Booster-2.
- Utilizes two safecom patented technologies for power management and AC-AC variable ratio step-up transformation. Provides ultimate voltage regulation to Local outputs port for pure sine voltage and for Ferro resonant P.S at all loads.
- Line conditioning allows for changing gears at 0 time (“zero crossing”). This smooth online transformation between gears provides “clean” voltage transformation without any RF noise and insures optimal and stabilized voltage levels from local and remote P.S.
- An additional new feature of the SYNERGY-2 is its soft and time delayed network startup, addressing the most serious problem of Ferro-based P.S: the inrush current. This innovative solution controls the current level during start up and prevents any possibility of the circuit breaker closing down during startup or utility power interruption.
- In addition, electronic overload protection protects the network and minimizes fuse blow when a momentary short circuit occurs.
- Safecom’s offer has the most efficient stabilized technology with almost 97% efficacy in a wide range of loads. It saves electricity, keeps the transformer and the electronic parts in cool condition, makes the unit reliable for unlimited lifetime use.
- The exclusive design of the toroidal transformer enables support of 87V-15A, while using a compact, light weight design.
- Using the voltage stabilizer capability for local or remote powering eliminates the need for stabilizing voltage such as FERRO P.S, This allows Operators to use non-Ferro transformers to supply power to the network, while increasing efficacy and further reducing cost.

Block Diagram SYNERGY-2



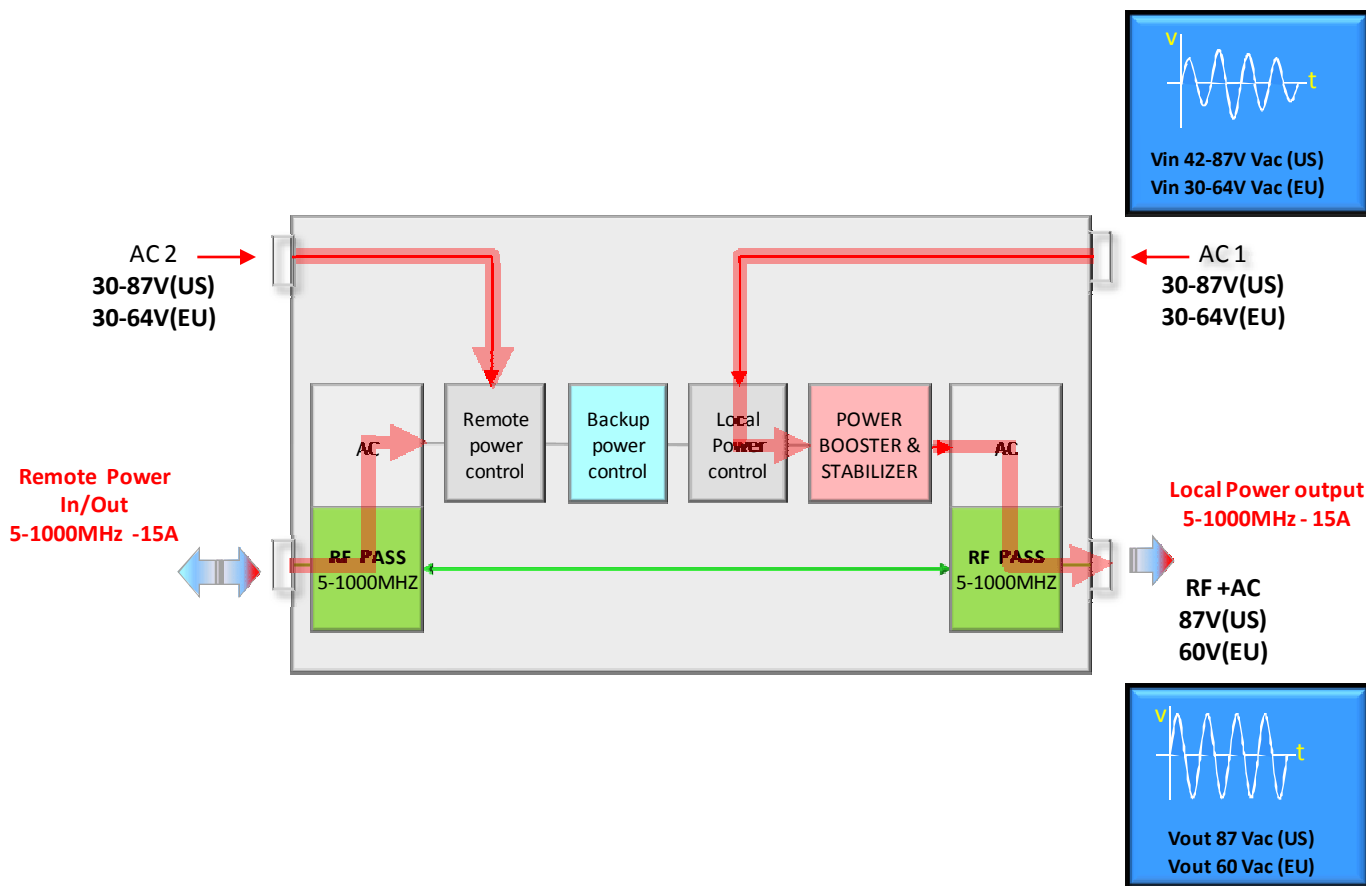
# Operational modes.

- Local ON , SYNERGY POWER-OUT



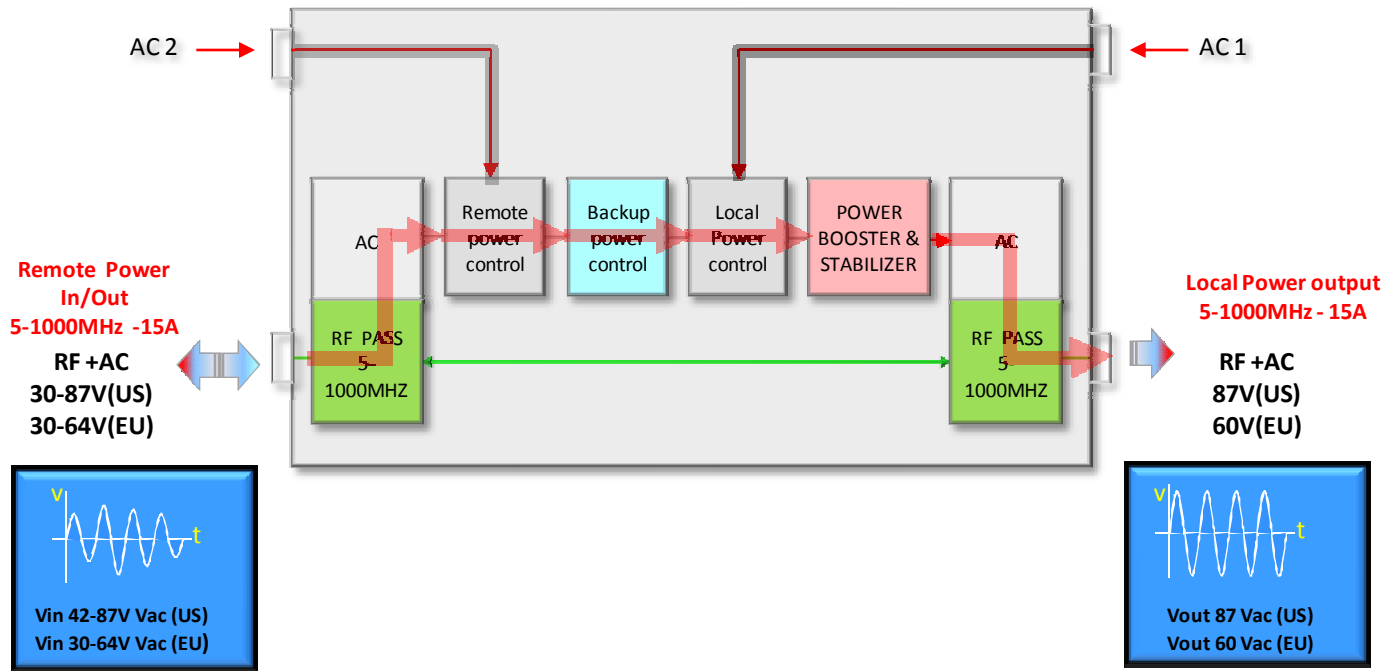
# Operational modes.

- Local ON , SYNERGY POWER-IN (Standby)



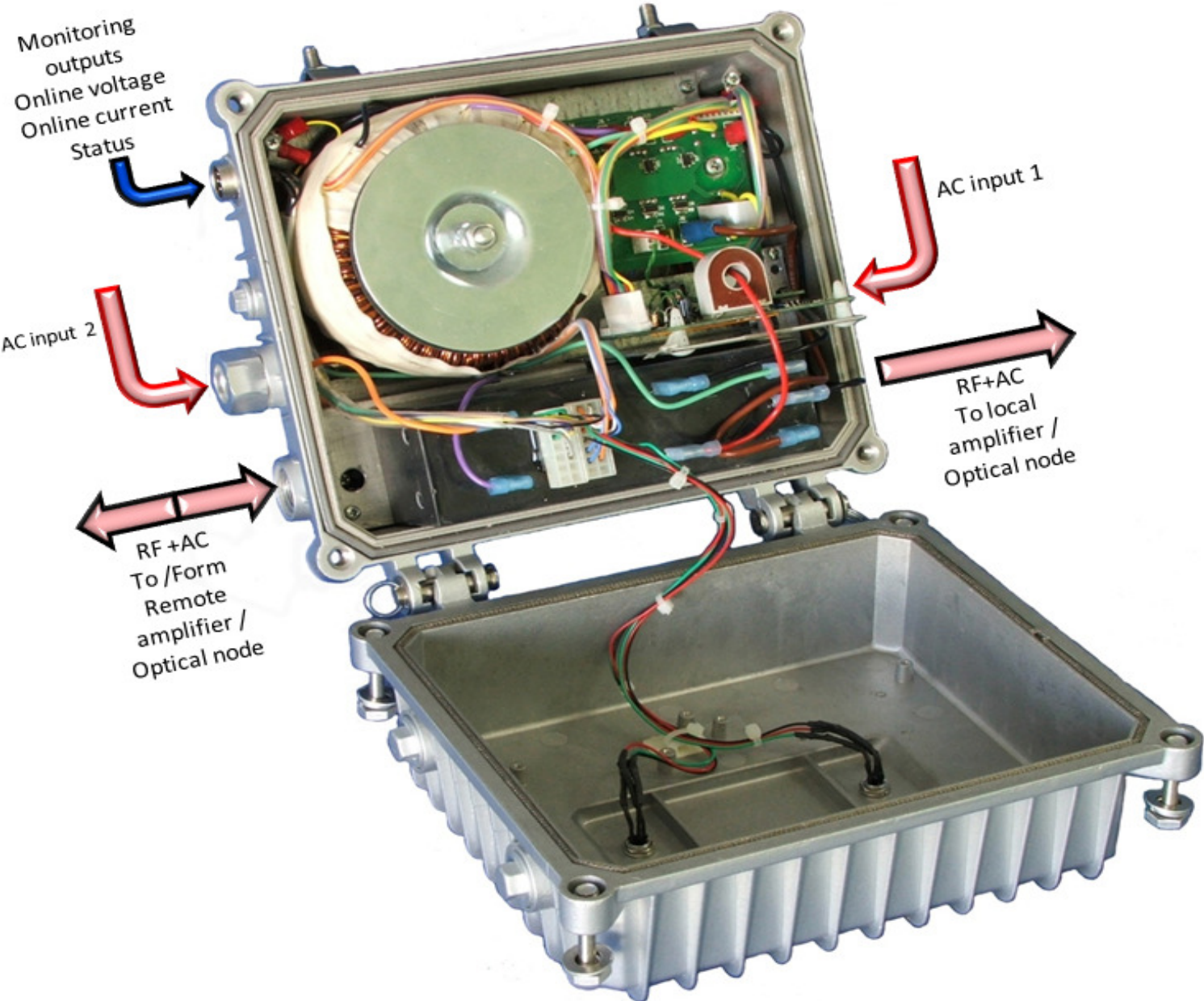
- Operational modes.

- Local OFF SYNERGY POWER –IN ( BACKUP-ON )



Inside view : SYNERGY-2 60/87V -2x15A

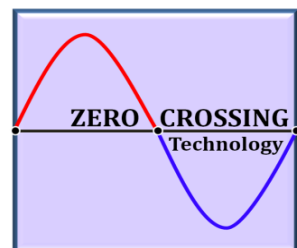
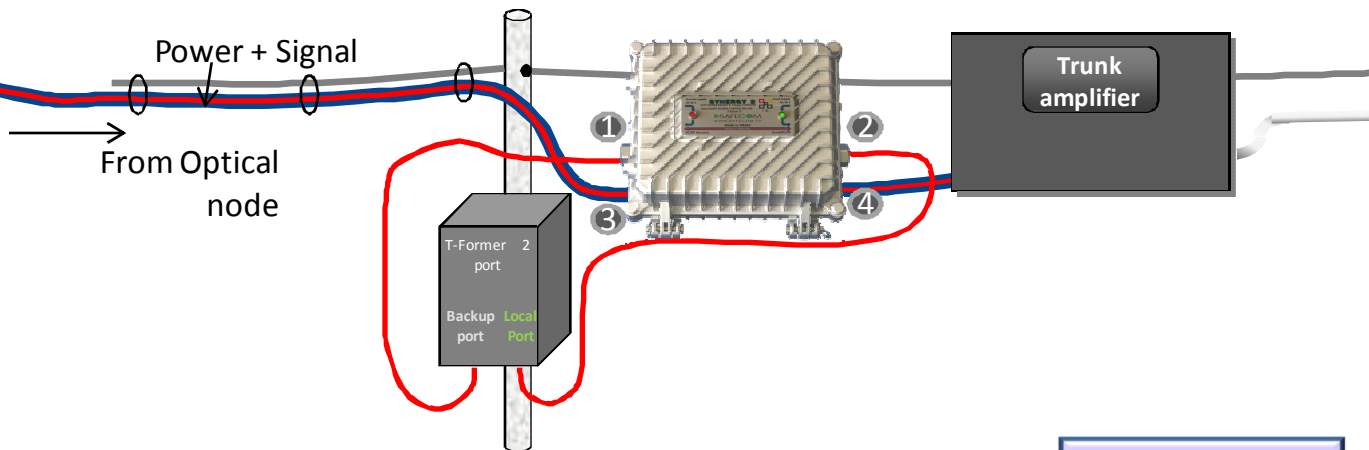
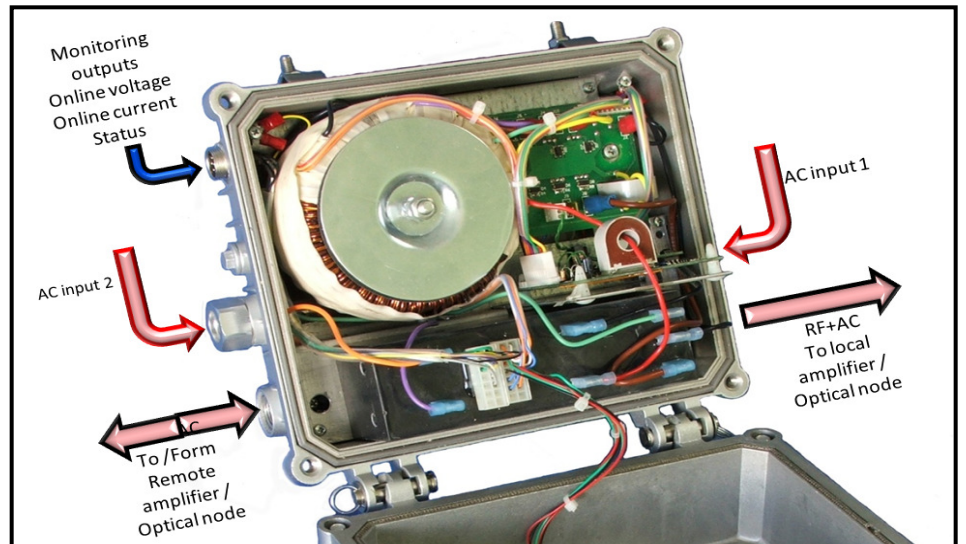
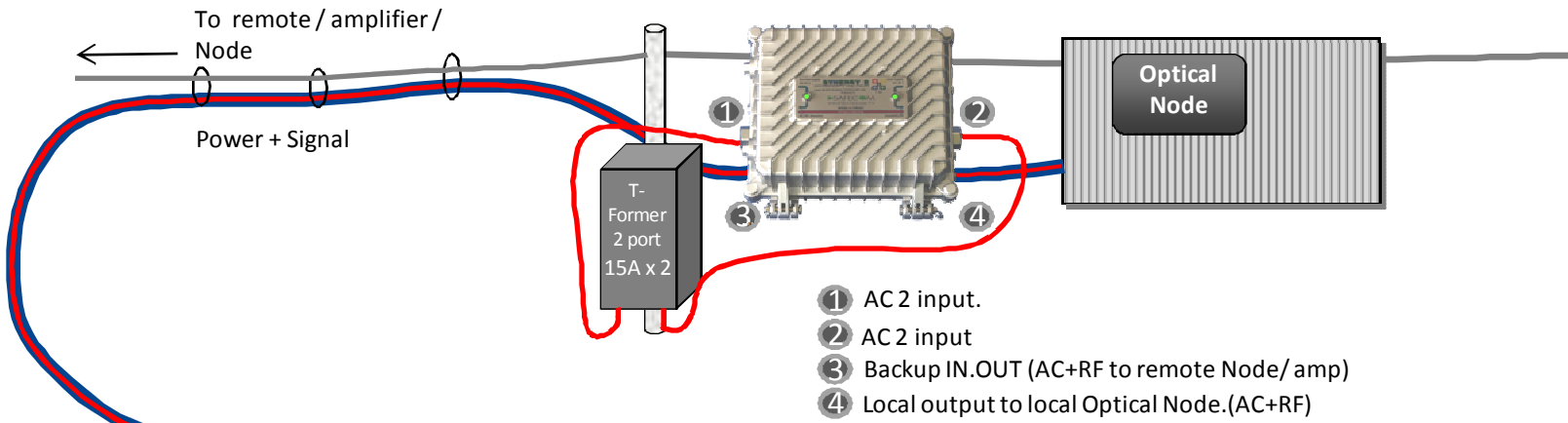
Inputs/ Outputs configuration





# SYNERGY-2 Installation guide

Typical configuration Optical node + Trunk amplifier



Operational & Testing Instructions for the SYNERGY-2 unit.

1. Turn ON the (P.S) AC1 & AC2. (Location A).  
Local & Remote power LEDs should be green when the first (AC1 & AC2) power supply is started.



2. Turn ON second P.S – AC1 & AC2. (Location B).  
Local Power LED should be green and Remote Power LED should be red.



3. Turn OFF PS – AC1 & AC2 (Location A ) Both LEDs will turn RED. (Now the Fiber node will receive alternative power from the neighboring Trunk amplifier via the SYNERGY-2 unit).



4. Reestablish mains power to P.S location A.  
Local Power LED = GREEN, Remote Power LED = RED.



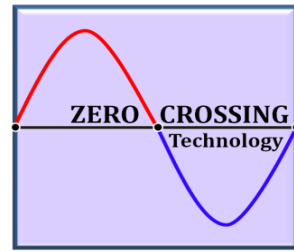
5. Return to POWERING LOCATION B . Turn OFF mains power to P.S (AC1, AC2-Location B ) Both LEDs will turn RED.  
(Now the Trunk amplifier will receive alternative power from the optical mode via the SYNERGY-2).



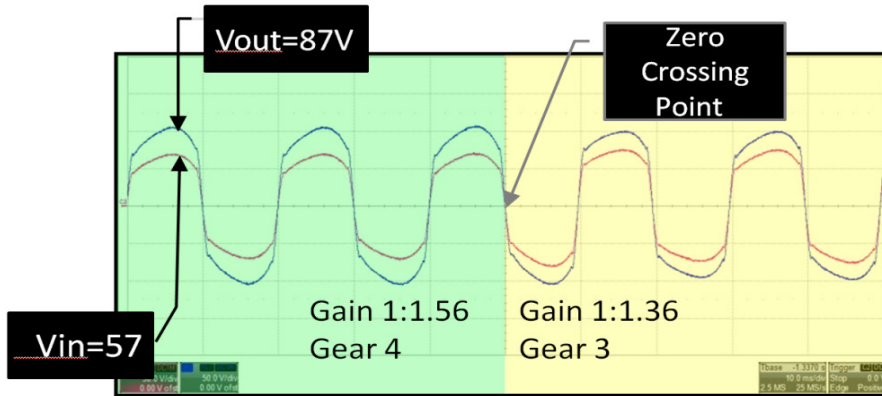
6. Test Voltage level at port 3 & 4 during remote powering.  
Voltage at port 3 indicate the low level because of voltage drop along the cable.  
Voltage at port 4 Local output port should be similar to the original voltage from P.S (60/87 V even from remote area)

## SYNERGY-2 Voltage Transition from the 4<sup>st</sup> to the 1<sup>nd</sup> gear

- Test using Ferro P.S 87V(US-Standard)
- 60V model EU-standard available.



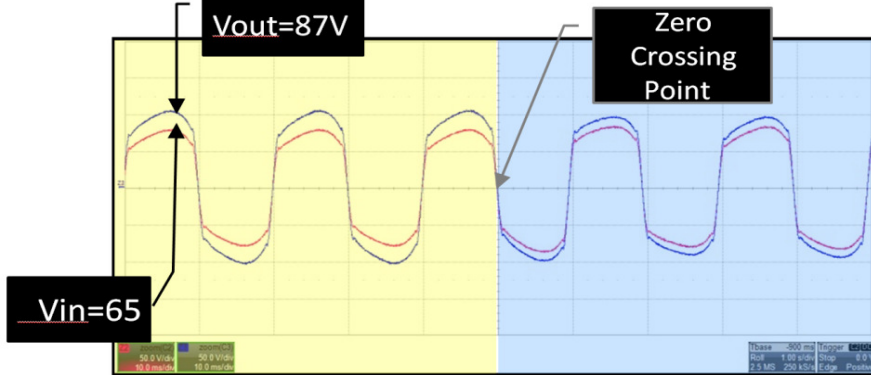
Waveforms: Transition from the 4<sup>st</sup> to the 3<sup>rd</sup> gear



- Zero Crossing means:**
- ✓ "0" taster time.
  - ✓ "0" inrush current.
  - ✓ Life time operation.

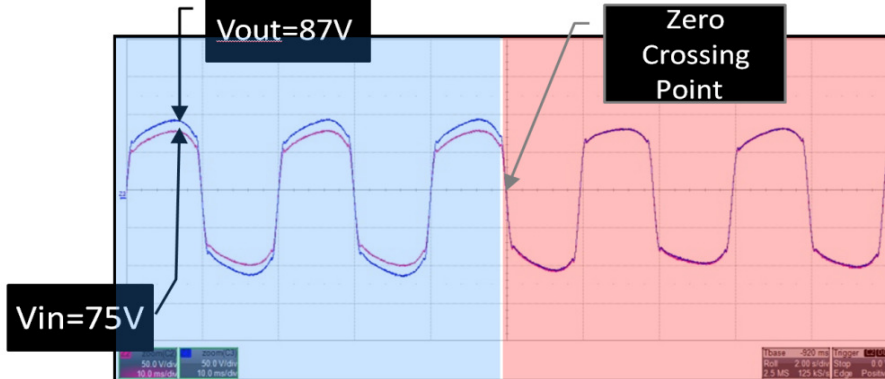
Red – Input voltage  
Blue – Output voltage

Waveforms: Transition from the 3<sup>st</sup> to the 2<sup>nd</sup> gear



Red – Input voltage  
Blue – Output voltage

Waveforms: Transition from the 2<sup>st</sup> to the 1<sup>nd</sup> gear



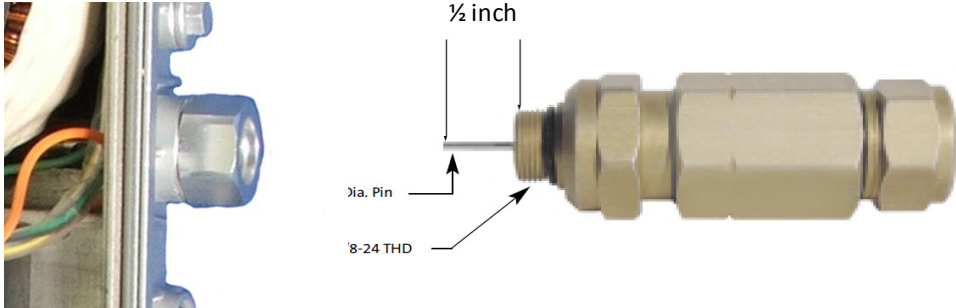
Red – Input voltage  
Blue – Output voltage

# Connecting Power Cable to SYNERGY AC 1 , AC 2 inputs

1 2

New Synergy-2 model has high current output quick type connector without seizure screw.

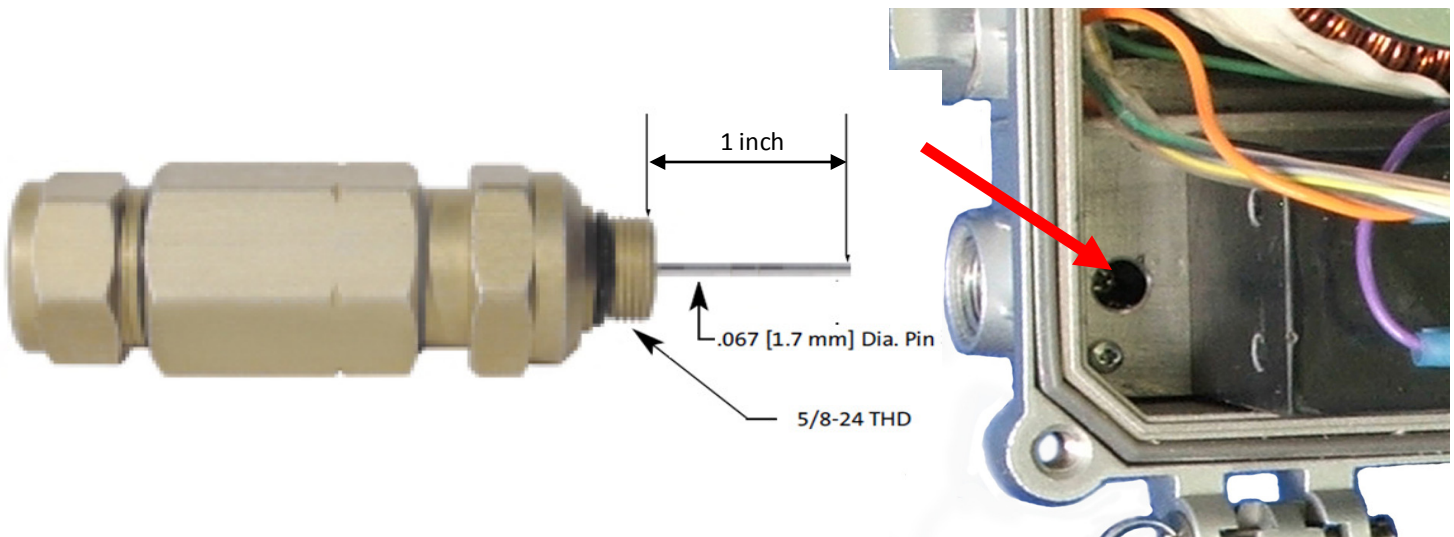
- ✓ Simply plug in connector at the front panel.
- ✓ Connection is made quickly and reliably from outside.
- ✓ Beryllium, cooper contact.



# Connecting Trunk Cables to SYNERGY Remote / Local outputs

3 4

- Open the inner seizure screw.
- Plug in Coax connector at the front panel.
- Close the inner seizure screw .



**Note :** The center conductor may be cut clean to allow for complete fit.  
The length of the center conductor must be 10 mm.

## Safety Instructions

Review the installation manual before proceeding.

If there are any questions regarding safe installation or operation & performance please contact us [support@safecom.tv](mailto:support@safecom.tv).

Prior to any handling, you must disconnect the power supply from the Mains.

Only an experienced and authorized technician or electrician who is qualified to work on the electrical grid while taking necessary precautions that comply with the electrical code should perform installation.

### **Before Installation:**

Make sure that SYNERGY-2 input voltage configuration matches the standard CATV voltage level (60Vac –EU, 87Vac-US) .

### **Safety:**

Prior to installation or removal recheck that utility circuit breaker is OFF and that there is no voltage at the P.S both Local Power Supplies and Remote P.S.



# Troubleshooting and Repair

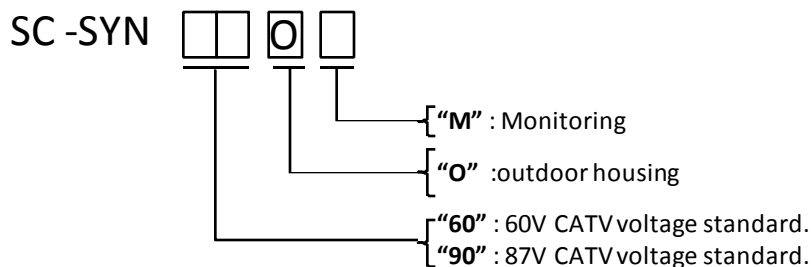
The SYNERGY-2 powering unit was designed to be the most reliable P.S that can be used for an unlimited period of time in harsh environmental conditions, such as high heat and humidity, even while at maximum load.

The unit has a slow start circuit and overload protection to prevent the most common network failure such as inrush current that switches the circuit breaker OFF, or can cause a fuse blow by overload or short circuit.

This guide explain the few rare, yet possible symptoms.

Symptom	Reason	Solution
No Voltage at Local output Port. RED LED "ON"	Synergy unit was shut down due to overload current short-circuit.	The network must be monitored and the failure cause must be removed.
No voltage at output LED "OFF".	No Power at the AC 1,2 and in/out remote port.	Check AC connection and P.S.
Output voltage exists but the LED is still Red.	Overload protection >15A activated.	Reduce the load under 15A .

## Safecom SYNERGY-2 P.S ordering information



## **SYNERGY-2 - Technical Specification**

<b>Electrical</b>		<b>Environmental</b>	
Max Current(Each port)	15A	Operating Humidity	0-100%
Input AC1,AC2 min threshold level	EU- 45 Vac US 58 Vac	Operating Temperature	-40°C ÷ +60°C
Min Voltage level-from remote area	30Vac	IP Standard – 100 % waterproof	IPX8
Transition between gears	0 mSec	Operating Temperature	-40°C ÷ +60°C
Operational Voltage Range – Local Power.	EU: 48-75VAC	<b>RF</b>	
	US: 60-90VAC	Bandwidth	5-1000Mhz
Power Consumption Backup unit	48Vac@50 Hz-1.8W	Through loss 1000 MHz	< 1.5 dB
	90Vac@50Hz-3.5W	Return Loss	> 18 dB
Power Consumption. Power Booster module	7 Watt Max (EU)	RFI	>110 dB
	18 Watt Max (US)	Hum Modulation	> 65
Min Voltage level-from remote area	30Vac	<b>General</b>	
Backup threshold Turn to backup-mode	18Vac	Backup operation Life Expectancy	500,000
		Broadcast Continuity	Online
Max Voltage all port	75 Vac (EU) , 90 Vac (US)	<b>Monitoring interface for IP transponder</b>	
Current 50Hz/60Hz	39mA / 31mA	Current from local P.S	0-15A -1%
Transition to Backup	15msec(max) –ONLINE	Current from remote P.S	0-15A -1%
LED's indicators		Voltage-all ports	0-90V-0.5%
Two <b>green</b>	Local ON , Remote ON.	Status of SYNERGY2	Local /Remote
Two <b>red</b>	Backup from Remote area.		
Left LED- <b>RED</b>	Local ON , Remote Standby	Dimensions ( L , W , H ) mm	250 X 200 X 152
Right LED - <b>Green</b>		Dimensions ( L , W , H ) inch	9.8 X 7.8 X 6
Voltage gain ratio (Max)	1 : 1.56	Weight	14.33 lbs / 6.5Kg

- Full Remote Synergy backup solution.**
- Power Booster + Voltage stabilizing.**
- Dual Power inserter 2 x 15A.**
- Monitoring online current & voltage.**

