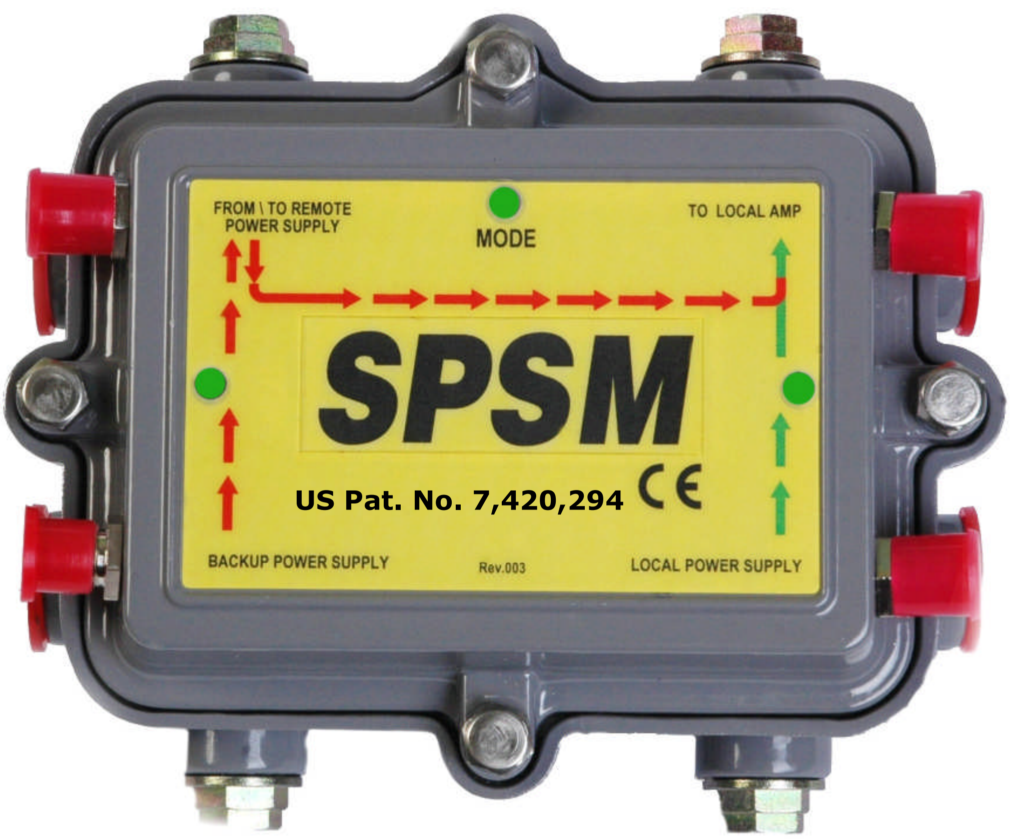
SPSM Technical Description



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SPSM Technology Description

The Smart Power Switch Multifunction (SPSM) was developed by broadband engineers wanting to reduce operating costs, eliminate batteries requiring maintenance and the need to repair expensive power supplies that suffered occasional inverter failure. In addition they were looking for an extended standby time that did not require expensive generators (fixed or portable) and expensive labor to keep the network functioning during long power outages.

The SPSM can be configured in double, triple, quadruple or any backup architecture you desire to deploy. It has been designed to allow the operator the maximum flexibility when deploying it in the network. If an area requires some unique power configuration due to some excessive network demands the SPSM offers the flexibility to be configured with standby powering and fixed generators or standard power supplies and generators connections in a configuration that when all of the available commercial power service areas have been exhausted the generator can be deployed.

Since the SPSM provides the network with virtually unlimited power without the use of inverters and batteries it is an ideal alternative. In addition to providing virtually unlimited power through the commercial power network, the SPSM lowers CAPEX and OPEX costs. Warehouse space and inventory can be minimized.

Microprocessor technology allows the SPSM to automatically identify the voltage and current of the network as well as to route power from alternative locations to the location of the power disruption. When normal trunk cable is used to power the system a Smart Power Combiner (SPC) is used to insert the power from the SPSM into the network. The SPC works in the same manner as a normal power combiner, however, the SPC can be configured to be a dual power combiner also. The dual power combiner configuration forces all power flow into the SPSM allowing all decisions for routing to be made by the SPSM. If the system architecture calls for the use of a separate power cable (22-25 ohm) for network powering, the system power combiner will be used in place of an SPC. The SPC can also work as a power splitter or power combiner as part of the normal truck system.

The SPSM system is easy to install and does not require special equipment, tools, permits or skills. It is installed in the same manner as a standard network splitter, coupler or power combiner. In addition the SPSM works with standby and/or standard power supplies as well as portable and/or fixed generators or any combination thereof. The SPSM offers the user a tremendous amount of flexibility in how it can be deployed to meet the network needs. The only limitation is the creative skills of the designer or engineer.

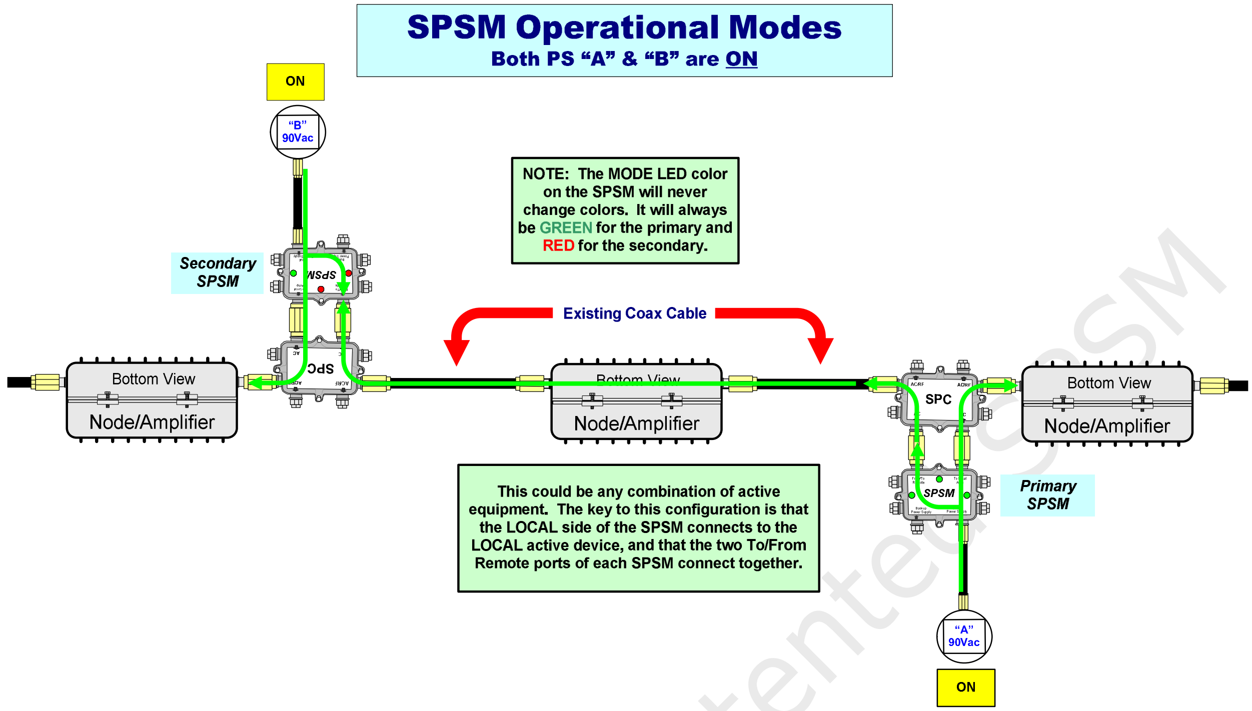

Fig 1

Fig. 1 shows the SPSM in the normal operational mode. All power sources are operating correctly.

The local power supplies feed the local network amplifier or node and any active equipment connect to that amplifier, and provide backup to one another power supply in the event there is a power failure. The LED lighting configuration for the primary SPSM will be **GREEN-GREEN-GREEN** while the secondary SPSM will be **RED-RED-GREEN**.

Note: The green line shows the possible power paths.

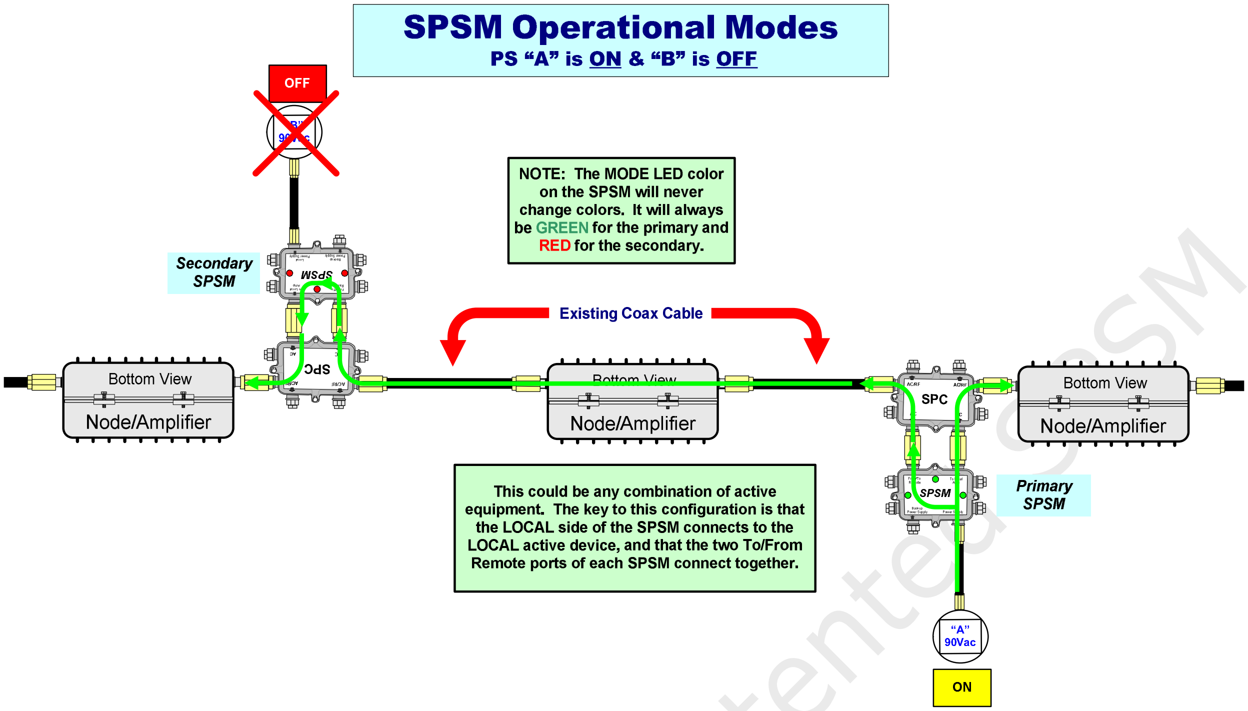

Fig 2

Fig. 2 shows a local power failure of PS "B", the left power supply. When PS "B" is **OFF** due to commercial power failure, PS "A" the right side power supply, will backup the left side, PS "B". This provides continuous power to both locations until power is restored at the fault location. When PS "B" fails, the LED's change to **RED-RED-RED** for the secondary SPSM while the LED's for the primary SPSM at PS "A" stay **GREEN-GREEN-GREEN.**

Note: The green line shows the actual power path.

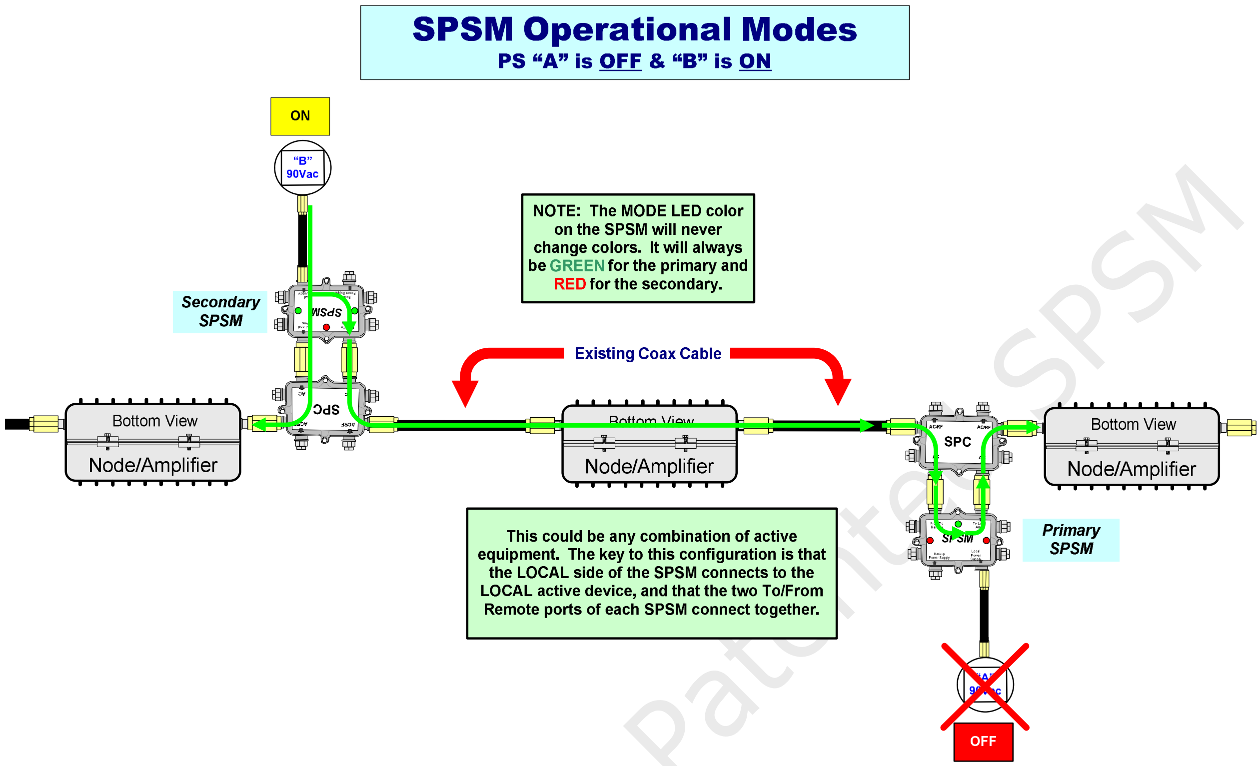

Fig 3

Fig. 3 shows the same functionality as Fig. 2 with the right side, PS "A" losing commercial power. Commercial power failure of PS "A" will cause the LED's at the primary SPSM to change to **RED-GREEN-RED** and the secondary LED's at PS "B" change to **GREEN-RED-GREEN**.

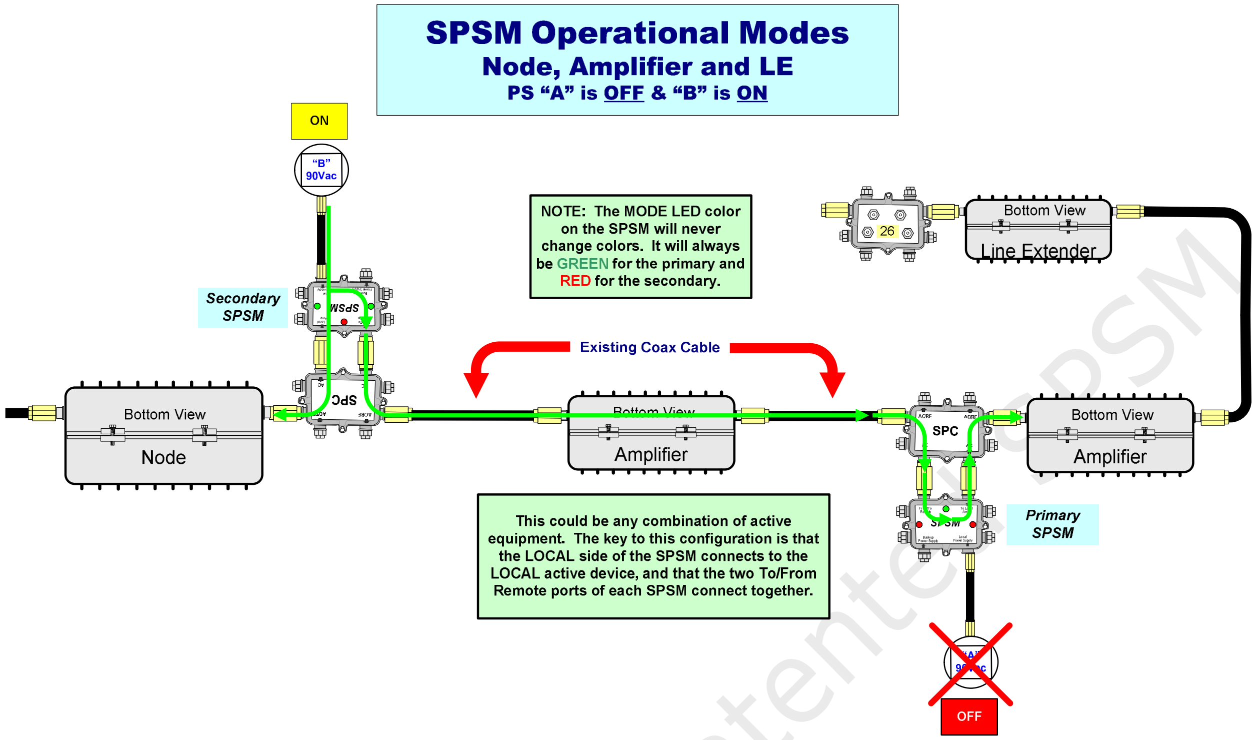

Fig 4

Fig. 4 shows the combination of the SPSM and the SPC in a simple two-way backup NODE - Amplifier topology. Commercial power failure of PS "A" will cause the LED's at the primary SPSM to change to **RED-GREEN-RED** and the secondary LED's at PS "B" change to **GREEN-RED-GREEN**.

Typical SPSM Monitoring Configuration

The SPSM contains an internal monitoring board that measures many critical internal parameters and transmits this information to an optional, remotely located status monitoring transponder, by means of a single coaxial cable connection.

The remote status monitoring transponder can be connected directly to a TCP/IP data network, or a Cable Modem can be used to transport the data over an existing DOCSIS/Euro DOCSIS infrastructure. The transponder uses industry-standard SNMP protocols, and it is fully compliant with SCTE HMS MIB's. Use of standards such as SNMP, DOCSIS/Euro DOCSIS and HMS, allows the customer to select any SNMP-compliant Network Manager software, virtually eliminating risk of interoperability problems.

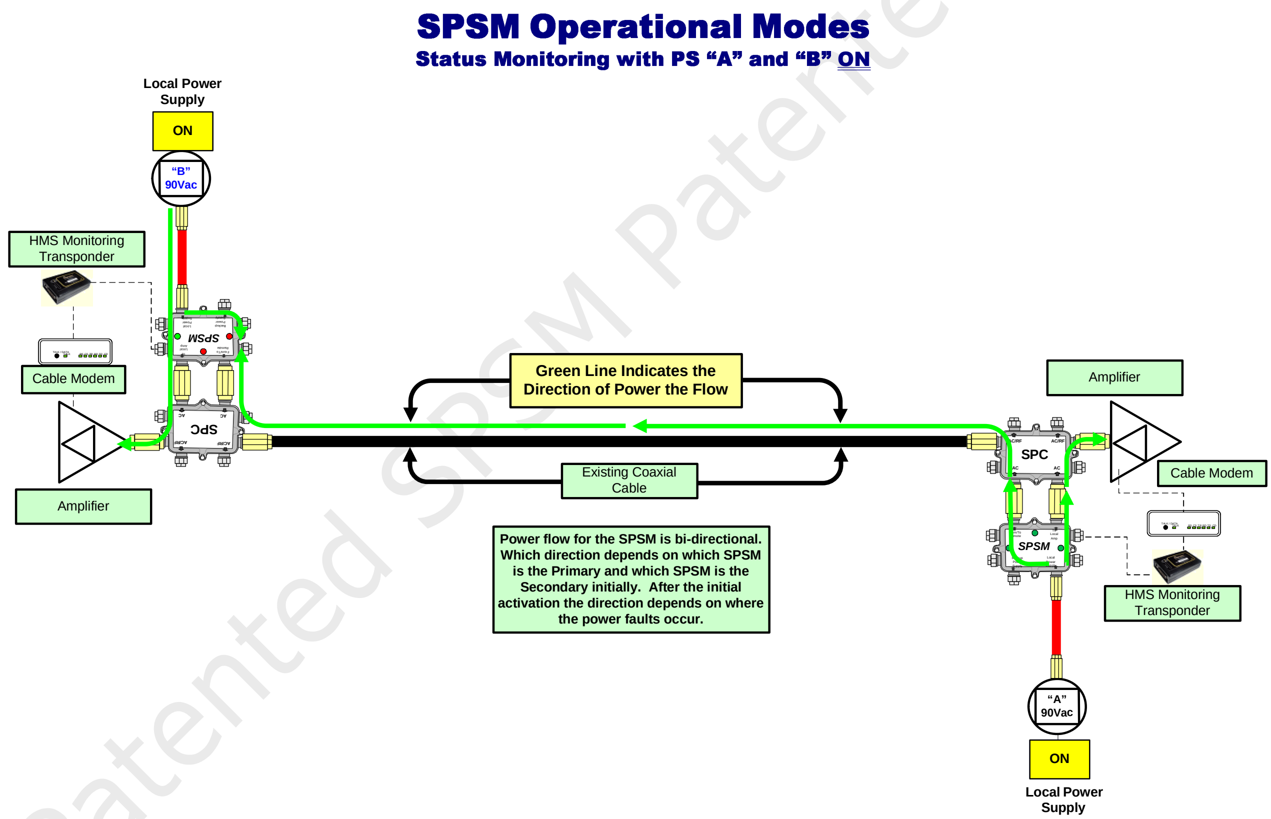

Fig 5

In Fig 6, below, the SPSM uses a separate power cable to provide the power backup path. The advantage to this configuration is very low power consumption, the ability to balance power, and longer spacing between power supplies.

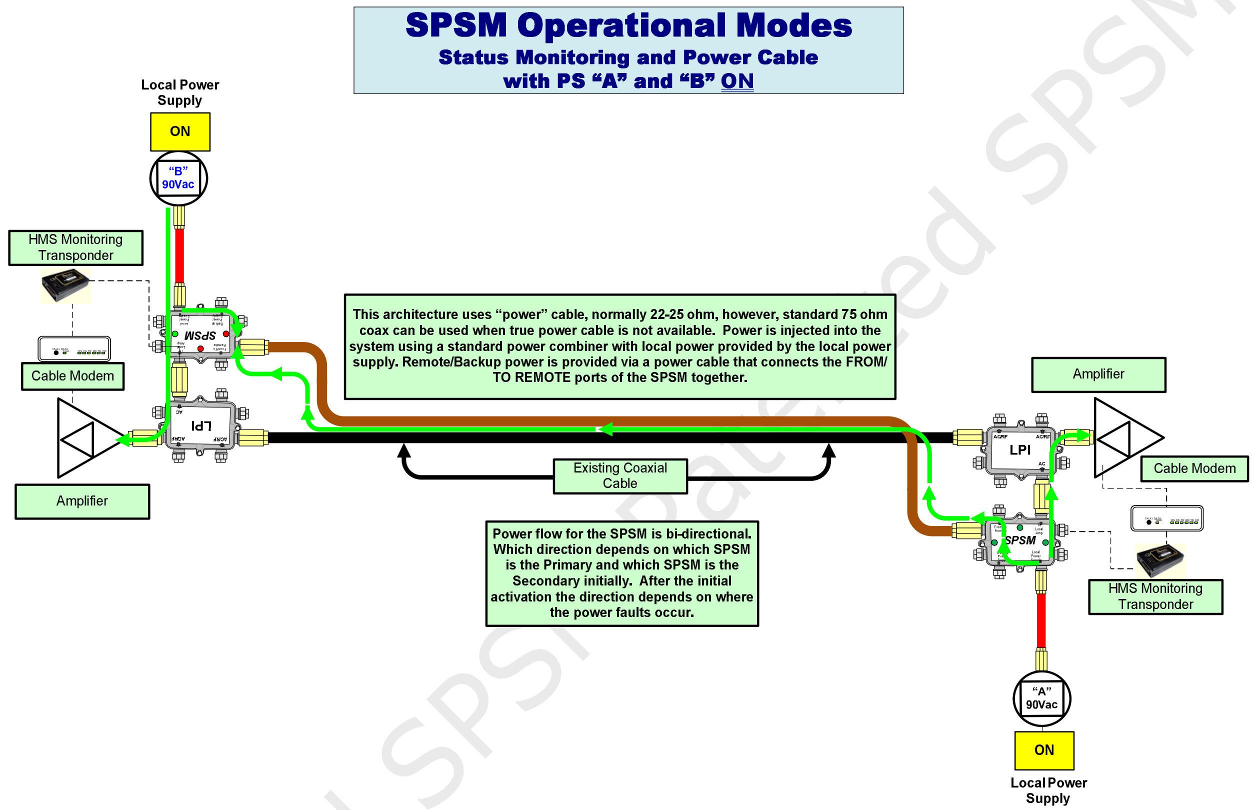

Fig 6

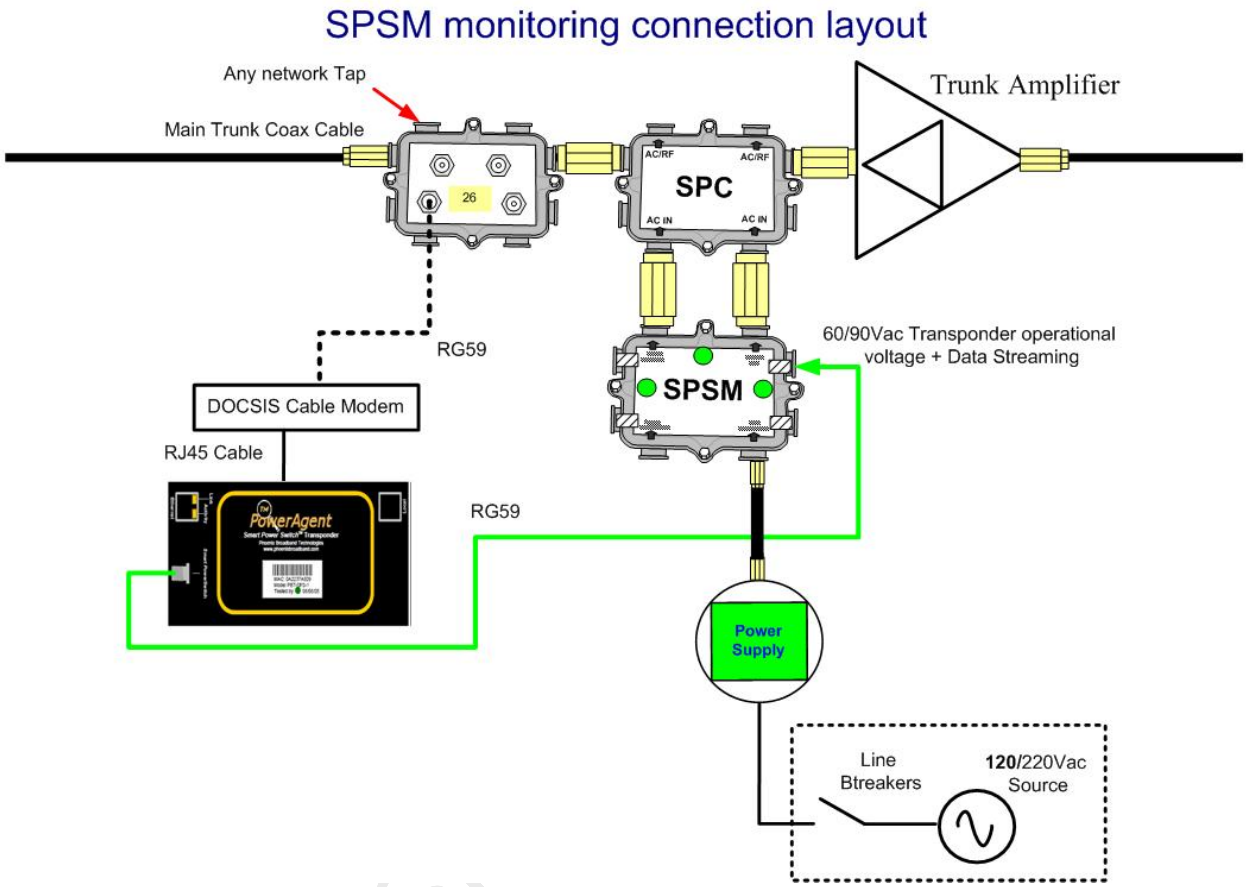

Fig 7

Fig. 7 shows is a detailed schematic of the monitoring system wiring connection