

1. **Invention Title.**

Providing Out-of-Band Signals for Legacy STBs in Mid-split or High-Split Plant

2. **Invention Summary.**

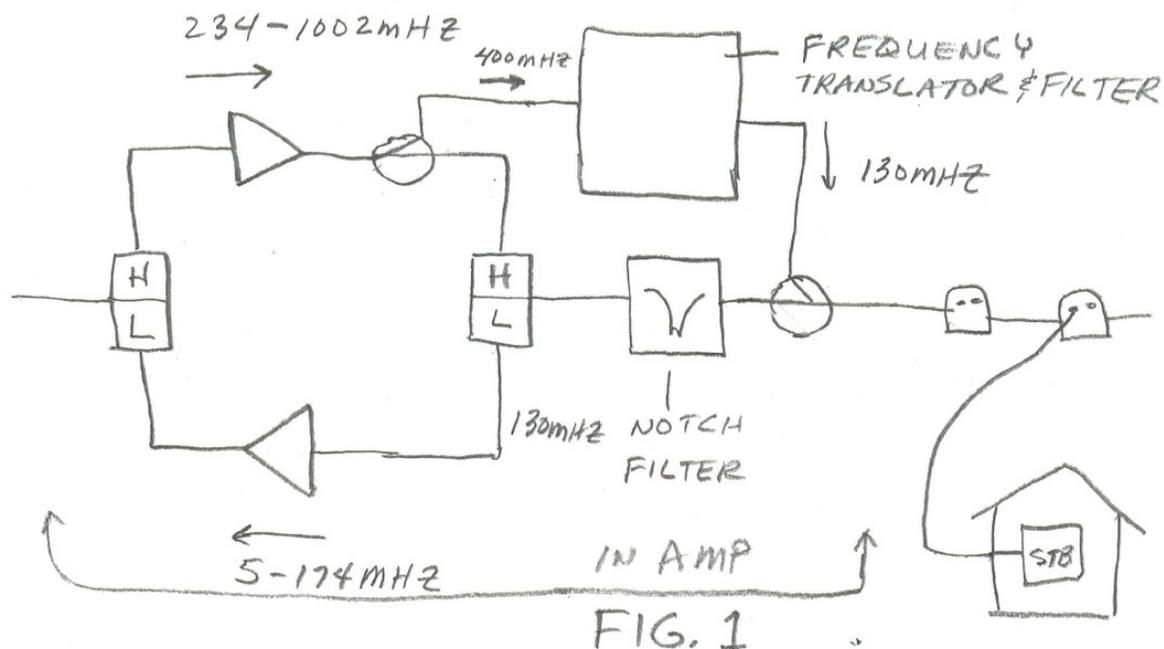
A mid-split or high-split amplifier provides a legacy QPSK carrier to STBs by down-converting a UHF carrier to the 70-130MHz band where it can be received by legacy STBs. The QPSK will essentially be traveling the “wrong way” (downstream) in the high-split cable system’s upstream band. Terminal equipment in homes will avoid transmitting on the QPSK carrier frequency to prevent interference.

3. **Invention Description.**

a. **Describe the invention in detail.**

Legacy STBs typically use one of two methods to receive downstream OOB (out-of-band) signals, the Motorola QPSK system or the Cisco (Scientific Atlanta) Davic system. SCTE 55-1 and SCTE 55-2 specify the Motorola and Cisco OOB signals. The OOB signals are used for one-way or two-way communications with the STBs. The receivers for these OOB signals are normally constrained to tune 70-130MHz. When the frequencies on the plant are changed from sub-split plans (5-42 upstream, 54-860MHz downstream) to mid-split or high-split plans, the downstream OOB receivers are now located in the upstream signal band, so they don’t work.

The solution is to build a high-split amplifier as illustrated in Fig. 1. Assume downstream frequencies are 234-1002MHz and upstream frequencies are 5-174MHz. A downstream OOB carrier is being transported, in this example, at 400MHz, which goes downstream. In the downstream amplifier, the 400MHz signals is frequency translated to 130 MHz and inserted on the downstream side, where it travels downstream in the upstream frequency band. At the home the 130MHz signal is received by the STB. Devices avoid sending signals upstream at 130MHz to avoid an interference, which could be created at a reflection point. The design of the frequency translator is conventional and involves filters, a local oscillator, and a mixer. The 130MHz notch filter prevents amplification of the OOB signal.



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- b. **Why was the invention developed? What problem(s) does the invention solve? How is it better?**

We need to move our splits to increase upstream data capacity, but legacy STB (settop boxes), which currently receive 100-130 MHz, can't be re-tuned. This approach allows one device to service many homes, no homes need to be visited, and the amplifiers need to be upgraded from sub-split to high-split anyhow.

- c. **Briefly outline the potential commercial value and customers of the invention.**

Idea is worth millions to operators.