XTB-F10/F15 10-Amp & 15-Amp Plug-In X10 Filters

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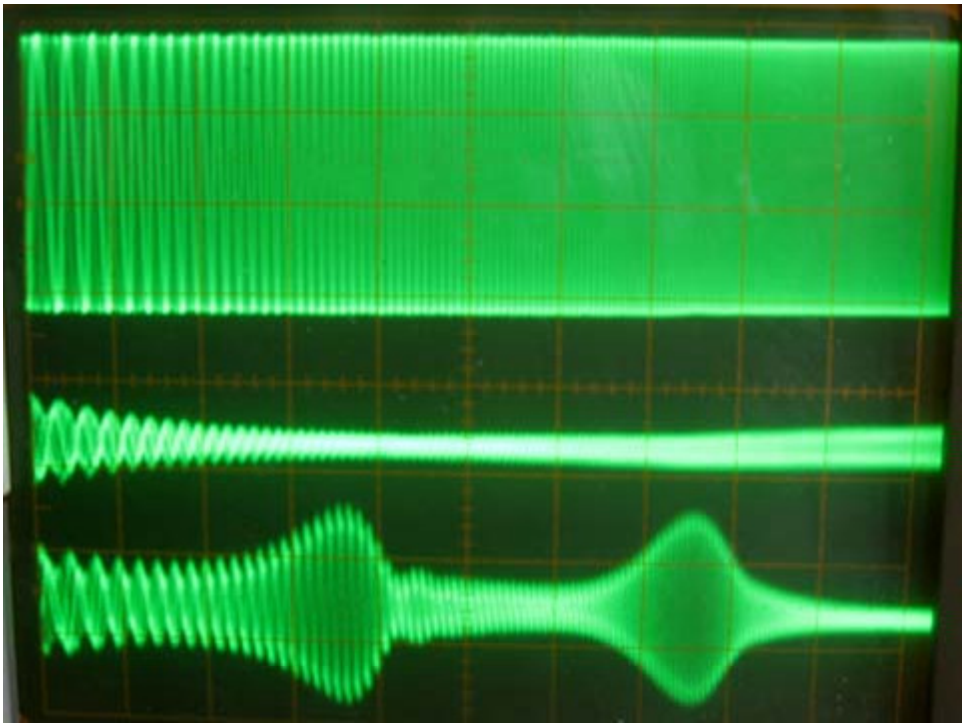
Our electrical systems have become vastly more complex since the 70's when the X10 protocol was developed. Our homes now contain various devices that load down X10 signal levels and inject electrical noise onto the powerline. Many of us are using signal boosters to deliver adequate signal levels, but the noise problem can be more difficult to resolve.

X10 commands are sent as a series of signal bursts coupled to the powerline. Presence of a burst signifies a logic "1", and absence a logic "0". Noise near the X10 carrier frequency can fill in those blank frames, making it impossible for a receiving module to decode the command unless it includes AGC to raise its detection threshold above the background noise level.

Many of us are using the X10 XPPF low-pass filter to isolate noise generators and "signals suckers". The XPPF is a very good low pass filter, but it gets warm and begins to stink when pushed to its 5 amp maximum rating. Most higher current filers are not as effective eliminating broadband noise as the XPPF. The XTB-F10 and F15 are high current filters that eliminate broadband noise almost as well as the XPPF. And they can perform even better rejecting noise inside the X10 bandpass.

The photo below is a frequency sweep being passed through the XTB-F10 and the 20-amp X10 XPF filter that shows the difference in performance between these two filters. Since the XPF is electrically similar to the high current filters made by ACT, those filters would perform similarly. The XTB-F10 is clearly much better at eliminating broadband noise.



In this plot the frequency is swept linearly from 20KHz to 220KHz, with 120KHz (the X10 bandpass) at the center. The excitation scale factor was 2V per cm. The filter outputs were 200mV per cm. A resistor was inserted in series with each filter to prevent loading down the signal generator and causing interaction between the two filters. (Without the resistor, the peaks on the XPF are much larger as that series-resonant circuit sucks energy from the signal generator.)

The XTB-F10 and XTB-F15 provide a very effective tool to isolate the high current noise generators and signal suckers that can plague our X10 systems today. Combining the XTB-F10/F15 to isolate the worst noise generators with the XTB-ANR to reduce overall noise levels, and the XTBR or XTB-IIR to boost signal levels, should result in a very reliable X10 system.