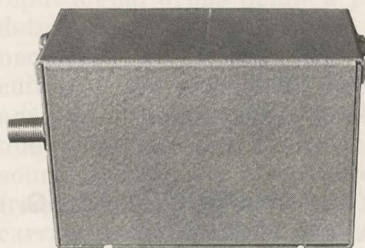


Noise As A Tool

As anyone who has "read" (or calculated to be more exact) signal-to-noise ratios with a field strength meter is well aware, noise is amplified by active CATV equipment and can be read on an FSM...if the level is sufficiently high. Therefore a system that has a broadband noise source (i.e. a noise generator that covers the required broadband spectrum), a field strength meter and an accurate signal generator can measure FCC-required in-channel flatness specifications without the usual wagon-full of tag-along equipment.

As noted last month (see September CATJ, page 46), we are here in the process in a multi-part-CATJ series to show you how you can, on your own in your own shop, construct all of the test equipment required to make the FCC-mandated technical compliance tests. The assumption for this month's part of the series is that you have an FSM, and a signal generator. If you do not have the signal generator portion, come back again next month and we'll show you how to build one with sufficient accuracy to handle that requirement as well.



Zener Diode Source

The heart of our broadband noise generator is a fairly common variety of zener diode. A zener diode, when biased properly, is one of the greatest noise generators ever to come down the pike. A couple of pre-amplifier manufacturers have discovered this fact when they attempted to install zener diodes as protection devices in their pre-amps, and found the pre-amp noise figures promptly

NOISE AS A MEASUREMENT TOOL Another Test Equipment Construction Project From Steve Richey

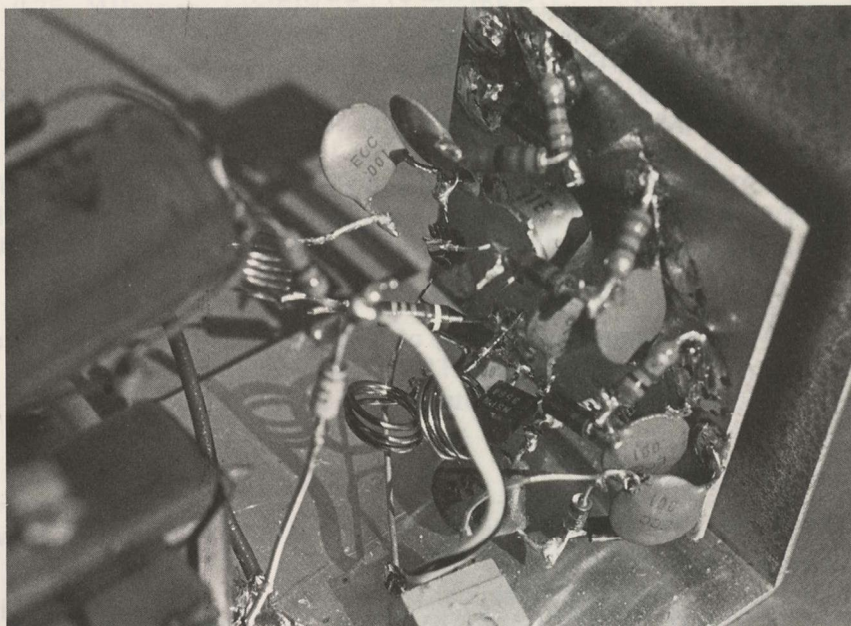
went to the dickens in a hand basket!

Sure that the world had at least one super-zener-noise-diode waiting to be discovered, we set out to check out the noise generating characteristics of several dozen common (and not so common) zener diodes. We ended up selecting one of the most common of all employed units, the 1N758. This is a 100 mW 10 volt zener and it has the capability of generating — 35 dBmV of wideband noise all by itself without any after-amplification. To boost that level to a more suitable level for our testing requirements, we followed the 1N758 with 15 dB of broadbanded amplifier using the also common 2N3564 family of bi-polar transistors.

As you can see from the photo illustrations, the broadband noise generator is constructed in a mini-box with built-in AC supply. The noise generator

proper is mounted on a small piece of copper clad (PC) board. When constructing the circuit, short lead lengths are essential, especially the emitter leads on both transistors.

Although the 2N3564 (or 2N3563) transistor is about as common as one can find in CATV, they are not crucial to the circuit. Any TO-39 configuration CATV type transistor can be substituted in the second stage of the amplifier, and in a pinch most types will also work in the first amplifier stage. If the unit is properly constructed, the only alignment required should be setting the 10K pot for maximum noise output, as measured with your FSM at channel 13. After doing this, if you have a way to check for noise output versus broadband output, you should find the level at the output is ± 1.5 dB maximum from 50 through 220 MHz.



BY S.K. RICHEY
Richey Development Corporation
Oklahoma City, Ok. 73119