

# Peak Your Picture With Home-Brew SSTV Test Gear

*Go from gray scale to color bars with these simple generators. No monitor should be without them.*

In my spare time I enjoy viewing slow-scan television on my home-brew monitor and like to keep up to date with advances in this field. Also, I enjoy designing with all types of integrated circuits, CMOS in

particular. Thus, I have combined these two interests into the two projects described here. Each generator has nine ICs and few other components and both can be built for well under \$100.

The SSTV gray-scale generator is used as a standard to adjust brightness and contrast levels on commercial slow-scan monitors and to peak sync and bandpass filters on home-brew equipment. It also can be used to

check repairs or modifications on any monitor.

In addition to the above-mentioned operations, the SSTV color-bar generator is useful when selecting red, green, and blue filters for color slow-scan photography. It provides a pattern with these colors plus mixtures of them into blue-green, violet, yellow, and white.

## Gray-Scale Generator

The MM5369 is a crystal-controlled oscillator providing a square wave at 3.58 MHz. This signal is divided by a factor of 10 through each of the 4017 dividers. A 35.8-kHz signal is present on pin 9 of the 4520 binary divider. A binary code is fed into the 4514 decoder.

Meanwhile, the 4069 clock provides a 240-Hz square wave to pin 1 of the other binary divider in the 4520 package. Here, the binary-coded output selects one of the 16 available input pins from the two 4051 digital selectors and passes reset information from the 4514 decoder through pin 3 of both 4051 ICs to the reset pin (pin 15) of the first binary divider.

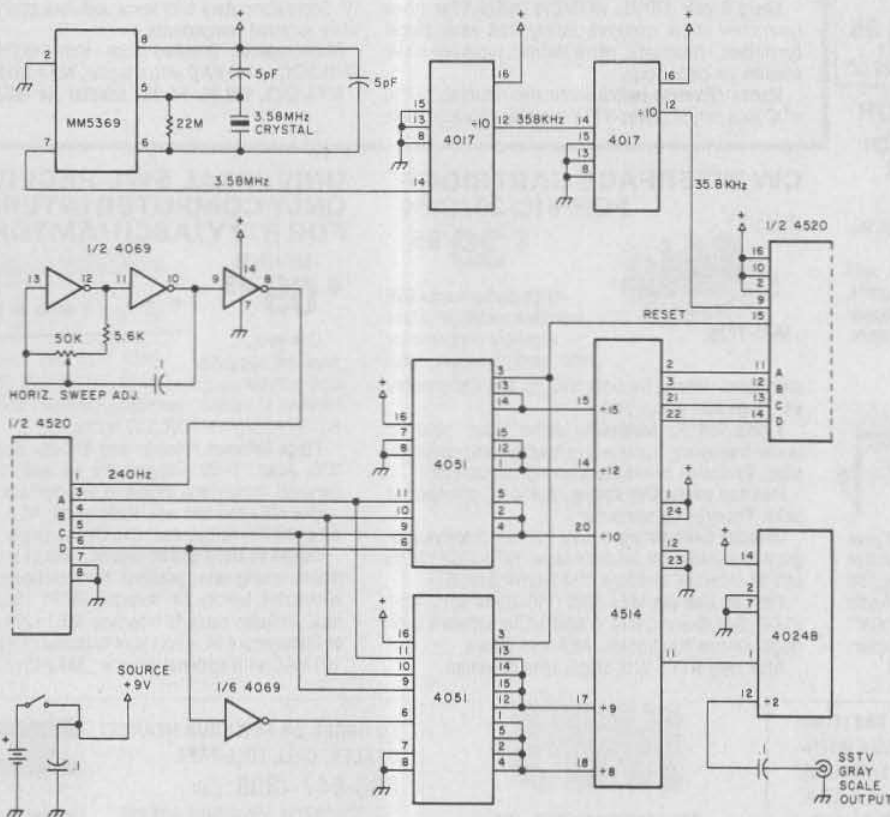


Fig. 1. CMOS SSTV gray-scale generator.

As the 16 input pins are swept through (top to bottom on the schematic), the 35.8-kHz frequency is divided by factors of 15, 12, 10, 9, and 8 respectively. This will constitute one scan line on the monitor. The 4024B takes frequencies from the "0" pin (pin 11) of the 4514 and divides all by a factor of two. The result is an SSTV gray scale with frequencies within one percent of 1200, 1500, 1800, 2000, and 2250 Hz. All are 50/50 duty-cycle square waves so gray-scale shades will result only from changes in frequency. The only adjustment necessary is horizontal sweep speed.

### Color Bars for SSTV

The same general operation of the gray-scale generator can be redesigned to give us the three frame patterns necessary to produce, photographically, a slow-scan color-bar frame.

We start again with a 3.58-MHz oscillator and divide by a factor of 100, this time in a single 4518. A 35.8-kHz signal is fed to pin 9 of the 4520 and a binary-coded output is available at the address inputs of the 4514. Also, a clock frequency of 120 Hz is provided at pin 1 of the 4520 and a binary code is presented to a single 4051.

The action of the 4051 and the two sections of the 4053 can be described as switches in series. Binary data on address pins 9, 10, and 11 of the 4051 and control pins 9 and 10 of the 4053 will route data from the 4514 pins 15, 14, and 18 to pin 15 of the 4520. The timing of these connections will produce horizontal and vertical pulses as well as full cutoff and saturation (black and white) bars when viewed on the monitor. When looking at the three frame patterns, one can see a relationship forming between the width of the bars and the square-wave frequency at the RGB select switch.

A 555 timer is used as a 98/2 duty-cycle clock to

control pin 10 of the 4053. This clock and the bottom 4053 switch provide a vertical sync option for the generator. For about two scan lines worth of time, the generator will produce a 1200-Hz tone. The monitor will look at this tone as a vertical sync pulse.

The 4013 is a divide-by-two stage that operates identically to the 4024B in the gray-scale generator. The output inverter is not necessary if one has a "B" series 4013 device.

### Going Further

The heart of these audio-tone generators can be a good starting point for other projects. Add a memory (ROM) and send graphics or your call letters without a computer. Build a flying spot scanner, vidicon camera, or a totally solid-state SSTV camera with the new Reticon photodiode arrays (see *Radio Electronics*, March, 1982, page 75). ■

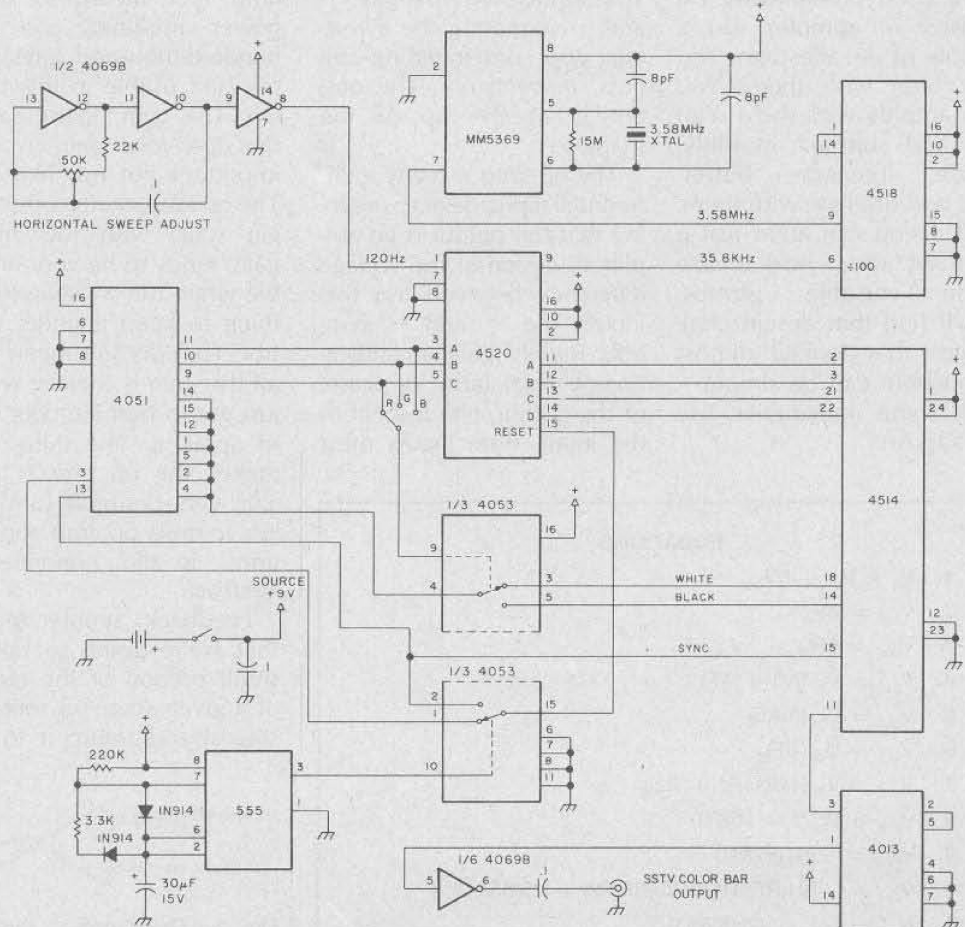


Fig. 2. CMOS SSTV color-bar generator.

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