Getting Started with Slow Scan Television

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Who says hams should be heard and not seen?

T hink of all the methods hams use to communicate with each other. The short list would include speech, data and Morse code. Did you forget *images*? At 420 MHz and up, hams routinely exchange live, full-motion video. It's called fast-scan television (FSTV)—the same TV you're accustomed to seeing at home. FSTV is a fun mode, but the transmitted range is limited to a few hundred miles under the best conditions. In addition, special transmitters and receivers are required.

But what if you wanted to share images over *thousands* of miles? You could take a fixed (nonmoving) image and slowly scan it line by line, converting the color and brightness variations into audio tones. Feed the audio tones to an ordinary SSB voice transceiver and you can send this information almost anywhere in the world. On the receiving end, the audio tones are translated back into an image on a computer screen. Hams call this technique slow-scan television (SSTV). Although it has neither the movement or the high resolution of FSTV, the advantage of SSTV is that you can send pictures over great distances without relaying devices or special transmitting gear by using the propagation characteristic of the high-frequency bands.

Thanks to the proliferation of personal computers and sound cards, it has never been easier to enter the world of SSTV. Most SSTV activity takes place on 20 meters, but you'll find it on other bands as well. Hams licensed as Technicians should note that SSTV can be used on VHF, too. You'll find activity on 6 meters from time to time, and a few amateurs have even swapped SSTV images via satellite!

We've Come a Long Way

About 28 years ago I constructed a slow-scan monitor based on a design by Cop McDonald, WA2BCW, that was published in the March 1964 *QST* ("A Compact Slow-Scan TV Monitor," p 43). State-of-the-art SSTV back then consisted of a tiny green screen that "painted" an image every eight seconds. The viewing wasn't easy. By the time the last line was painted at the bottom of the screen, the lines at the top were fading! And there was no way to save these old images other than to take time-exposure photographs or make audiotape recordings.

Today I enjoy sending and receiving high-quality, 16-million-color SSTV pictures—some even in 3D!—and have hundreds stored on my computer. I can watch them appear on my monitor in real time, or save them as image files for later viewing. I can even print my pictures in color on my ink-jet printer.

So how do you get started on SSTV? If you own a personal computer, you can use the software approach. If a PC isn't in your future, there's also the stand-alone system. Let's take a brief look at both.
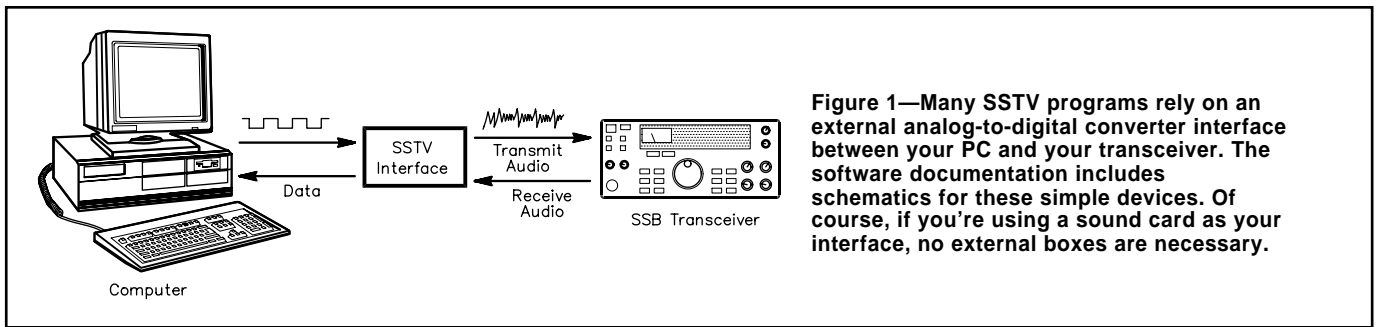
If You Own a PC…

Most of the software/hardware packages for SSTV are designed around IBM-compatible PCs. You don't need an ultra-fast, sophisticated machine; a 486 PC should do just fine. Even 386s can be used with some programs. There are a number of SSTV programs available; some are freeware, some are shareware, and others are strictly commercial. Most of these programs run in DOS and several also run under *Windows* 3.x and *Windows 95*.

If you work the author on SSTV, this is a sample of what you might see.

VGA/Super-VGA Video Cards

The type of video card installed in your PC dictates how the images will look on your monitor. There are many different types of video cards and setups used on PCs these days. Some older systems have the video on the motherboard. Some have combination I/O and video cards and others use ISA or PCI cards in slots. A few cards also require specific video software drivers. All SSTV programs require VGA display capability. If you're using an old monochrome or CGA display, you'll want to upgrade to see SSTV in its full glory.

You'll get best results with a video card that can display in at least 256 colors. Some SSTV programs may even require a 16-million-color display. You'll also find that modern video cards feature on-board video memory. Generally, 1 Mbyte of video RAM is sufficient for SSTV.

You can pay $200 to $300 for a fancy, high-speed video card, but these aren't necessary for SSTV. Unless you have high-powered graphics or animation applications that you want to run, a basic VGA card for about $50 is sufficient.

Figure 1—Many SSTV programs rely on an external analog-to-digital converter interface between your PC and your transceiver. The software documentation includes schematics for these simple devices. Of course, if you're using a sound card as your interface, no external boxes are necessary.

SSTV on a PC is more than just software, though. We have to translate analog SSTV tones into digital data the computer can understand. When it's time to transmit, the same process must occur in reverse. So we need an interface to bridge the gap between the digital and analog worlds. Sound cards are perfectly suited for this task—analog-to-digital conversion (and vice versa) is what they do best. That's why you'll find SSTV software written for PCs equipped with SoundBlaster (or compatible) cards. If your PC does not have a sound card, you can build a simple external interface to accomplish the same goal (see Figure 1). Several software packages use this approach exclusively.

You'll find SSTV software on services such as CompuServe and America Online, as well as on several ham-oriented BBSs. There is also a wealth of software on the Web. See the sidebar, "SSTV Software On Line."

If You *Don't* Own a PC…

There are several stand-alone SSTV systems that operate without computers. They accept video from a camcorder or other source and display images using standard TV monitors. These systems can also work in conjunction with a computer for additional storage and graphic functions.

For example…

• **Robot 1200C**—Introduced in 1984, this is an excellent scan-converter color system. The 1200C is out of production, but it often shows up at hamfest flea markets.

• **Tasco TSC-70U**—Reviewed in the April 1997 *QST* on page 59. This versatile system provides outstanding color images and many SSTV formats. It also offers a serial computer interface, infrared hand-held remote control and optional two-page video memory.

• **Handbuch SC-2**—From Wraase Elektronik, this is a scan converter designed by Volker Wraase, DL2RZ. The earlier SC-1 units contained the first line-sequential single-frame color (GBR). The SC-2 includes the Martin modes, and can be

Occasionally other SSTV stations in a net will retransmit images for those who didn't receive a clear picture from the originating station. Here the author does a "replay" for the group.

More SSTV Information on the Web

This is only a partial list, but it is a starting point on your quest for information on this fun aspect of Amateur Radio.

W5NOO	**http://www.junct.com/ramon** (my humble page)
W4MWG	**http://ns.netmer.com/~SSTV** (the IVCA page by Frank Lombard)
NL7J	**http://www.alaska.net/~buchholz**
KR7A	**http://www.accessone.com/~ericw/**
WB2OSZ	**http://www.ultranet.com/~sstv** (*The SSTV Handbook*)
VE3RDN	**http://www.kent.net/ve3rdn**
WB4EJC	**http://www.icanect.net/~rlehman**
W2PQC	**http://www.tripod.com/~pqc**
KA1LPA	**http://www.mindport.net/~jame**
N9NGF	**http://www.tima.com/~jjones**
WB9MMM	**http://ourworld.compuserve.com/homepages/sstv/**
N7CXI	**http://www.wolfe.net/~jlbarber/sstv.htm**
KB4YZ	**http://www.intersource.com/~djones**
GØITP	**http://www.nwnet.co.uk/dexter/sstv2.html**
WB4HCV	**http://members.gnn.com/JThomas310/jimt.htm**
BV1AL	**http://www.isite.net.tw/bvlal/e-index.htm**
VE3SSV	**http://www.cdx.net/ssv/sstv.htm**
PA3BVM	**http://www.publishnet.nl/~hoogzand/**
WØTUP	**http://parshall.ndak.net/~anrestel/w0tup.htm**
HB9HEX	**http://www.geocities.com/siliconvalley/park/9501/ hb9hfx.htm**

The smiling face of KQ4XZ, courtesy of SSTV!

equipped with a keyboard for adding graphics.

How Do We Make an SSTV Picture?

Receiving an SSTV image is easy and fun, but eventually you'll want to start sending images of your own. The first step is to create a picture. There are many ways to do this.

Digital cameras are becoming quite affordable (there are several on the market right now that cost less than $300). You can snap a picture, dump the image data to your PC, and send the data over the air. If you don't want to buy a digital camera, how about a hand-held or flatbed color scanner? Many are available for under $200. Pop a picture into the scanner and within seconds you have an image you can transmit.

Do you own a camcorder or a VCR? Video digitizers such as Snappy, Computer Eyes, Ventek, Video Logic Captivator and others can freeze and capture video images (live or prerecorded). Just save them to your hard drive and transmit!

If you're running Microsoft *Windows*, chances are you have *Paintbrush* on your PC. Did you know that you can use *Paintbrush* to create artwork that you can transmit via SSTV? Of course, if you own more sophisticated software such as *Paint Shop Pro*, you can really get cooking!

By the way, most SSTV programs have a text function that lets
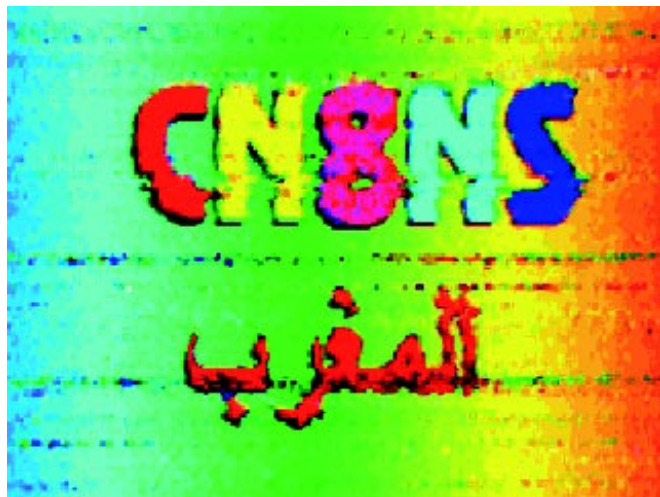
Yes, there is DX SSTV. The author received this image from CN8NS in Morocco. Notice the "noise lines" in the picture.

When you work JA6MC, he adds your signal report as text across the top of his picture.

Table 1
Popular SSTV Frequencies (MHz)

 3.845
 7.171
14.230*
14.233*
21.340
28.680

*You're most likely to find SSTV signals on these frequencies, particularly on weekends.

SSTV Software on Line

Check these bulletin board systems…

ARRL *Hiram* BBS, tel 860-594-0306

COOKIE BBS, tel 419-562-6327

ELMER BBS, tel 302-945-7224

Or surf the Web for SSTV software…

BLASTER SSTV (Color SSTV systems for the SoundBlaster interface by WB9MMM. Demo version available for download.)
   ftp://ftp.amsat.org/amsat/software/PC/fax-sstv/sstvbl.zip

EZSSTV (Interface demo software similar to Pasokon [see below])
   http://www.ultranet.com/~sstv/ezsstv.html

GSH-PC (Interface color SSTV system by DL4SAW)
   http://ourworld.compuserve.com/homepages/dl4saw/ GSH12ZIP.EXE

Hi-Scan (Use with ViewPort VGA interface available from A&A Engineering, 2521 W La Palma, Anaheim, CA 92801; tel 714-952-2114)
   http://home3inet.tele.dk/oz2lw/

JV-FAX (By DK8JV; interface SSTV system.)
   ftp://ftp.funet.fi/pub/ham/fax sstv/jvfax71.zip

MS-SCAN

   http://www.mscan.com/mscan211.zip

PASOKON TV Classic (SSTV color hardware/software system that installs in a 386 or faster PC. Operates in DOS with a mouse. By John Langer, WB2OSZ.)
   http://www.ultranet.com/~sstv/computer.html#pktv

PASOKON TV Lite (Interface color SSTV system similar to Pasokon TV Classic with reduced functions. By John Langner, WB2OSZ.)
   http://www.ultranet.com/~sstv/lite.html

PROSKAN (Interface color SSTV system by KA1LPA)
   http://www.mindport.net/~jamie/proskan.zip

VESTER (Interface color SSTV system by Ben Vester, K3BC. See *QST*, Jan 1994, pp 27-29.)
   ftp://ftp.funet.fi/pub/ham/fax_sstv/vester m.zip

W95SSTV (*Windows 95* color SSTV system using a sound card interface)
   http://www.wolfe.net/~jlbarber/sstv.htm
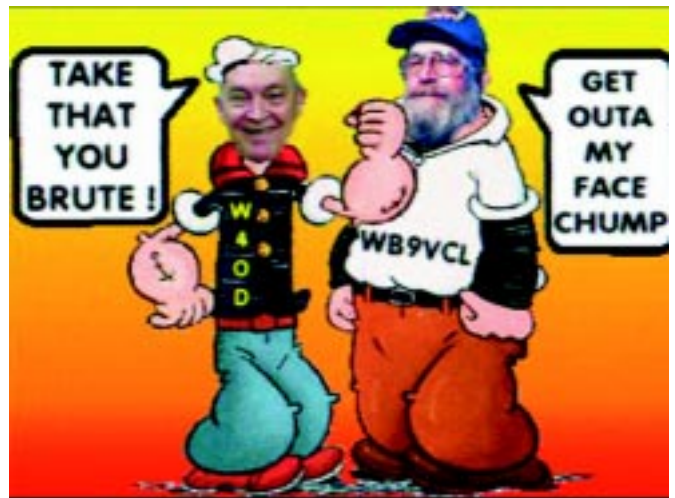
Win Pix Pro (Color SSTV system; runs under *Windows* 3.x and *Windows 95* with a sound card interface.)
   http://www.skypoint.com/~k0heo/

Wayne, W5FJS, assembled this "animal friendly" SSTV picture.

With the right software, you can create just about anything!

Show off your son or daughter to the world!

A canine group portrait makes for an attractive SSTV image.

you place "type" on the image to add information, comments or simply your call sign. These functions, however, are often limited in choices of fonts, colors and so on. You're probably better off using *Paintbrush* or other software to dress up your images.

And what kind of images can you send? Anything is fair game, as long as it isn't offensive or in poor taste. Show the world your rig, antenna, your home, your family or…yourself.

On-the-Air Operating Suggestions

As I've already mentioned, you'll find most SSTV activity on 20 meters, specifically at 14.230 and 14.233 MHz. As the bands improve with the progress of the current solar cycle, you may see the activity spread to other bands (see Table 1).

I suggest that you begin your SSTV adventure by simply listening. Take a few minutes this weekend and eavesdrop on the SSTV groups. What you'll hear are brief announcements such as, "Here's a picture of my new antenna. *Scottie One*!" followed by the *deedle-deedle* sound of the SSTV data signal.

"Scottie one" isn't the name of his antenna, it's the mode he is using to send the image. There are 27 different modes in use, with the most popular being Scottie One and Martin One. Everyone who is receiving your picture must have their software set to the proper mode. That's why you should announce the mode before transmitting.

The entire transmission can take as long as a minute or two. After that you'll hear the other operators jump in with quick com-

ments such as, "Nice-looking antenna, Joe!" If a distant station failed to copy the image (noise and interference can scramble an SSTV picture), another station might act as a relay by retransmitting the data.

After you've listened for a while, fire up your SSTV receive system and copy a few images. The quality and beauty will amaze you! You'll want to save some of these to disk and build a library of your own.

When you think you're ready to send some SSTV of your own, join the net and give it a try. You'll find that SSTVers are a pleasant bunch and they always welcome new operators.

Expand Your Vision

One of the most fascinating aspects of SSTV is that you get to *see* the people and places you've only *heard* in the past. There's something about seeing the face of a friend that adds a new dimension to any conversation. And just imagine what you'll see when the operator points his camera out the window to give you a minutes-old glimpse of his neighborhood. (If the nearby tree branches are swinging in the breeze, you'll see some odd "tears" in the image, but that's okay!) Now I ask you, is this slick or *what*?

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