

# Pasokon TV Slow-Scan TV Interface

*SSTV for everyone!*

Amateur slow-scan TV has been around for many, many years. The first experimenters used long-persistence phosphor displays "liberated" from old radar systems, and the quality was crude, to say the least. Still, it was a tremendous achievement to transmit pictures over our 3-kHz voice channels, and the SSTV art has slowly evolved ever since. The next wave used dedicated scan converters, which were digital memory boxes that could convert the normal TV scan rate down to something slow enough for narrowband transmission. The converters worked well, but they were quite expensive, and most were limited in their image processing capabilities beyond the basic functions of transmitting and receiving.

There are still plenty of the latter-generation dedicated scan converters on the air, and a few are still being made. These days, though, the trend is toward a more powerful, cheaper SSTV realization using that ubiquitous digital box we all love so much: the personal computer.

Wanna see what's being sent on 14.230 and 14.233? Wanna send some pictures of your own? All you need is an IBM-compatible computer and the new Pasokon TV system, which includes an interface board and the required software. I just recently got mine, and I'm having a great time with it.

## What You Need

Although the system can be run on a 286, you're much better off with a 386 or higher processor. I tried using it on my old 286, and it worked on most modes, but came up with "machine too slow" when I tried to receive some Robot 12-second pictures, which come in pretty fast and actually demand more of the computer than the newer, slower modes.

You need a standard ISA bus; the thing won't work with a microchannel bus of the PS/2 type. The more memory you have, the better, but you can run the system on anything, even 640K! Extra memory, however, lets you store multiple pictures in RAM,



Photo A. Screen shot of Pasokon's Mac/Windows-like interface.

which is extremely handy, for reasons I'll get into shortly. A mouse is very useful with the Pasokon system, but you don't need one. I don't have one and I'm able to use all the functions without it.

The quality of displayed pictures depends

a less capable card. My 1-meg card blew a RAM chip (through no fault of the Pasokon) and I switched back to my old 512K, 256-color card. At first, it looked terrible. After reading the manual, though, I ran the included universal VGA driver, and it allowed the Pasokon to use my card in a better graphics mode. The result was that pictures looked almost as good as with the 1-meg card, though not quite. No matter which card you use, the system still receives and saves pictures in the highest quality; if you later upgrade your card, you can see previously saved pictures in higher quality!

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a great deal on your VGA card. The system works best on a 1-meg card with 32K color capability and VESA 1.2 conformance. I tried it with such a card, and the pictures were pretty stunning. You can, however, use it with

## What You Get

The Pasokon TV system consists of an interface board, a 3.5" disk and a user manual. The interface board is basically a modem



Photo B. With the press of a key, the interface vanishes, and the image grows to full-screen (320 x 240) size.

and a timing circuit which helps the computer decode the SSTV information. The computer itself does most of the work, which is as it should be. The system supports just about every SSTV mode ever created, including the AVT (Amiga Video Terminal) standard. Unlike other modes, AVT does not use horizontal sync pulses, requiring very precise timing on both the transmitting and receiving ends in order to avoid slanted or distorted pictures. There are some advantages to that approach, the biggest one being that fading, noise, or QRM cannot mess up the sync timing, because there isn't any sync in the first place! Pasokon TV supports the AVT mode the right way, using its own onboard, crystal-controlled timing oscillator, rather than trying to rely on the computer's timing, which can vary from machine to machine. To make sure the timing comes out exactly right, there's even a trimcap, accessible from the outside, so you can set it perfectly. You can do this several ways: by watching pictures as they come in, using an external receiver to calibrate the oscillator, or connecting a frequency counter. If you have one, that's the quickest, best method. The board comes pre-calibrated, so you may not have to do it at all.

It is important to note that, like all currently available computer-based SSTV systems, the Pasokon does not include a video digitizer to get your own pictures into the computer for sending. Of course, you can still send computer-generated images and pictures you've received from other stations, but, if you want to send live "snaps" of yourself, your shack, your dog, or that latest homebrew gadget on your workbench, you'll have to find some way to input the pictures. Digitizers can be had for about \$300, or perhaps

you can use a friend's unit to get a bunch of pictures ready for transmission. Once you have them on a disk, you can put them into your computer and be ready to go.

#### Getting It Running

Basically, you just plug the board in, install the software and wire up the cables. Although common wiring schemes are shown in the manual, no pre-wired cables are available; there are just too many kinds of rigs out there to make that possible. Cleverly, the Pasokon board includes a relay for audio routing, so that you can keep your mike connect-

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ed. Or, if you're using your radio's accessory connector, you can keep your TNC, RTTY unit or other outboard gadget hooked up. When you operate SSTV, the Pasokon takes over and routes the audio to itself. When you go back to other modes, the relay switches out and the Pasokon effectively disappears. It's all pretty convenient. You will, however, have to make the cable, using the included interface connector and your own audio plugs, which you provide. But heck, we're hams! If we can't even wire up an audio connector, what are we doing in this hobby? For most of us, it should be no problem at all. I had mine up and running in about fifteen minutes, and it worked the first time.

If you have a standard PC, with standard addresses and interrupts, the Pasokon board

should be all ready to go. Just plug it in and you're done. If, however, your machine has some conflict, perhaps due to other peripherals sharing the same address space or something, you'd better know something about PCs and their architecture. You can set the Pasokon for other addresses and interrupts, but the manual assumes you know what you're doing; it's not written for beginners.

By the way, you can't run this thing under Windows, Dosshell, or any other menu shell program, because the decoding of SSTV signals requires very precise timing with which the menu programs can interfere. So, you'll have to quit out of Windows and run it under DOS. Luckily, it's no big deal to do that.

#### How It Works

After the software loads, you're presented with a Mac/Windows-like screen, with various buttons for transmission, reception and mode. At the top are pull-down menus for numerous functions, including saving and loading pictures, selecting from the included noise-reduction and enhancement routines, and even running other programs (such as for a digitizer) without quitting the Pasokon environment. You can use the menus with a mouse or by pressing the ALT key.

#### Receiving Pictures

All you have to do is fire up your computer, set your rig on an SSTV frequency such as 14.230, press the on-screen "receive" button and wait. The Pasokon decodes the VIS (vertical interval signal) codes which tell SSTV systems in what mode the picture is sent. It's really nifty to watch it switch to, say, Martin 1 when the picture starts. If, though, you tune in after the picture begins, you can still select the mode manually, as long as you know what it is. That might also be necessary if noise or QRM obscures the VIS code. Most of the time, though, the automatic feature takes care of it quite well.

If you're using an analog rig, or the sending operator is a bit off frequency, you may need to fine tune your receiver. The Pasokon includes a real-time, on-screen tuning indicator that is actually an audio spectrum analyzer! It shows you the incoming audio on a little, vertical graph, with a red box at the bottom for the sync. To tune, you just center a line within the box, and you're done. It isn't very critical, though, because the software will lock to signals as much as 100 Hz off frequency. The line also serves another function: it indicates the software's degree of certainty that it is, indeed, receiving sync pulses. As the sync is received, the line gets longer. If fading or noise starts to obscure the sync, the line shrinks and eventually disappears.

As a picture comes in, it's displayed in real-time in a generous window next to the tuning indicator. After the image is complete, you can press a button and the user interface will go away and be replaced by a full-



screen image of the received picture in all its 320-pixel by 240-line glory. It looks great!

Well, usually. If QRM or other noise has damaged the picture, you may be able to clean it up a bit using some of the included image enhancement features, such as low-pass filtering or two kinds of noise reduction. Depending on the original state of the image, these features can really help, although they sometimes blur the picture more than you might want. That's no fault of the Pasokon software, though; it's an unavoidable price of some of these kinds of image manipulation.

If you have extra memory, here's where it comes in handy. Instead of saving the picture immediately, which might cause you to miss the next one coming in, you can just leave it in memory. A small box at the bottom of the screen will display it in postage-stamp size. Depending on how much extra memory you have, you can get up to ten simultaneous pictures across the bottom of the screen. My 2-meg machine gives me four of them. I just save 'em up until there's a lull on the frequency, and then I store them to disk at my convenience.

Two extra-cool features in the Pasokon are its sync squelch and auto-save, which let

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you walk away and snag pictures automatically. The sync squelch makes sure voices or noise don't get misinterpreted as picture data, and the auto-save dumps received pictures to disk, using a numbered naming scheme. So, you can start it all up, go away for awhile, and come back to a whole bunch of images already stored on your hard drive.

#### Transmitting Pictures

As I mentioned before, there's no included digitizer. There is, however, a provision to take 3-D pictures! The procedure requires you to take two snaps with your digitizer, one

for the left and one for the right view. The software then alters the colors of the two views and combines them so that the resulting picture looks 3-D when viewed with red/blue glasses, which are included. And yes, you can send that image and it will still look 3-D at the other end, as long as the receiving operator also has the glasses.

To send a picture, you just get it into memory, either by digitizing some video, loading a stored image from disk or simply receiving a picture off the air, and then select the desired transmission mode and press Xmit. Away it goes! You don't have to convert the image in any way to use it in various modes. Even if you received it in Scottie 1, you can send it in AVT if you feel like it.

There's an externally accessible trimpot on the board which lets you adjust the audio output level, so you can set it up for the desired output power level from your radio. Many radios can't send SSTV or other full-duty-cycle modes at full power, requiring you to reduce it to half or less. I set mine up so it would put out 50 watts with the mike level control set to its normal voice position.

#### What I Liked

The Pasokon does exactly what it's supposed to, and it does it well. It supports various graphics standards, including GIF, TGA and PCX, so you can easily upload your received pictures onto online computer networks. And, converting a TGA file into GIF is as simple as loading it and resaving it in the new format. The software is easy to use, and the hardware installation is fairly hassle-free, as long as your computer doesn't have any special requirements. The cost of the system is very reasonable for what it does.

#### What I Didn't Like

There isn't much to complain about on this thing, but there are a few minor points. When you save a picture, the screen doesn't show its filename above the image until you reload it. That makes it hard to know which received pictures you've already saved. It would be better if the filename appeared as soon as the save was complete.

Although the image enhancement features work decently, there's no provision to replace

"hits," or noise-destroyed lines of video, with the previous line. That technique is standard in VCRs and is present in various computer image systems, and I wish it were available here. Of course, you could load the image into other software to fix it, but it would be a lot more convenient if the capability were included.

The pull-down menus are handy, but, when used without a mouse, they don't allow you to scroll down the options to pick the one you want. Rather, you must select the desired function by its letter. If you try to scroll down the menu, it just rolls up and disappears.

The manual, while fairly complete, is not

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written for the computer neophyte. Some of the explanations could be more complete, particularly regarding addresses and interrupts, a subject which confuses many people.

#### Conclusion

If you've ever wanted to get into SSTV, this is a great way to do it! I hope digitizer hardware comes down in price enough that computer-based systems can include it. Even if you have to buy a separate one, though, the price of a complete computer-based SSTV system is far lower than that of a dedicated scan converter, and the utility is much greater. The Pasokon is the most fun I've had on amateur radio in a long time. I highly recommend it.

Oh yeah, before I forget . . . A demo, receive-only version of the Pasokon system called EZSSTV is available on various computer networks, including the ARRL BBS and the Internet. It won't save pictures to disk, and it only supports a couple of the modes, but you can get your feet wet with a simple, one-chip, home-brewed interface and see how much fun SSTV is. There's also an SSTV primer from the same sources. Happy video, and I'll see you on the bands! 73

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