Technical Correspondence

Conducted By Paul Pagel, N1FB
Associate Technical Editor

VESTER SSTV/FAX480/FAX SYSTEM UPGRADES

By Ben Vester, K3BC, 4921 Bonnie Branch Rd, Ellicott City, MD 21043

◊ I've added a number of improvements to the software-based system described in March 1994 *QST*.[1] A brief outline follows, with a more extensive description included in the instruction manual packaged in the latest ZIP file, *VESTER_B.ZIP*, which you can download from the ARRL BBS (tel 203-666-0578).

Revision A Updates

• Because weatherfax pictures take up a lot of memory, I've added the capability to save a portion of the image in FAX480 format. This provides a magnified view of the area of interest and becomes another source of FAX480 files. If the recipient of the image is using the Vester system, he can colorize the weatherfax IR images to identify cloud tops, ocean currents and more.

• To the receive program, I've added automatic recognition of the VIS codes. The recognized mode is printed out and the machine continues to copy in that mode. While in automatic mode, manual choice of a mode is available should the VIS header be hit by interference or noise.

• Another automatic mode is identical to that just mentioned, except it has an automatic SAVE added for every picture copied, with the file names being sequential letters of the alphabet. I use a RAM disk as the recipient store for these files while in unattended operation as I'm afraid I'll forget that the system's turned on and fill up my hard disk! The VIS recognition won't work with very weak signals, so you're almost guaranteed that the majority of the images stored are not too noisy.

• I added an automatic mode to the *SLIDESHO* program. You set the dwell time you want for each slide, and when running, just hit **A**(uto) to start a continuous sequence of all the current directory files in the chosen category. The slide sequence continues indefinitely until you stop it.

• Dennis Snyder, KY1S, added a feature to his copy of the transmit program (actually the View and Transmit program, *VT.BAS*) that automatically provides a listing of all of the file names in the current directory that match the chosen mode (ie, Scottie 1, etc) after you activate *VT.BAS*. You pick a picture file from this selection and it's displayed for you to ensure it's the one you want. This only took a few BASIC commands to implement, so I added it to my software. Because not everyone might want this feature, a switch in the CONFIGURATION list is provided to allow you to turn the feature on and off. Dennis has provided a perfect example of how you can adapt the program to your own operating style using BASIC.

• I found that two-color files for the *LABEL* program are more available from the multitude of paint programs in a .PCX format, so I've added a *PCXLABEL* program.

• Some people objected to the "tone tick" audio cue, but were not satisfied with the loss of information when they turned it off with the program switch. I find the tone tick invaluable as a measure of the system's heartbeat. Because some computers have a fairly loud speaker output, you can combat the noise by inserting a resistor in series with the speaker lead to reduce the volume. Somewhat reluctantly, I've added a visual screen cue that lights when the machine is ticking. If you must turn off the speaker, do so in program lines 485 to 487 in *RT.BAS*.

• Since the program uses 262,144-color processing and display, picture sources must support the high color resolution. Some people had difficulty finding image format manipulation programs that offer output in 24-bit TIFF format to match my *TIFCONV* program. Listing the people who have found solutions to this: KY1S reports using *Tempra* and *Photo-Finish 3*; Clark Collet, N9ARX, reports using *Paint Shop Pro for Windows*; David Frandsen, WB7PAP, uses *Graphics Workshop 7.0* (he found this software on the same Steve Rimmer BBS listed in Note 1 of the original article as a source for video drivers; 416-729-4609.) The last two of these are shareware programs. These programs accept different color-resolution files in .GIF, .PCX and other formats. The final SSTV files, of course, have no more resolution than the source files.

• One unexpected result that arose as the system has been exercised on a larger number of systems is a much wider dispersion of time-of-day clock frequencies in many of the newer systems (mostly 486 systems). I chose this source of system timing specifically because it is generally held to close tolerances. Since the time gets updated from the battery-operated clock every time the computer reboots, this tolerance apparently was let slide due to competitive pressures. The line-timing adjustments, LT, in some cases required a larger correction factor than expected, but most users handled that well. They report that you need only experimentally determine one mode's line timing, and all the others come right on using the LT formula. I've added another simple formula that makes the initial correction possible after copying only one picture to ease the work if you have a system that significantly diverges from the mean.

A somewhat more serious problem appeared in some of these systems, as the wider frequency variation has moved the transmit header frequencies (ie, the Frame Sync) far enough to exceed the acquisition window of most systems with automatic VIS recognition. This can be adjusted out with a few judicious POKEs. To make this easy, I've added a 3-position switch to the SYSTEM CONFIGURATION area in *VT.BAS* which allows you to put the system in a Test mode so as to measure and directly adjust the header frequencies. In one extreme case, the frequencies were off far enough to break out of sync. This adjustment should take care of such situations and also satisfy those who want their signals right on frequency.

• Some of my sailing friends who use laptops with only 16-gray-shade displays wanted the improved processing on weatherfax incorporated into those programs. Also, some WEFAX users prefer the 16-shade format because it uses only half the memory for storage. A collection of these programs—including automatic scheduling for maps—has been included for those folks and others who only have 16-color display capability.

• Another problem that has shown up in a few cases is noisy I/O cards. These produce noise in the picture even with very strong signals. KY1S reported this first and fixed it by replacing the offending card with an older one he had. Others have used the same fix. I have no data on identifying which card brands are faulty, and —more importantly—which ones aren't! If those who have encountered this problem and solved it will send me the information, I will include it in later revisions of the software for others to use. These cards are cheap ($10 to $15), so replacement shouldn't be burdensome.

• Other information gleaned from helping others get their system working is included in the new instruction manual, *TVINFO.TXT*.

Revision B Updates

The following major changes were made in Revision B.

There are complete writeups in the new version of *TVINFO.TXT*—the paragraph headings in parentheses below refer to the *TVINFO.TXT* section titles.

• Routines were added to *RT.BAS* and *VT.BAS* to protect them from residuals left

[1] B. Vester, "An Inexpensive SSTV System," *QST*, Jan 1994, pp 27-29.

by other programs (such as *JVFAX, HAMCOMM* and others). This eliminates the need to reboot your computer (see *VT.BAS*).

• I added a slide-show program, *TRUSHO.BAS*, which supports true color (16.7-million-color) boards. It includes the option of full screen display of a single picture and/or four pictures per screen. See your saved pictures in their full splendor! This program and its associated *TRUSHO.ASM* and *TSS.BAT* files are installed in the DOS directory (see *TRUSHO.BAS*). (An example of the results you can expect with 16.7-million-color cards is shown in the Up Front section of this issue.)

• I've expanded the routine for using VESA boards/drivers by adding a bank-switch function to cover a wider field of choices, including many Cirrus Logic boards (see *VU.BAS*).

• I've cleaned up the transmit headers on the AVT modes and in FAX480 and added adjustment for the initial 244-Hz tone in the FAX480 header (see *VT.BAS*).

• Included is a description of what has been a source of trouble on some 80486 machines, particularly in transmit. The source of the trouble is terminate-stay-resident (TSR) programs that are "wired in," but switchable from a CMOS selection panel (see initial paragraphs prior to *VU.BAS*).

There are other miscellaneous additions/corrections in *TVINFO.TXT*, so it's worthwhile to reread the file (or maybe it'll be your first read of the file!).

[As this goes to press, VESTER_C. ZIP has become available.—*Ed.*]

VLF LISTENING CAN BE REWARDING

By Robert W. Fischer, K2ND, Consultant Engineer, 80 Iroquois Dr, Brightwaters, NY 11718

◊ I was delighted to read the article on VLF radio signals.[2] The field of VLF is unrecognized by most hams, and yet can be of great interest when studied from the hams' viewpoint. For many years I worked daily with VLF signals from the Omega system (10 to 14 kHz) and loran systems (100 kHz) as a navigation field engineer. I was also responsible for the daily monitoring of these signals for historical purposes. I found a remarkable correlation between the performance of these signals and propagation in the lower HF and VHF range.

The Omega system is composed of eight transmitters spaced strategically around the globe. Transmitters are located in Japan, Norway, Liberia, Hawaii, North Dakota, Reunion Island, Argentina and Australia. Signals are propagated in a duct that is formed by the Earth on one side, and the ionosphere on the other. Because of the low frequency, the height of this duct is only about one or two wavelengths. Any change in the ionospheric structure makes an immediate impact on the strength and phase of the received signal. At any one time, at least three transmitters may be heard almost anywhere on the surface of the Earth. Monitoring the changes in these signals will provide an instantaneous snapshot of the status of the ionosphere over the entire receiving path. For example, Polar Cap Absorption and auroral events are quite evident on the East Coast by monitoring the signal from the Norway Omega transmitter. Conversely, quiet conditions (stable amplitude and phase) on this path are indicative of good transatlantic propagation on 80 and 160 meters. Over the course of several years, I was able to establish a strong link between Omega signal propagation and HF band conditions.

Loran-C signals are transmitted at 100 kHz. Most of the Northern Hemisphere is covered by, or near to, a loran-C "chain" of transmitters. Propagation here is more like HF: There are distinct ground-wave and sky-wave components. Because of the nature of the transmitted signal's structure, these two components can be received separately. Observing the sky-wave signal will yield a wealth of information on the status of the upper atmosphere between the transmitter and receiver. Specifically, composition of the D layer and height and relative density of the E and F layers may be deduced. For example, I was once in western Tennessee monitoring signals from a loran-C transmitter on the North Carolina coast. The ground-wave signal was very weak, as expected. Suddenly, a strong sky-wave signal appeared, with rapid changes in amplitude and phase. A quick calculation of the reflective layer height showed that the reason for this aberration was a sporadic-E layer of moderate strength. I am quite sure that a wonderful VHF opening was in progress and wished I had a VHF radio with me. Alas, I was transfixed by the needs of my employer, rather than the pursuit of DX!

To receive VLF signals is not difficult. A long piece of wire, VLF converter (such as those made by Palomar Engineers[3]) and HF receiver will suffice for starters. Most good receiving systems use a short vertical antenna with an active preamplifier stage. An excellent ground system is more important than a big antenna at these frequencies. Loran analysis requires some knowledge of the signal formats, an oscilloscope and a timing generator. Omega signal analysis is a bit more complex since it usually requires the phase of the received signal to be compared to a stable, fixed-frequency oscillator. Omega signals can also be very weak and buried in noise, so a high-gain receiver with very narrow bandwidth is important.

More data on these systems can be obtained from the US Coast Guard (loran) and the US Navy (Omega). The US Naval Observatory also maintains a computer bulletin board that supplies the latest information on all navigation systems, including Omega, VLF, loran-C and GPS.

RELAY CHATTER

By Jack Huston, W0JAW, Box 151 Woodland, Park, CO 80866

◊ Since the publication of my article in the November 1993 issue of *QST*,[4] I've received several letters from builders. One letter of interest came from Duane Cutting, K9COL. Duane's unit experienced short relay chatter when it timed out and switched off. For some time I tried to duplicate this problem and have finally found that component variation can cause relay chatter. Simply replacing the FET corrects the problem.

[4]J. Huston, "I Wonder If...," New Ham Companion, *QST*, Nov 1993, pp 72-74.

Note: All correspondence addressed to the Technical Correspondence column should bear the name, call sign and complete address of the sender. Please include a daytime telephone number at which you can be reached if necessary.

Keep the author(s) in the communications loop. Whether praising or criticizing a work, copy the author(s) on comments sent to Technical Correspondence. QST

Feedback

◊ There is an error in the address shown for the PacComm Corporation in the article "Plug Into PacTOR" which appeared in March 1994 *QST*, page 67. PacComm's address is 4413 N Hesperides St, Tampa, FL 33614-7618.

◊ The telephone number listed for Wise Owl Worldwide Publications in April *QST* (Strays, page 107) was incorrect. It should have read 310-375-6258. Wise Owl, of Torrance, California, is the US distributor and agent for the UK magazines *Radio Bygones* and *Morsum Magnificat*.

◊ In the March 1994 *QST* article "Radio Gear of Yesteryear" (page 41), Bill Byron, W7DHD, of Sedona, Arizona, points out that in the spark transmitter diagram (Figure 1), the capacitor across the power transformer, although it may protect the transformer from RF to some extent, is part of the LC tuning circuit of the primary and its ac-dveloped charge provides essentially all the power of the wave trains transmited on each half-cycle of the power line ac. Thanks, Bill.—*Bob Shrader, W6BNB, Sebastopol, California* QST

[2]D. Schneider, "Mother Nature's Radio," *QST*, Jan 1994, pp 49-51. (See also D. Curry, "Build Your Own Lowfer Transceiver," *QST*, Apr 1994, pp 26-31.—*Ed.*)

[3]Palomar Engineers, Box 462222, Escondido, CA 92046, tel 619-747-3343; fax: 619-747-3346.