Technical Correspondence

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IMPROVED HF WEATHER FACSIMILE PROGRAMS

☐ Some time ago, I published two Technical Correspondence items dealing with HF weatherfax reception and image display.[1,2] (I suggest a review of these articles by anyone interested in HF fax reception.) Since the publication of those articles, I've developed some new programs and a simple HF-weatherfax interface that may be of interest to others.

The programs are designed to work with IBM PC and compatible computers using 8088, 80286, 80386DX and 80386 processors. They provide weatherfax maps and pictures received on an HF SSB receiver in LSB mode. Computers equipped with at least 20 megabytes of free hard-disk storage space can store a whole day's worth of images to review and print later.

Although the programs were developed on a Bondwell B310 laptop (an 80286 machine with a 12-MHz clock), other AT-compatible computers with similar clock speeds should work with some easily made program-timing adjustments. The LOREZ and HIREZ map programs will work, with reduced performance, even on such slower machines as the IBM PCjr. An 80286 or faster machine is recommended to run the gray-shade programs, however. The minimum amount of RAM necessary to run these programs is given below.

Assembly language programs (14GREY.ASM, 8GRAY.ASM, TS.ASM and LO.ASM) contain the program specifics. These programs are accessed via BASIC programs. This allows you to easily change timing and other program parameters by adding lines to the BASIC program in which modified values are POKEd into selected memory locations.

All programs are configured for use with the most-commonly available CGA display mode (640 × 200 graphics), which many portable computers use. Also, the programs can be modified to work with EGA and VGA display using BASIC POKEs.

The Serial Port Interface

Fig 1 is a schematic of the serial communications port interface. Power (± 12 V) for the op-amp clipper is derived from the serial-port lines. These power-supply lines are turned on and off by the software. By using a low-quiescent current IC (the 741) and limiting resistors in these lines, the current drawn from the COM port is kept to a safe level. Even a direct short of the 741 should be handled easily. The diodes block reverse voltages on the software-controlled lines. The IC provides a well-clipped, symmetrical square wave for the DSR line.

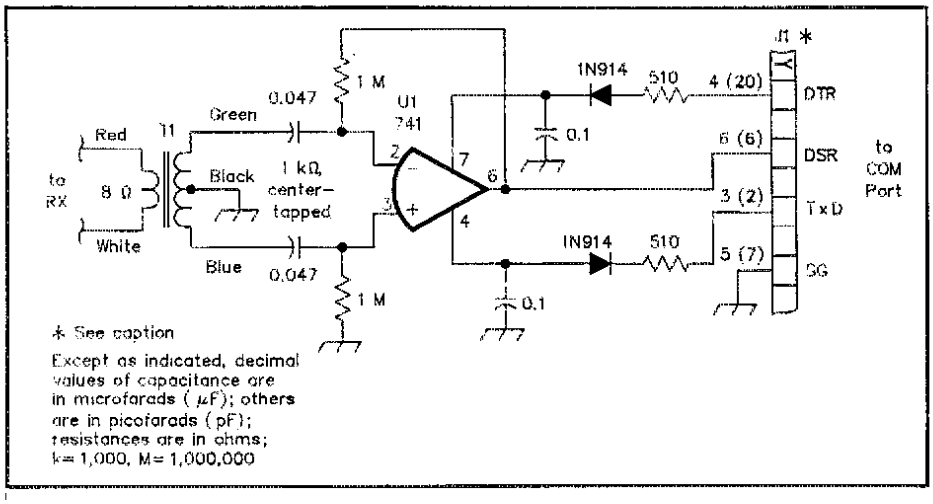
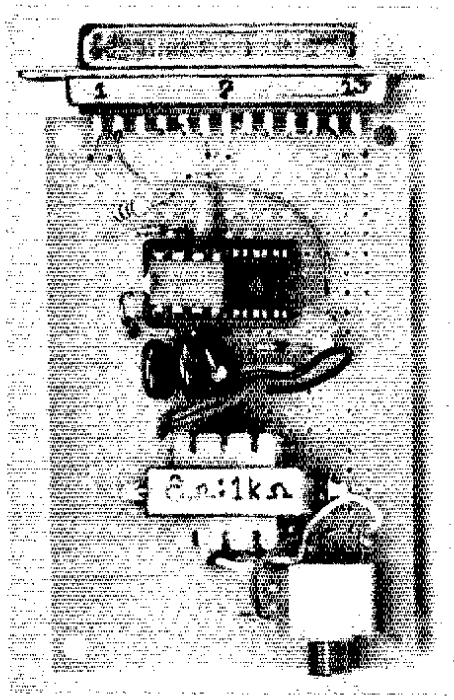


Fig 1—HF receiver/computer interface schematic. At J1, pin numbers for 9- and 25-pin connectors are shown; numbers in parentheses are for 25-pin (DB25) connectors. All resistors are ¼-W carbon-composition or film units. Part numbers in parenthese are Radio Shack.

C1, C2—0.047-μF/50-V ceramic disc (272-134).
C3, C4—0.1-μF/50-V ceramic disc (272-135).
D1, D2—1N914 or equivalent (276-1122).
J1—DB9F, 9-pin, D-type female socket (276-1538) or DB25F, 25-pin, D-type female socket (276-1548) to fit computer's serial port.
T1—Audio transformer, 8 Ω to 1 kΩ, center tapped (273-1380).
U1—741 op amp (276-007).



Here's one way of building K3BC's interface. A piece of experimenter's perf board is sandwiched between the two rows of pins on a DB25F connector. A wire-wrap socket holds the 741 op amp (an 8-pin socket wasn't available, so a 14-pin socket was used). The audio-input jack is glued to the perf board, and the mounting lugs of the transformer are soldered to board pads using short lengths of bare wire.

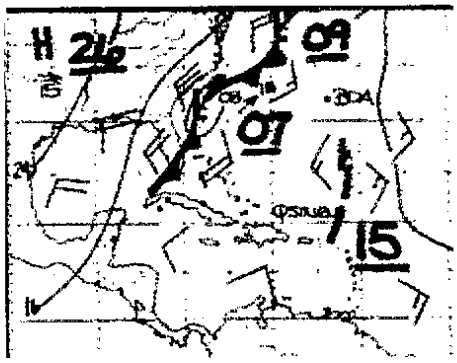


Fig 2—A sample of the resolution possible with the high-resolution program. This is a portion of a 5- × 6-inch HF weatherfax map. Even the small print in this picture is quite readable. This image was printed on a Diconix 150 ink-jet printer.

Program Names and Uses

For Reception

• LOREZ—This is the simplest program and uses every other line of incoming FAX data. It requires 128 kbytes of RAM and

[1]B. Vester, "HF WEFAX for the IBM PC, PCjr, and C-64," Technical Correspondence, *QST*, May 1987, pp 40-43.
[2]B. Vester, "C-64 WEFAX Improvements," Technical Correspondence, *QST*, Jan 1988, pp 47-49.

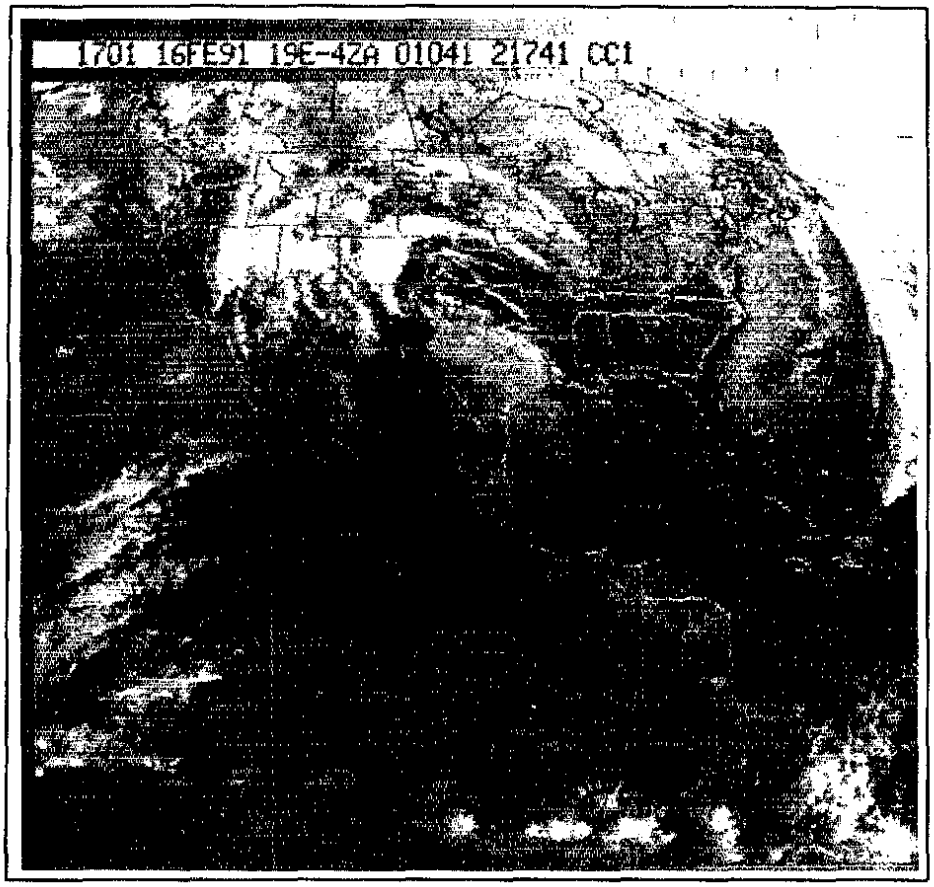


Fig 3—A 14-gray-shade HF weatherfax infrared IR image. On a cold winter day, the warmer Gulf Stream is visible off the East Coast. IR imagery is used mainly to determine cloud height by measuring the cloud temperature. This image was printed on a Seikosha SP-1000I printer.

incorporates a print program that minimizes paper use (see referent in note 2).

• HIREZ—To get the highest resolution possible (see Fig 2) and maintain a proper aspect ratio with a near-letter-quality (NLQ) printer, this program stores every line of incoming fax data at 960 pixels per line. A minimum of 512 kbytes of RAM is needed.

• 14GREY and 8GREY—These programs provide 14 and 8 shades of gray, respectively. 8GREY needs 512 kbytes of RAM; 14GREY requires 640 kbytes. 14GREY uses a double printer-head pass to produce the additional gray shades (see Fig 3). 8GREY, which uses a single printer-head pass, is adapted for use with inkjet printers that "blot" adjacent pixels when the two printer passes of 14GREY are used. 8GREY can also be used to reduce printing time, printer wear and memory storage requirements.

All of these programs are written in BASIC, so they save the images in 64-kbyte files. The use of BASIC allows you flexibility in creating your own programs for scheduling the reception of many images and properly storing them.

Printing and Viewing

• LOPLAYBK, HIPLAYBK, 14PLAYBK and 8PLAYBK are used to load into memory fax maps and pictures stored on disk. If you've saved an image using 14GREY, you can view and print the image using 8PLAYBK, if you want to print it on an inkjet printer (or if you have a fresh ribbon in your dot-matrix printer).

An Epson-compatible printer that accepts the graphic command ESC "L" n1 n2 and the carriage advance command ESC "3" n is required to print the images.

Image-Reception-Scheduling Programs

• 14SKED, 8SKED and LOSKED. The first two, 14SKED and 8SKED, are higher-resolution image-reception programs that allow you to schedule reception of a mix of maps and satellite images throughout the day, store them on disk and play them back for viewing and printing at a later time. If you look at the same maps every day, you can use the same file names and overwrite older files. If you want the files stored somewhere other than the default drive, you can do so by simply including the path in the file name (for instance, A:36hour). Both programs use HIREZ for maps and the specified gray shades choice for pictures.

In their present forms, the programs can handle up to five images. With a little BASIC programming, you can easily expand that number.

LOSKED is similar to 14SKED and 8SKED, but used for lower-resolution map reception. If the prevailing signal-to-noise ratio is excellent, LOSKED provides adequate results with a minimum of memory usage.

Copies of the programs, a sample picture and more-detailed program and operational information are available from me. Please send me a formatted disk (360-kbyte, 5¼", 720-kbyte or 1.44 Mbyte, 3½") in a self-addressed disk mailer bearing 45 cents First-Class postage.—*Ben Vester, K3BC, 4921 Bonnie Branch Rd, Ellicott City, MD, 21043*

MORE ON THE GLASS-MOUNTED 2-METER MOBILE ANTENNA

☐ I received some comments regarding my article "A Glass-Mounted 2-Meter Mobile Antenna System,"[3] that may be of interest to readers.

Howard W. Wease, KB7IBG, has a fiberglass-body car and wanted to know how to terminate the coax braid at the feed point, because there was no convenient metal body part to use for the ground point. The solution may also be of interest to those who don't want to drill into the trim of a metal-bodied car to affix a grounding screw.

Recall that this is a ¼-λ antenna. A traditional ¼-λ ground-plane antenna can be made by connecting ¼-λ radials to the braid at the feed point. Usually three or four radials are used, but two—or even one—will suffice.

I used #22 hook-up wire for the radials. See Fig 4. I don't have a Corvette to try this on, so I tested the antenna on a glass pane away from other objects, and in my car, to bracket the problem. Sure enough, 19½-inch radials did the job on the glass pane, presenting a low SWR when the radials were bent downward 45 degrees relative to the vertical element. The SWR with the radials at 90 degrees to the vertical element was acceptably below 2:1.

In my car, I tucked the radial wires into a groove between the headliner and trim—near lots of metal. As expected, there was lots of interaction between the radials and the car body. The 19½ inch radials were too long—the SWR was a little over 2:1 at the high end of the band, and about 1.5:1 at the lower end. I gradually trimmed the radials to a length of 14¼ inches. At this point, the SWR was under 1.5:1 across the band.

Here's the bottom line: If you have a fiberglass car, use 19-inch radials and trim the radiating element for best SWR. You may not get minimum SWR without trimming the radials too, because the car

[3]B. English, "A Glass-Mounted 2-Meter Mobile Antenna," *QST*, Apr 1991, pages 31-34.