

Modifying the Sony WaveHawk

Sony's ICF-SC1PC WaveHawk computer-controlled scanner sat me up straight for the brief period that it recently resided on my bench. (See Bob Parnass' review of the SC1PC and its non-computerized twin, the SC1 in *MT* Aug-98). This month I'll share with you what I found deep in the innards of these two exciting scanners. They're electronically identical except for the computer interface in the SC1PC.

■ Baseband Audio Mod

Today's rave is decoding digital radio signals. For that, you need a PC, software, and a tap into the scanner's NFM (narrowband FM) baseband audio. (Speaker and headphone signals are filtered and not good for signals any faster than about 2400-bits per second, bps.) The NFM discriminator in the Sony WaveHawk is IC-401. The baseband

audio output is at Pin 9.

Unfortunately, it's not all that easy to get to IC-401, located on the inner side of the intermediate frequency (IF) board. I didn't have an opportunity to remove it. But relax... fortunately, you don't have to see or touch IC-401. A baseband audio point is easily found on the accessible side of the IF board. Just remove the rear case — two screws by the belt clip frame and two more inside the battery compartment. Squeeze the sides of the rear case to release the catch-claws that hold it to the front case.

The visible side of the IF Board is pictured in Figure 1. Two points for the baseband audio are located at either end of a trace that runs top to bottom in the left center area of the board. Note my dark circle between L409 and RV401.

Inside that circle is a feed-through solder spot that goes to IC-401, Pin 9 on the other side of the board. Solder the (+) leg of a 10- μ F tantalum capacitor (RS #272-1436) to this point. Solder a wire to the (-) leg of the capacitor and route it to a jack of your choice mounted somewhere on the case. You'll need a wire from a ground trace on the board to a ground pin on the jack. If space is at a premium, use the pinline socket/jack method from my Jul-98 *MT* column.

■ Data Decoding

Build the Data Decoder Interface from my Feb-99 or Jul-98 columns, except use a 1-k Ω resistor for R2. (See below).

Modifying the Data Decoder Interface: There is an issue with the baseband audio level in the WaveHawk. At first, I wasn't able to decode trunk system control data using my tested and reliable Data Decoder Interface. Tuned to a strong data signal, I put a voltmeter on the baseband audio output jack and found the signal to be

0.150 volts ac, far weaker than most scanners. But nothing was wrong with the WaveHawk, so I had to modify my Data Decoder Interface.

Again, see *MT* Jul-98 or Feb-99. R2 is specified to be 3.3-k Ω . This is an optimized value for most scanners, but not the Sony WaveHawk, for which R2 must be changed to 1-k Ω .

This change to the Data Decoder Interface may be necessary for any scanner where the baseband audio output is less than 0.350V ac. A 2.2-k Ω resistor should suffice for signals between .25V-.35V, and 1-k Ω for signals less than 0.25V.

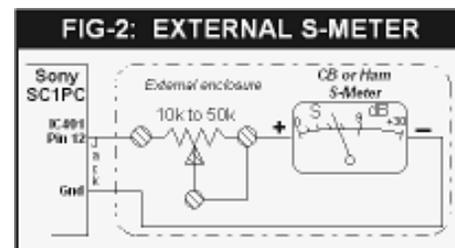
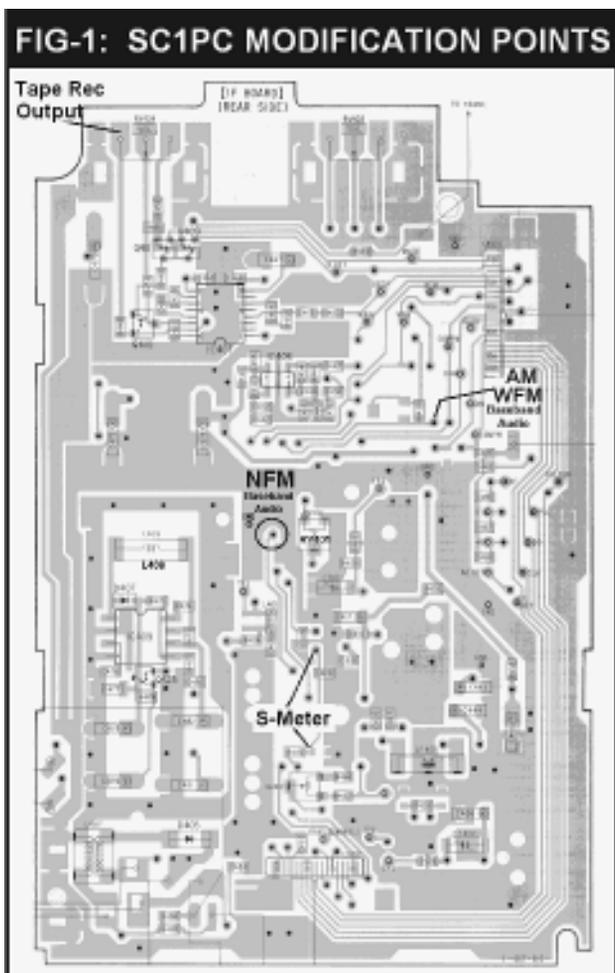
■ An S-meter Mod

The pick-off point for a ready-made signal for metering is at pin 12 of IC-401. Again, it's difficult to get to IC-401, but see Figure 1 for two easier access points on the visible side of the IF Board.

You have a choice of S-metering points, one at the indicated upper feed-thru solder point, and the other where the trace drops down to meet R-415. I don't remember which is best, so you decide. A wire connected to either of these points, along with a ground wire should be routed out to a jack of your choice.

The S-Meter must be external (lack of space inside the scanner). You can use an analog meter salvaged from a junked CB or ham radio, or you could build an LED meter from my *Scanner Modification Handbook Vol-2* (available from Comtronics). An analog meter is probably best for the SC1 and SC1PC. Figure 2 shows the external necessities.

You'll need a calibration trimmer pot, roughly 10k Ω ; maybe up to 50k Ω . Tune the scanner to a frequency on which you have a nearby walkie-talkie or other transmitter keyed up. Adjust the trim pot for exactly full-



scale deflection of the meter. All other signals will then read less, relative to strength. You'll wonder how you ever did without it!

■ AM and WFM Baseband Taps

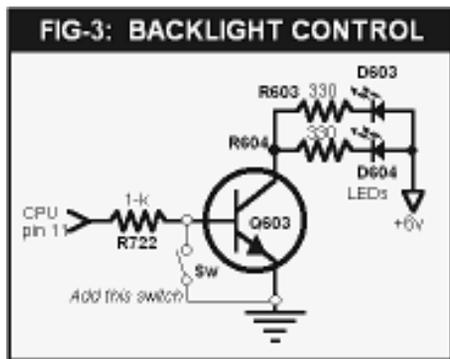
If you're into decoding ACARS (Aircraft Communication and Reporting System) or SCS (Subsidiary Carrier Service) signals, then you'll need to know about the circuit of IC-402 that processes AM and WFM signals. The baseband audio of both AM and wideband FM signals appears on Pin 21 of IC-402. The AM and WFM baseband audio point is also (fortunately) available on the visible side of the IF Board. See Figure 1 for the precise point.

■ Tape Recording

There is no reason why you can't make tape recordings direct from the WFM/AM and NFM baseband audio taps. These are unfiltered points, though, and might make unsavory recordings. You can always tap the "high" lug of the volume control for a Tape Rec output as shown in Figure 1. Solder the (+) leg of a 10- μ F electrolytic capacitor to this point and feed the (-) leg of the capacitor out to your Tape Rec jack. A ground wire is also needed.

■ Backlight Mod

The Sony WaveHawk back-light circuit is shown in Figure 3. Provided you can dig your way down to the Logic/CPU (central processing unit) board, add the SPST (single pole single throw) switch as shown for an external back-light control.



■ Tuning Meter Possibility

Unused Pin 16 of IC-402 is shown in the service manual as "Meter." Only C-440 connects to pin 16. Now if you were to add a wire to Pin 16 and run it through a series resistor to a meter, you might have a Center Tuning Meter!

I don't know what value of resistor to use, but it's easily determined with a setup similar

to the S-Meter drawing in Figure 2. Tune the scanner to a known accurate WFM signal, then adjust a trimmer pot for a center reading.

The problem here is that there is no easy access to IC-402, Pin 16. You'll have to figure out how to remove the IF Board so you can get to the inner side where IC-402 is located.

■ Extended Memory Possibility

The Sony WaveHawk uses an EEPROM (electrically erasable programmable read-only memory) chip (IC-605) as shown in Figure 4. One would think the programmable memory could be doubled (or more) using techniques published for the PRO-43 in the *World Scanner Report* (also from Comtronics). With computer control and fairly instant auto-programming of the 300-channels, maybe extended memory isn't all that hot of an idea. You decide.....

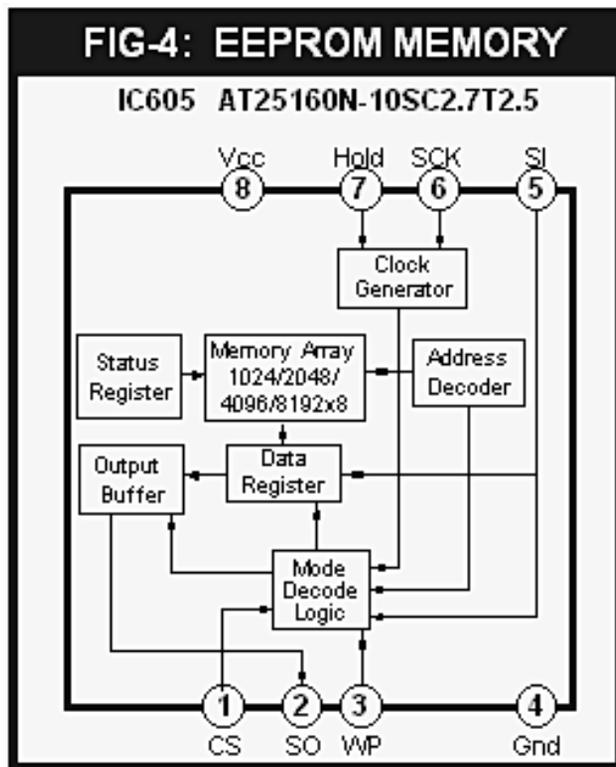
■ Other Possibilities

Mysterious "CPU Test": Pin 13 of the CPU is labeled "Test" in the service manual, but it's soldered directly to ground. This eliminates any normal keyboard or instrument test procedures. But one wonders what would happen if pin 13 were removed from ground (low) and raised "high" to +4V. The service manual says this pin is an input and that the "test mode is High." So elevate pin 13 from ground and solder a 10-k Ω resistor from it to ground. Solder a wire from +4V (high) to pin 13 and see what happens.

Cellular Mod? Probably impossible. The six keyboard matrix rows connect to the CPU at pins 93-98. Pin 99 is system ground, and Pin 100 is an NFM input. Pins 91-92 are open and have no connection or labeled function.

The five keyboard matrix columns connect to the CPU at pins 3-7. Pins 1-2 and 8/up are allocated, except pins 17 and 63 are open like pins 91-92. Pin 17 is labeled "DUB," whatever that means, but nothing is connected to it. Pins 63, 91, and 92 aren't labeled.

Logically speaking, any cellular liberation port should be between pins 91-100 and/or pins 1-8, but little or nothing is possible there.



I doubt that cellular is possible in the SC1 and SC1PC, though a comparison of non-USA models might be enlightening. Try researching a non-USA service manual. If a different CPU is used in foreign versions of the WaveHawk, then full USA coverage is out because the differences will be in the CPU firmware (code) ... and scanner firmware can't be accessed or altered.

■ Wrapup

Service manuals and information on Sony products are available from: Sony Electronics, Inc., One Sony Drive, Park Ridge, NJ 07656, (201) 930-6884 Web: <http://www.sony.com/radioscanner>, E-mail: custserv@mail.sel.sony.com, Feedback: <http://www.sel.sony.com/SEL/feedback.html>, Dealer Locations: (800) 222-7669 (also see: <http://www.grove-ent.com>)

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