# Ramsey Aircraft Monitor

By Bob Grove W8JHD

Two years ago my wife and I decided to take a plane trip to Hawaii. I thought it would be interesting to listen to aircraft communications, but knew that scanners aren't allowed on aircraft because the oscillator could conceivably disrupt navigational instruments.

But what if the receiver had no oscillator? What if a crystal diode detector with a tuned antenna and high-gain audio amplifier could be called into service? I made one and, lo and behold, I could hear messages from aircraft in flight for quite some distance! Built into a compact box, the device provided entertainment on the trip.

Now Ramsey electronics has released just such a product – much more refined – for the same application. The ABM1 "Passive Air Band Monitor" has a volume control, adjustable squelch, and comes with a set of ear buds with the cord doubling as an antenna.

The Monitor is powered by a nine-volt battery (not supplied) and its 2-1/2" x 4-1/2" case includes a convenient belt clip. Convenient thumb-wheel trimpots allow custom adjustment of sound levels and squelch threshold.

Ramsey provides a nice manual with an introduction to air-band monitoring, and which contains a complete schematic diagram of the monitor, along with stage identification.

## ❖ What's in the box? (For the techies!)

While you may think there's nothing special about a crystal radio with audio amplification, there's enough unique design and application that it received a patent in 1994 as an "Aircraft Band Radio that does not Radiate Interfering Signals."

The incoming signal is delivered to the radio from the earphone cord; a pair of RF chokes separates the VHF signals from the audio. Conceivably, a 1/8" (3.5 mm) Y adaptor could allow a listener to attach an air-band antenna for the reception of distant, weaker signals.

Three pass-band filters etched on the circuit board trim the received spectrum to the 118-137 MHz aircraft band. One is before the RF amplifier stage (a MiniCircuits MAR-1), another after, and the third precedes the logarithmic amplifier/AM detector (an Analog Devices AD8307AR).

From there, the detected audio is fed to an LM386 audio amplifier. Squelch action is provided by adjusting the offset voltage on an LM6492 dual op-amp which triggers an MMBF170L power MOSFET switch, clamping the audio line to the LM386.

The low-impedance audio output is fed back to the earphone jack through an RF choke to prevent the low-impedance audio line from grounding out the weak aircraft signals picked up by the ear-bud wire antenna.

The ABM1 requires a 9-volt battery; quiescent current drain is typically 20 milliamperes, peaking to 50 mA when receiving strong, audible signals.

## ❖ So, what does it hear?

Out here in the boonies of western North Carolina, we don't have a lot of air action! Even so, every few seconds to a minute or so, I hear the familiar voice of an aircraft pilot giving update information to an airport tower somewhere. I also hear the shrill data bursts of the aircraft's familiar ACARS digital packet transmissions; naturally, they are the loudest!

Weak signals are low in volume, and strong signals come blasting in; there is no automatic gain control (AGC) as found in conventional receivers, so it's best to keep the volume down low enough to avoid unpleasant surprises!


Unlike channelized scanners that step frequency by frequency, the ABM1 listens to the whole aircraft spectrum at once, and if two or more signals are being transmitted you'll hear them simultaneously.

Sensitivity is certainly adequate – better than 2 microvolts. I can't see the planes anywhere, but the ABM1 can hear them, and obviously from many miles away. For better reception of weak signals, it helps to push the ear bud/antenna wire away from your body – even shifting it left or right can make a difference.

The squelch works dependably, but it isn't responsive to weak signals. At my off-route location, I have to leave the squelch defeated so that there is always noise in the background; otherwise, I never receive any signals.

However, near an airport, or during an air show, or inside an airliner, signals will be strong enough to trip the squelch. But its filters are designed to receive only the 118-137 MHz civilian aircraft band; there is no provision for 225-400 MHz military air communications.

Although the filters are well designed, favoring the 120-140 MHz spectrum, the plastic case allows any strong, nearby signals to reach the diode detector and high-gain audio amplifier. Interference from my LCD computer monitor was severe; the ABM1 was unusable in that room.

While the unit works very well, perhaps Ramsey will consider some additional features in a future model:

(1) AGC as used on voice recorders to prevent blasting from strong signals;
(2) A parallel set of passband filters to include the 225-400 MHz military aircraft band;
(3) An external antenna jack or adaptor for listeners who are distant from air routes; and
(4) An external power jack to allow a wall wart to operate the unit indefinitely in a home or office; a drain of 50 mA on a 9-volt battery can drop its voltage pretty quickly.

## ❖ Final caveat:

Although there is no possibility that this monitor could interfere with aeronavigational equipment, with the current emphasis on security, you may wish to inform the pilot that what you have is a passive detector with no oscillator. It may help, or it may not.

The Ramsey ABM1 Air Band Monitor is available for $149.95 from Grove Enterprises (7540 Hwy 64 West, Brasstown, NC 28902; 800-438-8155 or *order@grove-ent.com*).