

MT REVIEW

Comparison of Eton Emergency Radios *A Model For Everyone*

By Gary Sargent, KE8WO

Eton has a strong history of marketing radios that provide communications capabilities during emergency situations when normal communications may not be available. Certainly there have been weather and terrorist events in the last decade where large numbers of people needed alternate means of gathering information.

I have been slowly planning my personal and family response to various emergency situations. I now have some quantities of food, water and other supplies to allow my family to hunker down for days should the need arise. I decided that I should have an emergency type radio on hand as part of this plan.

Ah, but what radio? Several manufacturers offer a bewildering array of models. The purpose of this article is to review Eton's current line of emergency radios.

Eton Emergency Radio Overview

Eton has refreshed their line of emergency radios in the last year. Part of this was prompted by the demise of the older analog television audio capabilities. Eton's primary lineup now ranges from very small (\$30) basic radios to more sophisticated, larger units (\$150). All of these receive AM, FM and the weather radio band. They also all feature a crank to recharge the internal battery, power an LED flashlight or charge a cell phone.

Eton offers these radios under the Eton brand name and also as American Red Cross branded units. I decided to acquire an Eton FR160, FR360 and FR600, and evaluate which would meet my needs (see chart).

My Testing

I evaluated each radio's basic performance on the various bands it receives. I have compared its reception to other receivers I have that are in this same \$30 to \$100 price range.

I tested each unit's ability to charge its internal battery given one minute of dynamo cranking and then listening to AM at low volume. I repeated the same test, exposing the photo cells to direct sunlight for two hours and then powering the AM radio for as long as the battery lasted.

Cranking the dynamo for each radio at a rate of about two revolutions per second quickly became very tiring. I believe that expecting to crank the dynamo for many minutes to charge a power hungry external cell phone would be unrealistic, except in the worst of cases where there was no alternative. I measured the current the dynamo could provide into a 15 ohm load and

still maintain a nominal 5 volts DC (VDC). Note the FR600 could not provide 5 VDC with a 15 ohm load.

FR160 Overview

The FR160 features AM, FM (mono) and weather band reception. Power options to charge the small internal three cell 350 mAh NI-MH battery are via the solar cell or the crank dynamo. There are no other power options.

A mono headphone jack is provided. The 10-inch tilt and swivel telescopic antenna is used for FM and weather band reception. The unit has a solid feel and an attractive appearance. The English portion of the small user manual is just over two pages in length.



Radio performance is adequate and on par with the least expensive AM/FM radio you might find. Local, medium or more powerful AM stations were very receivable. Some weaker, more distant AM stations were not.

The tuned frequency drifts as the battery discharges and requires a tweaking of the tuned frequency (via the radio's tuning knob). I consider it to be a minor annoyance that seems to occur primarily during the last few minutes of battery charge life.

FM performance seemed more sensitive and selective, and all of the expected stations were receivable. AM and FM tuning is very touchy, since the analog tuning dial is so small. Weather band reception is enabled via a slide switch that selects from the seven weather channels. The radio does not support either alert tones or SAME codes. My local weather station is received loud and clear, while another weather station 60 miles away was not detectable.

The three-LED flashlight is bright and very

usable. Since you must depress a button to get light, the flashlight will be less usable in situations where you need both hands for a given task.

The FR160 is billed as being able to charge a cell phone via its dynamo. According to the user manual, "Because cell phone batteries vary in their current ratings, we cannot specify charging rates or usage time. From 10 to 15 minutes of cranking may result in one or more minutes of talk-time." Further, it must be cranked at a brisk rate of two revolutions per second. The cell phone must use the now common USB port connector for recharging, but no USB cable is provided.

The FR160 is the smallest and most basic in features and performance of the Eton line-up. But it will meet all essential emergency communications needs with minimal investment.

FR360 Overview

The FR360 features digitally tuned AM, FM (mono) and weather band reception. Power options to charge the internal three cell 600 mAh NI-MH battery are the solar cell or the crank dynamo; three AAA batteries; or an external power adapter (6 VDC, positive polarity). A mono headphone jack is provided.

The short 6.5 inch tilt and swivel telescopic antenna is used for FM and weather band reception. The FR360 has a good feel and finish and a modern appearance. The English portion of the small user manual is just over five pages in length. Some radio features are omitted or not well explained.

Unlike most other digitally tuned radios, the FR360 has neither memories nor frequency scanning capabilities. There is a rotary tuning knob so one can rapidly move from one part of the band to another.

Radio performance is a mixed bag. AM is sensitive and reasonably selective, providing overall good performance. FM performance seemed less sensitive; some weaker stations needed the benefit of another foot or two of wire clipped to the short whip antenna before its FM performance came close to that of other low-cost radios.

Weather band reception is enabled via a rotary switch that selects from the seven weather channels. My local weather station was a little scratchy with drop-outs, depending on antenna orientation. A little more antenna length will help improve reception. The FR360 does have a mode where it silently monitors for the NOAA 1050 Hz "all hazard" alert signal. This worked properly on my test unit. It does not support Specific Area Message Encoding (SAME).



The four LED flashlight is bright and very usable. The clock and alarm functions are comprehensive and easy to use. The LCD display and some of the buttons have a very nice backlight when a button is pressed.

The FR360 is able to charge a mini-USB port cell phone via its dynamo. As noted in the user manual, "About 10 minutes of cranking results in one or two short emergency calls." The manual further cautions that if the specified procedures are not followed, the cell phone may be damaged. No USB cable is provided with the FR360.

FR600 Overview

The FR600 is the next step up from the FR360 and shares the same basic digital design and features. It is much larger in size and weight. The major additional features are: support for SAME weather message reception and coverage of shortwave frequencies.

Power options to charge the internal three cell 600 mAh NI-MH battery are the solar cell or the crank dynamo; three AA batteries; an external USB device; or an external power adapter (5 VDC, positive polarity). A stereo headphone jack is provided.

The 12 inch telescopic antenna is used for FM, SW and weather band reception. The antenna does not tilt or swivel. The radio has a solid feel and a modern appearance. The English portion of the small user manual is 18 pages in length. Some radio features are omitted or not well explained, especially the set-up of the SAME decoding features, which can be confusing. The radio supports a simple memory (20 FM, 10 AM, 10 for SW) and frequency scanning capability.

Overall radio performance is good or better than the FR360. A major limitation is that radio tuning is only through two up/down buttons. Depressing one button for about one second will start a signal seek action that is slow. This is especially problematic for the shortwave band.

AM and FM bands are both sensitive and reasonably selective, with overall good performance compared to the excellent, low-cost Grundig G8 radio. FM is in stereo by using headphones and sounds very good with no distortion detected. Audio from the small speaker is adequate, but not in keeping with its overall larger size.

Shortwave reception is continuous from 2.3 through 23 MHz, AM mode only, with 5 kHz step tuning rate. Again, sensitivity and selectivity are more than adequate for routine listening,



but nothing approaching radio hobby DX usage. Most signals will be receivable.

Local AM BCB interference is often detected. Either touching or lowering a section of the whip antenna often helps.

The main problem is the very slow tuning rate. I suggest that many of the 10 memories be used to store SW band starting frequencies. This will aid in moving from one band to another as quickly as possible. The FR600 would benefit from more memories, a rotary tuning knob, and/or a direct entry keyboard.

The weather band reception is set up by choosing which of the seven channels are active in your area. My local weather station was well received with the antenna extended. Weather band reception was much improved over the FR360, but not as good as the low cost FR160.

The SAME decoding capability is nicely implemented and not overly complex to set up, in spite of skimpy details in the user manual. You can select SAME codes for all of the counties within your area and enable or disable the various alert messages, such as severe thunderstorm watch, tornado watch, etc.

After these parameters are set up, placing the FR600 in the "alert" mode, lets it silently monitor the settings you have chosen. When it detects a weather alert, the radio either opens

with the weather audio for the alert or with a loud buzzer (user choice). There are red LED indicators used to indicate the nature of the alert (watch, warning, etc.). The text of the alert, such as "Tornado Warning" is displayed on the LCD. I found that the audio of the weather alert message was cut off after about two seconds, so you'll need to physically select the weather station to hear the full audio message.

The four LED flashlight is bright and very usable. The clock and alarm functions are straightforward. The LCD display has a backlight when a button is pressed.

The FR600 is able to charge a standard USB port cell phone via its dynamo. As with the FR160 and FR360, the manual cautions about following the cited procedure when charging a cell phone. No cables or adapters are provided.

FR1000 Overview

The FR1000 is the top-end of this line of Grundig models, with similar styling, but it differs considerably in other ways. I did not complete a personal test of this model, so this information is just an overview. The FR1000 is significantly larger than the FR600 and costs 50 percent more; it omits the solar power, USB capabilities, SAME decoding, and shortwave reception. In their place are FRS/GMRS transmit and receive capabilities including CTCSS/DCS privacy codes, channel scanning, dual watch and VOX operation.

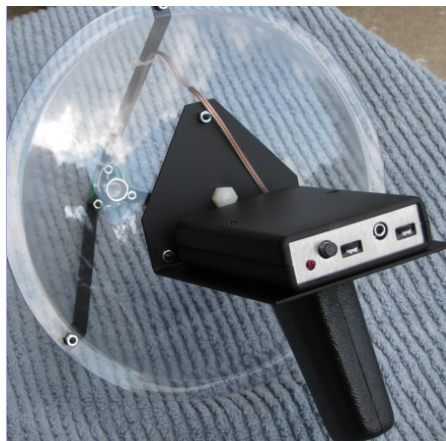
Charging a cell phone is supported; however, the connector for this is a coaxial /barrel type connector and not the USB jack as on the other FR radios.

These changes position the FR1000 to functions as a communications base station in an emergency or where two-way communications are needed. Having this capability in an emergency radio could be much appreciated when the chips are down.

Summary Comparison

Features

There is an orderly progression of features as you go from the FR160 to the FR1000, along with a corresponding price increase. The old saw of you get what you pay for applies here. For long term weather alert usage, you would likely want to power the FR360 or FR600 through an external AC power adapter at an additional cost of \$15 to \$20.



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Performance

Performance also progresses as you go up in the model numbers. The FR160's performance is inferior to the other models, since it is an analog radio, yet it meets basic reception needs. The FR360's AM, FM and weather band reception was not stellar. The FR600 had the best overall radio performance of the three.

Size

These radios range in size from very small for the FR160 to bulky for the FR360 and FR600.

The FR360, FR600 and FR1000 have modern styling, but in my opinion, sacrifice compactness and ease of use for the purpose of appearance.

Bottom Line

It's up to you to decide what features you most desire in an emergency radio. There are performance differences, to be sure. For me, I want a smaller radio with basic features that I will store away, hoping I never need to use it. Since I have another SAME capable weather radio, I choose the FR160 to stash away.

Features	FR160	FR360	FR600	FR1000
AM	✓	✓	✓	✓
FM	✓	✓	✓	✓
NOAA Weather	✓	✓	✓	✓
Crank Power	✓	✓	✓	✓
Cell Phone Charger	✓	✓	✓	✓
LED Flashlight	✓	✓	✓	✓
Solar Powered	✓	✓	✓	
USB Compatible	✓	✓	✓	
Alarm Clock		✓	✓	✓
Digital Tuner		✓	✓	✓
Flashing Beacon		✓	✓	✓
S.A.M.E.			✓	
Shortwave			✓	
Emergency Siren			✓	✓
GMRS				✓
Dimensions	5.2 x 2.5 x 1.8	6.3 x 6.5 x 2.8	7.8 x 8.5 x 2.5	11.1 x 6.2 x 4.1
List Price	\$40	\$70	\$100	\$150

TEST RESULTS				
One minute crank charge test	22 minutes of AM Radio	10 minutes of AM Radio	45 minutes of AM Radio	Not tested
Two hour solar charge test	130 minutes of AM Radio	60 minutes of AM Radio	87 minutes of AM Radio	No solar capability
Ma. Dynamo Current to 15 Ohm Load	230 ma. @ 4.7 V.	240 ma. @ 4.9 V.	250 ma @ 4.0 V.	Not tested

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energy which reaches them.

The exception is the active (voltage probe or E-field) antenna which consists of a short (a few inches to a few feet) receiving element coupled to a wideband, small-signal amplifier. It is not used for transmitting.

While active antennas may have small size and wide bandwidth, and can deliver large signals to the receiver, they have their disadvantages. They are expensive, they require power, they may burn out or degrade in performance from nearby lightning or strong signals, they generate noise and intermodulation interference ("intermod"), and they are usually placed close to interference-generating electronic appliances. Don't use an active antenna if an adequate passive antenna is available.

Invisible Antennas

Appearances or deed restrictions sometimes require a hidden antenna. Receiving antennas are much less demanding and easier to hide, but even transmitting antennas can be inconspicuous. Of course, VHF and UHF antennas, because of their compact sizes, are easier to hide than HF antennas, but even HF antennas can be unimposing.

An attic crawl space is the first recommendation provided the antenna can be separated from large metal surfaces and electrical wiring.

Always use low-loss, well-shielded coax transmission line to prevent appliance noise pickup during receive, and stray radiation during transmit. A balun transformer and ferrite-bead choke may be useful as well.

Wire antennas may be run along baseboards, ceiling molding, behind curtains, and even under eaves, rugs or carpeting. If outdoors is accessible, a thin, high wire is virtually invisible, especially if it is covered with grey (neutral color) insulation; run it from the roof to a tree. A ground rod would be virtually invisible by its nature.

A wire antenna in a tree is also inconspicuous. It can be run vertically up the trunk, suspended in the branches, or even constructed as a wire array for gain and directivity. An antenna element doesn't have to be perfectly straight. The coax feed line can be trenched just beneath the soil.

Resourceful hams, SWLs and scanning enthusiasts have often resorted to make-do antennas. Bed springs, filing cabinets, rain gutters and downspouts, aluminum window frames, curtain rods, disconnected telephone or power lines, metal flagpoles, aluminum ladders, fences, wheelbarrows, grocery carts, and even vehicle-mounted antennas coax-fed into the radio room have been called into service!

Next Month: Now that we've discussed antenna systems, what recommended accessories can improve both transmission and reception? And finally, what are the take-home points that mean the most? Don't miss next month's conclusion to this MT exclusive series on antennas!