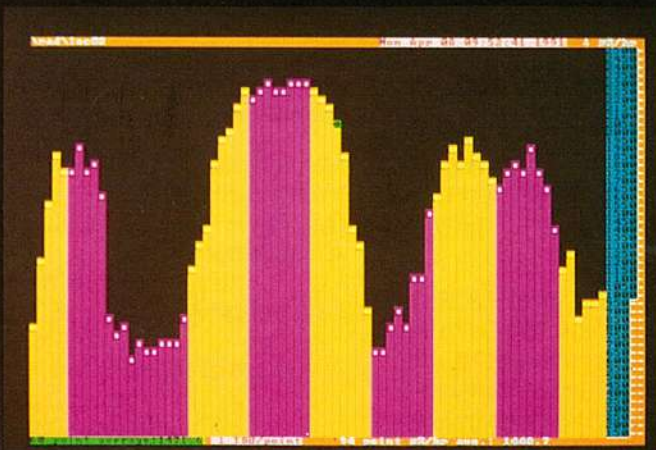


## MICRO-ROENTGEN RADIATION MONITOR



The RM-60 Micro-Roentgen Radiation Monitor, in conjunction with an IBM compatible computer, is a **highly sensitive, feature packed, easy to use geiger counter**.

The software included with the package gathers radiation data from the RM-60 by way of the computer's printer port or serial port and stores the data to disk, even while the computer is running other programs.

The software also allows a user to **quickly and conveniently scan days, weeks or months of stored radiation data** for any unusual surge or trend in radiation levels.

With its software alarm system, the RM-60 **can automatically alert you to the slightest increase of radiation level in your home or place of work.**

**LOW-LEVEL RADIATION:** The RM-60 can detect, display and/or continuously

monitor low levels of ionizing radiation, including **natural background radiation** as well as low levels of radiation from **bricks and other building materials, rocks, soil, water, etc.** The RM-60 can also measure small amounts of radiation from **contaminated foods, beverages, chemicals, etc.**

**RADON GAS:** The RM-60 can detect and continuously monitor for extremely low levels of radon gas (1 picocurie/L) by measuring any radioactive buildup on an air filter, such as found in a heating system, air conditioner or portable filter. This technique will also alert you to the presence of rare but very dangerous airborne radioactive particles.

**ATMOSPHERIC RADIOACTIVITY:** The RM-60 can automatically alert you to any increase in atmospheric radioactivity due to an increase in Radon, an accident or other man made cause.

**ALARM SYSTEM:** A software alarm

system allows you to set an exact alarm level between 1 and 100,000+ micro-roentgens per hour. When the radiation level reaches the alarm level, the computer speaker emits an attention-getting alarm sound.

**ALPHA, BETA, GAMMA, X-RAY:** with its stainless steel geiger tube and mica alpha window, the RM-60 can detect all three types of radiation emitted by radioactive materials, namely alpha, beta, and gamma radiation. It also detects X-ray radiation.

**DYNAMIC RANGE:** Sophisticated software allows the RM-60 to detect and accurately display levels of radiation one thousand times less than standard milliroentgen survey geiger counters. The RM-60 can detect and display levels of radiation as low as one micro-roentgen/hr to as high as 100,000+ microroentgens/hr. Typical background radiation averages 11 microroentgens/hr.



**SOFTWARE FEATURES:** The user friendly software, included with the package, monitors any LPT printer port or serial port for data from the RM-60.

The software displays the radiation level in a scrolling bar chart format, readily revealing any surge or trend in levels. The radiation level, the date and time of each data bar and the running average are displayed. The software will print the radiation data to printer in strip chart format. It will also export data to spread sheets and data bases.

One can preselect many display and operational variables, including the minutes/secs. of radiation data averaged per displayed bar or point, the vertical and horizontal display resolution, the display auto scroll rate, the alarm level and running alarm average length, as well as many other variables.

#### **ADDITIONAL SOFTWARE FEATURES**

- **ATSR (Terminate and Stay Resident) program** is included with the system. The TSR software will gather the radiation/date/time data to disk, click the speaker with each ionizing radiation pulse, calculate a running average of the radiation level, sound an alarm if the average exceeds a pre-selected level, and monitor for hot keys, all while the computer is running other user programs or tasks. A pop-up Mini Scrolling Graph is included.
- **Auto boot programming** is included, which will automatically load itself into the computer's memory, create a new

disk data file, initialize the RM-60, and store current radiation levels to disk, each time the computer is turned on.

- **External device status.** The main program as well as the TSR program, will monitor the operating status of an external device such as a fan, vent, switch, etc., while simultaneously monitoring the radiation level and alarm.

#### **ADDITIONAL RM-60 FEATURES**

- **No batteries.** An efficient regulated power supply draws a minute amount of power from the computer port. No need for batteries or external transformers.
- **Easy extension cord.** Modular RJ11 phone cord connects the RM-60 to the special D-sub adapter-to-modular jack converter. This allows easy extension of the standard 6 ft. RJ11 cord to hundreds of feet using standard modular telephone extension cord.
- **Detailed operating manual.** The manual includes methods of detecting extremely low levels of radon gas in air and water. Methods of alleviating radon gas build up are discussed. Included are instructions for detecting extremely small or large increases in radioactivity due to accidents, etc. Also included is a primer on radioactivity, a description of common radioactive materials, including radioactive items found around the house, how to distinguish between alpha, beta, gamma and X-ray radiation, health effects of ionizing radiation and more.

- **Five year limited warranty.** Excellence in engineering and construction allow us to provide a five year warranty on both parts and labor. (Tube covered separately; see price list.)

- **ABS case material** has flame retardant and threaded brass inserts. Case size: 4.4" x 2.44" x 1.06".

- **Industry standard sensor.** Halogen quenched stainless steel GM tube with mica window. (1.5 to 2 mg/cm<sup>2</sup>).

Max. diameter . . . . . 0.59 inches.

Max. length . . . . . 2.125 inches.

Dead time . . . . . 90 microseconds.

Alpha sensitivity . . . . . 2.5 Mev,  
80% at 3.6 Mev.

Beta sensitivity . . . . . 35% at 50 Kev,  
95% at 300 Kev.

Gamma & X-ray sensitivity . . . 10 Kev  
through end window,  
40 Kev through case.

- **Cesium calibration.** Tube calibrated to Cesium 137 +/- 5%. (MIL-STD-45662) Software digitally locked to tube

#### **ALSO AVAILABLE**

- Pancake and Milli R monitors, LCD digital displays, Clicker add on, Outdoor monitors, Coincidence count decoders, Photo-multiplier scintillator systems, Alarm strobe light/siren add on, Eight port serial cards for plugging up to eight units into one computer (20 ports max.), Eight plot, compressing, real-time graphing software, Networking and other, Semi-custom software.

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## RM-70, RM-80, RM-280, RM-680 and RM-G90

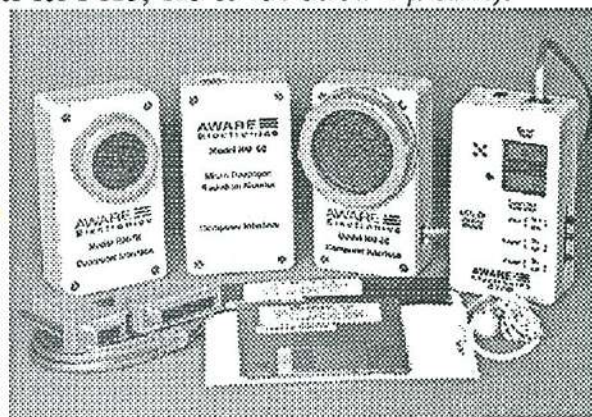
As mentioned in the RM-60 brochure, Aware Electronics has available other types of radiation monitors, including pancake tube monitors. Two such units are the RM-70 and RM-80. They are the same size as the RM-60 except the front cover has a 1.5" (RM-70) or 2.4" (RM-80) diameter threaded stem projection, in which is mounted a pancake style geiger tube.

	Type 712 tube: RM-60	Type 7231 tube: RM-70	Type 7313 tube: RM-80
<b>Window:</b>			
Areal Density:	1.5 to 2.0 mg/cm <sup>2</sup>	1.5 to 2.0 mg/cm <sup>2</sup>	1.5 to 2.0 mg/cm <sup>2</sup>
Eff. Diameter: (" /mm)	0.360/9.14	1.125/28.57	1.75/44.45
Area: (in <sup>2</sup> /mm <sup>2</sup> )	0.102/65.61	0.996/641.08	2.41/1552
Material:	Mica	Mica	Mica
<b>Wall:</b>			
Thickness: (" /mm)	0.012/0.381	0.06/1.52	0.187/4.75
Eff. Length: (" /mm)	1.5/38.1	0.48/12.19	0.5/12.7
Eff. Diameter: (" /mm)	0.566/14.38	1.126/28.6	1.75/44.45
Material:	446 SS	446 SS	466 SS

The RM-60 is excellent for general purpose monitoring of alpha, beta, gamma and x-ray, as described in the RM-60 brochure. Since the RM-70 & RM-80 alpha windows are approximately 10 & 24 times larger than the RM-60's alpha window, the RM-70 and RM-80 provide higher sensitivity to alpha, beta (for example Radon daughters) and/or lower energy X-ray. The RM-70 is slightly more sensitive to gamma than the RM-60. The RM-80 is more than three times as sensitive to gamma. **(Most geiger counters measure only gamma radiation).** RM-70 with AW-SRAD software, cable assembly and adapter: \$240.00. RM-80: \$319.00 (Excellent thyroid checker for I 123, 125 & 131 below 1  $\mu$  curie).

*The RM-60/70/80 and software are digitally locked to the tube. Each tube has passed all examinations, inspections, tests and calibrations of the LND Quality Assurance Procedures including DCAS MIL-Q985A, MIL-E-I and appendix B of 10CFR50. Calibration is accomplished in accordance with MIL-STD-45662. Sources for calibration and/or dose rates have calibration traceable to National Bureau of Standards.*

All tubes are halogen quenched. They are constructed of specially coated stainless steel, mica and ceramic. Joints are fused shut in a furnace with molten glass. They are very rugged. The RM-70/80 includes a screw-on stainless steel wire mesh cover to help protect the mica window from damage. The open area of the mesh is 72%. You can unscrew the cover, if so desired. The RM-60's stainless steel mesh is built into the case. The RM-60/70/80 case is ABS. You can cement ABS or PVC mounting brackets, etc. onto the case, using "Universal ABS-PVC" cement.



RM-70, RM-60, RM-80 & LCD-60

In addition to the RM-60/70/80, Aware Electronics has available the RM-280 with two 1.75" effective diameter pancake tubes (\$479), the RM-G90 with a 10.5" x 0.8" gamma tube (\$360) and the RM-680 with six 1.75" effective diameter pancake tubes mounted in a rugged aluminum housing with handle (\$920). AW-SRAD version 3.5 software, cable assembly, two adapters and manual are included.

The RM-70,80,280 and G90 can be ordered with weatherproofing, which includes hard wired 12 ft. cable and permanent sealing (case sealed shut with ABS to ABS fusion), for an additional \$20.00. (Non-weatherproof versions include a modular jack built into the case, into which the cable snaps in place)

Just like the RM-60, all models work with any 100% IBM compatible, including "Palm Tops" such as the H.P. LX100-200, "Notebooks", "Lap Tops", "Desk Tops", etc., or alternatively, with the LCD-60. All units covered by the same 5 year warranty as the RM-60 (tubes covered separately for 6 months) and include the 45 day money back guarantee. (Also available: Energy compensated X-ray monitors. Flat from 50 kev to 1.5 mev., .1mr/hr. to 50 R/hr., \$299; 500V-700V-900V tubeless box with BNC connector, \$169.50) (Intro. prices for a limited time.) Questions: Phone or fax at: (800)729-5397 or (302)655-3800.

-Over-



# PC MAGAZINE

## Radiation Sensor Helps Your PC Catch Some Rays

SCIENCE  
by Jeff Pridemore

Does exposure to alpha radiation have you worried? Gamma rays got you down? If so, check out the RM-60 Micro-Roentgen Radiation Monitor from Aware Electronics. More than just a toy or a tool for the curious, the RM-60 lets you use your PC to monitor your surroundings for life-threatening radiation, affording you the peace of mind that can come only from having your own Geiger counter.

The RM-60 is made up partly of hardware and partly of software. The hardware—an unobtrusive plastic box about the size of a pocket modem—contains a sensitive, calibrated Geiger tube similar to those in industrial radiation monitors. A cable running from the box plugs directly into your PC's parallel or serial port.

The software captures raw data transmitted from the radiation monitor and displays it in the form of a scrolling bar chart, accurately reflecting levels of ionizing radiation recorded for periods of days, weeks, or even months.

The RM-60 detects all three types of ionizing

radiation emitted by nuclear materials: alpha, beta, and gamma. It can also detect X rays, and, with the aid of a forced-air filtering system, low levels of radon gas (as little as 1 picocurie per liter). The manual that comes with the RM-60 contains a helpful discussion of common sources of radiation in the home, the units of measure, and what to do when the measured dose exceeds EPA-recommended levels.

Plug in the radiation monitor and install the software, and almost immediately you'll get a reading on the background radiation in your home or office. The software samples the environment continuously and averages the radiation levels in micro-roentgens per hour over the length of time you specify (a typical interval is 5 to 10 minutes). If the most recent reading exceeds a predetermined level (by default, 27 micro-roentgens

per hour), the software warns you by sounding an alarm.

There are as many different ways to use the RM-60 as there are types of radiation it will measure. Run in the foreground, it will graphically display running totals of ionizing radiation levels as they are read. Run as a TSR, it will quietly gather radiation data in the background while you go about business as usual. The software warns you if there is cause for alarm. Data captured and stored to the hard disk can be reviewed at your convenience.

To get you started, the RM-60 comes with a sample radiation data file generated from background radiation at a site in southeastern Pennsylvania. As a test, I set it up and measured the levels of background radiation in my California apartment.

The result: an average of 10.6 micro-roentgens per hour over a period of 30 minutes, a reason-

able figure inasmuch as typical levels of background radiation in this country range from about 5 to 25 micro-roentgens per hour, depending on where you live and what type of dwelling you live in. The RM-60 is capable of measuring levels as low as 1 micro-roentgen per hour and as high as 30,000.

You'll find this product particularly useful in environments where nuclear materials are handled—in nuclear plants and medical laboratories, for example. You'll also find application for it in the home if you're simply curious about naturally occurring levels of radiation in building materials, soil, food, or beverages. In addition, the RM-60 is an attractive alternative to home radon monitoring kits, which can cost several times as much and aren't nearly as fun to use.

For a real shock, hold the RM-60 in front of a lantern mantle of the type that can be bought in any camping store. Most lantern mantles contain quantities of thorium salt, a highly radioactive material that occurs in nature. Readings will soar to levels exceeding 500 micro-roentgens per hour, a clear indicator that this common household item shouldn't be treated lightly.

Among PC hardware and software products, the RM-60 is unique in many respects. Its most notable distinction may be that in the very worst case—in the event of nuclear attack or nuclear mishap—it is the *one* product you won't want to be without.

**Requires:** Parallel or serial port, DOS 2.0 or later, 256K RAM. Aware Electronics, P.O. Box 4299, Wilmington, DE 19807; (302) 855-3800.

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June 1995 COMPUTER LIFE, May/June 1994 HP PALMTOP PAPER (p. 30), 1-94 SKY & TELESCOPE (p. 108), 7-92 edition of SCIENCE PROBE (p. 104), 6-91 edition of DISCOVER magazine (p. 40), and the 1-91 edition of BYTE (p. 50) describes the RM-60. Also the 6-90 edition of Amsterdam's Personal Computing Magazine includes a nice review of the RM-60. The August '90 BYTE includes a very nice discussion of the RM-60 package by BYTE's well known expert advisor Jerry Pournelle. In Jerry's "Computing At Chaos Manor", column he described the RM-60 as: "... a wonderful thing that will turn your PC into - are you ready for this? - a Geiger counter... Using it is simple... Run the supplied software, read the instructions, and learn all about radiation".



This RM-60 bar chart displays ionizing radiation levels recorded over a period of 30 minutes at 1-minute intervals. You can specify other intervals if you desire.