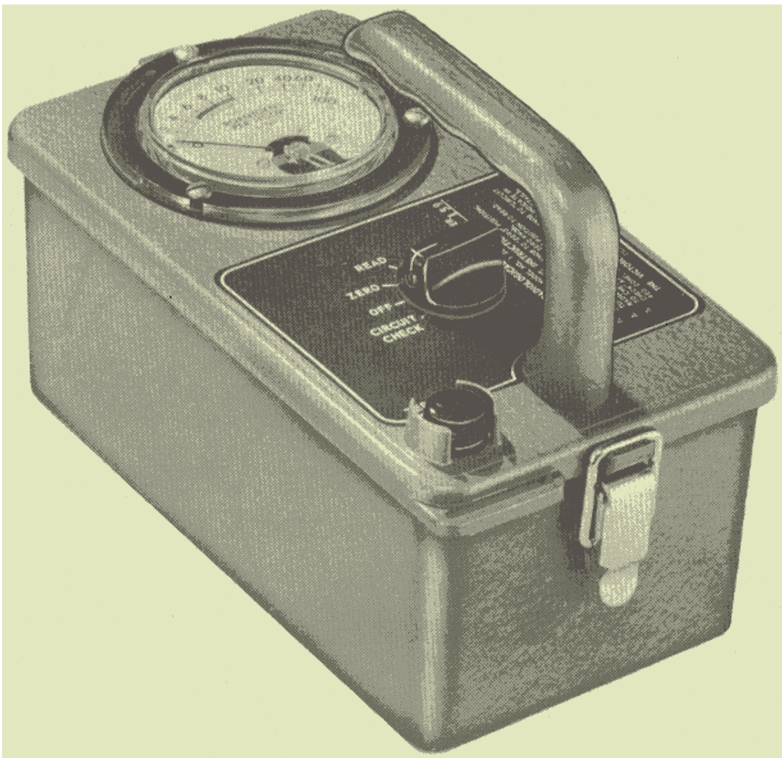
Instruction and Maintenance Manual

FOR

PERSONAL RADIOLOGICAL SURVEY METER, CD V-727



THE VICTOREEN INSTRUMENT COMPANY
5806 Hough Avenue • Cleveland 3, Ohio

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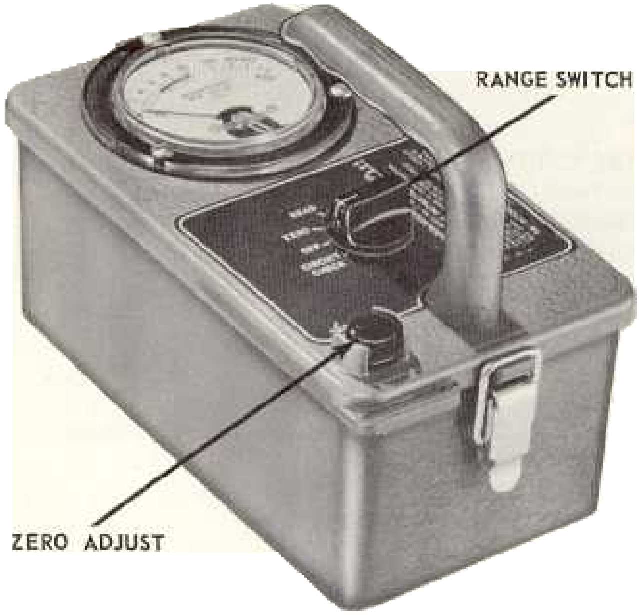

Figure 1. View of CD V-727, Showing Operating Controls

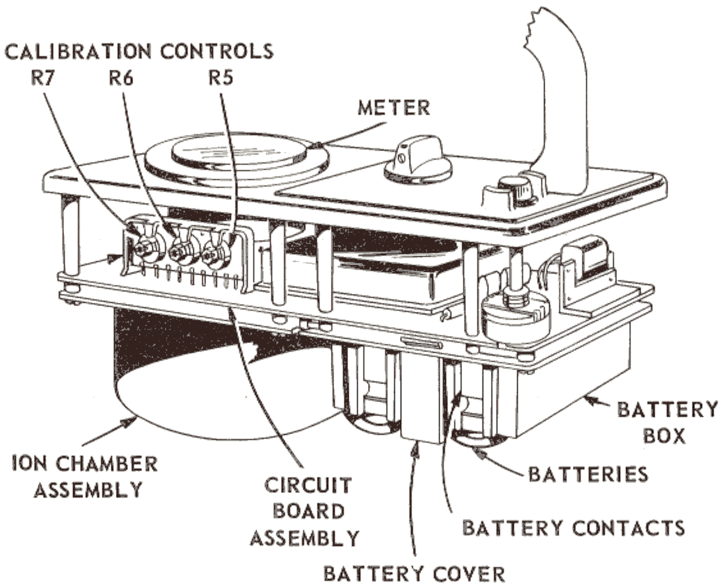

Figure 2. View of CD V-727, Showing Major Components

INTRODUCTION

The instrument described in this manual can provide you with vital information about fallout radiation levels (dose rates) in the event of nuclear attack.

The instrument is not a protective device. Special shielding - a fallout shelter -- is needed if you are to be protected from fallout radiation which can cause serious damage to living tissue. But the instrument can be used as a type of "radiological ruler" to measure the degree of danger you face, making it possible for you to take certain actions in or near a fallout shelter that might save your life.

Science has learned much in recent years about fallout radiation -- a silent "weapon" that could threaten more Americans than the blast and heat from nuclear explosions if our Nation is ever attacked. Additional discoveries about the nature of fallout probably will make the instrument described in this manual even more valuable to lyou than it is today.

OPERATION OF THE INSTRUMENT

The citizens ratemeter, CD V-727, is used to measure the intensity (dose rate) of radiation at a specific time. The measurements are read in roentgens per hour -- abbreviated "r/hr." Note that the range on the instrument scale is from 0 to 100 r/hr.

The instrument is powered by two 1-1/2 volt "D" cell flashlight batteries. No tools are required to change the batteries, and there are no internal adjustments to be made. Although the instrument is ruggedly constructed, dropping it could be damaging.

There are two controls on the instrument. One is a selector switch, and the positions are marked "Circuit Check," "Off," "Zero," and "Read." The other is a zero control knob, marked "Zero."

CHECKING THE INSTRUMENT

There are two basic checks to make <u>each time</u> the ratemeter is used to measure radiation dose rates. The first is to align the pointer accurately on the meter scale, and is termed "zeroing the instrument." The second (which should be done <u>after</u> zeroing the instrument) is to make sure that the electrical circuit in the instrument is working properly and the batteries are still good.

To zero the instrument, turn the selector switch to "Zero." Then adjust the zero control knob until the pointer on the meter scale is at "0". (See Fig. 3.)

To check the circuit and batteries in the instrument, turn the selector switch to "Circuit Check." You will have to hold the switch in position; otherwise it will spring back to "Off." If the instrument circuit is working properly and the batteries are still good, the indicator needle will show between 6 and 10 on the meter scale. (See Fig. 4.)

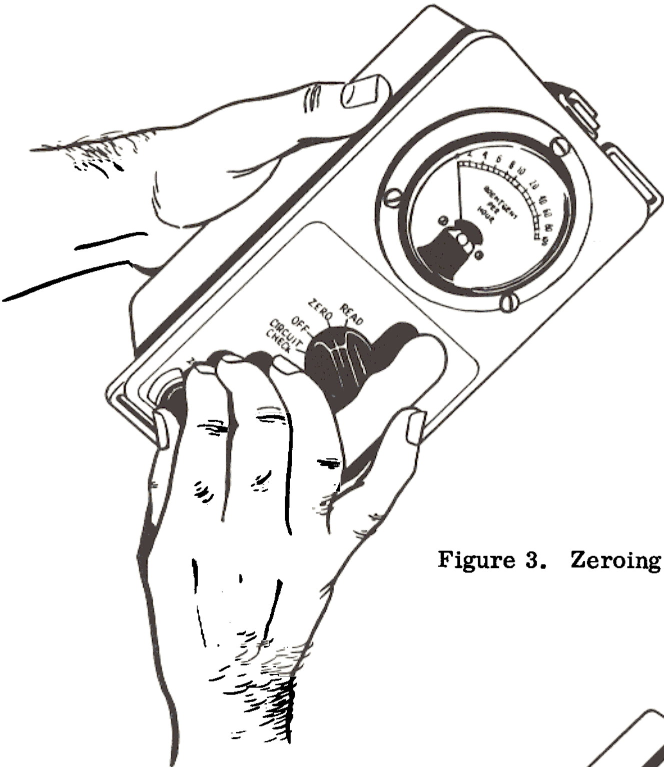

Figure 3. Zeroing The Instrument

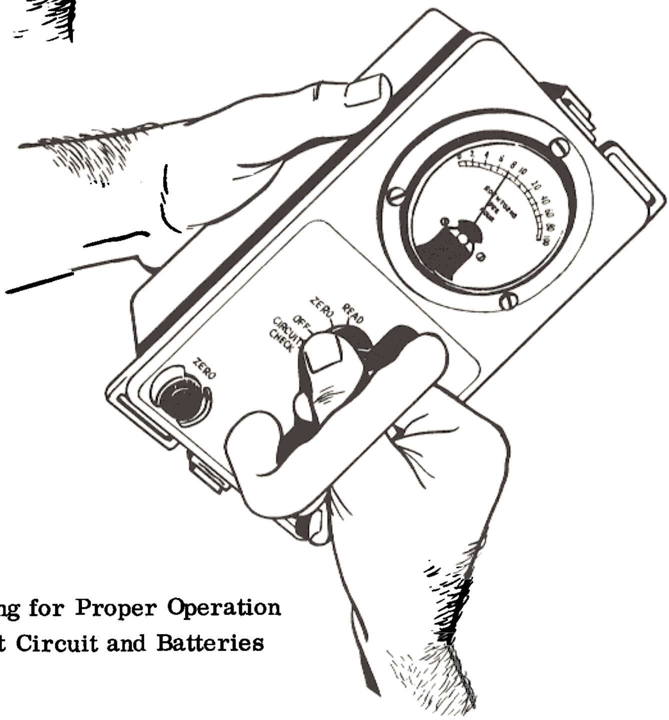

Figure 4. Checking for Proper Operation of the Instrument Circuit and Batteries

MAKING A READING

To take a dose rate reading with the instrument, simply turn the selector switch to the "Read" position. The meter will indicate the dose rate in roentgens per hour. (See Fig. 5) If the ratemeter is left on and used for an extended period of time, you should repeat the zeroing check (Fig. 3) every few minutes.

After using the instrument, be sure to turn the selector switch to the "Off" position to conserve the batteries. If the instrument is to be stored for an extended period, the batteries should be removed to eliminate the possibility of corrosion.

MEANING OF THE READINGS

To benefit most from the information that can be obtained from the CD V-727 ratemeter, you should have an understanding of the nature of radioactive fallout and the biological damage it could cause.

RADIOACTIVE FALLOUT

When a nuclear weapon is exploded close to the ground, tons of rock, soil, and other material located in the area are liquified and vaporized in the intense heat of the fireball. In addition, thousands of tons of dirt and debris are pulverized and drawn upward as the fireball rises and cools. The debris forms a mushroom-shaped cloud containing millions of radioactive particles which may reach an altitude of 15 miles or more. These particles are scattered by the winds and gradually fall to the earth, possibly hundreds of miles from the point of explosion. This is radioactive fallout.

There are two general types of fallout: "early fallout," which returns to the earth in the first day or so, and "delayed fallout," which may remain in the atmosphere for months or years. Since "early fallout" would pose the most serious and immediate danger to life, it is the fallout threat of greatest concern when one is viewing the overall threat of nuclear attack.

Radiation associated with early fallout is highly penetrating and can cause serious damage to living tissue. Since much of the fallout radiation is physically identical to X-rays, fallout particles can be described as millions of miniature X-ray "machines" that, in the aggregate, give off dangerous amounts of penetrating, cell-damaging radiation in the chaotic manner when compared with the carefully controlled and professional use of X-ray equipment in laboratories and hospitals.

The fallout particles that transmit this threat to life may be visible, especially if fallout arrives in dangerous amounts. They are about the size of table salt or fine beach sand. However, the radiation from the particles is invisible. It can be detected and measured only through the use of special instruments, such as the CD V-727.

There is no way of destroying radioactivity, but fallout radiation decreases in time through a process known as "radioactive decay." This decay is rapid at first, and then becomes slower as time passes. A significant decrease in radioactivity comes during the first 24 hours of its existence. For example, if the fallout radiation is measured at 80 r/hr 3 hours after a nuclear explosion, it would be only about 8 r/hr 21 hours later. This decay rate follows the rule-of-thumb that every sevenfold increase in time after detonation will reduce the radiation dose rate by a factor of 10.

Following a nuclear attack, the period of greatest danger from fallout probably would be the first two or three days. During this high-danger period it would be essential to have good protection -- to remain inside a good fallout shelter. After that you could probably leave the shelter for <u>brief</u> periods to carry out necessary tasks, but it might be several days or weeks before you and others in your community could safely spend much time in the open.

BIOLOGICAL DAMAGE

The subject of biological damage from exposure to fallout radiation is complex and cannot be described fully in a brief manual such as this. However, it is not necessary for you to understand the subject in great detail to be able to appreciate some of the more important aspects -- and to make good use of the CD V-727 in a National emergency.

Much has been written about the possible long-range effects from exposure to radiation -- increased incidence of leukemia, shortening of the life span, and genetic implications. No doubt exposure to fallout radiation would result in some increases in the small percentages of such occurrences normally expected. However, other effects of radiation, called acute effects, could result in sickness or death in a relatively short time. In the event of nuclear attack on the United States, it is these acute effects that would have to be dealt with first.

Although scientists generally agree on the amount of radiation damage the body can sustain without causing sickness or death, there are so many variables involved that no one could state just how radiation would affect all persons. For any individual case, these variables include the duration of the exposure, the age, and general health and vigor of the person. However, in spite of these and other variables, certain guidelines concerning the possible acute effects of radiation can be given. These are shown in Table 1, page 8.

The acute effects of radiation exposure would be modified considerably if the total radiation dose were received over a long period of time. The body repairs some of the damage (perhaps up to 90 per cent) if it is given time. For example, a whole-body exposure of 600 r in a short time -- say, four days or less -- would be fatal in most instances. But the same total exposure would not cause death or perhaps any noticeable external effects if it were received in small doses over a much longer period -- say, a year or more. However, it is well to keep in mind that any fallout radiation received, no matter how little, would be harmful because the body could never repair all the damage.

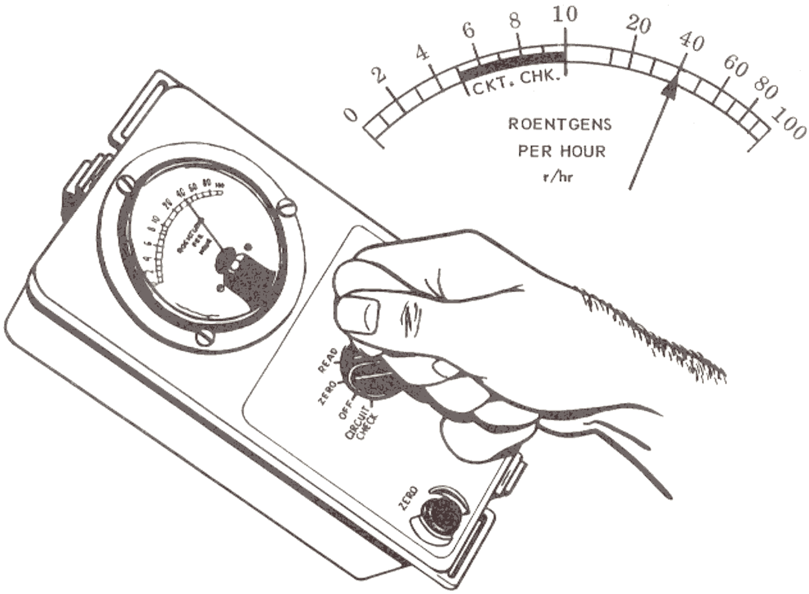

Figure 5. Reading of the Dose Rate. The Ratemeter Shows a Reading of 40 Roentgens Per Hour (r/hr).

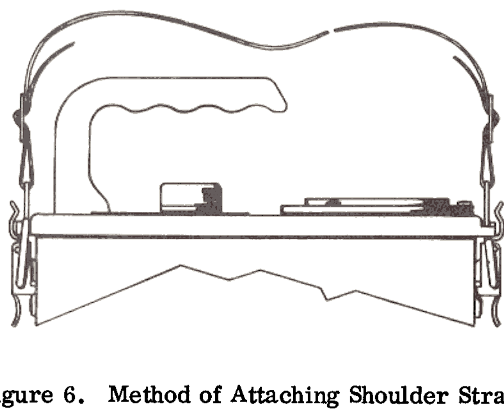

Figure 6. Method of Attaching Shoulder Straps

USING THE INSTRUMENT

Measurements with the CD V-727 ratemeter are always associated with time, just as an automobile speedometer reading is associated with time. For example, driving at 50 miles per hour for one hour will carry you a total of 50 miles. Similarly, if you are at a location where the radiation dose rate is 50 r/hr and you remain there for one hour, you will have been exposed to a total radiation dose of 50 r.

Following a nuclear attack, the radiation dose rate would increase while fallout is being deposited, reach a peak level, and then decrease with time--rapidly at first, but more slowly as time passes. Because of the changing dose rate, an accurate measurement of the total dose of radiation to which a person has been exposed could be made only by a dosimeter, such as the citizens dosimeter CD V-746. However, in an emergency it would be possible to use the CD V-727 ratemeter as a kind of "improvised dosimeter." For example, the ratemeter would help you to estimate the total dose of radiation to which you would be exposed if you had to leave a fallout shelter for a short time to take care of certain essential tasks. (See example "C" page 10.)

Personal decisions concerning how much radiation you should accept following a nuclear attack may have to be compromises between the desirable and the necessary. The first rule, of course, is to accept as little radiation as necessary -- none, if possible. This is desirable. But you could find it necessary to accept more than minimum amounts of radiation in order to carry out certain essential tasks. There is no black-and-white formula to go by in this complex matter of radiation exposure. However, Table 1 provides general guidelines on possible acute effects from exposure to various doses of radiation over period of a few days. Table 2 contains suggestions on radiation exposure during a National emergency -- suggestions that would be particularly significant after the fallout is down and the dose rate has reached its peak.1/ Both tables--and a good deal of common sense -- should be used in making personal decisions after a nuclear attack.

TABLE 1 -- Acute Effects of Radiation

Short-term*, whole-body exposure, in roentgens (r)	Probable Effects
0-100	No obvious effects.
100-200	Minor incapacitations. Possibly 5 per cent would require medical care.
200-400	Sickness and some deaths, but more than 50 per cent would survive.
400-600	Severe sickness. Less than 50 per cent would survive.
Over 600	Few survivors.

*Short-term exposure usually is defined as the total exposure dose over a period of about four days.

1/ Table 1 radiation figures are in total dose -- roentgens (r). Table 2 radiation figures are in dose rate -- roentgens per hour (r/hr).

TABLE 2 -- Emergency Radiation Exposure Guides

Dose rate outside the shelter (r/hr)	Recommendations*
1-2	Outside activity -- up to a few hours per day -- tolerable for carrying out necessary tasks, such as getting more food and water, disposing of wastes. Eating, sleeping, and all other activities should be conducted in the best available shelter.
2-10	Outside activity for short periods -- less than an hour per day -- tolerable for carrying out important tasks. Shelter occupants should rotate outside activities to minimize total radiation exposure to any one person. Outside activities of children should be limited to 10 to 15 minutes per day.
10-100	Time outside of shelter should be held to a few minutes, and limited to essential activities that cannot be postponed for at least 1 more day. If possible, stay in the best available shelter, no matter how uncomfortable.
More than 100 (Needle at far right of scale)	Outside activity of more than a few minutes could result in sickness, possibly death. The only situation which would justify leaving shelter would be extreme risk of death or serious injury by remaining inside the shelter.

*The recommendations were developed primarily for use during the first week following a nuclear attack by persons who have not been exposed to any significant exposure of nuclear radiation. There are guidelines to follow in the absence of official announcements and recommendations during the emergency.

In a National emergency the CD V-727 ratemeter could help you make decisions about when to seek shelter, actions that might be taken while inside a shelter, and when to leave a shelter to carry out certain essential tasks. Note that all of this is related to shelter. A properly constructed shelter would provide protection from fallout; the CD V-727 ratemeter would help you make the best use of that shelter. Following are examples of how the instrument could be used. "Example A" concerns when to seek shelter; "Example B" concerns actions that might be taken while inside a shelter; "Example C" concerns decisions to leave a shelter for brief periods.

EXAMPLE A -- A reading even as low as 1 r/hr should alert you of the need to seek shelter. It would indicate that the dose rate may build up to dangerous levels in a very short time. Of course, by the time you had a reading of 1 r/hr you might have been warned officially of approaching radioactive fallout. But you could have some critical tasks to take care of before moving into a shelter, and a dose rate reading of 1 r/hr means there would be no time to lose. For example, if you were going into a basement shelter, you might need to improve your radiation shielding by covering basement windows with dirt, rocks, or other heavy material. Also, you might need to get water, food, and other essential supplies into the shelter. At this stage in the emergency there would be two important precautions to keep in mind: (1) The dose rate could increase rapidly, possibly reaching lethal levels in a matter of minutes, (2) If you remained outside taking care of critical jobs, you would probably get fallout particles on your body and clothing. You should brush or shake your clothing thoroughly before entering the shelter to prevent carrying fallout particles inside the shelter. Uncovered portions of your body should be thoroughly brushed or washed, if possible, to remove any remaining particles.

EXAMPLE B -- Inside a shelter the ratemeter also could provide you with valuable information. For example, the instrument might show no appreciable reading. That in itself would be valuable, reassuring information.

Suppose the ratemeter shows a dose rate of about 1 r/hr inside the shelter. That's not a particularly dangerous level, especially when compared with the probable level outside the shelter. If the dose rate inside a good fallout shelter is 1 r/hr, the dose rate outside the shelter probably is 100 r/hr or higher, and that's a dangerous level. You should stay inside the shelter.

If the dose rate inside the shelter continues to rise, reaching a level of about 5 r/hr for example, you should find the part of the shelter where the dose rate is lowest, and improve the shielding there by rearranging stored goods, furnishings, and other material around and above it as much as possible. Then use that small area as the main shelter for a time. In addition, adults could use their own bodies to help shield any children in the shelter. The improvised arrangements might be uncomfortable, but the outside dose rate could be at or nearing its peak, and if so, it would soon start to decrease.

EXAMPLE C -- One of the most critical personal decisions you could face after a nuclear attack is when to leave the shelter. There are three general rules to keep in mind:

1. Your goal should be to keep your total radiation exposure as low as possible. For example, during the first few weeks after a nuclear attack you should keep your exposure to radiation as far below a total dose of 100 r as possible.

2. Following a nuclear attack, the most dangerous fallout -- early fallout -- probably would be down after the first day or so, and the dose rate peak would be reached at that time. At least during and immedi-

ately after this highly dangerous period, try to spend all your time inside a good fallout shelter.

3. Fallout probably would not be distributed uniformly, and there could be significant differences in dose rates at locations just a few hundred feet apart. The fact that you might get a reading of 5 r/hr outside your front door does not necessarily mean your neighbors would get the same reading outside their front doors. There could be considerable differences in dose rate readings at various places in your community.

With these general rules in mind, you could use the CD V-727 to help you make logical decisions about leaving a fallout shelter for brief periods a few days after an attack. Except in extreme emergency -- if you face probable death or serious injury by remaining inside a shelter -- you should not leave the shelter permanently on the basis of readings from the CD V-727 alone. But there are a number of other emergencies that could require you to leave the shelter for brief periods -- lack of water, food, or medical items, to name a few.

Before leaving the shelter, you should estimate the total amount of radiation to which you have been exposed. If it has been relatively low, make a quick trip outside the shelter to get a reading on the outside dose rate, and then return to the shelter. Your estimate of your previous total exposure, plus the outside dose rate reading, plus an estimate of how long you would have to remain outside the shelter would give you an estimate of how much danger you would face by carrying out the task. For example, you estimate you have already received a total radiation dose of 15 r. The dose rate outside the shelter is 50 r/hr. The job you have to do outside the shelter would take about a half hour, and therefore, would require you to accept an additional exposure of about 25 r. This would make your estimated total exposure dose since the start of the emergency about 40 r (15 r plus 25 r). On the basis of these estimations you could make a logical decision about whether the job outside the shelter should be taken care of immediately or postponed until the outside dose rate had decreased. This method of using the CD V-727, incidentally, is what was previously referred to as using the ratemeter as an "improvised dosimeter" -- to estimate total exposure dose.

If you are using a basement fallout shelter, the CD V-727 also could help you decide when you could move out of the shelter proper and spend most of your time in the basement, perhaps returning to the shelter only to sleep.

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Following a nuclear attack, the CD V-727 could provide you with important information. If this information is applied hurriedly and without thought of possible consequences, it could be worse than total ignorance of the danger you face. But if it is used carefully and intelligently, it could save your life.

BATTERY INSTALLATION

Open the instrument by snapping open the pull catch at each end of the case and separating the top from the case bottom. This exposes the battery box and battery retainer clip. Remove the retainer clip by squeezing its ends until it can be pulled out of the slots in the battery box. Insert the batteries in the battery box observing the indicated polarity. (The battery box is designed to be mechanically selective so that the batteries cannot be inserted with reversed polarity). Replace the battery retainer clip. Align the top with the case bottom and squeeze together gently. Snap the pull catches closed.

CAUTION

Do not install damaged or leaking batteries.

PREVENTIVE MAINTENANCE

Preventive maintenance procedures should be carried out once a month when the instrument is in use, and about once every six months when the instrument is in storage.

a. Remove the batteries, clean battery contacts and battery terminals if necessary and remove any corrosion present.

b. Replace the batteries making certain that all batteries make good contact and exceed minimum voltage.

c. Follow steps described in the OPERATION section of the manual to check performance of the instrument.

BATTERIES SHOULD BE REMOVED FROM THE INSTRUMENT IF IT IS TO BE STORED MORE THAN A FEW WEEKS. STORE BATTERIES IN THE SAME BOX WITH THE INSTRUMENT SO THEY WILL BE ON HAND WHEN NEEDED.

CORRECTIVE MAINTENANCE

CALIBRATION

Calibration of the citizens ratemeter should be attempted only by personnel familiar with its circuit and construction. Furthermore, if a radioactive isotope is used for calibration purposes, calibration should be attempted only by those who are trained in the use of radioactive isotope sources.

Due to the instruments unique nature, there are three calibration adjustments on the ratemeter, each provided for one specific adjustment, however, not independent of one another.

For calibration purposes the instrument may be exposed to a known radiation field or an equivalent electrical signal may be applied across the grid input Hi-Meg (R1) of the electrometer tube V1. For convenience and safety the second method is suggested.

Functional description of calibrating potentiometers: Orient the instrument as shown on Figure 2.

R5. First of the trial potentiometer units from the left. Variable resistance in series with CR4 diode, to adjust the sensitivity of the instrument in the 10-100 r/hr region.

R6. Center of the trial unit. Variable resistance in shunt with the indicating meter. Function; to adjust the sensitivity in 0 - 10 r/hr region.

R7. Third potentiometer from left. Variable resistance in series with the indicating meter. Function; to adjust the half-scale point of the instrument.

PROCEDURE

1. Turn the operationational switch to the "ZERO" position, and zero the instrument with potentiometer R8.
2. Turn the operational switch to the "READ" position.
3. Adjust R6 for maximum resistance; that is, for maximum meter sensitivity.
4. Apply an 0.5 V signal as described previously or expose the instrument to a 10 r/hr field and adjust R7 for a 10 r/hr indication on the meter.
5. Apply an 0.2 V signal or 4 r/hr field and take a reading. The meter should read slightly above 4 r/hr.
6. Adjust R6 so that the meter indicates as far below 4 r/hr as it originally indicated above.
7. Re-adjust R7 until meter reads 4 r/hr.
8. Re-check steps 4 and 7.
9. Apply a 4.0 V signal or 80 r/hr field and adjust R5 for an 80 r/hr indication on the meter.
10. Re-check steps 4, 7, and 9.
11. Check the scale at as many points as desired.

DISASSEMBLY FOR CORRECTIVE MAINTENANCE

a. Release the snap action catches and remove the instrument from the case bottom.
b. Remove the retaining clip and batteries from the battery box.
c. Remove the four screws which secure the battery box to the instrument top. Swing the battery box away from the circuit board. Wiring between the battery box and the circuit board prevents complete separation of the battery box.
d. Remove the four screws and spacers which secure the chamber to the instrument top.

   Note: At this point the instrument (with batteries) will operate on ZERO and CIRCUIT CHECK ranges and the bottom side of the circuit board is completely exposed for trouble shooting.

e. Remove the meter nuts.

f. Remove the knob from the ZERO control. It is not necessary to remove the range switch knob.

g. Remove the circuit board. This is, most easily accomplished by pressing on the ZERO control shaft and applying a slight pressure at the meter studs.

h. Remove the nuts, washers, and lockwashers from the top of the circuit shield box.

i. Remove the circuit shield box. The instrument is now completely disassembled.

Reassembly of the instrument is the reverse of the disassembly procedure.

CAUTION

Before beginning reassembly make certain the range switch and both switch wafers are oriented in the OFF position.

TROUBLE SHOOTING

The majority of the electrical components of the citizens ratemeter are standard parts familiar to electronic technicians and are readily checked by conventional means. The electrometer tube, the "Hi-Meg" resistors, the ion chamber insulator and the ceramic switch section are the only components requiring special precaution. These components are all part of the high resistance input circuit. THE INSULATING PORTIONS OF THESE FOUR COMPONENTS SHOULD NOT BE HANDLED. They should be touched only with clean tools when repairs are made. If surface leakage on any of these items is suspected, cleaning with clean alcohol using a clean camel hair brush is recommended. Avoid solder flux splattering on these components when repairs are made.

All batteries as well as the measuring circuit are checked by the "CIRCUIT CHECK". If trouble exists, batteries should be checked with any voltmeter having a sensitivity of 1000 ohms/volt or more. The "D" cells, BT1 and BT2, should read higher than 1.2 volts.

Circuit malfunctions may be traced with the aid of the schematic circuit diagram, Figure 7. Voltage measurements shown on this diagram are measured with respect to point* and are those obtained with a voltmeter having a sensitivity of 20,000 ohms per volt. Such voltage checks should be taken with the operational switch turned to the "ZERO" range and with the zero control adjusted so that the instrument reads zero.

The following troubles and corrective action are presented as an aid to trouble shooting.

TROUBLE SHOOTING CHART

Trouble and Cause	Corrective Action
NO READING	
Filament Battery Low	Replace the Battery
Corroded Battery Contacts	Clean or Replace the Contacts
Meter Damaged	Replace Meter
Chamber Damaged	Replace Chamber
Open Connection	Inspect Solder Joints
METER WILL NOT ZERO (Reads Upscale)	
Transformer Defective	Replace Transformer
METER WILL NOT ZERO (Reads Downscale)	
Power Supply Battery Low	Replace Battery
Corroded Battery Contacts	Clean or Replace Contacts
Defective Tube	Check Tube Filament
Transformer Defective (Transformer does not "Sing")	Replace Transformer
INSTRUMENT READS LOW	
Calibration Control Disturbed	Check Calibration
Defective Tube	Replace Tube
Meter Damaged	Replace Meter
Defective Chamber	Replace Chamber
Dirty High Resistance Components	Clean High Resistance Components
INSTRUMENT READS HIGH	
Calibration Control Disturbed	Check Calibration
Damaged "Hi-Meg" Resistor	Replace "Hi-Meg" Resistor
Dirty High Resistance Components	Clean High Resistance Components

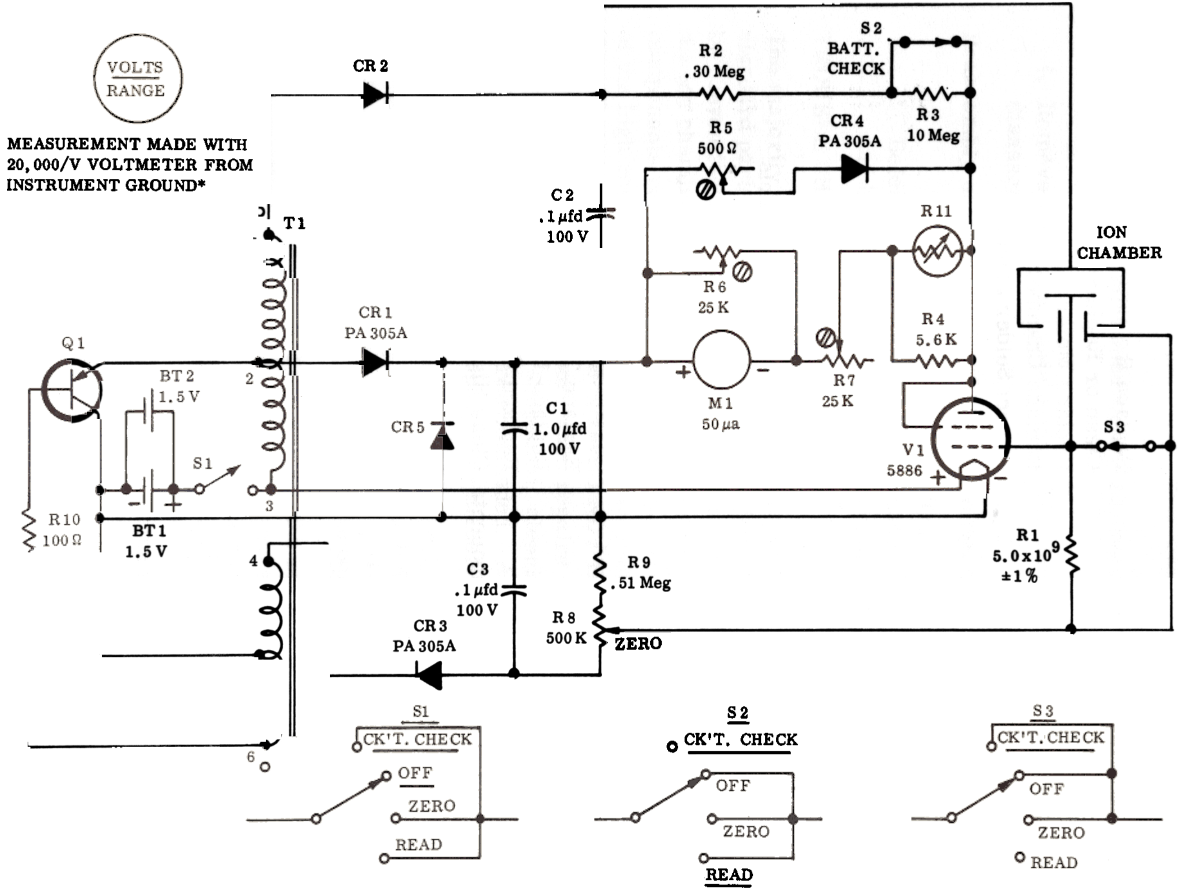
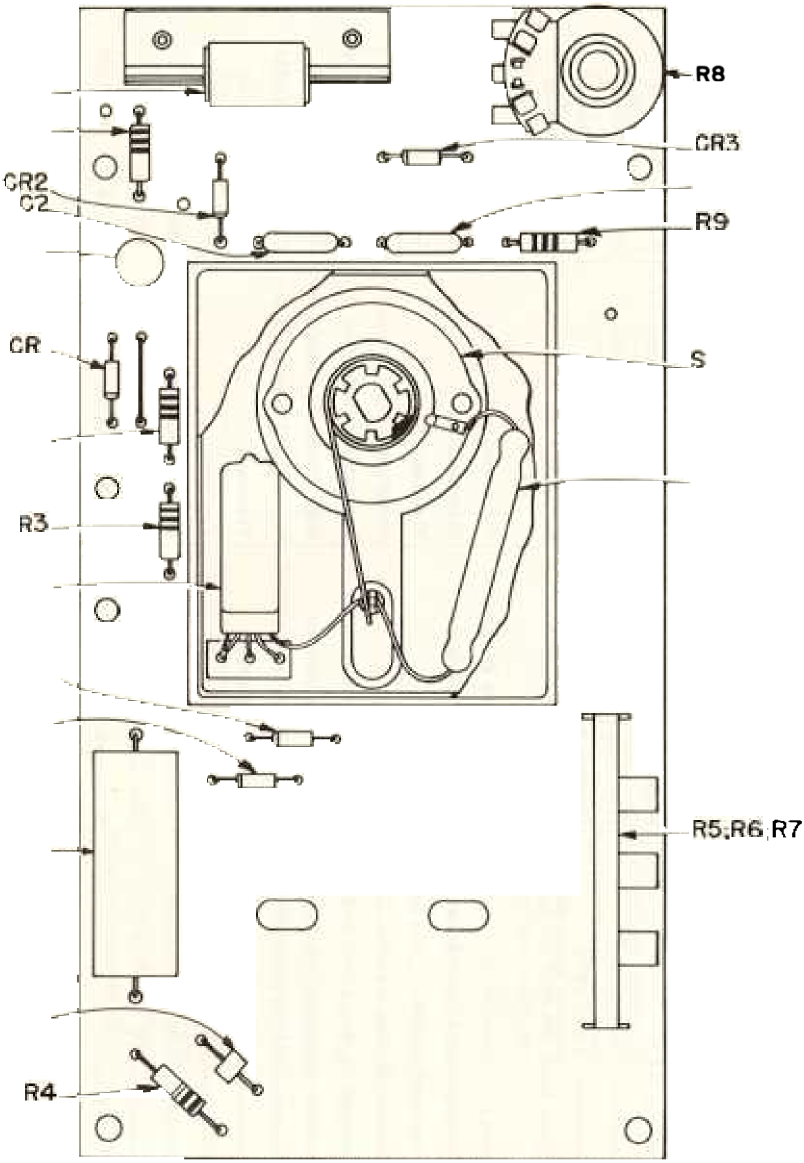


Figure 7. Schematic Circuit Diagram



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REPLACEABLE PARTS LIST

LECTRICAL COMPONENTS

Circuit Symbol	Description	Function	Manufacturer	Mfg. Part No.	Victoreen Part No.
BT1, BT2	Battery: 1.5 V	Power Supply	Union Carbide Consumers Co.	950	16-14
C1	Capacitor: 1.0 mfd; 100 V	Plate Supply Filter	General Instrument Co.	107	21-89
C2, C3	Capacitor: .1 mfd; 100 V	Chamber & Bias Supply Filter	Aerovox	V146X-123E	21-205
CR1, CR3, CR4	Silicon Diode: PA 305A (or equiv.)	Plate & Bias Supply Rectifier, Limiter	Victoreen	--------	52-35
CR2	Diode:	Chamber Supply Rectifier	Victoreen	----	52-30
CR5	Zener Diode: 15 V; ±10%; 100 MW	Plate Supply Regulator	Victoreen		52-37
Q1	Transistor: 1/2 W	Oscillator	Victoreen		23-17
R1	Resistor: Hi-Meg; $5 \times 10^9\ \Omega$; 1/2W; 1%	Signal Resistor	Victoreen	--------	185-1176
R2	Resistor: .3 Meg; 1/2 W; 10 %	Bucking Current Resistor	International Resistance Co.	GBT 1/2	185-1095
R3	Resistor: 10 Meg; 1/2 W; 10 %	Battery Check Resistor	International Resistance Co.	GBT 1/2	185-34
R4	Resistor: 5.6K; 1/2 W; 10 %	Thermistor Shunt Resistor	International Resistance Co.	GBT 1/2	185-274
R5, R6, R7	Potentiometer: 25 K; 25 K; 500 Ω; 30 %	Calibration Controls	Victoreen	--------	22-144
R8	Potentiometer: 500 K	Zero Control	Victoreen	--------	22-25
R9	Resistor: .51 Meg; 1/2 W; 5 %	Bias Supply Resistor	International Resistance Co.	GBT 1/2	185-3
R10	Resistor: 100 Ω; 1/2 W; 10 %	Bias Current Limiter	International Resistance Co.	GBT 1/2	185-118
R11	Thermistor:	Temperature Compensator	Carborundum Co.	551-H5	185-1339
S1, S2, S3	Switch: Phenolic Wafer	Function Selector	Victoreen	--------	727-506
V1	Tube: 5886	d.c. Amplifier	Victoreen		35-82
T1	Transformer:	Power Supply	Victoreen		727-504

MECHANICAL COMPONENTS

Description	Function	Manufacturer	Mfg. Part No.	Victoreen Part No.
Case Bottom Assembly	Bottom of Instrument Case	Victoreen	--------	727-517
Knob	Zero Adjust	Harry Davies Molding Co.	1450-AC	9-14
Battery Box Cover	Holds Batteries in Place	Victoreen	--------	720-121
Battery Contact	Provides Electrical Contact Between Battery and Circuit	Victoreen		700-68
Battery Box	Holds Batteries	Victoreen		700-66
Spacer	Keeps Ion Chamber from Touching Circuit Board and Provides Electrical Connection To Chamber	Victoreen		40-38
Spacer	Provides Electrical Contact Between Chamber Guard Ring and Circuit Board	Victoreen		720-117
Ion Chamber Assembly	Radiation Detector	Victoreen	--------	727-515
Knob	Range Control	Harry Davies Molding Co.	1500-K	9-9
Meter Gasket	Moisture-Tight Seal Around Meter	Victoreen	--------	700-63
Meter Assembly	Visual Indication of Radiation	Victoreen	--------	720-508
"O" Ring	Provides Seal Between Control Shaft and Shield Box	Parker Appliance Co.	5427-1	46-38
Switch Index	Positions Range Switch	Victoreen	--------	727-523
Decal	External Markings for Range Control	Victoreen	--------	727-535
"O" Ring	Provides Seal Around The Zero Control Shaft	Parker Appliance Co.	2-9	46-25
Handle	Instrument Carrying Handle	Victoreen	--------	720-114
Case Gasket	Water-Tight Seal Around Case Top Assembly	Victoreen	--------	720-157
Case Top	Top of Instrument Case	Victoreen	--------	720-111
Instruction Manual	Operation and Maintenance Instructions (Form 1104-62)	Victoreen	--------	727-501
Strap Buckle	Carrying Strap Length Adjustment	Waterbury Buckle Co.	8075 STL	710-44
Strap Fastener	Attaches Shoulder Strap	Victoreen	--------	815-47
Shoulder Strap	Carrying Strap	Victoreen	--------	727-537

LIST OF MANUFACTURERS

AEROVOX CORP., 740 Belleville Ave., New Bedford, Mass.
CARBORUNDUM CO., Globar Plant, Electronics Div., Niagara Falls, N.Y.
GENERAL INSTRUMENT CORP., Capacitor Div., Orange St., Darlington, S.C.
HARRY DAVIES MOLDING CO., 1428 N. Wells St., Chicago 10, Illinois
INTERNATIONAL RESISTANCE CO., 401 N. Broad St., Philadelphia, Penna.
PARKER APPLIANCE CO., 17325 Euclid Ave., Cleveland 12, Ohio
UNION CARBIDE CONSUMERS CO., 30 East 42nd St., N.Y., N.Y.
THE VICTOREEN INSTRUMENT CO., 5806 Hough Avenue, Cleveland 3, Ohio
WATERBURY BUCKLE CO., 862 S. Main St., Waterbury, Conn.

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