Dose and Dose rate instruments

Lesson topic 5.3

Enabling Objectives

- Perform gross and detailed radiological survey procedures, marking and recording those areas simulating radiological contamination
- Describe shipboard radiological countermeasure procedures, to include radiation surveys and ship and personnel decontamination procedures
- Measure the intensity or dose received from a radiation sources using one of the dose/dose rate instruments: DT-60, CP-95, AN/PDQ 1 & 2 pocket dosimeter IM-143

Enabling Objectives

- Measure the intensity or dose received from a radiation source using one of the dose/dose rate instruments: PDQ 1 & 2, DT-60, CP-95, Pocket Dosimeter, IPDS, AN/KAS-1, IM-143, PP-4276
- Measure the intensity or dose received from a radiation source using one of the dose/dose rate instruments: PDQ-1 & 2, DT-60, CP-95, Pocket Dosimeter, IPDS, AN/KAS-1, IM-143, PP-4276
- Describe the characteristics and operating procedures of the dose/dose rate instruments: PDQ-1 & 2, DT-60, CP-95, Pocket Dosimeter, IPDS, AN/KAS-1, IM-143, PP-4276

Enabling Objectives

- ***Perform*** **gross and detailed radiological survey procedures, marking and recording those areas simulated radiological contamination**
- ***Describe*** **shipboard radiological countermeasure procedures to include radiation surveys and ships and personal decontamination procedures**
- ***State*** **the functional description of the Multi Function Radiac in accordance with Radiac sets to include: Component characteristics and component functions**
- ***Describe*** **the operational characteristics of the Multi-Function Radiac**

Enabling Objectives

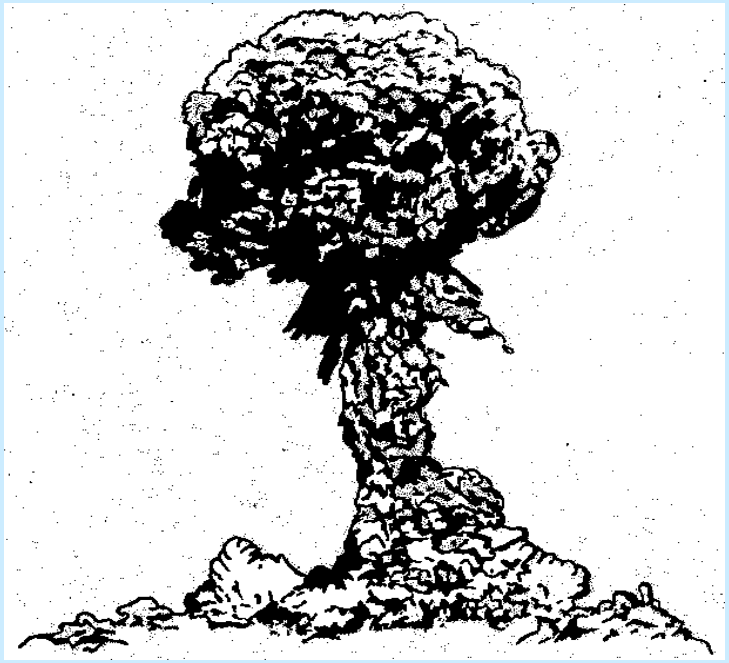
Describe **the operational characteristics of the Multi Function Radiac in accordance with Radiac sets to include: Theory of Operation, Pro-operational procedures, Normal operation procedures and post operation procedures.**

Purpose

- Designed to
  - Detect or measure alpha, beta & gamma radiation
  - Measure intensity
  - Determine the extent of contamination
  - Provide information for calculating the stay time of personnel

Dosimeters

- Dosimeters
  - Device worn to record the accumulated dose of ionizing radiation received



DT-60/PD

- Non-self-reading mass issue dosimeter
- Measures gamma radiation
- Issued to all hands
- Has a range of 10R-600R
- Cannot be zeroed or calibrated

DT-60

CP-95/PD, CP-95A/PD Radiac Computer Indicators

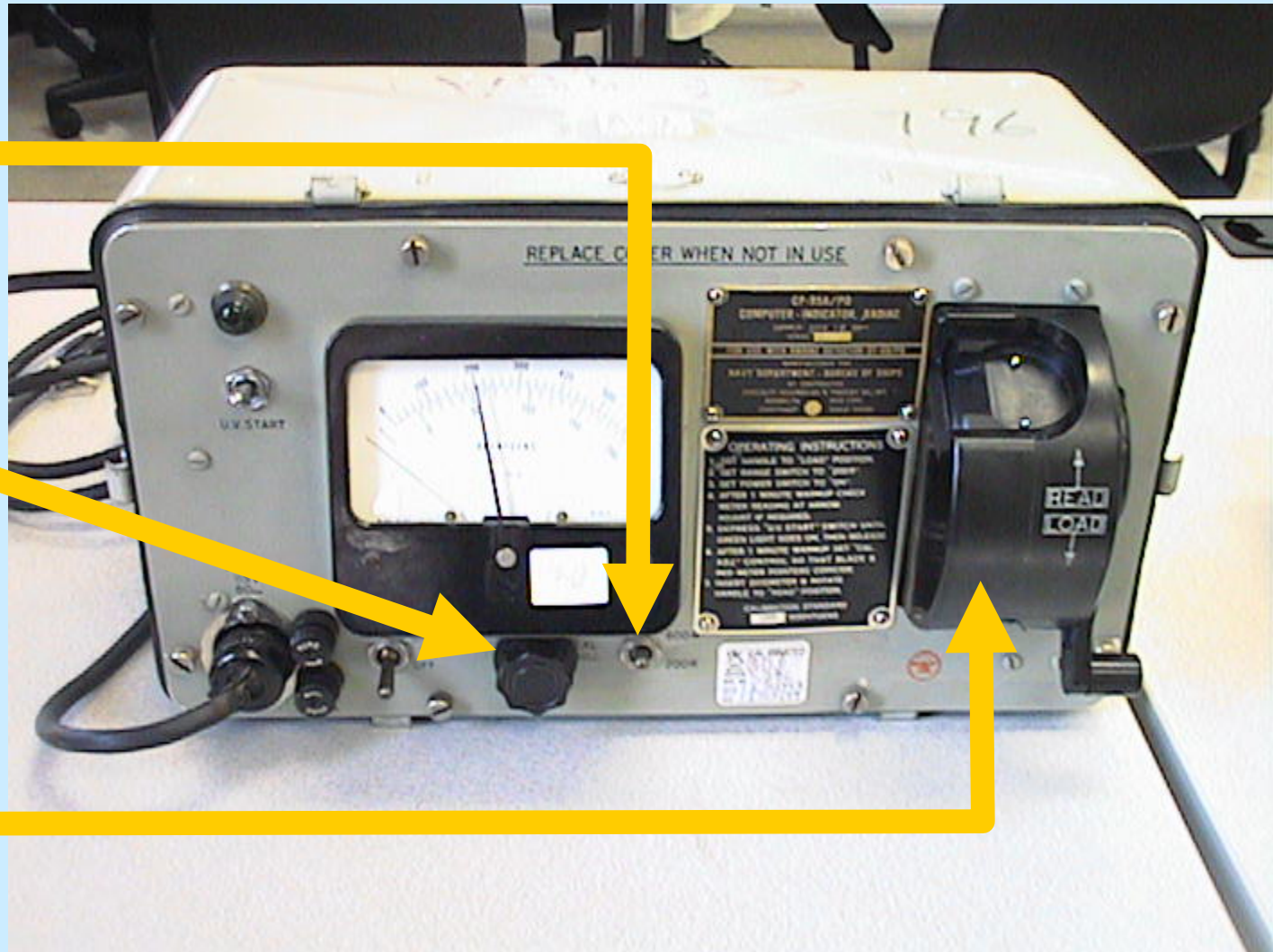
- Reads the DT-60
- Two range selections
  - 0 - 200
  - 0 - 600
- Power Supply 115-V ac. 60-HZ

CP-95

Selector switch

Cal. Adj. Knob

Loading drum



IM-143 pocket dosimeter

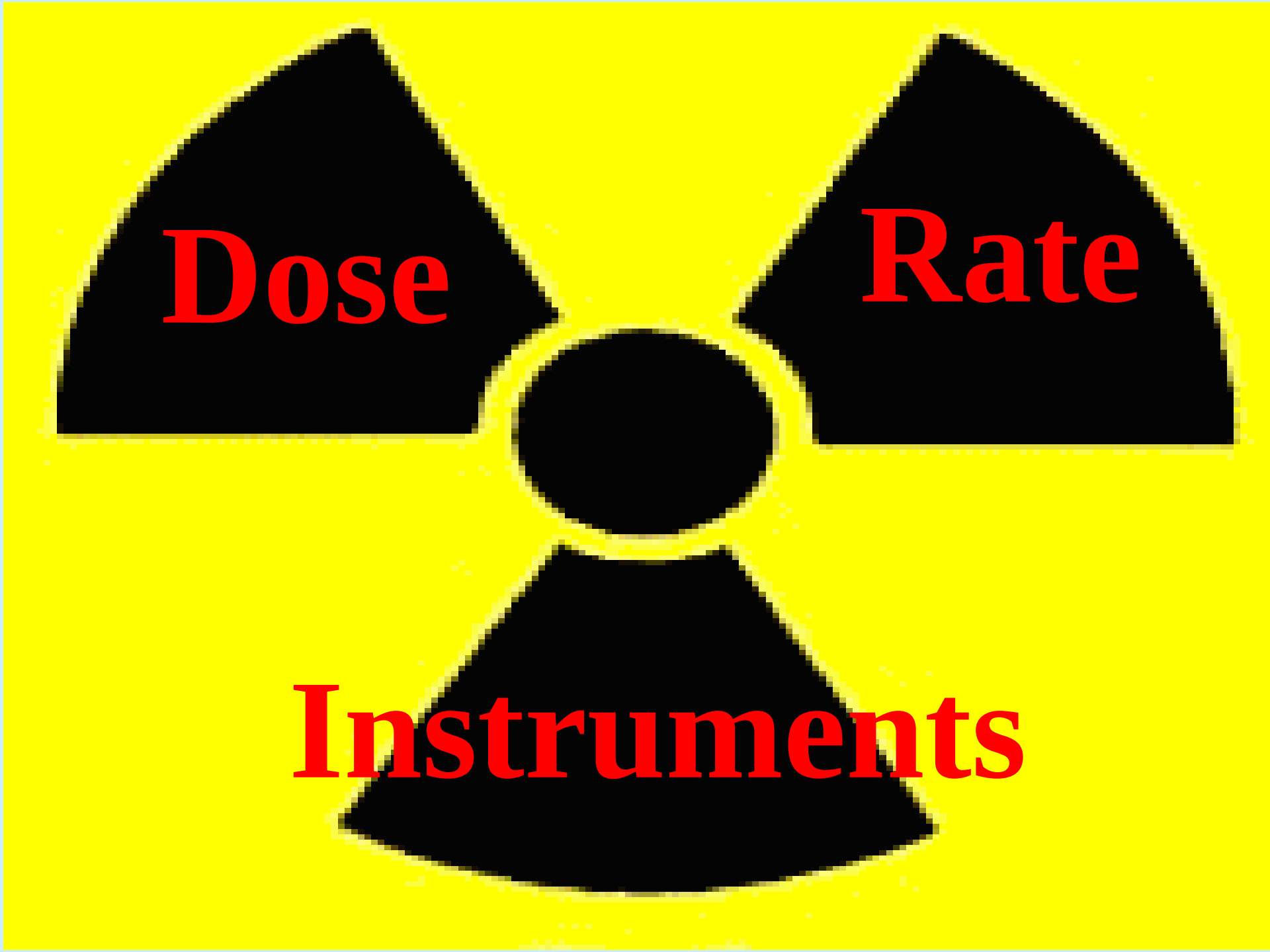
- Issued to key personnel
- 0-600R scale
- Self reading
- Can be calibrated
- Calibrated by the PP-4276

PP-4276


RECEPTACLE
DOWN
SCALE
PP-4276C/PD
RADIAC DETECTOR CHARGER
NAVAL ELECTRONIC SYSTEMS COMMAND
CONTRACTOR
CHATTERTON RESEARCH CORPORATION
CHATSWORTH, CA.

PP-4276

- Powered by 1 D Cell
- Operation
  - Insert IM-143 onto receptacle
  - Depress firmly while viewing the dosimeter scale through its eye piece
  - Rotate charging knob until quartz fiber image in IM-143 indicates zero
  - Remove IM-143


Dose
Rate
Instruments

AN/PDR-65

- Navy Standard Fixed/Mounted Radiac
- Functions
  - Provides gamma radiation dose & dose rate information

Characteristics

- Gamma intensity up to 10,000 R/hr
- Measures gamma dose to 9,999 R/hr
- 115 VAC or 4 NICAD batteries
- Consists of a detector assembly, power supply & remote control unit, remote detector mounting bracket, 200 feet of remote detector cable


AN/PDR-65 RADIAC SET 2
RADIAC METER
AN/PDR-65 RADIAC
POWER SUPPLY
2
POWER
ON
OFF
ALARM
ON
DETECTOR
REMOTE
LOCAL
CONTROL-POWER SUPPLY

Multi-function Radiac AN/PDQ-1 & 2

- Hand held electronic monitoring devices containing an internal gamma detector
- Interfaces with external measurement probes for alpha, beta, gamma/ beta, neutron and x-ray radiation
- Designed to replace the existing radiacs in use today

Component Characteristics and Functions

- AN/PDQ-1 & 2 are identical except for the line display
- Internal gamma detector (Geiger-Muller) GM tube
- Housing assembly with front panel controls (five button key pad)

AN/PDQ-1&2

- Power key
- Alarm set key
  - allows operator to temporarily alter the alarm set-points
- Audio key
- Light key

AN/PDQ-1 & 2

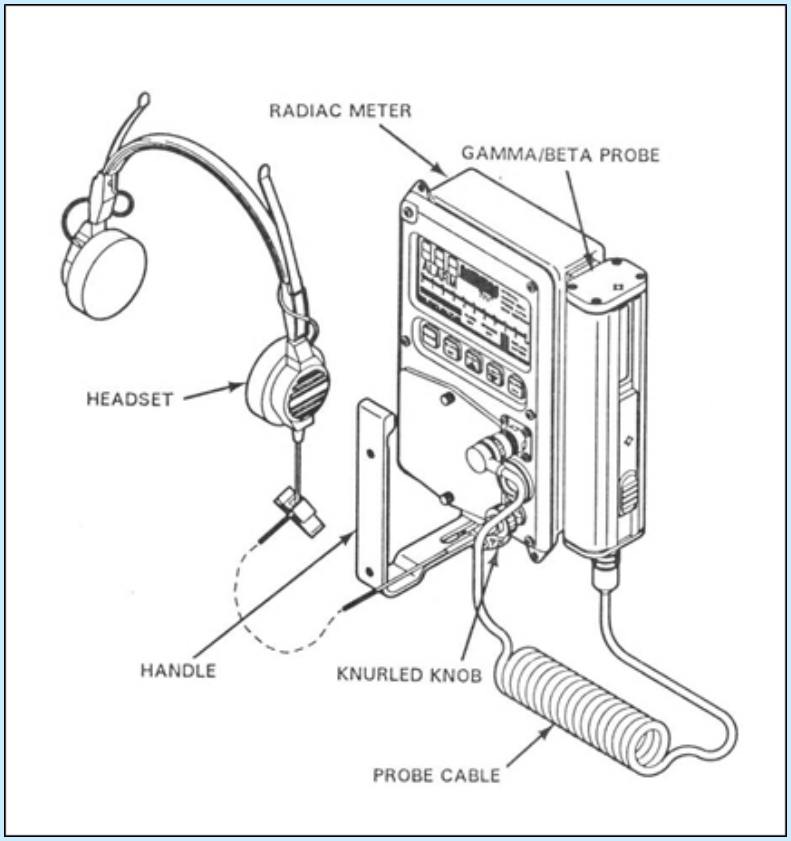
- Alarm ACK (acknowledge) key
  - When depressed and held for 5 seconds, the control unit will perform a reset where all Built In Tests (BIT) are performed
- Single line display AN/PDQ-1
- Dual line display AN/PDQ-2
- Liquid Crystal Display (LCD)

AN/PDQ-1 & 2

- Powered by two D-cell batteries
- 200 hours of battery life for the meter
- 100 hours when the meter & probe are used together

AN/PDQ-1 & 2

- Carrying Case
  - Waterproof
- Headset
- Shoulder strap
- Lightweight
- Operators manual



Ancillary probes used with the AN/PDQ-1 and 2

- Gamma/Beta (DT-680/PDQ)
- Single GM tube which covers an eight decade measurement range
- Beta sensitivity is provided through a side beta sliding window opposite the cleat mechanism
- Includes a separate carrying case

Beta probe DT-685 & DT-304/PDQ

- Single "pancake" probe holder, GM tube (DT-304/PDQ)
- Beta sensitivity is provided through an integral beta window
- Includes a separate carrying case

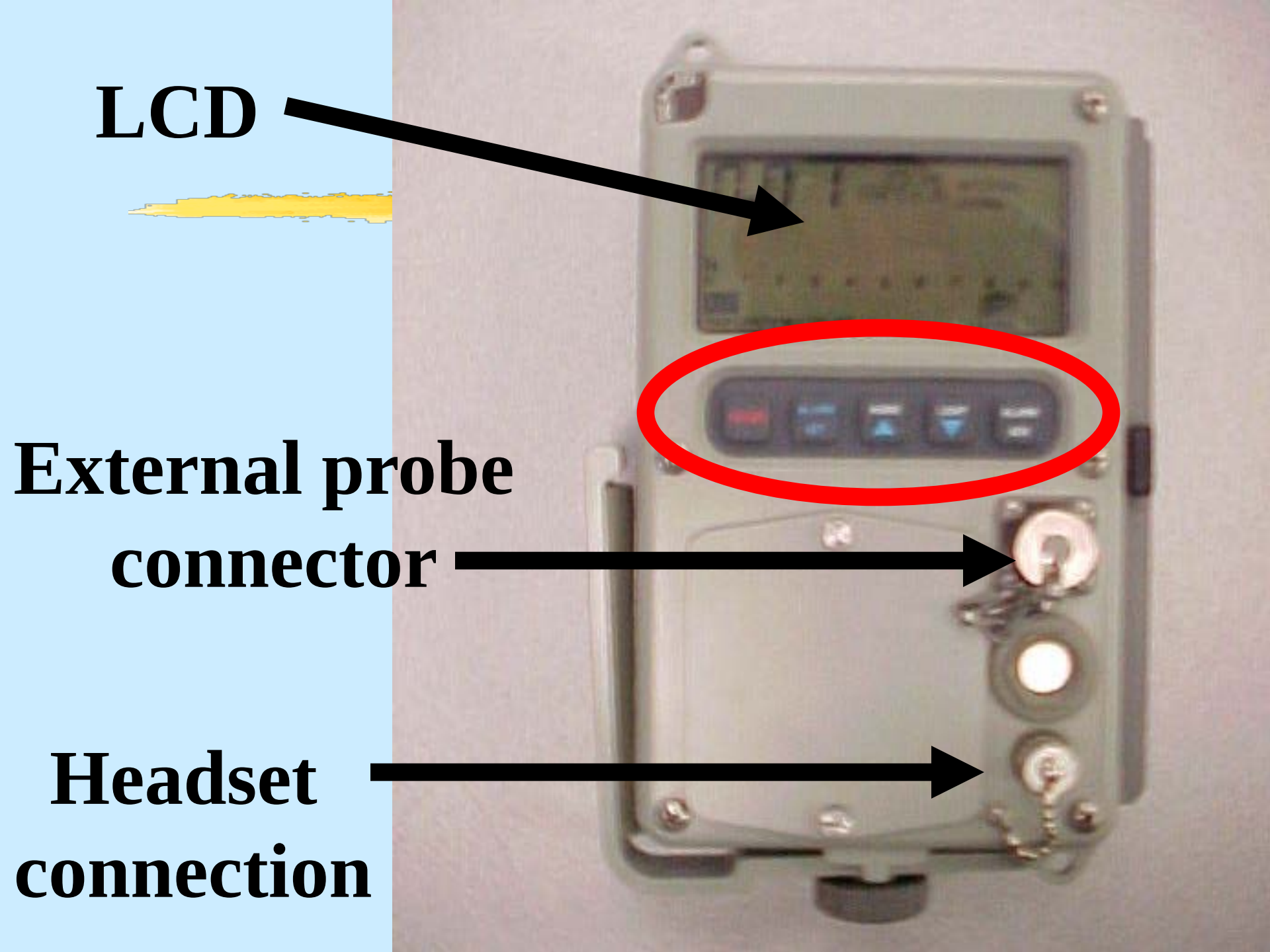
Additional Probes if needed

- DT-680/PDQ - Gamma/ Beta probe
- DT-681/PDQ - Alpha probe
- DT-683/PDQ - Neutron Indicator Probe, Explosive Ordnance Disposal (EOD)

Additional Probes if needed

- DT-684/PDQ - Neutron Probe
- DT-685/PDQ - Beta Probe with DT-304/PDQ "pancake" holder.
- DT-686/PDQ - Radiography Probe

DT-680/PDQ - Gamma/ Beta probe


LCD
External probe connector
Headset connection

AN/PDQ-1 with external probe

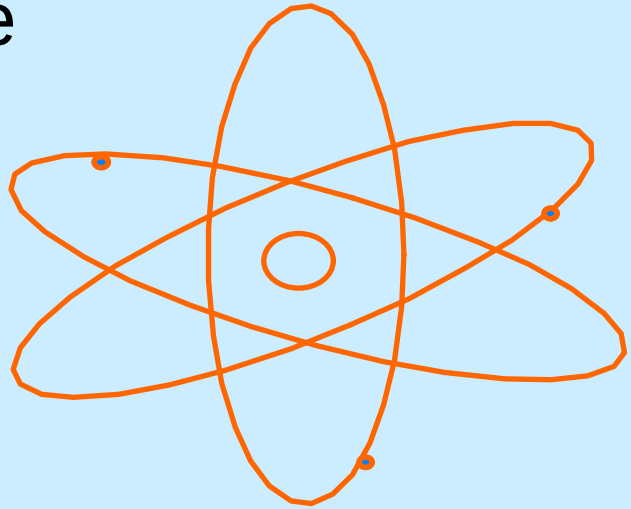
AN/PDQ-1 with external probe

Laboratory Safety Procedures Associated with Radioactive Material

- DO'S
  - Personnel will wear a pocket dosimeter unless otherwise directed by the Radiation Safety Officer
  - Personnel will be monitored after handling radioactive material
  - Personnel will wash their hands after handling sources

Laboratory Safety Procedures Associated with Radioactive Material

- Don'ts
  - Do not smoke, eat, drink or chew at anytime when working with radioactive material
  - Do not touch any radioactive material directly at any time



Summary

- Dosimeters
- AN/PDR 65
- AN/PDQ-1 & 2
- Lab safety