

8 DISCUSSION AND CONCLUSION

This paper emphasizes some of the factors and methods in developing, designing, assembling and servicing of portable nuclear radiation counter using IC UP/DOWN Decade Counters. The problems arising in the development of the UP/DOWN Portable Scaler are the high power consumed by the large numbers of integrated circuit and by the indicator tubes using as the readout unit which obtains the power from DC-DC converter.

From the experiment, the portable scaler consumed about 12 W from the rechargeable battery power supply. Because the scaler required no warm-up time, the best way to minimize power consumption is to switch the power on when and only when the instrument is used to count the radiation from the radioactive sample. The portable scaler should be off during the preparation period. By this way, the scaler can be used all day long before recharging of the battery is required.

Owing to the power loss in DC-DC conversion required to power the display unit using numerical gas filled tubes, the readout unit may be replaced by calibrated (decimal graduation) edgewise milliammeters connected directly to the BCD-to-Decimal Decoder/Drivers. Thus a reduction of power consumption by as much as 40 % may be achieved. The DC-DC power conversion is then needed for high voltage supply for radiation detectors and smaller pot cores and less electronic components will serve this purpose.