



INTERNATIONAL ATOMIC ENERGY AGENCY
UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION
INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS
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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION



INTERNATIONAL CENTRE FOR SCIENCE AND HIGH TECHNOLOGY

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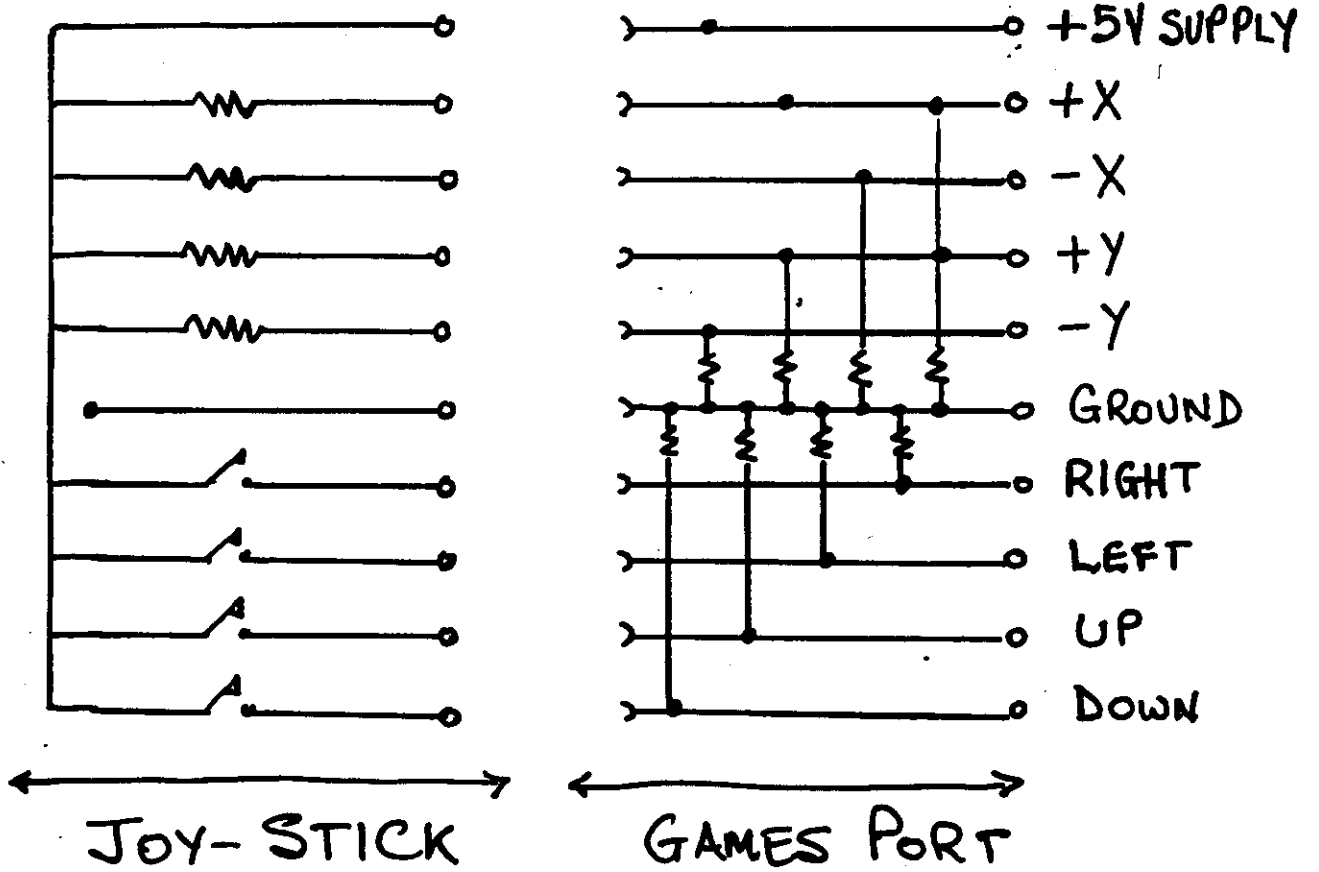
SMR/643 - 22

**SECOND COLLEGE ON
MICROPROCESSOR-BASED REAL-TIME CONTROL -
PRINCIPLES AND APPLICATIONS IN PHYSICS
5 - 30 October 1992**

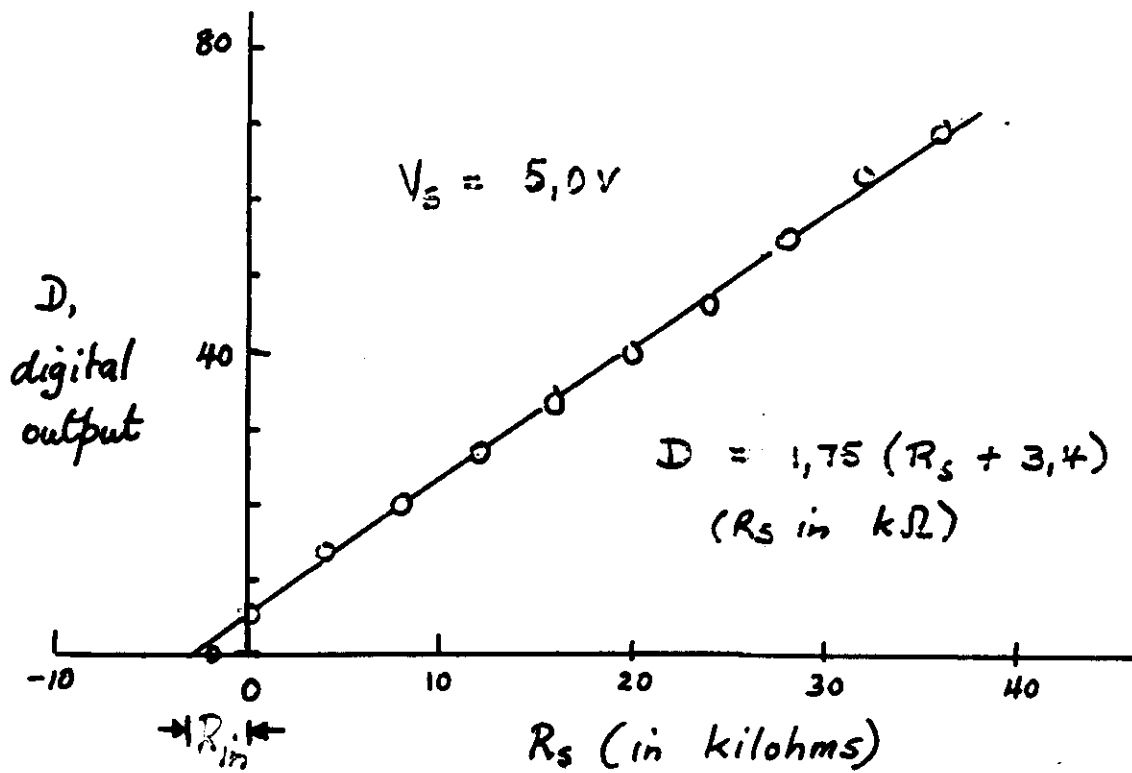
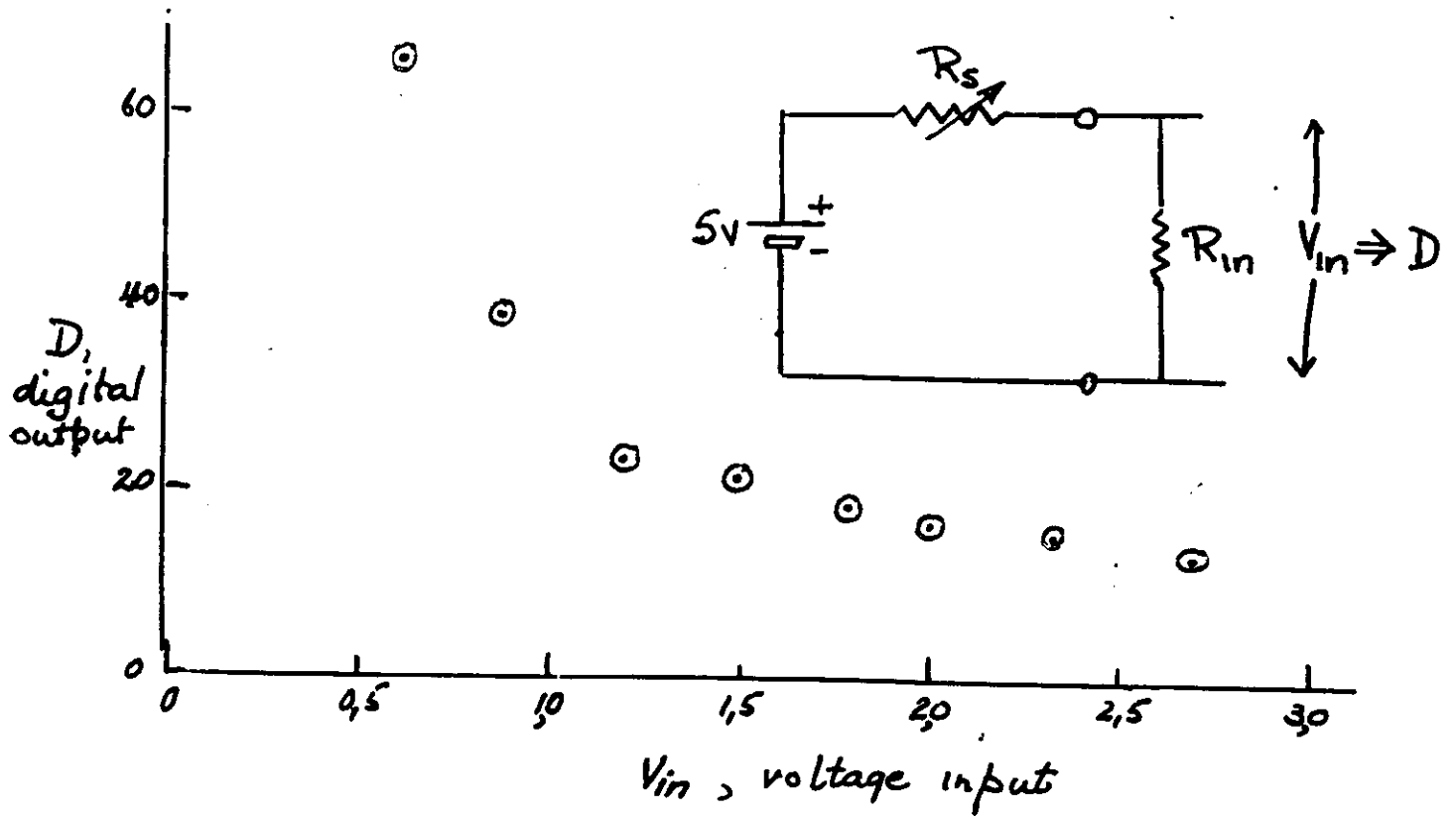
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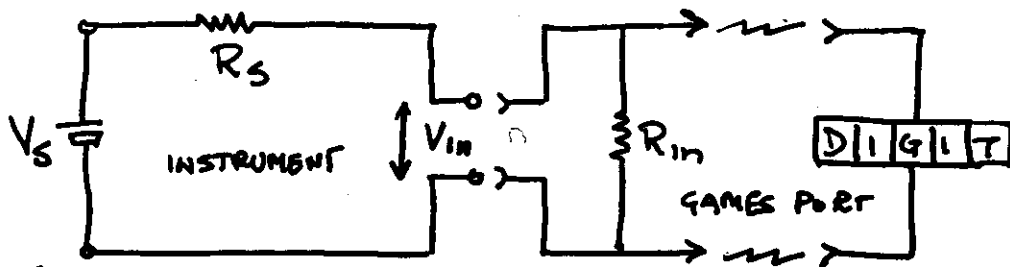
These are preliminary lecture notes, intended only for distribution to participants.



LOW-COST ADC 1



MODEL OF INTERFACE



V_{in} is the link between the instrument and the games port

$$V_{in} = V_s \cdot \frac{R_{in}}{R_s + R_{in}} \quad \text{--- (1)}$$

$$\text{but } D = k (R_s + R_{in}) \quad \text{--- (2)}$$

$\therefore$ from (1) and (2)

$$V_{in} = \frac{V_s \cdot k \cdot R_{in}}{D} \quad \text{--- (3)}$$

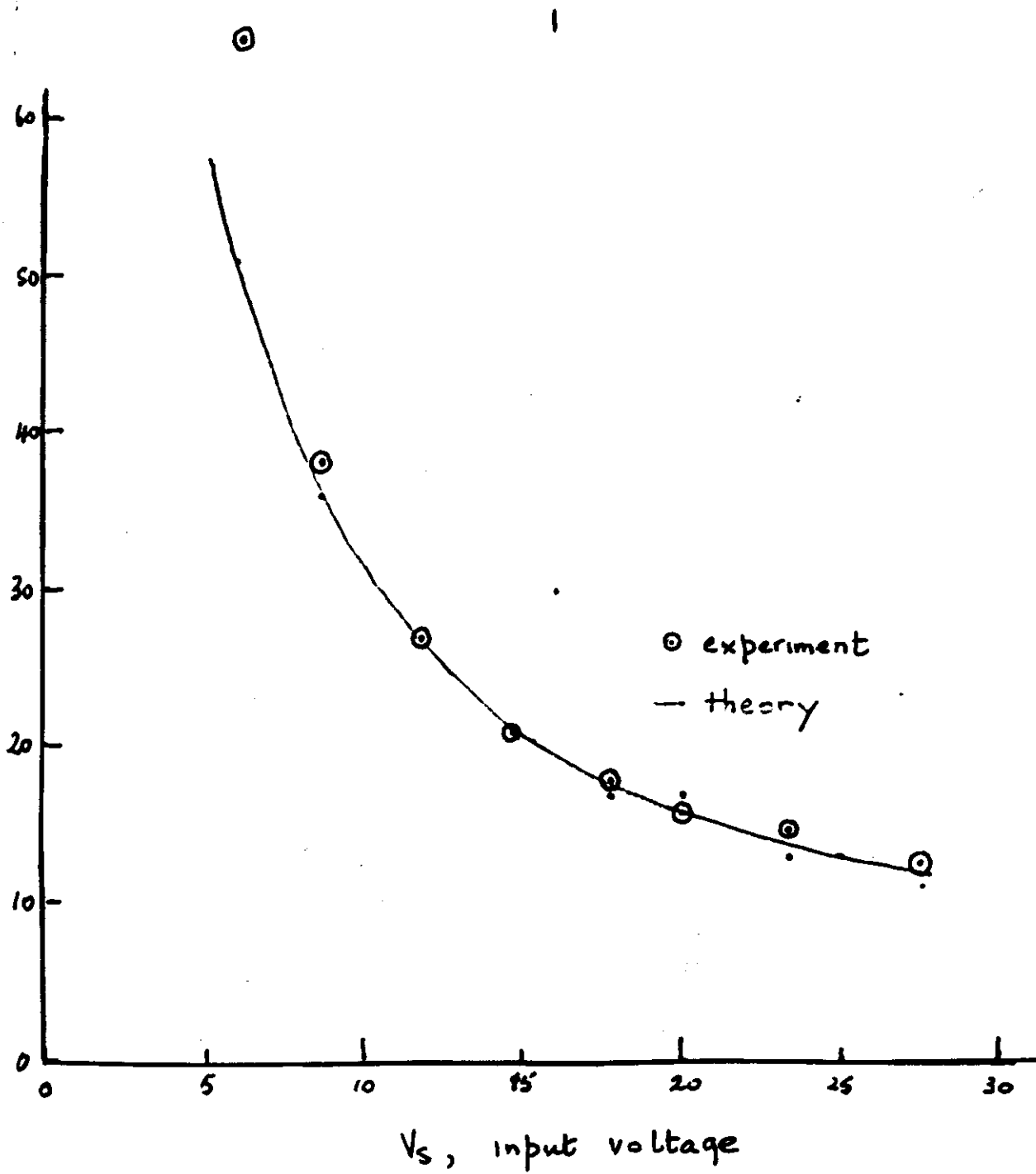
when $V_s = 5\text{v}$. the same D will be generated for V_{in}

$$\therefore V_{in} = \frac{5 \cdot k \cdot R_{in}}{R_s + R_{in}} \quad \text{--- (4)}$$

$\therefore$ from (3) and (4), eliminating R_{in}

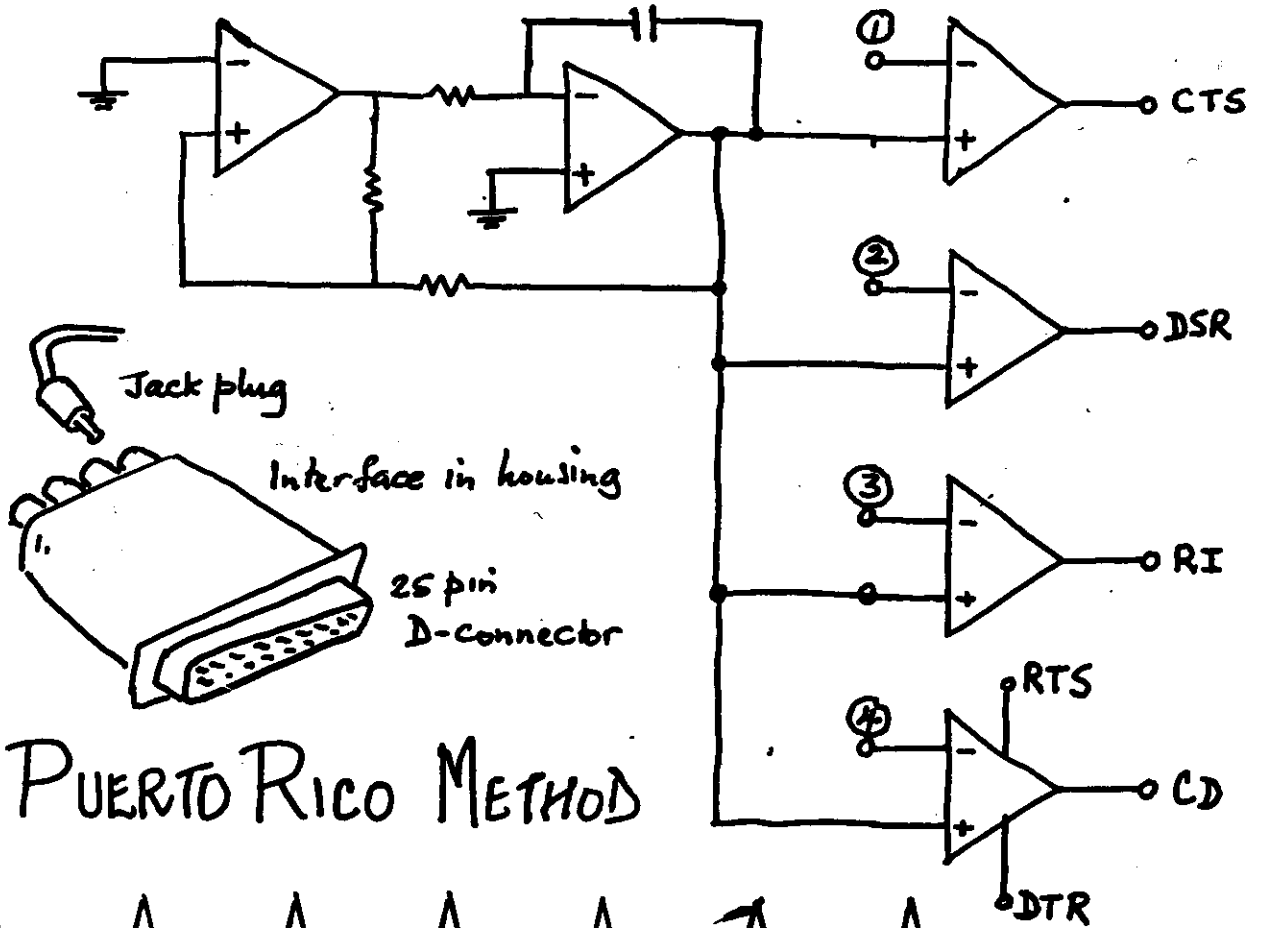
$$D = \frac{5k \cdot (R_s + R_{in})}{V_s}$$

Low Cost DACs - 3

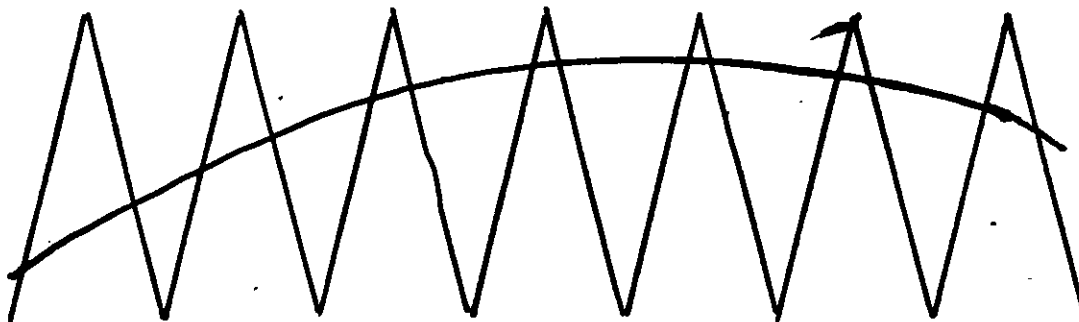


low cost ADCs - 4

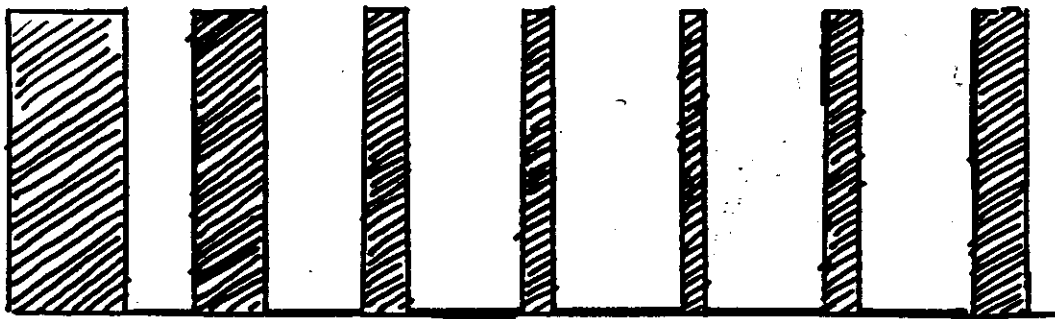
TRIANGULAR WAVE GENERATOR ANALOGUE INPUTS CHANNELS



THE PUERTO RICO METHOD



— analogue input
— triangular wave



Low cost ADC - 5