THE FES BEAM-DIAGNOSTICS SYSTEM

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1. INTRODUCTION

The purpose of this system is to monitor the internal and ejected beams during fast ejection at Serpukhov. Fig. 1 indicates the place of the different monitors. The monitors are numbered according to the straight section near which they are mounted. Fig. 2 gives the block diagram of the system and fig. 3 a possible front-panel layout. Almost all controls are centralized on the control panel which is detailed on fig. 4. We will make a brief survey of the different components of the system.

2. THE ELECTROSTATIC PICK-UP SYSTEM

The position of 1 bunch during 1 shot, both selectable at will, is measured by means of 4 large P.U., placed in SS 16, 24, 26 and 28 and 1 small P.U., placed in SS 28 on ejected beam A. The position can be read on the computer nixie display or on an independent local display.

3. THE BEAM TRANSFORMER SYSTEM

A large transformer, placed somewhere near SS 16 on the beam, measures the internal intensity, bunch per bunch. Smaller transformers are placed at the beginning and end of ejected beam A and at the beginning of beam B.

The large transformer, in combination with one of the smaller, allows a computer "T.V." display of the internal and external intensity and efficiency of the 30 bunches. The local display gives the same indication for 1 bunch, selectable at will, on nixies.

4. THE BEAM-PROFILE-MONITOR SYSTEM

An array of horizontal and vertical foils, placed in the path of the beam, measures the profile of the beam. BPM 24 and BPM 28 a measure the horizontal profile. BPM 28 b measures the horizontal and vertical profiles. These profiles are read from the computer "T.V." display. BPM 24 is mounted on the moving septum magnet chassis.

5. THE TARGET SYSTEM

A solid target intercepts part of the beam. The proton loss is measured by the beam-transformer TR 16 and displayed in the same way as an ejection efficiency. The target can be a Russian model or else a simple system mounted in the tank of SM 24.

6. THE RADIATION-MONITORING SYSTEM

The radiation level will be monitored near KM 16 and SM 24, 26 and 28. At each location a slow monitor (ionization chamber) and a fast monitor (scintillation counter) will be mounted. A warning will be given if the radiation exceeds a predetermined level. Readout will be on a multi-channel scope.

7. THE LUMINESCENT SCREENS

Luminescent screens will be placed at the entrance hole of SM 24 and at the entrance and exit holes of SM 26. Possibly, BPM 28 a and b will also be replaced by luminescent screens. The screens are composed of a fixed and a moving part. The T.V. system is supplied by the IHEP.

8. THE COMPUTER DISPLAY

The measurements of the monitors are treated by the computer. The results can be displayed in graphical form on a T.V. screen or in numerical form on nixie tubes or mechanical counters. By means of digital-to-analog converters these results can be displayed on a paper recorder.

9. THE LOCAL DISPLAY

The intensity and the position, at the different P.U. stations, of one bunch is stored in the local memory. A selector permits display of one measurement on nixie tubes. If a small analog divisor is added the position and efficiency can be displayed directly, without calculation. This system is totally independent of the computer.

10. THE CONTROL PANEL

Most controls are centered on this panel. The upper part of this panel can be duplicated elsewhere and control can then be transferred to these panels.

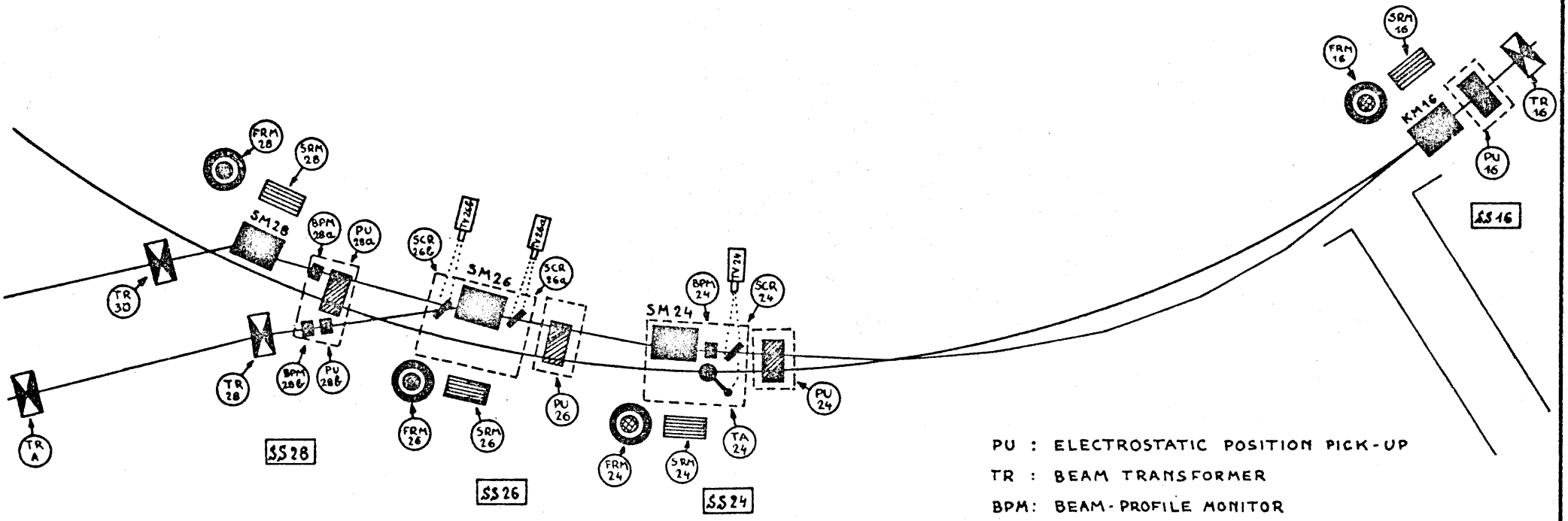

FIG. 1: LAYOUT OF MONITORS

PU : ELECTROSTATIC POSITION PICK-UP
TR : BEAM TRANSFORMER
BPM: BEAM-PROFILE MONITOR
SCR: LUMINESCEN SCREEN
TA : TARGET
SRM: RADIATION MONITOR (SLOW)
FRM: RADIATION MONITOR (FAST)

NOTE: THIS PLAN DEFINES AN UPPER LIMIT FOR THE B.D. SYSTEM. THE FACT THAT A MONITOR IS INCLUDED IN THIS DIAGRAM DOES NOT IMPLY THAT IT WILL BE INSTALLED.

Nombre de pièces			Désignation	Pos.	Matière	Observations
III	II	I				

Mod.	Date	Nom	Tolérances générales
A	9-2-70		de à ±
B	11-2-70		de à ±
C	24-2-70		de à ±

Ensemble | S. Ensemble | Echelle

BEAM DIAGNOSTICS:
LAYOUT OF MONITORS

Dossier N°
Dossier N°
Dossier N°

ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLÉAIRE
CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH
1211 GENÈVE 23

Dessiné	CUPERUS	
Contrôlé		
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Remplace
Remplacé par

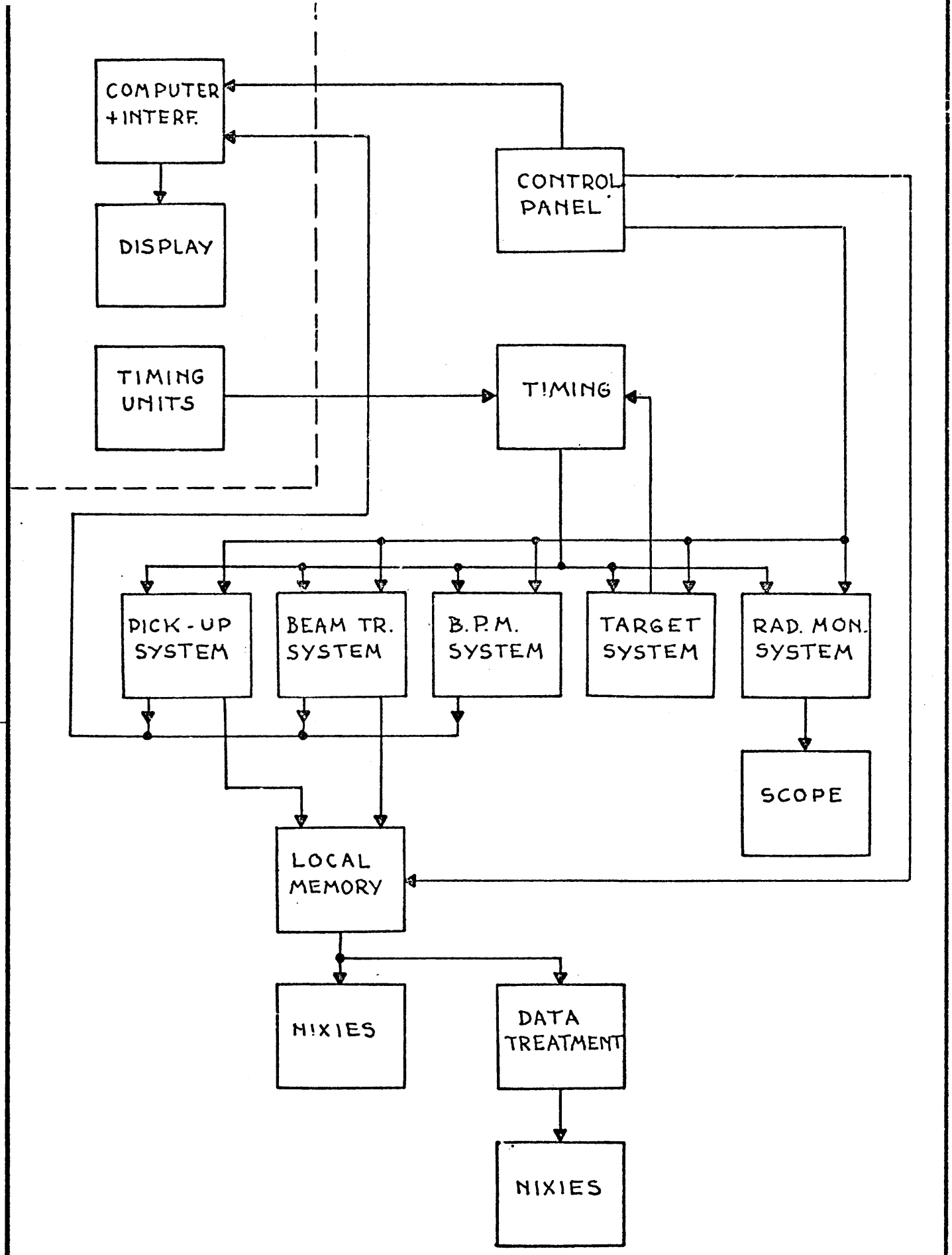

FIG. 2: BLOCK DIAGRAM OF THE BEAM-DIAGNOSTICS SYSTEM

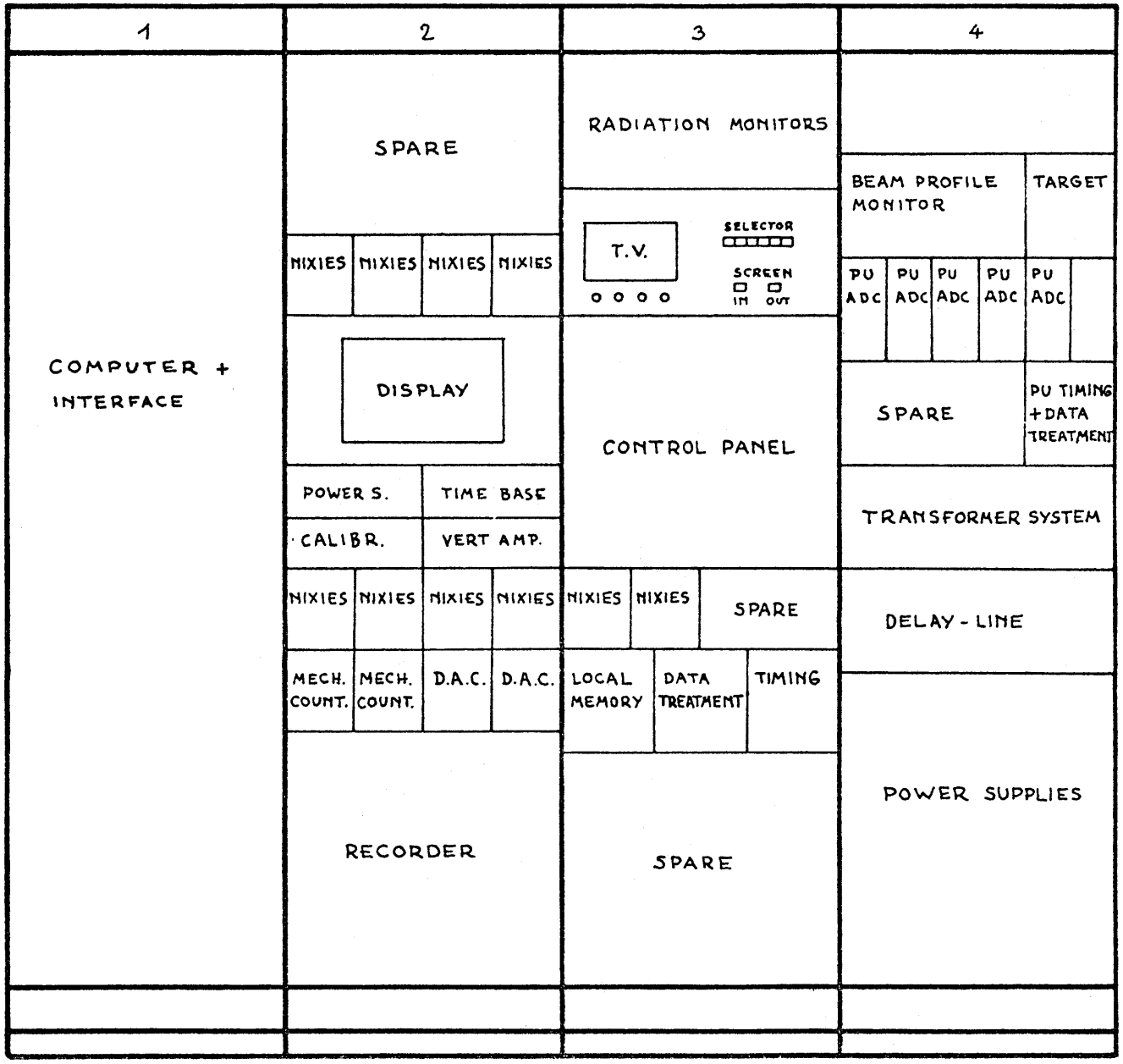

FIG. 3 : POSSIBLE PANEL LAYOUT : BEAM DIAGNOSTICS AND COMPUTER.

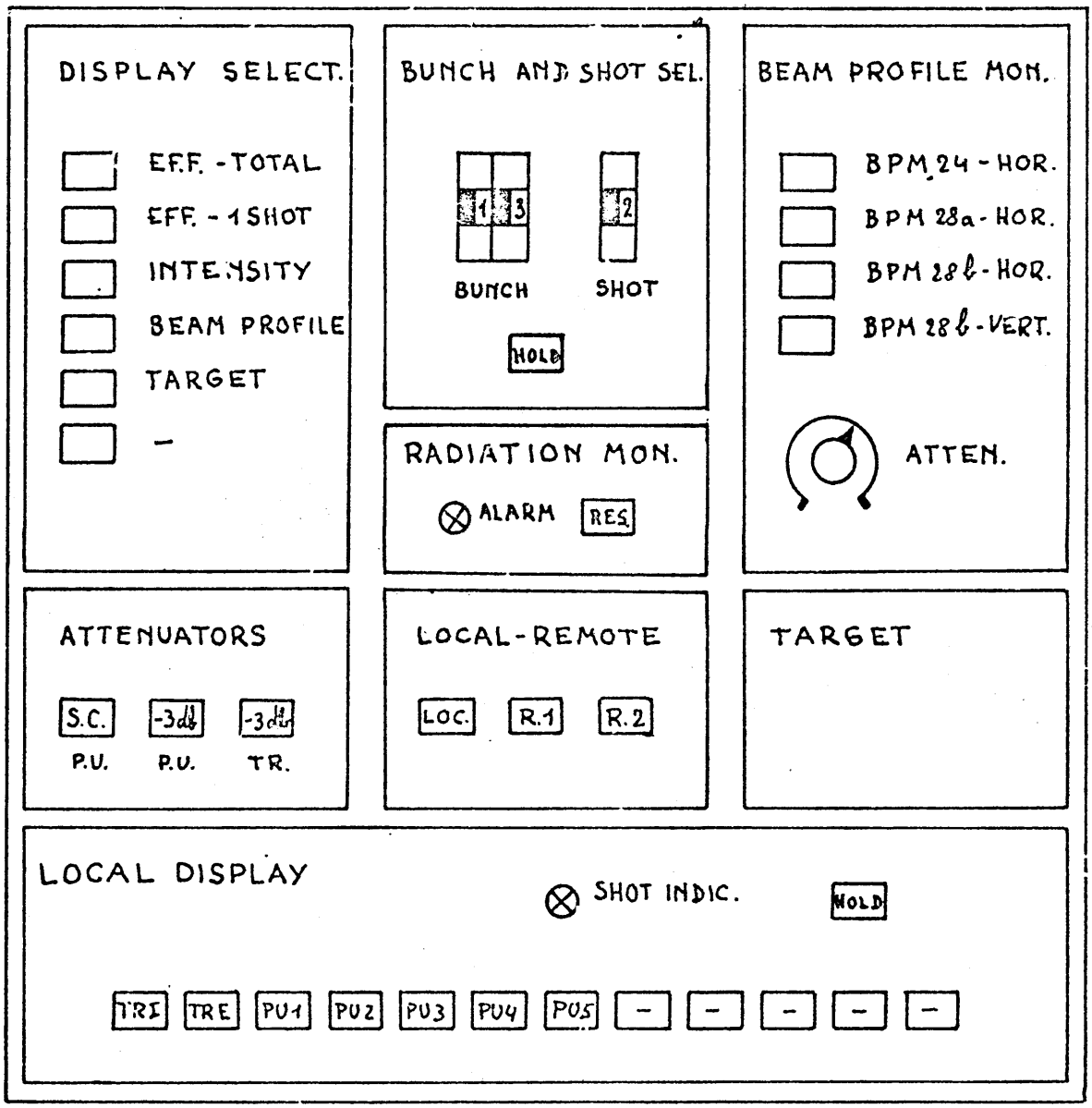

FIG. 4 : POSSIBLE LAYOUT FOR THE CONTROL PANEL