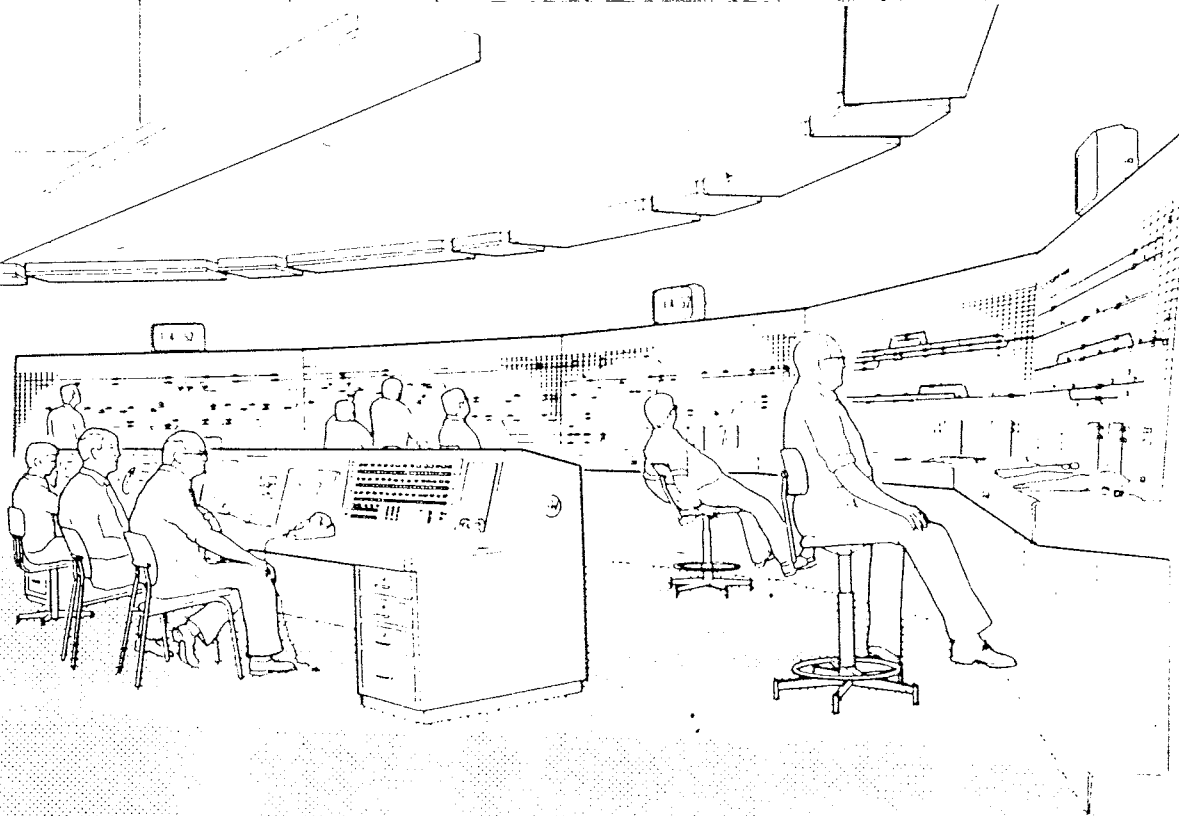
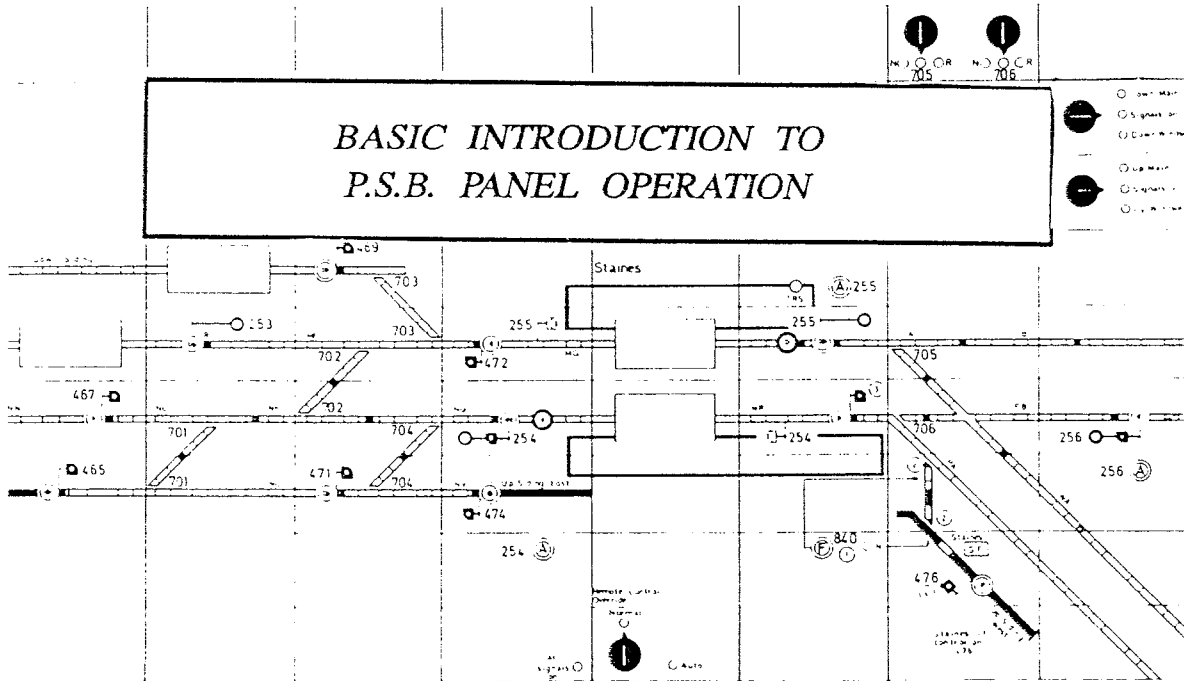


CENTRAL SERVICES SIGNALLING PROJECTS GROUP

BASIC INTRODUCTION TO P.S.B. PANEL OPERATION



BASIC INTRODUCTION TO P.S.B PANEL OPERATION

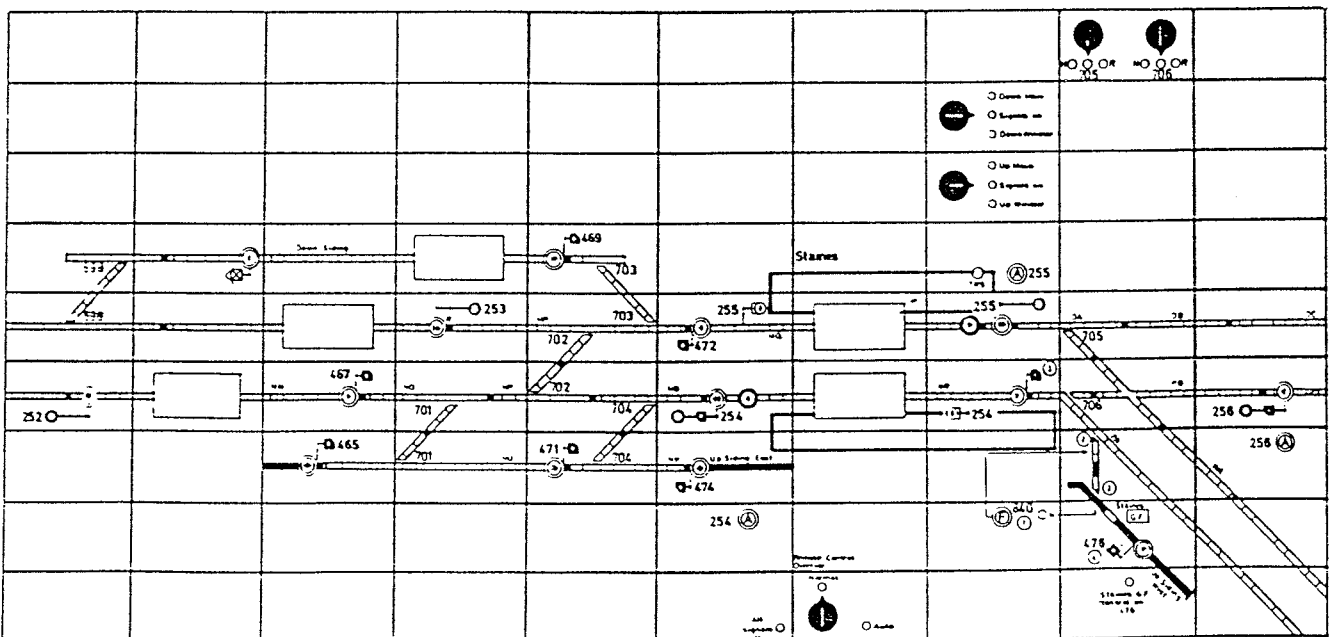
PANEL OPERATION

The introduction of colour-light signals, and power operated points, allowed the bulky and cumbersome lever-frame to be replaced by modern signalboxes with panels.

On British Rail, the standard type of panel is now the

“ENTRANCE-EXIT” (N-X)

type, with push-buttons for setting routes. An example of which is shown below:-



Mosaic diagram, showing part of a control panel and including an interlocking that is remotely controlled.

BASIC INTRODUCTION TO P.S.B PANEL OPERATION

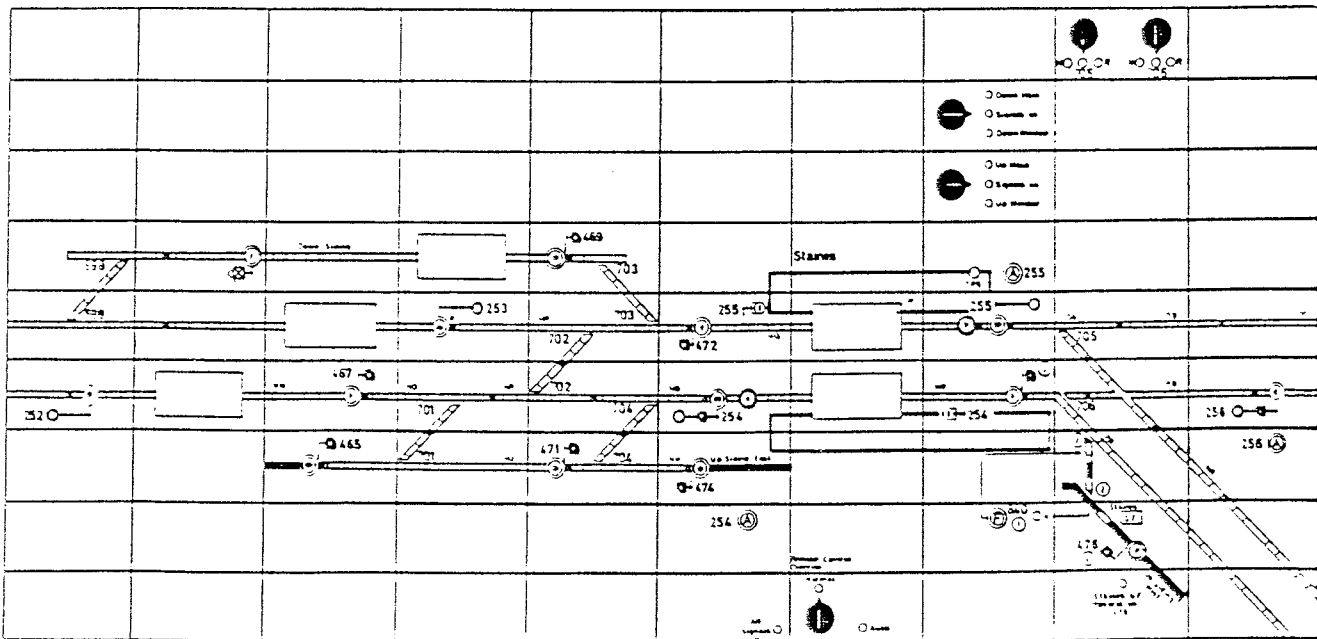
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BASIC INTRODUCTION TO P.S.B PANEL OPERATION

FACILITIES PROVIDED ON A ROUTE SETTING PANEL

The facilities, which are embodied on a route setting panel within a signalbox, are provided in a geographical manner so as to enable the operating staff to exert effective control over the traffic regulated by that signalbox.

The various facilities which are provided are as follows:-

1. Controls which directly affect the movement of trains.
2. Indications directly associated with the movement of trains.
3. Operational facilities/systems provided within a signal box to facilitate effective operation.

Typical methods of displaying facilities are shown in a series of diagrams which follow.

For any further information regarding Signalling Control and Indication Systems reference should be made to Standard Signalling Principle No. 25 which sets out the standards of presentation of controls and indications within a control centre together with associated facilities required so that the operating staff in that centre can exert effective control on the trains under their supervision.

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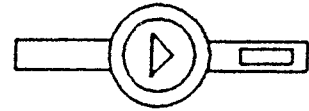
BASIC INTRODUCTION TO P.S.B PANEL OPERATION

ROUTE SETTING BUTTONS

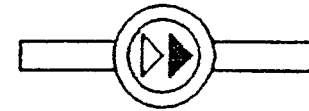
ENTRANCE
BUTTON



EXIT
BUTTON



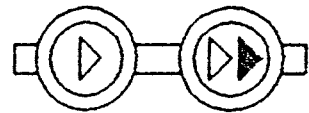
COMBINED
ENTRANCE/EXIT
BUTTON



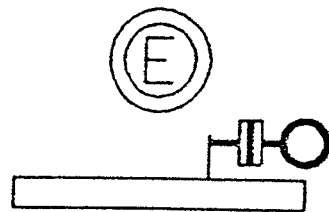
OR



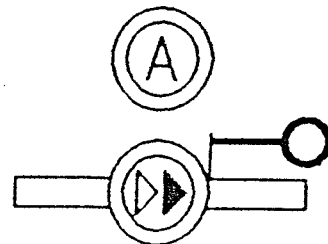
ADDITIONAL EXIT
BUTTON(S) EITHER
FOR DELAYED
CLEARANCE OR
FOR POSITION
LIGHT SIGNAL



EMERGENCY
REPLACEMENT
BUTTON



AUTOMATIC
WORKING
BUTTON



SIGNAL INDICATIONS

MAIN
SIGNAL



← MAIN SIGNAL INDICATIONS
TO BE PLACED HERE

AUTOMATIC
SIGNAL



← PROVIDED WHEN SUPERVISING
THIS AUTOMATIC SIGNAL

SEMI-AUTOMATIC
SIGNAL



← PROVIDED WHEN SUPERVISING
THIS SEMI-AUTOMATIC SIGNAL

POSITION LIGHT
SIGNAL PROVIDED
IN ASSOCIATION
WITH MAIN SIGNAL



← POSITION LIGHT INDICATION
TO BE PLACED HERE

POSITION LIGHT
SIGNAL



← INDICATIONS DISPLAYED HERE

LIMIT OF SHUNT
INDICATOR
(OF ANY TYPE)



← RED INDICATION DISPLAYED HERE

BASIC INTRODUCTION TO P.S.B PANEL OPERATION

MISCELLANEOUS SIGNAL INDICATIONS

BANNER REPEATING
SIGNAL



LOADING/UNLOADING
SHUNT SIGNAL

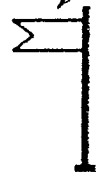


SEMAPHORE
SIGNAL

ARM COLOURED RED



ARM COLOURED YELLOW

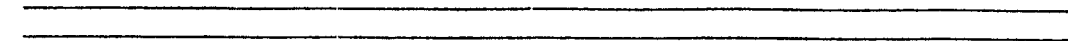


NOTICE
BOARD



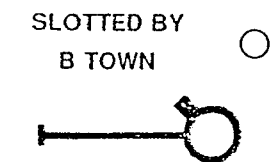
DIRECTIONAL INDICATIONS

INDICATION TO BE ILLUMINATED FOR
DIRECTION OF MOVEMENT SET



SLOT INDICATIONS

SIGNAL SLOTTED
BY OTHER
SIGNAL BOX



NORMAL SIGNAL
INDICATIONS

SLOT OFF

SLOTTED SIGNAL
(CONTROLLED BY
OTHER BOX)



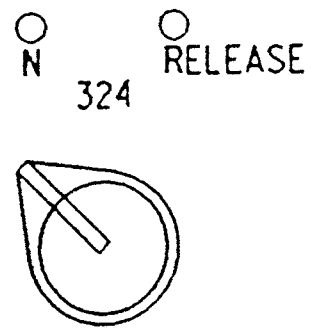
○ SLOT OFF

○ SLOT ON

BASIC INTRODUCTION TO P.S.B PANEL OPERATION

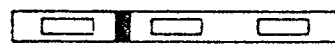
GROUND FRAME/PANEL RELEASES

BLOCK CONTROLS

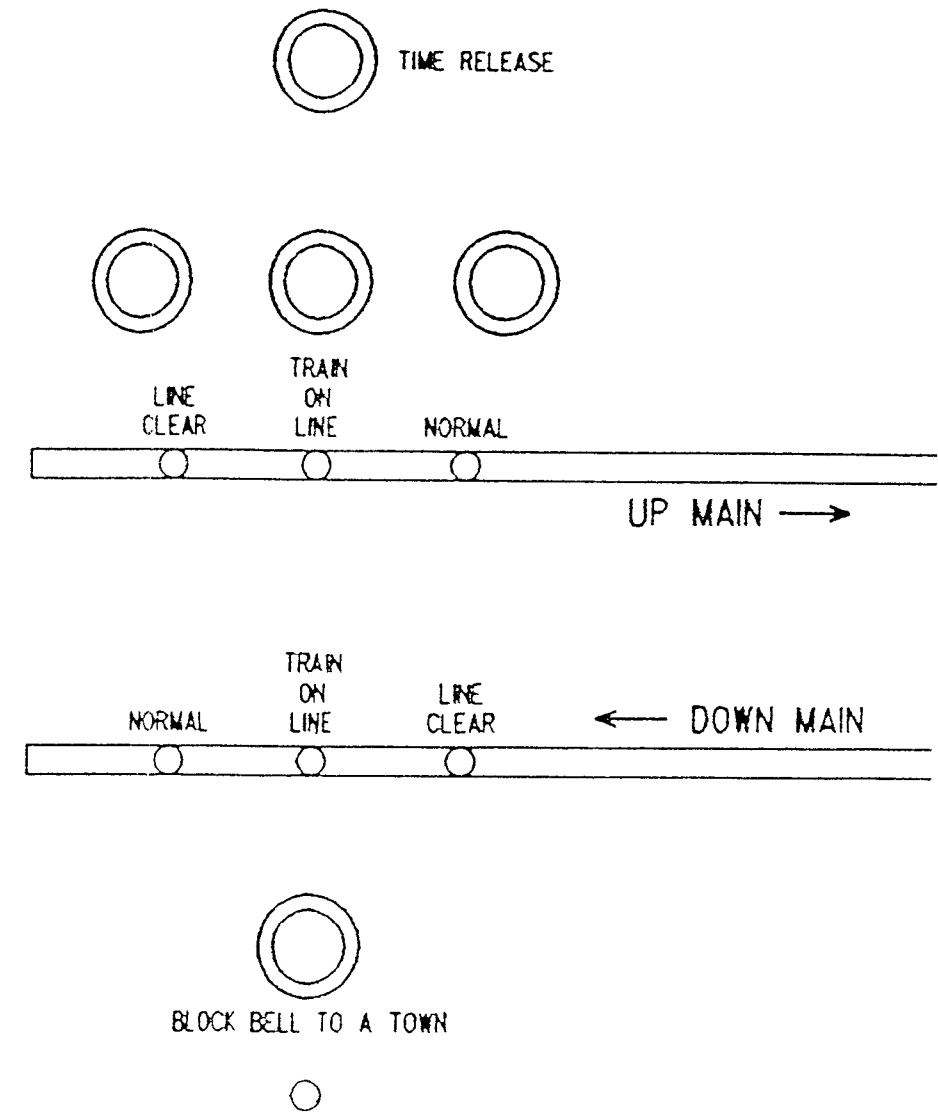
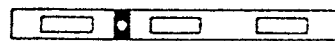


NOTE- INDICATIONS TO BE PROVIDED
ADJACENT TO SWITCH

TRACK CIRCUIT BOUNDARY



OVERLAPS WILL BE SHOWN AS-



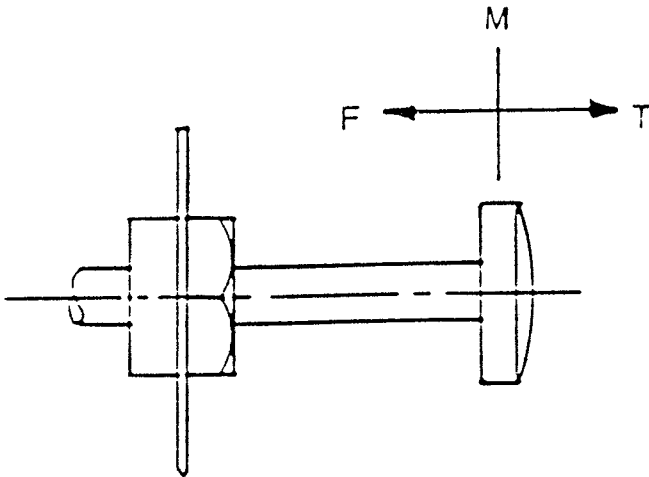
TO
A TOWN

BASIC INTRODUCTION TO P.S.B PANEL OPERATION

Each button has three positions:-

“MIDDLE”, “PUSHED” and “PULLED”.

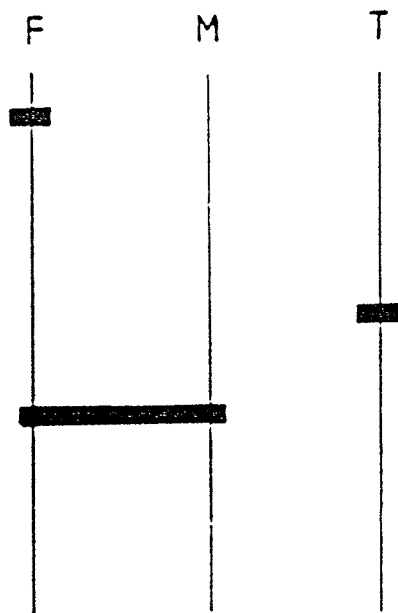
The button is sprung to return to the middle position after it is either pushed or pulled.



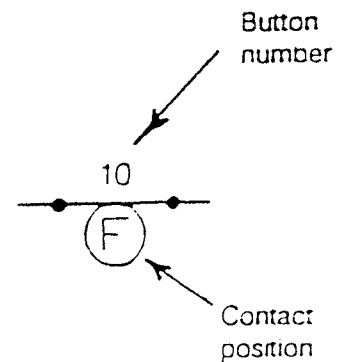
M = Middle position

F = Pushed position

T = Pulled position



Dark bands show when contact is made



Contact positions

continued

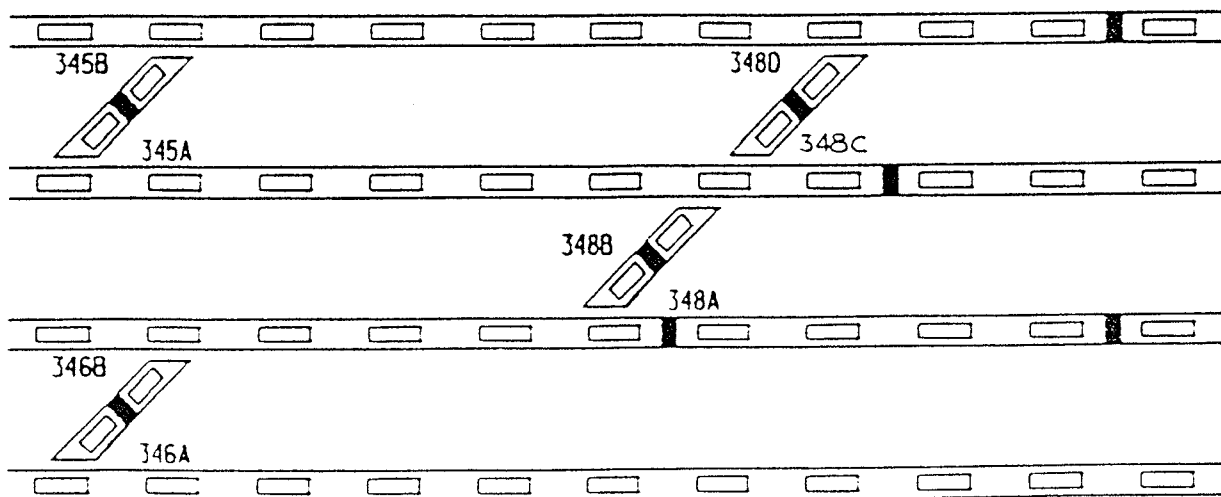
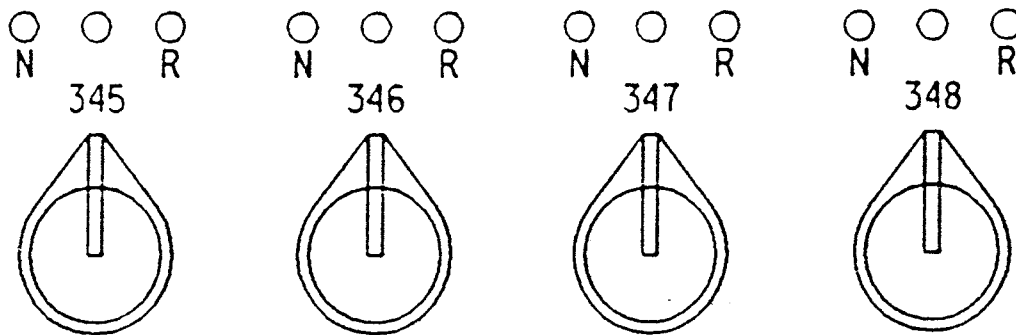
BASIC INTRODUCTION TO P.S.B PANEL OPERATION

To set a route and clear a signal, the entrance button corresponding to that signal must first be pushed and released. This button will flash, to indicate it is the selected entrance. The next button pressed is taken to be the exit or destination. Provided the route between the two buttons is both valid and available, then the route will set, the entrance button will change to a steady white light, and in addition white route lights will illuminate to the destination.

With the route set, any points will move to the required position automatically. Provided the route is clear, the signal will then clear.

To restore the signal to red, and release the route, the entrance button is pulled.

In case of failure, the points can be controlled manually from the panel. Each set of points is provided with a three position switch for this purpose. With the switch in the central position, the points will move automatically as routes are set. Alternatively, it may be turned either left to move the points normal, or right to move them reverse.



continued

BASIC INTRODUCTION TO P.S.B PANEL OPERATION

The position of all trains in the panel box area is indicated by red lights on the panel. Indications are also provided for each signal, and each set of points.

Unlike a lever frame, where the signalman can only pull a lever if it is safe to operate that signal or set of points, with a push-button panel the signalman is always able to operate the buttons or switches.

The trackside equipment will only respond provided it is safe to do so at that time.

The “**INTERLOCKING**” is used to ensure this safety. Conventionally, the interlocking has been done with relay circuits, a typical panel signalbox requiring thousands of relays.

On the latest schemes, computers have been used, this system is referred to as “**SOLID STATE INTERLOCKING**” or **S.S.I.**

CURRENT DEVELOPMENTS

In the latest signalboxes, the conventional push-button signalling panel has been replaced by a computer screen and keyboard, with the signalman setting routes using a trackerball. This is called the “**INTEGRATED ELECTRONIC CONTROL CENTRE**” or **I.E.C.C.**

This system is also able to signal the trains automatically according to the timetable and a pre-arranged set of priorities. The signalman now only has to intervene when things go wrong.

INTRODUCTION TO RAILWAY SIGNALLING COURSE - ADDENDUM

PBPAN

MODULE 17 - P.S.B. PANEL OPERATION.

BRIEF HISTORY OF POWER SIGNAL BOX PANEL OPERATION ON THE WESTERN REGION.

Previous to 1958 the Signalling on Western Region (Ex GWR) of BR was achieved by approx 2000 mechanical Signal Boxes working Absolute Block & a small number of Power operated miniature lever frames working Track Circuit Block. The miniature lever frames were in use at such places as Newport, Cardiff, Bristol & Paddington.

During 1958 the modernisation of the Western Region commenced with a program to replace steam Traction with more up to date forms, in the WRs case Diesel Traction & on other regions mostly Electric Traction. At the same time as the mode of traction was changing so were methods of signalling this being achieved with the advent of the Power S.B the method of operation being by Control Panel & not levers. The first of Panel operated P.S.Bs were installed at Birmingham Snow Hill & Plymouth. The Panel Operated P.S.Bs were a revolution in their time producing vast savings in manpower by replacing hundreds of mechanical S.Bs. Throughout the 60s, 70s & 80s Panel Boxes as Panel Operated P.S.Bs became known came into being throughout the region replacing all the Power operated miniature lever frames & approx 90% of the mechanical S.Bs.

Listed below are the main Panel Boxes that exist at the present time on what is now the Ex Western Region:

OLD OAK COMMON

SLOUGH

READING

SWINDON

BRISTOL

GLOUCESTER

NEWPORT

CARDIFF

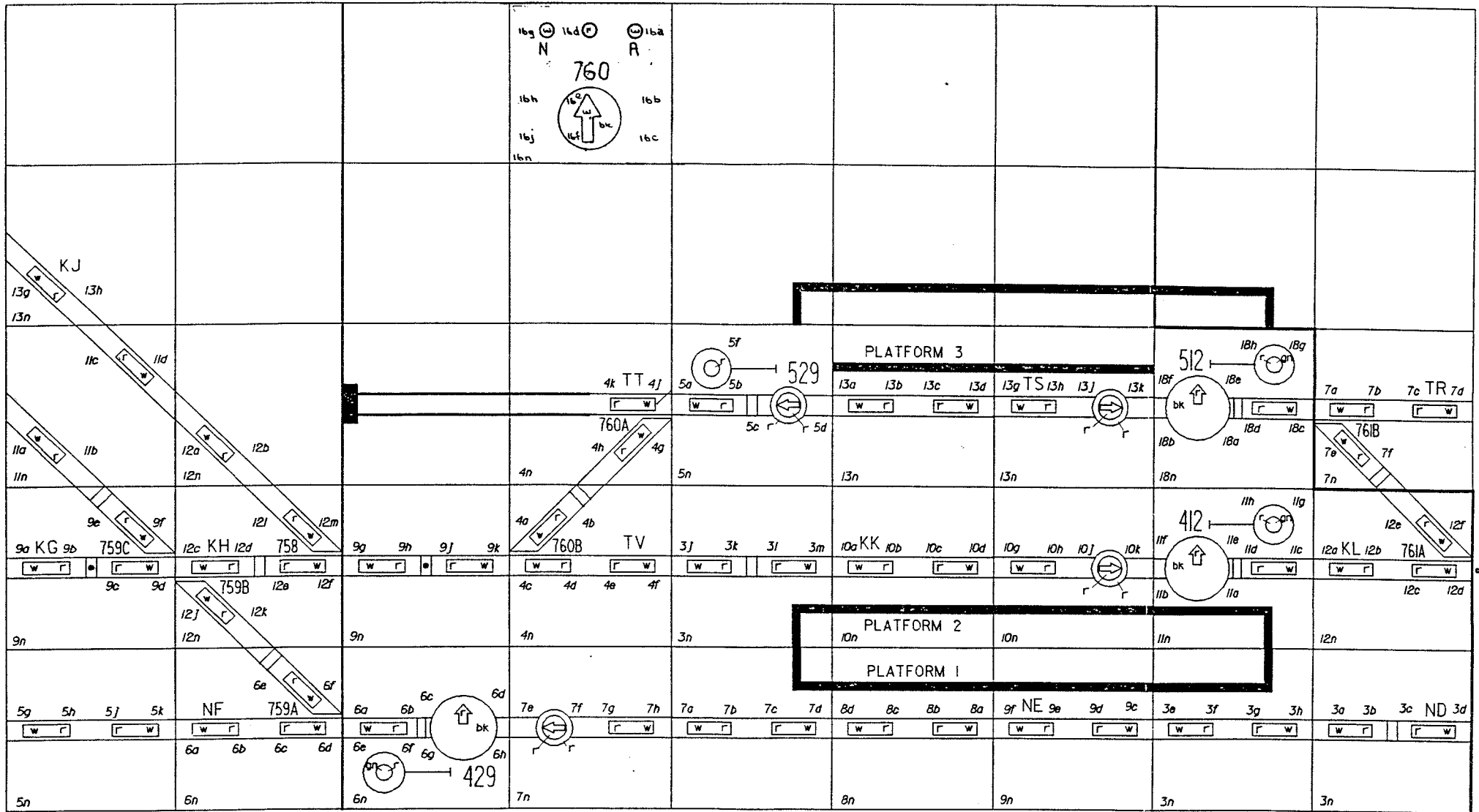
PORT TALBOT

OXFORD

WESTBURY

EXETER

PLYMOUTH



SIGNALLING PROJECTS GROUP READING

INTRODUCTION TO RAILWAY SIGNALLING COURSE - ADDENDUM

SESSION PLAN

MODULE 17 - P.S.B. PANEL OPERATION.

TYPIC. WR PANEL LAYOUT.

Issue 01
Date 3/93

PBPAN