



*Her Majesty's Yacht Britannia has been equipped with the first of the latest C.B. cordless telephone exchange designed by the G.E.C. The exchange combines the advantages of both cord and cordless switchboards. Ease of operation is ensured by pushbutton operation, whereby the operator initiates selection processes through automatic apparatus. Identification of calling lines is provided by coloured line lamps.*

# H.M. YACHT *BRITANNIA*

## Equipped with a new design of telephone exchange



The exchange in *Britannia* includes features special to the requirements of the Royal Yacht, but its basic designs are those of a cordless exchange of advanced design for general use.

The use of keys rather than cords on a manual switchboard ensures the minimum of physical effort on the part of the operator. On small switchboards the use of keys has always been practicable and economic, and cordless P.M.B.X. boards of small capacity have been popular for many years. The new system makes cordless operation practicable for much larger installations by employing automatic selection in conjunction with cordless operation.

The switchboard of the new exchange provides identification of each calling line on an individual line lamp. Thus the operator can exercise discretion, or carry out standing instructions, in

giving priority to any one of a number of simultaneous calls.

### **Operating Procedure**

The exchange in *Britannia* is notable not only for the attractive appearance of the switchboard, which is constructed to a convenient and modern design in polished oak, but for the simplicity of operating procedure.

A call is signalled to the operator by the glowing of the calling line lamp, whether from one of the ninety-four extensions or from one of the six shore lines. Simultaneous calls are dealt with in order of priority as indicated by the colour of the lamps. The operator throws the lever key of a disengaged connecting link and presses the push key associated with the calling line. A uniselector steps to the calling line and connects the operator to the caller.

On learning the number of the wanted line, the operator reverses the lever key and presses the push key associated with the wanted number. A uniselector in the other side of the link steps to the wanted line. Test for busy condition is automatic, and if the line is free, ringing current is fed automatically to the buzzer in the called telephone, the operator hears ring tone and the called line lamp flashes. When the call is answered, the operator restores the lever key, enabling the conversation to proceed.

While the call lasts, a lamp indicates that the link is engaged. When the telephone handsets are replaced, two further lamps, associated with the two sides of the link, glow, and the operator presses a single push key to restore the link and line circuits to normal and to extinguish all lamps.

Thus all that is required of the operator is to depress one key associated with a glowing lamp, one key labelled with a wanted number and two keys that operate and release a connecting link.

### Trunk Offering

If a wanted extension is engaged, the operator will hear a click signal and the busy lamp will glow. The waiting call may be on a trunk or priority line and can be offered to the engaged extension. The operator throws a key and presses the wanted line push key. A lamp associated with one side of

a link glows. The lever key of that link is depressed and the call offered to the wanted extension. If the call is accepted, the wanted party abandons the existing call and can then be connected to the waiting caller in the usual way.

### Operator Recalled

The operator is disconnected from any conversation in progress, but may be recalled, e.g. to transfer the call. The flashing of a link supervisory lamp signals the operator to throw the link lever key and take particulars from the party flashing the switchboard.

### Shore Lines

The six shore lines work into any kind of shore exchange when the yacht is in port. Calls to and from the shore are set up in the same way as extension-to-extension calls in all but one respect. If the shore exchange is automatic, the operator in *Britannia* dials to set up an outgoing call, if the shore exchange is magneto, the ring key is momentarily pressed to call the operator

Supervision of shore line calls differs from extension-to-extension calls in that an extra busy lamp glows above each engaged shore line, a link supervisory lamp flashes until an incoming shore line call is answered on an extension telephone, and only the extension telephone gives a clearing signal at the end of a call.

### Circuit Operation

All calls are set up by the sixteen connecting links. Each link has two uniselectors, as linefinders, in the Call side and two in the Answer side. Linefinder A in each side serves the six shore lines and extension lines 1 — 44, linefinder B serves extension lines 45 — 94. Thus any pair of lines may be connected together by any connecting link.

### Extension-to-extension Call

The raising of the handset by a calling party completes a circuit through the cradle switch to illuminate the extension Line Call Lamp. The Night Alarm, if switched on, sounds the switchboard buzzer.

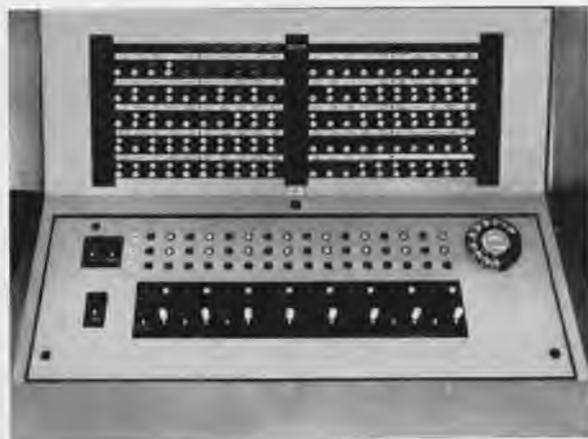


Fig. 1—The simplicity of the operating procedure is illustrated by the compact layout of the line and link connexions on the switchboard.



When the wanted line is found, ringing current is supplied over FC contacts to the buzzer, and the Line Call Lamp is connected by HC and L contacts over the linefinder bank and wiper to the flashing signal circuit.

Restoration of the lever key from Speak Call to normal releases relay CC. The lamp is disconnected, the wanted extension telephone speech circuit extended to the Stone bridge and speech battery, and the operator's telephone left out of circuit.

### Trunk Offering

The operation of a Line Locate key takes all connecting link supervisory lamps out of the normal supervisory circuit and connects them over wire AL or CL and the linefinder bank and wiper. Response to this searching circuit is from the operated Line Connect Key in the line circuit of the engaged extension, an earth potential being returned through the key contacts to cause illumination of the supervisory lamp associated with the uniselector through which an existing call is connected.

### Operator Recalled

When the operator is recalled during a conversation, repeated depression of the cradle switch breaks and makes the holding circuit of A or C relay, through a contact of which either the Answer or the Call supervisory lamp of the connecting link is caused to flash. Operation of the Speak key of the link to the Answer or the Call side re-energises relay CA or CC and connects together the speech circuits of the operator and the flashing extension.

### Apparatus

The apparatus racks are fitted in totally-enclosed cabinets of the same polished oak as the switch-



Fig. 4.—Apparatus racks, in the same polished oak as the switchboard.

board. Of the line equipment, only the line relays are mounted on the racks, the rest being housed within the switchboard.

The sixty-four uniselectors that constitute the sixteen connecting links, together with the associated relays, are mounted on the racks.

Each shore line has equipment consisting of a switch to set to the type of shore exchange into which the line is to work at a given time, a relay set and a line transformer.

The ringing supply is taken from a static sub-cycle unit, operated by *Britannia's* AC mains, but the operator is provided with a hand generator as a standby supply.