Telephone Equipment, Apparatus and Communication Systems

PLESSEY
TELECOMMUNICATIONS

Contents

General Information

Enquiries and Orders

Commercial and technical enquiries and all orders for products described in this catalogue should be directed to the following address which appears on all catalogue sheets:

The Plessey Company Limited,
Telecommunications Group,
Private Systems Division (Dept. LA),
Beeston, Nottingham NG9 1LA, England.
Telephone: Nottingham (0602) 254831 Telex: 37201
Each catalogue sheet includes specific ordering information.

Dimensions and Weights

Dimensions and weights are given, where possible, to assist shipping estimates.

Payment, Terms and Delivery Conditions

These are subject to our standard conditions of contract, or to special conditions which may be agreed at the time of quoting.

Packing Cases

Packing cases will be credited in full if returned in good condition within 14 days, carriage paid, and duly advised.

Return of Goods

Goods must not be returned without our consent.

Parts and Accessories

A booklet containing lists of components for the ordering of parts is usually supplied to the customer when goods are despatched. Otherwise a booklet can be obtained on application. Alternatively, replacements may be ordered by quoting the code number stamped on the original component.

Accessories may be ordered by naming the article and stating its code number.

Claims

Claims for damaged goods must be made on the carriers within the time specified in the contract.

Improvements in Design

In keeping with its policy of continually striving to improve its products, the Plessey Telecommunications Group reserves the right to change the design of, or withdraw, any item in this catalogue.

Illustrations

Illustrations are not binding, owing to improvements made from time to time.

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Introduction

This catalogue provides telephone administrations and similar organizations with a quick, easy reference to a range of telephone equipment, apparatus and systems produced and marketed by Private Communication Systems, part of Plessey Telecommunications. The range is extensive, covering subscribers' apparatus, private systems, rural exchanges and miscellaneous equipment. It does not, however, include Main Automatic Exchange (MAX) equipment, as this is dealt with by Plessey Telecommunications at Liverpool (Strowger and Crossbar 5005 exchanges) and Transmission and Electronic Exchanges, Beeston, Nottingham (TXE2 PENTEX space-division electronic exchanges).

The catalogue is based on the loose-leaf system, enabling it to be kept constantly up to date by the issue of supplementary or revised sheets so that customers have ready indication of new introductions. Six product-group sections are presented, each separated by a distinctive, numbered card carrying an integral identification tab for quick selection.

The philosophy behind this catalogue is simple—CUSTOMER SERVICE, a service that combines a willingness to investigate your particular telecommunications problems with the ability to solve them. This service is available to you at the initial stage of an enquiry. If you wish, we will act as your consultant in determining the product or system best suited to your needs. We will also provide full details on relevant matters such as system operation, installation, training, and logistics, and we will carry out surveys and give quotations for one or more systems without any charge whatsoever.

This comprehensive service is backed by Plessey Telecommunications' vast experience and accumulated knowledge over 60 years, coupled with advanced design, research, development and manufacturing facilities. By faithful adherence to high standards throughout our streamlined organization we get things done quickly, efficiently, and economically, thereby maintaining our fine reputation as manufacturers of telecommunications equipment second to none.

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Publication No. 7227/1

ZB29/500/2.73

Major Systems

Main Products

Strowger and Crossbar main and satellite exchanges : manual exchanges : international and national trunk switching centres : international, national and private automatic telex exchanges.

Headquarters:
Edge Lane, Liverpool L7 9NW
Liverpool (051) 228 4830
Telex 62267.
Edwards Lane, Liverpool L24 9HW
Liverpool (051) 486 4031
Telex 627516.
Fleming Road, Speke, Liverpool L24 9LJ. Liverpool (051) 486 3286
Telex 627329.
Dixon Road, Kirkby Industrial Estate, Liverpool L33 7XR. Liverpool (051) 546 3654 *Telex 62612.*
Exchange Factory, 39 Cheapside, Liverpool L2 2EA. Liverpool (051) 236 9881 *Telex 627053.*
Lamberhead Industrial Estate, Pemberton, Wigan, Lancashire
Wigan (0942) 83341 *Telex 67598.*
Pioneer Works, Wigan, Lancashire
Wigan (0942) 44272 *Telex 67598.*
Great George Street, Wallgate, Wigan, Lancashire. Wigan (0942) 47121 *Telex 67598.*
Carr Lane, Chorley, Lancashire PR7 3JP. Chorley (02572) 5521
Telex 67496.
North Hylton Road, Southwick, Sunderland, Co. Durham
Sunderland (08943) 4361
Telex 53411.
Eldon Street, Laygate, South Shields, Co. Durham. South Shields (08943) 4361 *Telex 53510.*

Installation

Headquarters:
Edge Lane, Liverpool L7 9NW
Liverpool (051) 228 4830
Telex 62267.
Regional Offices:
London, Home Counties and South East : Burford Road, London E15
London (01) 534 4533 Ext. 48
Telex 261676.
Midlands : Installation Dept., Beeston, Nottingham NG9 1LA
Nottingham (0602) 254831 Ext. 360
Telex 37201.
North West and North Wales : 95-97 Washway Road, Sale, Cheshire.
Sale (061) 973 1788
Scotland, Northern Ireland and North East : 224-228 West Street, Glasgow C5
Glasgow (041) 429 3292.
South Wales and South West : Royal London Buildings, 42 Baldwin Street, Bristol BS1 1PV
Bristol (0272) 24478
Beeston Factory Office : Dept. DN, Beeston, Nottingham NG9 1LA
Nottingham (0602) 254831
Telex 37201.

Transmission and Electronic Exchanges

Main Products

TXE2 (Pentex) main, dependent and satellite exchanges. Development, marketing and production of electronic telephone exchange systems and equipment : basic research in digital switching, p.c.m. and s.p.c.

Headquarters:
Beeston, Nottingham NG9 1LA
Nottingham (0602) 254831
Telex 37201.
Antrim Road, Ballynahinch, Co. Down, Northern Ireland.
Ballynahinch (0238 56) 2339.
Plessey Telecommunications Research Limited, Taplow Court, Taplow, Maidenhead, Berkshire
Maidenhead (0628) 23351
Telex 84119.
Data Communications Sciences Limited, Ilford, Essex. London (01) 478 3040 *Telex 23166.*

Overseas Operations

Headquarters:
Edge Lane, Liverpool L7 9NW
Liverpool (051) 228 4830
Telex 62267.
Offices and manufacturing facilties in Brazil, Portugal, Ireland, East & Central Africa, Canada, Singapore and Malaysia.

Private Communication Systems

Main Products

Telephones (all types) including flameproof, and pressbutton types for d.c. or m.f. signalling systems : secretarial, intercom and extension plan systems : Crossbar and Strowger PAX, PABX and rural exchanges : PMBX : telephone equipment accessories : mine telephones and signalling systems and other communications systems.

Headquarters, Sales and Contracts:
Beeston, Nottingham NG9 1LA
Nottingham (0602) 254831
Telex 37201.
Marketing:
Tolworth Rise, Surbiton, Surrey KT5 9NW. London (01) 337 6666
Telex 261834.
Plessey Communication Systems Limited, Tolworth Rise, Surbiton, Surrey KT5 9NW. London (01) 337 6666 *Telex 261834.*
London Branch Office:
9 Dallington Street, London EC1
Sales: London (01) 251 1254
Service: London (01) 251 0237
New Era Time & Telephone Systems Limited, Tolworth Rise, Surbiton, Surrey KT5 9NW. London (01) 337 6666 *Telex 261834.*

Obsolete Products

Due to continual improvement in product design, certain items of apparatus and equipment have become considerably outdated and are therefore to be withdrawn from manufacture. The most widely used of these obsolete products are listed below, together with references, where possible, to previous catalogues in which these products appeared, and to the nearest equivalent of new design where one exists.

Associated spare parts will continue to be available, as well as extra equipment for PABX extension, *but only for a limited period*. Customers are therefore strongly advised to assess their long-term requirements for spare parts etc. as quickly as possible and to place a single order accordingly.

Obsolete Product	Code No(s)	Old Catalogue Reference	Replacement Product	This Catalogue Reference
Telephones:				
Flameproof, table and wall, CB type	N 1397, 98 N 1473, 74	Ericsson Telephones Ltd (ETL) Cat. 60 Section 1	Auto versions N 1058, 1880 with dial locked by screw	Section 5
Intercom	N 1636, 37 etc.	ETL Cat. 60 Section 4	PAX systems	Section 1
House exchange	N 1669, 71, 79 etc.	ETL Cat. 49	2 +7 PABX 2 +5 Keymaster Secretarial Mk. VI 2 +10 House exchange	Section 2 Section 5 Section 5 Section 5
Intercom with loudspeaker	N 1732, 33, 47 etc.	ETL Cat. 60 Section 4	PAX systems	Section 1
Portable (Services type 'J')	N 1844	ETL Cat. 60 Section 1	None	—
Portable	N 1845 F, JK etc.	ETL Cat. 60 Section 1	None	—
'Etelux'	N 1980, 85 etc.	ETL Cat. 60 Section 1	None	Section 5
2-way battery-ringing types	N 1990, 91 etc.	ETL Cat. 60 Section 4	None	—
Magneto (hand-generator type)	N 2124, 2186, 2206, 2516	ETL Cat. 60 Section 1	Magneto teles. N 2128, 2208, 2908, with transistor generators	Section 5
Plan-Etelphone systems 2 and 4 to 15	—	ETL Cat. 60 Section 1	Plan-Etelphone Systems (Types 1 and 3) 2 +7 PABX 2 +5 Keymaster Secretarial Mk. VI 2 +10 House exchange	Section 5 Section 2 Section 5 Section 5 Section 5
Switchboards:				
6-line magneto type	N 564	ETL Cat. 60 Section 2	12-line magneto sw/bd N 569	Section 3
50/70 floor-pattern CB sw/bd	N 326 series	ETL Cat. 60 Section 2	100-line CB sw/bd N 327	Section 3
Private automatic branch exchanges:				
4 extensions + 1 exchange line	ATE 4.1.1	7045	2 +5 Keymaster	Section 5
9 extensions + 3 exchange lines	ATE 9.3.3	7046	5 +20 PABX equipped 3 +10	Section 2

Obsolete Product	Code No(s)	Old Catalogue Reference	Replacement Product	This Catalogue Reference
20 extensions + 5 exchange lines	ATE 20.5.5	7047	5 +20 PABX fully equipped	Section 2
24/49 extensions +4/10 exchange lines	ATE 25/50	7051	10 +50 PABX Strowger, or Crossbar PB 100	Section 2
48 extensions + 6 exchange lines	ATE 50.6.6	7050	20 +100 Strowger, sub-equipped, or Crossbar PB 100	Section 2
98 extensions + 12 exchange lines	ATE 100.12.12	7049	—	—
100 extensions and upwards	ATE 211	7048	Types 3, ET4 and Crossbar PBT	Sheet to be issued
Rurax ERP 1, 3 and 4 PABXs	—	ETL Cat. 60 Section 7	Strowger 10 +50, Type 3 and ET4; Crossbar PB 100, PB 480 and PBT	Section 2
Miscellaneous:				
Line connector 20 +4 type	—	ETL Cat. 60 Section 9	None	—
Minirax	N 22525B1	ETL Cat. 60 etc. Section 9	Rurax	Section 4
Multiphone system	N 1643, 44 23989, 90 etc.	—	—	—
Speech inverter ESE 10	N 34360A1 A2 etc.	ETL Cat. 60 Section 1	None	—
Time announcer	—	ETL Cat. 60 Section 3	None	—

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PLESSEY TELECOMMUNICATIONS

PAX 1

Private Automatic Exchanges

10- and 15-line PAX Units

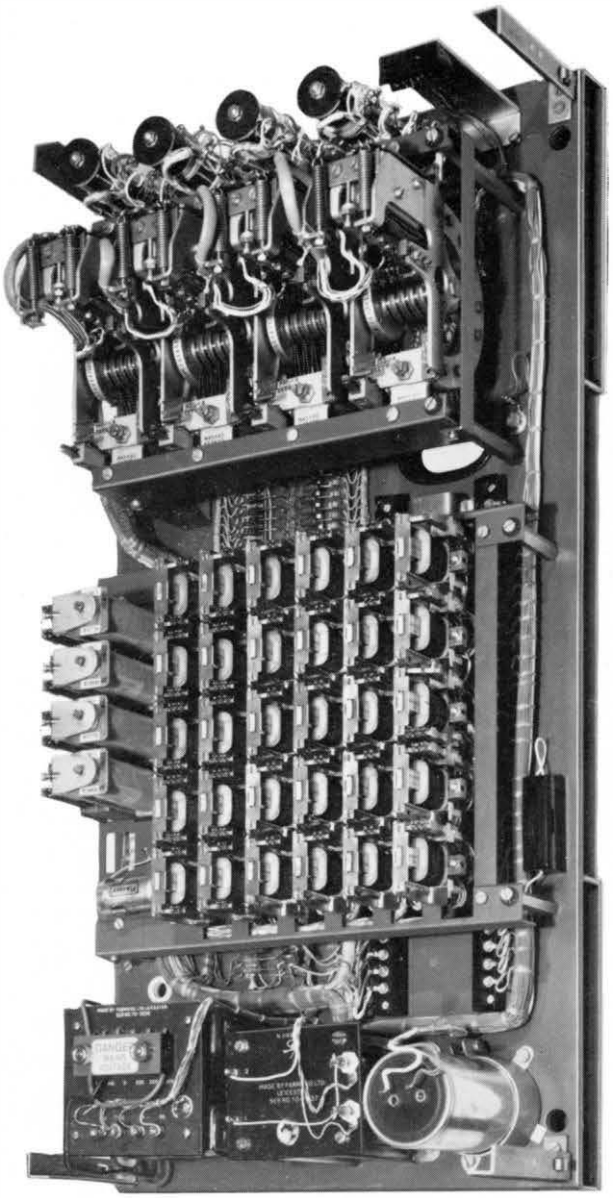
Designed with emphasis on low cost and simplicity, these newly developed 10- and 15-line private automatic exchanges provide secret communication between extensions, with intrusion facilities available to selected extensions.
Both exchanges are ideally suited for use in small manufacturing units, depots, warehouses, offices, small businesses, and similar establishments where they can function adequately as the sole means of internal communication. Alternatively, either can be gainfully employed as an auxiliary system in larger organisations to relieve the internal traffic load on a busy private branch exchange, so enabling the PBX operator to handle the important external calls with greater ease and efficiency.

Highlights general to both designs:
Powered by integral transformer/rectifier—types available cover all normal mains voltages and frequencies.
Mains derived ringing and tones—eliminating need for expensive conventional equipment.
Low fault liability—robust and reliable components.
Easy maintenance — straight-forward circuit design.
Wall mounting—small space requirements.
Total enclosure.
High-grade finish.

Facilities

10-line PAX

This unit, equipped with one connecting circuit, provides secret



15-line unit with cover removed

communication between any two of up to 10 extensions at any one time. Calls are made by dialling single-digit codes, the extensions being numbered 1 to 0.
One extension may have an intrusion facility enabling the user to intervene in an established connection. This is accomplished by momentary operation of the pressbutton provided on the particular telephone, and signalled by an intrusion tone to line. The engaged parties clear down on request, and the wanted extension is then dialled.

15-line PAX

Two connecting circuits permit two simultaneous secret conversations between any two pairs from up to 15 extensions. Calls are made by dialling one or two-digit codes, extensions being numbered 1 to 9 and 01 to 06. Up to three extensions may be provided with intrusion facilities.
When a dialled extension is engaged, busy tone is transmitted. If the caller has the intrusion facility, he can break into the engaged connection by dialling digit 1. When the engaged extension users replace their handsets on request, the wanted extension is re-called automatically.

Equipment Features

The exchange equipments are housed in mat elephant-grey all-metal cabinets fitted with quick-release covers.
The switching apparatus is of British Post Office standard type and consists of strip relays Type 12 (common yoke), major relays Type 3000, and two types of single-motion selector; miniature (10-line unit) and heavy-duty type (15-line unit).
The apparatus is mounted on a hinged-gate framework, giving convenient access to rear wiring and the backplate miscellaneous equipment. This includes the line terminal block and ringing-and-tone equipment, comprising mains transformer (with input, output and d.c. fusing), rectifier, and capacitor/resistor network.
The backplate incorporates wall-mounting brackets and protected cable entry holes for the passage of line cables and mains supply leads. Connection to the mains supply can be permanent or by flexible lead and plug. Wiring is p.v.c.-insulated throughout.

Ringing and Tones

Dial, busy and intrusion tones are mains derived via a 28V transformer tapping and capacitor/resistor network. Ringing is at mains frequency and transformer-tapped at 56V (nominal).

Power

The working voltage of both exchange units is 45 to 55V d.c. (50V nominal), derived from the standard built-in transformer which is designed for connection to 50Hz mains supplies within the range of 200 to 250V. Alternatively, transformers for operation on 60Hz, or within the range of 100 to 150V, can be supplied.

Extension Telephones

Two-wire Plesseyphones specifically developed for PAX working are recommended for general extension use. For the extension with the intrusion facility on the 10-line unit, a 3-wire version with pressbutton is available. Both types are supplied in silver-grey, lava green, hemp beige, ivory and black (see catalogue sheet 7159). Alternatively, other types of standard automatic telephones with and without pressbutton can be used, provided each incorporates an a.c. ringer and has a dial adjusted to transmit 10 pps with a 2:1 break/make ratio.

Line Limits

The loop resistance of extension lines can be up to 100Ω for the 10-line unit; for the 15-line unit 550Ω maximum is permissible. Using $6\frac{1}{2}$lb/mile (0·5mm) cable, these values correspond respectively to distances between the PAX and telephone of approximately 625yd (593m) and 3585yd (3262m).

Dimensions

10-line unit
12in x $8\frac{11}{16}$in x $7\frac{5}{16}$in
(305 x 221 x 186mm).

15-line unit
12in x 24in x $8\frac{1}{4}$in
(305 x 610 x 209mm).

Weights

One 10-line unit 14lb (6·4kg) net. 4 units (multiple export pack) 112lb (50·8kg).

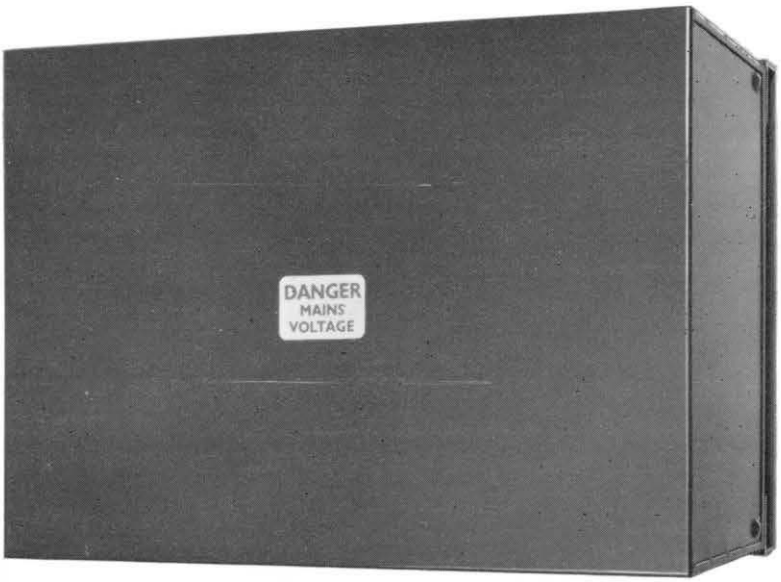
One 15-line unit 48lb (21·8kg) net. 4 units (multiple export pack) 260lb (117·9kg).

Ordering Information

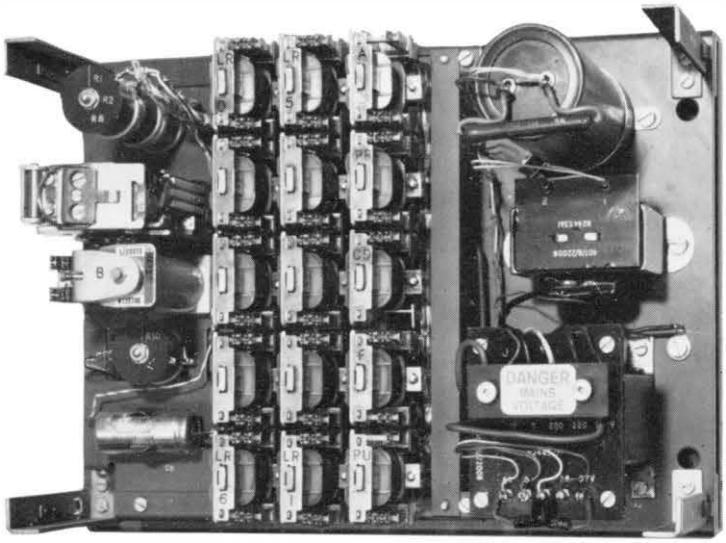
When ordering, please specify required items and corresponding code numbers from the table below. Also state quantities and give:

1 Details of local mains voltage and frequency.
2 Colour of extension telephones.
3 Number (up to 3) of extensions requiring intrusion facilities (15-line PAX only); this information determines the strapwiring adjustments to be made in the PAX unit before despatch.

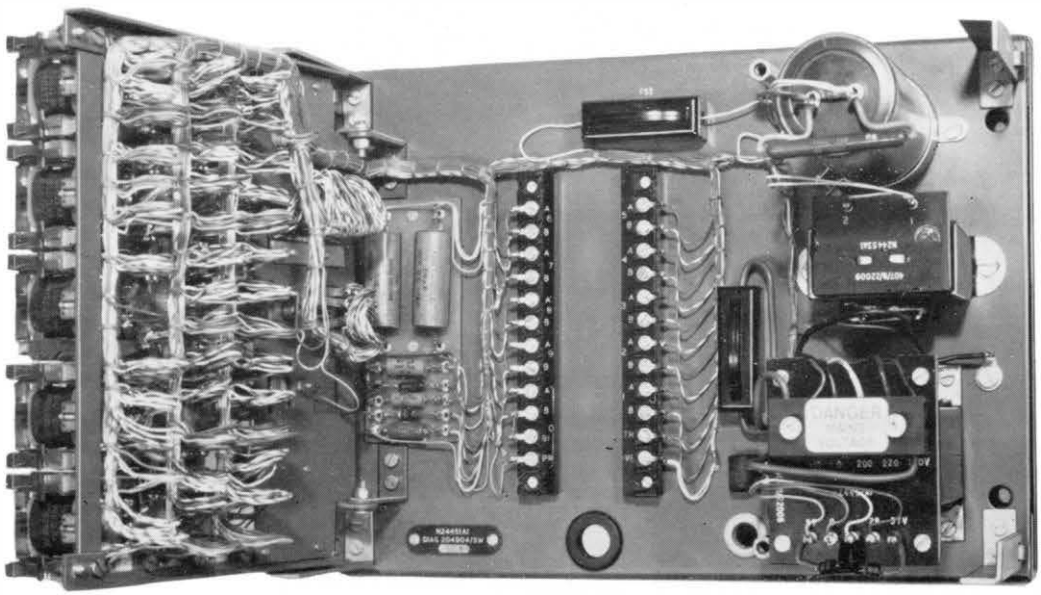
Equipment item	Code No.
10-line exchange unit	N24451A
15-line exchange unit	N24608A
2-wire telephone	N2020C
3-wire telephone with pressbutton (10-line PAX only)	N2021C



10-line unit



10-line unit with cover removed



10-line unit with hinged gate open

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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PAX 25

Long, reliable service and minimum maintenance are ensured by this PAX which is designed for business houses, hotels, etc. requiring not more than 25 lines.
The single unit occupies very little floor space.
The stock equipment is 15 line and two connector circuits but equipment can be supplied to order and extended as required to the capacity of 25 line and four connector circuits, the unit being fully wired to facilitate such extension.
Maximum extension line loop resistance, including the telephone, is 800Ω.

Numbering and Facilities

The numbering scheme is 1 to 9, 01 to 09 and 001 to 007.
Full intercommunication by direct dialling, with complete secrecy except on party lines, is given.
The following special facilities are provided as ordered, the extra equipment listed in the Table on the back page being wall mounted unless otherwise stated below.

1 *Preference* (*'Automatic' or 'Optional'*). Enables selected extensions to switch in on engaged lines. No extra apparatus required. Automatic Preference is given by means of a strap on the particular line circuit. For Optional Preference the telephone must have a pressbutton.

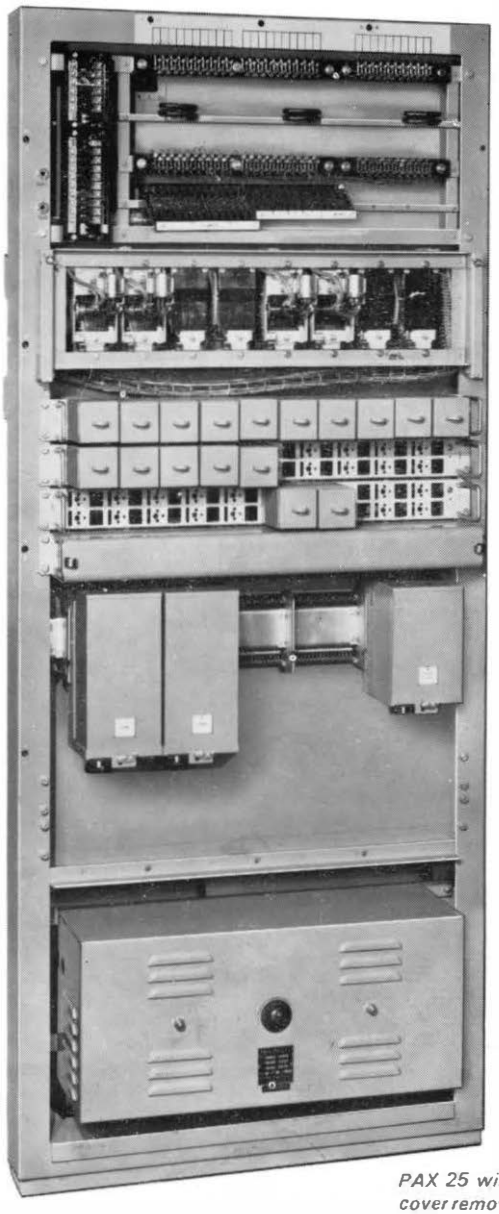
2 *Tie line.* For intercommunication between two PAXs. Up to two circuits can be mounted on the unit; others may be wall mounted. Suitable terminating equipment is necessary at the remote PAX, therefore the type of exchange should be specified. Extra equipment is necessary for long lines. Preference extensions can be given access to a busy tie line if required. An extra rectifier per tie line is necessary if the remote PAX is 50V.

3 *Loudspeaker with Direct Call.* Executive's loudspeaker telephone equipped with 10 double-throw keys for the direct calling of up to 20 selected extensions by a discriminating ringing signal.

4 *Conference and Direct Call.* Direct Call keys referred to in paragraph 3 can be used to connect together the executive and up to 10 Direct Call extensions for Conference when the Conference facility is specified. Direct Call facilities need not necessarily include Conference.

5 *Secretarial.* For the executive who may not wish to be always directly accessible by telephone. Various schemes available.

6 *Two-party line.* Permits individual service to two extensions over one pair of wires, thus reducing line costs. The two can communicate with each other, and either can make or receive calls without disturbing the other.



PAX 25 with cover removed

7 *Loud-ringing bells.* A loud-ringing mains signalling bell, such as N3137B, can be operated via the contacts of a d.c. relay supplied in a case.

8 *Staff call.* Any one of up to 15 persons may be called by dialling a code number to operate bells or buzzers throughout the premises. A person thus called dials '8' on the nearest telephone and is automatically connected to the caller. The equipment can be mounted on the unit unless a battery eliminator is to be accommodated. Visual code call systems, with or without an audible warning signal, for up to 15 codes can be supplied. Details will be furnished on request. All signalling devices are ordered separately.

9 *Discriminating ringing.* For use by executives or other selected extensions to indicate when such persons are calling.

Equipment

PAX Unit

This is a grey-enamelled pressed-steel dustproof unit of small size which stands on the floor and is supported 3in (76mm) from a wall by two brackets at the top. Drillings for floor fixings if required are included. The front cover is removable, the rear cover sealed.

The system operates on the 'line circuit control' principle. Heavy-duty uniselectors (BPO No. 2) are used as linefinders and connectors. Relays are Type N30000 (BPO 3000). The uniselectors are on a hinged shelf.

Line and miscellaneous relays are strip mounted. Jack-in mountings are used for connector and ringing and tone relay sets.

The incoming wires are soldered to tags at the top of the unit, then cross-connected by jumpers to screw terminals below. A white painted strip on the top ironwork is used for wire designations.

The equipment has full tropical finish. Connecting wires are pvc insulated.

Dimensions

Equipment Item	Height in	Height (mm)	Width in	Width (mm)	Depth in	Depth (mm)
PAX 25	69	(1753)	30¼	(768)	9¼	(235)
3A Battery Eliminator	7¼	(184)	24½	(623)	10½	(267)

Weights

Equipment Item	Code No.	Net Weight lb	Net Weight (kg)	Shipment Weight lb	Shipment Weight (kg)
PAX 25	N22425AT	223	(101·2)	Two Crates 411 95	(186·4) (43·0)
3A Battery Eliminator	N22406A	35½	(16·1)	72	(32·6)

Additional Equipment

Type No.	Equipment	Remarks
N22426T	One line circuit	
N22427T	One connector circuit	State whether circuit No. 3 or 4
N22429T	Set of spares	
N22400AT	Set of maintenance tools	
N22422	Set of installation material	
N22436T	One tie-line circuit	Does not include long line equipment
N22438T	Direct Call without Conference	Serves up to 20 Direct Call extns
N22440AT	Conf. and Direct Call 1—10	Not more than 10 Direct Call extns can be connected for Conference
N22440BT	Conf. and Direct Call 11—20	
N22444T	Discriminating ringing	One per four Direct Call lines
N22446T	One two-party line	Does not include line circuits
N22442T	Staff call (audible system)	15 persons max. (Visual systems also supplied)
N22506C	D.C. relay in case	For operating loud-ringing bell

Power Equipment

The working voltage is 20 to 26V (24V nominal).

With reliable a.c. mains, a 3A battery eliminator N22406A suitable for inputs of 100/125V or 200/250V, 40 to 60Hz and which mounts on the unit may be used. Alternatively, a 10Ah battery and 1A auto charger can be supplied.

If the mains supply is d.c., duplicate 10Ah batteries and a charging resistor are necessary.

Extension Telephones

Plesseyphones (catalogue sheet 7159), specifically developed for PAX working are recommended for general use. Alternatively, other types of standard automatic telephones such as Etelphones (catalogue sheet 7145) can be used.

Ordering Information

When ordering, please specify:

1 Quantity and codes where applicable.

2 Initial and ultimate requirements if these are different from the stock equipment.

3 Special facilities required; also miscellaneous items such as tools, spares, loud-ringing bells, etc.

4 Whether battery and charger, or a battery eliminator are required.

5 Local mains voltage and frequency.

6 Number and types of telephone instruments required.

7 Dimensions of proposed apparatus room, including clear height.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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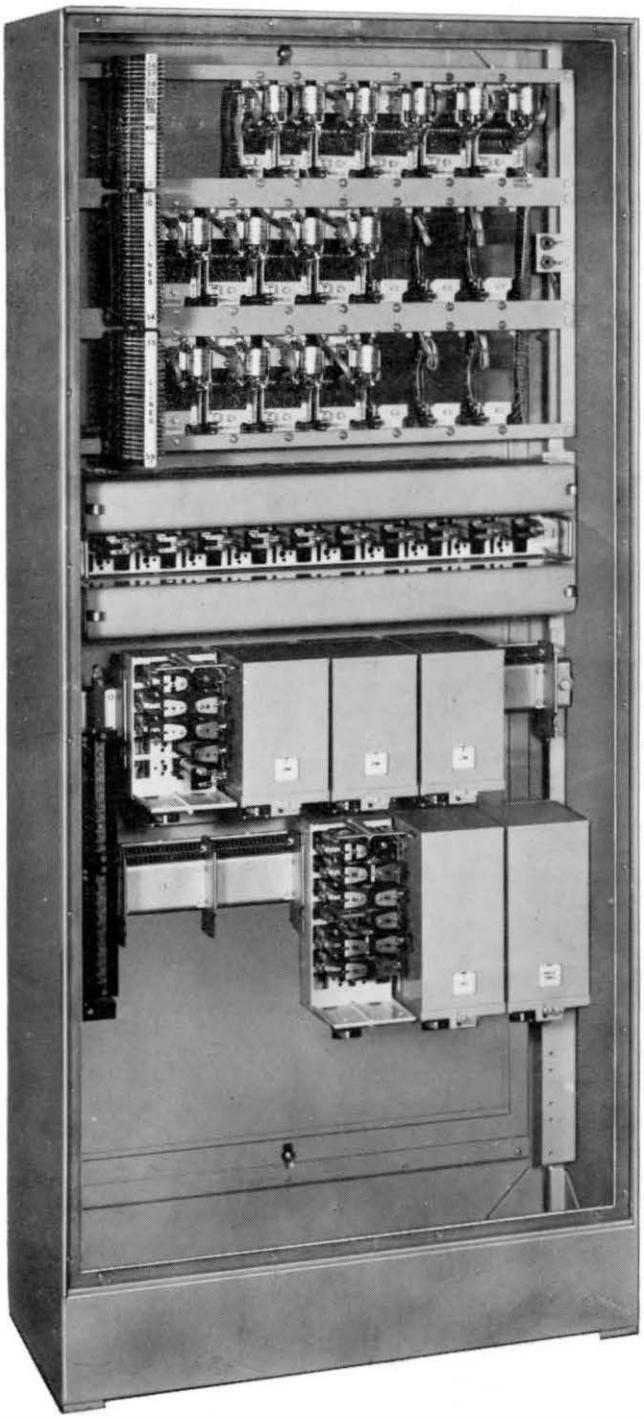
ZH1137/2k/4.71/S

PAX 50

This equipment, similar in many respects to PAX 50/400, is used when not more than 50 lines will ultimately be required. Excepting power equipment, and possibly some items required for special facilities, all apparatus is accommodated in a single unit.
The stock unit is equipped for 30 line and four connector circuits, but equipment can be supplied to order and extended as required to the capacity of 50 line and seven connector circuits, the unit being fully wired to facilitate such extension.
Maximum extension line loop resistance, including the telephone, is 800Ω, but long-line equipment to extend this limit can be supplied.

Numbering and Facilities

A two-digit numbering scheme is used.
Full intercommunication by direct dialling, with complete secrecy, except on party lines, is given.



PAX 50 Unit, with front door and some apparatus covers removed

The following special facilities are provided as ordered, the extra equipment listed in the Table on the back page being on the unit or wall mounted, depending upon the quantity.

1 *Preference ('Automatic' or 'Optional').* Enables selected extensions to switch in on engaged lines. A resistor per preference line is required. With Optional Preference, access to an engaged line is obtained by dialling a code digit on receiving busy tone.

2 *Tie line.* For intercommunication between two PAXs. Up to three circuits can be mounted on the unit; others may be wall mounted. Suitable terminating equipment is necessary at the remote PAX, therefore the type of exchange should be specified. Extra equipment is necessary for long lines. Preference extensions can be given access to a busy tie line and to a busy extension at the remote PAX if required. An extra rectifier per tie line is necessary if the remote PAX is 50V.

3 *Loudspeaker with Direct Call.* Executive's loudspeaker telephone equipped with 10 double-throw keys for the direct calling of up to 20 selected extensions by a discriminating ringing signal.

4 *Conference and Direct Call.* Direct Call keys referred to in paragraph 3 can be used to connect together the executive and up to 10 Direct Call extensions for conference when the Conference facility is specified. Direct Call facilities need not necessarily include Conference.

5 *Secretarial.* For the executive who may not wish to be always directly accessible by telephone. Various schemes available.

6 *Two-party line.* Permits individual service to two extensions over one pair of wires, thus reducing line costs. The two can communicate with each other, and either can make or receive calls without disturbing the other.

7 *Loud-ringing bells.* A loud-ringing mains signalling bell, such as N3137B, can be operated via the contacts of a d.c. relay supplied in a case.

8 *Staff call.* Any one of up to 15 persons may be called by dialling a code number to operate bells or buzzers throughout the premises. A person thus called dials '8' on the nearest telephone and is automatically connected to the caller. Visual code call systems, with or without an audible warning signal, for 7, 15 or 30 codes can be supplied. Details will be furnished on request. All signalling devices should be ordered separately.

9 *Discriminating ringing.* For use by executives or other selected extensions to indicate when such persons are calling.

10 *PBX hunting.* Enables a number of lines (usually up to four) to be called by dialling the number of the first line. If the first line is engaged, the call is automatically connected to the second line, and so on. If the directory number of the second or third line is dialled the call is not connected to the next line under engaged conditions.

11 *Emergency lines.* Where lines are used as reporting points for emergency calls such as fire alarm, ambulance, etc., normal line circuits would be terminated on telephones (usually red) not equipped with a dial, to prevent them being used for outgoing calls. If it is required that these extensions be called by dialling a number outside the normal numbering scheme, then additional equipment is necessary.

Equipment

PAX Unit

This is a grey-enamelled pressed-steel dust-proof unit of small size, totally enclosed by removable doors at the front and rear, the supporting wall brackets at the top being 21in (533mm) long, to allow access to the rear. Drillings for floor fixings if required are included.

The system operates on the 'register control' principle, the dialled impulses being received by either of two register circuits which drive the connector switches to the appropriate outlets.

The apparatus is arranged as shown in the illustration. All switches are heavy-duty uniselectors (BPO No. 2). Type N30000 (BPO 3000) relays are used in all except the line circuits, which employ twin relays Type N44700.

Three tie-line circuits, or apparatus for other special facilities, can be accommodated in the space near the bottom of the unit.

The incoming wires enter through the top of the cabinet and are soldered to connection strips alongside the uniselectors. A distribution box providing cross-connecting facilities for the lines can be supplied for wall mounting if specified.

The equipment has full tropical finish. Connecting wires are pvc insulated.

Power Equipment

The working voltage is 20 to 26V (24V nominal).

If a reliable a.c. mains supply is available, a battery eliminator, N22406B, may be used. It is designed for inputs of 100/125V or 200/250V, 40 to 60Hz, has a 5A output, and mounts on a wall.

Alternatively, a 20Ah battery and 3A auto charger can be supplied.

If the mains supply is d.c., duplicate 20Ah batteries and a charging resistor are necessary.

Orders should specify the type of equipment required and the mains voltage and frequency.

Extension Telephones

Plesseyphones (catalogue sheet 7159), specifically developed for PAX working are recommended for general use. Alternatively, other types of standard automatic telephones such as Etelphones (catalogue sheet 7145) can be used.

Dimensions

Equipment Item	Height in	Height (mm)	Width in	Width (mm)	Depth in	Depth (mm)
PAX 50	66	(1676)	30½	(775)	12⅜	(314)
5A Battery Eliminator	12	(305)	24½	(623)	8	(203)

Weights

Equipment Item	Code No.	Net Weight lb	Net Weight (kg)
PAX 50	N22450AT	363	(164·8)
5A Battery Eliminator	N22406B	46½	(21·1)

Additional Equipment

Type No.	Equipment	Remarks
N44846TK	One line circuit	
N22451T	One connector circuit	State circuit No. (5, 6 or 7)
N22452T	Set of spares	
N22400AT	Set of maintenance tools	
N22422	Set of installation material	
N3592A	Resistor for pref. line	One per preference line
N22460T	One tie line circuit	
N22462T	Direct Call without Conference	Serves up to 20 Direct Call extns
N22464AT	Conf. and Direct Call 1—10	Not more than 10 Direct Call extns can be connected for Conference
N22464BT	Conf. and Direct Call 11—20	
N22469T	One two-party line	Does not include line circuits
N22466T	Staff call (audible system)	For a maximum of 15 persons, (visual systems for 7, 15 or 30 codes also supplied)
N22506C	D.C. relay in case	For operating loud-ringing bell

Ordering Information

When ordering, please specify :

1 Quantity and codes where applicable.

2 Initial and ultimate requirements if these are different from the stock equipment.

3 Special facilities required ; also miscellaneous items such as tools, spares, loud-ringing bells, etc.

4 Whether battery and charger, or a battery eliminator are required.

5 Local mains voltage and frequency.

6 Number and types of telephone instruments required.

7 Dimensions of proposed apparatus room, including clear height.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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Printed in England Publication No. 7116 ZH1138/2k/4.71/S

Extensible Unit Type

50/400 PAX

Being of extensible type, this register-controlled PAX is ideal for progressive organizations where expansion from time to time may be anticipated. It employs single-motion selectors throughout and may be partially or fully equipped up to a maximum of 400 lines, the minimum number of lines being 50. The exchange equipment is composed of 50-line units specially designed to facilitate extension, an open-type main distribution frame (accommodating fuses and arrestors, if required) and the power plant.

Maximum extension-line loop resistance, including the telephone, is 1000Ω, but long-line equipment to extend this limit can be supplied.

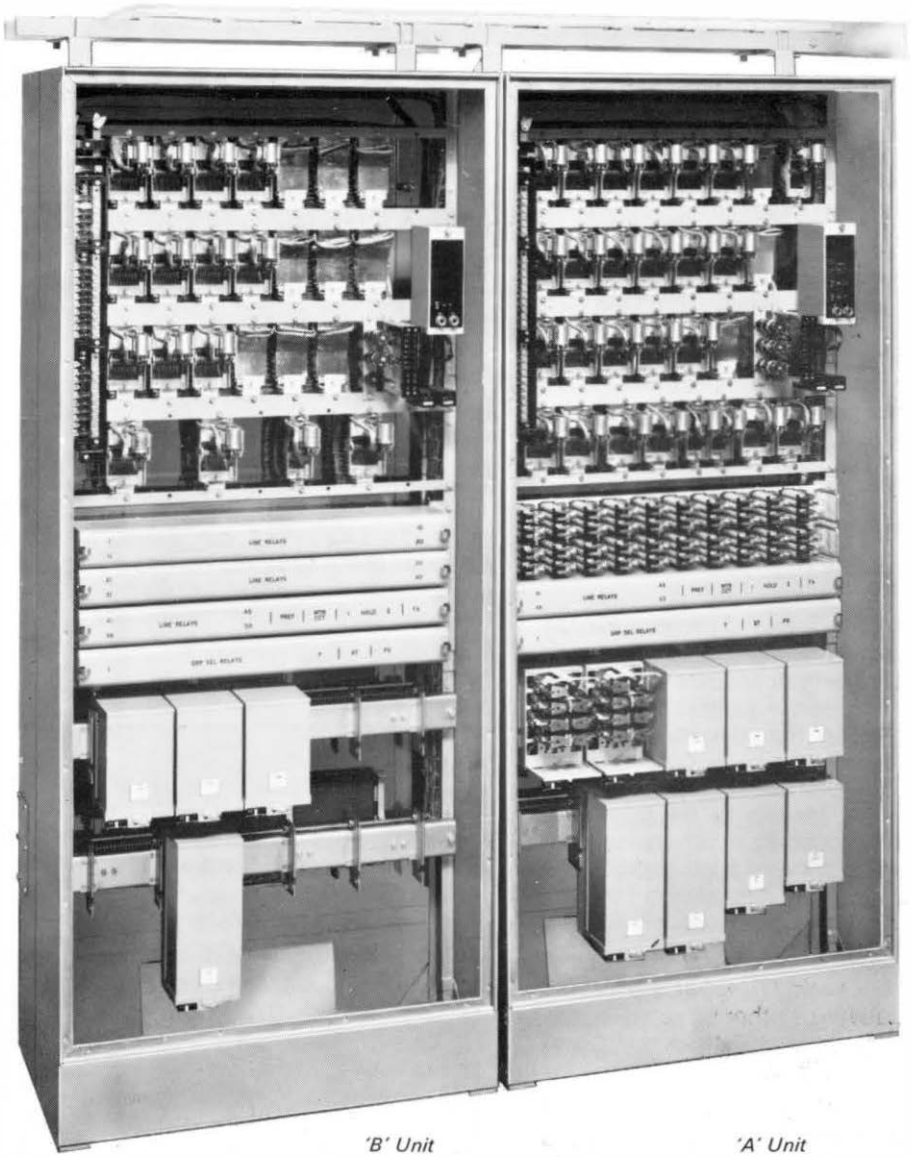
Numbering and Facilities

A 3-digit numbering scheme is used.

Full intercommunication by direct dialling, with complete secrecy except on party lines, is given.

The following special facilities are provided as ordered, the extra equipment listed in the table on page 3 being wall mounted unless otherwise stated below.

Preference (*'automatic' or 'optional'*). Enables selected extensions to switch in on engaged lines. One resistor per preference line is required for fitment on the unit. For automatic preference, one PF relay per register is also required. With optional preference, access to



'B' Unit *'A' Unit*

PAX 50/400 stock units, with some apparatus covers and the front doors removed. Note cable support on top.

an engaged line is obtained by dialling a further digit.

Tie Line. For intercommunication between two PAXs. Suitable terminating equipment is necessary at the remote PAX, therefore the type of exchange should be specified. Extra equipment is necessary for long lines. Preference extensions can be given access to a busy tie-line and to a busy extension at the remote PAX if required.

Loudspeaker with Direct Call. Executive's loudspeaker telephone equipped with 10 keys for the direct calling of up to 20 selected extensions by a discriminated ringing signal.

Conference and Direct Call. Direct-call keys referred to in the previous paragraph can be used to connect together the executive and up to 10 direct-call extensions for conference when the conference facility is specified. Direct-call facilities do not necessarily include conference.

Secretarial. For the executive who may not wish to be always directly accessible by telephone. Various schemes available.

Two-Party Lines. Permits individual service to two extensions over one pair of wires. The two can communicate with each other, and either can make or receive calls without disturbing the other. Three numbers are allocated per two-party line.

Loud - Ringing Bells. A loud - ringing mains signalling bell, such as N3137B, can be operated via the contacts of a d.c. relay supplied in a case.

Staff Call. Selected persons may be called by dialling a code number to operate bells or buzzers throughout the premises. A person thus called dials 8 on the nearest telephone and is automatically connected to the caller. There are various visual schemes for up to 64 codes, or audible schemes, or schemes giving a combination of both audible and visual signals. Details on request. All signalling devices should be ordered separately.

Discriminating Ringing. For use by executives or other selected extensions to indicate when such persons are calling.

PBX Hunting. Enables a number of lines (usually up to 4) to be called by dialling the first line directory number. If the first line is engaged, the call is automatically connected to the second line, and so on. If the directory number of the second or third line is dialled, the call is not connected to the next line under engaged conditions.

Emergency Lines. Where lines are used as reporting points for emergency calls, such as fire alarm, ambulance, etc., normal line circuits would be terminated on telephones (usually red) not equipped with a dial, to prevent them being used for outgoing calls. If it is required that these extensions be called by dialling a number outside the normal numbering scheme, additional equipment is necessary.

Switching Units

These are grey enamelled, pressed-steel, dustproof units, with removable front and rear doors. They are self-supporting and drilled for floor fixing.

Units may be type 'A' or 'B', equipped to order and are installed in suites in the sequence :
A.B.B.A.B.B.A.B.

In order to simplify extension, all are fully wired and the maximum number of wire connections are completed in the factory. All switches are heavy-duty (BPO No. 2) uniselectors.

Line relays are twin type N44700; other relays are N30000 (BPO 3000) type.

Inter-unit cables are run through the sides of the cabinets whilst i.d.f. cables are on supports attached to the top. Both sets of cables are soldered to connection strips.

The equipment has full tropical finish. Connecting wires are p.v.c. insulated. Cables are sheathed in cream p.v.c.

Main Distribution Frame

This is a single-sided, open-type frame for wall and floor fixing. It is equipped with connection strips and jumper rings to form a cross-connecting field for the lines. Should any of the lines require fuses and arrestors, these can be accommodated.

Power Equipment

The working voltage is 46–54V (50V nominal).

If the number of lines will never exceed 200 and a reliable a.c. mains supply is available, a battery eliminator N22405B, output 10A for up to 100 lines, or N22405C, 15A for up to 200 lines, may be used. Both are designed for inputs of 100/125 or 200/250V, 40–60Hz, and for wall mounting.

A battery and auto charger are recommended for larger equipments, or in lieu of the eliminator for the smaller installations if preferred.

With a d.c. supply, duplicate batteries and a charging resistance are necessary.

Extension Telephones

Plesseyphones (Catalogue Sheet 7159), specifically developed for PAX working, are recommended for general use. Alternatively, other types of standard automatic telephones such as ETELPHONES (Catalogue Sheet 7145) can be used.

Stock Units

These are equipped as indicated below, and wired to cater for ultimate quantities quoted in brackets.

'A' Unit N22475	'B' Unit N22476		
*6(7)	4(7)	Group selector switches	
*6(7)	4(7)	Linefinder switches	
*5(6)	3(6)	Connector switches	
2(2) sets	1(1) set	Register, 'units', 'tens' and 'hundreds' switches	
50(50)	25(50)	Line relays, twin type	Strip mounted
*6(7) sets	4(7) sets	Group selector relays	Strip mounted
1(1) set	1(1) set	Miscellaneous relays	Strip mounted
5(5)	3(5)	Connector relays (upper shelf)	Jack-in
–(1)	–(1)	Connector relays (lower shelf)	Jack-in
2(2)	1(1)	Register relays (lower shelf)	Jack-in
1(1)	– –	Tones set (lower shelf)	Jack-in
1(1)	– –	Ringing polechanger (lower shelf)	Jack-in

* Group selector and Linefinder No. 7 and Connector No. 6 are normally reserved for special requirements.

Dimensions

Equipment Item	Height in (mm)	Width in (mm)	Depth in (mm)
Both A & B Units	69 (1753)*	30½ (775)	18 (457)
10A battery eliminator	33 (838)	14¾ (375)	10½ (267)
15A battery eliminator	33 (838)	18¾ (476)	10½ (267)

* The height stated does not include the overhead cable support

Weights

Equipment Item	Code No.	Net Weight lb (kg)	Shipment Weight lb (kg)
A unit	N22475	488 (222)	2 crates 672 (304·8) 184 (83·5)
B unit	N22476	400 (182)	2 crates 650 (294·8) 116 (526·2)
10A battery eliminator	N22405B	105 (47·7)	2 multiple export pack 296 (134·2)
15A battery eliminator	N22405C	140 (63·6)	—

Additional Equipment

Type No.	Equipment	Remarks
N44847TK	1-line circuit	
N22477T	1-line finder and grp. selr. circuit	State circuit No. (5, 6 or 7)
N22478T	1-connector circuit	State circuit No. (4, 5 or 6)
N22479T	Set of spares (for 100 lines)	
N22400AT	Set of maintenance tools	
N22422	Set of installation material	
N3554R	Resistor for pref. line	One per preference line
N129214TK	Relay for auto pref.	One per register (Auto pref. only)
N22480T	1 tie-line circuit	Does not include long line equipment
N22483T	Direct call without conference	Serves up to 20 direct call extns.
N22485AT	Conf. and direct call 1–10	Not more than 10 direct call extns. can be connected for conference
N22485BT	Conf. and direct call 11–20	
N22490T	1 two-party line	Does not include line circuits
N22487T	Staff call, 15 persons max. (audible system)	Visual systems for 7, 15 or 30 codes also supplied
N22488T	Staff call, 50 persons max. (audible system)	
N22506C	DC relay in case	For operating loud-ringing bell

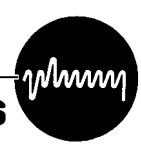
Ordering Information

When ordering please specify :

1 Quantity and codes where applicable.
2 Initial and ultimate requirements, if these are different from the stock equipment.
3 Special facilities required ; also miscellaneous items such as tools, spares, loud-ringing bells, etc.
4 Whether battery and charger, or a battery eliminator are required.
5 Local mains voltage and frequency.
6 Number and types of telephone instruments required.
7 Dimensions of proposed apparatus room, including clear height.
8 Exchange - extension requirements (if any) ; specify existing equipment and state number of units.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

PLESSEY
Telecommunications



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PLESSEY TELECOMMUNICATIONS

PABX 2

Private Automatic Branch Exchanges

Hotel PABXs 3H and ET4H

The specialised communication requirements of hotel managements are catered for by these private automatic branch exchanges which are based on the standard PABX designs (Types 3 and ET4) described in catalogue sheets 7124 and 7126. Each can be arranged to provide a variety of staff and guest facilities to suit customer needs, a typical range of facilities being as follows:

Corresponding numbering arrangements for guest rooms and associated telephones to facilitate accounting and services.

Direct exchange-line access from guest and service extensions, or access via the PABX operator.

For guests, outgoing calls are usually limited to those free of charge or charged automatically.

Barring of direct exchange-line access from any guest telephone while the room is vacant, by means of a key in the hotel reception area.

Chargeable calls registered automatically on meters, usually located in the hotel billing office.

Incoming exchange calls for guests and staff are answered and extended by the PABX operator.

Enquiry and call transfer at service extensions.

Direct dialling by guests for services or operator assistance.

Priority answering from any group of guest telephones (e.g. serving a luxury suite) ensured by distinctive lamp indication on PABX switchboard.

Guest-to-guest calls made via the PABX operator. As an alternative, direct dialling can be arranged, but can be barred at any time at management's discretion. Message-waiting signalling lamps at guest extensions.

Visual and/or audible staff-signalling equipment operated from the PABX.

A telephone dial showing typical hotel service codes

Information Required

When making enquiries or placing orders, please supply the following information 1 to 19 as appropriate. The information for items 14 to 19 can be obtained from your local Telephone Authority.

1 The type of PABX required: 3H or ET4H.

2 Plan showing accommodation available for equipment.

3 The quantity of public-exchange lines required.

4 The quantities of (a) guest and (b) hotel-administration extension lines required initially and (if possible) ultimately.

5 Is a room-related numbering scheme required? If so, detail the floor and room numbering.

6 Is guest-to-guest dialling required and, if so, is it required to be capable of complete barring at management's discretion?

7 How many (a) administration and (b) guest extensions are to be given direct dialling access to the public exchange?

Where guest extensions are given direct public-exchange access, is it required to be under the control of cut-off keys? What public-exchange codes (i.e., what routes) are to be barred from access by (c) administration (d) guest extensions?

8 Is it required to meter public-exchange calls originated by extension telephones? (Note: The ability to do this depends on the provision of a suitable metering signal from the public exchange to the PABX: see item 17.)

Are guest extensions to have (a) resettable or (b) non-resettable metering? How many administration extensions are to have (c) resettable or (d) non-resettable metering?

9 Are multi-access emergency extensions required? If so what numbers are to be allocated to them? (Avoid the use of room numbers.)

How many simultaneous calls to one emergency number should be catered for?

Are emergency calls to be answered by (a) the manual switchboard or (b) an extension telephone?

10 The titles of hotel services to be called up by dialling a code, and the preferred code digits.

Is each floor serviced individually, requiring floor-by-floor routing of service calls from guest extensions? Is it required to switch service calls to the manual board by keys at (a) the manual board or (b) the service telephones?

11 Are any non-dial extension telephones required, for example in public areas including lifts?

12 Are guests to have the 'message waiting' facility?

13 Are private tie lines required to other establishments, for example the airport?

14 The type of public exchange to which you are connected.

15 The type of call-metering signal (if any) available from the public exchange.

16 PABX busy-hour traffic data, and grades of service if possible.

17 Maximum number of simultaneous calls likely through the manual switchboard.

18 Local mains voltage and frequency.

19 Are telephones provided by the local telephone authority? If not, see catalogue sheets 7145 and 7159 and (a) state quantity and types of telephone required, and (b) give details of dial numbering if other than standard (i.e., 1 to 0).

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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2 + 7 PABX

without attendant

The facilities of much larger PABXs are given by this small single-unit system for two exchange and seven extension lines. It provides for three simultaneous conversations—two external and one internal. Enquiry calls can be made by extensions engaged on exchange calls without using the local link, and exchange calls can be transferred.

Being entirely extension-operated and employing simple components of known reliability, the 2+7 PABX offers the advantages of dependable 24-hour service and low running costs. It is completely self contained in a cabinet which can be table or wall mounted.

Component finishes and p.v.c. insulation on connecting wires are suitable for tropical conditions.

Maximum extension-line loop resistance, including the telephone, is 500Ω. Exchange-line loop resistance is up to 1000Ω, depending upon the limits imposed by the public exchange equipment. Extensions are numbered 1 to 7.

Facilities

1 *Extension-to-Extension Calls* are dialled direct.
2 *Outgoing Exchange Calls* are made by pressing the button on the extension telephone.
3 *Incoming Exchange Calls* are signalled on a special bell or bells and answered by any extension.
4 *Enquiry Calls,* with exchange line held, can be made by extension to extension.
5 *Exchange Call Transfer* by any extension to extension.
6 *Intrusion,* for enquiry or exchange call transfer, on local connections.
7 *Exchange-Line Switching* to predetermined extensions under mains-failure conditions.
8 *The Internal Link* is not used when setting up or transferring exchange calls or making enquiry calls, nor is it held if a handset is not replaced.

Equipment

The apparatus, including power supply and ringing and tone generators, is contained in a brown and cream enamelled sheet-metal cabinet having two removable hinged covers which open outwards from the centre. The components are on two frameworks which back on to each other; the one on the right-hand side is hinged on the front edge to allow access to wiring and terminating strips behind. Cables enter through the base of the cabinet via an aperture in the rear face of a shallow plinth.

The switching mechanisms are heavy-duty uniselectors, common-yoke line relays and conventional BPO relays for other circuits. Under normal conditions the components should require little more than cleaning and lubrication.

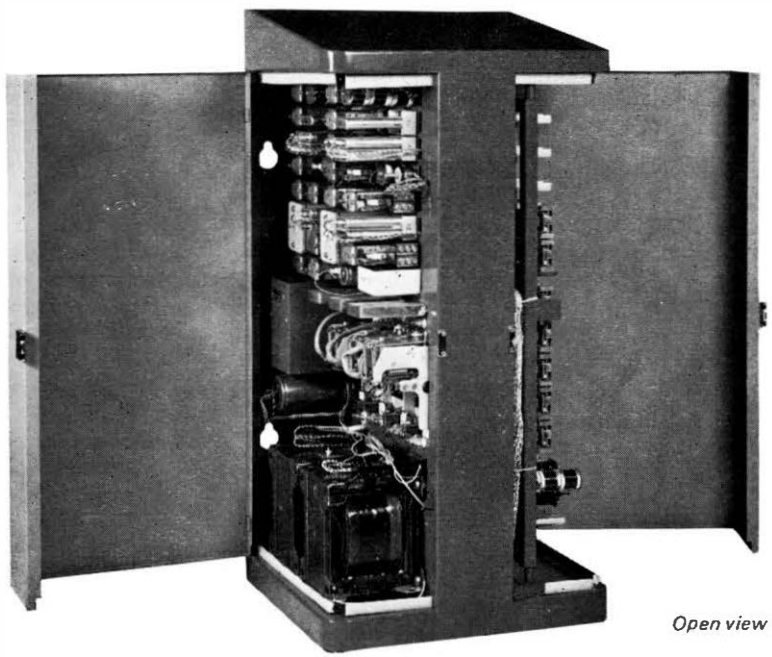
Ringing current is obtained from a converter fed from the 200V tappings of the power-supply transformer. The output of the transformer is also used for the derivation of dial and ring tones. Busy and intrusion tones are obtained from a transistor-type oscillator.

Power Supply

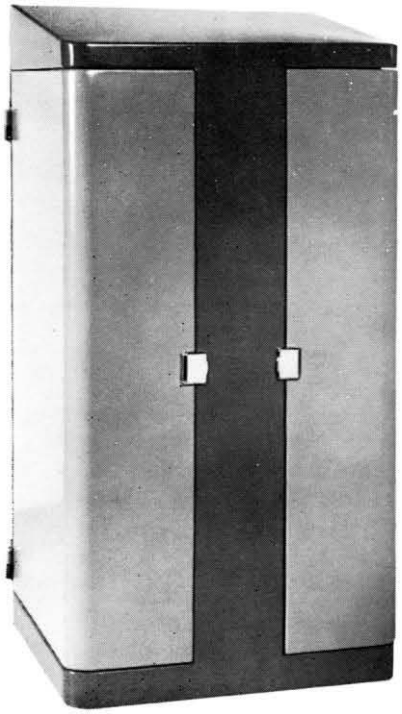
The power-unit transformer input is stepped for a.c. mains voltages between 100–125 and 200–250V, 50/60Hz. Smoothed outputs of 40/55V, 2A d.c. and 4·23V a.c. are provided.

Telephones

Plesseyphones (catalogue sheet 7159) or Etelphones (catalogue sheet 7145) are recommended for extension telephones. However, any telephones suitable for 2-wire-and-earth or 3-wire working may be used, provided it is equipped with a non-locking pressbutton and incorporates a dial with a 2:1 break/make ratio and pulsing speed of 10 p/s.



Open view of the 2 + 7 PABX Unit



Closed view of the 2 + 7 PABX Unit

Line Protectors and Exchange Call Bells

These are external to the PABX unit and are supplied to order. Protectors are recommended for open-wire lines of more than two spans. Up to three exchange call bells may be used.

Dimensions

Height: 28⅜in (721mm)
Width: 12¼in (311mm)
Depth: 14in (356mm)

Weights (approx.)

1 PABX unit: 120lb (54·4kg) net
1 PABX unit, export crated: 263lb (119·2kg)

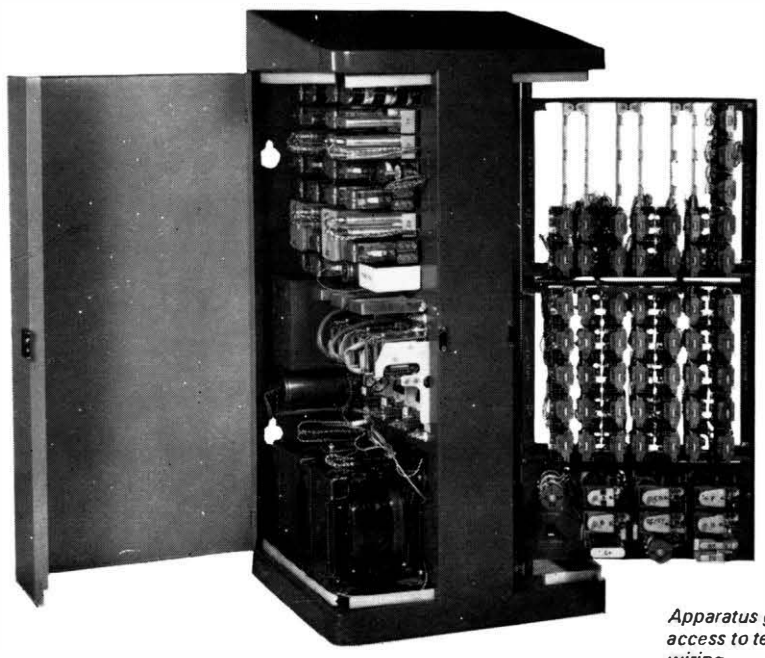
Ordering Information

When ordering, please specify PABX code number N24146A with extension lines as required (7 or 10). Because there is only one connecting link on this type of PABX, the use of 10 extensions is recommended only where light traffic conditions exist.

Supply information 1 to 4 as appropriate.

1 Number and type of extension telephones required.
2 Number of exchange call bells required
3 Number of line protectors required.
4 Amount and type (2- or 3-wire) of interconnecting cable required.

A price per yard (0·91m) of cable will be given on request.



Apparatus gate swung open for access to terminating strips and wiring

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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5 + 20 PABX

with or without attendant

This is a single-unit equipment for use where the ultimate requirement will not exceed 5 exchange lines and 20 extension lines. The stock equipments are for 5 + 20 lines with 4 connecting circuits, and 3 + 10 lines with 2 connecting circuits. Partially equipped units are wired for 20 extension-line circuits.

Tie lines to other private installations can be provided. The total of exchange and tie lines must not exceed 5. Both are normally arranged for auto or c.b. working.

A manual switchboard is not necessary (see Facility 3) but a small switchboard equipped for intercepting incoming exchange calls while others are being extended can be provided for a designated extension. A typical switchboard is illustrated overleaf.

Maximum extension-line loop resistance, including the telephone, is 800Ω. Exchange and tie-line loop resistance may be up to 1000Ω, depending upon the limits imposed by the remote exchange equipment.

Numbering and Facilities

Numbering

Extensions are numbered 20 to 29 and 30 to 39. Single-digit dialling codes 8, 9 and 0 are used for:

(*a*) Exchange lines.

(*b*) Tie-lines or a second group of exchange lines.

Facilities

1 *Extension-to-Extension Calls* are dialled direct.

2 *Outgoing Exchange Calls* are made by dialling an access digit, then the exchange subscriber's number (or instructing the distant operator if the exchange is manual).

3 *Incoming Exchange Calls* are signalled to designated extensions by a bell or bells. A call on any exchange line can be answered by any designated extension and transferred.

4 *Barred Access.* Extensions can be partially or completely barred exchange facilities.

5 *Enquiry Calls.* An exchange call can be held while making an inquiry call to another extension. The internal conversation is secret from the exchange subscriber.

6 *Exchange Calls* can be repeatedly transferred by extensions to others who are permitted to receive such calls.

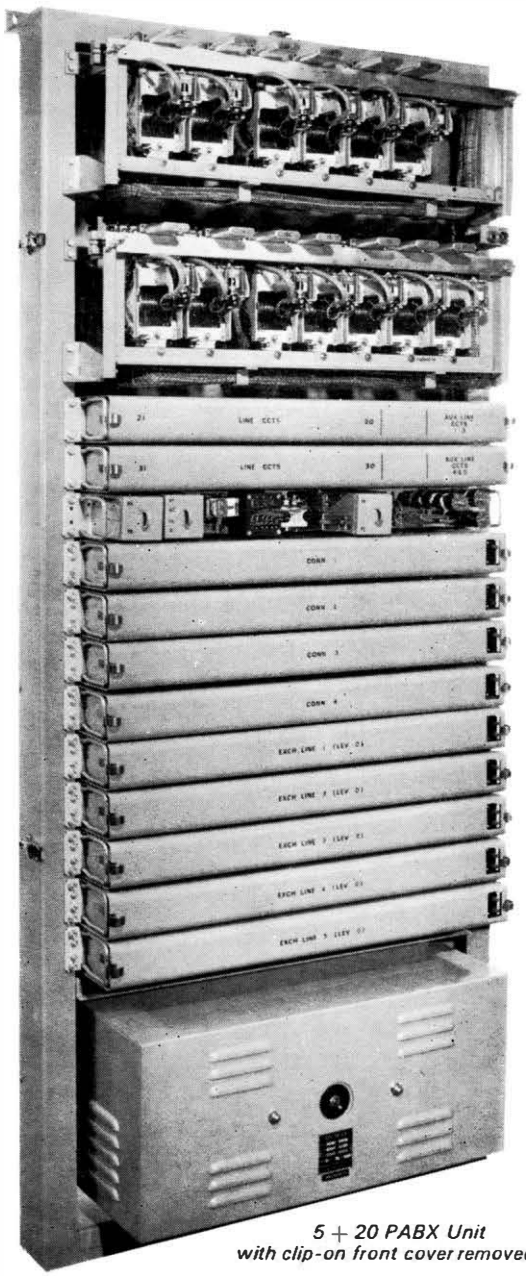
7 *Trunk Offering.* A designated extension can enter established extension-to-extension connections.

8 *Right-of-way.* Preference on local calls can be given to executives.

9 *Exchange-Line Switching.* Exchange lines are automatically switched to selected extensions in the event of power supply failure. Exchange-line conversation is not interrupted when power is restored.

Optional Service Features

Message registration (metering), conference, extension busy lamps, direct-access keycalling, staff location and route barring.



5 + 20 PABX Unit with clip-on front cover removed

Equipment

PABX Unit

This is a grey-enamelled pressed-steel dustproof unit of small size which stands on the floor, and is supported 3in (76mm) from a wall by two brackets at the top. The rear cover is sealed and the front one clip-retained. All the apparatus is accessible from the front.

The equipment has tropical finish. Connecting wires are p.v.c. insulated. Components are as used in public exchanges in Britain and of proven reliability. They include heavy-duty uniselectors used as line-finders and connectors and Types N30000 (BPO 3000) and N45000 (BPO 600) relays.

The switches are on two hinged shelves, which can be swung down to expose the fuse panel and the connection strips on which the incoming cables terminate. The upper shelf is not fitted on the 3+10 stock unit but can easily be installed later.

Strip-mounted circuits are used throughout. All are arranged on jack-in plates, excepting line circuits, but the plates for these can also be withdrawn without disturbing the connections.

Transistor oscillators are used to generate ringing current and tones. These static devices do not cause radio interference and require little maintenance.

Power Equipment

The working voltage is 45–55V (50V nominal). Power is usually supplied from the mains via a 4·2A eliminator N22404C, the input to which may be 100–125 or 200–250V 40–100Hz. The eliminator mounts at the bottom of the PABX unit. Alternatively, a 1A charger and 10Ah battery may be used.

Extension Telephones

Etelphones (catalogue sheet 7145) are recommended for extension telephones. Any other type of telephone must have an earth-connected, non-locking pressbutton and a dial pulsing at 10 pps with a 2:1 break/make ratio.

Dimensions

Equipment Item	Height in (mm)	Width in (mm)	Depth in (mm)
PABX unit	69 (1753)	30 (762)	14 (356)
Attendant's cordless switchboard	$7\frac{25}{32}$ (198)	$19\frac{7}{8}$ (505)	$13\frac{5}{8}$ (346)

Weights (approx.)

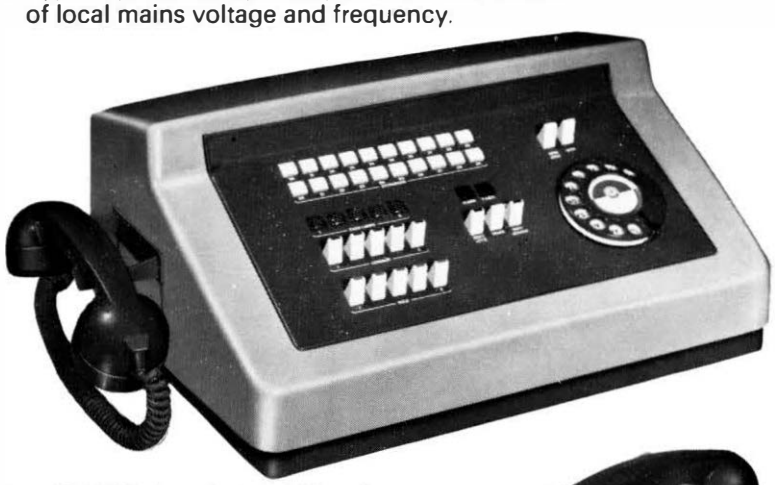
Equipment Item	Code No.	Net Weight lb (kg)	Shipment Weight lb (kg)
PABX stock unit 3+10 including battery eliminator	N22407D	370 (168·2)	Two crates: 519 (235·4) 86 (39)
PABX fully equipped unit including battery eliminator	N22407E	476 (216·4)	Two crates: 644 (292·1) 86 (39)
Battery eliminator	N22404C	58 (26·3)	86 (39)
Auto desk telephone with pressbutton, Etelphone	N1901	$3\frac{3}{4}$ (1·7)	*Fifty telephones 306 (138·8)
Auto wall telephone with pressbutton, Etelphone	N1066	$3\frac{3}{4}$ (1·7)	
Attendant's cabinet with 60ft cable	N24104A	$43\frac{1}{2}$ (19·8)	*Five cabinets 330 (149·7)

*multiple export pack

Ordering Information

When ordering, please state the PABX type and corresponding code number from the above table. Supply information 1 to 3 as appropriate.

1 Number and type of extension telephones required.
2 If attendant's switchboard required.
3 Type of power equipment preferred, also details of local mains voltage and frequency.



Type N24104A. Attendant's switchboard

Extension telephone N1901

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

PLESSEY
Telecommunications

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Printed in England Publication No. 7121/2 ZB13/2k/1.73

STROWGER

10 + 50 PABX

This is a single-unit equipment having capacity for 10 exchange lines, 50 extension lines and 7 connecting circuits. A desk-type cordless switchboard is supplied for dealing with incoming exchange calls, and assistance calls. The stock unit, equipped for 4 exchange lines, 30 extension lines and 4 connecting circuits, is fully wired to facilitate extension. Up to 5 tie lines to other private installations can be provided. The total of exchange and tie lines must not exceed 10. Both are normally arranged for auto or c.b. working. Maximum extension-line loop resistance including the telephone is 800Ω. Exchange and tie-line loop resistance may be up to 1,000Ω depending upon the limits imposed by the remote exchange equipment.

Numbering and Facilities

Numbering

Extensions are numbered 20 to 69. Single-digit dialling codes 7, 8, 9 and 0 are used for (*a*) exchange lines (*b*) tie lines or a second group of exchange lines (*c*) assistance (*d*) night service answering.

Facilities

1 *Extension-to-Extension Calls* are dialled direct.

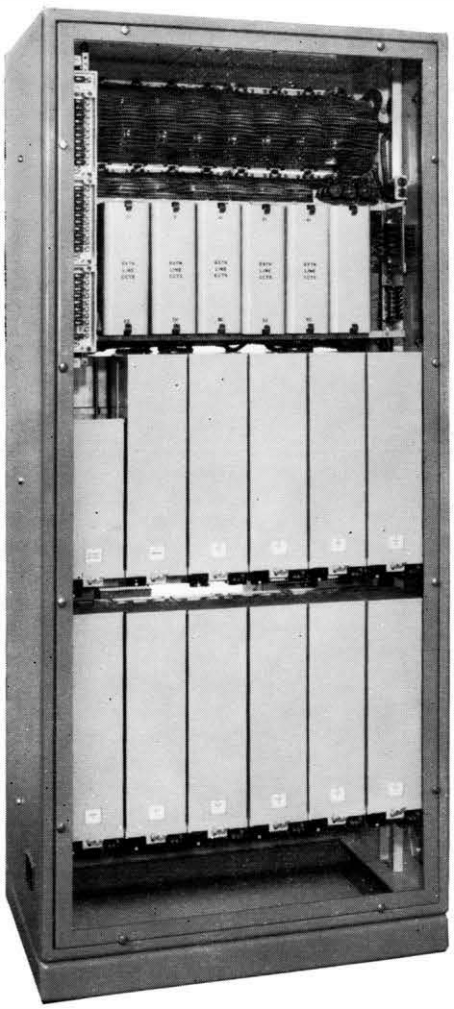
2 *Outgoing Exchange Calls* are made by dialling an access digit, then the exchange subscriber's number (or instructing the distant operator if the exchange is manual). Alternatively, calls may be set up by the PABX operator. The connecting circuits are used only for the setting up of a call.

3 *Incoming Exchange Calls* are received at the switchboard. Digit keys are used for extending the call. 'Ring when free' facilities are provided.

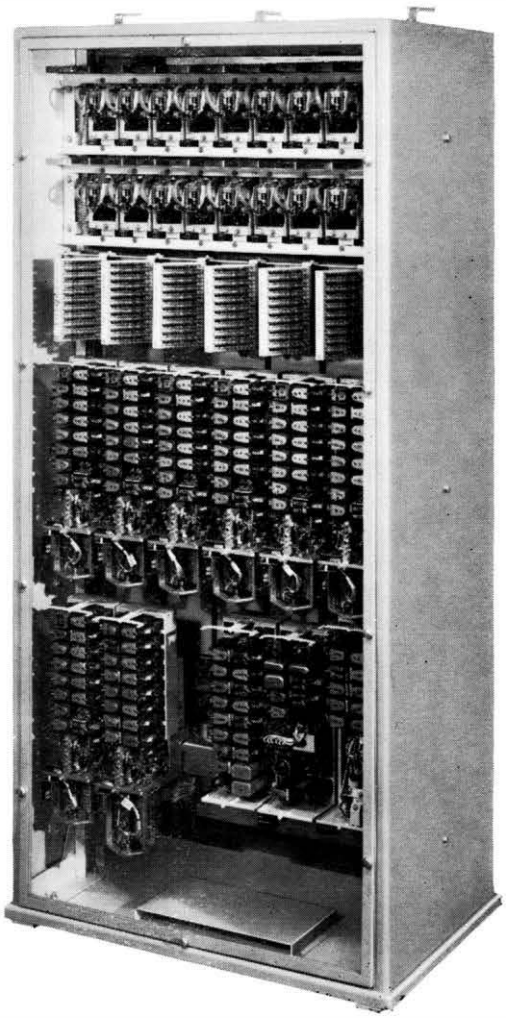
4 *Barred Access*. Extensions can be partially or completely barred exchange facilities.

5 *Enquiry Calls*. An exchange call can be held by the PABX operator or an extension while making an

Unit showing extension-line and exchange-line relay sets



Other side of unit showing selectors and relay sets with covers off and uniselector shelves at top



internal enquiry call. The internal conversation is secret from the exchange subscriber.

6 *Call Transfer*. Exchange calls can be repeatedly transferred, without operator assistance, by extensions to other extensions permitted to receive such calls.

7 *Trunk Offering*. The PABX operator can enter established connections; warning tone is given.

8 *Right-of-way*. Preference on local calls can be given to executives.

9 *Assistance*. Extensions dial a single digit to call the PABX operator.

10 *Manual Extensions*. Immediate calling of the PABX operator by lifting the handset can be arranged for up to three of the extensions.

11 *Night Service*. Incoming exchange calls are signalled by d.c. bells. Any extension not fully barred can answer by dialling 8. Alternatively, one or two extensions may be selected to answer calls.

Optional Service Features

Message waiting; message registration; conference; trunk barring; 'extension busy' lamps; direct-access key calling and staff location.

Equipment

PABX Unit

This is a double-sided, pressed-steel dustproof unit with lift-off steel-framed Perspex doors at the front and rear. The exterior is enamelled opaline green; the interior and apparatus covers are cream. The equipment has tropical finish. Connecting wires are p.v.c.-insulated.

Components are of standard BPO type and proven reliability. They include N30000 (BPO 3000) and N45000 (BPO 600) relays, heavy-duty line-finder uniselectors (BPO No. 2) and 100-outlet 2-motion selectors N46600 (BPO 4000). If specially ordered, selectors N43200 (BPO 2000) can be supplied.

Excepting strip-mounted line and miscellaneous relays, all circuits are on jack-in mountings to facilitate extension. On one side of the unit are line relays, exchange and tie-line relay sets and fuse panels; on the other, the finder uniselectors, 2-motion selectors and connection strips. Connection strips ('line' and 'exchange') are mounted under a cover at the side of the unit and serve for the distribution of incoming lines, cross-connection being made by means of screw-terminated jumpers. Line protectors are provided complete with heat coils and fuses on a separate wall mounting for 10 circuits when ordered.

The 25Hz and 400Hz ringing and tone frequencies are generated by transistor-type oscillators powered from the 50V exchange supply. These static devices require little maintenance and do not cause interference with radio signals.

Cordless Switchboard

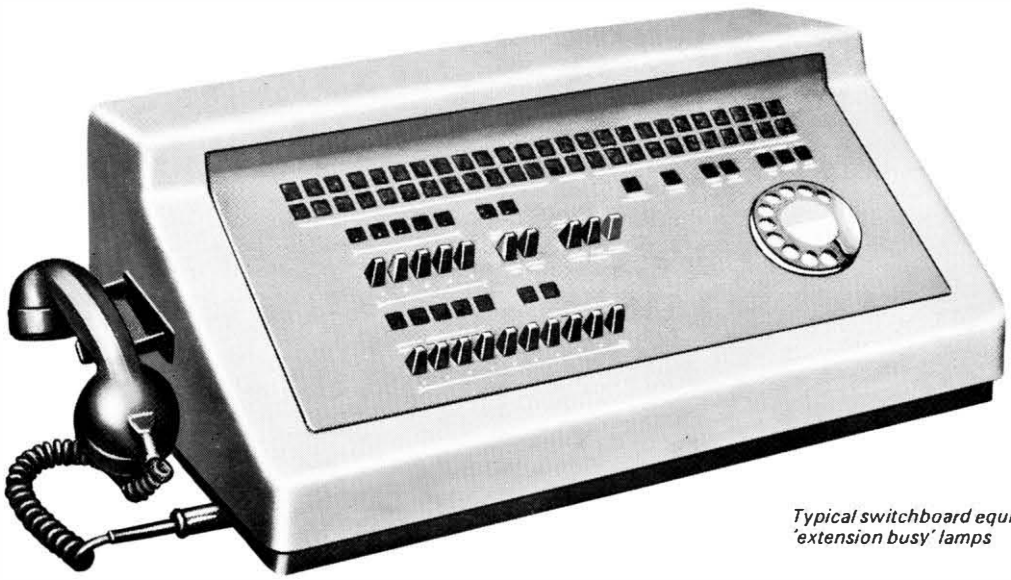
The design of the small two-tone grey switchboard accords with contemporary taste and facilitates maintenance. The metal front panel and internal rear equipment frame are both hinged to the metal base so that they can be opened, book fashion, when the ABS copolymer plastic drop-on cover is removed.

Keys have wedge handles with tips of contrasting colour to enable operated keys to be easily discerned.

Fifty lamps, arranged in two rows, are 'extension busy' lamps, fitted only when specified (see illustration).

The upper row of double-throw keys and associated lamps are for exchange-line, tie-line, manual-extension, assistance and miscellaneous circuits.

The lower row of keys, again of double-throw type, serve as key-sender digit keys when operated downwards, and provide for exchange and extension release,



Typical switchboard equipped with 'extension busy' lamps

flash, test, speak, etc., facilities when operated upwards.
Lamps can be removed without using an extractor.
The dial has standard numbering, 2:1 break/make pulse ratio, and a plastic fingerplate.
A grey plug-in handset with capsule receiver and grey braided extensible cord is provided, and 60ft (18·29m) of p.v.c.-insulated cable to connect the switchboard to the PABX unit.

Power Equipment

The working voltage is 45 to 55V (50V nominal). If a reliable a.c. mains supply is available, a battery eliminator N22405D may be used. It is designed for inputs of 100 to 125V or 200 to 250V, 40 to 100Hz, has a 7·5A output and mounts on a wall.
Alternatively, a 3A charger and 20Ah battery may be used.

Telephones

Plesseyphones (catalogue sheet 7159) or Etelphones (catalogue sheet 7145) are recommended for extension telephones. However, any telephone suitable for 2-wire-and-earth or 3-wire working, may be used, provided it is equipped with a non-locking pressbutton and incorporates a dial with a 2:1 break/make ratio and pulsing speed of 10 pps.

Ordering Information

When ordering, please state the equipment items and corresponding code numbers from the above table, together with quantities required, and provide additional information 1 to 8 below as appropriate.

1 The type of public exchange to which the PABX is to be connected.
2 Any special capacity requirements, bearing in mind that extension-line circuits are provided in multiples of ten.
3 Tie lines (if any).
4 Colour and types of extension telephones.
5 Details of power requirements and of local mains voltage and frequency; also amount of inter-connecting cable required, contained in steel or p.v.c. conduit.
6 Attendant's switchboard with or without 'extension busy' lamps, and cable for connection to the PABX unit.
7 Line protectors, maintenance tools and spares required.
8 Barring digits for trunk-barring facility if other than the standard 0 or 1.

Dimensions

Equipment Item	Height in	Height (mm)	Width in	Width (mm)	Depth in	Depth (mm)
PABX unit (including connection strip housing)	69	(1753)	34¾	(882)	20	(508)
Attendant's switchboard with 'busy' lamps	8½	(216)	26	(660)	15½	(394)
Attendant's switchboard without 'busy' lamps	8	(203)	20	(508)	14	(356)

Weights (approx.)

Equipment Item	Code No.	Net Weight lb	Net Weight (kg)	Shipment Weight lb	Shipment Weight (kg)
PABX equipped 4+30	N22845A	750	(340·9)	Two crates: 744 356	(337·9) (161·7)
PABX fully equipped 10+50	N22845A	992	(450·9)	Two crates: 780 612	(353·8) (277·5)
Battery eliminator	N22405D	57	(25·9)	105	(47·6)
Auto desk telephone with pressbutton (Etelphone)	N1901	¾	(1·7)	*Fifty telephones: 306	(138·8)
Auto wall telephone with pressbutton (Etelphone)	N1066	¾	(1·7)	*Fifty telephones: 306	(138·8)
Auto desk telephone with pressbutton (Plesseyphone)	N2021	1¾	(0·79)	*Hundred telephones: 276	(125·2)
Attendant's cabinet with 'busy' lamps	N24125A1T	40	(18·2)	102	(46·3)
Attendant's cabinet without 'busy' lamps	N24125A2T	38	(17·2)	100	(45·4)

* multiple export pack

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

PLESSEY
Telecommunications

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Printed in England

Publication No. 7122/1

ZH192/1.5M/4.71

Strowger

20 + 100 PABX

The 20 + 100 PABX is a single-unit equipment, having capacity for 20 auto or c.b. exchange lines (including tie lines to private exchanges if required), 100 extension lines in two separate groups of 50, and 10 connnecting circuits.

When the unit accommodates more than 50 extensions, the line-finders for each group of extension lines are connected via group switching relays to their respective connectors, exchange line and assistance circuits. These switching relays and the second group finders are not provided when 50 or fewer extensions are to be catered for; therefore the cost of the 20 + 100 PABX when equipped to 50 lines is kept to the minimum.

The exchange lines may comprise a single group of up to 20; alternatively, circuits 1 to 10 may be used for 2 groups of tie lines or constitute a separate exchange - line group.

A modern desk-type cordless switchboard is supplied for dealing with incoming exchange calls and assistance calls.

Numbering and Facilities

Numbering

Extensions are numbered 200 to 299. Single-digit dialling codes 6, 7, 8, 9 and 0 are used, as appropriate, for exchange-line and tie-line groups, and for assistance and night-service answering.

Facilities

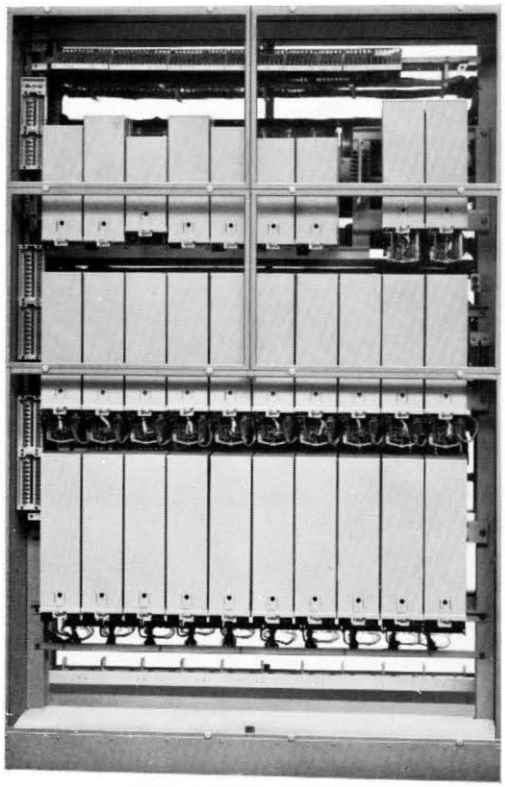
Extension - to - Extension Calls are dialled direct.

Outgoing Exchange Calls are made by dialling an access digit, then the exchange subscriber's number (or instructing the distant operator if the exchange is manual). Alternatively, calls may be set up by the PABX operator. Connecting circuits are not retained during exchange line calls.

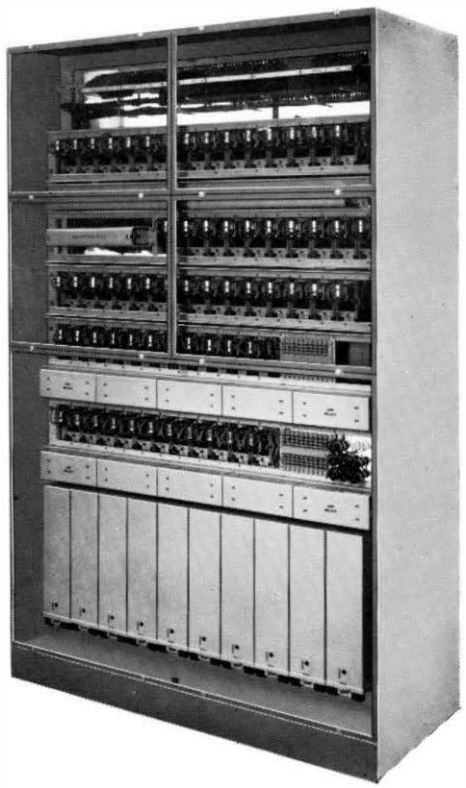
Incoming Exchange Calls are received at the switchboard. Digit keys are used for extending the call. Ring-when-free facilities are provided.

Barred Access. Extensions can be partially or completely barred exchange facilities.

Enquiry Calls. An exchange call



Front view of the 20 + 100 PABX unit, with dustproofing removed from the lower sections.



Rear view of the unit, showing dustproofing in position enclosing the distribution, exchange-line finders and common equipment. The dustproof panels are removed from the lower sections, exposing exchange-line relay sets and extension-line relay and finder shelves.

can be held by the PABX operator or an extension, while making an internal enquiry call. The internal conversation is secret from the exchange subscriber.

Call Transfer. Exchange calls can be repeatedly transferred without operator assistance, by extensions with exchange facilities, to other extensions permitted to receive such calls.

Trunk Offering. The PABX operator can enter established connections; warning tone given.

Right-of-way. Preference on internal calls can be given to executives.

Assistance. Extensions dial a single digit to call the PABX operator.

Manual Extensions. Immediate calling of the PABX operator by lifting the handset can be arranged for up to four of the extensions.

Night Service. Incoming exchange calls are signalled by d.c. bells. Any extension not fully barred can answer by dialling 8. Alternatively, from one to four extensions may be selected to answer calls.

Tie Lines. If standard exchange-line circuits are used, outgoing and incoming calls are obtained as described in 'Outgoing Exchange Calls' and 'Incoming Exchange Calls'. If special tie-line circuits are used, calls can be dialled out and dialled in, no extensions being barred.

Optional Service Features

Message waiting; message registration: conference; trunk barring; 'extension busy' lamps; direct-access keycalling and staff location.

PABX Unit

This is a double-sided unit, enclosed at the front and rear by transparent, semi-rigid, non-flammable plastic panels, edged with strips of 'magnetic' rubber to hold them firmly by attraction against light metal supports; nylon studs in the panels ensure correct positioning. The supporting T-section cross-members are easily removable to allow access to the entire unit if necessary, but for general maintenance, panels are removed one at a time. A panel can be lifted in one hand and temporarily parked over another panel simply by placing the two in contact. Enclosure of the unit is completed by sheet metal sides, base and roof.

The exterior finish is opaline green enamel; the interior ironwork, apparatus covers and p.v.c.-insulated cables are cream. The equipment has a tropical finish. Connecting wires are p.v.c.-insulated.

Components are of standard BPO type and proven reliability. They include N30000 (BPO 3000) and N45000 (BPO 600) relays, heavy-duty line-finder uniselectors (BPO No. 2) and 100-outlet 2-motion selectors N46600 (BPO 4000). (BPO 2000 type 2-motion selectors can be supplied if ordered specially.)

A cross-connecting field is included in the unit, and the line and exchange sides of circuits can be isolated for testing.

Ringing and tone frequencies are generated by transistor-type oscillators, powered from the 50V exchange supply. These static devices require little maintenance and do not cause interference with radio signals.

The switching equipment provided for PABXs of up to 50 lines and over 50 lines respectively is as follows:

	Up to 50 Extensions	*Over 50 Extensions*
Connectors	7	10 max.
Line finders	1 per connector	2 per connector
Assistance finders	1	2
Exchange finders	1 per exchange line	2 per exchange line
Call-back selectors	1	2
Group switching circuit	–	1

The following common items are supplied for each exchange: (a) assistance and night-extension circuit; (b) ringing, tones, alarms, and pulse circuit; (c) marker circuit; (d) unit common services.

Cordless Switchboard

The design of the small two-tone grey switchboard accords with contemporary taste and facilitates maintenance. The metal front panel and internal rear equipment frame are both hinged on the metal base so that they can be opened, book fashion, when the ABS copolymer plastic drop-on cover is removed. Keys have wedge handles with tips of contrasting colour, to enable operated keys to be easily discerned.

A hundred lamps, arranged in four rows, are 'extension busy' lamps fitted only when specified (see illustration).

N24119A1T, the cordless switchboard with 'extension busy' lamps.

The upper row of double-throw keys and associated lamps are for exchange line, tie-line, manual extension, assistance and miscellaneous circuits; the lower row for key-sending, intrusion, etc.
Supervisory lamps are at the left of the dial, and alarm keys and lamps at top right.
Lamps can be removed without using an extractor.
The dial has standard numbering, a 2:1 break/make pulse ratio and a plastic finger plate.
A grey plug-in handset, with rocking armature receiver and grey braided extensible cord is provided.
An alternative attendant's switchboard is available, with similar facilities, but also including lamps (one per extension) to indicate busy condition.

Power Equipment

The working voltage is 45 to 55V (50V nominal). If a reliable a.c. mains supply is available, a battery eliminator (N22405B) may be used. It is designed for inputs of 100 to 125 or 200 to 250V, 40 to 100Hz, has a 10A output and mounts on a wall.
Alternatively, a 45Ah battery, with 5A charger and control unit, can be supplied.

Telephones

Plesseyphones (catalogue sheet 7159) or Etelphones (catalogue sheet 7145) are recommended for extension telephones. However, any telephone suitable for 2-wire-and-earth or 3-wire working may be used, provided it is equipped with a non-locking pressbutton and incorporates a dial with a 2:1 break/make ratio and pulsing speed of 10 p/s.

Ordering Information

When ordering, please quote PABX 20 + 100 N24398A1T and state capacity requirements. Also state the associated equipment items and corresponding code numbers from the 'Weights' table below, together with quantities required, and provide additional information 1 to 8 as appropriate.

Please note:

(a) The stock PABX unit is wired and equipped for 10 exchange lines, 50 extensions and 7 connectors.

(b) A 60ft (18.29m) length of p.v.c.-insulated cable is supplied to connect the cordless switchboard to the PABX unit.

Dimensions

Equipment Item	Height in	Height (mm)	Width in	Width (mm)	Depth in	Depth (mm)
20+100 PABX unit	84	2134	54	1372	24	610
10A battery eliminator	14¾	375	33	838	10½	267
Attendant's switchboard without lamps	19⅞	505	13 13/16	354	7 13/16	198
Attendant's switchboard with lamps	25⅞	657	15⅝	391	8 31/32	228

Weights

Equipment Item	Code No.	Net Weight lb	Net Weight (kg)	Shipment Weight lb	Shipment Weight (kg)
20+100 PABX fully equipped	N24398A1T	2352	1068	Packed in four crates	
				858	389.1
				493	223.6
				407	184.6
				195	88.4
10A battery eliminator	N22405B	105	47.7	175	79.5
Attendant's cabinet without busy lamps	N24119A2T	23	10.4	108	49.0
Attendant's cabinet with busy lamps	N24119A1T	30	13.6	128	58.0
Auto desk telephone with pressbutton (Etelphone)	N1901	3¾	1·7	*Fifty telephones:	
				306	138·8
Auto wall telephone with pressbutton (Etelphone)	N1066	3¾	1·7	*Fifty telephones:	
				306	138·8
Auto desk telephone with pressbutton (Plesseyphone)	N2021	1¾	0·79	*Hundred telephones:	
				276	125·2

* multiple export pack

Notes

1 The type of public exchange to which the PABX is to be connected.

2 Any special capacity requirements, bearing in mind that extension-line circuits are provided in multiples of ten.

3 Tie lines (if any).

4 Colour and types of extension telephones.

5 Details of power requirements and of local mains voltage and frequency; also amount of inter-connecting cable required, in steel or p.v.c. conduit.

6 Line protectors, maintenance tools and spares required.

7 Barring digits for trunk-barring facility, if other than the standard 0 or 1.

8 The type of attendant's switchboard required, with or without 'extension busy' lamps.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

PLESSEY
Telecommunications

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Printed in England **Publication No. 7123** ZH1145/1M/7.70

Strowger

20 + 100 PABX

The 20 + 100 PABX is a single-unit equipment, having capacity for 20 auto or c.b. exchange lines (including tie lines to private exchanges if required), 100 extension lines in two separate groups of 50, and 10 connnecting circuits.

When the unit accommodates more than 50 extensions, the line-finders for each group of extension lines are connected via group switching relays to their respective connectors, exchange line and assistance circuits. These switching relays and the second group finders are not provided when 50 or fewer extensions are to be catered for; therefore the cost of the 20 + 100 PABX when equipped to 50 lines is kept to the minimum.

The exchange lines may comprise a single group of up to 20; alternatively, circuits 1 to 10 may be used for 2 groups of tie lines or constitute a separate exchange - line group.

A modern desk-type cordless switchboard is supplied for dealing with incoming exchange calls and assistance calls.

Numbering and Facilities

Numbering

Extensions are numbered 200 to 299. Single-digit dialling codes 6, 7, 8, 9 and 0 are used, as appropriate, for exchange-line and tie-line groups, and for assistance and night-service answering.

Facilities

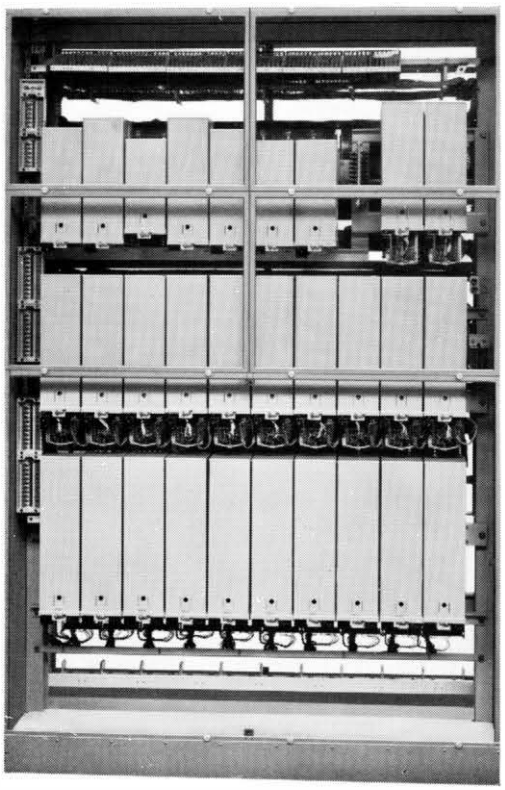
Extension - to - Extension Calls are dialled direct.

Outgoing Exchange Calls are made by dialling an access digit, then the exchange subscriber's number (or instructing the distant operator if the exchange is manual). Alternatively, calls may be set up by the PABX operator. Connecting circuits are not retained during exchange line calls.

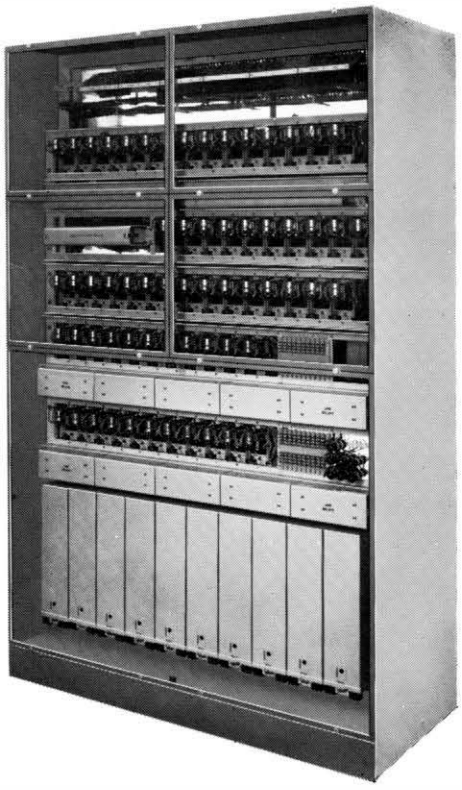
Incoming Exchange Calls are received at the switchboard. Digit keys are used for extending the call. Ring-when-free facilities are provided.

Barred Access. Extensions can be partially or completely barred exchange facilities.

Enquiry Calls. An exchange call



Front view of the 20 + 100 PABX unit, with dustproofing removed from the lower sections.



Rear view of the unit, showing dustproofing in position enclosing the distribution, exchange-line finders and common equipment. The dustproof panels are removed from the lower sections, exposing exchange-line relay sets and extension-line relay and finder shelves.

can be held by the PABX operator or an extension, while making an internal enquiry call. The internal conversation is secret from the exchange subscriber.

Call Transfer. Exchange calls can be repeatedly transferred without operator assistance, by extensions with exchange facilities, to other extensions permitted to receive such calls.

Trunk Offering. The PABX operator can enter established connections; warning tone given.

Right-of-way. Preference on internal calls can be given to executives.

Assistance. Extensions dial a single digit to call the PABX operator.

Manual Extensions. Immediate calling of the PABX operator by lifting the handset can be arranged for up to four of the extensions.

Night Service. Incoming exchange calls are signalled by d.c. bells. Any extension not fully barred can answer by dialling 8. Alternatively, from one to four extensions may be selected to answer calls.

Tie Lines. If standard exchange-line circuits are used, outgoing and incoming calls are obtained as described in 'Outgoing Exchange Calls' and 'Incoming Exchange Calls'. If special tie-line circuits are used, calls can be dialled out and dialled in, no extensions being barred.

Optional Service Features

Message waiting; message registration: conference; trunk barring; 'extension busy' lamps; direct-access keycalling and staff location.

PABX Unit

This is a double-sided unit, enclosed at the front and rear by transparent, semi-rigid, non-flammable plastic panels, edged with strips of 'magnetic' rubber to hold them firmly by attraction against light metal supports; nylon studs in the panels ensure correct positioning. The supporting T-section cross-members are easily removable to allow access to the entire unit if necessary, but for general maintenance, panels are removed one at a time. A panel can be lifted in one hand and temporarily parked over another panel simply by placing the two in contact. Enclosure of the unit is completed by sheet metal sides, base and roof.

The exterior finish is opaline green enamel; the interior ironwork, apparatus covers and p.v.c.-insulated cables are cream. The equipment has a tropical finish. Connecting wires are p.v.c.-insulated.

Components are of standard BPO type and proven reliability. They include N30000 (BPO 3000) and N45000 (BPO 600) relays, heavy-duty line-finder uniselectors (BPO No. 2) and 100-outlet 2-motion selectors N46600 (BPO 4000). (BPO 2000 type 2-motion selectors can be supplied if ordered specially.)

A cross-connecting field is included in the unit, and the line and exchange sides of circuits can be isolated for testing.

Ringing and tone frequencies are generated by transistor-type oscillators, powered from the 50V exchange supply. These static devices require little maintenance and do not cause interference with radio signals.

The switching equipment provided for PABXs of up to 50 lines and over 50 lines respectively is as follows:

	Up to 50 Extensions	*Over 50 Extensions*
Connectors	7	10 max.
Line finders	1 per connector	2 per connector
Assistance finders	1	2
Exchange finders	1 per exchange line	2 per exchange line
Call-back selectors	1	2
Group switching circuit	–	1

The following common items are supplied for each exchange: (a) assistance and night-extension circuit; (b) ringing, tones, alarms, and pulse circuit; (c) marker circuit; (d) unit common services.

Cordless Switchboard

The design of the small two-tone grey switchboard accords with contemporary taste and facilitates maintenance. The metal front panel and internal rear equipment frame are both hinged on the metal base so that they can be opened, book fashion, when the ABS copolymer plastic drop-on cover is removed. Keys have wedge handles with tips of contrasting colour, to enable operated keys to be easily discerned.

A hundred lamps, arranged in four rows, are 'extension busy' lamps fitted only when specified (see illustration).

N24119A1T, the cordless switchboard with 'extension busy' lamps.

The upper row of double-throw keys and associated lamps are for exchange line, tie-line, manual extension, assistance and miscellaneous circuits; the lower row for key-sending, intrusion, etc.
Supervisory lamps are at the left of the dial, and alarm keys and lamps at top right.
Lamps can be removed without using an extractor.
The dial has standard numbering, a 2:1 break/make pulse ratio and a plastic finger plate.
A grey plug-in handset, with rocking armature receiver and grey braided extensible cord is provided.
An alternative attendant's switchboard is available, with similar facilities, but also including lamps (one per extension) to indicate busy condition.

Power Equipment

The working voltage is 45 to 55V (50V nominal). If a reliable a.c. mains supply is available, a battery eliminator (N22405B) may be used. It is designed for inputs of 100 to 125 or 200 to 250V, 40 to 100Hz, has a 10A output and mounts on a wall.
Alternatively, a 45Ah battery, with 5A charger and control unit, can be supplied.

Telephones

Plesseyphones (catalogue sheet 7159) or Etelphones (catalogue sheet 7145) are recommended for extension telephones. However, any telephone suitable for 2-wire-and-earth or 3-wire working may be used, provided it is equipped with a non-locking pressbutton and incorporates a dial with a 2:1 break/make ratio and pulsing speed of 10 p/s.

Ordering Information

When ordering, please quote PABX 20 + 100 N24398A1T and state capacity requirements. Also state the associated equipment items and corresponding code numbers from the 'Weights' table below, together with quantities required, and provide additional information 1 to 8 as appropriate.

Please note:

(a) The stock PABX unit is wired and equipped for 10 exchange lines, 50 extensions and 7 connectors.

(b) A 60ft (18.29m) length of p.v.c.-insulated cable is supplied to connect the cordless switchboard to the PABX unit.

Dimensions

Equipment Item	Height in	Height (mm)	Width in	Width (mm)	Depth in	Depth (mm)
20+100 PABX unit	84	2134	54	1372	24	610
10A battery eliminator	14¾	375	33	838	10½	267
Attendant's switchboard without lamps	19⅞	505	13 15/16	354	7 13/16	198
Attendant's switchboard with lamps	25⅞	657	15⅜	391	8 31/32	228

Weights

Equipment Item	Code No.	Net Weight lb	Net Weight (kg)	Shipment Weight lb	Shipment Weight (kg)
20+100 PABX fully equipped	N24398 A1T	2352	1068	Packed in four crates	
				858	389.1
				493	223.6
				407	184.6
				195	88.4
10A battery eliminator	N22405B	105	47.7	175	79.5
Attendant's cabinet without busy lamps	N24119A2T	23	10.4	108	49.0
Attendant's cabinet with busy lamps	N24119A1T	30	13.6	128	58.0
Auto desk telephone with pressbutton (Etelphone)	N1901	3¾	1·7	*Fifty telephones:	
				306	138·8
Auto wall telephone with pressbutton (Etelphone)	N1066	3¾	1·7	*Fifty telephones:	
				306	138·8
Auto desk telephone with pressbutton (Plesseyphone)	N2021	1¾	0·79	*Hundred telephones:	
				276	125·2

* multiple export pack

Notes

1 The type of public exchange to which the PABX is to be connected.

2 Any special capacity requirements, bearing in mind that extension-line circuits are provided in multiples of ten.

3 Tie lines (if any).

4 Colour and types of extension telephones.

5 Details of power requirements and of local mains voltage and frequency; also amount of inter-connecting cable required, in steel or p.v.c. conduit.

6 Line protectors, maintenance tools and spares required.

7 Barring digits for trunk-barring facility, if other than the standard 0 or 1.

8 The type of attendant's switchboard required, with or without 'extension busy' lamps.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

PLESSEY
Telecommunications

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Printed in England **Publication No. 7123** ZH1145/1M/7.70

Crossbar

20+100 PABX 'PB 100'

This newly developed private automatic branch exchange is a register-controlled crossbar system, providing improved service for installations requiring up to 20 external circuits and 100 internal extensions; external circuits may be of exchange-line classification exclusively, or any combination of exchange-line and private circuits.

Contrary to usual practice in exchanges of this size, the automatic switching equipment is accommodated in two cabinets instead of one, each with capacity for 10+50 lines. As a result, the new design can fulfil the PABX requirements of both small and medium-size organisations at lowest cost. Plug-in modules simplify installation work and subsequent extension up to single or double-cabinet capacity, and also facilitate removal and re-use of the equipment in different locations. The cabinets are made for back-to-wall mounting to conserve floor space and are equipped for easy mobility on site before being installed.

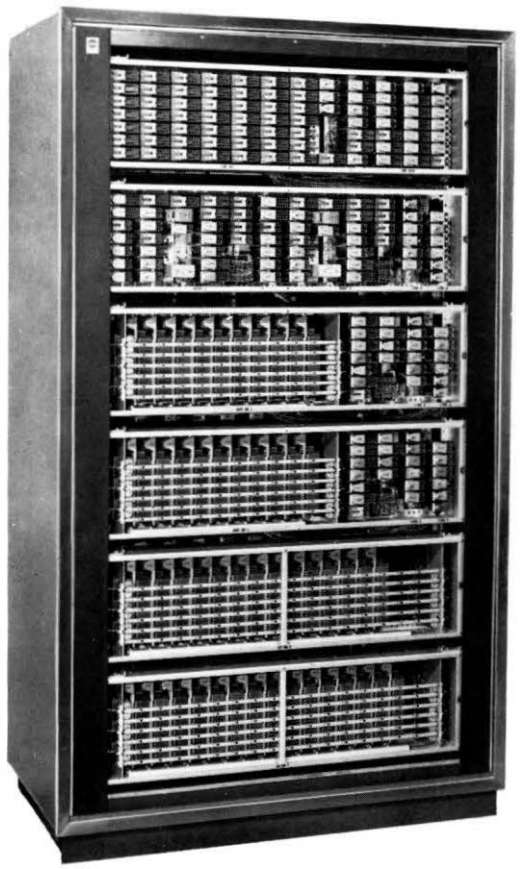
Attractive appearance characterises the overall exchange equipment, including the small, easy-to-operate switchboard for the PABX attendant. Colours and finishes are complementary, being selected to blend with modern office decor so that the complete exchange can be located satisfactorily adjacent to office furniture.

In both its forms the PABX employs simple 2-stage switching based on the well-tried Plessey 5005 crossbar switch. This uses precious-metal contacts, ensuring consistent high-quality transmission, while the short contact travel results in high speed, vibrationless, barely audible operation. Its simple relay-like structure also ensures maximum reliability with minimum mechanical wear.

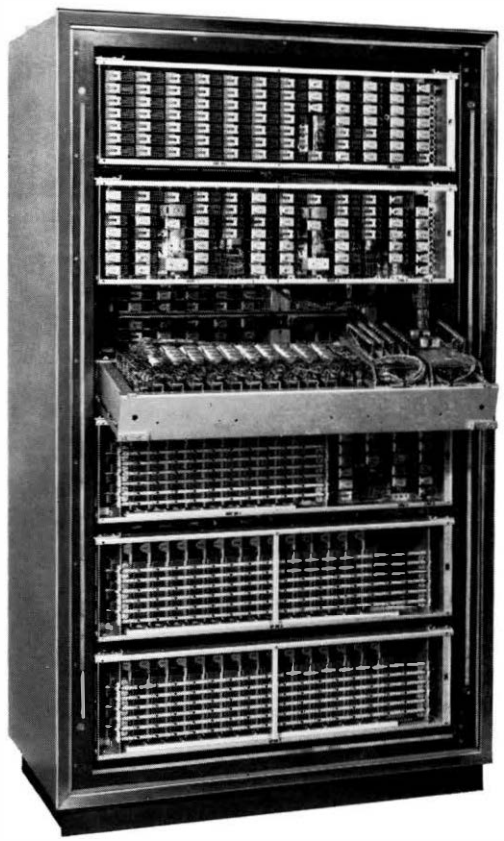
The exchange combines high traffic-handling capacity (0.15 erlang per extension) with an acceptable grade of service.

Numbering

The PABX provides full flexibility in numbering arrangements. By appropriate wire strapping, any one of 10 serial groups (100 to 199, 200 to 299 etc.) can be allocated to extensions, leaving the initial digit of each remaining group to be selected, as desired, for use as access codes to exchange lines, tie lines, attendant-assistance and night-service circuits.



General view of PABX unit



Crossbar-switch shelf lowered for inspection

Extensions can be connected without the need for consecutive internal-directory or equipment numbering.

Facilities

These are basically the same as those of earlier designed PABXs but are augmented by new arrangements to improve efficiency and convenience of service.

1 *Extension classification* is in four categories, each determined by appropriate wiring straps :

(a) *Unrestricted:* with full traffic facilities.

(b) *Trunk barred:* with full traffic facilities except dialled trunk calls (special trunk discrimination equipment is required).

(c) *Semi-restricted:* with full internal traffic facilities and able to receive incoming exchange calls. Outgoing exchange calls are made with the assistance of the PABX attendant.

(d) *Fully restricted:* debarred from originating or receiving exchange calls.

2 *Extension-to-extension calls* are unrestricted and dialled direct; connection is released when either party clears. Busy extensions are numerically displayed at the attendant's switchboard.

3 *Outgoing exchange calls* can be set up by the PABX attendant for any extension not fully restricted. Trunk-barred and unrestricted extensions can also make such calls directly by dialling an access digit, followed by the exchange subscriber's number (or instructing the distant operator if the exchange is manual).

4 *Incoming exchange calls* are received at the attendant's switchboard, digit keys being used to extend the call. After a call has been extended, all switchboard contact is automatically released from the connection. Busy exchange lines are visually displayed at the switchboard.

5 *Private-circuit calls* are obtained as in 3 and 4 above when standard exchange-line circuits are fitted for private-circuit application. If special private circuits (tie lines) are employed, calls can be dialled out and dialled in direct or via the attendant, no extension being barred.

6 *Discriminating ringing* indicates to an extension user whether an internal or an external call is awaiting answer.

7 *Trunk offering* enables the attendant to enter established connections; warning tone is given on line entry. After clear-down by the engaged parties, ringing is automatically applied to the wanted extension's line.

8 *Hold exchange line* by dialling digit 1, enables an enquiry call to be made to another extension in complete secrecy from the exchange-line caller. Alternatively, the originating extension can offer the exchange call to the called extension and transfer it by replacing the handset.

9 *Add-on conference* by repeating the digit 1 after an enquiry connection, the originating extension allows entry of the public-exchange caller to the enquiry connection, thus permitting 3-way conference.

10 *Attendant recall* on an exchange call is obtained by dialling digit 1 followed by the access digit allocated to assistance circuits.

11 *Group hunting* (optional) provided over a group of up to 10 numbers allocated to a group of extensions located in the same department or section ; numbers need not be consecutive.

12 *Night service* in two versions, under control of the attendant's switchboard :

(a) Automatic switching of incoming exchange calls to predetermined night extensions.

(b) Signalling of incoming calls at one or more separate bells placed at strategic points, and calls answered by any non-restricted extension by dialling an appropriate digit.

13 *Exchange-line service maintained* if mains failure occurs. Selected extensions (up to the number of exchange lines provided) have telephones with an in-built pressbutton for use during mains failure to gain access to an exchange-line.

Special Service Features

Dictation recording, message registration, message waiting, loudspeaking telephones with key-calling of selected lines, staff location and secretarial schemes. Also multi-frequency pressbutton "dial" telephones if parent public exchange is suitably equipped.

PABX Equipment Cabinets

The 20+100 PABX is accommodated in two floor-type cabinets A and B, intended for wall fixing. Both are identical in size and general appearance and capacity wired to accept add-on modules as requirements demand. System modules comprise fully wired crossbar-switch shelves and various relay sets which, after factory testing, can be packed and shipped as units ready for connection into the PABX.

The A and B cabinets together include provision for 10 local transmission relay groups (LTRGs) and 4 registers (6 LTRGs and 2 registers in the A cabinet and 4 LTRGs and 2 registers in the B cabinet).

Each equipment cabinet, excluding its front cover, is constructed in sheet and angle-section steel, carrying a dual smooth/texture stove-enamelled finish in hemp beige and loam brown. The overall colour scheme is completed by two lacquer-red resilient metal panels which clip vertically into stainless-steel edging strips to retain the front cover, this being composed entirely of clear, flame-retardant plastic. This simple clip-in cover arrangement affords quick access and convenient external viewing of the main switching equipment and ensures good mechanical protection and a dust-free interior.

Castors incorporated beneath each cabinet permit easy location within the office. Foot supports are also fitted, adjustable by hand; these enable the cabinets to be set plumb irrespective of floor irregularities, and also ensure complete PABX stability in combination with the integral wall-fixing lugs at the top of each cabinet.

The PABX switching equipment consists essentially of Plessey 5005 Crossbar switches in 10 and 16 bridge versions, together with newly developed high-reliability relays. Electronic circuits are used throughout for timing and pulse generation.

The crossbar switches are shelf-mounted on the front framework. Each shelf and its components are clearly identified by designation markings and can be swung forward and downwards to a self-locking position for inspection purposes. A similar degree of access is afforded to the rear equipment (comprising plug-in relay sets, fuse panel, battery jacks and,

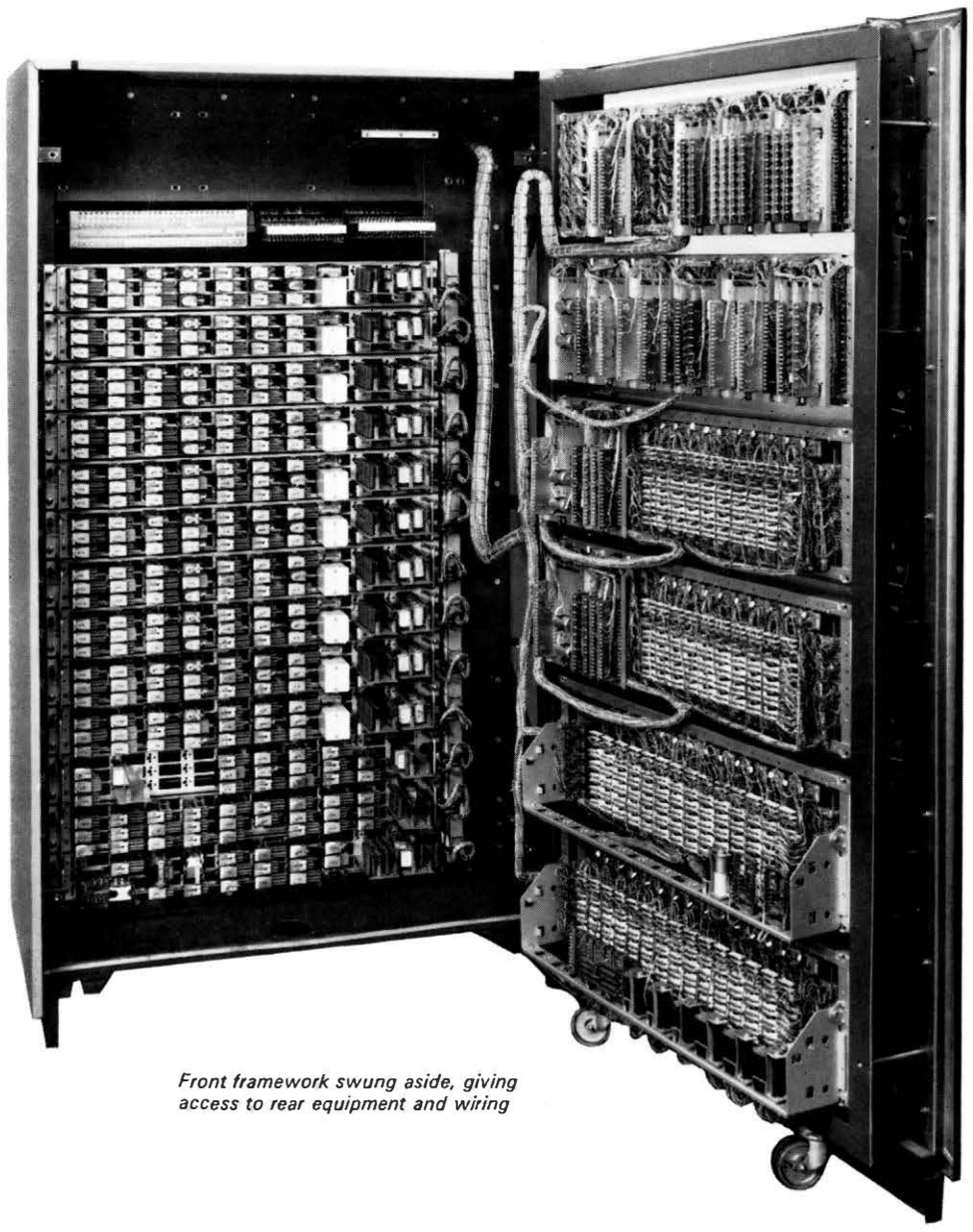
terminal strips for line and inter-cabinet connections) the front framework being hinged, and castor equipped for smooth opening on the release of four captive screws. Cable entry is provided at the top and bottom of each PABX cabinet.
All connecting wires to the line and inter-cabinet terminal strips have gun-wrapped solderless connections; p.v.c.-insulated wiring is used throughout and all equipment has full tropical finish.

Attendant's Switchboard

The attendant's switchboard is for use with double or single-cabinet versions of the PABX and has a matching colour scheme and finish. Its all-metal construction incorporates quick-access features, including a drop-on cover, clip-in hood, and hinged control panel. Control buttons with in-built supervisory lamps, contrasting colour tops, and simple press-to-release and non-locking actions, are used throughout, contributing to speed and efficiency and to the small size of the switchboard, comparable to that of a modern typewriter.
Ease of operation is further assisted by a pressbutton keyset, permitting rapid keying of extensions, a lightweight handset, and an illuminated display panel for ready identification of busy exchange lines, private circuits and extensions.
The rotary dial (used for public exchange calls only) has standard numbering and a 2:1 break/make ratio.

Ringing and Tones

The PABX can be equipped to provide either standard British Post Office or North American tones and periodicities. In each case the ringing and tone frequencies and the ringing current are generated by transistor-type oscillators powered from the 50V exchange supply. These static devices are virtually maintenance free and do not cause interference with radio signals.



Front framework swung aside, giving access to rear equipment and wiring

Power Equipment

The working voltage is 45-55V (50V nominal). If a reliable a.c. mains supply is available a wall-mounted battery eliminator can be supplied, designed for 100-125V, 200-250V, 40-100Hz input. Alternatively, a battery with charger and control unit can be provided.

Telephones

Plesseyphones (catalogue sheet 7159) or Etelphones (Catalogue sheet 7145) are recommended for extension use. However, any 2-wire auto telephone may be used, provided its dial has a 2:1 break/make ratio and pulsing speed of 10 pps. Auto telephones (3-wire) with single pressbuttons are required for extensions connected for continuing exchange-line service during mains failure.

Line Limits

Maximum extension-line loop (including the telephone) is 1000Ω at 50V.

Exchange and tie-line loop resistance may be up to 1000Ω depending upon the limits imposed by the remote exchange equipment.

Ordering Information

When ordering, please supply information 1 to 8 as appropriate.

1 Type of public exchange to which the PABX is to be connected.
2 Capacity requirements: auto extensions, exchange lines, tie-lines (if any).
3 Group-hunting requirements (if any).
4 Barring digits for any trunk barring required.
5 Type and colour of telephones.
6 Whether battery eliminator or battery and charger required.
7 Local mains voltage and frequency.
8 Special service features.

Dimensions and Weights

Equipment Item	Height in (mm)	Width in (mm)	Depth in (mm)	Nett weight lb (kg)
PABX cabinet (50 lines)	73 (1854)	42 (1067)	22 (559)	1050 (476·2)
Attendant's switchboard	7½ (191)	14¼ (362)	13½ (343)	23 (10·4)

Attendant's switchboard

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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Publication No. 7161/2

ZB3/500/1.73

PABX 3

This BPO-approved PABX is for use where the ultimate requirements are likely to exceed 100 extension lines. It is constructed on the self-contained unit principle to minimise cable costs and facilitate extension. The capacity is virtually unlimited. The switching scheme employs linefinders of heavy-duty uniselector type in conjunction with 2-motion group and final selectors. Floor-pattern cord switchboard sections as necessary are provided to deal primarily with incoming calls from the public exchange and from private exchanges over inter-PBX lines if required. The system may be used for a single exchange or for a main and satellite scheme having a central group of manual positions and a common numbering plan.

PABX 3 equipment can be supplied with standard or tropical finish; transparent p.v.c. enclosures can be fitted to the open type-racks on request. Racks and apparatus covers are cream enamelled, cables are sheathed in cream p.v.c. and connecting wires are p.v.c. insulated.

Exchange and inter-PBX line circuits can be arranged to meet all normal signalling conditions.

Maximum extension line loop resistance is 600 Ω excluding the telephone, but long-line equipment to extend this limit to 2000 Ω can be supplied. Exchange-line loop resistance may be up to 1000 Ω depending upon the limits imposed by the remote exchange equipment. Resistance limits for inter-PBX lines vary with the type of signalling employed. For example, the limit for a loop-disconnect auto/auto circuit terminating at a distant 50V exchange is 1200 Ω.

Numbering

3-digit, 4-digit or mixed 3- and 4-digit.

Level allocations:

Level 1—Spare;

Levels 2 to 8—Extensions and inter-PBX lines via second selectors if necessary;

Levels 9 and 0—Access to public exchange and PABX operator assistance as required.

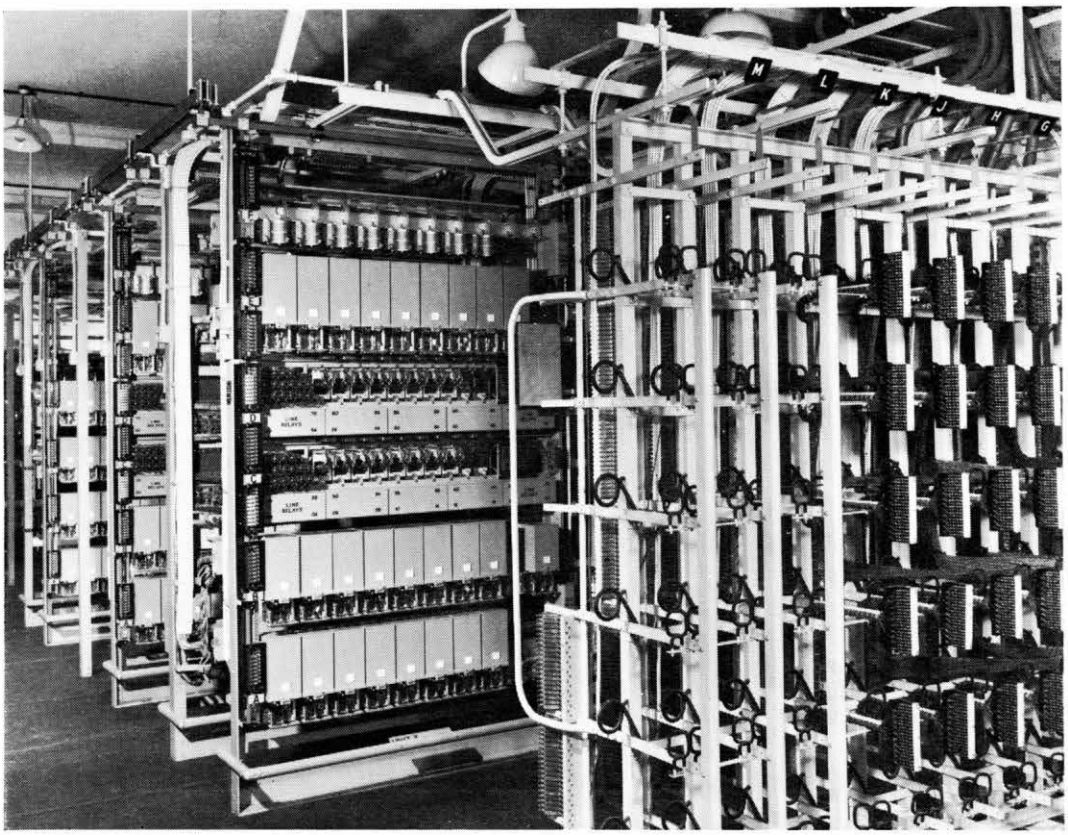
Main Facilities

Extension-to-extension calls are dialled direct.

Outgoing exchange calls are obtained by dialling the access digit, then the subscriber's number (or instructing the distant operator if the exchange is manual). Alternatively, calls may be set up by the PABX operator.

Incoming exchange calls are received at the switchboard.

Manual extensions may use auto



General view of 1000-line PABX with high-density traffic

circuits up to a total of five in each group of 50 auto extensions. Manual extensions are accessible by direct dialling from auto extensions or via the switchboard. Where a large number of manual extensions are required a separate circuit is available, which does not reduce the number of auto extensions.

Barred access denies public exchange access to particular extensions completely or partially, as required.

Inter-PBX line working can be arranged for manual/manual, auto/manual or auto/auto circuits.

Assistance is provided by the PABX operator, for whom extensions dial the required access digit.

Extension call lamps are provided according to the size of the exchange. Above 800 lines, or in smaller exchanges if preferred, assistance level relay sets, each with a jack and lamp appearance, are provided. On smaller exchanges lamp-per-line working is used.

Enquiry calls can be made by an extension engaged on an exchange call. A single depression of a press-button enables the extension to dial and secretly converse with another extension whilst the exchange line is held. A further depression of the button returns the original extension to the exchange line.

Operator recall is achieved by double depression of the press-button on exchange calls or single depression on manual inter-PBX calls.

Transfer is effected by the operator.

Trunk offering enables the PABX operator to enter established connections.

Free-line signalling gives automatic lamp indication of free exchange lines.

Night service is available in two versions:

1 Routing of incoming exchange calls to predetermined night extensions.
2 Receipt of calls at a night-service switchboard where each can be routed by the night-service operator dialling the required extension and connecting it through.

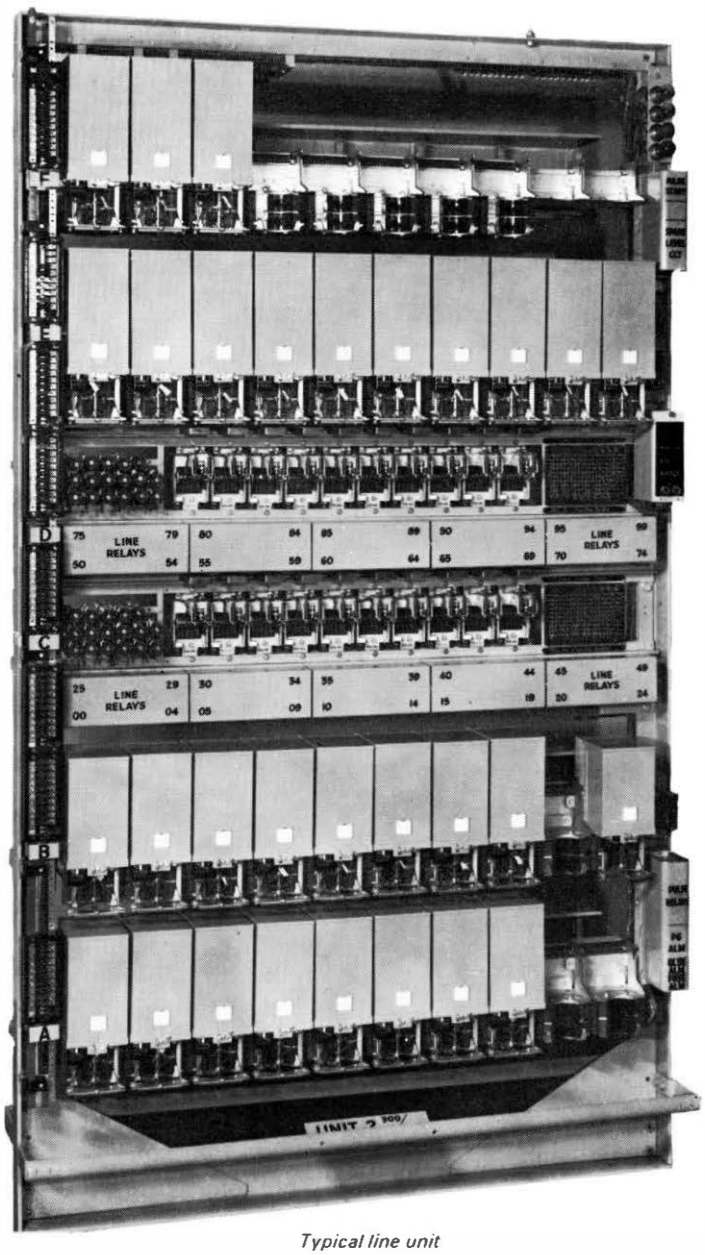
Equipment

Components are of standard BPO type and proven reliability. They include Type 3000 and Type 600 relays, Type 2 heavy-duty uniselectors and Type 2000, 100 outlet 2-motion selectors.

The equipment and layout for each exchange vary with its size and particular requirements. Switch quantities are normally calculated on a busy-hour grade of service of one lost call in 200, excepting calls to the switchboard.

The main distribution frame may be double-sided floor mounted or single-sided wall and floor mounted. It accommodates fuses, fuse dummies, test jacks, and also IDF-type connection strips if necessary.

The apparatus racks are of open type, supported by inter-connecting overhead ironwork which carries the cable. They are braced to a wall or ceiling. A clear height of 18in (457mm) is required above the racks for cabling.



Typical line unit

The line unit accommodates all the calling and switch equipment normally needed for two independent groups of 50 extensions. Grading facilities are provided on the group selector shelves. The unit illustrated has group selectors on shelves A and B, linefinders, line relays, and resistors for the two 50-line groups on shelves C and D, and final selectors on E and F. Enquiry selectors can be fitted on shelves A and B (10th position).
A separate multiple can be fitted on shelf F (positions 9 and 10) for incoming or enquiry selectors.

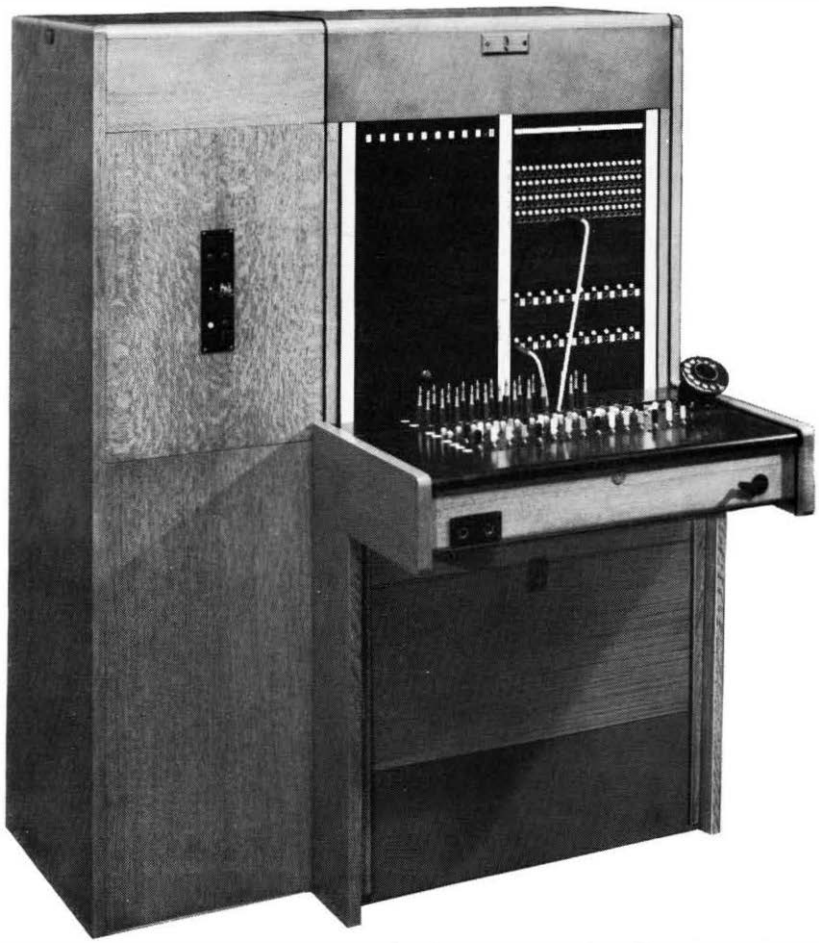
The group selector rack accommodates six shelves of 10 switches, which may include enquiry, incoming first or second selectors as required. Second selectors are necessary only for PABXs having a 4-digit numbering scheme.

The relay set rack accommodates jacked-in type relay sets for exchange line, assistance, inter-PBX, ringing, tone and pulse control, and other circuits.
A battery-driven dynamotor for generating the ringing, tone and pulse supplies is mounted at the bottom of the first rack. Wiring for a second machine with automatic changeover is provided.

A manual switchboard in standard steel-framed, 2-panel sections similar to that illustrated, is supplied for exchanges up to 1600 lines. Sections can be arranged in suite with single-panel 30° angle sections and a cable turning section. They have removable kicking panels and rear doors. Woodwork is normally oak relieved with grey Warerite facings. The normal arrangement is for a 4-panel multiple. Other arrangements are possible if more lines are required.
All extensions have a combined call-and-answer jack when lamp-per-line working is adopted, a calling lamp having only one appearance. 'O' level circuits, exchange lines and inter-PBX lines can have ancillary lamps, for which a 6V a.c. supply is provided. Free-line signalling can be given for exchange and inter-PBX lines. With lamp-per-line working, indication is given of any extension giving false calling condition such as misplaced hand-set.
There is capacity for 15 cord circuits per section, the relays for which are on jack-in mountings; facilities for cord testing are included.
A hand generator, lightweight headset and a chair for the operator are supplied. Jacks can be provided for connecting selected extensions to the exchange lines at night (see alternative arrangement below).
Night-service switchboard. This is a cordless switchboard suitable for use where night traffic is heavy. It consists of an oak cabinet equipped with a forest-green stove-enamel control panel, four connecting circuits, and a multi-way cord with plug and socket to allow easy removal of the switchboard when not in use.

Power Equipment

The working voltage is normally 50V. For loads over 100A a duplicate battery float system is used. Below 100A loading a single battery float system is normally supplied, but a duplicate battery arrangement can be provided for greater security or for quick re-charging after supply failure. Equipment is tailored to the requirements of particular exchanges.
With a single battery float system, the capacity of the battery supplied depends upon the period of reserve required in case of supply failure. This period is normally 24 hours. The 24-cell battery is 'floated' across the closely regulated output of an automatic float-charge rectifier unit. The output of the charging unit is sufficient to cover the busy hour load and thus the battery is maintained in a fully charged condition. Voltage regulation of the charging unit is by transductor control and the output is smoothed to CCITT standards.



One switchboard position with cable turning section

Telephones

Etelphones (catalogue sheet 7145) are recommended for extension telephones. However, any telephone equipped with a non-locking pressbutton and incorporating a dial with a 2:1 break/make ratio and pulsing speed of 10 p/s may be used.

Accommodation

Because of the many variable factors it is not possible to state the accommodation required for exchanges of any specified number of lines, but a typical layout is shown for a PABX of average size. The standard distances between racks are indicated, the wiring sides of each pair of suites being adjacent.

Economy of floor space is a feature of the design of PABX 3 equipment racks.

Ordering Information

When ordering please provide information 1 to 6 as appropriate:

1 Initial and ultimate requirements.

2 Special facilities required; also miscellaneous items such as tools, spares and loud-ringing bells.

3 Local mains voltage and frequency.

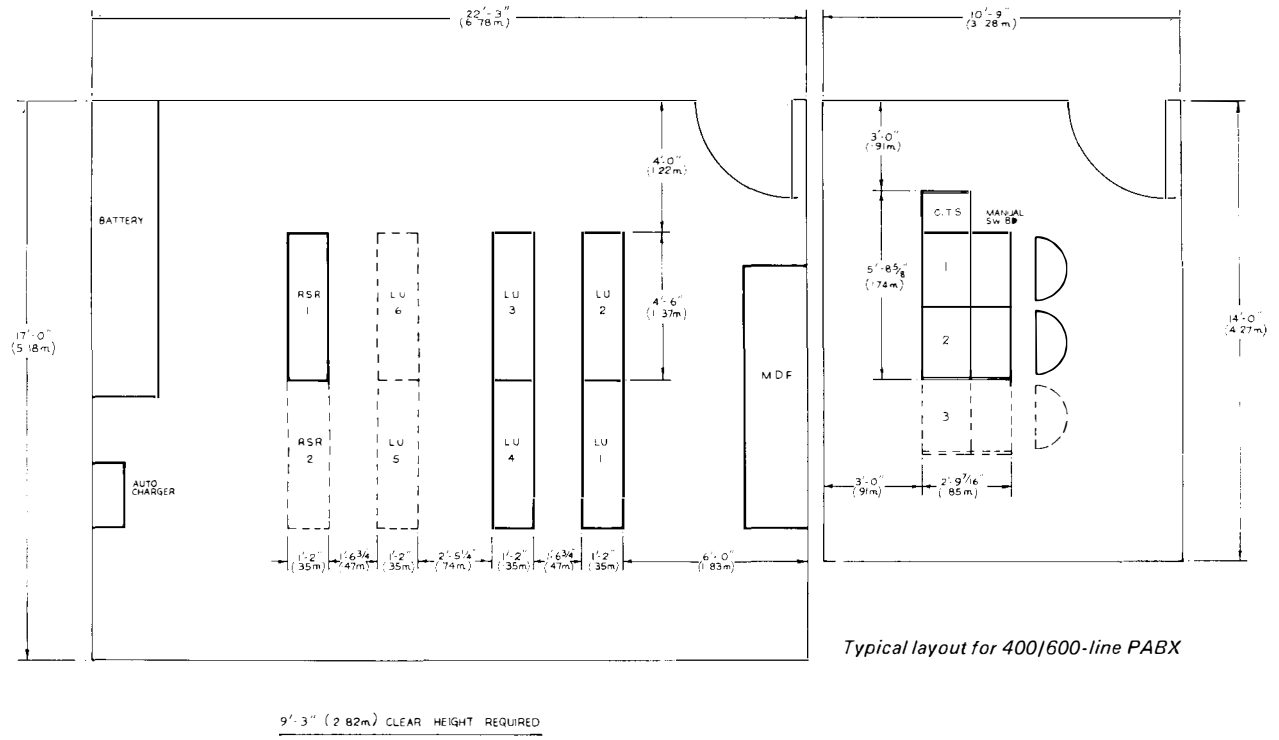
4 Number of extension telephones required.

5 Dimensions of proposed apparatus room, including clear height.

6 Exchange requirements; also existing equipment and units (if any).

Dimensions

Equipment Item	Height inches (mm)	Width inches (mm)	Depth inches (mm)
MDF	81¼ (2064)	—	—
Apparatus racks	93 (2362)	54 (1372)	14 (356)
Manual board section	51 (1295)	26 (660)	33½ (851)



Typical layout for 400/600-line PABX

9'-3" (2 82m) CLEAR HEIGHT REQUIRED

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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PABX ET4

The ET4 private automatic branch exchange is an attractive alternative to the PABX 3 (catalogue sheet 7124). It operates on the step-by-step principle and is for use when more than 50 extensions are required. As there is no fundamental limit to the capacity of the exchange, initial requirements may be readily expanded to any desired number of extensions, exchange or inter-PBX lines and manual positions. The manual positions are of console type and use lamp signalling and pressbutton control throughout.

The system may be used for a single exchange or for a main and satellite scheme having a central group of manual positions and a common numbering plan.

Exchange and inter-PBX circuits can be arranged to meet all normal signalling requirements.

Numbering

A 3-, 4-, or mixed 3- and 4-digit numbering scheme can be used. Selector levels are normally allocated:

Level 1—spare;

Levels 2 to 8—extensions and inter-PBX lines via second selectors if necessary; also night service;

Levels 9 and 0—access to public exchange, and PABX-operator assistance as required.

Facilities

Exchange

Extension-to-extension calls dialled direct.

Outgoing exchange calls obtained by dialling the access digit, then the subscriber's number (or instructing the distant operator if the exchange is manual). Alternatively, calls may be set up by the PABX operator.

Incoming exchange calls received at the switchboard. Ring-when-free conditions are applied if wanted extension engaged.

Barred access to exchange lines applied completely or partially to selected extensions.

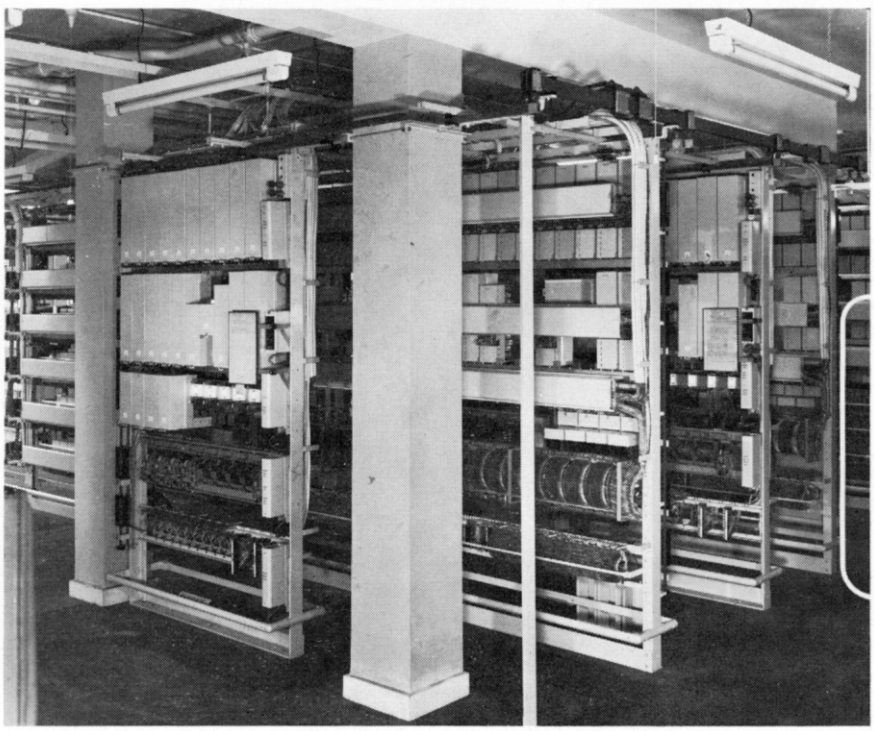
Right-of-way for selected extensions on (a) local calls and (b) exchange calls. Note: (b) is not permissible in the UK.

Differing ringing signals on incoming exchange and extension calls. Also differing busy tones to indicate whether an extension is engaged on an exchange or an extension call.

Secrecy on all calls with intrusion tone given when a right-of-way extension or the PABX operator breaks into an established connection.

Inter-PBX working arranged for manual/manual, auto/manual and auto/auto circuits.

Assistance from the PABX operator by dialling access digit.



Type ET4 apparatus racks in a 1500-line exchange

Enquiry calls made to any extension during an exchange call by single operation of instrument button and dialling wanted extension's number. A repeat button operation returns the original extension to the exchange line.

Automatic call transfer to any non-barred extension or the PABX operator; after set-up of the enquiry connection, transfer is immediate on replacement of handset.

Serial-call working (to customer order only) ensures that the outside caller is always reverted to the PABX operator after each completed conversation, enabling the caller to be connected to a number of extensions in succession.

Night service in two versions:

(a) Automatic switching of incoming exchange calls to predetermined extensions.

(b) Signalling of incoming calls at one or more separate bells placed at strategic points, and calls answered by any non-restricted extension by dialling an appropriate digit.

Switchboard

Separate lamp signals for incoming calls, operator recall and different circuit groups.

Waiting-call display indicates the number of unanswered exchange calls.

Automatic call parking at any stage during an attempt to set up a connection.

Display of exchange or inter-PBX route and the number of the circuit to which the PABX operator is connected.

Connecting circuits normally used only during call set-up, but can be used for call duration.

Lamp and tone supervisory signals including visual indication of type of call in progress when a busy extension is keyed.

Keysender or dial for originating any call.

Extension of alarms to switchboard.

Automatic call concentration as positions are vacated, and automatic night switching when all positions are unstaffed.

Exchange Equipment

This is mounted on open-type racks which are supported by overhead ironwork and braced to a ceiling or wall. The racks have a standard height of 93in (2362mm) and require an upper clearance of not less than 18in (457mm) for cabling purposes. If preferred, the racks may be totally enclosed by dustproof transparent panels held in position on a rack frame by magnetic attraction.

BPO-approved components are used throughout, and include major and minor relays (Types 3000 and 600), heavy-duty uniselectors (Type 2) and 100-outlet 2-motion selectors (Type 2000).

Switch quantities are normally calculated on a grade of service of one lost call in 200 at the busy hour, excepting calls to the switchboard.

The line rack accommodates 100 extension line circuits, 20 line-finders and 20 final selectors.

The group selector rack houses up to 60 selectors (1st, 2nd and call-back types) and also incorporates grading facilities.

The alarm equipment rack houses ringing equipment and alarm and miscellaneous circuits. Standby pulse relay sets are provided for installations of more than 100 lines, and a duplicate ringing machine with automatic changeover where the number of lines exceeds 400. This duplicate equipment can be provided for smaller exchanges if specified.

The exchange-line and position equipment rack has capacity for 14 exchange-line circuits, eight connecting circuits, night service, outgoing auto 'O' level and other miscellaneous circuits. Supplementary relay-set racks may be required for exchange direct-access, and inter-PBX relay sets.

The main distribution frame may be double-sided floor mounted, or single-sided wall and floor mounted. It accommodates fuses, fuse dummies, test jacks, and also IDF-type connection strips if necessary.

Manual Switchboard

This can consist of one console, or several consoles arranged in open

Manual switchboard

single file, back-to-back, or against a wall; a cable turning section is not required.
The console woodwork is light oak, and the plinth and writing shelf are faced respectively with black and grey Warerite. The steel control panel, with its lamps and keys arranged to facilitate speedy operation, is matt-finished in dark green. Its front is hinged, giving full access to all internal apparatus.
The control panel includes a waiting-calls meter for registering a maximum of ten incoming exchange calls, and three line-identification indicators, the particular number and letters being illuminated when the display key is pressed.
At the top left are alarm lamps and keys. Below these are seven columns of red (answer) and white (outgoing) buttons and lamps, each column being associated with a particular class of call, such as enquiry, incoming exchange, or operator recall. The bottom horizontal row of press-button keys in this group are controls common to the position and, like all other common keys, have black tops. Each of the eight columns of keys and lamps in the centre is associated with a connecting circuit. On the right, beside the dial, are the key-sender control keys which have black tops.
One operator's lightweight headset is supplied for each position. A chair is not supplied unless ordered. A supervisor's desk can be provided if necessary.

Telephones

Etelphones (catalogue sheet 7145) are recommended for extension telephones. However, any telephone may be used provided it is equipped with a non-locking press-button and incorporates a dial with a 2:1 break/make ratio and pulsing speed of 10 p/s.

Power Equipment

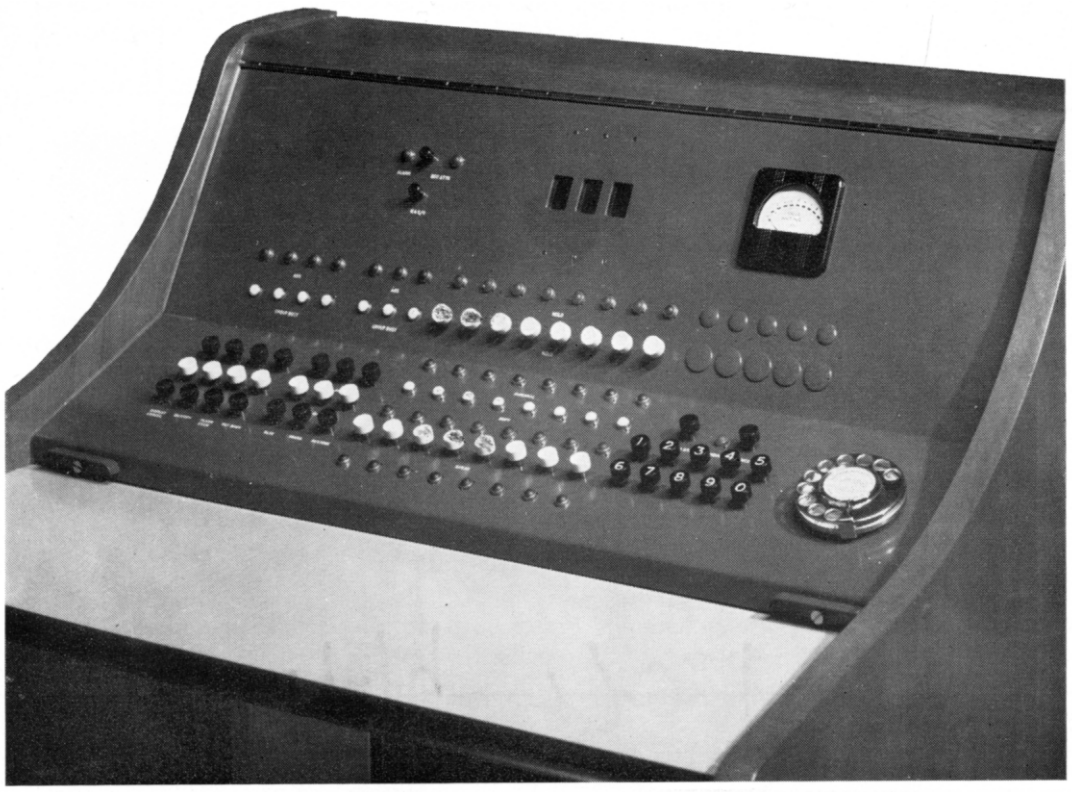
The working voltage is normally 50V. For loads over 100A (i.e. exchanges with 800 extensions approx.) a duplicate battery float system is used. Below 100A loading, a single battery float system is normally supplied, but a duplicate battery system can be provided for greater security or quick recharging after supply failure. Equipment provision is tailored to the requirements of each exchange.
With a single battery float system, the choice of battery capacity depends upon the period of reserve supply required in the event of mains failure. This period is normally 24 hours. The 24-cell battery is 'floated' across the closely regulated output of an automatic float-charge rectifier unit. Voltage regulation of the charging unit is by transductor control, and the output is smoothed to CCITT standard.

Line Limits

Maximum extension line loop resistance is 600Ω, excluding the telephone, but may be extended to 2000Ω by long-line equipment. Exchange-line loop resistance may be up to 1000Ω, depending upon the limits imposed by the remote exchange equipment. Inter-PBX line limits vary with the type of signalling employed; for example, a loop-disconnect auto/auto circuit to a 50V exchange is limited to 1200Ω.

Accommodation

Because of variable factors, it is not possible to state the accommodation required for exchanges of any specified number of lines, but a typical layout is shown for a PABX serving 200/400 extensions.



Switchboard control panel

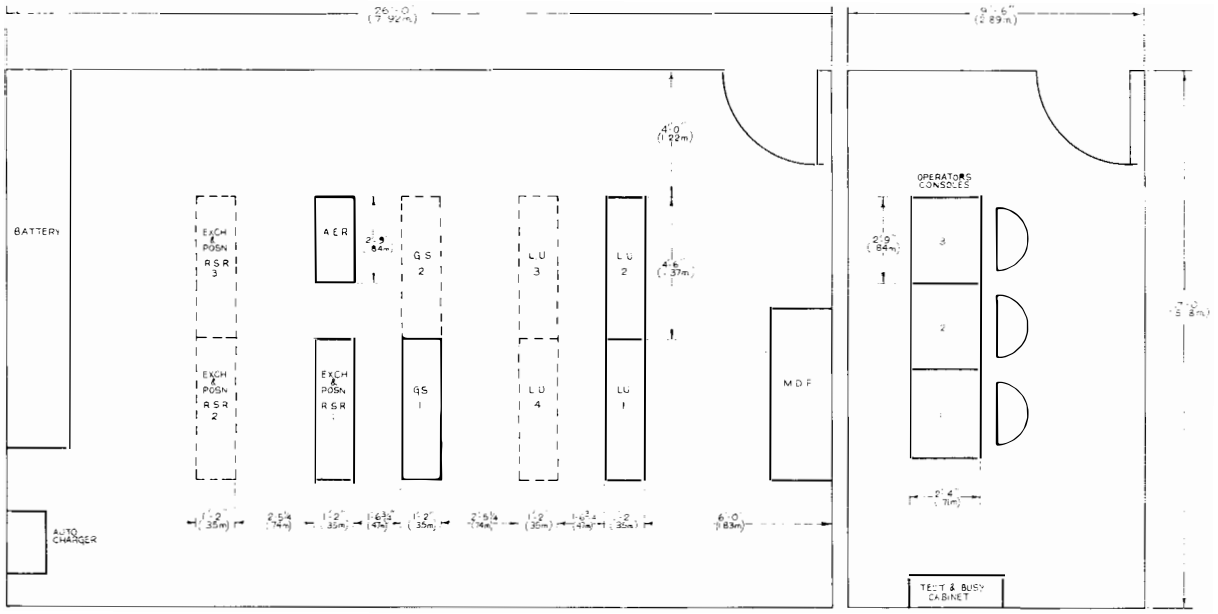
Ordering Information

When ordering please provide information 1 to 6 as appropriate :

1 Initial and ultimate requirements.
2 Special facilities required, and miscellaneous items such as tools, spares, and loud-ringing bells.
3 Local mains voltage and frequency.
4 Number of extension telephones required.
5 Dimensions of proposed apparatus room, including clear height.
6 Exchange requirements, and existing equipment and units (if any).

Dimensions

Equipment Item	Height inches	Height (mm)	Width inches	Width (mm)	Depth inches	Depth (mm)
MDF	81¼	(2064)	—		—	
Alarm equipment rack	93	(2362)	33	(838)	14	(356)
Other apparatus racks	93	(2362)	54	(1372)	14	(356)
Switchboard console	42	(1067)	33	(838)	28	(711)



Typical floor plan for 200/400-line PABX

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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ZH1148/2k/5.71/S

PLESSEY TELECOMMUNICATIONS

Private Manual Branch Exchanges

PMBX 3

Desk top

Cord-type PMBX 7 + 40/50

This private manual branch exchange brings a new dimension to the field of PMBX design. Sturdily constructed, yet superbly styled to complement the most luxurious surroundings in offices and other business premises, it employs a new Plessey component development – the cord-storage cassette – to present desk operation with cord-switching simplicity. Matching this unique feature is the switchboard's capability to accommodate a line capacity outside the practical or economic limits of conventional desk designs. Seven exchange lines are catered for, together with 10 cord circuits, and a basic 40 extensions, which may be increased to 50 if needed. Lamp signalling is employed throughout.

Cord-storage Cassette

The cassette is provided on the basis of two per cord circuit and consists essentially of a cord-carrying polycarbonate spring-loaded drum rotating within a nylon housing. The cord occupies $3\frac{1}{2}$ turns of the drum in the resting position, giving a total extended length of cord outside the plug-shelf of 2ft. Tension is the minimum for quick, reliable retraction, and cord life is high due to a reduction of both friction and cord flexure (each portion is flexed only twice per call, as against four times with pulley weights). Cassettes are retained by a single screw, allowing quick installation of a new unit when a cord becomes faulty or worn.

Switchboard Construction

The compactness of the cord storage has permitted the same freedom in styling as would be possible in a key-type design. The switchboard occupies small space, and is contained in an attractive walnut-veneered cabinet constructed in resin-bonded plywood. The plug-shelf, inclined at the optimum angle for ease of operation, is of sheet steel, finished in a durable dark blue stove enamel.

General Features

Lamp strips, mounted immediately above the relevant jacks, are fitted

Switchboard Type N 171.

with new type square lenses giving high-level uniform illumination. Ancillary jacks for ringing-supply test and cord-test are provided; a neon lamp is associated with the former. The cord-test facility utilizes the inserted plug's supervisory lamp as a fault indicator. A fuse alarm lamp is fitted adjacent to the ringing-supply neon, and the common-calling alarm pilot lamp is positioned centrally beneath the jack field.

The jack strips used throughout are of a demountable design, enabling individual worn jacks to be removed without disturbing others in the strip.

"Call" and "answer" supervisory lamps, and two similarly associated keys "speak/ring call" and "dial/ring back" are provided on each cord circuit.

Keys grouped at the left of the shelf provide for night service, buzzer cut-off, and changeover from the built-in transistor ringing generator to an external source when available.

The raising of the plugshelf on to its strut support gives ready access to wiring and components beneath, and does not require the breaking down of existing connections. Further calls can, in fact, be handled.

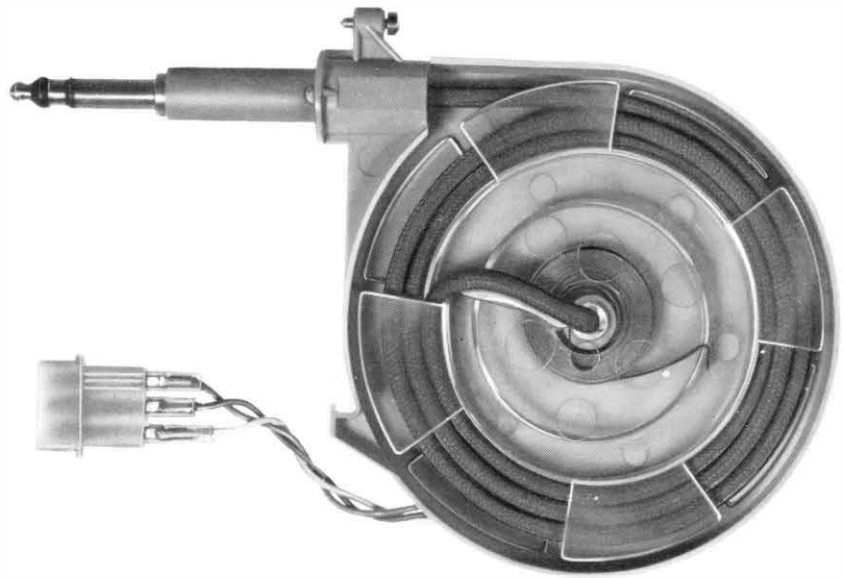
Relays are Type 3000, mounted in detachable vertical strips. Access is via the rear door which also serves to mount a fuse panel incorporating moulded alarm-type fuses.

An elephant-grey operator's handset, supported on a fixed horizontal cradle, is provided at the side of the switchboard, and connects into the circuit via the jack below the front edge of the plugshelf. In addition, a matching lightweight headset can be supplied.

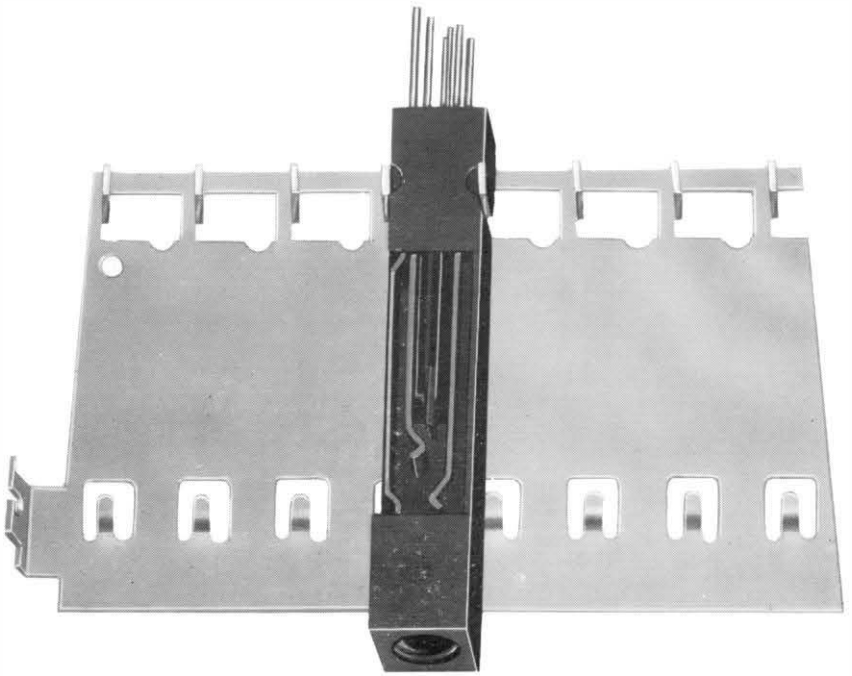
Operating Features

As is conventional, exchange calling lamps glow continuously on incoming calls until the answer plug is inserted, and extension lamps remain under control of the calling - instrument cradle - switch until answer.

Cord circuits apply an automatic hold to calling exchange lines when the "speak" key is released; the hold is maintained until the called extension answers. At termi-



The cord-storage cassette.



Demountable jack in position, ready for locking-in on metal carrier plate.

nation, both supervisory lamps glow when the extension replaces his handset—an action that immediately releases the exchange equipment. The effectively metallic plug-to-plug connection, which provides for this direct-clearing feature, also permits extensions to dial their own calls if desired.

On calls between extensions, the associated supervisory lamp glows as each extension clears.

During night service, selected extensions are connected to exchange lines, using cords 1 to 7 as required. Power is not disconnected from the board; calls from other extensions can still be dealt with as far as available cord circuits (8 to 10) and exchange lines permit.

Circuit Features

The switchboard uses simplified but efficient circuit arrangements for cost economy and low fault liability. Extension lines are 2-wire, calling lamps being energised directly in series with the instrument loops. Throughout the prescribed loop resistance for extension lines an adequate level of lamp illumination is maintained by circuit and lamp characteristics, which have eliminated the need for signalling relays. Similarly, extension-to-extension transmission performance is kept acceptably uniform, both lines being d.c. fed in parallel from a simple form of transmission bridge. On exchange-to-extension calls, part of the bridge acts as the exchange holding element prior to answering by the extension. During conversation the bridge is isolated, and the extension receives feed current from the exchange.

Line Limits

Extension loop resistances of up to 500Ω are permissible, provided the combined resistance of the exchange and the extension line does not exceed 1000Ω.

Power Supplies

Operating voltage is 50V d.c. (tolerance ±5V), with a peak current consumption of 1·5A. The supply will normally be mains-derived, with a float battery if security of service is essential. Exchange service can be maintained to selected extensions during supply failure by use of the night-extension facility.

Dimensions

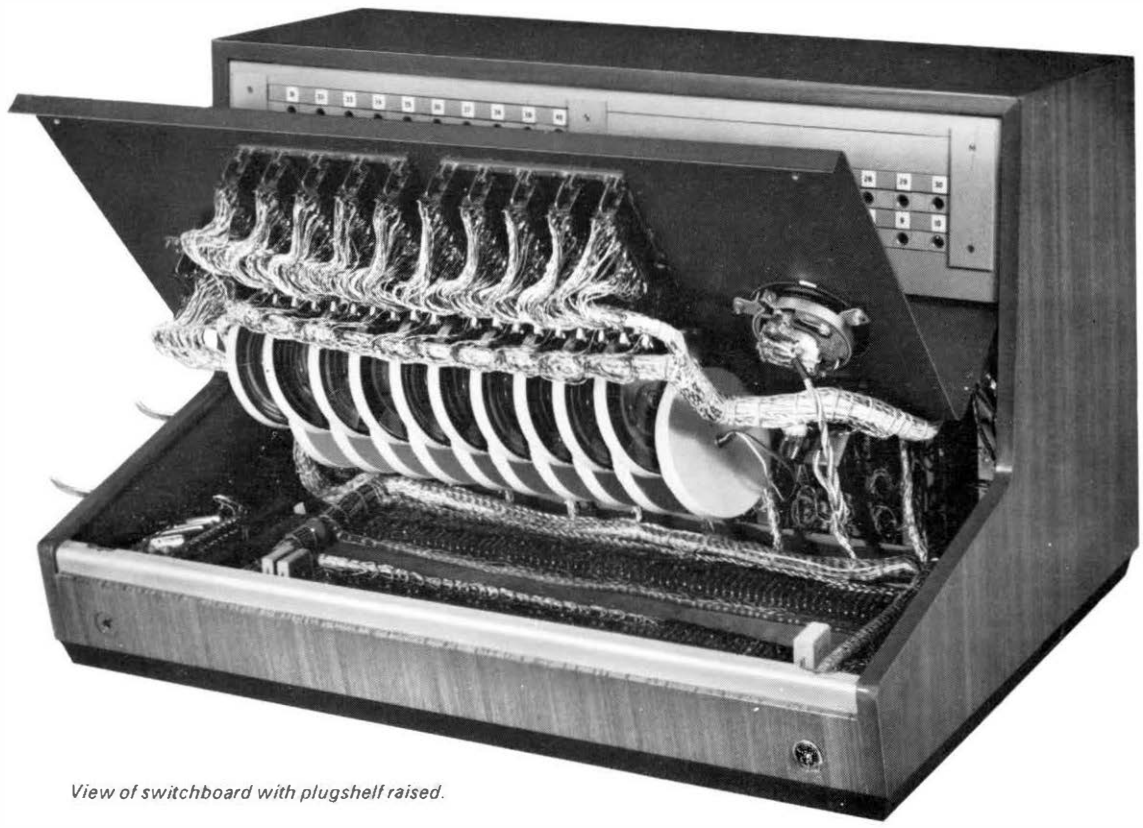
Height: 15¾in (399mm)
Width: 25½in (648mm)
Depth: 18⅞in (479mm)

Weights (approx.)

1 Switchboard: 108lb (48·9kg) net.
1 Switchboard, export packed: 168lb (76·2kg).

Ordering Information

When ordering, please state "switchboard Type N 171", and also "lightweight headset Type N9700H3T", if required.



View of switchboard with plugshelf raised.

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Printed in England **Publication No. 7133** ZH1155/2k/5.71/S

CB

2 + 4 or 3 + 9 cordless PMBX, indicator signalling

with auto or c.b. exchange lines

This compact switchboard, equipped for 2+4 (two exchange lines plus four internal extensions) or 3+9 lines, occupies no more space than a typewriter. It has a sloping front to afford maximum visibility and convenience for operating. The styling is attractive and the colour two-tone grey. Accessibility for maintenance is a feature of the design.

Facilities

1 Positive supervision.
2 Overcall (provided on type N122A only) to allow incoming calls to be answered when all connecting circuits are engaged.
3 Hold exchange.
4 Night extension.
5 Audible alarm.
6 Through dialling and through clearing.

Construction and Finish

The french-grey switchboard cover is a one-piece moulding of a durable copolymer plastic. It drops easily into position and is firmly retained by its leading edge beneath the front of the elephant-grey face panel, and by two screws in the rear of the baseplate. Removal of the cover exposes a 3-section chassis which can be opened book-fashion to permit inspection of wiring and components. Each vertical row of keys is removable as a unit.
When the switchboard is for connection to a c.b. exchange, the dial is replaced by a dummy. The equipment has full tropical finish, i.e. coils are impregnated and metal parts specially finished.
Wire conductors are insulated with p.v.c., which is moisture-proof and not subject to fungoid growth or attack by insects. The handset cord has a p.v.c. sheath, as well as p.v.c. insulation on the conductors.

Apparatus

Keys are N9300 miniature type, with wedge handles having inserts of contrasting colours in the tips so that an operated key is instantly discernible.
Totally enclosed twin-shutter miniature indicators are used; when operated, they reveal a white shield behind a green (extension lines) or red (exchange lines) number. Extension-line indicators Type N4831 are non-locking and self-restoring. The exchange-line indicators Type N4832 operate and lock to ringing current, and are restored by pressing down a projection at the top of the plastic front cover.
The dial has standard numbering (i.e. 1 to 0), a 2:1 break/make pulse ratio, and a plastic finger plate. The hand generator is of the rotating-magnet type, but this can be replaced or supplemented by a transistor ringing-current generator with associated ring-start facility.
A modern lightweight plug-in handset with rocking-armature receiver and coiled cord is included, but can be replaced or supplemented by a lightweight, plug-in headset if specially ordered. Also included are an alarm buzzer and cut-off key.
An internal terminal field permits direct termination of incoming lines. Alternatively, a flexible connecting cord with desk terminal block can be supplied.

The 2 + 4 switchboard with three connecting circuits

A miniature glass fuse is fitted at the rear of the base and can be replaced without removing the switchboard cover.

Power Details

Nominal operating voltage: 24V d.c., normally provided by a mains-operated 1A power unit. Alternatively, storage batteries with charging equipment can be supplied, if preferred. Busy hour current drain: 0·4A for 6-line, 0·6A for 12-line board.

Extension Telephones

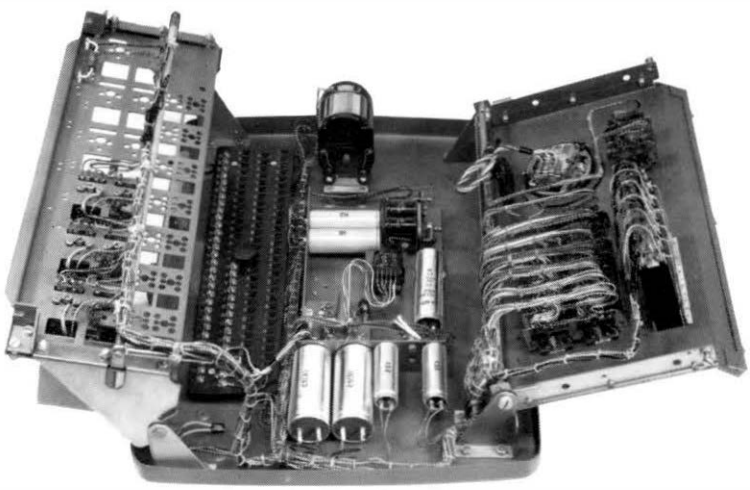
Etelphones (catalogue sheet 7145) or Plesseyphones (catalogue sheet 7159) are recommended, offering high transmission performance over extension-to-exchange loops of up to 1000Ω.

Dimensions (Casework)

Width: 21 5/16in (541mm)
Height: 7 3/4in (196mm)
Depth: 14in (355mm)

Weights (approx.)

1 Sw/bd N121A 32lb (14·5kg) net
1 Sw/bd N122A 40lb (18·1kg) net
6 Sw/bds N121A multiple export pack 300lb (136·1kg)
6 Sw/bds N122A multiple export pack 350lb (158·8kg)

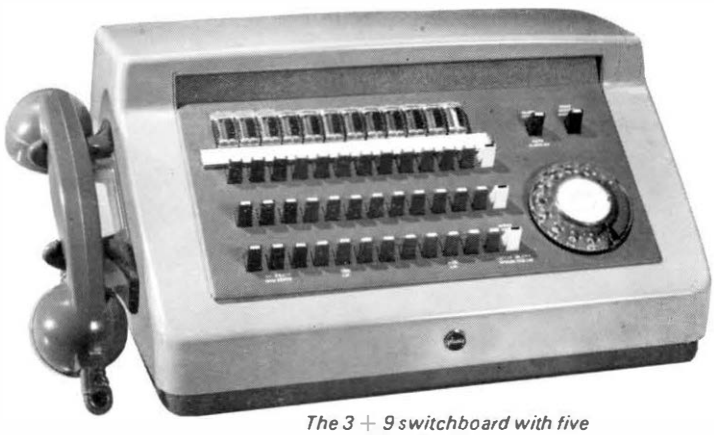


Open for maintenance

Ordering Information

When ordering, please supply the following information 1 to 7 as appropriate.

1 Switchboard 2 + 4 type N121A or switchboard 3 + 9 type N122A.
2 Auto or c.b. working. If former, state dial speed, pulse ratio and dial numbering if other than standard.
3 Quantity, colour, and type of extension telephones.
4 Operator's headset, transistor ringing unit, and flexible connecting cord with desk block, as required.
5 Power unit or storage batteries with charging unit.
6 State local mains voltage and frequency.
7 Standard or tropical finish.



The 3 + 9 switchboard with five connecting circuits

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Printed in England Publication No. 7127/1 ZH193/1M/7.71/SR

CB

2 + 6 cordless PMBX, lamp signalling

with auto or c.b. exchange lines

This private manual branch exchange switchboard with capacity for two exchange lines, six extensions and three connecting circuits has been designed in accordance with modern needs. Compared with earlier types of switchboard, it offers the attractive combination of improved facilities and compact design, both features having been obtained largely through the use of miniature keys and 4-wire extension lines. The switchboard operates from a 50V supply and its physical design features are similar to the 3 + 12 and 4 + 18 types in the cordless PMBX range.

Up to half the extension line circuits can be converted to 2-wire working by the use of wall-mounted auxiliary relay units of which there are five types for:

1 Long extension lines.
2 Short- and medium-distance private wires, tie lines and PBX junctions.
3 Long-distance private wires, tie lines and PBX junctions.
4 Medium - distance lines to PABX.
5 Long-distance lines to PABX.

Construction and Finish

The switchboard is in two-tone grey with matching Etelphone as the operator's instrument. The lift-off switchboard cover is a one-piece moulding made of impact-resisting light-grey plastic, whilst the plastic-faced metal equipment panel and the metal base are elephant grey. The front and the rear equipment mountings hinged on the base can be opened book fashion for maintenance as shown in the illustration overleaf.

The switchboard is fully tropicalized and uses p.v.c.-insulated wire throughout.

Apparatus

Keys are miniature type N9300 with ivory-coloured wedge handles tipped with inserts of contrasting colours to assist accurate operating. The lamps are behind a lens strip held by clips at the ends. When this strip is removed, the lamp-jack assembly can be pulled forward after releasing its fixing screws. Relays are Types N45000 (BPO 600) and N30000 (BPO 3000) protected by strip covers.

An internal terminal field permits direct termination of incoming lines. Alternatively, for plug-in switchboard connection, a 6ft (1·83m) flexible cord with matching plug can be supplied, together with an associated line jack.

At installations where no source of power ringing exists, a wall-mounted ringing converter, operating from 200-250V, 50Hz a.c. mains, can be supplied. Alternatively, a wall-mounted transistor ringing unit can be supplied.

General view of switchboard

Facilities

1 Lamp signalling on all lines.
2 Individual clearing signals on extension-to-extension calls.
3 Secretarial hold, enabling the operator to hold the exchange and consult an extension without being overheard.
4 Pressbutton operator recall on extension and exchange calls.
5 Night service.
6 Power-unit operation with mains failure safeguards.
7 Extension-to-exchange line limit of 1000Ω, or 900Ω if 4-wire/2-wire auxiliary unit is used.
8 Connection of private circuits and inter-switchboard circuits without modification to the permanent wiring of the switchboard.

Power Details

The required 50V d.c. supply is usually derived from the a.c. mains via a battery eliminator.
Full load current drain: 1A without auxiliary unit, 2A with auxiliary unit.

Extension Telephones

These are Plesseyphones (catalogue sheet 7159) or Etelphones (catalogue sheet 7145), arranged for use with the switchboard 4-wire lines. For auto working, dials are adjusted to transmit 10 pps with a 2:1 break/make ratio, and have standard numbering (i.e. 1 to 0).

Switchboard Dimensions

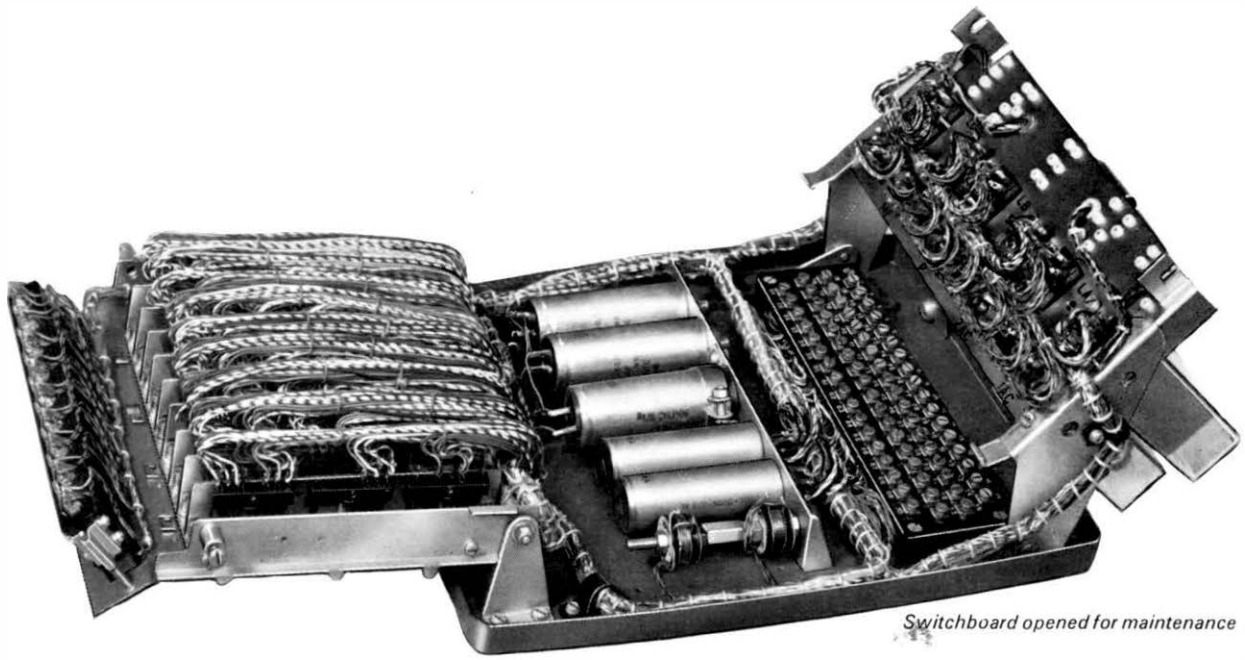
Height: 6⅛in (155mm)
Width: 9½in (241mm)
Depth: 11in (279mm)

Weights (approx.)

1 Switchboard: 12lb (5·4kg) net.
1 Switchboard (crated) 24lb (10·9kg).
20 Switchboards (multiple export pack) 392lb (177·8kg).

Ordering Information

When ordering, please supply the following information:
1 Switchboard type N114 with operator's telephone.
2 Quantity, colour, and type of extension telephones (auto or c.b.; table or wall-mounted type). If auto, state dial speed, pulse ratio and dial numbering if other than standard.
3 Cord, plug, and line jack, if switchboard plug-in connection required.
4 Battery eliminator: state local mains voltage and frequency.
5 Ringing converter or transistor ringing unit.
6 Number and type of 2-wire auxiliary relay unit.



Switchboard opened for maintenance

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Publication No. 7128/1
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CB

3 + 12 cordless PMBX, lamp signalling

with auto or c.b. exchange lines

This private manual branch exchange switchboard with capacity for three exchange lines, twelve extensions and five connecting circuits has been designed in accordance with modern needs. Compared with earlier types of switchboard, it offers the attractive combination of improved facilities and compact design, both features having been obtained largely through the use of miniature keys and 4-wire extension lines. The switchboard operates from a 50V supply and its physical design features are similar to the 2 + 6 and 4 + 18 types in the cordless PMBX range.

Up to half the extension line circuits can be converted to 2-wire working by the use of wall-mounted auxiliary relay units of which there are five types for:

1 Long extension lines.

2 Short- and medium-distance private wires, tie lines and PBX junctions.

3 Long-distance private wires, tie lines and PBX junctions.

4 Medium - distance lines to PABX.

5 Long-distance lines to PABX.

Construction and Finish

The switchboard is in two-tone grey. The lift-off cover is a one-piece moulding made of impact-resisting light-grey plastic, whilst the plastic-faced metal equipment panel and the metal base are elephant grey. The front and the rear equipment mountings hinged on the base can be opened book fashion for maintenance as shown in the illustration overleaf.

The switchboard is fully tropicalized and uses p.v.c.-insulated wire throughout.

Apparatus

Keys are miniature type N9300 with ivory-coloured wedge handles tipped with inserts of contrasting colours to assist accurate operating. The lamps are behind a lens strip held by clips at the ends. When this strip is removed, the lamp-jack assembly can be pulled forward after releasing its fixing screws.

Relays are Types N45000 (BPO 600) and N30000 (BPO 3000), protected by strip covers.

An internal terminal field permits direct termination of incoming lines. Alternatively, for plug-in switchboard connection, a 6ft (1·83m) flexible cord with matching plug can be supplied, together with an associated line jack.

At installations where no source of power ringing exists, a wall-mounted ringing converter, operating from 200-250V, 50Hz a.c. mains, can be supplied. Alternatively, an in-built or wall-mounted transistor ringing unit can be supplied.

The separate two-tone grey table-type Etelphone provided for the switchboard operator can be arranged for use in conjunction with an operator's lightweight headset, if required.

General view of switchboard

Facilities

1 Lamp signalling on all lines.
2 Individual clearing signals on extension-to-extension calls.
3 Automatic holding of exchange calls.
4 Follow-on call trap on incoming exchange calls.
5 Pressbutton operator recall on extension and exchange calls.
6 Night service.
7 Power unit operation with mains failure safeguards.
8 Extension-to-exchange line limit of 935Ω, or 850Ω if 4-wire/2-wire auxiliary unit is used.
9 Connection of private circuits and inter-switchboard circuits without modification to the permanent wiring of the switchboard.

Power Details

The required 50V d.c. supply is usually derived from the a.c. mains via a battery eliminator.

Full load current drain : 1A without auxiliary unit, 2A with auxiliary unit.

Extension Telephones

These are Plesseyphones (catalogue sheet 7159) or Etelphones (catalogue sheet 7145), arranged for use with the switchboard 4-wire lines.
For auto working, dials are adjusted to transmit 10 pps with 2 :1 break/make pulse ratio, and have standard numbering (i.e. 1 to 0).

Switchboard Dimensions

Height: 8in (203mm)
Width: 17$\frac{1}{8}$in (435mm)
Depth: 13$\frac{5}{8}$in (346mm)

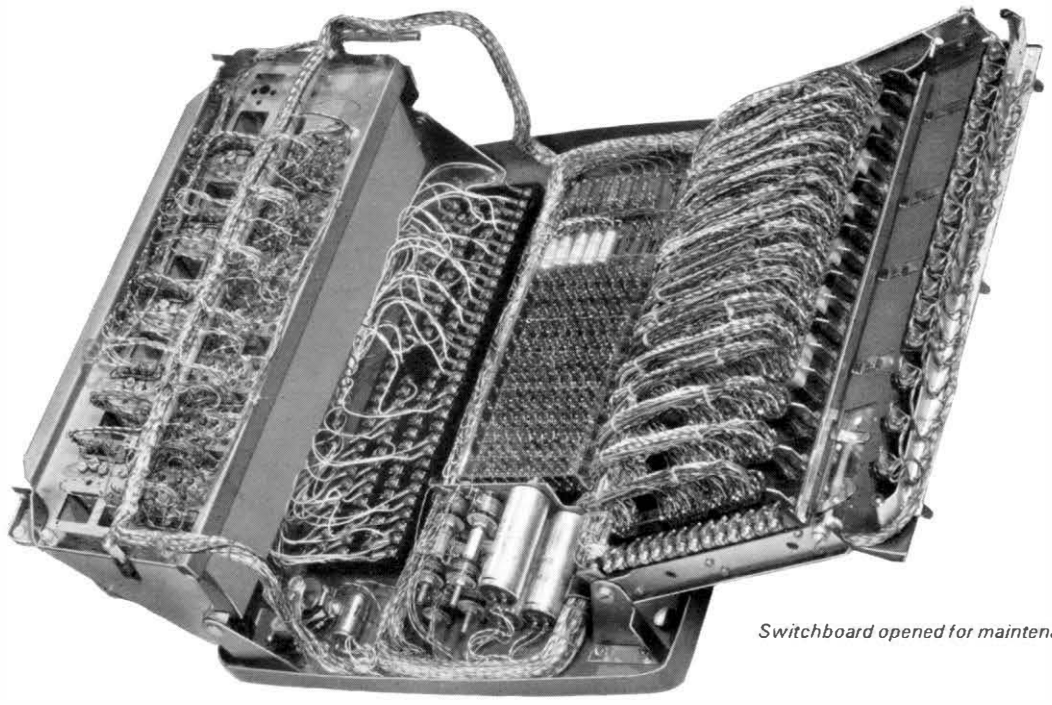
Weights (approx.)

1 Switchboard : 36lb (16·3kg) net.
6 Switchboards : (multiple export pack) 347lb (157·4kg).

Ordering Information

When ordering, please supply the following information 1 to 7 as appropriate.

1 Switchboard type N116.
2 Quantity, colour and type of extension telephones (auto or c.b.; table or wall-mounted type). If auto, state dial speed, pulse ratio, and dial numbering if other than standard.
3 Operator's telephone : with or without headset connected.
4 Cord, plug and line jack, if switchboard plug-in connection required.
5 Battery eliminator : state local mains voltage and frequency.
6 Ringing converter or transistor ringing unit. If latter, state internal or external mounting preference.
7 Number and type of 2-wire auxiliary relay unit.



Switchboard opened for maintenance

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Printed in England Publication No. 7129/1 ZH195/1.4M/4.71

CB

4 + 18 cordless PMBX, lamp signalling

with auto or c.b. exchange lines

This private manual branch exchange switchboard, with capacity for four exchange lines, 18 extensions, and seven connecting circuits, has been designed in accordance with modern needs. Compared with earlier types of switchboard, it offers the attractive combination of improved facilities and compact design, both features having been obtained largely through the use of miniature keys and 4-wire extension lines. The switchboard operates from a 50V supply and its physical design features are similar to the 2+6 and 3+12 types in the cordless PMBX range.

Up to half the extension line circuits can be converted to 2-wire working by the use of wall-mounted auxiliary relay units of which there are five types for:

1 Long extension lines.
2 Short- and medium-distance private wires, tie lines and PBX junctions.
3 Long-distance private wires, tie lines and PBX junctions.
4 Medium-distance lines to PABX.
5 Long-distance lines to PABX.

Construction and Finish

The switchboard is in two-tone grey. The lift-off cover is a one-piece moulding made of impact-resisting light-grey plastic, whilst the plastic-faced metal equipment panel and the metal base are elephant grey. The front and rear equipment mountings hinged on the base can be opened book fashion for maintenance, as shown in the illustration overleaf.

The switchboard is fully tropicalized and uses p.v.c.-insulated wire throughout.

Apparatus

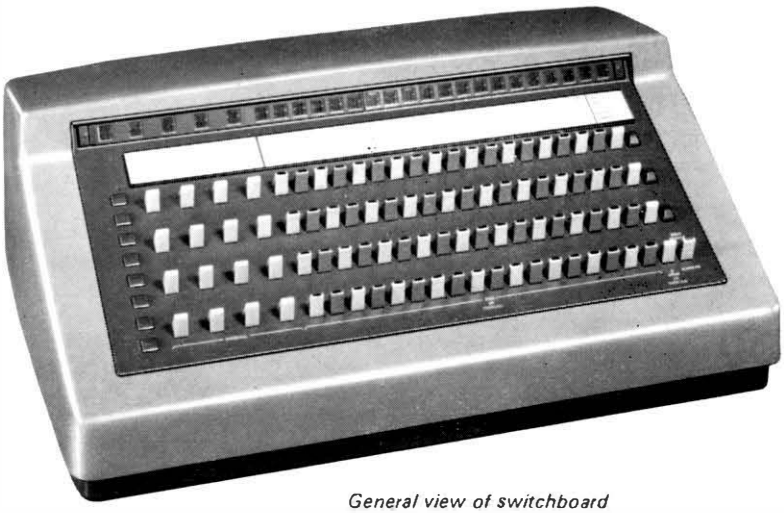
Keys are miniature type N9300, with ivory-coloured wedge handles tipped with inserts of contrasting colours to assist accurate operating.

The lamps are behind a lens strip held by clips at the ends. When this strip is removed, the lamp-jack assembly can be pulled forward after releasing its fixing screws. Relays are Types N45000 (BPO 600) and N30000 (BPO 3000), protected by strip covers.

An internal terminal field permits direct termination of incoming lines. Alternatively, for plug-in switchboard connection, a 6ft (1·83m) flexible cord with matching plug can be supplied, together with an associated line jack.

At installations where no source of power ringing exists, a wall-mounted ringing converter, operating from 200-250V, 50Hz a.c. mains, can be supplied. Alternatively, an inbuilt or wall-mounted transistor ringing unit can be supplied.

The separate two-tone grey table-type Etelphone provided for the switchboard operator, can be arranged for use in conjunction with an operator's lightweight headset, if required.



General view of switchboard

Facilities

1 Lamp signalling on all lines.
2 Individual clearing signals on extension-to-extension calls.
3 Automatic holding of exchange calls.
4 Follow-on call trap on incoming exchange calls.
5 Pressbutton operator recall on extension and exchange calls.
6 Free connector signalling.
7 'Overcall' to enable calls to be answered when all connectors are engaged.
8 Night service.
9 Power unit operation with mains failure safeguards.
10 Extension-to-exchange line limit of 935Ω, or 850Ω if 4-wire/2-wire auxiliary unit is used.
11 Connection of private circuits and inter-switchboard circuits without modification to the permanent wiring of the switchboard.

Power Details

The required 50V d.c. supply is usually derived from the a.c. mains via a battery eliminator.
Full load current drain : 2A without auxiliary unit, 4A with auxiliary unit.

Extension Telephones

These are Plesseyphones (catalogue sheet 7159) or Etelphones (catalogue sheet 7145) arranged for use with the switchboard 4-wire lines. For auto-working, dials are adjusted to transmit 10 p/s with 2 :1 break/make pulse ratio, and have standard numbering (i.e. 1 to 0).

Switchboard Dimensions

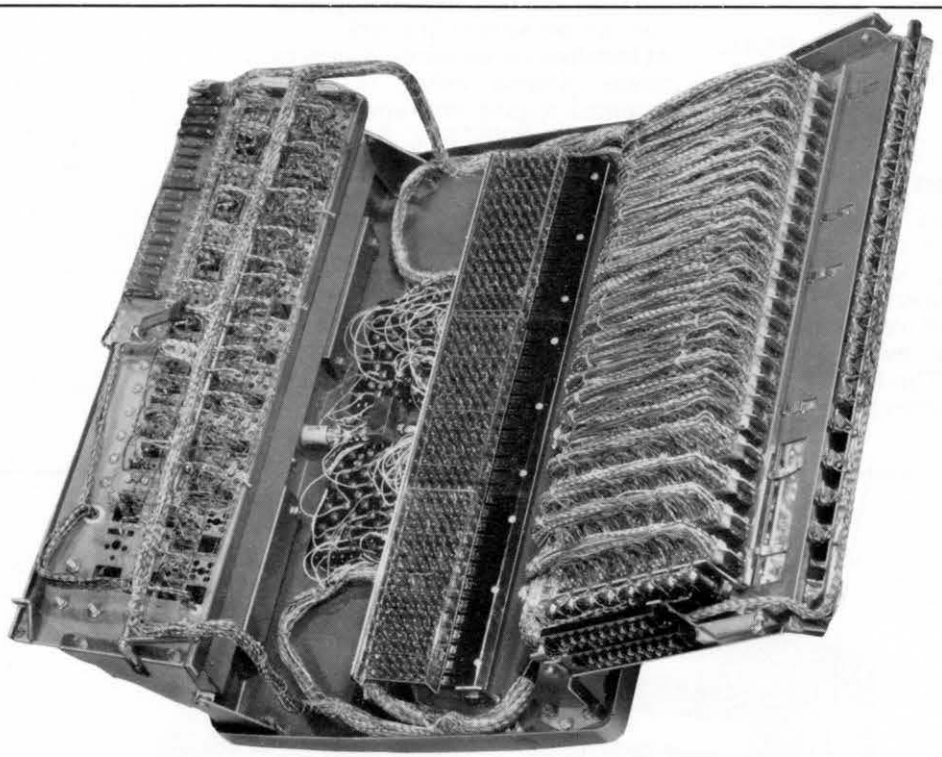
Height: 9in (229mm)
Width: $23\frac{1}{8}$in (587mm)
Depth: $15\frac{1}{4}$in (387mm)

Weights

1 Switchboard : 65lb (29·5kg) net
4 Switchboards (multiple export pack): 382lb (173·2kg)

Ordering Information

When ordering, please supply the following information 1 to 7 as appropriate.
1 Switchboard type N117.
2 Quantity, colour and type of extension telephones (auto or c.b.; table or wall-mounted type). If auto, state dial speed, pulse ratio, and dial numbering if other than standard.
3 Operator's telephone: with or without headset connected.
4 Cord, plug, and line jack, if switchboard plug-in connection required.
5 Battery eliminator: state local mains voltage and frequency.
6 Ringing converter or transistor ringing unit. If latter, state internal or external mounting preference.
7 Number and type of 2-wire auxiliary relay unit.



Switchboard opened for maintenance

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

PLESSEY
Telecommunications

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Printed in England
Publication No. 7130/1
ZH196/1.4M/4.71

CB

5+20 Cordless PMBX, Indicator Signalling

with Auto or CB exchange lines

This indicator-signalling switchboard extends the capacity range of desk-top cordless units to five exchange lines and 20 extensions. Seven connecting circuits are provided.

By the use of miniature keys and indicators, and lightweight structural materials, the size and weight are kept to the minimum.

An improved form of construction contributes to the switchboard's modern appearance and provides increased access to equipment for maintenance.

Facilities

Through dialling and through clearing.

Positive supervision.

Hold exchange.

Overcall; i.e. the facility for answering incoming calls when all connecting circuits are engaged.

Night extension.

Audible alarm.

Construction and Finish

The pressed-steel frame, welded to prevent distortion, is mounted on a hardwood base. The front panel can be swung down, as shown in the illustration overleaf, to afford access to the internal wiring. Each vertical row of keys is removable as a unit for spring inspection.

Replaceable plastic laminated panels enclose the equipment. The back and top are a single sheet which clips in at the top and can be removed to obtain access to the rear equipment after releasing three captive screws at the bottom. The switchboard is attractively coloured: the equipment panel, covered with grained dove-grey p.v.c. above the black bottom strip and base, tones well with the buff side and rear panels, which are outlined by bronzed metal strips. The appearance is enhanced by black indicators and a black handset and cord.

A dial dummy instead of the dial is provided on c.b. switchboards.

The equipment has full tropical finish; i.e. coils are impregnated and metal parts specially finished. Conductors are insulated with p.v.c., which is moisture-proof and not subject to fungoid growth or attack by insects.

An internal terminal field permits direct termination of incoming lines. Alternatively, a flexible connecting cord and cable distribution box can be supplied.

Type N115 Switchboard

Apparatus

Type N9300 miniature keys, and totally enclosed miniature twin-shutter indicators are used. Extension line indicators Type N4831 are non-locking and self-restoring. Exchange line indicators Type N4832 operate and lock to ringing current and are restored by pressing down a projection at the top of the plastic front cover. The curved shutters open horizontally to display a red (exchange line) or green (extension line) number against a white background.

The handles of the associated keys are tipped with red or green inserts to match; this facilitates accurate operating and enables operated keys to be instantly discerned.

The dial has standard numbering and a 2:1 break/make pulse ratio. The hand generator is of the rotating-magnet type, but can be replaced or supplemented by a transistor ringing unit if specially ordered. Relays and battery-feed retards are Type N30000 (BPO 3000).

Also included are an alarm buzzer and cut-off key, and a plug-in lightweight handset with capsule receiver and coiled cord. In lieu of, or in addition to, the handset, a lightweight headset can be supplied.

Power Details

Nominal operating voltage: 24V d.c. normally provided by a mains-operated 1A power unit. Alternatively, storage batteries with charging equipment can be supplied, if preferred. Busy hour current drain for fully equipped board: 0·84A.

Extension Telephones

Plesseyphones (catalogue sheet 7159) or Etelphones (catalogue sheet 7145) are recommended.
For automatic working, dials are normally adjusted to transmit 10 p/s with a 2:1 break/make pulse ratio, and have standard numbering (i.e. 1 to 0). Other speeds and numbering can be provided to customer requirements.

Switchboard Dimensions

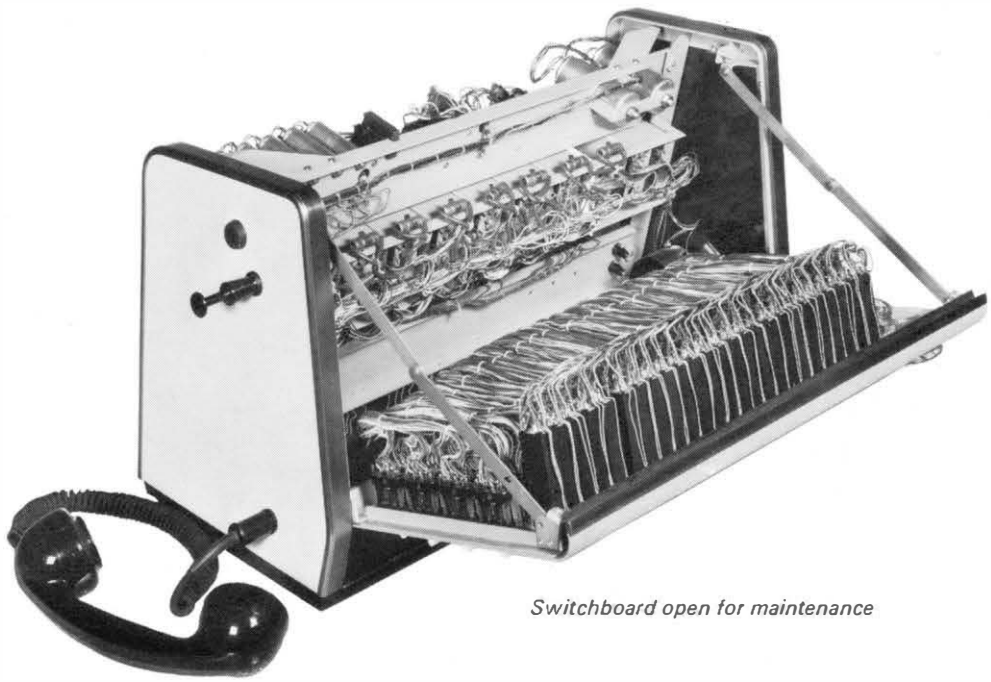
Height: 12½in (317mm)
Width: 23in (584mm)
Depth: 9½in (241mm)

Weights (approx.)

1 Switchboard (fully equipped 5+20): 58lb (26·3kg) net.
4 Switchboards (fully equipped 5+20): 362lb (164·2kg) crated (multiple export pack).

Ordering Information

When ordering, please supply the following information:
Switchboard, type N115 equipped for 5 + 20 or 4 + 16 lines.
Auto or c.b. working. If former, state dial speed, pulse ratio, and dial numbering, if other than standard.
Quantity, colour, and type (auto or c.b., table or wall mounted) of extension telephones.
Operator's headset, transistor ringing unit, and flexible connecting cord with desk block, as required.
Power unit or storage batteries with charging unit. State local mains voltage and frequency.
Standard or tropical finish.



Switchboard open for maintenance

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PLESSEY
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Printed in England Publication No. 7131 ZH1153/2M/3.71

CB

10+100 cord-type PMBX, lamp signalling

with auto or c.b. exchange lines

This switchboard employs lamp signalling on all circuits, and is arranged with positive supervision on all calls. Each board has capacity for 10 exchange and 100 extension lines with 15 cord circuits. For installations of from 100 to 200 extensions, two units may be bolted together to form a two-position, non-multiple switchboard. For such application, each unit is equipped with longer connecting cords and double pulley weights.

Exchange lines are normally for connection to an automatic exchange, but alternatively can be c.b. Each cord circuit has a speak/ring key and a dial/ring-back key.

Facilities

1 Through dialling and clearing.
2 Automatic exchange-line hold.
3 Separate positive supervision on local calls: double positive supervision on exchange calls.
4 Visual ringing indication.
5 Ring back.
6 Visual and audible fuse alarm.
7 Audible alarm.
8 Panel pilot signal.
9 Cord test.
10 Night-service working on cord circuits 1 to 11. *Note.* Additional plug-ended through-cords to connect extra circuits for night-service working can be supplied.

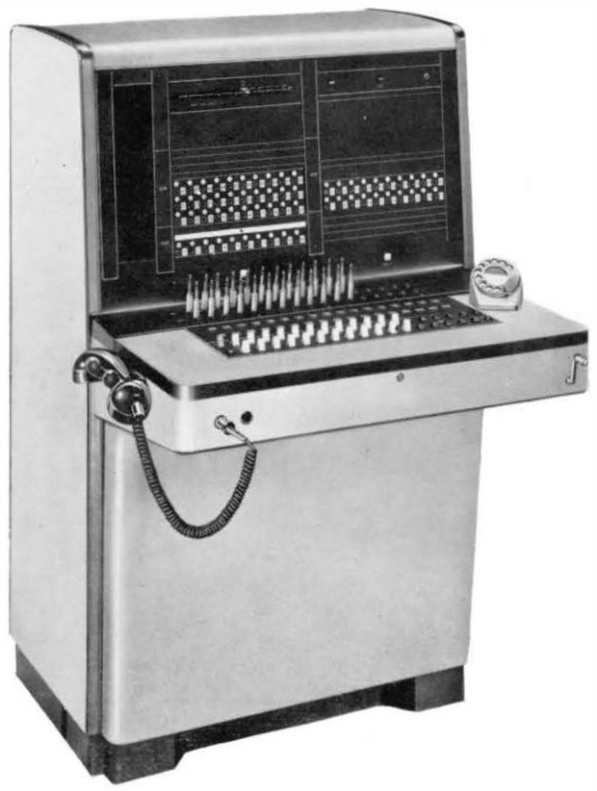
Construction

A welded, pressed-steel frame with integral plinth forms the main structure and component mounting, and is enclosed with laminated-wood panels. These are surfaced with hard-wearing, buff-coloured plastic, edged and secured by metal trims finished in glossy elephant grey stove enamel. In contrast, the face panel is coloured black and the key shelf buff linette.

When units are installed en suite, adjacent intermediate side panels are removed and the frames bolted together. Similarly, the front panel below the key shelf and the rear door can both be removed for convenience of access.

The face panel has exchange and extension signalling lamps and associated jacks arranged in alternate rows. Provision is made for night-extension keys, fuse and night alarm keys and the cord-test jack.

The key shelf is arranged with



General view of switchboard

supervisory lamps and switching keys for cord circuits and miscellaneous facilities.
Internal equipment is positioned and mounted for maximum accessibility. Incoming cables enter via covered apertures in the open-constructed plinth, and terminate on soldered terminal fields at the bottom of the unit.
For convenience of handling (e.g. during installation) the hinged key shelf can be raised and its apron lowered to reduce the depth by $8\frac{1}{2}$in (216mm).

Components

Switching keys are of miniature type, the wedge-shaped ivory-coloured handles being tipped in a contrasting colour, rendering operated keys instantly discernible.
Operating equipment, supplied as standard, includes a lightweight plug-in handset with rocking-armature receiver, a manually operated ringing-current generator and a dial adjusted to transmit 10 pps with 2:1 break/make pulse ratio and with standard numbering, i.e. 1 to 0.
Alternative equipment, available in lieu of, or in addition to, includes a lightweight plug-in headset, a transistor ringing unit powered from a 24V source, and a dial with any desired numbering and adjustment.

Internal components, including relays and relay retards, are to British Post Office specifications, and are afforded tropical finish, i.e. with coils suitably impregnated and metal parts specially finished. Conductors are heavily insulated with p.v.c., giving protection against moisture, fire, attack by insects and fungoid growth. Connecting cords are additionally protected with p.v.c. sleeving and nylon braiding.

Power

The switchboard operates on 24V d.c., the busy-hour current drain being approximately 2A. Power is normally derived from the local mains supply via a battery eliminator unit. Alternatively, batteries with charging equipment can be supplied if preferred.

Line Limits

Using Plesseyphones type N2020 (auto) or N1520 (c.b.) or Etelphones type N1900 (auto) or N1340 (c.b.) as extension instruments, the maximum permissible loop resistance between the public exchange and extension is 1000Ω.

Dimensions

Height: 48in (1220mm)
Width: 30$\frac{3}{8}$in (772mm)
Depth: 32in (813mm)

Weights (approx)

1 Switchboard, 310lb (140·8kg) net.

1 Switchboard, export packed, 461lb (209·1kg).

Ordering Information

When ordering, please supply the following information 1 to 6 as appropriate.

1 Specify switchboard code number N376, and detail the number of exchange lines, extension lines and cord circuits required.

2 If two units required, state if they are to form a two-position, non-multiple switchboard.

3 Give details of dial numbering, pulse speed and ratio if other than standard.

4 State if transistor ringing unit and lightweight headset are required in lieu of, or in addition to, standard equipment.

5 Power requirements, i.e. battery eliminator or batteries with charging equipment. Give details of local mains voltage and frequency.

6 State number of plug-ended through-cords, if more than 11 night-service connections required.

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Printed in England Publication No. 7138/1 ZH201/1.2M/4.71

CB

20 + 100 cord-type PMBX, indicator signalling

with auto or c.b. exchange lines

This switchboard, an indicator signalling type, has capacity for 20 exchange and 100 extension lines with 17 cord circuits. Stock units are available wired and equipped for 10 exchange lines, 50 or 70 extension lines and 15 cord circuits, and may subsequently be extended to full capacity as required.

The switchboard is specially suited for busy establishments where speed of operation is essential. The facility for automatic holding of exchange lines enables the operator to deal with other calls whilst waiting for a called party to answer.

For installations of from 100 to 200 extensions, two units may be bolted together to form a two-position, non-multiple switchboard. When two positions are installed en suite, each is equipped with longer connecting cords and double pulley weights.

Exchange lines are normally for connection to an automatic exchange, but alternatively can be c.b. Each cord circuit has a speak/ring key and a dial/ring-back key.

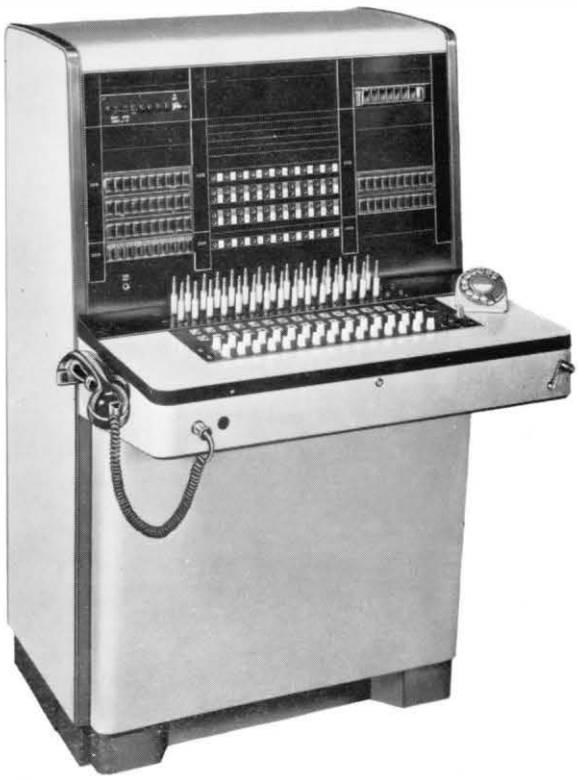
Facilities

1 Through dialling and clearing.
2 Automatic exchange-line hold.
3 Separate negative supervision on local calls: double negative supervision on exchange calls.
4 Visual ringing indication.
5 Ring back.
6 Visual and audible fuse alarm.
7 Audible alarm.
8 Cord test.
9 Continued exchange-line service in the event of local power failure.
10 Night-service working on cord circuits 1 to 11. *Note*. Additional plug-ended through-cords to connect extra circuits for night-service working can be supplied.

Construction

A welded pressed-steel frame with integral plinth forms the main structure and component mounting, and is enclosed by laminated-wood panels. These are surfaced with hardwearing, buff-coloured plastic, edged and secured by metal trims finished in glossy elephant grey stove enamel. In contrast, the face panel is coloured black and the key shelf buff linette. When two or more units are installed en suite, the adjacent intermediate side panels are removed and the frames bolted together. Similarly, the front panel below the key shelf, and the rear door are both removable for convenience of access.

The face panel has indicators arranged in two groups on either side of the jack strips, and includes



General view of switchboard.

provision for night-extension keys, fuse and night-alarm keys and cord-test jack.
The key shelf is arranged with supervisory indicators and switching keys for cord circuits and miscellaneous facilities.
Internal equipment is positioned and mounted for maximum accessibility. Incoming cables enter via covered apertures in the open-constructed plinth, and terminate on soldered terminal fields positioned at the bottom of the unit. For convenience of handling (e.g. during installation) the hinged key shelf can be raised and its apron lowered to reduce the depth by 8½in (216mm). The total weight for stock units varies depending upon extension-line capacity.

Components

Switching keys and signalling indicators are of miniature type. The wedge-shaped ivory key handles are tipped in a contrasting colour, rendering operated keys instantly discernible. Indicators are the twin-shutter type which restore automatically and, when operated, display a black numeral on a background of the same colour as the associated jack label.
Operating equipment, supplied as standard, includes a lightweight plug-in handset with rocking-armature receiver, a manually operated ringing-current generator, and a dial adjusted to transmit 10 pps with 2 :1 break/make ratio and with standard numbering, i.e. 1 to 0. Alternative equipment, supplied in addition to or in lieu of, includes a lightweight plug-in headset, a transistor ringing generator powered from a 24V source, and a dial with any desired adjustment and numbering.
Internal components, including relays and relay retards, are to British Post Office specification and are afforded tropical finish, i.e. with coils suitably impregnated and metal parts specially finished. Conductors are insulated with p.v.c., giving protection against moisture, fire, attack by insects and fungoid growth. Connecting cords are additionally protected by p.v.c. sleeving and nylon braiding.

Power

The switchboard operates from a 24V d.c. supply, the busy-hour current drain being approximately 2A. Power is normally derived from the local mains supply via a battery eliminator unit; alternatively, batteries with charging equipment can be supplied if preferred. Exchange-line service is not affected by any failure in the power supply.

Line Limits

Using Plesseyphones type N2020 (auto) or N1520 (c.b.) or Etelphones type N1900 (auto) or N1340 (c.b.) as extension instruments, the maximum permissible loop resistance between the public exchange and the extension is 1000Ω.

Dimensions

Height: 48in (1220mm)
Width: 30⅜in (772mm)
Depth: 32in (813mm)

Weights (approx)

1 Switchboard, between 272lb (124·0kg) net and 281lb (128·0kg) net.
1 Switchboard, export packed, 425lb (192·8kg).

Ordering Information

When ordering, please supply the following information 1 to 6 as appropriate.

1 Specify switchboard code number N327 and detail the number of exchange lines, extension lines and cord circuits required.
2 If two units required, state if they are to form a two-position, non-multiple switchboard.
3 Give details of dial numbering, pulse speed and ratio if other than standard.
4 State if transistor ringing unit and lightweight headset are required in lieu of, or in addition to, standard equipment.
5 Power requirements, i.e. battery eliminator or batteries with charging equipment. Give details of local mains voltage and frequency.
6 State number of plug-ended through-cords if more than 11 night-service connections required.

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PLESSEY
Telecommunications

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Printed in England Publication No. 7135/1 ZH198/1.3M/4.71

CB

20 + 100 cord-type PMBX, indicator signalling

with auto exchange lines

This switchboard is arranged for positive supervision on all calls, and has capacity for 20 exchange and 100 extension lines with 17 cord circuits. Stock units are available wired and equipped for 10 exchange and 30 or 60 extensions and 12 or 15 cord circuits. The 10+30 unit has wiring for up to 70 extensions, the 10+60 unit has wiring for 100 extensions and for optional multiple facilities. Both may be extended to full capacity as required.

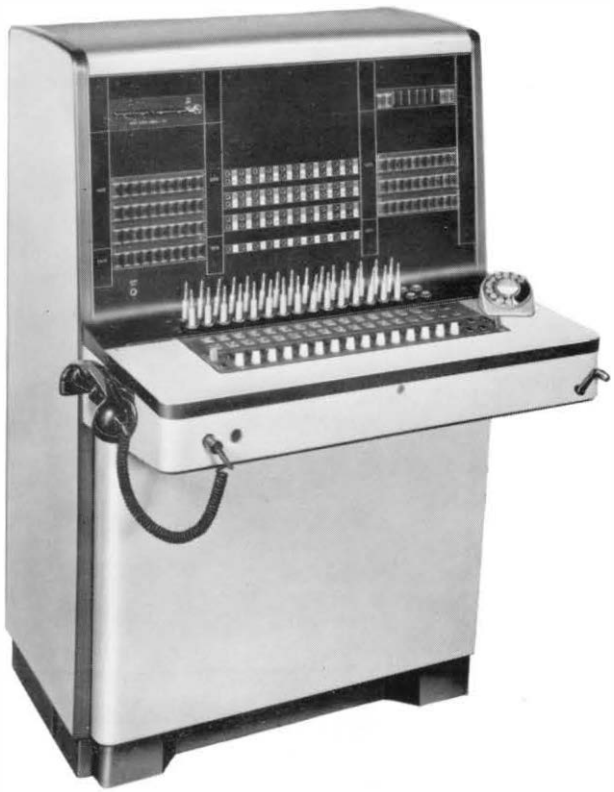
For installations of from 100 up to 200 extensions, two units may be bolted together to form a two-position, non-multiple switchboard. When up to the maximum of 400 extensions are required, four units, with provision for multiple equipment, can be similarly installed. When two or more positions are installed en suite, each is equipped with longer connecting cords and double pulley weights.

Facilities

1 Through dialling and clearing.
2 Separate positive supervision on local calls: double positive supervision on exchange calls.
3 Visual ringing indication.
4 Ring back.
5 Visual and audible fuse alarm.
6 Audible alarm.
7 Exchange-line prohibition at selected extensions.
8 Cord test and hold jack with called party answered supervision.
9 Continued exchange line service in the event of local power failure.
10 Multiple working with engaged test tone.
11 Night-service working on cord circuits 1 to 12. *Note.* Extra plug-ended through-cords to connect additional circuits for night-service working can be supplied.

Construction

A welded, pressed-steel frame, with integral plinth, forms the main structure and component mounting, and is enclosed by laminated-wood panels. These are surfaced with hard-wearing, buff-coloured plastic, edged and secured by metal trims finished in glossy elephant grey stove enamel. In contrast, the face panel is coloured black and the key shelf buff linette. When two or more units are installed en suite, adjacent intermediate side panels are removed and the units



General view of switchboard

bolted together. Similarly, both the front panel below the key shelf, and the rear door, can be removed for convenience of access.
The face panel has indicators arranged in two groups on either side of the jack strips, and includes provision for night-extension keys, fuse and night-alarm keys and cord-test jack. In addition, the jack panel has capacity for up to 100 multiple jacks for use when switchboards are multipled together.
The key shelf is arranged with supervisory indicators and switching keys for cord circuits and miscellaneous facilities.
Internal equipment is positioned and mounted for maximum accessibility. Incoming cables enter via covered apertures in the open-constructed plinth, and terminate on soldered terminal fields positioned at the bottom of the unit. For convenience of handling (e.g. during installation) the hinged key shelf can be raised and its apron lowered to reduce the depth by 8½in (216mm). The weight of the stock unit varies, depending upon the extension-line capacity.

Components

Switching keys and signalling indicators are of miniature type. The wedge-shaped ivory-coloured key handles are tipped in contrasting colour, rendering operated keys instantly discernible. The indicators have twin shutters that restore automatically, and, when operated, display a black numeral on a background of the same colour as the associated jack label.
Operating equipment, supplied as standard, includes a lightweight plug-in handset with rocking-armature receiver, a manually operated ringing-current generator and a dial adjusted to transmit 10 pps with 2:1 break/make pulse ratio and with standard numbering, i.e. 1 to 0.
Alternative equipment, available in lieu of, or in addition to, includes a lightweight plug-in headset, a transistor ringing-unit powered from a 24V source, and a dial with any desired numbering and adjustment.
Internal components, including relays and relay retards, are to British Post Office specification and are afforded tropical finish, i.e. with coils suitably impregnated and metal parts specially finished. Conductors are insulated with p.v.c., giving protection against moisture, fire, attack by insects and fungoid growth. Connecting cords are additionally protected by p.v.c. sleeving and nylon braiding.
Additional relay equipment, for extensions requiring the exchange-line prohibition facility, is mounted externally.

Power

The switchboard operates on 24V d.c., the busy-hour current drain being approximately 2A. Power is normally derived from the local mains supply via a battery eliminator unit. Alternatively, batteries with charging equipment can be supplied if preferred. Exchange-line working is not affected by any local power failure.

Line Limits

Using Plesseyphones type N2020 (auto) or N1520 (c.b.), or Etelphones type N1900 (auto) or N1340 (c.b.) as extension instruments, the maximum permissible loop resistance between public exchange and extension is 1000Ω.

Dimensions

Height: 48in (1220mm)
Width: 30⅜in (722mm)
Depth: 32in (813mm)

Weights (approx.)

1 Switchboard between 266lb (121kg) net and 300lb (136·2kg) net.
1 Switchboard, export packed, 435lb (197·3kg).

Ordering Information

When ordering, please supply the following information 1 to 8 as appropriate.

1 Specify switchboard code number N328, and detail the number of exchange lines, extension lines and cord circuits required.
2 If two units required, state if they are to form a two-position, non-multiple switchboard.
3 For more than two switchboards, state if required to be multipled together.
4 Indicate if any extension lines are required with exchange-line prohibition facility.
5 Give details of dial numbering, pulse speed and ratio, if other than standard.
6 State if transistor ringing-unit and lightweight headset required in lieu of, or in addition to, standard equipment.
7 Power requirements, i.e. battery eliminator or batteries with charging equipment. Give details of local mains voltage and frequency.
8 Detail number of plug-ended through-cords, if more than 12 night-service connections required.

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Printed in England
Publication No. 7136/1
ZH199/1M/7.71/SR

CB

20 + 100 cord-type PMBX, lamp and indicator signalling

with auto exchange lines

This switchboard employs lamp signalling on all circuits except exchange lines, these having plug-restored indicators to safeguard exchange-line service in the event of local power failure. The board is arranged with positive supervision on all calls and has capacity for 20 exchange and 100 extension lines and 15 cord circuits. Stock units are available wired and equipped for 10 exchange lines, 50 or 70 extension lines and 12 or 15 cord circuits, and may subsequently be extended to full capacity as required.

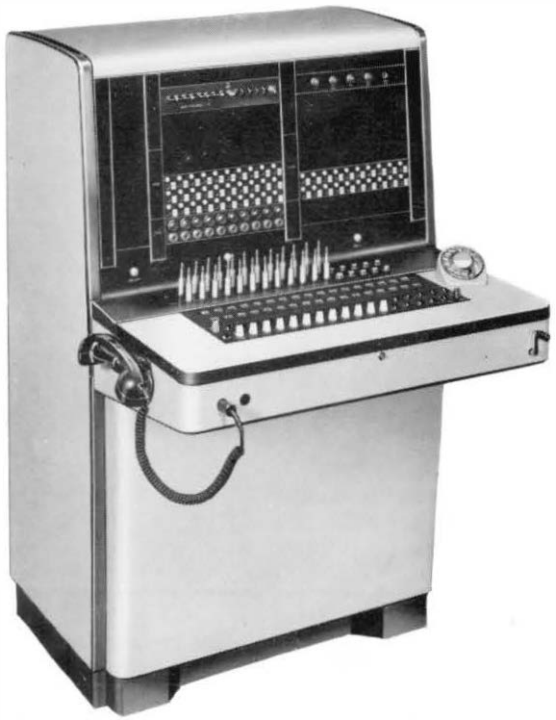
For installations of from 100 up to 200 extensions, two units may be bolted together to form a two-position, non-multiple switchboard. When up to the maximum of 400 extensions are required, four units, with provision for multiple equipment, can be similarly installed. When two or more positions are installed en suite, each is equipped with longer connecting cords and double pulley weights.

Facilities

1 Through dialling and clearing.
2 Separate positive supervision on local calls: double positive supervision on exchange calls.
3 Visual ringing indication.
4 Ring back.
5 Visual and audible fuse alarm.
6 Audible alarm.
7 Exchange-line prohibition at selected extensions.
8 Panel and cord supervisory pilot signals.
9 Cord test and hold jack with called-party answered supervision.
10 Continued exchange-line service in the event of local power failure.
11 Multiple working with engaged test tone.
12 Night-service working on cord circuits 1 to 12. *Note.* Additional plug-ended through-cords to connect extra circuits for night-service working can be supplied.

Construction

A welded pressed-steel frame, with integral plinth, forms the main structure and component mounting, and is enclosed with laminated-wood panels surfaced with hard-wearing, buff-coloured plastic, edged and secured by metal trims finished in glossy elephant grey stove enamel. In contrast, the face panel is coloured black and the key shelf buff linette. When two or more units are installed en suite, adjacent intermediate side panels are removed and the units bolted together. Similarly, both the front panel below the key shelf, and the rear door, can be removed for convenience of access.



General view of switchboard

The face panel has extension signalling lamps and associated jacks arranged in alternate rows. Provision is made for night-extension keys, fuse and night-alarm keys and cord-test jack. In addition, each panel has capacity for 100 multiple jacks for use when switchboards are multipled together.
The key shelf is arranged with supervisory lamps and switching keys for cord circuits and miscellaneous facilities.
Internal equipment is positioned and mounted for maximum accessibility. Incoming cables enter via covered apertures in the open constructed plinth, and terminate on soldered terminal fields positioned at the bottom of the unit.
For convenience of handling (e.g. during installation) the hinged key shelf can be raised and its apron lowered to reduce the depth by 8½in (216mm).

Components

Switching keys are of miniature type. The wedge-shaped ivory-coloured key handles are tipped in a contrasting colour, rendering operated keys instantly discernible. Exchange line indicators are plug-restored and, when operated, display a green disc.
Operating equipment, supplied as standard, includes a lightweight plug-in handset with rocking-armature receiver, a manually operated ringing-current generator and a dial adjusted to transmit 10 pps with 2:1 break/make pulse ratio and with standard numbering, i.e. 1 to 0. Alternative equipment available in lieu of, or addition to, includes a lightweight plug-in headset, a transistor ringing unit powered from a 24V source, and a dial with any desired numbering and adjustment.
Internal components, including relays and relay retards, are to British Post Office specification, and are afforded tropical finish, i.e. with coils suitably impregnated and metal parts specially finished. Conductors are individually insulated with p.v.c., giving protection against moisture, fire, attack by insects and fungoid growth. Connecting cords are additionally protected with p.v.c. sleeving and nylon braiding.
Additional relay equipment, for extensions requiring the exchange-line prohibition facility, is mounted externally.

Power

The switchboard operates on 24V d.c., the busy-hour current drain being approximately 2A. Power is normally derived from the local mains supply via a battery eliminator unit. Alternatively, batteries with charging equipment can be supplied if preferred. Exchange-line working is not affected by any local power failure.

Line Limits

Using Plesseyphones type N2020 (auto) or N1520 (c.b.) or Etelphones type N1900 (auto) or N1340 (c.b.) as extension instruments, the maximum permissible loop resistance between the public exchange and extension is 1000Ω.

Dimensions

Height: 48in (1220mm)
Width: 30⅜in (772mm)
Depth: 32in (813mm)

Weights (approx.)

1 Switchboard between 310lb (140·8kg) net and 330lb (149·8kg) net.
1 Switchboard, export packed, 443lb (201kg).

Ordering Information

When ordering, please supply the following information 1 to 8 as appropriate.

1 Specify switchboard code number N375 and detail the number of exchange lines, extension lines and cord circuits required.
2 When two units are required, state if they are to form a two-position, non-multiple switchboard.
3 For more than two units, state if required to be multipled together.
4 Indicate if any extensions are required with exchange-line prohibition facility.
5 Give details of dial numbering, pulse speed and ratio if other than standard.
6 State if transistor ringing unit and lightweight headset are required in lieu of, or in addition to, standard equipment.
7 Power requirements, i.e. battery eliminator or batteries with charging equipment. Give details of local mains voltage and frequency.
8 Detail number of plug-ended through-cords, if more than 12 night-service connections required.

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PLESSEY
Telecommunications

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MAGNETO

12 or 25-line cordless PMBX indicator signalling

These magneto switchboards are suitable for organizations requiring either 12 lines and 5 connecting circuits or 25 lines and 7 connecting circuits.

Facilities

1 Positive supervision (Ring off).
2 Audible alarm.
3 Lines may be either to magneto extensions or to a magneto exchange.

Construction

The 12-line switchboard has a sloping panel giving excellent visibility for operation. The french-grey switchboard cover is a one-piece moulding of a durable copolymer plastic. It drops easily into position and is firmly retained by its leading edge beneath the front of the elephant-grey face panel, and by two screws in the rear of the baseplate. Removal of the cover exposes a 3-section chassis which can be opened book-fashion to permit inspection of wiring and components. Each vertical row of keys is removable as a unit.
The appearance of the switchboard is enhanced by the elephant-grey handset and by indicators which display a green number against a white background when operated.
The 25-line switchboard makes full use of lightweight structural materials in conjunction with miniature keys and indicators. The basis of construction is a light but rigid welded steel frame surmounting a hardwood base. The case is formed of replaceable plastic laminated panels, the top and back being a one-piece wrap-over, giving easy access to rear equipment on the release of three captive screws. The key panel, tilted for optimum display of operated keys and indicators, can be swung down to provide full access to internal wiring. Each vertical row of keys is removable as a unit for springset inspection.
The board is attractively coloured; the equipment panel, covered with grained, dove-grey p.v.c. above the black bottom strip and base, tones well with the buff side and rear panels, which are outlined by bronzed metal strips. Black indicators and a black handset and coiled cord complete the overall visual effect.

Apparatus

1 N9300 type miniature keys with wedge handles having inserts of contrasting colours in the tips so that an operated key is instantly discernible.
2 Totally enclosed twin-shutter miniature indicators N4832 type are employed; these operate and lock to ringing current and are released by pressing down a projection at the top of the plastic front cover.

Type N569

Type N566

3 Heavy - duty, rotating - magnet hand generator. A transistor ringing unit can be fitted if specially ordered.
4 Alarm buzzer and cut-off key.
5 Rocking-armature receiver.
6 Anti-side-tone induction coil.
7 The external wires are normally connected direct to the screw terminals in the switchboard but, if a flexible connection is preferred, a moulded terminal block and 72in (1829mm) long black cord can be supplied as an extra.
8 Full tropical finish.
9 PVC insulated wires.

Batteries

Two 3V batteries, one for the operator's telephone circuit and one for the audible alarm circuit, are required. They are supplied only when specially ordered. When a transistor ringing unit is fitted, the audible alarm battery should be 6V.

Dimensions (Casework)

Equipment Item	Height in (mm)	Width in (mm)	Depth in (mm)
12-line PMBX	$7\frac{3}{4}$ (196)	$21\frac{5}{16}$ (541)	14 (355)
25-line PMBX	$12\frac{1}{2}$ (317)	23 (584)	$9\frac{1}{2}$ (241)

Weights

Equipment Item	Code No.	Net Weight lb (kg)	Shipment Weight lb (kg)
12-line PMBX	N569	23 (10·4)	—
25-line PMBX	N566	56 (25·4)	4 Switchboards* 354 (160·6)

* multiple export pack

Ordering Information

When ordering please specify :
1 The type of switchboard, quoting its code number.
2 Quantity required.
3 Battery requirements.
4 If flexible connecting cord required.
5 If transistor ringing unit is required.

Type N566 open for maintenance

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MAGNETO

20+100 cord-type PMBX, indicator signalling

with auto, c.b. or magneto exchange lines

This switchboard may be used either as a private exchange with magneto extension lines only, or as a private branch exchange connected to an auto, c.b. or magneto public exchange. Twenty auto, c.b. or magneto exchange lines can be accommodated; magneto exchange lines may be either additional lines or converted extension lines. Extension capacity is 100 with 17 cord circuits, but stock units are available with 50 or 70 extension lines, 10 or 12 cord circuits and wired but not equipped for exchange lines.

For installations of from 100 up to 200 extensions, two units may be bolted together to form a two-position, non-multiple switchboard. When up to the maximum of 400 extensions is required, four units, with provision for multiple working, can be similarly installed. Where two or more positions are installed en suite, each is equipped with longer connecting cords and double pulley weights.

For magneto working, one speak/ring key per cord circuit together with a common ring back key are fitted. When auto exchange lines are to be connected, additional equipment includes one dial key per line and a dial.

Facilities

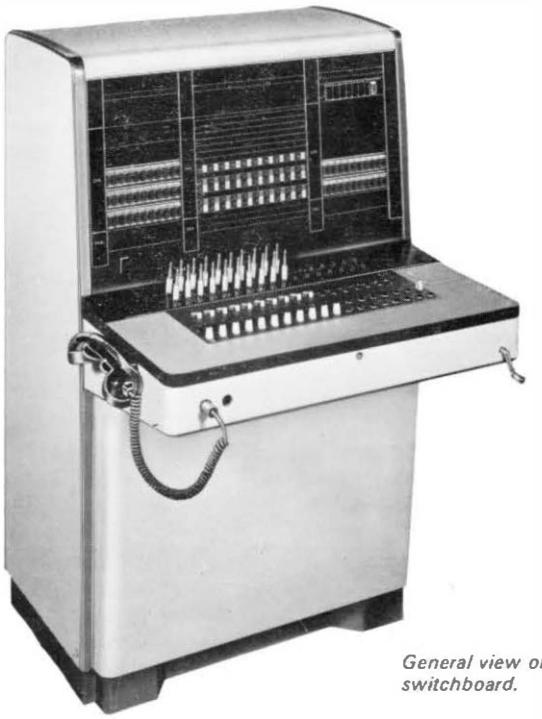
1 Single supervision when either party rings off.
2 Ring back.
3 Audible alarm.
4 Visual ringing indication.
5 Provision for auto, c.b. or magneto exchange lines.

Construction

A welded pressed-steel frame with integral plinth forms the main structure and component mounting, and is enclosed by laminated-wood panels. These are surfaced with hard-wearing, buff-coloured plastic, edged and secured with metal trims finished in glossy elephant grey stove enamel. In contrast, the face panel is coloured black and the key shelf buff linette. When two or more units are installed en suite adjacent intermediate side panels are removed and the units bolted together. Similarly, the front panel below the key shelf and the rear door can both be removed for convenience of access.

The face panel has indicators arranged in two groups on either side of the jack strips, and includes provision for equipment for other facilities as required. In addition, the jack panel has capacity for up to 100 multiple jacks for use when switchboards are multipled together. The key shelf is arranged with supervisory indicators and switching keys for cord circuits and miscellaneous facilities.

Internal equipment is positioned and mounted for maximum accessibility. Incoming cables enter via covered apertures in the open



General view of switchboard.

constructed plinth, and terminate on soldered terminal fields positioned at the bottom of the unit. For convenience of handling (e.g. during installation) the hinged key shelf can be raised and its apron lowered to reduce the depth by $8\frac{1}{2}$in (216mm). The weight of stock units varies depending upon the extension-line capacity.

Components

Switching keys and signalling indicators are of miniature type. The wedge-shaped ivory-coloured key handles are tipped in contrasting colour, rendering operated keys instantly discernible. Indicators have twin shutters which are restored by pressing the plastic window and, when operated, display a black numeral on a background of the same colour as the associated jack label.

Operating equipment, supplied as standard, includes a lightweight plug-in handset with rocking-armature receiver and a manually operated ringing-current generator. Alternative equipment, available in lieu of or in addition to, is a lightweight plug-in headset and a transistor ringing unit powered from a separate 6V source. On switchboards with auto exchange-line connection, a dial adjusted to transmit 10 pps with 2:1 break/make pulse ratio and with standard numbering, i.e. 1 to 0, is supplied as standard. Alternatively, a dial with any required adjustment and numbering can be provided if required.

Internal components are to British Post Office specification and are afforded tropical finish, i.e. with coils suitably impregnated and metal parts specially finished. Conductors are insulated with p.v.c. giving protection against moisture, fire, attack by insects and fungoid growth. Connecting cords are additionally protected by p.v.c. sleeving and nylon braiding.

Power

A 3 or 4·5V transmitter battery and a 3V night-alarm battery are required and may be housed within the switchboard.

Line Limits

For exchange-line working, using magneto Etelphones (catalogue sheet 7145) as extension instruments the maximum permissible loop resistance between the public exchange and extension is 1000Ω.

Dimensions

Height: 48in (1220mm)
Width: $30\frac{3}{8}$in (772mm)
Depth: 32in (813mm)

Weights (approx.)

1 Switchboard, between 188lb (85·3kg) net and 205lb (93kg) net

1 Switchboard, export packed, 345lb (156·5kg)

Ordering Information

When ordering, please supply the following information:

1 Specify switchboard code number N712 and detail the number and type of exchange lines (if required), also the number of extension lines and cord circuits.
2 State whether transmission circuit and night-alarm batteries are required.
3 For auto exchange-line working give details of dial numbering, pulse speed and ratio if other than standard.
4 State if transistor ringing unit and lightweight headset required in lieu of, or in addition to, standard equipment.

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PLESSEY TELECOMMUNICATIONS

4

Rural Unit Type Exchanges

RURAL 4

RURAX

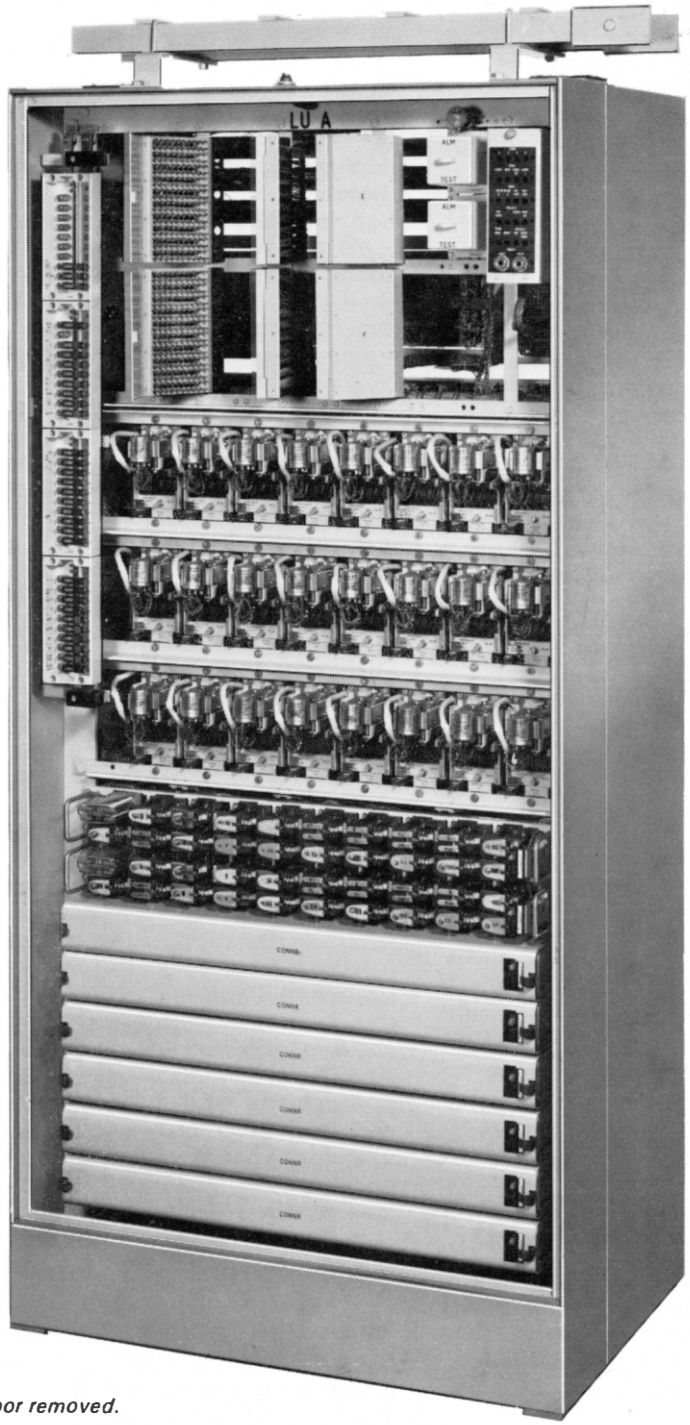
This is an economic, dependable system designed for rural communities requiring local area or nationwide trunk dialling. It caters for a wide range of facilities and easy growth in 50-line units up to 350 lines, and beyond this limit if necessary. Maintenance effort is minimal, as all switching is based on the step-by-step mode of operation and performed solely by relays and uniselectors. The overall equipment has a high-quality finish, is dustproof and capable of withstanding tropical conditions.

Numbering

3-digit scheme for capacity of 350, leaving levels spare for junctions, etc.
4-digit or mixed 3- and 4-digit scheme for beyond 350 lines.

Facilities

Fully automatic secret intercommunication, usually with calling-party release.
Forced release of switching equipment if dialling is unduly delayed,



Front view of a typical line unit with door removed.

or if the caller's handset is not replaced after conversation.
PBX hunting for up to 9 lines in each group of 50. Can be arranged as one number with 9 lines or a combination of numbers with smaller groups.
Prefix digit dialled for calls to (a) distant parent auto or manual exchange (b) adjacent exchanges.
Common or linked-numbering area working when arranged as a discriminating or trombone satellite exchange.
Single-fee, multi-fee or periodic metering.
Meter pulses may be received or transmitted according to the arrangement of junction circuits.
Incoming calls can be received from auto or manual exchanges. In the latter case, the manual-exchange operator can enter an engaged line, or re-ring without again setting up the connection.
Alarm test, reached by dialling, to give a tone signal indicative of a fault-alarm condition and the type of fault causing the alarm.
Alarm-extension signals to a nearby exchange or staffed location.
Long-line equipment provided for subscribers' lines exceeding 1000Ω.
Special services such as fire alarms.
Party-line working as an integral part of the system, usually where metering is not required. Any line may have party-line facilities.
Parties on a party-line normally have automatic intercommunication by dialling the relevant directory number.

Apparatus Units

Apparatus is housed in sheet-metal cabinets with removable front and rear doors. Polyurethane foam strip on the doors is compressed when the doors are in position, thus excluding dust. The doors can be fitted with locks if specified. The equipment has tropical finish, and p.v.c.-insulated connecting wires and cables. Cable normally has 20 or 25 s.w.g. (0·914 or 0·508mm) conductors.

Line Unit

The line unit is the basic Rurax unit. It is double-sided and may be equipped for up to 50 lines including junctions, so that with one MDF unit and the necessary power plant, it can constitute a complete exchange. Ringing current and tones are produced by transistor generators, and relays are used for pulse and tone interruption. Standby equipment with auto change-over is provided. Incoming cables terminate on the connection strips at the top front of the unit.
On the front left-hand side are alarm-type fuses; on the front right-hand side, battery jacks, fault isolation jacks, etc., and on the top of the cabinet a fuse alarm lamp. The connector and the ringing and tones relay sets are of jack-in type, as are junction circuits when fitted.

Group Selector Unit

This unit is usually necessary only for exchanges of over 50 lines. It accommodates a maximum of four pre-wired shelves bolted separately to the framework. Each shelf can be equipped with up to 16 heavy-duty uniselectors (2 per circuit) at the front, and associated relays arranged on jack-in mountings at the rear.
Bank multiple wires and incoming leads to switches terminate on connection strips on the rear of the shelf. Junction and special-service circuits terminate on a connection strip and are jumpered to the bank multiple strips as required.
Each shelf has an associated alarm-type fuse panel mounted on the busbars at the side. Spare-level, tone, and supervisory relays are at the top rear of the unit, and a fuse-alarm lamp is fitted on the top of the cabinet. In the top right-hand corner of the illustration may be seen the battery and fault isolation jacks.

Miscellaneous Apparatus Unit

This unit is provided only when the accommodation available on the line units, or elsewhere, for junction, toll, special-service, multi-metering and other circuits, is insufficient.
Although a standard layout is not possible, most requirements are normally met by providing accommodation for either 20 relay mountings and three shelves of eight uniselectors, or 24 relay mountings and two shelves of uniselectors.
All circuits terminate on connection strips to facilitate cabling on site, and each unit is equipped with fuse panels, fuse-alarm lamp and any other supervisory apparatus that may be necessary.

Equipment

Components include BPO Type 3000 and Type 600 relays and Type 2 heavy-duty uniselectors. Space is saved by using Type N44700 twin relays. Other apparatus, such as meters, protector mountings, fuse mountings, connection strips, is of standard BPO type.

Unit-Type MDF

The enclosed-type MDF unit is designed to line up with the switching equipment units, thereby reducing cabling costs. It comprises two verticals with a total capacity of 240 pairs of fuse mountings at the rear (where the external lines terminate) and 200 pairs of protectors incorporating electrodes, heat coils and test springs at the front. Rings are fitted for the cross-connecting jumpers. When two or more units are adjacent, the side-covers can be removed to permit inter-unit jumpering, in which case material is supplied to render the junction of the units dustproof.
When line-and-dial-testing equipment is required, it can be mounted either inside the unit (in which case the line equipment is reduced), or in a dustproof case at the side. A shelf and moulded telephone can be supplied as part of the testing equipment.

Open-Type MDF

An extensible open-type, single-sided main distribution frame for wall/floor fixing can be supplied instead of the MDF unit. The verticals are normally 8in (203mm) apart. Protectors and fuse mountings or connection strips can be accommodated. The usual allocation of circuits is 50 per vertical. A wall-mounted line tester (Type N22180B) complete with telephone can be provided with this MDF.

Power Equipment

The working voltage is nominally 50V. A single-battery float system is normally supplied, but a duplicate-battery arrangement can be provided for greater security or for quick recharging after supply failure. Equipment is tailored to the requirements of particular exchanges.
With a single-battery float system, the capacity of the battery supplied depends upon the period of reserve required in case of supply failure. This period is normally 24 hours. The 24-cell battery is 'floated' across the closely regulated output of an automatic float-charge rectifier unit. The output of the charging unit is sufficient to cover the busy-hour load and thus the battery is

maintained in a fully charged condition. Voltage regulation of the charging unit is by transductor control, and the output is smoothed to CCITT standard.

Telephones

Etelphones (catalogue sheet 7145) are recommended for subscribers' telephones. However, any telephone equipped with a non-locking pressbutton and incorporating a dial with a 2:1 break/make ratio and pulsing speed of 10 p/s may be used.

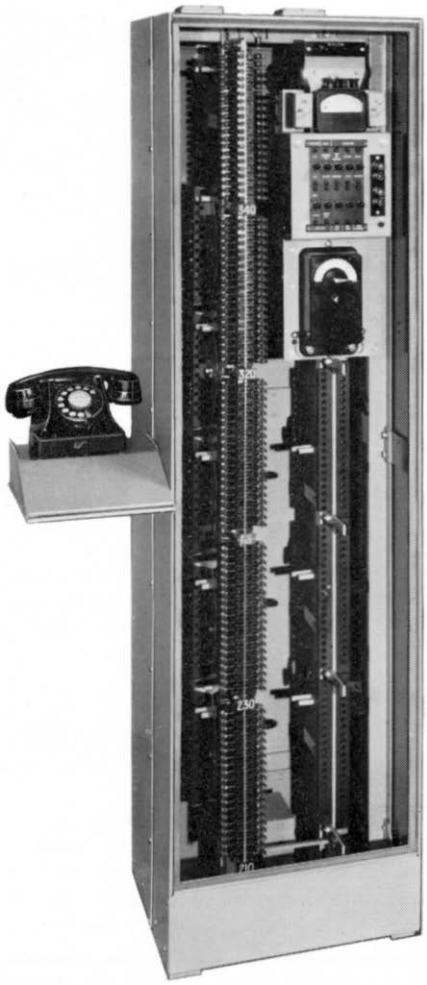
Ordering Information

When ordering, please provide information 1 to 6 as appropriate:

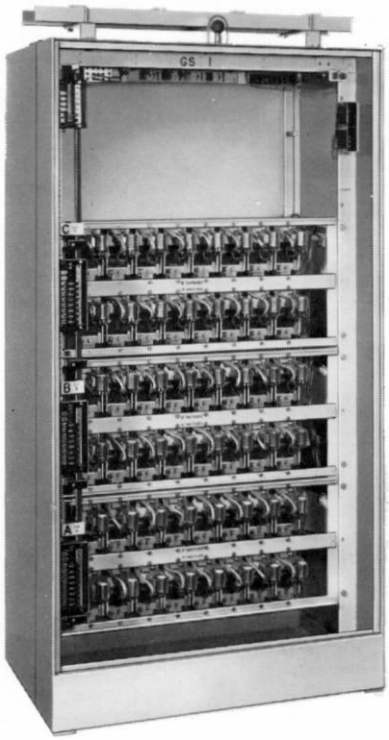
1 Initial and ultimate requirements.
2 Special facilities required, also miscellaneous items such as tools, spares, and loud-ringing bells.
3 Local mains voltage and frequency.
4 Number of subscribers' telephones required.
5 Dimensions of proposed apparatus room, including clear height. (*Note:* a typical floor plan can be provided on request.)
6 Existing equipment and units (if any).

Dimensions

Item	Height inches (mm)	Width inches (mm)	Depth inches (mm)
Line Unit and Misc. Unit	63 (1600)	30¾ (781)	21 (533)
Group Selector Unit and Relay Set Unit	63 (1600)	34¼ (870)	21 (533)
MDF Unit	63 (1600)	17¼ (438)	21 (533)
Open-Type MDF	81¼ (2064)	—	—



Front view of MDF unit fitted with testing equipment.



Partially equipped group selector unit.

Rear view of typical line unit with gate open.

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Crossbar

Type 5005D Exchange

The 5005D Crossbar exchange provides 24-hour automatic telephone service for small communities requiring 100 to 1,000 subscriber lines. Its minimal maintenance requirement, necessitating only occasional attendance, makes it an ideal exchange for use in remote locations.

The exchange can accommodate most numbering schemes, including mixed and 'unified national' numbering. Although only a 3-digit numbering scheme is required within the exchange, up to 7 digits may be dialled; in excess of 7 digits, auxiliary storage circuits are introduced.

Facilities

Full automatic secret intercommunication, with calling-party release.

Forced release with line lock-out if dialling is unduly delayed, or if the caller's handset is not replaced after conversation.

PBX working for groups of two or more lines in any 100-line distributor, without the need for sequential numbering.

Incoming, outgoing junction and transit calls.

Single-fee or periodic metering.

Metering over junctions, the meter pulses being received or transmitted according to the arrangement of the junction circuits.

Trunk offering on incoming-junction calls.

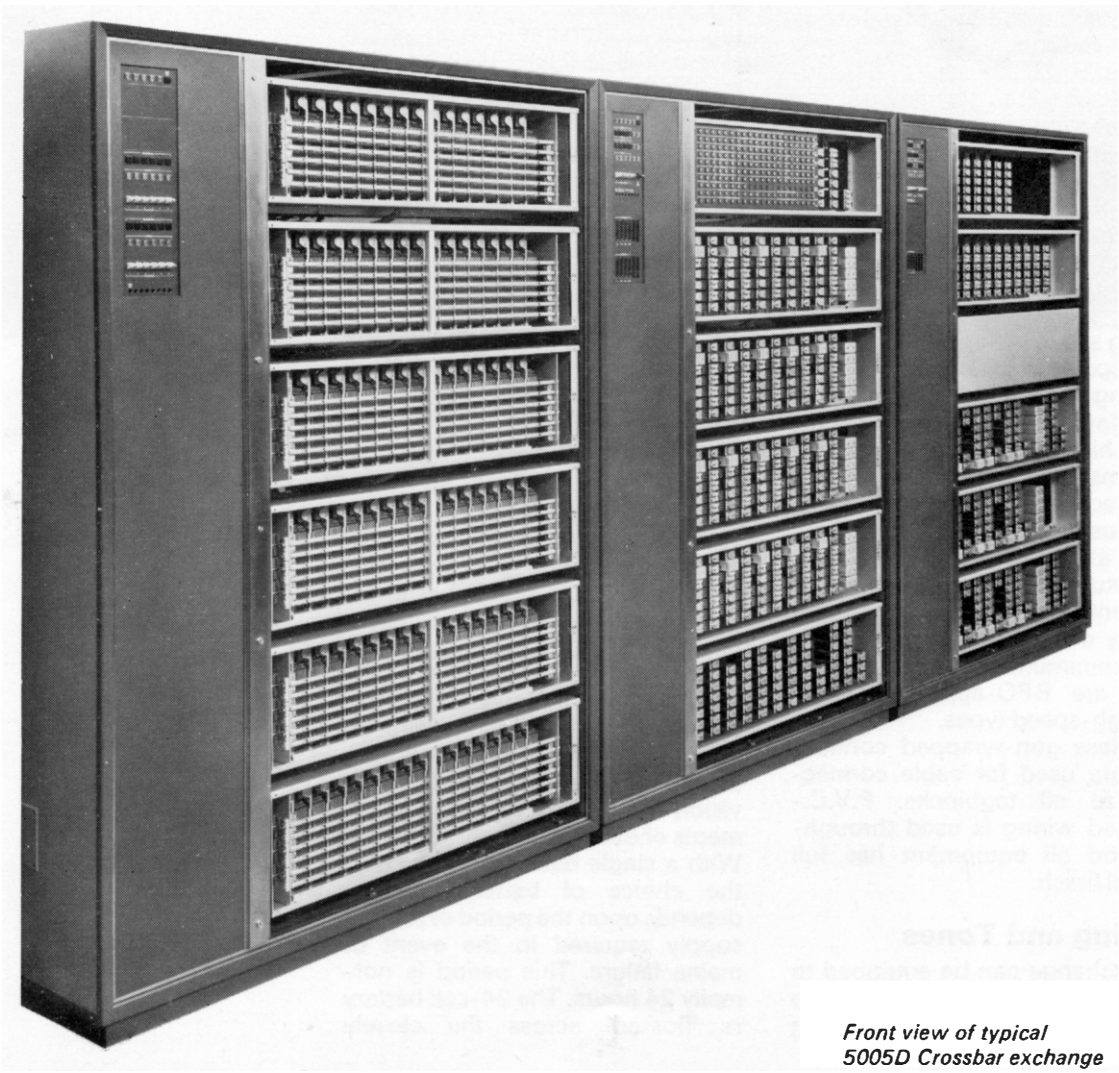
Alarm test, reached by dialling to give a tone signal indicative of a fault-alarm condition and the type of fault causing the alarm.

Alarm-extension signals to a nearby exchange or staffed location.

Long-line equipment provided for subscribers' lines exceeding 1400Ω.

Automatic repeat attempt at setting up a speech path if the initial attempt does not succeed.

Special services such as fire, police, and recorded announcements.



Front view of typical 5005D Crossbar exchange

Line testing from test desk or test case.
Faultsman's ringback.
Fault analysis meters.
Cold-cathode tube display of switches and common equipment used in establishing a call, and the path rejected and nature of fault if call failure occurs.

Trunking

The 5005D exchange uses the link principle of trunking, with register control of routing. Selection of a free speech path is obtained by the well-tried self-steering principle as used in the 5005A main exchange. With this arrangement connection is made between two terminal points via a number of switching stages; simultaneous marking signals are applied to the two terminal points and a circuit via one of the available paths is completed without the aid of any external control circuits.

Exchange Suite

This consists of sheet-metal cabinets fitted front and rear with clear-plastic inspection panels; these are retained by vertical stainless-steel strips.
Each cabinet houses a double-sided apparatus framework of angle-section steel and is finished in the following attractive colour scheme:

Loam brown: interior and unit framework.

Hemp beige: side and top panels.

Lacquer red: removable face panels, giving access to external cabling areas.

The apparatus units of the 5005D exchange consist of standard shelf mountings of standard dimensions. All are hinged or of plug-in-type to assist installation and maintenance and equipped with crossbar switches and associated relays, relays alone, or combinations of apparatus. The crossbar switches and control relays are of the latest Plessey design, ensuring long life with minimum attention; other relays are BPO-approved major and high-speed types.
Solderless gun-wrapped connections are used for cable connections to all tagblocks. P.V.C.-insulated wiring is used throughout, and all equipment has full tropical finish.

Ringing and Tones

The exchange can be equipped to provide tones and periodicities to Administration requirements. Ring and tone frequencies and the ringing current are generated by transistor-type oscillators powered from the 50V exchange supply.

System Reliability

The unit construction principle of the exchange is used to give high system reliability, independent of component reliability. Each switching unit is continuously monitored and switches itself out of service if failure occurs. Provision is also made for checking that a call has been successfully established, and for a second attempt to be made via a different path if the check shows the first attempt failed to succeed. These and other fault-tolerant features enable service to be maintained with only a small loss of efficiency until it is convenient to take remedial action.

Maintenance Aids

To facilitate quick location of faults when the exchange is visited, several in-built and portable devices are provided. These include a central-alarm display panel; a path indicator (illustrated) showing the faulty speech-path seized and nature of fault; fault-analysis meters for registering the number of faults and amount of congestion in vital equipment; a register/sender tester, and a test desk or line-test case.
Test-access points and keys are provided throughout the equipment for functional testing of any circuit.
Testing can be arranged from a remote test desk via a 4-wire junction and using the trunk-offering facility.

Power

The working voltage is 46-54V (50V nominal). For loads over 100A (i.e. exchanges with approximately 800 subscriber lines) a duplicate battery float system is used. Below 100A loading, a single battery float system is normally supplied, but a duplicate battery system can be provided for greater security or quicker charging after supply failure. Equipment provision is tailored to the requirements of each exchange.
With a single battery float system, the choice of battery capacity depends upon the period of reserve supply required in the event of mains failure. This period is normally 24 hours. The 24-cell battery is 'floated' across the closely regulated output of an automatic float-charge rectifier unit. Voltage regulation of the charging unit is by transductor control and the output is smoothed to CCITT standard.

Line Limits

The maximum subscriber-line loop resistance at 50V is 1400Ω, excluding the telephone. This limit can be considerably increased by the use of long-line equipment.

Traffic Capacity

The exchange combines high traffic-handling capacity (0.11 erlang, bothway, per line) with an acceptable grade of service.

Dimensions

Item	Height in	Height (mm)	Width in	Width (mm)	Depth in	Depth (mm)
Apparatus racks	70	(1778)	51	(1295)	22½	(572)

Weights (Approx.)

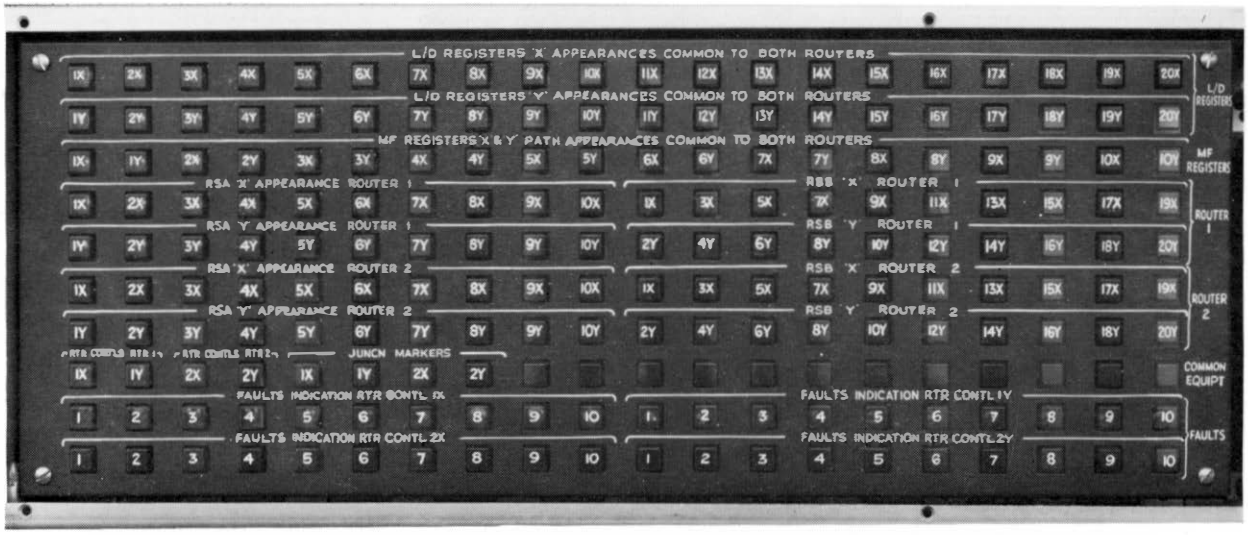
Fully equipped units	Weight			
	Net lb	Net (kg)	Gross : crated lb	Gross : crated (kg)
Line unit	1400	(635)	1900	(862)
Router unit	1350	(612)	1850	(839)
Misc./junc. unit	1150	(522)	1650	(748)

Ordering Information

When ordering, please supply information 1 to 8 as appropriate :

1 Initial and ultimate traffic and lines, including junction and special service lines.
2 Existing equipment, if any.
3 Types of junction and signalling systems with which the exchange is required to work.
4 Numbering scheme.
5 Metering requirements.
6 Local mains voltage and frequency.
7 Dimensions of proposed apparatus room, including clear height.
8 Number and types of telephones required.

Path-indicator maintenance aid



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ET100

Rural Unit-Type Exchanges

This exchange is extensible in units to approximately 2000 lines capacity. The basic unit incorporates line and switching equipment for up to 100 subscribers and, together with a main distribution frame and power plant, comprises all that is required for a small exchange. The equipment is easy to install, extend and maintain and features economy of cost and floor space. The standard units may be held in reserve by an administration and used to extend service on demand. An ET100 exchange may be a terminal exchange, a discriminating satellite, or function with a sleeve-control manual board as a group-centre exchange.

Numbering Scheme

This is usually arranged to suit customers' needs in the particular locality.

Facilities

Line lock-out; Line testing; PBX hunting; Subscriber's line-free indication by P-wire negative potential; Shared service; Strapping of any line as a coin-box circuit; Trunk offering; Unidirectional and/or bothway junction working; Long-line repeater working; Audible and visual alarms; Prompt and deferred alarms; Alarm check; Alarm extension; Malicious-call trap; Traffic recording; Positive-battery metering may be periodic or multi-metering; Local metering or metering back over junctions.

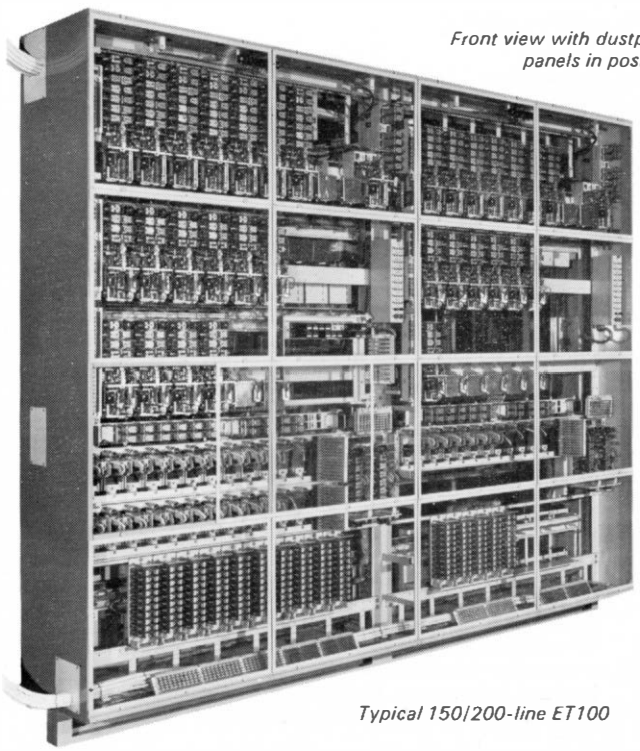
Equipment Unit

This is a double-sided unit accommodating switching equipment for 100 lines. The exterior is enamelled green, and the interior framework and equipment mountings are cream. Transparent plastic panels enclose the unit and minimize the ingress of dust and enable overall observation of the equipment. Maintenance is carried out while only exposing a small area of the unit; however, all equipment is fully accessible and, where possible, is hinged or on jack-in mountings.

Line-terminal fields, battery jacks and connection strips for jumpering and grading are arranged so that they are accessible without disturbing the panels enclosing the switching equipment.

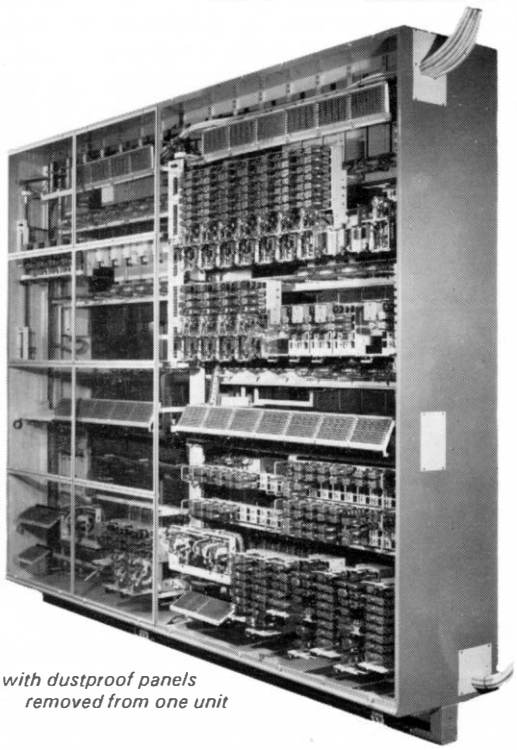
The exchange equipment includes standard BPO components such as Type 2 heavy-duty uniselectors, Type 2000 two-motion 100-outlet selectors and Types 12 and 3000 relays. Components have tropical finish to ensure continuous trouble-free service in all climates. Connecting wires are p.v.c. insulated, and cables are additionally protected by an outer p.v.c. sleeve.

Transistor generators provide the ringing and tone supplies, the necessary periodicities being obtained by a relay circuit. Although this equipment is extremely reliable,



Front view with dustproof panels in position

Typical 150/200-line ET100



Rear view with dustproof panels removed from one unit

it is duplicated because of its common application. Changeover of these circuits is automatic in the event of failure, or it can be manual. Changeover can be done remotely by the maintenance engineer or the parent-exchange operator dialling a specified code.
For exchanges over 100 lines much of the common equipment, such as ringing, tone, and alarm equipment, does not need to be repeated on the second and subsequent units. Thus additional space is saved for special facilities and ranks of second selectors if these become necessary.

Traffic

Each fully equipped unit can carry originating traffic of 0·06e and terminating traffic of 0·067e per subscriber. This is based on a grade of service of 2% congestion with conditions of less than 1·5% of calls having a 3s delay in receipt of dial tone. To meet higher traffic requirements, less than the full capacity of subscriber lines would be connected to each unit.

Line Limits

At 50V the maximum subscriber line loop resistance is 1500Ω, including the telephone instrument.

Power Equipment

The working voltage is nominally 50V. For loads over 100A a duplicate-battery float system is used. Below 100A loading a single-battery float system is normally supplied; however, a duplicate battery arrangement can be provided for greater security or for quick recharging after supply failure. Equipment is tailored to the requirements of particular exchanges.
With a single-battery float system, the capacity of the battery supplied depends upon the period of reserve required in case of supply failure. This period is normally 24 hours. The 24-cell battery is floated across the closely regulated output of an automatic float-charge rectifier unit. The output of the charging unit is sufficient to cover the busy-hour load, and thus the battery is maintained in a fully charged condition. Voltage regulation of the charging unit is by transductor control and the output is smoothed to CCITT standards.

Dimensions

Item	Height in (mm)	Width in (mm)	Depth in (mm)
100-line unit	102 (2590)	54 (1372)	18 (457)

Weights

Item	Net lb (kg)	Gross lb (kg)
100-line unit (excluding dustproofing)	1891 (857.8)	2 crates 1925 (873.2) 1145 (519.4)
Dustproofing for 1 unit	206 (93.4)	326 (147.9)

Ordering Information

When ordering, please provide information 1 to 9 as appropriate:

1 Initial number of lines required.
2 Details of existing equipment, if any.
3 Quantities and types of junction and trunks required, and details of type(s) of exchange to which they are to be connected.
4 Whether for use as a terminal exchange, discriminating satellite or as a group centre exchange.
5 Whether it is to be incorporated in an STD type network.
6 Type of metering, if required.
7 Details of any additional services required, e.g. line testing, shared service etc.
8 Grade(s) of service required.
9 Local mains voltage and frequency.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

PLESSEY
Telecommunications

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PLESSEY TELECOMMUNICATIONS

5

Telephones

TELES 5

Auto, CB, Magneto, and Convertible

ETELPHONES

The ETELPHONE range combines high performance with attractive appearance and wide application. It includes the basic instrument (Type N1900) designed in conjunction with the British Post Office and caters for the following requirements:

Auto, c.b., or magneto working.

Conversion from c.b. to auto working, and vice versa.

Conversion from magneto to auto or c.b. working.

Conversion from table to wall mounting and vice versa.

Line performance regulation.

Pressbutton for additional switching or signalling functions.

Tropical finish, with components specially finished and treated to withstand extreme climatic conditions.

Amplified handset for users with impaired hearing.

Ringer volume control.

All versions are similar in external design and available in pleasing light-fast colours: black, ivory, concord blue, topaz yellow, lacquer red, two-tone green and two-tone grey for auto and c.b. instruments, and black, ivory, and two-tone grey for magneto instruments.

The instrument case and handset mouldings are of ABS copolymer, a high-impact material impervious to cosmetics, inks, oils and most chemicals.

Table telephones are complete with a moulded desk-connecting block in matching colour, and both table and wall instruments feature a convenient off-hook position for the handset.

The transmission circuit ensures maximum frequency response and line sensitivity over exchange lines with loop resistances up to 1000Ω, and includes (a) an induction coil with high anti-side-tone properties; (b) transducers of sealed capsule type to facilitate maintenance, and (c) contact springs tipped with precious-metal contacts to ensure maximum contact reliability.

The instrument ringer is designed for long life and freedom from adjustment after manufacture. It is of the single-coil type and employs a high-retentivity ceramic magnet with torsion reed suspension.

Instrument wiring is point-to-point with soldered connections.

Conductors are insulated with p.v.c., a material fully resistant to moisture, attack by insects and fungoid growth. Desk and handset connecting cords are additionally protected by p.v.c. sleeving. External conductors terminate on screw terminals on the instrument terminal field.

ETELPHONE Types

Auto or c.b.

These types are suitable for use as main or extension instruments. The automatic instrument is equipped with a BPO Type 21 dial, adjusted to transmit 10 p/s with 2:1 break/make pulse ratio. The dial number ring is fitted externally and bears standard numbering, i.e. 1 to 0. Alternatively, dials can be supplied with adjustments and numbering to suit customer requirements.

Type N1900– two-tone version

Type N1065 with handset in the off-hook position

Line regulation (when required) is provided by a plug-in automatic performance regulator, which limits sensitivity over short lines without affecting performance over long lines. If regulation is not required, the regulator can be inverted in the socket on the telephone base to form an unregulated telephone.
When a pressbutton is included for additional switching and signalling functions (e.g. shared service or operator recall) it is positioned immediately in front of the handset cradle and operates a microswitch secured to the main instrument bracket.
The button, which is coloured to match the telephone and inscribed with the appropriate legend, may be locking or non-locking according to application.

Magneto

Magneto versions are suitable for connection to exclusive lines or code-ringing party lines. Ringing current is provided by a press-button-operated transistor generator mounted within the telephone. Power for the generator and the transmission circuit is delivered by a common 6V battery installed near to the telephone.
Line regulation is by a fixed-attenuation pad, introduced into the circuit by strapping adjustments on the instrument terminal field.

Convertible

For use on existing magneto, central-battery-signalling (c.b.s.) or central-battery (c.b.) systems, this instrument is designed to save the expense of replacement when systems are modernised. It is similar to the magneto ETELPHONE and can be supplied with connections appropriate to any of the following conditions and is readily convertible to any other as required.

1 Magneto, with or without 0·5μF capacitor in the receiver circuit.
2 Magneto, loop clear.
3 Magneto, earth clear.
4 C.B.S. Nos 1, 2 and 3.
5 C.B. long line.
6 Auto „ „
7 C.B. extension on intermediate.
8 Auto „ „ „
9 Auto.
10 C.B.

Type N2208H (magneto). Similar to type N2908H convertible

Type N2128H (magneto). Similar to type N2188H (convertible)

Type N1341 (central battery) with pressbutton

Stock instruments are in tropical finish, and include a transistor generator, wiring for both a dial and a plug-in regulator, a 5000Ω ringer and capacitors within the ringer and receiver circuits.
A diagram is supplied with each instrument, indicating the various strapping adjustments and equipment requirements (where necessary) for conversions 1 to 10 above. Conversions do not affect the induction coil.

Dimensions

These are common to all versions of the ETELPHONE: $4\frac{7}{8}$in x $9\frac{5}{16}$in x $8\frac{7}{8}$in (124 x 237 x 225mm)

Weights (approx.)

1 Telephone (N1900): 3lb 12oz (1·7kg) net
50 Telephones (N1900) crated: 284lb (128·8kg)
(multiple export pack)

Ordering Information

When ordering, please state the equipment item and corresponding code number (where applicable) from the adjacent tables, together with the quantity required. Also provide following information 1 to 6 as appropriate.

1 For all telephones, amplified handsets, pressbuttons and conversion parts (c.b. to auto and vice versa), state colour required.
2 When ordering convertible telephone, specify the system on which it will be used.
3 When ordering conversion parts, state the telephone code number. For conversion c.b. to auto, give details of pulse speed and ratio and of dial numbering.
4 For key unit N93226A, state marking required on the pressbutton.
5 For auto instruments, give details of dial numbering, pulse speed and ratio if other than standard.
6 For auto and c.b. types, state whether standard or tropical finish is required.

Telephones

Type	Code No.	Remarks
Auto table telephone ,, wall ,, C.B. table ,, ,, wall ,,	N1900 N1065 N1340 N1440	Standard or tropical finish
Auto table telephone with pressbutton Auto wall telephone with pressbutton C.B. table telephone with pressbutton C.B. wall telephone with pressbutton	N1901 N1066 N1341 N1441	
Magneto table telephone ,, wall ,,	N2128H N2208H	Tropical finish only
Convertible table telephone ,, wall ,,	N2188H N2908H	

Auxiliary Items

Item	Code No.	Remarks
Automatic line regulator	N102960	For all types except Magneto N2128H and N2208H
Bell volume control	N95188	For all types
Amplified handset	N9508	For all types
Conversion parts: table to wall	N94762	For all types
Conversion parts: c.b. to auto	—	For Types N1900 and N1901
Conversion parts: auto to c.b.	—	For Types N1900 and N1901
Dummy button	N95183A	For convertible types
Resistor R5 (150Ω)	N23333A29	For convertible types for conversions listed 7 and 8
Battery 6V (4 x $1\frac{1}{2}$V cells) Battery box	N3752 (dry) N3785 (inert) N3252	For magneto types
Key unit with pressbutton	N93226A	For Type N1900 for conversion to Type N1901

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AUTO, CB AND MAGNETO

Amplified telephone handsets

These handsets are designed to assist users with impaired hearing, but can be used with advantage in some noisy locations where reception is difficult because of weak signals.

Two versions are available for replacement of standard handsets on Etelphone-type instruments. No modification is required to instrument wiring; connection to the telephone is the same as for a standard handset.

Both versions embody in the handle section a single-junction transistor amplifier, providing a maximum signal gain in excess of 20dB. Operating current for the amplifier is drawn from the same source as the instrument transmitter so that no additional battery is required.

Signal strength is adjustable by means of a miniature edgewise volume control which, as shown in the illustration, is adjacent to the receiver cap. The control knob is inconspicuous but conveniently manipulated by the hand in which the handset is held, without removing the handset from the ear. Clicks and other disturbances are limited by the overload characteristic of the amplifier which controls the power fed to the receiver.

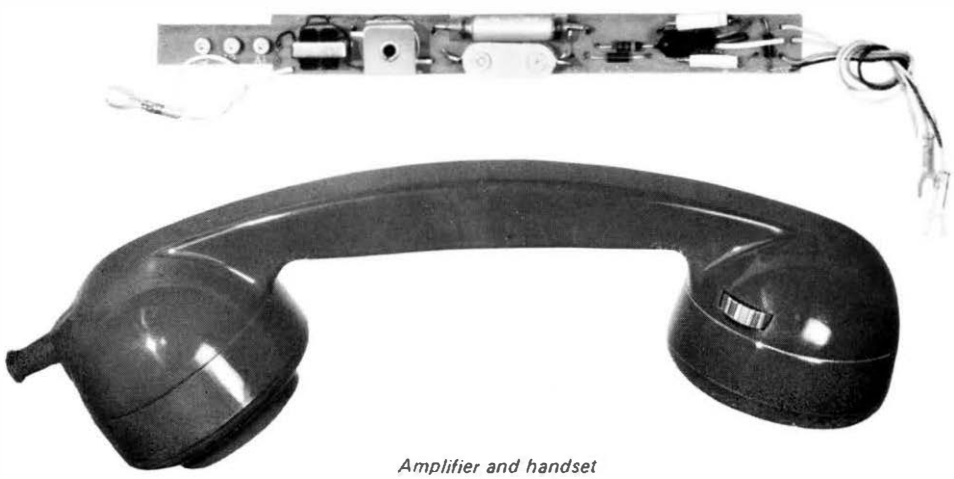
Weights *(approx.)*

One handset: 9¾oz (276g) net
200 handsets: 243lb (110·2kg) (multiple export pack)

Ordering Information

When ordering, please state the required types of handset and corresponding code numbers from the table below, together with quantities required.

Amp. H/S Code Nos.	Colours	For use with	Remarks
N9508A	Black, ivory, yellow, red, blue, grey, green	Auto/CB Etelphones and Plan Etelphones	See catalogue sheets 7145 and 7148
N9508E	Black, ivory, yellow red, blue, grey, green	Magneto Etelphones	



Amplifier and handset

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ZH1172/2M/4.71

AUTO, CB OR MAGNETO

All-weather Telephone

Every requirement for a weatherproof telephone for traction routes, building sites, etc., is met in the design of this instrument for wall, pole or post mounting. These requirements include compactness, light weight, robustness, durability, high-quality transmission, low cost, low maintenance liability, and security against unauthorized use. Provision for an Operator Recall pressbutton when specified is made in the auto and c.b. telephones.

Electrical characteristics equivalent to those of the BPO Type 746 telephone (catalogue sheet 7281) ensure wide frequency response and volume efficiency over lines of up to 1000Ω loop resistance.

Construction

The use of materials liable to corrosion is avoided. The enclosure, consisting of a base, a body and a hinged door, is of corrosion-resistant aluminium alloy; other parts are of brass, phosphor-bronze and high-quality stainless steel.

The body is a robust aluminium-alloy casting, webbed to form a solid internal shelf for the handset and drilled as necessary for the dial and/or pressbutton. Two screws inside the body secure it to the base, on which the remaining components are mounted.

The door—another aluminium-alloy casting—has brass hinges and a phosphor-bronze catch. It is channelled to mate with the rim of the body so that foamed Neoprene in the channel excludes moisture when the door is shut. The automatic catch is plunger-controlled, a single motion of the hand sufficing to release it and flip open the door. Self-closing doors, and doors equipped with locks are available to special large-quantity order.

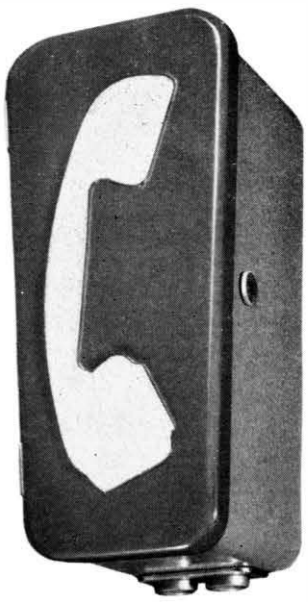
The stove-enamelled hard-aluminium-alloy base, with three hollow bosses on its underside for mounting purposes, fits well inside the telephone body and compresses a foamed Neoprene strip to make the joint weatherproof. Two brass bosses threaded for ¾in (19mm) dia. conduit are attached to the bottom of the base for the entry of external wires. For magneto working, a cast aluminium-alloy enclosure for the batteries is fixed to the bottom of the base; the conduit entries are then in the bottom of this auxiliary enclosure, and the incoming wires connect to a terminal block from whence they are permanently wired through an insulated hole into the telephone base.

Installation and Maintenance

Installation is facilitated by the telephone body being separate from the base, enabling the base to be fixed and the external wires terminated before the body is attached.

For maintenance, the body-fixing screws are released, the door is then closed to protect the handset,

The basic telephone assembly



Instrument case with telephone motif

and the body lifted down to hang suspended from the base by the nylon cord provided. Thus all components and wires are accessible.

Mounting Adapters

For pole fixing, a simple form of non-slip adapter is supplied, consisting of a suitably drilled plate with two stainless-steel worm clips. These are available in three sizes and adjustable to suit poles between 3in and 12in (76mm to 304mm) diameter.

The post-fixing adapter, suitable for mounting on a 2in (51mm) diameter post, consists of a spigot mounting casting of aluminium alloy, with vertical telephone-mounting plate.

Components and Finish

Components similar to those in the conventional BPO Type 706 telephone and therefore of proven reliability are used.

The handset, with temperature-resistant coiled cord, is moulded in high-impact plastic. The handset is held in position by a stainless-steel 'rest' at the receiver end and a phosphor-bronze clip at the bottom.

The dial number-ring has black characters on a white ground. Unless otherwise specified, dials have standard numbering and a 2:1 break/make ratio. The stainless-steel 4in (101mm) dia. ringer gongs are mounted on the underside of the base so that signals can be clearly heard.

A transistor ringing-current generator is contained within the magneto version and actuated by simple depression of a switch. A box for four ordinary torch cells is fitted at the lower end of the telephone.

Apparatus finishes are suitable for the tropics, and connecting wires are insulated with p.v.c., which is impervious to moisture and not subject to mould growth or insect attack.

The front of the telephone displays a raised silhouette of a handset in light grey to contrast with the darker background colour. The general interior and exterior hammer finish of the body is light-grey stoved enamel.

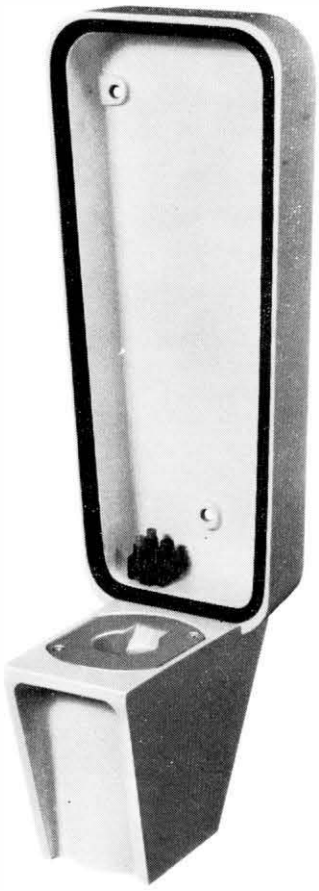
Ordering Information

When ordering, please state the equipment items and corresponding code numbers from the table below, together with quantities required. Also provide following information as appropriate:

(1) Wall, pole or post mounting. For pole mounting, give diameter of pole.

(2) Type of door, if other than standard manual-closing type.

Type	Dimensions			Weights	
	Height	Max Width	Depth	One telephone (net)	25 phones (multiple export pkd)
N1240A Auto without pressbutton N1241A Auto with pressbutton N1242A C.B. without pressbutton	12½in (311mm)	5¾in (146mm)	6⅝in (168mm)	10½lb (4·77kg)	374lb (169·6kg)
N1245C Magneto	17½in (444mm)	5¾in (146mm)	6⅝in (168mm)	14¾lb (6·69kg)	481lb (218·2kg)



Post-mounting adapter

Pole-mounting adapter

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Flameproof Table Telephone

Auto

These lightweight telephones comprise a table and portable type approved by the Oil Companies Material Committee in the UK for use in the petroleum and allied industries. Typical areas of application include offices, laboratories, control rooms, and tankers requiring temporary ship-to-shore communication.

The instruments are suitable for 1000Ω-loop working and are interchangeable with the earlier 600Ω-loop flameproof type. When required, extra facilities such as 'operator recall' or 'transfer' are catered for by a pressbutton situated in front of the handset.

The bell unit associated with each instrument is for permanent wall mounting and accommodates screw terminals for line connection. Before shipment, the unit is connected to the telephone by armoured, plastic-sheathed cable of sufficient flexibility to allow reasonable movement by the user. Since it is impracticable to flameproof the handset, it is made intrinsically safe by transformer coupling of the handset transducers with the remainder of the transmission circuit. The handset and cord have been satisfactorily tested in hydrogen by the Ministry, but flameproof certification for both types of set is limited to flameproof groups 2 and 3, BS 229–1957.

The telephone and bell-unit cases are made of silicon aluminium alloy and, to prevent unauthorised access, are secured by shrouded triangular-headed screws released by the special key provided.

Table Telephone

The telephone has four rubber feet secured by conventional screws to the base. This mates with the instrument body and is fixed by six triangular-headed screws.

The apparatus comprises a dial, transistor amplifier, plunger and pressbutton springsets, together with induction coil and capacitor. The dial mechanism, fixed to the telephone body, is coupled to the finger-plate by a spindle through a flameproof bearing. All other apparatus is unit-assembled on a bracket secured to the case by four screws. The telephone can be used as a c.b. instrument by locking the dial.

The handset rests on two roller-type plungers. When the handset is lifted, the rollers move over a plate which operates the springsets, the whole movement being practically frictionless.

Safety and high-quality transmission are assured by the use of rocking-armature transducers in conjunction with isolating transformers and an amplifier within an improved anti-side-tone circuit. The coiled, high-temperature resistant, p.v.c. handset cord, and the 4-way cord to the bell, are connected via glands to screw terminals in the terminal chamber at the back of the telephone.

Bell Terminal Unit

This unit is in two parts, hinged and fastened together by four screws. It is arranged for 3-point fixing and must be mounted vertically with the hinges to the left.

Flameproof auto telephone with bell terminal unit – type N1881A.

Screw terminals for line connections are in the base of the unit; the ringer is inside the cover, with the core irons and magnet extended through the metal to allow the armature and strike hammers to be under the dome. No adjustment is necessary with this type of mechanism. Four cable entries are provided, one having a gland for the telephone connecting cord, the remainder being threaded to suit a variety of connecting glands for the line cables, and an extension bell if required. Plugs for two entries are supplied as standard.

Portable Telephone

The portable telephone is used primarily for temporary ship-to-shore communication and consists of a telephone and bell terminal unit as described. Both are contained in an oiled and waxed hardwood case having a woven-fabric shoulder-carrying strap and brackets on the outside for storing the flexible cable. The lid of the case is stayed so that the telephone can be used while in the case. Cable, normally of metallic braided, p.v.c.-insulated type, is supplied to order. A flameproof cable plug, with associated socket for mounting on the jetty, can also be supplied. The telephone can be used as a c.b. instrument by locking the dial.

Dimensions

Telephone N1881 : $9\frac{5}{8}$ x $9\frac{1}{4}$ x 6in (244 x 235 x 152mm)
Bell Unit : $6\frac{1}{4}$ x $6\frac{1}{4}$ x $4\frac{1}{4}$in (159 x 159 x 108mm)

Weights

1 Telephone and Bell : $17\frac{1}{4}$lb (7·8kg) net
10 Auto Table Flameproof Telephones N1881A7, multiple export pack, with 10 glands : 285lb (129·2kg)

Ordering Information

When ordering, please state equipment items and corresponding code numbers from the table below, together with quantities required, and provide additional information 1 to 4 as appropriate.

1 For portable telephone, state whether pressbutton facility required.
2 For portable telephone, state length of connecting cable (if required).
3 For portable telephone, state if plug and socket are required.
4 For connecting gland for cable in conduit, specify outside diameter of conduit.

Equipment Item	Code No.	Remarks
Auto telephone without pressbutton	N1880A	All telephones complete with bell terminal unit. All telephones certified as follows : FLP4334 (telephone) } Groups FLP4335 (bell unit) } 2 & 3 Factory dept IS 3070 (handsets)
Auto telephone with pressbutton	N1881A	
Auto portable telephone with or without pressbutton	N29407A	
Connecting gland for s.w.a. cable	N89234A	For cable up to $\frac{3}{8}$in (9·5mm) dia. over inner sheath.
Connecting gland for t.r.s., p.v.c. or mineral insulated cable	N89240A	For cable up to $\frac{3}{8}$in (9·5mm) dia. overall.
Connecting gland for cable contained in conduit	N89247A	For conduit up to 1in (25·4mm) dia.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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ZB16/2k/1.73

Flameproof Wall Telephones

Auto and magneto

These telephones are designed for use in areas subject to fire hazard and are produced in two main patterns for connection to automatic, c.b. or magneto systems. For c.b. systems the auto telephone is used, with its dial locked. Both have the same general construction and, compared with previous types, offer reduced size and weight in addition to improved transmission performance.

Certification

Because it is impracticable to flameproof the handset and connecting cord, these components are made intrinsically safe by transformer coupling of the handset transducers with the remainder of the transmission circuit. The handset circuits have been satisfactorily tested in hydrogen by the Ministry, but flameproof certification is limited to flameproof groups 2 and 3, BS229–1957.

General Features

Each telephone is housed in an all-metal, silver-grey case equipped with a hinged door to protect the front of the instrument against possible damage.

The main apparatus, line-termination field and line-isolation switch are accommodated in separate compartments fitted with stove-enamelled, hammer-finished covers. These are fixed by triangular-headed screws to restrict access to authorised personnel issued with the special key provided with the telephone.

Installation is facilitated by the provision of open-ended wall-mounting lugs in the lower end of the case.

The main body of the instrument and the upper (main apparatus) cover are of cast iron, whilst the lower compartment covers are of silicon aluminium alloy, a material noted for its high resistance to corrosion and freedom from frictional sparking.

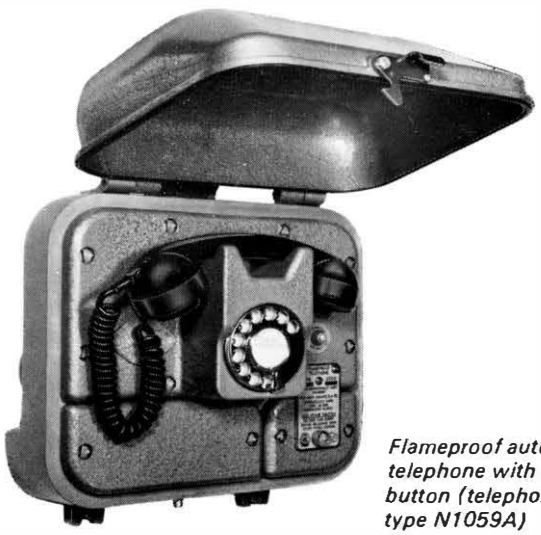
The door is opened by a straight pull on a stainless-steel slam catch, and can be raised to the horizontal and automatically latched in this position. If the instrument is installed outdoors, protection against the weather should be provided.

The isolation switch comprises a 3-pole microswitch interlocked with the main apparatus cover. Withdrawal of a captive screw in the isolation-switch cover causes the microswitch to release the interlock, so disconnecting the line and allowing the instrument to be serviced in complete safety in its fixed position.

The handset, moulded in high-impact-resistant material, incorporates rocking-armature transducers which are used with a sensitive anti-side-tone induction coil to ensure high-quality transmission on lines of up to 1000Ω-loop resistance, including the telephone. The handset cord, which is high-temperature resistant, is the coiled extensible type, and may be disconnected for maintenance without opening the main cover. Connecting wires are insulated with p.v.c.

Three cable entries in the underside of the case allow for the connection of line wires and an extension bell if required. The entries are threaded to accommodate various connecting glands

Flameproof telephone – closed view



Flameproof auto telephone with recall button (telephone type N1059A)

(see Ordering Information), and plugs for two entries are supplied as standard.

Special Features

The auto telephone features a trigger dial fitted with a 'fly-back' fingerplate; the dial has standard numbering and 2:1 break/make pulse ratio unless otherwise ordered. A pressbutton for operator-recall or line-intrusion purposes is an optional feature.

The 1000Ω ringer has two stainless-steel loud-ringing gongs of 4in (102mm) diameter fitted on the outside rear of the case; the striker arm projects through a flameproof bearing.

The magneto telephone is equipped with a hand generator of rotating-magnet type and a 2000Ω ringer. A 3V intrinsically safe inert battery can be accommodated in the main compartment; the battery is arranged for plug-in connection.

NOTE: Only intrinsically safe batteries with integral current-limiting resistor should be used with this type of magneto telephone.

Dimensions

Height: $13\frac{7}{16}$in (341mm)
Width: 13in (330mm)
Depth: $7\frac{5}{16}$in (181mm)

Weights (approx.)

1 Magneto telephone with gland: 74lb (33·5kg) net

1 Magneto telephone with gland: export pack: 98lb (44·4kg)

Ordering Information

When ordering, please state equipment items and corresponding code numbers from the table below, together with quantities required.

Equipment Item	Code No.	Remarks
Auto telephone without pressbutton	N1058A	Certificates FLP 4683 Factory dept IS 3186 (hydrogen, ethylene, pentane)
Auto telephone with pressbutton	N1059A	
Magneto telephone	N2987A	
Connecting gland for s.w.a. cable	N89234A	For cable up to $\frac{3}{8}$in (9·5mm) dia. over inner sheath
Connecting gland for t.r.s. or mineral insulated cable	N89240A	For cable up to $\frac{3}{8}$in (9·5mm) dia. overall
Connecting gland for cable in conduit	N89247A	For conduit up to 1in (25·4mm) dia. Please specify dia. of conduit
Intrinsically safe 3V inert battery	N3783	For use with magneto telephone N2987A

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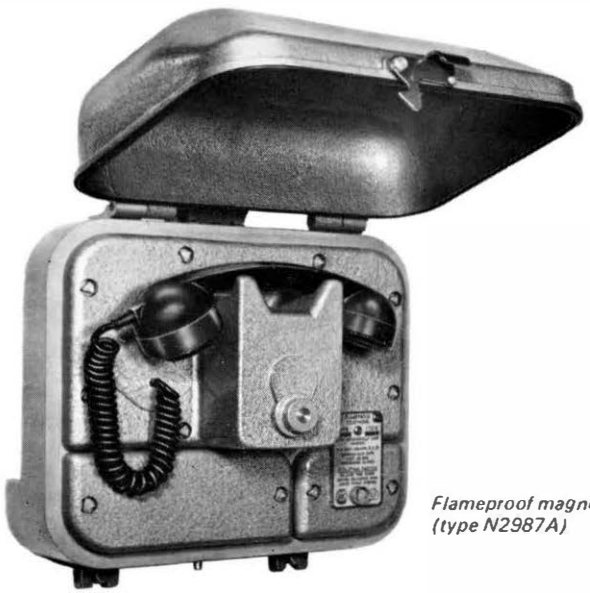

Flameproof magneto telephone (type N2987A)

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AUTO OR CB

Pendant Telephone

The conventional telephone and its cords occupy desk space which may be required for other purposes. This small pendant telephone, which can be installed on the side of a desk or on a partition, is the ideal alternative for reception areas, booking offices, lifts, corridors and other situations where table space is limited or unavailable. It is suitable for auto or c.b. systems and is fitted with a press-button switch for operator recall or shared-service facilities when required. Its transmission characteristics are the same as those of the Etelphone (see catalogue sheet 7145).

The instrument case and Etelphone-type handset are tough plastic mouldings; the coiled handset cord is p.v.c. insulated.

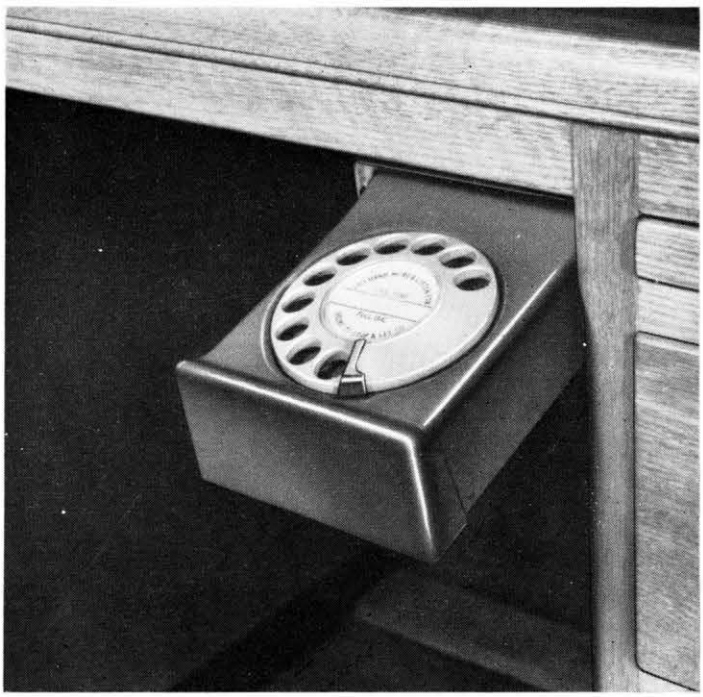
Only the cradle switches and the pressbutton switch together with screw terminals for the external connecting wires are accommodated in the set; the induction coil, capacitors and automatic regulator are in a separate bell set which also contains screw terminals for the line wires. The bell-set, which has a plastic moulded snap-on cover, can be installed wherever convenient.

For auto systems a separate dial unit is provided, suitable for mounting in the knee-hole of a desk as in the illustration. It consists of a metal case, containing a moulded plastic drawer in which a standard dial is inset. Two coiled springs unwind when the drawer is pulled out for use, and automatically retract it into the case when the drawer is raised to the horizontal position. Screw terminals are provided for the connecting wires.

The standard colour of the bell unit, dial unit and telephone handset is elephant grey; the telephone case is french grey.

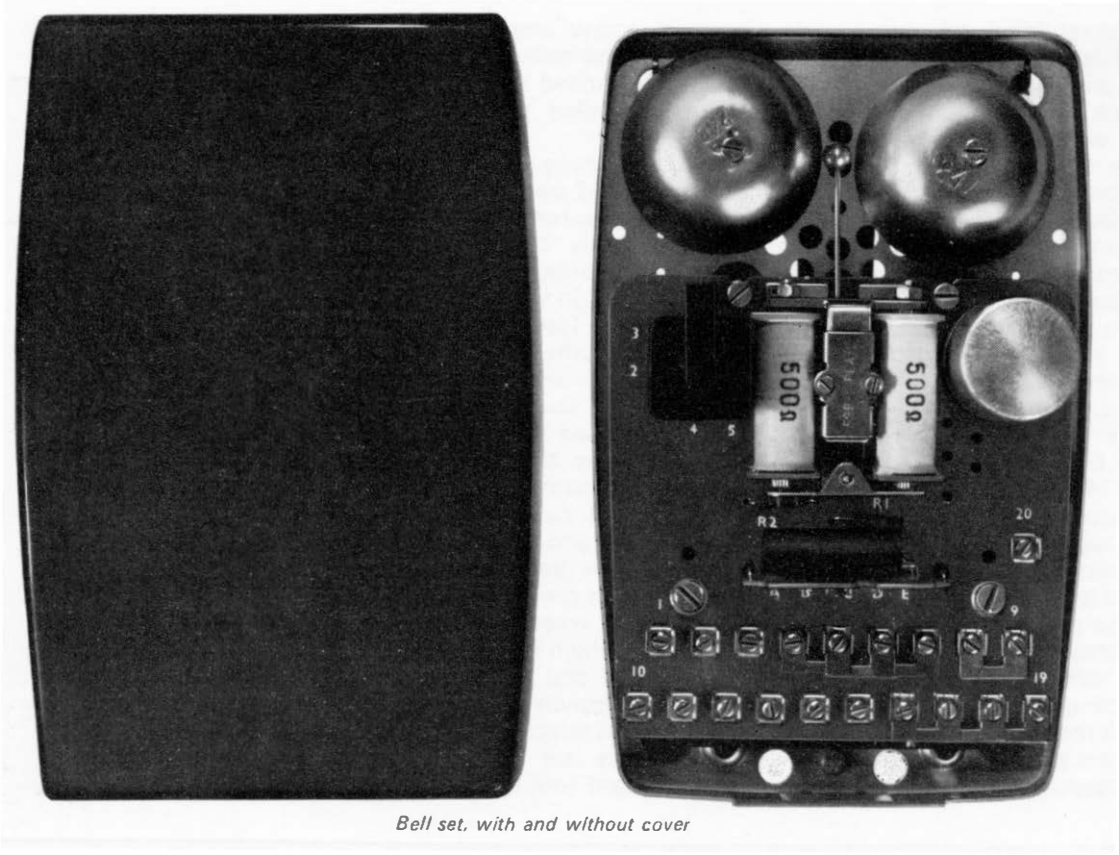
Connecting wires are insulated with p.v.c. which is moistureproof, fire-resistant and not susceptible to fungoid growth or insect attack.

The pendant telephone and associated units are available only with standard (not tropical) finish.



Dial Unit fitted in the knee-hole of a desk

General view of telephone



Bell set, with and without cover

Dimensions

Item	Height in (mm)	Width in (mm)	Depth in (mm)
Telephone (with pressbutton)	9 (229)	3 (76)	4 (102)
Bell Set	$8\frac{1}{4}$ (209)	$5\frac{1}{2}$ (140)	$2\frac{1}{4}$ (57)
Dial Unit	$2\frac{1}{2}$ (63)	3 (76)	7 (178)

Weight (Approx.)

Item	Code	Net Weight lb (kg)
Telephone with pressbutton	N24466E1	$1\frac{3}{8}$ (0·62)

Ordering information

When ordering, please quote the equipment items and corresponding code numbers, and quantities required.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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Telecommunications

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ZB12/2k/1.73

Plan-Etelphone Systems

Systems 1 and 3 described in the following pages represent simple exchange-connected extension plans, providing a low-cost dependable telephone service. They are particularly suitable for small organisations, and fulfil all main requirements for extension plans covering secretarial, parallel-extension, external-extension and dual exchange-line working. Connection can be made to any type of automatic or c.b. exchange, public or private.

The Plan Etelphone

The Plan Etelphone is the basic instrument for all extension plans, and is a variant of the Etelphone (see catalogue sheet No. 7145). Desk and wall-mounted versions are available.

The instrument case and the handset are moulded in high-impact plastic and produced in black, ivory and two-tone grey. Colours are virtually light-fast, ensuring a close colour match of replacement parts.

The handset cord is the coiled extensible type, sheathed in p.v.c. and coloured to match the telephone. Instrument colour matching also applies to the desk block and its associated line cord, provided the number of line-cord leads does not exceed six. In excess of this number the desk block and line cord are provided in elephant-grey.

A carrying handle and performance regulator unit are included in the instrument.

The dial (when fitted) has a clear-plastic finger plate, standard numbering (i.e. 1 to 0) and transmits 10 p/s with 2:1 break/make pulse ratio. Alternatively, dials can be supplied with any desired numbering, pulse speed and ratio.

Main Features

Pressbuttons arranged in line above the dial are locking and/or non-locking and up to four in number.

Locking pressbuttons are arranged to have:

Automatic release after depression of the switch-hook or another in-line locking pressbutton.

Manual release by means of an integral sliding cap. (*Note:* a pressbutton with this action provides simple on/off switching for such purposes as instrument-bell control.)

A fifth pressbutton is incorporated to the right above the dial when transfer or recall facilities are required.

In-line pressbuttons are forest-green on ivory telephones and elephant-grey on black and two-tone-grey instruments. Dummy pressbuttons, when fitted, are the same colour as the handset.

Visual signalling is provided, the lamp lens being accommodated in the left-hand area of the case above the dial.

Audible signalling is by a.c. bell and buzzer. Either or both units may be incorporated in the telephone according to the extension-plan requirements and can be supplemented by similar wall-mounted units.

The a.c. bell signals incoming calls from the main exchange. In-built transistor ringing generators provide a.c. ringing current for external-extension signalling. The d.c. buzzer signals calls between internal extensions situated in or near the same building.

Typical Plan Etelphone

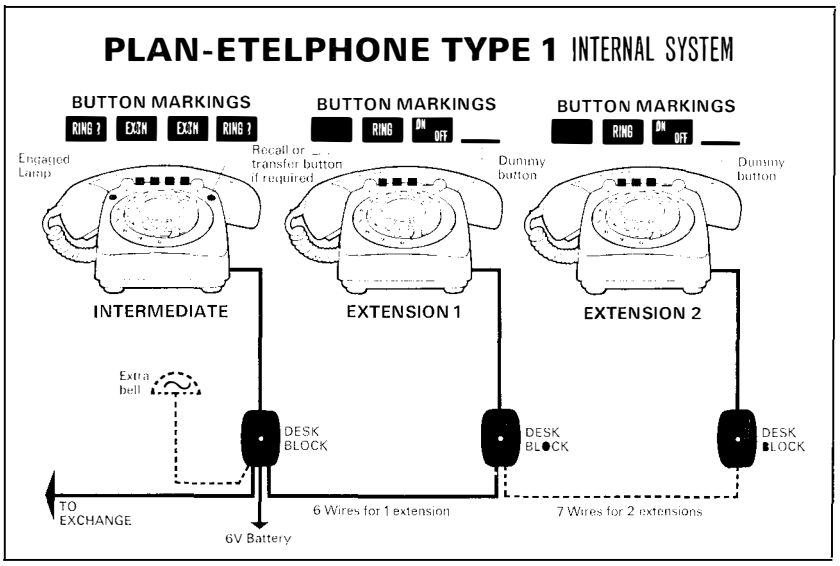
Line limits between internal extensions with 6V local signalling allow for loop resistances of up to 10Ω, this being equivalent, for example, to approximately 200ft (61m) of 6½lb/mile (0·5mm) conductor. Between an external extension and the main exchange the loop resistance may be up to 1000Ω.

Additional Features

Tropical finish with coils suitably impregnated and metal parts specially finished.
Handset amplifier for users with impaired hearing. Gives finger-tip control of the level of reception (see catalogue sheet No. 7150).
Operator recall enabling the user engaged on an exchange call to recall the PBX operator for enquiry or call-transfer purposes.
Conversion parts to equip c.b. instruments for auto working and table instruments for wall mounting.

Power Requirements

When required, local power supplies for signalling and transmission can be derived from a 6V dry battery, or a 6V 1A power unit connected to the mains supply (100 to 110V or 200 to 250V a.c.).



Plan-Etelphone Type 1

Internal System

AN INTERMEDIATE TELEPHONE WITH EXTENSION SWITCHING AND INTERNAL EXTENSIONS HAVING DIRECT EXCHANGE-LINE ACCESS.

This Plan system is suitable for up to two executives served by one exchange line and requiring incoming calls to be filtered at an intermediate (secretarial) point. Basically similar to BPO plans 105 and 105A, it provides two significant service features: (a) the automatic holding of exchange calls at the secretary's intermediate telephone and (b) direct access to the exchange line from the executives' extension telephones, dispensing with the need for secretarial assistance.
The intermediate (secretary's) telephone is simple to operate. It incorporates four pressbuttons. The outer two, designated RING 1 and RING 2, are used for selective calling of extensions; the inner two, designated EXCH and EXTN, are for switching functions. Exchange calls are answered by pressing the EXCH button and then offered to either extension as required by first pressing the EXTN button, followed by the appropriate RING button.
The exchange call is held automatically while the call is offered, and is transferred automatically when the handset at the intermediate telephone is replaced. Should the extension user not accept the call, the EXCH button is re-pressed to permit return to the exchange line.
If the intermediate instrument is temporarily unattended, an exchange call can be signalled at either extension on manual release of the bell on/off pressbutton, and the call accepted. During exchange calls at either extension, the 'engaged' lamp glows at the intermediate.

Main Facilities

Intermediate to exchange with buzzer available for extension calls. Extensions cannot overhear.
Intermediate to extension with bell across the exchange line. The secretary at the intermediate can ring and speak to either extension.
Information call from intermediate to extension while the exchange line is held. The exchange caller cannot overhear.
Transfer of exchange calls from the holding circuit to the wanted extension.
Direct access to the exchange line at both extensions when all buttons at the intermediate are normal.

Additional Facilities

Secrecy on extension-to-exchange calls by simple strap adjustment. If non-secret working is imposed, the intermediate (secretary) may join the conversation.
Intermediate recall permits either extension user to recall the intermediate during an exchange call. The 'engaged' lamp glows at the intermediate when either extension engages the exchange line.
Selective calling from the intermediate to either extension, if there are two.
Direct calling from either extension to the intermediate.
Extension-to-exchange calls made direct without switching through at the intermediate.
Exchange calls received at either extension when the intermediate is unattended.

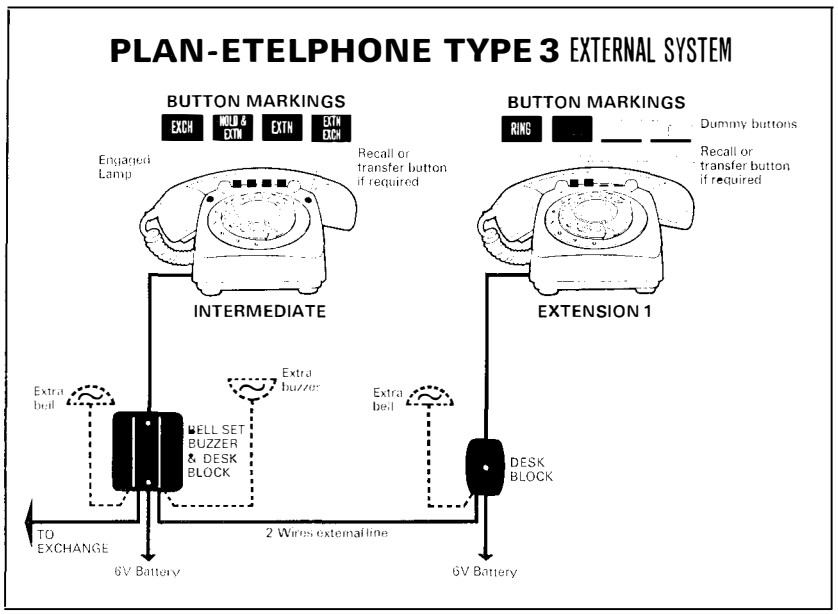
Power and cabling

A 6V battery or power unit is required at the intermediate instrument.
Cable supplied as required; 6-way for installations with one extension and 7-way for installations with two extensions.

Plan-Etelphone Type 3

External System

AN INTERMEDIATE TELEPHONE WITH EXTENSION SWITCHING AND AN EXTERNAL EXTENSION.



This Plan system is suitable for users with one exchange line serving two locations some distance apart; for example, a shop and associated warehouse. It consists of an intermediate and an external-extension telephone connected by a 2-wire line. Bothway signalling between intermediate and extension is by in-built transistor ringing units.

The loop resistance between the external extension and the main exchange can be up to 1000Ω.

At the intermediate telephone, four locking pressbuttons are provided for the following switching and signalling functions:

Intermediate to exchange with a.c. buzzer across the extension line. Extension cannot overhear.

Intermediate to extension with a.c. bell across the exchange line.

Information call with the exchange line held. The exchange caller cannot overhear.

Extension to exchange direct. Calls can be secret or non-secret from the intermediate.

Incoming exchange calls are normally answered at the intermediate, and are held when offered to the extension. The call is transferred automatically when the EXTN–EXCH button at the intermediate telephone is operated. Should the extension user not accept the call, the intermediate user may return to the exchange line by pressing the EXCH button. During extension-to-exchange calls the 'engaged' lamp glows at the intermediate.

Facilities

Intermediate to exchange with a.c. buzzer across the extension line. The extension cannot overhear.

Intermediate to extension with a.c. bell across the exchange line.

Information call from intermediate to extension, with the exchange line held.

Extension to exchange direct. When the extension handset is in position, the intermediate-telephone bell is connected across the exchange line to signal incoming exchange or extension calls.

Transfer of exchange calls from the intermediate to the extension.

Return to the exchange line if not required to transfer an exchange call after an information call.

Secrecy on extension-to-exchange calls by strapping adjustments.

Engaged lamp signal given at the intermediate during extension-to-exchange calls.

Ring extension condition applied by overpressing the EXTN switching button, thus avoiding the need for a separate button.

PBX recall or transfer button provided if required.

Power and cabling

A 6V battery or power unit is required at the intermediate and extension instruments.

A 2-wire cable is necessary between the intermediate and extension telephone.

Dimensions

Equipment Item	Height in (mm)	Width in (mm)	Depth in (mm)
Telephone	$4\frac{7}{8}$ (124)	$9\frac{5}{16}$ (237)	$8\frac{7}{8}$ (225)
Power unit	$4\frac{5}{8}$ (117)	$6\frac{1}{2}$ (165)	$4\frac{5}{8}$ (117)

Weights (approx)

Equipment Item	Code No.	Net Weight lb (kg)	Shipment Weight lb (kg)
Telephone (for both types of extension plan)	N1906	$4\frac{1}{8}$ (1·87)	*Fifty telephones 356 (161·4)
Power unit	N23801 B	$5\frac{1}{2}$ (2·5)	*Twenty power units 170 (77·1)

*multiple export pack

Ordering Information

When ordering, please state required extension plan and supply information 1 to 6 as appropriate.

1 Colour of telephones.
2 Any additional features required (see "additional features").
3 Amount of interconnecting cable (if required).
4 Whether one or two extensions required for plan type 1.
5 Whether for auto or c.b. working.
6 Details of local mains voltage and frequency if power unit required.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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Secretarial system Mk. VI

with auto or c.b. exchange lines

This flexible 2-station system for principal and secretary ensures the busy executive freedom from the distraction of answering unimportant telephone calls and provides the following main facilities:
The secretary (Control Station) and principal (Terminal Station) have access to a joint exchange line, intercommunication facilities, and, if required, an exclusive extra exchange line at either or both stations, i.e. a maximum of three exchange lines.
Incoming calls on the joint line are answered by Control and extended to Terminal if necessary. Extended calls may be made secret or non-secret from Control by simple terminal-strap adjustment.
Outgoing calls on the joint line can be made from both stations.
A joint line call can be held and transferred if necessary by either station during an enquiry call.
Either station can effect 'operator recall' by pressbutton operation.
Exchange lines may connect to an auto or c.b. public exchange, a PABX, PAX or PMBX. The exchange line loop resistance, including the telephone, can be up to 1000Ω.
Lamp supervision is given as follows:

(*a*) On both telephones by a green lamp if the joint line is engaged.

(*b*) On the disengaged telephone by a clear lamp if an exclusive line is engaged.

By means of an 'extend bell' key on the Control telephone, incoming calls can be signalled at the Terminal station when Control is not manned.

Power Supplies

Power for the system is obtainable from any one of the following sources:
The local a.c. mains via a 6V battery eliminator (power unit).
Four 1·5V dry cells.
A local 50V power supply (e.g. from a PAX) via a retard/capacitor element in a buzzer unit.

Equipment Requirements

Control telephone: one required.
Terminal telephone: one required.
50V Power feed and buzzer unit: one unit is required for each exclusive line and is wall mounted near the telephone with which the line is associated. If there are no direct lines, one unit is required if the system is powered from a 50V supply.
Power unit (alternatively dry cells): not required if system is powered from a 50V supply.

Cabling and Installation

The typical diagrams (Fig 1 overleaf) show the numbers of conductors required between units, etc. A price per yard (914mm) of p.v.c.-insulated multicore cable is usually quoted.
Full instructions for installation are given. The maximum distance permissible between stations is determined by the effective signalling distance, which allows a line resistance of 9Ω. This is equivalent to about 200ft (61m) of 6½lb/mile (1·8kg/km) cable, but the distance can be greater with cable of heavier gauge.

Equipment Details

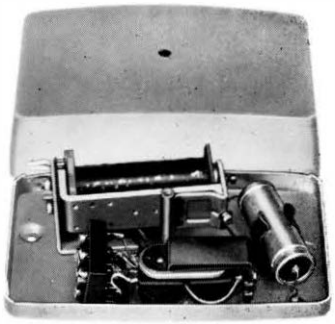
Telephone Instruments N1906D

These are fully tropical Plan-Etelphone type instruments, each with four pressbuttons and two lamps positioned as shown in the diagram overleaf (Fig 2). The appearance of the Control and Terminal telephones is identical, except for a lever switch below the dial on the Control telephone which is used to extend joint line incoming ringing to the Terminal station when the Control station is unattended. In this circumstance it can be arranged either for the Control bell to be switched off or left in circuit.
Stock instruments are ivory or two-tone grey; other colours in the Etelphone range could be supplied if required in sufficient quantity.
The components, all mounted on the base, are exposed by lifting off the telephone body which is secured to the base by two screws under the handset.
The instruments feature the normal Etelphone high-efficiency elements and handset. A plug-in automatic line regulator which controls transmission sensitivity over short lines is included; when not required it is inverted in the

Control station instrument

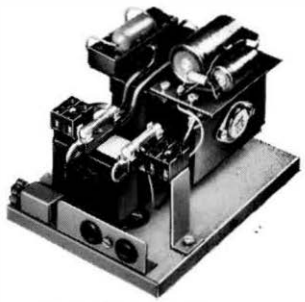
Terminal station instrument

base jack. All springsets and the dial mechanism are protected by plastic covers; provision is also made to exclude dust and insects from the interior of the telephone. Wires and cord conductors are p.v.c. insulated.
Cables connect to screw terminals in a moulded desk block.



Buzzer Unit N24202A

The unit contains a retard/capacitor element to allow operation from a 50V supply, an a.c. buzzer for direct line signals, and a screw terminal block for the connections. The enclosure consists of a metal base and a moulded grey plastic cover secured by one screw.



Power Unit N23801B

This is a battery eliminator incorporating transformer, choke, fuses and terminal block in a grey-enamelled metal case. The smoothed output is 6V ±0·5V/1A, d.c. and the input 100 to 125V in 5V steps, 200 to 250V in 10V steps, ±6%, 50/60Hz.

Dry Cells
(alternative to power unit)
These are usually purchased locally by customers.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

Dimensions

Equipment Item	Height in	Height (mm)	Width in	Width (mm)	Depth in	Depth (mm)
Telephone (control or terminal)	5½	(140)	9¼	(234)	11	(279)
Buzzer unit	2	(51)	6	(152)	3⅝	(92)
Power unit	6½	(165)	4⅝	(117)	4⅝	(117)

Weights (approx.)

Equipment Item	Code No.	Net Weight lb	Net Weight (kg)	Shipment Weight lb	Shipment Weight (kg)
Telephone (control or terminal)	N1906D	4⅛	(1·87)	*Fifty telephones 356	(161·4)
Buzzer unit	N24202A	1½	(0·68)	*Forty buzzer units 69½	(31·5)
Power unit	N23801B	5½	(2·5)	*Twenty power units 170	(77·1)

*multiple export pack

Ordering Information

When ordering, please specify 'Secretarial System Mk. VI', together with quantities of the appropriate items listed in the 'Weights' table above, and provide additional information 1 to 3 as appropriate.

1 Telephone colours required.
2 Amount of interconnecting multiple cable required.
3 Details of local mains voltage and frequency, if power unit required.

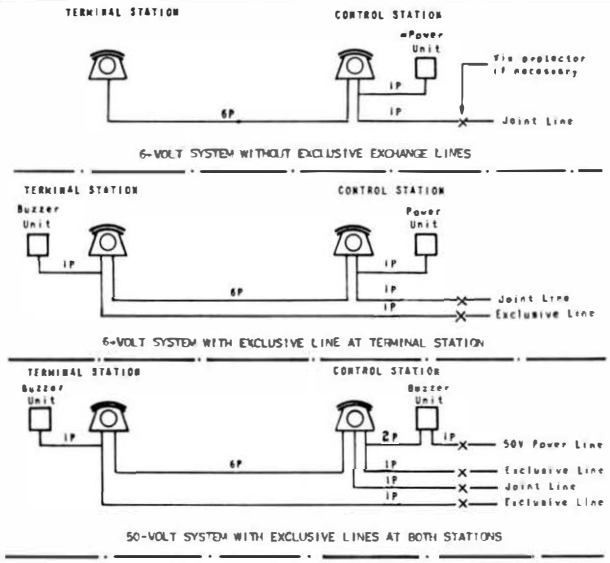


Fig. 1 Three typical examples of Secretarial System Mk. VI application

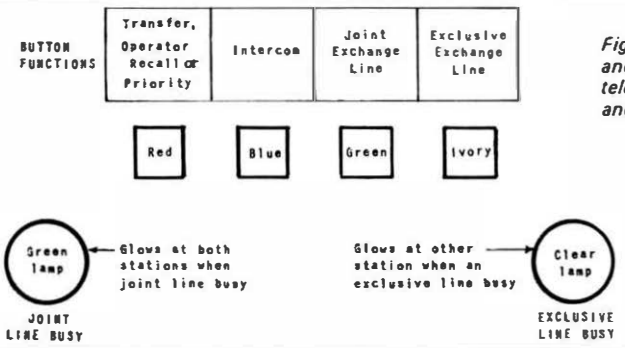


Fig. 2 Showing layout and functions of the telephone pressbuttons and lamps

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ZH203/1M/7.71/SR

2 + 5 'Keymaster'

with auto or c.b. exchange lines

The 2 + 5 'Keymaster' is a low-cost system providing direct access from any one of five internal stations to either of two auto or c.b. exchange lines, with intercom between stations and secrecy on exchange lines. It is designed for premises where all the stations are internal.

Exchange lines may be to a public exchange, PAX, PABX or PMBX.

Advantages of the 2 + 5 'Keymaster' are:

Low equipment, installation and maintenance costs owing to simplicity of operation and cabling, and the absence of large auxiliary units and junction boxes.

Station telephones are small and reliable, being of Plan-Etelphone type. They incorporate 6V lamps for exchange-line supervision.

The system has a variety of applications and, if intercom code-calling for pairs of stations is adopted, there can be more than five stations.

Equipment Required

Apart from the station telephones, the only items required are a battery eliminator or dry batteries, and a small relay unit.

Line Limits

The system is suitable for connection to 1000Ω exchange lines.

Facilities

The following items are fitted in each station telephone:

For Exchange Calls

A Call/Answer button and associated 6V lamp with clear lens for each exchange line.

A Hold button and associated 6V red lamp for each exchange line.

A Cancel button (X) for each exchange line.

An a.c. bell and on/off switch.

For Intercom Calls

Four call buttons.

A d.c. buzzer.

Exchange Calls

Direct access. All stations have direct access to both exchange lines.

Incoming calls are visually and audibly signalled. The call lamp flashes at ringing periodicity at all stations, then glows steadily when the call is answered and until the line is disengaged. Normally the bell is left operative at only one station, but all can be rung simultaneously if required.

Information calls. An exchange call can be held while making an information call to another station, or to, say, a PABX on the other exchange line. The Hold lamp glows steadily at the holding station during the hold condition. The information-call conversation cannot be overheard by the exchange party. At its conclusion, the original call can be resumed or transferred to another station.

Secrecy. Stations are normally connected in series to the exchange line; thus station 1 cuts off stations 2 to 5, station 2 cuts off 3 to 5, and so on.

Type N1676A with 'Recall' button

Transfer. Any station can transfer an exchange call to another station.

Cancel. If a dialling error is made, the call can be cancelled and the line reseized without replacing the handset, by pressing the X button of the exchange line concerned.

Simultaneous calls. While engaged on one exchange line, it is possible to answer a call on the other exchange line, then either clear or transfer the second call, or retain it and clear or transfer the first call.

Mains failure safeguard. Exchange-line service is maintained during mains failure conditions.

Intercom Calls

Selective calling of all other stations by pressbutton.

Incoming calls signalled by a buzzer.

Conference enabling all stations to converse together over the single intercom connecting circuit.

Buzzer Cut-off during exchange line conversations, by strap adjustment in the telephone.

Special Facilities

Call buttons on the intercom are operative whether the handset is off or on, in order to provide subsidiary signals if required.
All other buttons are inoperative when the handset is on.

Operator recall, priority or a similar facility can be provided utilizing one of the intercom call buttons. Should such a facility and five stations be required, two of the less important stations are code called.

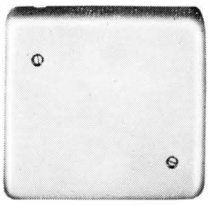
Equipment

Telephone N1676A (Auto) or N1677A (c.b.)

The general construction is similar to that of the Etelphone and Plan-Etelphone. Ivory or two-tone grey instruments with matching h.m.t. cord and grey desk terminal block can be supplied. The a.c. bell for exchange calls and the d.c. buzzer for intercom calls are in the instrument.
Pressbuttons and lamps are arranged as shown in diagram opposite, in which it will be seen that the Hold/Cancel (X) keys are of two-in-one type.
The Exchange and associated Hold buttons release each other, and the X button releases both. Any operated button is restored on replacement of the handset.
To allow for intercom call-button numbering to be varied to suit the particular station, a fifth call-button cap and a Recall cap are contained in the instrument.
Lamps are slide-mounted in a unit attached by a single screw to the equipment chassis and are easily accessible.
Exchange switching key springsets, consisting of six banks of comb-operated contacts in a single unit, are wired to three 6-way terminal blocks mounted on a frame which is secured to the rear of the chassis by a spring plunger. The springsets, terminal blocks and lampholder are removable as a unit assembly.
The 22-way desk-cord conductors are crimped to spade tags which fit into the moulded desk terminal block. Cord and cable entries are at opposite ends of the block.

Common Relay Unit N24203A

This is a grey moulded plastic box with a cable entry on one side, and

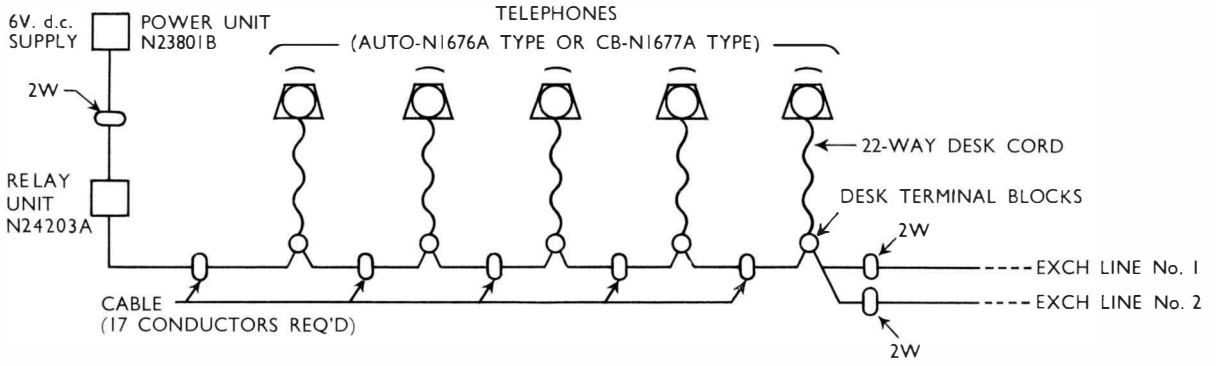


Type N24203A Relay Unit

a metal base to which the cover is attached by two screws. The equipment includes a transmission feed coil for the intercom, two relays for ringing and lamp-signal purposes, and screw terminals for cable connection.

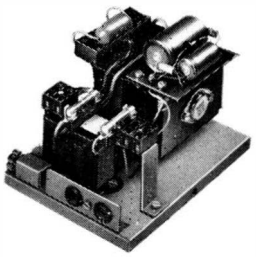
Power Unit N23801B

This is a battery eliminator incorporating a transformer, choke, fuses and terminal block in a grey-enamelled metal case.



Schematic drawing of the 2 + 5 'Keymaster' system

The smoothed output is 6V ± 0·5V, 1A d.c. for the lamps, and the input



Type N23801B Power Unit without cover

100 to 125V in 5V steps, 200 to 250V in 10V steps, ± 6%, 50/60Hz.

Alternative Power Supply

Batteries may be used if there is no local mains supply. In this event, a simple strap adjustment in the telephone renders the supervisory lamps operative only when the handset is removed, thereby reducing current drain.

Finish

The equipment has tropical finish. Connecting wires, including cord and cable conductors are insulated with p.v.c., which is impervious to moisture, fire-resistant and not subject to mould growth or insect attack. Plastic covers are fitted over mechanisms where necessary, and foam rubber strip inserted between the baseplate and cover of the telephone.

Installation and Cabling

Systems which are to be connected to exchanges under the jurisdiction of the British Post Office, are supplied and installed by them. Systems not in this category can be easily installed by the customer, since all cables connect to screw terminals.

A price per yard (914mm) of p.v.c.-sheathed cable can be given with quotations if required.

Exchange line 1 has switching priority over line 2. Therefore, if one line is more important than the other (e.g. if one is to the public exchange and the other to a PAX), it should be connected as line No 1 in the system.

The exchange lines are series-multipled into and out of each station in turn, normally beginning with No 1. Priority of access can be given to any station by connecting the exchange line(s) first to that particular station.

Ordering Information

When ordering, please state the equipment items and corresponding code numbers from the following 'Weights' table, together with quantities required, and provide additional information 1 to 3 as appropriate.

1 Telephone colours required.
2 Amount of interconnecting multiple cable required.
3 Details of local mains voltage and frequency, if power unit required.

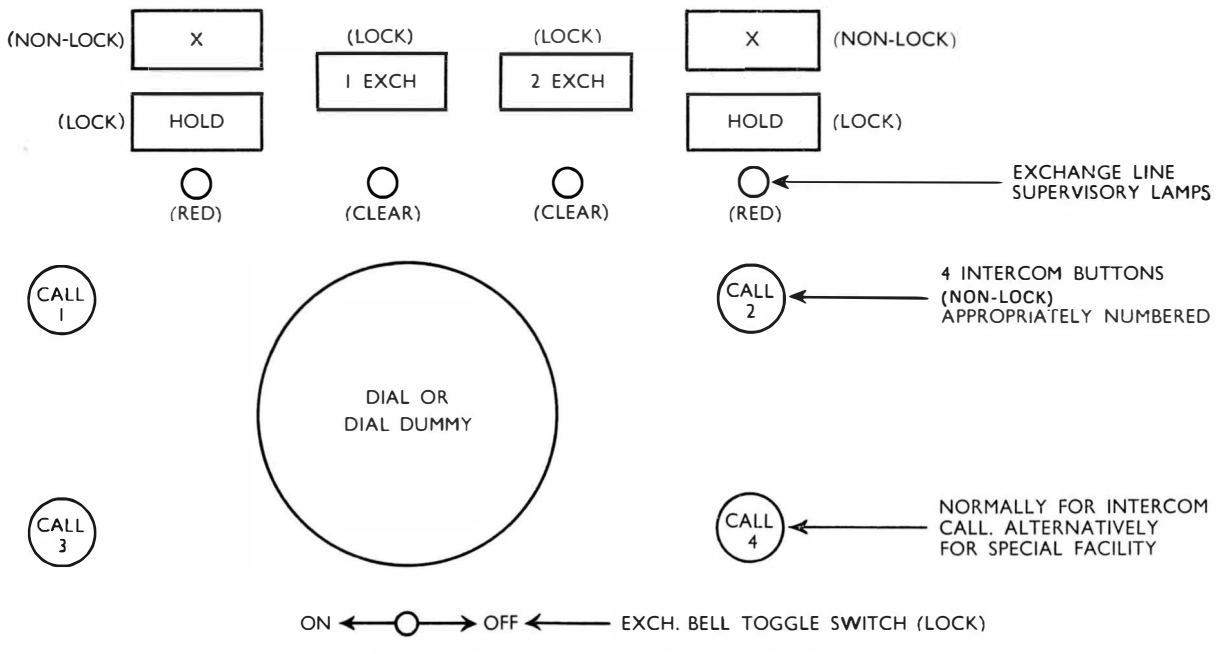
Dimensions

Equipment Item	Height in (mm)	Width in (mm)	Depth in (mm)
Telephone (auto or c.b.)	$4\frac{7}{8}$ (124)	$9\frac{5}{16}$ (237)	$8\frac{7}{8}$ (225)
Relay unit	$1\frac{3}{4}$ (44)	$6\frac{1}{8}$ (155)	$5\frac{1}{2}$ (140)
Battery eliminator	$6\frac{1}{2}$ (165)	$4\frac{1}{2}$ (114)	$4\frac{1}{2}$ (114)

Weights

Equipment Item	Code No.	Net Weight lb (kg)	Shipment Weight lb (kg)
Telephone (auto)	N1676A	7 (3·2)	*Fifty telephones 381 (172·8)
Telephone (c.b.)	N1677A	7 (3·2)	*Fifty telephones 381 (172·8)
Relay unit	N24203A	$2\frac{1}{2}$ (1·1)	
Battery eliminator	N23801B	$5\frac{1}{2}$ (2·5)	
20 relay units and 20 battery eliminators			*210 (95·3)

*multiple export pack



Schematic drawing showing arrangement of pressbuttons and lamps

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

PLESSEY
Telecommunications

The Plessey Company Limited,
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Telephone: Nottingham (0602) 254831. Telex: 37201

Printed in England

Publication No. 7146/2

ZB14/2k/1.73

2 + 10 House Exchange

This system provides ten stations with intercommunication facilities and access to two external circuits, which may be auto/c.b. public exchange lines or extension lines of PBX systems. It employs pressbutton intercommunication and exchange-line access, and is ideally suited to organizations with an anticipated high calling rate between stations.

Facilities

Direct pressbutton intercommunication.

Up to five simultaneous conversations.

Direct pressbutton access to exchange lines.

Lamp indication of exchange-line conditions.

Secrecy on exchange-line calls.

Enquiry calls (exchange line held).

Call transfer.

Operator recall on lines to PBXs.

Exchange bell on/off.

Conference calls from any station to all or selected stations.

Continued exchange-line service if power fails.

Night-service working.

Barred or restricted exchange-line access.

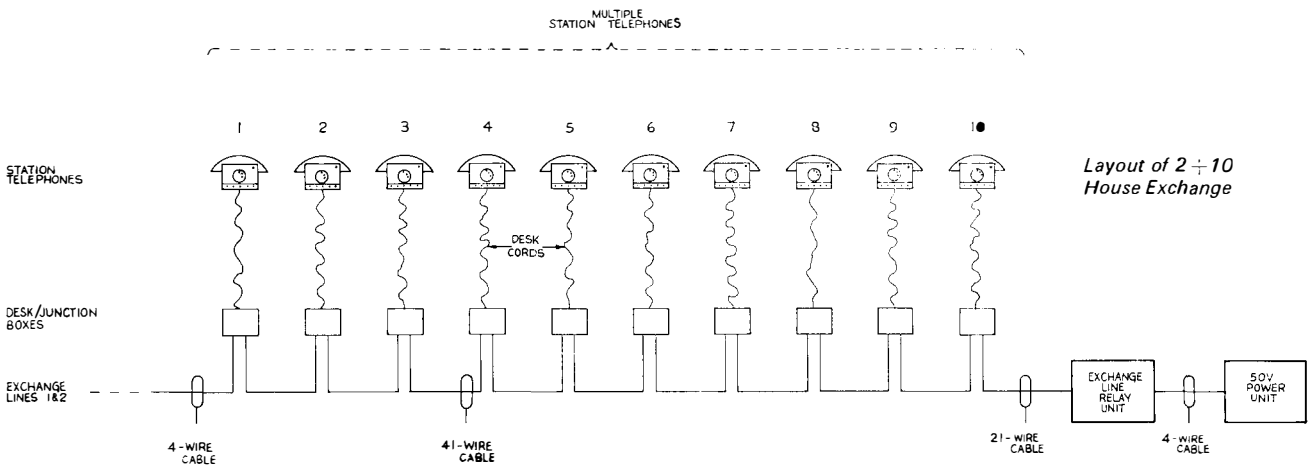
Station Multiple

Station telephones are connected in order of priority by a maximum of 400yd (365m) of cable. The first station on the multiple has priority over all other stations in making and answering exchange-line calls; when in use, it disconnects all other stations from the line. Similarly, the second station disconnects stations 3 to 10 and so on.
Cabling between stations is direct except where a station is inconveniently situated. A spur cable is then used to minimize the length of the main cable; this does not affect the order of priority.

Station Telephones

These instruments have been approved by the Council of Industrial Design and are available in black, grey and ivory. For convenience of installation and maintenance each telephone cord plug connects to an associated desk/junction box.
Both the instrument cover and handset are moulded from acrylonitrile butadiene styrene (ABS), a material noted for its high gloss, light fastness, and impact strength. The telephone interior, which is built on a pressed-steel base, includes a d.c. buzzer and an a.c.

Station telephone with associated wall-mounting desk/junction box



Layout of 2 ÷ 10 House Exchange

ringer, together with printed-wiring panels, carrying :

(a) transmission components, including plug-in line regulator.

(b) intercom-signalling contact springs. These engage with the printed wiring on depression of an intercom button and require no tensioning as necessary with conventional springsets.

Pressbuttons

These total 15 on the pressbutton panel; ten for intercom calls, two for exchange lines (labelled 1 and 2), two for exchange-line release (labelled R) and one for conference (labelled C).

Provision is made above the panel for four in-line buttons for bell on/off and other ancillary operations such as applying restricted exchange-line access to a station user.

Designation Labels

Slide-in reversible paper labels numbered 1 to 5 and 6 to 10 and protected by plastic windows are provided for the intercom keys. Space is left for writing the names of persons or departments on the labels.

Lamps

Two pairs of lamps ('exchange' and 'seize') serve for exchange-line visual signalling and supervision. The seize-lamp gives a steady signal at the originating station on seizure of the exchange line, whereas the exchange-lamp gives the following three signal indications at all stations :

(a) A pulsating signal at ringing periodicity until an exchange call is answered.

(b) A steady glow during an established exchange call.

(c) A 'wink' when a station holds an exchange line while making a call to another line. This signal becomes steady when the user returns to the held line.

Desk/Junction Box

This houses screw terminals for the main cable and a 56-way connector for acceptance of the plug-ended telephone cord. Where a station is connected via a spur, the spur cable is connected to the main cable at an auxiliary junction box similar to the desk/junction box.

Exchange-line Relay Unit

This unit accommodates relays for exchange-line switching and lamp signalling, together with a transistor device for regulating the current supply for the signalling lamps. Components mount on a raised platform, hinged to the base to facilitate access to the relay wiring. Cable entry is via rubber grommets in the base.

Installation and Cabling

Systems to be connected to exchanges under the jurisdiction of the British Post Office (or similar administrations overseas) are supplied and installed by the administration. Systems not in this category can be customer installed.

A price per yard (914mm) of p.v.c.-sheathed cable can be given with quotations if required.

Power

A mains-operated power unit is normally provided, giving a smoothed regulated 50V supply of up to 2·7A. Note : the call lamps are fed via a transistor current-regulating device which ensures long lamp life.

Dimensions and Weights

Equipment Item	Code Nos.	Dimensions						Net Weights	
		Height		Width		Depth			
		in	(mm)	in	(mm)	in	(mm)	lb	(kg)
Station telephone	N 1674B (auto)	5½	(140)	9¼	(235)	11½	(292)	8½	(3·9)
	N 1675B (c.b.)	5½	(140)	9¼	(235)	11½	(292)	8	(3·6)
Desk/junction box	N 3317A	6¼	(159)	5½	(140)	1¾	(44)	1	(0·5)
Exchange-line relay unit	N 24213C	12¼	(311)	8¾	(222)	7¼	(184)	13	(5·9)
Power unit	N 22404A	10½	(267)	25	(635)	11	(279)	50	(22·7)

Ordering Information

When ordering, please supply information 1–5 as appropriate :

1 Quantities and codes where applicable.

2 Colour of telephones required.

3 Telephones requiring operator-recall facility.

4 Details of mains supply and frequency (for power unit).

5 Amount of interconnecting multiple cable required.

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PLESSEY
Telecommunications

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Printed in England

Publication No. 7132

ZH160/2k/4.71/S

CB
Motorway All-Weather Telephone

This motorway telephone is based on the all-weather instrument (catalogue sheet 7163) which has been extensively proved in situations calling for the utmost reliability and robustness. It is used on British and Australian motorways and offers the advantages of simple operation, durability with light weight, competitive cost, low maintenance liability and high-quality transmission.

Construction

The use of materials liable to corrosion is avoided. The enclosure, consisting of a base, a body and a hinged door, is of corrosion-resistant aluminium alloy; other parts are of brass, phosphor-bronze and high-quality stainless steel. The body is a robust aluminium-alloy casting, webbed to form a solid internal shelf for the handset. Two screws inside the body secure it to the base. This is of hard aluminium alloy and recessed in the body. It mounts all the circuit components.

The self-closing door – another aluminium-alloy casting – is equipped with spring-loaded brass hinges, a magnetic catch, and a stainless-steel grab-handle. The door projects beyond the case side, allowing it to be knocked open if iced up. It is channelled to mate with the rim of the body, so that foamed Neoprene in the channel excludes moisture when the door is shut. Similar seals are provided between the body and base, and between the body and the post-mounting adapter. This adapter accepts a 2-in. (51-mm) diameter post.

In the parked position of the handset the receiver rests on a stainless-steel cradle plate, the earpiece operating the internal cradle switch via a plunger. A bracket inside the lid prevents the handset being dislodged by vibration. To assist replacement of the handset at night the front compartment is painted white, and a self-energized light source is provided just below the cradle plate. This source, which is encased in clear plastic, has a useful life in excess of 20 years.

The recessing of the front compartment affords a degree of weather protection, particularly to the cradleswitch plunger, even with the lid open.

The rear of the telephone baseplate carries two 4-in. (102 mm) stainless-steel bell gongs, actuated via a rocking shaft passing through a weatherproof sleeve to the interior of the body.

The post-mounting adapter affords complete protection to the rear of the telephone whilst still allowing an adequate calling signal. The adapter carries a 2-way terminal block having screw connections for the pin-ended leads from the telephone.

Complete telephone assembly including post-mounting adapter.

Supplied to the Dept. of the Environment (United Kingdom) as their 'Tele. 350'. Australian Post Office permit No. C/72/31/22

Installation and Maintenance

The telephone readily separates from the post-mounting adapter on withdrawal of three socket-head screws at the rear of the adapter. This allows the adapter to be separately mounted on the post and positively secured by two set screws in the adapter spigot. After terminating the cable all that is necessary is to screw the telephone connections into the terminating block and re-attach the telephone to the adapter.

Maintenance is facilitated by the telephone body being separated from the base. After releasing the body-fixing screws the door is closed to protect the handset, and the body lifted down to hang suspended from the base by the nylon cord provided. Thus all components and wires are accessible.

Components and Finish

Components of proven reliability are used throughout.

The circuit is the BPO-approved type 706B and the ringer is based on the BPO 59A type incorporating a ceramic magnet. A 27-way terminal block moulded in glass-filled nylon is provided for terminations inside the telephone. The handset, with temperature-resistant coiled cord, is moulded in high-impact plastic.

Apparatus finishes are suitable for the tropics, and connecting wires are insulated with p.v.c., which is impervious to moisture and not subject to mould growth or insect attack.

The standard external finish is a bright yellow epoxy resin stove enamel, but other colours can be supplied to quantity order.

The full-size handset silhouette is displayed on both the front of the telephone door and on the rear of the post-mounting adapter, and is in black on a rectangular panel of high-reflectivity yellow-beaded material.

Dimensions

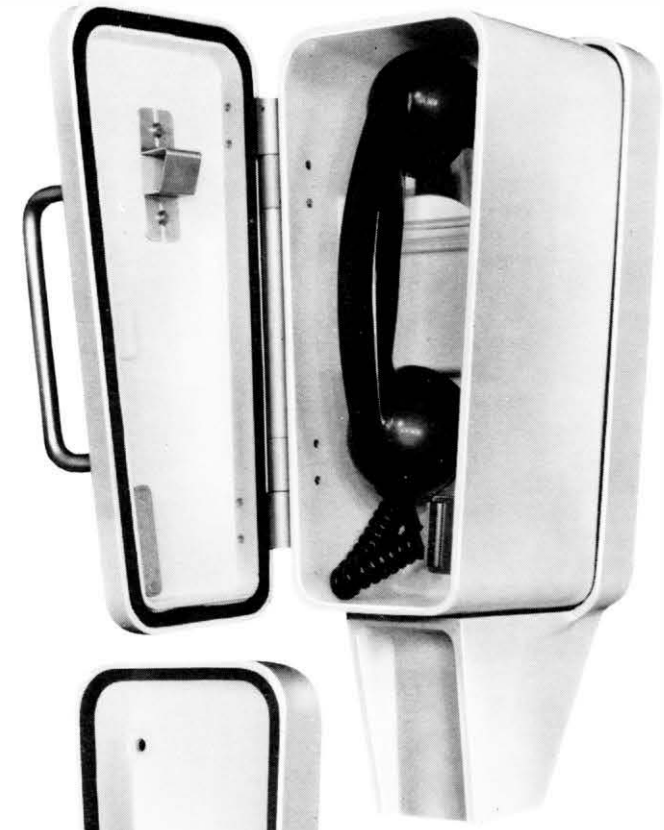
Height: 12¼ in. (311 mm)
Max. width: 5¾ in. (146 mm)
Depth: 6⅝ in. (168 mm)
(including adapter)

Weights (*approx*)

1 telephone (net): 10½ lb (4·77 kg)
25 telephones: 374 lb (169·6 kg)
(multiple export pack)
1 post-mounting adapter
(net): 4¼ lb (1·95 kg)

Ordering Information

When ordering, please quote 'Motorway All-Weather Telephone' N 1250A, together with quantities and colours required.



Internal view of telephone.

Post-mounting adapter.

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PLESSEY
Telecommunications

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Printed in England Publication No. 7264 ZH387/2.5k/6.72S

AUTO

Table Telephone
(BPO Type 746)

This automatic telephone (BPO type 746) meets the most up-to-date requirements for an instrument of compact proportions, advanced design and economic cost. Based on the BPO type 706, developed by Plessey in conjunction with the British Post Office, but with new and improved components, it combines simplified construction with functional efficiency. Its high-quality transmission and reception are based on CCITT recommendations.

Main Design Features

Modular shock-resistant construction
Printed-circuit board with miniature components
Stain-resistant, high-impact shell mouldings
Built-in carrying handle
Easily visible dial characters
Automatic line regulator
Optional pressbutton for operator-recall, shared service or bell on/off operation
Optional amplified handset
Standard or tropical finish

Cover

The cover is a one-piece ABS copolymer moulding of high-gloss finish and high-impact strength incorporating a recessed carrying handle.

An aperture, provided above the dial to accommodate a press-button, is closed by a dummy button when not required.

Dial

The dial is the conventional trigger type. A clear-plastic finger plate covers the antique-silver number plate, making the black numbers clearly visible even in poor light. The clear-plastic number card protector can be removed with a simple rubber suction disc.
Dial markings can be provided to most specifications.

Terminal Block

The terminal block is of identical material to the main instrument and can be secured to any flat surface.

Handset

The lightweight handset is the same as that used in the type 706 telephone, the mouthpiece and earpiece being screw fitted. The cord is bayonet clamped and the transmitter and receiver inserts are connected by screw terminals to give good connections. Both inserts are adjusted in manufacture for optimum sensitivity and frequency response.
An amplified handset can be provided as a direct replacement for the standard handset. It is

General view of Type N2160A (BPO 746)

suitable for use by persons with impaired hearing or in locations where reception is difficult.

Cords

Both line and handset cords have four copper tinsel conductors with p.v.c. insulation. The outer sheath is of pliable p.v.c. The handset cord is the coiled extensible type.

Baseplate

The pressed-steel baseplate rests on four chloroprene non-stain feet to prevent the instrument from sliding even on a highly polished surface.

All interior parts of the instrument, cradleswitch bracket, ringer and gongs, dial assembly and printed-wiring board are mounted on the baseplate.

Printed-Wiring Board

A printed-wiring board, on which all incoming and outgoing connections are terminated, accommodates all speech circuit components except the transducers.

The cradle microswitch has a low operating pressure and requires no maintenance; its reliability is greatly improved compared with previous types of switch.

The regulator, which operates on conventional principles, maintains constant speech levels, irrespective of line length. Unregulated instruments can be provided for large-quantity orders.

Maintenance

The cover is easily removed, being secured by a single screw at the rear of the instrument.

The outer dial ring, closefitting to the dial and a floating fit on the cover, facilitates cover removal.

A manually operated latch locks the cradleswitch in the handset-on position, allowing calls to be received during instrument inspection.

All cord conductors have spade terminations, allowing easy connection to the instrument wiring board and the terminal block.

Ringer, bell gongs and printed-wiring board are readily accessible and easily replaced.

Dial assembly contacts are protected from dust by a clamped-on plastic cover.

Robust construction and reliable components ensure trouble-free operation over long periods.

Colour Range

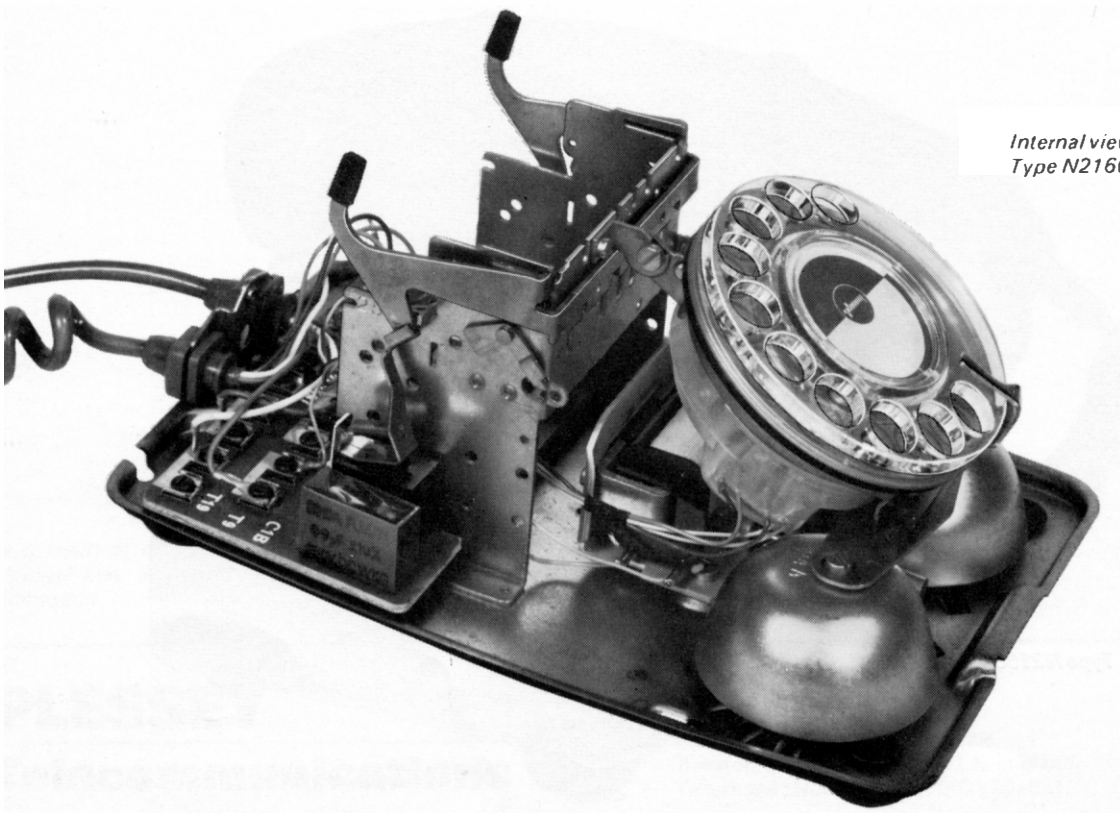
Standard colours are black, ivory and two-tone grey, but demands for special colours (red, blue, yellow and two-tone green) can be met for instruments ordered in sufficient quantity.

In two-tone colours, the handset, cords and terminal block are in the darker tone.

Dimensions and Weight

Overall height: 133 mm (5¼ in.)
width: 254 mm (10 in.)
depth: 216 mm (8¼ in.)
weight: 1.7 kg (3¼ lb)

Instruments are usually despatched in packs of 50, measuring 1.17 × 0.66 × 0.58 m (46 × 26 × 23 in.) and weighing 140 kg (308 lb).



Internal view of Type N2160A (BPO 746)

Abridged Specification

Cover, Handset and Terminal Block
ABS high-impact plastic.

Baseplate
Pressed-steel with overall passivated zinc-plate finish, supplemented by an underside coating of crinkled black enamel.

Colours
Standard : black, ivory or two-tone grey.
Special orders : red, blue, yellow or two-tone green.

Cords
PVC covered copper-tinsel conductors in p.v.c. sheath. Spade terminations.
Handset cord : 216 mm (8½ in.) coiled, 1780 mm (6 ft) extended. Line cord : 1780 mm (6 ft) standard, with other lengths available.

Cradle Switch
Microswitch BPO type 20A.

Dial
BPO type 21FA trigger dial.

Dial Characters
Black on antique-silver background to most specifications.

Dial Speed and Ratio
10 p.p.s. and 2 : 1.
Other ratios can be supplied.

Handset Transducers
Receiver insert : Rocking armature replaceable capsule BPO type 4T.
Transmitter insert : Carbon granule replaceable capsule BPO type 16.

Amplified Handset
20 dB maximum gain.

Regulator
Both transmission and reception zero line sensitivity attenuated by 5 dB.
Attenuation decreases with line length to 0 dB at 400 Ω.

Ringer

Type :	Unicoil, BPO type 79A.
DC resistance :	1000 Ω
Impedance at 25 Hz :	3000 Ω
Impedance at 1 kHz :	10 kΩ
Ringing current :	15 to 30 Hz

Bell Gongs
Double gong ; harmonizing tones.

Ordering Information
When ordering please quote 'Telephone N2160A', give quantity required and information (a) to (g) as appropriate.

(a) Colour
(b) Pressbutton for (i) shared-service, (ii) operator-recall, (iii) bell on/off operation.
(c) Without regulator (on large quantity orders only).
(d) Amplified handsets.
(e) Dial speed and ratio, if other than standard.
(f) Type of numerals.
(g) Standard or tropical finish.

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PLESSEY
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Printed in England

Publication No. 7281

ZH453/2k/11.72

AUTO/CB

GP Telephone

The GP telephone is a high-performance instrument of advanced design and wide application. Available in four types, it is suitable for use on central-battery or automatic telephone systems and for table or wall mounting. When required, inter-type conversion can be readily accomplished by means of appropriate component kits supplied on demand.

Main Features

Easy conversion
Modular shock-resistant construction
Printed-wiring board with miniature components
Stain-resistant, high-impact shell mouldings
Carrying handle
Easily visible dial characters
Automatic line regulator
Ringer-volume control
Optional pressbutton for operator-recall, shared-service or bell on/off operation
Optional amplified handset
Wide colour range
Standard or tropical finish

Cover

The cover consists of a one-piece ABS copolymer moulding of high-gloss finish and high-impact strength. A carrying handle is fitted across the handset cradle. An aperture, provided above the dial to accommodate a press-button, is closed by a dummy button when not required.

Dial

The dial is the conventional trigger type. A clear-plastic fingerplate and a number ring with an antique-silver background make the black characters easily visible even in poor light.
Dial markings can be provided to any specification (Arabic, Chinese, etc.).
The clear-plastic number card protector can be removed with a simple rubber suction disc.
In the CB version a dummy dial is fitted.

Handset

The lightweight handset is a one-piece moulding in ABS plastic with screw-on mouthpiece and earpiece. The inserts are the replaceable capsule type.
An amplified handset can be provided as a direct replacement for the standard handset. It is suitable for use by persons with impaired hearing or in locations where reception is difficult.

Terminal Block

The 6-way terminal block consists of a base and cover moulded in

General view of auto table version

polystyrene, the cover being fixed by a single captive screw.

Cords

The conductors of the cords are copper-tinsel with p.v.c. insulation and spade-type terminations. The outer sheath is of flexible p.v.c.
Grommets, fitted to both ends of the cords, lock into entry holes of the terminal block and main instrument to act as strainers.
The 4-way coiled extensible handset cord, 216 mm ($8\frac{1}{2}$ in.) long when coiled, extends to 1780 mm (6 ft).
The non-extensible 3-way line cord has a standard length of 6 ft; various non-standard lengths can be supplied.

Baseplate

The polystyrene baseplate accommodates the cradleswitch bracket, ringer and gongs, dial assembly and printed-wiring board.
Four domed chloroprene rubber feet prevent the instrument from sliding even on highly polished surfaces.
Two slotted domes, protected by a mesh in the tropical version, provide for ventilation and a good sound outlet.

Printed-Wiring Board

All speech-circuit components except the transducers are mounted on the printed-wiring board, to which all incoming and outgoing connections are made.
The automatic line regulator components are connected so as to form a variable loss network, maintaining speech levels constant irrespective of line length.
The cradle microswitch has a low operating pressure and requires no maintenance; its reliability is greatly improved compared with earlier types of switch.

Ringer

The unicoil ringer combines simplicity of construction with a good sound output. A knurled wheel projecting through the baseplate provides the means by which the output volume can be adjusted.

Maintenance

The cover is easily removed, being secured by two screws fixing the handle.
The outer dial ring, close-fitting to the dial and a floating fit on the cover, facilitates cover removal.
A manually operated latch locks the cradleswitch in the handset-on position, allowing calls to be received with the cover removed for instrument inspection.
Ringer, bell gongs and printed-wiring board are readily accessible and easily replaced.

All cord conductors have spade terminations, allowing easy connection to the screw terminals of the instrument wiring board, terminal block and handset inserts.
Dial assembly contacts are protected from dust by a clamped-on plastic cover.
Trouble-free operation over long periods is ensured by robust construction and reliable components.

Colour Range

All models are available in black, ivory, blue, yellow, red, two-tone grey, and two-tone green.
In two-tone colours the handset, terminal block, outer dial ring and cords are in the darker tone.

Dimensions and Weight

Base:	215 × 146 mm ($8\frac{1}{2}$ × $5\frac{3}{4}$ in.)
Height:	124 mm ($4\frac{7}{8}$ in.)
Length of handset:	238 mm ($9\frac{3}{8}$ in.)
Weight, telephone:	1280 g
Weight, handset:	220 g

General view of auto wall version

Abridged Specification

Cover and Handset
ABS high-impact plastic

Baseplate and Terminal Block
High-impact polystyrene

Cords
PVC insulated copper-tinsel conductors in flexible p.v.c. outer sheath. Spade terminals.
Handset cord: 216 mm (8½ in.) coiled, 1780 mm (6 ft) extended.
Line cord: 1780 mm (6 ft) standard, with other lengths available.

Cradleswitch
Microswitch, BPO type 20A.

Dial
BPO type 21FA trigger dial.

Dial Characters
Black on antique-silver to any specification (Arabic, Chinese, etc.)

Dial Speed and Ratio
10 p.p.s. and 2 : 1 standard.
Other ratios can be supplied.

Handset Transducers
Receiver: rocking armature replaceable capsule, BPO type 4T.
Transmitter: carbon granule replaceable capsule, BPO type 16.

Amplified Handset
20 dB maximum gain.

Regulator
Transmission and reception zero line sensitivity attenuated by 5 dB. Attenuation decreases with line length to 0 dB at 400 Ω.

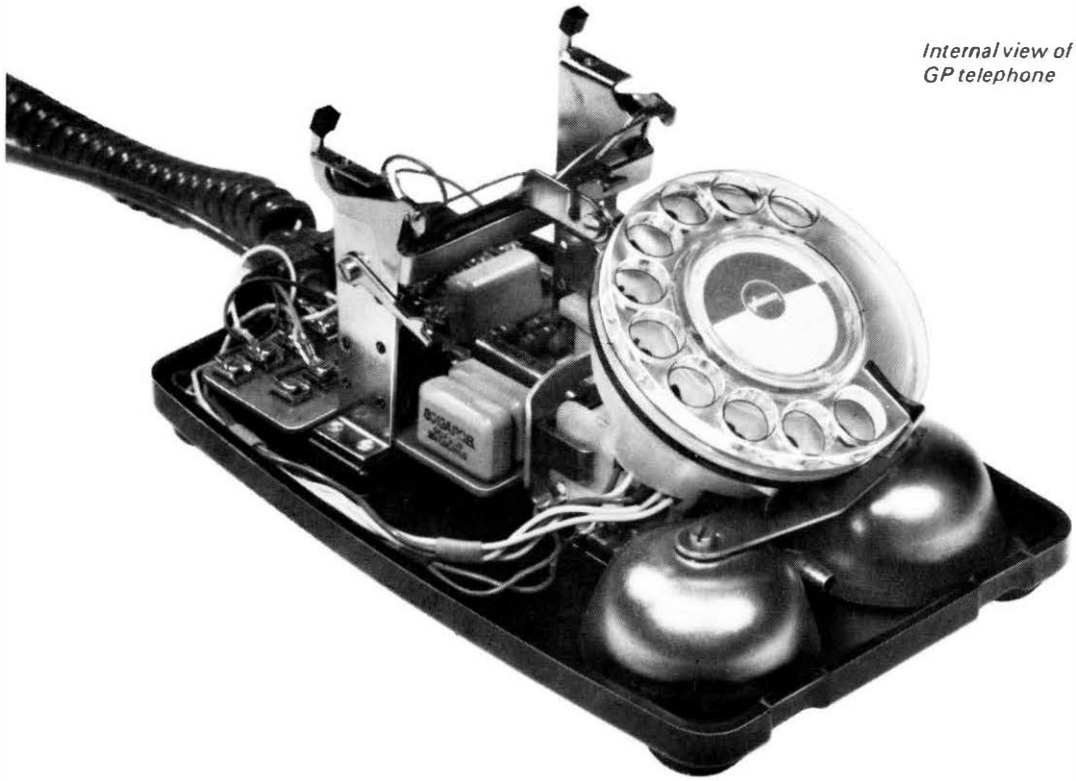
Ringer

Type:	Unicoil, BPO type 79A.
DC resistance:	1000 Ω.
Impedance at 25 Hz:	3 kΩ.
Impedance at 1 kHz:	10 kΩ.
Ringing current:	15 to 30 Hz.

Bell
Double gong: harmonising tones.

Colour Range
Black, ivory, blue, yellow, red, two-tone grey, two-tone green.

Ordering Information
When ordering please quote 'General Purpose Telephone', give quantity required and information (a) to (k) as appropriate.
(a) Auto or CB.
(b) Table or wall mounting.
(c) Conversion parts.
(d) Pressbutton for:
  (i) operator recall,
  (ii) shared service,
  (iii) bell on/off operation.
(e) With or without regulator.
(f) Amplified handsets.
(g) Dial speed and ratio if other than standard.
(h) Colour.
(j) Dial characters (Arabic, Chinese, etc.)
(k) Tropical or standard finish.



Internal view of GP telephone

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PLESSEY

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Publication No. 7282

ZH452/2·5k/11.72

PLESSEY TELECOMMUNICATIONS

6

Miscellaneous

All-weather Loud-ringing Bell

This lightweight, All-weather Bell combines compactness with high efficiency and stability of adjustment. Cost savings have been achieved through value-oriented design, in which components have been simplified and reduced in number without sacrificing reliability or robustness.

Two coaxially-mounted but independently adjustable gongs are employed, with the hammer operating in the upper annular space between them. This construction reduces frontal area to about one-third that of the conventional twin-gong design. Coupled with adequate weather-protection features, this means greater freedom in siting the bell for best results.

The bell uses materials having good corrosion-resistant properties and is suitable for all normal industrial and tropical environments. It operates from any ringing-current frequency in the range $16\frac{2}{3}$ to 25Hz. Tests with normal ringing voltage applied show sound output to be slightly greater than that of a representative twin-gong bell, even at the peak response frequency of the latter ($16\frac{2}{3}$Hz).

The use of unequally sized gongs increases the bell's effectiveness in noisy situations, as there is less risk of masking by dominant components in the noise spectrum.

For situations demanding the use of protected cable the bell can be fitted with a suitable gland. Armoured, MICC or in-conduit cable can be accommodated. This facility has previously been available only in special-purpose designs. The body of the bell is finished in concord blue and the outer gong in silver matt, this scheme harmonizing with that of the Plessey all-weather telephone (catalogue sheet 7163, section 5).

General view of All-weather Bell.

Construction

The motor and gongs are mounted on a chassis of diecast aluminium which forms a cover for a cable-terminating chamber of the same material and is secured to it by a single semi-captive screw passing through the gong-mounting pillar. The chamber is fitted with a 'Klippon' block providing screw-clamp termination of the cable; this obviates nicking of the conductors and consequent risk of breakage. Connection of the bell-motor cord to the block is of the push-on type.

The motor is a Plessey-patented unicoil, pivotless design, well-proved in other applications. For maximum sound output, the hammer has been increased in weight and the stem appropriately shortened.

Hexagon nuts on the threaded gong-mounting pillar permit independent adjustment and locking of the two gongs. An inverted cup washer under the head of the central securing screw prevents accidental disturbance of the outer nut and also serves as a styling trim.

A forward projecting peak on the chassis casting supplements the weather protection afforded by the outer gong to the hammer and stem exit-hole.

The cable entry hole provides a clearance of ¾in (19mm) diameter and is normally fitted with a membrane grommet. This can be pierced to accept flexible cable, or removed to allow fixing of a gland.

The chamber casting is provided with four mounting pads arranged in a diamond pattern. Two of these are drilled so as to accept fixing screws in line vertically; the other two can be drilled if a horizontal fixing line is necessary.

Installation and Maintenance

The compactness of the bell permits it to be shipped with the gongs fitted and fully adjusted; a considerable advantage to the installer. Wall fixing is particularly easy since only the lightweight terminating chamber requires to be handled; this can be used as a template for marking the fixing holes. The cable can be installed at some other time if more convenient. With only a single screw and two push-on connections being involved, attachment of the bell chassis or its removal for inspection is straightforward.

No maintenance will normally be required, but should the need for gong adjustment arise, it can be carried out without difficulty.

Life Tests

Life tests on the bell have shown performance to be unimpaired after the equivalent of 75 000 half-minute periods of auto ringing.

Dimensions

Approx. 7⅛in high x 6in wide x 4½in deep (184 x 153 x 114mm).

Weight

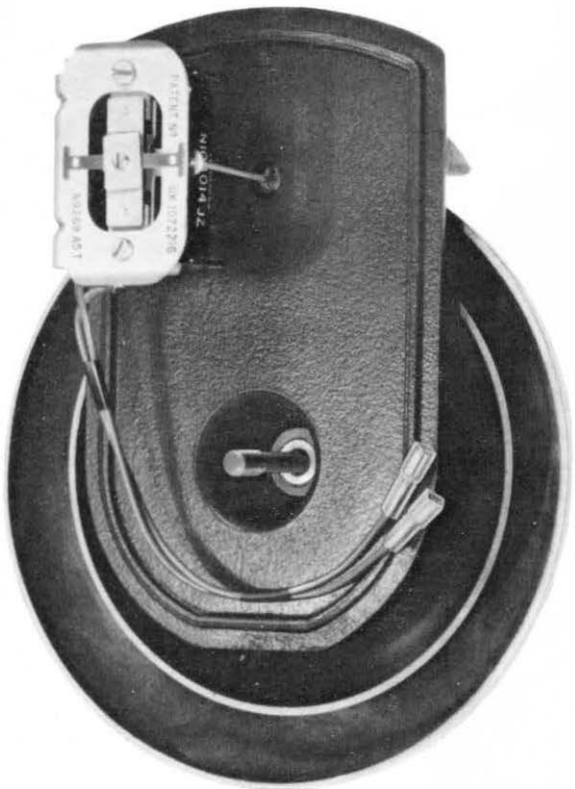
Approx. 3lb 10oz (1·64kg).

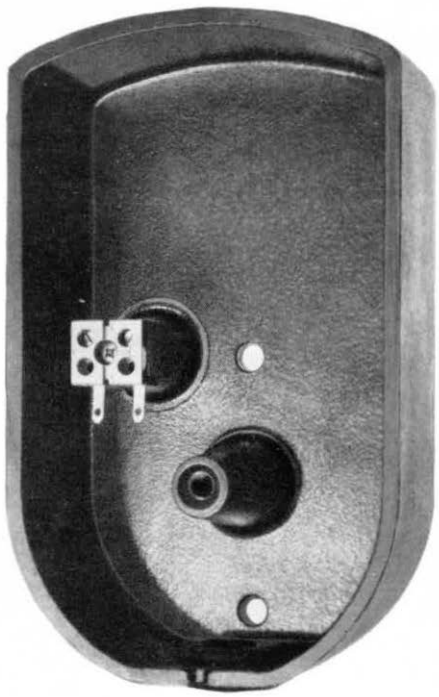
Coil resistance

1000Ω

Ordering Information

When ordering please quote 'All-weather Bell N.3108A1' and state quantity required.





Terminating chamber separated from bell chassis.

As a result of continual efforts to improve design, equipment supplied may vary from that described or illustrated in this publication.

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