INPHONE.
SWITCHING SYSTEMS

INSTALLATION
AND
MAINTENANCE
GUIDE

EMBLEM

British
TELECOM

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SWITCHING SYSTEMS

INSTALLATION AND MAINTENANCE GUIDE

EMBLEM

British
TELECOM

NOTE   Three item code numbers have been added to page 138 that were missing from the previous issue.

EMBLEM

Switching System
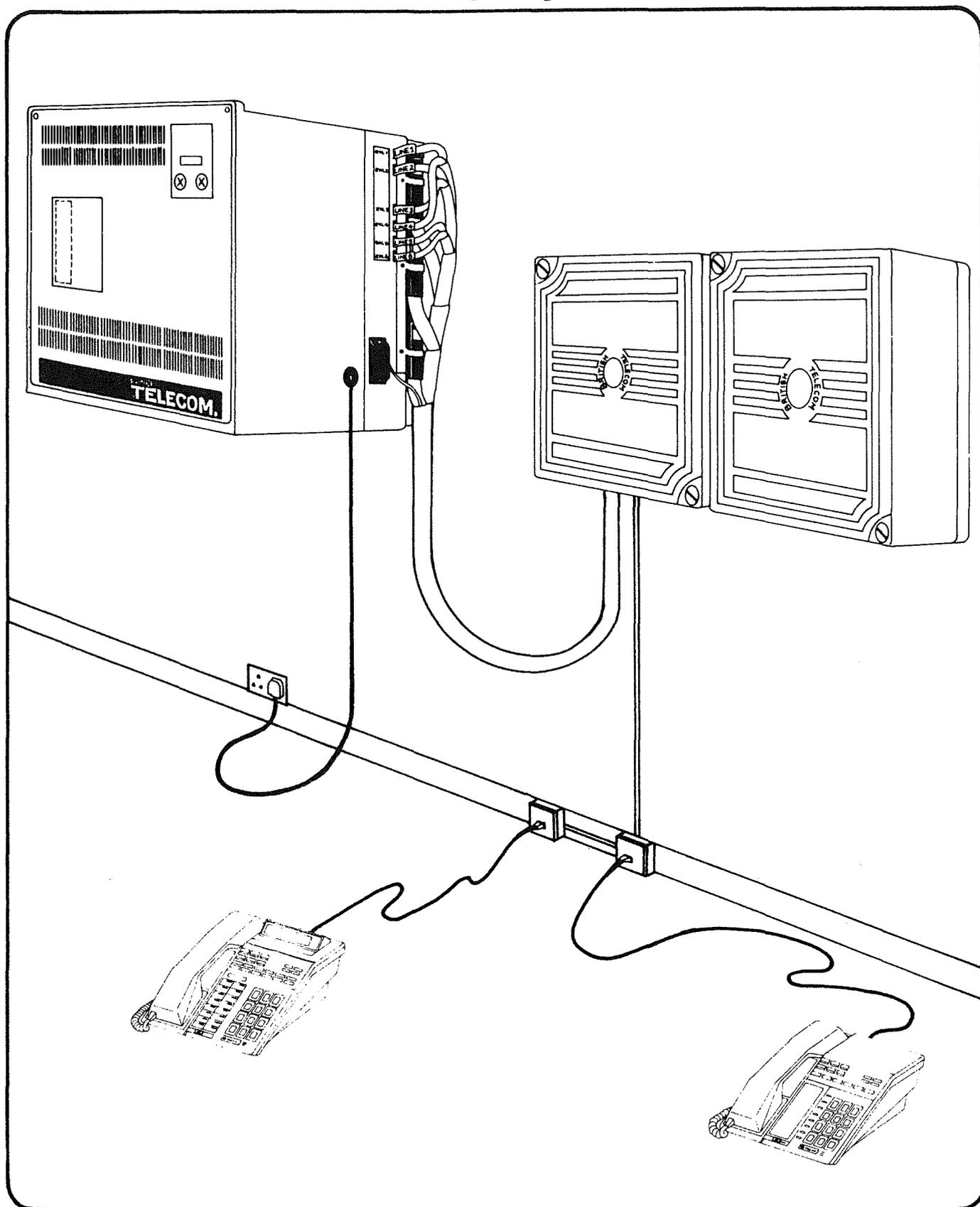
WARNING   This Equipment Contains Electrostatic Sensitive Devices

Electrostatic Sensitive Devices (ESDs), which may also be
known as Static Sensitive Devices (SSDs) are those devices
which may be damaged either catastrophically or partially by
inadvertent discharge of static electricity from a charged
body to the device.

ESDs include MOS devices, hybrid circuits containing ESDs,
PWBs containing ESDs etc. These devices may all have
breakdown voltages as low as 50V. Electrostatic voltages in
excess of a kilovolt may easily be produced which will cause
damage to these devices.

All units in the equipment described herein which contain
ESDs are identified by a yellow warning marking, typically a
yellow equilateral triangle, which may have a representation
in black of a hand with a bar across it.

The circuit diagram referring to the unit will also carry a
warning note or a representation of the warning triangle.
Wherever ESDs have been identified, basic precautions as set
out in Section 1.2 should be rigorously adhered to.

The following requirements are mandatory under the terms of the Approval.

Terminal Line connections must be via a box connection 252A.

Terminal plugs and sockets must not be compatible with normal Linejack Units. The terminal must be connected using Linejack Units 2/3C.

Terminal wiring must be independent of normal building distribution wiring.

An earth must be provided using permanent earth connection as described in Section 2.7.

Central equipment must be within 15m cable distance from box connection 252A, ie: cable run between 252A and 340A maximum cable length 13m.

Power fail regulations require 20% of exchange lines to be equipped for power fail working.

Contents _____ 9

Section 1: General Information

1.1 INTRODUCTION The Emblem Phone System (formerly S2616) is a small Business System with a maximum capacity of up to 6 exchanges lines and 16 terminals.

The system consists of a fully equipped wall mounted Main Equipment Unit, associated Box Connection, and terminals. The terminals are connected to the main unit by means of 4-wire distribution cables. The system uses a Z-80 eight-bit microcomputer which controls the switching matrix, call set-up and clear down procedures, also implementation of the system features.

Exchange-line signalling is loop-disconnect (LD). A wide range of programmable features is available, providing a high level of flexibility in terms of user facility requirements. Three types of terminal are available:

a) Standard terminals - equipped with a button and associated LED per exchange line to facilitate direct exchange-line calling and call-status display. The standard terminal is available with limited handsfree and answerback facilities and monitor.

b) Standard Terminal with loudspeech - as above, but including full loudspeech facilities.

c) Executive terminals - with enhanced facilities, including a display to indicate the number dialled and the time of day. The Executive terminal is provided with full Handsfree loudspeech and Power Fail operation. System and terminal facilities are programmed using an Executive terminal at the Terminal 10 position.

NOTE Only Emblem Terminals can be used on the Emblem. Special Line Jacks will be fitted to prevent accidental connection of other types of instrument. The matching terminal plug will prevent the use of Emblem terminals on other types of installation.

1.2 ANTI STATIC PRECAUTIONS Damage can be caused to the components used on the system if they are subjected to a discharge of static electricity. It is therefore important to take adequate precautions to avoid this.

1.2.1 Metal Oxide Silicon (MOS) devices   Some Printed Wiring Boards (PWBs) are fitted with MOS devices and, in view of their susceptibility to static electricity, it is essential to follow the procedures overleaf. In order to avoid confusion all PWBs, including main equipment and terminal PWBs must be treated as though they are fitted with MOS devices. Follow the precautionary measures strictly.

1.2.2 Precautions   Only handle PWBs after touching earth point to discharge body static, or connecting an ESP Wrist Band with Adapter No 1 (croc clip) to the terminal marked 'Earth' on the right hand side of the Central Equipment.

Move or store units only in conductive packaging. Conductive packing is available in various sizes as a Rate Book Item listed as Bags Static Shield Nos 2 & 3. EMBLEM S2616 Processor boards should only use Bags Static Shield No 2 if the Battery board is packed with it.

When handling PWBs do not make contact with the components, tracking or plug contact.

Do not remove or replace any slide-in unit in the Main Equipment Cabinet with power applied to the system.

Do not stack PWBs one upon another.

Do not store PWBs in excessively humid atmospheres or high temperatures.

Do not attempt to repair PWBs on site.

Always read and understand the detailed instructions for the PWB before proceeding to remove it.

Always use the PWB Extractor handles to remove or install a PWB.

Always check that the PWB is installed in the correct slot.

NOTE   Electro-static Protection Items are listed in the Rate Book. Item Code details are in Appendix A.

1.3 SITE PREPARATION Provision for the main equipment of a 13 Amp Socket Outlet, (to IEE wiring standards) is the responsibility of the customer.

In addition the customer should have considered the following:

1 Suitable lighting arrangements.

2 A suitable wall location for the main equipment at a convenient working height from the floor and clear of any obstructions.

3 The siting of the box connector and the PSTN connector.

4 The area allocated should be clean.

1.4 STORES INFORMATION Rate book codes of Main Equipment, terminals and field replaceable items are listed in Appendix A.

1.5 COLOUR The colour of the Central Equipment Case is two-tone Stone and Brown.

The terminals will be available only in one option, two-tone Stone and Brown.

1.6 NUMBERING SCHEME Terminals are numbered in the range 10 to 25.

1.7 GENERAL SYSTEM DATA Exchange lines: Loop Signalling
                                                Max loss 10 dB

Terminal lines: Data Pair Signalling

Max line length: 300 metres on 0.5mm copper wire
                    450 metres on 0.6mm copper wire
                    50 ohm loop resistance from Box Connection.

Line Test Conditions

Idle	2.8K	ohm	$1.8\mu F$
Seized	230	ohm	
Hold	160	ohm	

1.8 ADVICE NOTE FLOWCHART The flowchart in Fig 1/1 depicts typical documentation flow and related tasks.

1.9 DOCUMENTATION The following documentation is available:

a)   As a Documentation Pack or requisitioned separately:

Installation Guide - Subset of Installation and Maintenance Handbook. Not to be left with customer.

Programming Guide - To be left with the customer (preferably at terminal 10).

Warranty Card - Engineer to complete parts 1 and 3 and hand to the customer.

Three Emblem User Guides - To be left with the customer.

Sixteen Aide Memoires - All to be left with customer.

b)   Per System, enclosed in System packing.

Eighteen Labels - To be affixed to each Line Jack 2/3C.

Sixteen STD Labels - Spare labels for customer.

Master List (PXML) - List of approved boards and units within the system. To be left with the customer.

c)   Per System, given to Engineer with Advice Note:

Customer Configuration Information - Leave the Installation copy inside the back of the Programming Guide which is left with the customer.

d)   Per Installation Centre, Maintenance Centre and Business System Planning Group

Installation and Maintenance Manual.

FIG 1/1   ADVICE NOTE FLOWCHART

2.1 EQUIPMENT GENERAL DESCRIPTION

2.1.1 Emblem Main Equipment (Figures 2/1 and 2/2)

The Emblem cabinet is equipped with three type 226 connectors which provide access for terminal cabling and miscellaneous facility cabling.

Exchange lines are connected from the Box Conn. by means of the six individual ports located at the rear of the right hand side of the cabinet (see Figure 2/1).

The Emblem is supplied as a fully equipped Main Equipment Unit. Printed circuit boards are plug-in and are accessed from the front of the cabinet (see Figure 2/2).

The table below shows printed circuit boards in the Emblem Main Equipment.

Name	Description	Quantity
MCCU-6PA	Main control Processor and memories, dial sender and common use tone circuits.	1
3X8U-PA	Talk back control, 3 exchange lines and 8 terminals interface circuits.	2
RMXU-6PA	3x16 relay matrix expansion required when 2 of 3X8U-PA are installed.	1
LPTU-6PA	Line circuit protection fuse board.	1
RBTU-PA	Memory Battery Board, Sub board for CPU with backup battery	1
MCGU-6PB	Grounding Board required to provide Earth Recall to host PBX	1

NOTE Standard Installation Size. Grounding Board is optional.

VENTILATION SLOTS

MAINS SWITCH ASSEMBLY

WINDOW FOR STATUS LAMPS SYSTEM

360 mm

VIEW FROM FRONT

296 mm

EXCHANGE LINE CONNECTORS

WALL MOUNTING BRACKET

226 CONNECTORS

EXL 1
EXL 2
B
EXL 3
EXL 4
EXL 5
EXL 6
A 1

MAINS CABLE

ETH
GRD
A 2

275 mm

VIEW FROM RIGHT HAND SIDE

FIG 2/1 EMBLEM MAIN EQUIPMENT

MEMORY BACKUP BATTERY UNIT

+24V +5V G

+24V +5V

OFF ON

F1 3A   FO 3A

LPTU-6A

MCCU-6PA   3x8U-PA-1   3x8U-PA-2   RI4XU-6A   MLCU-6PA
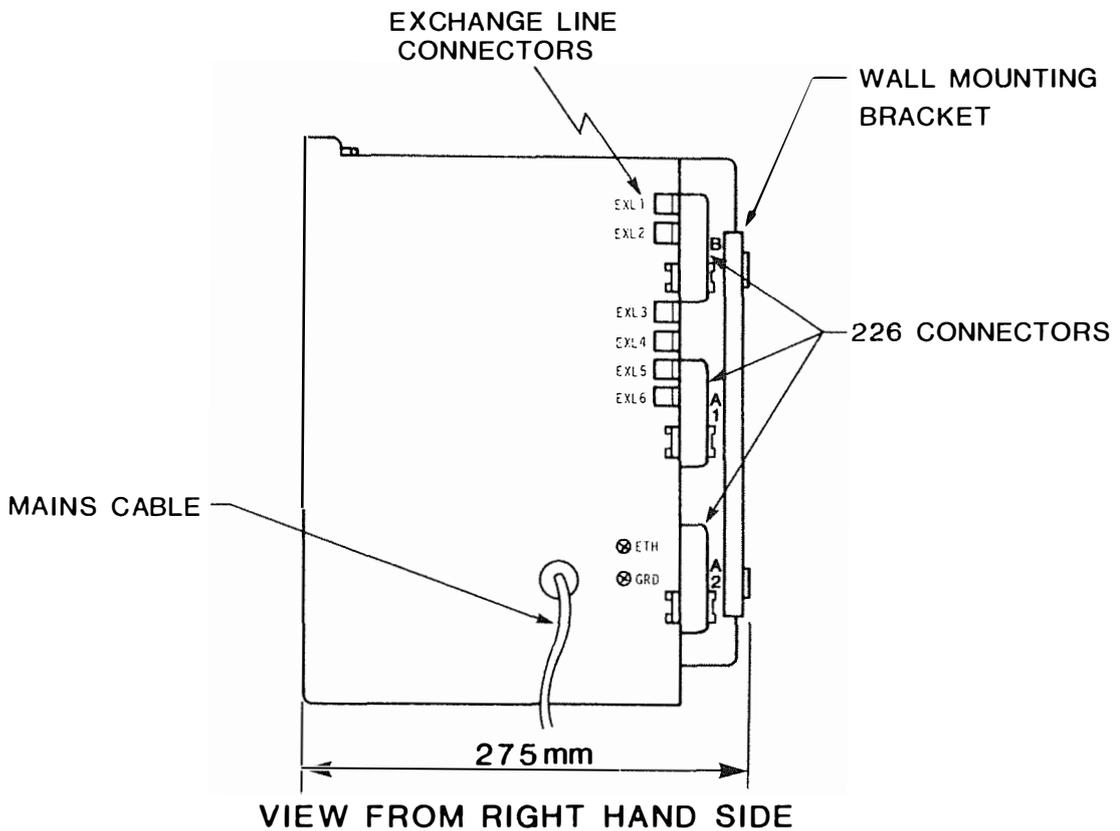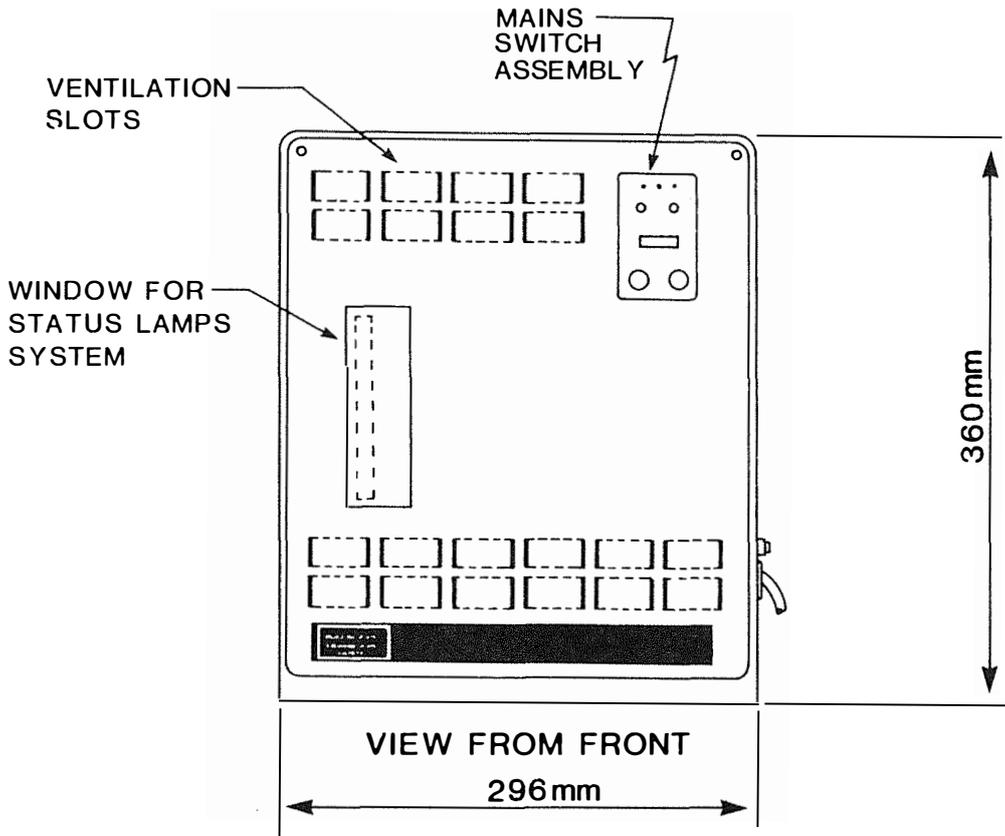
POWER SUPPLY UNIT
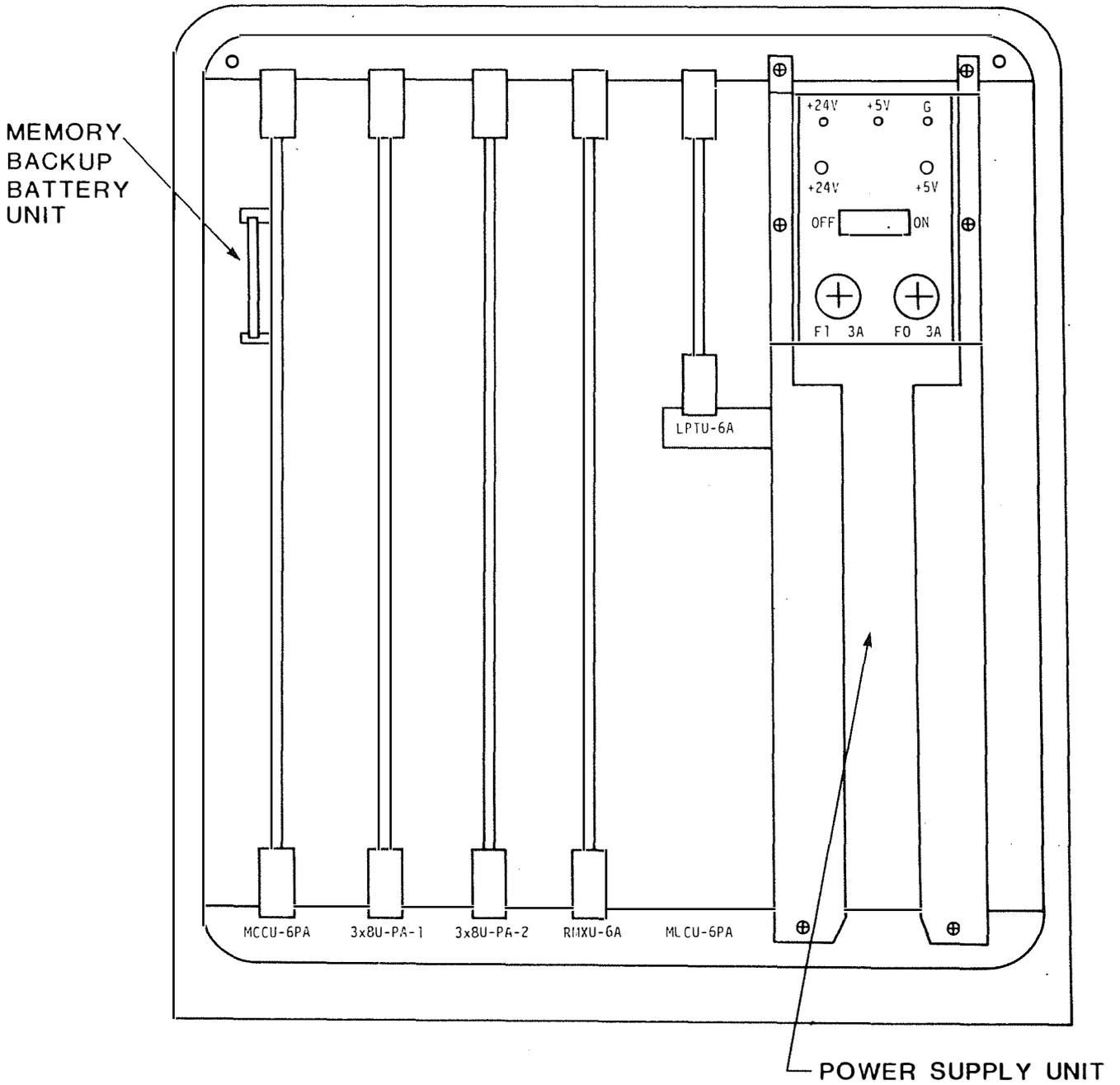
FIG 2/2 EMBLEM MAIN EQUIPMENT LAYOUT

2.1.2 S2616S
Standard
Terminal
(Figure 2/3)

Terminals are fitted with exchange-line buttons and LEDs on a one-per-line basis for exchange-line control and status monitoring. Facility buttons and LEDs are provided for the control of system facilities.

A further set of buttons provide the dual function of repertory number access and direct extension calling.

Additionally, the terminals have a 12 button keypad, microphone, loudspeaker, and slide action volume control.

2.1.3 S2616LS
Standard
Terminal
With
Loudspeech
(as Figure
2/3)

A version of the standard terminal with a full loudspeech facility.

2.1.4 S2616E
Executive
Terminal
(Figure 2/4)

The executive terminal has all the features of the standard terminal as described in 2.1.2.

An additional 6 facility buttons and 8 repertory number/direct extension selection buttons are provided.

Loudspeech and Power Fail working are available as standard on this model.

A programming-mode button is concealed underneath the removable Direct Extension Select (DES) fascia panel. This button will only function at Terminal 10.

2.1.5 Terminal
Numbers

The maximum number of terminals is 16, numbered 10 to 25.

EXCHANGE LINE ACCESS KEYS

SPEAKER

LABEL UNDER HANDSET

STD No:
Station No:
EMERGENCY 999

| LINE 1 | LINE 2 | LINE 3 |
| LINE 4 | LINE 5 | LINE 6 |

REP | INTRUDE

ICM

| NIGHT | CONF | R | MUTE | SPKR | HOLD |
FOLLOW | OND | LISTEN | | | Q / PROG

FACILITY KEYS

■ MW

MESSAGE WAITING LAMP

1	2	3
4	5	6
7	8	9
✻	0	⌗

British
TELECOM ≡

MICROPHONE

VOLUME CONTROL

VIEW FROM SIDE

63

70
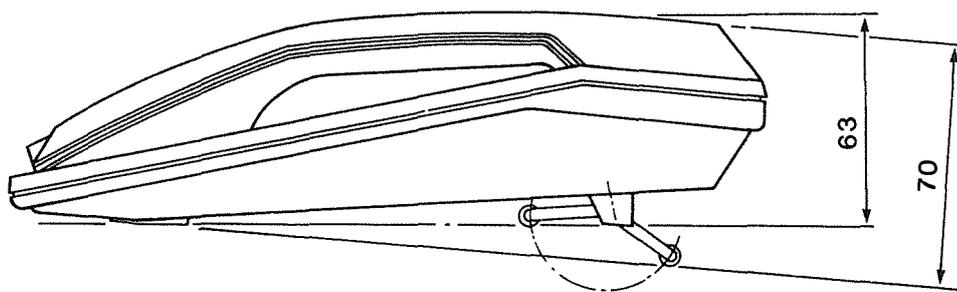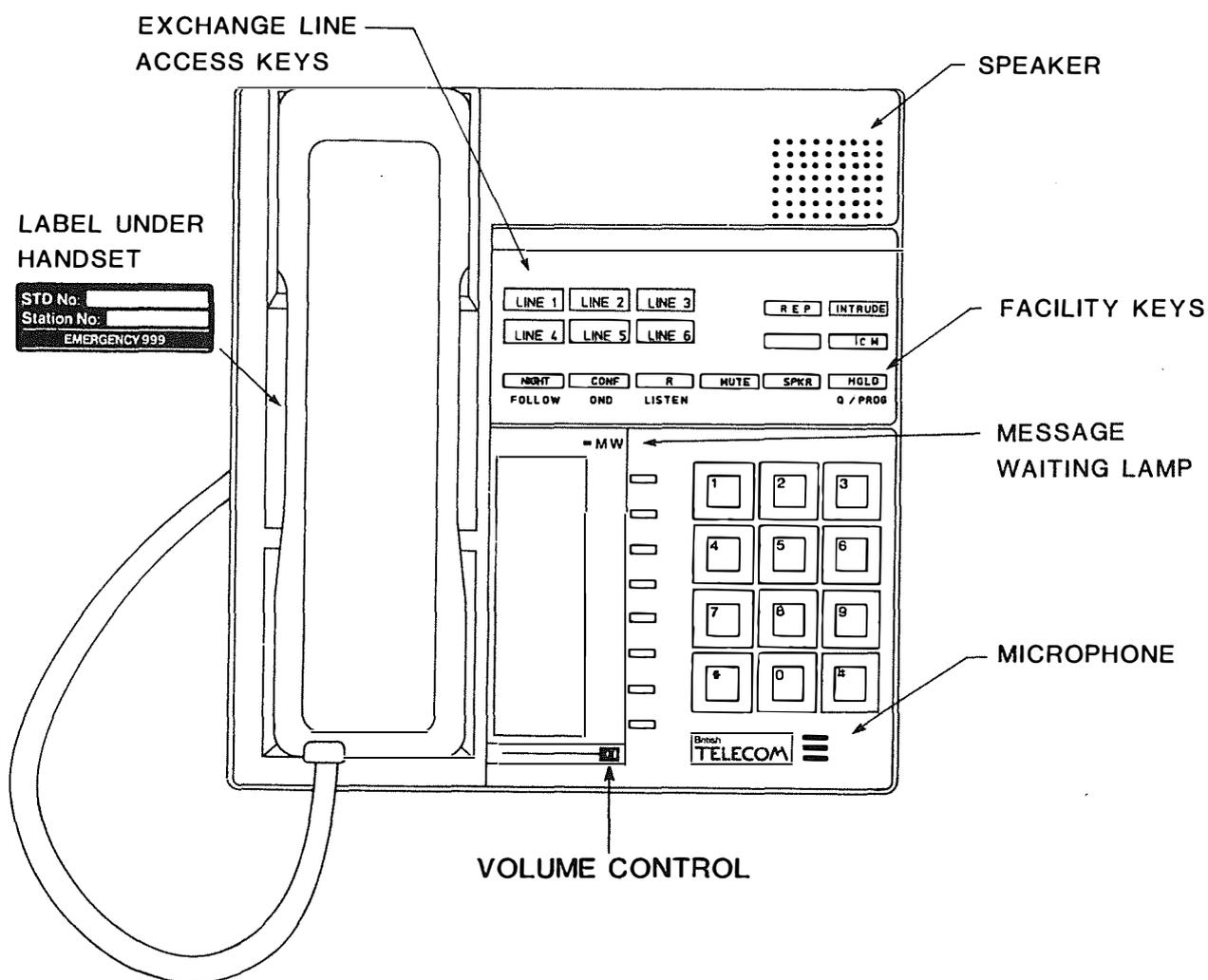
FIG 2/3 STANDARD TERMINAL AND
STANDARD TERMINAL WITH "LOUDSPEECH"

EXCHANGE LINE ACCESS KEYS

DISPLAY

MESSAGE WAITING LAMP

LABEL UNDER HANDSET

STD No:
Station No:
EMERGENCY 999

SPEAKER UNDER HANDSET

FACILITY KEYS

MICROPHONE

DIRECT EXTENSION SELECT (D.E.S.) KEYS

VOLUME CONTROL
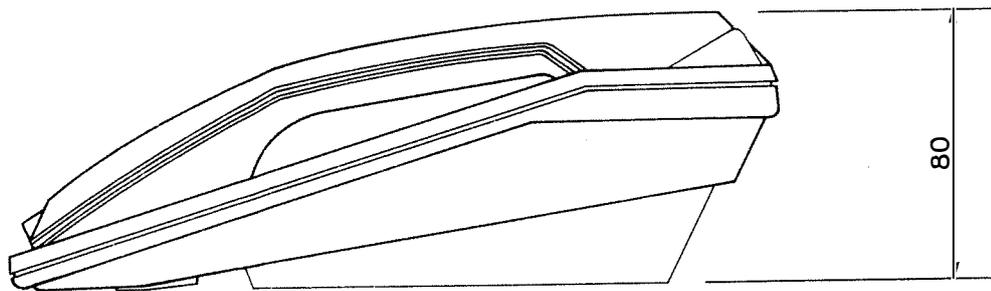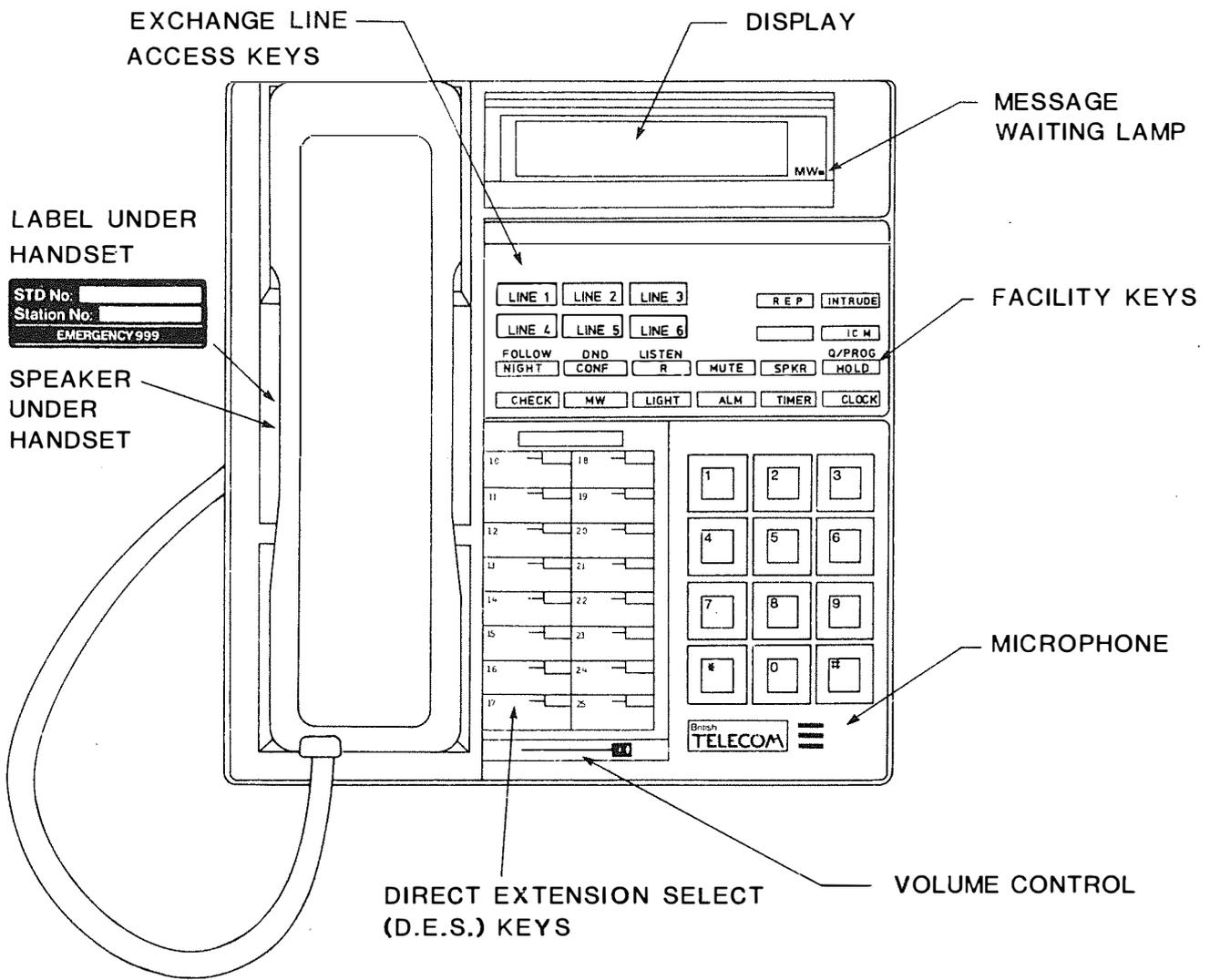
VIEW FROM SIDE

FIG 2/4 EXECUTIVE TERMINAL

2.2 EQUIPMENT CONFIGURATION

Refer to Installation Illustration (Figure 2/5).

2.2.1 Power Fail Operation

It is standard procedure under the terms of the Approval to provide an Executive Terminal on 20% or more of exchange lines. Executive terminals have facilities for both originating and answering exchange-line calls under power fail conditions.

On an incoming call, the sounder associated with the particular exchange line will operate.

The assignment of terminal lines for power fail operation is pre-determined by connection paths in the cabinet backplane wiring. Terminal lines and exchange lines are connected as follows under power fail conditions

Exchange line no	Terminal line no
1	10
2	13
3	16
4	18
5	21
6	24

STRIPS CONNECTIONS 237A

BOX CONNECTION
340A

QUAL TECH LINE PROTECTION UNITS

226
CONNECTIONS

B
A1
A2

EMBLEM
SYSTEM

ETN

EXTENSION
WIRING
AROUND BOX
CONNECTION

1
2
3
4
5
6

EXCHANGE
LINES

E   E

BOX 252A

MAINS SUPPLY

LINK WIRES BETWEEN
PROTECTION UNIT & LINE
CORDS

COMBINED
COVERED CABLE

2m LONG

SCREW TERMINAL BLOCK FOR
TERMINATION OF EXCHANGE LINE CORDS

EXTENSION CABLING

HOUSE CABLING
4.WIRE/EXTN.

NOTES:

1. MAXIMUM CABLE LENTH
BETWEEN CENTAL EQUIPMENT & BOX
252A NOT TO EXCEED 15m

LJ2/3C

LJ2/3C

LJ2/3C

STANDARD
TERMINAL WITH
LOUDSPEECH
S2616LS

STANDARD
TERMINAL
S2616S

EXECUTIVE
TERMINAL
S2616E

FIG 2/5 EMBLEM INSTALLATION

BRITISH TELECOM EMBLEM
BOX CONNECTION 340A
ASSEMBLY

7. JUMPER RING 37B.

6. STRIP CONNECTION No.237A (5 OFF)
DRG No CD 2930 MOUNTED ON FRAMES
MOUNTING 5/30/6/A

A. 10μF CAPACITOR TO BE FITTED ON
EQUIP. SIDE OF BARRIER UNIT.
SEE NOTE 1.

8. COVER No 113A (LOW PROFILE)
DRG No. 94573
(2 OFF)

9. BASE PLATE
DRG No DBA/282 SH 1-3
(2 OFF)

6
5
4
3
2
1 SPARE POSITION

QUAL TECH

1 } LINE
2 } CONNECTIONS

ISOLATION BARRIER

3 } LINE
4 } CONNECTIONS

B 32/150 B

5 } LINE
6 } CONNECTIONS

EARTH TO ISOLATION BARRIERS

EARTH BAR 5A CONNECTED TO FRAME.

WIRE TERMINATION TO SOLDER TAG ON REAR.

320 ±⁸ (REF)

LINE 1
LINE 2
LINE 3
LINE 4
LINE 5

CORD TO BE ANCHORED TO BACK PLATE WITH SUITABLE CABLE TIE

SYSTEM CORD CONSISTING OF 150 WIRES: 6 CORDS TERMINAL UNDER SCREWS ON BLOCK 6A & 1-1.5mm² EARTH WIRE

11 SCREW TERMINAL BLOCK 6A

10 BASE CLAMP 1/DCL/183 (2 OFF)

210 ±⁸ (REF)

420 ±⁸ (REF)

FIG 2/6 EMBLEM BOX CONNECTION 340A

2.2.2 **Box Connection 340A (Figure 2/6)** The box connection is a wall mounted assembly consisting of two 300 series box shells fixed together in the usual fashion. For this system the item is titled as a Box Connection 340 A.

The left hand unit contains the terminal terminations and miscellaneous facility terminations made to 5 Strips connection 237.

The right hand unit contains the line protection units.

The box connection is also provided with a connectorised cable connection (2 metres long) to provide connection to the Main Equipment. The cable connection consists of the terminal cabling, auxiliary facility cabling, line connections and an earth wire.

The terminal connections can be easily identified from the designations as fitted, see figure 2/7.

The port polarity identification is as follows:-

"A" wire speech +
"B" wire speech -
"C" wire data +
"D" wire data -

The flexibility of the terminal wiring will be limited unless one of the following two procedures is adopted.

(a) The terminal cabling should be wired around the box connection to provide sufficient surplus cable for future re-arrangements (see figure 2/6)

(b) An additional 301A box connection is mounted adjacent to the system box which would contain the terminal wiring terminations; these can then be jumpered across to the system connection field.

Two separate ports are available for connection of external paging amplifiers. They appear on Strip Conn No 2 in the box connection 340A as follows:

Port 1 - terminals B23 and B24
Port 2 - terminals B25 and B26

Wiring from these terminals must be connected directly to the non fused side of an approved fuse disconnect barrier circuit (line protection barrier unit 250/MB27 or line protection unit B32/150B). The barrier unit itself shall be mounted in the box connection 340A. A mounting for the barrier unit can be purchased from Austin Taylor. The connection is extended to the amplifier input terminals from the fused side of the barrier circuit using 2-wire balanced cable pairs.

Other connections in the range "B1" to "B32" on Strips Conn No's 2 and 3 are provided for future extended facilities.

STRIPS
CONNECTION

237A

EXTENSION WIRE

A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
SPEECH 10	DATA 10	S 11	D 11	S 12	D 12	S 13	D 13	S 14	D 14

No.   6

EXTENSION WIRE

A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
S 15	D 15	S 16	D 16	S 17	D 17	S 18	D 18	S 19	D 19

No.   5

EXTENSION WIRE

A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
S 20	D 20	S 21	D 21	S 22	D 22	S 23	D 23	S 24	D 24

No.   4

EXTENSION WIRE

A	B	C	D		B1	B2	B3	B4	B5	B6	B7	B8	B9	B 10	B 11	B 12	B 13	B 14
S 25	D 25

No.   3

B 15	B 16	B 17	B 18	B 19	B 20	B 21	B 22	B 23	B 24	B 25	B 26	B 27	B 28	B 29	B 30	B 31	B 32

2

1

(SPARE)

NOTE: 'A' WIRE = SPEECH   +
         'B' WIRE = SPEECH   —
         'C' WIRE = DATA   +
         'D' WIRE = DATA   —

FIG 2/7 BOX CONNECTION MAP
FOR EXTENSION PORT CONNECTION

2.2.3 Central Equipment Wall Mounting

The central equipment should be wall mounted on a suitable flat, sound surface. This should be within 3 metres of a mains socket outlet and should allow the central equipment to be clear of the floor and any obstructions.

Before the Central Equipment and associated box connection is fixed to the wall (ie holes drilled) a recommended metal detector should be used to locate any services beneath the surface. Where necessary, consultation with the customer on the whereabouts of these services should be made.

Drill and plug four holes, suitable for No 10 woodscrews, at a convenient working height from the floor and clear of any obstructions. The holes must be 300 mm apart horizontally and 200 mm apart vertically.

                   300 mm

0   0

                                 200 mm

0   0

Fit and tighten No 10 woodscrews (NOTE a space of 2mm between the wall and screw head must be left).

Loosen the 6 screws retaining the mounting brackets on the rear of the central equipment and adjust the Keyhold positions to fit the screws on the wall. Retighten the bracket screws.

Lift the cabinet and fit the keyholes of the bracket to the screws on the wall, and then carefully slide the cabinet downwards. Tighten screws to fix central equipment firmly to wall.

2.2.4 Terminal Connections

The terminals should be connected to the box connection with devoted house wiring, ie cabled independently of any existing building distribution wiring. Twisted pair cable such as Cable Equipment 2503F should be used.

The Emblem terminals are supplied ready equipped with plug ended line cords. The sockets that will be used are Line Jacks 2/3C.

USE TERMINAL	LINE JACK 2/3C	BOX CONN TERMINAL DESIGNATION
speech +	4	A wire
speech -	3	B wire
Data +	2	C wire
Data -	5	D wire

The Line Jack 2/3C is similar to the Line Jack 2/3A, but has a special polarisation which only allows the type of plug used on the Emblem terminals to be inserted.

NOTE

The Executive and Standard with Loudspeech terminals are polarity conscious on both speech and data pairs; the Standard without Loudspeech is polarity conscious on data but only on speech when the handset is in use.

2.2.5 System Connections

Terminal cables, line cables and auxiliary facilities are connected to the central equipment by means of three 25-pair BT 226 type connectors (marked B, A1 and A2 on connectors and the Central Equipment)and six Western electric style plugs (6 way bodies 4 ways connected). An earth link cable is also provided within the cable group which extends the Central Equipment earth (ETH on Central Equipment) to the box connection and the line protection units.

Both the 226 connectors and line plugs must be locked in place using the locking plate provided. Care should be taken when tightening the locking plate screws. (Figure 2/8).

2.3 SITE CABLING

Terminal wiring must be independent of normal building distribution wiring.

2.4 EXCHANGE LINE CONNECTIONS TO BOX CONNECTION 340A

To satisfy the current approval requirements the exchange lines must be connected via a Box Connection 252A (Figure 2/5).

The Box Connection 252A provides strips connection 237A for termination of exchange lines and is pre-wired to a screw terminal block for connection of the exchange lines to the system. The box should be mounted to provide a maximum cable run of 13m to the Box Connection 340A, hence maximum between 252A and the Central Equipment must be within 15m.

Exchange lines from the Box Connection 252A should be terminated on the screw terminals situated on the line side of the Line Protection Units (LPU) in the right hand side of the Box Connection 340A (Figure 2/6). These screw terminals are marked with appropriate line numbers.

2.5 PW CONNECTIONS

To satisfy the current Approval requirements, private wires must be connected via a different Box Connection 252A from the exchange lines (see figure 2/5).

The Box Connection 252A provides strips connection 237A for termination of the PW's and is pre-wired to a screw terminal block for connection of the PW's to the Equipment Signalling 27A.

The Equipment Signalling 27A houses the signalling converter and provides a strip connection 237A for the termination of the PW's from the box connection 252A and 340A. It also includes a mains to 50V powerunit to power the signalling converter and must be mounted within 3m of a 13A mains socket outlet.

2.6 PROGRAMMING PABX LINES

This programming information is not given in the customer programming manual. This must be set at the time of installation and will only require amending if the number of PABX lines or type of host PABX is changed. Programming instructions are given in this handbook in paragraph 3.4. It is important to document all changes.

FIG 2/8 CONNECTOR LOCKING PLATE ASSEMBLY

screw fixings – 3 off

EX.L 1 LINE 1

EX.L 2 LINE 2

EX.L 3 LINE 3

EX.L 4 LINE 4

EX.L 5 LINE 5

EX.L 6 LINE 6

WARNING

A2

connector locking plate

insulation shim
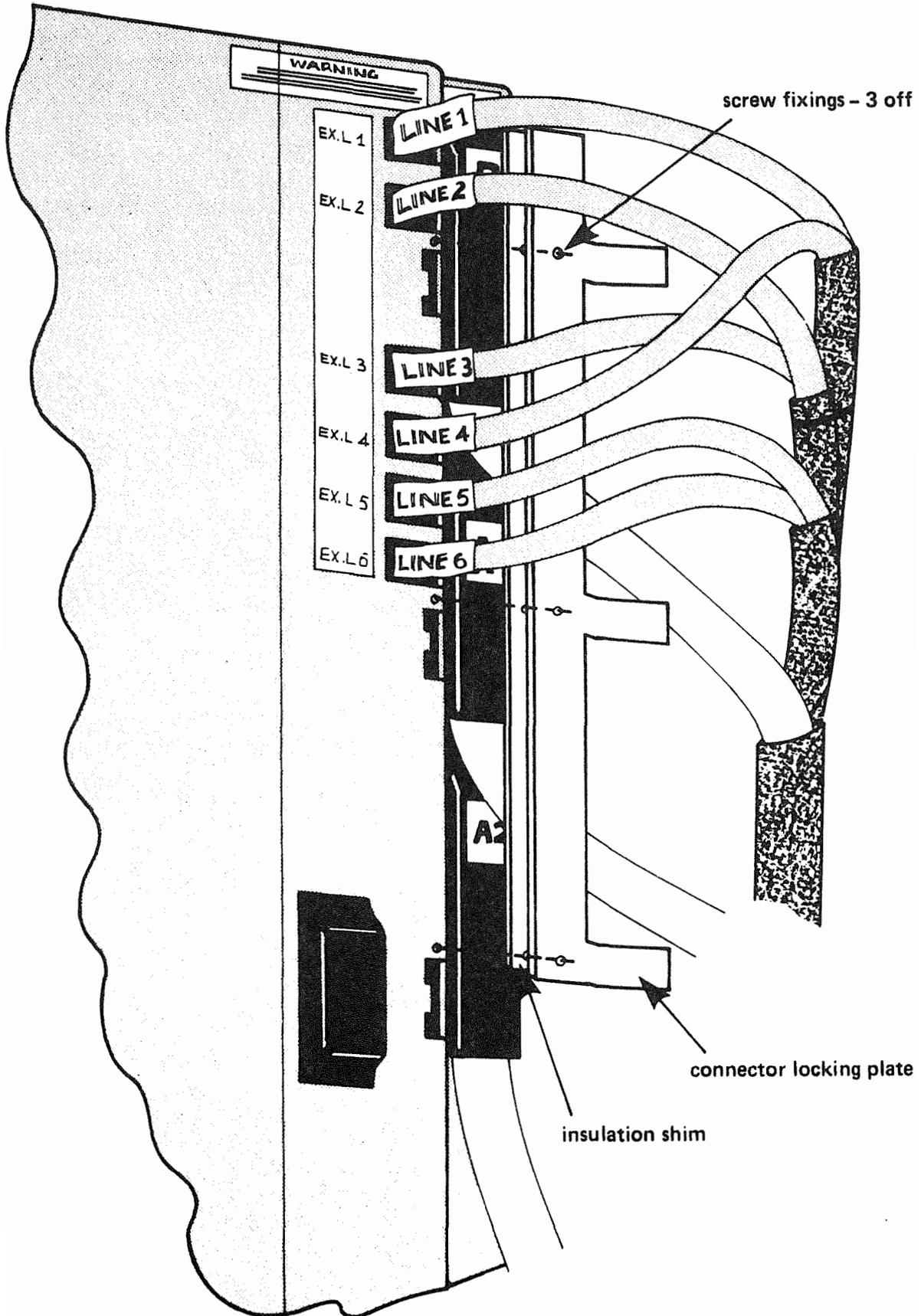
2.7 PROTECTIVE EARTH CONNECTIONS

It is essential that the 1.5sq.mm earth wire provided within the cable connection is connected to the earth terminal (Marked ETH) on the side of the central equipment.

In addition, a hard wired earth connection must be made from the ETH terminal on the central equipment to a proven building earth point using a 1.5mm sq insulated earth wire, (Earth cable ELP 6491 Green/Yellow 1.5mm sq code 791550). This is in addition to the earth connection provided via the 13 amp socket and power unit.

The earth connection should be confirmed using a suitable line earth loop impendance tester and used in accordance with the instructions provided. Maximum resistance must not exceed 4 Ohms.

2.8 INSTALLATION AND REMOVAL OF PRINTED WIRING BOARD

To remove a PWB use the extractor levers fitted at the top and bottom of each card.

PWBs must be carefully inserted into the Main Equipment cabinet as shown in Figure 2/2. Each PWB slot in the cabinet is labelled with the PWB type number.

Use the extractor levers at the top and bottom corners to apply pressure when inserting PWBs.

Observe Static Handling Precautions.

For removal and installation of the Power Supply Unit see Section 5.2.3.

NOTE   PWBs may only be inserted or removed when power is switched OFF.

2.9 SYSTEM INITIALIZATION

2.9.1 General Checks

The following paragraphs are intended for initial installation only, though the checks are good practice for maintenance visits.

Ensure all terminals, exchange lines, and miscellaneous facility units are correctly terminated.

Check that the A1, A2 and B cables are securely connected into the correct location on the Main Equipment cabinet.

Ensure that the 226 connector retaining bar on the right hand side of the equipment, is correctly fitted.

Check that the ETH terminal is securely connected to the earth wire which goes to the Exchange Line Protection Unit in the Box Connection.

NOTE The GND terminal is for connection of a Signalling Earth whichis normally required if the system is piggy-backed on a PABX.

The signalling earth must be provided separately from the protective earth using 1.5mm^2 insulated earth wire and connected to the building telecommunications earth point.

Check that safety covers are fitted over the ETH/GND terminals, etc.

Confirm the box connector jumpering is correct.

Confirm that the 13 amp mains plug is correctly fused (3A).

Check Main Equipment power switch is in the OFF position.

Take note of warning labels on the Main Equipment cabinet

Plug into mains power socket (power socket switch in OFF position).

Confirm that the 240V AC and 24V DC mains switch panel fuses are correctly inserted.

2.9.2 Switch-on Procedure

The following switches appear on the processor board (MCCU 6PA). See Figure 2/9. The switches must be set as follows:

Switch Designation Position
WR (Initially) left hand position
PPS Left position (away from LED)
MR Left position (away from LED)
MOH Right hand position (position nearest to LED)

Prior to application of power for the first time following installation, it is necessary to clear the memory of previous system data by setting the WR switch on the MCCU6PA to the left hand position side.

Turn on power at main outlet.

Turn on main supply switch on CCU power unit.

Check that 5V and 24V LEDs on main switch panel are lit.

After approximately 5 seconds from power-on move the WR switch to right hand position (position nearest LEDs).

Adjust VR1 (see Fig. 2/9) for the volume of the 'Music on
Hold'. The level varies between inaudible at fully
anticlockwise to maximum allowed level at fully clockwise.

FIG 2/9 COMMISSIONING PROGRAMING SWITCHES

WR

LED

PPS

MR

MOH

LED 1

2

3

4

5

6

7

3 X 8U–P–A–1

3 X 8U–P–A–2

RM X U–6A

processor board MCCU · 6PA
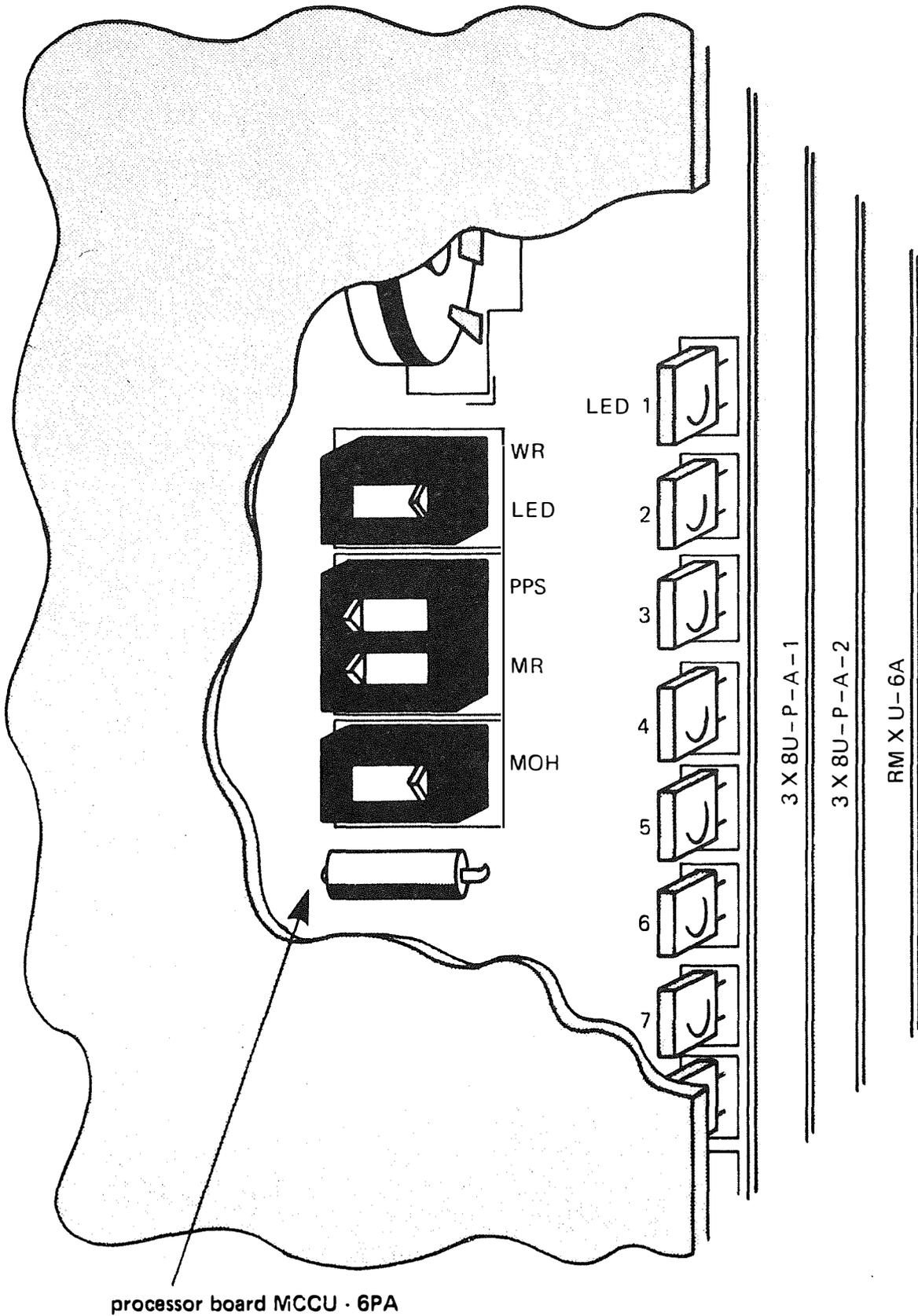
Check the diagnostic routine as described in 2.9.3.

2.9.3 LED Diagnostic Checks

NAME	STATE	NOTE
CPU OP	Flashing at 5 per second	The main CPU routine on MCCU-6PA functions correctly
	Other indication	System CPU fault
LOW BATTERY	No light	The CMOS memory back-up battery voltage is correct.
	Steady light	The CMOS memory battery voltage is low
TERM 10 through TERM 25 (marked STA1 to 16)	No light	Terminal connection to the Central Equipment faulty, reversed or not connected.
	Flashing at 5 per second	Off-hook or SPKR button "on" status at the associated terminal.
	Flashing at 1 per second	Data transmission and reception between Central Equipment and terminal functions correctly.
	Other indication	Data transmission and reception between Central Equipment and terminal is incorrect.

Exchange Line Status Display

A diagnostic LED for monitoring exchange line status is located on the 3X8U-PA line interface card. It lights steady when any of the 3 exchange lines on the card are engaged except during incoming signalling.

2.9.4 System Default Program

If all previously programmed data has been cleared during Initial Switch On Procedures, then the system configures to a default working condition as follows:

All terminals have Incoming and Outgoing signalling and access to all Exchange Lines.
All Lines in first group for Trunk Queueing.
All terminals in Night Service Group.
No terminals assigned as Manager/Secretary (call forwarding) pairs.
No terminals allowed the Do Not Disturb facility.
No Intrude Allowed.
Paging Groups set as terminals 10 to 13, 14 to 17 and 18 to 21 for Groups 1, 2 and 3 respectively.
Intercom signalling set as Voice Calling.
No Calls Barred.

3.1 SYSTEM PROGRAMMING INSTRUCTIONS

General

1   The initial configuration of the Emblem Phone System is done by the Installer; subsequent programming may be carried out either by the Customer or an Installation or Maintenance Engineer.

2   Initial configuration is carried out in accordance with information recorded on the Customer Configuration Sheet which should accompany the Advice Note. The Configuration Sheet must be left in the back of the Programmming Guide. The Section numbers in this Chapter correspond to those on this Sheet.

3   The current state of programming should be recorded on the Configuration Charts in Section 7-2 of the Programming Guide.

4   Always Structure your Programming; carefully follow the Entry and Exit procedures detailed later.

5   Programming can only be implemented from Terminal 10 - always an Executive.

6   Error Messages produced by mistakes when programming are shown in Section 7-1, together with explanations.

7   Check the WR switch is set to the right on the Processor board MCCU-6PA.

3.2 PROGRAM ENTRY AND EXIT

Entry

Wherever 'Enter Program Mode' is met in this Chapter, the following steps must be performed before Programming can commence.

Action

1   Remove the plastic cover and label above the DES keys on Terminal 10. These keys are labelled 1 to 16, and will be referred to as F1 to F16 to avoid confusion with the key pad.

2   Press WR - the recessed button below key F16 - display blank. You are now in Program Mode. See diagrams on following two pages.

Exit

Wherever 'Exit Program Mode' is met in this Chapter the
following steps must be performed to save, Exit and return
to a time display.

ACTION   DISPLAY

1. Press CHECK and F16   - - - - - - - - -   P

2. Press WR to save   - - - - - - - - -   Display returns
    changes   to telephony

It is important to note that any calls in progress on the
System will at this point be disconnected.

3. Replace plastic cover - - - - - - - -
    and label if programming
    finished

REMEMBER   Particularly when starting Programming, remember
                the following sequence.

Enter Program Mode
Program
Check
Exit Program Mode

As you become more familiar with programming, you may wish
to change several sections without continually Exiting
Program Mode.

This is possible as long as the Program Data is eventually
stored by following the EXIT instructions after several
sections are completed. It is possible to leave out the
CHECK procedure - not recommended.

Do NOT Program too many (more than three say) sections at
once.

If after ENTER-ing programming mode, you decide you would
like to EXIT without making any changes, then press WR
without pressing Check and F16. You will then EXIT from
programming mode and any functions programmed since
ENTER-ing will be ignored.

Update the Customer Configuration Information records with
changes made. This will save time and embarrassment should
the processor board fail or require replacement.
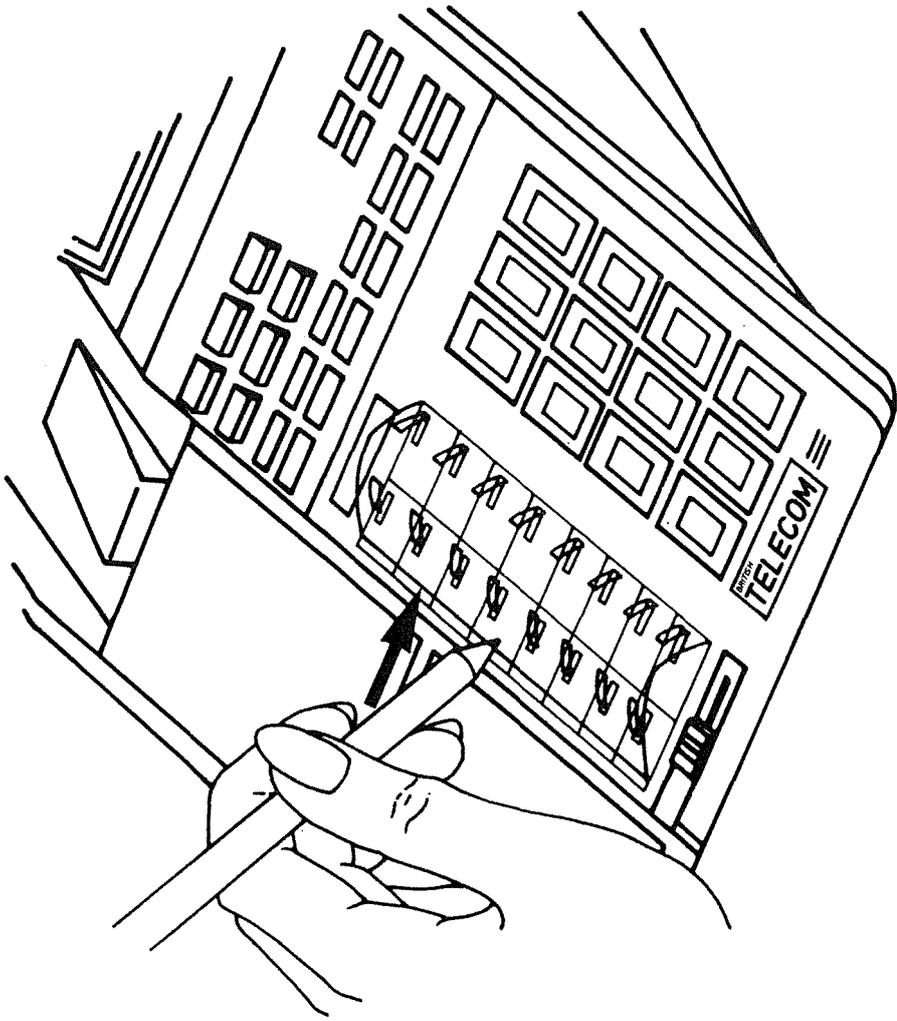
REMOVING LABEL COVER

(on Executive terminal 10)

F1 to F16

key pad

WR
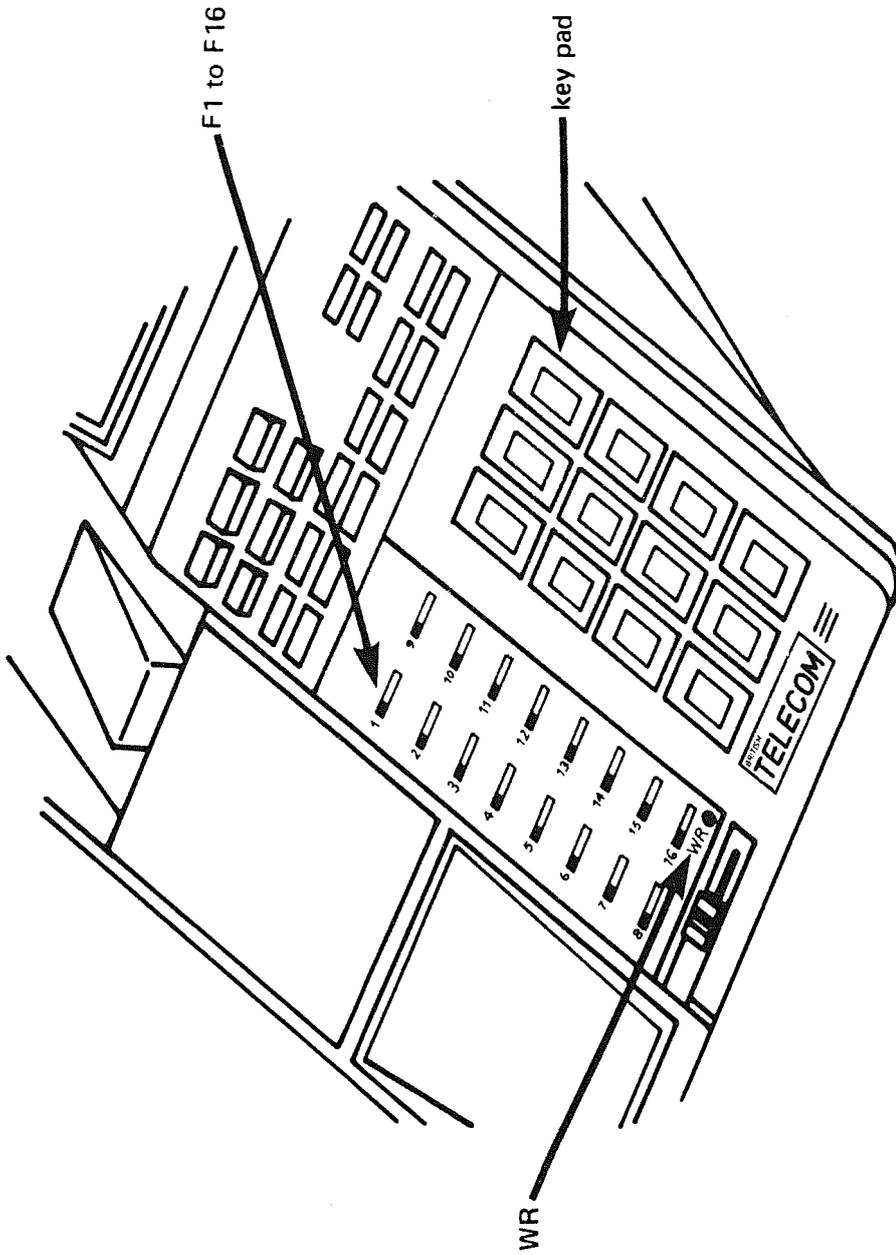
EXECUTIVE TERMINAL 10
(with plastic cover and lable removed)

3.3 **PROGRAMMING CUSTOMER CONFIGURATION**

The following pages are divided into sections, each having a Section Number which corresponds to the appropriate section within the Customer Configuration Information Sheet.

1-1 **OUTGOING EXCHANGE LINE ACCESS**

Terminals are initially allowed outgoing access to all exchange LINES.

This can be altered only on a per terminal basis to allow outgoing access at that terminal only on certain LINES. It is possible to deny all direct outgoing access at a particular terminal by not assigning any LINES to it during the steps below.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - - - - -	
2	Press F4	- - - - - - - - - - -	09
3	Key terminal number	- - - - - - - - - - -	Terminal number
4	Press each LINE Key to which that terminal is to have access		LINES available
5	Key *		
6	Repeat 3 to 5 for other terminals		
7	Key # when all terminals have been programmed		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press F4	- - - - - - - - -	C09
3	Key terminal number	- - - - - - - - -	Terminal number
4	Key *		LINES available
5	Repeat 3 and 4 for other terminals		
6	Key # when all terminals have been checked.		
7	Exit Program Mode		

1-2 ACCESS TO CALLS ON HOLD

Terminals are initially allowed access to all LINE calls placed on non-exclusive HOLD.

It is possible to alter this on a per LINE basis to deny access to HELD calls. This will only apply to terminals that are already not allowed Outgoing Access on that LINE.

A terminal may be fully barred to a particular LINE by using this feature in conjunction with 1-1 and Incoming Audible Signalling Disable, 1-4.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - - -	
2	Press Q/PROG	- - - - - - - - -	04
3	Press relevant LINE key	- - - - - - - - -	LINE number
4	Key 1 for HOLD access or key 0 to deny HOLD access		LINE access
5	Key *		
6	Repeat 3 to 5 for the other LINES		
7	Key # when complete		

	CHECK		
1	Press CHECK	- - - - - - - - -	C
2	Press Q/PROG	- - - - - - - - -	C04
3	Key LINE number	- - - - - - - - -	LINE number Hold access=1 Deny access=0
4	Repeat 3 for other LINES		
5	Key # after checking all LINES		
6	Exit Program Mode		

1-3 TRUNK QUEUEING/LINE GROUPS

All exchange LINES are initially placed in one group for Trunk Queuing-Group 1.

There are, however, up to six groups available for Trunk Queueing. It is possible to assign LINES to one or more of these groups.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - -	
2	Press F3	- - - - - - - - -	08
3	Key Group number (1 to 6)	- - - - - - - - -	Group Number
4	Press the LINE keys required in the first group		LINES in Group
5	Key *		
6	Repeat 3 to 5 for the other groups		
7	Key # when all LINE keys are assigned		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press F3	- - - - - - - - -	C08
3	Key group number	- - - - - - - - -	LINES available in group
4	Repeat 3 for other groups		
5	Key # after checking all groups		
6	Exit Program Mode		

1-4 INCOMING EXCHANGE LINE - AUDIBLE SIGNAL

All exchange LINES initially signal audibly at all terminals.

This may be altered on a per terminal basis to allow only certain or no LINES to signal audibly. This facility may be used in conjunction with 1-1 and 1-2 to allow/disallow particular terminals access to individual LINES (this does not affect the visual signals).

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - -	
2	Press F5	- - - - - - - - -	10
3	Key terminal number	- - - - - - - -	Terminal number
4	Press the LINES required to signal audibly at that terminal		LINES required to signal
5	Key *		
6	Repeat 3 to 5 for other terminals		
7	Key # when complete		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press F5	- - - - - - - - -	C10
3	Key terminal number	- - - - - - - -	Terminal number
4	Key *		LINES that signal
5	Repeat 3 and 4 for other terminals		
7	Key # after checking all terminals		
8	Exit Program Mode		

1-5 DISABLE AUDIBLE EXCHANGE LINE SIGNALLING

All terminals are initially not allowed to disable temporarily incoming audible indications by pressing NIGHT (Handset off).

This can be altered on a per terminal basis to allow all or some terminals to disable exchange LINE audible signalling. This facility may be overidden by Night Service and Manager/Secretary working and does not affect the visual signals.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - - -	
2	Press F6	- - - - - - - - -	11
3	Key terminal number	- - - - - - - - -	Terminal number
4	Key *		
5	Key 1 to allow or 0 not to allow		1=Allowed 0=Not allowed
6	Key *		
7	Repeat 3 to 6 for other terminals		
8	Key # when complete		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press F6	- - - - - - - - -	C11
3	Key terminal number	- - - - - - - - -	Terminal number
4	Key *		1=Allowed 0=Not allowed
5	Repeat keying of * steps through terminals		
6	Key # after checking		
7	Exit Program Mode		

1-6 PRESET NIGHT SERVICE TERMINALS

The system is initially set to signal audibly at all terminals when Night Service is activated from Terminal 10.

It is possible to adapt the Night Service to your circumstances so that the audible indication is transferred only to selected terminals.

Remember that Terminal 10 will also ring on Night Service unless altered by programming.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - -	
2	Press NIGHT	- - - - - - - -	00
3	Key terminal number	- - - - - - - -	Terminal number
4	Key *		
5	Key 1 for Night Service or key 0 if not to be used for Night Service terminal		1=Night Service 0=Not Night Service
6	Key *		
7	Repeat steps 3 to 6 for all other terminals		
8	Key #		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - -	C
2	Press NIGHT	- - - - - - - -	C00
3	Key terminal number	- - - - - - - -	
4	Key * to step through terminals		1=Night Service 0=Not Night Service terminal
5	Key # when all terminals have been checked.		
6	Exit Program Mode		

2-1 VOICE CALLING OR AUDIBLE SIGNALLING ON INTERNAL CALLS   All terminals are initially set for voice calling on internal calls.

It is possible on a system basis to alter this to give audible signalling (ringing) when internal calls are made.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - - -	
2	Press F12	- - - - - - - - -	17
3	Key 0 for voice calling or key 1 for ringing	- - - - - - - - -	0=Voice calling 1=Ringing
4	Key *		
5	Key #		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press F12	- - - - - - - - -	0=Voice calling 1=Ringing
3	Key #	- - - - - - - - -	
4	Exit Program Mode		

3-1 MANAGER/
SECRETARY
COMBINATIONS

There are no Manager/Secretary pairs initially assigned. It is possible to configure as many of these as are required - also to service several Managers from each Secretary.

It is important to note that Do Not Disturb for the Manager Terminal must be enabled directly after the pairs are configured below, and BEFORE Exiting Program Mode. If several pairs are configured at the same time, the Manager positions must be entered in numerical ASCENDING order. To cancel a pair follow below and set Secretary terminal number to 00.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - - -	
2	Press F7	- - - - - - - - -	12
3	Key first manager terminal number	- - - - - - - - -	Manager terminal number
4	Key *		
5	Key first secretary terminal number		Secretary terminal number
6	Key *		
7	Repeat 3 to 6 for other managers		
8	Key # when complete		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press F7	- - - - - - - - -	C12
3	Key first manager terminal number	- - - - - - - - -	Manager terminal number
4	Key *		Associated secretary number
5	Key * to step through all terminals		
6	Key #		
7	DO NOT Exit Program Mode until after the next section		

3-2 ENABLE DO NOT DISTURB

All terminals initially have the Do Not Disturb (DND) feature disabled.

It is possible to enable DND on a per terminal basis. If Manager/Secretary pairs are assigned, before Exiting Program Mode it is essential to enable the DND on the set Manager terminals.

	PROGRAM		DISPLAY
1	Enter Program Mode unless following from Manager/Secretary	- - - - - - - - -	
2	Press DND	- - - - - - - - -	01
3	Key terminal number	- - - - - - - - -	Terminal number
4	Key *		
5	Key 1 to enable or 0 to disable		0=Disabled 1=Enabled
6	Key *		
7	Repeat 3 to 6 for other terminals		
8	Key # when complete		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press DND	- - - - - - - - -	C01
3	Key terminal number	- - - - - - - - -	Terminal number
4	Key *		0=Disabled 1=Enabled
5	Key * to step through terminals		
6	Key #		
7	Exit Program Mode		

3-3 ENABLE
INTRUDE

All terminals initially cannot INTRUDE.

It is possible to enable terminals to originate one of three levels of INTRUDE, see NOTE over page.

It is NOT possible to intrude on a call if it was made using voice calling.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - -	
2	Press INTRUDE	- - - - - - - - -	05
3	Key level selection	- - - - - - - - -	Level selected
4	Key *		
5	Key terminal number		Terminal number
6	Repeat 4 and 5 for other terminals requiring level of intrude selection		
7	Key *		
8	Key # when complete		
9	Repeat 2 to 8 for other levels of intrude required		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press INTRUDE	- - - - - - - - -	C05
3	Key level	- - - - - - - -	Level selected
4	Key *		Terminal number
5	Key * to step through terminals on selected level		
6	Key #		
7	Repeat 1 to 6 for other levels of intrude		
8	Exit Program Mode		

NOTE   Intrude Levels

0   No INTRUDE allowed.
1   Direct INTRUDE after warning tone allowed on all calls except incoming exchange LINES. (Operator function.)
2   Direct INTRUDE after warning tone on internal calls only.
3   Intrude request tone given to terminals using handset.

4-1 PICKUP AND PAGING GROUPS

There are three Pickup and Paging Groups (A Pickup and Paging Group is one and the same). It is possible on a per terminal basis to alter the terminals assigned to each Group. Data cancellation is shown overleaf. Initially the terminals are Grouped as follows:

GROUP	GROUP CODE	TERMINALS
1	81	10-13
2	82	14-17
3	83	18-21

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - - -	
2	Press F10	- - - - - - - - -	15
3	Key Group code	- - - - - - - - -	Group code
4	Key *		
5	Key terminal to be added to group		Terminal number
6	Repeat 4 and 5 to add other terminals		
7	Key *		
8	Key # when complete		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press F10	- - - - - - - - -	C15
3	Key Group code	- - - - - - - - -	Group code
4	Key *		Terminal number
5	Key * to step through terminals		
6	Key #		
7	Exit Program Mode		

Data may be cancelled as below.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - -	
2	Press F10	- - - - - - - -	15
3	Key Group code	- - - - - - - -	Group code
4	Press F10		
5	Key terminal to be cancelled		Terminal number
6	Key *		
7	Repeat 5 and 6 to cancel other terminals		
8	Key # when complete and then CHECK		

5-1 CALL BARRING AND CLASS OF SERVICE

There are five Classes of Service (COS) available for Call Barring. It is possible to assign COS on a per terminal basis.

The COS are designated 0, 1, 2, 3, 5; the purpose of each is detailed below (Note NO COS 4):

COS 0

No Restriction on outgoing call numbers. All terminals are initially assigned COS 0.

COS 1

A maximum of four barred codes, each up to four digits in length, may be entered in COS 1. When an outgoing call is made, the first four digits are compared with those entered in COS 1. If there is agreement with any of the programmed codes the call is barred.

COS 2

Up to sixteen allowed and sixteen barred codes may be entered in COS 2. The allowed codes may be up to twenty digits in length, the barred codes up to four digits in length. Numbers are compared with the programmed codes and allowed or barred accordingly, priority being given to allowed codes. For example 0 and 010 could be barred, but specific STD or International Codes allowed.

COS 3

COS 3 specifies the maximum number of digits available before barring occurs and is modified by the barred codes in COS 2. The maximum number of digits is set between 1 and 19. If the number is not restricted by COS 2 above, and is less than or equal to the number programmed in COS 3, the call is allowed.

COS 5 (NOTE NO COS 4)

Restricted to Internal calls only.

The COS programming is shown overleaf.

All terminals are initially assigned to COS O. (All calls allowed).

It is possible on a per terminal basis to alter the COS. This is done by assigning terminals to a particular COS as shown below:

PROGRAM   DISPLAY

1 Enter Program Mode   - - - - - - - - -

2 Press F14   - - - - - - - - -   19

3 Key COS number   - - - - - - - - -   COS number

4 Key *

5 Key terminal number   Terminal number

6 Repeat 4 and 5 to
   add other terminals

7 Key *

8 Key # when complete

9 Repeat 2 to 8 for other COS

CHECK   DISPLAY

1 Press CHECK   - - - - - - - - -   C

2 Press F14   - - - - - - - - -   C19

3 Key COS number   - - - - - - - - -   COS number

4 Key *   Terminal number

5 Key * to step through
   terminals in COS

6 Key #

7 Repeat 1 to 6 for other COS

8 Exit Program Mode

5-2 CALL BARRING DATA ENTRY

Number data is entered on a per system basis. Each set of data or 'field' has an associated code, which must not be confused with the COS number.

The field codes are shown below:

FIELD CODE	DATA	RELATED COS
0	Barred numbers (Max 4)	1
1	Allowed numbers (Max 16)	2
2	Restricted numbers (Max 16)	2
3	Digit restriction (Max 19)	3

Each entry in a field has a two digit associated position number. For example, 01 is the first entry, 14 the fourteenth and so on.

These position numbers are shown on the COS entry sheet to the left of each entry.

To enter allowed or barred number data into the relevant field, the field code and position number must be known, as these are required during the programming shown overleaf.

The entry of allowed and barred number data is shown below. It is important to document all changes.

NOTE   To clear an unwanted barred number code omit step 7.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - - -	
2	Press F15	- - - - - - - - -	20
3	Key field code	- - - - - - - - -	Field code
4	Key *		
5	Key position number		Position number
6	Key *		
7	Key allowed/barred number (COS 1 and 2) or Key allowed number of digits (COS 3)		Allowed/barred
8	Key *		
9	Repeat 5 to 8 to enter other allowed/barred numbers		
10	Key # when complete		
11	Repeat 2 to 10 for other Field Codes		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press F15	- - - - - - - - -	C20
3	Key field code	- - - - - - - - -	Field code
4	Key *		
5	Key position number		Position number
6	Key *		Allowed/barred
7	Key * to clear the display		
8	Repeat 5 to 7 for other position numbers		
9	Key #		
10	Repeat 1 to 9 for other field Codes		
11	Exit Program Mode		

6-1 SETTING TIME, DATE, YEAR AND DAY   The Time, Day and Date may be reset.

	PROGRAM TIME		DISPLAY
1	Enter Program Mode	- - - - - - - - -	
2	Press CLOCK	- - - - - - - - - -	22 1 AM
3	Key # if PM required	- - - - - - - - -	1 PM
4	Key 2 digits for hour		Hour (eg 09)
5	Key 2 digits for minutes		Minutes
6	Key *		
7	Key #		
8	Exit Program Mode or continue		

	PROGRAM DATE		DISPLAY
1	Enter Program Mode	- - - - - - - - -	
2	Press CLOCK twice	- - - - - - - - -	2
3	Key 2 digits for month number		Month number
4	Key 2 digits for date		Date
5	Key *		
6	Key #		
7	Exit Program Mode or CONTINUE OVERLEAF		

PROGRAM YEAR		DISPLAY
1 Enter Program Mode	- - - - - - - -	
2 Press CLOCK three times	- - - - - - - - -	3
3 Key 4 digits for year	- - - - - - - -	Year
4 Key *		
5 Key #		
6 Exit Program Mode or continue		

PROGRAM DAY		DISPLAY
1 Enter Program Mode	- - - - - - - -	
2 Press CLOCK four times	- - - - - - - -	4
3 Key day number 0=Sunday, 6=Saturday	- - - - - - - -	Day number and day
4 Key *		
5 Key #		
6 Exit Program Mode		

NOTE There is no need to CHECK the data as it is displayed during telephony operation.

7-1 SYSTEM ERROR MESSAGES

When CHECK and F16 are pressed in sequence, P is displayed. This indicates that the Data was correctly entered.

Occasionally an Error Message may be generated. These Messages are shown below together with explanations.

ERROR MESSAGE	REASON
---- 3	Error Data was entered as the Manager/Secretary pair, usually produced when trying to assign a Secretary as a Manager
---- 4	DND not assigned to Master Terminal of Manager/Secretary pair

Any other Error Messages (1, 2, 5 and 6) are produced when an F number is used which is not one of the programming functions mentioned up to this point in the text. Further information is available at the end of the programming chapter.

If an Error Message is generated, then follow the procedure below:

	PROGRAM		DISPLAY
1	Error Message generated	- - - - - - - - -	Error Message
2	Press WR	- - - - - - - - -	Display returns to telephony
3	The information entered since last 'Exit Program' is lost	- - - - - - - - -	
4	Repeat Section including 'Enter Program': enter data CORRECTLY		

3.4 PROGRAMMING PABX LINES

The following information is not given to customers as this must be set at the time of installation and will only require amending if the number of PABX lines or type of host PABX is changed. It is important to document all changes.

3.4.1 Exchange Line Ports – Loop Dis or Multi Frequency

A number of modern PABXs (and an increasing number of public exchanges) are designed to accept high speed multi-frequency signalling (MF).

The Emblem has the capability of using MF signalling or the older type of loop disconnect.

	PROGRAM		DISPLAY
1	Enter Program Mode	– – – – – – – –	
2	Press F1	– – – – – – – –	06
3	Press LINE key	– – – – – – – –	LINE number
4	Key 0 for MF or Key 1 for Loop/Dis	– – – – – – – –	0=MF 1=Loop/Dis
5	Key *		
6	Repeat 3 to 5 for other lines		
7	Key #		

	CHECK		DISPLAY
1	Press CHECK	– – – – – – – –	C
2	Press F1	– – – – – – – –	C06
3	Press LINE	– – – – – – – –	LINE number and loop or MF code
4	Repeat 3 for all lines		
5	Key #		
6	Exit Program Mode		

3.4.3 Behind PABX
Working Data
Entry

When the system is piggy-backed onto a parent PABX, it will be necessary to reprogram the relevant exchange line ports for PABX working so that a pause is inserted after the PABX line access code when using the repertory store.

To set lines for PABX working:

1	Press F2	- - - - - - - -	07
2	Press LINE key	- - - - - - - -	LINE number
3	Key "0" for exchange line Key "1" for PABX line	- - - - - - - -	0 = exchange line 1 = PABX line
4	Key *		
5	Repeat 2 to 4 for other lines		
6	Key #		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - -	C
2	Press F2	- - - - - - - -	C07
3	Press LINE key	- - - - - - - -	LINE number and Exchange or PABX code
4	Repeat 3 for other lines		
5	Key #		
6	Do not exit programming mode until after the next section		

3.4.4 PABX Access Code Data Entry

The entry of PABX access code data is shown below. To clear an unwanted PABX access code omit step 7.

	PROGRAM		DISPLAY
1	Enter Program Mode	- - - - - - - -	
2	Press F15	- - - - - - - -	20
3	Key field code 4	- - - - - - - -	Field code
4	Key *		
5	Key position number (01 to 04)		Position number
6	Key *		
7	Key PABX Line access code		PABX access code
8	Key *		
9	Repeat 5 to 8 to enter other PABX Line access codes		
10	Key # when complete		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - -	C
2	Press F15	- - - - - - - -	C20
3	Key field code	- - - - - - - -	Field code
4	Key *		
5	Key position number	- - - - - - - -	Position number
6	Key *		PABX access code
7	Key * to clear the display		
8	Repeat 5 to 7 for other position numbers		
9	Key #		
10	Exit Program Mode		

3.4.5 Preset Pause The default pause is set at 3.2 seconds. To amend the pause
For Behind time:
PABX Working

1   Enter Program mode

2   Press TIMER   — — — — — — — —   21

3   Press INTRUDE   — — — — — — — —   7

4   Key number of 0.1 second
    pause units required — — — — — — — —   number of pause
    (max 200)   units

5   Key *

6   Key #

    CHECK

1   Press CHECK   C

2   Press TIMER

3   Press INTRUDE   — — — — — — — —   number of pause
                                                   units

4   Key #

5   Exit Program Mode

3.5 PROGRAMMABLE TIMING VARIATIONS

The following timing information (with the exception of Paragraphs 3.5.2 and 3.5.3) is not given to customers and is rarely likely to be used. It has been added to the Installation And Maintenance Handbook to assist the Installer or Maintainer should a particular site have unusual requirements or problems.

It is important to remember to record any changes to timings on the Customer Configuration Information Sheet, also the reason for these changes.

3.5.1 Reminder Tone at 3-Minute Intervals

This tone is normally disabled, but when enabled a tone will be heard every three minutes during Outgoing Exchange Line calls.

	PROGRAM	DISPLAY
1	Enter Program Mode - - - - - - - - - - -	
2	Press F13 - - - - - - - - - - -	18
3	Key 1 to enable tone or 0 to disable	1= Enabled 0= Disabled
4	Key *	
5	Key #	

	CHECK	DISPLAY
1	Press CHECK - - - - - - - - - - -	C
2	Key F13 - - - - - - - - - - -	1= Enabled 0= Disabled
3	Key *	
4	Key #	
5	Exit Program Mode	

3.5.2 Held Call
Automatic
Recall Timer

This timer is initially set at 30 seconds. The timer controls the period between holding a call and the operation of the sounder reminding you that a call has been put in HOLD at your terminal.

The sounder will repeat every time the programmed period elapses.

If the terminal is being used in the "Handsfree" mode the sounder will give either Reverted Calling cadence if your terminal is idle, or five short tones if you are engaged on another call.

	PROGRAM		DISPLAY
1	Enter Program mode		
2	Press TIMER	- - - - - - - - -	21
3	Press HOLD	- - - - - - - - -	1
4	Key Number in seconds up to 250 (max.)		Number Keyed
5	Key *		
6	Key #		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press TIMER	- - - - - - - - -	C21
3	Press HOLD		1
4	Key *	- - - - - - - - -	Data appears
5	Key #		
6	Exit Program Mode		

3.5.3 Exclusive This timer is initially set at 30 seconds.
Hold Automatic
Recall Timer The timer is the same as the timer described in 3.5.2,
except that it operates only on calls put in Exclusive HOLD.

If the time is set to zero then the timer is disabled and
the sounder does not operate.

	PROGRAM		DISPLAY
1	Enter Program mode		
2	Press TIMER	- - - - - - - - -	21
3	Press HOLD	- - - - - - - - -	1
4	Press HOLD	- - - - - - - - -	2
5	Key Number in seconds up to 250 (max.)		Number Keyed
6	Key *		
7	Key #		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press TIMER	- - - - - - - - -	C21
3	Press HOLD	- - - - - - - - -	1
4	Press HOLD		2
5	Key *		Data appears
6	Key #		
7	Exit Program Mode		

3.5.4 Reverted Call Signalling Time-Out

This timer is initially set at 20 secs. The timer controls the period that the sounder actually operates once it is activated by a reverted call as in 3.5.2, 3.5.3 and 3.5.5.

	PROGRAM		DISPLAY
1	Enter Program mode		
2	Press TIMER	- - - - - - - - -	21
3	Press ICM	- - - - - - - - -	3
4	Key Number in seconds up to 250 (max.)		Number Keyed
5	Key *		
6	Key #		

	CHECK		DISPLAY
1	Press CHECK	- - - - - - - - -	C
2	Press TIMER	- - - - - - - - -	C21
3	Press ICM	- - - - - - - - -	Data appears
4	Key #		
5	Exit Program Mode		

3.5.5 Transfer On Ringing, Reverted Call Timer

This timer is initially set to 30 seconds. The timer controls the period before the sounder operates to indicate that a call that was transferred on ringing has reverted to the transferring terminal due to inaction by the terminal to which it was transferred.

If the time is set to zero then the timer is disabled and the sounder does not operate.

	PROGRAM	DISPLAY
1	Enter Program mode	
2	Press TIMER - - - - - - - - -	21
3	Press NIGHT - - - - - - - - -	4
4	Key Number in seconds up to 250 (max.)	Number Keyed
5	Key *	
6	Key #	

	CHECK	DISPLAY
1	Press CHECK - - - - - - - - -	C
2	Press TIMER - - - - - - - - -	C21
3	Press NIGHT - - - - - - - - -	Data appears
4	Key #	
5	Exit Program Mode	

3.5.6 Hands Free Answer-Back Timer

This timer causes a "Handsfree Answer-back" call to cease and become an "Audible Signalling" call after the timer period has elapsed.

This timer only becomes operative if the system is configured for Voice Calling and a call is made to a standard terminal without loudspeech.

The timer is initially set to zero which enables the "Handsfree Answer-back" call to continue indefinitely.

	PROGRAM	DISPLAY
1	Enter Program mode	
2	Press TIMER - - - - - - - - -	21
3	Press SPKR - - - - - - - - -	5
4	Key Number in seconds up to 250 (max.)	Number Keyed
5	Key *	
6	Key #	

	CHECK	DISPLAY
1	Press CHECK - - - - - - - - -	C
2	Press TIMER - - - - - - - - -	C21
3	Press SPKR - - - - - - - - - -	Data appears
4	Key #	
5	Exit Program Mode	

3.5.7 Disable Timers

The timers listed in the previous sections can be disabled by entering 000 as the timer data.

3.6 INFORMATION DISPLAY – SYSTEM DATA ENTRY MODE

3.6.1 Configuration Data Entry

During the process of system programming, the display is clear following operation of the programming button at terminal No 10. When this is followed by the pressing of a function key to enter system data a reference code number corresponding to the function key is displayed on the left hand side of the display.

When checking data, the CHECK key and function key are operated in sequence and the function reference number is preceded by 'C'.

The function reference numbers are as shown in the table below:

Function key	Function Ref No display	Note
NIGHT/FOLLOW	00	Preset transferred terminal for exchange-line incoming signalling
DND	01	Enabling/disabling DND
MUTE	03	Talk back or Voice call of intercom calls
HOLD/Q/PROG	04	Exchange-line access barring
INTRUDE	05	Break-in allowed terminal
F-3	08	Line grouping for trunk queueing
F-4	09	Terminal allowed for outgoing calls on exchange line
F-5	10	Flexible exchange-line incoming signalling assignment
F-6	11	Enabling/disabling exchange-line incoming signalling by NIGHT
F-7	12	Call forwarding pair terminals
F-10	15	Internal zone paging or exchange-line incoming signalling from external loud-speaker

Function key	Function Ref No display	Note
F-11	16	Enable/disable meet-me-answer and meet-me-conference
F-12	17	2-digits signal call or voice/talk back call on intercom
F-13	18	Warning tone at every 3 minutes on exchange line
F-14	19	Call Barring terminal assignment to class of service
F-15	20	Bar code entry
TIMER	21	See clause (1) Timer Entry
CLOCK	22	See clause (2) Clock

3.6.2 Timer entry   When HOLD, ICM, NIGHT/FOLLOW, SPKR, R/LISTEN, INTRUDE or one of LINE 1 through LINE 6 keys is depressed following the operation of the TIMER key, the displayed TIMER, FUNCTION CODE NO (21) is replaced by the TIMING ENTRY REF NO as shown in the table below:

Key entry	Timing entry Ref No display	Note
HOLD	1	I-hold automatic recall timer
HOLD, HOLD	2	Exclusive-hold automatic recall timer
ICM	3	Signalling time-out during automatic recall
NIGHT/FOLLOW	4	Ring-inward timer
SPKR	5	Talk-back timer
R/LISTEN	6	Recall timer

3.6.3 Clock setting

The CLOCK key is used for entering the following: real-time clock setting, date setting, year setting and day setting. The CLOCK key is pressed once for real-time clock setting, twice for date setting, three times for year setting and four times for day setting: see table below for CLOCK SETTING REF NO display:

Number of CLOCK key operations	Clock setting Ref No Display		Note
Once	22	1 AM	real-time clock
Twice	22	2	date
Three times	22	3	year
Four times	22	4	day

3.6.4 System Data Error Message

When the CHECK and F-16 buttons are depressed in sequence, 'P' is displayed at the right-hand side of display. This indicates that the system data has been correctly entered.

If 'C' followed by '--' is displayed, it means that the WR switch on MCCU-6PA has not been set to the ON position (right). Therefore, CHECK and F-16 buttons must be depressed again in sequence after setting the WR switch to the ON position. Should there be any error in system data, an ERROR MESSAGE REF. NO is displayed as indicated in the table below:

Error Message Ref No Display	
--- 1	PABX access codes are not entered even though PABX lines are assigned
--- 2	The minimum pause timer is set to zero even though PABX lines are assigned
--- 3	Error data was entered as the call forwarding pair
--- 4	DND data is not set to the master terminal for call forwarding
--- 5	Data for recall timer is set to zero
--- 6	Data for Ring inward timer is set to zero.

Section 4: Features And Facilities

The system facilities can be checked to ensure satisfactory operation according to the instructions in this section.

4.1 LIST OF FACILITIES

4.1.1 Terminal Facilities

Manual hold
Automatic hold
Exclusive hold
On-hook dialling
Save and repeat dialling
Last number redial
Repertory dialling
    Terminal basis   8 numbers for standard terminal
    16 numbers for executive terminal
    System basis   60 numbers
Transfer
Multi-terminal conference
Manager/Secretary (system set)
Do not disturb
All call paging
Group paging
Meet-me answer paging
Meet-me conference
Intercom add-on conference
Camp-on
Message waiting
Ring when free
Group pick-up
Handsfree answerback
Microphone mute
Night Service and ring transfer
Programmable DTS calls and dial calls on ICM
Trunk queueing
Follow me
Intercom talk back and signal calls
Room monitor
Privacy
Handsfree-loudspeaking (option)

4.1.2 System Facilities

Flexible ringing assignment
Ring inward
Off-hook signalling
Loop disconnect or MF
Executive terminal

**4.2 FEATURES
PROVIDED AT
THE SYSTEM
TERMINALS**

**4.2.1 Standard
Terminal**

Loudspeaker volume control for system audible signals and speech.
"Handsfree" call set-up.
Access to a maximum of 6 outside exchange lines and 15 other terminals
Wide range of Hold and Transfer facilities
Terminal programmable Direct Extension Selection
Follow Me and Ring Transfer
Message Waiting
Rapid Dialling aided by:
Repeat Last Call
Repeat Stored Number
8 locally programmable repertory call numbers
System programmable Short Code Dialling for up to 60 numbers

Other system programmable facilities include:
Exchange Line groups - controlling access of terminals to lines
Terminal Grouping - call pick-up by any terminal within the group
Terminal Pairing - Manager/Secretary
Paging and Conference
Night Service and Room Monitoring
Intrusion
Do not Disturb

**4.2.2 Standard
Terminal
With
"Loudspeech"**

This terminal has all the features and facilities of the Standard Terminal, and externally is of identical appearance, but internally is equipped to provide "loudspeech" - the means to conduct a call without the use of a handset.

**4.2.3 Executive
Terminal**

This terminal has all the Standard Terminal features and facilities listed earlier, plus the following in addition:

"Loudspeech" capability
Calendar and time display
Alarm Clock
Stop Watch/Call Timer
Called Number/Stored Number display
16 locally programmable repertory call numbers
Direct Terminal Selection for all terminals
Message Waitng Originator display

4.3 DEFINITION OF "HANDSFREE" AND "LOUDSPEECH"

4.3.1 "Handsfree" Facilities

Many calls can be set-up or answered without the need to use the terminal handset. A microphone and a loudspeaker are built into the terminal base for this purpose.

To answer calls, speak towards the terminal at normal voice level, as if you were speaking "Face to Face".

If you cannot use "Handsfree" for any reason, use the handset as directed in the User Guide notes that follow.

4.3.2 "Loudspeech" Facilities

Some terminals are equipped for "loudspeech"; this facility permits telephony conversations without the use of the handset. Please note that excessive background noise will cause the incoming speech through the loudspeaker to be switched off.

4.4 USING THE EMBLEM

4.4.1 Answering Incoming Exchange Line Calls

An incoming exchange LINE call is indicated by a flashing LINE key. Those LINES requiring your specific attention are programmed to ring at your terminal.

To answer the call:

1 Lift the handset.
2 Press the LINE key.
3 Speak to Caller.

Alternatively, if your terminal is equipped for "Loudspeech":

1 Press the LINE key.
2 Press SPKR.
3 Speak towards your terminal.

The flashing rate of the LINE lamp changes to indicate that the call has been accepted by your terminal.

4.4.2 Cleardown For Any Call

When using the handset, replace the handset.

When using the SPKR facilities (handsfree), press SPKR (light OFF).

4.4.3 Making External Calls

As the system program may have been set to allow terminals limited access to exchange LINES, check the customer's terminal access chart in the customer guide to identify the LINES that are available for your use.

To make a call on an external line:

1 Look for an unlit LINE key.
2 Press the LINE key and lift the handset.
3 Wait for dialling tone, then key the number required. (Alternatively, use the Redial or Repertory Dial facilities that are described in 4.4.8 and 4.4.10.)

Alternatively: an external call can be set up "Handsfree":

1 Look for an unlit LINE key.
2 Press the LINE key
3 Press SPKR.
4 Wait for dialling tone before you key in the required number, or use the alternative facilities.

When the called person answers:

1 Lift your terminal handset to establish two-way speech OR:
2 If your terminal is equipped for "loudspeech", speak towards your terminal.

4.4.4 Trunk Queueing

If all exchange LINES to which you have access (made available during programming) are busy, you can queue for a LINE to become available.

When a LINE becomes free, you will be called automatically.

To join the queue when exchange lines busy:

1 Lift handset (or operate SPKR key), press Q/PROG
2 Key in Exchange LINE Group Number........
3 Replace handset if used or press SPKR

If your terminal has been accepted into the queue, you will hear a single "pip" of tone and the Q/PROG lamp will flash.

Five "pips" of tone indicates that the queue is too long and therefore your terminal cannot be accepted at this time.

When an outside exchange LINE in your group becomes available, you will hear half second tone pulses.

The free LINE and the Q/PROG lamps will flash.
4 Pick up handset or press SPKR (light ON).
5 Press LINE
6 Key the required number.

4.4.5 Call Hold   Regular Hold

To hold an incoming or outgoing exchange call, press HOLD.

The LINE lamp for the held call flashes rapidly.

For any terminal to retrieve this call, press the appropriate LINE key.

Exclusive Hold

To hold the call so that it can only be retrieved by your terminal, press HOLD twice.

The LINE lamp will double flash at 1 second intervals.

To retrieve your call, press the appropriate LINE key.

Automatic Hold

After answering an outside call, an internal call can be made by keying the appropriate terminal. The outside call will be held automatically. The call can be retrieved by pressing the appropriate LINE key.

Reverted Calls

A reminder Tone is heard every 30 seconds when a call is in Hold, or the Line will ring again if you have cleared down.

4.4.6 Exchange   After answering an incoming exchange LINE call you can
Call Transfer transfer the call to a second terminal by:
- Announced

1 Pressing the appropriate DES key OR
2 Pressing ICM and key the 2 digit terminal number.

The exchange line is now held automatically.

The second terminal may accept the call by:

1 Pressing the LINE key. The LINE lamp flashing at a regular rate indicates that the transfer has taken place.

You should then cleardown.

If the second terminal does not wish to accept the call, you should press the appropriate LINE key to retrieve the call.

4.4.7 Exchange Call Transfer - On Ringing

You may transfer an answered external call to another terminal without waiting for that terminal to answer as follows:

1 Press DES or press ICM and key code for the required terminal.
2 Press HOLD.
3 Replace the handset, or press SPKR if using "Handsfree".

The call has now been transferred and you may cleardown. The forward terminal will receive half second interval tone pulses and the relevant LINE lamp will double flash at 1 second intervals.

The LINE lamp at all other terminals will show "exclusive hold" (continuously lit).

If the forward terminal does not answer, the Line automatically recalls your terminal after 30 seconds.

NOTE The recall timer can be programmed for a different value if required.

4.4.8 Re-Dial Last Number

Your terminal remembers the last external number keyed.

To recall that number:

1 Select a free external LINE.
2 Press REP.
3 Key *.

The system automatically re-dials the number for you.
The Executive Terminal displays the number being dialled.

Each time you use the keypad to set up an outside call, the system stores that number and cancels the previously stored number.

4.4.9 Save Dialled A second memory is available which enables you to save the
Number last keyed external number while a call is in progress. This
memory is not affected by later calls to different numbers.

To save the last keyed number while a call is in progress:

1 Press REP twice.

To recall that number:

1 Select a free outside exchange LINE.
2 Press REP.
3 Key 0.

The Executive Terminal displays the number being dialled.

4.4.10 Repertory In addition to their prime functions you may use each Direct
Dialling Extension Selection (DES) key to store frequently used
external numbers (maximum 20 digits).

To store a number: To key a stored number:

1 Lift the handset or press SPKR   1 Lift the handset or press SPKR
2 Press REP   2 Press LINE
3 Press Q/PROG   3 Wait for dial tone
4 Press a DES key   4 Press REP
5 Key the number to be stored   5 Press the appropriate DES key.
6 Repeat the sequence for   6 Wait for the call to
  the other DES keys.   be set up.
7 Write the stored number against
  the DES key and on the list in
  the User Guide or Aide Memoire.

4.4.11 Setting Up Short Codes can only be set up by terminal 10.
Short Codes

To set up Short Code Dialling Stores:

1 Lift the handset.
2 Press REP.
3 Press Q/PROG.
4 Key the 2 digit short code (number between 10 and 69).
5 Key the required external number (maximum of 20 digits).
6 Replace handset.
7 Repeat steps 1 to 6 for the other short codes.
8 The Short Code Information can be recorded on the Aide
  Memoire

4.4.12 Short Code Dialling   The system is able to store 60 external numbers for use by all terminals. These can only be programmed by an Executive Terminal at terminal 10.

Any caller can use these numbers by keying a 2 digit code in the range 10 to 69 from any terminal, as detailed below:

1 Press a free exchange LINE.
2 Lift the handset, or press SPKR, and wait for dialling tone
3 Press REP
4 Key the 2 digit code on the keypad.
5 Other actions as for exchange LINE calls.

4.4.13 Night Service   The facility can be controlled from terminal 10 only.

All incoming exchange line ringing will be transferred to a pre-programmed terminal or to terminals nominated from terminal 10.

To Set Night Service Transfer to the Pre-Programmed Terminals:

At terminal 10:

1 Lift the handset.
2 Press NIGHT
3 Replace the handset (light ON).

All incoming calls will now be transferred to the pre-programmed terminal, which should be recorded in Customer Requirement Form or User Guide.

4.4.14 Ring Transfer   Terminal 10 may transfer exchange line ringing to other nominated terminals.

To set Ring Transfer:

1 Lift the handset or press SPKR (light ON).
2 Press NIGHT.
3 Key forward terminal code.(NIGHT light ON).
4 Key #
5 Replace handset or press SPKR (light OFF).

If a terminal has the I/C ringing programmed out on any of its lines, terminal 10 can, by using this facility remotely enable that terminal I/C ring while at the same time cutting out terminal 10 I/C ring. Any number of terminals can be brought into this facility; normal night service is unaffected.

To cancel Ring Transfer:

1 Lift the handset and press NIGHT.
2 Replace the handset.

4.4.15 Answering Internal Calls

The System Program for the installation will have been set for "Voice Calling" or "Signal Calling".

Voice Calling

When the system is programmed for "Voice Calling", an incoming internal call to a terminal is indicated by one or two short bursts of tone, followed by the voice of the caller through your loudspeaker.

Signal Calling

When the system is programmed for "Signal Calling", an incoming internal call to a terminal is indicated by the intercom calling tone.

This is recognisable as a 1 second burst of tone repeated at 3 second intervals.

See the following two pages on details for answering both types of call.

4.4.16 To Answer - Voice Calling

Either

1 Lift the handset
2 Press ICM
3 Speak into the handset

Or if you are using a terminal with "loudspeech"

1 If you hear one burst of tone through the terminal loudspeaker (microphone ON), speak towards the terminal "handsfree".

2 If you hear two bursts of tone through the terminal loudspeaker (microphone OFF), press MUTE (light OFF) and speak towards the terminal.

3 If a Conference or Call Transfer is to follow, then continue by answering as for "Signal Calling".

4.4.17 To Answer -
     Signal
     Calling

1   Lift the handset.
2   Press ICM.
3   Speak into the handset

Alternatively, if your terminal is equipped for
"Loudspeech";

1   Press SPKR.
2   Press ICM.
3   Speak towards the terminal.

4.4.18 Making   Internal calls can be made by either "Voice Calling" or
     Internal   "Signal Calling", depending on how the system has been set
     Calls   when programmed. The differences are described below and
                      overleaf.

Voice Calling

"Voice Calling" is indicated by either a single or double
burst of tone on your terminal loudspeaker, after selecting
the required terminal.

A single burst of tone indicates that the called person's
microphone is ON; Two bursts of tone indicate that the called
person's microphone is OFF.

When the called person answers:

1   If your terminal is equipped for "loudspeech", you can
     speak "handsfree" towards the terminal or lift handset.
2   If your terminal is NOT equipped for "loudspeech", lift
     handset.

If the called terminal is busy you will hear "intercom call
busy tone" - a short burst of tone, repeated at half second
intervals. You should clear down by replacing the handset
or pressing SPKR (light goes OFF).

Signal Calling

If the system is programmed for "Signal Calling", then after
selecting the required terminal, "intercom calling tone"
will be heard. You cannot be heard at the called terminal
until you hear the called person answer, when you should
follow steps 1 or 2 above.

Override

If you wish to change from "Voice" to "Signal Calling", after keying the call:

Key 1 on the keypad.

REMOVING LABEL COVER
(on Standard terminal)

Congestion

The system will automatically "Signal Call" if two internal calls are already "Voice Calling" when you set up your internal call, unless the internal calls are between "Full Loudspeech" terminals which do not require either of the two "voice calling" circuits.

In addition to two voice calling circuits there are a further four circuits available for internal calls.The allocation of these circuits is handled automatically by EMBLEM Central Equipment.

4.4.19 Making Internal Calls - Keyed Extension Selection

All terminals in the system have a unique two digit code in the range 10 to 25. To obtain an internal call using this code:

1 Lift the handset or press SPKR.
2 Press ICM.
3 Key the required terminal number (10 to 25).
4 Use "Voice" or "Signal Calling" as described above.

4.4.20 Making Internal Calls - Direct Extension Selection (DES)

Executive Terminals

Executive terminals have sixteen DES keys and associated lamps to indicate the status of all terminals on the system. The keys numbered 10 to 25 can be used for direct keying of any extension by:

1 Lifting the handset or pressing SPKR.
2 Pressing the appropriate DES key (10-25).
3 Use "Voice" or "Signal Calling" as described above.

Standard Terminals

Standard terminals have only eight DES keys which can be programmed by the terminal user for direct selection of any eight of the sixteen terminals. To assign these DES keys see 4.4.21. To direct key the eight programmed terminals, follow the sequence of steps 1 to 3 above.

4.4.21 To Assign Direct Extension Selection (DES) Keys (Standard Terminal)

To set the 8 DES keys to particular terminals:

1 Press SPKR (light ON)
2 Press REP
3 Press ICM
4 Press the particular DES key
5 Key in the 2 digit code (number between 10 and 25)
6 Repeat 4 and 5 for each other DES key to be programmed
7 Press SPKR (light OFF)

4.3.22 Call Transfer of Internal Calls

After answering an internal call by using ICM, you can transfer it to a third terminal by:

1 Press CONF
2 Call the third terminal either using the DES key, or press ICM and key the 2 digit code for the terminal.

When the third terminal has answered by using ICM, the transferring terminal should:

1 Press CONF
2 Replace the handset or press SPKR if using "loudspeech", to cleardown.

4.4.23 Mute On-Off

This facility controls the microphone in the base of the terminal.

Pressing the MUTE key alternately switches your terminal microphone off and on.

When the MUTE lamp is lit the microphone is OFF

When your microphone is muted an incoming "Voice Call" can be heard in the usual way, but two short pips are heard by both the caller and youself, to indicate that your microphone is off.

4.4.24 Follow Me

This facility allows you to transfer automatically internal calls intended for your terminal to a nominated forward terminal.

To set:

The initial setting must be done at your own terminal.

1 Do not lift the handset.
2 Press FOLLOW.
3 Key in your own terminal number.
4 Key in the forward terminal number.
5 Press FOLLOW.

At your terminal, the FOLLOW lamp will double flash at 1 second intervals.

At the forward terminal, the FOLLOW lamp will flash at regular intervals.

Change:

You can alter the forward terminal identity at either your own or the current forward terminal by repeating steps 1 to 5.

Cancel:

At your own or the forward terminal.

1 Do not lift the handset.
2 Press FOLLOW.
3 Key in the forward terminal number.
4 Press FOLLOW.

Both FOLLOW lamps will stop flashing.

4.4.25 Camp On   If you receive internal call busy tone on a call to another terminal - half second tone pulses - you can wait for automatic connection when the called terminal becomes free.

To set Camp On after receiving busy tone

If Using Handset:

1 Key *.
2 Press SPKR.
3 Replace handset.
4 When the called terminal becomes free internal ringing tone will be heard at both terminals and they will then be connected and you may speak.

If Using "Handsfree":

1 Key *.
2 As 4 above.

4.4.26 Ring When   This facility on internal calls enables you to tell the
Free   system to call you back when the terminal you want has become free.

To set Ring When Free if you have received Busy Tone:

If using the handset:

1 Key *.
2 Replace the handset.

If using "handsfree":

1 Key *.
2 Press SPKR (light OFF).

When the called party becomes free, you will hear "internal signal call", for 20 seconds. If you lift your handset during this time then the called terminal will be connected automatically.

To Cancel Ring When Free:

1 Lift handset or press SPKR (light ON).
2 Key *.
3 Key 0.
4 Replace handset or press SPKR (light OFF).

4.4.27 Message Waiting

If a called party does not answer your call, you can set up a "message waiting" signal at the called terminal, as follows:

Calling Terminal:	Called Terminal:
1 Set up internal call	No answer.
2 Key *	
3 Replace the handset or SPKR off. MW lamp double flashes at 1 second intervals	MW lamp flashes rapidly.

If you find the MW lamp flashing rapidly at your terminal you may Callback the Caller by:

1 Lift handset or press SPKR.
2 Press ICM.
3 Key 0.
4 The internal call will be established to the caller who left the message.

If you have an executive terminal with display and a MW key you will have additional features which are described in 4.5.5.

To cancel the message you left:

Calling Terminal: Called Terminal:

1 Lift the handset or press SPKR ON
2 Key #
3 Key called terminal number
4 Replace the handset or press SPKR OFF
  MW lamp stops flashing   MW lamp stops
                                                         flashing

NOTE   The message waiting cancel will not work if a call is in
             HOLD at the calling terminal.

4.4.28 Intrusion   If you receive busy tone on an internal call it is possible
             to INTRUDE on the call if the facility has been enabled by
             programming.

             Three levels of INTRUDE can be programmed for the Intruding
             Terminal.

1 Direct INTRUDE, after warning tones are issued, except on
  Incoming Exchange Line calls. Normally required for an
  Operator.

2 Direct INTRUDE with warning tone on Internal calls only.

3 INTRUDE Request. Pressing INTRUDE causes a 'pip' tone to be
  heard on the called terminal's sounder. This only applies if
  the called terminal is using the handset and is not
  "handsfree".

  To accept Intrude Request

  If on Exchange LINE Call:

1 Press ICM to accept INTRUDE. The exchange LINE call is
  automatically held.

2 Remember to return to held LINE call.

  OR If on Internal Call:

1 Finish internal call.

2 Press ICM to accept INTRUDE.

To Intrude on a busy terminal:

After receiving internal call busy signal (Tone pulses at half second intervals), to INTRUDE:

1 Press INTRUDE.

2 The busy signal will continue if the calling terminal has INTRUDE disabled or if attempting to intrude on a call made using voice calling.

3 If direct INTRUDE is allowed, a warning tone will be heard and then you will be able to speak to the called terminal.

4 If the programming is set for INTRUDE Request the busy signai will change to internal ringing and the called terminal will ring with intercom calling tone.

5 If the called terminal accepts the intrusion the call will be answered.

4.4.29 Internal Group Pick Up

During programming, terminals can be grouped together so that an internal call intended for one terminal in a group can be picked up by any terminal in that group.

The grouping for Terminals for Group Pickup is the same as for the Group Paging Groups.

To answer a call to your group:

1 Lift the handset, or press SPKR
2 Press INTRUDE.
3 Speak to caller.

4.4.30 Building Up a Multi-Terminal Conference

You may set up conference calls from your terminal. Up to five terminals can engage in an internal conference, but the conference is limited to two terminals if an exchange call is involved.

To set up a conference:

1 Establish the first call in the normal way.
2 Press CONF - you will receive internal dialling tone. If an External Call is one of the Conference Parties no dial tone will be heard.
3 Select the next terminal, in the normal way.
4 When the selected terminal answers: Press CONF.

1 tone "pip" will be heard on an internal conference. 3 tone "pips" will be heard if one of the parties is an external call.

The conference is then established between yourself and two other terminals.

You may extend the conference by repeating the above procedure from step 2 onwards.

Calls should be answered using ICM if the system is set to "Voice Calling"

4.4.31 Manager/ Secretary

Some Terminals will have been assigned Manager/Secretary status during system programming. Several manager terminals may have been allocated to one secretary terminal.

The managers can elect to have all calls, both internal and external, automatically transferred to the secretary who is able to transfer back those calls requiring attention.

The next two sections describe the details of operation for both secretary and manager terminals.

4.4.32 Secretary Terminal

If your terminal is programmed as a secretarial terminal, you can receive incoming calls from your assigned Manager terminal and if necessary transfer as detailed below.

To transfer an exchange LINE call to the Manager

1 Answer exchange LINE call.
2 Press the appropriate DES key, and inform the manager of the waiting call.
3 If the manager chooses to accept the call by pressing the appropriate LINE key, you may cleardown.
4 If the manager does not wish to accept the call, you can pick up the caller again by pressing the appropriate LINE key after the manager has cleared down.
5 Cleardown.

To transfer an internal call to the Manager

1 Answer the internal call using ICM.
2 Press CONF.
3 Set up call to manager in the normal way using ICM.
4 Ask the manager if he wishes to accept the call.
5 If he does, press CONF, and cleardown.
6 If he does not, wait for the manager to cleardown and press CONF.
7 Cleardown as normal.

4.4.33 Manager Terminal

If your terminal is programmed as a Manager Terminal you may elect to transfer all calls to your pre-assigned secretary's terminal:

1 Do not lift handset.
2 Press DND - the lamp will glow.

Your calls will then be diverted to the secretary who is now able to answer and subsequently transfer calls to you.

To accept Transfer Back of an internal call

1 Answer the enquiry from the secretary as for an Internal Call
2 If you wish to accept the call, ask the secretary to connect you.
3 Speak to the caller, OR
4 If you do not wish to accept the call, cleardown.

To accept Transfer of an exchange LINE call answered by the SECRETARY

1 Answer the enquiry from the secretary as for an Internal Call.
2 If you wish to accept the call, select the appropriate LINE key and speak to caller, OR
3 If you do not wish to accept the call, cleardown.

To cancel Transfer to Secretary

1 Do not lift the handset.
2 Press DND - lamp will stop flashing.

All calls for you will now be signalled at your terminal.

4.4.34 Do Not Disturb

The system can be set at the time of programming so that selected terminals as well as managers can be temporarily busied to incoming external or internal calls.

To Set Do Not Disturb:

1 Do not lift the handset.
2 Press DND (light ON).

An internal call to this terminal will receive DND busy tone (2 "pips" of tone at 1 second intervals).

To Cancel Do Not Disturb:

1 Do not lift the handset.
2 Press DND (light OFF).

4.4.35 Disable Audible Exchange Line Signalling (by Night)

The system can be set at the time of programming so that selected terminals can temporarily disable incoming Exchange Line signalling.

This facility is overridden by operation of the terminal 10 Night Key when appropriate.

To Disable Audible Signalling

1 Lift the handset.
2 Press NIGHT (light ON).
3 Replace handset.

To Enable Audible Signalling

1 Lift the handset.
2 Press NIGHT (light OFF).
3 Replace handset.

4.4.36 Room Listen   Any one terminal in the system can be listened to from another, setting up a "Shop Front" monitoring facility.

To set LISTEN:

1 At the monitored terminal, lift the handset.
2 Press LISTEN - the LISTEN lamp will flash to show that this terminal is being monitored.
3 Replace the handset.

To LISTEN In:

1 The monitored terminal must be set up as described above first.
2 At the monitoring terminal, do not lift the handset.
3 Press LISTEN - the lamp will flash.
4 You can now listen to the environment around the monitored terminal. The volume of your loudspeaker may be adjusted to suit.

To Cancel LISTEN:

1 At the monitored terminal lift the handset.
2 Press LISTEN - lamp will stop flashing.

Only one terminal can be monitored on the system at any one time. You may LISTEN only to Standard Terminals, not terminal 10 or terminals with loudspeech where handsfree can be used.

4.4.37 Paging   Any terminal can make paging announcements to all other free terminals, or to free terminals in a selected Group. Additionally paging announcements may be made via external amplifiers and loudspeakers when these have been provided.

The Groups are defined during initial programming.

To Group Page:

1 Lift the handset, or press SPKR (light ON) if "loudspeech"
is available at your terminal.
2 Press ICM
3 Key the Group Code.

Group Code

80 - All internal groups and external zones
81 - Internal group 1
82 - Internal group 2
83 - Internal group 3
84 - All internal groups
85 - External zone 1
86 - External zone 2
87 - Both external zones

When the paging facility is activated, all terminals in the
selected Group or Groups will hear a single tone "pip".

4 You can then make your announcement.

4.4.38 Meet Me,   To Page a Particular Person:
Answer
Paging   1 Either lift the handset OR if equipped for "loudspeech",
press SPKR (light ON).
2 Press ICM.
3 Key the Group Code.
4 Make your announcement.
5 Key *.
6 Keep the handset off or leave SPKR (light ON) while you wait
for the paged person to answer.

The Paged Person responds by:

1 At the nearest terminal, lifting the handset.
2 Keying *, and speaking.

4.4.39 Meet Me,   To set up a conference by Paging:
Conference
1 Lift the handset or if equipped for "loudspeech", press SPKR
(light ON).
2 Press ICM.
3 Key 84 (or Group Code).
4 Make your announcement.
5 Press CONF.
6 Keep the handset off or leave SPKR (light ON) while you wait
for the paged persons to answer.

The Paged Persons respond by:

1 Lifting the handset of the nearest terminal
2 Pressing CONF, and announcing presence.

A maximum of 4 terminals can form a "Meet Me Conference".

4.5 THE EXECUTIVE TERMINAL

The Executive Terminal has additional facilities to those offered by the Standard Model.

The alpha-numeric display panel provides a direct read out of the information either being offered to the system, or requested from the system.

Six extra keys - CHECK, MW, LIGHT, ALM, TIMER and CLOCK control some of the extra facilities.

Brightness Control

Three levels of brightness are available by repeatedly pressing LIGHT.

Time Display

The panel, when set to CLOCK, shows the date, day and time. The panel is also used to provide a visual check on, or indication of the varied facilities offered by the terminal. During these periods, the time display will be temporarily cancelled. You will always be able to return to the time display by pressing CLOCK and for some of the facilities, the display will automatically return to time.

As the date, day and time are controlled from the central equipment unit, a key misoperation or temporary disconnection of your terminal will not cause the normal function to fail.

The time setting is controlled from Terminal 10 so that the clock can easily be changed to or from British Summer Time. Other time facilities available are a call timer, a stop watch and three different locally programmable "Alarm" settings. Alarms 1 and 2 are "one shot" alarms, but alarm 3 remains active even after the tone has been cancelled and will repeat in 24 hours.

4.5.1 Alarm Clock

To set Alarm Clock:

1 Lift the handset
2 Press ALARM - once for alarm 1, twice for alarm 2 or three times for alarm 3 (maximum of 3).
3 Press * for am, # for pm

4 Key in the alarm time required - using 2 keys to signal the hour followed by 2 keys for the minute.
e.g.
Lift the handset and press ALARM ALARM * 0915. Replace the handset. Alarm 2 is now set for 9-15 AM.

5 Replace handset.

To Check Alarm Clock:

1 Lift the handset
2 Press ALARM - once for alarm 1, twice for alarm 2 or three times for alarm 3. The display will show the alarm time that has been set.
3 Replace the handset.

The normal time display will return.

To Stop Alarm Tone:

Press ALARM.

To Cancel Alarm Setting:

1 Lift the handset.
2 Press ALARM - once for alarm 1, twice for alarm 2, or three times for alarm 3 - the display will show the alarm time that has been set.
3 Press *.
4 Replace the handset, the normal time display will return.

4.5.2 Stop Watch   To start and stop timing, press TIMER.

The display will show the elapsed time to the nearest second

To return to normal time display, press CLOCK.

4.5.3 Call Timer   When the called party answers, press TIMER.

The display will count up in 1 second increments during the call, and the display will freeze on cleardown.

To return to normal time display, press CLOCK.

4.5.4 Other Display Functions   (a) Keyed numbers are displayed as they are keyed.

Similarly, the number will be displayed if you are using the "Re-Dial Last Number", "Save Dialled Number" or "Short Code Dial" facilities.

(b) To check DES Key Assignment:

1 Press CHECK.
2 Press ICM.
3 Press DES - identity of terminal will appear on display.
4 Press CLOCK to return to normal time display.

Repeat above for other DES Keys

(c) Check the Repertory Dialling Codes:

1 Press CHECK
2 Press DES key - stored number will be displayed.
3 Press CLOCK to return to normal time display.

(d) To check the Short Code Dialling Codes:

1 Press CHECK   number will be displayed

2 Key in the abbreviated code - store

3 Press CLOCK to return to normal time display.

Repeat above for other abbreviated codes.

NOTE   For facilities (c) and (d), the display shows the
first 11 digits of the stored number. If more than 11 digits
are stored, press * to display the remaining digits.

**4.5.5 Message
         Waiting**

The MW lamp flashes to indicate that one or more internal
callers have called in your absence and wish you to call
back.

The Executive Terminal is able to remember and display which
terminal or terminals called, using the "Message Waiting"
facility.

To Check Messages Waiting

1 Press MW - The display will show which terminal number left
the message.
2 Press MW again and the next terminal number will be
displayed.

4.6 CALL BARRING   Terminals may be barred from dialling certain numbers
depending on what Class of Service they have been assigned.

Indication of an attempt to dial a barred number is given by
three short bleeps followed by the inability to complete the
dialling.

Call Barring Terminal Assignments should be recorded on the Customer Requirement Form complete with Barred Codes. See pages 64 to 68.

4.7 CALL/SYSTEM STATUS INDICATIONS

4.7.1 Audible Indications

	Meaning of Signal	Frequency and Duration	
A1	Exchange line incoming call	580Hz AM	1s ON 3s OFF
A2	Exchange line automatic recall	580Hz AM	0.5s ON 0.5s OFF
A3	Voice paging splash tone	440Hz 2 SPLASH	
A4	Handsfree call splash tone	440Hz 1 SPLASH	
A5	Intercom signal call	630Hz/530/16Hz FM	1s ON 3s OFF
A6	Intercom call busy tone	440Hz	0.5s ON 0.5s OFF
A7	Intercom call: do not disturb tone	440Hz	0.1s ON 0.1s OFF 0.1s ON 0.7s OFF
A8	Intrusion tone	440Hz 2 SPLASH	0.1s ON 0.1s OFF 0.1s ON
A9	Trunk queueing accepted	440Hz 1 SPLASH	
A10	Trunk queueing denied	440Hz 5 SPLASH	
A11	Line available in trunk queueing	580Hz AM	0.5s ON 0.5s OFF
A12	Follow me denied	440Hz 5 SPLASH	

4.7.2 Visual
Indications

	Meaning of Signal	Lamp	Flash Rate Detail	
V1	Exchange line incoming call	(EXCHANGE)	60 IPM Flash	0.5s ON 0.5s OFF
V2	Exchange line regular hold	(EXCHANGE)	120 IPM Wink	0.4s ON 0.1s OFF
V3	Exchange line I-hold	(EXCHANGE)	300 IPM Flutter	0.1s ON 0.1s OFF
V4	Exchange line exclusive hold	(EXCHANGE)	120 IPM Flicker	0.1s ON 0.1s OFF 0.1s ON 0.7s OFF
V5	Exchange line busy	(EXCHANGE)	STEADY	
V6	I-use line	(EXCHANGE) (ICM)	60 IPM Flicker	1.7s ON 0.1s OFF 0.1s ON 0.1s OFF
V7	Intercom line incoming call	(ICM)	300 IPM Flutter	0.1s ON 0.1s OFF
V8	Intercom line busy	(ICM)	STEADY	
V9	Ring transferred	(NIGHT)	STEADY	
V10	Follow me transferred terminal	(FOLLOW)	300 IPM Flutter	0.1s ON 0.1s OFF
V11	Follow me originating terminal	(FOLLOW)	120 IPM Flicker	0.1s ON 0.1s OFF 0.1s ON 0.7s OFF
V12	Do-not-disturb	(DND)	STEADY	
V13	Monitoring at terminal	(LISTEN)	120 IPM Flicker	0.1s ON 0.1s OFF 0.1s ON 0.7s OFF
V14	Monitored at monitor box terminal	(LISTEN)	300 IPM Flutter	0.1s ON 0.1s OFF

Meaning of Signal	Lamp	Flash Rate Detail	
V15 Trunk queueing in progress	(Q/PROG)	STEADY	
V16 Trunk queueing accepted	(Q/PROG)	120 IPM Flicker	0.1s ON 0.1s OFF 0.1s ON 0.7s OFF
V17 Call forwarding active	(DND)	60 IPM	0.5s ON 0.5s OFF
V18 Microphone off	(MUTE)	STEADY	
V19 Handsfree speech enabled	(SPKR)	STEADY	
V20 Message waiting originating	(MW)	300 IPM Flutter	0.1s ON 0.1s OFF
V21 Message waiting received	(MW)	120 IPM Flicker	0.1s ON 0.1s OFF 0.1s ON 0.7s OFF
Executive Terminal			
V22 Terminal call in progress	(F-X)	300 IPM Flutter	0.1s ON 0.1s OFF
Terminal in off hook	(F-X)	STEADY	
Numbers dialled	(DISP)	Up to 11 digits	
Call duration	(DISP)	Hour, minute, second from left	
Date, month and time	(DISP)	Month, date, clock from left	
Day	(DISP)	ABBREVIATION	
Emergency - 1*	(DISP)	AL1	
Emergency - 2*	(DISP)	AL2	
Low battery	(DISP)	AL3	
Connection existing in the card	(MAIN)	STEADY	

Data transmission executed	(MAIN)	300 IPM	0.1s ON 0.1s OFF
Power supply voltage correct	(MAIN)	STEADY	

NOTE   ( ) denotes lamp location
           * facility not offered by BT

5 MAINTENANCE
GENERAL

On-site maintenance is limited almost entirely to changing printed wiring boards (PWBs). Faults should be localised to a single field replaceable unit (FRU) by using the facilities of the system, and the diagnostic routines given in Section 5 of this manual. The faulty unit is then replaced and returned with a fault label to the Repair Centre via Section Stock for repair. Careful attention to fault localisation will avoid unnecessary card changing, reducing wear and the danger of damage to the equipment.

5.1 MAINTENANCE
PHILOSOPHY

The EMBLEM maintenance philosophy is to undertake component repair and replacement at a central workshop and limit site maintenance to one of module replacement. This maintenance philosophy is a concept which is in-built within the system and hardware design.

The hardware is designed so that faulty modules can be identified and replaced on site by following simple diagnostic procedures.

5.2 MODULE
REPLACEMENT

A summary of the design features which facilitate simple module replacement are:

5.2.1 Main
Equipment

(a) Plug-in printed circuit cards.

(b) Self contained removeable power supply unit.

(c) The central equipment cabinet has built in sockets as follows:

Individual plug-ended cables per exchange line.
Two 25-pair plug-ended cables for terminals.
25-pair plug-ended cable for miscellaneous facilities.

(d) Spare fuses are mounted behind cabinet front cover.

(e) Front cover aperture provides main fuse access.

5.2.2 Terminals

(a) Terminal modules are interconnected by plug-ended wires.

(b) Line cord and handset cord plug directly to the main printed circuit card.

(c) Circuit cards and components within the terminal are easily accessible.

Although the above facilities enable terminal parts to be changed on site, the maintenance policy is normally to return complete terminals as Field Replaceable Units (FRU). In the case of a handset, handset cord or transducer fault, the individual faulty item may be replaced on site.

5.2.3 Backplane Replacement

NOTE   Not a field replaceable item.

Access to the backplane is obtained by removal of the following items:

Printed wiring boards

PCB support guide (adjacent to PSU assembly)

PSU assembly, i.e. PSU, mains switch/fuse panel, (remove 4 screws at top and bottom ends of vertical metal supports).

NOTE   Before fully extracting PSU assembly remove 4-way plug connecting PSU to backplane.

To remove the backplane, remove 15 self-tapping screws. 12 screws are located in alternate edge connectors, the remaining three being located at the right-hand side of the backplane.

5.2.4 Field Replacement Units

Field Replaceable Units are listed below:
See Appendix A for Item Codes.

5.2.4.1   Terminals - common items

Handset, handset cord and transducer
Line cord
Terminal Jack

5.2.4.2   Terminals

Standard Terminal S2616S
Standard Terminal with Loudspeech S2616LS
Executive Terminal S2616E

5.2.4.3   Main equipment

Case Assembly
Backplane Assembly
Mains Switch Assembly
Power Supply Unit

5.2.4.4 Circuit cards

Central Control Card	MCCU-6PA
Line Interface Card	3X8U-PA
Matrix Extender Card	RMXU-6A
Line Protection Card	LPTU-6A
Memory battery Card	RBTU-A
Grounding Card	MCGU-6PB

5.2.5 Fuse Ratings Fuse ratings are as follows:

LPTU-6A PCB	1A 1.25" glass
+24 volt	3A 20 mm
240 volt AC	3A 20 mm
Mains supply plug	3A 20 mm
Battery memory card	0.25A 1.25" glass

5.3 SYSTEM FAULT DIAGNOSTICS

WARNING   Before undertaking diagnostic test procedures

NOTE 1   Check that mains cable and plug are securely connected.

NOTE 2   Check that the protective earth terminal "ETH" is securely connected to a good earth connection with a copper conductor of 1.5 square millimetres cross section. See Section 2.7.

NOTE 3   It is essential that the AC mains is disconnected before attempting to remove securing screws to gain access to any of the following:

  (a)   Backplane Assembly

  (b)   Mains Switch Assembly.

  (c)   Power Supply Unit

NOTE 4   Take note of the safety warning labels on the main equipment cabinet assembly.

NOTE 5   Power must be switched off before cards are inserted or removed. Ensure cards are correctly inserted before switching on power.

5.3.1 Diagnostic General Information

Fault diagnosis is achieved by following the procedures defined in the diagnostic charts, shown on the following pages. These charts should be used in conjunction with the LED array located on the front panel of the main equipment and the LED and tone signalling functions at the terminal.

The following notes may also be of use:

1   If the speech pair to the terminal is connected the wrong way round, voice transmission is not possible, with the exception of S2616S terminals which will function "handsfree" but not while using the handset.

2   If the speech and data pairs on the terminal wiring are transposed, transmission "blow" may occur, but the appropriate LED on the Central Equipment will not light.

3   The Relay Matrix board adds four "non-handsfree" intercom circuits to the two "handsfree" circuits shared between the two 3X8U-PA boards.

4   Part of the intercom circuit also resides on the processor board.

5   Each terminal circuit in the Central Equipment has direct "non blocking" access to each exchange line.

5.3.1 DIAGNOSTIC ROUTINE

```
                        ╭─────────────╮
                        │    FAULT     │
                        │   REPORT     │
                        │ BY CUSTOMER  │
                        ╰─────────────╯
                               │
                               ▼
                          ◇ IS FAULT ◇        NO
                          ON CUSTOMER ─────────────┐
                          PROGRAMMED              │
                            FACILITY              │
                               │                  │
                              YES                 │
                               ▼                  │
                       ┌──────────────┐           │
                       │  REPROGRAM   │           │
                       │ THE FACILITY │           │
                       └──────────────┘           │
                               │                  │
                               ▼                  ▼
                          ◇ RETEST ◇     NO
                            O.K     ───────────┐
                               │               │
                              YES              │
                               ▼               │
                       ╭──────────────╮        │
                       │    FAULT      │        │
                       │  CLEARED      │        │
                       ╰──────────────╯        │
```

CHART I

```
  ◇ VOLTS ◇        YES      ◇  ARE   ◇    YES    ┌──────────────┐
  CORRECT AT ──────────────► ALL FACILITIES ────► REFER CUSTOMER │
  MAIN EQUIPMENT           WORKING              │   TO USER     │
      TEST                    │                 │ INSTRUCTIONS  │
     POINTS                  NO                 └──────────────┘
      │                       │                        │
     NO                       ▼                        ▼
      ▼                  ◇ IS A ◇      YES       ╭──────────────╮
┌──────────────┐         SPECIFIC ────────────►  │    FAULT      │
│ CHECK FUSES  │         EXCH LINE               │  CLEARED      │
│ REPLACE POWER│         DEFECTIVE               ╰──────────────╯
│     UNIT     │             │
└──────────────┘            NO
      │                      ▼
      ▼
  ◇ RETEST ◇   NO
    O K   ──────┐
      │
     YES
      ▼
╭──────────────╮      ╭──────────────╮      ╭──────────────╮
│    FAULT      │      │   GO TO      │      │   GO TO      │
│  CLEARED      │      │  CHART 2     │      │  CHART 3     │
╰──────────────╯      ╰──────────────╯      ╰──────────────╯
```

CHART 2

IS FAULT ON ALL EXTNS

YES → USE EXECUTIVE TERMINAL AT STATION 10 TO CHECK FACILITIES

NO

IS FAULT ON ONLY ONE EXTN.

YES → CHECK EXTN CABLING CHANGE EXTN.

NO

IS SYSTEM PROGRAMMED CORRECTLY

NO → REPROGRAM SYSTEM TO CUSTOMERS RECORD

YES

RETEST O K

NO → REPLACE MCCU-6PA (SEE NOTE 1)

YES

REPLACE ASSOCIATED 3x8U-PA (SEE NOTE 2)

RETEST O K

NO →

FAULT CLEARED

RETEST O.K

YES → FAULT CLEARED

NO

CHANGE CENTRAL EQUIPMENT BOX

RETEST O K

YES → FAULT CLEARED

NO

SEEK ASSISTANCE FROM DISTRICT SUPPORT

NOTE I: IF. MCCU - 6PA IS REPLACED THEN SYSTEM MUST BE REPROGRAMMED IN ACCORDANCE WITH CUSTOMERS RECORDS

NOTE 2 : THE 3x8U- PA-BOARD IN THE FIRST POSITION COVERS EXTNS 10 - 17. THE SECOND POSITION 3- 8U-PA COVERS EXTNS 18-25

```
                        ┌──────────────┐
                        │   CHART 3    │
                        └──────┬───────┘
                               │
                               ▼
                          ╱─────────╲
                    YES  ╱    IS     ╲
        ◄──────────────╱  LINE 1,2 OR 3╲
                       ╲   DEFECTIVE   ╱
                        ╲─────────────╱
                               │ NO
                               ▼




                        ┌──────────────┐
                        │  EXCHANGE    │
                        │  POSITIONS   │
                        │  OF FIRST AND│
                        │ SECOND 3x8U-PA│
                        └──────┬───────┘
                               │
                               ▼
                          ╱─────────╲
                    YES  ╱    IS     ╲
        ◄──────────────╱  LINE 1,2 OR 3╲
                       ╲   DEFECTIVE   ╱
                        ╲─────────────╱
                               │ NO
                               ▼
  ┌──────────────┐      ┌──────────────┐
  │   REPLACE    │      │   REPLACE    │
  │   3x8U-PA    │      │  RMXU - 6A   │
  │ IN FIRST POSITION│  └──────┬───────┘
  └──────┬───────┘             │
         └───────────────┐     │
                         ▼     ▼
                          ╱─────────╲         ┌──────────────┐
                         ╱  RETEST   ╲   NO    │CHANGE CENTRAL│
                        ╱    OK       ╲──────► │  EQUIPMENT   │
                        ╲             ╱        │    BOX       │
                         ╲───────────╱         └──────┬───────┘
                            │ YES                     │
                            ▼                         ▼
                     ┌──────────────┐          ╱─────────╲
                     │    FAULT     │◄── YES ──╱  RETEST   ╲── NO ──►┌──────────────┐
                     │   CLEARED    │         ╲    OK      ╱         │    SEEK      │
                     └──────────────┘          ╲─────────╱          │ ASSISTANCE   │
                                                                    │FROM DISTRICT │
                                                                    │  SUPPORT     │
                                                                    └──────────────┘
```
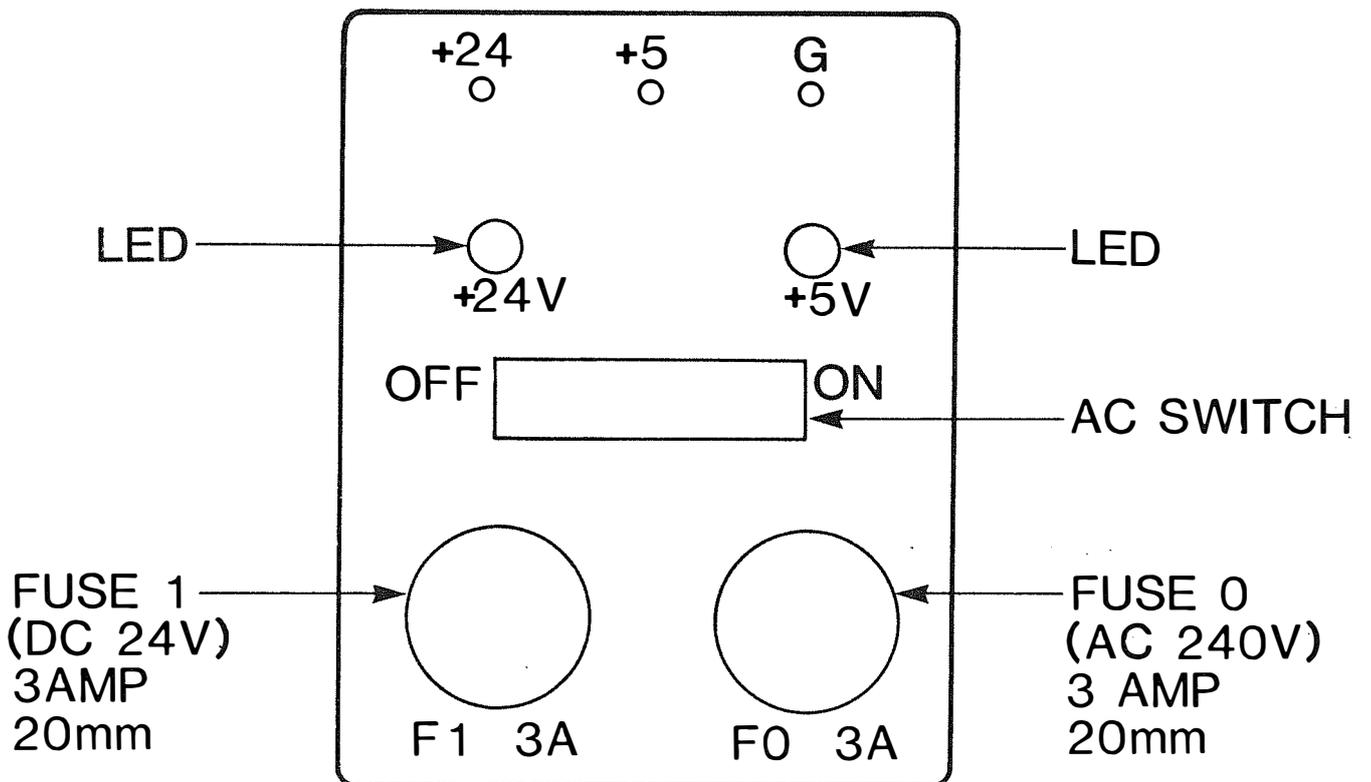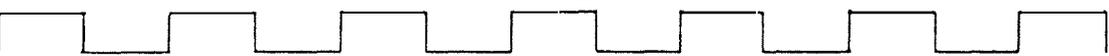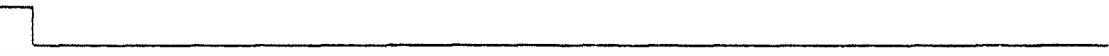
5.3.2 Power Supply Check

1 The 24V supply is checked by a voltmeter applied between test points +24 and G. The voltage must be within the range 20V to 28V

2 The 5V supply is checked by a voltmeter applied between test points +5 and G. The voltage must be within the range 4.5V to 5.5V
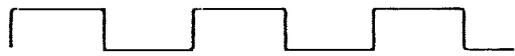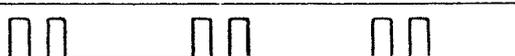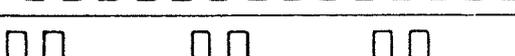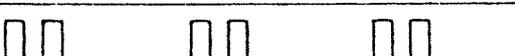
TONE DEFINITIONS

STATUS		TONE INTERVALS	NOTE
EXCH LINE AUDIBLE	NORMAL		LOCAL TONE 582.6/18 Hz
EXCH LINE AUDIBLE	REVERTED CALL		LOCAL TONE 582.6/18 Hz
CALLED EXTN BY ICM	SIGNAL CALLING TONE		FM TONE
CALLED EXTN BY ICM	SHORT TONE		MIC ON 440 Hz
CALLED EXTN BY ICM	TONE		MIC OFF 440 Hz
DND BUSY TONE			440 Hz
BUSY TONE			440 Hz
ALARM TONE AT EVERY 3 MINUTES			LOCAL TONE 582.6 Hz
NOT USED			LOCAL TONE 582.6 Hz
ALARM TONE (CLOCK)			LOCAL TONE 1165.2 Hz (CLOCK)
CONF INTRUDE			440 Hz
CALL BARRING			440 Hz

5.3.4 LED definitions

BUTTON	STATUS	DISPLAY OF LEDS	NOTE
EXCH LINE	INCOMING CALL	(waveform)	1 Hz
	REGULAR HOLD	(waveform)	2 Hz
	I – HOLD	(waveform)	5 Hz
	EXCLUSIVE HOLD	(waveform)	
	I – HAVE	(waveform)	
	BUSY	STEADY	
ICM	INTERCOMM CALL	(waveform)	
	I – HAVE	(waveform)	
	BUSY	STEADY	
NIGHT FOLLOW	FOLLOW ME	(waveform)	TRANSFERRED EXTN
		(waveform)	SETTING TRANSFER EXTN
	NIGHT SERVICE	STEADY	
CONF DND	DO NOT DISTURB	STEADY	
R LISTEN	ROOM MONITOR	(waveform)	MONITORED EXTN
		(waveform)	MONITORING EXTN
MUTE	MICROPHONE OFF	STEADY	
SPKR	ON HOOK DIALLING	STEADY	
HOLD Q/PROG	TRUNK QUEUING	STEADY	DURING OPERATION
		(waveform)	ACCEPT TRUNK QUEUING
——	MESSAGE WAITING	(waveform)	MESSAGED EXTN
		(waveform)	MESSAGING EXTN
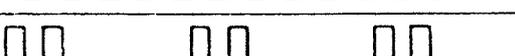
**5.3.5 LED
Diagnostic
Display
(Main
Equipment)**

The flow charts should enable faulty modules to be identified and replaced. Under certain conditions however faults may occur which cannot necessarily be guaranteed to result in a fault indication at the LED displays. Where this situation arises, fault location should be attempted by card/module substitution techniques in association with the system operation procedures relating to the particular "fault symptoms".

Before commencing fault finding, the following preliminary checks should be made:

(i) Ensure mains supply is switched on at the public supply point and the Main Equipment unit.

(ii) Check that all system plugs are fully inserted including:

(a) Terminal line cords
(b) Exchange line connections to Main Equipment
(c) 226 type connectors to Main Equipment

(iii) Check that all Main Equipment cards are correctly inserted.

Reference should also be made to the Main Equipment LED indications specified below.

Diagnostic displays are located behind the front cover window of main equipment. They indicate the following conditions.

LED	STATE	NOTE
CPU OP	Flashing at 5 per second	The main CPU routine on MCCU-6PA functions correctly
	Other indication	System CPU fault
LOW BATTERY	No light	The CMOS memory back-up battery voltage is correct.
	Steady light	The CMOS memory battery voltage is low
TERM 10 through TERM 25 (Marked STA1 to 16)	No light	Terminal connection to the Main Equipment faulty.
	Flashing at 5 per second	Off-hook or SPK button "on" status at the associated terminal
	Flashing at 1 per second	Data transmission and reception between Main Equipment and terminals functions correctly.
	Other indication	Data transmission and reception between Main Equipment and terminal is incorrect.

Exchange Line Status Display

A diagnostic LED for monitoring exchange line status is located on the 3x8U-PA line interface card. It lights steadily when any of the 3 exchange lines on the card are engaged except during incoming signalling.

5.3.6 Line Test Status Display

Idle	2.8 k-ohm	1.8μF
Seized	230 ohm	
Hold	160 ohm	

5.3.7 Memory Battery Card

If low battery lamp is lit, this may be caused by a discharge or faulty Memory Battery board RBTU-A. This will cause loss of configuration and Repertory Dial information should the mains power be removed. The system will then repower in the default condition.

A low battery will cause AL3 on Executive terminal displays to flash without operating the sounder.

It is possible to remove and replace the Memory Battery Board whilst the system is powered without loss of programmed information.

Under normal operation, the battery life is greater than 3 years.

The battery should be changed within 4 weeks of the warning LED operating.

Installation Items

EQUIPMENT	DETAILS	ITEM CODE
EMBLEM Equipment S2616A	Equipped as 6+16 consists of: 1 x control box and backplane 1 x power supply unit 1 x central processor board, MCCU-6PA 2 x line interface board, 3X8U-PA 1 x matrix extender board, RMXU-6PA 1 x line protection board, LPTU-6PA 1 x memory battery board, RBTU-PA	374 618
EMBLEM S2616 DOCUMENTATION PACK 1A	Documentation as follows: 1 x Installation Guide 1 x Programming Guide 3 x User Guides 16 x Aide Memoire Cards 1 x Warranty Card	374 799
Box Connection No 340	For connecting Emblem S2616 includes harness and line protection units.	374 790
EMBLEM Tele S2616S Standard Terminal without Loudspeech		374 620
EMBLEM Tele S2616LS Standard Terminal with Loudspeech		374 619
EMBLEM Tele S2616E Executive Terminal	Loudspeech and Power Fail Operation.	374 621
Line Jack 2/3C	Special Line Jack for EMBLEM.	870 127
Box Connection 252A	For Exchange Line Connection	314 405

SOCKET OUTLET NO 103 - Mains Plug

NOTE A minimum of one Executive terminal per system is required for programming purposes.

Also an additional Executive terminal must be attached as a power fail terminal if 6 exchange Lines are connected.

Field Replaceable Items

EQUIPMENT	DETAILS	ITEM CODES
EMBLEM S2616 Central Equipment Box	Includes: Equipment Case, Backplane and Mains Switch Assembly (excludes cards and power supply unit)	374 626
EMBLEM S2616A Power Supply Unit		374 627
EMBLEM S2616 Processor Board MCCU-6PA		374 622
EMBLEM S2616 Interface Board 3X8U-PA		374 623
EMBLEM S2616 Matrix Extender Board RMXU-6PA		374 624
EMBLEM S2616 Memory Battery Board RBTU-PA		374 628
EMBLEM S2616 Line Protection Board LPTU-6PA		374 625
Unit B32/150B	Line Protection unit for use with EMBLEM. Unit fits in Box Connection 340. One unit per 2 exchange lines.	374 791
EMBLEM S2616 Handset and Cord	Includes: Transducers, fits all S2616 terminals.	374 630
EMBLEM S2616 Grounding Board	Provides earthed loop recall for use on lines to host PABX	870 224
EMBLEM Cord connecting 4/529	3m line cord for all S2616 terminals	870 192
EMBLEM Label S2616S	Spare label for designating DES keys on S2616S and S2616LS terminals.	870 193
EMBLEM Label S2616E	Spare label for designating DES keys on S2616E terminal.	870 194
EMBLEM Extension bell kit		870 223

Additional Items

EMBLEM S2616 Loudspeech Board SPDU-6A	Repair Centre Replaceable Item For use in S2616E & LS instruments	374 629
Electrostatic Protection Wrist Band Medium	For use with Static Handling Precautions. This is not an obligatory item. Less than 170 mm wrist circumference.	141 737
ESP Wrist Band Large	Greater than 170 mm wrist circumference.	141 738
ESP Cord	For use with ESP Wrist Band.	141 736
ESP Adaptor No1	For use with ESP Wrist Band and cord. Crocodile Clip adaptor.	141 746
Bags Static Shield NO 2	Clear Antistatic bag - Conductive on the outside only. Suitable for use with on board battery PCBs 450mm x 450mm (18"x18") 375mm x 275mm (15"x11") 250mm x 200mm (10"x8") 125mm x 75mm (5"x3")	SEE RATE BOOK
Bags Static Shield NO 3	Size as for No.2 above - opaque antistatic bag for general use. Conductive inside and out.	SEE RATE BOOK