LONDON 32
LONDON 64

INSTALLATION MANUAL

National Telephone Systems

L O N D O N   3 2 / L O N D O N   6 4

WARNING

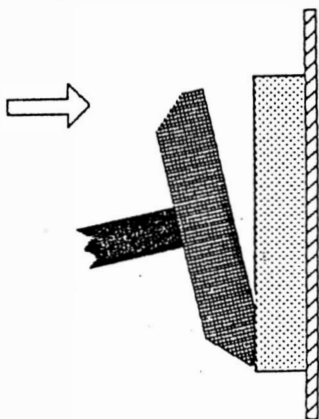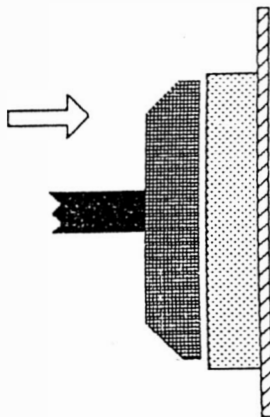#### TJF connection to CCU motherboard

It has been found that heavy-handed insertion of the TJF connectors into the motherboard can cause bending of the pins on the male connectors, resulting in an extension or exchange line failure.

We therefore recommend that you make a visual check of the pins before inserting the connectors, and that you ensure that the connectors are aligned correctly before being pushed home.

(1) Incorrect.   (2) Correct.

L I S T O F F I G U R E S

L I S T O F T A B L E S

TABLE OF CONTENTS

1. REQUIREMENTS

The London 32 or London 64 must be installed in compliance EITHER with Parts 1 and 2 of British Standard BS 6701 (1986); OR with the DTI Interim Code of Practice for the Installation of PBXs (August 1983); OR with BS 6506 (1984).

1.1. Parts

The following items are required for installation of the London 32 or London 64:

1.1.1. London 32

	Quantity
* London 32 basic system (0 + 16), comprising: 　1 Central control unit + PSU 　1 CPU card 　2 Extension line cards 　1 mains lead and plug fitted with 3-Amp fuse	1
* Extension line cards (8 circuits) as required	
* Exchange line cards (4 or 8 circuits) as required	
* Pre-wired TJF assembly	1
* Reception console (optional)	1
* MF upgrade kit (optional) with 4 decoders	1
* Console connector blocks (optional)	2
MDF (Krone box 250 or 300)	1
Approved (BS 6301) telephones as required	
Extension sockets (master type) as required	
Cable (1 pair per extension) as required	
Power protective earth cable min 2.5 sq.mm (as per IEE Regulations 15th edition) as required	
80-column printer with RS232C/V24 interface (optional)	

Items marked * are supplied by National Telephone Systems; other items are to be supplied by the installer.

The basic system is supplied with two extension line cards and no exchange line cards. Extension line cards (with eight circuits) and exchange line cards (with four or eight circuits) may be added, up to a maximum of 32 ports, to give the following possible configurations:

Exchange lines

		4	8
Extensions	8	✓	✓
	16	✓	✓
	24	✓	✓

NOTE: The four-circuit exchange line card can be used only for lines 1 to 4, not lines 5 to 8.

1.1.2. London 64

Quantity

* London 64 basic system (0 + 24), comprising: 1
     1 Central control unit + PSU
     1 CPU card
     1 Reception console
     3 Extension line cards
     1 mains lead and plug fitted with 3-Amp fuse

* Extension line cards (8 circuits) as required

* Exchange line cards (4 or 8 circuits) as required

* Pre-wired TJF assembly   1

* Reception console (optional)   1

* MF upgrade kit (optional) with 5 decoders   1

* Console connector blocks   2

MDF (Krone box 250 or 300)   1

Approved (BS 6301) telephones as required

Extension sockets (master type) as required

Cable (1 pair per extension) as required

Power protective earth cable min 2.5 sq.mm (as
per IEE Regulations 15th edition) as required

80-column printer with RS232C/V24 interface (optional)

Items marked * are supplied by National Telephone Systems;
other items are to be supplied by the installer.

The basic system is supplied with three extension line cards
and no exchange line cards. Extension line cards (with eight
circuits) and exchange line cards (with four or eight cir-
cuits) may be added up to a maximum of 64 ports, to give the
following configurations:

Exchange lines

	4	8	12	16
8	✓	✓	✓	✓
16	✓	✓	✓	✓
24	✓	✓	✓	✓
32	✓	✓	✓	✓
40	✓	✓	✓	✓
48	✓	✓	✓	✓
56	✓	✓		

Extensions

Other configurations may be achieved as follows, although
certain parts of the installed hardware will be redundant:

9 + 55	10 + 54	11 + 53	12 + 52
13 + 51	14 + 50	15 + 49	

NOTE: The four-circuit outside line card may be installed
only in slot 2 (lines 9 to 12) if an eight-circuit card is
installed in slot 1 (lines 1 to 8).

An RS232C/V24 interface is fitted as standard on both sys-
tems. The systems are designed to operate with telephones
approved to BS6301, either loop disconnect or multi-
frequency (MF). Loop disconnect phones need no recall
button; MF phones must be of the type incorporating a timed
break recall button.

Appendix A gives details of the configurations which can be achieved when private circuits are installed on the London 32/64.

1.2. Tools and test equipment

Item	Quantity
Anti-static wriststrap	1
Krone IDC inserter tool	1
IC inserter (RS stock number 423-829)	1
IC extractor (RS stock number 423-992)	1
Exchange line simulator	1
RS232 printer	1

1.3. Site requirements

The London 32/64 is designed to work in a normal office or hotel environment. The central control unit should be situated with ease of access in mind, and should be away from:
* Hazardous areas
* Processes producing electricity, fumes, dust, gasses or radiation (e.g. silicon or halon contamination from photocopying or fire protection equipment)
* Electrical meters or switchgear
* Fire sprinkler systems
* Water pipes
* Gas meters, pipes or appliances
* Dampness
* Vibration

The central control unit should be situated at a convenient working height in a well lit room. The room should be normally supervised, or have restricted access.

2. INSTALLATION INSTRUCTIONS

Read through these instructions carefully before starting to install the London 32 or London 64.

WARNING - THE CENTRAL CONTROL UNIT CONTAINS CMOS COMPONENTS WHICH ARE LIABLE TO DAMAGE FROM STATIC ELECTRICITY. ANTI-STATIC PRECAUTIONS (SEE BS 5783) SHOULD BE TAKEN WHEN WORKING ON OR NEAR THE UNIT

2.1. General

The central control unit is wall mounted according to customer requirements, within 2 cable metres of a suitable 240V 13A socket outlet. We recommend that the socket should be surface mounted, of the double switched type, and used exclusively for the London system and the printer if present.

The socket should be labelled: 'TELEPHONE EQUIPMENT - DO NOT REMOVE'.

Whenever possible, the customer should be asked to provide a 'clean' supply direct from the power distribution board.

2.2. Procedure

* Install and check the extension wiring and extension telephone sockets.

* Install and test the power protective earth wire to a proven protective earthing point.

* Wall mount the central control unit. See Figure 2-1 for the suggested layout of the CPU and TJF.

* Carry out a visual inspection of the control unit modules, switch settings and safety dependent features.

* Connect the battery back-up by inserting the Molex link on the CPU card.

* Insert the CPU card, extension line cards and outside line cards into the correct slots on the motherboard. Figures 2-2 and 2-3 show the motherboard slot allocation.

* Connect the reception console to J4 on the motherboard.

* Carry out a preliminary power-up check before plugging the CPU-TJF connector cables onto the motherboard.

* Connect extension wiring by jumpering from the MDF to the TJF according to the customer's extension numbering plan.

* Power up and perform preliminary tests.

* Carry out system programming in accordance with the customer's requirements.

* Complete the Certificate of Satisfactory Completion on page 30 of this manual.

* Complete the System Installation and Configuration Record (Section 18 of the London Range Programming Manual).

NOTE: In the UK, connection of PSTN lines to the London 32/64 can be carried out only by British Telecom personnel. The Network Test and Termination Point is the TJF; this is the point to which BT will connect the cable containing PSTN services.

Fig. 2-1: SUGGESTED LAYOUT OF CENTRAL CONTROL UNIT
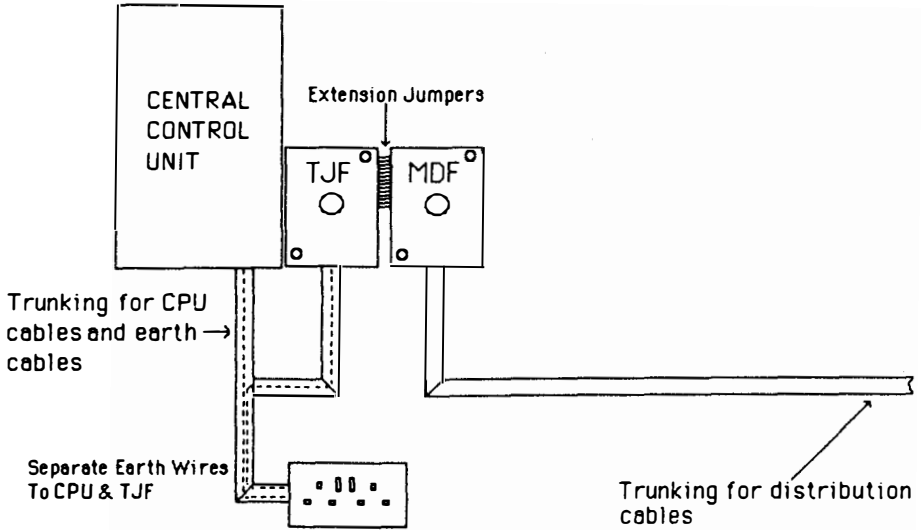
Fig. 2-2: LONDON 32 MOTHERBOARD SLOT ALLOCATION

POWER SUPPLY
UNIT

SLOT 1 CPU CARD
SLOT 2 OUTSIDE LINE CARD (1-4 or 1-8)

SLOT 4 EXTENSION LINE CARD (221-228)
SLOT 5 EXTENSION LINE CARD (229-236)
SLOT 6 EXTENSION LINE CARD (237-244)
SLOT 7 PRIVATE CIRCUIT CARD (1-4)

SLOT 11 METER PULSE DETECTION CARD

Power fail
relays
1

J4

J8   J7   Display unit
                 connector

8

Extension line   Outside line
connector   connector   Mains Gnd
221 - 244   1 - 8

FS3 ⊐⊏ ⊐⊏ FS1
FS4 ⊐⊏ ⊐⊏ FS2
Printer Port Fuses

Fig. 2-3: LONDON 64 MOTHERBOARD SLOT ALLOCATION

```
┌─────────────────┐
│  POWER SUPPLY   │
│      UNIT       │
└─────────────────┘

[            ]   [            ]SLOT 1  CPU CARD
[            ]   [            ]SLOT 2  OUTSIDE LINE CARD (1-4 or 1-8)
[            ]   [            ]SLOT 3  OUTSIDE LINE CARD (9-12 or 9-16)
[            ]   [            ]SLOT 4  EXTENSION LINE CARD (221-228)
[            ]   [            ]SLOT 5  EXTENSION LINE CARD (229-236)
[            ]   [            ]SLOT 6  EXTENSION LINE CARD (237-244)
[            ]   [            ]SLOT 7  EXTENSION LINE CARD (245-252)
[            ]   [            ]SLOT 8  EXTENSION LINE CARD (253-260)
[            ]   [            ]SLOT 9  EXTENSION LINE CARD (261-268)
[            ]   [            ]SLOT 10 EXTENSION LINE CARD (269-276)
[            ]   [            ]SLOT 11 METER PULSE DETECTION CARD
```

Power fail relays
1

J4

Display unit connector

J9   J8   J7

8

Mains Gnd
⊙

Extension line   Outside line
connector   connector
221 - 252   1 - 16

Extension line
connector
253 - 276

FS3 ⟩⟨   ⟩⟨ FS1
FS4 ⟩⟨   ⟩⟨ FS2
Printer Port Fuses

Fig. 2-4: LONDON 32 TJF LAYOUT

PROTECTIVE EARTH POINT
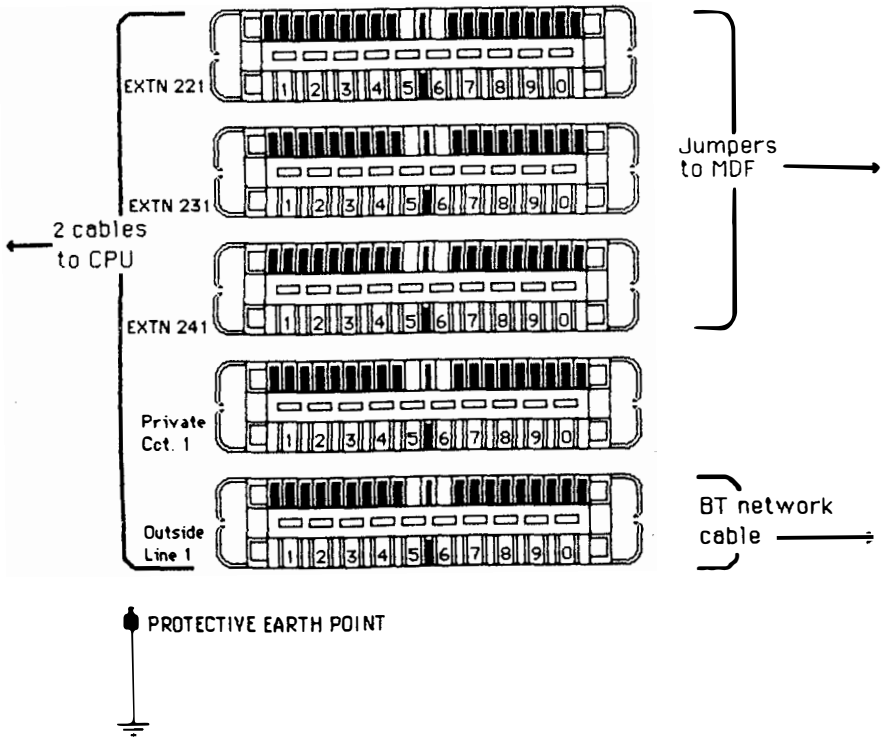
Fig. 2-5: LONDON 64 TJF LAYOUT

3 cables to CPU

EXTN 221
EXTN 231
EXTN 241
EXTN 251
EXTN 261
EXTN 271

Outside Line 1
Outside Line 11

Jumpers to MDF

BT network cable

PROTECTIVE EARTH POINT
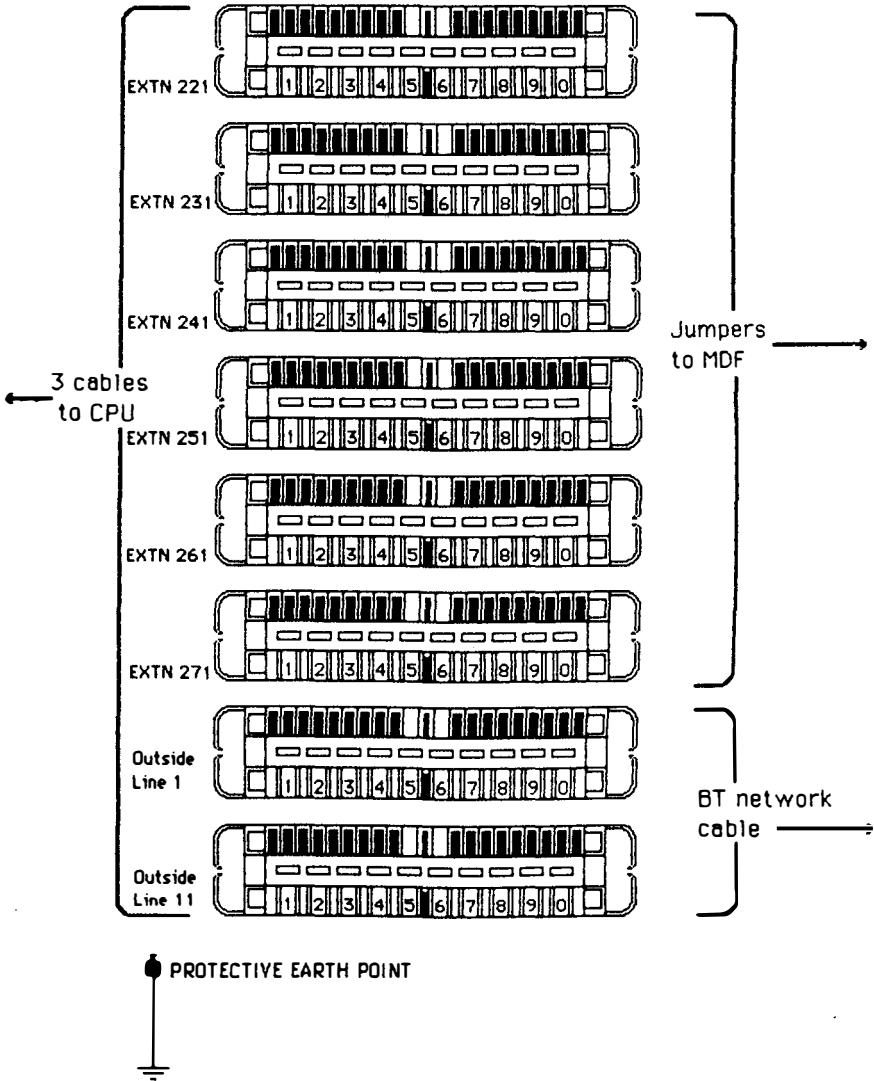
Table 2-1: TJF wiring schedule

Extension line connector J8 - Extensions 221 to 244 (London 32)
                              Extensions 221 to 252 (London 64)

Cable pair	Layer	Colour A	B	Extension
1	Green	Orange	Black	221
2	" "	Blue	Black	222
3	" "	Brown	Black	223
4	" "	Green	Black	224
5	" "	Blue	Yellow	225
6	" "	Orange	Yellow	226
7	" "	Brown	Yellow	227
8	" "	Green	Yellow	228
9	Brown	White	Blue	229
10	" "	White	Green	230
11	" "	White	Orange	231
12	" "	Red	Blue	232
13	" "	White	Brown	233
14	" "	Green	Red	234
15	" "	Red	Orange	235
16	" "	Brown	Red	236
17	Grey	Orange	Black	237
18	" "	Blue	Black	238
19	" "	Brown	Black	239
20	" "	Green	Black	240
21	" "	Blue	Yellow	241
22	" "	Orange	Yellow	242
23	" "	Brown	Yellow	243
24	" "	Green	Yellow	244
25	Orange	White	Blue	245
26	" "	White	Green	246
27	" "	White	Orange	247
28	" "	Red	Blue	248
29	" "	White	Brown	249
30	" "	Green	Red	250
31	" "	Red	Orange	251
32	" "	Brown	Red	252

Extension line connector J9 - Extensions 253 to 276 (London 64)

Cable_pair	Layer	Colour A	B	Extension
1	Green	Orange	Black	253
2	" "	Blue	Black	254
3	" "	Brown	Black	255
4	" "	Green	Black	256
5	" "	Blue	Yellow	257
6	" "	Orange	Yellow	258
7	" "	Brown	Yellow	259
8	" "	Green	Yellow	260
9	Brown	White	Blue	261
10	" "	White	Green	262
11	" "	White	Orange	263
12	" "	Red	Blue	264
13	" "	White	Brown	265
14	" "	Green	Red	266
15	" "	Red	Orange	267
16	" "	Brown	Red	268
17	Grey	Orange	Black	269
18	" "	Blue	Black	270
19	" "	Brown	Black	271
20	" "	Green	Black	272
21	" "	Blue	Yellow	273
22	" "	Orange	Yellow	274
23	" "	Brown	Yellow	275
24	" "	Green	Yellow	276
25	Orange	White	Blue	spare
26	" "	White	Green	spare
27	" "	White	Orange	spare
28	" "	Red	Blue	spare
29	" "	White	Brown	spare
30	" "	Green	Red	spare
31	" "	Red	Orange	spare
32	" "	Brown	Red	spare

Exchange line connector J7 - Lines 1 to 8 (London 32)
                            Lines 1 to 16 (London 64)

| | | Colour | | |
Cable pair	Layer	A	B	Outside line
1	Green	Orange	Black	1
2	" "	Blue	Black	2
3	" "	Brown	Black	3
4	" "	Green	Black	4
5	" "	Blue	Yellow	5
6	" "	Orange	Yellow	6
7	" "	Brown	Yellow	7
8	" "	Green	Yellow	8
9	Brown	White	Blue	9
10	" "	White	Green	10
11	" "	White	Orange	11
12	" "	Red	Blue	12
13	" "	White	Brown	13
14	" "	Green	Red	14
15	" "	Red	Orange	15
16	" "	Brown	Red	16
17	Grey	Orange	Black	spare
18	" "	Blue	Black	spare
19	" "	Brown	Black	spare
20	" "	Green	Black	spare
21	" "	Blue	Yellow	spare
22	" "	Orange	Yellow	spare
23	" "	Brown	Yellow	spare
24	" "	Green	Yellow	spare
25	Orange	White	Blue	spare
26	" "	White	Green	spare
27	" "	White	Orange	spare
28	" "	Red	Blue	spare
29	" "	White	Brown	spare
30	" "	Green	Red	spare
31	" "	Red	Orange	spare
32	" "	Brown	Red	spare

2.3. Extension wiring

Extensions are wired in a two-wire star configuration, with telephones connected via master sockets. Each socket must be labelled as follows:

WARNING - CONNECT ONLY APPARATUS COMPLYING WITH BS 6301 TO THIS PORT

The system control unit to extension line loop resistance must not exceed 98 ohms (500 metres of 0.5 mm copper cable). Extension wiring can be internal or external to the building, up to the line signalling limit of 98 ohms. If any wiring is installed externally, the extension interface should be protected by fitting surge arrestors No. 18 to the TJF.

Externally wired extensions must comply with the following rules:
* They should be not more than 50 metres outside the curtilage of the customer's premises.
* Wiring must be directly routed; i.e. not in a cable containing PSTN circuits.
* There should be not more than four spans of overhead cable

Figures 2-4 and 2-5 show the TJF layout.

2.4. Wall mounting

Using the mounting kit provided, fix the horizontal mounting bracket securely to the wall at a height of approximately 1500 mm. Take care to allow sufficient room to the left of the unit for cards to be installed and removed.

Attach the lower bracket/cable clamp to the unit, using the screws provided.

Locate the unit on the horizontal mounting bracket. Using the lower bracket as a guide, mark the lower fixing hole position.

Remove the unit from the wall. Drill and plug the marked hole.

Replace the unit on the horizontal mounting bracket. Secure to the wall by screwing through the lower bracket.

Mount the TJF adjacent to the unit(see Figure 2-1). Insert
the TJF cables and the console cable through the slot in the
base of the unit. Secure the cables by placing the grommets
supplied around each cable and screwing the cable clamp to
the lower bracket.

2.5. Visual inspection and pre-connection power-up check

Before you connect any extension wiring, carry out the
following checks:

* Check that the DIL switch settings on the CPU card, and
  on each interface card, are set for the required system
  configuration. Details of switch settings are given
  below.

* Ensure that the correct EPROMs are securely installed and
  that the firmware issue labels show the correct numbers,
  as detailed in the PXML.

* Check that all circuit cards are securely installed into
  the correct slots on the motherboard.

2.6. Remote siting of the reception console

A 5-metre cord is supplied with the console. If the console
is to be sited remotely (a maximum of 50 cable metres from
the central control unit), then the console cable should be
cut and terminated at each end on a six-way console
connector block (part number BX 64 DUACB). The two blocks
should be connected together with three-pair 0.5 sq.mm tele-
phone cable, as shown in Table 2-2.

Table 2-2: Connection of console cable blocks

Console cable	Connector block terminal number	Three-pair cable
Blue	1	White/Blue
Yellow	2	Blue/White
White	3	White/Orange
Black	4	Orange/White
Red	5	White/Green
Green	6	Green/White

NOTE: Using spare positions on the Krone connector strip is
not acceptable for the following reasons:

a. It can cause console faults.
b. It can produce intermittent faults on the system.
c. It is not the correct mode of connection as laid down in
   the PXML.

Maintenance call-outs caused by the incorrect termination of
a remote console may result in a charge being levied against
the dealer responsible.

2.7. CPU card switch settings

The CPU card DIL switches are used to define parameters such
as the number of extensions in use and the number of outside
lines connected. Switch settings are shown in Figure 2-6 and
on pages 18 to 21.

Fig. 2-6: CPU SWITCH SETTINGS

The cpu switches are arranged in eight banks:

```
┌──────────────────────────────────────────┐
│  ┌─────┐        SS64 CPU                   │
│  │ S1  │          REV...                   │
│  └─────┘                                   │
│  ┌─────┐                                   │
│  │ S2  │                                   │
│  └─────┘                                   │
│  ┌─────┐                                   │
│  │ S3  │                                   │
│  └─────┘                                   │
│  ┌─────┐                                   │
│  │ S4  │                                   │
│  └─────┘                                   │
│  ┌─────┐                                   │
│  │ S5  │                                   │
│  └─────┘                                   │
│  ┌─────┐                                   │
│  │ S6  │                                   │
│  └─────┘                                   │
│  ┌─────┐                                   │
│  │ S7  │                                   │
│  └─────┘                                   │
│  ┌─────┐                                   │
│  │ S8  │                                   │
│  └─────┘                                   │
└──────────────────────────────────────────┘
```
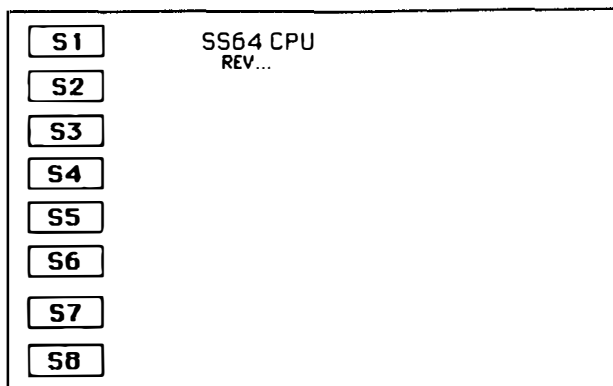
Switch 1

```
     1 - LOW }
     2       }
     3       } Number of extensions (1 to 56)
     4       } See Table 2-3
     5       }
     6 - HI  }
     7 - UNUSED
     8 - MF GENERATOR ENABLE
```

Switch 2

```
     1 - LOW }
     2       }
     3       } Number of outside lines (1 to 16)
     4       } See Table 2-4
     5 - HI  }
     6 - UNUSED
     7 - UNUSED
     8 - OFF = No console
         ON  = Console fitted
```

Switch 3

```
     1 - LOW }
     2       } Number of MF decoders (0 to 8)
     3       } London 32 - OFF OFF ON OFF (4 decoders)
     4 - HI  } London 64 -  ON OFF ON OFF (5 decoders)
     5 - Clock chip enable (should be ON)
     6 - Music on hold
     7 - Diagnostics (should be OFF)
     8 - UNUSED
```

Switch 4

    UNUSED

Switch 5

    UNUSED

Switch 6

    UNUSED

Switch 7

```
    1 - Outside line  1 dialling mode (OFF for LD dialling)
    2 - Outside line  2 dialling mode (OFF for LD dialling)
    3 - Outside line  3 dialling mode (OFF for LD dialling)
    4 - Outside line  4 dialling mode (OFF for LD dialling)
    5 - Outside line  5 dialling mode (OFF for LD dialling)
    6 - Outside line  6 dialling mode (OFF for LD dialling)
    7 - Outside line  7 dialling mode (OFF for LD dialling)
    8 - Outside line  8 dialling mode (OFF for LD dialling)
```

Switch 8

```
    1 - Outside line  9 dialling mode (OFF for LD dialling)
    2 - Outside line 10 dialling mode (OFF for LD dialling)
    3 - Outside line 11 dialling mode (OFF for LD dialling)
    4 - Outside line 12 dialling mode (OFF for LD dialling)
    5 - Outside line 13 dialling mode (OFF for LD dialling)
    6 - Outside line 14 dialling mode (OFF for LD dialling)
    7 - Outside line 15 dialling mode (OFF for LD dialling)
    8 - Outside line 16 dialling mode (OFF for LD dialling)
```

Note: If MF sending on outside lines is required (see
Section 2.11), position 8 of switch 1 should be ON, and the
relevant positions on switches 7 and 8 should also be ON.

Table 2-3: Switch 2 settings

No. of extns	Switch settings	No. of extns	Switch settings
1	100000	37	101001
2	010000	38	011001
3	110000	39	111001
4	001000	40	000101
5	101000	41	100101
6	011000	42	010101
7	111000	43	110101
8	000100	44	001101
9	100100	45	101101
10	010100	46	011101
11	110100	47	111101
12	001100	48	000011
13	101100	49	100011
14	011100	50	010011
15	111100	51	110011
16	000010	52	001011
17	100010	53	101011
18	010010	54	011011
19	110010	55	111011
20	001010	56	000111
21	101010		
22	011010		
23	111010		
24	000110		
25	100110		
26	010110		
27	110110		
28	001110		
29	101110		
30	011110		
31	111110		
32	000001		
33	100001		
34	010001		
35	110001		
36	001001		

0 = Switch OFF; 1 = Switch ON

Table 2-4: Switch 2 settings

No. of outside lines	Switch settings
1	10000
2	01000
3	11000
4	00100
5	10100
6	01100
7	11000
8	00010
9	10010
10	01010
11	11010
12	00110
13	10110
14	01110
15	11110
16	00001

0 = Switch OFF; 1 = Switch ON

Table 2-5: Interface card switch settings

Extension line and outside line interface cards contain a four-way DIL switch, which is used to define the address of the card; in other words, its physical position on the motherboard.

Type of card	Motherboard slot	Switch settings
Outside line 1 - 8 (or 1 - 4)	2	0000
Outside line 9 - 16 (or 9 - 12)	3	1000
Extension 221 - 228	4	0000
Extension 229 - 236	5	1000
Extension 237 - 244	6	0100
Extension 245 - 252	7	1100
Extension 253 - 260	8	0010
Extension 261 - 268	9	1010
Extension 269 - 276	10	0110

0 = Switch OFF; 1 = Switch ON

2.8. Earth connections and safety dependent features

Before connection to the mains supply, the London 32/64 must be connected to a power protective earth conforming to IEE Regulations (15th Edition). You may do this in one of two ways:

a. By running an earth wire from the central control unit to the customer's earth terminal (situated close to the power distribution board), or to an earth spike.

b. By utilising the earth continuity conductor on the back of the 13 Amp socket outlet. If you choose this method, you must observer the following points:

    * The socket must be surface mounted so that the cable enters through a designated cable 'knock-out'. (Note: flush mounted sockets may be raised from the wall using a mounting frame MK part no. MK 2133 WHI.)

    * The earth wire (minimum 2.5 sq.mm) must be protected by means of Mini trunking, capping or conduit.

In either case, you should test the impedance of the earth using an earth loop impedance tester; it should not exceed 0.5 ohm.

Ensure that the mains lead is terminated in a BS 1363 13-Amp mains plug fitted with a 3-Amp fuse.

Ensure that the correct value mains input fuse is installed in accordance with the label on the central control unit: '2A SLO BLO FUSE'. The fuse holder is located inside the mains input connector on the base of the central control unit.

Ensure that the correct type of fuses are fitted in the printer port fuse disconnection barrier as per the labelling on the motherboard PCB.

Check the continuity between the protective earth point and the internal earthing point on the motherboard PCB.

2.9. The call logging printer port

Connect a suitable printer or terminal to the 25-way D-type
CL port connector. The port conforms to the RS232C/V24
standard, and uses the signal lines as shown in Table 2-6.

Table 2-6: Printer port signal lines

Pin	Signal
3	Transmitted data (to printer)
7	Signal ground
20	Data terminal ready (DTR)

Note: some printers may require other pins to be strapped
together

Data is transmitted as 7 data bits plus even parity and one
stop bit at a baud rate set using the programming codes
shown in Table 2-7. These codes should be dialled from a
master phone.

Table 2-7: Programming codes for setting printer baud rate

Baud rate	Programming code
9600	19680
4800	19681
2400	19682
1200	19683
600	19684
300	19685

Power up the unit and make sure that the National Telephone
Systems sign-on message and the system configuration details
are printed.

2.10. Attachments

Only approved attachments (e.g. telephone answering mac-
hines, extension bells, callmakers, modems, etc.) may be
connected to the London 32/64. These attachments must con-
form to BS 6301; this is normally indicated by the prefix
'S' (meaning statutory) to the approval number. The number
of bells or sounders which can be handled by the system is
governed by the following rule: the sum of the REN numbers
of telephones and attachments connected to a single exten-
sion port must not exceed 3. The sum of the REN numbers of
all telephones and attachments connected to the system must
not exceed 70.

2.11. MF sending on outside lines

In certain circumstances, it may be useful to send MF
signalling on outside lines; for instance:

a. When the London 32/64 is being used as a subsidiary
   system to a host PBX that is capable of handling MF
   signalling on its extension ports.

b. When the local public exchange is capable of handling MF
   signalling; e.g. System X and the Mercury network in the
   UK.

To enable MF sending on outside lines, proceed as follows:

a. Insert the Molex link so that it bridges the two pins of
   LK2 (labelled 'MF OUT') on the CPU card.

b. Set position 8 of switch 1 on the CPU card to the ON
   position.

c. Set the relevant positions of switches 7 and 8 on the CPU
   card to the ON positions (see page 19).

Note: The link LK2 on the CPU card must not be put in if MF
sending is not to be enabled.

3. SYSTEM TESTS

Connect the extension wiring in accordance with the customer's extension numbering plan (see Figures 2-4 and 2-5).

Connect the RAM battery back-up by inserting the battery link so that it bridges the two Molex pins. The link is positioned next to the battery on the CPU card.

Carry out the following tests:

* On each extension, check: Internal dial tone
                             Ringing
                             Dialling

    NOTE: at this point, it may be useful to switch off secondary ringing at that extension (see Programming Manual) by dialling 69900.

For each outside line circuit installed, check line seizing and dialling:

* Select each line by dialling 801, 802, etc., and dial 0. Check that the Line Seized LED comes on and that the dialling relay is activated.

* Check the battery back-up.

    NOTE: If the battery is completely exhausted, it will need charging for 24 hours before you carry out this test.

* Set call diversion from Extension 222 to Extension 223 by dialling from Extension 222: 604223. Check that calls are diverted.

* Switch off mains power and then switch on again after 1 minute.

* Check that calls are still diverted from 222 to 223.

* Cancel the call diversion by dialling from 222: 605.

* Check that call diversion has been cancelled.

* Check incoming ringing using a suitable exchange line simulator.

* Check that Extensions 221, 222 and 223 ring for incoming calls on each outside line. Also check that each call is indicated on the console (if present).

For the call logging port (if printer is fitted):

*   Turn call logging on by dialling from Extension 221 (the master phone): 19651

*   Check the call logging printout on the customer's printer unit.

Power fail fall-back:

.*   Switch off the mains power and check that Outside Lines 1 to 8 fall back to Extensions 221 to 228

Reception console:

*   The system should power up with Extension 221 automatic-ally assigned to the console. If you want to assign a different extension to the console, dial from extension 221:

    1967 extension number

    If the system is a London 32, without a console, dial from Extension 221:

    1967220

    If a console is present, and no extension has been assigned, the LCD display will show 'NO CONSOLE'.

The console extension phone should be left off hook while you perform the following tests:

*   Check that side tone is present on the assigned extension. Dial tone should disappear once the extension has been assigned to the console.

*   Check that the clock display is shown on the LCD when the console is idle.

*   Check that the 'Power' light is lit.

*   Check the 'Night Mode' light by keying in ALT 4

*   Check the 'Calls Parked' light by making an internal call to the console (dial 0 from an extension), pressing the INTL key to answer the call, then pressing the PARK key twice.

*   Check each extension line status light by dialling each extension in turn from the console. The LED should flash in time with the ringing cadence.

* Turn on the console bell by keying in ALT 5 so that the
message 'BELL IS ON' appears. Check the bell by dialling
0 from an extension. the bell should ring with internal
cadence, while the light on the INTL key flashes.

4. SYSTEM PROGRAMMING

Refer to the Programming Manual supplied with the system,
either the London Range Programming Manual (for office
systems), or the London H-Series Programming Manual (for
hotel systems).

Each of these manuals has an appendix containing a program-
ming checklist; to ascertain the customer's requirements,
run through this list together. Then program the system
accordingly.

4.1. Configurable timeouts

Certain timeout values on the london 32/64 are configurable,
and can be changed from a master phone using the programming
codes listed in Table 4-1. Since operational problems can
occur if these values are changed without careful consider-
ation, it is strongly recommended that the programming codes
are not made known to the customer.

Table 4-1: Programming codes for configurable timeouts

Timeout	Programming code	Default value (sec)
Camp-on-busy return	1911 xxx	045
Unanswered call return	1912 xxx	030
Parked call return	1913 xxx	010
Unanswered alarm call	1914 xxx	240
Unanswered ringback	1915 xxx	015
Unused	(1916 xxx)	(250)
Console parked call return	1917 xxx	040
Unused	(1918 xxx)	(250)

xxx = time in seconds (001 to 250)

4.1.1. Camp-on-busy return

The time after which calls camped onto a busy extension by a
reception phone will be returned to the reception phone(s)
if the required extension does not become free.

4.1.2. Unanswered call return

The time after which a call transferred from a reception
phone will be returned to the reception phone(s) if the
required extension does not answer.

4.1.3. Parked call return

If an extension has parked a call, and is idle, the call
will be returned to the extension after this period of time.

4.1.4. Unanswered alarm call

The time for which an unanswered alarm call will continue to
ring an extension.

4.1.5. Unanswered ringback

The time for which an unanswered ringback will continue,
indicating that a required extension or outside line has
become free or available.

4.1.6. Console parked call return

The time for which a call parked by the console user will
remain before being presented on the RETN key once the
console becomes idle.

4.2. "Busying-out" selected lines

If the system is being checked for a possible outside line
fault, you can busy out selected lines by dialling from a
master phone:

1931 N   Causes outside line N to be ignored for outgoing
          calls (N = 01 to 16)

1932 N   Causes outside line N to be reinstated

DIAL 1954 ON A MASTER PHONE TO OBTAIN A PRINTOUT OF THE TIMEOUTS
SET, AND 1951 TO OBTAIN A PRINTOUT OF THE PROGRAMMING CONFIGUR-
ATION. THESE PRINTOUTS SHOULD BE LEFT ON SITE, WITH INSTRUCTIONS
TO THE CUSTOMER TO KEEP THEM IN A SAFE PLACE.

5. SITE DOCUMENTATION AND LABELS

The following should be available on site before connection of the system to the PSTN by the relevant authority (British Telecom in the UK):

* Private Exchange Master List (PXML 92)

* User Guides and Cards

* London Range Programming Manual OR London H-Series Programming Manual

* '999' labels fitted to each telephone

The above items are contained in the documentation packs supplied with the system.

* Maintenance Certificate (or a copy of the Maintenance Contract) issued by an approved maintainer and signed by the customer

* Printouts of the programming information (see above)

* Certificate of Satisfactory Completion (see page 30)

* Installation layout drawing showing the positions of all extension sockets and any distribution points

* Labels on each socket: 'WARNING - CONNECT ONLY APPARATUS COMPLYING WITH BS 6301 TO THIS PORT'

6. CERTIFICATE OF SATISFACTORY COMPLETION

This is to certify that a National Telephone Systems London PABX
type system model number .... serial number .... was
installed at ....
....
....
....
on ....../....../....... (date) in accordance with the require-
ments for installation in the Secretary of State's approval
number 84/0121 and in accordance with BS 6506.

The following documents have been left on site:

    PXML 92 Issue ....

    Maintenance certificate or copy of maintenance contract
    issued by an approved maintainer and signed by the customer.

Signed ....   Date ....../....../.........

On behalf of ....

A. PRIVATE CIRCUIT INSTALLATION

A.1. INTRODUCTION

The London 32/64 DC5 private circuit interface card contains four circuits for DC5 signalling (two-wire E & M). The card is installed in the central control unit, in either an extension slot or an outside line slot, depending on the availability of spare slots.

In addition, the London 32 has a dedicated private circuit card position (slot 7), which will always be used for the first DC5 card. Preferred locations are detailed in Section 3 of this Appendix.

The status of each private circuit is indicated on the busy lamp field of the reception console, with LED 280 corresponding to private circuit (PC) 01, 279 to PC02, etc. (see Table A-1 below).

Signalling protocols other than DC5 (also known as E & M) can be achieved by the use of approved converters, available from such companies as Keltek or Wescom (see below).

Table A-1: Possible configurations involving private circuits

LONDON 32:

Outside Lines + Extns	Private circuits		
	4	8	12
4 + 8	✓	✓	✓
4 + 16	✓	✓	
4 + 24	✓		
8 + 8	✓	✓	✓
8 + 16	✓	✓	
8 + 24	✓		

LONDON 64:

Private circuits

Outside Lines + Extns	4	8	12	16	20	24	28
4 + 8	✓	✓	✓	✓	✓	✓	✓
4 + 16	✓	✓	✓	✓	✓	✓	
4 + 24	✓	✓	✓	✓	✓		
4 + 32	✓	✓	✓	✓			
4 + 40	✓	✓	✓				
4 + 48	✓	✓					
4 + 56	✓						
8 + 8	✓	✓	✓	✓	✓	✓	✓
8 + 16	✓	✓	✓	✓	✓	✓	
8 + 24	✓	✓	✓	✓	✓		
8 + 32	✓	✓	✓	✓			
8 + 40	✓	✓	✓				
8 + 48	✓	✓					
12 + 8	✓	✓	✓	✓	✓	✓	
12 + 16	✓	✓	✓	✓	✓		
12 + 24	✓	✓	✓	✓			
12 + 32	✓	✓	✓				
12 + 40	✓	✓					
12 + 48	✓						
16 + 8	✓	✓	✓	✓	✓	✓	
16 + 16	✓	✓	✓	✓	✓		
16 + 24	✓	✓	✓	✓			
16 + 32	✓	✓	✓				
16 + 40	✓	✓					

A.2. LOCATION OF PRIVATE CIRCUIT CARDS

As discussed earlier, the DC5 card(s) can be installed in any spare extension or outside line slot, depending on availability. However, for the sake of good order, the cards should be located in the first spare slot, in the following order of preference:

LONDON 32:
            Slot 7
            Slot 6
            Slot 5

LONDON 64:
            Slot 10
            Slot 9
            Slot 8
            Slot 7
            Slot 6
   Slot 5
            Slot 3

Your choice of slot will determine the TJF connections used for the four-wire DC5 connection. Table A-2 shows the relationship between the available motherboard slots and the TJF.

Table A-2: TJF connections

Motherboard slot no.		TJF connections	
		A + B	E + M
10	1st circuit	269	270
	2nd circuit	271	272
	3rd circuit	273	274
	4th circuit	275	276
9	1st circuit	261	262
	2nd circuit	263	264
	3rd circuit	265	266
	4th circuit	267	268
8	1st circuit	253	254
	2nd circuit	255	256
	3rd circuit	257	258
	4th circuit	259	260
7	1st circuit	245	246
	2nd circuit	247	248
	3rd circuit	249	250
	4th circuit	251	252
6	1st circuit	237	238
	2nd circuit	239	240
	3rd circuit	241	242
	4th circuit	243	244
5	1st circuit	229	230
	2nd circuit	231	232
	3rd circuit	233	234
	4th circuit	235	235
3	1st circuit	O/L 9	O/L 10
	2nd circuit	O/L 11	O/L 12
	3rd circuit	O/L 13	O/L 14
	4th circuit	O/L 15	O/L 16

A.3. <u>STATUS INDICATION OF PRIVATE CIRCUITS</u>

The status of private circuits is indicated on the busy lamp
field of the console by LEDs 280 downwards

Fig. A-1: PRIVATE CIRCUIT BUSY LAMP FIELD

Extensions 221 222 223 224 ....

PC 4 PC 3 PC 2 PC 1
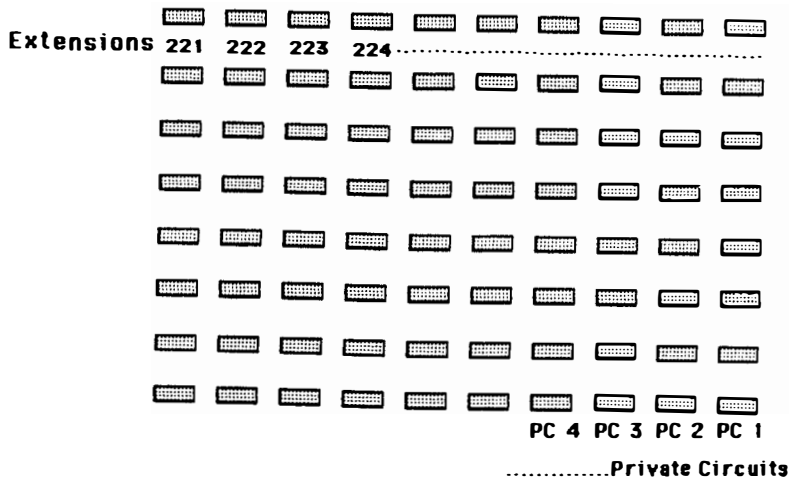
...............Private Circuits

The four-way DIL switch on the DC5 card is used to determine
the private circuit number (PC01, PC02, etc.), and hence the
console LED, regardless of the motherboard slot into which
the card is inserted.

Switch settings are shown in Table A-3.

Table A-3: DC5 card switch settings

PC no.	DC5 card switch setting	Console LED
01	0 0 0 0	280
02		279
03		278
04		277
05	1 0 0 0	276
06		275
07		274
08		273
09	0 1 0 0	272
10		271
11		270
12		269
13	1 1 0 0	268
14		267
15		266
16		265
17	0 0 1 0	264
18		263
19		262
20		261
21	1 0 1 0	260
22		259
23		258
24		257
25	0 1 1 0	256
26		255
27		254
28		253

0 = Switch OFF; 1 = Switch ON

A.4. CPU CARD SWITCH SETTINGS

When private circuit cards are fitted, switch 4 on the CPU card should be set as follows:

Switch 4

```
1 - LOW }
2        }
3        }  Number of private circuits (1 to 28)
.4       }  See Table A-4 below
5 - HI   }
6 - UNUSED
7 - UNUSED
8 - OFF = PSTN access barred  on all private circuits
  - ON  = PSTN access allowed on all private circuits
```

Table A-4: CPU card - settings for Switch 4

No. of PCs	Switch settings	No. of PCs	Switch settings
1	1 0 0 0 0	15	1 1 1 1 0
2	0 1 0 0 0	16	0 0 0 0 1
3	1 1 0 0 0	17	1 0 0 0 1
4	0 0 1 0 0	18	0 1 0 0 1
5	1 0 1 0 0	19	1 1 0 0 1
6	0 1 1 0 0	20	0 0 1 0 1
7	1 1 1 0 0	21	1 0 1 0 1
8	0 0 0 1 0	22	0 1 1 0 1
9	1 0 0 1 0	23	1 1 1 0 1
10	0 1 0 1 0	24	0 0 0 1 1
11	1 1 0 1 0	25	1 0 0 1 1
12	0 0 1 1 0	26	0 1 0 1 1
13	1 0 1 1 0	27	1 1 0 1 1
14	0 1 1 1 0	28	0 0 1 1 1

0 = Switch OFF; 1 = Switch ON

A.5. PARTS REQUIRED

Unless indicated otherwise, items shown are available from National Telephone Systems.

A.5.1. For DC5 signalling

Item	Quantity
DC5 interface card	1 per 4 circuits
Earth wire (signalling earth) min. 2.5sq. mm	As required

A.5.2. For AC15A signalling using Keltek conversion equipment

Item	Quantity
DC5 interface card	1 per 4 circuits
Earth wire (signalling earth) 2.5 sq.mm	As required
*Signalling unit 45A	1 per circuit
*Wall case 1P (accepts 1 circuit & includes PSU)	As required

A.5.3. For DC10A signalling using Keltek conversion equipment

Item	Quantity
DC5 Interface card	1 per 4 circuits
Earth wire (signalling earth) 2.5 sq.mm	As required
*Signalling unit 45A	1 per circuit
*Wall case 1P (accepts 1 circuit & includes PSU)	As required

*Available from:
              Keltek Electronics
              Pinnacle Hill Industrial Estate
              Kelso
              Roxburghshire
              Scotland TD5 8DW   Tel   05732 3601
                                    Telex 727513

A.5.4. For AC15A signalling using Wescom conversion equipment

Item	Quantity
DC5 interface card	1 per 4 circuits
Earth wire (signalling earth min. 2.5 sq.mm)	As required
*4512 -05 oscillator detector	1 per circuit
*4521 -01 E & M interface	1 per circuit
*4413 terminating set	1 per circuit
*14A wall mounting case	1 per circuit
*8548 PSU	1 per circuit

A.5.5. For DC10A signalling using Wescom conversion equipment

Item	Quantity
DC5 interface card	1 per 4 circuits
Earth wire (signalling earth min. 2.5 sq.mm)	As required
*2833 - 00 E & M to SC/DC converter	1 per circuit
*730 dual repeat coil	1 per circuit
*14A wall-mounted case	1 per circuit
*8548 PSU	1 per circuit

   *Available from:
   Certacom Ltd
                1 Holtspur Lane
                Wooburn Green
                High Wycombe
                Bucks HP10 OAA

If signalling converters are to be used, a 13 Amp socket outlet
must be available close to the chosen wall-mounting position.
this should be labelled: "TELEPHONE EQUIPMENT - DO NOT REMOVE".

A.6. INSTALLATION PROCEDURE

WARNING - THE CENTRAL CONTROL UNIT CONTAINS CMOS COMPONENTS
WHICH ARE PRONE TO DAMAGE FROM STATIC ELECTRICITY. ANTI-
STATIC PRECAUTIONS (SEE BS 5783) SHOULD BE TAKEN WHEN
WORKING ON OR NEAR THE UNIT.

* Cable from the spare 0-Volt point on the system PSU to
  the TJF earth post, the MDF earth post and the signalling
  converter earth point, using 2.5 sq.mm stranded wire (see
  Figure A-2).
  Note: If private circuits are being installed onto an
  existing system, the power protective earth strap should
  be removed from the TJF earth post.

* Install the signalling earth. This should be run back to
  the building earth point or to a buried earth electrode;
  it is NOT possible to use the system's power protective
  earth.
  Connect the signalling earth to the earth connection on
  the signalling converter. If you are not using signalling
  converters, the signalling earth should be connected to
  the MDF earth post.

* Install the DC5 interface card into the chosen
  motherboard slot, making sure that the DIL switches are
  set correctly.

* Set Switch 4 on the CPU card to correspond to the number
  of private circuits connected (see Table A-4).

* Test the DC5 card by carrying out a 'back-to-back'
  functional check of each circuit (see Section A.7 below).

* Mount the signalling conversion equipment close to the
  central control unit, using the instructions supplied.

* Connect each signalling converter to the TJF (two-wire
  speech plus E & M), noting the correct polarity of the E
  & M leads.

* Test the signalling converters for correct operation by
  carrying out a 'back-to-back' test if possible.

* Connect the converter to the private circuit and carry
  out an end-to-end test.

* Instruct the customer how to operate the private circuits
 (see the User Guide, the Console User Manual and the
  Programming Manual).

Fig. A-2: SUGGESTED LAYOUT OF CCU/SIGNALLING CONVERTERS
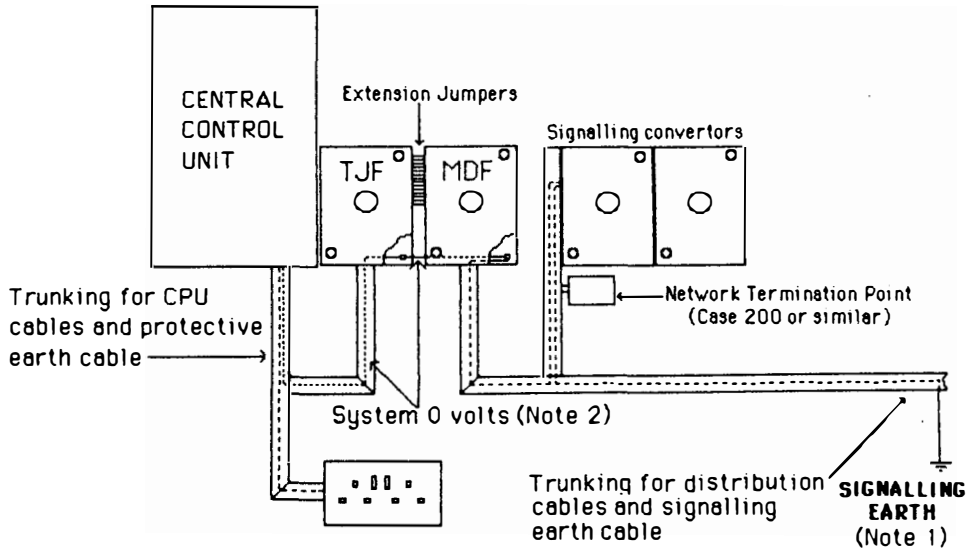
NOTES:
* The signalling earth must be derived from the building earth point or a buried earth electrode; mains earth must not be used.

* 2.5 sq.mm stranded cable should be run from the 0-Volt point on the system PSU to the TJF and MDF earth post.

* The signalling earth should be connected to the system 0-Volt point at the MDF earth post.

A.7. <u>TESTING</u>

The DC5 card can be tested for correct operation by means of 'back-to-back' connection. This involves connection of Circuit 1 to Circuit 2 and Circuit 3 to Circuit 4, in order to carry out a functional check of all circuits in both directions (incoming and outgoing). Connections between the circuits should be made as shown in Figure A-3.

Fig. A-3: CONNECTION OF CIRCUITS FOR BACK-TO-BACK TESTING
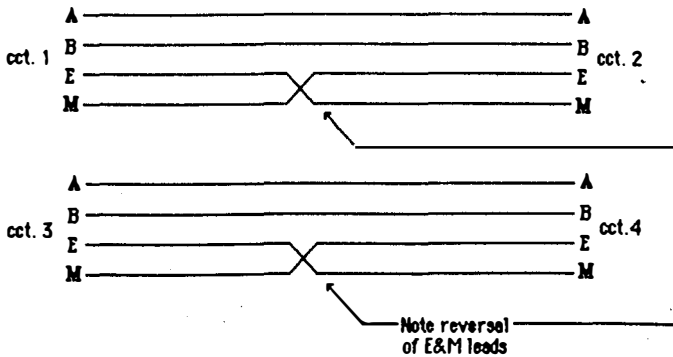
Before carrying out this test, ensure that the system has been programmed for direct dialling in on private circuits, by dialling from a master phone:

                        1780 XX YY

where XX is the first private circuit and YY is the last private circuit.

For example, if only one DC5 card were fitted, the code would be:

                        1780 01 04

Make an outgoing call on PC01 from any extension, by dial-
ling 8701. This should appear as an incoming call on PC02,
which will return dial tone.

Dial another extension number and make sure that the exten-
sion rings and that ringing tone is returned.

Answer the ringing extension and check for speech transmis-
sion between the two extensions.

Repeat this test for each private circuit by dialling 8702,
8703, 8704, etc.

If possible, you should repeat the above tests with the
signalling converters in circuit, as shown in Figure A-4.

Fig. A-4: SIGNALLING CONVERTERS IN CIRCUIT
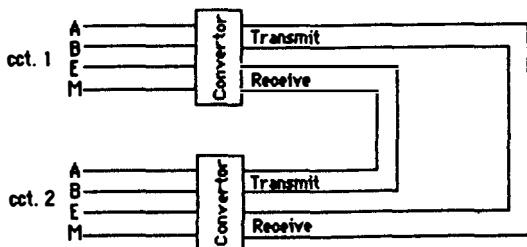
Carry out an end-to-end test once both ends of the private
circuit(s) have been connected by the public authority (BT
in the UK). This will, of, course, require co-operation by
the supplier of the distant end equipment.

A.8. 'BUSYING-OUT' INDIVIDUAL PRIVATE CIRCUITS

To busy out individual private circuits for testing purposes
dial from a master phone:

    1731 XX - private circuit XX to be ignored for outgoing
              calls
    1732 XX - private circuit XX to be reinstated

B. INSTALLING METER PULSE DETECTION

The meter pulse detection card consists of 16 pulse detector circuits, a microprocessor section to test the validity of received signals, and a serial data link to convey validated information to the main system processor. SPM (subscriber's private metering) pulses are required on all those exchange lines which are to monitored; these must be ordered from British Telecom, or the local PTT.

The card is designed to interface to the system via a dedicated position (Slot 11) on the motherboard. Connection to the outside pair is achieved via a 'piggyback connector', which is plugged into J7 on the motherboard. A 34-way ribbon cable jumper interfaces to a 34-way socket on the meter pulse card and a 34-way socket on the piggyback connector assembly (see Figure B-1).

B.1. INSTALLATION PROCEDURE (written for one MPD card)

WARNING - THE CENTRAL CONTROL UNIT CONTAINS CMOS COMPONENTS WHICH ARE PRONE TO DAMAGE FROM STATIC ELECTRICITY. ANTI-STATIC PRECAUTIONS (SEE BS 5783) SHOULD BE TAKEN WHEN WORKING ON OR NEAR THE UNIT.

* Using 2.5 sq.mm cable, run a signalling earth from the MDF earth post to either the building earth point or to a buried earth electrode.

* Strap the MDF earth post to the TJF earth post.

* Power down the London 32/64.

* Cable from the spare 0-Volt point on the system PSU to the TJF earth post using 2.5 sq.mm stranded wire (see Figure B-1).
  Note: If meter pulse detection is being installed onto an existing system, the power protective earth strap should be removed from the TJF earth post.

* Remove the plug from J7 on the motherboard and fit the piggyback connector. Replace the plug into the 64-way female connector on the piggyback connector card.

* Set the switches on the meter pulse detection card according to the number of lines which have metering (see Table B-1).

* Insert the meter pulse detection card into Slot 11.

* Insert the 34-way ribbon cable jumper between the meter pulse detection card and the piggyback connector.

* Power up the London 32/64.

* Test each metered line by making an outgoing call and checking that meter pulses are being detected. This is indicated by:
  i. The relevant LED on the meter pulse detection card
  ii. The call logging output, printed on completion of the call.

  Note: If you suspect that meter pulses are not present on a particular outside line, you can monitor the pulses using a high impedance test telephone (Tele 280 or similar) connected between one leg of the line and earth. Pulses, if present, will be heard periodically as a 50 Hz hum.

* Set the cost per metered unit according to the customer's requirements by dialling from a master phone:

                    1935 pppp

  where pppp is the cost of a meter unit in one-hundredths of a penny (for markets other than the UK, refer to the nots supplied with the software variant). This is more fully explained in Section 9.2 of the London Range Programming Manual.

B.2. SWITCH SETTINGS

Two eight-way DIL switches are provided on the meter pulse detection card. These are used to enable particular channel numbers corresponding to those exchange lines which have meter pulse signals present on them. For exchange lines without meter pulse signals, the corresponding DIL switches disable those channels so that spurious signals are ignored. Table B-1 shows which switches correspond to which exchange lines.

Table B-1: DIL switches enabling MPD on exchange lines

Switch	Exchange line	Switch	Exchange line
1.1	01	2.1	09
1.2	02	2.2	10
1.3	03	2.3	11
1.4	04	2.4	12
1.5	05	2.5	13
1.6	06	2.6	14
1.7	07	2.7	15
1.8	08	2.8	16

Switch OFF = channel enabled; switch ON = channel disabled

Fig. B-1: CONNECTION OF METER PULSE DETECTION CARD

To meter pulse detection card
in slot 11

34 way
ribbon
cable

Existing
TJF plug
for J7

Piggy-back
connector
assembly

console
connector

J6 7 way
molex
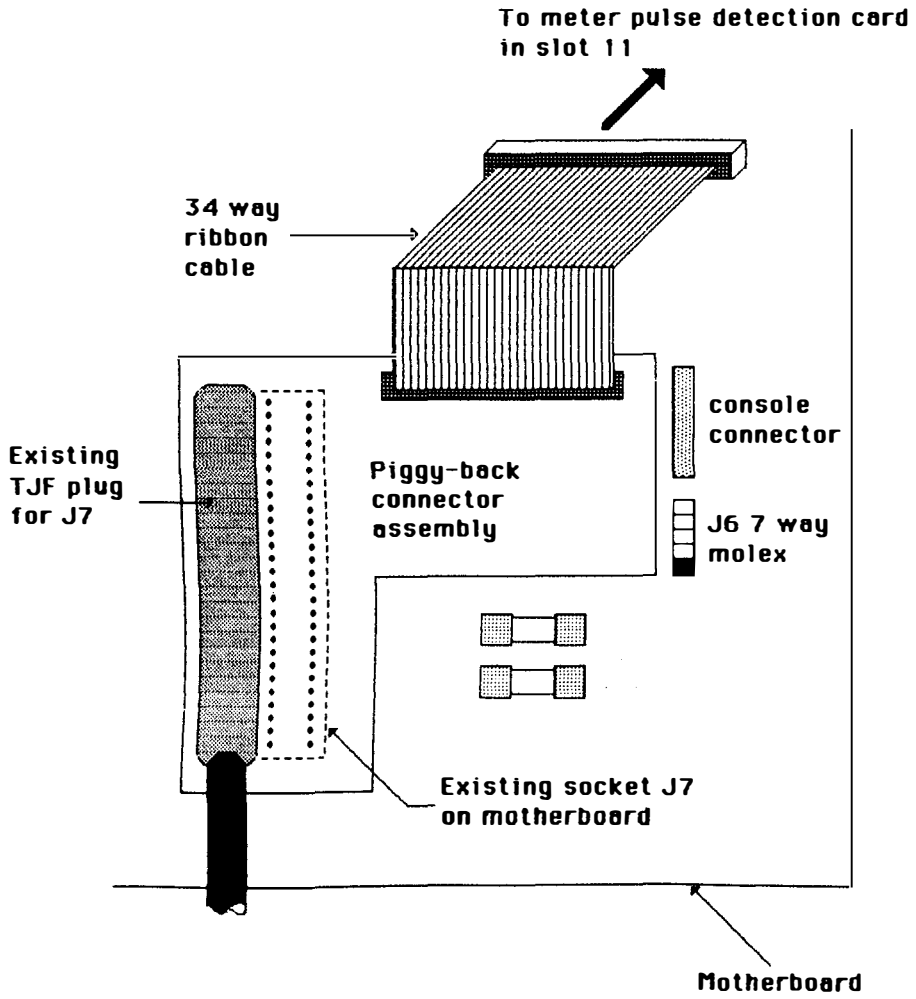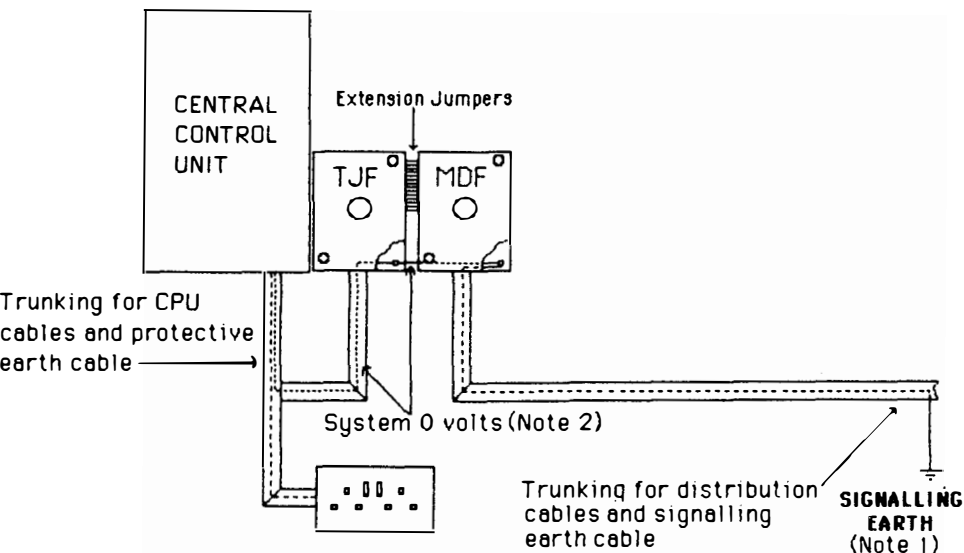
Existing socket J7
on motherboard

Motherboard

Fig. B-2: SIGNALLING EARTH ARRANGEMENT

Notes:
1 Signalling earth must be derived from building
   earth point or buried earth electrode Mains
   earth must not be used.
2. 2.5 sq mm stranded cable to be run from 0 volt
   point on system PSU to TJF earth post & MDF
   earth post.

C. <u>INSTALLING MF UPGRADE KIT</u>

This kit contains MF decoders (four for the London 32; five for the London 64), to enable the use of multi-frequency (MF) telephones on the system. The MF phones used <u>must</u> incorporate a timed break recall button.

Loop disconnect telephones may still be used when the MF option is fitted, as the system software is able to detect the type of signalling in use and adjust accordingly.

IMPORTANT: ENSURE THAT POWER IS REMOVED AND ANTI-STATIC PRECAUTIONS ARE TAKEN BEFORE YOU CARRY OUT THE OPERATIONS DESCRIBED BELOW.

*   Place the CPU card on a flat anti-static surface.

*   Using an IC inserter tool (RS Components stock number 423-829), insert the decoders into the appropriate sockets on the CPU card as shown in Figure C-1.

Fig. C-1: LOCATION OF MF DECODERS ON CPU CARD

* Set Switch 3 as shown in Table C-1.

Table C-1: Switch 3 settings

Switch number	London 32	London 64
3.1	OFF	ON
3.2	OFF	OFF
3.3	ON	ON
3.4	OFF	OFF

* Replace the CPU card and carry out a functional test using MF telephones.

D. INSTALLING LONDON H-SERIES HOTEL SOFTWARE

The London H-Series hotel software kit comprises two Issue 144.0 software EPROMs, contained in an anti-static plastic box.

IMPORTANT: ENSURE THAT POWER IS REMOVED AND ANTI-STATIC PRECAUTIONS ARE TAKEN BEFORE YOU CARRY OUT THE OPERATIONS DESCRIBED BELOW.

* Remove the CPU card from its package (or the CCU if you are upgrading an existing installation), and place it on a flat anti-static surface.

* Remove the battery link and replace the existing EPROMs with the new 144.0 EPROMs, as shown in Figure D-1, paying especial attention to their orientation and relative locations. Ensure that all legs are correctly inserted.

* Replace the battery link and install the CPU card.

* Ensure that all other cards are installed correctly; power up the system.

* Perform commissioning checks as outlined in Section 3 of this Installation Manual.

* Carry out system programming as described in the London H-Series Programming Manual. At the end of the Programming Manual is a checklist which you should run through in order to ascertain the customer's requirements before you start programming.

Fig. D-1: LOCATION OF 144.0 SOFTWARE EPROMS