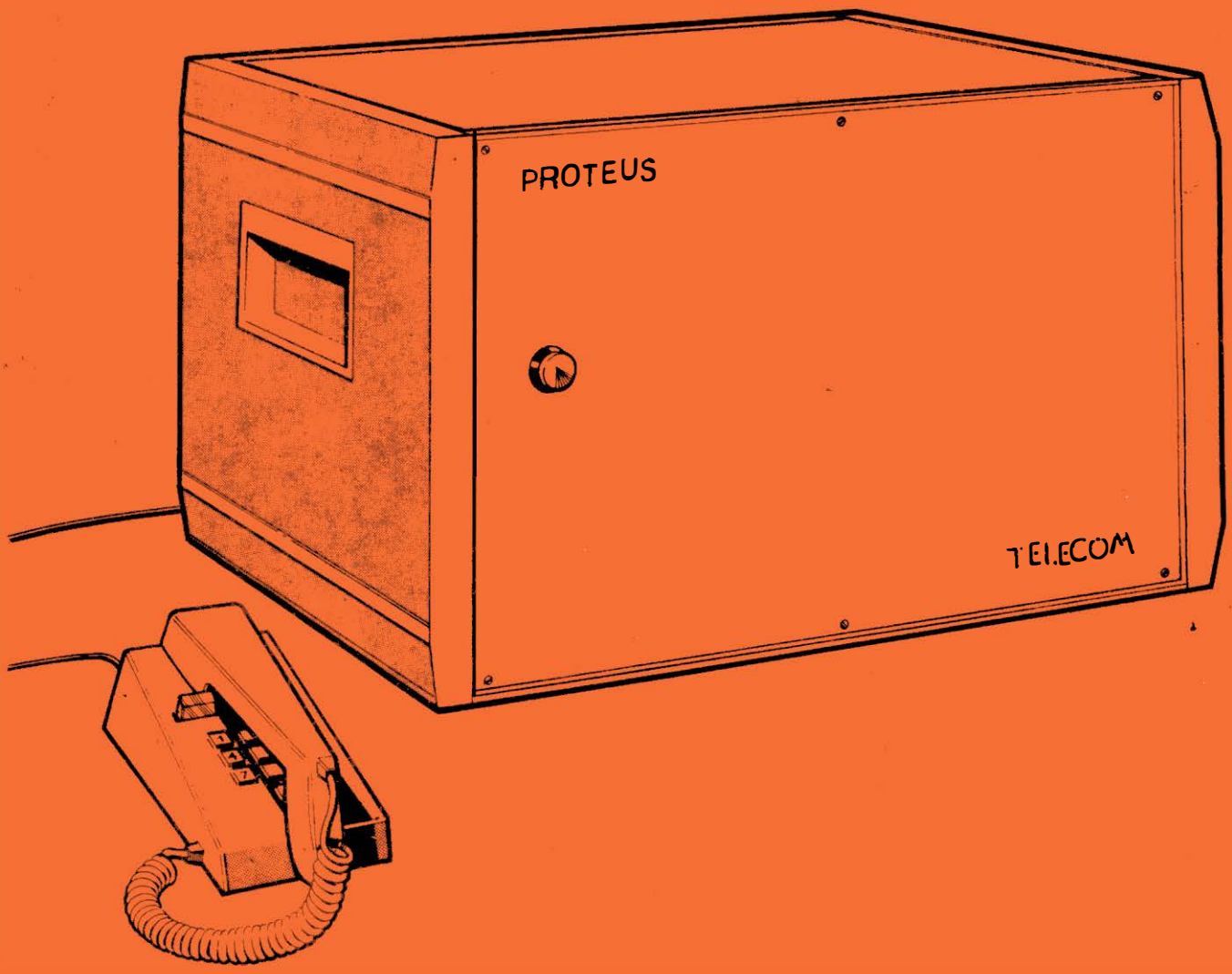
CUSTOMERS APPARATUS GUIDE NOTES

Proteus 24 & 64 (Internal Telephone System No. 3)



British TELECOM

PROTEUS 24 & 64 (INTERNAL TELEPHONE SYSTEM NO. 3)

This guide is intended to assist staff in the installation and maintenance of the Proteus and should be used in conjunction with the other documents referred to on page (v).
It will enable a fitter to install the system without reference to other documentation and will assist a faultsman to trace and locate faults.

Designed by PE/M/Reprographic Services

PRODUCED BY BTHQ/PS 5.1.2

CONTENTS

ADVICE NOTE ENTRIES

The following is an explanation of typical entries you will find on a customers Advice Note.

Typical entry	Explanation
PROVIDE PROTEUS 24 INTERNAL SYSTEM CONTROL UNIT	Provide case with 24 way backplane.
PROVIDE PROTEUS 64 INTERNAL SYSTEM CONTROL UNIT	Provide case with 64 way backplane.
PROVIDE 21 EXTENSION INTERFACES	Provide Line Extension ASU's (1 for every 8 extensions).
PROVIDE 21 PROTEUS EXTENSIONS	Provide 21 extensions on the system.

Any supplementary information such as the provision of plan numbers will be shown on the Advice Note in the normal way.

NOTE:– EACH TELEPHONE AREA WILL BE ALLOCATED A BLOCK OF NUMBERS ON A HYPOTHETICAL EXCHANGE CALLED 'PROTEUS' IN THE RANGE 1000 TO 1999.

EXTENSION TELEPHONE WIRING

Any standard British Telecom 10 p.p.s telephone can be used and all existing Plan arrangements may be provided.

Proteus is a 30V system so battery type push button telephones should not be provided as line charging cannot be employed. If however it is necessary to use this type of instrument then power unit charging must be provided.

DOCUMENTATION

Telecoms Instructions

C3 M4010
E5 D7304
E5 D7305
B4 N0011

IMPORTANT

Proteus uses CMOS devices and these are liable to permanent damage by the discharge of electrostatic potentials that are likely to be met in routine handling.

These potentials are present on the body and clothing so Apparatus Slide-in Units (ASU's) must be handled with care, a charge placed on the termination of a chip could cause permanent damage.

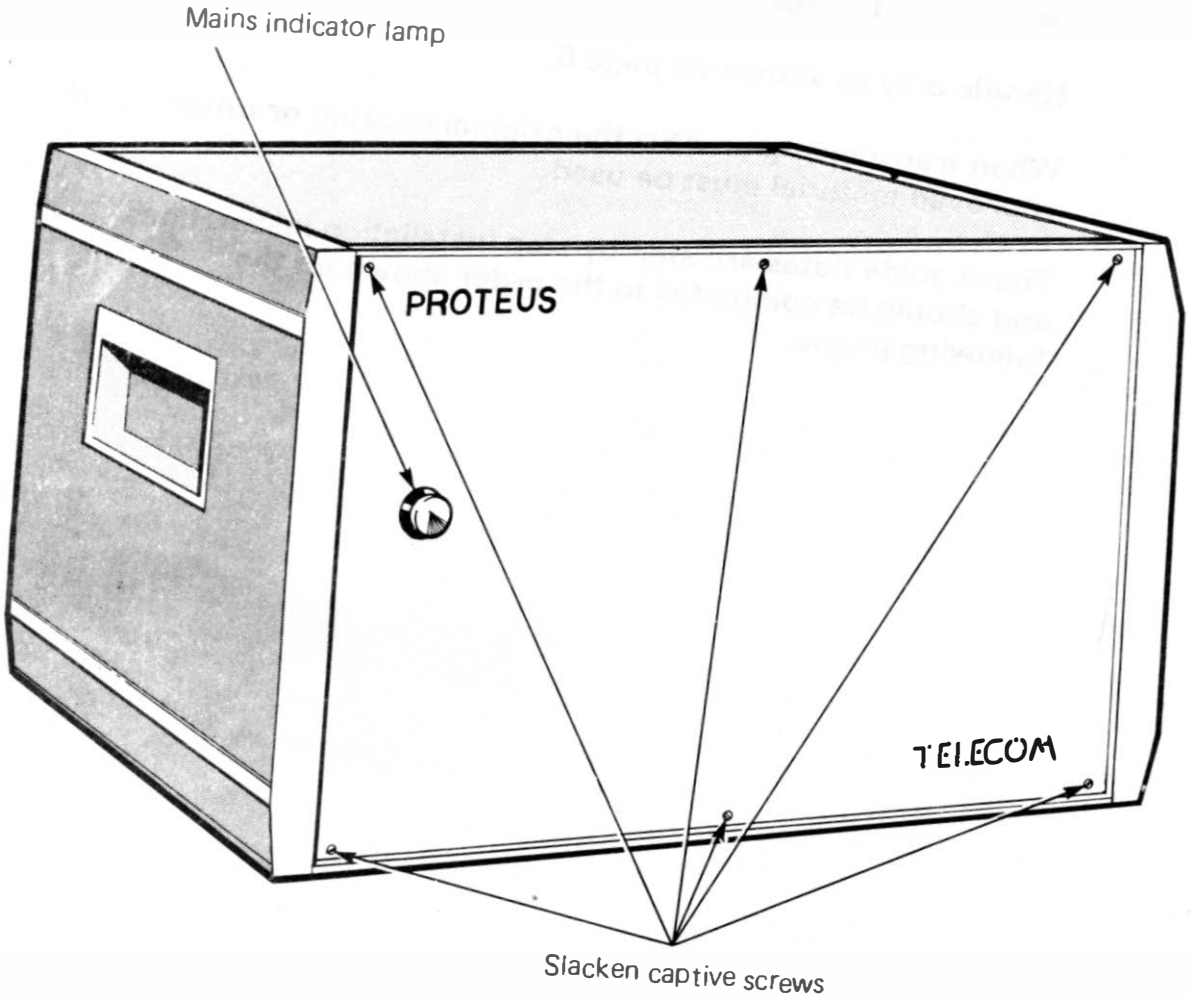
Handle only as shown on page 5.

When transporting an ASU the original packing or other approved material must be used.

These guide notes are step by step installation instructions and should be completed in the order shown on the following pages.

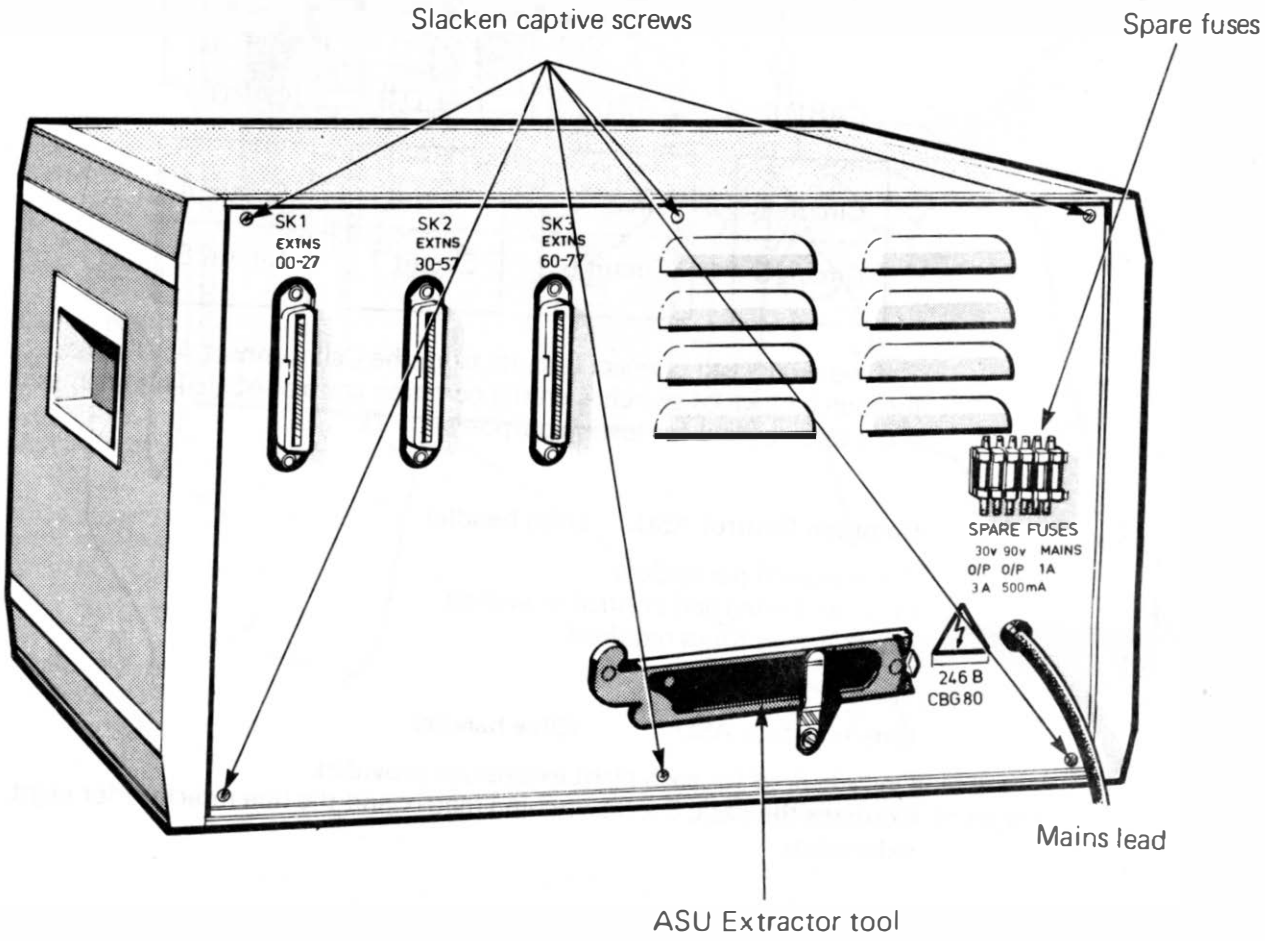
1. ACCESS TO CENTRAL SWITCHING UNIT (CSU)

1.1 Removing the Front Cover



N.B. Place cover in a safe position after removal.

1.2 Removing the Back Plate



N.B. Place cover in a safe position.

2. FITTING THE APPARATUS SLIDE-IN UNITS (ASU's)

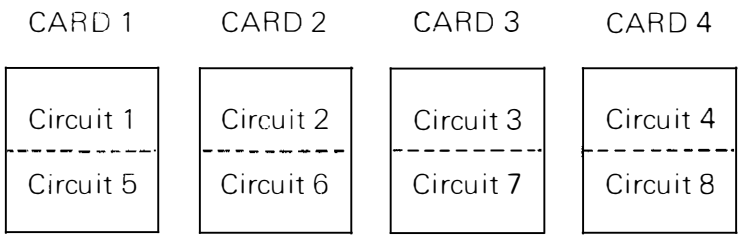
2.1 Types of ASU

Power Supply Unit. (Black)

One required per system.
Mains powered.
Capable of supplying a fully equipped 64 station system.

Call Connect ASU. (Yellow handle)

Each card contains two identical call connect circuits.
A maximum of 4 cards (8 connect circuits) can be provided.
The circuits are numbered as follows:—



The individual call connect circuits from the Call Connect ASU's pass through a block of switches on the common control ASU. This enables them to be busied for testing purposes.

Common Control ASU. (Red handle)

One required per system.
Provides timing and control of system.
Generates all tones required.

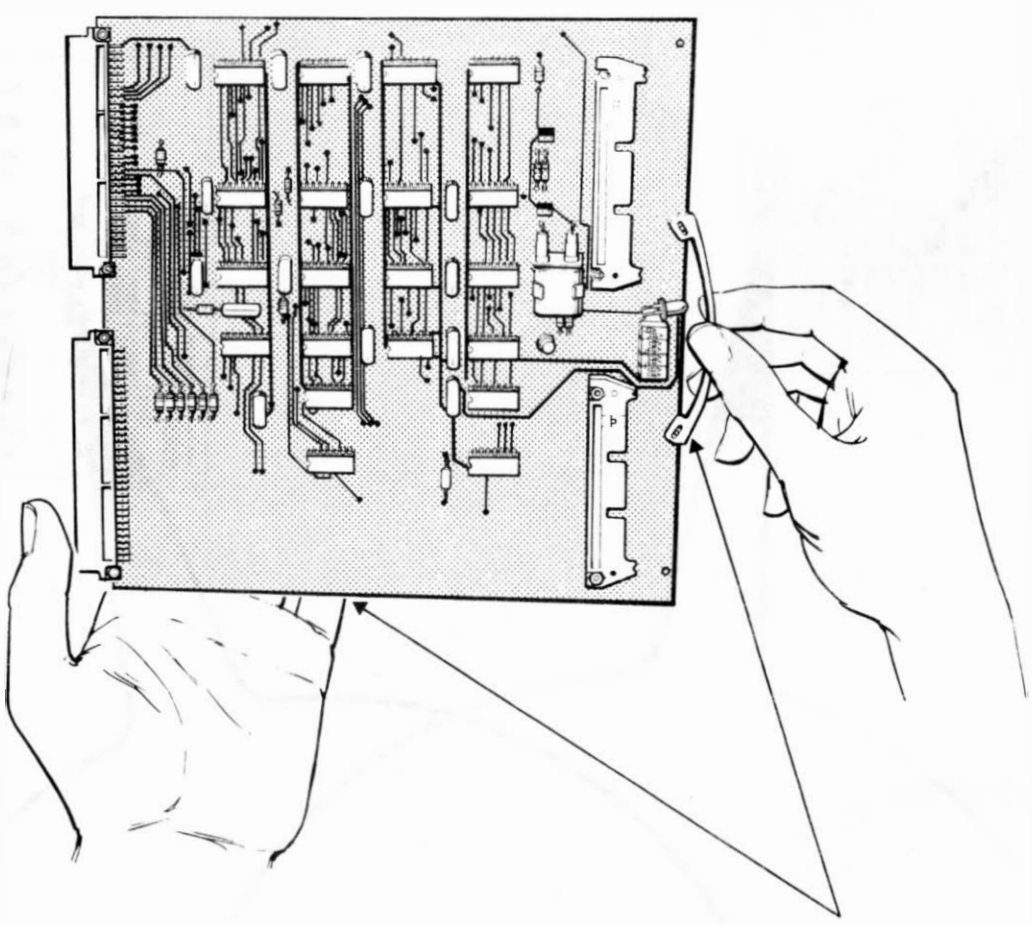
Line Interface ASU (Blue handle)

One required for each eight extensions provided.
Contains the basic 8 x 8 switching matrix and the line interface for eight extensions.

2.2 Unpacking

Remove carefully from the anti-static bag

Inspect the whole ASU for damage

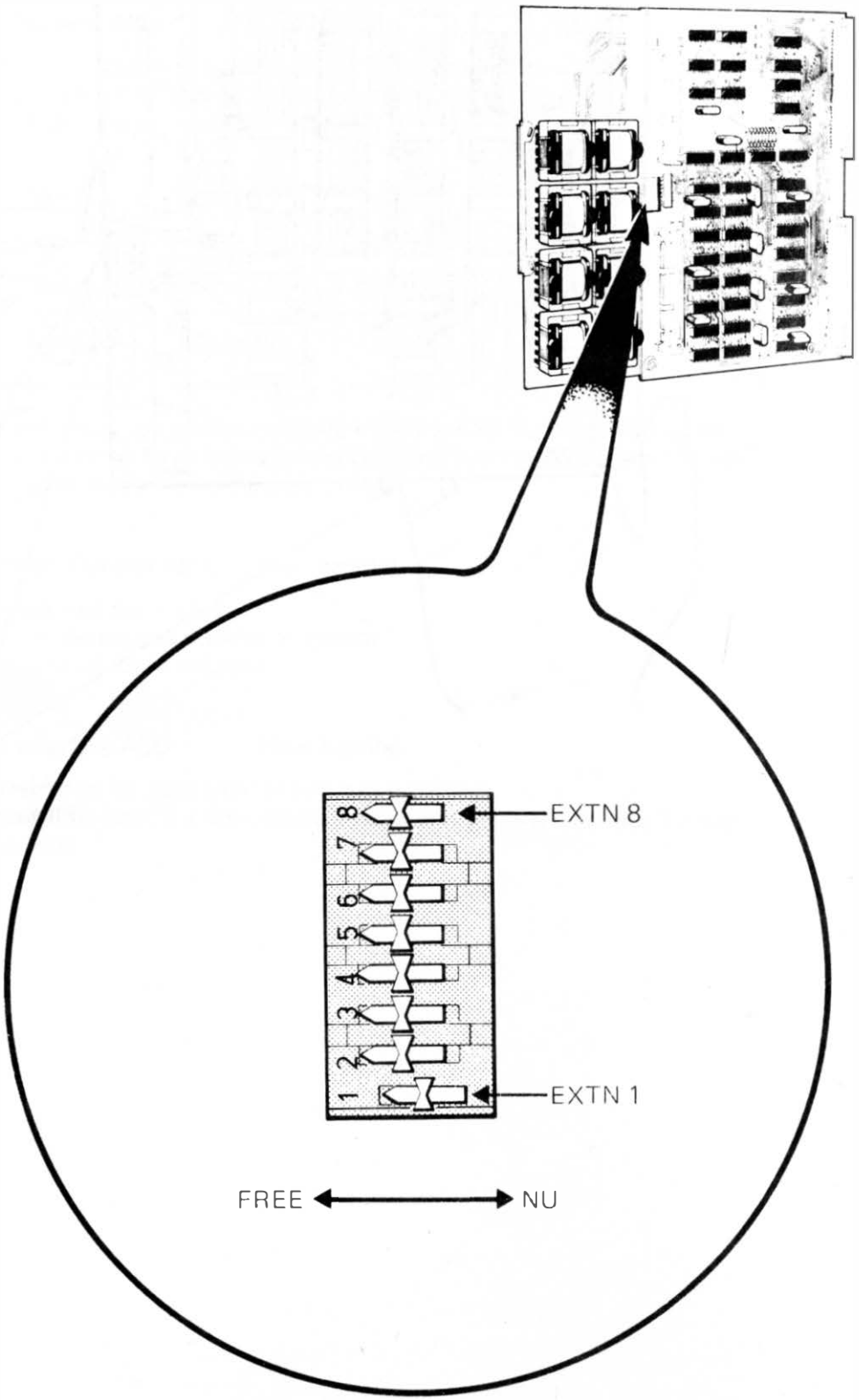


Always hold here
(Please refer to page 1)

2.3 Position of Switches

Line Interface ASU's

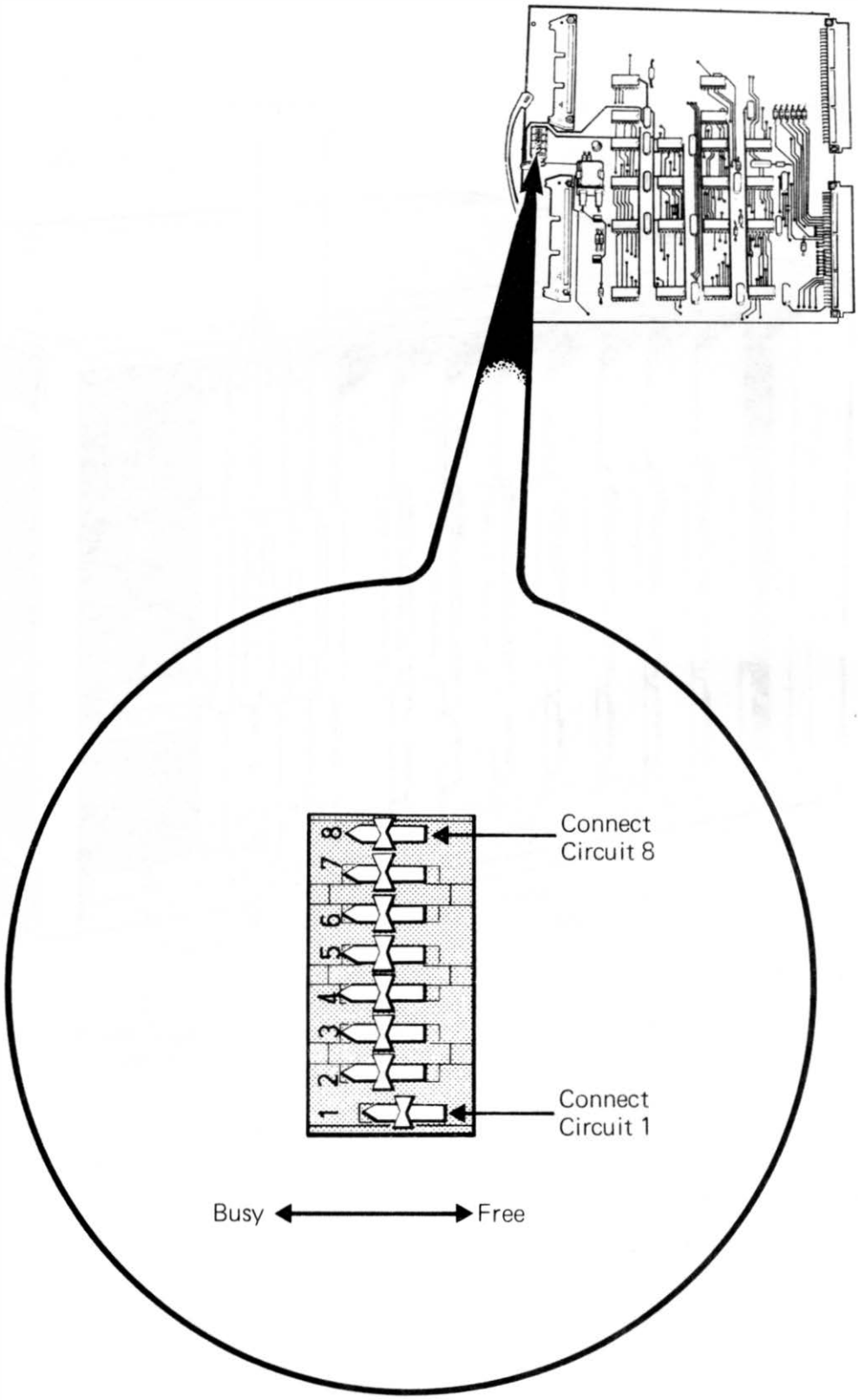
Each Line Interface ASU caters for eight extensions, if any extension is not provided or is designated 'Incoming Calls Barred' the appropriate switch should be operated to return NU tone if called.



Common Control ASU

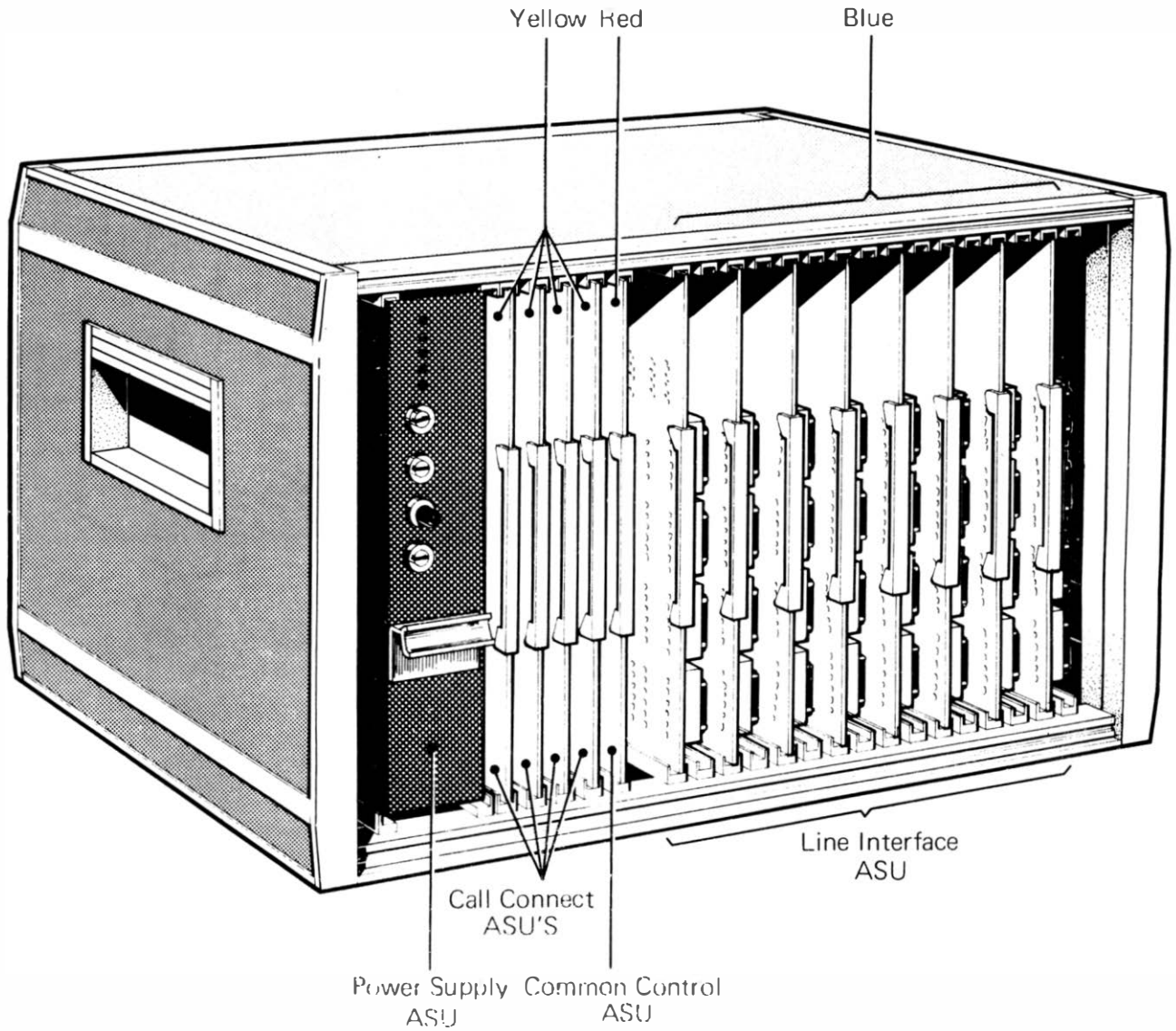
Individual call connect circuits can be busied on the Common Control ASU for testing purposes.

(Don't forget that Call Connect ASU number 1 accommodates circuits 1 and 5)



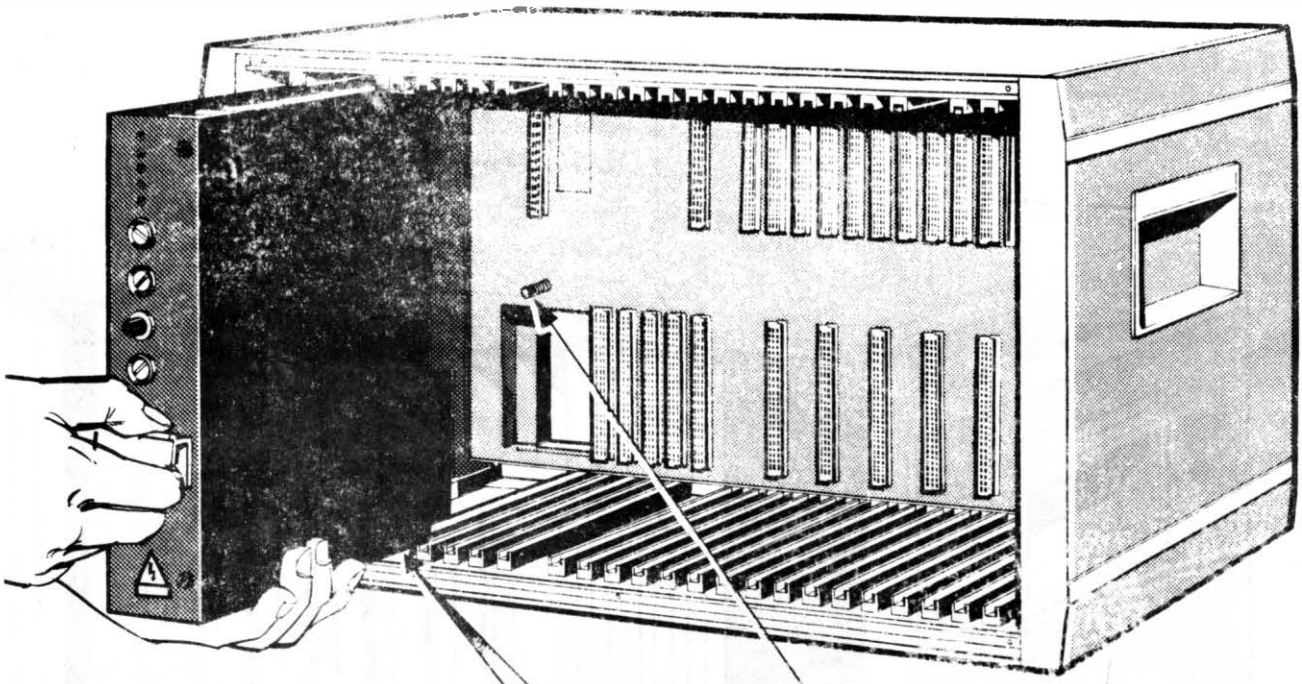
2.4 Positioning

Each ASU is colour coded on its handle and must be inserted in its correct position in the CSU where coloured reference numbers are also provided.



2.5 Insertion into the CSU

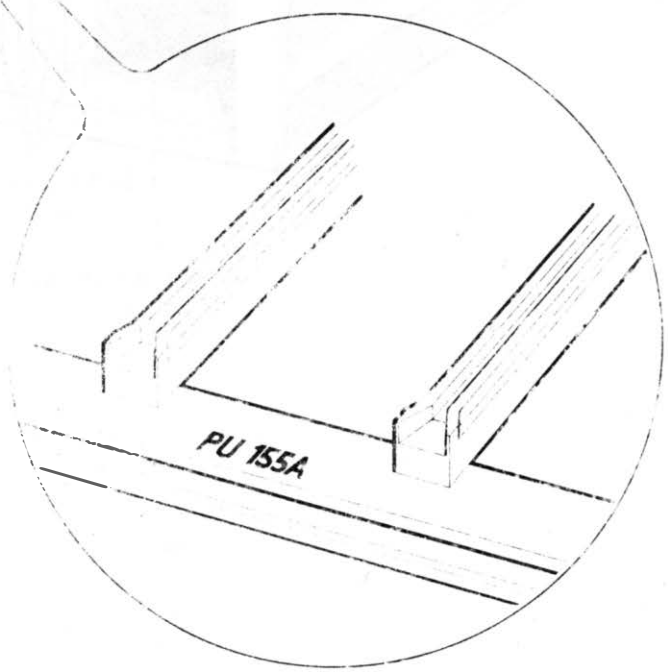
Power Unit



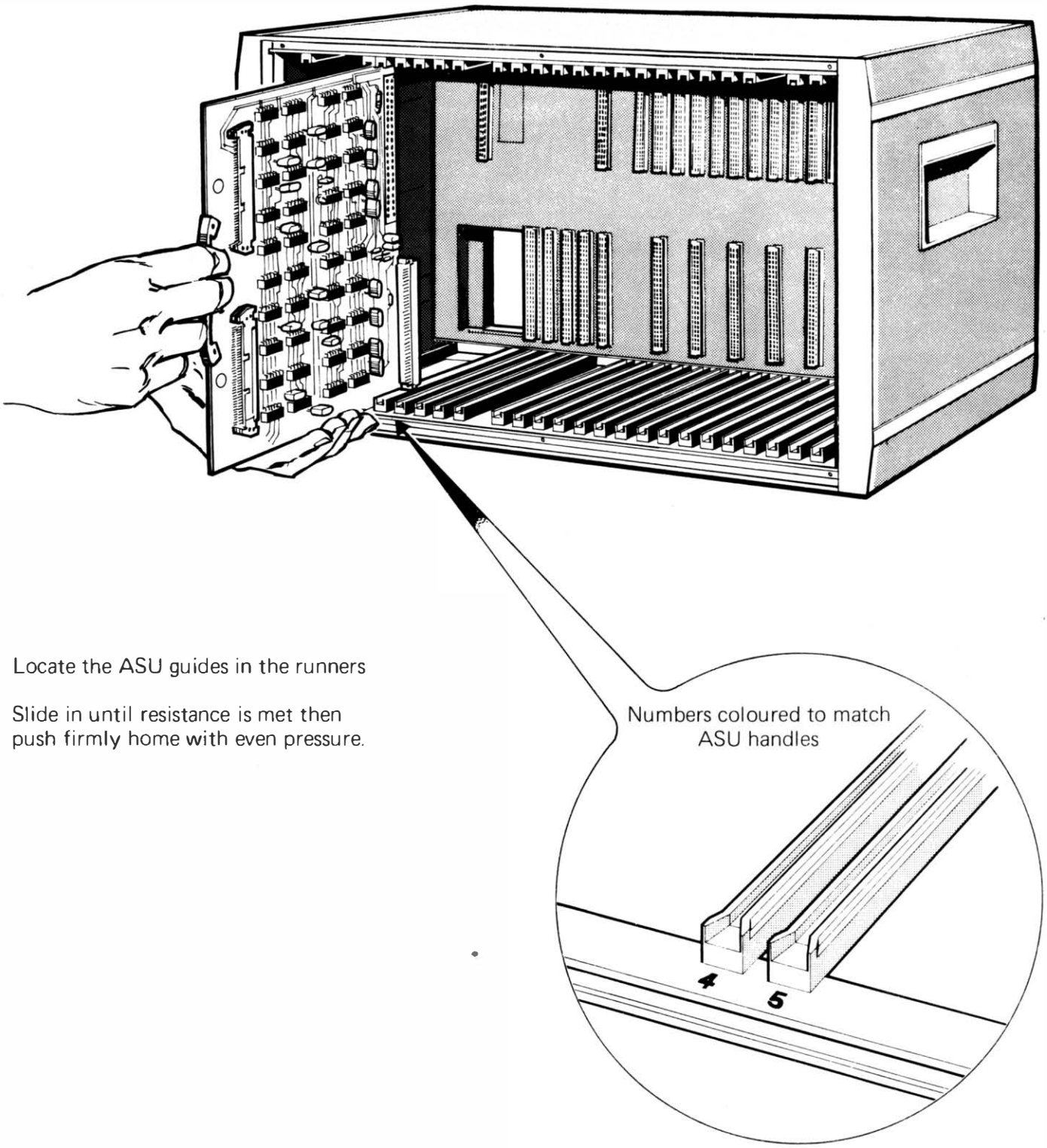
Securing screw

Locate the ASU guides in the runners

Push in until resistance is felt
then secure from the rear with
the securing screw



Other ASU's



Locate the ASU guides in the runners

Slide in until resistance is met then
push firmly home with even pressure.

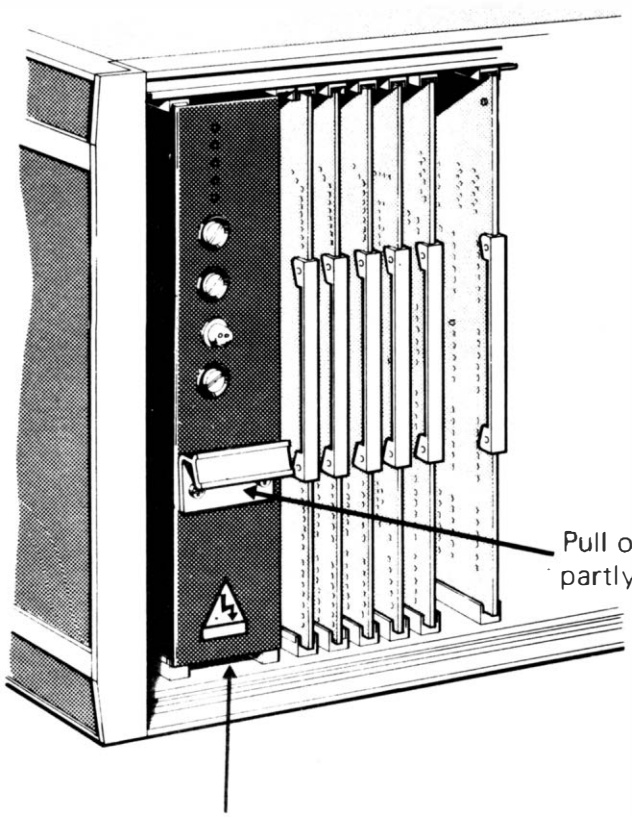
2.6 Removal of ASU's

Power Unit

Switch off and disconnect Mains Supply

Unplug mains supply lead from the ASU

Slacken the ASU securing screw at the rear of the CSU

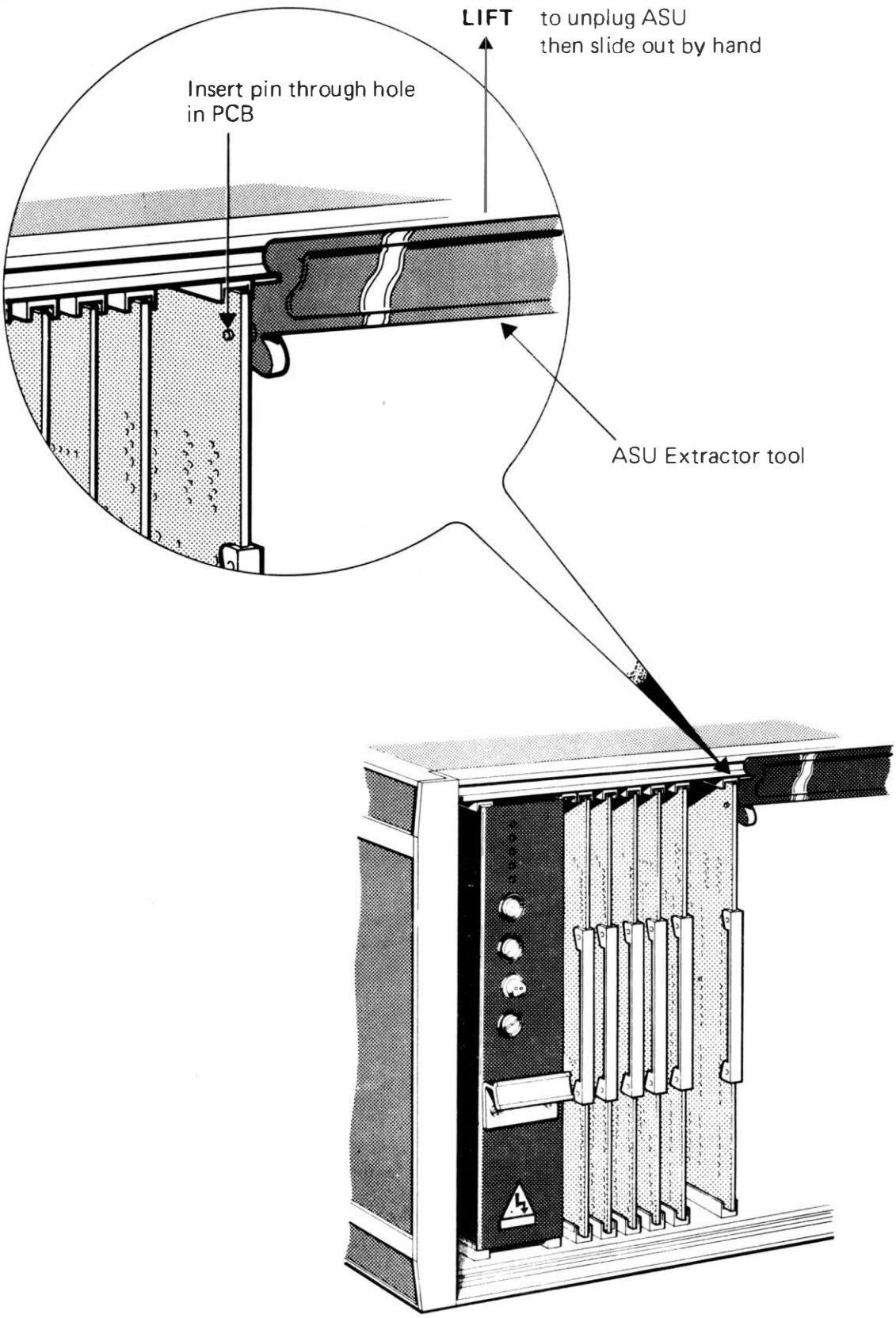


Pull on the handle and slide ASU partly out

Take the weight of the ASU by placing the other hand underneath and slide out the rest of the way

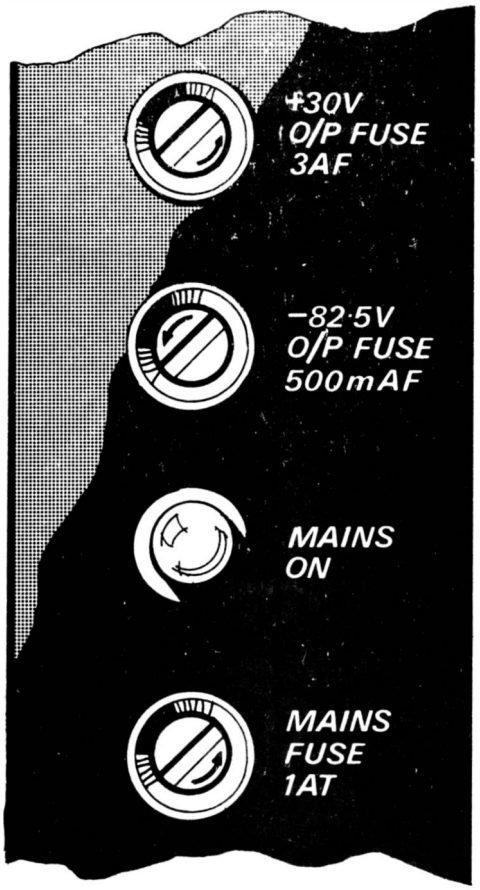
NOTE:– The mains transformer situated at the rear of the ASU is relatively heavy.

Other ASU's


LIFT to unplug ASU
then slide out by hand
Insert pin through hole
in PCB
ASU Extractor tool

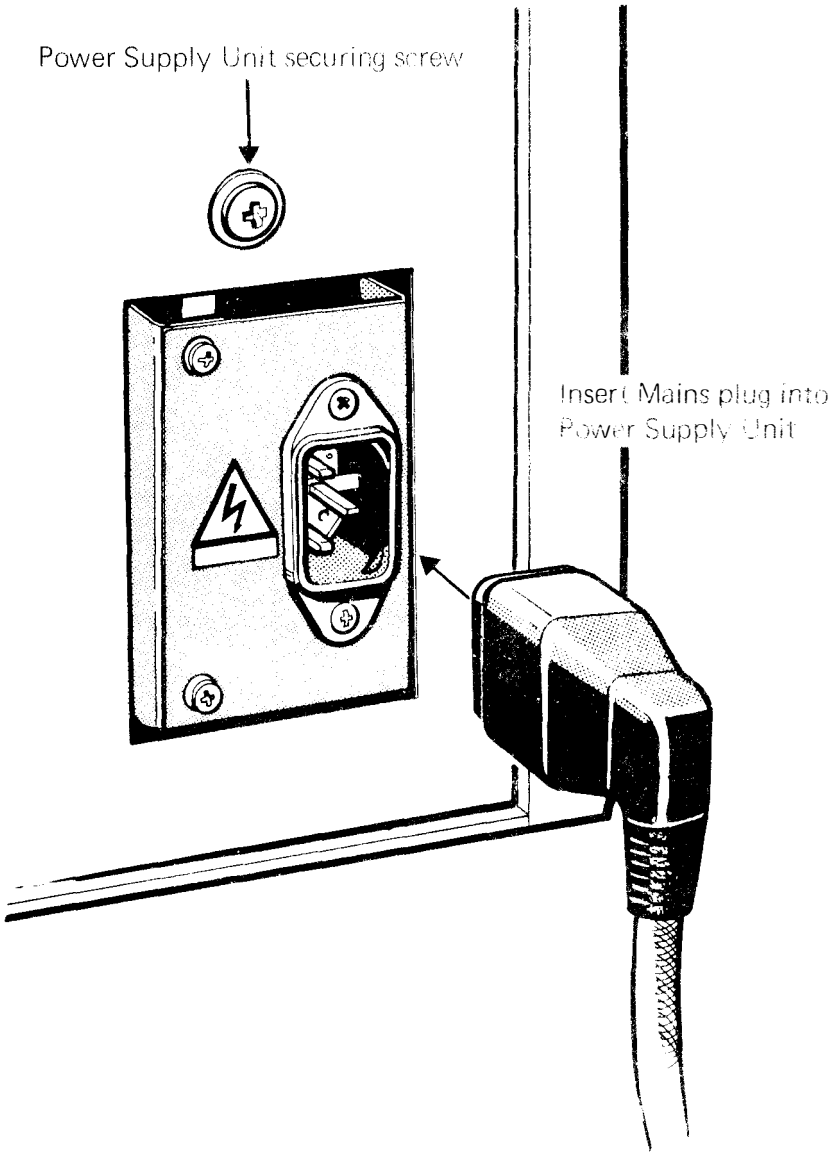
3. FUSES

The fuses are already fitted in the Power Supply Unit



NOTE:— Spare fuses are located on the back plate of the CSU.

4. CONNECTION OF POWER

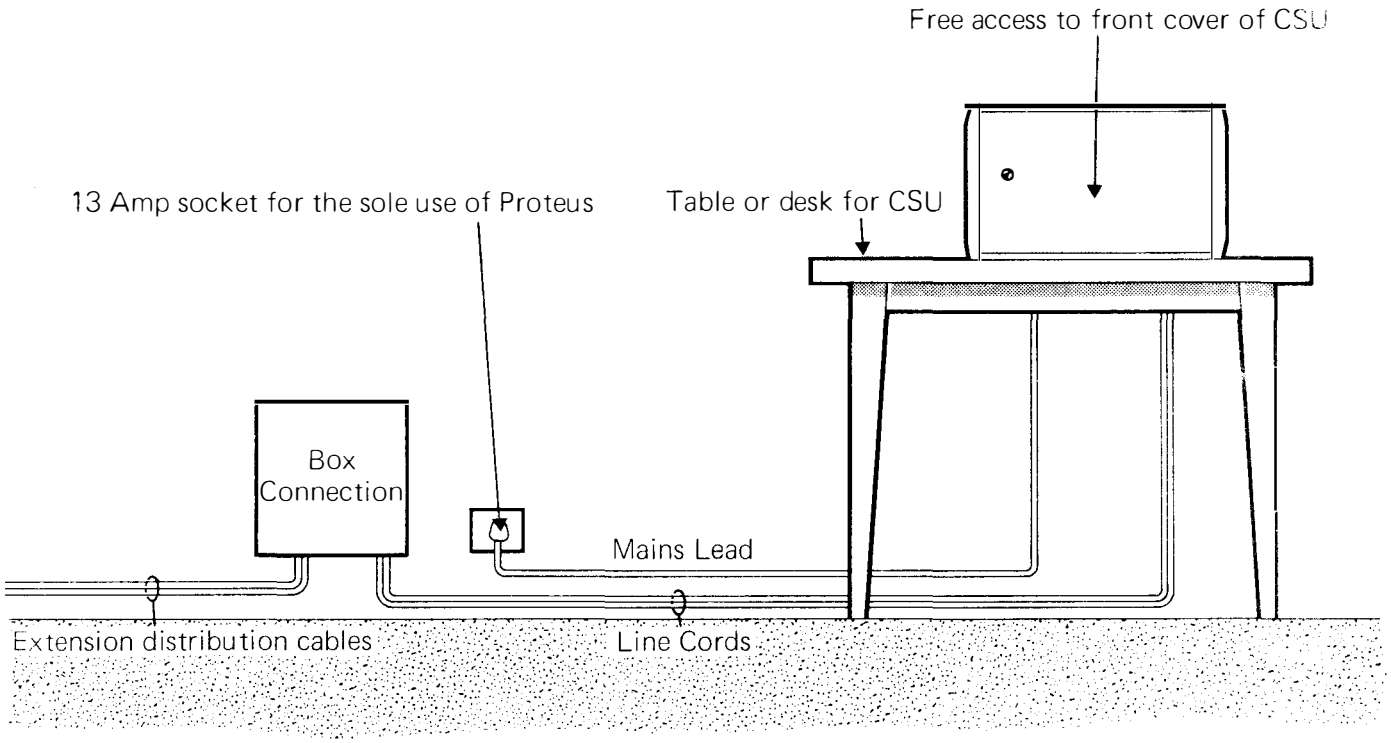


Fit plug for socket outlet No. 103 with **3 AMP** fuse.

5. CONNECTION OF DISTRIBUTION CABLES

5.1 Siting of equipment

The Line Cords are supplied in 3½ metre lengths already terminated to a Plug 226, the ½ metre is required for termination on the Box Connection leaving a maximum length of 3 metres. The Mains Lead is also supplied as a 3 metre length so this must be taken into account when siting the CSU.



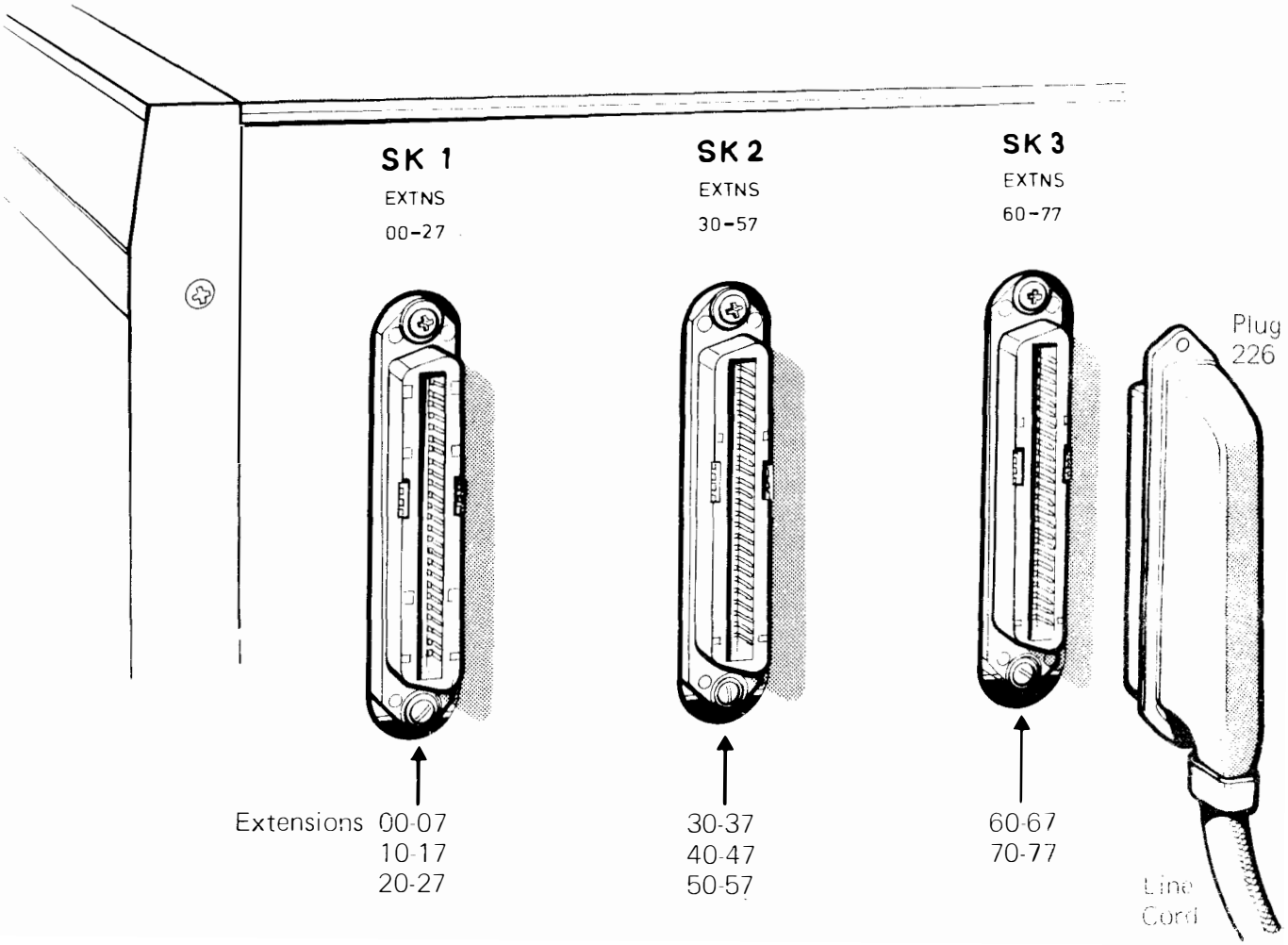
NOTE:— Care should be taken to ensure that cords do not cause a safety hazard.

5.2 Connection of line cords

The Line Cords are cables with a Plug 226 terminated at one end. The Plug should be marked to correspond with the socket it connects to at the rear of the CSU.

REPLACE REAR COVER

CONNECT LINE CORDS AS REQUIRED



NOTE:— Because of technical reasons the extensions are numbered in blocks of eight.

5.3 Colour code of line cords

CABLE	EXTENSIONS			Colour of insulation, base colour (wide band) first.	
PAIRS	SK1	SK2	SK3	'a' wire	'b' wire
1	00	30	60	White /Blue	Blue /White
2	01	31	61	White /Orange	Orange /White
3	02	32	62	White /Green	Green /White
4	03	33	63	White /Brown	Brown /White
5	04	34	64	White /Grey	Grey /White
6	05	35	65	Red /Blue	Blue /Red
7	06	36	66	Red /Orange	Orange /Red
8	07	37	67	Red /Green	Green /Red
9	10	40	70	Red /Brown	Brown /Red
10	11	41	71	Red /Grey	Grey /Red
11	12	42	72	Black /Blue	Blue /Black
12	13	43	73	Black /Orange	Orange /Black
13	14	44	74	Black /Green	Green /Black
14	15	45	75	Black /Brown	Brown /Black
15	16	46	76	Black /Grey	Grey /Black
16	17	47	77	Yellow /Blue	Blue /Yellow
17	20	50	-	Yellow /Orange	Orange /Yellow
18	21	51	-	Yellow /Green	Green /Yellow
19	22	52	-	Yellow /Brown	Brown /Yellow
20	23	53	-	Yellow /Grey	Grey /Yellow
21	24	54	-	Violet /Blue	Blue /Violet
22	25	55	-	Violet /Orange	Orange /Violet
23	26	56	-	Violet /Green	Green /Violet
24	27	57	-	Violet /Brown	Brown /Violet
25	-	-	-	Violet /Grey	Grey /Violet

6. FUNCTIONAL TESTS

Read the operating instructions, Card CI 40

Switch on the power and check:—

(i) The Mains On lamp is glowing
(ii) The LED on the Common Control Card (red handle) is flashing at a steady rate

Connect a test telephone to extension 00
Refer back to page 7 for busying the call connect circuits then busy all the circuits except one and carry out the following:—

(i) Lift handset — check that dial tone is returned.
(ii) Dial 99 — check that N.U. Tone is returned.
(iii) Replace handset.
(iv) Lift handset — make a call to another extension, check ringing tone and speech.
(v) Make a call to a busy extension, check for busy tone.
(vi) Check the 'first party release feature' functions correctly.
(vii) Check that a conference call can be set up.
(viii) Check that while in conference mode a call to an engaged extension results in Busy Tone which 'times out' after approximately 4 seconds and that Ringing Tone to an unanswered free extension 'times out' after approximately 12 seconds.

When the tests are completed busy the circuit just tested and release another, repeat the checks on this circuit. Repeat this sequence until all the call connect circuits have been checked.

Check each individual station to make sure that they can both receive and make calls.

When all the tests are satisfactorily completed replace the front cover.

The following sections are concerned with the maintenance aspects of the Proteus. It is important that you read pages 20, 21 and 22 before using the faulting charts.

7. FAULT LOCATING

7.1 Faulting Procedure

1 Read this page and the next one BEFORE using the faulting charts, it may save you a lot of unnecessary work when faulting.

2 Question the operator and if necessary check the Operating Instructions to make sure that you are aware of ALL the missing or faulty facilities.

3 Check how many circuits are affected, if a number of circuits are involved decide which equipment is common to them, this is probably where the fault lies. The faulting charts on the subsequent pages, will help.

4 If the fault is apparently specific to one circuit substitute the Apparatus Slide-in Unit (ASU) involved, for another, to prove the location of the fault. You should not normally clear faults on ASU's at a customer's premises unless it is a physical fault that can easily be remedied. If an ASU is faulty it should be changed. A temporary clear can be arranged, in some circumstances, by moving the circuit to a spare position in the same or another ASU.

5 PROTEUS uses CMOS devices and these are liable to permanent damage by the discharge of electrostatic potentials that are likely to be met in routine handling.

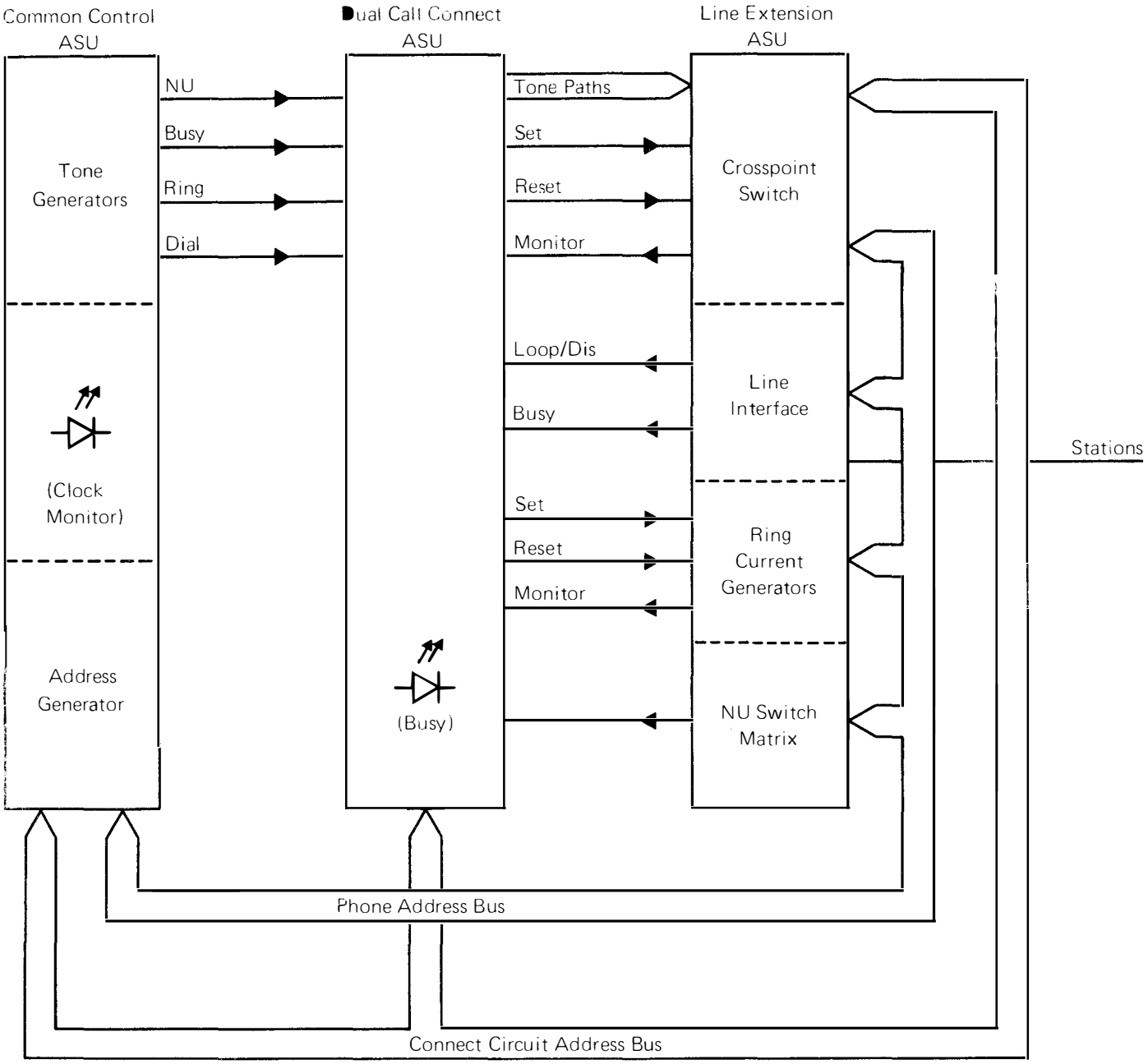
These potentials are present on the body and clothing so Apparatus Slide-in Units (ASU's) must be handled with care, a charge placed on the termination of a chip could cause permanent damage.

Handle only as shown on page 5.

When transporting an ASU the original packing or other approved material must be used.

6 The output of the power supply is not earthed so testing on the system must be across the pair of wires and not from one wire to earth.

7.2 PROTEUS Block Diagram



GENERAL DESCRIPTION

The following is an outline of the circuit operation and refers to the block diagram on the opposite page.

The common control continuously scans the phone address of the systems stations. The state of those is then returned to the call connect circuits. Single time shared data highways are used for each system condition eg NU. The condition is associated with the station being addressed at that time.

Power On

A number of circuits could be in an intermediate state when the power is first switched on, it is therefore arranged to have a 'power on reset sequence' to automatically make sure that all extensions are marked free, no cross-points are switched and that ringing is not applied to any line. The reset conditions are applied from the call connect circuit to the line extension ASU.

Calling

The BUSY line from the line interface is monitored continuously. When a busy condition is found the crosspoint switch MONITOR line is checked to see if a call connect circuit has already been allocated, as would be the case with an established call. If a connect circuit has not been allocated then the common control arranges an allocation and returns dial tone to the caller.

Dialling

The number dialled is accepted by a call connect register via the LOOP/DIS line. The call connect circuit then checks the called address condition and returns the appropriate tone to the caller. If the line is free ringing is applied by the stations ring current generator.

CSA

When the call is answered the ringing current generator is cleared, a speech path is opened in the crosspoint switch and the call connect circuit is made ready for further dial pulses in case the caller wishes to set up a conference call.

Conference Calls

These are set up by the original caller who dials the other stations in turn, a call to a busy, NU or unanswered line will be cleared automatically after a delay period.

NU Switch Matrix

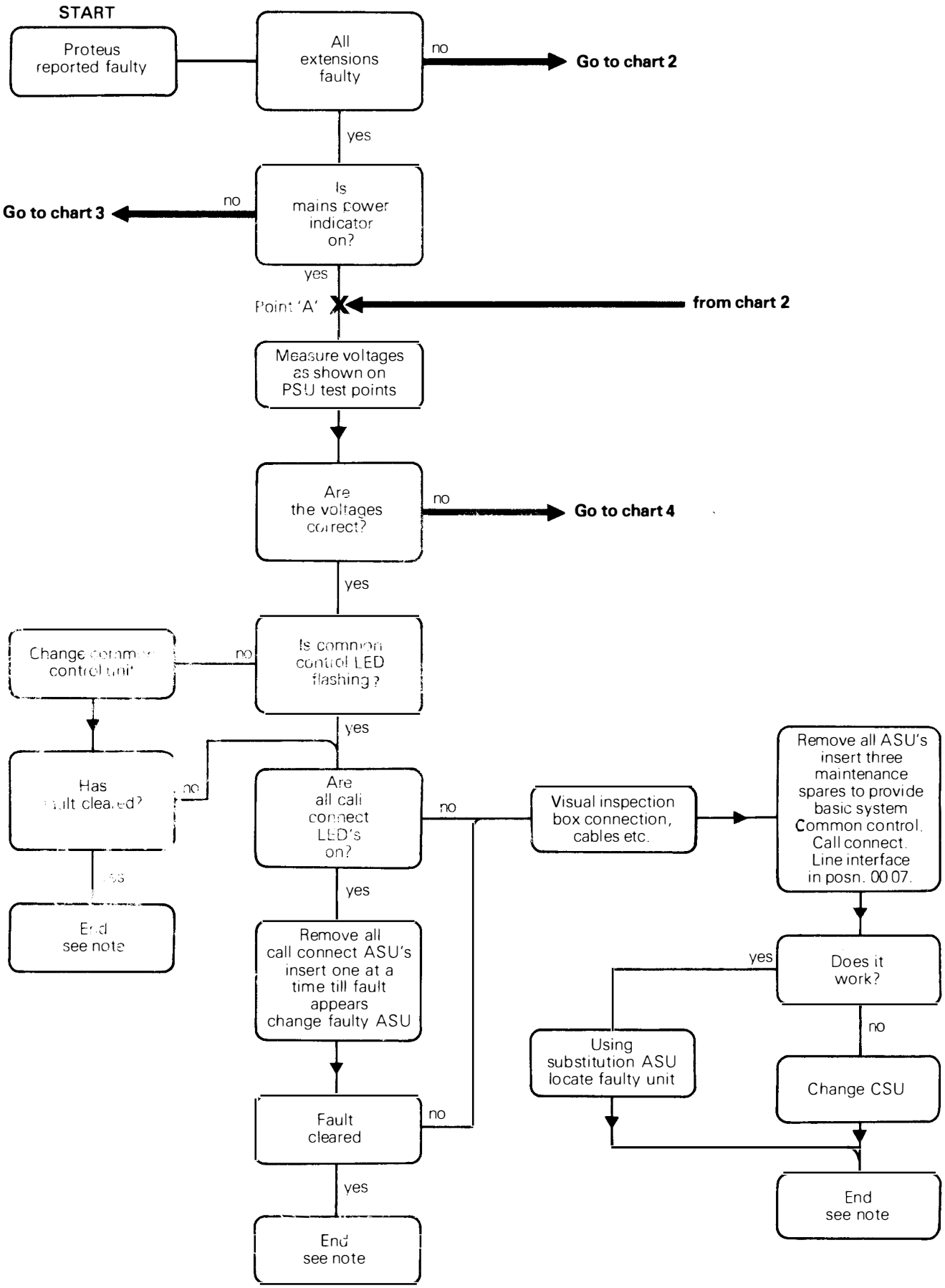
Physical operation of the NU switch will place NU tone on a spare or ICB line.

7.3 Faulting Charts

The following charts will enable you to locate faults to ASU's.

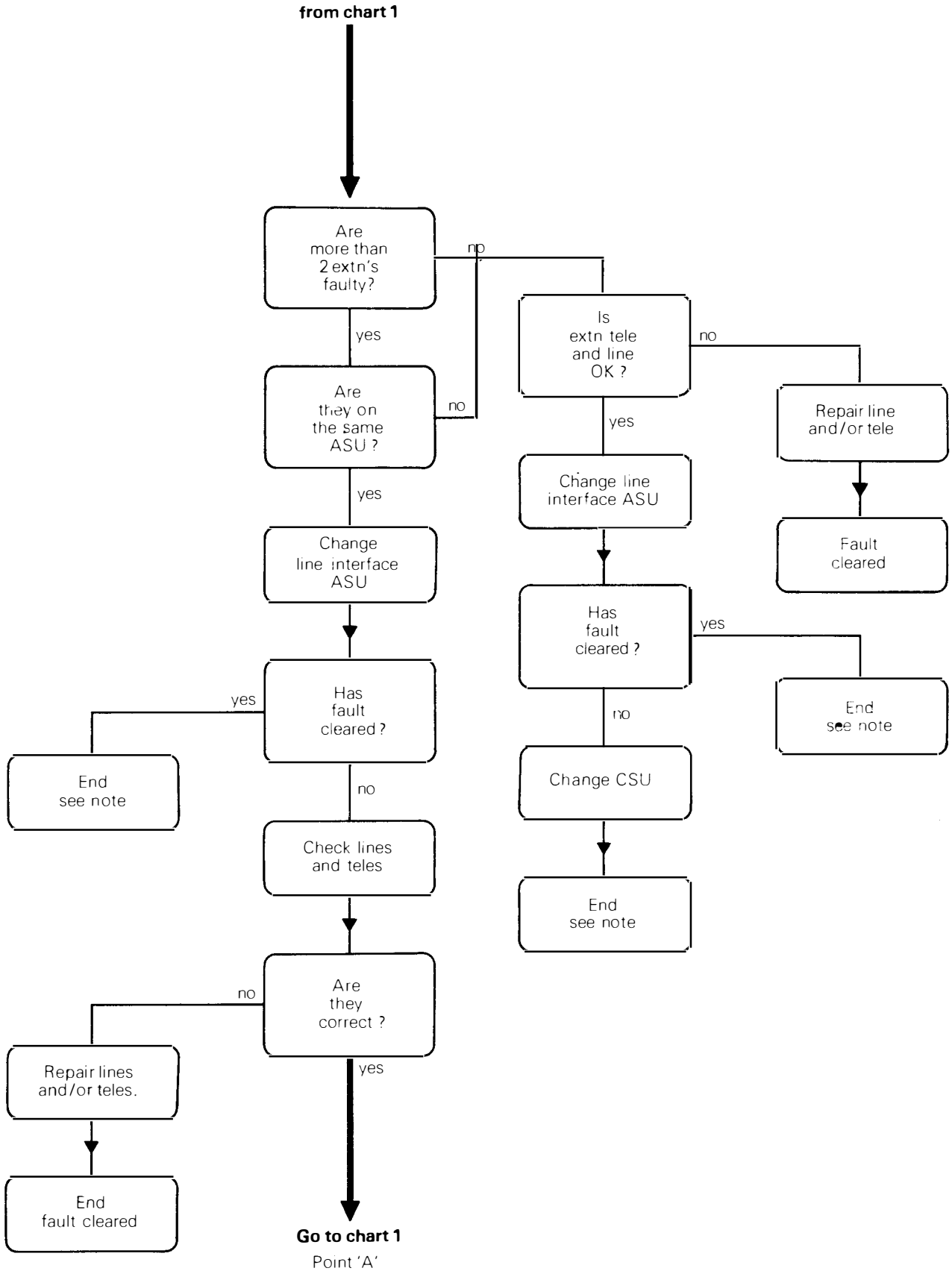
To locate a fault start at the top of the chart and follow the path indicated.

CHART 1



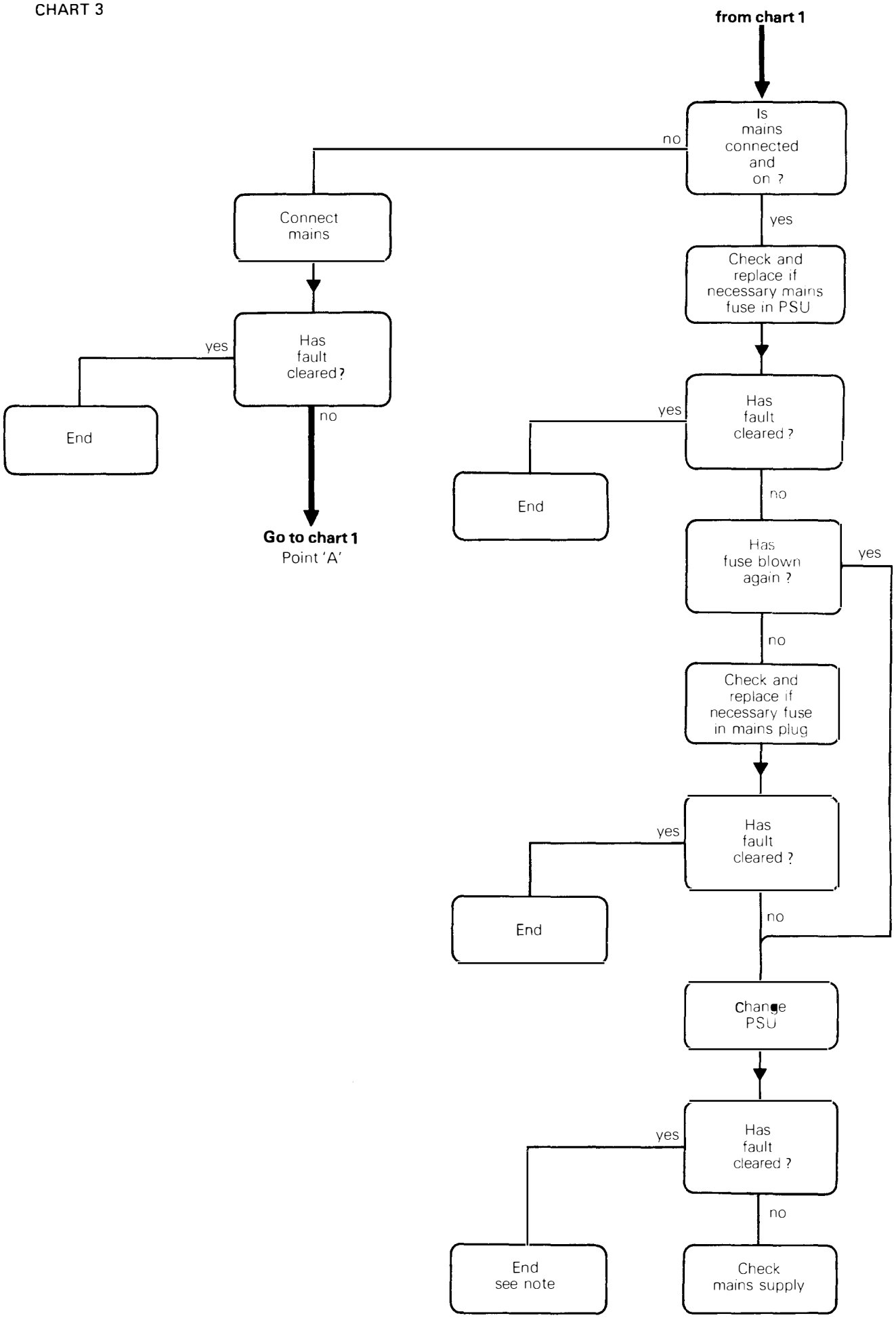
Note: Send faulty apparatus for repair to address given in maintenance instruction

CHART 2



Note: Send faulty apparatus for repair to address given in maintenance instruction

CHART 3



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