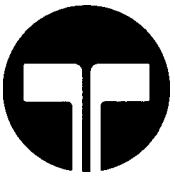
Commander N
616, 1236
& 2260
Business Systems

&
Maintenance Manual



Telecom Australia

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CONTENTS (Cont.)

1
GENERAL

1 .I INTRODUCTION

The N 616, N 1236 and N 2260 are electronic key telephone systems providing 6 exchange lines and 16 stations, 12 exchange lines and 36 stations, 22 exchange lines and 60 stations, respectively. They are a family of key telephone systems using common software and hardware modules, packaged to provide various economical solutions. The stations have modern functional styling.

The main equipment, stations and DSS console are controlled by micro processors with masked programs providing a wide range of facilities demanded by the users of key systems.

A prominant feature of this equipment compared to previous key systems is the elimination of multi-wire cabling in favour of 4 conductor (2 pair) cabling.

WARNINGS

A. This equipment contains a considerable number of MOS, and other static sensitive components. To reduce the incidence of the premature failure due to static discharge, the following precautions MUST be taken:

- Always ensure that power is disconnected before plugging PBAs.
- Always discharge static from yourself by touching a conductive part of the main equipment before handling boards.
- Handle PBAs by the edge or by the handles. Do not handle PBA tracks, components or edge connectors (contaminants introduced by fingers can cause corrosion and high resistance connections).
- Components are physically delicate. Finger pressure on a component can fracture, but not necessarily break component leads: a future fault.

To protect against physical damage and damage due to static discharge, PBA's must ALWAYS be wrapped in aluminium foil (e.g. cooking foil) and inserted into an ANTI-STATIC plastic bag and placed in the protective container provided with the new item. In the case of the ECMB remove the battery and package separately.

These procedures apply equally to both working and faulty PBA's. Careless handling, storage and transporting will cause secondary or future faults.

B. To prevent the likelyhood of damage to electronic components, power should be switched off before working on the systems.

C. The cabling between the Main Equipment and Stations is polarity sensitive. It is essential that the correct polarity be maintained from the Main Equipment to the Stations and pairs must not be swapped. Care must be exercised when checking voltages on cabling. Do not short or bridge between terminals as this will cause fuses on the ESTB boards to blow.

WIRE COLOUR	603 PLUG/ 610 SOCKET	WIRE DESIGNATION
WT White	2	AL1
BL Blue	6	AL2
RD Red	1	BD+
BK Black	5	BD—

D. Power supplies are powered from the 240 volt mains supply and hazardous voltages are present within. Do not attempt to repair these devices in the field.

E. ECMB- A,B, 8 D BOARDS

- If these PBA's are replaced, all site dependant data and abbreviated dial numbers are lost. It will be necessary to re-programme the system.
- The battery may be changed by removal of the daughter board (without loss of any programmed data) with the ECMB power up, i.e. power on.
- The press button (SW4) must be pressed to reset the crosspoints of the system after replacing ESTB or ELNB boards when the power is on.

1.2 FACILITIES

1.2.1 INTERCOMMUNICATION BETWEEN STATIONS

Each station is able to establish an internal (intercom) call to another station by dialling the desired stations number.

Automatic intercom line selection is provided, this requires only one Intercom Line Key per station.

Assigned stations can call a particular station using a direct access key, Hot Line Key. In addition, each system has a capacity for two Direct Station Select (DSS) Consoles incorporating a Busy Lamp Field (BLF).

1.2.2 ALTERNATE POINT ANSWERING (CALL PICK-UP)

Any other station can answer an intercom call to another station by lifting the handset and dialling the called stations number.

1.2.3 ADD ON CONFERENCE

A station may add another station onto an existing intercom call to set-up a three party intercom conference using the ADD ON feature key.

1.2.4 BREAK-IN, OVERRIDE

Executive Break-in is provided by Hot Lines. Hot Line calls have priority over all other call types. The DSS Console has priority to override an intercom call. An intrusion tone is signalled when the DSS Console overrides a call. The DSS Console may be programmed to override stations in Do Not Disturb.

1.2.5 DIRECT EXCHANGE LINE ACCESS

In general, any station can access any exchange line to answer an incoming call or make an outgoing call. The only exception is exclusive lines.

Up to a maximum of 6 Exclusive Exchange Lines may be provided with the limitation of one per station. An Executive/Secretarial configuration can be arranged where only the secretary's station responds to incomming calls and the secretary may extend the calls to the executive using an intercom call.

1.2.6 LAST NUMBER REDIAL

The user may recall the last number dialled by operating the asterisk '*' button after seizing an exchange line and depressing-the Dial Control (DC) Key. When the system is connected to a PABX via exchange lines, a 3 second pause is generated automatically when dialling through the PABX.

1.2.7 MULTIPLE EXCHANGE LINE ANSWER

The status of each exchange line is displayed at every station facilitating the possibility of answering an incoming call at any station. The exception being Exclusive Exchange Lines, which only appear on one station.

1.2.8 CONFERENCE CALL (SIMULTANEOUS OUTSIDE LINE CALL)

A conferencing facility is provided which allows up to three internal stations to be connected to an exchange line or, two exchange lines connected to an internal station.

1.2.9 COST CONTROL

Three forms of cost control are available. The systems can perform Access Barring by analysis of dialled digits. Dialled digits are compared with codes preprogrammed into the system's data base. The system caters for 5 classes of barring.

Class A — Unrestricted
Class B — Barred to ISD
Class C — Limited allowed STD and ISD codes
Class D — Barred to STD
Class E — Barred outgoing access when the system is installed behind a PABX.

The second form of cost control is the use of a Call Metering Unit which records the metering pulses on an exchange line basis.

A third, but less useful, form of cost control is provided by a facility allowing No Access to a group of Exchange Lines. This facility allows the exchange lines to be split into two groups and selected stations are not permitted to make calls using exchange lines in the second group.

1.2.10 TIE LINES

By use of a Remote Extension and Tie Line Interface Unit the system can handle two types of tie lines, Ring-in/Ring-out and Loop-in/Ring-out. The tie lines take the place of exchange lines.

1.2.11 PBX RECALL

Two methods of PBX Recall are available, Earth Recall or Switchhook Flash (Timed Loop Break). The key for this facility takes the place of an exchange line key.

1.2.12 TRANSFER

A manual transfer is required when transferring an exchange line call. The station holds the exchange line, notifies the other station using an intercom call and the station accepting the call must seize the exchange line by operating the corresponding exchange line key.

The DSS Console may perform a Revertive Transfer. After calling the other station using a DSS key the attendant may operate the Signal Call (SC) facility. The call is then signalled at the transferred station. If the call remains unanswered after 20 seconds the call reverts to the DSS station.

1.2.13 HOLD

Both manual and automatic hold are provided in the systems. Indications are provided for the Hold, I-Hold and Exclusive Hold conditions.

Stations are provided with manual hold by operating the Hold Key, I-Hold is indicated at the holding station and Hold is indicated at all other stations. A second operation of the Hold Key will place the exchange line on Exclusive Hold, no other station can accept the call.

The DSS Console has an Automatic Hold, used when transferring exchange line calls to another station. After answering an exchange line call the exchange line is automatically held when the DSS attendant operates a DSS Key, an Internal/External Paging Key or the All Call Key.

1.2.14 CALL FORWARDING

Intercom calls and exclusive line calls are forwarded to a preassigned station after this facility has been envoked by operating the Do Not Disturb Key at the unattended station. A maximum of 4 pairs of stations can have this facility.

1.2.15 ABBREVIATED DIALLING

Each station is provided with a 16 number store with a capacity of 16 digits for each number The station may store and recall numbers at any time.

1.2.16 PRIVACY

Privacy is provided for intercom calls as well as exchange line calls. The only exception is that the DSS Console has the posibility to override a handsfree talk-back intercom call, following an intrusion tone.

1.2.17 POWER FAILURE

When the power fails the exchange lines are automatically switched through to preassigned stations set-up by the wiring of the connectors on the main equipment. In this condition the preassigined stations can accept incoming calls and originate outgoing calls. All other facilities are inoperative.

The system data base stored in CMOS memory is retained by a lithium battery.

1.2.18 AUTOMATIC RING BACK

When an exchange line is put on exclusive hold longer than a preset time the call is rung back to the holding station.

1.2.19 NIGHT SWITCHING

Operation of the Night Transfer Key at a DSS Console directs ring signalling for all incoming calls to the programmed night transfer station(s).

1.2.20 MESSAGE WAITING

A visual indication is displayed at an unattended station to indicate that a message is waiting at a DSS Console. A call to the DSS Console resets the message waiting indication.

1.2.21 SUPERVISORY TONES

The following supervisory tones are generated within the system:

Intercom Dial Tone
Busy Tone
Intrusion Tone
Number Unobtainable Tone
Ring Tone

1.2.22 MUSIC ON HOLD

Provision has been made for internally generated synthesized tones, or music from an external source, to be transmitted to a caller who has been placed on hold.

1.2.23 BACKGROUND MUSIC

Provision has been made so that music, supplied from an external source, can be transmitted over the station speakers and external zone paging speakers, if required. The music can be turned on and off at each station and is automatically turned off when the handset is off-hook.

1.2.24 PUSHBUTTON DIALLING

Each station is equipped with a push button pad. Dialling, Decadic or VF, is controlled by a centralised dialling facility in the main equipment. A dialling station signals to the centralised dialling facility via a data transfer and the decadic or VF signals are sent out on the exchange line.

During power failure, powerfail stations have decadic or VF dials switched in at the station.

1.2.25 STANDARD TELEPHONES (P-WIRE INTERNAL EXTENSION)

It is possible to connect 2-wire standard telephones with decadic dialling using a special interface card and a ring generator unit in place of a 4-wire station interface card.

1.2.26 REMOTE EXTENSIONS (REMOTE STATION, P-WIRE TELEPHONE)

A remote extension can be connected to the systems using a Remote Extension and Tie Line Interface Unit which provides the 4-wire to 2-wire conversion, generation of ring voltages and tones. The remote extension must be a decadic telephone.

1.2.27 VISUAL INDICATIONS

A visual indication is provided at each station to show the status of exchange lines (Free, Incoming ring, Hold, I-Hold, Exclusive Hold and Busy), intercom lines (Free, Busy and Microphone on), and system facilities (Do Not Disturb, Monitoring, Message Waiting etc). The DSS Console has a Busy Lamp Field (BLF) which displays the status of each station in the system. In addition the DSS Console displays the number of the station(s) holding held exchange lines.

1.2.28 MONITORING (ON-HOOK DIALLING)

Each station may originate and monitor the progress of a call using the station speaker without lifting the handset.

1.2.29 HANDSFREE TALKBACK ON INTERCOM CALLS

The called party has a full handsfree facility when called via an intercom call. A single tone announces the call and the voice of the calling party is heard through the station speaker, at the same time the called station's microphone is activated and the intercom status lamp flashes to indicate the microphone is on. The microphone may be cut-off by operation of the DND key.

A volume control is used to adjust the sound level transmitted through the station speaker.

1.2.30 PAGING CALLS

Three paging facilities are provided, All Call, Internal Zone and External Zone Paging.

ALL CALL PAGING transmits an announcement over the station speakers of all stations and through the external loudspeakers.

INTERNAL ZONE PAGING calls can be made through station speakers to one of four zones. Stations are programmed to be in one of the four zones when the system is installed.

EXTERNAL ZONE PAGING calls are broadcast over external loudspeakers.

1.2.31 MEET-ME PAGING

The systems provide a facility which allows a person being paged to respond by simply lifting the handset of any station through which the announcement was heard and pressing the “8” button to be automatically connected to the caller. The caller must have pressed the asterisk '*' button following the announcement.

1.2.32 FULL HANDSFREE OPERATION

Full handsfree operation is possible by adding a Handsfree Console to a station. This provides handsfree operation at that station for every type of call.

1.2.33 CALL SIGNALLING

Incoming calls are signalled by a tone caller through the station speaker. Different signals are provided for intercom calls and exchange line calls. Each station may be programmed to signal when there is an incoming call on any exchange line or only on a group of exchange lines or it may not signal for incoming exchange line calls. The volume control provides a means of adjusting the volume of the tone caller.

1.2.34 ALARM SIGNALLING AT THE DSS CONSOLE

A supervisory or alarm device, which has as an output a set of contacts which open or close, can be connected to the system. When the device is activated a flashing LED and audible alarm signal will be indicated at the DSS Console. While in night transfer mode the alarm will be indicated at the night transfer station(s).

1.2.35 DO NOT DISTURB

The system can provide a Do Not Disturb facility for all stations depending how the system is programmed. Operation of the DND key puts the station in Do Not Disturb mode. This will turn off the background music, block all paging calls, send busy tone to intercom callers, stop audible signalling and forward calls to another station if so programmed.

1.2.36 KEY LABELS

The keys have transparent plastic covers which can be removed by hand so that a typed or handwritten label may be placed under the cover for easy key identification.

1.2.37 SIGNAL CALL

If after placing an intercom call in the usual manner, there is no immediate response, the call can be signalled using ring signalling by dialling an extra digit. The caller will hear ring tone and the called party must answer by lifting the handset and operating the ICM Key.

1.2.38 PRESELECTION

A user may preselect the facility that is to be used by operating the facility key and then lifting the handset off-hook, providing the handset is lifted within 5 seconds.

1.2.39 CALLS TO BUSY STATIONS

While a station is off-hook and busy on a call, muted incoming audible signalling may be heard through the station speaker, depending on system programming. In this case the user may decide to hold the exchange line he is using and accept the incoming call.

1.2.40 NUMBER PLAN

The systems have a fixed numbering scheme. Stations are numbered from 20 up to the maximum system size 35 (616), 55 (1236) and 79 (2260).

1.3 OPERATING INSTRUCTIONS

CONTENTS

1.3.1 STATION NOMENCLATURE

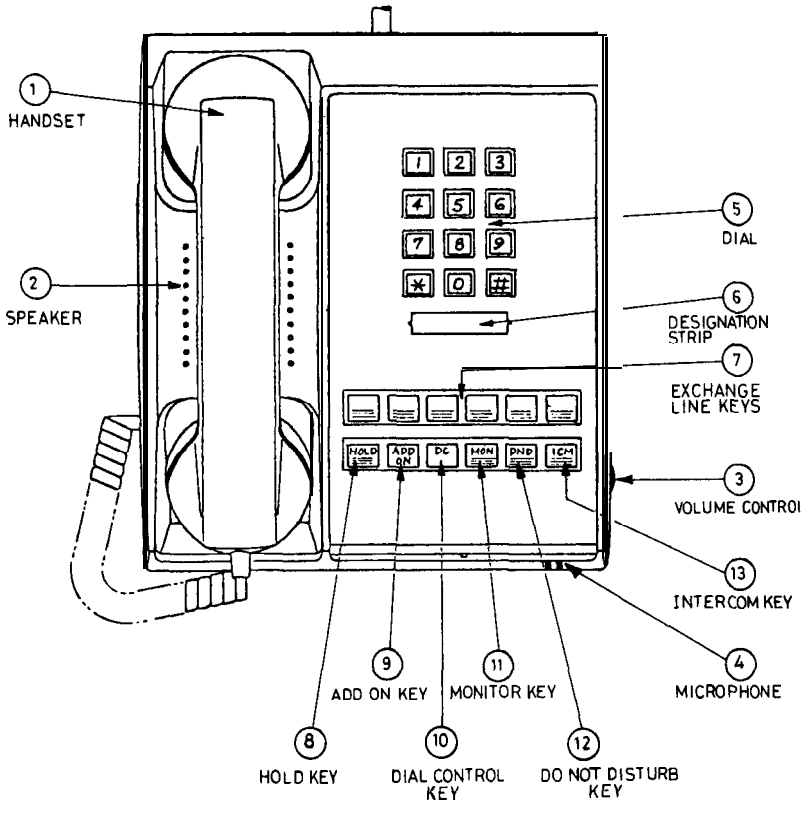

FIGURE 1 N616 STATION (TS-616)

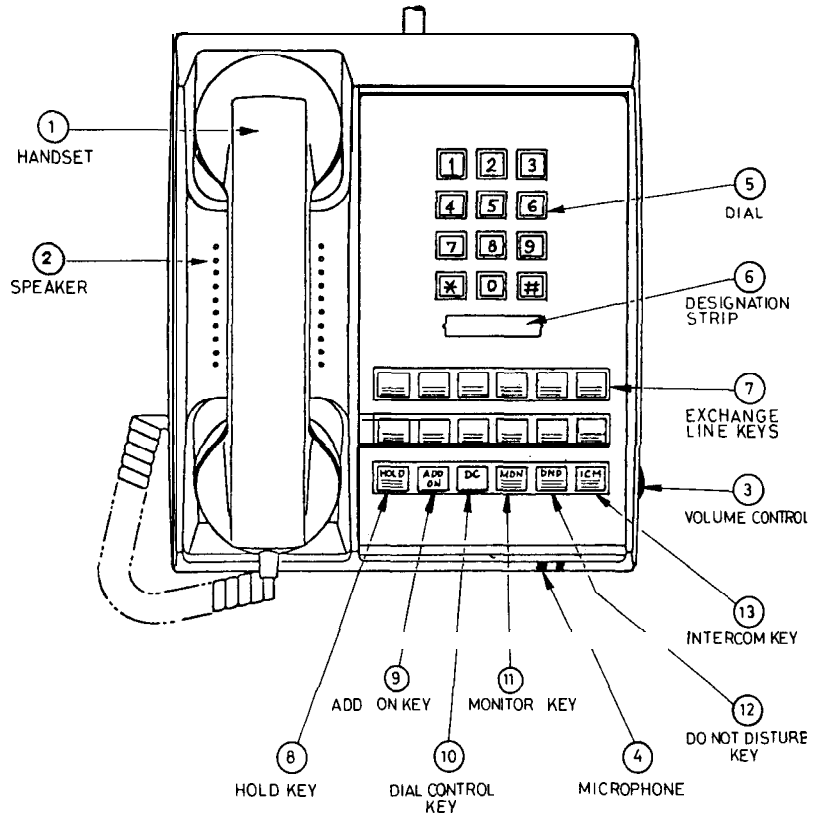

FIGURE 3 N1236 STATION (TS-1236)

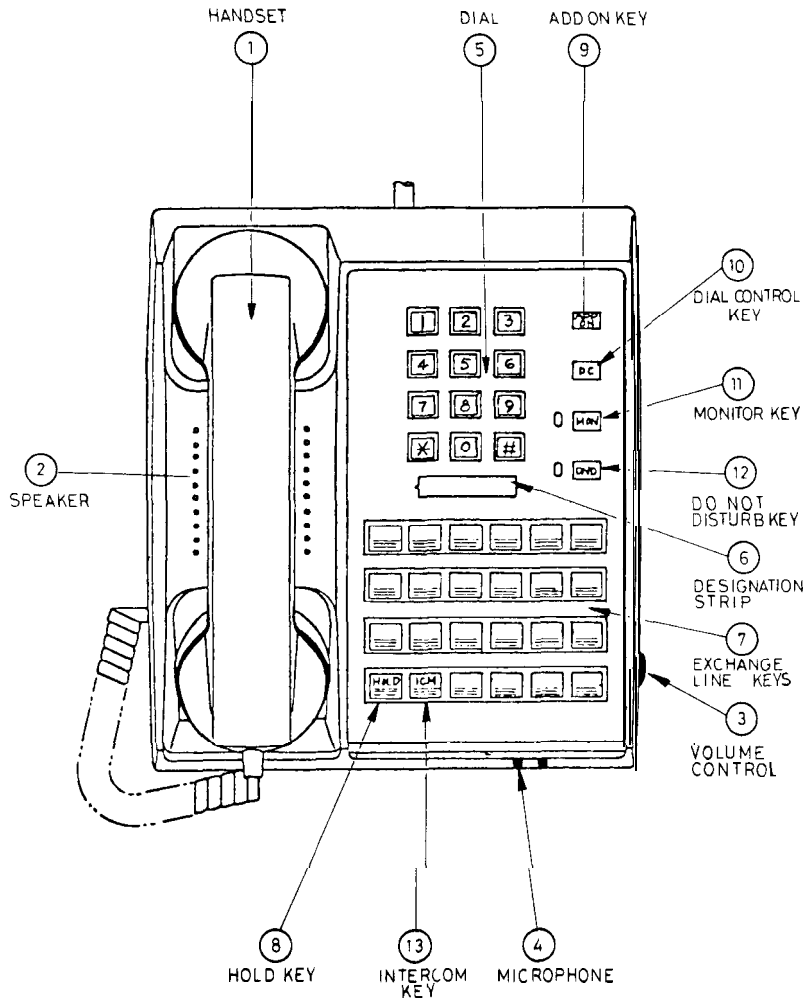

FIGURE 3 N2260 STATION (TS-2260)

1. Handset
2. Station Speaker
3. Volume Control
4. Microphone
5. Push-button Dial
6. Desighation Strip
7. Exchange Line Keys / Exchange Line Status LEDs
8. Hold Key / Message Waiting LED
9. Add On Conference Key
10. Dial Control Key
11. Monitoring Key / Monitoring Status LED
12. Do Not Disturb Key / Microphone Cut-off Key
13. Intercom Control Key / Intercom Status LED

When the system provides an Exclusive Line, Hot Line and Earth Recall or Switchhook Flash the keys used for these facilities are automatically allocated. The last three exchange line keys will be used depending on what facilities are required.

The keys are allocated as shown:

616	1236 2260	
- 4	- 1 0 - 2 0	Exclusive Line Key
- 5	- 1 1 - 2 1	Exclusive Line Key or Hot Line Key
- 6	- 1 2 - 2 2	Exclusive Line Key or Hot Line Key or Earth Recall Key or Switchhook Flash Key

The exchange line keys are allocated from the last key to the third last key. If two facilities are used, for example Exclusive Line and Earth Recall the Exclusive Line will be allocated to the second last exchange line key.

Note: If the system is fully equipped with exchange lines, then the station has lost the use of the last common exchange lines.

1.3.2 STATION LED INDICATIONS

Off	Free		
Steady	Busy On-Hook Dialling Do Not Disturb Listen-in Monitoring		
Slow Flash	Incoming Call Intercom Call (Microphone off) Microphone Off Message Waiting	(60 IPM)	
Flash	Hold	(120 IPM)	
Flicker	Exclusive Hold Add On Standby	(120 IPM)	
Rapid Flash	I-Hold Intercom Call (Microphone on) Hot Line Call Automatic Ring Back	(300 IPM)	

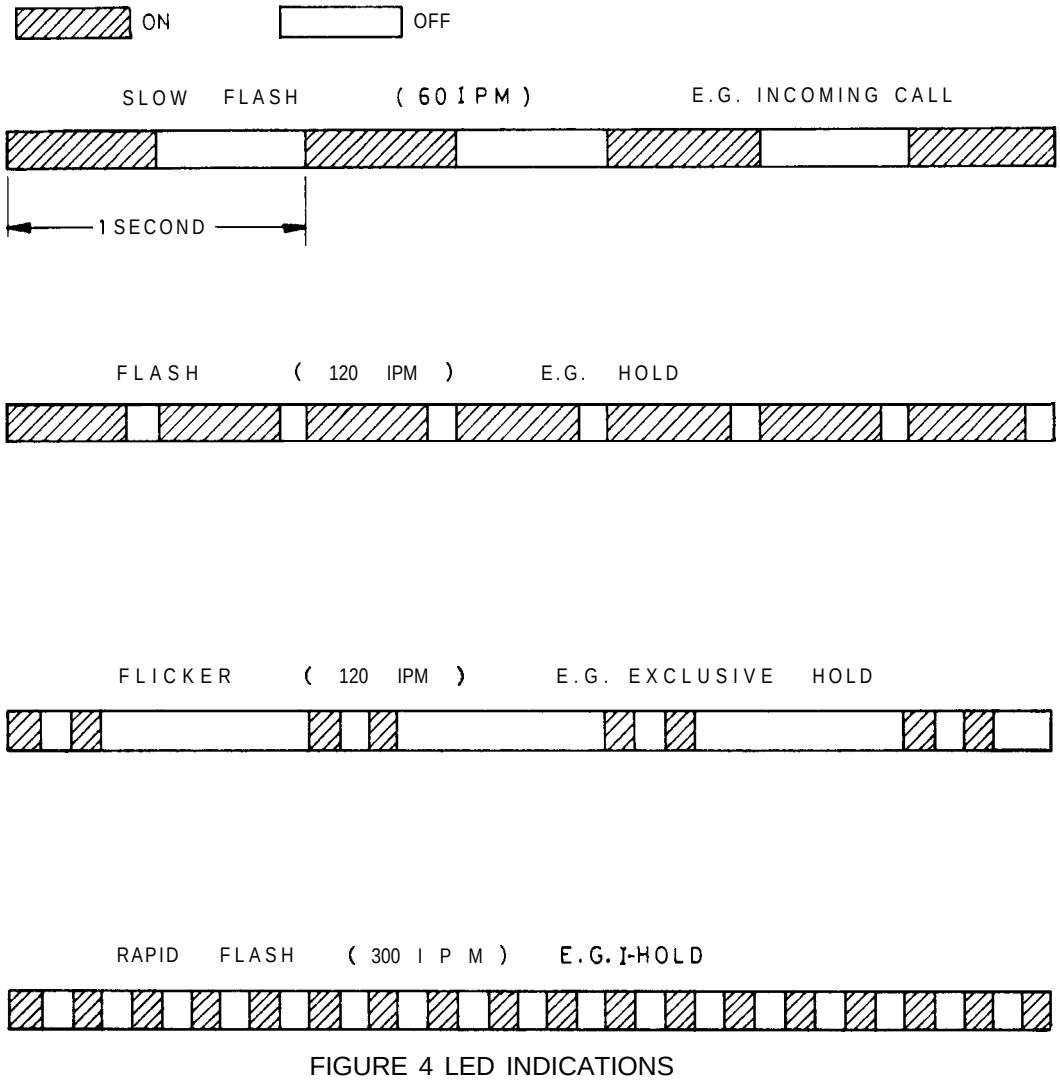

FIGURE 4 LED INDICATIONS

1.3.3 SYSTEM TONES

Ring Tone	–	Signal Call
Constant Tone	–	Dial Tone
Slow Repeating Tone (60 pulses per minute)	–	Station Busy Paging Busy
Fast Repeating Tone (120 pulses per minute)	–	Station in Do Not Disturb Number Unobtainable Tone
Single Tone Burst	–	Intercom Call to Station with Mic on
Double Tone Burst	–	Intercom Call to Station with Mic off
Single Warbling Tone	–	Paging Call
Repeating Warbling Tone	–	DSS Intrusion Tone
Five Tone Bursts	–	Hot Line Call
Rapid Repeating Tone (300 pulses per minute)	–	Alarm Signal

1.3.4 STATION OPERATIONS

PLACING AN EXCHANGE LINE CALL:

Lift the Handset (1) and press a free Exchange Line Key (7).

Dial the desired number after receipt of Dial Tone.

The selected Exchange Line Status LED (7) indicates:

● Busy condition at all stations.

No other station can come across this line. You have complete privacy.

LAST NUMBER REDIAL:

Lift the Handset (1).

Select a free Exchange Line Key (7).

When you hear Dial Tone, press the DC (Dial Control) Key (10) then press the '*' button.

The system automatically dials the last number called. A pause is inserted if you dialled through a PABX (i.e. if you first dialled the digit for an outside line).

ON-HOOK DIALLING:

To initiate a call without lifting the Handset (1);

● Press the MON Key (11),

Select a free Exchange Line Key (7) and dial the required number.

Once the person being called answers the telephone, you must lift the Handset (1) off-hook to speak.

ABBREVIATED DIALLING:

STORING TELEPHONE NUMBERS

Lift the Handset (1).

Press the DC Key (10) and wait for Dial Tone.

● The ICM Status LED (13) will light.

Assign the storage location by dialling a number from 10 to 25.

Then dial the desired telephone number. If a pause is required within the telephone number press the "#" button and continue entering the remaining digits.

Up to 16 digits may be stored including any pause.

To store further abbreviated dialling telephone numbers, press the DC Key (10) and repeat the above procedure. Place the Handset (1) on-hook when you have finished.

USING ABBREVIATED DIALLING

Lift the Handset (1).

Select a free Exchange Line Key (7).

Press the DC Key (10) and dial the abbreviated number (from 10 to 25) corresponding to the telephone number you wish to dial.

When dialling stops due to a pause, wait for the new dial tone, then press the '*' button to continue dialling the abbreviated number.

ANSWERING AN EXCHANGE LINE CALL:

Incoming calls are signalled by a Tone Caller (if assigned) through the Station Speaker (2) and the

Exchange Line Status LED (7) slow flashes at all stations.

To answer the call,
Lift the Handset (1),
Press the Exchange Line Key (7).
The Exchange Line Status LED (7) then indicates:

Busy condition at all stations,

Should an exchange line call come for your station while it is in the busy condition, off-hook ring signalling will be heard through the Station Speaker (2) if this option is assigned.

Once the call is answered, no other station can come across the line.

HOLDING AN EXCHANGE LINE:

Press the HOLD Key (8) once. The

Exchange Line Status LED (7) on your station will indicate I-HOLD.

HOLD condition is indicated on all other stations.

If provided, music is transmitted to the held line.

To release the exchange line from Hold, any station may press the Exchange Line Key (7) corresponding to the held line.

Pressing the "HOLD" Key (8) twice puts the exchange line on EXCLUSIVE HOLD. In this condition only the station which held the line may answer the line.

Exchange Line Status LED (7) indicates busy at all other stations.

The LED in the HOLD Key (8) may indicate Message Waiting.

AUTOMATIC RING BACK (PROGRAMMABLE OPTION):

Once an exchange line has been on Exclusive Hold for a preset time, the Tone Caller signals again. If the call is not answered after a further 20 seconds the DSS station will ring.

TRANSFERRING AN EXCHANGE LINE CALL:

Vocal Transfer

Hold the Exchange Line and advise the required person to pick-up the call.

Transfer by Intercom or Paging Call

Place the call on hold and inform the required person via an intercom or paging call as described in Placing an Intercom Call and Paging.

I-HOLD is indicated on the held Exchange Line Status LED (7) at the holding station and the

HOLD condition is indicated on the Exchange Line Status LED (7) at all other stations.

The transferred call is answered by lifting the Handset (1) and pressing the corresponding Exchange Line Key (7).

MULTI PARTY CONFERENCE (EXCHANGE LINE):

Two EXCHANGE LINE CONFERENCE (SIMULTANEOUS OUTSIDE LINE CALLS)

While talking on an exchange line call,

Press the ADD ON Key (9), the exchange line is held and the Exchange Line Status LED (7) indicates Add On Standby.

Place another call using a free exchange line and begin the conversation.

Press the ADD ON Key (9) again to begin the conference.

Both Exchange Line Status Lamps (7) indicate busy.

To release one exchange line press the Exchange Line Key (7) corresponding to the person to whom you wish to continue to converse.

To terminate the conference place the Handset (1) on-hook.

TWO OR THREE STATION CONFERENCE WITH AN EXCHANGE LINE (OUTSIDE CALL CONFERENCE)

While talking on an exchange line call,

Press the ADD ON Key (9), the exchange line is held and the Exchange Line Status LED (7) indicates Add On Standby.

Ask the desired person, if located nearby, to lift the Handset (1) and press the Exchange Line Key (7) you are using. Press the ADD ON Key (9) again to begin the conference.

The Exchange Line Status LED (7) indicates busy.

Alternatively, the station which is to join the conference may be called via the intercom.

When the intercom call is answered, ask the person called, to lift the Handset (1) and press the ICM Key (13) or the Exchange Line Key (7) you are using. Press the ADD ON Key (9) again to begin the conference.

- The Exchange Line Status LED (7) will indicate busy.

If the intercom call is not answered, press the ADD ON Key (9) to continue the conversation.

Up to 3 stations can be in conference with an exchange line, each station is added to the conference using the above procedure.

LISTEN-IN MONITORING:

Once a call is established and you wish to listen-in, but not take part in the conversation.

- Press the MON Key (11) and then place the Handset (1) on-hook.

The received voice signal will be heard through the Station Speaker (2).

To stop monitoring, press the MON Key (11) again, or lift the Handset (1).

SWITCHHOOK FLASH (PROGRAMMABLE OPTION):

This facility is provided only when the system is connected to a PABX which uses Voice Frequency dialling.

While on a local call via the PABX press the Switchhook Flash Key to hold the exchange line at the PABX. Operation of the Switchhook Flash Key will give loop break of 1 second.

The Switchhook Flash Key is allocated as follows:

616	Exchange Line 6
1236	Exchange Line 12
2260	Exchange Line 22.

EARTH RECALL (SYSTEM OPTION):

This facility is provided only when the system is connected to a PABX which uses decadic dialling.

While on a local call via a PABX press the RECALL Key to hold the exchange line at the PABX. Operation of the Recall Key will put an earth on the line for 1 second.

In some cases the RECALL Key may be used to call the PABX operator.

The RECALL Key is allocated as follows:

616	Exchange Line 6
1236	Exchange Line 12
2260	Exchange Line 22.

EXCLUSIVE LINE (SYSTEM OPTION):

Only one station is connected to an Exclusive Line. Operation of an Exclusive Line is the same as the operation of an exchange line, as described above.

The exceptions being; an Exclusive Line can not be transferred and access barring is not applied to an Exclusive Line.

An Exclusive Line may be one of the last three Exchange Line Keys (7).

HOT LINE **CALL**(SYSTEM OPTION):

Only two stations are connected to a Hot Line.

To call the other station,

Lift the Handset (1), and press the Hot Line Key.

The Hot Line Status LED indicates busy.

To answer a Hot Line call, the

Hot Line Status LED indicates a call.

Lift the Handset (1), and press the Hot Line Key.

The Hot Line Status LED indicates busy.

Hot Lines cannot take part in a conference.

A Hot Line may be one of the last two Exchange Line Keys (7).

PRESELECTION:

A key may be operated up to 5 seconds before lifting the handset to seize a line.

PLACING AN INTERCOM CALL:

Check that the Intercom Status LED (13) is not on, since this indicates that all intercom links are busy.

Lift the Handset (1).

Press the ICM Key (13).

Wait for Intercom Dial Tone (constant tone).

Dial the desired station's number.

A Single Tone Burst indicates you can converse with the person at that station. Your voice will be heard through the Station Speaker (2), "Handsfree Talkback".

A Double Tone Burst indicates that the station being called has the microphone switched off. Therefore, you will not hear the person being called unless the microphone is switched on or the ICM Key (13) is operated and the Handset (1) is used.

A Slow Repeating Tone indicates that the station is busy on another call.

A Fast Repeating Tone indicates that the station called is in the Do Not Disturb mode.

Another station can not listen-in on your call, complete privacy.

To call a DSS Console Attendant, carry out the above procedure and dial "0" for the first DSS Console or "9" for the second DSS Console instead of the station number.

SIGNAL CALL:

When placing an intercom call to another station, and there is no immediate response, the person at the calling station may choose to initiate a signal call by dialling any extra digit.

This action changes the signalling at the called station from voice signalling, "Handsfree Talkback", to audible signalling until the call is answered or the calling party hangs-up. The calling party will hear ring tone through the Handset (1) while the called station is transmitting audible signalling.

A Signal Call is answered by lifting the Handset (I) and pressing the ICM Key (13).

ANSWERING AN INTERCOM CALL:

A Single Tone Burst from the Station Speaker (2) signals an intercom call.

The originator of the call can be heard via the Station Speaker (2), "Voice Calling".

The Intercom Status LED (13) will indicate;

 Microphone-on, or

 Microphone-off.

When the microphone is on, you can "talk back" without lifting the handset, "Handsfree Tal kback"

If the microphone is off, press the DND Key (12) to turn the microphone on.

The DND Key (12) may be pressed during the call to turn off the microphone, another operation of the DND Key (12) is required to turn the microphone on, again.

At anytime during the call, the Handset (1) can be used.

Lift the Handset (1) and press the ICM Key (13).

 The Intercom Status LED (13) will indicate busy.

ALTERNATE POINT ANSWERING

To answer an intercom call being made to another station located nearby.

Lift the Handset (1).

Dial the number of the station being called. Do not press the Intercom Key during this operation.

 The Intercom Status LED (13) will indicate busy.

CALL TO A DSS CONSOLE ATTENDANT:

Lift the Handset (1).

 Press the ICM Key (13).

Wait for Intercom Dial Tone.

Dial "0" for the first DSS Console or
"9" for the second DSS Console.

THREE STATION INTERCOM CONFERENCE:

Place an intercom call to the first station and ensure that the called party answers using the Handset (1).

Press the ADD ON Key (9).

Wait for Intercom Dial Tone.

Call the second station and ensure that the called party answers using the Handset (1).

Press the ADD ON Key (9) again and the conference is set up.

If one party places the Handset (1) on-hook, the conversation may continue between the remaining parties.

DO NOT DISTURB (PROGRAMMABLE OPTION):

This facility is a programmable option and may not be allocated to all stations.

A single operation of the DND Key (12), while the handset is on-hook, puts the station into Do Not Disturb mode

The DND Status LED (12) indicates Do Not Disturb busy.

To remove the Do Not Disturb condition operate the DND Key (12) twice.

The DND LED (12), then indicates the free condition

The DSS Station may override the Do Not Disturb condition depending on how the system is programmed.

CALL FORWARDING (PROGRAMMABLE OPTION):

To automatically transfer Intercom and Exclusive Line calls to a preassigned station.

Press the DND Key (12).

Do Not Disturb Status LED (12) indicates busy.

Exclusive Line calls and Intercom calls will be automatically directed to the preassigned station.

Press the DND Key (12), twice to reset Call Forwarding.

Do Not Disturb Status LED (12) indicates the free condition.

MICROPHONE CUT-OFF:

To cut-off the microphone, while using "Handsfree Talkback" on an intercom call, press the DND Key (12). For stations programmed to have Do Not Disturb the DND Key (12) must be pressed twice. However, stations with an intercom call in progress, only require a single operation of the DND Key (12) to cut-off the microphone.

The DND Status LED (12) indicates Microphone Cut-off.

While in the Microphone Cut-off state the calling party can not hear any conversation at the called station.

A station in the Microphone Cut-off state can receive incoming intercom calls but "Handsfree Talkback" is inhibited.

A single operation of the DND Key (12) returns the microphone to its normal condition.

The DND Status LED (12) indicates the free condition.

PAGING:

Three types of paging calls may be made.

1. ALL CALL PAGING

   This method is used to make an announcement over the Station Speaker (2) of all stations and through the external loudspeakers, if equipped.

2. INTERNAL ZONE PAGING (PROGRAMMABLE OPTION)

   This method is used to make an announcement through the Station Speaker (2) of the stations included in one of four zones. When the system is installed the stations are programmed into one of the four zones.

3. EXTERNAL ZONE PAGING (SYSTEM OPTION)

   This method is used when an external public address or loudspeaker paging system is connected to the system.

To originate a paging call.

Lift the Handset (1).

Press the ICM Key (13).

Wait for Intercom Dial Tone.

Dial the desired paging number, hear single warbling tone and make the announcement. Busy stations will not hear the paging announcement.

The paging numbers are as follows:

80 . . . . . All Call Paging

81. . . . . Internal Zone 1
82 . . . . . Internal Zone 2
83..... Internal Zone 3
84 . . . . . Internal Zone 4

65 . . . . . External Zone 1
*86..... External Zone 2

• *Note: External Zone 2 is notprovidedin the 616system.*

MEET ME ANSWER PAGING (PROGRAMMABLE OPTION):

Make an All Call or Internal Zone Paging announcement for someone to "Meet Me".

The originator of the call depresses the '*' button and waits for a response.

To respond to a "Meet Me Answer Paging" call, the respondent lifts the Handset (1) of a station through which the paging announcement was heard, and dials "8" to speak to the originator.

MESSAGE WAITING:

When a DSS console attendant activates the Message Waiting facility.

The Hold LED (8) indicates Message Waiting.

The message may be obtained by pressing the ICM Key (13), and dialling "1".

Then ask the attendant for the message.

When the call has been answered.

The Hold LED (8) will indicate idle.

BACKGROUND MUSIC CONTROL:

When the Handset (1) is on-hook the "#" button is used to turn the Background Music on and off by alternate depressions.

The volume of the Background Music is regulated by the volume control at each station.

POWER FAILURE:

During power failure the exchange lines are automatically switched through to preassigned powerfail stations. In this condition incoming calls may be received or outgoing calls can be originated, all other facilities are inoperative.

To answer an incoming call, lift the Handset (1).

To place an outgoing call, lift the Handset (1), wait for exchange dial tone and dial the desired number.

If a short interruption of the mains power occurs, the operation of the system will be interrupted and all calls will be cut off.

In this case the red reset LED (RL LED) on the power supply will be on. Press the reset switch (RS switch) to extinguish the LED. Normal operation will resume if power is still available.

1.3.5 DSS CONSOLE NOMENCLATURE (616/1236, 2260)

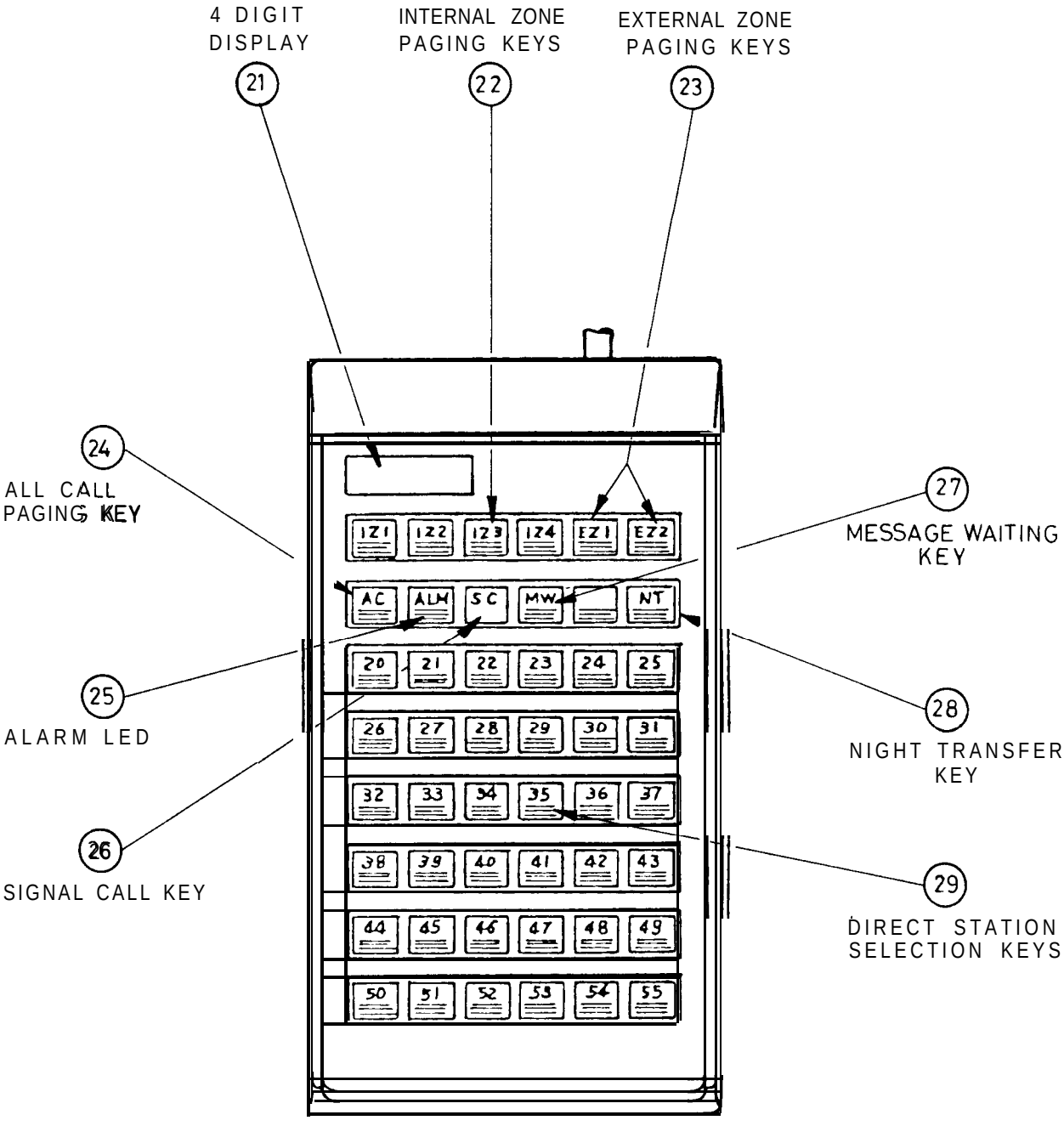

FIGURE 5 N616/1236 DSS CONSOLE (DSS-6161236)

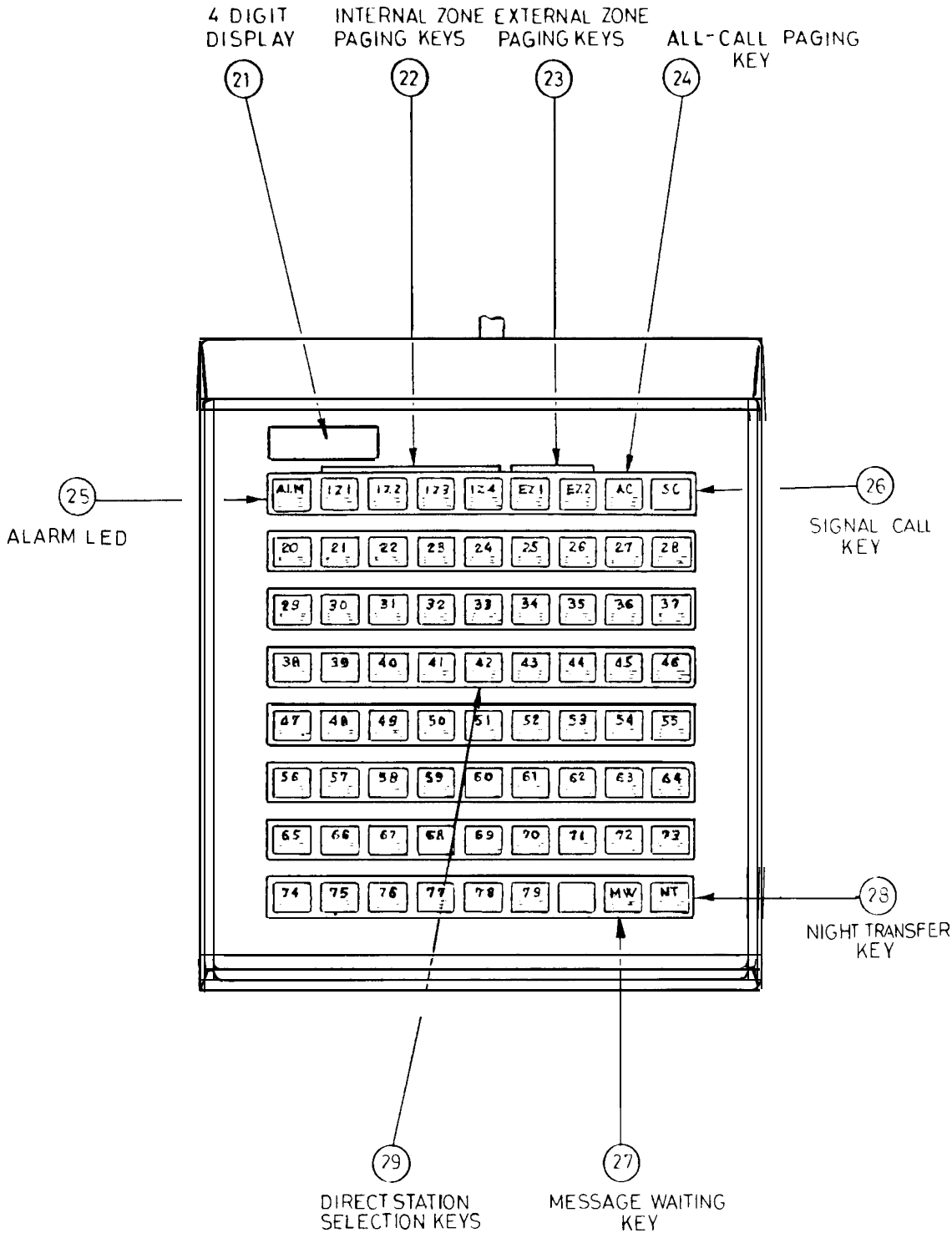

FIGURE 6 N2260 DSS CONSOLE (DSS-2260)

21. Display (4-digits)
22. Internal Zone Paging Keys
23. External Zone Paging Keys
24. All Call Paging Key
25. Alarm Lamp
26. Signal Call Key
27. Message Waiting Key
28. Night Transfer Key
29. Direct Station Selection Keys including Busy Lamp Field

DSS Station - the station located beside the DSS Console.

1.3.6 DSS CONSOLE LED INDICATIONS

The Busy Lamp Field shows station status

	Steady	Off Hook / Busy Condition	
	Slow Flash	Message Waiting Battery Low	(60 IPM)
	Flash	Station receiving a Handsfree Talkback Intercom Call	(120 IPM)
	Rapid Flash	Do Not Disturb Alarm	(300 IPM)

1.3.7 DSS CONSOLE OPERATIONS

SUMMARY

DSS Cal I
Automatic Exchange Line Hold
Digits Display
DSS Override
Signal Call
Automatic Ring Back
Message Waiting
Night Transfer
Alarm Indication
Battery Low Condition

DSS CALL

A DSS Call may be one of the following;

- Intercom Call
- Paging Call - All Call Paging
  Internal Zone Paging
  External Zone Paging.

To make a DSS Call.

Lift the Handset (1) at the DSS Station.

Press the single function key (22, 23, 24, 29) corresponding to the type and destination of the call you wish to make.

Automatically the Intercom or Paging Call will be established.

NOTE: A DSS Console cannot take part or set-up a conference using the ADD ON facility. A conference must be set-up from the DSS station, only.

AUTOMATIC EXCHANGE LINE HOLD:

When the attendant at a DSS Console answers an exchange line call, the call may be transferred using a DSS Key (29) or by initiating a paging call using the DSS Console's special function keys (22, 23, 24).

This action automatically places the exchange line on hold. Therefore, it is not necessary to operate the HOLD Key (8) at the DSS Station. The Display (21) will show the call is held by the station corresponding to the operated DSS Key (29).

DIGITS DISPLAY:

The two digits on the left side of the display show the number of the held exchange lines and the two digits on the right side of the display shows the number of the station which holds the exchange line.

DSS OVERRIDE:

Calls from the DSS Console have priority over Intercom Calls and Paging Calls.

When the DSS Console overrides a call, the originator of the call will hear DSS Intrusion Tone. A flashing LED in the DSS Key (29) indicates that a call may be overriden.

DSS Console priority over Do Not Disturb is a programmable option.

NOTE *A DSS Console can not override a remote or internal extension which is on Do Not Disturb.*

SIGNAL CALL:

When a DSS Console attendant does not receive a response after transferring an exchange line call using a DSS Key (29) the SC Key (26) may be used.

Operation of the SC Key (26), after a DSS Key (29) has been depressed, will cause Audible Signalling to be transmitted through the Station Speaker at the station to which the call has been transferred.

The Exchange Line LED(7) will indicate Exclusive Hold at the station to which the call has been transferred.

And Hold at all other stations.

Audible Signalling will be transmitted to the station for 20 seconds.

If the call is not answered within 20 seconds it will be directed back to the DSS Console.

Audible Signalling will be transmitted from the DSS Station Speaker (2) until the call is re-answered.

The Exchange Line Status LED (7) will indicate I-Hold condition at the DSS station, and the station to which the call has been transferred.

And hold condition at all other stations.

AUTOMATIC RING BACK:

If exchange line calls transferred from the DSS Console are not re-answered within the preprogrammed ring back time, Audible Signalling will be heard via the DSS Station Speaker (2).

The Exchange Line Status LED (7) will indicate the I-HOLD condition.

MESSAGE WAITING:

To indicate to a station that there is a message at the DSS Console, carry out the following procedure.

After pressing the desired DSS Key (29).

Press the MW Key (27).

The Message Waiting LED (8) (Hold LED) at the unattended Station and the corresponding DSS LED (27) on the DSS Console will indicate Message Waiting active.

The Message Waiting condition will clear when there is a call from the associated station or if the DSS Console attendant operates the MW Key (27) and the DSS Key (29), corresponding to the station where the message was left, while the Handset (1) is on-hook.

NIGHT TRANSFER:

Operation of the NT Key (28) will direct all incomming audible signals to the programmed Night Transfer Station.

The Night Transfer Status LED (28) will indicate active.

ALARM INDICATION:
When the external alarm signal is detected (option), Alarm Tone will be heard at the DSS Station.

The Alarm Status LED (25) will indicate an Alarm.

The condition is stopped when the alarm signal is cleared.

BATTERY LOW CONDITION:

The Alarm Status LED (25) indicates the Battery Low Condition.

If the battery is not replaced in a short time the system will malfunction.

1.3.8 OPTIONAL EQUIPMENT
— HANDSFREE CONSOLE —

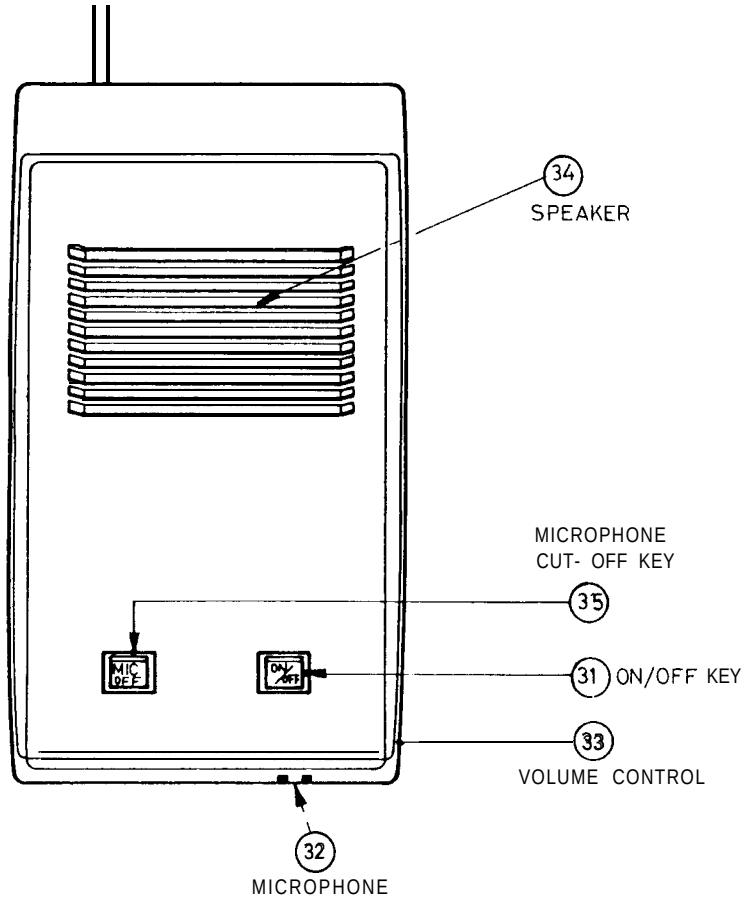

FIGURE 7 HANDSFREE CONSOLE (HFC-N)

Nomenclature

31. On/Off Key and LED
32. Microphone
33. Volume Control
34. Speaker
35. Microphone Off Key and LED

Lamp Indications

○	Off	Non-operational State
●	On	Active Handsfree Condition Microphone Off Condition

Operation

● Press the ON/OFF Key (31) to activate the Handsfree condition.

Select the required system feature using appropriate station key.

If necessary adjust the speaker volume level using the Volume Control (33).

○ Press the ON/OFF Key (31) again to terminate the call.

To transfer the conversation to the station Handset (1), simply lift the Handset (1). The ON/OFF LED (31) will go off automatically.

To transfer the conversation from the station Handset (1) to the Handsfree Console, first press the ON/OFF Key (31) and the

● ON/OFF LED (31) will come on.

Now, place the Handset (1) on-hook.

To prevent your speech being transmitted, press the MIC/OFF Key (35) to turn off the microphone, the

● MIC/OFF LED (35) will come on.

Press the MIC/OFF Key (35) again, to turn the microphone on. The

○ MIC/OFF LED (35) will go off

— INTERNAL EXTENSIONS (INTERNAL STATIONS) —

Nomenclature

Key Stations:	616/1 23612260 stations shown in the front of the instructions (fig. 1, 2 8 3).
Internal Extensions:	Telecom Touchfone 10 or rotary dial telephones with decadic dialling.

Internal Extensions are normally located in the same premises as the system and are restricted in their use of system facilities.

For Internal Extensions with intercom access only, refer to the operating instructions for Remote Extensions.

+ EXCHANGE LINE CALLS

Placing an Exchange Line Call :

Lift the Handset. Wait for Internal Dial Tone.

Dial “3” to allocate any free Exchange Line for your call or,

“4” to allocate a free Exchange Line from the second group when the exchange lines are grouped.

Dial the desired number after the Exchange Line Dial Tone has been connected.

Answering an Exchange Line Call :

There is no facility to directly answer an Exchange Line Call. Exchange line calls must be transferred to an Internal Extension using the ADD ON Conference facility at a Key Station, or by a signal call from a DSS Console.

Transferring an Exchange Line Call :

An Exchange Line Call transferred to an Internal Extension can be transferred to a Key Station or Internal Extensions as follows:

Depress the Switchhook momentarily while talking on an Exchange Line Call. This operation will put the Exchange Line on Add On Standby. The Exchange Line Key (7) on Key Stations will indicate Busy.

Wait for Internal Dial Tone. If dial tone is not received, depress the Switchhook again and the Exchange Line is returned to you. Repeat the above operation if necessary.

Dial the Station to which the Exchange Line is to be transferred using an Intercom Call.

Ensure that the person being called answers using the Handset.

Depress the Switchhook again and a conference is set-up between three parties. Place your Handset on-hook and the connection between the two remaining parties is maintained.

+ INTERCOM CALLS

Placing an Intercom Call :

Lift the Handset. Listen for Internal Dial Tone.

Then dial "2" and the number of the required Key Station or Internal Extension.

If the call is for another Internal Extension, Ring Tone or Busy Tone is heard in the receiver. Wait for the called party to answer.

If the call is for a Key Station, and the station is not busy, Single or Double Tone Burst is heard and a normal "Handsfree Talkback" call is initiated.

Answering an Intercom Call :

Incoming calls are announced when the telephone rings.

Lift the Handset to answer.

Three-party Intercom Conference

A three-party intercom conference may be set-up as described for transferring an exchange line call, above.

+ PAGING

Lift the Handset.

Wait for Internal Dial Tone.

Dial the desired paging number for

All Call Paging	80
Internal Zone Paging	81 -84
External Zone Paging	85 or 88'

* 86 is not provided in the 616 system.

+ CALL TO A DSS CONSOLE ATTENDANT

Lift the Handset.

Wait for Internal Dial Tone.

Dial "0" for the first DSS Console or
"9" for the second DSS Console.

— REMOTE EXTENSIONS (REMOTE STATIONS) —

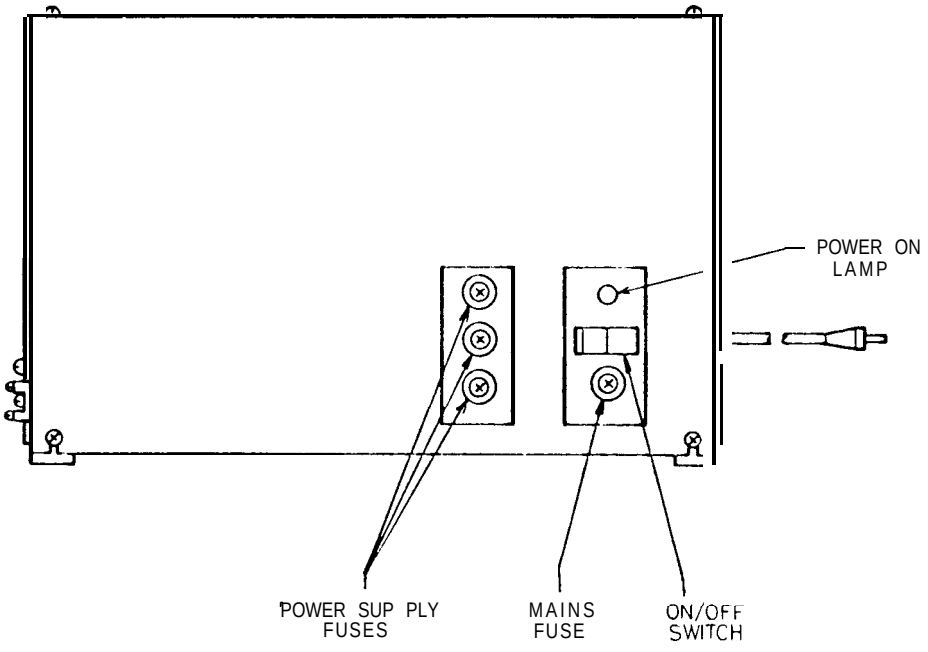

FIGURE 8 REMOTE EXTENSION AND TIE LINE
INTERFACE UNIT (RTIU-N)

Nomenclature

Key Stations: 616/1236/2260 stations shown in the front of the instructions (fig. 1, 2 & 3).

Remote Extension: Telecom Touchfone 10 or rotary dial telephones with decadic dialling.

Remote Extensions are located in premises remote from the system and are restricted in their use of system facilities.

+ EXCHANGE LINE CALLS

Placing an Exchange Line Call :

Call a Key Station.

Ask that person to connect an exchange line to your telephone using the ADD ON Conference facility.

Dial the desired number after Exchange Line Dial Tone has been connected.

Answering an Exchange Line Call :

There is no facility to directly answer an Exchange Line Call. Exchange line calls must be transferred to a Remote Extension using the ADD ON Conference facility at a Key Station.

Transferring an Exchange Line Call :

An Exchange Line Call transferred to a Remote Extension can be transferred to a Key Station, Internal Extension or Remote Extension as follows:

Depress the Switchhook momentarily while talking on an Exchange Line Call. This operation will put the Exchange Line on Add On Standby.

Wait for Internal Dial Tone. If dial tone is not received, depress the Switchhook again and the Exchange Line is returned to you. Repeat the above operation if necessary.

Dial the Station to which the exchange line is to be transferred using an Intercom Call.

Ensure that the person being called answers using the Handset.

Depress the Switchhook again and a conference is set-up between three parties. Place your Handset on-hook and the connection between the two remaining parties is maintained.

+ INTERCOM CALLS

Placing an Intercom Call :

Lift the Handset. Listen for Internal Dial Tone.

Then dial the number of the required Key Station or Remote Extension.

If the call is for another Remote Extension or Internal Extension, Ring Tone or Busy Tone is heard in the receiver. Wait for the called party to answer.

If the call is for a Key Station, and the station is not busy, Single or Double Tone Burst is heard and a normal "Handsfree Talkback" call is initiated.

Answering an Intercom Call :

Incoming calls are announced when the telephone rings.

Lift the Handset to answer.

Three-party Intercom Conference :

A three-party intercom conference may be set-up as described for transferring an exchange line call, above.

— TIE LINES —

When a system uses a tie line the tie line takes the place of an exchange line. Therefore, a tie line appears as an exchange line key on each station.

OUTGOING CALLS

Lift the Handset.

Select the exchange line key corresponding to the Tie Line.

The calling party will hear ring tone until the call is accepted.

INCOMING CALL

Incoming calls on a Tie Line are handled in the same way as an exchange line incoming call.

1.3.9 QUICK REFERENCE TABLE

STATIONS

PAGING: 80	All Call
81 -84	Internal Zones
85 — 86	External Zones
MEET-ME ANSWER PAGING:	Originator - Page then '*' Respondent - Off-hook "8"
MESSAGE WAITING:	Off-hook, ICM, "1".
SIGNAL CALL:	Any extra digit.
ALTERNATE POINT ANSWERING:	Off-hook, Called station number.
DSS ATTENDANT:	Off-hook, ICM, "0"(1st) or "9" (2nd).

INTERNAL EXTENSIONS

Outgoing Exchange Line Calls:	"3" or "4"
Intercom Calls:	"2" then intercom number.
Paging:	"80" All Call, "81 - 84" Internal Zone, "85 - 86" External Zone.
DSS Attendant:	"0" or "9"
Hold / Transfer:	Switchhook Depression (Add on).

1.4 SYSTEMS CAPACITIES AND COMPONENTS

1.4.1 SYSTEMS CAPACITIES

The maximum capacities of each system are tabulated below: —

	616	1236	2260
Common Exchange Lines (1)	6	12	22
Exclusive Exchange Lines (2) and/or Hot Lines	4	4	6
Total Exchange Lines	8	14	26
Intercom Links	4	6	6
Stations	16	36(3)	60(3)
DSS Consoles	2(4)	2	2

Notes: *(1) The last two exchange lines on all systems* can *be converted to exclusive exchange lines or hot lines. NB: circuits 1 & 2 on ELNB-A/4 are not used.*

(2) This figure assumes that the last two exchange lines are converted from common exchange lines to exclusive exchange lines or hot lines. The total number of exclusive exchange lines and hot lines cannot exceed this number.

(3) A DSS console uses one station port. Therefore, the total number of stations and DSS consoles is 36 in the 1236 and 60 with the 2260.

(4) The 616 provides an extra DSS console port on the EDTB-B card. Therefore, the total number of DSS consoles and stations is actually 17.

Refer to the Appendix for further information.

Call Metering Unit

The unit contains three metering circuits with digital displays. Any number of units may be used to cater for the exchange lines connected to the system.

Remote Extension and Tie Line Interface Unit (RTIU)

The unit has a capacity to provide two interface circuits for any combination of remote extensions, ring-in/ring-out tie lines or loop-in/ring-out tie lines. The number of RTIU's which can be used depends on system size. In the case of tie line interfaces, any number up to the maximum number of exchange lines can be used. In the case of remote extensions, any number up to the maximum number of stations can be used.

SYSTEM LIMITS

ITEM	SPECIFICATION
MAX. LOOP LIMITS	
TS-616	84 ohms* (490m 0.5mm cable)
TS — 1236	74 ohms* (430m 0.5mm cable)
TS — 2260	64 ohms* (370m 0.5mm cable)
DSS — 616 1236	52 ohms (300m 0.5mm cable)
DSS — 2260	48 ohms (280m 0.5mm cable)
IXT	700 ohms (4km 0.5mm cable)
RXT	1500 ohms (8.7km 0.5mm cable)
MUSIC SOURCE	
INPUT IMPEDANCE	600 ohms
INPUT LEVEL	0.05 — 0.3V RMS
EXTERNAL AMPLIFIER	
OUTPUT LEVEL	2W into an 8: ohm load
RELAY CONTACTS	616 1 circuit; 1236, 2260 2 circuits 1.25A at 24V dc
ALARM INPUT	
SENSING TYPE	Either N/O or N/C Dry contacts.

* These figures must be reduced by 10 ohms if a handsfree console is attached to a station.

1.4.2 SYSTEM COMPONENTS

1.4.2.1 Components

The systems are made-up of the following items; main equipment (ME), power supply (PS), stations, DSS console and powerfail bell. In addition, the following items are available; handsfree console (HFC), call metering unit (CMU), ring generator unit (RGU) and the remote extension and tie line interface unit (RTIU).

(i) Main Equipment

The main equipment is a one, two or three shelf rack depending on system size. The 616 system has the main equipment and power supply integrated into one unit. The main equipment has connectors located on the side of the ME which provide all necessary connections for power supplies and installation wiring. The main equipment houses polarised plug-in printed circuit boards. Refer to table 1 for details of printed circuit boards housed in the main equipment. Figures 15, 16 & 17 show the construction of the main equipment and location of PBA's.

TABLE 1: MAIN EQUIPMENT PRINTED CIRCUIT BOARDS

BOARD CODE	BOARD DESCRIPTION	MAXIMUM QUANTITY PER SYSTEM N616	N1236	N2260
STANDARD BOARDS (MUST BE EQUIPPED)				
ECPB-A	CENTRAL PROCESSOR BOARD This board has the main CPU and ROM containing the operational programme.	1	1	1
ECMB-A ECMB-B ECMB-D	CENTRAL MEMORY BOARD Contains memory for site dependent data and abbrievated dial numbers.	N.A. N.A. 1	N.A. 1 N.A.	1 N.A N.A
EDTB-A EDTB-B	DATA TRANSMISSION BOARD Transmits key data between the main equipment and stations. On the EDTB-B (N616 only) a DSS port is provided.	N.A. 1	1 N.A.	1 N.A
EICB-A	INTERCOM CONTROL BOARD Controls voice switching for up to 4 Intercom links. If there are more than 4 links required an expansion board must be used.	1	1	1
EPFB-A	POWERFAIL BOARD This board transfers a maximum of eight exchange lines to predetermined stations when there is a power failure. This board must be equipped even if no powerfail stations are used.	1	2	4
ETSB-A	TONE AND SENDER BOARD (VF) This board contains tone generators for internal tones and audible signalling. This board also provides VF signalling for all exchange lines up to the maximum system size.	1	1	1
ETSB-B	TONE AND SENDER BOARD (DECADIC) This board contains tone generators for internal tones and audible signalling and a microprocessor which controls decadic signalling on exchange lines. This unit controls decadic signalling for up to 16 exchange lines.	1	1	1
ETSB-C	TONE AND SENDER EXPANSION BOARD (DECADIC) Contains a microprocessor which controls decadic signalling on exchange lines. This board is used to control decadic signalling on an additional ten exchange lines and must be used with the ETSB-B board.	N.A.	N.A.	1
ESTB-C	STATION INTERFACE BOARD This board provided interfaces for four stations	4 (max.)	9 (max.)	15 (max.)

BOARD CODE	BOARD DESCRIPTION	MAXIMUM QUANTITY PER SYSTEM N616	N1236	N2260
ELNB-A	EXCHANGE LINE BOARD This board contains four exchange line circuits.	2 (max.)	4 (max.)	7 (max.)
EXPB-A	2260 EXPANSION BOARD This board provides an expansion when more than 12 exchange lines are equipped on a 2260. The board is located in position EXPB-Al . If more than 18 exchange lines are equipped on a 2260 a second EXPB-A board is required and it is located in position EXPB-A2. An EXPB-A board is required if more than 4 intercom links are to be provided. The board is located in position EXPB-Al.	N.A.	N.A.	2
EXPB-B	2260 EXPANSION BOARD This board is used to provide 2 extra voice switching circuits. This board must be used with an EXPB-A to provide the 2 extra intercom links.	N.A.	N.A.	1
EXPB-C	1236 EXPANSION BOARD This board provides an expansion when more than 12 exchange lines are equipped on a 1236. This board is also required if more than 4 intercom links are to be provided.	N.A.	1	N.A.
EXPB-D	1236 EXPANSION BOARD This board is used to provide 2 extra voice switching circuits. This board must be used with an EXPB-C to provide the 2 extra intercom links.	N.A.	1	N.A.
OPTIONAL BOARDS				
EPGB-B	PAGING BOARD This board contains two audio amplifiers to provide the external paging facility.	N.A.	1	1
EGPB-A	GROUNDING/PAGING BOARD This board contains one audio amplifier to provide an external paging facility. This board is also used to provide the Earth Recall facility, which is used for hold, transfer, and enquiry facility when the systems are connected to a PABX.	1	N.A.	N.A.
EGDB-A	GROUND RECALL BOARD This board is used to provide the Earth Recall facility which is used to provide hold, transfer, and enquiry facility when the systems are connected to a PABX.	N.A.	1	1

BOARD CODE	BOARD DESCRIPTION	MAXIMUM QUANTITY PER SYSTEM N616	N1236	N2260
E2WB-C	2-WIRE INTERNAL EXTENSION BOARD This board is used in place of an ESTB-C board. It provides interfaces between four 2-wire telephones and the system. It is recommended that at least one ESTB-C board is used per system to allow the use of a DSS Console. A RGU is required, refer to Section 1.4.2.1 .(ix)	3	8	14

(ii) **Power Supply**

The 616 power supply is integrated into the main equipment rack. The 1236 and 2260 use a common power supply. The ratings of the power supplies are as follows.

Input Voltage (AC): 225V -270V,50Hz,212VA-616, 613VA-1236/2260
Maximum Input Current: 2A -616, 5A-1236/2260
Output:

Voltage (DC)	Current 616	123612260	Designation
5V±0.5V	3A	.3A	L5V. LGD Logic
15V±0.5V	5A	5A	S15V, AGD Switching
			A15V, AGD Audio
			B7.5V, AGD Crosspoint Bias
24V±5V	3A	3A	R24V, RGD Relays
40V±10V	10/5A		T30V, TGD Stations

A cable with polarised connectors provides the connection between the power supplies and the main equipment. Power-on lamps, switches and fuses are located on the front of the power supply. Figures 18 shows an external view of the power supply.

(iii) **Stations**

There are two types of stations; standard stations and powerfail stations.

Standard stations contain a telephone network including handset, a dial key pad, non-locking function keys, status lamps, a microphone, a speaker, a volume control and electronics to control the stations operation.

Powerfail stations, in addition to the above, contain a powerfail dial either decadic or DTMF and an electronic buzzer to signal incoming calls during power failure. One powerfail station maybe equipped for each exchange line connected to the system.

Figures 19, 20, 21 show the stations.

(iv) **DSS Console** (Fig. 22, 23)

Primarily the DSS Console provides facilities required for an operators position. That is, a simpler means of answering and transferring calls, and a display of the status of each station in the system.

The DSS Console consists of a series of single function keys and direct station selection (DSS) keys with corresponding status lamps, a speaker for audible signalling, and a 4 digit display to show held exchange lines and the station holding the exchange line.

NOTE: As systems are programmed using a special DSS console, a DSS console socket must always be wired. The modified console is known as a Test and Programming Unit (TPU-N).

(v) **Powerfail Bell**

A powerfail bell may be connected to the systems to provide incoming audible signalling when a power failure occurs.

When the power fails the powerfail bell will be connected in parallel with the powerfail station.

The powerfail bell consists of a capacitor, a bell and a lamp that flashes with the incoming ring (fig. 25).

(vi) **Handsfree Console**

A handsfree console (HFC) may be connected to a station to provide full handsfree capability for all types of calls (fig. 24).

(vii) **Call Metering Unit**

The call metering unit may be connected to exchange lines to provide an indication of the cost of calls. The call metering unit records meter pulses sent from the local exchange (fig. 26).

(viii) **Remote Extension and Tie Line Interface Unit**

The RTIU is a small sub rack which provides the possibility to interface with remote extensions or tie lines with a maximum capacity of two interfaces per sub rack and a standard card.

The RTIU is equipped with its own power supply (PCB-C). The components which can be used with the RTIU are shown in Table 2 (fig. 27).

Table 2 : RTIU BOARDS

Standard	
RTB-A	Ring and Tone Source
Options	
RRB-A	Ring-in, Ring-out Tie Line Interface
LRB-A	Loop-in, Ring-out Tie Line Interface
RXB-A	Remote Extension Interface
22IFB-A	616.1236. 2260 Interface Circuit for RXB-A

Note: For a remote extension a pair of cards are required, the RXB-A card and the 22IFB-A card which is a main equipment interface card. For each remote extension both cards must be provided.

(ix) **Ring Generator Unit (RGU)**

The ring generator unit (figure 28) generates ring voltage for Internal Extensions. The RGU is used in conjunction with the E2WB-C. The RGU is capable of providing ring voltage for up to two E2WB-C boards.

1.4.2.2 Customer Provided Optional Equipment

Loudspeakers or a public address system with 8 ohm input impedance for external zone paging options.

A music source for background music and hold music.

An alarm detector or supervisory system for alarm signalling

1.4.3 BLOCK DIAGRAM DESCRIPTION

1.4.3.1 System Block Diagram (Figure 9)

This shows the main items of the system and their interconnection.

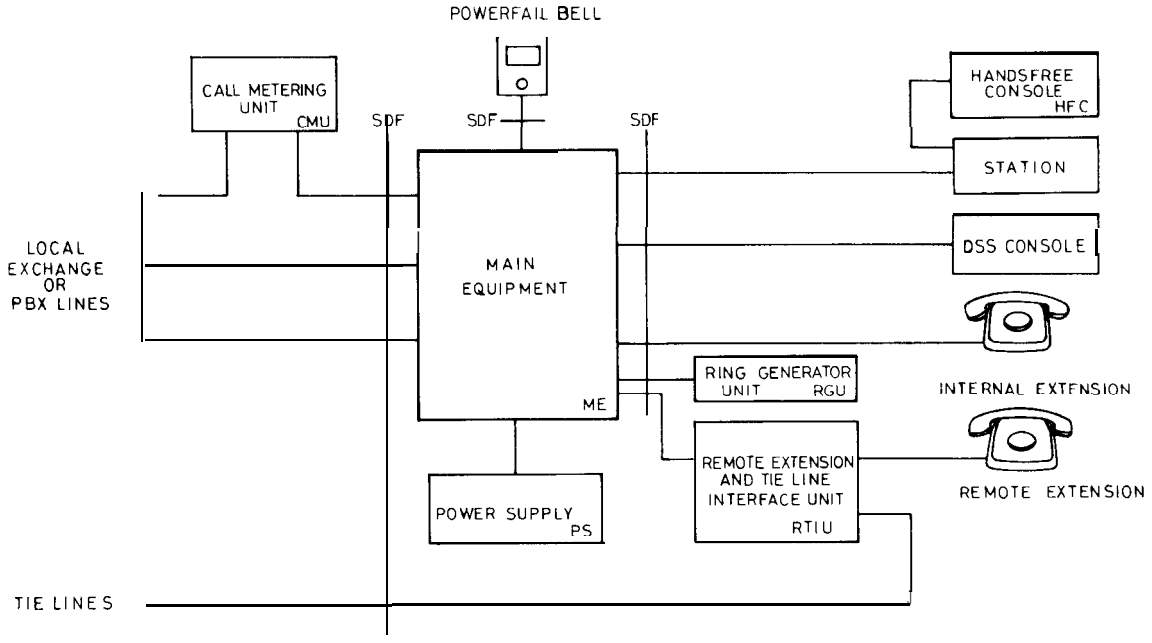

FIGURE 9 SYSTEM BLOCK DIAGRAM

Incoming Local **Exchange Lines** or **PBX Lines** are connected to the main equipment. A **Call Metering Unit** may be used to record meter pulses sent from the local exchange. **Tie Lines** are connected via a RTIU.

The **Power Supply** provides all the power necessary to operate all system modules with the exception of the RTIU which has its own power supply.

Powerfail Bells, if used, are automatically connected across incoming exchange lines when the power fails.

Handsfree Consoles are equipped on a per station basis and are directly connected to the station. They have no direct connection with the M.E.

The following devices may be connected to M.E. ports, **Stations, DSS Consoles, Internal Extensions** and **Remote Extensions.** Standard stations, powerfail stations and the DSS console are connected to the M.E. by 4 wires, one pair is the speech pair and the other pair is for data transmission and power feed to the station.

Standard decadic telephones, Internal Extensions, are connected to the M.E. by a single pair of wires, audio communication and decadic signalling is performed on this pair. A special interface and **Ring Generator Unit** is provided so standard telephones can be used.

Remote Extensions are connected to the M.E. via the RTIU. The RTIU has a 4 wire connection to the M.E., (one pair voice, one pair data) and a 2 wire connection to the remote extension for voice and decadic signalling. Cards in the RTIU perform the 4 wire to 2 wire interface.

1.4.3.2. Main Equipment Block Diagram (Figure IO)

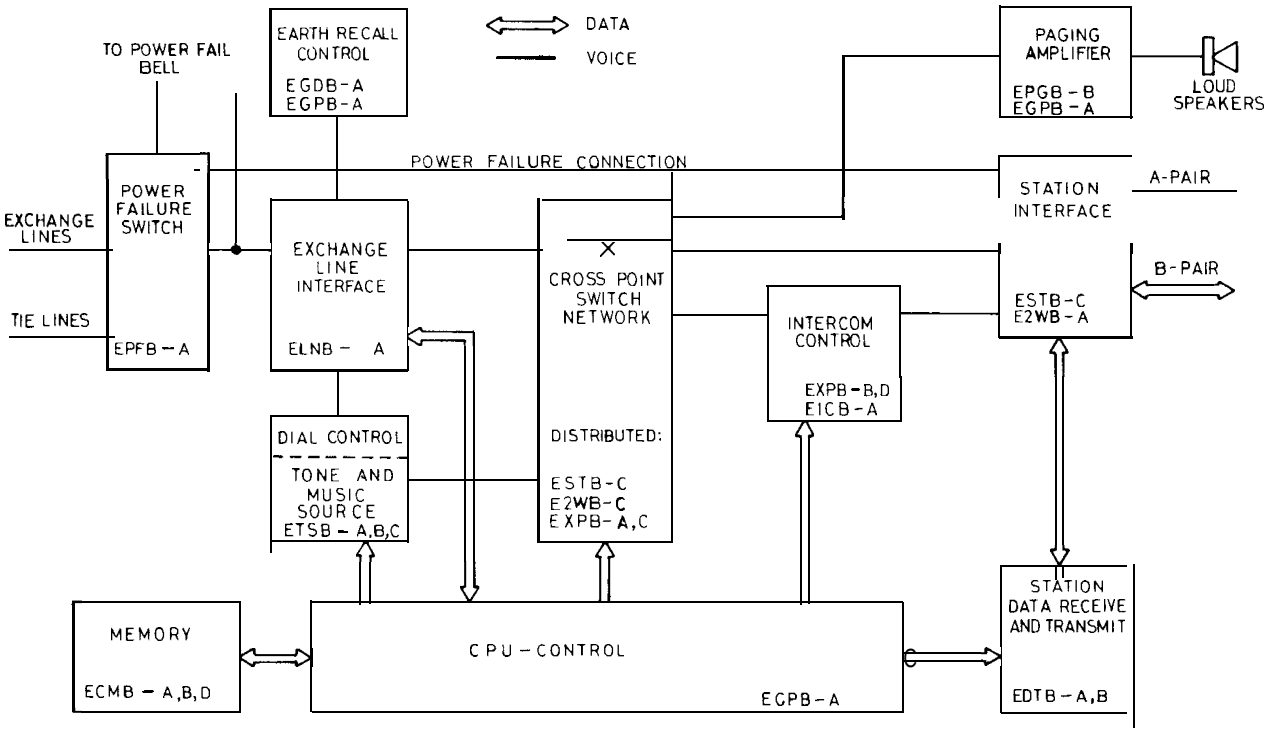

FIGURE 10 MAIN EQUIPMENT BLOCK DIAGRAM

CPU Control consists of the Z80 micro-processor, ROM program memory, RAM working registers, timing and control circuitry. The CPU controls all switching and system data manipulation.

RAM Memory is used as working memory, to store site dependant data and to store abbreviated dialling numbers. It is located on the ECMB cards and has a lithium battery to retain the data when power fails.

Power Failure Switch automatically connects exchange lines directly through to pre-assigned powerfail stations via the powerfail connection. At the same time the powerfail bell is connected in parallel with the powerfail station.

Exchange Line Interface provides the d.c. loop termination of the exchange line, ring detect circuit, audio coupling transformer, dialling relay, line surge protection and distribution for tones and hold music.

Earth Recall Control is used to apply PBX earth to one wire of the exchange line pair.

Dial Control module in one case, provides the VF tones, and in the other case, provides timing and control circuits for the loop-disconnect decadic dialling, depending on the type of exchange lines used.

Tone and Music Source generates all internal system, tones and synthesises hold music, it also provides the input for background music.

Crosspoint Switch Network is made-up of semiconductor crosspoints and is distributed over a number of cards. This circuit which decodes the CPU order to operate the crosspoints is located on the EDTB card. Figure 10 shows how the crosspoint switch matrix is made-up.

Intercom Control controls the voice switching circuits for handsfree talkback.

Station Interface provides circuits for transmission of voice and serial data between the stations and the M.E. There is no B pair when using the E2WB card.

Station Data Receive and Transmit contains microprocessors which control the transmission of new status information from the main CPU and receive data of operations initiated at each station.

Paging Amplifier amplifies the systems audio signals for broadcasting through external loudspeakers.

1.4.3.3 Station Block Diagram (Figure 11)

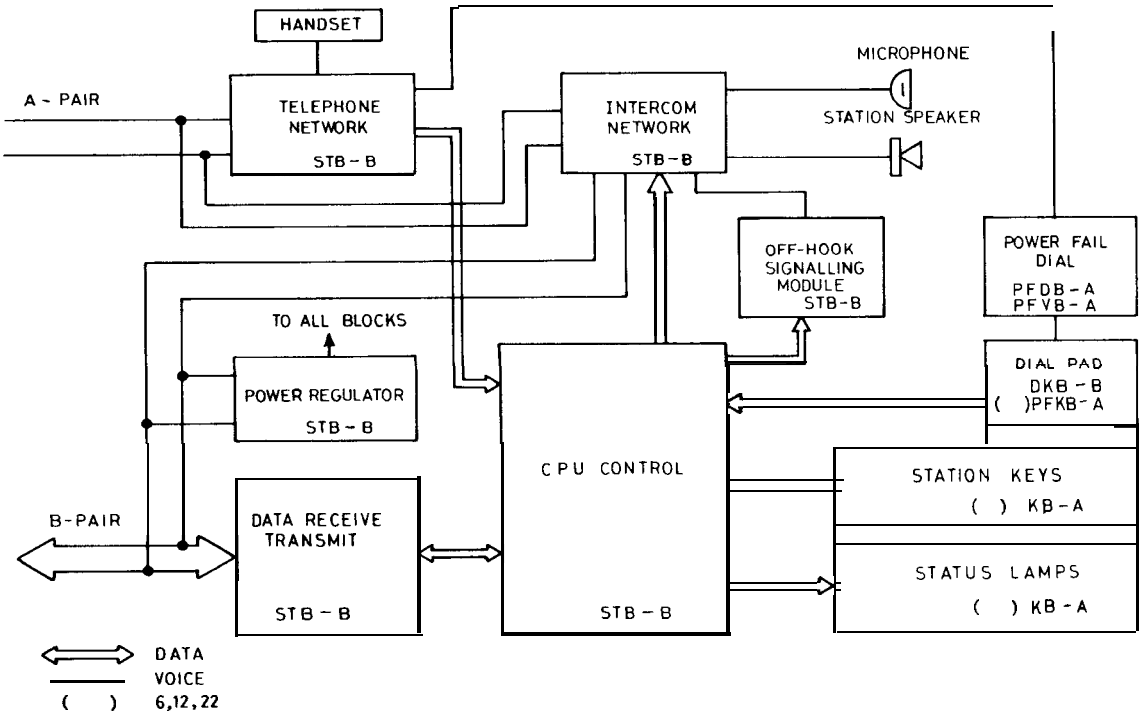

FIGURE 11 STATION BLOCK DIAGRAM

Telephone Network, transmission circuit and Handset are connected to the M.E. audio path by the A-pair.

The B-pair is used to transmit status information between the M.E. and the station and supply power. Microphone signals for handsfree talkback are phantomed between the A and B pairs.

Data Receive Transmit converts transmitted data into logic levels for the CPU.

Power Regulator takes power from the B-pair to supply the station circuits.

CPU Control supervises all operations at the station, informs the main equipment of station status and displays the status of system parameters, at the station.

Intercom Network contains the amplifiers for the station Speaker and Microphone and a solid state switch which the CPU operates to cut-off the microphone.

Off Hook Signalling Module generates ring signaling under the control of the CPU.

Status Lamps show the status of system facilities and are controlled by the CPU.

Station Keys are used to envoke system facilities and the CPU constantly monitors their status.

Dial Pad is used to input dialled digits. During normal operation the operation of the dial is monitored by the CPU and the information is conveyed to the main equipment. Under powerfail conditions the dial pad operates the Powerfail Dial which outputs either decadic pulses or DTMF tones onto the A-pair for signalling on the exchange line connected to that station.

1.4.3.4 DSS Console Block Diagram (Figure 12)

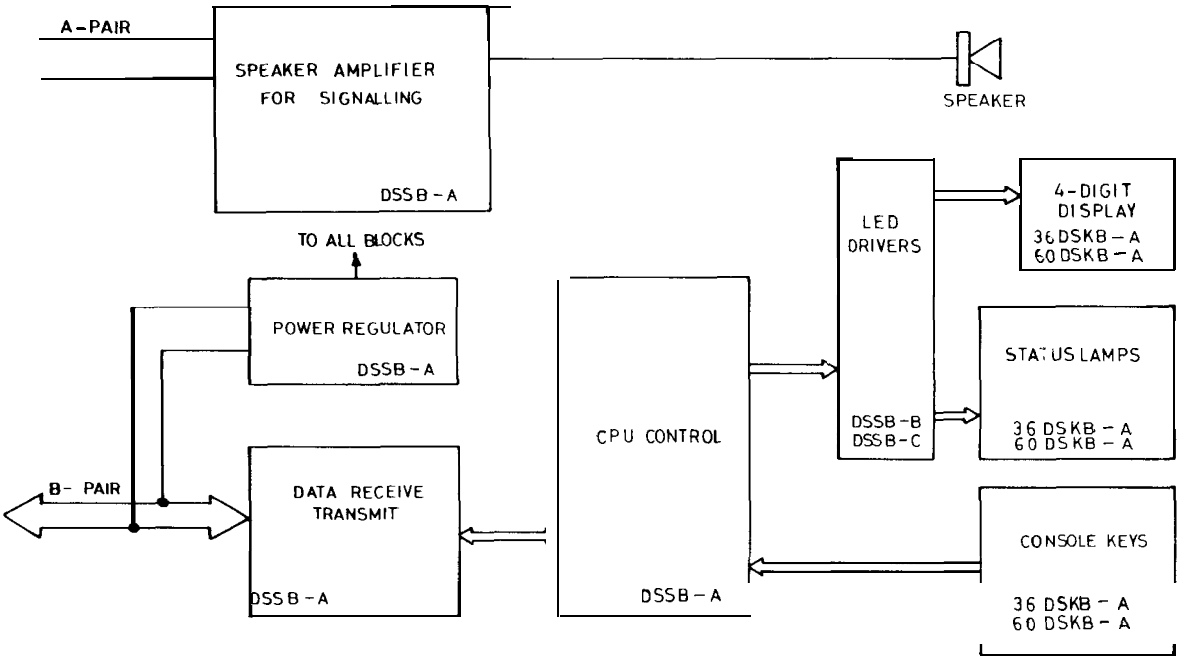

FIGURE 12 DSS CONSOLE BLOCK DIAGRAM

Speaker Amplifier and Speaker are connected to the ME by the A-pair to receive call signalling and alarm tones.

The B pair is used to transmit key status data to the ME and receive lamp data from the ME.

Data Receive Transmit block converts transmitted data into logic levels for the CPU.

Power Regulator takes power from the B-pair to supply the DSS console circuits.

CPU Control scans the DSS console keys, transmits DSS console status to the ME, and interprets data from the ME to control LEDS.

LED Drivers decode outputs from the CPU to drive LEDS in the DSS console keys and the four digit displays.

4-Digit Display uses seven-segment LEDS to display programming or held line information.

Status **Lamps** in the DSS Console keys show station and key function status.

Console Keys are used to evoke system facilities and to program system data.

1.4.3.5 Handsfree Console (Figure 13)

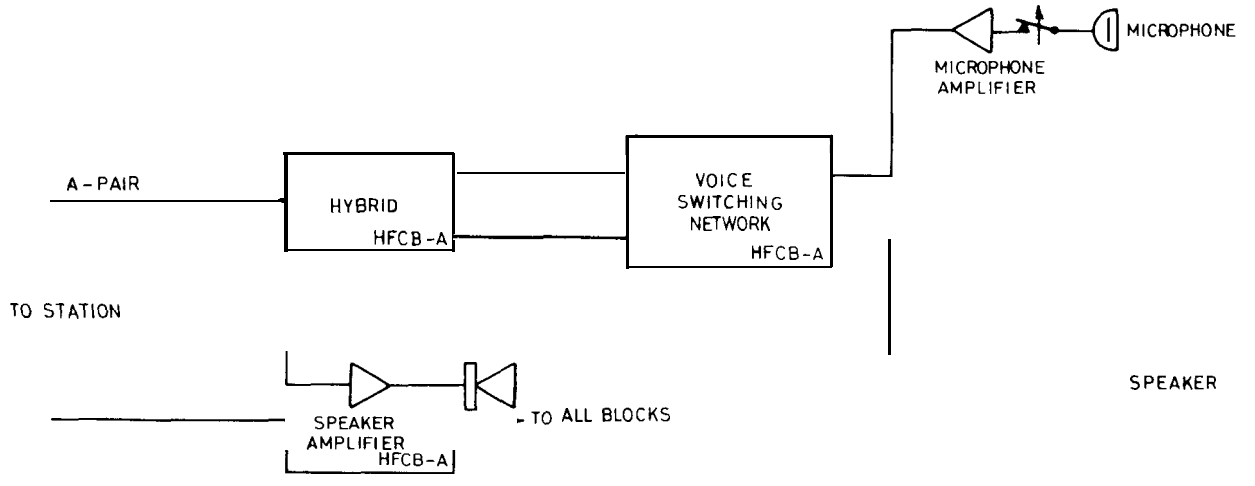

FIGURE 13 HANDSFREE CONSOLE BLOCK DIAGRAM

The handsfree console is connected to a station to allow a call to be originated without using the handset.

Hybrid is connected to the main equipment via the station A-pair and provides a 2 wire to 4 wire conversion.

Power Regulator takes power from the station to supply handsfree console circuits.

Voice Switch Network is connected between the microphone and speaker and the hybrid to prevent the handsfree console from singing. A noise operated gain adjusting device prevents the microphone switching on in a noisy environment.

Microphone Amplifier is switched on by the key on the handsfree console.

The **Speaker Amplifier** is connected to the voice switch.

1.4.3.6 Remote Extension & Tie Line Interface Unit (Figure 14)

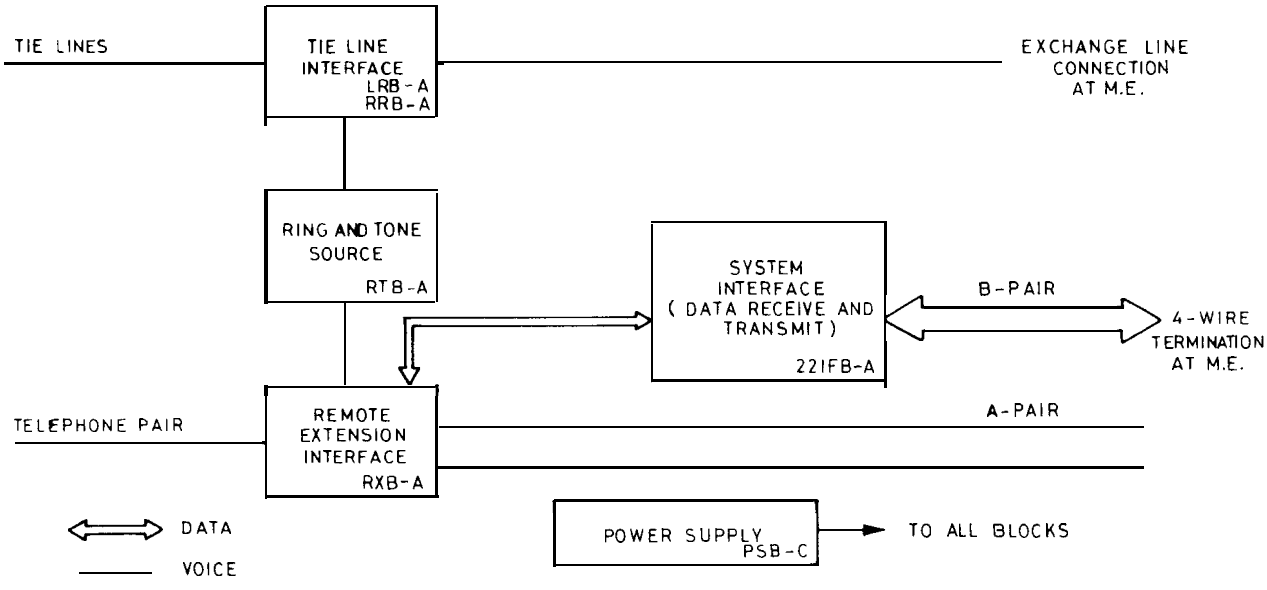

FIGURE 14 REMOTE EXTENSION AND TIE LINE INTERFACE UNIT BLOCK DIAGRAM

Ring and Tone Source provide two oscillators, one for busy tone and ringing signal cadence. A 16Hz 60V generator is provided for signalling.

Tie Line Interface is always loop in, ring out from the main equipment. It can be either Ring-in/Ring-out, (RRB) or Loop-in/Ring-out (LRB) from the tie line. The tie line interface uses the 16Hz signal for ringing and sends ring back tone to the main equipment or tie line.

Remote Extension Interface connected a 2 wire decadic telephone to the A-pair audio path. A CPU interprets decadic signalling from the remote extension and controls ringing signals for the remote extension.

System Interface controls data transmission to the main equipment via the B-pair. The same CPU is used as in a normal station. Keys are simulated by ROM under control of the Remote Extension Interface CPU - LED information is sent to the Remote Station Interface.

1.5 MECHANICAL DESCRIPTION

1.5.1 EQUIPMENT DRAWINGS

All of the main system components are shown in figures 15 to 28. The drawings show location of PBAs in the main equipment racks, fuses, switches, and alarm lamps on the power supplies, overall dimensions and locations of cords, plugs, sockets, earthing connections and station controls.

1.5.2 ASSEMBLY AND DISMANTLING INSTRUCTIONS

- Main Equipment, RTIU, RGU, CMU

  Turn the power off, then loosen screws on the cover to remove covers and gain access for installation and maintenance.

- DSS Console

  Unplug the DSS console then carefully remove the front panel using a screwdriver. Loosen the screws (2) fixing the top case moulding to the base moulding and lift off the top case.

  The bracket retaining the keys and display board may be lifted up.

  The line cord may be removed by removing the quick connect terminals and the line cord retainer, then draw the cord through the base moulding. Refer to fig. 67.

- Stations

  Unplug from socket, then carefully remove front panel using a screwdriver. Loosen the screws (2) fixing the top case moulding to the base moulding and lift off the top case. The bracket retaining the dial pad and keys may be lifted up.

  The line cord or handset cord may be removed by removing the quick connect terminals and the cord retainer, then drawing the cord though the base moulding. For re-assembly refer to figs. 49 a 50.

  To change the transmitter or receiver, unscrew the handset moulding, remove the anti-static sheet and transmitter or receiver. Ensure that the anti-static sheet is replaced with the insert.

  If a woodgrain colour panel is to be replaced by an orange or brown one, the woodgrain panel should be returned to the store to ensure adequate supplies are available for maintenance and workshop use.

1.53 TABLE 3: WEIGHTS OF EQUIPMENT

		N616	N 1236	N 2260
**	Main Equipment	25 kg	18kg	23 kg
	Power Supply	—	25 kg	25 kg
	Station	1 kg	1 kg	1 kg
	DSS Console	0.8 kg	0.8 kg	1 kg
	Handsfree Console	0.7 kg		
	Ring Generator Unit	1.5 kg		
*	RTIU	11 kg		
	Call Metering Unit	1.9 kg		

** No Boards Equipped

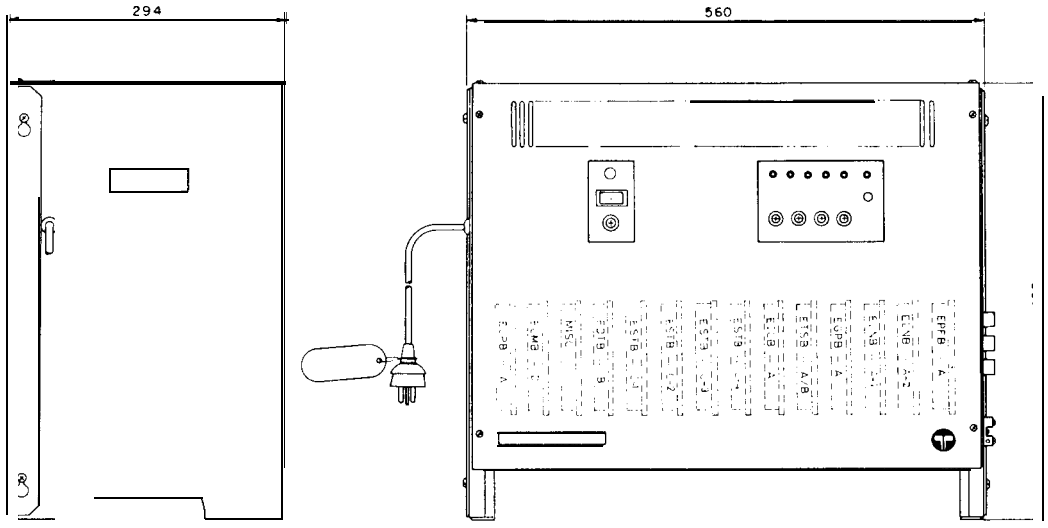

FIGURE 15 N616 MAIN EQUIPMENT (ME-61 6)

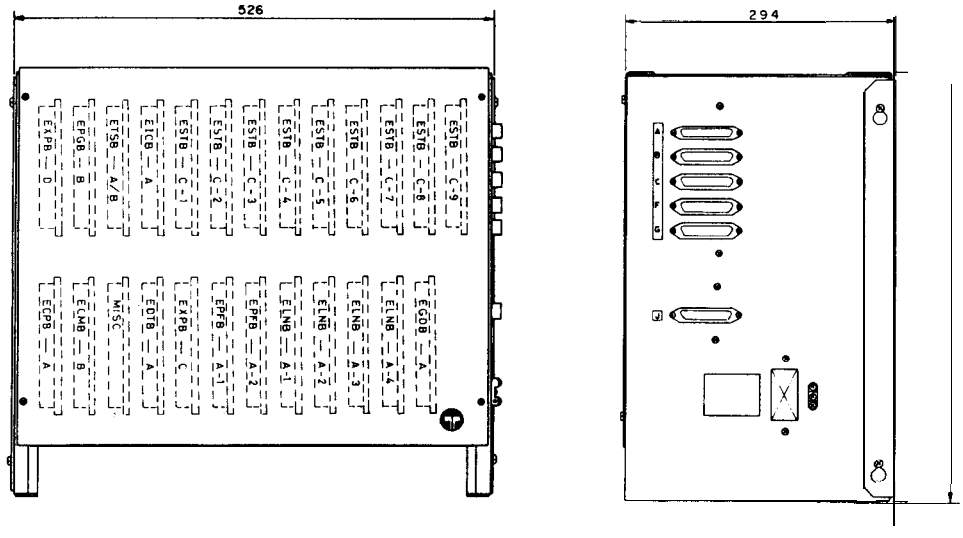

FIGURE 16 N1236 MAIN EQUIPMENT (ME-1 236)

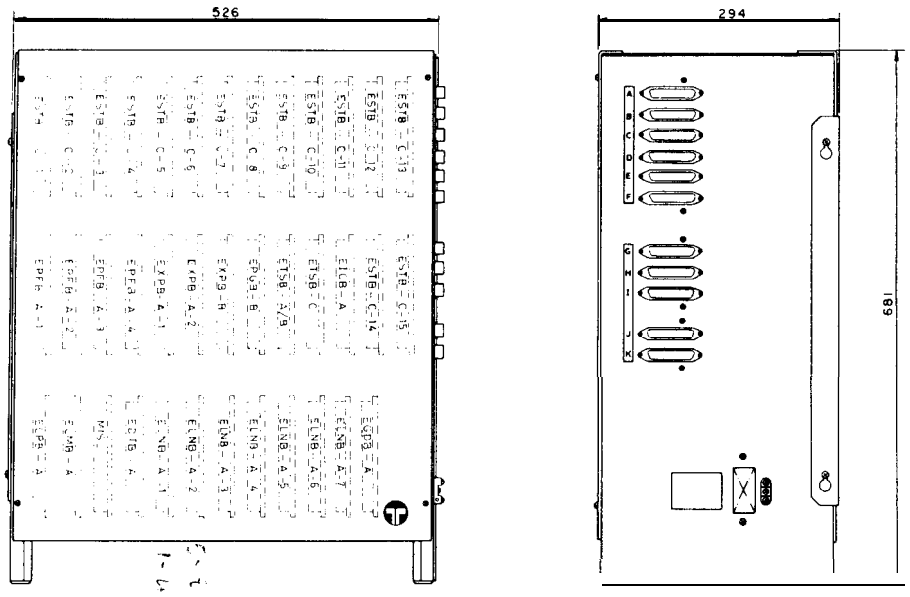

FIGURE 17 N2260 MAIN EQUIPMENT (ME-22601

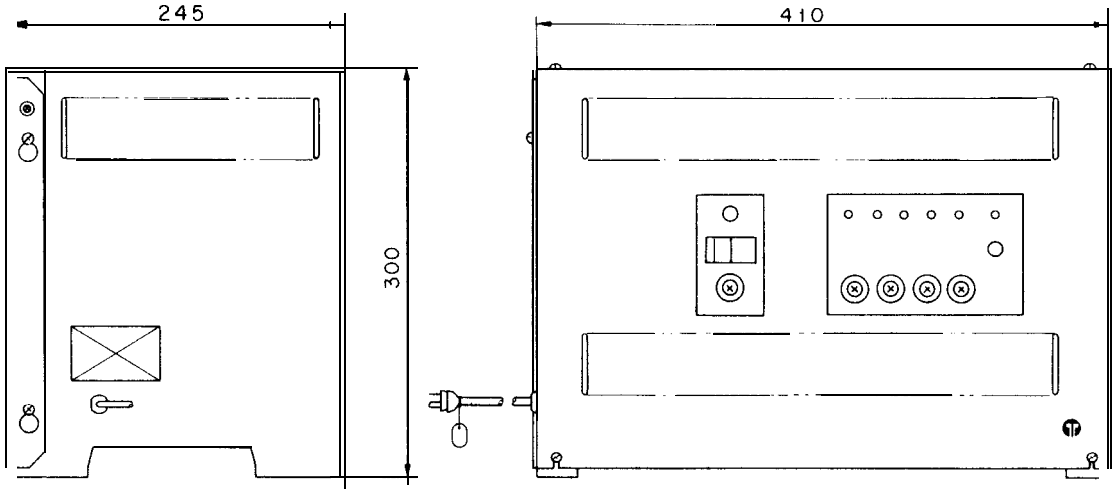

FIGURE 18 N1236 AND N2260 POWER SUPPLY
(PS-1236 2260)

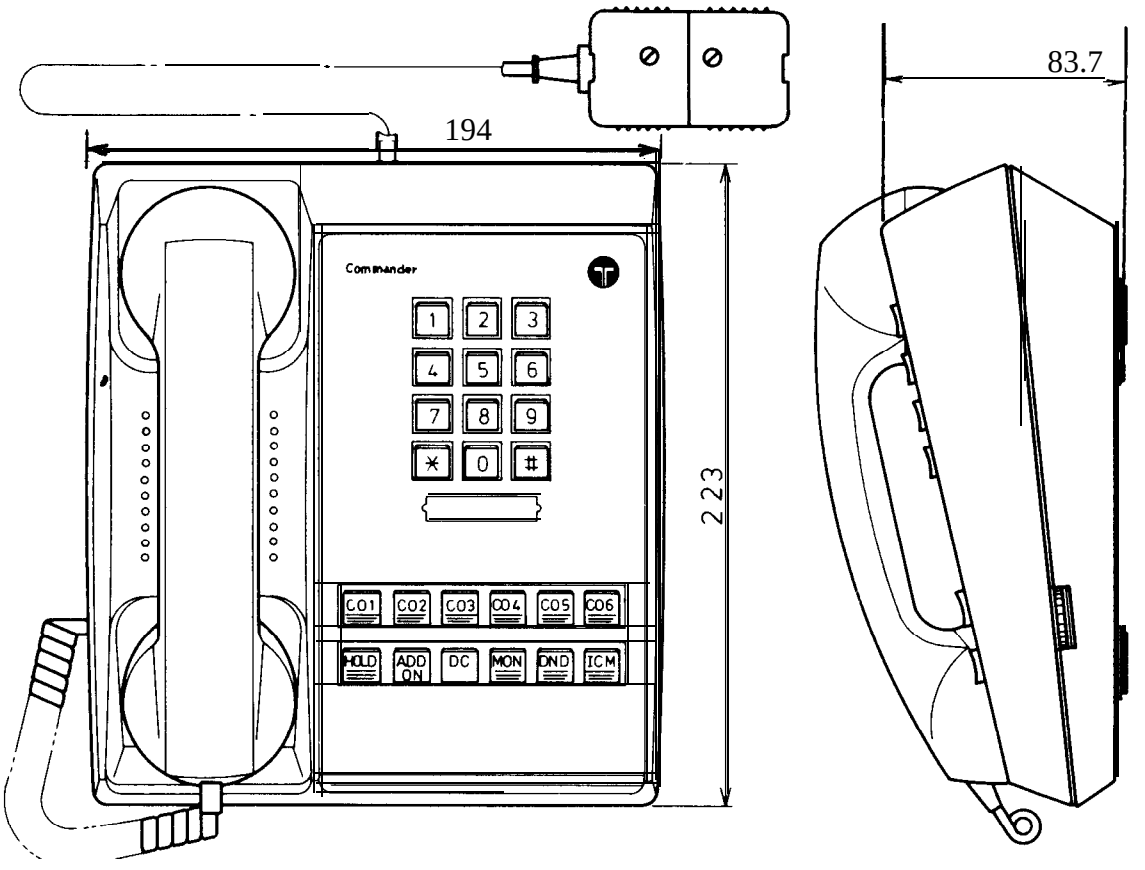

FIGURE 19 N616 STATION
(TS-616, TS-616-PFDEC, TS-616-PFVF)

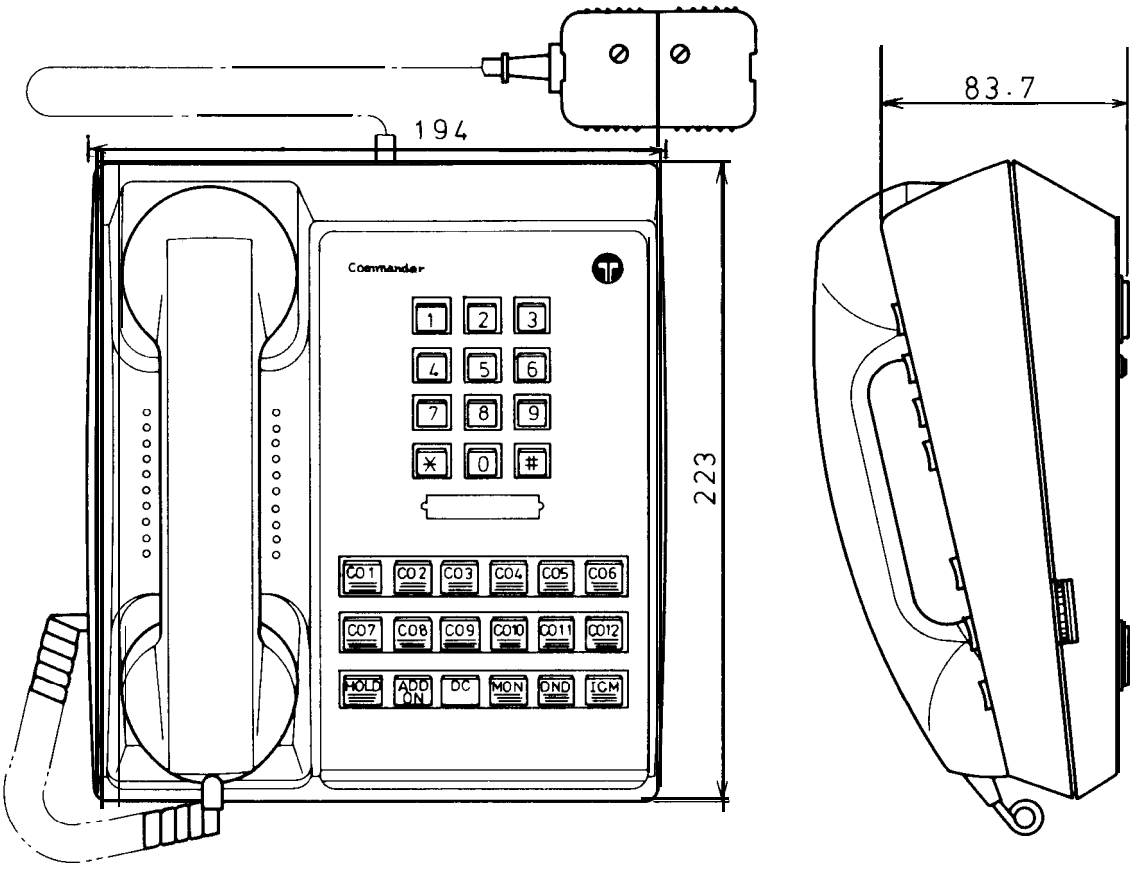

FIGURE 20 N1236 STATION
(TS-1236, TS-1236-PFDEC, TS-1236-PFVF)

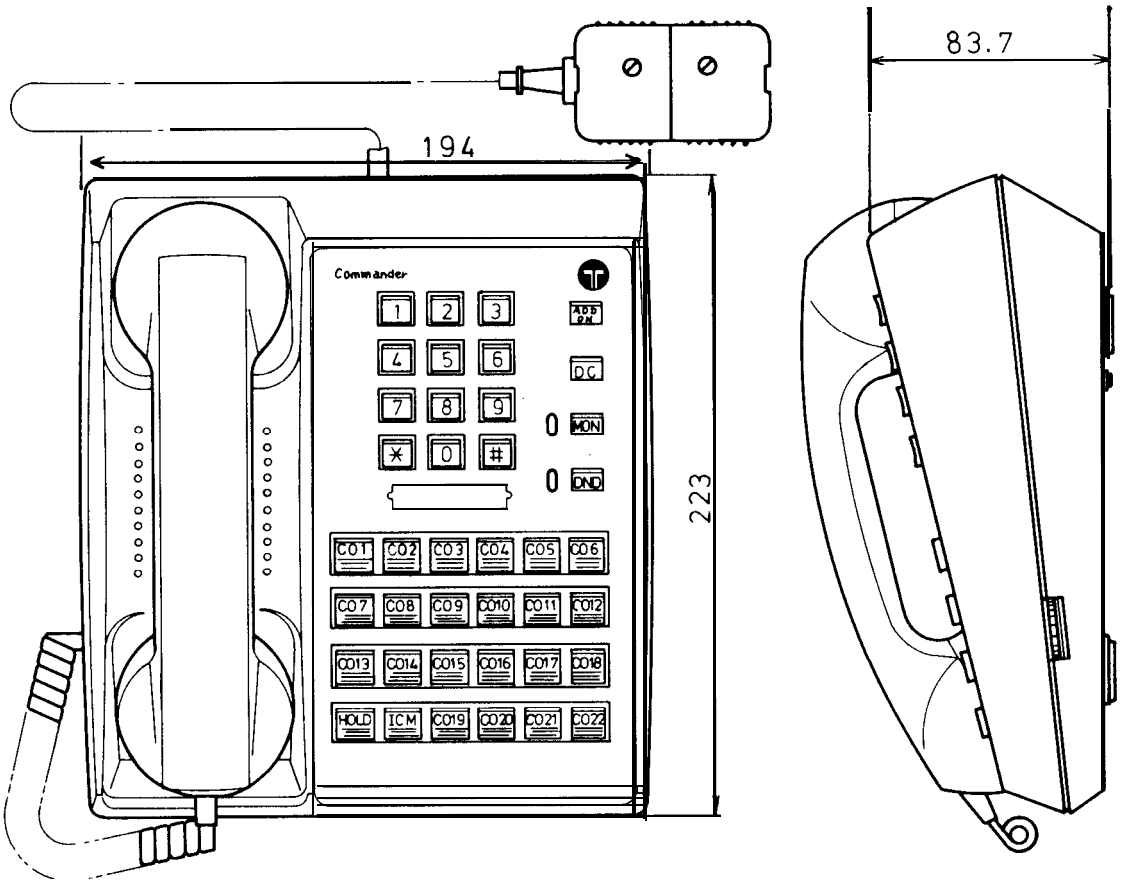

FIGURE 21 N2260 STATION
(TS-2260, TS-2260-PFDEC, TS-2260-PFVF)

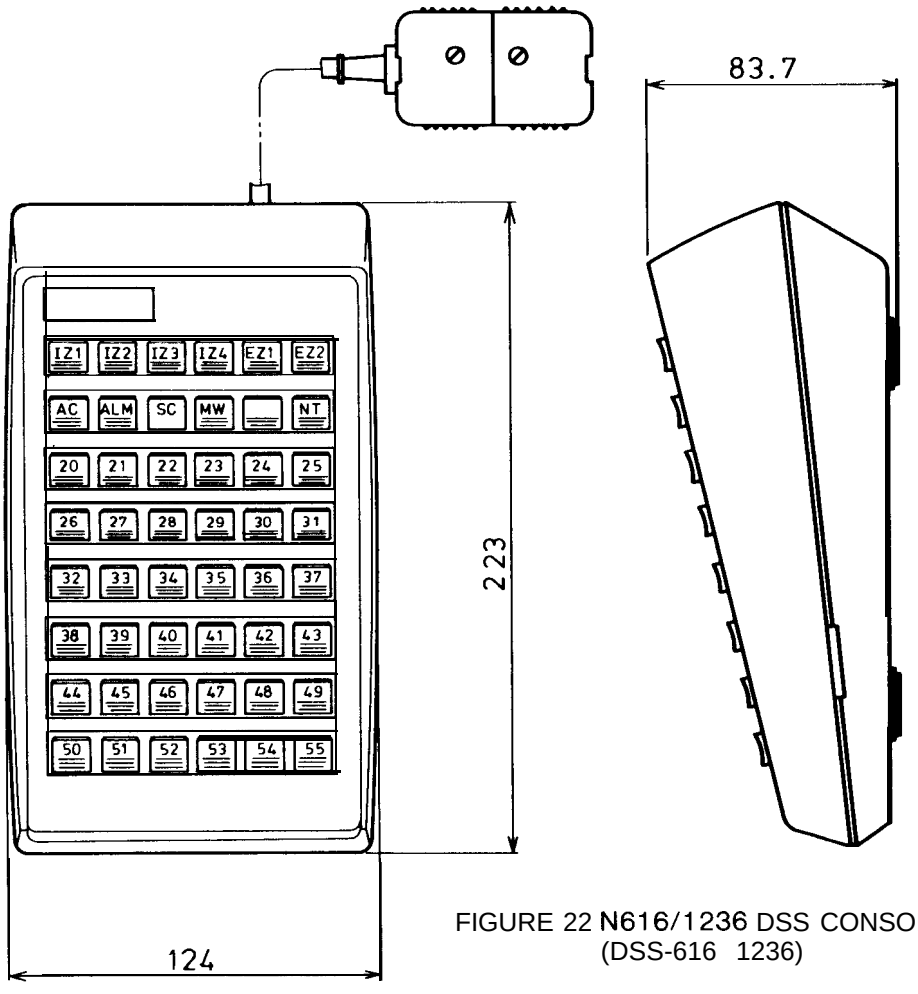

FIGURE 22 N616/1236 DSS CONSOLE
(DSS-616 1236)

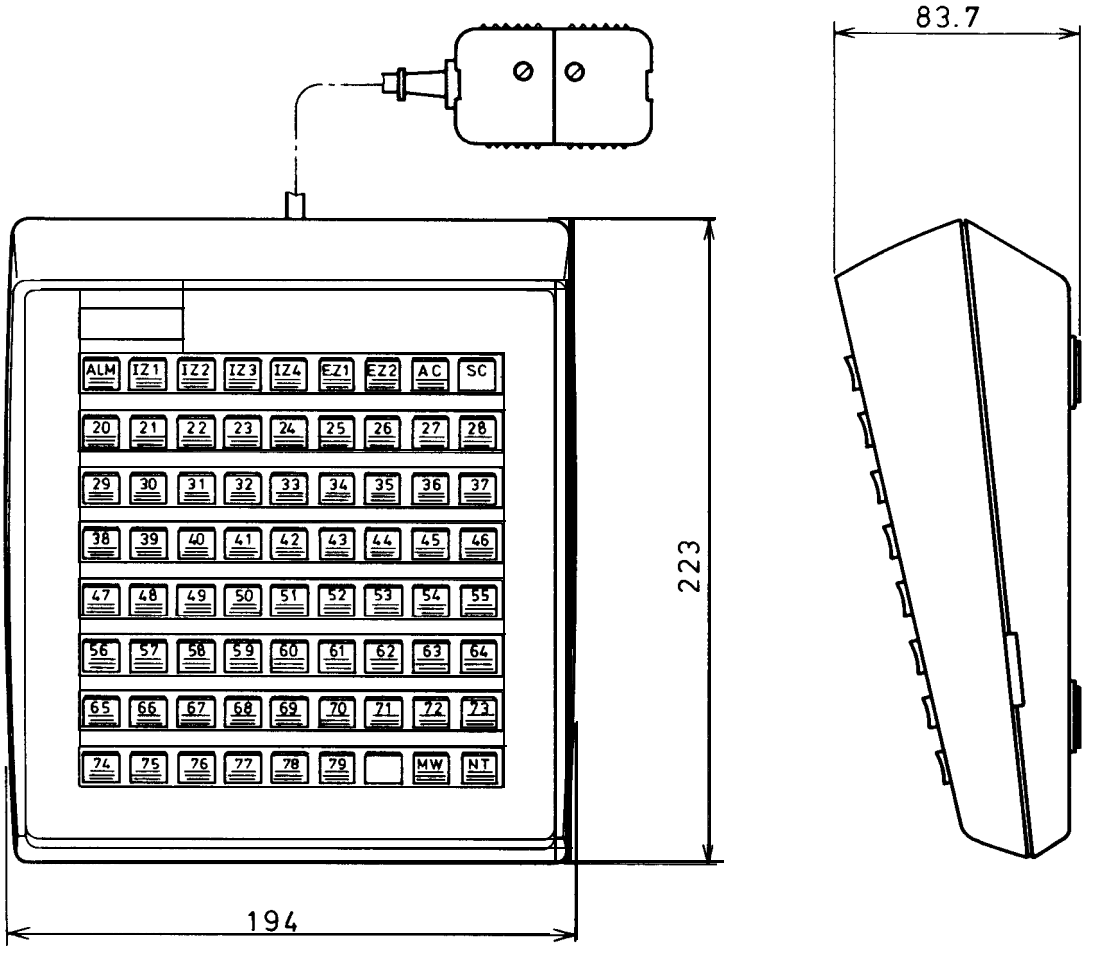

FIGURE 23 N2260 DSS CONSOLE
(DSS-2260)

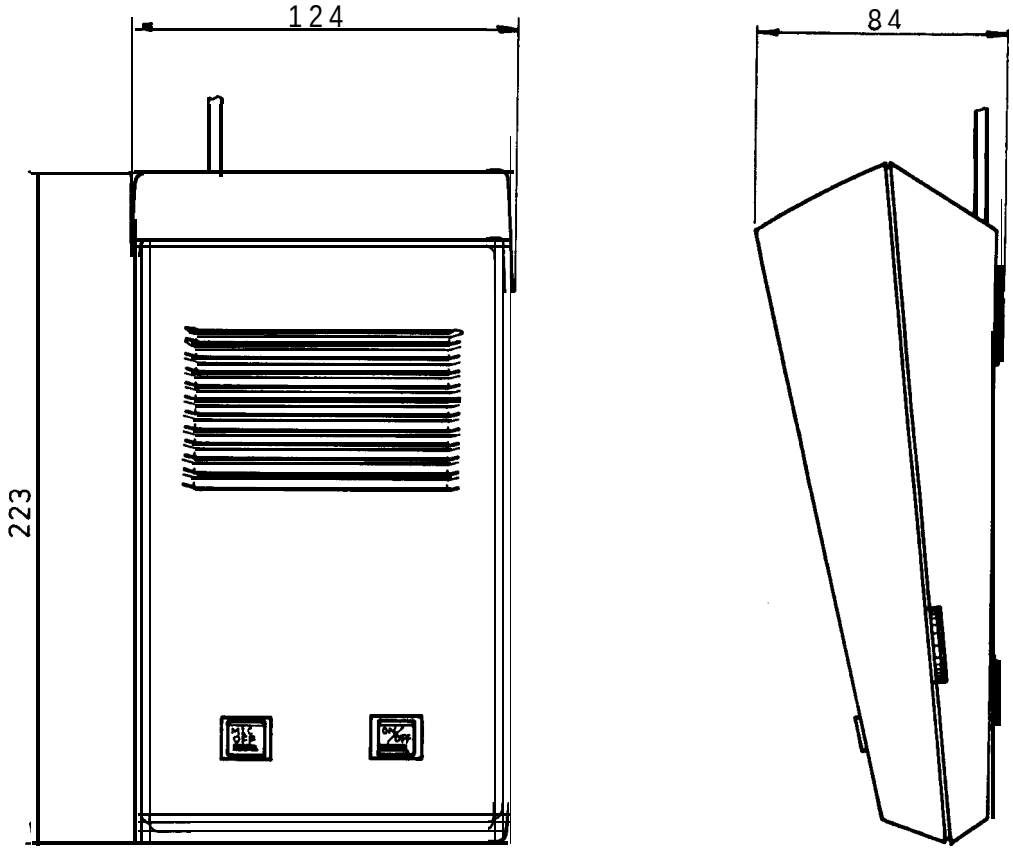

FIGURE 24 HANDSFREE CONSOLE
(HFC-N)

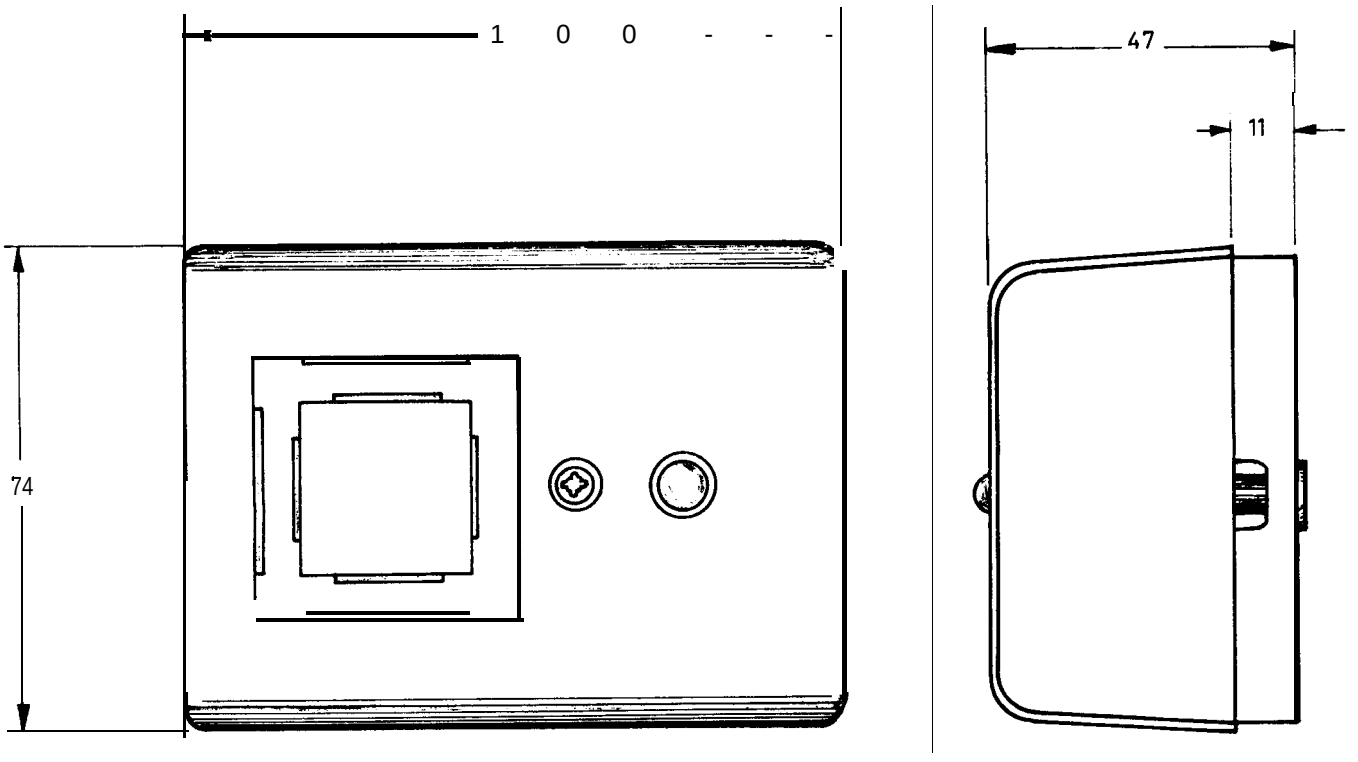

FIGURE 25 POWERFAIL BELL (PFB-N)

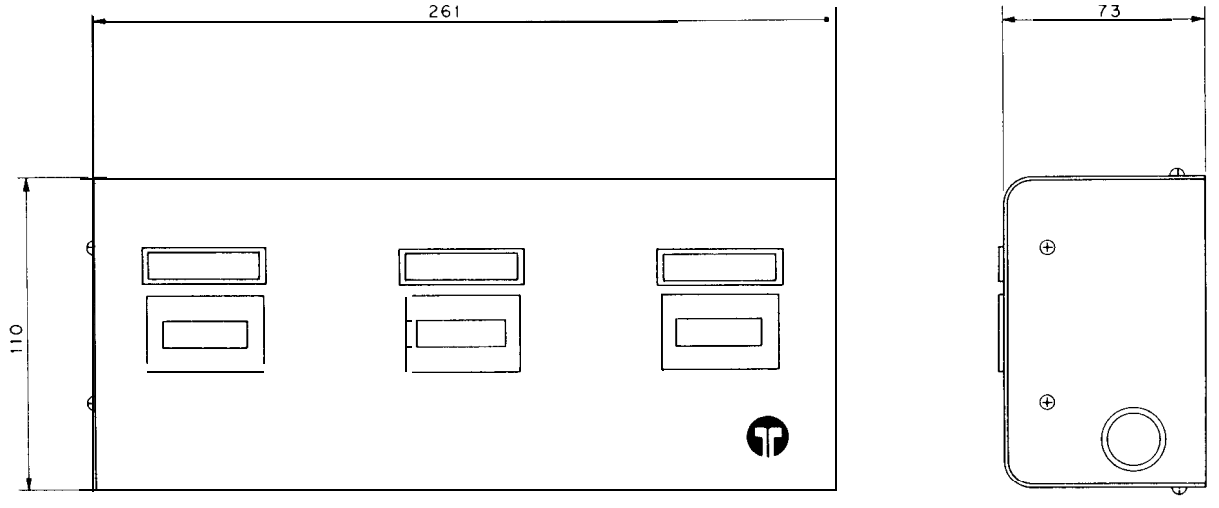

FIGURE 26 CALL METERING UNIT (CMU-N)

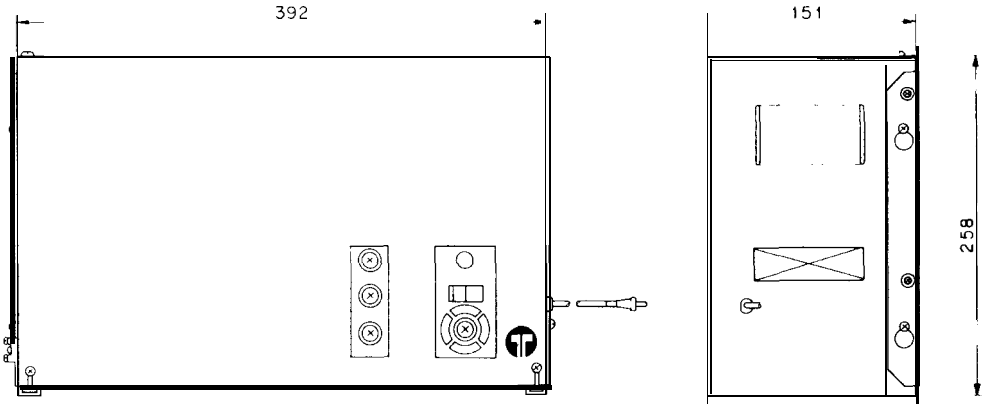

FIGURE 27 REMOTE EXTENSION AND TIE LINE INTERFACE UNIT (RTIU-N)

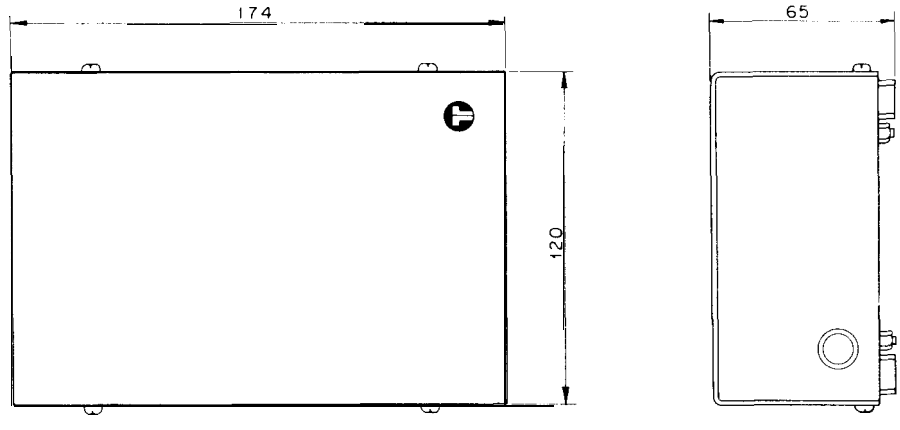

FIGURE 28 RING GENERATOR UNIT (RGU-N)

2
INSTALLATION

2.1 INTRODUCTION

The procedure, listed below, must be followed when installing the systems.

1. Using the Sales Form, the necessary equipment must be ordered.
2. Mount components, Main Equipment, SDF, Power Supply, Stations, Powerfail Bell, Ring Generator Unit, RTIU and Call Metering Unit.
3. Cable the site.
4. Terminate cables at M.E., SDF, 610 Sockets, Powerfail Bell, Ring Generator Unit, RTIU, Call Metering Unit, External Music Source, External Paging Loudspeakers and Alarm Detector.

   Lightning protection must be provided.

   A Telecom earth must be terminated on the Call Metering Unit.
5. Plug boards into Main Equipment.
6. Power-up the system.
7. Check cabling by measuring voltages at 610 sockets.
8. Connect Handsfree Consoles to the associated stations. Plug-in stations.
9. Programme the system using information provided on the sales form.
10. Carry out the functional test to ensure the system is operating correctly.
11. Write-up the site records.

Details required to perform the above procedure are described in this section.

2.2 SALES INFORMATION

The Telephone Order for any S.B.S. will be accompanied by an S.B.S. System Order.

Sales staff, after consultation with the customer, complete the System Order.

The information provided in this form will enable the ordering of the various items required for the installation. It also provides information required when programming the system.

Three copies of the System Order are forwarded to the installation area.

On completion of the installation any variation to the System Order should be noted on each copy of the order. One copy of the System Order should remain with the equipment to provide a record of the particular installation. The remaining two copies should be returned to the local Telecom Business Office.

COMMANDER TELEPHONE SYSTEM ORDER
MODEL N616, N1236, N2260

☐ SALE ☐ RENTAL

Telecom Australia

NOTE : Please tick appropriate boxes
**Delete whichever not applicable.*

CUSTOMER'S NAME					SERVICE NO
ADDRESS Postcode				NATURE OF BUSINESS CUSTOMER CONTACT	TELEPHONE
DATE OF APP'N	DATE ISSUED	SERVICE ORDER NO.	COMPLETION DATE	SALES CONTACT	TELEPHONE

TYPE OF INSTALLATION

☐ NEW ☐ REMOVAL SERVICE ☐ REPLACES (Specify type and model) .....

SUMMARY OF SYSTEM REQUIREMENTS

CAPACITY REQUIREMENTS

Item	No. to be Connected	Capacity To Be Provided
Exchange and Tie Lines		
Stations Key (Include Remote & DSS)		
2 Wire Internal		

EQUIPMENT CODE (Installing Officer Only)

EQUIPMENT REQUIREMENTS (Additional To Basic Provided)

Item	No.	Item	No.
CENTRAL EQUIPMENT		**STATION INSTRUMENTS**	
☐ Exch/Tie Line Modules		☐ Powerfail Stations	
☐ Key Station Modules		☐ Key Stations	
☐ 2-Wire Int. Station Modules		☐ 2-Wire Stations (Rem & Int)	
☐ Addit'l Intercom Links Module			
☐ External Paging Module		**STATION ATTACHMENTS**	
☐ Remote Stn/Tie Line Interface Unit		☐ DSS Consoles	
☐ Remote Station Modules		☐ Handsfree Consoles	
☐ Tie Line Connector Modules		☐ Wall Mounting Kits	
SYSTEM OPTIONS			
☐ Call Metering Unit			
☐ Powerfail Bells			

AUTHORISED ATTACHMENT CONNECTIONS

Type	Permit No.	Mode of Connection	Service Order No.
☐ Background Music			
☐ External Alarm			
☐ External Paging			

EXCHANGE/TIE LINE CONNECTIONS

Line No.	Details	P.F. Option	Call Mtrg	Line No.	Details	P.F. Option	Call Mtrg
1				14			
2				15			
3				16			
4				17			
5				18			
6				19			
7				20			
8				21			
9				22			
10							
11							
12							
13							

BUSINESS OFFICE COPY 1

TS 170 (9/81) FRONT (SHEET 1 OF 3 SHEETS)

FIGURE 29 SBS SYSTEM ORDER.
(SHEET 1)

EXPLANATORY NOTES

1. **COMP. DATE : To be inserted by installing Officer on completion of installation.**

2. **SALES CONTACT : Sales Officer conducting negotiations with customer.**

3. **CAPACITY REQUIREMENTS : Show total number of lines and stations to be connected and the system capacity required to cater for these.**

4. **EQUIPMENT REQUIREMENTS : Show number of Modules, additional to the basic tariff package, required in the central equipment to provide the required system capacity.**

5. **EXCHANGE/TIE LINE CONNECTIONS -DETAILS**

   (i) Exchange Line — show exchange number

   (ii) Tie Line — show equipment type and exchange number at distant end.

   Specify whether Power Fail Bell or Power Fail Station is to be provided.

   Indicate using ticks, those lines on which call metering equipment is to be provided.

COMMANDER TELEPHONE SYSTEM ORDER MODEL N616, N1236, **N2260**

*NOTE *Delete whichever Not Applicable*

CUSTOMERS NAME	SERVICE NO.	SRVCE ORDER NO.

PROGRAMMABLE OPTIONS

Option	Tick if req'd	Details
DSS Override of DND		
Off-Hook signalling		
Auto Recall		Timer Setting 16, 32, 48, 64, 80, 96, 112, 128 secs (circle one)
Meet-me-Answer		
External Alarm		See sheet 1 for alarm equipt details
Internal Paging		Stns Zone 1- / Stns Zone 3- / Stns Zone 2- / Stns Zone 4-
External Paging		Zone 1: B.G.M Yes ☐ No ☐ ; Ring Signal Common ☐ Group ☐ (No....) Night Transfer ☐
		Zone 2: B.G.M Yes ☐ No ☐ ; Ring Signal - Common ☐ Group ☐ (No....) Night Transfer ☐
Exclusive/Hot Lines		Line/Stn* to Stn / Line/Stn* to Stn
		Line/Stn* to Stn / Line/Stn* to Stn
		Line/Stn* to Stn / Line/Stn* to Stn
P.A.B.X. Recall		
Group I/C Call Signalling		Lines Gp 1 / Lines Gp 3 / Lines Gp 2 / Lines Gp 4
Exchange Line Splitting		Highest Line Lower Group / Stns barred to Upper Group-
Station Access Barring		(See sheet 3 for station assignment to classes) / Allowable No/ Codes Class C.
		Codes barred Class D — Max. No Length — Digits
		Common Access Codes
Stations to I/C Call signalling		Stns to Gp 1 (max 10)
		Stns to Gp 2 (max 10)
		Stns to Gp 3 (max 10)
		Stns to Gp 4 (max 10)
		Stns to Common (max 10)
		Stns to Night Transfer (max 20)
Do-not-Disturb		*(see sheet 3 for stations to be enabled)*
Executive-Secretarial		Groupings (max 4)

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FIGURE 30 SBS SYSTEM ORDER.
(SHEET 2)

EXPLANATORY NOTES

Where the option is required ensure details on right hand side of sheet are completed. An extra sheet should be used if space on one sheet is insufficient. Further explanations of details required are :

(i) INTERNAL PAGING	**show numbers of lowest and highest stations in each zone (e.g 20 27, 28-33, etc)**
(ii) EXCLUSIVE/HOT LINE	**Exclusive Line delete "Stn" and show Line number (from sheet 1) and station number.** **Hot Line - delete "Line" and show both station numbers.**
(iii)EXECUTIVE-SECRETARIAL	**- show groupings with executive station number first (e.g 27 29 where 27 "executive" station and 29 the "secretarial" station).**

SHEET ....

COMMANDER TELEPHONE SYSTEM ORDER MODELS, N616, N1236, N2260

CUSTOMERS NAME	SERVICE NO.	SERVICE ORDER NO.

(1) STN. NO.	(2) DESIGNATION AND/OR LOCATION	(3) STN TYPE & COLOUR	OPTIONAL FACILITIES (4) Access Class	(5) DND	(6) Exec. Sec.	(7) Power Fail	(8) 4'Free Console	(9) Wall Kit	EQUIPMENT CODE (Installing Staff Use)

TS 170 (9 '81) FRONT (SHEET 3 OF 3 SHEETS)

BUSINESS** OFFICE **COPY 1

FIGURE 31 SBS SYSTEM ORDER.
(SHEET 3)

EXPLANATORY NOTES

COLUMN 1 — Station numbering begins at 20.

COLUMN 2 — Show location and/or name of station user e.g., MNGR STORE, JONES 1st FL.

COLUMN 3 Key Stns Show Key or P/Fail and panel colour i.e. WG (Wood Grain) BR (Brown) or OR (Orange)

2 Wire Stns — Show REM (Remote)or INT (Internal) and instrument type and colour (eg. CF Ivory)

COLUMN 4 -- Designate required Access Class i.e. A, B, C, D, or E.

COLUMN 5 — Tick (✓) where required.

COLUMN 6 — On Executive Station designate Secretarial Station e.g. 25 SEC. Cross reference Secretarial Station to Executive Unit e.g. 22 Ex.

COLUMN 7 — Designate associated exchange line No. eg. L. 1.

COLUMNS 8 AND 9 — Tick (✓) where items required.

NOTE : *1. DSS consoles utilize station numbers and must be shown in column 3 immediately following the station with which it is associated.*

2. The DSS console on an N616 system may be allocated station number 36. This station number cannot be used for telephone stations and is provided exclusively for provision of a DSS console.

2.3 LOCATION AND MOUNTING OF EQUIPMENT

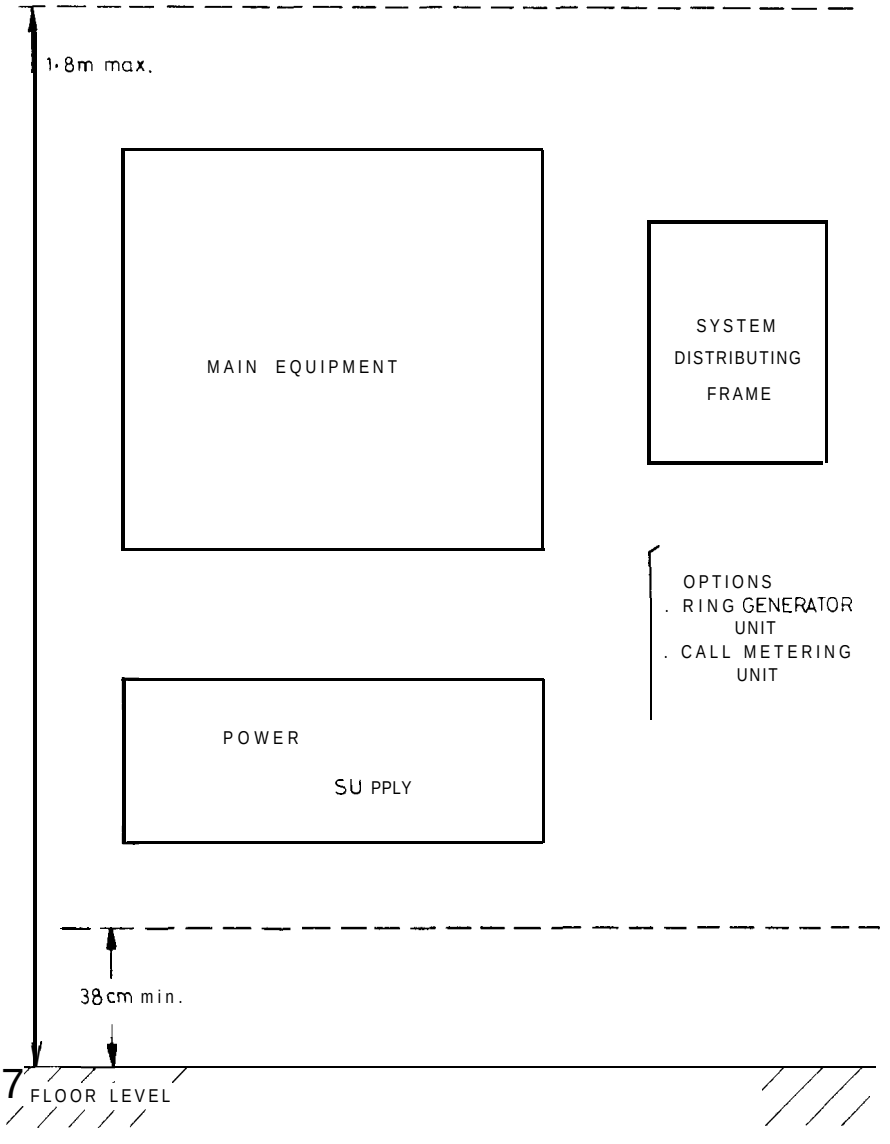


FIGURE 32 LIMITATIONS ON WALL MOUNTING

All items of equipment must be located in positions which allow good access for maintenance activities. The customer is responsible for providing satisfactory lighting for installation and maintenance activities at the equipment. When wall mounting equipment, allowance should be made for at least 30 cm clear wall space on each side and 1 metre of clear floor space in front of the units.

The Main Equipment, Power Supply, System Distributing Frame, Call Metering Units, Remote Extension and Tie Line Interface Unit and Ring Generator Unit must be mounted on a wall at least 38 cm from the floor and no higher than 1.8m from the floor as indicated on figure 32.

The customer will provide a single phase 200-250 volt, 10 amp, 50 Hz AC general purpose outlet within 1 metre of the equipment. The power outlet must be correctly earthed.

Due to the weight of the equipment, particularly the Power Supply, care should be exercised in the selection of the mounting position.

Both the Main Equipment and the Power Supply are to be wall mounted as shown in figure 32. Equipment may be mounted directly to solid brick walls or similar. For hollow structures, such as plaster-board walls or partitions, a suitable sized back-board should be firmly secured to the wall studs (or other supporting members) and the equipment fixed to the back-board.

Where equipment is to be mounted on solid brick walls or similar, suitable masonary anchors should be used in lieu of the mounting screws.

Further mounting details for the Main Equipment and Power Supply are provided in section 2.3.1 and 2.3.2 respectively.

While mounting equipment refer to the drawings of the components in section 1.5.

2.3.1 Main Equipment

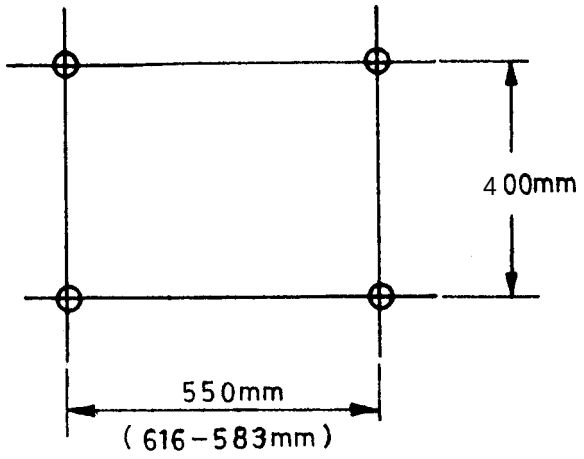


FIGURE 33 MOUNTING FOR MAIN EQUIPMENT

The cabinet is wall mounted. To mount on the wall, drill four holes in the locations shown in figure 33. Insert mounting screws in the holes. Remove the two wall mounting brackets from the rear corners of the cabinet. Reassemble, with bracket sides containing the two tear drop holes projecting out from the side of the cabinet, refer to figures 15 to 17.

Hang the cabinet on the screws using the tear-drop holes provided in the wall mounting brackets, then, tighten the screws.

2.3.2 Power Supply

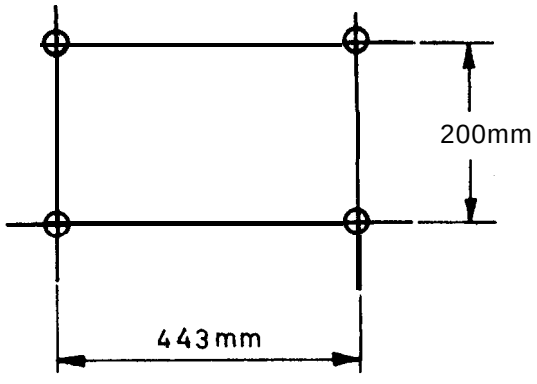


FIGURE 34 MOUNTING FOR POWER SUPPLIES 1236/2260

The power supply is wall mounted. Drill four holes in the locations shown on figure 34. Insert mounting screws into the holes. Change over the wall mounting brackets screwed on the rear corners of power supply, as described above for the main equipment, and hang the power supply on the mounting screws using the tear-drop holes. Tighten the screws.

2.3.3 **System Distributing Frame**

The S.D.F. provides a common terminating point for the main equipment, stations and other ancillary equipment. It also provides for any strapping necessary for provision of facilities.

The S.D.F. is constructed using the Krone LSA Plus terminating system. The terminal is an insulation displacement type terminal and is available in 10 pair modules. The modules provide the facility of opening the circuit for monitor or test purposes without the need to disturb the terminations. See figure 35.

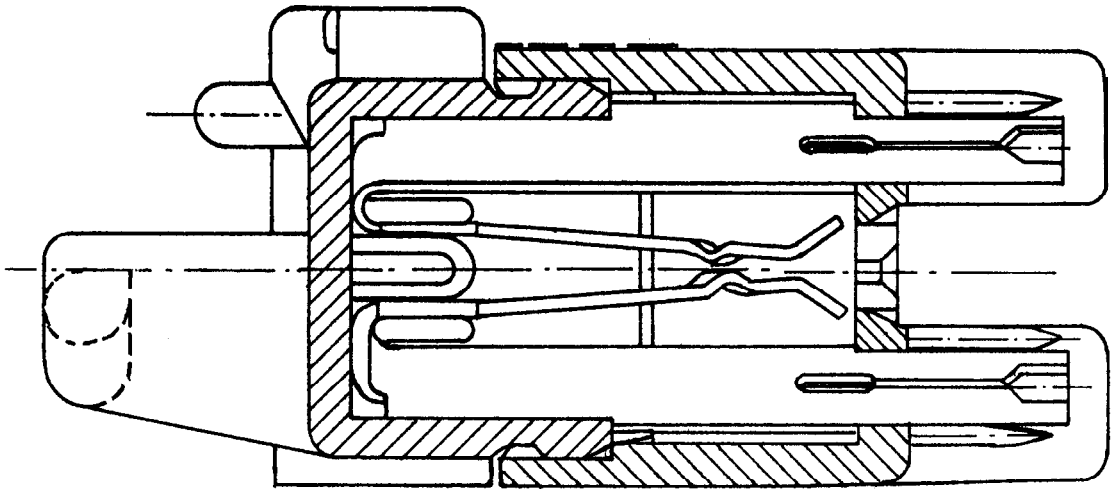


FIGURE 35 KRONE DISCONNECTION MODULE
(SIDE ELEVATION)

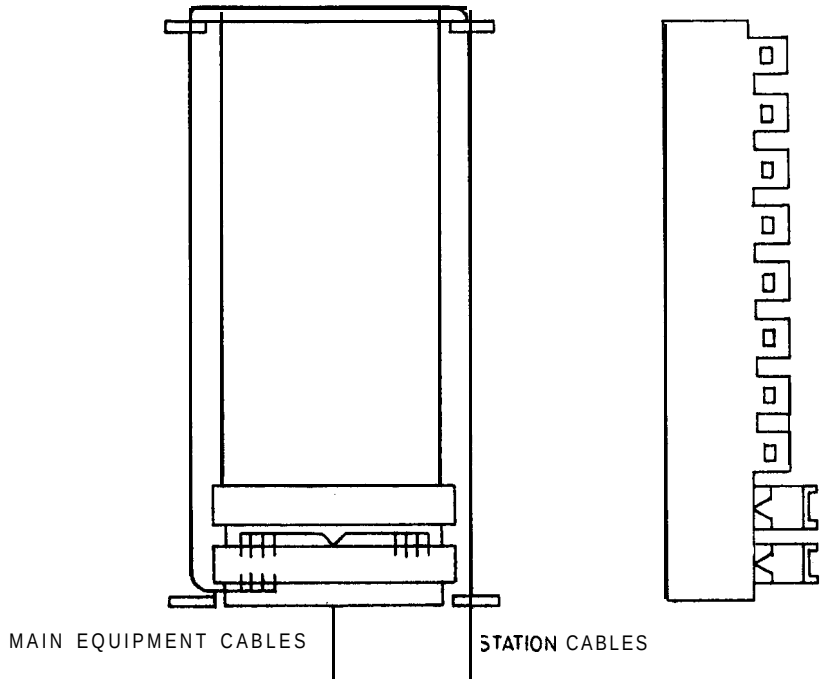


FIGURE 36 BACKMOUNT CHANNEL CABLE LAYOUT

The modules are mounted on a backmount channel. Each channel will accept 10 modules, thus giving a total capacity of 100 pairs. See figure 36.

Backmount channels can be mounted using either the backmount channel mounting frame or on a suitable sized backing board.

When more than 100 pairs are necessary, an additional backmount frame should be fitted in accordance with the layout shown in figure 37.

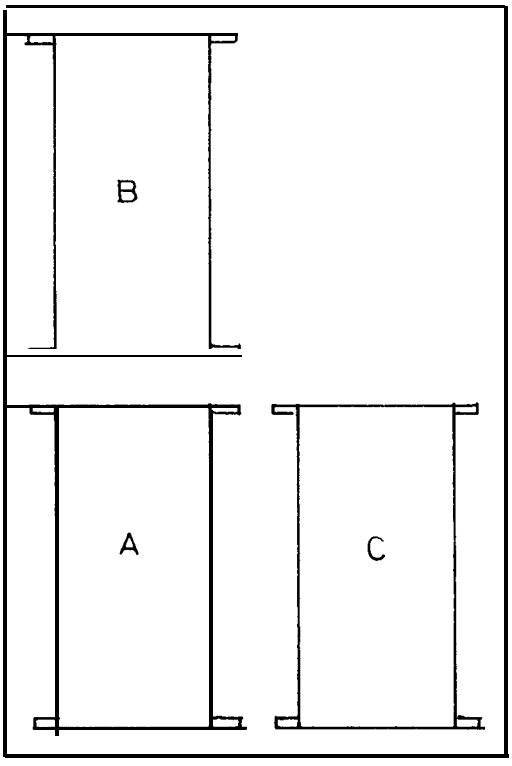


FIGURE 37 S.D.F. BACKMOUNT CHANNEL LAYOUT

TABLE 4: S.D.F. Terminal Requirements For Each System

SYSTEM	S.D.F. SIZE	TERMINATED PAIRS	AMP CHAMP CONNECTORS	KRONE MODULES
Commander N616	100 pairs	75	3	8
N1236	200 pairs	150	6	15
N2260	300 pairs	275	11	28

2.3.4 Stations

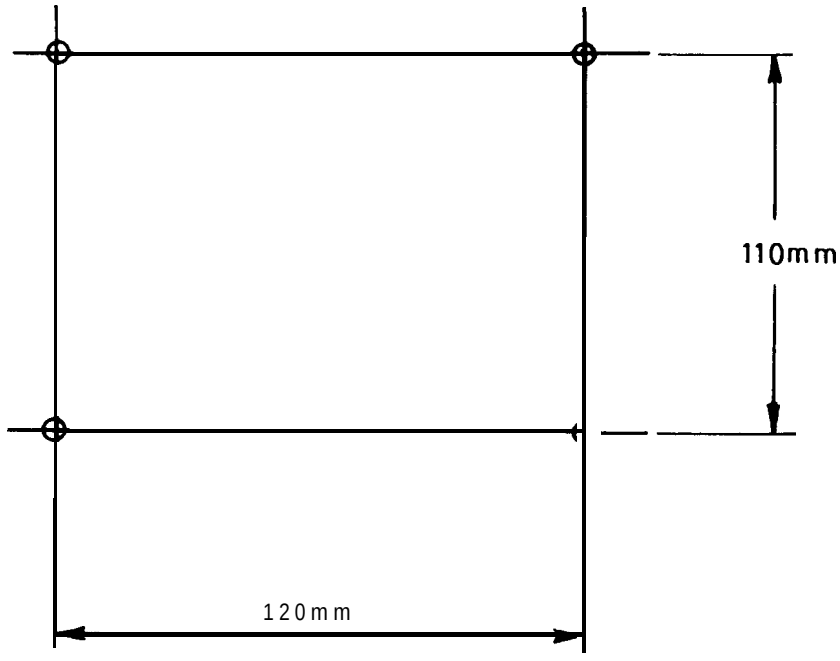
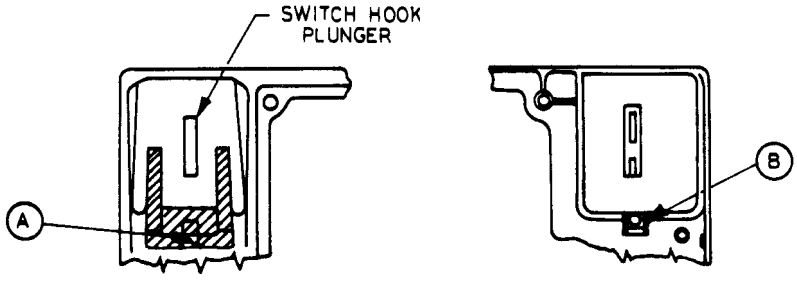


FIGURE 38 WALL MOUNTING FOR STATIONS

HOW TO INSTALL THE HANDSET HANGER



HOW TO PUT THE STATION ON TO
THE WALL MOUNTING BRACKET

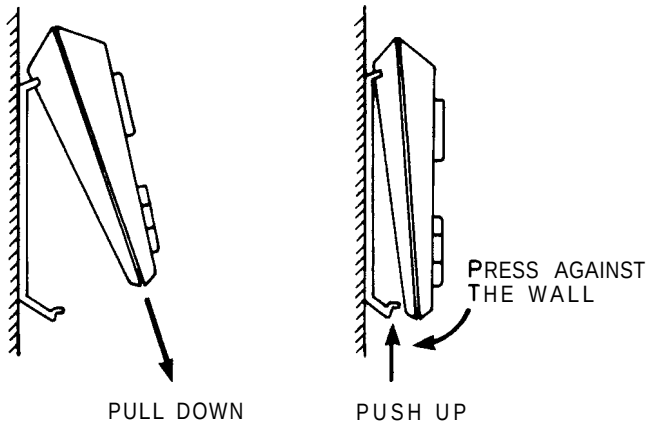


FIGURE 39 WALL MOUNTING BRACKET INSTALLATION

In order to mount the station on a wall, a Wall Mounting Bracket is required.

- Mount the bracket on the wall by means of the four screws which are supplied with the bracket. The bracket is located so that the edge with the two retaining tabs is at the top. Hole centres are shown in figure 38.
- Next, remove the front panel of the station with a screw driver, loosen the screws and remove the case moulding from the base moulding.
- Insert the hanger into the square hole (Point A in figure 39). This hole is located in the recess on the top moulding used for the receiver of the handset. Fasten the metal retainer from inside the housing using the screw provided (Point B in Figure 39). After fixing the handset hanger to the top moulding, reassemble the top moulding and the base moulding, tighten the screws and replace the front plate.
- Mount the telephone plug and socket on the wall in the centre of the wall mounting bracket. The line cord should be gathered together and placed inside the wall-mounting bracket.
- Now clip the station on to the wall-mounting bracket as shown in figure 39. This is done by fixing the upper portion of the bracket into the two square holes located in the base plate of the station. Then, push the station base towards the bracket until it clips into the lower portion of the bracket.

2.3.5 Powerfail Bell

Remove the cover of the bell by unscrewing the Phillips head screw in the middle of the cover. Screw the bell into place using the 3 holes located on the base, then replace the cover.

2.3.6 Remote Extension and Tie Line Interface Unit (RTIU)

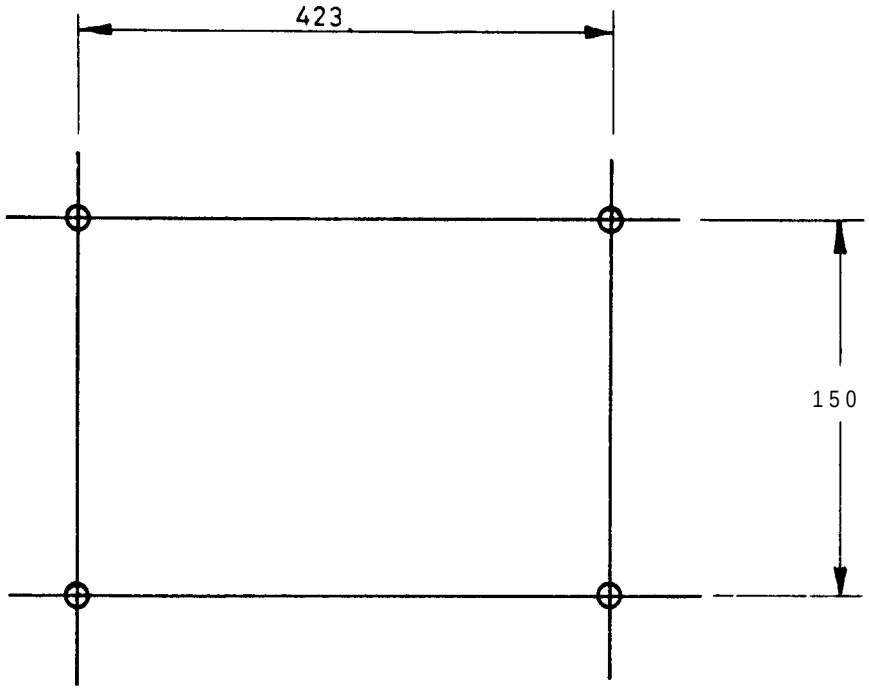


FIGURE 40 WALL MOUNTING FOR THE RTIU

The RTIU is located on the wall, normally adjacent to the main equipment. The mounting procedure for the RTIU is the same as the mounting for the main equipment and power supply, except the hole centres are different, refer to figure 40.

2.3.7 Call Metering Unit

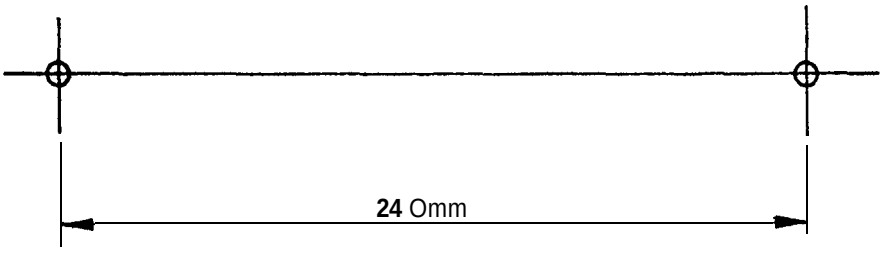


FIGURE 41 WALL MOUNTING FOR CALL METERING UNIT

The unit is fixed to the wall adjacent to the system distributing frame. Remove the cover by loosening the four retaining screws. Screw the base to the wall. Replace the cover after terminating the exchange lines on the terminal block, refer to figure 41.

2.3.6 Ring Generator Unit

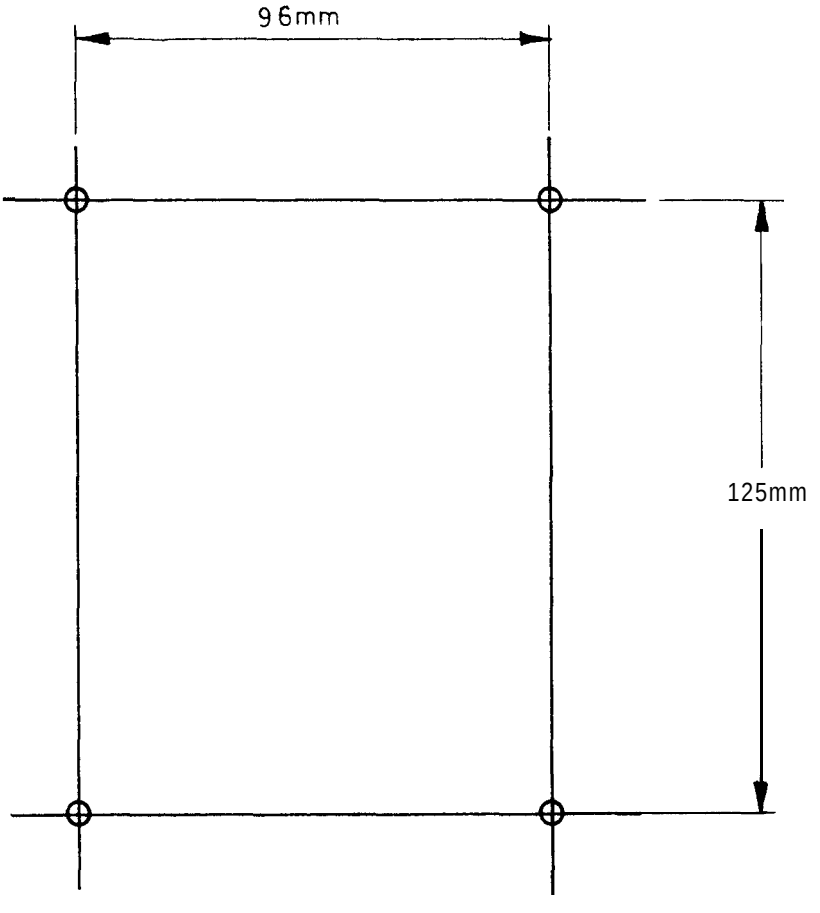


FIGURE 42 WALL MOUNTING FOR RING GENERATOR UNIT

The unit is fixed to the wall adjacent to the system distributing frame. Remove the cover by loosening the four retaining screws. Screw the base to the wall (refer to figure 42 for hole centres). Replace the cover after terminating the wiring on the terminal block.

2.4 CABLING AND TERMINATING METHODS

2.4.1 General

Stations and other ancillary equipment will normally be cabled direct to the S.D.F. The main equipment is connected to the S.D.F. via cables terminated, at the main equipment end, on 50 pin AMP Champ connectors.

Twisted two-pair cabling must be used when installing these systems. FLAT UNDER CARPET CABLE MUST NOT BE USED.

2.4.2 AMP Champ Connectors

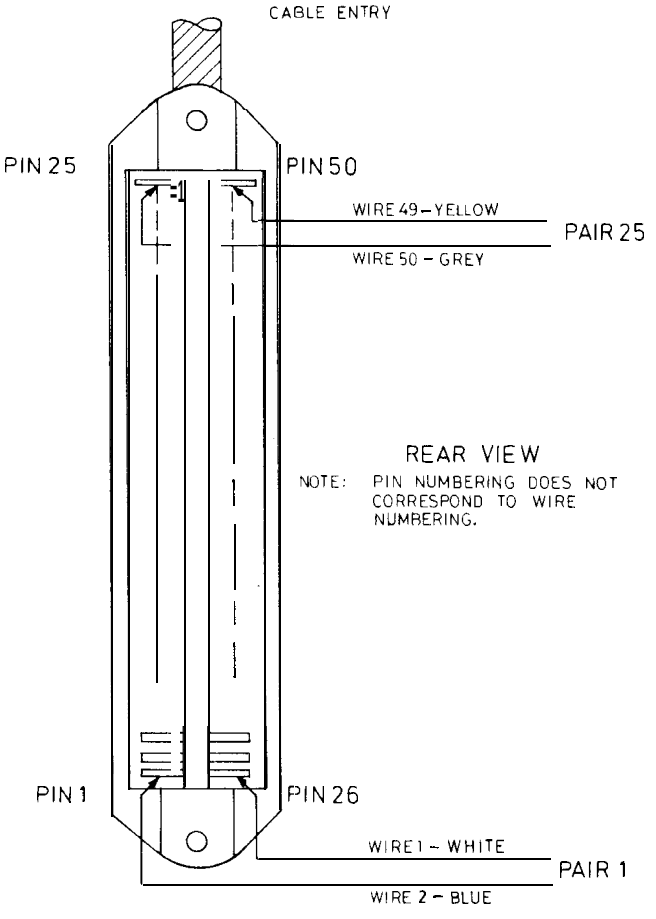


FIGURE 43 AMP CHAMP CONNECTOR -CABLE TERMINATION

Cables should be terminated in the following order, pair one located on pins number 1 and 26, with the colour on pin 1 and the mate on pin 26. Note the cable entry shown in figure 43.

To avoid damaging the conductors, the correct terminating tools must be used. Brackets are provided with the main equipment to retain the AMP Champ connectors in position on the main equipment.

2.4.3 S.D.F. Cabling

The cables from the main equipment are terminated at the S.D.F. in colour code sequence commencing from the bottom row of Block A, Refer to figure 37.

Wire designations for each system are listed in tables 5, 6 and 7. Cabling from the main equipment should be terminated in the top row of terminals of each module.

Cabling to the stations and optional equipment should be terminated in accordance with the requirements listed on the SBS Sales Form. Note, the order for terminating exchange lines is important when assigning audible signalling groups and the order for terminating stations is important for station number allocation and assigning internal paging zones.

Station cabling should be terminated on the bottom row of terminals of each module. See figures 36 and 37.

For ease of termination and to avoid damage to the conductors the correct terminating technique and tool must be used.

2.4.3.1 Krone Terminal Module

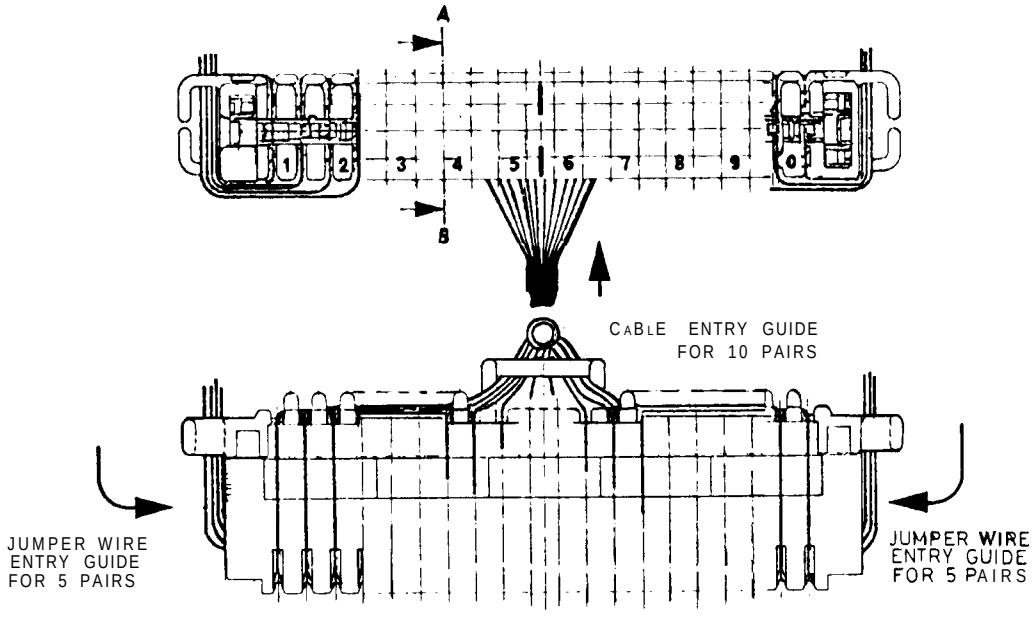


FIGURE 44 KRONE TERMINAL MODULE - CABLE TERMINATION

The main equipment cabling is run in the trough formed by the backmount channel.

10 pair tails are then formed into a “goose neck” to allow future removal of the module, if necessary. The tail is placed through the cable entry guide at the rear of the module and the module is then locked in position on the backmount channel. The tail is then fanned out and the wires placed in the slots, ready for termination to the top row of the module.

Station cabling is run as shown in figure 36 and 44 and terminated on the bottom row of the module.

TABLE 5 - N 616 AMPHENOL CONNECTOR ASSIGNMENT

CONNECTOR A SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	1
STA	AL2	1	
20	BD+	27	2
	BD-	2	
	AL1	28	3
STA	AL2	3	
21	BD+	29	4
	BD-	4	
	AL1	30	5
STA	AL2	5	
22	BD+	31	6
	BD-	6	
	AL1	32	7
STA	AL2	7	
23	BD+	33	8
	BD-	8	
	AL1	34	9
STA	AL2	9	
24	BD+	35	10
	BD-	10	
	AL1	36	11
STA	AL2	11	
25	BD+	37	12
	BD-	12	
	AL1	38	13
STA	AL2	13	
26	BD+	39	14
	BD-	14	
	AL1	40	15
STA	AL2	15	
27	BD+	41	16
	BD-	16	
	AL1	42	17
STA	AL2	17	
28	BD+	43	18
	BD-	18	
	AL1	44	19
STA	AL2	19	
29	BD+	45	20
	BD-	20	
	AL1	46	21
STA	AL2	21	
30	BD+	47	22
	BD-	22	
	AL1	48	23
STA	AL2	23	
31	BD+	49	24
	BD-	24	
		50	25
		25	

CONNECTOR L SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	26
STA	AL2	1	
32	BD+	27	27
	BD-	2	
	AL1	28	28
STA	AL2	3	
33	BD+	29	29
	BD-	4	
	AL1	30	30
STA	AL2	5	
34	BD+	31	31
	BD-	6	
	AL1	3 2	32
STA	AL2	7	
35	BD+	33	33
	BD-	8	
PF	1L1	34	34
	1L2	9	
S	2L1	35	35
T	2L2	10	
R	3L1	36	3.6
A	3L2	11	
P	4L1	37	37
S	4L2	12	
TO	5L1	38	38
	5L2	13	
STAx	6L1	39	39
	6L2	14	
AL1	7L1	40	40
&	7L2	15	
AL2	8L1	41	41
	8L2	16	
PF	1 AL1	42	42
	1AL2	17	
S	2AL1	43	43
T	2AL2	18	
A	3AL1	44	44
T	3AL2	19	
I	4AL1	45	45
0	4AL2	20	
N	5AL1	46	46
	5AL2	21	
A	6AL1	47	47
	6AL2	22	
P	7AL1	48	48
A	7AL2	23	
I	8AL1	49	49
R	8AL2	24	
		50	50
		25	

CONNECTOR M SIGNAL	DESG	PLUG PIN	SDF PAIR
E	1A	26	51
X	1B	1	
C	2A	27	52
H	2B	2	
A	3A	28	53
N	3B	3	
G	4A	29	54
E	4B	4	
	5A	30	55
L	5B	5	
I	6A	31	56
N	6B	6	
E	7A	32	57
S	7B	7	
	8A	33	58
	8B	8	
P	1A	34	59
0	1B	9	
W	2A	35	60
E	2B	10	
R	3A	36	61
F	3B	11	
A	4A	37	62
I	4B	12	
L	5A	38	63
	5B	13	
B	6A	39	64
E	6B	14	
L	7A	40	65
L	7B	15	
S	8A	41	66
	8B	16	
EARTH	ER	42	67
RECALL	ER	17	
	AL1	43	68
DSS	AL2	18	
36	BD+	44	69
	BD-	19	
BGM	MI	45	70
	M2	20	
ALARM	ALM1	46	71
	ALM2	21	
L	1LS1	4 7	72
OS	1LS2	22	
UP	1S1	48	73
DK	1S2	23	
		49	74
CMU	CMU+	24	
		50	75
	CMU-	25	

TABLE 6 - N 1236 AMPHENOL CONNECTOR ASSIGNMENT (1/2)

CONNECTOR A SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	1
STA	AL2	1	
20	BD+	27	2
	BD-	2	
	AL1	28	3
STA	AL2	3	
21	BD+	29	4
	BD-	4	
	AL1	30	5
STA	AL2	5	
22	BD+	31	6
	BD-	6	
	AL1	32	7
STA	AL2	7	
23	BD+	33	8
	BD-	8	
	AL1	34	9
STA	AL2	9	
24	BD+	35	10
	BD-	10	
	AL1	36	11
STA	AL2	11	
25	BD+	37	12
	BD-	12	
	AL1	38	13
STA	AL2	13	
26	BD+	39	14
	BD-	14	
	AL1	40	15
STA	AL2	15	
27	BD+	41	16
	BD-	16	
	AL1	42	17
STA	AL2	17	
28	BD+	43	18
	BD-	18	
	AL1	44	19
STA	AL2	19	
29	BD+	45	20
	BD-	20	
	AL1	46	21
STA	AL2	21	
30	BD+	47	22
	BD-	22	
	AL1	48	23
STA	AL2	23	
31	BD+	49	24
	BD-	24	
		50	25
		25	

CONNECTOR B SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	26
STA	AL2	1	
32	BD+	27	27
	BD-	2	
	AL1	28	28
STA	AL2	3	
33	BD+	29	29
	BD-	4	
	AL1	30	30
STA	AL2	5	
34	BD+	31	31
	BD-	6	
	AL1	32	3 2
STA	AL2	7	
35	BD+	33	33
	BD-	8	
	AL1	34	3 4
STA	AL2	9	
36	BD+	35	35
	BD-	10	
	AL1	36	36
STA	AL2	11	
37	BD+	37	37
	BD-	12	
	AL1	38	3 8
STA	AL2	13	
38	BD+	39	39
	BD-	14	
	AL1	40	40
STA	AL2	15	
39	BD+	41	41
	BD-	16	
	AL1	42	4 2
STA	AL2	17	
40	BD+	43	43
	BD-	18	
	AL1	44	44
STA	AL2	19	
41	BD+	45	45
	BD-	20	
	AL1	46	46
STA	AL2	21	
42	BD+	47	47
	BD-	22	
	AL1	48	48
STA	AL2	23	
43	BD+	49	49
	BD-	24	
		50	50
		25	

CONNECTOR C SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	51
STA	AL2	1	
44	BD+	27	52
	BD-	2	
	AL1	28	5 3
STA	AL2	3	
45	BD+	29	54
	BD-	4	
	AL1	30	55
STA	AL2	5	
46	BD+	31	56
	BD-	6	
	AL1	32	5 7
STA	AL2	7	
47	BD+	33	58
	BD-	8	
	AL1	34	59
STA	AL2	9	
48	BD+	35	60
	BD-	10	
	AL1	36	61
STA	AL2	11	
49	BD+	37	62
	BD-	12	
	AL1	38	63
STA	AL2	13	
50	BD+	39	64
	BD-	14	
	AL1	40	65
STA	AL2	15	
51	BD+	41	66
	BD-	16	
	AL1	42	67
STA	AL2	17	
52	BD+	43	68
	BD-	18	
	AL1	44	69
STA	AL2	19	
53	BD+	45	70
	BD-	20	
	AL1	46	71
STA	AL2	21	
54	BD+	47	72
	BD-	22	
	AL1	48	73
STA	AL2	23	
55	BD+	49	74
	BD-	24	
		50	75
		25	

TABLE 6 - N 1236 AMPHENOL CONNECTOR ASSIGNMENT (2/2)

CONNECTOR F SIGNAL	DESG	PLUG PIN	SDF PAIR
P	IL1	26	76
O	IL2	1	
W	2L1	27	77
E	2L2	2	
R	3L1	28	78
F	3L2	3	
A	4L1	29	79
	4L2	4	
	5L1	30	80
	5L2	5	
	6L1	31	81
S	6L2	6	
T	7L1	32	82
R	7L2	7	
A	8L1	33	83
P	8L2	8	
S	9L1	34	84
	9L2	9	
TO	10L1	35	85
	10L2	10	
STA	11L1	36	86
x x	11L2	11	
	12L1	37	87
AL1	12L2	12	
&	13L1	38	88
AL2	13L2	13	
	14L1	39	89
	14L2	14	
BGM	MI	40	90
	M2	15	
ALARM	ALM1	41	91
	ALM2	16	
		42	92
CMU	CMU-	17	
		43	93
	CMU-	18	
P	1A	44	94
0	1B	19	
W	2A	45	95
E	2B	20	
R	3A	46	96
F	3B	21	
A	4A	47	97
I	4B	22	
L	5A	48	98
	5B	23	
B	6A	49	99
E	6B	24	
L	7A	50	100
L	7B	25	

CONNECTOR G SIGNAL	DESG	PLUG PIN	SDF PAIR
P	1 AL1	26	101
0	1 AL2	1	
W	2AL1	27	102
E	2AL2	2	
R	3AL1	28	103
F	3AL2	3	
A	4AL1	29	104
I	4AL2	4	
L	5AL1	30	105
	5AL2	5	
	6AL1	31	106
S	6AL2	6	
T	7AL1	32	107
A	7AL2	7	
T	8AL1	33	108
I	8AL2	8	
O	9AL1	34	109
N	9AL2	9	
S	10AL1	35	110
	10AL2	10	
A	11AL1	36	111
	11AL2	11	
P	12AL1	37	112
A	12AL2	12	
I	13AL1	38	113
R	13AL2	13	
	14AL1	39	114
	14AL2	14	
L S	1LS1	40	115
O P	1LS2	15	
U E	1S1	41	116
D A	1S2	16	
K	2LS1	42	117
E	2LS2	17	
R	2S1	43	118
S	2S2	18	
P	8A	44	119
0	8B	19	
W	9A	45	120
E	9B	20	
R	10A	46	121
F	10B	21	
A	11A	47	122
I	11B	22	
L	12A	48	123
	12B	23	
B	13A	49	124
E	13B	24	
L	14A	50	125
L	14B	25	

CONNECTOR J SIGNAL	DESG	PLUG PIN	SDF PAIR
	A	26	126
	B	1	
	A	27	127
	B	2	
	A	28	128
	B	3	
E	A	29	129
K	B	4	
C	A	30	130
H	B	5	
A	A	31	131
N	B	6	
G	A	32	132
E	B	7	
	A	33	133
-	B	8	
-	A	34	134
N	B	9	
E	OA	35	135
S	OB	10	
	1A	36	136
	1B	11	
	2A	37	137
	2B	12	
	3A	38	138
	3B	13	
	4A	39	139
	4B	14	
		40	140
		15	
		41	141
		16	
		42	142
		17	
		43	143
		18	
		44	144
		19	
		45	145
		20	
		46	146
		21	
		47	147
		22	
		48	148
		23	
		49	149
		24	
EARTH	ER	50	150
RECALL	IER	25	

TABLE 7 - N 2260 AMPHENOL CONNECTOR ASSIGNMENT (1/4)

CONNECTOR A SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	1
STA	AL2	1	
20	BD+	27	2
	BD-	2	
	AL1	28	3
STA	AL2	3	
21	BD+	29	4
	BD-	4	
	AL1	30	5
STA	AL2	5	
22	BD+	31	6
	BD-	6	
	AL1	32	7
STA	AL2	7	
23	BD+	33	8
	BD-	8	
	AL1	34	9
STA	AL2	9	
24	BD+	35	10
	BD-	10	
	AL1	36	11
STA	AL2	11	
25	BD+	37	12
	BD-	12	
	AL1	38	13
STA	AL2	13	
26	BD+	39	14
	BD-	14	
	AL1	40	15
STA	AL2	15	
27	BD+	41	16
	BD-	16	
	AL1	42	17
STA	AL2	17	
28	BD+	43	18
	BD-	18	
	AL1	44	19
STA	AL2	19	
29	BD+	45	20
	BD-	20	
	AL1	46	21
STA	AL2	21	
30	BD+	47	22
	BD-	22	
	AL1	48	23
STA	AL2	23	
31	BD+	49	24
	BD-	24	
		50	25
		25	

CONNECTOR B SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	26
STA	AL2	1	
32	BD+	27	27
	BD-	2	
	AL1	28	28
STA	AL2	3	
33	BD+	29	29
	BD-	4	
	AL1	30	30
STA	AL2	5	
34	BD+	31	31
	BD-	6	
	AL1	32	32
STA	AL2	7	
35	BD+	33	33
	BD-	8	
	AL1	34	34
STA	AL2	9	
36	BD+	35	35
	BD-	10	
	AL1	36	36
STA	AL2	11	
37	BD+	37	37
	BD-	12	
	AL1	38	38
STA	AL2	13	
38	BD+	39	39
	BD-	14	
	AL1	40	40
STA	AL2	15	
39	BD+	41	41
	BD-	16	
	AL1	42	42
STA	AL2	17	
40	BD+	43	43
	BD-	18	
	AL1	44	44
STA	AL2	19	
41	BD+	45	45
	BD-	20	
	AL1	46	46
STA	AL2	21	
42	BD+	47	47
	BD-	22	
	AL1	48	48
STA	AL2	23	
43	BD+	49	49
	BD-	24	
		50	50
		25	

CONNECTOR C SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	51
STA	AL2	1	
44	BD+	27	52
	BD-	2	
	AL1	28	53
STA	AL2	3	
45	BD+	29	54
	BD-	4	
	AL1	30	55
STA	AL2	5	
46	BD+	31	56
	BD-	6	
	AL1	32	57
STA	AL2	7	
47	BD+	33	58
	BD-	8	
	AL1	34	59
STA	AL2	9	
48	BD+	35	60
	BD-	10	
	AL1	36	61
STA	AL2	11	
49	BD+	37	62
	BD-	12	
	AL1	38	63
STA	AL2	13	
50	BD+	39	64
	BD-	14	
	AL1	40	65
STA	AL2	15	
51	BD+	41	66
	BD-	16	
	AL1	42	67
STA	AL2	17	
52	BD+	43	68
	BD-	18	
	AL1	44	69
STA	AL2	19	
53	BD+	45	70
	BD-	20	
	AL1	46	71
STA	AL2	21	
54	BD+	47	72
	BD-	22	
	AL1	48	73
STA	AL2	23	
55	BD+	49	74
	BD-	24	
		50	75
		25	

TABLE 7 - N 2260AMPHENOL CONNECTOR ASSIGNMENT (2/4)

CONNECTOR D SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	76
STA	AL2	1	
56	BD+	27	77
	BD-	2	
	AL1	28	78
STA	AL2	3	
57	BD+	29	79
	BD-	4	
	AL1	30	80
STA	AL2	5	
58	BD+	31	81
	BD-	6	
	AL1	32	82
STA	AL2	7	
59	BD+	33	83
	BD-	8	
	AL1	34	84
STA	AL2	9	
60	BD+	35	85
	BD-	10	
	AL1	36	86
STA	AL2	11	
61	BD+	37	87
	BD-	12	
	AL1	38	88
STA	AL2	13	
62	BD+	39	89
	BD-	14	
	AL1	40	90
STA	AL2	15	
63	BD+	41	91
	BD-	16	
	AL1	42	92
STA	AL2	17	
64	BD+	43	93
	BD-	18	
	AL1	44	94
STA	AL2	19	
65	BD+	45	95
	BD-	20	
	AL1	46	96
STA	AL2	21	
66	BD+	47	97
	BD-	22	
	AL1	48	98
STA	AL2	23	
67	BD+	49	99
	BD-	24	
		50	100
		25	

CONNECTOR E SIGNAL	DESG	PLUG PIN	SDF PAIR
	AL1	26	101
STA	AL2	1	
68	BD+	27	102
	BD-	2	
	AL1	28	103
STA	AL2	3	
69	BD+	29	104
	BD-	4	
	AL1	30	105
STA	AL2	5	
70	BD+	31	106
	BD-	6	
	AL1	32	107
STA	AL2	7	
71	BD+	33	108
	BD-	8	
	AL1	3 4	109
STA	AL2	9	
72	BD+	35	110
	BD-	10	
	AL1	36	111
STA	AL2	11	
73	BD+	37	112
	BD-	12	
	AL1	3 8	113
STA	AL2	13	
74	BD+	39	114
	BD-	14	
	AL1	40	115
STA	AL2	15	
75	BD+	41	116
	BD-	16	
	AL1	4 2	117
STA	AL2	17	
76	BD+	43	118
	BD-	18	
	AL1	44	119
STA	AL2	19	
77	BD+	45	120
	BD-	20	
	AL1	46	121
STA	AL2	21	
78	BD+	47	122
	BD-	22	
	AL1	48	123
STA	AL2	23	
79	BD+	49	124
	BD-	24	
		50	125
		25	

CONNECTOR F SIGNAL	DESG	PLUG PIN	SDF PAIR
P	1L1	26	126
0	1L2	1	
W	2L1	27	127
E	2L2	2	
R	3L1	28	128
F	3L2	3	
A	4L1	29	129
I	4L2	4	
L	5L1	30	130
	5L2	5	
S	6L1	31	131
T	6L2	6	
R	7L1	32	132
A	7L2	7	
P	8L1	33	133
S	8L2	9	
	9L1	34	134
	9L2	9	
TO	10L1	35	135
	10L2	10	
STA	11L1	36	136
	11L2	11	
x x	12L1	37	137
	12L2	12	
AL1	13L1	38	138
&	13L2	13	
AL2	14L1	39	139
	14L2	14	
BGM	MI	40	140
	M2	15	
ALARM	ALM1	41	141
	ALM2	16	
		4 2	142
CMU	CMU+	17	
		43	143
	CMU-	18	
P	1A	44	144
0	1B	19	
W	2A	45	145
E	2B	20	
R	3A	46	146
F	3B	21	
A	4A	47	147
I	4B	22	
L	5A	48	148
	5B	23	
B	6A	49	149
E	6B	24	
L	7A	50	150
L	7B	25	

TABLE 7 - N 2260 AMPHENOL CONNECTOR ASSIGNMENT (3/4)

CONNECTOR G SIGNAL	DESG	PLUG PIN	SDF PAIR
P	1AL1	26	151
0	2AL2	1	
W	2AL1	27	152
E	2AL2	2	
R	3AL1	28	153
F	3AL2	3	
A	4AL1	29	154
I	4AL2	4	
L	5AL1	30	155
	5AL2	5	
S	6AL1	31	156
T	6AL2	6	
A	7AL1	32	157
T	7AL2	7	
I	8AL1	33	158
0	8AL2	8	
N	9AL1	34	159
S	9AL2	9	
	10AL1	35	160
A	10AL2	10	
	11AL1	36	161
P	11AL2	11	
A	12AL1	37	162
I'	12AL2	12	
R	13AL1	38	163
	13AL2	13	
	14AL1	39	164
	14AL2	14	
L S	1LS1	40	165
O P	1LS2	15	
U E	1S1	41	166
D A	1S2	16	
K	2LS1	42	167
E	2LS2	17	
R	2S1	43	168
S	2S2	18	
P	8A	44	169
0	8B	19	
W	9A	45	170
E	9B	20	
R	10A	46	171
F	10B	21	
A	11A	47	172
I	11B	22	
L	12A	48	173
	12B	23	
B	13A	49	174
E	13B	24	
L	14A	50	175
L	14B	25	

CONNECTOR H SIGNAL	DESG	PLUG PIN	SDF PAIR
P	15L1	26	176
0	15L2	1	
W	16L1	27	177
E	16L2	2	
R	17L1	28	178
F	17L2	3	
A	18L1	29	179
I	18L2	4	
L	19L1	30	180
	19L2	5	
S	20L1	31	181
T	20L2	6	
R	21 L1	32	182
A	21 L2	7	
P	22L1	33	183
S	22L2	8	
	23L1	34	184
TO	23L2	9	
	24L1	35	185
STA	24L2	10	
x x	25L1	36	186
	25L2	11	
AL1	26L1	37	187
&	26L2	12	
AL2		38	188
		13	
		39	189
		14	
		40	190
		15	
		41	191
		16	
		42	192
		17	
		43	193
		18	
P		44	194
0		19	
W	15A	45	195
E	15B	20	
R	16A	46	196
F	16B	21	
A	17A	47	197
I	17B	22	
L	18A	48	198
	18B	23	
B	19A	49	199
E	19B	24	
L	20A	50	200
L	20B	25	

CONNECTOR I SIGNAL	DESG	PLUG PIN	SDF PAIR
P	15AL1	26	201
3	15AL2	1	
W	16AL1	27	202
E	16AL2	2	
R	17AL1	28	203
F	17AL2	3	
A	18AL1	29	204
I	18AL2	4	
L	19AL1	30	205
	19AL2	5	
S	20AL1	31	206
T	20AL2	6	
A	21 AL1	32	207
T	21 AL2	7	
I	22AL1	33	208
0	22AL2	8	
N	23AL1	34	209
S	23AL2	9	
	24AL1	35	210
A	24AL2	10	
	25AL1	36	211
P	25AL2	11	
A	26AL1	37	212
I	26AL2	12	
R		38	213
		13	
		39	214
		14	
		40	215
		15	
		41	216
		16	
		42	217
		17	
		43	218
		18	
P		44	219
0		19	
W	21A	45	220
E	21B	20	
R	22A	46	221
F	22B	21	
A	23A	47	222
I	23B	22	
L	24A	48	223
	24B	23	
B	25A	49	224
E	25B	24	
L	26A	50	225
L	26B	25	

TABLE 7 - N 2260 AMPHENOL CONNECTOR ASSIGNMENT (4/4)

CONNECTOR J SIGNAL	DESG	PLUG PIN	SDF PAIR
	1A	26	226
	1B	1	
	2A	27	227
	2B	2	
	3A	28	228
	3B	3	
	4A	29	229
E	4B	4	
X	5A	30	230
C	5B	5	
H	6A	31	231
A	6B	6	
N	7A	32	232
G	7B	7	
E	8A	33	233
	8B	8	
	9A	34	234
L	9B	9	
I	10A	35	235
N	10B	10	
E	11A	36	236
S	11B	11	
	12A	37	237
	12B	12	
	13A	38	238
	13B	13	
	14A	39	239
	14B	14	
		40	240
		15	
		41	241
		16	
		42	242
		17	
		43	243
		18	
		44	244
		19	
		45	245
		20	
		46	246
		21	
		47	247
		22	
		48	248
		23	
		49	249
		24	
EARTH	ER	50	250
RECALL	ER	25	

CONNECTOR K SIGNAL	DESG	PLUG PIN	SDF PAIR
	15A	26	251
	15B	1	
	16A	27	252
	16B	2	
	17A	28	253
	17B	3	
	18A	29	254
E	18B	4	
X	19A	30	255
C	19B	5	
H	20A	31	256
A	20B	6	
N	21A	32	257
G	21B	7	
E	22A	33	258
	22B	8	
L	23A	34	259
I	23B	9	
N	24A	35	260
E	24B	10	
S	25A	36	261
	25B	11	
	26A	37	262
	26B	12	
		38	263
		13	
		39	264
		14	
		40	265
		15	
		41	266
		16	
		42	267
		17	
		43	268
		18	
		44	269
		19	
		45	270
		20	
		46	271
		21	
		47	272
		22	
		48	273
		23	
		49	274
		24	
		50	275
		25	

2.4.3.2 Krone Terminating Tool

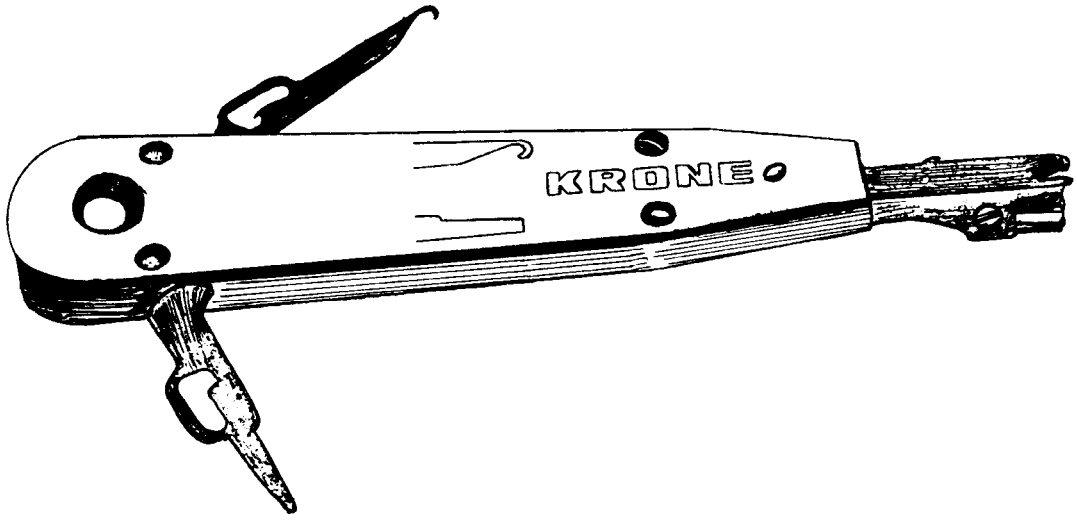


FIGURE 45 KRONE TERMINATING TOOL

The terminating tool shown in figure 45, is a spring loaded percussion device incorporating scissor action wire cutters. Termination and wire cutting are achieved by a single motion. Physically the tool can only be inserted one way, thus preventing the installer cutting the wrong side of the wire.

The “hook end” attachment is used for disconnection of the wire and for removing disconnect plugs.

The “blade end” attachment is used to remove the module from the backmount channel. The blade is inserted into the slot, at the ends of the module, to unseat the locking tabs on each side of the module from the backmount channel. The module can then be pulled off the backmount channel.

2.4.4 Lightning Protection

Lightning protection must be provided. The method of protection is comprehensively explained in Headquarters SBS Engineering Branch Information Document Number T32, “Lightning Protection for Commander N Series Business Systems”.

2.4.5 Exchange Lines

The exchange lines are terminated on the S.D.F. If a call metering unit is used, the exchange lines must be terminated on the CMU before being terminated on the S.D.F.

The order in which the exchange lines are terminated at the main equipment is important when assigning audible signalling groups.

Refer to figure 46, x represents the exchange line number.

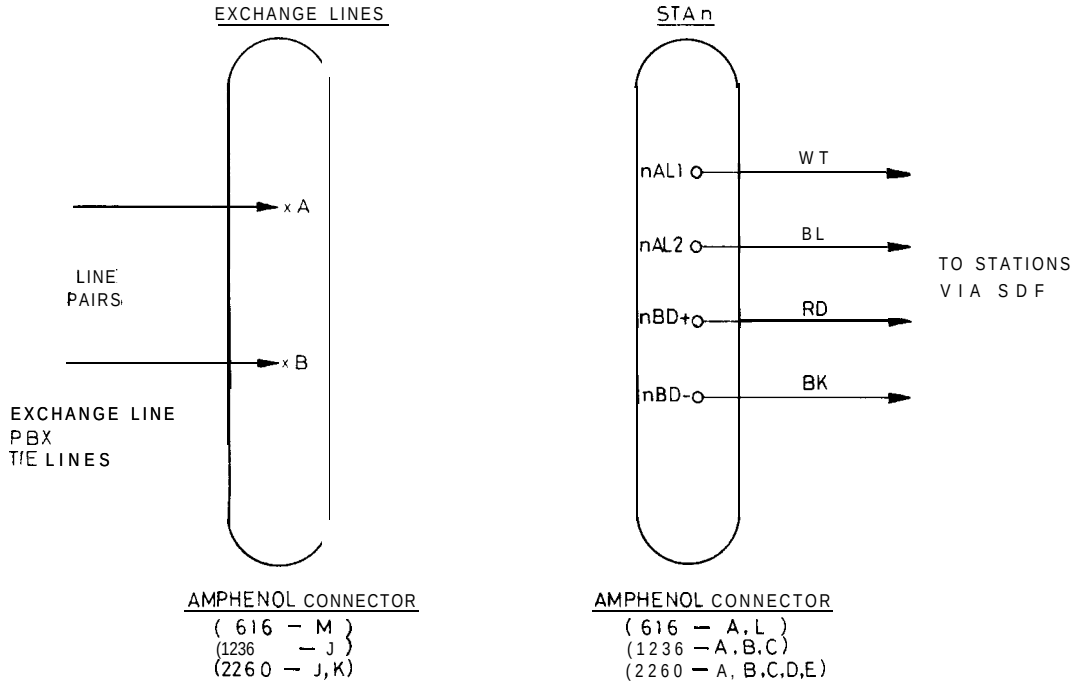


FIGURE 46 AMPHENOL CONNECTOR TERMINATIONS FOR STANDARD STATIONS

2.4.6 Earth Recall

When the system is connected to a PBX and the recall facility is required, the PBX earth must be connected to the ER connections via the S.D.F.

2.4.7 Stations and DSS Console

When cabling from the main equipment to the stations take care that the pairs are correctly terminated and the polarity of the pair is correct. Fuses in the main equipment will blow or the equipment will not operate if the system is not correctly cabled. The order in which stations are connected and the station number are important when assigning paging zones.

Refer to figure 46, n represents station number

TABLE 6 STATION CABLING

WIRE DESIGNATION	603 PLUG/61 0 SOCKET	WIRE COLOUR	DESIGNATION STATION & DSS
nAL1	2	WT White	LWT
nAL2	6	BL Blue	LBL
nBD+	1	RD Red	LRD
nBD-	5	BK Black	LBK

Provision must be made to allow for connection of both a DSS station and a DSS console for programming and testing. If the customer has not requested a DSS console, the DSS station and DSS console point must be cabled and located near the ME/SDF.

When cabling for stations the following limitations apply for 0.5mm twisted 2 pair cable.

TABLE 9 MAXIMUM CABLE LENGTH

STATION	LOOP RESISTANCE	CABLE LENGTH
TS-616	840hms .	490m
TS- 1236	740hms .	430m
TS-2260	640hms .	370m
DSS-6161236	**52** Ohms	300m
DSS-2260	**48** Ohms	280m

* These figures must be reduced by 10 Ohms or 60m if a Handsfree Console is attached to a station.

Station internal wiring is shown in figure 49.

2.4.8 Powerfail Stations

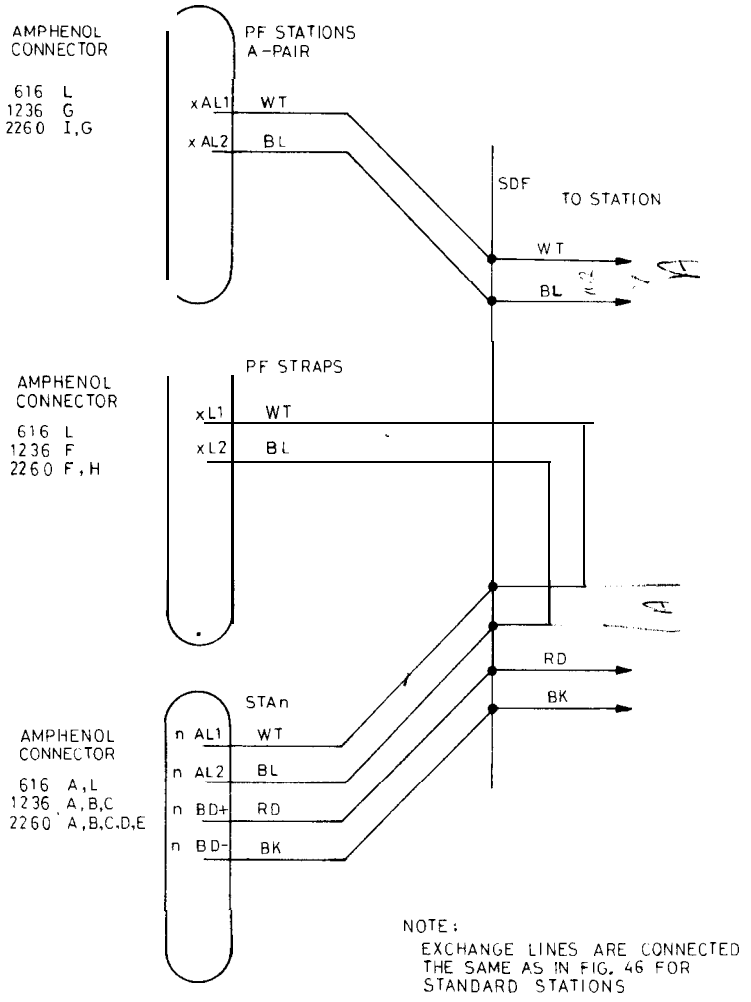


FIGURE 47 AMPHENOL CONNECTOR AND SDF TERMINATIONS FOR POWERFAIL STATIONS

Jumpering is required at the S.D.F. when cabling for powerfail stations. This cabling allows assigned stations to access an exchange line under powerfail conditions. Refer to figure 47 for method of connection, n stands for station number and x is the exchange line number.

For powerfail stations, jumper the station A-pair, nAL1 and nAL2 of the STAn connections, to the powerfail strap (PF STRAPS) connections xL1 and xL2 corresponding to the exchange line that is to be connected to the station under powerfail conditions. In this case the A-pair that is to be cabled to the powerfail station is the xAL1 and xAL2 connections of the PF STATION A PAIR. They will be cabled as xAL1, white (WT) and xAL2, blue (BL). The B pair that is cabled to the powerfail station is the normal nBD+ (RD) and nBD-(BK) of the STAn connections.

Refer to table 10 and figure 50 for the dial leads connection to STB-B terminals. Note BK from the dial is connected to the BK terminal on STB-B if a handsfree console is not used.

2.4.9 Powerfail Bell

When installing a powerfail bell connect wires from the bell, via the SDF, to POWERFAIL BELLS xA and xB on the amphenol connector corresponding the required exchange line (x).

2.4.10 Handsfree Console

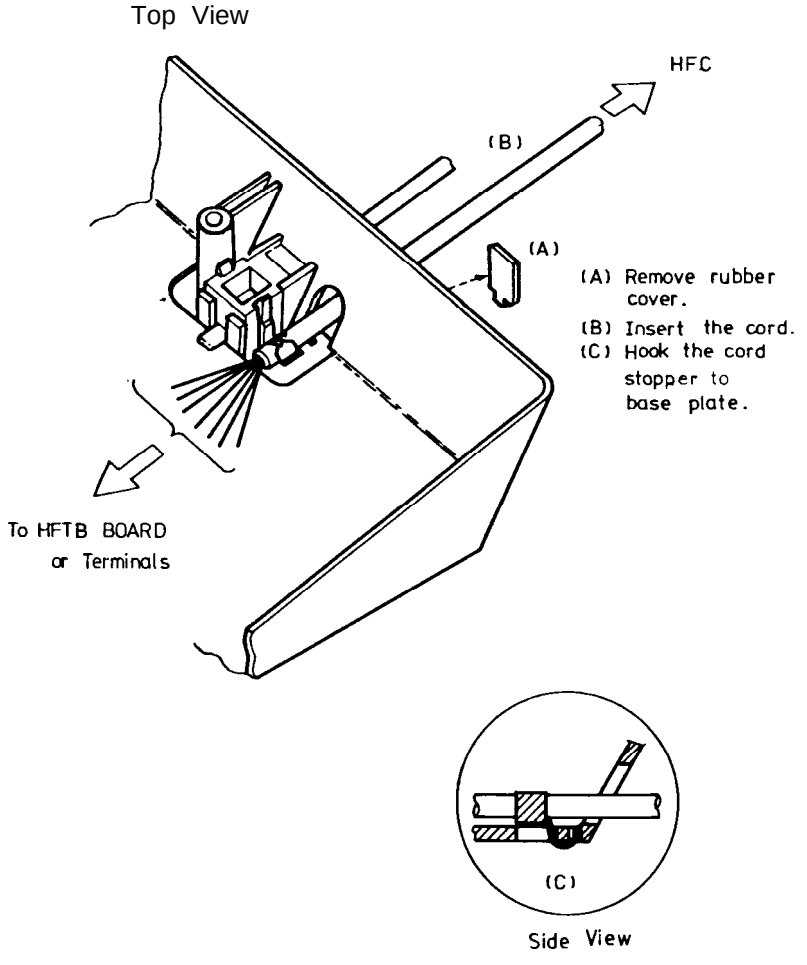


FIGURE 48 HANDSFREE CONSOLE CABLE INSTALLATION

Remove the front panel of handsfree console, then loosen the two screws holding the case moulding to the base moulding and ensure that the slide switch designated “K” is set to 20V.

Replace the case moulding and front panel.

Unplug the station.

Remove the station front panel and case moulding.

Carefully, lift the keyboard.

Remove the hole cover from the base moulding and insert the handsfree console cord into the hole (figure 48).

Connect the leads from the handsfree console to the terminals on the STB-B card in the station as shown in table 10 and figures 49 and 50.

Take care to insulate each unused lead (BK, GN, LBL and PK) individually before plugging in the station.

Remove the strap between C and BK in the standard station, and check that there is a strap between RR and F1

Replace the keyboard, case moulding and front panel when the handsfree console is working.

TABLE 10: N 616/1236/2260 HANDSFREE CONSOLE CONNECTION

STB-B TERMINAL	STATION		PF STATION	
	HFC	STRAP	PFDEC/ PFVF DIAL LEADS	HFC
BK	SL			SL
LK	LGN			LGN
FL			BK	BR
RR	WH	o	OR	WH
K1	VI	|		V1
F1		o	BL	
B			RD	
L1	RD			RD
RB	OR		SL	OR
SG	BL			BL
+5			BR	
C	YL&BR		GN	YL
PF				

NOTE: 1 Remove the strap between C and BK in the standard station.
2 Remove BK dial lead from BK to FL on the STB-B for a powerfail station.

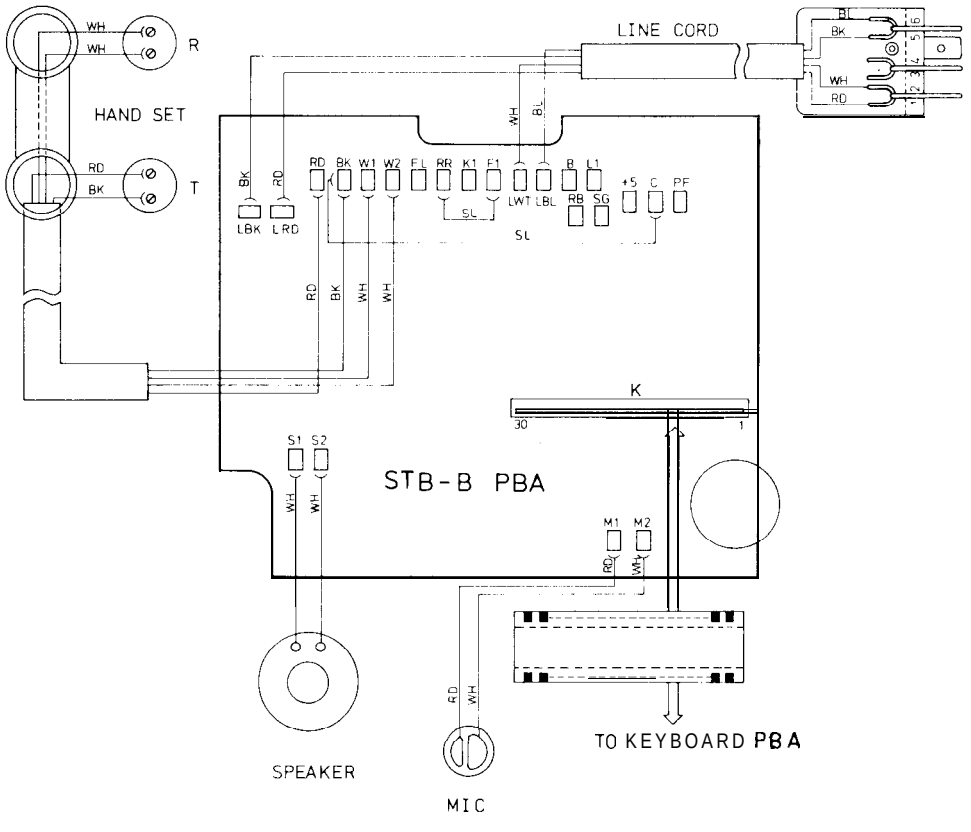


FIGURE 49 STB-B STATION BOARD ASSEMBLY AND WIRING FOR A STANDARD STATION

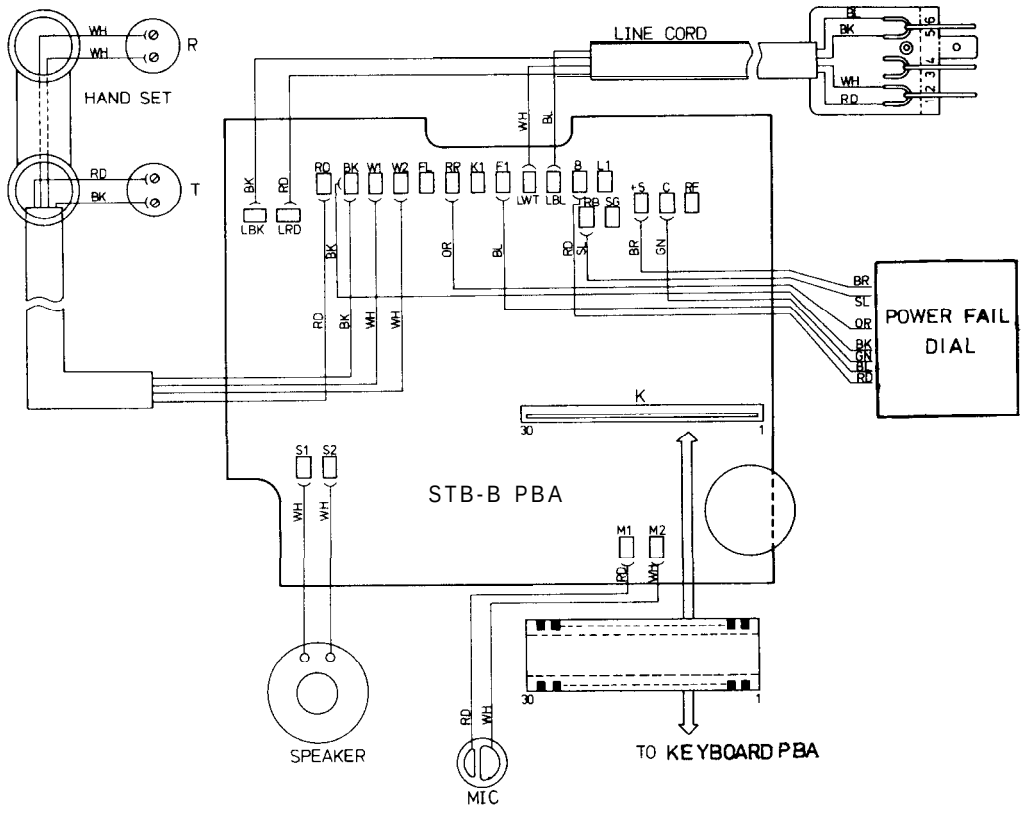


FIGURE 50 STB-B STATION BOARD ASSEMBLY AND WIRING FOR A POWERFAIL STATION

2.4.11 Call Metering Unit

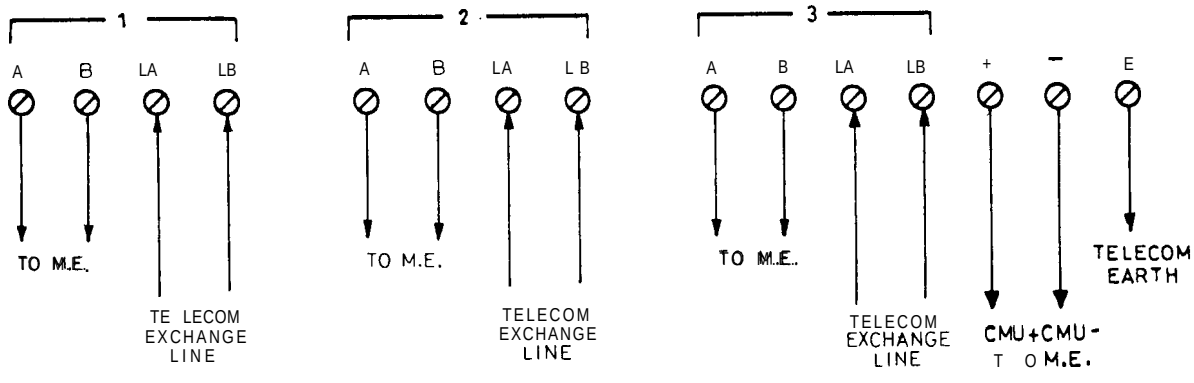


FIGURE 51 CALL METERING UNIT WIRING

The unit is capable of counting meter pulses for three exchange lines. Terminate the exchange lines on the CMU before terminating them at the SDF. The CMU derives its power from the main equipment, amphenol connector (CMU+, CMU-). Make connections between CMU+ and CMU- via the SDF to + and -, respectively, on the CMU. A Telecom metering earth is required to detect meter pulses and this must be connected to the CMU. (Refer to figure 51).

2.4.12 Remote Extension and Tie Line Interface Unit

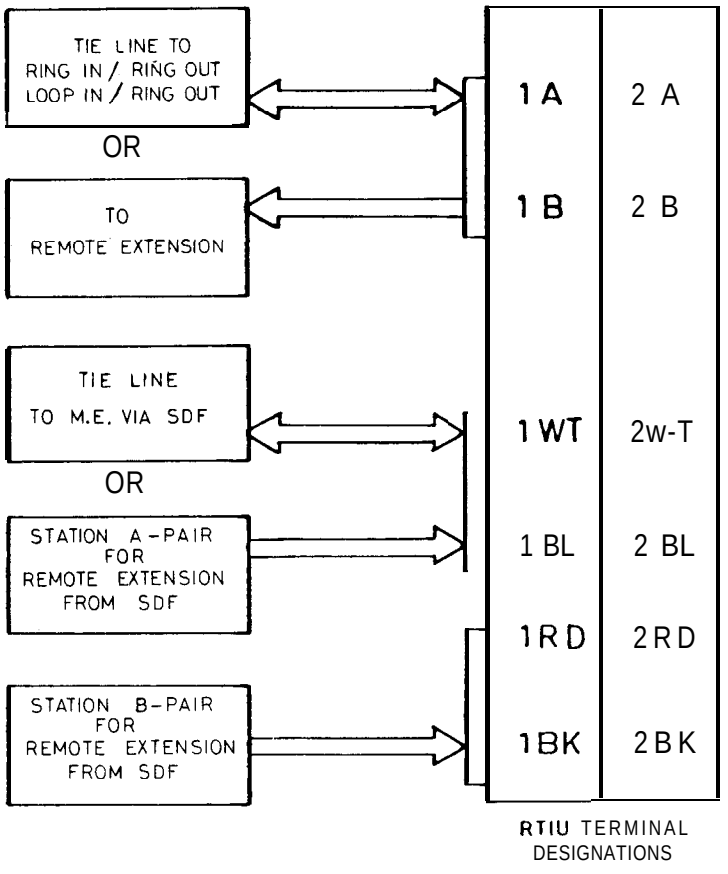


FIGURE 52 RTIU TERMINAL CONNECTIONS

Boards are simply plugged into the designated slots in the RTIU. Terminal connections are as follows. (Refer to figure 52.)

(a) Tie lines

A Tie line takes the place of an exchange line. Hence the Exchange Line Key now becomes a Tie Line Key for the appropriate line. The Tie Line terminates on 1A/B or 2A/B on the RTIU and the connection to the main equipment is taken from 1 WT/BL or 2WT/BL, respectively.

TABLE 11 - TIE LINE CONNECTION

TIE LINE	RTIU TERMINAL	MAIN EQUIPMENT TERMINAL
A B	1A or 2A 1WT or 2WT 1B 2 B 1BL 2BL	xA xB

(b) Remote Extensions

A remote extension takes the place of a station.

The remote extension terminates on 1 A/B or 2A/B and the 4-wire station connection to the main equipment is via 1 WT/BL/RD/BK or 2 WT/BL/RD/BK. Refer to table 12 and figure 52.

The loop limit for a remote extension using the RTIU and RXB is 1500 Ohms corresponding to 8.7km of 0.5mm cable.

TABLE 12 - REMOTE EXTENSION CONNECTION

REMOTE EXTENSION CONNECTION	RTIU TERMINAL	CABLE WIRE COLOUR	MAIN EQUIPMENT
A B	1A or 2A 1B 2B 1WT 2 W T 1BL 2BL 1RD 2RD 1BK 2BK	 White Blue Red Black	 nAL1 nAL2 nBD+ nBD−

2.4.13 EPWB-C and Ring Generator Unit (Internal Extensions)

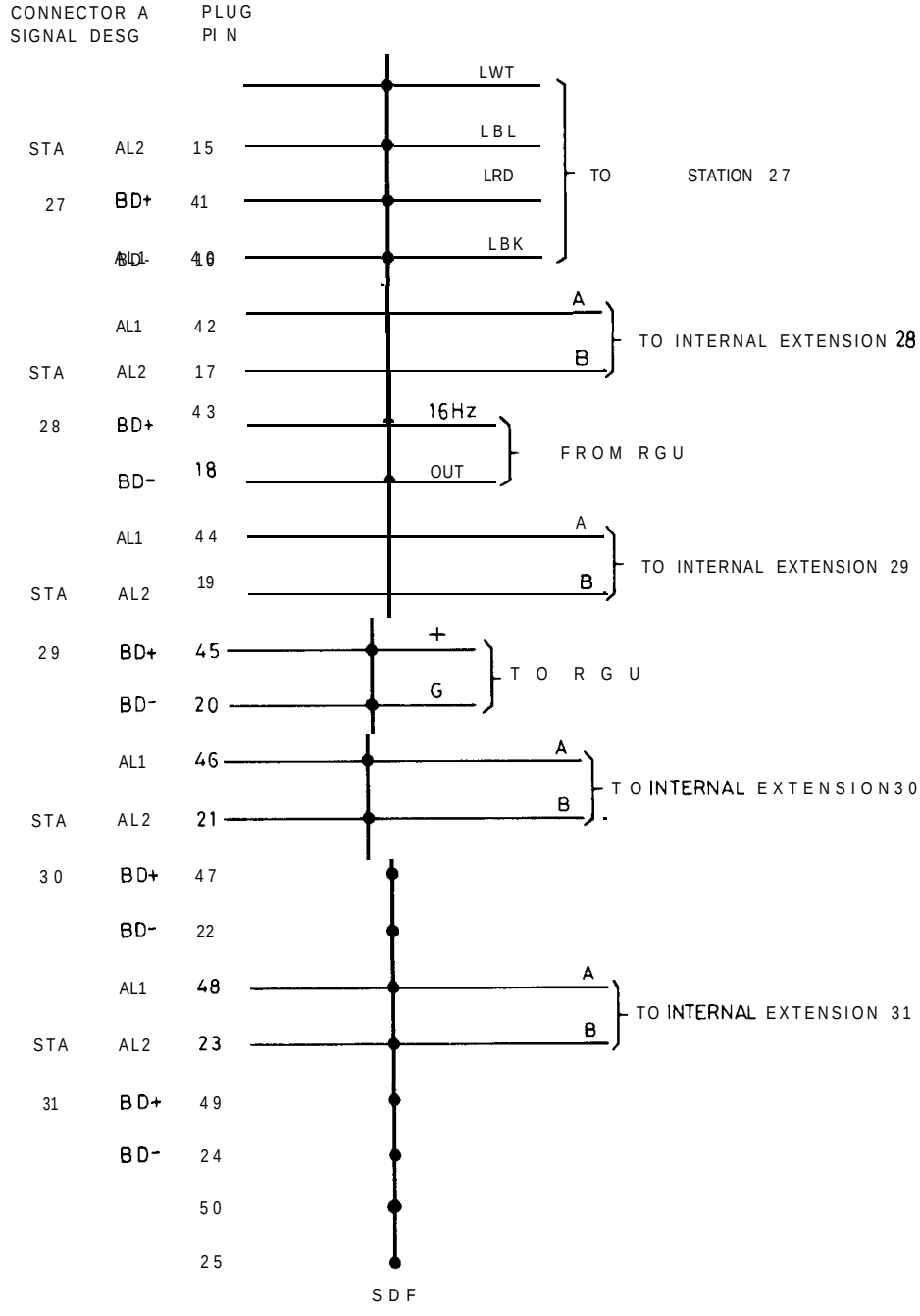


FIGURE 53 EXAMPLE OF WIRING FOR AN E2WB-C
INSTALLED IN POSITION ESTB-C/3

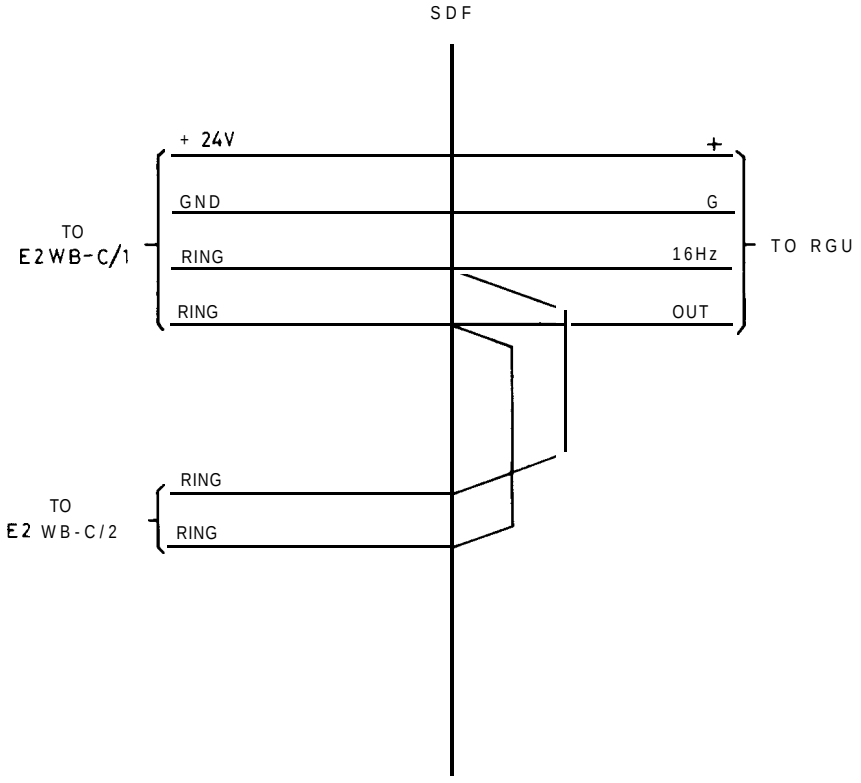


FIGURE 54 CONNECTION OF THE RING GENERATOR UNIT
FOR TWO E2WB-C BOARDS

The E2WB-C board replaces an ESTB-C board to provide four internal extensions. A Ring Generator Unit is required and is capable of supplying ring voltage for two E2WB-C boards. The RGU and internal extensions are connected to the main equipment via the SDF. The stations corresponding to the ESTB-C board position are replaced by internal extensions and the RGU when using the E2WB-C board. Refer to figure 53 for an example.

The A-pairs are connected to two-wire internal extensions, the B-pair of the first internal extension of each board is connected to ring voltage from the RGU (16Hz and OUT), and the B-pair of the second internal extension is used to supply power to the RGU (+ and G).

If the RGU is used to provide ring voltage to two E2WB-C boards, then the supply voltage must only be connected from the first E2WB-C board. Refer to figure 54.

The loop limit for an internal extension using the E2WB is 700 Ohms corresponding to 4km of 0.5mm cable.

2.4.14 External Music Source and Background Music

Connect the external music source input to Ml/M2 from the 604/611 plug and socket via the SDF. The music source connection has an input impedance of 600 ohms. The level of the incoming signal must be between 50 and 300 mVrms.

2.4.15 External Paging Loudspeakers

The loudspeakers are connected to a 604/611 plug and socket and wired to the amphenol connectors via the SDF. Connect the external paging loudspeakers to the LOUD SPEAK ER connections 1 LS1 and 1 LS2 for external zone 1 and 2LS1 and 2LS2 for external zone 2.

Relay contacts are provided for each external paging zone. They are designated 1S1 and 1 s2 for zone 1 and 2S1 and 2S2 for zone 2. The relay contact rating is 1.25A at 24Vdc.

The output power of the loudspeaker amplifier is 2 watts into an 8 ohm load.

2.4.16 Alarm Detector

Connect the alarm detector to ALM1 and ALM2 on the amphenol connector via the 604/611 plug and socket and the SDF. The system detects the opening or closing of a dry metallic contact, depending on system programming.

2.5 BOARD INSTALLATION INSTRUCTIONS

Before inserting boards into the ME rack, the following preliminary work is required.

WARNINGS

A. This equipment contains a considerable number of MOS, and other static sensitive components. To reduce the incidence of the premature failure due to static discharge, the following precautions MUST be taken:

- Always ensure that power is disconnected before plugging PBAs.
- Always discharge static from yourself by touching a conductive part of the main equipment before handling boards.
- Handle PBAs by the edge or by the handles. Do not handle PBA tracks, components or edge connectors (contaminants introduced by fingers can cause corrosion and high resistance connections).
- Components are physically delicate. Finger pressure on a component can fracture, but not necessarily break component leads: a future fault.

To protect against physical damage and damage due to static discharge, PBAs must ALWAYS be wrapped in aluminium foil (e.g. cooking foil) and inserted into an ANTI-STATIC plastic bag and placed in the protective container provided with the new item. In the case of the ECMB remove the battery and package separately.

These procedures apply equally to both working and faulty PBAs. Careless handling, storage and transporting will cause secondary or future faults.

B. To prevent the likelihood of damage to electronic components, power should be switched off before working on the systems.

C. The cabling between the main equipment and stations is polarity sensitive. It is essential that the correct polarity be maintained from the main equipment to the stations and pairs must not be swapped. Care must be exercised when checking voltages on cabling. Do not short or bridge between terminals as this will cause fuses on the ESTB boards to blow.

WIRE COLOUR	603 PLUG/ 610 SOCKET	WIRE DESIGNATION
WT White	2	AL1 A-pair
BL Blue	6	AL2
RD Red	1	BD+ B-pair
BK Black	5	BD—

D. Power supplies are powered from the 240 volt mains supply and hazardous voltages are present within. Do not attempt to repair these devices.

E. ECMB- A,B,& D BOARDS

- If these PBAs are replaced, all site dependant data and abbreviated dial numbers are lost. It will be necessary to re-programme the system.
- The battery may be changed by removal of the daughter board, BTB-A, (without loss of any programmed data) while the ECMB power is on.
- The press button (SW4) must be pressed to reset the crosspoints of the system after replacing ESTB or ELNB boards when the power is on.

2.51 ELNB-A

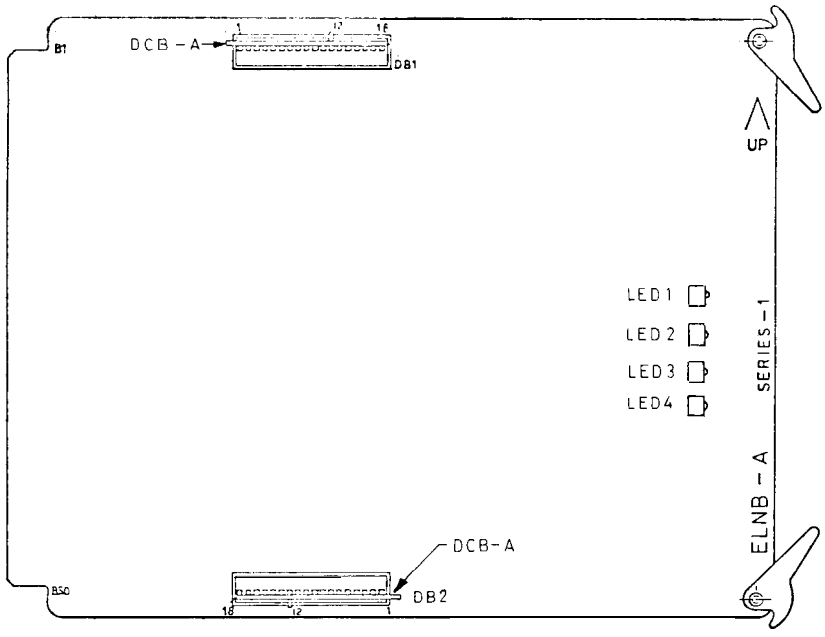


FIGURE 55 ELNB-A, DCB-A POSITION FOR A DECADIC EXCHANGE LINE

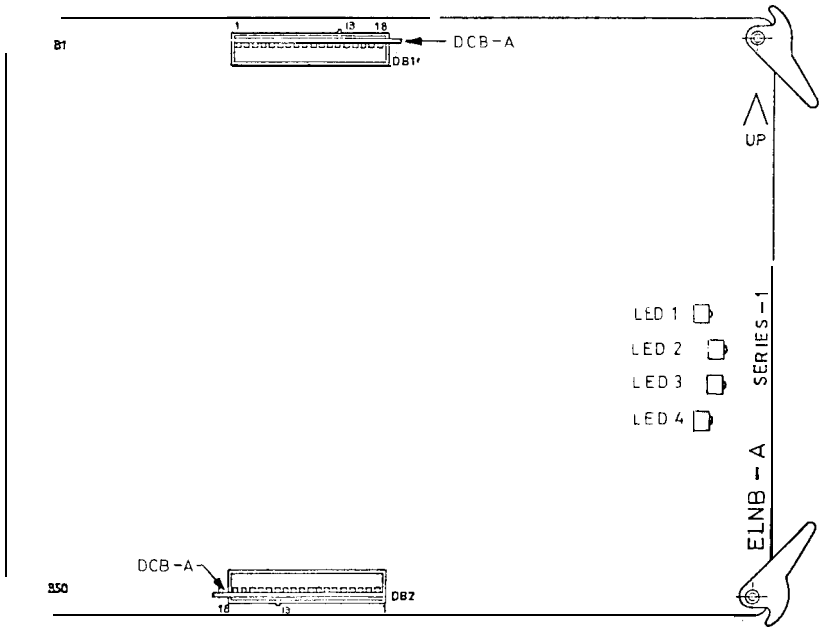


FIGURE 56 ELNB-A, DCB-A POSITION FOR AVF EXCHANGE LINE

There are two DCB-A plug-in daughter boards on this board. The DCB-A board must be correctly plugged into the connector, according to the type of exchange line used.

Figure 55 shows the location for a decadic exchange line (keying location is pin 12). Figure 56 shows the location for a VF exchange line (keying location is pin 13).

The ELNB-A board has LEDs to indicate exchange line status - LED1 for the first line, to LED4 for the fourth line. A steady LED indicates that the line is seized, a flashing LED indicates an incoming call and a flickering LED indicates decadic dialling.

2.5.2 ETSB-A and ETSB-B

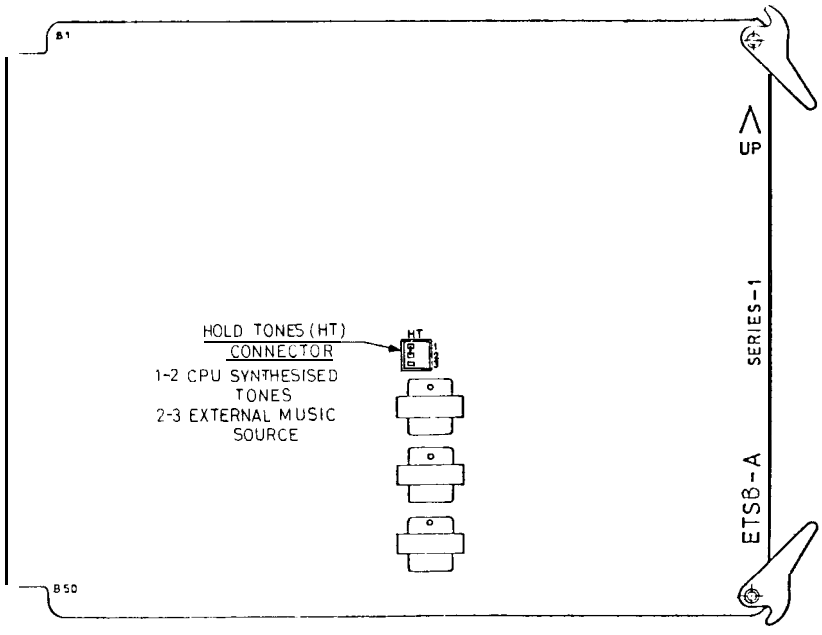


FIGURE 57 ETSB-A, HT CONNECTOR LOCATION

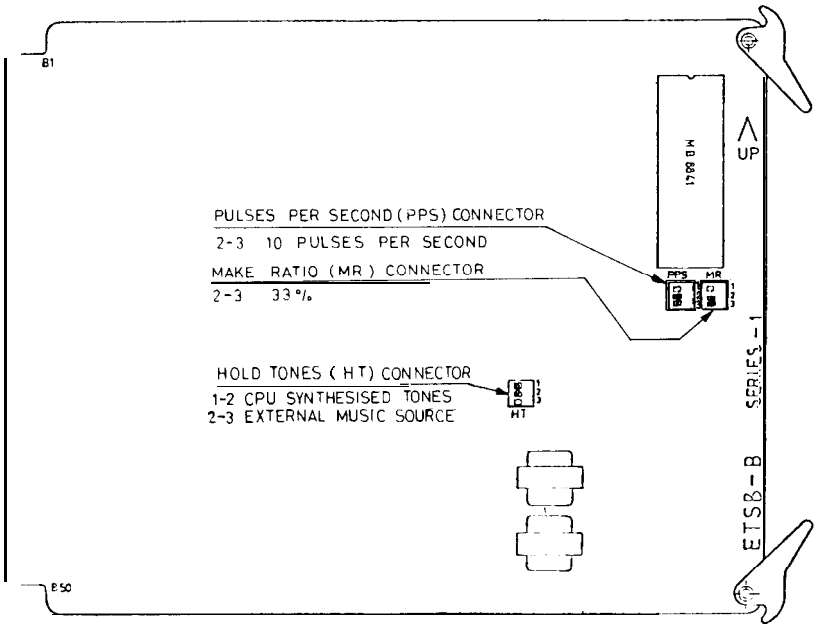


FIGURE 58 ETSB-B/C LOCATION OF HT, PPS & MR CONNECTORS

The link on the HT connector which selects the music source for music on hold must be correctly inserted according to the following information.

Link Between	Music On Hold Music Source
1 - 2	Internal, CPU Synthesised Tones
2 - 3	External Music Source

Refer to figures 57 and 58 for the location of the HT connector on the board.

2.5.3 ETSB-B and ETSB-C

There are two connectors, PPS and MR, used to set the pulsing speed and make break ratio for decadic dialling. The links are located as follows:

PPS Connector	Pulsing Speed
I - 2	20 PPS
2 - 3	10 PPS (Standard Setting)
MR Connector	Make Ratio
I - 2	30%
2 - 3	33% (Standard Setting)

Refer to figure 58 for the location of the PPS and MR connectors on the PBAs.

***PRECAUTION*:**

The links must be in the same position for both ETSB-B and ETSB-C cards in the N 2260.

2.5.4 ECMB-A, ECMB-B and ECMB-D

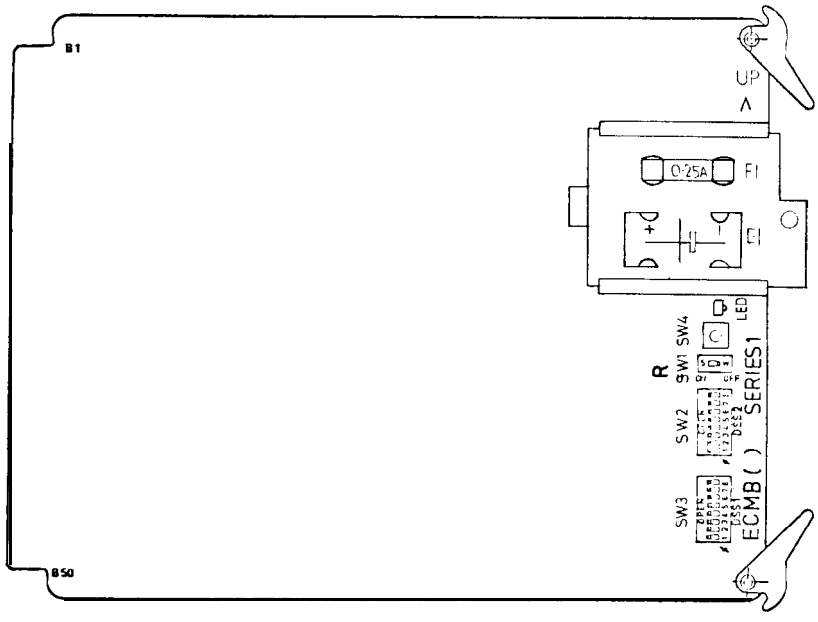


FIGURE 59 ECMB -A,B,D FUSE, BATTERY AND SWITCH LOCATIONS

Refer to figure 59. The fuse F1 is a 250mA fuse, which protects the battery from possible damage due to an accidental short circuit. Be sure that the fuse is not blown and then install the attached battery. Ensure that the battery is connected with the correct polarity. A LED is provided on the board to light if the battery voltage is low.

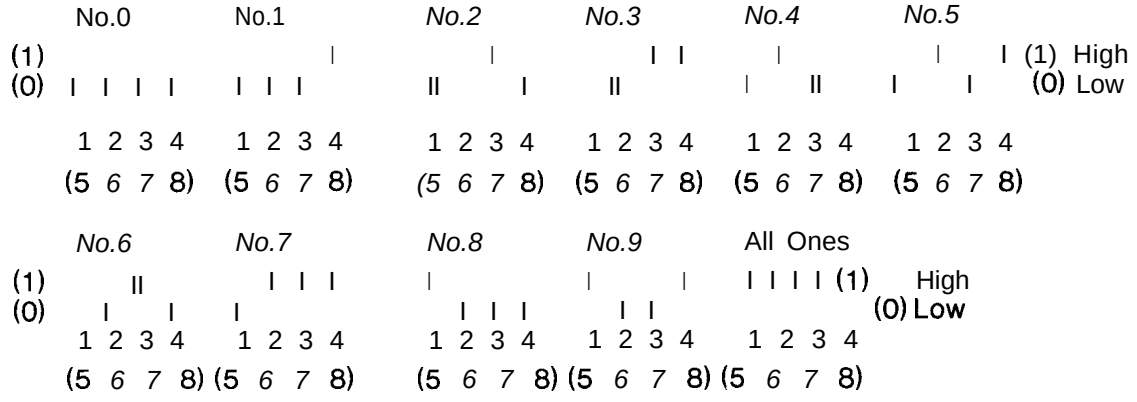
POWER-UP INITIALISATION

The SW1 switch (figure 59) is used to clear the RAM memory and initialise the data base when power is applied for the first time. Check that the SW1 switch is in the OFF(M) position before powering up the system for the first time. After power is applied to the system, set the switch to the ON(S) side without removing the ECMB-() board or turning off the power. The initial values of the system data are given in section 2.7.

ASSIGNING THE DSS STATION(S)

SW3 is used to assign the number of the first DSS station, SW2 is used to assign the number of the second DSS station if two DSS consoles are used. When the second DSS console is not equipped set SW2 to all ones. The first DSS console must always be assigned. The bits 1,2, 3& 4 assigns the TEN's number and bits 5, 6, 7 8 8 assign the UNIT's number. Once a DSS station number is assigned, the DSS console number is automatically the DSS station number plus one. Numbers equal to or greater than 36 (N616), 55 (N1236) and 79 (N 2260) are prohibited for use as the DSS station. The N 616 is provided with a dedicated DSS console port (number 36), therefore, it is recommended that it be used so that the full 16 station ports may be used.

In this case the DSS station port will be set as 35. The numbers are set as follows:



Example, the following switch setting is for the DSS station to be connected to port number *35.*

Note: Automatically the DSS console is assigned and must be connected to port number 36.

Refer to figure 59 for the location of switches.

Now, the system may be programmed from the Test and Programming Unit (TPU-N).

CROSS POINT RESET

The push button, SW4, is used to manually reset the crosspoint switches in the system. This must be operated each time a board is replaced while the power is on.

2.5.5 ESTB-C and EDTB-B

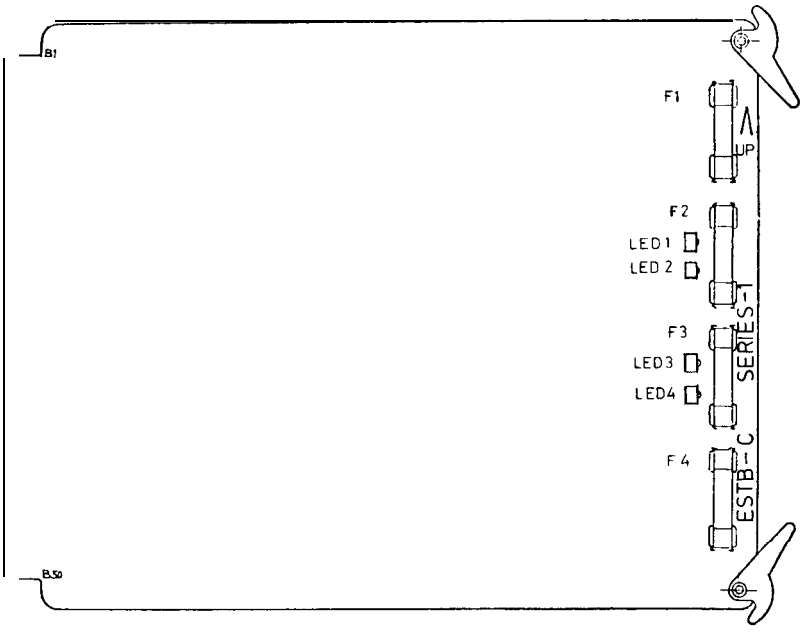


FIGURE 60 ESTB-C FUSE AND LED LOCATION

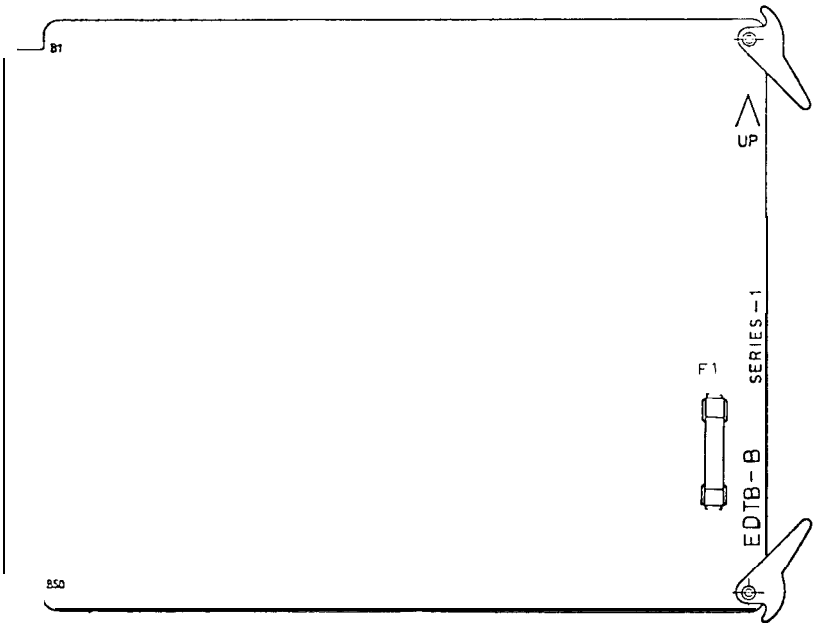


FIGURE 61 EDTB-B, FUSE LOCATION

Each station port is provided with a 375mA (315mA) 3AG fuse. The port corresponding to the DSS Console must have a 1 A fuse, replace the 375 mA fuse with the 1 A fuse packaged with the DSS console. As an example, station number 35 was assigned as the DSS station port in the example above, therefore, port number 36 is assigned as the DSS console port automatically. Then, the first fuse (F1) in the ESTB-C-5 position must be replaced. In the case of the N 616, the fuse on the EDTB-B card must have a 1 A rating.

Refer to figures 60 and 61 for fuse locations and Table 13 to find the fuse associated with each port. On the ESTB-C board there are four LEDS to indicate station handset status. LED1 for the first station to LED4 for the fourth station. The LED lights steadily when the station handset is off hook.

TABLE 13 FUSE LOCATIONS

ESTB BOARD	STATION PORT NUMBER				SYSTEM
	F1	F2	F3	F4	
- 1	20	21	22	23	
- 2	24	25	26	27	
- 3	28	29	30	31	
- 4	32	33	34	35	N616
- 5	36	37	38	39	
- 6	40	41	42	43	
- 7	44	45	46	47	
- 8	48	49	50	51	
- 9	52	53	54	55	N 1236
- 1 0	56	57	58	59	
- 1 1	60	61	62	63	
- 1 2	64	65	66	67	
- 1 3	68	69	70	71	
- 1 4	72	73	74	75	
- 1 5	76	77	78	79	N 2260

2.5.6 E2WB-C

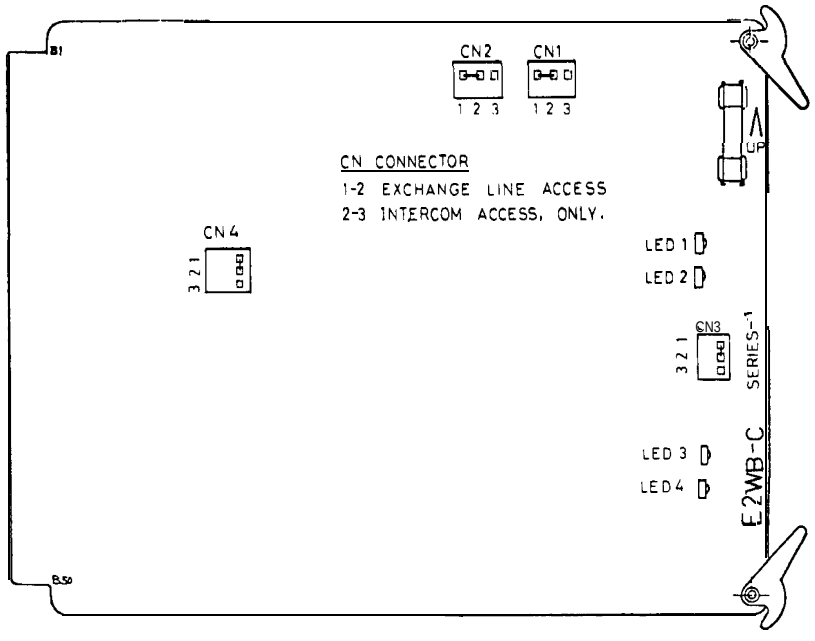


FIGURE 62 E2WB-C LOCATION OF INTERCOM/EXCHANGE LINE ACCESS CONNECTORS, FUSE AND LEDS

A single 375mA (315mA) 3AG fuse is provided on the E2WB-C board for the RGU power supply.

An intercom/exchange line access connector (CN) is provided on the E2WB-C board for each internal extension - CN1 for extension one to CN4 for extension four. The link is used as follows:

Link Between	
1-2	Extension has exchange line access
2-3	Extension has intercom access only

Refer to figure 62 for location of the CN connectors on the board. The E2WB-C board has LEDs to indicate extension status - LED1 for extension one, to LED4 for extension 4. The LED lights when there is a dc loop to the extension i.e. off hook and flickers to indicate decadic dialling.

2.5.7 ECPB-A

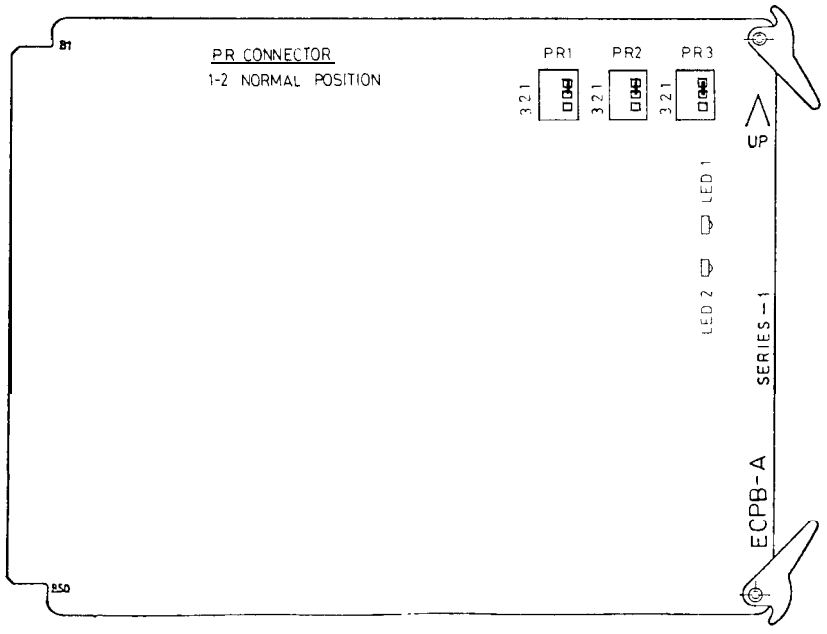


FIGURE 63 ECPB-A LOCATION OF PR CONNECTORS AND LEDS

Three PR connectors are provided on the ECPB-A board, and they must have the link inserted between I-2.

On the ECPB-A are LEDS to indicate CPU status. LED1 flashes at 60 IPM to indicate that the program is running, but goes steady (ON or OFF) when the system is in programming mode. LED2 flashes at 300 IPM to indicate that data transmission to stations is taking place. Refer to figure 63.

2.6 POWERING UP THE SYSTEM

When the system has been cabled and terminated and all printed circuit boards have been correctly set-up and installed, power-up the system.

Before installing the stations measure the voltages at the 610 sockets to ensure that the cabling is correct.

TABLE 14 STATION AND DSS CONSOLE VOLTAGES

		COLOUR	PIN	VOLTAGES
Station Voltages:	A-PAIR	WT	2	$+13\pm3V$
		BL	6	$+1.5\pm1.5V$
	B-PAIR	RD	1	$+40\pm10V$
		BK	5	REF
DSS Console:	A-PAIR	WT	2	* $+13\pm3V$
		BL	6	• $+1.5\pm1.5V$
	B-PAIR	RD	1	$+40\pm10V$
		BK	5	REF

* The N616 DSS console A-pair voltages are OV when using the DSS port (36) on the EDTB-B board.

When the voltages are correct at all stations, install the stations. System programming is now possible.

2.7 INSTALLATION PROGRAMMING

2.7.1 Programming Data

When the system is powered up for the first time, programmed data must be initialised. To initialise data, turn power off and set the SW1 switch on the ECMB board to the OFF(M) position. Turn power on, wait for ten seconds, then set the SW1 switch to the ON(S) position. The initial values of the data are given in section 2.7.6.

A unit designated as a Test and Programming Unit (TPU-N) has been developed. The TPU-N must be inserted into the DSS Console socket when programming or testing the system. To enter programmed data the system must be placed in programming mode. To do this, press the programme enable button using a pencil through the hole of the TPU-N.

The MW LED on the console will light to indicate that the system is in programming mode.

When the system is in programming mode normal operations are halted - existing calls are maintained, incoming exchange line calls will ring but cannot be answered unless you go out of programming mode. No new calls can be made. Programmed data can be entered using DSS keys to select a data category, and the dial of the DSS station (when OFF HOOK) is used to enter the relevant data. Programme data is indicated by the TPU display, and the associated DSS LED will light to indicate which data category is being programmed. Note that if two DSS console ports are provided, programming is possible from the first console only.

Data is programmed as follows: place the system into programming mode. Operate the DSS key associated with the data category to be programmed and the LED should light. Enter data by dialling from the DSS station (OFF HOOK). Dial "*" to send the write command and dial "#" to terminate a data category or data block within a category.

When data programming is completed, depress the programming button to return the system to operational mode and the MW LED will go OFF. If there is a fault in the programmed data, alarm tone is heard from the TPU, the DSS LED associated with the faulty data category will light and the system will not return to operational mode. If this occurs, the programming button should be despressed again to return the system to programming mode.

The faulty data category must be reprogrammed

2.7.2 Checking Programmed Data

Programmed data may be reviewed as follows: Place the system in programming mode by depressing the programming button on the DSS Console ensure that the MW LED is lit, and take the DSS Station OFF HOOK. Data is indicated on the TPU display in the same format as for programming data.

For system assignments, operate the DSS key associated with the data category. The associated DSS LED will light and data will be displayed on the console. If the data is in more than one part dial "*" to review further data. To terminate the review of a data category dial "*" then "#". For type of exchange line assignment, operate DSS key 34, dial the line number, then "*". To review other lines dial "*", line number, "*". Terminate review of data category by dialling "*","#".

For station assignments (except call forwarding and audible signalling, which are similar to system assignments), operate the associated DSS key, dial the station number, then "*". To review other stations dial "*", station number, "*". To terminate review of data category dial "*","#".

For access barring data (except number length limiter, which is similar to system assignments), operate AC then the associated DSS key. Review digits one by one by dialling "*", to display the next code dial "#". To terminate the data category dial "#" till the associated DSS LED goes off.

When data has been checked depress the programming button to return the system to operation mode. Check that the MW LED goes off.

Unplug the TPU when programming has been completed and connect the DSS Console if provided with the system.

2.7.3 Modifying Programmed Data

Except for access barring, programmed data can be re-written as it is checked. If incorrect data is found whilst checking programmed data, dial new data from the DSS station (when OFF HOOK). The new data will be shown in the display on the DSS console. Dial "*" to write in the new data, then continue with checking programmed data. Data is erased by dialling "00" as new data.

For access barring, incorrect data must be reprogrammed.

A code may be erased using the following procedure; operate the associated DSS key, dial "#" to step through to the code to be modified, erase the code by dialling "*". To programme new data use the procedure described in section 2.7.5.14.

It is not possible to programme some data categories while system facilities are active. Table 15 shows the conditions under which the system will not allow data to be programmed. If this occurs the associated DSS LED will not light when the DSS key is operated.

TABLE 15 CONDITIONS WHEN PROGRAMMING IS NOT ALLOWED

CATEGORY	ACTIVE FACILITY
IZ1 – IZ4 EZ1, EZ2	● All call paging in progress. ● Associated zone paging in progress. ● Incoming call audible signalling to EZ1 or EZ2.
Line Grouping Audible Signalling	● Incoming call to system.
Dial Sender Earth Recall or Switchhook Flash	● Exchange line busy.
Meet-Me-Answer	● Paging in progress.
Exclusive Line Hot Line	● Line is in use (calling, incoming or transferring).
Call Forwarding	● Call forwarding in operation. ● The station to be assigned as executive is in Do-Not-Disturb mode.

When programmed data is modified, depress the programming button to return the system to operational mode.

2.7.4 Re-Initializing Programmed Data

Programmed data may be reset to initial conditions as follows; turn power off and set the SW1 switch on the ECMB board to the OFF(M) position. Turn power on, wait for ten seconds, then set the SW1 switch to the ON(S) position.

2.7.5 Facility Programming

Press the programming button on the TPU. Lift the handset on the DSS station to allow the dial to transmit data to the main equipment. In the following examples, "X" represents any preprogrammed data.

2.7.5.1 DIAL SENDER (DSS 33)

DSS key 33 is used to assign the centralised dial sender as Decadic or VF.

If the exchange lines are VF, programme '0'.

If the exchange lines are Decadic, programme '1'.

Example: VF dialling

		DISPLAY				
Press	DSS 33	0	0	0	x	
	Dial "0"	0	0	0	0	(VF lines)
	Dial "*"	0	0	0	0	
	Dial "#"	0	0	0	0	
	DSS 33 LED goes off.					

2.7.5.2 DSS OVERRIDE (DSS 30)

DSS key 30 is used to give the DSS console the possibility of overriding stations in Do Not Disturb.

To disable override of Do Not Disturb, programme "0".

To enable override of Do Not Disturb, programme "1".

Example: Enable Override

		DISPLAY				
Press	DSS 30	0	0	0	x	
	Dial "1"	0	0	0	1	(Override enabled!
	Dial "*"	0	0	0	0	
	Dial "#"	0	0	0	0	
	DSS 30 LED goes off.					

2.7.5.3 OFF HOOK SIGNALLING (DSS 29)

DSS key 29 is used to assign off hook audible signalling at all stations for intercom calls and incoming exchange line calls.

To disable off hook signalling, programme "0".

To enable off hook signalling, programme "1".

Example: Enable Off Hook Signalling

		DISPLAY				
Press	DSS 29	0	0	0	x	
	Dial "1"	0	0	0	1	(Enabled)
	Dial "*"	0	0	0	0	
	Dial "#"	0	0	0	0	
	DSS 29 LED goes off.					

2.7.5.4 AUTOMATIC RING BACK TIMER (DSS 32)

DSS key 32 is used to set the time a call will stay on exclusive hold before it rings back to the holding station.

The timeout is given by the following formula:

TIMEOUT (seconds) = "N" x 16

where "N" is a single digit in the range 1 to 8. Therefore, "N" specifies the number of 16 second periods required to make-up the timeout.

To disable automatic ring back, programme "0".

Example: 48 Seconds Timeout

$$\text{"N"} = \frac{\text{TIMEOUT}}{16} = \frac{48}{16} = 3$$

		DISPLAY				
Press	DSS 32	0	0	0	x	
	Dial "3"	0	0	0	3	(48 seconds)
	Dial "*"	0	0	0	0	
	Dial "#"	0	0	0	0	
	DSS 32 LED goes off					

2.7.5.5 MEET-ME-ANSWER PAGING (DSS 36)

DSS key 36 is used to enable the meet-me-answer paging facility.

To disable meet-me-answer paging, programme "0".

To enable meet-me-answer paging, programme "1".

Example: Enable Meet-Me-Answer Paging

		DISPLAY				
Press	DSS 36	0	0	0	x	
	Dial "1"	0	0	0	1	(Enabled)
	Dial "*"	0	0	0	0	
	Dial "#"	0	0	0	0	
	DSS 36 LED goes off					

2.7.5.6 ALARM CONTACT TYPE (ALM)

DSS key ALM is used to specify the condition of the alarm contacts when the alarm is active.

If the contacts close when the alarm is active, programme "0".

If the contacts open when the alarm is active, programme "1".

If no alarm device is connected, programme "0".

Example: No Alarm Device Connected.

		DISPLAY				
Press	ALM	0	0	0	x	
	Dial "0"	0	0	0	0	(No Alarm)
	Dial "*"	0	0	0	0	
	Dial "#"	0	0	0	0	
	ALM LED goes off					

2.7.5.7 INTERNAL ZONE PAGING (IZ 1, IZ 2, IZ 3, IZ 4)

DSS keys IZ 1, IZ 2, IZ 3 and IZ 4 are used to set-up the zones within the system which will allow selective paging. Two station numbers must be programmed to define a zone, the stations programmed and each station with a number between the station numbers programmed are assigned to that zone.

Note, zones must not overlap and nesting (placing one zone within another) is not allowed.

DSS key IZ 1 is used to assign stations to Zone 1, IZ 2, IZ 3 and IZ 4 are used to assign stations to Zone 2, Zone 3 and Zone 4, respectively.

To disable this feature, programme "00","*","00","*","#" in each zone.

Example: Programme stations 20 and 33 and all stations in between into zone 1.

		DISPLAY				
Press	IZ 1	x	x	x	x	
	Dial "20"	2	0	x	x	(station 20)
	Dial "*"	2	0	x	x	
	Dial "33"	2	0	3	3	(stations 20-33)
	Dial "*"	0	0	0	0	
	Dial "#"	0	0	0	0	
	IZ 1 LED goes off					

2.7.5.6 EXTERNAL ZONE PAGING (EZ 1, EZ 2)

When the system is connected to a loudspeaker paging system two sets of information can be programmed.

DSS keys EZ 1 and EZ 2 are used to programme data for external zones 1 and 2, respectively.

Note that only EZ 1 is available with a 616.

The display is divided into two fields. The first field, the two digits on the left hand side, are used to assign background music (BGM) for the external zone, it will be heard while there are no paging announcements.

If background music is not required, programme "0".

If background music is required, programme "1".

The second field, the two digits on the right hand side, are used to assign one of the exchange line audible signalling groups.

The audible signalling group assigned to external paging may be programmed as one of the following (refer to 2.7.5.12):

"0" No exchange line audible signalling.
"1" 1 st audible signalling group.
"2" 2nd audible signalling group.
"3" 3rd audible signalling group.
"4" 4th audible signalling group.
"5" Common audible signalling, all lines.
"6" Night transfer audible signalling.

Example: Provide background music and audible signalling from the 3rd group of exchange lines for external zone 1.

	DISPLAY				
Press EZ 1	0	x	0	x	
Dial "1"	0	1	0	x	(BGM provided)
Dial "*"	0	1	0	x	
Dial "3"	0	1	0	3	(Group 3 assigned)
Dial "I"	0	0	0	0	
Dial "#"	0	0	0	0	
EZ 1 LED goes off					

2.7.5.9 EXCLUSIVE LINES OR HOT LINES (DSS 51 to 56)

DSS keys used to assign exclusive lines or hot lines are as follows.

DSS Key for Exclusive or Hot Line No.	Exchange Line Number		
	616 system	1236 system	*2260* system
51 for line-l	No. 5th	No. 11 th	No. 21 st
52 for line-2	No. 6th	No. 12th	No. 22nd
53 for line-3	No. 7th	No. 13th	No. 23rd
54 for line-4	No. 8th	No. 14th	No. 24th
55 for line-5	—	—	No. 25th
56 for line-6	—	—	No. 26th

* When using a 1236 DSS console for programming the unmarked key between MW and NT must be used instead of key 56.

The display is divided into two fields of two digits each.

Enter "00" before a station number to specify a exclusive line, and enter two station numbers to specify a hot line between those stations.

NOTE: 1 When a hot line is provided the corresponding exchange line must not have an exchange line connected. The exchange line circuit is used to provide signalling tones.

2 An exclusive line must not be assigned to a remote or internal extension.

Example: Provide a exclusive line using line-3 (exchange line 23, 2260 system) for station number 25.

	DISPLAY				
Press DSS 53	x	x	x	x	(line -3)
Dial "00"	0	0	x	x	(exclusive line)
Dial "*"	0	0	x	x	
Dial "25"	*0*	*0*	*2*	*5*	(to station 25)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 53 LED goes off.					

Example: Provide a hot line between stations 26 and 34 using line-4 (exchange line 14, 1236 system).

	DISPLAY				
Press DSS 54	x	x	x	x	(exchange line 14)
Dial "26"	2	6	X	X	(hot line between
Dial "*"	2	6	X	X	station 26)
Dial "34"	2	6	3	4	(and station 34)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 54 LED goes off.					

To change an existing exclusive line or hot line, enter "00" in both fields as shown in the example, before programming new data.

Example: Cancel hot line-l

	DISPLAY				
Press DSS 51	M	N	X	Y	(MN and XY are station numbers)
Dial "00"	0	0	x	Y	
Dial "*"	0	0	x	Y	
Dial "00"	0	0	0	0	
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 51 LED goes off.					

Example: Cancel exclusive line-4.

	DISPLAY				
Press DSS 54	0	0	P	Q	(PQ is a station number)
Dial "00"	0	0	P	Q	
Dial "*"	0	0	P	Q	
Dial "00"	0	0	0	0	
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 54 LED goes off.					

2.7.5.10 EARTH RECALL OR SWITCHHOOK FLASH (DSS 35)

When the system is connected to a PBX, earth recall or switchhook flash may be assigned.

DSS key 35 is used to assign the required facility earth recall or switchhook flash.

If neither earth recall nor switchhook flash is required, programme "0".

If earth recall is required, programme "1".

If switchhook flash is required, programme "2".

Example: Earth recall

	DISPLAY				
Press DSS 35	0	0	0	x	
Dial "1"	0	0	0	1	(earth recall)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 35 LED goes off.					

Important Note:

EXCLUSIVE LINES, EARTH RECALL or SWITCHHOOK FLASH key and HOT LINES require conversion of exchange line key(s). There are 8 cases of exchange line key conversion.

	KEY ASSIGNMENT			
	(Line-20)	(Line-21)	(Line-221	2260 Station
	(Line-l 0)	(Line-l 1)	(Line-l 2)	1236 Station
	(Line- 4)	(Line- 5)	(Line- 6)	616 Station
Case- 1:	EXCHANGE	EXCHANGE	EXCHANGE	
Case-2:	EXCHANGE	EXCHANGE	ER or FL	
Case-3:	EXCHANGE	HOT	ER or FL	
Case-4:	EXCHANGE	EXCLUSIVE	ER or FL	
Case-5:	EXCLUSIVE	HOT	ER or FL	
Case-6:	EXCHANGE	EXCHANGE	HOT	
Case-7:	EXCHANGE	EXCHANGE	EXCLUSIVE	
Case-8:	EXCHANGE	EXCLUSIVE	HOT	

2.7.5.11 TYPE OF EXCHANGE LINE (DSS 34)

Each exchange line connection must be defined as a local exchange connection or a PBX connection. This information is necessary for redial and access barring. Each line must be specified in sequence, lines must not be omitted. This also applies when equipping the system.

NOTE: For exchange lines connected to a PBX the code used to get an outside line (trunk access code) must be programmed using DSS key 44 as part of the access barring data.

DSS key 34 is used to allocate each exchange line, first enter the exchange line number, including leading zero.

If the exchange line is connected to an exchange, programme "0".

If the exchange line is connected to a PBX line, programme "1"

Example: Exchange line 1 is connected to an exchange.
Exchange line 2 is connected to a PBX line.

	DISPLAY				
Press DSS 34	**0**	**0**	**0**	**0**	(Exchange line 1)
Dial "01"	0	1	0	0	
Dial "*"	0	1	0	x	
Dial "0"	0	1	0	0	(Exchange.)
Dial "*"	0	0	0	0	
Dial "02"	0	2	0	x	(Exchange line 2)
Dial "*"	0	2	0	x	
Dial "1"	0	2	0	1	(PBX line)
Dial "*"	0	0	0	0	
●					
●					
●					
Dial "#"	**0**	**0**	**0**	**0**	
DSS 34 LED goes off.					

2.7.5.12 EXCHANGE LINE AUDIBLE SIGNALLING (DSS 20 to 28 and NT)

All stations have visual indication of incoming calls, but audible signalling is a programmed option. The options are:-

(i) COMMON SIGNALLING; stations assigned to common signalling will hear audible signalling whenever there is an incoming call on any exchange line. A maximum of 10 stations can be assigned to common signalling.

(ii) GROUP SIGNALLING; exchange lines connected to the system are divided into 4 groups with a maximum of 10 stations assigned to each group. Stations may be assigned to only one of the groups. An incoming call on an exchange line in group 2 will only signal to stations assigned to group 2.

(iii) NIGHT TRANSFER; this mode operates when the NT key on the DSS Console is operated. Effectively this adds'assigned stations (up to 20) to the common signalling group while the system is in night transfer mode.

In general, a station may be programmed to only one of the above options (i), (ii) or (iii). The only exception is that stations assigned to group signalling may also be assigned to night transfer signalling. Stations assigned to common signalling must not be assigned to night transfer - this will result in a programming error.

2.7.5.12.1 COMMON/GROUPED SIGNALLING MODE (DSS 20)

DSS key 20 is used to programme the audible signalling mode for incoming calls. There are two modes of signalling, common signalling only, or common and group signalling together.

If only common audible signalling is to be used, programme "0".

If common and grouped signalling is provided, programme "1".

Example: Common and Grouped signalling.

	DISPLAY				
Press DSS 20	0	0	0	x	
Dial "1"	0	0	0	1	(Common and Grouped
Dial "*"	0	0	0	0	Signalling)
Dial "#"	0	0	0	0	
DSS 20 LED goes off.					

2.7.5.12.2 **GROUP EXCHANGE LINES (DSS 21 to 23)**

It is possible to assign exchange lines in up to 4 groups. The groups are assigned sequentially based on the numerical order of the exchange line connections to the system. The number of the last exchange line in the group must be programmed. If the exchange line number is less then 10, a leading zero "0" must be entered, therefore two digits must be programmed. When the number of groups are less than 4, the last entry must be "O", **"0"**.

Example 1.
For a 2260 system, group 1 (line 1 to line 3), group 2 (line 4 to line 7) group 3 (line 8 to line 11) and automatically group 4, the last group is (line 12 to line 22).

	DISPLAY				
Press DSS 21	0	0	x	x	(Group 1)
Dial "0", "3"	0	0	0	3	(Line 1 to 3 are group 1.)
Dial "*"	0	0	x	x	
Dial "#"	0	0	0	0	
DSS 21 LED goes off.					
Press DSS 22	0	0	x	x	(Group 2)
Dial "0", "7"	0	0	0	7	(Line 4 to 7 are group 2)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 22 LED goes off.					
Press DSS 23	0	0	x	x	(Group 3)
Dial "1", "1"	0	0	1	1	(Line 8 to 11 are group 3 and the last lines are in group 4.)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 23 LED goes off.					

Example 2.
Only two groups assigned group 1 (line to line 9) and group 2 (line 10 and remaining lines)

	DISPLAY				
Press DSS 21	**0**	**0**	**x**	**x**	(Group 1)
Dial "0", "9"	**0**	**0**	**0**	**9**	(Line 1 to 9 are in group 1.)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 21 LED goes off.					
Press DSS 22	0	0	x	x	(Group 2)
Dial "0", "0"	0	0	0	0	(Line 10 to the last line are in group 2.)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 22 LED goes off.					

2.7.5.13 ACCESS BARRING - NO ACCESS TO EXCHANGE LINE GROUP (DSS 37)

DSS key 37 is used to nominate a particular exchange line which will split the exchange lines into two groups the lower group and the higher group, according to the sequence of the exchange line connections on the system.

The assigned exchange line number will be the last exchange line in the lower group.

If this facility is not used, programme **"0" "0"**.

Example: Divide the exchange lines so that exchange line 1 to exchange line 7 are in the lower group, exchange line 8 up to the maximum exchange line capacity (6, 12 or 22) are automatically in the higher group.

	DISPLAY				
Press DSS 37	0	0	x	x	
Dial "0", "7"	0	0	0	7	(line 7)
Dial "*"	O	O	O	O	
Dial "#"	O	O	O	O	
DSS 37 LED goes off.					

Now, according to section 2.7.5.15 stations can be programmed to access all exchange lines or only exchange lines in the lower group. Note that access barring by digit analysis is not applied to the higher group of lines.

2.7.5.14 ACCESS BARRING BY DIGIT ANALYSIS (DSS 40 to DSS 45)

These systems are provided with an access barring programme which will allow 5 classes of barring.

CLASS A — Unrestricted
CLASS B — Barred to ISD, STD allowed
CLASS C — Limited STD/ISD access
CLASS D — Local calls
CLASS E — PABX calls

Provision is made to store some common allowed numbers which any station may use, regardless of barring class.

Note that access barring by digit analysis is not applied to the higher group of lines when the "No Access to Exchange Line Group" facility is programmed.

To provide the access barring facility the following data must be programmed into the system.

CLASS A — No data required.

CLASSB — ISD code required.

DSS key 40 has the provision to programme one number of up to four digits. In Australia this is "0011".

CLASSC — STD access code(s) and allowed STD and ISD numbers are required.

Data programmed using DSS key 41 allows stations assigned to class C to dial preprogrammed STD or ISD numbers.

DSS key 41 has provision for up to 12 numbers with as many as 20 digits each. If a number is longer than the digits programmed it can be dialled providing the programmed digits agree with the first digits of the number dialled.

CLASS D — STD access code(s) and a number length limiter are required.

DSS keys 42 and 43 are used to programme data necessary to perform STD barring.

DSS key 42 is used to programme the maximum number of digits that can be dialled when making a local call. In the major capital cities in Australia this is usually "07", in other areas the maximum number length may vary.

DSS key 43 is used to programme the barred codes to stop STD calls. There is provision for up to eight numbers of two digits each. In the centre of a major capital cities "0" is usually sufficient, however, in outer metropolitan areas or in the country a more elaborate set of codes will be necessary.

CLASSE — Trunk access code is required.

DSS key 44 is used to programme the trunk access code of up to two digits, that is, the number dialled to get an outside line from the PABX. This data, in conjunction with data programmed using DSS key 34, exchange line type, is used for last number redial as well as access barring.

COMMON ALLOWED CODES

DSS key 45 is used to programme eight common allowed numbers of up to four digits each, which can be used by any station independent of the station class of service. The number dialled must agree exactly with the number programmed, therefore this facility allows stations to dial numbers which would normally be barred, emergency "000" or Telecom service numbers e.g. directory assistance "01 3".

The ISD code, the 12 STD/ISD numbers, the eight STD barring codes, the trunk access code and the common allowed numbers are programmed using the same procedure.

Example 1. ISD access code.

	DISPLAY				
Press DSS 40	0	1		(1	st digit)
Dial "0"	0	1		O	(1st digit is O)
Dial "0"	**0**	**2**		O	(2nd digit is 0)
Dial "1"	**0**	**3**	1		(3rd digit is 1)
Dial "1"	**0**	**4**	1		(4th digit is 1)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 40 LED goes off.					

Example 2. STD/ISD numbers, 03630331 and 0011441234519

	DISPLAY			
Press DSS 41	0	1		(1st number)
Dial "0"	0	1	0	(1st digit is 0)
Dial "3"	0	**2**	**3**	(2nd digit is 3)
●				
●				
●				
Dial "1"	0	**8**	1	(8th digit is 1)
Dial "*"	0	**2**		(2nd number)
Dial "0"	0	1	**0**	(1st digit is 0)
Dial "0"	0	**2**	**0**	(2nd digit is 0)
Dial "1"	0	**3**	1	(3rd digit is 1)
●				
●				
●				
●				
●				
Dial "1"	1	**2**	1	(12th digit is 1)
Dial "9"	1	**3**	**9**	(13th digit is 9)
Dial "*"	0	**3**		(3rd number)
Dial "#"	0	**4**		

Repeat depressions of "#" until 0000 is displayed.
DSS 41 LED goes off.

Example 3. When the number length data is a single digit enter a leading zero.

	DISPLAY				
Press DSS 42	0	0	x	X	
Dial "0"	0	0	x	O	
Dial "7"	0	0	0	**7**	(No. length)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 42 LED goes cff.					

Example 4. STD access code is "0".

	DISPLAY			
Press DSS 43	0	1		(1st Number)
Dial "0"	O	1	O	(1st Digit)
Dial "*"	O	**2**		(2nd Number)
Dial "#"		**3**		

Repeat depressions of "#" until 0000 is displayed.
DSS 43 LED goes off.

To display access barring codes stored in DSS keys 40, 41, 43, 44 or 45 you must first press the AC key followed by the desired DSS key. Then you may step through the digits using the "*" button on the DSS station or step through the codes using the "#" button on the DSS station.

To erase an existing code stored using DSS key 40, 41, 43, 44 or 45, press the DSS key (do not press AC first). Then step through the codes using the "#" button until the number of the code you wish to erase is displayed. Now press the "*" button to erase that code.

Example: Erase 2nd number in DSS 41

	DISPLAY	
Press DSS 41	0 1	(Point to 1 st Code)
Dial "#"	0 2	(Point to 2nd code)
Dial "*"	0 3	(2nd code erased and point to 3rd code)
Dial "#"	0 4	(Point to 4th code)
Dial "#"	0 5	(Point to 5th code)
Dial "#"	0 6	(Point to 6th code)
Dial "#"	0 7	(Point to 7th code)
●	●	
●	●	
●	●	
Dial "#"	1 1	(Point to 11 th code)
Dial "#"	1 2	(Point to 12th code)
Dial "#"	0 0 0 0	
DSS 41 LED goes off.		

STATION ASSIGNMENTS

2.7.5.15 STATIONS WITH NO ACCESS TO EXCHANGE LINES IN UPPER GROUP (DSS 38)

DSS key 38 is used to programme data on a per station basis as follows.

Exchange lines are split into two groups in 2.7.5.13.

Stations to access all exchange lines, programme "0".

Stations with access to lower group of lines only, programme "1".

Note that access barring by digit analysis is not applied to the higher group of lines.

Example: Data is programmed as follows.

	DISPLAY				
Press DSS 38	0	0	0	0	
Dial "2", "0"	2	0	0	0	(Station 20)
Dial "*"	2	0	0	x	
Dial "1"	2	0	0	1	(Station 20 has no access to upper lines).
Dial "*"	0	0	0	0	
Dial "2", "1"	2	1	0	0	(Station 21)
Dial "*"	2	1	0	x	
Dial "0"	2	1	0	0	(Station 21 has access to all lines)
Dial "*"	0	0	0	0	
Dial "3", "5"	3	5	0	0	(Station 35)
Dial "*"	3	5	0	x	
Dial "1"	3	5	0	1	(Station 35 has no access to upper lines)
Dial "*"	0	0	0	0	
Dial "#"	0	0	0	0	
DSS 38 LED goes off.					

2.7.5.16 ACCESS BARRING - STATIONS TO CLASS OF SERVICE (DSS 39)

DSS key 39 is used to assign each Station with a class of service for access barring. The data is programmed in the following manner, first enter the station number, then assign a class of service according to table below

Data	Class of Service	
0	A	UNRESTRICTED
1	B	BARRED ISD, STD ACCESS
2	C	LIMITED STD/ISD CODES
3	D	LOCAL CALLS
4	E	PABX CALLS.

Data for digit analysis is programmed in 2.7.5.14.

Example: Programme station 20 to CLASS-A, station 21 to CLASS-B, station 22 to CLASS-C, station 23 to CLASS-D, station 24 to CLASS-E, station 25 to CLASS-B and station 26 to CLASS-C.

	DISPLAY				
Press DSS 39	**0**	**0**	**0**	**0**	
Dial "2 0"	2	**0**	**0**	**0**	(Station 20)
Dial "*"	2	**0**	O	X	
Dial "0"	2	**0**	O	O	(Class A)
Dial "*"	**0**	**0**	**0**	**0**	
Dial "2 1"	2	1	**0**	**0**	(Station 21)
Dial "*"	2	1	**0**	**x**	
Dial "1"	2	1	0	1	(Class B)
Dial "*"	**0**	0	0	0	
Dial "2 2"	2	2	0	0	(Station 22)
Dial "*"	2	2	O		
Dial "2"	2	2	O	X2	(Class C)
Dial "*"	**0**	**0**	O	O	
Dial "2 3"	2	3	O	O	(Station 23)
Dial "*"	2	3	**0**	**x**	
Dial "3"	2	3	O	3	(Class D)
Dial "*"	**0**	**0**	O	**0**	
Dial "2 4"	2	4		**0**	(Station 24)
Dial "*"	2	4	**0**	**x**	
Dial "4"	2	4	**0**	4	(Class E)
Dial "*"	O	**0**	**0**	**0**	
Dial "2 5"	2	5	**0**	**0**	(Station 25)
Dial "*"	2	5	**0**	**x**	
Dial "1"	2	5	0	1	(Class B)
Dial "*"	**0**	**0**	O	O	
Dial "2 6"	2	6	O	O	(Station 26)
Dial "*"	2	6	0	x	
Dial "2"	2	6	0	2	(Class C)
Dial "*"	O	**0**	**0**	**0**	
Dial "#"	**0**	**0**	**0**	**0**	
DSS 39 LED goes off.					

2.7.5.17 STATIONS TO EXCHANGE LINE AUDIBLE SIGNALLING GROUPS (DSS 24 to 28 and NT)

Stations may be programmed into the following exchange line audible signalling groups.

(i) DSS key 24 is used to assign stations to signal for incoming calls on the exchange lines in group 1.

(ii) DSS key 25 is used to assign stations to signal for incoming calls on the exchange lines in group 2.

(iii) DSS key 26 is used to assign stations to signal for incoming calls on the exchange lines in group 3.

(iv) DSS key 27 is used to assign stations to signal for incoming calls on the exchange lines in group 4.

(v) DSS key 28 is used to assign stations to common signalling, i.e. to signal for an incoming call on any exchange line, except exclusive lines.

A station must only be in one of the above groups. Up to a maximum of 10 stations can be assigned to each group.

(vi) The NT key is used to assign stations to signal for incoming calls on any exchange line (common) while the system is in Night Transfer Mode. Up to 20 stations can be assigned to night transfer, but they must not be in the common group (DSS 28).

If less than 10 stations are assigned in one group (20 in the case of night transfer), enter "0","0" as the last data.

The display indicates on the left-hand side the number of stations programmed in that group and on the right-hand side the station number.

It is recommended that the DSS station(s) be programmed into the common exchange line audible signalling group. When programming common signalling (DSS key 28) you will see that the initialising programme sets the DSS station(s) into the common signalling group. Therefore, press the "*" button until the right hand side of the display shows "0 0", before starting programming.

It is recommended that two-wire stations should not be assigned to any signalling group.

Stations are assigned as shown in the following examples.

Example 1: Two DSS's are installed and the DSS station numbers are 20 and 42. Station 24 and 37 are to be assigned to the common audible signalling group.

	DISPLAY				
Press DSS 28	0	1	2	0	(DSS station 20)
Dial "*"	0	2	4	2	. (DSS station 42)
Dial "*"	0	3	0	0	
Dial "2", "4"	0	3	2	4	(station 24)
Dial "*"	0	4	0	0	
Dial "3", "7"	0	4	3	7	(station 37)
Dial "*"	0	5	0	0	
Dial "0", "0"	0	5	0	0	(Means no more.)
Dial "*"	O	6	0	0	
Dial "#"	O	0	0	0	
DSS 28 LED goes off.					

Example 2: Stations 25 and 30 are to receive exchange line audible signalling from the 2nd group of exchange lines.

	DISPLAY				
Press DSS 25	0	1	x	x	
Dial "2", "5"	0	1	2	5	(station 25)
Dial "*"	0	2	x	x	
Dial "3", "0"	0	2	3	0	(station 30)
Dial "*"	0	3	x	x	
Dial "0", "0"	0	3	0	0	(Means no more.)
Dial "*"	0	4	0	0	
Dial "#"	0	0	0	0	
DSS 25 lamp goes off.					

2.7.5.18 STATIONS ASSIGNED FOR DO NOT DISTURB (DSS 31)

DSS key 31 is assigned for this feature. Data "1" following the station number enables the DND function for that station. Data "0" following the station number disabies the DND function for that station.

NOTE: 1 Stations requiring the Call Forwarding facility must have the DND function.

2 Internal extensions and remote extensions must have DND enabled

		DISPLAY				
Depress	DSS 31	**0**	**0**	**0**	O	
	Dial "2", "0"	2	**0**	**0**	O	(Station 20)
	Dial "*"	2	**0**	**0**	X	
	Dial "1"	2	**0**	**0**	1	(DND enabled)
	Dial "*"	**0**	**0**	**0**	O	
	Dial "2", "1"	2	1	**0**	0	(Station 21)
	Dial "*"	2	1	**0**	X	
	Dial "0"	2	1	**0**	O	(DND disabled)
	Dial "*"	**0**	0	**0**	O	
	Dial "2", "2"	2	2	**0**	O	(Station 22)
	Dial "*"	2	2	**0**	X	
	Dial "1"	2	2	**0**	1	(DND enabled)
	Dial "*"	**0**	**0**	**0**	0	
	Dial "#"	**0**	**0**	**0**	0	
	DSS 31 LED goes off.					

2.7.5.19 STATIONS WITH CALL FORWARDING (DSS 47 to 50)

Stations requiring call forwarding must have the Do Not Disturb facility assigned.

Use DSS keys 47, 48, 49 and 50 to assign the Executive and Secretary Stations. The Executive station number must be entered first.

The secretary station must not have an exclusive line programmed.

Calls are forwarded to the secretary station when the executive station is in a Do Not Disturb mode.

Example: Assign stations 21 and 22 as Executive and Secretary Stations, respectively, and stations 33 and 34 as another pair.

	DISPLAY				
Press DSS 47	x	x	x	x	
Dial "21"	2	1	x	x	(Executive 21)
Dial "*"	2	1	x	x	
Dial "22"	2	1	2	2	(Secretary 22)
Dial "*"	O	O	O	O	
Dial "#"	0	0	0	0	
DSS 47 LED goes off.					
Press DSS 48	x	x	x	x	
Dial "33"	3	3	x	x	(Executive 33)
Dial "*"	3	3	x	x	
Dial "34"	3	3	3	4	(Secretary 34)
Dial "*"	O	O	0	O	
Dial "#"	0	0	0	0	
DSS 48 LED goes off.					

2.7.5.20 EXCHANGE LINE EQUIPPING

If internal extensions with exchange line access are used, each exchange line must be assigned as equipped or not equipped to the system. This information is necessary for exchange line selection from internal extensions.

DSS key 46 is used to allocate each exchange line, first enter the exchange line number, including leading zero.

If the exchange line is equipped, programme "0".

If the exchange line is not equipped, programme "1".

Example: Exchange line 1 equipped.
Exchange line 2 is not equipped.

	DISPLAY				
Press DSS 46	0	0	0	0	(Exchange line 1)
Dial "01"	0	1	0	0	
Dial "*"	0	1	0	X	
Dial "0"	0	1	0	0	(Exchange line equipped.)
Dial "*"	0	0	0	0	
Dial "02"	0	2	0	X	(Exchange line 2)
Dial "*"	0	2	0	X	
Dial "1"	0	2	0	1	(Exchange line not equipped.)
Dial "*"	0	0	0	0	
●					
●					
●					
Dial "#"	0	0	0	0	
DSS 46 LED goes off.					

2.8 FUNCTIONAL TEST

After completing system feature programming, the system must be tested in accordance with the following procedure. If faults are encounted follow the repair suggestion. The repair suggestion refers to section 3.6 Suggested Repair Actions in the Maintenance Section. Functional testing requires three stations, a DSS console and a DSS station.

Station A-assigned to common audible signalling.

Station B - Do-Not-Disturb enabled.

Station C - may be DSS station

Off Hook signalling and music-on-hold should be provided. Automatic ring back time should be programmed.

CAUTION

The test procedure should be followed in the order set out below. Each test is in a special sequence and no action (e.g. going on hook) should be taken between steps of the procedure. If the test is interrupted (due to a fault, say) restart the test at the beginning of each section or at any entry point (* in No. column).

2.8.1 EXCHANGE LINE TEST

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
*	1 Exchange Line	Go Off Hook at station A and operate line key. Repeat for each line connected to the system.	1) The associated line LED lights steadily on all stations. 2) Hear dial tone.	3.6.1 3.6.2
	2 Incoming	Call another line, using station A.	1) Associated line LED slow flashes at 60 IPM at all stations. 2) Only assigned stations receive audible signalling. 3) Off Hook signalling heard at station A.	3.6.3 3.6.4 3.6.5
	3 Answering	Go Off Hook at station B and operate incoming line key.	1) The line LED at all stations changes to steady. 2) Both parties can converse	3.6.6 3.6.7
	4 Privacy	Seize the same line at station C.	1) Station C cannot converse with other stations.	3.6.8
	5 ADD ON	At station B operate ADD ON, wait, then operate ADD ON again.	1) The 3 stations can converse.	**3.6.9**
	6 Hold	Go On Hook at station C and operate HOLD at station B.	1) The line LED flashes at 300 IPM at B, and at 120 IPM at other stations. 2) Station A hears music on hold.	3.6.10 3.6.1 1
	7 Re-seizure	Operate the held line at station B.	1) Stations A and B can converse. 2) Line LED changes to steady.	3.6.7 3.6.6
	8 Exclusive Hold	Operate HOLD twice at station B.	1) The line LED flickers at station B and is steady at other stations.	3.6.12

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
9	Automatic Ring Back	Wait for time out. Respond to the held line at station B, then go On Hook at all stations.	1) Audible signalling heard at station B. 1) Line LED changes to steady. 1) Line LEDs go off.	3.6.13
• 10	Last Number Redial	Go Off Hook and seize a line at station A, operate DC and dial "*". Go On Hook.	1) Call same line as previously called.	3.6.14
* 11	Abbreviated Dialling	Go Off Hook, Depress DC. Dial "10" and the desired number. Seize a line, then depress DC, dial "10" and wait. Go On Hook.	1) ICM LED lights. 2) Hear intercom dial tone. 1) Stored destination must be reached.	3.6.15 3.6.16
* 12	Noaccesstoa group of exchange lines. (if programmed)	Seize one of the lines in the higher group at a restricted station.	1) Station hears number unobtainable tone for about a second, then is disconnected from the line.	3.6.17
* 13	Access Barring by digit analysis (as programmed)	Seize a line at stations in different classes and dial various codes.	1) Class-A stations unrestricted. 2) Class-B barred ISD access, STD access provided. 3) Class-C limited ISD/STD access to 12 numbers or areas. 4) Class-D barred STD access, local calls only. Barring based on access code and number length. 5) Class-E barred outgoing by SBS behind a PABX. 6) When restriction occurs, station will hear number unobtainable tone for about a second, and then will be disconnected from the line.	3.6.18
* 14	Multi Party Conference	Call outside party using 1 st exchange line, then operate ADD ON. Call another outside party by a 2nd exchange line, then operate ADD ON. Go on hook.	1) The 1 st line lamp flickers at the station. 1) Two outside parties and the station are connected. 2) Line lamps are steady. 1) Two outside parties are disconnected.	3.6.19

2.8.2 INTERCOM TEST

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
*	15 Seizure	Operate ICM while Off Hook at station A.	1) ICM LED lights steadily at station A. 2) Hear intercom dial tone.	3.6.20
	16 Talk Back	Dial 2 digits to call station B	1) Hear single tone burst through handset of station A and speaker of station B. 2) ICM LED rapid flashes at 300 IPM at station B. 3) Station A voice can be heard through station B speaker. 4) Hear Talk Back answering by station B on station A handset.	3.6.21 3.6.22 3.6.23 3.6.24
	17 Microphone Cut Off	Operate DND at station B. Operate DND again.	1) ICM LED changes to slow flashing at 60 IPM at station B. 2) DND LED slow flashes at 60 IPM at station B 3) No Talk Back can be heard at station A. 1) DND LED goes off. 2) Talkback is possible.	3.6.25
	18 Signal Call	Dial "1" at station A.	1) Audible signalling heard through speaker of station B. 2) Ring tone heard through handset of station A.	3.6.26
	19 Answering	Operate ICM and go Off Hook at station B.	1) ICM LED at station B lights steadily. 2) Stations A and B can converse through handsets.	3.6.27
	20 Disconnection	Go On Hook at station B.	1) ICM LEDs at stations A and B go off.	3.6.28
*	21 Off Hook Signalling	Seize a Line at station A and call station A from station B. Go On Hook at both stations.	1) Signal call is made.	3.6.29
*	22 Do Not Disturb	Operate DND at station B. Call station B from station A. Go On Hook at station A and operate DND twice at station B.	1) DND LED lights steadily at station B. 1) Station A hears fast repeating tone. 1) DND LED goes off at station B.	3.6.30 3.6.31

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
* 23	Alternate Point Answering	Call station A from station B, then go Off Hook and dial station A's number at station C.	1) ICM LED at station C lights steadily. 2) The call is answered by station C.	3.6.32 3.6.33
		Go On Hook at all stations.	1) ICM LEDs go out.	
* 24	ICM Busy	Set up maximum number of simultaneous intercom calls.	1) All calls can be answered 'handsfree'. 2) ICM LED goes steady at every station. (Except those receiving intercom calls.)	3.6.21 3.6.34
		Go On Hook at all stations.	1) ICM LEDs go out.	

Note: Maximum number of simultaneous intercom calls is 4 for 6 if EXPB-B/D equipped) minus the number of DSS Consoles, as an intercom link is reserved for each DSS Console.

* 25 HOT LINE Call (if programmed)	Lift handset and operate HOT LINE.	1) HOT LINE LED lights steadily at originating station. 2) HOT LINE LED slow flashes at 60 IPM at called station. 3) Five tone bursts are heard through handset of calling, and through speaker of called stations.	3.6.35 3.6.36
	Lift handset and operate HOT LINE at the called station.	1) HOT LINE LED at the called station lights steadily.	
	Go On Hook.	2) Both stations can talk.	
* 26 ADD ON. Intercom Conference	Call station A from station C. At station A, go Off Hook and operate ICM. Depress ADD ON at station C.	1) After depression of ADD ON, hear intercom dial tone at station C.	3.6.37
	Call station B from station C. At station B, go OFF-HOOK and operate ICM. Operate ADD ON at station C.	1) After depression of ADD ON, a short intrusion tone is heard. 2) The three stations can converse.	3.6.38
	Station C goes On Hook.	1) Stations A and B can still converse.	3.6.39
	Go On Hook at all stations.		

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
* 27	Internal Zone Paging (if programmed)	Go off hook, operate ICM then dial "81" and page. Operate ICM, dial "82" and page. Operate ICM, dial "83" and page. Operate ICM, dial "84" and page.	1) Paging is heard at stations in Zone-l, after single warbling tone. 2) Paging is heard at stations in Zone-2, after single warbling tone. 3) Paging is heard at stations in Zone-3, after single warbling tone. 4) Paging is heard at stations in Zone-4, after single warbling tone.	3.6.40
28	External Zone Paging (if provided)	Operate ICM, dial "85" and page. Operate ICM, dial "86" and page.	1) Paging is heard from External Zone-l speaker, after single warbling tone. 2) Paging is heard from External Zone-2 speaker after single warbling tone.	3.6.41
29	All Call Paging	Operate ICM, dial "80" and page.	1) Paging is heard from all stations and external speakers, after single warbling tone.	3.6.40
30	Meet-Me-Answer Paging (if programmed)	Operate ICM at station A dial "80", page, then dial "*". Go to station B, lift handset and dial "8". Go On Hook at all stations.	1) After dialling "*", no more paging can be made. 1) ICM LED lights. 2) Stations A and B can talk.	3.6.42 3.6.43

2.8.3 STATION TEST

To be performed at each station.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
*	31 Line Keys	Go Off Hook and operate each line key.	1) Line LED lights. 2) Dial tone is heard if line is connected and free. 3) Station has sidetone.	3.6.44
	32 Dialling	Seize a line and dial an outside number	1) Destination is reached. 2) Parties can converse.	3.6.45
	33 Hold	Operate hold key Reseize line.	1) Line LED rapid flashes at 300 IPM. 1) Line LED goes steady.	3.6.45
	34 ADD ON	Operate ADD ON key.	1) Line LED flickers.	3.6.45
	35 ICM	Operate ICM Key.	1) ICM LED lights. 2) Hear intercom dial tone.	3.6.45
	36 MON	Operate MON key. Operate MON key, then ADD ON key, then go On Hook.	1) Hear intercom dial tone through speaker. 1) LEDs go off.	3.6.46 3.6.47
*	37 DC	Go Off Hook and operate DC key. Go On Hook	1) ICM LED lights. 2) Hear intercom dial tone. 1) ICM LED goes off.	3.6.45
	38 DND	Operate DND key (twice if DND enabled at station). Operate DND key again.	1) DND LED slow flashes at 60 IPM. 1) DND LED goes off.	3.6.45

2.8.4 DSS CONSOLE TEST

To be preformed for each DSS Console.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
* 39	DSS Call (also tests stations)	Go Off Hook at DSS station and operate DSS keys one by one.	1) If station not connected or busy, hear busy tone. DSS LED does not light. 2) If station in DND or Mic-Off, DSS LED flashes and hear double tone burst. 3) Otherwise, DSS LED flashes hear single tone burst then background noise from called station.	3.6.48 3.6 49
40	Automatic Hold	Seize a line at DSS station and dial a digit. Operate DSS key to call a station.	1) Line is automatically held by called station. 2) DSS display indicates held line and called station. 3) DSS station line LED flickers.	3.6 50
41	Automatic Ring Back (if programmed)	Wait for timeout. Seize line, then depress DSS key to call a station.	1) Off hook signalling at DSS station. 2) Line LED changes to rapid flash.	3.6
42	Signal Call	Operate SC Key Wait 20 seconds. Seize line, then go On Hook	1) Audible signalling heard at called station. 2) Line LED flashes at 300 IPM at called station and 120 IPM at other stations. 1) Audible ring signalling heard at DSS station. 2) Line LED changes to 300 IPM at DSS station.	3.6.50
* 43	Override Call	Call station B from station A using ICM. Go Off Hook at DSS station and Then call station B from DSS console. Go On Hook at DSS station	1) Station B receives intercom call handsfree. 1) Station B is transferred to DSS station. 2) Station A hears repeated warbling tone. 1) Station B is reconnected to station A.	3.6.49 3.6.51
*44	Overriding DND (if programmed)	Put station B into DND mode. Call station B by depressing DSS console key for station B.	1) DSS console LED for station A flashes at 300 IPM. 1) Double tone burst is heard. 2) Station B can hear DSS station. 3) Microphone is off.	3.6.52 3.6.53

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
45	Message Waiting	Call station A from DSS console then operate MW key on DSS console.	1) The DSS console LED for station A slow flashes at 60 IPM. 2) HOLD LED flashes at 60 IPM at the station.	3.6.50 3.6.54
		Go On Hook at the DSS station then seize ICM at station A and dial 1.	1) Call DSS station by Signal Call. 2) DSS station ICM LED rapid flashes at 60 IPM.	3.6.54
		Answer the call by going Off Hook and operating ICM at the DSS station	1) DSS console LED associated with the station A goes steady. 2) Hold LED at station A goes out	
		Go On Hook.	1) LEDs go out.	
*	46 Paging	Lift handset and operate IZ or EZ or AC.	1) Paging Zone LED goes ON. 2) Paging can be heard through the associated zone.	3.6.50 3.6.40
		Go On Hook		
*	47 Night Transfer	Operate NT and make exchange line incoming calls to the system.	1) NT LED goes ON. 2) Stations assigned to night transfer ring.	3.6.50 3.6.55
		Depress NT again.	1) NT LED goes out.	

2.8.5 MISCELLANEOUS TESTS

*	48 Powerfail Stations	Turn power off. Go Off Hook.	1) Hear dial tone. 2) Station has sidetone	3.6.56
		Dial a number.	1) Call is successful. 2) Parties can talk.	3.6.57
		Go On Hook Turn power on.	1) Call is disconnected.	
*	49 Background Music Control	Operate "#", at station.	1) Background Music can be heard.	3.6.58
		Operate "#" again	1) Background Music stops.	
*	50 Alarm	Activate alarm device into alarm condition.	1) ALM LED on DSS console rapid flashes at 300 IPM. 2) Alarm Tone is heard at DSS station continuously.	3.6.59
		Release the Alarm condition.	1) ALM LED goes off and Alarm Tone ceases.	3.6.60
*	51 Switch hook Flash/Earth Recall	Seize a PBX line, then operate FL or ER quickly.	1) The line loop is opened for a second, or 2) The line is earthed for a second.	3.6.61
		Go On Hook.		

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
* 52	Call Metering Unit	Seize on exchange line and make a call. Go On Hook.	1) Call Metering Unit counts metering pulses.	3.6.62
*53	Handsfree Console	Operate ON/OFF key.	1) ON/OFF LED lights steadily.	3.6.63
		Operate ICM.	1) ICM LED lights steadily. 2) Hear intercom dial tone.	3.6.64
		Lift handset.	1) ON/OFF LED goes off. 2) Dial tone transferred to handset.	
		Depress ON/OFF key, then return handset.	1) ON/OFF LED lights steadily. 2) Dial tone heard through speaker.	
		Call another station.	1) Talk hands free.	3.6.64
		Depress MIC/OFF key.	1) MIC/OFF LED lights steadily. 2) Called station cannot hear calling station.	
		Depress ON/OFF key.	1) ON/OFF, MIC/OFF and ICM LEDs go off. 2) Call is disconnected.	

2.8.6 **INTERNAL EXTENSION TEST**

To be performed for each Internal Extension with exchange line access. Perform RTIU Remote Extension test (63 to 66) for Internal Extensions without exchange line access.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
* 54	Intercom Call	Go Off Hook.	1) Hear internal dial tone 2) Extension has sidetone.	3.6.65
		Dial "2".	1) Hear intercom dial tone.	3.6.66
		Dial another station	1) Intercom call is made to station.	
		Have station answer using handset.	1) Parties can talk through handset.	3.6.67
55	ADD ON	Flash switchhook.	1) Hear internal dial tone.	3.6.68
		Flash switchhook aaain.	1) Recover intercom call.	
56	Disconnection	Go On Hook	1) Call is disconnected	3.6.69
* 57	Receiving Intercom Call	Call Internal Extension.	1) 2-wire internal extn. rings. 2) Calling station hears ring tone.	3.6.70
		Go Off Hook at internal extension	1) Parties can talk.	
		Go On Hook.	1) Call is disconnected.	
* 58	Exchange Line Call	Go Off Hook and dial "3" or "4".	1) Hear exchange line dial tone.	3.6.71
		Dial a number.	1) Call is made.	
		Go On Hook.	1) Call is disconnected.	

2.8.7 **RTIU TEST**

TIE LINES

To be performed for each Tie Line

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
* 59	Tie Line Seizure	Seize a tie line at a station.	1) Line LED lights steadily. 2) If LRB board fitted, RTIU sends ring voltage to tie line. Station hears ring tone. 3) If RRB board fitted, RTIU sends ring voltage to tie line for one second.	3.6.72
60	Tie Line Answered	Answer at tie line. Go On Hook	1) Ringing stops. 2) Station and tie line can converse.	3.6.73
* 61	Incoming Tie Line Call	Call in from tie line.	1) Incoming call is signalled and line LED flashes. 2) If LRB fitted, ring tone is sent on tie line.	3.6.74
62	Answering Tie Line	Operate line key. Go On Hook.	1) Line LED lights steadily. 2) Station and tie line can converse.	3.6.75

REMOTE EXTENSIONS

To be performed for each Remote Extension and Internal Extension with intercom access only.

* 63 Intercom Call	Go Off Hook.	1) Hear Intercom dial tone. 2) Extension has sidetone.	3.6.76
	Dial another station's number	1) Intercom call is made to station.	3.6.77
	Have station answer using handset.	1) Parties can talk using handsets.	
64 ADD ON	Flash switchhook	1) Hear dial tone.	3.6.78
	Flash switchhook again.	1) Recover intercom call.	
65 Disconnection	Go On Hook.	1) Call is disconnected.	**3.6.79**
* 66 Receiving Intercom Call	Call extension from a station.	1) Extension rings. 2) Calling station hears ring tone.	3.6.80
	Go Off Hook at extension.	1) Stations can converse.	
	Go On Hook	1) Stations are disconnected.	

2.9 RECORDS

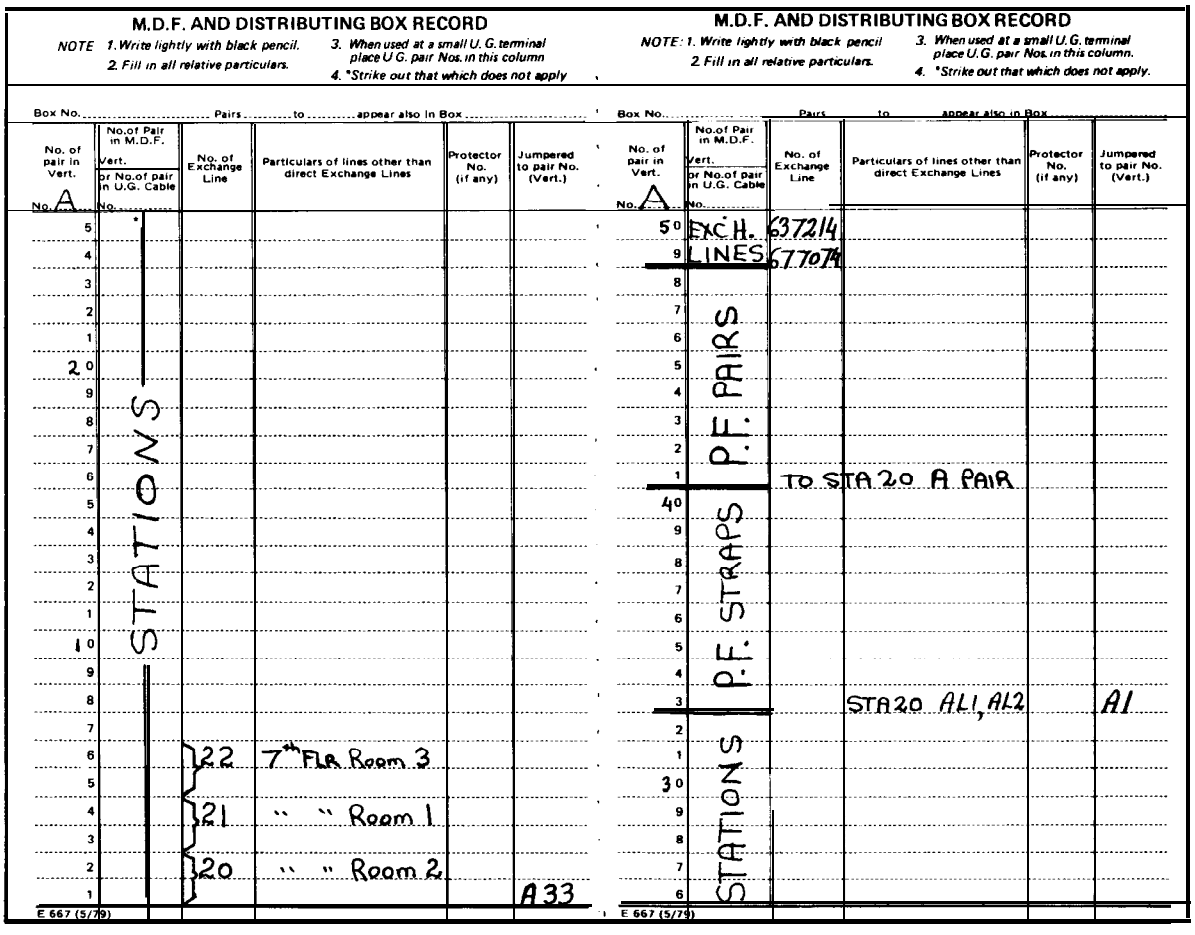


FIGURE 64 S.D.F. RECORDS

2.9.1 Software Programming Records

Upon completion of the installation a copy of the SBS System Order should be placed in the S.D.F. as a permanent record of the way the system has been programmed.

2.9.2 S.D.F. Records

The cabling records for the S.D.F. will be entered in a standard M.D.F. and Distributing Box Record Book. N616 and N1236 require Record Book E667 and the N2260 requires Record Book E668.

An example of the method of entering the records is shown in figure 64.

3
MAINTENANCE

3.1 TEST EQUIPMENT AND MAINTENANCE AIDS

The following items are necessary to carry out maintenance on the systems:

(i) A Multimeter with small test probes, to measure the various test point voltages;

(ii) A Continuity Tester, to check wiring between the main equipment and stations.

(iii) A DSS-6161236-B programming console commonly called TPU-N, Test and Programming Unit for Commander N-Series Business Systems. This is equipped with a programming button which places the system in 'programme' mode, thus enabling verification and/or reprogramming of site dependant system data;

(iv) An AMP-Champ connector insertion tool, which is used to terminate the AMP-Champ connector;

(v) Normal maintenance tools, i.e. Buttinski, Long-nose Pliers, Angle Cutters and Screw Drivers (both Phillips and straight blade types).

3.2 TEST POINTS

3.2.1 Power Supply

There are eight DC voltages supplied for these systems.

N616:

Supply voltages are accessed on the Power Supply Board (PSB-B). Care must be exercised, the voltages are read on PSB-B terminals (refer to figure 65 and table 16).

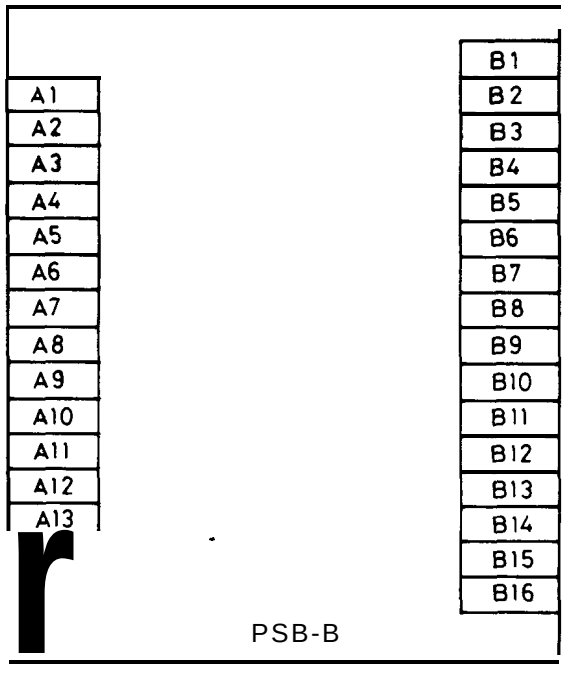


FIGURE 65 POWER SUPPLY BOARD (PSB-B) TERMINALS

N1236 and N2260:

Supply voltages are tested via the connector socket (refer to figure 66 and table 16), small test probes are required. If necessary the various voltages may be accessed similarly to the N616.

CAUTION The power supplies are powered from the 240 volt mains supply and hazardous voltages are present within. Do not attempt to repair these units.

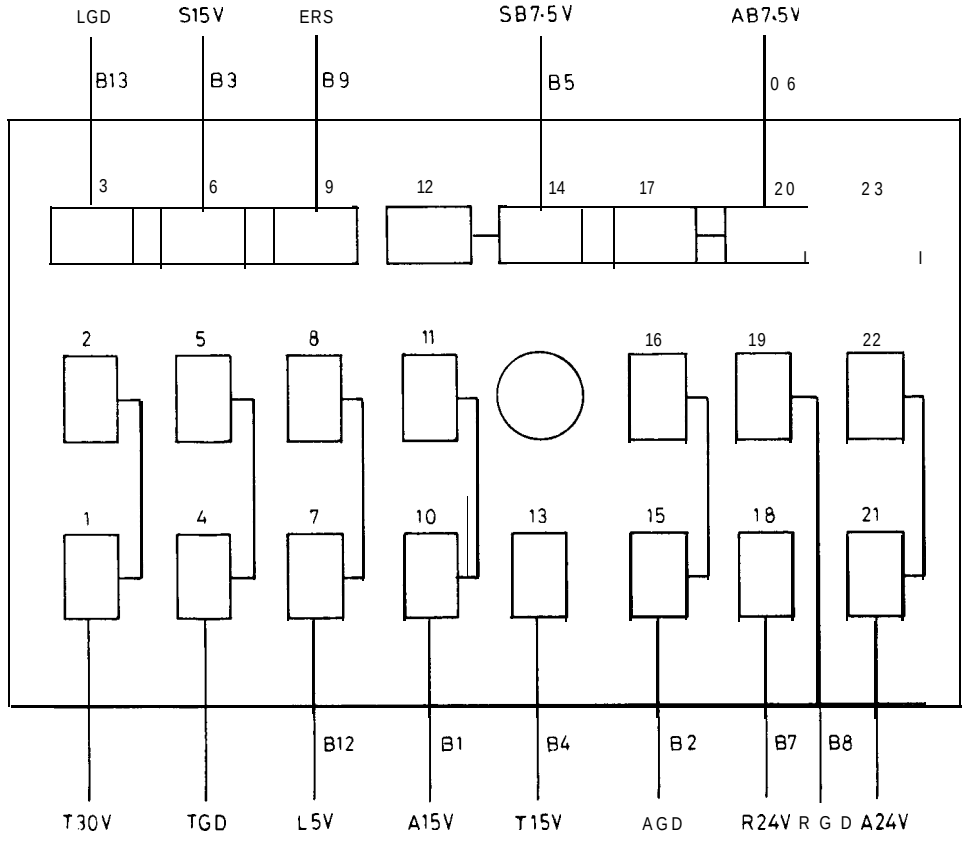


FIGURE 66 POWER SUPPLY VOLTAGES, CONNECTOR CONFIGURATION
(VIEWED FROM OUTSIDE THE POWER SUPPLY)

The following table lists the various voltages, the corresponding test points on the power supply board (PSB-B) and the connector outputs on the power supply.

TABLE 16 POWER SUPPLY VOLTAGES

VOLT.	SUPPLY VOLTAGE DESCRIPTION	TEST POINTS +ve	-ve	CONNECTOR PINS +ve PINS	-ve PINS
15V±0.5V	Cross point switch	B3	B13	6	3
40V±1 ov	Station & DSS console power	A9	B13	1	3
5V±0.5V	Logic	B12	B13	7	3
15V±0.5V	Handset battery feed	B4	B13	13	3
15V±0.5V	Amplifier power	B1	B13	10	3
7.5V±0.5V	Amplifier bias reference	B6	B13	20	3
7.5V±0.5V	Cross point bias reference	B5	B13	14	3
24V±5V	Relay	B7	B13	18	3

3.2.2 Main Equipment

Exchange Lines, Stations, Powerfail Bells, Music Source, External Speaker, Alarm Detector, Call Metering Unit power connection, Ring Generator Unit connection, and signal earth for Earth Recall can be accessed on the System Distributing Frame (SDF).

Exchange Lines on EPFB board

Eight pairs of terminals are located on each EPFB board. They are labelled L1T and L1R, to L8T and L8R respectively. The voltage across exchange line one can be checked by connecting a voltmeter between the terminals L1T and L1 R. The voltage across all other exchange lines can be checked by connecting a voltmeter between their respective terminals. The terminals for exchange line one are located at the top of the board and for exchange line eight at the bottom of the board.

LED indications provided by the 616/1236/2260 systems:

BOARD INDICATION

ECPB: The top LED slow flashes at 60 IPM to indicate that the main CPU programme is running, but goes steady (ON or OFF) when the system is in programmimg mode.

The bottom LED flashes at 300 IPM to indicate that data transmission to stations is taking place.

ECMB: The LED lights when the back up battery is going flat to indicate that the battery must be replaced.

ESTB: The LEDs light steady when the associated station is Off Hook. There are four LEDs per board.

E2WB: The LEDs light steady when the associated extension is off hook and flickers when dialling. There are four LEDs per board.

ELNB: The LEDs light steady when the associated exchange line is siezed, flashes when receiving an incoming call and flickers when decadic dialling. There are four LEDs per board.

3.2.3 Stations & DSS Console

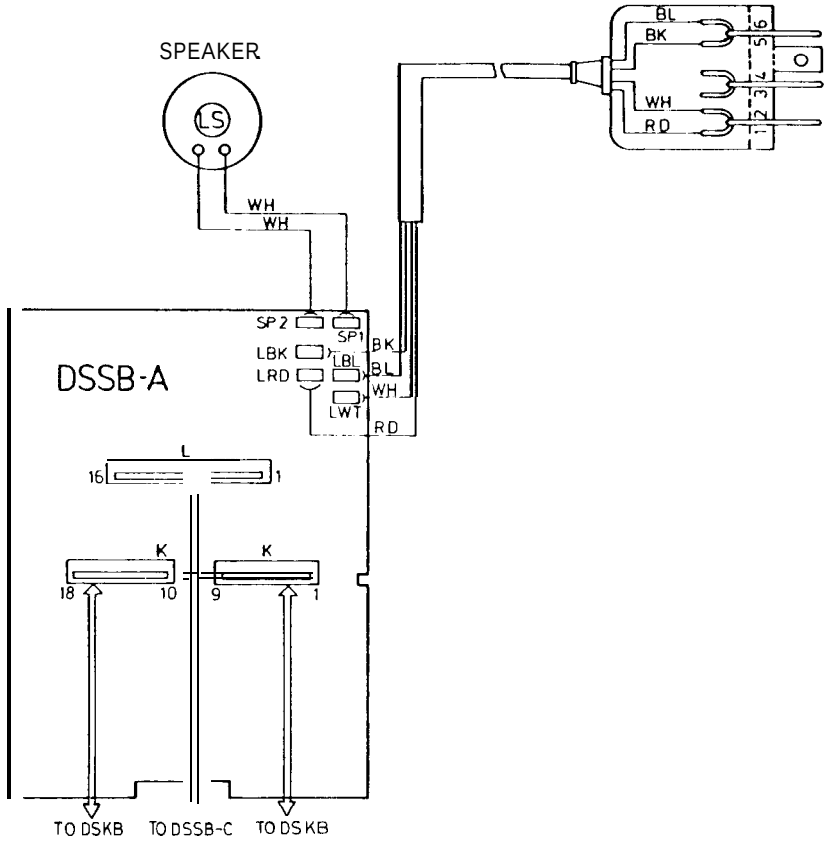


FIGURE 67 LINE CORD AND SPEAKER CONNECTIONS ON THE DSS CONSOLE BOARD

Station A and B pairs are accessed at the quick connect terminals LWT, LBL, and LRD, LBK respectively, which are on the STB-B board. These are illustrated in figures 49 and 50.

Similarly, the DSS Console A and B pairs are accessed at the quick connect terminals LWT, LBL, LRD and LBK, which are on the DSSB-A board. These are illustrated in figure 67.

TABLE 17 STATION AND DSS CONSOLE VOLTAGES

			603 PLUG PIN	VOLTAGES
Station Voltages:	A Pair	LWT	2	+13±3V
		LBL	6	+1.5±1.5V
	B Pair	LRD	1	+40±10V
		LBK	5	REF
DSS Console:	A Pair	LWT	2	+13±3V
		LBL	6	+1.5±1.5V
	B Pair	LRD	1	+40±10V
		LBK	5	REF

Note: The 616 DSS Console A Pair voltage is 0V when using the DSS port (36) on the EDTB-B board.

3.2.4 Handsfree Console

This unit is connected to the STB-B board in the associated station. Refer to figures 48, 49 and **50.**

The power test point is accessed on the STB-B board. The power to the console is accessed via the terminals 'RB' (Ground) and 'SG' (+20 V). Check that the "K" switch in the Handsfree Console is switched to the 20V position.

3.2.5 Remote Extension and Tie Line Interface Unit

Test points are accessed on the side of the unit as shown in figure 52.

The RTIU contains two circuits, terminals are prefixed by "1" for the first circuit and "2" for the second circuit.

When a remote extension is installed, the station A and B pairs from the main equipment are connected to 'WT', 'BL', and 'RD', 'BK' terminals respectively. The remote extension connects to the A and B terminals.

When a tie line is interfaced to the main equipment the terminals 'WT' and 'BL' are connected to the main equipment exchange line inputs. Terminals 'A' and 'B' are connected to the tie line.

The voltage across terminals 'A' and 'B' for a loop-in ring-out tie line should be +48V. There should be no DC voltage across the terminals for a ring-in ring-out tie line.

3.2.6 Call Metering Unit

Power to the CMU can be accessed via the '+' and '-' terminals. The nominal voltage is 30V which is supplied from the main equipment via the SDF.

Incoming exchange lines are connected to 'LA' and 'LB' terminals first, and connected to the SBS via terminals 'A' and 'B'.

3.2.7 Ring Generator Unit

The RGU is connected to the main equipment when internal extensions are used.

Power to the RGU can be accessed on the terminals +24 V and G (Ground) on the RGBB-A board contained within the RGU. The frequency of the ring voltage is 16Hz (nominal) which is accessed on the terminals '16Hz' and 'OUT', also contained within the RGU. The ring voltage is approximately 70V RMS (measured with multimeter).

3.3 POWER SUPPLY INDICATORS

3.3.1 Power Supply

The power supply for the main equipment contains a Power Failure Indicator, 'RL' LED, which lights when a mains power failure occurs for more than 80 m sec.

On power up the system is automatically reset. Depression of the 'RS' switch will extinguish the LED. This does NOT reset the system.

For an extended power failure the system will assign specific stations to given exchange lines, if powerfail stations are provided.

The mains and all power supply voltages are equipped with indicators which light when the supply is active.

If trouble arises with any of the supply voltages, check the voltages (see section 3.2) and, if necessary, replace the associated fuse, or the power supply. Refer to Section 3.4.2 Power Supplies.

The table illustrates which fuse corresponds to a given supply.

TABLE 16 POWER SUPPLY FUSE RATINGS

FUSE	RATING		POWER SUPPLY VOLTAGE
	616	**1236** 2260	
F0	2A	5A	MAINS
F1	5A	10A	30v
F2	3A	3A	5 v
F3	3A	3A	24V
F4	5A	5A	7.5 v, 15 v

3.3.2 Remote Extension and Tie Line Interface Unit

The power supply for the RTIU is equipped with one pilot lamp. This lights when power is supplied from the mains.

There are three mains derived DC supplies contained in the unit. If trouble arises with any supply check the voltage and the power supply fuses.

If necessary replace the fuse, or the entire RTIU. Table 19 illustrates which fuse corresponds to a given supply.

TABLE 19 RTIU FUSE RATINGS

FUSE	RATING	SUPPLY VOLTAGE
F0	1 A (0.8A)	MAINS
F1	1 A	+48V±10V
F2	1 A	+24V±8V
F3	1 A (0.8A)	+ 5V±0.3V

3.4 MAINTENANCE PROCEDURES

Due to the sensitivity of some components (especially the MOS components) and their susceptibility to damage by static discharge, maintenance will be limited to changeover in the case of PBAs, and replacement of telephone parts in the case of stations. To protect faulty assemblies, and items such as Stations, Handsfree Consoles, RTIU, Power Supply, and the Main Equipment; all transport must take place in the protective containers supplied with the new item. For return of faulty PBA's and other items of equipment refer to section 3.7 Repair Procedures.

3.4.1 Stations

Maintenance on stations will be confined to replacement of transmitter and receiver inserts, cords, plugs and sockets. Faults in the PBAs within the station, or with the pushbutton assemblies will be rectified by replacement of the station complete.

3.4.2 Power Supplies

The power supplies associated with the 1236 and 2260 systems are separate items from the main equipment. When they are diagnosed as being faulty, they will be changed over complete.

Note: The power supply for the 67 6 system is built info the main equipment. When the power supply is faulty for this system, it will necessitate changeover of the entire main equipment. The PBAs from the faulty main equipment will need to be re-installed in the new main equipment. This is necessary to ensure that system programming and abbreviated dialling memories are not lost.

CAUTION

The power supplies are powered from the 240 Volt mains supply and hazardous voltages are present within. Do not attempt to repair these units.

3.4.3 Remote Extension and Tie Line Interface Unit

The Remote Extension and Tie Line Interface Unit (RTIU) will be maintained similarly to the main equipment, i.e. individual PBAs will be replaced when they are diagnosed to be faulty. When the RTIU power supply is diagnosed to be faulty, it will necessitate changeover of the RTIU complete. The PBAs in the faulty RTIU will need to be re-installed in the new RTIU.

3.4.4 Other Items

When other items of equipment are diagnosed as faulty by the flow charts or testing, they will be changed over complete.

This includes Direct Select Station (DSS), Handsfree Console (HFC), Call Metering Unit (CMU), and the Ring Generator Unit (RGU), etc.

3.4.5 Printed Board Assemblies (PBAs)

Any fault in the PBA will necessitate replacement of the whole assembly. No repair of PBAs will be done on site or in field depots. Any attempt to repair a PBA in the field may damage the PBA resulting in additional faults.

Coded board ejectors are provided on PBAs to facilitate their removal from the main equipment. The board ejectors are coded into two categories.

(i) RED EJECTORS: Boards with red ejectors must not be removed from the main equipment until the mains power is turned OFF.

(ii) WHITE EJECTORS: Boards with white ejectors may be removed from the system at any time.

In addition to the above categories, boards containing MOS circuitry are marked with a RED LINE on the edge of the board and/or a “MOS” sticker on the ejector.

As previously mentioned, the boards require careful handling and, in general, must NOT be removed whilst the power is still on.

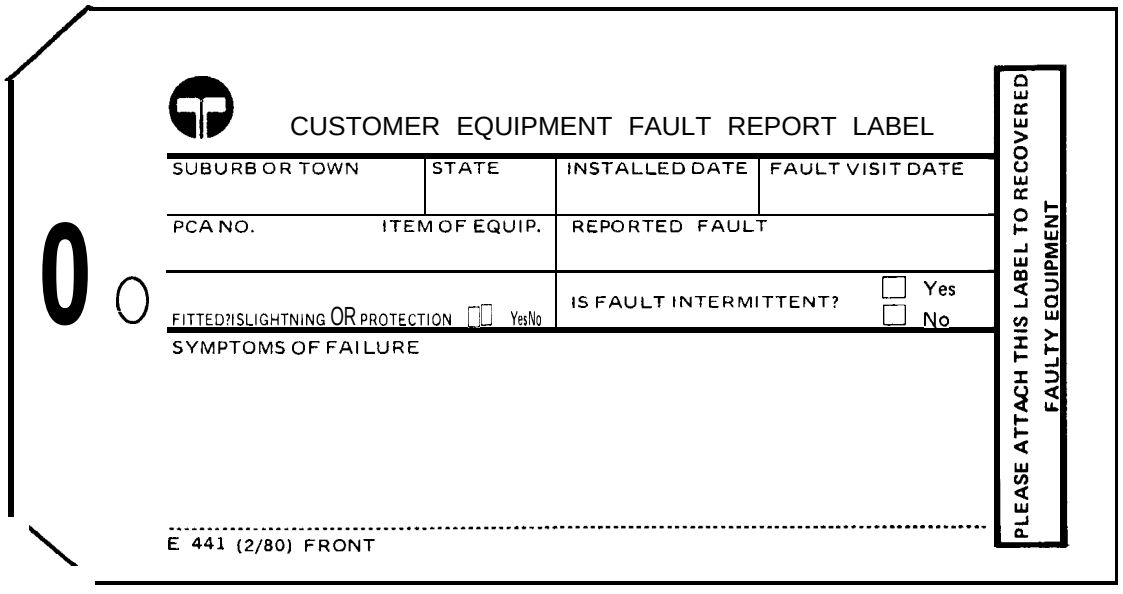


FIGURE 68 CUSTOMER EQUIPMENT FAULT REPORT LABEL (E441)

To assist centralised repair of assemblies and other items field staff must attach a Customer Equipment Fault Report Label (E441), figure 68, to all faulty assemblies at the time of field replacement. As the circuits of these assemblies are very complex, any information regarding the faulty condition will be of great assistance to the repair centre. If the fault condition is suspected of being intermittent, this should be noted also.

3.4.6 ***WARNINGS***

A. This equipment contains a considerable number of MOS, and other static sensitive components. To reduce the incidence of the premature failure due to static discharge, the following precautions MUST be taken:

- Always ensure that power is disconnected before unplugging PBAs.
- Always discharge static from yourself by touching a conductive part of the main equipment before handling boards.
- Handle PBAs by the edge or by the handles. Do not handle PBA tracks, components or edge connectors (contaminants introduced by fingers can cause corrosion and high resistance connections).
- Components are physically delicate. Finger pressure on a component can fracture, but not necessarily break component leads: a future fault.

To protect against physical damage and damage due to static discharge, PBAs must ALWAYS be wrapped in aluminium foil (e.g., cooking foil) and inserted into an ANTI-STATIC plastic bag and placed in the protective container provided with the new item. In the case of the ECMB remove the battery and package separately.

These procedures apply equally to both working and faulty PBAs. Careless handling, storage and transporting will cause secondary or future faults.

B. To prevent the likelihood of damage to electronic components, power should be switched off before working on the systems.

C. The cabling between the main equipment and stations is polarity sensitive. It is essential that the correct polarity be maintained from the main equipment to the stations and pairs must not be swapped. Care must be exercised when checking voltages on cabling. Do not short or bridge between terminals as this will cause fuses on the ESTB boards to blow.

WIRE COLOUR	603 PLUG/ 610 SOCKET	WIRE DESIGNATION
WT White	2	AL1 A-pair
BL Blue	6	AL2
RD Red	1	BD+ B-pair
BK Black	5	BD-

D. Power supplies are powered from the 240 volt mains supply and hazardous voltages are present within. Do not attempt to repair these devices.

E. ECMB- A,B,& D BOARDS

- If these PBAs are replaced, all site dependant data and abbreviated dial numbers are lost. It will be necessary to re-programme the system.
- The battery may be changed by removal of the daughter board, BTB-A, (without loss of any programmed data) while the ECMB power is on.
- The press button (SW4) must be pressed to reset the crosspoints of the system after replacing ESTB or ELNB boards when the power is on.

3.4.7 **Maintenance Requirements**

It is recommended that the following maintenance parts be carried by service staff:

COMPONENT		**IMPORTANCE**
1)	Transmitter	Non critical
2)	Receiver	Non critical
3)	Cords (Handset and Line)	Non critical
4)	603 Plug 610 socket	Non critical
5)	The following fuses:	
	i) Power Supply	
	2A M205	Critical
	3A M205	Critical
	5A M205	Critical
	10A M205	Critical

COMPONENT		IMPORTANCE
ii) ESTB-C, EDTB-B		
Station Fuse:	375 mA 3AG (315mA)	Non critical
DSS Console Fuse:	1A 3AG	Non critical
iii) Central Memory Board (ECMB)		
250mA 3AG		Non critical
iv) Remote Extension & Tie Line Interface Unit		
1.0A M205	(0.8A)	Non critical
v) E2WB		
Ring Voltage Fuse:	375 mA 3AG (315mA)	Non critical
6) Keycaps (3 types)		Non critical
7) Installation Cable, **2 Pair, FLAT CABLE MUST NOT BE USED.**		

The following parts will be kept at the FDC/SDC store. When the diagnostic flow charts or testing indicate that one or more of these parts requires replacement, they should be obtained from the store on a one-for-one basis.

8) 1236 and 2260 Power Supplies	Critical
9) 1236 and 2260 Main Equipment	Critical
10) 616 Main Equipment (includes power supply)	Critical
11) Printed Board Assemblies:	
i) Main Equipment	
ECPB-A	Critical
ECMB-A,B,D	Critical
EDTB-A,B	Critical
EICB-A	Critical
ETSB-A,B	Critical
ETSB-C	Non critical
EXPB-A,B,C,D	Non critical
EPGB-B	Non critical
EGPB-A	Non critical
EGDB-A	Non critical
EPFB-A	Non critical
ELNB-A	Non critical
ESTB-C	Non critical
E2WB-C	Non critical
ii) Remote Extension & Tie Line Interface Unit	
RTB-A	Non critical
22IFB-A	Non critical
RXB-A	Non critical
RRB-A	Non critical
LRB-A	Non critical
12) RTIU (includes power supply)	Non critical
13) Stations	Non critical
14) Powerfail Stations (Decadic & VF)	Non critical
15) DSS Consoles	Non critical
16) Ring Generator Unit	Non critical
17) Call Metering Unit	Non critical
18) Handsfree Console	Non critical
19) Powerfail Bell	Non critical
20) Battery	Non critical
(Replacement will be made by local purchase of an identical battery)	

3.5 FAULT FINDING FLOW CHARTS

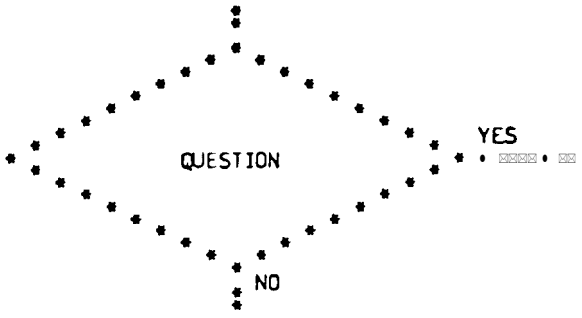
The disgnostic flow charts may be used whenever a system failure occurs. They are a means of localising a fault occurence in one of the printed board assemblies (PBA) in an established working system.

Always commence at the “Start” block.

Flow Chart Symbols:

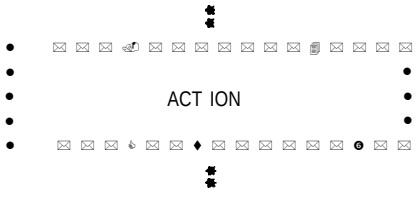
(a) Decision Function:

This block contains a question which may be answered only by a ‘YES’ or a ‘NO’. ONE ONLY of its two outward paths may be taken, depending upon that answer.



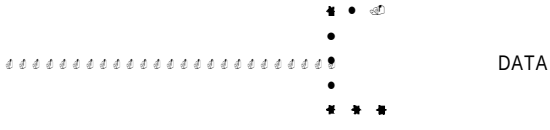
(b) Action/Operation:

This block contains instructions defining an action to be taken (e.g. board replacement) or a test to be made (this will precede a decision function). It is essential to comply exactly with the instructions.



(c) Data Block:

This does not form part of the fault-finding sequence, but provides necessary information (e.g. connector points, terminal allocations, etc.) required by an ‘Action or Decision Block’. It is attached to the relevant ‘Action or Decision’ block by a dotted line.



(d) Exit/Entry Points:

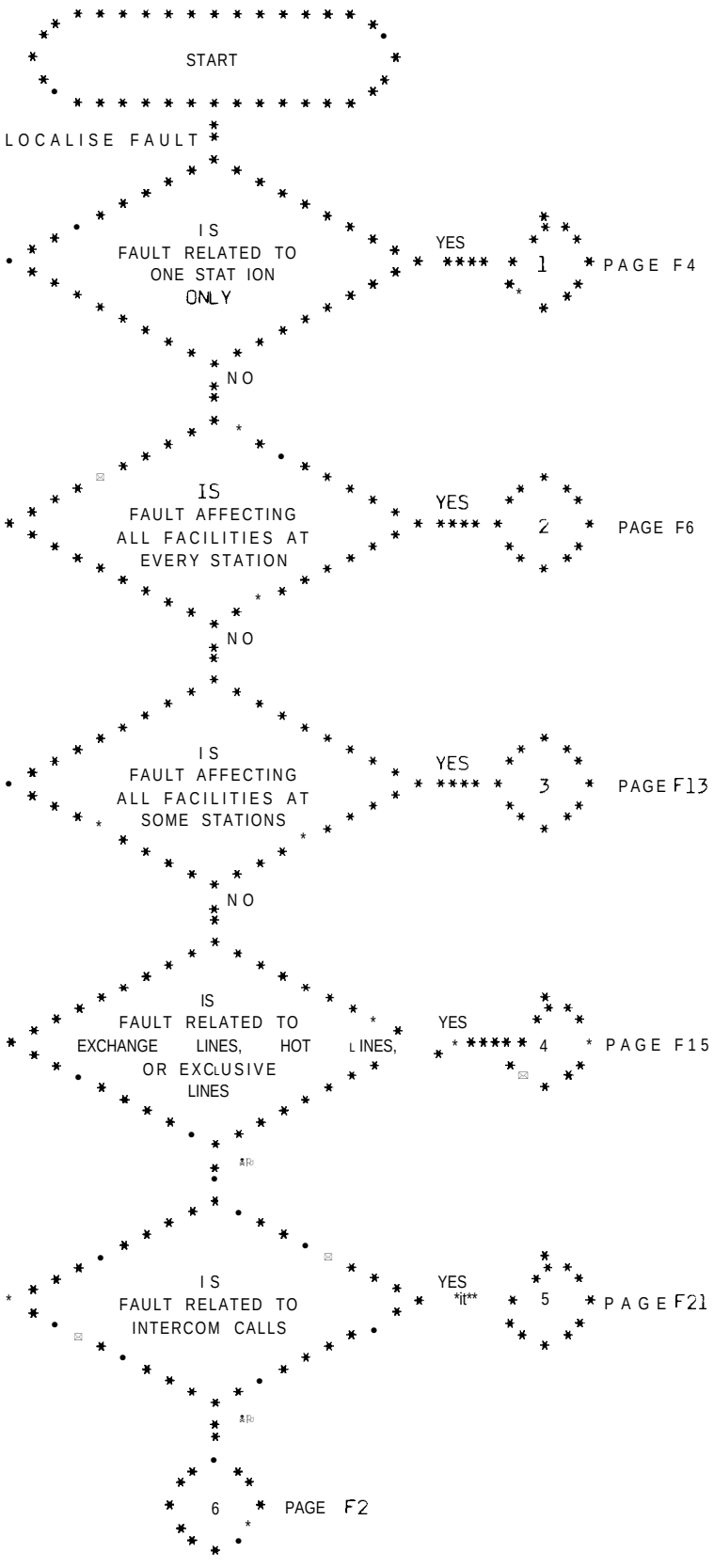
Numbered circles are used to move from page to page within a flow chart. In the example shown, exits to point '2' appear on both pages 6 and 9; entry point '3' is located on page 7. Each circle has its destination (or origin) page number(s) noted beside it.

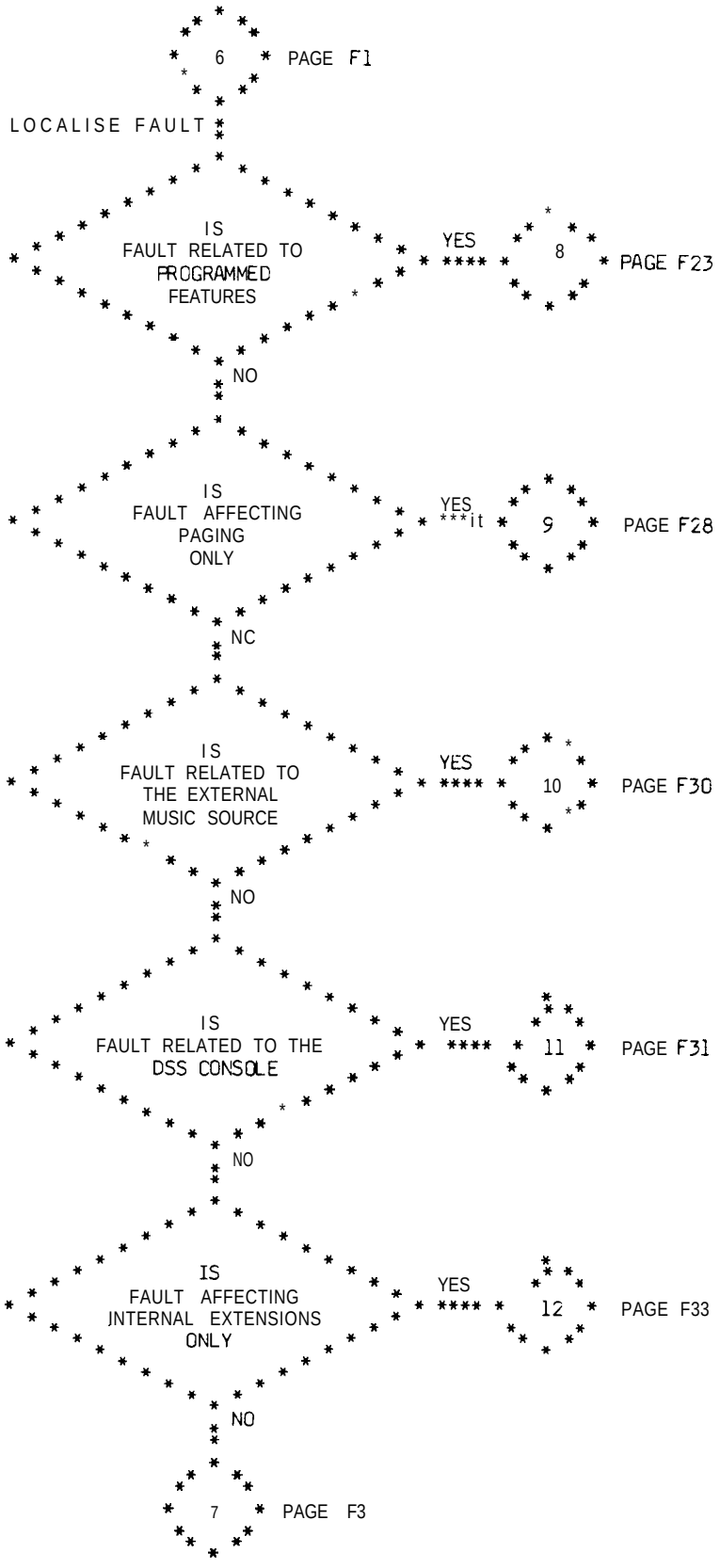
3.51 Board Swapping to Confirm Fault

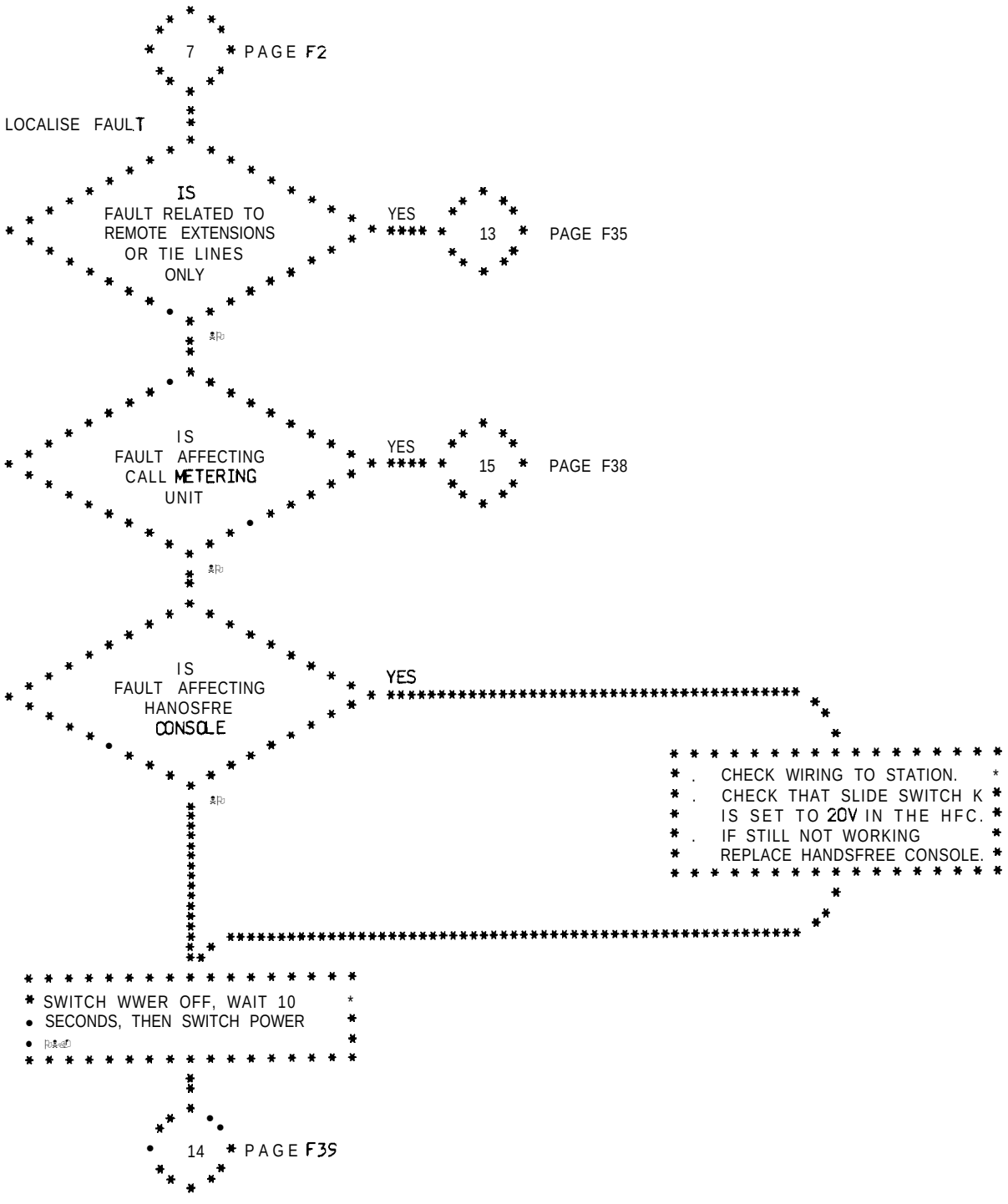
Board swapping can be used to confirm a faulty board diagnosis when the suspect board is duplicated in the system. This applies in particular to exchange line boards, station interface boards, power failure boards and 2 wire internal extension interface boards when used.

Take the suspect board and swap this board with an identical board. If this yields the same fault, the faulty board has been located. The fault will follow the faulty board.

3.5.2 Flow Charts




6
PAGE F1
LOCALISE FAULT
IS FAULT RELATED TO PROGRAMMED FEATURES
YES
8
PAGE F23
NO
IS FAULT AFFECTING PAGING ONLY
YES
9
PAGE F28
NC
IS FAULT RELATED TO THE EXTERNAL MUSIC SOURCE
YES
10
PAGE F30
NO
IS FAULT RELATED TO THE DSS CONSOLE
YES
11
PAGE F31
NO
IS FAULT AFFECTING INTERNAL EXTENSIONS ONLY
YES
12
PAGE F33
NO
7
PAGE F3


7
PAGE F2
LOCALISE FAULT
IS
FAULT RELATED TO
REMOTE EXTENSIONS
OR TIE LINES
ONLY
YES
13
PAGE F35
IS
FAULT AFFECTING
CALL METERING
UNIT
YES
15
PAGE F38
IS
FAULT AFFECTING
HANOSFRE
CONSOLE
YES
. CHECK WIRING TO STATION.
. CHECK THAT SLIDE SWITCH K
IS SET TO 20V IN THE HFC.
. IF STILL NOT WORKING
REPLACE HANDSFREE CONSOLE.
SWITCH WWER OFF, WAIT 10
SECONDS, THEN SWITCH POWER
14
PAGE F39

FAULT ON ONE STATION

- CHECK THAT STATION IS WIRED CORRECTLY (FIGS. 49 & 50).
- CHECK THAT 610 SOCKET OF STATION IS CABLED CORRECTLY FROM THE SDF.

WIRE	PIN
WT	2
BL	6
RD	1
BK	5

CHECK VOLTAGES OF FAULTY STATION A & B PAIRS AT THE 610 SOCKET.

	WIRE	VOLTAGE
A PAIR	WT	13 ±3V
	BL	1.5 ±1.5V
B PAIR	RD	40 ±10V
	BK	REF

ARE VOLTAGES CORRECT

NO

- CHECK FUSE ON ESTB BOARD AND REPLACE IF NECESSARY.
- RECHECK VOLTAGES.
- IF STILL WRONG, CHANGE ESTB BOARD.

YES

REFER TO NOTE 2 AT THE END OF THE FLOW CHARTS.

DOES STATION HAVE SIDE TONE

NO

CHECK HANDSET CORD, TRANSMITTER, RECEIVER AND INTERNAL WIRING BETWEEN STATION AND HANDSET. REFER FIG. 49 & 50.

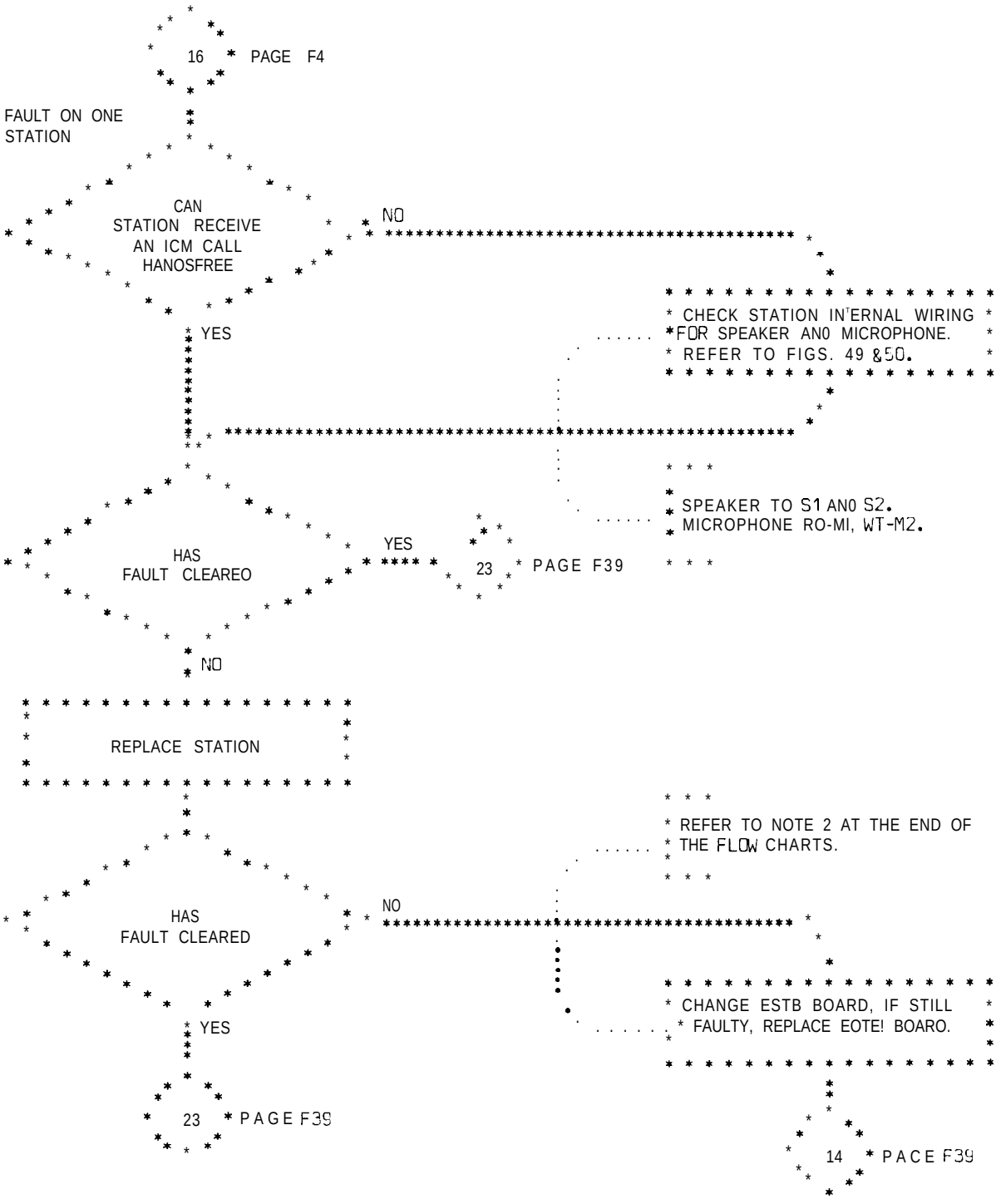
YES

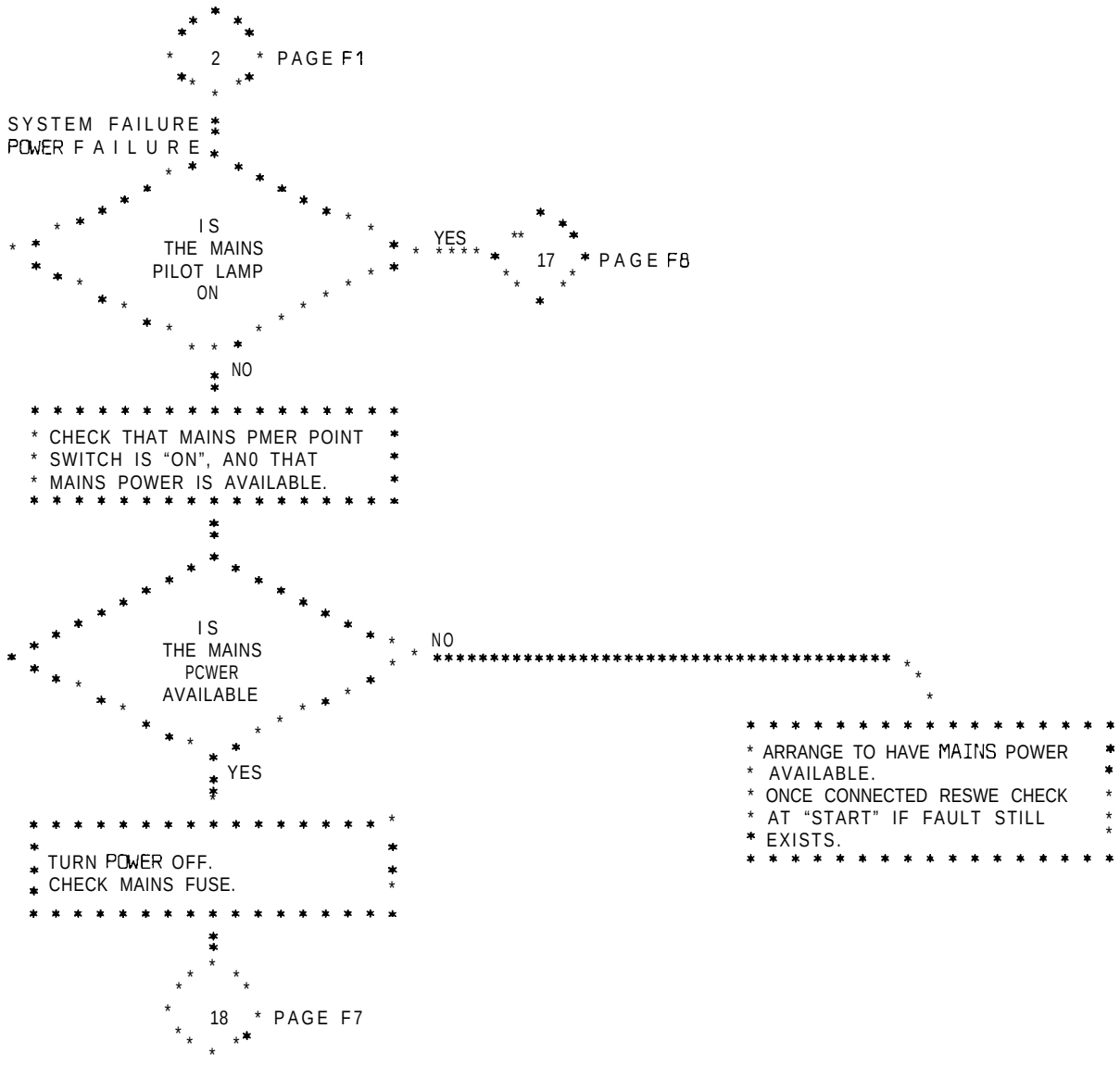
CAN STATION MAKE AN ICM CALL

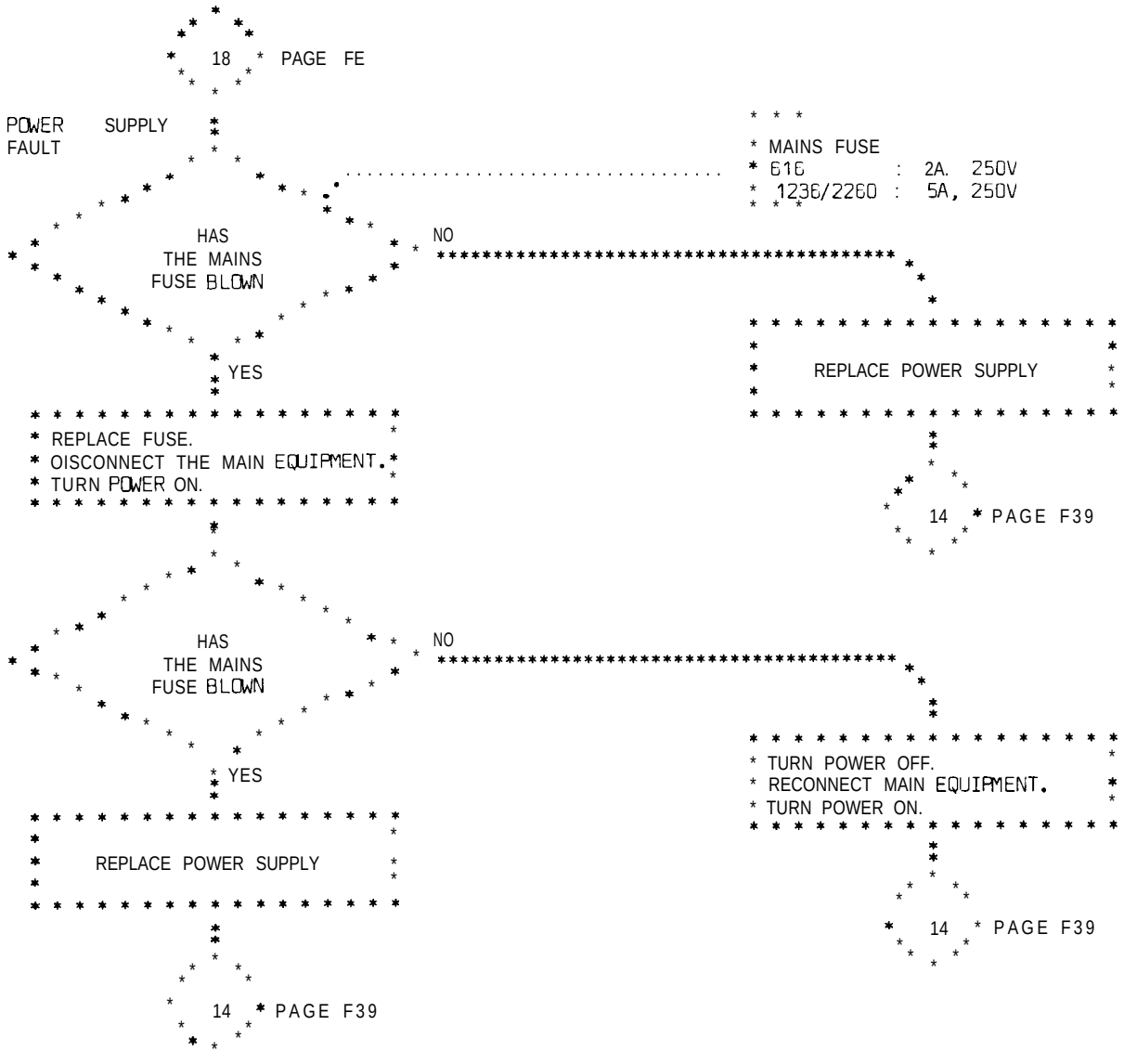
NO

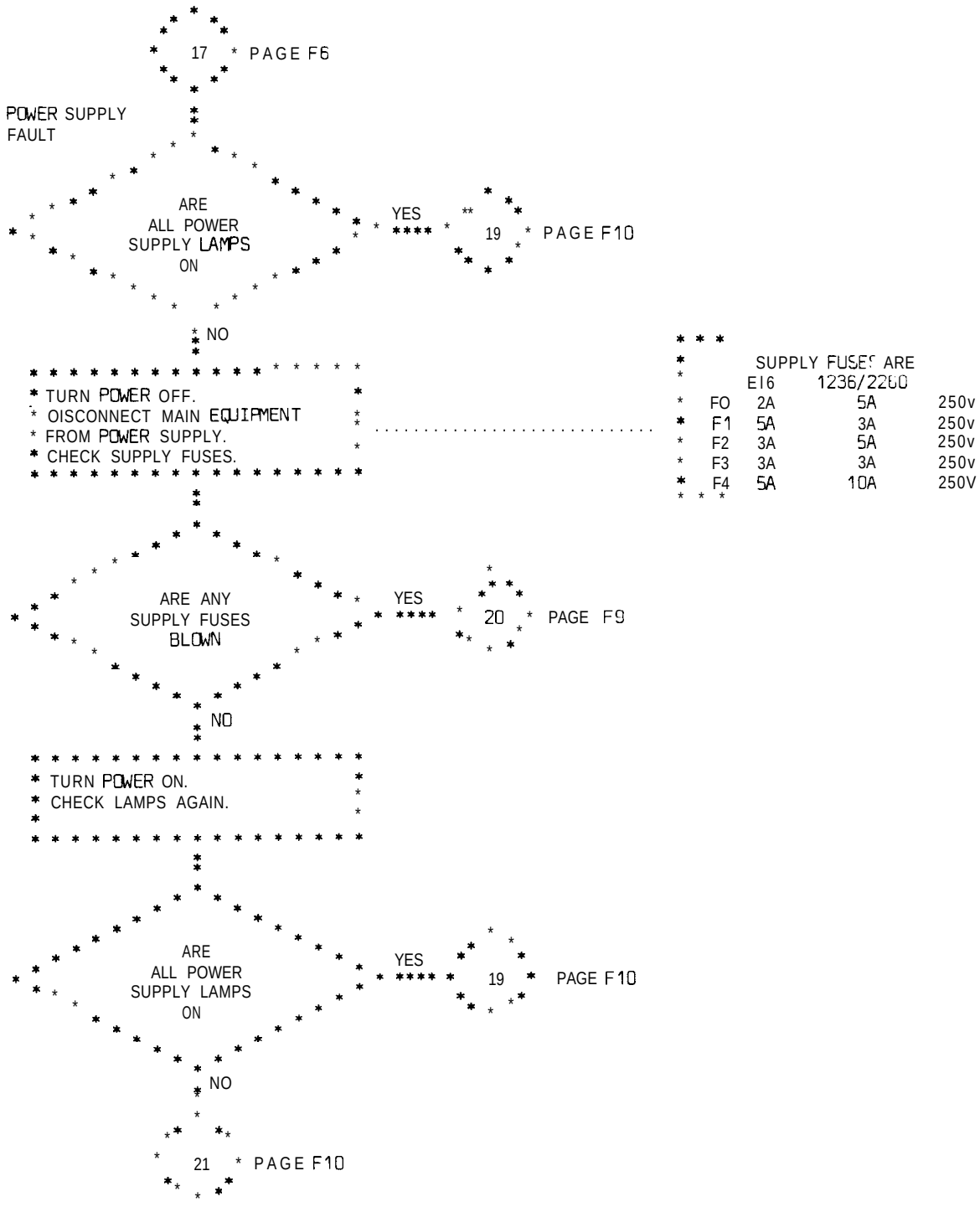
- CHECK RIBBON CONNECTOR IN STATION.
- CHECK THE LINE CORD IS CORRECTLY WIRED TO THE 603 PLUG AND THE STATION.
  - WT - LWT - PIN 2
  - BL - LBL - PIN 6
  - RD - LRD - PIN 1
  - BK - LBK - PIN 5

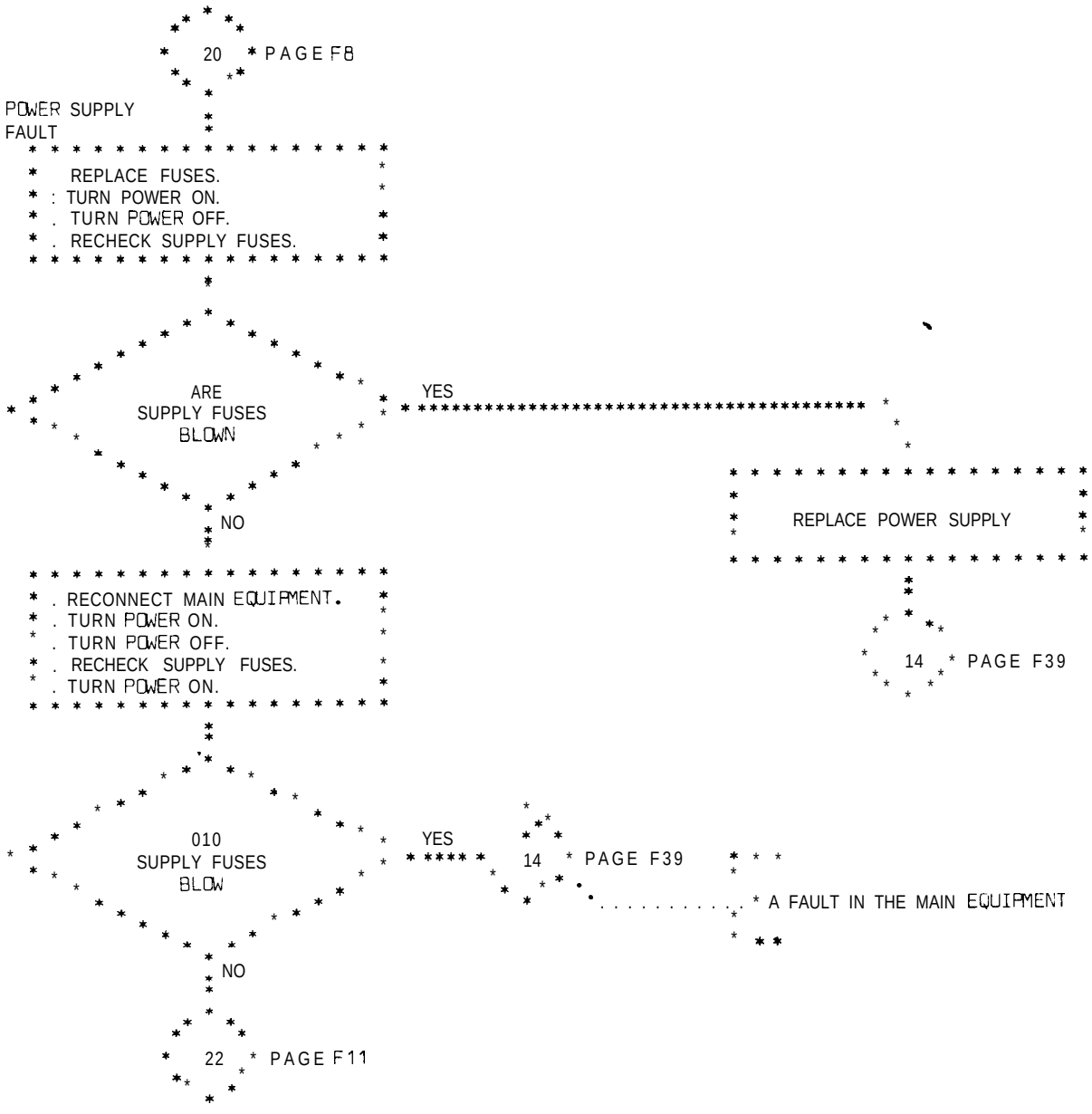
YES

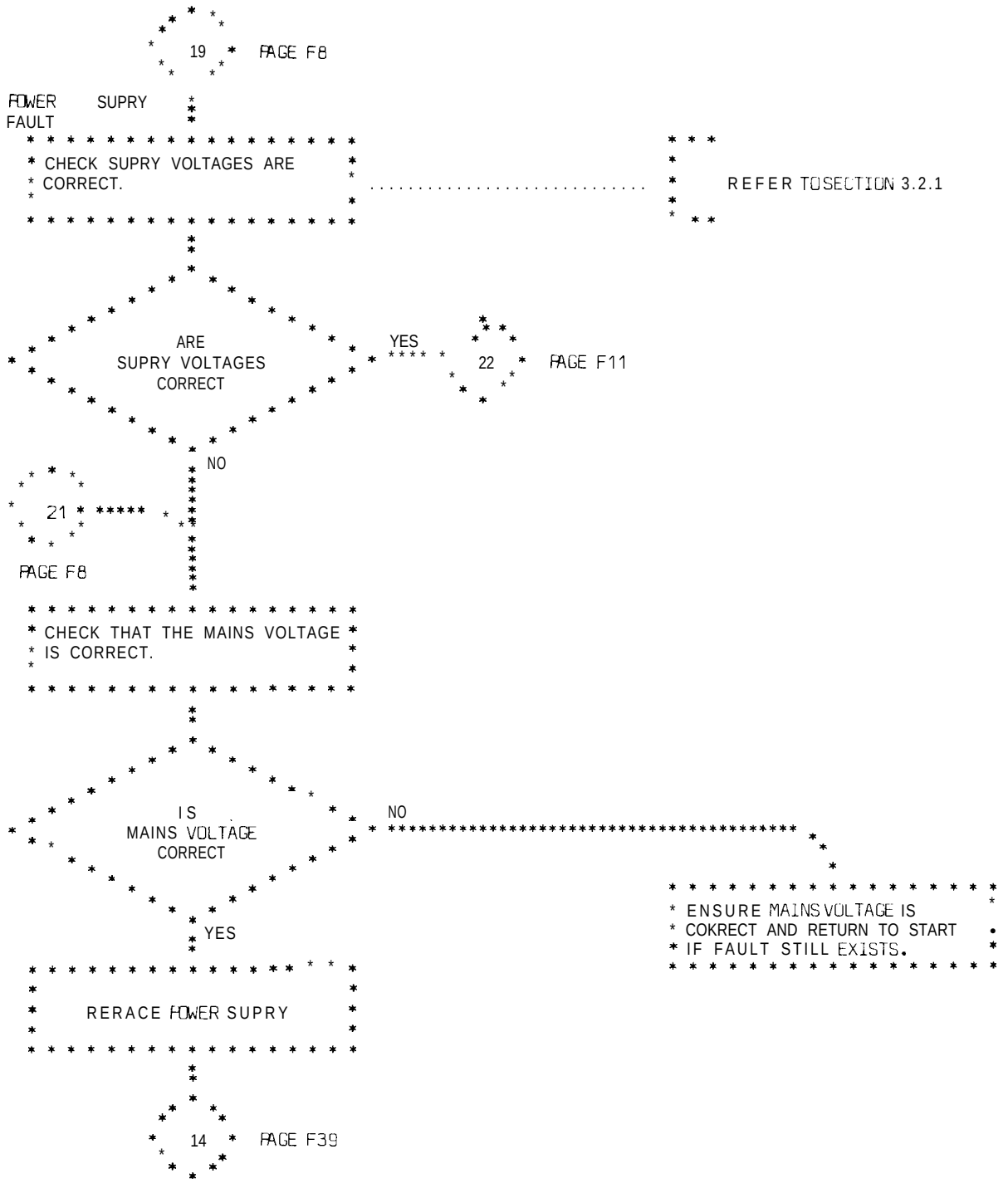

16 * PAGE F4
FAULT ON ONE STATION
CAN STATION RECEIVE AN ICM CALL HANOSFREE
NO
YES
* CHECK STATION INTERNAL WIRING FOR SPEAKER AN0 MICROPHONE. REFER TO FIGS. 49 &50.
SPEAKER TO S1 AN0 S2.
MICROPHONE RO-MI, WT-M2.
HAS FAULT CLEAREO
YES
23 * PAGE F39
NO
REPLACE STATION
* REFER TO NOTE 2 AT THE END OF THE FLOW CHARTS.
HAS FAULT CLEARED
NO
YES
* CHANGE ESTB BOARD, IF STILL * FAULTY, REPLACE EOTE! BOARO.
23 * PAGE F39
14 * PACE F39

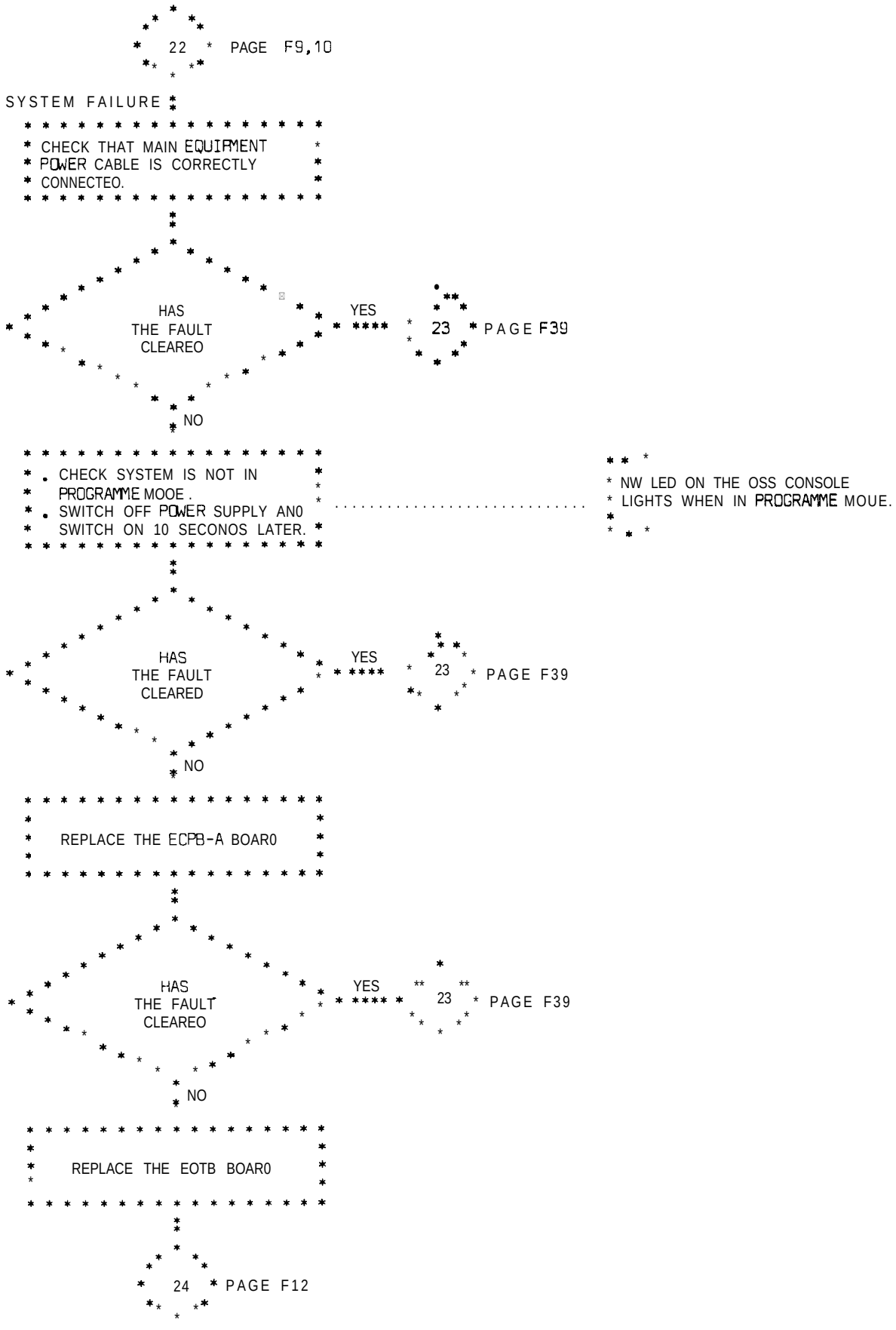

2
PAGE F1
SYSTEM FAILURE
POWER FAILURE
IS THE MAINS PILOT LAMP ON
YES
17
PAGE F8
NO
CHECK THAT MAINS PMER POINT SWITCH IS "ON", AN0 THAT MAINS POWER IS AVAILABLE.
IS THE MAINS PCWER AVAILABLE
NO
ARRANGE TO HAVE MAINS POWER AVAILABLE.
ONCE CONNECTED RESWE CHECK AT "START" IF FAULT STILL EXISTS.
YES
TURN POWER OFF.
CHECK MAINS FUSE.
18
PAGE F7

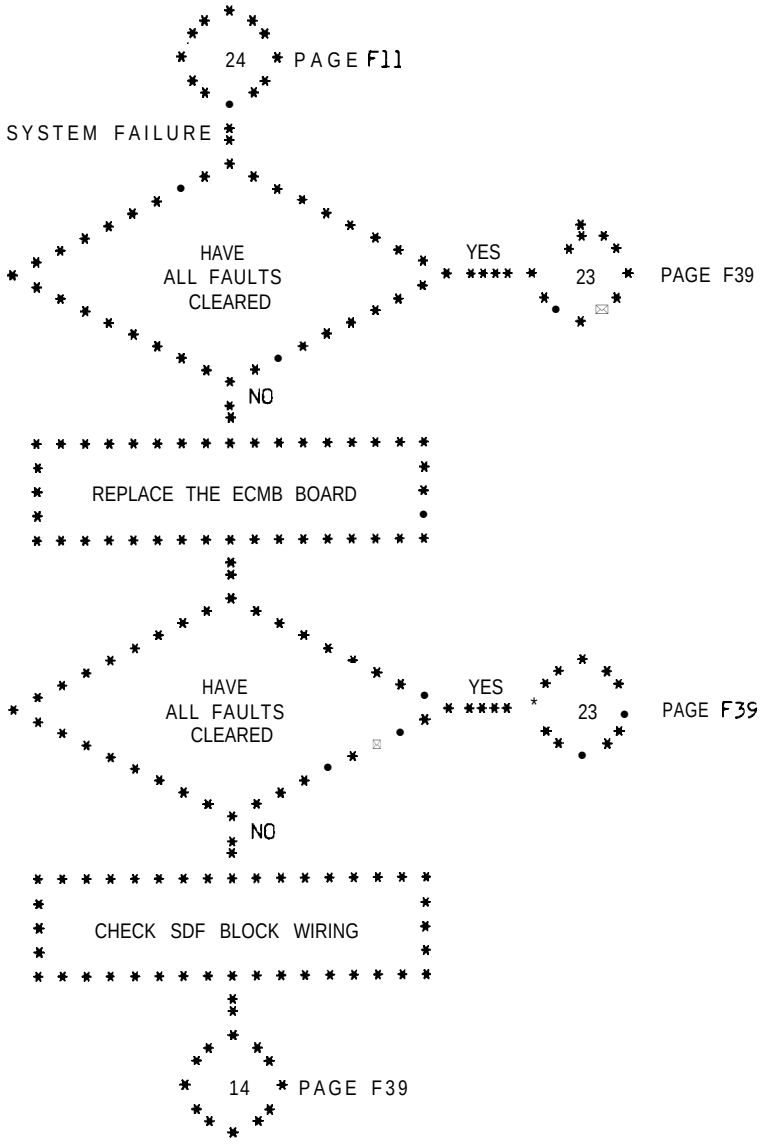

18 * PAGE FE
POWER SUPPLY FAULT
HAS THE MAINS FUSE BLOWN
NO
YES
* MAINS FUSE
* 616 : 2A. 250V
* 1236/2260 : 5A, 250V
REPLACE POWER SUPPLY
14 * PAGE F39
* REPLACE FUSE.
* OISCONNECT THE MAIN EQUIPMENT.
* TURN POWER ON.
HAS THE MAINS FUSE BLOWN
NO
YES
* TURN POWER OFF.
* RECONNECT MAIN EQUIPMENT.
* TURN POWER ON.
REPLACE POWER SUPPLY
14 * PAGE F39
14 * PAGE F39

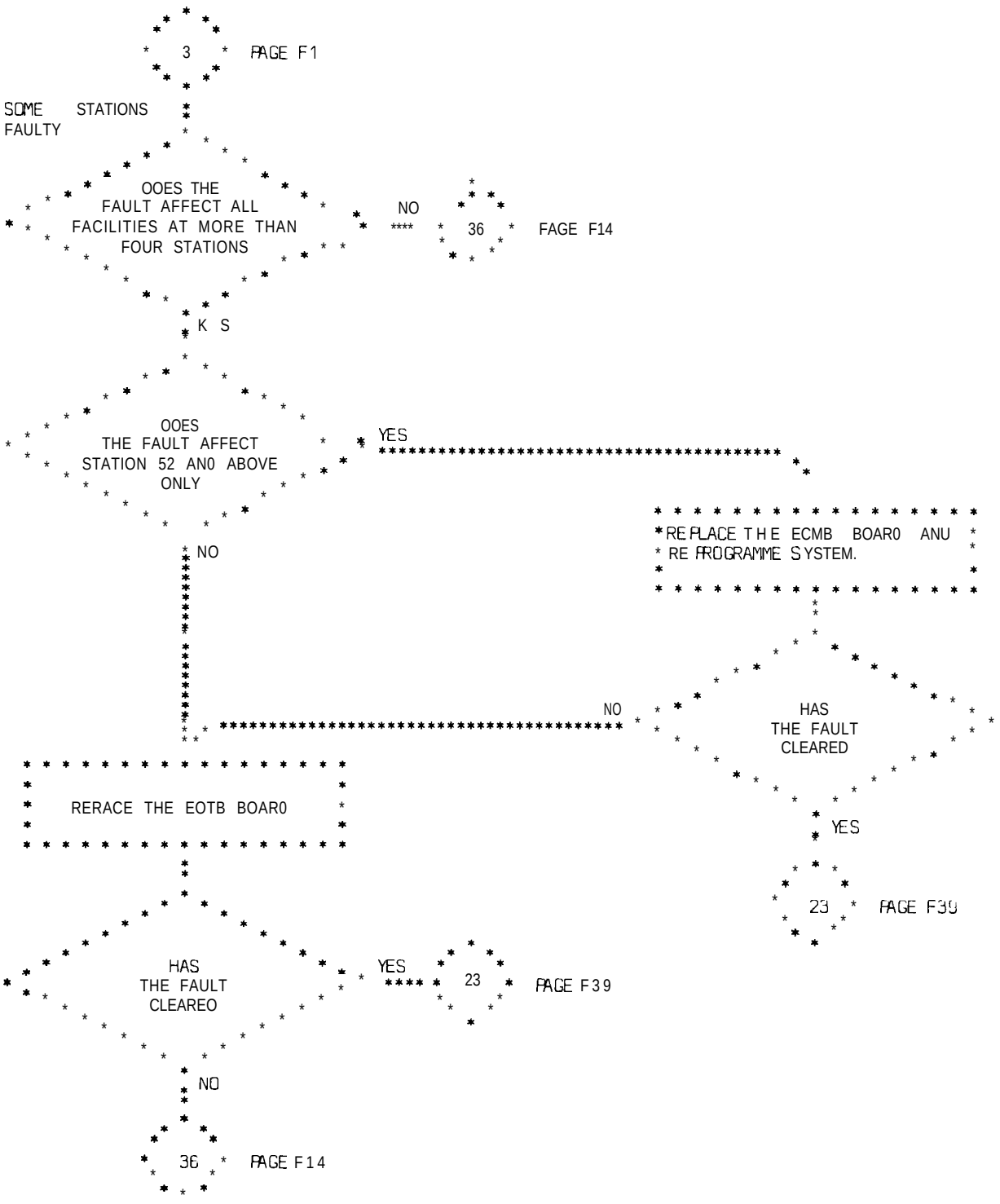

17
PAGE F6
POWER SUPPLY FAULT
ARE ALL POWER SUPPLY LAMPS ON
YES
19
PAGE F10
NO
TURN POWER OFF.
DISCONNECT MAIN EQUIPMENT FROM POWER SUPPLY.
CHECK SUPPLY FUSES.
SUPPLY FUSES ARE
E16 1236/2260
FO 2A 5A 250v
F1 5A 3A 250v
F2 3A 5A 250v
F3 3A 3A 250v
F4 5A 10A 250V
ARE ANY SUPPLY FUSES BLOWN
YES
20
PAGE F9
NO
TURN POWER ON.
CHECK LAMPS AGAIN.
ARE ALL POWER SUPPLY LAMPS ON
YES
19
PAGE F10
NO
21
PAGE F10

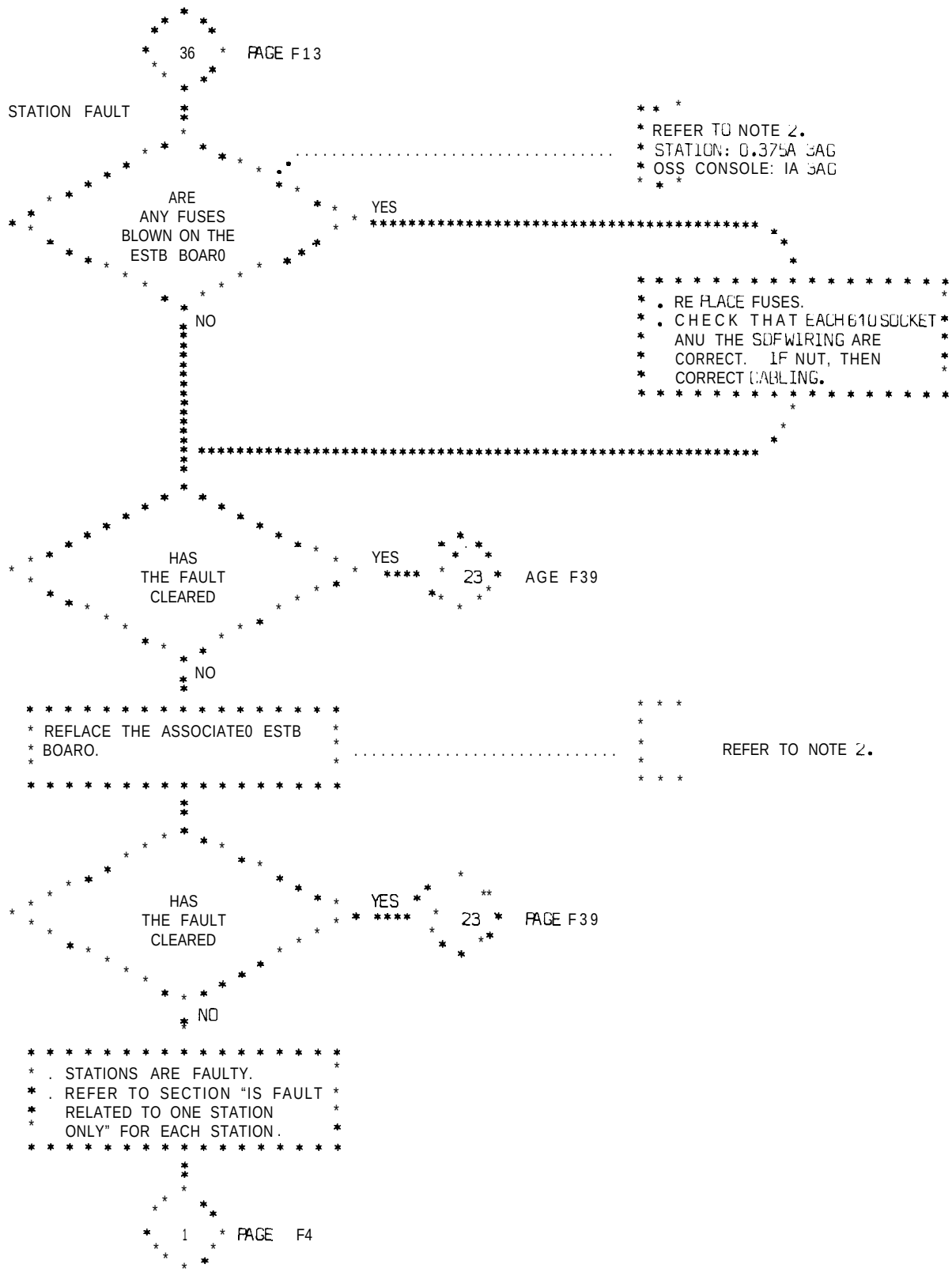

20
PAGE F8
POWER SUPPLY FAULT
REPLACE FUSES.
: TURN POWER ON.
. TURN POWER OFF.
. RECHECK SUPPLY FUSES.
ARE SUPPLY FUSES BLOWN
YES
NO
REPLACE POWER SUPPLY
. RECONNECT MAIN EQUIPMENT.
. TURN POWER ON.
. TURN POWER OFF.
. RECHECK SUPPLY FUSES.
. TURN POWER ON.
14
PAGE F39
010 SUPPLY FUSES BLOW
YES
14
PAGE F39
A FAULT IN THE MAIN EQUIPMENT
NO
22
PAGE F11

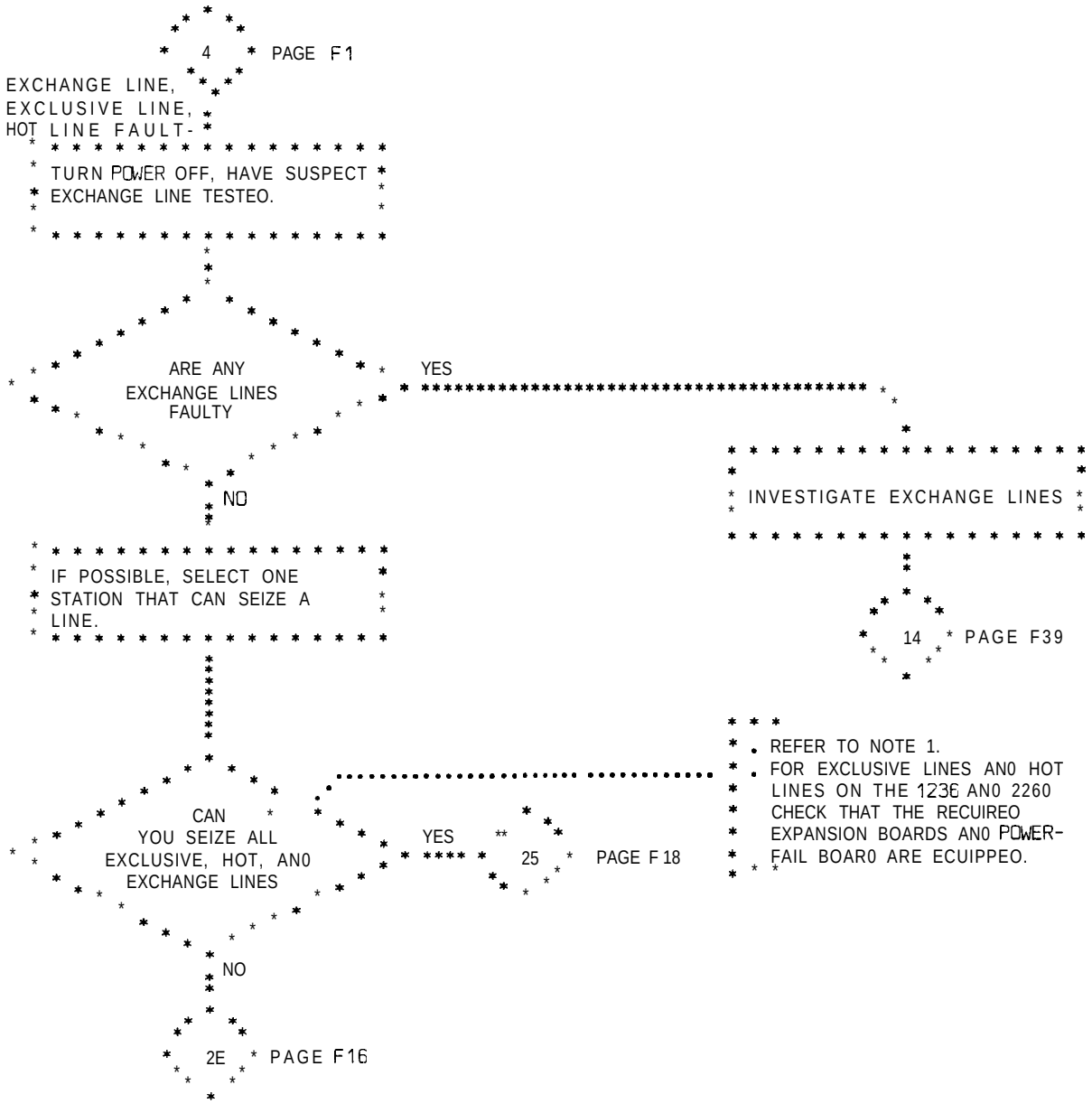

19
PAGE F8
POWER SUPRY FAULT
CHECK SUPRY VOLTAGES ARE CORRECT.
REFER TOSECTION 3.2.1
ARE SUPRY VOLTAGES CORRECT
YES
22
PAGE F11
NO
21
PAGE F8
CHECK THAT THE MAINS VOLTAGE IS CORRECT.
IS MAINS VOLTAGE CORRECT
NO
ENSURE MAINS VOLTAGE IS COKRECT AND RETURN TO START IF FAULT STILL EXISTS.
YES
RERACE POWER SUPRY
14
PAGE F39

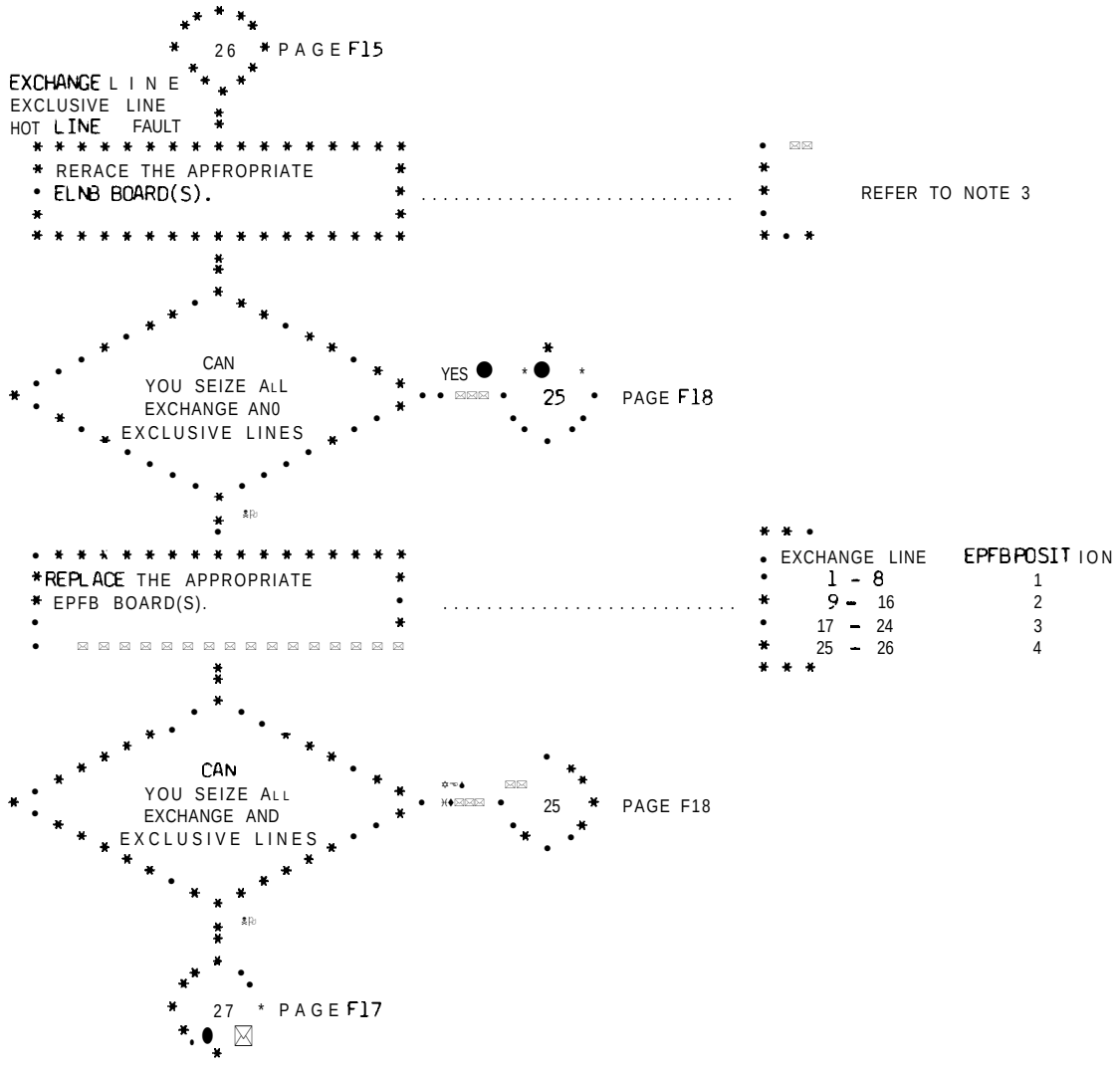

22
PAGE F9,10
SYSTEM FAILURE
CHECK THAT MAIN EQUIPMENT POWER CABLE IS CORRECTLY CONNECTEO.
HAS THE FAULT CLEAREO
YES
23
PAGE F39
NO
CHECK SYSTEM IS NOT IN PROGRAMME MOOE.
SWITCH OFF POWER SUPPLY AN0 SWITCH ON 10 SECONOS LATER.
NW LED ON THE OSS CONSOLE LIGHTS WHEN IN PROGRAMME MOUE.
HAS THE FAULT CLEARED
YES
23
PAGE F39
NO
REPLACE THE ECPB-A BOAR0
HAS THE FAULT CLEAREO
YES
23
PAGE F39
NO
REPLACE THE EOTB BOAR0
24
PAGE F12

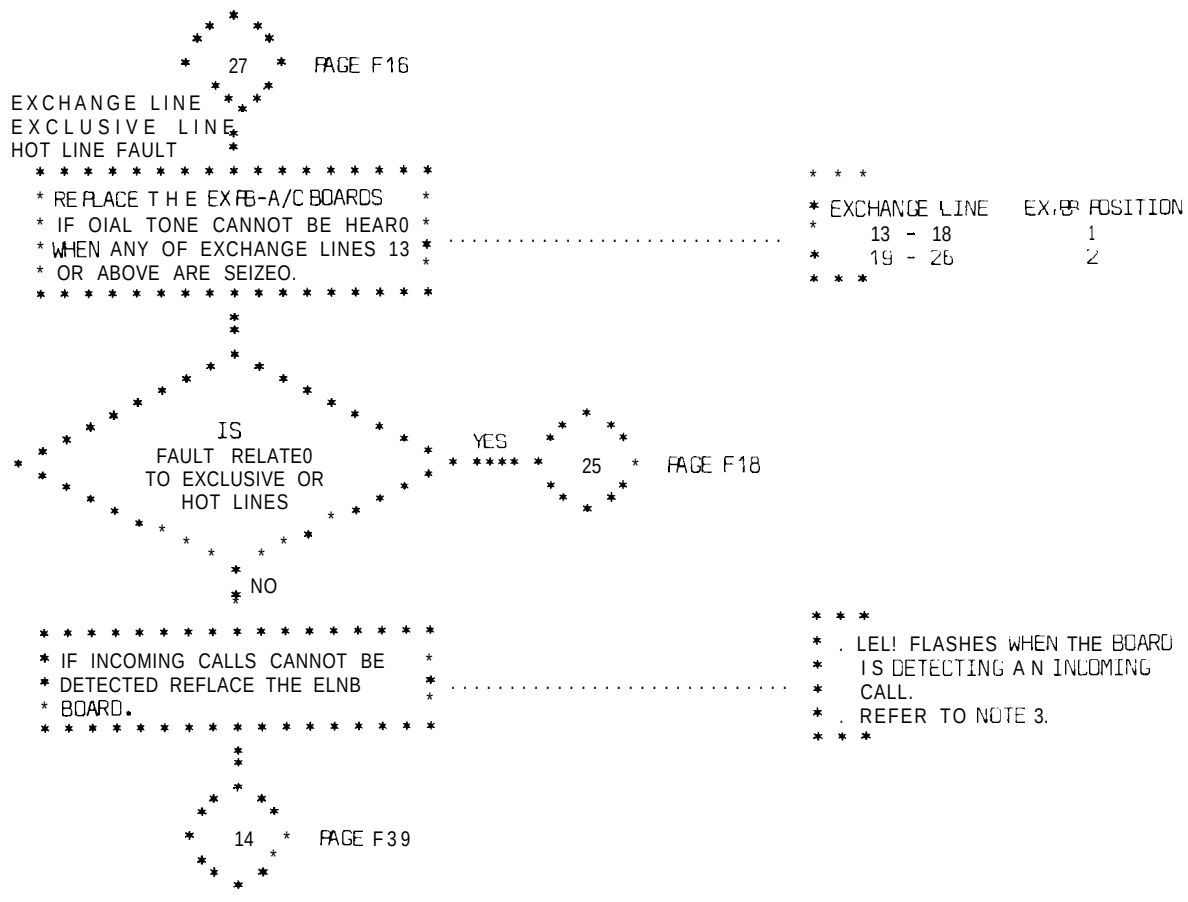

24
PAGE F11
SYSTEM FAILURE
HAVE ALL FAULTS CLEARED
YES
23
PAGE F39
NO
REPLACE THE ECMB BOARD
HAVE ALL FAULTS CLEARED
YES
23
PAGE F39
NO
CHECK SDF BLOCK WIRING
14
PAGE F39

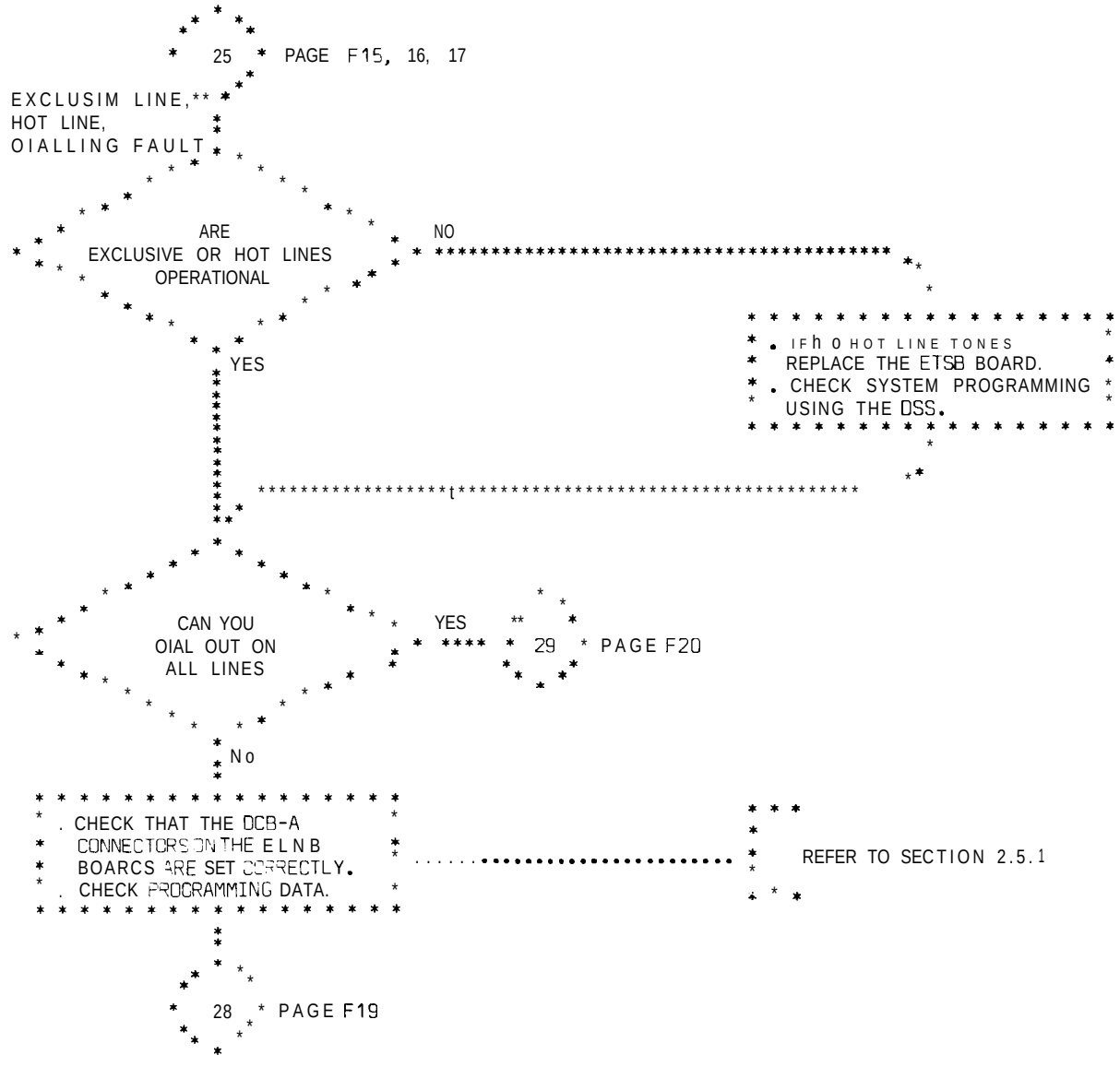

3
PAGE F1
SOME STATIONS FAULTY
OOES THE FAULT AFFECT ALL FACILITIES AT MORE THAN FOUR STATIONS
NO
36
FAGE F14
K S
OOES THE FAULT AFFECT STATION 52 AN0 ABOVE ONLY
YES
NO
REPLACE THE ECMB BOAR0 ANU RE PROGRAMME SYSTEM.
HAS THE FAULT CLEARED
NO
YES
23
PAGE F39
RERACE THE EOTB BOAR0
HAS THE FAULT CLEAREO
YES
23
PAGE F39
NO
36
PAGE F14

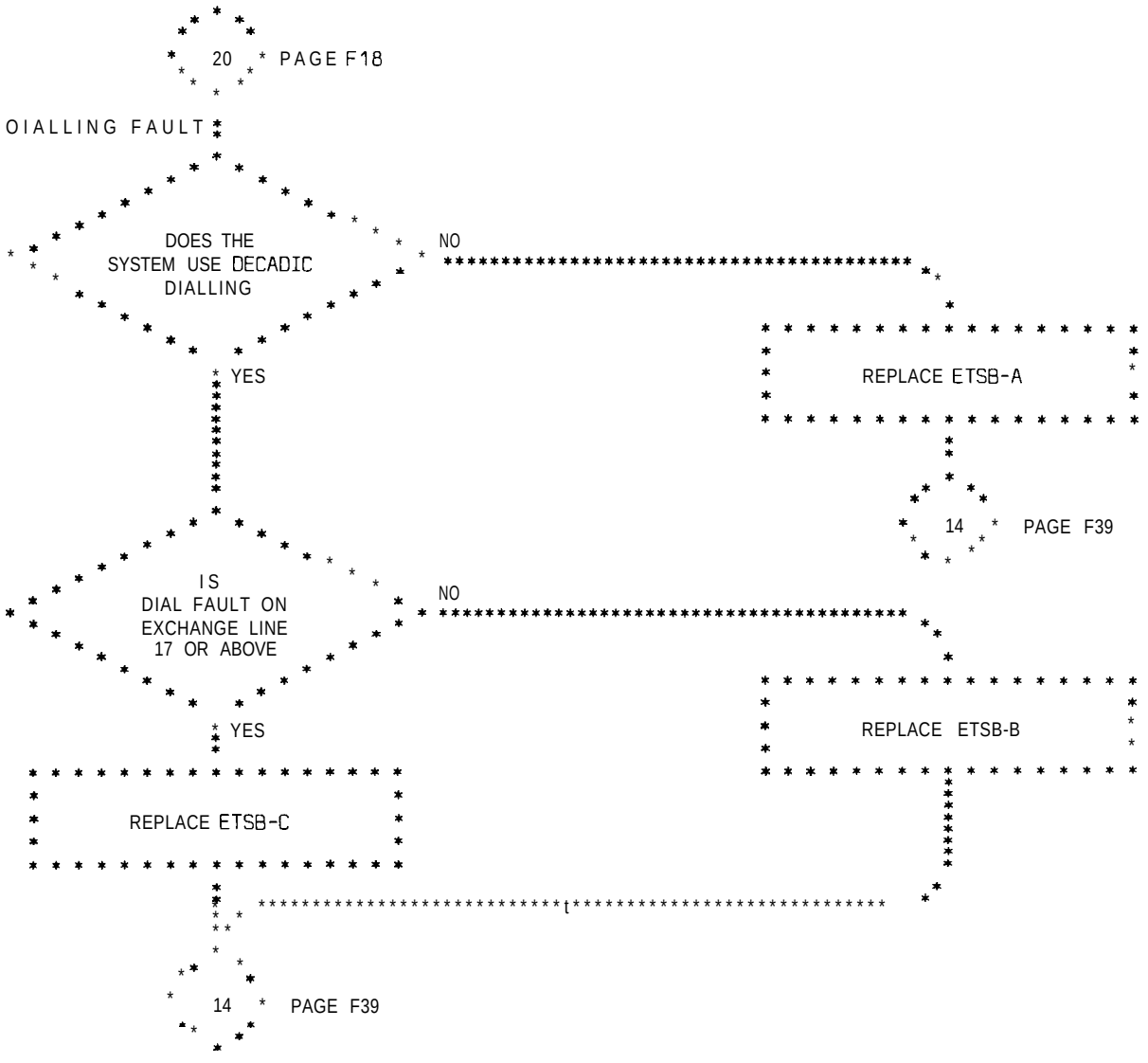

36
PAGE F13
STATION FAULT
REFER TO NOTE 2.
STATION: 0.375A 3AG
OSS CONSOLE: IA 3AG
ARE ANY FUSES BLOWN ON THE ESTB BOAR0
YES
NO
. RE PLACE FUSES.
. CHECK THAT EACH 61U SOCKET ANU THE SDFWIRING ARE CORRECT. IF NUT, THEN CORRECT CABLING.
HAS THE FAULT CLEARED
YES
23
AGE F39
NO
REFLACE THE ASSOCIATE0 ESTB BOARO.
REFER TO NOTE 2.
HAS THE FAULT CLEARED
YES
23
PAGE F39
NO
. STATIONS ARE FAULTY.
. REFER TO SECTION "IS FAULT RELATED TO ONE STATION ONLY" FOR EACH STATION.
1
PAGE F4

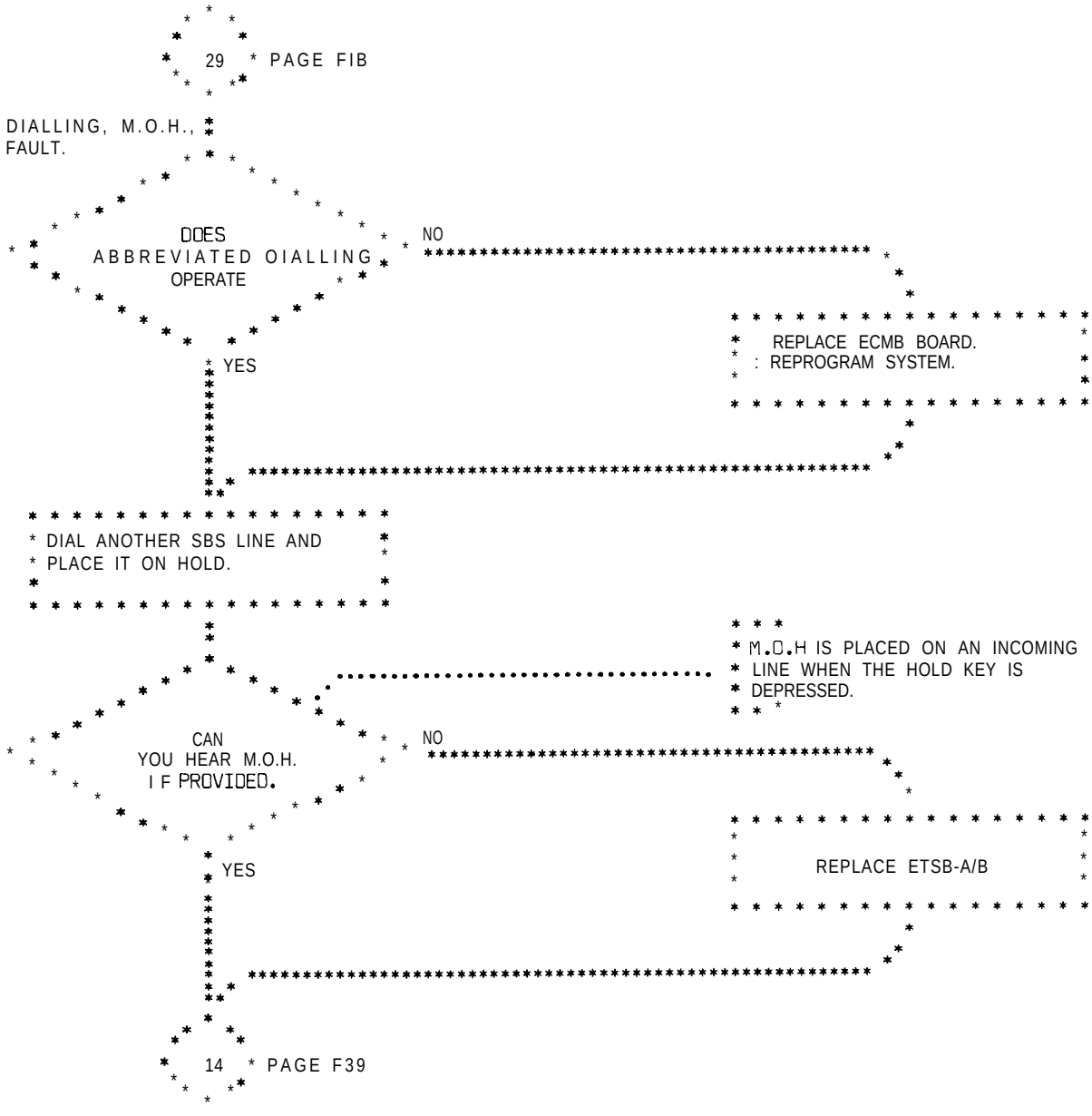

4
PAGE F1
EXCHANGE LINE,
EXCLUSIVE LINE,
HOT LINE FAULT-
TURN POWER OFF, HAVE SUSPECT EXCHANGE LINE TESTEO.
ARE ANY EXCHANGE LINES FAULTY
YES
NO
INVESTIGATE EXCHANGE LINES
14
PAGE F39
IF POSSIBLE, SELECT ONE STATION THAT CAN SEIZE A LINE.
REFER TO NOTE 1.
FOR EXCLUSIVE LINES AN0 HOT LINES ON THE 1236 AN0 2260 CHECK THAT THE RECUIREO EXPANSION BOARDS AN0 POWER-FAIL BOAR0 ARE ECUIPPEO.
CAN YOU SEIZE ALL EXCLUSIVE, HOT, AN0 EXCHANGE LINES
YES
**
25
PAGE F 18
NO
2E
PAGE F16

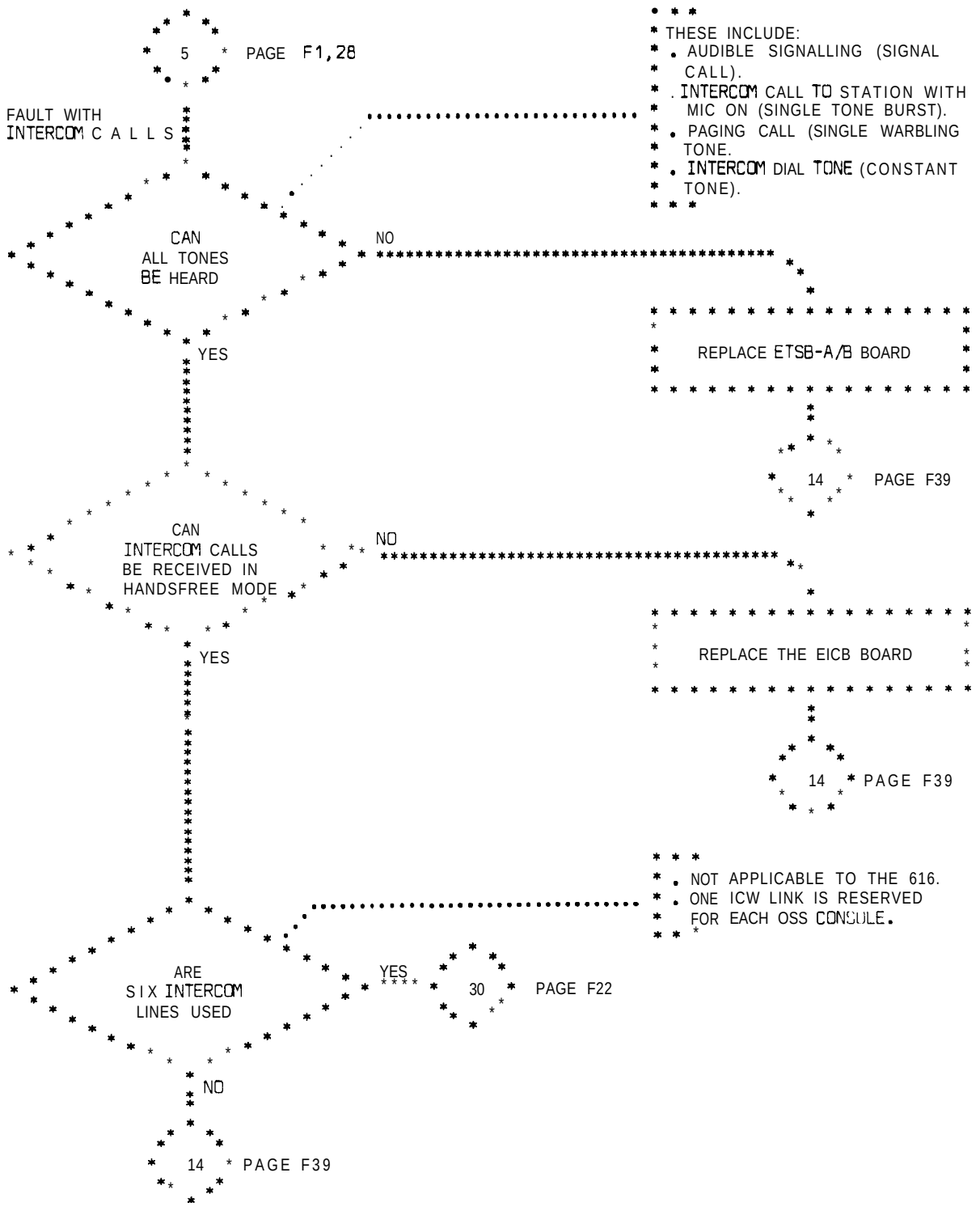

26
PAGE F15
EXCHANGE LINE
EXCLUSIVE LINE
HOT LINE FAULT
REPLACE THE APPROPRIATE ELNB BOARD(S).
REFER TO NOTE 3
CAN YOU SEIZE ALL EXCHANGE AND EXCLUSIVE LINES
YES
25
PAGE F18
REPLACE THE APPROPRIATE EPFB BOARD(S).
EXCHANGE LINE
EPFB POSITION
1 - 8
1
9 - 16
2
17 - 24
3
25 - 26
4
CAN YOU SEIZE ALL EXCHANGE AND EXCLUSIVE LINES
25
PAGE F18
27
PAGE F17

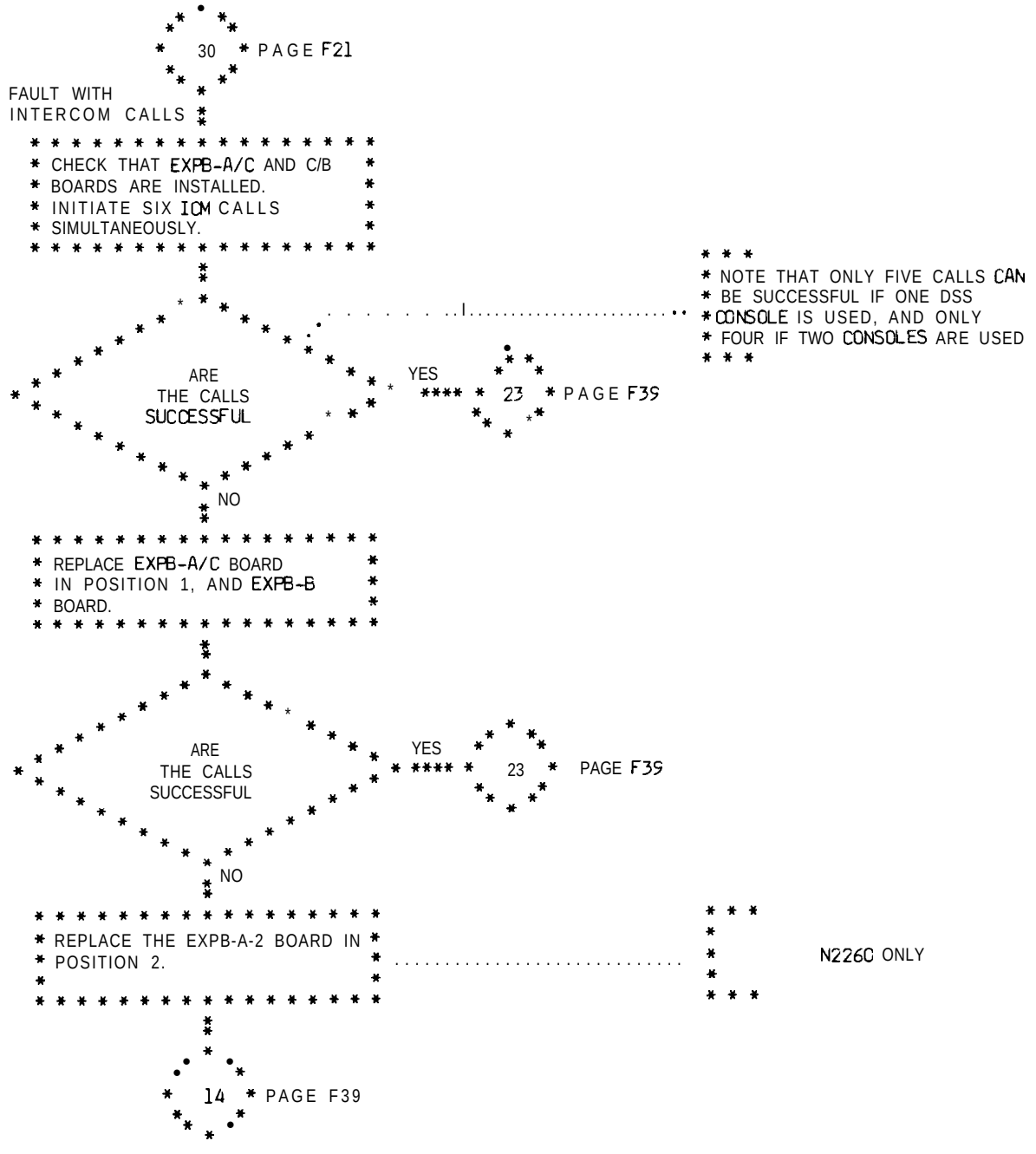

27
PAGE F16
EXCHANGE LINE
EXCLUSIVE LINE
HOT LINE FAULT
REPLACE THE EXPB-A/C BOARDS
IF DIAL TONE CANNOT BE HEARD
WHEN ANY OF EXCHANGE LINES 13
OR ABOVE ARE SEIZED.
EXCHANGE LINE
EXPB POSITION
13 - 18
1
19 - 26
2
IS
FAULT RELATED
TO EXCLUSIVE OR
HOT LINES
YES
25
PAGE F18
NO
IF INCOMING CALLS CANNOT BE
DETECTED REFLACE THE ELNB
BOARD.
. LED FLASHES WHEN THE BOARD
IS DETECTING AN INCOMING
CALL.
. REFER TO NOTE 3.
14
PAGE F39

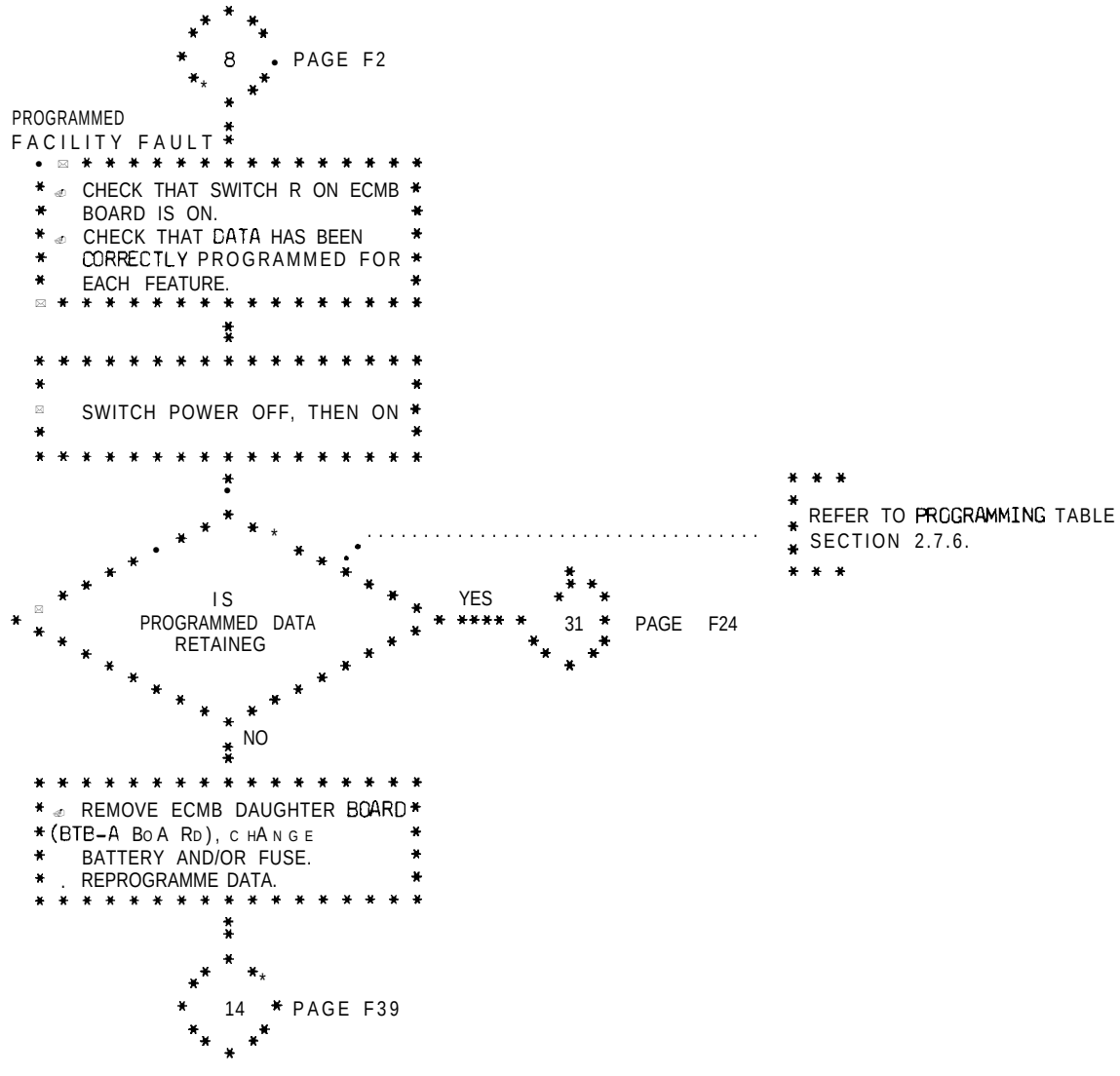

25
PAGE F15, 16, 17
EXCLUSIM LINE,**
HOT LINE,
OIALLING FAULT
ARE
EXCLUSIVE OR HOT LINES
OPERATIONAL
NO
YES
IFh O HOT LINE TONES
REPLACE THE ETSB BOARD.
CHECK SYSTEM PROGRAMMING
USING THE DSS.
CAN YOU
OIAL OUT ON
ALL LINES
YES
**
29
PAGE F20
No
CHECK THAT THE DCB-A
CONNECTORS ON THE ELNB
BOARCS ARE SET CORRECTLY.
CHECK PROGRAMMING DATA.
REFER TO SECTION 2.5.1
28
PAGE F19

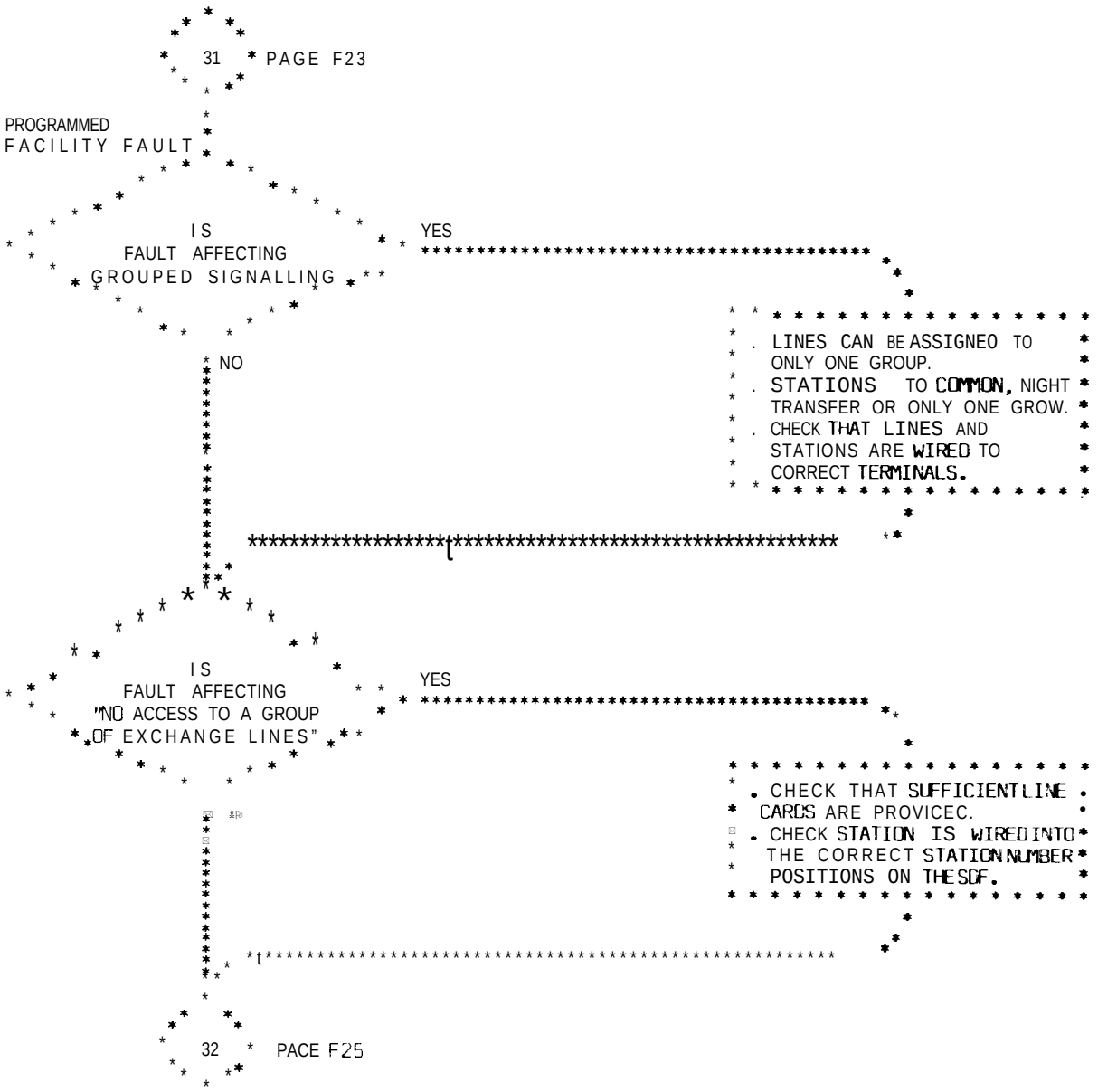

20
PAGE F18
DIALLING FAULT
DOES THE SYSTEM USE DECADIC DIALLING
NO
YES
REPLACE ETSB-A
14
PAGE F39
IS DIAL FAULT ON EXCHANGE LINE 17 OR ABOVE
NO
YES
REPLACE ETSB-B
REPLACE ETSB-C
14
PAGE F39

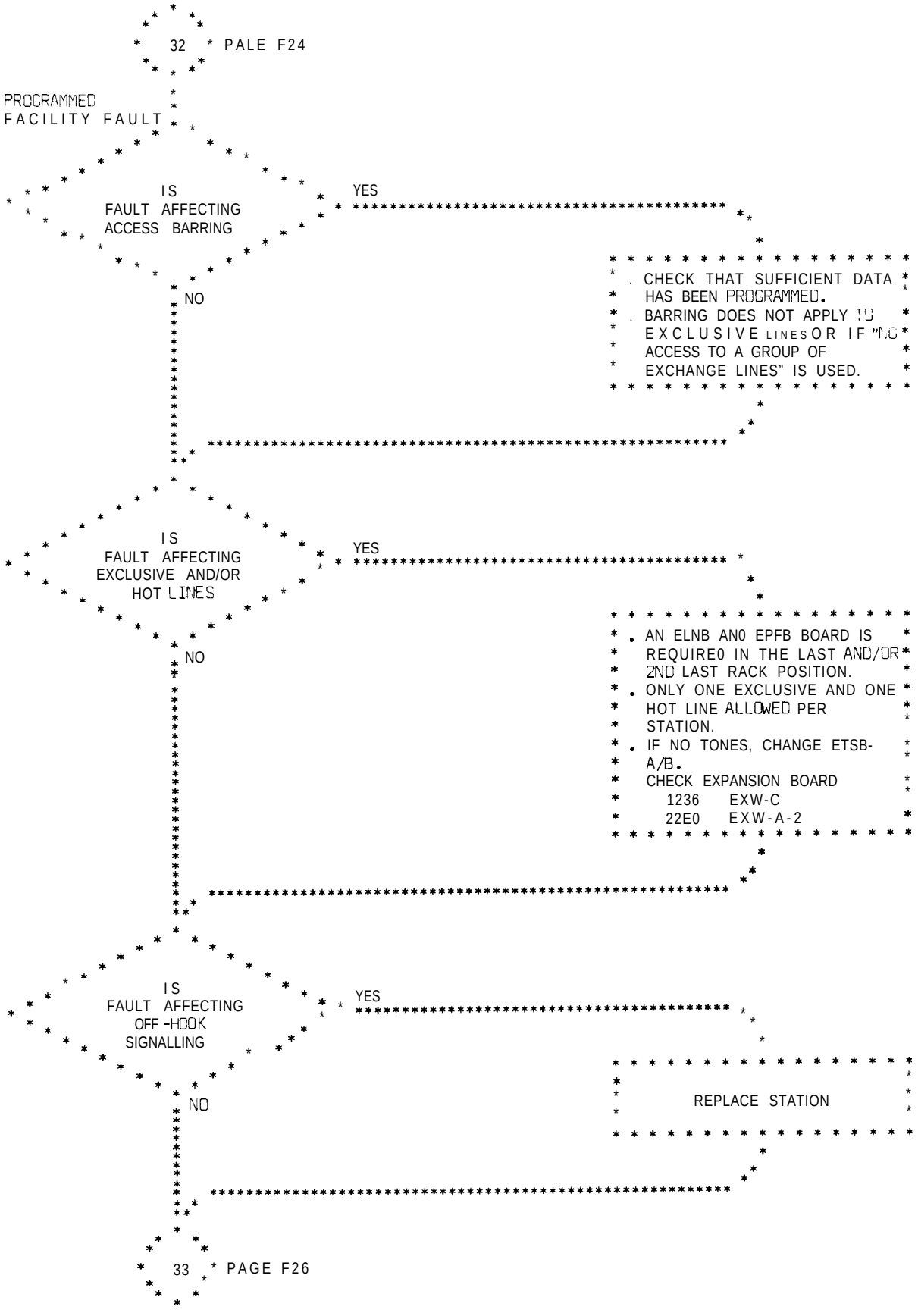

29
PAGE FIB
DIALLING, M.O.H., FAULT.
DOES ABBREVIATED DIALLING OPERATE
NO
REPLACE ECMB BOARD.
: REPROGRAM SYSTEM.
YES
DIAL ANOTHER SBS LINE AND PLACE IT ON HOLD.
M.O.H IS PLACED ON AN INCOMING LINE WHEN THE HOLD KEY IS DEPRESSED.
CAN YOU HEAR M.O.H. IF PROVIDED.
NO
REPLACE ETSB-A/B
YES
14
PAGE F39

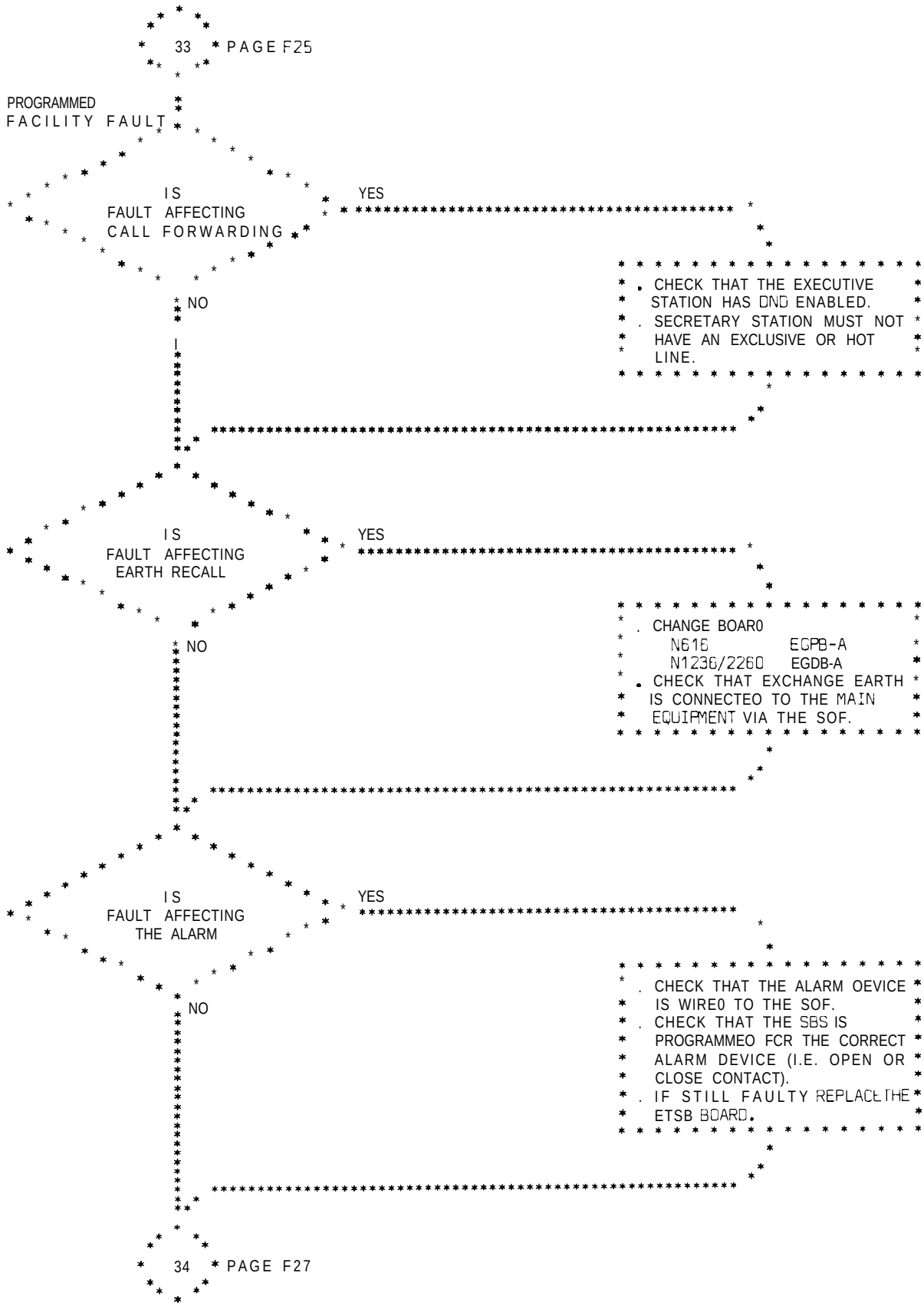

5
PAGE F1,28
FAULT WITH INTERCOM C A L L S
THESE INCLUDE:
. AUDIBLE SIGNALLING (SIGNAL CALL).
. INTERCOM CALL TO STATION WITH MIC ON (SINGLE TONE BURST).
. PAGING CALL (SINGLE WARBLING TONE.
. INTERCOM DIAL TONE (CONSTANT TONE).
CAN ALL TONES BE HEARD
NO
YES
REPLACE ETSB-A/B BOARD
14
PAGE F39
CAN INTERCOM CALLS BE RECEIVED IN HANDSFREE MODE
NO
YES
REPLACE THE EICB BOARD
14
PAGE F39
. NOT APPLICABLE TO THE 616.
. ONE ICW LINK IS RESERVED FOR EACH OSS CONSOLE.
ARE SIX INTERCOM LINES USED
YES
30
PAGE F22
NO
14
PAGE F39

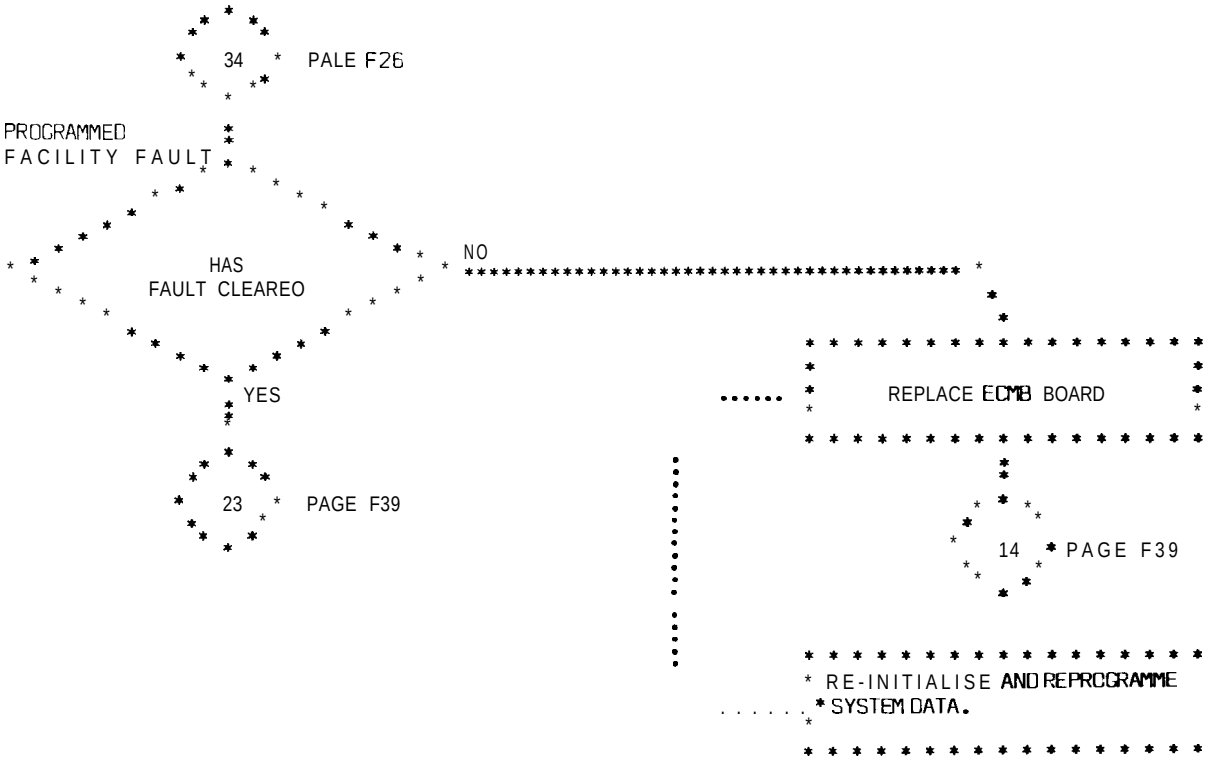

30
PAGE F21
FAULT WITH INTERCOM CALLS
CHECK THAT EXPB-A/C AND C/B BOARDS ARE INSTALLED.
INITIATE SIX IOM CALLS SIMULTANEOUSLY.
NOTE THAT ONLY FIVE CALLS CAN BE SUCCESSFUL IF ONE DSS CONSOLE IS USED, AND ONLY FOUR IF TWO CONSOLES ARE USED
ARE THE CALLS SUCCESSFUL
YES
**** 23 PAGE F39
NO
REPLACE EXPB-A/C BOARD IN POSITION 1, AND EXPB-B BOARD.
ARE THE CALLS SUCCESSFUL
YES
**** 23 PAGE F39
NO
REPLACE THE EXPB-A-2 BOARD IN POSITION 2.
N226C ONLY
14
PAGE F39

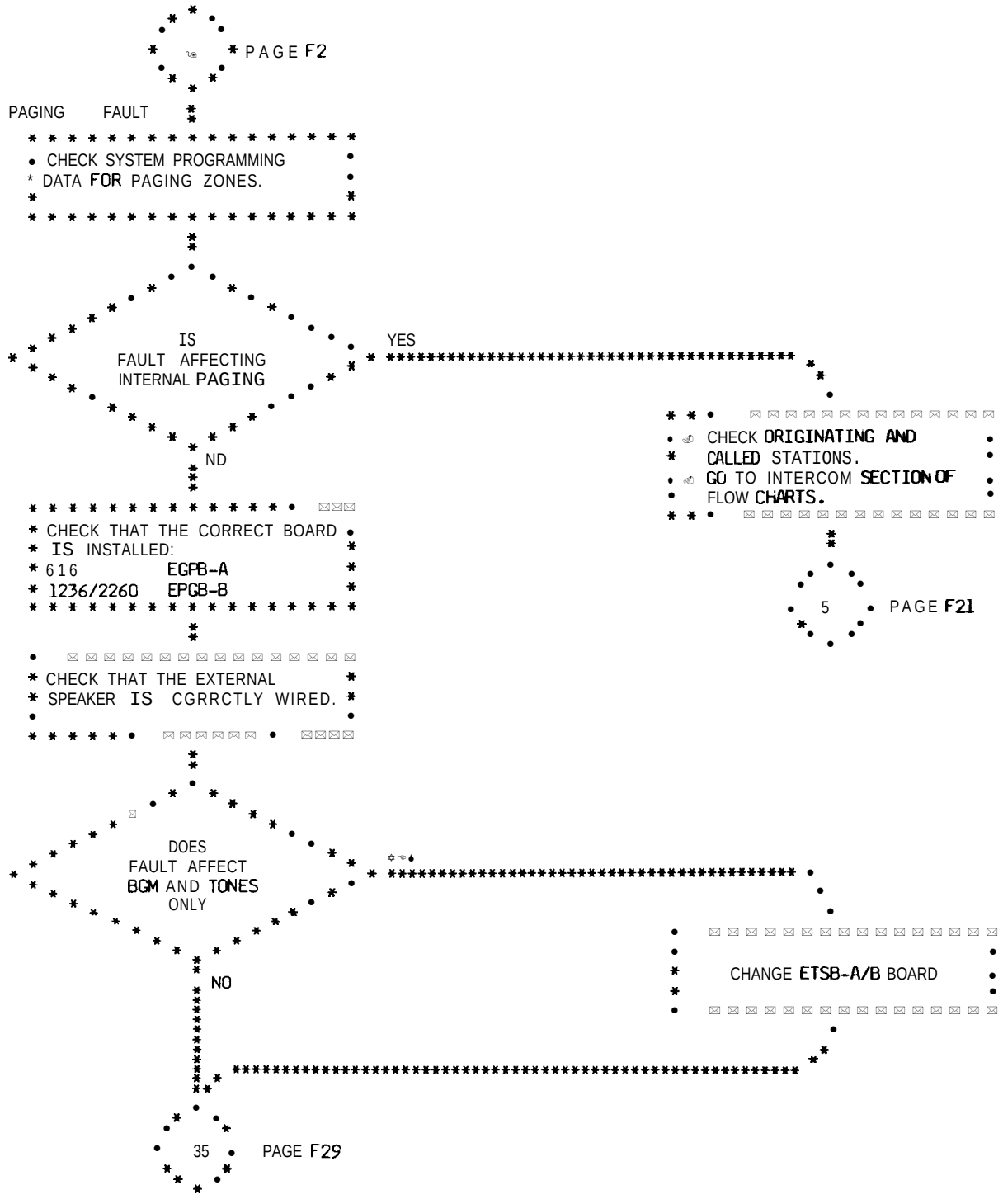

8
PAGE F2
PROGRAMMED
FACILITY FAULT
CHECK THAT SWITCH R ON ECMB BOARD IS ON.
CHECK THAT DATA HAS BEEN CORRECTLY PROGRAMMED FOR EACH FEATURE.
SWITCH POWER OFF, THEN ON
REFER TO PROGRAMMING TABLE SECTION 2.7.6.
IS PROGRAMMED DATA RETAINEG
YES
31
PAGE F24
NO
REMOVE ECMB DAUGHTER BOARD (BTB-A BOA RD), CHANGE BATTERY AND/OR FUSE.
REPROGRAMME DATA.
14
PAGE F39

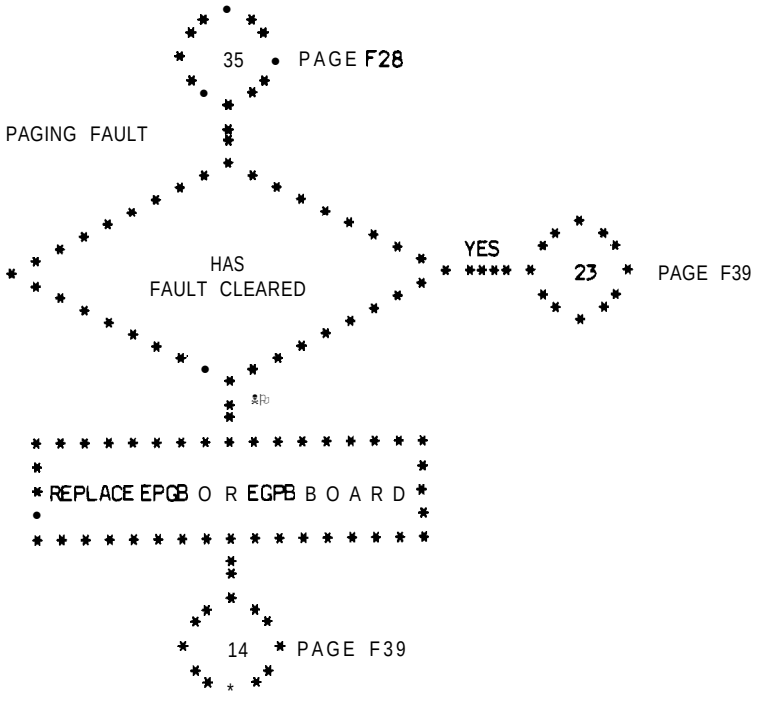

31
PAGE F23
PROGRAMMED FACILITY FAULT
IS FAULT AFFECTING GROUPED SIGNALLING
YES
NO
. LINES CAN BE ASSIGNED TO ONLY ONE GROUP.
. STATIONS TO COMMON, NIGHT TRANSFER OR ONLY ONE GROW.
. CHECK THAT LINES AND STATIONS ARE WIRED TO CORRECT TERMINALS.
IS FAULT AFFECTING "NO ACCESS TO A GROUP OF EXCHANGE LINES"
YES
. CHECK THAT SUFFICIENT LINE CARDS ARE PROVICEC.
. CHECK STATION IS WIRED INTO THE CORRECT STATION NUMBER POSITIONS ON THE SDF.
32
PACE F25

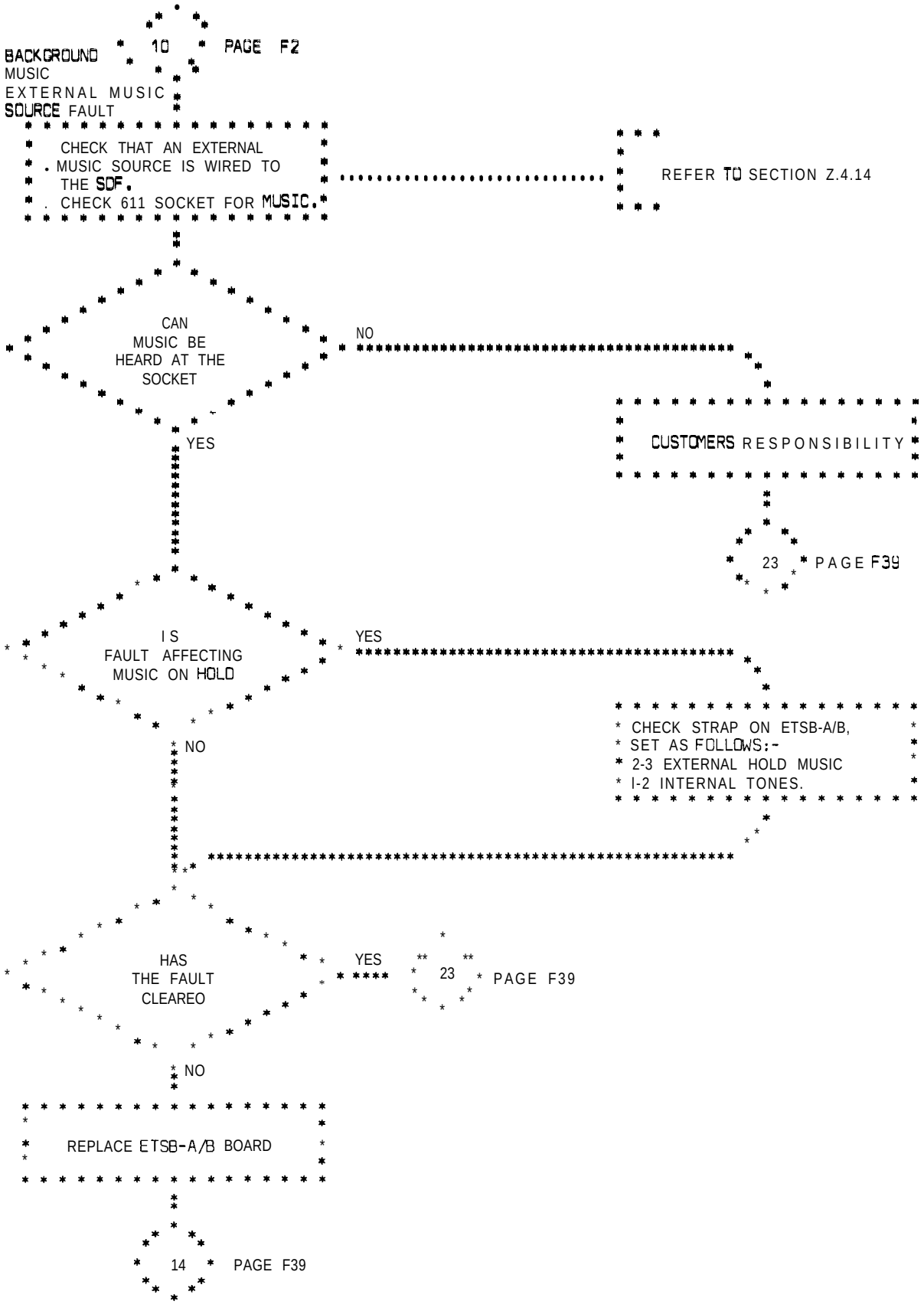

32
PALE F24
PROGRAMMED FACILITY FAULT
IS FAULT AFFECTING ACCESS BARRING
YES
NO
. CHECK THAT SUFFICIENT DATA HAS BEEN PROGRAMMED.
. BARRING DOES NOT APPLY TO EXCLUSIVE LINES OR IF "NO ACCESS TO A GROUP OF EXCHANGE LINES" IS USED.
IS FAULT AFFECTING EXCLUSIVE AND/OR HOT LINES
YES
NO
. AN ELNB AN0 EPFB BOARD IS REQUIRE0 IN THE LAST AND/OR 2ND LAST RACK POSITION.
. ONLY ONE EXCLUSIVE AND ONE HOT LINE ALLOWED PER STATION.
. IF NO TONES, CHANGE ETSB-A/B.
CHECK EXPANSION BOARD
1236 EXW-C
22E0 EXW-A-2
IS FAULT AFFECTING OFF-HOOK SIGNALLING
YES
NO
REPLACE STATION
33
PAGE F26

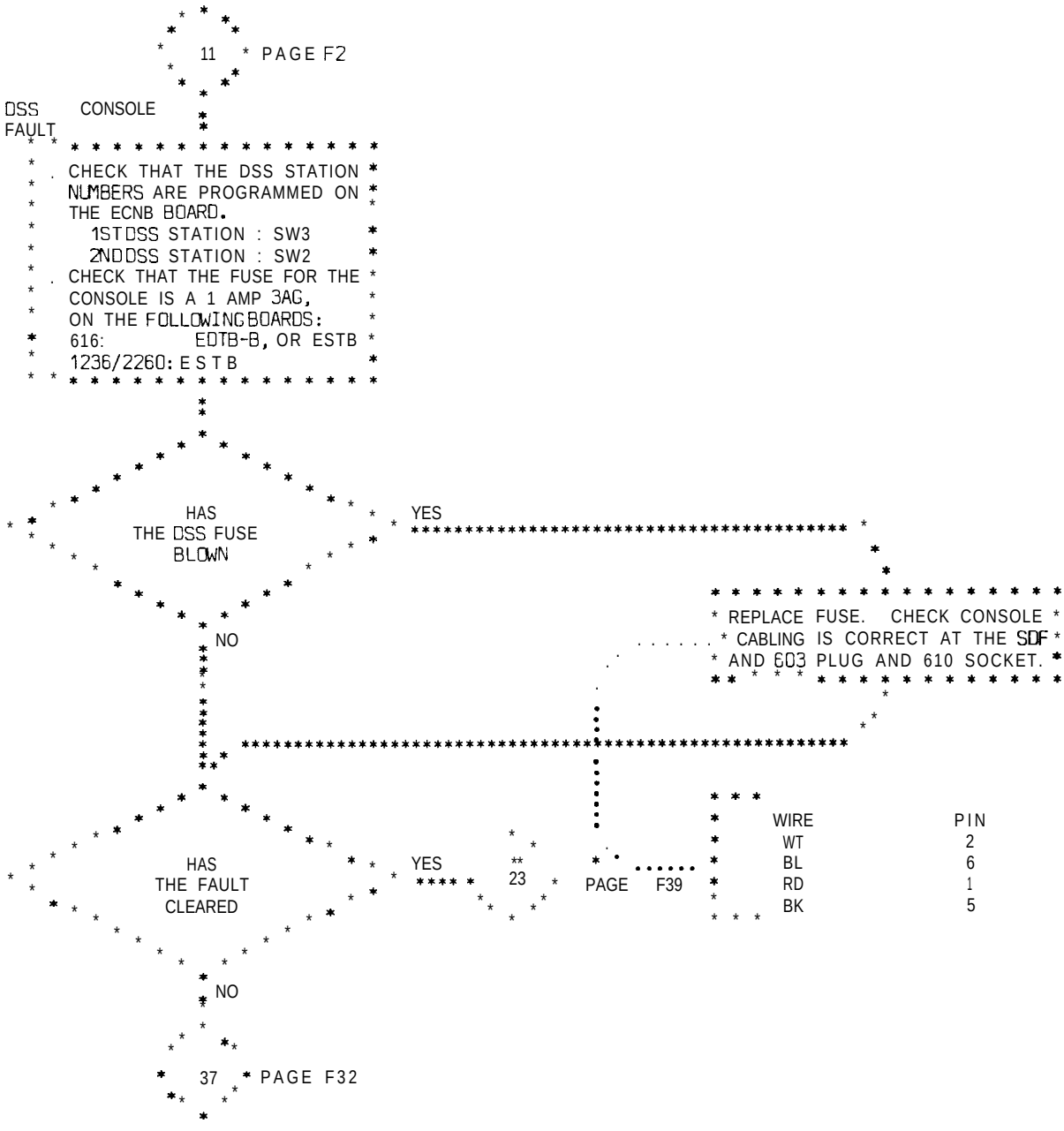

33
PAGE F25
PROGRAMMED FACILITY FAULT
IS FAULT AFFECTING CALL FORWARDING
YES
NO
. CHECK THAT THE EXECUTIVE STATION HAS DND ENABLED.
. SECRETARY STATION MUST NOT HAVE AN EXCLUSIVE OR HOT LINE.
IS FAULT AFFECTING EARTH RECALL
YES
NO
. CHANGE BOARD
N616 EGPB-A
N1236/2260 EGDB-A
. CHECK THAT EXCHANGE EARTH IS CONNECTED TO THE MAIN EQUIPMENT VIA THE SOF.
IS FAULT AFFECTING THE ALARM
YES
NO
. CHECK THAT THE ALARM DEVICE IS WIRED TO THE SOF.
. CHECK THAT THE SBS IS PROGRAMMED FOR THE CORRECT ALARM DEVICE (I.E. OPEN OR CLOSE CONTACT).
. IF STILL FAULTY REPLACE THE ETSB BOARD.
34
PAGE F27

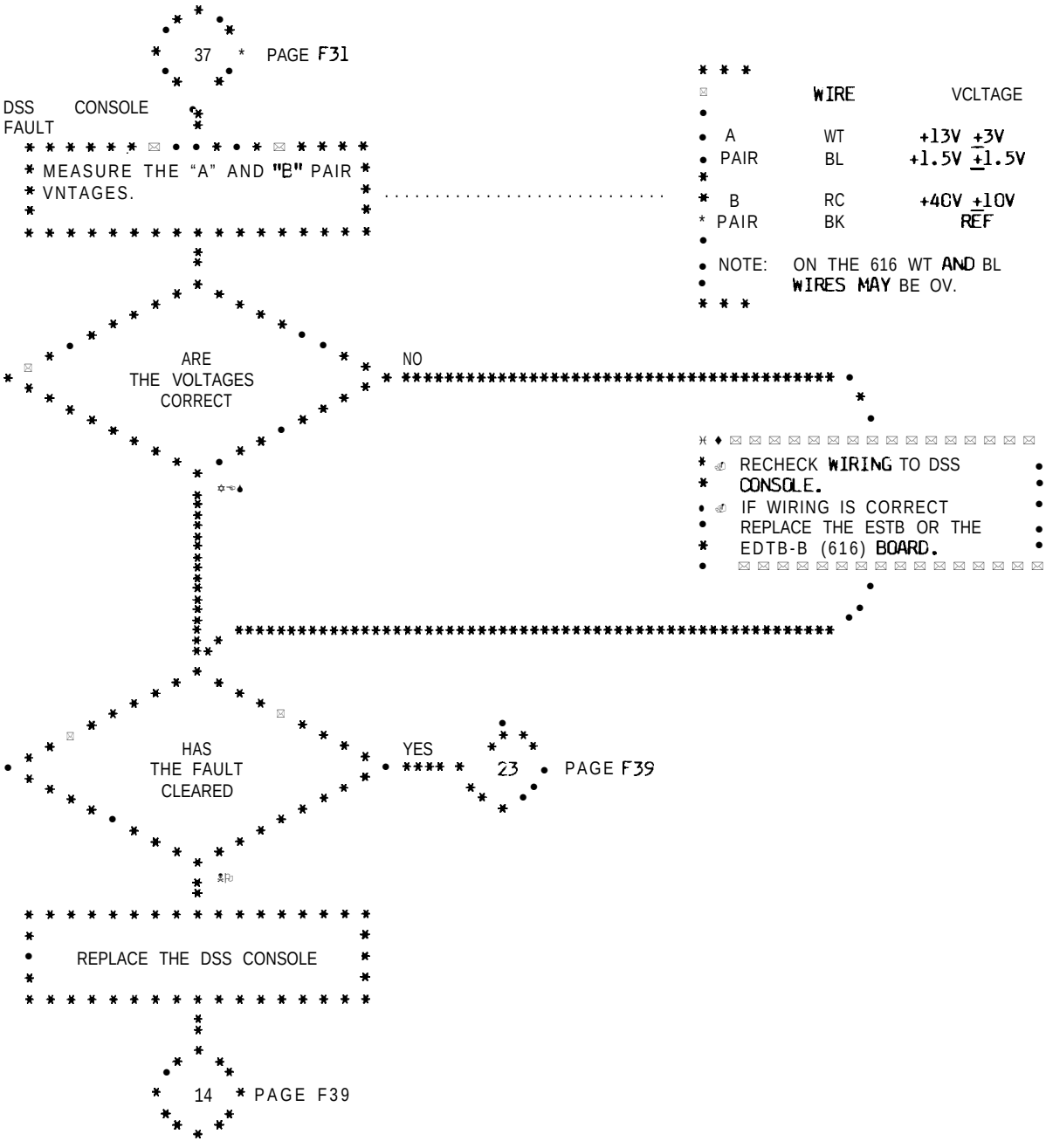

34
PALE F26
PROGRAMMED
FACILITY FAULT
HAS
FAULT CLEARED
NO
YES
REPLACE ECMB BOARD
23
PAGE F39
14
PAGE F39
RE-INITIALISE AND REPROGRAMME
SYSTEM DATA.

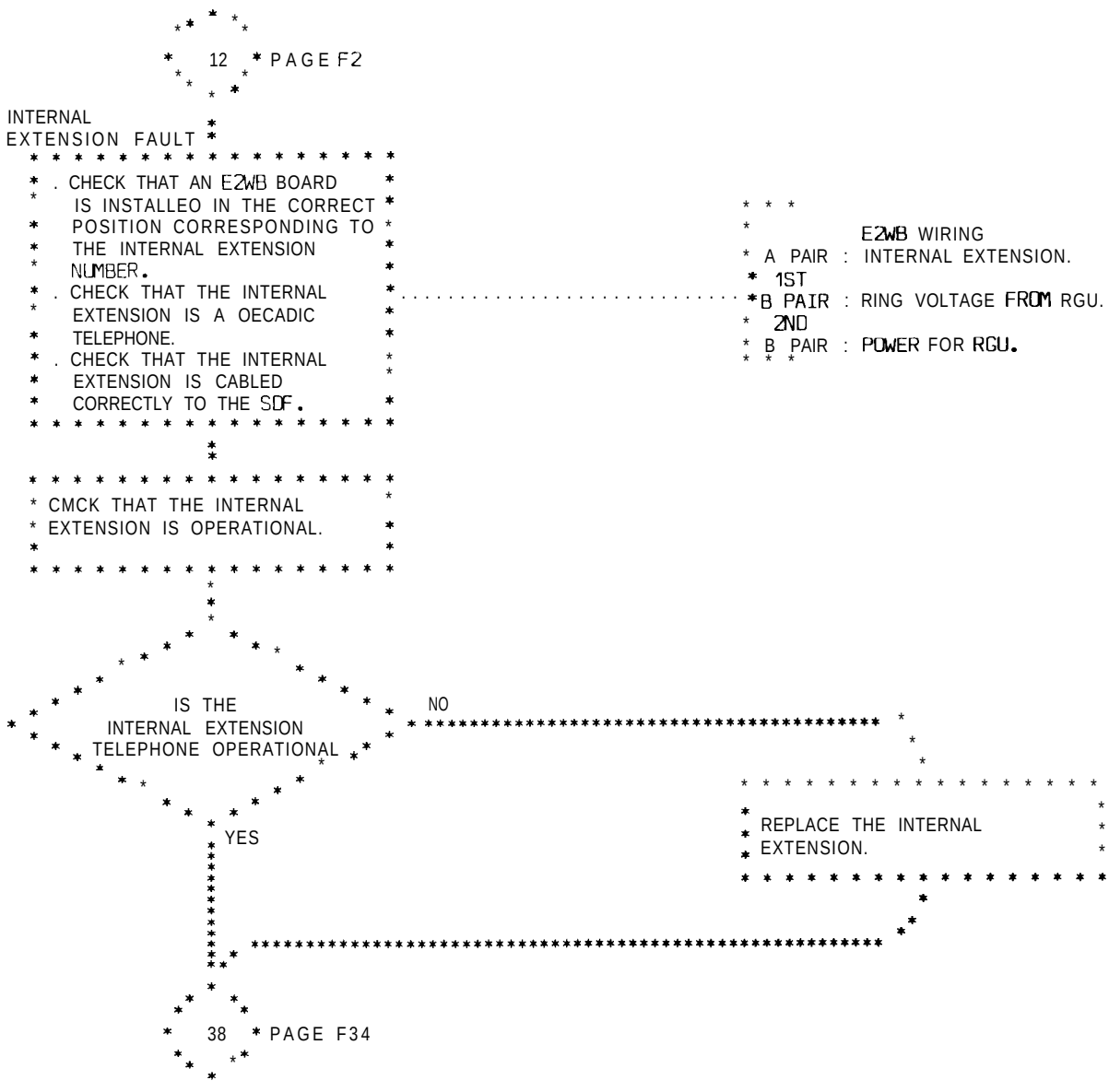

PAGE F2
PAGING FAULT
CHECK SYSTEM PROGRAMMING DATA FOR PAGING ZONES.
IS FAULT AFFECTING INTERNAL PAGING
YES
ND
CHECK ORIGINATING AND CALLED STATIONS. GO TO INTERCOM SECTION OF FLOW CHARTS.
5
PAGE F21
CHECK THAT THE CORRECT BOARD IS INSTALLED:
616 EGPB-A
1236/2260 EPGB-B
CHECK THAT THE EXTERNAL SPEAKER IS CGRRCTLY WIRED.
DOES FAULT AFFECT BGM AND TONES ONLY
NO
CHANGE ETSB-A/B BOARD
35
PAGE F29

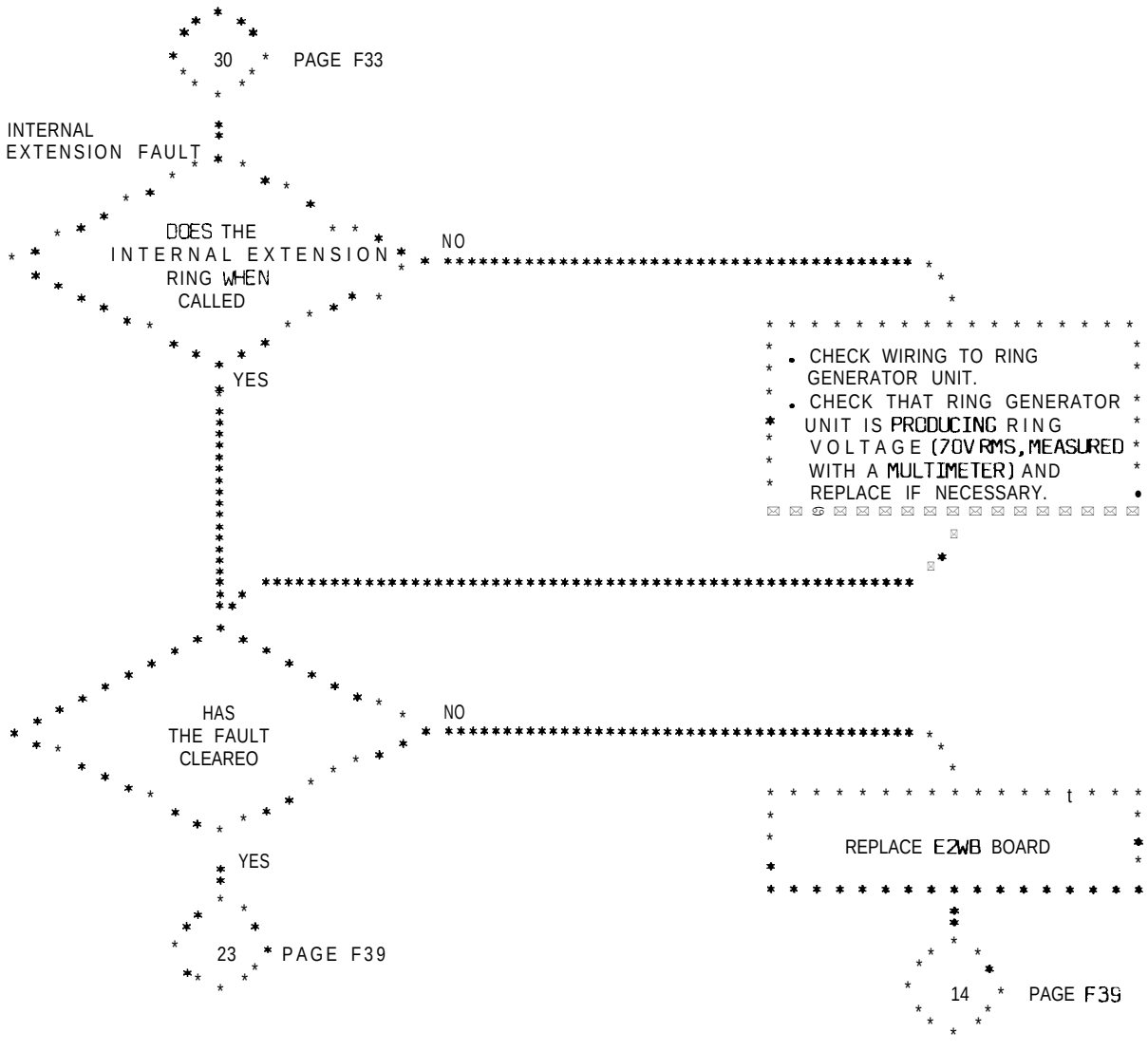

35 • PAGE F28
PAGING FAULT
HAS
FAULT CLEARED
YES
23
PAGE F39
REPLACE EPGB O R EGPB B O A R D
14
PAGE F39

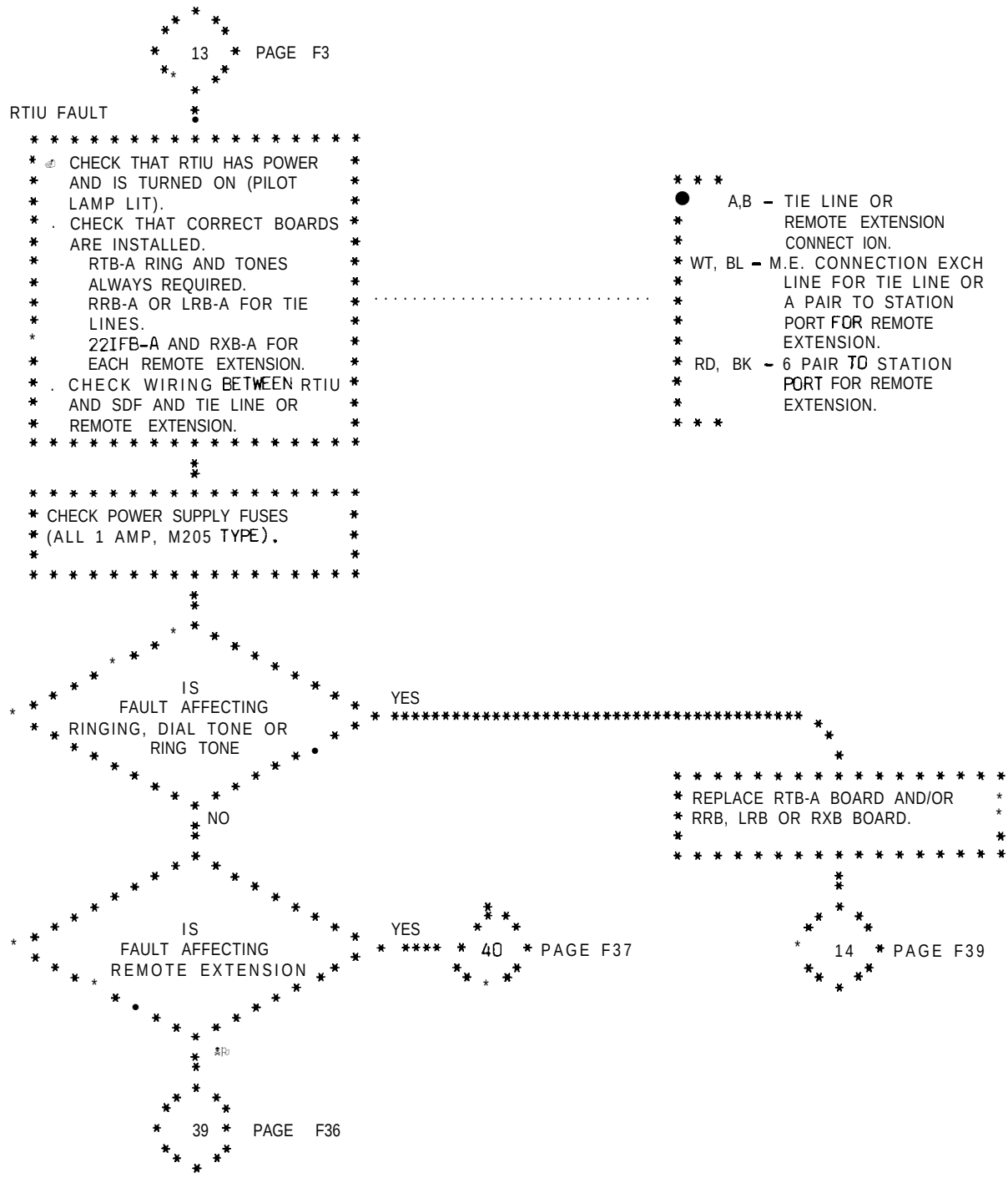

BACKGROUND MUSIC
10
PAGE F2
EXTERNAL MUSIC SOURCE FAULT
CHECK THAT AN EXTERNAL MUSIC SOURCE IS WIRED TO THE SDF.
CHECK 611 SOCKET FOR MUSIC.
REFER TO SECTION Z.4.14
CAN MUSIC BE HEARD AT THE SOCKET
NO
YES
CUSTOMERS RESPONSIBILITY
23
PAGE F39
IS FAULT AFFECTING MUSIC ON HOLD
YES
NO
CHECK STRAP ON ETSB-A/B, SET AS FOLLOWS:-
2-3 EXTERNAL HOLD MUSIC
I-2 INTERNAL TONES.
HAS THE FAULT CLEARED
YES
23
PAGE F39
NO
REPLACE ETSB-A/B BOARD
14
PAGE F39

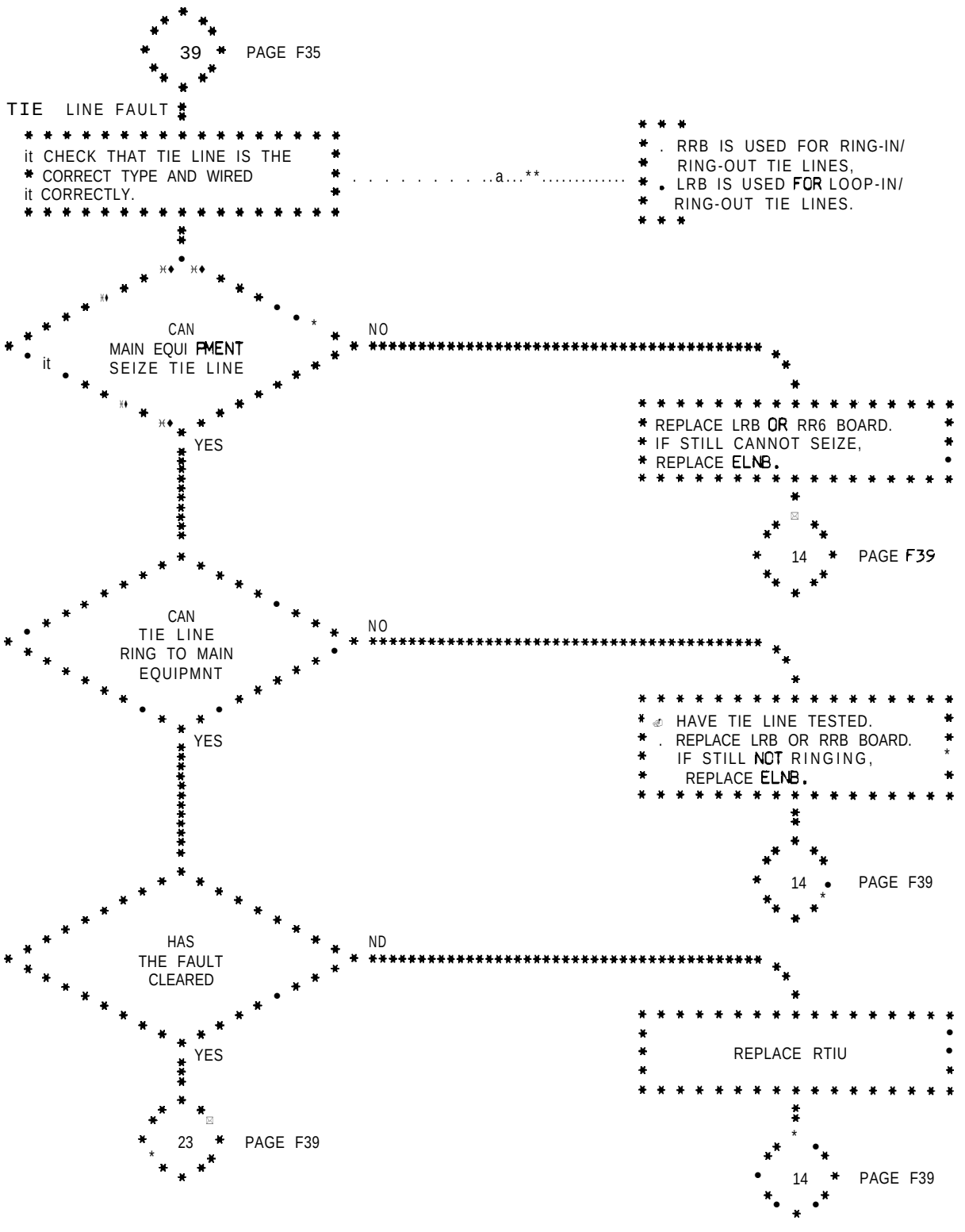

11
PAGE F2
DSS CONSOLE FAULT
. CHECK THAT THE DSS STATION NUMBERS ARE PROGRAMMED ON THE ECNB BOARD.
1ST DSS STATION : SW3
2ND DSS STATION : SW2
. CHECK THAT THE FUSE FOR THE CONSOLE IS A 1 AMP 3AG, ON THE FOLLOWING BOARDS:
616: EDTB-B, OR ESTB
1236/2260: E S T B
HAS THE DSS FUSE BLOWN
YES
NO
REPLACE FUSE. CHECK CONSOLE CABLING IS CORRECT AT THE SDF AND 603 PLUG AND 610 SOCKET.
WIRE PIN
WT 2
BL 6
RD 1
BK 5
HAS THE FAULT CLEARED
YES
23
PAGE F39
NO
37
PAGE F32

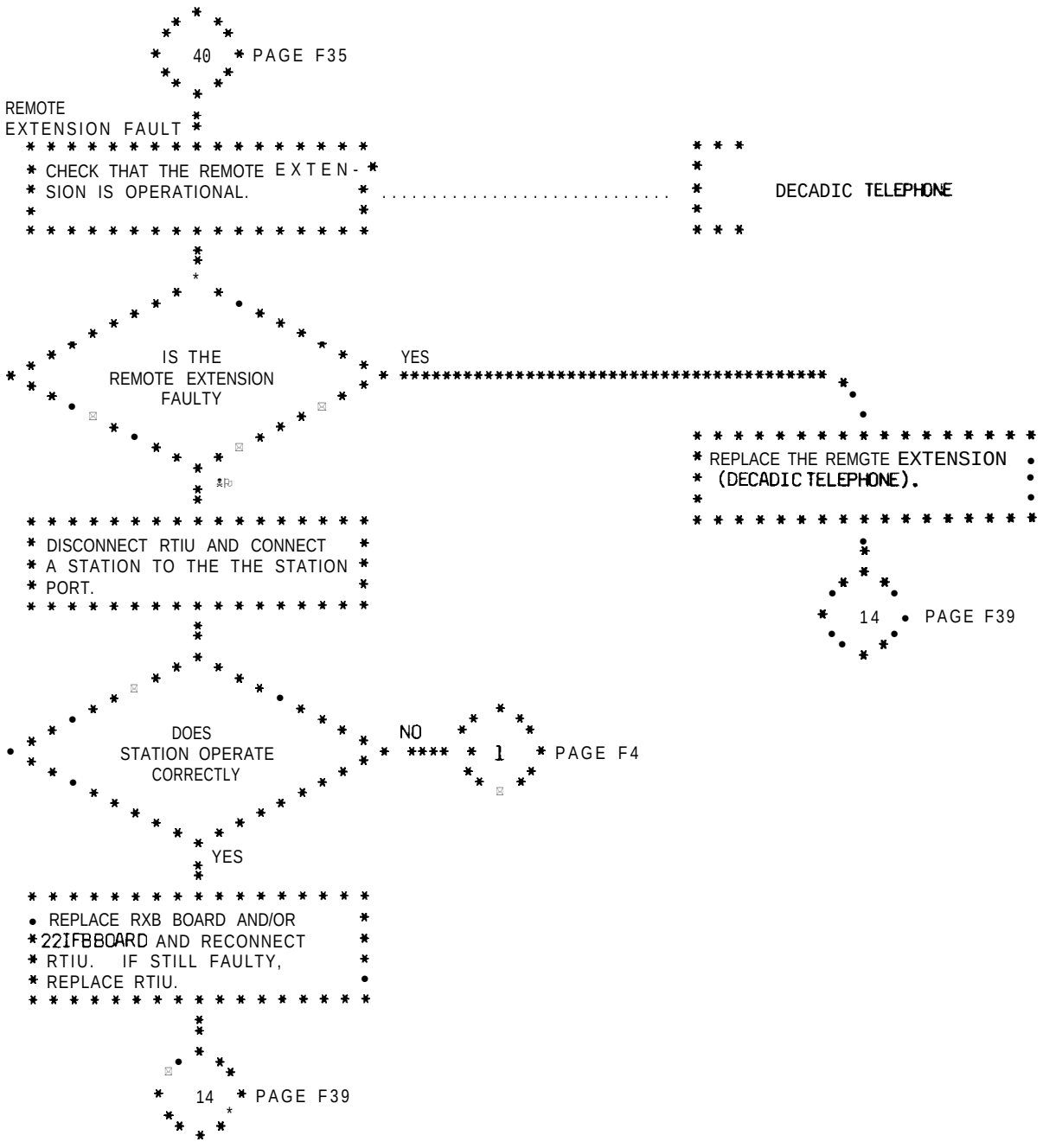

37
PAGE F31
DSS CONSOLE FAULT
MEASURE THE "A" AND "B" PAIR VNTAGES.
WIRE
VCLTAGE
A PAIR
WT
BL
+13V ±3V
+1.5V ±1.5V
B PAIR
RC
BK
+40V ±10V
REF
NOTE: ON THE 616 WT AND BL WIRES MAY BE OV.
ARE THE VOLTAGES CORRECT
NO
RECHECK WIRING TO DSS CONSOLE.
IF WIRING IS CORRECT REPLACE THE ESTB OR THE EDTB-B (616) BOARD.
HAS THE FAULT CLEARED
YES
23
PAGE F39
REPLACE THE DSS CONSOLE
14
PAGE F39

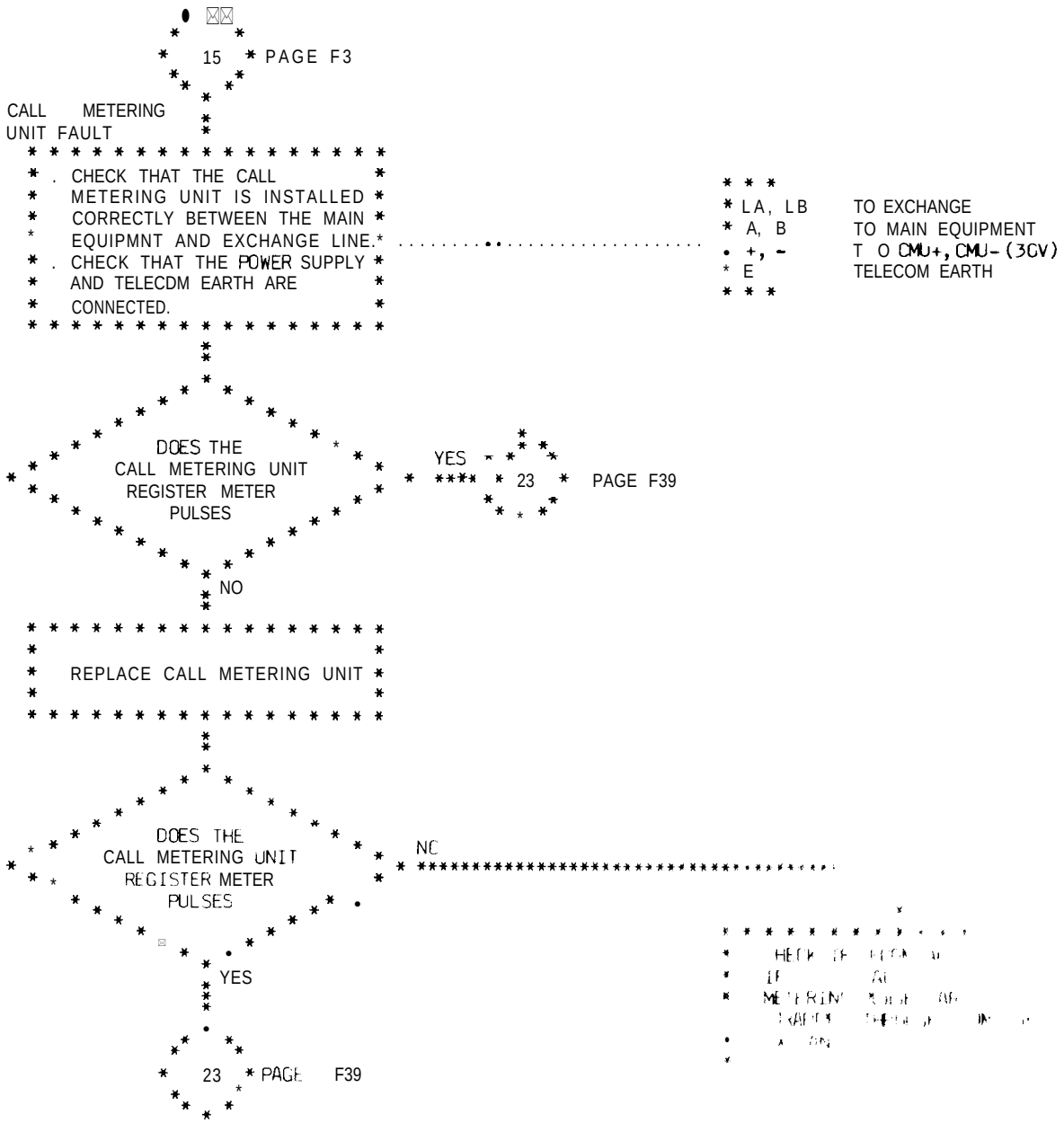

12
PAGE F2
INTERNAL EXTENSION FAULT
. CHECK THAT AN E2WB BOARD IS INSTALLEO IN THE CORRECT POSITION CORRESPONDING TO THE INTERNAL EXTENSION NUMBER.
. CHECK THAT THE INTERNAL EXTENSION IS A OECADIC TELEPHONE.
. CHECK THAT THE INTERNAL EXTENSION IS CABLED CORRECTLY TO THE SDF.
E2WB WIRING
A PAIR : 1ST INTERNAL EXTENSION.
B PAIR : RING VOLTAGE FROM RGU.
2ND
B PAIR : POWER FOR RGU.
CMCK THAT THE INTERNAL EXTENSION IS OPERATIONAL.
IS THE INTERNAL EXTENSION TELEPHONE OPERATIONAL
NO
YES
REPLACE THE INTERNAL EXTENSION.
38
PAGE F34

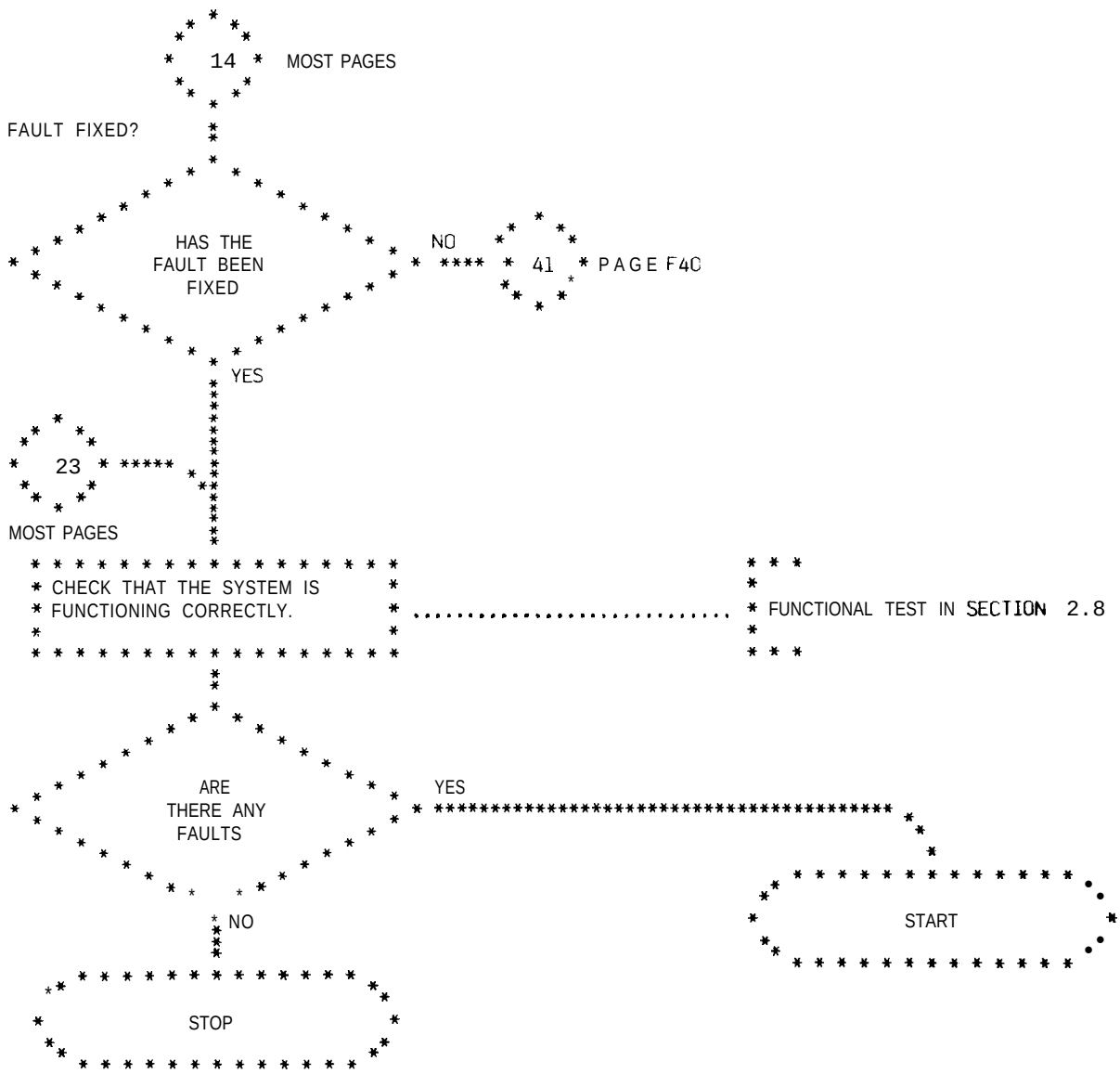

30
PAGE F33
INTERNAL EXTENSION FAULT
DOES THE INTERNAL EXTENSION RING WHEN CALLED
NO
YES
• CHECK WIRING TO RING GENERATOR UNIT.
• CHECK THAT RING GENERATOR UNIT IS PRODUCING RING VOLTAGE (70V RMS, MEASURED WITH A MULTIMETER) AND REPLACE IF NECESSARY.
HAS THE FAULT CLEARED
NO
YES
REPLACE E2WB BOARD
23
PAGE F39
14
PAGE F39

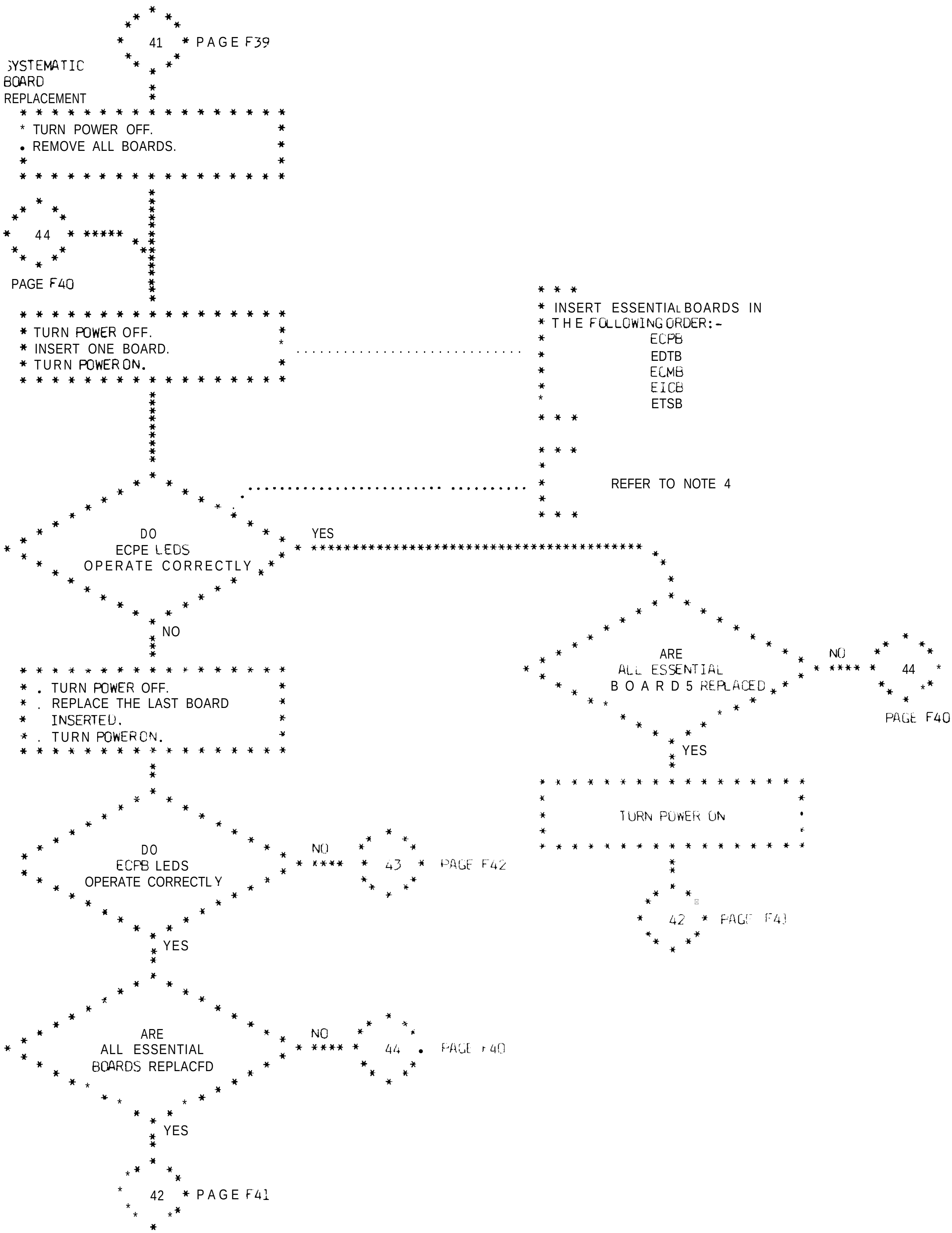

13 PAGE F3
RTIU FAULT
CHECK THAT RTIU HAS POWER AND IS TURNED ON (PILOT LAMP LIT).
CHECK THAT CORRECT BOARDS ARE INSTALLED.
RTB-A RING AND TONES ALWAYS REQUIRED.
RRB-A OR LRB-A FOR TIE LINES.
22IFB-A AND RXB-A FOR EACH REMOTE EXTENSION.
CHECK WIRING BETWEEN RTIU AND SDF AND TIE LINE OR REMOTE EXTENSION.
CHECK POWER SUPPLY FUSES (ALL 1 AMP, M205 TYPE).
A,B - TIE LINE OR REMOTE EXTENSION CONNECT ION.
WT, BL - M.E. CONNECTION EXCH LINE FOR TIE LINE OR A PAIR TO STATION PORT FOR REMOTE EXTENSION.
RD, BK - 6 PAIR TO STATION PORT FOR REMOTE EXTENSION.
IS FAULT AFFECTING RINGING, DIAL TONE OR RING TONE
YES
NO
REPLACE RTB-A BOARD AND/OR RRB, LRB OR RXB BOARD.
IS FAULT AFFECTING REMOTE EXTENSION
YES
40 PAGE F37
14 PAGE F39
39 PAGE F36

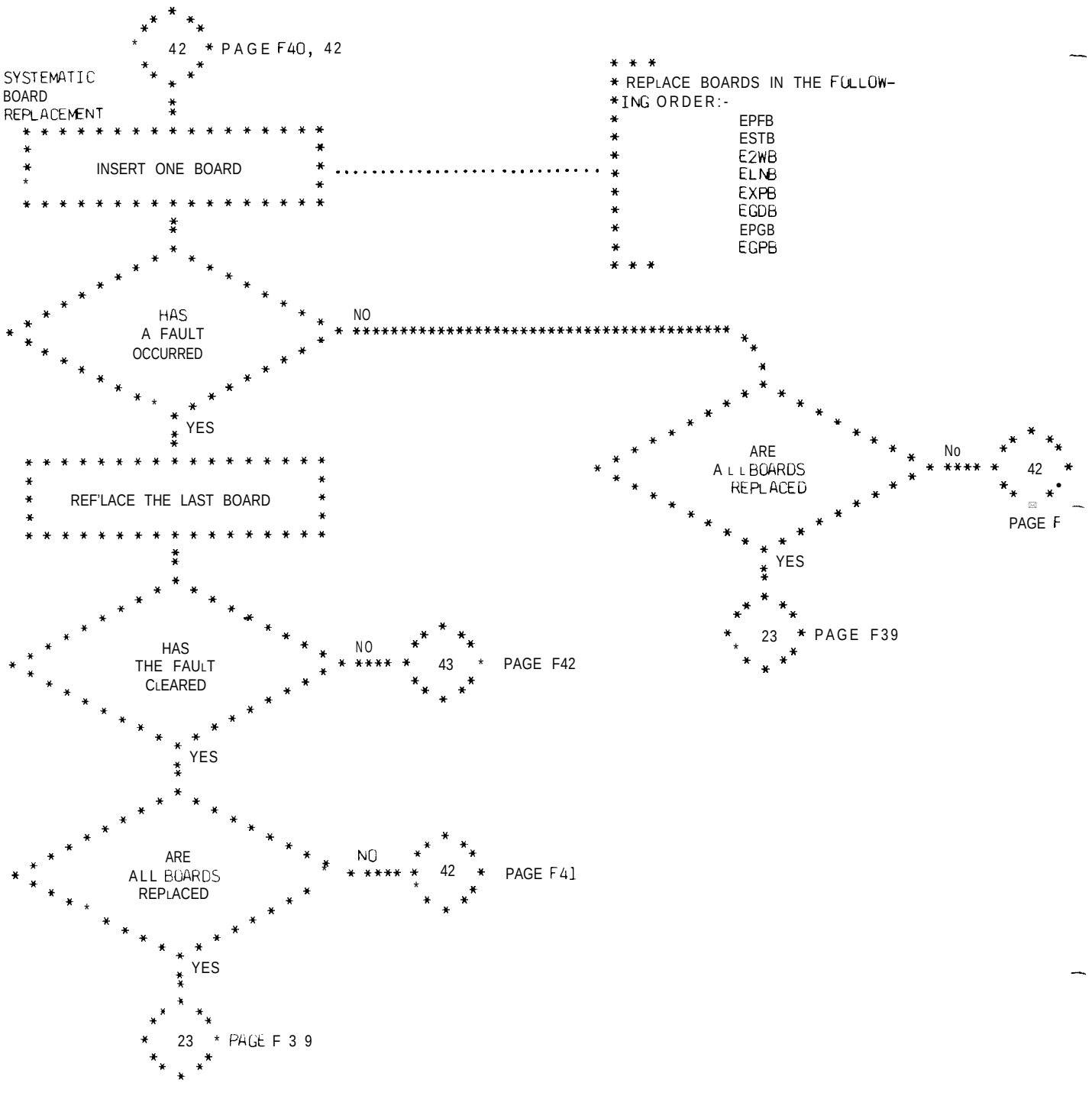

39
PAGE F35
TIE LINE FAULT
it CHECK THAT TIE LINE IS THE CORRECT TYPE AND WIRED it CORRECTLY.
. RRB IS USED FOR RING-IN/ RING-OUT TIE LINES,
. LRB IS USED FOR LOOP-IN/ RING-OUT TIE LINES.
CAN MAIN EQUIPMENT SEIZE TIE LINE
NO
REPLACE LRB OR RR6 BOARD. IF STILL CANNOT SEIZE, REPLACE ELNB.
14
PAGE F39
YES
CAN TIE LINE RING TO MAIN EQUIPMNT
NO
HAVE TIE LINE TESTED.
. REPLACE LRB OR RRB BOARD. IF STILL NOT RINGING, REPLACE ELNB.
14
PAGE F39
YES
HAS THE FAULT CLEARED
ND
REPLACE RTIU
14
PAGE F39
YES
23
PAGE F39

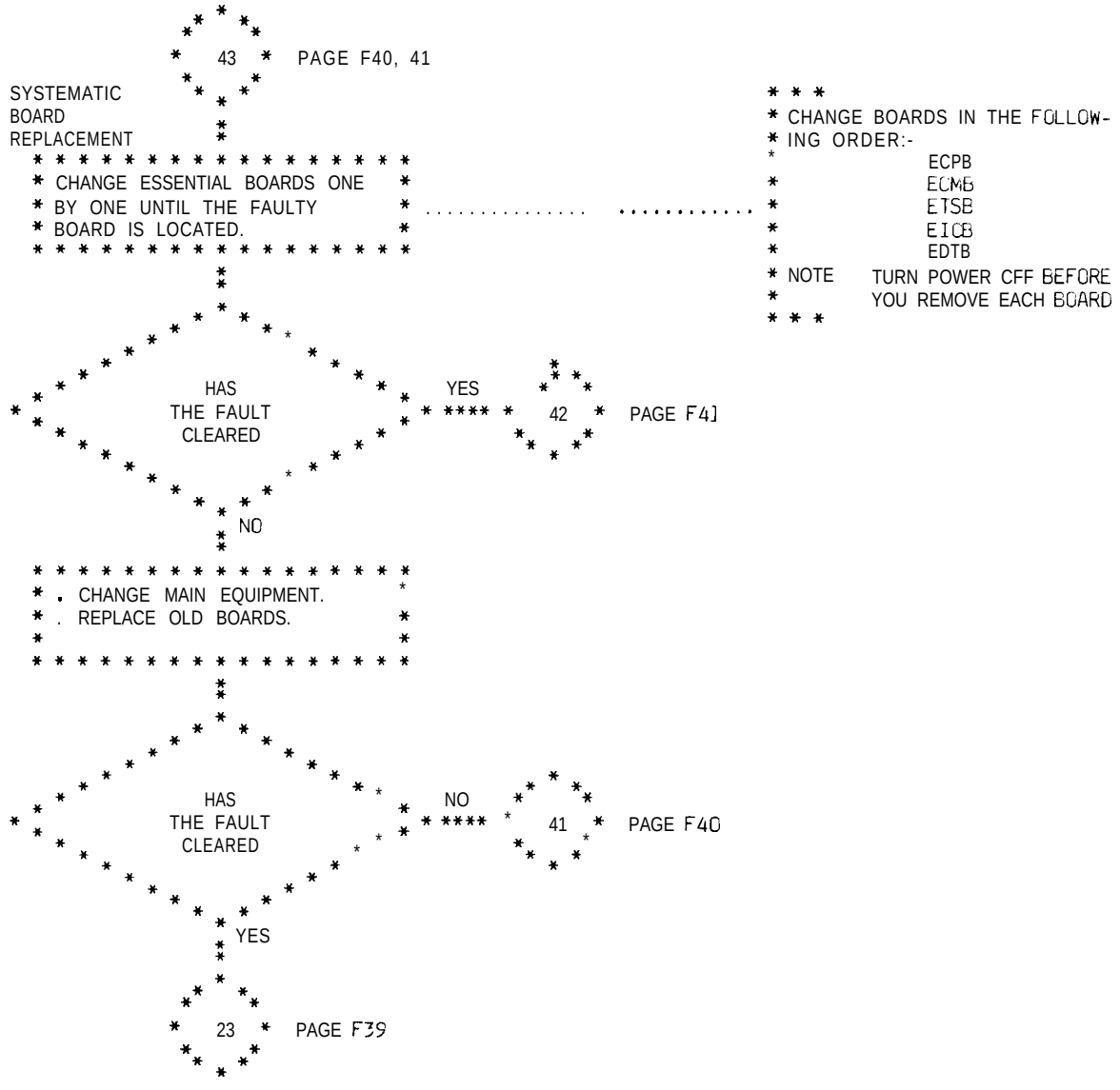

40
PAGE F35
REMOTE
EXTENSION FAULT
CHECK THAT THE REMOTE EXTEN-
SION IS OPERATIONAL.
DECADIC TELEPHONE
IS THE
REMOTE EXTENSION
FAULTY
YES
REPLACE THE REMGTE EXTENSION
(DECADIC TELEPHONE).
14
PAGE F39
DISCONNECT RTIU AND CONNECT
A STATION TO THE THE STATION
PORT.
DOES
STATION OPERATE
CORRECTLY
NO
PAGE F4
YES
REPLACE RXB BOARD AND/OR
IFB BOARD AND RECONNECT
RTIU. IF STILL FAULTY,
REPLACE RTIU.
14
PAGE F39


15
PAGE F3
CALL METERING UNIT FAULT
. CHECK THAT THE CALL METERING UNIT IS INSTALLED CORRECTLY BETWEEN THE MAIN EQUIPMNT AND EXCHANGE LINE.
. CHECK THAT THE POWER SUPPLY AND TELECDM EARTH ARE CONNECTED.
LA, LB TO EXCHANGE
A, B TO MAIN EQUIPMENT
+, - T O CMU+, CMU- (3GV)
E TELECOM EARTH
DOES THE CALL METERING UNIT REGISTER METER PULSES
YES
23
PAGE F39
NO
REPLACE CALL METERING UNIT
DOES THE CALL METERING UNIT REGISTER METER PULSES
NO
YES
23
PAGE F39


14
MOST PAGES
FAULT FIXED?
HAS THE FAULT BEEN FIXED
NO
41
PAGE F40
YES
23
MOST PAGES
CHECK THAT THE SYSTEM IS FUNCTIONING CORRECTLY.
FUNCTIONAL TEST IN SECTION 2.8
ARE THERE ANY FAULTS
YES
NO
START
STOP


41
PAGE F39
SYSTEMATIC BOARD REPLACEMENT
TURN POWER OFF.
REMOVE ALL BOARDS.
44
PAGE F40
TURN POWER OFF.
INSERT ONE BOARD.
TURN POWER ON.
INSERT ESSENTIAL BOARDS IN THE FOLLOWING ORDER:-
ECPB
EDTB
ECMB
EICB
ETSB
REFER TO NOTE 4
DO ECPB LEDS OPERATE CORRECTLY
YES
NO
ARE ALL ESSENTIAL BOARDS REPLACED
NO
44
PAGE F40
YES
TURN POWER ON
42
PAGE F41
. TURN POWER OFF.
. REPLACE THE LAST BOARD INSERTED.
. TURN POWER ON.
DO ECPB LEDS OPERATE CORRECTLY
NO
43
PAGE F42
YES
ARE ALL ESSENTIAL BOARDS REPLACED
NO
44
PAGE F40
YES
42
PAGE F41


42 * PAGE F40, 42
SYSTEMATIC BOARD REPLACEMENT
INSERT ONE BOARD
* * *
* REPLACE BOARDS IN THE FOLLOW-
*ING ORDER:-
EPFB
ESTB
E2WB
ELNB
EXPB
EGDB
EPGB
EGPB
* * *
HAS A FAULT OCCURRED
NO
YES
REF'LACE THE LAST BOARD
ARE ALL BOARDS REPLACED
No
42
PAGE F
YES
23 * PAGE F39
HAS THE FAULT CLEARED
NO
43 * PAGE F42
YES
ARE ALL BOARDS REPLACED
NO
42 * PAGE F41
YES
23 * PAGE F 3 9


43
PAGE F40, 41
SYSTEMATIC BOARD REPLACEMENT
CHANGE ESSENTIAL BOARDS ONE BY ONE UNTIL THE FAULTY BOARD IS LOCATED.
HAS THE FAULT CLEARED
YES
42
PAGE F41
NO
CHANGE MAIN EQUIPMENT.
REPLACE OLD BOARDS.
HAS THE FAULT CLEARED
NO
41
PAGE F40
YES
23
PAGE F39
CHANGE BOARDS IN THE FOLLOWING ORDER:-
ECPB
ECMB
ETSB
EICB
EDTB
NOTE TURN POWER CFF BEFORE YOU REMOVE EACH BOARD

NOTE 1: An exchange line seizure is indicated by activation of an inaividual LED on the corresponding ELNB board for an outgoing call or the application of ring current to the line for an incoming call. The LED does not light if the exchange line is a hot line.

NOTE 2: The following table illustrates the station numbers and the position of the corresponding ESTB-C boards in the Main Equipment.

STATION NUMBER	ESTB-C POSITION
20 - 23	1
24 - 27	2
28 - 31	3
32 - 35	4
36 - 39	5
40 - 43	6
44 - 47	7
48 - 51	8
52 - 55	9
56 - 59	10
60 - 63	11
64 - 67	12
68 - 71	13
72 - 75	14
76 - 79	15

NOTE 3: The following table illustrates the exchange line numbers and the position of the corresponding ELNB-A boards in the Main Equipment.

EXCHANGE LINE NUMBER	ELNB POSITION
1 - 4	1
5 - 8	2
9 - 12	3
* 13 - 14 (LED 3 & LED 4)	4
15 - 18	5
19 - 22	6
23 - 26	7

* Circuits 1 and 2 are not used.

NOTE 4: The LEDs on the ECPB board flash as follows when the system is operating correctly : -

TOP LED:	ON	1 Second	Indicates main program is running.
	OFF	1 Second	
BOTTOM LED:	ON	100 mSec	Indicates Data Transmission between main equipment and stations is operational.
	OFF	100 mSec	

3.6 SUGGESTED REPAIR ACTIONS

This section contains repair actions to be taken if a fault is found during functional testing described in section 2.8. If the repair actions do not rectify the fault, refer to the maintenance flow charts, section 3.5.

Before following repair actions check that the necessary circuit boards have been installed - boards ECPB, ECMB, EDTB, EICB and ETSB are necessary for the system to operate. An ESTB-C board is required for each four stations and one ELNB-A board for each four exchange lines. An EPFB board is required for each eight exchange lines. EXPB boards are necessary if more than twelve exchange lines are fitted.

PBA Coding

Board ejectors are provided on PBAs to facilitate their removal from the main equipment. The board ejectors are coded into two categories.

(i) RED EJECTORS: Boards with red ejectors must not be removed from the main equipment until the mains power is turned OFF.

(ii) WHITE EJECTORS: Boards with white ejectors may be removed from the system at any time.

In addition to the above categories, boards containing MOS circuitry are marked with a RED LINE on the edge of the board and/or a "MOS" sticker on the ejector.

As previously mentioned these boards require careful handling and, in general, must NOT be removed whilst the power is still on.

EXCHANGE LINE TESTS:

3.6.1 Line Seizure:

1. Check that the system has power and that station A is connected, check that the system is not in programming mode (MW LED on DSS console must not be ON).
2. Check wiring from the main equipment to station. Check socket connections and wiring in station as follows:

WIRE	610 SOCKET PIN NUMBER	CONNECTION IN STATION	VOLTAGE wrt LBK
WT	2	LWT	+13V ± 3V
BL	6	LBL	+ 1.5V ± 1.5V
RD	1	LRD	+40V ± 10V
BK	5	LBK	REF

3. Check the station fuse on the associated ESTB board, if the fuse is blown check wiring (fuse is 0.375 AMP 3AG).
4. Check voltages on the wires to the stations. If they are not similar to the above table, change ESTB board.
5. Check the ribbon connector between the STB-B board and key pad assembly in the station.
6. Change station.

3.6.2 **Line Seizure:**

1. Check the wiring from the main equipment to exchange line. Check that the LED lights on the ELNB board for the line (this indicates a DC loop).
2. Test exchange line.
3. Check receiver and its connections in the station. (White wires to W1, W2).
4. Replace ELNB board.

3.6 3 Incoming Call:

1 Check connection to exchange line.

2 Check that the LED flashes with incoming ring on the ELNB board for the incoming line. If the LED does flash refer to maintenance flow charts for further fault diagnosis.

3 Check that the system is dialling out, if not check that it is set up correctly:-

Decadic Dialling:

ELNB - DCB-A daughter board has key in location 12.
ETSB - B installed.
ETSB - C installed if more than 16 exchange lines, are used.
System programmed for decadic dialling.

Voice Frequency Dialling:

ELNB - DCB-A daughter board has key in location 13.
ETSB - A installed.
System programmed for voice frequency dialling.

3.6.4 **Incoming Call:**

1. Check the system programming data for exchange line audible signalling.
2. Check the wiring from the main equipment to stations as in section 3.6.1. (Check that the stations are connected to the correct SDF terminals).
3. Check that exchange lines are connected in the correct sequence.
4. If there are no signalling tones at all, change the ETSB-A/B board.

3.6.5 **Incoming Call:**

1. Check that system programming assigns exchange line audible signalling to station A and that Off Hook signalling is assigned.
2. Check that the speaker is connected in station A (to S1 and S2). If it is, replace station A.

3.6.6 **Answering:**

1. Check wiring from main equipment to station B (check voltages as in 3.6.1).
2. Check fuse on ESTB board for station B.
3. Change station B.

3.6.7 **Answering:**

1. Check A pair wiring (and DC voltages) to station A and station B.
2. Check stations A and B for sidetone, if there is no sidetone, check transmitter and receiver and station wiring as follows:-

Transmitter	RD, BK
Receiver	W1, W2

- Standard Station (figure 49)

Straps	BK to C
	RR to F1

- Powerfail Station (figure 50)
  Wires from Dial Board

WIRE	TERMINALS
BN	+5
GN	C
SL	RB
BL	F1
OR	RR
BK	BK
RD	B
PK)	not connected
YL)	and insulated

3. Change station B.

3.6.8 Privacy:

1. Check A-pair wiring to station C (does it short circuit with other stations?).
2. Change the associated ESTB board.

3.6.9 Add-on:

1. Check that stations Band C are functioning properly by using the station test.

3.6.10 Hold:

Change station B.

3.6.11 Music-on-Hold:

Check HT option connector strapping on ETSB-A or ETSB-B board.

I-2 for internally generated hold music
2-3 for external music source

2. If an external music source is used, check the source at the SDF and its connection to the main equipment. If the music is not heard at the 61 1 socket then liability for repair lies with the customer.
3. Change ETSB board.
4. Change ELNB board.

3.6.12 Exclusive Hold:

1. Follow maintenance flow charts.

3.6.13 Automatic Ring Back:

Check the system programming data for the automatic ring back time out.

3.6.14 Last Number Redial:

If line is behind PABX, check the type of exchange line and trunk access code programming.

2. Replace station A.

3.6.15 Abbreviated Dialling:

1. Replace station.

3.6.16 Abbreviated Dialling:

1. If line is behind PABX, check that the pause is operated correctly.
2. Check that the correct ECMB board has been installed.

SYSTEM	ECMB BOARDS
616	ECMB-D
1236	ECMB-B
2260	ECMB-A

3.6.17 Access Barring - No Access to a Group of Exchange Lines:

1. Check the programming.
2. Check that stations are wired correctly (i.e. Cabled with the right station number).

3.6.18 Access Barring by Digit Analysis:

1. Check the programming. Check station allocation to class and data needed for barring.
2. Check that the digits programmed agree with the sales form.

3.6.1 g Multi Party Conference:

1. Check that both exchange lines are functioning correctly (i.e. try tests 1 and 2 for each line).
2. Ensure that operations are carried out as in the functional test. Pressing ADD ON before seizing the second line will reseize the first line. Refer to the operating instructions if necessary.
3. It is not possible to dial after a multi party conference has been established.

INTERCOM TESTS

3.6.20 ICM:

1. If the ICM LED doesn't light, change the station.
2. If there is no dial tone, change the EICB board.
3. If there still is no dial tone change the ETSB board.
4. Change ESTB board.

3.6.21 Talk Back:

1. Check that station B is not in do-not-disturb (When in DND mode the LED is on).
2. Change EICB board.
3. Change ETSB board.
4. Change ESTB board.

3.6.22 Talk Back:

1. Check that station B is not in DND mode. (DND LED on).
2. Change station B.

3.6.23 Talk Back:

1. Change ESTB board for station B.
2. Change EICB board or EXPB-B/D, if equipped.

3.6.24 Talk Back:

1. Check that station B microphone is turned on (DND LED flashing means the microphone is off).
2. Change EICB board or EXPB-B/D, if equipped.
3. Check microphone connection in station B.

   RD to M1)—microphone is polarity sensitive
   WT to M2)
4. Change station B.

3.6.25 Microphone Off:

1. Change station B.

3.6.26 Signal Call:

1. Change ESTB board for station B.
2. Change ETSB board.

3.6.27 Answering:

1. Replace ESTB boards for station B and station A.
2. Replace station B.

3.6.28 Disconnection:

1. Check that the switchhook is not fouled by wires in station B. Check station B is not on monitor (i.e. MON lamp off).

3.6.29 Off Hook Signalling:

1. Check the system programming data for off hook signalling.
2. Change station B.

3.6.30 Do Not Disturb:

1. Check that station B has DND enabled in system programming.
2. Change station B.

3.8.31 Do Not Disturb:

1. Refer to maintenance flow charts.

3.6.32 Alternate Point Answering:

1. Ensure that station C is operational using the station test. Do not operate the ICM key at station C.
2. Replace ECPB board.

3.6.33 Alternate Point Answering:

1. Change ESTB board for station C.
2. Change station C.

3.6.34 ICM Busy:

1. Ensure that every station was operational (station test).
2. If EXPB-B or EXPB-D is installed six stations may seize intercom lines. An intercom line is reserved for each DSS console.

3.6.35 Hot Line:

1. Check that the hot line has been programmed in the system data
2. Check the calling and called stations wiring and operation.

3.6.38 Hot Line:

1. Check that an ELNB board is installed in the position used by hot line (usually the last or second last ELNB position) and that EXPB-A/C boards are installed as required.
2. Check the calling and called stations wiring and operation.
3. Replace ELNB board.

3.6.37 ADD ON:

1. It is important to exactly follow the instructions when testing this facility. If ADD ON is attempted at station A, it will not work.
2. Change station C.

3.8.38 ADD ON:

1. If there is no intrusion tone, change ETSB board.
2. Change ESTB board for station C.
3. Change EICB board.

3.6.39 ADD ON:

1. Follow maintenance flowcharts.

3.6.40 Internal Zone Paging:

1. Check the system programming data for internal paging zones.
2. Check the stations which do not correctly receive paging. Ensure that the speaker is connected to S1 and S2. Check that stations function correctly (station test).
3. A station will not receive paging if it is busy (i.e. is OFF HOOK and has pressed a key).
4. Change ESTB board associated with stations which don't function.

3.6.41 External Zone Paging:

1. Check that the correct paging amplifier board has been installed.

   N 123612260

   EPGB-B Two external zones

   N616

   EGPB-A Only one external zone.

2. Check that external speaker have been correctly wired and work. Speaker impedance should be 8 ohms or greater.
3. Replace EPGB or EGPB board.

3.6.42 **Meet Me:**

1. Check system programming for Meet Me Answer Paging.

3.6.43 **Meet Me:**

1. Change station B. Note, do not operate the ICM key at station B.

STATION TESTS:

3.6.44 **Line Keys:**

1. Check wiring from the main equipment. Check that voltages at station sockets are as follows:

WIRE	610 SOCKET PIN NUMBER	CONNECTION IN STATION	VOLTAGE
WT	2	LWT	+13V±3V
BL	6	LBL	+1.5V±1.5V
RD	1	LRD	+40V±10V
BK	5	LBK	REF

2. Check station fuse on ESTB board (0.375 AMP 3AG).
3. Check line cord connection and plug wiring as in table above.
4. If line LED doesn't light, check ribbon cable between keyboard assembly and STB-B board in the station.
5. If no dial tone, check receiver and station wiring as in 3.6.7.
6. If no sidetone, check transmitter and station wiring as in 3.6.7.
7. Replace station.
8. Replace ESTB board.

3.6.45 **Station Keys:**

1. Check ribbon cable between keyboard assembly and STB-B board.
2. Replace station.

3.6.46 **Monitor:**

1. Check that speaker is connected to S1 and S2.
2. Check ribbon cable between keyboard assembly and STB-B board.
3. Replace station.

3.6.47 **Disconnection:**

1. Check that the switchhook is not fouled by station internal wiring.
2. Check station wiring as in 3.6.7.
3. Replace station.

DSS CONSOLE TESTS:

3.6.48 DSS Call:

1. If a station is not connected, is faulty or is busy, then the associated DSS console LED will not light and busy tone will be heard when the DSS console key is depressed. (The DSS console is always busy).
2. If the DSS console has keys or LEDs which don't function, replace the DSS console.
3. Check that the DSS console is correctly installed.
   - DSS console is installed at DSS station number plus one with a 1 AMP 3AG fuse on corresponding ESTB board.
   - Switches on ECMB board are as follows:

     SW3 First DSS station.
     SW2 Second DSS station (set to "all l's" if not equipped)
     SW1 On (R switch)
4. Check wiring to DSS station and DSS console.
5. Test DSS station using station test.

3.6.49 **Background Noise:**

Check called station using station test.

2. Double tone burst, but no background noise is heard if station is in Do Not Disturb or Microphone-off.
3. Check microphone connection in station is RD to Ml, WT to M2.
4. Replace called station.

3.6.50 DSS Console:

1. Replace DSS Console.

3.6.51 Call Override:

1. Follow the test instructions exactly: It is only possible for the DSS to override station B while it is in handsfree mode (its DSS console LED is flashing). If it is attempted to override station A or station B while using its handset, then off hook signalling will result.

3.6.52 Override DND:

1. Check the system programming for station B, DND enabled.

3.6.53 Overriding DND:

1. Check system programming data for DSS override of DND.
2. If override is programmed, then station B should receive an intercom call with microphone off.

3.6.54 Message Waiting:

1. Replace station A.

3.6.55 Night Transfer:

1. Check system programming data for night transfer.
2. Check that stations assigned to night transfer operate (station test).

MISCELLANEOUS TESTS:

3.6.56 Powerfail Stations:

1. Check that A-pair voltage (BL to WT) is approximately 50V station on hook. If not replace EPFB board.
2. Check wiring on SDF block for powerfail station.
3. Confirm that station operates with power on (station test).
4. Replace powerfail station.

3.6.57 **Powerfail Stations:**

1. Check station internal wiring (refer to 3.6.7).
2. Replace powerfail station.

3.6.58 **Background Music Control:**

1. Check the background music source can be heard at SDF. Input impedance of the system is 600 ohms.
2. Check that the station is functioning (station test).
3. Change ETSB board.
4. Change ESTB board for the station.

3.6.59 Alarm:

1. Check that the system is correctly programmed for open or closed contact alarm condition.
2. Check that the external alarm has operated.
3. Check the wiring from the alarm to the main equipment.
4. Change ETSB board.
5. Change DSS console if LED doesn't light.

3.6.60 **Alarm:**

1. Check that the external alarm has turned off.

3.6.61 **Switchhook Flash/Earth Recall:**

1. Check system programming for switchhook flash or earth recall. Switchhook flash or earth recall appears as the last line key on the station. Note that earth recall only functions on lines assigned as PBX lines.
2. Check that earth recall board is correctly installed.

   N1236/2260 EGDB-A
   N616 EGPB-A
3. With earth recall, check that a signal earth has been connected to the main equipment ER connection (on SDF block)
4. Try switchhook flash or earth recall from a different station, if it works, change first station.

3.6.62 **Call Metering Unit:**

1. Check that the Call Metering Unit is installed as follows:

   LA,LB: Exchange Line
   A, B: Main Equipment Exchange Line Connection
   +, — : CMU+ and CMU- from Main Equipment
   E: Telecom Earth
2. Check that metering pulses are provided on exchange line.
3. Replace Call Metering Unit

3.6.63 **Handsfree Console:**

1. Check that station has power (LEDs light) and that switch K in the HFC is set to 20V.
2. Check station wiring for Handsfree Console (3.6.64) and ribbon connector in HFC.
3. Change Handsfree Console.

3.6.64 Handsfree Console:

1. Check station wiring for Handsfree Console as follows:

Station Board	Wire from Handsfree Console	
	Normal Station	Power Fail Station
RR	WT	WT
FL		BR
L1	RD	RD
C	BR,YL	YL
BK	SL	SL
LK	LGN	LGN
K1	VI	VI
SG	BL	BL
RB	OR	OR

Strap RR to F1
Remove strap BK to C

Wires PK, LBL, BK and GN should be insulated (taped) separately and stored in the station

2. Check that connector D in HFC is strapped 1 to 2 and 4 to 5.

3. Check that microphone and speaker are connected in HFC:-

Speaker: to SP1 and SP2
Microphone: RD to Ml and WT to M2.

4. Check that station can make an ordinary ICM call, if it can, replace Handsfree Console.

INTERNAL EXTENSION TEST

3.6.65 Internal Extension Intercom Call:

1. Check wiring to Internal Extension, extension should be cabled to A-pair position on SDF block.

2. Check voltage between wires, must be between 30 and 40V extension on hook. If voltage is incorrect, replace E2WB board.

3. Check transmitter, receiver, switchhook and wiring in Internal Extension (decadic telephone).

4. Change E2WB board.

3.6.66 Internal Extension Intercom Call:

1. Check links on E2WB board CN connectors.
   Link l-2 for exchange line access
   Link 2-3 for intercom only. Carry out remote extension test.

2. Change E2WB board.

3.6.67 Internal Extension Intercom Call:

1. Internal Extension must be a standard decadic telephone. Test the telephone on an exchange line.

2. Test called extension and confirm its operation.

3. Replace E2WB board.

3.6.68 Internal Extension ADD ON:

1. The switchhook is flashed by depressing it for about half a second. If switchhook flash is unsuccessful, try again.

2. Replace E2WB board.

3.6.69 Internal Extension Disconnection:

1. Check that extension is on hook for at least 1 second.

2. Change internal extension.

3. Change E2WB board.

3.6.70 Internal Extension Intercom Call Received:

1. Check wiring to RGU as follows:

   16HZ, OUT to first B-pair corresponding to E2WB board.
   +,G to second B-pair corresponding to E2WB board.
   Refer Section 2.4.13.

2. Check fuse on E2WB board. (0.375 AMP 3AG)
3. If no ring voltage, replace RGU.
4. Change internal extension.
5. Replace E2WB board.

3.6.71 Internal Extension Exchange Line Call:

1. Check links on E2WB board CN connectors:

   Link 1 to 2 exchange line access allowed
   Link 2 to 3 intercom access only.

2. If all exchange line lines are busy, receive busy tone.
3. Check system programming for access barring and exchange line equipping.
4. Replace E2WB board.

RTIU TESTS

3.6.72 Tie Line Seizure:

1. Check RTIU wiring to tie line as follows:

   A,B : to tie line
   WT,BL : to exchange line connection on main equipment.

2. Check that RTIU has power, that it is turned on, and the pilot lamp is lit. Check fuses - all are 1 AMP (M205).
3. If LRB board fitted, tie line should receive interrupted ring voltage and calling station should hear ring tone. If no tones or ring voltage, replace LRB board.
4. If RRB board fitted, tie line should receive ring voltage steadily for approximately a second. If not, replace RRB board.
5. If still no ring voltage or tone, replace RTB board.
6. Change RTIU.
7. Change ELNB board.

3.6.73 **Tie Line Answered:**

1. If LRB board is fitted, ringing should stop when a dc loop is completed by the tie line. Battery feed of 48V is supplied for the tie line. If faulty, check fuses, then replace LRB board.
2. If RRB board is fitted, ringing should stop after approximately a second. If not, replace RRB board.

   The RRB board does not provide battery feed or a dc loop for the tie line.

3.6.74 **Incoming Tie Line Call:**

1. If LRB is fitted, a loop in tie line (RTIU) should send interrupted ring voltage to the main equipment and ring tone to the tie line. If unsuccessful, replace LRB board.
2. If RRB is fitted, ring voltage from the tie line should be detected and interrupted ring voltage sent to the main equipment. If unsuccessful, replace RRB board.

3.6.75 **Answering Tie Line:**

1. Change ELNB board.
2. Replace LRB or RRB board

3.6.76 **Remote Extension Intercom Call:**

1. For internal extension refer to 3.6.65 and 3.6.66.
2. Check RTIU cabling as follows:

   A,B: remote extension
   WT,BL: Station A-pair from main equipment
   RD,BK: Station B-pair from main equipment

3. Check that the RTIU has power, is turned on, and that the pilot lamp is lit. Check fuses - all are 1 AMP.
4. Check voltage between wires to station, must be 48V remote extension on hook. If voltage is wrong, recheck fuses and replace RXB board.
5. If no dial tone, replace RTB board.
6. Check transmitter, receiver, switchhook and wiring of remote extension.
7. Replace RXB board.

3.6.77 **Remote Extension Intercom Call:**

1. For Internal Extension refer to 3.6.65, 3.6.66 and 3.6.67.
2. Remote extension must be a standard decadic telephone. Test the telephone on an exchange line.
3. Test called station and confirm its operation.
4. Check that a 221FB board and an RXB board are installed for each remote station.
5. Replace RXB board.
6. Replace 221FB board.

3.8.78 **Remote Extension ADD ON:**

1. For Internal Extension refer to 3.6.68.
2. The switchhook is flashed by depressing it for about half a second. If switchhook flash is unsuccessful, try again.
3. Replace RXB board.

3.6.79 **Remote Extension Disconnection:**

1. For Internal Extension, refer to 3.6.69.
2. Check that telephone is on hobk for at least a second.
3. Change remote extension.
4. Replace RXB board.
5. Replace 221FB board.

3.6.80 **Remote Extension Intercom Call Received:**

1. For Internal Extension, refer to 3.6.70.
2. Change remote extension.
3. Replace RTB board.
4. Replace RXB board.
5. Replace 221FB board.

3.7 REPAIR PROCEDURES

No repair of PBA's will be carried out on-site or in field depots. Any fault in a PBA will necessitate replacement of that assembly.

All faulty PBA's will be suitably packaged (refer 3.4.6) and promptly returned to your State Workshop on a changeover basis. A Customer Equipment Fault Report Label (E441) (Figure 68) must be attached to all faulty PBA's, and filled out with as many details of the faulty condition as possible.

Each State Workshops should keep an accurate record of all PBA's despatched and received to ensure that replacements are obtained one-for-one.

Other Items - (Refer to 3.4.4):

No repair of these items will be carried out on-site or in field depots. Any fault in an item will necessitate replacement of that item complete; exceptions — where a fault has been diagnosed to the PBA's or the Spare Parts listed in Appendix 1. page 202 & 203.

Consumable items (parts listed in Spare Parts page 202 8 203), will be disposed of in a manner similar to other consumable items.

All faulty items will be suitably packaged (same type of carton as supplied with new item) before forwarding from the field to their local store, for forwarding to the sifting room using Form S417 procedures.

Note: A Customer Equipment Fault Report Label (E441) Figure 68 must be attached to all faulty items, and filled out with as many details of the fault condition as possible. Replacement items will be obtained using normal requisitioning procedures on your State Supply Branch.

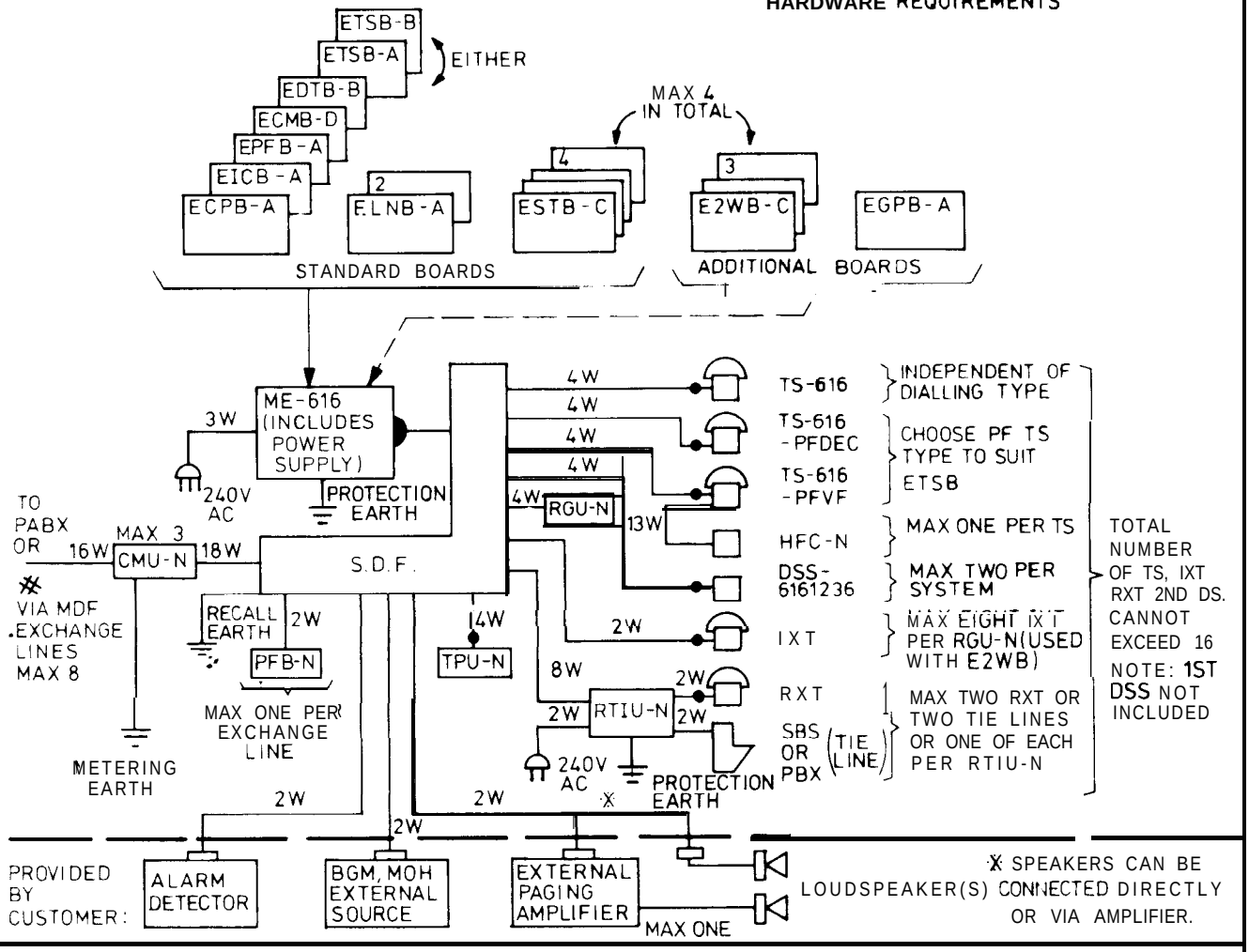
APPENDIX 1

CONTENTS

REPARED BY SBS ENGINEERING BRANCH HEADQUARTERS CE-99093

COMMANDER N616 SERIES BUSINESS SYSTEM

HARDWARE REQUIREMENTS



ALSO AVAILABLE: WMK-N-TS; CP-616-TSBR / CP-616-TSO; CP-6161236-DSSBR / CP-6161236-DSSO; CP-N-HFCBR / CP-N-HFCO

TS, DSS AND HFC ARE ISSUED WITH WG CP'S

KEY

BGM	BACKGROUND MUSIC
BR	BROWN
CMU	CALL METERING UNIT
CP	COLOUR PANEL
DEC	DECADIC (DIALLING)
DSS	DIRECT SELECT STATION
ECMB	CENTRAL MEMORY BOARD
ECPB	CENTRAL PROCESSOR BOARD
EDTB	DATA TRANSMISSION BOARD
EGPB	GROUNDING PAGING BOARD
EICB	INTERCOM CONTROL BOARD
ELNB	LINE BOARD (EXCHANGE)
EPFB	POWER FAIL BOARD
ESTB	STAT ION BOARD
ETSB-A	TONE & SENDER BOARD (VF)
ETSB-B	TONE & SENDER BOARD (DEC)
ETSB-C	TONE & SENDER EXPANSION BOARD
E2WB	2-WIRE INTERNAL EXT BOARD
EXPB	EXPANSION BOARD
HFC	HANDSFREE CONSOLE
	AMP-CHAMP PLUG/SOCKET (CK-61222-50)
	TELECOM PLUG/SOCKET (604/611)
IXT	INTERNAL EXTENSION TELEPHONE
ME	MAIN EQUIPMENT
MOH	MUSIC ON HOLD
O	ORANGE
PABX	PRIVATE AUTOMATIC BRANCH EXCHANGE
PBX	PRIVATE BRANCH EXCHANGE
PF	POWER FAIL
PFB	POWER FAIL BELL
PS	POWER SUPPLY
RGU	RING GENERATOR UNIT
RTIU	REMOTE EXTENSION AND TIE-LINE INTERFACE UNIT
RXT	REMOTE EXTENSION TELEPHONE
SBS	SMALL BUSINESS SYSTEM
SDF	SYSTEM DISTRIBUTING FRAME
TPU	TEST AND PROGRAMMING UNIT
TS	TELEPHONE STATION
VF	VOICE FREDUENCY (DIALLING)
WG	WOODGRAIN
WMK	WALL MOUNTING KIT
2w	2 WIRES REQUIRED ETC
X	TELEPHONE EXCHANGE
●	TELECOM PLUG/SOCKET (603M/610M)

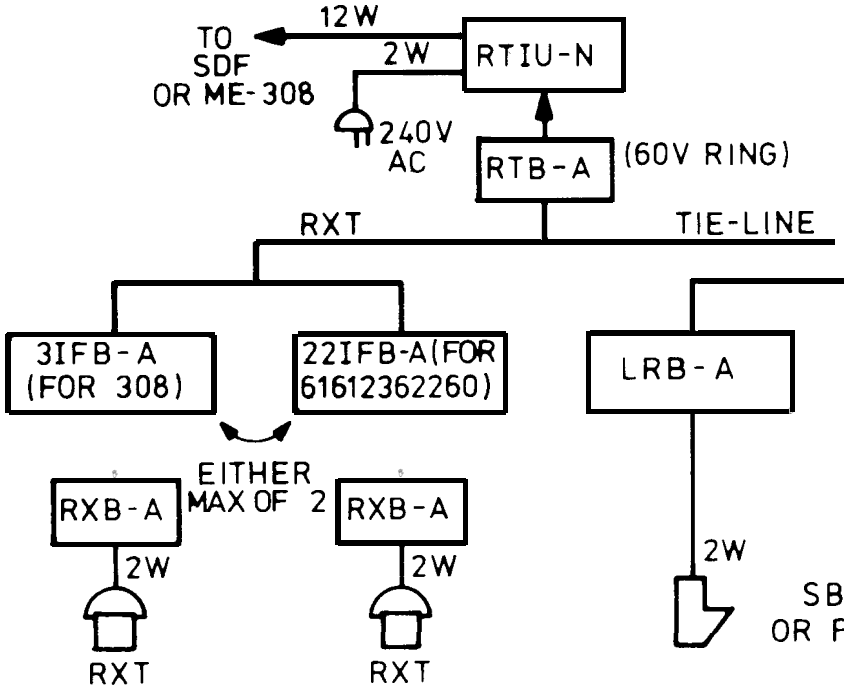
. DSS HAS DEDICATED PORT (1 OFF)
. FOR EACH TIE-LINE PORT PROVIDED LOSE ONE EXCHANGE LINE PORT
. FOR EACH IXT OR RXT PORT PROVIDED LOST ONE TS PORT

FIG. A1 - N616 HARDWARE REQUIREMENT

PREPARED BY SB S ENGINEERING BRANCH HEADQUARTERS CE-99093

COMMANDER N SERIES BUSINESS SYSTEM

REMOTE EXTENSION AND TIE-LINE SUMMARY HARDWARE REQUIREMENTS



EACH RTIU-N CAN FEED TWO TERMINAL CONNECTIONS ie

TIE-LINE	RXT
0	1
0	2
1	1
2	0
1	0

EG. TO PROVIDE ONE RXT AND ONE TIE-LINE WITH LR SIGNALLING USED WITH N308 REQUIRE:

- 1 × RTIU-N
- 1 × RTB-A
- 1 × 3IFB-A
- 1 × RXB-A
- 1 × LRB-A

RXT & TIE-LINE LOOP LIMITED TO 1500 Ω

RXT MAY BE ANY TELECOM APPROVED DECADIC DIALLING TELEPHONE.

KEY:

3IFB	308 INTERFACE BOARD	RTIU	REMOTE EXTENSION AND TIE-LINE INTERFACE UNIT.
22IFB	22 INTERFACE BOARD		
LRB	LOOP-IN RING-OUT BOARD	RXB	REMOTE EXTENSION BOARD
PBX	PRIVATE BRANCH EXCHANGE	RXT	REMOTE EXTENSION TELEPHONE
RRB	RING-IN RING-OUT BOARD	SBS	SMALL BUSINESS SYSTEM
RTB	RING TONE BOARD	SDF	SYSTEM DISTRIBUTING FRAME
		2W	2 WIRE ETC.

FIG. A2 - RTIU

N616, 1236, 2260
ISSUE 2

N616 INSTALLATION PARTS CHECK LIST[1]

SERIAL 336

CODE	ITEM NO.
ME-61 6	3381362
CK-6122250	570
ECPB-A	420
ECMB-D	424
EICB-A	421
EDTB-B	427
EPFB-A	425
ETSB-A	441
ETSB-B	442
ELNB-A	428
ESTB-C	440
EGPB-A	430
E2WB-C	443
TS-616	360
TS-616-PFDEC	540
TS-616-PFVF	541
DSS-6161236	381
HFC-N	546
WMK-N-TS	568
PFB-N	571
CMU-N	567
RGU-N	572
RTIU-N	560
RTB-A	563
221 FB-A	562
RXB-A	561
LRB-A	565
RRB-A	564
CP-616-TSWG	377
CP-616-TSO	378
CP-616-TSBR	379
CP-6161236-DSSWG	394
CP-6161236-DSSO	395
CP-6161236-DSSBR	396
CP-N-HFCWG	557
CP-N-HFCO	558
CP-N-HFCBR	559

N616 MAINTENANCE PARTS CHECK LIST[2]

SERIAL 338

CODE	ITEM NO.
DSSC-6161236-C	338/607
DSSHFCB-6161236-C	609
HB-N-C	602
HC-N-C	611
HFCC-N-C	608
HRC-N-C	603
HTC-N-C	604
KC-N-C	613
KC-N-CL	614
KC-N-RL	615
LC-N	612
REC-N	600
TNWC-N	610
TRA-N	601
TSB-N-C	606
TSC-N-C	605

SERIAL 268

DESCRIPTION	ITEM NO.
PLUG, 603M	268/39
SOCKET, 61 OM	40
SOCKET, 611	50

SERIAL 11

CODE	ITEM NO.
FUSE-M205-1A	11/108
FUSE-M205-2A	109
FUSE-M205-3A	110
FUSE-M205-5A	111
FUSE-M205-1OA	112
FUSE-3AG-0.25A	113
FUSE-3AG-0.375A	114
FUSE-3AG-1 A	115

1. Parts listed are all those which may be required at installation. Full details may be found in the following pages.
2. Parts listed are those which may be required for maintenance. Full details may be found in the following pages under “Spare Parts For N616, 1236, 2260”. See also “N616 Installation Parts - Check List”.

SDF AND LIGHTNING PROTECTION PARTS AS REQUIRED.

N616 PARTS LIST

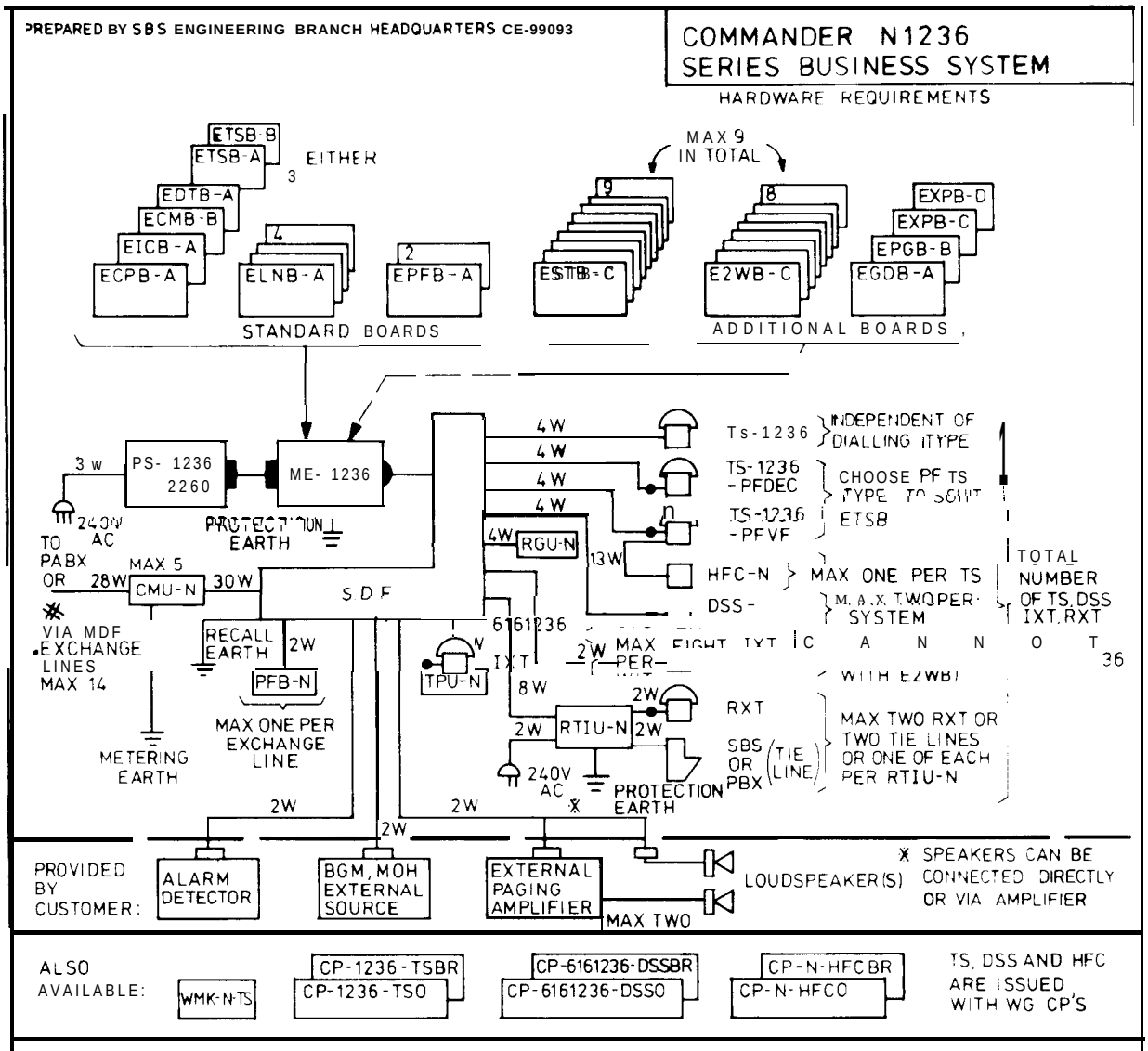
ITEM NO.	CODE	DESCRIPTION	REMARKS
N616 MAIN COMPONENTS			
338/362	ME-61 6	Main Equipment 616	Houses the N616 control equipment and integral power supply.
338/570	CK-61222-50	Connector Kit 50 Position Amp Champ	For use with 3381362,383, 403 to interconnect with System Distributing Frame.
N616 PRINTED BOARD ASSEMBLIES			
338/420	ECPB-A	Central Processor Board A	Used in 338/362, 383, 403 to provide system intelligence.
338/424	ECMB-D	Central Memory Board D	Used in 3381362 retains system data and provides abbreviated dialling.
338/421	EICB-A	Intercom Control Board A	Used in 338/362, 383, 403 provides 4 intercom links.
338/427	EDTB-B	Data Transmission Board B ● With DSS Port	Used in 338/362. Sends and receives data between main equipment and stations. Also provides one DSS port.
338/425	EPFB-A	Power Failure Board A	Used in 338/362, 383, 403. Provides 8 power fail exchange line ports.
338/441	ETSB-A	Tone and Sender Board A .VF	Used in 338/362, 383, 403 when VF dialling is required.
3381442	ETSB-B	Tone and Sender Board B .DEC	Used in 338/362, 383, 403 when decadic dialling is required.
338/428	ELNB-A	Exchange Line Board A	Used in 338/362, 383, 403. Provides 4 exchange line ports.
338/440	ESTB-C	Station Board C	Used in 338/326, 383, 403. Provides 4 station ports.
338/430	EGPB-A	Grounding Paging Board A	Used in 338/362 when external zone paging and/or PBX recall is required.
338/443	E2WB-C	2-Wire Internal Extension Board C	Used in 338/362, 383, 403 in conjunction with 3381572 to provide four 2-wire working internal extension telephone ports. Max loop limit 700 ohms.
N616 STATIONS			
338/360	TS-616	Telephone Station 616	Standard Station for use with N616 BS.
338/540	TS-616-PFDEC	Telephone Station 616 . PF/DEC	Power failure telephone for use in N616 BS with decadic dialling.
338/541	TS-616-PFVF	Telephone Station 616 . PF/VF	Power failure telephone for use in N616 BS with VF dialling.
338/381	DSS-6161236	Direct Select Station 616, 1236	Used in the N616, 1236 BS to provide operator facilities.

N616 PARTS LIST

ITEM NO.	CODE	DESCRIPTION	REMARKS
N616 MISCELLANEOUS ITEMS			
3381546	HFC-N	Handsfree Console	For use with N308, 616, 1236, 2260 BS's when handsfree exchange line facilities are required. Must be used in conjunction with a telephone station.
338/568	WMK-N-TS	Wall Mounting Kit N ● Telephone Station	Used when wall mounting N Series BS's telephone stations.
3381571	PFB-N	Power Fail Bell N	For use with N BS's to indicate incoming ring on exchange lines during powerfail conditions.
3381567	CMU-N	Call Metering Unit N	For use with N Series BS's to record number of exchange line meter pulses received. Each unit can meter 3 lines.
338/572	RGU-N	Ring Generator Unit-N	For use with N Series BS's to provide ring when internal two wire extension are required. Has capacity for eight extension telephones.
338/560	RTIU-N	Remote Extension and Tie Line Interface Unit N	For use with N Series BS's when remote station(s) and/or tie-line(s) are to be connected. Provides mounting for 338/561, 563, 564, 565, 566, 569.
338/563	RTB-A	Ring and Tone Board A	For use with 338/560.
338/562	22IFB-A	22 Interface Board A	For use in 3381560 when connected to N616, 1236, 2260 BS's.
338/561	RXB-A	Remote Extension Board A	For use with 338/560.
338/565	LRB-A	Loop-in/Ring-out Tie Line Interface Board A	For use with 338/560.
338/564	RRB-A	Ring-in/Ring-out Tie Line Interface Board A	For use with 338/560.
338/573	DSS-6161236-B	Direct select station with program enable button	Commonly called TPU-N. Test and programming unit for N series Business Systems.
268/50		Socket, type 611	Used to connect permitted attachments.

N616 PARTS LIST

ITEM NO.	CODE	DESCRIPTION	REMARKS
N616 COLOUR PANELS			
338/377	CP-616-TSWG	Colour Panel, 616 Telephone Station ● Woodgrain	Issued with 3381360,540, 541.
338/378	CP-616-TSO	Colour Panel, 616 Telephone Station ● Sunset Orange	Used with 338/360, 540, 541 so that station colour can be changed to suit surrounding decor.
3381379	CP-616-TSBR	Colour Panel, 616 Telephone Station ● Chocolate Brown	Used with 338/360, 540, 541 so that station colour can be changed to suit surrounding decor.
338/394	CP-6161236-DSSWG	Colour Panel, 616, 1236 Direct Select Station ● Woodgrain	Issued with 338/381
3381395	CP-6161236-DSSO	Colour Panel, 616, 1236 Direct Select Station ● Sunset Orange	Used with 3381381 so that station colour can be changed to suit surrounding decor.
338/396	CP-6161236-DSSBR	Colour Panel, 616, 1236 Direct Select Station ● Chocolate Brown	Used with 3381381 so that Station colour can be changed to suit surrounding decor.
3381557	CP-N-HFCWG	Colour Panel, Handsfree Console ● Woodgrain	Issued with 3381546
3381558	CP-N-HFCO	Colour Panel, Handsfree Console ● Sunset Orange	Used with 338/546 so that station colour can be changed to suit surrounding decor.
3381559	CP-N-HFCBR	Colour Panel, Handsfree Console ● Chocolate Brown	Used with 3381546 so that station colour can be changed to suit surrounding decor.



KEY

BGM	BACKGROUND MUSIC
BR	BROWN
CMU	CALL METERING UNIT
CP	COLOUR PANEL
DEC	DECADIC (DIALLING)
DSS	DIRECT SELECT STATION
ECMB	CENTRAL MEMORY BOARD
ECPB	CENTRAL PROCESSOR BOARD
EDTB	DATA TRANSMISSION BOARD
EGOB	GROUNDING BOARD
EGPB	GROUNDING & PAGING BOARD
EICB	INTERCOM CONTROL BOARD
ELNB	LINE BOARD (EXCHANGE)
EPFB	POWER FAIL BOARD
EPGB	PAGING BOARD
ESTB	STATION BOARD
ETSB-A	TONE & SENDER BOARD (VF)
ETSB-B	TONE & SENDER BOARD (DEC)
ETSB-C	TONE & SENDER EXPANSION BOARD
E2WB	2 WIRE INTERNAL EXT BOARD
EXPB	EXPANSION BOARD
HFC	HANDSFREE CONSOLE
	CONNECTOR (PART OF ME)
	TELECOM PLUG/SOCKET (604/611)
IXT	INTERNAL EXTENSION TELEPHONE
ME	MAIN EQUIPMENT
MOH	MUSIC ON HOLD
O	ORANGE
PABX	PRIVATE AUTOMATIC BRANCH EXCHANGE
PBX	PRIVATE BRANCH EXCHANGE
PF	POWER FAIL
PFB	POWER FAIL BELL
PS	POWER SUPPLY
RGU	RING GENERATOR UNIT
RTIU	REMOTE EXTENSION AND TIE-LINE INTERFACE UNIT
PXT	REMOTE EXTENSION TELEPHONE
SBS	SMALL BUSINESS SYSTEM
SDF	SYSTEM DISTRIBUTING FRAME
TPU	TEST AND PROGRAMMING UNIT
TS	TELEPHONE STATION
VF	VOICE FREQUENCY (DIALLING)
WG	WOOD GRAIN
WMK	WALL MOUNTING KIT
2W	2 WIRES REQUIRED
	TELEPHONE EXCHANGE
	TELEPHONE PLUG/SOCKET 603M/610M
	AMP-CHAMP PLUG/SOCKET (CK-61222-50)

. FOR EACH TIE-LINE PORT PROVIDED LOSE ONE EXCHANGE LINE PORT

• FOR EACH IXT OR RXT PORT PROVIDED LOSE ONE TS PORT

N616, 1236, 2260
ISSUE 2

FIG. A3 - N1236 HARDWARE REQUIREMENT

N1236 INSTALLATION PARTS CHECK LIST[1] SERIAL 336

CODE	ITEM NO.
ME-1 236	338/383
PS-12362260	402
ECPB-A	420
ECMB-B	502
EICB-A	421
EDTB-A	462
EPFB-A	425
ETSB-A	441
ETSB-B	442
ELNB-A	428
ESTB-C	440
EXPB-C	500
EXPB-D	501
EGDB-A	461
EPGB-B	460
E2WB-C	443
TS- 1236	380
TS-1236-PFDEC	542
TS-1236-PFVF	543
DSS-6161236	381
HFC-N	546
WMK-N-TS	568
CMU-N	567
PFB-N	571
RGU-N	572
RTIU-N	560
RTB-A	563
22IFB-A	562
RXB-A	561
LRB-A	565
RRB-A	564
CP-1236-TSWG	397
CP-1236-TSO	398
CP-1236-TSBR	399
CP-6161236-DSSWG	394
CP-6161236-DSSO	395
CP-6161236-DSSBR	396
CP-N-HFCWG	557
CP-N-HFCO	558
CP-N-HFCBR	559

N1236 MAINTENANCE PARTS CHECK LIST[2] SERIAL 336

CODE	ITEM NO.
DSSC-6161236-C	338/607
DSSHFCB-6161236-C	609
HB-N-C	602
HC-N-C	611
HFCC-N-C	608
HRC-N-C	603
HTC-N-C	604
KC-N-C	613
KC-N-CL	614
KC-N-RL	615
LC-N	612
REC-N	600
TNWC-N	610
TRA-N	601
TSB-N-C	606
TSC-N-C	605

SERIAL 268

DESCRIPTION	ITEM NO.
PLUG, 603M	268/39
SOCKET, 61 OM	40
SOCKET, 611	50

SERIAL 11

CODE	ITEM NO
FUSE-M205-1A	11/108
FUSE-M205-2A	109
FUSE-M205-3A	110
FUSE-M205-5A	111
FUSE-M205-1OA	112
FUSE-3AG-0.25A	113
FUSE-3AG-0.375A	114
FUSE-3AG-1A	115

1. Parts listed are all those which may be required at installation. Full details may be found in the following pages.
2. Parts listed are those which may be required for maintenance. Full details may be found in the following pages under “Spare Parts For N616, 1236, 2260”. See also “N1236 Installation Parts - Check List”.

SDF AND LIGHTNING PROTECTION PARTS AS REQUIRED.

N1236 PARTS LIST

ITEM NO.	CODE	DESCRIPTION	REMARKS
N1236 MAIN COMPONENTS			
338/383	ME-1 236	Main Equipment 1236	Houses the N1236 control equipment.
338/402	PS-12362260	Power Supply 1236, 2260	Used to power 338/383, 403.
338/570	CK-61222-50	Connector Kit 50 Position Amp Champ	For use with 3381362,383, 403 to interconnect with System Distributing Frame.
N1236 PRINTED BOARD ASSEMBLIES			
338/420	ECPB-A	Central Processor Board A	Used in 338/362, 383, 403 to provide system intelligence.
338/502	ECMB-B	Central Memory Board B	Used in 338/383 to retain system data and provide abbreviated dialling memory.
338/421	EICB-A	Intercom Control Board A	Used in 338/362, 383, 403 provides 4 intercom links.
3381462	EDTB-A	Data Transmission Board A	Used in 3381383,403. Sends and receives data between main equipment and stations.
338/425	EPFB-A	Power Failure Board A	Used in 338/362, 383, 403. Provides 8 power fail exchange line ports.
338/441	ETSB-A	Tone and Sender Board A .VF	Used in 338/362, 383,403 when VF dialling is required.
338/442	ETSB-B	Tone and Sender Board B .DEC	Used in 338/362, 383, 403 when decadic dialling is required.
338/428	ELNB-A	Exchange Line Board A	Used in 338/362, 383, 403. Provides 4 exchange line ports.
338/440	ESTB-C	Station Board C	Used in 338/326, 383, 403. Provides 4 station ports.
338/500	EXPB-C	Expansion Board C	Used in 338/383 when providing 2 additional intercom links or when more than 12 exchange lines are required.
338/501	EXPB-D	Expansion Board D	Used in 338/383. Required when providing 2 additional intercom links.
338/461	EGDB-A	Grounding Board A	Used in 338/383, 403. When PBX recall is required.
338/460	EPGB-B	Paging Board B	Used in 338/383, 403. When external paging is required. Provides facility for an external amplifier.
338/443	E2WB-C	2-Wire Internal Extension Board C	Used in 338/362, 383, 403 in conjunction with 338/572 to provide four 2-wire working internal extension telephone ports. Max loop limit 700 ohms.

N1236 PARTS LIST

ITEM NO.	CODE	DESCRIPTION	REMARKS
N1236 STATIONS			
338/380	TS-1236	Telephone Station 1236	Standard Station for use with N1236 BS.
338/542	TS-1236-PFDEC	Telephone Station 1236 . PF/DEC	Power failure telephone for use in N1236 BS with decadic dialling.
338/543	TS- 1236-PFVF	Telephone Station 1236 • PF/VF	Power failure telephone for use in N1236 BS with VF dialling.
338/381	DSS-6161236	Direct Select Station 616, 1236	Used in the N1236 BS to provide operator facilities.
N1236 MISCELLANEOUS ITEMS			
338/546	HFC-N	Handsfree Console	For use with N308, 616, 1236, 2260 BS's when handsfree exchange line facilities are required. Must be used in conjunction with a telephone station.
338/568	WMK-N-TS	Wall Mounting Kit N .Telephone Station	Used when wall mounting N Series BS's telephone stations.
338/571	PFB-N	Power Fail Bell N	For use with N BS's to indicate incoming ring on exchange lines during powerfail conditions.
338/567	CMU-N	Call Metering Unit N	For use with N Series BS's to record number of exchange line meter pulses received. Each unit can meter 3 lines.
338/572	RGU-N	Ring Generator Unit-N	For use with N Series BS's to provide ring when internal two wire extensions are required. Has capacity for eight extension telephones.
338/560	RTIU-N	Remote Extension and Tie Line Interface Unit N	For use with N Series BS's when remote station(s) and/or tie-line(s) are to be connected. Provides mounting for 338/561, 563, 564, 565, 566, 569.
3381563	RTB-A	Ring and Tone Board A	For use with 338/560.
338/562	22IFB-A	22 Interface Board A	For use in 338/560 when connected to N616, 1236, 2260 BS's.
338/561	RXB-A	Remote Extension Board A	For use with 338/560.
338/565	LRB-A	Loop-in/Ring-out Tie Line Interface Board A	For use with 338/560.
338/564	RRB-A	Ring-in/Ring-out Tie Line Interface Board A	For use with 338/560.

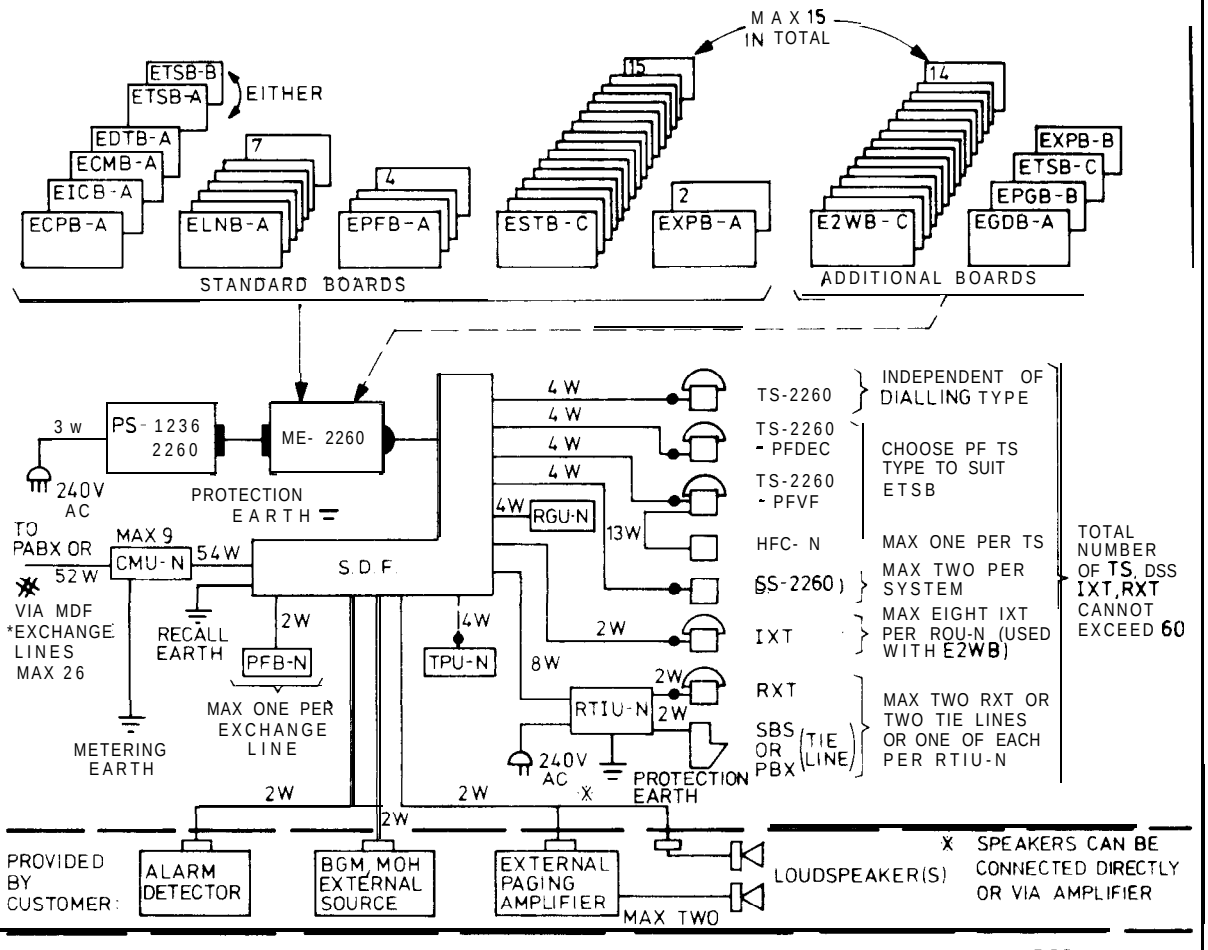
N1236 PARTS LIST

ITEM NO.	CODE	DESCRIPTION	REMARKS
N1236 MISCELLANEOUS ITEMS (CONT.)			
338/573	DSS-6161236-B	Direct Select Station with program enable button.	Commonly called TPU-N. Test and programming unit for N series Business Systems.
268/50		Socket, type 611	Used to connect permitted attachments.
N1236 COLOUR PANELS			
338/397	CP-1236-TSWG	Colour Panel, 1236 Telephone Station ● Woodgrain	Issued with 338/380, 542, 543.
338/398	CP-1236-TSO	Colour Panel, 1236 Telephone Station ● Sunset Orange	Used with 338/380, 542, 543 so that station colour can be changed to suit surrounding decor.
338/399	CP-1236-TSBR	Colour Panel, 1236 Telephone Station ● Chocolate Brown	Used with 338/380, 542, 543 so that station colour can be changed to suit surrounding decor.
338/394	CP-616 1 236-DSSWG	Colour Panel, 616, 1236 Direct Select Station ● Woodgrain	Issued with 338/381
338/395	CP-616 236-DSSO	Colour Panel, 616, 1236 Direct Select Station ● Sunset Orange	Used with 338/381 so that station colour can be changed to suit surrounding decor.
338/396	CP-6161236-DSSBR	Colour Panel, 616, 1236 Direct Select Station ● Chocolate Brown	Used with 338/381 so that station colour can be changed to suit surrounding decor.
338/557	CP-N-HFCWG	Colour Panel, Handsfree Console ● Woodgrain	Issued with 338/546
338/558	CP-N-HFCO	Colour Panel, Handsfree Console ● Sunset Orange	Used with 338/546 so that station colour can be changed to suit surrounding decor.
338/559	CP-N-HFCBR	Colour Panel, Handsfree Console ● Chocolate Brown	Used with 338/546 so that station colour can be changed to suit surrounding decor.

REPARED By SBS ENGINEERING BRANCH HEADQUARTERS CE-99093

COMMANDER N2260 SERIES BUSINESS SYSTEM

HARDWARE REQUIREMENTS



KEY

BGM	BACKGROUND MUSIC	'XT	INTERNAL EXTENSION TELEPHONE
BR	BROWN	ME	MAIN EQUIPMENT
CMU	CALL METERING UNIT	MOH	MUSIC ON HOLD
CP	COLO'JR PANEL	0	ORANGE
DEC	DECADIC (DIALLING)	PABX	PRIVATE AUTOMATIC BRANCH EXCHANGE
DSS	DIRECT SELECT STATION	PBX	PRIVATE BRANCH EXCHANGE
ECMB	CENTRAL MEMORY BOAR3	PF	POWER FAIL
ECPG	CENTRAL PROCESSOR BOARD	PFB	POWER FAIL BELL
EDTB	DATA TRANSMISSION BOARD	PS	POWER SUPPLY
EGDB	GROUNDING BOARD	RGU	RING GENERATOR UNIT
EGPB	GROUNDING &PAGING BOARD	RTIU	REMOTE EXTENSION AN3 TIE-LINE INTERFACE UNIT
EICB	INTERCOM CONTROL BOARD	RXT	REMOTE EXTENSION TELEPHONE
ELNB	LINE BOARD (EXCHANGE)	SBS	SMALL BUSINESS SYSTEM
EPFB	POWER FAIL BOARD	SDF	SYSTEM DISTRIBUTINGFRAME
EPGB	PAGING BOARD	TPU	TEST AND FROGRAMMING UNIT
ESTB	STATION BOARD	TS	TELEPHONE STATION
ETSB-A	TONE &SENDER BOARD (VF)	VF	VOICE FREQUENCY (DIALLING)
ETSB-B	TONE & SENDER BOARD(DEC)	WG	WOOD GRAIN
ETSB-C	TONE & SENDER EXPANSION BOARD	WMK	WALL MOUNTING KIT
E2WB	2-WIREINTERNAL EXT. BOARD	2w	2 WIRES REQUIRED
EXPB	EXPANSIONBOARD		TELEPHONE EXCHANGE
HFC	HANDSFREE CONSOLE		TCL EPHONE PLUG/SOCKET 603M/510M
	CONNECTOR (PART OF ME)		AMP. CHAMP PLUG/SOCKET CK-61222-50
	TELECOM PLUG/SOCKET (604/611)		

. FOR EACH TIE-LINE PORT PROVIDED LOSE ONE EXCHANGE LINE PORT

. FOR EACH IXT OR RXT PORT PROVIDED LOSE ONE TS PORT

FIG. A4 - N2260 HARDWARE REQUIREMENT

N2260 INSTALLATION PARTS CHECK LIST[1]

SERIAL 336

CODE	ITEM NO.
ME-2260	338/403
PS-12362260	402
CK-61222-50	570
ECPB-A	420
ECMB-A	523
EICB-A	421
EDTB-A	462
EPFB-A	425
ETSB-A	441
ETSB-B	442
ELNB-A	428
ETSB-C	521
ESTB-C	440
EXPB-A	520
EXPB-B	522
EGDB-A	461
EPGB-B	460
E2WB-C	443
TS-2260	400
TS-2260-PFDEC	544
TS-2260-PFVF	545
DSS-2260	401
HFC-N	546
WMK-N-TS	568
PFB-N	571
CMU-N	567
RGU-N	572
RTIU-N	560
RTB-A	563
22IFB-A	562
RXB-A	561
LRB-A	565
RRB-A	564
CP-2260-TSWG	417
CP-2260-TSO	418
CP-2260-TSBR	419
CP-2260-DSSWG	414
CP-2260-DSSO	415
CP-2260-DSSBR	416
CP-N-HFCWG	557
CP-N-HFCO	558
CP-N-HFCBR	559

N2260 MAINTENANCE PARTS CHECK LIST[2]

SERIAL 336

CODE	ITEM NO.
DSSC-2260-C	3381617
DSSHFCB-6161236-C	609
HB-N-C	602
HC-N-C	611
HFCC-N-C	608
HRC-N-C	603
HTC-N-C	604
KC-N-C	613
KC-N-CL	614
KC-N-RL	615
LC-N	612
REC-N	600
TNWC-N	610
TRA-N	601
TSB-N-C	606
TSC-N-C	605

SERIAL 266

DESCRIPTION	ITEM NO.
PLUG, 603M	268/39
SOCKET, 61 OM	40
SOCKET, 611	50

SERIAL 11

CODE	ITEM NO.
FUSE-M205-1A	11/108
FUSE-M205-2A	109
FUSE-M205-3A	110
FUSE-M205-5A	111
FUSE-M205-1OA	112
FUSE-3AG-0.25A	113
FUSE-3AG-0.375A	114
FUSE-3AG-1 A	115

1. Parts listed are all those which may be required at installation. Full details may be found in the following pages.
2. Parts listed are those which may be required for maintenance. Full details may be found in the following pages under "Spare Parts For N616, 1236, 2260". See also "N2260 Installation Parts - Check List".

SDF AND LIGHTNING PROTECTION PARTS AS REQUIRED.

N2260 PARTS LIST

ITEM NO.	CODE	DESCRIPTION	REMARKS
N2260 MAIN COMPONENTS			
338/403	ME-2260	Main Equipment 2260	Houses N2260 control equipment.
3381402	PS-12362260	Power Supply 1236, 2260	Used to power 3381383, 403.
3381570	CK-61222-50	Connector Kit 50 Position Amp Champ	For use with 3381362,383, 403 to interconnect with System Distributing Frame.
N2260 PRINTED BOARD ASSEMBLIES			
3381420	ECPB-A	Central Processor Board A	Used in 338/362, 383, 403 to provide system intelligence.
338/523	ECMB-A	Central Memory Board A	Used in 338/403 to retain system data and provide abbreviated dialling.
3381421	EICB-A	Intercom Control Board A	Used in 338/362, 383, 403 provides 4 intercom links.
338/462	EDTB-A	Data Transmission Board A	Used in 3381383,403. Sends and receives data between main equipment and stations.
338/425	EPFB-A	Power Failure Board A	Used in 338/362, 383, 403. Provides 8 power fail exchange line ports.
338/441	ETSB-A	Tone and Sender Board A .VF	Used in 338/362, 383, 403 when VF dialling is required.
338/442	ETSB-B	Tone and Sender Board B .DEC	Used in 338/362, 383, 403 when decadic dialling is required.
3381428	ELNB-A	Exchange Line Board A	Used in 338/362, 383, 403. Provides 4 exchange line ports.
338/521	ETSB-C	Tone and Sender Expansion Board C . DEC	Used in 338/403 when decadic dialling is to be employed and more than 16 exchange lines are to be connected.
338/440	ESTB-C	Station Board C	Used in 338/326, 383, 403. Provides 4 station ports.
3381520	EXPB-A	Expansion Board A	Used in 338/403 when providing 2 additional intercom links or when more than 12 exchange lines are required.
3381522	EXPB-B	Expansion Board B	Used in 338/403. Required when providing 2 additional intercom links.
338/461	EGDB-A	Grounding Board A	Used in 338/383, 403. When PBX recall is required.
3381460	EPGB-B	Paging Board B	Used in 338/383, 403. When external paging is required. Provides facility for external amplifier.
338/443	E2WB-C	2-Wire Internal Extension Board C	Used in 338/362, 383, 403 in conjunction with 3381572 to provide four 2-wire working internal extension telephone ports. Max loop limit 700 ohms.

N2260 PARTS LIST

ITEM NO.	CODE	DESCRIPTION	REMARKS
N2260 STATIONS			
3381400	TS-2260	Telephone Station 2260	Standard Station for use with N2260 BS.
338/544	TS-2260-PFDEC	Telephone Station 2260 ● PF/DEC	Power failure telephone for use in N2260 BS with decadic dialling.
3381545	TS-2260-PFVF	Telephone Station 2260 ● PF/VF	Power failure telephone for use in N2260 BS with VF dialling.
3381401	DSS-2260	Direct Select Station 2260	Used in the N2260 BS to provide operator facilities.
N2260 MISCELLANEOUS ITEMS			
3381546	HFC-N	Handsfree Console	For use with N308, 616, 1236, 2260 BS's when handsfree exchange line facilities are required. Must be used in conjunction with a telephone station.
3381568	WMK-N-TS	Wall Mounting Kit N ● Telephone Station	Used when wall mounting N Series BS's telephone stations.
3381571	PFB-N	Power Fail Bell N	For use with N BS's to indicate incoming ring on exchange lines during powerfail conditions.
3381567	CMU-N	Call Metering Unit N	For use with N Series BS's to record number of exchange line meter pulses received. Each unit can meter 3 lines.
3381572	RGU-N	Ring Generator Unit-N	For use with N Series BS's to provide ring when internal two wire extensions are required. Has capacity for eight extension telephones.
338/560	RTIU-N	Remote Extension and Tie Line Interface Unit N	For use with N Series BS's when remote station(s) and/or tie-line(s) are to be connected. Provides mounting for 338/561, 563, 564, 565, 566, 569.
3381563	RTB-A	Ring and Tone Board A	For use with 3381560.
338/562	22IFB-A	22 Interface Board A	For use in 3381560 when connected to N616, 1236, 2260 BS's.
338/561	RXB-A	Remote Extension Board A	For use with 338/560.
3381565	LRB-A	Loop-in/Ring-out Tie Line Interface Board A	For use with 3381560.
3381564	RRB-A	Ring-in/Ring-out Tie Line Interface Board A	For use with 3381560.

N2260 PARTS LIST

ITEM NO.	CODE	DESCRIPTION	REMARKS
N2260 MISCELLANEOUS ITEMS (CONT.)			
3381573	DSS-6161236-B	Direct select station with program enable button.	Commonly called TPU-N. Test and programming unit for N Series Business Systems.
268/50		Socket, type 611	Used to connect permitted attachments.
N2260 COLOUR PANELS			
3381417	CP-2260-TSWG	Colour Panel, 2260 Telephone Station ● Woodgrain	Issued with 3381400,544, 545.
338/418	CP-2260-TSO	Colour Panel, 2260 Telephone Station ● Sunset Orange	Used with 338/400, 544, 545 so that station colour can be changed to suit surrounding decor.
3381419	CP-2260-TSBR	Colour Panel, 2260 Telephone Station ● Chocolate Brown	Used with 3381400,544, 545 so that station colour can be changed to suit surrounding decor.
3381414	CP-2280-DSSWG	Colour Panel, 2260 Direct Select Station ● Woodgrain	Issued with 3381401.
3381415	CP-2260-DSSO	Colour Panel, 2260 Direct Select Station ● Sunset Orange	Used with 3381401 so that station colour can be changed to suit surrounding decor.
338/4 16	CP-2260-DSSBR	Colour Panel, 2260 Direct Select Station ● Chocolate Brown	Used with 338/401 so that Station colour can be changed to suit surrounding decor.
3381557	CP-N-HFCWG	Colour Panel, Handsfree Console ● Woodgrain	Issued with 3381546
338/558	CP-N-HFCO	Colour Panel, Handsfree Console ● Sunset Orange	Used with 3381546 so that station colour can be changed to suit surrounding decor.
338/559	CP-N-HFCBR	Colour Panel, Handsfree Console ● Chocolate Brown	Used with 338/546 so that station colour can be changed to suit surrounding decor.

SPARE PARTS FOR N616, 1236, 2260

ITEM NO.	CODE	DESCRIPTION	REMARKS
3381607	DSSC-6161236-C	DSS Case 616, 1236 ● Colonial Cream	Maintenance part for N Series BS's.
338/617	DSSC-2260-C	DSS Case 2260 ● Colonial Cream	Maintenance part for N Series BS's.
3381609	DSSHFCB-6161236-C	DSS/Handsfree Console Base ● Colonial Cream	Maintenance part for N Series BS's.
3381602	HB-N-C	Handset Body ● Colonial Cream	Maintenance part for N Series BS's.
338/611	HC-N-C	Handset Cord ● Colonial Cream	Maintenance part for N Series BS's.
3381608	HFCC-N-C	Handsfree Console Case ● Colonial Cream	Maintenance part for N Series BS's.
338/603	HRC-N-C	Handset Receiver Cap ● Colonial Cream	Maintenance part for N Series BS's.
3381604	HTC-N-C	Handset Transmitter Cap ● Colonial Cream	Maintenance part for N Series BS's.
338/613	KC-N-C	Key Cap - Clear	Maintenance part for N Series BS's.
3381614	KC-N-CL	Key Cap - Clear with Lens	Maintenance part for N Series BS's.
338/615	KC-N-RL	Key Cap - Red with Lens	Maintenance part for N Series BS's.
338/612	LC-N	Line Cord	Maintenance part for N Series BS's.
3381600	REC-N	Receiver Inset	Maintenance part for N Series BS's.
3381610	TNWC-N	Telephone Number Window Cover	Maintenance part for N Series BS's.
338/601	TRA-N	Transmitter Inset	Maintenance part for N Series BS's.

SPARE PARTS FOR N616, 1236, 2260

ITEM NO.	CODE	DESCRIPTION	REMARKS
338/606	TSB-N-C	Telephone Station Case Colonial Cream	Maintenance part for N Series BS's.
3381605	TSC-N-C	Telephone Station Case Colonial Cream	Maintenance part for N Series BS's.
11/108	FUSE-M205-1A	Fuse, 1 Amp, M205 type.	Used as maintenance part for 338/560.
11/109	FUSE-M205-2A	Fuse, 2 Amp, M205 type.	Used as maintenance part for 338/362.
11/110	FUSE-M205-3A	Fuse, 3 Amp, M205 type.	Used as maintenance part for 3381362,402.
11/111	FUSE-M205-5A	Fuse, 5 Amp, M205 type.	Used as maintenance part for 3381362,402.
11/112	FUSE-M205-10A	Fuse, 10 Amp, M205 type.	Used as maintenance part for 338/402.
11/113	FUSE-3AG-0.25A	Fuse, 0.25 Amp, 3AG type.	Used as maintenance part for 338/424, 502, 523.
11/114	FUSE-3AG-0.375A	Fuse, 0.375 Amp, 3AG type.	Used as maintenance part for 3381440.
11/115	FUSE-SAG-1 A	Fuse, 1 Amp, 3AG type.	Used as maintenance part for 338/427 and one is used in 338/440 when a 338/381 or 338/401 is connected.
268/39		Plug, type 603M	Used as maintenance part to connect 338/360, 380, 381, 400, 401, 540, 541, 542, 543, 544, 545, 1 XT and RXT.
268/40		Socket, type 81 OM	Used as a maintenance part to connect 338/360, 380, 381, 400, 401, 540, 541, 542, 543, 544, 545, 1 XT, and RXT.