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APPENDIX

1. GENERAL

1.1 INTRODUCTION

The Commander BN-824, BN-1236, BN-2464 are electronic key telephone systems providing 8 exchange lines and 24 stations for the BN-824, 12 exchange lines and 36 stations for the BN-1236 and 24 exchange lines and 64 stations for the BN-2464. It is an electronic system using hardware and software modules packaged to provide various economical solutions. The stations have a modern stylish appearance.

The main equipment and the stations are controlled by microprocessors with masked programs providing a wide range of facilities demanded by the users of key systems.

"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 in PBAs.
- Always discharge static from yourself by touching a conductive part of the main equipment before handling boards.
- Handle PBAs by their edges. Do not handle PBA tracks or components (contaminants introduced by lingers 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 inserted into a conductive ANTI-STATIC bag and placed in the protective container provided with the new item. In the case of the CPB-BN-A 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.

WIRE COLOUR	605 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. CPB-BN-A Board

- If this PBA is replaced, all site dependent data, abbreviated dial numbers and the clock are lost. It will be necessary to reprogramme the system.
- The battery may be changed, without loss of any programmed data, while the CPB-BN-A is powered up, that is, the power is on.

1.2 FEATURES

1.2.1 Stations

There are three types of stations associated with the system. They are the On-Hook Station, the Handsfree Station and the Door Station. On-Hook and Handsfree stations are available in 8, 12 or 24 line versions and can be connected to any of the BN-824, BN-1236 or BN-2464 systems.

Handsfree stations feature full handsfree operation on all calls and also feature a display which can show the time, date, dialled number and a variety of other information.

In addition, standard telephones, either decadic or DTMF, may be installed in place of either the Handsfree or On-Hook stations.

1.2.2 Modularity

The BN-1236 can be upgraded to a BN-2464 system by the addition of the ER-BN2464 Expansion Rack.

In addition, all systems may be sub-equipped to provide less than the maximum number of lines or stations. Exchange lines and stations are equipped in groups of four by plugging in exchange line boards or station boards. The same power supply is used for both the BN-1236 and BN-2464 systems, whether fully equipped or not. The BN-824 has a power supply built into its main equipment.

1.2.3 DSS Consoles

Up to two DSS consoles may be connected to the BN-824 and BN-1236 systems while up to six DSS consoles may be connected to a BN-2464 system.

The DSS consoles provide visual indication of the status of each station in the system. In addition, the consoles provide a quick and efficient method of establishing intercom calls and paging calls.

1.2.4 Power Failure

When the power fails the exchange lines are automatically switched through to preassigned stations. In this condition preassigned stations can accept incoming calls and place outgoing calls. All other facilities are inoperative.

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

1.2.5 Programmability

A large number of facilities are provided by system programming. Thus the system may be customised to suit the user's particular needs.

1.2.6 Visual Indications

A visual indication is provided at each station to show the status of exchange lines (Idle, Incoming Ring, Hold, I-Hold, Exclusive Hold and Busy), intercom lines (Free, Busy, Incoming) and system facilities (Do Not Disturb, Monitoring, Message Waiting, Speaker on etc.).

1.2.7 Tie Lines

By use of the 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.

1.3 FACILITIES

The following facilities are described in this section:

1.3.1 Direct Exchange Line Access
1.3.2 Exchange Line Groups
1.3.3 Common Exchange Lines
1.3.4 Push Button Dialling
1.3.5 Last Number Redial
1.3.6 Saved Last Number
1.3.7 Abbreviated Dialling
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1.3.11 Idle Exchange Line Preference
1.3.12 Single Access On-Hook Dialling
1.3.13 Preselection
1.3.14 Cost Control
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1.3.19 Do Not Disturb
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1.3.22 Hold
1.3.23 Automatic Ringback
1.3.24 Music-on-Hold
1.3.25 Transferring Calls
1.3.26 Privacy
1.3.27 Conference Call

1.3.28 Simultaneous Outside Call

1.3.29 PBX Recall

1.3.30 Intercommunication Between Stations

1.3.31 Intercom Step Call

1.3.32 Intercom Camp-On

1.3.33 Intercom Call Back

1.3.34 Message Waiting

1.3.35 Pilot Number Call

1.3.36 Alternate Point Answering

1.3.37 Automatic Answer of Intercom Calls

1.3.38 Handsfree Talkback on Intercom Calls

1.3.39 Intercom Conference

1.3.40 Intercom Off-Hook Signalling

1.3.41 Transferring Intercom Calls

1.3.42 Room Monitoring

1.3.43 Paging Calls

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1.3.46 Background Music

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1.3.51 Tenant Working

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1.3.53 Headsets (optional)

1.3.54 Standard Telephones

1.3.55 Call Details Recorder (optional)

1.3.56 Station Based Alarm

1.3.1 Direct Exchange Line Access

In general, any station can access any exchange line to answer incoming or place outgoing calls. Exclusive Exchange Lines may be provided, each of which can be accessed by one station only.

1.3.2 Exchange Line Groups

A system may group its exchange lines into a maximum of 24 line groups. Each station in the system is assigned access to a maximum of two incoming and two outgoing line groups. Stations assigned access to a certain line group cannot access the exchange lines of other groups except when calls are transferred.

1.3.3 Common Exchange Lines

In addition to the exchange line groups, exchange lines may be classed as being Common Exchange Lines allowing all stations, regardless of line grouping, access to the common exchange lines.

1.3.4 Push Button Dialling

Each station is equipped with a push button dial. Each exchange line can be individually programmed to dial out using Decadic or DTMF dialling. While dialling out on an exchange line assigned decadic dialling, the user can change to DTMF dialling at any stage.

1.3.5 Last Number Redial

The last number dialled can be automatically dialled again.

1.3.6 Saved Last Number

In addition to Last Number Redial a number dialled may be saved. This number will not be erased until a new number is saved.

1.3.7 Abbreviated Dialling

A maximum of 90 numbers, up to 18 digits each, can be stored as common use abbreviated dial numbers. In addition, 10 numbers can be stored by each station as independent use abbreviated dial numbers for that station.

If the system comprises any PABX lines, the PABX access code must be inserted onto all external telephone numbers to be stored. The PABX access code must also be programmed in accordance with section 2.7.4.30.4. The PABX access code will be automatically removed when dialling out on a direct exchange line.

1.3.8 Repertory Dialling

Stations are provided with 10 DSS keys which are used to store frequently called abbreviated dial codes.

1.3.9 On-Hook Dialling

Key stations may originate and monitor the progress of a call through the station speaker without lifting the handset.

1.3.10 Outside Line Request

When all exchange lines in a group are busy the user may request the next available exchange line in a particular group. Up to a maximum of 4 groups can be allocated for this purpose.

1.3.11 Idle Exchange Line Preference

A station can select idle exchange lines automatically without the need to press an idle LINE key.

1.3.12 Single Access On-Hook Dialling

Pressing an idle exchange line key seizes the exchange line and places the station into the on-hook dialling mode.

1.3.13 Preselection

A user may preselect certain facilities such as exchange line and intercom line seizure by operating the facility key then going off-hook within 3 seconds.

1.3.14 Cost Control

Five forms of cost control are available. The system can perform Access Barring by analysis of dialled digits. Dialled digits are compared with codes pre-programmed into the system's data base. The system has 6 classes of barring and assigns each station to one of the following classes.

Class A	–	Unrestricted
Class B	–	Barred to ISD
Class C	–	Limited STD and ISD access
Class D	–	Barred to STD and ISD
Class E	–	Barred outgoing access when the system is installed behind a PABX
Class F	–	Intercom calls only

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

The third form of cost control is the facility that can deny stations access to certain exchange lines for outgoing calls.

The fourth form of cost control is provided by the Night Mode Restriction which places preassigned stations into Class F when the system is in Night Mode.

The fifth form of cost control is provided by the Call Details Recorder Board and a printer. Details of incoming and outgoing calls are printed.

1.3.15 Call Signalling

Incoming calls are signalled by tones through the station and/or external paging speakers. Different tones 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 certain exchange lines or the station may not signal for any exchange lines. One of two types of exchange line ring is available for each line.

The volume control provides a means for adjusting the volume of call signalling tones emitted from the station speaker.

1.3.16 Automatic Incoming Exchange Line Answer

The system may be programmed so that stations can answer an incoming exchange line call by going off-hook without the need to press the incoming exchange line key.

1.3.17 Follow Me

Incoming signalling of exchange line calls and intercom calls may be transferred from one station to another. A maximum of 3 stations may transfer calls to any one station.

1.3.18 Call Forwarding

In addition to Follow Me, intercom calls and exchange line calls can be forwarded to pre-programmed stations. A maximum of eight pairs of stations can be assigned for call forwarding.

1.3.19 Do Not Disturb

The system can provide a Do Not Disturb facility for stations depending upon system programming. This facility will block all paging calls, send a busy tone to intercom callers, stop audible signalling of exchange line calls, disable the background music capability and forward calls to another station if required.

1.3.20 Off-Hook Signalling

The system can be programmed to provide low level audible signalling of incoming intercom and exchange line calls to a station while it is in the off-hook condition.

1.3.21 Night Transfer

The incoming signalling for exchange line calls and outgoing access to exchange lines can be changed depending upon whether the system is in day or night mode.

The entire system or individual groups of stations may be placed into night mode depending upon system programming.

1.3.22 Hold

Both manual and automatic holding of exchange lines are provided by the system. Visual indications are provided for exchange lines placed on Hold, I-Hold and Exclusive Hold.

Stations are provided with a hold facility for placing exchange lines on hold. Any other station can take over the held call. In addition an exchange line can be placed on Exclusive Hold preventing any other station taking over the call.

Exchange lines are automatically placed on Hold when an intercom or paging call is made.

In addition, intercom calls may be placed on Intercom Hold. The station holding an intercom call cannot perform other functions until the call is re-answered.

1.3.23 Automatic Ringback

When an exchange line is put on I-Hold or Exclusive Hold for longer than a pre-programmed time the holding station is signalled to remind the station of the held call.

1.3.24 Music-On-Hold

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

1.3.25 Transferring Calls

A manual transfer is the common used method of 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 seizes the exchange line.

Another method of transferring calls is transferring without announcing, The station receives the transferred call as an incoming call while all other stations show that the exchange line is busy. If the call is not answered within a set time it will return to the original station.

1.3.26 Privacy

Privacy is provided for intercom calls as well as for exchange line calls. The only exception is that certain stations can be given the facility of breaking into another stations calls (exchange or intercom) or send off-hook signalling to busy stations. The break-in facilities are determined by station programming.

1.3.27 Conference Call

A conferencing facility is provided which allows up to six stations to be connected to an exchange line.

1.3.28 Simultaneous Outside Call

Two outside line calls can be conducted simultaneously at a station.

1.3.29 PBX Recall

Two methods of PBX Recall are available, Earth Recall or Switchhook Flash (Timed Loop Break) and are assigned to each line as required.

1.3.30 Intercommunication Between Stations

Each station is able to establish an internal (intercom) call to any other station on the system.

1.3.31 Intercom Step Call

If the called intercom station is busy or does not answer, then the first idle station with the next highest extension number can be called using the step call facility.

1.3.32 Intercom Camp-On

When a busy tone is heard after making an intercom call, the caller can place the call in the Camp-On mode. When the called station is free, the intercom call is automatically established.

1.3.33 Intercom Call Back

If the station in the Intercom Camp-On mode hangs up then the Intercom Call Back facility is activated. When the called station becomes available a signal call is made to the originating station. Responding to the signal call will re-initiate the original intercom call.

1.3.34 Message Waiting

A visual indication may be left at an unattended station to indicate that a message is waiting at another station.

1.3.35 Pilot Number Call

Stations can be grouped into a maximum of ten pilot groups having a maximum of four stations in each group. A station calling the pilot group initiates an intercom call with the first idle station in the group. Exchange line calls can be transferred by calling a pilot group.

1.3.36 Alternate Point Answering

Any station can answer an intercom call sent to another station.

1.3.37 Automatic Answer of Intercom Calls

A station can answer an incoming intercom call by simply lifting the handset.

1.3.38 Handsfree Talkback on Intercom Calls

The called party has a full handsfree facility when called via an intercom voice call. A single tone announces the call and the voice of the calling party is heard through the station speaker. The microphone may be turned off at any time during the conversation.

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

1.3.39 Intercom Conference

A station may add another four stations onto an existing intercom call to set up a six party intercom conference.

1.3.40 Intercom Off-Hook Signalling

A muted signal tone indicating an incoming intercom call can be sent to a station while it is in the off-hook mode.

1.3.41 Transferring Intercom Calls

An intercom call can be transferred to another station by using the intercom conference capability.

1.3.42 Room Monitoring

The monitoring of sound in the vicinity of any key station by any other station in the system is possible.

1.3.43 Paging Calls

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

All Call Paging transmits an announcement over all the station speakers and also through the external loudspeakers, if provided.

Internal Zone Paging calls can be made through the station speakers of stations allocated to one of four internal zones.

External Zone Paging calls are broadcast over one of two external zone loudspeakers.

All External Zone Paging calls are broadcast over all the external zone loudspeakers.

1.3.44 Meet-Me Paging

The meet-me paging facility allows a person being paged to be connected via an intercom call to the caller at any station receiving the paging announcement.

1.3.45 Meet-Me Conference Paging

Up to five stations receiving a paging call can take place in an intercom conference. The conference is established by originating an all call or internal zone paging call. The conference can be joined from any station receiving the paging call.

1.3.46 Background Music

Provision is made so that music supplied from an external music source can be transmitted over the station speakers and external zone loudspeakers if required. The music can be turned on and off at each station. It is also automatically turned off when the handset is off-hook or an incoming call is received.

1.3.47 Automatic Pause Insertion

If the system is connected to exchange lines via a PABX, a three second pause is inserted between the PABX access code and the remaining digits when using either abbreviated dialling, repertory dialling or redial.

1.3.48 Alarm Detection

The system can have two alarm inputs that when triggered activate an alarm tone at pre-assigned stations and external speakers. Line isolation of alarm inputs is necessary.

1.3.49 Control Inputs for External Devices

The system can have six control inputs (four inputs if the two alarm inputs are programmed) for controlling an exchange line when a data modem or facsimile machine shares the exchange line with the system.

1.3.50 Guarded Data Call Mode

When a modem is connected in parallel with the A-pair of a station the user may place the station into Guarded Data Call Mode after originating an outside call and giving the modem access to the line. The station will appear busy to the other stations in the system and the outside call cannot be disconnected until the station is taken out of guarded call mode.

1.3.51 Tenant Working (Lamp Shift Mode)

With tenant working smaller capacity stations can be used on a larger capacity system providing access to the higher numbered exchange lines.

1.3.52 Handsfree Stations

Handsfree stations provide the user with full handsfree operation for every type of call. The handsfree station has a display which can show time of day, date, dialling information stored in repertory and abbreviated dial locations, duration of the call and the dialled number whenever dialling occurs. The Handsfree Station automatically shows the calling station number on intercom calls and also provides two alarms which can be set independently.

1.3.53 Headsets (Optional)

Provision may be made to connect a lightweight headset to On-Hook or Handsfree stations. The handsfree facility is lost if a headset is provided on a Handsfree station.

1.3.54 Standard Telephones

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

1.3.55 Call Details Recorder (Optional)

By using a special interface board and a printer, it is possible to print out details of calls including the time, date, duration of the call, the station originating or receiving the call, the number dialled and an account code.

1.3.56 Station Based Alarm

A Station Based Alarm allows monitoring of a station's incoming ring signals at a remote location. The unit provides a high pitched signalling tone suitable for use in areas of high background noise.

1.4 OPERATING INSTRUCTIONS

1.4.1 Station Nomenclature

1.4.2 Station Lamp Signals

1.4.3 DSS Console Lamp Signals

1.4.4 System Tones

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1.4.5.1.5 Single Access On-Hook Dialling (Optional)
1.4.5.2 Outgoing Calls
1.4.5.3 On-Hook Dialling
1.4.5.4 Abbreviated Dialling
1.4.5.5 Repertory Dialling
1.4.5.6 Last Number Redial
1.4.5.7 Last Number Saved

1.4.6 Outside Calls — Incomming

1.4.6.1 Incoming Calls
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1.4.6.3 Follow Me
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1.4.6.5 Off-Hook Signalling (Optional)
1.4.6.6 Night Transfer (Optional)

1.4.7 Outside Calls — Holding and Transferring

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1.4.8 Outside Calls — Other Facilities

1.4.8.1 Outside Call Conference
1.4.8.2 Simultaneous Outside Line Calls
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1.4.8.4 Change Decadic Dialling to DTMF Signal
1.4.8.5 PABX Recall/Switchhook Flash (Optional)
1.4.8.6 Music-On-Hold (Optional)
1.4.8.7 Do Not Disturb (Optional)
1.4.8.8 Data Calls
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1.4.9 Intercom Calls — Outgoing

1.4.9.1 Making An Intercom Call
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1.4.9.5 Intercom Camp-On
1.4.9.6 Intercom Call Back
1.4.9.7 Message Waiting
1.4.9.8 Pilot Number Call

1.4.10 Intercom Calls — Incoming

1.4.10.1 Incoming Intercom Call (Voice)
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1.4.11 Intercom Calls — Other Facilities

1.4.11.1 Intercom Conference
1.4.11.2 Intercom Line Hold
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1.4.12 Paging

1.4.12.1 Making a Paging Call
1.4.12.2 Meet-Me Paging Call
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1.4.13 Other Facilities

1.4.13.1 Background Music (Optional)
1.4.13.2 Alarm Detection

1.4.14 Handsfree Station

1.4.14.1 Handsfree Operation
1.4.14.2 Dialled Number Display
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1.4.14.9 Repertory Dial Number Check
1.4.14.10 DSS Station Number Check

1.4.15 Headset Station

1.4.15.1 Headset Operation
1.4.15.2 Incoming Calls

1.4.16 DSS Console

1.4.16.1 DSS Call
1.4.16.2 Automatic Hold of Exchange Line
1.4.16.3 Paging
1.4.16.4 Automatic Transfer After Intercom Call
1.4.16.5 Transfer Without Announcing
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1.4.16.7 Night Transfer

1.4.17 Door Stations

1.4.18 Standard Telephone Station

1.4.18.1 Outside Calls — Outgoing
1.4.18.2 Outside Calls — Incoming
1.4.18.3 Outside Line Request
1.4.18.4 Enquiry Call
1.4.18.5 Transferring an Outside Call
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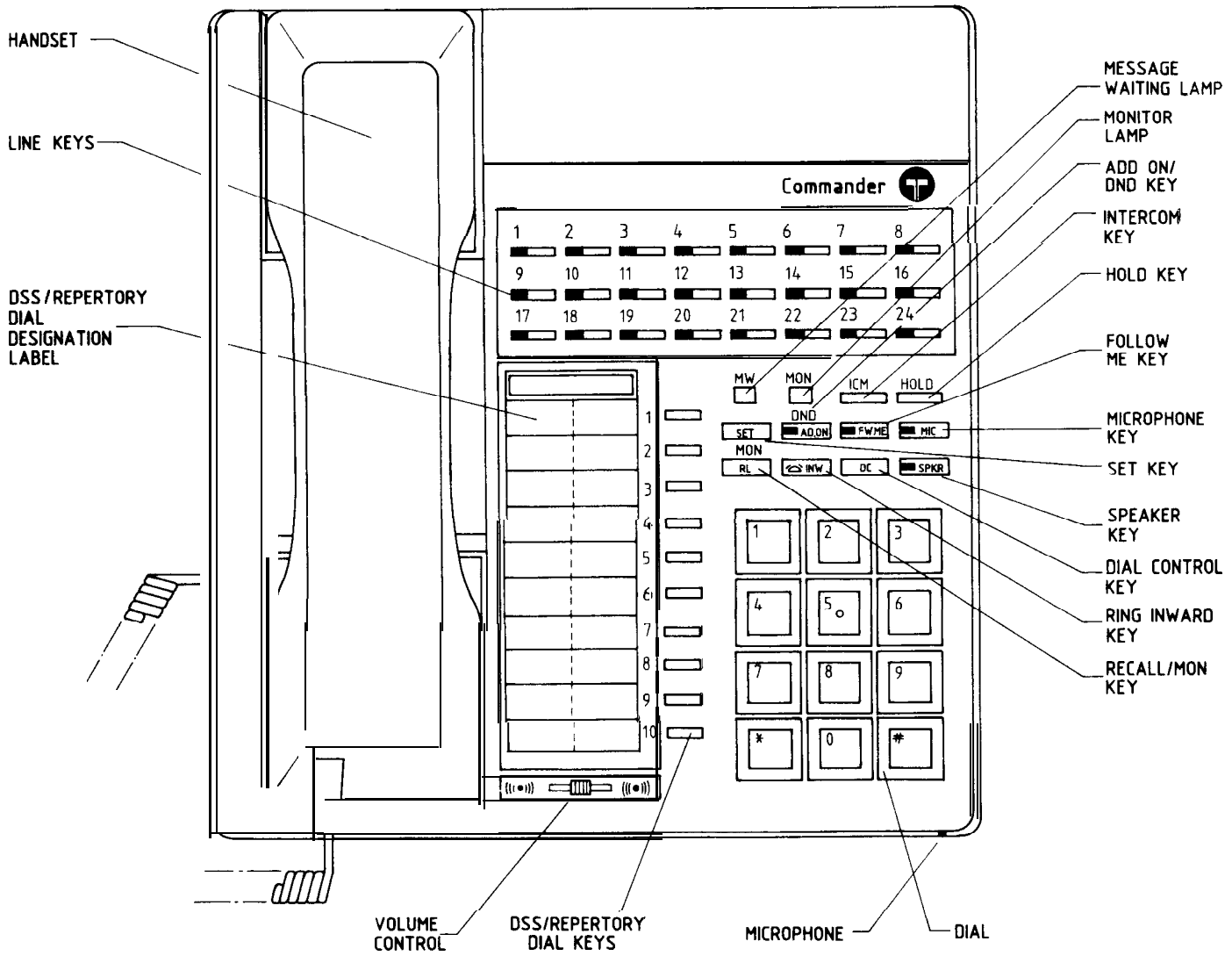
1.4.18.7 Intercom Calls — Outgoing
1.4.18.8 Intercom Calls — Incoming
1.4.18.9 Intercom Camp-On
1.4.18.10 Intercom Call Back

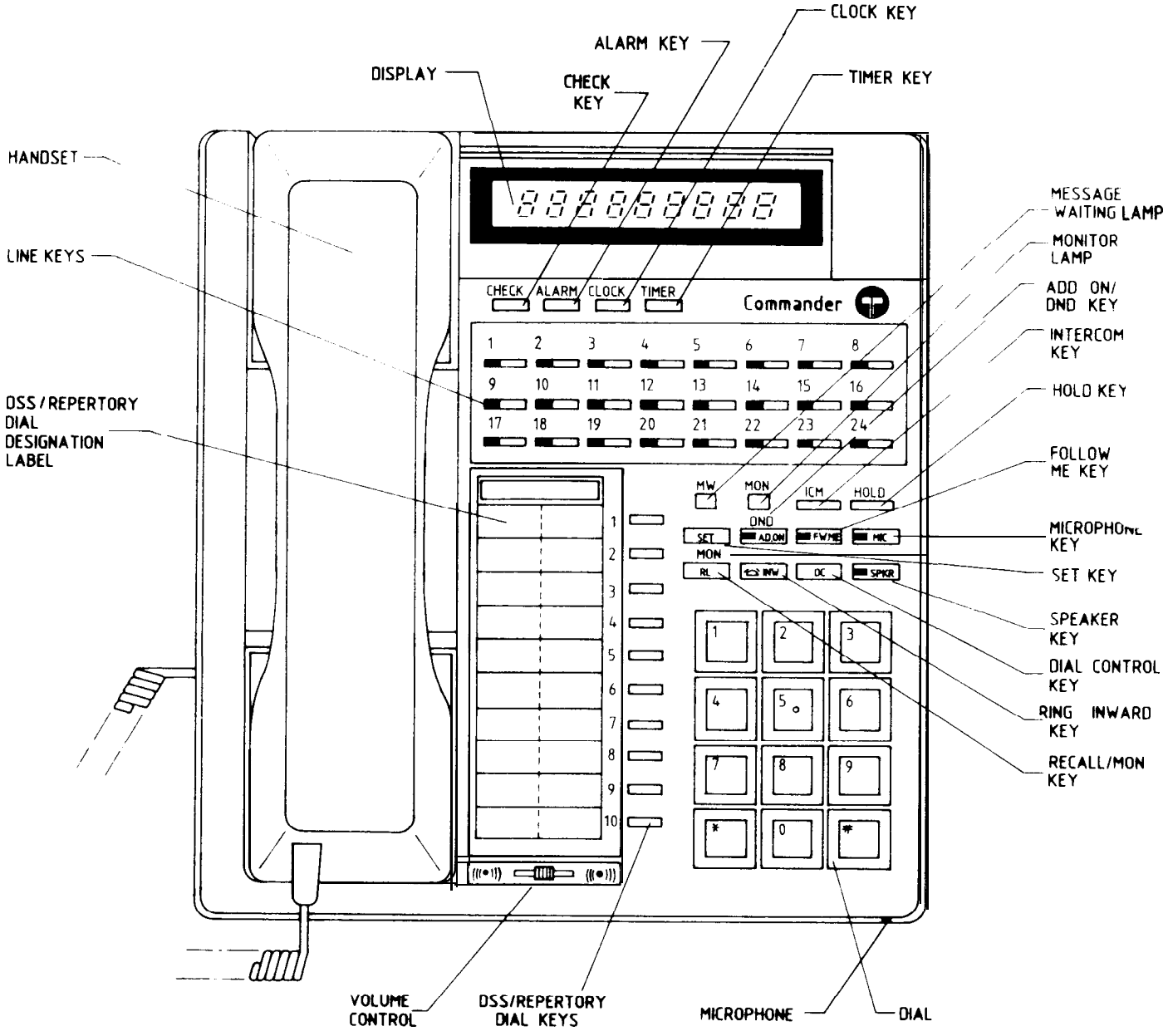
1.4.19 Call Details Recorder

1.4.1 Station Nomenclature



NOTE: LINE KEYS 1 TO 8 AVAILABLE ON TS-BN824-OH
LINE KEYS 1 TO 12 AVAILABLE ON TS-BN1236-OH
LINE KEYS 1 TO 24 AVAILABLE ON TS-BN2464-OH

FIG. 1.4.1 (a) TS-BN824-OH, TS-BN1236-OH AND TS-BN2464-OH ON-HOOK STATIONS



NOTE: LINE KEYS 1 TO 8 AVAILABLE ON TS-BN824-HF
LINE KEYS 1 TO 12 AVAILABLE ON TS-BN1236-HF
LINE KEYS 1 TO 24 AVAILABLE ON TS-BN2464-HF

FIG. 1.4.1 (b) TS-BN824-HF, TS-BN 1236-HF
AND TS-BN2464-HF HANDSFREE STATIONS

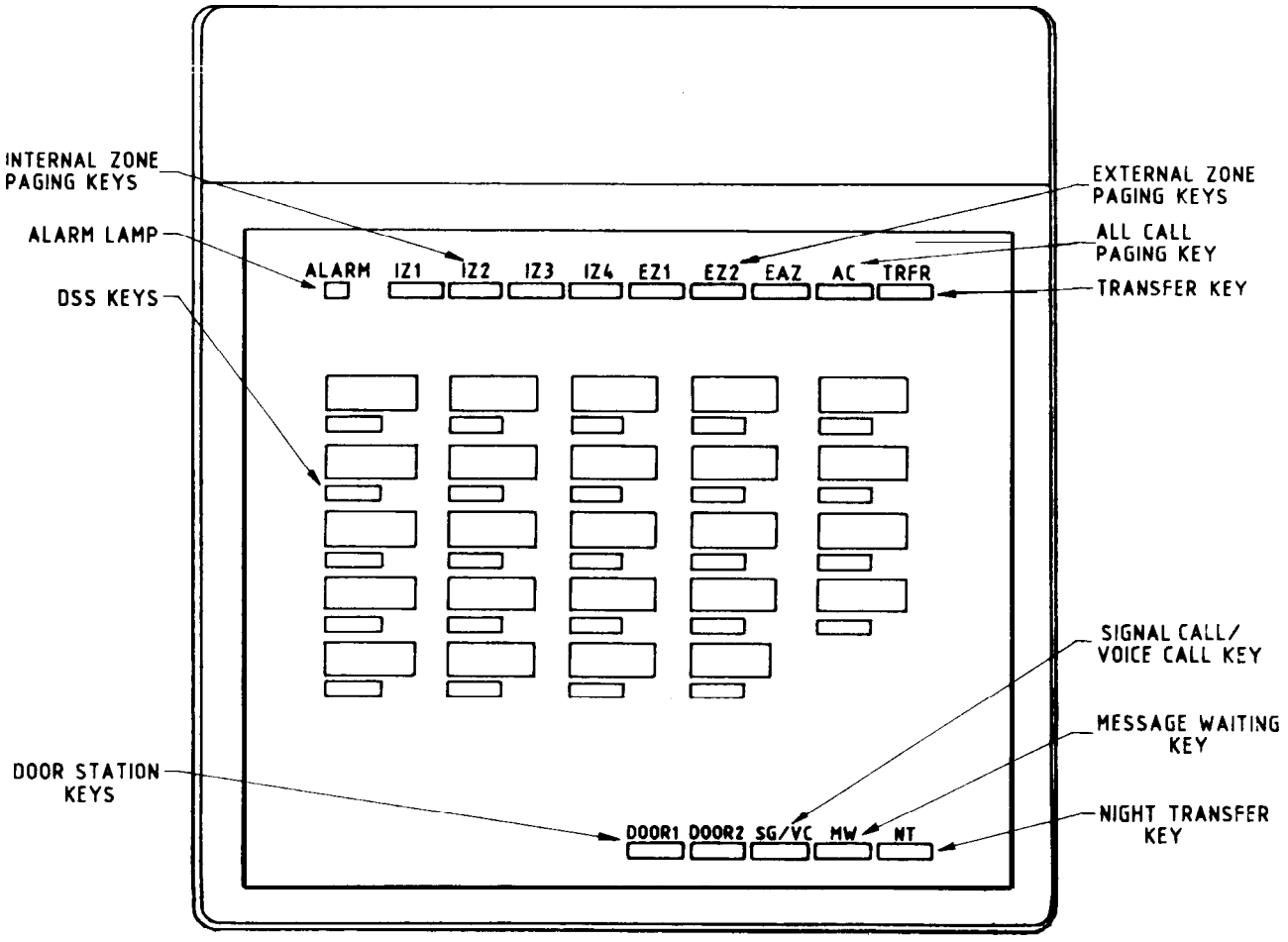


FIG. 1.4.1 (c) DSS-BN824 DSS CONSOLE

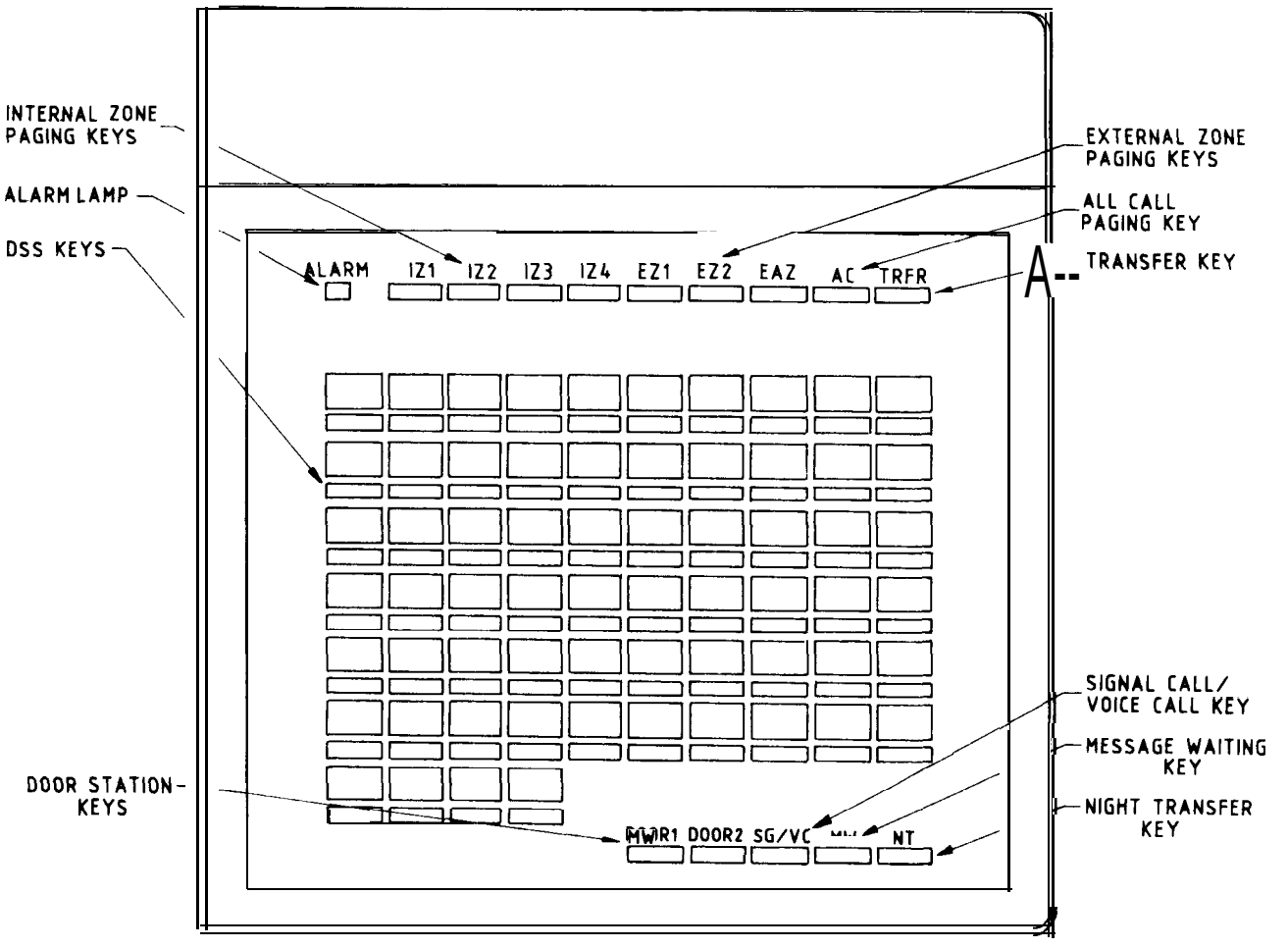


FIG. 1.4.1 (d) DSS-BN 12362464 DSS CONSOLE

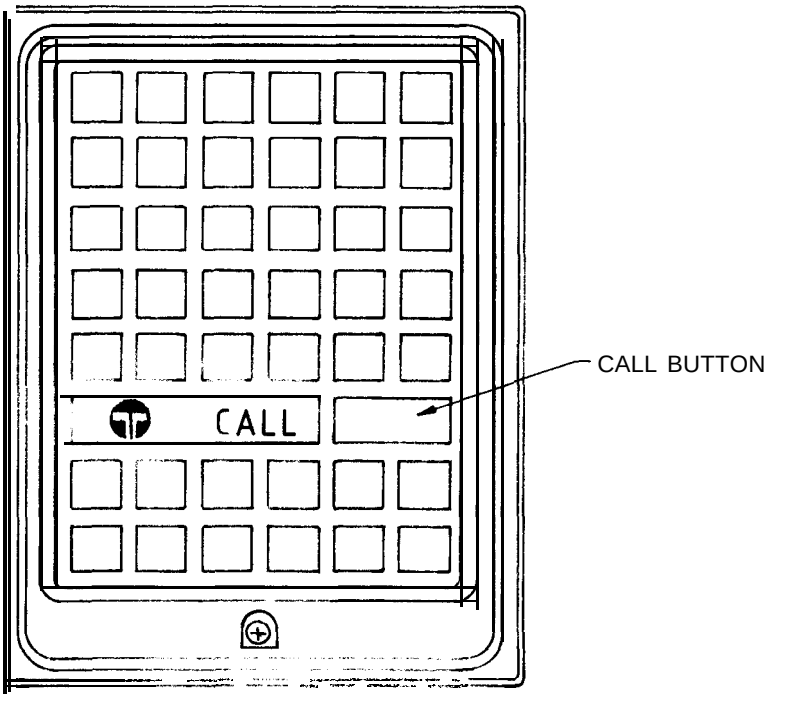


FIG. 1.4.1 (e) DS-BN DOOR STATION

1.4.5.1.3 Outside Line Request

When all outside lines in your group are busy, you may request the next free line (refer to Section 2.7.4.1 for programming instructions).

- Lift the handset or press SPKR key.
- Press the HOLD key. The ICM lamp will light and the internal dial tone is heard.
- Dial your outside line request group number (0 to 4).
- Replace the handset or press SPKR key again.

If the request is accepted the the HOLD lamp will flicker.

If the request is denied then a fast repeating tone is heard.

When a line becomes available a fast repeating warbling tone will sound and the line lamp will flicker.

- Lift the handset or press SPKR key.
- Press the line key.

NOTE: If the free line is not accepted within 20 seconds the request is automatically terminated.

1.4.5.1.4 Idle Exchange Line Preference

Idle exchange lines may be selected automatically by either of the two methods listed below:-

METHOD 1

- Dial 0

An idle exchange line is seized and station is placed into on-hook dialling mode

METHOD 2

- Press SPKR key.
- Dial an outside line request group number (0 to 4).

An idle exchange line in line request group is seized and station is placed into on-hook dialling mode.

NOTE: Method 1 must be performed with the handset on-hook.

1.4.5.1.5 Single Access On-Hook Dialling

Pressing an idle exchange line key will seize that line and place the station into the on-hook dialling mode.

- Press idle exchange line key

The exchange line is seized (dial tone will be heard) and station is placed into on-hook dialling mode.

1.4.5.2 Outgoing Calls

- Seize a line.
- Dial the wanted number.

1.4.5.3 **On-Hook Dialling**

To make a call

- Seize a line.
- Dial the wanted number
- When the called party answers, lift the handset to speak
- Replace the handset when the call is completed.

To release the line before the connection is established or the handset is lifted, press the SPKR key.

1.4.5.4 **Abbreviated Dialling**

A maximum of 90 numbers (00 to 89), up to 18 digits each, can be stored as common use abbreviated numbers. In addition, 10 numbers (90 to 99) can be stored as independent abbreviated dial numbers for each station.

To call a stored number

- Seize a line.
- Press DC key.
- Dial the appropriate abbreviated code (00 to 99).

The stored number will be automatically dialled.

Only station 10 can store numbers for the 90 common use abbreviated dial numbers (00 to 89). However, all stations may store 10 numbers as independent use abbreviated dial numbers (90 to 99).

To store numbers

- Lift the handset or press SPKR key
- Press DC key. The ICM lamp will light and the intercom dial tone will be heard.
- Press the HOLD key. The ICM lamp will remain alight but the intercom dial tone will cease
- Dial the abbreviated dial number e.g. 95
- Dial the telephone number to be stored
- To store more numbers, press the DC key and repeat the above procedure.
- Replace the handset or press SPKR key again when finished.

NOTE:

1. If your system is an extension from a PABX and a pause is required within the telephone number, press the RL key and continue to enter the remaining digits.

2. A three second pause is automatically inserted between the trunk access code and the telephone number when the trunk access code is programmed (refer to Section 2.7.4.30.4 for programming instructions) and the outside line is programmed as a PABX line (refer to Section 2.7.4.1 (a)).

3. If the system comprises any PABX lines, the PABX access code must be inserted onto all external telephone numbers to be stored. The PABX access code must also be programmed in accordance with section 2.7.4.30.4. The PABX access code will be automatically removed when dialling out on a direct exchange line.

4. Numbers stored in the common use abbreviated dial (00 to 89) are not subject to access barring. However, numbers stored as independent use abbreviated dial numbers (90 to 99) are subject to access barring depending upon the class of service of the station (refer to Section 2.7.4.30 for access barring programming).

1.4.5.5 **Repertory Dialling**

Stations are provided with 10 DSS keys which are used to store frequently used abbreviated dial numbers (00 to 99).

To call a Repertory Dial Number

- Seize a line.
- Press DC key.
- Press the required DSS key.

The stored number will be automatically dialled.

To Store Repertory Dial Numbers

- Lift the handset or press SPKR key
- Press the DC key. The ICM lamp will light and the intercom dial tone will be heard.
- Press the HOLD key. The ICM lamp will remain alight but the intercom dial tone will cease.
- Press the required DSS key corresponding to the location of the number to be stored.
- Dial the abbreviated dial code (00 to 99), corresponding to the number to be stored.
- To store more numbers, press the DC key and repeat the above procedure.
- Replace the handset or press SPKR key again when finished.

1.4.5.6 **Last Number Redial**

- Seize a line.
- Press DC key and dial *.

The last number called will be automatically dialled again.

1.4.5.7 **Last Number Saved**

A frequently called outside number which does not answer, or is engaged, can be saved for automatic redial.

To save the number after receiving busy tone or no answer

- Press the DC key twice
- Replace the handset.

To call the last number saved

- Seize a line.
- Press DC key and dial #.

The saved last number will be automatically dialled.

1.4.6 Outside Calls – Incoming

1.4.6.1 **Incoming Calls**

- The exchange line lamp will slow flash and ring signalling will be heard through the station speaker. Two different incoming ring tones are available for ring signalling of each exchange line (Refer to Sections 2.7.4.2, 2.7.4.3, 2.7.4.6 and 2.7.4.35 for programming instructions).

- To answer, lift the handset and press the LINE key or press the LINE key first and then lift the handset within 3 seconds.

1.4.6.5 **Off-Hook Signalling (Optional)**

If you are engaged on an exchange line call or an intercom call, the audible signal on incoming exchange lines and intercom calls (if off-hook signalling priority break-in is invoked) will sound through the station speaker (Refer to Sections 2.7.4.4 and 2.7.4.13 for programming instructions).

If you are engaged on an exchange line call and an intercom call comes in then your outside call is held automatically when the ICM key is pressed. If another exchange line call comes in you may either hold the existing outside call and then answer the new call by pressing the incoming LINE key, or release the existing outside call by answering the new call by pressing the incoming LINE key.

If you are engaged on an intercom call and an exchange line call comes in then your intercom call will be terminated automatically when the outside call is answered.

If another intercom call comes in then the ICM lamp will fast flash and the existing intercom call will be terminated automatically when the new intercom call is answered.

1.4.6.6 **Night Transfer (Optional)**

When required, the system may be placed into a night service mode disallowing preassigned stations access to exchange lines for outgoing calls. In addition the audible signalling for incoming exchange lines is reassigned to pre-determined stations allocated by system programming (Refer to Section 2.7.4.1 (d), 2.7.4.6 and 2.7.4.7(a) for programming instructions).

The entire system may be placed into night service mode by a single station or DSS console (system night service mode). Alternatively, separate groups of stations may be placed into night service mode (group night service mode) depending upon system programming (Refer to Section 2.7.4.14 for programming instructions). The station groupings for group night service mode are the same as for the first assigned incoming line groups as programmed in Section 2.7.4.6.

1. System Night Service Mode

   The entire system may be placed into night service mode by station 10 or by any DSS console and its associated station.

   To place the entire system into and out of night service mode.

   a) from a DSS console

      - Press NT key. The NT lamp will light on all the DSS consoles and the FW.ME lamp will light on all the stations.

      - Press NT key again to take the system out of night mode. The NT lamps on the DSS console and the FW.ME lamps on the stations will go out.

   b) from station 10 or an associated station to a DSS console

      - Lift the handset or press SPKR key
      - Press FW.ME key
      - Dial #
      - Replace the handset or press SPKR key again

        The FW.ME lamp on all the stations and the NT lamp on the DSS consoles will light.

To take the system out of night service mode:-

- Lift the handset or press SPKR key
- Press FW.ME key twice
- Replace the handset or press SPKR key again

The FW.ME lamp on all the stations and the NT lamp on the DSS consoles will go out.

2. Group Night Service Mode

Any station may place itself and the stations within the same incoming line group into and out of night service mode.

To place your group into night service mode:-

- Lift the handset or press SPKR key
- Press FW.ME key
- Dial #
- Replace the handset or press SPKR key again.

The FW.ME lamp on all the stations with the same incoming line group will light. The NT lamp of any DSS consoles associated with stations in the group will also light.

To take your group out of night service mode.

- Lift the handset or press SPKR key
- Press FW.ME key twice
- Return the handset or press SPKR key again

The FW.ME lamp on all the stations with the same incoming line group will go out. The NT lamp on any DSS consoles associated with stations in the group will also go out.

1.4.7 Outside Calls – Holding and Transferring

1.4.7.1 Holding an Outside Call

- Ask your outside party to wait
- Press the HOLD key. The line lamp will fast flash showing HOLD at your station and will flash showing HOLD at all other stations.

Any other station can take over a held call.

The outside call may be reanswered by pressing the LINE key while off-hook

Once an outside call has been placed on Hold for a pre-programmed length of time an audible recall tone will remind you of the held call (Refer to Section 2.7.4.27 for programming instructions). If a station goes off-hook, that is, lifts the handset during the ringback period then the held call will be automatically reanswered without the need to press the appropriate LINE key. The facility is dependent upon system programming (Refer to Section 2.7.4.31 for programming instructions).

1.4.7.2 **Exclusive Hold**

Pressing the HOLD key twice places the outside line on Exclusive Hold. The line lamp will flicker at your station and light steadily at all other stations. In this condition other stations cannot take over the held call.

The outside call may be re-answered by pressing the LINE key.

Once an outside call has been placed on Exclusive Hold for a pre-programmed length of time an audible recall tone will remind you of the held call. If the line on exclusive hold is not reanswered within a pre-programmed time the line will automatically revert to normal hold allowing any station to answer the line (Refer to Section 2.7.4.25 and 2.7.4.26 for programming instructions).

1.4.7.3 **Transfer After Announcing**

- Ask your outside party to wait.
- Intercom the station to which the call will be transferred. (Refer to Section 1.4.9). The outside line is placed on hold automatically.
- Announce the call
- When the transferred station has taken the call the line lamp will glow steadily.

The transferred station takes over the call by lifting the handset and pressing the held LINE key.

1.4.7.4 **Automatic Transfer After Announcing**

After announcing a transferred call and ensuring the transferred station has answered using the handset, the call can be transferred automatically by pressing the INW key without the need for the transferred station to press the held LINE key.

This method can be used to transfer calls to standard telephone stations.

1.4.7.5 **Transfer Without Announcing (Ring Inward)**

- Ask the outside party to wait
- Intercom the station to which the call will be transferred. (Refer to Section 1.4.9). The outside line is placed on hold automatically.
- Press INW. The line lamp will change to a steady glow
- Replace the handset. At the station to which the call is being transferred a fast warbling tone is heard and the line lamp flickers.

If the call remains unanswered after a predetermined time it will recall to your station with a fast warbling tone heard over the station speaker. The line lamp will show I-HOLD at your station and HOLD at all other stations (Refer to Section 2.7.4.28 for programming instructions).

This method can be used to transfer calls to standard telephone stations.

1.4.8 Outside Calls – Other Facilities

1.4.8.1 **Outside Call Conference**

A maximum of six stations and one outside party can take part in a conference.

To establish a conference

- Ask the outside party to wait
- Press the AD.ON key. The outside line lamp flickers
- Call the second station via intercom
- Ensure the called party answers by using the handset
- Press the AD.ON key. The outside line lamp lights steadily

A conference is now established. To add more stations to the conference repeat the above procedure for each station to be included into the conference.

If any party replaces the handset the conference will continue between the remaining parties.

1.4.8.2 **Simultaneous Outside Line Calls**

Two outside line calls can be conducted simultaneously at a station.

After establishing an outside call, the second call is established as follows:-

- Ask the first party to wait
- Press the SET key then the AD.ON key. The outside line lamp flickers.
- Place the second outside call after seizing an idle exchange line
- Press the AD.ON key. The line lamps for both calls light steadily.

The simultaneous outside line call is now established.

To redial the number if the second party is busy or does not answer:-

- Press another LINE key and redial on receipt of dial tone

To return to your first party if the second party is unavailable:-

- Press the AD.ON key
- Press the first party's LINE key

Either party can be released from the conference by pressing the line key of the party the user wants to continue the conversation with.

1.4.8.3 **Priority Break-In (Optional)**

Stations can be assigned a priority break-in level for the purpose of breaking into busy outside or intercom conversations depending upon programming. (Refer to Section 2.7.4.4 for programming instructions).

The priority break-in levels are:

Level 1 – Station can break into another station's outside or intercom call. In addition, the station can send off-hook signalling to busy stations.

Level 2 – Station can break into another station's intercom call only. In addition, the station can send off-hook signalling to busy stations.

Level 3 – Station can send off-hook signalling to a busy station.

After receiving the busy tone when making an intercom call:

- Press the RL key. The intrusion tone will be heard by both parties and conversation will be possible if the station breaking in has the necessary priority break-in level assigned (levels 1 or 2).

Stations with priority break-in levels 1, 2 or 3 can send off-hook signalling to a busy station.

After receiving the busy tone when making an intercom call:

- Dial 1. Off-hook signalling will commence at the called station.

1.4.8.4 **Change Decadic Dialling to DTMF Signal**

While dialling out on an exchange line assigned decadic dialling, the user can change to DTMF dialling at any stage by dialling #.

Once decadic dialling has been changed to DTMF dialling it cannot be changed back to decadic dialling while the call is in progress.

1.4.8.5 **PABX Recall/Switchhook Flash (Optional)**

If the system is an extension from a PABX, the RL key can be used as an earth recall or switchhook flash key to obtain hold and transfer features. PABX recall or switchhook flash is selected for each line in the system with the recall or flashing time being programmable (Refer to Sections 2.7.4.1 (e) and 2.7.4.19 for programming instructions).

1.4.8.6 **Music-On-Hold (Optional)**

When an outside line or an intercom line is placed on hold, the caller will hear music while the call is held.

The music-on-hold may be the internal electronically synthesised tunes or an external music source.

There are two internal electronically synthesised tunes available.

They are:-

1) Home on the range
2) Greensleeves

Station 10 can select either of the two tunes as the music-on-hold for the entire system.

To select the tune from station 1 O:-

- Lift the handset or press SPKR key
- Press SET key, then the HOLD key
- Dial 1 for Home on the range or dial 2 for Greensleeves
- Replace the handset or press SPKR key again

1.4.8.7 **Do Not Disturb (Optional)**

Preassigned stations may enter Do Not Disturb (DND) mode to cancel audible signalling for incoming exchange line calls or for all calls, including intercom calls, depending upon the programming (Refer to Section 2.7.4.7(d) for programming information).

There are three modes of operation:-

Mode 1 – cancel audible signalling for incoming exchange lines
Mode 2 – cancel audible signalling for all calls
Mode 3 – station may have a choice of DND mode 1 or 2.

To activate DND modes 1 and 2:-

- Press DND key with the handset on-hook. The DND lamp will flash for mode 1 and remain steady for mode 2.

To cancel DND modes 1 and 2:-

- Press DND key with the handset on-hook. The DND lamp will go out for both modes.

To activate DND mode 3:-

- Press the DND key once with the handset on-hook. The DND lamp will flash indicating that the station is in DND mode 1.
- Press the DND key a second time with the handset on-hook. The DND lamp will glow steadily signalling that the station is in DND mode 2.
- Press the DND key a third time with the handset on-hook to cancel the DND modes. The station is returned to the normal mode of operation.

1.4.8.8 **Data Calls**

1) Guarded Data Calls

Modems connected in parallel with the A-pair of a key station can make data calls without interference when the station is placed into the Guarded Data Call mode.

The user originates an outside or intercom call using the key station and then passes control of the A-pair to the modem. Once the station is placed into Guarded Data Call Mode the station is disabled until the call finishes and the station is taken out of the Guarded Data Call Mode.

To place a station into Guarded Data Call Mode after a call has been established

- Press the SET key and then the HOLD key. The HOLD LED will light continuously.

To take the station out of Guarded Data Call Mode:-

- Press the SET key and then the HOLD key. The HOLD LED will go out.

NOTE: For instructions on how to connect modems to the Commander BN systems (Refer to Sections2.4.13and2.4.14).

2) Shared Exchange Lines

Modems, facsimile machines or other data transferring equipment, sharing an exchange line with the system can take control of the exchange line for the duration of the data or other calls (Refer Sections 2.4.13 and 2.4.14 for installation instructions and Sections 2.7.4.3 and 2.7.4.23 for programming).

To give the modem or facsimile machine control of the idle exchange line

- Apply the control voltage to the control input for the shared exchange line. The shared exchange line LED will light at all stations indicating that the line is busy.

When the modem or facsimile machine is finished with the line

- Disconnect the control voltage from the control input for the shared exchange line. The line LED will go out at all stations indicating that the line is idle.

1.4.8.9 **Power Failure**

i) When a power failure occurs, outside lines are automatically switched through to preassigned stations as follows:-

OUTSIDE LINE	POWERFAIL STATION	OUTSIDE LINE	POWERFAIL STATION
1	10	13	46
2	11	14	47
3	12	15	48
4	13	16	49
5	14	17	50
6	15	18	51
7	16	19	52
8	17	20	53
9	18	21	54
10	19	22	55
11	20	23	56
12	21	24	57

TABLE 1.4.8.9 POWERFAIL STATION CONNECTION BN-824/1236/2464

ii) Powerfail stations, if equipped, are able to make incoming and outgoing calls during power failure.

iii) Incoming calls are signalled via a powerfail bell which is equipped with both audible and visual signalling. One powerfail bell may be provided for each line required for use during power failure.

iv) All other facilities provided by the system are inoperative during power failure.

1.4.8.10 **Confidence Tone (Optional)**

A confidence tone can be provided at the station each time a key is pressed (refer to Section 2.7.4.7 for programming instructions).

To activate the confidence tone:

- Dial * with the handset on-hook and the speaker off.

Each time a key is pressed a short tone will be heard through the station speaker.

To deactivate the confidence tone:

- Dial * with the handset on-hook and the speaker off.

1.4.9 Intercom Calls – Outgoing

1.4.9.1 Making An Intercom Voice Call

- Check that the ICM lamp is out (the ICM lamp will glow if all intercom lines are busy).
- Lift the handset and press the ICM key. The ICM lamp will glow and intercom dial tone will be heard
- Dial the wanted station number
- Speak after hearing a single tone burst

If a double tone burst is heard, the called station has the microphone switched off. Remind the called party to switch the microphone on to reply.

If a slow repeating tone is heard, then a continuous ring signal is being sent to the called station.

Busy tone means that the party is engaged on another call.

A medium repeating tone means that the called station is in the "Do Not Disturb" mode (Section 1.4.8.7).

1.4.9.2 Continuous Ring Signal

If there is no immediate response when a station is called, a continuous ring signal can be transmitted to the station by dialling "1". The continuous ring signal can be cancelled and the voice call re-established by again dialling "1".

If the system is programmed in the signal call mode, continuous ring is transmitted in the first instance. Dialling "1" reverts the call to a voice call.

1.4.9.3 Direct Station Selection (DSS) Calls.

The Direct Station Selection keys are designated 1 to 10. Ten frequently called station numbers can be allocated to the DSS keys and can be called by pressing only one of the DSS keys.

To Store a Station Number

- Lift the handset or press SPKR key
- Press DC key. The ICM lamp will light and the intercom dial tone will be heard.
- Press ICM key. The intercom dial tone will cease and the ICM lamp will remain alight
- Press the required DSS key where the station number is to be stored
- Dial the station number
- To store more station numbers in other DSS key locations press DC key and repeat the above procedure.

To make an intercom call:-

- Lift the handset
- Press the required DSS key

All the normal intercom tones will be received when using Direct Station Selection.

1.4.9.4 Intercom Step Call

When the called station is busy or does not answer, the idle station with the next highest station number can be called automatically by dialling # after receiving the busy tone or receiving no answer.

1.4.9.5 **Intercom Camp-On**

If a busy tone is heard when making an intercom call, you can wait for the intercom call to be automatically established when the busy station becomes free.

- Dial * after receiving the busy tone and wait with the handset off-hook until the called station becomes free. The continuous intercom ring tone will be heard through your station handset when the called station becomes free.

To cancel the Intercom Camp-on

- Replace the handset then lift the handset again
- Dial * and 1
- Replace the handset

1.4.9.6 **Intercom Call Back**

If a busy tone is heard when making an intercom call, you can wait with the handset on-hook for the intercom call to be automatically established when the busy station becomes free.

- Dial * after receiving the busy tone and replace the handset.

When the called station becomes free your station will ring. Upon answering, continuous intercom ring tone will be heard at your station until the called station answers.

If the call back is not answered within 20 seconds then it will be automatically cancelled.

To cancel Intercom Call Back

- Lift the handset or press SPKR key
- Dial * and 1
- Return the handset or press SPKR key again

1.4.9.7 **Message Waiting**

A station may leave a message waiting at a called station if there is no answer.

- Make an intercom call
- Dial 0 if the called party does not answer
- Return the handset

The MW lamp will flicker at your station and fast flash at the called station. If the MW lamp does not flicker at your station the message waiting has been unsuccessful.

A maximum of one station and one DSS console may leave a message waiting at any one station. When a called station which has more than one message waiting answers the message waiting then the DSS console will be answered first.

To answer the message waiting at the called station

- Lift the handset
- Press the ICM key. The intercom dial tone is heard
- Dial *

An intercom signal call will be automatically connected between the station leaving the message and the station answering the message waiting.

The message waiting condition is automatically cancelled by the answering of the intercom call by the station leaving the message waiting condition.

The message waiting can be cancelled by the station originating the message at anytime. If the MW lamp continues to fast flash then more than one message waiting was left at the called station.

To cancel:-

- Lift the handset or press SPKR key
- Dial * and 0
- Replace the handset or press SPKR key

1.4.9.8 **Pilot Number Call**

Stations may be divided into a maximum of 10 groups of up to 4 stations for pilot number calls (Refer to Section 2.7.4.9 for programming).

When the pilot number call is implemented the first available station in the group is called in the same manner as a normal intercom call.

To establish a pilot number call:-

- Lift the handset
- Press the ICM key. The ICM lamp will glow and intercom dial tone will be heard.
- Dial # and then the pilot number (0 to 9).

If the station called does not answer, dialling # will call the next available station in the pilot group.

Exchange line calls can be transferred to a pilot group.

1.4.10 Intercom Calls – Incoming

1.4.10.1 **Incoming Intercom Call (Voice)**

Incoming. intercom calls are signalled by a single burst of tone followed by the calling party's voice through the speaker. The ICM lamp will fast flash indicating that there is an incoming intercom call. The call may be answered handsfree without lifting the handset.

The microphone may be turned off by pressing the MIC key. The MIC lamp will light steadily indicating that the microphone is off. Pressing the MIC key again will turn the microphone back on which is indicated by the MIC lamp going out.

If the status of the microphone is changed during an intercom call then the microphone will automatically switch back to its original status at the end of the call.

1.4.10.2 **Incoming Intercom Call (Signal)**

Incoming intercom calls can be signalled by a short repeating ring tone and the ICM lamp fast flashing. The call can only be answered by lifting the handset.

1.4.10.3 Alternative Point Answering

An intercom call to a particular station can be answered by any other station in the system.

To answer another station's intercom call:-

- Lift the handset
- Dial the called station number

The intercom call is now connected to your station.

If the called station number is in the same paging group as your station then the intercom call can be answered by a simpler method to the one described above.

To answer another station's intercom call when the other station is in the same paging group as your station:-

- Lift the handset
- Dial #

The intercom call is now connected to your station.

NOTE: If a Meet-me paging call is heard at your station at the same time you wish to answer an intercom call to another station, then the above operating procedure will answer the Meet-me paging call.

1.4.11 Intercom Calls – Other Facilities

1.4.11.1 Intercom Conference

A maximum of six stations can be connected together to form a conference.

- Call the first party and ensure that the called party answers using the handset.
- Press the AD.ON key
- Listen for intercom dial tone
- Dial the second station and ensure that the called party answers using the handset.
- Press the AD.ON key

A three station conference is now established. To include more stations into the conference repeat the above procedures.

If an attempt to include more than six stations into a conference is made then a long single tone will be heard.

If any party replaces the handset the conference continues between the remaining parties.

The intercom conference facility is lost when the number of intercom lines is increased by programming (Refer to Section 2.7.4.34).

1.4.11.2 Intercom Line Hold

An intercom call can be placed on hold.

- Ask the internal party to wait
- Press the HOLD key. The ICM lamp flickers

While holding an intercom line, the holding station must remain off hook and cannot perform any other operation.

The intercom line may be reanswered by pressing the ICM key.

Music-on-hold is sent to the held station.

The intercom hold facility is lost when the number of intercom lines is increased by programming (Refer to Section 2.7.4.34)

1.4.11.3 **Transferring Intercom Calls**

Intercom calls may be transferred to another station by utilising the intercom conference facility

During an intercom call between you and another station

- Press the AD.ON key
- Listen for intercom dial tone
- Dial the station number to which the call will be transferred and ensure that the called party answers using the handset
- Inform the second party that there is a call to be transferred
- Press the AD.ON key again
- Replace the handset

The intercom call has been transferred to the second party.

Transferring of intercom calls is not possible when the number of intercom lines is increased by programming (Refer to Section 2.7.4.34).

1.4.11.4 Room Monitor (Optional)

The monitoring of sound in the vicinity of any key station by any other station is possible (Refer to Section 2.7.4.22 for programming instructions).

At the key station to be monitored

- Lift the handset or press SPKR key
- Press the MON key. The MON key lamp fast flashes
- Replace the handset or press SPKR key again

At the stations monitoring the sound

- Press the MON key. The MON lamp will flicker

When room monitoring is in progress an intercom line is used for the monitoring.

Outside calls and intercom calls can still be made at any of the stations involved. However, room monitoring will be automatically suspended during the progress of the call and will resume when the call is completed.

Repeat the above procedures to cancel room monitor.

1.4.12 Paging

There are four types of paging calls that can be made.

1. Internal Zone Paging – to make an announcement to stations in one of four internal paging zones.

2. External Zone Paging – to make an external public address announcement over one of two external zones.

3. All External Zone Paging – to make an external public address announcement over both external zones.

4. All Call Paging – to make an announcement to all stations and both external zones.

For internal zone paging programming refer to Section 2.7.4.7.

For external zone paging programming refer to Section 2.7.4.15 and 2.7.4.16.

1.4.12.1 Making a Paging Call

To make a paging call

- Lift the handset
- Press the ICM key. The ICM lamp will light and intercom dial tone will be heard
- Dial the paging code required and make the announcement
- Return the handset

Paging Codes

All Call Paging	80
Internal Zone 1	81
Internal Zone 2	82
Internal Zone 3	83
Internal Zone 4	84
All External Zone Paging	85
External Zone 1	86
External Zone 2	87

A double splash tone is optional when a paging announcement is made. For splash tone programming refer to Section 2.7.4.32.

1.4.12.2 Meet-Me Paging Call

After making an All Call or Internal Zone paging announcement for a called party to “Meet-me”

- Press #and wait with the handset off hook for the called party to respond.

The called party establishes an intercom connection by lifting the handset and dialling # at any station receiving the paging call.

1.4.12.3 Meet-Me Conference Paging

After making an All Call or Internal Zone paging announcement for the called parties to "Add-On" and form a conference of up to six stations

- Press AD.ON key and wait with the handset off hook for the called parties to respond.

To respond to the meet-me conference call

- Lift the handset
- Press the AD.ON key at any station receiving the paging call

The called parties must respond to the meet-me conference call within 30 seconds otherwise they will be excluded from the conference.

1.4.13 Other Facilities

1.4.13.1 Background Music (Optional)

On systems where background music is provided the music may be heard over a station's speaker by dialling #. The background music may be turned off by again dialling # (Refer to Section 2.7.4.21 for programming instructions).

NOTE: Background music is automatically suppressed when incoming or outgoing calls are in progress.

1.4.13.2 Alarm Detection (Optional)

The system has two alarm inputs that, when triggered, activate an alarm tone at preassigned stations and external speakers. There are two different tones to signal the two alarms. Alarm 1 activates a short repeating tone while Alarm 2 activates a repeating triple tone burst (Refer to Sections 2.7.4.15, 2.7.4.23 and 2.7.4.33 for programming instructions).

The alarms are automatically cancelled when the alarm trigger condition is cancelled.

1.4.14 Handsfree Station

Handsfree stations feature a display and the display control keys in addition to the other facility keys found on the On-Hook station.

The following facilities are available in addition to the facilities described earlier.

1.4.14.1 Handsfree Operation

The station may operate in Handsfree mode for every type of call. To place the station in Handsfree mode press the SPKR key with the handset on hook. This is equivalent to lifting the handset. To terminate the call press the SPKR key again.

Lifting the handset during a Handsfree call will automatically switch the conversation to the handset.

If you wish to change from the handset conversation to Handsfree mode press the SPKR key before replacing the handset.

The microphone may be disabled at any time during a Handsfree conversation by pressing the MIC key. The MIC lamp will glow to indicate that the microphone is off. To enable the microphone press the MIC key again.

If the status of the microphone is changed during an intercom or exchange line call the microphone will automatically switch back to its original status at the end of the call.

If the microphone is initially off and an intercom or exchange line is seized the microphone will be automatically switched on. At the completion of the call the microphone status will return to the off condition.

1.4.14.2 Dialled Number Display

When dialling out, the number dialled will be shown on the display. The last 11 digits will remain displayed during the progress of the call, or can be cleared by pressing the CLOCK or TIMER keys.

1.4.14.3 Timer

The timer can be used either as a stopwatch or to time a call's duration in hours, minutes and seconds.

To start the timer:-

- Press the TIMER key

To stop the timer:-

- Press the TIMER key
  OR
- Replace the handset or press SPKR key if hands free when the duration of a call is being timed.

Press the CLOCK key to return the display to the clock mode.

1.4.14.4 Clock

When in the clock mode the display will show the month, date, day of the week and the time in hours and minutes.

The clock can only be set by a Handsfree station or the Test and Programming Unit plugged into station 10 socket.

To set the clock:-

- Lift the handset or press SPKR key
- Press SET key
- Press CLOCK key
- Dial the year (e.g. 19861
- Dial *
- Dial the month and date (e.g. 0927-27th September)
- Dial *
- Dial the number corresponding to the day of the week

  0 – Sunday, 1 – Monday, ... 6 – Saturday

- Dial *
- Dial the time in 24 hour time (e.g. 1315 – 1.15p.m.)
- Dial *
- Return the handset or press SPKR key

1.4.14.5 **Alarm Clock**

Two alarm clocks are available and when set will go off at the set time every day.

To set the alarms

- Lift the handset or press SPKR key
- Press the ALARM key
- Dial 1 for alarm 1 or dial 2 for alarm 2
- Dial the required time in 24 hour time (e.g. 1305 -1.15p.m.)
- Dial *
- Replace the handset or press SPKR key again.

The symbols ((1)) for alarm 1 or ((2)) for alarm 2 will be displayed to signal that one or both alarms have been set.

The alarm can be silenced by pressing the ALARM key. If the ALARM key is not pressed, the tone will continue for approximately one minute.

To clear the alarms:-

- Lift the handset or press SPKR key
- Press the ALARM key
- Dial 1 for alarm 1 or dial 2 for alarm 2
- Dial *
- Replace the handset or press SPKR key again.

1.4.14.6 **Incoming Intercom Call Check**

The station number of the station originating an intercom call will be automatically displayed when the display is in the clock mode. When the display is displaying the dialled number then pressing the CHECK key will display the station number originating the intercom call. If the display is in a Timer mode then the display must be placed into the Clock mode before pressing the CHECK key to display the station number originating the intercom call.

1.4.14.7 **Message Waiting Check**

If the MW lamp is indicating that there is a message waiting by fast flashing then the station numbers of the stations originating the messages can be displayed.

To display the station numbers:-

- Press the CHECK key with the handset on hook
- Dial *

Press the CLOCK key to return the display to the clock mode.

1.4.14.8 **Abbreviated Dial Number Check**

The abbreviated dial numbers can be displayed.

- Press the CHECK key with the handset on hook
- Dial the abbreviated code (00 to 991. The stored number will be displayed.

If the number exceeds 11 digits, press the * key to display the remaining digits.

Press the CLOCK key to return the display to the clock mode.

1.4.14.9 Repertory Dial Number Check

To display the abbreviated dial codes stored for repertory dialling.

- Press the CHECK key with the handset on hook
- Press the required DSS key. The abbreviated dial code will be displayed.

Press the CLOCK key to return the display to the clock mode.

1.4.14.10 DSS Station Number Check

The station numbers assigned to the DSS keys can be displayed.

- Press the CHECK key with the handset on hook, then the ICM key
- Press the required DSS key. The station number assigned to the DSS key will be displayed.

Press the CLOCK key to return the display to the clock mode.

1.4.15 Headset Station

Headset stations can be either Handsfree or On-Hook stations which have the Headset Interface Board installed (refer to Section 2.3.5.4 for installation instructions). A Handsfree station loses the handsfree facility when the headset interface is installed.

1.4.15.1 Headset Operation

The Headset station can operate in headset mode for every type of call. To place the station into headset mode press the SPKR key with the handset on-hook. This is equivalent to lifting the handset. To terminate a call press the SPKR key again.

Lifting the handset during a headset call will automatically switch the conversation to the handset.

If you wish to change from using the handset to the headset press the SPKR key before replacing the handset.

1.4.15.2 Incoming Calls

Incoming intercom calls (voice) are received via the headset and can be answered without touching the station. The ICM lamp fast flashes.

Incoming intercom calls (ring) are signalled through the station speaker and by the fast flashing of the ICM lamp.

To answer

- Press the SPKR key. The SPKR lamp will light.
- Press the ICM key. The ICM lamp will light steadily and conversation is possible via the headset.

Incoming outside line calls are signalled through the station speaker and by the slow flashing of the LINE lamp.

To answer:

- Press the SPKR key. The SPKR lamp will light.
- Press the incoming LINE key. The LINE lamp will light steadily and conversation is possible via the headset.

1.4.16 DSS Console

Up to two DSS consoles can be used with the BN-824 and BN-1236 systems and up to six DSS consoles can be used with the BN-2464 system.

Each DSS console is assigned to a station (Refer to Section 2.7.4.11 for programming instructions).

1.4.16.1 DSS Call

An intercom call to any station can be made with a single key operation using the DSS console.

- Lift the handset on the associated station
- Press the required direct station selection (DSS) key to establish an intercom call.

To change an intercom voice call to a signal call or an intercom signal call to a voice call press the SG/VC key.

1.4.16.2 Automatic Hold of Exchange Line

Pressing a direct station selection key or paging key while having an outside call will automatically place the outside call on hold.

1.4.16.3 Paging

A paging call to any of the internal or external zones can be made with a single key operation in a similar manner to a DSS call.

The internal zones are labelled IZ1, IZ2, IZ3, and IZ4 while the external zones are labelled EZ1, EZ2, and EAZ for external all zone. The All Call paging key is labelled AC.

To make a paging call:-

- Lift the handset on the associated station
- Press the required paging key to establish a paging call

1.4.16.4 Automatic Transfer After Intercom Call

After announcing a transferred call using intercom and ensuring the transferred station has answered using the handset, the call can be transferred automatically by pressing the TRFR key without the need for the transferred station to press the held LINE key.

This is a similar method to Automatic Transfer after Announcing, Section 1.4.7.4

1.4.16.5 Transfer Without Announcing

- Ask the outside party to wait
- Press the required direct station selection (DSS) key. The outside line is automatically placed on hold
- Press the TRFR key. The line lamp will change to a steady glow
- Replace the handset.

At the station to which the call is being transferred a fast warbling tone is heard and the line lamp flickers.

If the call remains unanswered for a predetermined time it will recall to your station with a fast warbling tone heard over the station speaker. The line lamp will show I-HOLD at your station and HOLD at all other stations. (Refer to Section 2.7.4.28 for programming instructions of the ringback timer).

This transfer method is similar to Section 1.4.7.5 Transfer Without Announcing.

1.4.16.6 Message Waiting

The DSS console may leave a message waiting at another station if the station does not answer

- Make an intercom call
- Press MW key if the called party does not answer
- Replace the handset

The MW lamp on the associated station will flicker and the station lamp on the DSS console will slow flash.

The MW lamp on the message waiting station will fast flash.

To cancel the message waiting:-

- Press the MW key with the handset on hook
- Press the DSS key of the station which you want to clear the message waiting condition.

The message waiting is similar to Section 1.4.9.7 Message Waiting.

1.4.16.7 Night Transfer

The DSS console can place the system or the group that the DSS console is a member of into night service mode (Refer to Section 1.4.6.6 Night Transfer).

To place the system or group of stations into night service mode:-

- Press the NT key with the handset on hook. The NT lamp on the DSS console and the FW.ME lamp of the stations placed into night mode will light.

To take the system or group of stations out of night service mode:-

- Press the NT key again with the handset on hook. The NT lamp of the DSS consoles and FW.ME lamp of the stations previously placed into night mode will go out.

1.4.17 Door Stations

Door stations provide a chime tone and Handsfree talkback to assigned key stations (Refer to Section 2.7.4.10 for programming instructions).

A maximum of two door stations may be connected to the system with each door station having a different chime tone. Door station 1 has a slow chime tone while door station 2 has a quick chime tone. The length of the chime is selectable between a short tone and a 30 second repeating chime tone (Refer to Section 2.7.4.24 for programming instructions).

To initiate a door station call:-

- Press the CALL button. The chime tone will be heard at the door station and the stations programmed to receive a door station call. The ICM LED will fast flash at stations receiving the door station call.

To answer a door station call

- Lift the handset while the ICM LED is fast flashing. The ICM LED will light steadily indicating an intercom call is in progress with the door station.

To call a door station

- Lift the handset and press the ICM key. The ICM lamp will light and intercom dial tone will be heard.
- Dial 88 for door station 1 or 89 for door station 2

NOTE: Only one door station can send or receive calls at any one time. The other door station not in use cannot initiate a door station call and the door station appears busy to calling stations.

1.4.18 Standard Telephone Station

1.4.18.1 Outside Calls — Outgoing

- Lift the handset, listen for special facility tone
- Dial 0 to connect to any free line
- Listen for outside dial tone, then dial the wanted number

To seize a line allocated to a line request group dial the line request group number 1 to 4 after obtaining the internal dial tone

To seize a particular line dial 5, then the two digit line number.

01 to 08 for BN-824
01 to 12 for BN-1236
01 to 24 for BN-2464.

1.4.18.2 Outside Calls — Incoming

- Lift the handset to answer incoming calls

1.4.18.3 Outside Line Request

When all outside lines in your group are busy, the next free line may be requested when the busy tone is heard.

- Dial the outside line request group number (1 to 4). The special facility tone will be heard.
- Replace the handset.

NOTE: If the busy tone is still heard after dialling the line request group number then the outside line request has been denied.

When a line in the group becomes available the station will ring.

- Lift the handset. The outside dial tone will be heard.

NOTE: If the free line is not accepted within 20 seconds the request is automatically terminated.

1.4.18.4 **Enquiry Call (Holding An Outside Call)**

To make an internal call while holding an outside call:-

- Ask the outside party to wait
- Quickly depress and release the switchhooks
- Listen for special facility tone
- Dial 7
- Listen for intercom dial tone
- Dial the required station number for the enquiry call
- Depress and release the switchhooks again to return to the held call.

1.4.18.5 Transferring an Outside Call

- Ask the outside party to wait
- Quickly depress and release the switchhooks
- Listen for special facility tone
- Dial 7
- Listen for intercom dial tone.
- Dial the required station number to whom the call will be transferred
- Announce the call
- Replace the handset, the call is automatically transferred.

If the called station is busy or does not answer then you may return to the held line by quickly depressing and releasing the switchhooks.

1.4.18.6 PABX Recall/Switchhook Flash

If the system is an extension from a PABX, the hold and transfer facilities of the PABX can be obtained.

- Quickly depress and release the switchhooks. The special facility tone will be heard
- Dial 1

1.4.18.7 **Intercom Calls — Outgoing**

- Lift the handset, listen for special facility tone
- Dial 7 to connect to an intercom line
- Dial the required station number

If all intercom lines are busy then the busy tone will be heard.

1.4.18.8 **Intercom Calls — Incoming**

- Lift the handset to answer incoming intercom calls

1.4.18.9 Intercom Camp-On

If the busy tone is heard when making an intercom call

- Dial 2 and remain off hook

Provided the handset remains off hook, an intercom signal call will be automatically established when the called station becomes free. Dialling 1 changes the intercom signal call to an intercom voice call.

1.4.18.10 Intercom Call Back

If the busy tone is heard when making an intercom call

- Dial 2 and replace the handset

When the called station becomes free your station will ring

- Lift the handset. An intercom signal call is automatically established with the called station.

NOTE: If the call back is not answered within 20 seconds then the call is automatically cancelled.

To cancel Intercom Call Back

- Lift the handset. The special facility tone will be heard.
- Dial 8 and replace the handset

1.4.18.11 Entering An Account Code

If the call details recorder facility with the account code option is provided (Refer to Section 1.4.19) then an account code can be entered anytime during a call.

To enter an account code

- Quickly depress and release the switchhooks. The special facility tone will be heard
- Dial 9
- Enter an account code
- Quickly depress and release the switchhooks to return to your call.

1.4.19 Call Details Recorder

The call details recorder facility provides call data printouts via a printer. Details of calls made and received on the BN systems are printed in five categories.

The call categories and abbreviations are:

• Outgoing call	OTG
• Incoming call	INC
• All trunks busy	ATB
• Barred outgoing	BRD
• Buffer full	BFL

The details for each category will include the date, time, line number or group number. duration, station number, number dialled, ring duration before answer (incoming calls only) and if required an account code. (Refer to Section 2.5.6 for installation instructions and Sections 2.7.4.3, 2.7.4.36 and 2.7.4.37 for programming instructions).

The details of 55 calls per page will be printed. The page number is printed on the top right hand side of the page and the call number (01-55) is printed in the first column.

CDR Printout Example

PAGE 0 01

CLASS	DATE	TIME	LINE	DUR	ST#	DIALED #	RING	AC
01 OTG	28/4/83	15:50:05	01	00:00:11	20	60655		
02 INC	28/4/83	15:51:10	01	00:00:10	10		00:01	
03 ATB	28/4/83	15:50:42	03	00:05:00				
04 OTG	28/4/83	15:55:43	01	00:00:06	20	02 60683		
05 BRD	28/4/83	15:55:53	02	00:00:03		0		
06 OTG	28/4/83	15:56:09	02	00:00:30	10	001112136502311		
07 BFL	28/4/83	16iOO:OO	14					
08 OTG	28/4/83	16:42:54	01	00:00:05	11	60666		12345678

Outgoing Calls (OTG)

A maximum of 20 digits dialled can be printed. However, the last 2 digits will not be printed in order to maintain privacy.

The timing of the call commences 1 or 5 seconds after the 1st digit is dialled (set at installation).

NOTE: Call duration provided by the Call Details Recorder is not used by Telecom to determine call charging.

Incoming Calls (INC)

The time in the DURation column (hours, mins, secs) indicates call duration after answer. The time in the RING column (mins, secs) indicates the time the caller waited before answer. The entry in the ST# column indicates the station number that answered the call. If there is no entry in the ST# column then the call was not answered.

All Trunks Busy (ATB)

When all lines in a group are in use, the entry in the LINE column indicates the line group number. See call number 3 of sample printout.

Barred Outgoing (BRD) — Option

When this option is selected, the printout will indicate the station number, line number and the barred code attempted.

Buffer Full (BFL)

8 buffer memories per outside line are provided to store information while the printer is out of service. This will occur when changing the paper. When the printer is back in service the call details will be printed.

If the printer is out of service for a lengthy period the buffers may become full. The number of calls for which information is lost is printed out on an hourly basis. The entry in the LINE column indicates the number of calls not printed. See call number 7 of sample printout.

Account Code (AC)

If it is necessary to charge calls to a department, individual extension, or a client, account codes are entered when calls are made and received. The account facility can be compulsory, optional or not available and is decided upon at installation (refer to Section 2.5.6 for installation instructions). Account codes are selected from a range of 1 to any 8 digit number. The person making or receiving the call enters the account code by dialling *account code* from a key station. To enter an account from a standard telephone station, quickly depress and release the switchhooks, dial 9, enter the account code, and then quickly depress and release the switchhooks to return to your call. The account code can be entered at any time during the call.

NOTE: If your company has selected the option of inserting the account code before dialling, outgoing calls cannot be made until the account code is entered.

1.4.20 Service Difficulties and Assistance

1.4.20.1 Service Difficulties

If difficulties are encountered call Service Difficulties on 1100.

1.4.20.2 Assistance

Telecom Australia has skilled Service Advisors available to assist you with the operation of your Commander system. For further information, call your Telecom Business Office. The free call telephone number is listed in the information pages of your telephone directory.

1.5 SYSTEM COMPONENTS

1.5.1 General

The system is made up of the following items; Main Equipment (ME), Expansion Rack (ER) if BN-2464 system, Power Supply if BN-1236/2464 system, Stations and Powerfail Bells. In addition the following are available; Call Metering Unit (CMU), Two-Wire Extender Unit (2WEU-AN), Tie Line Unit (RTIU) and the Ring Generator Unit (RGU-AN).

(i) **BN-824 Main Equipment**

The main equipment consists of a two shelf rack. The lower shelf houses plug-in PBA's described in Table 1 .5.1(i) and Amp CHAMP connectors to provide connection of the SDF to the backplane. The top shelf houses a removable power supply for the BN-824 and the removable SDF. The power supply is connected to the backplane via a multipin socket.

(ii) **BN-1236 Main Equipment**

The Main Equipment consists of a one shelf rack which houses plug-in PBA's. Table 1 .5.1(i) contains details of the printed circuit boards housed in the main equipment and the expansion rack. In addition, the main equipment has AMP CHAMP connectors below the shelf rack to provide connection between the main equipment and the SDF. A multipin socket is provided for connection of the BN-1236/2464 Power Supply to the main equipment.

(iii) **BN-2464 Expansion Rack**

The Expansion Rack consists of a one shelf rack which houses plug-in PBA's and AMP CHAMP connectors above the shelf rack in a similar arrangement to the ME-BN12362464 Main Equipment. In addition, the expansion rack has two ribbon cables and two sets of power cables to connect the expansion rack to the main equipment. The printed circuit boards housed in the expansion rack are detailed in Table 1.5.1(i).

MAIN EQUIPMENT PRINTED CIRCUIT BOARDS

BOARD CODE	BOARD DESCRIPTION	CABINET RACK	MAXIMUM QTY.
CPB-BN-A	CENTRAL PROCESSOR BOARD (ESSENTIAL) This board has the main CPU, ROM containing the operational program, RAM containing site dependent data and abbrev. dial Nos, real time clock and the interfaces between the CPU and the dedicated microprocessors on other boards.	ME(824) ME(1236)	1 1
TSB-BN-A	TONE SOURCE BOARD (ESSENTIAL) This board contains an internal music-on-hold generator, system tone generators and two daughter boards (EMB-BN-A and the optional PGB-BN-A) providing interface circuits for an external music source, external paging and alarm inputs. In addition, a dedicated microprocessor provides communication with the main CPU, alarm detection, control of the external music source and external paging.	ME(824) ME(1236)	1 1
LNB-BN-A	EXCHANGE LINE BOARD This board contains the interface circuitry for 4 exchange lines and a dedicated microprocessor providing communication with the main CPU, ring detection and both decadic and DTMF dialling.	ME(824) ME(1236) ER(2464)	2 3 3
STB-BN-A	STATION INTERFACE BOARD This board contains the interface circuitry for 4 stations, crosspoint switch matrix and a dedicated microprocessor providing communication with the main CPU and control of the crosspoint switch matrix.	ME(824) ME(1236) ER (2464)	6 9 7
2WB-BN-A	TWO-WIRE STATION BOARD This board contains the interface circuitry for 4 standard telephone stations, crosspoint switch matrix and a dedicated microprocessor providing communication with the main CPU and control of the crosspoint switch matrix. Standard telephone stations may be either decadic or DTMF telephones. For each DTMF standard telephone a DTMFB-BN-A daughter board must be plugged in.	ME(824) ME(1236) ER(2464)	6 9 7

BOARD CODE	BOARD DESCRIPTION	CABINET RACK	MAXIMUM QTY.
CDRB-BN-A	CALL DETAILS RECORDER BOARD This board contains the interface to a printer for the generation of a record of incoming and outgoing calls. A dedicated microprocessor provides communication with the main CPU and controls the printer interface.	ME(824) ME(1236)	1 1
DSSDST-DN-A	DSS AND DOOR STATION BOARD This board contains the interface circuitry for 2 DSS Consoles and 2 Door Stations. A dedicated microprocessor controls the interfaces and provides communication with the main CPU.	ME(824) ME(1236) ER (2464)	1 1 2
XPB-BN-A	EXPANSION BOARD This board contains the additional crosspoint matrix required by the BN-2464 system and a dedicated microprocessor providing communication with the main CPU and control of the crosspoint matrix. One or two XPB-BN-A boards are required when there are more than 12 exchange lines connected to the system. An XPB-BN-A board in slot XPB(1) gives stations 10 to 41 access to all exchange lines. A second XPB-BN-A board must be equipped into position XPB(2) to give all stations access to all lines.	ER (2464)	2
EMB-BN-A	EXTERNAL MUSIC SOURCE AND CONTROL INPUT INTERFACE BOARD This board contains six control input interfaces, external music-on-hold interfaces, background music interfaces and external music-on- hold control lines. This board is a standard daughter board for TSB-BN-A	N/A	1
PGB-BN-A	EXTERNAL PAGING INTERFACE BOARD This board contains two external speaker interfaces, crosspoint matrix and control lines for the speakers. This board is an optional daughter board for TSB-BN-A.	N/A	1
DTMFB-BN-A	DTMF RECEIVER BOARD This board contains a DTMF receiver allowing DTMF standard telephone stations to be connected to the 2WB-BN-A (or 2WSTB-BN-A). This board is a daughter board for 2WB-BN-A (or 2WSTB-BN-A).	N/A	4 per 2WB-BN-A (2 per 2WSTB-BN -A)

TABLE 1.5.1 (i) PBA'S USED WITH BN-824/1236/2464 SYSTEMS.

NON-STANDARD PRINTED CIRCUIT BOARDS

BOARD CODE	BOARD DESCRIPTION	CABINET RACK	MAXIMUM QTY.
2WSTB-BN-A	TWO-WIRE AND KEY STATION BOARD This board contains the interface circuitry for 2 standard telephone stations and 2 key stations. The board also contains the crosspoint switch matrix and a dedicated microprocessor providing communication with the main CPU and control of the crosspoint switch matrix. Standard telephone stations may be either decadic or DTMF telephones. For each DTMF standard telephone the DTMFB-BN-A daughter board must be plugged in.	ME(824) ME(1236) ER (2464)	6 9 7
DSS-BN-A	DIRECT STATION SELECTION CONSOLE BOARD This board contains the interface circuitry for 4 DSS Consoles and 2 dedicated microprocessors each controlling two of the four interface circuits and providing communication with the main CPU.	ME(824) ME(1236) ER (2464)	1 1 2

TABLE 1 .5. 1 (ii) NON-STANDARD PBA'S

(iv) **BN-824 and BN-1236/2464 Power Supplies**

Both power supplies consist of a transformer, a switch panel assembly containing the mains switch and all the fuses and a printed board assembly containing the regulators for the various power supply rails.

(v) **Stations**

There are three types of stations; On-hook and Handsfree stations, available in 8, 12 or 24 line versions, and Door stations.

On-hook 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.

Handsfree stations contain, in addition to the above, extra function keys, a handsfree board and a display capable of showing various types of information.

Door stations contain an intercom network and a speaker.

(vi) **DSS Consoles**

DSS consoles contain single function keys, direct station selection (DSS) keys with corresponding status lamps and electronics to control the console's operation.

(vii) **Test and Programming Unit (TPU-BN)**

The test and programming unit contains a display, function keys and a dial. The TPU-BN is used to programme system data.

(viii) **Powerfail Dial**

A powerfail dial can be installed into an On-hook or a Handsfree station to provide dialling facility during power failure. The dial is switchable between decadic or DTMF dialling and contains an electronic buzzer to indicate the incoming calls during power failure.

(ix) **Call Metering Unit (CMU)**

The call metering unit may be connected to exchange lines to provide an indication of the number of meter pulses sent from the local exchange.

(x) **Tie Line Unit (RTIU)**

The RTIU is a small sub-rack which provides the interface for tie lines with a maximum capacity of two tie lines per sub-rack.

The RTIU is equipped with its own power supply (PSB-C). The components which can be used with the RTIU are shown in Table 1.5.1 (iii).

BOARD CODE	DESCRIPTION
RTB-A (Standard)	Ring and Tone Source .
RRB-A (Optional)	Ring in, Rmg out Tie Lme Interface
LRB-A (Optional)	Loop in, Ring out Tie Line Interface

TABLE 1.5.1 (iii) PBA'S USED WITH THE RTIU

(xi) **Ring Generator Unit (RGU-AN)**

The ring generator unit (RGU-AN) generates ring voltage for 2-wire extensions. The RGU-AN is used in conjunction with the 2-Wire Station Board (2WB-BN-A) or the non-standard 2 Wire and Key Station Board (2WSTB-BN-A).

(xii) **Two-Wire Extender Unit (2WEU-AN)**

The two-wire extender unit provides a power supply to the 2WB-BN-A (or 2WSTB-BN-A) board to allow two-wire stations to be connected with loop lengths up to 1500 ohms.

(xiii) **Powerfail Bell**

A powerfail bell may be connected to the system to provide incoming ring 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.

(xiv) **Headset Adapter Kit (HAK-BN-A)**

The headset adapter kit is a station sub-base fitted with an interface board and a socket to plug the headset in. It provides interface and control circuitry to convert an On-hook or a Handsfree station to a headset station.

(xv) **Customer Provided Optional Equipment**

An amplifier and loudspeakers for external zone paging options.

A music source for background music and hold music.

A printer for call details recording.

Alarm devices

1.5.2 System Block Diagram

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

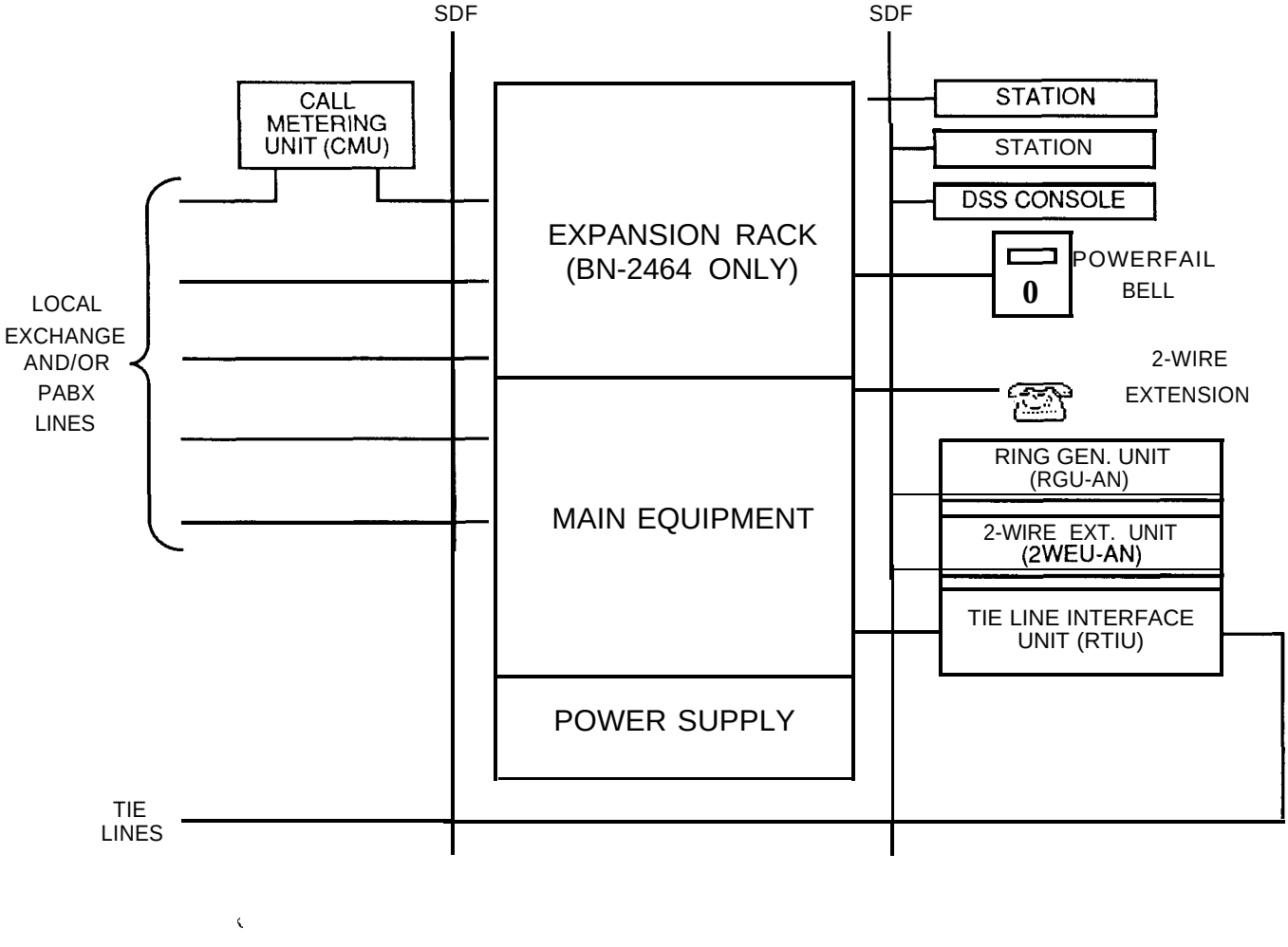


FIG. 1.5.2 SYSTEM BLOCK DIAGRAM

Incoming Local Exchange Lines or PBX Lines can be connected to the BN-824 Main Equipment (lines 1 to 8), the BN-1236 Main Equipment (lines 1 to 12) or the BN-2464 Expansion Rack (lines 13 to 24). A Call Metering Unit may be used to record meter pulses sent from the local exchange. Tie lines are connected via a tie line interface unit (RTIU).

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

Stations and standard telephone stations can be connected to the BN-824 Main Equipment (Stations 10 to 33), the BN-1236 Main Equipment (Stations 10 to 45) and the BN-2464 Expansion Rack (Stations 46 to 73) via the System Distribution Frame (SDF). Handsfree and On-hook stations are connected by 4 wires, one pair is used for speech transmission while the other pair is used for data transmission and power feed for the station.

Standard decadic or DTMF telephones are connected to the system by a single pair of wires. Audio communication and either decadic or DTMF signalling are performed on this pair. A special interface and Ring Generator Unit are provided if standard telephones are used.

The Two-Wire Extender Unit increases the maximum allowed loop resistance for standard telephone stations to 1500 ohms (8.5km of 0.5mm cable).

DSS consoles and Door stations are connected to the system via the SDF by a single pair of wires. Data transmission and power feed is provided by the pair used for the DSS consoles while audio communication is performed on the Door station pair.

1.5.3 Main Equipment Block Diagram.

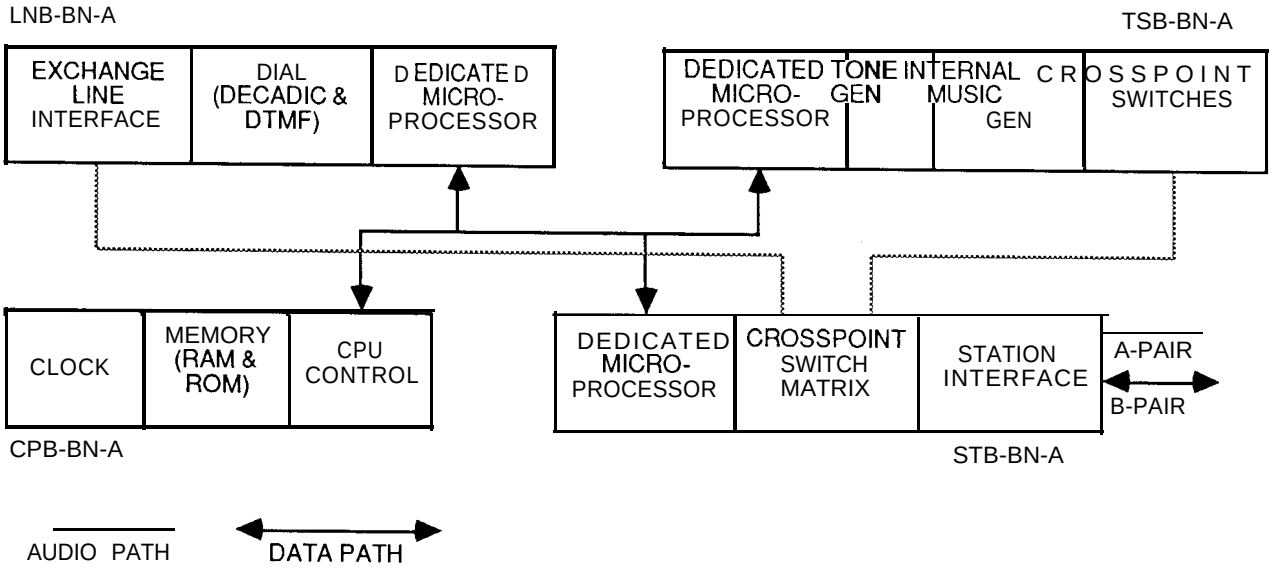


FIG. 1.5.3(a) BN-824 and BN-1236 MAIN EQUIPMENT BLOCK DIAGRAM.

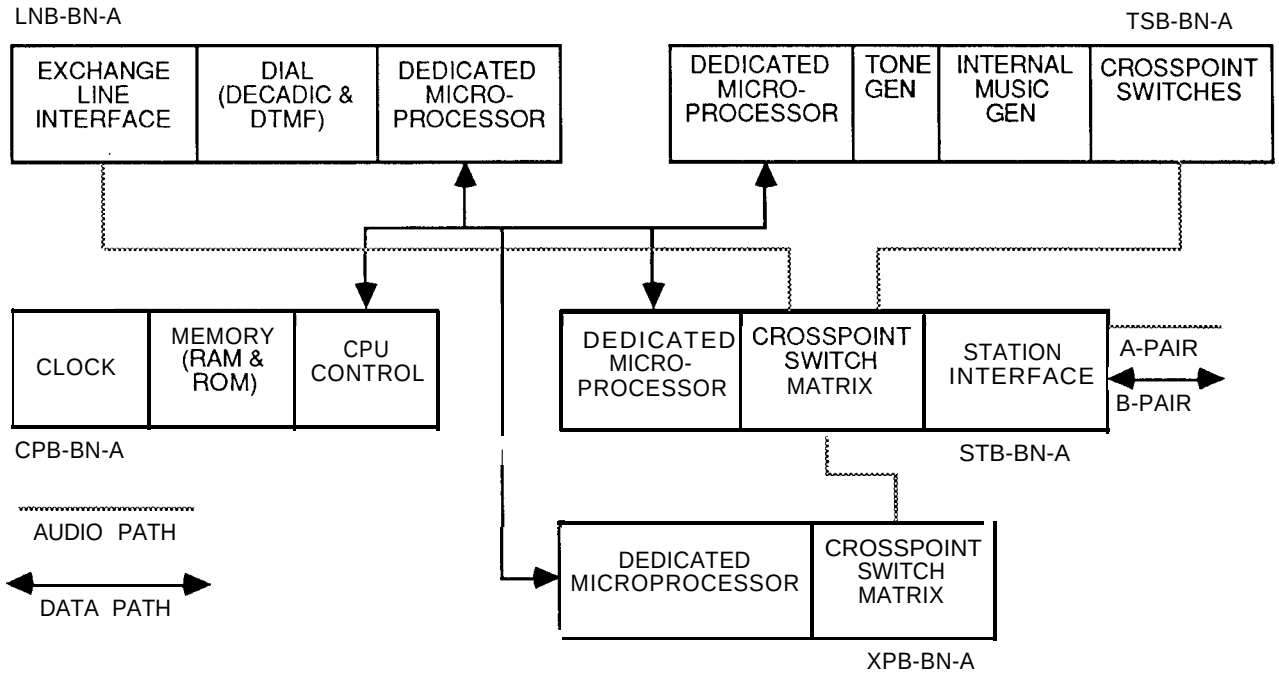


FIG. 1.5.3(b) BN-2464 EXPANSION RACK BLOCK DIAGRAM

CPU Control is provided by a Z80 microprocessor, 56K ROM program memory, 24K RAM site dependent data, 4.0MHz clock and timing and control circuitry.

The clock circuit maintains a real-time clock used to update the clock display on the Handsfree station and for the Call Details Recorder.

The Dedicated Microprocessor controls the transmission of information between the main CPU and also controls the functions of the PBA's.

Dial Control generates the required decadic and DTMF signals. The DTMF signal is routed through a crosspoint switch to the required exchange line. The decadic dial data directly controls the dialling relay in the exchange line interface.

Exchange Line Interface provides the D.C. loop termination of the exchange line, ring detect circuit, audio coupling transformer, dialling relay, grounding relay and line surge protection.

Crosspoint Switch Matrix is made up of semiconductor crosspoints which switch on or off under microprocessor control to provide audio connections between various parts of the system.

Station Interface provides circuits for transmission of voice and serial data to and from the stations.

Tone Generator provides the required system tones.

Internal Music Generator contains a music generating circuit, a switch selecting either internal or external Music-On-Hold and a level control. In addition, there are interfaces for external Music-on-Hold and Background Music sources with a level control. Two external paging interface circuits are also provided.

1.5.4 Station Block Diagrams

1.5.4.1 On-Hook Station

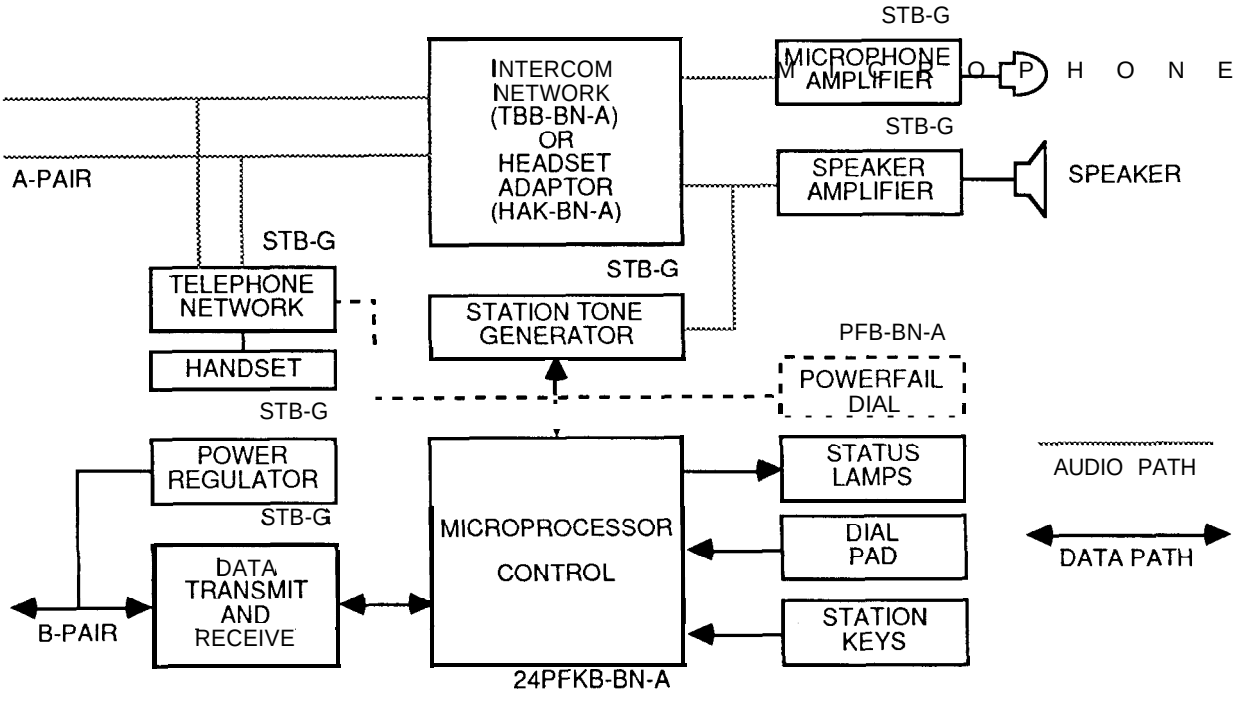


FIG. 1.5.4(a) ON-HOOK STATION BLOCK DIAGRAM

Telephone Network, Transmission Circuit and Handset are connected to the station interface of the STB-BN-A board by the A-pair. An electronic transmission circuit customised for the Australian network is used with identical transducers for the transmitter and receiver.

Data Transmit and Receive converts data transmitted on the B-pair into logic levels for the station microprocessor.

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

The Station Microprocessor carries out processing of data received on the B-pair to control tones and status lamps as well as sending station status data back to the station interface on STB-BN-A.

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

Station Keys are used to invoke the system facilities and the station microprocessor constantly monitors their status.

Dial Pad is used to input dialled digits. The operation of the dial is monitored by the station microprocessor and the information is conveyed to the main equipment.

The Intercom Network contains two balanced hybrids allowing talkback intercom calls.

The Powerfail Dial provides the dialling facility during power failure. The powerfail dial is an optional feature.

The Headset Interface permits connection of a Telecom approved headset to the station.

1.5.4.2 **Handsfree Station**

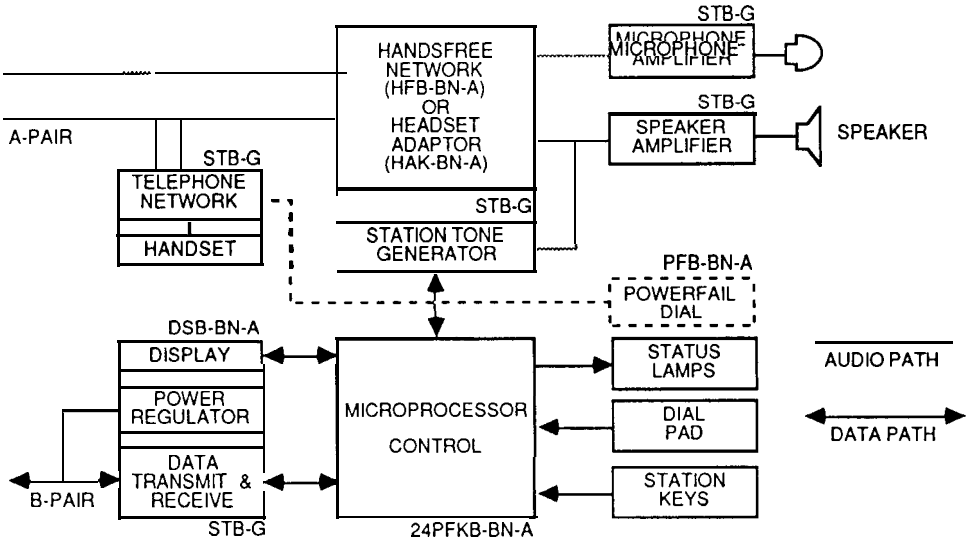


FIG. 1.5.4(b) HANDSFREE STATION BLOCK DIAGRAM

The Handsfree Station is similar to the On-Hook Station with the Handsfree Station having the following extra functions.

The Handsfree Network allows both outside line and intercom calls to be conducted without using the handset.

The Display provides access to a clock, timer and a variety of other information. The data from the station microprocessor drives a display processor which controls the eleven digit Liquid Crystal Display.

1.5.5 Two-Wire Standard Telephone Station Interface Block Diagram

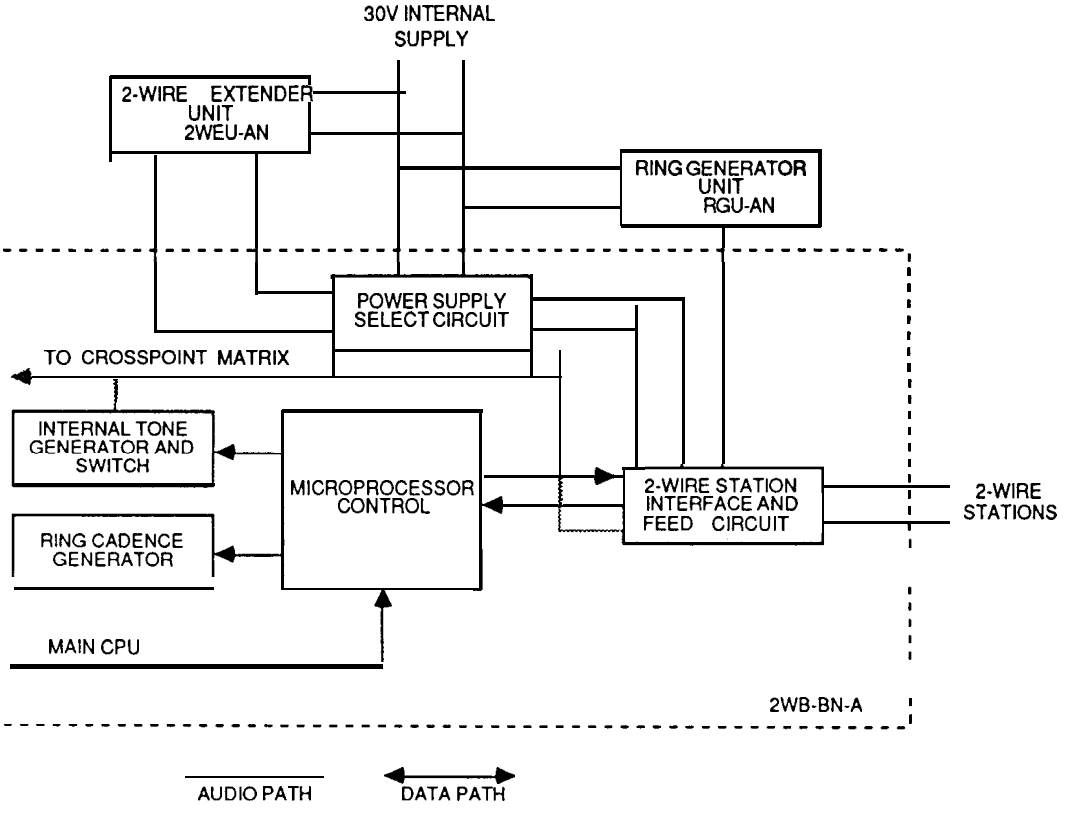


FIG. 1.5.5(a) TWO-WIRE STATION INTERFACE BLOCK DIAGRAM

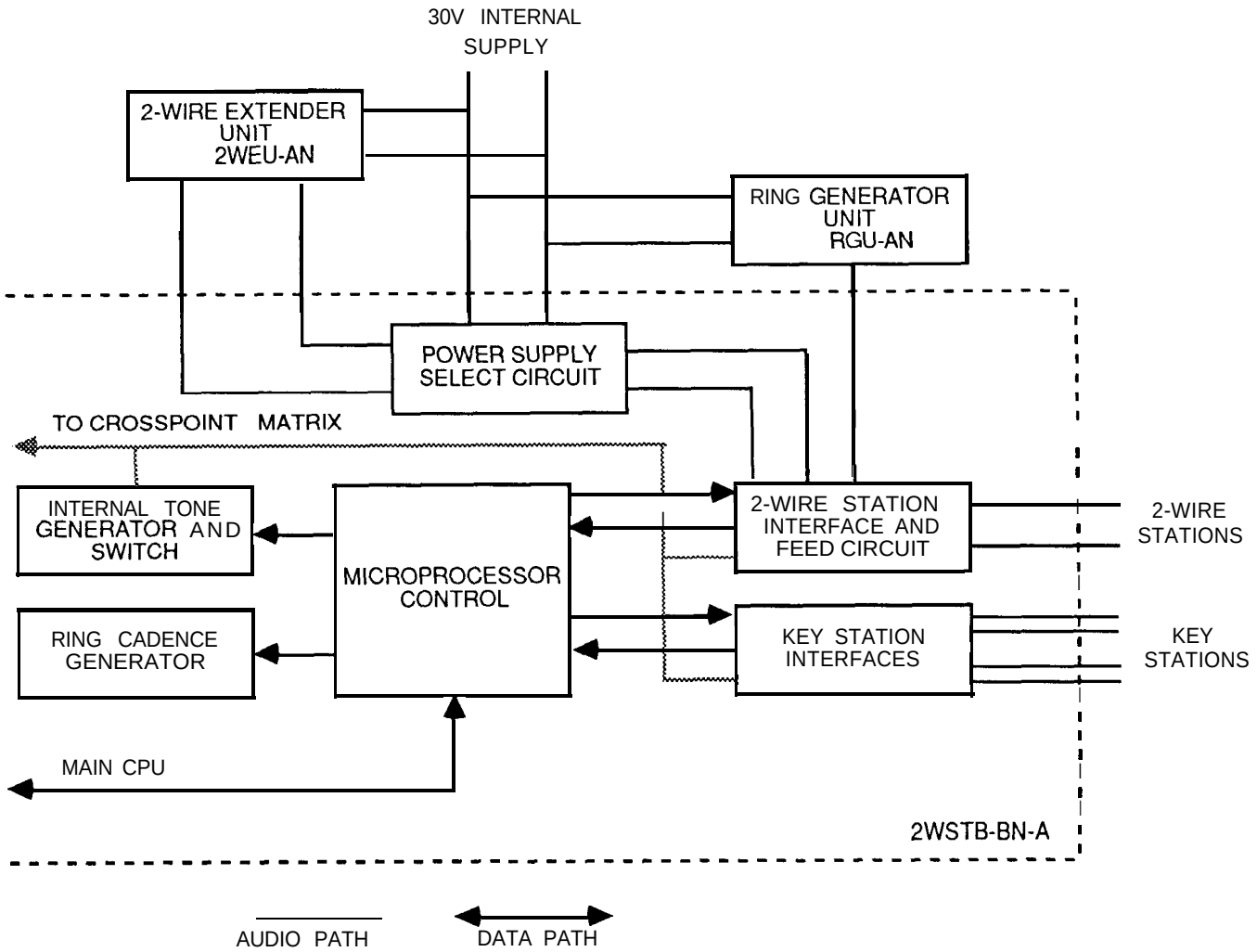


FIG. 1.5.5.(b) TWO WIRE AND KEY STATION INTERFACE BLOCK DIAGRAM (NON-STANDARD BOARD)

Two-Wire Station Interface and Feed Circuit provides the audio path, D.C. power supply and the ring connection for a standard telephone station.

Key Station Interface provides the transmission of audio and serial data to and from the key stations on 2WSTB-BN-A boards only.

The Microprocessor Control consists of two dedicated microprocessors. The first controls the data transmission between the 2WB-BN-A and the main CPU, crosspoint switch matrix control and communication while the second microprocessor controls the key station and standard telephone station interfaces and internal tones.

The Two-Wire Extender Unit (2WEU-AN) is a D.C./D.C. converter that increases the voltage supplied to the standard telephone station in order to enable it to operate over distances up to 8.5km.

The Ring Cadence Generator provides the Microprocessor Control with a signal it uses to switch the 25Hz ring signal sent to the station.

The Ring Generator Unit (RGU-AN) consists of an oscillator, an amplifier, and a transformer which provides a signal for ringing the standard telephone station.

The Internal Tone Generators and Switch Circuits provide the tone sent to the station under the control of the microprocessors.

1.5.6 Call Details Recorder Board (CDRB-BN-A) Block Diagram.

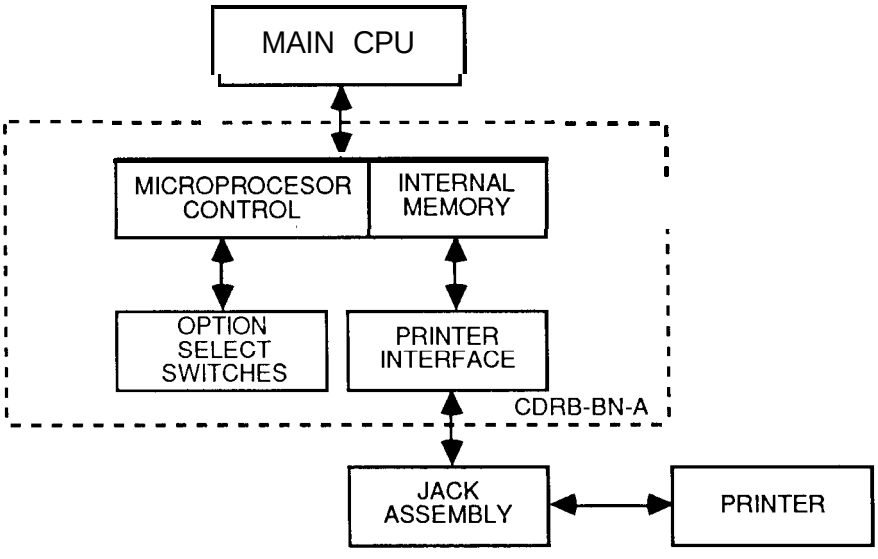


FIG. 1 .5.6 CALL DETAILS RECORDER BLOCK DIAGRAM

Microprocessor Control provides data communication between the PBA dedicated microprocessor and the main CPU. The dedicated microprocessor controls the printer interface which sends serial data to the printer in RS-232C format at 150, 300, 600, 1200, 2400, 4800, 9600, or 19200 baud. Calls are stored temporarily in memory while the printer is unavailable.

Switches are used to set the baud rate for the printer and to select various printout options.

Jack assembly provides connection between the CDRB-BN-A board and a standard RS-232C cable.

1.6 SYSTEM CAPACITIES AND LIMITS

1.6.1 System Capacities

	BN-824	BN-1236	BN-2464
Total Exchange Lines	8	12	24
Exclusive Lines	8 (Note 1)	12 (Note 1)	24 (Note 1)
Intercom Links	6 (Note 2)	6 (Note 2)	6 (Note 2)
Stations	24	36	64
DSS Consoles	2	2	6
Door Stations	2	2	2

NOTE: 1) Any exchange line can be assigned as an exclusive line, up to the maximum of 8 for BN-824, 12 for BN-1236 and 24 for BN-2464.

2) When background music is programmed, one intercom line is reserved for background music.
When DSS Consoles are assigned, one intercom line is reserved for the DSS Consoles.

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.

Tie Line Unit (RTIU)

The unit has a capacity to provide two interface circuits for any combination of ring in/ring out or loop in/ring out tie lines. Any number of RTIUs up to the maximum number of exchange lines can be used.

Two-Wire Extender Unit (2WEU-AN)

The unit provides a power supply to the 2WB-BN-A and 2WSTB-BN-A boards so that standard telephone stations may be used with line loops up to 1500 ohms. One unit is required for every 2WB-BN-A board or every 2WSTB-BN-A board installed.

Ring Generator Unit (RGU-AN)

The unit provides ring voltage for signalling to two-wire telephone stations. One unit provides ring for one 2WB-BN-A board or one 2WSTB-BN-A board.

1.6.2 System Limits

ITEM	SPECIFICATIONS
Max. Loop Limits Key Stations Two-Wire Extensions Two-Wire Extensions with two wire extender unit (2WEU-AN)	 52 ohms (300m 0.5mm cable) 300 ohms (1.7km 0.5mm cable) 1500 ohms (8.5km 0.5mm cable)
External Music Inputs Input Impedance Required Input Level	 600 ohms – 10 dBm from a source less than 600 ohms
External Paging Output Output Impedance Output Level	 600 ohms – 10 dBm into an impedance greater than 600 ohms
Power Requirements AC Mains Voltage Max. Power Dissipation	 BN-824:225-270V (rms) 50Hz BN- 1236/2464:204-280V (rms) 50Hz 216 VA for BN-824 280 VA for BN-1236 500 VA for BN-2464
Operating Temperature System Stations	 0°C to +45°C 0°C to +45°C
Relative Humidity	10% to 95%
Weight BN-824 Main Equipment BN- 1236 Main Equipment BN-2464 Expansion Rack BN-1236/2464 Power Supply Stations DSS Consoles	 19.0kg 9.5kg 10.0kg 17.0kg 1.0kg 0.7kg

TABLE 1.6.2 SYSTEM LIMITS FOR COMMANDER BN-824/1236/2464.

1.7 MECHANICAL DRAWINGS

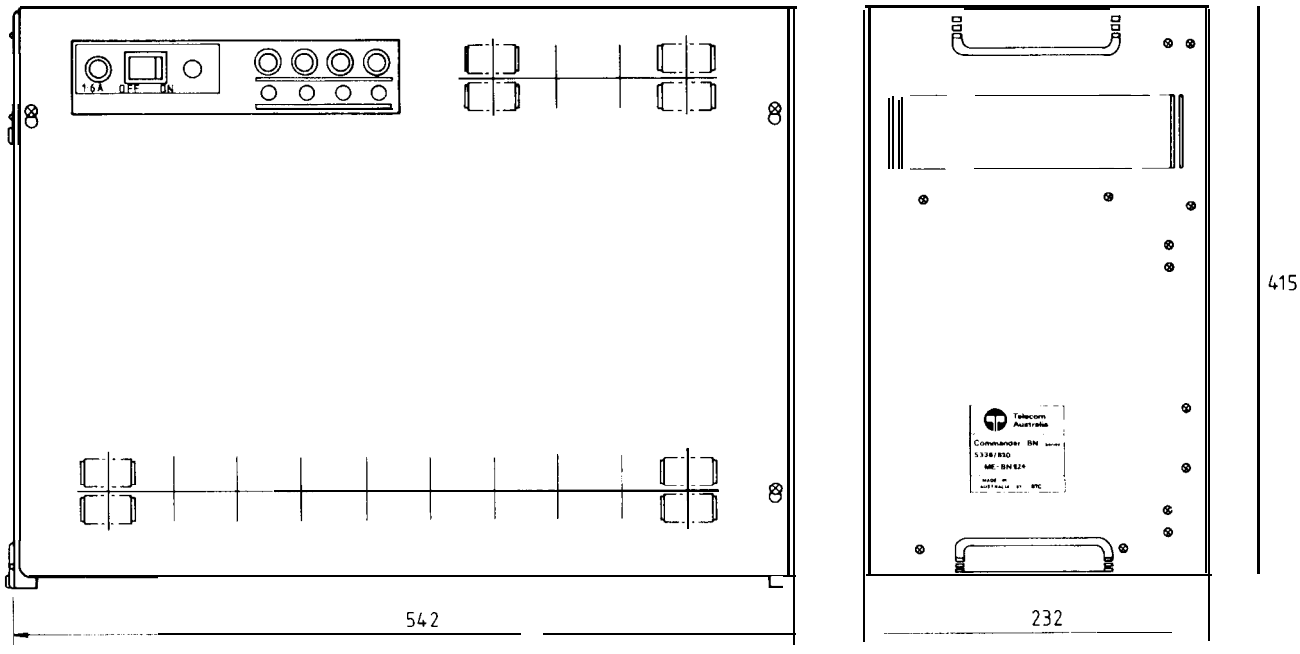


FIG. 1.7.1 ME-BN824 MAIN EQUIPMENT

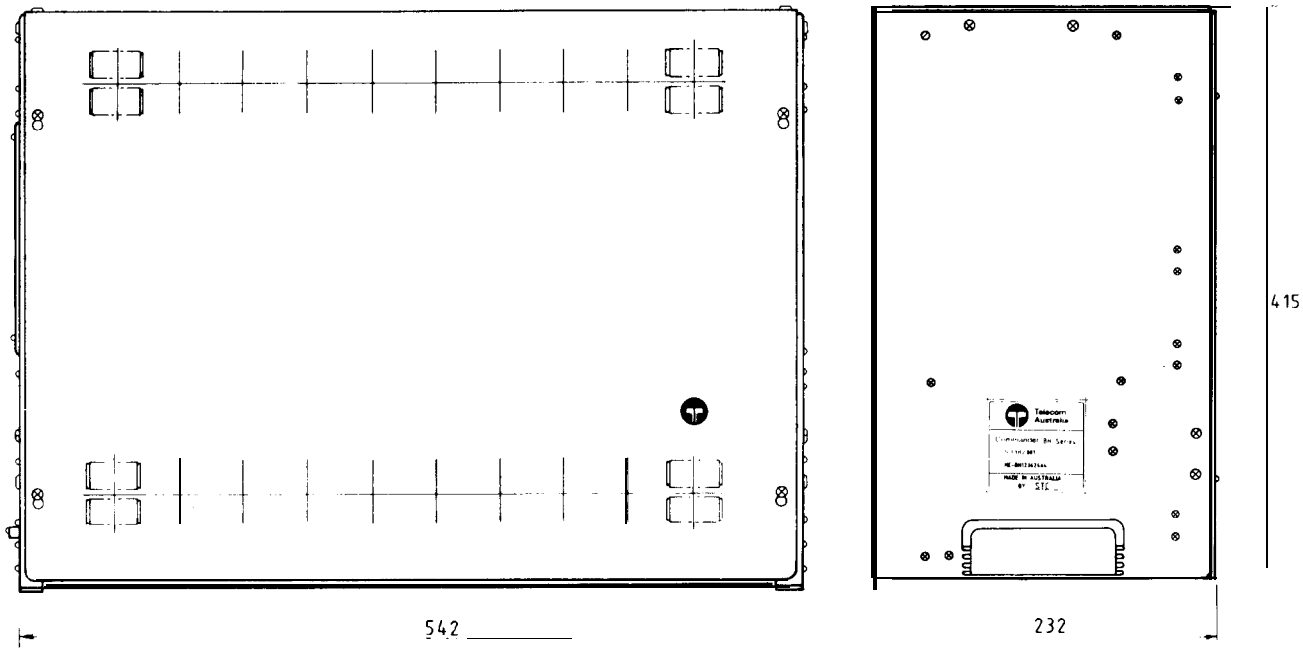


FIG. 1.7.2 ME-BN12362464 MAIN EQUIPMENT

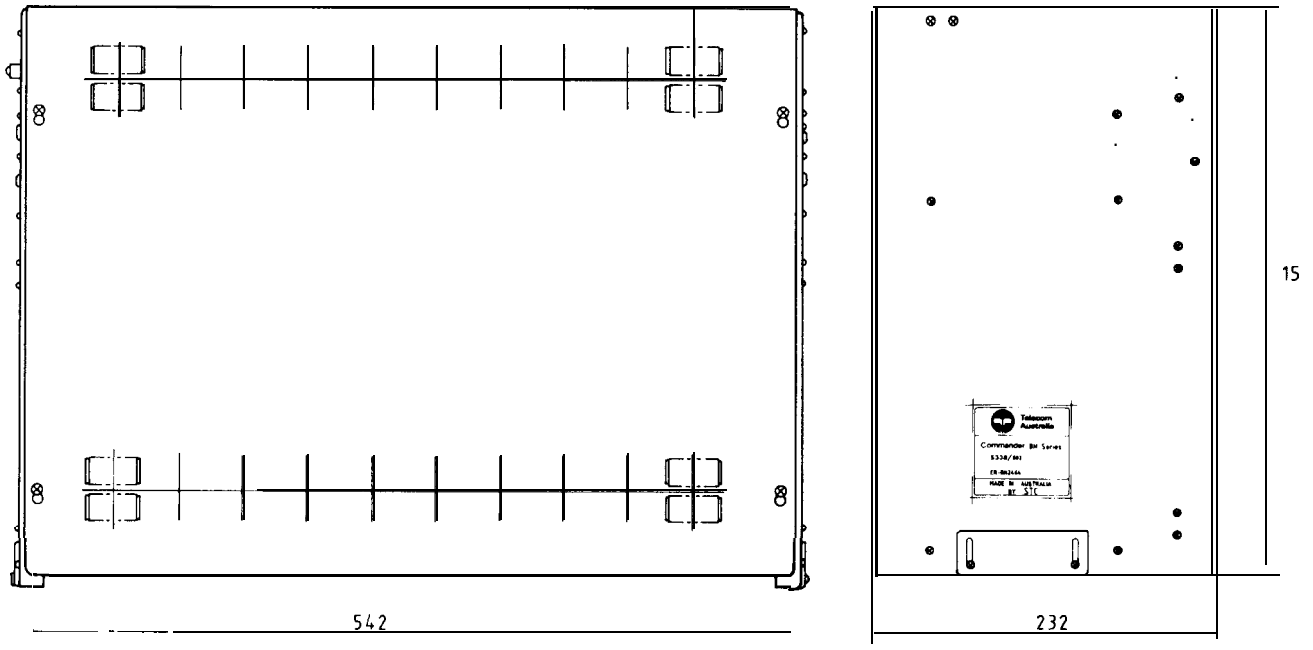


FIG. 1.7.3 ER-BN2464 EXPANSION RACK

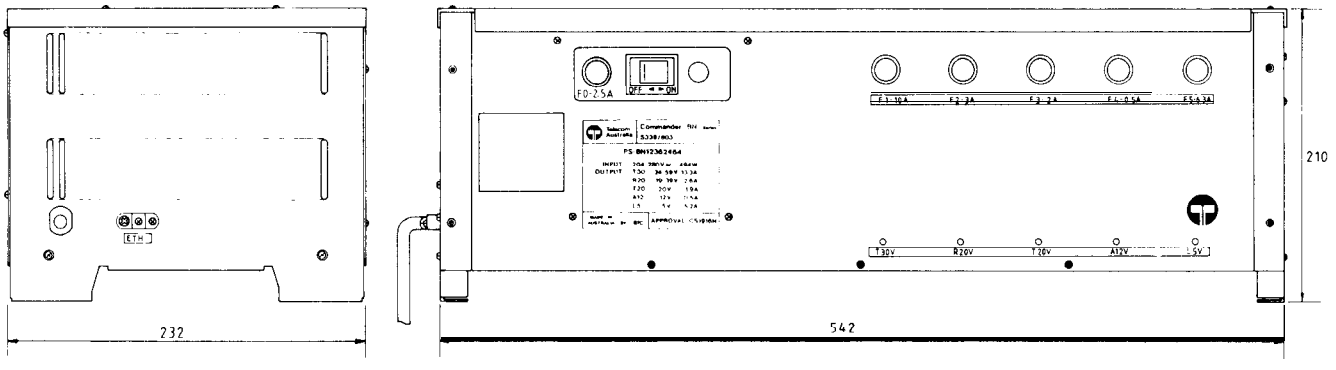


FIG. 1.7.4 PS-BN12362464 POWER SUPPLY

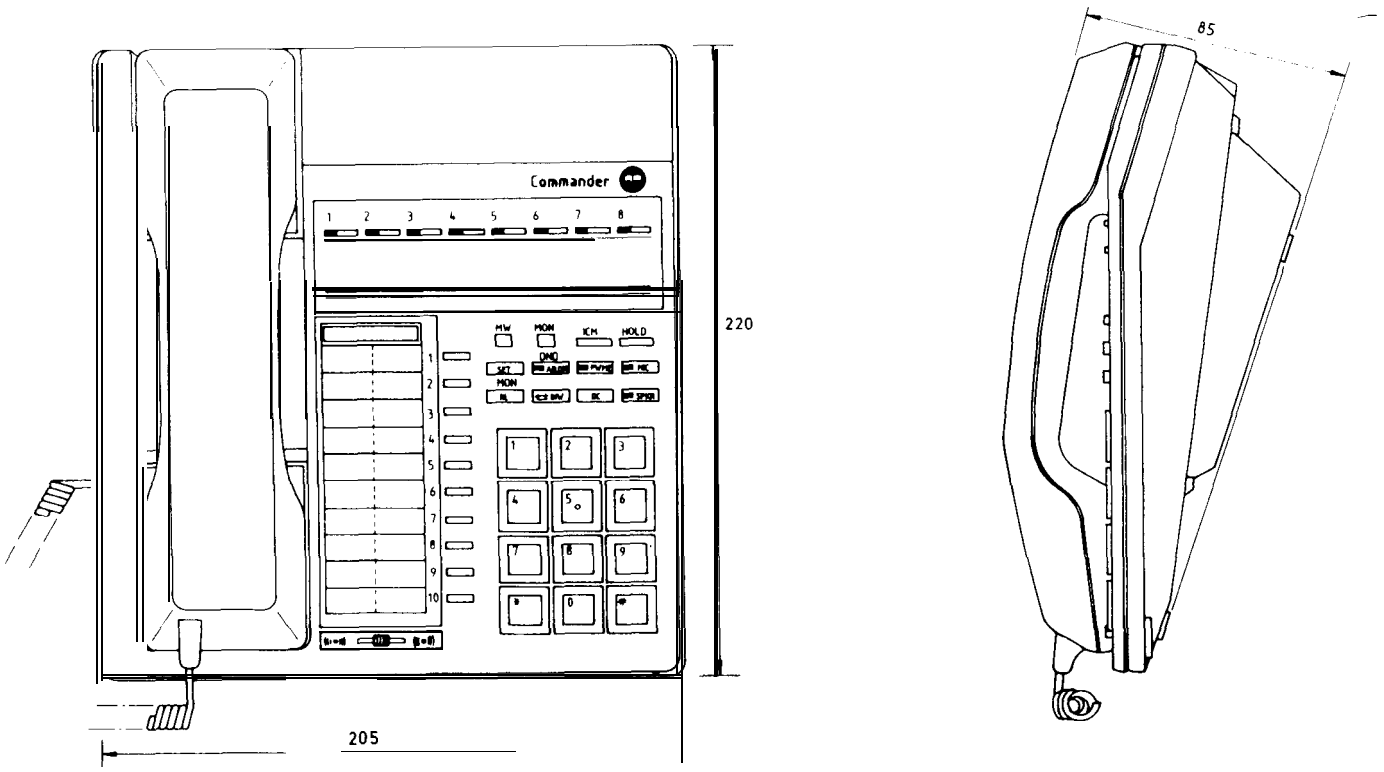


FIG. 1.7.5 TS-BN824-0H 8 LINE ON-HOOK STATION

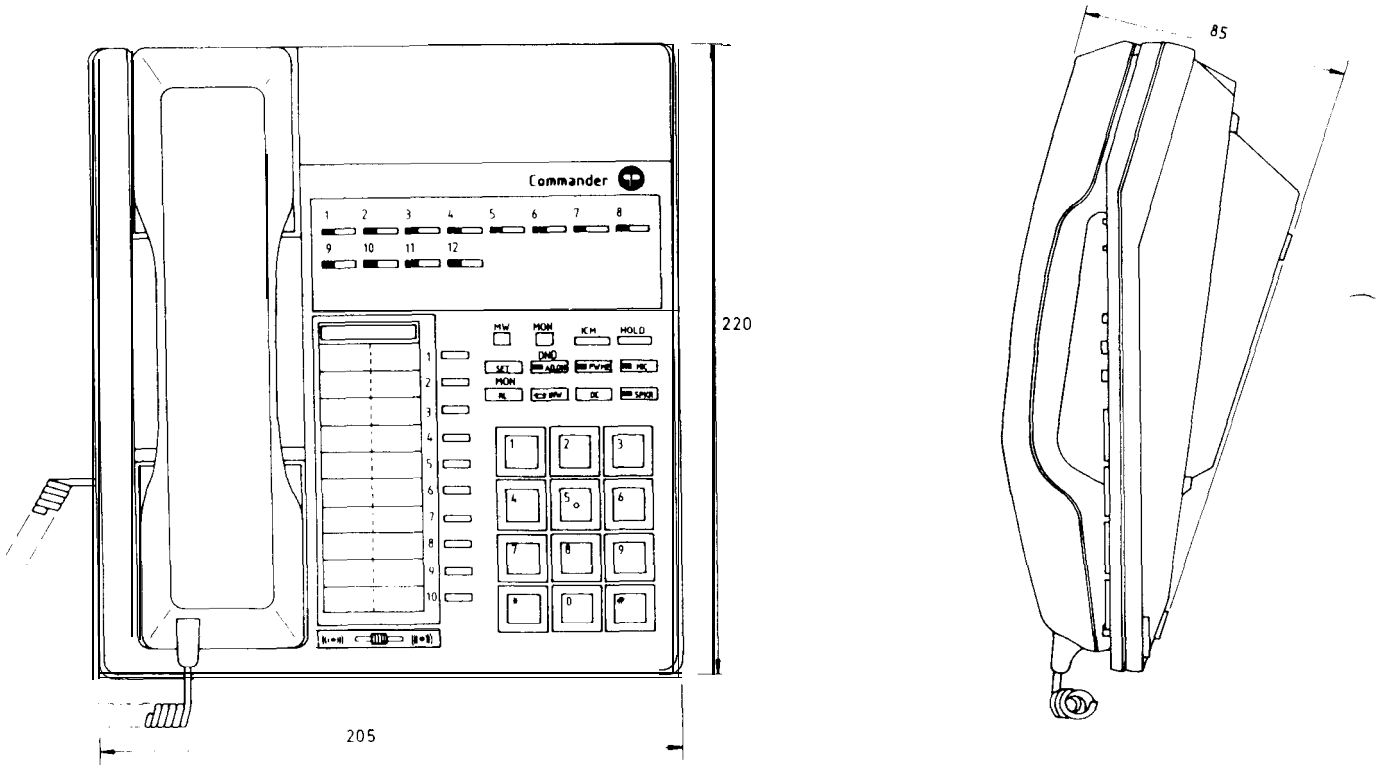


FIG. 1.7.6 TS-BN1236-OH 12 LINE ON-HOOK STATION

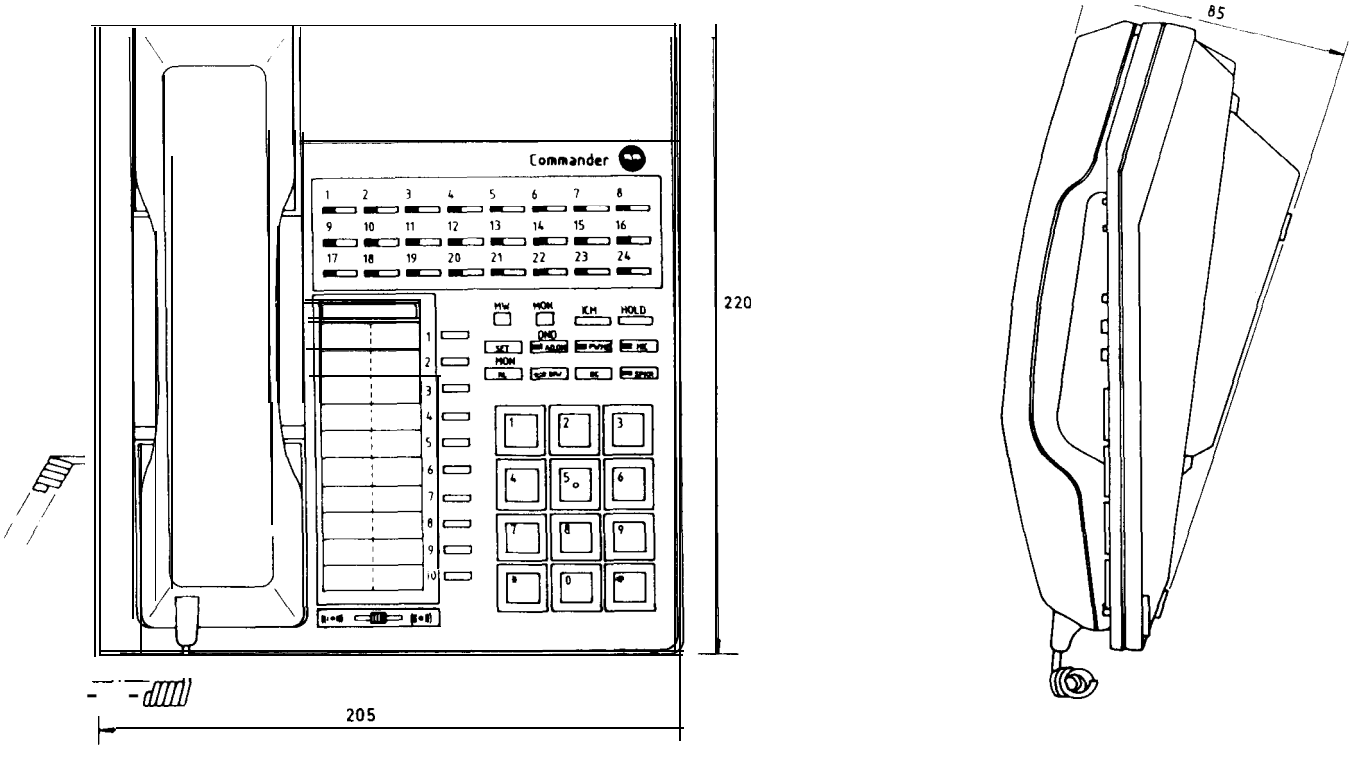


FIG. 1.7.7 TS-BN2464-OH 24 LINE ON-HOOK STATION

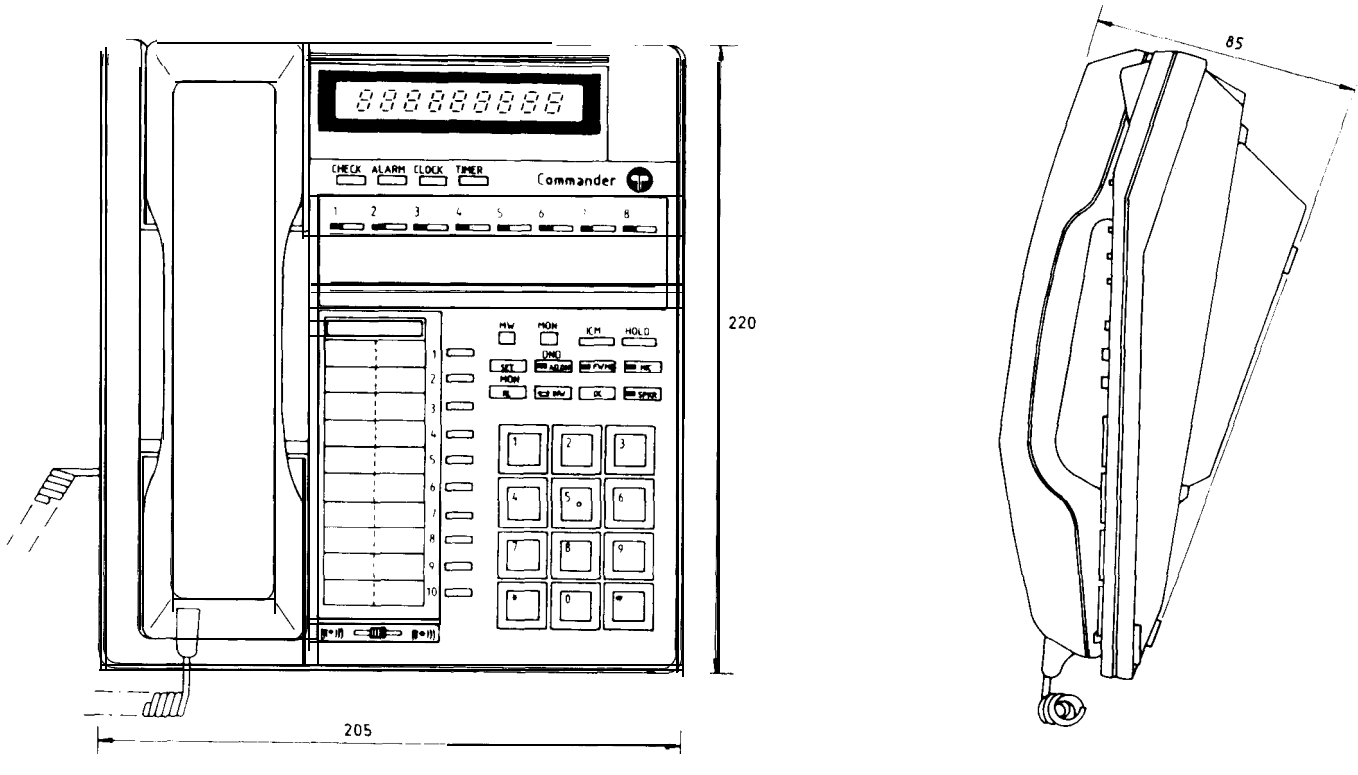


FIG. 1.7.8 TS-BN824-HF 8 LINE HANDSFREE STATION

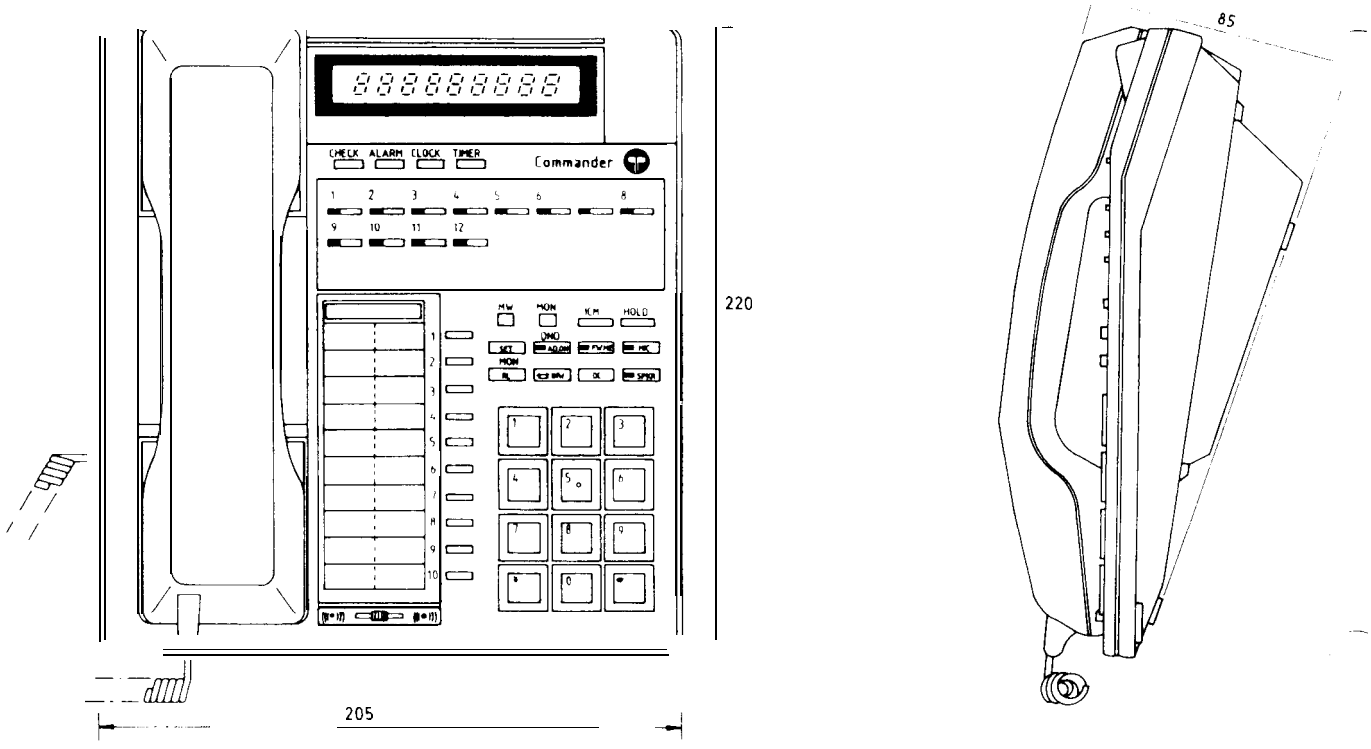


FIG. 1.7.9 TS-BN1236-HF 12 LINE HANDSFREE STATION

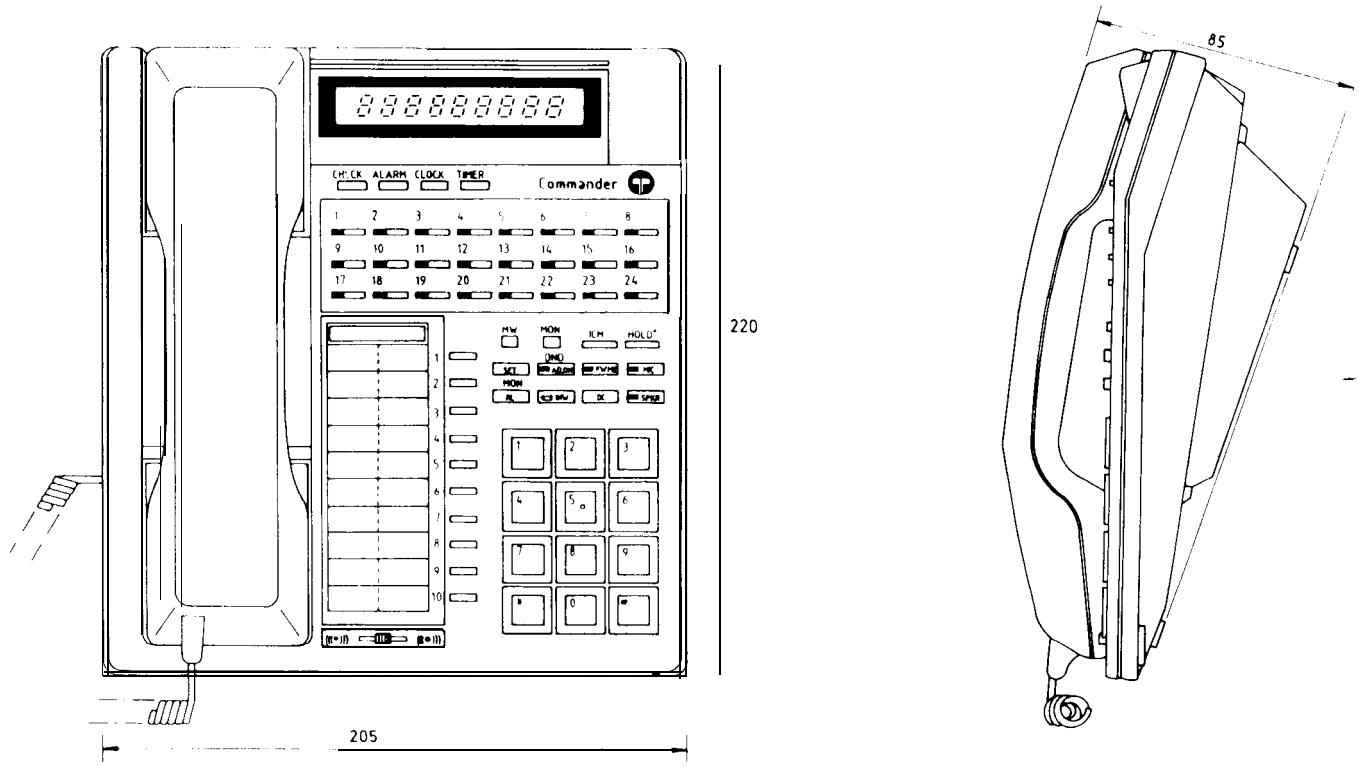


FIG 1.7.10 TS-BN2464-HF 24 LINE HANDSFREE STATION

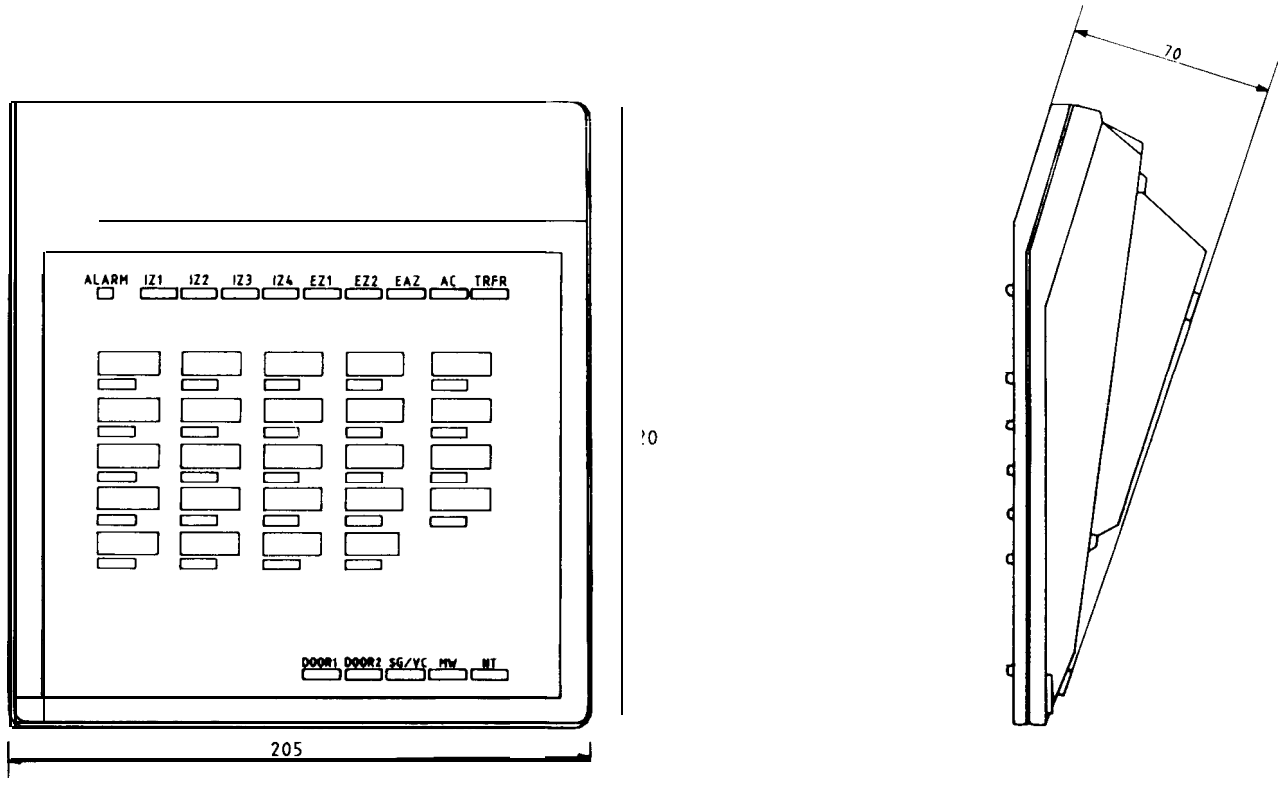


FIG 1.7.11 DSS-BN824 DSS CONSOLE

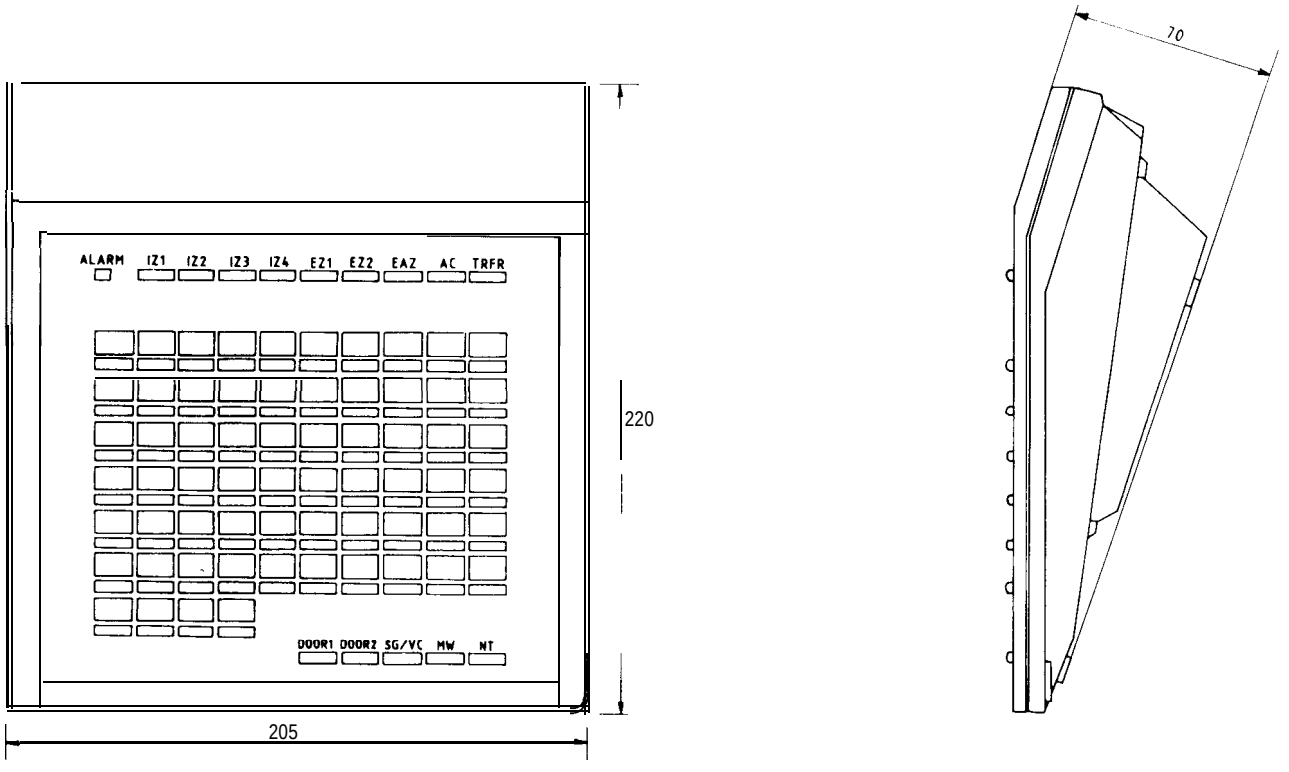


FIG. 1.7.12 DSS-BN 12362464 DSS CONSOLE

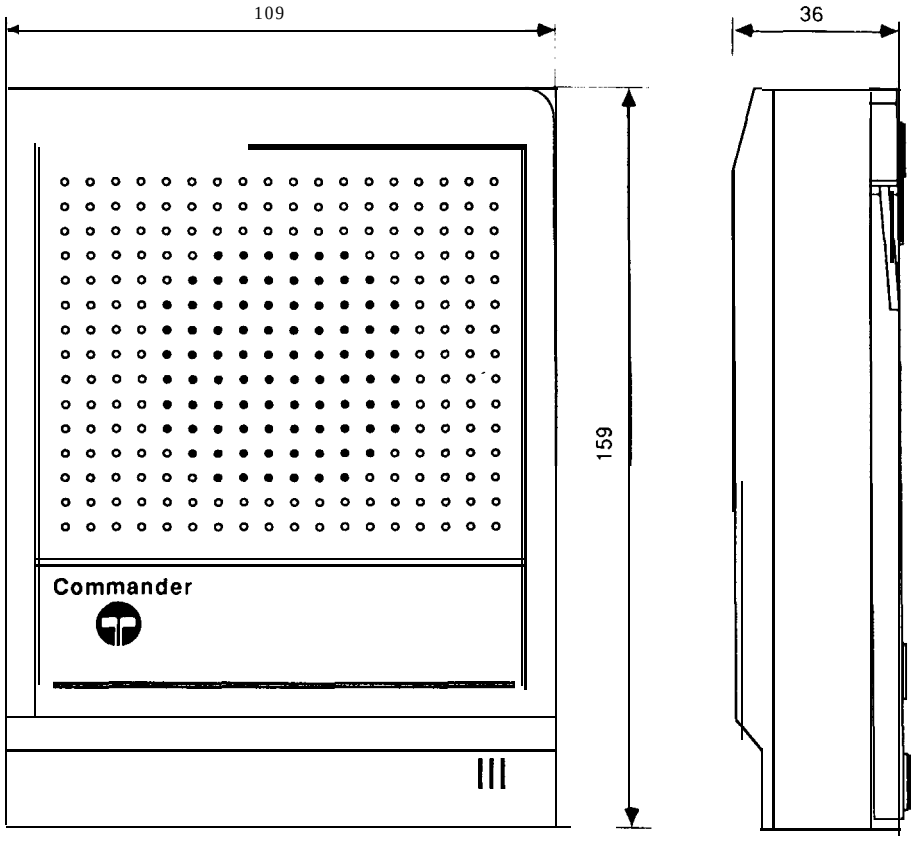


FIG. 1.7.13 SBA-BN STATION BASED ALARM

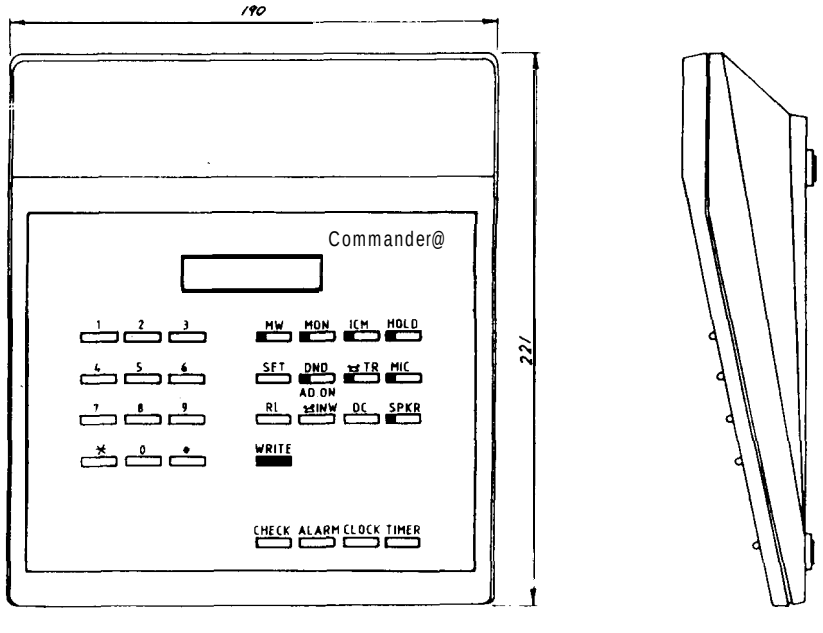


FIG. 1.7.14 TPU-BN TEST AND PROGRAMMING UNIT.

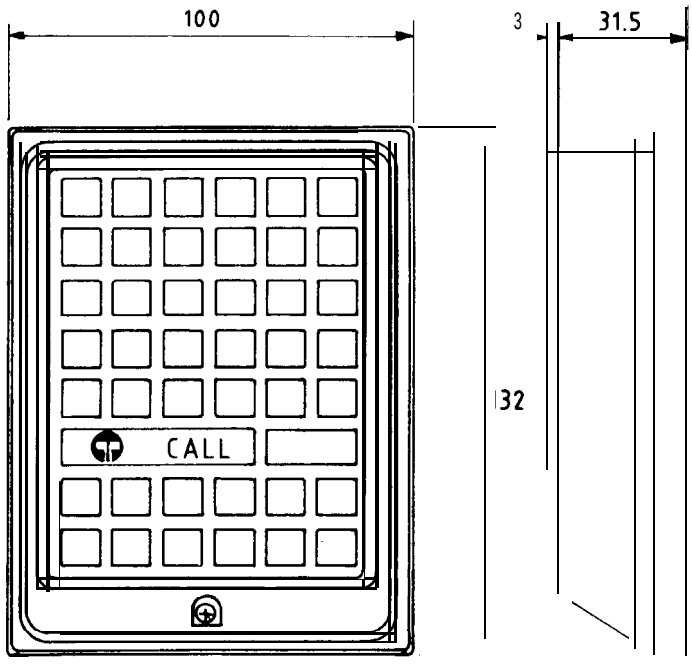


FIG. 1.7.15 DS-BN DOOR STATION

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, Expansion Rack if system is BN-2464, Power Supply, SDF, Stations, Powerfail Bells, Ring Generator Unit, RTIU and Call Metering Unit.

3. Cable the site.

4. Terminate cables at ME, ER, SDF, 610 Sockets, Powerfail Bells, Ring Generator Unit, RTIU, Call Metering Unit, External Music Source, External Paging Loudspeaker.

   Surge protection must be provided.

   A Telecom earth must be terminated on the Call Metering Unit,

5. Plug boards into Main Equipment and Expansion Rack if system is BN-2464.

6. Power-up the system.

7. Check cabling by measuring voltages at 610 sockets.

8. Connect Powerfail Dials or Headset Adaptor Kits to the appropriate 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 (refer to Section 2.8.).

11. Write-up the site records.

Details required to perform the above procedure are described in the following sections.

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, should 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. Note that the system may be provided as packages.

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 BN TELEPHONE SYSTEM ORDER

Telecom Australia

Refer Instructions on reverse

MODEL BN1236 BN2464

Tick required boxes

CUSTOMER'S NAME

ADDRESS

TOWN OR SUBURB

POSTCODE

NATURE OF BUSINESS

CUSTOMER CONTACT

TELEPHONE

SALES CONTACT

TELEPHONE

STD CODE

SERVICE NO.

IF OFF PBX

PBX EXTN

INSTAL REQ DATE D D M M Y Y

APP'N DATE D D M M Y Y

A

SERVICE ORDER No NUMERIC

DATE ORDER ISSUED D D M M Y Y

DATE COMPLETED D D M M Y Y

PAYMENT METHOD

- ☐ Sale (other than deferred payment)
- ☐ Rental
- ☐ Deferred payment

TYPE OF INSTALLATION

- ☐ New Commander
- ☐ In-Situ

STD CODE

PREVIOUS TELEPHONE No

IF OFF PBX

- ☐ Privately owned

TYPE OF INSTALLATION

- ☐ New Service
- ☐ Removal of Service
- ☐ Replacement for (type or model)

(Specify type and model)

TARIFF SECTION

Section 1

PRODUCT TARIFF CODE

Section 2

	Qty.	PRODUCT CODE
Basic Package		
Expansion Package		

CENTRAL EQUIPMENT

Basic Unit		
Exchange/Tie Line Module		
Keystation Module		
2-Wire Module (2x2W+2xKeystn.)		
2-Wire Module (4x2W)		
2-Wire Tone Rec. Module		
DSS/Doorstation Module		
Expansion Board		
Call Details Recorder Module		
2-Wire Extender Unit		
Tie Line Interface Unit		
Tie Line Connector Module		

STATION INSTRUMENTS (Do not include package instruments)

On Hook Stations		
Handsfree Stations		
Powerfail Module		
DSS Console		
Door Station		
2-Wire Stations		

SYSTEM OPTIONS

Powerfail Bell		
Ext. Paging Module		
C.D.R. Printer		

STATION OPTIONS

Headset Adaptor Kit		
Extension Alarm		
Totals		

INSTALLERS ONLY

(Enter Tariff Details on *BUSINESS OFFICE COPY* 4)

SUMMARY OF SYSTEM REQUIREMENTS

		Exchange Line
		Tie Lines — Non PABX
		— PABX
		Stations — Total

Tick if required		Permit No.	Service Order No
	External Music Source		
	External Alarm		
	External Paging		
	Private CDR Printer		

Permit No. MUST accompany Service Order No

TS254 (2/87) Sheet 1 of 5 Sheets

INSTALLING OFFICER'S COPY

Telecom Australia

COMMANDER TELEPHONE SYSTEM ORDER MODEL ☐ BN1236 ☐ BN2464

Customers Name	Service No	Service Order No

PROGRAMMABLE OPTIONS

EXCH. LINE	EXCH/TIE LINE DETAILS			01. EXCH LINE ASSIGNMENT					02. EXCH GROUP ASSIGN			03. EXCH LINE ASSIGNMENT			58.
	Tie Line	Service No.	Service Order No.	Line Type	Signalling Type	Line Request Group	PABX Night	PABX Recall	Grp. No.	Start Line	End Line	CDR Print Out	FAX Data Line	Common Line	EXCH. LINE RING
	(.)			(1)	(0)	(1)	(0)	(0)		(0 1)	(max)	(0)	(0)	(0)	(0)
01									01						
02									02						
03									03						
04									04						
05									05						
06									06						
07									07						
08									08						
09									09						
10									10						
11									11						
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15									15						
16									16						
17									17						
18									18						
19									19						
20									20						
21									21						
22									22						
23									23						
24									24						

0 no line
1 Exch/Tie
2 (resvd)
3 PABX line

If PABX lines connected
43. Sheet 5 must be completed

0 Decadic
1 Tone

0 no group
1 group 1
2 group 2
3 group 3
4 group 4

0 no
1 yes

0 Hook Flash
1 Earth

- Enter Start and End Exch Line No 01-24
- Max 24 Groups
- Exclusive Lines assign 1 line to group
- Groups may overlap or be nested

0 yes
1 no

0 no
1 yes

0 no
1 yes

0 = Normal Ring
1 Alt Ring

Telecom Australia

COMMANDER TELEPHONE SYSTEM ORDER MODEL

☐ BN1236 ☐ BN2464

Customers Name	Service No	Service Order No

STATION BASED OPTIONS

STN.	DESIGNATION AND/OR LOCATION	STN TYPE	04. PRIOR BREAK -IN (0)	06. LINE GROUP O/G 1st Exch Group (01)	06. LINE GROUP O/G 2nd Exch Group (00)	07. LINE GROUP I/C 1st Group Exch Line Group (01)	07. LINE GROUP I/C 1st Group Signal Mode (0)	07. LINE GROUP I/C 2nd Group Exch Line Group (00)	07. LINE GROUP I/C 2nd Group Signal Mode (0)	08. EACH STN ASSIGNMENT Night Rest (0)	08. Key Tone (1)	08. Stn. Type (0)	08. DND (0)	08. Page Zone (0)	40. ACCESS CLASS (0)	53. AUDIBLE SIGNAL FOR EXTERNAL ALARM (0)
10						1-		2-								
11						1-		2-								
12						1-		2-								
13						1-		2-								
14						1-		2-								
15						1-		2-								
16						1-		2-								
17						1-		2-								
18						1-		2-								
19						1-		2-								
20						1-		2-								
21						1-		2-								
22						1-		2-								
23						1-		2-								
24						1-		2-								
25						1-		2-								
26						1-		2-								
27						1-		2-								
28						1-		2-								
29						1-		2-								
30						1-		2-								
31						1-		2-								
32						1-		2-								
33						1-		2-								
34						1-		2-								
35						1-		2-								
36						1-		2-								
37						1-		2-								
38						1-		2-								
39						1-		2-								
40						1-		2-								
41						1-		2-								
42						1-		2-								
43						1-		2-								
44						1-		2-								
45						1-		2-								

KSH/F
KSO/H
KSP/F
2-W DEC
2-W TONE

0 none
1 All calls
2 ICM calls
3 Off hook signalling

Exch group assigned in **02.**

Exch group assigned in **02.**
0 none
1 day
2 night
3 1+2

Exch group assigned in **02.**
0 none
1 day
2 night
3 1+2

0 no
1 yes

0 yes
1 no

0 key
2 2W Dec.
3 2W Tone

0 no
1 Exch
2 All calls
3 1+2

0 none
1 Zone 1
2 Zone 2
3 Zone 3
4 Zone 4

0 No restriction
1 Barred ISD
2 Limited ISD + STD
3 Barred ISD + STD
4 PABX calls only
5 Intercom calls only

0 no
1 yes

Telecom Australia

COMMANDER TELEPHONE SYSTEM ORDER MODEL ❑ BN1236 ❑ BN2464

Customers Name	Service No	Service Order No

STATION BASED OPTIONS

STN.	DESIGNATION AND/OR LOCATION	STN TYPE	**04.** PRIOR BREAK -IN (0)	**06.** LINE GROUP O/G 1st Exch Group (01)	2nd Exch Group (00)	**07.** LINE GROUP I/C 1st Group Exch Line Group (01)	1st Group Signal Mode (0)	2nd Group Exch Line Group (00)	2nd Group Signal Mode (0)	**08.** EACH STN ASSIGNMENT Night Rest (0)	Key Tone (1)	Stn Type (0)	DND (0)	Page Zone (0)	**40.** ACCESS CLASS (0)	**53.** AUDIBLE SIGNAL FOR EXTERN ALARMS (0)
46						1-		2-								
47						1-		2-								
48						1-		2-								
49						1-		2-								
50						1-		2-								
51						1-		2-								
52						1-		2-								
53						1-		2-								
54						1-		2-								
55						1-		2-								
56						1-		2-								
57						1-		2-								
58						1-		2-								
59						1-		2-								
60						1-		2-								
61						1-		2-								
62						1-		2-								
63						1-		2-								
64						1-		2-								
65						1-		2-								
66						1-		2-								
67						1-		2-								
68						1-		2-								
69						1-		2-								
70						1-		2-								
71						1-		2-								
72						1-		2-								
73						1-		2-								

KS H/F
KS O/H
KS P/F
2-W DEC
2-W TONE

0 none
1 All calls
2 ICM calls
3 Off hook signalling

Exch group assigned in **02.**

Exch group assigned in **02.**
0 none
1 day
2 night
3 1+2

Exch group assigned in **02.**
0 none
1 day
2 night
3 1+2

0 no
1 yes

0 yes
1 no

0 key
2 2W Dec
3 2W Tone

0 no
1 Exch
2 All calls
3 1+2

0 none
1 Zone 1
2 Zone 2
3 Zone 3
4 Zone 4

0 No restriction
1 Barred ISD
2 Limited ISD + STD
3 Barred ISD + STD
4 PABX calls only
5 Intercom calls only

0 no
1 yes

CDR PRINTOUT OPTIONS (See 03. sheet 2 also)

INCOMING CALLS

	Print all incoming calls
	Print incoming calls only if Account Code entered

ACCOUNT CODE FACILITY

	Provided		Not Provided
	Compulsory		Optional
	2 Wire Stn provided with Account code facility		
	2 Wire Stn not provided with Account code facility		

OUTGOING CALLS

Time delay for recording call duration

	1 Sec or 5 Secs after dialling completed

PRINT OUTGOING CALLS

	All outgoing calls, or exceeding 1 minute duration
60.	Exceeding specified number length
	— PABX Calls printed
	barred Stations outgoing calls printed
59.	Station for non-printing

Telecom Australia

COMMANDER TELEPHONE SYSTEM ORDER MODEL ☐ BN1236 ☐ BN2464

Customers Name | Service No | Service Order No.

PROGRAMMABLE OPTIONS

09. CALL FORWARDING PAIRS

Pair	EXEC No.	SEC. No
1	—	—
2	—	—
3	—	—
4	—	—
5	—	—
6	—	—
7	—	—
8	—	

Exec. Stns. must be assigned DND (see 08. sheets 3 and 4)

11. GROUP ASSIGNMENT FOR PILOT NO CALL

Pilot No	Stations assigned to Pilot group			
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				

12. STN RECEIVING DOORSTATION CALL

	Stn No
01	—
02	—
03	—
04	—
05	—
06	—
07	—
08	—
09	—
10	—

13. STN WITH DSS CONSOLE

DSS No.	Stn. No.	DSS No.	Stn. No.
01	—	03	—
02	—	04	—
		07	—
		08	—

(2 max on BN1236)

SYSTEM EASED OPTION

No	Facility	Data	Initial	Notes
15.	Tenant Working		(0)	0 disabled 1 enabled
16.	Off-hook Signalling on incoming Exch. calls		(0)	0 disabled 1 enabled
17.	Assigning Night Service		(0)	0 one night mode 1 grouped night mode
19.	Assigning External Paging Zones for all Call Paging		(0)	0 No ext zone activated 1 Ext. zone 1 activated 2 Ext zone 2 activated 3 1 & 2
20.	Automatic Incoming Exchange Call Pick-up		(0)	0 disabled 1 Exch. group answer 2 audible answer
22.	Exclusive Hold		(1)	0 disabled 1 enabled
23.	Timed Flash for PABX		(01)	0 disabled 01-20 (100m/sec 2 sec)
24.	ICM Call Mode		(0)	0 Voice call 1 Signal call
26.	External Music Source		(0)	0 Not connected 1 Connected
27.	Room Monitoring		(0)	0 disabled 1 enabled
32.	Doorstation Chime		(0)	0 twice 1 30 sec
47.	Auto Pick-up of I-Hold Line		(0)	0 disabled 1 enabled
52.	Splash Tone on Paging		(1)	0 disabled 1 enabled
57.	Increase Intercom Links		(00)	Enter the first Exchange No to be converted to an Intercom Link

TIMERS

Timer	Initial	Required
35. Exclusive Hold Recall Timer	90 Sec	
36. Recall Duration for Exclusive Hold	20 Sec	
37. I-Hold Recall Timer	90 Sec	
38. Release Time of Ring Inward	40 Sec	
39. I-Hold Transfer Timer	40 Sec	

ACCESS BARRING PERMIT CODES

41. Allowed STD/ISD Codes	**44.** Common Allowed Codes
	(000)
	(008)
	(019)
	Vacant
	(4 digits max)

43. PABX Access Codes

(8 digits max) (2 digits max)

18. SIGNALLING TO EXTERNAL PAGING

Ext. Paging Zone	Audible Sig Exch Group (00)	Background Music (0)	Audible Sign. Alarm 2 (0)	Audible Sign. Alarm 1 (0)
1				
2				
	Exch Line Group 00-24	0 None 1 Yes	0 None 1 Yes	

28. ALARM OPTION

Alarm	Required (0)	Closed/Open (0)
1		
2		
	0 No 1 Yes	0 Closed On 1 Open On

2.3 LOCATION AND MOUNTING OF EQUIPMENT

2.3.1 General Requirements

Equipment must be located in positions that allow good access for maintenance activities.

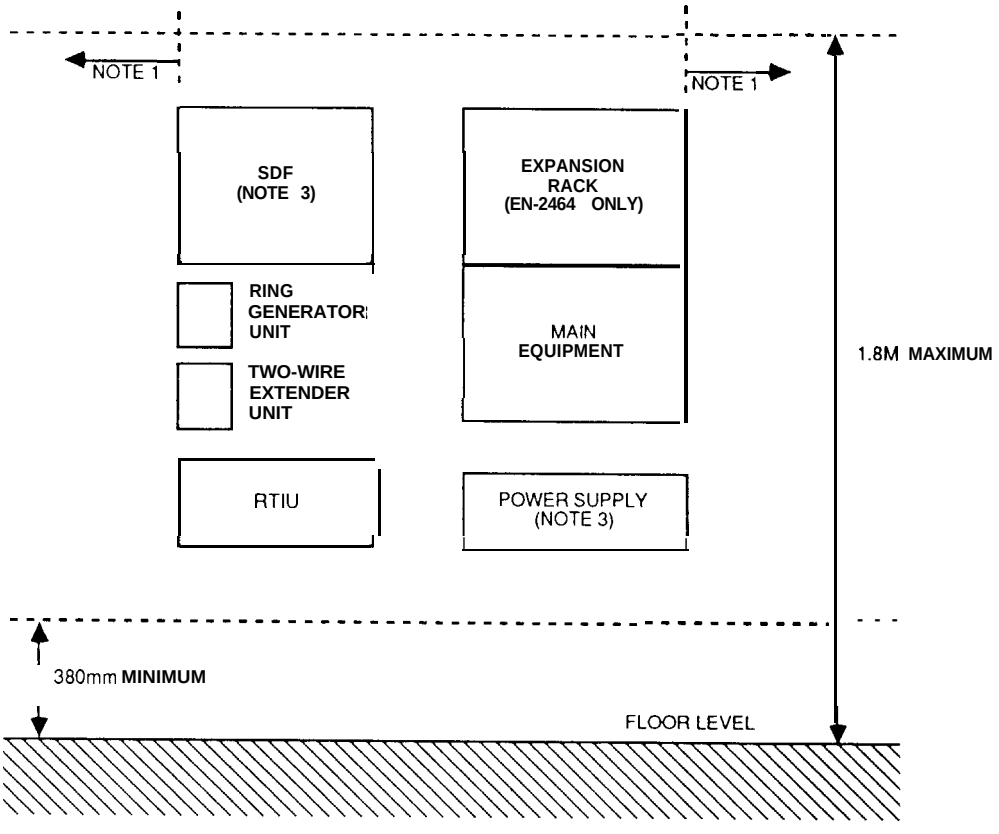
The customer is responsible for providing satisfactory lighting for installation and maintenance activities.

The customer is to provide a single phase 220-250V, 10 Amp, 50Hz AC general purpose outlet within 1 metre of the equipment. The power outlet must be correctly earthed.

When wall mounting the equipment, allowance should be made for at least 300mm clear wall space on each side and 1 metre of clear floor space in front of the equipment.

Wall mounted equipment should be mounted at least 380 mm and no more that 1.8m from the floor as indicated in fig. 2.3.1.

Further mounting details for the main equipment are provided in Section 2.3.2.



Notes:
1. Minimum clearance of 300mm on each side.
2. The drawing is not to scale.
3. The power supply and SDF are integral to the BN-824 Main Equipment.

FIG. 2.3.1 LIMITATIONS ON WALL MOUNTING.

2.3.2 BN-824 and BN-1236 Main Equipments

The cabinet dimensions for the BN-824 and BN-1236 Main Equipment are shown in figures 2.3.2(a) and (b).

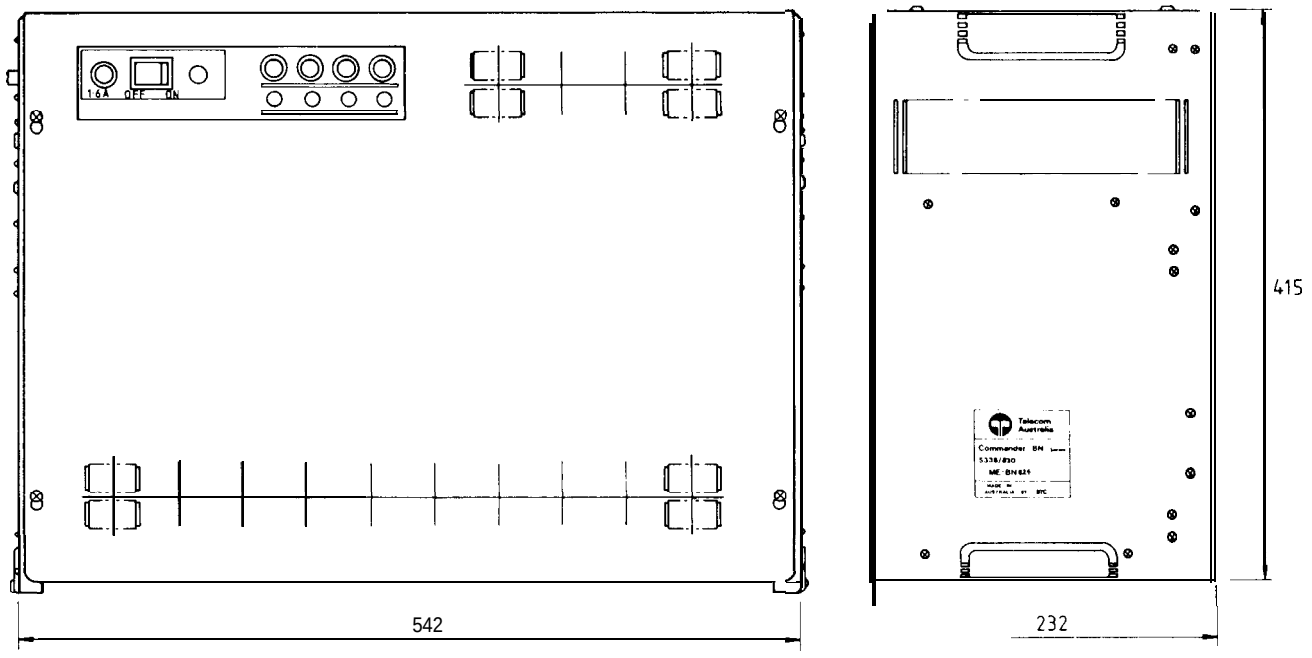


FIG. 2.3.2(a) BN-824 MAIN EQUIPMENT CABINET DIMENSIONS

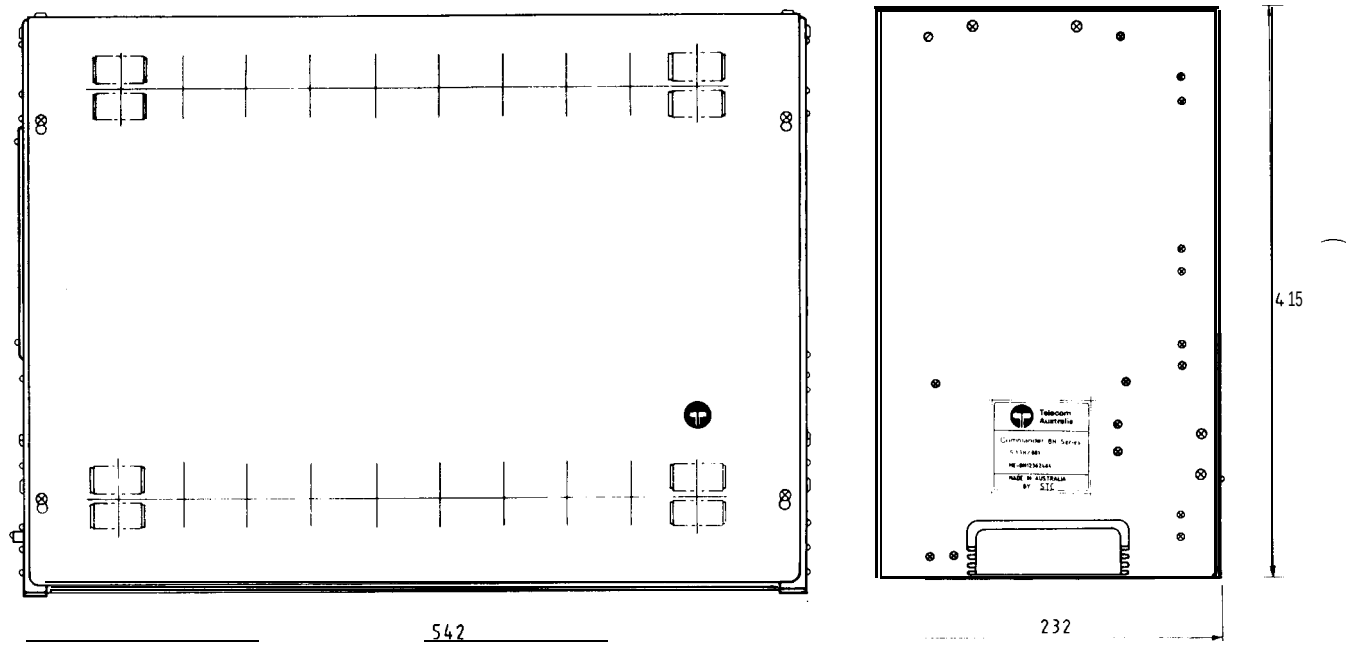


FIG. 2.3.2(b) BN-1236 MAIN EQUIPMENT CABINET DIMENSIONS

The BN-824 and BN-1236 main equipment cabinets are wall mounted as follows. Refer to figure 2.3.2 (c).

- Attach the wall mounting bracket to the wall using the five wood screws provided.
- Attach the two side brackets to the cabinet using the screws already inserted in the side bracket mounting holes ensuring that the side brackets are turned inwards behind the cabinet.
- Hang the main equipment on the wall mounting bracket after removing the locking screws.
- Fasten the main equipment to the wall mounting bracket by inserting the locking screws onto the sides of the main equipment.

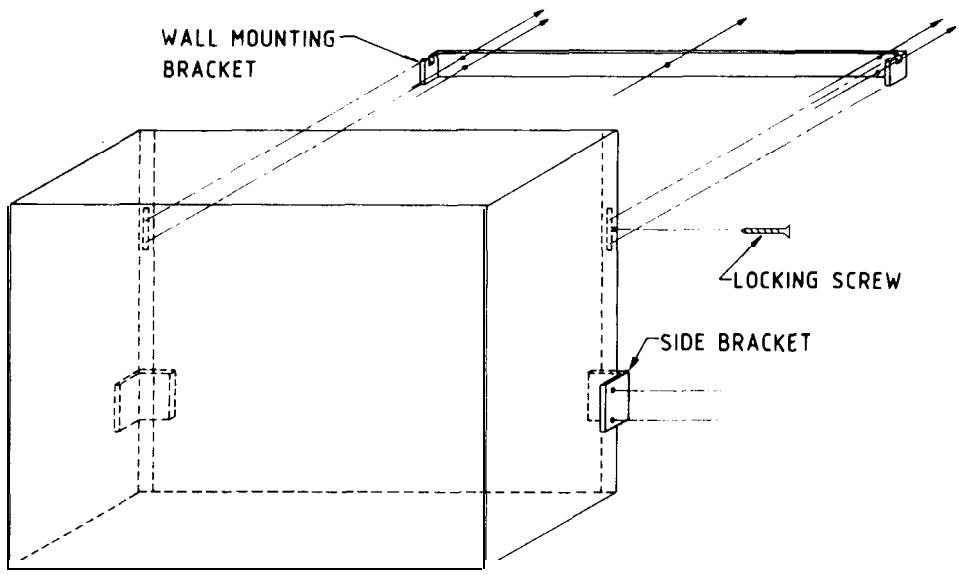


FIG 2.3.2(c) WALL MOUNTING OF MAIN EQUIPMENT CABINET

2.3.3 BN-2464 Expansion Rack

The cabinet dimensions for the Expansion Rack are shown in figure 2.3.3 (a).

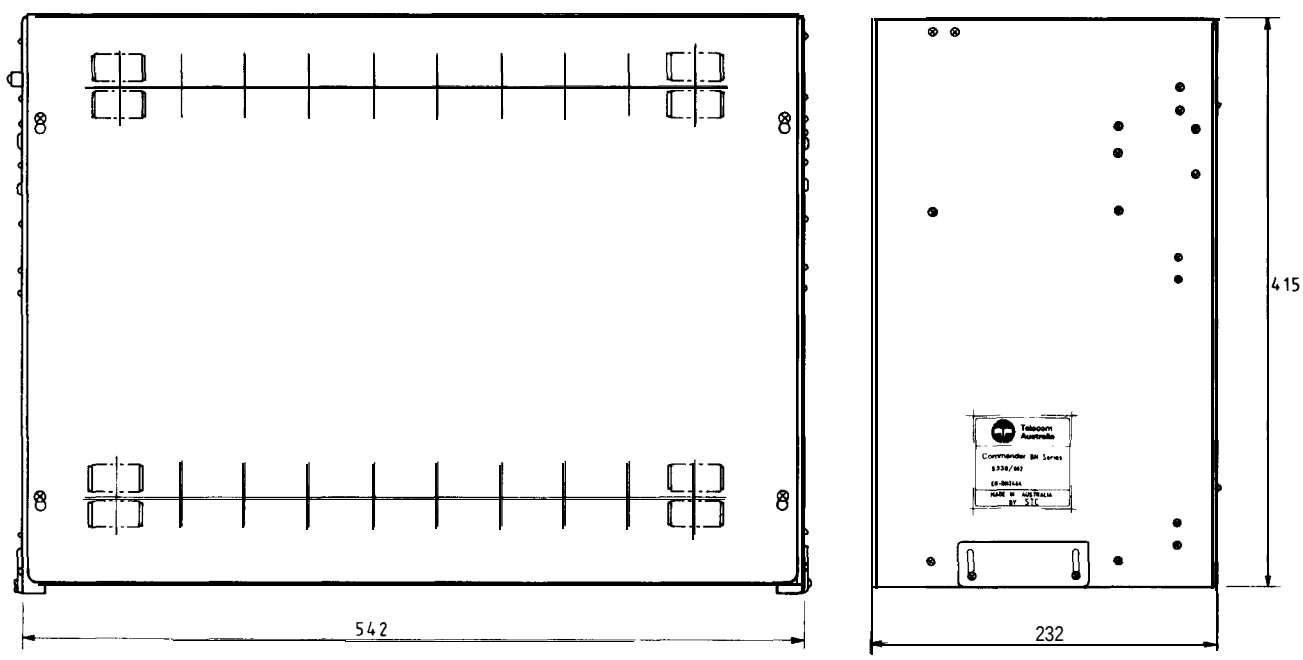


FIG. 2.3.3(a) BN-2464 EXPANSION RACK CABINET DIMENSIONS

The BN-2464 Expansion Rack (ER) cabinet is mounted as follows. Refer to figure 2.3.3(b).

- Remove the top of the main equipment cabinet and transfer it to the expansion rack cabinet.
- Place the ER cabinet on top of the main equipment cabinet locating the ER cabinet using the embossing on the ME side plates.
- Fasten the ER cabinet to the ME cabinet using the locking plates on either side of the ER cabinet.

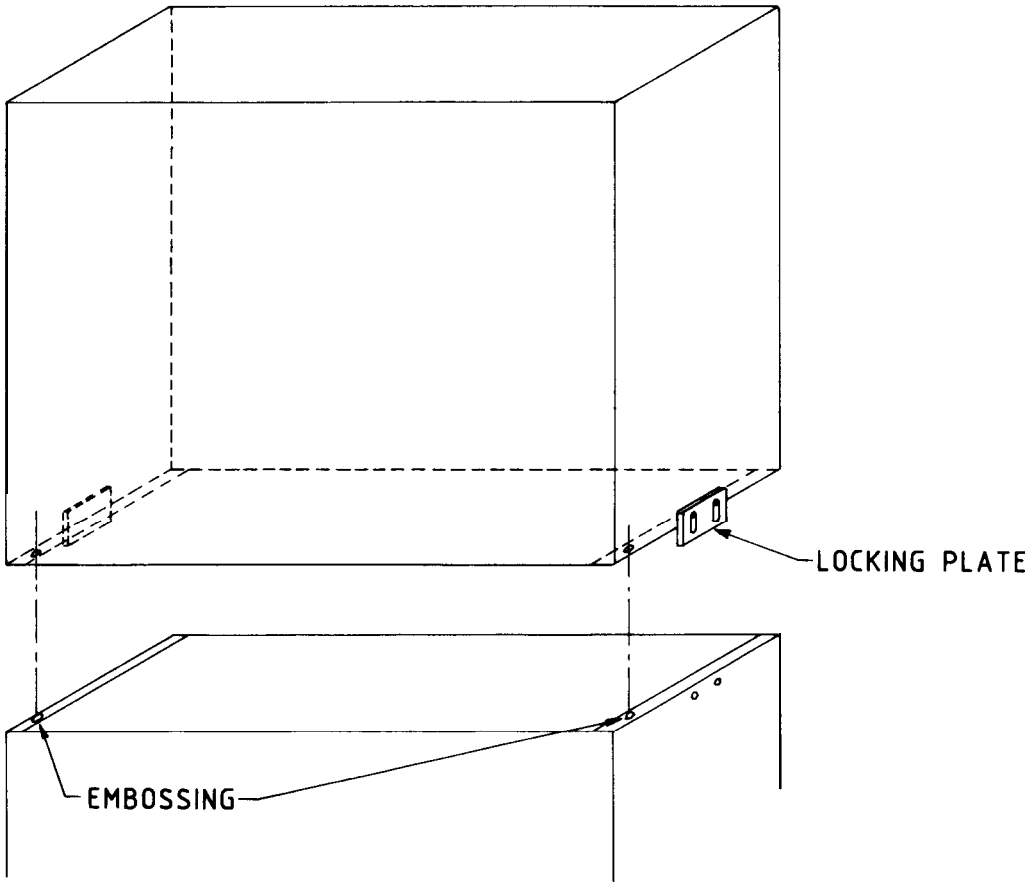


FIG. 2.3.3 (b) WALL MOUNTING OF BN-2464 EXPANSION RACK CABINET

2.3.4 BN-1236/2464 Power Supply

The dimensions for the Power Supply are shown in fig. 2.3.4.(a)

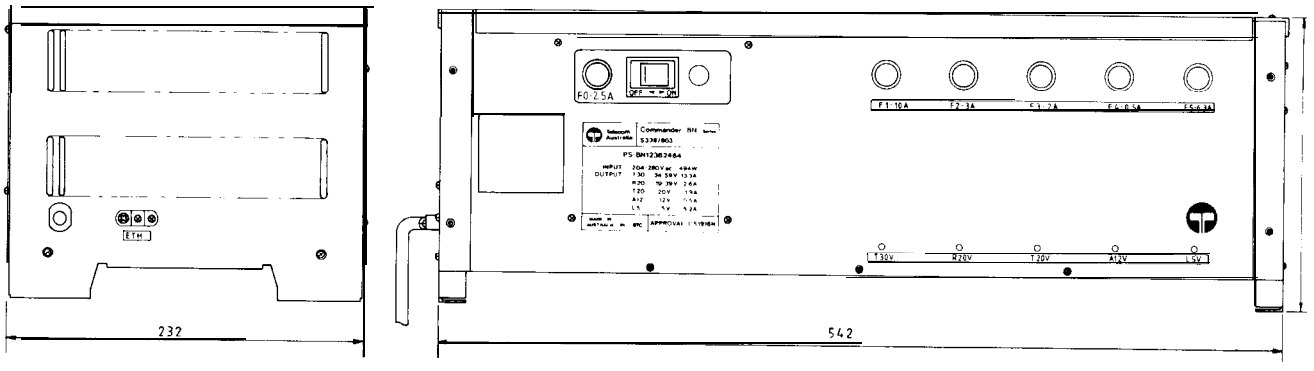


FIG. 2.3.4.(a) BN-1236/2464 POWER SUPPLY DIMENSIONS

The power supply is wall mounted as follows. Refer to figure 2.3.4(b).

- Attach the wall mounting bracket to the wall using the 5 wood screws provided.
- Attach the base bracket to the underside of the power supply using the screws already inserted in the base bracket mounting holes.
- Hang the power supply on the wall mounting bracket.
- Fasten the base of the power supply by tightening a wood screw through the slot of the base bracket.

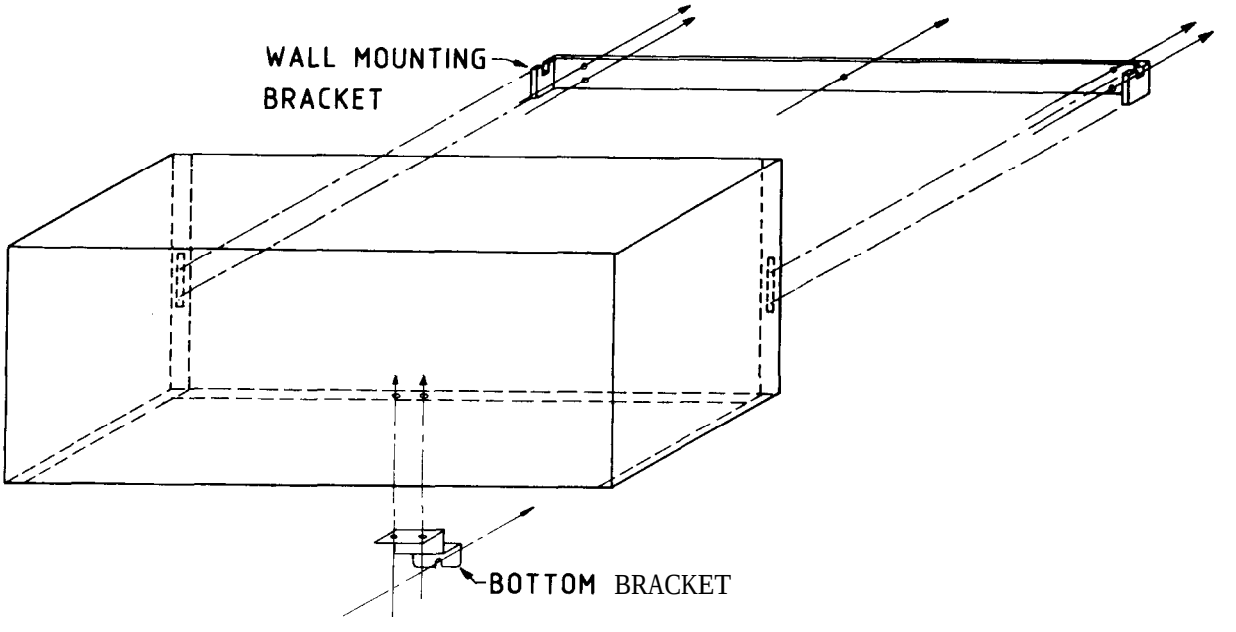


FIG. 2.3.4.(b) WALL MOUNTING THE POWER SUPPLY. PS-BN12362464

2.3.5 Key Stations

There are two types of key stations available with this system. They are the Handsfree and On-Hook stations, and each are available in 8, 12 or 24 line versions.

2.3.5.1 Wall Mounting of Key Stations

The following steps describe the wall mounting of key stations. Refer to fig. 2.3.5 (a), (b) and (c).

- Remove sub-base unit from the station and disconnect the ribbon cable from the PBA.
- Rotate the sub-base so that the label is upside down.
- Attach the sub-base to the wall by using the four screws provided. Do not overtighten screws.
- Insert the handset hanger in the holes below the hookswitch button on the station.
- Mount the telephone plug and socket immediately below the sub-base on the wall.
- Attach the station to the sub-base, making sure that the line cord is threaded through the notches provided in the base. (Re-connect the ribbon cable to the PBA).
- The line cord may be hidden underneath the station.

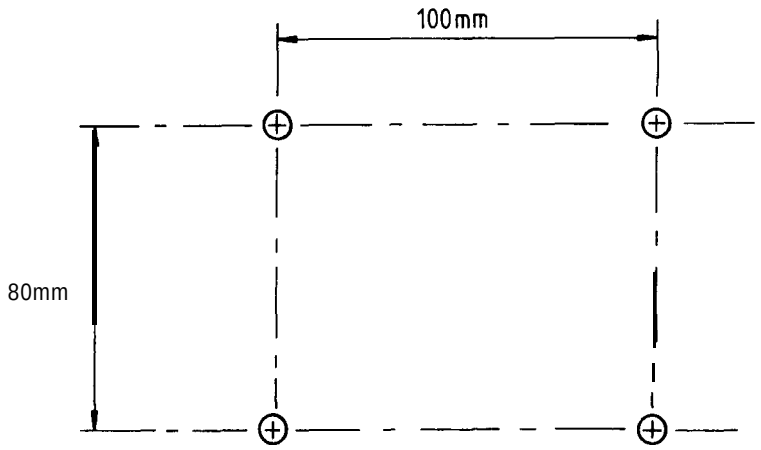


FIG. 2.3.5(a) WALL MOUNTING DIMENSIONS FOR KEY STATIONS

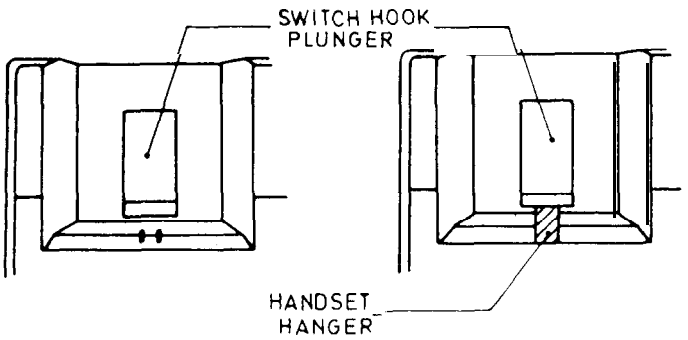


FIG. 2.3.5(b) INSTALLING THE HANDSET HANGER

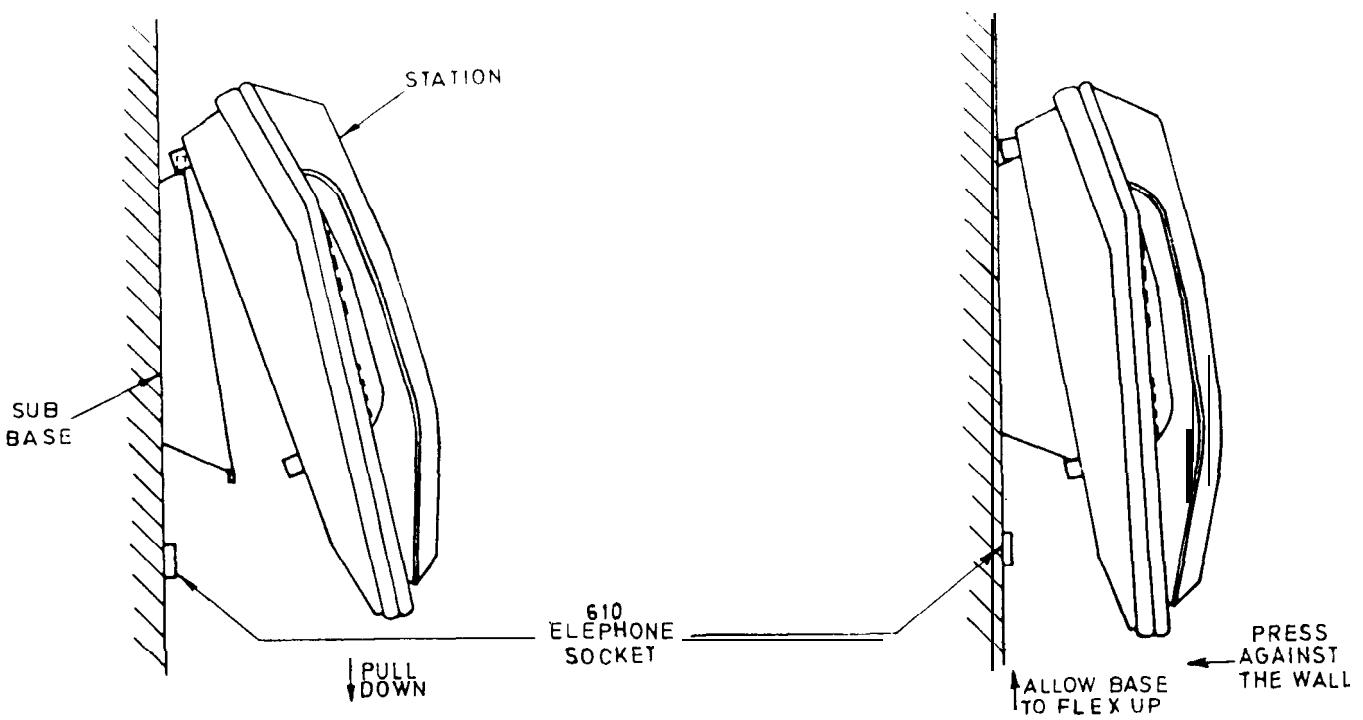


FIG. 2.3.5(c) WALL MOUNTING THE KEY STATIONS

2.3.5.2 **Colour Panels and Labels**

The colour panels may be changed by unclipping the panel and replacing it with the new panel as shown in fig 2.3.5(d). The DSS/Repertory Dial Designation Label can be changed by pressing down on the left hand side of the label cover and replacing the label with a new label as shown in fig 2.3.5 (d).

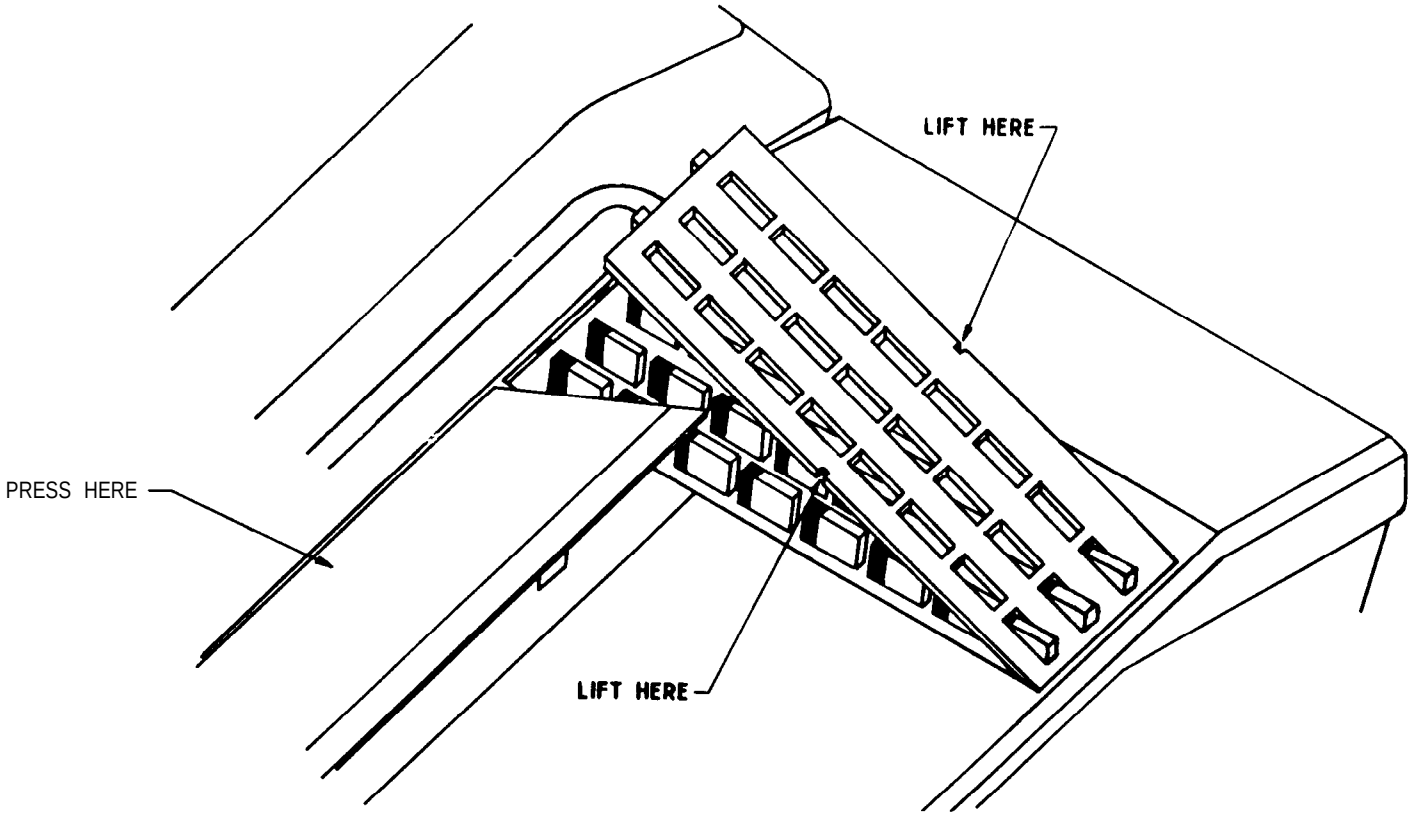


FIG. 2.3.5(d) INSTALLATION OF THE KEY STATION COLOUR PANEL AND LABEL

2.3.5.3 **Powerfail Dial**

A powerfail dial may be installed in a Handsfree or On-Hook station as follows (refer to fig. **2.3.5(e))**

- Loosen the two screws holding the station case to the base moulding.
- Lift the case from the base, unclipping the ribbon cable between the keyblock and station board and the connections for the speaker, microphone and volume control.
- Install the powerfail board PFB-BN-A in the space next to the station board and fasten the board with the screw and washer.
- Remove the link S1 on the Station Board.
- Select either DTMF or Decadic dialling by setting the links Sl and S2 on PFB-BN-A as follows.
  Decadic Dialling: connect a link on S1 and remove the link on S2.
  DTMF Dialling: remove the link on Sl and connect a link between pins 2 and 3 on S2.
- Connect the ribbon cable between the powerfail dial board PF connector and the PF connector on the station board.
- Connect the ribbon cable between the powerfail dial CN1 and connector CN2 on the keyblock.
- Replace the ribbon cable between the keyboard and connector CN1 on the station board. Re-connect the volume control to the VR1 connector, the speaker to the SPKR connector and the microphone to the MIC connector.
- Re-assemble the station and tighten the screws.

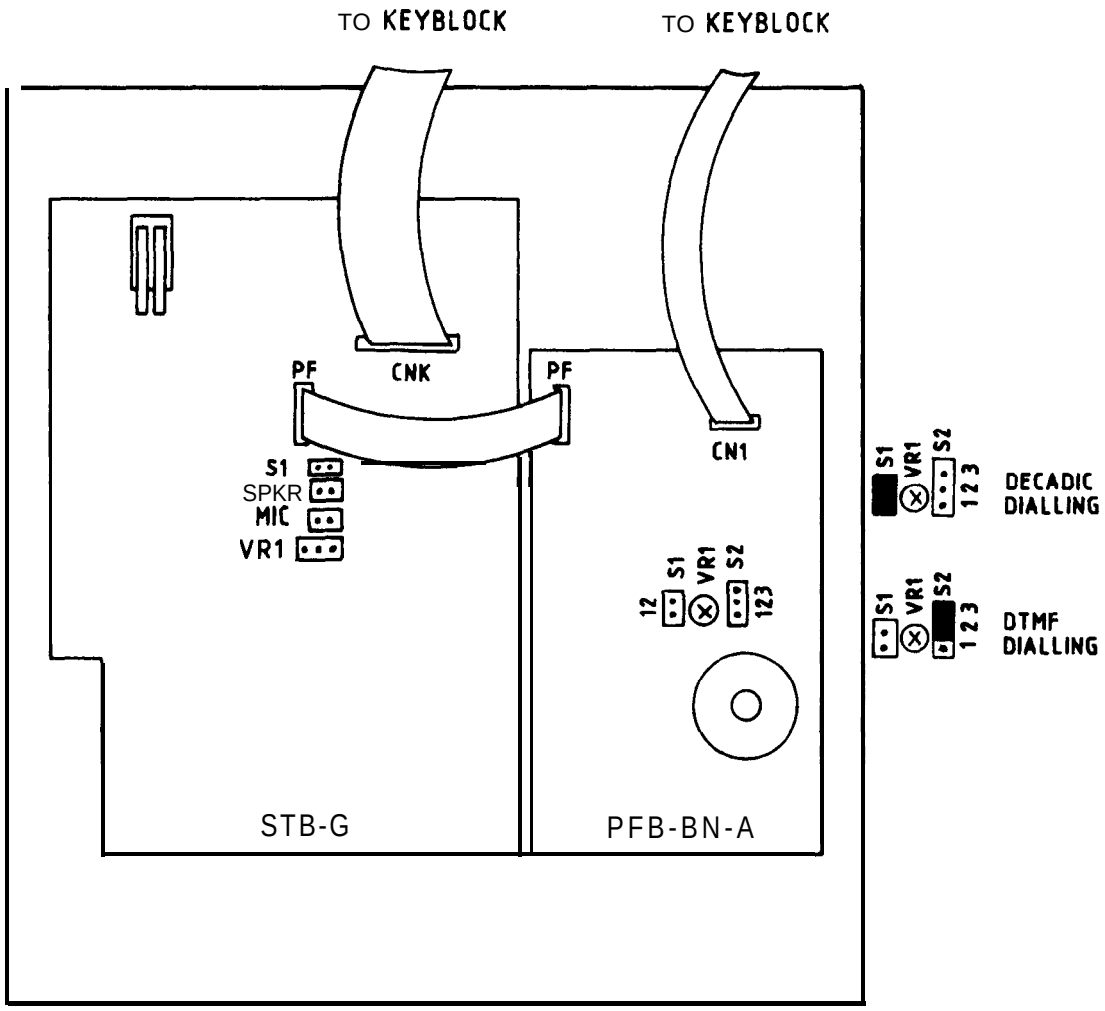


FIG. 2.3.5(e) INSTALLATION OF THE POWERFAIL DIAL

2.3.5.4 Headset Adaptor Kit

The Headset Adaptor Kit may be installed in a Handsfree or On-Hook station as follows:

- Remove the sub-base from the station
- Disconnect the ribbon cable from the PBA in the sub-base
- Connect the ribbon cable between the connector on the Headset Adaptor Board and connector CN2 on the underneath of the station board.
- Attach the sub-base with the Headset Adaptor Kit to the station.

NOTE: A handsfree station loses the handsfree facility when the headset adaptor kit is installed.

2.3.6 Door Stations

The following steps describe the wall mounting of door stations. Refer to figure 2.3.6

- Remove the base of the door station.
- Attach the base to the wall using the two screws provided. Do not overtighten the screws.
- Pass the cable through the base using the cable entry at the bottom right hand corner of the base.
- Terminate the cable.
- Attach the door station to the base.

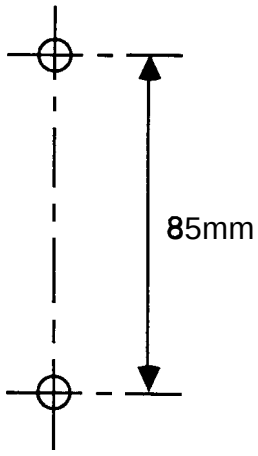


FIG. 2.3.6 WALL MOUNTING DIMENSIONS FOR DOOR STATIONS

2.3.7 Station Based Alarms

The following steps describe the wall mounting of station based alarms. Refer to figure 2.3.7.

- Unclip the base of the station based alarm.
- Pass the cable through the base using the cable entry at the top left hand corner of the base.
- Attach the base to the wall using the two screws provided. Do not over tighten the screws.
- Terminate the cable.
- Set the links on the board as required.
- Attached the station based alarm to the base.

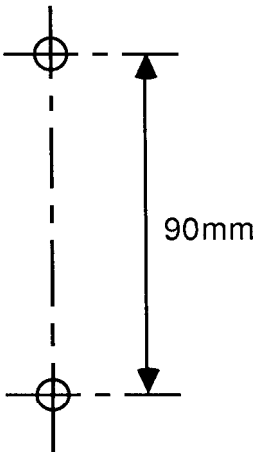


FIG. 2.3.7 WALL MOUNTING DIMENSIONS FOR STATION BASED ALARMS

2.3.8 Test and Programming Unit

The Test and Programming Unit plugs into the Station 10 socket. Replace the station currently inserted into the Station 10 socket with the Test and Programming Unit.

2.3.9 Auxiliary Equipment

2.3.9.1 System Distribution Frame (SDF)

The SDF provides a common terminating point for the main equipment, expansion rack if the system is BN-2464, stations and other ancillary equipment.

The SDF is constructed using the Krone 'LSA' plus terminating system.

Two 10 Module Backmount Units are required for a BN-1236 system while three 10 Module Backmount Units are required for a BN-2464 system. The BN-824 system has the SDF included in the BN-824 Main Equipment.

Each Backmount Unit is supplied with two brackets which slip onto the ends of the metal backmount channel. The assembled units are then fastened to the wall using screws inserted through slotted mounting holes in each bracket.

If a frame cover is required, ensure that the bracket incorporating the locking bar is at the bottom of the assembled unit.
The SDF terminal requirements are:

	BN-824	BN-1236	BN-2464
SDF size	100 pairs	125 pairs	225 pairs
Amp Champ Connectors	4	5	9
Krone Modules	10	13	**23**

2.3.9.2 Powerfail Bell

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

2.3.9.3 Two-Wire Extender Unit (2WEU-AN)

The unit is located on the wall, adjacent to the main equipment.For distances between mounting hole centres refer to fig. 2.3.9(a).

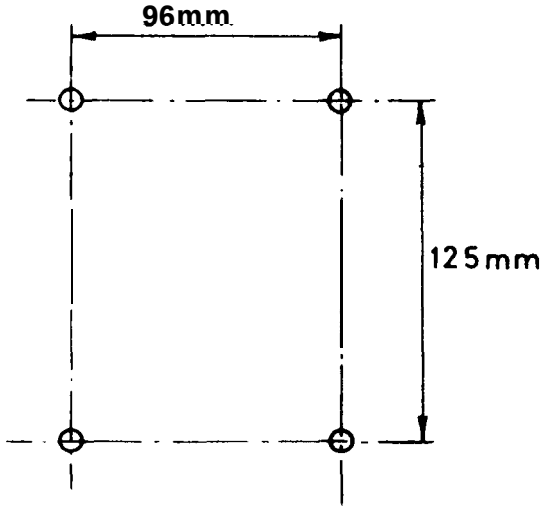


FIG. 2.3.9(a) WALL MOUNTING 2WEU-AN

2.3.9.4 **Tie Line Unit (RTIU)**

The unit is located on the wall, normally adjacent to the main equipment. For distances between the mounting hole centres refer to fig. 2.3.9(b).

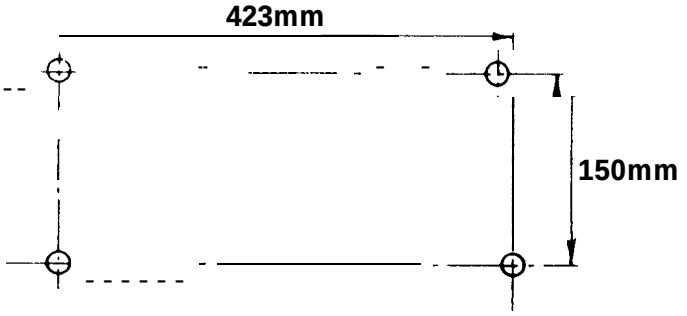


FIG. 2.3.9(b) WALL MOUNTING OF RTIU

2.3.9.5 **Call Metering Unit**

The unit is fixed to the wall adjacent to the system distribution 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 fig. 2.3.9(c).

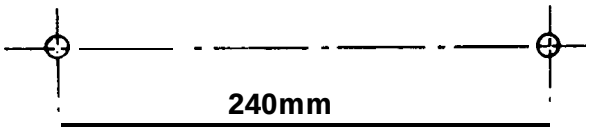


FIG 2.3.9(c) WALL MOUNTING DIMENSIONS FOR CALL METERING UNIT

2.3.9.6 **Ring Generator Unit**

The unit is fixed to the wall adjacent to the system distribution frame. Remove the cover by loosening the four retaining screws. Screw the base to the wall (refer to fig. 2.3.9(d) for hole centres). Replace the cover after terminating the wiring on the terminal block.

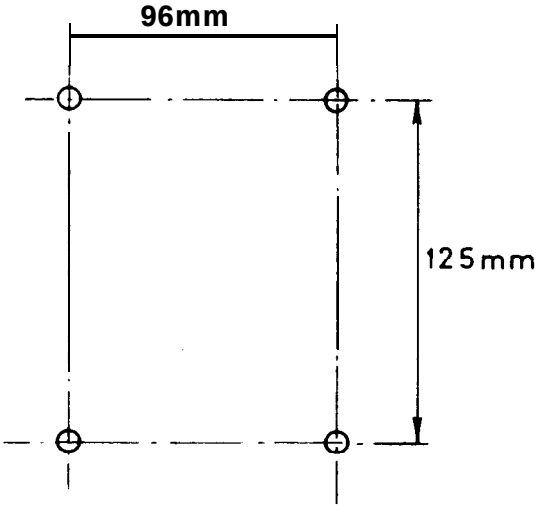


FIG. 2.3.9(d) WALL MOUNTING DIMENSIONS FOR RING GENERATOR UNIT

2.3.9.7 Call Details Recorder

The jack assembly is mounted on the main equipment to provide a connection for the RS-232C cable to the printer. Any printer providing 80 column width and a standard RS-232C interface with 7 bit word, even parity and 150, 300, 600, 1200, 2400, 4800, 9600 or 19200 baud may be used. The switch on the jack assembly must be set to **IN SERVICE** when the printer has been installed. The switch must be set to OUT **OF SERVICE** when the printer paper is being changed, then set back to IN SERVICE when the printer paper is lined up for the top of the page and the printer is ready.

Remove the plastic cover on the left hand side of the Main Equipment and replace with the jack assembly as shown in figure 2.3.9(e). Plug the ribbon cable from the jack assembly into connector CN1 of the CDRB-BN-A board.

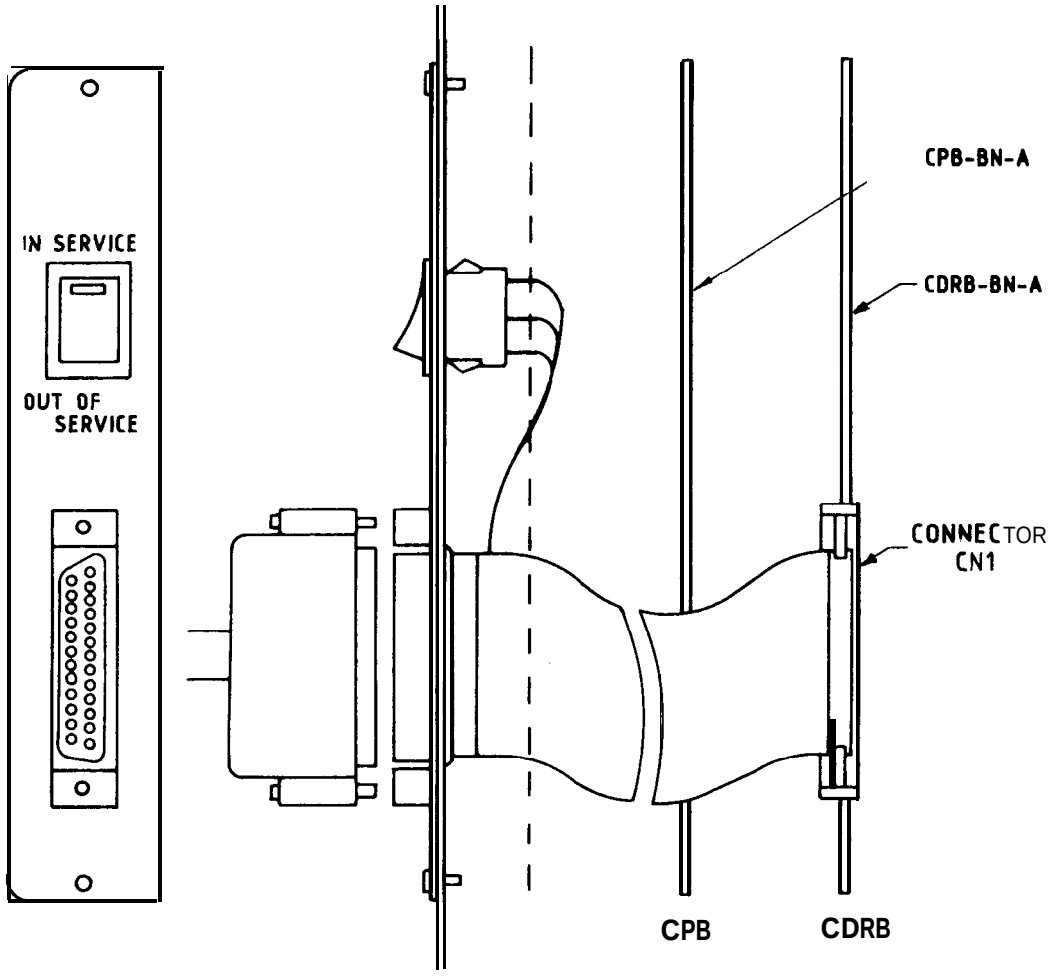


FIG. 2.3.9(e) MOUNTING OF JACK ASSEMBLY

2.4 CABLING AND TERMINATIONS

2.4.1 Cabling Scheme

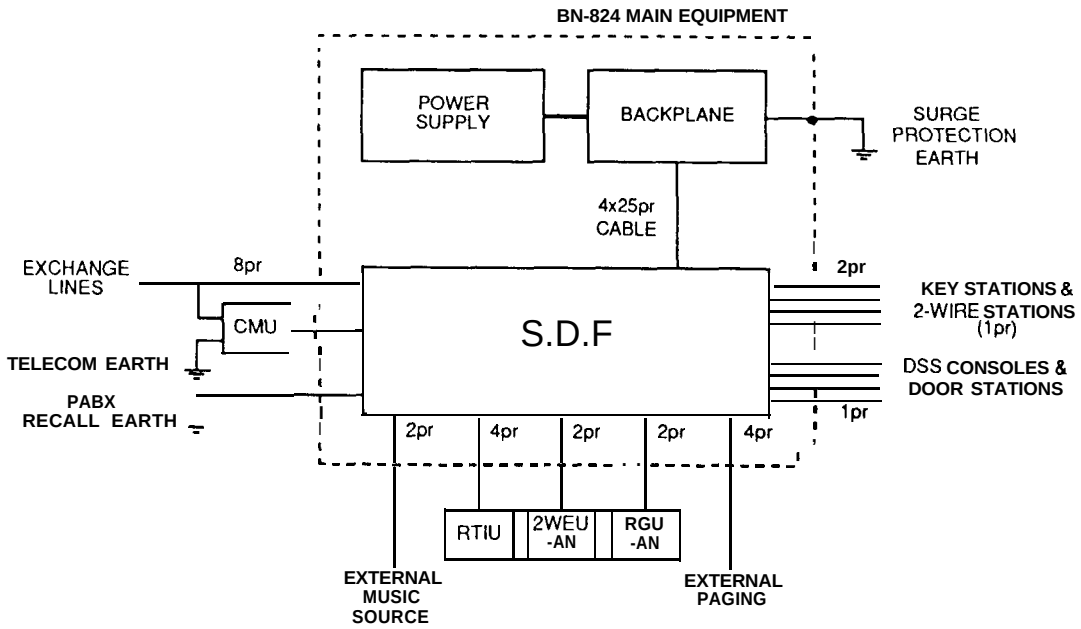


FIG 2.4.1 (a) CABLING SCHEME FOR BN-824

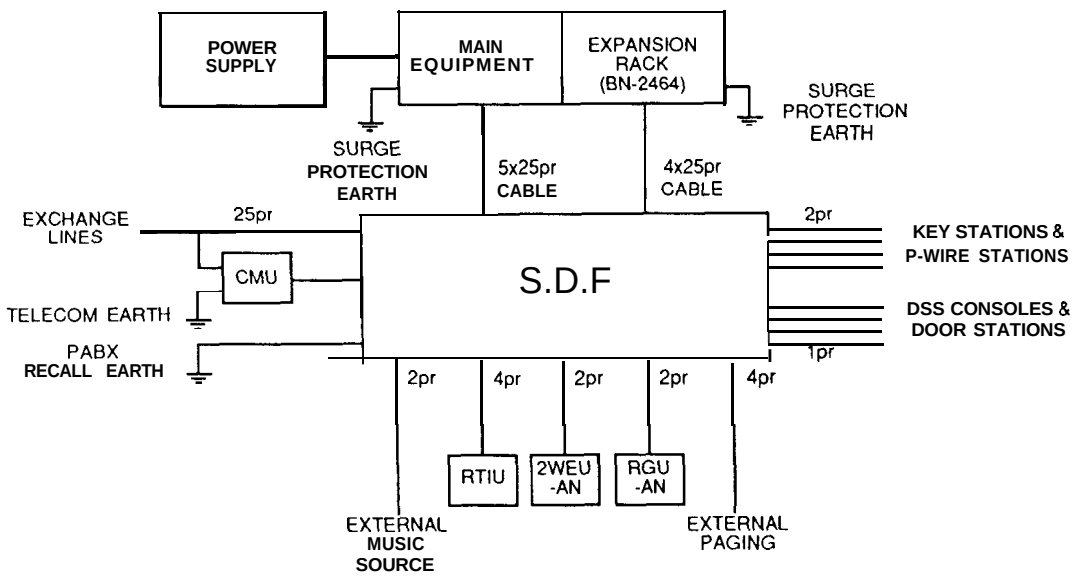


FIG. 2.4.1 (b) CABLING SCHEME FOR BN-1236/2464

2.4.2 BN-1236/2464 Power Supply

The power supply connects to the BN-1236 Main Equipment via the power supply cable. Connect the cable from the power supply to connector “POW” on the Main Equipment backplane with the power off.

2.4.3 BN-2464 Expansion Rack

The BN-2464 expansion rack is connected to the BN-1236 main equipment via two ribbon cables and two sets of power cables. Connect CN1, CN2 and CN3 of the expansion rack to CN1, CN2 and CN3 of the main equipment as shown in fig. 2.4.3.

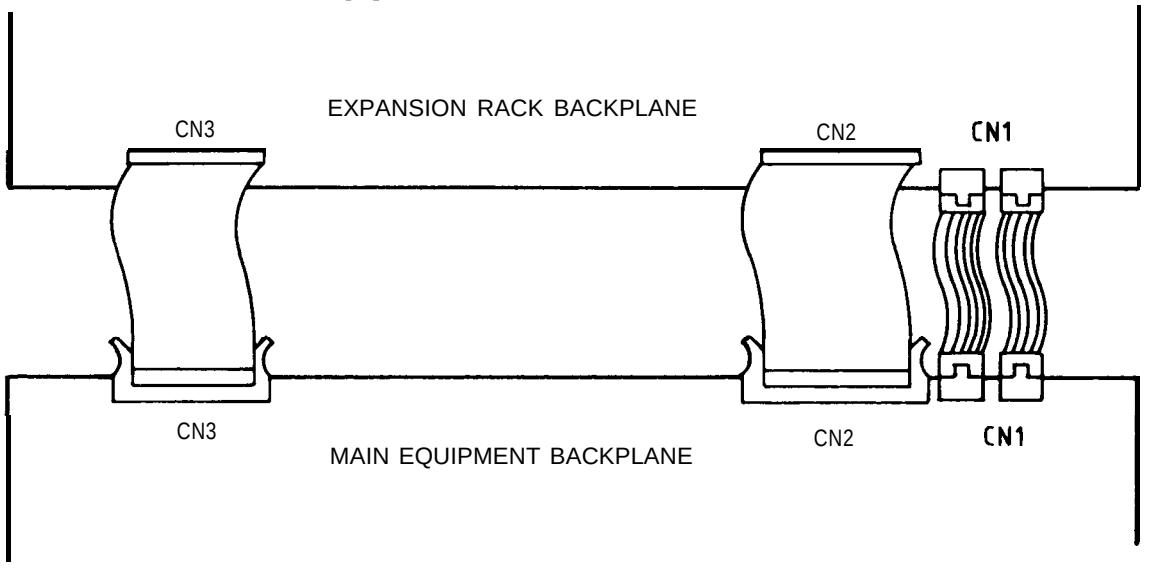


FIG. 2.4.3 BN-2464 EXPANSION RACK CONNECTION TO BN-1236 MAIN EQUIPMENT

2.4.4 Amp Champ Connectors

The main equipment is connected to the SDF via cables terminated, at the main equipment end, on 50 pin AMP Champ connectors. Pre-terminated cable tails can be used.

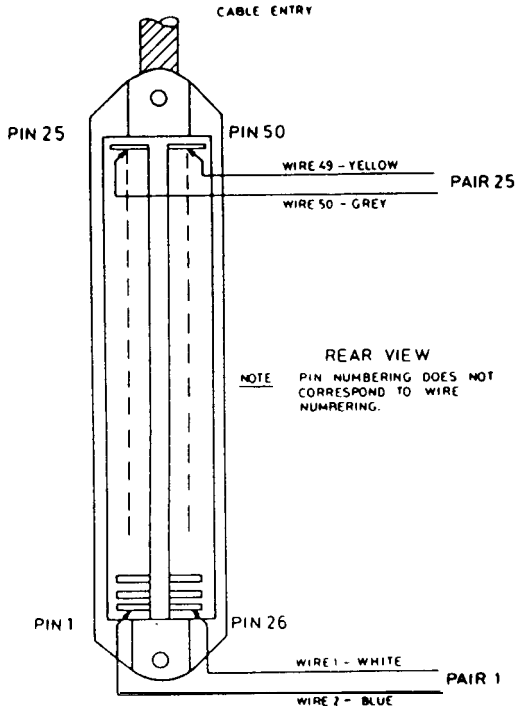


FIG. 2.4.4 AMP CHAMP CONNECTOR — CABLE TERMINATION

Cables should be terminated in the following order, pair one located on pins numbered 1 and 26, with the colour on pin 1 and the mate on pin 26. Note the cable entry shown in fig. 2.4.4.

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

2.4.5 System Distribution Frame Cabling

The SDF uses the LSA Plus terminating system. Refer to TPH0216 "LSA Plus Terminating System".

The cables from the main equipment and/or expansion rack are terminated at the SDF in colour code sequence commencing from the bottom row.

Wire designations for the systems are listed in Table 2.4.5. 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 sales form.

Station cabling should be terminated on the bottom row of terminals of each module.

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

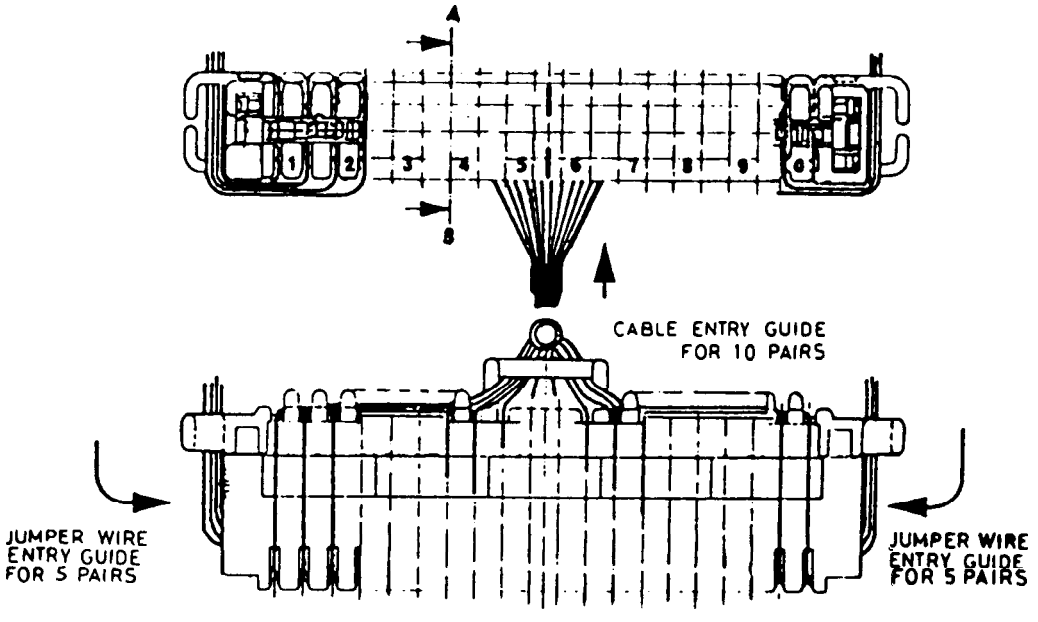


FIG. 2.4.5 KRONE TERMINAL MODULE - CABLE TERMINATION

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 fig. 2.4.5 and terminated on the bottom row of the module.

The SDF is located inside the Main Equipment of the BN-824 system.

KR1		
SIGNAL	SDF PAIR	DESC.
LN1	1	L1A L1B
LN2	2	L2A L2B
LN3	3	L3A L3B
LN4	4	L4A L4B
LN5	5	L5A L5B
LN6	6	L6A L6B
LN7	7	L7A L7B
LN8	8	L8A L8B
	9	
EARTH RECALL	10	PBX EARTH

KR2		
SIGNAL	SDF PAIR	DESC.
PFB1	11	BEL1A BEL1B
PFB2	12	BEL2A BEL2B
PFB3	13	BEL3A BEL3B
PFB4	14	BEL4A BEL4B
PFB5	15	BEL5A BEL5B
PFB6	16	BEL6A BEL6B
PFB7	17	BEL7A BEL7B
PFB8	18	BEL8A BEL8B
	19	
	20	

KR3		
SIGNAL	SDF PAIR	DESC.
STA 10	21 22	10WT 10BL 10RD 10BK
STA 11	23 24	11WT 11BL 11RD 11BK
STA 12	25 26	12WT 12BL 12RD 12BK
STA 13	27 28	13WT 13BL 13RD 13BK
	29	
	30	

KR4		
SIGNAL	SDF PAIR	DESC.
STA 14	31 32	14WT 14BL 14RD 14BK
STA 15	33 34	15WT 15BL 15RD 15BK
STA 16	35 36	16WT 16BL 16RD 16BK
STA 17	37 38	17WT 17BL 17RD 17BK
	39	
30V(1) SUPPLY	40	30V+ 30V−

KR5		
SIGNAL	SDF PAIR	DESC.
STA 18	41 42	18WT 18BL 18RD 18BK
STA 19	43 44	19WT 19BL 19RD 19BK
STA 20	45 46	20WT 20BL 20RD 20BK
STA 21	47 48	21WT 21BL 21RD 22BK
	49	
	50	

KR6		
SIGNAL	SDF PAIR	DESC.
STA 22	51 52	22WT 22BL 22RD 22BK
STA 23	53 54	23WT 23BL 23RD 23BK
STA 24	55 56	24WT 24BL 24RD 24BK
STA 25	57 58	25WT 25BL 25RD 25BK
	59	
	60	

TABLE 2.4.5 (a) BN-824 MAIN EQUIPMENT
SYSTEM DISTRIBUTION FRAME ASSIGNMENT

KR7		
SIGNAL	SDF PAIR	DESC.
STA 26	61	26WT 26BL
	62	26RD 26BK
STA 27	63	27WT
	64	27RD 27BK
STA 28	65	28WT 28BL
	66	28RD 28BK
STA 29	67	29WT 29BL
	68	29RD 29BK
	69	
30V(2) SUPPLY	70	30V+ 30V−

KR8		
SIGNAL	SDF PAIR	DESC.
STA 30	71	3oWT 30BL
	72	31RD 30BK
STA 31	73	31WT 31BL
	74	31RD 31BK
STA 32	75	32WT 32BL
	76	32RD 32BK
STA 33	77	33WT 33BL
	78	33RD 33BK
	79	
	80	

KR9		
SIGNAL	SDF PAIR	DESC.
DSS1	81	D1RD D1BK
DSS2	82	D2RD D2BK
DSS11	83	D11RD D11BK
DSS12	84	D12RD D12BK
DOOR 1	85	DR1RD DR1BK
DOOR2	86	DR2RD DR2BK
TO MOH SOURCE	87	MOH A MOH B
	88	MHC A MHC B
TO BGM SOURCE	89	BGMA BGM B
	90	

KR10		
SIGNAL	SDF PAIR	DESC.
EXT SPKR1	91	EXT1A EXT1B
	92	ETC1A ETC1B
EXT SPKR2	93	EXT2A EXT2B
	94	ETC2A ETC2B
CNTL SOURCE1	95	CNTL1A CNTL1B
CNTL SOURCE2	96	CNTL2A CNTL2B
CNTL SOURCE3	97	CNTL3A CNTL3B
CNTL SOURCE4	98	CNTL4A CNTL4B
CNTL SOURCE5	99	CNTL5A CNTL5B
CNTL SOURCE6	100	CNTL6A CNTL6B

TABLE 2.4.5(a) BN-824 MAIN EQUIPMENT SYSTEM DISTRIBUTION FRAME ASSIGNMENT

CONNECTOR A SIGNAL	DESIG	PIN	SDF PAIR	DESC
	LN1	26 1	1	L1A L1B
	LN2	27 2	2	L2A L2B
E	LN3	28 3	3	L3A L3B
x L c I	LN4	29 4	4	L4A L4B
H N A E	LN5	30 5	5	L5A L5B
N S G	LN6	31 6	6	L6A L6B
E	LN7	32 7	7	L7A L7B
	LN8	33 8	8	L8A L8B
	PFB1	34 9	11	BEL1A BEL1B
P 0	PFB2	35 10	12	BEL2A BEL2B
W B E E	PFB3	36 11	13	BEL3A BEL3B
R L F L	PFB4	37 12	14	BEL4A BEL4B
A S I	PFB5	38 13	15	BEL5A BEL5B
L	PFB6	39 14	16	BEL6A BEL6B
	PFB7	40 15	17	BEL7A BEL7B
	PFB8	41 16	18	BEL8A BEL8B
		42 17		
		43 18		
		44 19		
		45 20		
		46 21		
		47 22		
		48 23		
		49 24		
]EARTH]RECALL	ER	50 25	10	PBX EARTH

CONNECTOR B SIGNAL	DESIG	PIN	SDF PAIR	DESC
	AL1	26	21	10WT
STA	AL2	1		10BL
10	BD+	27	22	10RD
	BD−	2		10BK
	AL1	28	23	11WT
STA	AL2	3		11BL
11	BD+	29	24	11RD
	BD−	4		11BK
	AL1	30	25	12WT
STA	AL2	5		12BL
12	BD+	31	26	12RD
	BD−	6		12BK
	AL1	32	27	13WT
STA	AL2	7		13BL
13	BD+	33	28	13RD
	BD−	8		13BK
	AL1	34	31	14WT
STA	AL2	9		14BL
14	BD+	35	32	14RD
	BD−	10		14BK
	AL1	36	33	15WT
STA	AL2	11		15BL
15	BD+	37	34	15RD
	BD−	12		15BK
	AL1	38	35	16WT
STA	AL2	13		16BL
16	BD+	39	36	16RD
	BD−	14		16BK
	AL1	40	37	17WT
STA	AL2	15		17BL
17	BD+	41	38	17RD
	BD−	16		17BK
	AL1	42	41	18WT
STA	AL2	17		18BL
18	BD+	43	42	18RD
	BD−	18		18BK
	AL1	44	43	19WT
STA	AL2	19		19BL
19	BD+	45	44	19RD
	BD−	20		19BK
	AL1	46	45	2oWT
STA	AL2	21		20BL
20	BD+	47	46	20RD
	BD−	22		20BK
	AL1	48	47	21WT
STA	AL2	23		21BL
21	BD+	49	48	21RD
	BD−	24		21BK
30V(1)	3ov +	50	40	
SUPPLY	30V−	25		

TABLE 2.4.5(b) BN-824 MAIN EQUIPMENT
AMPHENOL CONNECTOR ASSIGNMENT

CONNECTOR C SIGNAL	DESIG	PIN	SDF PAIR	IDESC
	AL1	26	51	22WT
STA	AL2	1		22BL
22	BD+	27	52	22RD
	BD−	2		22BK
	AL1	28	53	23WT
STA	AL2	3		23BL
23	BD+	29	54	23RD
	BD−	4		23BK
	AL1	30	55	24WT
STA	AL2	5		24BL
24	BD+	31	56	24RD
	BD−	6		24BK
	AL1	32	57	25WT
STA	AL2	7		25BL
25	BD+	33	58	25RD
	BD−	8		25BK
	AL1	34	61	26WT
STA	AL2	9		26BL
26	BD+	35	62	26RD
	BD−	10		26BK
	AL1	36	63	27WT
STA	AL2	11		27BL
27	BD+	37	64	27RD
	BD−	12		27BK
	AL1	38	65	28WT
STA	AL2	13		28BL
28	BD+	39	66	28RD
	BD−	14		28BK
	AL1	40	67	29WT
STA	AL2	15		29BL
29	BD+	41	68	29RD
	BD−	16		29BK
	AL1	42	71	30WT
STA	AL2	17		30BL
30	BD+	43	72	30RD
	BD−	18		30BK
	AL1	44	73	31WT
STA	AL2	19		31BL
31	BD+	45	74	31RD
	BD−	20		31BK
	AL1	46	75	32WT
STA	AL2	21		32BL
32	BD+	47	76	32RD
	BD−	22		32BK
	AL1	48	77	33WT
STA	AL2	23		33BL
33	BD+	49	78	33RD
	BD−	24		33BK
30V(2)	30V+	50	70	
SUPPLY	3ov −	25		

CONNECTOR D SIGNAL	DESIG	PIN	SDF PAIR	DESC
DSS1	DS+	26	81	D1RD
	DS−	1		D1BK
DSS2	DS+	27	82	D2RD
	DS−	2		D2BK
DSS11	DS+	28	83	D11RD
	DS−	3		D11BK
DSS12	DS+	29	84	D12RD
	DS−	4		D12BK
DOOR1	DR+	30	85	DR1RD
	DR−	5		DR1BK
DOOR2	DR+	31	86	DR2RD
	DR−	6		DR2BK
	MOHA	32	87	TO MOH
MOH	MOHB	7		SOURCE
	MHCA	33	88	
	MHCB	8		
	EXT1A	34	91	TO EXT
EXT	EXT1B	9		SPKR1
PAGE1	ETC1A	35	92	
	ETC1B	10		
	EXT2A	36	93	TO EXT
EXT	EXT2B	11		SPKR2
PAGE2	ETC2A	37	94	
	ETC2B	12		
BGM	BGMA	38	89	TO BGM
	BGMB	13		SOURCE
CNTL1	CNTL1A	39	95	TO CNTL
	CNTL1B	14		SOURCE1
CNTL2	CNTL2A	40	96	TO CNTL
	CNTL2B	15		SOURCE2
CNTL3	CNTL3A	41	97	TO CNTL
	CNTL3B	16		SOURCE3
CNTL4	CNTL4A	42	98	TO CNTL
	CNTL4B	17		SOURCE4
CNTL5	CNTL5A	43	99	TO CNTL
	CNTL5B	18		SOURCE5
CNTL6	CNTL6A	44	100	TO CNTL
	CNTL6B	19		SOURCE6
		45		
		20		
		46		
		21		
		47		
		22		
		48		
		23		
		49		
		24		
		50		
		25		

TABLE 2.4.5(b) BN-824 MAIN EQUIPMENT
AMPHENOL CONNECTOR ASSIGNMENT

CONNECTOR A SIGNAL	DESIG	PIN	SDF PAIR	DESC
	LN1	26	1	L1A
		1		L1B
	LN2	27	2	L2A
		2		L2B
	LN3	28	3	L3A
		3		L3B
	LN4	29	4	L4A
		4		L4B
E	LN5	30	5	L5A
x L		5		L5B
c I	LN6	31	6	L6A
H N		6		L6B
A E	LN7	32	7	L7A
N S		7		L7B
G	LN8	33	8	L8A
E		8		L8B
	LN9	34	9	L9A
		9		L9B
	LN10	35	10	L10A
		10		L10B
	LN11	36	11	L11A
		11		L11B
	LN12	37	12	L12A
		12		L12B
	PFB1	38	13	BEL1A
		13		BEL1B
P	PFB2	39	14	BEL2A
0		14		BEL2B
W B	PFB3	40	15	BEL3A
E E		15		BEL3B
R L	PFB4	41	16	BEL4A
F L		16		BEL4B
A S	PFB5	42	17	BEL5A
I		17		BEL5B
L	PFB6	43	18	BEL6A
		18		BEL6B
	PFB7	44	19	BEL7A
		19		BEL7B
	PFB8	45	20	BEL8A
		20		BEL8B
	PFB9	46	21	BEL9A
		21		BEL9B
	PFB10	47	22	BEL10A
		22		BEL10B
	PFB11	48	23	BEL11A
		23		BEL11B
	PFB12	49	24	BEL12A
		24		BEL12B
EARTH	ER	50	25	PBX
		25		EARTH

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

TABLE 2.4.5(c) BN-1236/2464 MAIN EQUIPMENT
AMPHENOL CONNECTOR ASSIGNMENT

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

CONNECTOR D			SDF	
SIGNAL	DESIG	PIN	PAIR	DESC
	AL1	26	76	34WT
STA	AL2	1		34BL
34	BD+	27	77	34RD
	BD−	2		34BK
	AL1	28	78	35WT
STA	AL2	3		35BL
35	BD+	29	79	35RD
	BD−	4		35BK
	AL1	30	80	36WT
STA	AL2	5		36BL
36	BD+	31	81	36RD
	BD−	6		36BK
	AL1	32	82	37WT
STA	AL2	7		37BL
37	BD+	33	83	37RD
	BD−	8		37BK
	AL1	34	84	38WT
STA	AL2	9		38BL
38	BD+	35	85	38RD
	BD−	10		38BK
	AL1	36	86	39WT
STA	AL2	11		39BL
39	BD+	37	87	39RD
	BD−	12		39BK
	AL1	38	88	40WT
STA	AL2	13		40BL
40	BD+	39	89	40RD
	BD−	14		40BK
	AL1	40	90	41WT
STA	AL2	15		41BL
41	BD+	41	91	41RD
	BD−	16		41BK
	AL1	42	92	42WT
STA	AL2	17		42BL
42	BD+	43	93	42RD
	BD−	18		42BK
	AL1	44	94	43WT
STA	AL2	19		43BL
43	BD+	45	95	43RD
	BD−	20		43BK
	AL1	46	96	44WT
STA	AL2	21		44BL
44	BD+	47	97	44RD
	BD−	22		44BK
	AL1	48	98	45WT
STA	AL2	23		45BL
45	BD+	49	99	45RD
	BD−	24		45BK
30V(3)	30V+	50	100	
SUPPLY	30V−	25		

TABLE 2.4.5(c) BN-1236/2464 MAIN EQUIPMENT
AMPHENOL CONNECTOR ASSIGNMENT

CONNECTOR E SIGNAL	DESIG	PIN	SDF PAIR	DESC
DSS1	DS+ DS-	26 1	101	D1RD D1BK
DSS2	DS+ DS-	27 2	102	D2RD D2BK
DSS11	DS+ DS-	28 3	103	D11RD D11BK
DSS12	DS+ DS-	29 4	104	D12RD D12BK
DOOR 1	DR+ DR-	30 5	105	DR1RD DR1BK
DOOR 2	DR+ DR-	31 6	106	DR2RD DR2BK
MOH	MOHA MOHB MHCA MHCB	32 7 33 8	107 108	TO MOH SOURCE
EXT PAGE 1	EXT1A EXT1B ETC1A EXC1B	34 9 35 10	109 110	TO EXT SPKR 1
EXT PAGE 2	EXT2A EXT2B ETC2A ETC2B	36 11 37 12	111 112	TO EXT SPKR 2
BGM	BGMA BGMB	38 13	113	TO BGM SOURCE
CNTL 1	CNTL1A CNTL1B	39 14	114	TO CNTL SOURCE 1
CNTL 2	CNTL2A CNTL2B	40 15	115	TO CNTL SOURCE 2
CNTL 3	CNTL3A CNTL3B	41 16	116	TO CNTL SOURCE 3
CNTL 4	CNTL4A CNTL4B	42 17	117	TO CNTL SOURCE 4
CNTL 5	CNTL5A CNTL5B	43 18	118	TO CNTL SOURCE 5
CNTL 6	CNTL6A CNTL6B	44 19	119	TO CNTL SOURCE 6
		45 20	120	
		46 21	121	
		47 22	122	
		48 23	123	
		49 2 4	124	
		50 25	125	

TABLE 2.4.5(c)BN-1236/2464 MAIN
EQUIPMENT AMPHENOL CONNECTOR ASSIGNMENT

CONNECTOR F SIGNAL	DESIG	PIN	SDF PAIR	DESC
	LN13	26	126	L13A
		1		L13B
	LN14	27	127	L14A
		2		L14B
	LN15	28	128	L15A
		3		L15B
E	LN16	29	129	L16A
X		4		L16B
c L	LN17	30	130	L17A
H I		5		L17B
A N	LN18	31	131	L18A
N E		6		L18B
G S	LN19	32	132	L19A
E		7		L19B
	LN20	33	133	L20A
		8		L20B
	LN21	34	134	L21A
		9		L21B
	LN22	35	135	L22A
		10		L22B
	LN23	36	136	L23A
		11		L23B
	LN24	37	137	L24A
		12		L24B
	PFB13	38	138	BEL13A
		13		BEL13B
	PFB14	39	139	BEL14A
		14		BEL14B
	PFB15	40	140	BEL15A
		15		BEL15B
P	PFB16	41	141	BEL16A
0		16		BEL16B
W B	PFB17	42	142	BEL17A
E E		17		BEL17B
R L	PFB18	43	143	BEL18A
F L		18		BEL18B
A S	PFB19	44	144	BEL19A
I		19		BEL19B
L	PFB20	45	145	BEL20A
		20		BEL20B
	PFB21	46	146	BEL21A
		21		BEL21B
	PFB22	47	147	BEL22A
		22		BEL22B
	PFB23	48	148	BEL23A
		23		BEL23B
	PFB24	49	149	BEL24A
		24		BEL24B
		50	150	
		25		

CONNECTOR G SIGNAL	DESIG	PIN	SDF PAIR	DESC
	AL1	26	151	46WT
STA	AL2	1		46BL
46	BD+	27	152	46RD
	BD−	2		46BK
	AL1	28	153	47WT
STA	AL2	3		47BL
47	BD+	29	154	47RD
	BD−	4		47BK
	AL1	30	155	48WT
STA	AL2	5		48BL
48	BD+	31	156	48RD
	BD−	6		48BK
	AL1	32	157	49WT
STA	AL2	7		49BL
49	BD+	33	158	49RD
	BD−	8		49BK
	AL1	34	159	50WT
STA	AL2	9		50BL
50	BD+	35	160	50RD
	BD−	10		50BK
	AL1	36	161	51WT
STA	AL2	11		51BL
51	BD+	37	162	51RD
	BD−	12		51BK
	AL1	38	163	52WT
STA	AL2	13		52BL
52	BD+	39	164	52RD
	BD−	14		52BK
	AL1	40	165	53WT
STA	AL2	15		53BL
53	BD+	41	166	53RD
	BD−	16		53BK
	AL1	42	167	54WT
STA	AL2	17		54BL
54	BD+	43	168	54RD
	BD−	18		54BK
	AL1	44	169	55WT
STA	AL2	19		55BL
55	BD+	45	170	55RD
	BD−	20		55BK
	AL1	46	171	56WT
STA	AL2	21		56BL
56	BD+	47	172	56RD
	BD−	22		56BK
	AL1	48	173	57WT
STA	AL2	23		57BL
57	BD+	49	174	57RD
	BD−	24		57BK
30V(4)	30V+	50	175	
SUPPLY	30V−	25		

TABLE 2.4.5(d) BN-2464 EXPANSION RACK
AMPHENOL CONNECTOR ASSIGNMENT

CONNECTOR H SIGNAL	DESIG	PIN	SDF PAIR	DESC
	AL1	26	176	58WT
STA	AL2	1		58BL
58	BD+	27	177	58RD
	BD−	2		58BK
	AL1	28	178	59WT
STA	AL2	3		59BL
59	BD+	29	179	59RD
	BD−	4		59BK
	AL1	30	180	60WT
STA	AL2	5		60BL
60	BD+	31	181	60RD
	BD−	6		60BK
	AL1	32	182	61WT
STA	AL2	7		61BL
61	BD+	33	183	61RD
	BD−	8		61BK
	AL1	34	184	62WT
STA	AL2	9		62BL
62	BD+	35	185	62RD
	BD−	10		62BK
	AL1	36	186	63WT
STA	AL2	11		63BL
63	BD+	37	187	63RD
	BD−	12		63BK
	AL1	38	188	64WT
STA	AL2	13		64BL
64	BD+	39	189	64RD
	BD−	14		64BK
	AL1	40	190	65WT
STA	AL2	15		65BL
65	BD+	41	191	65RD
	BD−	16		65BK
	AL1	42	192	66WT
STA	AL2	17		66BL
66	BD+	43	193	66RD
	BD−	18		66BK
	AL1	44	194	67WT
STA	AL2	19		67BL
67	BD+	45	195	67RD
	BD−	20		67BK
	AL1	46	196	68WT
STA	AL2	21		68BL
68	BD+	47	197	68RD
	BD−	22		68BK
	AL1	48	198	69WT
STA	AL2	23		69BL
69	BD+	49	199	69RD
	BD−	24		69BK
30V(5)	30V+	50	200	
SUPPLY	30V−	25		

CONNECTOR I SIGNAL	DESIG	PIN	SDF PAIR	DESC
	AL1	26	201	70WT
STA	AL2	1		70BL
70	BD+	27	202	70RD
	BD−	2		70BK
	AL1	28	203	71WT
STA	AL2	3		71BL
71	BD+	29	204	71RD
	BD−	4		71BK
	AL1	30	205	72WT
STA	AL2	5		72BL
72	BD+	31	206	72RD
	BD−	6		72BK
	AL1	32	207	73WT
STA	AL2	7		73BL
73	BD+	33	208	73RD
	BD−	8		73BK
DSS3	DS+	34	209	D3RD
	DS−	9		D3BK
DSS4	DS+	35	210	D4RD
	DS−	10		D4BK
DSS5	DS+	36	211	D5RD
	DS−	11		D5BK
DSS6	DS+	37	212	D6RD
	DS−	12		D6BK
DSS7	DS+	38	213	D7RD
	DS−	13		D7BK
DSS8	DS+	39	214	D8RD
	DS−	14		D8BK
DSS9	DS+	40	215	D9RD
	DS−	15		D9BK
DSS10	DS+	41	216	D10RD
	DS−	16		D10BK
		42	217	
		17		
		43	218	
		18		
		44	219	
		19		
		45	220	
		20		
		46	221	
		21		
		47	222	
		22		
		48	223	
		23		
		49	224	
		24		
		50	225	
		25		

TABLE 2.4.5(d) BN-2464 EXPANSION RACK
AMPHENOL CONNECTOR ASSIGNMENT

2.4.6 Surge Protection

High voltage surge protection is provided in the system. To utilise this inbuilt surge protection circuitry a telecommunications earth must be provided to the terminal marked ETH on the outside of the main equipment.

In lightning prone areas exchange lines and two-wire extensions must be protected at the point of entry or distribution in accordance with TPH 0265N0 “Lightning Protection at Customers Premises” and TPH 0216 “LSA Plus Terminating System”.

For this protection to be effective an earth must be supplied to the SDF, the resistance of which should be as low as possible and must not be greater than 30 ohms.

2.4.7 Tie Lines

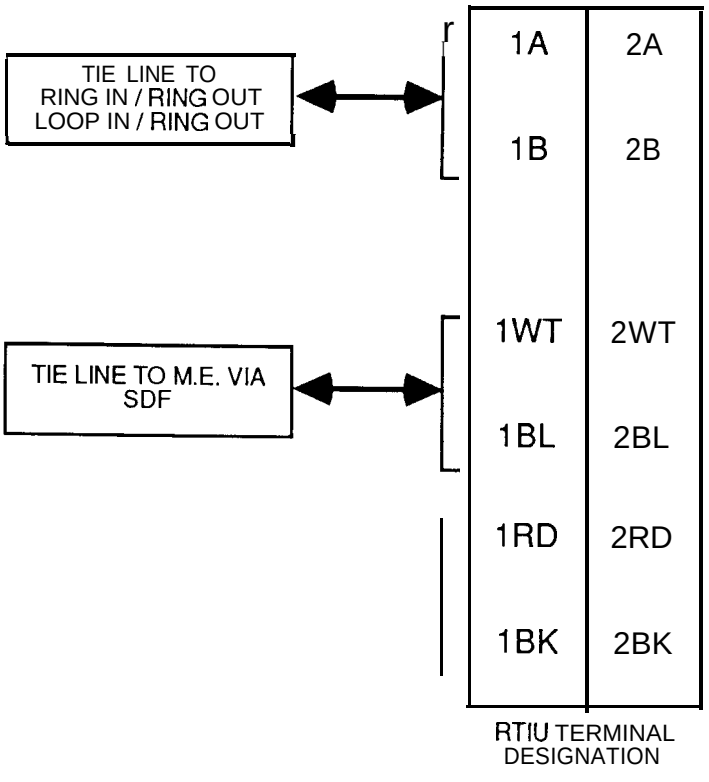


FIG. 2.4.7(a) RTIU TERMINAL CONNECTIONS

Boards are simply plugged into the designated slots in the RTIU. Terminal connections are as above (refer fig. 2.4.7(a)).

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 line terminates on 1A/B or 2A/B on the RTIU and the connection to the main equipment is taken from 1WT/BL or 2WT/BL, respectively. Insert LRB-A or RRB-A in slot RXB-A-1 or RXB-A-2 respectively and an RTB-A in slot RTB-A. 221FB is not used.

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

TABLE 2.4.7(b) TIE LINE CONNECTION

2.4.8 Stations

2.4.8.1 **Key Stations**

When cabling from the main equipment to the key stations take care that the pairs are correctly terminated and the polarity of the pair is correct. 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 powerfail stations.

The connections between exchange lines and stations during power failure are fixed as follows:

EXCHANGE LINE NO	STATION NO
1	10
2	11
3	12
4	13
5	14
6	15
7	16
8	17
9	18
10	19
11	20
12	21

EXCHANGE LINE NO	STATION NO
13	46
14	47
15	48
16	49
17	50
18	51
19	52
20	53
21	54
22	55
23	56
24	57

TABLE 2.4.8(a) POWERFAIL STATIONS

The station cabling is as follows:

WIRE DESIGNATION	605 PLUG/ 610 SOCKET	WIRE COLOUR	DESIGNATION IN STATION
AL1	2	WT WHITE	LWT
AL2	6	BL BLUE	LBL
BD+	1	RD RED	LRD
BD-	5	BK BLACK	LBK

TABLE 2.4.8(b) KEY STATION CABLING

2.4.8.2 Door Stations

In the case of the door stations, the DSSDST-BN-A board must be inserted into the first DSS position of the BN-824 or BN-1236 Main Equipment. When cabling from the main equipment to the door stations take care that the pairs are correctly terminated and the polarity of the pair is correct. The equipment will not operate if the system is not correctly cabled.

The door station cabling is as follows:-

WIRE DESIGNATION	WIRE COLOUR	DESIGNATION IN DOOR STATION
DR+	RD RED	R
DR-	BK BLACK	C

TABLE 2.4.8(c) DOOR STATION CABLING

2.4.8.3 DSS Consoles

For DSS Consoles, the DSSDST-BN-A board (or DSS-BN-A if used) must be inserted into the DSS positions of the main equipment and expansion rack. When cabling to the DSS consoles take care that the pairs are correctly terminated and the polarity of the pair is correct. The equipment will not operate if the system is not correctly cabled.

WIRE DESIGNATION	605 PLUG/ 610 SOCKET	WIRE COLOUR	DESIGNATION IN STATION
DS+	1	RD RED	LRD
DS-	5	BK BLACK	LBK

TABLE 2.4.8(d) DSS STATION CABLING

NOTE: DSS Consoles are not necessarily wired in numerical order as shown in Table 2.4.8 (e) . For example, if a DSS-BN-A board is installed into slot DSS (1) of a main equipment then the DSS consoles are designated DSS1,2,11, and 12 and must be wired and programmed accordingly.

	DSSDST-BN-A		DSS-BN-A
BN-824, BN-1236 Main Equipment	DSS 1 and 2 Door Station 1 and 2		DSS 1 and 2 DSS 11 and 12
BN-2464 Expansion Rack DSS(2)	DSS 3 and 4 –		DSS 3 and 4 DSS 5 and 6
BN-2464 Expansion Rack DSS(3)	DSS 7 and 8 –		DSS 7 and 8 DSS 9 and 10

TABLE 2.4.8(e) DSS CONSOLE AND DOOR STATION DESIGNATION

2.4.8.4 Station Based Alarms

Station Based Alarms are wired in parallel with the B-pair of the associated key station. When cabling from the main equipment or key station to the station based alarm take care that the pairs are correctly terminated and the polarity of the pair is correct. The equipment will not operate if the system is not correctly cabled.

The station based alarm cabling is as follows:-

WIRE DESIGNATION	WIRE COLOUR	DESIGNATION IN STATION BASED ALARM
BD+	RD RED	DB3
BD−	BK BLACK	DB4
v +	RD RED	DB1
V−	BK BLACK	DB2

Connections DB1 and DB2 in the station based alarm are control lines used to power/control another alarm.

NOTE

For external devices to be connected relay isolation must be in accordance with Telecom Specification 1364.

The device must be:

(i) Telecom authorised apparatus only.

(ii) Apparatus must be authorised specifically to be used with a 'BN' 824/1236/2464 key system.

2.4.8.5 Standard Telephone Stations

In the case of standard telephone stations 2WB-BN-A boards (or 2WSTB-BN-A if used) must be inserted into the required STB-BN-A positions and the ring generator (RGU-AN) mounted near the SDF. For standard telephone stations with loop lengths less than 300 ohms, short out pins 1 and 2 of connectors S1 and S2 on the 2WB-BN-A boards (or 2WSTB-BN-A if used). For stations with loop lengths greater than 300 ohms, refer to section 2.4.10.1.

Standard telephone stations are wired in groups of four for 2WB-BN-A boards (or groups of two for 2WSTB-BN-A board).

1) 2WB-BN-A

2WB-BN-A provides four standard telephone station ports. Thus if 2WB-BN-A board is inserted into STB-BN-A position 4 in the main equipment, stations 22, 23, 24 and 25 would be all standard telephone stations. The stations are connected to the A-pair terminals (AL1 and AL2) on the SDF.

The Ring Generator Unit (RGU-AN) requires two pairs of conductors in order to connect it into the system. The 25Hz output terminals of RGU-AN are ALWAYS connected to the first B-pair (BD+ and BD-) in the block of four stations corresponding to one 2WB-BN-A. The d.c. input terminals (+) and (−) are always connected to the second B-pair in the block. An example of wiring up is shown in Table 2.4.8(f).

One RGU-AN is required for each 2WB-BN-A board used in the system.

Example: A 2WB-BN-A board is installed into STB-BN-A position number 4 (STB(4))

CONNECTOR C SIGNAL	DESIG	PIN	SDF PAIR	DESC	
	AL1	26	51	22WT	---WT) To Standard Telephone
STA	AL2	1		22BL	---BL) Station No. 22
22	BD+	27	52	22RD	------- 25Hz)
	BD−	2		22BK	------- 25Hz) From RGU-AN
	AL1	28	53	23WT	_ -WT) To Standard Telephone
STA	AL2	3		23BL	_ -BL) Station No. 23
23	BD+	29	54	23RD	------- +/IN+) To RGU-AN
	BD−	4		23BK	------- G/IN-) and 2WEU-AN
	AL1	30	55	24WT	---WT) To Standard Telephone
STA	AL2	5		24BL	---BL) Station No. 24
24	BD+	31	56	24RD	_____ OUT+)
	BD−	6		24BK	------- OUTG) From 2WEU-AN
	AL1	32	57	25WT	-- -WT) To Standard Telephone
STA	AL2	7		25BL	-- -BL) Station No. 25
25	BD+	33	58	25RD	
	BD−	8		25BK	

TABLE 2.4.8(f) – STANDARD TELEPHONE STATION RGU-AN AND 2WEU-AN WIRING FOR 2WB-BN-A

2) 2WSTB-BN-A

NOTE: This is a non-standard board that may be used in some circumstances.

2WSTB-BN-A provides two key station ports and two standard telephone station ports. Thus if 2WSTB-BN-A board is inserted into STB-BN-A position 4 in the main equipment, stations 22 and 23 would be key stations and stations 24 and 25 would be standard telephone stations. The standard telephone stations are connected to the A-pair terminals (AL1 and AL2) on the SDF.

The Ring Generator Unit (RGU-AN) requires two pairs of conductors in order to connect it into the system. The 25Hz output terminals of RGU-AN are ALWAYS connected to the third B-pair (BD+ and BD−) in the block of four stations corresponding to one 2WSTB-BN-A. The d.c. input terminals (+) and (−) are always connected to the 30V + and 30V − terminals at the SDF. An example of wiring up is shown in Table 2.4.8(g).

One RGU-AN is required for each 2WSTB-BN-A board used in the system.

Example: A 2WSTB-BN-A board is inserted into STB-BN-A position number 4 (STB (4)).

CONNECTOR C SIGNAL	DESIG	PIN	SDF PAIR	DESC	
	AL1	26	51	22WT	- - -WT) A-pair
STA	AL2	1		22BL	-- -BL) Key Station No. 22
22	BD+	27	52	22RD	- - -RD) B-pair
	BD−	2		22BK	-- -BK) Key Station No. 22
	AL1	28	53	23WT	- - -WT) A pair
STA	AL2	3		23BL	- - -BL) Key Station No. 23
23	BD+	29	54	23RD	- - -RD) B-pair
	BD−	4		23BK	_ -BK) Key station No. 23
	AL1	30	55	24WT	-- -WT) To Standard Telephone
STA	AL2	5		24BL	-- -BL) Station No. 24
24	BD+	31	56	24RD	- - - - - - - 25Hz)
	BD−	6		24BK	- - - - - - - 25Hz) From RGU-AN
	AL1	32	57	25WT	-- -WT) To Standard Telephone
STA	AL2	7		25BL	- - -BL) Station No. 25
25	BD+	33	58	25RD	- _ _ -OUT+)
	BD−	8		25BK	_ _ _ _ _ OUTG) From 2WEU-AN

TABLE 2.4.8(g) – STANDARD TELEPHONE STATION RGU-AN AND 2WEU-AN WIRING FOR 2WSTB-BN-A.

2.4.9 Earth Recall

When the system is connected to a PBX and the recall facility is required, then the PBX earth must be connected to the ER terminal at the SDF.

2.4.10 Auxiliary Equipment

2.4.10.1 Two-Wire Extender Unit (2WEU-AN)

When the loop length of cable between the SDF and the standard telephone stations exceeds 300 ohms, the Two-Wire Extender Unit (2WEU-AN) has to be installed.

Short out pins 2 and 3 of connectors Sl and S2 on the 2WB-BN-A or 2WSTB-BN-A boards. Mount the 2WEU-AN on the wall near the SDF.

1) 2WB-BN-A

Connect the terminals IN+ and IN- to the second B-pair in the block of stations corresponding to one 2WB-BN-A. Connect terminals OUT+ and OUTG to the third B-pair in the block. The connections are made on the SDF. An example of how to wire in the RGU-AN and 2WEU-AN when the 2WB-BN-A board is inserted into STB-BN-A position 4 is shown in Table 2.4.8(f).

2) 2WSTB-BN-A

Connect the terminals IN + and IN − to the 30V + and 30V − terminals at the SDF. Connect terminals OUT+ and OUTG to the fourth B-pair in the block. The connections are made on the SDF. An example of how to wire in the RGU-AN and 2WEU-AN when the 2WSTB-BN-A board is inserted into STB-AN-A position four is shown in Table 2.4.8(g).

One 2WEU-AN is required for each 2WB-BN-A or 2WSTB-BN-A board used in the system, if the loop length exceeds 300 ohms.

NOTE: Surge protection must be provided for external two-wire standard telephone stations as described in Section 2.4.6.

2.4.10.2 **Call Metering Unit (CMU)**

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, SDF terminals 30V + , 30V−. Make connections between 30V + and 30V − 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 fig 2.4.10.2).

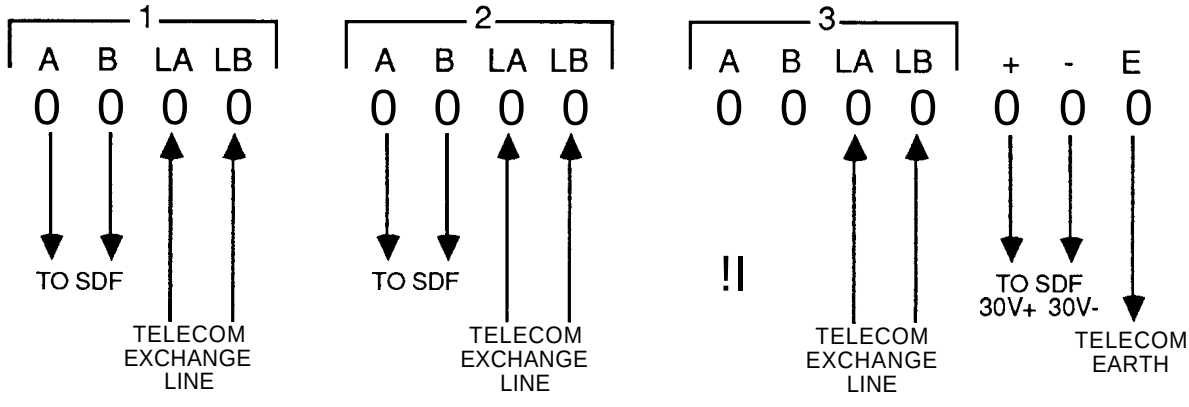


FIG. 2.4.10.2 CALL METERING UNIT WIRING

2.4.10.3 Powerfail Bell

When installing a powerfail bell, connect the wires from the bell to the terminals BELxA and BELxB on the SDF, corresponding to line x.

2.4.11 External Music Sources

An external music source can be connected to terminals BGMA and BGMB (SDF pair 89 for BN-824 or SDF pair 113 for BN-1236/2464) to provide background music for the system. In addition, another external music source can be connected to terminals MOHA and MOHB (SDF pair 87 for BN-824 or SDF pair 107 for BN1236/2464) to provide music-on-hold for the system. Should the one external music source be required to provide both background music and music-on-hold then simply connect BGMA and BGMB terminals to MOHA and MOHB terminals respectively.

Terminals MHCA and MHCB are control lines for the music-on-hold. The terminals are normally open circuited, however, when music-on-hold is selected the terminals are shorted together. Thus, the terminals MHCA and MHCB can be used to switch the external music-on-hold source on or off as required.

NOTE: For external music sources and external paging devices relay isolation must be in accordance with Telecom Specification 1364.
The device must be:

(i) Telecom authorised apparatus only

(ii) Apparatus must be authorised specifically to be used with a 'BN' 824/1236/2464 key system.

2.4.12 External Paging

External Paging amplifiers are connected to 605 plug and 611 socket and wired to the amphenol connectors via the SDF. The external amplifiers are connected to terminals EXT1A and EXT1B (SDF pair 91 for BN-824 or SDF pair 109 for BN-1236/2464) for external zone 1 and to terminals EXT2A and EXT2B (SDF pair 93 for BN-824 or SDF pair 111 for BN-1236/2464) for external zone 2.

Terminals ETC1A and ETC1B (SDF pair 92 for BN-824 or SDF pair 110 for BN-1236/2464) and ETC2A and ETC2B (SDF pair 94 for BN-824 or SDF pair 112 for BN-1236/2464) are control lines for the external paging. The terminals are normally open-circuited, however, when the external speakers are selected the terminals are shorted together.

NOTE: For external music sources and external paging devices relay isolation must be in accordance with Telecom Specification 1364.
The device must be:

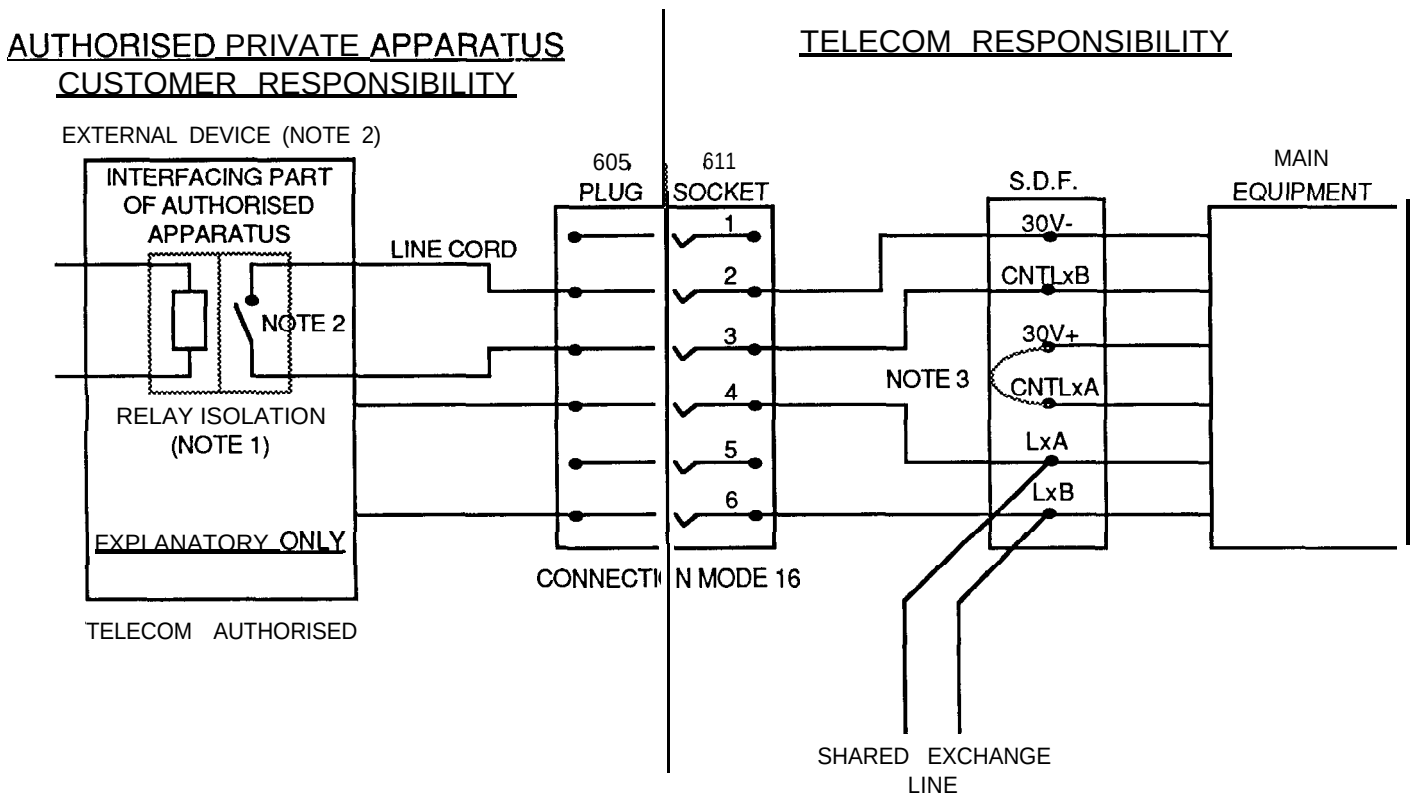
(i) Telecom authorised apparatus only.

(ii) Apparatus must be authorised specifically to be used with a 'BN' 824/1236/2464 key system.

2.4.13 Control Inputs for External Devices.

Six control inputs are available on the system. The first two inputs can also be used as alarm inputs if required (Refer to Section 2.7.4.23 for programming instructions). The control inputs are associated with exchange lines that are allocated for use with external devices such as data modems or facsimile machines. When the exchange lines are being used by external devices the control input is activated by the device or manually by the user. When the input is active the system shows the associated exchange line as being busy by turning on the line LED for that line at all stations. Other users are then prevented from intruding on the line used by the external device (Refer to Section 2.7.4.3 for programming instructions).

The control input becomes active when 20 to 30V DC is applied across terminals CNTLxA and CNTLxB at the SDF. In the case of alarm inputs the trigger condition can be set to when current flows (i.e. when contacts close) or when current ceases (i.e. when contacts open).



NOTE: 1. Relay isolation must be in accordance with Telecom Specification 1364.

2(a) Telecom authorised apparatus only.

(b) A 611 socket must be installed. A customer connect apparatus must not be connected.

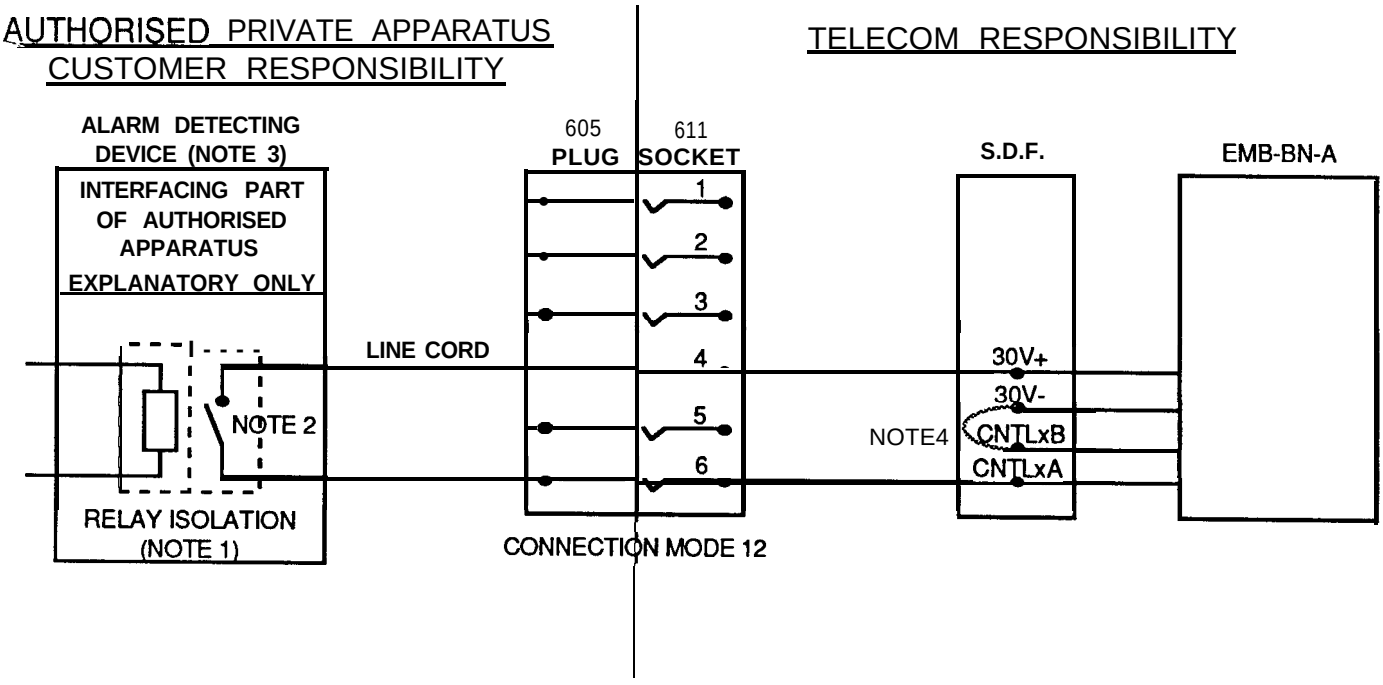
(c) Apparatus must be authorised specifically to be used with a 'BN' 8241123612464 key system.

(d) Electrically isolated contacts, normally open and extended by the line cord to busy out the SBS exchange line appearance.

(e) A 611 socket must be installed. Connection mode 16 will be used with line 1 being the control pair and line 2 being the line wires.

3. Strap between 30V+ and CNTLxA terminals.

FIG. 2.4.13 (a) CONTROL INPUTS FOR EXTERNAL DEVICES



NOTE: 1. Relay isolation must be in accordance with Telecom Specification 1364.

2. Relay contacts may be either normally open or normally closed.

3 (a) Telecom authorised apparatus only.

(b) A 611 socket must be installed. A customer connect apparatus must not be connected.

(c) Apparatus must be authorised specifically to be used with a 'BN' 8241123612464 key system.

(d) A 611 socket must be installed. Connection mode 12 will be used with private line being the alarm pair.

4. Strap between 30V— and CNTLxB terminals.

FIG. 2.4.13 (b) CONTROL INPUTS AS ALARMS

2.4.14 Data Communication Equipment.

A data terminal or a computer can be connected to the system through a modem, to provide data communication connections. The modem may be connected to the system by:-

(i) connecting the modem in parallel with the a-pair of the **key** station;
(ii) connecting the modem to a 2-wire station interface provided by the 2WB-BN-A or 2WSTB-BN-A PBA;
(iii) connecting the modem to the exchange line before it enters the system thus sharing the exchange line with the system.

1. Parallel Key Station Operation

Data communication equipment (e.g. modems) may be connected in parallel with the A-pair of the key station as shown in Fig. 2.4.14. A switch and/or a mode 3 Telecom double adaptor controls the connection of either the data communication equipment or the key station to the A-pair.

NOTE: Auto dial/auto answer modems cannot make use of the auto dialling and auto answering facilities. Calls must be placed manually or incoming calls answered by the key station before control is passed to the modem by connecting it to the A-pair.

The key station can be placed into the guarded data call mode after setting up the call (Refer to Section 1.4.8.8 for operating instructions). When the key station is in the guarded data call mode all of the stations operations are inhibited to prevent interference with the data call.

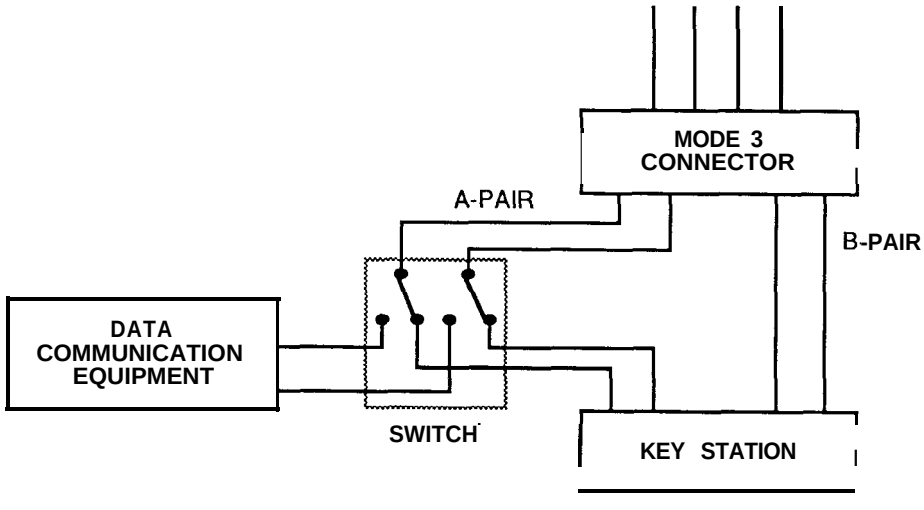


FIG. 2.4.14 PARALLEL KEY STATION OPERATION

2. 2-Wire Interface

Data communication equipment may be connected to a 2-wire interface allowing auto dial/auto answer facilities to be used. Either decadic or DTMF dialling modems may be connected to the 2-wire interface in the same way as 2-wire standard telephones (Refer to Section 2.4.8.5).

For the purposes of auto dialling, the exchange line access codes (O-4) followed by a pause must precede the outside number to be dialled.

3. Shared Exchange Lines

The modem may be connected to share an exchange line with the BN systems. By utilising the control inputs for external devices (Refer to Section 2.4.13) the modem can **take** control of the exchange line without interference from the system. The system shows the line as busy preventing other users from intruding on the line. Fig. 2.4.13(a) illustrates the connection of a modem sharing an exchange line with the system.

2.5 BOARD INSTALLATION INSTRUCTIONS.

2.5.1 General

Before inserting boards into the Main Equipment or Expansion 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 in PBAs.
- Always discharge static from yourself by touching a conductive part of the main equipment before handling boards.
- Handle PBAs by their edges. 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 inserted into a conductive ANTI-STATIC bag and placed in the protective container provided with the new item. In the case of the CPB-BN-A 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.

WIRE COLOUR	605 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.

- If this PBA is replaced, all site dependent data and abbreviated dial numbers are lost. It will be necessary to re-programme the system.
- The battery may be changed without loss of any programmed data with the power up, i.e. power on.

2.5.2 CPB-BN-A

The CPB-BN-A board requires a lithium battery to maintain the data stored in RAM memory. The battery fits on the CPB-BN-A board as shown in Fig. 2.5.2.

The fuse F1 is a 100mA 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. All Handsfree Stations connected to the system will indicate the low battery voltage by flashing BAT in the display.

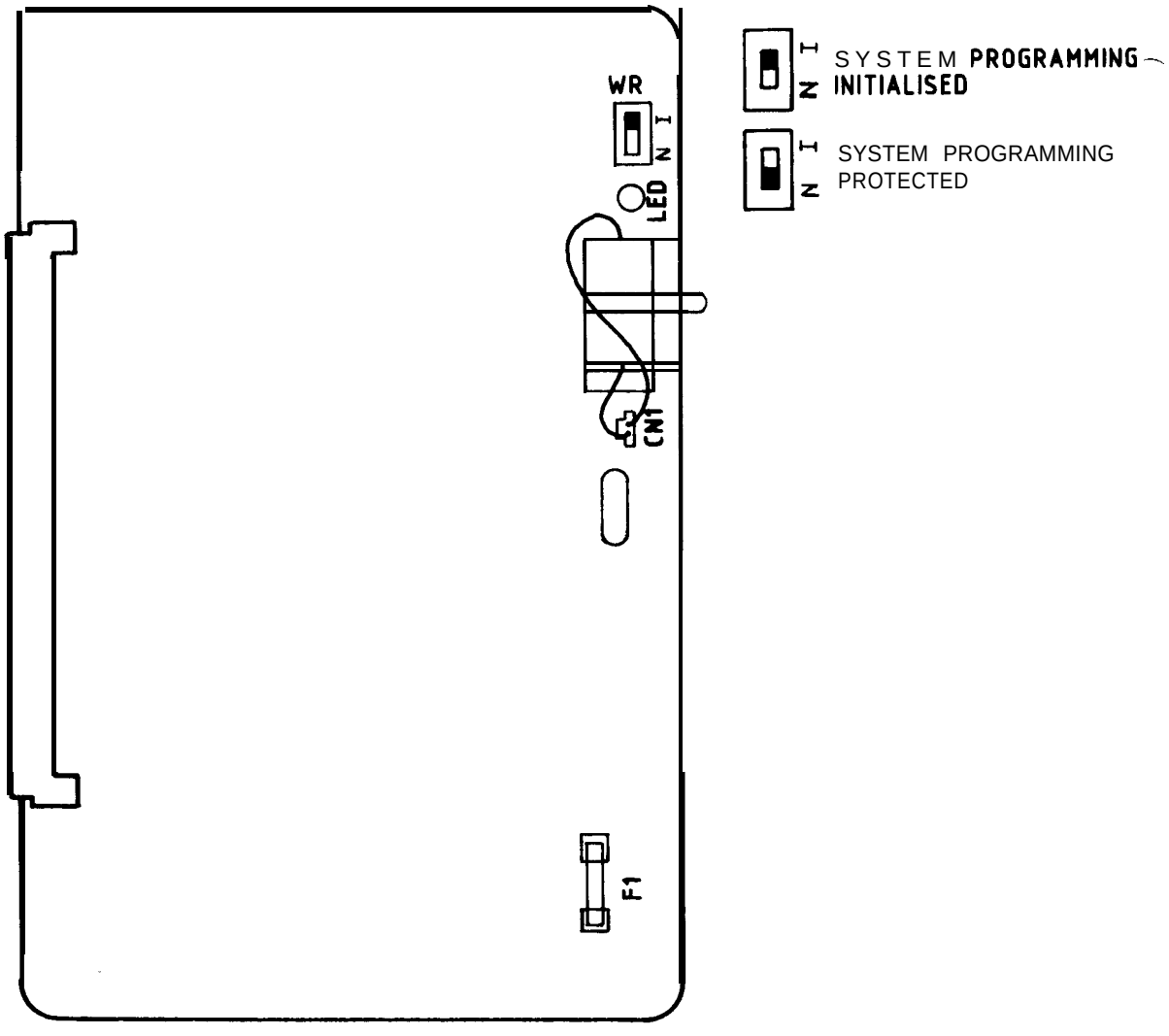


FIG. 2.5.2 CPB-BN-A FUSE, BATTERY AND SWITCH LOCATIONS

The switch WR (Fig. 2.5.2) is used to clear the RAM memory and initialise the data base when power is applied for the first time. Check that the WR switch is in the upper, "I" (Initial) position before powering up the system for the first time. After power is applied to the system wait 10 seconds, then set the switch to the lower "N" (Normal) position. The intial values of the system data are given in Section 2.7.6.

2.5.3 TSB-BN-A.

Switch SW1 on the TSB-BN-A board selects either the internal synthesised music source or the external music source to provide music-on-hold. The internal music is selected when SW1 is in the "1" (lower) position, while the external music source is selected when SW1 is in the "0" (upper) position. Volume control VR1 controls the music-on-hold level.

The EMB-BN-A daughter board fitted to TSB-BN-A board via connectors CN1 and CN2 provides interfaces for background music, external music-on-hold, up to 2 alarm inputs and up to 6 external device control inputs. Volume control VR1 on EMB-BN-A controls the background music level.

If the system requires external loudspeakers to be connected then the PGB-BN-A daughter board must be fitted to the TSB-BN-A board via connectors CN3 and CN4. The PGB-BN-A board provides interfaces for speaker amplifiers and also control lines for each speaker output. Volume controls VR1 and VR2 on PGB-BN-A control the appropriate speaker output level.

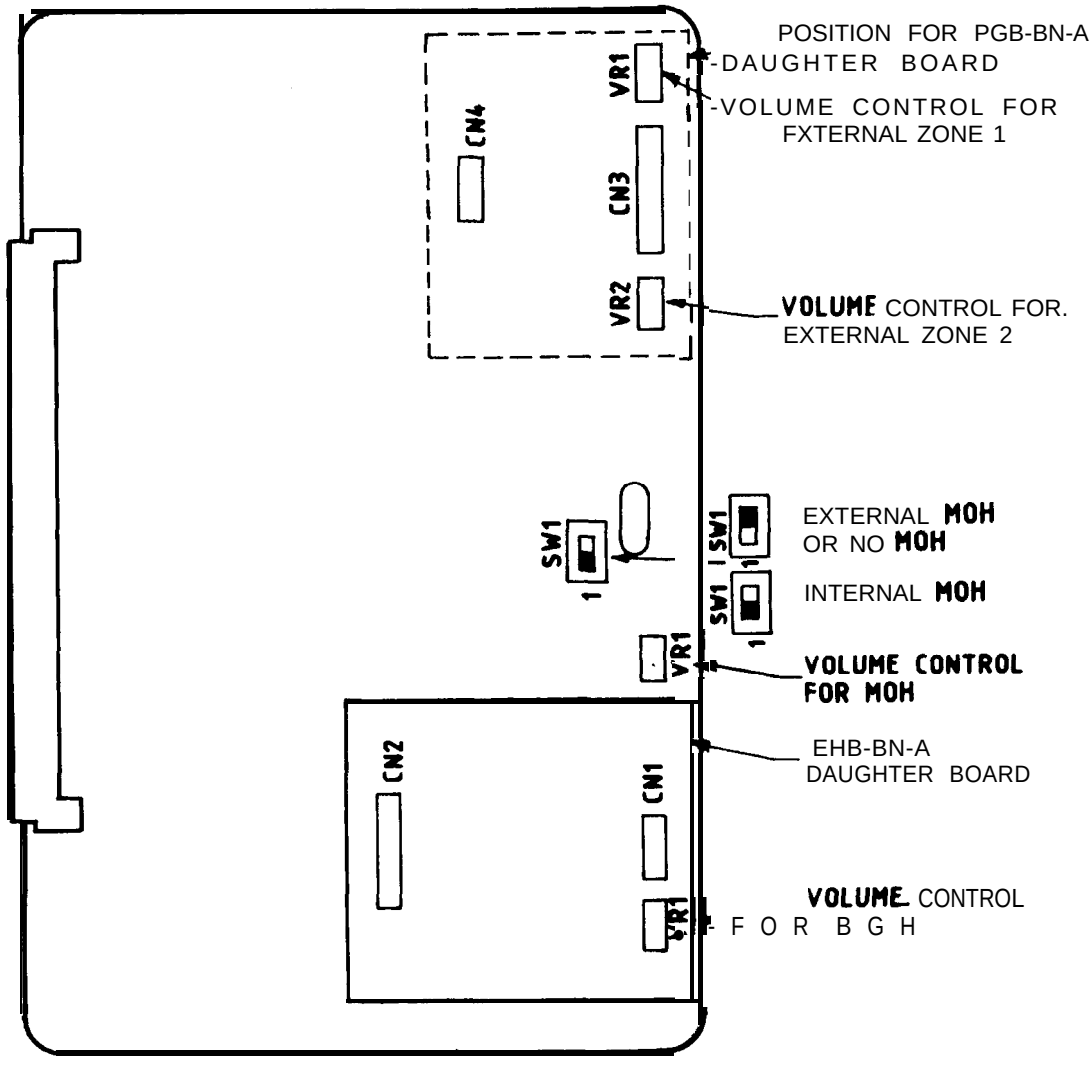


FIG. 2.5.3 TSB-BN-A SWITCH, VOLUME CONTROL AND DAUGHTER BOARD LOCATIONS

2.5.4 2WB-BN-A AND 2WSTB-BN-A

The 2WB-BN-A (or 2WSTB-BN-A) board is installed into an STB-BN-A slot to provide an interface for four standard telephone stations. Up to four daughter boards, DTMFB-BN-A, may be installed on 2WB-BN-A (two on 2WSTB-BN-A) to alter the interface from a decadic standard telephone station interface to a DTMF standard telephone station interface.

Links S1 and S2 on the 2WB-BN-A or 2WSTB-BN-A boards are used to select the power supply for the standard telephone stations as follows.

LINKS ON S1 AND S2	POWER SUPPLY SELECTED
1 to 2 2 to 3	Internal External (2WEU-AN)

The external power supply, 2WEU-AN, should be selected when the loop length of cable between the SDF and the standard telephone station exceeds 300 ohms.

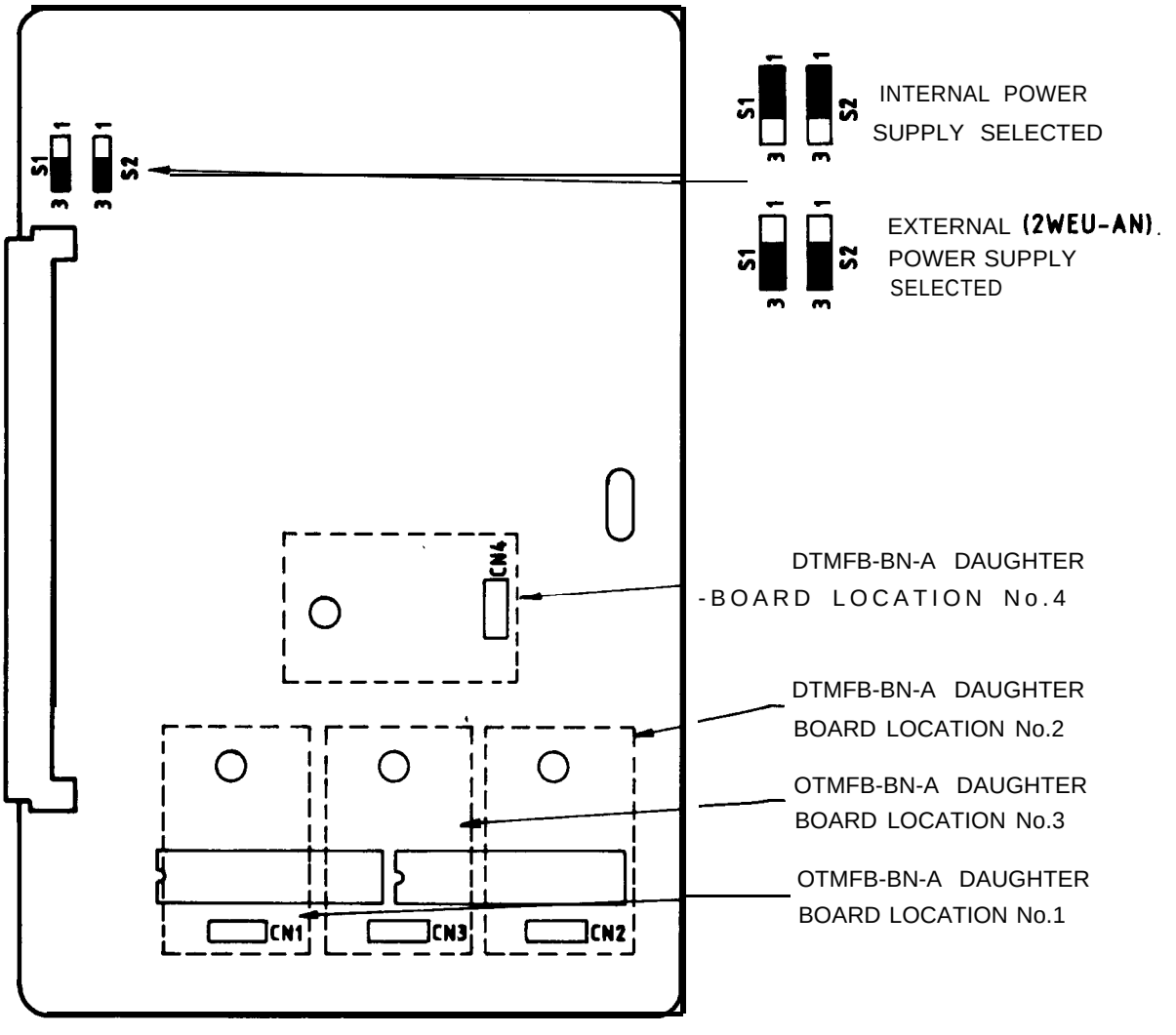


FIG. 2.5.4 2WB-BN-A LINKS AND DTMFB-BN-A DAUGHTER BOARD LOCATIONS

2.5.5 DSSDST-BN-A

The DSSDST-BN-A board is installed into the DSS/DST slots in the main equipment to provide an interface for two DSS consoles and two door stations. Refer to Fig. 2.5.5 for the location of the door station switches and volume control.

The door station control switch, SW1, must be set as shown in Fig. 2.5.5 depending upon the door stations installed.

The volume control, VR1, sets the door station output volume level.

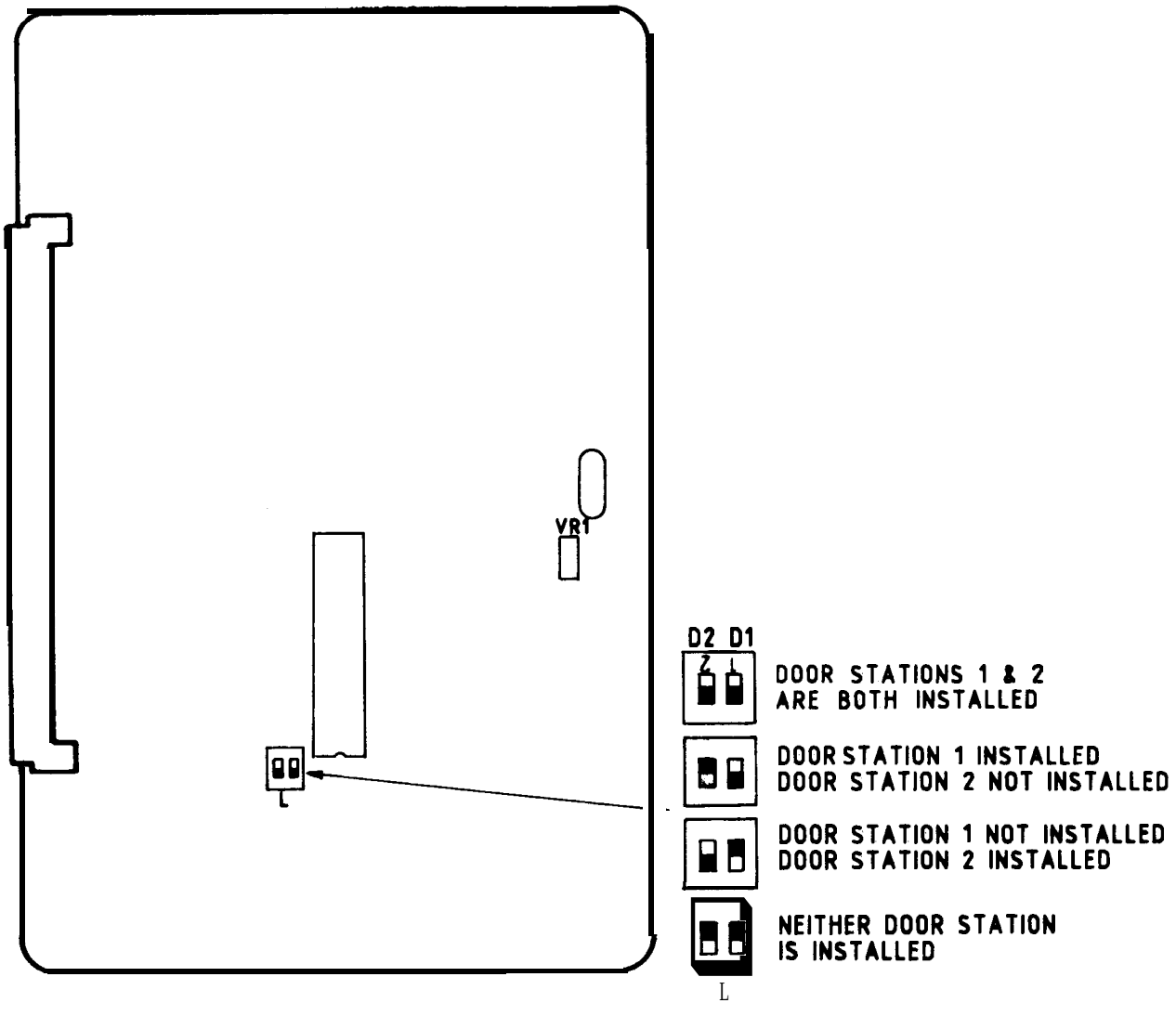


FIG. 2.5.5 DSSDST-BN-A SWITCH AND VOLUME CONTROL LOCATIONS

2.5.6 CDRB-BN-A

The CDRB-BN-A is installed in the CDRB slot of the Main Equipment. Refer to Fig. 2.5.6 for the location of switches and the connector.

1) Baud Rate Selection Switch, SW3

The SW3 switch is used to select the baud rate for the printer. Remove the switch cover and slide the switch to the appropriate position to select 150, 300, 600, 1200, 2400, 4800, 9600, or 19200 baud to match the printer. The baud rate is factory set at 2400 baud.

2) Option Select Switch, SW1

The SW1 switch is used to select the following printout options.

SW1-1: Number of Digits in Dialled Number to be Printed
- OFF — All digits are printed
- O N — The last two digits are not printed.

SW1-2: Duration of Calls to be Printed
- OFF — Outgoing calls printed only if their duration is more than 1 minute.
- O N — All outgoing calls are printed.

SW1-3: Delay Before Call Duration is Timed
- OFF — Timer starts 1 second after dialling.
- ON — Timer starts 5 seconds after dialling.

SW1-4: Account Code I
- OFF — An account code must be entered before dialling is allowed.
- ON — Account code is optional and may be entered anytime when required.

SW1-5: Incoming Calls
- OFF — Print answered incoming calls only if an account code is entered.
- ON — Print all incoming calls.

SW1-6: Barred Calls
- OFF — Print details of barred calls
- ON — No printout for barred calls.

SW1-7: Account Code for Standard Telephone Station
- OFF — An account code can be entered after seizing an exchange line, quickly depressing and releasing the switchhooks and dialling 9.
- ON — No account code may be entered from a standard telephone station.

SW1-8: Account Code II
- OFF — Account code facility unavailable
- ON — Account code facility available

3) Option Select Switch, SW2

SW2-1: PABX Calls
OFF — PABX calls are printed
ON — PABX calls are not printed

SW2-2 to 8 are not used and should be set to all ON

4) Connector CN1

The jack assembly is connected to the CDRB-BN-A connector CN1 via a ribbon cable. A printer is then connected to the jack assembly via an RS232C cable.

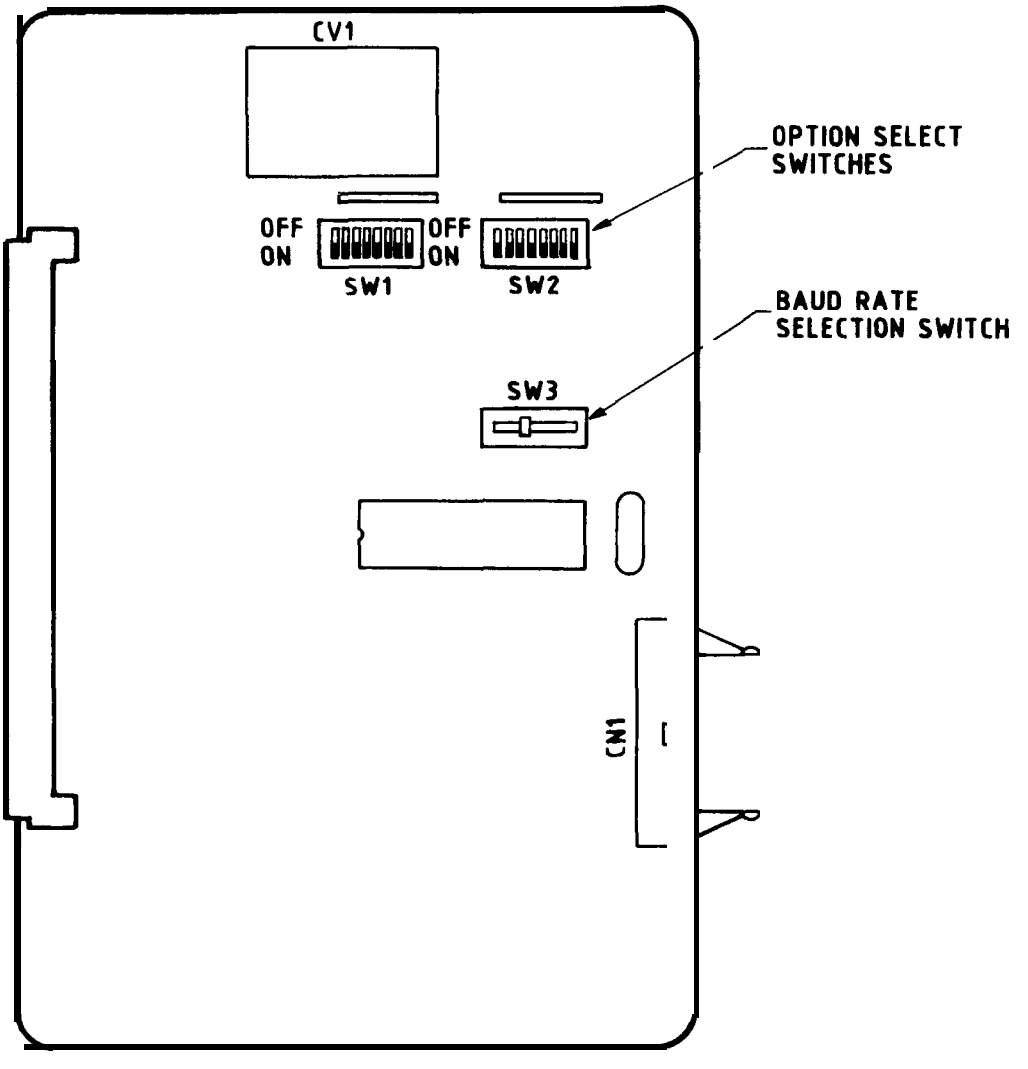


FIG. 2.5.6 CDRB-BN-A SWITCH AND CONNECTOR LOCATIONS

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.

	COLOUR	PIN	VOLTAGES
Station Voltages: A-PAIR	WT	2	9 ± 2v
	BL	6	REF A
B-PAIR	RD	1	39.5 ±15.5V
	BK	5	REF B
S tan da r d Telephone Stations Without 2WEU-AN	WT	2	39.5 ±15.5V
	BL	6	REF
With 2WEU-AN	WT	2	50 ± 6V
	BL	6	REF

TABLE 2.6 STATION VOLTAGES

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 programming the system, the WR switch on the CPB-BN-A board must be switched to the lower, "N" (normal), position: The system can only be programmed from the Test and Programming Unit that is inserted into Station 10 socket.

When the system is powered up for the first time, programmed data must be initialized. To initialise data, turn power off and set the WR switch on the CPB-BN-A board to the upper, "I" (Initial), position. Turn the power on, wait for ten seconds, then set the WR switch to the lower, "N" (Normal), position. All system data is now initialized to the default values listed in Section 2.7.6. However, programmed data such as abbreviated dial numbers and alarm clock data are not initialized (cleared) by this method. To initialize the abbreviated dial numbers and alarm clock data see Section 2.7.4.39.

To program the system, set the WR switch on the CPB-BN-A board to the lower, "N" (Normal), position. Insert the Test and Programming Unit into Station 10 socket and enter into the programming mode before any data is entered. To do this press the WRITE key on the Test and Programming Unit. All other stations on the system operate normally while the Test and Programming Unit is in the programming mode.

The general form of programming is as follows:

1) Dial the program number required
2) Dial "*"
3) Dial the objective – such as the exchange line number or the station number.
4) Dial "*"
5) Dial the data required
6) Dial "*"
7) Repeat steps 5 and 6 for each subsequent objective
8) Dial "#"

Dialling "*" enters the data previously dialled while dialling "#" terminates the program category.

When the data programming is completed the Error Check Function (Section 2.7.4.38) should be performed. The program numbers that have been programmed incorrectly are displayed and must be corrected.

Programmed data is also automatically checked whenever the "*" or "#" key is pressed. An error is indicated by the "–" mark flashing in front of the item in error.

After the data is correctly programmed the Test and Programming Unit may be returned to normal mode by pressing the WRITE key on the Test and Programming Unit.

2.7.2 Checking Programmed Data

Programmed data may be reviewed as follows:

1) Place the Test and Programming Unit in the programming mode.
2) Dial the program number required.
3) Dial "*"
4) Dial the objective – such as the exchange line number or the station number.
5) Dial "*"
6) Repeat step 5 until all data has been viewed.
7) Dial "#"

To modify existing data follow the programming procedure for that program number.

NOTE: All facilities covered by that objective must be re-programmed in that case.

2.7.3 Re-Initialising Programmed Data

Programmed data, except for abbreviated dial numbers and alarm clock data, may be reset to initial conditions as follows:

1) Turn power off
2) Set the WR switch on CPB-BN-A board to the upper, "I" (Initial), position
3) Turn power on
4) Wait ten seconds
5) Set the WR switch on CPB-BN-A board to the lower, "N" (normal), position.

2.7.4 Facility Programming – Optional Facilities

Plug the Test and Programming Unit into the Station 10 socket. Press the WRITE key to place the unit into programming mode. Program the following facilities as required.

2.7.4.1 Program 1 – Exchange Line Facilities I

This program allocates the following facilities to each exchange line.

a) Exchange Line Type
- 0) no-line connected
- 1) direct exchange line
- 2) not used – do not programme
- 3) PABX line

b) Dialling Mode
- 0) decadic dialling
- 1) DTMF dialling

c) Grouping for Exchange Line Request
- 0) not included in any group
- 1) group 1
- 2) group 2
- 3) group 3
- 4) group 4

d) PABX Night Mode Enable/Disable
- 0) disable
- 1) enable

e) Earth Recall or Switchhook Flash
- 0) switchhook flash
- 1) earth recall

Initially, all lines are direct exchange lines with decadic dialling and switchhook flash, allocated to exchange line request group 1 and the PABX night mode disabled.

Example: Program line 5 as a PABX line with DTMF dialling and earth recall, allocated to exchange line request group 4 and the PABX night mode enabled.

Dial	Display	
	00	
1 *	01	Program number 1
	01-00	
5 *	01-05	Exchange line number
	01-05-10100	The previous data is displayed
3	01-05-01003	PABX line
1	01-05-10031	DTMF dial mode
4	01-05-00314	Line request group 4
1	01-05-03141	PABX night mode enabled
1 *	01-05-31411	Earth recall
	01-06-10100	Next exchange line is automatically displayed
#	00	

2.7.4.2 Program 2 — Exchange Line Grouping

This program allocates exchange lines into a maximum of 24 groups to be used for grouping stations into incoming audible signalling groups (Section 2.7.4.6) and also for allocating station access to outgoing exchange lines (Section 2.7.4.5). Any exclusive lines in the system must be placed in only one group with the exclusive line as the only member of the group. The groups are programmed by entering the first and the last line numbers of the lines in the group. Thus, the line groups consist of consecutive line numbers.

Groups may overlap or be nested inside other groups.

Initially, lines 1 to 24 are assigned to group 1 only. No other groups are programmed.

Example: Assign lines 3 to 12 to group 1, lines 6 to 23 to group 2 and line 24 to group 3.

Dial	Display	
	00	
2 *	02	Program number 2
	02-00	
1 *	02-01	Group number 1
	02-01-0124	Previous data
03 *	02-01-03 24	Line 3
	02-01-03-24	
12 *	02-01-03-12	Line 12
	02-02-00 00	Next group is automatically displayed
6 *	02-02-06 00	Line 6
	02-02-06-00	
23 *	02-02-06-23	Line 23
	02-03-00 00	Group 3 automatically displayed
24 *	02-03-24 00	Line 24
	02-03-24-00	
24 *	02-03-24-24	Line 24
	02-04-00 00	Group 4 automatically displayed
#	00	

2.7.4.3 Program 3 — Exchange Line Facilities II

This program allocates the following facilities to each exchange line.

a) CDR Printout
   0) enabled — details of all calls are printed
   1) disabled — no printout of calls is available

b) Data/Facsimile Line
   0) disabled
   1) enabled

c) Common Exchange Line
   0) disabled
   1) enabled

A maximum of six lines may be nominated as data/facsimile lines.

A data/facsimile line is a line that is shared with an external device such as a data modem or facsimile machine.

Common exchange lines can be accessed by any station in the system regardless of the exchange line grouping.

Initially, the CDR printout is enabled while common exchange and data/facsimile lines are disabled for all exchange lines.

EXAMPLE: Assign exchange line 3 as a common line, line 4 as a data/facsimile line and line 5 as both a common and data/facsimile line with no printout.

Dial	Display		
	00		
3	03		Program number 3
*	03-00		
3	03-03		Exchange line number 3
*	03-03	-000	Previous data
001	03-03	-001	Common exchange line
*	03-04	-000	Line 4 automatically displayed
010	03-04	-010	Data/facsimile line
*	03-05	-000	Line 5 automatically displayed
111	03-05	-111	Common and data/facsimile line with no printout
*	03-06	-000	Line 6 automatically displayed
#	00		

2.7.4.4 **Program 4 — Priority Break-In**

This program enables a station to break into another station's exchange line or intercom call depending on the priority break-in level programmed. The break-in level is assigned to each station as follows.

0 — disable break-in
1 — station can break into another station's outside or intercom call. Also, it can send off-hook signalling to busy stations.
2 — station can break into another station's intercom call. In addition, it can send off-hook signalling to busy stations.
3 — station can send off-hook signalling to busy stations.

Initially, no station has break-in assigned.

Example: Assign priority break-in level 2 to station 21.

Dial	Display		
	00		
4	04		Program number 4
*	04-00		
21	04-2 1		Station number 21
*	04-21	-0	Previous data
2	04-21	-2	Break-in level 2 assigned
*	04-22	-0	Station 22 automatically displayed
#	00		

2.7.4.5 Program 6 — Station Access to Exchange Lines for Outgoing Calls

This program limits the station access to exchange lines for outgoing calls by allowing stations access to the line groups programmed in Section 2.7.4.2. Stations may access a maximum of two line groups. Entering 0 instead of a group number means that the station has no access to any group.

Initially, every station has access to line group 1 only.

EXAMPLE: Allow station 12 access to line groups 15 and 19.

Dial	Display	
	00	
6	06	Program number 6
*	06-00	
12	06-12	Station number 12
*	06-12-01	Previous data
15	06-12-15	Access to line group 15
*	06-12-15-00	
19	06-12-15-19	And line group 19
*	06-13-01	Station 13 automatically displayed
#	00	

2.7.4.6 Program 7 — Station Access to Exchange Lines for Incoming Calls

This program limits the station access to exchange lines for incoming calls by allowing stations access to the line groups programmed in Section 2.7.4.2. The incoming ring signalling is also assigned. Stations may access a maximum of two line groups.

a) Incoming Exchange Line Group

00 — not assigned to any group
N — group number, 01 to 24.

b) Incoming Ring Signalling

0 — no incoming tone
1 — ring in day mode only
2 — ring in night mode only
3 — ring in both day and night mode

Initially, all stations have access to line group 1. Station 10 has ring signalling in both day and night mode while all other stations have no ring signalling assigned.

EXAMPLE: Assign station 38 to ring for line group 13 in both day and night mode and have no ring signalling for group 12.

Dial	Display	
	00	
7	07	Program number 7
*	07-00	
38	07-38	Station number 38
*	07-38-l-010	First group previous data
1	07-38-l-101	
3	07-38-l-013	Group 13
3	07-38-l-133	Ring signalling in both day and night mode
*	07-38-2-000	Second group previous data
1	07-38-2-001	
2	07-38-2-012	Group 12
0	07-38-2-120	No ring signalling
*	07-39-l-010	Station 39 automatically displayed
#	00	

2.7.4.7 **Program 8 — Station Facilities**

This program allocates the following facilities to each station:-

a) Night Service Mode Restriction
- 0 — disabled
- 1 — enabled

b) Confidence Tone
- 0 — enabled
- 1 — disabled

c) Station Type
- 0 — key station
- 1 — reserved — do not programme
- 2 — standard telephone — decadic
- 3 — standard telephone — DTMF

d) Do Not Disturb
- 0 — disabled
- 1 — enabled for incoming exchange lines
- 2 — enabled for all calls including intercom calls
- 3 — enabled for either incoming exchange lines or for all calls

e) Paging Zone Assignment
- 0 — not included in any paging zone
- 1 — paging zone 1
- 2 — paging zone 2
- 3 — paging zone 3
- 4 — paging zone 4

Stations with night service mode restriction enabled are placed into access barring class F (intercom calls only) when the system is placed into night service mode.

Initially, all stations are assigned as key stations not included in any paging zone. The night service mode restriction, confidence tone and do not disturb are disabled for all stations.

EXAMPLE: Program station 15 as being a key station with confidence tone disabled, allocated to paging zone 4 with do not disturb for all calls and night service mode restriction enabled.

Dial	Display	
	00	
8	08	Program number 8
*	08-00	
15	08-15	Station number 15
*	08-15-01000	Previous data
1	08-15-10001	Night service mode restriction enabled
1	08-15-00011	Confidence tone disabled
0	08-15-00110	Key Station
2	08-15-01102	DND for all calls
4	08-15-l 1024	Paging zone 4
*	08-16-01000	Station 16 automatically displayed
#	00	

2.7.4.8 **Program 9 — Call Forwarding Pairs**

This program allocates call forwarding pairs. Calls are forwarded to the secretary station when the executive station initiates call forwarding. The executive station is programmed first, then the secretary station. A maximum of eight call forward pairs can be assigned.

NOTE:
1) The executive station must have do not disturb mode 2 or mode 3 programmed as per Section 2.7.4.7(d)
2) Call forward pairs may not be chained. For example, assigning Station 10 as the executive and Station 11 as the secretary in one pair and then assigning Station 11 as the executive and Station 12 as the secretary in another pair will cause an error.
3) The secretary station must have incoming access to the same lines as the executive station.
4) When lamp shift mode is programmed, the secretary station must have access to all the lines the executive station has access to.

Initially, there are no call forwarding pairs allocated.

EXAMPLE: Assign stations 10 and 11 and stations 21 and 23 as Executive/Secretary pairs.

Dial	Display	
	00	
9	09	Program number 9
*	09- 1-00-00	First pair
10	09- l-10-00	Executive station 10
*	09- l-10-00	
11	09- l-10-1 1	Secretary station 11
*	09- 2-00-00	Second pair automatically displayed
21	09- 2-21-00	Executive station 2 1
*	09- 2-21-00	
23	09- 2-21-23	Secretary station 23
*	09- 3-00-00	Third pair automatically displayed
#	00	

2.7.4.9 Program 11 — Station Grouping for Pilot Intercom

This program allocates stations into pilot intercom groups. A maximum of ten groups can be assigned with up to four stations in each group. The group number is entered first followed by the stations assigned to that group. Groups are numbered from 0 to 9.

Initially, no stations are allocated into pilot intercom groups.

EXAMPLE: Allocate stations 38, 47, 56 to group 1.

Dial	Display		
	00		
11	11		Program number 11
*	11-0		
1	11-1		Group number 1
*	11-1	1-00	First station
38	11-1	1-38	Station 38
*	11-1	2-00	Second station
47	11-1	2-47	Station 47
*	11-1	3-00	Third Station
56	11-1	3-56	Station 56
*	11-1	4-00	Fourth station
#	00		

2.7.4.10 Program 12 — Stations Receiving the Door Station Call

This program assigns the stations which receive the door chime when the door station is activated. Up to 10 stations may be assigned.

Initially, no stations are assigned to receive the door station call.

EXAMPLE: Assign stations 10, 23 and 47 to receive the door chime.

Dial	Display		
	00		
12	12		Program number 12
*	12	01-00	First station previously unallocated
10	12	01-10	First station — Station 10
*	12	02-00	Second station previously unallocated
23	12	02-23	Second station — Station 23
*	12	03-00	Third station previously unallocated
47	12	03-47	Third station — Station 47
*	12	04-00	Fourth station automatically displayed
#	00		

2.7.4.1 1 **Program 13 — Assign DSS Consoles to Stations**

This program assigns DSS consoles to stations. A maximum of two DSS consoles can be assigned for the BN-824 and BN-1236 systems, while a maximum of six DSS consoles can be assigned for a BN-2464 system.

Initially, no DSS consoles are assigned to any stations.

EXAMPLE: Assign DSS1 to station 10, DSS2 to station 23 and DSS8 to station 33.

Dial	Display		
	00		
13	13		Program number 13
*	13	-01-00	DSS 1 previously unallocated
10	13	-01-10	DSS1 — Station 10
*	13	-02-00	DSS2 previously unallocated
23	13	-02-23	DSS2 — Station 23
*	13	-03-00	DSS3 previously unallocated
*	13	-04-00	DSS4 unallocated
*	13	-05-00	DSS5 unallocated
*	13	-06-00	DSS6 unallocated
*	13	-07-00	DSS7 unallocated
*	13	-08-00	DSS8 previously unallocated
33	13	-08-33	DSS8 — Station 33
*	13	-09-00	DSS9 unallocated
*			Display cleared
#	00		

NOTE: DSS positions 5,6,9,10,11 and 12 are utilised only when the non-standard board DSS-BN-A is used.

2.7.4.12 Program 15 — Tenant Working (Lamp Shift Mode)

When a small capacity station is connected to a larger system, that is a 12 line station connected to a 2464 system, the smaller capacity station can only access the exchange lines that correspond to the key station's line keys, that is, lines 1 to 12 for a 12-line key station. The higher numbered exchange lines cannot be accessed by the smaller capacity stations.

However, when the Tenant Working facility is enabled, a smaller capacity key station has the ability to access the higher numbered exchange lines.

1. All key stations in the system have their exchange line keys assigned to lines corresponding to the FIRST assigned line group programmed in Section 2.7.4.6 — Station Access to Exchange Lines for Incoming Calls.

2. Stations no longer have the independent incoming and outgoing exchange line grouping. The incoming exchange line grouping serves for both incoming and outgoing calls.

3. Stations no longer have access to the Common Exchange Lines programmed in Section 2.7.4.3. unless these lines are included in the stations line grouping programmed in Section 2.7.4.6.

4. The second assigned incoming line group programmed in Section 2.7.4.6. is cleared when the Tenant Working facility in enabled. As well, the Station Access to Exchange Lines for Outgoing Calls, programmed in Section 2.7.4.5., is also cleared. Both of these facilities must be reprogrammed when the Tenant Working facility is disabled, otherwise stations will not have access to exchange lines for placing outgoing calls.

Initially, the tenant working facility is disabled.

EXAMPLE: Enable tenant working.

Dial	Display		
	00		
15	15		Program number 15
*	15	-0	Previous data
1	15	-1	Facility enabled
*			Display cleared
#	00		

2.7.4.13 Program 16 — Off Hook Signalling

This program enables/disables off-hook signalling for exchange line calls to the entire system.

0 — disables off-hook signalling
1 — enables off-hook signalling

Initially, off-hook signalling is disabled

EXAMPLE: Assign off-hook signalling to the system.

Dial	Display		
	00		
16	16		Program number 16
*	16	-0	Previous data
1	16	-1	Enable off-hook signalling
*			Display cleared
#	00		

2.7.4.14 Program 17 — Night Service Mode Assignment

This program selects the method of placing the system into Night Service Mode. Station 10 or any DSS console can place the system into night service mode or alternatively a group of stations can be placed into night service mode by any station within the group. The grouping of stations is set by the FIRST assigned incoming line group (refer to Section 2.7.4.6). That is, stations with the same first incoming line group are in the same night mode group.

0 — system night service mode
1 — group night service mode

Initially, the night mode assignment is set for system night mode.

EXAMPLE: Assign group night mode to the system.

Dial	Display		
	00		
17	17		Program number 17
*	17	-0	Previous data
1	17	-1	Set group night service mode
*			Display cleared
#	00		

2.7.4.15 Program 18 — External Zone Facilities

This program allocates the following facilities to the two external zones, EZ1 and EZ2.

1) Incoming Exchange Line Ring Signalling.

This facility allocates exchange line ring signalling by assigning an exchange line group programmed in Section 2.7.4.2 to an external zone.

00 — no incoming ring
N — group numbers, 01 to 24.

2) Other Facilities

a> Background Music

0 — disable background music on external speakers
1 — enable background music on external speakers

b) Alarm 2 Signalling on External Speakers

0 — disable alarm 2 signalling on external speakers
1 — enable alarm 2 signalling on external speakers

c) Alarm 1 Signalling on External Speakers

0 — disable alarm 1 signalling on external speakers
1 — enable alarm 1 signalling on external speakers

NOTES: 1. When background music is enabled, program 26, Section 2.7.4.21, must also be enabled.

2. Alarm and trigger condition programming is described in Section 2.7.4.23, Program 28 — Alarm Assignment.

Initially, both external zones have no incoming ring and background music and alarm signalling are disabled.

EXAMPLE: Assign incoming ring for group 13, background music and signalling for alarm 2 on external zone 1. Also assign incoming ring for group 17, background music and signalling for alarms 1 and 2 on external zone 2.

Dial	Display		
	00		
18	18		Program number 18
*	18-0		
1	18-l		External zone 1
*	18-l-00		Previous line group
13	18-l-13		Line group 13 assigned
*	18-l-13-000		Previous data
1	18-l-13-001		Background music enabled
1	18-l-13-011		Alarm 2 signalling enabled
0	18-l-13-1 10		Alarm 1 signalling disabled
*	18-2-00		External zone 2
17	18-2-17		Line group 17 assigned
*	18-2-17-000		Previous data
1	18-2-17-001		Background music enabled
1	18-2-17-011		Alarm 2 signalling enabled
1	18-2-17-111		Alarm 1 signalling enabled
*			Display cleared
#	**00**		

2.7.4.16 Program 19 — External Zone All Call Paging

This program enables All Call Paging messages to be sent over the external zone speakers. To programme, the following codes are used.

0 — disables external zone all call paging
1 — enables external zone speaker 1
2 — enables external zone speaker 2
3 — enables both external zone speakers

Initially, external zone all call paging is disabled.

EXAMPLE: Enable All Call Paging to both external zone speakers.

Dial	Display		
	00		
19	19		Program number 19
*	19	-0	Previous data
3	19	-3	Enable both speakers
*			Display cleared
#	00		

2.7.4.17 Program 20 — Automatic Incoming Exchange Line Answer

This program enables a key station to answer an incoming exchange line call by going off-hook. When this facility is enabled there is no need to first press the line key. The station will seize the incoming line only if the station has been assigned to the appropriate incoming line group programmed in Section 2.7.4.6.

This facility has three modes:-

0 — disable automatic incoming exchange line answer
1 — enable facility for any station in the appropriate incoming line group.
2 — enable facility for any station that has ring signalling for the appropriate line.

Initially, the automatic incoming exchange line answer is disabled.

EXAMPLE: Assign Automatic Incoming Exchange Line Answer to the system for all calls that have ring signalling.

Dial	Display		
	00		
20	20		Program number 20
*	20	-0	Previous data
2	20	-2	Ring signalling
*			Display cleared
#	00		

2.7.4.18 Program 22 — Exclusive Hold

This program enables/disables exclusive hold for the system.

0 — Exclusive Hold disabled
1 — Exclusive Hold enabled

Initially, the exclusive hold facility is enabled.

EXAMPLE: Disable the exclusive hold facility for the system

Dial	Display		
	00		
22	22		Program number 22
*	22	-1	Previous data
0	22	-0	Exclusive hold disabled
*			Display cleared
#	00		

2.7.4.19 Program 23 — Switchhook Flash/Earth Recall Time.

The flashing or earth recall time is programmable up to a maximum of 2 seconds in units of 100 milliseconds. Programming 0 for the flashing/recall time disables the flashing/recall facility.

Initially, the flashing/earth recall time is set to 100 milliseconds.

EXAMPLE: Set the Switchhook Flash or Earth Recall time to 500 milliseconds.

Dial	Display		
	00		
23	23		Program number 23
*	23	-01	Previous data
05	23	-05	Time set to 500 milliseconds
*			Display cleared
#	00		

2.7.4.20 Program 24 — Intercom Call Mode

This program allows the selection of either voice call or signal call when making an intercom call. Signal call sends a continuing ring signal to the station being called while voice call establishes handsfree talkback at the station called. The call mode is selected as follows:-

0 — voice call
1 — signal call

Initially, the intercom call mode is set for voice call.

EXAMPLE: Assign signal call as the Intercom Call Mode.

Dial	Display		
	00		
24	24		Program number 24
*	24	-0	Previous data
1	24	-1	Signal call mode
*			Display cleared
#	00		

2.7.4.21 Program 26 — Background Music

This program enables/disables background music:

0 — background music disabled
1 — background music enabled

Initially, background music is disabled.

NOTE: When background music is enabled one intercom link is reserved for the background music.

EXAMPLE: Enable background music for the system.

Dial	Display		
	00		
26	26		Program number 26
*	26	-0	Previous data
1	26	-1	Background music enabled
*			Display cleared
#	00		

2.7.4.22 Program 27 — Room Monitor

This program enables/disables the Room Monitor facility:

0 — room monitor disabled
1 — room monitor enabled

Initially, the room monitor facility is disabled.

EXAMPLE: Enable the room monitor facility for the system.

Dial	Display		
	00		
27	27		Program number 27
*	27	-0	Previous data
1	27	-1	Room Monitor enabled
*			Display cleared
#	00		

2.7.4.23 Program 28 — Alarm Assignment

This program assigns the first two control inputs for external devices as alarm inputs. In addition the trigger condition for each alarm is assigned.

a) Alarm assignment
0 — alarm disabled
1 — alarm enabled

b) Triggering
0 — when current flows
1 — when current ceases

Initially, both alarms are disabled.

EXAMPLE: Enable both alarms 1 and 2 and set alarm 1 to trigger when current flows and alarm 2 to trigger when current ceases.

Dial	Display		
	00		
28	28		Program number 28
*	28-O		
1	28-l		Alarm number 1
*	28-l	-0 0	Previous data
1	28-l	-1 0	Enable alarm 1
*	28-l	-1 -0	
0	28-l	-1 -0	Trigger when current flows
*	28-2	-0 0	Alarm number 2
1	28-2	-1 0	Enable alarm 2
*	28-2	-1 -0	
1	28-2	-1 -1	Trigger when current ceases
*			Display cleared
#	**00**		

2.7.4.24 Program 32 — Door Station Chime Length

This program selects the length of time that the door station's chime will sound at stations receiving the door station's call.

0 — chime sounds twice
1 — chime sounds for 30 seconds

Initially, the chime will sound twice.

EXAMPLE: Set the chime length to 30 seconds.

Dial	Display		
	00		
32	32		Program number 32
*	32	-0	Previous data
1	32	-1	Chime lasts 30 seconds
*			Display cleared
#	00		

2.7.4.25 Program 35 — Exclusive Hold Release Time

Calls held by exclusive hold will ringback after a programmed length of time. The time period is programmable up to a maximum of 2550 seconds (42 minutes, 30 seconds) in units of 10 seconds.

It is an error to programme 0 for the time period.

Calls held on exclusive hold will revert to normal hold at the end of the ringback period (Refer Section 2.7.4.26).

Initially, the exclusive hold release time is set to 90 seconds.

EXAMPLE: Set the exclusive hold release time to 80 seconds.

Dial	Display		
	00		
35	35		Program 35
*	35	-009	Previous data was 90 seconds
008	35	-008	Time now set to 80 seconds
*			Display cleared
#	00		

2.7.4.26 Program 36 — Exclusive Hold Automatic Ringback Timer

The duration of exclusive hold ringback to the holding station is programmable up to a maximum of 2550 seconds (42 minutes, 30 seconds) in units of 10 seconds.

Calls on exclusive hold will revert to normal hold at the end of the recall signalling period.

Initially, the exclusive hold automatic ringback time is set to 20 seconds.

EXAMPLE: Set the Exclusive Hold Automatic Ringback Timer to 10 seconds.

Dial	Display		
	00		
36	36		Program Number 36
*	36	-002	Previous data was 20 seconds
001	36	-001	Time now set to 10 seconds
*			Display cleared
#	00		

2.7.4.27 Program 37 — I-Hold Automatic Ringback Timer

The time a call will stay on hold before it rings back to the holding station is programmable up to a maximum of 2550 seconds (42 minutes, 30 seconds) in units of 10 seconds. To disable the automatic ringback timer programme 0 for the time period.

Initially, the I-Hold automatic ringback time is set to 90 seconds.

EXAMPLE: Set the I-Hold Automatic Ringback Time to 120 seconds (2 minutes).

Dial	Display		
	00		
37	37		Program number 37
*	37	-009	Previous data was 90 seconds
012	37	-012	Timer set to 120 seconds
*			Display cleared.
#	00		

2.7.4.28 Program 38 — Ring Inward Timer

The length of time after which a call, transferred by the Ring Inward Method (Section 1.4.7.5), is rung back to the transferring station is programmable up to a maximum of 2550 seconds (42 minutes, 30 seconds) in units of 10 seconds.

Initially, the ring inward timer is set to 40 seconds.

EXAMPLE: Set the Ring Inward Timer to 110 seconds.

Dial	Display		
	00		
38	38		Program number 38
*	38	-004	Previous data was 40 seconds
011	38	-011	Timer set to 110 seconds.
*			Display cleared
#	00		

2.7.4.29 Program 39 — I-Hold Transfer Timer

The I-Hold indication becomes regular Hold indication when transferring by an intercom call. The length of time after which a call is returned to the I-Hold condition and subsequently rung back to the transferring station is programmable up to a maximum of 2550 seconds (42 minutes, 30 seconds) in units of 10 seconds. To disable the I-Hold transfer timer programme 0 for the time period.

Initially, the. I-hold transfer timer is set to 40 seconds.

EXAMPLE: Set the I-Hold transfer timer to 70 seconds.

Dial	Display		
	00		
39	39		Program number 39
*	39	-004	Previous data was 40 seconds
007	39	-007	Timer set to 70 seconds
*			Display cleared
#	00		

2.7.4.30 Access Barring by Digit Analysis

Stations may be assigned to one of 6 classes for access barring:-

Class A — Unrestricted
Class B — Barred to programmed ISD codes. STD allowed
Class C — Limited STD/ISD access
Class D — Local calls
Class E — PABX calls
Class F — Intercom calls only.

Provision is made to store common allowed codes which any station, except stations in Class F, may dial regardless of barring class.

Any station, except stations in class F, may dial numbers stored as common use abbreviated dial numbers (00 to 89) regardless of barring class. Numbers stored as independent use abbreviated dial numbers (90-99) are subject to barring depending upon the class of service of the station.

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

Class A — No data required

Class B — Barred ISD access codes must be programmed. Up to four codes of four digits may be programmed. If the dialled number agrees with the ISD code then the station is restricted. (Section 2.7.4.30.6)

Class C — The barred STD access codes (Section 2.7.4.30.7) and the number length limiter (Section 2.7.4.30.3) must be programmed. Allowed STD/ISD numbers (Section 2.7.4.30.2) must also be programmed. Stations with Class C access barring may dial preprogrammed STD/ISD numbers, but are barred from other STD or ISD calls. Up to 12 allowed numbers of up to 8 digits each may be programmed as allowed STD/ISD numbers. If a number is longer than the digits programmed, it can be dialled providing the programmed digits agree with the first digits dialled. In addition, stations in class C are able to dial the common allowed codes without the number length limiter applying.

Class D — The barred STD access codes (Section 2.7.4.30.7) and the number length limiter (Section 2.7.4.30.3) must be programmed.

Up to sixteen numbers of up to four digits each may be programmed as barred STD access codes. In the centre of capital cities "0" is usually sufficient, however in outer metropolitan or country areas a more elaborate set of codes is required.

The number length limiter sets the maximum number of digits that may be dialled for a call. Any number between 0 and 30 may be programmed. Stations in class D are allowed to dial the common allowed codes without the number length limiter applying.

Class E — The PABX trunk access code (Section 2.7.4.30.4) must be programmed. Up to four codes of up to two digits may be programmed.

This data must be programmed if any outside lines have been assigned as PABX lines in Section 2.7.4.1. This class of station is allowed to dial the common allowed codes (Section 2.7.4.30.5)

Class F — No data required.

2.7.4.30.1 Program 40 — Station to Class of Service

To assign stations to a class of service the following codes are used:-

0 — Class A
1 — Class B
2 — Class C
3 — Class D
4 — Class E
5 — Class F

Initially, all stations are assigned to Class A.

EXAMPLE: Assign station 12 to Class F and station 13 to Class B.

Dial	Display		
	00		
40	40		Program number 40
*	40-00		
12	40-12		Station 12
*	40-12	-0	Previous data was Class A
5	40-12	-5	Assign to Class F
*	40-13	-0	Station 13
1	40-13	-1	Assign to Class B
*	40-14	-0	Station 14
#	00		

2.7.4.30.2 Program 41 — Allowed STD/ISD Numbers

Twelve numbers of up to eight digits may be programmed.

Initially, no numbers are programmed.

EXAMPLE: Assign numbers 03630033 and 042 as allowed STD/ISD numbers

Dial	Display		
	00		
41	41		Program number 41
*	41-00		
1	41-01		First number
*			Display cleared
03630033	03630033		
*	41-02		Second number
042	042		
*	41-03		Third number
#	00		

To clear any previously entered data press the SET key instead of entering a number.

2.7.4.30.3 Program 42 — Number Length Limiter

Programming 0 results in no limit being applied to the number length. Otherwise, the Number Length Limiter must be between 1 and 30.

Initially, the number length limiter is 7.

EXAMPLE: Limit the number of digits to 10.

Dial	Display		
	00		
42	42		Program number 42
*	42	-07	Previous data
10	42	-10	Limited to 10 digits
*			Display cleared
#	00		

2.7.4.30.4 Program 43 — PABX Access Codes

Four numbers of up to two digits may be programmed as PABX access codes.

Initially, no PABX access codes are programmed.

EXAMPLE: PABX access code "0".

Dial	Display		
	00		
43	43		Program number 43
*	43-o		
1	43-l		First PABX access code
*	43-l		
0	43-l	-0	PABX access code = 0
*	43-2		Second PABX access code
#	00		

To clear any previously entered data press the SET key instead of entering a code.

2.7.4.30.5 Program 44 — Common Allowed Codes

Four numbers of up to four digits may be programmed as Common Allowed Codes.

Initially, the following common allowed codes are programmed.

1 — 000
2 — 008
3 — 019
4 — Vacant

EXAMPLE: Add the common allowed code "046".

Dial	Display	
	00	
44	44	Program number 44
*	44-o	
4	44-4	Fourth code
*	44-4	
046	44-4 - 046	
*		Display cleared
#	00	

To clear any previously entered data press the SET key instead of entering a number.

2.7.4.30.6 Program 45 — Barred ISD Access Codes

Four numbers of up to four digits may be programmed as Barred ISD Access Codes.

Initially, the following ISD access codes are programmed.

I-0011
2 — 0014
3 — Vacant
4 — Vacant

EXAMPLE: Add the operator assisted international trunk call code 010 to the barred ISD access codes.

Dial	Display	
	00	
45	45	Program number 45
*	45-o	
3	45-3	Third code
*	45-3 -	
010	45-3 -010	
*	45-4 -	Fourth code automatically displayed
#	00	

To clear any previously entered data press the SET key instead of entering a code.

2.7.4.30.7 Program 46 — Barred STD Access Codes

Sixteen numbers of up to four digits may be programmed as Barred STD Access Codes.

Initially, the following STD access codes are programmed.

1 - 0 2	9 - 0 0 1
2 — 03	10 — 002
3 — 04	11 — 003
4 — 05	12 — 004
5 - 06	13 - 0 1 1
6 - 07	14 — 015
7 - 08	15 — Vacant
8 - 09	16 — Vacant

EXAMPLE: Barred STD access code "0"

Dial	Display		
	00		
46	46		Program number 46
*	46-00		
1	46-01		First code
*	46-01	-02	Previous data
0	46-01	- 0	
*	46-02	-03	Second code automatically displayed
#	00		

To clear any previously entered data press the SET key instead of entering a code

2.7.4.31 Program 47 — Automatic Pickup of I-Hold Line

After placing a call on I-Hold, a station may go on-hook, that is, replace the handset. The automatic ringback for calls placed on hold will sound after the length of time programmed in Section 2.7.4.27. When the station goes off-hook, that is, lifts the handset during the ringback then the held call will be automatically reanswered without the need to press the appropriate LINE key.

0 — disables automatic pickup
1 — enables automatic pickup

Initially, the automatic pickup of I-hold line is disabled.

NOTE: If the I-Hold Automatic Ringback Timer (Section 2.7.4.27) is programmed to zero, that is, disabling the ringback, then the automatic pickup is also effectively disabled.

EXAMPLE: Enable automatic pickup of I-Hold Line.

Dial	Display		
	00		
47	47		Program number 47
*	47	-0	Previous data
1	47	-1	Enable facility
*			Display cleared
#	00		

2.7.4.32 Program 52 — Paging Splash Tone

A splash tone can be provided when making paging announcements.

0 — Paging splash tone disabled
1 — Paging splash tone enabled.

Initially, the paging splash tone is enabled.

EXAMPLE: Disable paging splash tone.

Dial	Display		
	00		
52	52		Program number 52
*	52	-1	Previous data
0	52	-0	Splash tone disabled
*			Display cleared
#	00		

2.7.4.33 Program 53 — Stations Receiving Alarm Tones

An alarm tone can be provided to stations when the system detects an alarm condition. Each station is assigned as follows:-

0 — disable alarm tone
1 — enable alarm tone

Initially, all stations have the alarm tone disabled.

EXAMPLE: Assign station 10 to receive the alarm tone.

Dial	Display		
	00		
53	53		Program number 53
*	53-00		
10	53-10		Station 10
*	53-10	-0	Previous data
1	53-10	-1	Alarm tone enabled
*	53-11	-0	Station 11 automatically displayed
#	00		

2.7.4.34 Program 57 — Increase the Number of Intercom Lines

This program increases the number of intercom lines at the expense of exchange lines. Unused exchange lines are converted to intercom lines by entering the number of the first exchange line not used. Programming 00 disables the facility. The number of extra intercom lines is equal to the number of exchange lines not used.

Initially, the facility is disabled.

NOTE: 1) Intercom Hold and Intercom Conferencing facilities are disabled when this facility is enabled.

2) Two XPB-BN-A cards must be equipped to use this facility for the BN-2464 system.

3) Exchange lines must not be connected after the last exchange line number entered above.

4) The programming for the exchange lines that are converted to intercom lines is automatically modified as follows:

Program 1 — Exchange Line Facilities I
All lines converted to intercom lines are altered as follows:

(a) Exchange line type — 0 no line connected
(b) Dialling Mode — 0 decadic
(c) Exchange line request group — 0 not in a group
(d) PABX night mode — 0 disabled
(e) Recall - 0 Switchhook flash

Program 2 — Exchange Line Grouping

All groups containing the lines converted to intercom lines as members are modified to remove the lines from the groups by changing the last member of the group to the last exchange line used.

Program 3 — Exchange Line Facilities II

All lines converted to intercom lines are altered as follows:

(a) CDR printout — 0 enabled
(b) Data/facsimile line — 0 disabled
(c) Common exchange line — 0 disabled

The above facilities must be reprogrammed when program 57 — Increase the Number of Intercom Lines is disabled.

EXAMPLE: Convert the last four exchange lines to intercom lines on a BN-2464 system. That is, lines 21,22,23 and 24.

Dial	Display		
	00		
57	57		Program number 57
*	57	-00	Previous data
21	57	-21	First exchange line not used is line 21
*			Display cleared
#	00		

Four extra intercom lines have been assigned to bring the total number of intercom lines to ten lines.

2.7.4.35 Program 58 — Incoming Ring Signalling

This program assigns the incoming ring signalling for each exchange line.

0 — repeating single tone
1 — repeating double tone

Initially, all exchange lines have the repeating single tone assigned as the incoming ring signalling.

EXAMPLE: Assign the repeating double tone to lines 6 and 7

Dial	Display		
	00		
58	58		Program number 58
*	58-00		
06	58-06		Line 6
*	58-06	-0	Previous data
1	58-06	-1	Line 6 — repeating double tone
*	58-07	-0	Line 7 automatically displayed
1	58-07	-1	Line 7 — repeating double tone
*	58-08	-0	Line 8 automatically displayed
#	00		

2.7.4.36 Program 59 — Limit CDR Printout by Station Number

This program enables/disables CDR printout for each station on the system.

0 — printout enabled
1 — printout disabled

Initially, the CDR printout is enabled for all stations.

EXAMPLE: Disable the CDR printout for stations 3 1 and 32.

Dial	Display		
	00		
59	59		Program number 59
*	59-00		
31	59-31		Station 3 1
*	59-31	-0	Previous data
1	59-31	-1	Station 3 1 — printout disabled
*	59-32	-0	Station 32 — automatically displayed
1	59-32	-1	Station 32 — printout disabled
*	59-33	-0	Station 33 — automatically displayed
#	00		

2.7.4.37 Program 60 — Limit CDR Printout by Number Length

This program limits the CDR printout to numbers of more than the programmed number of digits. The number length limit may be set between 0 and 20 digits. Programming 0 as the number length results in no limit being applied to the number length.

Initially, the number length is 0. That is, no limit.

EXAMPLE: Limit the CDR printout to numbers longer than 7 digits

Dial	Display		
	00		
60	60		Program number 60
*	60	-00	Previous data
07	60	-07	Number length set to 7
*			Display cleared
#	00		

2.7.4.38 Program 90 — Error Checking

Any errors in the system programming may be checked by this facility.

EXAMPLE:

Dial	Display		
	00		
90	90		Program number 90

(If there are no errors)

*	-EO	

(If there are errors)

*	-E	Error exists
*	-XX	Program number in error

Repeated dialling of "*" will display all programs with errors.

2.7.4.39 Program 91 — Clearing Abbreviated Dial Numbers and Alarm Clock Data

All abbreviated dial numbers and the alarm clock data is cleared by this program. This data should be cleared when the system is first installed.

EXAMPLE:

Dial	Display		
	00		
91	91		Program number 91
*	91	-A	
*			Clear the data
#	00		

2.7.5 Non-Standard Facilities and Options

Some of these facilities may be utilised to suit customers special requirements.

2.7.5.1 Program 5 — Unsupervised Conference

This option enables/disables the unsupervised conference facility.

0 — disables unsupervised conference
1 — enables unsupervised conference.

The system is initialised with the unsupervised conference facility disabled and the facility should remain disabled.

EXAMPLE: Disable unsupervised conference if it has been accidently enabled.

Dial	Display		
	00		
5	05		Program number 5
*	05	-1	Previous data
0	05	-0	Disable facility
*			Display cleared
#	00		

2.7.5.2 Program 21 — Automatic Idle Exchange Line Seizure

This program enables idle exchange lines to be seized by two separate methods. The first method is by dialling "0" in the on-hook mode while the second method is by pressing the speaker key and then an Exchange Line Request Group number programmed in Section 2.7.4.1.

Programming allows the selection of either one of the above methods or both of the methods according to the following:-

0 — facility disabled
1 — exchange line seized by pressing "SPKR" then the Exchange Line Request Group number.
2 — exchange line seized by dialling "0"
3 — exchange line seized by either of the above two methods.

This system is initialised to mode 3 and should remain at mode 3.

EXAMPLE: Assign mode 3 for Automatic Idle Exchange Line Seizure if the programming has been altered

Dial	Display		
	00		
21	21		Program number 21
*	21	-0	Previous data
3	21	-3	Either method
*			Display cleared
#	00		

2.7.5.3 Program 25 — Initial Microphone State

This program sets the initial microphone state of all the stations in the system to either active or non-active. The initial microphone state is selected as follows:-

0 — microphone active
1 — microphone non-active

The system is initialised with the initial microphone state active and the state should remain active.

EXAMPLE: Set the microphones in the system to the active mode if the mode has been set to non-active.

Dial	Display		
	00		
25	25		Program Number 25
*	25	-1	Previous data
0	25	-0	Microphone active
*			Display cleared
#	00		

2.7.5.4 **Program 29 — Exchange Line Conference Mode Selection.**

This program selects the mode of operation when initiating an exchange line conference. The conference mode is selected as follows:-

0 — mode 1
1 -mode2

The system is initialised to mode 1 and should remain in mode 1.

EXAMPLE: Set the exchange line conference mode to mode 1 if the mode has been changed.

Dial	Display		
	00		
29	29		Program number 29
*	29	-1	Previous data
0	29	-0	Select mode 1
*			Display cleared
#	00		

2.7.5.5 **Program 30 — Simultaneous Exchange Line Calls**

This program enables/disables the simultaneous exchange line call facility.

0 — disables simultaneous exchange line call facility.
1 — enables simultaneous exchange line call facility.

The system is initialised with the simultaneous exchange line call facility enabled and the facility should remain enabled.

EXAMPLE: Enable simultaneous exchange line call facility if it has been disabled.

Dial	Display		
	00		
30	30		Program number 30
*	30	-0	Previous data
1	30	-1	Enable feature
*			Display cleared
#	00		

2.7.5.6 Program 31 — 3 Minute Warning Tone on Exchange Lines

This program enables/disables a warning tone that is provided at three minute intervals on exchange line calls.

0 — disables warning tone
1 — enables warning tone.

The system is initialised with the warning tone disabled and the facility should remain disabled.

EXAMPLE: Disable three minute warning tone if it has been enabled.

Dial	Display		
	00		
31	31		Program number 3 1
*	31	-1	Previous data
0	31	-0	Warning tone disabled
*			Display cleared
#	00		

2.7.5.7 Program 33 — Single Operation Exchange Line Seizure

This program enables a key station to seize an exchange line by simply pressing the exchange line key. The station will be placed into call monitor mode for an On-Hook station or handsfree mode for a Handsfree station.

0 — disable facility
1 — enable facility

The system is initialised with the single operation exchange line seizure facility enabled and the facility should remain enabled.

EXAMPLE: Enable single operation exchange line seizure facility if it has been disabled.

Dial	Display		
	00		
33	33		Program number 33
*	33	-0	Previous data
1	**33**	-1	Enable facility
*			Display cleared
#	00		

2.7.5.8 Program 50 — Call Duration Display

When making an exchange line call, the dialled number will be displayed. However, by enabling this facility the call duration will be displayed after a period of time programmed in Section 2.7.5.9. The type of display required is selected by programming the following:-

0 — display dialled number
1 — display call duration

The system is initialised with the call duration display disabled and the facility should remain disabled.

EXAMPLE: Disable the call duration display if it has been enabled.

Dial	Display		
	00		
50	50		Program Number 50
*	50	-1	Previous data
0	50	-0	Disable call duration display
*			Display cleared
#	00		

2.7.5.9 Program 51 — Delay Time Before Call Duration Display

The delay in changing the display from showing the dialled number to showing the call duration is programmable from 5 seconds to 255 seconds in units of 1 second.

The system is initialised to 5 seconds delay time. The delay time is irrelevant when the call duration display is disabled (refer to Section 2.7.5.8)

EXAMPLE: Set the delay time to 15 seconds,

Dial	Display		
	00		
51	51		Program number 51
*	51	-005	Previous data was 5 seconds
015	51	-015	Delay time 15 seconds
*			Display cleared
#	00		

2.7.5.10 Program 54 — Automatic Hold Release

The system will automatically disconnect a held outside call if the line current is interrupted for more than the programmed period. The time period is programmed as follows:-

0 — held line is not released by current interruption
1 — held line is released after a 600 millisecond current interruption
2 — held line is released after a 90 millisecond current interruption.

The system is initialised so that the held line is not released by current interruption.

EXAMPLE: Set the release time to 90ms.

Dial	Display		
	00		
54	54		Program number 54
*	54	-0	Previous data
2	54	-2	90ms release time
*			Display cleared
#	00		

2.7.6 Summary of Facility Programming and Initial Values.

PAR.	PROG	FACILITY	ASSIGNMENT	INIT. VALUE
2.7.4.1	1	Exchange Line Facilities I	a) Exchange Line type 0 — no line connected 1 — direct exchange line 2 — not used 3 — PABX line	a) 1 for all lines
			b) Dialling Mode 0 — Decadic 1 — DTMF	b) 0 for all lines
			c) Exchange Line Request Groups 0 — not in any group 1 — group 1 2 — group 2 3 — group 3 4 — group 4	c) 1 for all lines
			d) PABX night mode 0 — disable 1 — enable	d) 0 for all lines
			e) Earth Recall or Switchhook Flash 0 — Switchhook Flash 1 — Earth Recall	e) 0 for all lines
2.7.4.2	2	Exchange Line Grouping	Enter group number, then first and last line in the group	Group 1 Lines 1-8 (BN-824), 12 (BN-1236) or 24 (BN-2464). No other groups programmed.
2.7.4.3	3	Exchange Line Facilities II	a) CDR Printout 0 — enabled 1 — disabled	a) 0 for all lines
			b) Data/Facsimile Line 0 — disabled 1 — enabled	b) 0 for all lines
			c) Common Exchange Line 0 — disabled 1 — enabled	c) 0 for all lines
2.7.4.4	4	Priority Break-In	Enter station number, then 0 — break-in disabled 1 — priority level 1 2 — priority level 2 3 — priority level 3	0 for all stations

AR.	PROG	FACILITY	ASSIGNMENT	INIT. VALUE
.7.4.5	6	Station Access to Exchange Lines for Outgoing Calls	Enter station number, then line groups for which station has outgoing access	All stations assigned to group 1.
.7.4.6	7	Station Access to Exchange Lines for Incoming Calls	Enter station number, then line group for which station has incoming access, then ring signalling code. 0 – no incoming tone 1 – tone in day mode only 2 – tone in night mode only 3 – tone in both day and night	All Stations assigned to group 1. Only station 10 has tone in both day & night. All other stations have no incoming tone
.7.4.7	8	station Facilities	a) Night Service Mode Restriction 0 – disable 1 – enable	a) 0 for all stations
			b) Confidence Tone 0 – enable 1 – disable	b) 1 for all stations
			c) Station Type 0 – key station 1 – reserved, do not programme 2 – standard telephone decadic 3 – standard telephone DTMF	c) 0 for all stations
			d) Do Not Disturb 0 – disable 1 – enabled for incoming exchange lines 2 – enabled for all calls 3 – enabled for either incoming exchange lines or for all calls	d) 0 for all stations
			e) Paging Zone 0 – not in any zone 1 – zone 1 2 – zone 2 3 -zone3 4 – zone 4	e) 0 for all stations

PAR.	PROG	FACILITY	ASSIGNMENT	INIT. VALUE
2.7.4.8	9	Call Forwarding Pairs	Enter Executive station then Secretary station	No call forwarding pairs assigned.
2.7.4.9	11	Station Grouping for Pilot Intercom	Enter group number, then stations in the group	No stations assigned to any groups
2.7.4.10	12	Stations Receiving the Door Station Call	Enter station numbers	No stations assigned
2.7.4.11	13	Assigning DSS Consoles to Stations	Enter station numbers	No DSS consoles assigned
2.7.4.12	15	Tenant Working (Lamp Shift Mode)	0 — disable 1 — enable	0
2.7.4.13	16	Off Hook Signalling	0 — disable 1 — enable	0
2.7.4.14	17	Night Service Mode Assignment	0 — system night service mode 1 — grouped night service mode	0
2.7.4.15	18	External Zone Facilities	a) Exch. line ring signalling 00 — no incoming tone N — exchange line group b) Background music 0 — disable 1 — enable c) Alarm 2 Signalling 0 — disable 1 — enable d) Alarm 1 Signalling 0 — disable 1 — enable	a) 00 for both zones b) 0 for both zones c) 0 for both zones d) 0 for both zones
2.7.4.16	19	External Zone All Call Paging	0 — disable all call 1 — enable EZ1 2 — enable EZ2 3 — enable both EZ1 and EZ2	0
2.7.4.17	20	Automatic Incoming Exchange Line Answer	0 — disable facility 1 — enable for stations with correct line grouping 2 — enable for stations with ring signalling	0

'AR.	'ROG	'ACILITY	ASSIGNMENT	INIT. VALUE
2.7.4.18	22	Exclusive Hold	0 — disable 1 — enable	1
2.7.4.19	23	Switchhook Flash/Earth Recall Time	Enter time period in multiples of 100 milliseconds	1 — i.e. 100 milliseconds
2.7.4.20	24	Intercom Call Mode	0 — voice call 1 — signal call	0
2.7.4.21	26	Background Music	0 — disable 1 — enable	0
2.7.4.22	27	Room Monitor	0 — disable 1 — enable	0
2.7.4.23	28	Alarm Assignment	Enter alarm number then, a> 0 — alarm disabled 1 — alarm enabled b) triggering 0 — when current flows 1 — when current stops	0,0 for both alarms
2.7.4.24	32	Door Station Chime Length	0 — chime sounds twice 1 — chime sounds for 30 seconds	0
2.7.4.25	35	Exclusive Hold Release Timer	Enter time period in multiples of 10 seconds	009 — i.e.90 seconds
2.7.4.26	36	Exclusive Hold Automatic Ringback Timer	Enter time period in multiples of 10 seconds	002 — i.e.20 seconds
2.7.4.27	37	I-Hold Automatic Ringback Timer	Enter time period in multiples of 10 seconds	009 — i.e.90 seconds
2.7.4.28	38	Ring Inward Timer	Enter time period in multiples of 10 seconds	004 — i.e.40 seconds
2.7.4.29	39	I-Hold Transfer Timer	Enter time period in multiples of 10 seconds	004 — i.e.40 seconds
2.7.4.30.1	40	Access Barring Station to Class of Service	Enter station number then, 0 — Class A 1 — Class B 2 — Class C 3 — Class D 4 — Class E 5 — Class F	All stations are in Class A

PAR.	PROG	FACILITY	ASSIGNMENT	INIT. VALUE
2.7.4.30.2	41	Access Barring Allowed STD/ ISD numbers	Enter up to 12 allowed numbers of up to 8 digits	No allowed numbers
2.7.4.30.3	42	Access Barring Number Length Limiter	Enter the maximum number of digits allowed	07
2.7.4.30.4	43	Access Barring PABX Access Codes	Enter up to 4 codes of up to 2 digits	No PABX access codes
2.7.4.30.5	44	Access Barring Common Allowed Numbers	Enter up to 4 numbers of up to 4 digits	1 — 000 2 — 008 3 -019 4 — Vacant
2.7.4.30.6	45	Access Barring Barred ISD Codes	Enter up to 4 numbers of up to 4 digits	1 — 0011 2 — 0014 3 — Vacant 4 — Vacant
2.7.4.30.7	46	Access Barring Barred STD Codes	Enter up to 16 numbers of up to 4 digits	l-02 9-001 2-03 10-002 3-04 11-003 4-05 12-004 5-06 13-011 6-07 14-015 7-08 15- 8-09 16-
2.7.4.3 1	47	Automatic Pick-up of I-Hold Line	0 — disable 1 — enable	0
2.7.4.32	52	Paging Splash Tone	0 — disable 1 — enable	1
2.7.4.33	53	Stations Receiving Alarm Tones	Enter station number then, 0 — disable alarm tone 1 — enable alarm tone	0 for all stations
2.7.4.34	57	Increase the Number of Intercom Lines	Enter first exchange line not used	00 — facility disabled
2.7.4.35	58	Incoming Ring Signalling	Enter line number then, 0 — repeating single tone 1 — repeating double tone	0 for all lines
2.7.4.36	59	Limit CDR Printout by Station Number	Enter station number then, 0 — enable printout 1 — disable printout	0 for all stations
2.7.4.37	60	Limit CDR Printout by Number Length	Enter the number length limit	00 i.e. no limit
2.7.4.38	90	Error Checking	Dial * to display errors	EO
2.7.4.39	91	Clearing Abbreviated Dial Numbers and Alarm Clock Data	Dial * to clear data	A

2.8 FUNCTIONAL TEST

2.8.1 General

After completing the system facility programming, the system must be tested in accordance with the following test procedure. If faults are encountered, follow the repair suggestions contained in Section 3.5, Suggested Repair Action.

Note: for the BN-308/5 12 systems follow the repair suggestions in Section 4.3.5.

*****CAUTION*****

The test procedures should be followed in the order set out in the following sections. Each test is 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) restart the test at the beginning of each section or at any entry point marked * in the NO. column.

2.8.2 System Test

This functional test requires three stations which are referred to as stations A, B, and C in the test procedure.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
1	Exchange Lines	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 at Stations A,B & C 2) Hear dial tone at Station A	3.5.1. 3.5.2.
2	Incoming Call	Call another line using Station A	1) Associated line LED slow flashes at Stations A,B & C 2) Only assigned stations receive ring signalling	3.5.3. 3.5.4.
3	Answering	Go off-hook at Station B and press flashing line key	1) The slow flashing line LED changes to steady at all stations 2) Both parties (A and B) can converse	3.5.5. 3.5.6.
4	Hold	Press HOLD key at Station B	1) Line LED fast flashes at Station B and flashes at all other stations 2) Station A hears music-on-hold	3.5.7. 3.5.8.
5	I-Hold Automatic Ring Back	Wait for timeout	1) Ring signalling heard at Station B for approximately 8 seconds	3.5.9.
6	Reseizure	Respond to the held line at Station B by pressing the line key	1) Line LED changes to steady 2) Stations A and B can converse	3.5.5. 3.5.6.

JO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
7	Exclusive Hold	Press HOLD key twice at Station B	1) Line LED flickers at Station B and is steady at all other stations 2) Station A hears music-on-hold	3.5.7. 3.5.8.
8	Exclusive Hold Release Time and Recall Signalling Duration	Wait for timeout (release time)	1) Audible signalling heard at Station B for the length of time programmed for the recall signalling duration 2) Line LED fast flashes at Station B and flashes at all other stations when ring signalling stops at Station B	3.5.10. 3.5.10.
9	Reseizure	Respond to the held line at Station B by pressing the line key	1) Line LED changes to steady at all stations 2) Stations A and B can converse	3.5.5. 3.5.6.
0	Automatic Hold of Exchange Line	Press ICM key at Station B	1) Line LED fast flashes at Station B and flashes at all other stations 2) ICM LED lights steadily at Station B 3) Station B hears intercom dial tone. Station A hears music-on-hold	3.5.7. 3.5.11. 3.5.11. 3.5.8.
11	Automatic Transfer after Announcing	Dial two digits to call Station C Go off-hook at Station C	1) Hear a single tone burst through the handset of Station B and speaker of Station C. 2) ICM LED fast flashes at Station C. 3) Line LED fast flashes at Station C and flashes at all other stations. 1) ICM LED lights steadily at Station C 2) Stations B and C can converse through the handset	3.5.12. 3.5.13. 3.5.6.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
		Press INW key at Station B	1) Line LED lights steadily at all stations 2) Stations A and C can converse through handset	3.5.5. 3.5.6.
		Go on-hook at Station B		
2	Outside Call Conference	Press AD.ON key at Station A	1) Line LED flickers at Station A and lights steadily at all other stations 2) Station C hears music-on-hold	3.5.7 3.5.8
		Call Station B from Station A using intercom	1) Hear a single tone burst through the handset of Station A and speaker of Station B	3.5.11 3.5.12
		Go off-hook at Station B	1) ICM LED lights steadily at Station B 2) Stations A and B can converse through handset	3.5.13
		Press AD.ON key at Station A	1) ICM LEDs go out. Line LED lights steadily at all stations 2) Stations A, Band C can converse through their handset	3.5.14
		Go on-hook at Stations A, B and C		
*13	Intercom Seizure	Press ICM key while off-hook at Station A Dial two digits to call Station B	1) Intercom LED lights steadily 2) Hear intercom dial tone	3.5.11.
14	Intercom Voice Call		1) Hear a single tone burst through the handset of Station A and speaker of Station B 2) ICM LED fast flashes at Station B 3) Hear talkback answering by Station B on Station A handset	3.5.12.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
15	Microphone cut off	Press MIC key at Station B Press MIC key again at Station B	1) MIC LED lights steadily 2) No talkback can be heard at Station A 1) MIC LED turns off 2) Talkback is possible again	3.5.15.
16	Intercom Signal Call	Dial 1 at Station A	1) Ring signalling is heard through speaker at Station B 2) Ring tone heard through handset of Station A	3.5.16. 3.5.17.
17	Answering	Go off-hook at Station B	1) ICM LED lights steadily at Station B 2) Stations A and B can converse through handset	3.5.13.
18	Intercom Hold	Press HOLD key at Station A	1) ICM LED flickers at Station A and lights steadily at Station B 2) Station B hears music-on-hold	3.5.18. 3.5.8.
19	Reseizure	Press ICM key at Station A	1) ICM LED lights steadily at Stations AandB 2) Stations A and B can converse through handset	3.5.13.
20	Disconnection	Go on-hook at Stations AandB	1) ICM LED's go out at Stations A and B	3.5.19.
21	Single Key Access Dialling	With Station A on-hook press a line key Press SPKR key at Station A	1) Line LED lights steadily at all stations 2)SPKR LED lights steadily at Station A 3) Dial tone is heard through speaker of Station A. Station A is in the on-hook dialling mode 1) Line LED and SPKR LED goes out.	3.5.20

The following test sequence checks that the system options operate correctly.

The tests are carried out only on the facilities that have been provided. The tests for facilities not provided are to be ignored.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
"22	Background Music (if provided and programmed Ref. 2.7.4.21)	With Station A on-hook dial # Dial # again at Station A	1) Background music can be heard through speaker of Station A 1) Background music turns off	3.5.21.
"23	Decadic or DTMF dial exchange line (as programmed Ref. 2.7.4.1).	Seize each exchange line in succession and check whether dialling is decadic or DTMF	1) Appropriate line LED turns on 2) Dialling method is as programmed for each line connected to the system	3.5.1. 3.5.22
'24	Incoming Signalling Assignment (as programmed Ref. 2.7.4.6.).	Seize one line at Station A Dial another number on the system Repeat for all lines connected to the system	1) Line LED lights 2) Dial tone is heard at Station A 1) Only assigned stations receive audible signalling	3.5.1. 3.5.2. 3.5.23
"25	Line Request (as programmed Ref. 2.7.4.1.).	With Station A off-hook press HOLD key Dial a programmed line request group number then go on-hook Go off-hook and press the flickering LINE key at Station A	1) ICM LED turns on and intercom dial tone is heard at Station A 1) HOLD LED flickers at Station A 2) ICM LED turns off 3) Line LED within the programmed group flickers at Station A and lights steadily at all other stations 4) Station A receives ring signalling 1) HOLD LED turns off 2) Line LED lights steadily at all stations	 3.5.24.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
		Go on-hook Repeat for all programmed line request groups	1) All LEDS turn off	
26	Access Barring by Digit Analysis (as programmed Ref. 2.7.4.30)	Seize a line at stations in different classes and dial various codes	1) Class A stations – unrestricted 2) Class B stations – barred ISD access allowed STD access 3) Class C stations – limited ISD/STD access to 12 numbers 4) Class D stations – local calls only 5) Class E stations – PABX calls only when the system is located behind a PABX otherwise intercom calls only 6) Class F stations – intercom calls only 7) When restriction occurs the station will hear a long single tone after the line is automatically disconnected. Stations in Class F can seize exchange lines but cannot dial out.	3.5.25.
"27	External Paging (if provided and programmed Ref. 2.7.4.16)	Seize an intercom line and dial 85 at any station	1) A paging call can be heard over all the external speakers	3.5.26.
"28	PABX Recall (if system located behind a PABX)	Seize a PABX line at Station A and dial another line on the system	1) An incoming call is signalled at assigned stations	3.5.27.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
		Answer the call at Station B Press RL key at Station A , Press RL key at Station A again Go on-hook at Stations A and B	1) Stations A and B can converse 1) Station A hears PABX dial tone 2) Station B is placed on PABX hold 1) Stations A and B can converse	
'29	Off-hook Signalling (if programmed Ref.2.7.4.4 & 2.7.4.13).	Seize a line at Station A Make an intercom call from Station B to Station A.Dial 1 at Station B. (Station B has priority break-in) Go on-hook at Station B Go on-hook at Station A	1) Line LED lights steadily 2) Hear dial tone at Station A 1) ICM LED fast flashes at Station A and lights steadily at Station B 2) Station A receives ring signalling 1) ICM LEDS go out 1) Line LED goes out	3.5.28
'30	Call Details Recorder	Switch the jack assembly switch to IN SERVICE	1) Ready LED lights 2) Printer prints heading	3.5.29. 3.5.30.

2.8.3 Station Test

The following test sequence is to be performed on each station within the system. The sequence is divided into three parts. The first part covers facilities common to the On-Hook and Handsfree stations. The second part covers facilities exclusive to the Handsfree station. The third part covers facilities provided on the standard telephone stations.

PART 1: ON-HOOK AND HANDSFREE STATIONS.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
*1	Line Keys	Go off-hook and press each line key	1) Line LED lights 2) Dial tone is heard if line is connected and free 3) Station has sidetone	3.5.31.
2	Dialling	Seize a line and dial	1) Destination is reached 2) Parties can converse	3.5.32.
3	Hold	Press HOLD key Reseize the line	1) Line LED fast flashing 1) Line LED lights steadily	3.5.33.
4	ICM	Press ICM key Reseize the line Go on-hook	1) Line LED fast flashes 2) ICM LED lights steadily 3) ICM dial tone is heard 4) ICM LED goes off 1) Line LED turns off	3.5.33. 3.5.34.
*5	On-Hook Operation	Go off-hook and press a line key Press SPKR key then place handset on-hook Press SPKR key again	1) Line LED lights 2) Dial tone is heard 1) SPKR LED turns on 2) Dial tone heard through station speaker 1) SPKR LED turns off 2) Line LED turns off	3.5.31 3.5.35.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
*6	Microphone Disable	Press MIC key Press MIC key again	1) MIC LED turns on 1) MIC LED turns off	3.5.33.
*7	Intercom Calls Using DSS key	Go off-hook and press a DSS key Go on-hook	1) ICM LED lights and intercom connection is made 1) ICM LED turns off	3.5.33. 3.5.34.

PART 2: HANDSFREE STATION

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
"8	Display	Press CLOCK key Press TIMER key Press TIMER key again Press CLOCK key	1) Display shows time and date 1) Display shows the timer and starts timer 1) Timer stops 1) Display shows time and date	3.5.36.
*9	Handsfree Operation	Press SPKR key and seize a line Dial an outside number Press SPKR key again	1) SPKR LED lights steadily 2) Line LED lights steadily 3) Hear dial tone through speaker 1) Destination is reached 2) Both parties can converse 1) SPKR and line LED's go off 2) Line is disconnected	3.5.37.

PART 3: STANDARD TELEPHONE STATIONS

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
*10	Standard Telephone Station	Lift the handset	1) Hear special facility tone	3.5.38.
		Dial 0	1) Hear outside line dial tone	
		Dial an outside number	1) Destination is reached 2) Parties can converse	
		Quickly depress and release the switchhooks	1) The call is placed on hold	
		Go on-hook at the standard telephone station	1) Ring signalling is heard at the standard telephone station	
		Lift the handset then hang up to finish the call		

The following test sequence checks that the programmable station options operate correctly.

The stations are to be tested only on facilities that have been programmed for each station. Tests for facilities not programmed are to be ignored.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
*1	Line Access Restrictions (if programmed Ref. 2.7.4.5.)	Go off-hook and seize each line in succession	1) Each station can only access the allowed lines	3.5.39.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
*2	Do-Not-Disturb (if programmed Ref. 2.7.4.7.)	i) Mode 1 – Press DND key – Press DND key again ii) Mode 2 – Press DND key – Press DND key again iii) Mode 3 – Press DND key – Press DND key again – Press DND key a third time	1) DND LED flashes 1) DND LED goes out 1) DND LED lights steadily 1) DND LED goes out 1) DND LED flashes 1) DND LED lights steadily 1) DND LED goes out	3.5.33.
*3	Call forwarding (if programmed Ref. 2.7.4.8.)	With the handset on-hook, press DND key once if Do Not Disturb mode 2 is programmed or press the DND key twice if Do Not Disturb mode 3 is programmed at the Executive Station Press DND key at Executive station again	1) DND LED lights steadily at Executive Station 2) DND LED slow flashes at Secretary station. 1) Both DND LED's go out	3.5.40.

2.9 SITE RECORDS AND INSTALLATION FEEDBACK LABEL

2.9.1 Software Programming Records

Upon completion of the installation, a copy of the BN-824 or BN-1236/2464 SBS System Order should be placed in the SDF as a record of the way the system has been programmed.

2.9.2 SDF Records

The cabling records of the SDF should be carried out as per Telecom Technical Publication TPH 0216 "LSA Plus Terminating System".

Existing record books and cards should be used for the LSA Plus terminating system. A record book holder is provided inside the 100 pair frame cover.

2.9.3 Installation Feedback Label

To provide information on equipment quality, an "Installation Feedback Label" is supplied with the main equipment. This label should be filled out at the completion of installation and returned to the address shown.

NOTE: When equipment is defective a Customer Equipment Fault Report Label (E441) must be completed (Refer Section 3.6.).

3. MAINTENANCE

3.1 TEST EQUIPMENT

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

(i) A multimeter with small test probes, to measure the various test voltages and to test the continuity of wiring between the main equipment and stations.
(ii) A Test and Programming Unit, TPU-BN, for the BN-824/1236/2464 system.
(iii) An AMP-Champ connector insertion tool, which is used to terminate the AMP-Champ connector.
(iv) Normal maintenance tools, i.e. Long-nose pliers, Angle Cutters, and both Phillips and flat blade type screwdrivers.

3.2 TEST POINTS

3.2.1 Power Supply

There are live DC voltages supplied for the BN-824 system and seven DC voltages supplied for the BN-1236/2464 systems.

The supply voltages are accessed by disconnecting the power plug from the backplane of either the BN-824 or BN-1236/2464 Main Equipment with the power off.

Measure the voltages across the plug pins on the backplane end of the power supply cord as shown in Table 3.2.1(a) for the BN-824 and Table 3.2.1(b) for the BN-1236/2464. Figure 3.2.1 (a) shows the pin locations on the plug for the BN-824 while figure 3.2.1 (b) shows the pin locations on the plug for the BN-1236/2464.

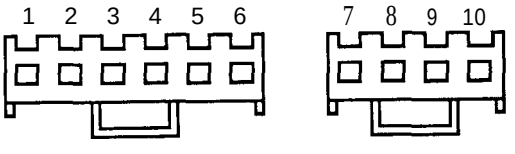


FIG 3.2.1 (a) BN-824 POWER SUPPLY CORD PIN LOCATIONS, BN-824

PIN NO.	WIRE COLOUR	PCB DESIGNATION	VOLTS (V)	REFERENCE PIN
1	DARK BLUE	+5V	5.10 ± 0.35	2 (LGD)
2	PURPLE	LGD	–	–
3	GREY	+12V	12.0 ± 0.5	4 (AGD)
4	WHITE	AGD	–	–
5	BLACK	R20V	24 TO 36	7 (RGD)
6	LIGHT BLUE	T20V	19 ± 1.5	7 (RGD)
7	BROWN	RGD	–	–
8	RED	T30	38 TO 55	9 (TGD)
9	ORANGE	TGD	–	–
IO	YELLOW	RES	–	–

TABLE 3.2.1 (a) DC VOLTAGE TEST POINT SUMMARY, BN-824

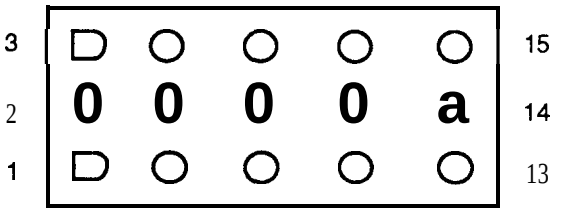


FIG. 3.2.1 (b) POWER SUPPLY CORD PIN LOCATIONS, BN-1236/2464.

PIN NO.	YIRE COLOUR	PCB DESIGNATION	VOLTS (V)	REFERENCE PIN
1	BROWN	R20	24 to 36	2 (RGD)
2	WHITE	RGD	—	—
3	PINK	T30A	38 to 55	5 (TGDA)
4	LIGHT BLUE	T30B	38 to 55	6 (TGDB)
5	YELLOW	TGDA	—	—
6	PURPLE	TGDB	—	—
7	GREY	T20	19 ± 1.5	8 (AGD)
8	DARK BLUE	AGD	—	—
9	ORANGE	Al2	12.0 ± 0.5	10 (AGD)
10	RED	AGD	—	—
11	BLACK	L5A	5.10 ± 0.35	13 (LGDA)
12	WHITE/BLUE	L5B	5.10 ± 0.35	14 (LGDB)
13	WHITE/BLACK	L G D A	—	—
14	WHITE/RED	LGDB	—	—
15	WHITE/YELLOW	RES	—	—

TABLE 3.2.1 (b) DC VOLTAGE TEST POINT SUMMARY

The mains and DC power supplies are equipped with indicators which light when the supply is active. Refer to Section 3.2.2 for their description.

If trouble arises with any of the supply voltages, check the voltages and, if necessary, replace the associated fuse. Table 3.2.1 (c) illustrates which fuse corresponds to a given power supply.

POWER SUPPLY	RATING BN-824	RATING BN-1236/2464
Mains	FO 1.6A	FO 2.5A
T30	F1 3.15A	F1 10A
R20	F2 1.6A	F2 3A
T20	—	F3 2A
Al2	F3 0.2A	F4 0.5A
L5	F4 1.6A	F5 6.3A

TABLE 3.2.1 (c) POWER SUPPLY FUSE RATING

3.2.2 Main Equipment

Exchange lines, stations, powerfail bells, music source, external amplifier, call metering unit, power connection, ring generator unit, 2-wire extender unit and signal earth for earth recall can all be accessed on the system distribution frame (SDF).

The voltage across line 1 can be checked by connecting a voltmeter between terminals L1A and L1B with the system mains off. The voltage across all other exchange lines can be checked by connecting a voltmeter between their respective terminals.

LED indications provided on the BN-824/1236/2464 system are:-

CPB-BN-A — The LED flashes at 600 IPM to indicate that the main CPU program is running.

LNB-BN-A — The LED lights steadily when any of the four exchange lines associated with the PBA are seized.

PS-BN824, PS-BN12362464 — There are four LEDs on the BN-824 power supply unit and five LEDs on the BN-1236/2464 power supply unit. The LEDs light steadily to indicate that the power supplies are active. The LEDs are (from left to right)

T30	—	Key station power supply	
R20	—	Relay supply	) Combined on
T20	—	Key station A-pair supply	) BN-824
Al2	—	Crosspoint and amplifier supply	
L5	—	Logic supply	

3.2.3 Stations

Station A and B pairs are accessed at the 605 plug pins. The voltages measured on each pin should be within limits shown in Table 3.2.3.

	WIRE COLOUR	605 PLUG PIN	VOLTAGES
Station Voltages: A-PAIR	WT	2	+ 9 ± 2V
	BL	6	REF A
B-PAIR	RD	1	t39.5 ±15.5V
	BK	5	REF B
Standard Telephone Stations (On Hook): Without 2WEU-AN	WT	2	t39.5 ±15.5V
	BL	6	REF
With 2WEU-AN	WT	2	+50± 6V
	BL	6	REF

TABLE 3.2.3 STATION VOLTAGES

3.3 MAINTENANCE PROCEDURES

3.3.1 General

Due to the sensivity of the components (especially MOS components) and their susceptibility to damage by static discharge, maintenance will be limited to changeover in the case of PBA's and replacement of telephone parts in the case of stations. To protect faulty assemblies and items such as the power supply, stations and the main equipment, all transports 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 3.6. — Repair Procedures.

3.3.2 Main Equipment

Any fault in the PBA's will require replacement of the faulty PBA with a new one. No repair of the PBA is to be carried out on site or in field depots. Any attempt to repair the PBA in the field may result in further damage to the PBA.

Main Equipment PBA's, except STB-BN-A, LNB-BN-A, DSS-BN-A, DSSDST-BN-A, 2WB-BN-A and 2WSTB-BN-A must NOT be removed from the cabinet unless the mains power is off.

3.3.3 Power Supply

When the power supply is diagnosed as being faulty, it is to be changed over completely by disconnecting the power supply from the backplane and removing the unit from the main equipment for the BN-824.

To remove the BN-824 power supply:

- Disconnect the mains cord from the power socket.
- Remove the four front panel screws fastening the power supply to the main equipment.
- Remove the top cover.
- Disconnect the power supply connector from the backplane.
- Unclip the grommet holding the mains cord to the side panel.
- Slide out the power supply.

To install the power supply unit simply reverse the above procedure.

CAUTION

The power supply is powered from a 240V mains supply and hazardous voltages are present within. Ensure that the mains cord is disconnected from the mains before removing the power supply unit. Do not attempt to repair these units.

3.3.4 Stations

Maintenance of the stations will be confined to the replacement of transmitter and receiver inserts, cords, plugs, powerfail dial boards, headset interface and sockets. Faults in the PBA's within the station or with the pushbutton assemblies will be rectified by replacement of the station completely.

3.4 FAULTFINDING PROCEDURES

3.4.1 Board Swapping

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 the line interface, station interface and two-wire internal extension boards.

Take the suspect board and swap it with an identical board. If the fault follows the suspect board then it is faulty, otherwise the fault is located somewhere else.

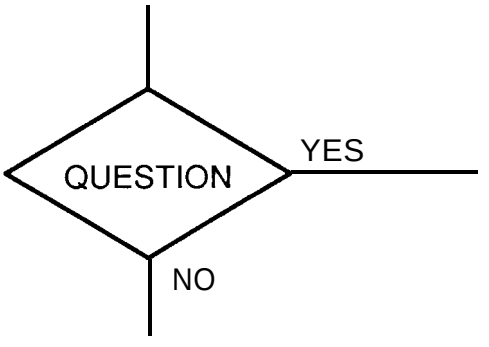
3.4.2 Flow Chart Symbols

The diagnostic flow charts may be used whenever 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:

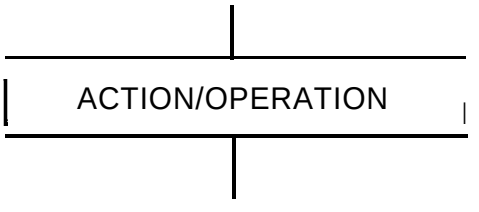
(a) Decision Function.

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 the 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.

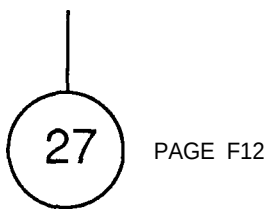


(c) Data Block.

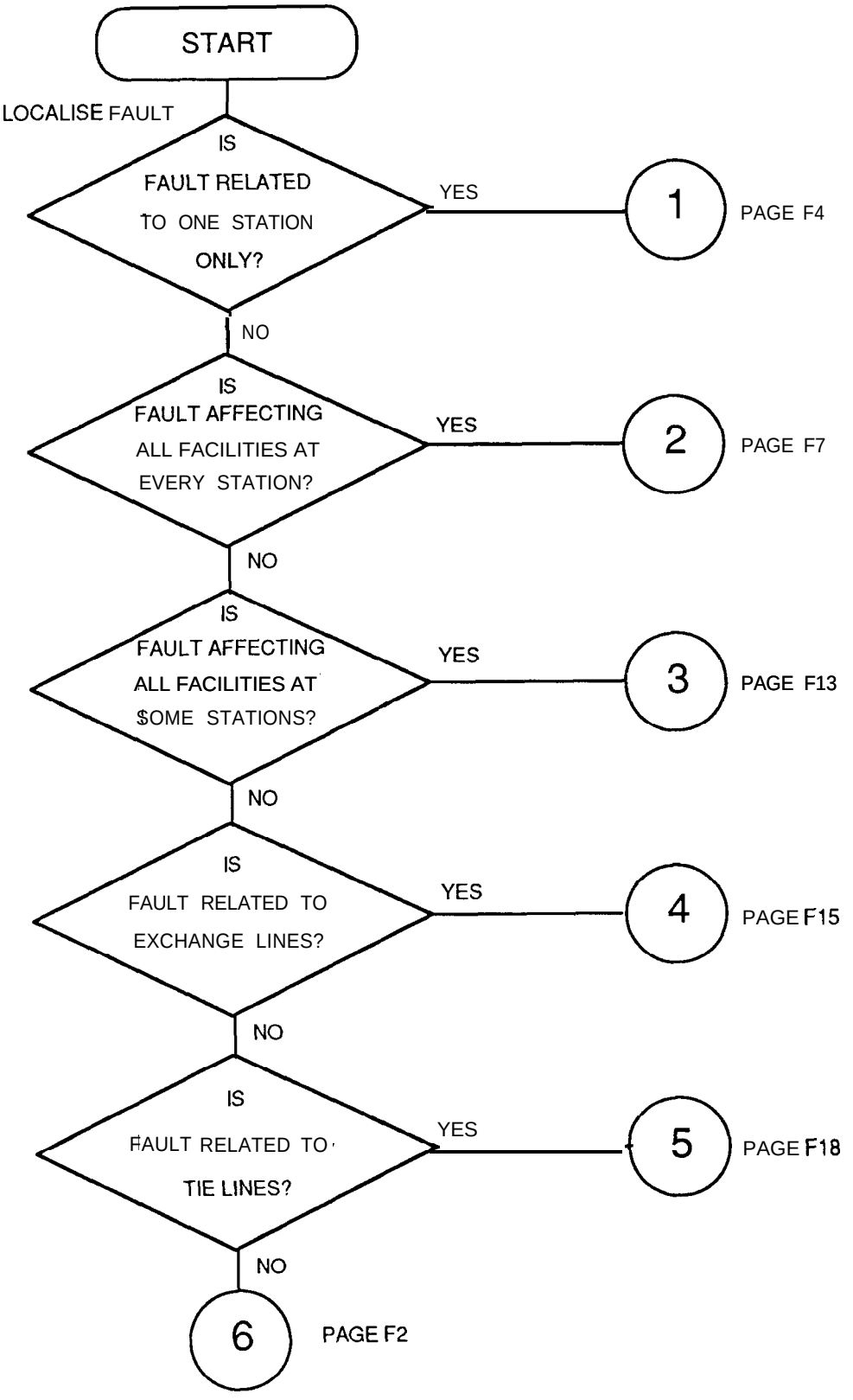
This does not form part of the faultfinding sequence, but provides necessary information (e.g. connector points, terminal allocations, etc.> required by an Action or Decision block. It is attached to the relevant Action or Decision block by a dashed lined.

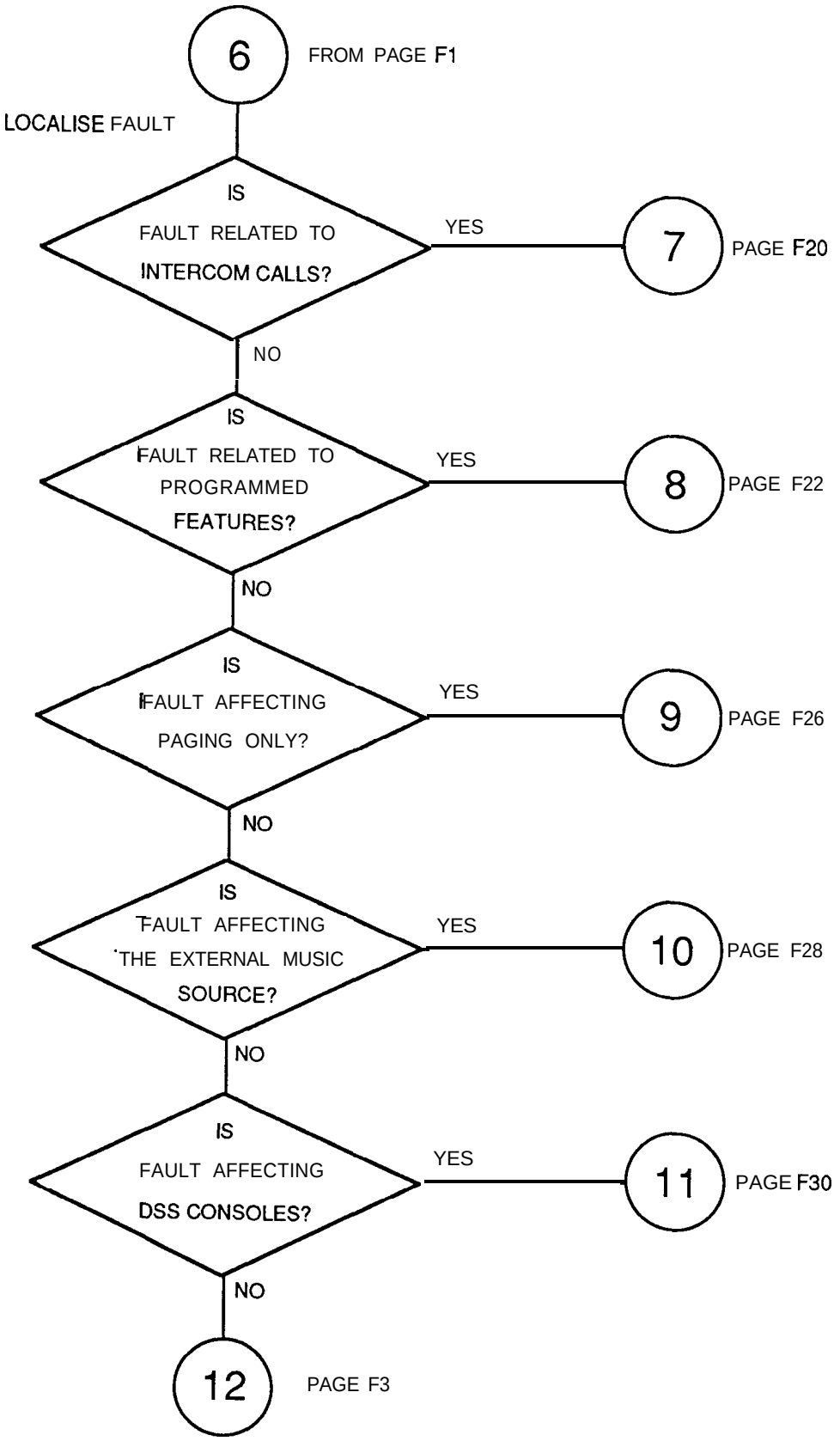
(d) Exit/Entry Points.

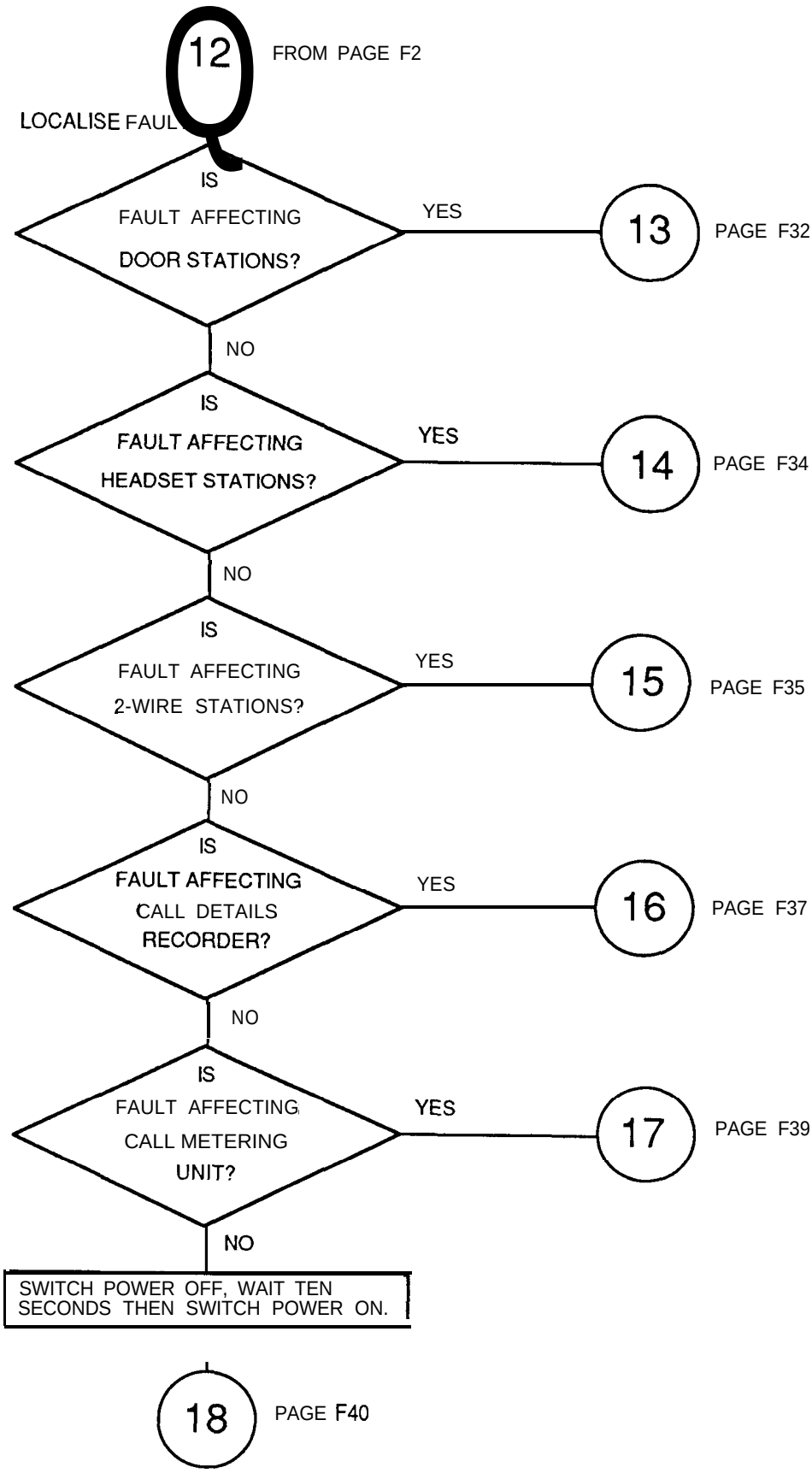
Numbered circles are used to move from page to page within a flow chart. Each circle has its destination or origin page number(s) noted beside it.

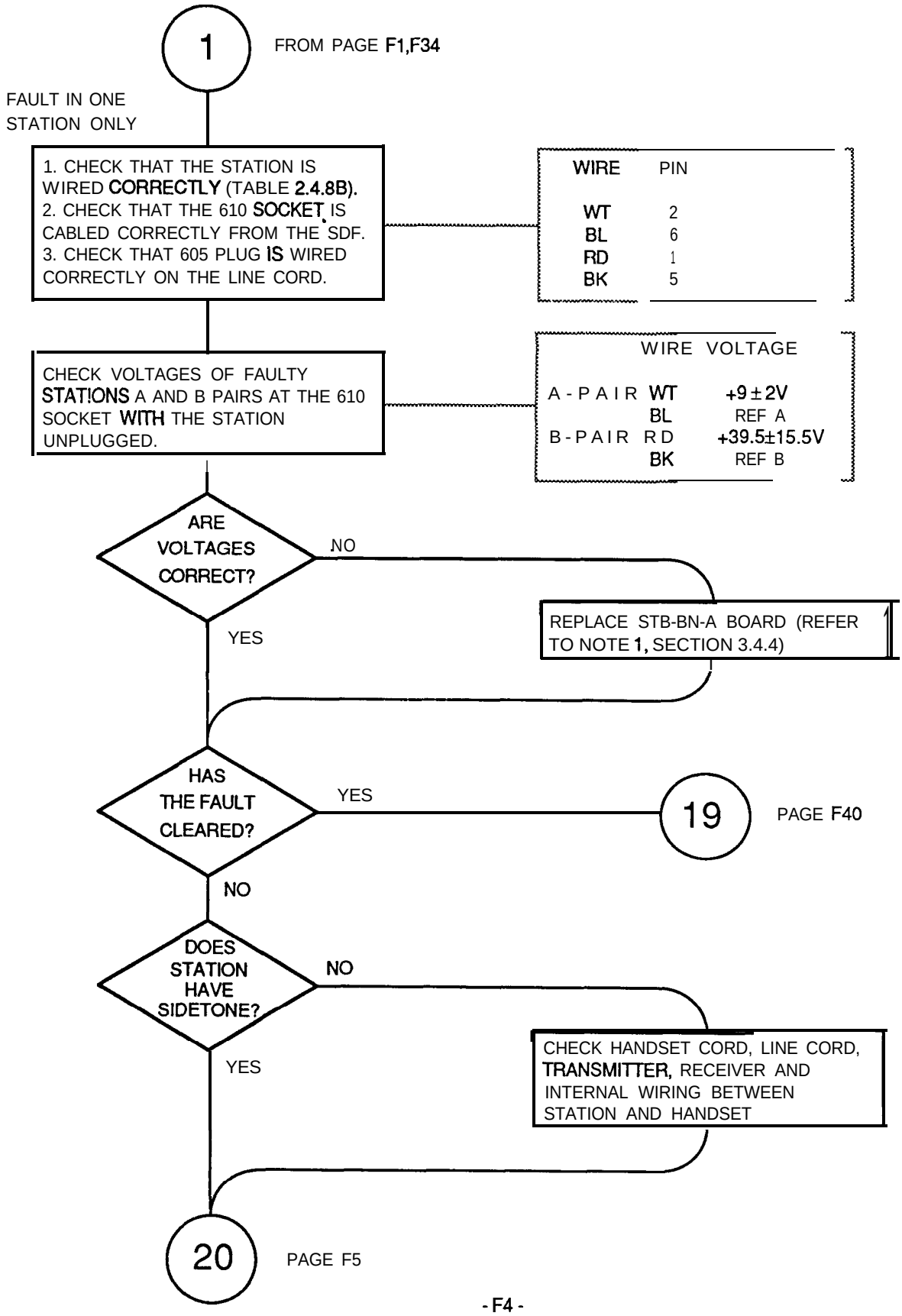


3.4.3 FLOW CHARTS

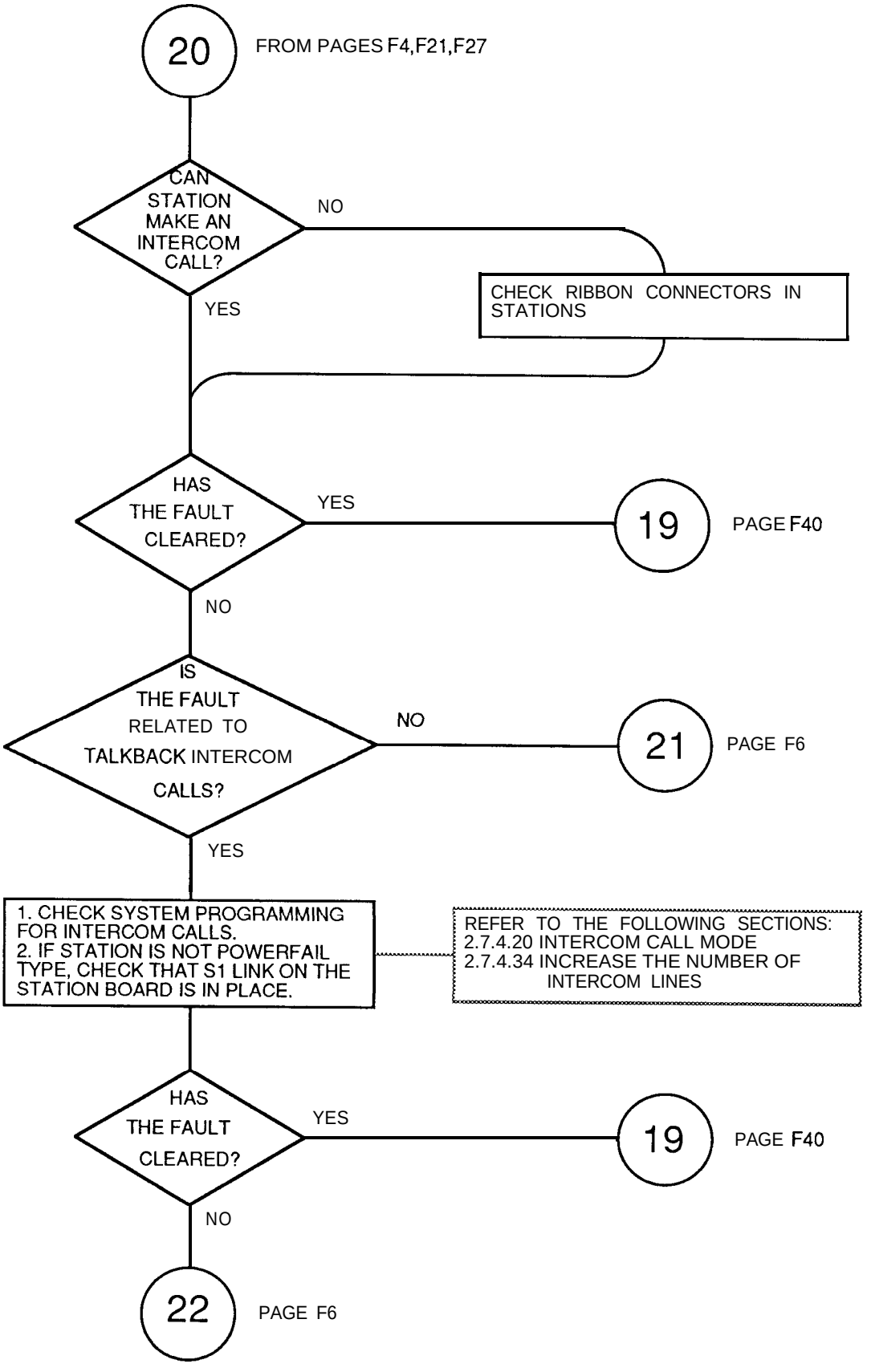


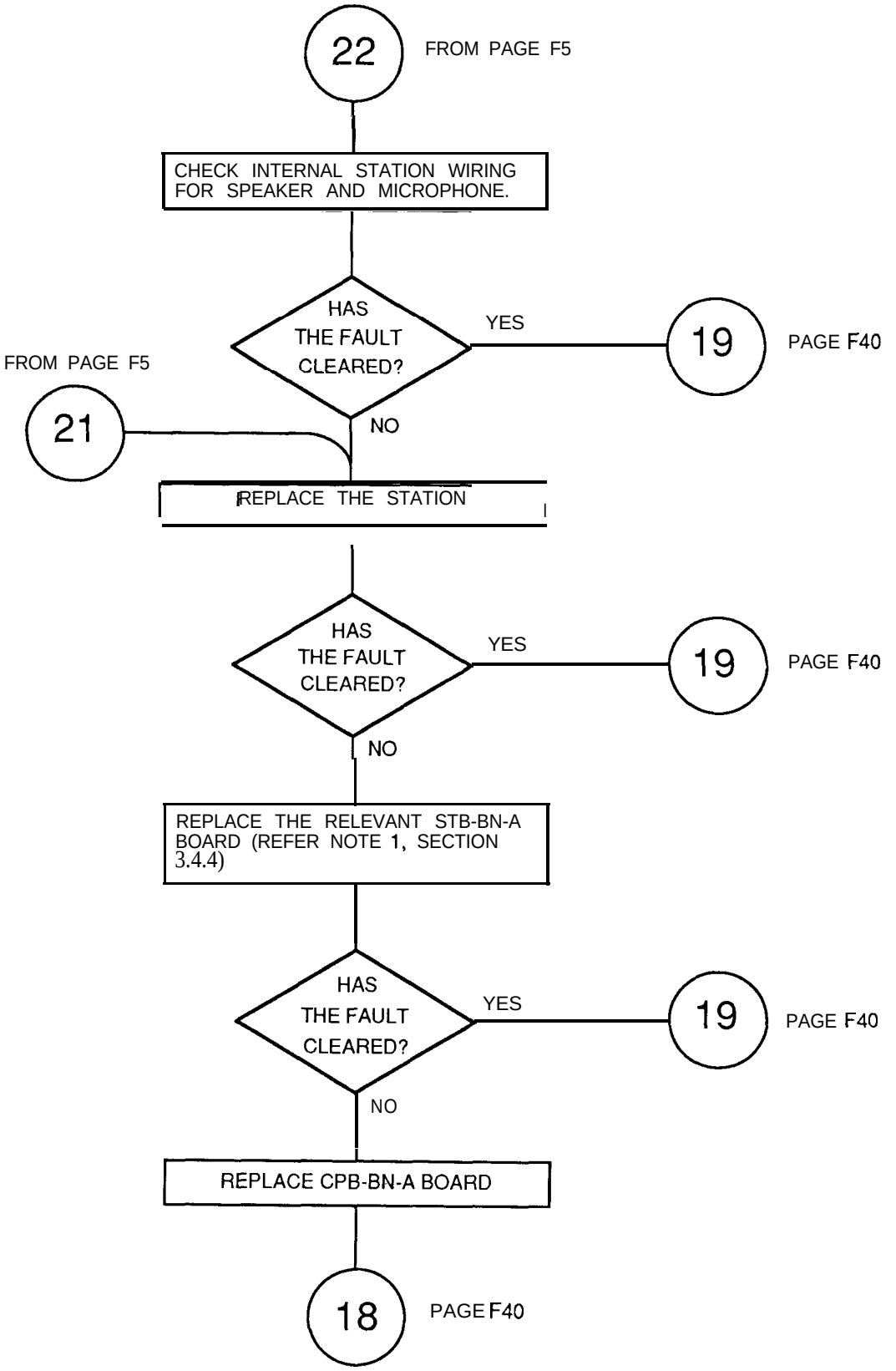

6
FROM PAGE F1
LOCALISE FAULT
IS FAULT RELATED TO INTERCOM CALLS?
YES
7
PAGE F20
NO
IS FAULT RELATED TO PROGRAMMED FEATURES?
YES
8
PAGE F22
NO
IS FAULT AFFECTING PAGING ONLY?
YES
9
PAGE F26
NO
IS FAULT AFFECTING THE EXTERNAL MUSIC SOURCE?
YES
10
PAGE F28
NO
IS FAULT AFFECTING DSS CONSOLES?
YES
11
PAGE F30
NO
12
PAGE F3

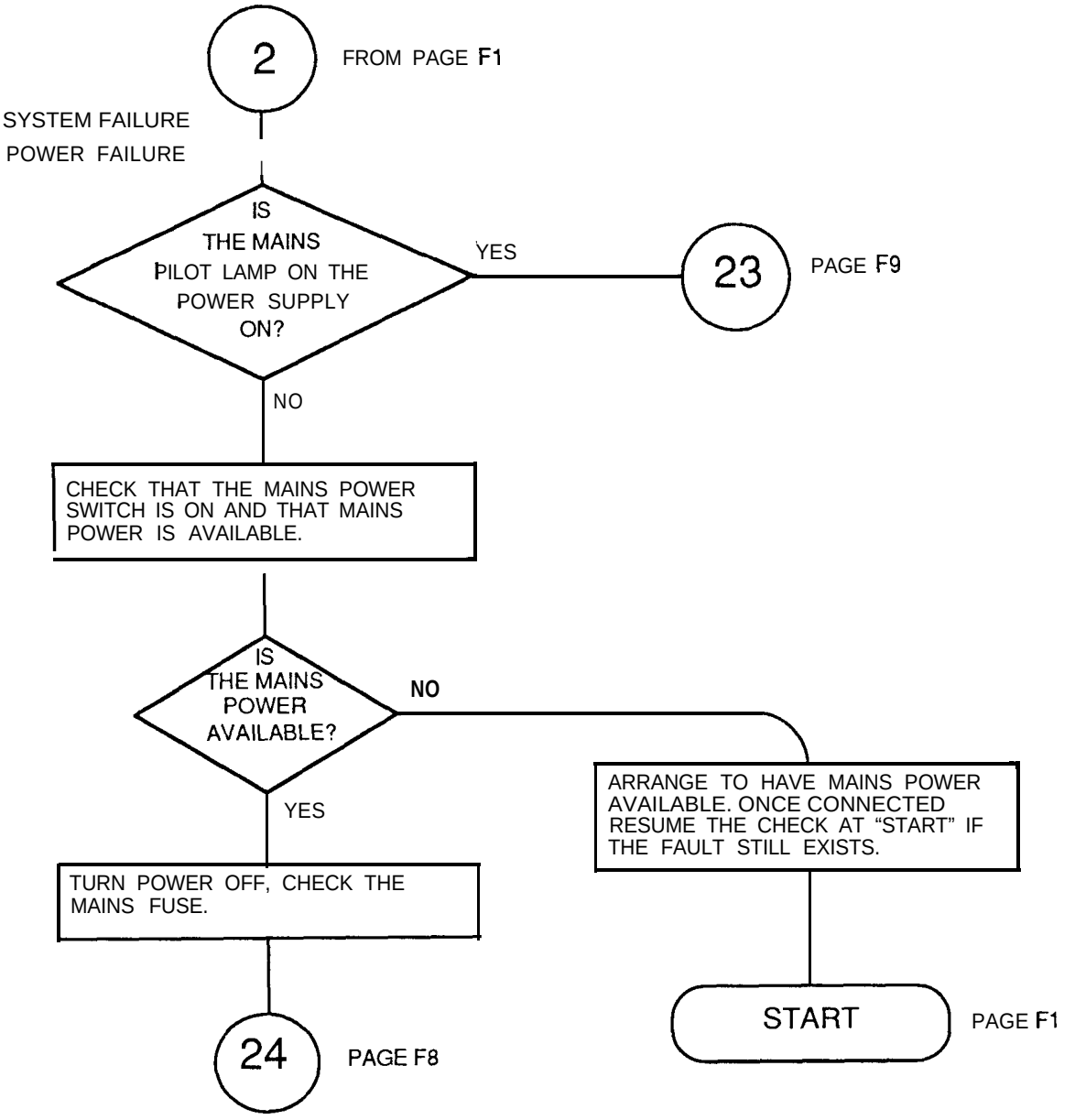

12
FROM PAGE F2
LOCALISE FAUL
IS FAULT AFFECTING DOOR STATIONS?
YES
13
PAGE F32
NO
IS FAULT AFFECTING HEADSET STATIONS?
YES
14
PAGE F34
NO
IS FAULT AFFECTING 2-WIRE STATIONS?
YES
15
PAGE F35
NO
IS FAULT AFFECTING CALL DETAILS RECORDER?
YES
16
PAGE F37
NO
IS FAULT AFFECTING CALL METERING UNIT?
YES
17
PAGE F39
NO
SWITCH POWER OFF, WAIT TEN SECONDS THEN SWITCH POWER ON.
18
PAGE F40

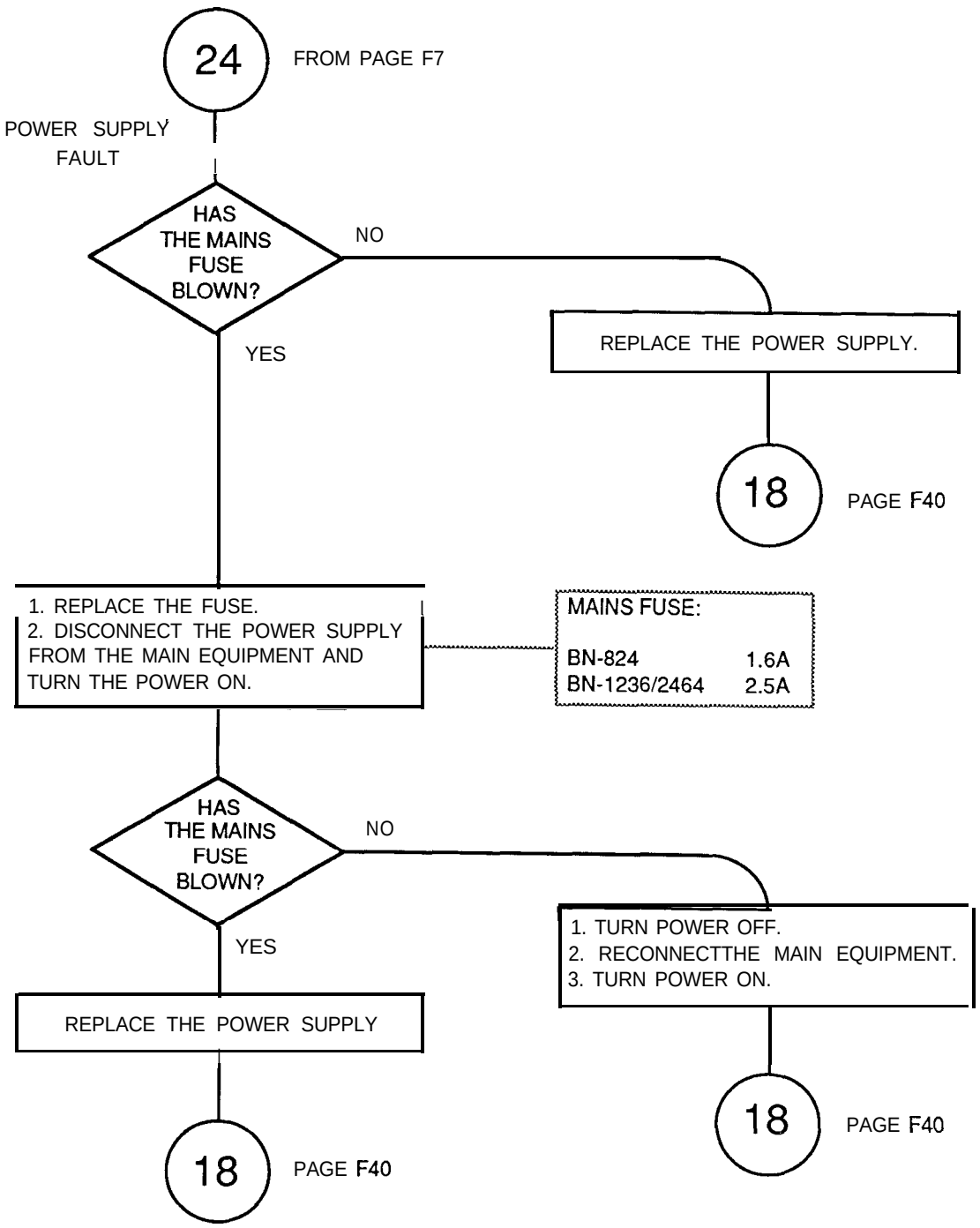

1
FROM PAGE F1,F34
FAULT IN ONE STATION ONLY
1. CHECK THAT THE STATION IS WIRED CORRECTLY (TABLE 2.4.8B).
2. CHECK THAT THE 610 SOCKET IS CABLED CORRECTLY FROM THE SDF.
3. CHECK THAT 605 PLUG IS WIRED CORRECTLY ON THE LINE CORD.
WIRE PIN
WT 2
BL 6
RD 1
BK 5
CHECK VOLTAGES OF FAULTY STATIONS A AND B PAIRS AT THE 610 SOCKET WITH THE STATION UNPLUGGED.
WIRE VOLTAGE
A - PAIR WT +9 ± 2V
BL REF A
B - PAIR RD +39.5±15.5V
BK REF B
ARE VOLTAGES CORRECT?
NO
YES
REPLACE STB-BN-A BOARD (REFER TO NOTE 1, SECTION 3.4.4)
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
DOES STATION HAVE SIDETONE?
NO
YES
CHECK HANDSET CORD, LINE CORD, TRANSMITTER, RECEIVER AND INTERNAL WIRING BETWEEN STATION AND HANDSET
20
PAGE F5

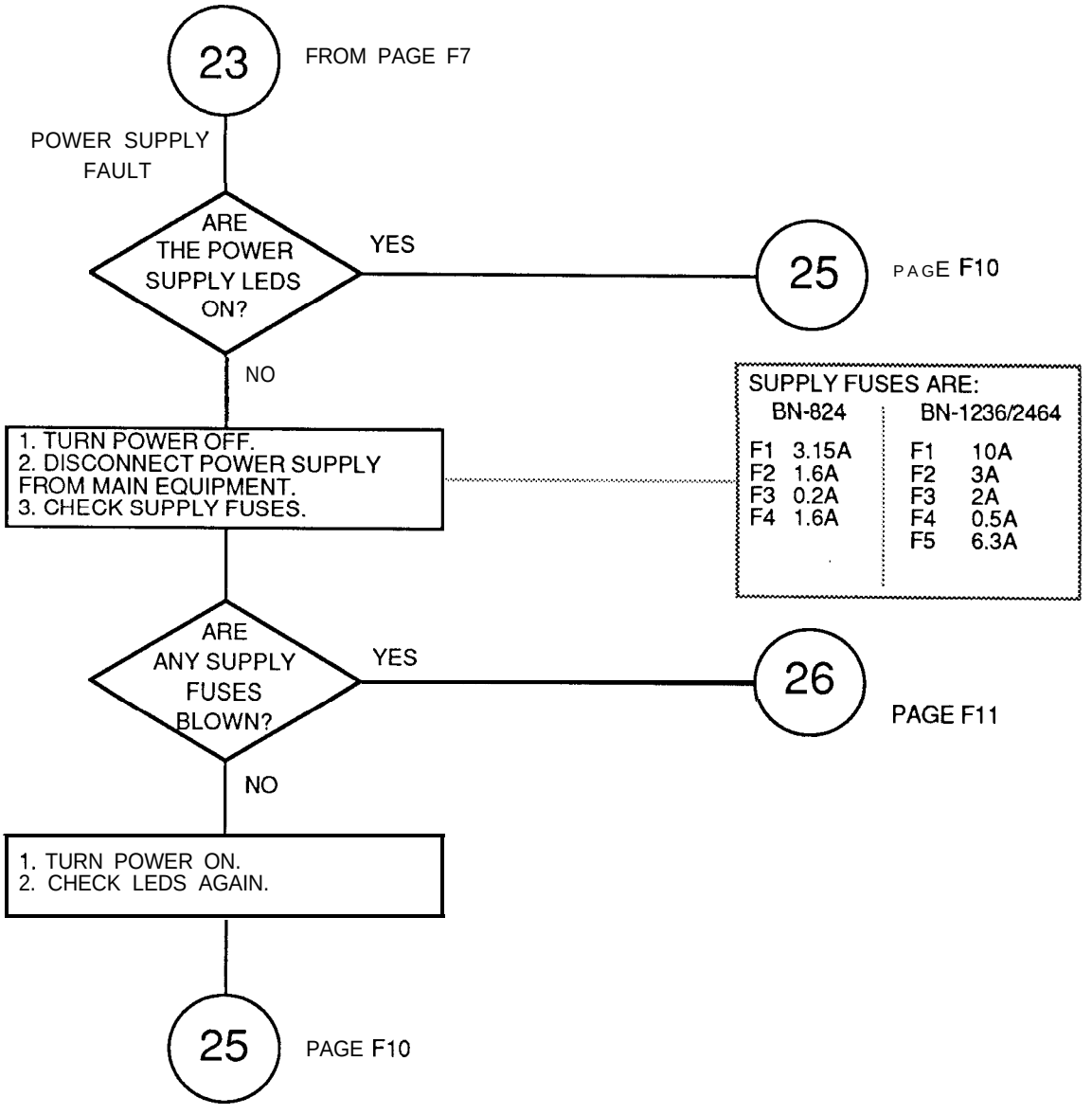
- F4 -

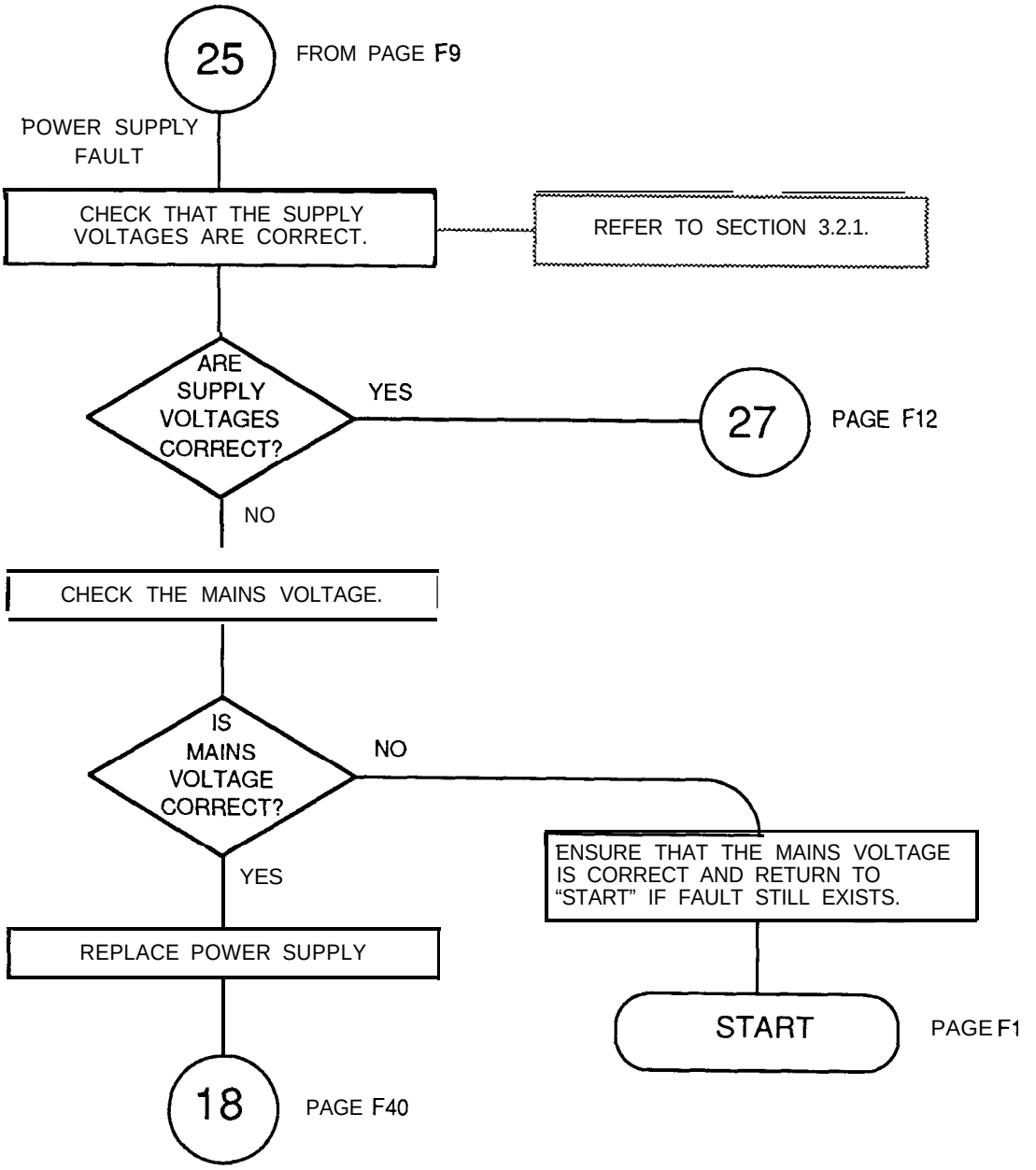

20
FROM PAGES F4,F21,F27
CAN STATION MAKE AN INTERCOM CALL?
NO
CHECK RIBBON CONNECTORS IN STATIONS
YES
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
IS THE FAULT RELATED TO TALKBACK INTERCOM CALLS?
NO
21
PAGE F6
YES
1. CHECK SYSTEM PROGRAMMING FOR INTERCOM CALLS.
2. IF STATION IS NOT POWERFAIL TYPE, CHECK THAT S1 LINK ON THE STATION BOARD IS IN PLACE.
REFER TO THE FOLLOWING SECTIONS:
2.7.4.20 INTERCOM CALL MODE
2.7.4.34 INCREASE THE NUMBER OF INTERCOM LINES
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
22
PAGE F6

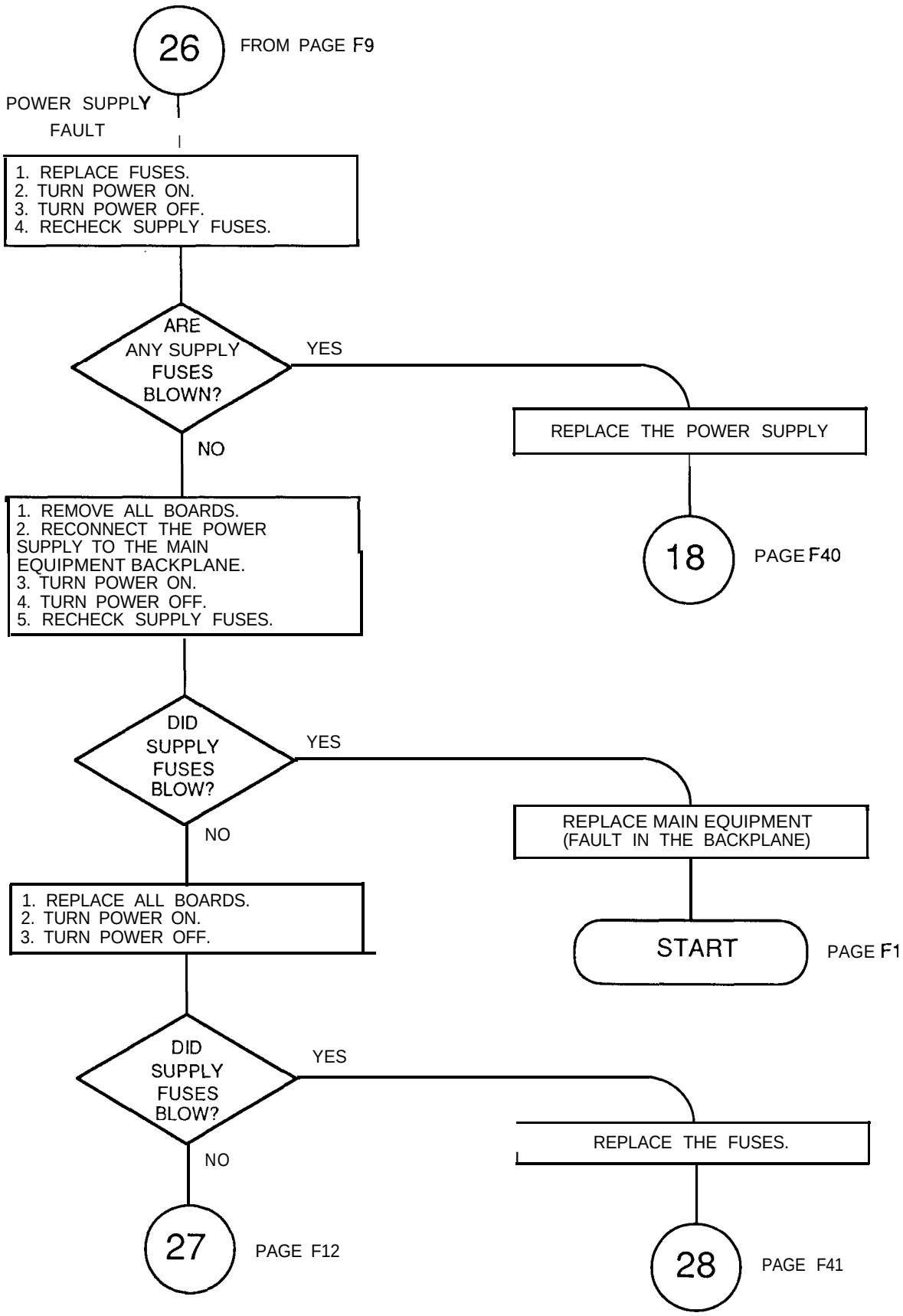

22
FROM PAGE F5
CHECK INTERNAL STATION WIRING FOR SPEAKER AND MICROPHONE.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
FROM PAGE F5
21
NO
REPLACE THE STATION
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE THE RELEVANT STB-BN-A BOARD (REFER NOTE 1, SECTION 3.4.4)
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE CPB-BN-A BOARD
18
PAGE F40

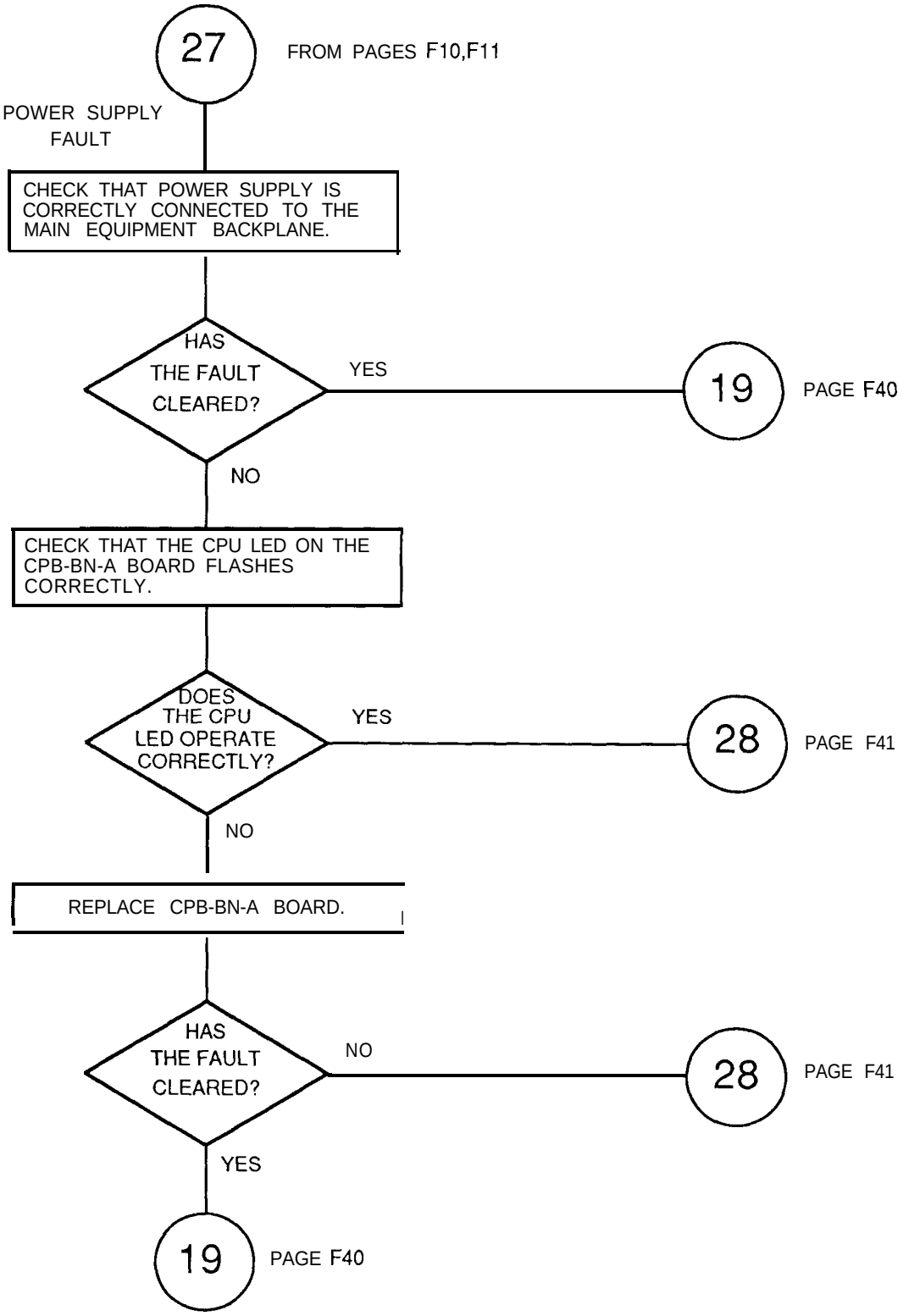

2
FROM PAGE F1
SYSTEM FAILURE
POWER FAILURE
IS THE MAINS PILOT LAMP ON THE POWER SUPPLY ON?
YES
23
PAGE F9
NO
CHECK THAT THE MAINS POWER SWITCH IS ON AND THAT MAINS POWER IS AVAILABLE.
IS THE MAINS POWER AVAILABLE?
NO
YES
ARRANGE TO HAVE MAINS POWER AVAILABLE. ONCE CONNECTED RESUME THE CHECK AT "START" IF THE FAULT STILL EXISTS.
TURN POWER OFF, CHECK THE MAINS FUSE.
START
PAGE F1
24
PAGE F8

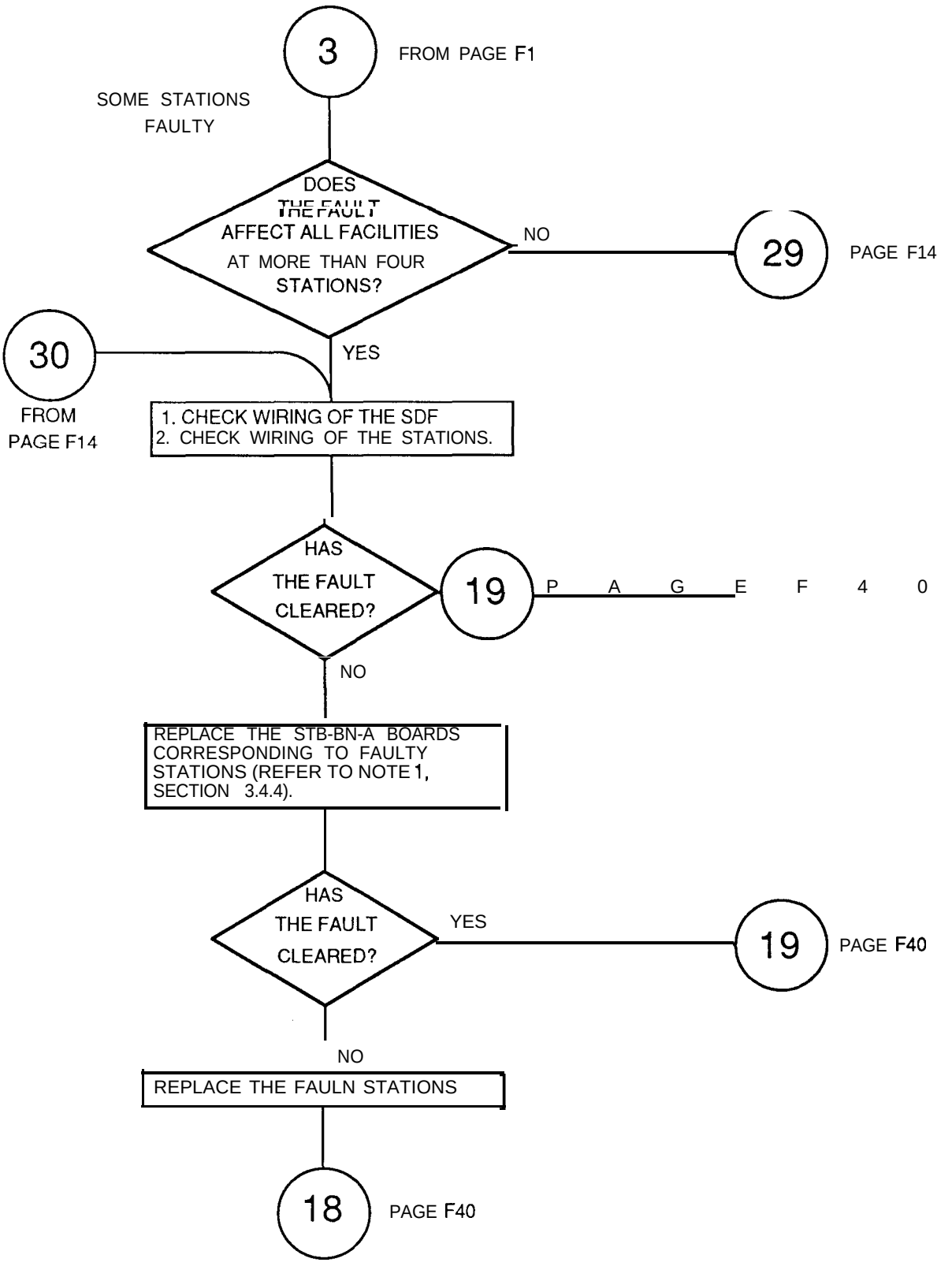

24
FROM PAGE F7
POWER SUPPLY FAULT
HAS THE MAINS FUSE BLOWN?
NO
YES
REPLACE THE POWER SUPPLY.
18
PAGE F40
1. REPLACE THE FUSE.
2. DISCONNECT THE POWER SUPPLY FROM THE MAIN EQUIPMENT AND TURN THE POWER ON.
MAINS FUSE:
BN-824 1.6A
BN-1236/2464 2.5A
HAS THE MAINS FUSE BLOWN?
NO
YES
1. TURN POWER OFF.
2. RECONNECTTHE MAIN EQUIPMENT.
3. TURN POWER ON.
REPLACE THE POWER SUPPLY
18
PAGE F40
18
PAGE F40

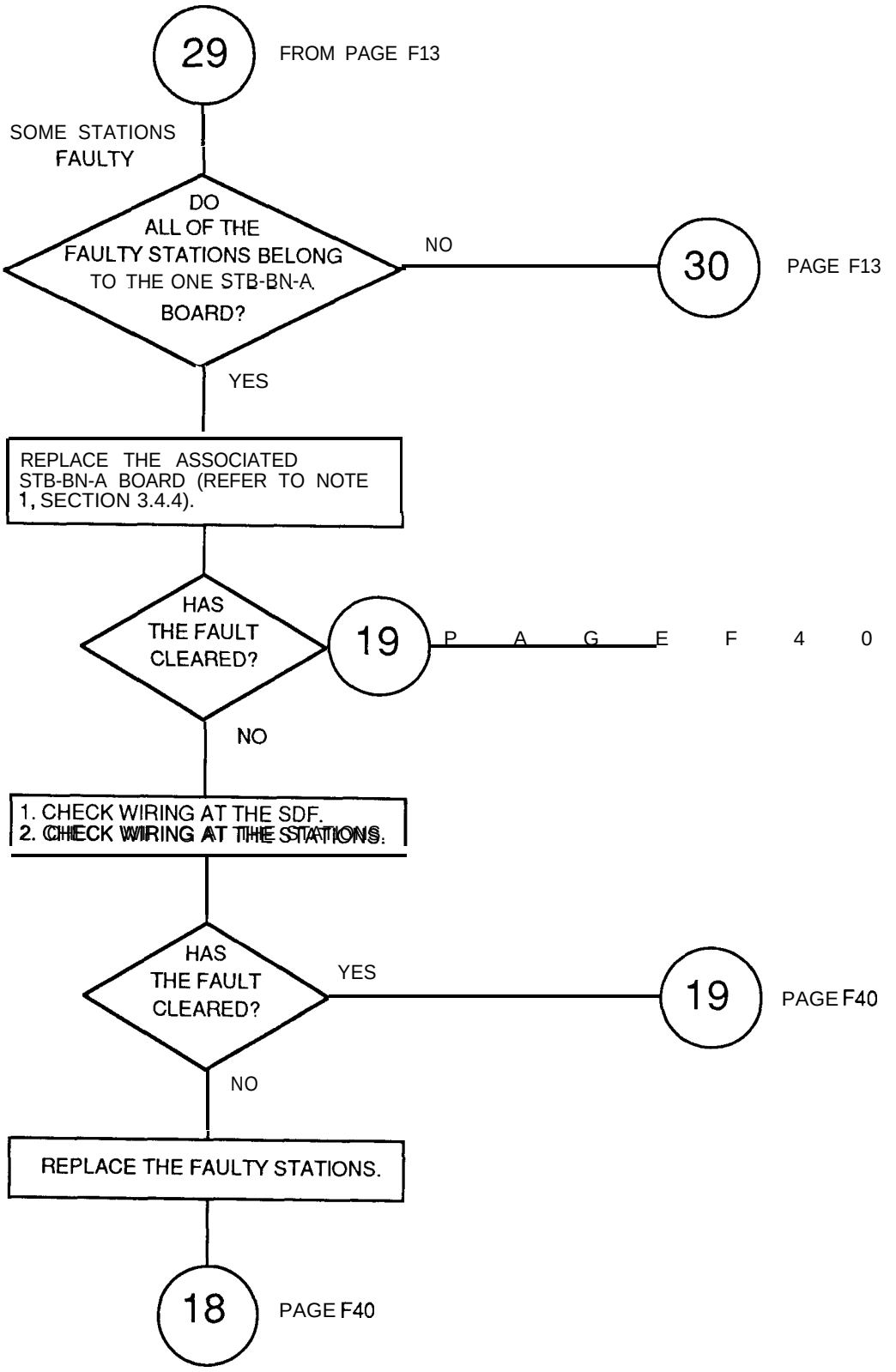

23
FROM PAGE F7
POWER SUPPLY FAULT
ARE THE POWER SUPPLY LEDS ON?
YES
25
PAGE F10
NO
1. TURN POWER OFF.
2. DISCONNECT POWER SUPPLY FROM MAIN EQUIPMENT.
3. CHECK SUPPLY FUSES.
SUPPLY FUSES ARE:
BN-824
F1 3.15A
F2 1.6A
F3 0.2A
F4 1.6A
BN-1236/2464
F1 10A
F2 3A
F3 2A
F4 0.5A
F5 6.3A
ARE ANY SUPPLY FUSES BLOWN?
YES
26
PAGE F11
NO
1. TURN POWER ON.
2. CHECK LEDS AGAIN.
25
PAGE F10

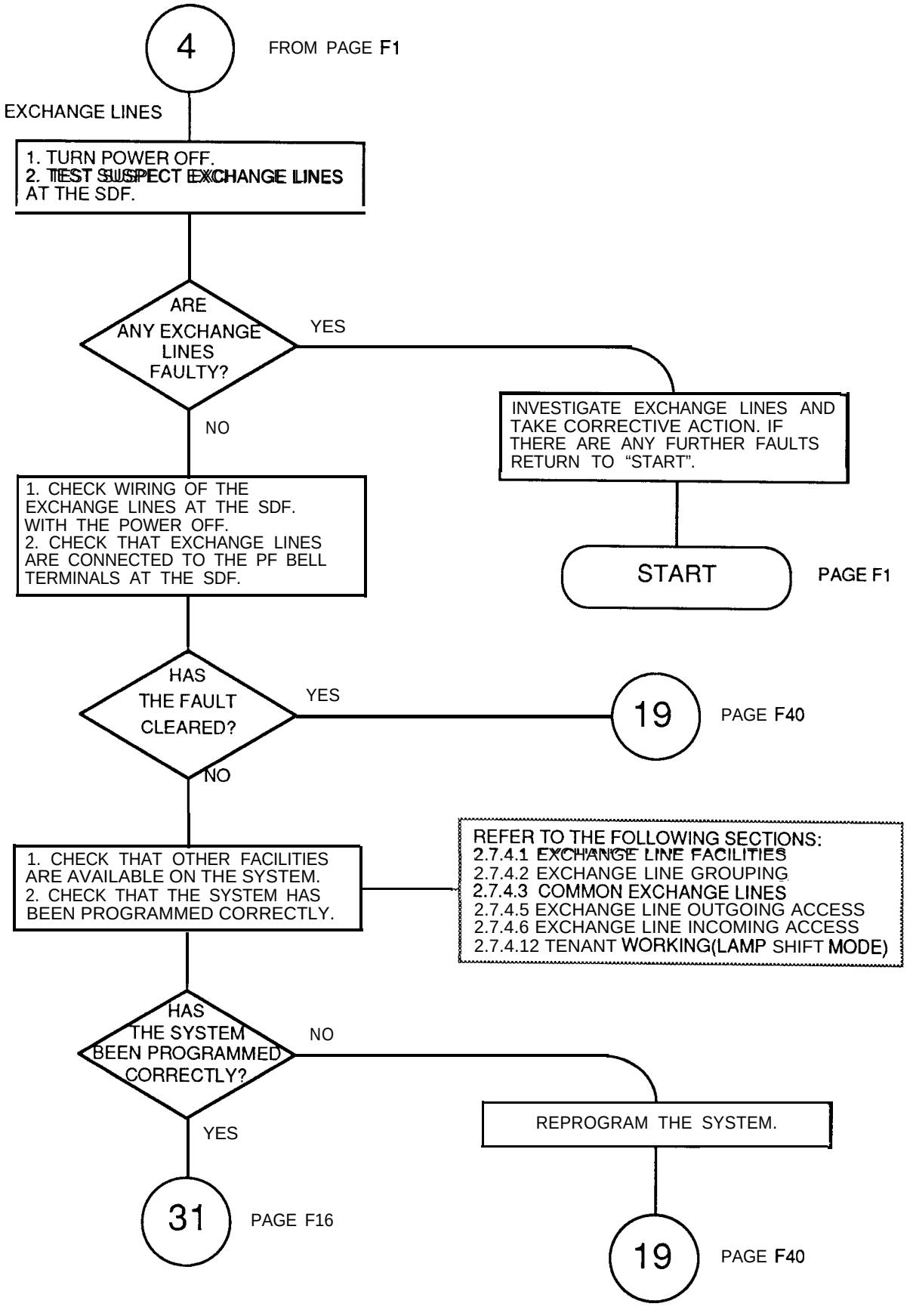

25
FROM PAGE F9
POWER SUPPLY FAULT
CHECK THAT THE SUPPLY VOLTAGES ARE CORRECT.
REFER TO SECTION 3.2.1.
ARE SUPPLY VOLTAGES CORRECT?
YES
27
PAGE F12
NO
CHECK THE MAINS VOLTAGE.
IS MAINS VOLTAGE CORRECT?
NO
YES
ENSURE THAT THE MAINS VOLTAGE IS CORRECT AND RETURN TO "START" IF FAULT STILL EXISTS.
REPLACE POWER SUPPLY
START
PAGE F1
18
PAGE F40

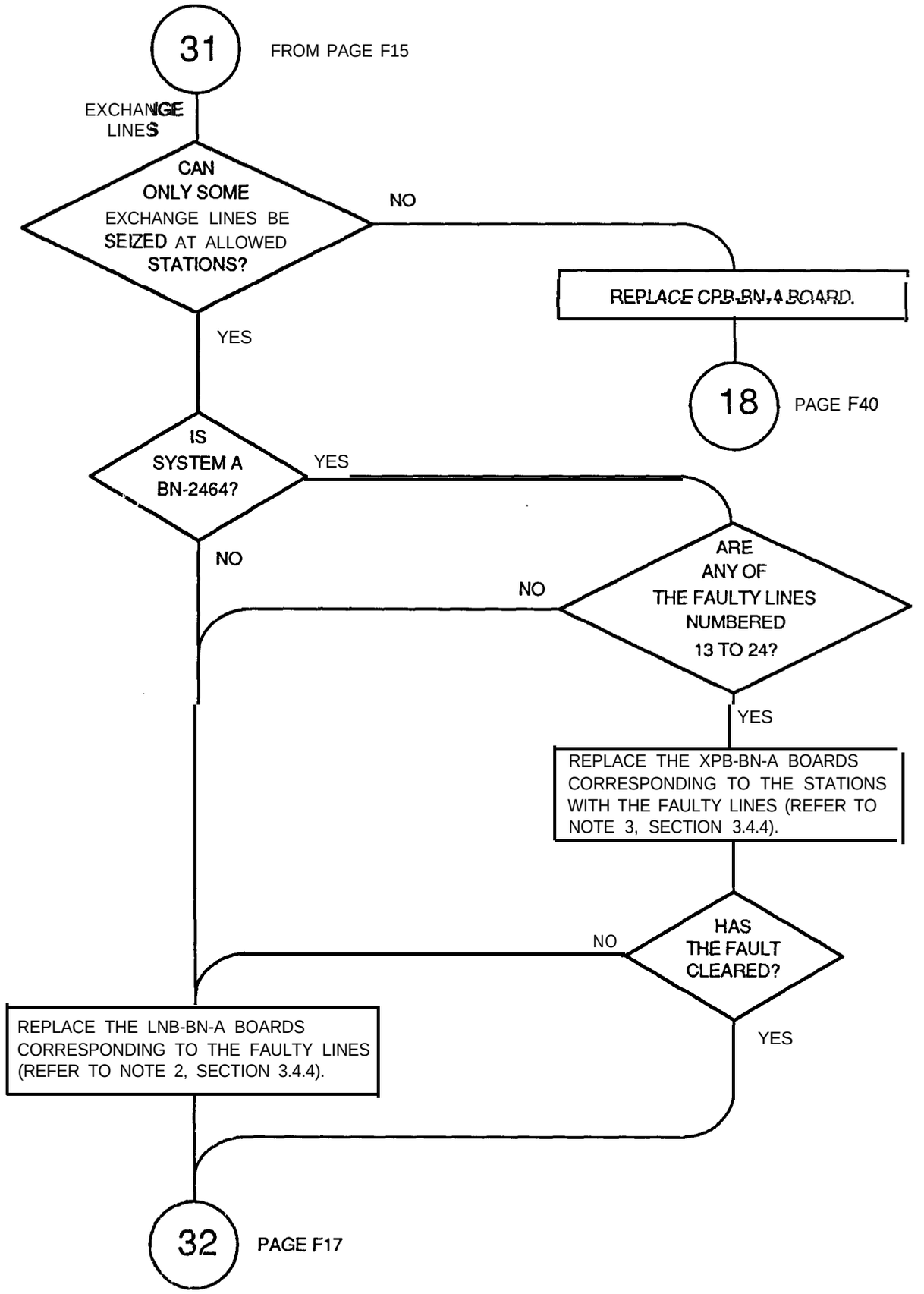

26
FROM PAGE F9
POWER SUPPLY FAULT
1. REPLACE FUSES.
2. TURN POWER ON.
3. TURN POWER OFF.
4. RECHECK SUPPLY FUSES.
ARE ANY SUPPLY FUSES BLOWN?
YES
NO
REPLACE THE POWER SUPPLY
18
PAGE F40
1. REMOVE ALL BOARDS.
2. RECONNECT THE POWER SUPPLY TO THE MAIN EQUIPMENT BACKPLANE.
3. TURN POWER ON.
4. TURN POWER OFF.
5. RECHECK SUPPLY FUSES.
DID SUPPLY FUSES BLOW?
YES
NO
REPLACE MAIN EQUIPMENT (FAULT IN THE BACKPLANE)
START
PAGE F1
1. REPLACE ALL BOARDS.
2. TURN POWER ON.
3. TURN POWER OFF.
DID SUPPLY FUSES BLOW?
YES
NO
REPLACE THE FUSES.
27
PAGE F12
28
PAGE F41


27
FROM PAGES F10,F11
POWER SUPPLY FAULT
CHECK THAT POWER SUPPLY IS CORRECTLY CONNECTED TO THE MAIN EQUIPMENT BACKPLANE.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
CHECK THAT THE CPU LED ON THE CPB-BN-A BOARD FLASHES CORRECTLY.
DOES THE CPU LED OPERATE CORRECTLY?
YES
28
PAGE F41
NO
REPLACE CPB-BN-A BOARD.
HAS THE FAULT CLEARED?
NO
28
PAGE F41
YES
19
PAGE F40

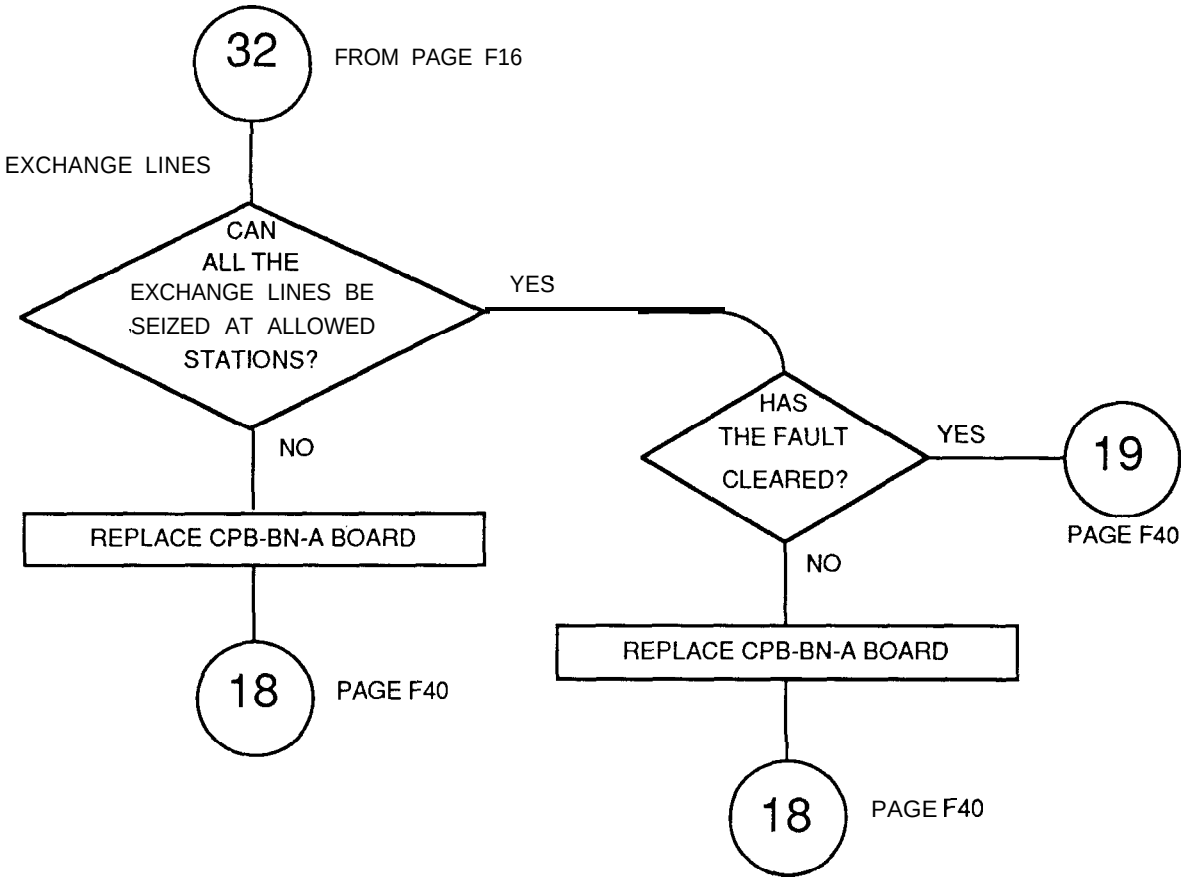

3
FROM PAGE F1
SOME STATIONS FAULTY
DOES THE FAULT AFFECT ALL FACILITIES AT MORE THAN FOUR STATIONS?
NO
29
PAGE F14
YES
30
FROM PAGE F14
1. CHECK WIRING OF THE SDF
2. CHECK WIRING OF THE STATIONS.
HAS THE FAULT CLEARED?
19
PAGE F40
NO
REPLACE THE STB-BN-A BOARDS CORRESPONDING TO FAULTY STATIONS (REFER TO NOTE 1, SECTION 3.4.4).
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE THE FAULN STATIONS
18
PAGE F40

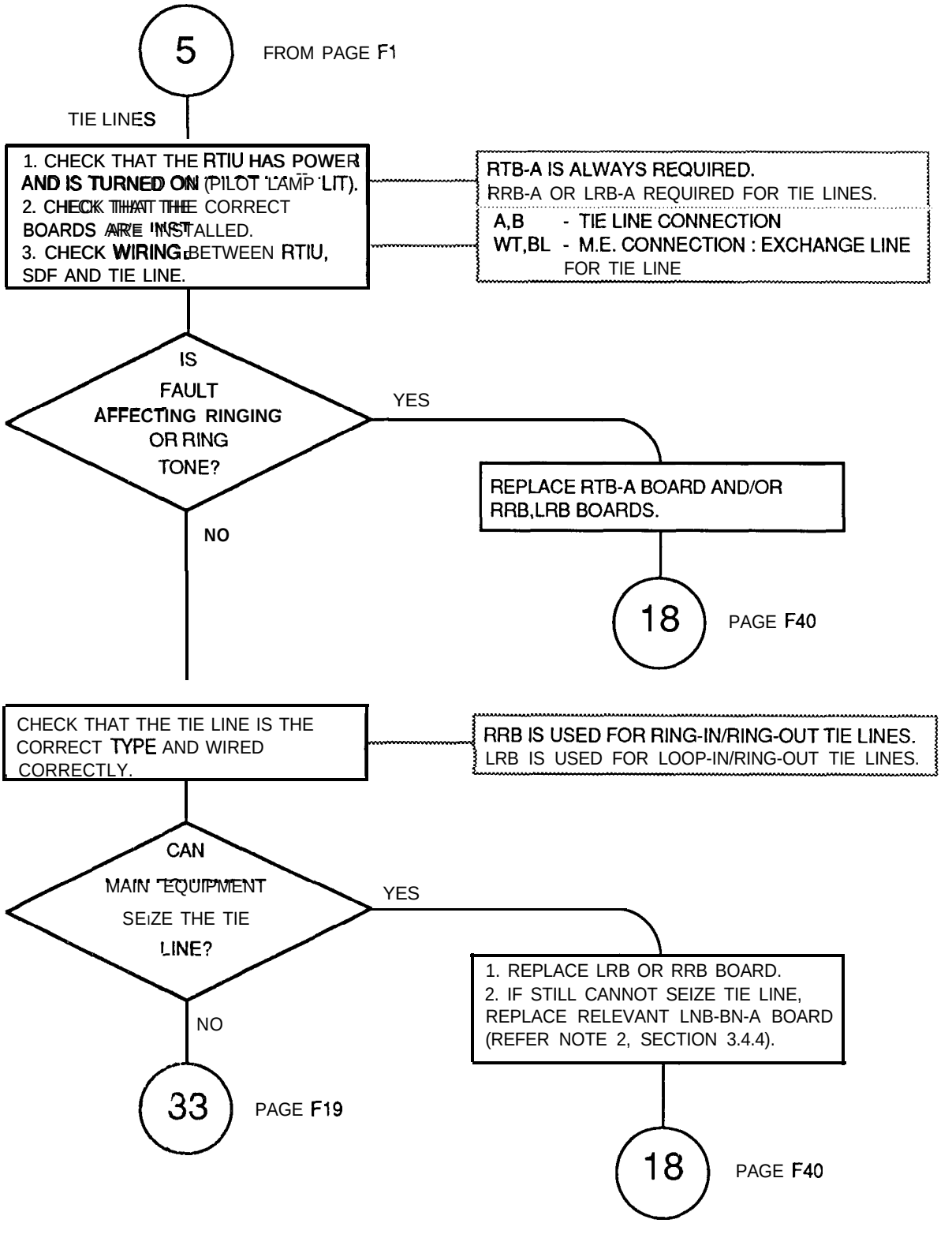

29
FROM PAGE F13
SOME STATIONS FAULTY
DO ALL OF THE FAULTY STATIONS BELONG TO THE ONE STB-BN-A BOARD?
NO
30
PAGE F13
YES
REPLACE THE ASSOCIATED STB-BN-A BOARD (REFER TO NOTE 1, SECTION 3.4.4).
HAS THE FAULT CLEARED?
19
PAGE F40
NO
1. CHECK WIRING AT THE SDF.
2. CHECK WIRING AT THE STATIONS.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE THE FAULTY STATIONS.
18
PAGE F40

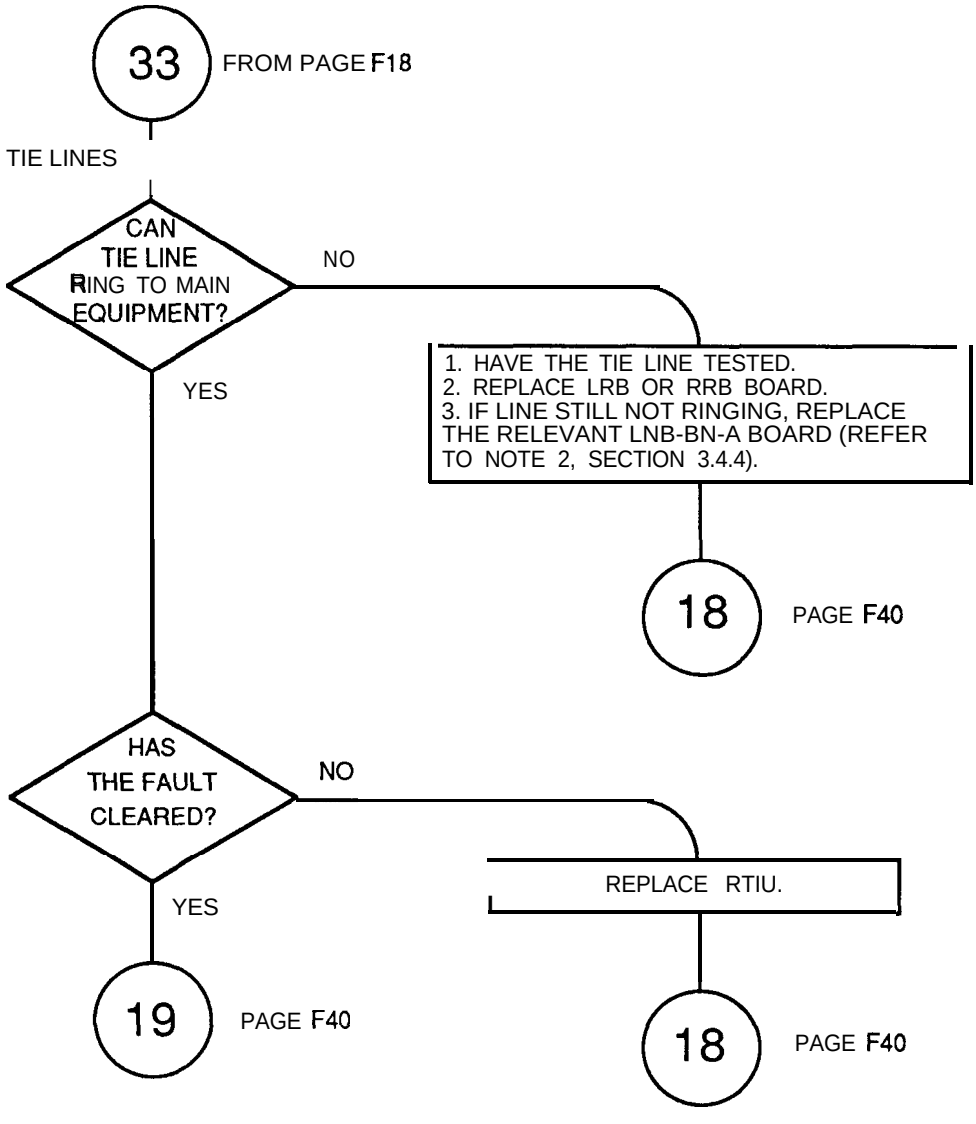

4
FROM PAGE F1
EXCHANGE LINES
1. TURN POWER OFF.
2. TEST SUSPECT EXCHANGE LINES AT THE SDF.
ARE ANY EXCHANGE LINES FAULTY?
YES
NO
INVESTIGATE EXCHANGE LINES AND TAKE CORRECTIVE ACTION. IF THERE ARE ANY FURTHER FAULTS RETURN TO "START".
START
PAGE F1
1. CHECK WIRING OF THE EXCHANGE LINES AT THE SDF. WITH THE POWER OFF.
2. CHECK THAT EXCHANGE LINES ARE CONNECTED TO THE PF BELL TERMINALS AT THE SDF.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
1. CHECK THAT OTHER FACILITIES ARE AVAILABLE ON THE SYSTEM.
2. CHECK THAT THE SYSTEM HAS BEEN PROGRAMMED CORRECTLY.
REFER TO THE FOLLOWING SECTIONS:
2.7.4.1 EXCHANGE LINE FACILITIES
2.7.4.2 EXCHANGE LINE GROUPING
2.7.4.3 COMMON EXCHANGE LINES
2.7.4.5 EXCHANGE LINE OUTGOING ACCESS
2.7.4.6 EXCHANGE LINE INCOMING ACCESS
2.7.4.12 TENANT WORKING(LAMP SHIFT MODE)
HAS THE SYSTEM BEEN PROGRAMMED CORRECTLY?
NO
YES
REPROGRAM THE SYSTEM.
31
PAGE F16
19
PAGE F40

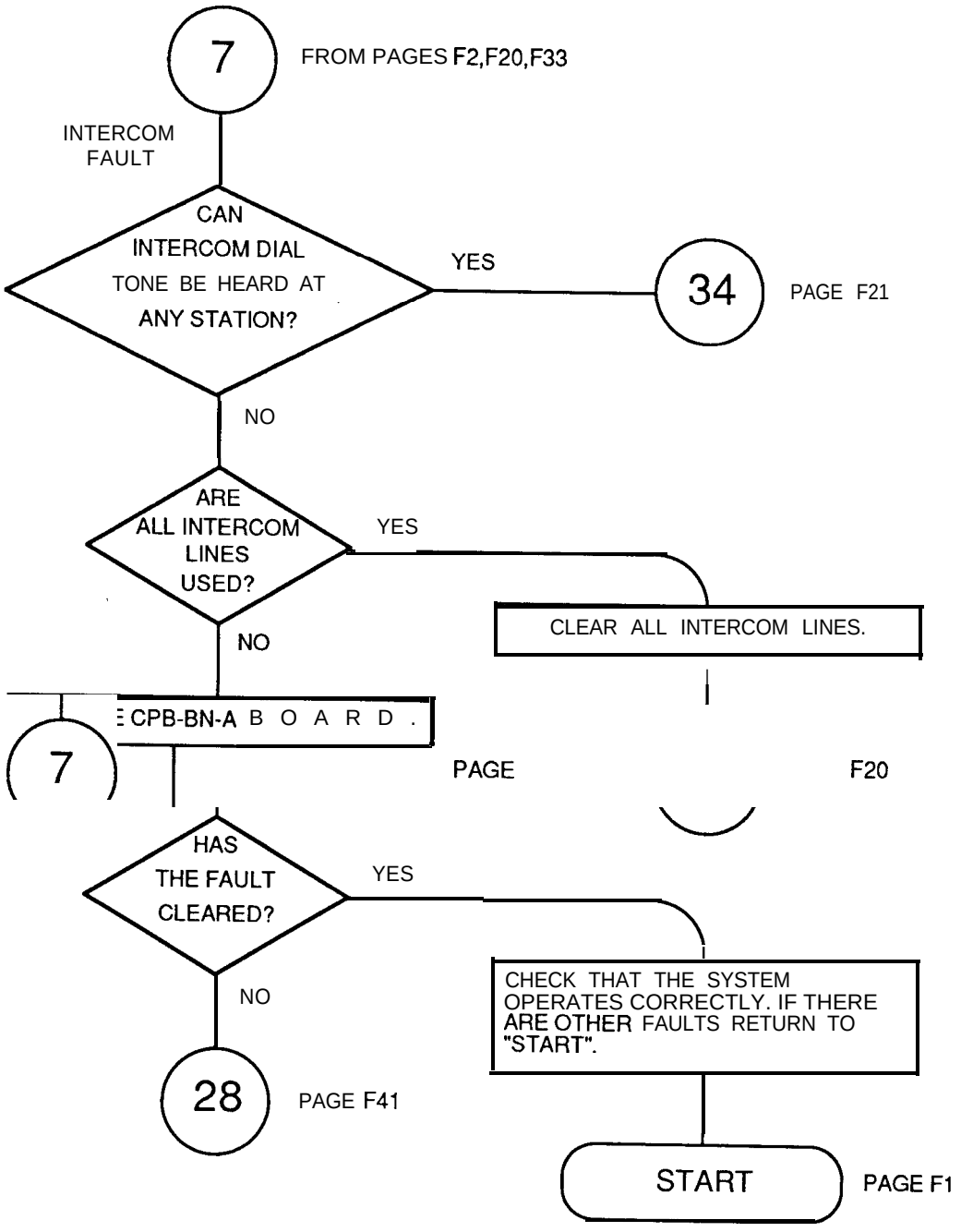

31
FROM PAGE F15
EXCHANGE LINES
CAN ONLY SOME EXCHANGE LINES BE SEIZED AT ALLOWED STATIONS?
NO
REPLACE CPB-BN-A BOARD.
YES
18
PAGE F40
IS SYSTEM A BN-2464?
YES
NO
ARE ANY OF THE FAULTY LINES NUMBERED 13 TO 24?
NO
YES
REPLACE THE XPB-BN-A BOARDS CORRESPONDING TO THE STATIONS WITH THE FAULTY LINES (REFER TO NOTE 3, SECTION 3.4.4).
HAS THE FAULT CLEARED?
NO
YES
REPLACE THE LNB-BN-A BOARDS CORRESPONDING TO THE FAULTY LINES (REFER TO NOTE 2, SECTION 3.4.4).
32
PAGE F17

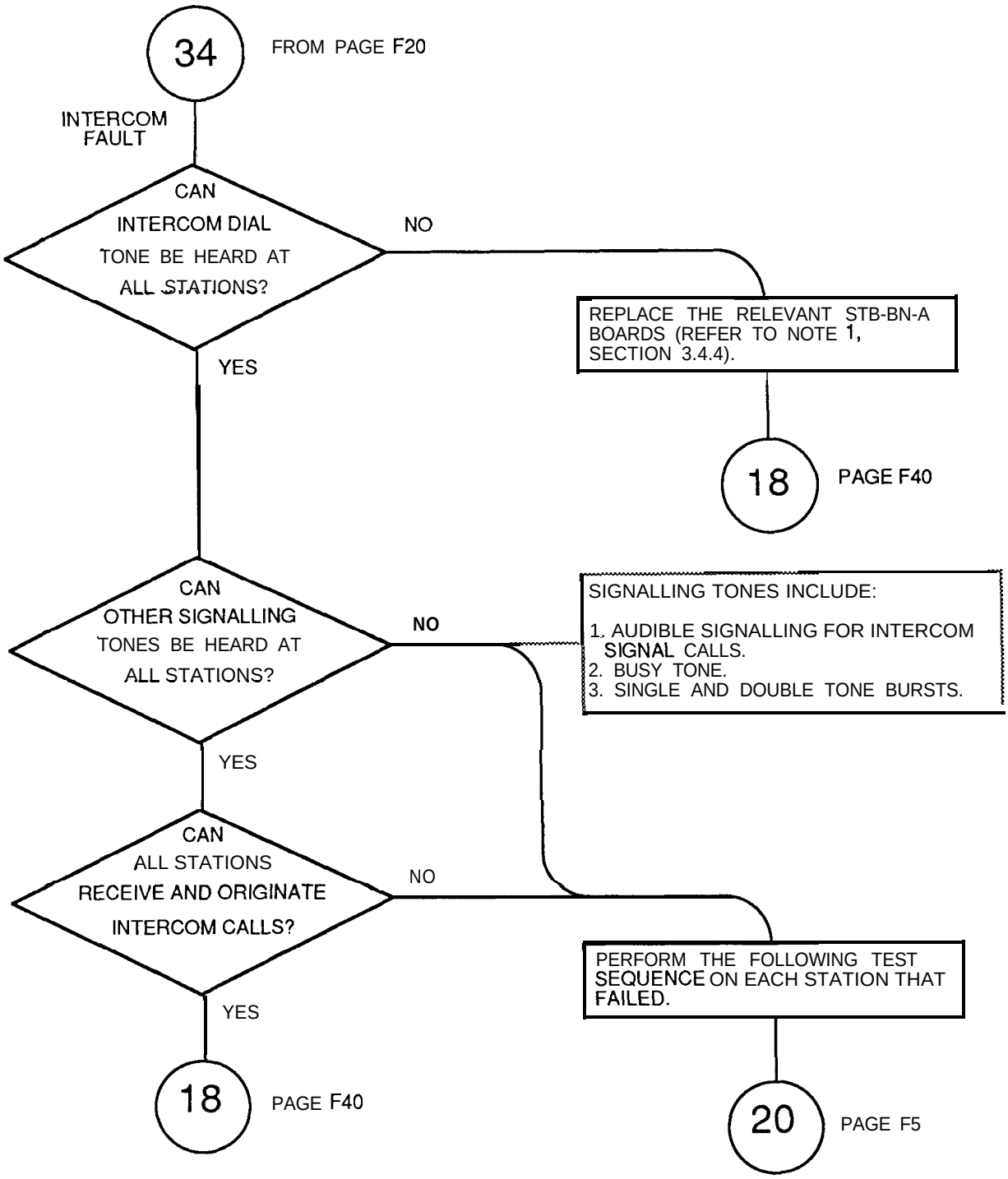
- F16 -

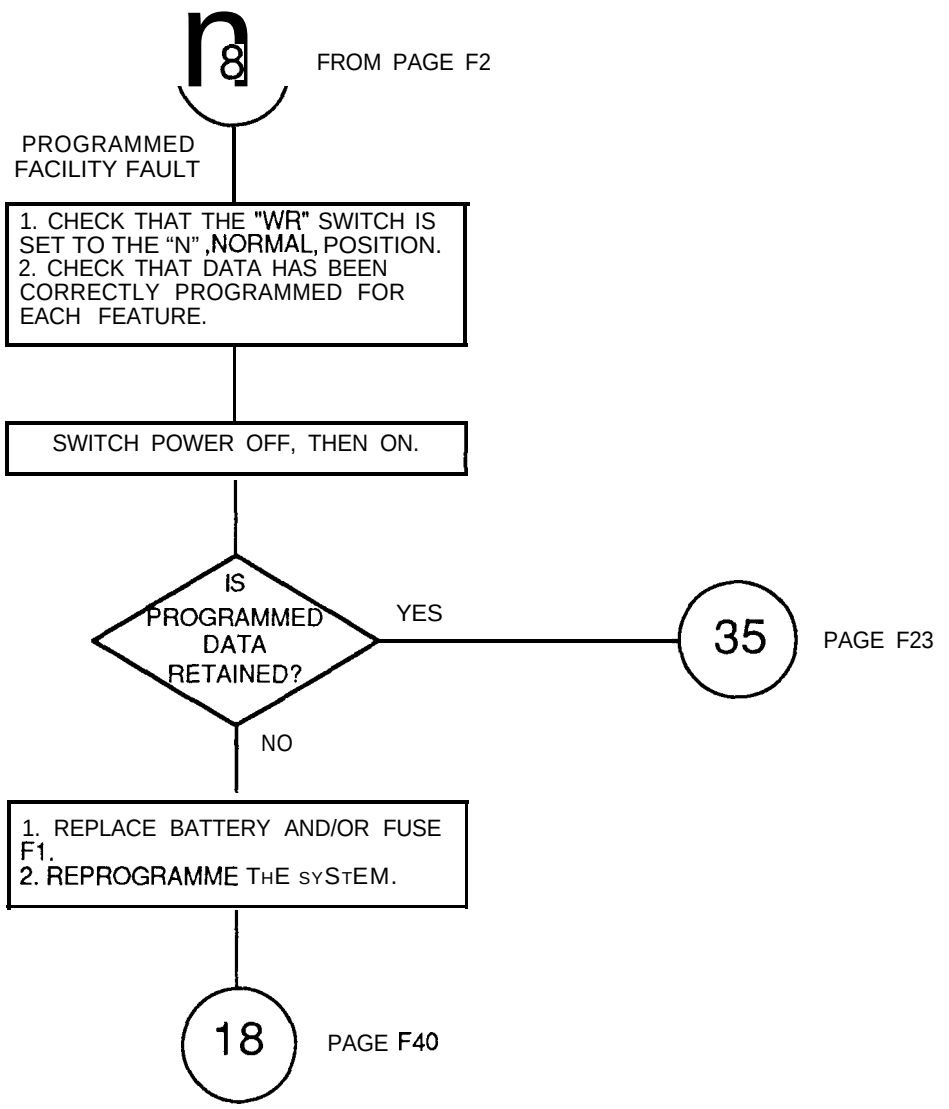

32
FROM PAGE F16
EXCHANGE LINES
CAN ALL THE EXCHANGE LINES BE SEIZED AT ALLOWED STATIONS?
YES
NO
REPLACE CPB-BN-A BOARD
18
PAGE F40
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE CPB-BN-A BOARD
18
PAGE F40

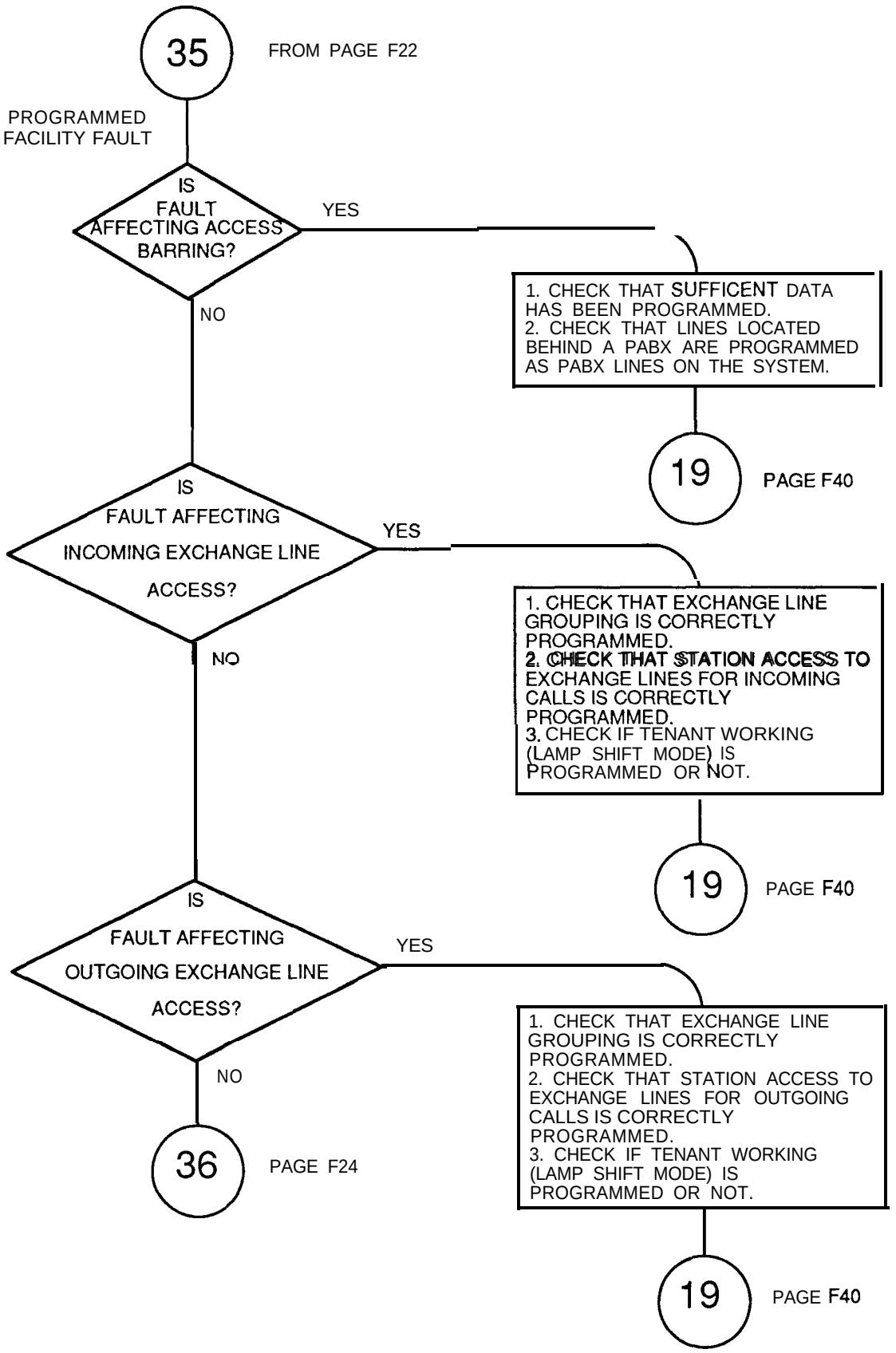

5
FROM PAGE F1
TIE LINES
1. CHECK THAT THE RTIU HAS POWER AND IS TURNED ON (PILOT LAMP LIT).
2. CHECK THAT THE CORRECT BOARDS ARE INSTALLED.
3. CHECK WIRING BETWEEN RTIU, SDF AND TIE LINE.
RTB-A IS ALWAYS REQUIRED.
RRB-A OR LRB-A REQUIRED FOR TIE LINES.
A,B - TIE LINE CONNECTION
WT,BL - M.E. CONNECTION : EXCHANGE LINE FOR TIE LINE
IS FAULT AFFECTING RINGING OR RING TONE?
YES
NO
REPLACE RTB-A BOARD AND/OR RRB,LRB BOARDS.
18
PAGE F40
CHECK THAT THE TIE LINE IS THE CORRECT TYPE AND WIRED 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 THE TIE LINE?
YES
NO
1. REPLACE LRB OR RRB BOARD.
2. IF STILL CANNOT SEIZE TIE LINE, REPLACE RELEVANT LNB-BN-A BOARD (REFER NOTE 2, SECTION 3.4.4).
33
PAGE F19
18
PAGE F40

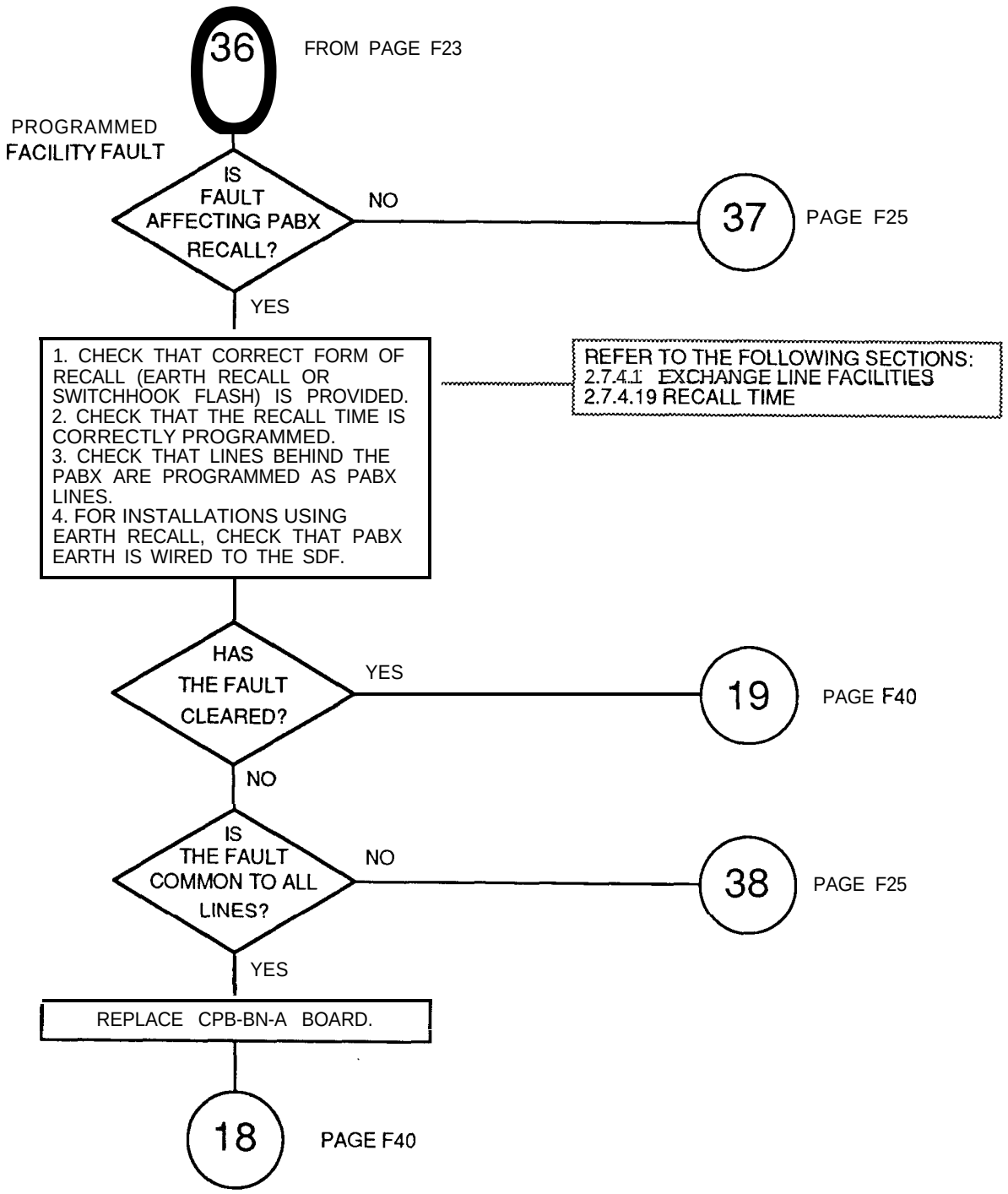

33
FROM PAGE F18
TIE LINES
CAN TIE LINE RING TO MAIN EQUIPMENT?
NO
YES
1. HAVE THE TIE LINE TESTED.
2. REPLACE LRB OR RRB BOARD.
3. IF LINE STILL NOT RINGING, REPLACE THE RELEVANT LNB-BN-A BOARD (REFER TO NOTE 2, SECTION 3.4.4).
18
PAGE F40
HAS THE FAULT CLEARED?
NO
YES
REPLACE RTIU.
19
PAGE F40
18
PAGE F40

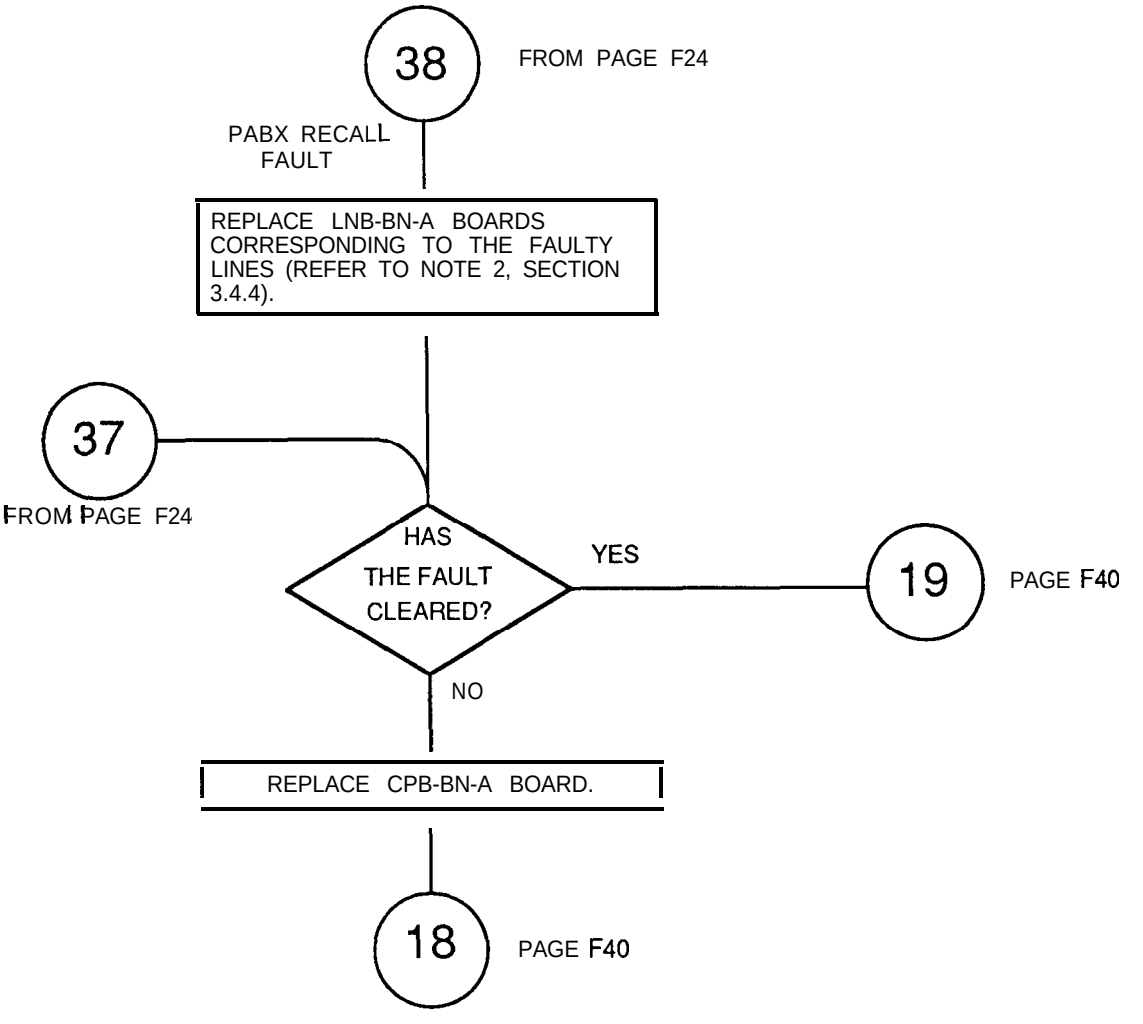

7
FROM PAGES F2,F20,F33
INTERCOM FAULT
CAN INTERCOM DIAL TONE BE HEARD AT ANY STATION?
YES
34
PAGE F21
NO
ARE ALL INTERCOM LINES USED?
YES
CLEAR ALL INTERCOM LINES.
NO
E CPB-BN-A B O A R D .
7
PAGE
F20
HAS THE FAULT CLEARED?
YES
NO
CHECK THAT THE SYSTEM OPERATES CORRECTLY. IF THERE ARE OTHER FAULTS RETURN TO "START".
28
PAGE F41
START
PAGE F1


34
FROM PAGE F20
INTERCOM FAULT
CAN INTERCOM DIAL TONE BE HEARD AT ALL STATIONS?
NO
YES
REPLACE THE RELEVANT STB-BN-A BOARDS (REFER TO NOTE 1, SECTION 3.4.4).
18
PAGE F40
CAN OTHER SIGNALLING TONES BE HEARD AT ALL STATIONS?
NO
SIGNALLING TONES INCLUDE:
1. AUDIBLE SIGNALLING FOR INTERCOM SIGNAL CALLS.
2. BUSY TONE.
3. SINGLE AND DOUBLE TONE BURSTS.
YES
CAN ALL STATIONS RECEIVE AND ORIGINATE INTERCOM CALLS?
NO
YES
PERFORM THE FOLLOWING TEST SEQUENCE ON EACH STATION THAT FAILED.
18
PAGE F40
20
PAGE F5


8
FROM PAGE F2
PROGRAMMED FACILITY FAULT
1. CHECK THAT THE "WR" SWITCH IS SET TO THE "N" ,NORMAL, POSITION.
2. CHECK THAT DATA HAS BEEN CORRECTLY PROGRAMMED FOR EACH FEATURE.
SWITCH POWER OFF, THEN ON.
IS PROGRAMMED DATA RETAINED?
YES
35
PAGE F23
NO
1. REPLACE BATTERY AND/OR FUSE F1.
2. REPROGRAMME THE SYSTEM.
18
PAGE F40


35
FROM PAGE F22
PROGRAMMED FACILITY FAULT
IS FAULT AFFECTING ACCESS BARRING?
YES
NO
1. CHECK THAT SUFFICENT DATA HAS BEEN PROGRAMMED.
2. CHECK THAT LINES LOCATED BEHIND A PABX ARE PROGRAMMED AS PABX LINES ON THE SYSTEM.
19
PAGE F40
IS FAULT AFFECTING INCOMING EXCHANGE LINE ACCESS?
YES
NO
1. CHECK THAT EXCHANGE LINE GROUPING IS CORRECTLY PROGRAMMED.
2. CHECK THAT STATION ACCESS TO EXCHANGE LINES FOR INCOMING CALLS IS CORRECTLY PROGRAMMED.
3. CHECK IF TENANT WORKING (LAMP SHIFT MODE) IS PROGRAMMED OR NOT.
19
PAGE F40
IS FAULT AFFECTING OUTGOING EXCHANGE LINE ACCESS?
YES
NO
1. CHECK THAT EXCHANGE LINE GROUPING IS CORRECTLY PROGRAMMED.
2. CHECK THAT STATION ACCESS TO EXCHANGE LINES FOR OUTGOING CALLS IS CORRECTLY PROGRAMMED.
3. CHECK IF TENANT WORKING (LAMP SHIFT MODE) IS PROGRAMMED OR NOT.
19
PAGE F40
36
PAGE F24


36
FROM PAGE F23
PROGRAMMED FACILITY FAULT
IS FAULT AFFECTING PABX RECALL?
NO
37
PAGE F25
YES
1. CHECK THAT CORRECT FORM OF RECALL (EARTH RECALL OR SWITCHHOOK FLASH) IS PROVIDED.
2. CHECK THAT THE RECALL TIME IS CORRECTLY PROGRAMMED.
3. CHECK THAT LINES BEHIND THE PABX ARE PROGRAMMED AS PABX LINES.
4. FOR INSTALLATIONS USING EARTH RECALL, CHECK THAT PABX EARTH IS WIRED TO THE SDF.
REFER TO THE FOLLOWING SECTIONS:
2.7.4.1 EXCHANGE LINE FACILITIES
2.7.4.19 RECALL TIME
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
IS THE FAULT COMMON TO ALL LINES?
NO
38
PAGE F25
YES
REPLACE CPB-BN-A BOARD.
18
PAGE F40


38
FROM PAGE F24
PABX RECALL FAULT
REPLACE LNB-BN-A BOARDS CORRESPONDING TO THE FAULTY LINES (REFER TO NOTE 2, SECTION 3.4.4).
37
FROM PAGE F24
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE CPB-BN-A BOARD.
18
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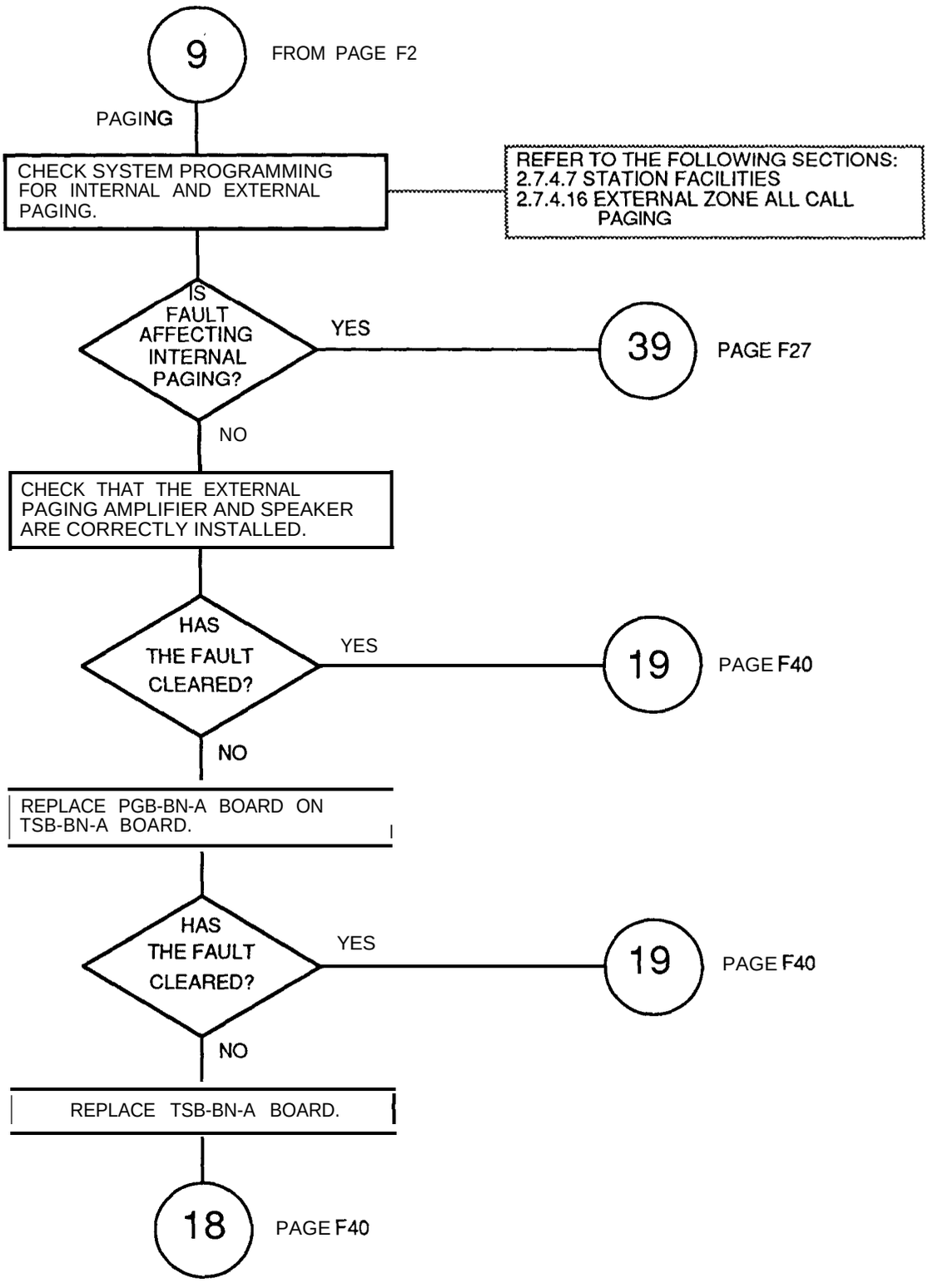
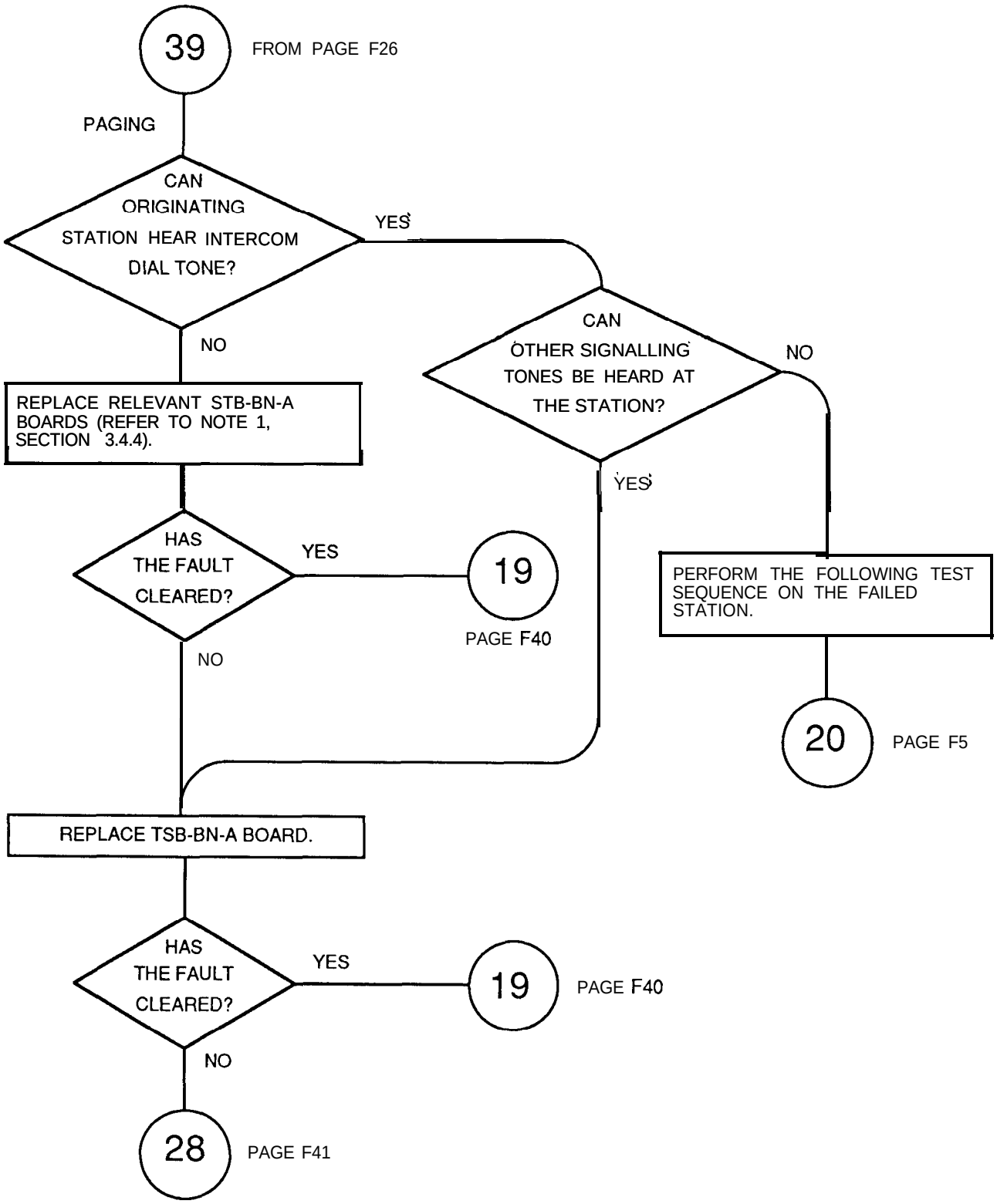
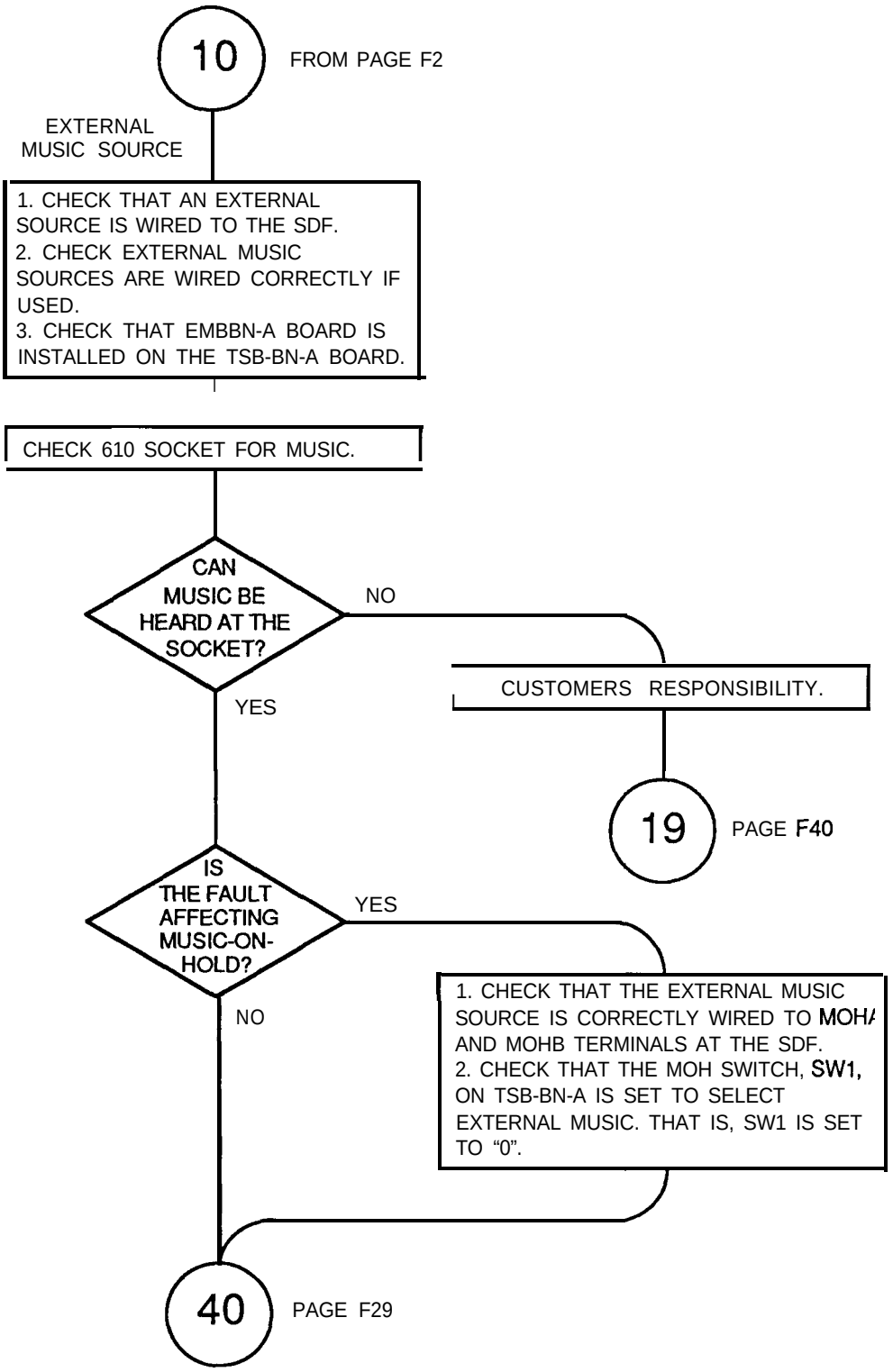
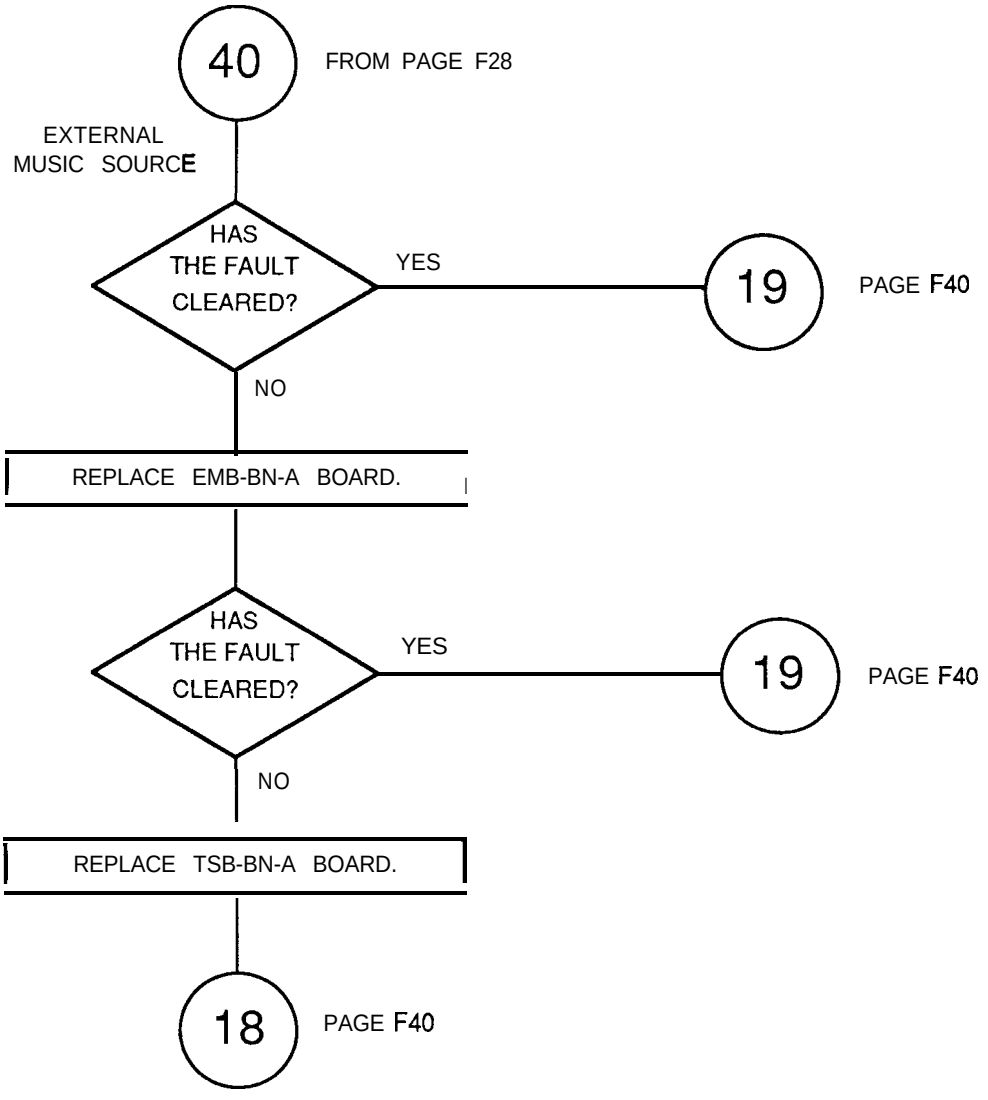
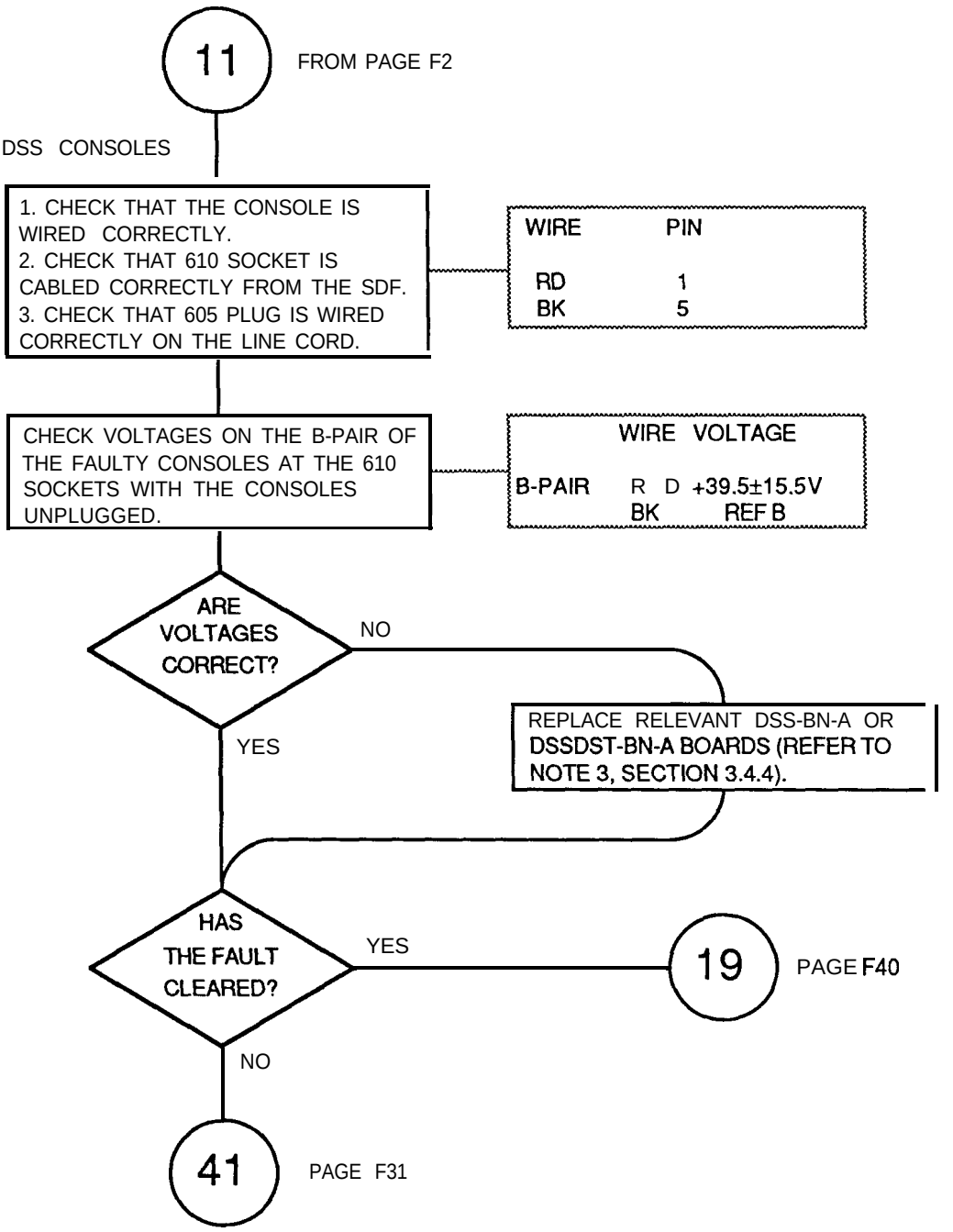
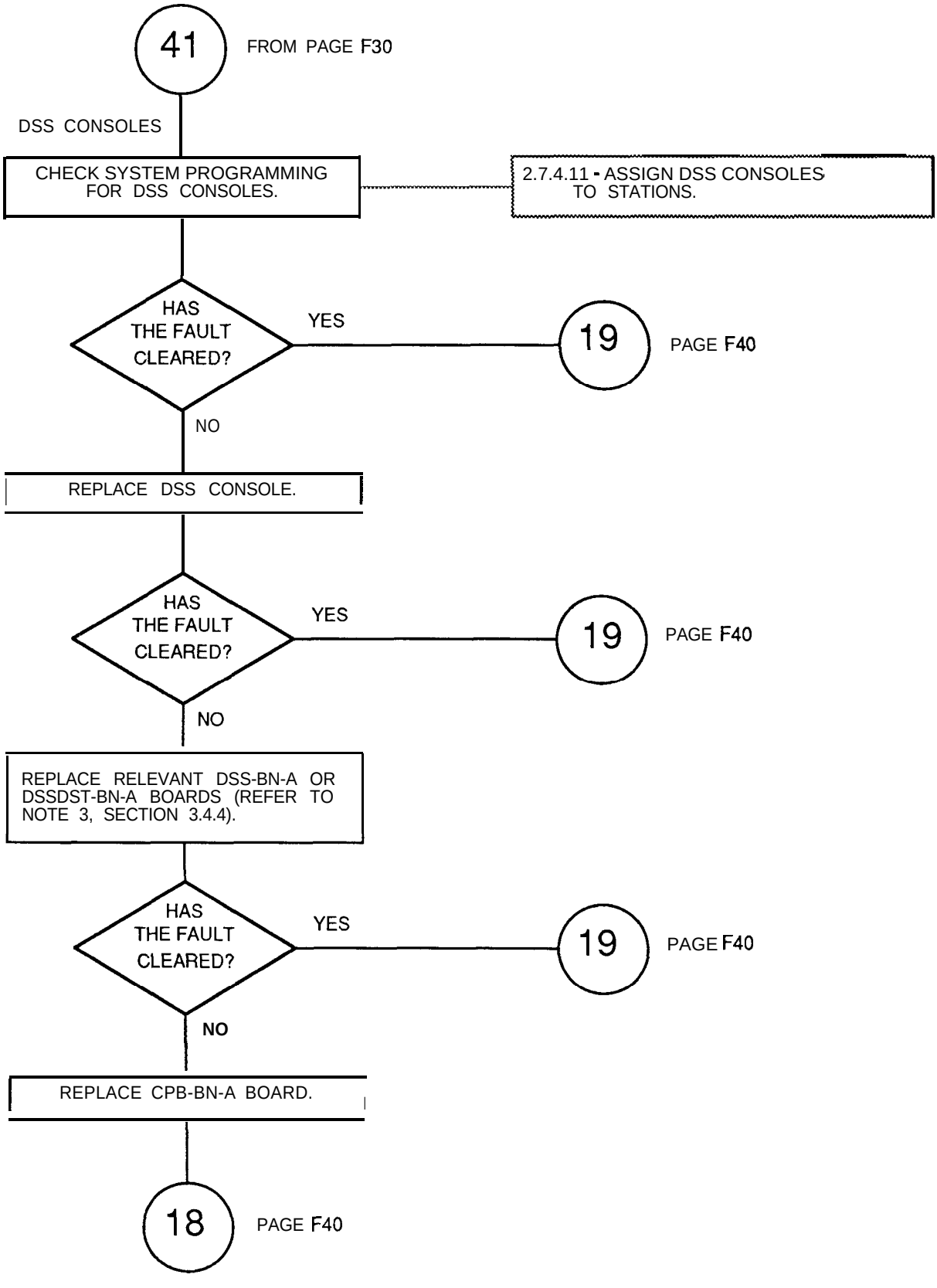

9
FROM PAGE F2
PAGING
CHECK SYSTEM PROGRAMMING FOR INTERNAL AND EXTERNAL PAGING.
REFER TO THE FOLLOWING SECTIONS:
2.7.4.7 STATION FACILITIES
2.7.4.16 EXTERNAL ZONE ALL CALL PAGING
IS FAULT AFFECTING INTERNAL PAGING?
YES
39
PAGE F27
NO
CHECK THAT THE EXTERNAL PAGING AMPLIFIER AND SPEAKER ARE CORRECTLY INSTALLED.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE PGB-BN-A BOARD ON TSB-BN-A BOARD.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE TSB-BN-A BOARD.
18
PAGE F40

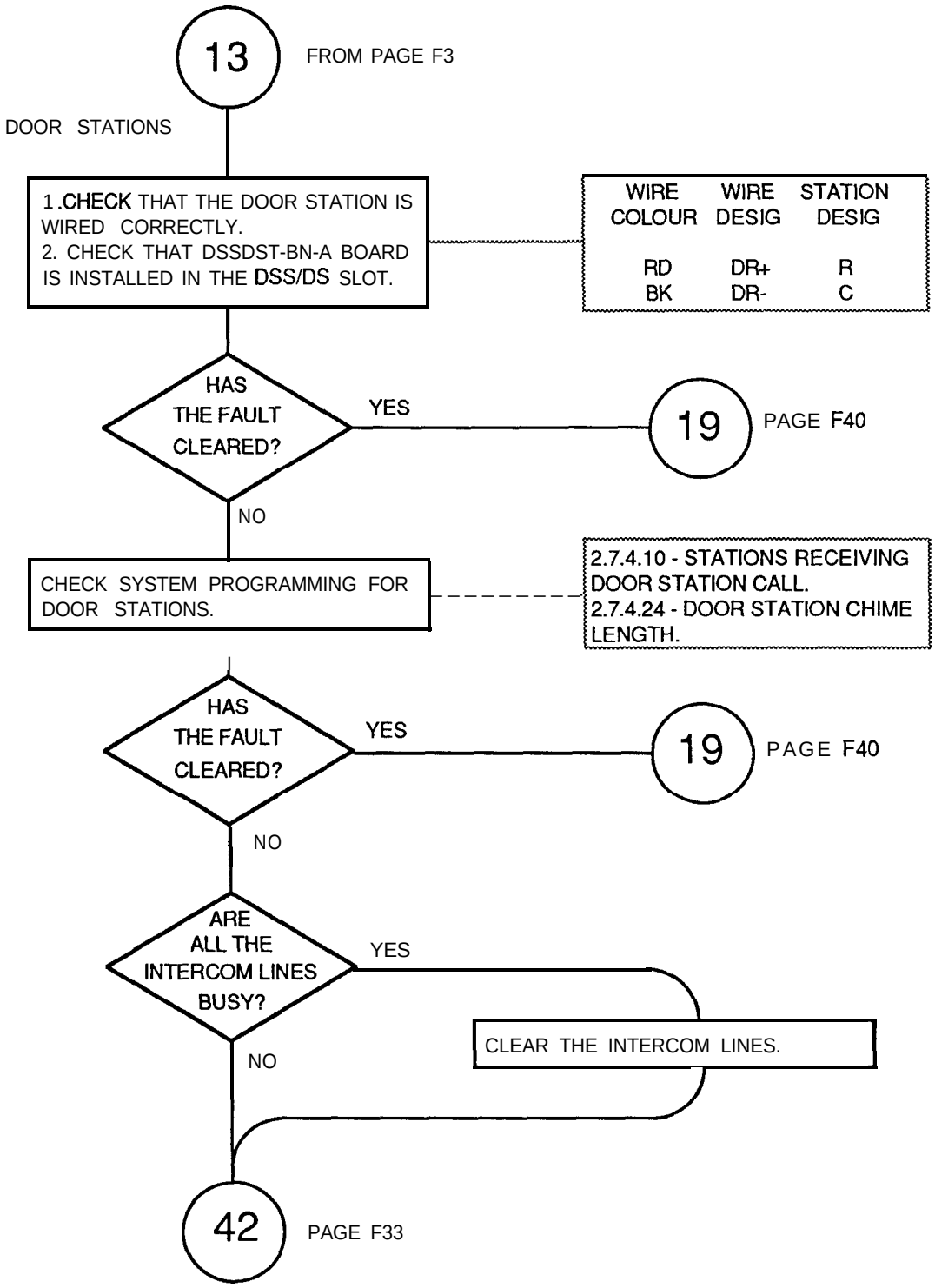

39
FROM PAGE F26
PAGING
CAN ORIGINATING STATION HEAR INTERCOM DIAL TONE?
YES
NO
REPLACE RELEVANT STB-BN-A BOARDS (REFER TO NOTE 1, SECTION 3.4.4).
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
CAN OTHER SIGNALLING TONES BE HEARD AT THE STATION?
NO
YES
PERFORM THE FOLLOWING TEST SEQUENCE ON THE FAILED STATION.
20
PAGE F5
REPLACE TSB-BN-A BOARD.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
28
PAGE F41

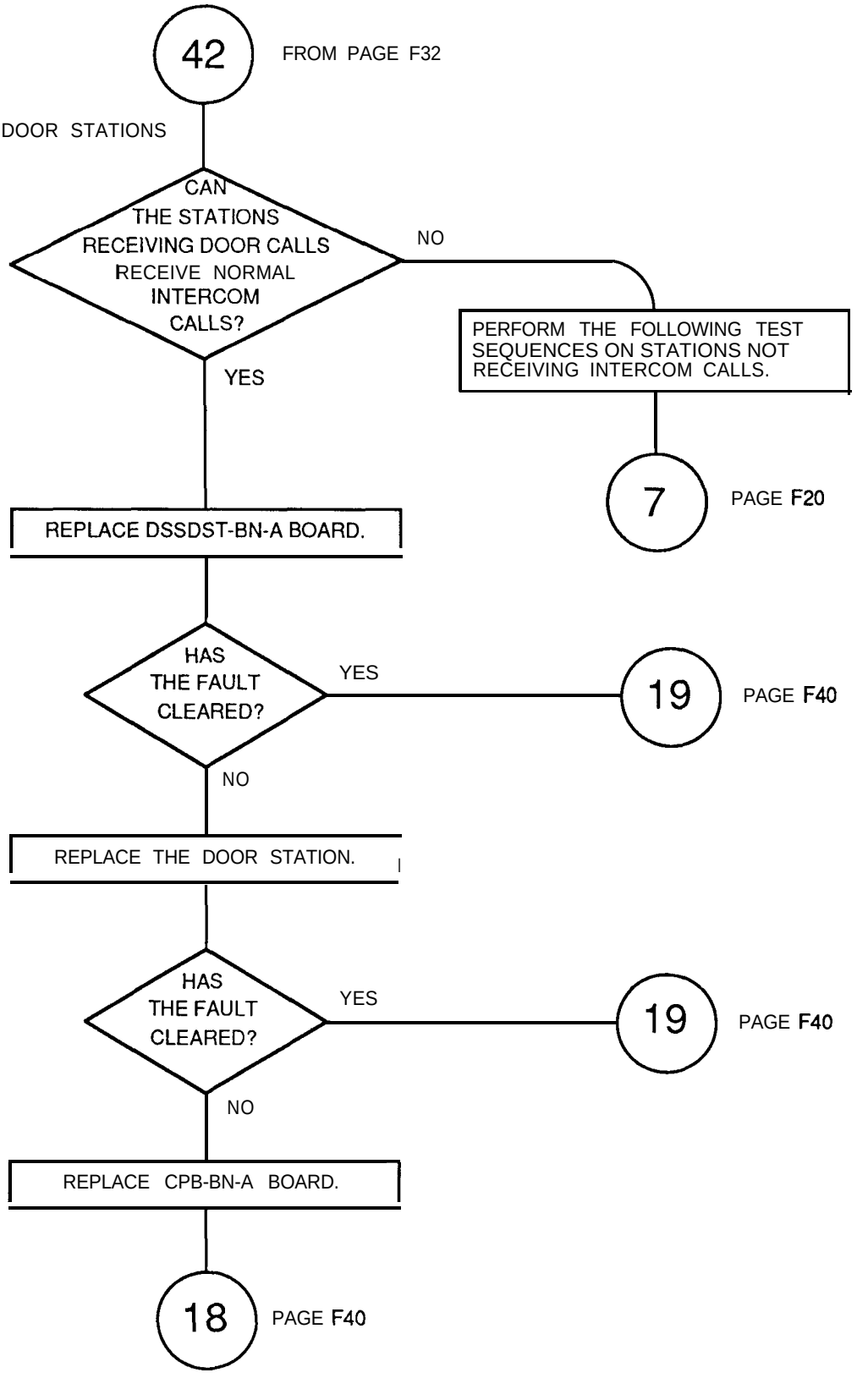

10
FROM PAGE F2
EXTERNAL MUSIC SOURCE
1. CHECK THAT AN EXTERNAL SOURCE IS WIRED TO THE SDF.
2. CHECK EXTERNAL MUSIC SOURCES ARE WIRED CORRECTLY IF USED.
3. CHECK THAT EMBBN-A BOARD IS INSTALLED ON THE TSB-BN-A BOARD.
CHECK 610 SOCKET FOR MUSIC.
CAN MUSIC BE HEARD AT THE SOCKET?
NO
CUSTOMERS RESPONSIBILITY.
YES
19
PAGE F40
IS THE FAULT AFFECTING MUSIC-ON-HOLD?
YES
1. CHECK THAT THE EXTERNAL MUSIC SOURCE IS CORRECTLY WIRED TO MOHA AND MOHB TERMINALS AT THE SDF.
2. CHECK THAT THE MOH SWITCH, SW1, ON TSB-BN-A IS SET TO SELECT EXTERNAL MUSIC. THAT IS, SW1 IS SET TO "0".
NO
40
PAGE F29

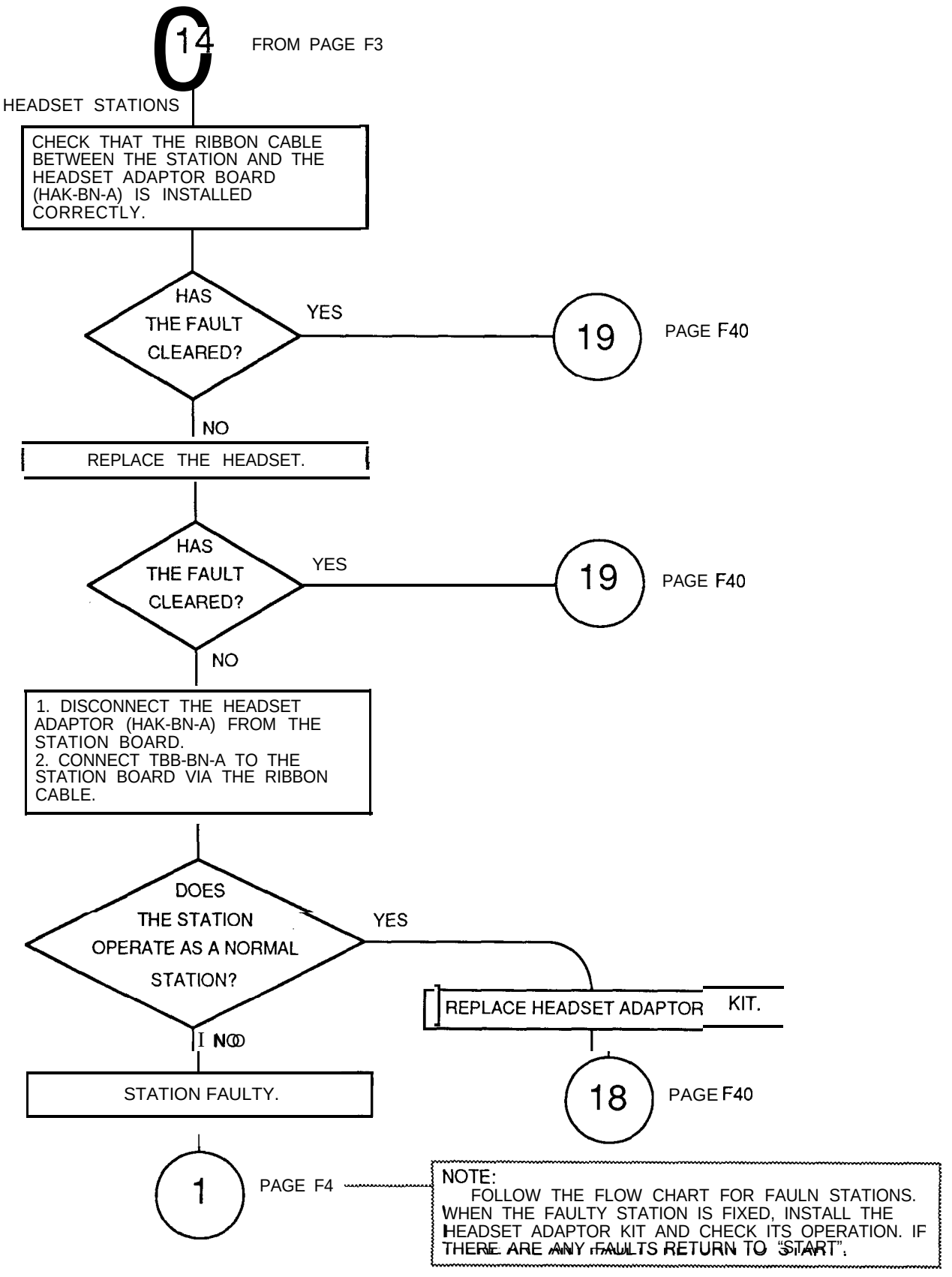

40
FROM PAGE F28
EXTERNAL
MUSIC SOURCE
HAS
THE FAULT
CLEARED?
YES
19
PAGE F40
NO
REPLACE EMB-BN-A BOARD.
HAS
THE FAULT
CLEARED?
YES
19
PAGE F40
NO
REPLACE TSB-BN-A BOARD.
18
PAGE F40

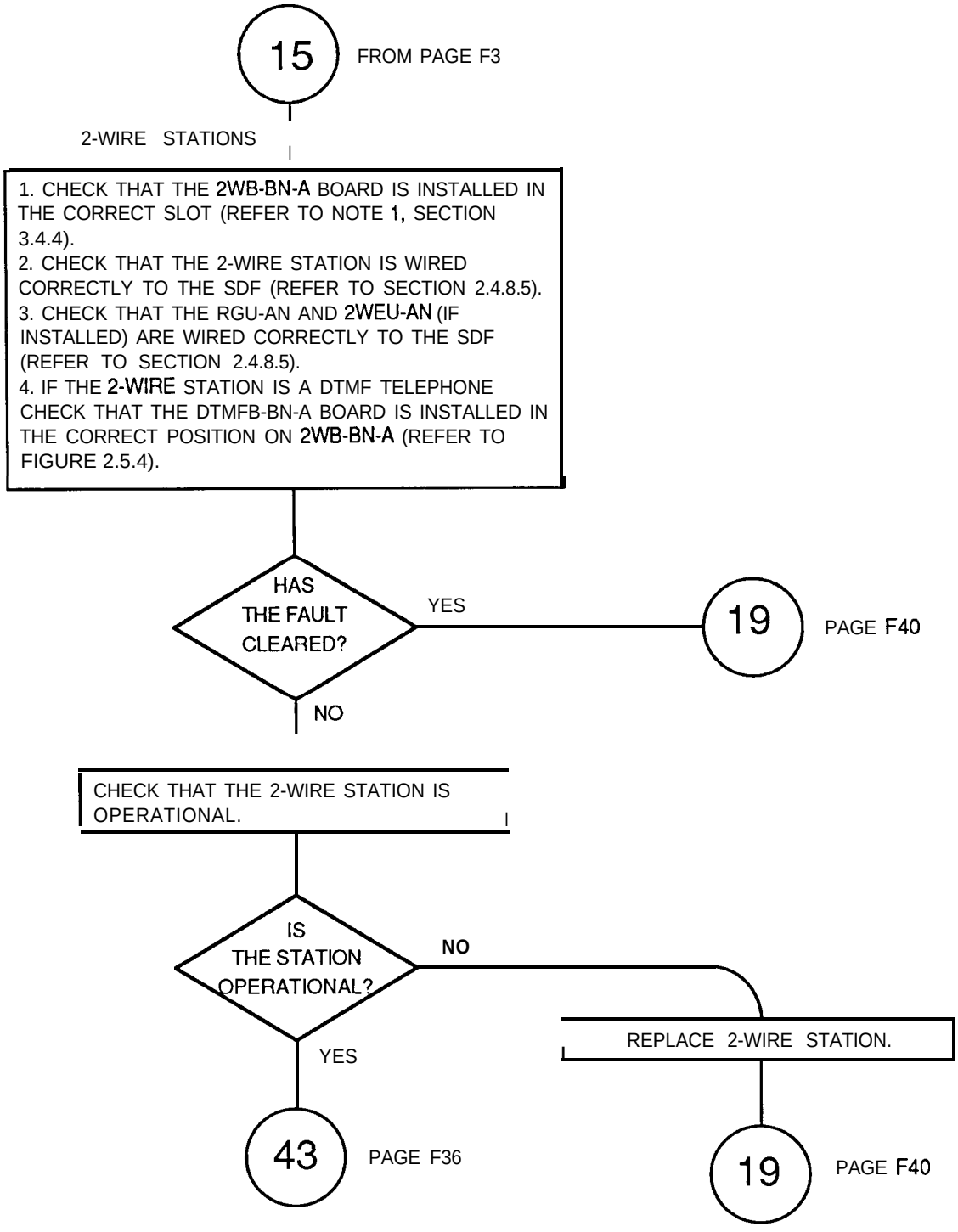

11
FROM PAGE F2
DSS CONSOLES
1. CHECK THAT THE CONSOLE IS WIRED CORRECTLY.
2. CHECK THAT 610 SOCKET IS CABLED CORRECTLY FROM THE SDF.
3. CHECK THAT 605 PLUG IS WIRED CORRECTLY ON THE LINE CORD.
WIRE PIN
RD 1
BK 5
CHECK VOLTAGES ON THE B-PAIR OF THE FAULTY CONSOLES AT THE 610 SOCKETS WITH THE CONSOLES UNPLUGGED.
WIRE VOLTAGE
B-PAIR R D +39.5±15.5V
BK REF B
ARE VOLTAGES CORRECT?
NO
YES
REPLACE RELEVANT DSS-BN-A OR DSSDST-BN-A BOARDS (REFER TO NOTE 3, SECTION 3.4.4).
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
41
PAGE F31

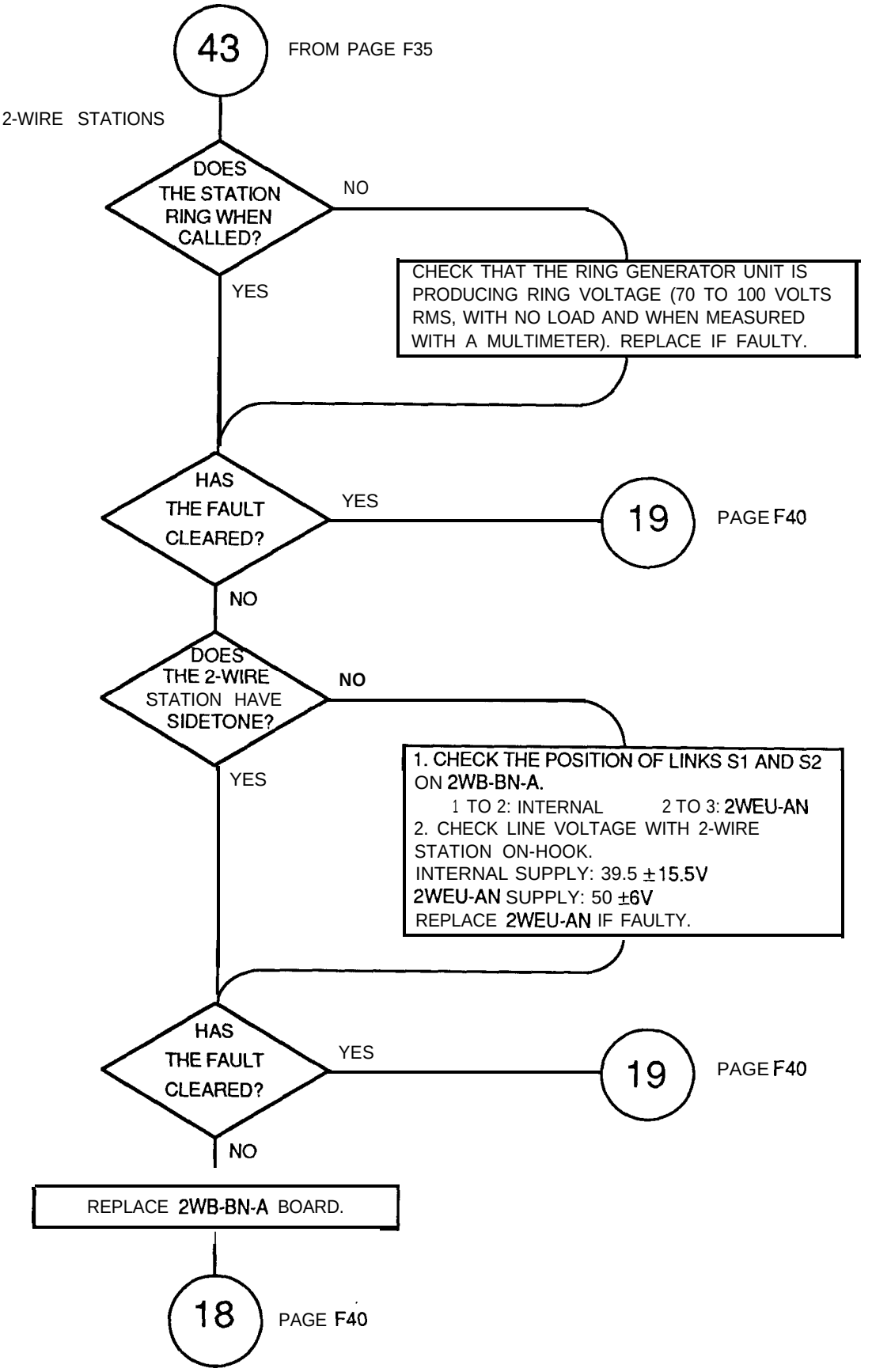

41
FROM PAGE F30
DSS CONSOLES
CHECK SYSTEM PROGRAMMING FOR DSS CONSOLES.
2.7.4.11 - ASSIGN DSS CONSOLES TO STATIONS.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE DSS CONSOLE.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE RELEVANT DSS-BN-A OR DSSDST-BN-A BOARDS (REFER TO NOTE 3, SECTION 3.4.4).
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE CPB-BN-A BOARD.
18
PAGE F40

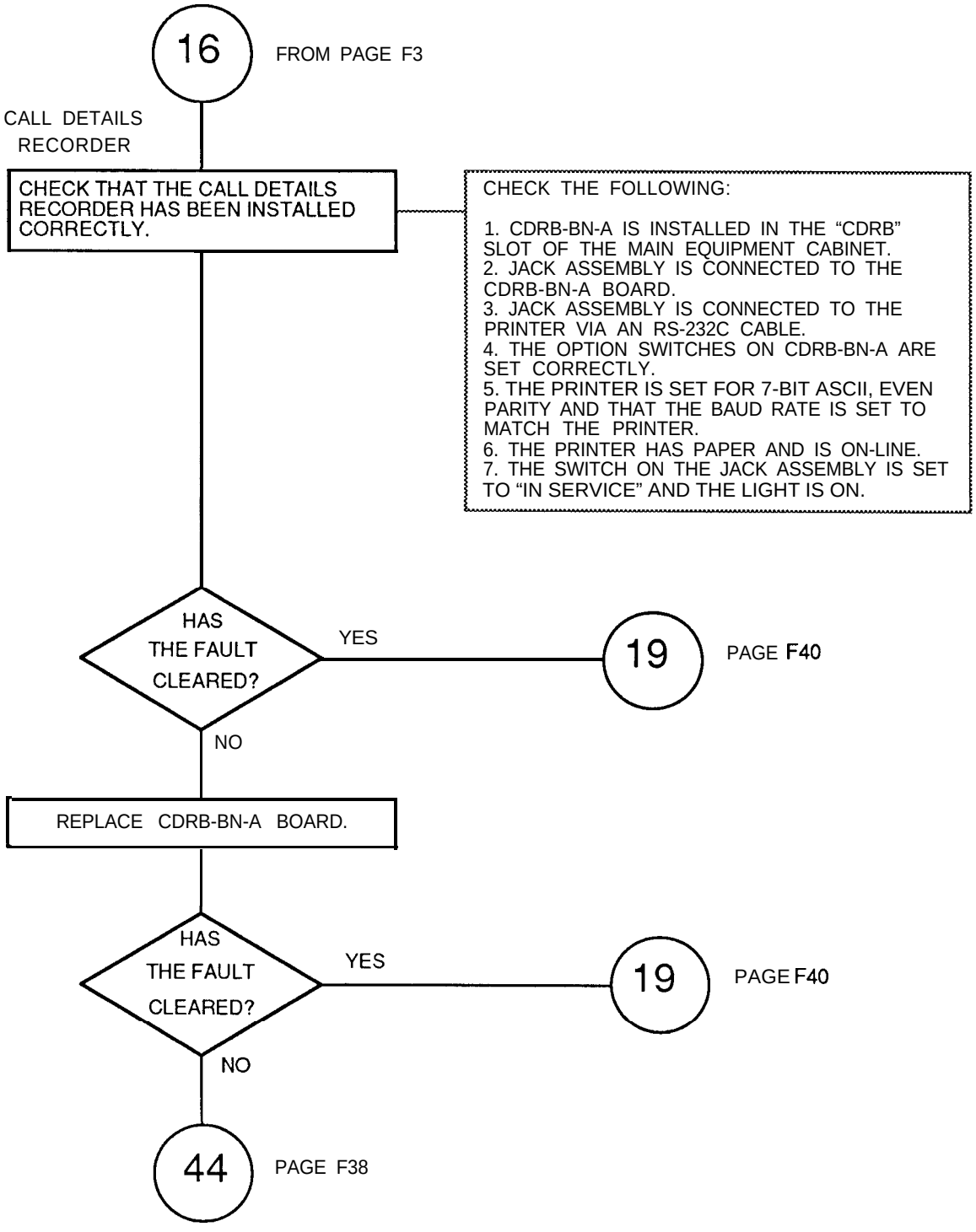

13
FROM PAGE F3
DOOR STATIONS
1.CHECK THAT THE DOOR STATION IS WIRED CORRECTLY.
2. CHECK THAT DSSDST-BN-A BOARD IS INSTALLED IN THE DSS/DS SLOT.
WIRE COLOUR
WIRE DESIG
STATION DESIG
RD
DR+
R
BK
DR-
C
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
CHECK SYSTEM PROGRAMMING FOR DOOR STATIONS.
2.7.4.10 - STATIONS RECEIVING DOOR STATION CALL.
2.7.4.24 - DOOR STATION CHIME LENGTH.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
ARE ALL THE INTERCOM LINES BUSY?
YES
CLEAR THE INTERCOM LINES.
NO
42
PAGE F33

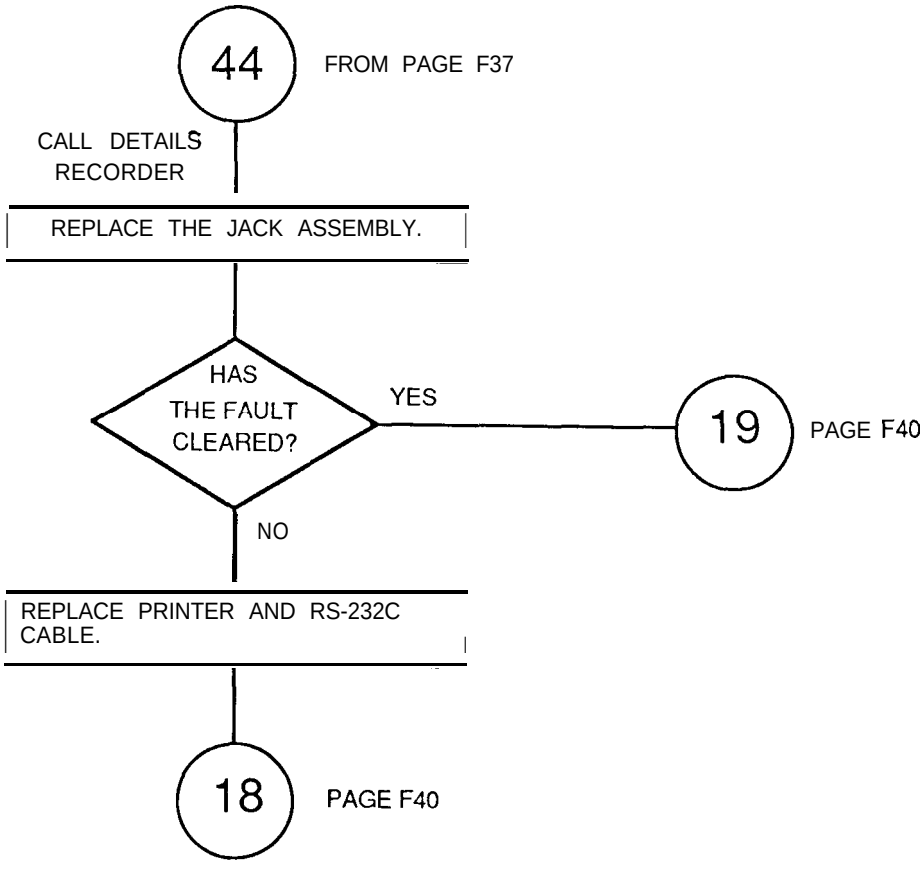

42
FROM PAGE F32
DOOR STATIONS
CAN THE STATIONS RECEIVING DOOR CALLS RECEIVE NORMAL INTERCOM CALLS?
NO
YES
PERFORM THE FOLLOWING TEST SEQUENCES ON STATIONS NOT RECEIVING INTERCOM CALLS.
7
PAGE F20
REPLACE DSSDST-BN-A BOARD.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE THE DOOR STATION.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE CPB-BN-A BOARD.
18
PAGE F40

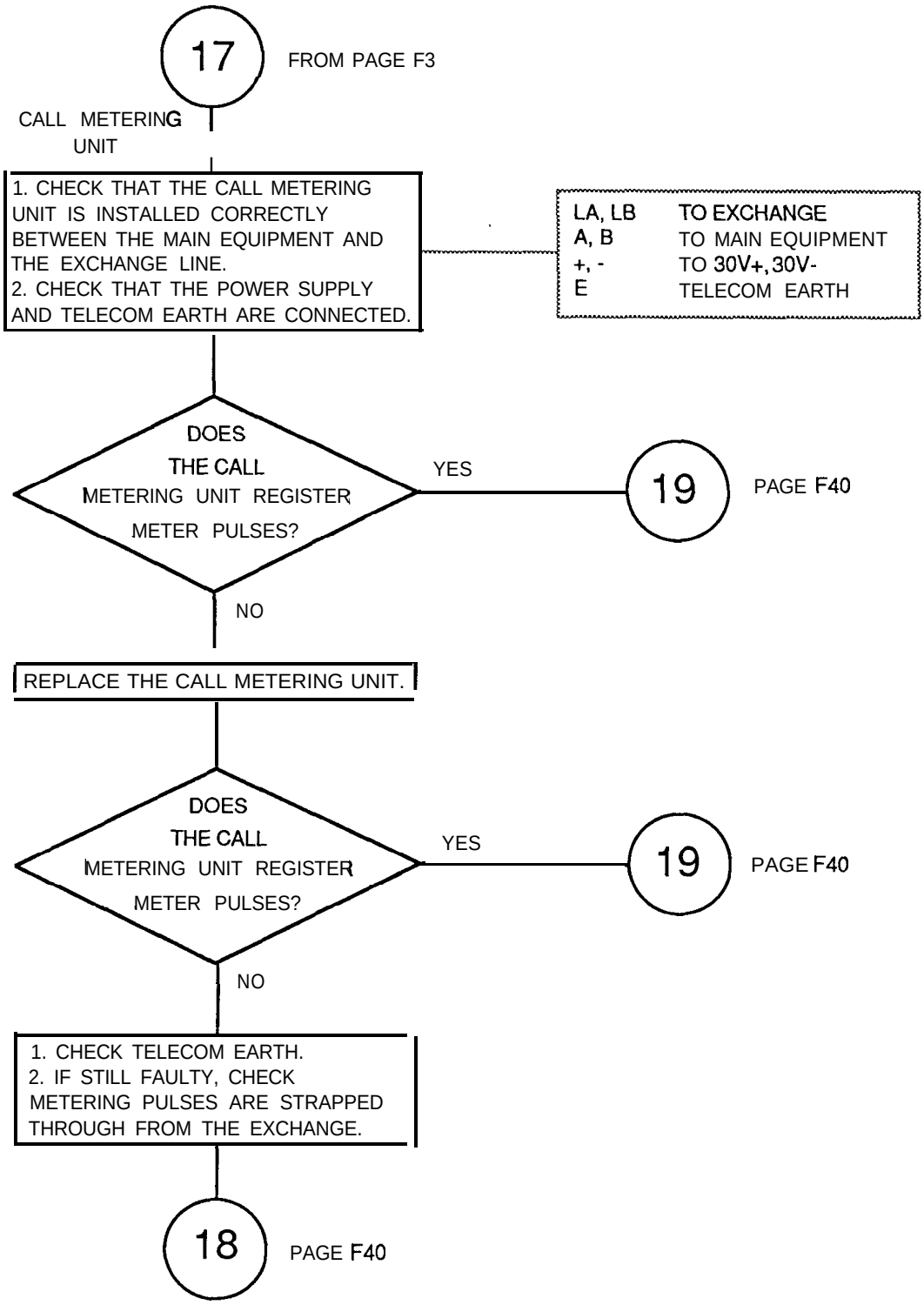

14
FROM PAGE F3
HEADSET STATIONS
CHECK THAT THE RIBBON CABLE BETWEEN THE STATION AND THE HEADSET ADAPTOR BOARD (HAK-BN-A) IS INSTALLED CORRECTLY.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE THE HEADSET.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
1. DISCONNECT THE HEADSET ADAPTOR (HAK-BN-A) FROM THE STATION BOARD.
2. CONNECT TBB-BN-A TO THE STATION BOARD VIA THE RIBBON CABLE.
DOES THE STATION OPERATE AS A NORMAL STATION?
YES
NO
REPLACE HEADSET ADAPTOR KIT.
STATION FAULTY.
18
PAGE F40
1
PAGE F4
NOTE:
FOLLOW THE FLOW CHART FOR FAULN STATIONS. WHEN THE FAULTY STATION IS FIXED, INSTALL THE HEADSET ADAPTOR KIT AND CHECK ITS OPERATION. IF THERE ARE ANY FAULTS RETURN TO "START".

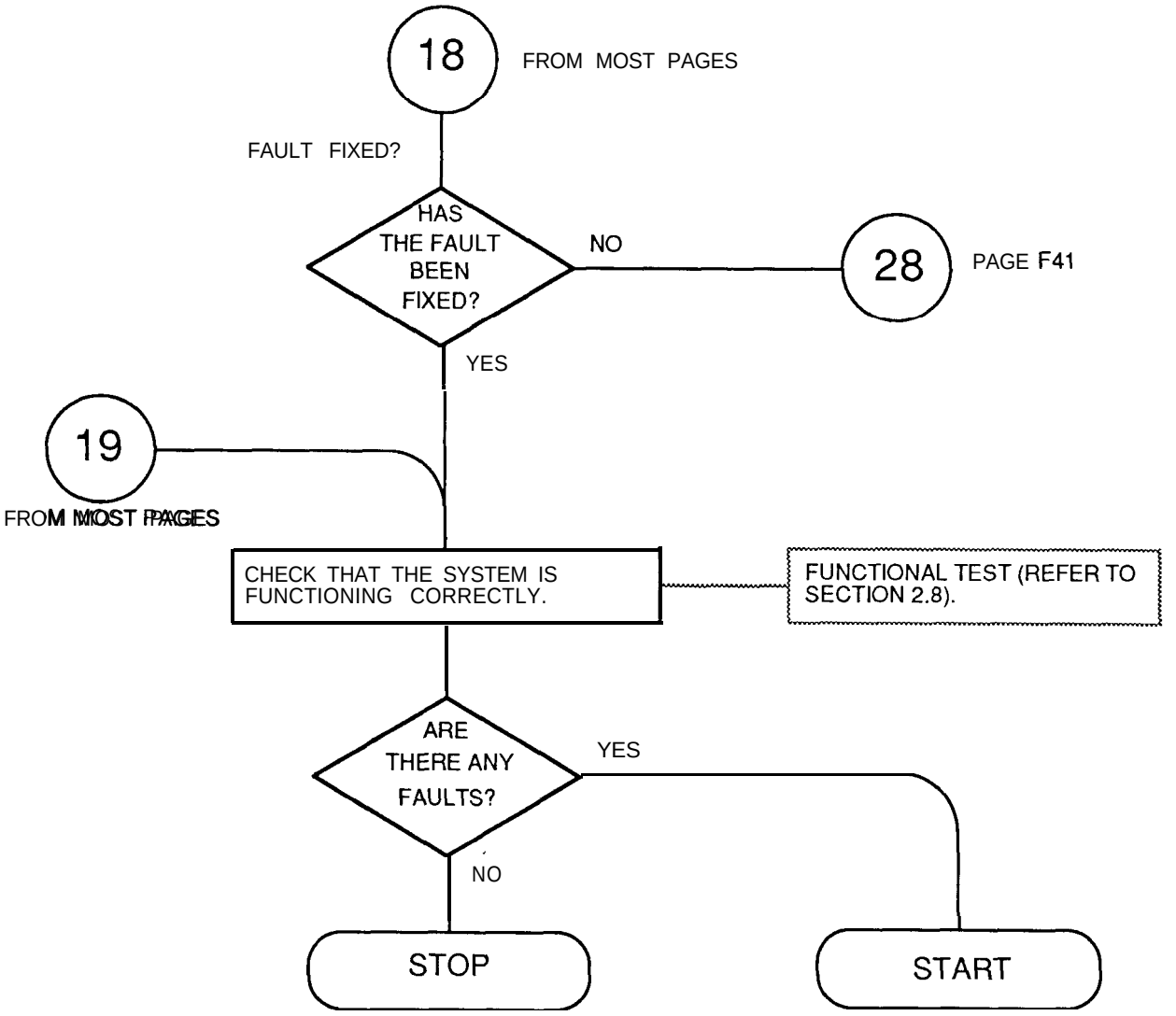

15
FROM PAGE F3
2-WIRE STATIONS
1. CHECK THAT THE 2WB-BN-A BOARD IS INSTALLED IN THE CORRECT SLOT (REFER TO NOTE 1, SECTION 3.4.4).
2. CHECK THAT THE 2-WIRE STATION IS WIRED CORRECTLY TO THE SDF (REFER TO SECTION 2.4.8.5).
3. CHECK THAT THE RGU-AN AND 2WEU-AN (IF INSTALLED) ARE WIRED CORRECTLY TO THE SDF (REFER TO SECTION 2.4.8.5).
4. IF THE 2-WIRE STATION IS A DTMF TELEPHONE CHECK THAT THE DTMFB-BN-A BOARD IS INSTALLED IN THE CORRECT POSITION ON 2WB-BN-A (REFER TO FIGURE 2.5.4).
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
CHECK THAT THE 2-WIRE STATION IS OPERATIONAL.
IS THE STATION OPERATIONAL?
NO
REPLACE 2-WIRE STATION.
YES
43
PAGE F36
19
PAGE F40

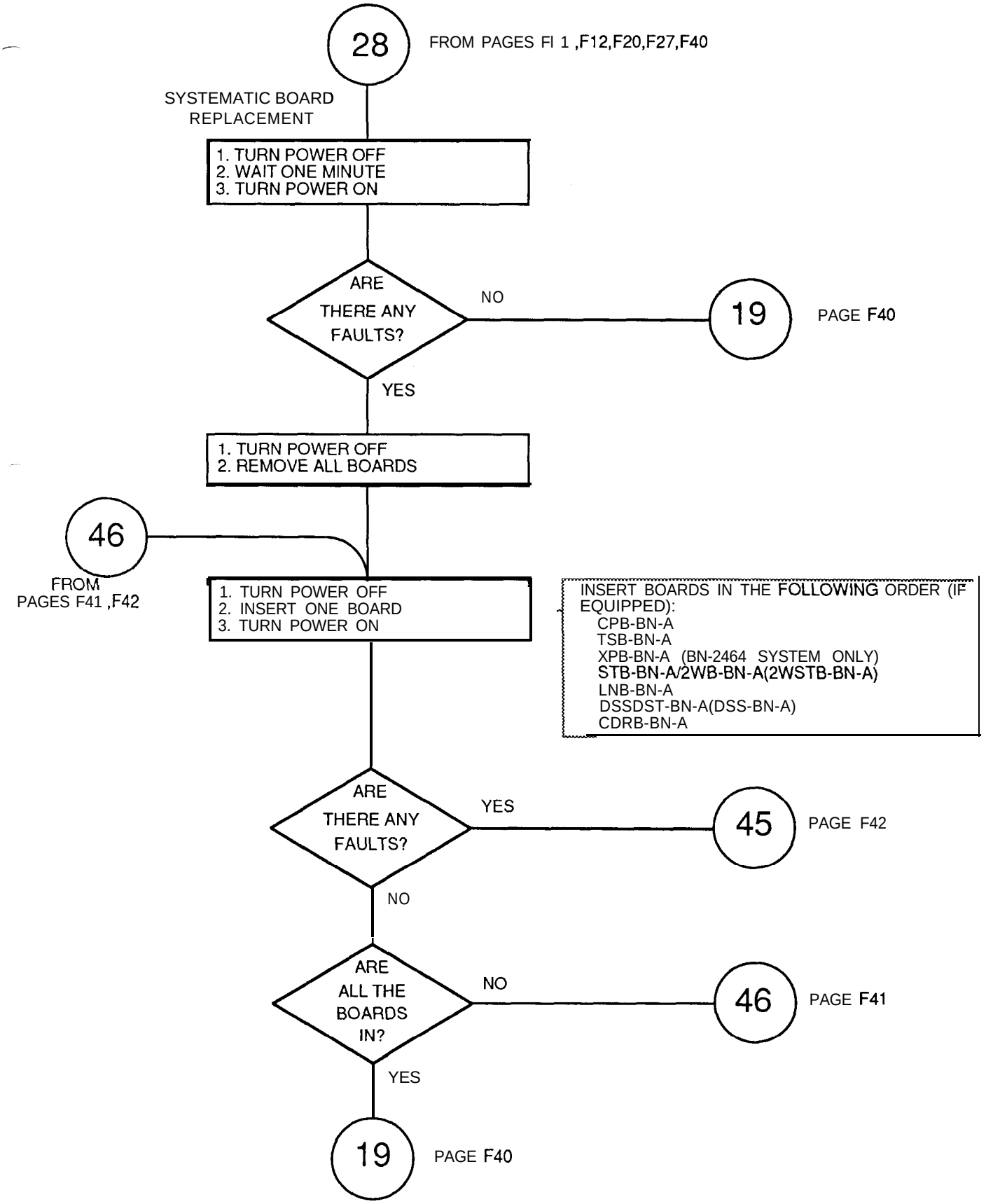

43
FROM PAGE F35
2-WIRE STATIONS
DOES THE STATION RING WHEN CALLED?
NO
YES
CHECK THAT THE RING GENERATOR UNIT IS PRODUCING RING VOLTAGE (70 TO 100 VOLTS RMS, WITH NO LOAD AND WHEN MEASURED WITH A MULTIMETER). REPLACE IF FAULTY.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
DOES THE 2-WIRE STATION HAVE SIDETONE?
NO
YES
1. CHECK THE POSITION OF LINKS S1 AND S2 ON 2WB-BN-A.
1 TO 2: INTERNAL 2 TO 3: 2WEU-AN
2. CHECK LINE VOLTAGE WITH 2-WIRE STATION ON-HOOK.
INTERNAL SUPPLY: 39.5 ±15.5V
2WEU-AN SUPPLY: 50 ±6V
REPLACE 2WEU-AN IF FAULTY.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE 2WB-BN-A BOARD.
18
PAGE F40

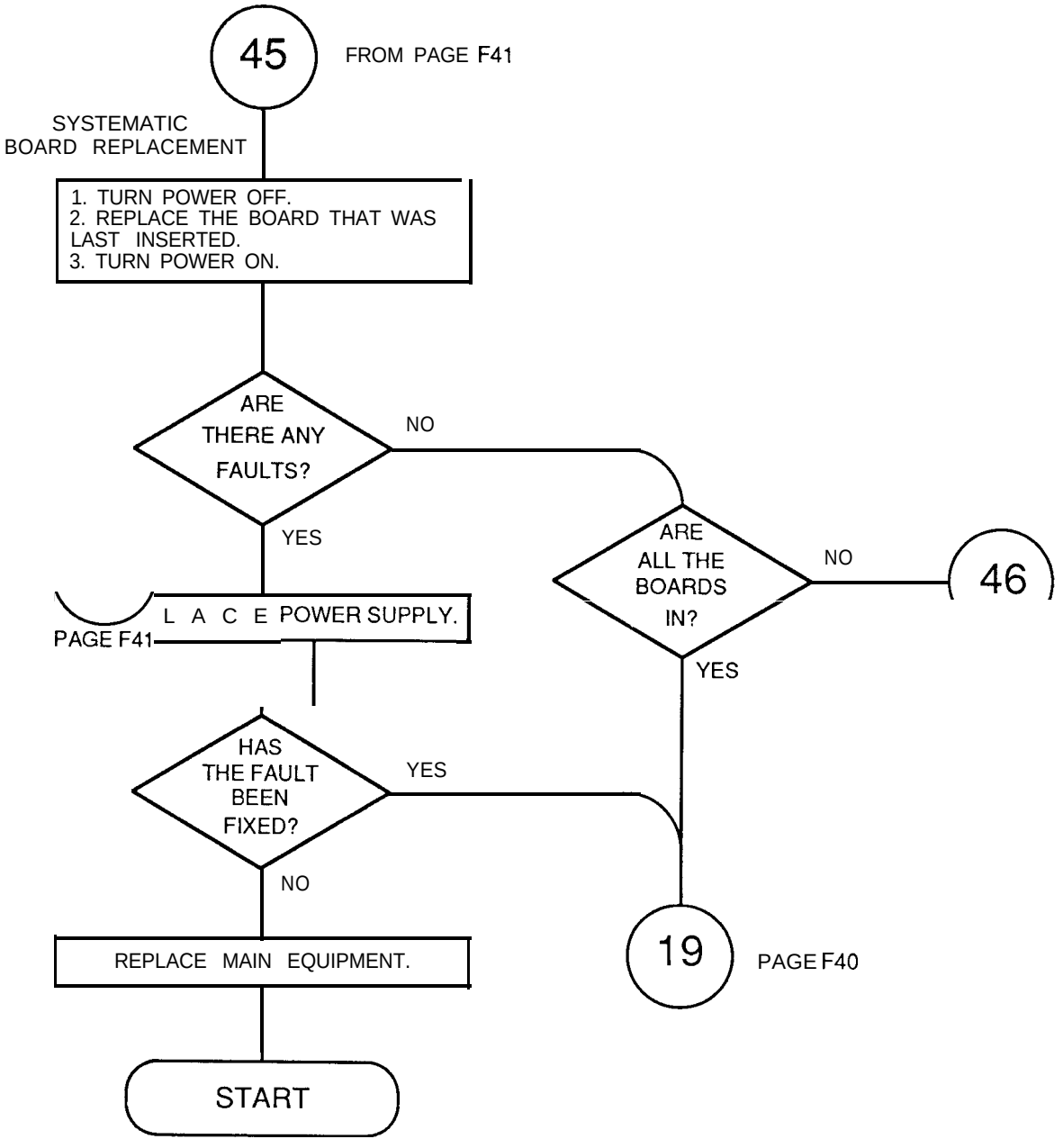

16
FROM PAGE F3
CALL DETAILS RECORDER
CHECK THAT THE CALL DETAILS RECORDER HAS BEEN INSTALLED CORRECTLY.
CHECK THE FOLLOWING:
1. CDRB-BN-A IS INSTALLED IN THE "CDRB" SLOT OF THE MAIN EQUIPMENT CABINET.
2. JACK ASSEMBLY IS CONNECTED TO THE CDRB-BN-A BOARD.
3. JACK ASSEMBLY IS CONNECTED TO THE PRINTER VIA AN RS-232C CABLE.
4. THE OPTION SWITCHES ON CDRB-BN-A ARE SET CORRECTLY.
5. THE PRINTER IS SET FOR 7-BIT ASCII, EVEN PARITY AND THAT THE BAUD RATE IS SET TO MATCH THE PRINTER.
6. THE PRINTER HAS PAPER AND IS ON-LINE.
7. THE SWITCH ON THE JACK ASSEMBLY IS SET TO "IN SERVICE" AND THE LIGHT IS ON.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
REPLACE CDRB-BN-A BOARD.
HAS THE FAULT CLEARED?
YES
19
PAGE F40
NO
44
PAGE F38


44
FROM PAGE F37
CALL DETAILS
RECORDER
REPLACE THE JACK ASSEMBLY.
HAS
THE FAULT
CLEARED?
YES
19
PAGE F40
NO
REPLACE PRINTER AND RS-232C
CABLE.
18
PAGE F40


17
FROM PAGE F3
CALL METERING UNIT
1. CHECK THAT THE CALL METERING UNIT IS INSTALLED CORRECTLY BETWEEN THE MAIN EQUIPMENT AND THE EXCHANGE LINE.
2. CHECK THAT THE POWER SUPPLY AND TELECOM EARTH ARE CONNECTED.
LA, LB TO EXCHANGE
A, B TO MAIN EQUIPMENT
+, - TO 30V+, 30V-
E TELECOM EARTH
DOES THE CALL METERING UNIT REGISTER METER PULSES?
YES
19
PAGE F40
NO
REPLACE THE CALL METERING UNIT.
DOES THE CALL METERING UNIT REGISTER METER PULSES?
YES
19
PAGE F40
NO
1. CHECK TELECOM EARTH.
2. IF STILL FAULTY, CHECK METERING PULSES ARE STRAPPED THROUGH FROM THE EXCHANGE.
18
PAGE F40


18
FROM MOST PAGES
FAULT FIXED?
HAS THE FAULT BEEN FIXED?
NO
28
PAGE F41
YES
19
FROM MOST PAGES
CHECK THAT THE SYSTEM IS FUNCTIONING CORRECTLY.
FUNCTIONAL TEST (REFER TO SECTION 2.8).
ARE THERE ANY FAULTS?
YES
NO
STOP
START


28
FROM PAGES FI 1 ,F12,F20,F27,F40
SYSTEMATIC BOARD REPLACEMENT
1. TURN POWER OFF
2. WAIT ONE MINUTE
3. TURN POWER ON
ARE THERE ANY FAULTS?
NO
19
PAGE F40
YES
1. TURN POWER OFF
2. REMOVE ALL BOARDS
46
FROM PAGES F41 ,F42
1. TURN POWER OFF
2. INSERT ONE BOARD
3. TURN POWER ON
INSERT BOARDS IN THE FOLLOWING ORDER (IF EQUIPPED):
CPB-BN-A
TSB-BN-A
XPB-BN-A (BN-2464 SYSTEM ONLY)
STB-BN-A/2WB-BN-A(2WSTB-BN-A)
LNB-BN-A
DSSDST-BN-A(DSS-BN-A)
CDRB-BN-A
ARE THERE ANY FAULTS?
YES
45
PAGE F42
NO
ARE ALL THE BOARDS IN?
NO
46
PAGE F41
YES
19
PAGE F40


45
FROM PAGE F41
SYSTEMATIC
BOARD REPLACEMENT
1. TURN POWER OFF.
2. REPLACE THE BOARD THAT WAS LAST INSERTED.
3. TURN POWER ON.
ARE THERE ANY FAULTS?
NO
YES
ARE ALL THE BOARDS IN?
NO
46
YES
L A C E POWER SUPPLY.
PAGE F41
HAS THE FAULT BEEN FIXED?
YES
NO
REPLACE MAIN EQUIPMENT.
19
PAGE F40
START

3.4.4 Notes

1. The following table lists the station numbers and the corresponding STB-BN-A board position in the BN-824 and BN-1236/2464 Main Equipments and the BN-2464 Expansion Rack.

STATION NUMBER (MAIN EQUIPMENT BN-824,BN-1236/2464	STB-BN-A POSITION	STATION NUMBER (EXPANSION RACK BN-2464)	STB-BN-A POSITION
10-13	1	46-49	10
14-17	2	50-53	11
18-21	3	54-57	12
22-25	4	58-61	13
26-29	5	62-65	14
30-33	6	66-69	15
34-37	7	70-73	16
38-41	8		
42-45	9		

2. The following table lists the line numbers and the corresponding LNB-BN-A board position in the BN-824 and BN-1236/2464 Main Equipments and BN-2464 Expansion Rack.

STATION NUMBER (MAIN EQUIPMENT BN-824,BN-1236/2464	LNB-BN-A POSITION	STATION NUMBER (EXPANSION RACK BN-2464)	LNB-BN-A POSITION
1-4	1	13-16	4
5-8	2	17-20	5
9-12	3	21-24	6

3. The following tables list the DSS Consoles or Door Stations and the corresponding DSS-BN-A and DSSDST-BN-A board positions in the BN-824 or BN-1236/2464 Main Equipment and Expansion Rack

DSSDST-BN-A POSITION	DSS CONSOLES/DOOR STATIONS
BN-824 or BN- 123612464 Main Equipment DSS (1)	DSS 1 — 2 DOOR STATIONS 1 — 2
BN-2464 Expansion Rack DSS(2)	DSS 3 — 4
BN-2464 Expansion Rack DSS(3)	DSS 7 — 8

DSS-BN-A POSITION	DSS CONSOLES
BN-824 or BN-123612464 Main Equipment DSS (1)	DSS 1 – 2 DSS 11 – 12
BN-2464 Expansion Rack DSS(2)	DSS3 -6
BN-2464 Expansion Rack DSS (3)	DSS 7 – 10

3.5 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 flowcharts, Section 3.4.3.

Before following repair actions check that the necessary circuit boards have been installed. CPB-BN-A and TSB-BN-A are essential for the system to operate. STB-BN-A is required for each four stations connected to the system while LNB-BN-A is required for each four exchange lines connected to the system. XPB-BN-A are required when more than 12 exchange lines are connected to the BN-2464 system.

SYSTEM TESTS

3.5.1 Exchange Line

1. Check that the system has power and that station A is connected.
2. Check wiring from the main equipment to station. Check socket connections and wiring to station as follows:

WIRE	6 10 SOCKET PIN NUMBER	VOLTAGE
WT	2	+ 9V ± 2 V
BL	6	REF A
RD	1	+39.5±15.5V
BK	5	REF B

3. Check voltages on the wires to the station. If they are not similar to the above table, change the relevant STB-BN-A board (refer to Note 1, Section 3.4.4.).
4. Check ribbon connector between the keypad assembly and the station printed board assembly.
5. If the fault still exists change the station.

3.5.2 Exchange Line

1. Check the wiring from the main equipment to the exchange line.
2. Test the exchange line
3. Check receiver and its connections in the station.
4. If the system is a BN-2464 system, replace the first XPB-BN-A board if station A is numbered between 10 and 41 or replace the second XPB-BN-A board if station A is numbered between 42 and 73.
5. Replace the relevant STB-BN-A board if fault still exists.

3.5.3 Incoming Call

1. Check connections from the SDF to the exchange line.
2. Test the exchange line.
3. Check that the system is dialling correctly. If not, check that it has been programmed for correct form of signalling, decadic or DTMF.
4. Replace the relevant LNB-BN-A board if fault still exists (refer to Note 2, Section 3.4.4.).

3.5.4 Incoming Call

1. Check the system programming data for exchange line ring signalling.
2. Check the wiring from the main equipment to the stations as in Section 3.5.1. Check that the stations are connected to the correct SDF terminals.
3. Check that the exchange lines are connected in the correct sequence.

3.5.5 Answering

1. Check wiring from main equipment to station B (check voltages as in 3.5.1.)
2. Change STB-BN-A if voltages incorrect.
3. Change station B if fault still exists.

3.5.6 Answering

1. Check A-pair wiring (and DC voltages) to stations A and B.
2. Check stations A and B for sidetone. If there is no sidetone check transmitter and receiver wiring.
3. If the system is a BN-2464 system with more than 12 exchange lines connected then replace the first XPB-BN-A board if station B is numbered between 10 and 41 or replace the second XPB-BN-A board if station B is numbered between 42 and 73.

3.5.7 Hold

1. Change station B.

3.5.8 Music-On-Hold

1. Check switch S1 on TSB-BN-A.

   0 : External music source
   1 : Internal 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 610 socket then liability for repair lies with the customer.

3. If an external music source is used then replace the EMB-BN-A daughter board on TSB-BN-A.

4. Replace the TSB-BN-A board.

5. Replace the relevant STB-BN-A board (refer to Note 1 Section 3.4.4).

3.5.9 I-Hold Automatic Ring Back

1. Check the system programming data for I-hold automatic ring back timer.

3.5.10 Exclusive Hold Release Time and Recall Signalling Duration.

1. Check the system programming data for Exclusive Hold Release Timer and Exclusive Hold Automatic Ringback Timer.

3.5.11 Intercom Seizure

1. If the ICM LED doesn't light, replace the station.

2. If there is no intercom tone, replace the relevant STB-BN-A board (refer to Note 1, Section 3.4.4.).

3. If there is still no intercom tone, replace TSB-BN-A board.

3.5.12 Talkback (Optional)

1. Check that station C's microphone is turned on.

2. If there is no tone burst heard at station B, check speaker connections. If there is still no tone burst then replace the relevant STB-BN-A board (refer to Note 1, Section 3.4.4.). If there is still no tone burst then replace TSB-BN-A board.

3. If ICM LED does not double flash then replace station C.

4. If there is no talkback check the following.

   (i) System programming is correct.
   (ii) Station C's microphone wiring is correct.
   (iii) TBB-BN-A board is correctly installed in station C's sub-base.

5. If there is still no talkback, replace station C, then replace the boards in the following order:

   STB-BN-A
   CPB-BN-A

3.5.13 Intercom Answering

1. Replace station C.
2. Replace relevant STB-BN-A boards for stations A and C (refer to Note 1, Section 3.4.4.).

3.5.14 Exchange Line Conference

1. Replace relevant STB-BN-A boards for stations A, B, and C (refer to Note 1, Section 3.4.4.).

3.5.15 Microphone Cut-off

1. Replace station B.

3.5.16 Intercom Signal Call

1. Replace station B.
2. Replace relevant STB-BN-A board for station B. (Refer to Note 1, Section 3.4.4.).

3.5.17 Station Call

1. Replace relevant STB-BN-A board for station A.
2. Replace CPB-BN-A board.

3.5.18 Intercom Hold

1. If ICM LED does not flicker replace station A.

3.5.19 Intercom Disconnection

1. Check that both stations are on hook properly.

3.5.20 Single Access On-Hook Dialling

1. Check that the system programming for single access on-hook dialling is correct.
2. Check that the station has outgoing access to the line.
3. Replace station A.
4. Replace the relevant STB-BN-A board (refer to Note 1, Section 3.4.4.).

3.5.21 Background Music

1. Check that the music can be heard at the 610 socket. If not, the responsibility for repair lies with the customer.
2. Check that the wiring from the 610 socket to the SDF is correct.
3. Replace station A.
4. Check volume control pot, VR1, setting on EMB-BN-A.
5. Replace EMB-BN-A daughter board on TSB-BN-A.
6. Replace TSB-BN-A board.
7. Replace relevant STB-BN-A (refer to Note 1, Section 3.4.4.).

3.5.22 Dialling

1. Check that the station is allowed access to all lines.
2. Check that the system programming data for each line is correct.
3. Replace relevant LNB-BN-A board (refer to Note 2, Section 3.4.4.).
4. Replace CPB-BN-A board.

3.5.23 Incoming Signalling Assignment

1. Check that the incoming signalling assignment data is correct.
2. Check that none of the stations are in call transfer/follow me mode.
3. Check that none of the stations are in Do-Not-Disturb mode, i.e. DND LED is off.

3.5.24 Exchange Line Request

1. Check station A wiring.
2. Check that system programming data is correct.
3. Replace station A.
4. Replace the relevant STB-BN-A board (refer to Note 1, Section 3.4.4.)

3.5.25 Access Barring by Digit Analysis

1. Check the programming. Check station allocation to class of service and data needed for barring.
2. Check that the programmed data agrees with the sales form.

3.5.26 External Paging

1. Check that the paging signals appear at the SDF and the control lines operate correctly at the SDF. If they do then the fault is in the paging amplifier or external speakers in which case the repair is the customer's responsibility.
2. Replace PGB-BN-A daughter board on TSB-BN-A.
3. Replace TSB-BN-A board.
4. Replace CPB-BN-A board.

3.5.27 PABX Recall

1. Check that the system is programmed for the type of recall required by the PABX line.
2. If earth recall is required check that the earth is provided and has been wired up correctly on the SDF.
3. If switchhook flash is required check that the switchhook flash timer has been programmed correctly.
4. If 2 and 3 are correct and problem still exists replace the relevant LNB-BN-A board corresponding to the line on which the PABX recall fails (refer to Note 2, Section 3.4.4.).
5. Replace CPB-BN-A board.

3.5.28 Off-Hook Signalling

1. Check that the system programming for off-hook signalling is correct.
2. Replace station A.

3.5.29 Call Details Recorder

1. Check that the jack assembly is connected to the CDRB-BN-A board in the main equipment.
2. Check that the printer is connected to the jack assembly via an RS-232C cable.
3. Check that printer power is on. The printer is on-line and that the printer is not out of paper.
4. Replace CDRB-BN-A board.
5. Replace the jack assembly.
6. Replace RS-232C cable and printer.

3.5.30 Printer In Service

1. Check that the printer is set for 7-bit ASCII, even parity and that the baud rate on the CDRB-BN-A board is set to match the printer.
2. Replace the CDRB-BN-A board.
3. Replace RS-232C cable and printer.

STATION TESTS

3.5.31 Line Keys

1. Check the wiring from the main equipment. Check that the station voltages are correct according to the table in 3.5.1.
2. Check line cord connection and plug wiring according to the table in 3.5.1.
3. If the LED doesn't light, check ribbon cable between keyboard assembly and the main PBA in the station.
4. If no dial tone check receiver and transmitter wiring.
5. If no sidetone replace station.
6. Replace relevant STB-BN-A boards (refer to Note 1, Section 3.4.4.).

3.5.32 Dialling

1. Check that all digits were dialled.
2. Check transmitter and receiver wiring.
3. If system is a BN-2464 system with more than 12 exchange lines, check XPB-BN-A boards as in 3.5.6.
4. Replace station.

3.5.33 LED Operation

1. If the LED doesn't light, check the ribbon cable between the keyboard and the main PBA in the station.
2. Replace the station.

3.5.34 Intercom

1. Check whether station has sidetone. If not check receiver and transmitter wiring as in 3.5.6.
2. Check plug and socket wiring as in 3.5.1.
3. Replace station.

3.5.35 On-Hook Operation

1. Check the speaker wiring in the station.
2. Replace the station.

3.5.36 Display

1. Check station wiring at the plug and socket according to the table in 3.5.1
2. Replace the station.

3.5.37 Handsfree Operation

1. Check the ribbon connector between the sub-base board and the main board in the station.
2. Replace the station.

3.5.38 Standard Telephone Station

1. If the standard telephone station is a DTMF telephone, check that the DTMFB-BN-A daughter board is connected to the correct position on the relevant 2WB-BN-A board.
2. Check that the standard telephone station operates correctly on an exchange line.
3. Check that the 2WB-BN-A board has been installed in the correct STB-BN-A slot in the main equipment.

4. Check that the shorting links on 2WB-BN-A are set correctly. Refer to Section 2.5.4.

5. Check the wiring from the main equipment to the station. Check wiring to RGU-AN and 2WEU-AN if installed.

6. Check open circuit voltage at the SDF. The voltage should be 39.5 ± 15.5V or 50 ± 6V if 2WEU-AN is equipped.

7. Check that the output of RGU-AN is greater than 45 volts when ringing a station.

3.5.39 Line Access

1. Check that the programming data is correct.

2. Check the ribbon connector between the keyboard and the main station board.

3. Replace the station.

3.5.40 Call Forwarding

1. Check that the system programming for executive and secretary stations is correct. In particular check that executive station has DND mode 2 or mode 3 programmed.

2. Check the ribbon connector between the keyboard and the main station board, first on the executive station, then on secretary station if necessary.

3. Replace the executive station.

4. Replace the secretary station.

3.6 REPAIR PROCEDURES

3.6.1 Printed Board Assemblies

Repair of the PBA's shall NOT be carried out on-site or in field depots. Any fault in the PBA will necessitate replacement of that assembly.

All faulty PBA's will be suitably packaged. To protect against physical damage and damage due to static discharge, PBA's must ALWAYS be packed in the conductive ANTI-STATIC bag and placed in the protective container provided with the new item. In the case of CPB-BN-A remove the battery and package separately.

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

The packaged PBA's will be promptly returned to your State Workshop on a changeover basis. A Customer Equipment Fault Report Label (E441) must be attached to all faulty PBA's and filled with as many details of the faulty condition as possible.

Each State Workshop should keep an accurate record of all PBA's dispatched and received to ensure that replacements are obtained one-for-one.

3.6.2 Other Items (Refer to Section 3.3.)

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.

All faulty items must be suitably packaged (same type of carton as supplied with a 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) must be attached to all faulty items and filled out with as many details of the fault condition as possible. Replacement items may be obtained using normal requisitioning procedures on your State Supply Branch.

4. BN-308/512 INSTALLATION AND MAINTENANCE MANUAL

4.1 GENERAL

4.1.1 Introduction

The Commander BN-308 and BN-512 are electronic key telephone systems providing three exchange lines and eight stations for the BN-308 and live exchange lines and up to twelve stations for the BN-512 system. They are electronic systems utilising hardware and software modules to provide various economical configurations. The stations have the same modern stylish appearance as the BN-824/1236/2464 stations.

The main equipment and the stations are controlled by microprocessors with masked programs providing the same wide range of facilities as for the larger BN-824/1236/2464 systems.

4.1.2 Features

4.1.2.1 General

The BN-308/512 systems share many features with the BN-824/1236/2464 systems except for those described in the following sub-sections.

4.1.2.2 Styling

The BN-308/512 Main Equipment has a slim, unobtrusive styling. The BN-308 and BN-512 use the same main equipment cabinet and power supply. The power supply and System Distribution Frame are contained in the main equipment cabinet which simplifies installation and improves the appearance of the installed system.

4.1.2.3 Modularity

The BN-308 system can be upgraded to a BN-512 system by the addition of extra line and station boards.

4.1.3 Facilities

The facilities available on the BN-308/512 are the same as the facilities available on the BN-824/1236/2464 systems except that the BN-308/512 has only one external paging zone. Please refer to Section 1.3 for further details.

4.1.4 Operating Instructions

The operating instructions for the BN-308/5 12 are identical to the operating instructions for the BN-824/1236/2464 systems (refer to Section 1.4 for further details).

4.1.5 System Components

4.1.5.1 General

The BN-308/5 12 systems are made up of the following items: Main Equipment (ME), Stations, Door Stations and Powerfail Bells. In addition the following items are available: Two-Wire Extender Unit (2WEU-AN), Tie Line Unit (RTIU) and the Ring Generator Unit (RGU-AN).

(i) Main Equipment

The main equipment consists of a top shelf containing a removable power supply. The lower section houses the printed circuit boards described in Table 4.1.5.1. The lower section also contains a removable SDF connected to the printed circuit boards by AMP CHAMP connectors.

BOARD CODE	BOARD DESCRIPTION	SYSTEM
CPB-BN-B	CENTRAL PROCESSOR BOARD (ESSENTIAL) This board contains the main CPU, ROM containing the operational program, RAM containing site dependent data and abbreviated dial numbers, real time clock, internal music-on-hold generator, system tone generators and interface circuits for external music sources, external paging and control inputs for external devices. In addition, the board contains the interface circuitry for eight key stations, crosspoint switch matrix and a dedicated microprocessor providing control of the station interfaces and crosspoint switch matrix under control of the main CPU	BN308 BN512
3LNB-BN-B	3 EXCHANGE LINE BOARD This board contains the interface circuitry for three exchange lines and a dedicated microprocessor providing communication with the main CPU, ring detection and control of both decadic and DTMF dialling.	BN308 BN512
2LNB-BN-B	2 EXCHANGE LINE BOARD This board contains the interface circuitry for two exchange lines and a dedicated microprocessor providing communication with the main CPU, ring detection and controlling both decadic and DTMF dialling.	BN512
STB-BN-B	4 WIRE STATION BOARD This board contains the interface circuitry for four key stations, crosspoint switch matrix and is controlled by the dedicated microprocessor on the CPB-BN-B board.	BN512
2WB-BN-B	2 X 4 WIRE AND 2 X 2 WIRE BOARD This board contains the interface circuitry for two key stations and two standard telephone stations, crosspoint switch matrix and a dedicated microprocessor controlling the standard telephone station interfaces. Standard telephone stations may be either decadic or DTMF telephones. For each DTMF standard telephone the DTMFB-BN-A daughter board must be attached. The key station interface and crosspoint switch matrix are controlled by the dedicated microprocessor on the CPB-BN-B board.	BN512

BOARD CODE	BOARD DESCRIPTION	SYSTEM
2WRGB-BN-B	2 X 2 WIRE AND RING GENERATOR BOARD This board contains the interface circuitry for two standard telephone stations, ring generator for producing ring voltage to the standard telephone stations and a dedicated microprocessor controlling the standard telephone station interfaces and ring generator. Standard telephone stations may be either decadic or DTMF standard telephones. For each DTMF standard telephone the DTMFB-BN-A daughter board must be attached. The crosspoint switch matrix is controlled by the dedicated microprocessor on the CPB-BN-B board.	BN512
DST-BN-B	DOOR STATION BOARD This board contains the interface circuitry for two door stations and a dedicated microprocessor controlling the interlaces. This board is a daughter board for the CPB-BN-B.	BN308 BN512
CDRB-BN-B	CALL DETAILS RECORDER BOARD This board contains the interface to a printer for the generation of a record of incoming and outgoing calls. A dedicated microprocessor controls the printer interface. This board is a daughter board for the CPB-BN-B.	BN308 BN512
DTMFB-BN-A	DTMF RECEIVER BOARD This board contains a DTMF receiver allowing DTMF standard telephone stations to be connected to the BN5 12 system. This board is a daughter board for 2WB-BN-B and 2WRGB-BN-B.	BN512

TABLE4.1.5.1 BN-308/512 PBA DESCRIPTIONS

(ii) Stations

There are three types of stations, On-hook and Handsfree stations, both available in 3 or 5 line versions, and Door Stations.

On-hook and Handsfree stations are the same as the stations used in the BN-824/1236/2464 systems except for the number of exchange line keys.

Door stations are exactly the same as the door stations used in the BN-824/1236/2464 systems.

(iii) Other Components

Other components for the BN-308/512 systems are common with the BN-824/1236/2464 systems. These include the Test and Programming Unit (TPU-BN), Powerfail Board (PFB-BN-A), Tie Line Unit (RTIU), Ring Generator Unit (RGU-AN), Two Wire Extender Unit (2WEU-AN), Powerfail Bell, Headset Adaptor Kit (HAK-BN-A) and customer provided optional equipment.

4.1.5.2 **System Block Diagram**

Fig. 4.1.5.2 shows the main components of the system and their interconnection. The system block diagram is essentially the same as the BN-824/1236/2464 systems.

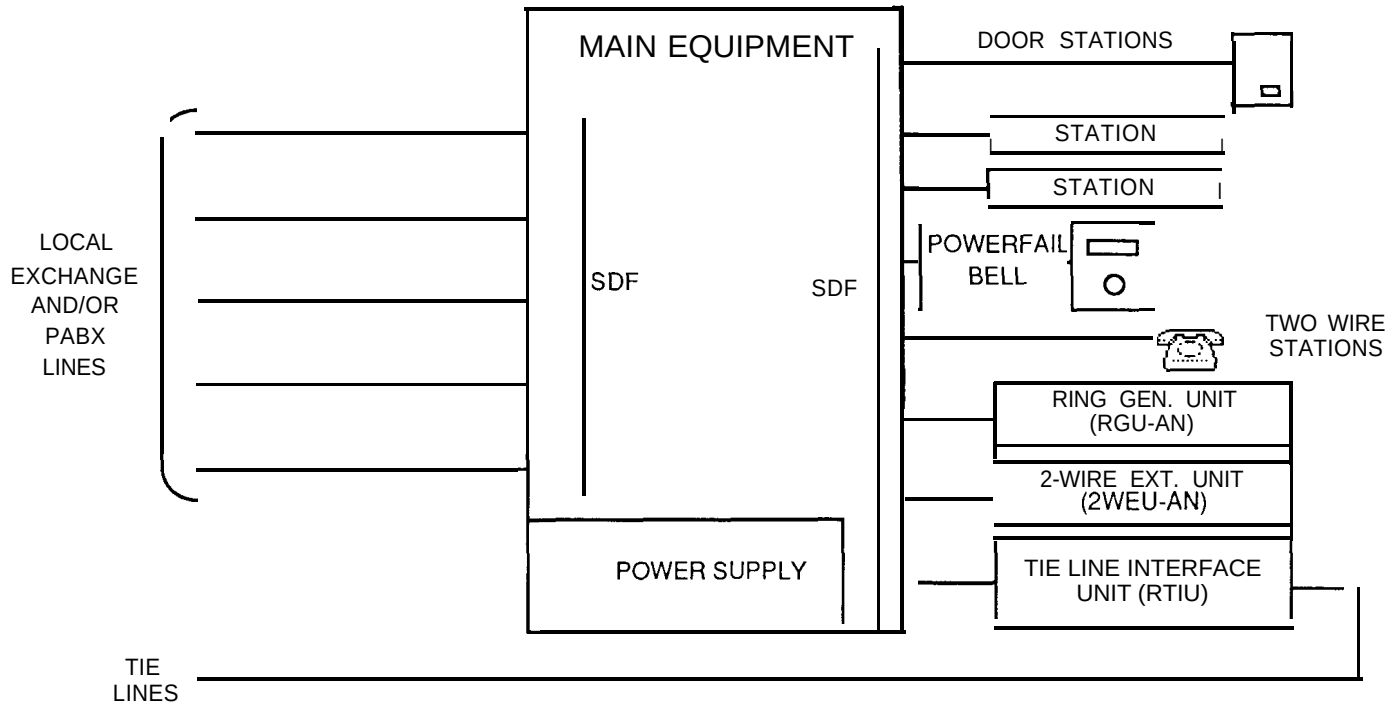


FIG. 4.1.5.2 SYSTEM BLOCK DIAGRAM

4.1.5.3 **Main Equipment Block Diagram**

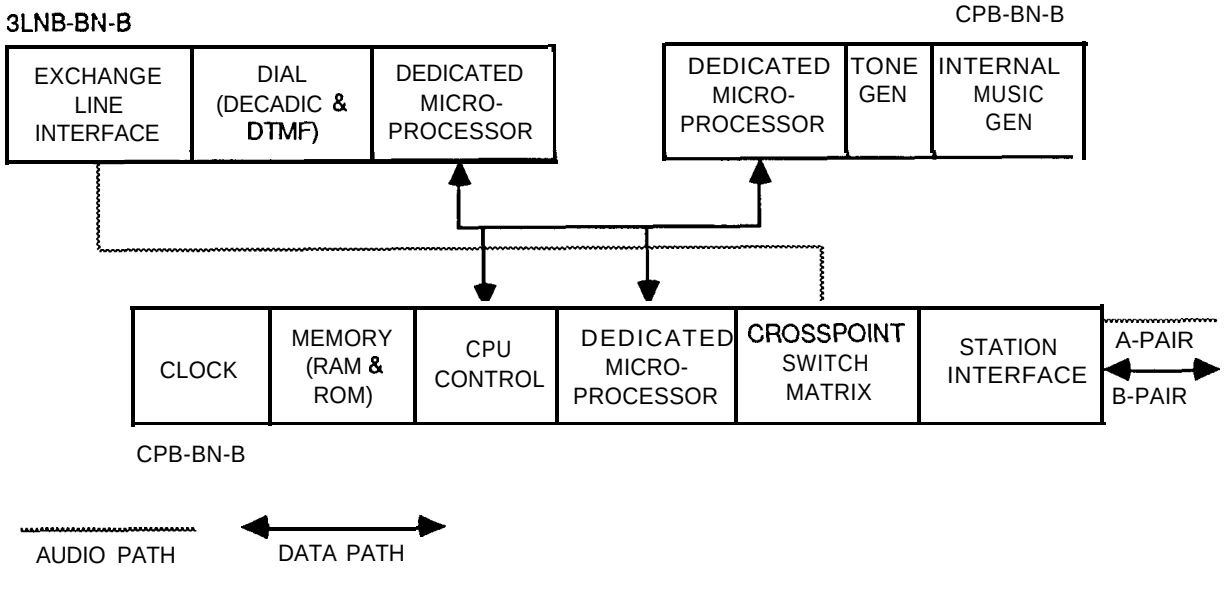


FIG. 4.1.5.3(a) BN-308 MAIN EQUIPMENT BLOCK DIAGRAM

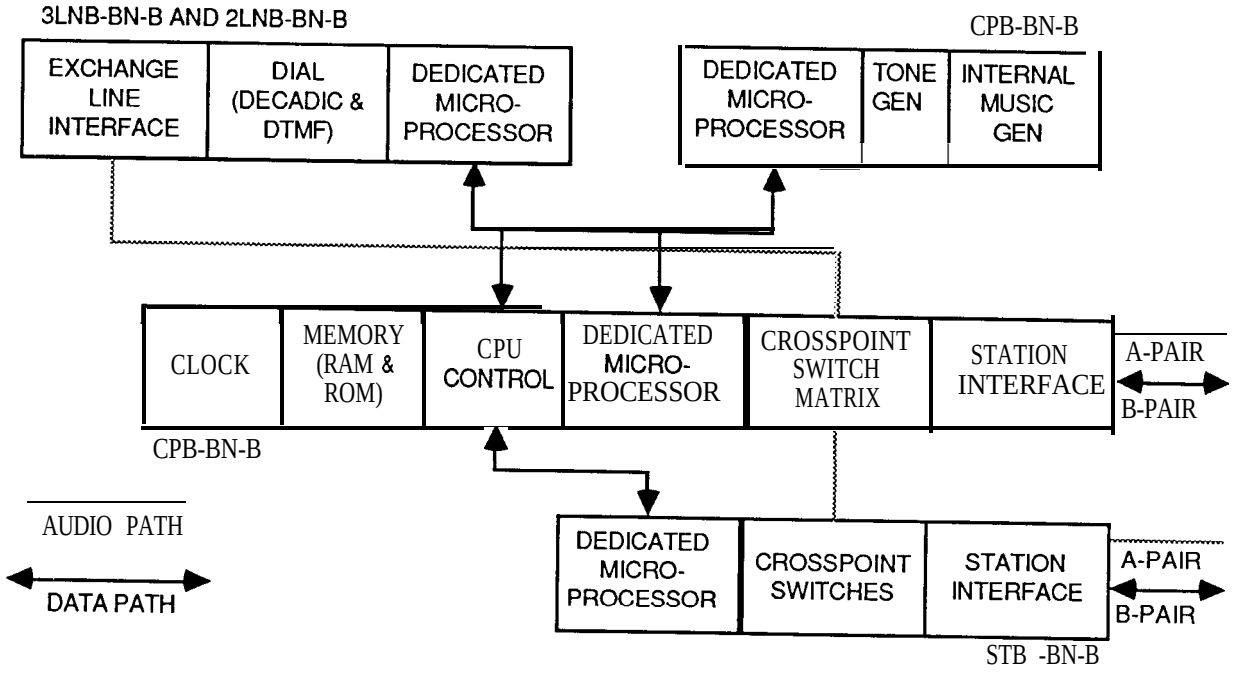


FIG. 4.1.5.3(b) BN-512 MAIN EQUIPMENT BLOCK DIAGRAM

CPU Control is provided by a Z80 microprocessor, 64K ROM program memory, 16K RAM site dependent data, 4.0MHz clock and timing and control circuitry.

The clock circuit maintains a real-time clock used to update the clock display on the Handsfree station and for the Call Details Recorder.

The Dedicated Microprocessor on CPB-BN-B controls the key station interfaces and crosspoint switch matrix on CPB-BN-B, STB-BN-B, 2WB-BN-B and 2WRGB-BN-B.

The Dedicated Microprocessors on 3LNB-BN-B and 2LNB-BN-B control the exchange line interfaces.

Dial Control generates the required decadic and DTMF signals. The DTMF signal is routed through a crosspoint switch to the required exchange line. The decadic dial data directly controls the dialling relay in the exchange line interface.

Exchange Line Interface provides the D.C. loop termination of the exchange line, ring detect circuit, audio coupling transformer, dialling relay, grounding relay and line surge protection.

Crosspoint Switch Matrix is made up of semiconductor crosspoints which switch on or off under microprocessor control to provide audio connections between various parts of the system.

Station Interface provides circuits for transmission of voice and serial data to and from the stations.

Tone Generator provides the required system tones.

Internal Music Generator contains a music generating circuit, a switch for selecting either internal or external Music-On-Hold and a level control. In addition, there are interfaces for external Music-on-Hold and Background Music sources with a level control. An external paging interface circuit is also provided.

4.1.5.4 Station Block Diagrams

Station Block Diagrams are identical to the BN-824/1236/2464 station block diagrams (refer to Section 1.5.4).

4.1.5.5 **Two-Wire Standard Telephone Station Interface Block Diagram.**

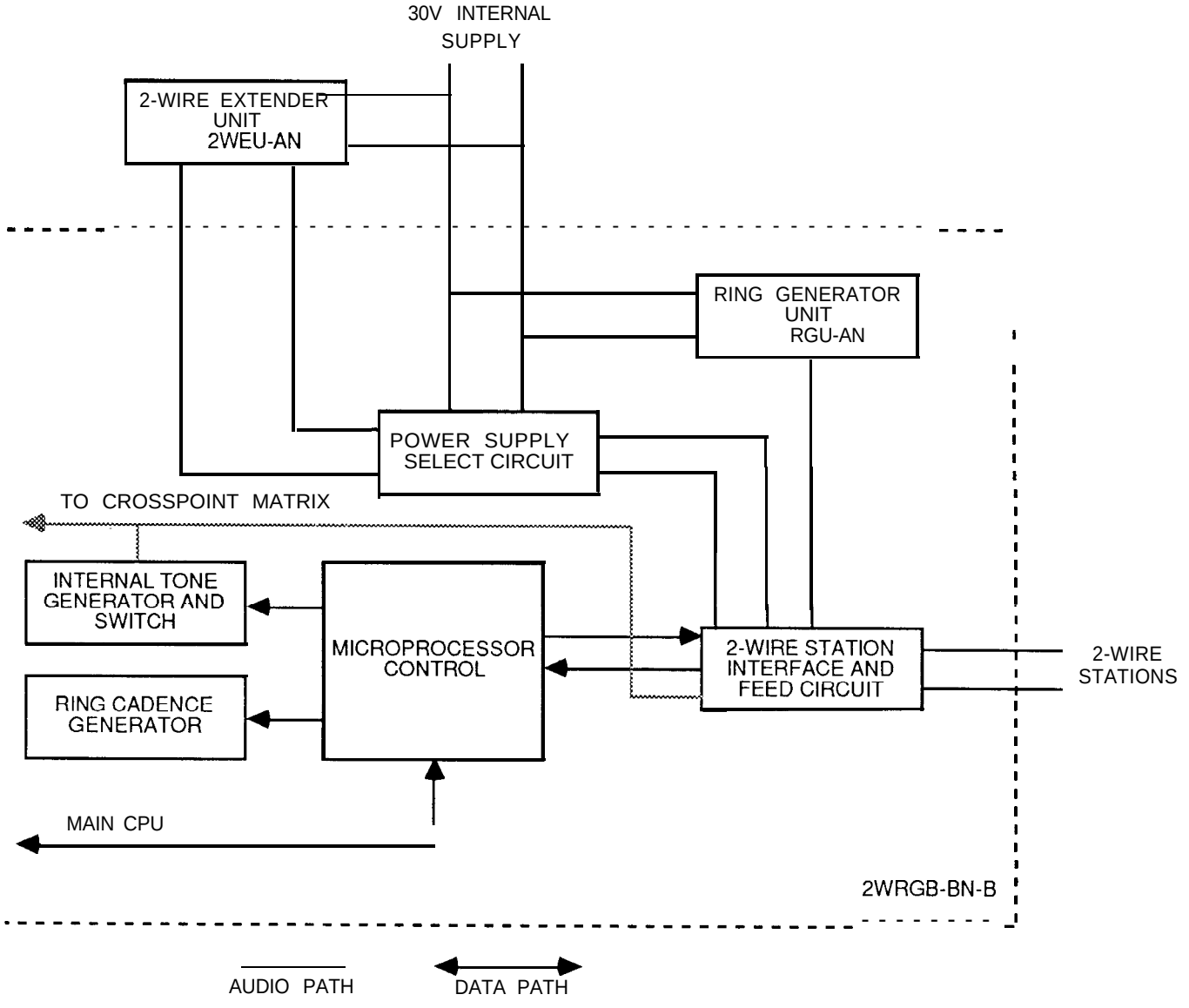


FIG. 4.1.5.5.(a) 2WRGB-BN-B TWO WIRE AND RING GENERATOR INTERFACE BLOCK DIAGRAM

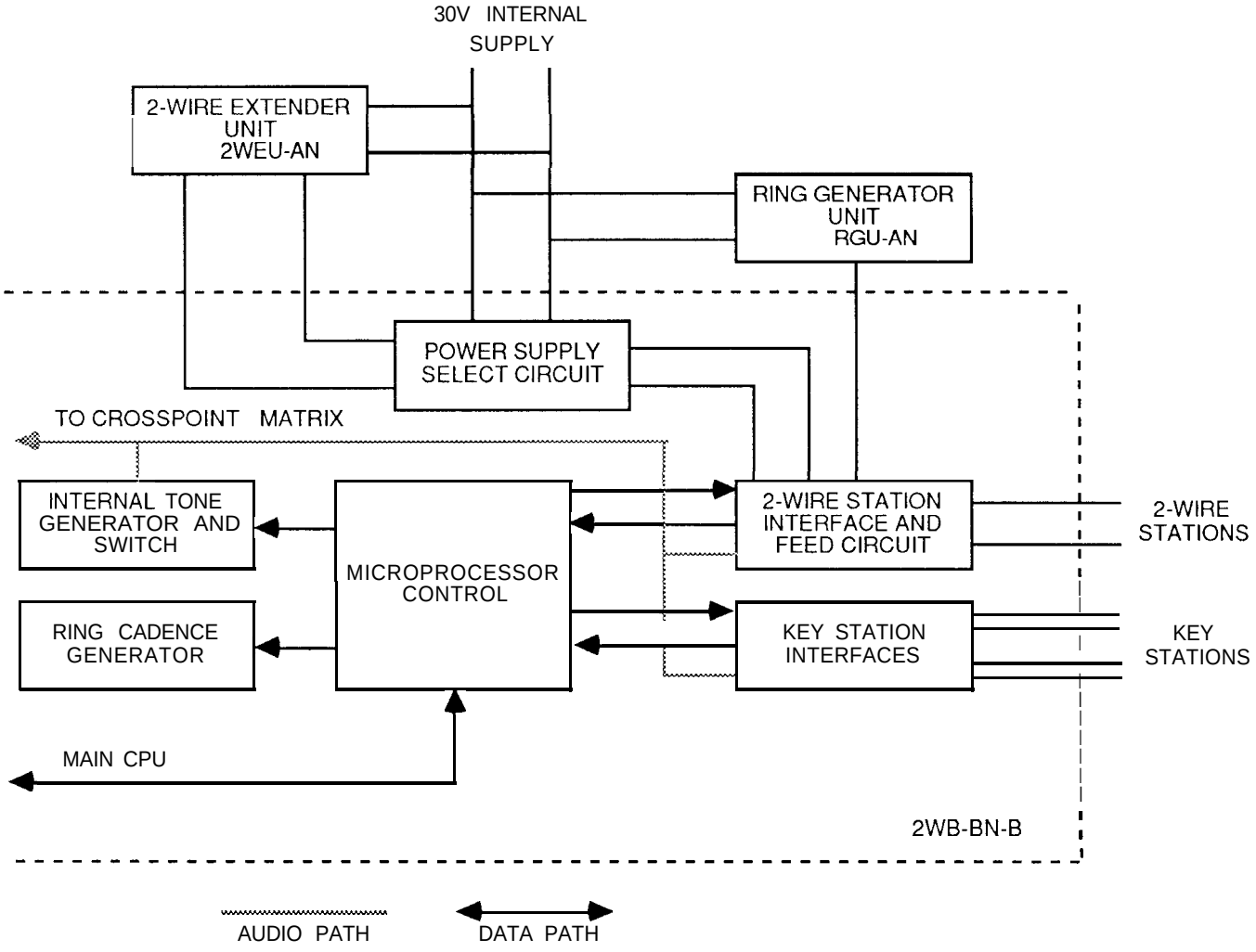


FIG 4.1.5.5(b) 2WB-BN-B TWO-WIRE AND KEY STATION INTERFACE BLOCK DIAGRAM

Two-Wire Station Interface and Feed Circuit provides the audio path, D.C. power supply and the ring connection for a standard telephone station.

Key Station Interface provides the transmission of audio and serial data to and from the key stations on 2WB-BN-B boards only.

The Microprocessor Control is provided by a dedicated 4-bit microprocessor controlling the standard telephone station interfaces, internal tones and ring cadence generation.

The Two-Wire Extender Unit (2WEU-AN) is a D.C./D.C. converter that increases the voltage supplied to the standard telephone station in order to enable it to operate over distances up to 8.5km.

The Ring Cadence Generator provides the Microprocessor Control with a signal to switch the 25Hz ring signal sent to the station.

The Ring Generator Unit (RGU-AN) consists of an oscillator, an amplifier, and a transformer which provides a signal for ringing the standard telephone station. On 2WRGB-BN-B, the ring generator unit is provided on the board.

The Internal Tone Generators and Switch Circuits provide the tone sent to the station under the control of the microprocessors.

4.1.5.6 Call Details Recorder Board (CDRB-BN-B) Block Diagram

The call details recorder board block diagram is exactly the same as the BN-824/1236/2464 Call Details Recorder Board (CDRB-BN-A) block diagram (refer to Section 1.5.6).

4.1.6 System Capacities and Limits

4.1.6.1 System Capacities

	BN-308	BN-512
Total Exchange Lines	3	5
Exclusive Lines	3(Note)	5 (Note)
Intercom Links	2	2
Background Music Link	1	1
Stations	8	12
Door Stations	2	2

NOTE: Any exchange line can be assigned as an exclusive line, up to the maximum of 3 for the BN-308 and 5 for the BN-5 12.

4.1.6.2 System Limits

ITEM	SPECIFICATION
Max. Loop Limits Key Stations Two-Wire Extensions Two-Wire Extensions with two wire extender unit (2WEU-AN)	 52 ohms (300m 0.5mm cable) 300 ohms (1.7km 0.5mm cable) 1500 ohms (8.5km 0.5mm cable)
External Music Inputs Input Impedance Required Input Level	 600 ohms – 10 dBm from a source less than 600 ohms
External Paging Output Output Impedance Output Level	 600 ohms – 10 dBm into an impedance greater than 600 ohms
Power Requirements AC Mains Voltage Max. Power Dissipation	 225 to 270V (rms) at 50Hz 162VA
Operating Temperature Systems Stations	 0°C to +45°C 0°C to +45°C
Relative Humidity	1 0% to 95%
Weight BN-308/5 12 Main Equipment Stations	 14.0kg 1 .0kg

4.1.7 Mechanical Drawings

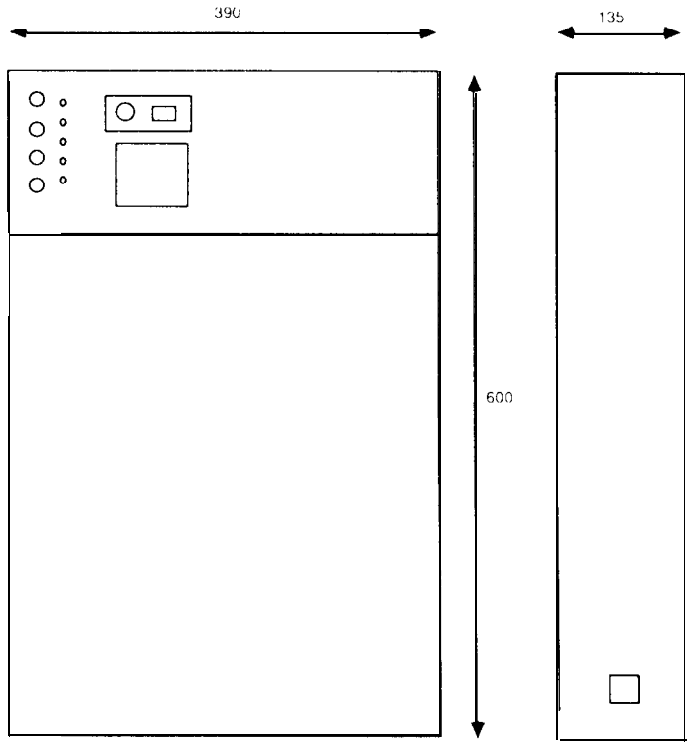


FIG. 4.1.7.1 ME-BN308512 MAIN EQUIPMENT

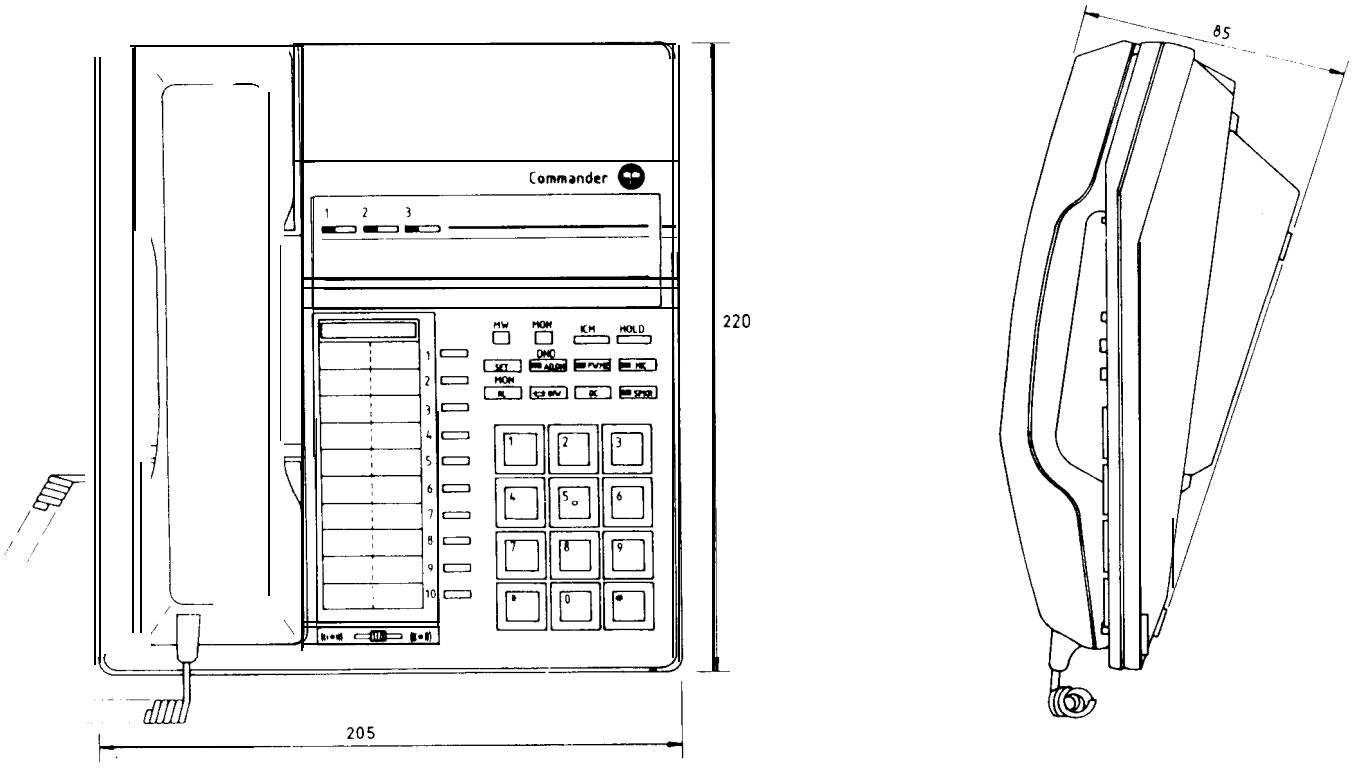


FIG. 4.1.7.2 TS-BN308-OH STATION

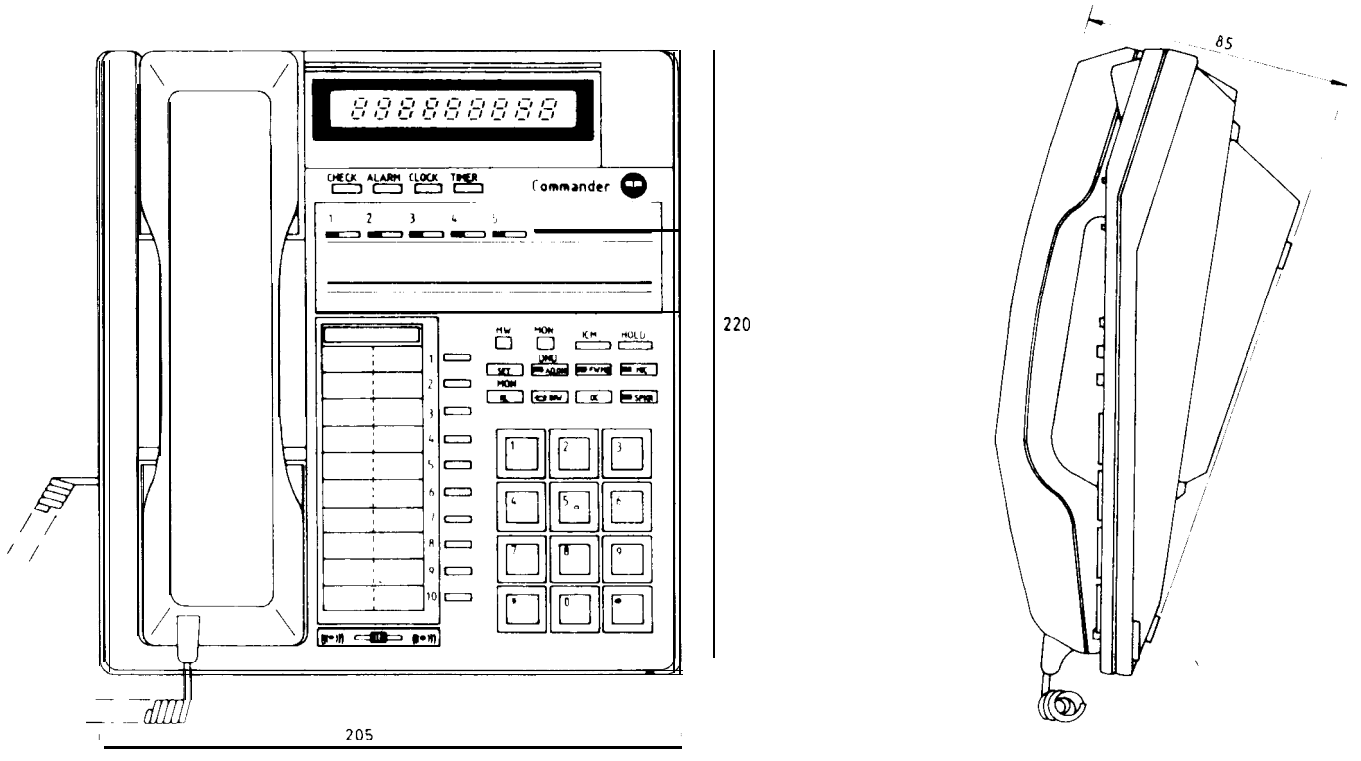


FIG. 4.1.7.5 TS-BN512-HF STATION

4.2 BN-308/512 INSTALLATION

4.2.1 Introduction

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

1. The necessary equipment must be ordered using the Sales Form.
2. Mount components, Main Equipment and Stations, Powerfail Bells, Ring Generator Unit and RTIU.
3. Cable the site.
4. Terminate cables at ME, 610 Sockets, Powerfail Bells, Ring Generator Unit, RTIU, External Music Source, External Paging Loudspeaker.

   Surge protection must be provided.
5. Power-up the system.
6. Check cabling by measuring voltages at 610 sockets.
7. Connect Powerfail Dials or Headset Adaptor Kits to the appropriate stations. Plug in stations.
8. Programme the system using information provided on the sales form.
9. Carry out the functional test to ensure the system is operating correctly (refer to Section 2.8.).
10. Complete the site records.

Details required to perform the above procedure are described in the following sections.

4.2.2 Sales Information

The Telephone Order for any Small Business System will be accompanied by a Small Business System Order.

Sales staff, after consultation with the customer, should 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. Note that the basic package forms part of 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 BN TELEPHONE SYSTEM ORDER

Telecom Australia

Refer instructions on reverse

MODEL BN308

Tick required boxes

CUSTOMER'S NAME

ADDRESS

TOWN OR SUBURB

POSTCODE

NATURE OF BUSINESS

CUSTOMER CONTACT | TELEPHONE

SALES CONTACT | TELEPHONE

STD CODE | SERVICE NO | IF OFF PBX PBX EXTN | INSTAL REQ DATE D D M M Y Y

APP'N DATE D D M M Y Y | SERVICE ORDER No A NUMERIC | DATE ORDER ISSUED D D M M Y Y | DATE COMPLETED D D M M Y Y

PAYMENT METHOD

- ☐ Sale (other than deferred payment)
- ☐ Rental
- ☐ Deferred payment

TYPE OF INSTALLATION

- ☐ *New* Commander
- ☐ In-Situ — STD CODE — PREVIOUS TELEPHONE No — IF OFF PBX
- ☐ Privately owned

TYPE OF INSTALLATION

- ☐ *New* Service
- ☐ Removal of Service
- ☐ Replacement for (type or model)

(Specify type and model)

TARIFF SECTION

		Qty.	PRODUCT CODE
Section 1	Basic Package		

	PRODUCT TARIFF CODE
Section 2	

CENTRAL EQUIPMENT

	Qty.	PRODUCT CODE
2-Wire/Module (2x2W)		
2-Wire Tone Rec. Module		
Doorstation Module		
Expansion Assembly (reqd. for 2-Wire Stations)		
Call Details Recorder Module		
2-Wire Extender Unit		
Tie Line Interface Unit		
Tie Line Connector Module		

STATION INSTRUMENTS (Do not include package instruments)

On Hook Stations		
Handsfree Stations		
Powerfail Module		
Door Station		
2-Wire Stations		

SYSTEM OPTIONS

Powerfail Bell		
Ext. Paging Module		
C.D.R. Printer		

STATION OPTIONS

Headset Adaptor Kit		
Extension Alarm		

INSTALLERS ONLY

(Enter Tariff Details on *BUSINESS OFFICE COPY* 4)

SUMMARY OF SYSTEM REQUIREMENTS

☐	Exchange Line	
☐	Tie Lines — Non PABX	
☐	— PABX	
☐ ☐	Stations — Total	

Tick if required		Permit No.	Service Order No.
☐	External Music Source		
☐	External Alarm		
☐	External Paging		
☐	Private CDR Printer		

Permit No. MUST accompany Service Order No.

INSTALLING OFFICERS COPY 1

COMMANDER TELEPHONE SYSTEM ORDER MODEL ☐ BN308

Telecom Australia

Customers Name	Service No.	Service Order No

EXCHANGE LINE EASED OPTIONS

EXCH. LINE	EXCH/TIE LINE DETAILS: Tie Line (.)	Service No	Service Order No.	01. EXCH LINE ASSIGNMENT: Line Type (1)	Signalling Type (0)	Line Request Group (1)	PABX Night (0)	PABX Recall (0)	02. EXCH. GROUP ASSIGN: Grp. No	Start Line (01)	End Line (max)	03. EXCH LINE ASSIGNMENT: CDR Print Out (0)	FAX Data Line (0)	Common Line (0)	58. EXCH. LINE RING (0)
01									01						
02									02						
03									03						
04									04						
05									05						
									06						
									07						
									08						

- Tie Line: 0 = no line; 1 = Exch/Tie; 2 = (resvd); 3 = PABX line. If PABX lines connected 43 Sheet 3 must be completed
- Service No: 0 = Decadic; 1 = Tone
- Signalling Type: 0 = no group; 1 = group 1; 2 = group 2; 3 = group 3; 4 = group 4
- Line Request Group: 0 = no; 1 = yes
- PABX Night: 0 = Hook Flash; 1 = Earth
- Grp. No: * Enter Start and End Exch. Line No 01-08; * Max 8 Groups; * Exclusive lines assign 1 line to group; * Groups may overlap or be nested
- CDR Print Out: 0 = yes; 1 = no
- FAX Data Line: 0 = no; 1 = yes
- Common Line: 0 = no; 1 = yes
- 58. EXCH. LINE RING: 0 = Normal Ring; 1 = Alt Ring

STATION BASED OPTIONS

STN.	DESIGNATION AND/OR LOCATION	STN. TYPE	04. PRIOR BREAK -IN (0)	06. LINE GROUP O/G: 1st Exch Group (01)	2nd Exch Group (00)	07. LINE GROUP I/C: 1st Group Exch Line Group (01)	1st Group Signal Mode (0)	2nd Group Exch Line Group (00)	2nd Group Signal Mode (0)	08. EACH STN ASSIGNMENT: Night Rest (0)	Key Tone (1)	Stn. Type (0)	DND (0)	Page Zone (0)	40. ACCESS CLASS (0)	53. AUDIBLE SIGNAL FOR EXTERN. ALARMS (0)
10						1-		2-								
11						1-		2-								
12						1-		2-								
13						1-		2-								
14						1-		2-								
15						1-		2-								
16						1-		2-								
17						1-		2-								
18						1-		2-								
19						1-		2-								
20						1-		2-								
21						1-		2-								

- STN. TYPE: KS H/F; KS O/H; KS P/F; 2-W DEC; 2-W TONE
- 04. PRIOR BREAK -IN: 0 = none; 1 = All calls; 2 = ICM calls; 3 = Off hook signalling
- 06. LINE GROUP O/G: 1st Exch Group / 2nd Exch Group: Exch group assigned in 02.
- 07. LINE GROUP I/C: 1st Group / 2nd Group: Exch group assigned in 02.: 0 = none; 1 = day; 2 = night; 3 = 1+2
- 07. LINE GROUP I/C: Signal Mode: 0 = no; 1 = yes
- 08. EACH STN ASSIGNMENT: Night Rest: 0 = no; 1 = yes
- 08. EACH STN ASSIGNMENT: Key Tone: 0 = key; 2 = 2W Dec.; 3 = 2W Tone
- 08. EACH STN ASSIGNMENT: Stn. Type: 0 = no; 1 = Exch; 2 = All calls; 3 = 1+2
- 08. EACH STN ASSIGNMENT: DND: 0 = none; 1 = Zone 1; 2 = Zone 2; 3 = Zone 3; 4 = Zone 4
- 08. EACH STN ASSIGNMENT: Page Zone: 0 = No restriction; 1 = Barred ISD; 2 = Limited ISD + STD; 3 = Barred ISD + STD; 4 = PABX calls only; 5 = Intercom calls only
- 40. ACCESS CLASS: 0 = no; 1 = yes
- 53. AUDIBLE SIGNAL FOR EXTERN. ALARMS: 0 = no; 1 = yes

CDR PRINTOUT OPTIONS (See 03. sheet 2 also)

INCOMING CALLS

	Print all incoming calls
	Print incoming calls only if Account Code entered

ACCOUNT CODE FACILITY

	Provided		Not Provided
	Compulsory		Optional
	2 Wire Stn. provided with Account code facility		
	2 Wire Stn. not provided with Account code facility		

OUTGOING CALLS

Time delay for recording call duration

	1 Sec., or 5 Secs after dialling completed
PRINT OUTGOING CALLS	
	All outgoing calls, or exceeding 1 minute duration
60.	Exceeding specified number length .....
	— PABX Calls printed
	— Barred Stations outgoing calls printed
59.	Station for non-printing

COMMANDER TELEPHONE SYSTEM ORDER MODEL ☐ BN308

Telecom Australia

Customers Name	Service No.	Service Order No.

PROGRAMMABLE OPTIONS

09. CALL FORWARDING PAIRS

Pair	EXEC No.	SEC No
1	—	—
2	—	
3	—	—
4	—	—
5	—	
6	—	
7	—	—
8	—	

Exec. Stns. must be assigned DND (see 08. sheet 2)

11. GROUP ASSIGNMENT FOR PILOT NO. CALL

Pilot No.	Stations assigned to Pilot group.			
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				

12. STN. RECEIVING DOORSTATION CALL

Stn No
01 —
02 —
03 —
04 —
05 —
06 —
07 —
08 —
09 —
10 —

SYSTEM BASED OPTION

No.	Facility	Data	Initial	Notes
15.	Tenant Working		(o)	0 disabled 1 enabled
16.	Off-hook Signalling on incoming Exch. calls		(o)	0 disabled 1 enabled
17.	Assigning Night Service		(o)	0 one night mode 1 grouped night mode
19.	Assigning External Paging Zones for all Call Paging		(o)	0 No. ext zone activated 1 Ext. zone 1 activated
20.	Automatic Incoming Exchange Call Pick-up		(o)	0 disabled 1 Exch. group answer 2 audible answer
22.	Exclusive Hold		(1)	0 disabled 1 enabled
23.	Timed Flash for PABX		(01)	0 disabled 01-20 (100m/sec - 2 sec)
24.	ICM Call Mode		(o)	0 Voice call 1 Signal call
26.	External Music Source		(o)	0 Not connected 1 Connected
27.	Room Monitoring		(o)	0 disabled 1 enabled
32.	Doorstation Chime		(o)	0 twice 1 30 sec.
47.	Auto. Pick-up of I-Hold Line		(o)	0 disabled 1 enabled
52.	Splash Tone on Paging		(1)	0 disabled 1 enabled
57.	Increase Intercom Links		(00)	Enter the first Exchange No. to be converted to an Intercom Link.

TIMERS

Timer	Initial	Required
35. Exclusive Hold Recall Timer	90 Sec.	
36. Recall Duration for Exclusive Hold	20 Sec.	
37. I-Hold Recall Timer	90 Sec	
38. Release Time of Ring Inward	40 Sec.	
39. I-Hold Transfer Timer	40 Sec.	

ACCESS BARRING PERMIT CODES

41. Allowed STD/ISD Codes	**44.** Common Allowed Codes
	(000)
	(008)
	(019)
	vacant
	(4 digits max)

43. PABX Access Codes

(8 digits max) *(2 digits max)*

18. SIGNALLING TO EXTERNAL PAGING

Ext. Paging Zone	Audible Sig. Exch Group (00)	Background Music (0)	Audible Sign. Alarm 2 (0)	Audible Sign. Alarm 1 (0)
1				
	Exch Line Group 00-08	0 None 1 Yes	0 None 1 Yes	

28. ALARM OPTION

Alarm	Required (0)	Closed/Open (0)
1		
2		
	0 No 1 Yes	0 Closed On 1 Open On

Alarm option available only if system capacity exceeds 8 Extensions

4.2.3 Location and Mounting of Equipment

4.2.3.1 General Requirements

Equipment must be located in positions that allow good access for maintenance activities.

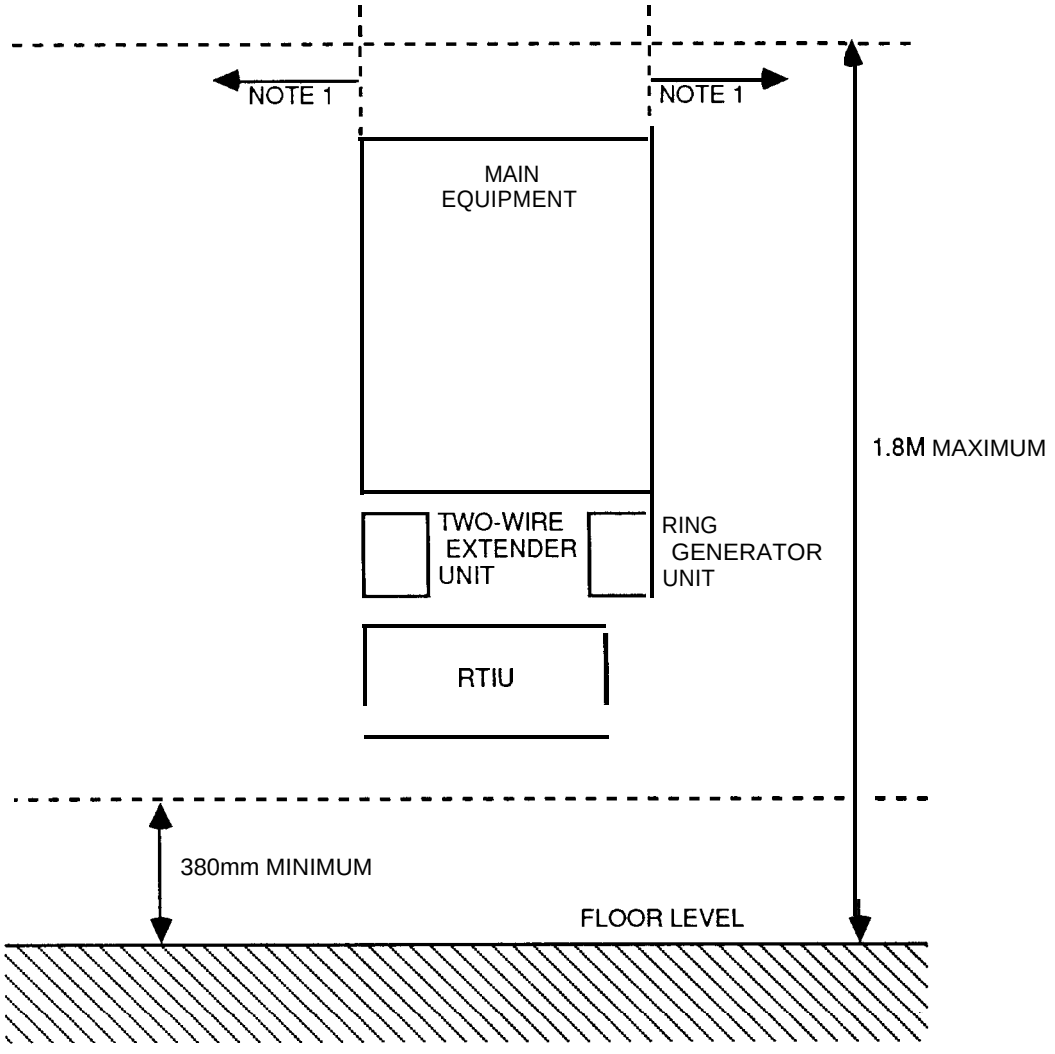
The customer is responsible for providing satisfactory lighting for installation and maintenance activities.

The customer is to provide a single phase 240V, 10 Amp, 50Hz AC general purpose power outlet within 1 metre of the equipment. The power outlet must be correctly earthed.

When wall mounting the equipment, allowance should be made for at least 300mm clear wall space on each side and 1 metre of clear floor space in front of the equipment.

Wall mounted equipment should be mounted at least 380 mm and no more that 1.8m from the floor as indicated in fig. 4.2.3.1.

Further mounting details for the main equipment are provided in Section 4.2.3.2.



Notes: 1. Minimum clearance of 300mm on each side.
2. The drawing is not to scale.

FIG. 4.2.3.1 LIMITATIONS TO WALL MOUNTING.

4.2.3.2 **BN-308/512 Main Equipment**

The BN-308/512 main equipment cabinets are wall mounted as follows. Refer to figure 4.2.3.2.

- Attach the wall mounting bracket to the wall using the five wood screws provided.
- Attach the bottom bracket to the cabinet using the screws provided ensuring that the bracket is turned upwards behind the cabinet.
- Hang the main equipment on the wall mounting bracket after removing the locking screws.
- Fasten the main equipment to the wall mounting bracket by inserting the locking screws into the sides of the main equipment.

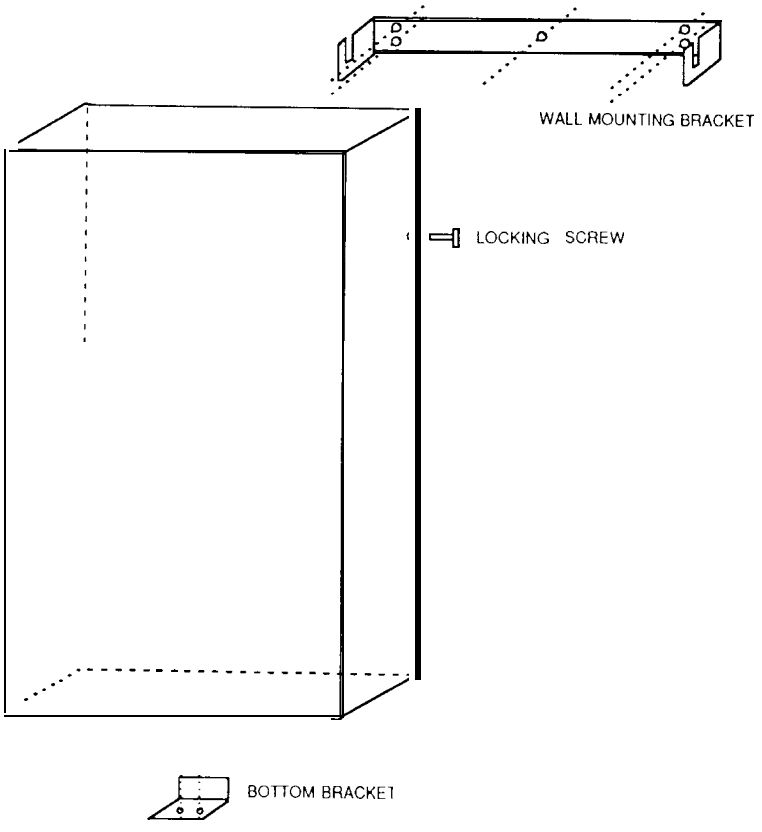


FIG 4.2.3.2 WALL MOUNTING OF MAIN EQUIPMENT CABINET

4.2.3.3 **Key Stations**

There are two types of key stations available with this system. They are Handsfree and On-Hook stations, and each are available in versions of 3 or 5 line keys. Refer to Section 2.3.5 for details of wall mounting, colour panel exchange, Powerfail Dial installation and Headset Adaptor Kit installation.

4.2.3.4 **Auxiliary Equipment**

For the installation of the following equipment refer to Sections 2.3.6, 2.3.7 and 2.3.9:

- Door Stations
- Powerfail Bells.
- Two-Wire Extender Unit (2WEU-AN).
- Station Based Alarm.
- Tie Line Unit. (RTIU).
- Ring Generator Unit.

4.2.3.5 **Call Details Recorder**

The jack assembly is mounted on the main equipment to provide a connection for the RS-232C cable to the printer. Any printer providing 80 column width and a standard RS-232C interface with 7 bit word, even parity and 150, 600, 1200, 2400, 4800, 9600 or 19200 baud may be used. The switch must be set to OUT OF SERVICE when the printer paper is being changed, then set back to IN SERVICE when the printer paper is lined up for the top of the page and the printer is ready.

Remove the plastic cover on the right hand side of the Main Equipment and replace with the jack assembly as shown in figure 4.2.3.5. Plug the ribbon cable from the jack assembly into connector CN1 of the CDRB-BN-B board.

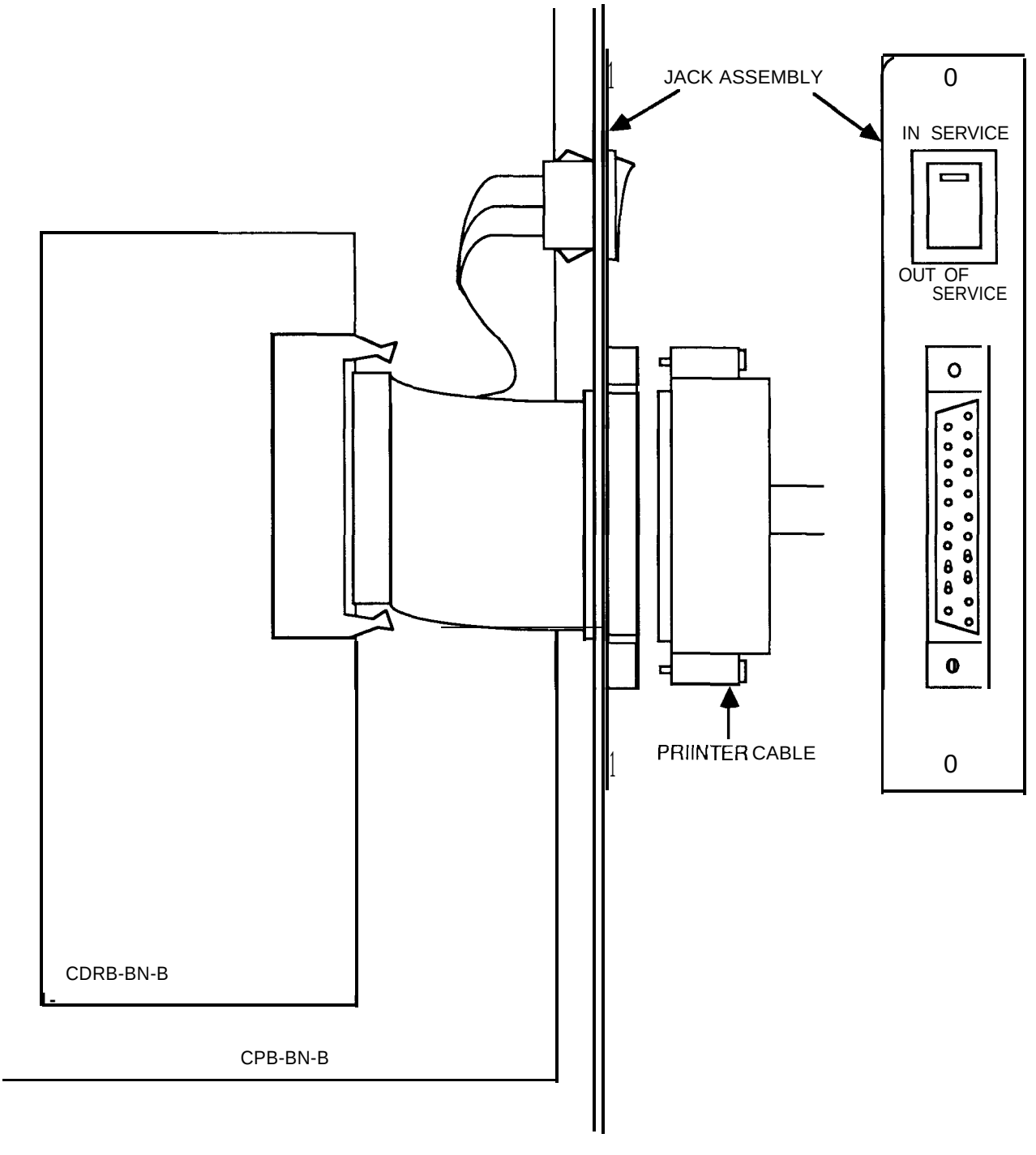


FIG. 4.2.3.5 MOUNTING OF JACK ASSEMBLY

4.2.4 Cabling and Terminations

4.2.4.1 Cabling Scheme

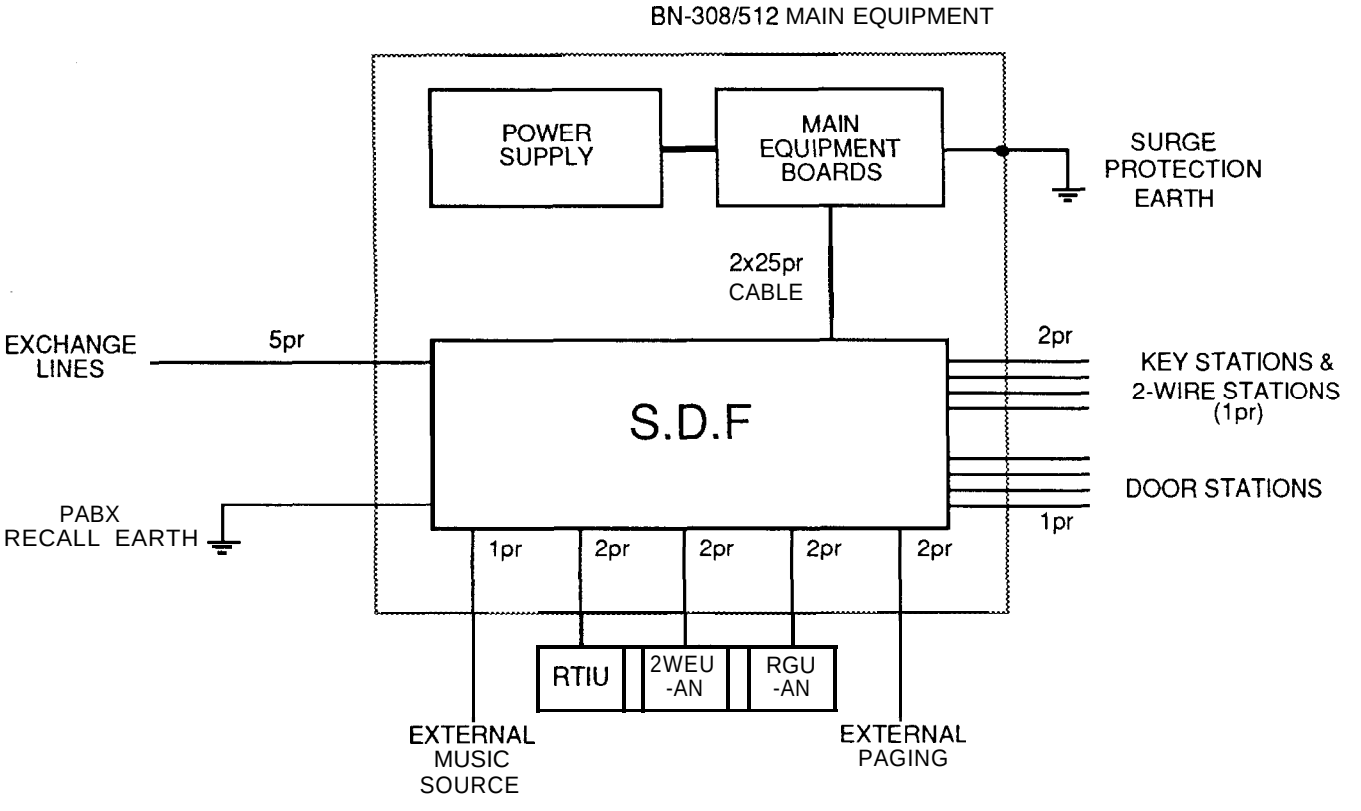


FIG 4.2.4.1 CABLING SCHEME FOR BN-308/512

4.2.4.2 System Distribution Frame Cabling

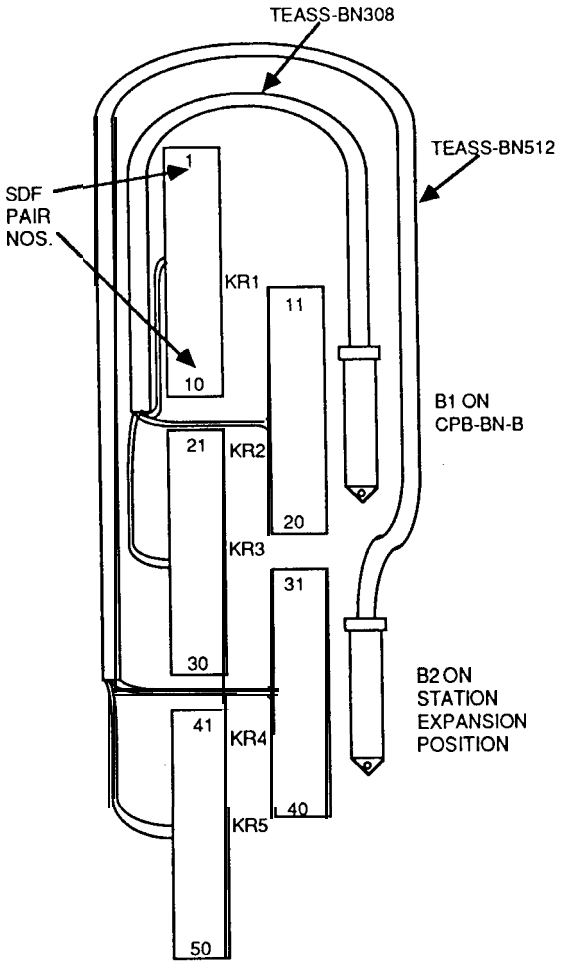
The SDF uses the LSA plus terminating system. Refer to TPH0216 “LSA Plus Terminating System”.

Wire designations for the systems are listed in Table 4.2.4.2(b).

Cabling to the stations and optional equipment should be terminated in accordance with the requirements listed on the sales form. This cabling should be terminated on the left hand side terminals of each module. All external cabling should be fixed using the cable clamp on the left hand side of the main equipment cabinet.

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

Connections from 3LNB-BN-B and 2LNB-BN-B boards to the SDF are factory wired for both the BN-308 and BN-512 Systems. However, if the 2LNB-BN-B is added during a system expansion the 2LNB-BN-B connections have to be made. A length of two-pair cable is recommended for these connections. Both the 3LNB-BN-B (for maintenance only) and 2LNB-BN-B connections are shown in Table 4.2.4.2(a). NOTE that connections to the SDF should be made on the right-hand side of the Krone blocks. The ribbon cable provided with the 2LNB-BN-B must also be connected between 2LNB-BN-B and the corresponding terminal on the 3LNB-BN-B.



NOTE:

TEASS-BN308 ASSEMBLY IS EQUIPPED IN BOTH BN-308 AND BN-512 SYSTEMS. TEASS-BN512 ASSEMBLY IS EQUIPPED IN THE BN-512 SYSTEM ONLY. WHERE AN EXISTING BN-308 SYSTEM IS TO BE EXPANDED TO A BN-512 THE TEASS-512 ASSEMBLY MUST BE PROVIDED WITH THE EXPANSION PACKAGE. CABLING FOR LINES 4 AND 5 MUST ALSO BE PROVIDED BETWEEN KRN1 ON 2LNB-BN-B AND SDF PAIRS 49 AND 50.

FIG 4.2.4.2 BN-308/512 SYSTEM DISTRIBUTION FRAME

BOARD	BOARD KRN TERMINAL NO.	SDF PAIR
3LNB-BN-B	1 2	19
	3 4	20
	5 6	30
	— 8	10
2LNB-BN-B	1 2	49
	3 4	50

TABLE 4.2.4.2(a) 3LNB-BN-B and 2LNB-BN-B connections

KR1		
SIGNAL	SDF PAIR	DESC
STA 10	1	10WT 10BL
	2	10RD 10BK
STA 11	3	11WT 11BL
	4	11RD 11BK
STA 12	5	12WT 12BL
	6	12RD 12BK
STA 13	7	13WT 13BL
	8	13RD 13BK
— —	9	— —
— ER	10	— EARTH

KR2		
SIGNAL	SDF PAIR	DESC
STA 14	11	14WT 14BL
	12	14RD 14BK
STA 15	13	15WT 15BL
	14	15RD 15BK
STA 16	15	16WT 16BL
	16	16RD 16BK
STA 17	17	17WT 17BL
	18	17RD 17BK
LN1	19	L1A L1B
LN2	20	L2A L2B

KR3		
SIGNAL	SDF PAIR	DESC
PFB1	21	BEL1A BEL1B
PFB2	22	BEL2A BEL2B
PFB3	23	BEL3A BEL3B
DOOR1	24	DR1RD DR1BK
DOOR2	25	DR2RD DR2BK
TOBGM SOURCE	26	BGM 1 BGM 2
TO MOH SOURCE	27	MOH 1 MOH 2
TO EXT SPEAKER	28	EXT 1 EXT 2
	29	ETC 1 ETC 2
LN3	30	L3A L3B

KR4		
SIGNAL	SDF PAIR	DESC
STA 18	31	18WT 18BL
	32	18RD 18BK
STA 19	33	19WT 19BL
	34	19RD 19BK
STA 20	35	20WT 20BL
	36	20RD 20BK
STA 21	37	21WT 21BL
	38	21RD 21BK
— —	39	— —
FROM 48V SOURCE	40	EX 48V EXGND

KR5		
SIGNAL	SDF PAIR	DESC
PFB4	41	BEL4A BEL4B
PFB5	42	BEL5A BEL5B
CONTROL SOURCE1	43	CNT1A CNT1B
CONTROL SOURCE2	44	CNT2A CNT2B
	45	
	46	
	47	
	48	
LN4	49	L4A L4B
LN5	50	L5A L5B

NOTE: SDF Pair 10 on KR1 refers to Earth Recall (ER)

TABLE 4.2.4.2(b) BN-308/512 SDF CABLING

4.2.4.3 **Surge Protection**

High voltage surge protection is provided in the system. To utilise this inbuilt surge protection circuitry a telecommunications earth must be provided to the terminal marked ETH on the outside of the main equipment.

In lightning prone areas exchange lines and two-wire extensions must be protected at the point of entry or distribution in accordance with TPH 0265N0 "Lightning Protection at Customers Premises" and TPH 02 16 "LSA Plus Terminating System".

For this protection to be effective an earth must be supplied to the SDF, the resistance of which should be as low as possible and must not be greater than 30 ohms.

4.2.4.4 **Tie Lines**

For tie line connection refer to Section 2.4.7.

4.2.4.5 **Stations**

When cabling from the main equipment to the key stations take care that the pairs are correctly terminated and the polarity of the pair is correct. 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 powerfail stations.

The connections between exchange lines and stations during power failure are fixed as follows:

EXCHANGE LINE NO	STATION NO
1	10
2	11
3	12
4*	18
5*	19

*NOTE: When 2WRGB-BN-B board is equipped Lines 4 and 5 are connected to Stations 20 and 21 respectively.

TABLE 4.2.4.5 POWERFAIL STATIONS

For cabling of key stations and door stations refer to Section 2.4.8.

4.2.4.6 **Standard Telephone Stations**

Where standard telephone stations are used, 2WB-BN-B or 2WRGB-BN-B must be equipped in the station expansion position (See Figure 4.2.5.6). For 2WB-BN-B the ring generator (RGU-AN) must be mounted near the Main Equipment. For standard telephone stations with loop lengths less than 300 ohms, short out pins 1 and 2 of connectors S1 and S2 on 2WB-BN-B or 2WRGB-BN-B boards. For stations with loop lengths greater than 300 ohms refer to Section 4.2.4.8.

(i) 2WB-BN-B

2WB-BN-B provides two key station ports and two standard telephone station ports. Thus if 2WB-BN-B board is equipped in the station expansion position stations 18 and 19 would be keystations and stations 20 and 21 would be standard telephone stations. The standard telephone stations are connected to the A-pair terminals on the SDF (Pairs 35 and 37).

The Ring Generator Unit (RGU-AN) requires two pairs of conductors to connect it into the system. The 25Hz output terminals of RGU-AN are connected to the third B-pair (SDF Pair 36) in the block of four stations corresponding to the expansion position. The dc input terminals (+) and (-) of RGU-AN are always connected to the fourth B-pair (SDF Pair 38) which provides the 30V + and 30V − required by the RGU-AN.

The wiring for the 2WB-BN-B board is shown below:

SIGNAL	SDF PAIR	DESC		
STA 18	31	18WT	− WT)	A-Pair
		18BL	−BL)	Keystation No. 18
	32	18RD	−RD)	B-Pair
		18BK	−BK)	Keystation No. 18
STA 19	33	19WT	− WT)	A-Pair
		19BL	−BL)	Keystation No. 19
	34	19RD	−RD)	B-Pair
		19BK	−BK)	Keystation No. 19
STA 20	35	20WT	−WT)	To standard
		20BL	−BL)	Telephone No.20
	36	20RD	−	25Hz)
		20BK	−	25Hz) From RGU-AN
STA 21	37	21WT	−WT)	To standard
		21BL	−BL)	Telephone No. 2 1
	38	21RD	−	30V+)
		21BK	−	30V −) To RGU-AN

TABLE 4.2.4.6(a) 2WB-BN-B STATION CONNECTIONS

(ii) 2WRGB-BN-B

2WRGB-BN-B provides two standard telephone ports with inbuilt ring generator unit. Thus if 2WRGB-BN-B board is inserted into the station expansion position in the main equipment stations 20 and 21 would be standard telephone stations. The standard telephone stations are connected to the A pair terminals on the SDF (Pairs 35 and 37). NOTE that Stations 18 and 19 are not used when the 2WRGB-BN-B expansion board is equipped.

The wiring required for the 2WRGB-BN-B board is shown below:

SIGNAL	SDF PAIR	DESC.		
STA 20	35	20 WT	− WT)	To Standard Telephone
		20 BL	− BL)	Station No. 20
STA 21	37	21 WT	− WT)	To Standard Telephone
		21 BL	− BL)	Station No. 21

TABLE 4.2.4.6 (b)
2WRGB-BN-B STANDARD TELEPHONE STATION CONNECTIONS

4.2.4.7 Earth Recall

When the system is connected to a PBX and the recall facility is required, then the PBX earth must be connected to the Earth Recall (ER) terminal at the SDF. (Pair 10, second conductor).

4.2.4.8 Auxiliary Equipment

Table 4.2.4.8 details the appropriate connections for all auxiliary equipment. For details of these connections refer to Sections 2.4.10 – 2.4.13.

EQUIPMENT	SDF PAIRS	DESC	
1. Two wire extender Unit 2WEU-AN*	38	21RD 21BK	– 30V+) – 30V–) to 2WEU-AN
	40	EX 48V EX GND	– 48V+) – 48V GND) From 2WEU-AN
2. Powerfail Bells	21-23 41,42	BEL xA BEL xB	) To Powerfail Bell x)
3. External Music Source	26	BGM 1 BGM2	) To Background Music) Source
	27	MOH 1 MOH 2	) To Music On Hold source)
4. External Paging	28	EXT 1 EXT 2	) To External Paging) Amplifier
	29	ETC 1 ETC 2	) External Paging Control) Lines
5. Control Inputs	43	CNTL 1A CNTL 1 B	)) To Control/Alarm Source 1
	44	CNTL 2A CNTL 2B	)) To Control/Alarm Source 2
6. Data Communications Equipment	Refer to Section 2.4.14		

*NOTE: When 2WEU-AN is equipped links S1 and S2 must be placed in the 2-3 position on the 2WB-BN-B or 2WRGB-BN-B.

TABLE 4.2.4.8 AUXILIARY EQUIPMENT CONNECTIONS

4.2.5 Board Installation Instructions

4.2.5.1 **General**

When the BN-308 system is installed all PBA's required are already equipped in the main equipment. When the BN-512 system is installed all PBA's required are equipped in the main equipment except for the station expansion position (See Figure 4.2.5.6) which may be equipped with one of the three station option boards. These are listed below:-

OPTION	**FUNCTION**
STB-BN-B	4 Key station interfaces
2WRGB-BN-B	2 Standard telephone interfaces and Ring Generator
2WB-BN-B *	2 Key station interfaces and 2 standard telephone interfaces. *

* Requires external Ring Generator Unit (RGU-AN)

If door stations are required the DST-BN-B board must be installed. This board provides two door station interfaces and is equipped on the CPB-BN-B.

If a call details recorder is to be used with the system the CDRB-BN-B must also be equipped on the CPB-BN-B.

Before powering up the Main Equipment 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 premature failure due to static discharge, the following precautions MUST be taken:

- Always ensure that power is disconnected before handling PBAs.
- Always discharge static from yourself by touching a conductive part of the main equipment before handling boards.
- Handle PBAs by the edge only. Do not handle PBA tracks, components or edge connectors (contaminants introduced by lingers 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 inserted into a conductive ANTI-STATIC bag and placed in the protective container provided with the new item. In the case of the CPB-BN-B 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.

WIRE DESIGNATION	605 PLUG/ 6 10 SOCKET	WIRE COLOUR	DESIGNATION IN STATION
AL1	2	WT WHITE	LWT
AL2	6	BL BLUE	LBL
BD+	1	RD RED	LRD
BD-	5	BK BLACK	LBK

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. CPB-BN-B BOARDS

- If this PBA is replaced, all site dependent data and abbreviated dial numbers are lost. It will be necessary to re-programme the system.
- The battery may be changed without loss of any programmed data with the power up, i.e. power on.

4.2.5.2 CPB-BN-B

The CPB-BN-B board requires a lithium battery to maintain the data stored in RAM memory. The battery fits on the CPB-BN-B board as shown in Fig. 4.2.5.2.

The fuse F1 is a 100mA 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. All Handsfree Stations connected to the system will indicate the low battery voltage by flashing BAT in the display.

The switch SW1-1 (Fig. 4.2.5.2) is used to clear the RAM memory and initialise the data base when power is applied for the first time. Check that the SW1-1 switch is in the "I" (Initial) position (other side) before powering up the system for the first time.

After power is applied to the system wait 10 seconds, then set the switch to the "N" (Normal) position (number side). The initial values of the system data are given in Section 2.7.6.

When the system is connected as a BN-308 Link JO should be in position l-2 and for a BN-512 Link JO should be in position 2-3.

Switch SW l-2 selects either the internal synthesised music source or the external music source to provide Music-on-Hold. The internal source is selected when SW1-2 is on the number side of the switch, while the external music source is selected when SW1-2 is on the other side. Volume control VRO controls the Music-on-Hold level.

Volume control VR 1 controls the speaker output level for external paging while VR2 controls the background music level.

DST-BN-B and CDRB-BN-B are mounted on the CPB-BN-B as shown in Figure 4.2.5.2. Note to mount these boards the two plastic spacers provided with the boards must be mounted on the CPB-BN-B in the appropriate holes before the board is mounted. The board is then placed on the connector and two spacers and pushed down on the connector. Ensure that the two spacers clip through the board to hold the board in place.

A 30V output is provided on CPB-BN-B by terminals T30, TGD for use with auxiliary equipment (Two-wire extender unit 2WEU-AN, Call metering unit CMU etc.1 if required. To use these terminals lift the plastic cover, insert wire into the hole located on the top of the terminal and then push the plastic cover down to lock the wire. NOTE single core 0.4mm wire with 8mm of insulation removed should be used.

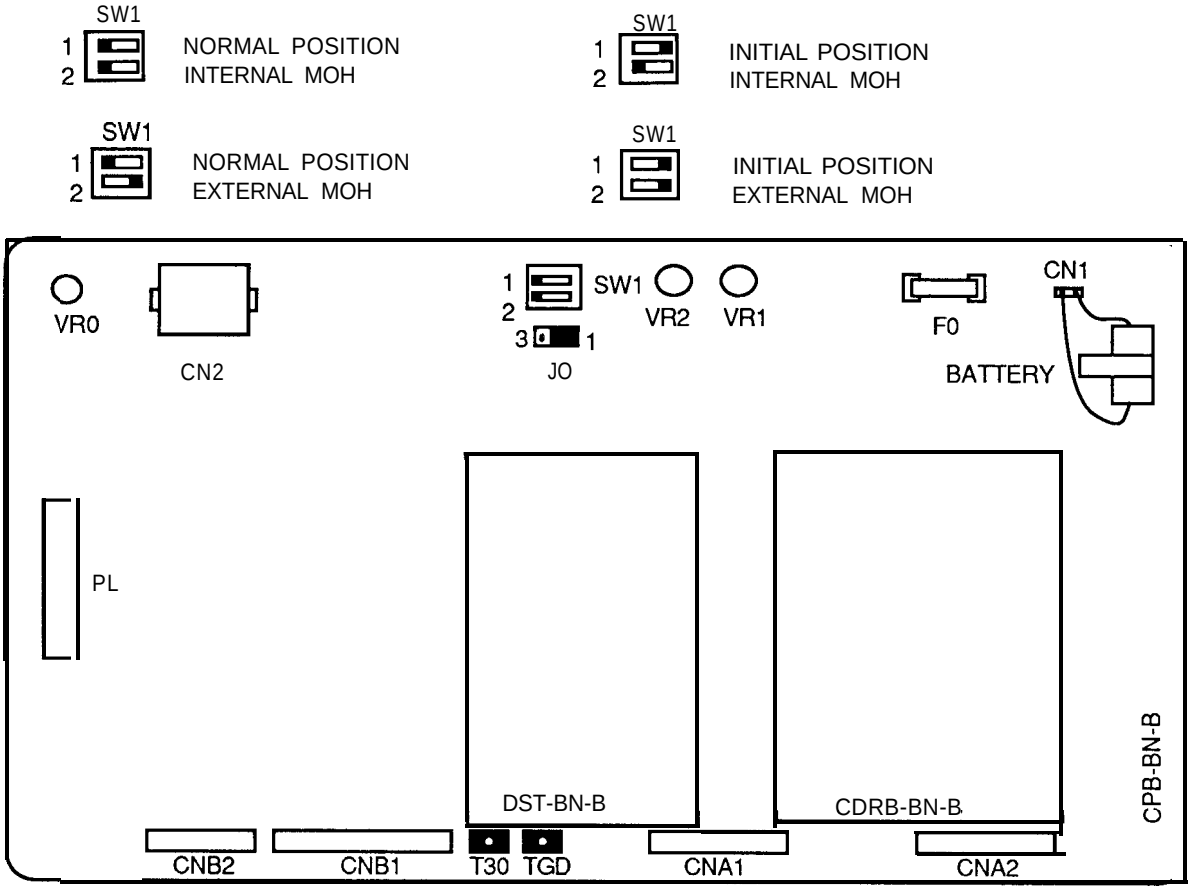


FIG. 4.2.5.2 CPB-BN-B FUSE, BATTERY AND SWITCH LOCATIONS

4.2.5.3 2WB-BN-B and 2WRGB-BN-B

Links S1 and S2 on the 2WB-BN-B or 2WRGB-BN-B boards are used to select the power supply for the standard telephone stations as follows:

LINKS ON S 1 AND S2	POWER SUPPLY SELECTED
1 TO 2 2 TO 3	INTERNAL EXTERNAL (2WEU-AN)

The external power supply, 2WEU-AN, should be selected when the loop length of cable between the SDF and the standard telephone station exceeds 300 ohms.

Up to two DTMFB-BN-A daughter boards may be installed on the ZWB-BN-B or 2WRGB-BN-B to alter the interface from a decadic standard telephone interface to a DTMF standard telephone interface.

Figures 4.2.5.3(a) and (b) show link and DTMF board locations.

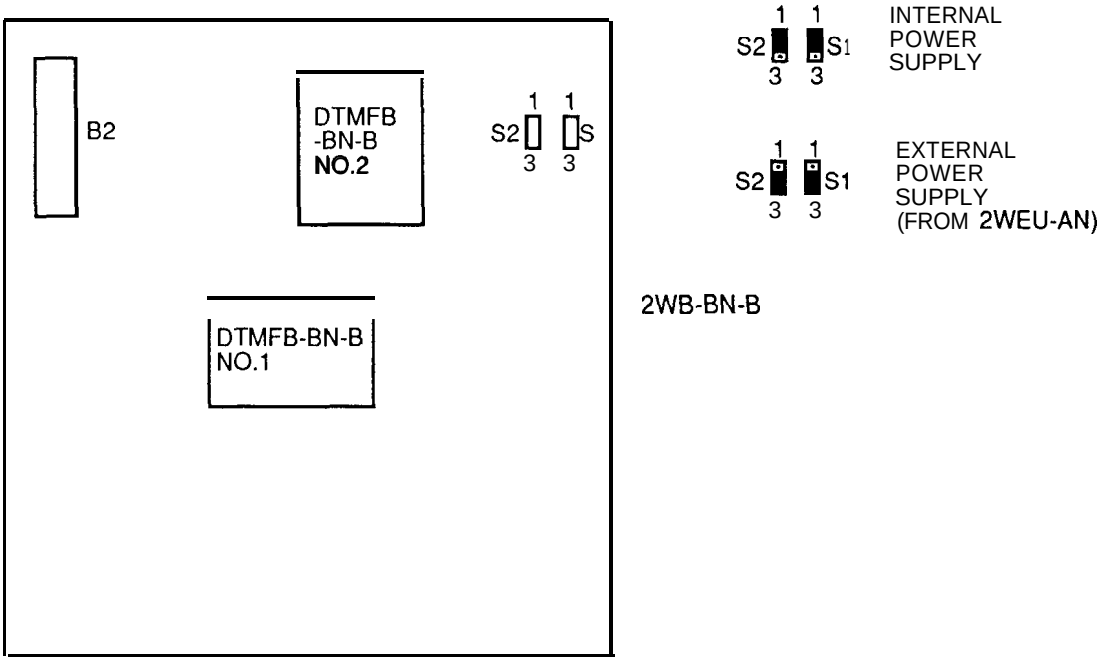


FIG. 4.2.5.3(a) 2WB-BN-B LINKS AND DAUGHTER BOARD LOCATIONS

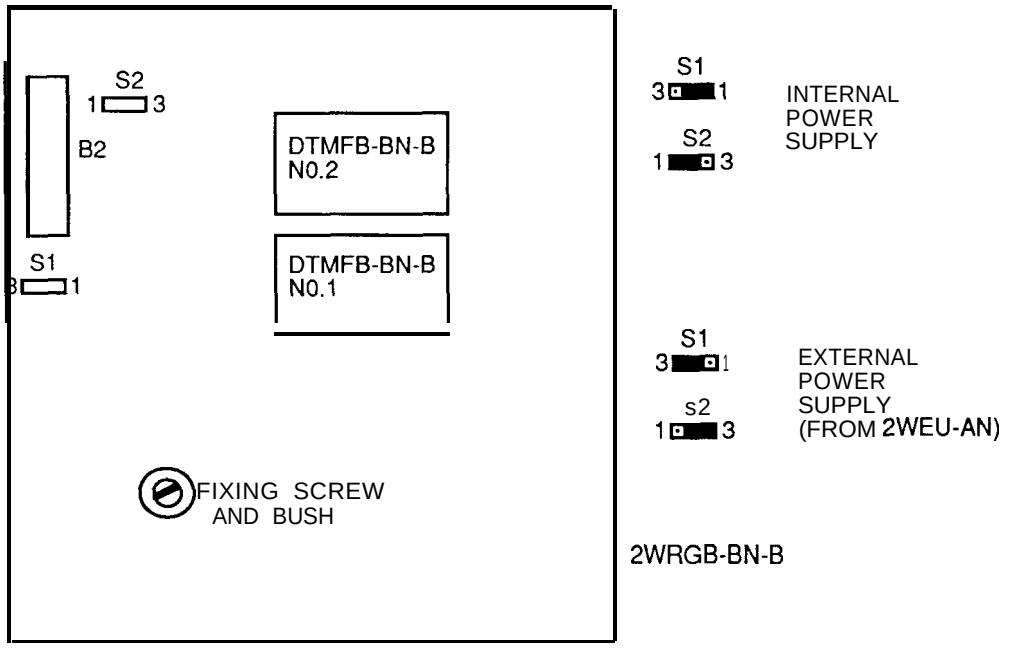


FIG. 4.2.5.3(b) 2WRGB-BN-B LINKS AND DAUGHTER BOARD LOCATIONS

4.2.5.4. DST-BN-B

The DST-BN-B is installed on the CPB-BN-B to provide interfaces for two door stations. Refer to Fig. 4.2.5.4 for location of door station control switch and volume control.

The door station control switch, SW, must be set as shown in Figure 4.2.5.4 depending upon the door stations installed. The volume control, VR1, sets the door station output volume level.

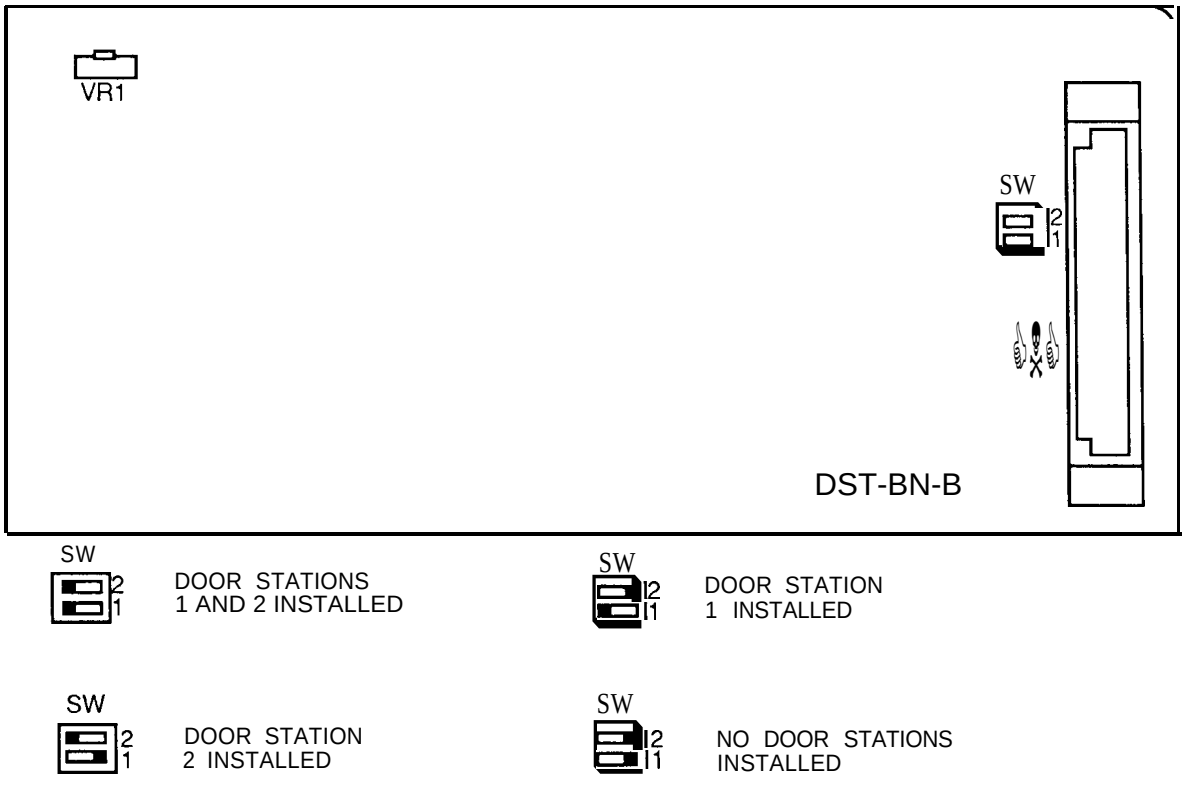


FIG. 4.2.5.4 DST-BN-B SWITCH AND VOLUME CONTROL LOCATIONS

4.2.5.5 CDRB-BN-B

The CDRB-BN-B is installed on the CPB-BN-B. For selection of Switches SW1 to SW3 refer to Section 2.5.6.

The jack assembly is connected to the CDRB-BN-B connector CN1 via a ribbon cable. A printer is then connected to the jack assembly via an RS-232C cable.

For positions of Switches SW1 to SW3 and CN1 refer to Fig. 4.2.5.5.

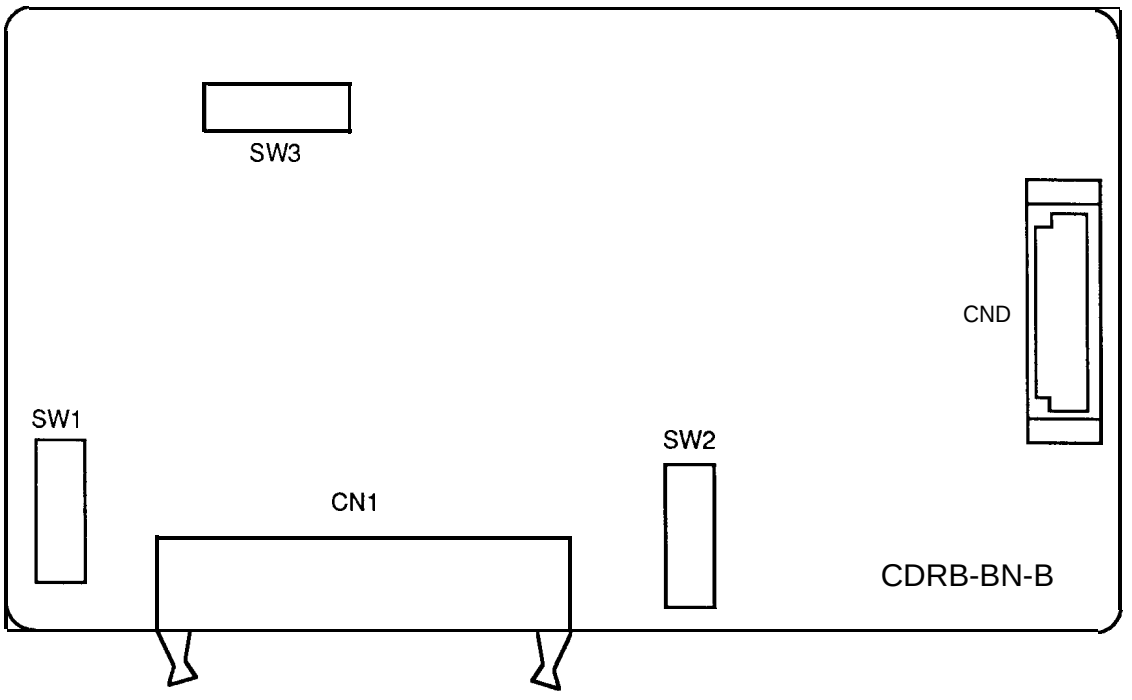


FIG. 4.2.5.5 CDRB-BN-B SWITCH AND CONNECTOR LOCATIONS

4.2.5.6 Station Expansion Position

When a station expansion board (STB-BN-B, 2WB-BN-B or 2WRGB-BN-B) is equipped with the system it must be located as shown in Figure 4.2.5.6. The procedure to be followed is detailed below:-

- Press board onto the four plastic supports.
- Connect the three ribbon cables provided with the expansion board. Two cables connect between sockets on the expansion boards and adjacent sockets on the CPB-BN-B. One cable connects between a socket on the expansion board and an adjacent socket on the 2LNB-BN-B. Note that the U-link printed circuit board must be removed from CNE before the ribbon cable is inserted.
- Connect the amphenol connector from the SDF to the expansion board and tighten the retaining screw.

  NOTE

  RETAINING SCREW SHOULD NOT BE OVER TIGHTENED AS THIS CAN CAUSE THE OTHER SIDE OF THE CONNECTOR TO LIFT.

- Place JO link on CPB-BN-B in the 2-3 position.
- For 2WRGB-BN-B the screw provided should be used to fix the board to the rear panel. Ensure that the bush and collar provided are clipped onto the 2WRGB-BN-B to provide adequate insulation for the screw. Note the bush is pushed from the top of the board through the hole provided (See Figure 4.2.5.3(b)) and clips into the collar which is located under the board.

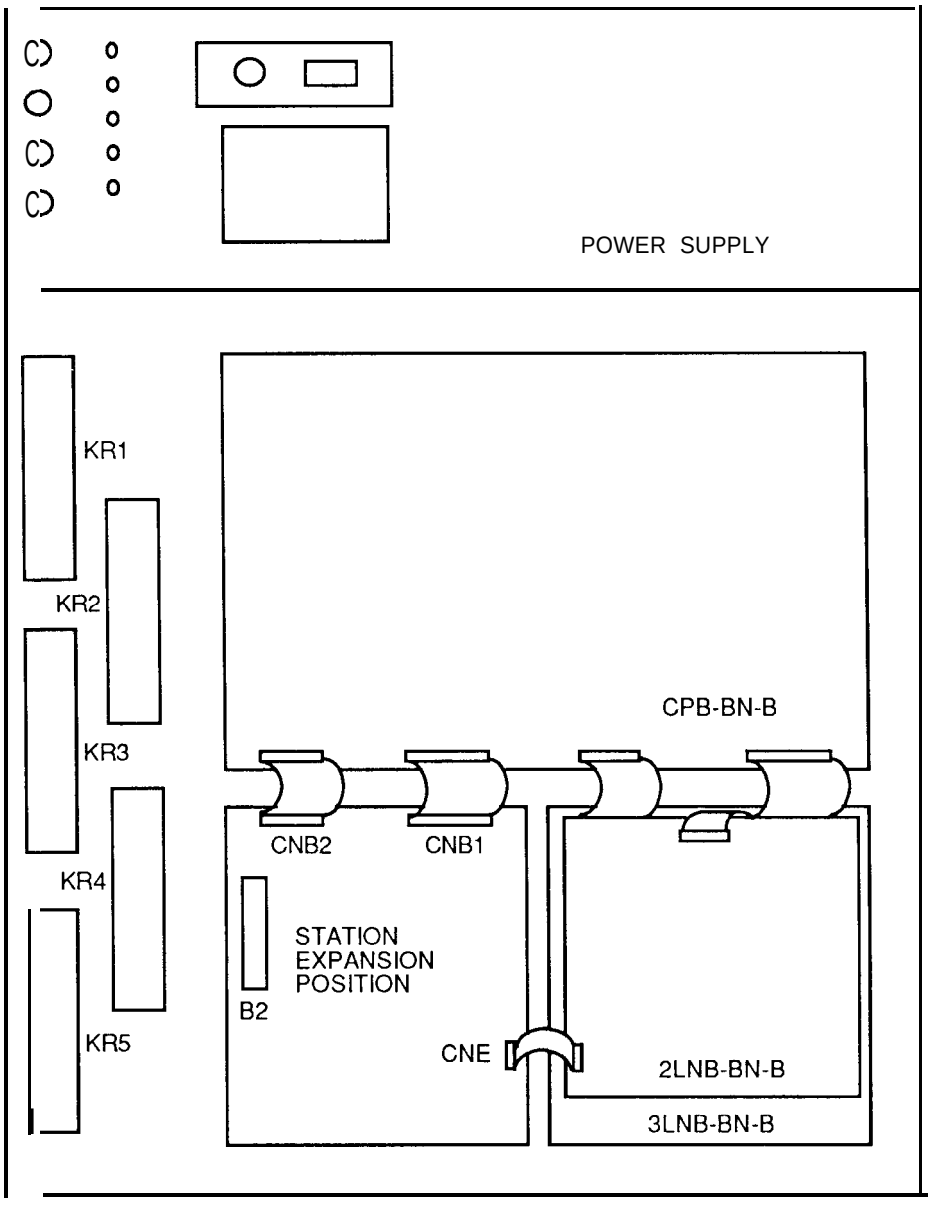


FIG. 4.2.5.6 STATION EXPANSION POSITION

4.2.6 Powering Up the System

Refer to Section 2.6.

4.2.7 Installation Programming

Programming for the BN-308/5 12 is identical to the BN-824/1236/2464 and reference should be made to Section 2.7 for programming details. Note that for the CPB-BN-B board the "N" — Normal position for SW1-1 is the number side and the "I" — Initial position is the other side.

Other programming facilities are limited by the BN-308/5 12 system capacities. For example the maximum number of line groups is eight so only eight line groups can be programmed.

4.2.8 Functional Tests

Refer Section 2.8.

4.2.9 Site Records and Installation Feedback Label

Refer Section 2.9.

4.2.9.1 Software Programme Records

Upon completion of the installation, a copy of the BN-308/512 Small Business System System Order should be placed in the Main Equipment as a record of the way the system has been programmed.

4.2.9.2 SDF Records

The cabling records of the SDF should be carried out as per Telecom Technical Publication TPH 02 16 “LSA Plus Terminating System”.

Existing record books and cards should be used for the LSA plus terminating system. A record book holder is provided inside the Main Equipment front cover.

4.2.9.3 Installation Feedback Label

To provide information on equipment quality, an “Installation Feedback Label” is supplied with the main equipment. This label must be filled out at the completion of installation and returned to the address shown.

NOTE: When equipment is defective a Customer Equipment Fault Report Label (E441) must be completed (Refer Section 3.6.).

4.3 BN-308/512 MAINTENANCE

4.3.1 Test Equipment

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

(i) A multimeter with small test probes, to measure the various test voltages and to test the continuity of wiring between the main equipment and stations.

(ii) A Test and Programming Unit, TPU-BN, for the BN systems.

(iii) Normal maintenance tools i.e. Long-nose pliers, Angle cutters and both Philips and flat blade screw drivers.

4.3.2 Test Points

4.3.2.1 **Power Supply**

There are six DC voltages supplied for the systems. The supply voltages are accessed by disconnecting the 12-pin power plug from the CPB-BN-B.

Measure the voltages across the plug pins of the power plug as shown in Table 4.3.2.1 (a).

Figure 4.3.2.1 shows the pin locations on the plug.

PIN NO.	WIRE COLOUR	PCB DESIGNATION	VOLTS (V)	REFERENCE PIN
1	BROWN	+5V	5.05 ±0.3	2 (LGD)
2	RED	LGD	–	–
3	ORANGE	+12V	12 + 0.8/– 1.5	5 (AGD)
4	YELLOW	SB	6 + 0.8/– 1.2	5 (AGD)
5	PINK	AGD	–	–
6	BLUE	R20	20.6 ± 1.5	8 (RGD)
7	PURPLE	T20	19.2 ± 1.5	8 (RGD)
8	GREY	RGD	–	–
9	WHITE	T30	26 TO 46	10 (TGD)
10	BLACK	TGD	–	–
11	LIGHT BLUE	RESET	–	–
12	–	–	–	–

TABLE 4.2.3.1 (a) DC VOLTAGE TEST POINT SUMMARY

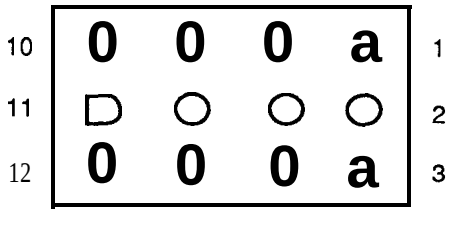


FIGURE 4.3.2.1 POWER SUPPLY PIN LOCATIONS

The mains and DC power supplies are equipped with indicators which light when the supply is active. Refer to Section 4.3.2.2. for their description.

If trouble arises with any of the supply voltages, check the voltages and, if necessary, replace the associated fuse. Table 4.3.2.1 (b) illustrates which fuse corresponds to a given power supply.

FUSE	POWER SUPPLY	RATING
FO	MAINS	1.6A
F1	T30V	2A
F2	T20V,R20V	1.6A
F3	+ 12v	0.3A
F4	+5V	1.6A

TABLE 4.3.2.1 (b) POWER SUPPLY FUSE RATING

4.3.2.2 Main Equipment

Exchange lines, stations, powerfail bells, music source, external amplifier, ring generator unit, 2-wire extender unit and signal earth for earth recall can all be accessed on the system distribution frame (SDF)

The voltage across line 1 can be checked by connecting a voltmeter between terminals L1A and L1B with the system mains off. The voltage across all other exchange lines can be checked by connecting a voltmeter between their respective terminals.

LED indications provided on the BN-308/5 12 systems are:

CPB-BN-B — The LED flashes at 600 IPM to indicate that the main CPU program is running.

3LNB-BN-B — The LED lights steadily when any of the three exchange lines associated with the PBA is seized.

2LNB-BN-B — The LED lights steadily when either of the two exchange lines associated with the PBA is seized.

PS-BN308512 — There are five LEDs on the power supply units. The LEDs light steadily to indicate that the power supplies are active. The five LEDs are (from top to bottom).

T30 — Key station power supply
T20,R20 — Relay supply, Key station A-pair supply.
+12V — Crosspoint and amplifier supply
+6V — Signal Bias
+5V — Logic Supply.

4.3.2.3 Stations

Station A and B pairs are accessed at the 605 plug pins. The voltages measured on each pin should be within limits shown in Table 4.3.2.3.

	WI R E COLOUR	605 PLUG PIN	VOLTAGES
Station Voltages: A-PAIR	WT	2	+ 9 ± 2V
	BL	6	REF A
B-PAIR	RD	1	+36 ± 10V
	BK	5	REFB

TABLE 4.3.2.3 STATION VOLTAGES

4.3.3 Maintenance Procedures

4.3.3.1 General

Due to the sensitivity of the components (especially 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 the power supply, stations and the main equipment, all transports 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 4.3.6. — Repair Procedures.

4.3.3.2 Main Equipment

Any fault in the PBAs will require replacement of the faulty PBA with a new one. No repair of the PBA is to be carried out on site or in field depots. Any attempt to repair the PBA in the field may result in further damage to the PBA.

Main Equipment PBAs must NOT be removed from the cabinet unless the mains power is OFF.

4.3.3.3 Power Supply

When the power supply is diagnosed as being faulty, it is to be changed over completely by disconnecting the power supply from the CPB-BN-B.

CAUTION

The power supply is powered from a 240V mains supply and hazardous voltages are present within. Ensure that the mains cord is disconnected from the mains before removing the power supply unit. Do not attempt to repair these units.

4.3.3.4 Stations

Maintenance of the stations will be confined to the replacement of transmitter and receiver inserts, cords, plugs, powerfail dial boards, Headset interface and sockets. Faults in the PBAs within the station or with the pushbutton assemblies shall be rectified by replacement of the complete station.

4.3.4 Fault Finding Procedures

4.3.4.1 Board Swapping

Board swapping can be used to confirm a faulty board diagnosis when a duplicate board is available.

Remove the suspect board and replace it with an identical board. If the fault follows the suspect board then it is faulty, otherwise the fault is located somewhere else.

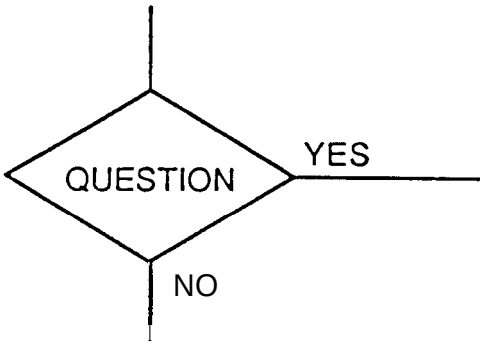
4.3.4.2 Flow Chart Symbols

The diagnostic flow charts may be used whenever failure occurs. They are a means of localising a fault occurrence in one of the printed board assemblies (PBA) in an established working system. Always commence at the "Start Block".

Flow Chart Symbols

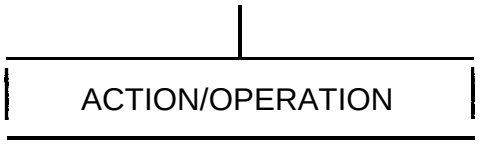
(a) Decision Function

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 the 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.

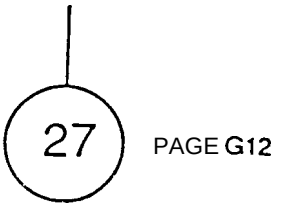


(c) Data Block

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 dashed lined.

(d) Exit/Entry Points

Numbered circles are used to move from page to page within a flow chart. Each circle has its destination or origin page number(s) noted beside it.



APPENDIX A

SERIAL AND ITEM NUMBER PARTS LIST BN824/1236/2464

ITEM NO.	CODE	DESCRIPTION	REMARKS
BN MAIN COMPONENTS			
338/820	ME-BN824	Main Equipment BN824	Houses BN824 Control Equipment and includes SDF and Power Supply.
338/821	ME-BN12362464	Main Equipment BN1236/2464	Houses BN1236 Control Equipment.
338/802	ER-BN2464	Expansion Rack BN2464	Used to expand BN1236 to BN2464
338/803	PS-BN12362464	Power Supply BN 123612464	Used to power BN 123612464 BS
BN STATIONS			
3381862	TS-BN824-OH	Telephone Station BN824 On-Hook	On-Hook station used with BN824 BS
3381863	TS-BN824-HF	Telephone Station BN824 Handsfree	Handsfree Station used with BN824 BS
3381855	TS-BN1236-OH	Telephone Station BN 1236 On-Hook	On-Hook Station used with BN1236 BS.
3381856	TS-BN1236-HF	Telephone Station BN1236 Handsfree	Handsfree Station used with BN1236 BS.
3381857	TS-BN2464-OH	Telephone Station BN2464 On-Hook	On-Hook Station used with BN2464 BS
3381858	TS-BN2464-HF	Telephone Station BN2464 Handsfree	Handsfree Station used with BN2464 BS
3381864	DSS-BN824	Direct Select Station BN824	Used in BN824 to provide operator facilities.
3381859	DSS-BN12362464	Direct Select Station BN1236/2464	Used in BN1236/2464 to provide operator facilities.
3381860	DS-BN	Door Station for BN System	Used in BN824/1236/2464 to provide intercom and doorbell facilities.