CONTENTS

1. GENERAL

2. INSTALLATION

3. MAINTENANCE

APPENDIX

1. GENERAL

1.1 INTRODUCTION

The Commander AN-61 6 is an electronic key telephone system providing 6 exchange lines and 16 stations. It is an electronic system using hardware and software modules packaged to provide various economical solutions. The stations have a very modern and 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 PBAs.
- Always discharge static from yourself by touching a conductive part of the main equipment before handling boards.
- Handle PBAs by the edge or by the handles. Do not handle PBA tracks, components or edge connectors (contaminants introduced by fingers can cause corrosion and high resistance connections).
- Components are physically delicate. Finger pressure on a component can fracture, but not necessarily break component leads: a future fault.

To protect against physical damage and damage due to static discharge, PBAs must ALWAYS be inserted into a conductive ANTI-STATIC bag and placed in the protective container provided with the new item. In the case of the CPB-AN 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-AN BOARDS

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

F. TMB-AN BOARDS

- If this PBA or the CPB-AN PBA is replaced, then the system clock is lost and must be reprogrammed.

1.2 FEATURES AND FACILITIES

1.2.1 Direct Exchange Line Access

In general, any station can access any exchange line to answer an incoming or make an outgoing call. Up to 8 Exclusive Exchange Lines may be provided each of which can be accessed by one station only.

1.2.2 Last Number Redial

The user may recall the last number dialled by dialling "*" after seizing an exchange line and pressing the Dial Control (DC) key.

1.2.3 Saved Last Number

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

1.2.4 Multiple Exchange Line Answer

The status of each exchange line is displayed at every station facilitating the possibility of answering an incoming call at every station. The only exceptions are Exclusive Exchange lines, which appear at only one station.

1.2.5 Conference Call (Simultaneous Outside Call)

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

1.2.6 Cost Control

Three forms of cost control are available. The systems can perform Access Barring by analysis of dialled digits. Dialled digits are compared with codes preprogrammed into the system's data base. The system caters for 6 classes of barring.

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

A third form of cost control is provided by a facility allowing access to selected lines. Each station may be denied access to particular exchange lines for outgoing calls.

1.2.7 Exchange Line Request

When all lines in a group are busy the user may request the next available exchange line in a particular group. Up to a maximum of 6 groups can be allocated for this purpose.

1.2.8 Tie Lines

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

1.2.9 Hold

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

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

Exchange lines are automatically placed on Hold when either ICM or a DSS key are operated in order to make an intercom call.

1.2.10 Automatic Ring Back

When an exchange line is put on I Hold or Exclusive Hold longer than a pre-set time the call is rung back to the holding station.

1.2.11 Transfer

A manual transfer is the most often 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 must seize the exchange line by operating the corresponding exchange line key.

Another method of transferring calls is without announcing. After transferring the call by an intercom call, the transferring party presses the HOLD key. The called station then presents the 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.

1.2.12 Call Forwarding

Intercom calls and exclusive line calls are forwarded to a pre-assigned station after this facility has been activated using the DND key.

1.2.13 Repertory Dialling

Basic and On-Hook stations are provided with 8 DSS keys which can be used to store frequently used numbers. Numbers with up to 20 digits can be stored.

Handsfree stations are provided with 16 DSS keys and thus can store up to 16 numbers.

The stations may store and recall numbers at any time.

1.2.14 Abbreviated Dialling

A maximum of 60 numbers, up to 20 digits each, can be stored as common use abbreviated numbers. These numbers can be accessed at any station by seizing an exchange line, pressing the DC key and dialling the abbreviated code corresponding to the number required. The abbreviated dial code is a two digit number between 10 and 69.

1.2.15 Privacy

Privacy is provided for intercom calls as well as the exchange lines. The only exception is that certain stations can be given the facility of breaking into exchange line and/or intercom calls. The stations with this facility are determined by system programming.

1.2.16 Night Switching

Operation of the ⌓ TR key at station 10 directs ring signalling for all incoming calls to the programmed Night Transfer station(s).

1.2.17 PBX Recall

Two methods of PBX Recall are available, Earth Recall or Switchhook Flash (Timed Loop Break).

1.2.18 Automatic Pause Insertion

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

1.2.19 Power Failure

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

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

1.2.20 Pushbutton Dialling

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

Each exchange line can be individually set to dial out using decadic or VF dialling.

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

1.2.21 Intercommunication Between Stations

Each station is able to establish an internal (intercom) call to another station by dialling the desired station's number or by pressing the desired Direct Station Select (DSS) key.

1.2.22 Alternate Point Answering

Any other station within the same internal paging zone can answer an intercom call to another station by lifting the handset and pressing the BREAK key.

1.2.23 Intercom Conference

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

1.2.24 Intercom Camp-On

When a busy tone is heard after making an intercom call, pressing the '*' key will place the call in the Camp-On mode. When the called station hangs up, the intercom call will be automatically established provided the originating station has remained off-hook.

1.2.25 Intercom Call Back

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

1.2.26 Follow-Me

Intercom calls can be transferred from any station to another station.

1.2.27 Handsfree Talkback on Intercom Calls (optional)

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

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

1.2.28 Signal Call

If after placing an intercom call in the usual manner, there is no immediate response, the call can be signalled using ring signalling by dialling "1". The caller will hear ring tone and the called party must answer by lifting the handset and operating the ICM key.

1.2.29 Message Waiting

A visual indication may be left at an unattended station to indicate that a message is waiting at another station. Pressing ICM and dialling "0" at the message left station will route the call to the station originating the message.

1.2.30 Priority Break-In (optional)

Break-In is available in three levels of priority, programmed on a station by station basis. Break-In can be restricted to signal calls, intercom calls or intercom and exchange line calls.

1.2.31 Paging Calls (optional)

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

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

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

EXTERNAL ZONE PAGING calls are broadcast over external loudspeakers.

1.2.32 Meet-Me Paging (optional)

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

1.2.33 Meet-Me Conference (optional)

Up to five stations in the same internal paging zone can take part in an intercom conference. The conference is established by originating an internal zone paging call and pressing the ADON key. The conference can be joined from any station in the same zone by lifting the handset and pressing the ADON key.

1.2.34 Music On Hold (optional)

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

1.2.35 Background Music (optional)

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

1.2.36 Preselection

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

1.2.37 Call Signalling

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

1.2.38 Do Not Disturb (optional)

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

1.2.39 Off-Hook Signalling (optional)

The system can be programmed to provide audible indication of incoming intercom and exchange line calls to a station while it is in the off-hook condition. This facility is programmed individually for each station.

1.2.40 Warning Tone (optional)

The system can provide a warning tone at three minute intervals during exchange line conversations.

1.2.41 Visual Indications

A visual indication is provided at each station to show the status of exchange lines (Free, Incoming Ring, Hold, I-Hold, Exclusive Hold and Busy), intercom lines (Free, Busy and Microphone Off) and system facilities (Do Not Disturb, Monitoring, Message Waiting, Speaker On etc.). The Handsfree Station has a Busy Lamp Field (BLF) which displays the status of each station in the system.

1.2.42 On-hook Dialling

Handsfree and On-Hook stations may originate and monitor the progress of a call through the station speaker without lifting the handset.

1.2.43 Handsfree Station

Handsfree Station provides the user with full handsfree operation for every type of call. It 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 also provides three alarms which can be set independently.

The Handsfree Station has 16 DSS keys, 8 more than the On-Hook and Basic models. It incorporates a Busy Lamp Field (BLF) which provides the user with the information on the status of each station and line in the system.

1.2.44 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.

1.2.45 Standard Telephones

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

1.2.46 Call Details Recorder (optional)

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

1.3 OPERATING INSTRUCTIONS

1.3.1 Station Nomenclature

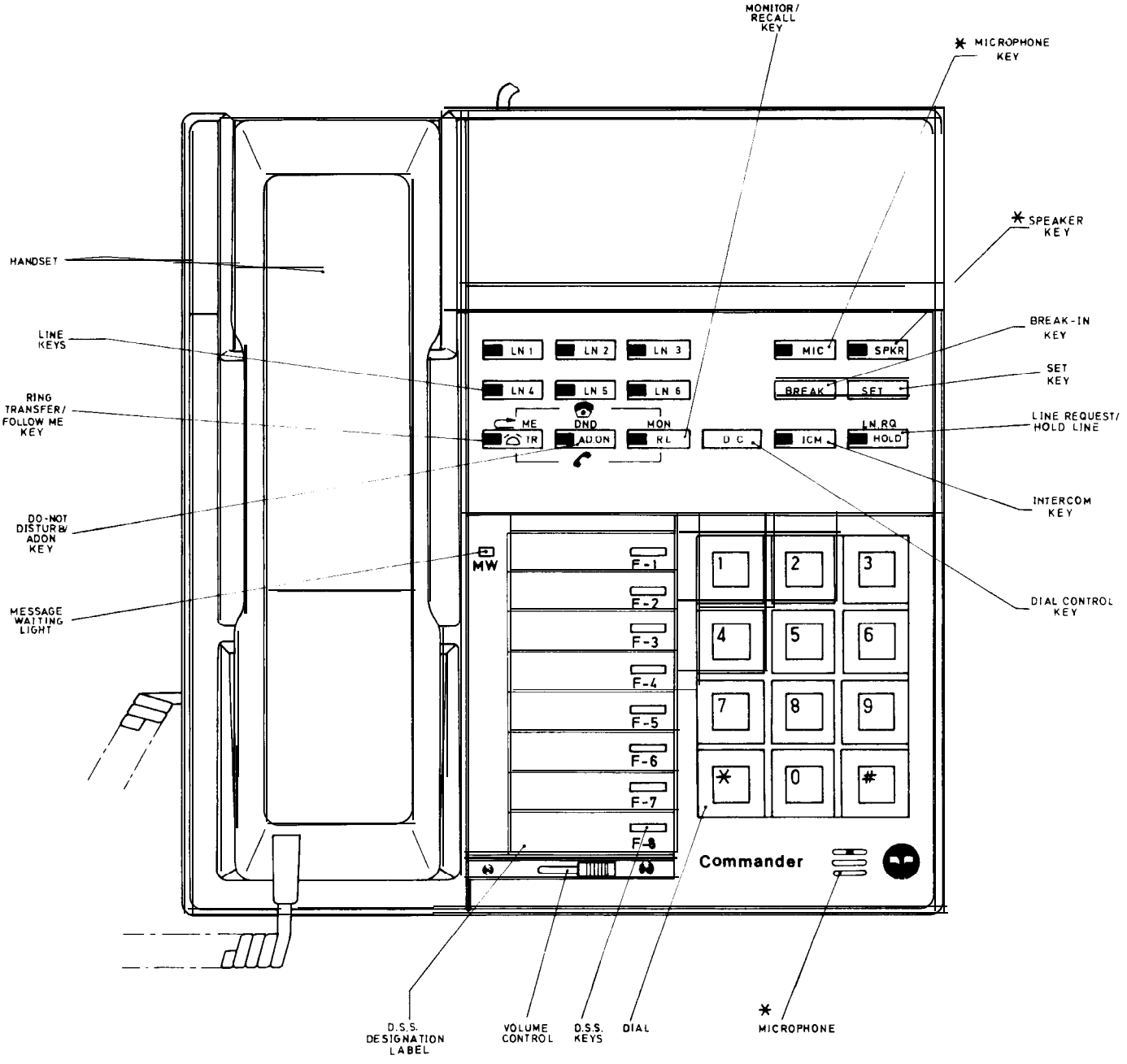


Fig. 1.3.1 (a) TS-AN-BA BASIC AND TS-AN-OH ON-HOOK STATIONS

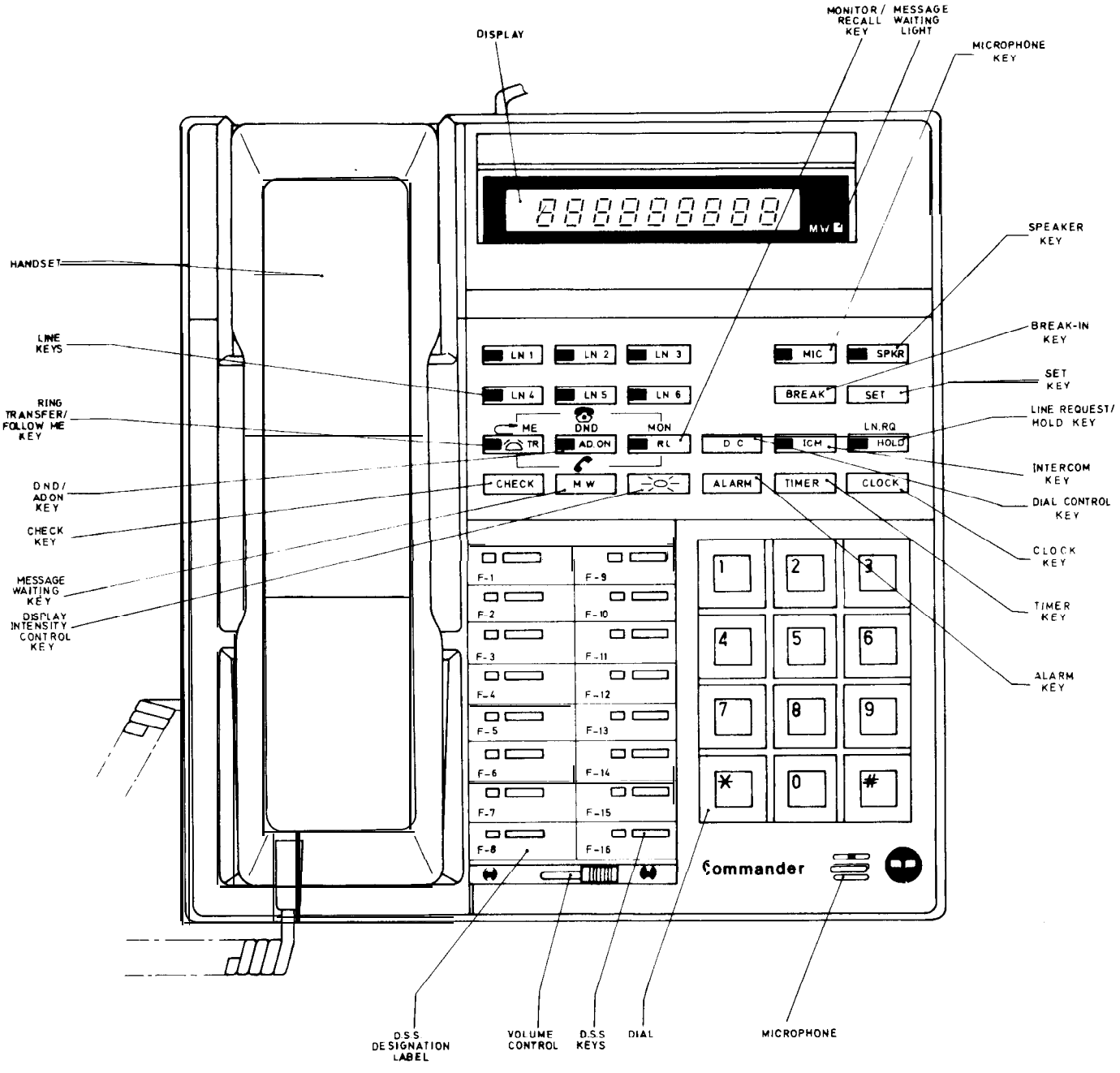


Fig. 1.3.1 (b) TS-AN-HF HANDSFREE STATION

1.3.2 Station Lamp Signals

	LAMP SIGNAL	—	STATUS
OUTSIDE LINES	Out	—	line free
LN 1/6	Steady	—	line busy
	Slow Flash	—	incoming call
	Flash	—	hold
	Flicker	—	exclusive hold add-on standby
	Double Flash	—	I hold
ICM KEY	Steady	—	intercom call (handset)
	Double Flash	—	incoming intercom call
SPKR KEY	Steady	—	on-hook dialling handsfree speech enabled (optional)
MIC KEY	Steady	—	microphone off
HOLD/LN.RQ KEY	Steady	—	outside line request in progress
	Flicker	—	outside line request accepted
⌓ TR/⌐ ME KEY	Steady	—	ring transferred
	Flicker	—	follow-me originating station
	Double Flash	—	follow-me transferred station
ADON/DND KEY	Steady	—	do-not-disturb
	Slow Flash	—	call forwarding active
MON KEY	Flicker	—	remote monitoring station
MW LAMP	Double Flash	—	message waiting signal received
	Flicker	—	message waiting signal sent
DSS KEYS	Steady	—	station off hook
F1/16	Flash	—	intercom call in progress
	Double Flash	—	station in do-not-disburb

1.3.3 System Tones

Constant tone	—	internal dial tone
Busy tone	—	station busy number unobtainable
Slow repeating tone	—	incoming intercom signal call
Single tone burst	—	intercom call (microphone on) intrusion tone (intercom) outside line request accepted
Double tone burst	—	intercom call (microphone off)
Triple tone burst	—	intrusion tone (outside line)
Repeating double tone burst	—	station in do-not-disturb
Five quick tone bursts	—	follow-me request denied outside line request denied
Slow repeating warbling tone	—	incoming call
Fast repeating warbling tone	—	automatic hold recall line available in outside line request

1.3.4 Outside Calls

1.3.4.1 Outgoing calls

- lift the handset and select a free outside LINE key
- listen for dial tone, then dial the wanted number.

1.3.4.2 On Hook Dialling

To make a call

- press the SPKR key
- press a free outside LINE key
- when dial tone is heard, dial the wanted number
- when the called party answers, lift the handset to speak.
- replace the handset when the call is completed
- to release a line before connection is established, press the SPKR key

1.3.4.3 Incoming Calls

- the line lamp will slow flash and the audible signal will sound (if provided)
- to answer, lift the handset and press the LINE key.

1.3.4.4 Holding an Outside Call

- ask your outside party to wait
- press the HOLD key. The line lamp will show I HOLD, and show normal hold at all other stations.

Any other station can take over a held call.

Pressing the HOLD key twice will place the outside line on EXCLUSIVE HOLD.

In this condition other stations cannot take over a held call.

Return to your outside caller by pressing the LINE key.

1.3.4.5 Auto Ringback (optional)

Once an outside line has been on "HOLD" or "EXCLUSIVE HOLD" for a predetermined time, the audible signal will remind you of the held call.

If the line on "EXCLUSIVE HOLD" is not re-answered within a predetermined time the line will automatically revert to normal hold so that it can be answered at any station.

1.3.4.6 Off Hook Signalling — external (optional)

If you are engaged on a call, the audible signal on incoming calls will sound through the station speaker.

You may either hold your existing outside call or release by hanging up.

Answer the new call by pressing the LINE key.

An intercom call will be terminated automatically when the outside call is answered.

1.3.4.7 Abbreviated Dialling

All stations have access to a system which contains frequently called telephone numbers. These numbers are entered into the memory from station 10 (refer to 1.3.6.5).

To call a stored number

- lift the handset and press any free outside LINE key
- press the DC key
- dial the appropriate abbreviated code (10-69).

The stored number will be automatically dialled.

1.3.4.8 Last Number Redial

- lift the handset and press any free outside LINE key
- when dial tone is heard, press DC then ● .

The last number called will be automatically dialled again.

1.3.4.9 Last Number Saved

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

After busy tone or no answer:

- press the DC key twice
- replace the handset.

To call the last number saved

- lift the handset
- select a free outside line
- when dial tone is heard, press the DC key then dial 0.

The saved last number will be automatically dialled.

1.3.4.10 Outside Line Request

When all outside lines in your group are busy, you may request the next free line

- lift the handset
- press the HOLD key. The HOLD and ICM lamps glow
- dial your outside line group number (1 to 6)

If the request is accepted

- a burst of tone is heard
- the HOLD lamp flickers
- replace the handset

If the request is denied

- the HOLD lamp goes out
- five quick bursts of tone will be heard.

When a line is available

- a fast repeating warbling tone will sound and the line lamp will flicker
- lift the handset and press the line key.

Note: If the free line is not accepted within 20 seconds, the request will be automatically cancelled.

1.3.5 Intercom Calls

1.3.5.1 Making an Intercom Call

- ensure the ICM lamp is out (the ICM lamp will glow if all intercom lines are busy)
- lift the handset, press the ICM key, the lamp will glow
- listen for internal dial tone, then dial the wanted station number
- speak after hearing a single burst of tone

If a double burst of tone 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 continuing ring signal is being sent to the called station.

Busy tone means the party is engaged on another call.

A repeating double tone means the station is in the "Do Not Disturb" mode (1.3.7.1).

1.3.5.2 Special Ring Signal

If there is no immediate reponse when a station is called, a special continuing ring signal can be transmitted by dialling "1".

1.3.5.3 Incoming Intercom Calls

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 double flash indicating your microphone is active. The call can be answered as required, either handsfree, or by lifting the handset and pressing the ICM key.

1.3.5.4 Ring Signal

Incoming intercom calls can be signalled by a slow repeating tone and a double flash on the ICM key. The call can only be answered by lifting the handset and pressing the ICM key.

1.3.5.5 Alternative Answering

An intercom call to a particular station can be answered at any other station in the same internal zone group, by lifting the handset and pressing the BREAK key.

NOTE: If two or more calls are waiting to be answered, the call to the lowest numbered station will be answered first.

1.3.5.6 Microphone Cut-Off

If required, your microphone can be cut off during a handsfree intercom call, or while your station is idle, by pressing the MIC key. The lamp will indicate status. Press again to restore to normal.

1.3.5.7 Off Hook Signalling — internal (optional)

If you are engaged on outside call, and an intercom call is waiting to be answered, the signal will be a slow repeating tone and a double flash on the ICM key. You may either terminate your existing call or hold the call automatically by answering the waiting call.

- Press the ICM key to answer.

1.3.5.8 Direct Station Selection (Basic and On-Hook Stations)

The Direct Station Selection keys are designated F1-F8. 8 frequently called station numbers can be stored in the system memory, and called by using only one key (F1-F8).

To store a station number

- lift the handset
- press DC, ICM and the required F key where the station number is to be stored
- dial the station number
- replace the handset

Repeat the above steps for other F locations.

To make an intercom call

- lift the handset
- press the required F key

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

1.3.5.9 Follow Me

To divert intercom calls from your station to any other station:

- with the handset on hook
- press the ⌓ TR key
- dial your station number, then the station number to which your calls are to be diverted
- press the ⌓ TR key again

The ⌓ TR lamp will flicker at your station and will show a double flash at the selected station.

To cancel

- with the handset on hook
- press the ⌓ TR key
- dial your own station number
- press the ⌓ TR key again. The lamps will go out.

1.3.5.10 Paging (optional)

Three types of paging calls can be made:

All call paging

To make an announcement to all stations

Zone paging — Internal

To make an announcement to stations in one of three zones

Zone paging — External

To make an external public address announcement

To make a paging call

- lift the handset
- press the ICM key
- wait for internal dial tone
- dial the wanted paging code and make the announcement

Paging codes

all call paging	80
internal zone 1	81
internal zone 2	82
internal zone 3	83
internal all-zone	84
external zone	85

1.3.5.11 Meet-me Paging (optional)

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 the connection by lifting the handset and dialling . at any station receiving the paging call.

1.3.5.12 Intercom Camp-on (optional)

If busy tone is heard when making intercom calls

- press . and remain off-hook, the intercom call will be automatically established when the called station is free.

Note: This feature is not provided if the called station is programmed for off-hook signalling.

1.3.5.13 Intercom Call Back (optional)

If busy tone is heard when making intercom calls

- press . key
- replace the handset

When the called station is free your station will ring

- lift the handset and the intercom call will be automatically established

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

This feature is not provided if the called station is programmed for off-hook signalling.

To cancel Intercom Call Back

- lift the handset
- dial "0"

1.3.5.14 Message waiting

- make an intercom call
- press . if the called party does not answer
- hang up

The MW lamp will flicker at your station and double flash at the called station.

To answer the message waiting at a called station

- lift the handset and press the ICM key
- wait for dial tone, then dial "0"

To cancel

- lift the handset and press the # key
- dial the called station number
- replace the handset

1.3.6 Other Features

1.3.6.1 Repertory Dialling

In addition to direct station selection, the Fl -F8 keys are used for repertory dialling. On each F key you may store one intercom number (as described earlier) and one outside number.

To store an outside number

- lift the handset
- press the DC key. The ICM lamp will glow when internal dial tone is heard
- press the HOLD key and the required F key where the number is to be stored
- dial the telephone number
- replace the handset. The ICM lamp will go out.

NOTE: If your system is an extension from a PABX and a pause is required within the telephone number, press BREAK key and continue to enter the remaining digits. Up to 20 digits can be stored including any pauses.

To call a stored outside number

- lift the handset
- press any free outside line key
- press the DC key
- press the required F key, the stored number will be called automatically

1.3.6.2 Transferring Outside Calls

To transfer without announcing

- ask the outside party to wait
- press the required Fl -F8 key, the line lamp will show normal hold
- press the HOLD key, the line lamp will change to a steady glow
- replace the handset

If the call is unanswered after a predetermined time it will recall at your station. The line lamp will show I-HOLD on your station and normal hold on all other stations.

To answer

A transferred call is signalled by a flickering line lamp and a fast repeating warbling tone.

- lift the handset
- press the LINE key

To transfer after announcing

- ask the outside party to wait
- call the second station via paging, DSS or intercom. The line will be held automatically
- announce the call
- when the wanted party has taken the call the line lamp will glow steadily.

To answer

After being advised of a waiting call

- lift the handset
- press the given LINE key.

Transferring a call from a key station to a standard telephone station

To transfer without announcing, use the procedure above.

To transfer after announcing

- ask the outside party to wait
- press the AD.ON key
- call the required standard telephone station (via ICM or DSS)
- press the AD.ON key
- replace the handset.

If the called station does not answer or is engaged

- press the AD.ON key to return to the held call.

1.3.6.3 Ring Transfer (from station 10 only)

The audible signal for outside calls can be transferred from station 10 to any number of other stations:

- lift the handset
- press ⌓ TR key. The ICM lamp glows and internal dial tone will be heard
- dial the required station numbers, separating each number by the pressing the # key
- replace the handset. The ⌓ TR lamp glows.

To cancel ring transfer

- lift the handset
- press the ⌓ TR key.
- replace the handset. The lamp will go out.

1.3.6.4 Night Transfer (from station 10 only)

When required your system may be switched to allow all outside calls to be directed to the programmed night transfer stations.

- lift the handset
- press the ⌓ TR key. ICM lamp glows, internal dial tone is heard
- replace the handset. The ⌓ TR lamp glows.

To cancel the night transfer mode simply repeat the above steps.

1.3.6.5 Abbreviated Dialling — programming procedures for station 10 only

Up to 60 frequently called numbers can be stored in the system memory for abbreviated number calling. All stations have access to stored numbers, but programming can be done only from station 10.

Numbers with up to 20 digits can be entered into memory locations 1 O-69.

Storing Numbers

- lift the handset
- press the DC key. The ICM lamp will glow, and internal dial tone will be heard
- press the HOLD key
- dial the required location number eg. 10
- dial the required telephone number eg. 123456
- to store more numbers, press the DC key and repeat the above procedure
- replace the handset

The telephone number 123456 is now stored in memory location 10. Any number previously stored for location 10 will be automatically erased.

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

1.3.6.6 Outside Call Conference

Two stations and one outside party can take part in a conference.

To set up the conference:

- ask the outside party to wait
- press the AD.ON key. The line lamp flickers
- call the second station via intercom using the special ring facility
- the called party answers by lifting the handset and pressing the ICM key
- press the AD.ON key. A triple burst of tone is heard.

The conference is then established.

If the intercom call is not answered press the AD.ON key to return to your caller.

1.3.6.7 Simultaneous Outside Line Calls

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

The second call is established as follows:

- ask your first party to wait
- press the AD.ON key. The line lamp flickers
- place the second outside call
- press the AD.ON key. A triple burst of tone is heard

The conference is then established.

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

- press the first party's LINE key
- press the second line key again and redial on receipt of dial tone

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

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

Either party can be released from the connection by pressing the line key of the incompleted call.

1.3.6.8 Three Station Conference

- call the first station and ensure that the called party answers using the handset
- press the AD.ON key
- listen for internal dial tone
- call the second station and ensure that the called party answers using the handset
- press the AD.ON key. A single burst of tone is heard.

The conference is then established

If any party replaces the handset the call can continue between the remaining parties.

1.3.6.9 Meet-me Conference

After making an all call or internal zone paging announcement for the called parties to "Add On"

- 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 AD.ON key

1.3.6.10 Room Monitor

The monitoring of sound in the vicinity of any On Hook station is set up as follows:

At the station to be monitored

- lift the handset
- press the MON key, the lamp shows a double flash
- replace the handset

At the station monitoring the sound

- press the MON key, the lamp flickers

Outside calls and intercom calls can still be made. However, Room Monitoring will be automatically suspended during the progress of a call and will resume when the call is completed.

Repeat the above procedures to cancel room monitor.

1.3.6.11 Power Failure

i) If a Power-fail Station is installed, incoming and outgoing calls can be made during a power failure simply by lifting the handset.

All other facilities are inoperative.

ii) When a power failure occurs, outside lines are automatically switched through to pre-assigned stations as follows:

OUTSIDE LINE	POWERFAIL STATION CONNECTION
1	10
2	11
3	14
4	15
5	18
6	19
7 (Exclusive Line)	22
8 (Exclusive Line)	23

Incoming calls are signalled via a remote bell unit which is equipped with both audible and visual signalling. One remote bell is provided for each line required for use during power failure.

All other facilities are inoperative.

1.3.7 Optional Features

1.3.7.1 Do Not Disturb

To activate the Do Not Disturb facility, press the AD.ON key with the handset on hook. All audible signals to your station will be blocked. The AD.ON lamp will show status.

Press the AD.ON key again to restore normal service.

1.3.7.2 Call Forwarding

Pressing the AD.ON key will transfer incoming intercom and exclusive line call signals to a predetermined station. To restore normal service, press the AD.ON key again. The AD.ON lamp will go out.

1.3.7.3 Exclusive Line

An exclusive line is an outside line which is dedicated to one station only. The exclusive line appears instead of LN6 at the assigned station.

1.3.7.4 Priority Break-In

Stations equipped with this facility are able to break into a busy conversation.

There are three categories in this break-in facility:

Category I — stations can break in to busy outside line and intercom calls.

Category II — stations can break into intercom calls and make a ring signal call to a station on an outside call.

Category III — stations can send a ring signal call to a busy station.

To break-in

If, when making an intercom call, busy tone is heard, press the BREAK key. Intrusion tone will be heard by both parties in the conversation.

1.3.7.5 Background Music

On systems where background music is provided it can be heard through the speaker by pressing # key once.

To turn the music off press # key once again.

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

1.3.7.6 Music-On-Hold

On systems where background music is provided, a caller may hear this music when placed on hold.

1.3.7.7 PABX Recall

If your system is an extension from a PABX, the RL key can be used to obtain hold and transfer features.

1.3.7.8 Ring Cancel (except Station IO)

Stations equipped with this facility are able to stop audible signalling for incoming exchange line calls by pressing the ⌓ TR key with the handset off hook. The ⌓ TR lamp will show status.

Press the ⌓ TR key with handset off hook to restore audible signalling.

1.3.7.9 Headset Station

Plug the headset into the socket on the left side of the station.

To use the station in the headset mode press the SPKR key with the handset on hook. To terminate the call press the SPKR key again.

Incoming talkback on voice call intercom calls are connected immediately to the headset. Ring signal intercom calls are answered by pressing the SPKR and ICM keys.

A headset station will operate as an On Hook station when the headset is unplugged.

1.3.8 Optional Equipment

1.3.8.1 Handsfree Station

Handsfree stations feature a display, 16 Direct Station Selection keys F1-F16, and display control feature keys.

The station numbers for direct station selection on keys F1-F16 are preassigned for the Handsfree Station.

The F1-F16 keys are also used to store outside numbers for Repertory Dialling (see 1.3.6.1 .).

The following facilities are available in addition to the standard station facilities described earlier:

Dialled Number Display

When dialling out the number dialled will be shown on the display. The last 1 1 digits will remain displayed during the progress of the call, or can be cleared by pressing the CLOCK key.

Clock

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

Timer

The timer can be used either as a stop-watch or to time call duration in hours, minutes and seconds.

Starting the timer

- press the TIMER key. The elapsed time will be shown in hours, minutes and seconds.

Stopping the timer

- press the TIMER key or replace the handset
- press the CLOCK key to return the display to the clock mode.

Alarm Clock

The clock can be set for three separate alarms. Alarms 1 and 2 are non-repeatable while Alarm 3, when set, will go off at the set time every day.

To set alarm 1

- lift the handset
- press the ALARM key
- press . for AM or # for PM
- dial the required time, 2 digits for the hour and 2 digits for the minutes eg, 03-35
- replace the handset. The (⍾) symbol glows on the display to indicate an alarm has 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 10 minutes.

The alarm setting can be checked by lifting the handset and pressing the ALARM key.

To set alarms 2 and 3, follow the above steps, but press the ALARM key twice for alarm 2 and 3 times for alarm 3.

To cancel a set alarm, eg. alarm 1

- lift the handset
- press the ALARM key. The set time for alarm 1 will be displayed
- press .
- replace the handset

To cancel alarms 2 and 3, follow the above steps but press the ALARM key twice for alarm 2 and 3 times for alarm 3.

Clock Setting

If station 10 is a handsfree station, the time, date, year and day may be set as follows:

Enter the clock set mode by going off-hook and pressing the SET key.

To set time

- press clock key once
- dial . for AM or # for PM
- dial the time (four digits), e.g. 9 o'clock — 0900
- dial *#

To set date

- press clock key twice
- dial the date (four digits), e.g. 2 1 st June — 062 1
- dial *#

To set year

- press clock key three times
- dial the year (four digits), e.g. 1986
- dial *#

To set day

- press clock key four times
- dial day of week (1 digit) 0 Sunday — 6 Saturday
- dial *#

Leave the clock set mode by pressing the SET key and replacing handset.

Handsfree Operation

To use the station in the handsfree mode press the SPKR key with the handset on hook. To terminate the call press the SPKR key again.

Lift the handset to change from handsfree mode to normal conversation.

If you wish to disable the microphone during a handsfree conversation press the MIC key. To enable the microphone press the MIC key again.

Message Waiting Check

If the MW lamp is indicating that there is a message waiting, press MW key to display the originating station number. If more than one message has been left, repeated pressing of the MW key will show the numbers of the stations that have left messages.

If you are engaged on an outside call and an intercom call arrives, press the MW key and the calling station number will be displayed.

NOTE: The number will not be shown if the display is in the timer mode.

Repertory Dial Check (see 1.3.6.1 for storing numbers for Repertory dialling)

To display the numbers stored for repertory dialling

With the handset on-hook

- press the CHECK key
- press the required F1-F16 key. The stored number will be displayed.

If the number exceeds 1 1 digits, press the . key to display the remaining digits.

Abbreviated Dial Check

To display numbers which have been stored for abbreviated code dialling

With the handset on-hook

- press the CHECK key
- dial the abbreviated code (1 O-69). The stored number will be displayed.

If the number exceeds 1 1 digits, press the . key to display the remaining digits.

Brightness Control

The brightness of the display can be changed by pressing the ☼ key to one of the three levels.

Battery Low Alarm

"ALM3" will flash slowly on the display at all handsfree stations to indicate battery low condition. If this occurs, call Service Difficulties on 1 100 immediately.

1.3.8.2 Standard Telephone Station

Intercom calls

Making an Intercom Call

- lift the handset, listen for dial tone
- dial the required station number
- speak after hearing a single burst of tone

If a double burst of tone 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 continuing ring signal is being sent to the called station.

Busy tone means the party is engaged on another call.

A repeating double tone means the station is in the "Do Not Disturb" mode (1.3.7.1).

Intercom Camp On

If busy tone is heard when making intercom calls

- dial 1.

Provided you remain off hook, the intercom call will be automatically established when the called station is free.

NOTE: This feature is not provided if the called station is programmed for off hook signalling.

Intercom Call Back

If busy tone is heard when making intercom calls

- dial 1
- replace the handset.

When the called station is free your station will ring.

- lift the handset and the intercom calls will be automatically established.

NOTES: If the call back is not answered within 20 seconds the call is cancelled.

This feature is not provided if the called station is programmed for off-hook signalling.

Incoming Intercom Calls

- Simply lift handset to answer.

Three Station Conference

- call the first station and ensure the called party answers using the handset
- quickly depress and release the switchhooks
- listen for special facility tone
- call the second station and ensure the called party answers using the handset
- quickly depress and release the switchhooks, a single burst of tone is heard.

The conference is then established.

Outside Calls

Outgoing

- lift the handset, listen for dial tone
- dial 0 to connect to any free line
- listen for outside dial tone, then dial the wanted number.

To seize a line from a particular group dial 9 instead of 0, then the group number l-6.

If an exclusive line is assigned dial 0 to seize the exclusive line.

Outside Line Request

If all outside lines in your group are busy, you may request the next free line, when busy tone is heard.

- dial the line group number 1-6
- 3 bursts of tone will be heard
- replace the handset.

When a line in your group becomes free, your station will ring

- lift the handset, outside dial tone will be heard.

NOTE: If the call is not answered within 20 seconds the request will be automatically cancelled.

Incoming Calls

- Simply lift the handset to answer an incoming call signalled at your station.

Enquiry 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 the required station number for the enquiry call
- depress and release the switchhooks to return to the held call.

Transferring an Outside Call

- ask the outside party to wait
- quickly depress and release the switchhooks
- hear special facility tone
- dial the required station number, ensure the called party answers using the handset
- announce the call
- replace the handset, the call is automatically transferred.

Outside Call Conference

A conference can be set up between two stations and an outside party by following the procedure for holding an outside call, but dialling 3 before the required station number.

PABX Recall

If your system is an extension from a PABX, to obtain hold and transfer features

- quickly depress and release the switchhooks
- hear special facility tone
- dial 4

Last Number Redial

- Select an outside line
- quickly depress and release the switchhooks
- hear special facility tone
- dial 5.

The last number called will be automatically dialled.

Abbreviated Dialling

Standard telephone stations have access to the system memory which contains up to 60 frequently called telephone numbers.

To call a stored number

- select an outside line
- quickly depress and release the switchhooks
- listen for special dial tone
- dial 6 and the abbreviated dial code, 1 O-69.

The stored number will be automatically dialled.

Repertory Dialling

This facility allows you to store up to 8 frequently called outside numbers for abbreviated dialling. Only your station will have access to these stored numbers.

To store a number

- lift the handset, listen for internal dial tone
- dial 7, listen for special facility tone
- dial the required location number 1-8
- dial the telephone number
- replace the handset.

To call a stored number

- select an outside line
- quickly depress and release the switchhooks
- listen for special facility tone
- dial 7 followed by the required location number 1-8.

The stored number will be automatically dialled.

Paging

To make a paging call

- lift the handset, listen for dial tone
- dial the required paging code

Paging codes

all call paging	80
internal zone 1	81
internal zone 2	82
internal zone 3	83
internal all-zone	84
external zone	85

Call Forwarding

To set call forwarding

- lift the handset, listen for dial tone
- dial 3
- hear 3 tone bursts if call forwarding is successful
- replace the handset.

Incoming call signalling will be transferred to a predetermined station.

To cancel call forwarding

- lift the handset, listen for dial tone
- dial 4
- hear 3 tone bursts if cancel is successful
- replace the handset.

Follow Me

To set follow me

- lift the handset, listen for dial tone
- dial 5
- dial your station number, then the station number to which your calls will be diverted
- dial 5
- hear 3 tone bursts if follow me is successful
- replace the handset.

Incoming intercom calls will be diverted.

To cancel follow me

- lift the handset, listen for dial tone
- dial 6
- dial your station number
- dial 6
- hear 3 tone bursts if cancel is successful
- replace the handset.

1.3.8.3 Call Details Recorder

This facility provides call data printouts via a terminal printer. Details of calls made and received on your Commander AN system are printed in 5 categories.

The categories and abbreviations for each are:

outgoing	OTG
incoming	INC
all trunks busy	ATB
barred outgoing	BRD
Buffer full	BFL

The details for each category will include date, time, line number or group number, duration, station number, number dialled, ring duration before answer (incoming only) and if required an account code.

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

CDR PRINTOUT

Example:

PAGE 001

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	16:00:00	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 last 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 this column 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)

4 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. 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 ● . 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.

1.3.9 Service Dlff iculties and assistance

1.3.9.1 Service Difficulties

If difficulties are encountered call Service Difficulties on 1 100.

1.3.9.2 Assistance

Telecom Australia has skilled Service Advisers 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.

1.4 SYSTEM CAPACITIES AND COMPONENTS

1.4.1 System Capacities

The maximum capacities of the system are tabulated below:-

Total Exchange Lines	8
Common Exchange Lines	6
Exclusive Lines	8 (Note)
Intercom Links	3
Monitor Links	1
Stations	16

Note: Any exchange line can be assigned as an exclusive line, up to the maximum of 8 lines.

Refer to Appendix for further information.

Call Metering Unit

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

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 2WLB-AN boards so that the standard telephone station may be used with line loops up to 1500 ohms. One unit is required per 2WLB-AN board.

Ring Generator Unit (RGU-AN)

The unit provides ring voltage for signalling to two-wire telephone stations. One unit provides ring for one 2WLB-AN board.

1.4.2 System Limits

ITEM	SPECIFICATION
Max. Loop Limits : System Stations Two-wire Extensions with two-wire extender unit.	 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 ohm 15 mV (rms)
External Page Output Output Impedance Output Level	 1 kohm 300 mV, Load 10kohm
Power Requirements AC Mains Voltage Max. Power Dissipation	 225 to 270 V (rms) at 50Hz 160VA
Operating Temperature System Stations	 0°C to +45°C 0°C to +45°C
Relative Humidity	10% to 95%
Weight Main Equipment Stations	 11 Kg 1 Kg

Table 1.4.2 — SYSTEM LIMITS FOR COMMANDER-AN

1.4.3 System Components

The system is made up of the following items; main equipment (ME-AN), stations and powerfail bells. In addition the following items are available; call metering unit (CMU), 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 one shelf rack which houses a removable power supply and a number of polarised plug-in printed circuit boards. Refer to table 1.4.3(i) for details of the printed circuit boards housed in the main equipment rack.

BOARD CODE	BOARD DESCRIPTION	MAXIMUM QUANTITY
CPB-AN	CENTRAL PROCESSOR BOARD (ESSENTIAL) This board has the main CPU, ROM containing the operational programme, RAM containing site dependent data and abbreviated dial numbers, the dialling circuits and station-to-main CPU interface circuits.	1
SLB-AN	EXCHANGE LINE & STATION BOARD This board contains interface circuitry for 2 exchange lines and 4 stations, the crosspoint matrix and powerfail relays.	4
TMB-AN	OPTIONAL FACILITIES BOARD This board contains voice switch circuits, real time clock data, internal music-on-hold generator and interface circuits for external music source and external paging.	1
2WLB-AN	TWO-WIRE STATION LINE BOARD This board contains interface circuitry for two exchange lines and four standard telephone stations, the crosspoint matrix and powerfail relays.	3
CDRB-AN	CALL DETAILS RECORDER BOARD This board contains circuitry to interface with a printer to print a record of outside line calls.	1

Table 1.4.3(i) — BOARDS USED WITH ME-AN

(ii) Stations

There are three types of stations; basic, on-hook and handsfree stations.

Basic stations contain a telephone network including handset, a dial key pad, non locking function keys, status lamps and electronics to control the station's operation.

On-hook stations contain, in addition to the above, a microphone, a speaker and a volume control.

Handsfree stations also contain additional function keys, a handsfree board and a display capable of displaying a large variety of information.

(iii) Powerfail Dial

A powerfail dial, either decadic or VF, can be installed into an on-hook or a handsfree station to provide dialling facility during power failure. The dial contains an electronic buzzer to indicate the incoming calls during power failure.

(iv) 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.

(v) Tie Line Unit (RTIU)

The RTIU is a small sub-rack which provides the possibility to interface with tie lines with a maximum capacity of two tie lines per sub-rack and a standard board.

The RTIU is equipped with its own power supply (PSB-C). The components which can be used with the RTIU are shown in table 1.4.3.(ii)

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

Table 1.4.3 (ii) — BOARDS USED WITH THE RTIU

(vi) 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 Line Board.

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

The two-wire extender unit provides a power supply to the 2WLB-AN boards to allow two-wire stations to be connected with loop lengths up to 1500 ohms.

(viii) Powerfail Bell

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

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

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

(ix) Headset Adapter Kit (HAK-AN)

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.

(x) Customer Provided Optional Equipment

An amplifier and loudspeakers for external zone paging options.

A music source for background music and hold music.

(xi) Test and Programming Unit (TPU-AN)

The test and programming unit contains the display, function keys, DSS keys and dial of a Handsfree Station. The TPU-AN may be used to programme system data.

1.5 BLOCK DIAGRAM DESCRIPTION

1.5.1 System Block Diagram

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

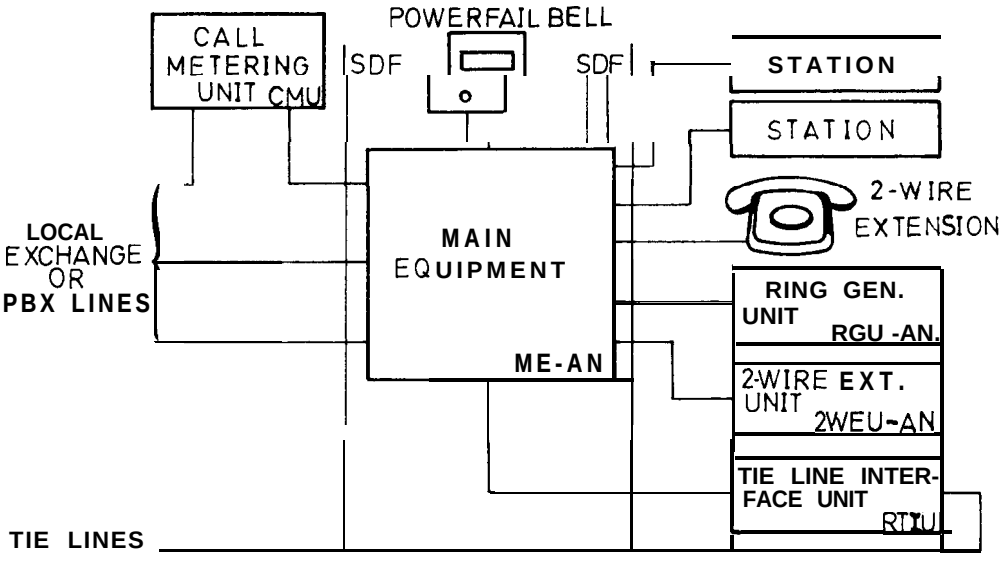


Fig. 1.5.1 — SYSTEM BLOCK DIAGRAM

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

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

Stations and standard telephone extensions are connected to the ME ports. Handsfree, on-hook and basic stations are connected to ME by 4 wires, one pair is the speech pair and the other is for data transmission and power feed to the station.

Standard decadic telephones, standard telephone stations, are connected to the ME by a single pair of wires. Audio communication and decadic 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 (8.5 km of 0.5mm cable).

1.5.2 Main Equipment Block Diagram

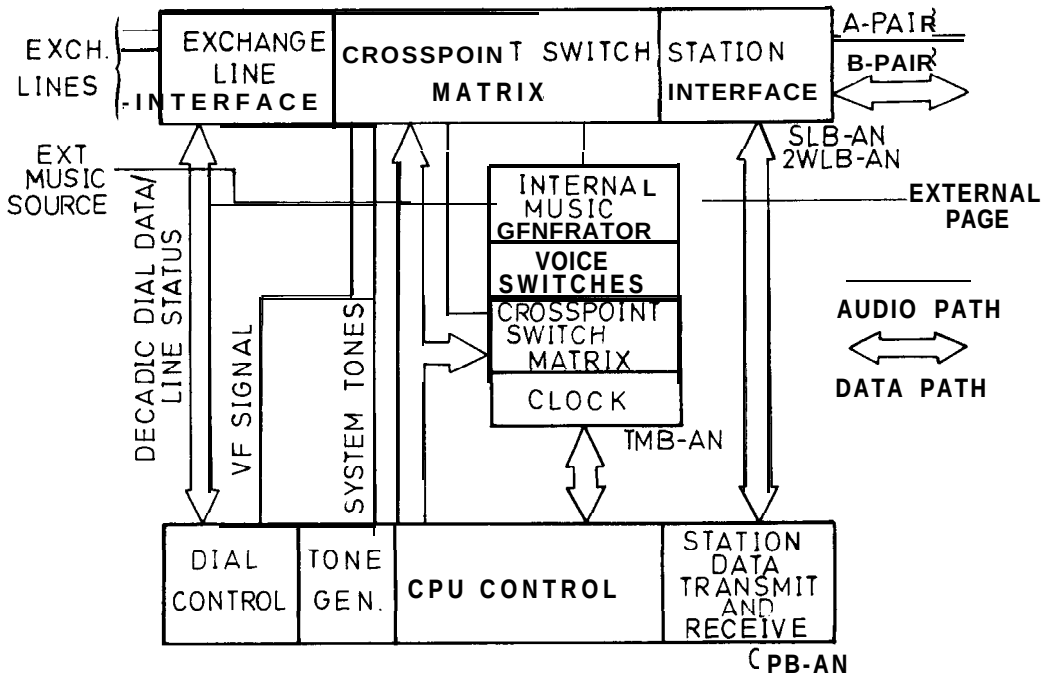


Fig. 1.5.2 — MAIN EQUIPMENT BLOCK DIAGRAM

CPU Control consists of the 280 microprocessor, 48K ROM program memory, 8K RAM site dependent data, 1.8 MHz clock, timing and control circuitry.

Dial control generates the required decadic and VF dialling pulses. The VF signal is routed through the crosspoint switches to the required exchange line. The decadic dial data directly controls the dialling relay in the Exchange Line Interface.

Tone generator provides the required system tones under the CPU control.

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

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

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

Station Interface provides circuits for transmission of voice and serial data between the stations and the ME. For two-wire station interface block diagram, refer to section 1.5.4.

Internal Music generator contains a music generating circuit, a switch selecting either internal or external Music-On-Hold source and interface and level controls for external Music-on-Hold and Background music sources. It also contains an external page interface circuit.

Voice switches are electronic circuits used for talkback intercom calls.

The Clock circuit maintains a real-time clock used to update the clock display on the handsfree stations and for the call details recorder.

1.5.3 Station Block Diagram

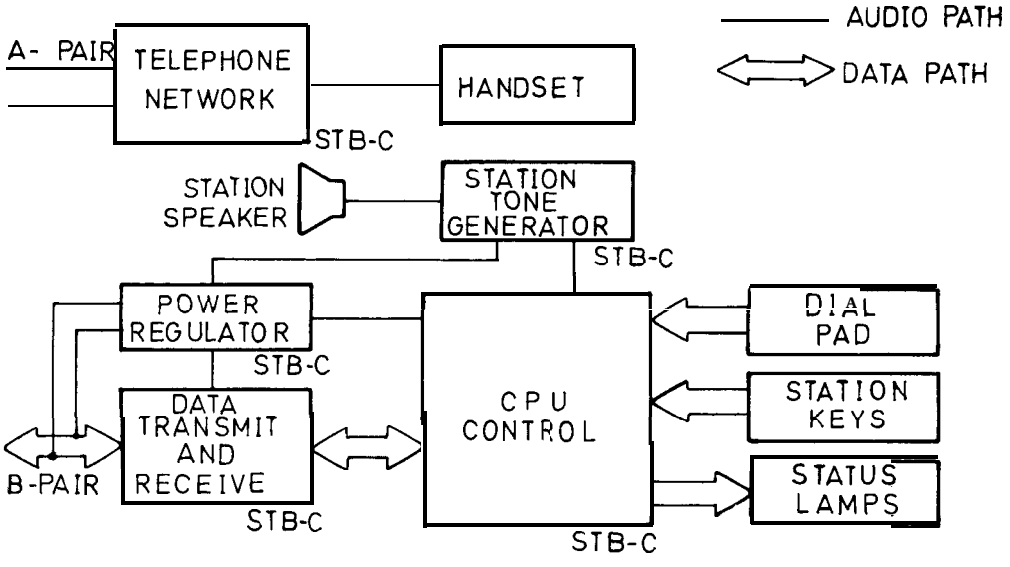


Fig 1.5.3(a) — BASIC STATION BLOCK DIAGRAM

Telephone Network, transmission circuit and Handset are connected to the ME audio path by the A-pair. An electronic transmission circuit customised for the Australian network is used with identical transducers for transmitter and receiver.

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

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

CPU Control carries out processing of data received from the main equipment to control tones and LED's, as well as sending station status data back to the main equipment.

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

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

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

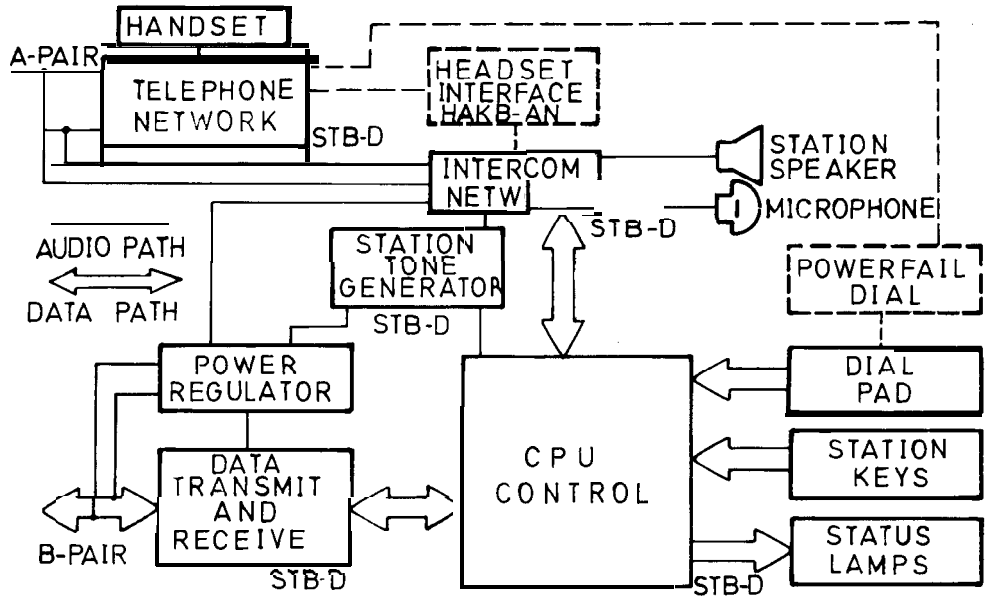


Fig. 1.5.3(b) — ON-HOOK STATION BLOCK DIAGRAM

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

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

The Headset Interface permits connection of FEATHERSET or STYLELITE headsets to the station.

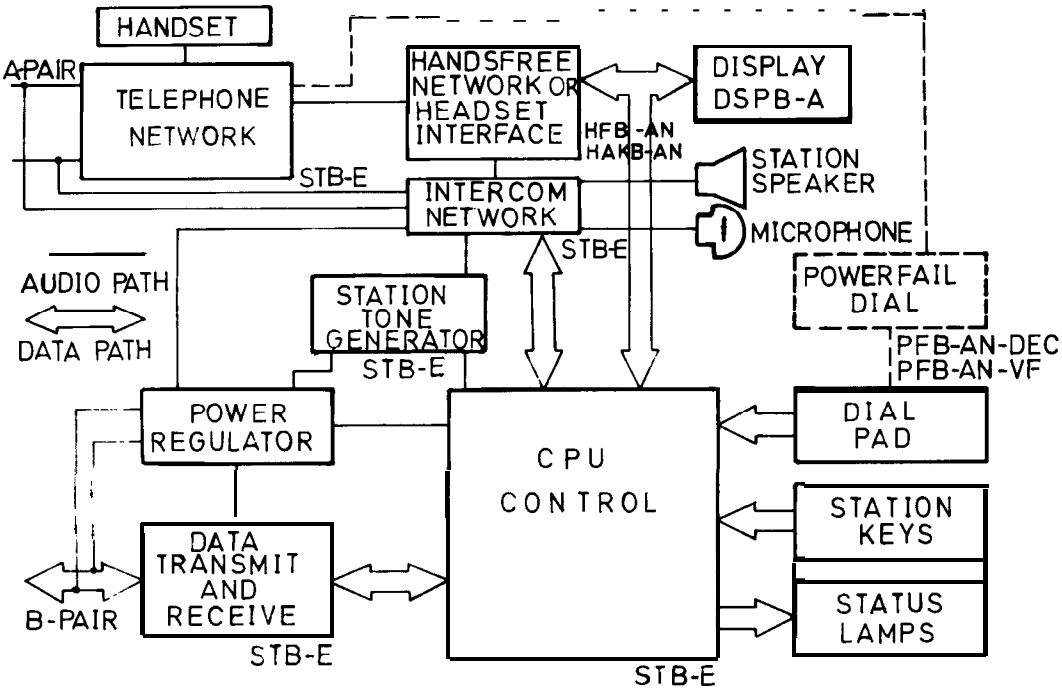


Fig. 1.5.3(c) — HANDSFREE STATION BLOCK DIAGRAM

The Handsfree network allows both outside line and intercom calls to be conducted without using the handset. The circuit incorporates an automatic gain control for the speaker to compensate for different line conditions.

The Display provides access to a clock, timer and a variety of other information. The data from the CPU control drives a processor on the display board which controls the 11 digit fluorescent display and provides clock and timer features. The station clock is updated every hour from the main equipment.

1.5.4 Two-Wire Standard Telephone Station Interface

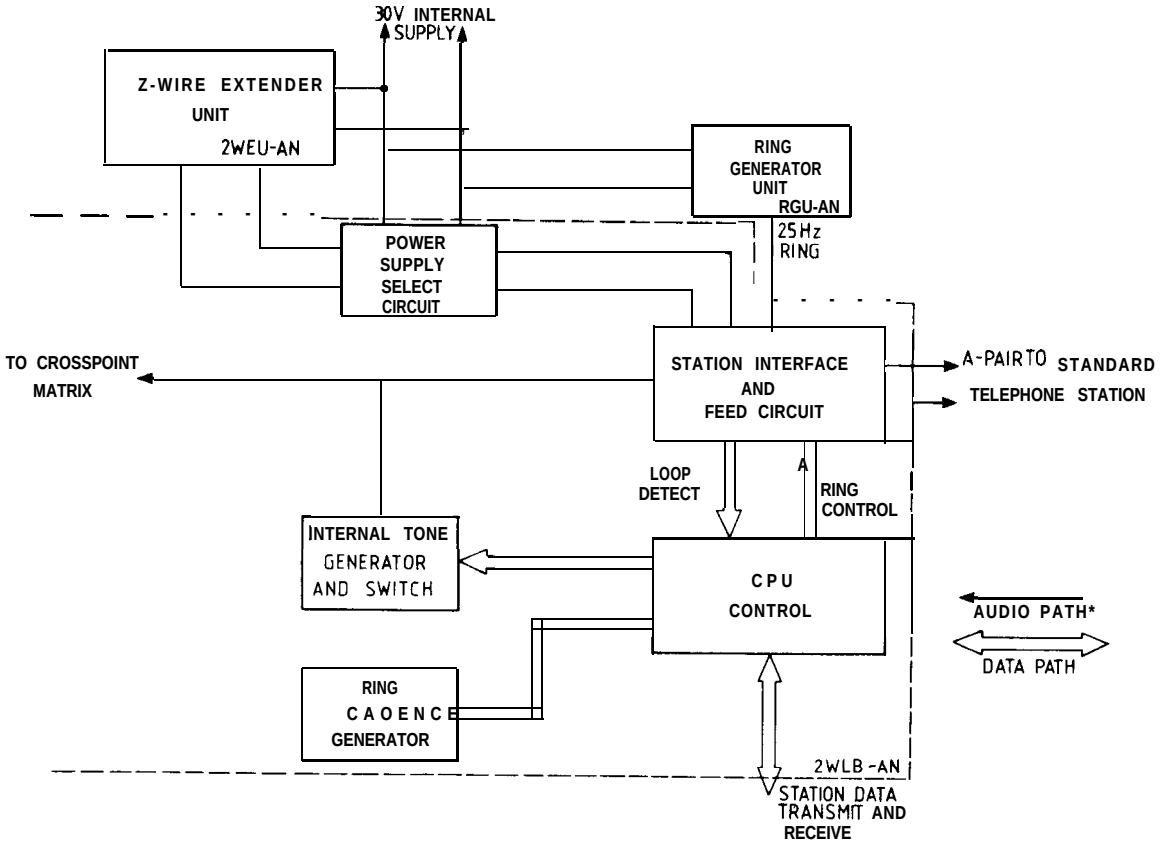


Fig. 1.5.4 — TWO-WIRE STATION INTERFACE

Station Interface and Feed Circuit provides the audio path to connect a standard telephone station to the system, the d.c. power supply and the connection for ring.

The CPU Control processes data received from the central processor to control the switching of the ring signal and internal tones to the stations. It also sends to the central processor, data related to the status of the standard telephone station.

Each 2WLB-AN board provides four CPU Control and Station Interface and Feed circuits, one for each standard telephone station.

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 8.5 km.

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

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

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

1.5.5 Call Details Recorder (CDR-AN)

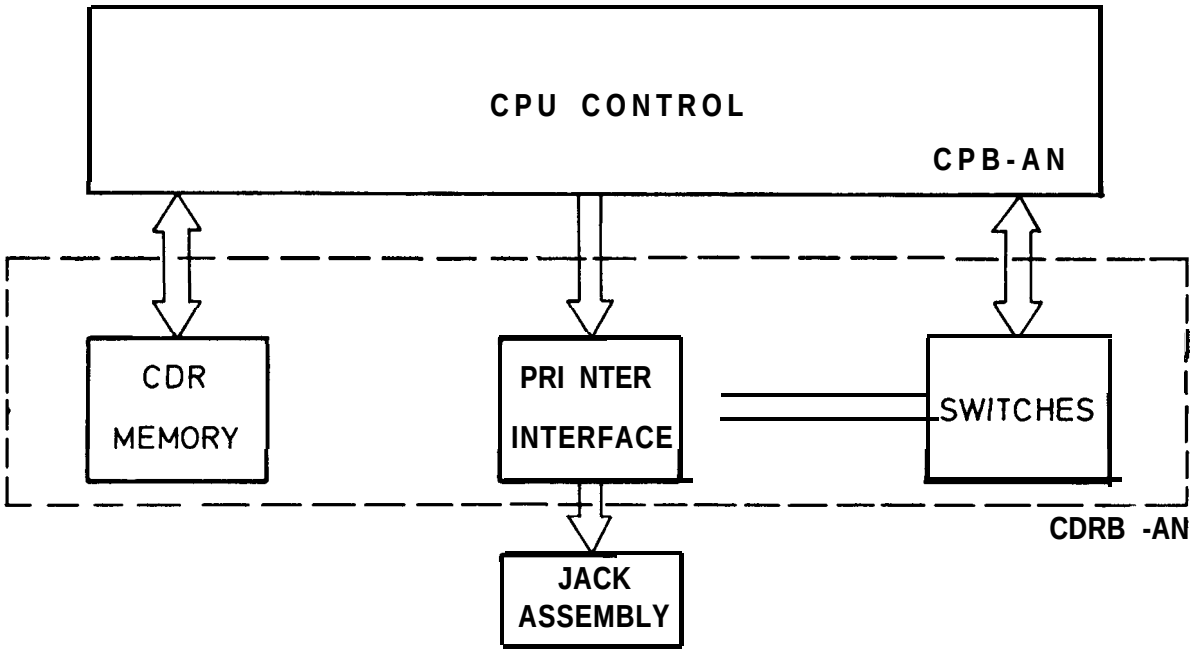


Fig. 1.5.5 — CALL DETAILS RECORDER

CDR Memory is used to store call details for each exchange line until the printer is ready for data.

Printer Interface sends serial data to the printer in RS-232C format at 150, 300, 600, 1200, 2400 or 4800 baud.

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

Jack Assembly provides connection between the CDR board and a standard RS-232C cable.

2. INSTALLATION

2.1 INTRODUCTION

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

1. Using the Sales Form, the necessary equipment must be ordered.
2. Mount components, Main Equipment, SDF, Stations, Powerfail Bell, Ring Generator Unit, RTIU and Call Metering Unit.
3. Cable the site.
4. Terminate cables at ME, SDF, 610 Sockets, Powerfail Bell, 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.
6. Power-up the system.
7. Check cabling by measuring voltages at 6 10 sockets.
8. Connect powerfail dials or Headset Adaptor Kits to the associated stations. Plug-in stations.
9. Programme the system using information provided on the sales form.
10. Carry out the functional test to ensure the system is operating correctly.
11. Write-up the site records.

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

2.2 SALES INFORMATION

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

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

The information provided in this form will enable the ordering of the various items required for the installation. It also provides information required when programming the system. Note that the system may be provided as packages — refer to Appendix A, Serial and Item Number Parts List.

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

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

COMMANDER TELEPHONE SYSTEM ORDER

Telecom Australia

Refer *Instructions* on reverse

MODEL AN 616

Use for application to purchase/rent Commander Telephone System

Tick required boxes

CUSTOMER'S NAME

ADDRESS

TOWN OR SUBURB **POSTCODE**

NATURE OF BUSINESS

CUSTOMER CONTACT **TELEPHONE**

SALES CONTACT **TELEPHONE**

STD CODE **SERVICE NO.** **PBX EXTN** IF OFF PBX

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

a ☐ Sale (other than deferred payment)

☐ Rental

☐ Deferred payment

TYPE OF COMMANDER

☐ 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)

If removal, specify equipment at old address

TARIFF SECTION — Section 1	Qty.	PRODUCT CODE	SALE PRICE $	ANNUAL RENTAL $	ANNUAL SERVICE FEE $	INSTALLATION CHARGE $	INSTALLERS ONLY
Basic Package							
Expansion Package							

Section 2	PRODUCT TARIFF CODE	Qty.	PRODUCT CODE	SALE PRICE at $	SALE PRICE total $	ANNUAL RENTAL at $	ANNUAL RENTAL total $	ANNUAL SERVICE FEE at $	ANNUAL SERVICE FEE total $	INSTALLATION CHARGE at $	INSTALLATION CHARGE total $
Main Equipment (Not Available)											
Exchange/Station Module											
2-Wire Station Module											
2-Wire Extender Unit											
Tie Line Interface Unit											
Tie Line Connector Module											
Powerfail Module VF											
DEC											
C.D.R. Module											
Station Instruments (Do not include package instruments)											
On Hook Stations											
Handsfree Stations											
2-Wire Station (int or rem)											
System Options											
Powerfail Bell											
C.D.R. Printer											
Station Options											
Headset Adapter Kit											
			Total								

EXCHANGE/TIE LINE CONNECTION DETAILS

LINE NO.	SERVICE ORDER NO.	SERVICE NO.	EXCH.	Rotary No.	VF	DEC	TIE LINE NON PABX	TIE LINE PABX	PABX RECALL EARTH	PABX RECALL HOOK/SWITCH	Power fail bell	EXCLUSIVE LINE TO STN. NUMBER
1												
4												
5												
6												
7												
8												
		Totals										

COMMANDER TELEPHONE SYSTEM ORDER MODEL AN616

SYSTEM PROGRAMMABLE OPTIONS

PROGRAMMABLE OPTIONS	Tick if **Req.**			
MUSIC ON HOLD				
BACKGROUND MUSIC				
MEET ME ANSWER PAGING				
INTERCOM CALL SIGNAL				
INTERCOM VOICE CALL		Microphone ON		OFF
3 MINUTE AUDIBLE SIGNAL				
I-HOLD RECALL		Timer Settmg		(enter number of secs.)
EXCLUSIVE HOLD RECALL		Timer Settmg		(enter number of secs.)
AUTO-RECALL		Timer Settmg		(enter number of secs.)
RING-INWARD TIMER		Timer Setting		(enter number of secs.)
ACCESS PAUSE TIMER		Timer Setting		(enter number of secs in milliseconds)
STATIONS ACCESS BARRING		See Sheet 3 for Stn. assignment to classes		
		CLASS B BARRED I.S.D. CODE		
		CLASS C ALLOWABLE NOS/CODES		
		CLASS D CODES BARRED	Max. No. Length	Digits
		CLASS E PABX CODE	Enter PABX code	
		CLASS F Common Access Codes		
C.D.R. PRINTOUT OPTIONS		INCOMING CALLS		
		Print all incoming calls, or ..		
		Print selected account codes only		
		SELECT TIME DELAY FOR RECORDING CALLS		
		1 sec , or 5 secs. after dialling completed		
		OUTGOING CALLS		
		PRINT OUTGOING CALLS,		
		—Preceeded with account code		
		-Without account code		
		-Exceeding a 1 minute duration		
		—exceeding specified number length		
		STATIONS/LINE GROUPS NOT PRINTED		
		-select stations for non-printing of outgoing calls		
	Stn. Nos.			
		-select exchange lines for non-printing of outgoing calls		
	Exch. line nos.			
		-barred stations outgoing calls printed		

PERMITTED ATTACHMENTS	Tick if Req.	Permit No.	Mode of Connection	Service Order No.
BACKGROUND MUSIC EXT.				
MUSIC ON HOLD				
EXTERNAL PAGING				

INSTALLING OFFICER'S COPY

178 1/10/84 (Sheet 2 of 3 Sheets)

COMMANDER TELEPHONE SYSTEM ORDER MODEL AN616

STATION PROGRAMMABLE OPTIONS

STATION PROGRAMMABLE OPTIONS (tick Stn nos.)		STATION NUMBERS															
		10	11	12	13	14	15	16	17	16	19	20	21	22	23	24	25
POWER FAIL LINES		1	2			3	4			5	6			7	8		
STATIONS TO INCOMING CALL SIGNALLING DAY	1																
	2																
EXCH LINE NOS.	3																
	4																
	5																
	6																
STATIONS TO INCOMING CALL SIGNALLING NIGHT																	
OUTGOING ACCESS TO EXCHANGE LINES	1																
	2																
	3																
	4																
	5																
	6																
OFF-HOOK SIGNALLING																	
DO NOT DISTURB																	
CANCEL EXCHANGE LINE CALL SIGNALLING																	
CALL FORWARDING (enter station no. to be forwarded to)																	
INTERNAL ZONE PAGING (enter zone number, 1,2,3)																	
PRIORITY BREAK-IN (Enter category no., 1,2,3)																	
STATION ACCESS BARRING (enter access code a,b,c,d,e,f)																	
POWER FAIL STATION TYPE (enter VF or DEC)																	
STATION TYPE -ON HOOK																	
-HANDS FREE																	
-P-WIRE																	

EXCHANGE LINE REQUESTS	GROUP No.	EXCHANGE LINE Nos.
	GROUP No.	EXCHANGE LINE Nos.
	GROUP No.	EXCHANGE LINE Nos.
	GROUP No.	EXCHANGE LINE Nos.
	GROUP No.	EXCHANGE LINE Nos.
	GROUP No.	EXCHANGE LINE Nos.

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.

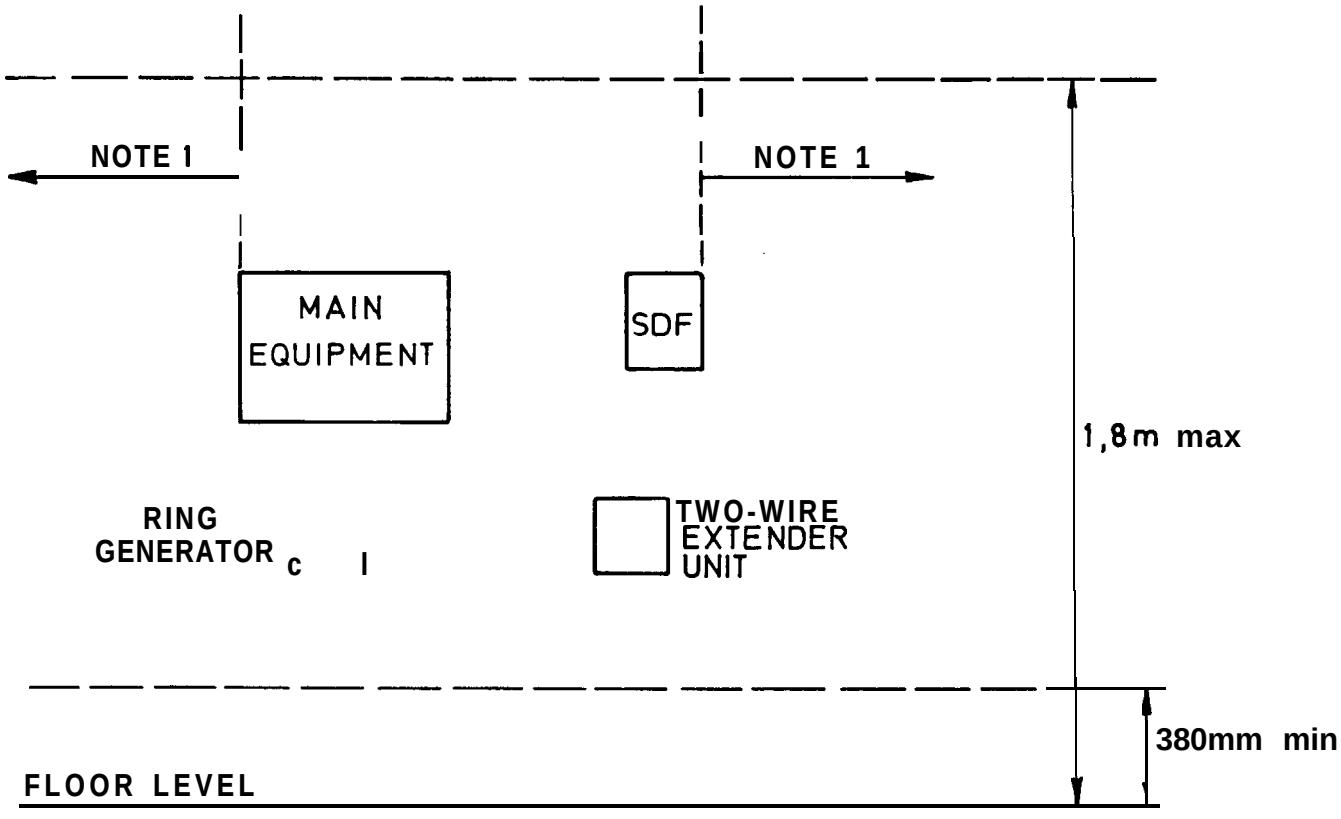
The customer is responsible for providing satisfactory lighting for installation and maintenance activities.

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 than 1.8m from the floor as indicated in fig. 2.3.1.

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



Notes: 1. Minimum clearance of 300mm on each side.
2. The drawing is not to scale.

Fig. 2.3.1 — LIMITATIONS TO WALL MOUNTING

2.3.2 Main Equipment

The cabinet dimensions are shown in fig. 2.3.2(a).

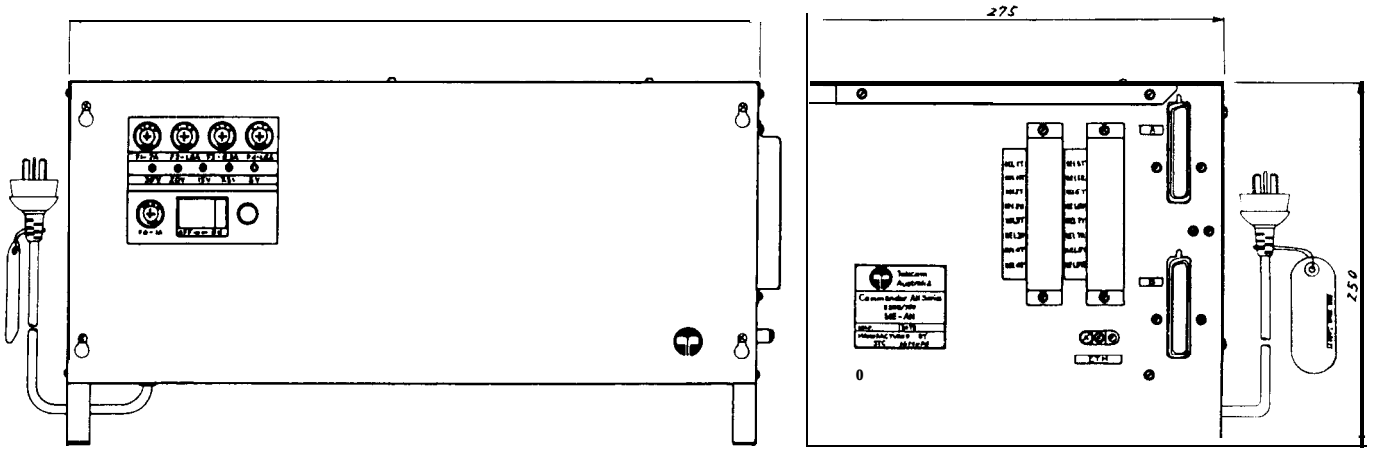
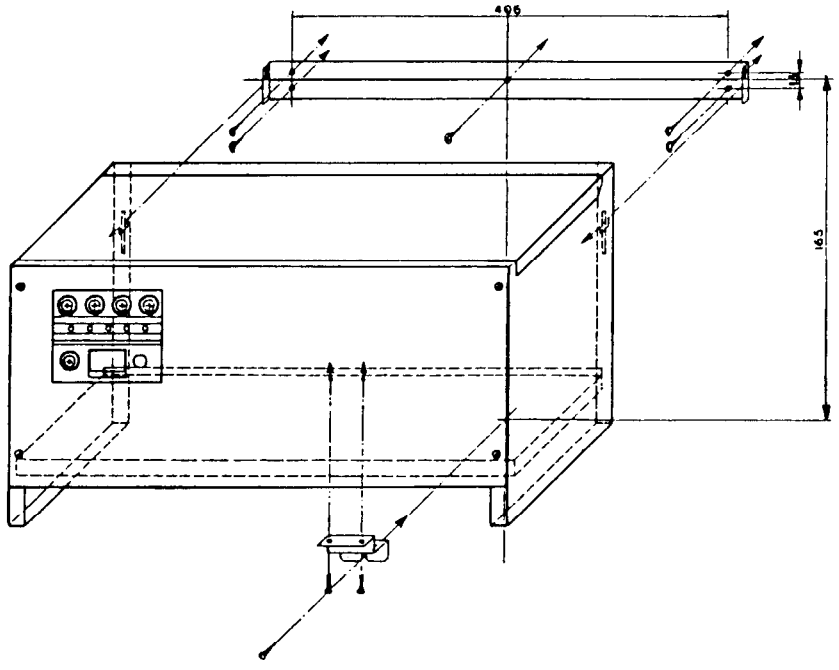


Fig. 2.3.2(a) — MAIN EQUIPMENT CABINET DIMENSIONS

The main equipment cabinet is wall mounted. Attach the wall mounting bracket to the wall using the five wood screws provided. Attach the base bracket to the main equipment and hang the main equipment on the wall mounting as shown in fig. 2.3.2(b). Fasten the bottom of the cabinet by tightening a screw through the base bracket.



all dimensions in mm.

Fig. 2.3.2(b) — WALL MOUNTING OF THE MAIN EQUIPMENT CABINET

2.3.3 System Distribution Frame (SDF)

The SDF provides a common terminating point for the main equipment, stations and other anciliary equipment.

The SDF is constructed using the Krone 'LSA' Plus terminating system. One 10 Module Backmount Unit is required. It is supplied with two brackets which slips onto the ends of the metal backmount channel. The assembled unit is then fastened to the wall using screws inserted through two 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:

SDF Size : 50 pairs
Amp CHAMP connectors : 2
Krone Modules : 5

2.3.4 Stations

There are three types of stations available with this system. They are Handsfree, On-Hook and Basic station.

2.3.4.1 Wall Mounting

The following steps describe how to wall-mount the stations. Refer to fig. 2.3.4 (a), (b) and (c).

- **Remove sub-base unit from the station (disconnect the ribbon cable from the PBA if the station is Handsfree type).**
- **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 over-tighten 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. @e-connect the ribbon cable to the PBA if the station is Handsfree type.)**
- **The line cord may be hidden underneath the station.**

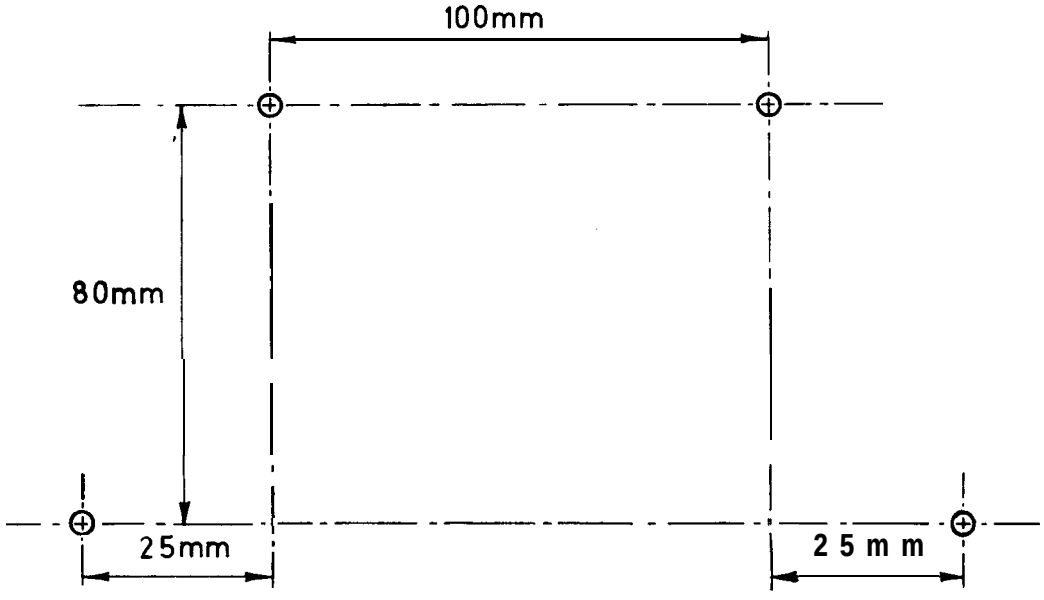


Fig. 2.3.4(a) — WALL MOUNTING FOR STATIONS

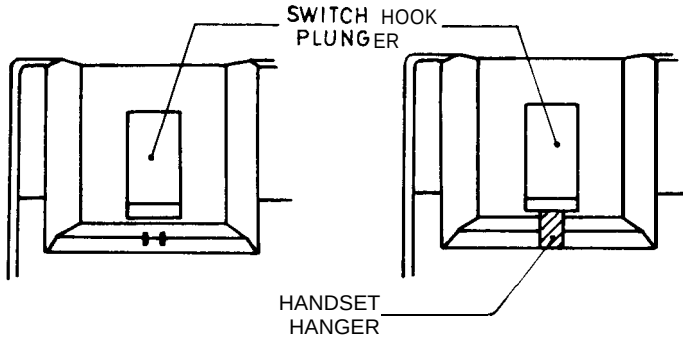


Fig. 2.3.4(b) — HOW TO INSTALL THE HANDSET HANGER

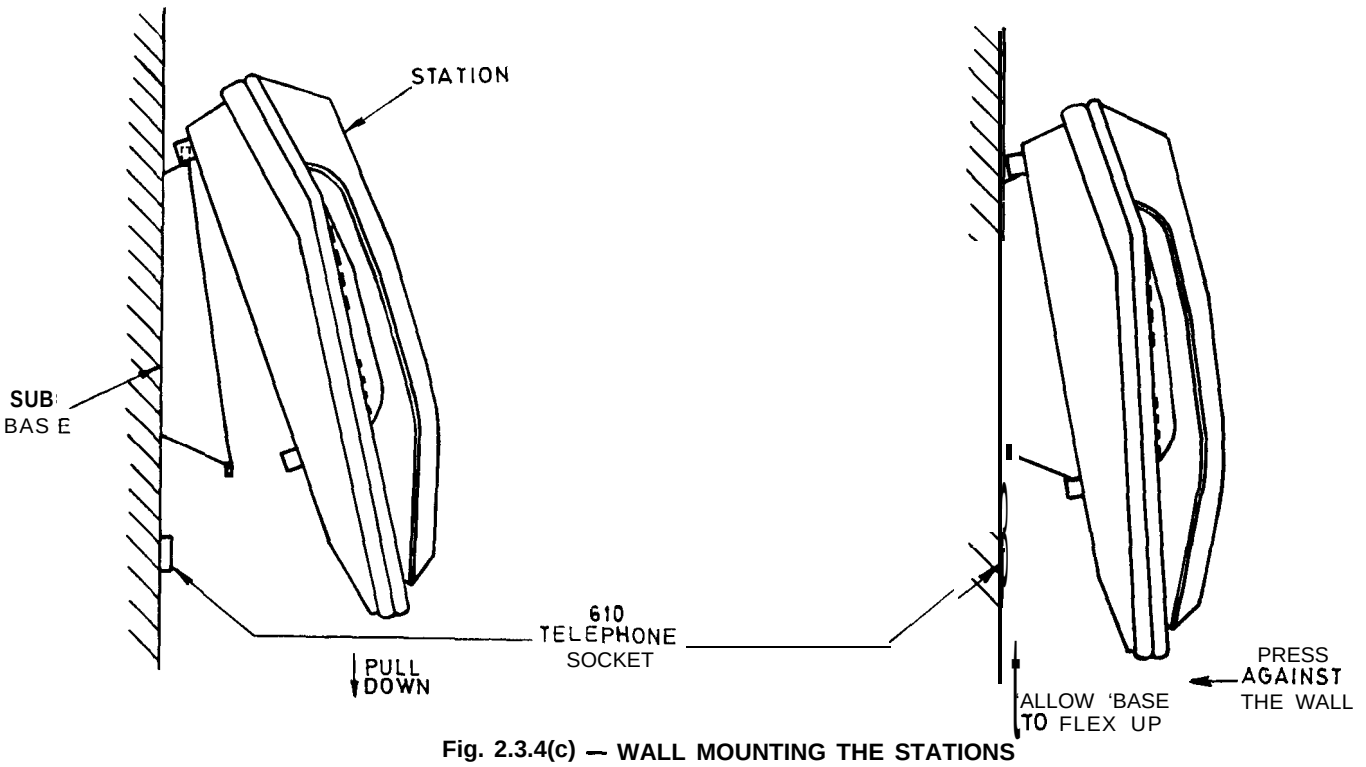


Fig. 2.3.4(c) — WALL MOUNTING THE STATIONS

2.3.4.2 Colour Panels

The *colour* panels may be changed by unclipping the panel and replacing it with the new panel as shown in fig. 2.3.4(d).

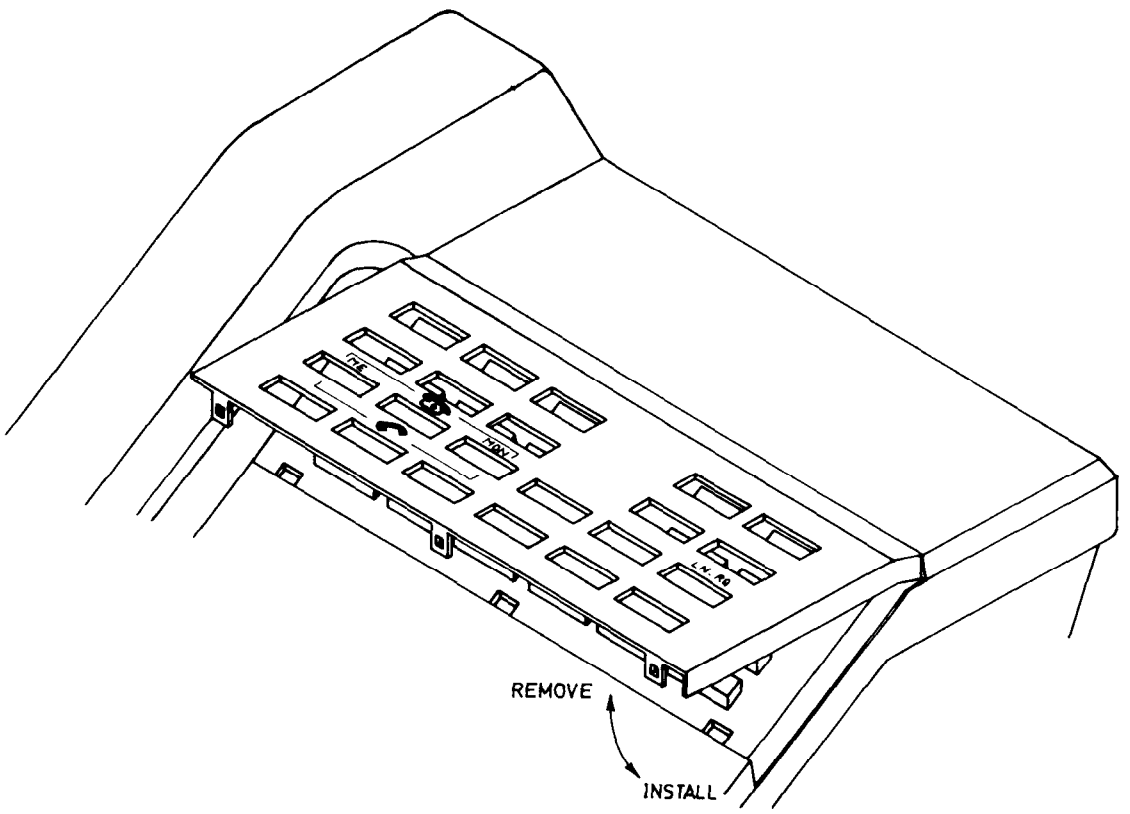


Fig. 2.3.4(d) — INSTALLATION OF STATION COLOUR PANEL

2.3.4.3 Powerfail Dials

A power-fail dial may be installed in a Handsfree or On-Hook station as follows (refer to fig. 2.3.4(e)):

- Loosen the two screws holding the station case to the base moulding.
- Lift the case from the base, unclipping the ribbon cable between keyblock and station board and the connections for speaker and volume control.
- Install the powerfail dial board PFB-AN-VF or PFB-AN-DEC in the space next to the station board and fasten the board with the screw and washer.
- Remove the link S2 on the station board.
- Connect the ribbon cable between the powerfail dial board and PF connector on the station board.
- Connect the ribbon cable between the powerfail dial and connector CN4 on the key board.
- Replace the ribbon cable between the keyboard and connector CN2 on the station board, re-connect the volume control to the VR1 connector and the speaker to the SP connector.
- Re-assemble the station and tighten the screws.

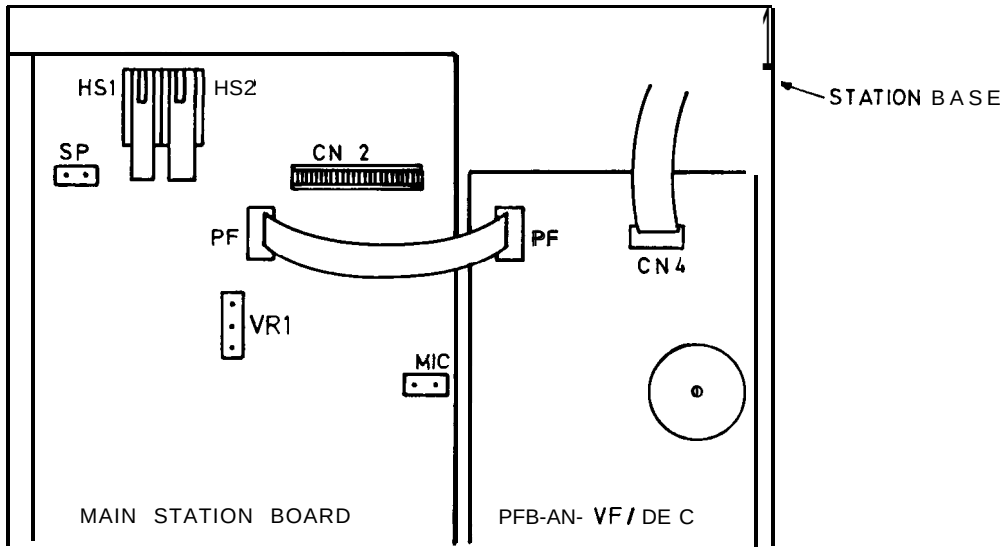


Fig. 2.3.4(e) — INSTALLATION OF THE POWERFAIL DIAL

2.3.4.4 Headset Adaptor Kit

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

- Remove the sub-base from the station (disconnect the ribbon cable from the PBA for Handsfree stations).
- Connect the ribbon cable between the connector on the Headset Adaptor Board and connector CN1 on the station board.
- Remove the links from connector S1 on the On-Hook station.
- Attach the sub-base to the station.

2.3.5 Powerfail Bell

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

2.3.6 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 fig. 2.3.6.

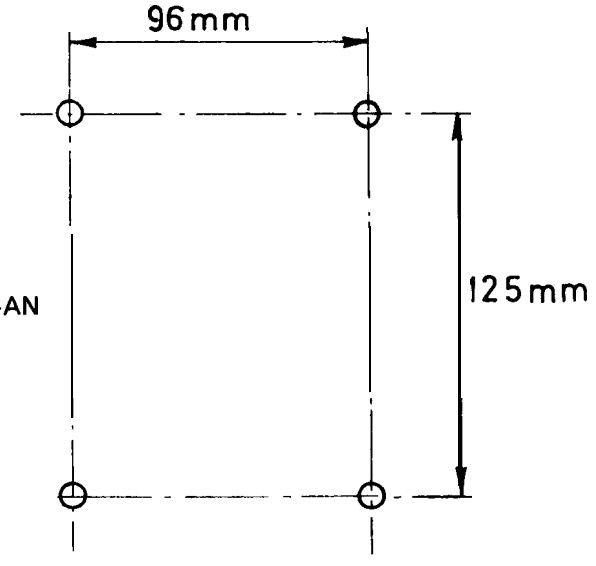


Fig. 2.3.6 — WALL MOUNTING 2WEU-AN

2.3.7 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 fig. 2.3.7.

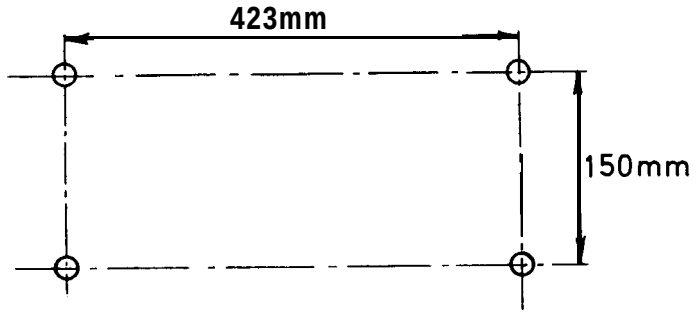


Fig. 2.3.7 — WALL MOUNTING OF RTIU

2.3.0 Call Metering Unit

The unit is fixed to the wall adjacent to the system distributing frame. Remove the cover by loosenng 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. 2.3.8.

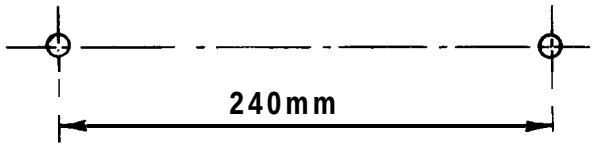


Fig. 2.3.8 — WALL MOUNTING FOR CALL METERING UNIT

2.3.9 Ring Generator Unit

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

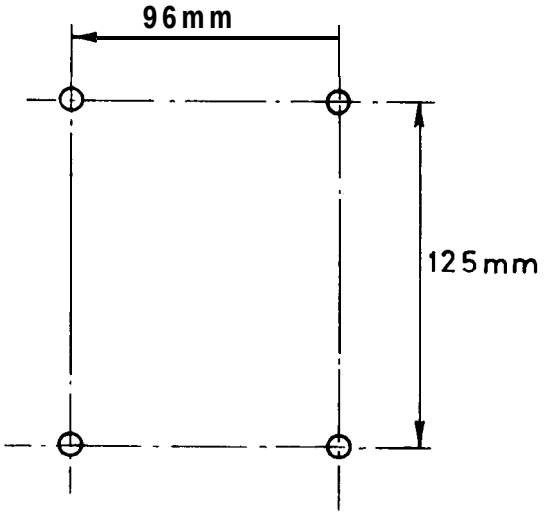


Fig. 2.3.9 — WALL MOUNTING FOR RING GENERATOR UNIT

2.3.10 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 or 4800 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 top of page and the printer is ready.

Attach the jack assembly to the PS-AN with the two screws provided. Attach the adhesive clamp to the PS-AN as indicated in figure 2.3.10.

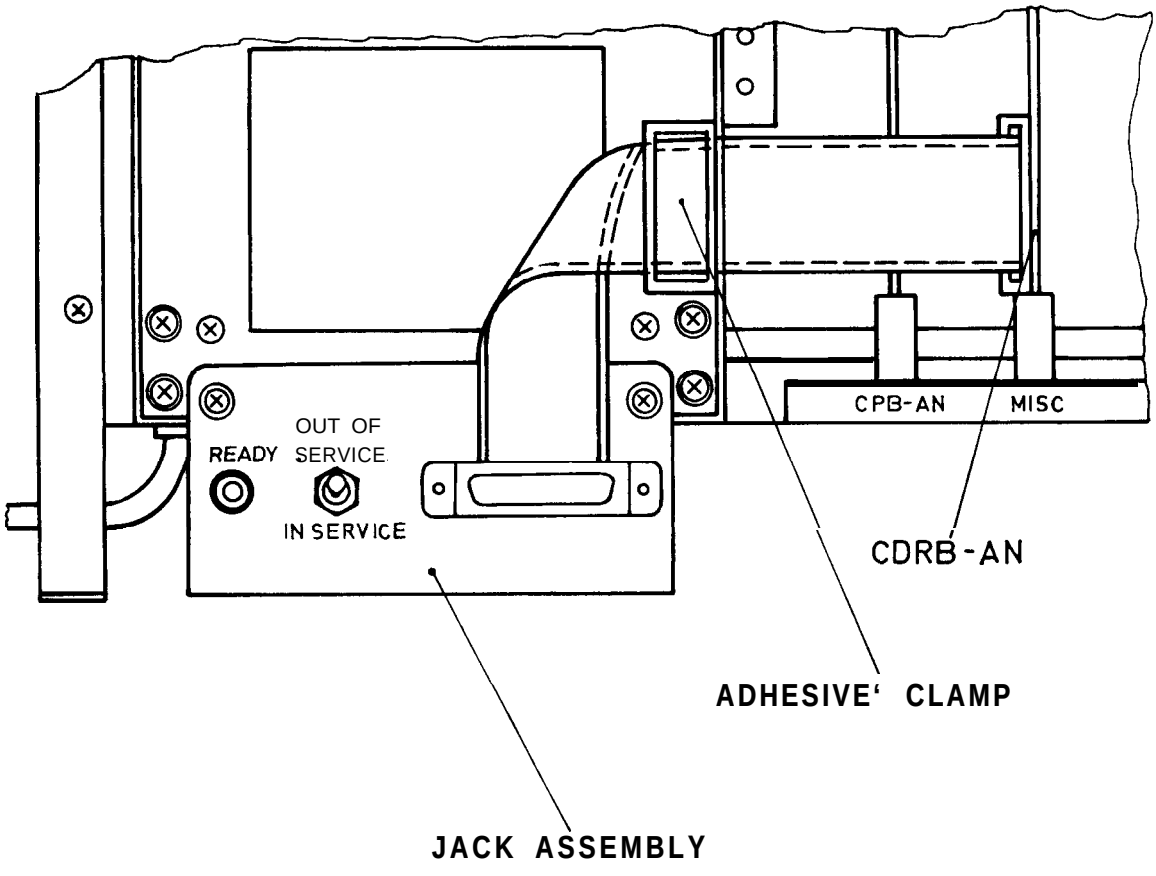


Fig. 2.3.10 — MOUNTING OF JACK ASSEMBLY

2.4 CABLING AND TERMINATING

2.4.1 Cabling Scheme

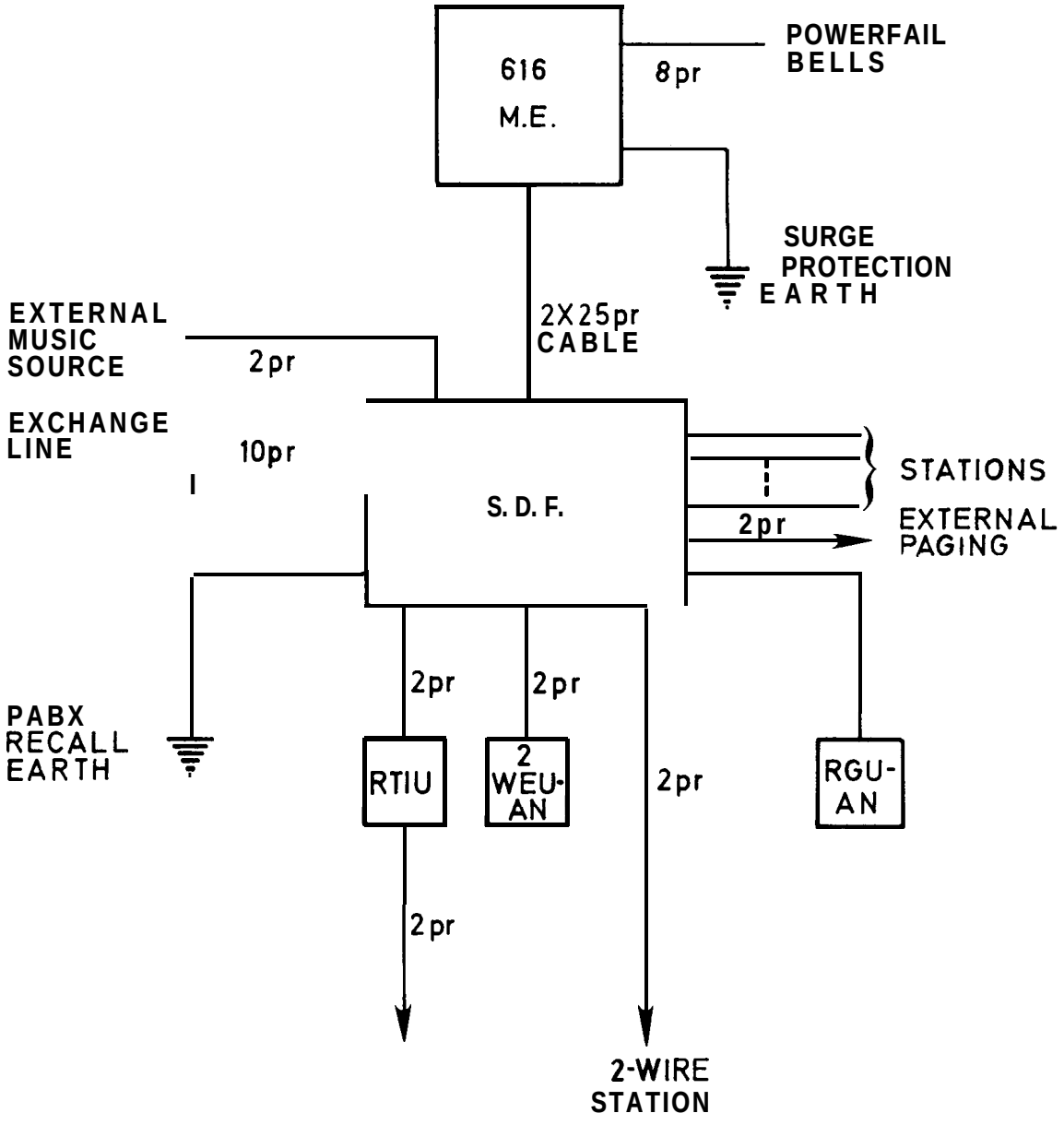


Fig. 2.4.1 — CABLING SCHEME FOR AN-6 16

2.4.2 Main Equipment

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.

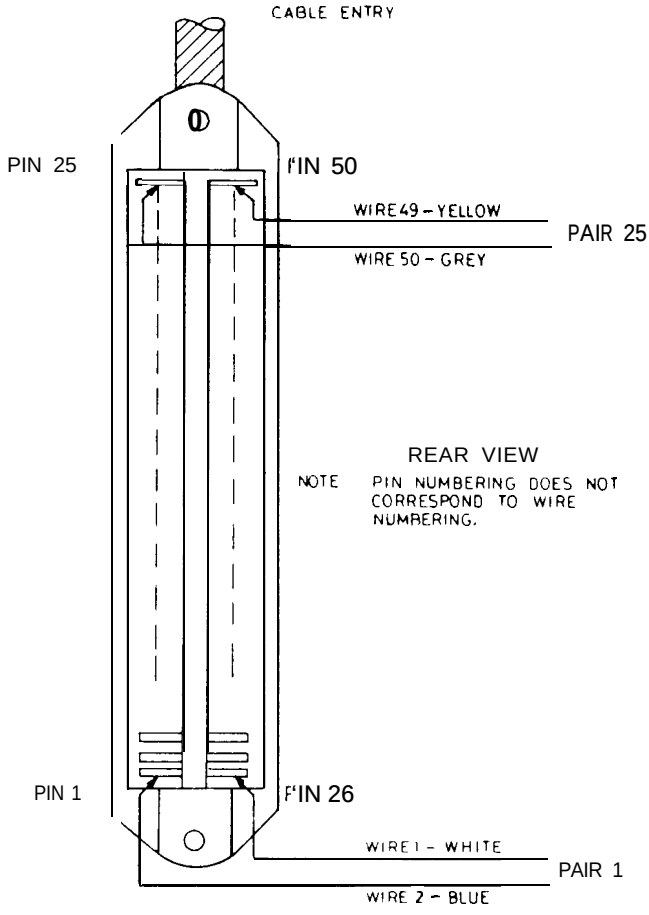


Fig. 2.4.2 — AMP CHAMP CONNECTOR — CABLE TERMINATION

Cables should be terminated in the following order, pair one located on pins number 1 and 26, with the colour on pin 1 and the mate on pin 26. Note the cable entry shown in fig. 2.4.2.

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

2.4.3 System Distribution Frame

The SDF uses the LSA Plus terminating system. Refer to TPH02 16 "LSA Plus Terminating System".

The cables from the main equipment are terminated at the SDF in colour code sequence commencing from the bottom row.

Wire designations for the system are listed in table 2.4.3. 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.

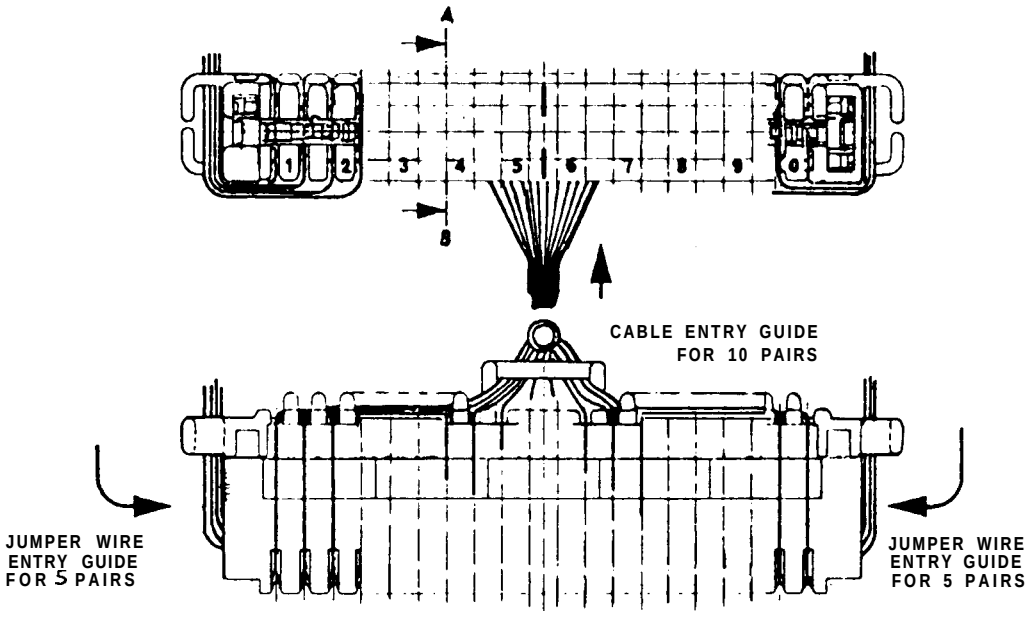


Fig. 2.4.3 — KRONE TERMINAL MODULE — CABLE TERMINATION

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. 2.4.3 and terminated on the bottom row of the module.

CONNECTOR A SIGNAL	DESIG	PIN	SDF PAIR	DESC.	CONNECTOR B SIGNAL	DESIG	PIN	SDF PAIR	DESC.
	AL1	26	1	1 OWT		AL1	26	26	1 BWT
STA	AL2	1		1 OBL	STA	AL2	1		1 BBL
10	BD+	27	2	1 ORD	18	BD+	27	27	1 BRD
	BD—	2		1 OBK		BD—	2		1 BBK
	AL1	28	3	11WT		AL1	28	28	19WT
STA	AL2	3		11BL	STA	AL2	3		19BL
11	BD+	29	4	11RD	19	BD+	29	29	19RD
	BD—	4		11BK		BD—	4		19BK
	AL1	30	5	12WT		AL1	30	30	20WT
STA	AL2	5		12BL	STA	AL2	5		20BL
12	BD+	31	6	12RD	20	BD+	31	31	20RD
	BD—	6		12BK		BD—	6		20BK
	AL1	32	7	13WT		AL1	32	32	21WT
STA	AL2	7		13BL	STA	AL2	7		21BL
13	BD+	33	8	13RD	21	BD+	33	33	21RD
	BD—	B		13BK		BD—	8		21BK
	AL1	34	9	14WT		AL1	34	34	22WT
STA	AL2	9		14BL	STA	AL2	9		22BL
14	BD+	35	10	14RD	22	BD+	35	35	22RD
	BD—	10		14BK		BD—	10		22BK
	AL1	36	11	15WT		AL1	36	36	23WT
STA	AL2	11		15BL	STA	AL2	11		23BL
15	BD+	37	12	15RD	23	BD+	37	37	23RD
	BD—	12		15BK		BD—	12		23BK
	AL1	38	13	16WT		AL1	38	38	24WT
STA	AL2	13		16BL	STA	AL2	13		24BL
16	BD+	39	14	16RD	24	BD+	39	39	24RD
	BD—	14		16BK		BD—	14		24BK
	AL1	40	15	17WT		AL1	40	40	25WT
STA	AL2	15		17BL	STA	AL2	15		25BL
17	BD+	41	16	17RD	25	BD+	41	41	25RD
	BD—	16		17BK		BD—	16		25BK
E	LN1	42	17	L1A	E	LN5	42	42	L5A
x L		17		L1B	x L		17		L5B
c I	LN2	43	18	L2A	c I	LN6	43	43	L6A
H N		18		L2B	H N		18		L6B
A E	LN3	44	19	L3A	A E	LN7	44	44	L7A
N S		19		L3B	N S		19		L7B
G	LN4	45	20	L4A	G	LNB	45	45	LBA
E		20		L4B	E		20		LBB
EXT.	EXT 1	46	21	TO EXT.			46	46	
PAGE	EXT 2	21		SPEAKE			21		
B.G.M.	BGM 1	47	22	TO BGM			47	47	
	BGM 2	22		SOURCE			22		
EXT.	MHS 1	48	23	TO MOH			48	48	
M.O.H.	MHS 2	23		SOURCE			23		
EARTH		49	24	PBX			49	49	
RECALL	ER	24		EARTH			24		
3ov	CMU —	50	25				50	50	
SUPPLY	CMU +	25					25		

TABLE 2.4.3 616 AMPHENOL CONNECTOR ASSIGNMENT

2.4.4 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.

2.4.5 Earth Recall

When the system is connected to a PBX and the recall facility is required, the PBX earth must be connected to the ER connection via the SDF.

2.4.6 Stations

When cabling from the main equipment to the stations take care that the pairs are correctly terminated and the polarity of the pair is correct. 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	14
4	15
5	18
6	19
7	22
8	23

The station cabling is as follows:

WIRE DESIGNATION	605 PLUG/61 0 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 2.4.6 — STATION CABLING

2.4.7 Powerfail Bell

When installing a power-fail bell, connect the wires from the bell to terminals BELxT and BELxR on the main equipment, corresponding to line x.

2.4.0 Call Metering Unit

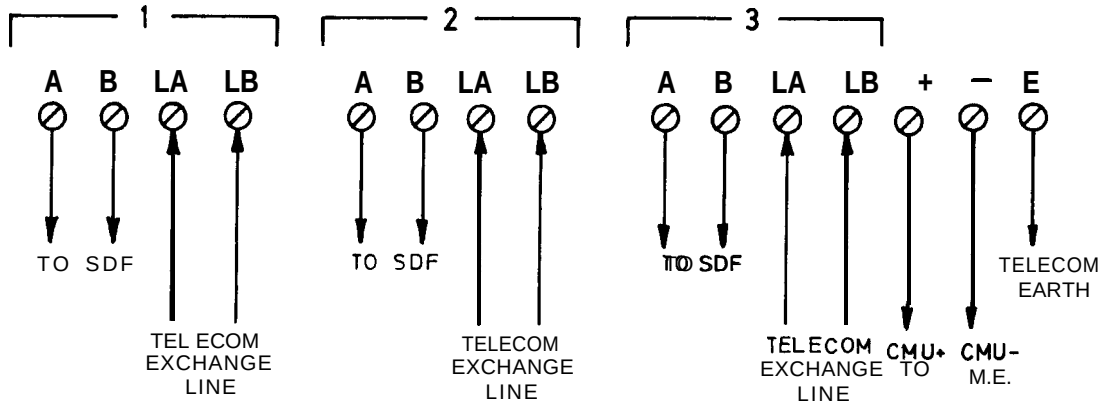


Fig. 2.4.8 — CALL METERING UNIT WIRING

The unit is capable of counting meter pulses for three exchange lines. Terminate the exchange lines on the CMU before terminating them at the SDF. The CMU derives its power from the main equipment, amphenol connector (CMU+, CMU—). Make connections between CMU+ and CMU- via the SDF to + and —, respectively, on the CMU. A Telecom metering earth is required to detect meter pulses and this must be connected to the CMU. (Refer to fig. 2.4.8.)

2.4.9 Tie Lines

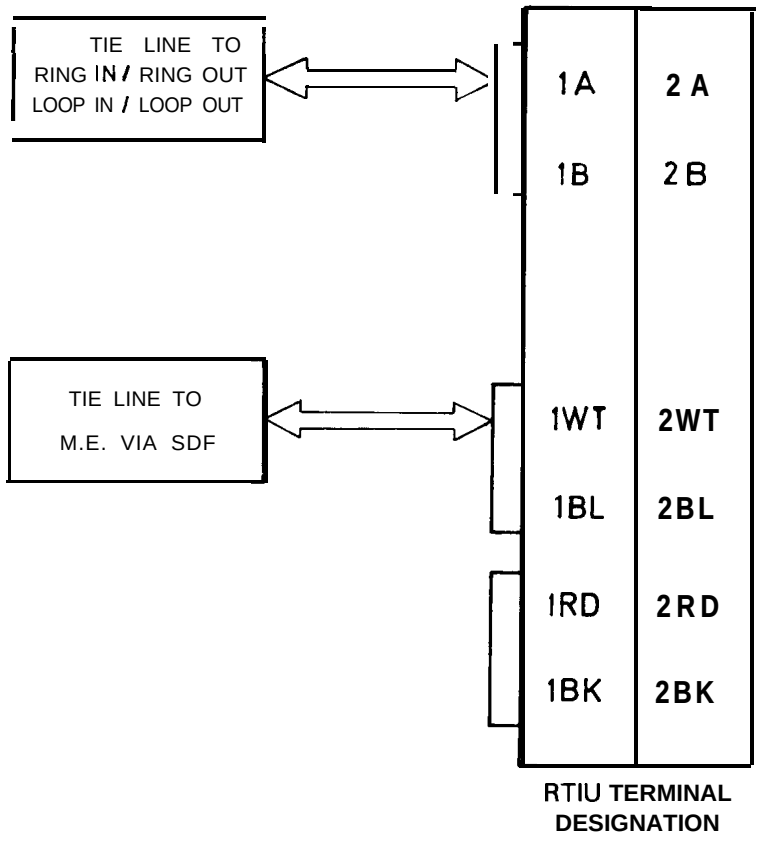


Fig. 2.4.9 — RTIU TERMINAL CONNECTIONS

Boards are simply plugged into the designated slots in the RTIU. Terminal connections are as follows (refer fig. 2.4.9).

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 1 A/B or 2A/B on the RTIU and the connection to the main equipment is taken from 1 WT/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 TERMINAL	MAIN EQUIPMENT TERMINAL
A B	1A or 2A 1WT or 2WT 1B 2B 1BL 2 B L	xA xB

Table 2.4.9 — TIE LINE CONNECTION

2.4.10 Two-Wire Standard Telephone Stations

Install the 2WLB-AN board(s) into the required SLB-AN position(s) in the main equipment and mount the ring generator (RGU-AN) near the SDF. In case of standard telephone stations with loop lengths less than 300 ohms, short out pins 2 and 3 of connectors S1 and S2 on the 2WLB-AN. For stations with loop lengths greater than 300 ohms, refer to section 2.4.1 1.

Standard telephone stations are wired in blocks of four, as each 2WLB-AN provides four station ports. Thus if 2WLB-AN board is inserted into SLB-AN position 4 in the main equipment, stations 22 to 25 would all be 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 2WLB-AN. 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 2.4.10.

One RGU-AN is required for each 2WLB-AN used in the system.

SDF

CONNECTOR B SIGNAL	DESIG	PIN	PAIR	DESCRIP.	EXAMPLE: 2WLB-AN is inserted in SLB-AN Position #4.
STA 22	AL1	34		22WT	--- WT) To Standard Telephone
	AL2	9		22BL	--- BL) Station No. 22
	BD+	35	10	22RD	----- 25Hz) From RGU-AN
	BD—	10		22BK	----- 25Hz)
STA 23	AL1	36	11	23WT	--- WT) To Standard Telephone
	AL2	11		23BL	--- BL) Station No. 23
	BD+	37	12	23RD	----- +/IN+) To RGU-AN and
	BD—	12		23BK	----- G/IN-) 2WEU-AN
STA 24	AL1	38	13	24WT	--- WT) To Standard Telephone
	AL2	13		24BL	--- BL) Station No. 24
	BD+	39	14	24RD	----- OUT +) From 2WEU-AN
	BD—	14		24BK	----- OUT G)
STA 25	AL1	40	15	25WT	--- WT) To Standard Telephone
	AL2	15		25BL	- - - BL) Station No. 25
	BD+	41	16	25RD	
	BD—	16		25BK	

Table 2.4.10 — STANDARD TELEPHONE STATION, RGU-AN AND 2WEU-AN WIRING

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

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

Short out pins 1 and 2 of connectors SI and S2 on the 2WLB-AN. Mount the 2WEU-AN on the wall, near the SDF. Always connect the terminals IN+ and IN— to the second B-pair in the block of stations corresponding to one 2WLB-AN. Connect terminals OUT+ and OUT G 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 2WLB-AN board is inserted into SLB-AN position four is shown in table 2.4.10.

One 2WEU-AN is required for each 2WLB-AN 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 2.4.4.

2.4.12 External Music Source and External Paging

Connect the External Music Source to terminals BGM1 and BGM2 (SDF pair 22). Should this source be required to provide music-on-hold then simply connect BGM1 and BGM2 terminals (SDF pair 22) to MHS1 and MHS2 terminals (SDF pair 23) on the connector A block.

The External Paging amplifier is connected to a 605/610 plug and socket and wired to the amphenol connectors via the SDF. Connect the external amplifier to terminals EXT1 and EXT2 (SDF pair 21) on the connector A block (refer table 2.4.3).

2.5 BOARD INSTALLATION INSTRUCTIONS

2.5.1 General

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

WARNINGS

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

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

To protect against physical damage and damage due to static discharge, PBAs must ALWAYS be inserted into a conductive ANTI-STATIC bag and placed in the protective container provided with the new item. In the case of the CPB-AN 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	AL'
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-AN BOARDS

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

F. TMB-AN BOARD

- If this board or the CPB-AN board are replaced, then the system clock is lost and must be reprogrammed.

2.5.2 CPB-AN

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

The fuse F1 is a 250mA fuse which protects the battery from possible damage due to an accidental short circuit. Be sure that the fuse is not blown and then install the attached battery. Ensure that the battery is connected with the correct polarity. A LED is provided on the board to light if the battery voltage is low. As well as the LED, all Handsfree Stations connected to the system will indicate the low battery voltage by flashing ALMS in the display.

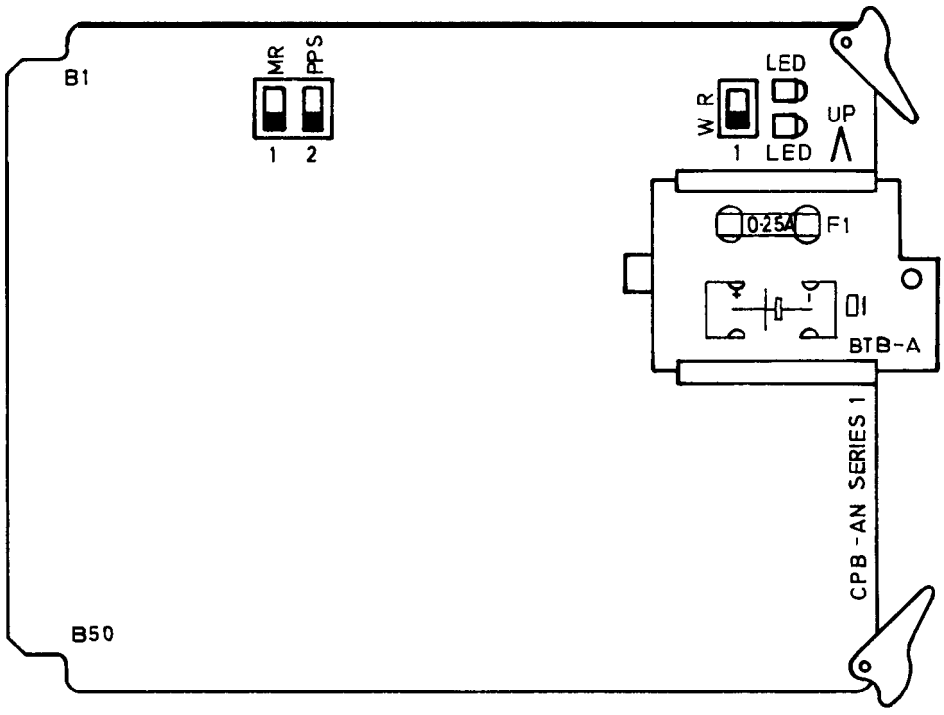


Fig. 2.5.2 — CPB-AN FUSE, BATTERY AND SWITCH LOCATIONS

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 "0" (up) positon 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 "1" (down) position. The initial values of the system data are given in section 2.7.5.

There are two switches, on the CPB-AN board, used to set the pulsing speed and make/break ratio for decadic dialling. The settings are as follows:—

Switch Designation	Switch Position	Result
		Pulsing Speed
PPS	0	10 PPS (Standard Setting)
PPS	2	20 PPS
		Make Ratio
MR	0	33% (Standard Setting)
MR	1	39%

2.5.3 TMS-AN

Link S1 on the TMB-AN selects either the internal (link 1 to 2) or external (link 2 to 3) music source to provide music on hold. Volume control VR1 controls the music-on-hold level, while VR2 controls the background music level (see fig. 2.5.3).

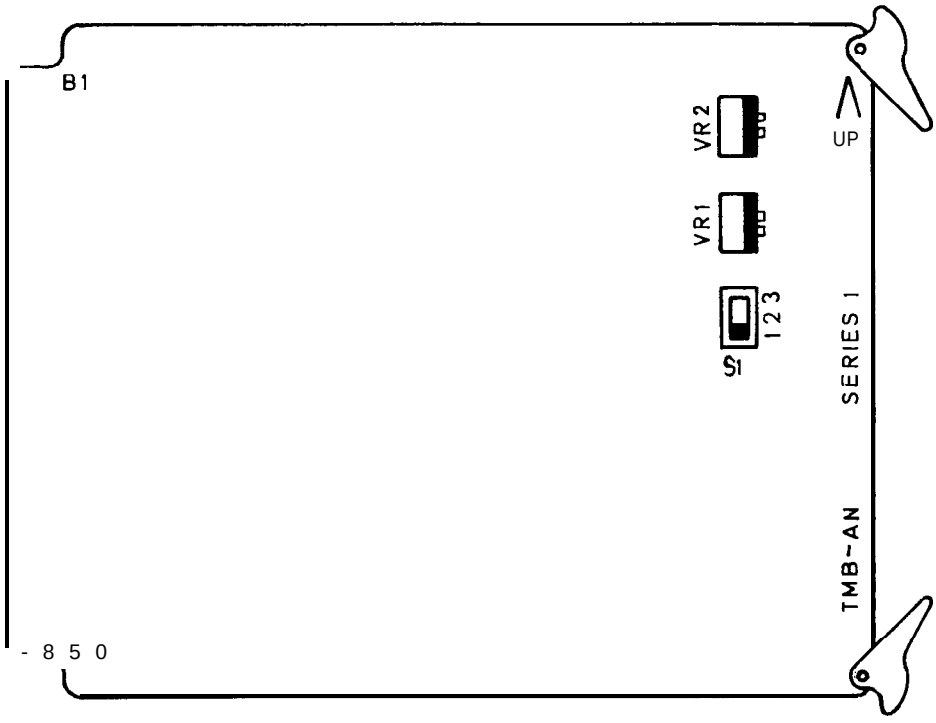


Fig. 2.5.3 — MOH SWITCH AND VOLUME CONTROLS LOCATION

2.5.4 CDRB-AN

The CDRB-AN is installed in the MISC slot of the AN-61 6 Main Equipment. Refer to fig. 2.5.4 for the location of switches and the connector.

BAUD RATE SELECTION SWITCH

The SW3 switch (Figure 2.5.4) 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 or 4800 baud to match the printer.

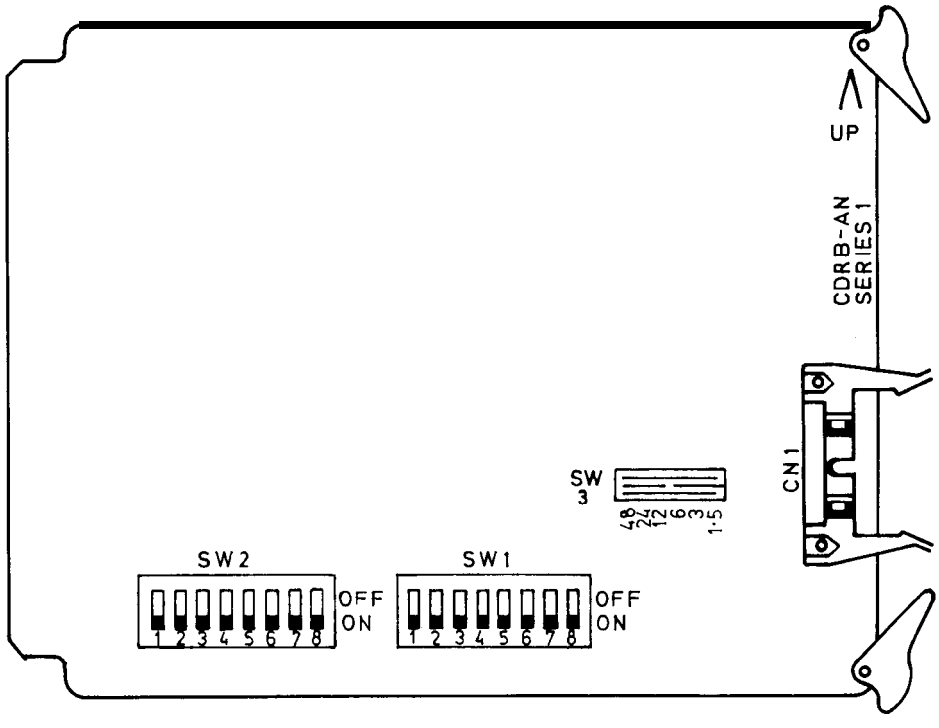


Fig. 2.5.4 — CDRB-AN SWITCH AND CONNECTOR LOCATIONS

OPTION SELECTION SWITCH

The SW1 switch (Figure 2.5.4) is used to select printout options.

SW I- 1 :Number of Digits in Dialled Number to be Printed

OFF — All digits are printed
ON — The last two digits are not printed.

SW I-2: Duration of Calls to be Printed

OFF — Outgoing calls printed only if their duration is more than 1 minute
ON — All outgoing calls are printed.

SW I-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

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,B: Not Used — Set to ON.

The SW2 switch is not used and should be set to all ON.

CONNECTOR CN1

The jack assembly is connected to the CDRB-AN connector CN1 via a ribbon cable. A printer is then connected to the jack assembly via an RS-232C cable.

2.5.5 PWLB-AN

The 2WLB-AN board is installed into an SLB-AN slot in order to provide an interface for four standard telephone stations and two outside lines. A daughter board (2WCB-A) is attached to 2WLB-AN via connector CN1. The locations of the connector, links and 2WCB-A are shown in figure 2.5.5.

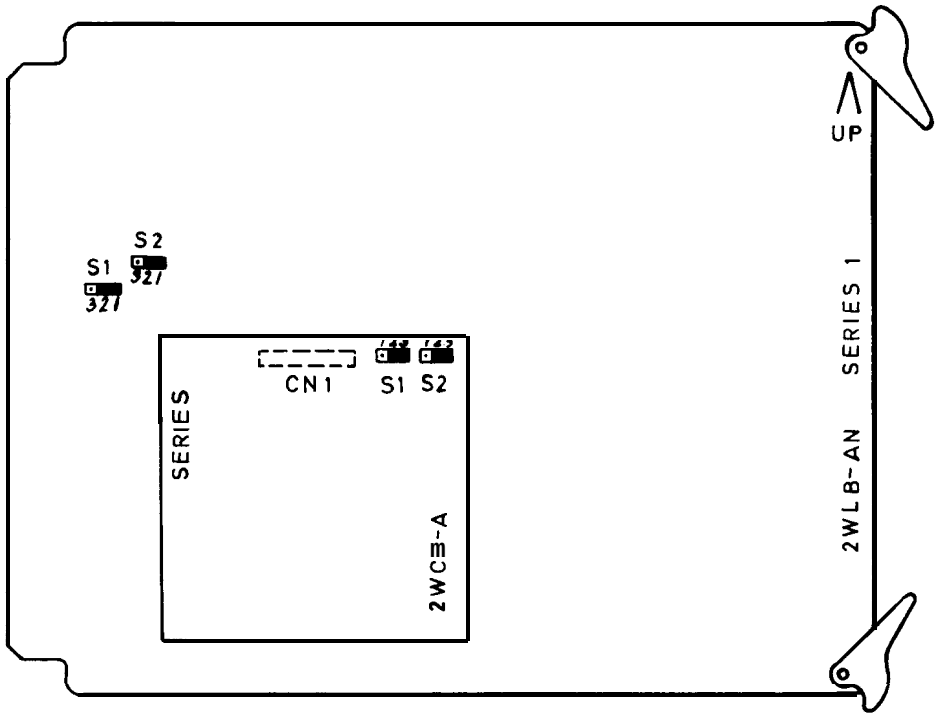


Fig. 2.5.5. — 2WCB-A, CONNECTOR AND LINK LOCATIONS ON THE 2WLB-AN BOARD

Links S1 and S2 on the 2WLB-AN are used to select the power supply for the standard telephone stations as follows:

LINKS ON S1 AND S2	POWER SUPPLY SELECTED
1 to2 2 to 3	External (2WEU-AN) Internal

Table 2.5.5 (a) — POWER SUPPLY SELECTION

Links S1 and S2 on the 2WCB-A are used to programme the switchhook flash duration for standard telephone stations as follows:

LINKS ON S1	LINKS ON S2	SWITCHHOOK FLASH DURATION
2 to 3	2 to 3	500 msec.
1 to 2	2 to 3	7 50 msec.
2 to 3	1 to 2	1 sec.
1 to2	1 to2	1.25 sec.

Table 2.5.5 — SWITCHOOK FLASH DURATION SELECTION

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	+32 ± BV
	BK	5	REF B
Standard Telephone Stations			
Without 2WEU-AN	WT	2	+32 ± BV
	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 the system is powered up for the first time, programmed data must be initialised. To initialise data, turn power off and set the WR switch on the CPB-AN board to the "0" position. Turn power on, wait for ten seconds, then set the WR switch to the "1" position. The initial values of the data are given in section 2.7.5.

The system may be programmed from either a TS-AN-HF Handsfree Station or a unit designated TPU-AN Test and Programming Unit. The TPU-AN or TS-AN-HF must be inserted into Station 10 socket when programming or testing the system. To enter program data the TPU-AN or TS-AN-HF must be placed into programming mode. To do this press the write button on the TPU-AN or the program enable button under the DSS label on the TS-AN-HF. Other stations on the system operate normally while the TPU-AN or TS-AN-HF is in programming mode.

When the TPU-AN or TS-AN-HF is in programming mode, data is shown by the display along with the code associated with the data category being programmed. The data category is selected by pressing the appropriate keys on the TPU-AN or the TS-AN-HF.

Data is programmed as follows: place the TPU-AN or TS-AN-HF into programming mode. Operate the key associated with the data category to be programmed and the display shows the code for that data category. Enter data by using the dial on the TPU-AN or TS-AN-HF. Dial "*" to send the write command and dial "#" to terminate a data category.

When the data programming is completed press the "CHECK" key followed by the DSS 16 key. The display will show "P" if the data has been accepted, or an error code if the data has not been accepted (refer to Table 2.7.1). If you go out of programming mode without pressing "CHECK" and DSS 16 keys or without the display showing "P", when these keys are pressed, then all data entered since the last time data was accepted, will be lost. **The data categories affected must be reprogrammed.**

The system will reset, dropping ail calls, when programming mode is left if any data has been changed.

-ERROR CODE	DESCRIPTION
P	Programmed data is correct.
C - - - -	WR switch on CPB-AN is set to "0" position.
- - - - 1	Lines have been assigned as PABX, but trunk access code has not been programmed.
- - - - 2	Lines have been assigned as PABX, but PABX pause is set to zero.
- - - - 3	Call forwarding data is in error.
- - - - 4	Manager station is not assigned DND
- - - - 5	Signalling time out is set to zero
- - - - 6	Ring inward timer is set to zero
- - - - 7	Exclusive line assigned to secretary
- - - - 8	Two exclusive lines assigned to one station.

Table 2.7.1 PROGRAMMING ERROR CODES

2.7.2 Checking Programmed Data

Programming data may be reviewed as follows:

Place the TPU-AN or TS-AN-HF in the programming mode by pressing the programming button. Press the "CHECK" key followed by the appropriate key related to the data category you wish to check. The display will show a "C" in front of the data category code. Dial "*" to step through the programmed data and "#" to terminate the data category.

To modify existing data follow the programming procedure for that data category.

2.7.3 Re-initiaiising Programmed Data

Programming data may be reset to initial conditions as follows:

Turn power off and set the WR switch to the "0" position. Turn power on, wait for ten seconds, then set the WR switch to the "1" position.

2.7.4 Facility Programming

Press the programming button on the TPU-AN or TS-AN-HF and proceed to program the facilities as described in the following sections.

2.7.4.1 Diaiiing Mode (F-I)

DSS key F-I is used to assign each line to dial in either decadic or VF mode. To programme, dial the line number, ● , then "1" for decadic or "0" for VF.

Example: programme line 1 as decadic, line 2 as VF:

		DISPLAY		
PRESS	"F-1"	0 6		
DIAL	"1"	1		
	"*"	1		
	"1"	1	1	(line 1 — Decadic)
	"*"			
	"2"	2		
	"*"	2		
	"0"	2	0	(line 2 — VF)
	"*"			
	"*"			
	"#"			

To check the programmed data:

		DISPLAY			
PRESS	"CHECK"	C			
	"F-1"	C O 6			
DIAL	"1"		1	1	(line 1 — Decadic)
	"2"	.	2	0	(line 2 — VF)
	"#"				

2.7.4.2 Off-Hook Signailing (F-8)

DSS key F-B is used to assign off-hook signalling to selected stations for intercom and incoming exchange line calls.

Note: When off-hook signalling is assigned to a station intercom camp-on and call-back facilities calls cannot be made to that station.

To programme, dial station number, ● , then "0" to disable off-hook signalling, or "1" to enable off-hook signalling.

Example: Assign off-hook signalling to station 10, but not to station 12.

		DISPLAY			
PRESS	"F-8"	1 3			
DIAL	"10"		1 0		(Station 10)
	"*"		1 0		
	"1"		1 0	1	(enabled)
	"*"				
	"12"		1 2		(Station 12)
	"*"		1 2		
	"0"		1 2	0	(disabled)
	*				
	"#"				

To check the programmed data:

		DISPLAY			
PRESS	"CHECK"	C			
	"F-8"	c 1 3			
DIAL	"10"		1 0		(Station 10)
	"*"		1 0	1	
	"12"		1 2		(Station 12)
	"*"		1 2	0	
	"#"				

2.7.4.3 Type of Exchange Line (F-2)

Each outside line must be defined as a local exchange or a PABX connection. This information is necessary for redial and access barring.

Note: For lines connected to a PABX, the code used to get an outside line (trunk access code) must be programmed as part of the access barring data (2.7.4.26) and the PABX access pause timer set (2.7.4.23).

If the line is connected to an exchange, programme "0". If the line is connected to a PABX line, programme "1".

Example: Assign line 1 as an exchange line and line 2 as a PABX line.

		DISPLAY		
PRESS	"F-2"	0 7		
DIAL	"1"	1		
	"*"	1		
	"0"	1	0	(line 1 — exchange line)
	"*"			
	"2"	2		
	"*"	2		
	"1"	2	1	(line 2 — PABX line)
	"*"			
	"#"			

To check the programmed data:

PRESS	"CHECK"	C		
	"F-2"	c o 7		
DIAL	"1"	1	0	(line 1 — exchange line)
	"2"	2	1	(line 2 — PABX line)
	"#"			

2.7.4.4 Earth Recall or Switchhook Flash (RL)

Each line must be assigned for earth recall or switchhook flash.

For PABX lines programme "1" for switchhook flash or "0" for earth recall. The earth recall/switchhook flash timer must be set (2.7.4.22).

For exchange lines programme "1". Operating the RL key will release the line for 1 .B seconds to disconnect calls.

Example: Assign line 1 for earth recall, line 2 for switchhook flash.

		DISPLAY		
PRESS	"RL"	0 2		
DIAL	"1"	1		
	"*"	1		
	"0"	1	0	(line 1 — Earth Recall)
	"*"			
	"2"	2		
	"*"	2		
	"1"	2	1	(line 2 — Switchhook flash)
	"*"			
	"*"			
	"#"			

To check the programmed data:

PRESS	"CHECK"	C		
	"RL"	c o 2		
DIAL	"1"	1	0	(line 1 — Earth recall)
	"2"	2	1	(line 2 — switchhook flash)
	"#"			

2.7.4.5 Exclusive Lines (HOLD)

Up to eight exchange lines can be assigned as Exclusive Lines. An exclusive line can only be accessed by the assigned station.

Programme the line number and station to which it is assigned.

To cancel an exclusive line programme "00" as station number.

Notes:

1. The exclusive line always appears as line six at the assigned station.
2. If any of the lines one to six are assigned as exclusive lines then these lines cannot be accessed at any station other than the assigned station.
3. The exclusive lines should be assigned in reverse order, ie. line 8 first then other lines as required.
4. If two Manager stations call forward to the same Secretary station, only one Manager may be assigned an exclusive line.
5. Stations assigned an exclusive line must be allowed outgoing access to line 6 in 2.7.4.6.

Example: Provide an exclusive line to station number 10 using line 6 and station number 20 using line 7.

		DISPLAY		
PRESS	"HOLD"	0 4		
DIAL	"8"	a		
	"*"	a		
	"10"	a	1 0	(line a exclusive to station 10)
	"*"			
	"7"	7		
	"*"	7		
	"20"	7	2 0	(line 7 exclusive to station 20)
	"*"			
	"#"			

To check programmed data:

PRESS	"CHECK"	C		
	"HOLD"	c o 4		
DIAL	"8"	a		
	"*"	a	1 0	(line a exclusive to station 10)
	"7"	7		
	"*"	7	2 0	(line 7 exclusive to station 20)
	"#"			

2.7.4.8 Exchange Line Audible Signaling (F-5)

All exchange lines have visual indication of incoming calls, but audible signalling is a programmed option. Each station can have audible indication of incoming calls for any combination of lines.

To programme, dial the station number, ● , then the line numbers for the lines to be signalled.
Dial 0 as the line number to disable audible signalling for a station.

Example: Station 10 is to have audible signalling for lines 1, 2 and 3; station 1 1 for lines 4, 5 and 6 and station 12 for line 4.

		DISPLAY		
PRESS	"P-5"	1 0		
DIAL	"10"	1 0		
	"*"	1 0		
	"1"	1 0	1	
	"2"	1 0	2 1	
	"3"	1 0	3 2 1	(Station 10 signals for lines 1, 2 and 3)
	"*"			
	"1 1"	1 1		
	"*"	1 1		
	"4"	1 1	4	
	"5"	1 1	5 4	
	"6"	1 1	6 5 4	(Station 1 1 signals for lines 4, 5, 6)
	"*"			
	"1 2"	1 2		
	"*"	1 2		
	"4"	1 2	4	(Station 12 signals for line 4)
	"*"			
	"#"			

To check the programmed data:

PRESS	"CHECK"	C
	"P-5"	c 1 0
DIAL	"IO"	1 0
	"*"	1 0 3 2 1
	"11"	1 1
	"*"	1 1 6 5 4
	"12"	1 2
	"*"	1 2 4
	"#"	

2.7.4.7 Grouping for Exchange Line Request (F-3)

It is possible to assign exchange lines in up to 6 groups. Any number of lines can be assigned to a group and a particular line can be assigned to more than one group.

To programme, dial the group number, ● , then dial the number of each exchange line assigned to the group.

Example: Program only 3 groups. Assign lines 1 and 2 to group 1, line 3 to group 2 and lines 3, 4, 5 and 6 to group 3.

		DISPLAY	
PRESS	"P-3"	0 8	
DIAL	"1"	1	(1 st group)
	"*"	1	
	"1"	1 1	
	"2"	1 2 1	(lines 1 and 2)
	"*"		
	"2"	2	(2nd group)
	"*"	2	
	"3"	3	(line 3)
	"*"		
	"3"	3	(3rd group)
	"*"	3	
	"3"	3 3	
	"4"	3 4 3	
	"5"	3 5 4 3	
	"6"	3 6 5 4 3	(lines 3 to 6)
	"*"		
	"#"		

To check the programmed data:

PRESS	"CHECK"	C	
	"P-3"	C 0 8	
DIAL	"1"	1 2 1	(Group 1)
	"2"	2 3	(Group 2)
	"3"	3 6 5 4 3	(Group 3)
	"#"		

2.7.4.8 Station Access to Exchange Lines (F-4)

The system can be programmed to limit the station access to exchange lines for outgoing calls.

Note: Stations with an exclusive line must be assigned access to line 6 for outgoing calls.

To programme, dial station number, ● , then the line numbers to which access is allowed.

Example: Station 10 allowed access to lines 1, 2, 3.
Station 11 allowed access to lines 2, 3.
Station 12 allowed access to lines 5, 6.

		DISPLAY			
PRESS	"F-4"	0 9			
DIAL	"10"	1 0			(Station 10)
	"*"	1 0			
	"1"	1 0		1	
	"2"	1 0		2 1	
	"3"	1 0		3 2 1	(Access to lines 1 to 3)
	"*"				
	"1 1"	1 1			(Station 11)
	"*"	1 1			
	"2"	1 1		2	
	"3"	1 1		3 2	(Access to lines 2 and 3)
	"*"				
	"1 2"	1 2			(Station 12)
	"*"	1 2			
	"5"	1 2	5		
	"6"	1 2	6 5		(Access to lines 5 and 6)
	"*"				
	"#"				

To check the programmed data:

PRESS	"CHECK"	C			
	"F-4"	c o 9			
	"10"	1 0			
	"*"	1 0		3 2 1	(Station 10)
	"1 1"	1 1			
	"*"	1 1		3 2	(Station 11)
	"12"	1 2			
	"*"	1 2	6 5		(Station 12)
	"#"				

2.7.4.9 Disable Exchange Line incoming signailing (F-8)

Each station (except Station 10) can be given the facility to disable incoming signalling by pressing the ⌓TR key. The facility is programmed on a per station basis. Programme "1" to provide and "0" not to provide the facility.

Example: Provide facility for station 12, do not provide facility for station 13

		DISPLAY			
PRESS	"F-6"	1 1			
DIAL	"12"		1 2		(Station 12)
	"*"		1 2		
	"1"		1 2	1	(facility provided)
	"*"				
	"13"		1 3		(Station 13)
	"*"		1 3		
	"0"		1 3	0	(facility not provided)
	"*"				
	"#"				

To check the programmed data:

PRESS	"CHECK"	C			
	"F-6"	Cl 1			
DIAL	"12"		1 2		(Station 12)
	"*"		1 2	1	
	"13"		1 3		(Station 13)
	"*"		1 3	0	
	"#"				

2.7.4.10 Stations Assigned for Night Transfer (⌓TR)

Stations may be programmed to signal for incoming calls on any line during night transfer using the ⌓TR key.

Programming is done on a per station basis. For stations required to receive incoming signalling during night transfer programme "1", for stations not required to receive incoming signalling programme "0".

Example: signalling transfers to station 1 1, but not to station 12 during night transfer.

		DISPLAY		
PRESS	"⌓TR"	0 0		
DIAL	"1 1"	1 1		(transferred from
	"*"	1 1		station 10 to
	"1"	1 1	1	station 11)
	"*"			
	"1 2"	1 2		(Not transferred
	"*"	1 2		from station 10
	"0"	1 2	0	to station 12)
	"*"			
	"*"			
	"#"			

2.7.4.11 Stations Assigned for Do-Not-Disturb (AD.ON)

The AD.ON key is used to programme this feature. Data "1" following the station number enables the DND function for that station. Data "0" following the station number disables the DND function for that station.

Note: Stations assigned as Manager Stations for Call Forwarding (2.7.4.12) must have the DND enabled.

Example: Enable DND for station 10 and disable DND for station 1 1.

		DISPLAY		
PRESS	"AD.ON"	0 1		
DIAL	"10"	1 0		(Station 10)
	"*"	1 0		
	"1"	1 0	1	(DND enabled)
	"*"			
	"1 1"	1 1		(Station 1 1)
	"*"	1 1		
	"0"	1 1	0	(DND disabled)
	"*"			
	"#"			

2.7.4.12 Stations With Call Forwarding (F-7)

Stations requiring call forwarding must have Do Not Disturb enabled. Calls are forwarded to the secretary station when the Manager station is in the Do Not Disturb mode.

Use DSS key F-7 to assign Manager and Secretary stations. Programme the Manager station number, then the Secretary station number.

The Secretary station must not have an exclusive line programmed. If two Manager stations call forward to the same Secretary station, only one Manager may be assigned an exclusive line.

Example: Assign Stations 10 and 1 1 and Stations 2 1 and 23 as Manager/Secretary pairs.

		DISPLAY		
PRESS	"F-7"	1 2		
DIAL	"10"	1 0		(Manager Station)
	"*"	1 0		
	"1 1"	1 0	1 1	(Secretary Station)
	"*"			
	"21"	2 1		(Manager Station)
	"*"	2 1		
	"23"	2 1	2 3	(Secretary Station)
	"*"			
	"#"			

To cancel call forwarding enter the Manager station number and then enter "00" as the secretary station number.

2.7.4.13 internal Zone Paging (F-l 0)

DSS key F-l 0 is used to set up zones within the system which will allow selective paging.

There are a maximum of three internal paging zones designated "81", "82" and "83".

Note: 1. Internal paging zones are used for alternate point answering of intercom calls.

2. A station can be assigned to one internal paging zone only.

To programme internal paging zones, enter the zone code and the station numbers of all stations within that zone.

Example: Programme stations 10, 12 and 2 1 within the zone designated "8 1"

		DISPLAY		
PRESS	"F-10"	1 5		
DIAL	"81"	a 1		(Internal Zone a 1)
	"*"	a ı		
	"10"	a 1	1 0	(Station 10)
	"*"	a 1		
	"1 2"	a 1	1 2	(Station 12)
	"*"	a 1		
	"2 1"	a ı	2 1	(Station 2 1)
	"*"			
	"#"			

To check the programmed data:

PRESS	"CHECK"	C		
	"F-10"	C 1 5		
DIAL	"81"	a ı		(Zone a 1)
	"*"	8 1	1 0	
	"*"	a 1	1 2	
	"*"	a 1	2 1	
	"#"			

Stations can be removed from a zone by pressing F- 10, entering the zone number, pressing F- 10 again and entering the station numbers.

Example: Remove stations 12 and 2 1 from internal zone 81.

PRESS	"F-10"	1 5		
	"81"	a 1		
	"F-10"	a 1		
	"1 2"	a ı	1 2	(Station 12 removed)
	"*"	a ı		
	"2 1"	a 1	2 1	(Station 2 1 removed)
	"*"	a ı		
	"#"			

Note: **If you require a station to shift from one zone to another simply programme the station into the zone as in the first example. The station will be automatically removed from its previous zone.**

2.7.4.14 Priority Break-in (BREAK)

The system is provided with 3 levels of break-in to established outside or intercom calls.

Level 1: **Stations can break into busy outside line and intercom calls.**

Level 2: **Stations can break into intercom calls and make a signal call to a station on an outside call.**

Level 3: **Stations can send a signal call to a busy station.**

To assign stations to a break-in level press the BREAK key, enter the break-in level and the assigned station numbers. Stations not allocated to a break-in level do not have the break-in facility.

Example: Assign stations 10 and 1 1 to Break-In level 1.

PRESS	"BREAK"	0 5		
DIAL	"1"	1		(level 1 selected)
	"*"	1		
	"10"	1	1 0	(Station 10)
	"*"	1		
	"1 1"	1	1 1	(Station 1 1)
	"*"	1		
	"#"			

To check the programmed data:

PRESS	"CHECK"	C		
	"BREAK"	c o 5		
DIAL	"1"	1		(level 1)
	"*"	1	1 0	
	"*"	1	1 1	
	"#"			

To remove the Break-In facility from a station enter "0" as the break-in level.

Example: Remove Break-In facility from station 1 1.

PRESS	"BREAK"	0 5			
DIAL	"0"		0		(cancel break-in)
	"*"		0		
	"1 1"		0	1 1	(Station 11 removed)
	"*"		0		
	"#"				

2.7.4.15 Meet-Me Paging (F-l 1)

DSS key F- 11 is used to enable Meet-Me-Answer and Meet-Me-Conference paging.

To disable Meet-Me paging, programme "0".
To enable Meet-Me paging, programme "1".

Example: Enable Meet-Me paging.

			DISPLAY	
PRESS	"F-11"	6		
DIAL	"1"		1	(enabled)
	"*"			
	"#"			

2.7.4.18 Signal, Voice and Taikback intercom Calls (F-l 2, MIC)

There are three types of Intercom calls:—

1. Signal Call — On this type of intercom call the called station gives indication of the incoming call with an intercom ring signal.
2. Voice Call (Microphone off) — On this type of intercom call the calling party's voice can be heard through the called station speaker. The called party responds by lifting the handset and pressing ICM key, or by pressing MIC key and speaking into the microphone.
3. Talkback Call (Microphone On) — On this type of intercom call the calling party's voice is heard through the called station's speaker. The called party responds by speaking into the microphone.

Programming of this facility is divided into two stages:

Stage 1. DSS key F-l 2 is used to programme intercom calls as either Signal or Voice/Talkback calls.

For Signal calls programme "1".
For Voice/Talkback calls programme "0".

Stage 2. "MIC" key is used to programme intercom calls as either Voice (microphone off) or Talkback (microphone on) calls.

For Voice calls programme "0".
For Talkback calls programme "1".

Example 1: Programme the system for Signal intercom calls.

			DISPLAY	
PRESS	"F-12"	1 7		
DIAL	"1"		1	(Signal calls)
	"*"			
	"#"			

Example 2: Programme the system for Talkback Intercom calls.

			DISPLAY	
PRESS	"F-l 2"	1 7		
DIAL	"0"		0	(Voice/Talkback)
	"*"			
	"#"			
PRESS	"MIC"	0 3		
DIAL	"1"		1	(Talkback calls)
	"*"			
	"#"			

2.7.4.17 Three Minute Warning Tone on Exchange Lines (F-I 3).

On exchange line calls a warning tone can be provided at three minute intervals.

To provide the warning tone, programme "1".
To cancel the warning tone, programme "0".

Example: Warning Tone provided.

			DISPLAY	
PRESS	"F-13"	1 a		
DIAL	"1"		1	(enabled)
	"*"			
	"#"			

2.7.4.18 I-Hold Automatic Ringback Timer (TIMER, HOLD)

TIMER and HOLD keys are used to set the time a call will stay on hold before it rings back to the holding station.

The time period is programmable up to a maximum of 250 seconds in units of one second. To disable the timer enter 0 for the time period.

Example: Set I-Hold recall timer to 60 seconds.

			DISPLAY		
PRESS	"TIMER"	2 1			
	"HOLD"		1		(I-Hold timer)
DIAL	"60"			6 0	(60 seconds)
	"*"				
	"#"				

2.7.4.1 g Exclusive-Hold Automatic Ringback Timer (TIMER, HOLD)

TIMER and HOLD keys are also used to set the time a call will stay on exclusive hold before it rings back to the holding station.

The time period is programmable up to a maximum of 250 seconds in units of one second. To disable the timer enter 0 for the time period.

Example: Set the Exclusive-Hold Recall timer to 80 seconds.

			DISPLAY		
PRESS	"TIMER"	2 1			
	"HOLD"		1		
	"HOLD"		2		(exclusive hold timer)
DIAL	"80"			8 0	(80 seconds)
	"*"				
	"#"				

2.7.4.20 Signailing Time-out During Automatic Ringback (TIMER, ICM)

TIMER and ICM keys are used to set the length of time a call is signalled to the holding station in I-Hold and Exclusive-Hold automatic ringback. After this time, the call is rung back to the holding station every 20 seconds.

The time period is programmable up to a maximum of 250 seconds in units of one second.

Example: Automatic Ringback Signalling to time out in 20 seconds.

			DISPLAY		
PRESS	"TIMER"	2 1			
	"ICM"		3		
DIAL	"20"		3	2 0	(20 seconds)
	"*"				
	"#"				

2.7.4.21 Ring inward Timer (TIMER, ⌓ TR)

TIMER and ⌓ TR keys are used to set the length of time after which a call, transferred by Ring Inward method is rung back to the transferring station.

The time period is programmable up to a maximum of 250 seconds in units of one second.

Example: Ring inward signalling to time out after 120 seconds.

		DISPLAY		
PRESS	"TIMER"	2 1		
	"⌓ TR"	4		
DIAL	"1 20"	4	1 2 0	(120 seconds)
	"*"			
	"#"			

2.7.4.22 Earth Recall/Switchhook Flash timer (TIMER, RL)

TIMER and RL keys are used to set the duration for Earth Recall or Switchhook flash on PBX lines. Note that switchhook flash is always 1 .B seconds for lines assigned as exchange lines.

The length of the pulse is programmable in 0.1 second units up to a maximum of 20 seconds. To disable the timer enter 0 for the time period.

Example: Set the Earth Recall/Switchhook flash duration to 0.8 seconds.

		DISPLAY		
PRESS	"TIMER"	2 1		
	"RL"	6		
DIAL	"8"	6	a	(0.8 seconds)
	"*"			
	"#"			

2.7.4.23 PABX Access Pause Timer (TIMER, BREAK)

TIMER and BREAK keys are used to set the length of the PABX access pause.

The length of the access pause is programmable in 0.1 second units up to a maximum of 20 seconds. To disable the timer enter 0 for the time period.

Example: Set the access pause length to 2.5 seconds.

		DISPLAY		
PRESS	"TIMER"	2 1		
	"BREAK"	7		
DIAL	"25"		2 5	(2.5 seconds)
	"*"			
	"#"			

2.7.4.24 Automatic Hold Release (TIMER)

The system will automatically disconnect a held outside line if the current from the exchange or PBX is interrupted for more than a programmed time.

The time period is programmable on a per line basis, in steps of 20 milliseconds.

Example: Programme maximum interruptions allowed to lines 1 and 2 as 200 and 300 milliseconds respectively.

		DISPLAY		
PRESS	"TIMER"	2 1		
DIAL	"1"	c 1		(line 1)
	"10"	c 1	1 0	(200 ms)
	"*"			
	"2"	c 2		(line 2)
	"1 5"	c 2	1 5	(300 ms)
	"*"			
	"#"			

2.7.4.25 Clock Setting (SET, CLOCK)

The clock is set from station 10 without entering programming mode. Lift the handset and press SET to enter clock set mode. After setting the clock press SET again to leave clock set mode.

The clock is set in four separate sections: time, date, year and day.

(i) time setting — press "CLOCK" once, then either "*" for AM or "#" for PM. Enter four digits (including leading zeros) for hours (01-I 2) and minutes (00-59).

(ii) date setting — press "CLOCK" twice, then enter four digits (including leading zeros) for month (01-12) and day (01-31).

(iii) year setting — press "CLOCK" three times, then enter four digits for year.

(iv) day setting — press "CLOCK" four times then enter the digit corresponding to the day of the week. The digits are from 0 to 6 corresponding with Sunday to Saturday.

Example: Adjust the clock to 4.25 pm on Wednesday the 3rd of September, 1985.

			DISPLAY	
PRESS	"SET"			(enter clock set mode)
			am	
PRESS	"CLOCK" 2 2	1		
			pm	
	"#"	1		
			pm	
	"0425"	1	0 4 2 5	(4.25 pm)
			pm	
	"*"	1	0 4 2 5	
	"#"			
	"CLOCK" x 2	2		
	"0903"	2	0 9 0 3	(3rd of Sept)
	"*"	2	0 9 0 3	
	"#"			
	"CLOCK" x 3	3		
	"1985"	3	1 9 8 5	(1985)
	"*"	3	1 9 8 5	
	"#"			
	"CLOCK" x 4	4		
		Wed		
	"3"	4	3	(Wednesday)
	"*"			
	"#"			
	"SET"			(leave clock set mode)

2.7.4.28 Access Barring by Digit Analysis (F-I 5)

Stations may be assigned to one of 6 classes for access barring:—

- Class A — Unrestricted
- Class B — Barred to ISD, STD allowed
- Class C — Limited to STD/ISD codes
- Class D — Local calls
- Class E — PABX calls
- Class F — Intercom Calls only.

Provision is made to store some common allowed codes which any station may dial regardless of barring class.

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

Class A — No data required.

Class B — ISD Codes (data 0) must be programmed.

Up to four codes of four digits each may be programmed.

Class C — The barred STD access codes (data 2) and allowed STD/ISD numbers (data 1) must be programmed.

Stations with class C access barring may dial pre-programmed STD/ISD numbers, but are barred from other STD or ISD calls. Up to 16 allowed numbers of up to 20 digits each may be programmed. If a number is longer than the digits programmed, it can be dialled providing the programmed digits agree with the first digits dialled.

Class D — The barred STD access codes (data 2) and number length limiter (data 3) must be programmed.

Up to sixteen numbers of up to four digits each may be programmed as STD 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 local call. In major capital cities this is "7", although in other areas the number length limit may vary. Any number between 0 and 30 may be programmed.

Class E — The PABX trunk access code (data 4) must be programmed. Up to four codes of up to two digits each may be programmed.

This data must be programmed if any outside lines have been assigned as PABX lines in 2.7.4.3.

Class F — Common allowed codes (data 5) may be programmed. Up to eight codes of up to four digits each may be programmed. Any station may dial these codes, regardless of its access barring class. The number dialled must agree exactly with the programmed code, therefore this facility allows stations to dial numbers which would normally be barred, eg emergency "000" or Telecom service numbers.

To programme or modify access barring data press F-l 5, dial the data type (0-5), press "*", dial the number of the code (eg 1 for first code, 2 for second code), press "*" then dial the code or number for barring. To enter other codes of the same data type press "*", dial the number of the code, press "*" and dial the code. When all the codes for a data type have been programmed dial "*","#".

Note that the DC key is used to denote "0" to "9". For example, if "9","DC" are entered as a trunk access code, then all the codes 90, 91 . 99 are considered to be trunk access codes. The display shows "—" when DC is programmed as part of a code.

Example 1: Barred ISD Access Code

		DISPLAY			
PRESS	"F-15"	2 0			
DIAL	"0"	0			(Data 0)
	"*"	0			
	"1"	0	1		(1 st code)
	"*"	0	1		
	"001 1"	0	1	0 0 1 1	(ISD Access Code)
	"*"	0			
	"#"				

Example 2. Allowed STD/ISD numbers 03630033 1 and 008 (INWATS)

		DISPLAY			
PRESS	"F-15"	2 0			
DIAL	"1"	1			(Data 1)
	"*"	1			
	"1"	1	1		(1 st code)
	"*"	1	1		
	"03630033 1"	1	1	3 0 0 3 3 1	(See Note below)
	"*"	1			
	"2"	1	2		(2nd code)
	"*"	1	2		
	"008"	1	2	0 0 8	
	"*"	1			
	"#"				

NOTE: For Data 1, only the last 6 digits of the code are displayed.

Example 3. Limit the number of digits to 7.

		DISPLAY			
PRESS	"F-15"	2 0			
DIAL	"3"	3			(Data 3 — Number length limiter)
	"*"	3			
	"1"	3	1		(1 st code)
	"*"	3	1		
	"7"	3	1	7	(7 digits allowed)
	"*"	3			
	"#"				

Example 4. Barred STD access code "0".

		DISPLAY			
PRESS	"F-15"	2 0			
DIAL	"2"	2			(Data 2 — Barred Codes)
	"*"	2			
	"1"	2	1		(1 st code)
	"*"	2	1		
	"0"	2	1	0	(STD Access Code "0")
	"*"	2			
	"#"				

Example 5. Common allowed code "000"

		DISPLAY			
PRESS	"F-15"	2 0			
DIAL	"5"	5			(Data 5 — Common Allowed Codes)
	"*"	5			
	"1"	5	1		(1 st code)
	"*"	5	1		
	"000"	5	1	0 0 0	(Emergency Code 000)
	"*"	5			
	"#"				

To check programmed data, press CHECK, F-l 5, dial the data type, "*", number of the code, "*". To check other codes of the same data type press "*", then dial the number of the code. Press "*", "#" to terminate. For data 1, only the first 6 digits of the code are displayed. Press "*" to view other digits.

2.7.4.27 Access Barring — Stations to Class of Service (F-l 4)

DSS key F-l 4 is used to assign each station with a class of service for access barring. To programme first enter data for Class of Service then stations numbers assigned to that class. The data is entered according to the table below.

DATA	CLASS OF SERVICE	
0	A	Unrestricted
1	B	Barred ISD, STD Access
2	C	Limited STD. ISD Codes
3	D	Local Calls
4	E	PABX Calls
5	F	Intercom calls only.

Example: Allocate stations 10 and 12 to Class A.

		DISPLAY			
PRESS	"F-14"	1 9			
DIAL	"0"		0		(Class A)
	"*"		0		
	"10"		0	1 0	(Station 10)
	"*"		0		
	"12"		0	1 2	(Station 12)
	"*"		0		
	"#"				

2.7.4.28 Call Details Recorder Printout (ALARM)

The ALARM key is used to programme data to restrict the Call Details Recorder printout based on number length, exchange line or station number.

To limit the printout to numbers of more than a specified number of digits, programme ALARM, dial "1", "*" then the number length limit for printout. The number length limit may be set between O-20 digits.

Programme "0" to print calls regardless of number length.

Example: Only print numbers of more than 7 digits.

PRESS	"ALARM"	2 3			
DIAL	"1"		1		(Limit Printout by number length)
	"*"		1		
	"07"		1	0 7	(More than seven digits)
	"*"		1		
	"#"				

To limit the printout by exchange lines programme ALARM, dial "2". "*", line number then dial "0" to print for that line, "1" to not print.

Example: Printout for line 1 but not for line 2.

PRESS	"ALARM"	2 3			
DIAL	"2"		2		(limit printout by exchange line)
	"*"		2		
	"1"		2 1		(line 1)
	"*"		2 1		
	"0"		21	0	(print)
	"*"		2		
	"2"		2 2		(line 2)
	"*"		2 2		
	"1"		22	1	(no printout)
	"*"		2		
	"#"				

To limit the printout by station number, programme ALARM, dial "3","*", station number for which details aren't printed.

Example: No printout for stations 10 or 1 1.

PRESS	**"ALARM"**	**2**	**3**		
DIAL	**"3"**		**3**		**(Limit printout by station number)**
	"*"		**3**		
	" 10"		**3**	1 0	**(station 10 no printout)**
	"*"		**3**		
	"1 1"		**3**	1 1	**(station 11 no printout)**
	"*"		**3**		
	"#"				

To restore printout for a station, programme ALARM, dial "4","*", station number for which printout is restored.

Example: Restore printout for station 1 1.

PRESS	**"ALARM"**	**2**	**3**		
DIAL	**"4"**		**4**		**(Restore printout for station)**
	"*"		**4**		
	"1 1"		**4**	1 1	**(Station 11 call details printout)**
	"*"		**4**		
	"#"				

2.7.5 Summary of Facility Programming and initial Values

PAR.	FACILITY	ASSIGNMENT	KEY	CODE	INIT. VALUE
2.7.4.1	Dialling Mode	VF = 0 Decadic = 1	F-I	06	1 for all lines
2.7.4.2	Off-hook Audible Signalling	Enter station Number, then: disable = 0 enable = 1	F-8	13	0 for all stations
2.7.4.3	Exchange Line Type	Local Exchange Line = 0 PABX Line = 1	F-2	07	0 for all lines
2.7.4.4	Earth Recall or Switchhook Flash	Earth Recall = 0 Switchhook Flash = 1	RL	02	1 for all lines
2.7.4.5	Exclusive Lines	Enter Line number, then station number	HOLD	04	00 for all lines
2.7.4.6	Exchange Line Audible Signalling	Enter station number, then lines for which the station is to have signalling	F-5	10	All lines signal to all stations
2.7.4.7	Exchange Line Request Groups	Enter group number, then lines in the group	F-3	08	All lines in Group 1
2.7.4.8	Station access to Exchange lines	Enter station number, then lines to which it has access	F-4	09	All stations haveaccess to all lines
2.7.4.9	Disable exch. line incoming signalling	Enter station number, then 0=facility disabled 1=facility enabled	F-6	11	0 for all stations
2.7.4.10	Night Transfer Stns. Group	Enter station number, then 1 -station in NT Group O-station not in NT Group	☎ TR	00	1 for all stations
2.7.4.1 1	Do-Not-Disturb	Enter Station number, then: 0 = DND disabled 1 = DND enabled	AD.ON	01	0 for all stations
2.7.4.12	Call Forwarding	Enter Manager station, then Secretary station	F-7	12	00 for all stations
2.7.4.13	Internal Zone Paging	Enter Zone Number (81, 82 83), then stations in the zone	F-10	15	81:10,11,12,13 82:14,15,16,17 83:18,19,20,21
2.7.4.14	Break-In	Enter Break-In level (1, 2 or 3) then station numbers assigned	BREAK	05	No Break-In stations
2.7.4.15	Meet-Me Answer Paging	0 — disable 1 — enable	F-I 1	16	1

'AR.	FACILITY	ASSIGNMENT	KEY	:ODE	INIT. VALUE
.7.4.16	Signal, Voice, ralkback and ntercom calls	Stage I: 0-Voice/Talkback 1 -Signal	:-12	17	0
		Stage II: O-Voice call 1 -Talkback call	MIC	03	1
.7.4.17	3-Minute Warning Tone	0 — disable 1 — enable	:-13	18	0
.7.4.18	-Hold Ring-back Timer	Enter number of seconds	TIMER HOLD	21 1	30
.7.4.19	Exclusive Hold Ringback Timer	Enter number of seconds	TIMER HOLD HOLD	21 1 2	30
.7.4.20	Signalling Timeout during Ringback	Enter number of seconds	TIMER CM	21 3	20
.7.4.21	Ring Inward timer	Enter number of seconds	TIMER ⌓ TR	21 4	30
.7.4.22	Earth Recall — Switchhook Flash Timer	Enter time period in multiples of 100 milliseconds	TIMER RL	21 6	5
.7.4.23	PABX Access pause timer	Enter time period in multiples of 100 milliseconds	TIMER BREAK	21 7	32
.7.4.24	Automatic Hold bridge release	Enter time period in multiples of 20 milliseconds	TIMER	21	0 for all lines
.7.4.25	Clock setting	Refer text	CLOCK	22	—
.7.4.26	Access barring	Enter data category, then codes and numbers as required. 0 — ISD code, 1 — Allowed ISD/STD, 2 — STD barred code 3 — Length, 4 — Trunk Access, 5 — Common Allowed Codes	F-15	20	All data cleared
.7.4.27	Station to Class of Service	Enter class of service then stations allocated 0 — Class A, 1 -- Class B, 2 — Class C, 3 — Class D, 4 — Class E, 5 — Class F	F-14	19	All stations to Class A
.7.4.28	CDR Printout	1 — Number length limit 2 — Exchange line limit 3 — Station limit 4 — Restore Station printout	ALARM	23	All data cleared

2.8 FUNCTIONAL TEST

2.8.1 General

After completing system feature programming, the system must be tested in accordance with the following test procedure. If faults are encountered, follow the repair suggestion. The repair suggestion refers to Section 3.6, Repair Procedures in the Maintenance Section.

• 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 require three stations referred to as stations A, B and C in the test procedure.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
•	Exchange Line	Go off-hook at Station A and operate line key. Repeat for each line connected to the system.	1) The associated line LED lights steadily at Stations A, B and C. 2) Hear dial tone.	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 and C. 2) Only assigned stations receive audible signalling.	3.5.3 3.5.4
3	Answering	Go off-hook at Station B and operate incoming line key.	1) The line LED change to steady at all stations. 2) Both parties can converse.	3.5.5 3.5.6
4	Hold	Operate HOLD at Station B.	1) The line LED double flashes at Station B and flashes at 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) Audible signalling heard at Station B	3.5.9
6	Re-seizure	Respond to the hold line at Station B by pressing the line key. Go on-hook at Stations A and B.	1) Stations A and B can converse. 2) Line LED changes to steady.	3.5.6 3.5.5

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
7	Intercom Seizure	Operate ICM while off-hook at Station A. Dial 2 digits to call Station B.	1) Intercom LED lights steadily. 2) Hear intercom dial tone.	3.5.10
8	Talkback (if talkback not equipped go to test 10)		1) hear a single tone burst through handset of Station A and speaker of Station B. 2) ICM LED double flashes at Station B. 3) Hear talkback answering by Station B on Station A handset.	3.5.11
9	Microphone Cut-off	Operate MIC at Station B. Operate MIC at Station B again. Dial "1" at Station A.	1) MIC LED lights steady. 2) No talkback can be heard at Station A. 1) MIC LED turns off. 2) Talkback is possible again.	3.5.12
10	Signal Call		1) Audible signalling heard through speaker at Station B. 2) Ring tone heard through handset of Station A.	3.5.13 3.5.14
11	Answering	Operate ICM and go off-hook at Station B.	1) ICM LED at Station B lights steady. 2) Stations A and B can converse through handsets	3.5.15
12	Disconnection	Go on-hook at Station B. Go on-hook at Station A.	ICM LED's at Stations A and B go off.	3.5.16

The following test sequence checks that the system options operate correctly.

The tests are carried out only on the features that have been provided. The tests for features not provided are to be ignored.

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
*13	Background Music (if provided)	With Station "A" on-hook, press "#"	1) Background music can be heard through Station A speaker.	3.5.17
'14	Decadic or VF dial line (as programmed)	Seize each line in succession and check whether dialling is decadic or VF.	1) Appropriate line LED's turn on. 2) Dialling method is as programmed for each line connected to the system.	3.5.1 3.5.18
'15	Incoming signalling assignment (as programmed)	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) Dialling tone is present. 3) Only assigned stations receive audible signalling.	3.5.1 3.5.2 3.5.1 g
'16	Line Request (as programmed)	With Station A off-hook press HOLD Dial a programmed group number then hang up. Go off-hook and press the LINE key. Hang up. Repeat for all programmed line request groups.	1) ICM and HOLD LEDs turn on. 1) HOLD LED slow flashes at Station A. 2) Line LED within the programmed group slow flashes at Station A and is steady at all other stations. 3) Station A receives audible signalling. 1) HOLD led turns off. 2) Line led turns steady. 1) All leds turn off.	3.5.20

IO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
'17	Access barring by digit analysis (as programmed	Seize a line at stations in different classes and dial various codes.	1) Class A stations — unrestricted. 2) Class B stations — barred ISD access, STD access provided 3) Class C stations — limited ISD/STD access to 16 numbers. 4) Class D stations — local calls only 5) Class E stations — PABX calls only when the system is located behind a PABX. 6) Class F stations — intercom calls only. 7) When restriction occurs the station will hear number unobtainable tone and then will be discontinued from the line.	3.5.21
'18	External Paging (if provided)	Seize an intercom line and dial "85"	1) A paging call can be heard through the external speaker	3.5.22
'19	PABX Recall (if system located behind a PABX)	Seize a PABX line at Station A and dial another line on the system. Answer the call at Station B. Press LN.RL key at Station A. Hang up at Stations A and B and repeat this test for all PABX lines connected to the system.	1) An incoming call is signalled at assigned stations 1) Conversation can occur between Stations A and B 1) Station A hears PABX dial tone. 2) Station B is placed on PABX hold.	3.5.23
'20	Call Details Recorder	Switch the jack assembly to IN SERVICE	1) Ready LED lights. 2) Printer prints heading.	3.5.35 3.5.36

2.8.3 Station Test

The following test sequence is to be performed on each station within the system. The sequence is divided into four parts. The first part covers features common to the BASIC, ON-HOOK and HANDSFREE STATIONS. The second part covers features common to ON-HOOK and HANDSFREE stations, while the third part covers features exclusive to the the HANDSFREE station. The fourth part covers features provided on the standard telephone stations.

Part I — Basic, On-Hook and Handsfree stations:

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
* 1	Line Keys	Go off-hook and operate each line key.	1) Line LED lights 2) Dial tone is heard if line is connected and free. 3) Station has side tone.	3.5.24
2	Dialling	Seize a line and dial an outside number.	1) Destination is reached. 2) Parties can converse.	3.5.25
3	HOLD	Operate HOLD key. Reseize the line.	1) Line LED double flashes. 1) Line LED goes steady.	3.5.26
4	ICM	Operate ICM key. Reseize the line and go on-hook.	1) Line LED double flashes. 2) ICM LED lights steady. 3) Hear intercom dial tone. 1) All LED's go off	3.5.26 3.5.27

Part II — On-hook and Handsfree Stations:

* 5	On-hook operation	Operate SPKR key, then seize a line Operate SPKR again.	1) SPKR LED turns on. 2) Line LED turns on. 3) Hear dial tone through station speaker. 1) SPKR LED turns off.	3.5.28
* 6	Microphone disable	Operate MIC key. Operate MIC key again.	1) MIC LED turns on. 1) MIC LED turns off.	3.5.26

Part III — Handsfree Station:

* 7	Display	 Press TIMER Press TIMER again Press CLOCK	1) Displays time and date. 1) Display shows the timer and starts counting. 1) Timer stops counting. 1) Displays time and date.	3.5.29

NO.	CHECKITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
* 8	Handsf ree operation	Press SPKR key. Seize a line. Dial an outside number. Press SPKR key.	1) SPKR and DSS LED's turn on. 1) Line LED turns on. 2) Hear dial tone through station speaker. 1) Destination is reached. 2) Both parties can converse. 1) LED's turn off. 2) Line is disconnected.	3.5.30

Part IV — Standard Telephone Station:

* 9	Standard Telephone Station	Lift the handset Dial "0" Dial an outside number. Quickly depress and release the switch-hooks. Hang up. Lift the handset then hang up to finish the call.	1) Hear internal dial tone. 1) Hear outside line dial tone. 1) Destination is reached. 2) Parties can converse. 1) The call is placed on hold. 1) Audible signal-ling is heard at the station.	3.5.34

The following test sequence checks that the programmable station options operate correctly.

The stations are to be tested only on features that have been programmed for each station. Tests for features not programmed are to be ignored.

*10	Do-Not-Disturb (if programmed)	Operate DND key. Operate DND key again.	1) DND LED lights steadily. 1) DND LED goes off	3.5.26
*11	Line Access Restrictions (if programmed1	Go off-hook and seize each line in succession.	1) Each station can only access the allowed lines.	3.5.31
'12	Call Forwarding (if (programmed)	With the handset on hook, press the DND key at a Manager station Press DND key at Manager station again..	1) The DND LED lights steady at the Manager station 2) The DND LED slowly flashes at the secretary station. 1) Both DND leds go out.	3.5.32

NO.	CHECK ITEM	ACTION	EXPECTED RESULT	REPAIR SUGGESTION
'13	Off-hook Signalling (if programmed)	Seize a line. Make an intercom call to the busy station.	1) Hear dial tone. 2) Line led lights steady. 1) ICM LED double flashes. 2) Station receives audible signalling.	3.5.33

2.9 SITE RECORDS AND INSTALLATION FEEDBACK LABEL

2.9.1 Software Programming Records

Upon completion of the installation a copy of the AN-6 16 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 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 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 of 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 programming console commonly called TPU-AN, Test and Programming Unit for AN-61 6 Business System. This is equipped with a programming button which places the unit into "programme" mode, thus enabling verification and/or reprogramming of site-dependant system data.

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

(iv) Normal maintenance tools, i.e. Buttinski, Long-nose pliers, Angle Cutters, and both Phillips and flat blade type screwdrivers.

3.2 TEST POINTS

3.2.1 Power Supply

There are six DC voltages supplied for these systems:

The supply voltages are accessed by pulling out the power supply unit from the main equipment cabinet and disconnecting the 12-pin power plug from the backplane.

Measure the voltages across the plug pins as shown on table 3.2.1 (a). Figure 3.2.1 shows the pin locations on the plug.

PIN NO.	WIRE COLOUR	PCB DESIGNATION	VOLTS (V)	REFERENCE PIN
1	Brown	+5	5.05 ± 0.3	2 (LGD)
2	Red	LGD	–	
3	Orange	+15	15 ± 0.8	5 (AGD)
4	Yellow	+7.5	7.5 ± 0.8	5 (AGD)
5	Pink	AGD		
6	Blue	R20	20 ± 1	8 (RGD)
7	Purple	T20	19 ± 1	5 (AGD)
8	Grey	RGD		
9	White	T30	36 — 40	10 (TGD)
10	Black	TGD		
11	Light Blue	Reset		
12				

Table 3.2.1 (a) — DC VOLTAGE TEST POINT SUMMARY

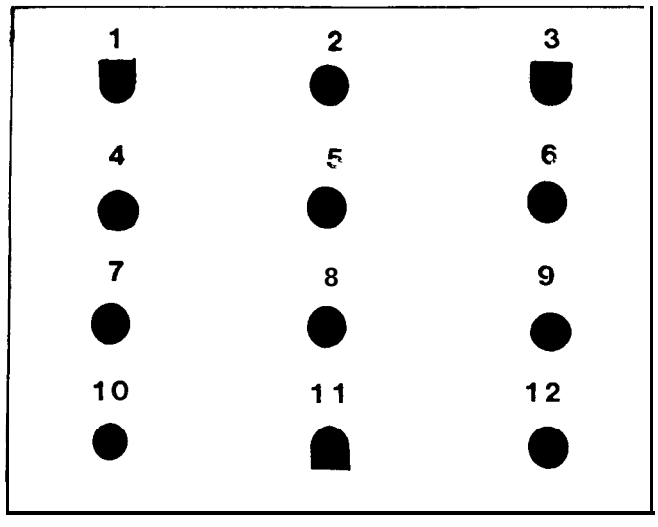


Fig. 3.2.1 — PIN LOCATIONS

The mains and 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 (b) illustrates which fuse corresponds to a given power supply.

FUSE	RATING	POWER SUPPLY
F0	1A	Mains
F1	2A	+ 3ov
F2	1.6A	+ 2ov
F3	0.3A	+ 15V
F4	1.6A	+ 5v

Table 3.2.1 (b) — POWER SUPPLY FUSE RATING

3.2.2 Main Equipment

Exchange lines, stations, music source, external amplifier, call metering unit power connection, ring generator unit connection, and signal earth for earth recall can be accessed on the system distribution frame (SDF).

Eight pairs of terminals are located on the right-hand side of the main equipment cabinet. These terminals are used to install the powerfail bells, so they can be used to access the exchange lines at the main equipment. The location of the terminals is shown on Figure 3.2.2.

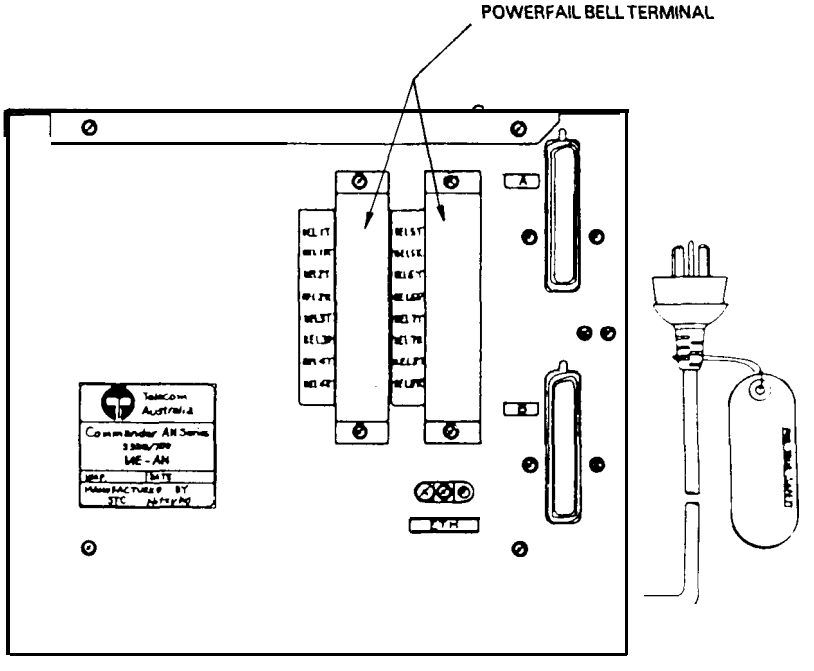


Fig. 3.2.2 — POWERFAIL BELL TERMINAL LOCATIONS

The voltage across line 1 can be checked by connecting a voltmeter between terminals BEL1T and BEL1R 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 by the AN-6 16 system:

CPB-AN The top LED lights when the battery board has been removed or when the back-up battery is going flat to indicate that the battery must be replaced.

The bottom LED flashes at 300 IPM to indicate that the main CPU program is running.

PS-AN There are five LED's on the power supply unit to indicate whether any of the power supplies are faulty. They are (from left to right):

3ov	Station Logic Supply
2ov	Relays and Station A-pair Supply
15V	Crosspoint and Amplifier Supply
7.5V	Amplifier Bias Supply
5v	Main Equipment 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 on 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	+ 32 ± 8V
	BK	5	REF B
Standard Telephone Stations (On Hook): Without 2WEU-AN	WT	2	+ 32 ± 8V
	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 sensitivity of some 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 the SLB-AN and 2WLB-AN, must NOT be removed from the cabinet unless the mains power is turned OFF.

3.3.3 Power Supply

When the power supply is diagnosed as being faulty, it is to be changed over completely by disconnecting it from the backplane and removing the unit from the main equipment cabinet.

To remove the power supply:

- Disconnect the mains cord from the power socket.
- Remove all boards from the main equipment cabinet (refer to section 2.5 for board handling instructions).
- Disconnect the power supply connector from the backplane.
- Remove the four front panel screws fastening the power supply to the main equipment.
- Slide out the power supply unit as far as it can go.
- Unclip the grommet holding the mains cord to the bottom guide plate.
- Pull the mains cord through the hole in the bottom guide plate and remove the power supply unit.

To install the power supply unit simply follow the reverse of the procedure set out above.

• 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, power-fail 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/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

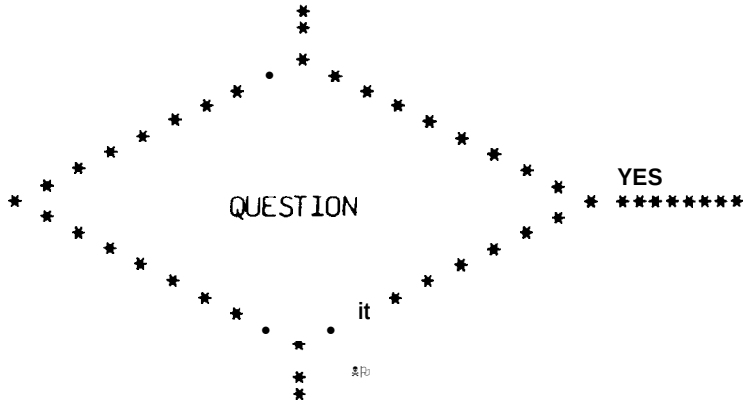
The diagnostic flow charts may be used whenever failure occurs. They are a means of localising a fault occurrence in one of the printed board assemblies (PBA) in an established working system.

Always commence at the "Start" block.

Flow Chart Symbols:

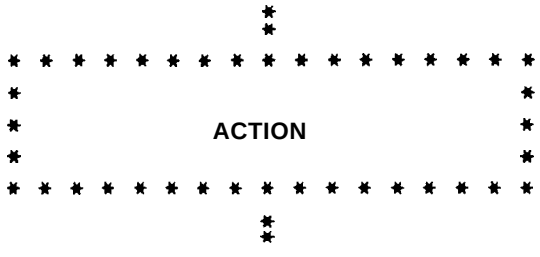
(a) Decision Function:

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.



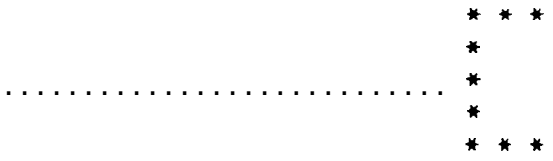
(b) Action/Operation:

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.



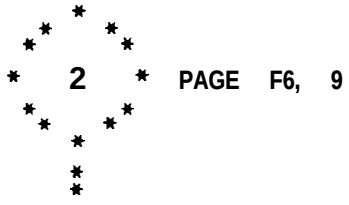
(c) Data Block:

This does not form part of the 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 dotted line.

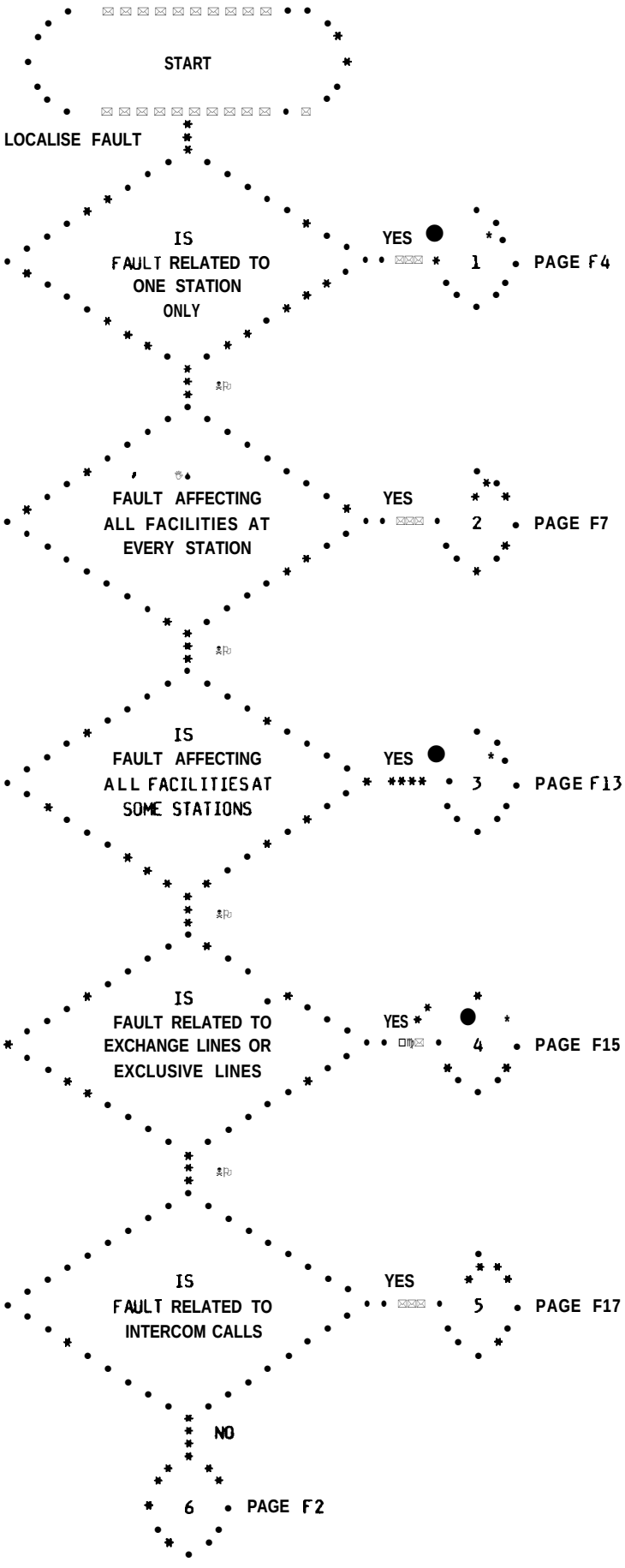


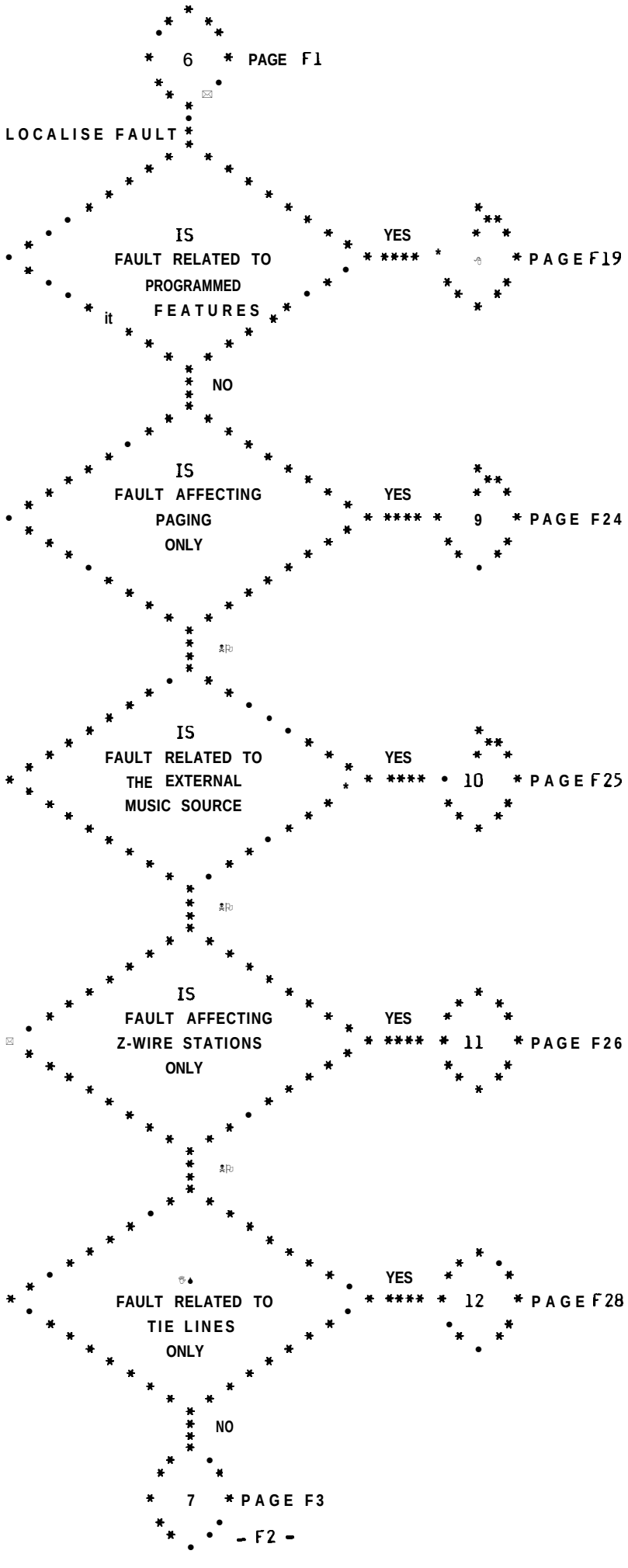
(d) Exit/Entry Points:

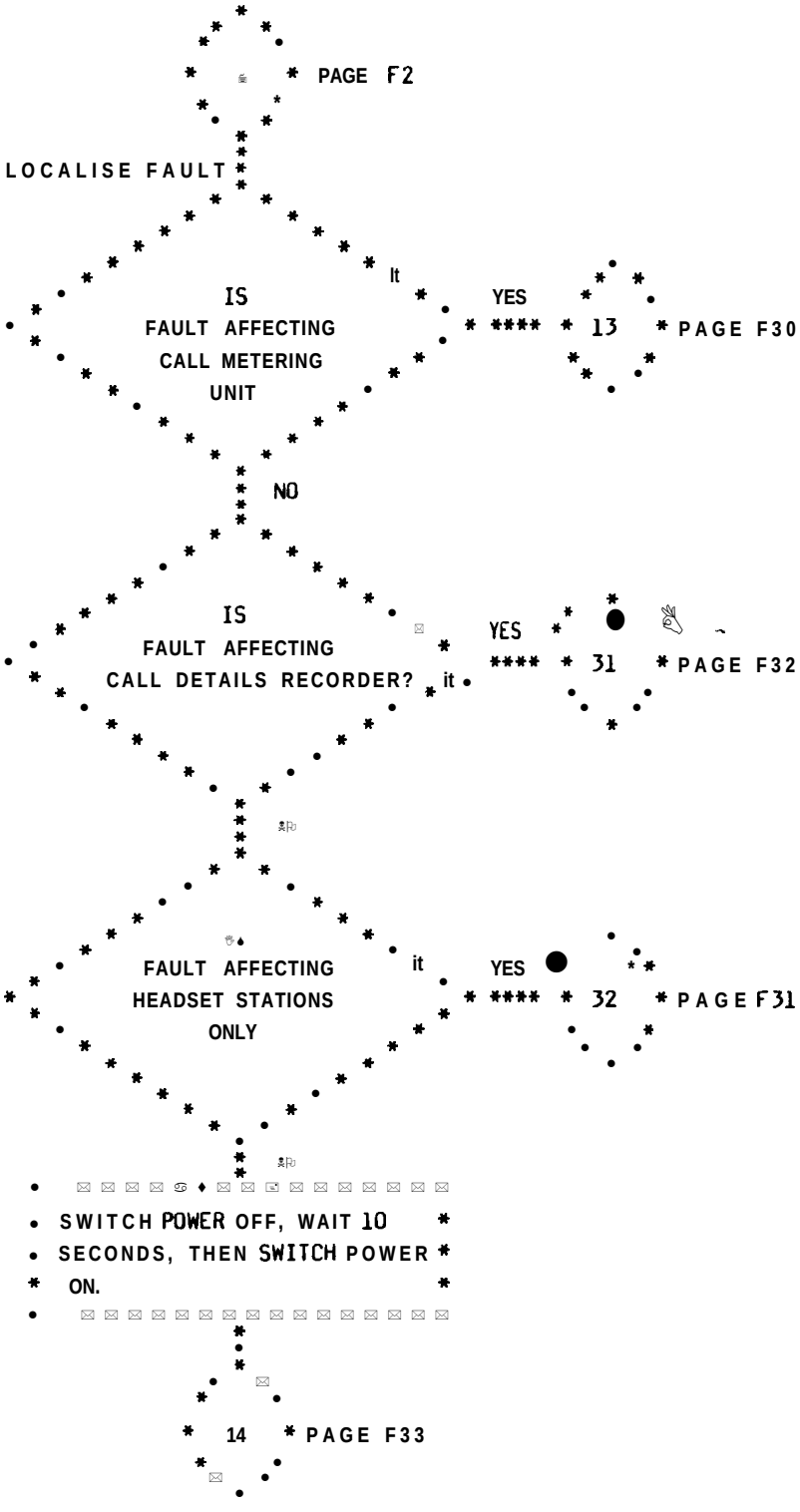
Numbered circles are used to move from page to page within a flow chart. In the example shown, exits to point "2" appear on both pages 6 and 9; entry point "3" is located on page 7. Each circle has its destination (or origin) page number(s) noted beside it.

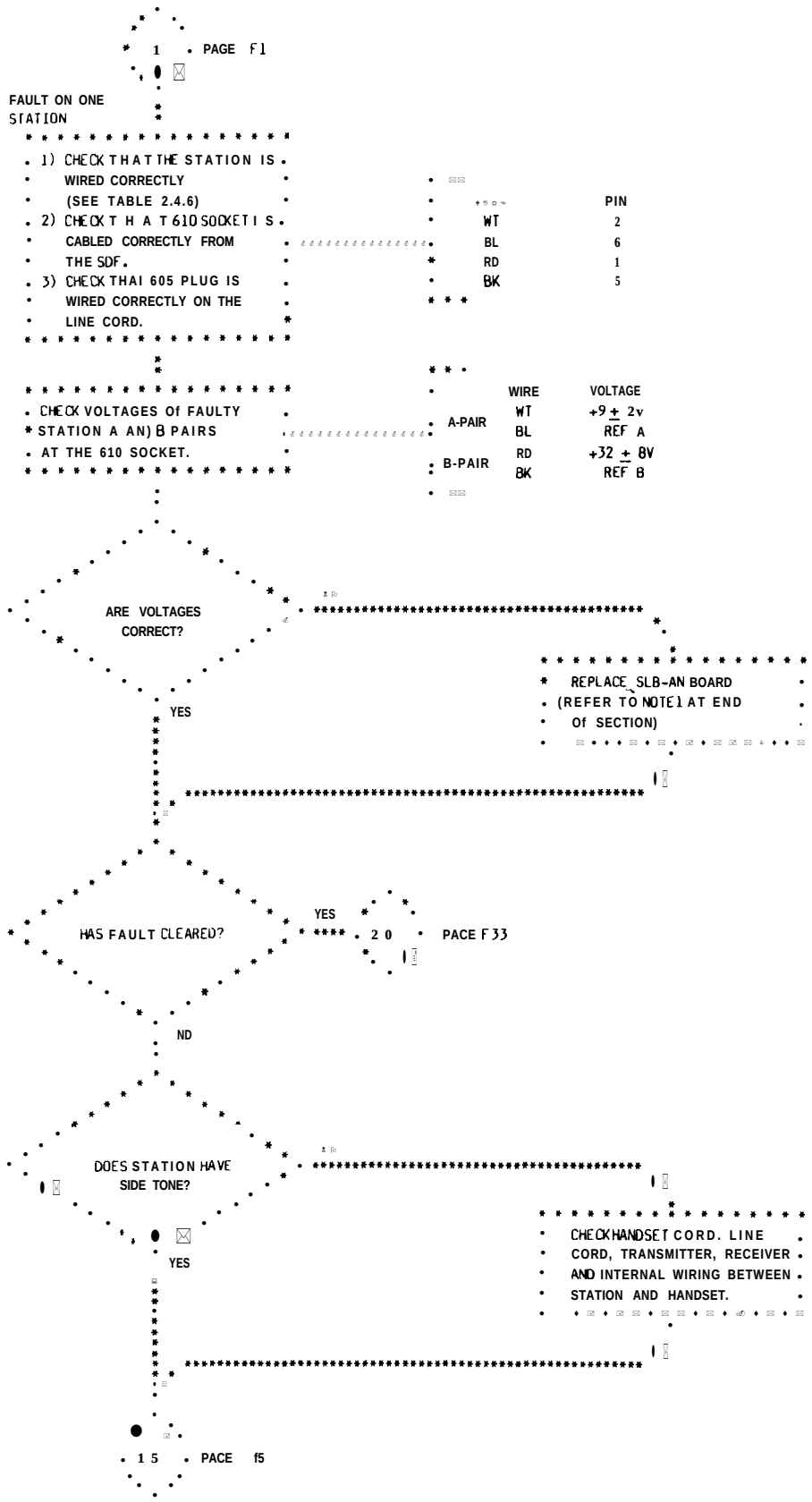


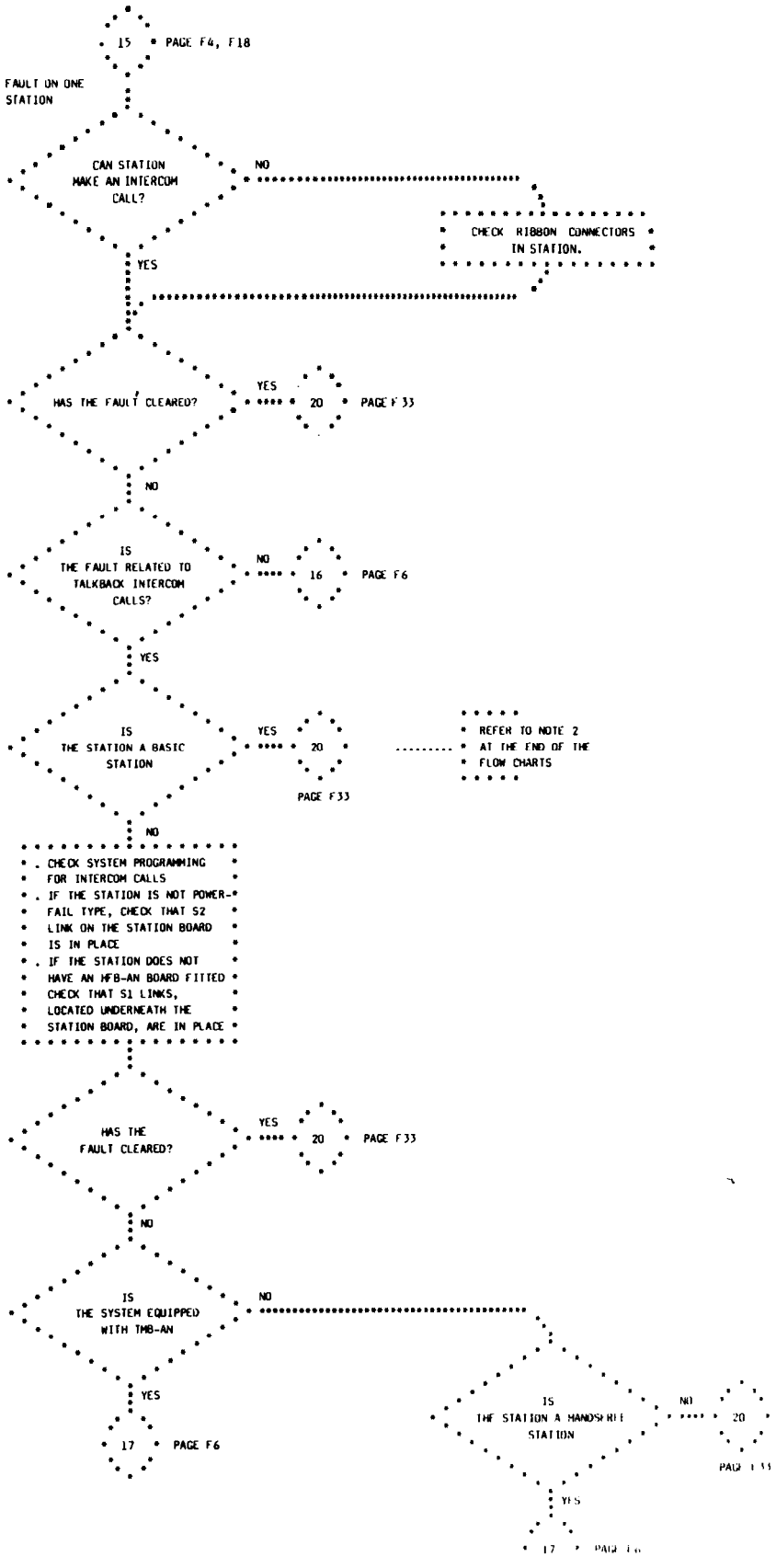
3.4.3 Maintenance Flow Charts

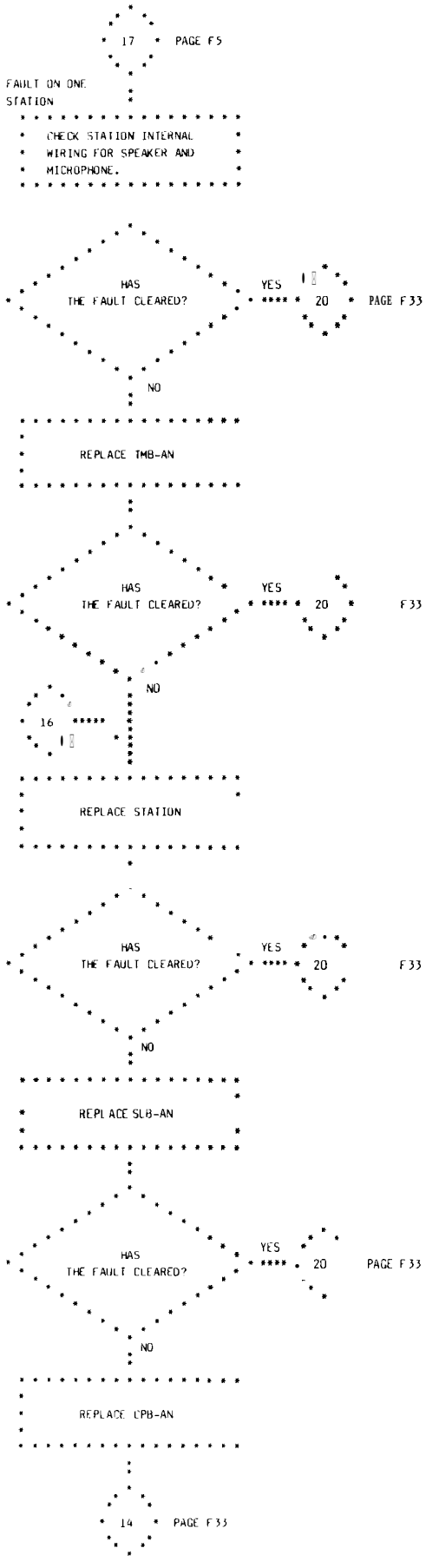


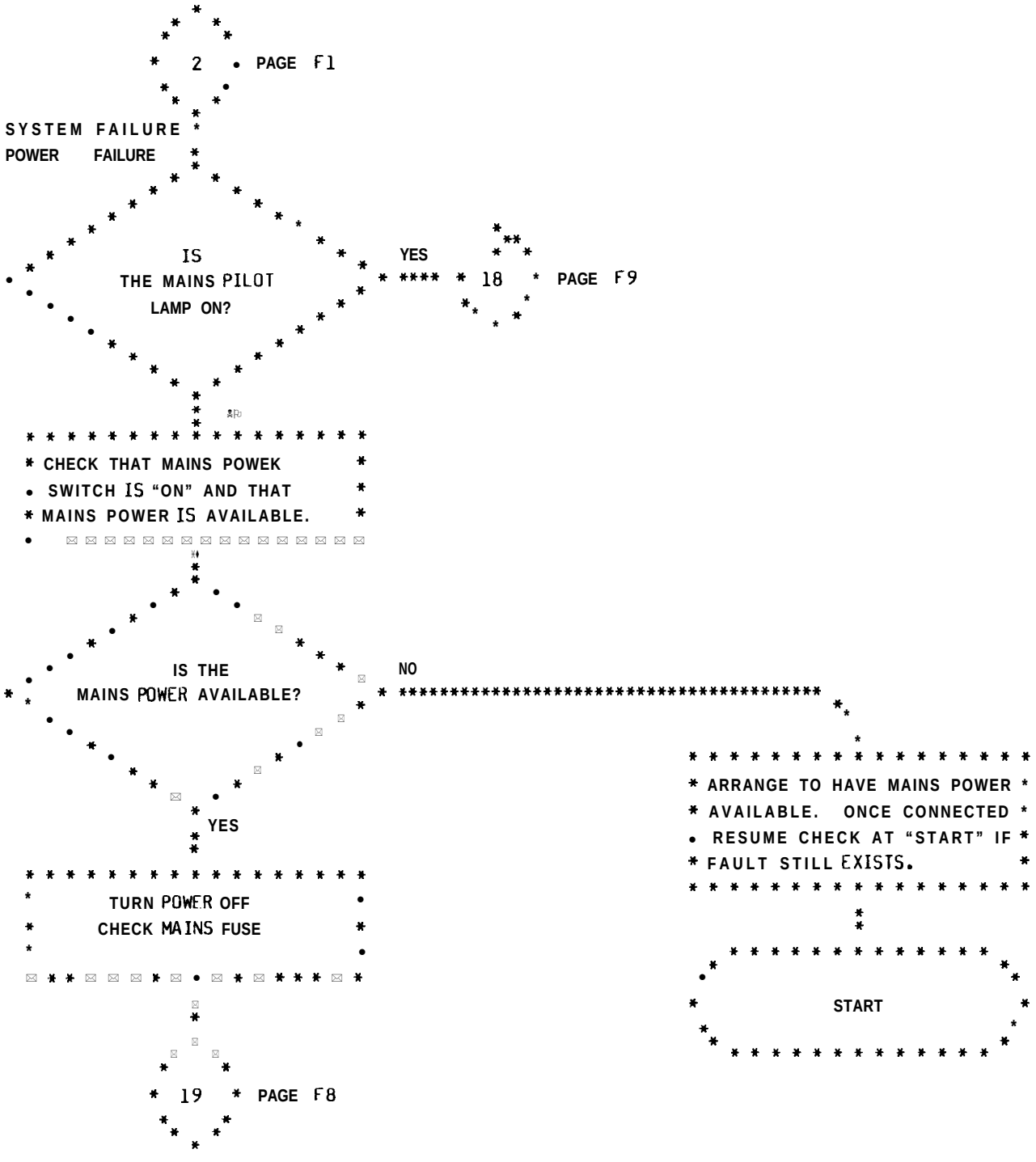

6
PAGE F1
LOCALISE FAULT
IS FAULT RELATED TO PROGRAMMED FEATURES
YES
PAGE F19
NO
IS FAULT AFFECTING PAGING ONLY
YES
9
PAGE F24
IS FAULT RELATED TO THE EXTERNAL MUSIC SOURCE
YES
10
PAGE F25
IS FAULT AFFECTING Z-WIRE STATIONS ONLY
YES
11
PAGE F26
FAULT RELATED TO TIE LINES ONLY
YES
12
PAGE F28
NO
7
PAGE F3
- F2 -

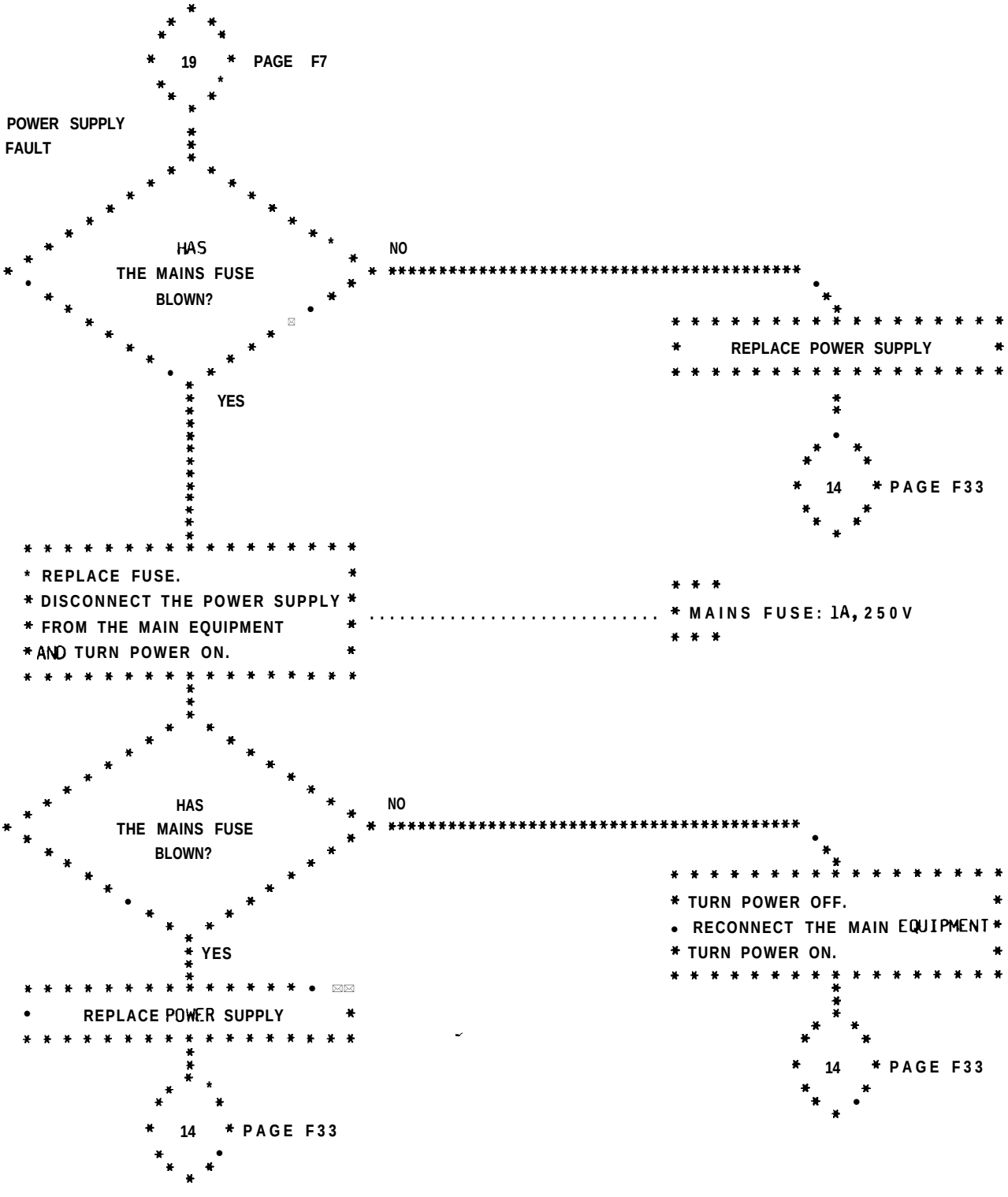

PAGE F2
LOCALISE FAULT
IS FAULT AFFECTING CALL METERING UNIT
YES
13
PAGE F30
NO
IS FAULT AFFECTING CALL DETAILS RECORDER?
YES
31
PAGE F32
FAULT AFFECTING HEADSET STATIONS ONLY
YES
32
PAGE F31
SWITCH POWER OFF, WAIT 10 SECONDS, THEN SWITCH POWER ON.
14
PAGE F33

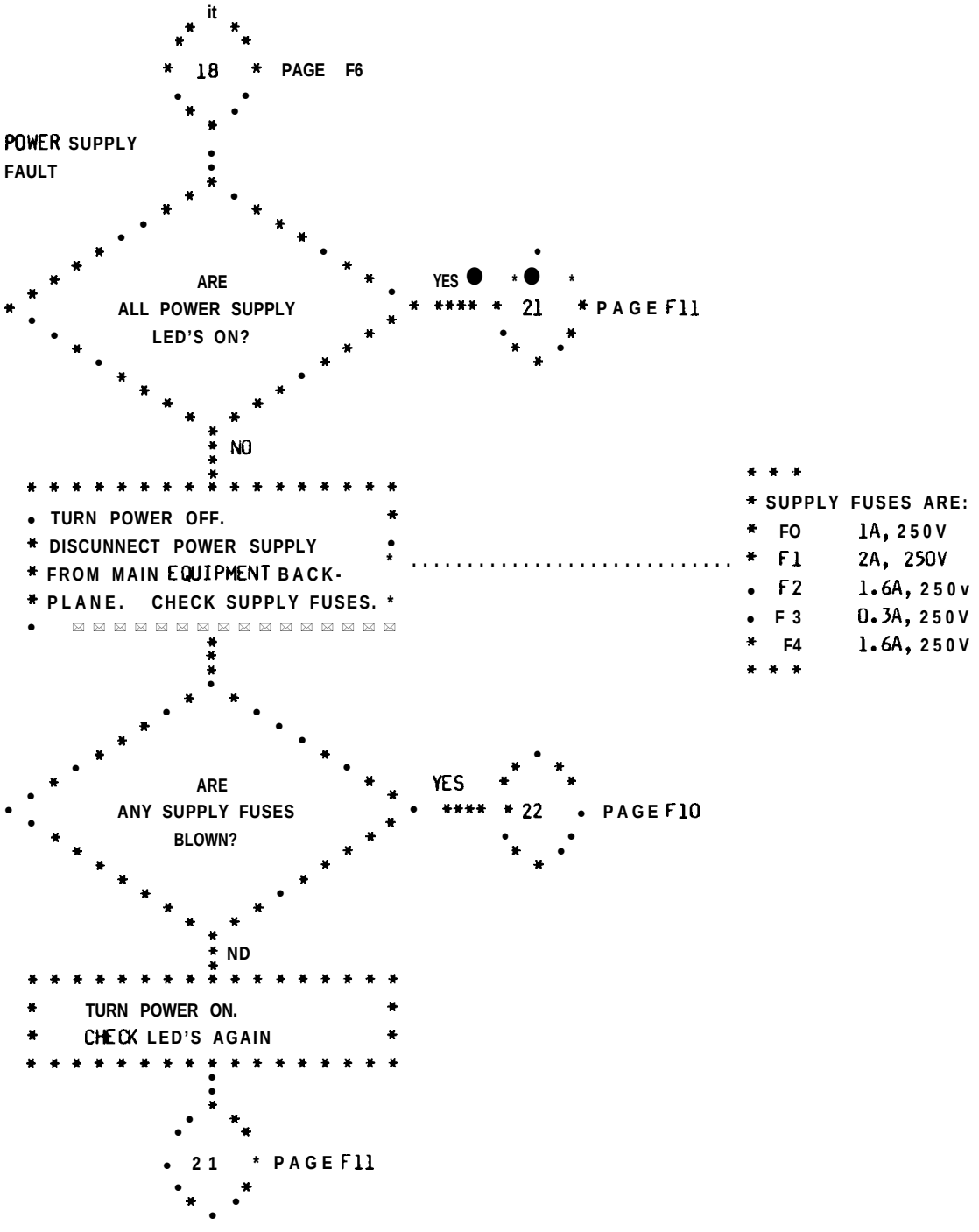

1 PAGE F1
FAULT ON ONE STATION
1) CHECK THAT THE STATION IS WIRED CORRECTLY (SEE TABLE 2.4.6)
2) CHECK THAT 610 SOCKET IS CABLED CORRECTLY FROM THE SDF.
3) CHECK THAT 605 PLUG IS WIRED CORRECTLY ON THE LINE CORD.
PIN
WT 2
BL 6
RD 1
BK 5
CHECK VOLTAGES Of FAULTY STATION A AND B PAIRS AT THE 610 SOCKET.
WIRE
VOLTAGE
A-PAIR
WT
BL
+9 ± 2v
REF A
B-PAIR
RD
BK
+32 ± 8V
REF B
ARE VOLTAGES CORRECT?
YES
REPLACE SLB-AN BOARD (REFER TO NOTE 1 AT END Of SECTION)
HAS FAULT CLEARED?
YES
20
PACE F33
ND
DOES STATION HAVE SIDE TONE?
YES
CHECK HANDSET CORD. LINE CORD, TRANSMITTER, RECEIVER AND INTERNAL WIRING BETWEEN STATION AND HANDSET.
15
PACE f5

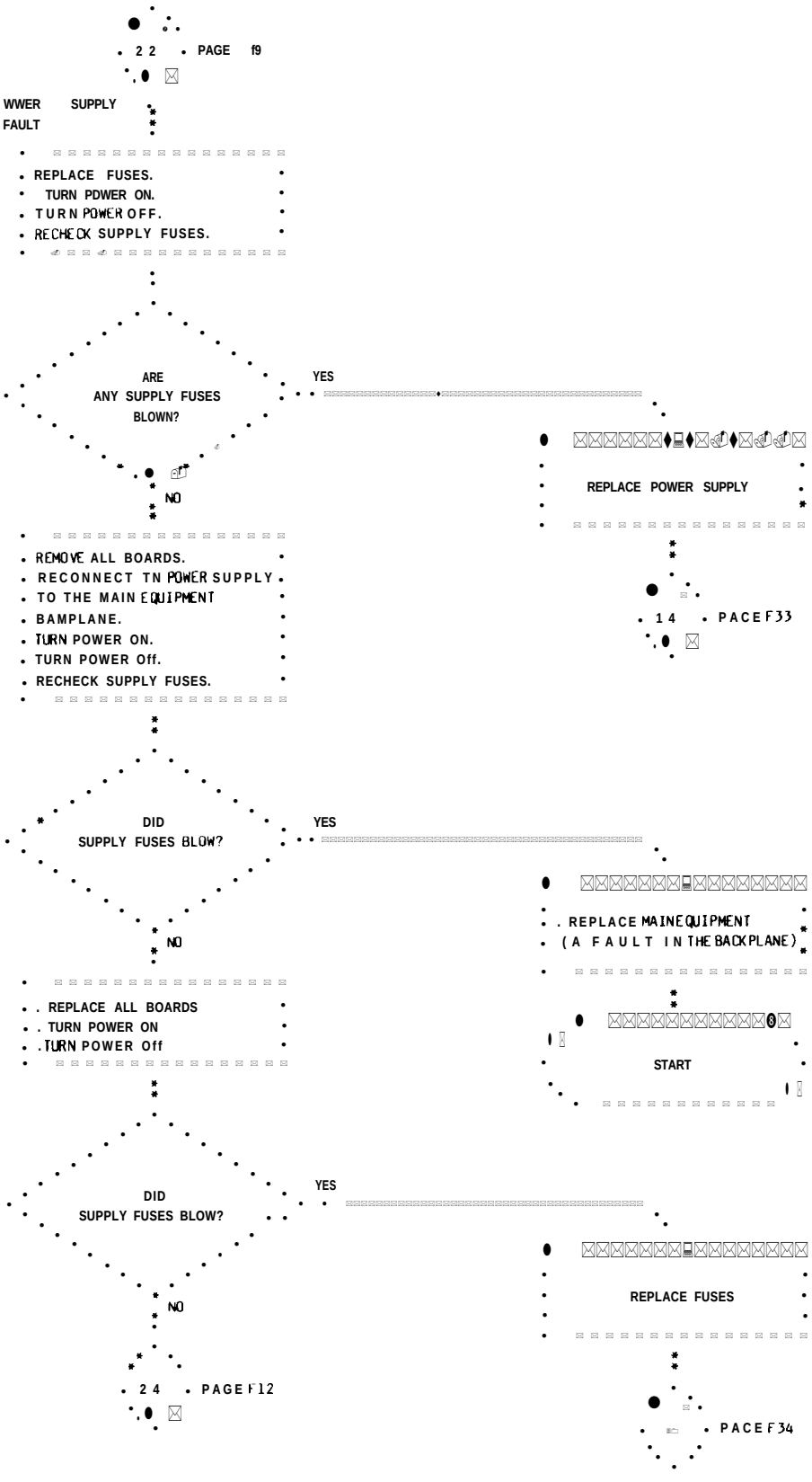

15 * PAGE F4, F18
FAULT ON ONE STATION
CAN STATION MAKE AN INTERCOM CALL?
NO
CHECK RIBBON CONNECTORS IN STATION.
YES
HAS THE FAULT CLEARED?
YES
20
PAGE F33
NO
IS THE FAULT RELATED TO TALKBACK INTERCOM CALLS?
NO
16
PAGE F6
YES
IS THE STATION A BASIC STATION
YES
20
PAGE F33
REFER TO NOTE 2 AT THE END OF THE FLOW CHARTS
NO
. CHECK SYSTEM PROGRAMMING FOR INTERCOM CALLS
. IF THE STATION IS NOT POWER-FAIL TYPE, CHECK THAT S2 LINK ON THE STATION BOARD IS IN PLACE
. IF THE STATION DOES NOT HAVE AN MFB-AN BOARD FITTED CHECK THAT S1 LINKS, LOCATED UNDERNEATH THE STATION BOARD, ARE IN PLACE
HAS THE FAULT CLEARED?
YES
20
PAGE F33
NO
IS THE SYSTEM EQUIPPED WITH TMB-AN
NO
YES
17
PAGE F6
IS THE STATION A HANDSFREE STATION
NO
20
YES
17

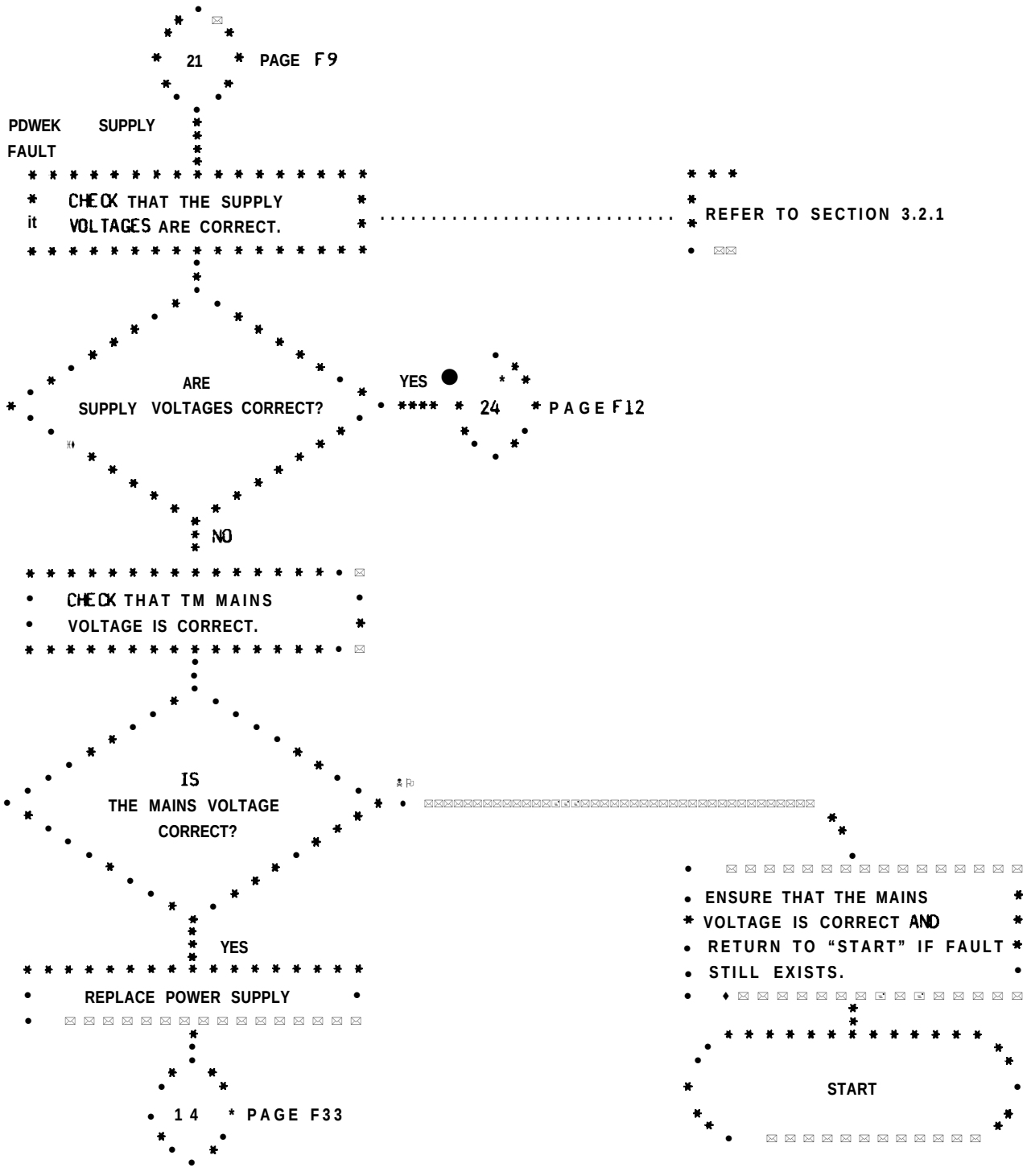

17
PAGE F5
FAULT ON ONE STATION
CHECK STATION INTERNAL WIRING FOR SPEAKER AND MICROPHONE.
HAS THE FAULT CLEARED?
YES
20
PAGE F33
NO
REPLACE TMB-AN
HAS THE FAULT CLEARED?
YES
20
F33
NO
16
REPLACE STATION
HAS THE FAULT CLEARED?
YES
20
F33
NO
REPLACE SLB-AN
HAS THE FAULT CLEARED?
YES
20
PAGE F33
NO
REPLACE CPB-AN
14
PAGE F33

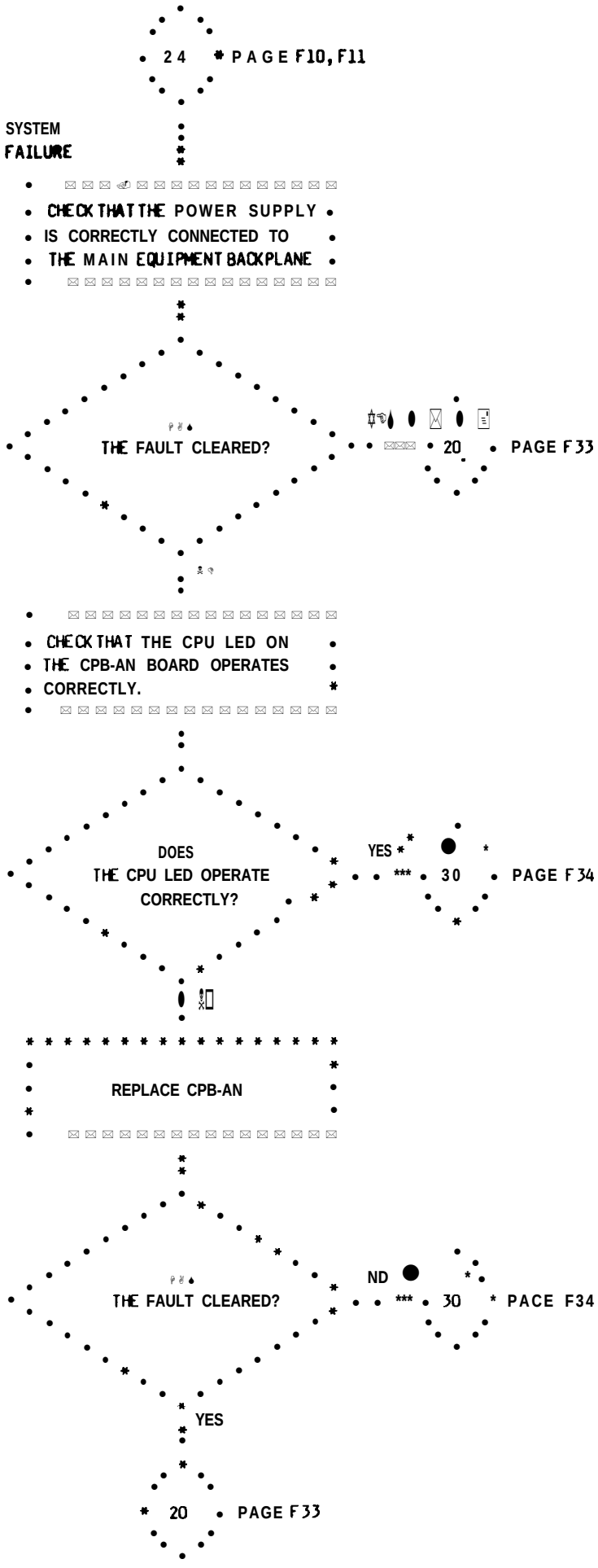

2
PAGE F1
SYSTEM FAILURE
POWER FAILURE
IS THE MAINS PILOT LAMP ON?
YES
18
PAGE F9
CHECK THAT MAINS POWEK SWITCH IS "ON" AND THAT MAINS POWER IS AVAILABLE.
IS THE MAINS POWER AVAILABLE?
NO
YES
TURN POWER OFF
CHECK MAINS FUSE
19
PAGE F8
ARRANGE TO HAVE MAINS POWER AVAILABLE. ONCE CONNECTED RESUME CHECK AT "START" IF FAULT STILL EXISTS.
START

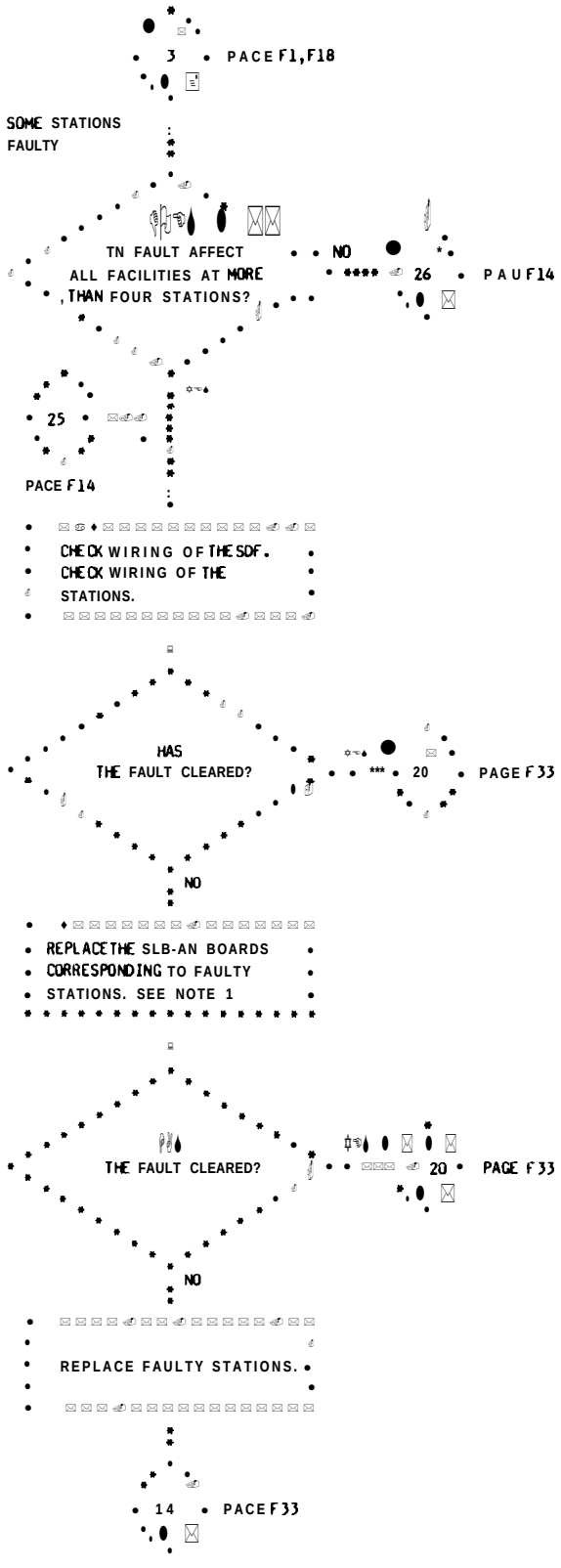

19
PAGE F7
POWER SUPPLY FAULT
HAS THE MAINS FUSE BLOWN?
NO
YES
REPLACE POWER SUPPLY
14
PAGE F33
REPLACE FUSE.
DISCONNECT THE POWER SUPPLY FROM THE MAIN EQUIPMENT AND TURN POWER ON.
MAINS FUSE: 1A, 250V
HAS THE MAINS FUSE BLOWN?
NO
YES
REPLACE POWER SUPPLY
14
PAGE F33
TURN POWER OFF.
RECONNECT THE MAIN EQUIPMENT
TURN POWER ON.
14
PAGE F33

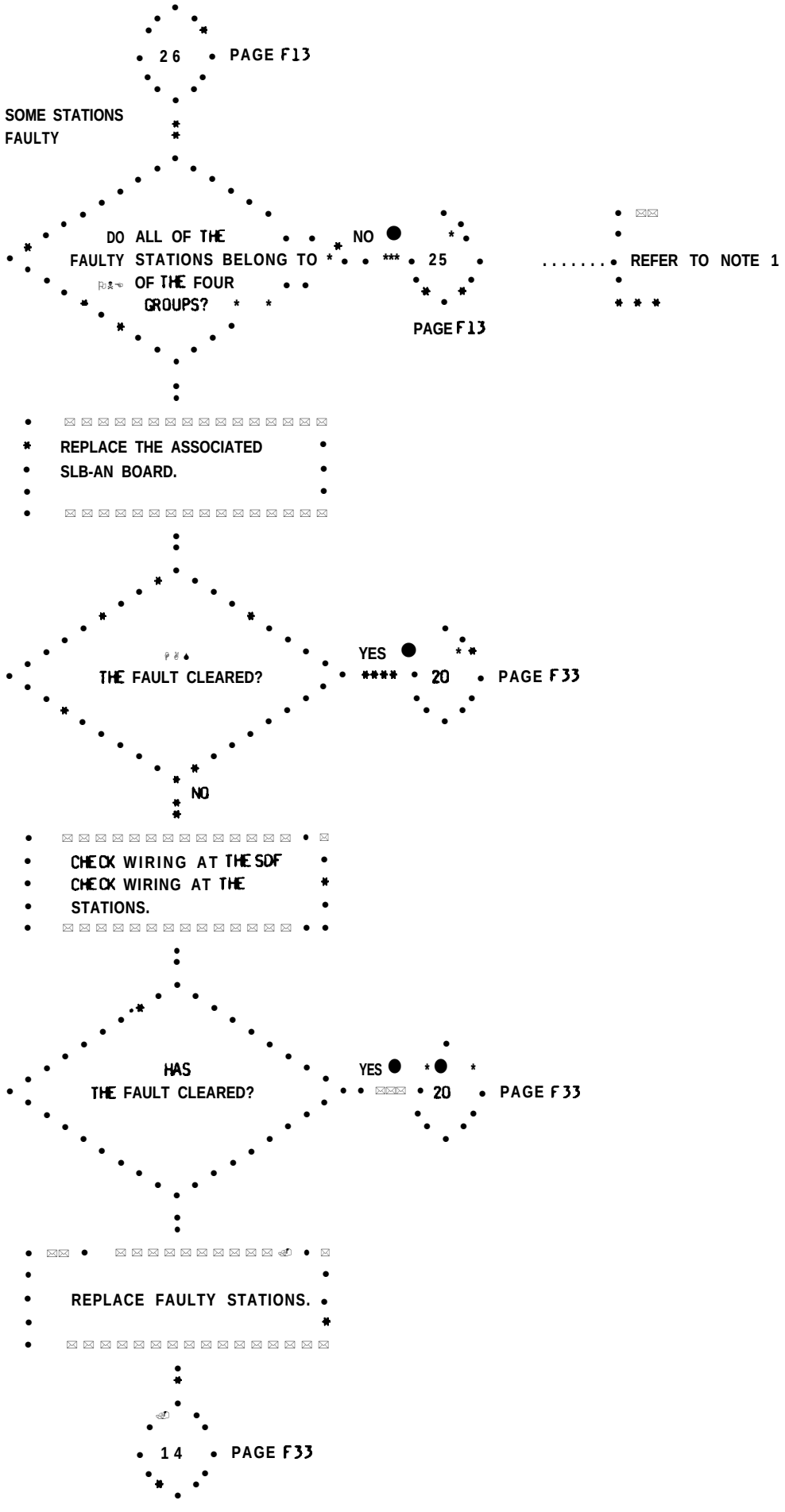

it
18
PAGE F6
POWER SUPPLY FAULT
ARE ALL POWER SUPPLY LED'S ON?
YES
21
PAGE F11
NO
TURN POWER OFF.
DISCUNNECT POWER SUPPLY FROM MAIN EQUIPMENT BACK-PLANE. CHECK SUPPLY FUSES.
SUPPLY FUSES ARE:
FO 1A, 250V
F1 2A, 250V
F2 1.6A, 250v
F3 0.3A, 250V
F4 1.6A, 250V
ARE ANY SUPPLY FUSES BLOWN?
YES
22
PAGE F10
ND
TURN POWER ON.
CHECK LED'S AGAIN
21
PAGE F11

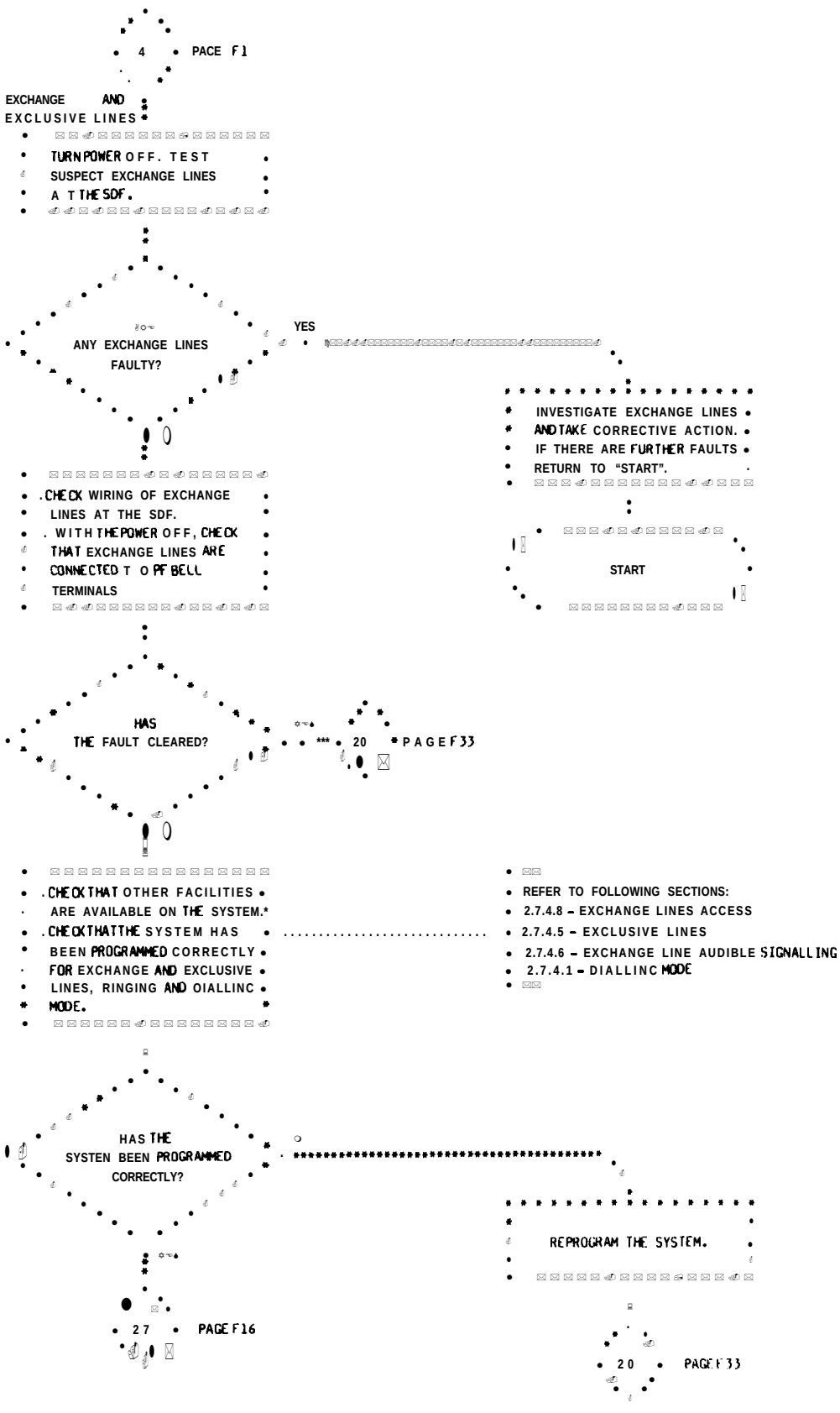

22 PAGE f9
WWER SUPPLY FAULT
REPLACE FUSES.
TURN PDWER ON.
TURN POWER OFF.
RECHECK SUPPLY FUSES.
ARE ANY SUPPLY FUSES BLOWN?
YES
NO
REPLACE POWER SUPPLY
14 PACE F33
REMOVE ALL BOARDS.
RECONNECT TN POWER SUPPLY TO THE MAIN EQUIPMENT BAMPLANE.
TURN POWER ON.
TURN POWER Off.
RECHECK SUPPLY FUSES.
DID SUPPLY FUSES BLOW?
YES
NO
. REPLACE MAINEQUIPMENT (A FAULT IN THE BACKPLANE)
START
. REPLACE ALL BOARDS
. TURN POWER ON
. TURN POWER Off
DID SUPPLY FUSES BLOW?
YES
NO
REPLACE FUSES
24 PAGE F12
PACE F34

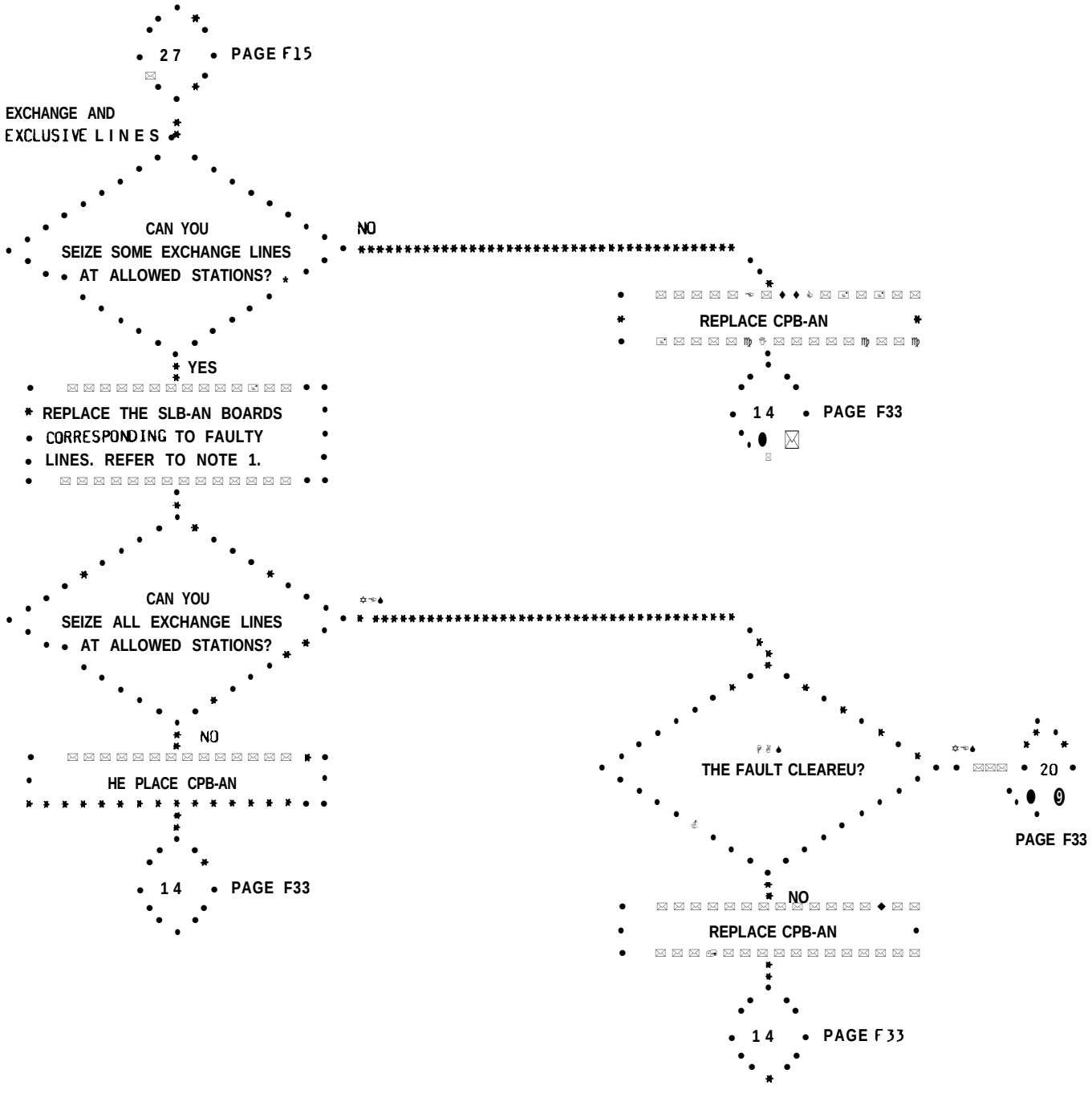

21
PAGE F9
PDWEK SUPPLY FAULT
CHECK THAT THE SUPPLY VOLTAGES ARE CORRECT.
REFER TO SECTION 3.2.1
ARE SUPPLY VOLTAGES CORRECT?
YES
24
PAGE F12
NO
CHECK THAT TM MAINS VOLTAGE IS CORRECT.
IS THE MAINS VOLTAGE CORRECT?
YES
REPLACE POWER SUPPLY
14
PAGE F33
ENSURE THAT THE MAINS VOLTAGE IS CORRECT AND RETURN TO "START" IF FAULT STILL EXISTS.
START

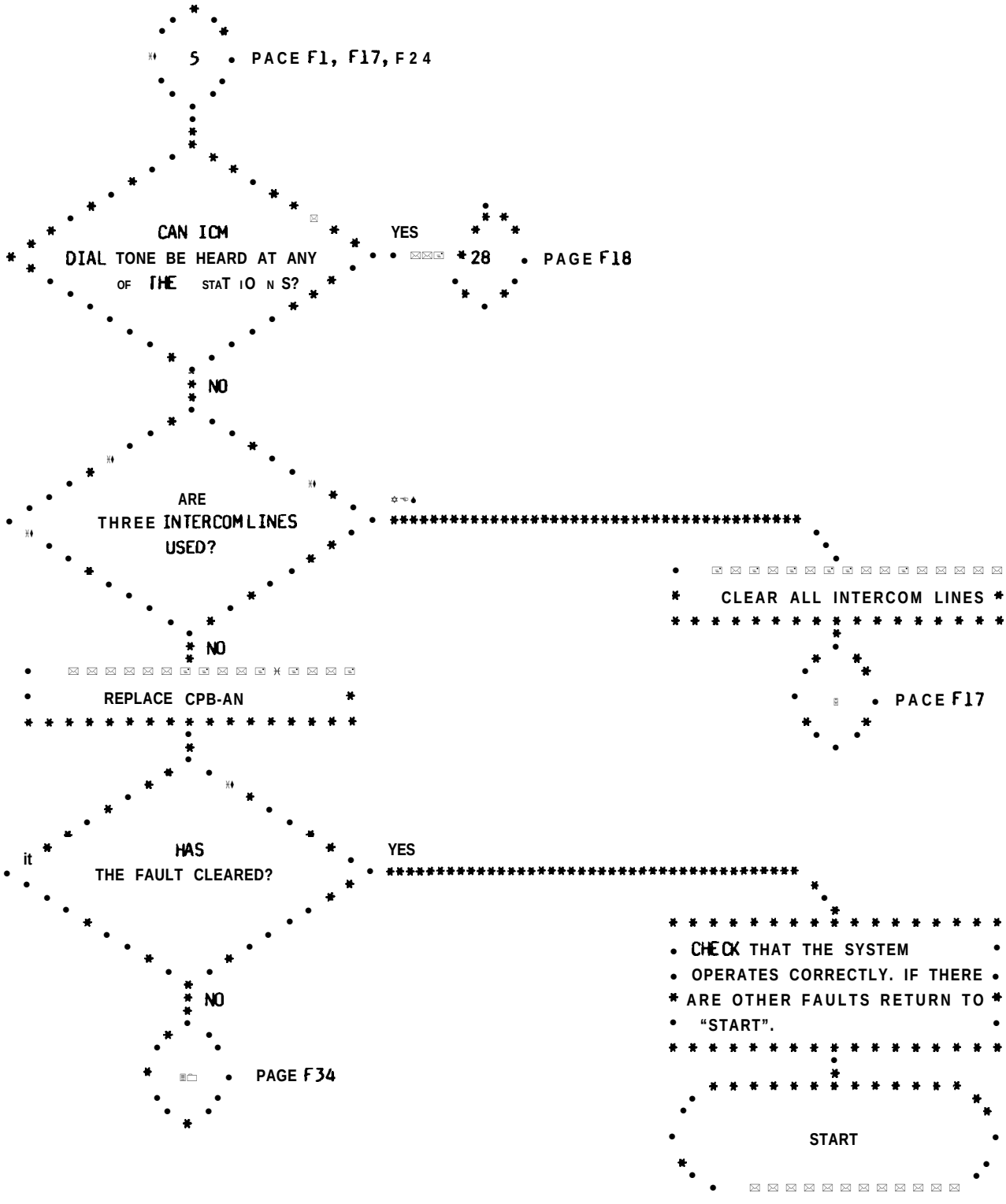

24 * PAGE F10, F11
SYSTEM FAILURE
CHECK THAT THE POWER SUPPLY IS CORRECTLY CONNECTED TO THE MAIN EQUIPMENT BACKPLANE
THE FAULT CLEARED?
20 PAGE F33
CHECK THAT THE CPU LED ON THE CPB-AN BOARD OPERATES CORRECTLY.
DOES THE CPU LED OPERATE CORRECTLY?
YES
30 PAGE F34
REPLACE CPB-AN
THE FAULT CLEARED?
ND
30 * PACE F34
YES
20 PAGE F33

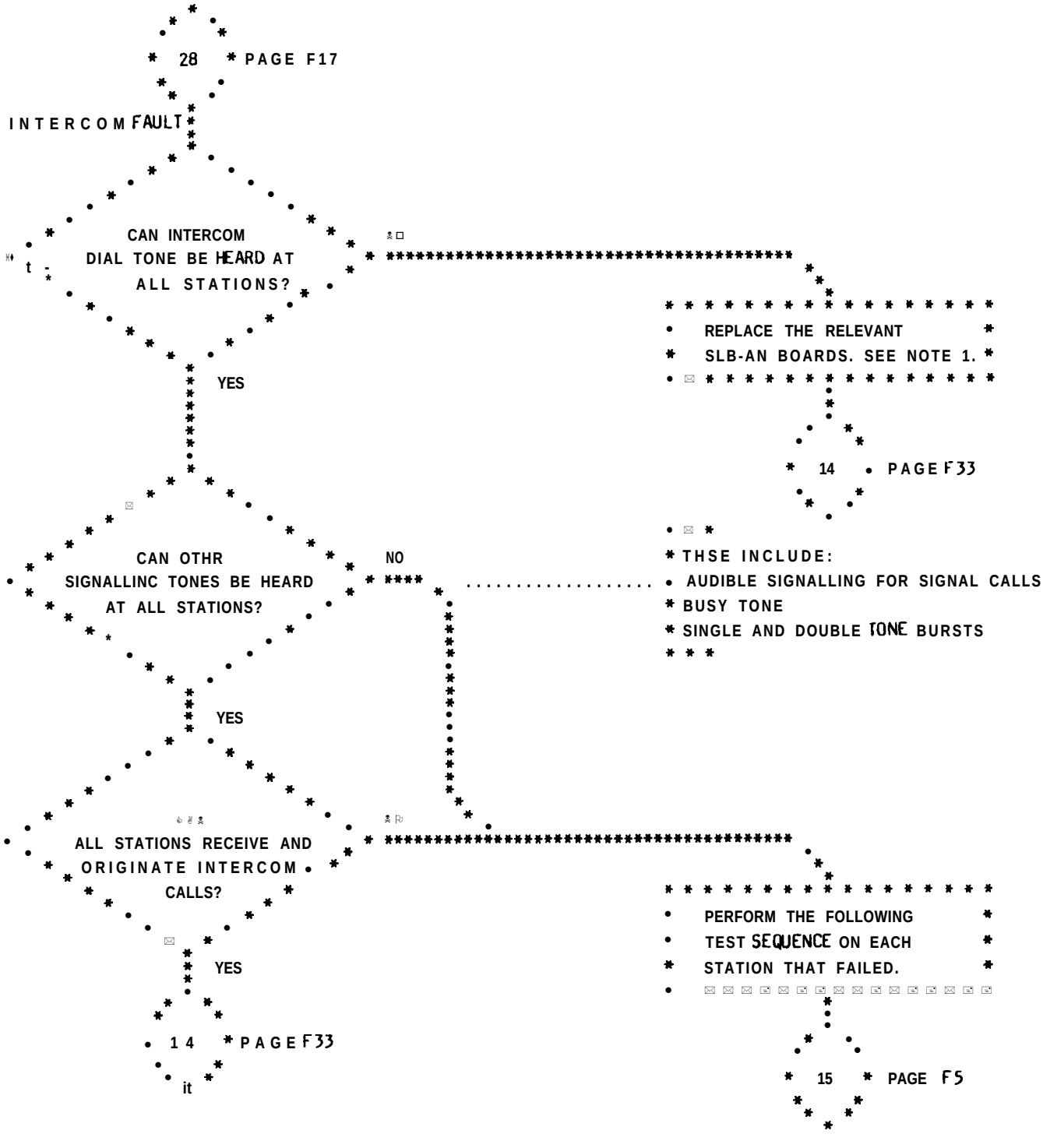

3
PACE F1,F18
SOME STATIONS FAULTY
TN FAULT AFFECT ALL FACILITIES AT MORE THAN FOUR STATIONS?
NO
26
PAU F14
25
PACE F14
CHECK WIRING OF THE SDF.
CHECK WIRING OF THE STATIONS.
HAS THE FAULT CLEARED?
20
PAGE F33
NO
REPLACE THE SLB-AN BOARDS CORRESPONDING TO FAULTY STATIONS. SEE NOTE 1
THE FAULT CLEARED?
20
PAGE F33
NO
REPLACE FAULTY STATIONS.
14
PACE F33


26
PAGE F13
SOME STATIONS FAULTY
DO ALL OF THE FAULTY STATIONS BELONG TO ONE OF THE FOUR GROUPS?
NO
25
PAGE F13
REFER TO NOTE 1
REPLACE THE ASSOCIATED SLB-AN BOARD.
THE FAULT CLEARED?
YES
20
PAGE F33
NO
CHECK WIRING AT THE SDF
CHECK WIRING AT THE STATIONS.
HAS THE FAULT CLEARED?
YES
20
PAGE F33
REPLACE FAULTY STATIONS.
14
PAGE F33


4
PACE F1
EXCHANGE AND EXCLUSIVE LINES
TURN POWER OFF. TEST SUSPECT EXCHANGE LINES AT THE SDF.
ANY EXCHANGE LINES FAULTY?
YES
INVESTIGATE EXCHANGE LINES AND TAKE CORRECTIVE ACTION. IF THERE ARE FURTHER FAULTS RETURN TO "START".
START
CHECK WIRING OF EXCHANGE LINES AT THE SDF. WITH THE POWER OFF, CHECK THAT EXCHANGE LINES ARE CONNECTED TO PF BELL TERMINALS
HAS THE FAULT CLEARED?
20
PAGE F33
CHECK THAT OTHER FACILITIES ARE AVAILABLE ON THE SYSTEM.*
CHECK THAT THE SYSTEM HAS BEEN PROGRAMMED CORRECTLY FOR EXCHANGE AND EXCLUSIVE LINES, RINGING AND DIALLING MODE.
REFER TO FOLLOWING SECTIONS:
2.7.4.8 - EXCHANGE LINES ACCESS
2.7.4.5 - EXCLUSIVE LINES
2.7.4.6 - EXCHANGE LINE AUDIBLE SIGNALLING
2.7.4.1 - DIALLING MODE
HAS THE SYSTEN BEEN PROGRAMMED CORRECTLY?
REPROGRAM THE SYSTEM.
27
PAGE F16
20
PAGE F33


27 PAGE F15
EXCHANGE AND
EXCLUSIVE LINES
CAN YOU
SEIZE SOME EXCHANGE LINES
AT ALLOWED STATIONS?
NO
REPLACE CPB-AN
14 PAGE F33
YES
REPLACE THE SLB-AN BOARDS
CORRESPONDING TO FAULTY
LINES. REFER TO NOTE 1.
CAN YOU
SEIZE ALL EXCHANGE LINES
AT ALLOWED STATIONS?
NO
HE PLACE CPB-AN
14 PAGE F33
THE FAULT CLEAREU?
20
PAGE F33
NO
REPLACE CPB-AN
14 PAGE F33


5 • PACE F1, F17, F24
CAN ICM DIAL TONE BE HEARD AT ANY OF THE STAT IO N S?
YES
28 • PAGE F18
NO
ARE THREE INTERCOM LINES USED?
CLEAR ALL INTERCOM LINES
• PACE F17
NO
REPLACE CPB-AN
it HAS THE FAULT CLEARED?
YES
NO
• PAGE F34
CHECK THAT THE SYSTEM OPERATES CORRECTLY. IF THERE ARE OTHER FAULTS RETURN TO "START".
START


28
PAGE F17
INTERCOM FAULT
CAN INTERCOM DIAL TONE BE HEARD AT ALL STATIONS?
NO
REPLACE THE RELEVANT SLB-AN BOARDS. SEE NOTE 1.
14
PAGE F33
YES
CAN OTHR SIGNALLINC TONES BE HEARD AT ALL STATIONS?
NO
THSE INCLUDE:
AUDIBLE SIGNALLING FOR SIGNAL CALLS
BUSY TONE
SINGLE AND DOUBLE TONE BURSTS
YES
ALL STATIONS RECEIVE AND ORIGINATE INTERCOM CALLS?
NO
PERFORM THE FOLLOWING TEST SEQUENCE ON EACH STATION THAT FAILED.
YES
14
PAGE F33
15
PAGE F5

B PAGE F2

PROGRAMMEU

FACILITY FAULT

- CHECK THAT THE "WR" SWITCH IS SET TO THE "1" POSITION.
- CHECK THAT DATA HAS BEEN CORRECTLY PROGRAMMED FOR EACH FEATURE.

SWITCH POWER OFF, THEN ON

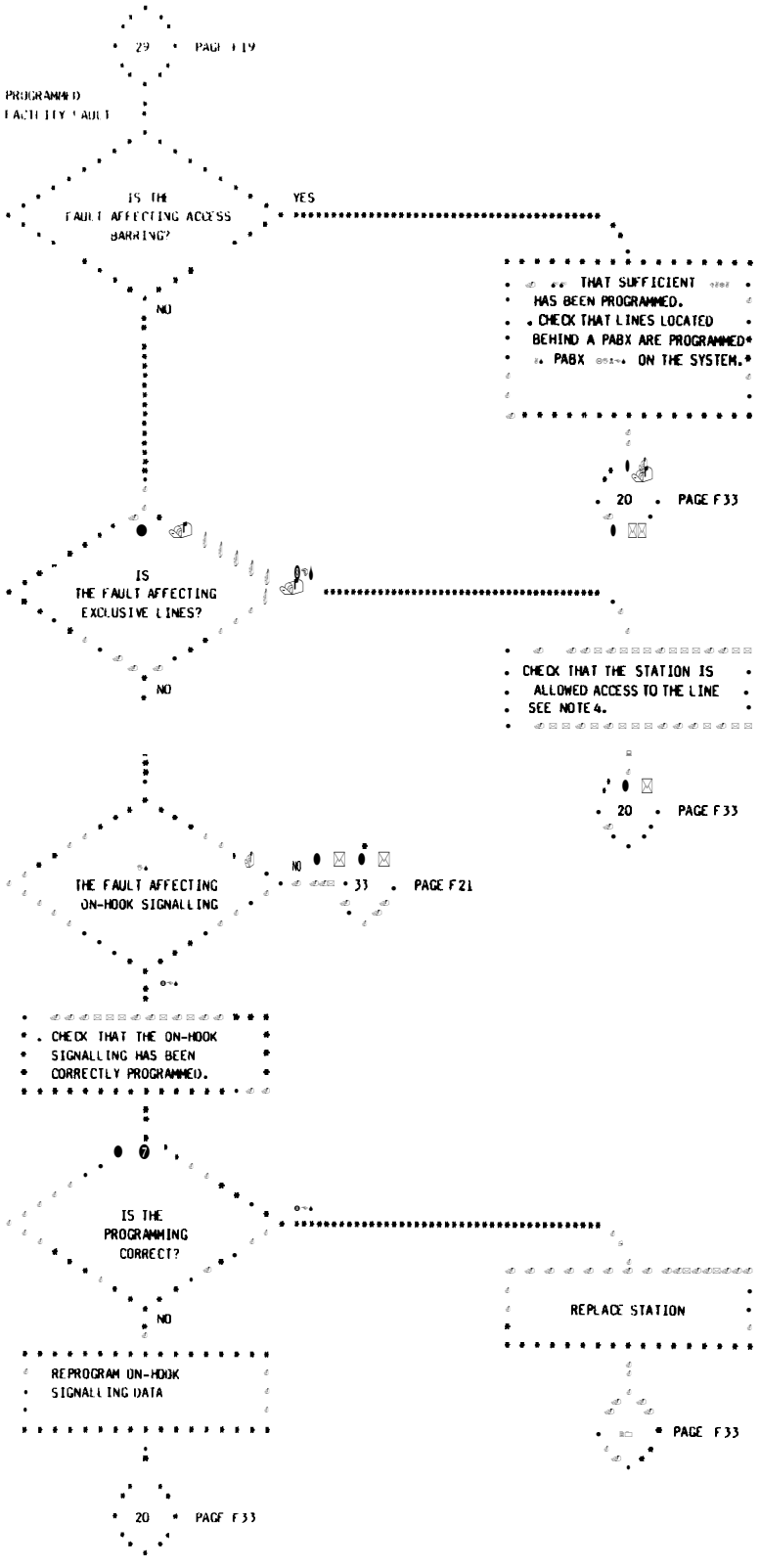
IS PROGRAM DATA RETAINED?

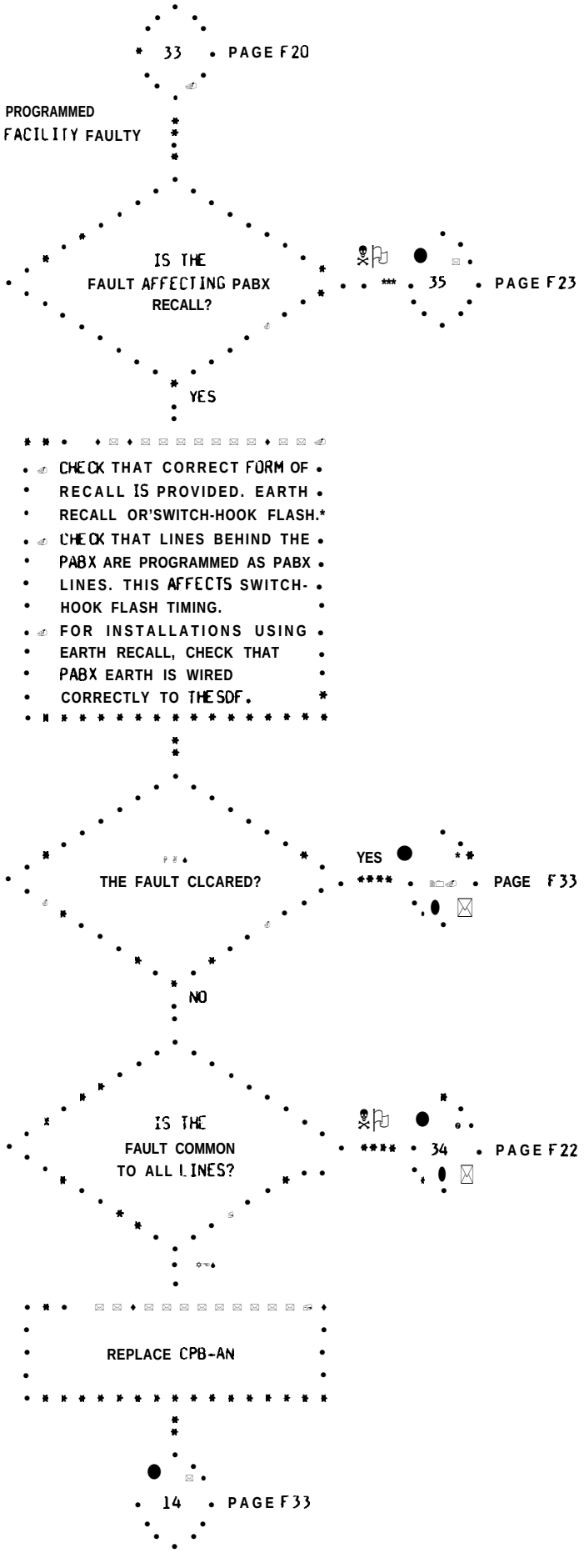
YES ● 29 PAGE F20

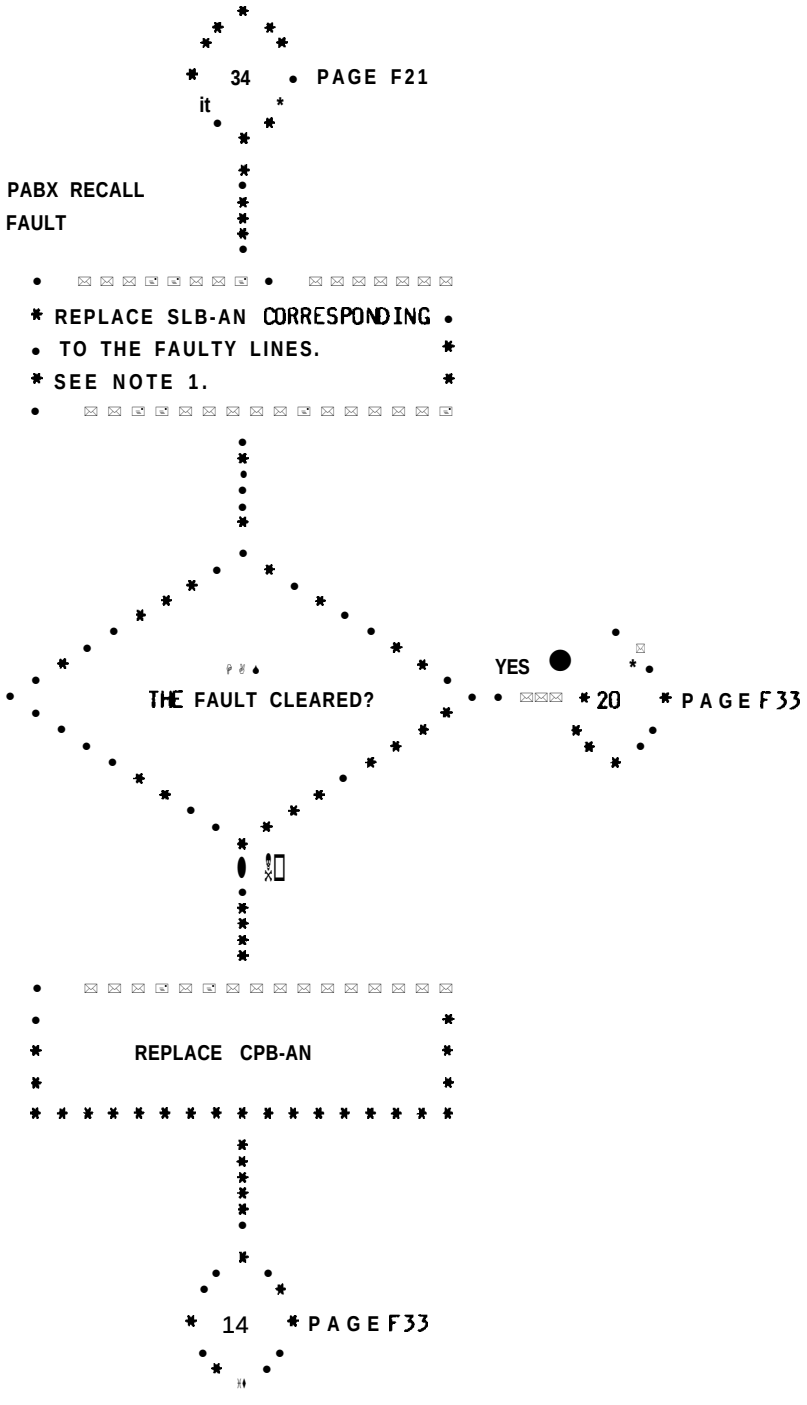
- REMOVE CPB-AN DAUGHTER BOARD (BTB-A BOARD), CHANGE BATTERY AND/OR FUSE.
- REPROGRAMME DATA.

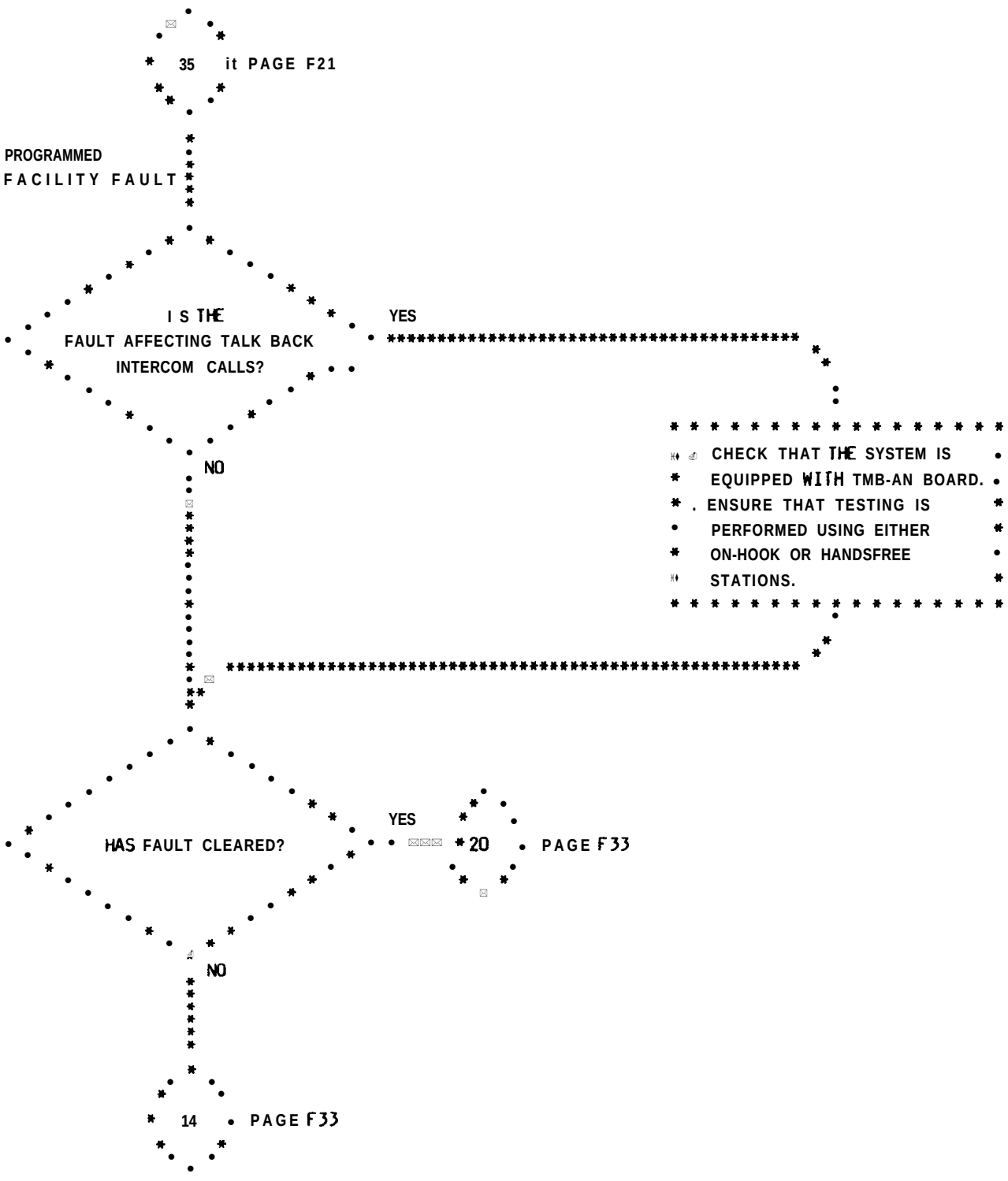
14 PAGE F33

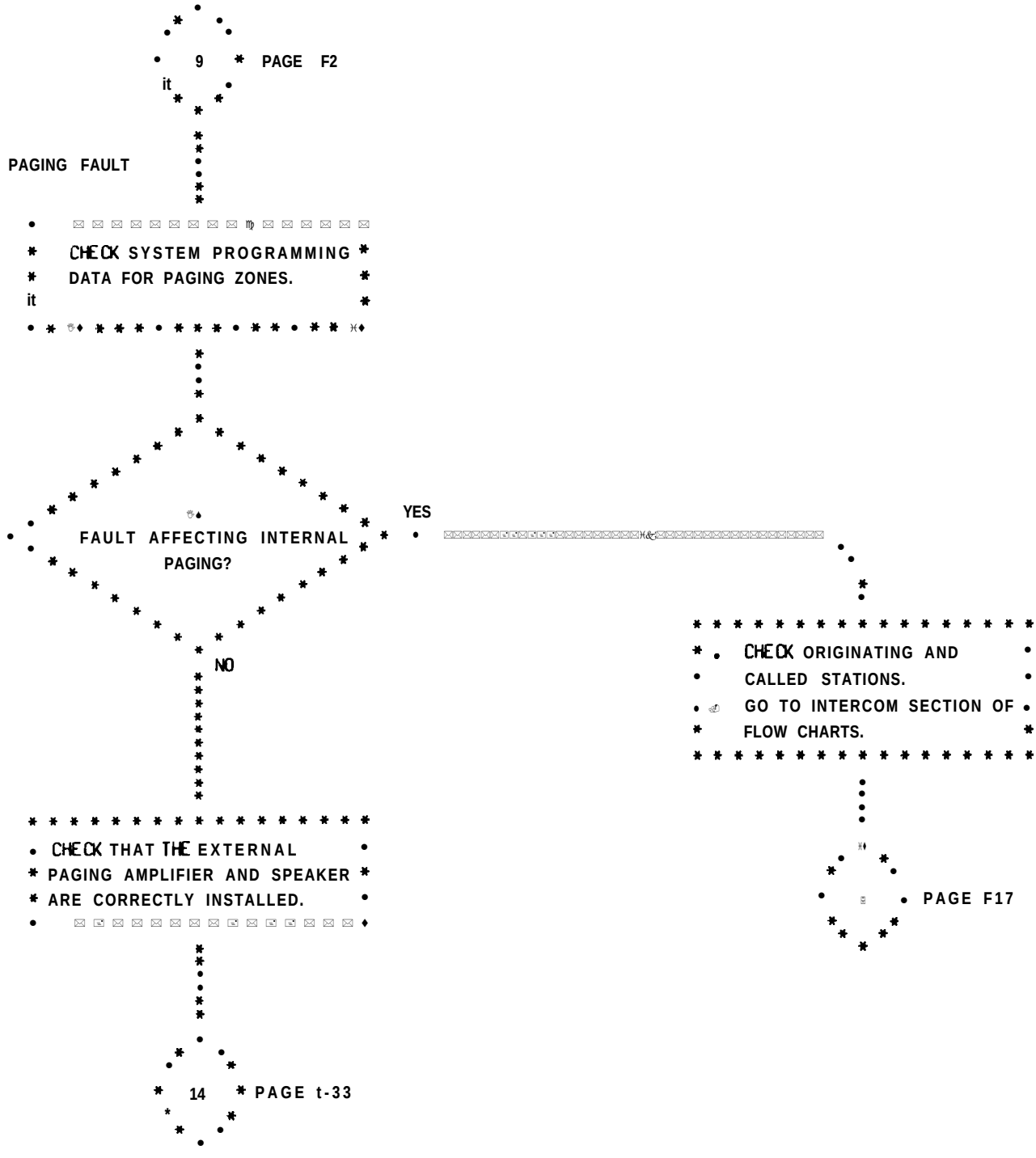
- REFER TO NOTE 3 AT THE END OF FLOWCHARTS.

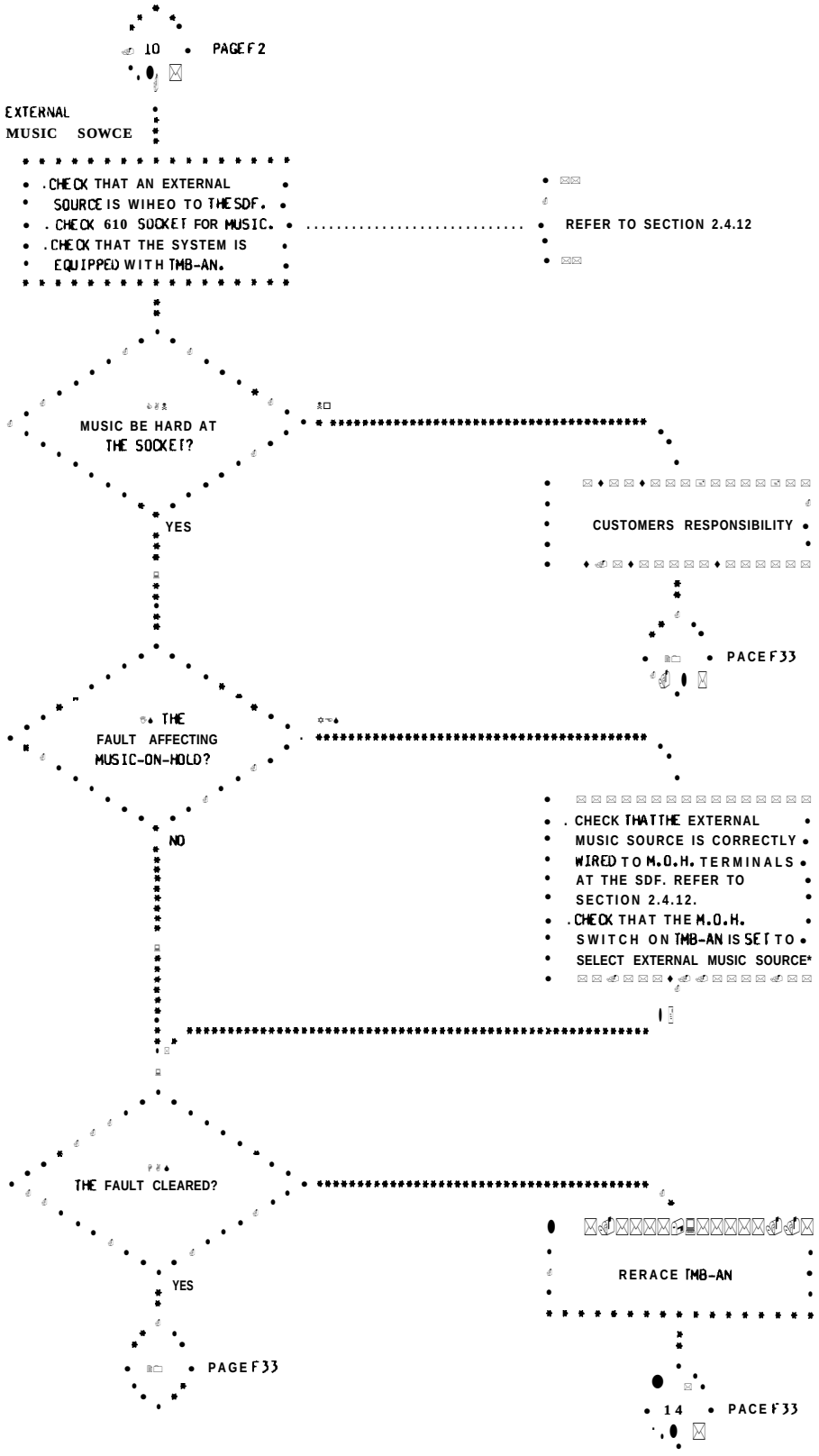

29
PAGE F19
PROGRAMMED
FACILITY FAULT
IS THE
FAULT AFFECTING ACCESS
BARRING?
YES
NO
THAT SUFFICIENT
HAS BEEN PROGRAMMED.
CHECK THAT LINES LOCATED
BEHIND A PABX ARE PROGRAMMED
PABX ON THE SYSTEM.
20
PAGE F33
IS
THE FAULT AFFECTING
EXCLUSIVE LINES?
NO
CHECK THAT THE STATION IS
ALLOWED ACCESS TO THE LINE
SEE NOTE 4.
20
PAGE F33
THE FAULT AFFECTING
ON-HOOK SIGNALLING
NO
33
PAGE F21
CHECK THAT THE ON-HOOK
SIGNALLING HAS BEEN
CORRECTLY PROGRAMMED.
IS THE
PROGRAMMING
CORRECT?
NO
REPLACE STATION
PAGE F33
REPROGRAM ON-HOOK
SIGNALLING DATA
20
PAGE F33

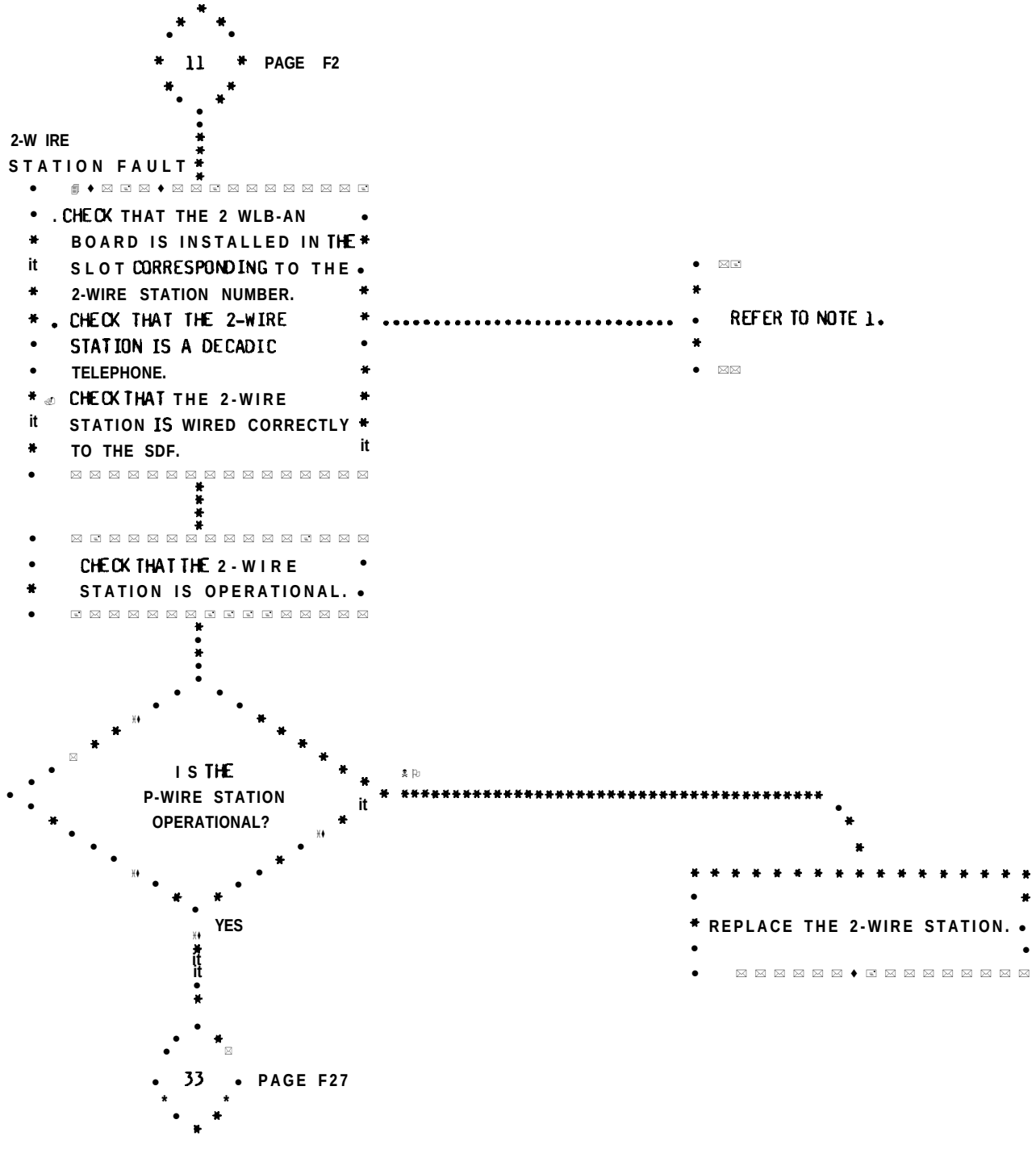

33
PAGE F20
PROGRAMMED
FACILITY FAULTY
IS THE
FAULT AFFECTING PABX
RECALL?
35
PAGE F23
YES
CHECK THAT CORRECT FORM OF
RECALL IS PROVIDED. EARTH
RECALL OR SWITCH-HOOK FLASH.*
CHECK THAT LINES BEHIND THE
PABX ARE PROGRAMMED AS PABX
LINES. THIS AFFECTS SWITCH-
HOOK FLASH TIMING.
FOR INSTALLATIONS USING
EARTH RECALL, CHECK THAT
PABX EARTH IS WIRED
CORRECTLY TO THE SDF.
THE FAULT CLCARED?
YES
PAGE F33
NO
IS THE
FAULT COMMON
TO ALL LINES?
34
PAGE F22
REPLACE CPB-AN
14
PAGE F33

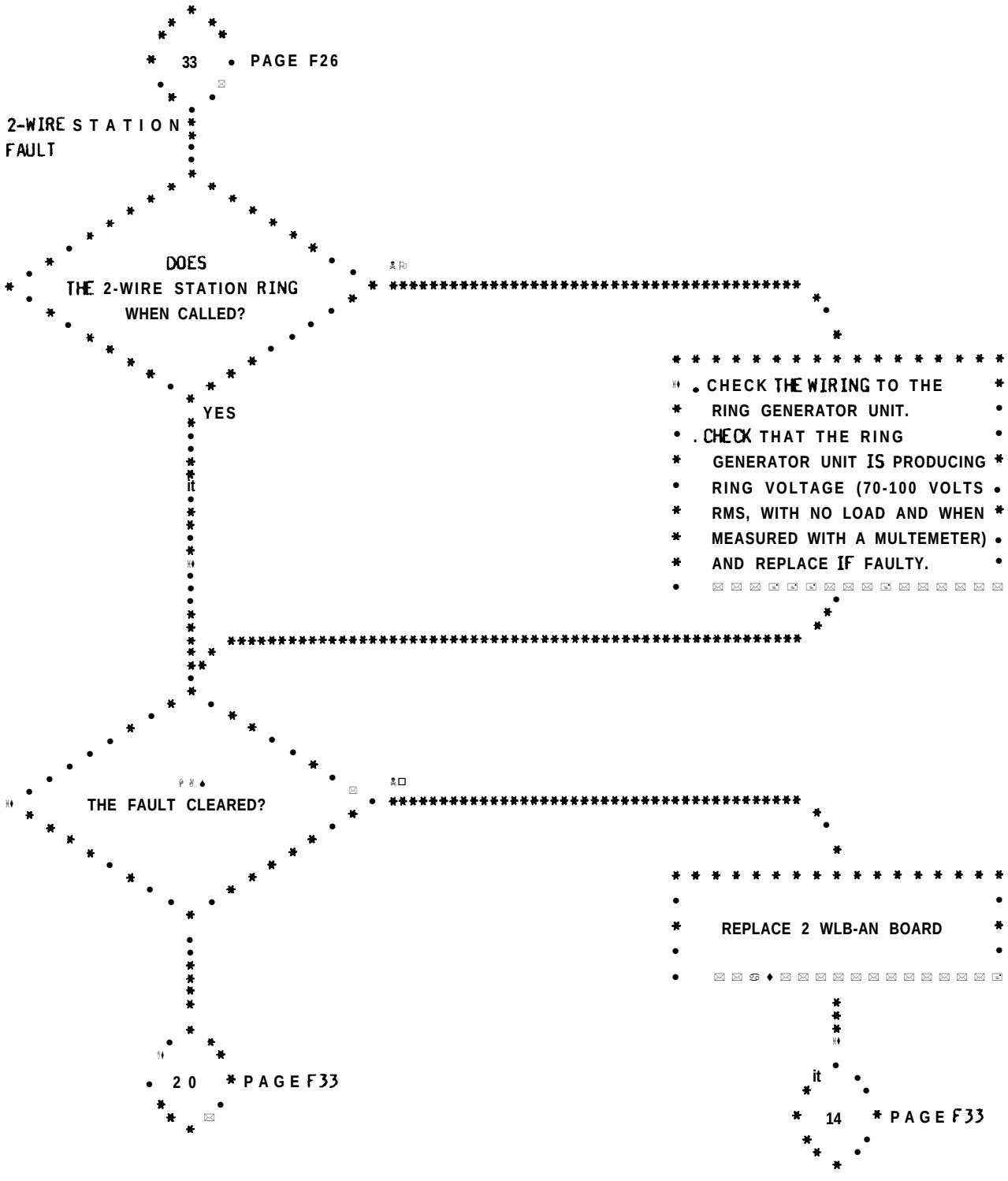

34
PAGE F21
PABX RECALL FAULT
REPLACE SLB-AN CORRESPONDING TO THE FAULTY LINES.
SEE NOTE 1.
THE FAULT CLEARED?
YES
20
PAGE F33
NO
REPLACE CPB-AN
14
PAGE F33

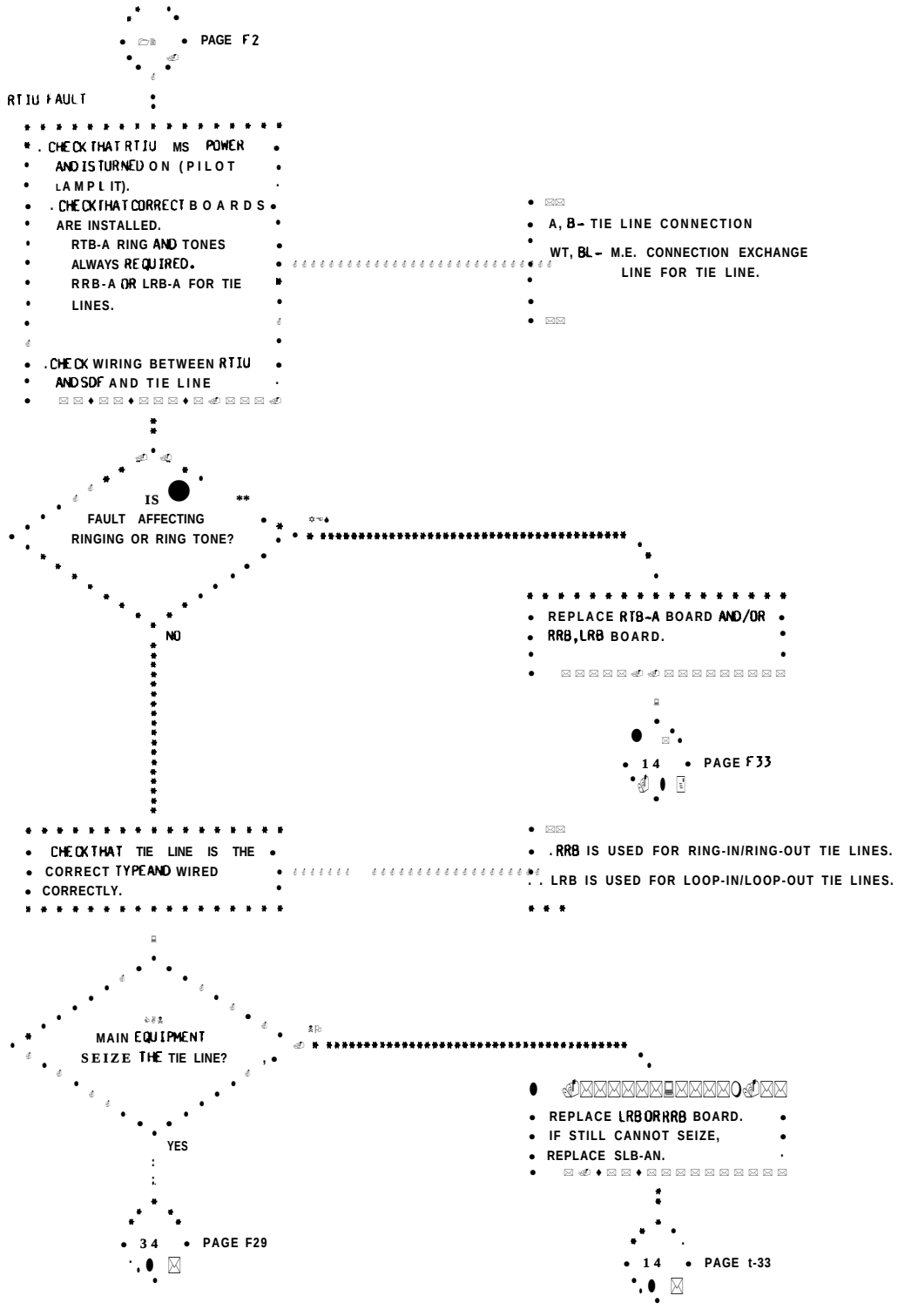

35 it PAGE F21
PROGRAMMED
FACILITY FAULT
I S THE
FAULT AFFECTING TALK BACK
INTERCOM CALLS?
YES
NO
CHECK THAT THE SYSTEM IS
EQUIPPED WITH TMB-AN BOARD.
. ENSURE THAT TESTING IS
PERFORMED USING EITHER
ON-HOOK OR HANDSFREE
STATIONS.
HAS FAULT CLEARED?
YES
20
PAGE F33
NO
14
PAGE F33

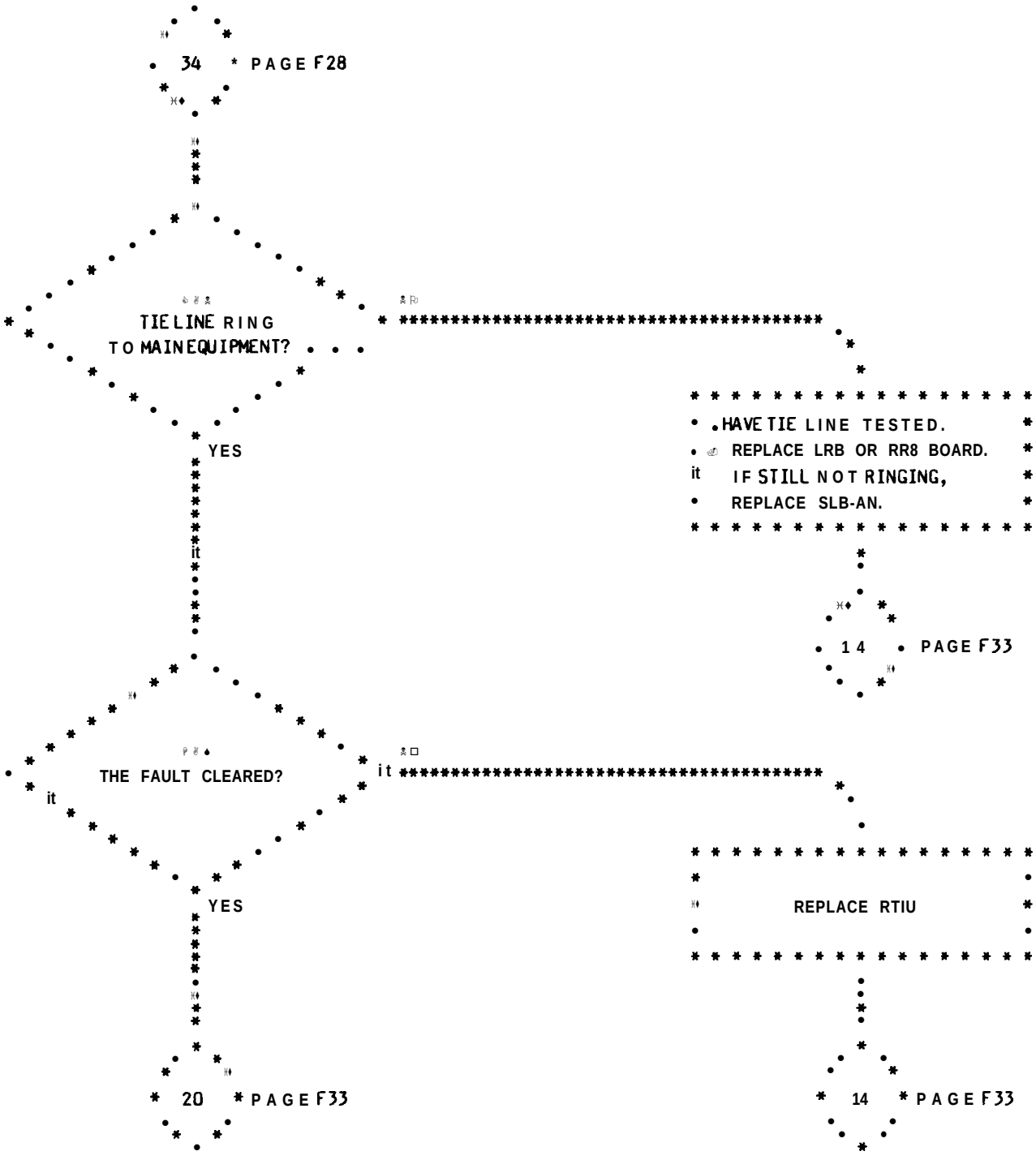

9
PAGE F2
PAGING FAULT
CHECK SYSTEM PROGRAMMING DATA FOR PAGING ZONES.
FAULT AFFECTING INTERNAL PAGING?
YES
NO
CHECK ORIGINATING AND CALLED STATIONS. GO TO INTERCOM SECTION OF FLOW CHARTS.
PAGE F17
CHECK THAT THE EXTERNAL PAGING AMPLIFIER AND SPEAKER ARE CORRECTLY INSTALLED.
14
PAGE t-33

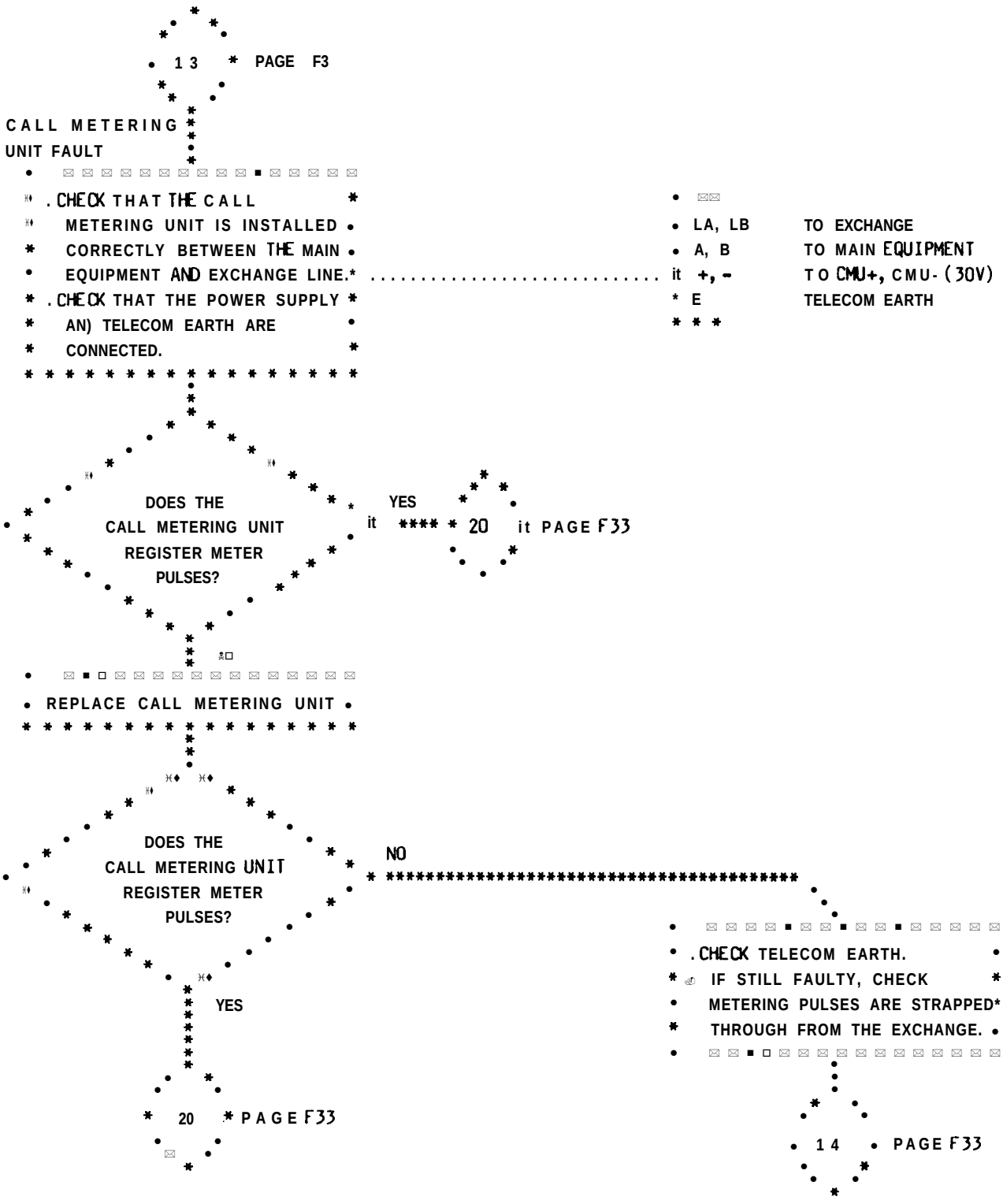

10
PAGE F2
EXTERNAL MUSIC SOWCE
.CHECK THAT AN EXTERNAL SOURCE IS WIHEO TO THESDF.
. CHECK 610 SOCKET FOR MUSIC.
.CHECK THAT THE SYSTEM IS EQUIPPED WITH TMB-AN.
REFER TO SECTION 2.4.12
MUSIC BE HARD AT THE SOCKEI?
YES
CUSTOMERS RESPONSIBILITY
PACE F33
THE FAULT AFFECTING MUSIC-ON-HOLD?
NO
. CHECK THATTHE EXTERNAL MUSIC SOURCE IS CORRECTLY WIRED TO M.O.H. TERMINALS AT THE SDF. REFER TO SECTION 2.4.12.
.CHECK THAT THE M.O.H. SWITCH ON TMB-AN IS SEI TO SELECT EXTERNAL MUSIC SOURCE*
THE FAULT CLEARED?
YES
PAGE F33
RERACE TMB-AN
14
PACE F33

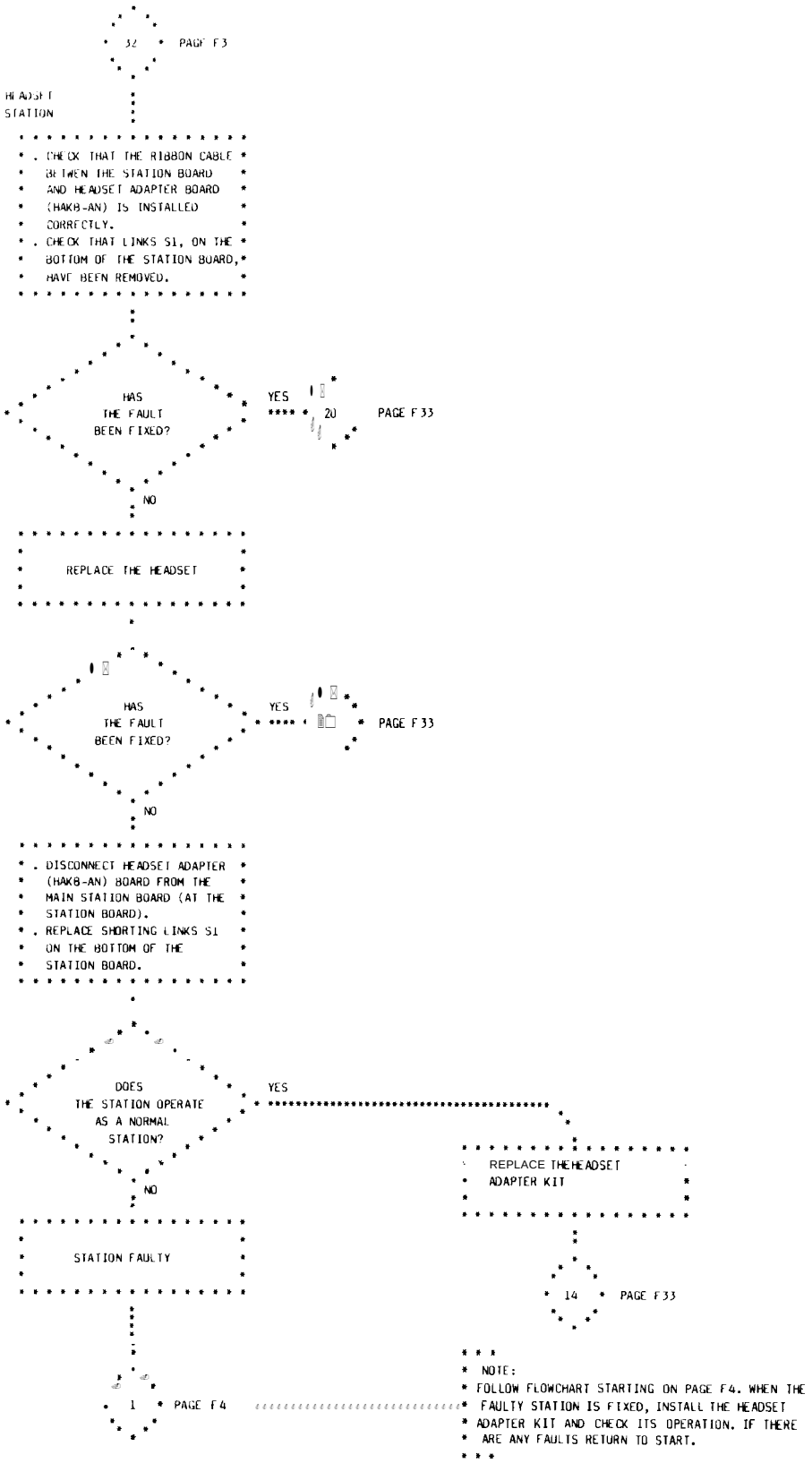

11
PAGE F2
2-WIRE STATION FAULT
. CHECK THAT THE 2 WLB-AN BOARD IS INSTALLED IN THE SLOT CORRESPONDING TO THE 2-WIRE STATION NUMBER.
. CHECK THAT THE 2-WIRE STATION IS A DECADIC TELEPHONE.
CHECK THAT THE 2-WIRE STATION IS WIRED CORRECTLY TO THE SDF.
REFER TO NOTE 1.
CHECK THAT THE 2-WIRE STATION IS OPERATIONAL.
IS THE P-WIRE STATION OPERATIONAL?
YES
REPLACE THE 2-WIRE STATION.
33
PAGE F27

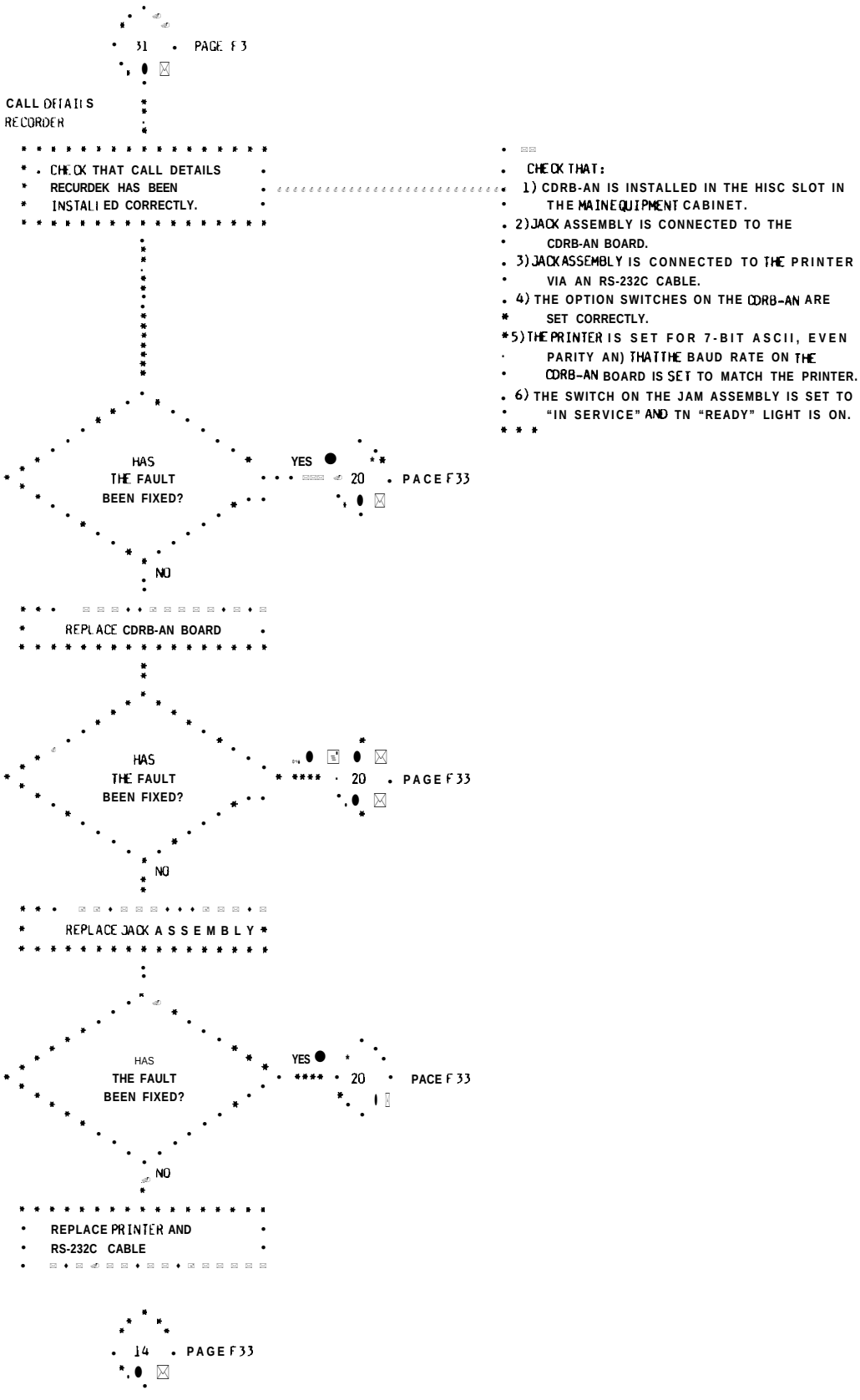

33 • PAGE F26
2-WIRE STATION FAULT
DOES THE 2-WIRE STATION RING WHEN CALLED?
YES
• CHECK THE WIRING TO THE RING GENERATOR UNIT.
• CHECK THAT THE RING GENERATOR UNIT IS PRODUCING RING VOLTAGE (70-100 VOLTS RMS, WITH NO LOAD AND WHEN MEASURED WITH A MULTEMETER) AND REPLACE IF FAULTY.
THE FAULT CLEARED?
REPLACE 2 WLB-AN BOARD
20 * PAGE F33
14 * PAGE F33

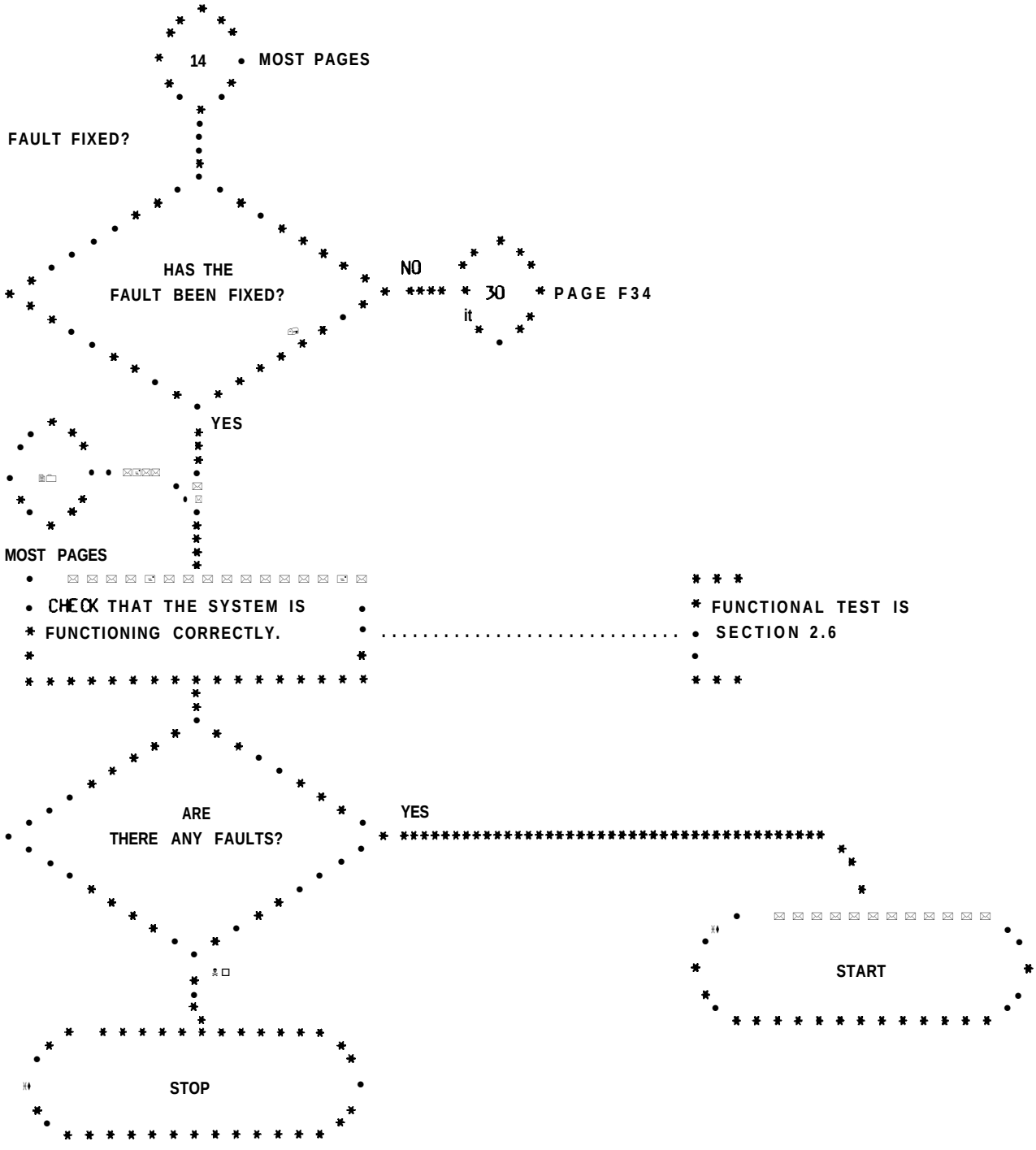

PAGE F2
RTIU FAULT
. CHECK THAT RTIU MS POWER AND IS TURNED ON (PILOT LAMP LIT).
. CHECK THAT CORRECT BOARDS ARE INSTALLED.
RTB-A RING AND TONES ALWAYS REQUIRED.
RRB-A OR LRB-A FOR TIE LINES.
. CHECK WIRING BETWEEN RTIU AND SDF AND TIE LINE
A, B- TIE LINE CONNECTION
WT, BL- M.E. CONNECTION EXCHANGE LINE FOR TIE LINE.
IS FAULT AFFECTING RINGING OR RING TONE?
NO
REPLACE RTB-A BOARD AND/OR RRB, LRB BOARD.
14 PAGE F33
CHECK THAT 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/LOOP-OUT TIE LINES.
MAIN EQUIPMENT SEIZE THE TIE LINE?
YES
34 PAGE F29
REPLACE LRB OR RRB BOARD.
IF STILL CANNOT SEIZE,
REPLACE SLB-AN.
14 PAGE t-33

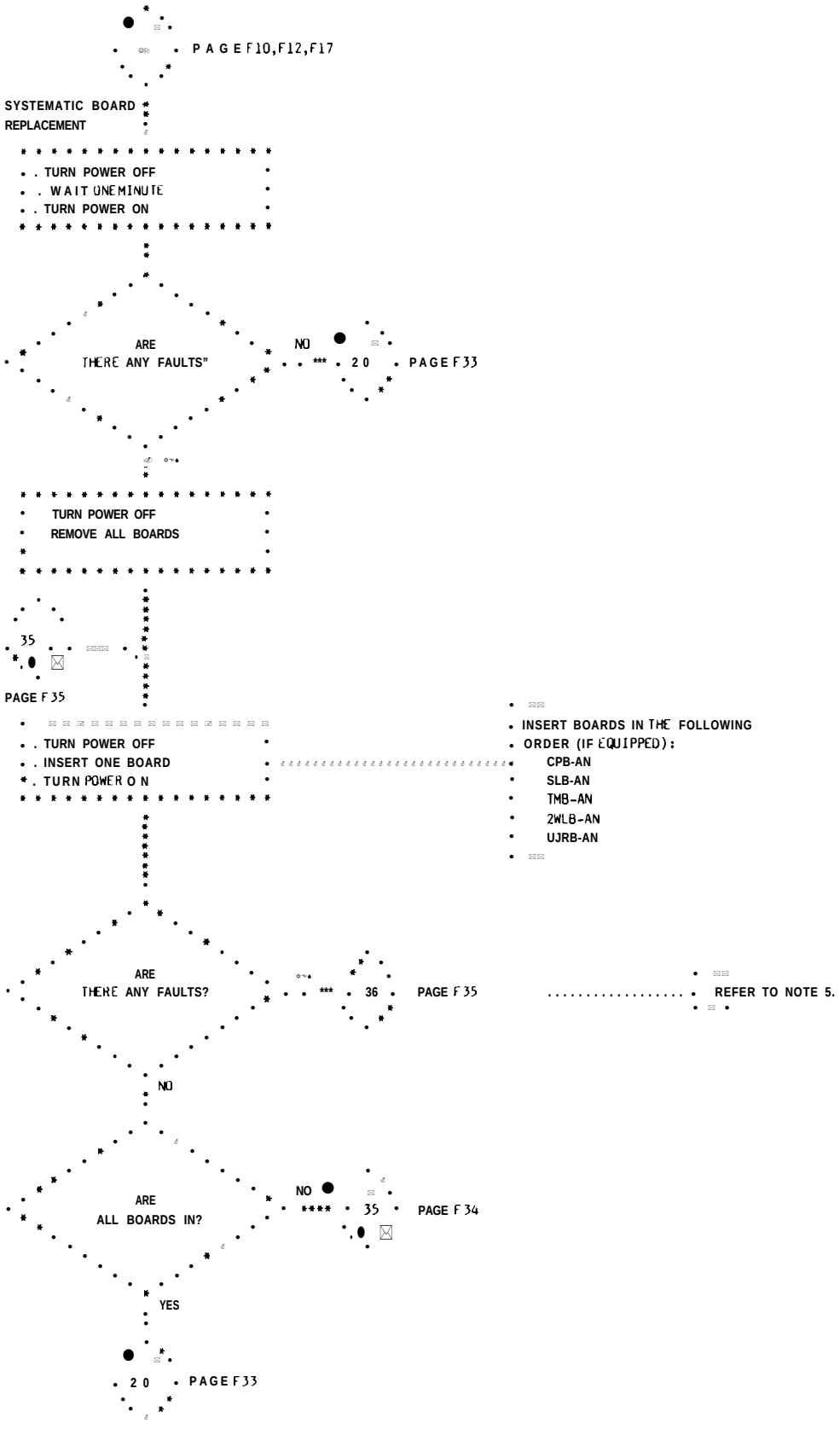

34 * PAGE F28
TIE LINE RING TO MAIN EQUIPMENT?
YES
HAVE TIE LINE TESTED.
REPLACE LRB OR RR8 BOARD.
IF STILL NOT RINGING,
REPLACE SLB-AN.
14 PAGE F33
THE FAULT CLEARED?
YES
REPLACE RTIU
20 * PAGE F33
14 * PAGE F33

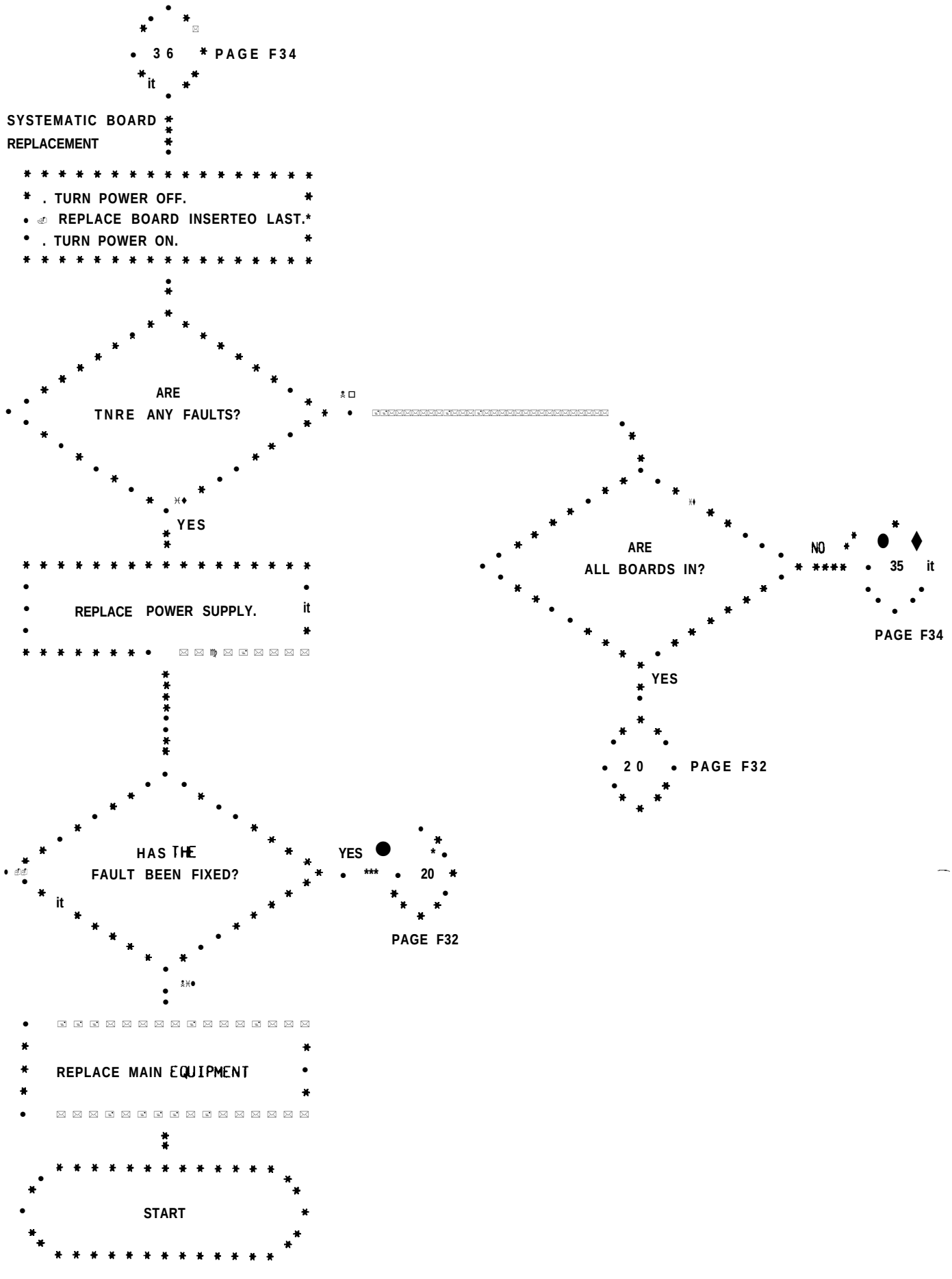

13
PAGE F3
CALL METERING UNIT FAULT
. CHECK THAT THE CALL METERING UNIT IS INSTALLED CORRECTLY BETWEEN THE MAIN EQUIPMENT AND EXCHANGE LINE.
. CHECK THAT THE POWER SUPPLY AN) TELECOM EARTH ARE CONNECTED.
LA, LB TO EXCHANGE
A, B TO MAIN EQUIPMENT
+, - TO CMU+, CMU- (30V)
E TELECOM EARTH
DOES THE CALL METERING UNIT REGISTER METER PULSES?
YES
20
PAGE F33
REPLACE CALL METERING UNIT
DOES THE CALL METERING UNIT REGISTER METER PULSES?
NO
YES
20
PAGE F33
. CHECK TELECOM EARTH.
IF STILL FAULTY, CHECK METERING PULSES ARE STRAPPED THROUGH FROM THE EXCHANGE.
14
PAGE F33


32
PAGE F3
HEADSET
STATION
. CHECK THAT THE RIBBON CABLE BETWEEN THE STATION BOARD AND HEADSET ADAPTER BOARD (HAKB-AN) IS INSTALLED CORRECTLY.
. CHECK THAT LINKS S1, ON THE BOTTOM OF THE STATION BOARD, HAVE BEEN REMOVED.
HAS THE FAULT BEEN FIXED?
YES
20
PAGE F33
NO
REPLACE THE HEADSET
HAS THE FAULT BEEN FIXED?
YES
PAGE F33
NO
. DISCONNECT HEADSET ADAPTER (HAKB-AN) BOARD FROM THE MAIN STATION BOARD (AT THE STATION BOARD).
. REPLACE SHORTING LINKS S1 ON THE BOTTOM OF THE STATION BOARD.
DOES THE STATION OPERATE AS A NORMAL STATION?
YES
NO
STATION FAULTY
1
PAGE F4
REPLACE THEHEADSET ADAPTER KIT
14
PAGE F33
NOTE:
FOLLOW FLOWCHART STARTING ON PAGE F4. WHEN THE FAULTY STATION IS FIXED, INSTALL THE HEADSET ADAPTER KIT AND CHECK ITS OPERATION. IF THERE ARE ANY FAULTS RETURN TO START.


31 PAGE F 3
CALL DETAILS RECORDER
CHECK THAT CALL DETAILS RECURDEK HAS BEEN INSTALLI ED CORRECTLY.
CHECK THAT:
1) CDRB-AN IS INSTALLED IN THE HISC SLOT IN THE MAINEQUIPMENT CABINET.
2)JACK ASSEMBLY IS CONNECTED TO THE CDRB-AN BOARD.
3)JACKASSEMBLY IS CONNECTED TO THE PRINTER VIA AN RS-232C CABLE.
4) THE OPTION SWITCHES ON THE CDRB-AN ARE SET CORRECTLY.
5)THE PRINTER IS SET FOR 7-BIT ASCII, EVEN PARITY AN) THATTHE BAUD RATE ON THE CDRB-AN BOARD IS SET TO MATCH THE PRINTER.
6) THE SWITCH ON THE JAM ASSEMBLY IS SET TO "IN SERVICE" AND TN "READY" LIGHT IS ON.
HAS THE FAULT BEEN FIXED?
YES
20 PACE F33
NO
REPLACE CDRB-AN BOARD
HAS THE FAULT BEEN FIXED?
YES
20 PAGE F33
NO
REPLACE JACK A S S E M B L Y
HAS THE FAULT BEEN FIXED?
YES
20 PACE F33
NO
REPLACE PRINTER AND RS-232C CABLE
14 PAGE F33


14
MOST PAGES
FAULT FIXED?
HAS THE
FAULT BEEN FIXED?
NO
30
PAGE F34
YES
MOST PAGES
CHECK THAT THE SYSTEM IS
FUNCTIONING CORRECTLY.
FUNCTIONAL TEST IS
SECTION 2.6
ARE
THERE ANY FAULTS?
YES
START
STOP


PAGE F10,F12,F17
SYSTEMATIC BOARD REPLACEMENT
. TURN POWER OFF
. WAIT ONE MINUTE
. TURN POWER ON
ARE THERE ANY FAULTS"
NO
*** 20
PAGE F33
TURN POWER OFF
REMOVE ALL BOARDS
35
PAGE F35
. TURN POWER OFF
. INSERT ONE BOARD
. TURN POWER ON
INSERT BOARDS IN THE FOLLOWING ORDER (IF EQUIPPED):
CPB-AN
SLB-AN
TMB-AN
2WLB-AN
UJRB-AN
ARE THERE ANY FAULTS?
*** 36
PAGE F35
REFER TO NOTE 5.
NO
ARE ALL BOARDS IN?
NO
**** 35
PAGE F34
YES
20
PAGE F33


36
PAGE F34
SYSTEMATIC BOARD REPLACEMENT
. TURN POWER OFF.
REPLACE BOARD INSERTEO LAST.
. TURN POWER ON.
ARE TNRE ANY FAULTS?
YES
REPLACE POWER SUPPLY.
ARE ALL BOARDS IN?
NO
35
PAGE F34
YES
20
PAGE F32
HAS THE FAULT BEEN FIXED?
YES
20
PAGE F32
REPLACE MAIN EQUIPMENT
START

NOTES:

1. The following table illustrates the station numbers and the position of the corresponding SLB-AN boards in the Main Equipment.

STATION NUMBER	EXCHANGE LINE NO.	SLB-AN POSITION
IO - 13	1, 2	1
14 — 17	3.4	2
18 — 21	5.6	3
22 — 25	7.8	4

2. Talkback intercom calls are not provided under the following conditions:
   (i) If the station receiving the call is a BASIC station.
   (ii) If the station receiving the call is an ON-HOOK station and the system is not equipped with the TMB-AN board.
   (iii) If the system has been programmed to have signal calls only.

3. The system will not accept new programming data unless "CHECK" and "F16" keys are pressed and the system responds with "P" in the display. Should the programmer leave the programming mode without doing this, all data entered since the last time "CHECK" and "F16" produced "P" in the display, will be lost. If an error message is displayed, data has not been accepted. Consult section 2.7.1 for the description of errors.

4. When programming an exclusive line to a station, first program the station to have access to that line and then program the line to be exclusive to the station. This is required in order to prevent all stations becoming unable to access that particular line as would happen if a station is denied access to a line exclusive to it.

5. The LED's on the CPB-AN give following indications when the system is operating correctly:

   TOP LED: ON — Battery Board out or battery voltage low.
   OFF — Battery OK.

   BOTTOM LED: ON 100 msec) indicates that main program
   OFF 100 msec) is running.

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 maintenance flowcharts, section 3.4.3.

Before following repair actions check that the necessary circuit boards have been installed — CPB-AN is necessary for the system to operate. An SLB-AN board is required for each four stations and two exchange lines connected to the system.

All boards require careful handling and all boards, except the SLB-AN and 2WLB-AN, must NOT be removed while the power is still on.

SYSTEM TESTS

3.51 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	610 SOCKET PIN NUMBER	VOLTAGE wrt BK
WT	2	+ 9V ±2V
BL	6	REF A
RD	1	+ 24 to +40V
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 SLB-AN board (refer to Note 1 at the end of flowcharts).
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 exchange line.
3. Check receiver and its connections in the station.
4. Replace SLB-AN 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 VF.
4. Replace SLB-AN board if fault still exists.

3.5.4 incoming Call

1. Check the system programming data for exchange line audible 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 8 (check voltages as in 3.5.1).
2. Change SLB-AN if voltages incorrect.
3. Change station 8.

3.5.6 Answering

1. Check A-pair wiring (and DC voltages) to stations A and 8.
2. Check stations A and 8 for sidetone. If there is no sidetone check transmitter and receiver wiring.
3. Change station 8.

3.5.7 Hold

1. Change station 8.

3.5.8 Music-on-Hold

1. Check S1 link on TMB-AN.

LINK	MUSIC SOURCE
1 to2	Internal
2 to 3	External

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. Change TMB-AN board.
4. Change SLB-AN board.

3.5.9 i-hold Automatic Ring Back

1. Check the system programming data for I-hold ring back time out.

3.5.10 intercom Seizure

1. If the ICM LED doesn't light, change the station.
2. If there is no dial tone, change SLB-AN board.
3. If there is still no dial tone change CPB-AN board.

3.5.11 Taikback (optional)

1. Check that station 8 microphone is turned on and that the system is equipped with TMB-AN.
2. If there is no tone burst heard at station 8, check speaker connections. If there is no tone burst again replace SLB-AN. If there is still no tone burst replace CPB-AN.

3. If ICM LED does not double flash change station 8.

4. If no talkback, check the following:

   (i) System programming data is correct
   (ii) Station 8 microphone wiring is correct.

5. If still no talkback replace Station 8, then boards in the following order:

   TMB-AN
   SLB-AN
   CPB-AN

3.5.12 Microphone Cut-off

1. Change station 8.

3.5.13 Signal Call

1. Change station 8.
2. Change SLB-AN for station 8.

3.5.14 Station Call

1. Change SLB-AN for station A.
2. Change CPB-AN.

3.5.15 Answering

1. Replace station 8.
2. Replace SLB-AN for stations A and 8.

3.5.16 Disconnection

1. Check that both stations are on hook properly.
2. Check that both stations are not on monitor (ie MON light off).

3.5.17 Background Music

1. Check that the music can be heard at the 6 10 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. Replace TMB-AN board.
5. Replace SLB-AN board.

3.5.10 Diaiiing

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 CPB-AN board.

3.5.19 incoming Signailing Assignment

1. Check that the incoming signalling assignment data is correct.
2. Check that none of the stations are in ring transfer mode.
3. Check that none of the stations are in Do-Not-Disturb mode, i.e. DND LED is off.

3.5.20 Exchange Line Request

1. Check station A wiring.
2. Check that system programming data is correct.
3. Replace Station A.
4. Replace the corresponding SLB-AN board.

3.5.21 Access Barring by Digit Analysis

1. Check the programming. Check station allocated to class of service and data needed for barring.
2. Check that the programmed data agrees with the sales form.

3.5.22 External Paging

1. Check that the paging signals appear at the SDF. If they do then the fault is in the paging amplifier or external speaker in which case the repair is customers responsibility.
2. Check that the system is equipped with the TMB-AN board.
3. Replace TMB-AN board.
4. Replace CPB-AN board.

3.5.23 PABX Recall

1. Check that the system is programmed for the type of recall required by the PABX.
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 SLB-AN board corresponding to the line on which PABX recall fails.
5. Replace CPB-AN.

STATION TESTS

3.5.24 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 as in 3.5.6.
5. If no sidetone replace station.
6. Replace SLB-AN board.

3.5.25 Diaiiing

1. Check that all digits were dialled.
2. Check transmitter and receiver dialling as in 3.5.6.
3. Replace station.

3.5.26 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 station.

3.5.27 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.

3.5.28 On-hook Operation

1. Check that the station is either ON-HOOK or HANDSFREE type.
2. Check speaker wiring in the station.
3. Replace station.

3.5.29 Display

1. Check station wiring at the plug and socket according to table in 3.5.1.
2. Replace the station.

3.5.30 Handsfree Operation

1. Check the ribbon connector between the sub-base board and the main board in the station.
2. Replace the station.

3.5.31 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.

3.5.32 Call Forwarding

1. Check that the system programming for manager and secretary stations is correct.
2. Check the ribbon connector between the keyboard and the main station board, first on the manager station, then on secretary station, if necessary.
3. Replace the manager station.
4. Replace the secretary station.

3.5.33 Off-Hook Signailing

1. Check that the programming for off-hook signalling is correct.
2. Replace the station.

3.5.34 Standard Telephone Station

1. Check that the standard telephone station is a decadic telephone.
2. Check that the standard telephone station operates correctly on an exchange line.
3. Check the wiring from the main equipment to the station. Open circuit voltage should be 32 ± 8V or 50 ± 6V if 2WEU-AN is equipped.
4. Check that the 2WLB-AN board has been installed in the correct SLB-AN slot in the main equipment.
5. Check that 2WLB-AN shorting links are set correctly. Refer section 2.5.5.
6. If a 2WEU-AN is installed, check wiring to 2WEU-AN. Check that output voltage of 2WEU-AN (OUT+ and OUTG) is 50 ±6V. Check that the S1, S2 connectors on the 2WLB-AN are shorting pins 1 to2.
7. Check that the Ring Generator Unit (RGU-AN) has been installed correctly. Ensure that the output of RGU-AN is greater than 45 Volts when ringing a station.

3.5.35 Call Details Recorder

1. Check that the jack assembly is connected to the CDRB-AN 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 not out of paper.
4. Replace CDRB-AN board.
5. Replace jack assembly.
6. Replace RS-232C cable and printer.

3.5.36 Printer in Service

1. Check that the printer is set for 7-bit ASCII, even parity and that the baud rate on the CDRB-AN board is set to match the printer.
2. Replace CDRB-AN board.
3. Replace RS-232C cable and printer.

3.0 REPAIR PROCEDURES

3.6.1 Printed Board Assemblies

No repair of the PBAs will be carried out on-site or in field depots. Any fault in the PBA will necessitate replacement of that assembly.

All faulty PBAs will be suitably packaged. To protect against physical damage and damage due to static discharge, PBAs 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-AN remove the battery and package separately.

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

The packaged PBAs 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 PBAs and filled with as many details of the faulty condition as possible.

Each State Workshop should keep an accurate record of all PBAs dispatched and received to ensure that replacements are obtained one-for-one.

3.6.2 Other items — (refer to 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 PBAs or the parts listed in Appendix A.

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.

APPENDIX A
SERIAL AND ITEM NUMBER PARTS LIST

ITEM NO	CODE	DESCRIPTION	REMARKS
AN 616 MAIN COMPONENTS			
338/700	ME-AN	Main Equipment AN 6 16	Houses the AN 6 16 control equipment and integral power supply.
338/710	CK-61222-50	Connector Kit 50 position Amp Champ	For use with *3381700* to interconnect with system distributing frame.
AN 616 STATIONS			
338/701	TS-AN-BA	Telephone Station AN 6 16 Basic	Basic station for use with AN 616 B.S.
338/*702*	TS-AN-OH	Telephone Station AN 6 16 On-Hook	On-Hook Station for use with AN 616 B.S.
338/703	TS-AN-HF	Telephone Station AN 6 16 Handsfree	Handsfree Station for use with AN 616 B.S.
AN616 PRINTED BOARD ASSEMBLIES			
338/704	CPB-AN	Central Processor Board — AN	Used in *3381700* to provide system intelligence.
338/705	SLB-AN	Station Line Board — AN	Used in *3381700* to provide 2 exchange lines and 4 station ports.
338/706	TMB-AN	Talk-Back, Music, Clock Board	Used in *3381700* to provide Talk-Back, Music, Clock facilities
338/707	PFB-AN-DEC	Power Fail Board Dec	Used in 338/702, *JO3* for power fail facilities with decadic dialling
338/708	PFB-AN-VF	Power Fail Board VF	Used in *3381702, JO3* for power fail facilities with VF dialling.
338/709	2WLB-AN	2 Wire Station Line Board	Used in *3381700* to provide 2 exchange lines and 4 2-wire extension telephone ports. Max. loop limit 300 ohms.
AN 616 MISCELLANEOUS ITEMS			
338/710	2WEU-AN	2 Wire Station Line Extender Unit	For use with 338/709 to allow 2-wire Stations to be connected with max. loop limit 1500 ohms.
338/711	TPU-AN	Test and Programming Unit	For use with AN 6 16 system for testing or programming.
338/712	RGU-AN	Ring Generator Unit	For use with *3381700* to generate ring voltage for 2-wire extensions.
3381713	CDRB-AN	Call Details Recorder Board	For use with AN 6 16 system to print a record of outside line calls.
338/714	HAK-AN	Headset Adapter Kit	For use with 338/702, *JO3* to provide headset facilities.
338/571	PFB-AN	Power Fail Bell N	For use with N B.S. to indicate incoming ring on exchange lines during power fail conditions.
338/560	RTIU-N	Remote Extension and Tie Line Interface Unit N	For use with AN B.S.s when tie lines are to be connected. Provides mounting for 338/563, *564,565.*
338/563	RTB-A	Ring and Tone Board A	For use with *3381560.*
338/564	RRB-A	Ring In/Ring Out Tie Line Interface Board A	For use with *3381560*
338/565	LRB-A	Loop In/Ring Out Tie Line Interface Board A	For use with *3381560*

ITEM NO	DESCRIPTION	REMARKS
338/770	AN 6 16 Standard Package comprises:	The AN 6 16 Standard package comprises 7 items to provide a basic 4 exchange line/8 stations working system for Commander AN 6 16.

Ser/Item	Desc.	Qty
338/700	M E - A N	1
338/704	C P B - A N	1
338/705	S L B - A N	2
338/706	T B M - A N	1
338/707	P F B - A N - D E C	1
338/702	T S - A N - O H	6
338/703	T S - A N - H F	2

ITEM NO	DESCRIPTION	REMARKS
338/771	AN 616 Expansion Package comprises:	The AN 6 16 Expansion package comprises two items to provide an expansion of 2 exchange line/4 stations to the Standard AN 6 16 package.

Ser/Item	Desc.	Qty
338/705	SLB-AN	1
338/702	T S - A N - O H	4

APPENDIX B
MECHANICAL DRAWINGS

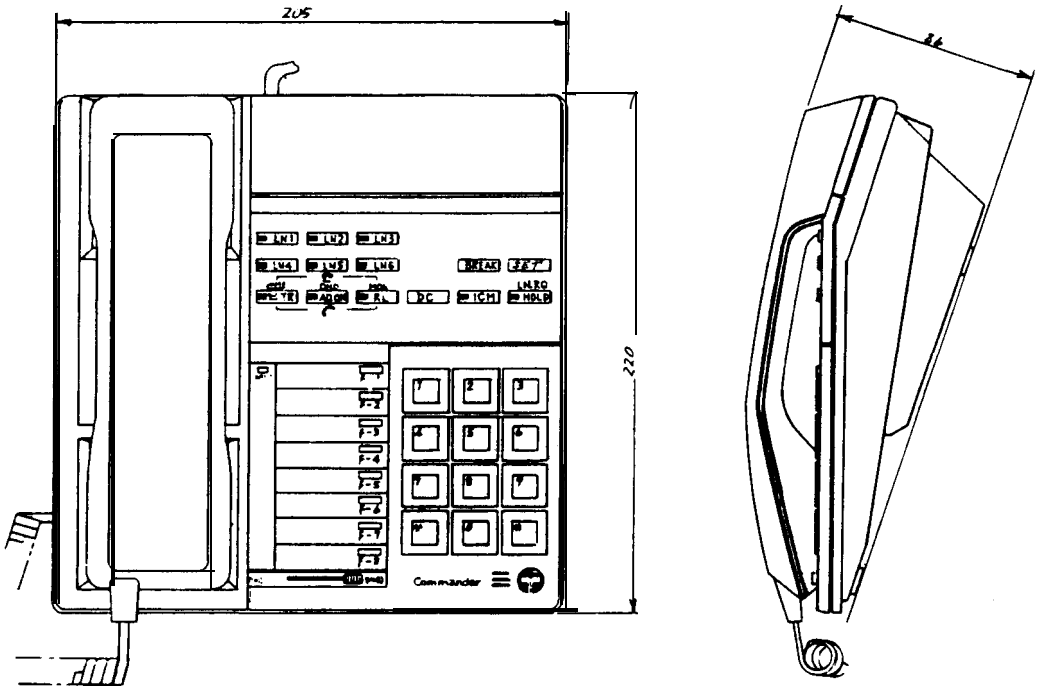


Fig. B1 TS-AN-BA — BASIC STATION

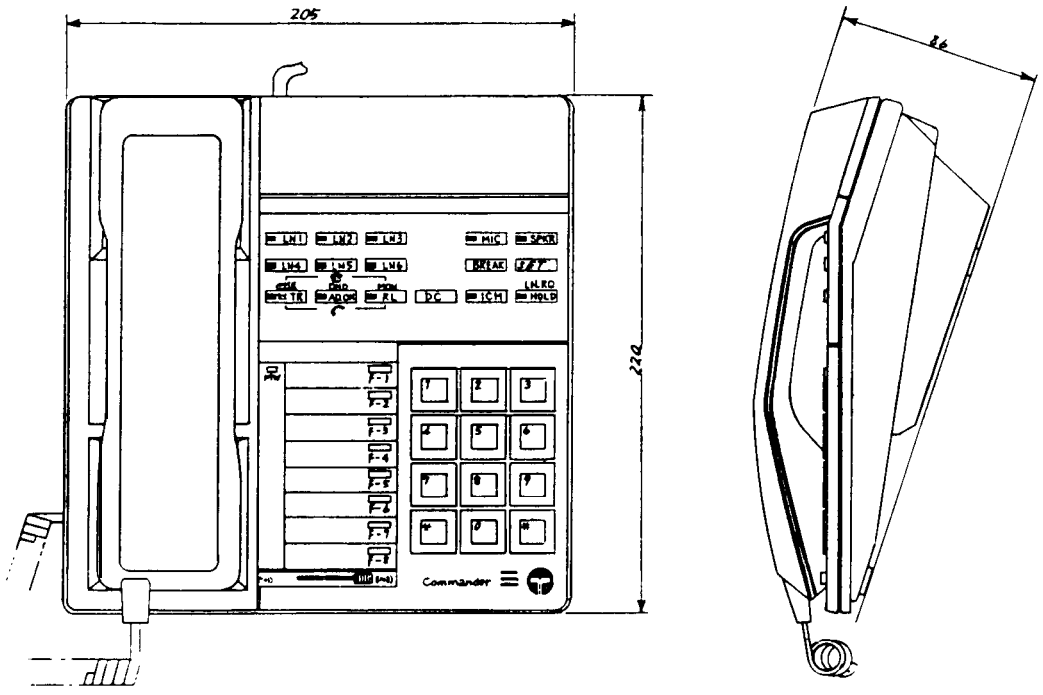


Fig. B2 TS-AN-OH — ON-HOOK STATION

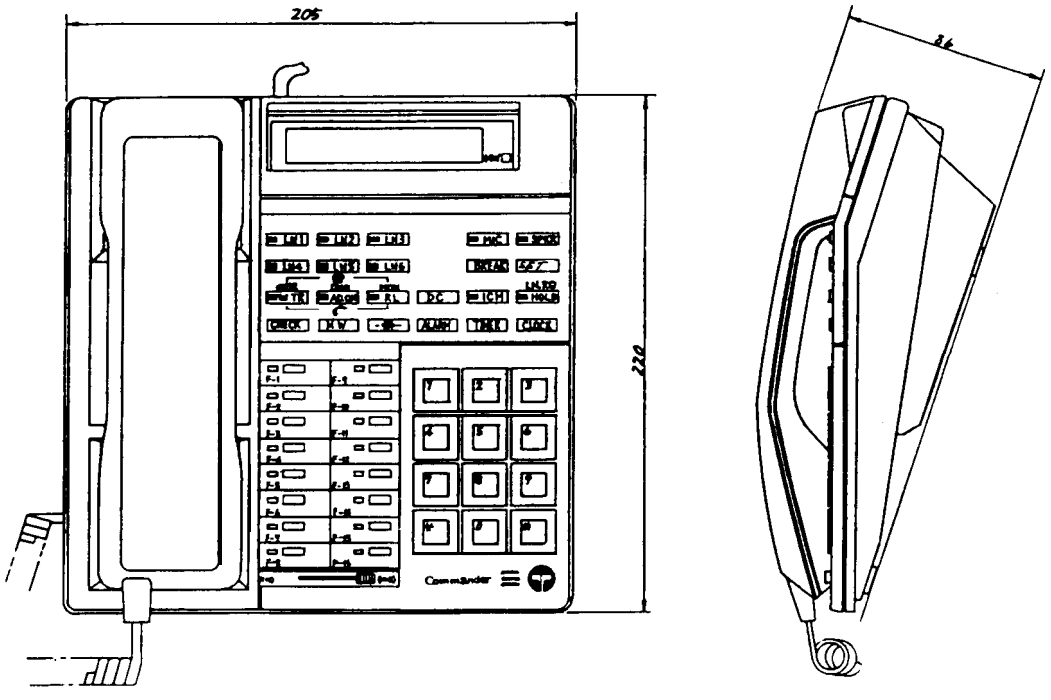


Fig. B3 TS-AN-HF — HANDSFREE STATION

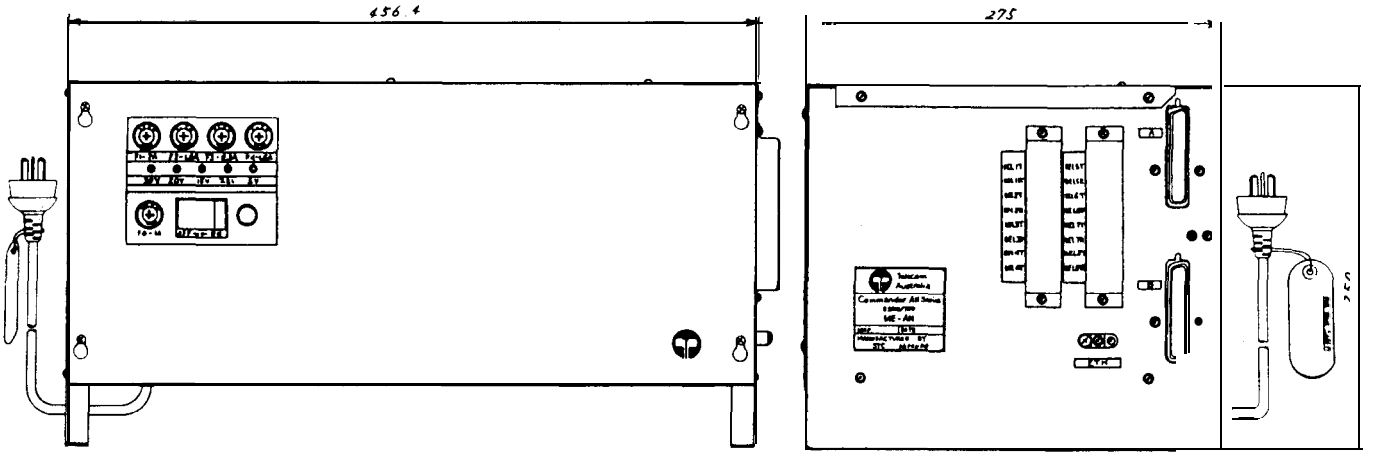


Fig. B4 ME-AN — MAIN EQUIPMENT

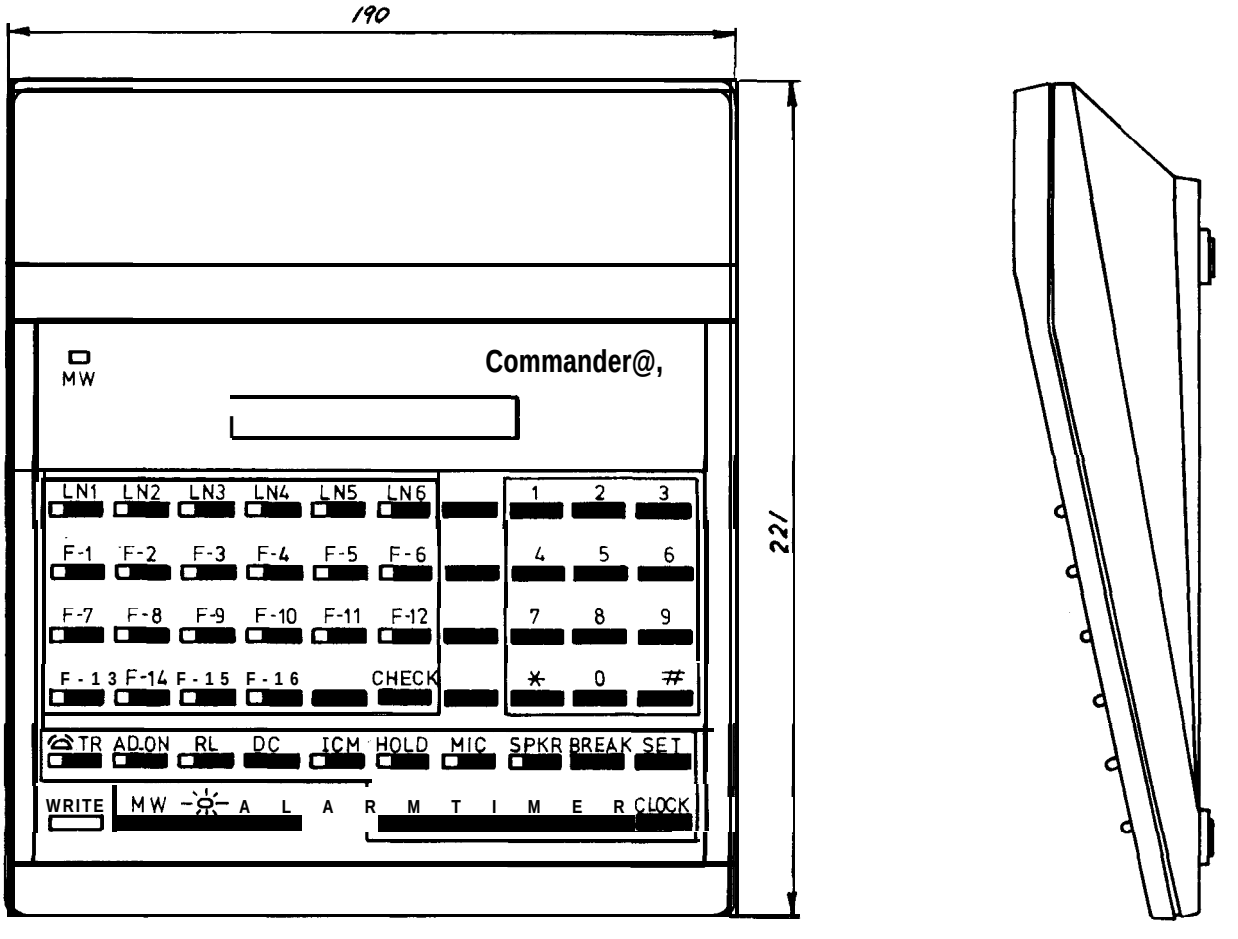


Fig. B5 TPU-AN — TEST AND PROGRAMMING UNIT