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SECTION 1 GENERAL

1.1 INTRODUCTION

This manual has been prepared for the purpose of providing installation and maintenance personnel with information required to competently perform installation, commissioning and maintenance tasks on the enhanced Commander S range of Business Telephone Systems.

These systems have become known as 'Small Business Systems' in Australia, (SBS) and are designed to provide comprehensive telephone facilities for small business concerns and like organisations.

They are derivatives of 'Slim-Wire Key (Telephone) Systems' in use overseas. The slim-wire terminology refers to the use of only 4 wires to connect any station to the central unit, as distinct from hitherto available systems providing similar features, that required anything from 30-100 wires. This economy of wires is achieved through data dialogue between the central unit and peripheral stations.

The systems are primarily intended for use in 'stand-alone' profile, but are well suited for 'behind-PBX' applications (as sub-systems), or the domestic environment.

1.2 THE COMMANDER S RANGE

The new members of the Commander S family are:

206: providing up to 2 exchange lines and 6 stations
408: providing up to 4 exchange lines and 8 stations
824: providing up to 8 exchange lines and 24 stations

The station instruments are actually of 2 different types, viz:

1. Telephone Station, (with LED display) and with recall key, as used with S207, S416 & S620, family of systems.
2. COMSET station, with handsfree operation and direct station selection (DSS).

The above station types may be mixed so as to match the customer's requirements. The operating procedures on both types of instruments are virtually identical.

The instruments are connected to the central unit in what is known as 'star-formation' (of 4 wires per station).

It is of interest to note that the station instrument is not merely a telephone, but in fact a data terminal, and should be regarded as such. A significant difference from a normal telephone for example, is the fact that a number of keying procedures are conducted with the handset cradled (i.e. on-hook).

The 'Main-Equipment', (or Central Control Unit) is light, compact, includes the power supply and is not in need of expansion techniques to achieve full utilization of all facilities (apart from the optional 2-wire module and in the case of the S824, the 8SM module).

1.3 WARNINGS AND HANDLING PROCEDURES

1.3.1 Warnings

1. The following precautions must be observed when working on the system. The power switch on the power supply must be turned OFF when re-wiring the system, or adding optional and operating system modules. If this work is executed with the power ON, semiconductor circuits in the system may be damaged.
2. Commander S is a four wire telephone system. One pair is used for analog speech transmission, the second for power and data. Hence it is imperative that the system is wired with the correct polarities. Check all wiring before initial powering up of the system.

Table 1.1 System to Station wiring Colour Scheme

Telecom Cable	603/610 Plug/Socket	Designation	Function
White (WT)	2	a	La
Blue (BL)	6	b	Lb
Red (RD)	1	c	Data —
Black (BK)	5	d	Data +

3. Take special care not to short between any terminals. This may cause damage to the system.
4. The fuses that are provided in the system are unlikely to blow if the system is connected properly. The fuses may blow when a component or a station is replaced with the power ON, or wiring is incorrect.
5. The Remote Station Extender Unit (RSEU) used in association with 2-wire stations, is polarity conscious, and must be connected as marked, a to a, and b to b.

1.3.2 **Handling of Boards (Reduce the incidence of premature failure!!!)**

This equipment contains a considerable number of MOS, and other static sensitive components. To protect the components from damage due to high charge voltages, the following rules should be observed:

- Always ensure that power is disconnected before unplugging PBA's.
- The terminals of the MOS — components, uninsulated components and tracks of the printed circuit assembly, must not be touched or bridged against the equipment frame, when the system is switched on.
- Always discharge static from yourself by touching a conductive (earthed) part of the main equipment before handling boards.
- Handle PBA's by the edge or by the grips. Do not handle PBA tracks, components or edge connectors (contaminants introduced by fingers can cause corrosion and high resistance connections).

  Further, note that components are physically delicate. Finger pressure on a component can fracture, but not necessarily break components leads; a future fault.
- All modules equipped with memory components are to be protected from sunlight and strong UV-light (fluorescent light).
- New or replacement items are provided in special packaging. When exchanging a module, always re-use the correct packaging as supplied, for item being recovered.

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

1.4 FEATURES

The Commander 'S' range of Small Business Systems are microprocessor controlled key telephone systems with a capability of providing:

2 exchange lines and 6 stations - 206
4 exchange lines and 8 stations - 408
8 exchange lines and 24 stations - 824

Important common features of the systems include:

- Common types of station instruments used for all size systems
- Inbuilt/Integrated Power Supply for 206/408. Pluggable power supply for the 824
- Modern Styling
- Push Key Operation
- Latest Technology. (Using solid state switching)
- Only 4 wires needed to connect Station Instruments
- Optional Handsfree Station Instruments. (COMSET)
- No Operator Console required
- Ease of Installation and Service
- SPC (Stored Program Control)
- Automatic starting-up and testing routines
- No battery memory back-up required
- Data Security
- Direct Station Select (DSS) Console can be used on the 824 in conjunction with Comset Handsfree Stations (T16) only

1.5 FACILITY LIST: STANDARD FACILITIES

1.5.1 External Line Facilities

- Visual Indication of Line Status
- Audible Signalling
- Call Waiting Tone (External)
- Direct Access (Multiple Line Access) — I/C and O/G
- Indirect Access (Multiple Line Access) — O/G
- Exchange Line Booking
- Access Barring by Digit Analysis
- Decadic/MMF sending (programmable)
- Abbreviated Dialling: System
- : Individual Station
- Last Number Re-Dial
- Saved Number Re-Dial (with Comset)
- Operator Station
- Do-Not-Disturb (Station Guarding)
- Enquiry and Transfer (Internal)
- Enquiry (External) with hold
- Group Call
- Automatic Call Forwarding
- Call Pick-up

1.5.2 Internal Line Facilities

- Internal Calls
- Audible Signalling
- Call Diversion
- Follow Me
- Visual Indication of Follow Me (at Initiating Station and Target Station)
- Do-Not-Disturb
- Visual Indication of Do-Not-Disturb (at Initiating Station)
- Call Waiting Tone (Internal)
- Call Waiting
- Handsfree answerback (with Comset T16)
- Direct Call
- Zone paging (with Comset)

1.5.3 **System Facilities**

- Hold : Automatic Hold
  : Manual Hold
  : I-Hold
  : Common Hold
- Recall : from Hold
  : from Auto Transfer/Non-Answer
  : from Auto Transfer/Busy
- Auto Forwarding on Unanswered Calls (Centralised Answering)
- Secrecy
- Night Switching
- Service Tones
- Conference
- Power Fail
- Data Retention During Power Fail
- Customer Data (Abbreviated Dialling) Alteration by Authorized Station User
- Customer Data Alteration by Pass-Code Access
- MMF and Decadic sending to Parent
- Central External Alarm
- Music-On-Hold
- Multiple Hot Line
- PBX Recall for Stations
- Power Fail Telephone
- External Music on Hold
- Data Transfer Security
- Unit Lines (Programmable)

1.5.4 **Station Facilities**

- Push Key Dialling
- LED Status Indicators
- Volume Control/Tone Ringer
- Pitch Control/Tone Ringer

1.6 FACILITY LIST: OPTIONAL FACILITIES

- 2-Wire Station (Local)
- 2-Wire Station (Remote)
- External Paging
- Feature Station (Comset T16)
- DSS (Direct Station Select) Console

1.7 FACILITY DEFINITIONS AND DESCRIPTIONS

1.7.1 Data Station

Any station can be marked as a "Data Station" in the Customer Data Record. The effect of this is to disallow any form of knocking (internal and external) to be sent to that station.

1.7.2 Common Hold

If an external call is placed on "Hold" and the station handset replaced, the call is marked as being in "Common Hold" status. This means that any station (with access to that exchange line) can retrieve the call by pressing the line number key.

If the call is not retrieved within a programmed time (Transfer Time in the Customer Data Record) an attempt is made to recall the instigator of the Common Hold procedure. If that station is free, the recall signal is generated, otherwise the call is re-sent to the Common Hold status, but this time the instigator's status is checked every five seconds. At the end of this second programmed time (Recall Time in the Customer Data Record), the call is dropped off. During all of this time the call is available to all stations with Class of Service level 1 or greater.

1.7.3 Hot-line

A pair of stations that have additional facilities provided for inter-working. Up to 4 station pairs may be defined with this facility. Note that the same station can appear in more than one group. (Care should be taken when adopting this approach).

Features of the hot-line facility are:

- distinctive knocking tone
- distinctive ring signal
- access to the partner by the " * " button
- in a search loop (through the Call Forwarding facility), the executive is by-passed
- automatic diversion of calls from the executive to the secretary station when Do-Not-Disturb is activated.

In the S206/408 stations, no special link is programmed for this procedure. However in the S824, each "Hot-Line" pair is allocated an internal link.

1.7.4 Internal Recall After Call Waiting

If a station does not respond to the call waiting tone, but simply replaces his handset to on-hook, he will receive an internal recall signal, indicating that the party is still waiting. This will only eventuate if the "Knocked-on" station has not placed any other external calls in hold. External calls have priority over internal calls, and in such a case the waiting party will again receive busy tone.

1.7.5 Call F&warding

The system provides four options of call forwarding (all on an individual line basis). The "main station", "secondary answer point" and type (option) of forwarding are all programmable and the details are stored in the Customer Data Record.

The four options are defined as follows:

Option *00:* No Forwarding

- The incoming call is sent to the "main station" regardless of the current state of that station. It remains at this station until the call is answered or the ringing party hangs-up.

Option *01:* Forwarding

- If the "main station" does not answer within the programmed time, or if it is in a "temporary unavailable" state, then the call is forwarded to the 'Second answer" point.
- "Temporary Unavailable" status are:
  during dialling (and up to interdigit interval)
  do-not-disturb

Option 02: Forward and Search Cyclical

- If both the "main station" and "second answer" point do not respond to the incoming call, then a cyclical forwarding results as each available station is rung.
- Excluded from the loop are:
  — executive station in a hot line pair
  — stations in "Temporary Unavailable" state
  — stations with call diversion activated
- The search continues until the call is answered or the calling party hangs-up.

Option 03: Forward, Search and Stop

- If the call is unanswered by the "main station" and "second answer" point, then it is transferred to the first available station in the system. Exclusions from the "available" list are as per option 02. It remains here until answered or the calling party hangs-up.

1.7.6 Dialling Method

The system may be connected to a mixture of decadic/MMF type exchange lines. The form of dialling information is determined by data provided in the Customer Data Record. Similarly, behind PABX's the method of recall (either as earth imbalance or flash) is programmable on a line basis.

Note also that while connected to a "decadic" line, the system may be switched to sending DTMF tones,

(1) from the key stations by pressing the "#" button

(2) from the 2-wire stations by dialling "7 9" (after the dialling-end tone is heard).

1.7.7 Data Handling

The Commander S system allows two methods of connecting data handling devices such as personal computers, terminals, etc. Firstly, through the two wire port as a dedicated position, and programmed as such in the Customer Data Record.

Secondly, as a device paralleled to a standard station and through a procedure code: S9. The electrical arrangement is such that the a-b pair is shared by both the data terminal and the telephone station. A data link is set up and controlled by the telephone station. The station selects the line over which the data transfer is to take place, then dials the link number of the external computer (as for a normal call) and only presses the S and 9 keys and hangs up after the confirmation is received that the link is made.

Station keypad input is continuously scanned. However the only valid procedure while in this state is again "S9" to toggle out from data transfer mode. Other inputs are totally ignored.

Note that de-activation of this procedure on-hook will release the exchange line. Off-hook de-activation will transfer the station to normal exchange line connected status.

During the time that the procedure is active, the 'station is not available to be rung, or knocked on. This state is visibly indicated (at the initiating station) by slow flashing of all leds in synchronism.

Maximum data transfer rate is guaranteed at 4800 Baud. Faster rates are possible however some errors may be anticipated.

1.7.8 Night Service Modes

There are two modes of night service available by the system. These are designated as Night mode A and Night mode B operation.

Night mode A, when activated, provides the user with a fully programmable arrangement of ring allocation, class of services, etc. to a similar depth as available in daytime operation. The data is programmed into the "S4" data group of the Customer Data Record. Note that call forwarding is reduced to Option type 00.

Night mode B reduces the system to the state of one (Customer allocatable) station being the answer point for all incoming lines. Class of Service to this station is temporarily increased to 07 and call forwarding is reduced to Option 00. All other system features and facilities remain active and available for use.

1.7.9 Zone Paging (S824 only)

Comset Handsfree stations can be assigned to a group of stations that may be contacted simultaneously for a "public" announcement. Two such groups, of up to 12 stations, may be programmed.

If a station is in any busy state, it is automatically disconnected from the message/paging link.

1.7.10 Call Waiting Tone

The call waiting tone can only be injected onto a station that is marked as "available". At all other times, the station is set as "not available," and the waiting party continues to receive ring tone (for external calls) or busy tone (for internal calls).

"Not Available" states: during dialling
until Interdigit Interval is timed-out
in do-not-disturb
when programmed for data transfer.

1.7.11 Unit Line

When this facility is activated it provides the user with direct access to the programmed exchange line, without having to select the line. Any operation which is exchange line related will

- automatically select the programmed exchange line.
- set the station in handsfree mode.

1.7.12 Group Call

Up to four stations can be allocated to ring simultaneously for an incoming exchange line call. The station that takes the call will have complete privacy and will be excluded from the group until it is finished with that call and returns to idle state.

Note (1) the off-hook station will not receive "call alerting" tone.

(2) incoming calls that arrived during the time that a station was busy, will not be announced to the station when it returns to idle state.

1.8 FACILITY LIMITATIONS

1.8.1 Power Fail (S206 and S408)

At power fail the system provides only the following connections:

exchange line 1: connected to "power fail" telephone (Optional). This telephone is able to make both-way calls.

exchange line 2: connected to station 12 for incoming calls only.

1.8.2 Power Fail (S824)

exchange line 1: connected to "power fail" telephone (Optional). This telephone is able to make both-way calls

exchange line 2: connected to station 12 for incoming calls only

exchange line 3: connected to station 13 for incoming calls only

exchange line 4: connected to "power fail" telephone (optional). This telephone is able to make bothway calls

exchange line 5: not connected

exchange line 6: not connected

exchange line 7: not connected

exchange line 8: not connected

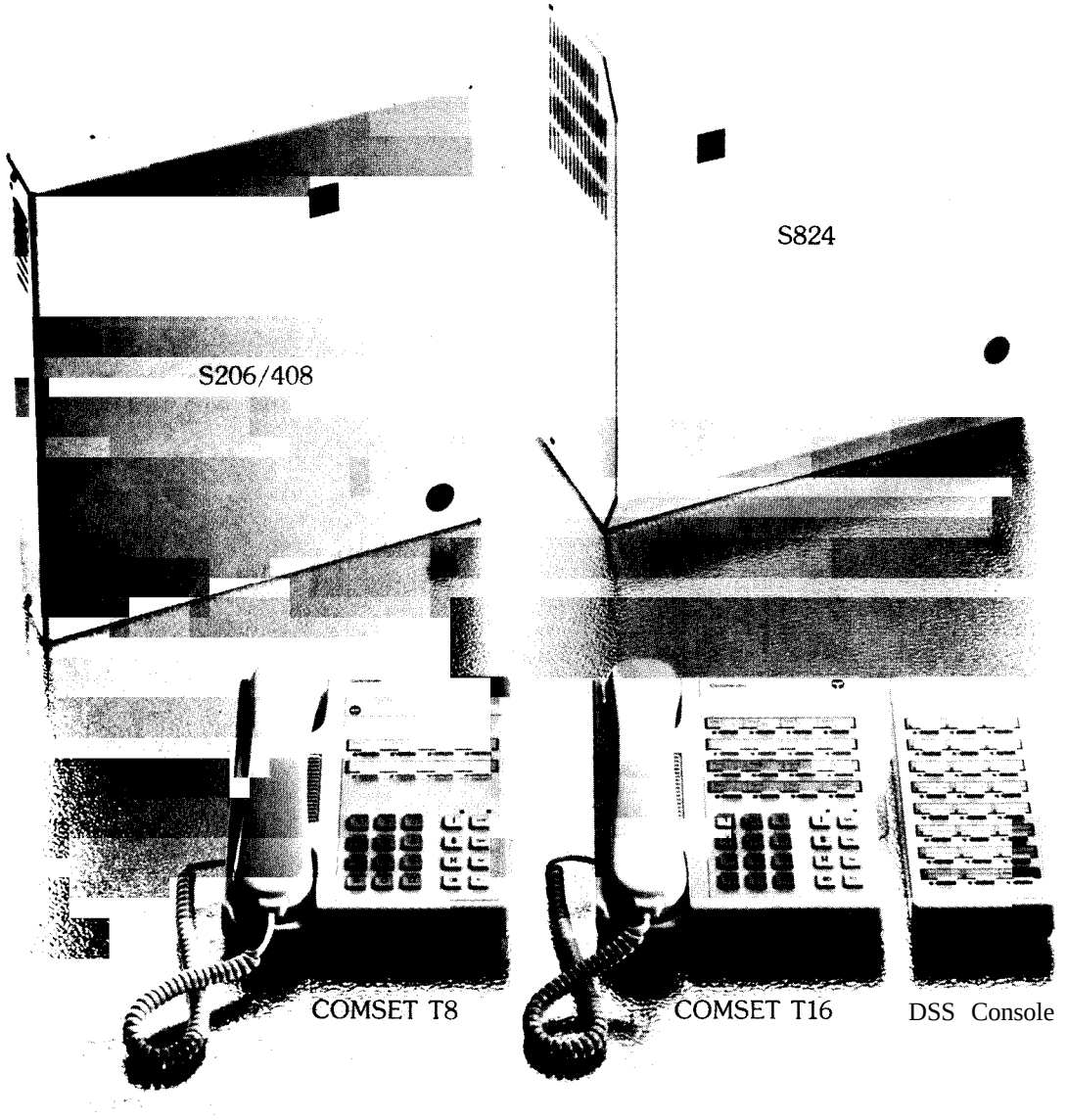
1.8.3 Parallel Telephones

The use of telephones in parallel is not recommended on these systems. Conflicting status information from the station interface ports can lead to that particular port being marked as non-existent (in the software service map).

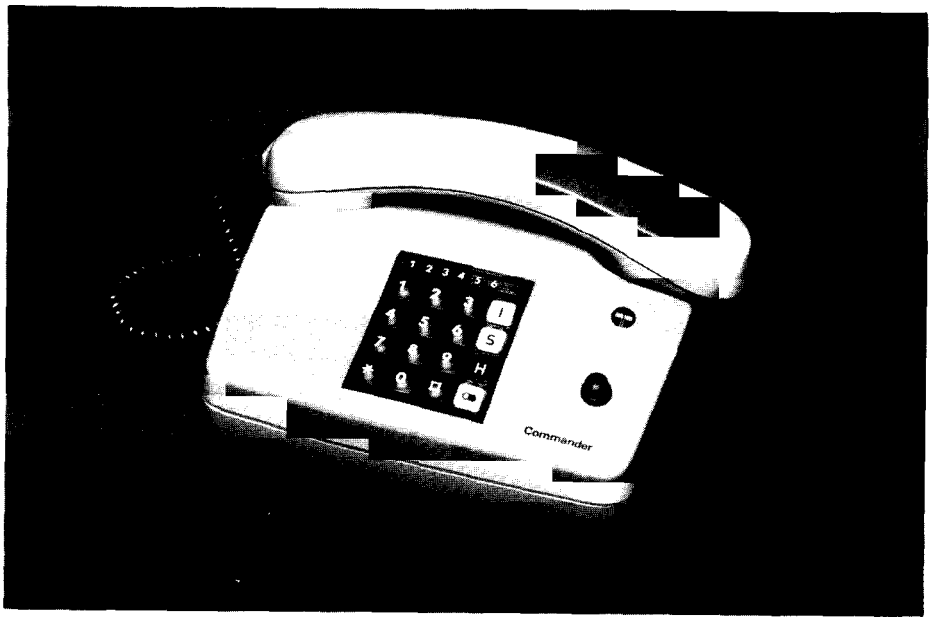
The only time a port should be used for more than one device is in the case of "Data Handling". Refer to Sections 1.7.7 and 2.5.12 for more details.

1.8.4 Operation During Power Fail

If station 12 (for an S206/408) or station 12/13 (for an S824) are fitted with decadic %-wire stations, then during power fail conditions these positions can also make outgoing calls.


S824
S206/408
COMSET T8
COMSET T16
DSS Console

STANDARD KEY STATION



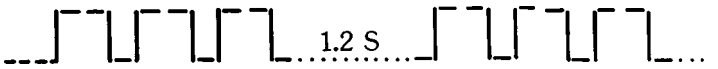
TWO-WIRE STATION
(typical 807)

1.9 OPERATING INSTRUCTIONS FOR USERS

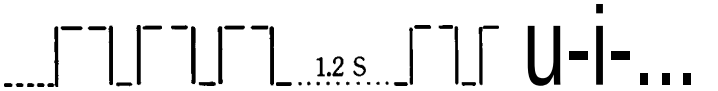
1.9.1 Service Tones

Note "—" = approx. 120 *mS*

Dial Tone-Normal (418 Hz)



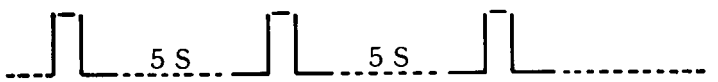
Dial Tone "'Active" (836 Hz)



Busy Tone

Link-Made Tone (Ring Tone), and dial-end tone

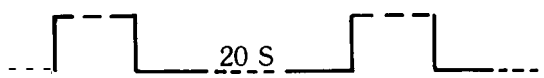
Knocking Tone



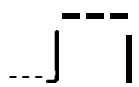
Hot Line Knocking

"Short" Busy Tone

Handsfree Answerback (HFA) Tone



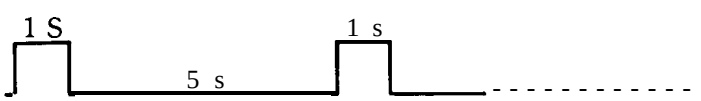
Paging and HFA end



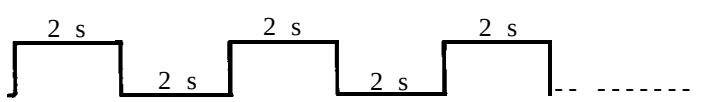
1.9.2 Service Signals (Ringing)

Note: *Periodicity* as indicated

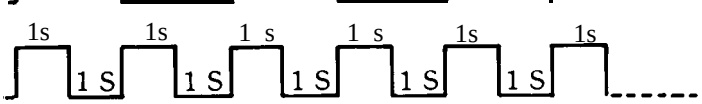
Internal Ringing



Hot Line Ringing



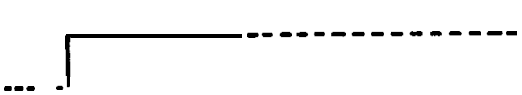
Recall Ring



Note: Outside call ring follows the cadence of the incoming signal

1.9.3 LED Sequences

Steady on



Slow Flashing

Fast Flashing

Flickering

1.9.4 **Station Face Layouts, Optical Signals and Keypad Functions**

1.9.4.1. **Standard Key Station**

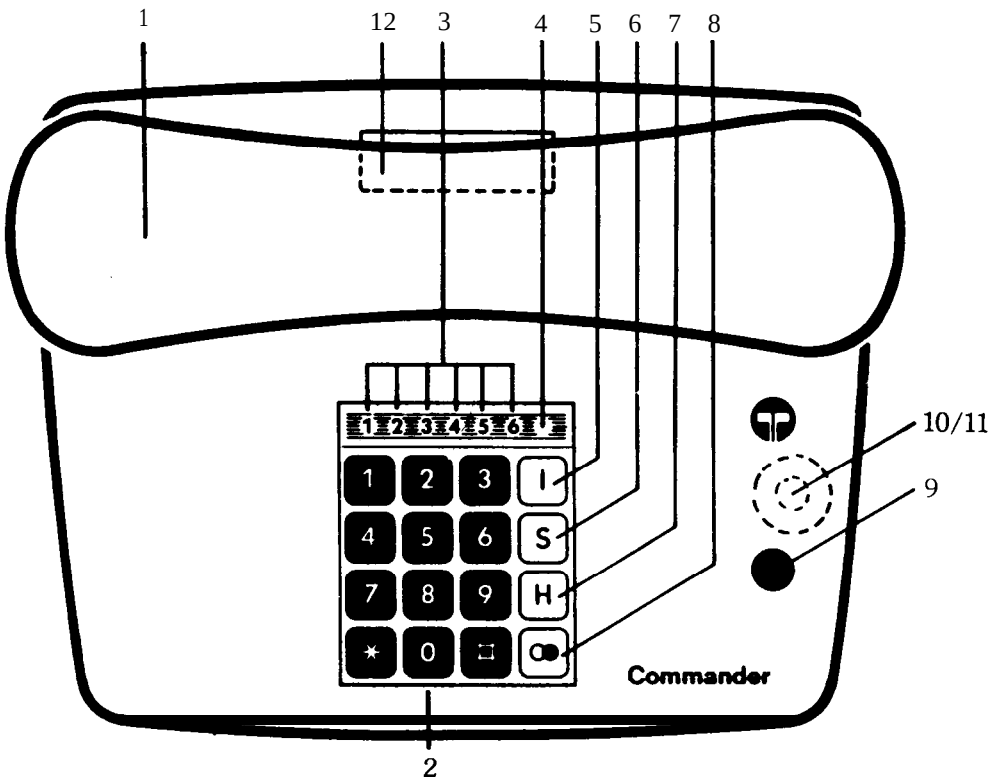


Fig. 1.1 Standard Key Station Face Layout

1. Handset
2. Keypad Assembly
3. LED'S (red) for external line status
4. LED (yellow) for facility activation indication — (facilities LED)
5. Internal Key — for dialling internal call numbers
6. Special Procedure Key — for activation of special procedures
7. Hold key — for holding external calls
8. Last Number Redial Key
9. PABX Recall Key
10. Knurled wheel for adjustment of ringer volume
11. Adjustment of ringer tone
12. Station Label

OPTICAL SIGNALS

The RED led's provide information regarding the status of the exchange lines:

steady on — the related exchange line is in use
slow flashing — the related exchange line is in HOLD state
fast flashing — there is an unanswered incoming external call on that line.

The YELLOW led provides details regarding the internal conditions:

steady on — "night state" activated (mode A and mode B)
slow flashing — Do-not-disturb, Call Diversion or Follow Me activated
fast flashing — the station is being knocked-on.

NOTE: "Steady on" state takes precedence over other con-current active display details.

KEY PAD FUNCTION

Key	Off Hook Function	On Hook Function
1-8	Select that line for an external call.	"Book" that line for an external call.
0	Select any available exchange line.	"Book" first available exchange line.
#	Switch from decadic outpulsing to DTMF (in the State "External Connection").	Initiate station self test (#1).
*	Hot line code.	
I "Internal Key"	— 111 . 134 Dial an internal station. — 18 Access to "Paging system". (See Para 1.9.5.5)	
S "Service key"	— S00 . . . S59 Dial an abbreviated number — Answer a knocking signal.	N/F
	— s o General cancellation of call diversion, follow-me facility and Do-not-disturb.	Ditto
	— S1 Activate/cancel Call Diversion	Ditto
	— s 2 Activate/cancel Follow-me	Ditto
	— s 3 Activate/cancel Do-not-disturb	Ditto
	— S4XX Activate "Night Switch'.	Ditto
	— s 4 Cancel "Night Switch'.	Ditto
	— S6 Send "Message Waiting" to a Comset.	N/F
	— s 7 Conference (both int/ext/int and int/ext/ext.)	N/F
	— S8 "Direct call" to a Comset.	N/F
	— s 9 Activate/cancel Data Transfer	
	— S# Programming of station abbreviated numbers	N/F
H "Hold Key"	— Hold an external call.	N/F
○● "Redial Kev"	— Redial of the "Last Number" dialled.	N/F

NOTE: * System abbreviated numbers are programmable only from station 11, via a Service Key (S) procedure.

*N/F = No function

1.9.4.2 **Comset Handsfree Station**

NOTE: the station layout displayed is as set up for a S408 system.

For the S206, Line 3, Line 4, DSS 6 and DSS 7 push button positions have no function.

For the S824, the second row of push buttons (drawn here unlabelled) are the positions for Line 5 to Line 8.

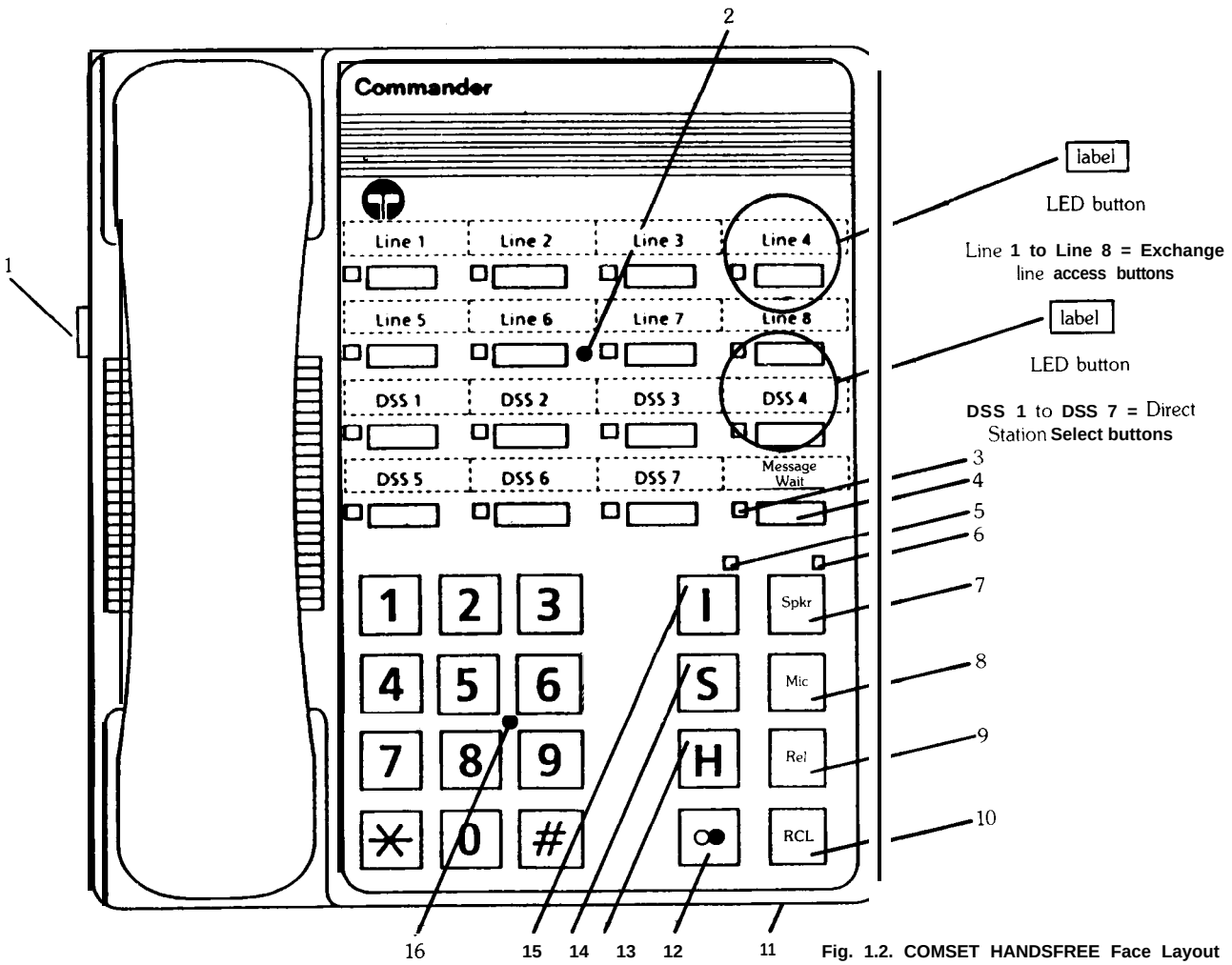


Fig. 1.2. COMSET HANDSFREE Face Layout

1 Volume control for handsfree loudspeaker
2 "DSS" push button field
3 Message Waiting LED
4 Message Waiting activation button
5 Facilities LED, indicating the activation of Do-Not-Disturb, Call Diversion, Call Follow-me, or Night Switch State
6 Speaker/Microphone Mute LED
7 Speaker On/Off key
8 Microphone Key — Permitting/barring the Handsfree Answerback facility
9 Exchange Line release Key — acts as a quasi hook switch
10 PABX Recall Key
11 Inbuilt microphone for handsfree communications
12 Number Redial Key — "Last Number" or "Saved Number" can be redialled
13 Hold Key — for holding exchange line calls
14 Special Procedures Key — for activation of call diversion, call follow me, abbreviated numbers, etc.
15 Internal Key — for access to the paging link
16 Dialling Keypad
17 (Not shown) Ringer tone and volume combined control, accessible on base of Comset

OPTICAL SIGNALS

Exchange Line LED's

Steady ON — exchange line busy
Slow flashing — exchange line on hold
Fast flashing — incoming call
Flickering — knocking from that particular exchange line.

Station LED's

Steady ON — station busy
Fast flashing — that station is calling or being called from another station
Flickering — that station is generating knocking or is engaged in a HFAB call with this station.

Facilities LED

Steady ON — night state activated
Slow flashing — DND, call diversion or follow me activated

Message Waiting LED

Steady ON — this station has left a message
Slow flashing — message is waiting to be answered.

SPKR LED

Steady ON — microphone mute is activated
Fast flashing — loudspeaker is ON (handsfree operation)

KEY PAD FUNCTIONS

Key	Off Hook Function	On Hook Function
0	Select any available exchange line	"Book' first available exchange line
#	Switch from decadic outpulsing to DTMF (in the state "External Connection")	
I "Internal Key"	— 18 access to "paging" system (see Para 1.9.5.5)	Ditto
S "Service Key"	— S00 . . . S59 Dial an abbreviated number	
	— SO General cancellation of call diversion, follow-me facility and Do-not-disturb	Ditto
	— S1 Activate/cancel Call diversion	Ditto
	— S2 Activate/cancel Follow-me	Ditto
	— S3 Activate/cancel Do-not-disturb	Ditto
	— S4XX Activate "Night Switch'	Ditto
	— S4 Cancel "Night Switch"	Ditto
	— S6 Send "Message Waiting" to a Comset	

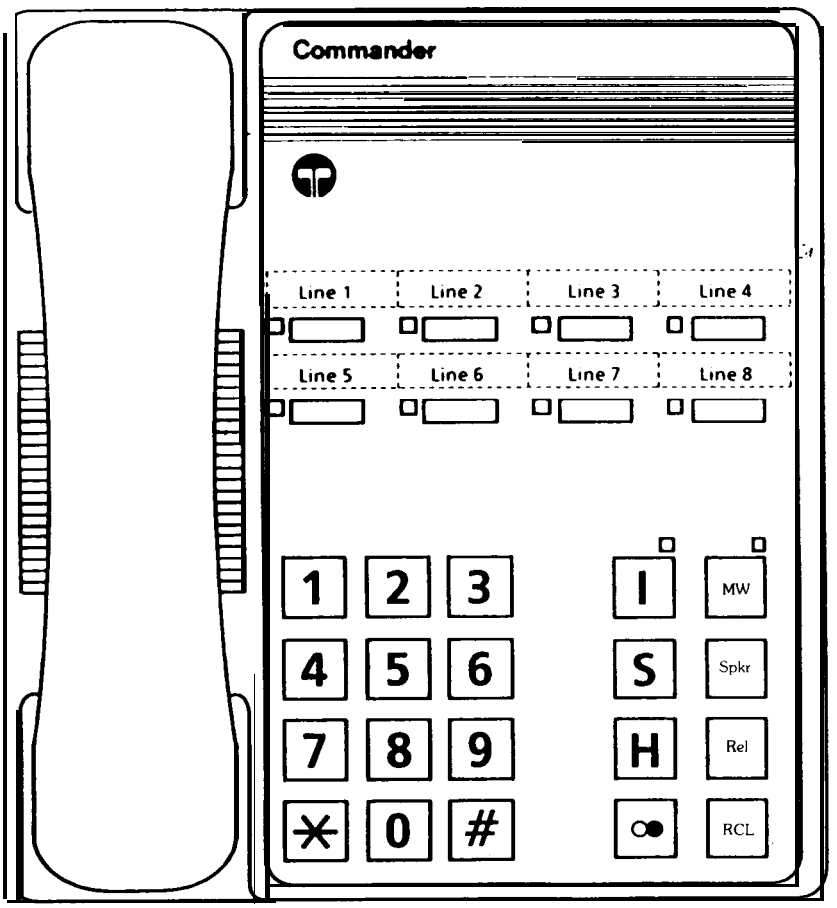
Key	Off Hook	On Hook
S "Service Key" (cont.)	— s7 External conference Int/Ext/Int Int/Ext/Ext — S8 "Direct call" to a Comset — S9 Activate/cancel Data Transfer — S# Programming of station abbreviated numbers — SO● Activate "Save Number" Redial facility (for later redialling)	
H "Hold Key"	— Hold an external call	
O● "Redial Key"	— Redial of the "Last Number" or "Saved Number"	
Spkr	— Loudspeaker on/off	ditto (in "Handsfree" operation mode this key also simulates the hook-switch)
Mic	—	microphone on/off
Rel	— Release (similar to effect of "on-hook")	ditto
RCL	— Signals the Main Equipment to send the required signal (earth or flash) to the parent exchange	

DSS KEY PAD FIELD FUNCTIONS

Key	Off-Hook	On-Hook
Line 1 -Line 8	— Select that line for an external call	"Book" that line for an external call
DSS	— Call to an internal station (multi-call to set up conference)	Ditto
	— answer internal knocking (recognized by flickering LED of calling station)	Ditto
	— refer back (enquiry call	Ditto
	— call pick-up	Ditto
Message Wait	— Leave a message (to another COMSET)	Ditto
	— Answer a message	Ditto

NOTE: The operation of any line key, DSS key, key pad digit, abbreviated dial code, or "I" key, while on-hook (at a Comset station) will automatically activate the on-hook dialling mode. If the Comset T16 is used, conversation can proceed via the in-built microphone. Otherwise the handset must be lifted.

1.9.4.3 **Comset On-Hook Station**



OF'TICAL SIGNALS

Exchange Line LED's

Steady ON — exchange line busy
Slow flashing — exchange line on hold
Fast flashing — incoming call
Flickering — knocking from that particular exchange line.

Facilities LED

Steady ON — night state activated
Slow flashing — DND, call diversion or follow me activated

Message Waiting LED

Steady ON — this station has left a message
Slow flashing — message is waiting to be answered.

KEY PAD FUNCTIONS

Key	Off Hook Function	On Hook Function
0	Select any available exchange line	'Book" first available exchange line
#	Switch from decadic outpulsing to DTMF (in the state "External Connection")	
I "Internal Key"	— 18 access to "paging" system (see Para 1.9.5.5)	Ditto
S "Service Key"	— S00 . . . S59 Dial an abbreviated number	
	— SO General cancellation of call diversion, follow-me facility and Do-not-disturb	Ditto
	— S1 Activate/cancel Call diversion	Ditto
	— s 2 Activate/cancel Follow-me	Ditto
	— S3 Activate/cancel Do-not-disturb	Ditto
	— S4XX Activate "Night Switch"	Ditto
	— S 4 Cancel "Night Switch"	Ditto
	— S6 Send "Message Waiting" to a Comset	
S "Service Key" (cont.)	— s 7 External conference Int/Ext/Int Int/Ext/Ext	
	— S8 "Direct call" to a Comset	
	— S9 Activate/cancel Data Transfer	
	— S# Programming of station abbreviated numbers	
	— SO● Activate "Save Number" Redial facility (for later redialling)	

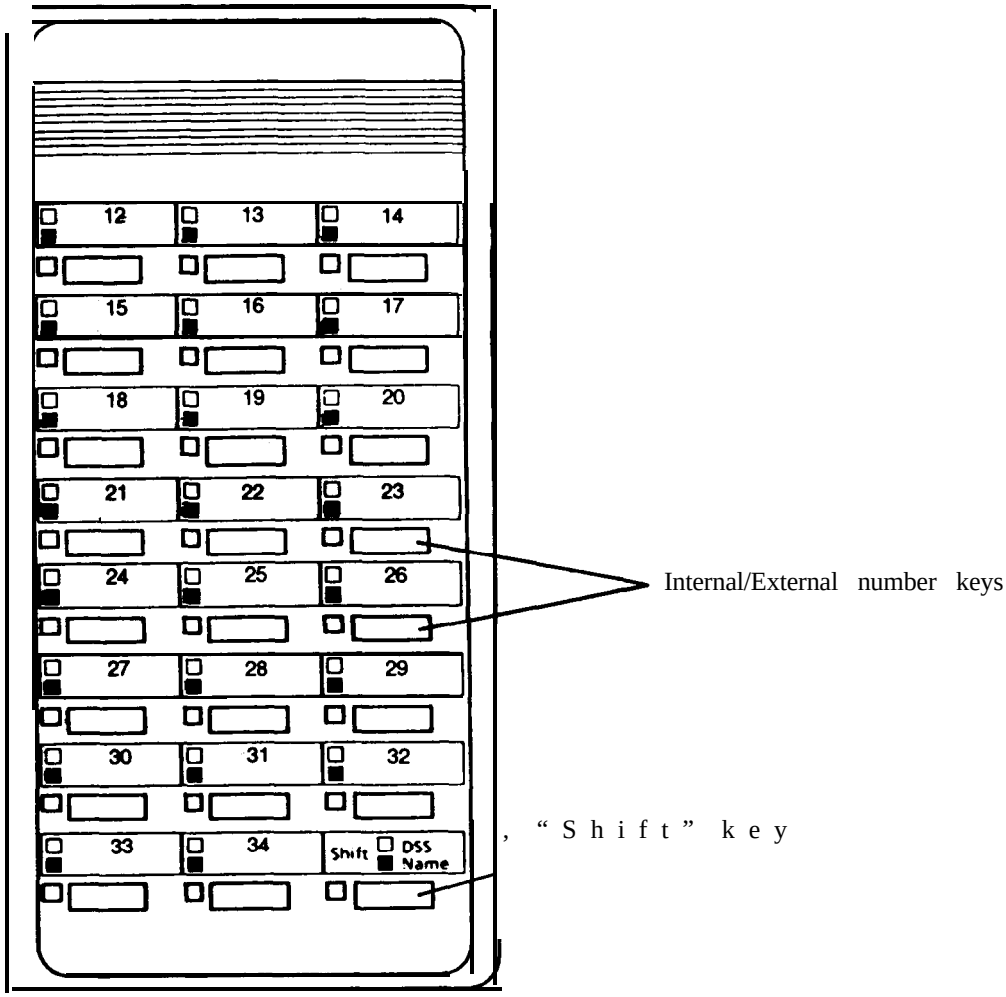
Key	Off Hook	On Hook
H "Hold Key"	— Hold an external call	
O● "Redial Key"	— Redial of the "Last Number" or "Saved Number"	
Spkr	— Loudspeaker on/off (in "idle state" only)	ditto
Rel	— Release (similar to effect of "on-hook")	ditto
RCL	— Signals the Main Equipment to send the required signal (earth or flash) to the parent exchange	
MW	— Sends "Message Waiting" to another Comset — Answers "Message Wait" from another Comset	

DSS KEY PAD FIELD FUNCTIONS

Key	Off-Hook	On-Hook
Line 1 -Line 8	— Select that line for an external call	"Book" that line for an external call

NOTE: The operation of any line key, key pad digit, abbreviated dial code, or "I" key, while on-hook (at a Comset station) will automatically activate the on-hook dial mode.

1.9.4.4 **DSS Console**



In the "idle" state the DSS console keys are programmed to connect to internal stations. By pressing the "Shift" key, the DSS console now generates the coding to access external numbers, either directly stored, or stored as abbreviated number locations.

1.9.4.5 **Two Wire Station(s)**

Dial-pulsing telephones may be connected in lieu of the four-wire station type, by means of an optional module: TWIM-DEC-S (S338/950). See also section 2.4.5.

This module allows the **use** of a maximum of 8 normal dial-pulsing telephones which may or may not be equipped with a (PABX) recall-key, however, Telecom reserves the right to limit the number of 2-wire stations connected to an S206/S408/S824 system.

Standard impulse format is required, i.e.

10-20 P.P.S.
2: 1 break/make ratio

Facilities operation while on an external call can only occur after the end of the "interdigit interval". This is signalled to the user by a single short tone burst (referred to as the dial-end tone). Note that if "00" is programmed as interdigit interval in the customer data, then the two wire station timer is set to 20 seconds.

DIALLING CODES

Note that activation/deactivation of facilities from two-wire stations, must of course, be carried out with the handset off -hook.

***Digit Function for 206/408**

Diait Dialled	Function
0	• Seizure of a free external line for outgoing calls • Re-seizure of a previously held external line
1 to 4	• Seizure of a particular external line (or pick up a line from Common Hold
7	• Activation/Deactivation of a special facility 71 Call Diversion (71xx : where xx = destination) 72 Follow Me 73 Do-not-disturb (with issue "D" software) 74 Night Switch Mode 75 76 77 Int/Ext/Int Conference (with issue "D" software) 78 79 Change-over to DTMF out-dialling 70 Cancellation of 71 and/or 72
9	• Internal-Call code, followed by station number • Holding of an external connection. (Note that, if during a held external call the handset is replaced, the Common-hold state is not invoked, consequently the two-wire station is recalled immediately) • 98 Access to "Paging" and "Common Hold"

'Digit Function for S824

Diait Dialled	Function
0	• Seizure of a free external line for outgoing calls • Re-seizure of a previously held external line
1 to 8	• Seizure of a particular external line (or pick up a line from Common Hold)
9	• 911-934 Internal Call Code • While on an outside call, will place that call into exclusive hold. (Note that, if during a held external call the handset is replaced, the Common-hold state is not invoked, consequently the two-wire station is recalled immediately) • Activation/Deactivation of a special facility 971 Call Diversion (971xx: where xx = destination) 972 Follow Me 973 Do-not-disturb 974 Night Service (974 xx) 975 976 Message Wait (to Comset only) 977 978 979 970 Cancellation of 971/972/973 980 All call paging and Common Hold 981 Paging to Zone 1 982 Paging to Zone 2 984 Paging to Zone 1 and 2 985 Access to external paging and Common Hold

1.9.4.6 **DSS Numbering Scheme for Comset Handsfree Stations (T16)**

The lower 7 keys of the Cornset's DSS field are initially configured as direct access to the following arrangement of stations:

S206/408 and S824 group I

	Stn 12	Stn 13	Stn 14	Stn 15
	Stn 16	Stn 17	Stn 18	

(core number 11) (as seen by station 11)

S824 group II

	Stn 20	Stn 21	Stn 22	Stn 23
	Stn 24	Stn 25	Stn 26	

(core number 19) (as seen by station 19)

S824 group III

	Stn 28	Stn 29	Stn 30	Stn 31
	Stn 32	Stn 33	Stn 34	

(core number 27) (as seen by station 27)

Note (1) The direct access to other internal stations is initially limited to its 'bwn group of eight". (Other stations are accessed via the "I" procedure).

(2) The scheme shown above reflects the access as seen by the indicated station. At other stations, the station's individual number (on the key location) is replaced by the "core" number, for instance group I core number is 11.

e.g. at station 22 of a S824, the initial layout would be

Stn 20	Stn 21	Stn 19	Stn 23
Stn 24	Stn 25	Stn 26	

(3) The DSS keys can be re-programmed at each individual station (behind a S824) to access any stations of the complete system.

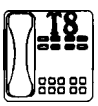
1.9.5 FACILITY DESCRIPTIONS AND OPERATIONS

1.9.5.1 Symbol Definitions

Throughout this section the following symbols are used to relate procedures to specific types of instruments:

Procedures related to "Standard" Key telephone stations (S338/70 and S338/71)

Procedures related to "Comset Handsfree" stations (S338/916), also referred to as T16



Procedures related to "Comset On-Hook Dialling" stations (S338/990), also referred to as T8

Procedures relating to decadic 2-wire stations

☑ 206/408 Procedures that are valid for the S206/S408

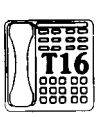
☑ 8 2 4 Procedures that are valid for the S824

Note: The Comset On-Hook Station (T8) will only operate on S206/408 fitted with issue 'D' or later software. All production S824 have the T8 compatible software.

1.9.5.2 Internal Communication

☑ 206/408 ☑ 8 2 4

Station to station communication is initiated in the off-hook state, by pressing the 'I' key followed by the two digit station number. The dialled station receives internal ring signal and the initiator receives the "link-made" tone. The physical link is established when the rung party picks up the handset.



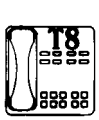
☑ 206/408

Station to station communication is initiated in the on/off-hook state, by pressing the allocated key position on the DSS panel. The dialled station receives internal ring signal and the initiator receives the "link-made" (single burst) tone. The physical link is established when the rung party picks up the handset, or presses the 'SPKR' key.

The station (B) also receives a visual indication of which station is initiating the call, by a fast flashing LED signal of the calling party (A). At all other Comset stations, the (B) party LED is on fast flashing sequence, while (A) party LED is steady on.

☑ 8 2 4

If required station has been programmed as a DSS appearance, then the procedure is as above. For access to all other stations the procedure is initiated by pressing the "I" key followed by the two digit station number.



☑ 206/408 ☑ 8 2 4

Station to station communication is initiated in the on/off-hook state, by pressing the 'I' key followed by the two digit station number. The dialled station receives internal ring signal and the initiator receives the "link-made" tone. The physical link is established when the rung party picks up the handset. Note that the T8 user must lift-off the handset to communicate (i.e. no "handsfree" operation).

☑ 206/408 ☑ 8 2 4

An internal call is established by lifting-off and dialling '9' followed by the two digit station number. If the called station is free, the two-wire station receives the "link-made" tone.

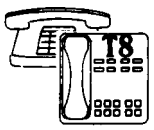
The link is disconnected by either party replacing their handset or at a COMSET by pressing the 'Rel' key or 'Spkr' (during the on-hook mode). At this time the other party receives busy tone.

1.9.5.3 **Internal Conference**

Up to 5 stations can be included in an internal conference: four stations directly, and the fifth via the knocking procedure.

The called station joins the conference when its handset is lifted. Conference is terminated by the subscribers replacing their handsets to on-hook.

If requested station is busy then the conference link receives the "short" busy tone sequence. Note that automatic knocking does not occur. If a requested station does not answer before the "Transfer time" (as programmed in the Customer Data) then the call is released. Stations already connected will receive a warning tone to indicate that another party is about to join the conference.



206/408 8 2 4

To build up conference connection, any of the parties already connected in an internal call simply need to press 'I', and the two digit number of the required station.

206/408

To build up a conference connection, any of the parties already connected in an internal call simply need to press the 'DSS' key allocated to the required station.

Fast flashing of the station LED's indicate which stations are required for the internal link-up. When the station joins the conference that station LED (at all Comsets) goes to the steady on state.

824

If the required party has been programmed as a DSS appearance then the procedure is as above. Otherwise, press "I" and the two digit station number.

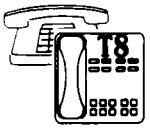
206/408 8 2 4

To build up a conference connection, standard telephones users simply need to dial digit 9, followed by the two digit number of the required station.

1.9.5.4 **Internal Call Waiting**

If a signalled internal station is busy, the system provides the capability of injecting a "call waiting" signal to that station to indicate that it is required by another internal party. The procedure is automatic and is engaged if an internal call receives busy tone for more than 5 seconds. After this mandatory 5 seconds, the system checks if an injection of tone is permitted to the called station. If a "call waiting" tone is allowed, the busy tone is switched off and the tone is sent to the called party. This tone is repeated every 5 seconds until the call is answered or the calling party hangs up. A continuing busy tone indicates that the required station is not reachable.

If the alerted station is a key station, then there is also visual indication of call waiting, at that station: fast flashing of the facilities LED or particular DSS LED.



206/408 *8 2 4*

The alerted party has two methods of answering the signal:

(1) Hang up the receiver: The station will then ring and the waiting party automatically connected on lift-off.

(2) Press the 'S' key:
- if presently connected to an external call, then this will be automatically put in to Exclusive Hold and the waiting party connected.
- if presently connected to an internal call, then the waiting party is brought into a conference mode.

206/408

Answering is by pressing the DSS Key (button) associated with that station:
- if presently connected to an external call, then this will be automatically put in to Exclusive Hold and the waiting party connected.
- if presently connected to an internal call then the waiting party is brought into a conference mode.

8 2 4

If the waiting station exists as a DSS position, then answering is accomplished by -pressing the relevant DSS key. Otherwise press the 'S' key.

206/408 *8 2 4*

The wanted party, upon hearing the alerting tone, is able to accept the call by firstly replacing the handset. Then, after receipt of the internal-recall ringing signal, on lifting the handset, a connection to the calling party is established.

1.9.5.5 **Paging**

☑ 206/408

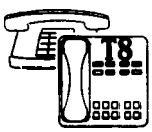
A "paging" link is provided by the system, access to which is programmable. If external paging is programmed as "not available" then the user receives a busy tone, otherwise an announcement tone is sent through the system and also to the user. NOTE: Module type TWIM-DEC-S must be fitted for this facility.

Access Code (AC) = 8

☑ 8 2 4

The 824 system provides access to both an external paging system on up to two groups of internal Comset stations. Up to 12 Comset stations can exist in each group, and a Comset may also be common to both groups. The Access Codes are as follows.

External and both Internal Zones:	AC = 80
Paging to Internal Zone 1:	AC = 81
Paging to Internal Zone 2:	AC = 82
Paging simultaneously to Zone 1 and Zone 2:	AC = 84
External paging only:	AC = 85



☑ 206/408 ☑ 8 2 4

Access to the specific link is established off-hook by dialling "I" followed by the "AC'.

☑ 206/408

Access to the specific link is established on/off-hook by dialling "I" followed by the "AC".

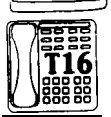
☑ 8 2 4

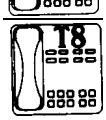
If a DSS key has been programmed to enable this procedure simply press the key, on/off-hook. Otherwise follow the above procedure.

☑ 206/408 ☑ 8 2 4

Access to the specific link is established off-hook, by dialling "9" followed by the "AC".

1.9.5.6 **External Communication**





☑ 206/408 ☑ 8 2 4

Incoming calls are signalled audibly and visually: audibly at the station(s) as preprogrammed in the Customer Data Record and visually by a fast flashing of the relevant red LED at all stations with Class of Service level 1 or greater.

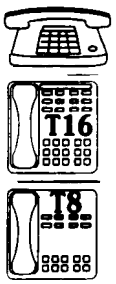
At the ringing station, the call is answered by lifting off the handset, or at the COMSET HANDSFREE by pressing the "Spkr" key. At all other (allowed) stations, by lifting-off and pressing the key number of the associated flashing LED. Once the call is answered, the LED remains steady on until some further operation is carried out.

☑ 206/408 ☑ 8 2 4

Incoming external calls, if directed to a two-wire station as the "Designated Answer Point", will be audibly signalled at that point and visually at all keystations. Lifting the handset at the ringing telephone is all that is required to answer the call.

1.9.5.7 **Bypassing (of external calls)**

The system provides a facility whereby it is possible to make an external call (if an exchange line is available) even though an incoming call is being rung at that station.



206/408 **824**

Activation of the temporary bypass is by selecting a free exchange line with the handset on-hook. Note that line selection can also be done by pressing "0" thus getting the first available line.

The effect of the bypass is dependent on the pre-programmed call forwarding option allocated to the ringing line.

With option 00: no forwarding: the call is sent to a status defined as "ring at non-existing subscriber". During this time the call is still available to be picked up by any authorized station. If the call is still ringing when station (A) returns to the available state (handset on-hook) the call will be automatically re-allocated to him.

Other options: The call will be sent to the alternate answer point, and follow the normal call forwarding operation.

Note that the station initiating the bypassing receives a ringing signal (and fast flashing yellow LED) since the "Line Booking" procedure has been initiated.

1.9.5.8 Call Pick-Up

206/408 **8 2 4**

If the LED of a particular station is fast flashing (in the DSS field of any other COMSET HANDSFREE) call pick-up is possible. Any COMSET HANDSFREE user can answer that call by simply picking up his own handset and pressing the key (button) of the "flashing" extension.

Further call procedures are then carried on as normal.

The call pick-up facility can be activated while the required station is busy with another -call.

1.9.5.9 **Outgoing Traffic**

206/408 8 2 4

Exchange line selection for an external call is carried out by lifting the handset and by pressing either the line key number, or by pressing 'O', in which case the next free line will be allocated.

206/408 0 824

An outgoing external connection may be established with the handset on-hook (handsfree dialling) or handset off-hook (normal mode).

HANDSFREE MODE:

An exchange line is selected and the number dialled via the keypad, the last number redial key, or the abbreviated number procedure.

The call can progress in either the HF mode or by lifting the handset for a private mode. The loudspeaker can be switched on and off any number of times during the call. The Spkr-LED indicates the HF mode by flashing slowly.

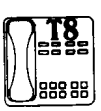
NORMAL MODE:

Exchange line selection can be made by pressing the required line key in the 'DSS' field (i.e. specific selection), or by pressing '0' in the dialling field (i.e. first available line).

The setup can be disconnected by the 'Rel' key while in HF mode or by replacing the handset during normal mode.

206/408 8 2 4

An outgoing external connection may be established with the handset on-hook (on-hook dialling) or handset off-hook (normal mode).



ON-HOOK MODE:

An exchange line is selected and the number dialled via the keypad, the last number redial key, or the abbreviated number procedure.

The call can progress only by lifting the handset. The loudspeaker cannot be switched on during the call.

NORMAL MODE:

Exchange line selection can be made by pressing the required line key in the 'DSS field (i.e. specific selection), or by pressing '0' in the dialling field (i.e. first available line).

The setup can be disconnected by the 'Rel' key or by replacing the handset during normal mode.

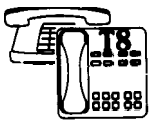
206/408 8 2 4

Exchange line selection for an external call is carried out by lifting the handset and by dialling the appropriate line number or by dialling digit '0', in which case the next free line will be allocated.

Note that because a specific interval needs to be timed-out, there will be a period of some seconds after dialling is completed before further functions can be invoked. This time is programmed in the Customer Data, and transmitted to the 2-wire station as the 'dial-end' tone.

1.9.5.10 **External Call Waiting**

External "call waiting" is audibly recognized by the alerting tone with the periodicity of normal external ring, and visually indicated by the flashing or flickering of the LED of that line.



206/408 8 2 4

To answer call waiting, press the S key.
Refer to Table 1.2 (below) to determine the result of this procedure.

206/408

To answer the call waiting, press the key of the line associated with the flickering LED.
Refer to Table 1.2 (below) to determine the result of this procedure.

8 2 4

To answer the call waiting, press the key of the line associated with the flickering LED or press the S key.
Refer to Table 1.2 (below) to determine the result of this procedure.

206/408 8 2 4

To answer the call waiting, replace the handset to the on-hook condition and wait for the ring signal.

Table 1.2 Answering the Call Waiting

Present State	Call Waiting from	After Answer Procedure
Internal Call	Internal	Conference (3-way internal)
	External	Internal party disconnected External party connected
External Call	Internal	External call put on exclusive hold Internal party connected
	External	First external call put on exclusive hold Second external party connected

1.9.5.11 **Enquiry and Call Transfer**

206/408 8 2 4

Enquiry is initiated at (A) by pressing the 'I' key followed by the required station's number (B). At both these stations, the line LED of the external line flashes slowly.

Call transfer can now take place in the following manner:

(1) Called party (B), hangs up: external call automatically reconnected to the original party (A)

(2) Calling party (A), hangs up: external call is automatically transferred and connected to the called party (B)

(3) Either party presses key '0': automatic connection to the external call, other party receives busy tone

(4) Either party presses key related to that line: as per (3)

(5) Calling party (A), selects another exchange line WITHOUT HANGING UP. External call is automatically transferred to the called party (B).

206/408

Enquiry is initiated by pressing the required station's number DSS key. As in the case of internal calls, the called station appears as a flashing signal on all other COMSET's within the system. The line LED of the now held call appears as a flickering signal at the calling station. At the called station, the line LED of the external line flashes slowly.

Further transfer procedures take place as described above, or additionally by (A) party pressing the 'Rel' key.

8 2 4

If the required station is programmed to appear as a DSS position, then enquiry is initiated by pressing that key. Alternatively, enquiry may be initiated in the same way as for the standard key station.

206/408 8 2 4

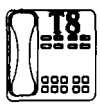
To conduct an enquiry call, the two-wire station must dial '9' followed by the wanted station number. The call may be transferred by waiting for the wanted party to respond, then replacing the handset.

If during the enquiry call, the two-wire party wishes to return to the connection with the external party, then the two-wire party must dial '0'.

1.9.5.12 Transfer Before Answering

Transfer Before Answering procedure is permitted by this system. If the call is not taken before the end of a pre-programmed transfer time, then it is returned to the originator as a recall. At this time the line LED changes from a slow flashing sequence to a fast flashing sequence, and is indicated to all available 4-wire stations within the system.

The line is disconnected automatically if it has not been answered after the second programmed time has elapsed.



☑ 206/408 ☑ **8 2 4**

After dialling 'I' and the required station number, the handset is returned to on-hook condition. The call is now automatically transferred to the required station, and signalled by the recall ring signal. At the transferring station the line LED is flashing slowly (and remains in this condition until the call is answered), while at the dialled station the line LED flashes fast. To all other stations, the line LED remains steady on.

The "sending" station may retrieve the call at any time while the line LED is flashing (indicating a non-completed transfer).

☑ 206/408

The procedure is activated by pressing the required stations DSS key and releasing the line (handset on-hook, 'Rel' key etc.)

☑ **824**

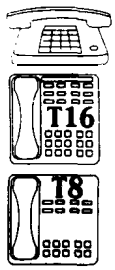
If the required station has been programmed to appear as a DSS location, then the procedure is activated by pressing the particular DSS key. Otherwise, dial "I" and the required station number.

☑ 206/408 ☑ **8 2 4**

To transfer, the two-wire station must dial '9' followed by the wanted station number and put the handset on-hook.

If the wanted party fails to respond, then after a programmed time, the two-wire station is recalled.

1.9.5.13 **Exclusive Hold**



206/408 8 2 4

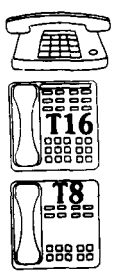
Pressing the 'I-I' key during an external connection will put that line in a "holding" condition. The line LED indicates this condition by changing from a steady on state to a slow-flashing state. At all other stations the line LED remains steady on. Retrieval of the call is by pressing the key number associated with the line, or digit '0'.

206/408 8 2 4

If a moment of privacy is required, the two-wire station may dial '9' thus placing the external line on hold. Return to the external party is achieved by the subsequent dialling of digit '0'.

1.9.5.14 **Common Hold**

An answered external call may be made available for take-over by an undetermined station via the "Common Hold" procedure. Should the held call not be answered within a programmed time, then it is returned to the initiator, where it is signalled as a recall, with "recall" ringing sequence and fast flashing LED. If it cannot be answered immediately, a check is made every 5 seconds (up to the pre-programmed interval) for answer possibility. At the end of this time the call is disconnected. A "Common Hold" call is taken over by selecting the line on which the call is held.



206/408 8 2 4

Pressing the 'H' key then replacing the handset, puts the call to this mode. The line LED indicates this status at all stations by a slow flashing signal.

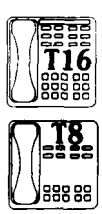
206/408

From a two-wire station, an external line may be brought into a state of "Common Hold" by dialling '9' then '8' and then replacing the handset. This is actually a call to the paging circuit (or quasicall when paging is not provided). Return to the external party at the two-wire station from this state would not normally be required, but can be achieved by the subsequent dialling of the specific (known) line number.

824

Common Hold is achieved by dialling "9","8","5", then placing the handset on-hook.

1.9.5.15 **Unit Line Dialling (COMSET only)**



206/408 8 2 4

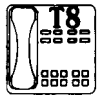
The COMSET position can be so programmed as to have a "unit line". Thus allowing immediate dialling out from the system without the selection of an exchange line.

1.9.5.16 Last Number Redial/Saved Number Redial

Note that "Saved Number Redial" is available only on the COMSET type stations.

206/408 8 2 4

The Standard Station contains a buffer that retains the number last dialled on an exchange line. To redial a number, firstly an exchange line needs to be selected and then the 'O●' (redial) key pressed.



206/408 8 2 4

The stored number is dialled automatically by line seizure followed by operation of the 'REDIAL' key. The system provides one of two redial features:

- Automatic Storage (last number redial)
- Saved Number Redial

A) **Automatic Storage:**
The digits are stored automatically and the old contents of the last number redial memory are overwritten when a new number is dialled.

B) **Saved Number Redial:**
Operation of the 'S' key and 'REDIAL' key before replacing the handset, stores the number dialled into the redial memory. By operating the line-key and 'REDIAL' key, the stored number will be dialled. Should the number be required to be "saved" again, the procedure must be repeated. Note that "last number" redial does not function while a number exists in the "saved number" store.

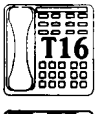
1.9.5.17 Alternating

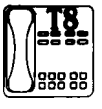
Alternating involves the alternating connection to two or more exchange lines. Once an established call is put in the hold condition, the station is free to select another exchange line and make another exchange call. Newly arriving external calls can also be included in the alternating procedure.

Disconnection of an external line occurs by hanging up while connected to that line. The remaining external party is then automatically connected to the station when the handset is picked up.

206/408 8 2 4

To alternate between the two (or more) external calls, press the 'H' key and select the line that needs to be serviced.





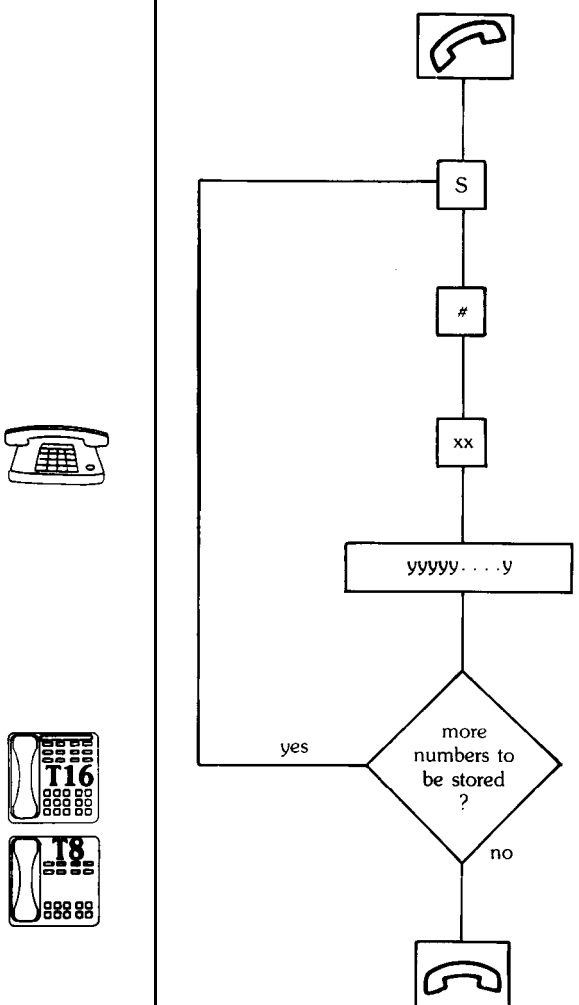
206/408 8 2 4

To alternate simply press the line key of the line that needs to be serviced. The current exchange line is placed on hold, and selected line switched through to the station.

1.9.5.18 **Abbreviated Dialling – Storing of Station Numbers**

206/408 8 2 4

Each station can store up to ten 20 digit numbers for private use. "Station" abbreviated numbers are programmed from the relevant station as follows:



handset off-hook

press the "S" key

press the "#" key

dial the two digit code (00. . 09) at which the number is to be stored

dial the full number

handset back to on-hook

The number is stored only when the handset is replaced or the 'S' key pressed to indicate the further numbers are to be stored.

Note: (1) that the abbreviated dialled number is selected from the information stored in the main memory of the system. As such the "last number redial" procedure is inactive and does not retain the number dialled via this procedure.

(2) individual station abbreviated numbers are not displayed by the system display. It is up to the user to confirm that his entry is correct.

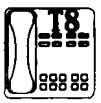
(3) the individual station numbers are exclusive to that station and cannot be accessed by other stations.

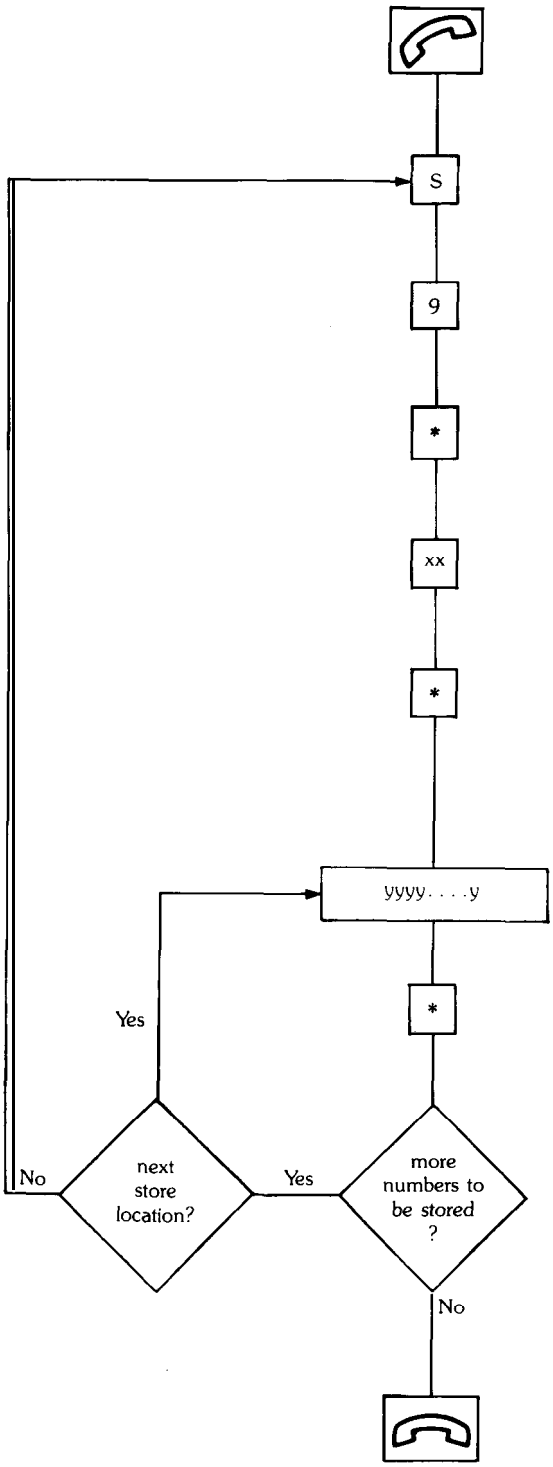
(4) individual station abbreviated numbers may be cleared by pressing: S # xx # S

1.9.5.19 **Abbreviated Dialling – Storing of System Numbers**

206/408 8 2 4

The "System" group of numbers comprises of fifty 20 digit numbers available to all users of the system with access to an exchange line. These numbers can be programmed from the socket on the main equipment or the station numbered 11. Programming is carried out in the following manner:





handset off -hook

press the "S" key

dial digit "9"

press the "*" key

dial the two digit code (10. , , .59) at which the number is to be stored

press the "*" key

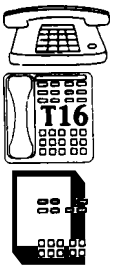
dial the full number

press the "*" key

handset back to on-hook

Note: Individual "System" Abbreviated numbers may be cleared by pressing S 9 * xx * # *

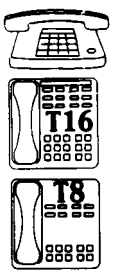
..9.5.20 **Abbreviated Dialling Usage**



206/408 **8 2 4**

To use an "abbreviated number": select an exchange line then press the 'S' key followed by the two digit address of the required number. Chaining of abbreviated dialling is possible, and is accomplished by once again pressing the 'S' key and the two digit address.

1.9.5.21 Line Booking



206/408 **824**

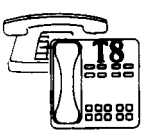
If all exchange lines are busy, the "first available" exchange line can be selected by pressing digit '0'. Alternatively a specific line may be booked by pressing that specific key. Line booking is carried out with handset on hook.

As soon as the exchange line becomes available, the station is signalled by the recall ring sequence and visually by a slow flashing sequence of the related line LED. If it is not taken within a preprogrammed time (recall time), it becomes generally available.

During the time that "booking" is active, the station is available for incoming calls. Booking can be cancelled by lifting then replacing the handset.

1.9.5.22 **Conference: Internal/External/Internal**

During an external connection it is possible to include another internal party into the connection to create this form of conference. The procedure is similar to that for a refer back call.



206/408 **8 2 4**

The 'I' key is pressed and the required station number dialled. Once the internal link is established, the 'S' key and digit '7' are pressed. The external connection is re-established, and now includes the second internal station.

206/408

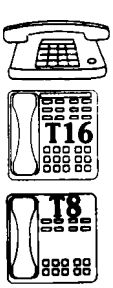
The required station is selected via the relevant DSS key and the conference then established by pressing key S and 7.

824

If the required station has been programmed a DSS appearance, then press the relevant DSS key. Alternatively, any station can be invited into the conference by pressing the "I" key followed by the two digit station number.

The conference may continue, or either party may take over the call by pressing the line key or digit '0'. The alternate station is then disconnected and receives busy tone.

1.9.5.23 **Conference: Internal/External/External**



206/408 **824**

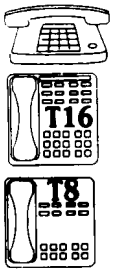
Due to the arrangement of the crosspoint matrix, it is possible to arrange a conference between two external parties and one internal party. After the first external call is established and put on hold, the second external call can be established. Conference mode can be entered at this stage by the procedure of pressing the 'S' key followed by digit '7'. All three parties are now connected.

If further communication needs to be carried out with only one of the external parties, then the line key related to this line needs to be pressed. The other external party is disconnected.

1.9.5.24 **Call Diversion**

Every station can activate a call diversion process whereby all incoming calls are answered at another allocatable station. Normal outgoing communication can be carried by station (A). However, all incoming calls (internal and external) are rung at station (B). Note that station (B) can ring station (A) during this procedure.

Note that if station (B) has originally a COS (0) it is now upgraded to be able to answer external calls.



☑ 206/408 ☑ 8 2 4

To activate call forwarding at station (A), press the 'S' key, digit '1' then followed by the two digit number of the destination station (B). Station (A) displays a slow flashing facilities LED to indicate this condition and is now provided with a special dial tone as a reminder. Station (B) displays a slow flashing facilities LED to also indicate this condition. To cancel this function, station (A) has to press the 'S' key and digit '1'.

Facility Code:

☑ 206/408 = 71

☑ 824 = 971

To activate the facility from station (A), dial the "facility code" followed by the two digit destination station (B). As acknowledgement that this function is active, the station (A) hears the special dial tone on handset lift-off.

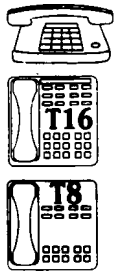
Cancellation of the facility is from the initiating station (A), by once again dialling the "facility code".

1.9.5.25 **Call Follow Me**

"Follow Me" is an extension to the "Call Diversion" procedure: however with this procedure it is possible to not only redirect calls to a particular station, but to also then further redirect the calls to another station without returning to the original station.

The procedure is activated from station (A) by initiating the normal "call-diversion" procedure.

Normal outgoing communication can be carried out by station (A). However, all incoming calls (internal and external) are rung at station (B). Note that station (B) can ring station (A) during this procedure.



☑ 206/408 ☑ 8 2 4

Subsequent re-routing of the call can be done from any station. The procedure is: press the 'S' key, digit '2' and station (A)'s number.

Deactivation can only take effect at station (A) (the originator) by again pressing 'S' and '2' (a toggling function).

Facility code:

☑ 206/408 = 72

☑ 824 = 972

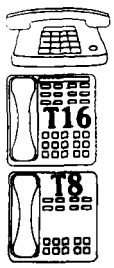
The procedure is the same as for "Call Diversion".

Cancellation (deactivation) can only take effect at station (A) by off-hook and dialling the facility code.

1.9.5.26 Do-Not-Disturb

By entering this procedure, a station is effectively cut-off from all incoming (internal and external) communication. Outgoing calls may still be made from this station.

Note: If a station of a "hot-line" pair activates D-N-D, then all incoming calls are automatically re-routed to the other member of the pair.



☑ 206/408 ☑ **8 2 4**

Activation and deactivation of this function is by pressing the 'S' key followed by digit '3'.

As an indication that the D-N-D is in operation, the facilities LED is in a slow flash cycle and the special dial tone is heard in the off-hook state.

Note: At all Comset stations the initiator of D-N-D is indicated as a busy station, i.e. DSS position LED on).

Facility code:

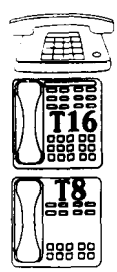
☑ 206/408 = 973 NA (not available) before issue 'D' software : otherwise = 73

☑ **824**

Activation/deactivation of Do-not-disturb is in the off -hook state by dialling the facility code (and then replacing the handset to on-hook).

1.9.5.27 **"Isolation" Procedures and Cancelling**

The three procedures Call Diversion, Call Follow Me and Do Not Disturb all in effect "Isolate" the activating station. To simplify any confusion that might result in not knowing which procedure to cancel, a general "cancelling" is available.



☑ 206/408 ☑ **8 2 4**

The indication that any of these facilities is active is the slow flashing of the facilities LED and the special dial tone.

By pressing 'S' followed by digit '0', all of the activated isolation procedures are cancelled.

Facility code:

☑ 206/408 = **70**

☑ **824 = 970**

The indication that any of these facilities is active, is the special dial tone heard on handset lift-off.

To activate the general cancelling procedure, lift off the handset and dial the facility code.

1.9.5.28 **Message Waiting**

A "message waiting" signal can be sent only to COMSET station that cannot be reached under normal conditions (busy, does not answer, etc.). The dialled station indicates that state by the slow flashing of the "message waiting" LED.

If the dialled station has call diversion active then message waiting cannot be sent.

A station can only send or receive ONE message wait signal.

Message waiting is answered (at a COMSET station) by pressing the "MESSAGE WAIT" key.

☑ 206/408 ☑ **8 2 4**

Before placing the handset back on-hook (after an unsuccessful contact attempt), press 'S' key and digit '6', or the "MESSAGE WAIT" (MW) key on the COMSET.

If the procedure was successful, then the "link-made" tone will be heard and the station returns to the off hook state, otherwise the busy tone continues.

The "message wait" remains until either the (B) party makes the connection or is cancelled by (A) party (by pressing 'S' key and digit '6' either off/on hook).

'Facility code:

☑ 206/408 = NA (not available)

☑ **824 = 976**

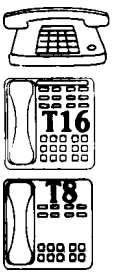
Before replacing the handset (after an unsuccessful internal call) dial the facility code.

To cancel Message Waiting, lift off handset and again dial the facility code.

1.9.5.29 **Night Switching**

The night state can only be switched at the "authorized" stations. The station that activated the procedure receives a special dial tone in off-hook state. All key stations indicate night state with the "facilities" LED on steady condition.

Refer to section 1.7.8 for definition of "modes".



206/408 8 2 4

The system can be switched into either one of the night modes by the following procedure:

for night mode A: press 'S' key then digits '4, 0, 0'.

for night mode B: press 'S' key then digit '4', then the two digit number of the required station.

The system can be returned to "daytime" state by pressing the 'S' key then digit '4'.

Facility code:

206/408 = 74

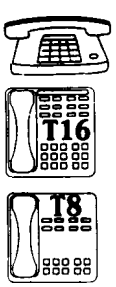
824 = 974

To activate this procedure from a two-wire station, dial the facility code.

- followed by '0' and '0' to invoke night mode A or
- followed by the two digit number of the target station to invoke night mode B.

To cancel "night switching", the authorized station again dials the facility code.

1.9.5.30 **Hot-Line**



206/408 8 2 4

Dialling between the pairs of a hot-line is carried out by pressing the '*' key from either station. The partner is advised of a hot-line call by a differing ring cadence to other internal (or external) calls.

If Do-Not-Disturb is activated (by either one of the hot-line pairs) then calls coming into that station are re-routed to the partner station.

1.9.5.31 **External Data Transfer**

To facilitate non-interruptible and non-corruptible data transfers (e.g. PC to PC) the handset can be returned to the on-hook condition after the procedure is activated.

The exchange line is controlled by the system and therefore must be released (by the system) at the end of the transfer.

206/408 824

(1) Select the line to be used for the transfer.

(2) If the parallel connected data device has its own dialling circuitry then go directly to (4).

(3) If the data device is a "dumb" terminal then establish the link by dialling the required number. When link is established (generally recognized by a continuous tone sent from the receiving end) then,

(4) Press keys S and 9, and replace handset to on-hook state. Activation of this procedure is indicated by a slow flashing sequence of all LED's

At the end of the transfer the exchange line can be returned to normal status by going off-hook and pressing the S and 9 keys to continue voice communication. OR — the line can be released by pressing the S and 9 keys while the handset is on-hook.

1.9.5.32 Direct Call to a Comset Station

206/408 824

If the dialled station of an internal call is a Comset, then it is possible to engage the "direct call" procedure (i.e., activation of "handsfree answer back" facility of the Comset). The procedure is as follows:

Dial 'I' followed by the two digit number of the station (e.g. XX)

then 'S' and '8'

i.e. I XX S 8.

If the dialled station was not a Comset, or the dialled station is not reachable then the calling party receives a busy tone.

Note: If the called station was a COMSET ON-HOOK DIAL station, the called party must lift the handset to answer back.

1.9.5.33 Security (Microphone Mute)

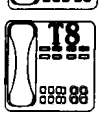
206/408 8 2 4

To prevent access by the Handsfree Answer Back procedure, each COMSET station can switch off its microphone. After pressing the 'Mic' key the Spkr-LED glows continuously to indicate that the microphone is off. Note that the activation must be carried out before an incoming call.

The operation of this facility does not impair the initiation of other functions.

The security protection can be cancelled by once again pressing the 'Mic' key.

1.9.5.34 PABX Recall



206/408 8 2 4

If the Commander S system is fitted as a satellite to a PABX, then recall to the PABX is effected by operating the "Recall button" on the telephone instruments.

Note that on the COMSET, the recall button is marked "RCL".

Note also that the system must be programmed to acknowledge that it is fitted behind a PABX.

1.9.5.35 Hands Free Answer Back

206/408 8 2 4

Each COMSET HANDSFREE station can contact any other COMSET HANDSFREE extension directly and announces such a request by means of the alerting tone.

There are two ways of utilizing the Hands Free Answer Back facility, the difference being only in the sequence of keys to be pressed.

First possibility:

The 'DSS' key of the wanted station is pressed after the handset had been lifted. Should the called extension not answer immediately, just press the keys 'S' and '8'.

Second possibility:

Operate the keys 'S' and '8' first and then the station 'DSS' key to put the called station into Hands Free Answer Back status before the call is put through.

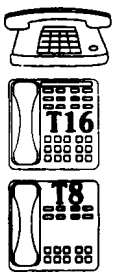
The called station is now signalled the alerting tone and the LED of the calling station flickers on the called station during the call and the announcement.

The calling station receives the ring tone through the receiver and the LED of the called station is flashing fast. On all other COMSET stations the LED is ON continuously during the call and the announcement.

At the conclusion of the alerting tone, the called station can be contacted directly via loudspeaker. The microphone of the called station is switched on and the called station can answer directly in handsfree mode. For security reasons the two stations receive the altering tone every 20 seconds. The alerting tone is sounded again to the called station after the setup has been disconnected.

A normal internal call is initiated should, however the called station answer by lifting the handset. The LED of the called station on the calling station is now on continuously.

1.9.5.36 **Customer Account Code**



824

(A) For an outgoing call:
During the call, BUT AFTER THE ELAPSE OF THE INTERDIGIT INTERVAL, press the * key, followed by the required account number (up to 8 digits) and terminated by the * key.

(B) For an incoming call:
Press the * key, followed by the required account code (up to 8 digits) and terminated by the * key.

1.10 S206/408 SYSTEM TECHNICAL DESCRIPTION

The following section will briefly describe the various discrete functions that are performed by the system circuit "modules". There are no individual modules as such, but due to their operation they can be considered as independent units.

1.10.1 Main Equipment Hardware Subdivisions

Figure 1.3 indicates the main functional subdivisions and their hardware positions on the motherboard. Each of the functional blocks are further described under individual references.

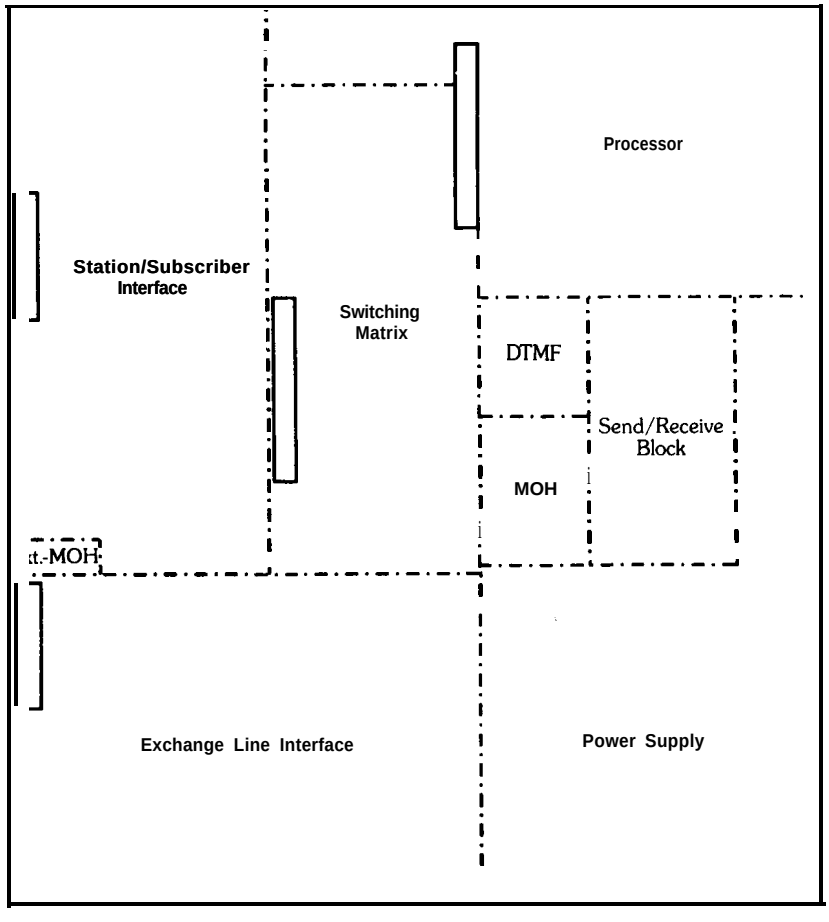


Figure 1.3 Hardware subdivisions

1.10.2 **Switching Network**

The matrix is built up from integrated circuits (type 22100) which each provide a 4 x 4 arrangement. The subscribers are organised as "rows" in the matrix, while the exchange lines are organised as "columns" (see Figure 1.4).

Additionally provided as "'columns" are

- the internal links
- internal tone 1 and 2
- paging link
- confidence tone feedback link (for DTMF dialling)

The cross-point switch can selectively apply DTMF output Signals, external knocking tone or music-on-hold on each of the exchange lines as required. Note also that the MOH signal can be (manually) selected as being derived from the internal provided "music" chip, or externally input from any type of sound source (radio, land-line, tape, etc.).

Block diagram (Figure 1.4) shows the configuration of the actual circuit.

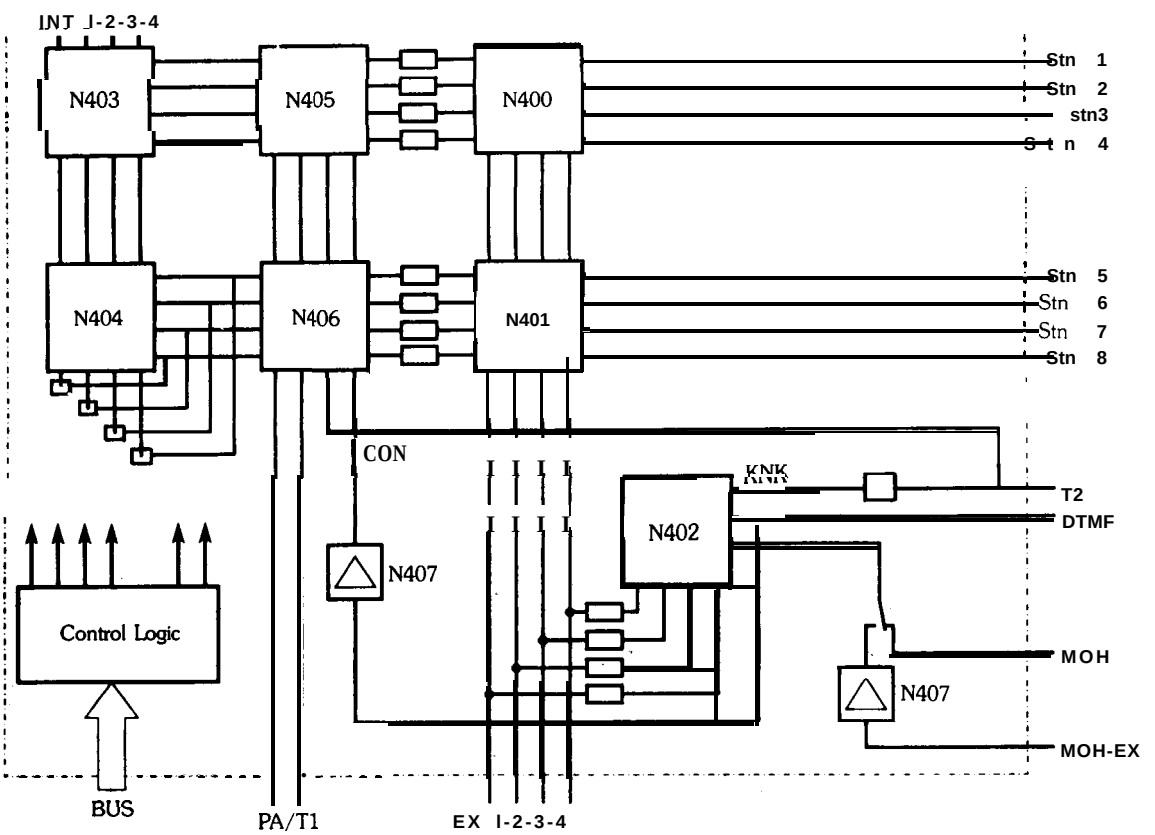


Figure 1.4 Cross Point Matrix Arrangement

Every individual cross-point can be selected or de-selected at any time, independent of each other.

Switching Matrix Control

Micro-circuits make up the inter-facing and control logic to the cross-point switching matrix. The BUS signals are decoded at normal TTL level. The cross-points are CMOS devices, and require to be driven at higher voltage levels. This level translation is performed within the matrix control circuitry.

Connection to Exchange Lines

Exchange connections are provided again by the setting of specific cross-points. Only one cross-point is required to be set for this connection, thereby ensuring minimum level drop through the system.

DTMF Connection

The DTMF code sender is switched to the required exchange line by the cross-point switch. During sending of DTMF tones the subscriber is connected to the CON-line, which provides the feedback path to the subscriber as a "confidence" tone. The diagram (Figure 1.5) shows, in simplified form, the processes during connection:

1. A cross-point connects the subscriber to the exchange line.
2. During DTMF sending CP N402 is active, N405-N406 is active and N400-N401 is deactivated. Tone feedback occurs.
3. After sending, CP N402, N405-N406 are deactivated and N400-N401 activated. Subscriber is again connected to the exchange line.

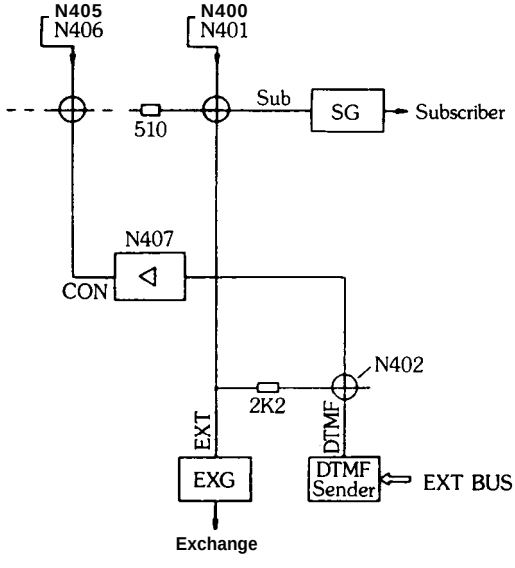


Figure 1.5 DTMF Connection

Tone Switching

For acoustic signals, two tone sources are available. T1 provides 418 Hz while T2 provides 836 Hz. The sinusoidal tone signals are switched as required to the subscriber through cross point switches.

Paging Switching

Connection to the Paging Pre-Amplifier is provided by the link PA. Note that the pre-amplifier is an option module, and is also part of the 2-wire option module.

Music-On-Hold Switching

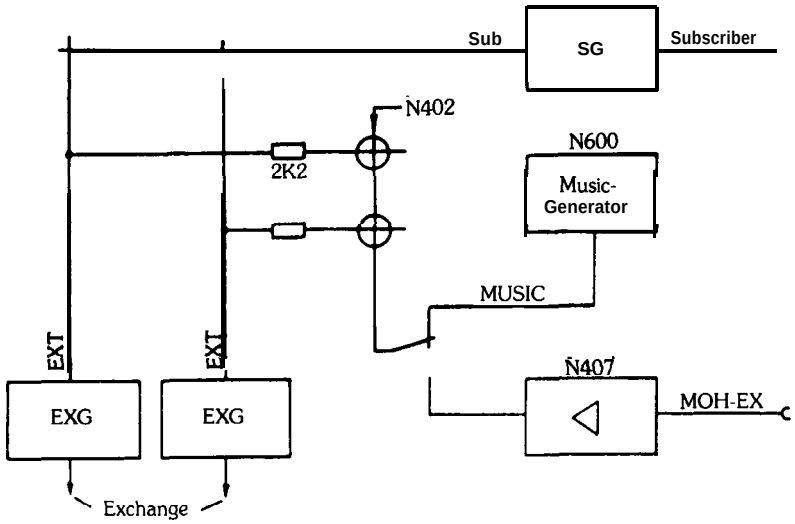


Figure 1.6 MOH Connection

The source of music can be manually selected as either internal or external. Internal music is generated by an integrated circuit. External music (from any source) is inputted via either the connection through the distribution connector. Level adjustment of the external source is through an operational amplifier network.

External Knocking

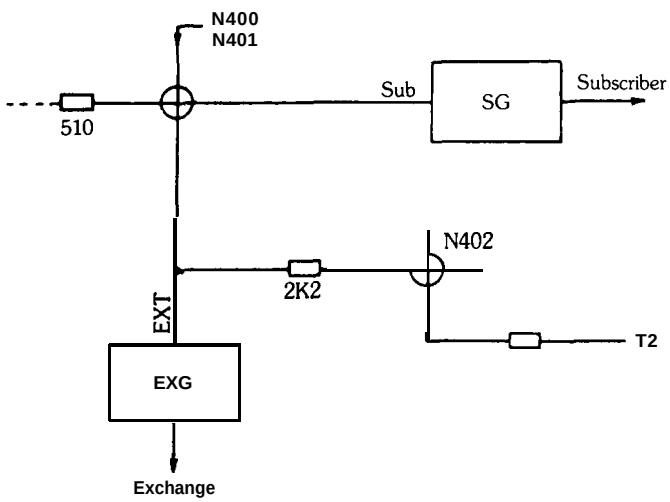


Figure 1.7 Tone Connection

Tone source T2 is switched on to particular lines to provide the knocking signal. A resistor sets the level of knocking.

Internal Link Switching

The System 408 has 4 internal links, switched by cross-point switches. This means that the system can in fact provide 100% availability to all subscribers.

The resistors (2 x 510 ohms and 1 x 4K3 ohm) set up a symmetrical “T” attenuation bridge, of 5dB.

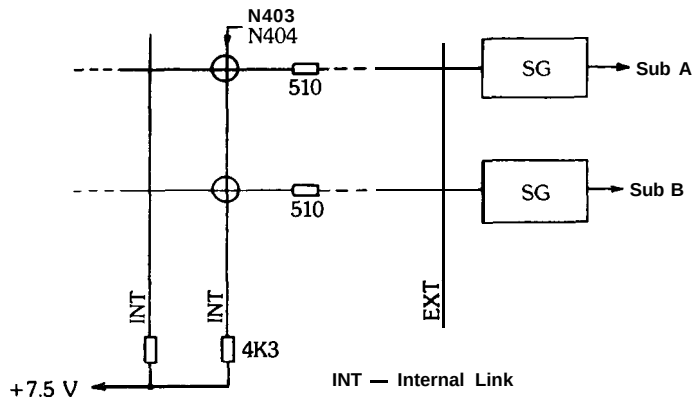


Figure 1.8 Internal Link Switching

1.10.3 **The Processor**

The "processing" block contains the following main elements and their associated components:

- control microprocessor 8085
- data microprocessor 8049
- timing logic
- reset logic and control
- system memory (ROM and RAM)
- "customer specific" memory (EEPROM)
- device select decoding

The central microprocessor supervises all operations within the system.

The block diagram (Figure 1.9) indicates the configuration of the processor sub-module.

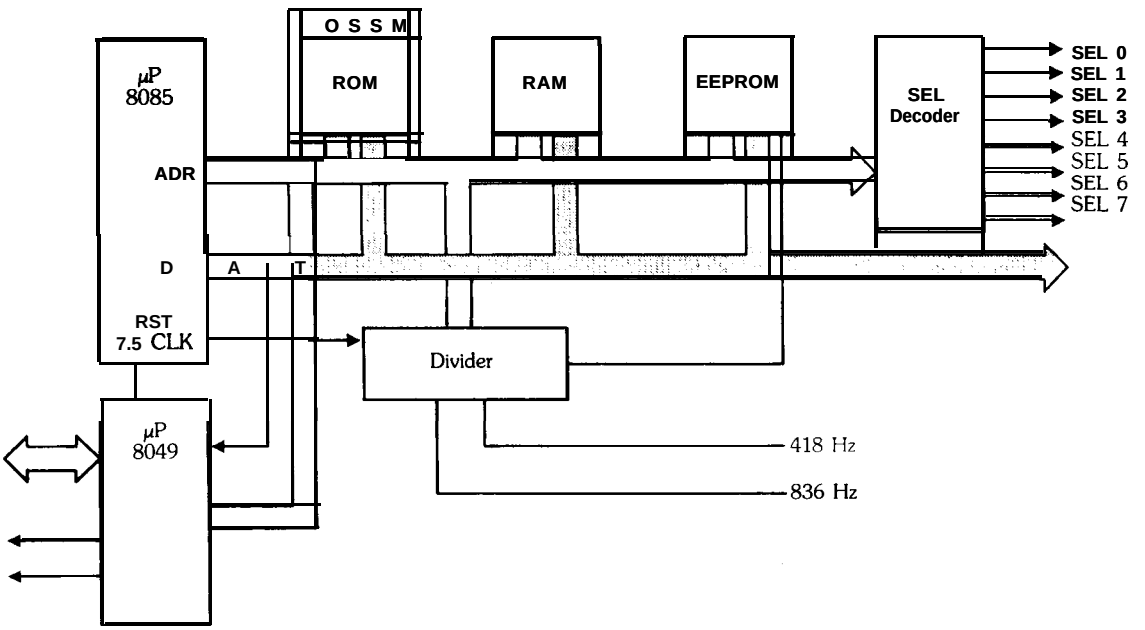


Figure 1.9 Processor Module

ROM

The capacity of the ROM (Read Only Memory) is 56 K. All system operation procedures are stored on ROM, and the ROM itself is sited on a removable sub module. Thus future operating system changes are easily accomplished.

RAM

The 4 K of RAM (Random Access Memory) contains transient dynamic data on the immediate state of the system. This data is lost under the condition of "no-power".

EEPROM

Each system installed at a customer site will require to be differently programmed to provide for the needs of that specific customer. This programmed data is held by the 2kbyte capacity EEPROM (electrically) erasable programmable ROM. This device, even though in effect it is a KAM, does not lose its data at "no power".

DEVICE SELECT DECODER

The decoder selects the latch circuitry to be enabled for a particular process. Data then follows to operate specific cross points and gates to define the specific operation.

CENTRAL CONTROL

The central control block is actually a 2-processor system. One processor (the 8049) is totally involved with data communication from- and to-the stations through the individual "modem" interface. The second processor (the 8085) takes charge of ALL switching control instructions, the dual 7-segment display and operating procedures.

A part of the RAM area is accessible to both processors (though not at the same time!) and is used as a data transfer buffer.

The EEPROM is protected against false data writing procedures during a power-down state by a "write-protect" arrangement.

Resetting of the system can occur either manually or by the "watchdog" circuitry. During normal system operation, the central processor provides a reset signal to the watchdog circuit. If this reset does not occur within the allotted time, the watchdog will reset the total system. Reset also occurs on power-up of the system.

PROCESSOR ARBITRATION

When the data processor (the 8049) requires access to the bus, it sends a "hold" request to the 8085. The 8085 completes the command that it is working with, relinquishes the bus control, and advises this action to the 8049 by an output on the HLDA line.

VOLTAGE SUPERVISION

In the normal power condition, the voltage comparator has 2.63 volts as the input to its sense gate. Should the 5 volt supply drop to less than 4.75 volt (corresponding to 2.5 volt at the sense) then the comparator initiates a reset action.

1.10.4 **Exchange Line Interface**

The exchange line interface performs the following functions:

- d.c. isolation between the exchange line and the switching matrix;
- overvoltage protection;
- d.c. loop and electronic "hold";
- recognition of incoming ring signal;
- decadic out-pulsing;
- "earth" or "flash" for PABX recall.

The following description will use the module for exchange line 1. The remaining exchange line modules function in exactly the same manner.

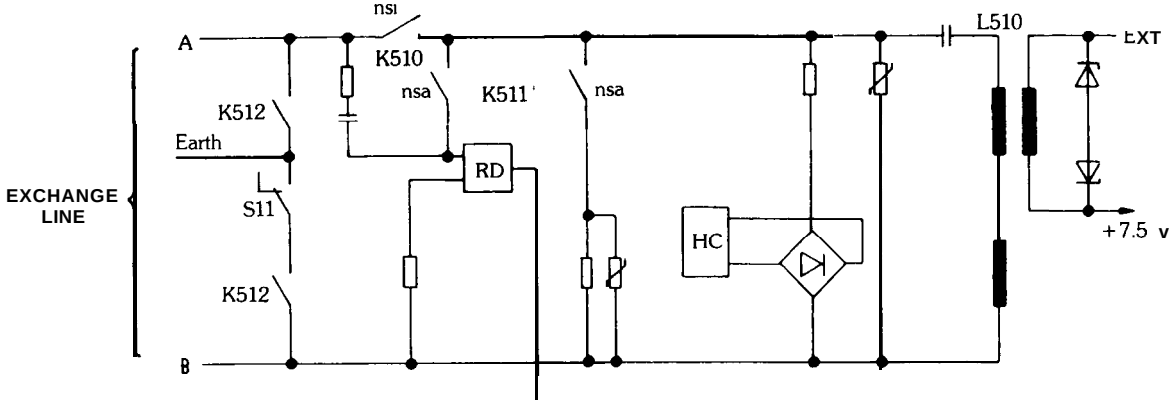


Figure 1.10 Exchange Line Module

Isolation

The transformer "L510" effectively isolates the exchange line from the cross-point matrix.

Overvoltage Protection

Overvoltage that arrives from the exchange line is limited by the protection network included on the KCM. The arrangement provides both transverse and longitudinal protection at approximately 160 volt.

D.C. Loop and 'Hold"

The d.c. loop is realized by an electronic choke. To be effective this electronic choke must have a high A.C. resistance and a defined d.c. resistance. A high A.C. resistance ensures that the attenuation of the voice signal through the choke is minimal.

Recognition of Incoming Ring

Incoming ring is detected by a microcircuit. Once the chip has recognized the ring, it triggers the optocoupler and feeds a signal to the main processor.

This signal will follow the periodicity of the incoming ring.

Decadic Out-Pulsing

The d.c. loop is provided by the "electronic choke".

For dialling, the nsa relay is activated, and the nsi relay "makes" and "breaks" on the exchange line. The loop resistance with both nsi and nsa relay contacts closed is 10 ohm.

The voltage drop across this resistor is coupled to the cross-point connected to the subscriber. This provides the feedback for "'confidence" during decadic out-pulsing.

During dialling an "RC" network provide a secondary function across the nsi contact as "spark quenching".

At the end of the pulse train, the nsa relay returns to its idle state. To release the exchange line, the following sequence of events occurs:

1) nsa activated
2) nsi de-activated
3) nsa de-activated.

The purpose of this sequence is to prevent the generation of a voltage spike which could otherwise be induced into nearby PC tracks and cause problems.

PABX Recall

Two modes of PABX recall are provided:

1) "Earth unbalance" — on "a" side of the exchange line.

2) Flash — programmable "open circuit" time.

The mode is selected by programming into the Customer Data Specific Code area. "Earth' recall is performed by a relay, which connects earth to the "a" side of the exchange line. The "b" side is connected by setting the switches on the main pcb.

"Flash" is performed by first activating the nsa relay and then de-activating the nsi relay (K510) for the preprogrammed time. At the end of this time, nsi is re-activated and after a further 20 mSec (approximately) the nsa relay is de-activated.

1.10.5 **Subscriber/Station Interface**

The station interface performs the following functions:

- d.c. feed
- d.c. isolation between the station and connection matrix
- ring cadence control
- overvoltage protection for the station and the switching matrix.

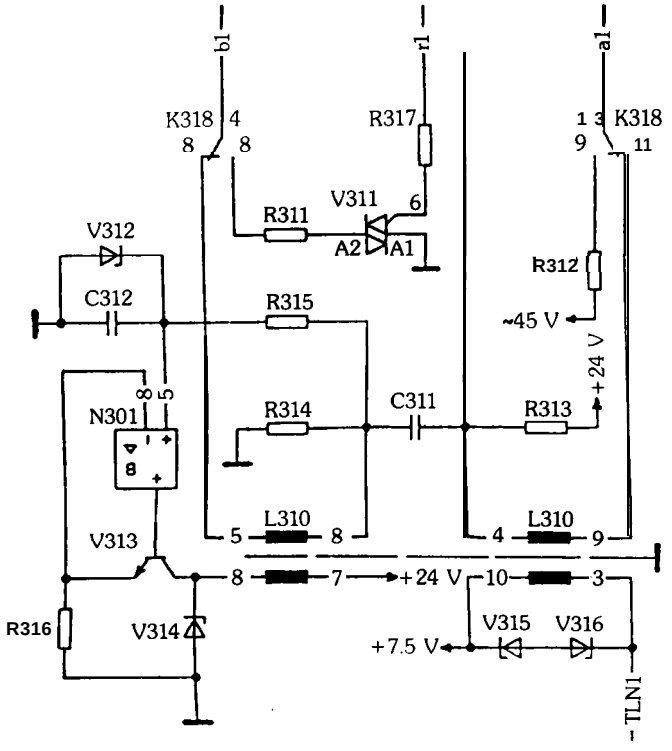


Figure 1.11 Subscriber Interface Module

DC. Reding

24 Volt d.c. feed is provided by connection through a choke/transformer. A capacitor provides the balancing for a.c. between the two side of the transformer.

Due to the need of maintaining low transmission losses, the number of turns on the coils is necessarily high. This has the unfortunate effect that even a small d.c. current can drive the core material into saturation. To compensate for this effect, a “compensation winding” of is built up on the same core. The amount of compensation current is determined by the voltage drop tapped from the resistor and is provided to the non-inverting input of the operation amplifier by a low pass filter.

Isolation

The “voice” signal from the subscriber is isolated by the choke. A winding of the choke carries the signal, while the other side of the choke is connected to +7.5 volt.

The voltage is the “virtual ground” for the voice signal, and is actually at the mid point of the voltage of cross-point switches.

Theoretically this means that the voice signal can swing undistorted to the full voltage range.

Switching/Timing of Ring Signals

Ring signal to the station begins with a data word on the system BUS.

Ringing voltage is switched by a Triac, and ring current is limited by a series resistor.

The periodicity of the ring signal is controlled by switching of the triac. Information to the triac is derived from the BUS and latched. A low signal at the gate of the triac interrupts the ring signal.

Overvoltage Protection

Overvoltage protection from external interference is provided to the Subscriber. Interface circuitry, by means of a 75 V (RMS) varistor.

1.10.6 **The Power Supply**

The primary side of the transformer is tapped to allow inputs of 110, 127, 220 or 240 V A.C. Voltage requirements for the system are:

+5 V for logic circuitry

+ 7.5 V as the "quasi" mid point float for all voice circuits

+ 15 V for the CMOS switches

+24 V for relays

45 V A.C. for ringing signal

The d.c. voltages are derived from two windings on the secondary side. Each of the supplies are individually regulated by a chip regulator and each can be isolated from the distribution circuitry by the removal of a specific shorting link.

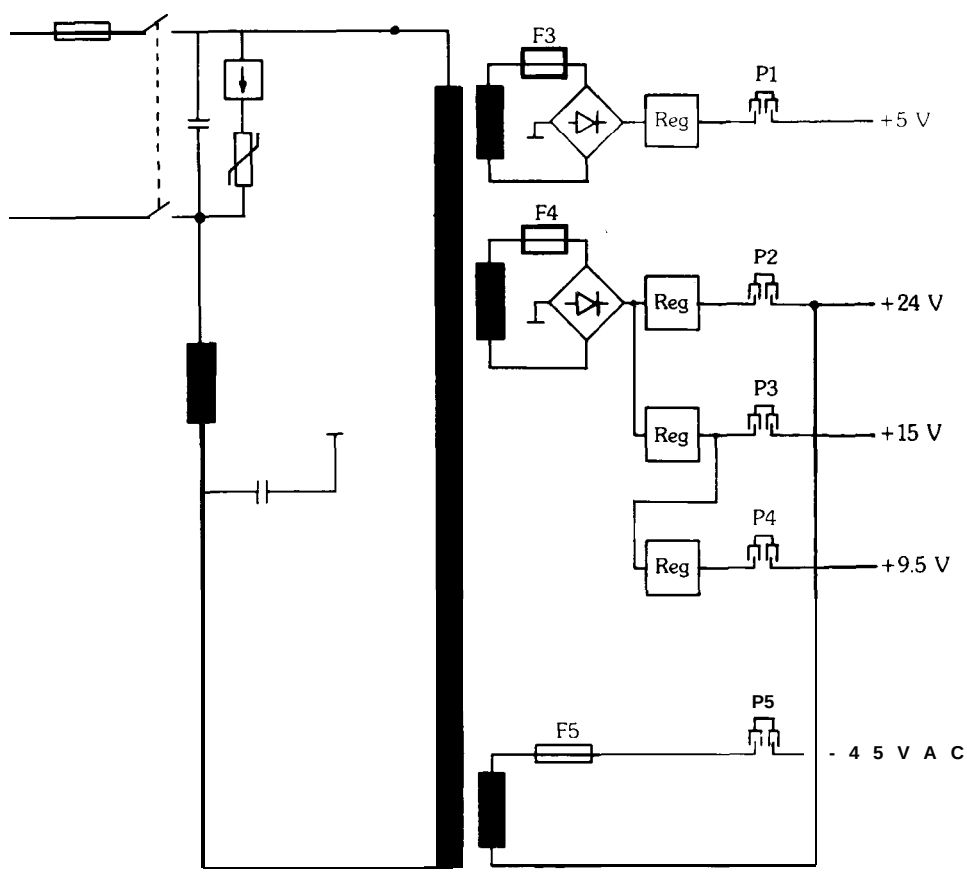


Figure 1.12 Power Supply Module

1.10.7 **The Send/Receive Block**

This block performs the communication function between the main processor and the telephone station processor. It translates TTL signals from the interface procession (DAT) into a voltage swing (22.5 V and 19.5 V) to the station and converts the return information from the station, from a current swing (30 mA and 15 mA) into a TTL level for the DAT.

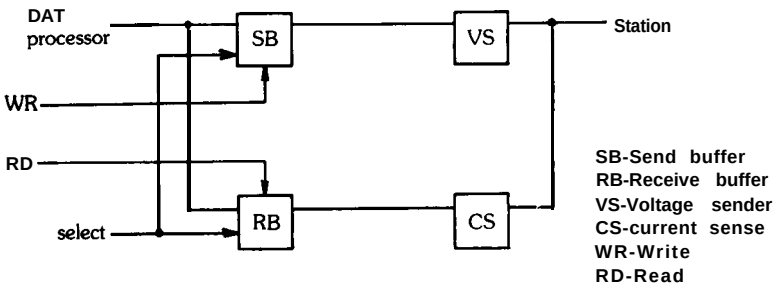


Figure 1.13 Send-Receive Module

The 4-wire stations, have one pair of wires allocated as the “data” set. Each station has its own send/receive circuit which in turn is driven from a common bus. Data is transmitted to and received from the stations in bit-serial mode.

1.10.8 **Music-On-Hold**

Internal MOH is electronically provided by a pre-programmed music chip of the 7910 family. Two tunes are available and the selection is a function of the setting of switch S5 (Figure 1.14). Level control is provided by the potentiometer. As an alternative, an external music source may also be connected. A transistor and its related components provide an amplification function for the output of the music chip.

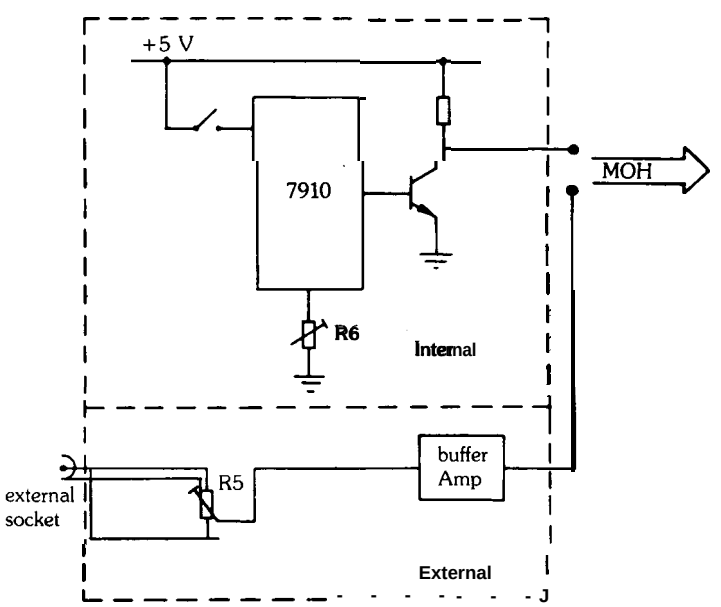


Figure 1.14 MOH Module

External MOH is controlled simply by a potentiometer into a buffer amplifier. This amplifier also modifies the band width of the signal to eliminate the higher frequencies.

1.10.9 **DTMF Sender**

An on-board chip generates the row and column tone information in accordance with the CCITT recommendations. The combined frequencies are directed through the switching matrix and transmitted through the exchange line interface.

One half of the chip, N602, provides a 3 dB gain buffer for the tone signal, while the other half performs a low pass filtering function.

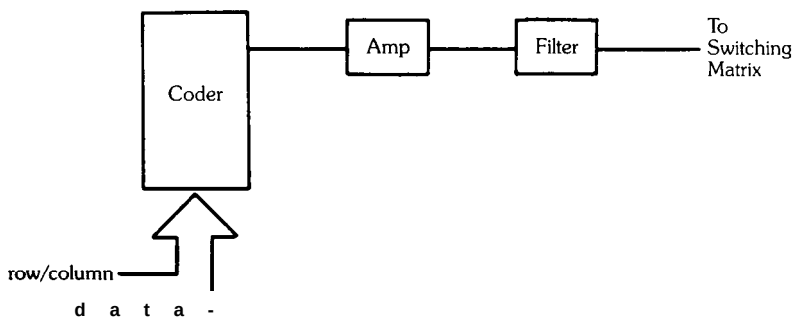


Figure 1.15 DTMF Module

1.10.10 **Tone (Internal) Generator**

Station users are provided with two distinct tones as part of the confirmation or indication of specific facility initiations. The tones are 418 Hz and 836 Hz. RT1=418 Hz T2.

These tones are generated digitally as a square wave of the required period and are passed to two low pass individual filters to achieve a relatively low distortion sine wave (Figure 1.16).

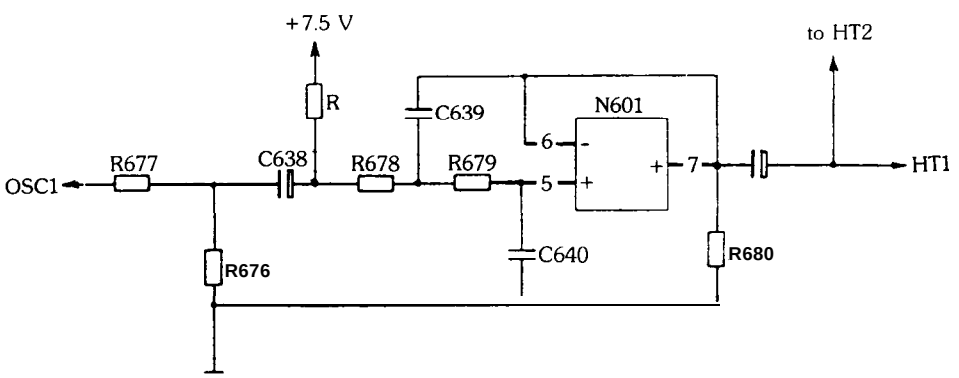


Figure 1.16 Tone Module

1.11 S824 SYSTEM TECHNICAL DESCRIPTION

The S824 is a "modular" system in that it contains discrete PCB modules with individually definable functions. In block form they can be represented as in Figure 1.17.

Module designations for the S824 are as follows:

Designation	Module	Function
KCM-S824	Connect Module	Distribution terminal I/O interface (RS232) Power fail control Exchange line protection network Station protection network Input for external music on hold
CPM-S824	Central Processor Module	Processor functions Signalling functions Customer data memory Program Memory Switching matrix Paging pre-amplifier 7-segment display DTMF dialling Music-on-Hold (*) Connector for Call Detail Recording module
408M-S824	4 exchange line/ 8 station interface	Interface circuitry Incoming ring detector
8SM-S824	8 station interface	Interface circuitry
PS-S824	Power Supply	Ring voltage supply Logic supply
TWIM-DEC-S	Two-wire Interface	Interface for 8 standard decadic telephones

(*) refer to Section 1.10.8 for additional information.

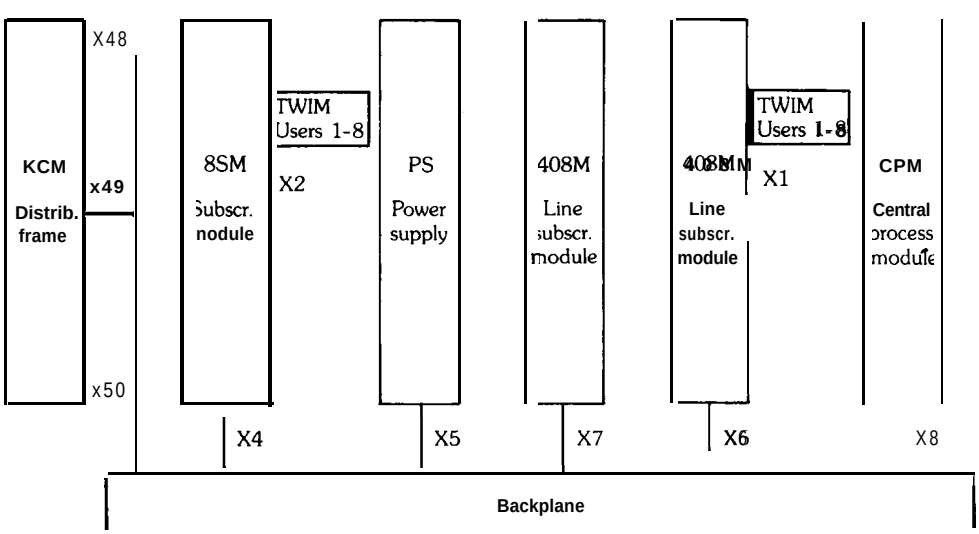


Fig. 1.17 S824 module arrangement

1.11.1 Krone Connect Module (KCM-S824)

This module provides the mechanical and electrical connections for all external devices (i.e. stations, bells, paging system, etc) The protection network for the exchange lines is of the same "star network" form as proven on the S206/408. Protection elements are also provided for the a/b pair of all stations.

The KCM is mounted on a detachable back-plate for ease of installation, and is connected to the remainder of the system by three ribbon cables.

1.11.2 Central Processor Module (CPM-S824)

The CPM performs the following functions:

- control of all operations
- switching matrix
- dtmf dialling
- internal Music-on-Hold
- interrupt controller
- communication to all stations
- real time clock
- paging pre-amplifier
- system program
- custom data memory
- connector for Call Detail Recorder Module

Basically the individual "building blocks" function in a similar manner to those on the S206/408, with however a few significant differences.

Firstly the main processor chip in the S824 is an 8088 (a 16-bit processor) and consequently has minor differences in the hardware support needs. The Operating System Software Module (OSSM) has been reduced to a single 1 Mbit chip, and the layout provides for an expansion chip of another 1 Mbit.

Customer Data is still stored in EEPROM, but in this case the capacity has been significantly increased (due to the number of stations, and also the connection of DSS consoles).

The switching matrix concept is a direct take-over from the S206/408, but again it has been increased in size. Each of the matrix switch chips provide an 8 x 8 field (i.e. a total of 64 cross points as compared to 16 on the S206/408).

A buffered real time clock is also carried by the CPM. Programming of the clock can be carried out by the normal programming procedure. This "real time" is important for the Call Detail Recorder. A loss of power of up to 1 hour can be supported by the clock buffer. After this time, the clock will need to be reset by an input procedure.

The actual printout to a printer is controlled by the options module, CDRM-S824, and is plugged-in to the CPM.

DTMF dialling circuitry and Music-on-Hold is identical to that of the S206/408.

A Paging pre-amplifier is provided on the CPM which makes the pre-amps on any subsequently attached TWIM units redundant.

1.11.3 Exchange Line and Station Interface (408M-S824)

This module contains 4 sets of exchange line interface circuits and 8 sets of station interface circuits. The actual circuitry is in the main part exactly identical to that of the S206/408, and in operation is totally identical.

1.11.4 Station Interface (8SM-S824)

The 8SM module is best described as an underequipped 408M. It provides only the circuitry for 8 sets of station interfaces. In all other aspects, the modules are the same.

1.11.5 Power Supply (PS-S824)

All voltages are derived from the 240V mains via a multi tapped transformer and series regulators. The power supply has its own mechanics and is attached to the main circuit via a connector.

Power dissipation (under maximum load) is approximately 60 watt and the whole mounting panel acts as the heat sink.

1.12 STANDARD STATION

The key stations consist of:-

- a key pad with control board
- a printed circuit board with speech circuit, balancing network, and connectors to the handset, recall key, tone ringer
- a tone ringer

• **Telephone Station Keypad** (Figure 1.18)

The keypad is a composite sub-assembly containing the actual keys, the status display LED's, and a micro-processor with input/output support elements. Power is derived from the c/d data lines (being part of the 4-wires-per-station reticulation wiring). The keypad is provided with a short flexible 4-conductor plug-ended cord for connection to the main PBA in the instrument, and an additional 2-conductor cord if a recall key is required.

Data-out: When the station processor recognises that data is to be forwarded to the central processor, two levels of constant current are logic switched, over the c/d lines. The normal 15 mA level is either supplemented/not supplemented by a further 15 mA, thus ranging the c/d line current between 15-30 m/A.

Data-in: Incoming data is seen as voltage change, in an order of a magnitude of 3.6 volts. The leading edge of the incoming data stream triggers the interrupt function, and data is then entered at the appropriate port via a transistor.

• **Telephone Station PBA** (Figure 1.19)

The telephone station PBA is equipped with the components for the speech and ringing circuits, with the hybrid and with the connector lugs for connecting the ringer, the key pad, the connecting cord and the handset-connecting cord.

In the 'on-hook' state the ringing circuit is presented to the a/b wires via the contacts of the cradle (GU). On lifting the handset the speech circuit is connected to the a/b wires. The contact uII of the cradle is closed after contact uI, which switches on the spark quenching circuit for protection of contact uII. The speech circuit consists of a hybrid which decouples the microphone from the receiver inset. By adjusting the balancing network (R3, R4 and C2) good attenuation between microphone and receiver can be achieved, so that the caller can only hear his own voice faintly in the handset receiver (side tone reference equivalent). For protection against high noise and clicks, rectifiers are used in a parallel series combination with the receiver, to form an acoustic shock-absorber.

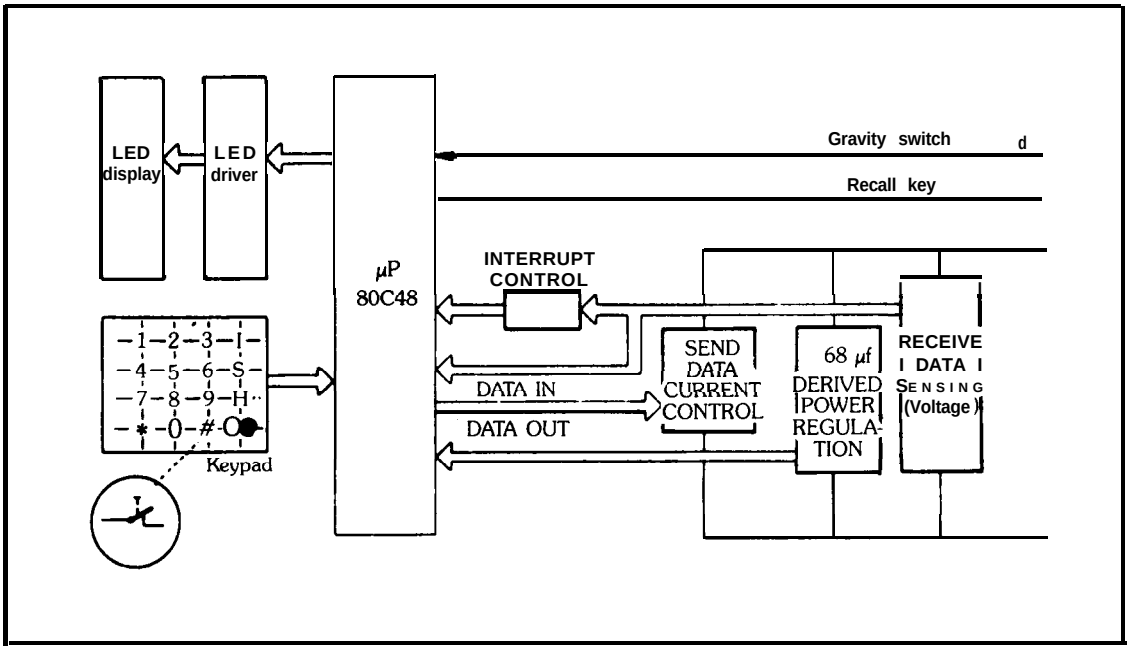


Figure 1.18 Block diagram of the Telephone station KEYPAD

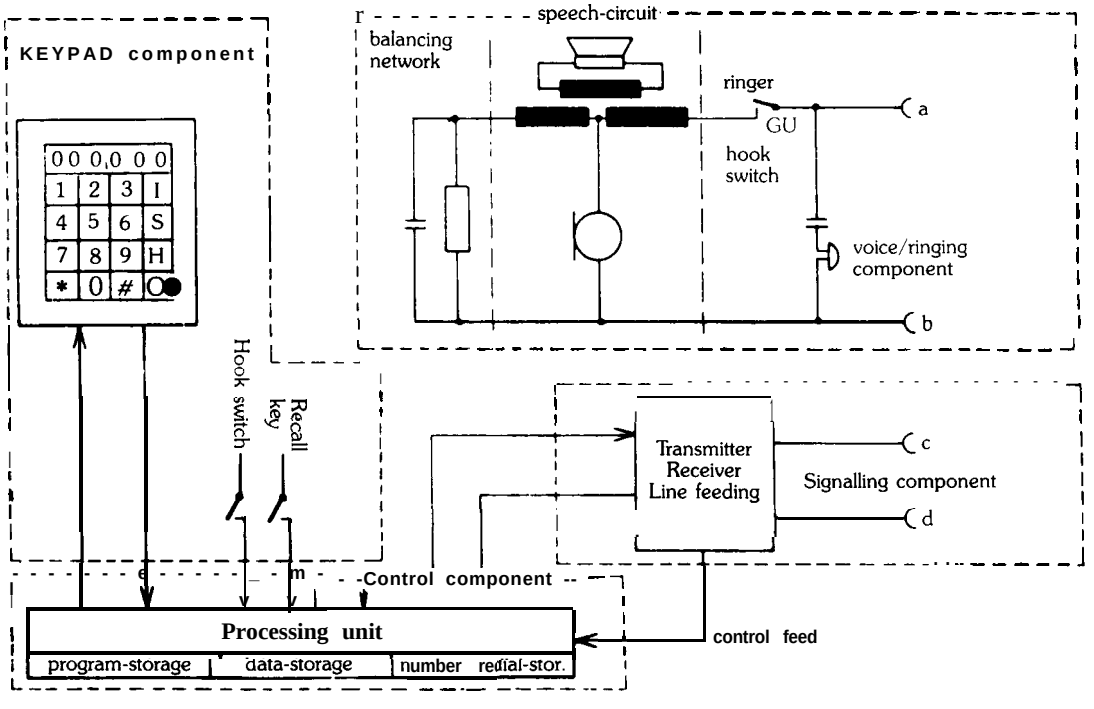


Figure 1.19 Telephone Station PBA

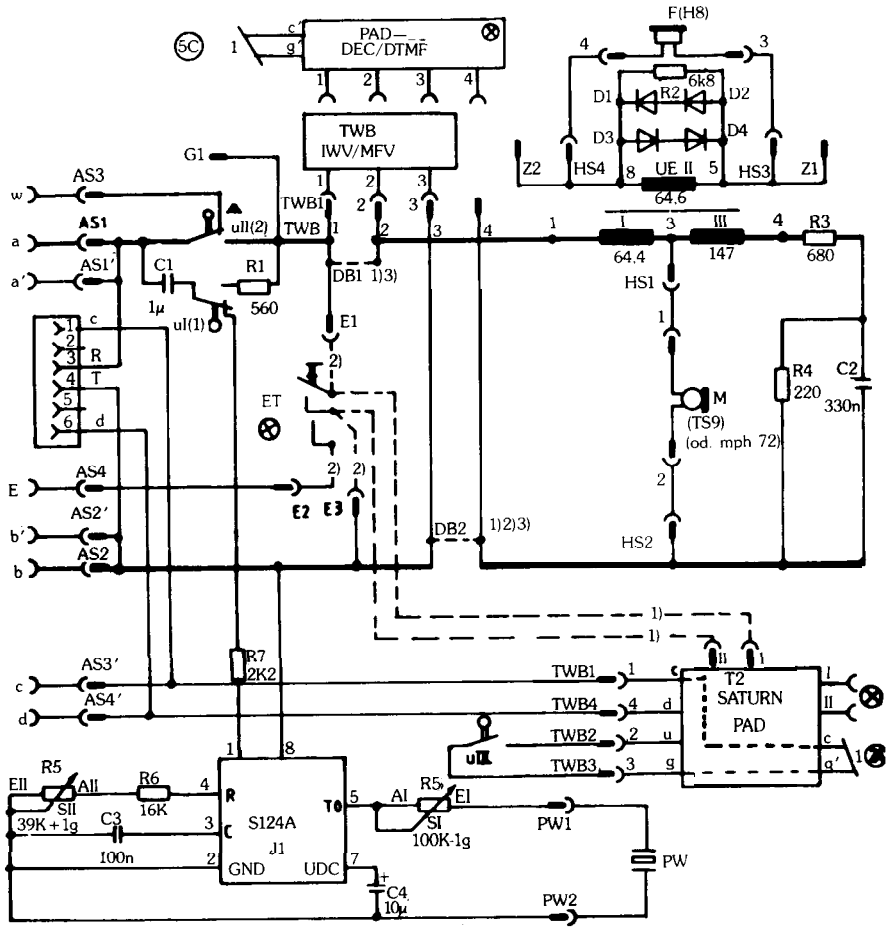


Figure 1.20 Schematic of Telephone Station PBA

LEGEND

F	**receiver inset**	PW	tone ringer
DI-D4	acoustic **shock** absorber	uI, uII, uIII	gravity-switch **contacts**
U	**hybrid**	**TWB 1. . 4**	**connector lug to key pad**
M	**microphone**	**AS 1.. . 4**	**connector lug for connecting cords a, b, c, d**
R3/R4/C2	**balancing network**	**HS 1.. . 4**	**connector lug for handset cord**

• Tone Ringer

The telephone stations are equipped with a piezo-electric transducer or buzzer, controlled by an integrated circuit, (instead of a mechanical ringer). By means of an internal oscillator the IC generates two tone frequencies (1250 and 1680 Hz) which are alternated rapidly and made audible (75 dB (A) at a distance of 1 m) via an amplifier stage in a piezo-electric transducer. The voltage of the tone ringer device is supplied by the ringing signal. Built-in voltage and current hysteresis ensures correct operation and protection against noise pulses. An integrated rectifier bridge with a protective Z diode provides protection against ringing signal over-voltages. Both the volume (L regulator) and the pitch (K regulator) have linear output regulation.

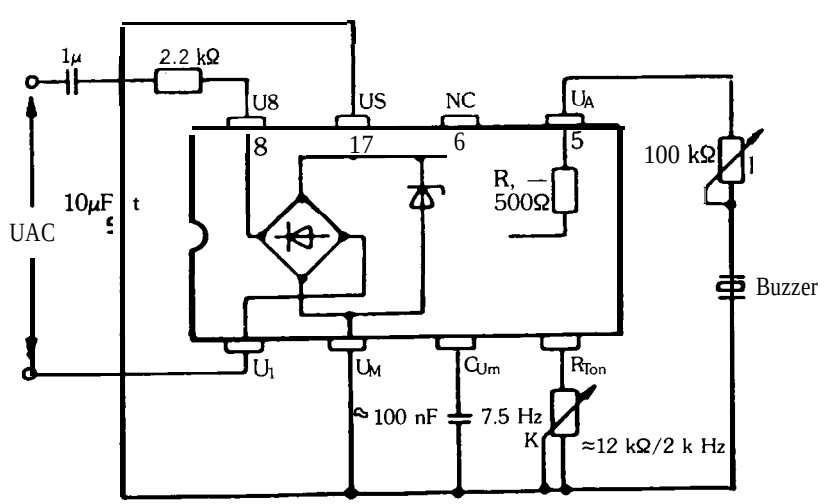


Figure 1.21 Schematic of the Tone Ringer Circuit

1.13 COMSET HANDSFREE STATION

1.13.1 General

COMSET HANDSFREE Stations consist of:

— a printed circuit board containing push buttons and LED's.

— a printed circuit board containing speech circuit, handsfree circuit and tone ringer.

The COMSET has all the characteristics of a handsfree telephone and the following additional features:

— Direct Call, single push button actuation to each internal subscriber.

— Busy Lamp Display.

— Handsfree Answerback, intercom function with voice controlled send/receive switch.

— Dialling while handset on-hook.

— Speed dialling by automatic seizure and selection on a line marked for the respective subscriber (unit line).

— Monitoring function, i.e. beginning of the conversation by lifting handset or activating the handsfree function only after the called station has answered.

— Mic Mute, microphone can be switched on or off.

— Call follow me, remote controllable call diversion function.

— Message waiting, information display at the telephone.

— Individual abbreviated number storage, maximum 10 station abbreviated call numbers (of up to 20 digits) can be stored.

All functions are controlled by a 80C51 microprocessor. The push buttons are scanned by the address/data bus port of the microprocessor and the LED's are multiplexed driven from address bus port of the microprocessor. Send/receive, gravity switch and handsfree switch are controlled from the address/data bus port of the microprocessor.

NOTE: The handset unit of the Comset stations designated Comset 92 (S338/992) are not compatible with the new generation Comset Handsfree (S338/916) and Comset **On-Hook** (S338/990) stations.

Significant redevelopments have been carried out to improve operation characteristics at limit line conditions. These changes have also included a new microphone capsule; thus the incompatibility.

1.13.2 Circuit Overview

The c/d wire pair is the means of data communication between the DAT processor (of the main equipment) and the 80C51 processor of the COMSET.

The type of information exchange is similar to that of the standard station.

The a/b pair are only involved with the voice communication path.

idle state: the gravity switch (gu) is open.

at ringing: gu open, and the ring detector is connected to the a/b pair via a capacitor.

speech condition; gu switches on the speech circuit.

loudspeaker state: (after pressing the SPKR button) the receive side of the speech circuit of the automatic switching network is connected. Power is supplied via the line through the "K"-relay.

handsfree state: both transmit and receive parts of the circuit are connected.

HFA state: in the normal state the K-relay is switched off. In HFA mode, the K-relay is switched on by the DAT processor information. The function then is similar to the handsfree state.

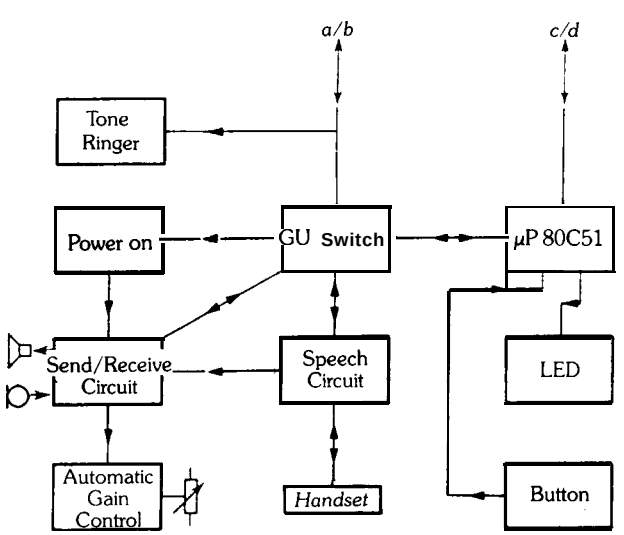


Figure 1.22 Block Diagram COMSET

1.14 TECHNICAL SPECIFICATIONS

	206/408	824
A.C. Supply Requirements		
Voltage	Set at 240 V 50 Hz (204 - 270 V) (Selectable: 110, 127, 220 V)	
Operation Range	94-270 v	
Input Power	35 VA	80 VA
Protection mode	double insulated, tested to 4 KV	
Interface Connections		
Exchange Lines (maximum)	2 for 206 4 for 408	8
Key stations (maximum)	6 for 206 8 for 408	24
2-wire stations (maximum)	via a single option module 6 for 206 8 for 408	via two option modules 16 (note: each option module provides a maximum of 8 2-wire interfaces)
Loop resistance: 4-wire max.	125 ohm =1 n for 0.5 mm cable	
2-wire max.	300 ohm (807 2-wire telephone)	
Signal levels		
Dial tone	418 Hz normal 836 Hz with active facilities	
Dial modes: DTMF	to CEPT specifications (-6dBm + 2dB) pre-emphasis 2 dB pulse length 70 mS interpulse time 70 mS	
: Decadic	66/33 (make/break ratio) 800 mS pause time.	
Paging (Output voltage)	300 mV, 600 ohm	
Recall to PABX: programmable "flash"	40-1620 mS	
: earth	'a' ground	
Music on hold internal	2 melodies, selectable	
external	input via KCM (100 mV, 10K ohm)	

Transmission Performance

Bandwidth	300 Hz to 3400 Hz
Nominal impedance	
— exchange line side	600 ohm
— station side	600 ohm
Insertion Loss	
— connection to exchange line	
300 Hz	less than 0.9 dB
800 Hz	less than 0.6 dB
3400 Hz	less than 0.6 dB
— connection to internal party	
300 Hz	5 dB ± 0.5 dB
800 Hz	5 dB ± 0.3 dB
3400 Hz	5 dB ± 0.3 dB
Crosstalk Attenuation	
300 Hz	greater than 72 dB
800 Hz	greater than 75 dB
3400 Hz	greater than 70 dB
"Noise"	
generated continuous white noise	less than — 80 dB
in idle state	less than — 80 dB
during ringing	less than — 72 dB
Maximum data transmission rate	4800 baud

Overvoltage performance

Protection	external: a,b — ground 5 kv (10/700 waveform)
	a-b 2 kv (10/700 waveform)
	internal: a,b — ground 5 kv (10/700 waveform)
	a-b 2 kv (10/700 waveform)
Static	maximum 15 kv
Environmental	Operation range: —20°...70°C
	93% relative humidity (at 40°C)
	SO_2/H_2S proof to DIN 40046

1.15 SYSTEM HARDWARE: PHYSICAL ASPECTS

1.15.1 Dimensions and Weights

EQUIPMENT	DIMENSIONS (mm)	WEIGHT
Main Equipment S206 including Power Supply and cover	380(H) X 390(W) X 85(D)	5.3 kg
Main Equipment S408 including Power Supply and cover	380(H) X 390(W) X 85(D)	5.5 kg
Main Equipment S824 including Power Supply and cover	425(H) X 400(W) X 190 (D)	13.5 kg
Remote Station Extender Unit	220(H) X 140(W) X 75(D)	1 kg
*Telephone Station TS-SCW-R TS-SBR-R	118(H) X 230(W) X 165(D)	1 kg
Comset	85(H) X 210(W) X 215(D)	1.1 kg
DSS Console	60(H) X 105(W) X 215(D)	0.5 kg

*TS-S = Telephone Station
CW = Cracked Wheat
BR = Burnt Rye
R = Recall Key

1.15.2 **Standard Arrangement**

System Function/Feature	Equipped Maxima S 206	S 408	S 824	Notes
Exchange lines	2	4	8	S 206/408 are integral to mother board
Telephone Stations	6	8	24	
Internal Connecting Links	*	*	11	Internal call capacity * = non blocking
Simultaneous enquiry	2	4	8	Irrespective of internal traffic occupancy
Abbreviated Dialling Memory — System	50	50 I	50 I	
Abbreviated Dialling Memory — Station	6 x 10	8 x 10	24 x 10	Each Station has a possibility to store 10 private Tel. Numbers for his own use
Last or Saved number Redial	* or +	* or +	* or +	+ = Last number redial * = Saved number redial (only COMSET) except 2-wire Stations
Conference Internal Initiating station, plus	3	3	3	Results in (maximum of) 4-party conference, internal only
Conference External Initiating station, plus	1	1	1	Results in (maximum of) 3-party conference where only one party is external subscriber
Extern, Extern, Intern Conference	*Yes*	*Yes*	*Yes*	Two exchange lines connected to one Station
Customer Data Programming Station	1	1	1	Station 11 or parallel connected socket on main equipment
Power fail to system telephone stations	1	1	2	Outgoing calls not possible
Power fail telephones	1	1	2	Provides for both way call capability Note also, 2-wire stations, when assigned as P.F. points, permit B/W working
Access Barring by digit discrimination stations	6	8	24	All stations are categorised. Categories are available in a 'width against depth' spectrum

1.15.3 **Option Arrangement**

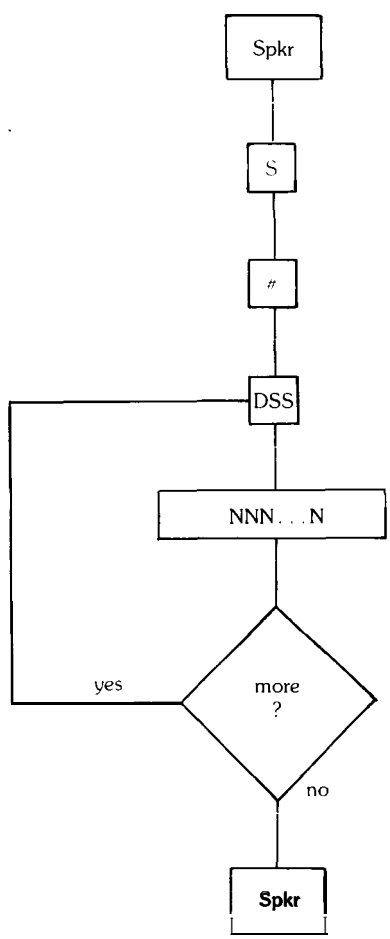
System Function/Feature	Equipped Maxima			Notes
	S 206	S 408	S 824	
Central External Alarm	S	S	S	One 50 Hz alarm circuit. Maximum load 30 mA
Hot Line	3	4	4	Teams of two stations programmable
Reserved Outgoing Line (Unit Line)	S	S	S	Minimum quantity of stations to be assigned access programmable
2-Wire Station/local or 2-Wire Station/remote	6	8	16 *	2-wire interface module needed (*2 modules required)
PBX recall parent lines	2	4	8	Mixed configuration possible
DTMF Signalling to parent lines	S	S	S	
Handsfree operation for stations	6	8	24	Depends entirely upon station-instrument type
Access to External Paging (when available)	1	1	1	One circuit only. Actual interface *not* provided with S206/408 system
Modem connection	Yes	Yes	Yes	2-wire interface module may be needed
Programming Telephone	Yes	Yes	Yes	Station number 11 is disconnected during the time of using

S = standard, programmable

1.16 REPROGRAMMING COMSET T16 KEYS (S824 only)

The DSS keys field of a COMSET T16 station used behind a S824 system can be reprogrammed to be used as any combination of DSS appearances or single button facilities operations.

Reprogramming may take place from either each individual COMSET T16, or from the programming terminal. From the stations the procedure is as follows:



Press "Spkr" key

Press "S" key

Press "#" key

Press the "DSS" key at which this operation is to be located

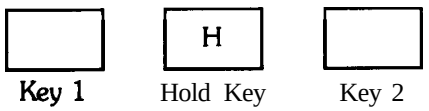
Dial the normal sequence of keys for the required operation

Press "Spkr" key

1.16.1 **Special Notes:**

(1) Exchange Line access buttons (normally positioned as the first two rows of keys) cannot be re-programmed, unless they are individually marked as "No Line Available" in code group S1, address 01-08, of the customer data.

(2) Physical locations of line access can be altered by the "swap" procedure, i.e. pressing the following sequence of keys (only in the station programming mode!)



The effect is to "swap" the feature/facility accessed by Key 1, to the physical location of Key 2 (and naturally vice-versa).

(3) The addition of the DSS console automatically clears the internal station access facilities that were originally set under the bottom two rows of keys of the Comset Handsfree Station. (Does not apply to Comset On-Hook Station).

These locations are now available **only** for programming of features/facilities and cannot be used for:

- internal station select
- exchange line access

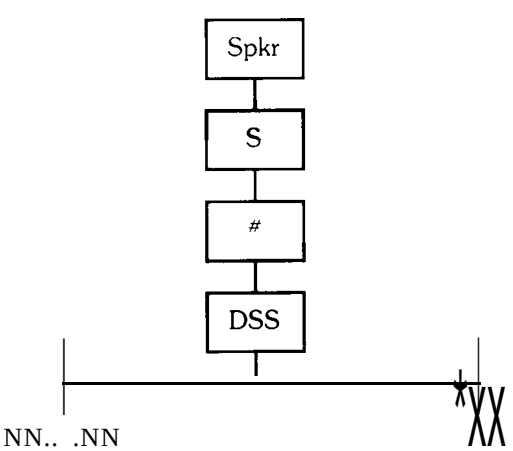
(4) Each station port has memory reserved for 10 "private" abbreviated numbers. The addition of the DSS console does not affect the quantity of numbers that can be stored as "station (or private)" numbers.

1.17 PROGRAMMING OF DSS CONSOLE KEYS

The "external" level of the DSS Console (accessed through the Shift Key) can be programmed to provide single key operation of

- direct dialled numbers
- "system" abbreviated numbers

to program:



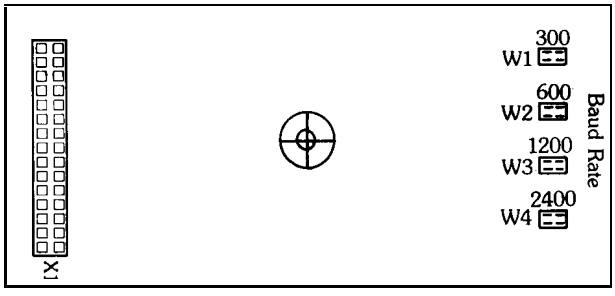
(Note: The shift key has automatically gone into "external" level)

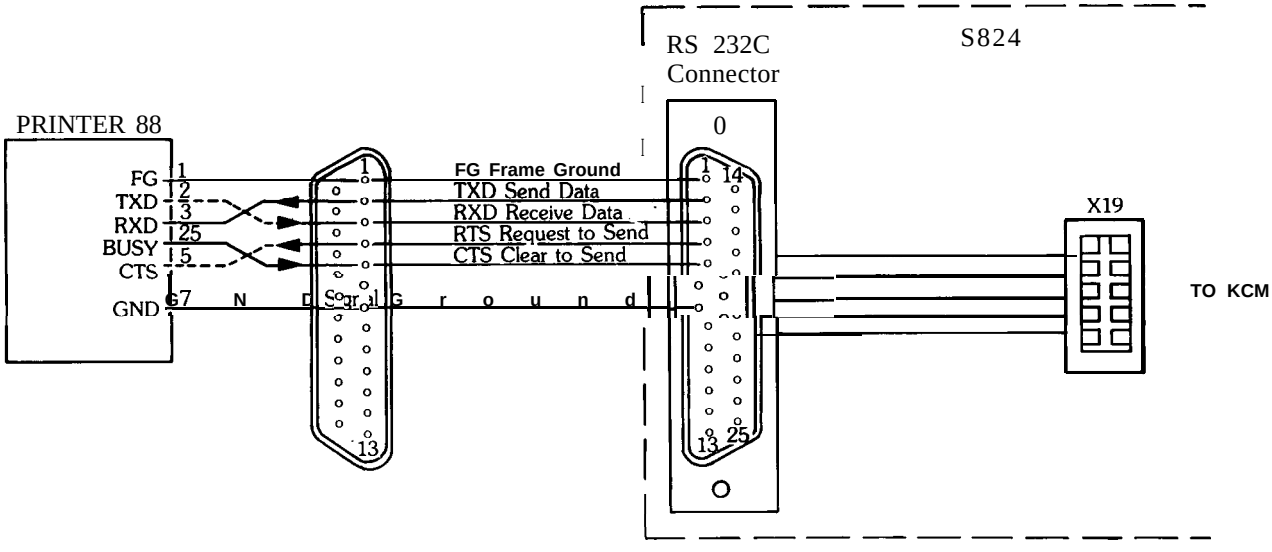
xx = 10...59

for storing of "direct" numbers

for storing of "system" abbreviated numbers

1.18 CALL DETAIL RECORDER MODULE





Call Detail Recorder Module Data-Out Format

Character Set: standard ASCII
Paper Control: as programmed in Customer Data
Parity: Even
Data Structure: 1 start bit
8 information bits
1 parity bit
1 stop bit
Output Levels: according to RS 232C (V.24)
Baud Rate: adjustable by strapping on module

x19

	B	A
Al = GND B1 = CTS	1 ■	■
A2 = TXD B2 = RTS	2 ■	■
A3 = RXD B3 = RXD	3 ■	■
A4 = RTS B4 = TXD	4 ■	■
A5 = CTS B5 = GND	5 ■	■

Note that the system has facility to store information when the printer is Off-line. This means that there need to be handshaking between the printer and the system, so that status is continually monitored.

SECTION 2 INSTALLATION AND COMMISSIONING

2.1 GENERAL

2.1.1 Introduction

The COMMANDER-S Systems come in three capacities:—

S206: 2 exchange lines and 6 stations
S408: 4 exchange lines and 8 stations
S824: 8 exchange lines and 24 stations

2.1.2 Warnings

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

(a) Always discharge static from yourself by touching a conductive part of the main equipment before handling PBA's.

(b) handle PBA's 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).

(c) Components are physically delicate. Finger pressure on a component can fracture, but not necessarily break component leads; a future fault.

(d) All PBA's equipped with memory components are to be protected from sunlight and strong UV-light.

(e) To protect against physical damage and damage due to static discharge, PBA's must ALWAYS be wrapped in the original wrapping and inserted into the protective container provided with the new item.

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

(B) 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.

Take special care not to short between any terminals. This may cause damage to the system. The fuses provided are unlikely to blow if the system is connected correctly. The fuses may blow when a PBA or a station is replaced with the power ON, or wiring is incorrect.

Table 2.1 Station Voltages

Telecom	605/610 Plug/Socket	Designation	Function	Voltage Table
WHITE (WT)	2	a	La	On-Hook: b (ref.) to a +24 V (±4 V)
BLUE (BL)	6	b	Lb	Off-Hook: b (ref.) to a +4 V (±1 V)
RED (RD)	1	c	Data 1	d (ref.) to c +22 V(±2 V)
BLACK (BK)	5	d	Data 2	

2.2 INSTALLATION PROCEDURE

Before installation is commenced, confirm that arrangements have been made with "Sales Advisory" for customer instruction.

(a) Order for required equipment from details supplied on the System Order Form.
(b) Cabling.
(c) Mount equipment.
(d) Terminate cabling.
(e) Ensures switches are set in normal delivery positions. Refer to Section 2.8.
(f) Set switches to customer's requirements.
(g) Power up.
(h) Check cabling by measuring voltages at all 610 sockets.
(i) Perform "Customer Data Initialisation Procedure", i.e. the SO * 00 * procedure. Refer to Section 2.12 for full procedure details.
(j) Program the system from details supplied on the System Order Form.
(k) Perform test of system.
(l) Write-up site records.
(m) Complete "Feedback Label".
(n) Make a note of the ME and station sequential serial number and record them in the System Record Book.

Arrangements should be made with "Sales Advisory" for customer instruction, prior to the installation commencement.

2.3 SALES INFORMATION

The Telephone Order for an SBS will be accompanied by a COMMANDER Telephone System Order which is completed by Sales staff after consultation with the customer.

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

A sample of the System Order is shown in Appendix 2.

Further details on system equipping are outlined in Section 2.7 (Equipping Systems).

The System Order comes as six copies. Copies 1 and 2 come in sets of 6 sheets. Copies 3, 4, 5 and 6 come in sets of 3 sheets. They are pre-carboned for ease of completion. The installer will receive copies 2, 3 and 4 which are distributed as follows after completion of the installation:-

(a) Copy No. 2 remains with the installed equipment.
(b) Copies No. 3 and No. 4 are returned to TBO.

If installation staff find that the system order form is incorrect and additional equipment is required not shown on the form, they must do one of the following:

(a) Have their supervisor arrange for the sales consultant to return and renegotiate the contract with the customer,

OR

(b) Make the required amendments to the system order form and return them to their supervisor who will in turn return them to the TBO.

2.4 LOCATION AND MOUNTING OF EQUIPMENT

24.1 General

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

(b) The installation location must be free from excessive heat, vibration and strong electric fields. Mounting equipment in proximity to plastic welders, electric motors, photo-copying machines or any other device which emits a strong electrostatic or magnetic field is definitely not recommended.

(c) The customer is to provide a power point for the Main Equipment and each Remote Station Extender Unit, the points must be within 1 metre of the respective equipment. Extension leads and "adapters" are not acceptable.

(d) It should be noted that although the system is largely independent of mains fluctuations and transients, certain erratic behaviour and problems can be traced to improper voltage. It is the customer's responsibility to provide a "smooth" source for the system to operate from.

(e) The equipment should be mounted with at least 400 mm clear wall space on each side and 1 m of clear space in front.

(f) Wall mounted equipment should be mounted between .38 m and 1.8 m from floor level (refer Figure 2.1). The final position must be mutually acceptable to both the customer and the installation guidelines as stated here.

(g) These mounting dimensions are suggested values. The absolute minimum distances are advised in the "Technicians Manual".

2.4.2 Main Equipment

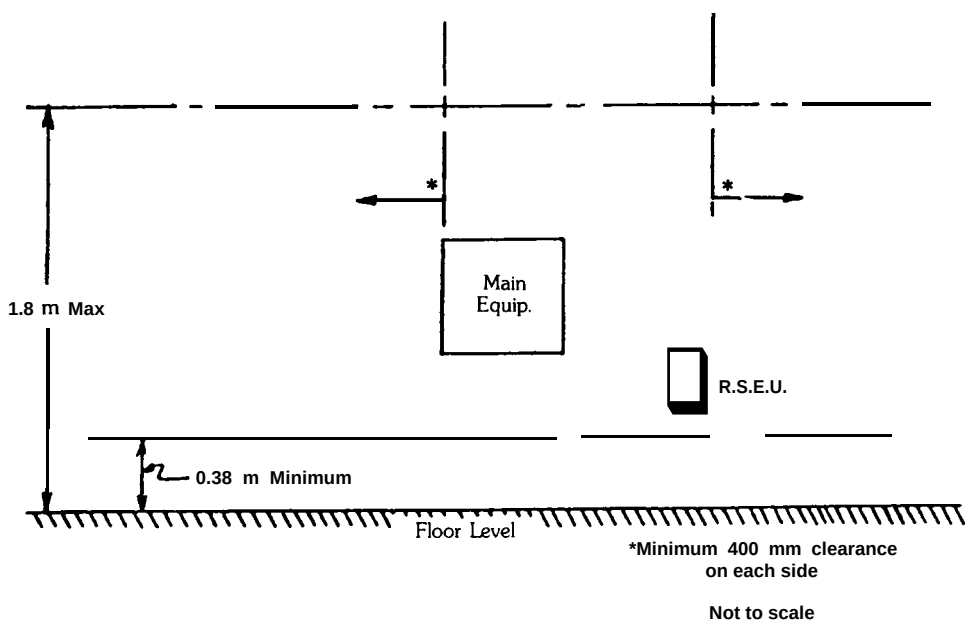


Figure 2.1 Mounting Positions

2.4.3 Stations

(i) Telephone station with recall
(ii) Comset

All stations are connected via normal 605/610 or 612 plug/sockets which are to be made captive. An exception may be made where station 11 is remote from the main equipment, and thus must be made portable for programming purposes. The station sockets S268/80 are a separate item and must be provided by the installer.

2.4.4 Power-fail telephone

This can be selected from the range of table or wall model telephones. Make sure the telephone is the same dialling type as the first exchange line on the system, tone or decadic.

2.4.5 2-Wire Stations

Two wire stations can be selected from the normal range of wall or table models. The two wire interface module will be for decadic phones only. A tone version will not be available.

It should be noted that an incompatibility problem can exist when certain 2-wire stations are fitted to an S206/408/824 with PABX lines connected.

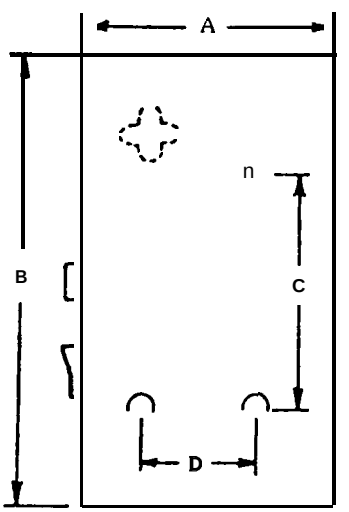
The problem, in the form of the Main-equipment not receiving the recall earth, is caused by the electronic switching arrangement in the 2-wire station.

To date the problem has been detected with both the Transit Memory and the Envoy premium telephones but any telephone that relies on electronic switching for the recall could be suspect.

To overcome the problem we recommend that 2-wire stations with a metallic switched recall earth, be used in cases where they are situated behind a PABX.

2.4.6 Remote Station Extender Unit

Dimensions of the RSEU are shown below (Figure 2.2). Fixing devices are placed through the mounting holes and tightened.



Dimensions
A: Width = 140 mm
B: Height = 220 mm
Depth = 75 mm

Mounting
D: Width = 44 mm
E: Height = 137 mm

A B C D

Figure 2.2 RSEU Dimensions

2.4.7 Central External Alarm

An electronic/a.c. alarm is mounted in the desired location.

2.4.8 External Music-on-hold

External M.O.H. is connected via the Krone Connect Module. All connections to the M.O.H. tags on this module must be via a 611 type socket, the 604 plug counterpart is connected to a Telecom approved Line Isolation Unit which the customer must supply. A current list of retailers of Line Isolation Units can be obtained from your C.V.E. group in each State, or by contacting Telecom Australia Telephone Regulatory Section on (03) 606 5765. Telecom's responsibility is up to and including the 611 socket, it is up to the customer to supply and maintain the Line Isolation Unit and 604 plug/cord assembly.

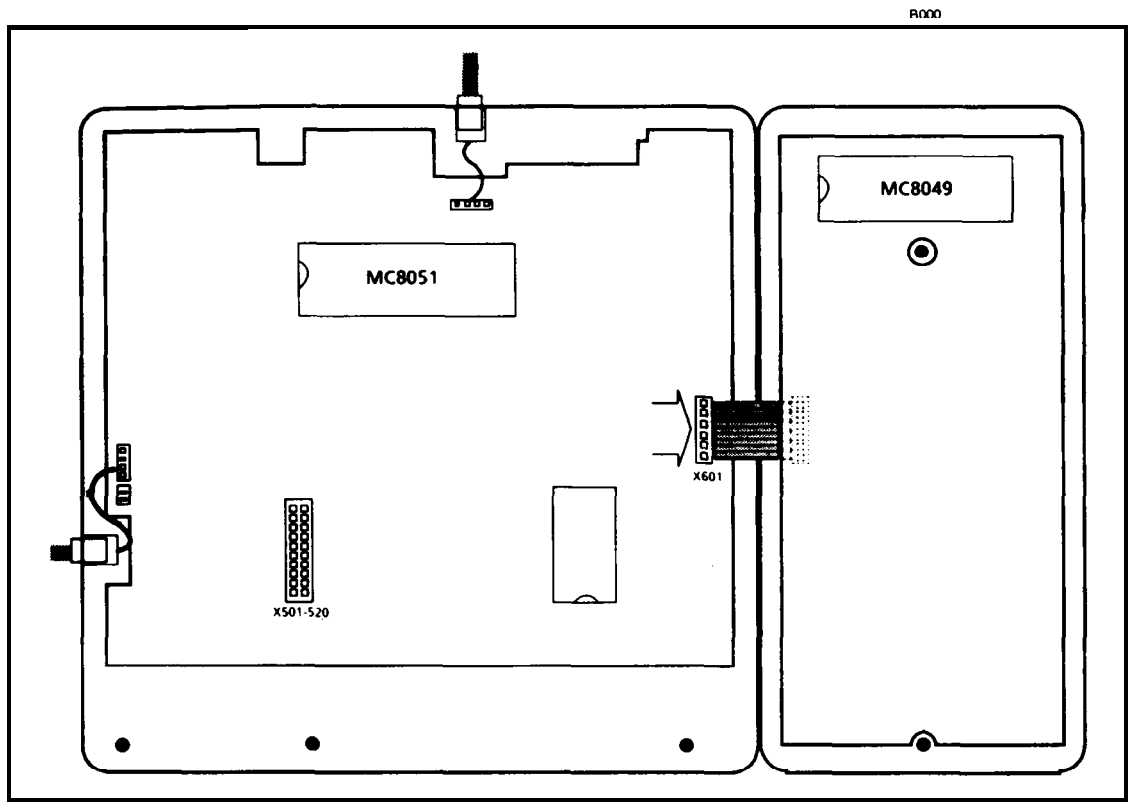
2.4.9 External Paging

External paging is connected via the Krone Connect Module. As with the M.O.H., a Telecom approved Line Isolation Unit must be provided to isolate the external amplifier from the Main Equipment. It should be noted that due to the low output from the paging pre-amplifier it is recommended that cable runs to the 611 socket be kept as short as possible, or alternatively shielded cable should be used to reduce the possibility of hum pickup at the input of the customer's P.A. amplifier. (Privately supplied).

2.4.10 Call Detail Recorder

Provision has been made for the connection of a Call Detail Recorder on the KCM (Krone Connect Module). (This feature requires an additional plug-in module, mounted on the CPM of only the S824).

2.4.11 Connection of DSS Console to Comset Handsfree Station



Note that the DSS Console can only be connected to a Comset Handsfree (T16) Station.

2.5 CABLING AND TERMINATING

2.5.1 Overview

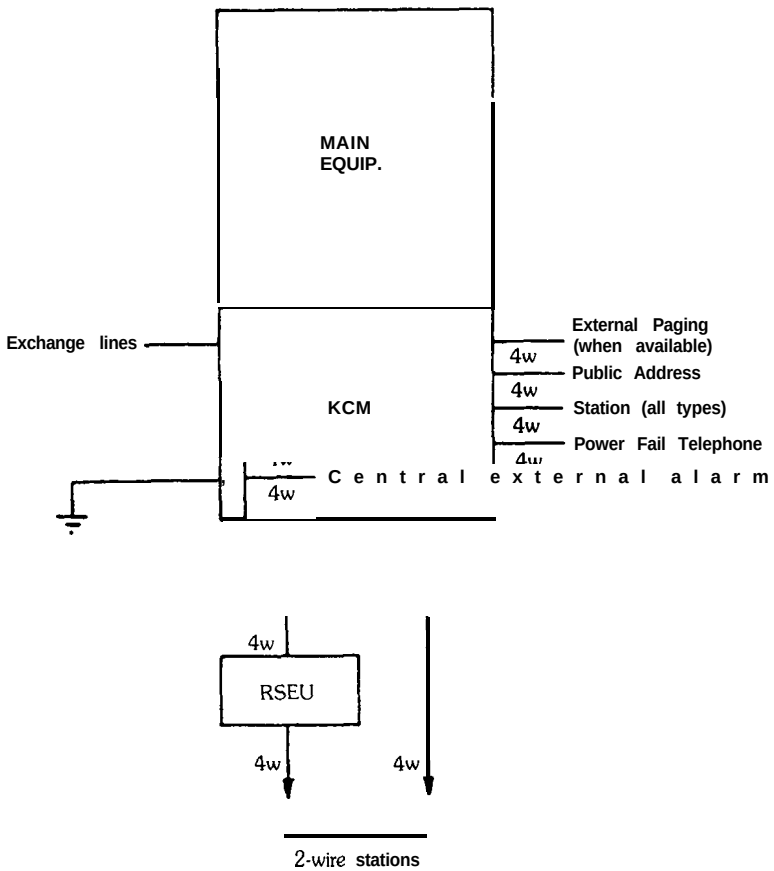


Figure 2.3 Terminating Overview

2.5.2 Krone Connect Module S206/408

The KCM (Krone Connect Module) provides the means by which the Main Equipment is connected to the outside world. All stations and lines, etc., are wired direct to the KCM with no need for jumpering.

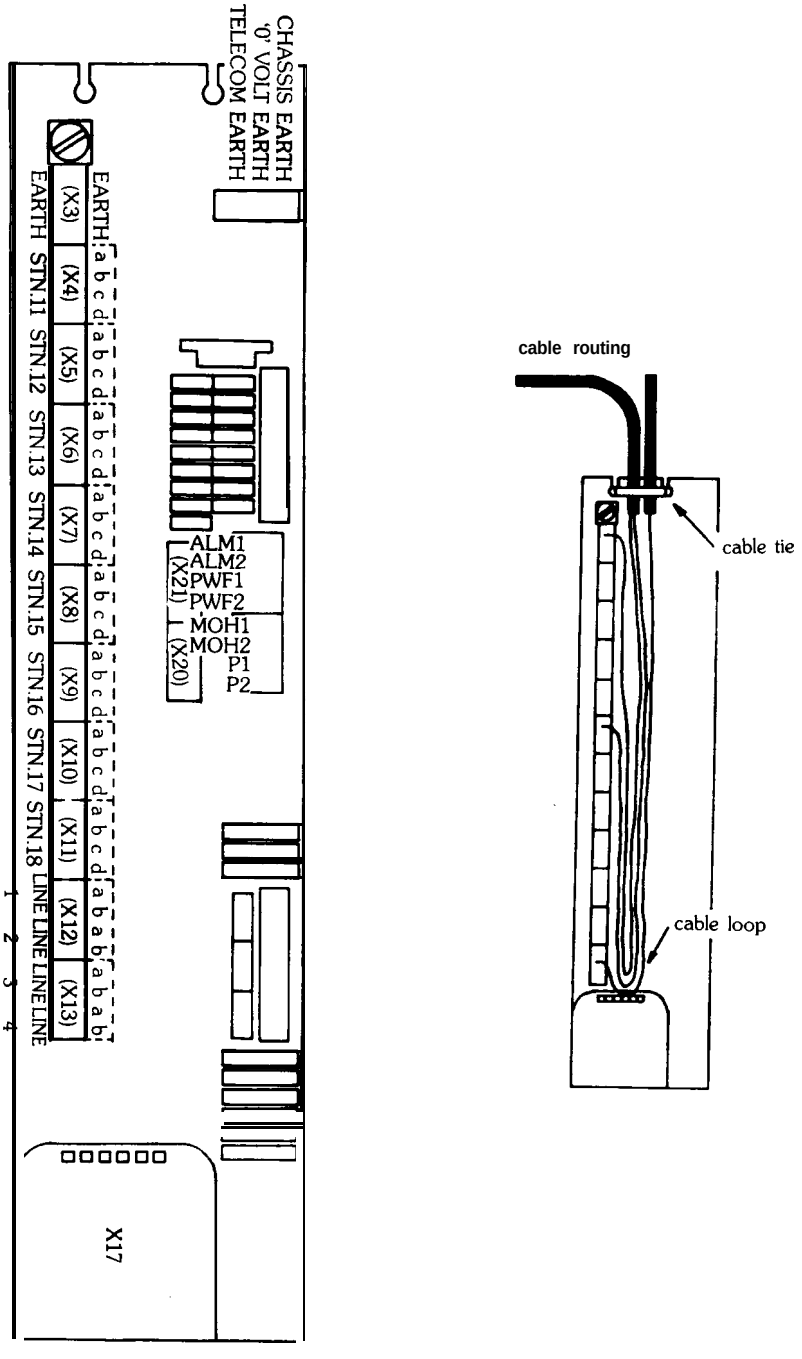


Figure 2.4 KCM Layout for S206/408

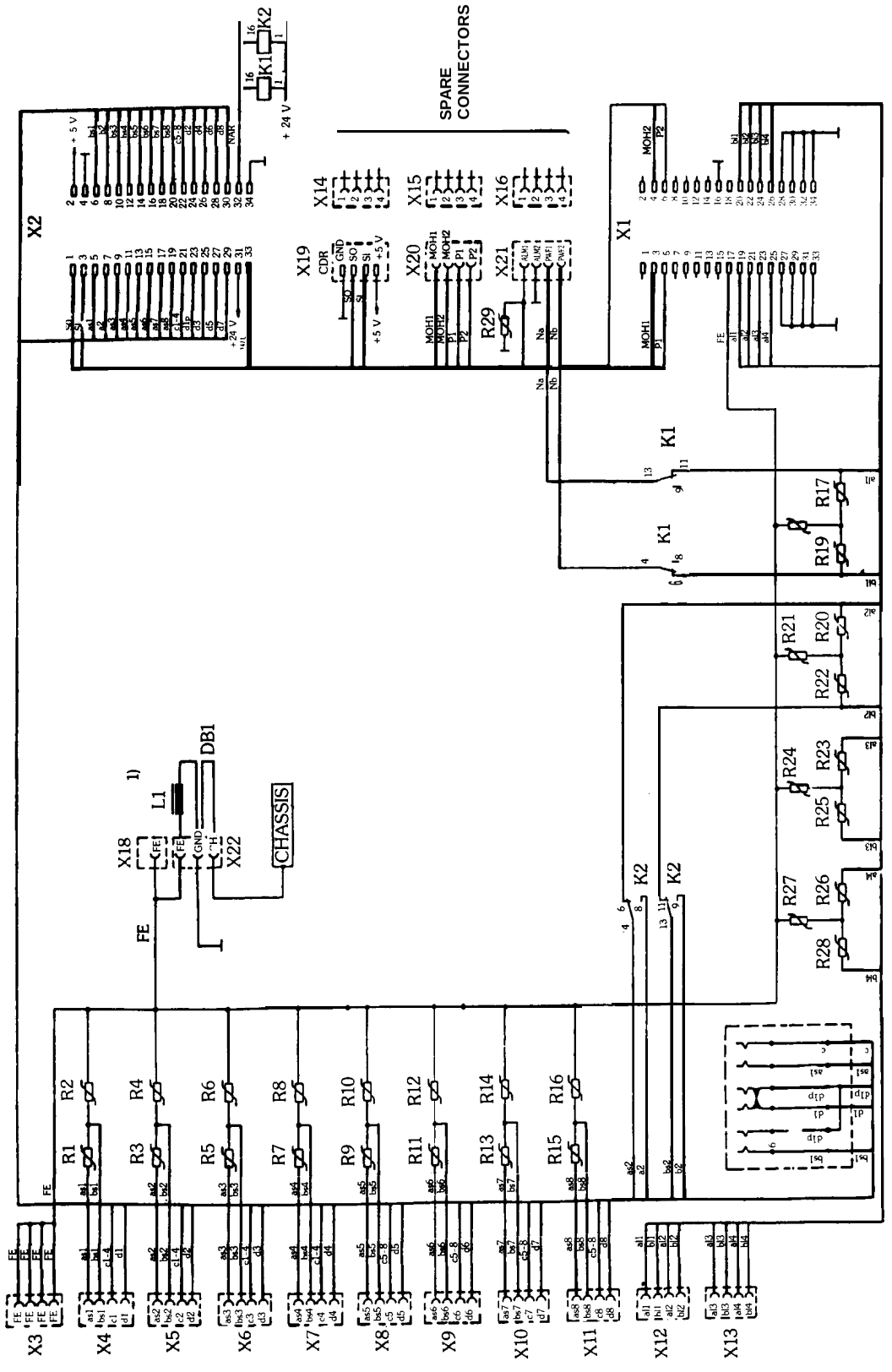


Figure 2.5 KCM Circuit Diagram for S206/408

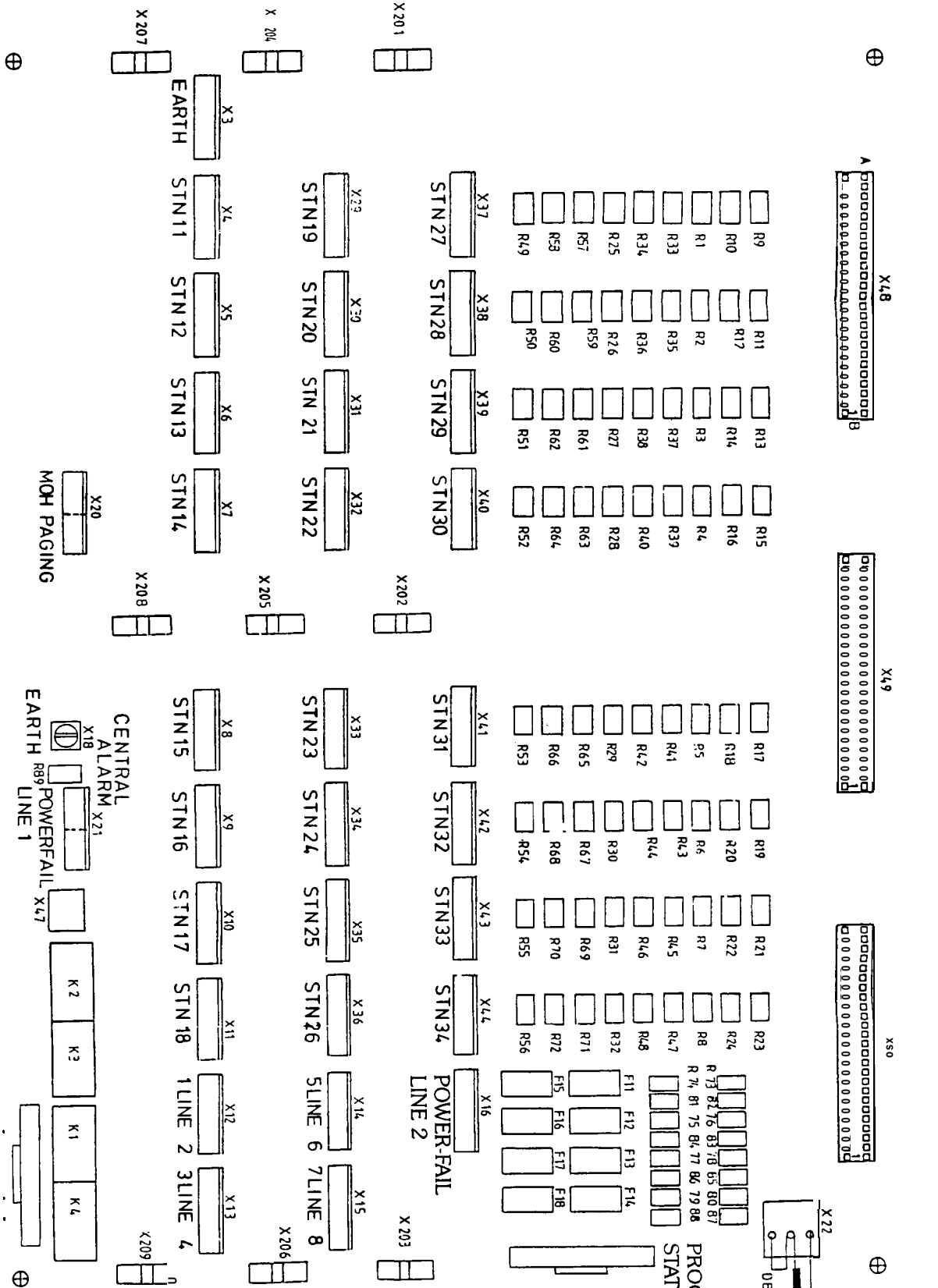


Figure 2.6 KCM Layout for S824

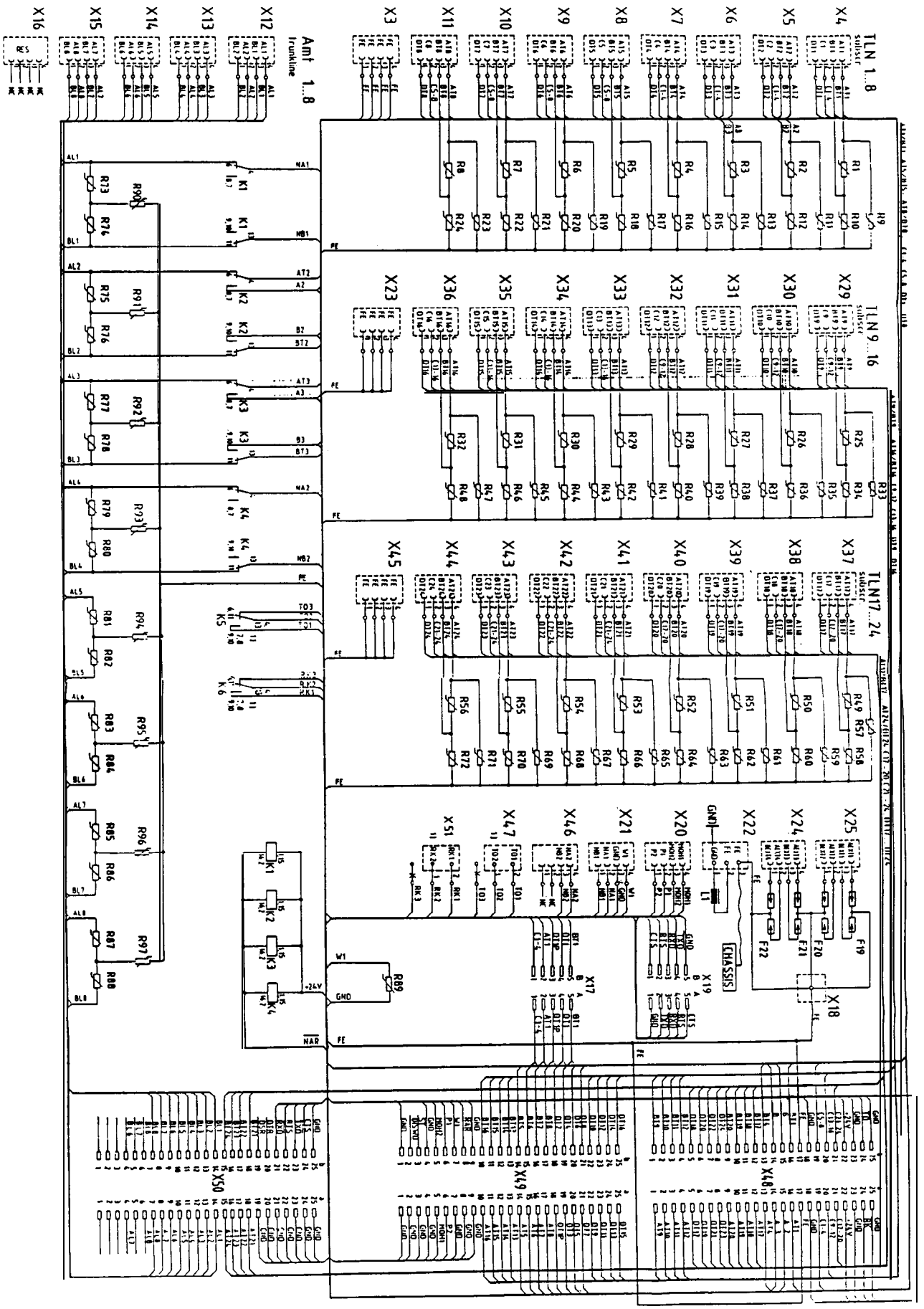


Figure 2.7 KCM Circuit Diagram for S824

2.5.4 Cabling Limits

		Max. distance (km) with wire Ø mm		
	R (ohm)	**0.4**	0.5	0.64
Commander Standard Station	150	0.53	0.84	1.36
Comset	150	0.53	0.84	1.36
2-wire Telephone (807)	300	1.07	1.68	2.72
2-wire Telephone (807) via RSEU switch position 1	800	2.88	4.5	7.27
2-wire Telephone (807) via RSEU switch position 2	1100	3.96	6.18	10.0

NOTE: Cable may be 2-pair standard or flat

2.5.5 Stations

— Comset
— Telephone Station with recall

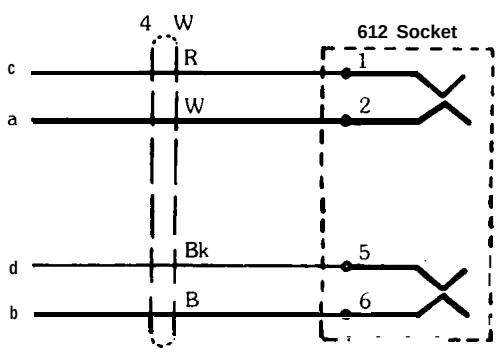


Figure 2.8 Station Cabling

(or alternatively, wall type telephone)

2.5.6 Power Fail Telephone

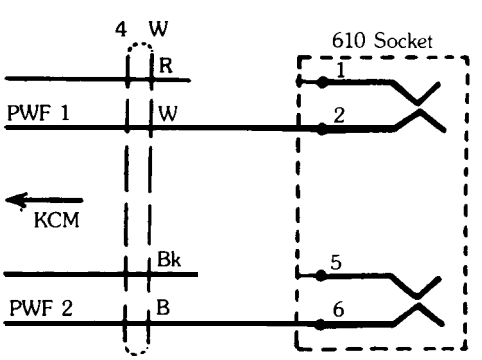


Figure 2.9 Power Fail Telephone Cabling

2.5.7 2-wire Station

If a Remote Station Extender Unit is not used, the 2-Wire Station is cabled to the KCM where it terminates on the line terminals of the required station number. (Figure 2.10).

Remote alarms can be connected to any station. Two wire stations can be treated as a standard telephone in the respect of connecting remote alarms. Care should be taken not to exceed the maximum resistance as laid down in the specification list.

Four wire stations can be treated in a similar manner, and the a/b station pair can be extended to the remote alarm. Take care not to exceed the current limit of the ring generator (refer 1.13).

Refer to TPH 1449 regarding the fitting of external alarms.

NOTE: An 807 type two wire telephone can be plugged into any four wire station port and will work correctly.

An 802 type two wire telephone must have the wire on terminal 5 removed. See also section 2.4.5.

(or alternatively, wall type telephone)

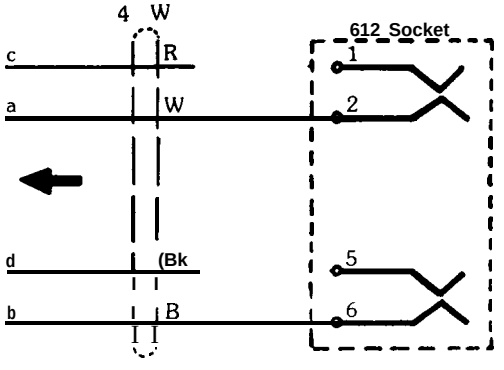


Figure 2.10 2-wire Station

2.5.8 Remote Station Extender Unit (RSEU)

If a Remote Station Extender Unit is used, the 2W station can be wired direct to the RSEU (Figure 2.11).

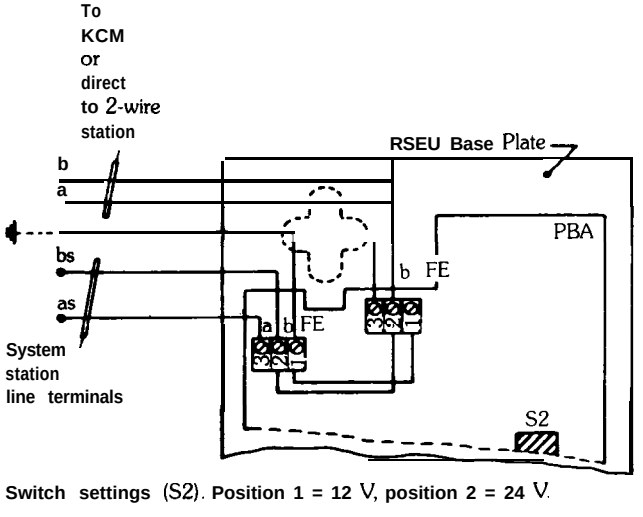
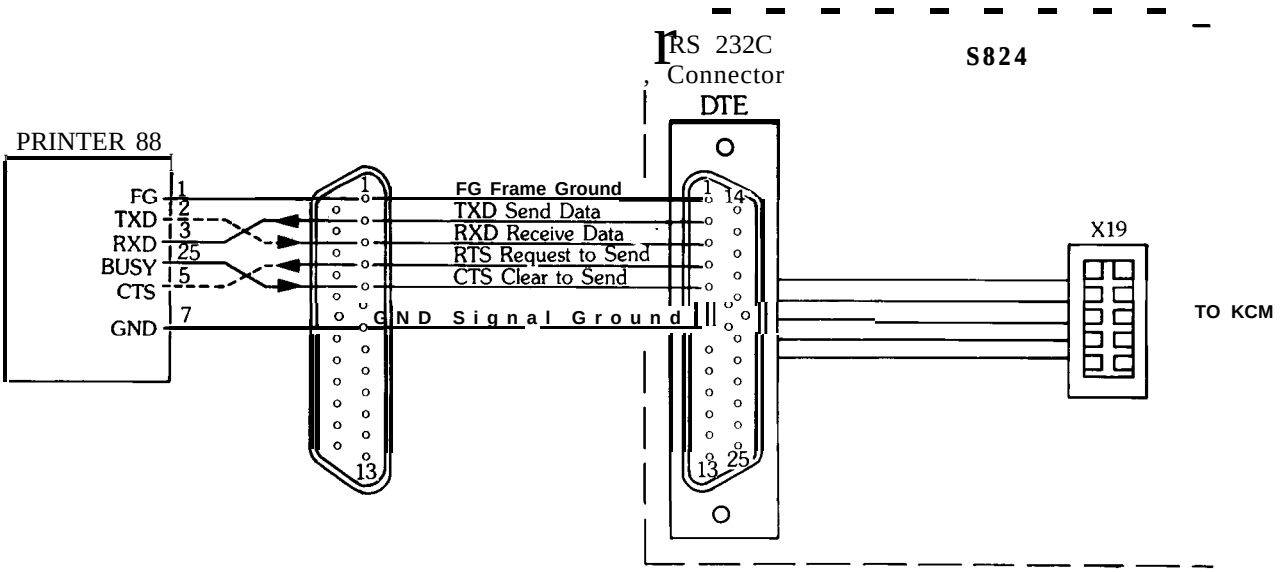


Figure 2.11 RSEU Connection

2.5.9 CDR Printer Connection



X19

					B	A
Al	=	GND	B1	=	CTS	1
A2	=	TXD	B2	=	RTS	2
A3	=	RXD	B3	=	RXD	3
A4	=	RTS	B4	=	TXD	4
A5	=	CTS	B5	=	GND	5

2.5.10 Central External Alarm

See also TPH 1449 regarding the fitting of external alarms

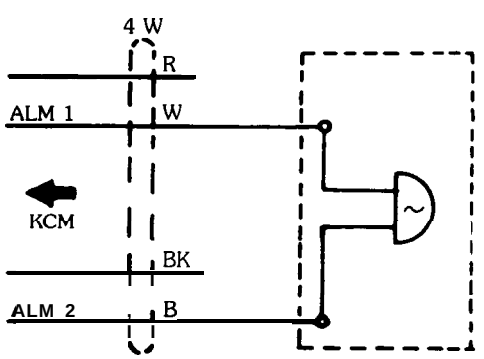


Figure 2.14
External Alarm Cabling

2.5.11 External Music On Hold or External Paging

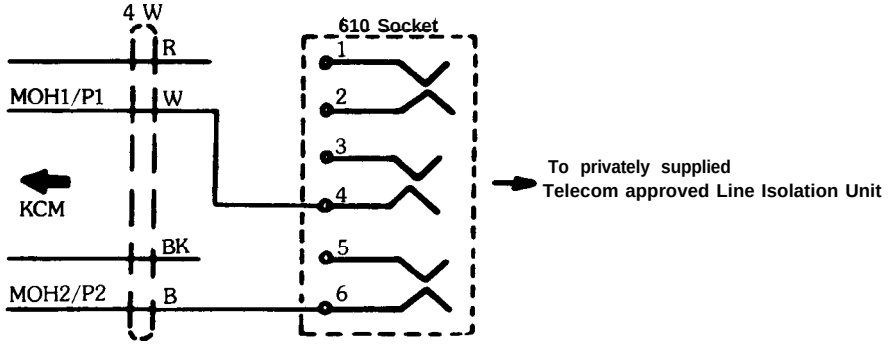


Figure 2.15
External MOH/Paging
Cabling

2.5.12 Data Device Termination

(A) *Parallel*

It is recommended that Telecom double adaptors be used for customers wishing to connect their own Modems or DTE's to 4-wire key stations. (See also section 1.7.7).

The standard Telecom double adaptor can be used for cases using a simple 2-wire Modem incorporating no internal switching facility to switch the line back out to a separate telephone.

The MODE 3 Telecom double adaptor should be used in cases where a 4-wire Modem is used, this type of Modem has an internal switching device to switch the line out on terminals 1 and 5 when the Modem is not in use. If there is any doubt with regard to the type of Modem or mode of connection, it should be left to the Technician to do the final connection.

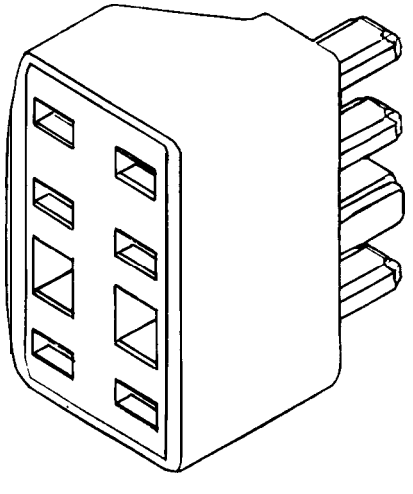


Figure 2.16 Parallel Data Socket

(B) Dedicated

Dedicated Data stations can be treated the same as a 2-wire with regard to installation, the station must be programmed as a "data secure 2-wire station" under S1 system configuration code, Op code 11-18, station type 11 (see section 2.14). A data secure station is a station which has been programmed to have all break-in tones and interrupts permanently removed. The DTE (Data Terminal Equipment) i.e. FAX, Modem, etc. can be permanently wired to the 2-wire port. If a 2-wire station is associated with the DTE, then the same conditions apply regarding type of Modem and mode of connection as in the "Parallel" termination. i.e. 2-wire Modem can use the standard Telecom double adaptor, 4-wire Modem can use the *MODE* 3 Telecom double adaptor.

2.6 HARDWARE DETAILS – S206/408

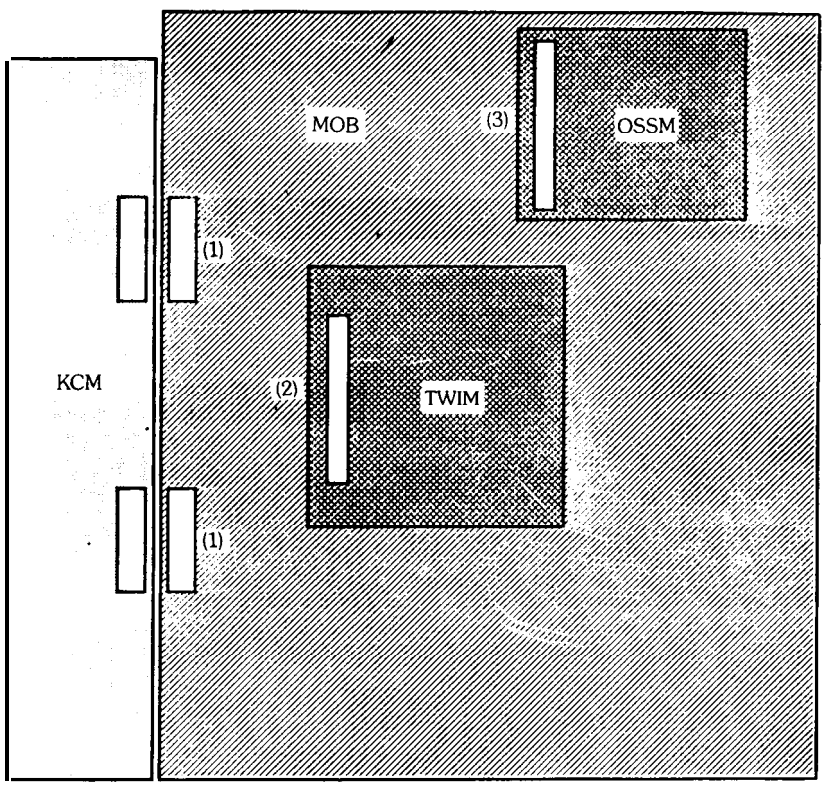
2.6.1 System Layout

As can be seen from Figure 2.17, the main equipment uses a single PCB containing all of the logic circuitry and switching matrix.

The Operating System Software (OSSM) in pluggable at the socket marked as "3", and provides a comfortable means of updating the system should it be required.

Socket "2" is the interface for the Two-wire station adaptor module.

Sockets marked "1" are the connection between the main PCB and the KCM, and provide a means of isolating the system from the wiring to facilitate system swap.



MOB Mother board
OSSM Operating System Software Module
KCM Krone Connecting Module
TWIM Two Wire Intetface Module (incl. paging) optional

Figure 2.17 S206/408 Layout

2.6.2 System Equipping – Options

Single Two wire interface module for	206 6 stations	408 8 stations
Paging option (standard with TWIM)	1	1

Note a TWIM-DEC-S (S338/950) will be required when either "paging" or "two-wire station" is required.

2.6.3 Switches, Test Points and Adjustments

The main PCB contains several trimmer potentiometers and switches. Except for the "on-site condition" switches and controls *NO OTHER DEVICES* are to be altered. Potentiometers control the various voltages required by the system and are preset during production. Normally these will not need any final adjustment.

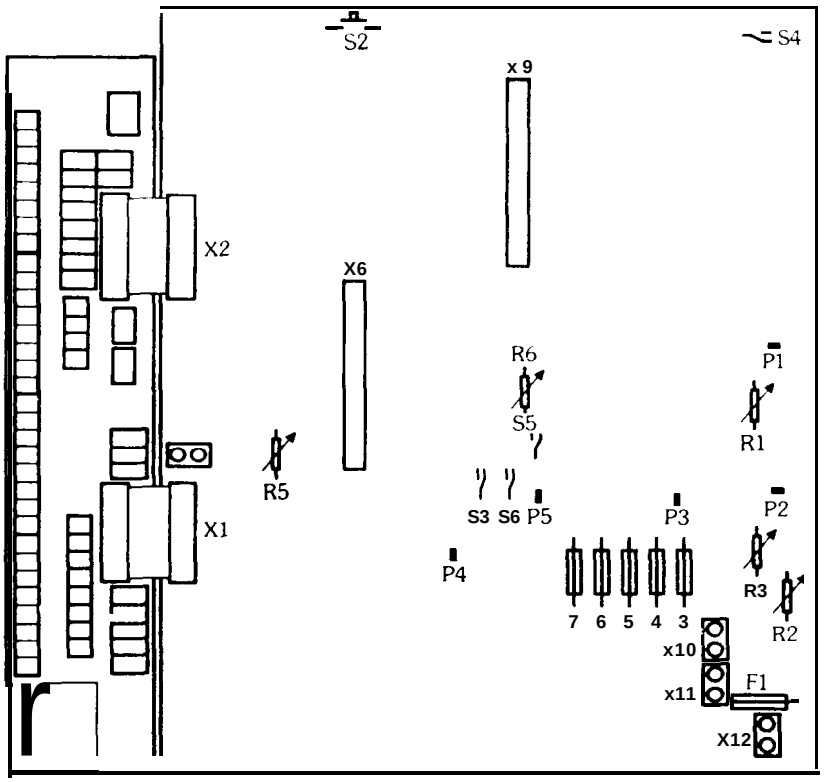


Figure 2.18 S206/S408 Motherboard controls positions

-ON-SITE CONDITIONS" CONTROL

Switch	Function	Delivery Cond.	Remarks
s 5 S6	Melody select MOH Int/Ext	Open Int	"Internal" MOH tune'. Internal MOH selected.

*from a choice of 2 electronically generated melodies.

Control	Function
R5	External MOH adjustment
R6	Internal MOH adjustment

PRODUCTION SWITCHES

Switch	Function	Delivery Cond.	Remarks
s 2	Reset		Spring return. Manual reset of system
s 3	Self Test	Open	When closed, activates a self test
s 4	Watch Dog Disable	Open	When closed, prevents watchdog from resetting the system

VOLTAGE POTENTIOMETERS AND TEST POINTS

Trim Pot	Test Point	LED	Voltage (ref. to gnd)
R1	P1	L1	+5 v
R2	P2	L2	+24 V
R3	P3	L3	+15 v
	P4	L4	+7.5 v
	P5		AC 45 V

FUSES

Fuses	circuit	Value	Type
F1	Mains	200 mA	M205 Slow Blow
F3	5 v	800 mA	M205 Slow Blow
F4	24/15/7.5 V	1A	M205 Slow Blow
F5	45 V (AC)	100 mA	M205 Slow Blow
F6	Stn 11-14	160 mA	M205 Slow Blow
F7	Stn 15-18	160 mA	M205 Slow Blow

CONNECTORS

Designation	Function
X1	Interface to KCM — part 1
x 2	Interface to KCM — part 2
X6	Connector for TWIM/paging option module
I X9	Connector for OSSM

2.7 HARDWARE DETAILS – S824

2.7.1 System Layout

The S824 system is developed in modular form and its main component modules are replaceable, Figure 2.19 indicates the arrangement.

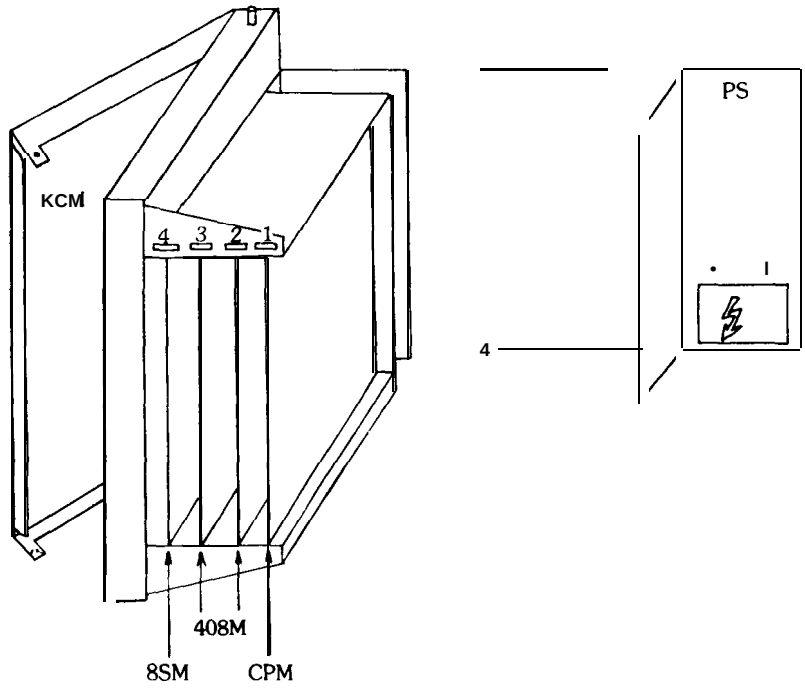


Figure 2.19 S824 Layout

2.7.2 System Equipping Options

Facility	Option	Location
Up to 8 2-wire stations (with station number 11 to 18)	1 off TWIM-DEC-S	On Module 2
Up to 8 2-wire stations (with station number 26 to 34)	1 off TWIM-DEC-S	On Module 4
Call Detail Recorder	1 off CDRM-S824	On Module 1

Position	Module	Title	Remarks
1	CPM-S824	Central Processor Module	Contains: OSSM (system program) EEPROM (customer data) Socket for CDRM
2	408M-S824	Exchange Line & Station Interface Module	This slot position must be occupied by a 408M Exchange Lines: 1 to 4 4 wire/2 wire stations: 11 to 18
3	408M-S824 or 8SM-S824	(as above) Station Interface Module	Exchange Lines: 5 to 8 4 wire stations: 19 to 26 Note: No 2 wire capability in this slot position
4	408M-S824 or 8SM-S824	(as above)	4 wire/2 wire stations: 27 to 34 Note: No exchange line capability in this slot position

2.7.3 Switches, Test Points and Adjustments

KCM: no switches
no test points
no adjustments

PS

Fuses	Circuit	Value	Type
F1	Mains	500 mA	M205 Slow Blow
F3	5 V	2 A	M205 Slow Blow
F4	24/10/5 V	3.15 A	M205 Slow Blow
F5	45 V (AC)	315 mA	M205 Slow Blow
F6	Stn 11-14	200 mA	M205 Slow Blow
F7	Stn 15-18	200 mA	M205 Slow Blow
F8	Stn 19-22	200 mA	M205 Slow Blow
F9	Stn 23-26	200 mA	M205 Slow Blow
F10	Stn 27-30	200 mA	M205 Slow Blow
F11	Stn 31-34	200 mA	M205 Slow Blow

CPM: (refer Figure 2.20)

Switch	Function	Delivery Cond.	Remarks
S100	Reset		Spring return. Manual reset of system
S800	Self Test	Open	Initiates CPM self test
S900	MOH Select	Open	Selects 1 of 2 internal melodies
S901	Int/Ext MOH	Int	Source of MOH

Control	Function
R90	Internal MOH level adjustment
R91	External MOH level adjustment

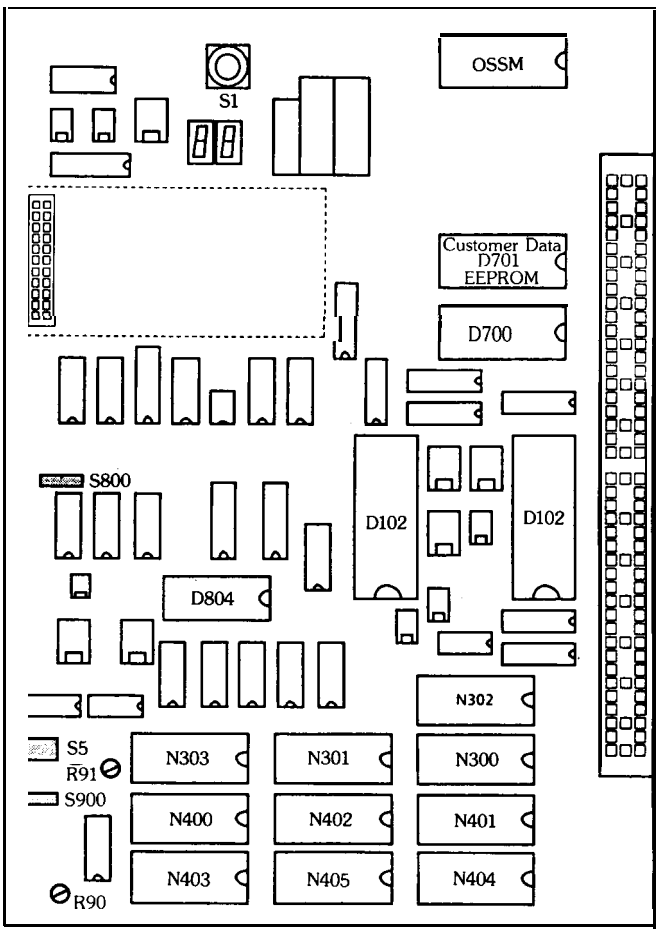


Figure 2.20 CPM Layout

408M/8SM: no switches
no test points
no adjustments

CDRM: (Option Module. Refer Figure 2.21)
Bridge for require "baud" rate for attached printer.

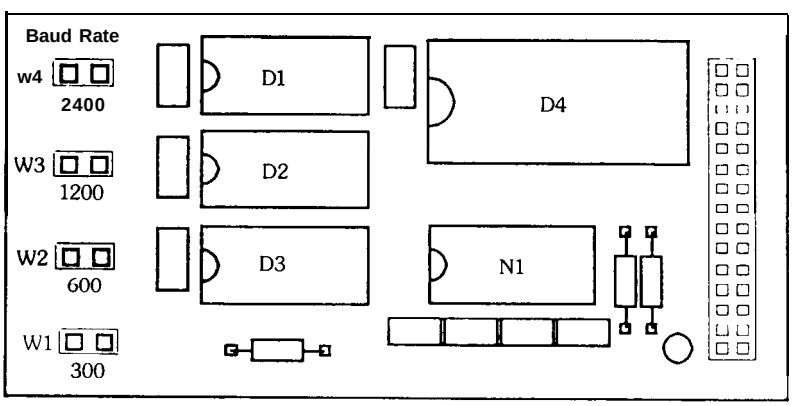


Figure 2.21 CDRM Layout

2.8 LIGHTNING PROTECTION

In lightning prone areas, exchange lines and 2-wire external stations must be protected at the point of entry or distribution frame using Protector Block (S442/36), in accordance with Lines Engineering Standard TPH0265, Lightning protection at Customer's Premises. To fully utilise the inbuilt surge protection an earth must be provided to the Krone Connect Module. The resistance must be less than of 30 ohms.

2.9 TELECOM EARTH FOR MAIN EQUIPMENT

A telecommunications earth is required at the Main Equipment for the following purposes:-

(a) To provide a discharge path for electrostatic charges,

(b) Recall earth if the system is connected to a PABX.

(c) To provide a discharge path for the varistors under voltage surge conditions on exchange lines.

Connection to the earth must be made by at least 1 pair of 2.5 mm internal cable. Normally a telecommunications earth will be provided at an IDF/MDF. If not, a separate earth must be run to the KCM. The resistance value of the earth must be less than 30 ohms.

A heavy duty lug has been provided on the KCM for the purpose of connection of larger diameter earth cables.

2.10 FAULTY EQUIPMENT PROCEDURE

If faulty equipment is encountered during installation the following steps must be followed. It should be noted that to claim the manufacturers warranty this must be carried out as quickly as possible.

(a) The faulty item must be suitably packed and promptly returned to your State Workshop on a changeover basis.

(b) A Customer Equipment Fault Report Label (E441) must be attached to all faulty PBA's and filled out with as many details of fault condition as possible.

(c) Each State workshop will keep an accurate record of all PBA's despatched and received to ensure that replacements are obtained one-for-one.

(d) No repair of faulty PBA's will be allowed in the field or work-station unless directed to do so by your particular CVE section.

2.10.1 Installation Feed-back Label

To provide feed-back on equipment defects, a yellow "Installation Feed-Back Label" is supplied with Main equipment. This label should be filled out at completion of the installation, and returned to the address shown.

INSTALLATION FEEDBACK LABEL **COMMANDER-S**

CONTRACTOR TO COMPLETE ❑ ME ❑ S-206 S-408

PRIOR TO SHIPMENT, EQUIPMENT CHECKED BY _____ DATE _____

TELECOM TO COMPLETE
INSTALLER'S NAME _____
INSTALLER'S TEL. NO. (0) _____ DATE _____

WRITE 'NIL' IF NO DEFECTS OR DESCRIBE FAULT

DEFECTIVE MODULES (ENTER DATE OF MANUFACTURE e.g.4/86)

ME		MB	
KCM		RSEU	
TWIM-DEC		TS/TS-R	
OSSM		COMSET	

TYPE OF FAULT (TICK BOX)		FAULT CLEARED (TICK BOX)	
ELECTRICAL FAULT	☐	MODULE REPLACEMENT	☐
PHYSICAL DAMAGE	☐	EQUIPMENT REPLACEMENT	☐
INTERMITTENT	☐	FUSE	☐
OTHER	☐	OTHER	☐

REMARKS

SBS A X100 004

INSTALLATION FEEDBACK LABEL **COMMANDER-S824**

CONTRACTOR TO COMPLETE _____

PRIOR TO SHIPMENT, EQUIPMENT CHECKED BY _____ DATE _____

TELECOM TO COMPLETE
INSTALLER'S NAME _____
INSTALLER'S TEL NO. (0) DATE _____

WRITE 'NIL' IF NO DEFECTS OR DESCRIBE FAULT

DEFECTIVE MODULES (ENTER DATE OF MANUFACTURE e.g. 4/86)

ME		CPM	
KCM		RSEU	
TWIM-DEC		TS/TS-R	
408M		COMSET	
8SM		PS	
		CDRM	

TYPE OF FAULT (TICK BOX)		FAULT CLEARED (TICK BOX)	
ELECTRICAL FAULT	☐	MODULE REPLACEMENT	❑
PHYSICAL DAMAGE	☐	EQUIPMENT REPLACEMENT	☐
INTERMITTENT	☐	FUSE	☐
OTHER	☐	OTHER	☐

REMARKS

A88817X674 A100 2 7664

PLEASE ENSURE THESE LABELS ARE RETURNED, AS IT IS THE QUICKEST METHOD OF ALERTING HEADQUARTERS TO POTENTIAL PROBLEMS.

2.11 POWERING UP THE SYSTEM

Before initial power-up of the system, ensure that

(1) the OSSM is correctly fitted
(2) all fuses are sound
(3) distribution wiring is correct
(4) connect a station to the programming socket

Now connect the mains and switch on.

A few seconds after power on the LED's at the program stations will turn on (for approximately 1 second) then off. If this occurs then the system is "up and running". Note that the same event occurs at all "correctly wired" stations.

At the main equipment a "run" indication (see 2.12.5) is provided on the programming display.

2.12 PROGRAMMING

2.12.1 General

The system is delivered with a programmed "Standard Data" package. Each node of the data package is re-programmable. Data display/alteration can be carried out from either the programming socket on the main equipment, or station 11. In both cases the station must be a 4-wire type (Standard Station or Comset). The data can be read from the two character display at the main equipment.

Customer Data is divided into two main groups:

(1) programmable by the installing technician
(2) programmable by the customer

Due to the recessed nature of the displays (mounted on the OSSM) of the S206/408, it is recommended that the cover be removed for all programming operations on this system. This is achieved by loosening of the two knurled thumb screws located on the bottom edge of the system, and swinging the cover away.

2.12.2 Pass Code Accessible Programming Procedures

(technician accessible)

The programming procedure is initiated by pressing key 'S' then 'H', followed by the "Pass Code" (746).

Note that once the pass code has been entered, it remains stored and valid for a continuous stream of data changes. The pass code is cancelled by the replacement of the handset to the on-hook condition.

After the pass code, the actual procedure group number must be entered (SO to S9). The two character display will show only the numeric part of the procedure number.

Note that during the data entry mode, if an illogical or impossible code/data is entered, the system responds with the characters 'EE' flashing on the display and a short burst of busy tone is heard in the handset.

Certain parameters are accessed by the system during an initialization phase and are subsequently used as information. If these are changed during system programming then it is not until a re-initialization (e.g. by replacing the handset of the programming station, or pressing the reset button) that the new information is used.

During each of the above procedures, the information on the display is presented as:

— the address — steady on for approximately 3 seconds followed by
— the data — flashing at 2 seconds on, 1 second off.

2.12.3 Initialization

Before the system is configured with customer specific data it is imperative that a total system initializatiin (TSI) is carried out. There are many parameters that need to be transferred from the EEPROM to the working RAM, that are not accessible to change. The transfer (initialization) is carried out as follows.

S H 7 4 6 S 0 * 00 *

The * are the "send" command (see also later description). TSI takes up to 20 seconds to complete for the S206/408, and up to 90 seconds for the S824. During this time the display shows — —. At the end of TSI the display indicates system readiness by PP.

Some parts of the TSI are also available for partial initialization. This is of use when a particular program section needs major change and thus would be more effective to be reprogrammed from a known "Standard" form. The full list of initialization possibilities are as follows (all are triggered by SO*).

Initialization Depth	**00**	**10**	**20**	**30**	**40**
Standard Data	x	x			
Digit Discrimination Initialization	x		x		
System Abbrev. Numbers clearing	x				x
Digit Discrimination Clear				x	
System Timing Parameters	x				

2.12.4 Programming Operation Codes

Customer data is grouped into specific "code groups" and are all accessed in exactly the same following manner:

(firstly the "pass code" needs to be entered, i.e. SH 746)

S N * C C *

Where N is the particular code group

= 1 for Configuration data display/alter
= 2 for Exchange line data display/alter
= 3 for Station related data display/alter
= 4 for Night switch related data display/alter
= 5 for Digit Discrimination display/alter
= 6 for Maintenance related data display/alter
= 9 for System Abbreviated number display/alter

additionally for the S824 only

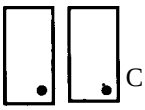
= 7 for CDR format data display/alter
= 8 for Comset key function allocation

and CC is the actual address that is to be effected.

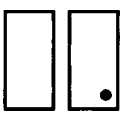
NOTES:

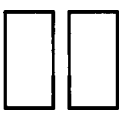
(1) * = Transmit code from Keypad (as displayed at ME) to central processor (equivalent to "carriage return" on a computer terminal).
(2) I* = increment to next code (address)
(3) cc* = jump to code (address) CC
(4) SN * = jump to data group N

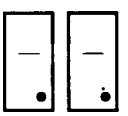
2.12.5 **Display on OSSM**


CPU running

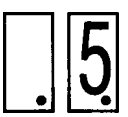
reset, reloading of RAM


reset, reloading of RAM

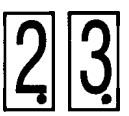

main power off, 5 V power missing, CPU failure

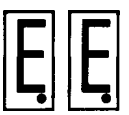

loading of Standard Customer Data


ready for programming


procedure number


code number


flashing = data related to current code number


flashing = incorrect input

2.12.6 Standard Customer Data Records

All Commander S systems are supplied pre-programmed with a standard data package. The following section outlines the depth to which each system can be tailored to suit the specific customer. Information is presented in a form similar to that seen on the programming card, but with more information on "cross-effects".

Note that the programming is basically divided into the following sections:

(i) S1 Configuration Data
(ii) S2 Exchange Line Related Data
(iii) S3 Station Related Data (Daytime Operation)
(iv) S4 Night Switch Related Data (Night Mode "A' Operation)
(v) S7 Call Detail Recording Data (S824 Only)
(vi) S8 Comset Key Allocation Data (S824 Only)

2.12.7 **Configuration Data**

Access to this group of operation codes (Op. Codes) and data is via the Access Code **S1.**

	Op. Code	Std. Data
Exchange Line and Type To indicate the existence of an exchange line and also whether it is a DTMF or Decadic type	01 to 08	10
Station Type The system can automatically distinguish between a Comset and Standard Key station, but it must be told if there is a 2-wire station connected at a particular port. This code is also used to allocate security against intrusion tones (internal and external).	11 to 34	00
Transfer Time Specifies the time that a call may be unanswered at a transferred-to station before recalling at the sending station. It is also used as the time that a call may be left in Common Hold.	41	15
Paging (see also Op. Codes 50, 51) If a two wire module is fitted, paging must be programmed to allow maximum facilities to be available at the two-wire station. Note that the "hardware" for paging on a S824 is standard (ie. not dependent on the fitting of a TWIM-DEC option module).	42	00
Int/Ext./Ext. Conference Advises the system that two party external conference is/is not allowed. Basically depends on the source of the 'exchange" lines (PABX or exchange).	43	10
Exchange Line Release Time When the handset is replaced after the end of an incoming exchange line call, that particular line is not available for reuse for this length of time. This is to ensure that the calling party has released the line and the public exchange has cleared all connections.	44	**03**
Dial Pulse Break Break time for a decadic type exchange network.	**45**	**66**
Dial Pulse Make Make time for a decadic type exchange network.	**46**	**33**
Recall Time When a call is returned to the originator as a result of not being answered, then it is only available for this time. After this period the call is automatically disconnected.	**47**	**20**
Internal Paging Zones (Only for S824) Up to 12 Comset stations can be grouped together and simultaneously accessed on the internal paging link. Two groups can be defined, and stations can appear in either/both groups.	**50** **51**	00 00

2.12.8 Exchange Line Related Data

Access to this group of Op. Codes and data is via Access Code **S2**.

	Op. Code	Std. Data
Recall Key If the Commander S system is sited behind a PABX, this code advises the system as to the type of recall signalling required. For the "earth" recall mode, the earth is maintained while the recall key is depressed. "Flash" recall generates a timed line break Each external line may be individually programmed.	01 to 08	**00**
Exchange Code Behind a PABX an initial digit needs to be sent to select a "real" exchange line. This code also defines the pause between the exchange line selection and dialling commencement.	11 to 18	**00**
Central Alarm Individual lines can be programmed to activate the central alarm	21 to 28	**00**
Call Forwarding Type, Main Answer Point and Alternative Answer Point The data under this combined code address indicates the action to be taken for an incoming exchange line call. The first pair of digits defines the type of forwarding. There are four Forwarding options: 00 = No forwarding, i.e., the call remains at the station allocated for that exchange line. 01 = Forward to the alternate answer point, if the main answer point is unavailable or does not answer within a defined time. Then remain at that station. 02 = Similar to 01, however, if that station is unavailable or after the elapse of the defined time, start a loop search from the first availabl station on the system. Continue to search unt the call is answered or terminated. 03 = Similar to 02, however, the call remains at tha first free station in the system. * The second pair of digits (in the data) defines the main answer point for that exchange line. * The final pair of digits defines the alternate answer point. * If data "11" is programmed as the type of Forwarding, then the system uses data from "group answer" as the ringing point(s).	31 32 33 34 35 36 37 38	01 11 16 01 12 16 01 13 16 01 14 16 01 15 16 01 16 16 01 17 16 01 18 16
Group Answer The system can be programmed to allow an exchange call to be announced at up to 4 stations at the same time. Any station may belong to any group and also may belong to more than one group. Note that when this facility is programmed, the call forwarding programming does not take effect.	41 to 48	**00**

	Op. Code	Std. Data
Auto Forwarding Time The duration of a call at an unanswered station before transfer may (if allowed) take place.	61 to 68	10
Interdigit Interval The interval of time between digit operations before the system returns to a passive state. During dialling this is the maximum time allowed between dialled digits, after which the system returns to a wait state (waiting for a command). After line selection, the first digit must be dialled before this time elapses; otherwise the system releases the line and returns to idle state.	71 to 78	05

2.12.9 **Station Related Data ("Daytime" operation)**

Access to this group of Op. Codes is via the Access Code **S3**.

	Op. Code	Std. Data
Hot Line Station pairs may be assigned together to form a working team which results in additional features/ facilities between them. Note that it is important to determine which of the pair is to be the executive.	01 to 04	**00 00**
Exchange Line Access and Class of Service Each station may be assigned differing access rights to each of the available exchange lines. There are eight discrete levels of access; from COS 0 being no access to exchange lines up to digit COS 7 which allow dialling on the exchange line with no digit discrimination.	11 to 34	12 22 32 42 52 62 72 82 (*see note)
Night Switch Authorization The system can be switched into either mode of night service only from two stations, one of which is programmable. Station 11 is always authorised to perform this operation. Reverting back to daytime operation is only possible from the authorized stations.	41	**00**
Unit Line Selection This feature is available only with the Comset station and provides the user with access to the allocated exchange line, directly on dialling of digits.	51 to 74	**00**

*Note: For S206/408 Op. Code: 11 to 18. Data 12 22 12 42

2.12.10 **Night Switch Related Data**

Access to this group of Op. Codes is via the Access Code S4.

	Op. Code	Std. Data
Exchange Line Access and Class of Service Under the condition of night mode "A" operation, a complete alternate assignation of access rights can be made. The form and format is identical to that for daytime operation.	11 to 34	12 22 32 42 12 62 72 82 (*see note)
Call Allocation Night mode "A" operation does not allow any call forwarding to take place. A new set of main answer points needs to be defined, or, alternatively, "group answer" invoked.	41 to 48	00
Group Answer Provides the facility whereby more than one (up to a maximum of 4) station can be rung on an incoming external call.	51 52 53 54 55 56 57 58	11 16 00 00 12 16 00 00 13 16 00 00 14 16 00 00 15 16 00 00 16 16 00 00 17 16 00 00 18 16 00 00
Central Alarm Activation of central alarm also needs to be redefined for this mode. Similar to the daytime operation, each line can be individually enabled.	61 to 68	**00**

*Note: For S206/408 Op. Code: 11 to 18. Data 12 22 32 42

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2.12.11 **Service Data**

Access to this group of Op. Codes is via the Access Code S6.

	Op. Code	Std. Data
Quality-Counter Program Monitors the running of the normal program and searches for any resets due to the system running into a "FF" address.	*01*	*00*
Quality-Counter Reset Monitors the total number of times that the system has been reset by any cause.	02	*00*
Quality-Counter C-Data Monitors for any mismatch between customer data held in EEPROM and the working copy held in RAM.	03	00
Quality-Counter EEPROM Monitors data held in EEPROM via a checksum procedure, and indicates the number of times a correction has been required.	04	00
Quality-Counter EPROM Monitors the data held in EPROM and reports any deviation compared to the checksum.	05	00
DAT Error Error in communication between the main processor and the interface processor.	**06**	**00**
Interface DAT-PAD Error in communication between interface processor and station processor.	**07**	**00**
Running Time Indication (in hours) of the time that the system is running in self-test mode. Used only in burn-in testing.	**08**	**00**
System Software Main software level number.	09	01
Country Code	**10**	**00**
Version Number Reflect minor changes within the main level number	11	01
Software Production Detail (824 only) xx = production location code yy = patch version zz. .zz = CRC value	21	xx yy zz. .zz

Note: The usefulness of the data presented by this Code group is more fully appreciated at central repair workshops.

2.12.12 **Call Detail Recording Data**

Access to this group of Op. Codes is via the Access Code **S7.**

	Op. Code	Std. Data
Exchange Line Related Data Defines which exchange lines will/will not produce a message for incoming/outgoing calls and whether account codes will be printed out for the particular line.	01 to 08	**00 00**
Station Related Data Defines which station will/will not be reported on printouts for incoming/outgoing calls, and whether account codes will be printed for the particular station.	11 to 34	**00 00**
Numbers Related Data Defines which station numbers are to be printed and the masking of the externally dialled numbers.	41 to 64	00 02
System Related Data Minimum time all exchange lines must be busy before an "all trunks busy" message is generated.	71	**00**
Minimum time on exchange line has to be clear before a timing is to be stopped.	72	**00**
Minimum exchange line connection time before a message will be generated.	73	30
Printing of "all trunks busy" and/or "lost call" messages.	74	00
Printer type	75	00
Printing of header	76	00
Length of paper (in lines)	77	72
Number of datasets (printed lines) per page	78	68
Control characters at beginning or end of each minted line.	79	00
Data Elements Defines the information to be printed and the actual position in the printed string.	81 82 83 84 85 86 87 88 89 90 91	00 01 02 03 04 05 10 13 99

2.12.13 **Comset DSS Button Field Code Allocation (S824 only)**

Access to this group of Op. Codes is via the Access Code **S8.**

		Op. Code	Std. Data
The function of each key of the DSS field of a Comset can be defined. Each station has 4 "lines" of data, related to the four rows of buttons Note that for the Comset On-Hook Station, only the first two rows of data have any significance.	Stn 11	01	01 01 01 02 01 03 01 04
		02	01 05 01 06 01 07 01 08
		03	02 12 02 13 02 14 02 15
		04	02 16 02 17 02 18 16 00
	Stn 12	05	01 01 01 02 01 03 01 04
		06	01 05 01 06 01 07 01 08
		07	02 11 02 13 02 14 02 15
		08	02 16 02 17 02 18 16 00
	Stn 13	09	0101 0102 0103 0104
		10	01 05 01 06 01 07 01 08
		11	0212 0211 0214 0215
		12	02 16 02 17 02 18 16 00
	Stn 14	13	0101 0102 0103 0104
		14	01 05 01 06 01 07 01 08
		15	02 12 02 13 02 11 02 15
		16	02 16 02 17 02 18 16 00
	Stn 15	17	0101 0102 0103 0104
		18	01 05 01 06 01 07 01 08
		19	02 12 02 13 02 14 02 11
		20	02 16 02 17 02 18 16 00
	Stn 16	21	0101 0102 0103 0104
		22	01 05 01 06 01 07 01 08
		23	02 12 02 13 02 14 02 15
		24	02 11 02 17 02 18 16 00
	Stn 17	25	01 01 01 02 01 03 01 04
		26	01 05 01 06 01 07 01 08
		27	02 12 02 13 02 14 02 15
		28	0216 0211 0218 1600
	Stn 18	29	01 01 01 02 01 03 01 04
		30	01 05 01 06 01 07 01 08
		31	02 12 02 13 02 14 02 15
		32	02 16 02 17 02 11 16 00
	Stn 19	33	0101 0102 0103 0104
		34	01 05 01 06 01 07 01 08
		35	02 20 02 21 02 22 02 23
		36	02 24 02 25 02 26 16 00
	Stn 20	37	0101 01 02 01 03 01 04
		38	01 05 01 06 01 07 01 08
		39	02 19 02 21 02 22 02 23
		40	02 24 02 25 02 26 16 00
	Stn 21	41	0101 0102 0103 0104
		42	01 05 01 06 01 07 01 08
		43	02 20 02 19 02 22 02 23
		44	02 24 02 25 02 26 16 00
	Stn 22	45	01 01 01 02 01 03 01 04
		46	01 05 01 06 01 07 01 08
		47	02 20 02 21 02 19 02 23
		48	02 24 02 25 02 26 16 00
	Stn 23	49	01 01 01 02 01 03 01 04
		50	01 05 01 06 01 07 01 08
		51	02 20 02 21 02 22 02 19
		52	02 24 02 25 02 26 16 00

	Op. Code	Std. Data
Stn 24	53	0101 0102 0103 0104
	54	0105 0106 0107 0108
	55	02 20 02 21 02 22 02 23
	56	02 19 02 25 02 26 1600
Stn 25	57	0101 0102 0103 0104
	58	0105 0106 0107 0108
	59	02 20 02 21 02 22 0223
	60	02 24 02 19 0226 1600
Stn 26	61	0101 0102 0103 0104
	62	0105 0106 0107 0108
	63	02 20 02 21 02 22 02 23
	64	02 24 02 25 02 19 1600
Stn 27	65	0101 0102 0103 0104
	66	0105 0106 0107 0108
	67	02 28 02 29 02 30 0231
	68	02 32 0233 02 34 1600
Stn 28	69	0101 0102 0103 0104
	70	0105 0106 0107 0108
	71	02 27 02 29 0230 0231
	72	02 32 02 33 02 34 16 00
Stn 29	73	0101 0102 0103 0104
	74	0105 0106 0107 0108
	75	0228 0227 0230 0231
	76	0232 0233 02 34 1600
Stn 30	77	0101 0102 0103 0104
	78	0105 0106 0107 0108
	79	02 28 02 29 02 27 02 31
	80	0232 02 33 02 34 1600
Stn 31	81	0101 0102 0103 0104
	82	0105 0106 0107 0108
	83	02 28 02 29 02 30 02 27
	84	02 32 02 33 02 34 1600
Stn 32	85	0101 0102 0103 0104
	86	0105 0106 0107 0108
	87	02 28 02 29 02 30 02 31
	88	02 27 02 33 0234 16 00
Stn 33	89	0101 0102 0103 0104
	90	0105 0106 0107 0108
	91	02 28 0229 0230 0231
	92	02 32 02 27 02 34 16 00
Stn 34	93	0101 0102 0103 0104
	94	0105 0106 0107 0108
	95	02 28 0229 02 30 0231
	96	02 32 02 33 02 27 1600

2.12.14 **Date and Abbreviated Numbers**

Note that this code group can be accessed also directly by the user, without the "pass code". This is the S9 code group.

	Op. Code	Std. Data
Setting of Time		
Year	01	00
Month	02	00
Day	03	00
Hour	04	00
Minute	05	00
Second	06	00
12/24 hour display	07	10
System Abbreviated Numbers	10	FF
Numbers that are to be accessed by all stations may be stored in these locations	to 59	

2.13 CUSTOMER DATA RECORD OPTIONS

The following details summarize the options available within each operation code under each of the main access codes.

SYSTEM CONFIGURATION DATA S1

Characteristic		Op. Code	Data	Remarks
Exchange Line	L1	01	30 = non existent	Dialling method
	L2	02	10 = Decadic	
	L3	03	20 = DTMF	
	L4	04		
	L5	05		
	L6	06		
	L7	07		
	L8	08		
Station Type	Stn 11	11	DO = 4-wire station	secure = no break-in tones, no interrupts
	Stn 12	12	01 = 2-wire Telephone	
	Stn 13	13	10 = 4-wire station data secure	
	Stn 14	14		
	Stn 15	15	11 = 2-wire Telephone data secure	
	Stn 16	16		
	Stn 17	17		
	Stn 18	18		
	Stn 19	19		
	Stn 20	20		
	Stn 21	21		
	Stn 22	22		
	Stn 23	23		
	Stn 24	24		
	Stn 25	25		
	Stn 26	26		
	Stn 27	27		
	Stn 28	28		
	Stn 29	29		
	Stn 30	30		
	Stn 31	31		
	Stn 32	32		
	Stn 33	33		
	Stn 34	34		
Transfer time before recall		41	01-99	Data x 2 sec
Paging existent		42	00 = no, 10 = yes	
Int/Ext/Ext conference		43	00 = no. 10 = ves	
Exchange line release time		**44**	**00-99**	Data x 1 sec
Dial Pulse break		45	01-99	Data x 1 msec
Dial Pulse make		46	01-99	Data x 1 msec
Recall time		47	00-99	Data x 1 sec
Internal Paging: Zone A		50	station number	Up to 12 sets
Internal Paging: Zone B		51	station number	Up to 12 sets

LINE DATA S2

Characteristic		Op. Code	Data	Remarks
Recall Key Function	L1	01	30 = not required	Flashtime = X x Y x 20 msec
	L2	02	10 = Earth	e.g. for 320 mS
	L3	03	21-99 = Flash + Time	= 4 x 4 x 20
	L4	04		i.e. data = 44
	L5	05		
	L6	06		
	L7	07		
	L8	08		
Exchange Code	L1	11	30-99	Programmable switch over time for reconnection to PABX
	L2	12	30 = not required	
	L3	13	X = 1-9 x 1 sec (pause)	
	L4	14	Y = O-9 PABX code	
	L5	15		
	L6	16		
	L7	17		
	L8	18		
Central Alarm	L1	21	00 = off	
	L2	22	10 = on	
	L3	23		
	L4	24		
	L5	25		
	L6	26		
	L7	27		
	L8	28		
Call Forwarding Type	L1	31	first two byte = option	Option 00 = only (A)
Main Answer Point (A)	L2	32	3. + 4. byte = main answer point (A)	Option 01 = (A) then (B)
Alt. Answer Point (B)	L3	33		Option 02 = (A) then (B) then search
	L4	34		Option 03 = (A) then (B) then search then stop
	L5	35		11 = group call
	L6	36	5 + 6 byte = alternative answer point (B)	
	L7	37		
	L8	38		
Group Call	L1	41	11-18	Maximum of 4 stations. Insert all stations in that particular group
	L2	42		
	L3	43		
	L4	44		
	L5	45		
	L6	46		
	L7	47		
	L8	48		
Auto Forwarding time	L1	61	01-15	Number of ringing cycles
	L2	62		
	L3	63		
	L4	64		
	L5	65		
	L6	66		
	L7	67		
	L8	68		
Interdigit Interval (Post dial Pulse)	L1	71	00-15 = Time x 2 sec	Maximum time allowed between two button operations at external dialling
	L2	72		00 = non-limited time
	L3	73		
	L4	74		
	L5	75		
	L6	76		
	L7	77		
	L8	78		

STATION DATA S3

Characteristic		Op. Code	Data	Remarks
Hot Line Pairs		01 02 03 04	00 00 not required 1st two byte = chief number 2nd two byte = secretary number	
Class of Service	Stn 11	11	1X, 2x, 3x, 4x, 5X, 6X, 7X, 8X l-8 line x = cos: 0 internal 1 incoming only 2-7 according to barring data	For each line specified COS
	Stn 12	12		
	Stn 13	13		
	Stn 14	14		
	Stn 15	15		
	Stn 16	16		
	Stn 17	17		
	Stn 18	18		
	Stn 19	19		
	Stn 20	20		
	Stn 21	21		
	Stn 22	22		
	Stn 23	23		
	Stn 24	24		
	Stn 25	25		
	Stn 26	26		
	Stn 27	27		
	Stn 28	28		
	Stn 29	29		
	Stn 30	30		
	Stn 31	31		
	Stn 32	32		
	Stn 33	33		
	Stn 34	24		
Night Switch Authorization		41	DO = only station 11 12-18 = other stations	
Unit line only Comset	Stn 11	51	DO = not connected 1Y = connected Y = line number for automatic line connection	
	Stn 12	52		
	Stn 13	53		
	Stn 14	54		
	Stn 15	55		
	Stn 16	56		
	Stn 17	57		
	Stn 18	58		
	Stn 19	59		
	Stn 20	60		
	Stn 21	61		
	Stn 22	62		
	Stn 23	63		
	Stn 24	64		
	Stn 25	65		
	Stn 26	66		
	Stn 27	67		
	Stn 28	68		
	Stn 29	69		
	Stn 30	70		
	Stn 31	71		
	Stn 32	72		
	Stn 33	73		
	Stn 34	74		

STATION AND LINE DATA **FOR NIGHT SERVICE S4**

Characteristic		Op. Code	Data	Remarks
Class of Service	Stn 11	11	1X, 2x, 3x, 4x, 5X, 6X, 7X, 8X l-8 line x = cos: 0 internal 1 incoming only 2-7 according to barring data	For each line specified COS
	Stn 12	12		
	Stn 13	13		
	Stn 14	14		
	Stn 15	15		
	Stn 16	16		
	Stn 17	17		
	Stn 18	18		
	Stn 19	19		
	Stn 20	20		
	Stn 21	21		
	Stn 22	22		
	Stn 23	23		
	Stn 24	24		
	Stn 25	25		
	Stn 26	26		
	Stn 27	27		
	Stn 28	28		
	Stn 29	29		
	Stn 30	30		
	Stn 31	31		
	Stn 32	32		
	Stn 33	33		
	Stn 34	34		
Call Allocation	L1	41	00 = group call XX = station number	Call forwarding options are reduced to option 01
	L2	42		
	L3	43		
	L4	44		
	L5	45		
	L6	46		
	L7	47		
	L8	48		
Group Call	L1	51	11-18 insert all stations in that particular group	Maximum of 4 stations
	L2	52		
	L3	53		
	L4	54		
	L5	55		
	L6	56		
	L7	57		
	L8	58		
Central Alarm	L1	61	00 = off 10 = on	
	L2	62		
	L3	63		
	L4	64		
	L5	65		
	L6	66		
	L7	67		
	L8	68		

CALL DETAIL RECORDING DATA S7

Characteristic	Op. Code	Data
Exchange Line L1 Related Data L2 L3 L4 L5 L6 L7 L8	01 02 03 04 05 06 07 08	AB CD

where	A	Incoming Call Reported YES	Incoming Call Reported NO	Outgong Call Reported YES	Outgong Call Reported NO
	= 0	X	— X	—	
	1	—	x	x	—
	2	x	-	-	x
	3	-	x	-	x

	Account Code Reported YES	Account Code Reported NO	Data Transfer Reported YES	Data Transfer Reported NO
B=O	X		— X	—
1	—	x	X	
2	x	-	-	x
3	-	x	-	x

C = 0: connection to this exchange line will be reported.
= 1: connection to this exchange line will be ignored.
D = 0: fixed data (for future use) ignored at present.

Characteristic		OP. Code	Data
Station Related Data	Stn 11	11	AB C D
	Stn 12	12	
	Stn 13	13	
	Stn 14	14	
	Stn 15	15	
	Stn 16	16	
	Stn 17	17	
	Stn 18	18	
	Stn 19	19	
	Stn 20	20	
	Stn 21	21	
	Stn 22	22	
	Stn 23	23	
	Stn 24	24	
	Stn 25	25	
	Stn 26	26	
	Stn 27	27	
	Stn 28	28	
	Stn 29	29	
	Stn 30	30	
	Stn 31	31	
	Stn 32	32	
	Stn 33	33	
	Stn 34	34	

where	A	Incoming Call Reported YES	Incoming Call Reported NO	Outgong Call Reported YES	Outgong Call Reported NO
	= 0	X	—	x	—
	1	—	X	x	—
	2	X	— —		x
	3	—	x	—	x

	Account Code Reported YES	Account Code Reported NO	Data Transfer Reported YES	Data Transfer Reported NO
B = O	X	—	X	—
1	—	X	X	—
2	X			X
3		X		X

C = 0: connections from this station are to be reported.
= 1: connections from this station do not get reported.
D = 0: fixed data (for future use) ignored at present.

Characteristic		Op. Code	Data	Remarks
Numbers Related Data	Stn 11	41	AB CD	A = 0: for printout of internal station number = 1: for no recording of internal station number B = 0: for non-printing of 'C' or 'D' externally dialled digits = 1: for non-printing of any externally dialled number C = O-9: quantity of digits not printed at start of externally dialled number D = O-9: quantity of digits not printed at end of externally dialled number
	Stn 12	42		
	Stn 13	43		
	Stn 14	44		
	Stn 15	45		
	Stn 16	46		
	Stn 17	47		
	Stn 18	48		
	Stn 19	49		
	Stn 20	50		
	Stn 21	51		
	Stn 22	52		
	Stn 23	53		
	Stn 24	54		
	Stn 25	55		
	Stn 26	56		
	Stn 27	57		
	Stn 28	58		
	Stn 29	59		
	Stn 30	60		
	Stn 31	61		
	Stn 32	62		
	Stn 33	63		
	Stn 34	64		

Characteristic	Op. Code	Data	Remarks
All Trunks Busy Time	71	xx where xx = 00 to 99 sec	Minimum ATB time before message
Call Terminated Timer	72	xx where xx = 00 to 99 sec	Line connect timing is stopped
Call Start Timer	73	xx where xx = 00 to 99 sec	Timing is started after this period
Message Print	74	xy ATB = x (Yes 1, No 0) lost calls = y (Yes 1, No 0)	
Printer Type	75	xy where xy = 00 for PT88	
Header Printing	76	xy where x = 0 (fixed) y = 0: print header = 1: no header = 2: print header and line space	
Paper Length	77	xx where xx = length of paper in "print lines"	

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Characteristic		Op. Code	Data	Remarks
Printed Lines		78	xx where xx = 00 to 99	Number of lines printed before "form feed'
Printer Control Characters		79	xy where x = Before Data, y = After Data CR and LF: x = 0, y = 3 Cr: x = 1, y = 1 LF: x = 2, y = 2 No Control: x = 3, y = 0	Sent to the printer, before or at the end of each line of date
Print Data	1	81	xx	Refer to "CDR Data Table"
	2	82	xx	
	3	83	xx	
	4	84	xx	
	5	85	xx	
	6	86	xx	
	7	87	xx	
	8	88	xx	
	9	89	xx	
	10	90	xx	
	11	91	xx where xx = 00-13, 99	

CDR DATA TABLE

Item	Print Data Code	Length
Class of call	00	7
Date	01	10
Time	02	10
Line	03	6
Duration	04	10
Station Number	05	5
Dialled Number	06	22
Ring Duration	07	7
Account Code	08	10
Dialled Number or Ring Duration	09	22
Dialled Number or Account Code or Ring Duration	10	22
Dialled Number or Account Code	11	22
Rinq Duration or Account Code	12	10
Information	13	10
End of set	99	—

Note that the total length of the data string (made up by summing the length of the individual data items) must not exceed 80 characters. The printer control characters need to be included within this 80 character limit.

DEFINITION OF TERMS ON 'CDR" PRINTOUT

Class: Class of call, printed out as follows:
INC for incoming calls
OTG for outgoing calls

Date: The date of the call, printed out as day/month/year

Time: The time that the call commenced/was made, printed as hours: minutes: seconds:

Line: The line used for outgoing or incoming calls

Duration: The duration of the call is printed out in hours: minutes: seconds. The timing of the call commences after the first digit is dialled, with a delay as programmed in the Customer Data.

ST # : The internal station number of the destination of an incoming call, or station making an outside call.

Dialled # : The dialled number (up to a maximum of 20 digits) is printed out. Masking of the number, either first 'n' positions or last 'n' positions is as programmed in the Customer Data.

Ring: The time in minutes and seconds that a caller waited before the call was answered.

AC: If it is necessary to charge calls to a department, an individual extension, or a client, account codes can be entered at any time during the call.

Info.: Additional information about the call, e.g. if it was a voice call (voice), data transfer, group call (g.c.), account code (AC), conference (conf.).

There are twelve buffer storage areas for call details. These memory locations store call information when the printer is out of service. If this period extends beyond the buffer capacity, then any new information is registered only as quantity.

When the printer is returned to service, the buffer information and "number of calls lost" information is immediately printed.

If all exchange lines are busy for a minimum time as defined in Customer Data then the message "all trunks busy" together with the duration of this condition is printed.

COMSET DSS FIELD BUTTON ALLOCATION S8

Characteristic	Op. Code	Data A_1B_1	C_1D_1	A_2B_2	C_2D_2	A_3B_3	C_3D_3	A_4B_4	C_4D_4
Station 11									
Key 1-4	01	01	01	01	02	01	03	01	04
Key 5-8	02	01	05	01	06	01	07	01	08
Key 9-12	03	02	12	02	13	02	14	02	15
Key 13-16	04	02	16	02	17	02	18	16	00
Station 12									
Key 1-4	05	01	01	01	02	01	03	01	04
Key 5-8	06	01	05	01	06	01	07	01	08
Key 9-12	07	02	11	02	13	02	14	02	15
Key 13-16	08	02	16	02	17	02	18	16	00
Station 13									
Key 1-4	09	01	01	01	02	01	03	01	04
Key 5-8	10	01	05	01	06	01	07	01	08
Key 9-12	11	02	12	02	11	02	14	02	15
Key 13-16	12	02	16	02	17	02	18	16	00
Station 14									
Key 1-4	13	01	01	01	02	01	03	01	04
Key 5-8	14	01	05	01	06	01	07	01	08
Key 9-12	15	02	12	02	13	02	11	02	15
Key 13-16	16	02	16	02	17	02	18	16	00
Station 15									
Key 1-4	17	01	01	01	02	01	03	01	04
Key 5-8	18	01	05	01	06	01	07	01	08
Key 9-12	19	02	12	02	13	02	14	02	11
Key 13-16	20	02	16	02	17	02	18	16	00
Station 16									
Key 1-4	21	01	01	01	02	01	03	01	04
Key 5-8	22	01	05	01	06	01	07	01	08
Key 9-12	23	02	12	02	13	02	14	02	15
Key 13-16	24	02	11	02	17	02	18	16	00
Station 17									
Key 1-4	25	01	01	01	02	01	03	01	04
Key 5-8	26	01	05	01	06	01	07	01	08
Key 9-12	27	02	12	02	13	02	14	02	15
Key 13-16	28	02	16	02	11	02	18	16	00
Station 18									
Key 1-4	29	01	01	01	02	01	03	01	04
Key 5-8	30	01	05	01	06	01	07	01	08
Key 9-12	31	02	12	02	13	02	14	02	15
Key 13-16	32	02	16	02	17	02	11	16	00
Station 19									
Key 1-4	33	01	01	01	02	01	03	01	04
Key 5-8	34	01	05	01	06	01	07	01	08
Key 9-12	35	02	20	02	21	02	22	02	23
Key 13-16	36	02	24	02	25	02	26	16	00
Station 20									
Key 1-4	37	01	01	01	02	01	03	01	04
Key 5-8	38	01	05	01	06	01	07	01	08
Key 9-12	39	02	19	02	21	02	22	02	23
Key 13-16	40	02	24	02	25	02	26	16	00
Station 21									
Key 1-4	41	01	01	01	02	01	03	01	04
Key 5-8	42	01	05	01	06	01	07	01	08
Key 9-12	43	02	20	02	19	02	22	02	23
Kew 13-16	44	02	24	02	25	02	26	16	00

COMSET DSS FIELD BUTTON ALLOCATION S8

Characteristic	Op. Code	Data A_1B_1	C_1D_1	A_2B_2	C_2D_2	A_3B_3	C_3D_3	A_4B_4	C_4D_4
Station 22									
Key 1-4	45	01	01	01	02	01	03	01	04
Key 5-8	46	01	05	01	06	01	07	01	08
Key 9-12	47	02	20	02	21	02	19	02	23
Key 13-16	48	02	24	02	25	02	26	16	00
Station 23									
Key 1-4	49	01	01	01	02	01	03	01	04
Key 5-8	50	01	05	01	06	01	07	01	08
Key 9-12	51	02	20	02	21	02	22	02	19
Key 13-16	52	02	24	02	25	02	26	16	00
Station 24									
Key 1-4	53	01	01	01	02	01	03	01	04
Key 5-8	54	01	05	01	06	01	07	01	08
Key 9-12	55	02	20	02	21	02	22	02	23
Key 13-16	56	02	19	02	25	02	26	16	00
Station 25									
Key 1-4	57	01	01	01	02	01	03	01	04
Key 5-8	58	01	05	01	06	01	07	01	08
Key 9-12	59	02	20	02	21	02	22	02	23
Key 13-16	60	02	24	02	19	02	26	16	00
Station 26									
Key 1-4	61	01	01	01	02	01	03	01	04
Key 5-8	62	01	05	01	06	01	07	01	08
Key 9-12	63	02	20	02	21	02	22	02	23
Key 13-16	64	02	24	02	25	02	19	16	00
Station 27									
Key 1-4	65	01	01	01	02	01	03	01	04
Key 5-8	66	01	05	01	06	01	07	01	08
Key 9-12	67	02	28	02	29	02	30	02	31
Key 13-16	68	02	32	02	33	02	34	16	00
Station 28									
Key 1-4	69	01	01	01	02	01	03	01	04
Key 5-8	70	01	05	01	06	01	07	01	08
Key 9-12	71	02	27	02	29	02	30	02	31
Key 13-16	72	02	32	02	33	02	34	16	00
Station 29									
Key 1-4	73	01	01	01	02	01	03	01	04
Key 5-8	74	01	05	01	06	01	07	01	08
Key 9-12	75	02	28	02	27	02	30	02	31
Key 13-16	76	02	32	02	33	02	34	16	00
Station 30									
Key 1-4	77	01	01	01	02	01	03	01	04
Key 5-8	78	01	05	01	06	01	07	01	08
Key 9-12	79	02	28	02	29	02	27	02	31
Key 13-16	80	02	32	02	33	02	34	16	00
Station 31									
Key 1-4	81	01	01	01	02	01	03	01	04
Key 5-8	82	01	05	01	06	01	07	01	08
Key 9-12	83	02	28	02	29	02	30	02	27
Key 13-16	84	02	32	02	33	02	34	16	00
Station 32									
Key 1-4	85	01	01	01	02	01	03	01	04
Key 5-8	86	01	05	01	06	01	07	01	08
Key 9-12	87	02	28	02	29	02	30	02	31
Key 13-16	88	02	27	02	33	02	34	16	00

COMSET DSS FIELD BUTTON ALLOCATION S8

Characteristic	Op. Code	Data A_1B_1	C_1D_1	A_2B_2	C_2D_2	A_3B_3	C_3D_3	A_4B_4	C_4D_4
Station 33									
Key 1-4	**89**	01	01	01	02	01	03	01	04
Key 5-8	**90**	01	05	01	06	01	07	01	08
Key 9-12	91	02	28	02	29	02	30	02	31
Key 13-16	92	02	32	02	27	02	34	16	00
Station 34									
Key 1-4	**93**	01	01	01	02	01	03	01	04
Key 5-8	**94**	01	05	01	06	01	07	01	08
Key 9-12	**95**	02	28	02	29	02	30	02	31
Kev 13-16	**96**	02	32	02	33	02	27	16	00

Note: the programming of each key requires two "bytes", AB and CD. The first byte (AB) allocates the function and the second byte (CD) the additional information.

Function	Code (AB)	Data (CD)
Exchange Line Select	01	01-08
Direct Station Select	02	11-34
Call Forwarding	11	11-34
Do-not-disturb	13	00
Night Service-fixed	14	00
Night Service-variable	14	11-34
Message Wait	16	00
Conference (Add-on)	17	00
Direct Call	18	11-34
Data Station	19	00
Station Abbrev. Number	20	00-09
System Abbrev. Number	20	10-59
Hot-line messages:		
please wait/priority call	30	01
take message/meeting	30	02
Paging:		
All Call	40	00
Zone 1	40	01
Zone 2	40	02
Zone 1 & 2	40	04
External	40	05

Note: Hot-line messages are only displayed on the Comset-D station, and have no meaning to the Comset Handsfree and Comset On-Hook dialling stations.

2.14 CLASS OF SERVICE/ACCESS BARRING (S5)

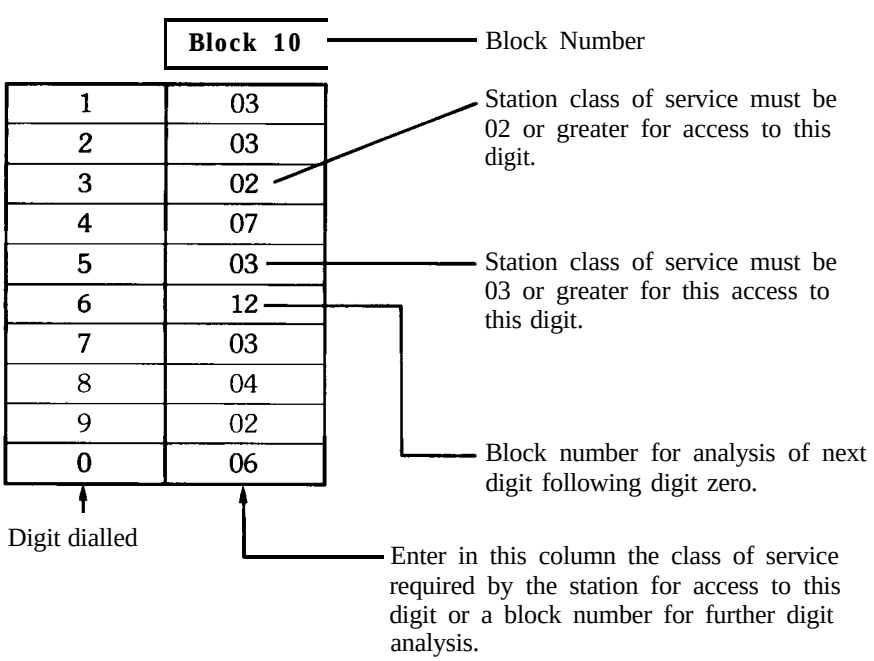
The system provides for up to eight distinct "class of services", from COS 00 to COS 07. These classes relate to access rights to exchange lines.

- COS 00 is defined as no access for that exchange line
- COS 01 allows access only for answering of calls (for that exchange line)
- COS 07 provides for open access, i.e. no digit discrimination when that particular line is used.

COS 02 to COS 06 are freely definable, but as Standard Data provide the following:

COS	ACCESSIBLE EXCHANGE PREFIXES
02 local network	1 to 9 000 008 013 019 0161 to 0169
03 manual operator connected calls	011 012 015 017
04 STD	02 to 09 002 to 004 007 018 0160
06 International Services (ISD)	001 010

Concept of Barring Block
EXAMPLE



The access barring always begins by using the first digit dialled (after the selection of an exchange line) as an index to find the corresponding entry in the access barring Block 08. If the entry contains a required access right (COS 00 to 07), this code will be compared with the COS code of the station dialling this digit. If the class of service of the station is lower than the class of service required for this digit, the line will be released and the station will receive busy tone.

If the class of service of the station is the same or greater than required, the digit analysis ends. If the entry contains a block number, the dialling is still allowed because it cannot be yet decided which class of service is required. This block number will be used to check the second digit dialled in the same way as the first digit was compared, and so on for further digit analysis.

Standard number Access Scheme

First digit dialled

Block 08

Digit	B/C	Data
1	C	02
2	c	02
3	c	02
4	C	02
5	C	02
6	C	02
7	C	02
8	C	02
9	C	02
0	B	09

Block 09

Digit	B/C	Data
1	B	10
2	C	04
3	C	04
4	C	04
5	C	04
6	C	04
7	C	04
8	C	04
9	C	04
0	B	11

Block 10

Digit	B/C	Data
1	C	03
2	C	03
3	C	02
4	C	07
5	c	03
6	C	12
7	C	03
8	C	04
9	C	02
0	C	06

Block 11

Digit	B/C	Data
1	C	1061
2	c	04
3	c	04
4	c	04
5	c	07
6	C	07
7	C	04
8	C	02
9	C	07
0	C	02

Block 12

Digit	B/C	Data
1	C	02
2	C	02
3	C	02
4	C	02
5	C	02
6	C	02
7	C	02
8	C	02
9	C	02
0	C	04

Block 13

Digit	B/C	Data
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		

Block 14

Digit	B/C	Data
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		

Block 15

Digit	B/C	Data
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		

NOTES: 1) B/C column is for information only.
2) B represents block number for further analysis.
3) C represents class of service required for this digit.

Programming of Discrimination / Barred numbers

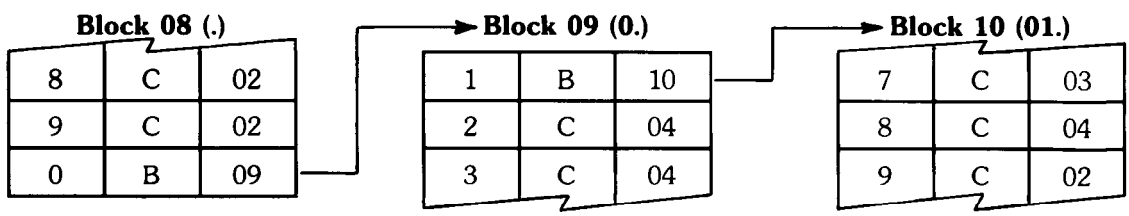
If it is necessary to change the standard data, then the procedure is as follows:

1. (After normal access to the programming mode) press S, digit 5, then the * key.
2. Enter the two digit number of the block to be accessed, and press the * key to send this information.
3. The display will now show the data for digit '1' of this block.
4. Press the * key to increment to the next digit within this block.
   Note: Repeated pressing of the * key will increment the display out of the current block, and into the next block.
5. Immediate access to the next block can be achieved by pressing the * key, I key, * key.
6. All analysis starts at Block 08.

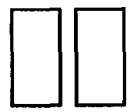
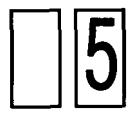
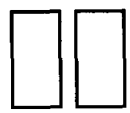
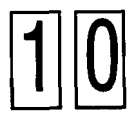
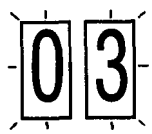
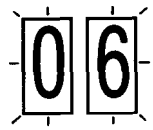
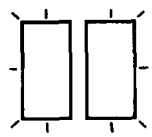
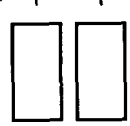
The following examples should serve to indicate the procedure for alteration to these blocks:

- Example 1: Prefix code 018 to be available to stations of COS (Class of Service) 02

Examination for this code (from standard data) indicates the following:



Which means that digit 8 of block 10 needs to be changed to 02.
From station 11 (or M.E.) carry out the following:

Action	Indication on display	Comment
1. Handset off hook		
2. Press S H X X X (XXX = pass code)		Ready for programming
3. Press S 5		Procedure # 5
4. Press *		Sent to central processor
5. Press **1 0**		Block to be examined
6. Press *		To examine/alter data for first digit. The display is in flashing mode indicating that it shows data.
7. Press * 7 more times (Note: In between * the display indicates --)		To access data for digit 8
8. Press 0 and 2		New data for this position
9. Press *		Previous data sent, and next positional data now is on the display
10. Handset on-hook		

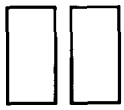
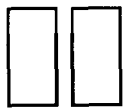
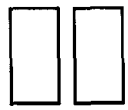
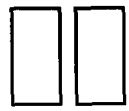
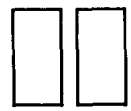
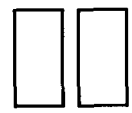
● Example 2: A new prefix code 052 is to be available for stations of COS 02 (and above).
The first digit (0) of the code is examined by Block 08, and this has (in standard data) a pointer to Block 09 for evaluation of the next (second) digit.
The second digit (5) of the code, in Block 09 originally shows access to stations of COS 04. This will need to be changed to show a pointer for further digit evaluation. Blocks 10 and 11 contain data, so the first available block is 13. At position 5 in Block 09 the data will need to be changed to 12.

The table for Block 13 will need to be:

Digit	B/C	Data
1	C	07
2	C	02
3	C	07
4	C	07
5	C	07
6	C	07
7	C	07
8	C	07
9	C	07
0	C	07

Note that at all digit positions EXCEPT 2, that the COS is 07.
At digit 2, the COS is entered for the access right to the "full" number 052.

From station 11 (or the M.E.) the action is as follows:

Action	Indication on display	Comment
1. Handset off hook		
2. Press **S H X X X S 5 ***		milar to steps **2-4** previous example
3. Press 09 * * * * *		ata for digit 5 at ock 09
4. Press **1 3 ***		hows data for next igit position
5. Press **s5 ***		ack to "overhead" rogramming mode
6. Press **12 ***		o get to 2nd digit of lock 12
7. Press **02 ***		how data for next igit position
8. To verify that the data has been entered: **s 5 * 13 * ***		
9. Handset on-hook		

Note: That the number of * key pressings after the entry of Block number, increments the display to the required digit positions. Pauses are allowable between the * key pressings, and this will in fact display the data for the intermediate digits.

2.15 CUSTOMER ACCESSIBLE PROCEDURES

2.15.1 S206/408

The only procedures that are accessible without the service procedure relate to the storage and examination/interrogation of abbreviated numbers. There are two groups of abbreviated numbers:

(1) the system group.

(2) the station group.

The procedure for storing station abbreviated numbers is described in the section dealing with "Facility Descriptions" (1.9.5). Each station can only access its own group of station numbers.

A second group of abbreviated numbers exists in the system domain, i.e. accessible by all stations. These numbers can be programmed only from station 11, or the programming socket at the main equipment. Fifty locations of up to 20 digit long numbers can be stored; the procedure is as follows: (handset off-hook).

S9 * AA * DD DD DD * etc.

Where AA = storage address

DD = stored numbers (in pairs).

Interrogation of System Store Abbreviated Numbers

The procedure for interrogation of system stored abbreviated numbers is as follows: (handset off-hook).

S9 * AA * __ * -- * -- * etc.

The stored numbers will be displayed as flashing digit pairs, pressing the * key will display the next pair of digits, they will not scroll to the left as in the earlier S systems. Please note that the only valid addresses (AA) are 10-59; station abbreviated numbers cannot be interrogated.

2.15.2 S824

In addition to the procedure available for the S206/408 (as per section 2.15.1) the S824 allows access to the time and date setting codes.

Characteristic	Op Code	Standard Data	Remarks
Year	01	00	
Month	02	00	
Day	03	00	
Hour	04	00	
Minute	05	00	
Second	06	00	
24 hour/l2 hour display	07	10	00 = 12 hour 10 = 24 hour

Programming is carried out (from station 11 only!) via the access code S9, in the normal manner. The data is loaded into the system when the station is returned to the on-hook condition.

2.16 CUSTOMER DATA RECORD CARD

Refer to Appendix 2 "Commander Telephone System Order Form" for layout details of this card. Note that for on-site purposes the "Installation Pack" contains a Customer Data Record Booklet, with pages also for service history details.

2.17 COMMISSIONING PROCEDURE

The following steps should be followed to give the system a final test before commissioning. Refer to Appendix 1 for test procedures.

(a) Ensure all wiring has been checked for accuracy and neatness.

(b) Ensure all programming steps have been carried out.

(c) Check that all stations can access and hold all exchange lines, checking the hold recall on at least one station.

(d) Check that all lines can be put into common hold at one station and can be all taken out of hold by another station.

(e) Check that internal calls can be established from all stations.

(f) Check the 'Class of Service' barring on all stations.

The following tests can be checked at one station.

(a) Establish and test an "enquiry" call.

(b) Establish and test a "conference" call.

(c) Establish and test a "follow-me" call.

(d) Establish and test the "call waiting" feature both internal and external.

(e) Check the "do-not-disturb" feature.

(f) The "power-fail" feature (if connected).

(g) Store and recall a number from the abbreviated number store.

The following tests should be carried out if the particular option is connected.

(a) Comset — Check that all "DSS" (direct select stations) can be contacted. Check that the "hands-free" and "message-waiting" features work correctly.

(b) PBX Recall — Check that all PABX lines can be put into recall from at least one station.

(c) External paging — Check that the external paging feature works correctly from at least one station.

(d) Two-wire stations — Check all two-wire stations for all features, if the two-wire station is external, test it at the point where it leaves the building and arrange for either the person who installed the external end telephone or yourself to give a basic test at the far end. This basic test should consist of at least checking exchange access and setting up of an internal call.

(e) External music-on-hold — Check the overall levels and adjust them externally (if available).

(f) Check the operation of all "hot-line" pairs.

(g) Data Stations — Check for exclusion of all knocking tones (external and internal) sent to these stations.

(h) Night switch — Check for both night mode A and B and the return to daytime service from the designated night switch station.

Due to the large number of features on the new generation of Commander S small business systems it would be prohibitive to test every feature at every station, with this in mind the preceding functional tests should give an overall impression of whether the system has any problems, not withstanding it should be said to the customer after commissioning, that if they are experiencing technical problems in the near future, assistance is available. It is good practice to have a number that the customer can call regarding installation problems, not simply leave it to "1100".

All faults encountered on commissioning testing must be remedied prior to the installation technician leaving the job. In other words don't leave known faulty equipment, be it a software problem or faulty hardware in a completed installation, thinking that the customer will never use that particular function, so why worry?

2.18 BI-DIRECTIONAL DATA TEST

The Bi-directional Data Test is the speediest method of confirming the integrity of the wiring to the station, and the functionality of the station. Naturally at this time the system (Main Equipment) has been subjected to the same test via its programming socket.

The test is initiated at the station selected (or under examination) and results in both data signals and ring signals being sent from the main equipment.

Initiation of the test is as follows:

(1) for the standard key station and COMSET connected to an S824 system
(* leave handset on-hook)
* press the # key
* press the 1 key
- for approximately 5 seconds the following will occur,
all LED's flashing slowly
tone ringer sounding (if not heard, first check volume control setting)

(2) for the COMSET station connected to an S206/408 system
(* leave handset on-hook)
* press 0
- the station rings (since in fact "line booking" has been requested). Note that if the COMSET has "Unit Line" programmed to it, another station will need to busy that line.
* lift handset
* press S
* press 9
- all LED's should now be flashing slowly
* replace handset
* press S
* press 9

Fault Analysis

(A) "Dead" Station: Check c/d continuity to the KCM
(B) No ringing: Check a/b continuity to the KCM.

2.19 CHECK-OFF LIST

It is good practice at the completion of an installation to mentally check that you have covered all the points regarding the installation, these should include the following.

(a) System tests out okay.
(b) Customer has all the hardware they have paid for, if not has the sales sheet been altered?
(c) Customer is happy with the quality of workmanship.
(d) Customer Advisory section has been advised and an appointment has been made for customer instruction.
(e) Customer has a number to call regarding any installation problems.
(f) All paper work, including sales sheets and customer records have been completed.
(g) Copies 3 and 4 of the System Order Form (sales sheets) are returned to the TBO.

2.20 SEQUENTIAL SERIAL NUMBERS

It should be noted that all Commander S main equipments and stations are now issued with sequential serial numbers. The serial numbers are issued as a means by which customers can identify their personal property, it is therefore most important that the numbers are recorded in the Customer Data Record book during installation.

If for any reason a station or main equipment is returned or changed over, the new number must be recorded in the Customer Data Record book.

Figure 2.25 indicates the location of the sequential numbers on the range of Commander S equipment.

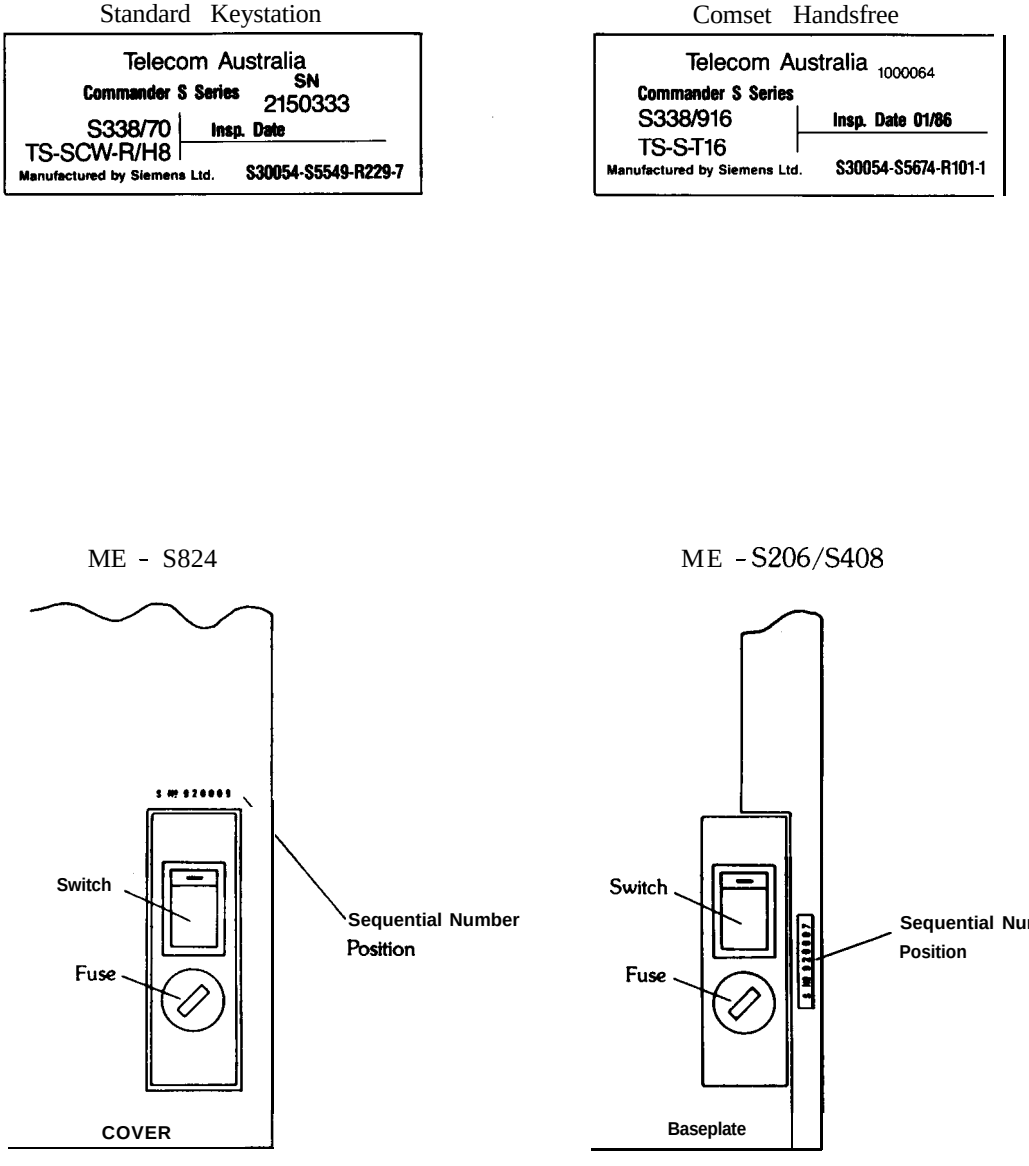


Figure 2.25 Location of Sequential Number Labels

SECTION 3. MAINTENANCE

3.1 SYSTEM OPERATION SELF ANALYSIS

Several means of automatic recovery from operational fault conditions are used by the system, which in principle means that the hardware reset button should not be required to be used.

3.1.1 System Supervlsion

A background maintenance program is periodically called by the operating system. It has the lowest priority in the hierarchy of procedures and may be interrupted by all other active procedures. Due to this inconstant duration it is not supervised by the time-out control.

The program recognizes any changes that have been made in the EEPROM due to Customer Data Changes, or Abbreviated Number Storage, and recalculates a check-sum. This check-sum is stored back into the EEPROM, and used in subsequent tests.

The WATCHDOG performs a hardware reset if it does not get a periodic reset from the software to indicate that the system is operating correctly.

3.2 TEST EQUIPMENT

Due to the designed concept of these systems, maintenance can be carried out with relatively simple procedures and the following tools:

1) high impedance multimeter (preferably digital)
2) telephone buttinsky
3) standard handtools
4) Krone wiring tool

3.3 TEST PROCEDURES AND ACTIONS

We are presuming that a fault condition has been confirmed, and that the system has already been in service.

TYPE OF FAULT	CHANGE/CHECK
STANDARD STATION	
1. No initialization	Fuse
2. No #1 test	Fuse
3. No internal dial tone	Fuse
4. No internal ringing tone after dialling call number	Fuse
5. No busy tone (after dialling one's own number)	Fuse
6. LED for exchange line does not light	ME
7. No external dial tone (after seizure of an exchange line)	ME
8. "Hold" function (H-key) not possible	ME
9. No recall from held exchange line (after pressing H-key and replacing handset).	ME
10. Last number redialling not possible	Station
11. Call waiting function not possible	ME or programming
12. Call pick-up after call waiting tone not possible	ME or programming
13. Outside call cannot be answered (LED's do not flash)	Fuse, MOB or programming
14. Enquiry call not possible	ME
15. Call cannot be resumed after "hold"	ME or programming
16. Call transfer without offering not possible	ME
17. No PABX signal key function	Switches on ME Telephone ground connected?
EMERGENCY TELEPHONE	
1. 2-wire emergency telephone does not function (during power failure)	KCM (K-relay)
HOT LINE	
1. Key " * " on executive's telephone has been pressed, however connection to secretary's telephone is not established	Programming
2. No call waiting tone with outside call on exec./secr. line	Programming (exec./secr line for outside calls)
3. After call waiting tone and pressing the S-key internal call not interrupted and connection to outside party not established	ME
CENTRAL RINGER	
1. Central ringer does not function	MOB, KCM, programming
DTMF DIALLING	
1. DTMF dialling is not possible	Programming
MUSIC ON HOLD	
1. No melody injected during "hold"	Switch
LOUDSPEAKER ANNOUNCEMENT	
1. No internal feeding after dialling "8"	KCM, ME, TWIM
2. Announcement not possible, despite internal feeding after dialling "8"	TWIM, ME

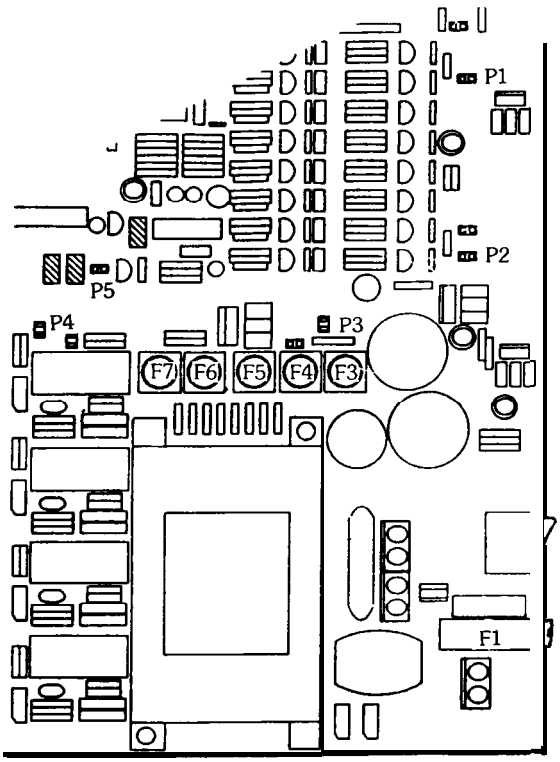


Figure 3.1 Test Point Locations (S206/408)

3.4 REPLACEMENTPROCEDURES – S206/408

Due to its large size and delicate nature, mother boards will not be available as a spare part. If a fault is diagnosed in the mother board the whole main equipment must be replaced. The station and distribution cabling can be left intact on the KCM; any customer data can be saved by swapping the EEPROM chips on the mother boards. The system will not require reprogramming providing the correct replacement procedures are adhered to.

The PBA module change-over service that is available in each State Workshop, will hold replacement main equipments, KCM's, TWIM's OSSM's and will shortly be extended to cover all key stations. It is most important that for this service to work correctly faulty items must be returned as promptly as possible, this is particularly vital when claiming repair within the manufacturers warranty period (12 months from the date of manufacture).

(1) Switch off mains power and remove power cord from power point.

(2) Disconnect the two cable connectors between the KCM and the main PCB and loosen the KCM mounting screws.

(3) Remove and lay back the KCM with the intact wiring.

(4) Remove the main equipment from the wall.

(5) Fit the new main equipment and connect the KCM.

(6) Carefully swap the customer data EEPROM between the systems. See Figure 3.2 for location.

(7) Connect power and switch on.

(8) DO NOT REINITIALISE THE SYSTEM.

(9) Make a record of the new sequential serial number in the Customer Data Record Book.

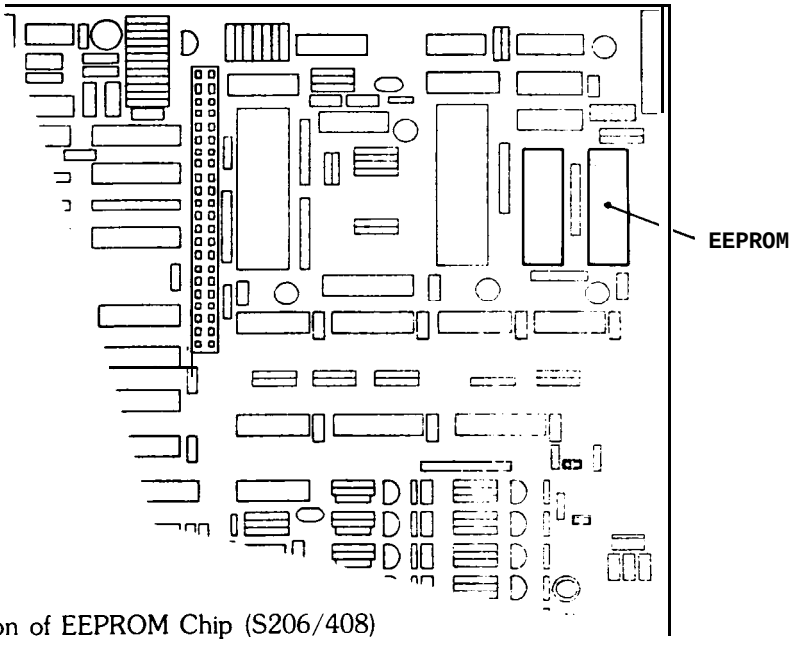


Figure 3.2 Position of EEPROM Chip (S206/408)

3.5 REPLACEMENTPROCEDURES – KEYSTATIONS

Maintenance on key stations will be confined to replacement of the following components:

transmitter and receiver insets
line cords
handset cords
plugs/sockets

Faults in the PBA's within the station, or within the keypad unit of the standard station, are to be rectified by replacement of the telephone station complete.

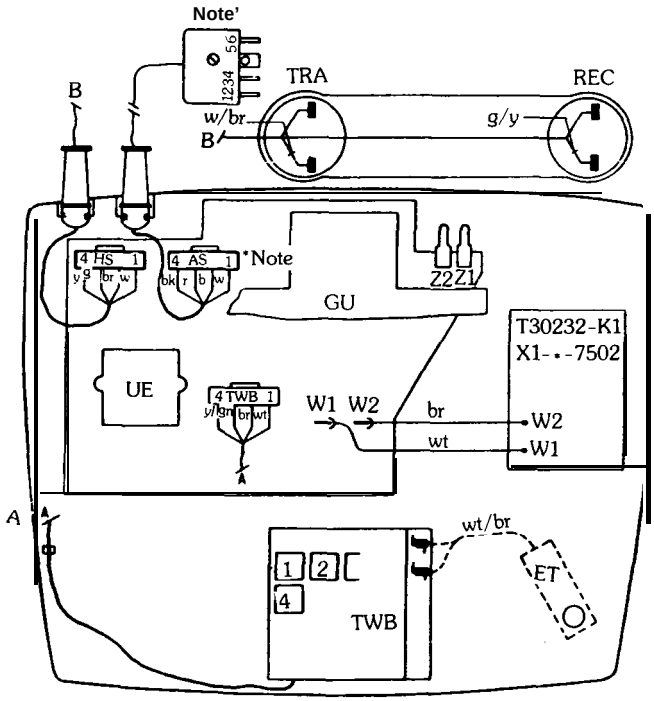


Figure 3.3 Standard Station Layout

Figure 3.3 indicates the layout of the standard station and Figure 3.4. the COMSET layout

Note: Dependent on manufacturing source, line cord colour code will be either:—

605 PLUG TERM NO.				
1	RED	OR	GREEN
2	WHITE		WHITE
5	BLACK		YELLOW
6	BLUE		BROWN

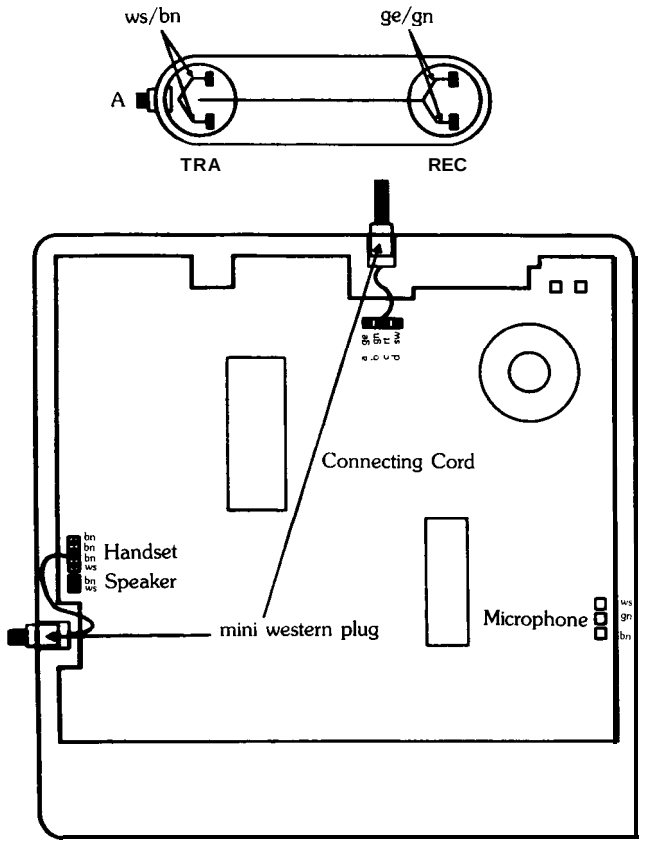


Figure 3.4 Comset Layout

3.6 REPLACEMENT PROCEDURES — S824

3.6.1 General

Due to the sensitivity of some components and difficulties of performing precise field diagnosis and repair and the fact that the design of this system supports the fault isolation by swapping or changing modules, maintenance is therefore limited to changeover of printed board assemblies (PBAs) and the power supply (PS) in the ME. See Section 3.8 — Detailed Fault Check List.

The normal changeover service that is available in each State Workshop for the S206/408 systems will be extended to cover the following S824 items of equipment — CPM, 8SM, 408M, KCM modules, CDRM plus the PS.

If the CPM is changed, any customer data can be saved by swapping the EEPROM chip (refer Fig. 2.20, chip D701) from the faulty module to its replacement CPM. If a TWIM module is fitted to an 8SM or 408M module and if either of those modules is found to be faulty, then that TWIM must be removed and re-installed on the replacement 8SM or 408M module.

No repair of any PBA is to be carried out on site or in field depots. Any attempt to repair the PBA or PS in the field may result in further damage and may void the manufacturer's warranty on the item.

Ensure that the PBAs are inserted in their correct mounting position and are securely locked into place by both top and bottom locking levers.

3.6.2 Power Supply

If the power supply is diagnosed as being faulty, it is to be removed and replaced completely with a new unit.

To remove the power supply:

1. Turn the power off
2. Remove the cover
3. Disconnect the mains cord from the power socket
4. Remove the power cord from its slide-in location on the bottom of the equipment gate
5. Open the equipment gate and loosen the three power supply locking screws on the rear of the mounting gate
6. Carefully slide out the power supply from its connecting socket and remove completely.

To install the power supply, simply follow the reverse of the above procedure.

CAUTION: The power supplies are powered from the 240 Volt mains supply and hazardous voltages are present within. DO NOT ATTEMPT TO REPAIR THESE UNITS.

3.7 DETAILED FAULT CHECK LIST – S206/408

NO.	FAULT DESCRIPTION	MODULE TO BE REPLACED change in sequence				ADDITIONAL/SPECIAL PROCEDURES
		MOB	TWIM	KCM	STATION	
1	No initialisation (a) No response from LED (b) LED's on	2			1	1. Check network wiring 2. Check "C" fuses
2	No # 1 test response at programming socket	1				1. Check KCM
2a	No # 1 test response at station	3		2	1	1. Check KCM 2. Check wiring
3	No dial tone at more than one station	1				1. Check fuse 15 V
3a	No dial tone at one station	3		2	1	1. Change station
4	No internal dial tone	1				1. Check fuse 7.5 V
5	No busy tone	1				1. Check fuses
6	No internal feeding	2			1	1. Change station 2. Check fuse 24 V
7	No LED when external line is selected (busy tone)	1			2	1. Check programming to confirm that station may access exchange line
8	No exchange dial tone on more than one station	2		1		1. Check exchange wiring with Butt
9	No LED flashing for incoming exchange call	2		1		1. Check for ringing with Butt at KCM
10	Power fail telephone not functioning correctly	3		1	2	1. Check NA-relays at KCM 2. Check wiring
11	Internal call not correct	1				1. Check fuses
12	No hot line link	1				1. Check programming
13	No central alarm operation	2		1		1. Check programming 2. Check wiring
14	No dial tone/busy tone at 2 wire station	4	3	1	2	1. Check programming 2. Check loop current (25 mA)
15	No recall to PABX	2		1		1. Check programming 2. Check switches S11 to S14 3. Check PABX to SBS ground
16	No DTMF dialling	1				1. Check programming
17	No music on hold	1				1. Check switches S5 and S6 2. Check level potentiometer
18	CPU doesn't work	1				1. Check + 5 V power 2. Check + 5 V level potentiometer 3. Check watchdog switch S4
19	Power supply doesn't work	1				1. Check all voltages 2. Check all fuses 3. Check bridge plugs 1 to 5

3.8 DETAILED FAULT CHECK LIST – S824

NO.	FAULT DESCRIPTION	ITEM TO BE CHECKED				ADDITION/SPECIAL PROCEDURES
		PS	KCM	CPM	408M/8SM	
1	No initialization	4		6	5	1. Telephone Station 2. Programming 3. Wiring
2	No internal dial tone	2		4	3	1. Telephone Station
3	No internal ring tone	1		2		
4	No busy tone	1		2		
5	Line LED's not indicating status			3		1. Telephone Station 2. Programming
6	No external dial tone	3	2	5	4	1. Wiring
7	"Hold" not functioning			3	2	1. Telephone Station
8	No recall from held line			3	2	1. Programming
9	Last number redial malfunction					Keyset 200: Station Comset: Saved Number Redial active?
10	Call "take-over" not possible			5	4	1. Conference with 4-parties? 2. More exchange lines on hold? 3. No COS for this line?
11	Call alerting not sent				4	1. Destination in multi-conference? 2. Data-Mode? 3. Hot-line executive?
12	Internal Enquiry not possible	1		3	2	
13	No PABX function					1. Programming 2. PABX earth missing?
14	No hot-line "*" function				2	1. Programming
15	Central Alarm not functioning		3	4		1. AC/DC type? 2. Programming
16	No Music-on-hold			2		1. Switch position on CPM
17	DTMF dialling not possible			2		1. Programming
18	No Paging			3		1. Programming 2. Wiring
19	No 2-wire function					1. TWIM module inserted? 2. Programming 3. Wiring 4. Decadic only telephone!

APPENDIX 1

TEST 1 BIDIRECTIONAL DATA TEST (#1)

This procedure tests:

-integrity of the a/b pair
-integrity of the c/d pair
-communication between the telephone station processor and the central processor
-the functioning of the LED's
-the functioning of the tone ringer

TEST 2 DIAL/SIDE TONE TEST

This test is divided into two parts.

-the first part checks that there is 'dial' tone to the handset through the switching network
-the second part checks the feeding circuit when an internal link is seized

TEST 3 BUSY TONE TEST

This test confirms that in all cases the switching network allows busy tone to reach the handset.

TEST 4 LINE SEIZURE TEST

This test is performed to see whether stations are able to access exchange lines or not, according to their class of service. Once seized, the line is held by the 'H' function key, and another line is then seized. The test is to confirm that software interaction between station control and hold circuits is correct.

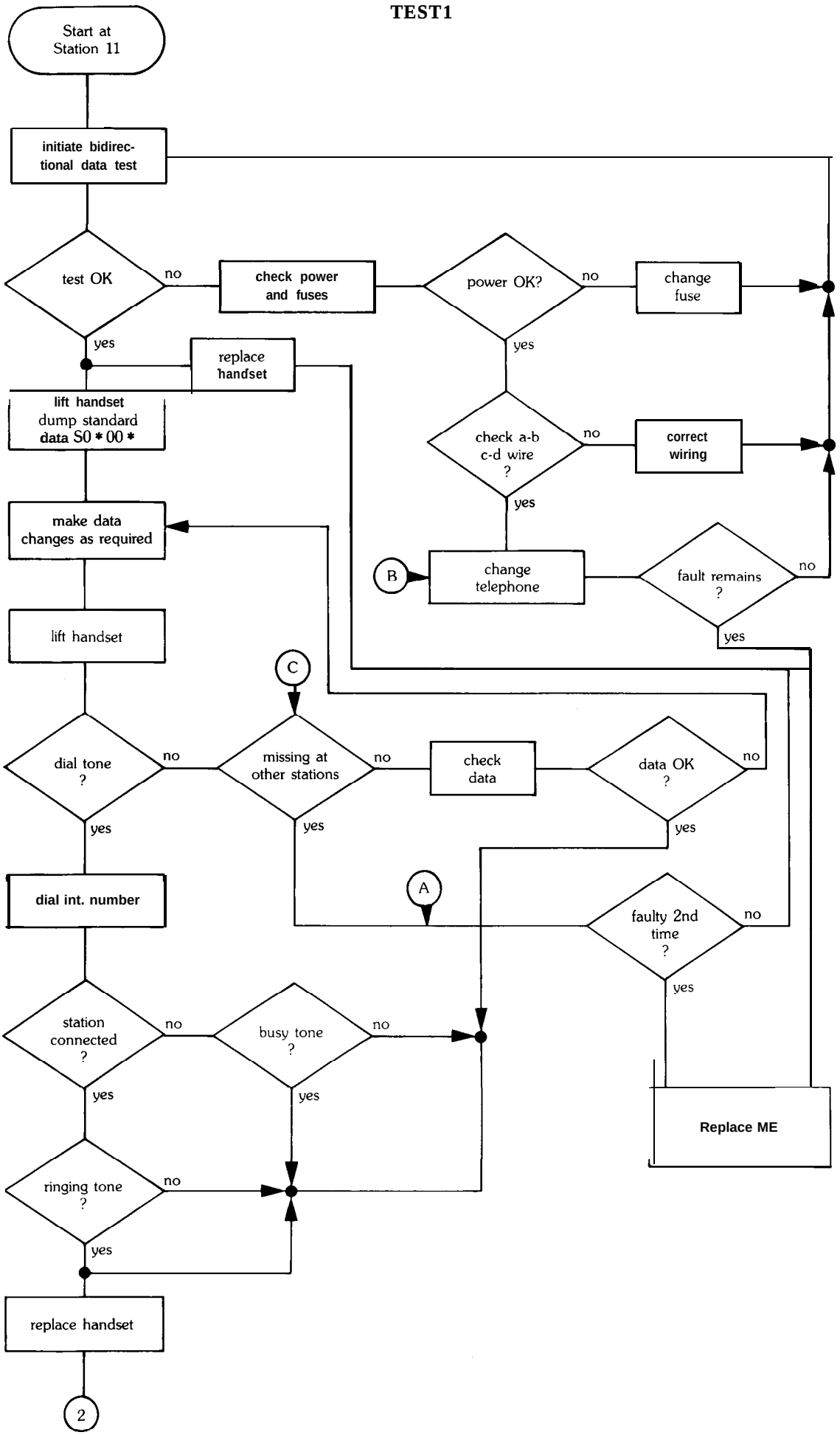
TEST 5 RECALL TEST

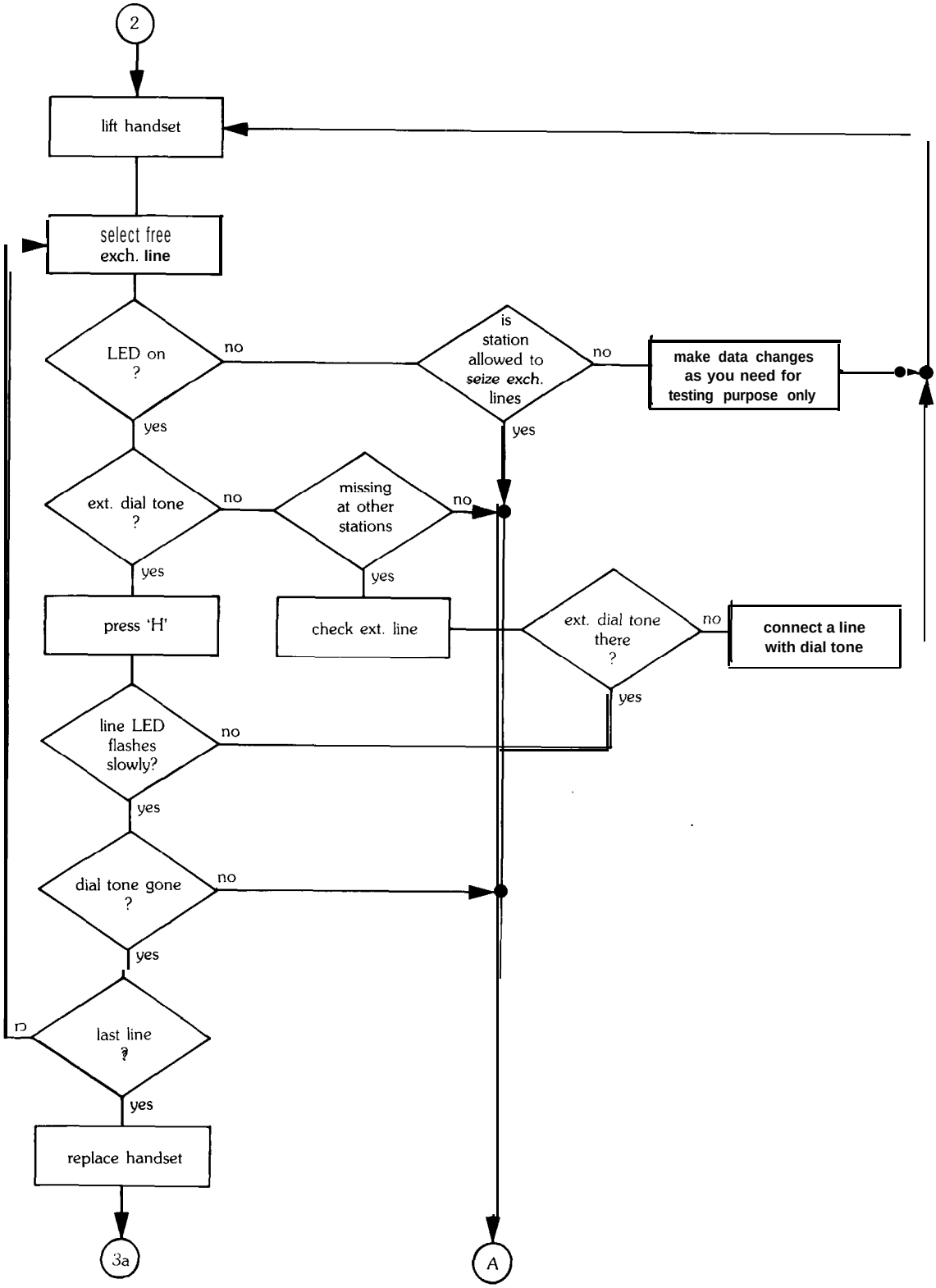
The recall facility causes a recall after the station handset has been replaced, if one or more external parties are waiting. All lines that were held by the station must audibly recall at the same station.

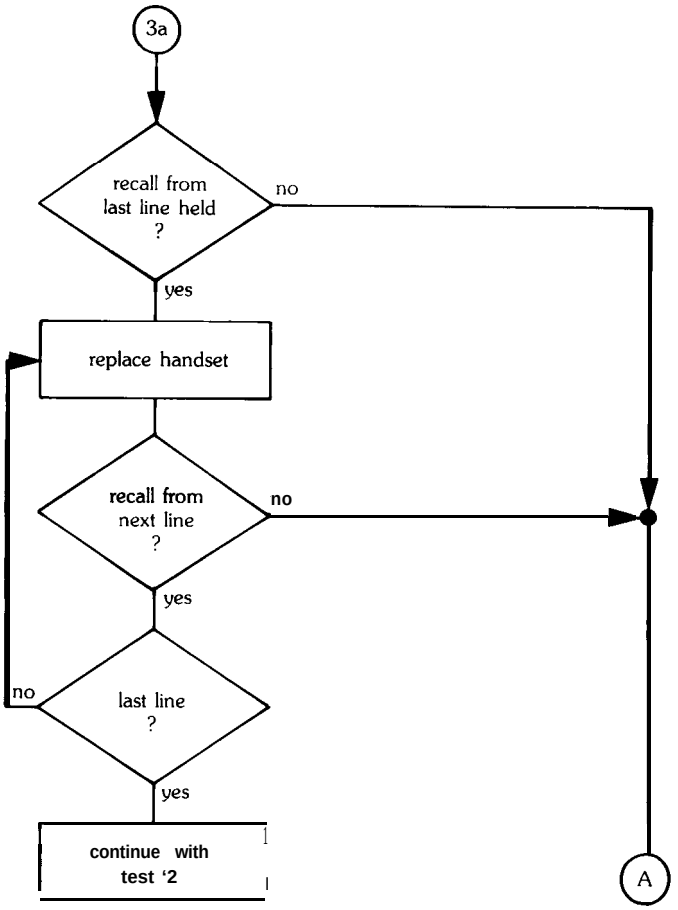
TEST 6 EXCHANGE LOOP TEST

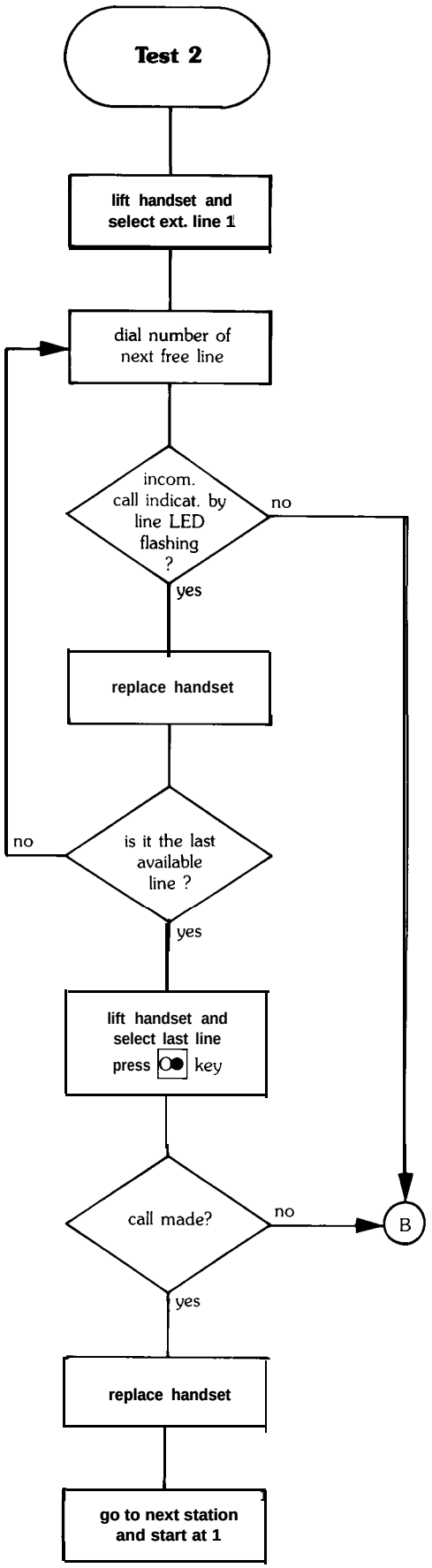
This is a basic test, performed only at the first station (i.e. Station 11), to confirm that dial pulsing is possible on the exchange lines, and that incoming calls are recognized. Complete testing of access to exchange lines is made at a later stage.

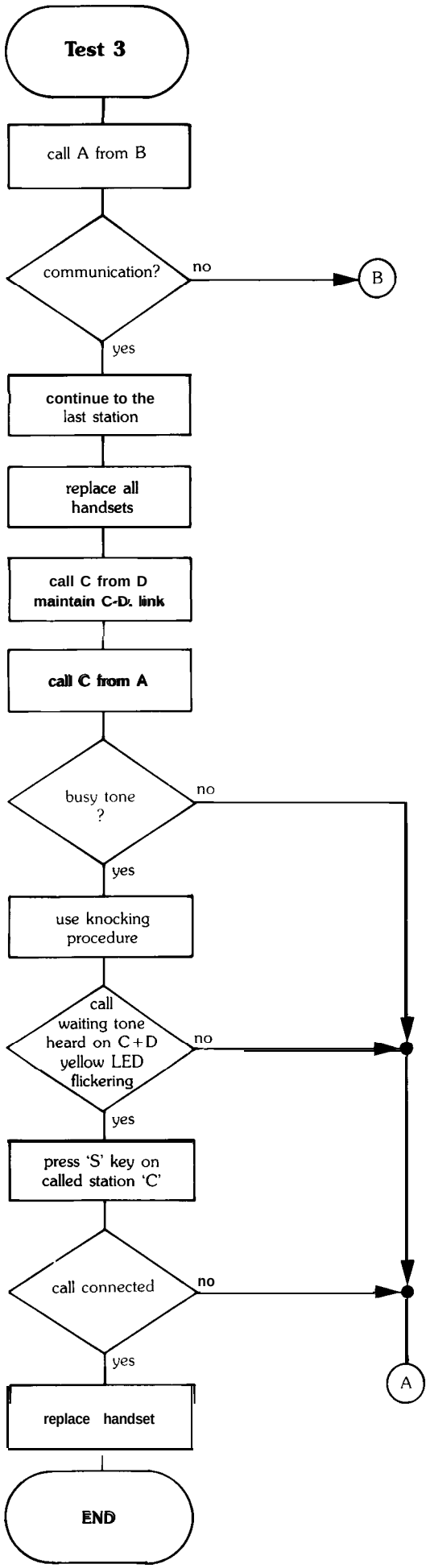
TEST1

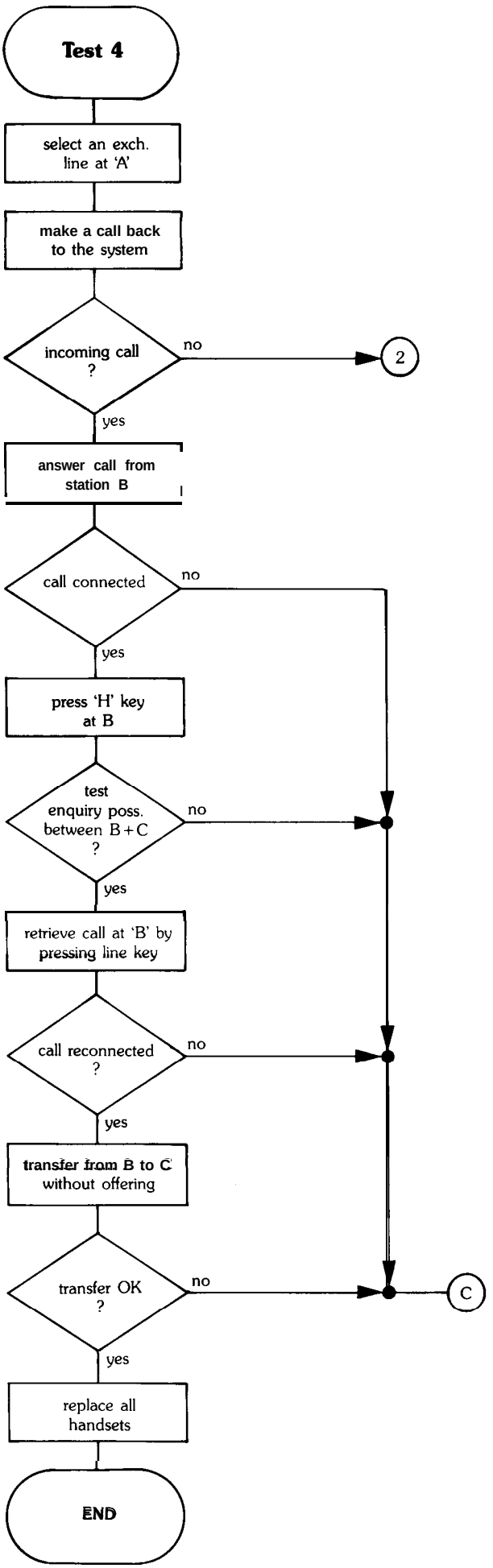

Start at Station 11
initiate bidirec-tional data test
test OK
no
check power and fuses
power OK?
no
change fuse
yes
replace handset
yes
lift handset dump standard data S0 * 00 *
check a-b c-d wire ?
no
correct wiring
yes
make data changes as required
B
change telephone
fault remains ?
no
yes
lift handset
C
dial tone ?
no
missing at other stations
no
check data
data OK ?
no
yes
yes
yes
A
dial int. number
faulty 2nd time ?
no
yes
station connected ?
no
busy tone ?
no
yes
yes
Replace ME
ringing tone ?
no
yes
replace handset
2

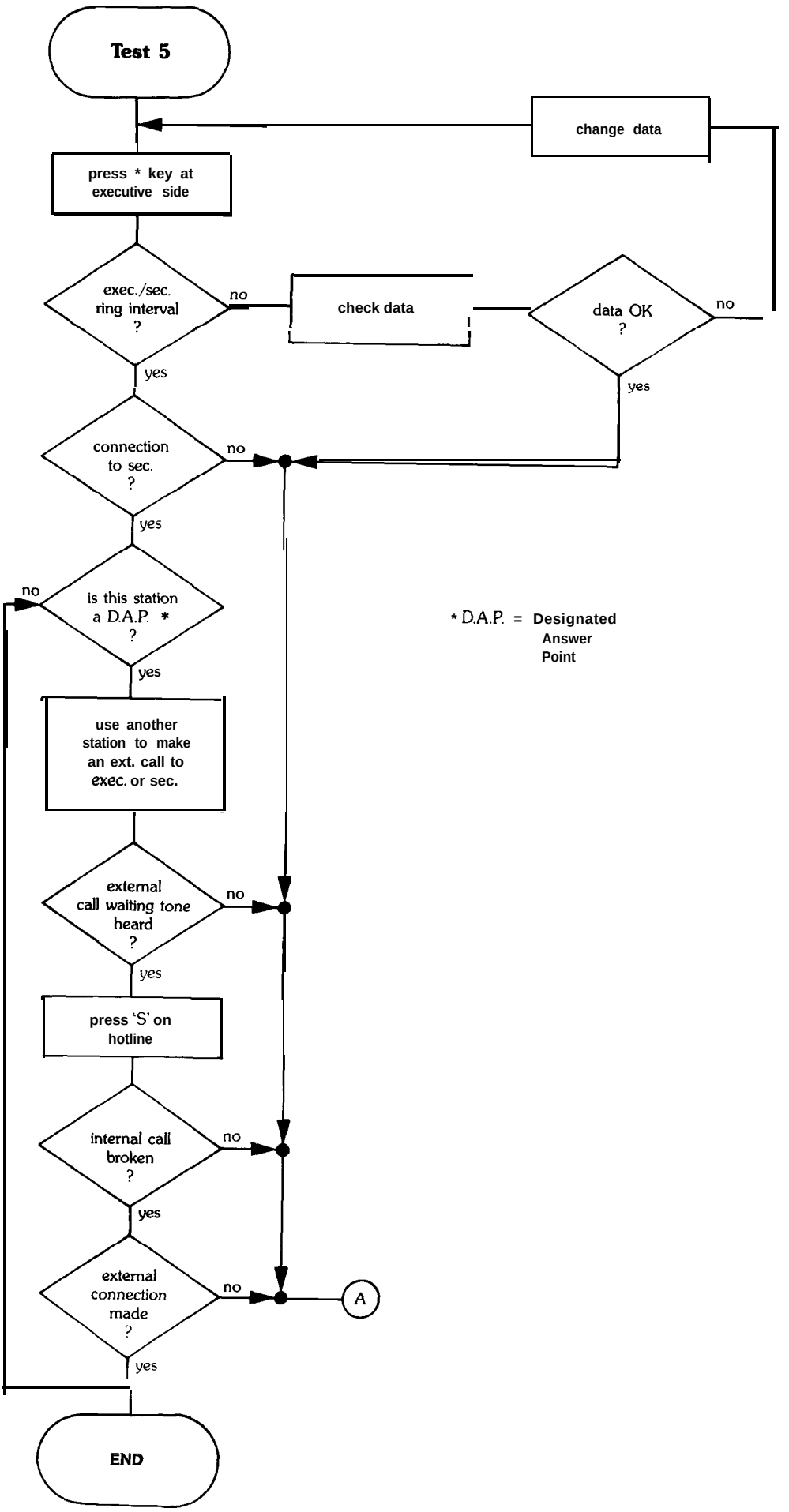

2
lift handset
select free exch. line
LED on ?
no
is station allowed to seize exch. lines
no
make data changes as you need for testing purpose only
yes
yes
ext. dial tone ?
no
missing at other stations
no
yes
yes
press 'H'
check ext. line
ext. dial tone there ?
no
connect a line with dial tone
yes
line LED flashes slowly?
no
yes
dial tone gone ?
no
yes
last line ?
yes
replace handset
3a
A


3a
recall from last line held ?
no
yes
replace handset
recall from next line ?
no
yes
last line ?
no
yes
continue with test '2
A


Test 2
lift handset and select ext. line 1
dial number of next free line
incom. call indicat. by line LED flashing ?
no
yes
replace handset
is it the last available line ?
no
yes
lift handset and select last line
press key
call made?
no
B
yes
replace handset
go to next station and start at 1


Test 3
call A from B
communication?
no
B
yes
continue to the last station
replace all handsets
call C from D
maintain C-D. link
call C from A
busy tone ?
no
yes
use knocking procedure
call waiting tone heard on C+D yellow LED flickering
no
yes
press 'S' key on called station 'C'
call connected
no
yes
A
replace handset
END


Test 4
select an exch. line at 'A'
make a call back to the system
incoming call ?
no
2
yes
answer call from station B
call connected
no
yes
press 'H' key at B
test enquiry poss. between B+C ?
no
yes
retrieve call at 'B' by pressing line key
call reconnected ?
no
yes
transfer from B to C without offering
transfer OK ?
no
C
yes
replace all handsets
END


Test 5
change data
press * key at executive side
exec./sec. ring interval ?
no
check data
data OK ?
no
yes
yes
connection to sec. ?
no
yes
no
is this station a D.A.P. * ?
yes
use another station to make an ext. call to exec. or sec.
external call waiting tone heard ?
no
yes
press 'S' on hotline
internal call broken ?
no
yes
external connection made ?
no
A
yes
END
* D.A.P. = Designated Answer Point

APPENDIX 2

COMMANDER TELEPHONE **SYSTEM** ORDER

Refer **Instructions on reverse**

M O D E L ☐ **S206** ☐ **S408** ☐ **S824**

Tick *required boxes*

CUSTOMER'S NAME

ADDRESS

TOWN OR SUBURB | POSTCODE

NATURE OF BUSINESS

CUSTOMER CONTACT | TELEPHONE

SALES CONTACT | TELEPHONE

STD CODE | SERVICE NO. | IF OFF PBX | PBX EXTN | INSTAL. REQ. DATE D D M M Y Y

APP'N DATE D D M M Y Y | A SERVICE ORDER No. NUMERIC | DATE ORDER ISSUED D D M M Y Y | DATE COMPLETED D D M M Y Y

PAYMENT METHOD

- ☐ Sale (or Lease)
- ☐ Rental
- ☐ Deferred **payment**

TYPE OF INSTALLATION

- ☐ New | STD CODE | PREVIOUS TELEPHONE No
- ☐ **In-Place** | IF OFF PBX

☐ **Privately owned System Removal**

IF NEW INSTALLATION

- ☐ **New Service**
- ☐ **Removal of Service**
- ☐ **Replacement for**

.....
(Specify type and model)

EQUIPMENT REQUIREMENTS	Qty.	PRODUCT CODE
BASIC PACKAGE		
MAIN EQUIPMENT		
KEY STATION MODULE (S824 ONLY)		
2 WIRE STATION/EXTERNAL PAGING MODULE		
2 WIRE STATION MODULE (S824 ONLY)		
KEY STATIONS — COMSET HANDSFREE		
— COMSET ON HOOK		
2 WIRE STATIONS (INT or REM)		
POWERFAIL TELEPHONE		
CENTRAL ALARM		
REMOTE STATION EXTENDER UNIT		
CALL DETAILS RECORDER MODULE (S824 ONLY)		
CDR PRINTER (S824 ONLY)		
DSS CONSOLE (S824 ONLY)		
TOTALS		

INSTALLER'S NOTES

SUMMARYOF SYSTEM **REQUIREMENTS**

	Exchange Line
	Tie Lines — Non PABX
	— PABX

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

Permit No MUST accompany Service Order No.

COMMANDERTELEPHONE SYSTEM ORDER – MODEL S206, S408, S824

CUSTOMER'S NAME	SERVICE NO.	ORDER NO.

EXCHANGE/TIE LINE DETAILS

LINE NO.	SERVICE NUMBER	ORDER NUMBER
1		
2		
3		
4		
5		
6		
7		
8		

INSTALLERS ONLY

STATION DETAILS

STN. NO.	STATION TYPE & COLOUR	LOCATION/DESIGNATION
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
P/FAIL 1		
P/FAIL 2 (S824 only)		

COMMANDERTELEPHONE SYSTEM ORDER – MODEL S206, S408, S824

CUSTOMER'S NAME	SERVICE NO.	ORDER NO.

PROGRAMMABLE OPTIONS

SYSTEM DATA S1

Characteristic		Code	Standard Data	Latest Data	
EXCHANGE LINE and DIALLING METHOD	LINE 1	01	10		00 = Not Used 10 = Decadic 20 = DTMF (Tone)
	2	02	10		
	3	03	10		
	4	04	10		
	5	05	10		
	6	06	10		
	7	07	10		
	8	08	10		
STATION TYPE	STATION 11	11	00		00 = 4 Wire Station 01 = 2 Wire Tel 10 = 4 Wire Station Data 11 = 2 Wire Tel Data
	12	12	00		
	13	13	00		
	14	14	00		
	15	15	00		
	16	16	00		
	17	17	00		
	18	18	00		
	19	19	00		
7	20	20	00		
	21	21	00		
	22	22	00		
	23	23	00		
	24	24	00		
	25	25	00		
	26	26	00		
	27	27	00		
	28	28	00		
	29	29	00		
	30	30	00		
	31	31	00		
	32	32	00		
	33	33	00		
	34	34	00		
TRANSFER TIME (before recall)		41	15		01-99 x 2 sec = Time
EXTERNAL PAGING		42	00		00 = No 10 = Yes
INT/EXT/EXT CONFERENCE		43	10		00 = No 10 = Yes
EXCHANGE LINE RELEASE TIME	INSTALLER	44	03		00-99 sec
DIAL PULSE BREAK	TO	45	66		01-99 msec
DIAL PULSE MAKE	COMPLETE	46	33		01-99 msec
RECALL TIME (before call is disconnected)		47	20		00-99 sec
INTERNAL PAGING ZONE 1 (824 only)		50	00 00 00 00 00 00 00 00 00 00 00 00		Comset Handsfree and Comset On-Hook only
INTERNAL PAGING ZONE 2 (824 only)		51	00 00 00 00 00 00 00 00 00 00 00 00		00 = Not Used XX = Station Number

EXCHANGE LINE DATA S2

Characteristic		Code	Standard Data	Latest Data	
RECALL KEY	LINE 1	01	00		00 = Not Used 10 = Earth 21-99 = Flashtime = X . Y . 20 m sec E.G. 51 = 100 m sec 55 = 500 m sec
	2	02	00		
	3	03	00		
	4	04	00		
INSTALLER TO COMPLETE	5	05	00		
	6	06	00		
	7	07	00		
	8	08	00		
EXCHANGE CODE	LINE 1	11	00		00 = Non existent YX = PABX Connected Y = 1-9 x 1 sec dial pause X = 0-9 PABX Access Code
	2	12	00		
	3	13	00		
	4	14	00		
INSTALLER TO COMPLETE	5	15	00		
	6	16	00		
	7	17	00		
	8	18	00		

COMMANDERTELEPHONESYSTEM ORDER – MODEL S206, S408, S824

CUSTOMER'S NAME	SERVICE NO.	ORDER NO.

PROGRAMMABLE OPTIONS

EXCHANGE LINE DATA S2 (Cont)

Characteristic		Code	Standard Data				Latest Data				
CENTRAL ALARM	LINE 1	21	00								00 = Off 10 = On
	2	22	00								
	3	23	00								
	4	24	00								
	5	25	00								
	6	26	00								
	7	27	00								
	8	28	00								
AUTOMATIC FORWARDING	LINE 1	31	01	11	16						00 = Option 1 (A) 01 = Option 2 (A) + (B) 02 = Option 3 (A) + (B) + search 03 = Option 4 (A) + (B) + search/stop 11 = Group Call
	2	32	01	12	16						
a AUTO FORWARD TYPE (Code)	3	33	01	13	16						
b MAIN ANSWER POINT (Stn A)	4	34	01	14	16						
c ALTERNATIVE ANSWER POINT (Stn B)	5	35	01	15	16						
	6	36	01	16	16						
	7	37	01	17	16						
	8	38	01	18	16						
GROUP CALL	LINE 1	41	00	00	00	00					Insert all stations which must ring (incoming calls only) maximum of 4 stations
	2	42	00	00	00	00					
	3	43	00	00	00	00					
	4	44	00	00	00	00					
	5	45	00	00	00	00					
	6	46	00	00	00	00					
	7	47	00	00	00	00					
	8	48	00	00	00	00					
AUTO FORWARD TIME	LINE 1	61	10								01-15 = Number of ring cycles before transfer (Not used in Group Calling)
	2	62	10								
	3	63	10								
	4	64	10								
	5	65	10								
	6	66	10								
	7	67	10								
	8	68	10								
INTERDIGIT INTERVAL	LINE 1	71	05								01-15 = Time x 2 sec 00 = Indefinite
	2	72	05								
	3	73	05								
	4	74	05								
	5	75	05								
	6	76	05								
	7	77	05								
	8	78	05								

STATION DATA S3

Characteristic		Code	Standard Data				Latest Data				
HOT LINE PAIRS	1	01	00	00							0000 = Not Used CCSS CC = Chief Stn. No. SS = Secretary Stn No
	2	02	00	00							
	3	03	00	00							
	4	04	00	00							

REMARKS:

COMMANDERTELEPHONE SYSTEM ORDER – MODEL S206, S408, S824

CUSTOMER'S NAME	SERVICE NO.	ORDER NO.

PROGRAMMABLE OPTIONS

STATION DATA **S3 (Cont)**

Characteristic		Code	Standard Data								Latest Data								
CLASSES OF SERVICE	STATION 11	11	12	22	32	42	52	62	72	82									YX. . . YX Y = Line Number X = Class of Service 0 = Internal Only 1 = Incoming Only 2 = Local Network 3 = Manual Trunk 4 = STD 6 = ISD 7 = Unrestricted
	12	12	12	22	32	42	52	62	72	82									
	13	13	12	22	32	42	52	62	72	82									
	14	14	12	22	32	42	52	62	72	82									
	15	15	12	22	32	42	52	62	72	82									
	16	16	12	22	32	42	52	62	72	82									
	17	17	12	22	32	42	52	62	72	82									
	18	18	12	22	32	42	52	62	72	82									
	19	19	12	22	32	42	52	62	72	82									
	20	20	12	22	32	42	52	62	72	82									
	21	21	12	22	32	42	52	62	72	82									
	22	22	12	22	32	42	52	62	72	82									
	23	23	12	22	32	42	52	62	72	82									
	24	24	12	22	32	42	52	62	72	82									
	25	25	12	22	32	42	52	62	72	82									
	26	26	12	22	32	42	52	62	72	82									
	27	27	12	22	32	42	52	62	72	82									
	28	28	12	22	32	42	52	62	72	82									
	29	29	12	22	32	42	52	62	72	82									
	30	30	12	22	32	42	52	62	72	82									
	31	31	12	22	32	42	52	62	72	82									
	32	32	12	22	32	42	52	62	72	82									
	33	33	12	22	32	42	52	62	72	82									
	34	34	12	22	32	42	52	62	72	82									
NIGHT SWITCH AUTHORISATION		41	00																00 = Only Stn. 11 XX = Stn. No. (In addition to 11)
UNIT LINE (Comset Only)	STATION 11	51	00																00 = Not Connected 1Y = Connected Y = Line No. for Auto Line Connection
	12	52	00																
	13	53	00																
	14	54	00																
	15	55	00																
	16	56	00																
	17	57	00																
	18	58	00																
	19	59	00																
	20	60	00																
	21	61	00																
	22	62	00																
	23	63	00																
	24	64	00																
	25	65	00																
	26	66	00																
	27	67	00																
	28	68	00																
	29	69	00																
	30	70	00																
	31	71	00																
	32	72	00																
	33	73	00																
	34	74	00																

REMARKS:

COMMANDERTELEF'HONE SYSTEM ORDER – MODEL S206, S408, S824

CUSTOMER'S NAME	SERVICE NO.	ORDER NO.

PROGRAMMABLE OPTIONS

STATION AND LINE DATA FOR NIGHT SERVICE **S4**

Characteristic		Code	Standard Data								Latest Data								
CLASSES OF SERVICE	STATION 11	11	12	22	32	42	52	62	72	82									YX YX Y = Line Number X = Class of Servi 0 = Internal Only 1 = Incoming Onl 2 = Local Networl 3 = Manual Trunk 4 = STD 6 = ISD 7 = Unrestricted
	12	12	12	22	32	42	52	62	72	82									
	13	13	12	22	23	42	52	62	72	82									
	14	14	12	22	32	42	52	62	72	82									
	15	15	12	22	32	42	52	62	72	82									
	16	16	12	22	32	42	52	62	72	82									
	17	17	12	22	32	42	52	62	72	82									
	18	18	12	22	32	42	52	62	72	82									
	19	19	12	22	32	42	52	62	72	82									
	20	20	12	22	32	42	52	62	72	82									
	21	21	12	22	32	42	52	62	72	82									
	22	22	12	22	32	42	52	62	72	82									
	23	23	12	22	32	42	52	62	72	82									
	24	24	12	22	32	42	52	62	72	82									
	25	25	12	22	32	42	52	62	72	82									
	26	26	12	22	32	42	52	62	72	82									
	27	27	12	22	32	42	52	62	72	82									
	28	28	12	22	32	42	52	62	72	82									
	29	29	12	22	32	42	52	62	72	82									
	30	30	12	22	32	42	52	62	72	82									
	31	31	12	22	32	42	52	62	72	82									
	32	32	12	22	32	42	52	62	72	82									
	33	33	12	22	32	42	52	62	72	82									
	34	34	12	22	32	42	52	62	72	82									
CALL ALLOCATION	LINE 1	41	00																00 = Group Call XX = Station Number
	2	42	00																
	3	43	00																
	4	44	00																
	5	45	00																
	6	46	00																
	7	47	00																
	8	48	00																
GROUP CALL	LINE 1	51	11	16	00	00													Insert all stations which must ring (incoming trunk calls only) maximum of 4 stations
	2	52	12	16	00	00													
	3	53	13	16	00	00													
	4	54	14	16	00	00													
	5	55	15	16	00	00													
	6	56	16	16	00	00													
	7	57	17	16	00	00													
	8	58	18	16	00	00													
CENTRAL ALARM	LINE 1	61	00																00 = Off 10 = On
	2	62	00																
	3	63	00																
	4	64	00																
	5	65	00																
	6	66	00																
	7	67	00																
	8	68	00																

REMARKS:

APPENDIX 3

SERIAL AND ITEM LIST FOR THES206/408 SYSTEMS

338/906	Main-equipment S206 system.	ME-S206	Equipped as a 2/06 system.
338/908	Main-equipment S408 system.	ME-S408	Equipped as a 4/08 system.
338/910	Krone connect module for both S206 and S408 ME's.	KCM-S206	Part of both the S206 and S408 Main-equipments; module for terminating distribution cables.
338/911	Operational system software module.	OSSM-S206	Part of both the S206 and S408 Main-equipments; module containing the system program.
338/950	Two-wire and paging module	TWIM-DEC-S	Provides two-wire and paging features. Optional PBA for the S206 and S408 ME's. One required only.
11/238	Mains fuse. (F1).	200 mA	Mains fuse for both the S206 and S408 ME's.
11/130	5 volt fuse. (F3).	800 mA	5 volt supply fuse for the S206 and S408 ME's.
11/125	24/15/7.5 volt fuse. (F4).	1 A	24/15/7.5 volt fuse for the S206 and S408 ME's.
11/150	45 volt fuse. (F5).	100 mA	45 volt (AC) ring fuse for the S206/408 ME's.
11/129	Station fuse. (F6, F7).	160 mA	Station fuse for the S206 and S408 ME's. F6 — Stn's 11 — 14 F7 — Stn's 15 — 18

APPENDIX 4

SERIAL AND ITEM LIST FOR THE S824 SYSTEM

338/924	Main Equipment	ME-S824	Equipped as 8/16.
Spares Items			
338/926	Central Processor Module	CPM-S824	Provides switching and logic control.
338/927	Station and Exchange Module	408M-S824	Four exchange lines and 8 station interfaces.
338/929	Power Supply	PS-S824	
338/930	Krone Connect Module	KCM-S824	Provides terminations for all external cabling.
338/931	Operating System Software Module	OSSM-S824	
11/243	Mains fuse. (F1).	500 mA	
11/122	5 volt fuse. (F3).	2 A	
11/245	24/10/5 volt fuse. (F4).	3.15 A	
11/236	45 volt fuse. (F5).	315 mA	
11/238	Station fuse. (F6-F11).	200 mA	
Expansion Items			
338/928	Station Module	8SM-S824	Provides 8 station interfaces
Option Items			
338/950	Two-wire Module	TWIM-DEC-S	Provides two-wire capability
338/932	Call Detail Recording Module	CDRM-S824	RS232/V24 Interface Module

APPENDIX 5

SERIAL AND ITEM LIST FOR THE SYSTEM STATIONS

338/70	Standard key station with recall	TS-SCW-R * H8	Standard cracked wheat key station with recall.
338/71	Standard key station with recall.	TS-SBR-R * H8	Standard burnt rye key station with recall.
338/992	Comset key station.	TS-SC92	Provides hands-free and DSS features (S206, S408, S824 systems only).
338/916	Comset Handsfree	TS-S-T16	Provides handsfree, DSS features (S206/408/824) and DSS console attachment (S824 ONLY).
338/990	Comset On Hook	TS-S-T8	Standard Comset station with On Hook dial.
338/ 160	Receiver inset.	REC-S	Receiver inset for standard key stations without H8 code suffix.
338/ 162	Receiver inset.	REC-S-H8	Receiver inset for all Comset and standard key stations with the H8 code suffix.
338/161	Transmitter inset.	TRA-S	Transmitter for standard key stations.
338/ 163	Transmitter inset.	TRA-SC92	Transmitter for Comset 92 key stations.
338/ 164	Transmitter inset	TRA-S8	Transmitter for Comset T8 and Comset T16 key stations.
338/ 190	Handset cord	HC-SLB	Handset cord for standard key stations.
338/ 192	Handset cord	HC-SC92	Handset cord for all Comset key stations.
338/191	Line cord.	LC-SLB	Line cord for standard key stations.
361/252	Line cord.	LC-T210	Line cord for all Comset stations.
338/993	Mounting bracket	WMK-S	Wall mounting kit for Comset telephone stations.

* Please note — Standard key stations with a H8 suffix in their item code, i.e. TS-SCW-RH8 use the non-magnetic, H8 type receiver, accordingly the internal circuitry of the station PBA has been changed to accommodate the higher matching impedance.

APPENDIX 6

SERIAL AND ITEM LIST FOR THE DOCUMENTATION

338/980	User guide S206/408/824.	DOC-S206-UG	User guide for the S206, S408 and S824 systems.
338/981	Basic Tech's manual.	DOC-S206-TM	Basic Technician's manual for the S206/408.
338/982	Installation and Maintenance manual.	DOC-S206-IM	Comprehensive Installation and Maintenance manual for the S206/S408 and S824 systems.
338/983	Basic Tech's manual.	DOC-S824-TM	Technician Manual for S206/408/824.
338/984	Insert for Installation and Maintenance manual	DOC-S824-IM	Comprehensive Installation and Maintenance manual for the S206/S408 and S824 systems.
338/985	Customer Data Record Book.	DOC-S824-CD	For all S206/408/824 systems.
338/986	Quick Reference Guide.	DOC-S206-QRG	For S206/408
338/987	Quick Reference Guide.	DOC-S824-QRG	For S824.

Installation and Maintenance Manual - S824H Supplement
List of Contents

Installation and Maintenance Manual - S 824H Supplement

1.1 Introduction

The "Commander S" ME-S824H Serial item no. 338/900 is an extended Hybrid Version of the previous ME-S824 system.

It offers substantial improvements and expansions especially if used as a Hybrid system with two-wire stations and Comset stations attached.

All the user procedures for the Comset stations are unchanged. Only the two-wire station user procedures for Call Pick-up, making an outside call and Common Hold (retrieve) are adapted to the two-wire station facility expansion (see 1.3).

Please note that a different numbering scheme (port numbers) is used for Customer Data programming.

This I & M Manual supplement provides all the information required and should be used in conjunction with the I & M Manual 338/984. The references to the I & M Manual are given in square brackets [], where applicable.

IMPORTANT - PLEASE NOTE:

The system incorporates a new CPM-S824H Serial Item No: 338/936 and a new Backplane. The CPM-S824H and the Backplane are not compatible with the previous version and therefore not interchangeable. All other S824H modules are interchangeable with the S824.

1.2 New Features

1.2.1 Two-wire station capability

The System is designed to handle up to 24 two-wire stations with three Twim-DEC-S attached to the 408M (2) and 8SM(1). It is recommended to use at least one Comset station at position 11 for programming purposes.

1.2.2 Extended two-wire station facilities

. Call Pick-up
- Last Number Redial
- Abbreviated Dialling
- Conference
- Direct Call to a Comset HF station.

1.2.3 Extended Access Barring

The Class of Service/Access Barring S5 within the Customer Data is extended (Block 16 and 17) to achieve identical access barring on PABX and exchange lines.

1.2.4 Station Classes of Service

The Station Classes of Service S3 and 75 to 98 enables the system to block any station from using the following features:

- Dial without I-button
- Paging
- Call Diversion

. Do Not Disturb

- Message Waiting
- External Conference
- Data Mode
- Voice Call send
- Voice Call receive

1.2.5 **Digit Analysis**

The S11 group within the Customer Data allows the technician to:

- Change the user procedures, if required
- Change the exchange line or station position without rewiring the system.

Note:

This system feature should only be used if really required, because a change could result in differences between the system procedures and the user guide.

1.2.6 **Trunk Line Groups**

The eight exchange lines can be programmed to two Trunk Line groups, (S2 code 81, 82 - max 8 lines in each group). This enables the user to distinguish between the two groups for "Line Booking" and "making an outside call".

1.2.7 DSS **Capability**

The system memory space is extended so that the ME-S824H can be equipped with up to six Direct Station select consoles (S338/994).

1.3 New or changed operation procedures for the S824H User Instructions

1.3.1 **Call Pick-up:** [Ref. 1.9.5.8]
An incoming external call can be picked up by any two-wire station without knowing the line number. The call is redirected by dialling the call pick-up code "4" (standard data).

1.3.2 **Making an Outside Call using a specific line:**
To select a specific line from a two-wire station, dial the line access code "81" to "88" (standard data 81-88 for eight exchange lines).

From a Comset station a specific line is selected by dialing "81" to "88" or by pressing the appropriate line key.

1.3.3 **Making an Outside Call using a trunk group:** [Ref. 1.9.5.9]
The available 8 exchange lines can be programmed into two groups in any combination.
Access to these trunk groups can be made by dialling "0" for group 1 and "1" for group 2.
Line Booking can also be activated by using these two access codes. (Comset station only).

1.3.4 **Common Hold:** [Ref. 1.9.5.14].
To place an answered External Call on Common Hold by a two-wire station, dial '985" (standard data) and hang up.

To retrieve a call from Common Hold, dial digit "5" followed by the line access code "81-88".

This facility is limited because the external line number must be known to retrieve the call from Common Hold.

Note: The external paging must be programmed active to allow this facility (S1 Code 42 Data 10).
The transfer time for Common Hold is programmable independent of the normal transfer time (S1 Code 48).

1.3.5 **Last Number Redial: [1.9.5.16].**
The S824H system provides the Last Number Redial facility for a standard (decadic) two-wire station. By dialling digit "3" (standard data) the exchange line is seized automatically and the last number is redialled.

Note that the system carries out the same exchange line seizure procedure as used before. For example, if a specific line was used (see 1.3.2) only that line is taken for redial.

1.3.6 **Abbreviated Dialling:** [Ref. 1.9.5.18-1.9.5.20].
Each two-wire station can store up to ten 20-digit numbers for private use.

Programming:

The "station" abbreviated number is programmed by:
- first dialling the digits "7" and "5
- then dialling the two digit code (00-09) representing the store position number
- followed by the number itself (max. 20 digits).

Use of abbreviated number:

To use an abbreviated number dial digit "6" (standard data), followed by the two-digit address of the store position number (00-59, includes the system abbr. no.).

Note: System abbreviated numbers can be programmed by station 11 using a Comset station.

1.3.7 Conference Internal/External/Internal: [Ref. 1.9.5.22].

During an external call from a two-wire station it is possible to to set up a conference with another internal party.

To form a conference call, dial digit "9", followed by the required internal number and digits "77" when the party answers.

To disconnect the added internal party dial "0".

1.3.8 **Direct Call to a Comset Station:** (Intercom voice call) [Ref. 1.9.5.35].

With the S824H it is possible to activate the Hands Free Answer Back facility to any Comset Hands Free station from a standard two-wire station:

First example: After lifting the handset the Comset station is called by dialling digit 9" and the station number. If the call is not answered, the Hands Free Answer Back status is activated at the called Comset station by dig the digits "7" and "8".

Second example: The Hands Free Answer Back facility to a Comset station is activated directly by dialling "78"and the required station number.

1.3.9 **Shortened Codes for Special Procedures:**

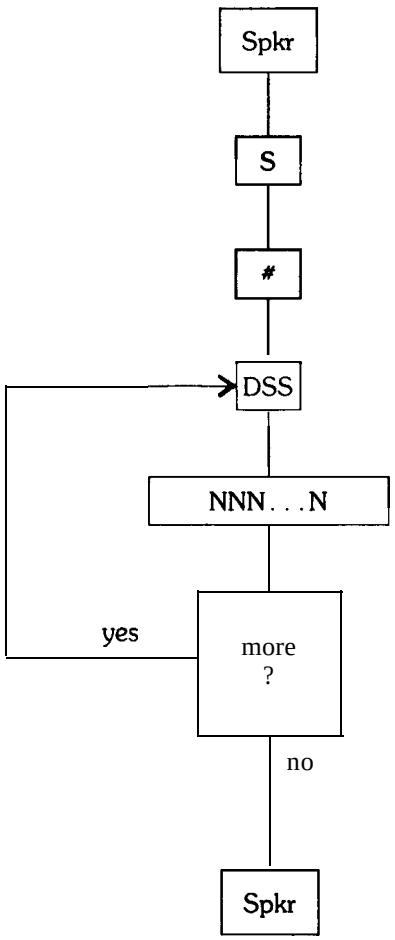
The following procedures for a two-wire station are same as for the S824 systems, but with the S824H the prefix digit 9" should be omitted.

1. Call Diversion	71	[Ref. 1.9.5.24]
2. Cancel Diversion	71	
3. Follow me	72	[Ref. 1.9.5.25]
4. Cancel Follow me	72	
5. Do Not Disturb	73	[Ref. 1.9.5.26]
6. Cancel DND	73	
7. General cancellation	70	[Ref. 1.9.5.27]
8. Message Waiting	76	[Ref. 1.9.5.28]
9. Message answer	76	
10. Night Switch at authorised stn.	74	[Ref. 1.9.5.29]
11. Returning to daytime mode	74	

1.3.10 **Reprogramming Comset T16 Keys (S824H) [Ref. 1.16]**

The DSS key field of a Comset T16 station used behind a S824H system can be reprogrammed to be used as any combination of DSS appearances or single button facilities operations.

Reprogramming may take place from either each individual Comset T16, or from the programming station 11 using group S8. From the stations the procedure is as follows:



Press "Spkr" key

Press "S" key

Press "#" key

Press "DSS" key at which this operation is to be located

Dial the following sequence of keys for the required procedure

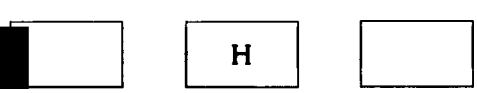
Facility	Procedure
- Internal Call	I-11....34
- Paging	I-8-0....2/4/5
- Call Diversion	S-1-11....34
- Do Not Disturb	s-3
- Nightswitch	S-4-00/11....34
- Intercom Voice Call	S-8-11....34
- Conference (Ext.)	S-*-7
- Data-mode	s-*-9
- Abb. dialling central	*-10...59

Press "Spkr" key

Special Notes:

(1) Exchange Line access buttons (normally positioned as the first two rows of keys) cannot be re-programmed, unles they are individually marked as "Not Used" in code group S1, address 01-08, of the customer data.

(2) Physical locations of the access can be altered by the swap" procedure, i.e. pressing the following sequence of keys (only in the station programming mode!)



Key 1 Hold Key Key 2

The effect is to Swap" the feature/facility accessed by Key 1, to the physical location of Key 2 (and naturally vice-versa).

(3) The addition of the DSS console automatically clears the internal station access facilities that were originally set under the bottom two rows of keys of the Comset Handsfree Station. (Does not apply to Comset On-Hook Station).

These locations are now available **only** for programming of features/facilities and cannot be used for:

- internal station select
- exchange line access

(4) Each station port has memory reserved for 10 station" abbreviated numbers. The addition of the DSS console does not affect the quantity of numbers that can be stored as private numbers.

(5) Unused line keys on a Comset On-Hook Dialling Station (T8) can be programmed to be used as Direct Station Select Keys or single button facility operation (relevant exchange line set to Not used" (00) in block S1 code 01 to 08).

2. Programming

2.1.1 Port Numbering Scheme

The S824H system programming is expanded to improve the system flexibility. With the **Digit Analysis** block S11 all procedures, station numbering and exchange line access can be customized to fulfil1 any special customer requirements.

This requires an absolute reference numbering scheme for all station and exchange lines, now designated as ports with numbering commencing with zero. The following list shows the relationship of the port numbers to the standard allocated line and station numbers. These port numbers **must** be used when a particular line or station is to be specified within the customer data.

STATION PORT No.	00	01	02	03	04	05	06	07
Std. LINE No.	(8)1	(8)2	(8)3	(8)4	(8)5	(8)6	(8)7	(8)8

STATION PORT No.	00	01	02	03	04	05	06	07	08	09	10	11
Std. STATION No.	11	12	13	14	15	16	17	18	19	20	21	22

STATION PORT No.	12	13	14	15	16	17	18	19	20	21	22	23
Std. STATION No.	23	24	25	26	27	28	29	30	31	32	33	34

Note that the above allocation can be changed by use of S11 block address 11 to 18 and 31 to 54!

2.1.2 Clearing Code

If a station or exchange line is to be programmed 'non existent" or "not included" the clear code " -- " must be used. By pressing the "# Key" the particular memory location is cleared.

2.1.3 Digit Analysis S11 programming

Any dialled digit is interpreted by the system software with reference to the status of the station, but also with reference to the content of the S11 group.

By changing the S11 data, the exchange line number, station number and procedure can be changed. The S11 data consists of two main code groups:

- Codes dialled in the idle state
  - Standard codes for Two-Wire Stations
  - Service codes for Two-Wire Stations without S-key
  - General standard codes (line location, trunk group codes, station call allocation)
- Codes dialled to initiate special services
  - Service code following the S-key or code for "S" (TW-STATION)
  - Codes dialled during an exchange call following the S-key or code for "S" (TW-STATION)

The code settings within S11 must be clear and logical. A double use of one particular digit for different procedures is not permitted. For example digit "4" for **Night Switch** cannot be used again within the feature codes group in the first position.

To avoid accidental reprogramming of S11, an additional barrier has been added to the S11 programming. **Only cleared address positions can be reprogrammed.** If data is to be changed, the existing (standard) data must be cleared first (by using the "# key") before the new data can be programmed.

ATTENTION:

The use of the DIGIT ANALYSIS block S11 must be restricted to cases where changes are absolutely necessary! Be aware that, if changes are carried out, the information given in the USER GUIDE is no longer valid and will need to be updated!

2.2.1 Configuration Data [Ref. 2.12.7]

Access to this group of operation codes (Op. Codes) and data is via the Access Code **S1.**

	Op. Code	Std. Data
Exchange Line and Type To indicate the existence of an exchange line and also whether it is a DTMF or Decadic type	01 to 08	10
Station Type The system can automatically distinguish between a Comset and Standard Key station, but it must be told if there is a 2-wire station connected at a particular port. This code is used to allocate security against intrusion tones (internal and external), or special operation made for 2-wire station.	11 to 34	**00**
Transfer Time Specifies the time that a call may be unanswered at a transferred-to station before recalling at the sending station.	41	15
Paging (see also Op. Codes 50, 51) If a two wire module is fitted, paging must be programmed active to allow the common hold facility to be available at the the two-wire station. Note that the "hardware" for paging on a S824H is standard (ie. not dependent on the fitting of a TWIM-DEC option module).	42	00
Int/Ext./Ext. Conference Advises the system that two party external conference is/is not allowed. Basically depends on the source of the 'exchange" lines (PABX or exchange).	43	10
Exchange Line Release Time When the handset is replaced after the end of an incoming exchange line call, that particular line is not available for re-use for this length of time. This is to ensure that the calling party has released the line and the public exchange has cleared all connections.	**44**	03
Dial Pulse Break Break time for a decadic type exchange network.	45	66
Dial Pulse Make Make time for a decadic type exchange network.	**46**	33
Recall Time When a call is returned to the originator as a result of not being answered, then it is only available for this time. After this period the call is automatically disconnected.	47	20
Transfer Time (Common Hold) Specifies the time that a call is in common hold before recalling.	**48**	15
Call Time at Conference Specifies the time **an** intended station is called to enter a conference. If the station does not answer within this time it is disconnected.	**49**	15
Internal Paging Zones Up to 12 Comset stations can be grouped together and simultaneously accessed on the internal paging link. Two groups can be defined, and stations can appear in either/both groups.	50 51	-- --

2.2.2 Exchange Line Related Data [Ref. 2.12.8]

Access to this group of Op. Codes and data is via Access Code S2.

	Op. Code	Std. Data
Recall Key If the Commander S system is sited behind a PABX, this code advises the system as to the type of recall signalling required. For the 'earth" recall mode, the earth is maintained while the recall key is depressed. 'Flash" recall generates a timed line break. Each external line may be individually programmed. The first pair of digits are used to distinguish between a trunk line and a PABX line. It is used to activate (PABX-line)/deactivate (trunk line) Block 16, 17 in S5.	01 to 08	00 00
Exchange Code Behind a PABX an initial digit needs to be sent to select a "real" exchange line. This code also defines the pause between the exchange line selection and dialling commencement.	11 to 18	*00*
Central Alarm Individual lines can be programmed to activate the central alarm.	21 to 28	*00*
Call Forwarding Type, Main Answer Point and Alternative Answer Point The data under this combined code address indicates the action to be taken for an incoming exchange line call. The first pair of digits defines the type of forwarding. There are four Forwarding options: 00 = No forwarding, i.e., the call remains at the station allocated for that exchange line. 01 = Forward to the alternate answer point, if the main answer point is unavailable or does not answer within a defined time. Then remain at that station. 02 = Similar to 01, however, if that station is unavailable or after the elapse of the defined time, start a loop search from the first available station on the system. Continue to search until the call is answered or terminated. 03 = Similar to 02, however, the call remains at the first free station in the system. * The second pair of digits (in the data) defines the main answer point for that exchange line. * The final pair of digits defines the alternate answer point. • If data "11" is programmed as the type of Forwarding, then the system uses data from "group answer" as the ringing point(s) .	31 32 33 34 35 36 37 38	01 00 05 01 01 05 01 02 05 01 03 05 01 04 05 01 05 05 01 06 05 01 07 05
Group Answer The system can be programmed to allow an exchange call to be announced at up to 4 stations at the same time. Any station may belong to any group and also may belong to more than one group. Note: that when this facility is programmed, the call forwarding programming does not take effect.	41 to 48	-- -- --

	Op. Code	Std. Data
Auto Forwarding Time The duration of a call at an unanswered station before transfer may (if allowed) take place.	61 to 68	10
Interdigit Interval The interval of time between digit operations before the system returns to a passive state. During dialling this is the maximum time allowed between dialled digits, after which the system returns to a wait state (waiting for a command). After the selection, the first digit must be dialled before this time elapses; otherwise the system releases the line and returns to idle state.	71 to 78	05
Trunk Groups (1 & 2) Two exchange line groups can be defined with two different access codes. Exchange lines can appear in either/both groups.	81 82	00 01 02 03 04 05 06 07 00 01 02 03 04 05 06 07

2.2.3. Station Related Data ("Daytime" operation) [Ref. 2.12.9]

Access to this group of Op. Codes is via the Access Code S3.

	Op. Code	Std. Data
Hot Line Station pairs may be assigned together to form a working team which results in additional features/ facilities between them. Note that it is important to determine which of the pair is to be the executive.	01 to 04	— —
Exchange Line Access and Class of Service Each station may be assigned differing access rights to each of the available exchange lines. There are eight discrete levels of access; from COS 0 being no access to exchange lines up to digit COS 7 which allows dialling on the exchange line with no digit discrimination.	11 to 34	03 13 23 33 43 53 63 73
Night Switch Authorization The system can be switched into either mode of night service only from two stations, one of which is programmable. Station 11 is always authorised to perform this operation. Reverting back to daytime operation is only possible from the authorized stations.	41	00
Unit Line Selection This feature is available only with the Comset station and provides the user with access to the allocated exchange line, directly on dialling of digits.	51 to 74	-- --
Station Classes of Service This facility allows certain internal features (eg. call diversion) to be barred from use for particular stations	75 to 98	01 11 11 11 11 11 11 11

2.2.4 Night Switch Related Data [Ref. 2.12.10]

Access to this group of Op. Codes is via the Access Code **S4.**

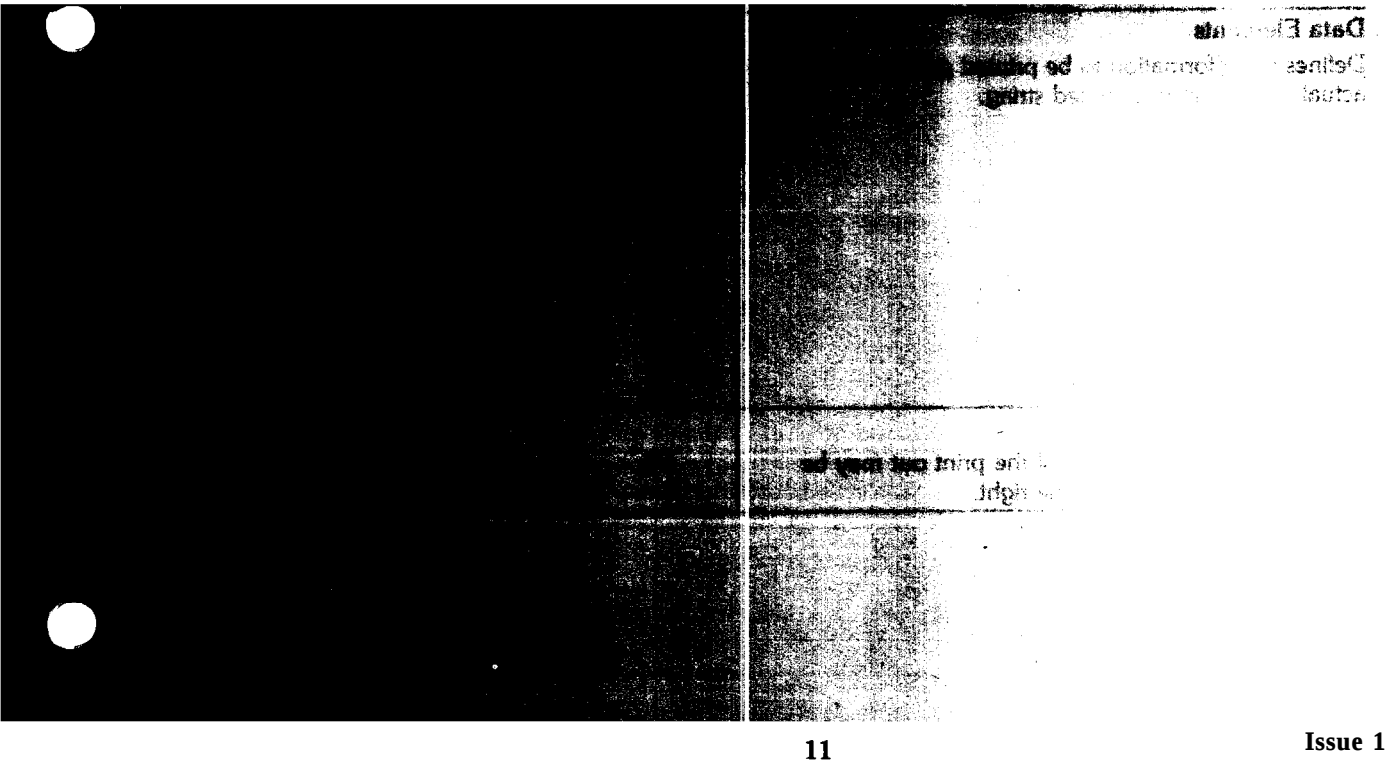
	Op. Code	Std. Data
Exchange Line **Access and Class of Service** Under the condition of night mode "A" operation, a complete alternate assignation of access rights can be made. The form and format is identical to that for daytime operation.	11 to 34	33 13 23 33 13 53 63 73
Call Allocation Night mode "A" operation does not allow any call forwarding to take place. A new set of main answer points needs to be defined, or, alternatively, "group answer" invoked.	41 to 48	--
Group Answer Provides the facility whereby more than one (up to a maximum of 4) station can be rung on an incoming external call.	51 52 53 54 55 56 57 58	00 05 -- -- 01 05 -- -- 02 05 -- -- 03 05 -- -- 04 05 -- -- 05 05 -- -- 06 05 -- -- 07 05 -- --
Central Alarm Activation of central alarm also needs to be redefined for this mode. Similar to the daytime operation, each line can be individually enabled.	61 to 68	**00**

2.2.5 Service Data [Ref. 2.12.11]

Access to this group of Op. Codes is via the Access Code **S6.**

	Op. Code	Std. Data
Quality-Counter Program Monitors the running of the normal **program and** searches for any resets due to the system running into a "FF" address.	01	**00**
Quality-Counter Reset Monitors the total number of times that the system has been reset by any cause.	**02**	**00**
Quality-Counter C-Data Monitors for any mismatch between customer data held in EEPROM and the working copy held in RAM.	**03**	**00**
Quality-Counter EEPROM Monitors data held in EEPROM via a checksum procedure. and indicates the number of times a correction has been required.	**04**	**00**
Quality-Counter EPROM Monitors the data held in EPROM and reports any deviation compared to the checksum.	**05**	**00**
System Software Main software level number.	**09**	01
Country Code	10	**00**
Version Number Reflect minor changes within the main level number	11	01
Software Production Detail **EPROM 1** **EPROM 2** **1'** = APS No. (Factory location) 2' = Patch Version 3' = CRC - Word	21 **22**	**1' 2' 3a*** **3b* 3c***

Note: The usefulness of the data presented by this Code group is **more** fully **appreciated** at central repair workshops.



2.2.6 Call Detail Recording Data [Ref. 2.12.12]

Access to this group of Op. Codes is via the Access Code S7.

	Op. Code	Std. Data
Exchange Line Related Data Defines which exchange lines will/will not produce a message for incoming/outgoing calls and whether account codes will be printed out for the particular line.	01 to 08	**00 00**
Station Related Data Defines which station will/will not be reported on printouts for incoming/outgoing calls. and whether account codes will be printed for the particular station.	11 to 34	00 00
Numbers Related Data Defines which station numbers are to be printed and the masking of the externally dialled numbers.	41 to 64	00 02
System Related Data		
Minimum time all exchange lines must be busy before an "all trunks busy" message is generated.	71	00
Minimum time on exchange line has to be clear before a timing is to be stopped.	**72**	00
Minimum exchange line connection time before a message will be generated.	**73**	**30**
Printing of "'all trunks busy" and/or "lost call" messages.	**74**	**00**
Printer type	**75**	00
Printing of header	**76**	**00**
Length of paper (in lines)	**77**	**72**
Number of datasets (printed lines) per page	**78**	**68**
Control characters at beginning or end of each printed line.	**79**	**00**
Data Elements Defines the information to be printed and the actual position in the printed string.	81 **82** **83** **84** **85** **86** **87** **88** **89** **90** to 96	00 **01** **02** **03** **04** **05** **10** **13** **99** — —
Margin Alignment **The** *dialled digits/Ac/Ring" of the print out may be aligned to either the left or the right.	97	**10**

2.2.7 Comset DSS Button Field Code Allocation [Ref. 2.12.13]
Access to this group of Op. Codes is-via the Access Code S8.

The function of each key of the DSS field of a Comset can be defined. Each station has 4 "lines" of data, related to the four rows of buttons

Note that for the Comset On-Hook Station, only the first two rows of data have **any** significance.

	Op. Code	Std. Data
Stn. port 00	01	**01 00 01 01 01 02** 01 03
	02	01 04 01 05 01 06 01 07
	03	02 01 02 02 02 03 02 04
	04	02 05 02 06 02 07 16 00
Stn. port 01	05	01 00 01 01 01 02 01 03
	06	01 04 01 05 01 06 01 07
	07	02 00 02 02 02 03 02 04
	08	00 05 02 06 02 07 16 00
Stn. port 02	09	01 00 01 01 01 02 01 03
	10	01 04 01 05 01 06 01 07
	11	02 01 02 00 02 03 02 04
	12	02 05 02 06 02 07 16 00
Stn. port 03	13	01 00 01 01 01 02 01 03
	14	01 04 01 05 01 06 01 07
	15	02 01 02 02 02 00 02 04
	16	02 05 02 06 02 07 16 00
stn. port 04	17	01 00 01 01 01 02 01 03
	18	01 04 01 05 01 06 01 07
	19	02 01 02.02 02 03 02 00
	20	02 05 02 06 02 07 16 00
Stn. port 05	21	01 00 01 01 01 02 01 03
	22	01 04 01 05 01 06 01 07
	23	02 01 02 02 02 03 02 04
	24	02 00 02 06 02 07 16 00
Stn. port 06	25	01 00 01 01 01 02 01 03
	26	01 04 01 05 01 06 01 07
	27	02 01 02 02 02 03 02 04
	28	02 05 02 00 02 07 16 00
Stn. port 07	29	01 00 01 01 01 02 **01 03**
	30	01 04 01 05 01 06 **01 07**
	31	02 01 02 02 02 03 02 04
	32	02 05 02 06 02 00 16 00
Stn. port 08	33	01 00 01 01 01 02 01 03
	34	01 04 01 05 01 06 01 07
	35	0 2 0 9 0 2 1 0 0 2 1 1 02 12
	36	02 13 02 14 02 15 16 00
stn. port 09	37	01 00 01 01 01 02 01 03
	38	01 04 01 05 01 06 01 07
	39	02 08 02 10 02 11 02 12
	40	02 13 02 14 02 15 16 00
sbl. port 10	41	01 00 01 01 01 02 01 03
	42	01 04 01 05 01 06 01 07
	43	0 2 0 9 0 2 0 8 0 2 1 1 02 12
	44	02 13 02 14 02 15 16 00
stn. port 11	45	01 00 01 01 01 02 01 03
	46	01 04 01 05 01 06 01 07
	47	02 09 02 10 02 08 02 12
	48	02 13 02 14 02 15 16 00
stn. port 12	49	01 00 01 01 01 02 **01 03**
	50	01 04 01 05 01 06 01 07
	51	02 09 02 10 02 11 02 08
	52	02 13 02 14 02 15 16 00

	Op. Code	Std. Data
Stn. port 13	53	01 00 01 01 01 02 01 03
	54	01 04 01 05 01 06 01 07
	55	0 2 0 9 0 2 1 0 0 2 1 1 0 2 1 2
	56	02 08 02 14 02 15 16 00
Stn. port 14	57	**01 00 01** 01 01 02 01 03
	58	01 04 01 05 01 06 01 07
	59	0 2 0 9 0 2 1 0 0 2 1 1 0 2 1 2
	60	02 13 02 08 02 15 16 00
Stn. port 15	61	01 00 01 01 01 02 01 03
	62	01 04 01 05 01 06 01 07
	63	02 09 02 10 02 11 02 12
	64	02 13 02 14 02 08 16 00
Stn. port 16	65	01 00 01 01 01 02 01 03
	66	01 04 01 05 01 06 01 07
	67	02 17 02 18 02 19 02 20
	68	02 21 02 22 02 23 16 00
Stn. port 17	69	01 00 01 01 01 02 01 03
	70	01 04 01 05 01 06 01 07
	71	02 16 02 18 02 19 02 20
	72	02 21 02 22 02 23 16 00
Stn. port 18	73	01 00 01 01 01 02 01 03
	74	01 04 01 05 01 06 01 07
	75	02 17 02 16 02 19 02 20
	76	02 21 02 22 02 23 16 00
Stn. port 19	77	01 00 01 01 01 02 01 03
	78	01 04 01 05 01 06 01 07
	79	02 17 02 18 02 16 02 20
	80	02 21 02 22 02 23 16 00
Stn. port 20	81	01 00 01 01 01 02 01 03
	82	01 04 01 05 01 06 01 07
	83	02 17 02 18 02 19 02 16
	84	02 21 02 22 02 23 16 00
Stn. port 21	85	01 00 01 01 01 02 01 03
	86	01 04 01 05 01 06 01 07
	87	02 17 02 18 02 19 02 20
	88	02 16 02 22 02 23 16 00
Stn. port 22	89	01 00 01 01 01 02 01 03
	90	01 04 01 05 01 06 01 07
	91	02 17 02 18 02 19 02 20
	92	02 21 02 16 02 23 16 00
Stn. port 23	93	01 00 01 01 01 02 01 03
	94	01 04 01 05 01 06 01 07
	95	02 17 02 18 02 19 02 20
	96	02 21 02 22 02 16 16 00

2.2.8 Date and Abbreviated Numbers.

Note that this code group can be accessed also directly by the user, without the "pass code: This is the S9 code group.

	Op. Code	Std. Data
Setting of Time		
Year	01	00
Month	02	00
Day	03	00
Hour	04	00
Minute	05	00
Second	06	00
12/24 hour display	07	10
System Abbreviated Numbers Numbers that are to be accessed by all stations may be stored in these locations	10 to 59	FF

Note:

Input variation */# at beginning not possible

\# = cancel complete number

* = end of input

H = * function for DTMF dialling

Redial Button = pause, time must be set up in datagroup S2, address 11-18 (per line)

2.2.9 Digit Analysis Data

Access to this group of Codes and data is via Access Code **S11**

	Op. Code	Std. Data
Unit line select without I-button dialling at station	01	--
I-button for 2-wire station	02	9
S-button for 2-wire station	03	7
Exchange line access codes		
To use a particular exchange line	11	81
	12	82
	13	83
	14	84
	15	85
	16	86
	17	87
	18	88
Reconnection on a held line		
To get back to a held line	19	0
Trunk group 1 and 2		
Exchange lines may be grouped into two groups with two different access codes, Trunks can belong to both or either group.	21	0
	22	1
Call pick up		
Incoming calls can be picked up from any two-wire station bv using this feature.	29	4
Station call numbering		
Gives the flexibility to use different numbering schemes.	31 to 54	11 to 34
Feature codes		
The following features may be activated by two-wire stations by using these codes together with digit 7 instead of S button.		
General cancellation	60	0
Call diversion	61	1
Follow me	62	2
Do not disturb	63	3
Night switch	64	4
Message wait	65	6
Direct call (HFAB)	66	8
Start programming abb. no central	67	9
Prog. abb no. individual 2-wire stns.	75	5
Feature codes		
These codes may be used by a two-wire station without S-code		
Send abbr. numbers	80	6
Redial	81	3
Select line from common hold (plus line code)	82	5
Features by external calls		
Starts with S-code		
Conference	85	7
Data Mode/DTMF mode for two-wire stns.	86	9
Codes for paging and standard night-switch on.		
Pre select paging	90	8
All zones	91	0
Zone 1	92	1
Zone 2	93	2
Zones 1 and 2	94	4
External loudspeaker	95	5
Activate std. niaht-switch	96	00

Note: To charge the standard data the data needs to be cleared first. Data can be cleared by pressing the # key.

2.3 CUSTOMER DATA RECORD OPTIONS

The following details summarize the options available within each operation code under each of access codes.

System Configuration Data S1

Characteristic	Port	Op Code	Data	Remarks
Exchange Line	00	01	30 = non existent	Dialling method
	01	02	10 = Decadic	
	02	03	20 = DTMF	
	03	04		
	04	05		
	05	06		
	06	07		
	07	08		
Station Type	00	11	00 = 4-wire station	secure = no break-in tones or interrupts
	01	12	31 = 2-wire Telephone	
	02	13	10 = 4-wire station data secure	
	03	14	11 = 2-wire Telephone data secure	
	04	15		
	05	16		
	06	17		
	07	18		
	08	19		
	09	20		
	10	21		
	11	22		
	12	23		
	13	24		
	14	25		
	15	26		
	16	27		
	17	28		
	18	29		
	19	30		
	20	31		
	21	32		
	22	33		
	23	34		
Transfer time before recall		41	01-99	Data x 2 sec
Paging existent		42	00 = no. 10 = yes	
Int/Ext/Ext conference		43	00 = no. 10 = yes	
Exchange line release time		44	01-99 00 = No time	Data x 1 sec
Dial Pulse break		45	20-99	Data x 1 msec
Dial Pulse make		46	20-99	Data x 1 msec
Recall time		47	00-99	Data x 1 sec
Transfer time (common hold)		48	00-99	Data x 2 sec
Call time at conference		49	00-99	Data x 2 sec
Internal Paging Zone A		50	station port number	up to 12 sets
Internal Paging Zone B		51	station port number	UP to 12 sets
Free		52		
Free		53		
Free		50		
Free		61		

LINE DATA S2

Characteristic	Port	Op Code	Data	Remarks
Recall Key Function	00	01	XY VW = data	VW = flash, time in ms
	01	02	X = 0, trunk line	V = 2-9, W = l-9; VxWx20ms
	02	03	X = 1, PABX line	
	03	04	Y = not used	
	04	05	VW = 00, no function	
	05	06	VW = 10, earth recall	
	06	07		
	07	08		
Exchange Code	00	11	**00-99**	Programmable switch-over time
	01	12	1st digit = pause in sec.	for reconnection to PABX
	02	13	2nd digit = PABX access	
	03	14	code	
	04	15		
	05	16		
	06	17		
	07	18		
Central Alarm	00	21	00 = off	
	01	22	10 = on	
	02	23		
	03	24		
	04	25		
	05	26		
	06	27		
	07	28		
Call Forwarding Type	00	31	first two digits = option	00 = Option 1 only (A)
Main Answer Point (A)	01	32	3. + 4. digit = main	01 = Option 2 (A) then (B)
Alt. Answer Point (B)	02	33	answer	02 = Option 3 (A) then (B)
	03	34	point (A)	then search
	04	35		03 = Option 4 (A) then (B)
	05	36	5. + 6. digit = alternative	then search
	06	37	answer	then stop
	07	38	point (B)	11 = group call
Group Call	00	41	00-23	Maximum of 4 stations.
	01	42	Station port number	Insert all stations port numbers in
	02	43		that particular group.
	03	44		
	04	45		
	05	46		
	06	47		
	07	48		
Auto Forwarding time	00	61	01-15	Number of ringing cycles
	01	62		
	02	63		
	03	64		
	04	65		
	05	66		
	06	67		
	07	68		
Interdigit Interval	00	71	00-15 = Time x 2 sec	Maximum time allowed between
(Post dial Pulse)	01	72		two button operations at external
	02	73		dialling
	03	74		00 = non-limited time'
	04	75		
	05	76		• (20 sec. for two-wire stn.)
	06	77		
	07	78		
Trunk group 1		81	00-07	Insert line port no.
Trunk group 2		82	00-07	Insert line port no.

STATION DATA S3

Characteristic	Port	Op Code	Data	Remarks
Hot Line Pairs 1		01	-- -- not required	
2		02	1st two digits = chief stn.	
3		03	port number	
4		04	2nd two digits = secretary stn. port number	
Class of Service	00	11	0X, 1X, 2x, 3x,	For each line specified COS
	01	12	4X, 5X, 6X, 7X	
	02	13		
	03	14	X = COS:	
	04	15	0 internal	
	05	16	1 incoming only, 2-7	
	06	17	according to barring	
	07	18	data	
	08	19		
	09	20		
	10	21		
	11	22		
	12	23		
	13	24		
	14	25		
	15	26		
	16	27		
	17	28		
	18	29		
	19	30		
	20	31		
	21	32		
	22	33		
	23	34		
Night Switch Authorization		41	00-23	00 = only stn. port 00 01-23 = stn. port no.
Unit line	00	51	-- = not connected	
only Comset	01	52	1Y = connected	
	02	53	Y = line port no.	
	03	54	for automatic line	
	04	55	connection.	
	05	56		
	06	57		
	07	58		
	08	59		
	09	60		
	10	61		
	11	62		
	12	63		
	13	64		
	14	65		
	15	66		
	16	67		
	17	68		
	18	69		
	19	70		
	20	71		
	21	72		
	22	73		
	23	74		

STATION DATA S3 Cont.

Characteristic	Port	Op Code	Data	Remarks
Station COS	00	75	AB CD EF GH IK	A = Dial without I-button
	01	76	LM NO PR	B = Paging
	02	77		C = Call Diversion
	03	78	Feature	D = Do Not Disturb
	04	79	0 = not allowed	E = Message Wait
	05	80	1 = allowed	F = External Conference
	06	81		G = Data Mode
	07	82		H = Direct Call, send
	08	83		I = Direct Call, receipt
	09	84		K = Free
	10	85		L = Free
	11	86		M = Free
	12	87		N = Free
	13	88		0 = Free
	14	89		P = Free
	15	90		R = Free
	16	91		
	17	92		
	18	93		
	19	94		
	20	95		
	21	96		
	22	97		
	23	98		

STATION AND LINE DATA FOR NIGHT SERVICE S4

Characteristic	Port	Op Code	Data	Remarks
Class of Service	00	11	0X, 1X, 2x, 3x,	For each line specified COS
	01	12	4X, 5X,.6X, 7X	
	02	13		
	03	14	X = cos:	
	04	15	0 internal	
	05	16	1 incoming only, 2-7	
	06	17	according to barring	
	07	18	data	
	08	19		
	09	20		
	10	21		
	11	22		
	12	23		
	13	24		
	14	25		
	15	26		
	16	27		
	17	28		
	18	29		
	19	30		
	20	31		
	21	32		
	22	33		
	23	34		
Call Allocation	00	41	-- = group call	Call forwarding options are reduced to option 01
	01	42	XX = station port number.	
	02	43		
	03	44		
	04	45		
	05	46		
	06	47		
	07	48		
Group Call	00	51	00-23	Maximum of 4 stations
	01	52	insert all station port	
	02	53	numbers in that particular	
	03	54	group	
	04	55		
	06	56		
	07	57		
	08	58		
Central Alarm	00	61	00 = off	
	01	62	10 = on	
	02	63		
	03	64		
	04	65		
	05	66		
	06	67		
	07	68		

CALL DETAIL RECORDING DATA S7

Characteristic	Port	Op. Code
Exchange Line Related Data	00	01
	01	02
	02	03
	03	04
	04	05
	05	06
	06	07
	07	08

Data

AB CD

		Incoming Call Reported		Outgong Call Reported	
		YES	NO	YES	NO
where	A = 0	X	—	x	—
	1	—	X	x	—
	2	X	—	—	X
	3	—	X	—	X

	Account Code Reported		Data Transfer Reported	
	YES	NO	YES	NO
B = O	X	—	X	—
1	—	X	X	—
2	X	—	—	X
3	—	X	—	X

C = 0: connection to this exchange line will be reported.
= 1: connection to this exchange line will be ignored.
D = 0: fixed data (for future use) ignored at present.

Characteristic	Port	Op. Code
Station Related Data	00	11
	01	12
	02	13
	03	14
	04	15
	05	16
	06	17
	07	18
	08	19
	09	20
	10	21
	11	22
	12	23
	13	24
	14	25
	15	26
	16	27
	17	28
	18	29
	19	30
	20	31
	21	32
	22	33
	23	34

Data

AB CD

		Incoming Call Reported		Outgong Call Reported	
		YES	NO	YES	NO
where	A = 0	x	—	x	—
	1	—	X	x	—
	2	x	—	—	x
	3	—	x	—	X

	Account Code Reported		Data Transfer Reported	
	YES	NO	YES	NO
B=O	X	—	x	—
1	—	X	X	—
2	X	—	—	X
3	—	x	—	X

C = 0: connections from this station are to be reported.
= 1: connections from this station do not get reported.
D = 0: fixed data (for future use) ianored at present.

Characteristic	Port	Op Code	Data	Remarks
Numbers	00	41	AB CD	
Related	01	42		A = 0: for printout of internal station number
Data	02	43		= 1: for no recording of internal station number
	03	44		
	04	45		
	05	46		
	06	47		B = 0: for non-printing of 'C' or 'D' externally dialled digits
	07	48		= 1: for non-printing of any externally dialled number
	08	49		
	09	50		
	10	51		
	11	52		C = O-9: quantity of digits not printed at start of externally dialled number
	12	53		
	13	54		
	14	55		D = O-9: quantity of digits not printed at end of externally dialied number
	15	56		
	16	57		
	17	58		
	18	59		
	19	60		
	20	61		
	21	62		
	22	63		
	23	64		

Characteristic	Op. Code	Data	Remarks
All Trunks Busy Time	71	xx where xx = 00 to 99 sec	Minimum ATB time before message
Call Terminated Timer	72	xx where xx = 00 to 99 sec	Line connect timing is stopped
Call Start Timer	73	xx where xx = 00 to 99 sec	Timing is started after this period
Message Print	74	xy Yes No ATB = x 0 lost calls - =- y 1 - 0	
Printer Type	75	xy where xy = 00 for PT88	
Header Printing	76	xy where x = 0 (fixed) y = 0: print header = 1: no header = 2: print header and line space	
Paper size	77	xx where xx = length of paper in "print lines"	

Characteristic	Op. Code	Data	Remarks
Printed Lines	78	xx where xx = 00 to 99	Number of lines printed before "form feed'
Printer Control Characters	79	xy where x = Before Data, y = After Data CR and LF: 0, 3 Cr: 1, 1 LF: 2, 2 No Control: 3, 0	Sent to the printer, before or at the end of each line of date
Print Data 1	81	xx	Refer to "CDR Data Table"
2	82	xx	
3	83	xx	
4	84	xx	
5	85	xx	
6	86	xx	
7	87	xx	
8	88	xx	
9	89	xx	
10	90	xx	
11	91	xx where xx = 00-13, 99	
Margin Alignment	97	00 = light justified 10 = left justified	

CDR DATA TABLE

Item	Print Data Code	Length
Class of call	00	7
Date	01	10
Time	02	10
Line	03	6
Duration	04	10
Station Number	05	5
Dialled Number	06	22
Ring Duration	07	7
Account Code	08	10
Dialled Number or Ring Duration	09	22
Dialled Number or Account Code or Ring Duration	10	22
Dialled Number or Account Code	11	22
Ring Duration or Account Code	12	10
Information	13	7
End of set	99	—

Note that the total length of the data string (made up by summing the length of the individual data items) must not exceed 80 characters. The printer control characters need to be included within this 80 character limit.

DEFINITION OF TERMS ON 'CDR" PRINTOUT

Class: Class of call, printed out as follows:
INC for incoming calls
OTG for outgoing calls

Date: The date of the call. printed out as day/month/year

Time: The time that the call commenced/was made. printed as hours: minutes: seconds:

Line: The line used for outgoing or incoming calls

Duration: The duration of the call is printed out in hours: minutes: seconds. The timing of the call commences after the first digit is dialled, with a delay as programmed in the Customer Data.

ST # : The internal station number of the destination of an incoming call, or station making an outside call.

Dialled # : The dialled number (up to a maximum of 20 digits) is printed out. Masking of the number, either first 'n' positions or last 'n' positions is as programmed in the Customer Data.

Ring: The time in minutes and seconds that a caller waited before the call was answered.

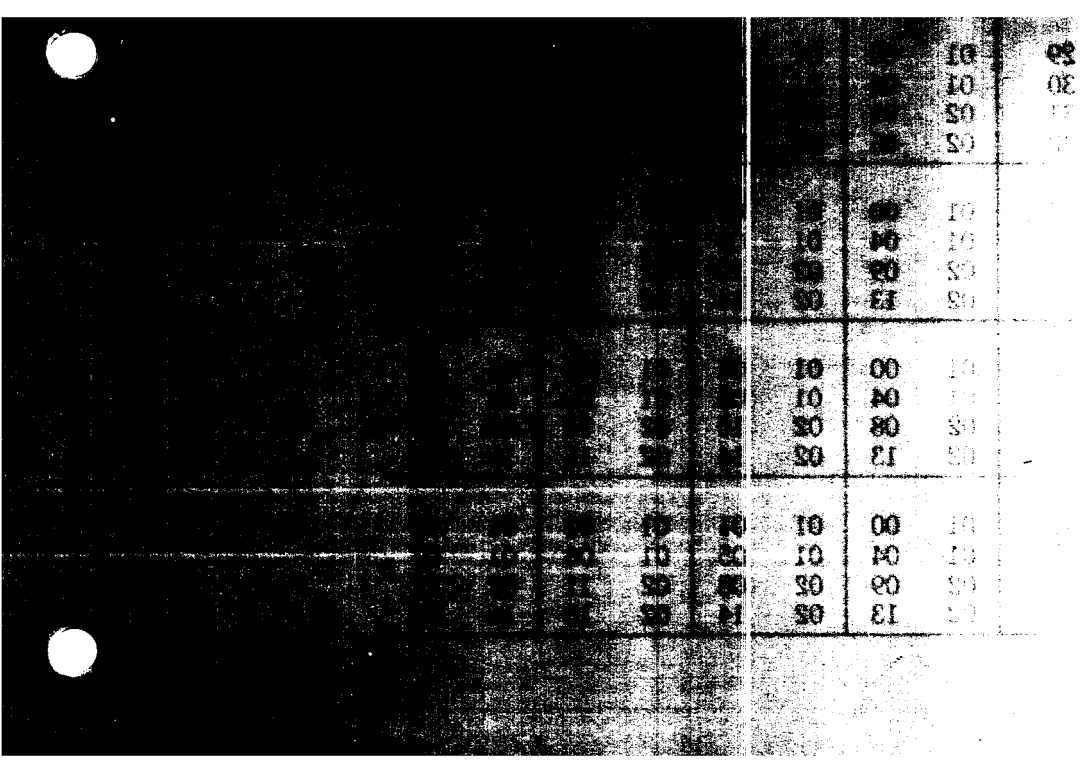
AC: If it is necessary to charge calls to a department. an individual extension, or a client. account codes can be entered at any time during the call.

Info.: Additional information about the call, e.g. if it was a voice call (voice), data transfer, group call (g.c.), account code (AC), conference (conf.).

There are twelve buffer storage areas for call details. These memory locations store call information when the printer is out of service. If this period extends beyond the buffer capacity, then any new information is registered only as quantity.

When the printer is returned to service, the buffer information and "number of calls lost" information is immediately printed.

If all exchange lines are busy for a minimum time as defined in Customer Data then the message "all trunks busy" together with the duration of this condition is printed.



COMSET DSS FIELD BUTTON ALLOCATION S8

Characteristic	Op. Code	Data A_1B_1	C_1D_1	A_2B_2	C_2D_2	A_3B_3	C_3D_3	A_4B_4	C_4D_4
Station port 00									
Key 1-4	01	01	00	01	01	01	02	01	03
Key 5-8	02	01	04	01	05	01	06	01	07
Key 9-12	03	02	01	02	02	02	03	02	04
Key 13-16	04	02	05	02	06	02	07	16	00
Station port 01									
Key 1-4	05	01	00	01	01	01	02	01	03
Key 5-8	06	01	04	01	05	01	06	01	07
Key 9-12	07	02	00	02	02	02	03	02	04
Key 13-16	08	02	05	02	06	02	07	16	00
Station port 02									
Key 1-4	09	01	00	01	01	01	02	01	03
Key 5-8	10	01	04	01	05	01	06	01	07
Key 9-12	11	02	01	02	00	02	03	02	04
Key 13-16	12	02	05	02	06	02	07	16	00
Station port 03									
Key 1-4	13	01	00	01	01	01	02	01	03
Key 5-8	14	01	04	01	05	01	06	01	07
Key 9-12	15	02	01	02	02	02	00	02	04
Key 13-16	16	02	05	02	06	02	07	16	00
Station port 04									
Key 1-4	17	01	00	01	01	01	02	01	03
Key 5-8	18	01	04	01	05	01	06	01	07
Key 9-12	19	02	01	02	02	02	03	02	00
Key 13-16	20	02	05	02	06	02	07	16	00
Station port 05									
Key 1-4	21	01	00	01	01	01	02	01	03
Key 5-8	22	01	04	01	05	02	06	01	07
Key 9-12	23	02	01	02	02		03	02	04
Kev 13-16	24	02	00	02	06	02	07	16	00
Station port 06									
Key 1-4	25	01	00	01	01	01	02	01	03
Key 5-8	26	01	04	01	05	01	06	01	07
Key 9-12	27	02	01	02	02	02	03	02	04
Kev 13-16	28	02	05	02	00	02	07	16	00
Station port 07									
Key 1 - 4	29	01	00	01	01	01	02	01	03
Key 5-8	30	01	04	01	05	01	06	01	
Key 9-12	31	02	01	02	02	02	03	02	07 04
Key 13-16	32	02	05	02	06	02	00	16	00
Station port 08									
Key 1-4	33	01	00	01	01	01	02	01	03
Key 5-8	34	01	04	01	05	01	06	01	07
Key 9-12	35	02	09	02	10	02	11	02	12
Key 13-16	36	02	13	02	14	02	15	16	00
Station port 09									
Key 1-4	37	01	00	01	01	01	02	01	03
Key 5-8	38	01	04	02	05	01	06	01	07
Key 9-12	39	02	08	02	10	02	11	02	12
Kev 13-16	40	02	13		14	02	15	16	00
Station port 10									
Key 1-4	41	01	00	01	01	01	02	01	03
Key 5-8	42	01	04	01	05	01	06	01	07
Key 9-12	43	02	09	02	08	02	11	02	12
Key 13-16	44	02	13	02	14	02	15	16	00

COMSET DSS FIELD BUTTON ALLOCATION S8

Characteristic	Op. Code	Data A_1B_1	C_1D_1	A_2B_2	C_2D_2	A_3B_3	C_3D_3	A_4B_4	C_4D_4
Station port 11		01							
Key 1-4	45	01	0400	01	01	01	02	01	03
Key 5-8	46			01	05	01	06	01	07
Key 9-12	47	02	09	02	10	02	08	02	12
Key 13-16	48	02	13	02	14	02	15	16	00
Station port 12									
Key 1-4	49	01	00	01	01	01	02	01	03
Key 5-8	50	01	04	01	05	01	06	01	07
Key 9-12	51	02	09	02	10	02	11	02	08
Key 13-16	52	02	13	02	14	02	15	16	00
Station port 13									
Key 1-4	53	01	00	01	01	01	02	01	03
Key 5-8	54	01	04	01	05	01	06	01	07
Key 9-12	55	02	09	02	10	02	11	02	12
Key 13-16	56	02	08	02	14	02	15	16	00
Station port 14									
Key 1-4	57	01	00	01	01	01	02	01	03
Key 5-8	58	01	04	01	05	01		01	07
Key 9-12	59	02	09	02	10	02	0611	02	12
Key 13-16	60	02	13	02	08	02	15	16	00
Station port 15									
Key 1-4	61	01	00	01	01	01	02	01	03
Key 5-8	62	01	04	01	05	01	06	01	07
Key 9-12	63	02	09	02	10	02	11	02	12
Key 13-16	64	02	13	02	14	02	08	16	00
Station port 16									
Key 1-4	65	01	00	01	01	01	02	01	03
Key 5-8	66	01	04	01	'05	01		01	07
Key 9-12	67	02	17	02	18	02	0619	02	20
Key 13-16	68	02	21	02	22	02	23	16	00
Station port 17									
Key 1-4	69	01	00	01	01	01	02	01	03
Key 5-8	70	01	04	01	05	01	06	01	07
Key 9-12	71	02	16	02	18	02	19	02	20
Key 13-16	72	02	21	02	22	02	23	16	00
Station port 18									
Key 1-4	73	01	00	01	01	01	02	01	03
Key 5-8	74	02	04	01		01	06	01	07
Key 9-12	75		17	02	0516	02	19	02	20
Key 13-16	76	02	21	02	22	02	23	16	00
Station port 19									
Key 1-4	77	01	00	01	01	01	02	01	03
Key 5-8	78	01	04	01	05	01	06	01	07
Key 9-12	79	02	17	02	18	02	16	02	20
Key 13-16	80	02	21	02	22	02	23	16	00
Station port 20									
Key 1-4	81	01	00	01	01	01	02	01	03
Key 5-8	82	01	04	01	05	01	06	01	07
Key 9-12	83	02	17	02	18	02	19	02	16
Key 13-16	84	02	21	02	22	02	23	16	00
Station port 21									
Key 1-4	85	01	00	01	01	01	02	01	03
Key 5-8	86	01	04	01	05	01	06	01	07
Key 9-12	87	02	17	02	18	02	19	02	20
Key 13-16	88	02	16	02	22	02	23	16	00

COMSET DSS FIELD BUTTON ALLOCATION S8

Characteristic	Op. Code	A_1B_1	C_1D_1	Data A_2B_2	C_2D_2	A_3B_3	A_4B_4		C_4D_4
Station port 22									
Key 1-4	89	01	00	01	01	01	02	01	03
Key 5-8	90	01	04	01	05	01	06	01	07
Key 9-12	91	02	17	02	18	02	19	02	20
Key 13-16	92	02	21	02	16	02	23	16	00
Station port 23									
Key 1-4	**93**	01	00	01	**01**	01	02	01	03
Key 5-8	94	01	04	01	05	01	06	01	07
Key 9-12	95	02	17	02	18	02	19	02	20
Key 13-16	96	02	21	02	22	02	16	16	00

Note: the programming of each key requires two "bytes", AB and CD. The first byte (AB) allocates the function and the second byte (CD) the additional information.

Function	Information (2nd Byte)	Data Code (AB)	Data (CD)
Exchange Line Select	00-07 = exchange line port	01	00-07
Direct Station Select	00-23 = station port	02	00-23
Feature Key			
General Cancelling	00= no meaning	10	00
Call Forwarding	00-23 = station port	11	00-23
Do-Not-Disturb	00 = no meaning	13	00
Night Service Fiied	24 = fixed	14	24
Night Service Variable	00-23 = variable port	14	00-23
Direct Call	00-23 = station port	18	00-23
Abb. Dialling			
Station Abbrev. Number	00-09 = address	20	00-09
Svstem Abbrev. Number	10-59 = address	20	10-59
Hot line display message			
Secretary Station	01 = priority call	30	01
Secretary Station	02 = meeting	30	02
Executive Station	01 = please wait	30	01
Executive Station	02 = take message	30	02
Paging			
All Call	00 = all zones int/ext	40	00
Zone 1	01 = intern zone 1	40	01
Zone 2	02 = intern zone 2	40	02
Zone 1 & 2	04 = intern zone 1 and 2	40	04
External	05 = external svstem	40	05
Features on Exchange Line			
Conference (Add-on)	00 = no meaning	50	00
Data Station	00 = no meaning	51	00

Note: Hot-line messages are only displayed on the Comset-D station, and have no meaning to the Comset Handsfree and Comset On-Hook dialling stations.

DIGIT ANALYSIS DATA S11

Characteristic	Port	Op Code	Data	Remarks
Unit line without I-button dialling at station		01	--	Not to be activated
I-button for 2-wire station		02	9	
S-button for 2-wire station		03	7	
Line port numbering	00	11	81-88	
	01	12		
	02	13		
	03	14		
	04	15		
	05	16		
	06	17		
	07	18		
Line group numbering		21	0 = access code	21 = Trunk group 1
		22	1 = access code	22 = Trunk group 2
Call pick up		29	4 = access code	
Station port numbering	**00**	31	11-34	Up to three digits can be assigned as Station Call number
	01	32	Station call numbers	
	02	33		
	03	34		
	04	35		
	05	36		
	06	37		
	07	38		
	08	39		
	09	40		
	10	41		
	11	42		
	12	43		
	13	44		
	14	45		
	15	46		
	16	47		
	17	48		
	18	49		
	19	50		
	20	51		
	21	52		
	22	53		
	23	54		

DIGIT ANALYSIS DATA S11

Characteristic	Op Code	Data	Remarks
Feature Codes – (with S-code)			
Gen. cancelling	**60**	**0**	
Call diversion	61	1	
Follow me	**62**	**2**	Can also be used at
Do not disturb	**63**	**3**	2-wire stations
Night switch	**64**	**4**	
Message wait	**65**	**6**	
Direct call (HFAB)	**66**	**8**	
Start of prog. abbr. no. central	67	9	
Free	**68**	—	
Free	69	--	
Free	70	--	
Free	**71**	**71**	
Free	**72**	**72**	
Free	**73**	--	
Free	**74**	--	
Programming of abbr. numbers individual for 2-wire stations	**75**	**5**	
Feature Codes (without S-Code)			
Send abbr. numbers	**80**	**6**	2-wire station feature codes.
Redial	81	**3**	
Select line from common hold	82	**5**	
Free	84	--	
Features by external calls			
Conference	**85**	**7**	Start with S-code
Data mode/DTMF mode for 2-wire station	86	9	
Free	**87**	--	
Free	**88**	--	
Free	89	--	
Preselect paging	**90**	**8**	
All zones	91	0	
Zone 1	92	1	
Zone 2	**93**	**2**	
Zones 1 and 2	**94**	**4**	
External loudspeaker	**95**	**5**	
Activate standard night-switch	96	00	

2.4 CLASS OF SERVICE/ACCESS BARRING (S5)

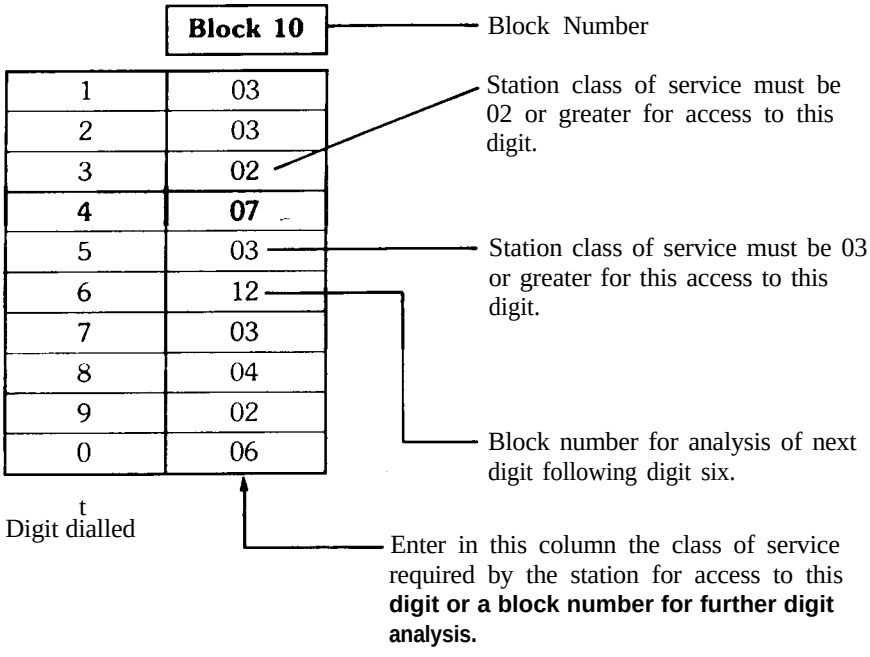
The system provides for up to eight district "class of services", from COS 00 to COS 07. These classes relate to access rights to exchange - or PABX lines.

- COS 00 is defined as no access for that line.
- COS 01 allows access only for answering of call (for that line).
- COS 07 provides for open access, i.e. no digit discrimination when that particular line is used.

COS 02 to COS 06 are freely definable, but as Standard Data provide the following:

c o s	ACCESSIBLE EXCHANGE PREFIXES
02 local network	1 to 9 000 008 013 019 0161 to 0169
03 manual operator connected calls	011 012 015 017
04 STD	02 to 09 002 to 004 007 018 0160
06 International Services (ISD)	001 010

Concept of Barring Block
EXAMPLE



The access barring always begins by using the first digit dialled (after the selection of an exchange line) as an index to find the corresponding entry in the access barring Block 08. If the entry contains a required access right (COS 00 to 07), this code will be compared with the COS code of the station dialling this digit. If the class of service of the station is lower than the class of service required for this digit, the line will be released and the station will receive busy tone.

If the class of service of the station is the same or greater than required, the digit analysis ends. If the entry contains a block number, the dialling is still allowed because it cannot be yet decided which class of service is required. This block number will be used to check the second digit dialled in the same way as the first digit was compared, and so on for further digit analysis.

If an external line is programmed as a PABX line the comparison starts in Block 16. This allows identical access barring for mixed PABX-/Exchange lines.

Standard number Access Scheme

First digit dialled for exchange lines

Block 08

Digit	B/C	Data
1	C	02
2	C	02
3	C	02
4	C	02
5	C	02
6	C	02
7	C	02
8	C	02
9	C	02
0	B	09

Block 09

Digit	B/C	Data
1	B	10
2	C	04
3	C	04
4	C	04
5	C	04
6	C	04
7	C	04
8	C	04
9	C	04
0	B	11

Block 10

Digit	B/C	Data
1	C	03
2	C	03
3	C	02
4	C	07
5	C	03
6	C	12
7	C	03
8	C	04
9	C	02
0	C	06

Block 11

Digit	B/C	Data
1	C	06
2	C	04
3	C	04
4	C	04
5	C	07
6	C	07
7	C	04
8	C	02
9	C	07
0	C	02

Block 12

Digit	B/C	Data
1	C	02
2	C	10
3	C	02
4	C	02
5	C	02
6	C	02
7	C	02
8	C	02
9	C	02
0	C	04

Block 13

Digit	B/C	Data
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		

Block 14

Digit	B/C	Data
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		

Block 15

Digit	B/C	Data
1		
2		
3		
4		
5		
6		
7		
8		
9		
0		

First digit dialled for PABX lines

Block 16

Digit	B/C	Data
1		00
2		00
3		00
4		00
5		00
6		00
7		00
8		00
9		00
0	B	08

Block 17

Digit	B/C	Data
1		00
2		00
3		00
4		00
5		00
6		00
7		00
8		00
9		00
0		00

With Block 16 and Block 17 the PABX Access Code (one or two digits) is taken into account, if programmed as a PABX line in S2 Adr. 01 to 08.

NOTES: 1) B/C column is for information only.
2) B represents block number for further analysis.
3) C represents class of service required for this digit.

Programming of Discrimination /Barred numbers

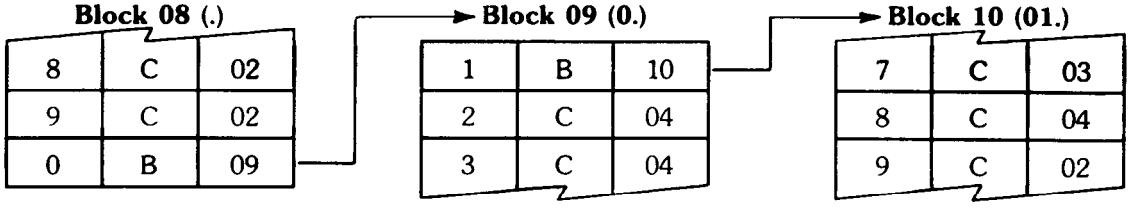
If it is necessary to change the standard data, then the procedure is as follows:

1. (After normal access to the programming mode) press S, digit 5, then the * key.
2. Enter the two digit number of the block to be accessed, and press the * key to send this information
3. The display will now show the data for digit '1' of this block.
4. Press the * key to increment to the next digit within this block.
   Note: Repeated pressing of the * key will increment the display out of the current block, and into the next block.
5. Immediate access to the next block can be achieved by pressing the * key. I key. * key.
6. All analysis starts at Block 08 for exchange lines and at Block 16 for PABX lines.

The following examples should serve to indicate the procedure for alteration to these blocks:

- Example 1: Prefix code 018 to be available to stations of COS (Class of Service) 02

Examination for this code (from standard data) indicates the following:



Which means that digit 8 of block 10 needs to be changed to 02.
From station 11 (or M.E.) carry out the following:

SERIAL AND ITEM LIST FOR THE S824H SYSTEM

338/900	Main Equipment	ME-S824H	Equipped as 8/ 16.

Spares Items

338/936	Central Processor Module	CPM-S824H	Provides switching and logic control.
338/927	Station and Exchange Module	408M-S824	Four exchange lines and 8 station interfaces.
338/929	Power Supply	PS-S824	
338/930	Krone Connect Module	KCM-S824	Provides terminations for all external cabling.
338/931	Operating System Software Module	OSSM-S824	
11/243	Mains fuse. (F1).	500 mA	
11/122	5 volt fuse. (F3).	2 A	
11/245	24/10/5 volt fuse. (F4).	3.15 A	
11/236	45 volt fuse. (F5).	315 mA	
11/238	Station fuse. (F6-F11).	200 mA	

Expansion Items

338/928	Station Module	8SM-S824	Provides 8 station interfaces.

Option Items

338/950	Two-wire Module	TWIM-DEC-S	Provides two-wire capability
338/932	Call Detail Recording Module	CDRM-S824	RS232/V24 Interface Module
338/994	Direct Station Select Console	DSS-S824	Provides full station select capability

SERIAL AND ITEM LIST FOR THE DOCUMENTATION - S824H

338/973	Technicians Manual	DOC-S824H-TM	Basic Technicians Manual for the S824H system
338/974	Installation and Maintenance Manual S824H Supplement	DOC-S824H-IM	Supplement to the I&M manual [338/984] covering the S824H system
338/975	Customer Data Record Book	DOC-S824H-CD	Customer Data Record Book for the S824H system
338/976	User Guide S824H	DOC-S824H-UG	User Guide for the S824H system
338/977	Quick Reference Guide	DOC-S824H-QRG	Quick Reference Guide for the S824H system
338/984	Insert for Installation and Maintenance manual	DOC-S824-IM	Comprehensive Installation and Maintenance manual for the S206/S408 and S824 systems.