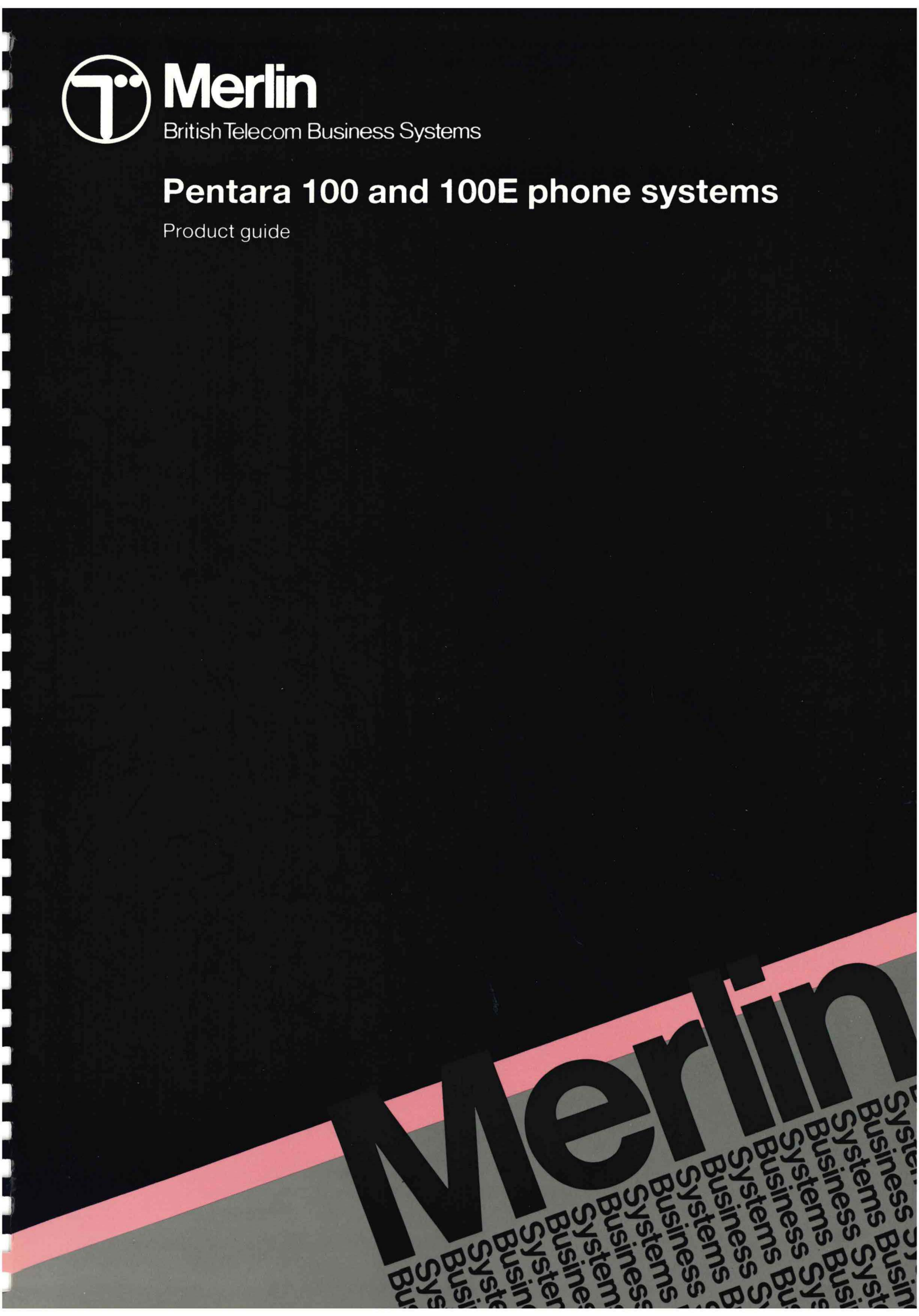
Merlin

British Telecom Business Systems

Pentara 100 and 100E phone systems

Product guide



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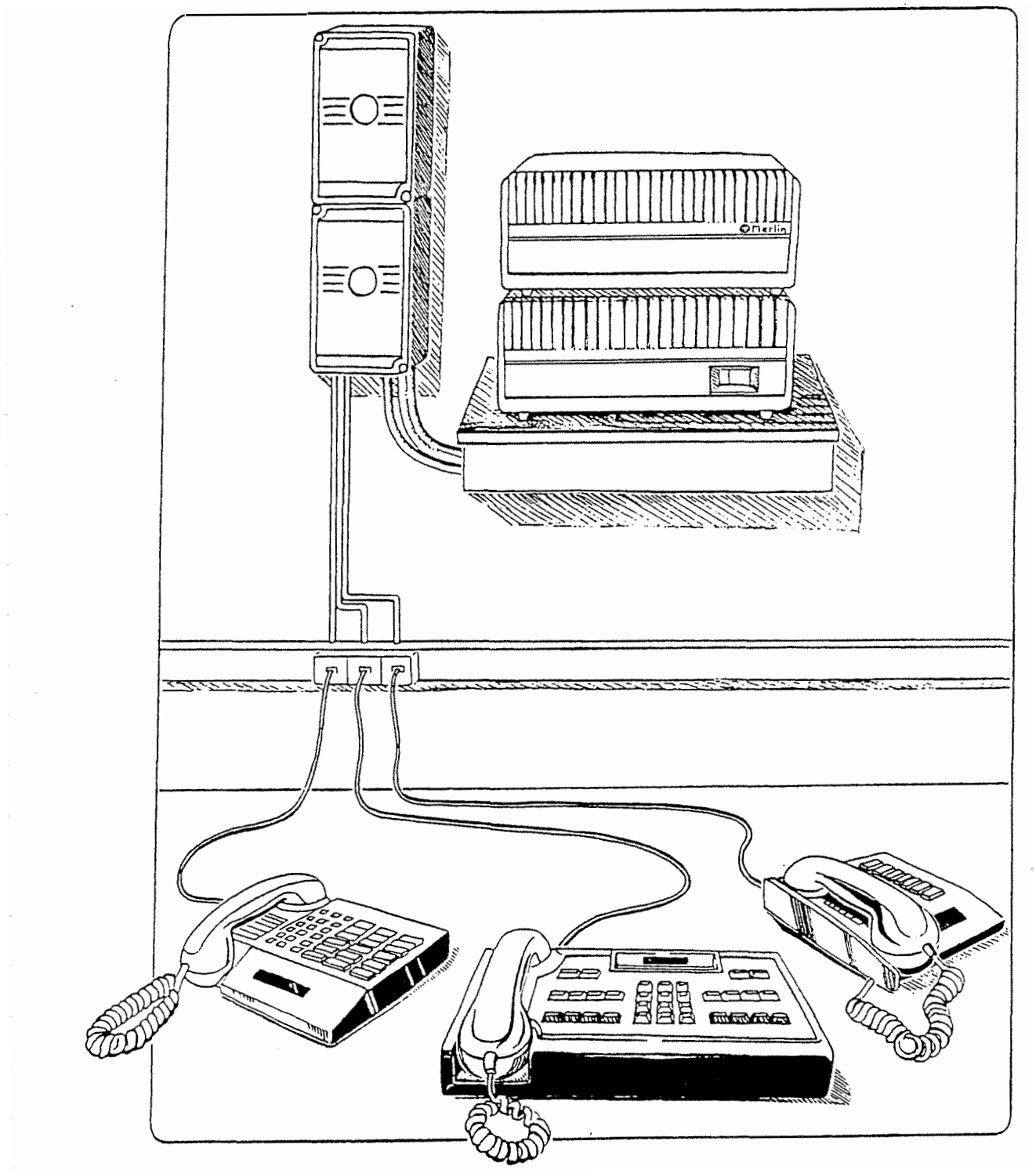
This guide includes both the **Pentara** 100 & 100E generics, the difference being in the software version used. For convenience, where no distinction is required, the general term **Pentara** has been used.

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them.

S/1000/GS/1981/PR

Pentara 100 and 100E phone system



THIS EQUIPMENT CONTAINS ELECTROSTATIC SENSITIVE DEVICES

Electrostatic Sensitive Devices (ESDs), which may also be known as Static Sensitive Devices (SSDs) are those devices which may be damaged either catastrophically or partially by inadvertent discharge of static electricity from a charged body to the device.

ESDs include MOS devices, hybrid circuits containing ESDs, PWBs containing ESDs etc. These devices may all have breakdown voltages as low as 50V. Electrostatic voltages in excess of a kilovolt may easily be produced which will cause damage to these devices.

Whenever ESDs are used, basic precautions as set out in Appendix E should be rigorously adhered to.

LEGAL CONNECTION REQUIREMENTS

The following requirements are mandatory under the terms of the Approval.

An earth must be provided using permanent earth connection as described in Section 5.

Regulations require 20% of exchange lines to be connected directly to telephones under power fail conditions, to enable incoming calls to be answered. At least one of these telephones should be capable of signalling to the local exchange for outgoing service.

The outgoing telephone can be one of the normal extension telephones or a separate telephone provided for the purpose.

Appendices

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1.1 DESCRIPTION

The Merlin Pentara 100E Phone System is a small business system with a maximum capacity of 116 ports; a port being either an extension or external line on the system.

The system consists of a table standing control unit, associated box connection, and terminals. The terminals are connected to the main unit by means of 4-wire distribution cables. The system uses a 8088 microprocessor which controls the switching matrix, call set-up and clear down procedures and implementation of the system features.

External line signalling is Loop Disconnect, MF4, AC15 or SSDC 5/10.

Three ranges of terminal can be supported by the system:

- Existing Herald HS and HL terminals.
  Herald Improved and Improved Loudspeaking terminals.
- Pentara Terminals plus a custom designed operator terminal
- and any standard 2-wire telephone instrument.

Pentara 100E is the latest in the range of Herald systems. It has a large number of new facilities in addition to those of its predecessors and has added installation and operational flexibility.

The table below compares the Pentara processor with previous Herald processors.

PROCESSOR	"A"	"B5"	Pentara 100,100E
CPU	8085(8 bit)	8085(8 bit)	8088(16 bit)
CLOCK	2MHz	2MHz	12MHz
PROM (executive)	16Kbytes	24Kbytes	128Kbytes
EAROM	1K+4Kb (mem extn)	_____	_____
EEPROM	_____	6-12Kb (plug in proms)	12Kb (plug in proms)
RAM	1K+2Kb	8Kb	24Kb
CONFIGURED BY	H3S	H3S	HDS or self configuration
CALL LOGGING	none	limited	Comprehensive (requires call logging card)

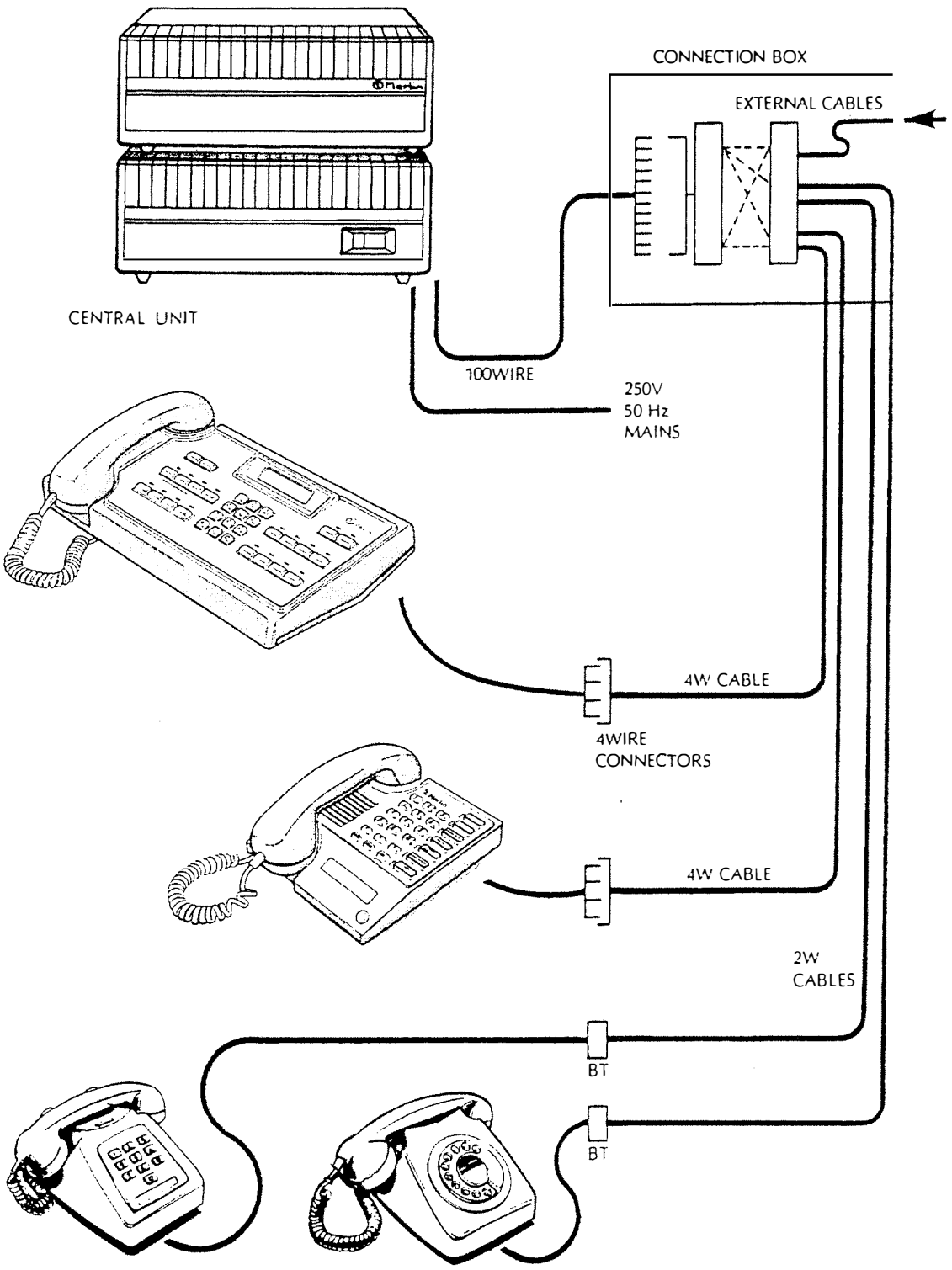


FIGURE 1-1 HERALD C LAYOUT DRAWING

1.2 INSTALLATION

The box connection is wall mounted and connected to the control unit via 50-way and 100-way umbilical cords with 226 type connectors. Strip connections are used for cross jumpering the control unit connections to building distribution wiring. Pre-wired harnesses are supplied which connect the 226 type terminations to strip connections.

Pentara 100E terminals use a 4-wire speech and signalling system.

Standard 2-wire telephones require an earth recall facility.

The system may be configured using either HDS, an interactive microcomputer program run on a Rair Black Box at a data entry room, or self configured using built-in software on the processor card.

Self configuration involves selecting the appropriate cards for the size and features of the system required, connecting the appropriate terminals, powering up the system and moving a small plug on the control card to commence self configuration of the system. Two basic configurations can be selected - a PABX system or a Key System.

After a few seconds the system will be operational, supporting a default range of facilities on each terminal.

The customer will be able to configure the unit further if required to his own personal requirements by the use of dial-up codes.

The system can incorporate a speech synthesiser so that the user can examine the facilities and repertory dial numbers he has incorporated under his keys.

1.3 SYSTEM FEATURES AVAILABLE

ABBREVIATED DIALLING
Central repertory dialling store for up to 100 numbers accessed by a three digit code (400 - 499).

ANSWER INTERNAL
Queueing of internal calls (includes DDI Pccts) which are part of an extension group. Does not queue calls directed at a specific terminal.

ANSWER EXTERNAL

ANSWER GROUP

BUZZ
Effects a single burst of ringing or a tone (if the terminal is off hook) to a pre-programmed terminal

CALL BARRING

CALLS FOR

CALL LOGGING

CANCEL
Cancels all digits keyed and reverts to dial tone.

CONFERENCE

DIVERT

DIVERT ON NO ANSWER
Diverts if unanswered after 7 seconds.(not available to the operator)

DIVERT ON BUSY
Diverts if called terminal is busy.

EXTERNAL CONFERENCE
Up to 5 internal users can be connected to 1 exchange line.

GROUP CALLING
Enables a group of terminals to be rung simultaneously.

INTER-PBX EXTENSION WORKING

INTRUSION

JOIN
Operator facility enabling the joining of two parties being supervised

MF4 CAPABILITY
MF4 telephones can be used.

MUSIC ON HOLD
Music played whilst callers are in hold.

NIGHT SERVICE PICKUP

PRIVATE CIRCUITS
Up to eight different routes (71 to 78). SSDC5/10 and SSAC15 signalling.

RE-ESTABLISH
Operators facility enabling re-try of reverted calls to the same terminal.

REVERTED CALLS

RING WHEN FREE
Recalls a hitherto busy terminal automatically when it becomes free.

SPEAK
Works in two modes :
- as a stand alone facility.
- with a terminal number programmed on the key to give single key operation.

SPEECH SYNTHESIS
An option enabling spoken announcements, information, key functions etc to be heard.

STORE LAST No. IN REP DIAL BLOCK

SYSTEM SHORT CODES

THREE PARTY CONVERSATION
Allows three terminals or two terminals and an external line to be interconnected.

TRANSFER ON ANSWER

TRANSFER ON RINGING/BUSY

1.4 AVAILABLE DOCUMENTATION

Master List (PXML No.63) - List of approved boards and units within the system.

System Manual (TPU100) - which includes the following:

System programmers guide - TPU100A
System log book - TPU100B
Console operators guide - TPU100C
Call logging guide - TPU100D
Terminal User's guide - TPU100E
Telephone User's guide - TPU100F

Contents Page

2.1 CONTROL SHELVES / POWER UNITS

The Control Shelves house the system circuit cards and power supply units and provide termination for all external and internal lines on the system.

The Control Shelf is installed in four sizes which comprises either a basic control unit singly or together with one or two extension modules and a battery shelf if required.

The enclosures are of moulded plastic construction. The body of the enclosure is made in two halves which are bolted together. If more than one enclosure is required, they are bolted together to form a rigid stack. The control unit takes the top position on the stack.

The control shelf comprises a backplane carrying the full complement of edge connectors for 8 ASUs, and cable connectors for a fully equipped system. An extension module comprises a backplane carrying the full complement of edge connectors and cable connectors for 10 ASUs.

Where extension modules are fitted, ribbon cable interconnections are provided between the unit backplane PWBs. Mains and battery interconnections are also provided between units. When in situ all cables are secured by cable clamps at the rear of the units; the unit back covers concealing the equipment wiring.

One fifty way and up to five one hundred-way cords and the mains cable extend from the base of the control equipment at the back. The cords are taken from the control equipment to the system connection box. The mains cable is terminated at an unswitched 13A mains supply provided by the customer.

The system circuit cards, power supplies and battery units are inserted into the enclosures from the front.

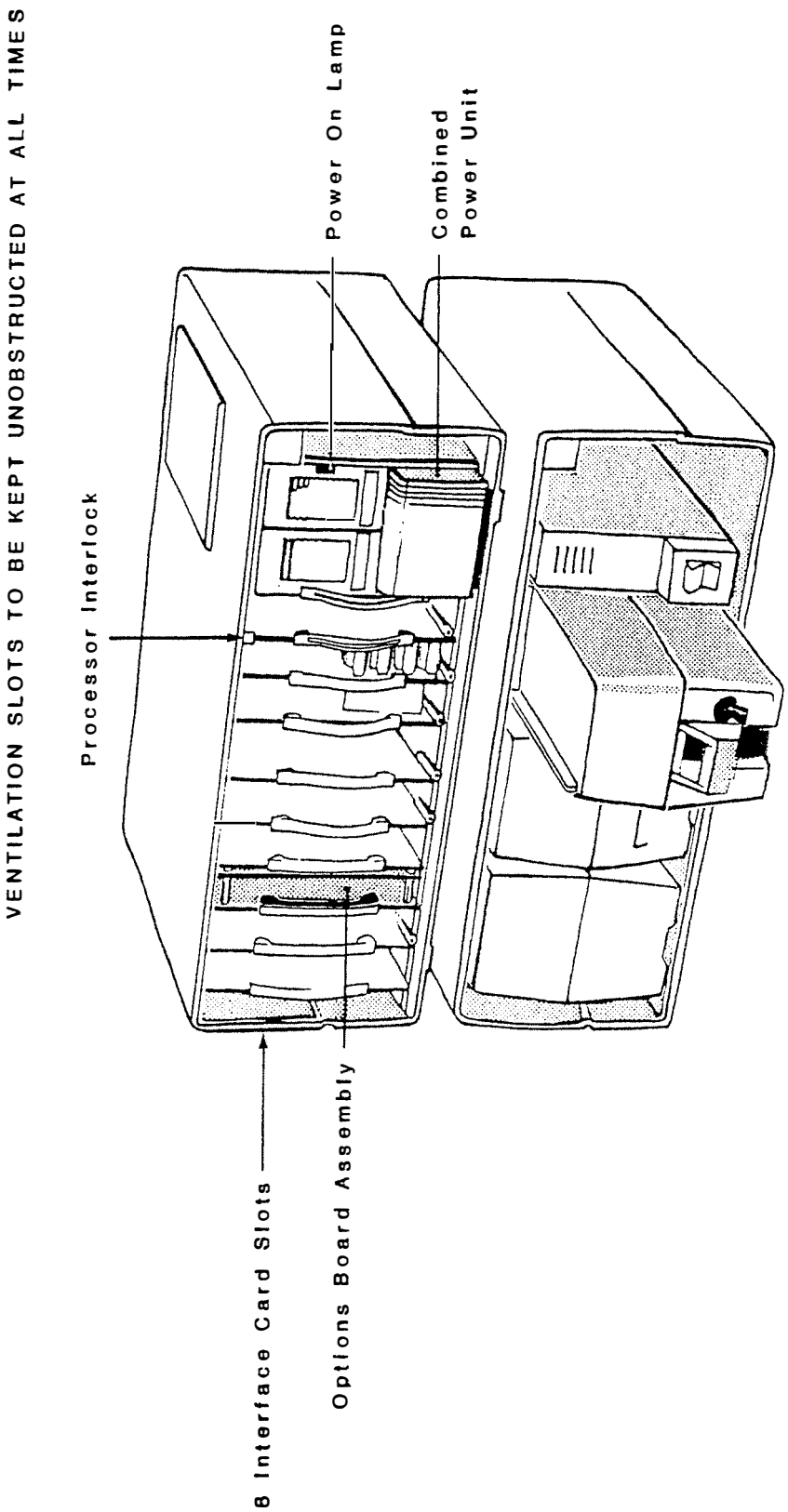


FIGURE 2-1 C CONTROL SHELF LAYOUT

2.1.1 Combined Power Supply Unit

This PSU is a combination of the AC/DC and the DC/DC power units found on Herald A and 100B systems and fits only in a dedicated slot in the top shelf (control unit) of a Pentara system. In addition to providing the DC power for the system, this PSU also provides the ringing current supply and has the ability to float charge batteries.

There are no external fuses on the unit, all protection being internal. Mains lead connection is at the rear via I.E.C. connectors. There is also a socket to connect the PSU to the battery shelf (if fitted) for charging the batteries. A safety interlock is provided to ensure that the PSU cannot be removed without the mains and battery power leads being disconnected first.

Test jacks are provided on the front of the unit for all 8 power rails generated.

2.1.2 Extension AC/DC Power Unit

The Extension AC/DC Unit provides power for the extension shelf of a Pentara system; fitting into a dedicated slot in the extension shelf.

The unit may also be used in the battery shelf to enable rapid recharging of standby power.

There are no external fuses on the power unit. Two test jacks, for plus 50V and minus 50V are fitted.

2.1.3 Battery Shelf

The Battery Shelf is an additional system shelf which provides standby power for the system. The shelf contains a battery control card and up to three modular sealed (maintenance free) plug-in battery units.

The battery control card monitors the charge state of the batteries and sends alarm messages to the control card in the event of mains failure, low battery voltage, or failure of a power unit.

Each plug-in battery unit has a capacity of 5Ah. The capacity will therefore be 15Ah for a fully equipped shelf.

The battery has a nominal voltage of 42V. During normal operation the batteries are float charged across the 50V supply. This can be derived from either the power units in the equipment shelf or an additional Extension AC/DC unit installed in the battery shelf. The only advantage that the latter gives is a faster battery recharge time.

The hold-up time of the battery shelf is dependant on the system size. However a fully equipped battery shelf with 3 fully charged battery units should provide a typical standby time of 2 hours for a typical 3 shelf system.

Corresponding smaller standby times can be provided by sub-equipping the shelf.

An interlock is included in the shelf to prevent accidental movement of the battery units which each weigh 10kg.

A circuit breaker switch accessible by the customer is provided on the front of the battery shelf to disconnect all power to the system.

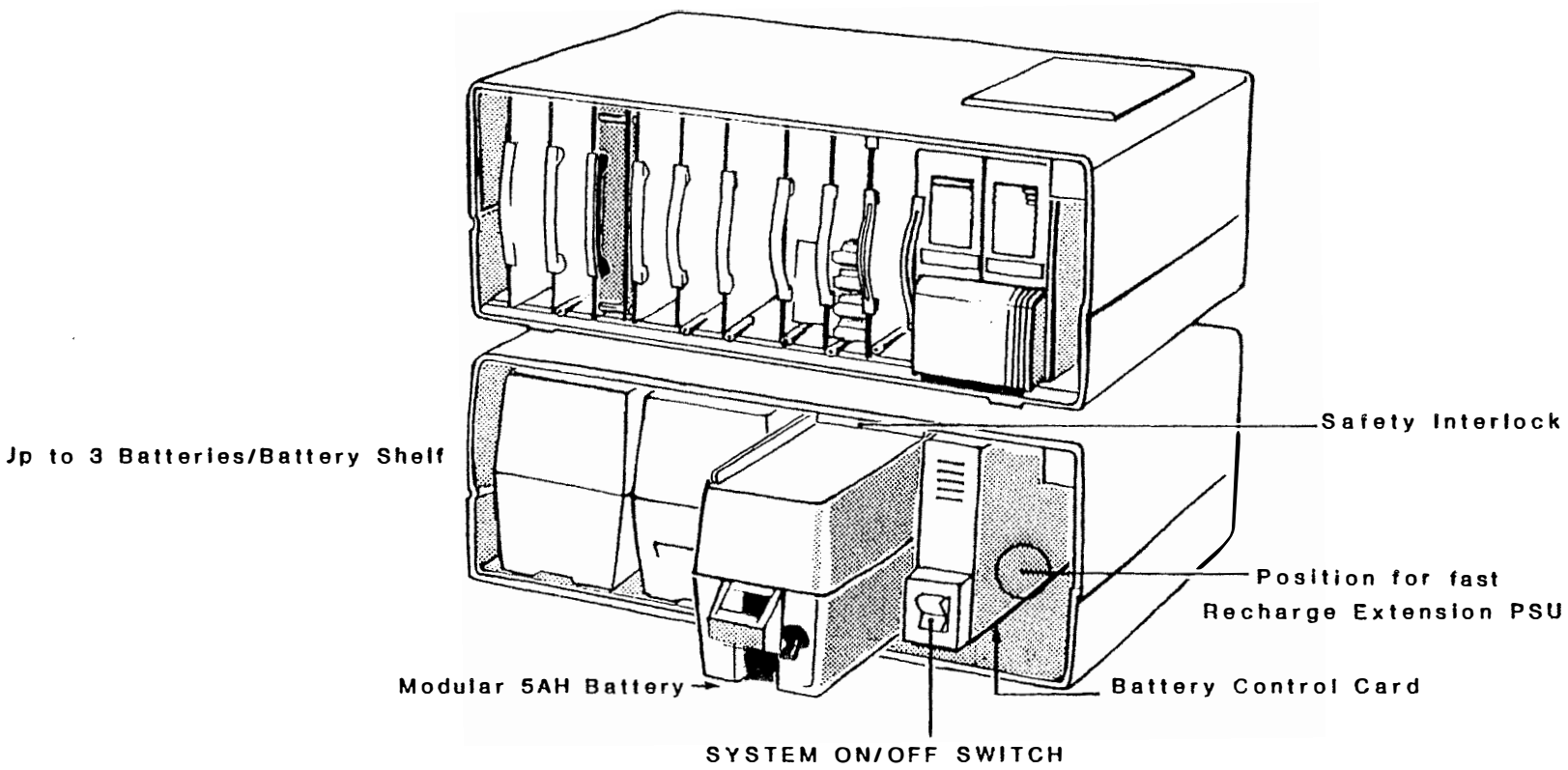


FIGURE 2-2 BATTERY SHELF LAYOUT

2.2 CONTROL CARD

The control card executes all scan and control functions of the user terminals, external lines and facility cards, and monitors the progress of all calls through the system. It controls the signalling to and from each terminal.

All tone generation circuitry is incorporated on the card; the required tones being fed onto the speech highways via a crosspoint matrix. A port is provided for the connection of a source of internal music-on-hold. Internal and external ringing is synthesised on the card and amplified by the combined power unit before being fed to extension interfaces.

The Control Card incorporates an 8088 processor, 128k of EPROM, and 24k of RAM. 12k of EEPROM is used for the retention of system parameters and the customer database. All EPROM and EEPROM devices have been mounted on sockets to facilitate enhanced software updates.

A serial V24 channel with selectable baud rate of 300/1200 baud is provided for engineering maintenance of the system.

A plug is provided on the board which can occupy one of four positions. The function that three of the sockets perform is under software control. The fourth position acts as a holder for the plug.

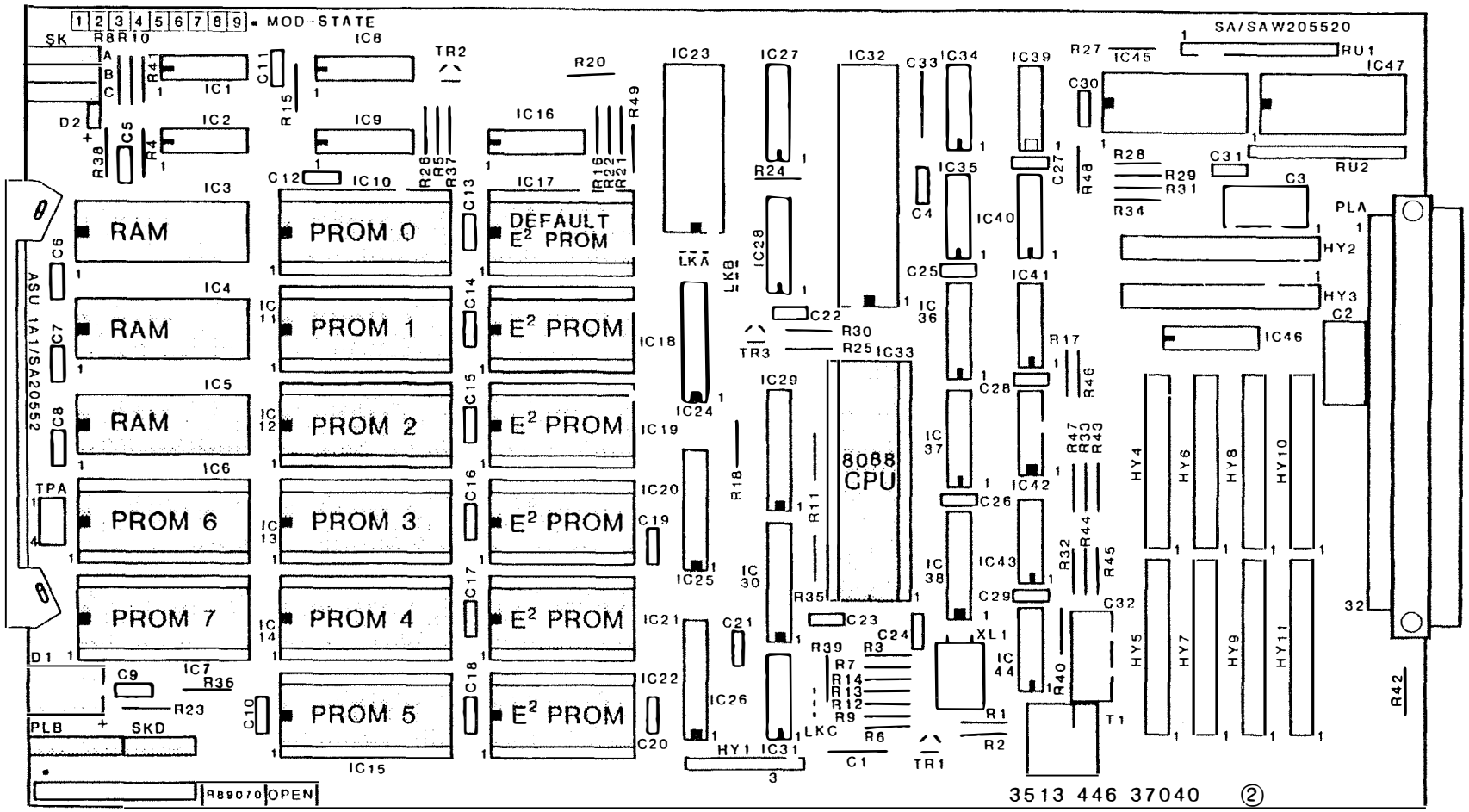
A LED is provided on the front of the board as a self-programming indicator and to indicate system errors. i.e.

- Detected hardware errors

  The absence of a connected master extension

  Detected programming errors

- or Lack of sufficient memory for the size of system required.



Herald ASU 1A1/SA 20552 C control card

FIGURE 2-3 C CONTROL LAYOUT

2.3 OPTIONS MOTHER/DAUGHTER BOARDS

A mother/daughter board assembly has been used to provide additional facilities to the system which do not warrant the use of a full size ASU.

2.3.1 Motherboard

The Options Mother Board has positions on it to mount up to three daughter boards; any daughter board functioning in any of the three positions.

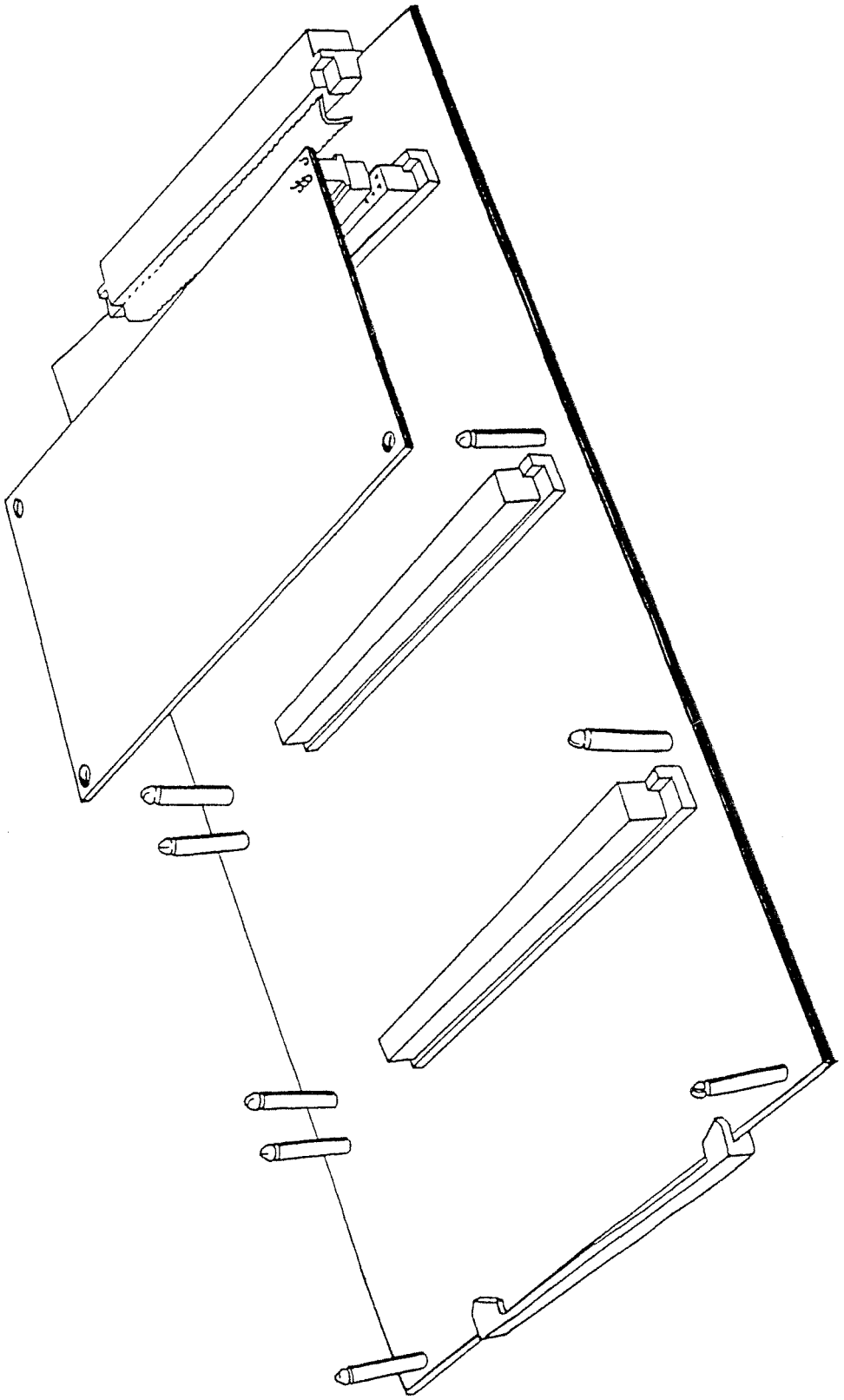


FIGURE 2-4 OPTIONS MOTHERBOARD ASSEMBLY

2.3.2 MF4 Receiver

This has two circuits per card which can each be used to interpret MF4 tone pairs generated by any MF4 extension instruments attached to the system. The number of receivers to be provided is dependant on the quantity of MF4 extensions and the frequency of use.

Loop disconnect telephones also receive dial tone via the receivers. The receiver is released after the first pulse of dialling. Thus provisioning rules for MF4 receiver cards should take the total number of 2W telephones into account.
Typical provisioning rules should be to install:

- card for up to 16 2W extensions.
- cards for up to 32 2W extensions.
- cards for greater than 32 2W extensions.

2.3.3 Speech Synthesiser

Accessed by one user at a time, the synthesiser indicates to an extension user what facilities and repertory dial numbers he has available.

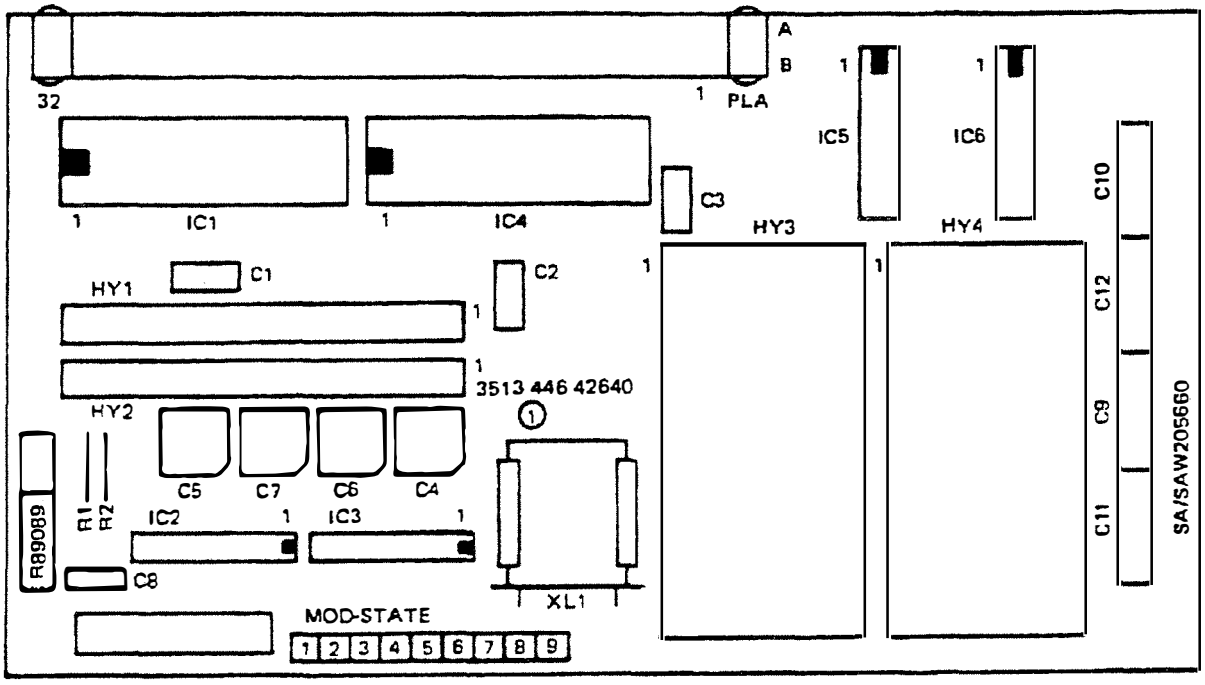
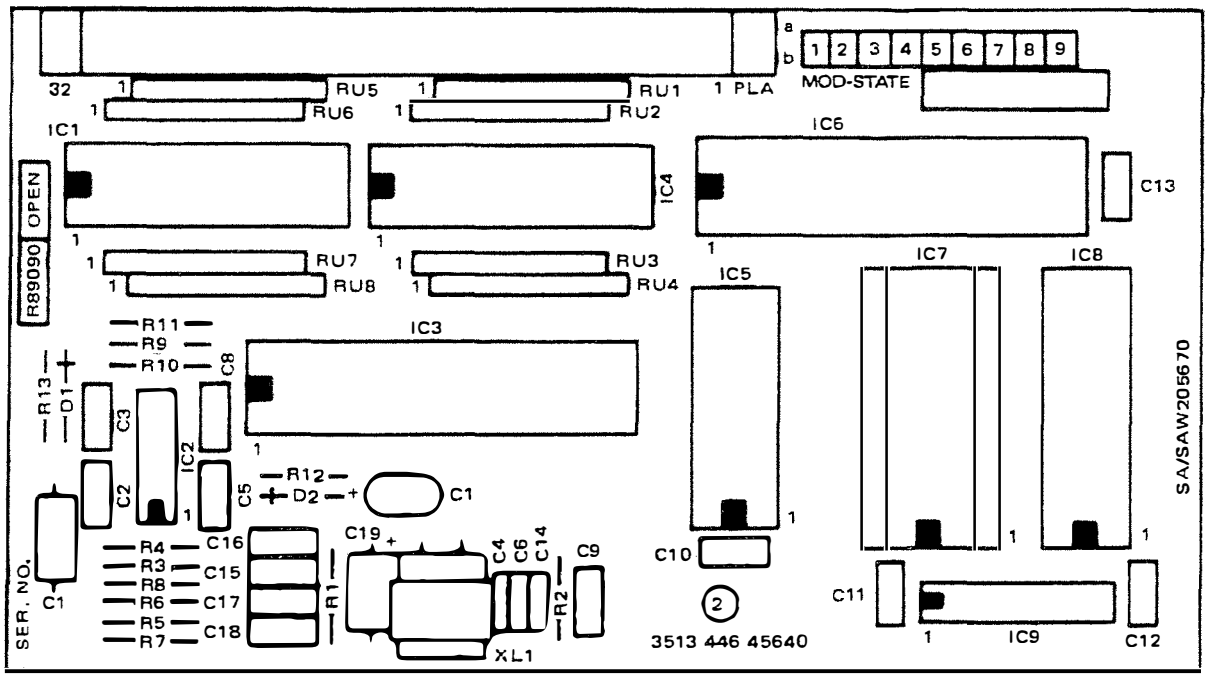


FIGURE 2-5 MF4 RECEIVER CARD

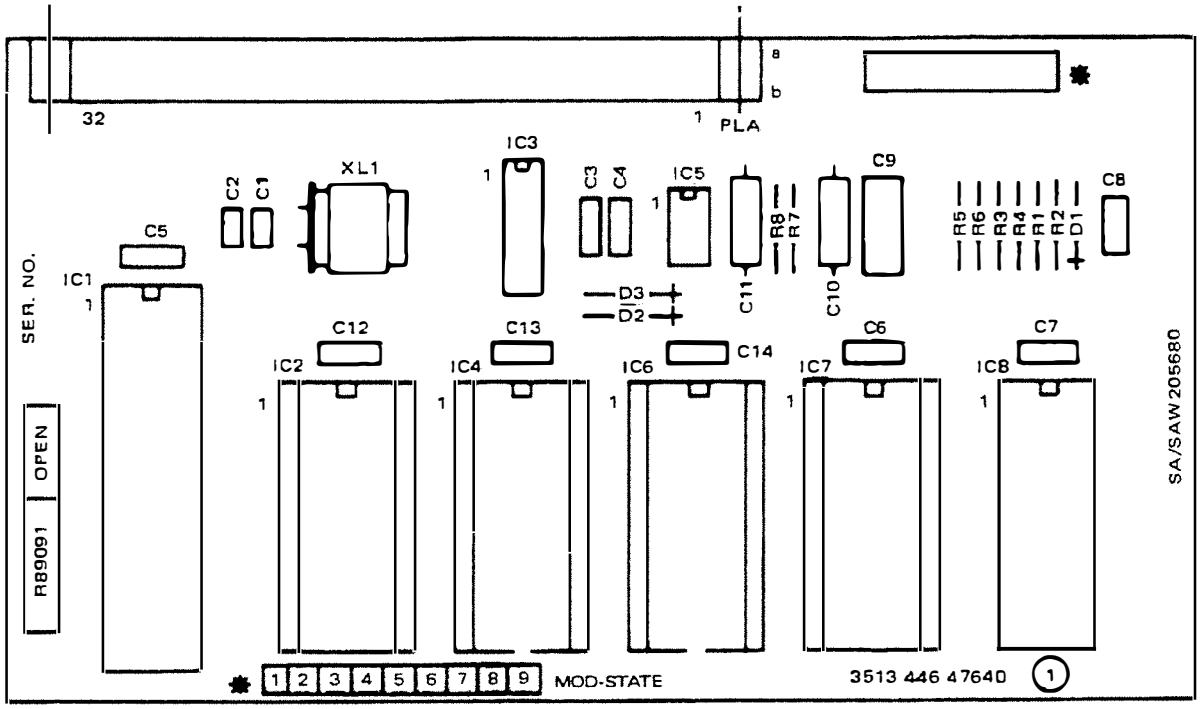


Herald card SA 20567

FIGURE 2-6 SPEECH SYNTHESIS OPTION

2.3.4 Music On Hold Card

This card provides an electronically generated source of non-copyright music, which can be wired on the system box connection to full facility line interfaces for external party MOH and to the control card for internal music-on-hold the card repeatedly generates "The Entertainer" by Scott Joplin.



Herald card SA 20568

FIGURE 2-7 MUSIC ON HOLD OPTION CARD

2.3.5 Modem Option Card

This card provides an interface between the UART on the Control Card and an external line in 300 baud duplex transmission mode. This enables a remote maintenance centre to carry out system programming by calling into the system and then being transferred to the option card by the operator/supervisor. (Facility not available with Software Version 8.3).

2.3.6 Broadcast Option Card

By programming an extension group number under a SPEAK key a terminal user can page the group members through their terminal loudspeakers. (Facility not available with Software Version 8.3).

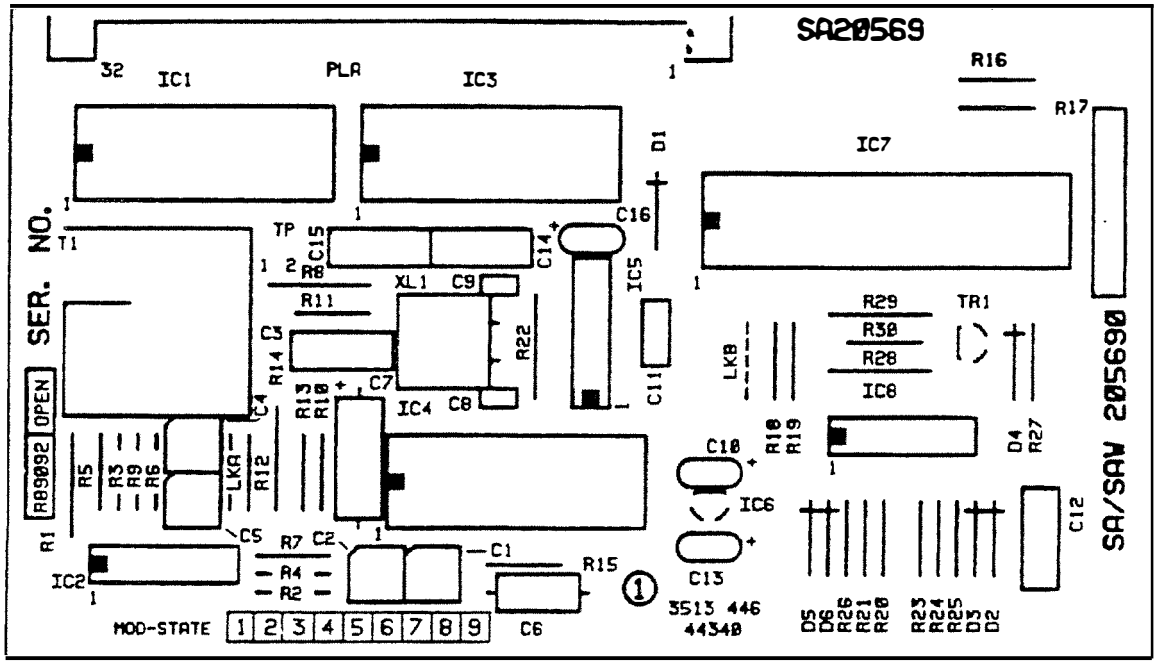


FIGURE 2-8 MODEM OPTION CARD

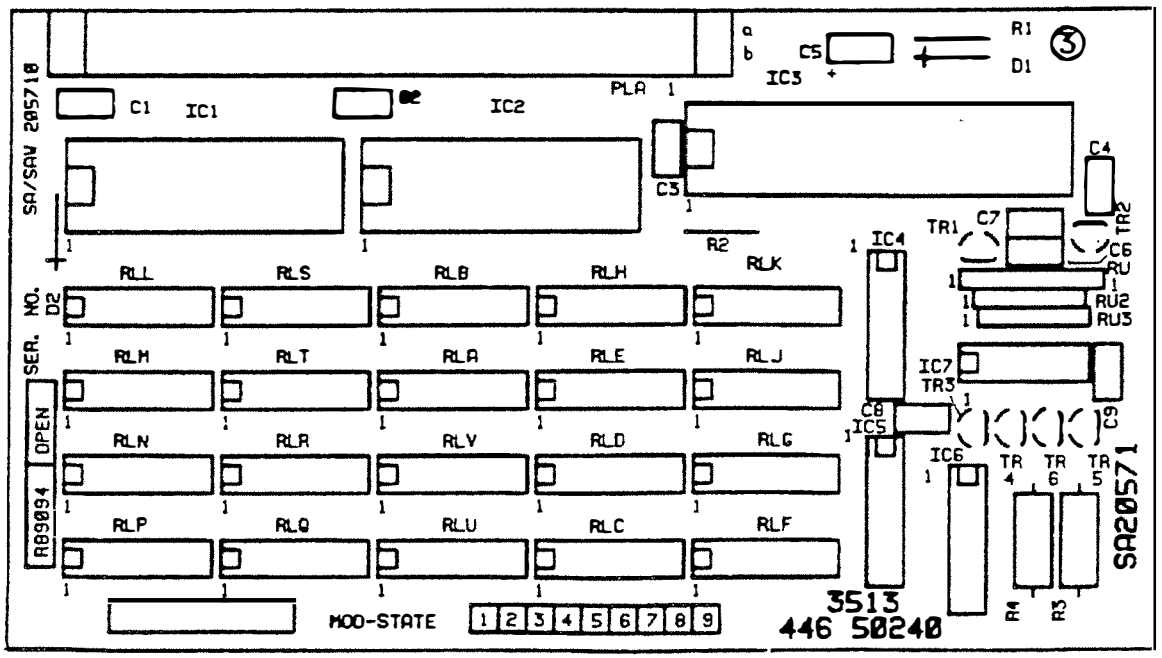


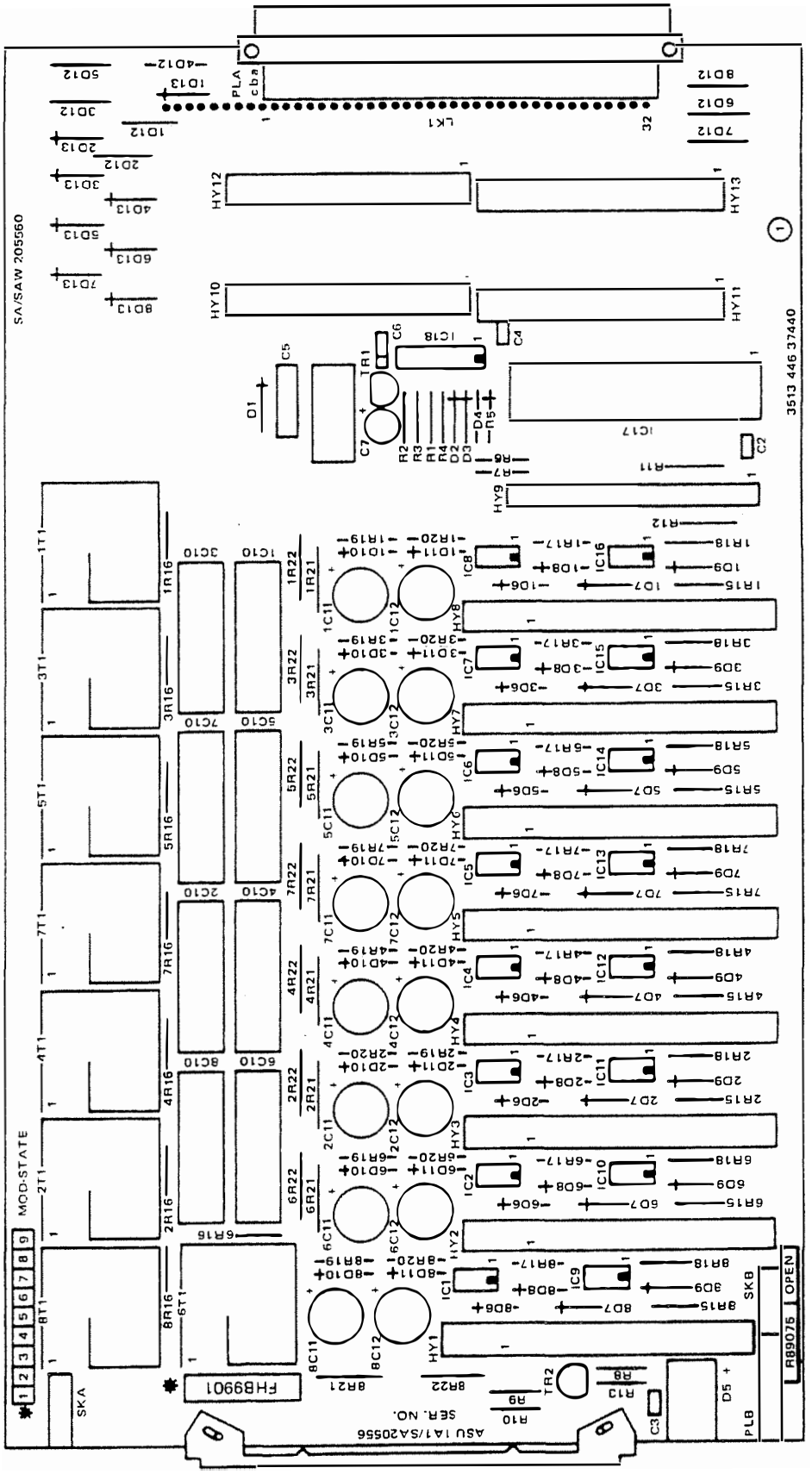
FIGURE 2-9 BROADCAST OPTION CARD

2.4 Interface ASUs

2.4.1 Two Wire (telephone) Interface Card (8 ccts per card)

This ASU provides eight circuits per card for 2-wire extensions and will accomodate loop disconnect signalling, and MF4 if an MF4 options card is available.

SLICs are used to provide a constant current supply of 35 - 45 mA to each extension which gives a route distance of up to 3.3Km on 0.5mm Copper. The ringing supply is triac controlled and therefore silent.



Herald ASU 1A1/SA 20556 8 Port 2 Wire Card

FIGURE 2-10 TWO WIRE INTERFACE CARD

2.4.2 Four Wire Display Terminal Interface Card (4 ccts per card)

This interface is designed to support four wire terminals. Speech transmission circuits similar to the 2-wire interface are used on the card but a control IC for the interchange of data between the control card and the terminal, and data transmit/receive and power feed circuits are incorporated.

The card is able to support terminals fitted with message displays.

Four circuits are provided per card.

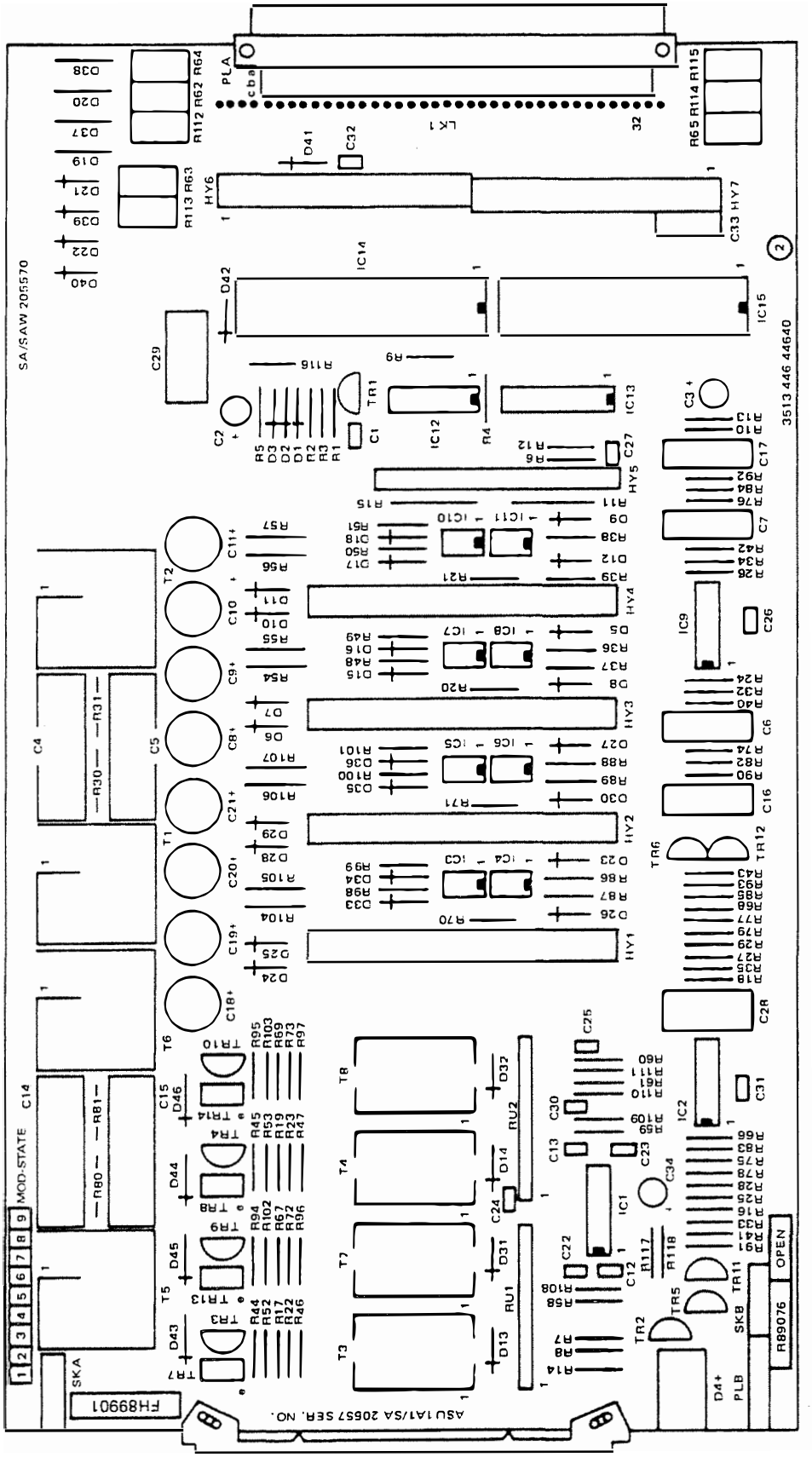


FIGURE 2-11 FOUR WIRE INTERFACE CARD

2.4.3 Four Port Exchange Line Interface Card (4 ccts per card)

Contains four exchange lines on one card which are each capable of generating loop disconnect or MF4 signalling, and earth/timed break recall. Ringing/loop and dial tone detection are performed by the card.

No provision is made on this card for music-on-hold to external callers.

NO POWER FAIL CIRCUITRY IS PROVIDED ON THIS CARD.

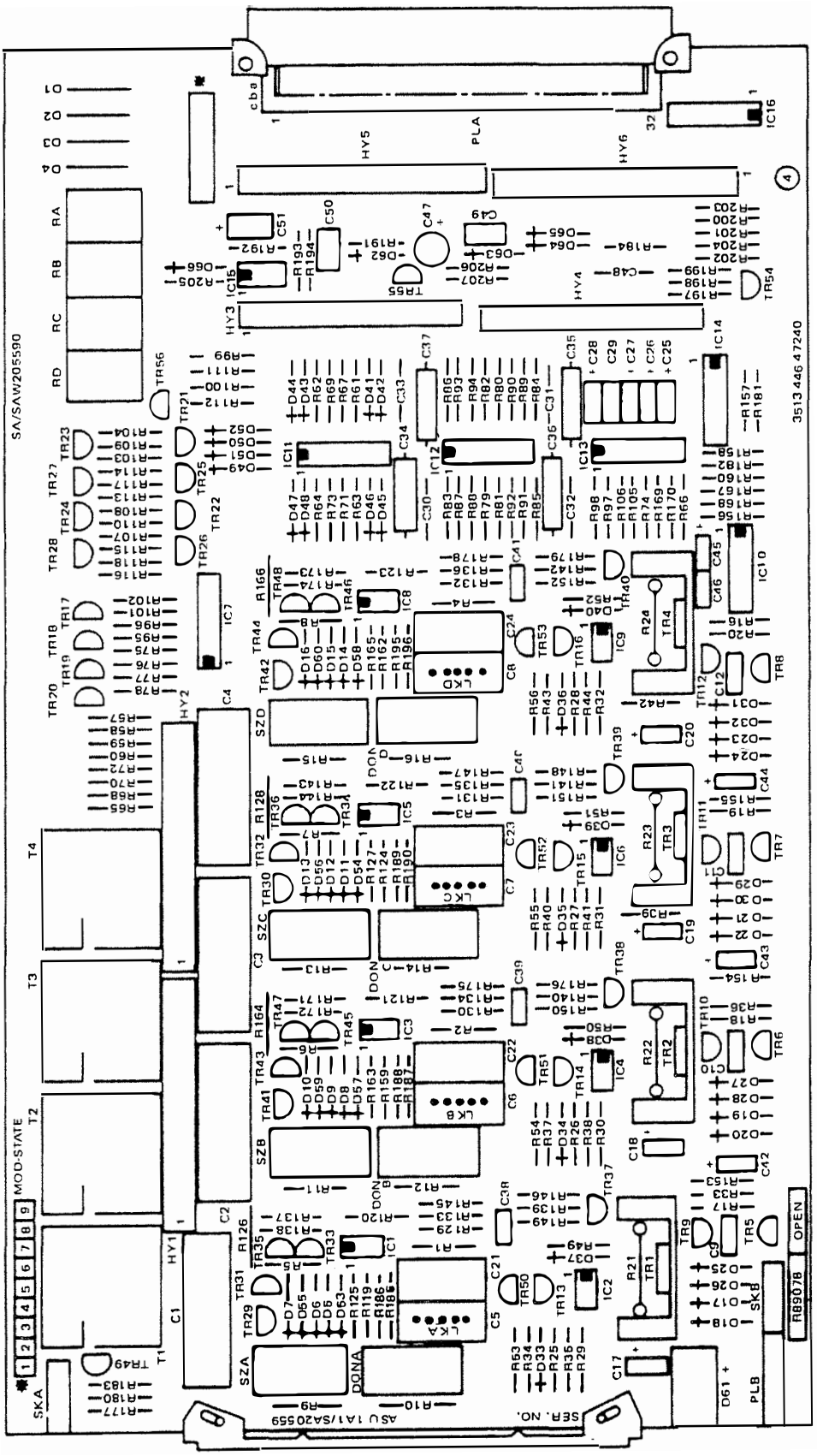


FIGURE 2-12 FOUR PORT EXCHANGE LINE CARD

2.4.4 Full Facility Exchange Line Interface Card (2 ccts per card)

This card provides all the facilities of the 4 circuit card plus power fail switching of both circuits, and external MOH.

The additional circuitry required by these facilities means that only two exchange lines can be controlled by each card.

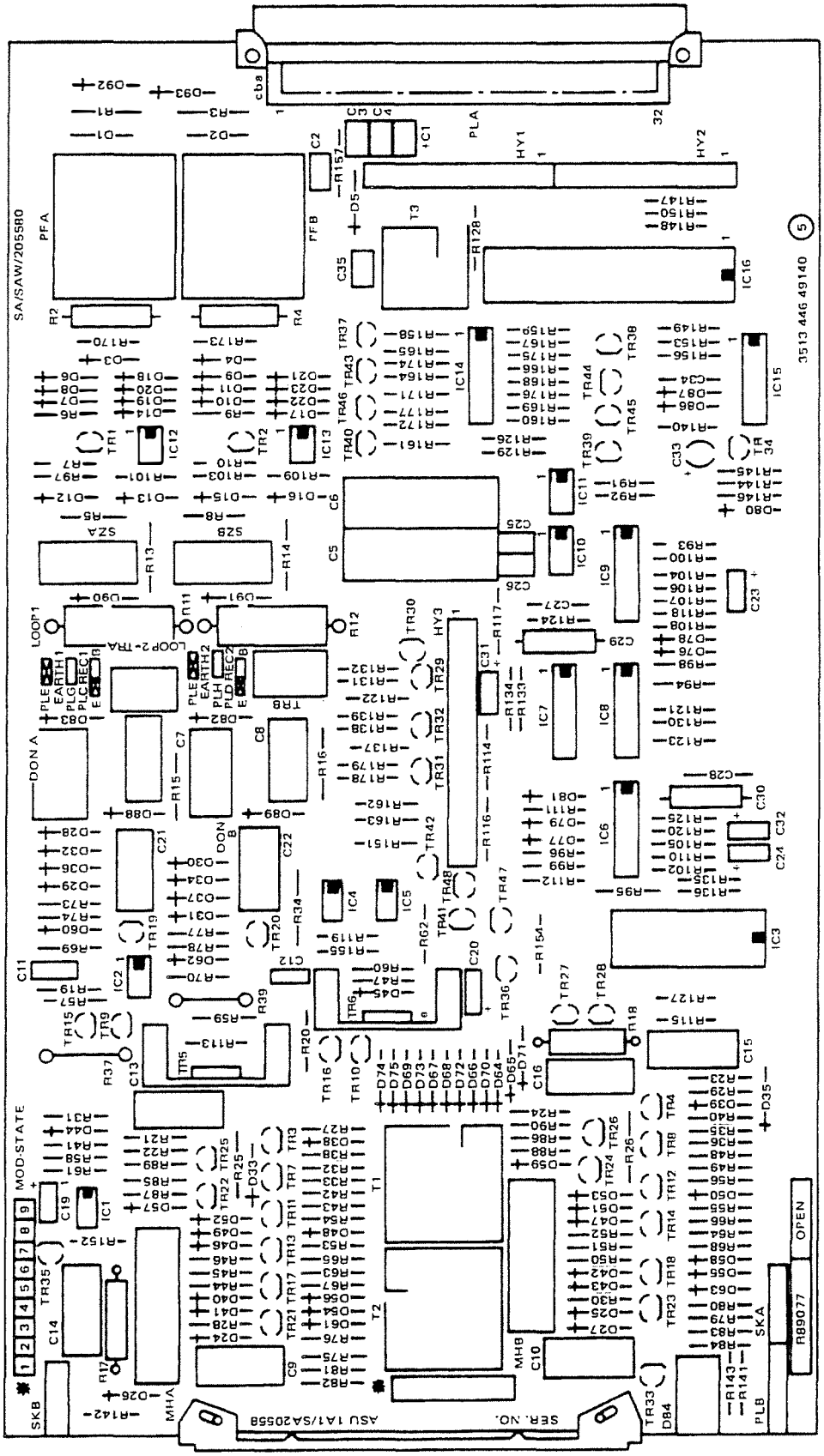


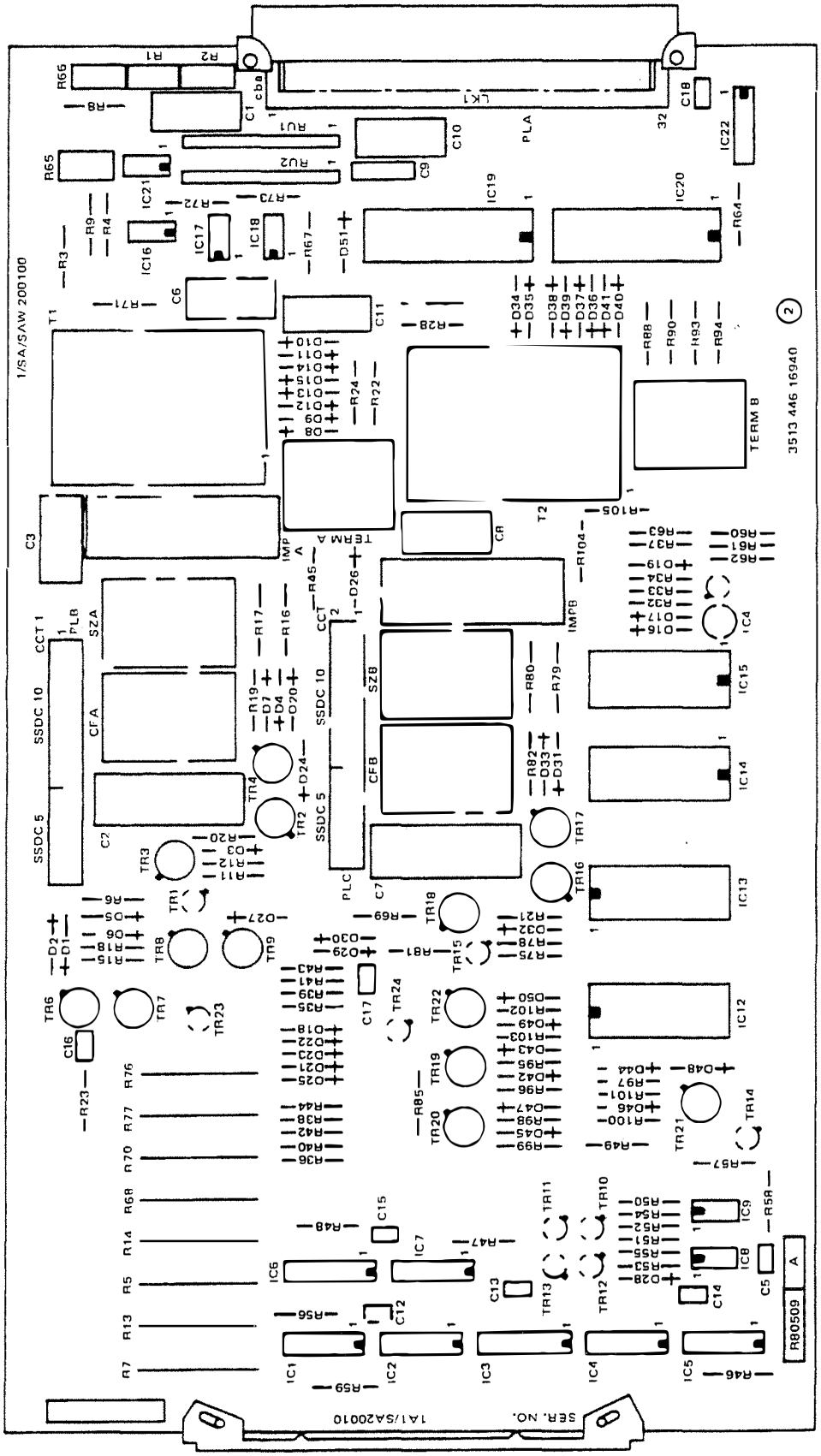
FIGURE 2-13 FULL FACILITY INTERFACE CARD

2.4.5 DC5/10 Interface (2 ccts per card)

The DC5/10 Interface Card provides two circuits which are each able to make outgoing and receive incoming calls over SSDC tie lines. Signalling, either SSDC5 or SSDC10, is dependant upon which system has been link selected for each circuit on the card.

The SSDC5 system employs four wires, two for speech (A and B) and two for signalling (E and M).

The SSDC10 system employs two wires (A and B) carrying both speech and signalling.



DC 5/10 interface card ASU 1A1/SA20010

FIGURE 2-14 DC5/10 INTERFACE

2.4.6 AC15 Interface (1 cct per card)

SSAC15A is a continuous tone type in-band signalling system for the link-by-link transmission of supervising signals and 10pps digits. It uses a single frequency 2280Hz tone in each direction on a 4-wire transmission path. The absence or presence of this tone indicates a specific signal dependant on its position in the signalling sequence and in certain cases, on its duration. When the circuit is idle, a continuous low-level signalling tone is present in both directions. SSAC15A can be described as a Tone On Idle signalling system.

Each AC15 card provides one SSAC15A circuit.

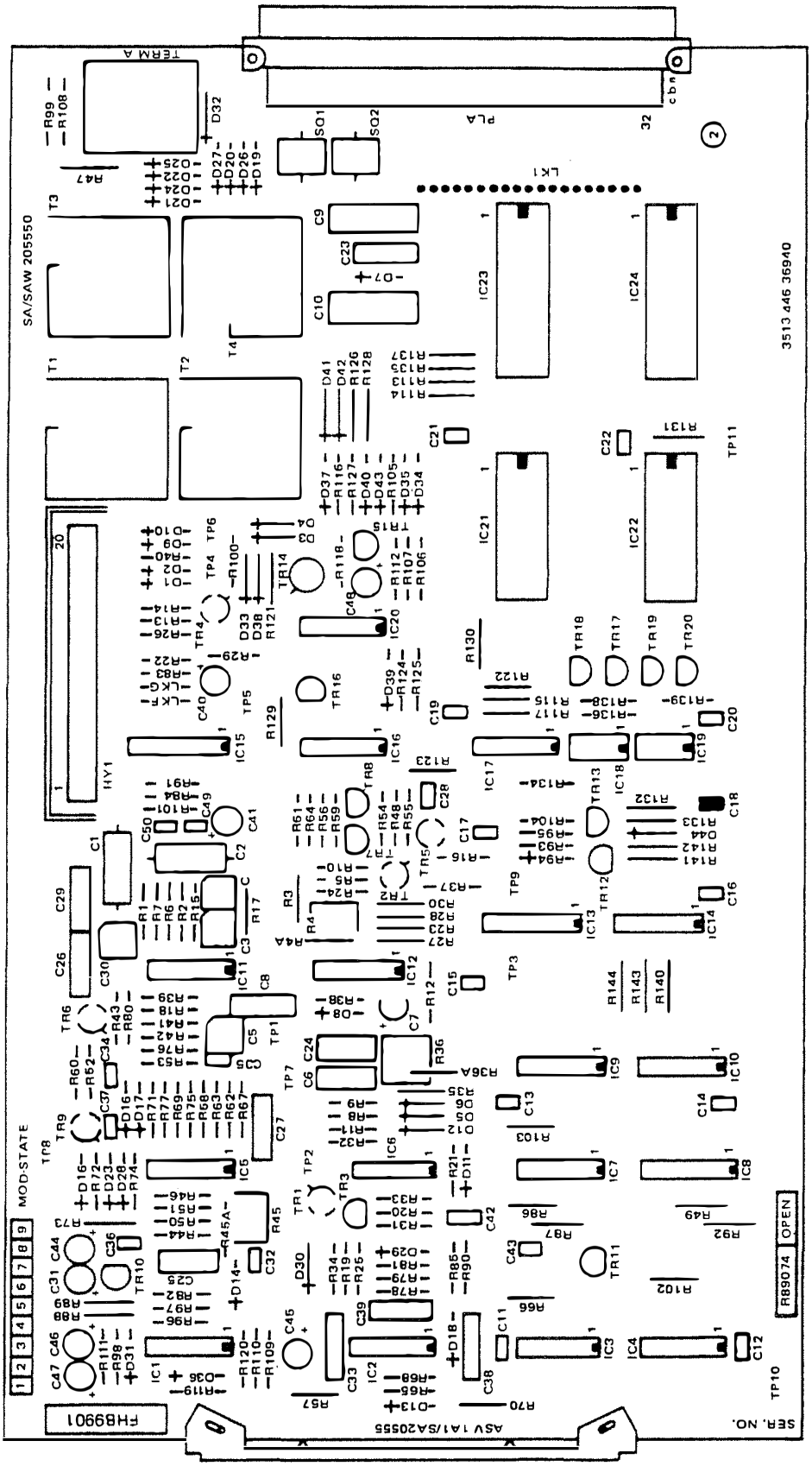


FIGURE 2-15 AC15 INTERFACE

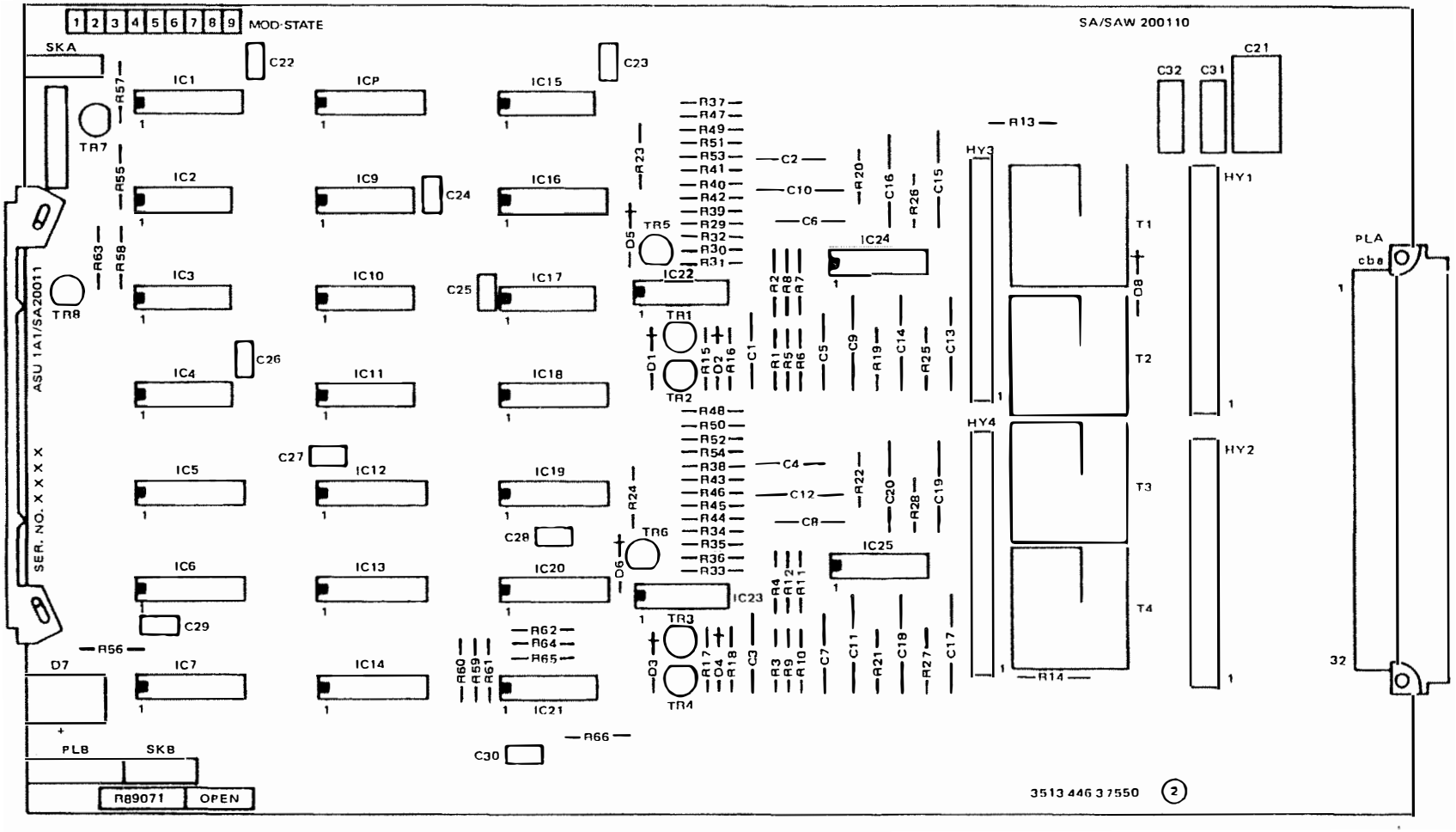
2.4.7 External Conference Card (2 ccts per card)

The External Conference Card enables two separate conference circuits to be established. Each conference circuit provides speech connections between one external call (either an exchange line or an Inter-PBX circuit) and up to five internal extensions.

The card is **not** necessary for purely internal conferences.

In operation, the speech paths are established by the processor card which places the terminals on one of the 20 system speech paths and the external line on a second speech path. All terminals are thus bunched onto one speech path.

The two resultant speech paths (one for internal parties, one for the external party) are connected via a balanced Conference Amplifier on the External Conference Card. The gain of this amplifier is set by the Control Card and is dependant on the number of terminals in the conference. This is automatically adjusted as terminals join and leave the conference.



External conference card Herald ASU 1A1/SA20011

FIGURE 2-16 EXTERNAL CONFERENCE CARD

2.4.8 Call Logging Card

This card provides additional processing power and memory for call logging purposes. The memory can hold approximately 70 call records. It also incorporates a real time clock and an isolated V24 interface.

WARNING: CONNECT ONLY APPARATUS COMPLYING WITH BS6301 TO THIS PORT

It is connected to a printer via a separate D-type connector which is wired out from the Krone connection strip. The recommended connector is Datajack Unit 21B/25F. The strip connection should be labelled with the warning above. The speed is preset to 300 baud, 7 bit word, odd parity but the parameters are switch selectable using the DIL switch on the front edge of the card.

Switches 1 to 3 determine the baud rate viz:

Speed (Baud)	1	2	3
110	0	1	1
300	**0**	**0**	**0**
600	1	0	0
1200	1	1	1
2400	1	1	0
4800	0	0	1
9600	1	0	1

0 = off
1 = on

The other switches control the functions below. Default settings are boldfaced.

	4	5	6	7	8
Parity - Odd		**0**			
- Even	1				
DSR & Xon/off - Ignore	**0**				
- Active	1				
Printer			**0**		
Call Manager			1		
Error Log - Off				**0**	
- On				1	
Self Test - Off					**0**
- On					1

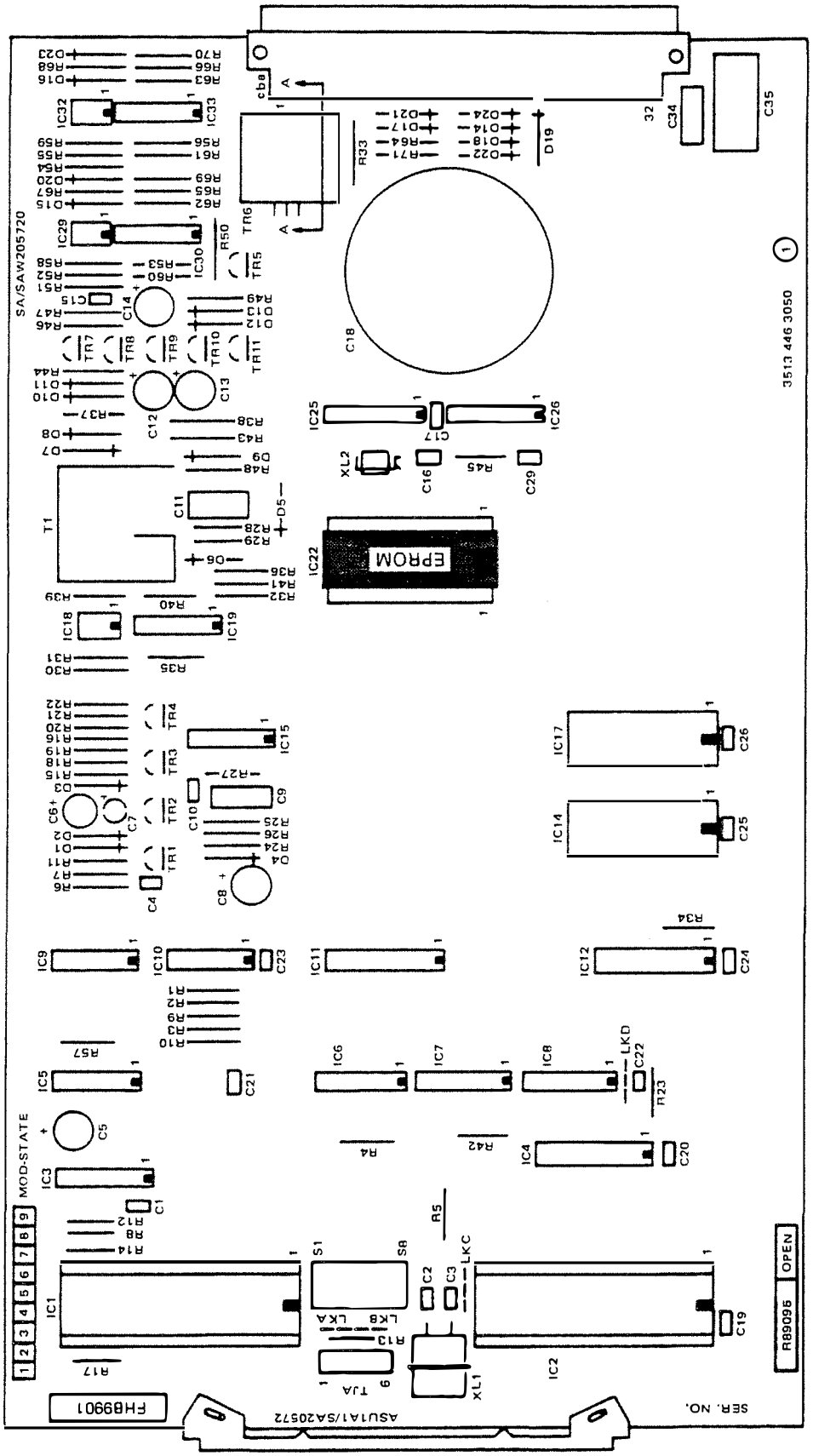


FIGURE 2-17 CALL LOGGING CARD

The last field of any call record output is normally a logical record sequence number. This can be changed to contain checksum information using DIL switch 6.

It is possible to record any system call management errors by selecting Error Logging (DIL 7).

Selection of Self Test invokes a routine in the call logging software that outputs a continuous series of call records to the V24 port. This allows checking of correct protocols between the logging card and DTE device (DIL 8).

A 1 Farad capacitor is incorporated on the card to keep the real time clock running for a period of approximately 18 hours in the event of complete system power failure.

2.5 TERMINALS

All terminals are four wire instruments using an analogue speech pair and a digital data pair employing a proprietary signalling system for scanning of the keypad and update of the LEDs. All terminals use modular line jacks.

It is possible to use the existing range of Herald terminals on the Pentara. These use a 12 button keypad, four permanently programmed function buttons, and 8 (Herald Small - HS) or 26 (Herald Large - HL) programmable buttons which may or may not be illuminated with an adjacent rectangular wide angle light emitting diode (LED).

The permanently programmed buttons are allocated to the following uses :

R Recall (PBX Operator or Register)
T Transmit. This is pressed to transmit a stored repertory dialling number.
P Program. For use when programming the system.
H Hold. To place any call in hold.

A monitor loudspeaker or headset jack may be added to the basic terminal.

Two further variants of the Herald Small Terminal exist:

The Herald Improved Terminal (HIT) uses the same case mouldings as the standard HS but has improved transmission performance, a variable pitch sounder and incorporates a monitor loudspeaker as standard. A programmable button can be allocated to function as a monitor switch.

The Herald Loudspeaking Terminal (LS/HIT) is similar to the HIT with the addition of a full handsfree facility using a built-in loudspeaker and microphone. One of the programmable buttons is hardwired as a mute key.

2.5.1 TX54 – Operator Terminal

The TX54 is a purpose designed operator terminal for the Pentara. It incorporates a 16 character alphanumeric LCD display, a monitor speaker and a headset jack as standard. Dedicated keys are provided for all standard operator facilities.

In common with all of the 4-wire terminals that are used on the system, an electronic speech circuit is used, in conjunction with specialised handset transducers. Variations of the Handset 16 (Amplifying, transmitter cut-off) cannot be substituted for the original handset fitted.

A continuously adjustable sounder/monitor control is fitted.

It is possible to change the frequency of the electronic tone caller by moving a small molex plug sited on the rear of the terminal PWB.

2.5.2 TX55 – Standard Terminal

The TX55 is the basic 4-wire instrument. Seven programmable facility buttons with associated LEDs are available and the unit incorporates a monitor loudspeaker.

An elastomer keymat has been used to reduce the number of moving parts in the terminal, and separate tone sounder and monitor level controls are fitted.

As well as the standard 12 button keypad the terminal incorporates dedicated buttons for Program, Recall, Transmit, Hold and Monitor. It is possible to change the frequency of the electronic tone caller by moving a small molex plug on the terminal PWB.

2.5.3 TX56 – Standard Loudspeaking Terminal

The TX56 incorporates all the features of the TX55, but also has a loudspeaking facility, with an associated dedicated mute key.

2.5.4 TX57 – Large Loudspeaking Terminal

The TX57 is a larger version of the TX56, but incorporates 18 programmable facility buttons with associated LEDs.

2.5.5 TX58 – Large Loudspeaking Display Terminal

The TX58 has all the facilities of the TX57, but also has a 16 character alphanumeric dot matrix LCD display for system messages.

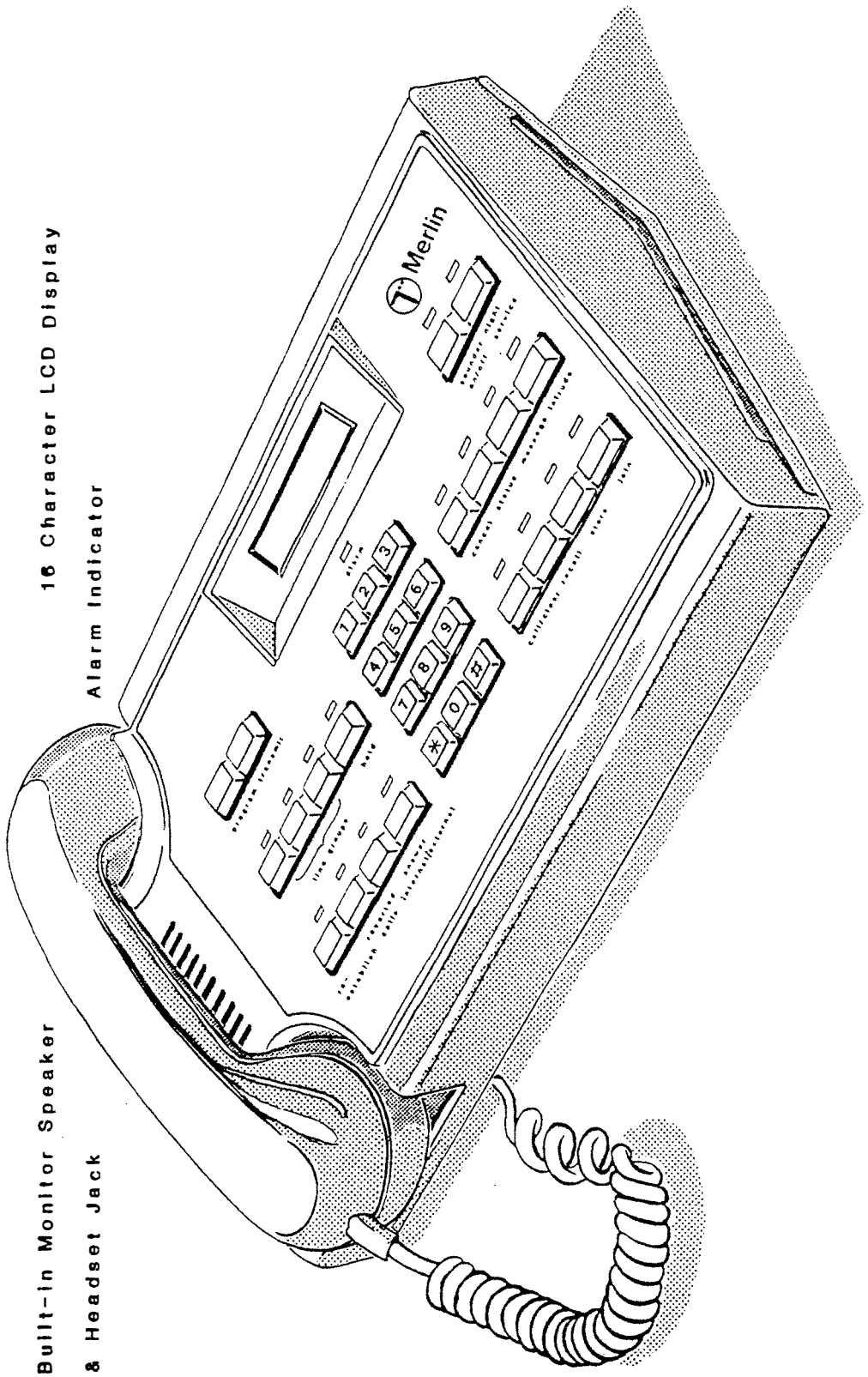


FIGURE 2-18 TX54 OPERATOR TERMINAL

FIGURE 2-19 TX56 STANDARD LOUDSPEAKING TERMINAL

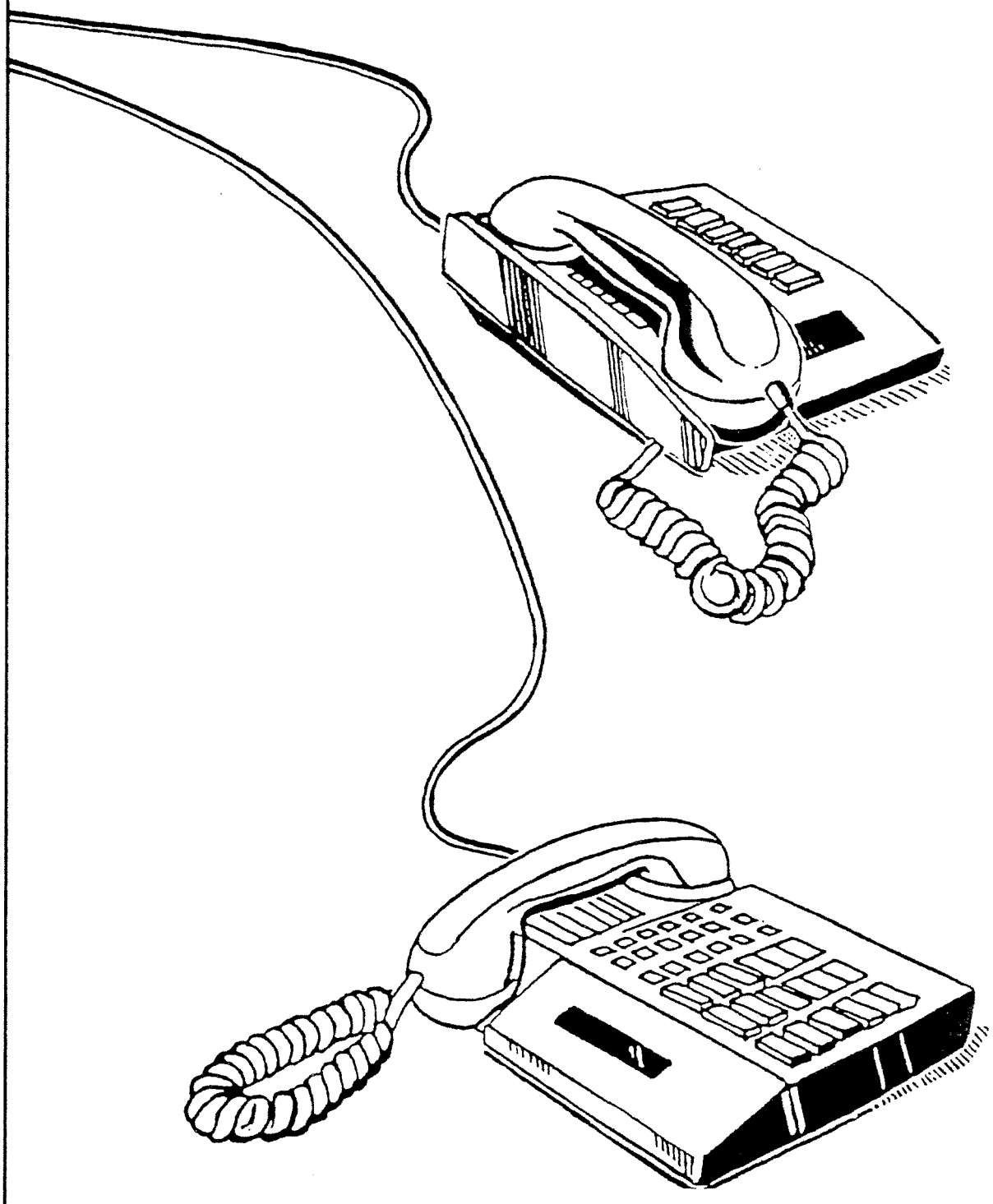


FIGURE 2-20 LARGE LOUDSPEAKING DISPLAY TERMINAL

Contents Page

3.1 NUMBERING SCHEME INFORMATION

It is possible to to assign different functions against different leading digits.

The default assignment is shown below.

Leading digit	Function	Range
0	Single digit access to operator group	
1	3 digit access	- Terminals 123-199
2	3 digit access	- Terminals 200-237
3	Not Allocated	
4	3 digit short code	- 400 - 499
5	Not Allocated	
6	3 digit dialup codes	- 600 - 699
7	Private circuit access	- 71 to 78
8	1 digit dialup code	- Night service pickup
9	1 digit access	- Exchange line groups

3.2 PENTARA 100 FACILITIES - software version 8.3

3.2.1 Answer External (Dial-up code 637)

This allows all incoming external calls (with the exception of DDI private circuits) to be answered in the order that they were queued. Where an extension has keys for more than one external line group, ANSWER EXTERNAL will de-queue incoming calls in the order that they arrive, irrespective of which group they are in. All calls answered by ANSWER EXTERNAL can be transferred on busy or ringing, from any terminal.

After being answered once, a DDI private circuit can be subsequently transferred as any other external call.

If the ANSWER EXTERNAL key is pressed during an existing call, then the call will be cleared and the next one in the queue will be answered. If there are no further calls queued, dial tone will be returned.

3.2.2 Answer Internal (636)

This allows internal or non-transferred DDI private circuits to be answered in the order that they were queued. To be queued onto an ANSWER INTERNAL key, the call must be placed onto a dummy extension group, which can contain one or more physical extensions. Internal calls to specific extensions in a dummy group will be answered normally.

If the ANSWER INTERNAL key is pressed during an existing call, then the call will be cleared and the next one in the queue will be answered. If there are no further call queued, dial tone will be returned.

Where both ANSWER EXTERNAL and ANSWER INTERNAL are provided, then the audible signal for simultaneous incoming external and internal calls is at internal cadence. The user then has the choice of which call to take.

3.2.3 Answer Group

Incoming external calls which are programmed as being included in a particular group can be answered in the order they were queued by pressing an ANSWER GROUP key relating to that group. Each group can consist of any combination of Exchange lines.

An ANSWER GROUP key can also be used for O/G access of a line in this group.

3.2.4 Buzz (647)

Wherever a BUZZ key is provided, a valid named intercom may be stored on it. This number can be changed at will by the user, subject to Class Of Service, and provides the address of the extension to be BUZZed.

If the BUZZ key is pressed while the extension programmed to be buzzed is on-hook, then a single burst of ringing will be produced at that terminal.

If the BUZZed extension is taking part in an established conversation, he will hear a short tone. The other party does not hear the tone.

If the BUZZ attempt is successful, then the associated lamp will glow on the terminal which invoked it, for the duration of the BUZZ. If the BUZZed terminal is in any other state other than mentioned above, BUZZ will have no effect. BUZZ is not affected by DIVERT.

3.2.5 Call/Clear (625)

This will perform the on-hook and off-hook function as it is repeatedly operated, and is used where a headset is fitted.

3.2.6 Call Barring

The barring class for each extension can be programmed at the master/operator terminal or by HDS interactive program by the allocation of a barring code.

The barred numbers for each of the above groups can be altered by means of HDS to suit customers particular requirements.

3.2.7 Calls For (624)

This facility causes a lamp to flash at the extension it is programmed on, when that extension receives a diverted call from the nominated CALLS FOR extension. The number of the diverting extension must be programmed on the CALLS FOR key. Assuming appropriate Class Of Service, this number can be changed by the extension user.

A DIVERTed external call can be answered by pressing the key associated with flashing CALLS FOR lamp. An internal call would be answered off-hook.

A number of CALLS FOR keys can be allocated to the same terminal, in which case a call from an individual diverting terminal can be answered, even when more than one is ringing simultaneously.

3.2.8 Call Logging

When the call logging board is fitted and enabled by the relevant dial-up code at the operator terminal, a record will be output to the printer whenever a line is cleared or transferred.

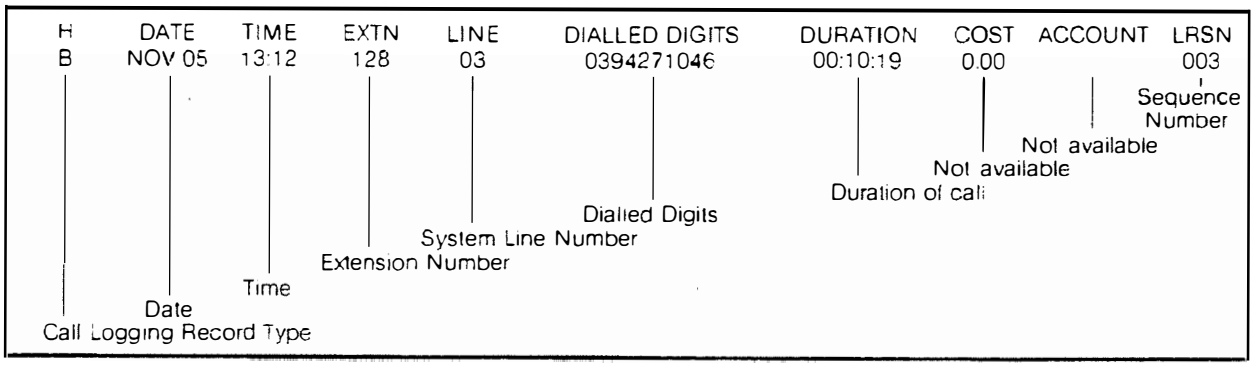
During a CONFERENCE or THREE PARTY conversation, the controller or initiator is associated with the external party as far as the logging records are concerned. This continues, even after the controller has left the conference, until another controller takes his place.

The CALL LOGGING can be set by the interactive HDS program to log particular calls only. The following parameters can be used to determine whether a call is logged or not:

- Incoming external calls only on certain line numbers.
- Calls from certain extensions only.
- Calls exceeding a certain minimum duration only.
- Outgoing calls commencing with certain digits only.

The call duration is timed from the moment when the handset is lifted to when it is replaced.

A typical logging record is shown below:



The record is divided up as follows:

- Record type
  - A = Outgoing call on line seized by extension
  - B = Outgoing call on a transferred line
  - C = Incoming call direct to extension
  - D = Incoming call transferred to extension
  - G = External line interconnection (The other external line involved is shown in the extension field)
  - Hx = This record can be a text header, start-up message, clock change, error report, (Depending on value of x)
- Date — Month followed by date
- Time — Hours : minutes (24 Hour clock format)
- Extn — Extension number talking to external party (Maximum of 4 digits)
- Line — System line number used by extension for call
- Digits — Digits dialled to the line (Maximum of 18)
- Duration — Duration of call (Hours : Minutes : Seconds)
- LRSN — Sequence number. Increments by one per record

3.2.9 Cancel (629)

Operation of the CANCEL key cancels the effect of all digits dialled since the user was last listening to dial tone. The user is then returned to dial tone. Use of this key has no effect on the state of any other calls currently being handled by the extension.

3.2.10 Conference (610)

Any terminal which has a push button programmed CONFER can initiate and control a conference call. The controlling terminal can bring additional terminals into an existing conference up to the maximum of 6 internal parties. Up to 2 simultaneous conferences can exist in a system.

The controlling terminal can leave a conference temporarily, say to make an enquiry call, and subsequently rejoin it.

Any participant whose terminal has a CONFER button can also leave the conference for a time and then rejoin.

A controller may clear from the conference, and any remaining member whose terminal has a CONFER button may become the new controller. In this event the former controller cannot rejoin the conference, unless invited to by the new controller.

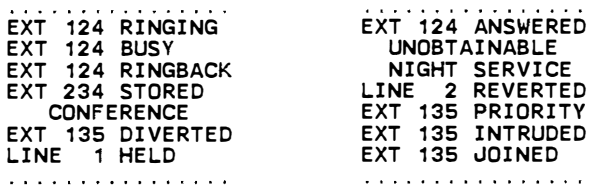
Similarly, once a participant has cleared from a conference, he cannot rejoin unless invited to do by the controller.

It is not possible to connect external calls unless an External Conference Card is fitted to the system. If a card is fitted then it is possible to connect one external call to a conference. Operation of the facility is identical to internal conference with the same maximum of 6 .

3.2.11 Display Driver

This is a facility which allows visual alphanumeric messages of up to 16 characters in length to be sent to the operator's console, or to an executive featurephone. These messages give information about:

- Status of calls made from the terminal and implementation of night service or conference. eg:



- The date, time and repertory stored numbers can also be displayed. eg:

3.2.12 Divert (616)

This enables an extension user to arrange for all incoming calls to be signalled at a nominated terminal, in addition to the one they were sent to. The audible signals will appear exclusively at the nominated terminal when DIVERT is in operation.

The number of the nominated terminal must be programmed on the DIVERT key before it will work. DIVERTed calls can themselves be DIVERTed at the nominated terminal, to further terminals.

The nominated terminal, or any terminal in a DIVERT chain will be able to transfer DIVERTed calls back to any terminal higher in the DIVERT chain.

Only one type of DIVERT is allowed at any one time. For example, pressing DIVERT cancels DIVERT ON BUSY, or DIVERT ON NO ANSWER. The user cannot divert calls over exchange lines or private circuits or to extension groups. The Operator cannot DIVERT internal calls to anyone else.

3.2.13 Divert After No Answer (620)

This has exactly the same features as DIVERT, except that signalling will only be transferred to the nominated extension after the DIVERTing extension has been rung without answer for approximately 10 seconds.

3.2.14 Divert On Busy (618)

This has exactly the same features as DIVERT, except that signalling will only be transferred to the nominated extension when the DIVERTing extension is being rung while it is handling another call.

3.2.15 External Line Access

For the purposes of incoming and outgoing external line access, lines are accessible either as individual lines or as groups of lines.

The system allows lines to be referred to by means of a line number (in the case of line keys) or by means of line groups defined in the system database which correspond to access codes '9' and '79' for exchange lines and '71' to '78' for private circuits.

External/exchange line groups:

The system supports up to thirty groups, accessible via the dial 9 access code or 71 - 79.

Each of these groups of lines is capable of containing up to 16 loop disconnect, MF4, SSDC5/10, or SSAC15 interface circuits. Each interface circuit can only appear in one group. The signalling parameters for each line are programmable at installation.

Outgoing access:

An extension user can access an external line by either dialling an access code (9 or 71 to 79), or by pressing a dedicated line key which has been provided on his extension.

Dial 9 and dial 79 outgoing access:

This facility allows the caller to make outgoing calls on the first free line of a group of exchange lines by keying or dialling the digits '9' or '79' whilst off-hook. The groups over which the system hunts depends on the outgoing groups allocated to each extension at installation. This allows an extension to hunt over none, one or any of the groups depending on the groups programmed for that extension. Should all the lines of the available groups already be busy then BUSY tone will be returned to the caller.

On each attempt to seize an outgoing line by dialling '9' or '79' the system searches for a free line by cycling through the groups available at that extension.

If no lines are available to an extension, Number Unobtainable tone is returned.

Dial 71 - 78 outgoing access (private circuits):

This facility allows the caller to make outgoing calls on the first free line of a group of private circuits by keying or dialling the digits 71 - 78 whilst off-hook. If all the lines of the required group already are busy then BUSY tone is returned to the caller.

On each attempt to seize an outgoing line by dialling the respective access code the system searches for a free line by cycling through the required group.

Line Keys:

As an alternative to dialled access to trunks the system allows one or more lines to appear as dedicated keys on one or more four wire extensions. The users with these extensions have the option of making an outgoing call by pressing the required line key when listening to internal dial tone and then being connected to the particular interface circuit. This facility allows access to exchange lines or private circuits.

Incoming access:

The system allows incoming calls to be answered by means of an ANSWER EXTERNAL key or a dedicated line key or a Key for the Group to which the line belongs. If no Keyed means of answering the call is available then Direct Off Hook answering is provided.

All incoming External Calls are queued in the order in which they arrive. The ANSWER EXTERNAL Key de-queues all External Calls incoming to that extension, including all calls which also appear on any ANSWER GROUP Key. The ANSWER GROUP Key de-queues all incoming calls of that group.

At those extensions provided with a dedicated line key the call makes the lamp associated with the key flash with ringing cadence. The extension user can then answer the call by lifting his handset and pressing the line key.

Clearing of Outgoing Interface Calls:

Through-clearing is provided on all outgoing calls from the system. When the extension replaces the handset, the equipment sends a clear signal to the public exchange or distant PBX.

At all extensions (other than the originator of the outgoing call), a three second busy period is applied to allow the originator to seize the same interface circuit again if desired. The system will not apply a new seizing condition to the exchange for three seconds (to allow the exchange to clear from the previous call).

Clearing of Incoming Interface Calls:

When the called extension clears, the equipment releases.

Route Barring:

The system holds a route barring matrix which defines which exchange lines and private wire groups may be interconnected. This matrix is set up by interactive programming (HDS) at installation. Typically, it is possible to extend any incoming exchange line over any outgoing private wire, but not over another exchange line.

3.2.16 Group Calling

The system can be programmed by the interactive HDS programme, or at the Operator's terminal by use of a dial-up code, to associate a dummy extension number (one that does not already exist) with a group of extensions. When this number is rung, all free extensions in that group will be rung together.

3.2.17 Hold

Pressing HOLD enables the user to perform some other activity while retaining control of the held call, so that it can be transferred to some other circuit. A typical sequence of operations would be:

- Extension 126 receives incoming external call on line 4
- Extension 126 answers call and presses HOLD (and hears dial tone)
- Extension 126 makes an internal call to extension 134
- Extension 126 replaces his handset immediately that he hears ring tone or busy tone and the held party on line 4 will be connected to extension 134 when it is answered.

Alternatively, extension 126 could wait until extension 134 answers and ask if he wants to talk to line 4 (who will not hear this conversation), before completing the transfer.

If the called party is busy or unobtainable the extension user can return to the held call by pressing HOLD.

In the case when the extension user has a key for the circuit in HOLD, he can retrieve the circuit from HOLD by pressing the relevant key. Any of these circuits can be put back into HOLD by simply pressing HOLD while connected to it. Dial tone will then be heard.

The last party held can be recovered either by pressing its associated key (if it has one), or by pressing HOLD. Only one party can be held at any one time, when no associated keys are available.

If the extension user replaces his handset while calls not previously transferred are still held, any held internal calls are cleared (including DDI private circuits), and any held external calls (REVERTED CALLS) will ring back to the terminal after a preset period. These calls will light the REVERTED CALLS lamp (if one is programmed) to inform the user of their nature, and take priority over any other call that may be incoming if no REVERTED CALLS key is provided.

3.2.18 Intrusion (609)

This allows a caller to enter into an established call (internal or external) and speak to the existing parties. When the caller dials one of the parties and receives busy tone, he just presses INTRUDE to make it into a three-way conversation. A tick tone is heard by all parties, to warn them of the intrusion.

An INTRUDE will only be successful if the INDRUDEing party has an INTRUDE priority equal or greater to that of the highest of the existing parties. It is also not possible to INTRUDE on any call involving more than two parties. If the attempt is unsuccessful, number unobtainable tone will be heard by the party pressing INTRUDE.

After a successful INTRUDE, if one of the parties replaces his handset, the other two will continue, and the tick tone is removed.

The Operator can HOLD an external call, INTRUDE on the party it was intended for and then, by use of the CALL/CLEAR key, leave the call camped on busy. The extension will then be rung by this call when its handset is replaced.

3.2.19 Join

This facility is provided at an Operator's terminal to allow the Operator to interconnect the first and second parties that are being supervised. Hence JOIN normally operates like the THREE PARTY facility.

It is possible for JOIN to function as a conference facility.

3.2.20 Keyed Access To Extensions

This allows an extension user to call another extension on the same Herald system by keying that extension's number.

3.2.21 MF4 Capability

The system allows the use of MF4 extension phones in addition to the existing terminals and 2-wire loop dis phones, when MF4 options board(s) are fitted. The MF4 user will get the same facilities as a 2-wire extension user.

3.2.22 Monitor (611)

This allows a user to monitor the progress of an outgoing call without raising the handset. By pressing MONITOR, the user executes an "off hook" and an internal amplifier (if fitted) is activated and the extension connected to the line. The user thus hears the ringing at the far end and the voice which answers. To continue the call, the handset must be used. Whenever a MONITOR facility is programmed, it is the responsibility of the programmer to ensure that an amplifier is fitted to the terminal concerned.

3.2.23 Music On Hold

This facility allows a source of non-copyright music to be played to any external call placed in HOLD. The lines which this facility applies to are determined by the way the Box Connection is wired; only lines which are connected to full facility line interfaces will receive music.

3.2.24 Named Intercom

This allows an extension user to call another extension on the same Herald system, by lifting the handset and pressing a single pre-programmed key for the called extension. The number to which the NAMED INTERCOM key is programmed can be changed by the user, and when programmed it will indicate which state the other extension is in, by its cadence.

Extension free : Lamp off (steady)
Extension busy : Lamp on (steady)
Extension held : Lamp flashes ON (long), OFF (short)
Extension parked or not provided : Lamp on (steady)

3.2.25 Night Service (631)(PBX configuration only)

This allows incoming exchange calls to the operator to be diverted to alternative answering positions when the Operator's position is unattended. It can only be used from the Operator's terminal. Pressing the NIGHT SERVICE key will switch the facility ON and light the associated lamp. All exchange calls are then diverted to ring extensions in the NIGHT SERVICE group (programmed by HDS or at the Operator's position). Any incoming calls to extensions other than the Operator's are unaffected.

It is possible to allocate a NIGHT SERVICE PICK-UP key (633) to a terminal so that incoming NIGHT SERVICE calls can be distinguished from other incoming calls appearing at that extension.

It is necessary to key in a dial-up code (632) to cancel NIGHT SERVICE. An extension which is not in the NIGHT SERVICE group can answer NIGHT SERVICE calls by keying a dial-up code (8).

3.2.26 Operator's Console

The system will support up to three Operator's consoles, equipped with LCD displays and dedicated function buttons. The type of messages displayed are shown in DISPLAY DRIVER.

3.2.27 Private Circuit Access

The system will support SSDC5, SSDC10 and SSAC15 signalling systems.

Outgoing access to private circuits:

Up to 8 groups of private circuits can be configured on a particular system. These can be separately accessed by dialling codes (normally being 71 - 78). Alternatively, keys can be programmed for groups and for individual private circuits.

An extension user can transfer both internal and incoming calls over a private circuit.

Incoming access to private circuits:

The system normally expects to receive dialled digits to route the call to a specific extension. Using HDS, a manual circuit can be defined to ring a specific extension on seizure.

3.2.28 Recall

Extension users can send a RECALL signal to the Pentara's parent exchange when engaged on external calls. Three options can be used. They are:

- Timed break recall
- Earth recall
- No recall

The type used can be selected at installation, by use of the HDS, or by Operator programming. To initiate a RECALL, press the 'R' key.

3.2.29 Re-establish (630)

This facility can be implemented at any extension. It allows Reverted calls, including calls abandoned in HOLD to be RE-ESTABLISHed at the extension to which they were camped on busy or camped on ringing, before reverting.

A reverted call can be RE-ESTABLISHed by the extension user pressing the RE-ESTABLISH key whilst speaking to the incoming caller. The system then sets up the call in the same way as if the extension user had keyed the required extension number. However, this function will cause an automatic camp on busy or on ringing. By using the RE-ESTABLISH facility, the Operator does not have to query reverted calls, even if the Operator did not supervise the initial transfer.

3.2.30 Reverted Calls (640)

A key can be programmed at any terminal to provide the REVERTED CALLS function. The associated lamp will flash with a ringing cadence when a reverted call rings the terminal. The call can then be answered by pressing the REVERTED CALLS key. If two or more calls are reverted, then they will be de-queued by successive depressions of this key.

Calls appearing at the REVERTED CALLS key will not appear at any other common answering key.

3.2.31 Repeat Last Number

Keying 'T' 'T' or programmed button on a terminal will automatically redial the last external line number keyed. REPEAT LAST NUMBER will select the same outgoing route as previously keyed, whether by access digit or named line/line group key.

3.2.32 Repertory Dialling

This facility allows the User access to a block of commonly used telephone numbers. Two forms of repertory store exist:

- System repertory dial (Short code dialling)
- Individual repertory dial (Repertory/abbreviated dialling)

System repertory dial:

The numbers stored in this can be programmed from the Operator's terminal and are accessed by dialling a short code (which is associated with a telephone number at the time of programming). Numbers can be programmed as follows:

1 Press and hold down the 'P' button
2 Dial 3-digit short code
3 Dial repertory number
4 Release the 'P' button

Individual repertory dial:

Telephone numbers can be stored against the digits *,#,1-9 and 0 on the keypad. Alternatively, they can be stored against a programmable key. The programming procedure is as follows:

1 Press and hold down the 'P' button
2 Press and release the 'T' button
3 Press a programmable key (to store number on)
4 Dial repertory number
5 Release the 'P' button

Note **Pauses for dial tone can be programmed by pressing 'T'.**

A specific line/private wire or line group/private wire group can be specified for selection by the repertory dialler, by pressing the relevent line/PW key immediately after stage 3 above.

To delete the repertory number, execute 1, 2, 3 and 5, above.

Having programmed a key, the dialled number stored on it can be used by lifting the handset, pressing 'T' and then the programmed key.

It is possible to place the last number dialled in the repertory dial store. The programming procedure is as follows:

1 Press and hold down the 'P' button
2 Press and release the 'T' button
3 Press and release the 'R' button
4 Press a programmable key (to store number on)
5 Release the 'P' button

When a repertory number is sent to an MF4 line, the characters * and # will be sent wherever they occur in the number. If a loop disconnect line is used, Number Unobtainable will be sent at the first occurrence.

Repertory dialling can be used on any external line, once the line has been seized.

It is possible to increase the number of repertory dial blocks available on a terminal using HDS - see Section 4.6

3.2.33 Ring When Free (606)

If a User keys an extension and receives busy tone, the RING WHEN FREE key can be pressed (or a dial-up code used). If this attempt is successful, the associated lamp will light. When both extensions are free or ringing with external cadence, the User's terminal will ring with internal cadence. When it is picked up, ring tone will be heard as the previously busy extension is automatically rung. If busy tone is heard, it means that the extension has started another call before the RING WHEN FREE call was answered.

The RING WHEN FREE is cancelled automatically when:

- It has been successfully completed.
- The 2 extensions involved have been connected by a intercom call before RING WHEN FREE has been completed.
- 8 hours have elapsed.
- A RING WHEN FREE call has not been answered at the instigating terminal within 30 seconds.

The User instigating the RING WHEN FREE cannot DIVERT it to another extension. The facility is not available to or from an operator group.

3.2.34 Single Digit Access To Operator

This single digit (0) is recognised both for internal calls and for programming the operator as a nominated extension.

3.2.35 Sounder ON/OFF (615)

When this function is activated, the associated lamp comes on. The terminal's sounder is then silenced for incoming external calls which have a LED visual indication e.g. ANSWER EXTERNAL, ANSWER GROUP, LINE KEY. The sounder will operate for incoming external calls which do not have a visual indication.

The SOUNDER ON/OFF function is de-activated by pressing the key again.

3.2.36 Speak (613)

After dialling an extension and receiving ringing tone, the User can press SPEAK to switch on the called extension's monitor. This allows the User to speak directly to the called extension before it is answered. Subsequent call transfers are not allowed.

It is possible to program an intercom number on the SPEAK key, in which case the number will be dialled and SPEAK invoked as soon as the key is pressed. When an enquiry call is made in this way, it is possible to transfer a held external party to the "spoken to" extension.

If there is no monitor fitted at the called extension, the sounder will be operated instead.

3.2.37 Speech Synthesis (641)

The system has a synthesised speech option which will tell a User what numbers and facilities are stored on each key.

"Your key is programmed to sounder on off"
"Your key is programmed to divert extension one two four"

SPEECH SYNTHESIS can be accessed by means of a dial-up code, or a programmed function key.

3.2.38 Store (642)

This facility allows the user to temporarily store a call (on this button), whilst HOLD works in the normal way.

While listening to a call, the user presses STORE and dial tone is returned. When STORE is pressed again, while listening to dial tone, the call is reconnected. The lamp associated with STORE will flash with Held cadence when a call is stored.

3.2.39 Three Party Conversation (608)

An extension user can put an existing call in HOLD, make a further call, and then press THREE PARTY CONVERSATION to join all three. If an attempt is made to establish a three party call which is not allowed by the route barring (described under EXTERNAL LINE ACCESS), then the attempt will be ignored.

When one of the parties replaces their handset, the call will revert to a normal two way conversation.

3.2.40 Transfer

This allows an extension user to transfer an established conversation direct to another extension, or via a private circuit to another extension.

Three forms of TRANSFER are available:

- TRANSFER after answer
- TRANSFER on ringing
- TRANSFER on busy

To initiate a transfer, the extension user puts the call in HOLD, and then makes a call to any other extension. On receiving ring tone or busy tone, the user has a choice of actions:

Ring tone returned:

The user can replace the handset, and the call will be TRANSFERed when the called extension answers. Alternatively, the user could wait until the called extension answers, to make an enquiry call, and then replace the handset.

Busy tone returned:

The user can press HOLD to inform the caller that the line is busy, or can replace the handset while listening to busy tone, in which case the call will be transferred when the called extension becomes free.

External callers who are camped on busy or ringing will receive MUSIC ON HOLD, if the option has been fitted, and if this situation continues for 30 seconds then the call will revert to the transferring extension. If this extension is now busy, the call will revert to the Operator (unless the Operator position is not provided, in which case the call will be camped on busy at ext 123).

If the required extension becomes free shortly before the camp on busy timeout expires, then the extension will be rung for at least 10 seconds before the caller is reverted to the Operator.

A busy extension user who has a call transferred to his extension will hear a short burst of tone to indicate that a second call is waiting.

The enquiry call will ring an extension with internal cadence, but this will change to external cadence if the enquiring party replaces his handset before the extension answers. (The call will also be put at the end of the Answer External.)

Intercom calls cannot be transferred on ringing or busy, and all transferred calls are subject to DIVERT if this is operational at the called extension.

3.2.41 Transfer Dial Tone From Operator's Position

The system allows the Operator to transfer dial tone from an external interface to an extension which is otherwise barred from accessing it. To do this, the Operator puts the extension in HOLD and then selects an external line. When the Operator then goes on hook, dial tone is transferred for one call.

3.3 PENTARA 100 E FACILITIES – Software Version 8.4

In addition to the facilities provided in Software Version 8.3, the following facilities are also provided in Software Version 8.4.

3.3.1 Automatic Hold

This facility allows the operator when in conversation with an incoming internal or external caller (including Reverted Calls) to directly key another extension number using the keypad or Named intercom. This will result in the incoming party being held automatically. AUTOMATIC HOLD is available to other terminal users if required.

3.3.2 Broadcast

The system, when fitted with a Broadcast Option Card allows a SPEAK call to be made to a group of terminal users. The SPEAK key will have the extension group number programmed under it. Divert chains are not followed during a broadcast nor is a call transfer allowed to the broadcast group.

3.3.3 Single Key Working

When the Operator (and other terminal users) press any answering key to answer a call ringing their terminal the monitor or headset will be switched on automatically. This facility will also be provided when any facility key is pressed which will complete a call in one press. This facility can be enabled for all terminal users or enabled normally and disabled only when the system is in NIGHT SERVICE.

3.3.4 Modem (670/671)

When the Modem Option Card is fitted to the system an extension user can establish an external call and then key a dial–up code or press a facility key to access the modem. The external call is then transferred to the modem, and through wiring made on the Connection Box. Communication is thereby established with the Control Card UART. Remote Programming of the system database using HDS can then be carried out.

3.3.5 Transfer by Line Key

While a terminal User is in conversation with an external party for whom there is a line key on his terminal, he may press the key to hold the line. In addition to the LED flashing with held cadence at the holding terminal, it will flash similarly at all other terminals with the same line appearance. The call can be recovered at any of the terminals by going off- hook and pressing the line key. The call will remain in hold for (normally) 60 seconds before reverting as an abandoned call.

3.3.6 Interrupted Dial Tone

The validation period for dial tone has been reduced to 600ms to cater for subsidiary working where interrupted dial tone is returned on lines to indicate selection of special services such as divert. This is only offered when the Full Facility Line Interface (ASU 1A1/SA20558) is used.

3.3.7 Internal Music–on–hold

This is now available for held internal callers. The music source is jumpered to the control card via the Connection Box.

Contents Page

4 SYSTEM CONFIGURING & PROGRAMMING

This describes the means of configuring the database for the Pentara.

The system supports five levels of database configuration, corresponding to the complexity and scope of the variables and options to be programmed.

These are as follows:

4.1 SELF CONFIGURING ROUTINES

The system contains sufficent resident software to allow simple installations to be configured without the need for interactive programming. It is performed automatically at installation, to give a basic working system.

Detail:

The self configuring routines can initialise the system either as a PABX or KEY system.

All exchange line interfaces are configured initially with loop disconnect signalling, auto ringing detector, and earth recall.

In the PBX mode, all incoming circuits are configured so as to ring the Operator.

In the KEY mode incoming lines are configured to ring the first 20 extensions, and all exchange lines are available for outgoing access from all extensions. All outgoing interfaces are available from all extensions, including the Operator.

Four-wire telephones are configured with a default terminal layout. It is possible to modify this terminal layout at a later date by means of the interactive program, or user programming, subject to a suitable Class Of Service.

The default Night service group consists of the first 20 extensions.

4.2 EXTENSION USER PROGRAMMING

It is possible to programme a number of the system facilities directly at the extension user's telephone. The particular facilities that are programmable at each extension depend on the Class Of Service (COS) of that extension.

The Programming Class Of Service of each extension is allocated and can be changed by the operator/master extension or by HDS.

The system supports a maximum of 8 programming COSs.

4.2.1 Facility Programming

It is possible to programme a facility (such as DIVERT) under an unallocated programmable key in the following manner:

Press and hold down the 'P' button (PROGDN)

Press the Unallocated button to be programmed

Key the DIVERT dial-up code (616)

Release the 'P' button (PROGUP)

A list of dial-up/service codes is given in Appendix C.

If an attempt is made by an extension to programme a facility that is not available then the system returns Number Unobtainable tone. The system will indicate that a facility programming operation has been successful by returning dial tone. Facility buttons can be de-allocated using the delete (603) code.

4.2.2 Facility Addresses (excluding Repertory dial)

It is possible to programme a facility address (such as the nominated divert extension) under some facility keys in the following manner:

Press and hold down the 'P' button (PROGDN)

Press the Facility button to be programmed

Dial the extension number or press a Named intercom Key of the extension to be addressed

Release the 'P' button (PROGUP)

4.3 OPERATOR/SUPERVISOR PROGRAMMING (See also System Programming Guide, TPU100A)

In a system configured using HDS, any number of Supervisory extensions are possible.

It is not possible to enter any programming activity from a supervisory programming extension (remote or local) until after the 'Programming enable' facility code has been keyed, followed by the system password (a three digit number in the range 000-255).

Should 30 seconds of inactivity elapse at the supervisory extension after the 'Programming enable' code has been entered then programming will be automatically inhibited until the 'Programming enable' code has been re-entered.

Note **In a self configured system, there is only one Supervisory extension and this is the first extension plugged into the system. This must be plugged into the first physical position on the first shelf of the Herald control box.**

4.3.1 Real time clock

Clock time (24 Hr.Format)
PROGDN
Time dialup code (650)
DIGIT > - hours
DIGIT
DIGIT > - minutes
DIGIT
PROGUP

Clock date
PROGDN
Date dialup code (656)
DIGIT > - year
DIGIT
DIGIT > - month
DIGIT
DIGIT > - day
DIGIT
PROGUP

4.3.2 Abbreviated dialling

PROGDN
Abbreviated dialling dialup code (400–499)
.
.
. Rep. dial sequence
.
.
PROGUP

4.3.3 Parking of devices

Parking/Unparking Extension
PROGDN
Extension required to Park or Unpark
Park/Unpark dialup code (651/652)
PROGUP

Park/Unpark External line
PROGDN
DIGIT 9
DIGIT > – Ext. line number to park/unpark (01–99)
DIGIT
Park/Unpark dialup code(651/652)
PROGUP

4.3.4 External line signalling

Trunk line parameter set
PROGDN
DIGIT 9
DIGIT > – External line number (01 to 99)
DIGIT
Line parameter dialup code (653)
DIGIT > – New parameter set (1 to 8)
PROGUP

See Appendix G or H for default parameters

4.3.5 Call logging

Enable/Disable Call Logging
PROGDN
Call logging enable/disable dialup code (634/635)
PROGUP

4.3.6 Extension Barring and Programming

Extension Barring Class of service.
PROGDN
Extension number to have BCOS changed
Barring COS dialup code (649)
DIGIT > – New barring COS code (00–31)
DIGIT
PROGUP

Each extension is allocated a barring class of service (00 – 17). This is made up of combinations of 5 barred groups as shown below.

barring class of service (HDS-Engineering)	barring class of service (Customer)		Barred Groups
1	00	No Barring	With group 5 exceptions
2	01	1	With group 5 exceptions
3	02	2	With group 5 exceptions
4	03	1,2	With group 5 exceptions
5	04	3	With group 5 exceptions
6	05	1,3	With group 5 exceptions
7	06	2,3	With group 5 exceptions
8	07	1,2,3	With group 5 exceptions
9	08	4	With group 5 exceptions
10	09	1,4	With group 5 exceptions
11	10	2,4	With group 5 exceptions
12	11	1,2,4	With group 5 exceptions
13	12	3,4	With group 5 exceptions
14	13	1,3,4	With group 5 exceptions
15	14	2,3,4	With group 5 exceptions
16	15	1,2,3,4	With group 5 exceptions
17	16	Total barring	With group 5 exceptio ns
18	17	Total barring	

The basic system allocates a barring code 00 (no barring) to all extensions. Other useful barring codes as available on the basic system are:

Code	Pentara 100	Pentara 100E
00	No barring	No barring
01	Total barring	Bar 010 *
02	Total barring except 999,151	Bar 0 *
03	As 02	Bar 0,010 *
04	Bar 0	Bar local services *
08	Bar 010	Bar local calls *
16	Total barring	Total barring *
17	Total barring	Total barring
		* except 142,151,192,197,999

The bar codes may have been changed to meet local requirements and so may differ from the barring invoked by the class of service codes. In this case, the barring should be determined using the above table in conjunction with the tables for barring groups 1 to 5 which follow.

Programming Class of Service
PROGDN
Extension number to have PCOS changed
Programming COS dialup code (659)
DIGIT New Programming COS (0-7)
PROGUP

Intrude Priority
PROGDN
Extension number to have Intrude Priority changed
Intrude Priority dialup code (658)
DIGIT New Intrude Priority (0-7)
PROGUP

4.3.7 Nominate terminal type

PROGDN
Extension number (keyed or named intercom)
Terminal type dialup code (662)
DIGIT Terminal keys
DIGIT
DIGIT Terminal type
PROGUP

Terminal keys: 00 = 2-wire extension
08 = TX 51, 55, 56 terminals
20 = TX54 Operator console
26 = TX52, TX57, TX58

Terminal type : Null input required if no display fitted
1 = Display fitted

For example, to set type as a TX58 (with display), enter 261. To set type as a TX51, enter 08.

Note **The system exchange has no way of knowing what type of telephone is actually fitted to any extension.**

Note **It is now possible on Pentara 100E to change a 2W extension to 4W extension using this code.**

4.3.8 Extension group parameters.

Define Dummy Terminal Group
PROGDN
Terminal Group dialup code (655)
Dummy Terminal number
PROGUP

Note **The dummy terminal number must be the next unallocated extension number in the system. For example, in a 4 + 16 system which also has 2 private circuits and 1 existing terminal group, the required number would be 123 + 4 + 16 + 2 + 1 = 146. Therefore, the sequence to add another terminal group would be:**

PROGDN 655 146 PROGUP.

Add terminal(s) to group
PROGDN
Dummy terminal number
.
.
Extension number(s) to be added
.
.
PROGUP

Delete terminal from group
PROGDN
Dummy terminal number
Extension number to be deleted
DELETE function code (603)
PROGUP

Delete all terminals from group
PROGDN
Dummy terminal number
DELETE function code (603)
PROGUP

Note **The Dummy Terminal group remains allocated but empty.**

Note **A dummy terminal group must be allocated for the broadcast facility to operate.**

4.3.9 Night Service Group

Add Extension(s) to Night Service Group
PROGDN
Night Service dialup code (631)
.
.
Extension number(s) to be added to night service group
.
.
PROGUP

Delete from Night Service Group
PROGDN
Night Service dial up code (631)
Extension number to be deleted
Delete function code
PROGUP

Delete all terminals from
PROGDN
Night Service dial up code (631)
DELETE function code
PROGUP

4.3.10 Outgoing Access to External Lines

Line group nomination
PROGDN
DIGIT 9
DIGIT > - Line number (01 to 99)
DIGIT
Line group nomination dialup code (660)
DIGIT > - group number (01-15 or 17-31) (note 1)
DIGIT
PROGUP

Note 1 : LINE GROUP	ACCESS DIGIT TO THIS GROUP
01-15	9 (EXCHANGE LINES)
17	71)
18	72)
19	73)
20	74)
21	75) (PRIVATE CCTS)
22	76)
23	77)
24	78)
25	79 (EXCHANGE LINES)
26-31	LINE KEY ONLY ACCESS

Outgoing External Line Groups hunted over from extension
PROGDN
Extension number
External Line Hunt Group Code (661)
DIGIT (see note below)
DIGIT Group number(s) (01-15 or 17-31)
DIGIT
:
:
PROGUP

Note **can be *, #, 0, or 1 as follows:**

- *** Bar access to ALL groups, except those subsequently input before PROGUP.**
- **# Bar access to NO groups, except those subsequently input before PROGUP.**
- **0 Current settings unchanged, additional groups to be given access must be input before PROGUP.**
- **1 Current settings unchanged, additional groups to be barred must be input before PROGUP.**

4.3.11 Line Ring Map

Additional extnsion(s) to be rung by this line
PROGDN
DIGIT 9
DIGIT > - Line number (01 to 99)
DIGIT
Line Ring Map(663)
.
Additional extension number(s) to be rung by this line
.
.
PROGUP

Remove extension from ring map
PROGDN
DIGIT 9
DIGIT > - line number
DIGIT
Line Ring Map (663)
Extension number of terminal to be deleted
DELETE function code (603)
PROGUP

Remove all extensions from ring map.
PROGDN
DIGIT 9
DIGIT > - Line number (01-99)
DIGIT
Line Ring Map (663)
DELETE function code (603)
PROGUP

4.4 INTERACTIVE PROGRAMME CONFIGURATION

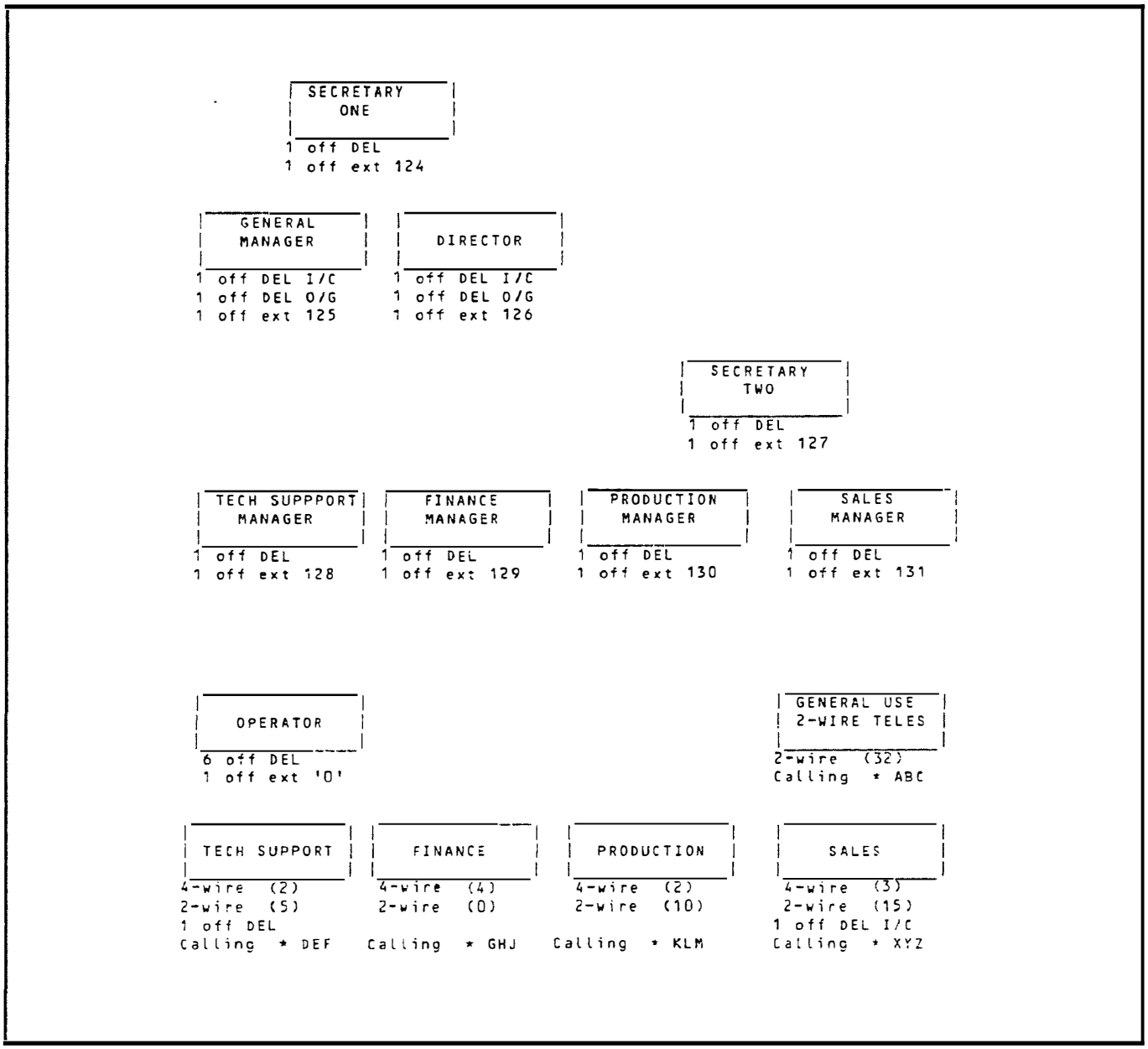
The system allows an interactive program (HDS) to configure the system database to suit a customer's requirements.

This is performed within British Telecom premises to allow the system to be customised to the precise requirements of each installation.

See also 4.6 for more detail.

4.5 EXAMPLE OF CUSTOMISATION OF A DEFAULT DATA SYSTEM INSTALLATION

This document details precisely how a customer's requirements can be transformed into a working installation, using self-configuration and user/supervisory programming and documenting the system using the tables provided in the Customer Site Documentation book.



4.5.1 Requirements

The schematic diagram above, depicts a fictitious business, to be served by a Pentara installation. Additional information on customer requirements is detailed overleaf. Extension information:

This is self explanatory from the extension data table.

Line information:

- All lines shown in schematic are to ring only the extension or extensions shown.
- O/G only lines do not ring anywhere.
- All extensions from departments (ie below manager) will have O/G access the lines which ring the operator
- All lines to managers and above to be exclusive to person.
- All lines shown to a specific department are to be exclusive to that department.
- Two private circuits to be provided (SSDC5/10) - available from operator, secretary and managers only.

- Speech Synthesis
- 4-wire extensions to be given to General managers, directors and secretarys. Additionally, to Finance (4), Sales (4), Technical support (2) and Production (2). A total of 20
- A total of 62 2-wire extensions are required.

4.5.2 Implementation

To achieve the above, three basic steps must be taken.

- Assembly of stores.
- Self-Configuration.
- User/Supervisory programming.

4.5.3 Constraints of self-configuration

Physical size of Cabinet (Max of 28 Optional interfaces for C)

Requirement		Optional Interface Positions
4-wire exts 4 Ports per card	20 off	5
2-wire exts 8 Ports per card	62 off	8
External Lines (Exchange) 2 Ports per card	18 off	9
External Lines (DC5/10) 2 Ports per card	2 off	1
Mother board Speech Synthesis	1 off 1 off	1
TOTAL		24

4.5.4 E^2 PROM Constraints

The 12K of E^2 PROM is arranged into three discrete sections.

- Default variables.
- Fixed area for 116 Logical devices.
- Variable data storage for additional information required by certain devices.

The maximum number of devices that can be accommodated is 116. A device is defined as either: Extension, Extension group or line.

For simplicity, the term 'USAGE' may be used. This is therefore defined by taking the device which uses minimum E^2 PROM (32 bytes) and normalising other devices to this datum.

4.5.5 Usage

Type of device	Amount of E^2 PROM used (USAGE)
External line	1
2-wire Extension	0
4-wire Extension	5.75
Extension Groups	1
System repertory dial	34 (100 off 20 digit numbers)

Total store available on default is 265

On self-configuration, system rep dial is inherent and only (265 minus 34) 231 stores are available for use.

	Devices	Usage
4-wire extensions	20	115
2-wire extensions	62	0
Lines 1 to 20	20	20
Extension groups 4	4	4
Total used	106	139
Maximum permissable	116	231
Remainder free	10	96

4.5.6 Installation Procedure

- Insert all the interfaces required and plug in all 4-wire extensions and then initiate self-configuration.
- Complete the installation documentation and hence deduce the extension numbers available for extensions and extension groups.
- Re-arrange lines into line groups and extensions into extension groups.
- Check installation works OK!

4.5.7 System Hardware Allocation

The next available extension number is: 227

1/9	1/8	1/7	1/6	1/5	1/4	1/3	1/2	1/1	1/0	1/-
*159	*151	*143	*139	*135	*131	*127	*"0"	S5102	COMBINED	
*160	*152	*144	*140	*136	*132	*128	*124	CPU	PSU	
*161	*153	*145	*141	*137	*133	*129	*125			
*162	*154	*146	*142	*138	*134	*130	*126			
*163	*155	*147								
*164	*156	*148								
*165	*157	*149								
*166	*158	*150								

2/9	2/8	2/7	2/6	2/5	2/4	2/3	2/2	2/1	2/0	2/-
L9	L7	L5	L3	L1	*199	*191	*183	*175	*167	AC/DC
					*200	*192	*184	*176	*168	PSU
					*201	*193	*185	*177	*169	
L10	L8	L6	L4	L2	*202	*194	*186	*178	*170	
					*203	*195	*187	*179	*171	
					*204	*196	*188	*180	*172	
					*B0	*197	*189	*181	*173	
					*B0	*198	*190	*182	*174	

3/9	3/8	3/7	3/6	3/5	3/4	3/3	3/2	3/1	3/0	3/-
				SPCH	L19	L17	L15	L13	L11	AC/DC
										PSU
					L20	L18	L16	L14	L12	

4.5.8 Exchange Line Table

System external lines

SYSTEM LINE NO.	NATIONAL EXCHANGE LINE NUMBER/ INTER-PBX CIRCUIT NUMBER
1	ANYTOWN 271656
2	271657
3	271658
4	271659
5	271660
6	271661
7	271662
8	271663
9	271664
10	271665
11	271666
12	271667
13	271668
14	271669
15	271670
16	271671
17	271672
18	271673
19	PRIVATE CCT ONE
20	PRIVATE CCT TWO
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	

4.5.9 External Line / Line Group Table

System lines into external line groups (groups 1 - 15)

EXTERNAL LINE GROUP	SYSTEM LINE NUMBERS IN GROUP					
01(ACCESS)	1					
02(ACCESS)	2					
03(ACCESS)	3					
04(ACCESS)	4					
05(9 ACCESS)	5					
06(9 ACCESS)	6					
07(9 ACCESS)	7					
08(9 ACCESS)	8					
09(9 ACCESS)	9					
10(9 ACCESS)	10					
11(9 ACCESS)	11	12	13	14	15	16
12(9 ACCESS)	17					
13(9 ACCESS)	18					
14(9 ACCESS)						
15(9 ACCESS)						

System lines into external groups (groups 17 -31)

EXTERNAL LINE GROUP	SYSTEM LINE NUMBERS IN GROUP					
17(71 ACCESS)	19					
18(72 ACCESS)	20					
19(73 ACCESS)						
20(74 ACCESS)						
21(75 ACCESS)						
22(76 ACCESS)						
23(77 ACCESS)						
24(78 ACCESS)						
25(79 ACCESS)						
26(line key ACCESS)						
27(line key ACCESS)						
28(line key ACCESS)						
29(line key ACCESS)						
30(line key ACCESS)						
31(line key ACCESS)						

4.5.10 External Line Ringing Map

External line ringing map (lines 1 to 32)

LINE NO.	BUSIED	INCOMING EXTERNAL LINE RINGING MAP						
01		124						
02		125						
03				NONE	O/G	ONLY		
04		126						
05				NONE	O/G	ONLY		
06		127						
07		128						
08		129						
09		130						
10		131						
11		0						
12		0						
13		0						
14		0						
15		0						
16		0						
17		132	133	143	144	145	146	147
18		140						
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								

4.5.11 Extension / External Group Access Table

Terminals 123–139 type and external line group access (groups 1 to 15)

TERM NO.	BUSIED	TERM TYPE	CALL BARRING CODE	TERM. PROG LEVEL	ACCESS TO EXTERNAL GROUPS													
					01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
123		OPER													J				
124		4W			J														
125		4W					J												
126		4W							J										
127		4W								J									
128		4W									J								
129		4W										J							
130		4W											J						
131		4W												J	J				
132		4W													J	J			
133		4W													J	J			
134		4W													J				
135		4W													J				
136		4W													J				
137		4W													J				
138		4W													J				
139		4W													J				

Terminals 123 – 139 external line group access (groups 17–31)

TERM NO.	ACCESS TO EXTERNAL LINE GROUPS														
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
123	J	J													
124	J	J													
125	J	J													
126	J	J													
127	J	J													
128	J	J													
129	J	J													
130	J	J													
131	J	J													
132															
133															
134															
135															
136															
137															
138															
139															

Terminals 140 - 156 type and external line group access (groups 1 to 15)

TERM NO.	BUSIED	TERM TYPE	CALL BARRING CODE	TERM. PROG LEVEL	ACCESS TO EXTERNAL GROUPS														
					01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
140		4W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
141		4W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
142		4W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
143		2W			—	—	—	—	—	—	—	—	—	—	J	J	—	—	—
144		2W			—	—	—	—	—	—	—	—	—	—	J	J	—	—	—
145		2W			—	—	—	—	—	—	—	—	—	—	J	J	—	—	—
146		2W			—	—	—	—	—	—	—	—	—	—	J	J	—	—	—
147		2W			—	—	—	—	—	—	—	—	—	—	J	J	—	—	—
148		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
149		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
150		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
151		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
152		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
153		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
154		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
155		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
156		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—

Terminals 140 -156 external line group access (groups 17-31)

TERM NO.	ACCESS TO EXTERNAL LINE GROUPS														
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
140	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
141	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
142	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
143	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
144	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
145	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
146	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
147	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
148	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
149	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
151	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
152	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
153	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
154	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
155	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
156	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Terminals 157 – 173 type and external line group access (groups 1 to 15)

TERM NO.	BUSIED	TERM TYPE	CALL BARRING CODE	TERM. PROG LEVEL	ACCESS TO EXTERNAL GROUPS														
					01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
157		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
158		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
159		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
160		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
161		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
162		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
163		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
164		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
165		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
166		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
167		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
168		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
169		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
170		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
171		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
172		2W			—	—	—	—	—	—	—	—	—	—	J	—	J	—	—
173		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—

Terminals 157 – 173 external line group access (groups 17–31)

TERM NO.	ACCESS TO EXTERNAL LINE GROUPS														
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
157	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
158	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
159	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
160	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
161	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
162	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
163	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
164	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
165	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
166	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
167	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
168	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
169	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
170	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
171	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
172	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
173	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Terminals 174 – 190 type and external line group access (groups 1 to 15)

TERM NO.	BUSIED	TERM TYPE	CALL BARRING CODE	TERM. PROG LEVEL	ACCESS TO EXTERNAL GROUPS														
					01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
174		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
175		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
176		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
177		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
178		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
179		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
180		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
181		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
182		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
183		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
184		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
185		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
186		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
187		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
188		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
189		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—
190		2W			—	—	—	—	—	—	—	—	—	—	J	—	—	—	—

Terminals 174 –190 external line group access (groups 17–31)

TERM NO.	ACCESS TO EXTERNAL LINE GROUPS														
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
174	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
175	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
176	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
177	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
178	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
179	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
180	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
181	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
182	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
183	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
184	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
185	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
186	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
187	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
188	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
189	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
190	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Terminals 191 – 207 type and external line group access (groups 1 to 15)

TERM NO.	BUSIED	TERM TYPE	CALL BARRING CODE	TERM. PROG LEVEL	ACCESS TO EXTERNAL GROUPS														
					01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
191		2W													J				
192		2W													J				
193		2W													J				
194		2W													J				
195		2W													J				
196		2W													J				
197		2W													J				
198		2W													J				
199		2W													J				
200		2W													J				
201		2W													J				
202		2W													J				
203		2W													J				
204															J				
205	J																		
206	J																		
207																			

Terminals 191 – 207 external line group access (groups 17–31)

TERM NO.	ACCESS TO EXTERNAL LINE GROUPS														
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
191															
192															
193															
194															
195															
196															
197															
198															
199															
200															
201															
202															
203															
204															
205															
206															
207															

4.5.12 Extension Group Calling Table

List of devices including dummy terminals

EXTENSION NUMBER	SYSTEM LINE NUMBER	BUSIED OUT
123	OPERATOR	
124	SECRETARY ONE	
125	GENERAL MANAGER	
126	DIRECTOR	
127	SECRETARY TWD	
128	TECH. SUPPORT MANAGER	
129	FINANCE MANAGER	
130	PRODUCTION MANAGER	
131	SALES MANAGER	
132	TECH. SUPPORT 1	
133	2	
134	FINANCE 1	
135	2	
136	3	
137	4	
138	PRODUCTION 1	
139	2	
140	SALES 1	
141	2	
142	3	
143	TECH. SUPPORT 3	
144	4	
145	5	
146	6	
147	PRODUCTION 3	
148	4	
149	5	
150	6	
151	7	
152	8	
153	9	
154	10	
155	11	
156	12	
157	13	
158	SALES 4	
159	5	
160	6	

EXTENSION NUMBER	SYSTEM LINE NUMBER	BUSIED OUT
161	SALES 7	
162	8	
163	9	
164	10	
165	11	
166	12	
167	13	
168	14	
169	15	
170	16	
171	17	
172	18	
173	GENERAL 1	
174	2	
175	3	
176	4	
177	5	
178	6	
179	7	
180	8	
181	9	
182	10	
183	11	
184	12	
185	13	
186	14	
187	15	
188	16	
189	17	
190	18	
191	19	
192	20	
193	21	
194	22	
195	23	
196	24	
197	25	
198	26	
199	27	
200	28	

EXTENSION NUMBER	SYSTEM LINE NUMBER	BUSIED OUT
201	GENERAL 29	
201	29	
202	30	
203	31	
204	32	
205		✓
206		✓
207	ANYTOWN 271656	
208	271657	
209	271658	
210	271659	
211	271660	
212	271661	
213	271662	
214	271663	
215	271664	
216	271665	
217	271666	
218	271667	
219	271668	
220	271669	
221	271670	
222	271671	
223	271672	
224	271673	
225	PRIVATE CIRCUIT ONE	
226	PRIVATE CIRCUIT TWO	
227	TECH SUPPORT GRP	
228	FINANCE GRP	
229	SALES GRP	
230	PRODUCTION GRP	
231	GENERAL GRP	
232		
233		
234		
235		
236		
237		

4.5.13 Night Service Table

Night service extensions

	EXTENSION NUMBER		EXTENSION NUMBER
1	0	21	156
2	124	22	157
3	127	23	173
4	132	24	
5	133	25	
6	138	26	
7	139	27	
8	143	28	
9	144	29	
10	145	30	
11	146	31	
12	147	32	
13	148	33	
14	149	34	
15	150	35	
16	151	36	
17	152	37	
18	153	38	
19	154	39	
20	155	40	

4.6 INTERACTIVE PROGRAM FOR CONFIGURING A PENTARA SYSTEM

The interactive program used to configure the customer discs and load and recover the database from the system is called the Herald Documentation System (HDS).

HDS offers certain options which are **not** available from self-configuration. i.e.:

- **Prime Line Answering:**
  Lines answered "off hook" even though they may appear on ANSWER EXTERNAL, LINE or LINE GROUP keys.
- **Repertory Dial Blocks:**
  Up to 2 of the following 3 blocks can be allocated per terminal - keypad, 1st block of 12 function keys, 2nd block of 12 function keys.
- **Internal Digit Barring:**
  Permits specific extensions to be barred a combination of leading digits.
- **Call Barring:**
  Enables call barring template files to be merged into a customer's database.
- **Call Logging:**
  It is possible to edit the variables described in Section 3.2.8
- **Route Barring:**
  For I/C and O/G call connections.
- **Manual Private Circuit Working:**
  An incoming private circuit can be made to ring a predetermined set of extensions as soon as it is seized.
- **Altering the Numbering Scheme**
  The numbering scheme can be amended to meet specific needs of customers.

The HDS program is Menu driven and the information is displayed such that an Operator will have a regional as well as local awareness of system variables (H3S allowed only a limited local awareness). The operator is presented with a concise menu which will either:

- offer him various options such as: create, or edit a database.
- or will simultaneously display an exhaustive list of variables, each associated with an alpha numeric character on the extreme left hand side of the VDU.

The operator will select which data to edit by keying its associated alpha numeric character and the VDU screen prompt will then display the variable to be edited.

The operator is compelled to enter data which is absolutely essential for correct operating procedure, but there is no compulsion to enter non-essential data.

Due to changes in the operation of the main exchange software, and a HDS 'copy' (allowing for example data entered regarding signalling parameters of one line to be copied to a selection of other lines) and powerful delete facility, a considerable decrease in the time taken to input the data necessary to configure or edit a customer disc has been effected.

The six phases of the HDS program are listed below.

Phase 1	Create/Edit a self configuring system.
Phase 2	Create and Edit a Customised Database.
Phase 3	Edit Call Logging Options.
Phase 4	Documentation Printout.
Phase 5	Transfer and Utilities.
Phase 6	Barcode Editor.
Phase 7	Numbering Scheme Editor.

A summary of these phases follows. A training course (E2-0-120) in the use of HDS is available.

4.6.1 HDS Phase I For Self Configured Exchanges

By implication, the HDS program does not need to communicate with the exchange to produce a self configured and operational exchange.
The HDS program for Self Configuration is contained within Phase One and the operator need only input data regarding:

- Total number and types of telephones.
- Total number and types of external lines.
- Number and type of ASU Cards available for use.
- HDS will then produce a printout of data regarding all lines and extensions.
- History records where input.
- Assembly instructions.
- Stores list and requisitions.
- Wiring schedule.

4.6.2 HDS Phase II - Create And Edit

This program enables a database to be configured which exploits the full potential of a hybrid installation.

Create
This option enables the operator to create a customised database which may be configured to rules which are too complicated to be inherent in the self configuration or self programming routines. For example: call barring, call logging, individual repertory dial blocks and prime line answering points.

Edit
This program enables the operator to fully edit any da tabase which exists (a) as a customer disc or (b) resident within the system which and may be copied/transferred out as necessary.

Other options available to the operator during phase two create or edit are:

- Merge in New Database Template file.
- Merge in New Numbering Scheme Template file.
- Merge in New Call Barring.

After an Edit or Create of a customer's disc, it will be possible to create/edit further discs or return to the operating system and load another phase of HDS.

4.6.3 HDS Phase III – Call Logging / Route Barring

This program will allow a customer's disc to have information for selective call logging and a route barring matrix edited.

4.6.4 HDS Phase IV–Printout

This program is used to produce the documentation printout for phase one, two or three of HDS.

4.6.5 HDS Phase V – Transfer

Phase five contains the programs to 'transfer to' and 'transfer from' the exchange. This enables an exchange to be loaded remotely with a customer's database stored on disc. 'Transfer from' enables a database to be sucked out of an exchange and stored on disc.

The 'Recovery' program enables a database to be sucked from an exchange and subsequently edited, even when the original customer disc has been lost.

4.6.6 HDS Phase VI – Bar Code Editor

This enables a Bar Code template file to be created, edited or printed out. Template files previously created for Herald by H3S can be used for Pentara.

4.6.7 HDS Phase VII–Number Scheme Editor

This program enables the numbering scheme to be edited to suit individual customers needs.

4.6.8 Hardware

The original Rair Black Box which runs H3S, requires a modification to incorporate an additional 192K RAM which is configured as a virtual disc (drive C) in order to run HDS. This upgrade is controlled by BTE/Business Systems SS2.4.1(BT Spec MERLIN SE21105/AJ). The majority of the HDS program reside, if necessary in this drive thus in many instances, releasing the two physical drives for customer discs.

All H3S programs with the exception of utilities will run transparently on the upgraded machines. A new utilities disc is issued whenever a RAIR BLACK BOX is upgraded. Any CP/M discs below CP/M 2–2 should be FCOPY'd before running on the virtual disc machine. The virtual disc machine uses CP/M 2–2l which is the Digital Research CP/M 2–2 with British Telecom customisation to British Telecom Specification MERLIN/SE 2.1.105/AJ. CP/M is the registered trademark of Digital Research Inc..

In addition to the RAIR BLACK BOX, HDS supports the same VDU, keyboard and printers as used by H3S.

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