SM40
Sound Distribution System

Instructions for use

Eng

LBB 1350/30

Philips
Communication &
Security Systems

PHILIPS

IMPORTANT SAFETY INSTRUCTIONS

1. Read instructions - All the safety and Instructions for use should be read before the system is operated.

2. Retain instructions - The safety and instructions for use should be retained for future reference.

3 Heed warnings -All warnings on the unit and in the operating instructions should be adhered to.

4. Follow instructions - All operating and instructions for use should be followed.

5. Cleaning - Unplug system units from the mains outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

6. Attachments - Do not use attachments not recommended by the product manufacture as they may cause hazards.

7. Water and Moisture - Do not use this unit near water for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, near a swimming pool, in an unprotected outdoor installation, or any area which is classified as a wet location.

8. Accessories - Do not place this unit on an unstable stand, tripod, bracket, or mount. The unit may fall, causing serious injury to a person and serious damage to the unit. Use only with a stand, tripod, bracket, or mount recommended by the manufacturer, or sold with the product. Any mounting of the unit should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

   An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

9. Ventilation - Openings in the enclosure, if any, are provided for ventilation and to ensure reliable operation of the unit and to protect it from overheating. These openings must not be blocked or covered. The unit should not be placed in a built-in installation unless proper ventilation is provided or the manufacturers instructions have been adhered to.

10. Power sources - Units should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply you plan to use, consult your appliance dealer or local power company. For units intended to operate from battery power, or other sources, refer to the instructions for use.

11. Grounding or polarization - This unit may be equipped with a polarized alternating current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug still does not fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
    Alternatively, this unit may be equipped with a 3-wire grounding type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

12. Power-Cord Protection - Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles, and the point where they exit from the appliance.

13. Overloading - Do not overload outlets and extension cords as this can result in a risk of fire or electrical shock.

14. Object and Liquid Entry - Never push objects of any kind into this unit through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the unit.

15. Servicing - Do not attempt to service this unit yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

16. Damage Requiring Service - Unplug the unit from the outlet and refer servicing to qualified service personnel under the following conditions:
    a. When the power-supply cord or plug is damaged.
    b. If liquid has been spilt, or objects have fallen into the unit
    c. If the unit has been exposed to rain or water.
    d. If the unit does not operate normally by following the instructions for use. Adjust only those controls that are covered by the instructions for use, as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the units to their normal operation.
    e. If the unit has been dropped or the units has been damaged.
    f. When the unit exhibits a distinct change in performance - this indicates a need for service.

17. Replacement Parts - When replacement parts are required be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.

18. Safety Check - Upon completion of any service or repairs to the units, ask the service technician to perform safety checks to determine that the unit is in proper operating condition.

19. Coax Grounding - If an outside cable system is connected to the unit, be sure the cable is grounded, U.S.A. models only - Section 810 of the National Electrical Code, ANSI/NFPA No.70-1981, provides information with respect to proper grounding of the mount and supporting structure, grounding of the coax to a discharge unit, size of grounding conductors, location of discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
20. Lightning - For added protection of the units during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the cable system. This will prevent damage to the unit due to lightning and power-line surges.

FCC and ICES INFORMATION
(U.S.A and Canadian Models only)

WARNINGS - This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules and ICES-003 of Industry Canada. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Intentional or unintentional changes or modifications not expressly approved by the party responsible for compliance shall not be made. Any such changes or modifications could void the user's authority to operate the equipment.

If necessary, the user should consult the dealer or an experienced radio/television technician for corrective action. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

SAFETY PRECAUTIONS

CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT OPEN COVERS. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This label may appear on the bottom of the unit due to space limitations.

The lightning flash with an arrowhead symbol, with an equilateral triangle, is intended to alert the user to the presence of uninsulated 'dangerous voltage' within the products enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation mark within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Warning: To prevent fire or shock hazard, do not expose units not specifically designed for outdoor use to rain or moisture.

Attention: Installation should be performed by qualified service personnel only in accordance with the National Electrical Code or applicable local codes.

Power Disconnect: Units with or without ON-OFF switches have power supplied to the unit whenever the power cord is inserted into the power source; however, the unit is operational only when the ON-OFF switch is in the ON position. The power cord is the main power disconnect for all units.

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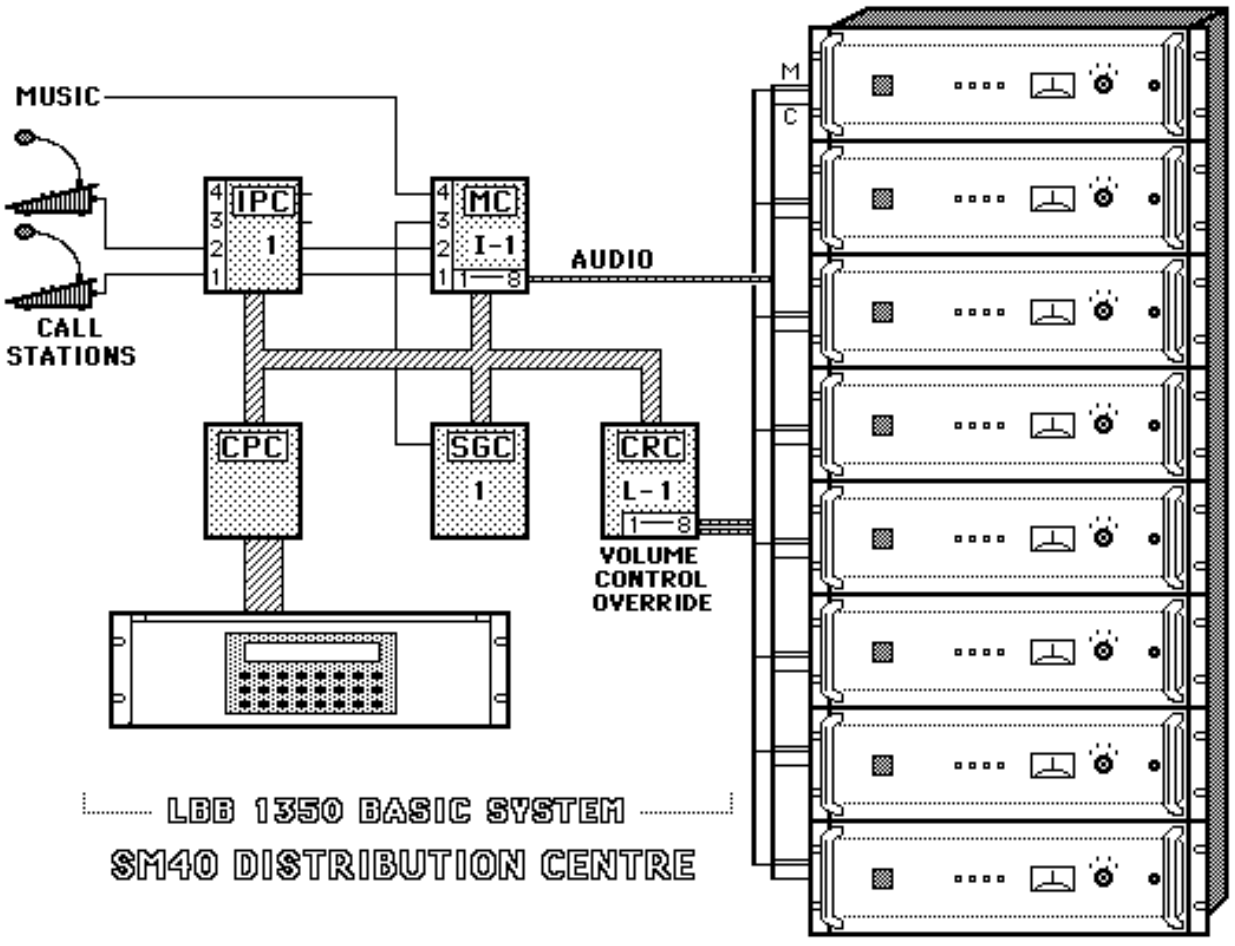

SM40 PUBLIC ADDRESS DISTRIBUTION SYSTEM

ABBREVIATIONS USED IN SM40 DOCUMENTS

INPUT SOURCES

CST = Call STation
AST = Alarm STation
ECS = Extended Call Station
MCS = Master Call Station
BMS = Background Music Source

PRINTED CIRCUIT BOARDS

MAP = Micr. Amplifier Pcb
KSP = Key Sensing Pcb
KCP = Key Confirmation Pcb
CMP = Communication Pcb
MTB = Matrix Termination Board
RTB = Relay Termination Board

SM40 EURO-CARDS

IPC = In Put Card 4 channels
CPC = Central Processor Card
SGC = Signal Generator Card
MC = Matrix Card 4in/8out
CRC = Control Relay Card
TCC = Tone Control Card 4 channels
SPC = Signal Processor Card
AVC = Autom. Volume Control 2 ch.
DMC = Digital Message Card
SSC = MSC = MMSC = Switch Card

I/O = CMP+ Bracket +Connector

1 GENERAL INTRODUCTION AND OPERATING PRINCIPLES

11 Introduction

To meet the demand for a comprehensive public address distribution system, a new concept, built around 19 inch rack mounted Euro card circuit boards, has been developed.

Being controlled by a microprocessor, the system is particularly flexible, specific functions being easily programmed and changed by non technical personnel. In order to meet differing application needs a variety of circuit cards are available and a wide range of system configurations are possible.

The total public address distribution system comprises:
Call stations; a 19 inch rack unit, containing a microprocessor controlled SM40 centre; and SQ45 power amplifiers. These in turn feed loudspeakers located in geographical and/or functional zones where people must be reached with background music, announcements alarm signals and evacuation messages

The SM40 Distribution centre is fed by professional microphones mounted on Call Stations. Each Call station contains up to 10 user keys, which can be programmed to route the microphone calls, digitally stored messages, attention tones or alarm signals to one or several power amplifiers.

Because the SM4O centre is designed to handle many different commands simultaneously, a system of priorities has been developed to cope with conflict situations. A person attempting to call a zone already being called by someone with a higher priority will not be switched through, and is warned by a red (busy) LED mounted on the Call station. If the zone is clear to call, or is being called by a station with a lower priority, a green (talk) LED is illuminated and any lower priority calls are overridden.

All wiring in the SM40 system is particularly installer friendly. Two core screened microphone cable is used between call stations and central racks, and standard loudspeaker cable between power amplifiers and loudspeakers.

The basic (starter) system, LBB 1350, which can be fed by a maximum of 3 call stations, comprises:
1x Input Card; 1x Central Processing Card; the Display and Keyboard (which is mounted on the front panel); 1x Signal Generator Card; 1x Matrix Card; 1x Control Relay Card; 1x power supply; plus 1x Interconnection Board and 3x Termination Boards; tested and mounted in a 19 inch rack frame. The basic system is capable of controlling 8 amplifiers to feed a maximum of 8 loudspeaker zones.

The single 19 inch rack frame, capable of holding 10 circuit cards, has enough room to accommodate the basic system plus 5 extra cards. Adding these cards expands the basic system, enabling it to be fed by additional Call Stations and auxiliary inputs, and to feed more amplifiers.

When a system's requirements exceed the space offered in a single rack frame, SM40 Extension Frame LBB 1360 is available. This comprises: 1x power supply; 1x Interconnection Board; and 5x Termination Boards; tested and mounted in a 19 inch rack frame. 10 SM40 circuit cards fit into each Extension Frame, and these frames can be linked together to expand the system.

In a maximum configuration, the distribution centre can accept (via a 16 x 64 matrix) up to 16 audio inputs to feed up to 64 individual amplifier inputs, or (via a 32 x 32 matrix) up to 32 audio inputs to feed up to 32 amplifiers. The basic system is expandable to a maximum of:

- 8 Input Cards,
- 32 Matrix Cards,
- 16 Control Relay Cards (128 make and break contacts).
- 16 Digital Message Cards,
- 8 Signal Generator Cards

Plus associated:

- Tone Control Cards,
- Automatic Volume Control Cards,
- Signal Processing Cards.

Background music can be supplied by a background music player or from a radio tuner, compact disc player, cassette deck, etc..

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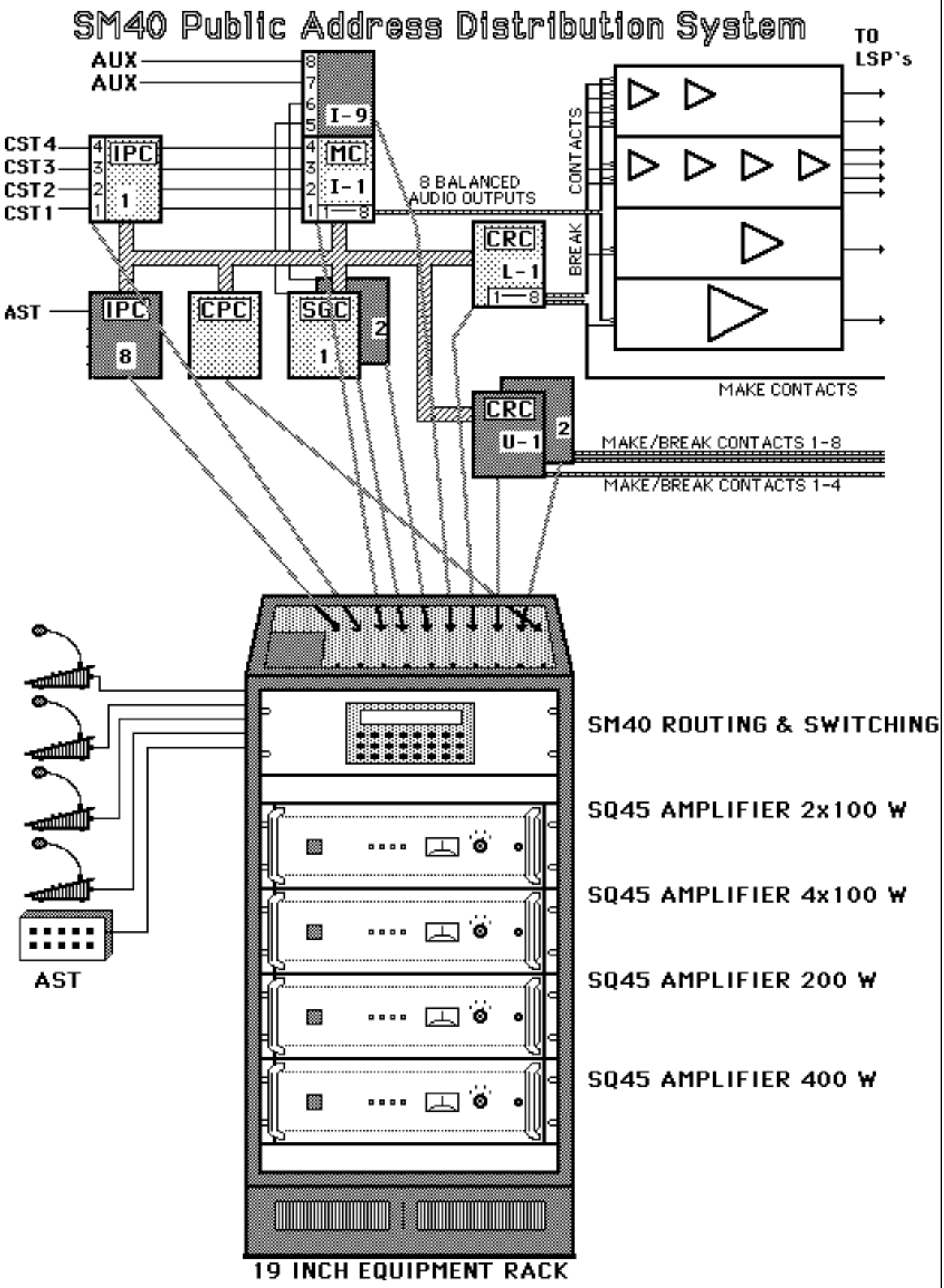

SM40 Public Address Distribution System
TO LSP's
AUX
AUX
I-9
CST4
CST3
CST2
CST1
IPC
1
MC
I-1
8 BALANCED AUDIO OUTPUTS
CONTACTS
BREAK
CRC
L-1
AST
IPC
8
CPC
SGC
1
2
MAKE CONTACTS
CRC
U-1
2
MAKE/BREAK CONTACTS 1-8
MAKE/BREAK CONTACTS 1-4
SM40 ROUTING & SWITCHING
SQ45 AMPLIFIER 2x100 W
SQ45 AMPLIFIER 4x100 W
SQ45 AMPLIFIER 200 W
SQ45 AMPLIFIER 400 W
AST
19 INCH EQUIPMENT RACK

1. GENERAL INTRODUCTION AND OPERATING PRINCIPLES

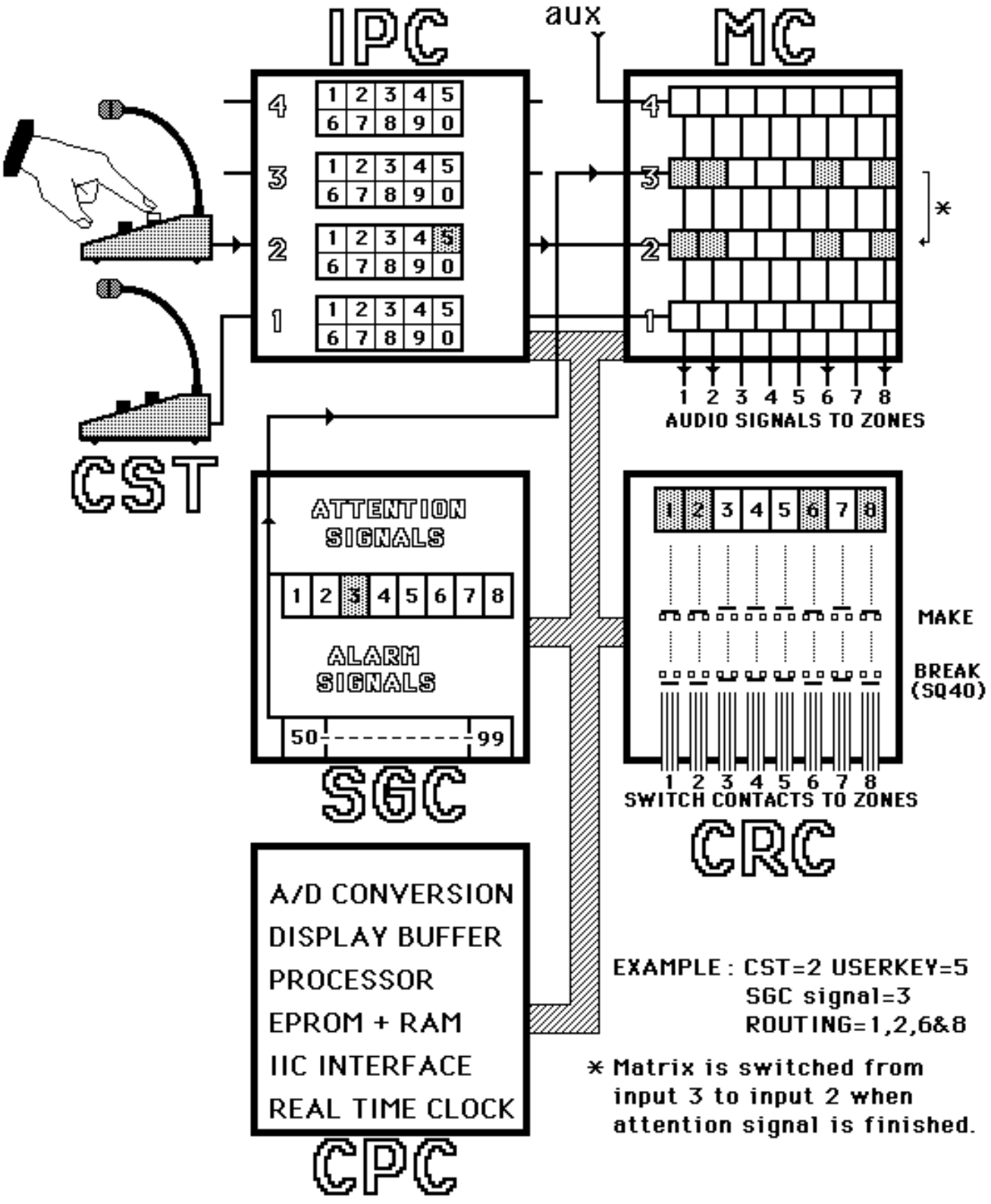
The system, being capable of handling several different signals at the same time, is also ideally suited to situations where a number of music sources are fed to the same loudspeaker location simultaneously. Typical applications are hospitals, hotels and nursing homes, where it is required that a choice of music channels are selectable at each individual loudspeaker cabinet.

Various timer facilities allow tones, recorded messages, and music to be both switched in and routed at specific times of the day. Days of the week are also selectable.

An ambient noise dependent volume control function is available for installations where continually changing background noise levels are a problem (e.g. airports, sport stadiums).

As an optional extra, an I/O -PCB is available, which allows the SM40 system to be coupled to a personal computer via a standard RS232 serial interface. Depending on the software applied the computer can be used in the 'active' or 'passive' mode. In the passive mode you can read or record the static information (system configuration, sources connected) and the 'dynamic' information (call logging, auxiliary routing, failure information). In the 'active' mode you can use the computer for up/down loading of the programme, to program the matrix, or even to operate as a Call station or Master Call station.

Because of their integral music/announcement relays, SQ45 amplifiers are ideally matched to the SM40 centre. During an announcement the preset music level can be automatically overridden, while the announcement itself comes through at the normal level.


IPC
aux
MC
4
3
2
1
1 2 3 4 5
6 7 8 9 0
*
1 2 3 4 5 6 7 8
AUDIO SIGNALS TO ZONES
CST
ATTENTION SIGNALS
1 2 3 4 5 6 7 8
ALARM SIGNALS
50 99
SGC
MAKE
BREAK (SQ40)
SWITCH CONTACTS TO ZONES
CRC
A/D CONVERSION
DISPLAY BUFFER
PROCESSOR
EPROM + RAM
IIC INTERFACE
REAL TIME CLOCK
CPC
EXAMPLE : CST=2 USERKEY=5
SGC signal=3
ROUTING=1,2,6&8
* Matrix is switched from input 3 to input 2 when attention signal is finished.

1.2 OPERATION PRINCIPLES

The SM40 Public Address Distribution Centre is easy to use and logical in its operation, it is helpful however to understand, in principle, how the system works.

Herewith a typical series of actions, initiated by the operator, and carried out by the system:

1. User Key on Call Station (CST) is pushed (see Chapter 5.12).

2. Central Processor Card (CPC), which is continuously scanning the system, monitors which User Key on which CST is being pressed. It then puts into effect a list of orders it was given at its programming stage (see Chapter 4.1).

3. First it looks to see which amplifier input, or inputs, our User Key is routed to (see Chapters 4.3.1, 5.3 and 5.12)

4. Then it makes sure that no other Call Station is currently calling that same input (see Chapter 5.12). If the requested loudspeaker zone is already being called, the CPC checks which priority rating each User Key has been given, and if the original caller has a lower priority than the Key being pushed, its call will be muted and overridden by the new caller.
   If the Key being pushed has the same, or a lower priority than the original Key, its call will be ignored, and a 'BUSY' LED mounted on the Call station illuminates to advise that the call has not gone through.

5. If all is clear the CPC checks which attention tone and/or pre-recorded message has been programmed to precede an announcement originating from our User Key, then it switches on the Signal Generator Card; selects a tone; activates message(s) from the Digital Message Card(s) (DMC's) and feeds it to the designated amplifier inputs (see Chapters 5.4 and 5.11).

6. Meanwhile it sends an electrical signal, via the IPC, back to the CST which energises a flashing green LED in order to tell the user that the call is going through, but that they will have to wait until the attention signal has finished (see Chapter 5.12).

7. If our key was given an alarm tone it will, dependent on the type of tone, be broadcast either for 1 minute, or until the user key is released.

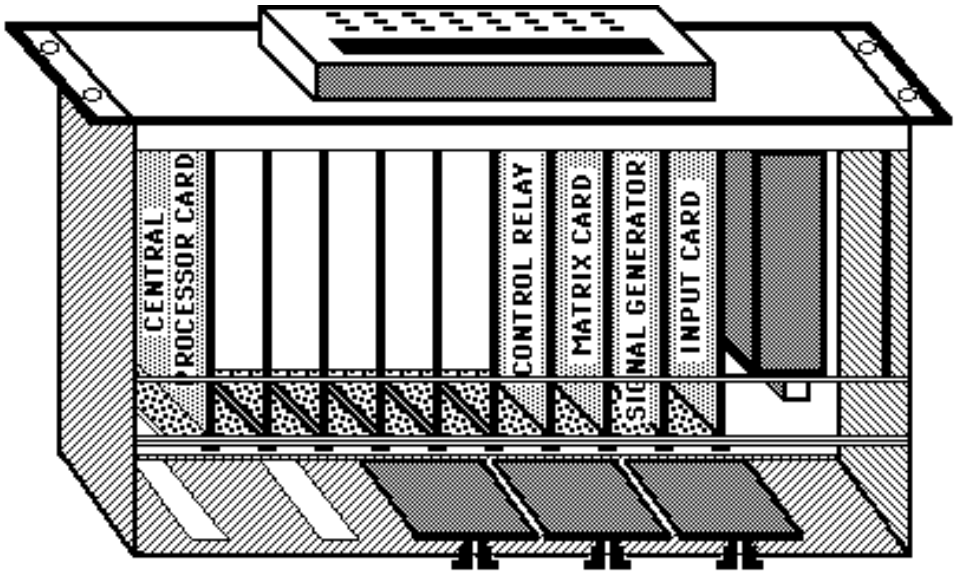
8. The CPC checks, not only to see where the User Key has been routed to, but whether it has been given any special orders regarding what it is to do when it gets there. Normally the CPC will mute any music signal being transmitted to a loudspeaker zone, when an announcement is being broadcast in it.

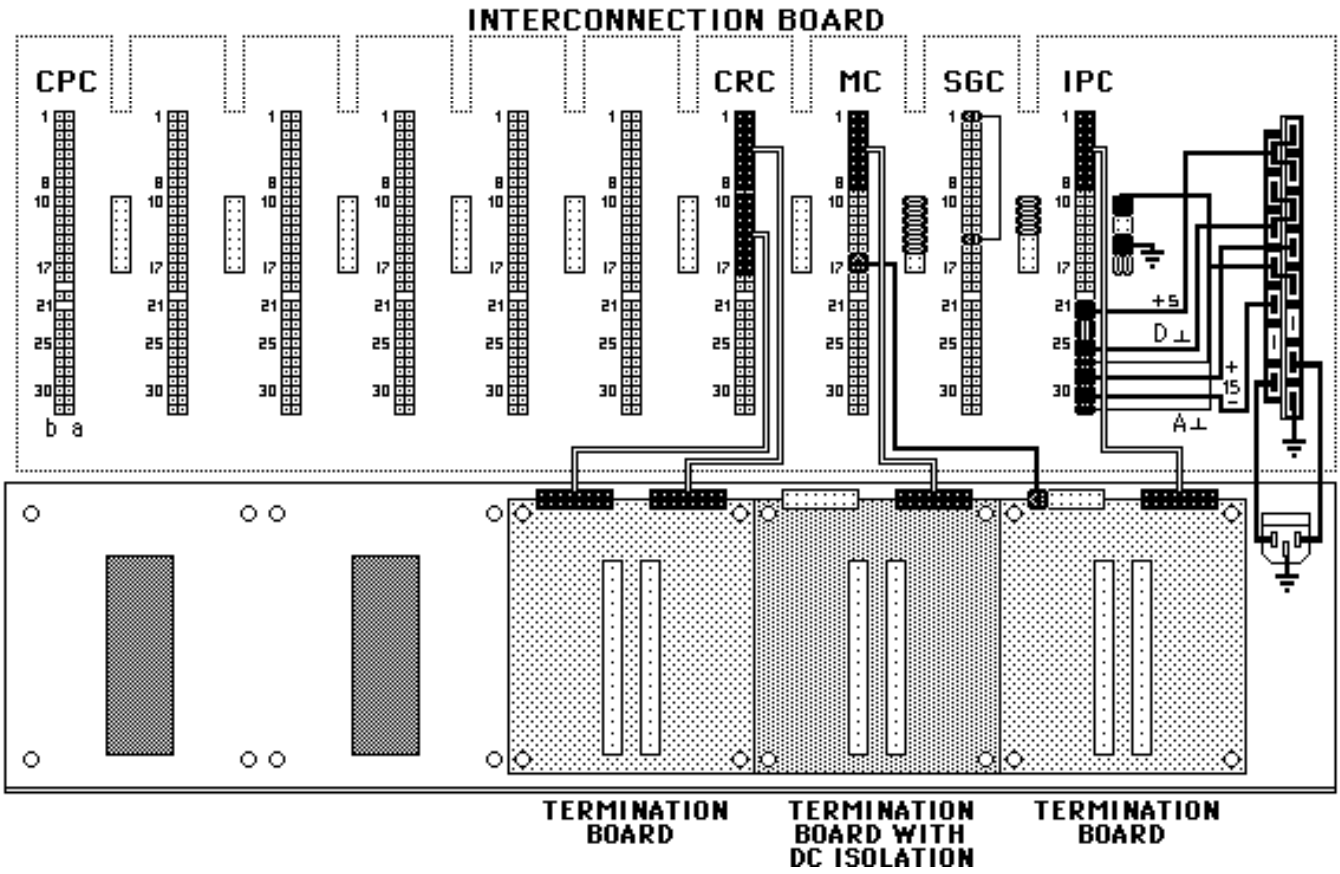
9. In order to allow the announcement and/or signal to come through at full volume, regardless of the volume settings of amplifiers or individual loudspeakers, the CPC switches in a series of corresponding relays mounted on the Control Relay Card(CRC). These in turn activate the volume control override circuits of the SQ45 amplifiers and/or individual volume controls in loudspeakers, or loudspeaker groups (see Chapter 5.6).

10. When the CPC is certain that all is in order, it proceeds to give the message to the Input Card (IPC), which in turn initiates the Call Station (CST) microphone.

11. The amplifier built into the CST amplifies the audio signal to line level, after which it runs through the Input Card (IPC); via the Matrix Cards (MC)s; through Tone Control Cards (TCC)s if fitted; via the Interconnection Board (IB); to the Termination Board (TB); and out to the inputs of the amplifiers; which in turn feed loudspeakers located in geographical or functional zones.

12. When the announcement is completed and the User Key is released, the system returns to its idle mode, with the CPC continually scanning, until another call is made. This whole operation is carried out in less than $^{1}/_{10}{}^{th}$ of a second, giving the user the speed and power necessary to communicate in a clear and efficient manner.





LBB 1350
SM40 Basic System

2. UNPACKING AND INSTALLATION

2.1 Unpacking and Installation

In order to ensure that your SM40 Centre functions properly, please follow these few simple instructions after unpacking your unit.

1. Carefully check the enclosed system components for physical damage caused during shipping. Any complaints should be made immediately to the shipping company.

2. Mount the Basic System frame in the appropriate position in the 19 inch rack unit (not higher than shoulder height, so that the display and keyboard can be clearly seen).

3. Extension Frames are available to expand the Basic System into a larger system. These should now be mounted, and wired according to the appropriate wiring diagrams.

4. Mount the amplifiers and auxiliary equipment in the rack(s). If power amplifiers are mounted beneath SM40 frames, a heat shield should be installed above them to deflect hot air currents.

5. Taking care to avoid earth (ground) loops, wire the mains power to the units.

   SM40 will operate successfully on mains voltages from 187 V to 264 V when tapped for 220 V, and from 90 to 132 V when tapped for 110 V. Be sure to check that your system is wired for the correct mains voltage. Refer to Chapter 2.2 Power Supply Modules.

   Warning: Because it is possible to touch the mains voltage terminals when the frame back panels are opened, it is advisable not to turn the power on at this stage.

6. Open the back panel of the Basic system, and check that all of the connectors on the Interconnection Board and Termination boards are firmly in place. If, in the unlikely event that one of the connectors has become disconnected, refer to the enclosed basic system wiring diagram.

7. Referring to Termination Board illustrations in Chapter 5.2, wire the Call Stations, auxiliary input sources, amplifiers, etc., to the screwblock connectors.

8. Plug the screwblock connectors into the termination boards, ensuring that they are in the correct locations.

9. Open the front panel of the rack frame and gently push each of the circuit cards to make sure that they are all firmly connected to the Interconnection Board.

10. If, after double checking that all of the mains power and signal wiring is correct, and that the system is adequately earthed, switch on the mains power to the rack.

11. The display on the front panel shows:

For installer programming refer to Chapter 4.3.4.

2.2 Power supply Modules

The SM40 Basic System frame LBB 1350 includes a Power Supply Module type SPM 315, and the SM40 Extension frame includes a Power Supply Module type SPM 215. Both modules, with the placement of jumpers (included on delivery) can be configured for use on either 220 - 230 Volts AC, or 110 - 115 V AC.

To ensure that your SM40 frame operates on the correct voltage, refer to the figure opposite and proceed as follows:

WARNING: BEFORE WORKING ON A SYSTEM, READ THE SECTION 'IMPORTANT SAFETY INSTRUCTIONS' FOUND AT THE BEGINNING OF THIS MANUAL. ALWAYS DISCONNECT THE FRAME FROM THE MAINS SUPPLY PRIOR TO WORKING ON THE FRAME ITSELF.

1. SM40 Basic System frame LBB 1350 using Power Supply Module SPM 315

Operation on 110 - 115 V AC

a. Open the front panel of the rack frame, and gently remove the Power Supply Module from its housing.
b. Once the module is removed, unscrew and remove the 2 retaining screws needed to locate the module's printed circuit board. Once removed, carefully slide the top cover plate away from the module itself to reveal the printed circuit board.
c. On the printed circuit board (component side up) locate the jumper circuit (see figure opposite). Using the jumper link(s) delivered with the module, place the jumper as shown.

Operation on 220 - 230 V AC

d. For operation on 220 - 230 V AC (factory setting) DO NOT PLACE the jumper.

2. SM40 Basic Extension frame LBB 1360 using Power Supply Module SPM 215

Operation on 110 - 115 V AC

a. Open the front panel of the rack frame and gently remove the Power Supply Module from its housing.
b. Once the module is removed, unscrew and remove the 8 retaining screws found on top of the modules cover plate, needed to locate the module's printed circuit board. Once removed, carefully slide the top cover plate away from the module itself to reveal the printed circuit board.
c. On the printed circuit board (component side up) locate the jumper circuit (see figure opposite). Using the jumper link(s) delivered with the module, place the three jumper(s) as shown.

Operation on 220 - 230 V AC

d. For operation on 220 - 230 V AC (factory setting) only 1 jumper link is placed (see opposite).

3. General

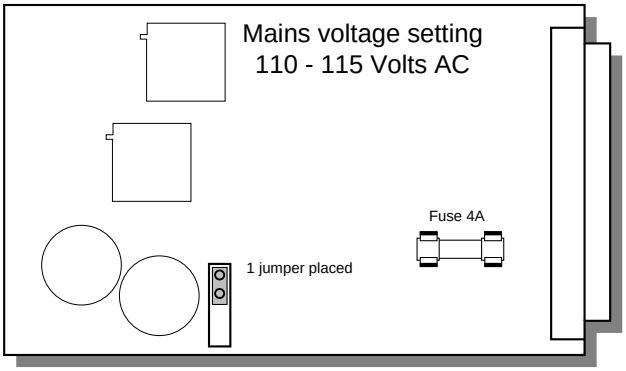
a. The SM40 Basic System frame LBB 1350 and the SM40 Extension frame LBB 1360 are supplied with a 3-core mains cable. The mains cable is terminated with a 2-pole mains plug with earth contacts (or earth pin) for connection to the mains supply, and at the other end with a CEE connector for connection to the mains socket on the rear of the frame. For use in some countries it may be necessary to replace the mains cable with one of a local standard type. The wiring is as follows:
   - Live/brown
   - Neutral/blue
   - Earth/green-yellow

WARNING: THE FRAME MUST BE EARTHED VIA THE MAINS SUPPLY USING THE GREEN/YELLOW WIRE. THE MAINS PLUG MUST BE OF AN EARTHED TYPE.

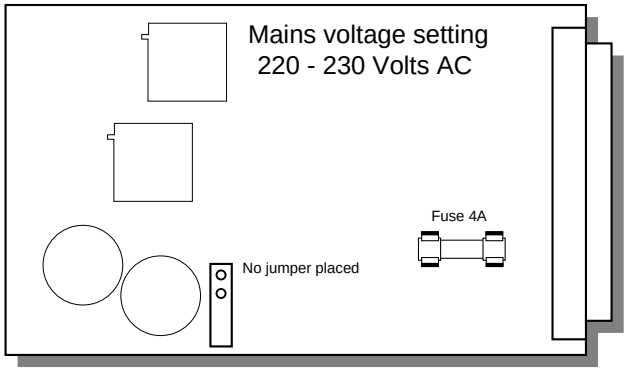
b. Power Supply Module, replacement fuses, are 4 Amps (adaption is not required for alternative voltages).

POWER SUPPLY MODULE FOR SM40 BASIC FRAME LBB 1350

Power Supply Module SPM 315

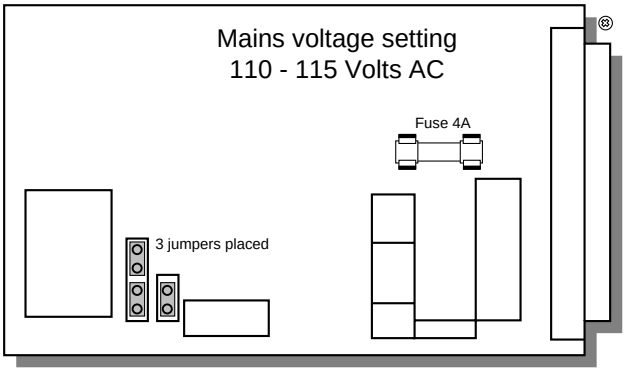


Power Supply Module SPM 315

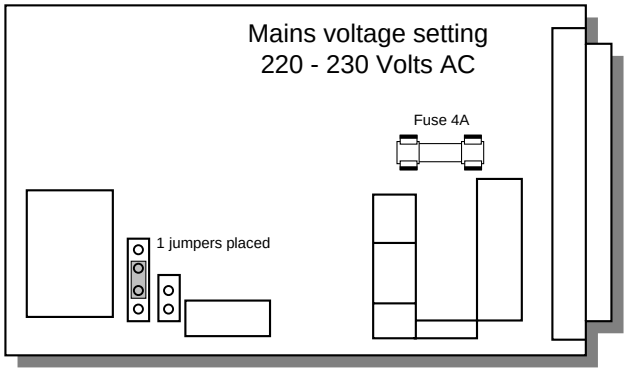


POWER SUPPLY MODULE FOR SM40 EXTENDED MODULE FRAME LBB 1360

Power Supply Module SPM 215



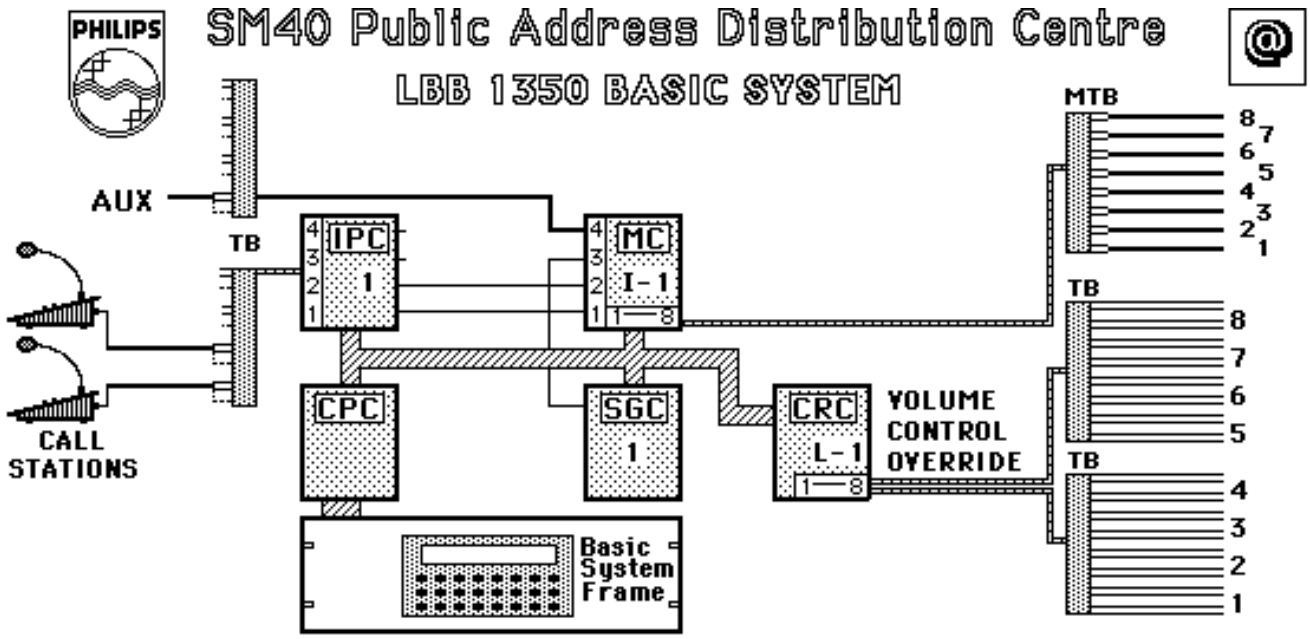
Power Supply Module SPM 215

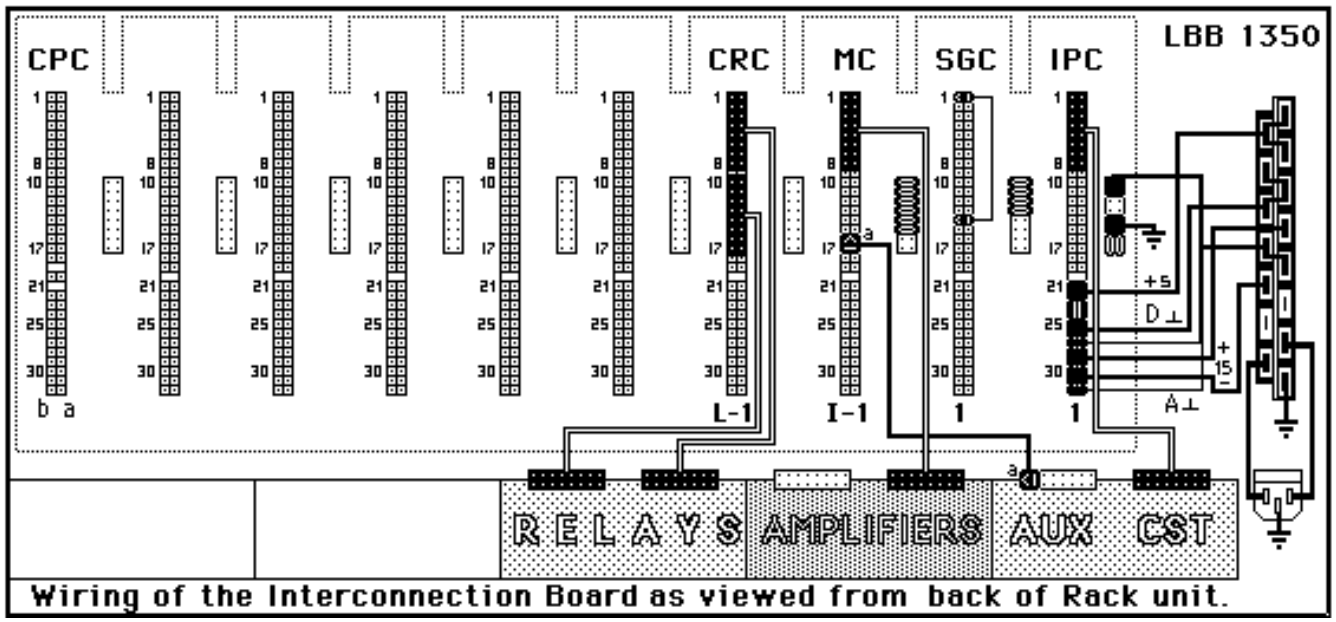


JUMPER PLACEMENT

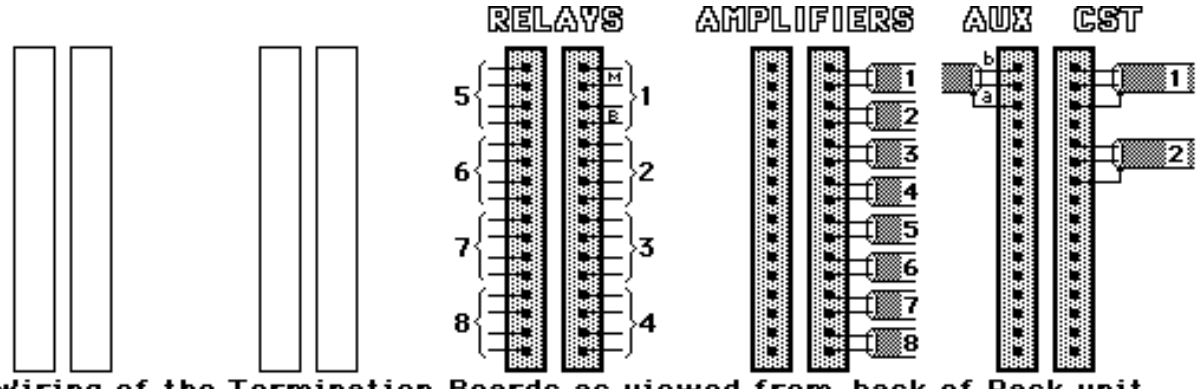

Jumper open


Jumper placed in position





Wiring of the Interconnection Board as viewed from back of Rack unit.



Wiring of the Termination Boards as viewed from back of Rack unit.

3. SM 40 BASIC SYSTEM AND EXTENSION FRAME

3.1 Basic System - BS LBB 1350/30

Self contained, fully operational system, around which all SM40 systems are built. Comprises 5 circuit cards, mounted in a single 19 inch rack frame.

The Basic (starter) System is the heart of the SM40 Public Address Distribution Centre. When supplemented with a variety of Euro-cards and PCB's, a wide range of system configurations are possible, and many different application needs are successfully met.

Containing (along with its other circuit cards) the Central Processor Card (CPC); and the Display and Keyboard; and because it is mounted in a single rack frame; the Basic System is a self contained, fully working unit in its own right.

Being fed by a maximum of 3 Call Stations LBB 9567 (ordered separately), it is capable of controlling 8 amplifiers to feed a maximum of 8 loudspeaker zones.

Because the Basic System is supplied fully wired, adjusted, tested, and mounted in its own 19 inch rack unit, ready for use, it is an ideal model from which to build a larger system.

By running through the Basic System's programming sequence it is easy to understand how the SM40 concept works. Any larger system has merely a greater quantity of Call Stations (CST)s, auxiliary inputs, etc. to program, and is dealt with in exactly the same way.

When a system's requirements exceed the facilities available in the Basic System, further circuit cards (plus the Extension Frames LBB 1360 necessary to accommodate them) are ordered, expanding the system to meet specific application needs.

Units included with Basic System LBB 1350:

1x	Single 19 Inch Rack Frame	
1x	Power Supply +15V/-15V/+5V	
1x IB	Interconnection Board	
2x TB	Termination Boards	LBB 1377/00
1x MTB	Matrix Termination Board	LBB 1371/00
1x DK	Display & Keyboard (mounted on front panel)	
1x CPC	Central Processor Card Distribution System Software	LBB 1352/30
1x CRC	Control Relay Card	LBB 1356/00
1x IPC	Input Card	LBB 1351/00
1x SGC	Signal Generator Card	LBB 1354/00
1x MC	Matrix Card	LBB 1355/00

Optional Euro-Cards:

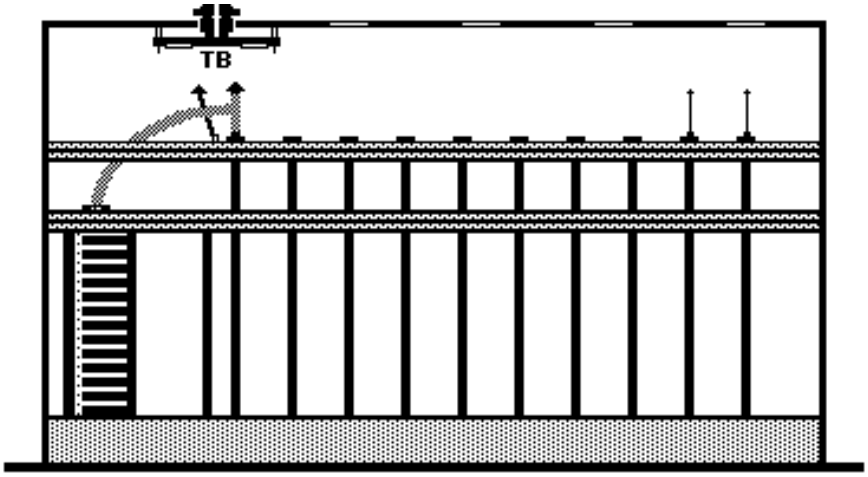
TCC	Tone Control Card	LBB 1357/00
SPC	Signal Processing Card	LBB 1358/00
AVC	Automatic Volume Card	LBB 1359/09, /21, /00
DMC	Digital Message Card	LBB 1378/00
SSC	Surveillance Switch Card	LBB 1374/00
CRC	Control Relay Card	LBB 1356/00
IPC	Input Card	LBB 1351/00
SGC	Signal Generator Card	LBB 1354/00
MC	Matrix Card	LBB 1355/00

Optional PCB's:

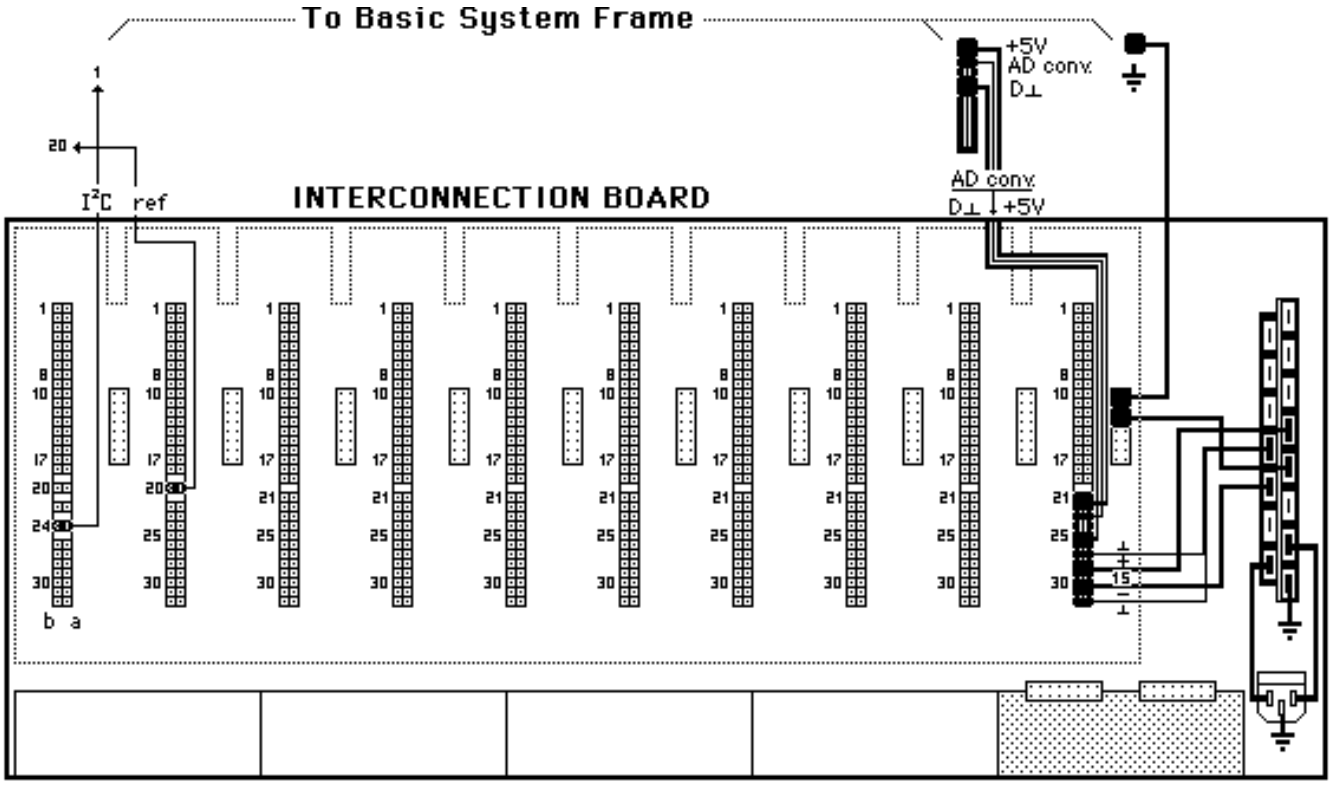
CMP	Communication PCB	LBB 1366/00
I/O	I/O - PCB	LBB 1375/00
MTB	Matrix Termination Board	LBB 1371/00
MAP	Microphone Amp PCB	LBB 1364/00
KSP	Key Sensing PCB	LBB 1363/30
KCP	Key Confirm PCB	LBB 1365/00
TB	Termination Board	LBB 1377/00
RTB	Relay Termination Board	LBB 1379/00

Optional Units:

CST	Call Station (Standard version)	LBB 9567/30
-	Extension Frame	LBB 1360/30



FRONT TOP VIEW



REAR VIEW

LBB 1360
Extension Frame

3.2 Extension Frame - EF LBB 1360/30

Single 19 inch rack frame, capable of holding 10 SM40 circuit cards. Complete with power supply, Interconnection and Termination Boards.

A single rack frame, capable of holding, and interconnecting 10 SM40 circuit cards, has enough room to accommodate the Basic (starter) System, described elsewhere, plus 1x Input Card, 3x Matrix Cards, and 1x Control Relay Card.

When the quantity of cards required in an SM40 system exceeds the amount of space offered in this single rack frame, Extension Frame LBB 1360, is available.

Each Extension frame allows expansion of the system by up to 10 circuit cards, so that a system should be specified as 1x Basic System LBB 1350; plus the extra circuit cards required; plus the quantity of extension frames needed to accommodate those cards.

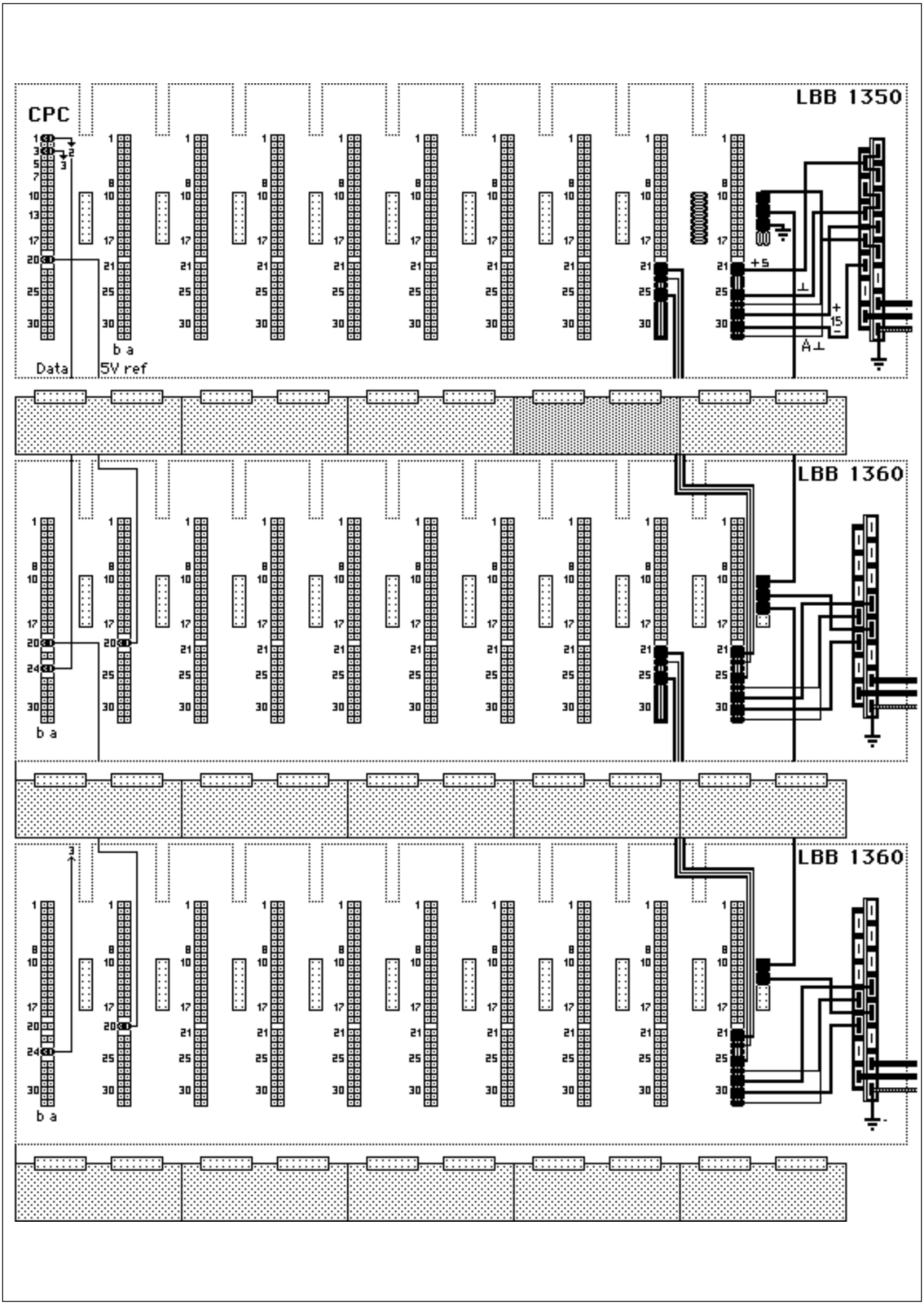
Units included with Extension Frame LBB 1360:

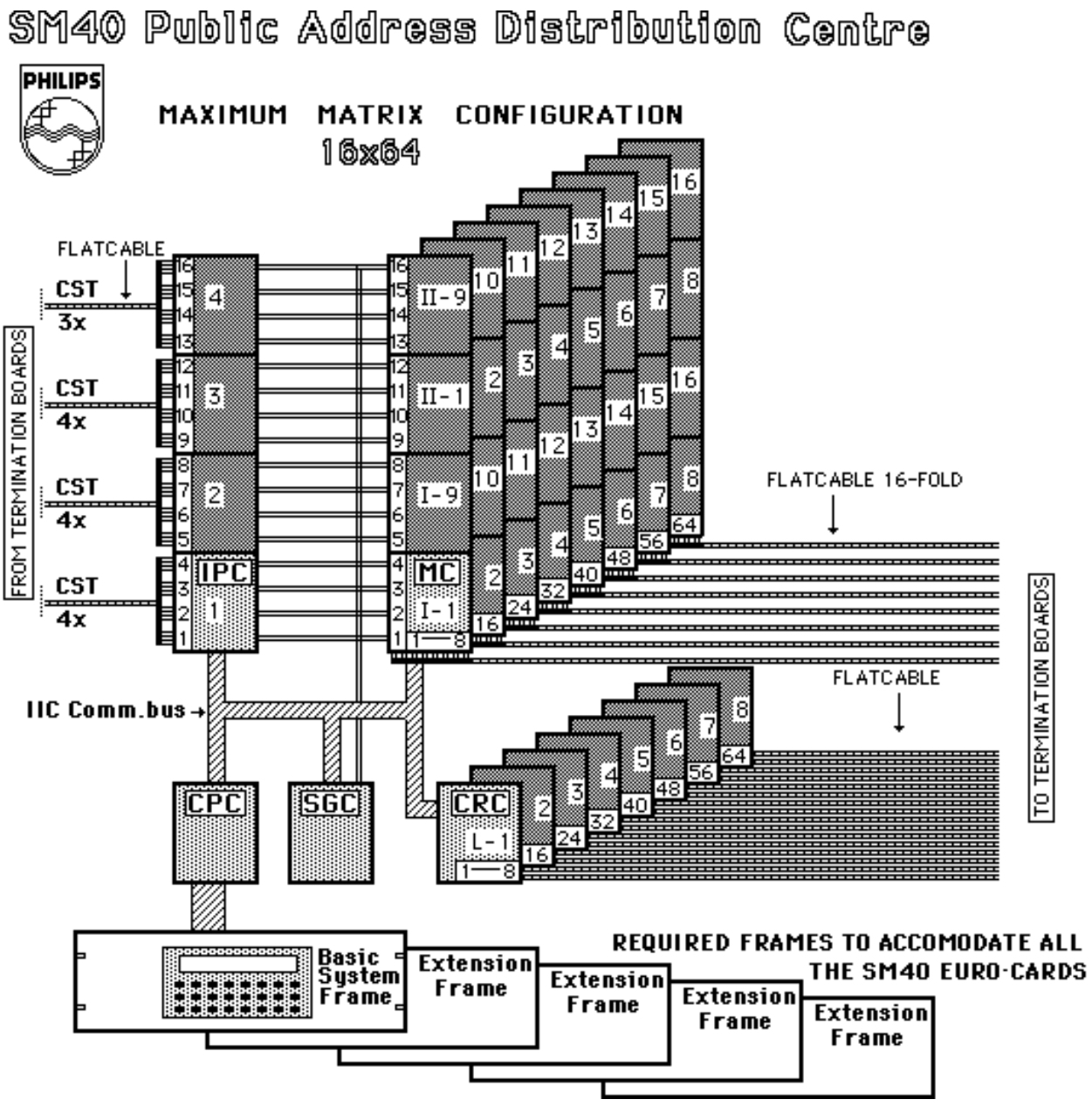
1x	Single 19” rack frame	
1x	Power Supply Unit +15V/ -15V	
1x IB	Interconnection Boards	
1x TB	Termination Boards	LBB 1377/00

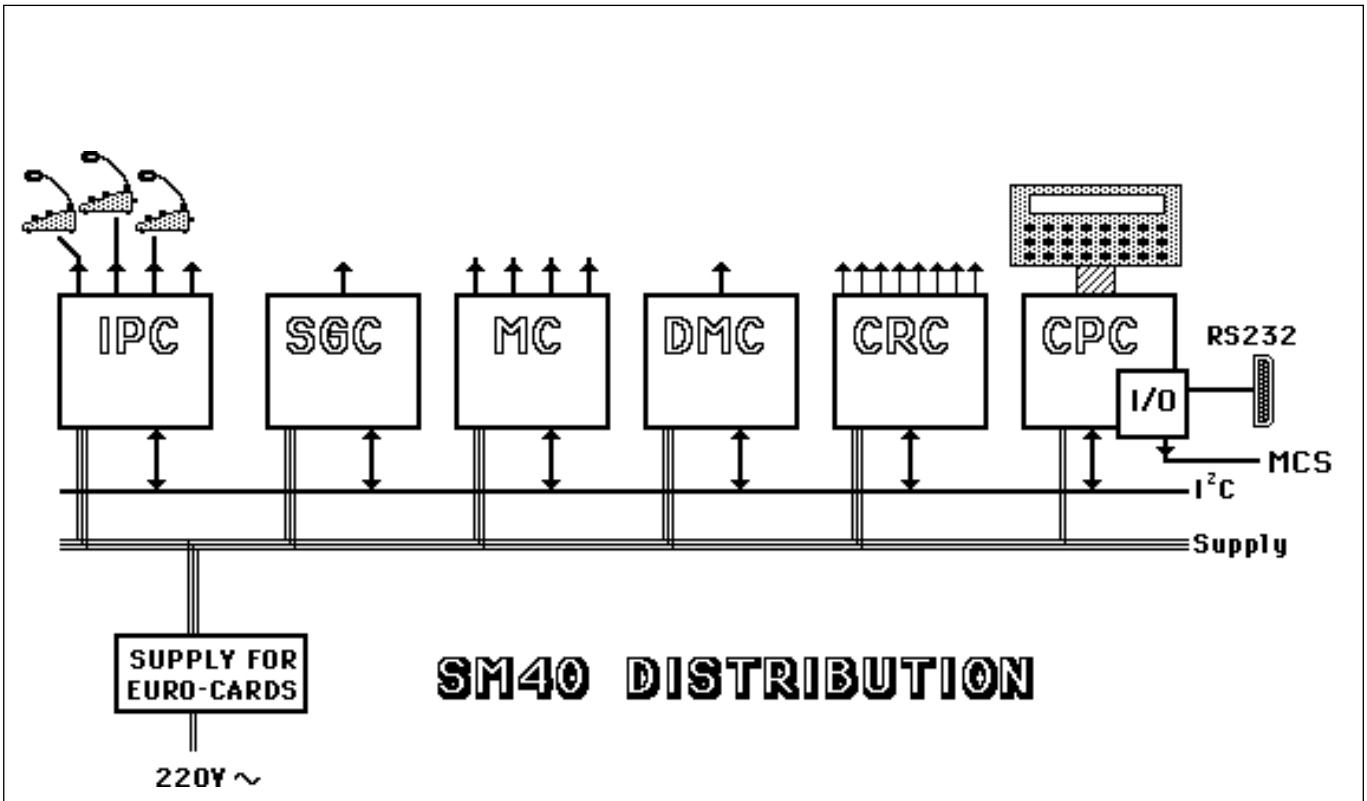
These components, mounted in the 19 inch rack frame, are supplied tested, and wired to accept and power up to 10 SM40 circuit cards.

Note: All circuit cards controlled by the CPC must be mounted in the basic system and the first 7 extension frames. All other cards (TCC, SPC, AVC, etc.) may then be mounted in as many frames as are necessary.

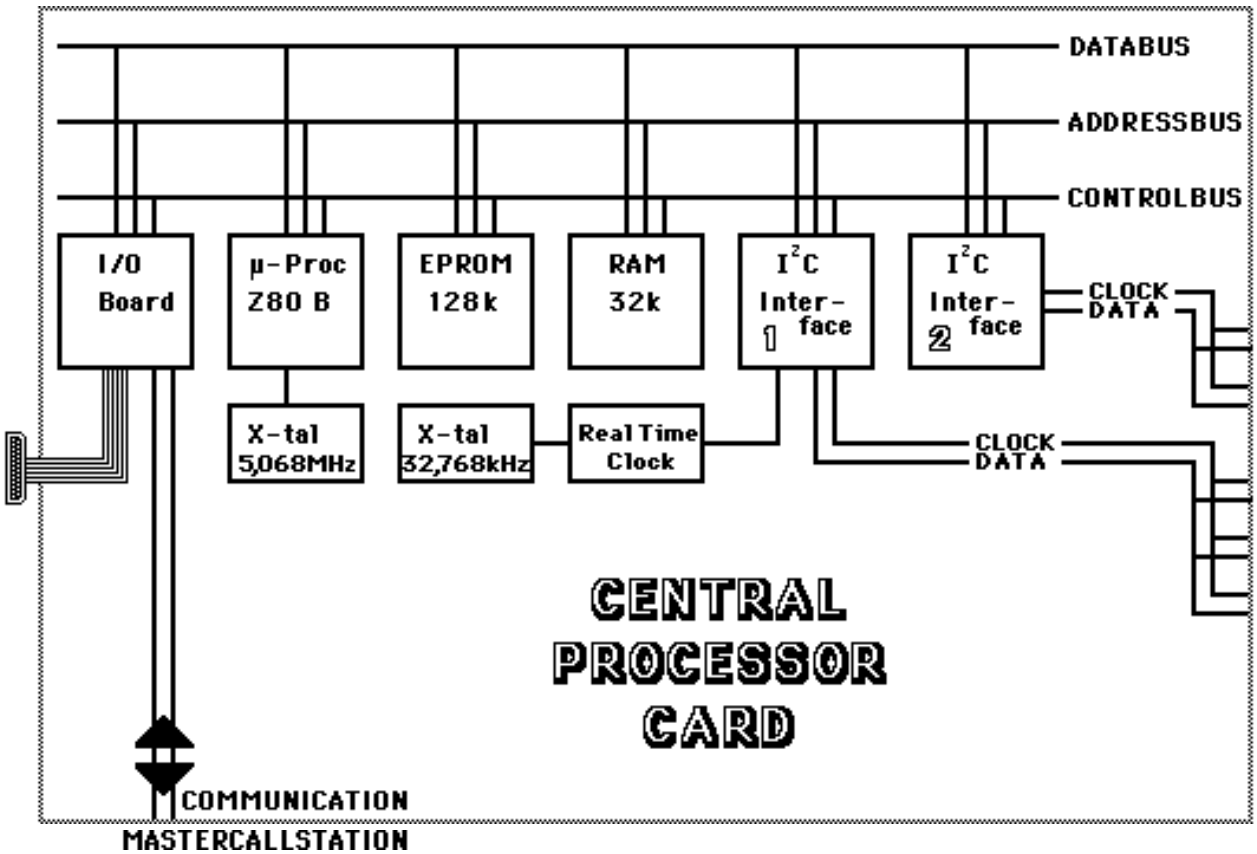
A maximum of 40 cards can be connected to one I^2C bus. The basic frame includes two I^2C busses.


CPC
LBB 1350
Data
5V ref
b a
+5
⊥
+
15
-
A⊥
LBB 1360
b a
LBB 1360
b a


SM40 Public Address Distribution Centre
PHILIPS
MAXIMUM MATRIX CONFIGURATION
16x64
FLATCABLE
CST
3x
CST
4x
CST
4x
CST
4x
FROM TERMINATION BOARDS
IPC
MC
I-1
II-9
II-1
I-9
FLATCABLE 16-FOLD
FLATCABLE
TO TERMINATION BOARDS
IIC Comm.bus
CPC
SGC
CRC
L-1
Basic System Frame
Extension Frame
Extension Frame
Extension Frame
Extension Frame
REQUIRED FRAMES TO ACCOMODATE ALL THE SM40 EURO-CARDS



SM40 DISTRIBUTION



CENTRAL PROCESSOR CARD

4. OPERATING AND PROGRAMMING THE SM40 SYSTEM

4.1 Central Processor Card - CPC

At the heart of the SM40 Public address Distribution System is the Central Processor Card (CPC). Capable of controlling 16 or 32 call stations; 320 user keys; 1024 matrix points; 2 x 128 relays, 16 Digital Message Cards and 8 signal generators; this is a powerful piece of equipment, providing a system of this type with previously unheard of possibilities.

The basic functions of this card are as follows:

DETECTION of call station user keys. Using information given it by the Input Card (IPC), the unit is capable of sensing which user key is being pressed.

ROUTING of microphones and attention signal tones (actuated by user keys), alarm tones, digital messages, background music, etc., via Matrix Card (MC) to amplifiers and loudspeakers located in geographical and/or functional zones.

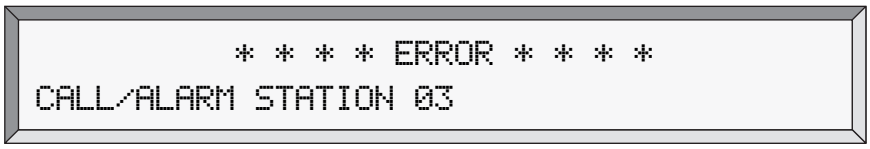
USER KEY PRIORITY level setting. To cope with conflict situations (e.g. when 2 call stations attempt to call the same zones simultaneously) each user key is given a priority level of 0-9, 9 being highest priority.

ATTENTION SIGNAL TONES, are coupled with the user keys so that when a key is pressed the tone will be broadcast before or instead of an announcement. Dependant on their character these tones may also be used as alarm signals or test tones.

DIGITAL MESSAGE CARD control, allows per card up to 7 messages with varying duration up to a maximum of 65 seconds to be recorded, and played back as desired. The maximum number of cards per centre is 16.

SWITCHING of loudspeaker volume control override circuits, and bypassing of the input attenuators in the SQ45 amplifiers, via the Control Relay Card (CRC).
SWITCHING of amplifier outputs for loudspeaker group switching, via 'unlocked' Control Relay Cards.

CHECKING of system hardware. The processor acts as a "watchdog", continuously scanning the SM40 system hardware to check for errors, malfunctions or disconnections. If a problem exists a message is displayed on the lcd screen of the Display & Keyboard; for instance if Call Station 3 is disconnected the message displayed is:



REAL TIME CLOCK is built into the unit, and is displayed, giving date, hours and minutes. A timer facility is coupled to the clock, making it possible to switch on and route tones, recorded messages and music at specific times of the day, or week.

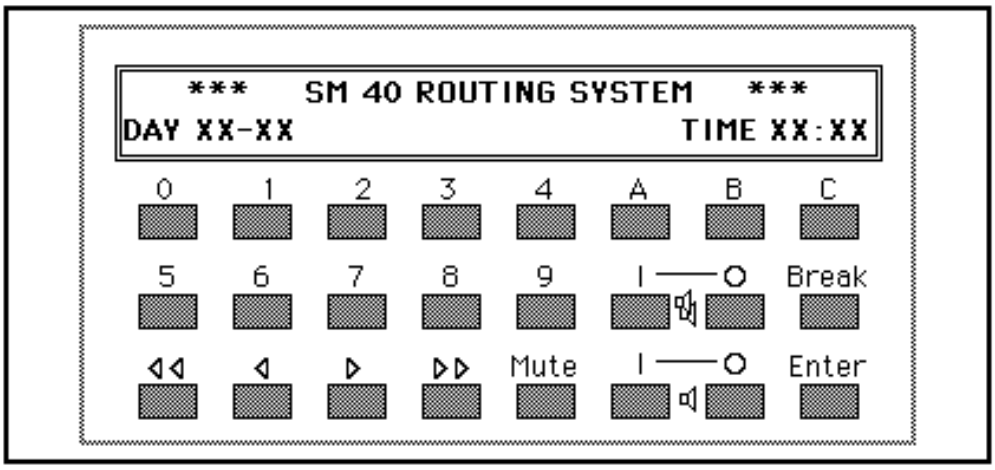
A yellow LED, mounted on the front edge of the (CPC) card advises that the unit is running with the rest of the SM40 system, and 1 green LED indicates that adequate supply voltage is present.

A Display & Keyboard mounted on the rack unit's front panel, is used to carry out installer and user programming as listed above. When programming is complete, the unit returns to its idle mode and, until a secret password is entered it has no influence on the processor.
In this state the day, date, and time are displayed.

The CPC has 2 driver stages providing communication lines for up to 80 cards approximately. All circuit cards controlled by the CPC must be mounted as close as possible to the CPC. All other cards may then be mounted in as many frames as are necessary.

4. OPERATING AND PROGRAMMING THE SM40 SYSTEM

The unit is mounted in the rack unit's front panel, which may be flipped up, locking automatically in a horizontal position. This is an ideal angle from which to view and operate the unit.



THE KEYS ARE FUNCTIONAL IN PROGRAMMING MODE e.g. USER MENU
INSTALLER MENU
SERVICE MENU

DISPLAY READ-OUTS AFTER PUSHING 9 6 ENTER

```
>> WELCOME TO SM 40 PROGRAMMING MODE <<
>> Version X.X          Date XX-XX-XX <<

* USERMENU *          scroll with 'ENTER'
PRESS '1' TO PROGRAM CALL STATIONS

* USERMENU *          scroll with 'ENTER'
PRESS '2' TO PROGRAM AUXILIARIES

* USERMENU *          scroll with 'ENTER'
PRESS '3' TO SET REAL-TIME CLOCK/TIMERS
```

DISPLAY & KEYBOARD

4.2 Display and Keyboard

A programming tool, containing a keyboard for user key assignment and a display which shows the sequence of programming. Mounted in the front panel of the rack unit.

Users of the SM40 Public Address Distribution System are able to program and make changes to the functions of their system, quickly and easily, with the aid of the Display And Keyboard. This is a simple programming tool comprising a 24 key keyboard and a 2x40 character lcd display which shows the sequence of programming.

SM40 KEY FUNCTIONS

0-9 Numeric keys to select call station number, user key number, priority level, attention signal tone number and program numbers as listed in the main menu.

 Moves the cursor 1 position to the right when routing Call Stations, Attention Tones, pre-recorded messages or Auxiliary sources (background music players, etc.) to amplifier inputs; each amplifier input representing a loudspeaker zone. Also used for programming free-programmable relays. This is called : "MATRIX/RELAY PROGRAMMING".

 Moves the cursor 1 position to the left during matrix/relay programming.

 Moves the cursor to the beginning of the following lock of 8 amplifier inputs during matrix programming.

 Moves the cursor to the end of the previous block of 8 amplifier inputs during matrix programming.

 Switches the output, indicated by the cursor during matrix programming, to the "ON" position. Routing the call station or auxiliary source being programmed to the desired amplifier input.

 Switches the output to the "OFF" position, cancelling routing of the call station or auxiliary to the amplifier input indicated by the cursor.

 Switches all outputs to the "ON" position, routing the source being programmed to all amplifier inputs.

 Switches all outputs to the "OFF" position, cancelling all routing of the source being programmed.

Mute Switches the output, indicated by the cursor, to the -10 dB mode when it is desired to attenuate the volume of background music during an announcement, rather than muting it.
This function is only available on every fourth input of the Matrix card.

Break If pressed during auxiliary programming, will return user to the main menu for the next programming sequence (in this case Call Station programming) without storing any new information.
During Call Station programming, 'BREAK' returns the user to the previous stage in the program (e.g. after "PROGRAM USER KEY: (1-10)", it will go back to "PROGRAM CALL STATION: (1-16)" without storing any new information.

Enter Enters numerical inputs into the memory and moves to the next program stage, or at the end of a program sequence; to the main menu ready for the next program.

A While the system is in its run mode, pressing button A, displays the system status. The top line of the display indicates where Call Stations, Signal Generator Cards, Digital Message Cards and auxiliary sources are connected to the matrix. The bottom line indicates which user key is currently being pushed, and which SGC is producing a signal or which DMC is relaying a message.

B In the Installer programming Menu, button B, is used to set the I/O RS232 serial interface communication parameters with an external computer. The parameters are as follows: Baud rate, stop bits and parity. See Chapter 5.13 on the I/O PCB.

C With the system in programming mode, button C is used to couple or uncouple the Keysets (KST)s, as described in the Input Card, see Chapter 5.3.

4. OPERATING AND PROGRAMMING THE SM40 SYSTEM

4.3 SM40 Programming

During the remainder of this chapter, specific contexts (status) and user actions are shown in the left column, and possible display results are shown in the right column. Characters between quotes ('Key') denote keyboard inputs, and ocurrances of 'XX' and 'YY' in any displays shown in the right column denote information which is dependant on the system configuration, or entered by the user.

When the SM40 system is powered up, either one of the following two displays is shown:

Status / Action	Result / Remarks
When memory was cleared the display shows:	`* * * SYSTEM MUST BE PROGRAMMED * * *` `* * *  GO TO INSTALLER MENU  * * *`
When the system was installed previously, the display shows:	`* * * SM40 ROUTING SYSTEM * * *` `DAY XX-XX  TIME XX:XX`

4.3.1 User Programming Menu

The User Programming Menu allows the user to program the following options:

Call Station Programming	Auxiliary Programming	Real-time clock / timer settings
- Call Station No. - Alarm Station No. - User Key No. - Key priority level - Signal No. - Digitally Stored Messages - Unlocked CRC Relay activation - Routing to Amplifiers	(for signals from a music source): - Routing signals to 1 or more outputs	- Set real-time clock - Program timers

Status / Action	Result / Remarks

To enter the User Programming Menu, enter the password: '9', '6', 'Enter'.	`>> WELCOME TO SM40 PROGRAMMING MODE <<`
	`>> VERSION X.X  DATE XX-XX-XX <<`
	Display after entering the password. Indicated here are the software version number and release date.

Wait until the welcome message clears.	`* USER MENU *  scroll with 'ENTER'`
	`PRESS '1' TO PROGRAM CALL STATIONS`
	The display now shows the first programming option.

Press 'Break' to return the system to its 'Normal Run Mode'. Otherwise, to proceed with the first programming option, press the key marked '1', as shown in the display.	Note: To scroll through the programming options, use the 'Enter' key.

User Programming Menu: Call Station Programming

Status / Action	Result / Remarks
Press the '1' key when the display shows the 'User Menu'.	PROGRAM STATION:_
Enter Call Station number and press 'Enter'.	
When a non-existent Call Station number is entered (numbers 1-16 in 16x64 mode or 1-32 in 32x32 mode) the display shows:	PROGRAM STATION:XX CALL/ALARM STATION XX NOT PRESENT
Otherwise, when a non-existent Call Station number was entered (numbers 17-32 in 16x64 mode) the display shows:	PROGRAM STATION:XX CALL/ALARM STATION XX NOT PRESENT
Otherwise, when an existing Call Station number was entered the display shows:	PROGRAM STATION:XX PROGRAM USER-KEY:_
Enter User Key and press 'Enter'.	
Pressing 'Break' will return display to "PROGRAM STATION:".	
When the Key Number is entered, and the Call Station number exists the display shows:	CST:XX KEY:XX PRIORITY:X (0-9;0=lowest) PRESS 'ENTER' OR CHANGE AND PRESS ENTER
Otherwise, when the Key Number is entered and the Call Station number is between 17 and 32 in 16x64 mode the display shows:	AST:XX KEY:XX PRIORITY:X (0-9;0=lowest) PRESS 'ENTER' OR CHANGE AND PRESS ENTER
If the current priority level is desired press 'Enter' to save this level, otherwise enter the desired level by pressing one of '0' to '9' followed by 'Enter'.	The current priority level will blink. If the memory has been cleared previously, the priority level will be set at default level zero.
Pressing 'Break' will return display to "PROGRAM USER-KEY:".	
If there is a signal generator present within the system, the display will show:	CST:XX KEY:XX PRIORITY:X SIGNAL NR:XX PRESS 'ENTER' OR CHANGE AND PRESS ENTER
	The current signal number programmed for key XX will be displayed. Pressing 'Enter' will save this value, any other signal number, followed by 'Enter' changes the signal number. Entering '00' means "no signal". The list of available signals should be consulted to avoid selection of a non-existent signal.

Status / Action	Result / Remarks
When a Modified Surveillance Switch Card (MSC) installed in the system, used for activating messages from an external message source, the display shows:	CST:XX KEY:XX PRIORITY:X SIGNAL NR:XX MESSAGE:X The Modified Surveillance Switch Card (MSG) can activate up to 8 messages from an external message source. Entering '0' means "no message" (default after memory cleared: zero).
Press 'Break' to return to "PROGRAM USER-KEY:".	
Otherwise, press 'Enter'. If there are one or more Digital Message Cards in the system, the display shows:	CST:XX KEY:XX DMC:XX XX XX XX XX XX XX RECORDED MESSAGES: X X X X X X X The upper line on the display shows the Digital Message Card selection. The lower line shows the message numbers. When activating a call which includes a programmed digital message, all message cards needed for that call are reserved and can not be used for another call before the message cycle has ended. This is not the case when the new call has a higher priority level. Up to 7 individual messages can be randomly programmed under one Call Station user key. If the selected Digital Message Card is not present, this will be displayed on the lower display line.
To exit recorded message programming, enter a '0' for either selection.	Note: Entering a seventh message will also exit message programming. The selected message will be played sequentially in the same order as programmed.

User Programming Menu: Call Station Programming (32x32 mode)

Status / Action	Result / Remarks
The display shows the following:	CST:XX KEY:XX ROUTED TO AMPLIFIERS 00001111 00000*** ———————— 11111111 01 The above display shows a graphical representation of the routing for key XX of call station XX. The number of symbol blocks displayed depends on the number of matrix cards connected to that particular Call Station, or on the presence of Control Relay Cards L1 to L4. The number shown at the lower right of the display indicates the actual Amplifier Zone at the current cursor position.

Keys		Symbols	
◁, ◁◁, ▷, ▷▷	Move cursor to specific zone	0	Zone switched off.
1 , 0 , '**Mute**'	(De-)activate routing	1	Zone switched on (an auxiliary source routed to that zone will be muted during the call).
1	Switch all zones ON	*	Zone switched on (an auxiliary source routed to that zone will be attenuated during the call). Only possible for auxiliaries connected to every fourth input.
0	Switch all zones OFF	—	No Matrix Card / Locked Relay Card present.

Status / Action	Result / Remarks
	When an audio output of SM40 is activated by a call, the corresponding relay of the Locked Relay Card, with address 1-4 is also automatically activated. If a system has no more than 8 audio outputs, CRC cards 2, 3 and 4 can be considered as being freely programmable. However they are still shown on the display as routing. They can be used to activate zone relays or volume override relays.
Press 'Enter' to save the new settings. Otherwise press 'Break' to return to "PROGRAM USER-KEY:".	
	In the 32x32 matrix mode, the relays of Locked Relay Cards L5-L8 are free and can be considered as free programmable and can be programmed accordingly.
When the routing is entered, the display shows:	CST:XX KEY:XX ACTIVATES RELAYS (L5-L8): 11100000 00000000 -------- 00000000 01 [L-5] [L-6] [L-7] [L-8]
	This is the current programming of the relays on Locked Relay Cards 5-8. This causes the programmed relays to activate when the corresponding Call Station key is active. In addition the relays on Unlocked CRC U-4, U-5, U-6, U-7 and U-8 can be activated via a user-key.
When 'Enter' is pressed and Unlocked CRC U-4, U-5, U-6, U-7 and U-8 are present in the system, the display shows:	CST:XX KEY:XX ACTIVATES RELAYS (U4-U8): 00011111 00000000 -------- 00000000 + 01 [U-4] [U-5] [U-6] [U-7]
	CST:XX KEY:XX ACTIVATES RELAYS (U4-U8): 00000000 33 [U-8]
	The above screen shows the current programming of the relays CRC U-4, U-5, U-6, U-7 and U-8. This causes the programmed relays to activate when the corresponding Call Station key is active. Programming is identical to matrix programming.
When the keys of Call Station XX are programmed, pressing 'Break' will return display to "PROGRAM STATION:".	
When all Call Stations present are programmed, pressing 'Break' again will return the display to the main menu.	

User Programming Menu: Call Station Programming (16x64 mode)

Status / Action	Result / Remarks

The display shows the following:

```
CST:XX KEY:XX ROUTED TO AMPLIFIERS:
00001111 00000*** ———————— 11111111 + 01
```

The above display shows a graphical representation of the routing for key XX of call station XX. The number of symbol blocks displayed depends on the number of matrix cards connected to that particular Call Station, or on the presence of Control Relay Cards L1 to L8.

The number shown at the lower right of the display indicates the actual Amplifier Zone at the current cursor position.

Note: A guide to the symbols shown on the display, and to the keys used to edit the routing, refer to the table on page 4-6.

When an audio output of SM40 is activated by a call, the corresponding relay of the Locked Relay Card, with address L-1 to L-8 is also automatically activated. If a system has no more than 8 audio outputs, CRC cards L-2 to L-8 can be considered as being free programmable. However they are still shown on the display as routing. They can be used to activate zone relays or volume control override relays.

Press 'Enter' to save the new settings.

Otherwise, press 'Break' to return to "PROGRAM USER-KEY:".

When 'Enter' is pressed and Unlocked CRC U-4, U-5, U-6, U-7 and U-8 are present in the system, the display shows:

```
CST:XX KEY:XX ACTIVATES RELAYS (U4-U8):
11100000 00000000 00000000 11000001 +01
```

[U-4] [U-5] [U-6] [U-7]

```
CST:XX KEY:XX ACTIVATES RELAYS (U4-U8):
11100000                           +33
```

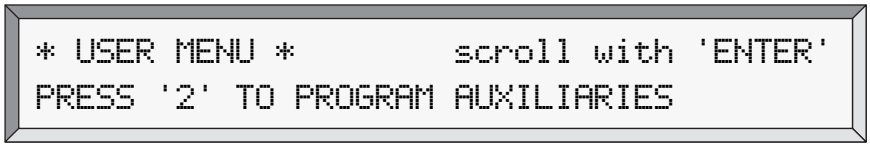
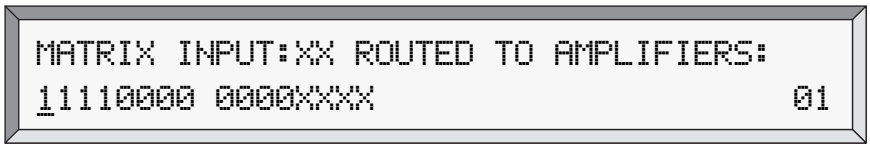
[U-8]

The above screen shows the current programming of the relays CRC U-4, U-5, U-6, U-7 and U-8. This causes the programmed relays to activate when the corresponding Call Station key is active. Programming is identical to matrix programming.

When the keys of Call Station XX are programmed, pressing 'Break' will return display to "PROGRAM STATION:".

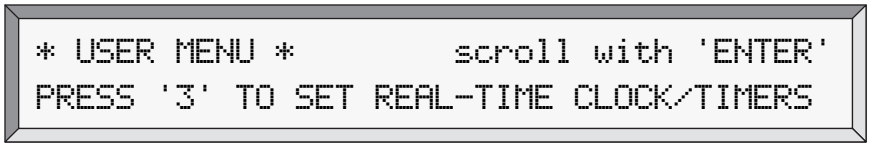
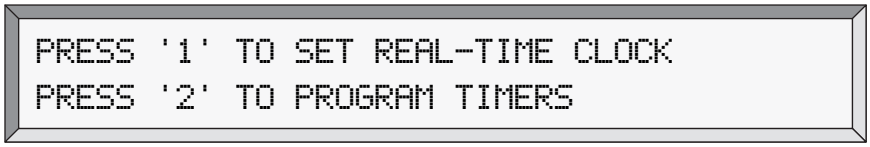
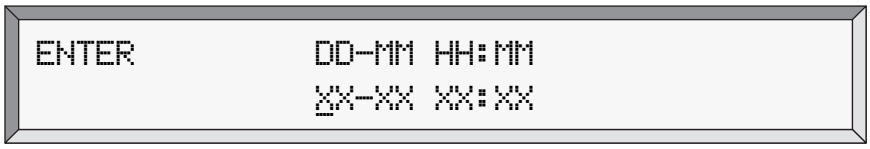
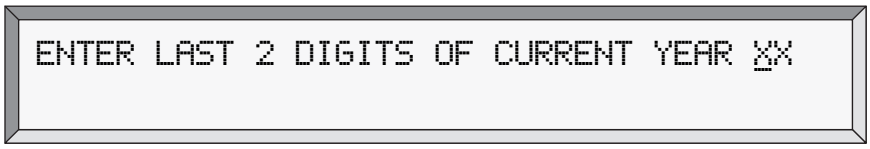
When all Call Stations present are programmed, pressing 'Break' again will return the display to the main menu.

User Programming Menu: Auxiliary Programming

Status / Action	Result / Remarks
The display shows the following:	 Matrix inputs that are not occupied by Call Stations, and are not assigned to Signal Generators or Message Sources, are available as auxiliary inputs for use with background music sources etc.. When the '2' key is pressed the system will search for an available matrix input. When there are no free inputs, the system will skip this program mode.
The '2' key is pressed, and there are free inputs available. Possible display:	 The above display shows the graphical representation of the routing of the auxiliary source connected to matrix input XX. The number of symbol blocks shown depends on the number of matrix cards connected to the auxiliary source. Routing auxiliaries is identical to routing the Call Station, except for the fact that the 'Mute' key is disabled. When the 1 key is pressed whilst the cursor is positioned at an occupied zone (marked by an 'X'), the setting of the previously assigned output will be overridden.
Press 'Enter' to save the new settings. The next free auxiliary input available will be displayed automatically. Otherwise, press 'Break' to leave settings unaffected and to return to the Menu User Menu.	

Keys		Symbols	
◁, ◁◁, ▷, ▷▷	Move cursor to specific zone	0	Zone switched off.
1 , 0	Activate routing	1	Zone switched on.
1	Switch all zones ON	X	Zone already occupied by another auxiliary output.
0	Switch all zones OFF		

User Programming Menu: Set Real-Time Clock

Status / Action	Result / Remarks
The display shows the following:	
Press the '3' key.	
When the '1' key is pressed the display shows:	 The current time will be displayed and the cursor will blink at the tens of 'DD'. The date and time settings can be changed by either entering the complete date and time, or by moving the cursor to a position to change a single value.
Press 'Enter' to save the new setting.	When an invalid time and/or date is entered, this is shown by marking the incorrect value with a question mark ('?').
When 'Enter' is pressed and the date and time values are valid, the display shows:	
Enter the last two numbers of the current year.	The SM40 system will now calculate the current day-of-the-week.
Press 'Break' to return to the Menu User Menu without changing the date and/or time settings.	
Otherwise press 'Enter' to store the setting and return to the Menu User Menu.	

User Programming Menu: Program Timers: Program Auxiliary Routing

Status / Action	Result / Remarks
The display shows the following:	`* USER MENU *  scroll with 'ENTER'` `PRESS '3' TO SET REAL-TIME CLOCK/TIMERS`
Press the '3' key.	`PRESS '1' TO SET REAL-TIME CLOCK` `PRESS '2' TO PROGRAM TIMERS`
Display shown when the '2' key is pressed.	`PRESS '1' TO PROGRAM RELAY/AUX-ROUTING` `PRESS '2' TO PROGRAM TIME SIGNALS`
Display shown when the '1' key is pressed.	`PRESS '1' TO PROGRAM AUXILIARY ROUTING` `PRESS '2' TO PROGRAM RELAYS`

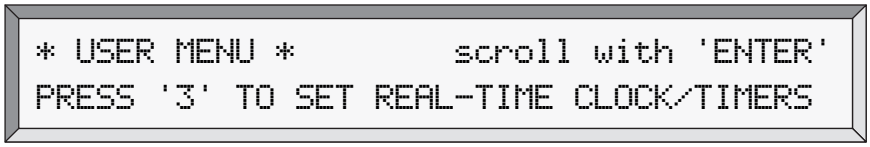
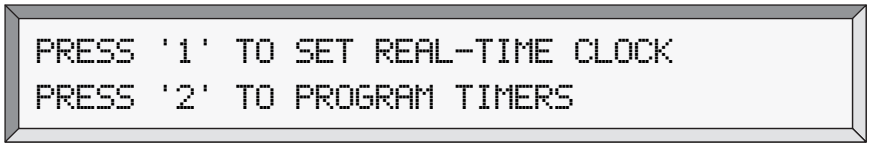
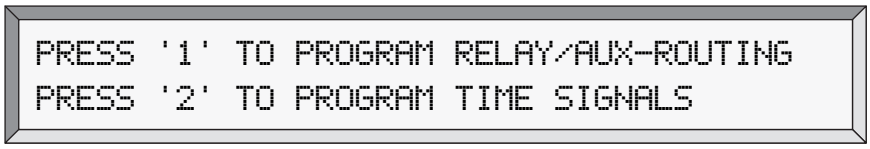
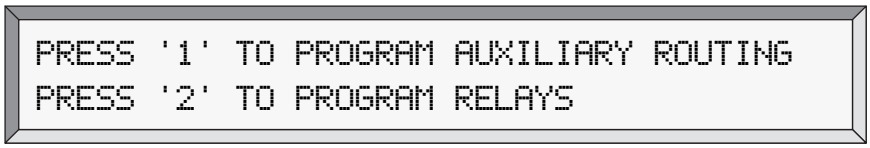
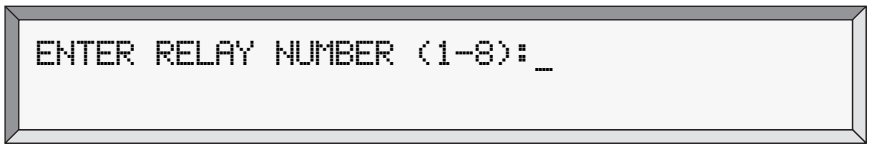
Display shown after pressing the '1' key, and when Unlocked Relay Card 2 is not in the system.	`*WARNING* UNLOCKED CRC #2 NOT IN SYSTEM`
	`PRESS 'ENTER'`
	Note: Because this Matrix Timer mode is intended for supplying background music to several zones at several times, the use of a relay contact is not always required. The display shown above is intended as a warning and not as a fatal error message.

Press 'Enter' when the warning was shown, otherwise press '1'.	
When Unlocked CRC U-2 is present the display shows:	`ENTER RELAY NUMBER (1-8):_`
When Unlocked CRC U-2 is not present the display shows:	`ENTER TIMER GROUP (1-8):_`

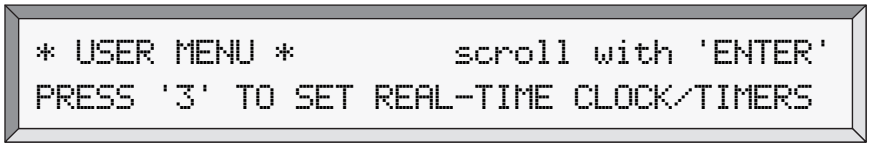
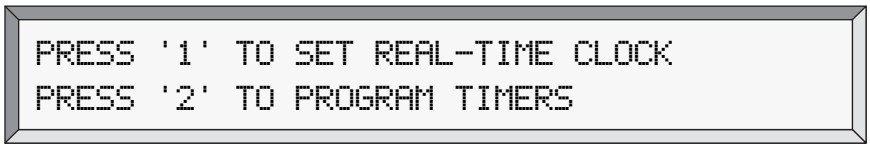
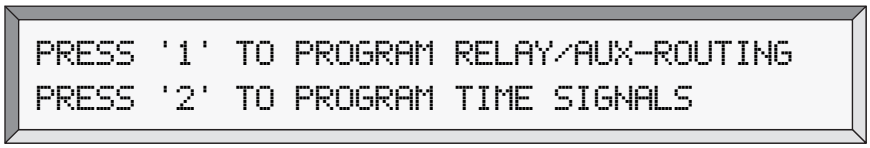
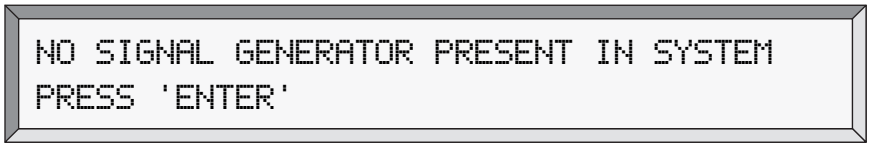
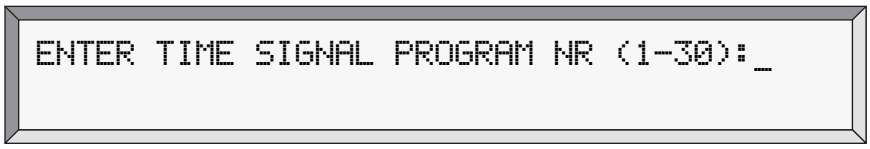
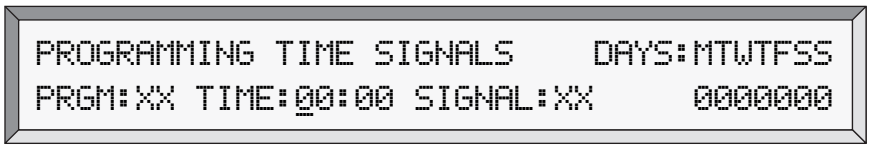
Enter the relay/group number.	`RELAY: X ACTIVE FROM 00:00 DAY: MTWTFSS`
	`BLOCK: 0  TO 00:00  0000000`
	Note: The word 'RELAY' shown above will be replaced by 'GROUP' when Unlocked CRC U-2 is not present.
	The cursor will flash at the tens of the 'ACTIVE FROM' time. Use the cursor keys to position the cursor, and the number keys to alter values. Use the double arrow keys to move to the next or previous block.

Status / Action	Result / Remarks
	The week-field is intended to set a day of the week active or inactive. This is done by moving the cursor to the week-field and by using the On/Off similar to the way matrix programming is done. The All-On/All--Off keys may be used as well, without moving the cursor to the week-field.
Press 'Enter' after programming the time parameters. The display now shows:	`ENTER MATRIX INPUT (1-16) TO BE ROUTED BY TIMER:_` Note: The display will show '1-32' instead of '1-16' when the 32x32 Matrix was selected.
Display after entering a matrix input which is not present in the system:	`ERROR NO MATRIX CARD PRESENT AT INPUT X PRESS 'ENTER'`
Display after entering a matrix input which is occupied by a Call Station:	`INPUT ALREADY OCCUPIED BY CALL STATION PRESS 'ENTER'`
Display after entering a matrix input which is occupied by either a Signal Generator, a Digital Message Card of an External Message Source:	`ALREADY OCCUPIED BY SIGNAL GENERATOR PRESS 'ENTER'`
Display after entering a valid input number:	`RELAY:X TIME BLOCK:_ MATRIX INPUT:_ TO XXX00000 01` Auxiliary Routing Programming is identical to Auxiliary Programming. Warning: An 'X' means the zone is already programmed from the normal Auxiliary Programming mode. If the timer also needs to activate these zones, the auxiliary setting will be overruled by the timer programming and will not be restored after timer deactivation.
After pressing 'Enter', the settings will be stored and the display will show:	`RELAY: X ACTIVE FROM 00:00 DAY: MTWTFSS BLOCK: 1 TO 00:00 0000000` Every relay or timer group can be programmed in 10 time blocks per week. The 'BLOCK' number will count up to 9 and then restart at 0.
Press 'Break' to return the display to 'ENTER RELAY NUMBER' or 'ENTER TIMER GROUP'.	
Pressing 'Break' again will return the display to:	`PRESS '1' TO PROGRAM AUXILIARY ROUTING PRESS '2' TO PROGRAM RELAYS`

User Programming Menu: Program Timers: Program Relays

Status / Action	Result / Remarks
The display shows the following:	
Press the '3' key.	
Display shown when the '2' key is pressed.	
Display shown when the '1' key is pressed.	
Display shown after pressing the '2' key, and when Unlocked Relay Card U-3 is not in the system.	 Note: Because card CRC U-3 is required for this particular function, this error is of the class 'Fatal Error'.
Press 'Enter' when the error message was shown to return to the Main User Menu.	
Display shown after pressing the '2' key, and when Unlocked Relay Card U-3 is in the system.	 Programming relays is similar to programming the matrix timers, except that after entering the time, the display returns with the next relay-program instead of programming the matrix routing. Every relay can be programmed to activate and de-activate 10 times a day. Unlocked Relay Card U-3 has 8 relays, therefore the total number of relay timers is 80.

User Programming Menu: Program Timers: Program Time Signals

Status / Action	Result / Remarks
	Time Signals (30 max.) are treated by the system as 'Calls', with their own priority (set at priority 0). This means that a time signal can be overruled by a call with a higher priority. When a time signal activates, and there is no Signal Generator available, the system will wait until there is a free generator and then generate the signal. When a Call Station is calling the same zone to which the signal is routed, the time signal will be delayed until there is no more zone conflict. When several time signals are programmed to sound at the same time, and there are not enough generators available, the signals will be activated sequentially.
The display shows the following:	
Press the '3' key.	
Display shown when the '2' key is pressed.	
Display shown when the '2' key is pressed. but no signal generator is present:	 Note: Because a signal generator is required for this particular function, this error is of the class 'Fatal Error'.
Press 'Enter' when the error message was shown to return to the Main User Menu.	
Display shown when the '2' key is pressed. and a signal generator is present:	
When a valid program number is entered, the display shows:	 The cursor will blink at the tens of hours.

Status / Action	Result / Remarks
Enter the time and day at which the signal must sound.	The time can be set using the numeric keyboard. This way a signal will sound only at that particular time on the day it was set. It is also possible to use 'don't care' values using the 'Mute' key. For example: - Time set at '**:00', - The signal will sound on the hour, 24 times a day. - Time set at '0*:30', - The signal will sound from 00:00 to 09:59 on the half hour. - Time set at '**:**', - The signal will sound every minute.
The display shows the following:	Every signal available in the Signal Generator may be selected, except for signals with a number of 57 or higher (alarm signals). Programming the week-field is identical to matrix & relay timer setting.
Display after pressing 'Enter', if the Signal Generator is not yet routed.	*WARNING* SIGNAL GENERATOR NOT ROUTED PRESS 'ENTER' Note: This is a 'Fatal Error' message, and after pressing 'Enter', the display will return to the Main User Menu.
Press 'Enter' to save the settings.	Illegal time inputs and no signal number set, when any day was set active will not be accepted by the system. In this case the time set display will not disappear, and the cursor will blink at the illegal input.
When a Digital Message Card is installed in the system, the display now shows:	PROGRAM:01 DMC:00 00 00 00 00 00 00 RECORDED MESSAGES: 0 0 0 0 0 0 0 Every 'Time Signal' can activate up to seven messages from one or more Digital Message Cards. Programming is identical to Call Station Programming.
Otherwise, when a Digital Message Card is not installed in the system, the display will now show:	PROGRAM:01 DMC:0X 00 00 00 00 00 00 SELECTED DMC NOT PRESENT: PRESS 'ENTER'
Display after selection of Digital Messages Press 'Enter' to show the next time signal process.	PROGRAM:XX SWITCHES SIGNAL:XX TO AMPL: 00000000 00000000 00000000 00000000 01 Note: The fourth input of each Matrix Card can be attenuated during a time signal instead of being muted (using the 'Mute' key).

User Programming Menu: Leaving the User Programming Menu

Status / Action	Result / Remarks
Press 'Break' as often as necessary to return to the Main User Menu:	* USER MENU * scroll with 'ENTER' PRESS 'BREAK' TO EXIT PROGRAMMING MODE
Press 'Enter' to return to the first option of the Main User Menu:	* USER MENU * scroll with 'ENTER' PRESS '1' TO PROGRAM CALL STATIONS
Otherwise press 'Break' once more to return to 'Normal Run Mode'.	* * * SM40 ROUTING SYSTEM * * * DAY XX-XX TIME XX:XX

Notes:
- 'DAY' shown on the display above will be replaced by either one of 'MON', 'TUE', 'WED', 'THU', 'FRI', 'SAT', 'SUN'.

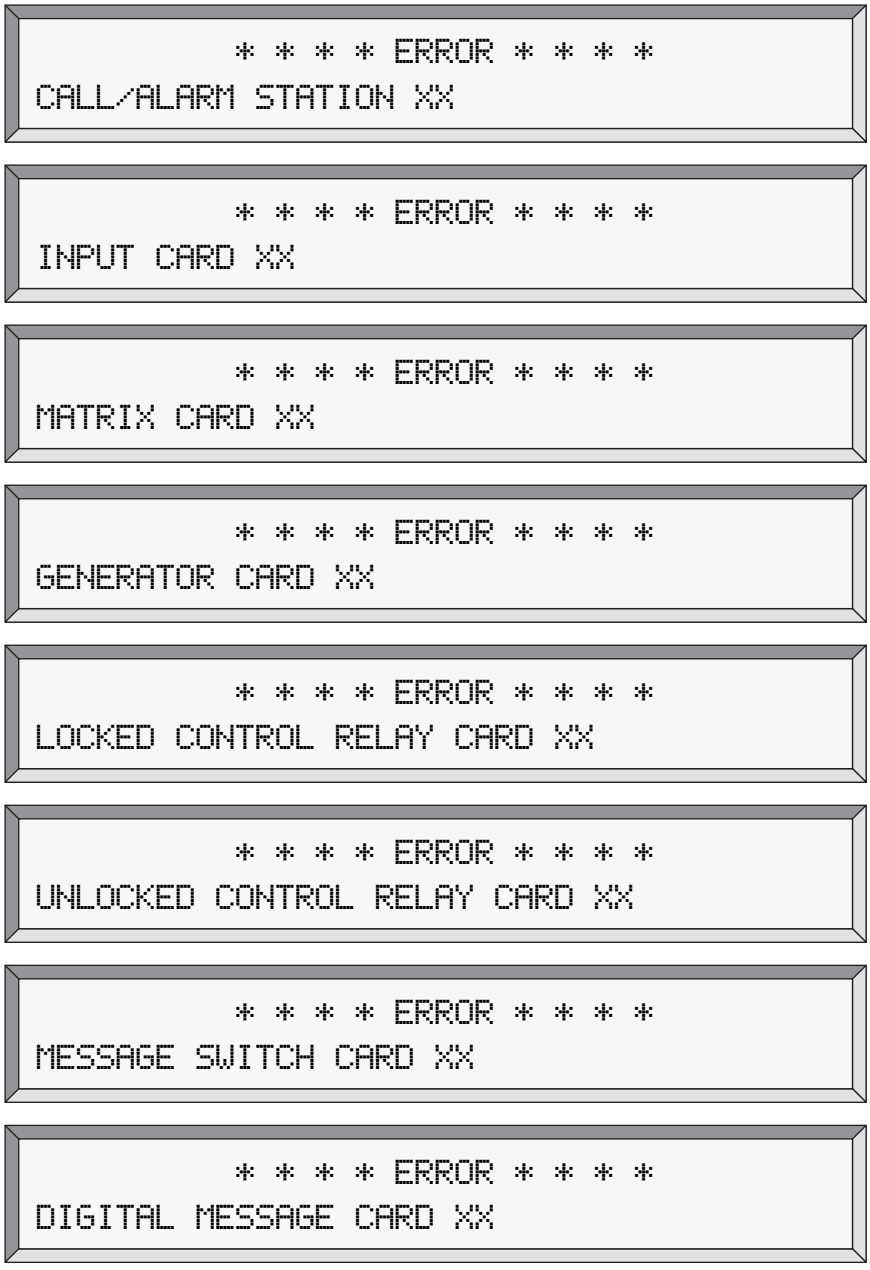
- It is not necessary to scroll the Main User Menu to a specific option to be able to select it. For instance, option '3' can be selected by pressing the '3' key, even though the display shows 'PRESS '1' TO PROGRAM CALL STATIONS'.

4.3.2 Error Messages

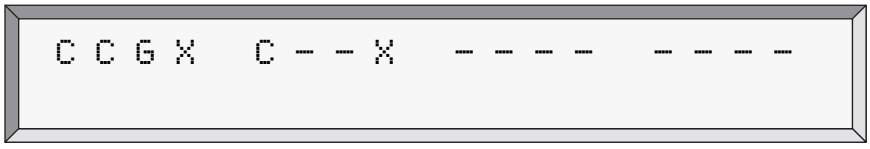
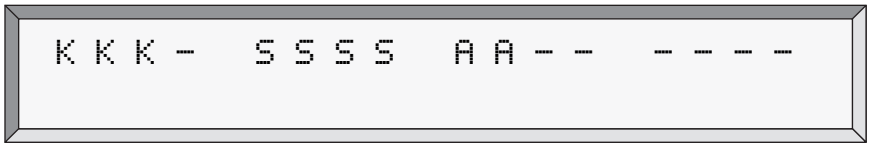
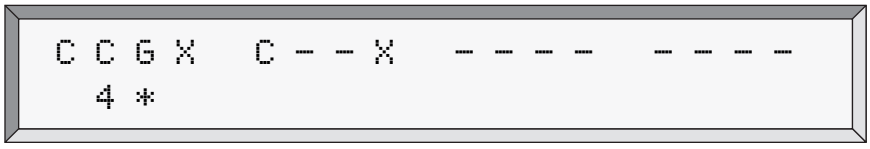
Status / Action	Result / Remarks

The SM40 system continuously monitors to see whether all cards and Call Stations are still connected and communicating with the CPC. If, for some reason, a card is not communicating with the CPC; a Call Station is disconnected or a Call station's detection current exceeds the limit, one of the following messages will be displayed.

Note: These messages will not be displayed when them SM40 system is in programming mode or in status display mode.



4.3.3 Status Display

Status / Action	Result / Remarks
	The SM40 system is able to display its static and dynamic state. Switching between the normal and status display is done by means of the 'A' key. Note: The status display is unavailable when the system is in programming mode. The status displays upper line shows 4 blocks containing 4 symbols each. These symbols represent the inputs (1-16) of the matrix cards. Pressing 'A' again shows inputs 17-32. When 'A' is pressed once again, the system returns to normal time/date display.
Status shown when memory is cleared:	
Possible status display after storing system hardware (option 4):	 Meaning: Call Stations are connected to inputs 1, 2 and 5 of the matrix.
Possible status display after programming auxiliary sources (option 2):	 Meaning: Auxiliary sources are connected to matrix input 4 and 8.
Possible status display after assigning signal generator input (option 6):	 Meaning: A signal generator is (or must be) connected to matrix input 3.
Possible status display of inputs 17-32:	
Possible dynamic status display:	 Meaning: Call Station 2 is active, and the '4' key was pressed. Furthermore, the Signal Generator (3) produces the calls signal.

Symbol Guide			
C	Call or activating station	S	Selected station for Master Call Station
X	Auxiliary input	A	Alarm Station
G	Signal generator input or Message source input	–	Not assigned or present
K	Key Station for extended Call Station		

4.3.4 Installer Programming Menu

The Installer Programming Menu allows the user to program the following options:

Store System Hardware	**Key: '4'**	
Show System Hardware	**Key: '5'**	
- Call Stations connected	- Input card(s)	- Digital Message card(s)
- Alarm Stations connected	- Matrix card(s) 16 inputs	- Locked CRC(s)
- Key Stations connected	- Matrix card(s) 32 inputs	- Unlocked CRC(s)
- Selection Stations connected	- Signal generator(s)	- Serial I/O
- PC inputs assigned	- Message switch card(s)	- Communication PCB
Routing Signal Generator	**Key: '6'**	
- Routing Signal Generator - Routing to Matrix input		
Manual Signal Selection (for monitoring signals)	**Key: '7'**	
- Generator No.. - Signal No..		
Clear All Memory	**Key: '8'**	
Route Message Source	**Key: '9'**	
- Message source - Message card		
Set Matrix Configuration	**Key: '0'**	
Select Program Shut-Off timer	**Key: 'A'**	
- Disable/Enable - Time between last key-stroke		
Setup I/O Parameters	**Key: 'B'**	
Configure Call Stations	**Key: 'C'**	
- Configure Extended CST	- Separate / combine	
- Configure master CST	- Couple / Uncouple	
Route Digital Message Card	**Key: '◁◁'**	
Message (Re-)Recording	**Key: '◁'**	
Message Monitoring	**Key: '▷**	
Message Card Back-Up	**Key: '▷▷'**	
Exit Programming Mode	**Key: 'Break'**	

Status / Action	Result / Remarks
To enter the Installer Menu, enter the password: '8', '1', 'Enter'.	>> WELCOME TO SM40 PROGRAMMING MODE << >> VERSION X.X DATE XX-XX-XX <<
	Display after entering the password. Indicated here are the software version number and release date.
Wait until the welcome message clears. The display now shows:	* INSTALL MENU * scroll with 'ENTER' PRESS '4' TO STORE SYSTEM HARDWARE
	Note: Options 1, 2 and 3 are identical to modes 1, 2 and 3 of the User Programming Menu. Note: To scroll through the programming options, use the 'Enter' key. Use the 'Break' key to abort a command without storing information.
Press '4' to store hardware configuration.	* INSTALL MENU * scroll with 'ENTER' STORING HARDWARE CONFIGURATION....
	Storing hardware information is necessary to enable dynamic system error detection.
Press 'Enter' in the Installer Menu to show option 0:	* INSTALL MENU * scroll with 'ENTER' PRESS '0' TO SET MATRIX CONFIGURATION
	To enable systems with more than 16 audio inputs, it is possible to choose between 16 inputs with 64 outputs, and 32 inputs with 32 outputs. The latter is the maximum input configuration.
Press '0' to select the matrix configuration option. The current situation is shown being either:	CURRENT MATRIX: 16 INPUTS; 64 OUTPUTS PRESS '0' FOR 16X64; '1' FOR 32X32
Or:	CURRENT MATRIX: 32 INPUTS; 32 OUTPUTS PRESS '0' FOR 16X64; '1' FOR 32X32
Press '0' or '1' to select a matrix configuration or press 'Break' to leave this setting untouched.	

Installer Programming Menu: Display System Hardware

Status / Action	Result / Remarks
The display shows the following:	* INSTALL MENU * scroll with 'ENTER' PRESS '5' TO DISPLAY SYSTEM HARDWARE
Press '5', and the display shows (for Call Stations 1-16):	CALL STATIONS CONNECTED: XX, XX, XX
After pressing 'Enter' the display shows (for Call Stations 17-32):	CALL STATIONS CONNECTED: XX, XX, XX
After pressing 'Enter' the display shows (for Alarm Stations 1-16):	ALARM STATIONS CONNECTED: XX, XX, XX
After pressing 'Enter' the display shows (for Alarm Stations 17-32):	ALARM STATIONS CONNECTED: XX, XX, XX
After pressing 'Enter' the display shows:	KEY STATIONS CONNECTED: XX, XX, XX
After pressing 'Enter' the display shows:	SELECT. STATIONS CONNECTED: XX, XX, XX
After pressing 'Enter' the display shows:	PC INPUTS ASSIGNED: XX, XX, XX
After pressing 'Enter' the display shows:	INPUT CARD(S) NR: XX, XX, XX
After pressing 'Enter' the display shows:	MATRIX CARD(S): I-XXXXXXXX XXXXXXXX (16 inputs) II-XXXXXXXX XXXXXXXX

Note: When the 32x32 matrix has been selected, '16' will be replaced by '32' on the above display.

Status / Action	Result / Remarks
After pressing 'Enter' the display shows:	SIGNAL GENERATOR(S) NR: XX, XX, XX
After pressing 'Enter' the display shows:	MESSAGE SWITCH CARD(S) CONNECTED: XX, XX
After pressing 'Enter' the display shows:	DIGITAL MESSAGE CARD(S): XX, XX
After pressing 'Enter' the display shows:	LOCKED CRC(S): XX, XX, XX UNLOCKED CRC(S): XX, XX, XX
After pressing 'Enter' the display shows:	I/O BOARD MOUNTED: YES
After pressing 'Enter' the display shows:	* INSTALL MENU * scroll with 'ENTER' PRESS '6' TO ROUTE SIGNAL GENERATOR

Installer Programming Menu: Routing Signal Generator

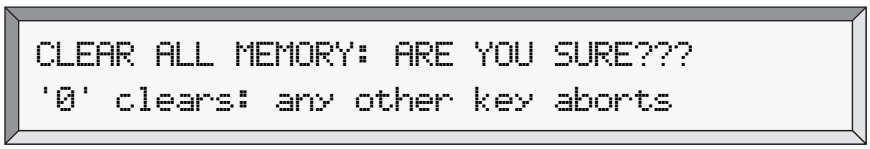
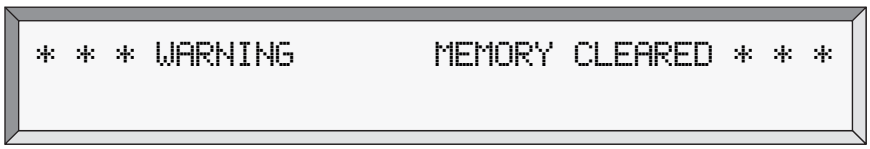
Status / Action	Result / Remarks
After pressing '6' in the Main Installer Menu the display shows:	WHICH GENERATOR MUST BE ROUTED (1-8):_
When the selected generator is not present, the display will show:	WHICH GENERATOR MUST BE ROUTED (1-8):X GENERATOR CARD X NOT PRESENT
Otherwise, when the selected generator is present the display will show:	WHICH GENERATOR MUST BE ROUTED (1-8):X SIGNAL GENERATOR CONNECTED TO INPUT:XX
	The current matrix input number is displayed, unless memory was cleared in which case2 black squares are displayed. The input to which the generator is routed depends on the matrix configuration.
Press 'Enter' to store the changed input number , or 'Break' to return to the Main Installer Menu.	

Status / Action	Result / Remarks
When 'Enter' was pressed but there is no matrix card present at the selected input the display shows:	MATRIX INPUT XX NOT PRESENT PRESS 'ENTER'
Otherwise, when assigning a matrix input that is already occupied by a Call Station the display shows:	INPUT ALREADY OCCUPIED BY CALL STATION PRESS 'ENTER'
Otherwise, when the input is accepted the display will ask for the next routing:	WHICH GENERATOR MUST BE ROUTED (1-8):_
When 'Break' is pressed, the display will again show the Main Installer Menu:	* INSTALL MENU * scroll with 'ENTER' PRESS '7' FOR MANUAL SIGNAL SELECTION

Installer Programming Menu: Manual Signal Selection

Status / Action	Result / Remarks
After pressing '7' in the Main Installer Menu the display shows:	WHICH GENERATOR MUST BE MONITORED:_
When the selected generator is not present, the display will show:	WHICH GENERATOR MUST BE MONITORED:X GENERATOR CARD X NOT PRESENT
Otherwise, when the selected generator is present the display will show:	TYPE SIGNAL NUMBER AND PRESS 'ENTER' PRESS 'ENTER' TO END SIGNAL
	Entering a signal number followed by 'Enter' will activate the selected generator. Pressing 'Enter' without entering a signal number will end the signal. Because calls have priority over generator monitoring, it is possible that during monitoring, a monitored signal will be overridden by a signal which precedes that call. When monitoring a generator which is being used for a call, the selected signal will be available when the generator is free.
Press 'Break' to return to the Main Installer Menu.	

Installer Programming Menu: Clear All Memory

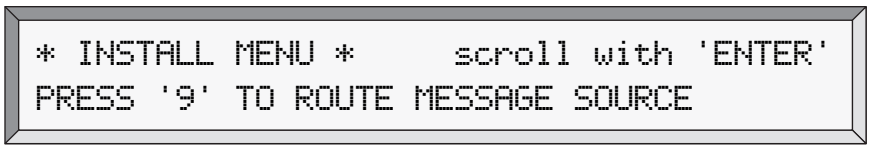
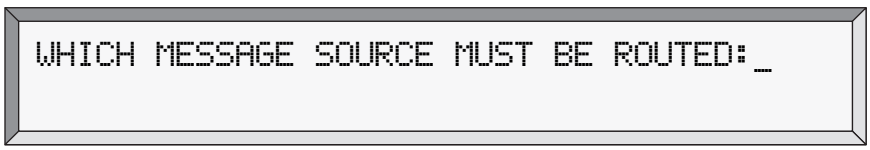
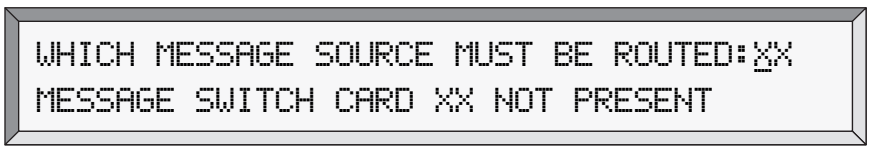
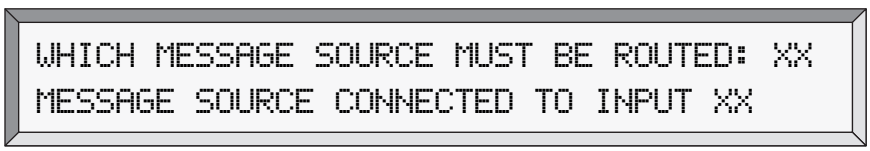
Status / Action	Result / Remarks
	
After pressing '8' in the Main Installer Menu the display shows:	
All keys except the '0' will return to the Main Installer Menu. After pressing the '0' key the memory is cleared and the display shows:	
After a short delay the display changes to:	

As a result of clearing the memory, the system will be inoperative until it is reprogrammed. It is necessary to re-enter the installer password in order to enter the Installer Programming mode.

4

Installer Programming Menu: Route Message Source

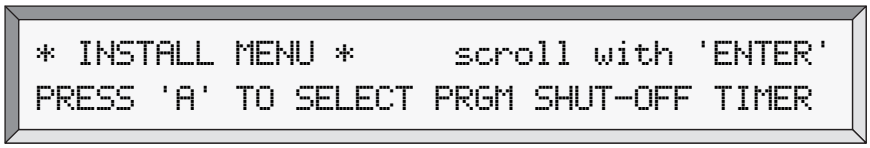
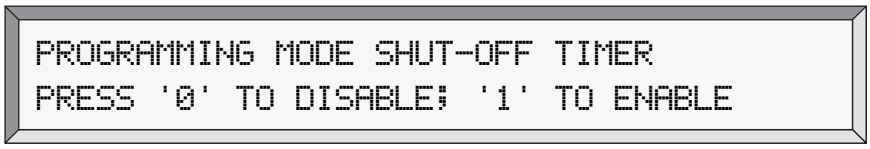
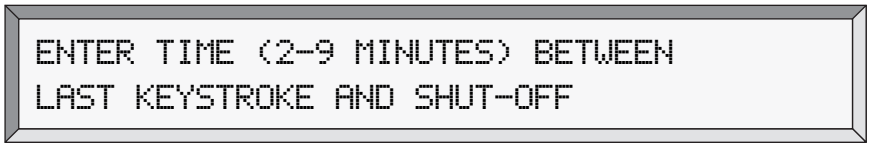
This function is to route external message sources which are activated by a surveillance switch card (message switch card). Clock synchronisation is available, see section 5.10.

Status / Action	Result / Remarks
	
After pressing '9' in the Main Installer Menu the display shows:	
After entering the number of a non-existent message source the display shows:	
Otherwise, the display shows:	

The display shows the current routing. The input to which a message source can be connected depends on the matrix configuration (16x64 or 32x32).

NOTE: If a surveillance switch card is applied for clock synchronisation only, the selected input must be 00.

Installer Programming Menu: Select Program Shut-Off Timer

Status / Action	Result / Remarks
	 This option is used to enable or disable automatic return to the normal running mode from the programming mode after a pre-programmed idle delay from 2 to 9 minutes. The idle timer is reset every time a keystroke is detected.When the delay time has elapsed, the system will drop out of the Installer Programming mode and return to the normal run mode.
After pressing 'A' in the Main Installer Menu the display shows:	 The system will wait for keyboard input. During this period the shut-off timer is temporarily disabled (if it was enabled previously).
Press 'Break' to return to the Main Installer Menu without changing the setting.	
Otherwise press '0' to disable the Shut-Off timer and return to the Main Installer Menu.	
Otherwise press '1' to enter the delay time:	
Press any key of '1' to '9' to set the delay time, or press 'Break' to return to the Main Installer Menu leaving the setting untouched.	
	Note: Unless and Signal Generator Card (SGC), Digital Message Card (DMC) or Surveillance Switch Card (SSC) is installed in the system, the Select Program Shut-Off Timer is the last programming option.

Installer Programming Menu: Set-Up I/O Parameters

Status / Action	Result / Remarks
To set-up Input/Output (I/O) parameters enter the Installer Programming menu as explained earlier, and scroll (using the 'Enter' key) until the display shows:	`* INSTALL MENU *  scroll with 'ENTER'` `PRESS 'B' TO SET I/O PARAMETERS`
	Note: The I/O parameters can only be set-up when the I/O PCB LBB 1375 is mounted on the CPC.
After pressing 'B' in the Main Installer Menu the display shows:	`PRESS BREAK TO DISABLE I/O` `PRESS 'ENTER' TO PROCEED`
Press 'Break' to return to the Main Installer Menu without changing the settings.	
Otherwise press 'Enter':	`SELECT BAUD RATE:_` `1:300  2:1200  3:2400  4:4800  5:9600`
Select the desired baud-rate and press 'Enter':	`SELECT NUMBER OF STOP BITS (1 or 2):_`
Select the desired number of stop-bits ('1' or '2') and press 'Enter':	`PARITY SELECTION:_` `1:EVEN  2:ODD  3:NO PARITY`
Select the required parity setting and press 'Enter':	`* INSTALL MENU *  scroll with 'ENTER'` `PRESS 'C' TO CONFIGURE CALL STATIONS`

Installer Programming Menu: Configure Call Stations: Configure Extended Call Station

The Extended Call Station programming option makes it possible to configure 1 to 4 Call Stations with more than 10 keys.

The (key-) stations connected to input cards 5, 6, 7 and 8 can be coupled to Call Stations 1, 2, 3 or 4 but the total number of assigned key sets (including the Master Call Stations) can never exceed 16 (160 keys).

Every (key-) station of the coupled key sets behaves like a normal Call Station. A hardware addition is necessary when the LED indicators of the Call Stations and Key Stations need to be coupled.

Status / Action	Result / Remarks

```
* INSTALL MENU *     scroll with 'ENTER'
PRESS 'C' TO CONFIGURE CALL STATIONS
```

After pressing 'C' in the Main Installer Menu the display shows:

```
PRESS '1' TO CONFIGURE EXTENDED CST
PRESS '2' TO CONFIGURE MASTER CST
```

Possible display after pressing the '1' key:

```
CURRENT EXTENDED CALL STATION ASSIGNMENT
INPUT 17-32 + ECS: 1110 2220 XXXX 0000
```

The four blocks of characters at the lower line on the display represent inputs 17 to 32 of input cards 5 to 8.

	Explanation
111	The key sets connected to inputs 17, 18 and 19 are functioning as extensions of Call Station 1.
222	The key sets connected to inputs 21, 22, and 23 are functioning as extensions of Call Station 2.
0	Nothing is assigned to inputs 24, 29, 30, 31 and 32.
X	The key sets connected to inputs25, 26, 27 and 28 are functioning as extensions of the Master Call Station.

After pressing 'Enter' the display shows:

```
COUPLE/UNCOUPLE EXTENDED CST (1-4):_
```

Entering the Extended Call Station number.

If the number of a non present Extended Call Station is entered the display shows:

```
*** ERROR *** CALL STATION NOT IN SYSTEM
PRESS 'ENTER'
```

Otherwise, when the selected Extended Call Station is in use the display shows:

```
*** ERROR *** STATION ALREADY ASSIGNED
PRESS 'ENTER'
```

Status / Action	Result / Remarks
Otherwise, the display shows: Enter the first of the range of key set inputs: xx =17,21,25, 29 for master 1,2,3,4.	ENTER FIRST KEY SET INPUT (17-32):XX ENTER NUMBER OF KEYSETS (1-4)
Enter the number of key sets. If the corresponding slave Input Card is not present the display shows:	*** ERROR *** INPUT CARD X NOT PRESENT PRESS 'ENTER'
Otherwise, when the required number of inputs is not available the display shows:	** NOT ALL SELECTED INPUTS PRESENT ** PRESS 'ENTER'
Otherwise, when the inputs are accepted the display shows:	PRESS '1' TO COUPLE; '0' TO UNCOUPLE Selecting '1' will couple the selected range of key set inputs, '0' will uncouple the selected range.
After pressing either '1' or '0', the display shows:	CURRENT EXTENDED CALL STATION ASSIGNMENT INPUT 17-32 + ECS: 1110 2220 XXXX 0000
Press 'Enter' to couple or uncouple another Extended Call Station:	COUPLE/UNCOUPLE EXTENDED CST (1-4):_
Otherwise, press 'Break' to return to the following display:	PRESS '1' TO CONFIGURE EXTENDED CST PRESS '2' TO CONFIGURE MASTER CST

Installer Programming Menu: Configure Call Stations: Configure Master Call Station

With a Master Call Station it is possible to depart from the standard SM40 concept by having priority, attention signals and routing hidden under one user key.

A Master Call Station consists of an activation section and 1 to 16 selection stations. A number of selection keys (one or more zones can be programmed for every key) can be selected, and will be combined into one routing.

The selected routing is activated by pressing a key on the activation station. Additional hardware is required between the activation and selection stations to be able to indicate the selected keys from every selection station.

Status / Action	Result / Remarks

```
* INSTALL MENU *     scroll with 'ENTER'
PRESS 'C' TO CONFIGURE CALL STATIONS
```

After pressing 'C' in the Main Installer Menu the display shows:

```
PRESS '1' TO CONFIGURE EXTENDED CST
PRESS '2' TO CONFIGURE MASTER CST
```

Possible display after pressing the '2' key:

```
CURRENT MASTER CALL STATION ASSIGNMENT
INPUT 17-32 + ECS: 1110 2220 XXXX 0000
```

The four blocks of characters at the lower line on the display represent inputs 17 to 32 of input cards 5 to 8.

	Explanation
111	The key sets connected to inputs 17, 18 and 19 are functioning as extensions of Master Call Station 1.
222	The key sets connected to inputs 21, 22, and 23 are functioning as extensions of Master Call Station 2.
0	Nothing is assigned to inputs 24, 29, 30, 31 and 32.
X	The key sets connected to inputs25, 26, 27 and 28 are functioning as extensions of an Extended Call Station.

After pressing 'Enter' the display shows:

```
COUPLE/UNCOUPLE MASTER CST (1-4):_
```

Entering the Master Call Station number.

NOTE: After entering and confirming the input assignments of the key sets, the appropriate audio inputs of the key sets can be used for auxiliary inputs, these become available in menu item 2.

Status / Action	Result / Remarks
If the number of a non present Master Call Station is entered the display shows:	`*** ERROR *** CALL STATION NOT IN SYSTEM` `PRESS 'ENTER'`
Otherwise, when the selected Master Call Station is in use the display shows:	`*** ERROR *** STATION ALREADY ASSIGNED` `PRESS 'ENTER'`
Otherwise, the display shows:	`ENTER FIRST KEY SET INPUT (17-32):XX` `ENTER NUMBER OF KEYSETS (1-4)`
Enter the first of the range of key set inputs:	`ENTER FIRST KEY SET INPUT (17-32):XX` `ENTER NUMBER OF KEY SETS (1-16):_`
Enter the number of key sets.	
If the corresponding slave Input Card is not present the display shows:	`*** ERROR *** INPUT CARD X NOT PRESENT` `PRESS 'ENTER'`
Otherwise, when the required number of inputs is not available the display shows:	`** NOT ALL SELECTED INPUTS PRESENT **` `PRESS 'ENTER'`
Otherwise, when the inputs are accepted the display shows:	`MASTER: X  KEYSETS: XX XX` `PRESS '1' TO COUPLE; '0' TO UNCOUPLE`
Press '0' to uncouple the selected range.	
Otherwise, after pressing '1' the display shows:	`ENTER SIGNAL/PRIORITY PRE-SELECTION MODE` `PRESS '0' FOR SEPARATE; '1' FOR COMBINED`

Activating selected routing can be programmed in two separate modes:

0 Separate Mode
Five attention or alarm signals plus Digital Messages can be programmed under keys 1 to 5 of the activation station Four priority levels can be programmed under keys 6 to 9 of the activation station. Keys 6 to 9 will also activate the complete pre-selection.

1 Combined Mode
Nine attention or alarm signals plus Digital Messages with a priority can be programmed under keys 1 to 9 of the activation station. The keys will also activate the complete pre-selection.
Note: This selection is valid for each Master Call Station connected.

Status / Action	Result / Remarks
	Note: The keys of the selection station have a toggle function for route selection. Pressing once means 'Zone(s) on' whilst pressing twice means 'Zone(s) off'. Key 10 of the activating station will act as a 'Clear' for the complete pre-selection.
After selecting either Separate ('0') or Combined ('1') mode, the display shows:	PRESS '0' TO MAINTAIN ZONE SELECTION PRESS '1' TO CLEAR SELECTION AFTER CALL
	Pressing '0' will cause the pre-selected zone to be maintained after end of call; the reset key will clear the routing. Pressing '1' will cause the pre-selected zones to be cleared after end of call.
	Note: This selection is valid for each Master Call Station connected. The question will not be repeated at the following MCSs.
After selecting either '0' or '1' the display shows:	CURRENT MASTER CALL STATION ASSIGNMENT INPUT 17-32 + MCS: 1111 2200 XXXX 0000
Press 'Enter' to couple or uncouple another Extended Call Station:	COUPLE/UNCOUPLE MASTER CST (1-4):_
Otherwise, press 'Break' to return to the following display:	PRESS '1' TO CONFIGURE EXTENDED CST PRESS '2' TO CONFIGURE MASTER CST

4

Installer Programming Menu: Route Digital Message Card

Status / Action	Result / Remarks
To route the Digital Message Card enter the Installer Programming menu as explained earlier, and scroll (using the 'Enter' key) until the display shows:	* INSTALL MENU * scroll with 'ENTER' PRESS '<<' TO ROUTE DIGIT. MESSAGE CARD
After pressing '◁◁' the display shows:	WHICH MESSAGE CARD MUST BE ROUTED:_
When a non-existent Digital Message Card number is entered the display shows:	WHICH MESSAGE CARD MUST BE ROUTED:XX DIGITAL MESSAGE CARD XX NOT PRESENT
Otherwise, when an existent Digital Message Card number is entered the display shows:	WHICH MESSAGE CARD MUST BE ROUTED:XX MESSAGE CARD CONNECTED TO INPUT XX
	Note: Unlike the Signal Generator Card, it is possible to connect more Digital Message Cards to the same matrix input.
Press 'Break' to return to the Main Installer Menu.	

Installer Programming Menu: (Re-)recording Messages

Status / Action	Result / Remarks
To (re-)record messages enter the Installer Programming menu as explained earlier, and scroll (using the 'Enter' key) until the display shows:	`* INSTALL MENU *  scroll with 'ENTER'` `PRESS '<' FOR MESSAGE (RE-)RECORDING`
After pressing '◁' the display shows:	`SELECT DIGITAL MESSAGE CARD:_`
When a non-existent Digital Message Card number is entered the display shows:	`SELECT DIGITAL MESSAGE CARD:XX` `DIGITAL MESSAGE CARD XX NOT PRESENT`

Otherwise, when an existent Digital Message Card number is entered the display shows:	`DMC: XX SELECT MESSAGE TO RECORD:_`
	`PRESS 'C' TO ERASE ALL MESSAGES`
	Either select a message to record, or press 'C' to erase all messages recorded previously.

When 'C' is pressed, followed by 'Enter', the display shows:	`DMC: XX SELECT MESSAGE TO RECORD:C` `'0' CLEARS; ANY OTHER KEY ABORTS`
Press '0' now to erase all previously recorded message from the card:	`DMC: XX SELECT MESSAGE TO RECORD:_` `ALL MESSAGES ERASED`

After selecting a message number followed by pressing 'Enter' the display shows:	`TIME: - - - - - - - - - - - - - - - -`
	`PRESS 'ENTER' TO START (RE-)RECORDING`
	Note: It is possible to record up to seven messages on a single card. The total recording time available is approximately 65 seconds.

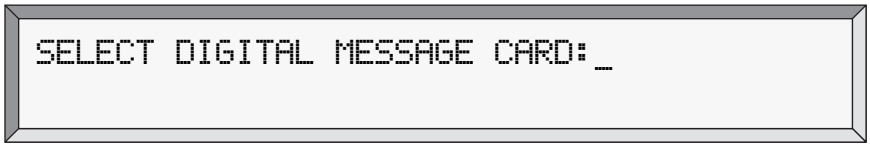
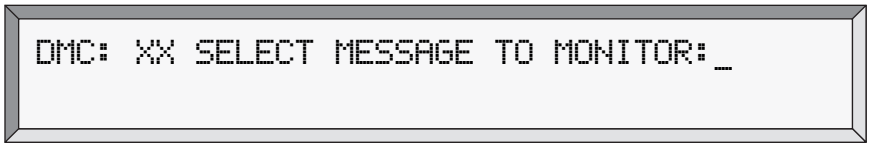
NOTES:

1. If all messages are erased, the following recording sequence is mandatory: Message 1 first, followed by Message 2 second etc upto message 7.

2. A system reset during recording may disturb the recording.

Status / Action	Result / Remarks
	Recording can be controlled in the following three ways: 1. Using the 'Enter' key, 2. Using the 'Call Station' key connected to the Digital Message Card, 3. Using the 'On/Off' switch of the microphone connected to the Digital Message Card (if jumper X102 on the DMC is in position 1-2).
Using the 'Enter' key:	
Press 'Enter':	TIME: – – – – – – – – – – – – – – – – – PRESS 'ENTER' TO STOP RECORDING Recording begins and the time bar decreases.
Press 'Enter':	DMC: XX SELECT MESSAGE TO RECORD:_ PRESS 'C' TO ERASE ALL MESSAGES Recording stops, and another message can be recorded.
Using the 'Call Station' key:	
Press and hold the 'Call Station' key.	TIME: – – – – – – – – – – – – – – – – – RELEASE KEY TO STOP RECORDING Recording begins and the time bar decreases.
Release the 'Call Station' key.	DMC: 02 SELECT MESSAGE TO RECORD:_ PRESS 'C' TO ERASE ALL MESSAGES Recording stops, and another message can be recorded.
Using the microphone:	Recording using the microphones switch is identical to recording using the 'Call Station' key.
When re-recording a previously recorded message the display shows:	TIME: – – – – – – – – – – – – – – – – – (RE-)RECORDING MESSAGE: X Note: Re-recording can not be stopped. Recording automatically stops at the end of the original recorded messages time.
When, using any of the methods above, the available recording time has been used, the display shows:	DMC: XX SELECT MESSAGE TO RECORD:_ AVAILABLE TIME USED; RECORDING STOPPED

Installer Programming Menu: Message Monitoring

Status / Action	Result / Remarks
To monitor messages enter the Installer Programming menu as explained earlier, and scroll (using the 'Enter' key) until the display shows:	
After pressing '▷' the display shows:	
When an existent message number is entered, followed by 'Enter', the display shows:	
Press 'Enter':	 The selected message is now running.
Press 'Enter' to stop monitoring, or wait until the message finishes:	 Note: Similar to when recording messages, the 'Call Station' key and the microphone switch can also be used to start and stop monitoring (see '(Re-)recording Messages').

Installer Programming Menu: Message Card Back-Up

The digital message card unlike the Signal Generator Card is treated by the system in a different manner. For instance, when a call requires an attention or an alarm signal, a free Signal Generator Card is searched for and activated. All signal generators are identical with regard to their signals. However during Call Station programming, the Digital Message Card is also assigned to the call. Every Digital Message card can, if required, contain different messages. To prevent a call from not being accepted because a message card is busy, or reserved by another call, it is possible to have message cards with identical messages in the system which will only be accessed if the first card is not available.
Messages on back-up cards cannot be programmed via the Call Station Programming Menu. Only one back-up card per message can be assigned. The selected card number +8 will be the back-up card. This means that the message card input must be selected between 1 & 8.

Status / Action	Result / Remarks
To monitor messages enter the Installer Programming menu as explained earlier, and scroll (using the 'Enter' key) until the display shows:	`* INSTALL MENU *  scroll with 'ENTER'` `PRESS '>>' FOR MESSAGE CARD BACK-UP`
After pressing '▷▷' the display shows:	`CURRENT BACK-UP SITUATION: PRESS 'ENTER'` `1→09 2→10 3→11 4→12 5→13 6→14 7→15 8→16`
Press 'Enter':	`SELECT DIGITAL MESSAGE CARD:_`
When a non-existent Digital Message Card number is entered the display shows:	`SELECT DIGITAL MESSAGE CARD:XX` `DIGITAL MESSAGE CARD XX NOT PRESENT`

Otherwise, when a non-existent Backup Digital Message Card number (+8) is entered the display shows:	`SELECT DIGITAL MESSAGE CARD:XX`
	`BACK-UP CARD YY NOT PRESENT`
	Note: 'YY' must be higher than 'XX'.

When both the original and back-up cards are present, the display shows:	`ORIGINAL CARD:XX  BACK-UP CARD: YY`
	`PRESS '1' TO COUPLE; '0' TO UNCOUPLE`
	Pressing '1' will couple both cards, '0' will uncouple them. Pressing 'Break' will leave the coupling untouched.

After pressing either '0', '1' or 'Break' the display shows:	`CURRENT BACK-UP SITUATION: PRESS 'ENTER'` `1→09 2→10 3→11 4→12 5→13 6→14 7→15 8→16`
Press 'Break' to return to the Main Installer Menu.	

Installer Programming Menu: Leaving the Installer Programming Menu

Status / Action	Result / Remarks
Press 'Break' as often as necessary to return to the Main User Menu:	* INSTALL MENU * scroll with 'ENTER' PRESS 'BREAK' TO EXIT PROGRAMMING MODE
Press 'Break' once more to return to 'Normal Run Mode'.	* * * SM40 ROUTING SYSTEM * * * DAY XX-XX TIME XX:XX
	Note: When the available Signal Generators or Message Cards are not routed, the system will not return to Normal Run Mode.
When the available Signal Generators are not routed, the display shows:	* WARNING * SIGNAL GENERATOR NOT ROUTED PRESS 'ENTER'
After pressing 'Enter' the display will show the SGC routing program, or:	* WARNING * MESSAGE SOURCE NOT ROUTED PRESS 'ENTER'
After pressing 'Enter', the display will show the Message Routing program, or:	* WARNING * DIG. MESSAGE CARD NOT ROUTED PRESS 'ENTER'
After pressing 'Enter', the display will show the Digital Message Card routing menu.	

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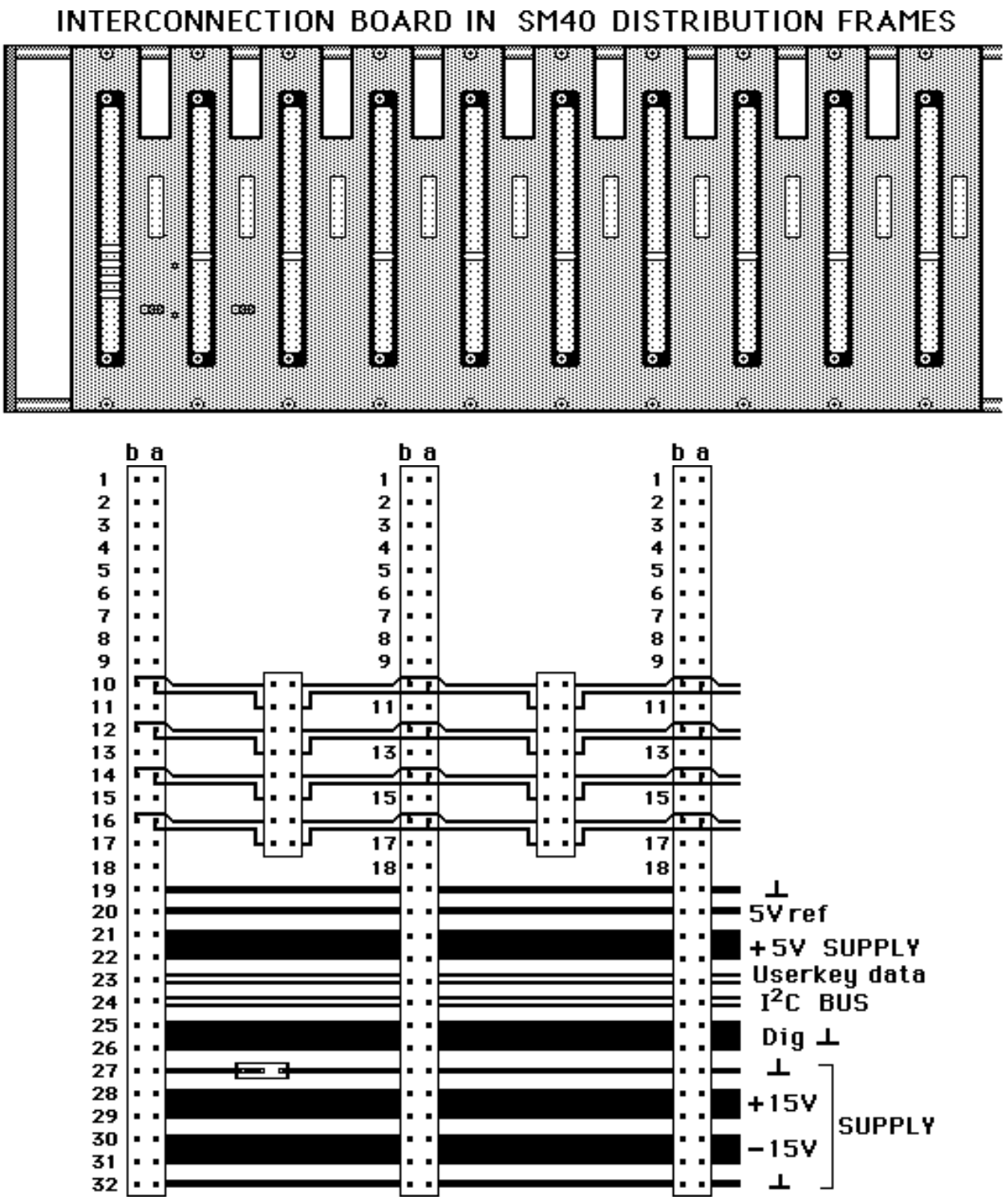


Interconnection Board

5. SM40 MODULES

5.1 Interconnection Board - IB

Interconnection board for 10 SM40 eurocards. Eurocard pressfit a + b (2 x 32) connectors.
Mounted at the rear of the 19 inch rack frame.

In any sophisticated communication system, convenient and reliable interconnection of the various Eurocards and other printed circuit cards and components, is vital.
The use of the Interconnection Board (IB) gives the SM40 Public Address Distribution Centre both reliability and a great deal of flexibility.

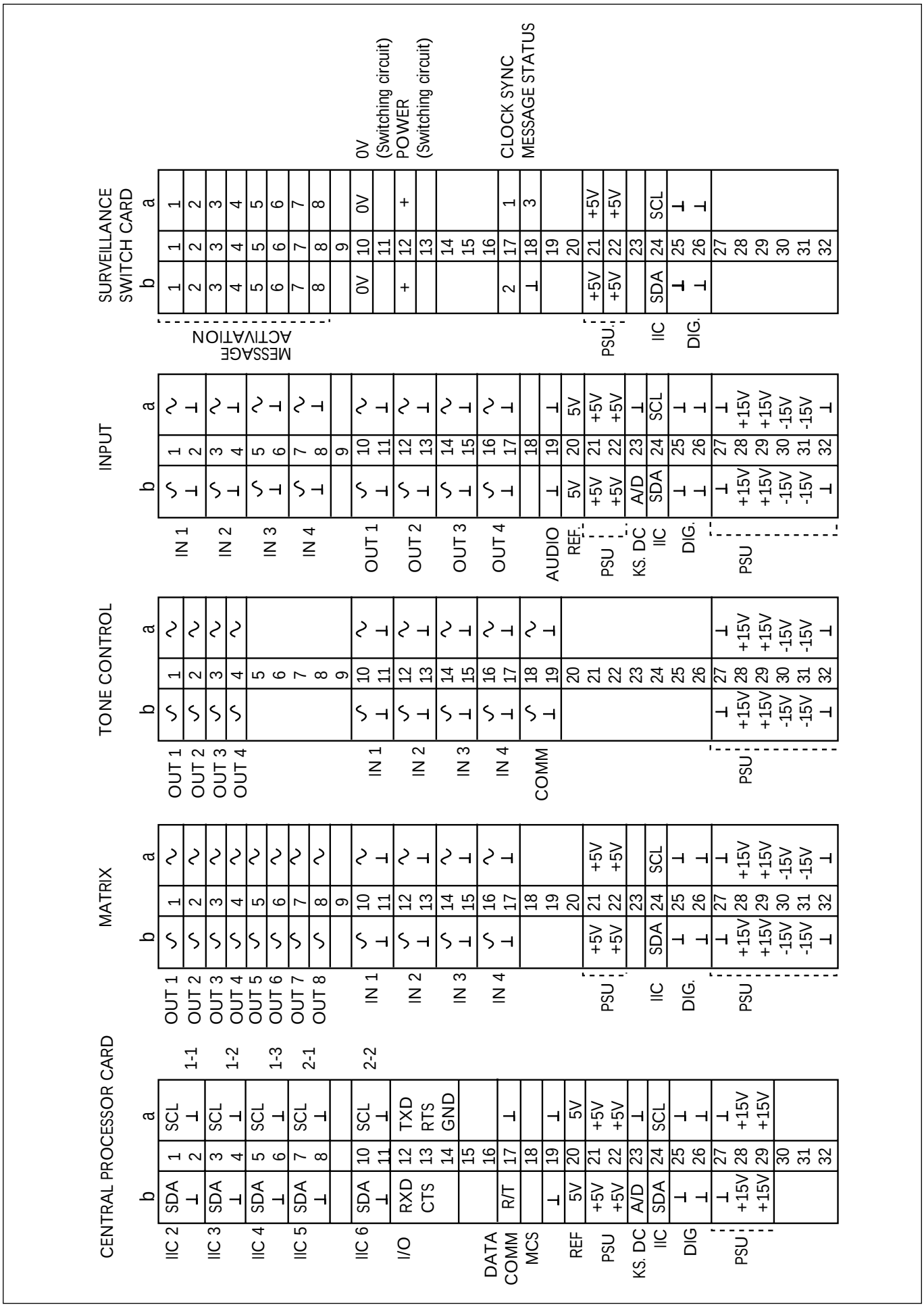
One IB is mounted at the rear of each 19 inch frame unit, and contains 10 Eurocard 'Pressfit' connectors of the 'a+b' (2x32) format, into which 10 SM40 circuit cards can be plugged.

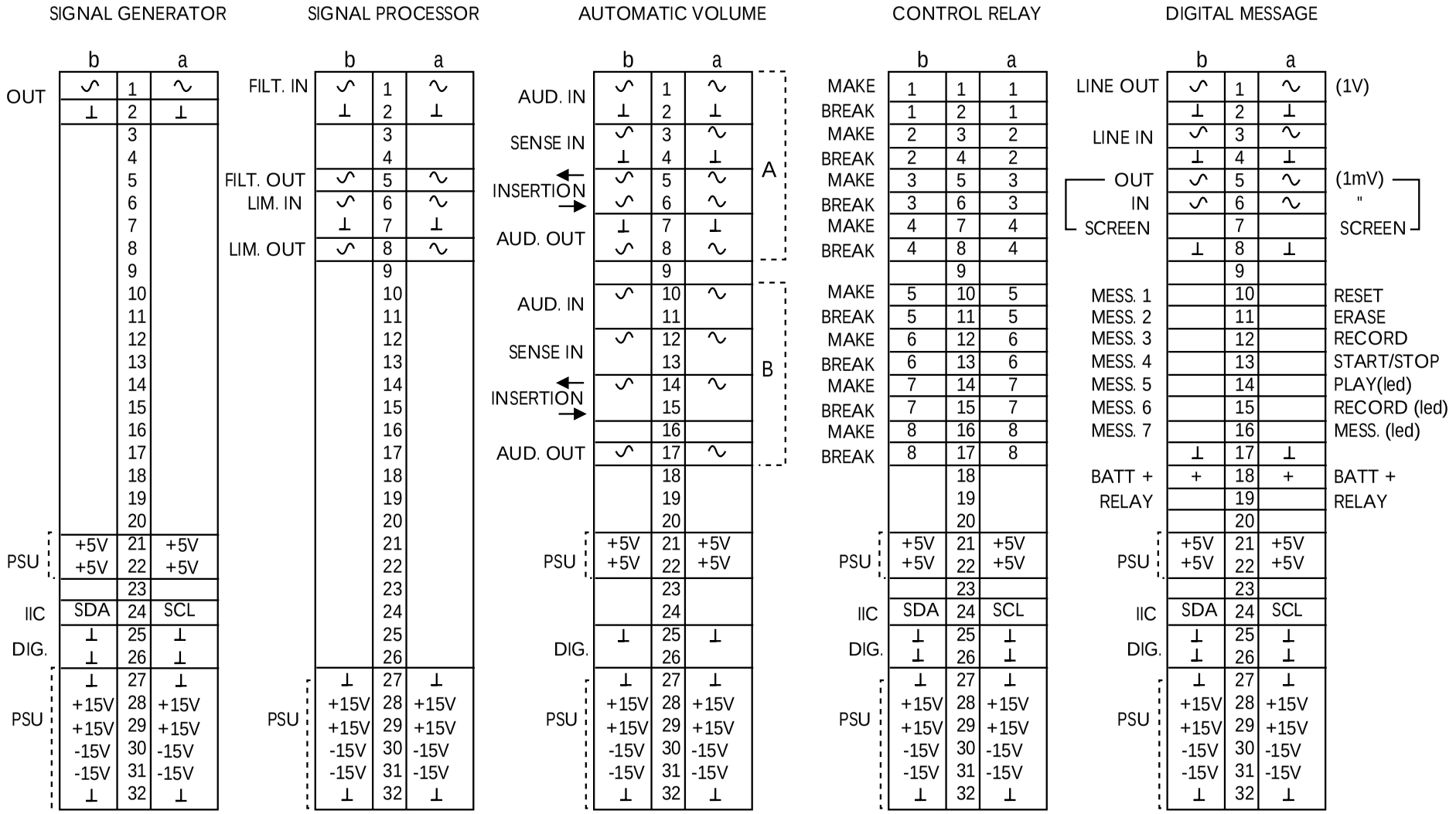
The SM40 circuit card slides along rails within the frame unit and, with a light extra push, is mated securely with the IB.
Removal of a card is done in the same way; a gentle tug with the special tool supplied, and the card then slides out of the frame unit for service. After replacing a card always reset the CPC card.

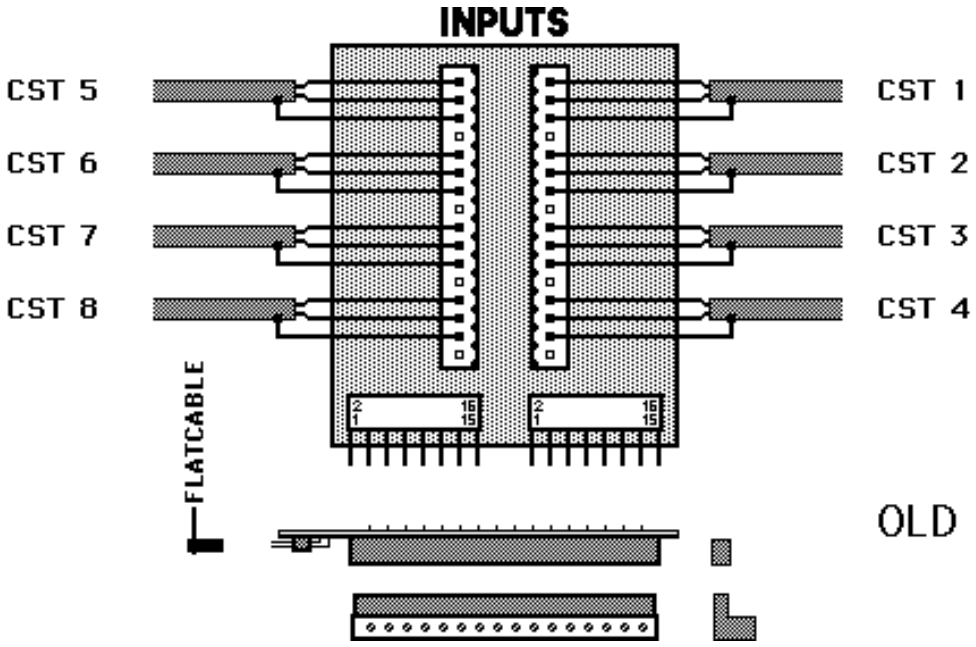
Each connector on the IB is universal, so that the cards may be located in the most convenient order within the frame. This means that, regardless of the system configuration, every card position in the rack frames may be used, and that alteration or expansion of the system is both easy and economical.

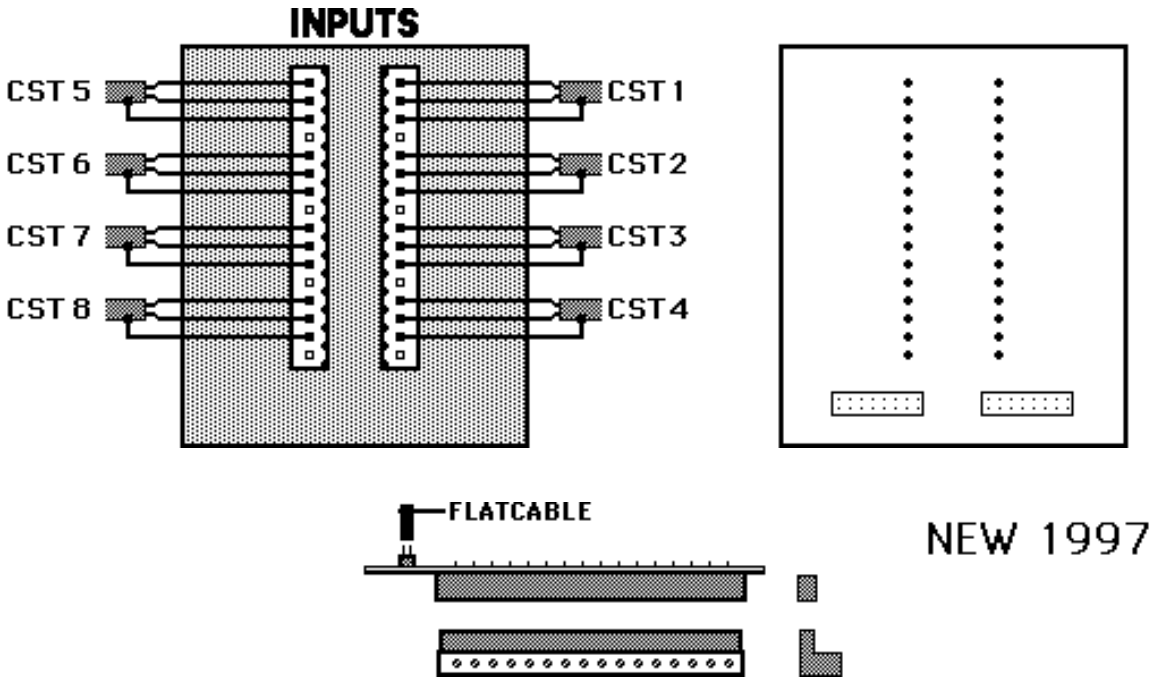
The power supply and reference signals, common to all of the circuit cards, is carried on rails printed on the IB, but because the SM40 system has such a wide range of configuration possibilities, a certain amount of cross-wiring between circuit cards is necessary. This is easily accomplished by terminating the individual connector wires or flat cables with female Pressfit connectors. These are then pushed onto the pins of the Eurocard connectors which are exposed on the rear side of the IB.

Interconnection between the IB and the Termination Boards (TB)s is also accomplished using flat cables fitted with female Pressfit connectors and small individual wiring connectors.
Located between the 10 connectors, on the rear of the IB, are Pressfit (2x8) connector blocks, whose function is to join certain contacts of adjacent cards together. Small Pressfit jumper plugs are used for this purpose (making the time consuming use of a soldering iron unnecessary). This 'through connection' of boards is particularly convenient when connecting an Input Card (IPC) or a Signal Generator Card (SGC) to 1 or more Matrix Cards (MC)s.


CENTRAL PROCESSOR CARD
MATRIX
TONE CONTROL
INPUT
SURVEILLANCE SWITCH CARD
MESSAGE ACTIVATION
IIC 2
IIC 3
IIC 4
IIC 5
IIC 6
I/O
DATA COMM
MCS
REF
PSU
KS. DC
IIC
DIG
PSU
OUT 1
OUT 2
OUT 3
OUT 4
OUT 5
OUT 6
OUT 7
OUT 8
IN 1
IN 2
IN 3
IN 4
COMM
AUDIO
REF.
PSU
KS. DC
IIC
DIG.
PSU
0V (Switching circuit)
POWER (Switching circuit)
CLOCK SYNC
MESSAGE STATUS


SIGNAL GENERATOR
b a
OUT
PSU +5V +5V
IIC SDA SCL
DIG.
PSU +15V +15V -15V -15V
SIGNAL PROCESSOR
b a
FILT. IN
FILT. OUT
LIM. IN
LIM. OUT
PSU +15V +15V -15V -15V
AUTOMATIC VOLUME
b a
AUD. IN
SENSE IN
INSERTION
AUD. OUT
A
AUD. IN
SENSE IN
INSERTION
AUD. OUT
B
PSU +5V +5V
DIG.
PSU +15V +15V -15V -15V
CONTROL RELAY
b a
MAKE BREAK MAKE BREAK MAKE BREAK MAKE BREAK
MAKE BREAK MAKE BREAK MAKE BREAK MAKE BREAK
PSU +5V +5V
IIC SDA SCL
DIG.
PSU +15V +15V -15V -15V
DIGITAL MESSAGE
b a
LINE OUT (1V)
LINE IN
OUT (1mV)
IN "
SCREEN SCREEN
MESS. 1 RESET
MESS. 2 ERASE
MESS. 3 RECORD
MESS. 4 START/STOP
MESS. 5 PLAY(led)
MESS. 6 RECORD (led)
MESS. 7 MESS. (led)
BATT + BATT +
RELAY RELAY
PSU +5V +5V
IIC SDA SCL
DIG.
PSU +15V +15V -15V -15V





TERMINATION BOARDS
WIRING CONFIGURATIONS

5.2 Termination Boards

Termination Board LBB 1377 (TB) (2 per Basic System)
Matrix Termination Board LBB 1371 (MTB) (1 per Basic System)
Relay Termination Board LBB 1379 (RTB)

Interconnection board mounted on the 19 inch frame back side, connecting:
a) 8 input sources (call stations and music sources) to the SM40 Centre.
b) SM40 Centre to the audio inputs of a maximum of 16 amplifiers.
c) The SM40 CRC's to the control inputs of 8 SQ45 amplifiers (break contacts), and/or to 8 loudspeaker volume control override circuits (make contacts).
Transformers may be mounted on TB (LBB 1377) to avoid earth(ground) loops when the system is interfaced with domestic music sources.
d) The CRC's to switch the 100 V output of the SQ45 amplifiers (see section 5.2.3)

The task of the termination boards described here is to connect the central rack unit of the SM40 Public Address Distribution Centre to external equipment.

A maximum of 5 boards can be mounted on the rear panel of each rack frame, which hinges down to expose the boards for service.
The use of push fit support studs to mount the boards onto the back panel makes fitting or removal a fast and simple matter.

Each termination board is connected to the Interconnection Board (IB) by flat cable and/or individual wires fitted with female Pressfit connectors.

Call Stations and amplifiers are wired (as shown), to screw connector blocks which are plugged into sockets mounted on the termination boards. This has the advantage that if, for some reason, an SM40 rack frame, or a TB, has to be removed, the screw connector block is simply unplugged, leaving the peripheral equipment wiring intact. This avoids the tedious and risky business of rewiring the blocks in their original configurations.

5.2.1 Termination Board - TB LBB 1377/00

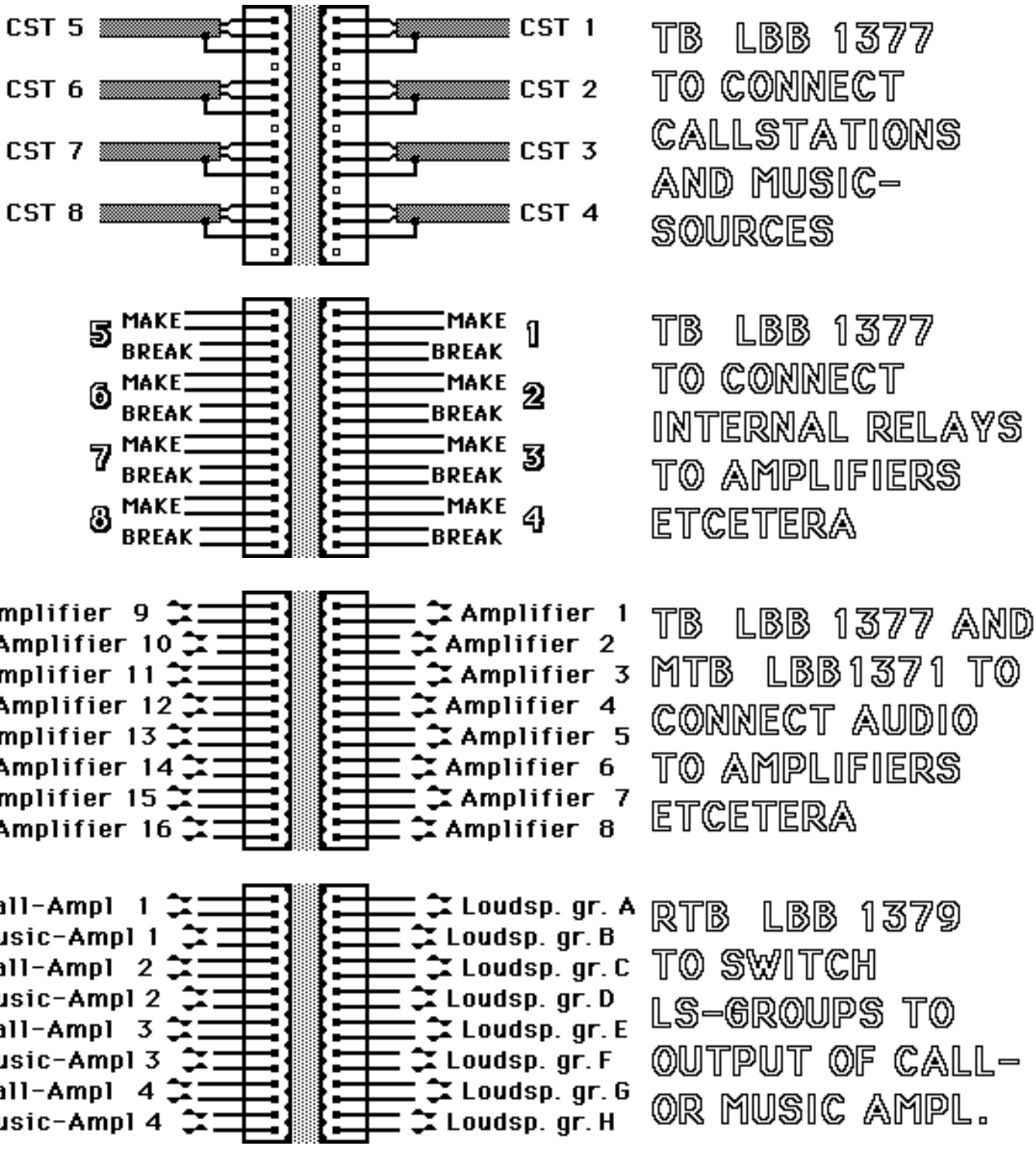
The Termination Board (TB) has a total of 2 x16 screwblock connectors, and is capable of carrying out several different functions:

1. Connection of Call Stations (CST)s and auxiliary input sources such as a background music player, cassette player, etc. to 8 audio inputs of the SM40 Centre.
2. Connection of up to 16 SM40 Centre audio outputs to the inputs of 16 SQ45 amplifiers.
3. Connection of the 'break' contacts of the Control Relay Cards (CRC)s to the volume control override inputs of SQ45 amplifiers.
4. Connection of the CRC 'make' contacts to the volume control override circuits which override the volume control settings of individual loudspeaker cabinets.

If encountering the disturbing effects of an earth (ground) loop, up to 8 'galvanic separation' transformers (for which the board of the LBB 1371 is pre-drilled) may be mounted. These transformers isolate the earth (ground) of the input source equipment from that of the SM40 system.

5.2.2 Matrix Termination Board - MTB LBB 1371/00

Matrix Termination Board LBB 1371 (MTB) is used to suppress any small clicks which may occur when outputs from the matrix are wired directly to an amplifier. A standard TB may be used when the signal is routed via a TCC or similar buffering device.



TERMINATION BOARDS CONNECTORS

EXTERNAL WIRING CONFIGURATIONS
(AS VIEWED FROM BACK OF RACK UNIT)

5.2.3 Relay Termination Board LBB 1379/00

Function
This card will be used in an SM40 PA System to route the 100 volt audio output of a call and music amplifier to a maximum of eight loudspeaker zones (see circuit diagram on opposite page).

The card is therefore equipped with eight relays to be activated by the make contacts of the eight relays of a Control Relay Card (CRC) in a SM40 system which in turn can be activated by programming the system.

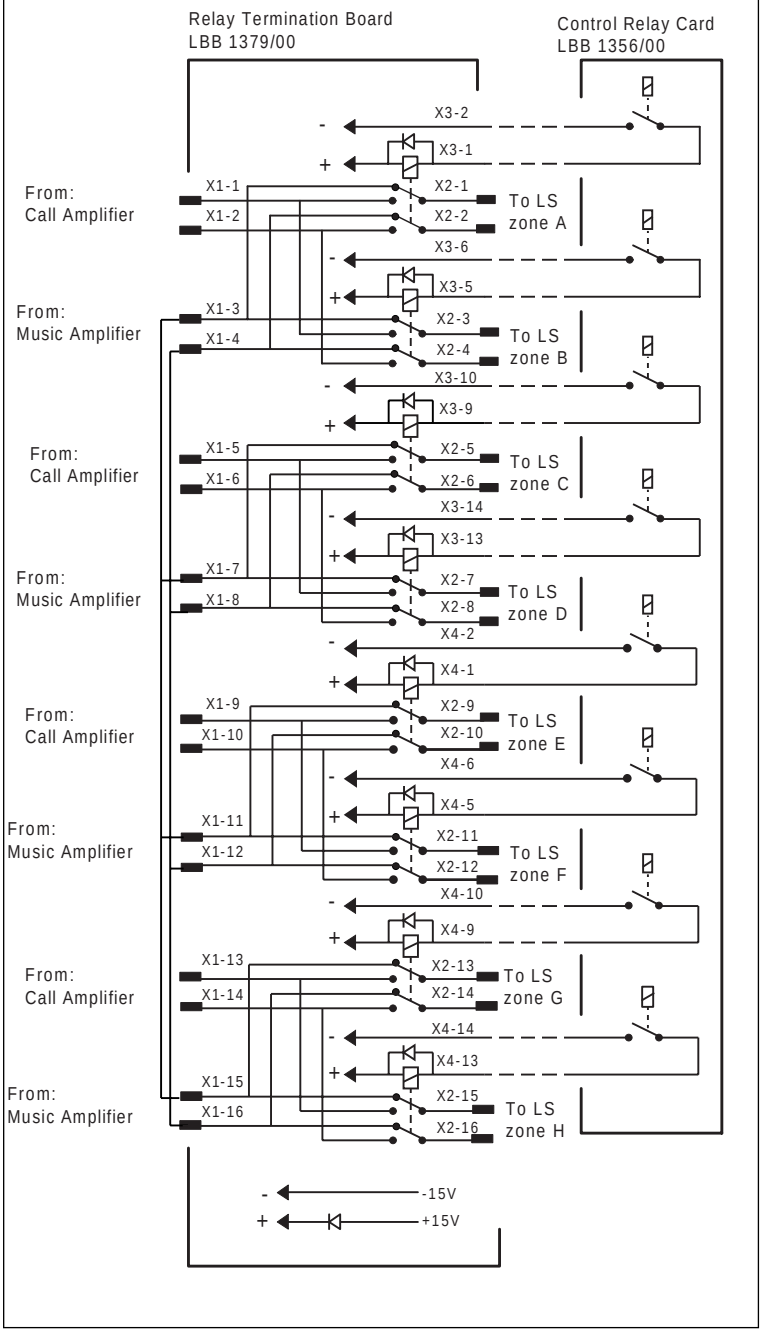
Installation
This card should be installed in place of a normal termination board (replaces it) inside an SM40 system and should be connected via 2 standard flat cables of 16 wires, to the Control Relay Card. See Termination Board Connectors.

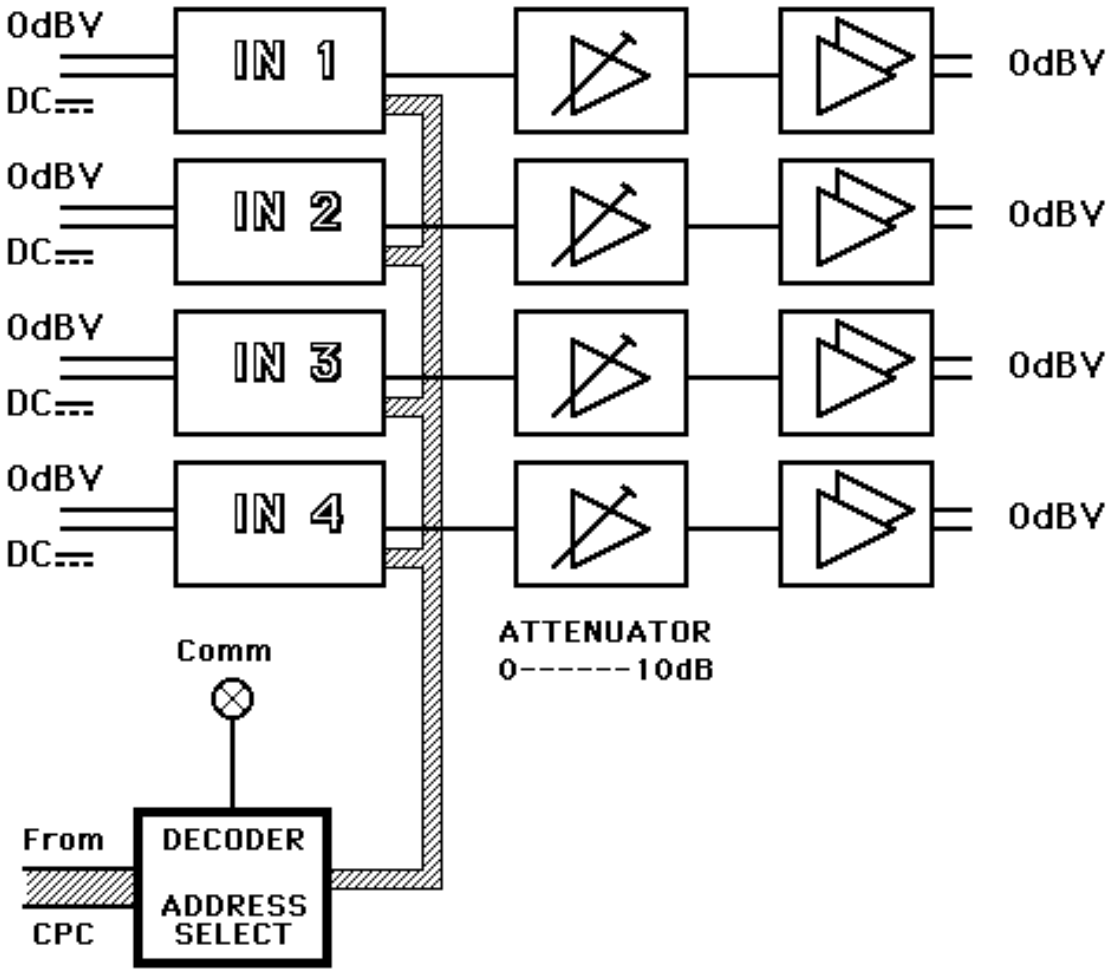
The power supply voltage for the relays is achieved from the internal SM40 power supply (+15 Volt and -15 Volt) via a standard 2-wire flat cable (see attached connecting diagram).

Remarks
- The card is protected against reversed connection of the power supply voltage.
- Instead of the internal power supply unit of the SM40 system an external power supply unit of approx. 30 volt can be used to activate the relays.
- Depending on the required audio power in the loudspeaker zones, 1 up to 4 call and/or music amplifiers can be connected to this card creating 8 loudspeaker zones.

NOTE: Relays are de-activated during calls via the Relay Termination Board (RTB).

Circuit diagram





LBB 1351
Input Card

5.3 Input Card - IPC LBB 1351

Eurocard 10 x 22 cm with an 'a b' connector (2 x 32). Inputs for 4 Call Stations, supplying phantom power and user key detection. There are 4 outputs and a connection to the communication line of the SM40.

Controlled and monitored by the central processor, each Input Card (IPC) LBB1351 interfaces 4 Call Stations (CST)s with the SM40 Public Address Distribution Centre.

The SM40 Centre will accept a maximum of 8 Input Cards.

By coupling Input Cards, Call Stations can be extended to accept up to 50 User Keys. This is accomplished in the Installer programming mode, using key C on the Display and Keyboard. The extra User Keys (Key Sensing PCB (KSP)) are connected to IPC 5, 6 7 or 8 for Call station CST1 to CST4.

The Key-Sensing PCB (KSP) can also be used without the 'Call' facility, to activate e.g. alarm tones. Depending on the configuration these are connected to IPC 5 -8, and are called Alarm Stations (ASTs).

Each Input Card has 4 audio inputs and outputs, and provides each Call Station with (phantom) powering, and user key detection.

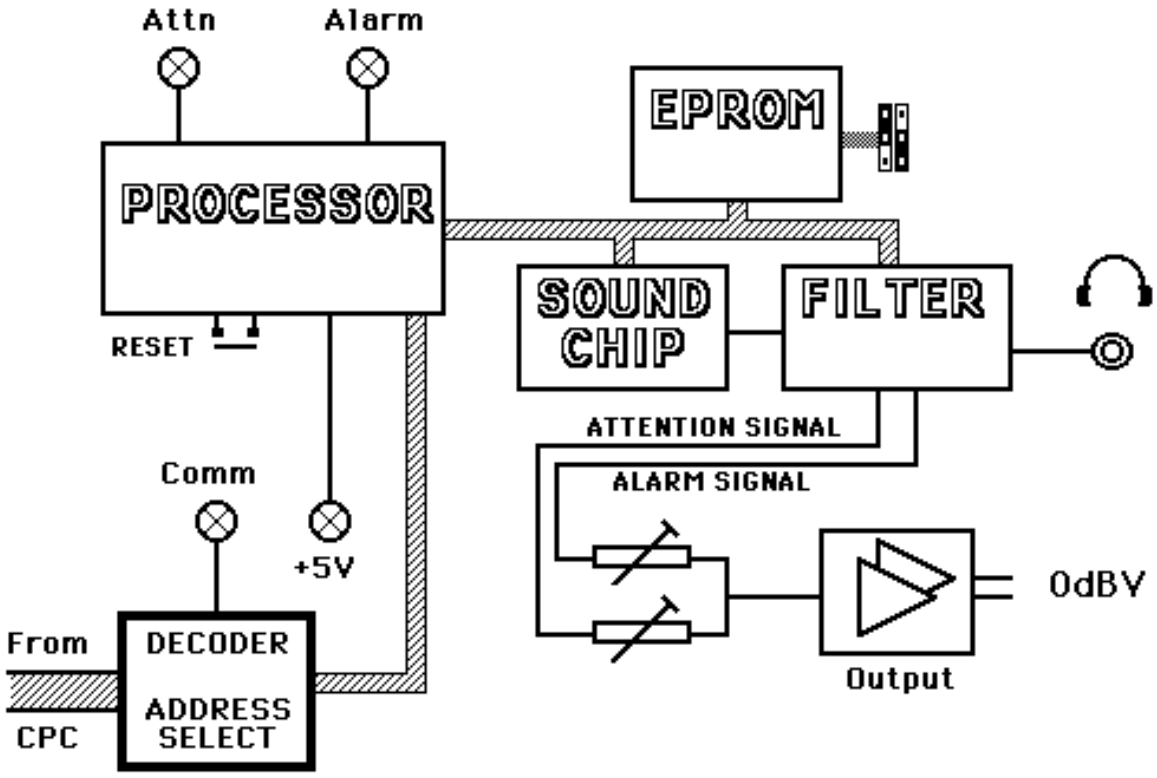
The phantom powering also powers red "busy" and green "call" LEDs, mounted on the Microphone Call Stations, a circuit built into the IPC causes the green LED to flash when in the "wait" mode (during attention signal).
The user key detection circuit informs the Central Processor Card (CPC) which user key on which call station is being pressed.

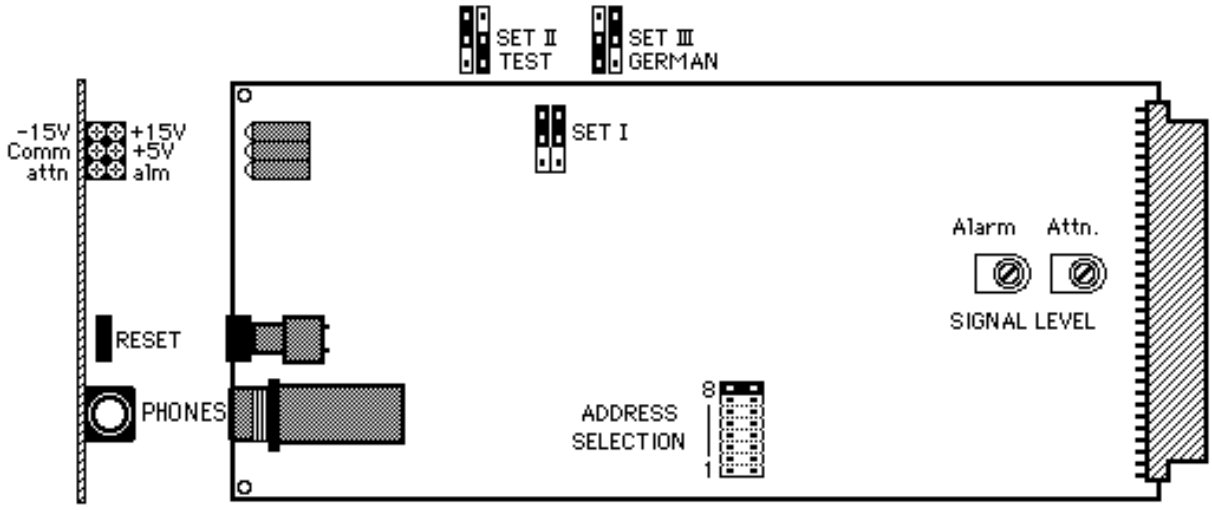
In order for the Central Processor to "recognise" an Input Card, each unit is given an "address". This address setting is accomplished by positioning a jumper on the IPC card.

In line with Philips' commitment to reliability and ease of service, the following features have been built in to the unit:

- If an input is short circuited the other inputs will not be effected.
- A yellow LED on the front edge of the card advises that the Input Card (IPC) is in communication with the Central Processor Card (CPC).
- 3 green LEDs indicate that adequate supply voltage is present.
- Four screwdriver potentiometers, mounted on the card, allow attenuation of each channel to be preset.

Note: These potentiometers should normally be placed in their maximum position and should only be changed in situations where full power, using the relevant call station, is not required from the system.





LBB 1354
Signal Generator Card

5.4 Signal Generator Card - SGC LBB 1354

Eurocard 10 x 22 cm with an 'a b' connector (2 x 32) containing a chime/alarm and test tone generator which is preprogrammed with over 70 signals. Each signal can be activated by the CPC via the communication line.

Attention signals, warning tones, time chimes, etc., are a vital part of any public address installation. The Signal Generator Card (SGC) enables the user to select from a wide variety of greatly differing tones and signals, and to route them to loudspeakers located in geographical or functional zones.

The Signal Generator is equipped with its own processor, and pre-programmed with over 70 different signals, chimes, alarms, and test tones. A maximum of 8 SGCs may be used in each SM40 system.

Any signal may be programmed to precede an announcement from a Call Station or, dependent on its character, may be used alone as an alarm, or warning tone.

The facility also exist to activate signals at specific times of the day or week via the timer built into the Central Processor Card (CPC).

The signals listed are divided into the following general categories:

SIGNAL SET I	SIGNAL SET II	SIGNAL SET III
Attention and Time Signals Alarm Signals	Test Signals	Attention and Time Signals Dedicated German Alarm Signals

Signals in Set II are used during installation and for service purposes.

If a Signal Generator Card is being used by, for instance, an alarm tone in a particular zone, and someone attempts to call another zone, the CPC will automatically select an alternative SGC to generate the chime signal. Because of this it is important, when planning a system, to have enough SGCs and Matrix Cards (to which they are connected) to enable it to operate normally in this kind of situation.
In order for the Central Processor to "recognise" a SGC, each unit is given an 'address'. This address setting is accomplished by repositioning a jumper on the Signal Generator Card.

The 6.3 mm jack socket, located on the front of the SGC, allows generated signals to be heard on headphones, while monitoring during Installer programming.

A red LED is located on the front edge of the card to indicate that an alarm tone is sounding; a yellow LED indicates that an attention, general purpose or time signal is sounding; another yellow LED indicates that the unit is in communication with the Central Processor, and 3 green LEDs advise that adequate supply voltage is present.

A screwdriver potentiometer, mounted on the card, presets the alarm signal volume level, and another sets the level of the other signals.

LIST OF AVAILABLE SIGNALS

Signal Set I

CHIME TONES

Stop after pre-programmed duration, unless user key is released.

01	1-tone chime; frequency	440 Hz.
02	2-tone chime; frequencies	554 & 440 Hz
03	3-tone chime; frequencies	392, 523 & 659 Hz
04	3-tone chime; frequencies	659, 523 & 392 Hz
05	4-tone chime; frequencies	554, 440, 493 & 330 Hz
06	4-tone chime; frequencies	659, 523, 392 & 330 Hz
07	Mixed-tone chime; frequencies	440 & 554 Hz
08	4-tone chime; frequencies	196, 262, 330 & 392 Hz

ALARM SIGNALS

Stop when user key is released, or where a time is noted below: the signal continues to the end of that duration even though the key is released.

56 Swedish: Immediate danger (Swedish standard SS 031711).
Single tone of 600 Hz; 200 ms on, 200 ms off and repeating. Signal duration: 60 seconds (Not available)

57 Norway: End-of-alarm:
Single tone of 1000 Hz; 2 seconds on, 2 seconds off and repeating.

58 Norway: End-of-alarm:
Single tone of 1000 Hz; 200 ms on, 200 ms off and repeating.

59 Norway: Damm alarm:
Tone of 350, 370 & 390 Hz mixed; 6 seconds on, 9 seconds off and repeating. Signal duration: 300 seconds.

60 Norway: Gas alarm:
Tone of 350, 370 & 390 Hz mixed; 4 seconds on, 4 seconds off, 12 seconds on, 4 seconds on and repeating. Signal duration: 120 seconds.

61 Norway: Important message:
Tone of 350, 370 & 390 Hz mixed; 11 seconds on, 13 seconds off, 11 seconds on, 13 seconds off, 11 seconds on, 60 seconds off. This cycle is repeated 3 times.

62 Norway: Air alarm:
Tone of 350, 370 & 390 Hz mixed; 700 ms on, 600 mS off and repeating. Signal duration: 60 seconds.

63 Norway: End of alarm:
Tone of 350, 370 & 390 Hz mixed; Signal duration: 30 seconds.

64 DIN alarm:
Sweeping signal from 1200 down to 500 Hz in 1 second and repeating.

65 DIN alarm:
Sweeping signal from 1200 down to 500 Hz in 1 second and repeating. Signal duration: 60 seconds.

66 American Police siren:
Sweeping signal from 800 down to 400 Hz in 500 ms and repeating.

67 American Police siren:
Sweeping signal from 800 down to 400 Hz in 500 ms and repeating. Signal duration: 60 seconds.

68 Two tone alarm:
Alternating frequencies of 440 & 554 Hz. Every frequency lasts 1 second.

69 Two tone alarm:
Alternating frequencies of 440 & 554 Hz. Every frequency lasts 1 second. Signal duration: 60 seconds.

70 Important message (Swedish standard SS 03 17 11) (Not available on SGC)
Frequency 600 Hz
6 times 6 seconds on followed by 12 seconds silence.
Total signal length: 96 seconds

71 All Clear (Swedish standard SS 03 17 11) (Not available on SGC)
Frequency 600 Hz; Signal length: 30 seconds

72 Repeated character 'S' in Morse. Frequency: 1200 Hz.

73 Repeated character 'S' in Morse. Frequency: 1200 Hz. Signal duration: 60 seconds.

74 Repeated character 'S' in Morse. Frequency: 2700 Hz.

75 Repeated character 'S' in Morse. Frequency: 2700 Hz. Signal duration: 60 seconds.

78 Norway: Abandon platform. Single tone of 1000 Hz.

79 Norway: Abandon platform. Single tone of 1000 Hz. Signal duration: 60 seconds.

80 Norway: End of alarm.
Single tone of 1000 Hz; 1 second on, 0.5 second off and repeating.

81 Norway: End of alarm.
Single tone of 1000 Hz; 1 second on, 0.5 second off and repeating. Signal duration: 60 seconds.

82 Slow Whoop:
Sweeping signal from 500 up to 1200 Hz in 1 second, followed by 1 second of silence and repeating.

83 Slow Whoop:
Sweeping signal from 500 up to 1200 Hz in 1 second, followed by 1 second of silence and repeating.
Signal duration: 60 seconds.

93 France: Evacuation signal.
Alternating frequencies of 554 & 440 Hz. 554 Hz lasts 100 ms; 440 Hz lasts 400 ms.

94 France: Evacuation signal.
Alternating frequencies of 554 & 440 Hz. 554 Hz lasts 100 ms; 440 Hz lasts 400 ms. Signal duration: 60 seconds.

Signal Set II: TEST SIGNALS

The signals in this set are intended for installation purposes only. Amplitudes of the continuous signals and frequency spectra of the noise signals are not calibrated.

16 Single tone of 250 Hz. Signal ends after key release.

17 Single tone of 250 Hz. Signal ends when card is reset.

18 Single tone of 400 Hz. Signal ends after key release.

19 Single tone of 400 Hz. Signal ends when card is reset.

20 Single tone of 1000 Hz. Signal ends after key release

21 Single tone of 1000 Hz. Signal ends when card is reset.

22 Single tone of 2000 Hz. Signal ends after key release.

23 Single tone of 2000 Hz. Signal ends when card is reset.

24 Single tone of 4000 Hz. Signal ends after key release.

25 Single tone of 4000 Hz. Signal ends when card is reset.

26 Pink noise. Signal ends after key release.

27 Pink noise. Signal ends when card is reset.

28 White noise. Signal ends after key release.

29 White noise. Signal ends when card is reset.

30 Repeating 1 tone chime. Signal ends after key release.

31 Repeating 1 tone chime. Signal ends when card is reset.

32 Loudspeaker phase test click. Signal ends after key release.

33 Loudspeaker phase test click. Signal ends when card is reset.

Signal Set: III: Dedicated German Signals

CHIME TONES

Stop after pre-programmed duration, unless user key is released.

01	1-tone chime; frequency	440 Hz.
02	2-tone chime; frequencies	554 & 440 Hz
03	3-tone chime; frequencies	392, 523 & 659 Hz
04	3-tone chime; frequencies	659, 523 & 392 Hz
05	4-tone chime; frequencies	554, 440, 493 & 330 Hz
06	4-tone chime; frequencies	659, 523, 392 & 330 Hz
07	Mixed-tone chime; frequencies	440 & 554 Hz
08	4-tone chime; frequencies	196, 262, 330 & 392 Hz

ALARM SIGNALS

Stop when user key is released, or where a time is noted below: the signal continues to the end of that duration even though the key is released.

64 DIN alarm:
Sweeping signal from 1200 down to 500 Hz in 1 second and repeating.

65 DIN alarm:
Sweeping signal from 1200 down to 500 Hz in 1 second and repeating. Signal duration: 60 seconds.

Signals 66-69 are not available in this signal set.

70 End of alarm.
Start frequency 100 Hz, sweeping up to 420 Hz, holding that frequency for 60 seconds, sweeping down to 100 Hz and ending.

71 Fire alarm.
Start frequency 100 Hz, sweeping up to 420 Hz, holding that frequency for 10 seconds, sweeping down to 300 Hz, holding that frequency for 10 seconds and repeating this cycle until 60 seconds are passed. Then sweeping down to 100 Hz and ending.

Signals 72-75 are not available in this signal set.

76 Air alarm.
Start frequency 100 Hz, sweeping up to 420 Hz, sweeping down and up between 300 and 420 Hz until 60 seconds have passed. Then sweeping down to 100 Hz and ending.

77 ABC alarm.
Start frequency 100 Hz, sweeping up to 420 Hz, sweeping down and up between 300 and 420 Hz during 10 seconds, sweeping down to 100 Hz and holding that frequency during 10 seconds and repeat sweep cycle until 60 seconds have passed. Then sweeping down to 100 Hz and ending.

Signals 78-83 are not available in this signal set.

84 End of alarm.
Single tone of 400 Hz.

85 End of alarm.
Single tone of 400 Hz. Signal duration: 60 seconds.

86 Evacuation signal.
Frequency 400 Hz; 500 mS on, 2 seconds off and repeating.

87 Evacuation signal.
Frequency 400 Hz; 500 mS on, 2 seconds off and repeating. Signal duration: 60 seconds.

88 Fire alarm.
Alternating frequencies of 925 & 1075 Hz. Each frequency lasts 1 second.

89 Fire alarm.
Alternating frequencies of 925 & 1075 Hz. Each frequency lasts 1 second. Signal duration: 60 seconds.

90 Run for your life alarm.
Sweeping signal from 350 up to 700 Hz in 330 mS, then sweeping down to 350 Hz in 660 ms and repeating.

91 Run for your life alarm.
Sweeping signal from 350 up to 700 Hz in 330 mS, then sweeping down to 350 Hz in 660 ms and repeating.
Signal duration: 60 seconds.

92 Special ABC alarm.
Start frequency 100 Hz, sweeping up to 420 Hz, sweeping down and up between 420 & 300 Hz during 10 seconds. Sweeping down to 100 Hz and holding that frequency during 10 seconds and restarting until 60 seconds passed. Then silence during 30 seconds and restarting until 150 seconds have passed.

Signals 93-94 are not available in this signal set.

95 Permanent alarm.
Single tone of 800 Hz.

96 Ship alarm.
Frequency 800 Hz; 1 second on, 1 second off, 2 seconds on, 1 second off and repeating.

97 Ship fire alarm.
Frequency 800 Hz; 7 times 1 second, 1 second off, followed by 2 seconds on, 1 second off and repeating.

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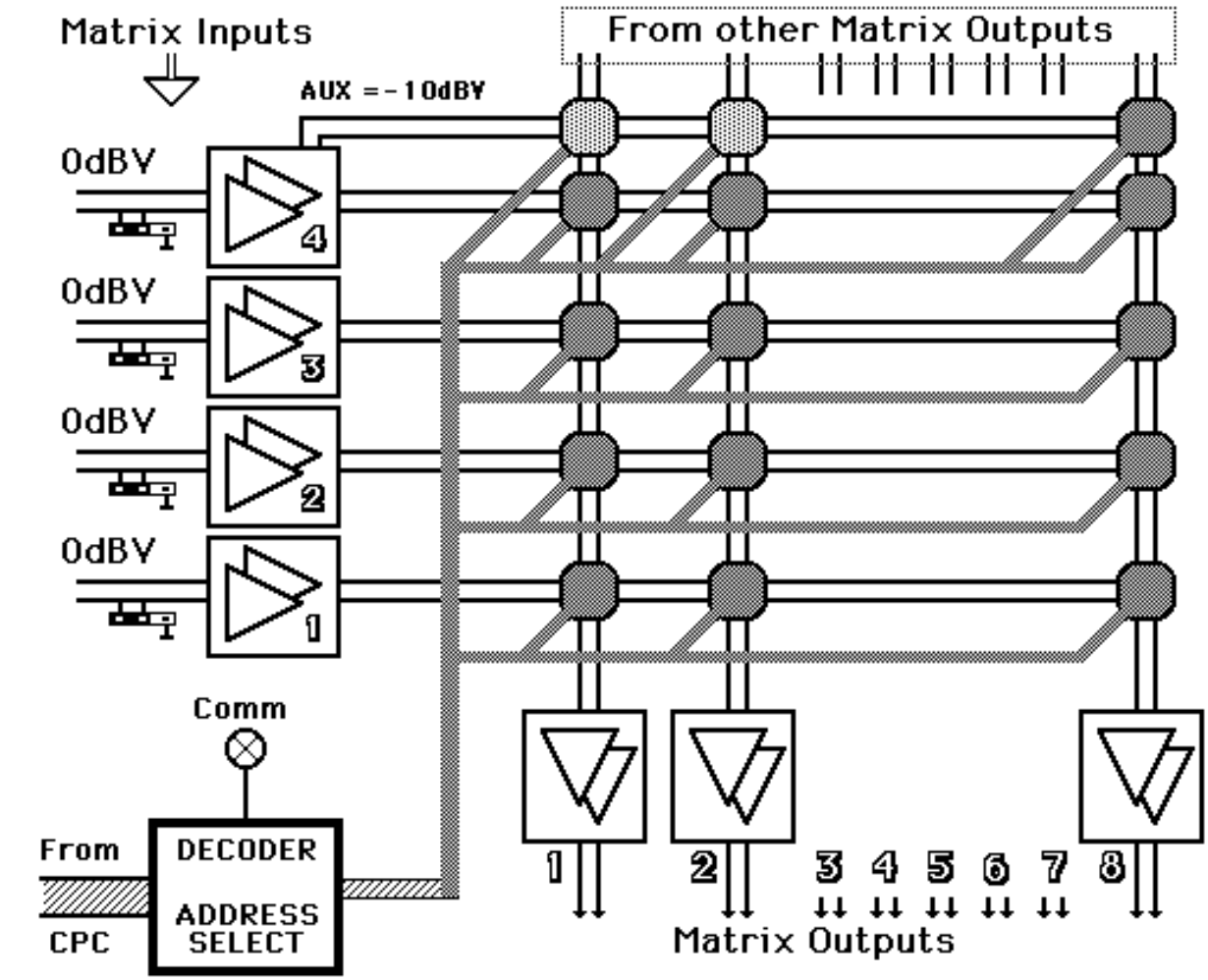
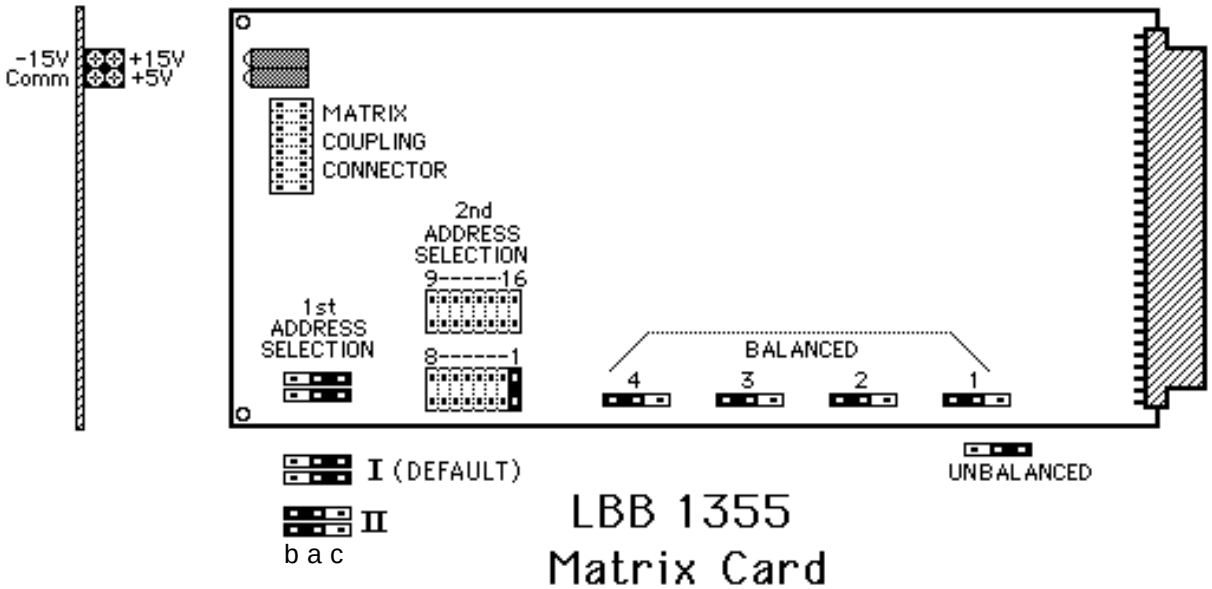




LBB 1355
Matrix Card

5.5 Matrix Card - MC LBB 1355

Eurocard 10 x 22 cm with an 'a b' connector (2 x 32) containing a 4 in, 8 out matrix. Extra cards can form a 16 in, 64 out or 32 in 32 out matrix. The actual switching is activated by the CPC via the communication line.

Matrix Card (MC) LBB 1355 enables inputs of the SM40 public address distribution centre to be routed to loudspeakers located in geographical and/or functional zones where people must be reached with background music, announcements and alarm signals.

Each Matrix Card, controlled by the central processor card (CPC), switches 4 line level electronically balanced audio inputs to any or all of its 8 outputs. Up to 32 units may be connected together to form a maximum matrix of 16 audio inputs to 64 audio outputs, or 32 audio inputs to 32 audio outputs (32 x 32).

Switching of more than one input to the same output simultaneously is prevented by the system's software.

Signal sources for Matrix Card inputs are:
Input Cards (IPC)s (interface from 4 Call Stations); Signal Generator Cards (SGC)s (alarm and attention tones); Signal Processing Cards (SPC)s, Tone Control Cards (TCC)s, Digital Message Cards (DMC)s, Automatic Volume Control Cards(AVC)s, and auxiliary sources (background music players, cassette machines, and other message devices).

Auxiliary sources are normally patched to the 4th input of the MC, which has a switch, programmable to attenuate the music signal by 10dB when a Call Station is routed to the same loudspeaker zone. Music from a 4th input not programmed with this option, or from another input, is automatically muted when a CST is routed to the same zone.

Matrix card outputs may be connected to:
Signal Processing Cards (SPC)s; Tone Control Cards (TCC)s; Automatic Volume Control Cards (AVC)s; direct to amplifier inputs; or to the mixing inputs of other MCs, using a flat cable plugged into their coupling connector.

When forming a larger matrix, cards are "addressed"; meaning that they are given specific places in the total matrix, by repositioning 2 sets of jumpers on each card. In a matrix of 32 cards, the MCs are be divided into two groups, (I and II), and numbered 1 to 16. It should be noted that when using the 1st address selection blocks to address the cards to a group, both jumper plugs must be in the same position: either a-c for group 1, or a-b for group 2 (see circuit card layout drawing).

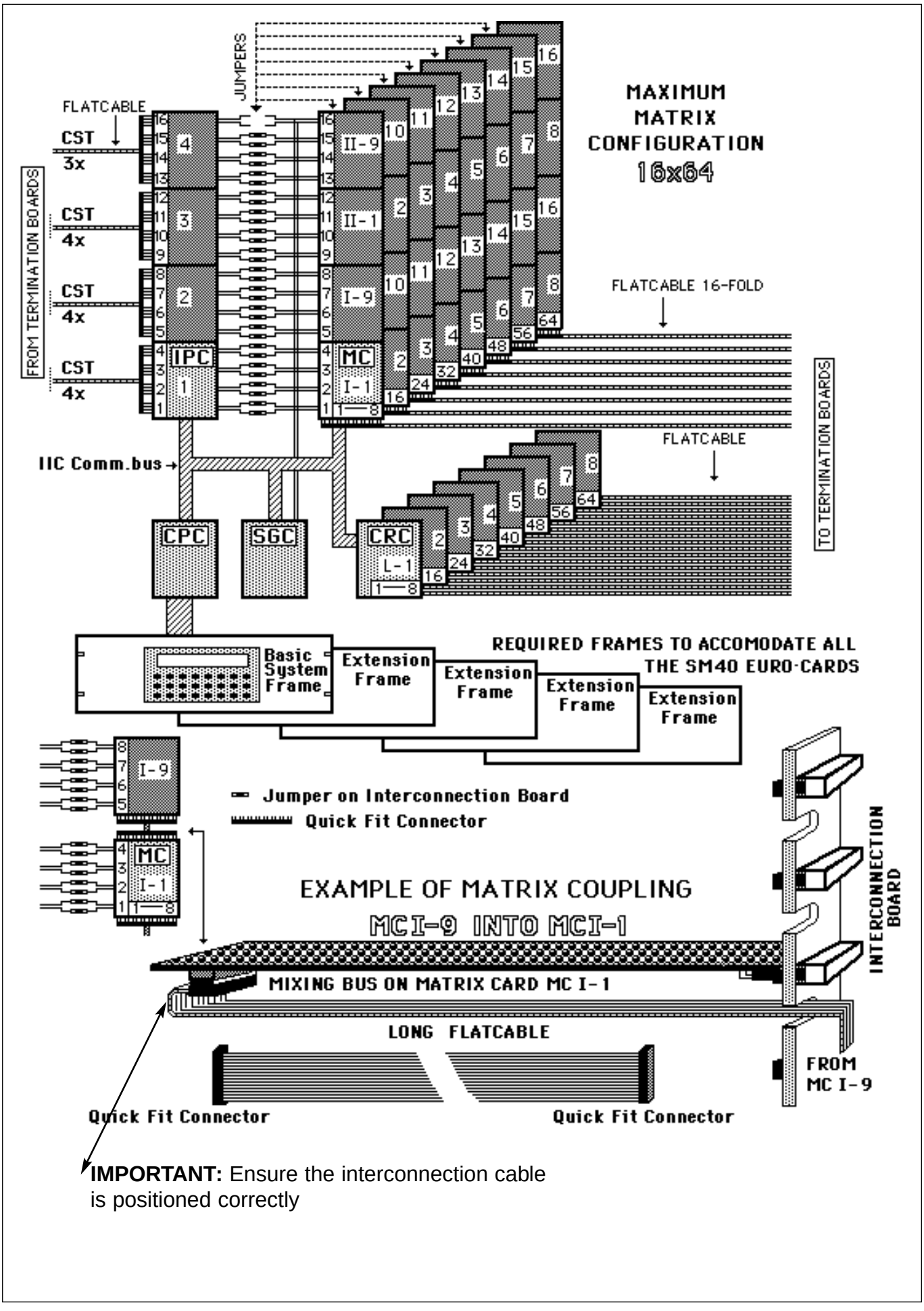
A card's address in the matrix will determine which set of inputs and outputs it is assigned. For instance if a card is addressed I-7 in a 16 x 64 matrix system, it will receive signals from inputs 1 to 4, and feed outputs 49 to 56. This is easiest understood by referring to the accompanying 'Total Matrix' block diagram.

Dependent on how the MCs are addressed, a large number of system configurations are possible. For instance, certain Call Stations may be switchable to a large number of speaker zones, while others in the same system are switchable to only a limited number of zones. A few of the many possible configurations are shown in the system block diagrams later in this information.

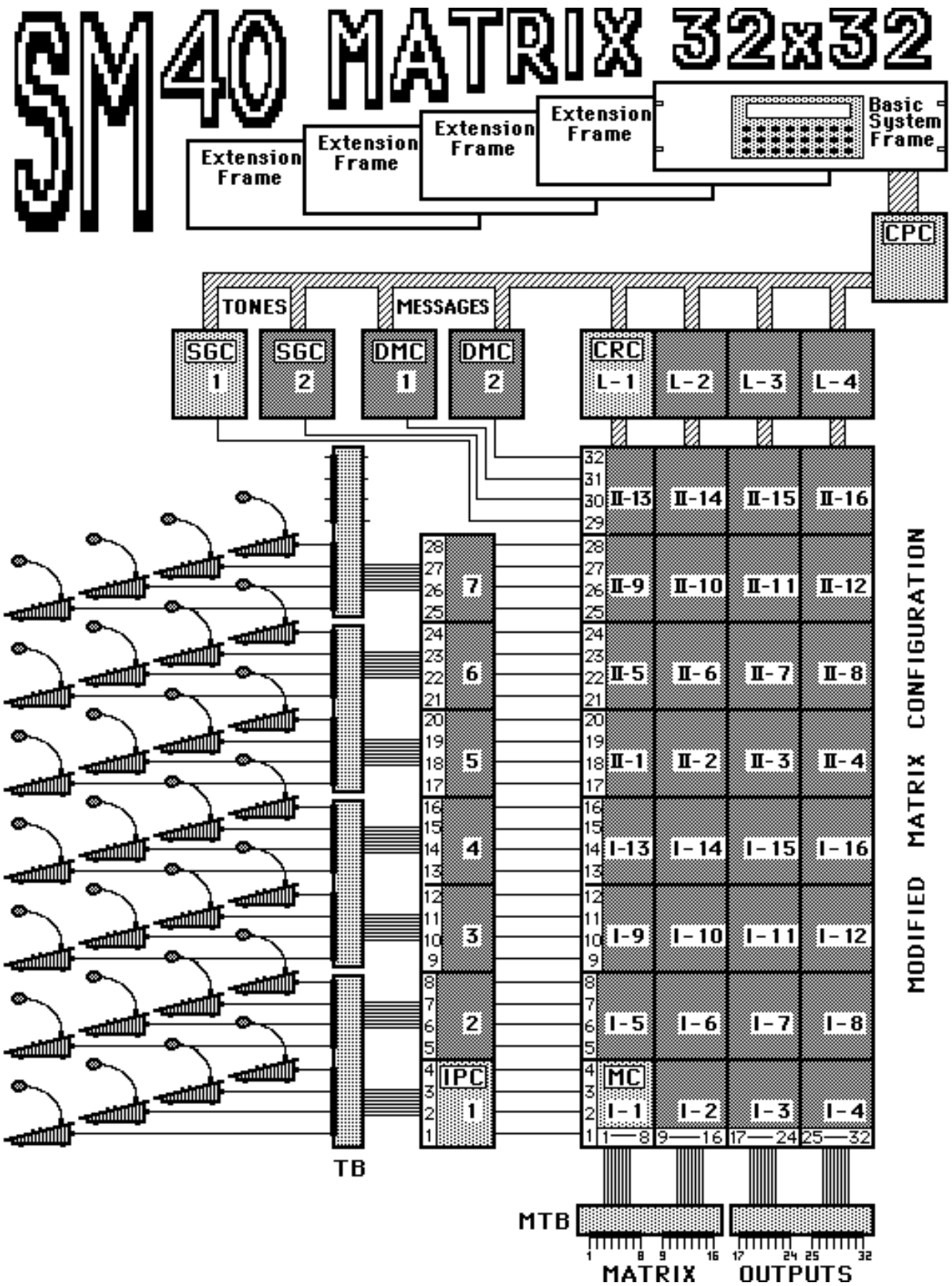
Each MC input, though electronically balanced, has a jumper mounted on the card which, when repositioned, enables it to accept an unbalanced signal from an auxiliary source.

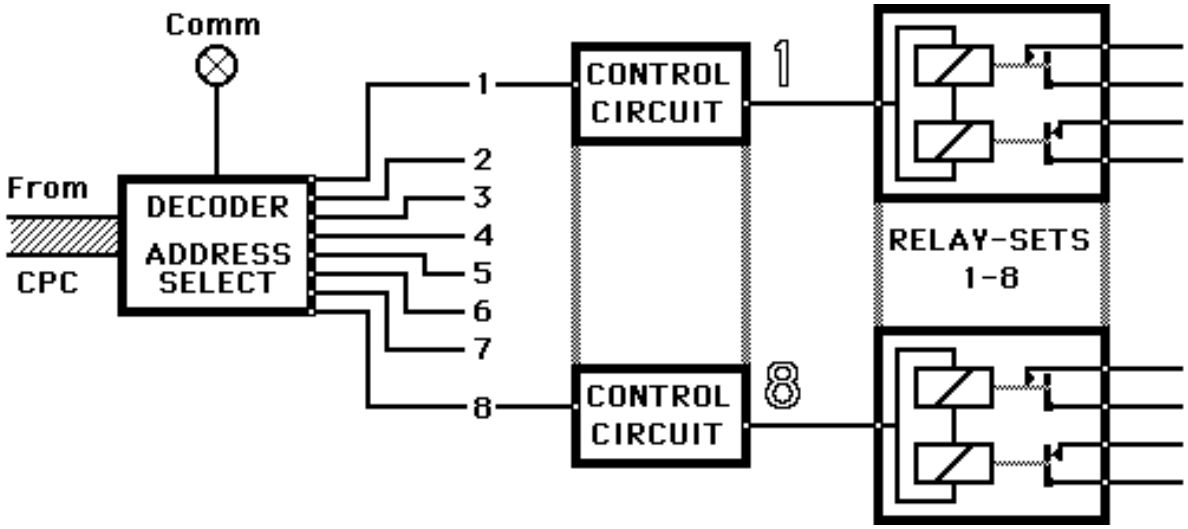
It should be noted that, in line with Philips' commitment to reliability, the short circuit of an input will not effect the other inputs.

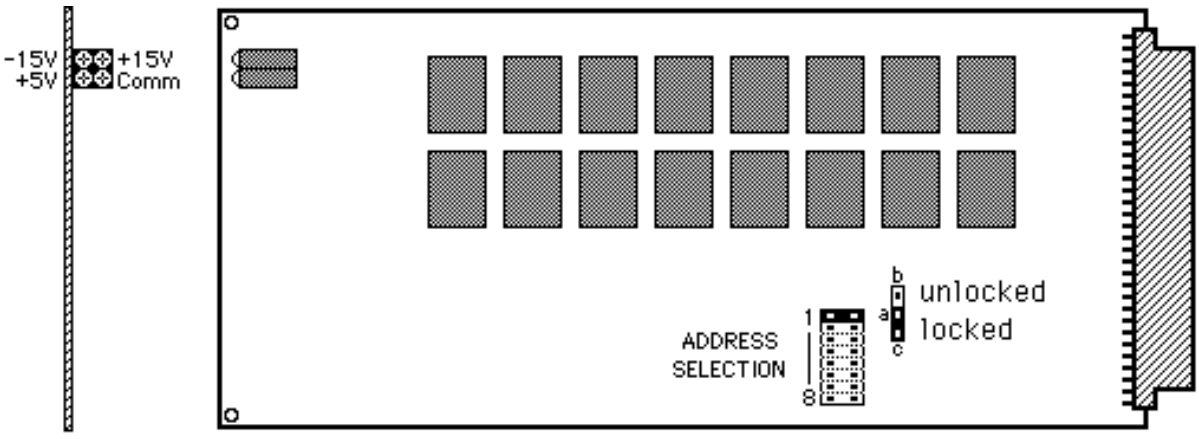
A yellow LED is mounted on the front edge of the card to advise that the unit is in communication with the Central Processor, and 3 green LEDs indicate that adequate supply voltage is present.



IMPORTANT: Ensure the interconnection cable is positioned correctly


SM40 MATRIX 32x32
Extension Frame
Extension Frame
Extension Frame
Extension Frame
Basic System Frame
CPC
TONES
MESSAGES
SGC 1
SGC 2
DMC 1
DMC 2
CRC
L-1
L-2
L-3
L-4
II-13
II-14
II-15
II-16
II-9
II-10
II-11
II-12
II-5
II-6
II-7
II-8
II-1
II-2
II-3
II-4
I-13
I-14
I-15
I-16
I-9
I-10
I-11
I-12
I-5
I-6
I-7
I-8
MC
I-1
I-2
I-3
I-4
IPC 1
7
6
5
4
3
2
TB
MTB
MATRIX
OUTPUTS
MODIFIED MATRIX CONFIGURATION





LBB 1356
Control Relay Card

5.6 Control Relay Card - CRC LBB 1356

Eurocard 10 x 22 cm with an 'a b' connector (2 x 32) containing 8 make and 8 break contacts to activate e.g. loudspeaker volume control override relays and 'priority' inputs of the SQ45 amplifier range. The contacts are activated by the CPC via the communication line.

The SQ45 amplifiers (used with the SM40 Centre) are unique in having a 'music' input (with preset sensitivity) and a 'priority' input. When used with the SM40 Centre, both these inputs are wired in parallel. When an announcement or alarm signal is routed to an SQ45 amplifier, the break contacts of the CRC deactivate the amplifier's relay, effectively overriding the in-built attenuator (which may have been preset for broadcasting music at a reduced level). This allows the call or alarm signal to come through at its full level.

When the announcement or signal is finished, the relay will again be activated; the music will be routed to the amplifier, and will resume at the level it was set at before the interruption.
Control Relay Card (CRC) LBB 1356 has 8 'break' contacts, which deactivate up to 8 SQ45 input relays. The card also contains 8 'make' contacts to activate up to 8 loudspeaker volume override relays.

These loudspeaker relays override the volume control setting of the actual loudspeaker itself, so that regardless of the individual volume setting of each loudspeaker, all the loudspeakers in that zone will work at full volume when a Call is routed to it.

A maximum of 16 CRCs may be used in an SM40 system. 8 of which are related to a column of Matrix Cards (MC)s. Each pair of the CRC's make and break relays are 'locked' by means of the Function Switch (position a-c) to 1 of the columns 8 outputs, so that when a call station is routed to that output these relays will be automatically activated.

A CRC's position in the system, and the way in which it relates to the Matrix Card columns, is defined by the "address" it is given. This address setting is accomplished by repositioning a jumper on the Control Relay Card itself.

Note: In a 32 x 32 matrix system, CRC L-5 to CRC L-8 have the same function as CRC U-4 to CRC U-8.

The relationship between Matrix Cards and Control Relay Cards is more easily understood by referring to the accompanying diagrams.
With the CRC's function switch in the 'unlocked' (U) state (position a-b), a number of extra functions become available:

CRC U-1 Relay set 1 is activated when a system error occurs. This could be used, for instance, to switch on a remote warning lamp, or personal pager. Relay sets 2 to 8 are not yet used.

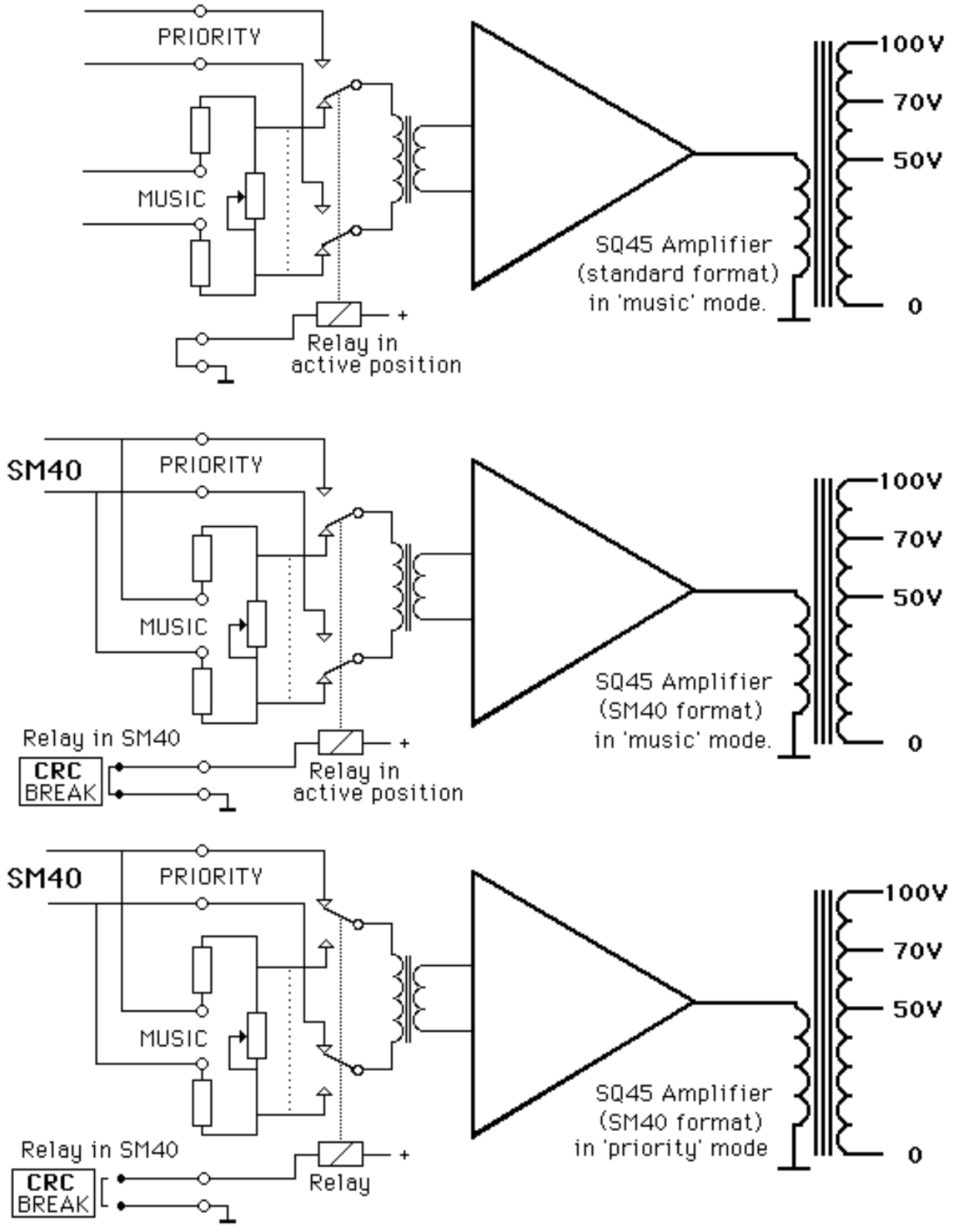
CRC U-2 These relays are activated by the CPC's built-in clock. Ten blocks of time can be designated for each relay, which may be used to both switch on and to route Auxiliary sources via the matrix (Time related switching and routing).

CRC U-3 These relays are activated by the CPC's built-in clock; each relay being activated and deactivated up to 10 times per day. Days of the week are also selectable.

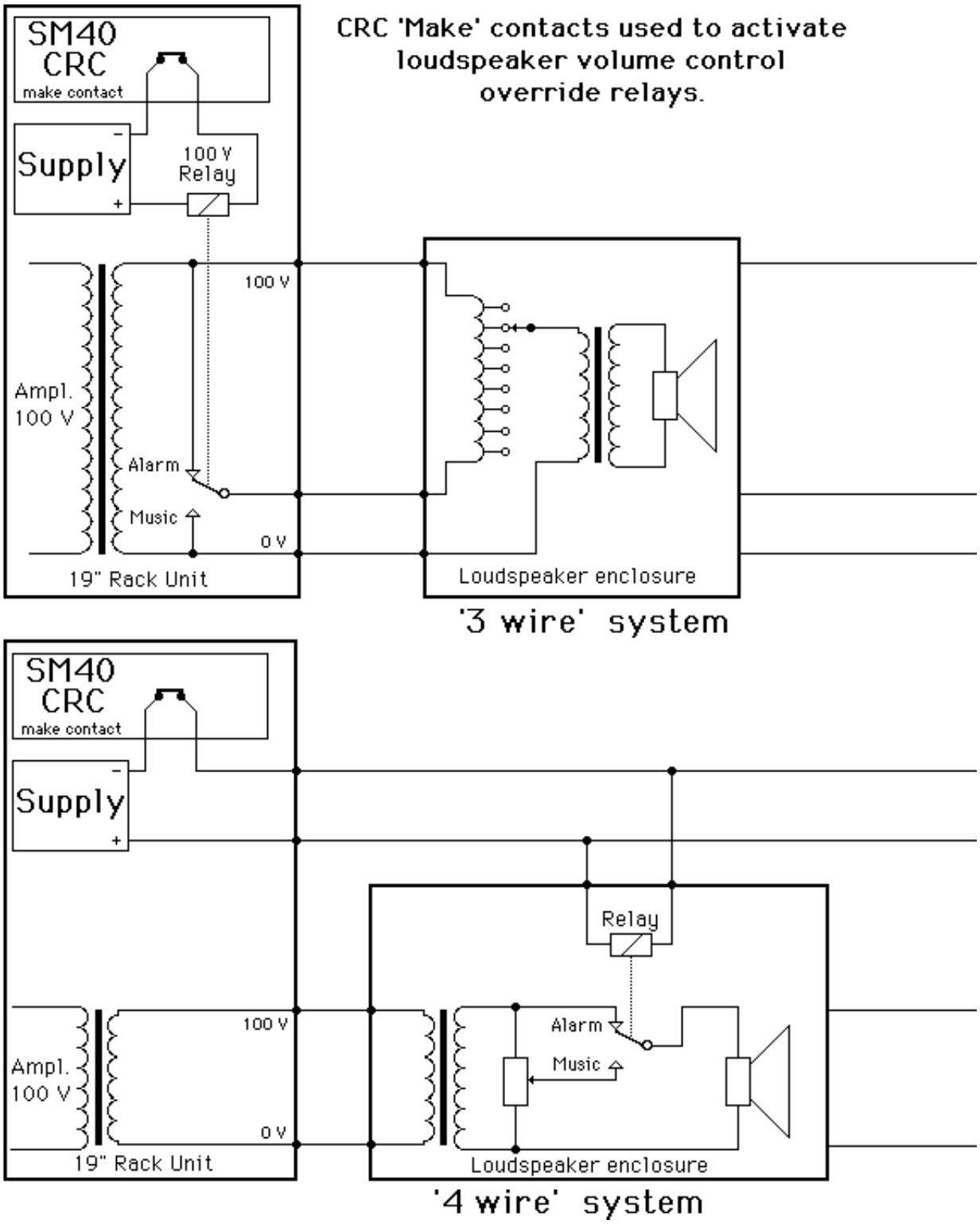
CRC U-4, 5, 6, 7, 8 These relays can be programmed via the User or Installer menu to be activated by Call Station user keys. They can be used for 'output' routing; i.e. activating power relays at the outputs of the amplifiers. By activating power relays in this way one large amplifier can be used to selectively feed a number of different loudspeaker groups. This is additional to input routing, which is done via the matrix, at the input of the amplifiers.

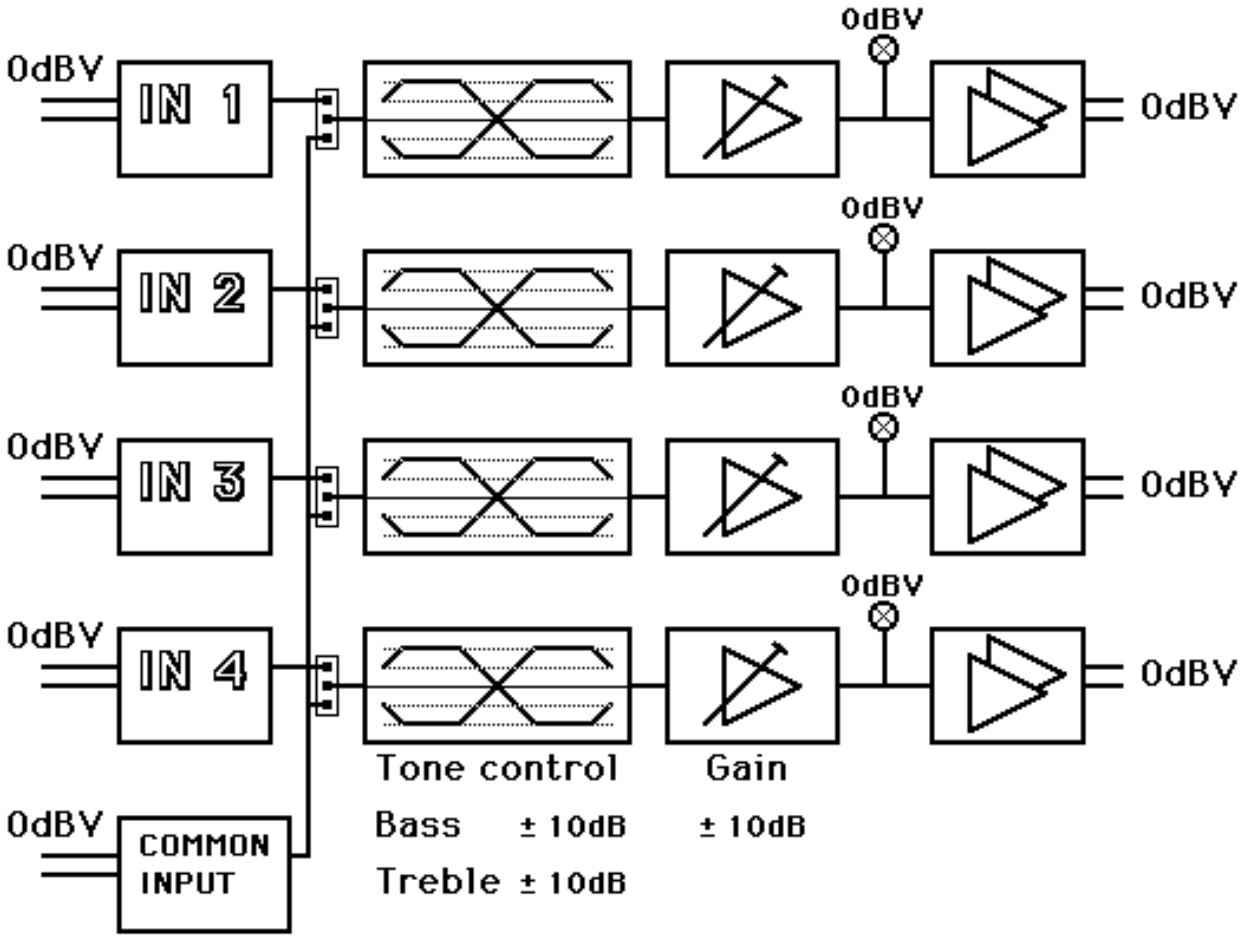
This function can be used in a maximum system, when extra routing is required.
A yellow LED on the front edge of the card advises that the CRC is in communication with the Central Processor Card (CPC) and 3 green LEDs indicate that adequate supply voltage is present.

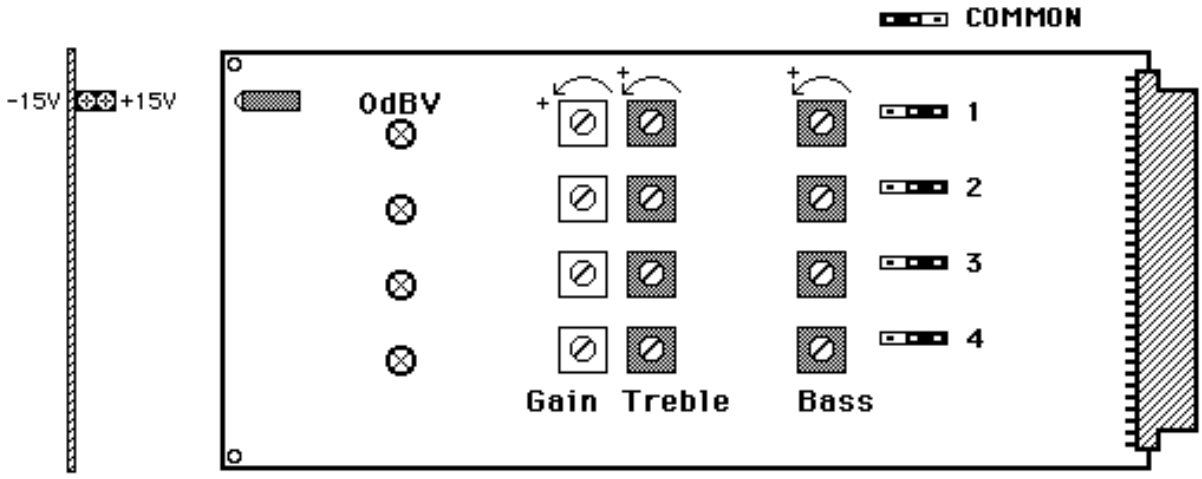
Note: The maximum current per relay is rated at 1 Amp. AC or DC.



SQ45 Amplifier override relay circuit


CRC 'Make' contacts used to activate loudspeaker volume control override relays.
SM40 CRC
make contact
Supply
100 V Relay
Ampl. 100 V
100 V
Alarm
Music
0 V
19" Rack Unit
Loudspeaker enclosure
'3 wire' system
SM40 CRC
make contact
Supply
Relay
Ampl. 100 V
100 V
0 V
Alarm
Music
19" Rack Unit
Loudspeaker enclosure
'4 wire' system





LBB 1357
Tone Control Card

5.7 Tone Control Card - TCC LBB 1357

Eurocard 10 x 22 cm with ‘a b’ connector (2 x 32) containing 4 individual tone control circuits with bass and treble correction (+/- 10 dB), gain correction (+/- 10 dB), and an additional input for a splitter function. All controls are screwdriver preset potentiometers.

In situations where clarity of speech is vital, and room acoustics make this difficult to obtain, Tone Control Card LBB 1357 (TCC) is a very useful asset.

The unit has 4 independent tone control circuits, each having individual inputs and outputs. Each tone control circuit gives separate bass and treble amplification and attenuation to a maximum of 10 dB.

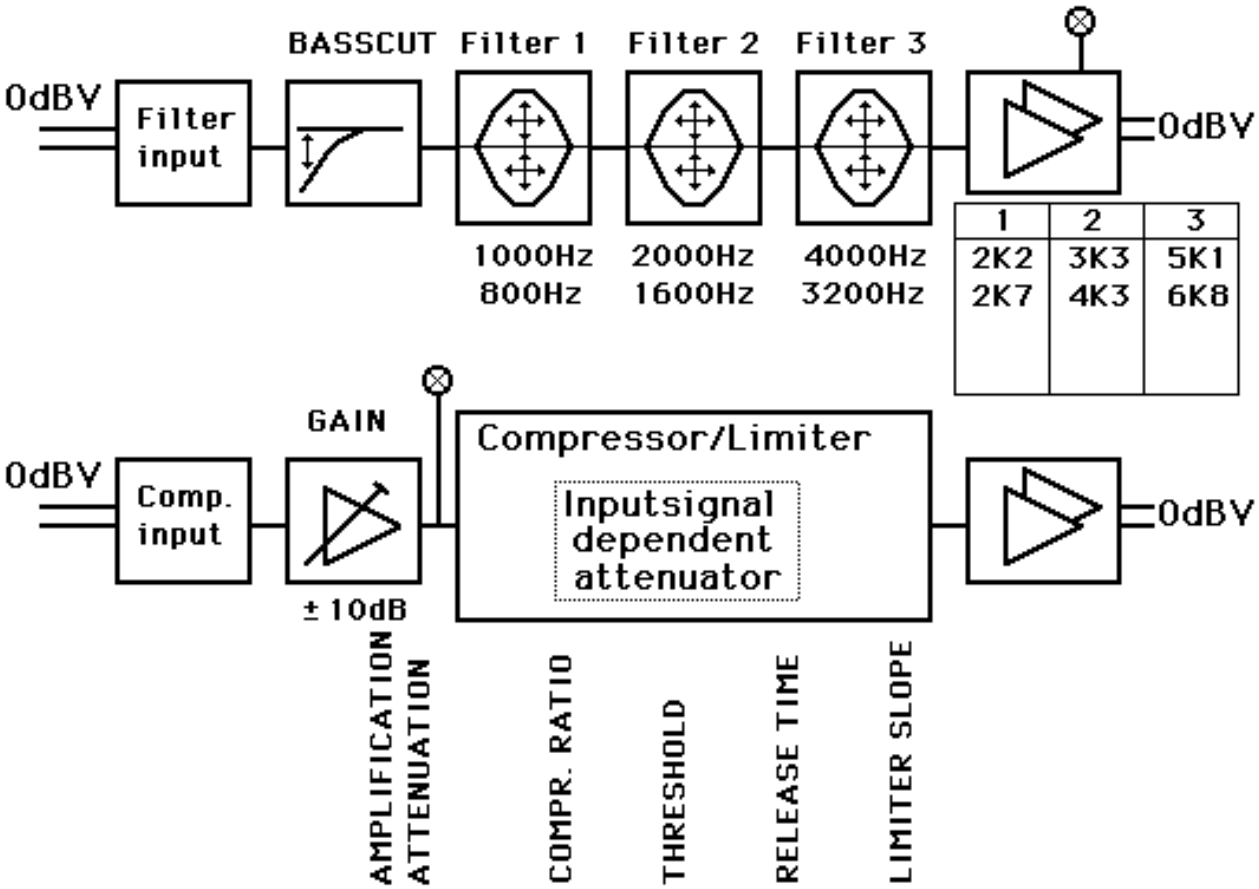
As well as the 4 independent inputs, the TCC has an extra input which acts as a splitter. This ‘common’ input allows all 4 inputs to be fed by a single source, instead of the 4 independent ones. This is particularly useful when several amplifiers are required to operate from 1 matrix output.

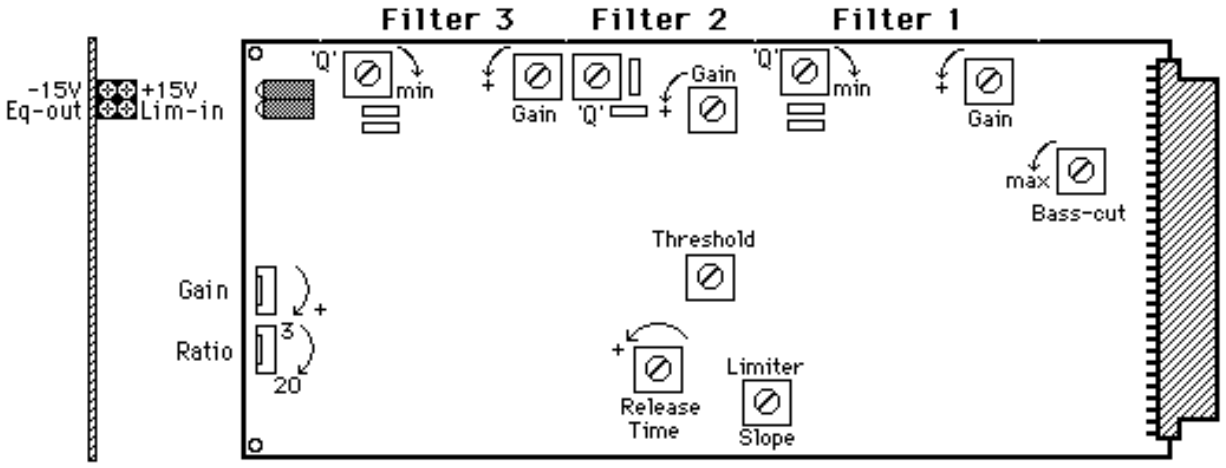
At the input of each circuit is a screwdriver preset control, adjusting the gain from -10 to +10 dB. The unit will accept a balanced or unbalanced source without any loss of sensitivity.

The TCC has several different applications within an SM40 system, and operates effectively between any or all of the following:
- Matrix group outputs and amplifier inputs;
- Input Cards (IPC) outputs and Matrix Card (MC) inputs;
- Auxiliary sources (background music player, etc.) and MC inputs.

Because it is not controlled by the Central Processor Card (CPC), the amount of TCCs used in a system is limited only by rack space and the amount of d.c. power available. In a ‘maximum’ system, of 64 outputs, where TCCs are used between matrix outputs and amplifier inputs, a total of 16 cards would be used.
4 red LEDs are mounted on the circuit board, each of which switches on when its associated circuit reaches its nominal output signal level of 0 dBV.

Two green LEDs advise that adequate supply voltage is present.





LBB 1358
Signal Processing Card

5.8 Signal Processing Card - SPC LBB 1358

Eurocard 10 x 22 cm with an 'a b' connector (2 x 32), comprising 2 independent channels:
- Filter combination channel (adjustable 15 dB bass cut , and 3 parametric filters).
- Compressor / Limiter channel with ratio adjustable from 1:3 to 1:20.

Both channels can be cascaded to operate as one combined signal processing channel.

The Signal Processing Card (SPC) LBB 1358 comprises two independent audio channels: a filter combination channel and the other a compressor/limiter channel. A unique feature of the unit is that by simply repositioning two jumper plugs on the Interconnection Board, the output of the filter channel is fed into the input of the compressor channel, enabling it to operate as one channel. Both channels are electronically balanced, but will accept unbalanced sources without any loss of sensitivity.

FILTER COMBINATION CHANNEL contains a bass cut, and 3 parametric filters with fixed centre frequencies. It is particularly effective in helping compensate for the adverse effects of poor room acoustics, by reducing the audio volume at frequencies amplified by the room itself, and amplifying those frequencies which the room acoustics absorb.
The bass cut (high pass) filter substantially reduces low frequency 'rumble', originating from record decks or from floor vibrations transferred to microphones. It is adjustable, using a screwdriver preset potentiometer, to a maximum of 15 dB at 100 Hz, sloping to 0 dB at 1000 Hz.

The 3 parametric filters have centre frequencies fixed at 800, 1600 and 3200 Hz, but these frequencies can be altered by changing the value of several resistors, mounted on solder tags on the circuit board. The gain at the centre frequency of each band is adjustable to a maximum of +/-10 dB, using a screwdriver preset potentiometer which has a centre click at 0 dB. The 'Q'factor slope (width) of each band can be adjusted, using a preset potentiometer, to match and correct differing irregularities in the frequency curve.

COMPRESSOR/LIMITER CHANNEL has a screwdriver preset potentiometer mounted on the front edge of the circuit card with which to adjust the compression ratio from 1:3 to a maximum of 1:20.
Given a normal amount of compression the unit acts as a compressor, reducing input peaks, above a preset threshold, by a certain percentage of their nominal output value. This percentage is dependent on the compression ratio selected. A compressor is particularly useful for supplying uniform microphone output levels, compensating for variations in voice volume, when people have different voice strengths and/or speak at different distances from the microphone.

If the compression ratio is adjusted to 1:20, the unit will act as a limiter, restricting the maximum output to a preset level, thus protecting amplification equipment against peak overloads.

The attack time of the compressor is factory set at 1 ms, but the release time is adjustable, using a preset potentiometer, to between 40 ms and 4 seconds.

The compressor/limiter's preamplifier gain is adjustable by a maximum of 20db, using a preset potentiometer.

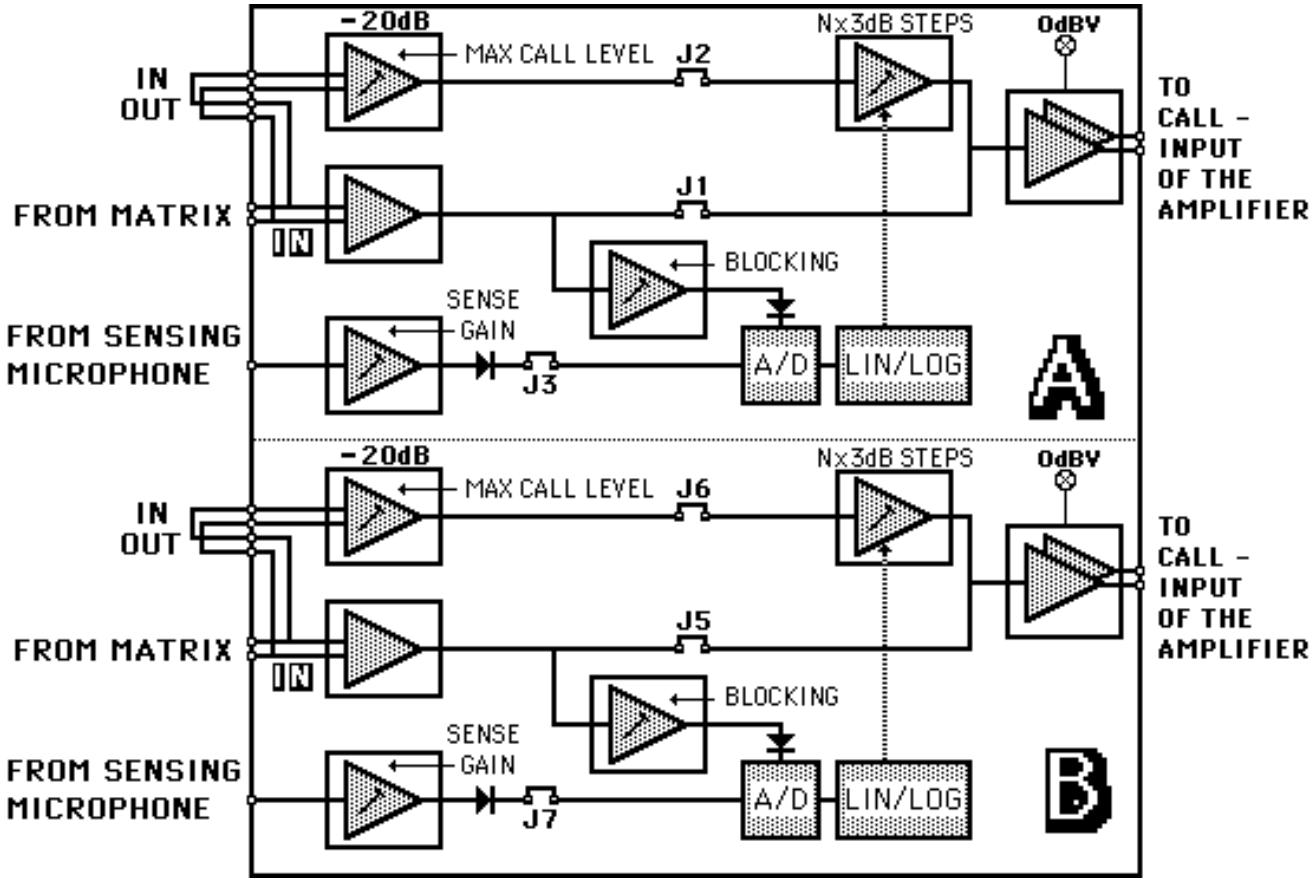
A red LED indicates 0dBV at the filter output, and another red LED indicates 0 dBV at the compressor/limiter input.

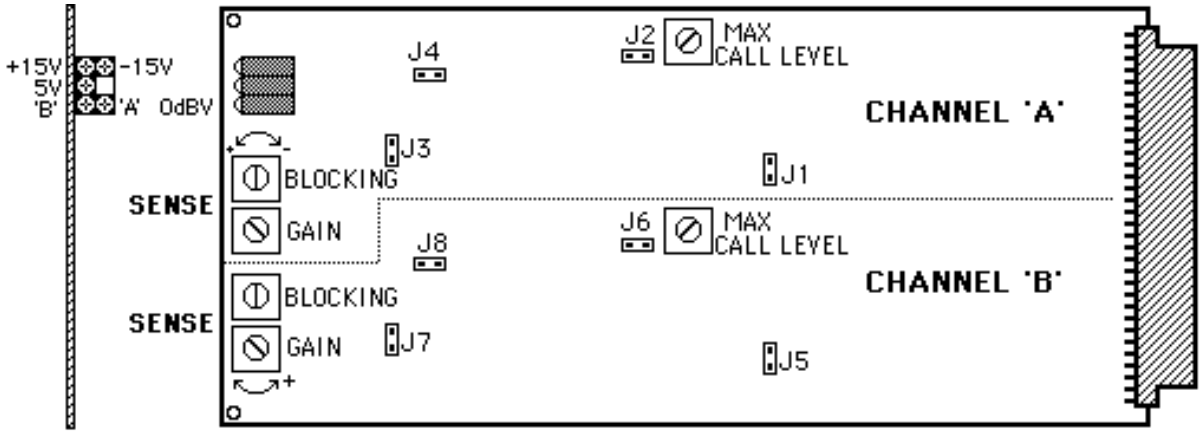
Two green LEDs advise that adequate supply voltage is present.

Due to its great versatility, the SPC may be used in any or all of several positions in the SM40 system. It may be used before a Matrix Card, being fed by an Input card or an auxiliary source; or after the matrix, feeding an amplifier input.

The unit can be used with an Automatic Volume Control (AVC) card to give it Automatic Noise Dependent Audio Processing (ANDAP) capabilities.

Because the unit is not controlled by the system's central processor, the amount of SPCs used is limited only by rack space and the amount of d.c. power available.





LBB 1359
Automatic Volume Control Card

5.9 Automatic Volume Control Card - AVC LBB 1359/00, /09, /21

Eurocard 10 x 22 cm, with an 'a b' connector (2 x 32), containing 2 independent Automatic Volume Control circuits. When combined with an SPC the unit can function as an Automatic Noise Dependent Audio Signal Processing (ANDAP) unit.

The Automatic Volume Control (AVC) card performs a powerful function in any Public Address system. The card allows PA systems to be set up according to the maximum Sound Pressure Level (SPL) specified. The card also provides an automatic loudness reduction function for use in very quiet circumstance, where the system could cause unacceptable or unwanted annoyance. The control range of the AVC is normally restricted to 9 dB. The maximum SPL of the system should never be lower than 80 dB (regarded as a comfortable listening level). This means therefore that the maximum possible SPL should not exceed 89 dB. Both levels peak reading on sound level meter.

The AVC is activated by a sensing microphone. The microphone is placed in the loudspeaker zone. This placement guarantees that any variation in ambient noise near the loudspeakers causes a variation in loudness of the call through the loudspeakers. Sensing is a continuous process, but the actual control of the gain is blocked during a call, although it resumes during pauses in speech.

When designing the PA system, it is important to know the loudness and frequency spectrum of the ambient noise. All the adjustments on the AVC card are factory preset. Only the sensing input and the blocking function requires adjustment. This adjustment is carried out according to local situations and requirements.

AVC card conditions:
Jumper J1 removed:
- Maximum gain 0 dB
- Reduction: 6 dB = 2 steps of 3 dB = (modified LBB 1359/09 (change R38,R138 from 2k7 to 1k8)
- Reduction: 9 dB = 3 steps of 3 dB = LBB 1359/09
- Reduction: 12 dB = 4 steps of 3 dB = (modified LBB 1359/21 (change R34,35,36,134,135,136 to 3k9)
- Reduction: 15 dB = 5 steps of 3 dB = (modified LBB 1359/21 (change R34,35,134,135 to 5k6))
- Reduction: 21 dB = 7 steps of 3 dB = LBB 1359/21

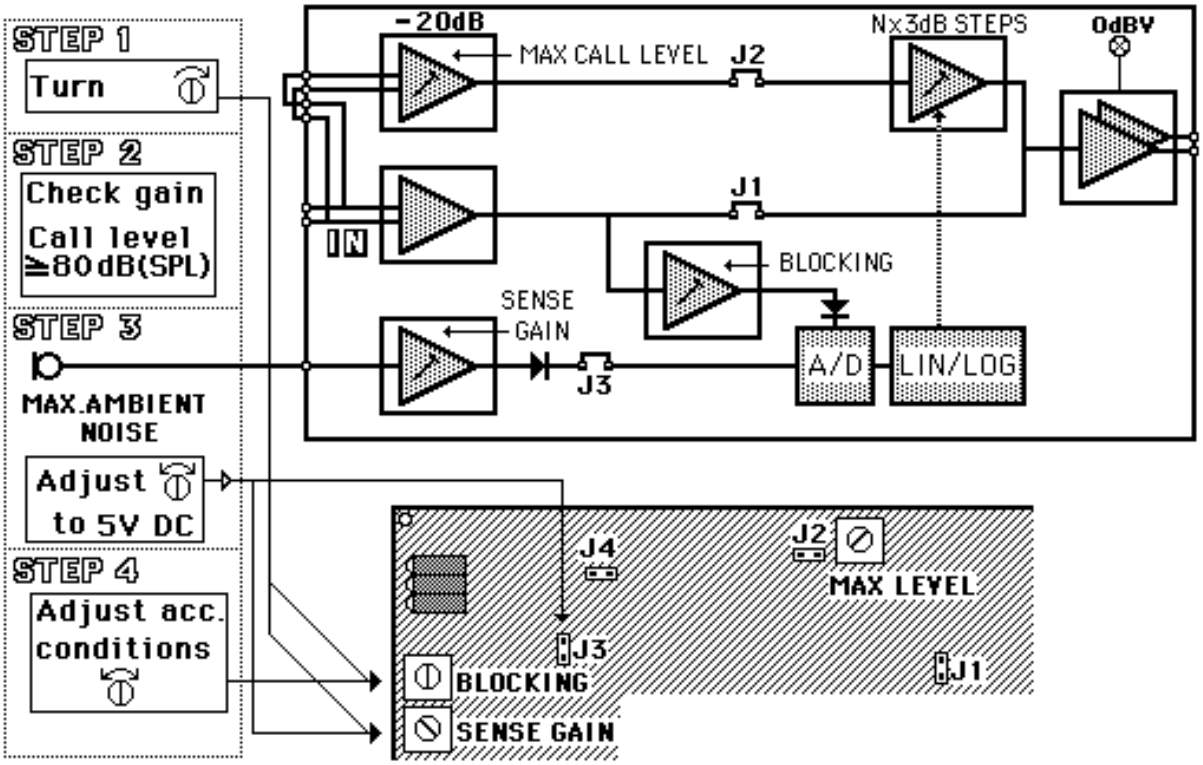
Refer to service documentation for relevant resistors.
See section Adjustments to suit local conditions.

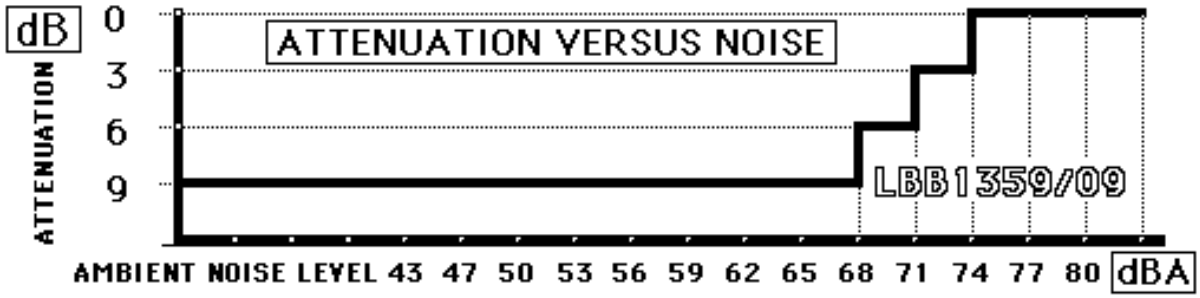
The AVC card combined with a Signal Processing Card (SPC) can perform an Ambient Noise Dependant Audio Signal processing function (ANDAP). The call signal is gradually processed by increasing ambient noise. Processing is done by reshaping the call spectrum with parametric filters which emphasise the spectrum from 1 - 4 kHz. This spectrum within a speech signal is normally at a low level (6 dB/oct from 500 Hz). However this spectrum contains the energy produced by consonants which are vital for speech intelligibility. Increasing the spectrum does not overpower the system easily, but increases the intelligibility considerably. Due to this step-by-step reshaping, the natural content of the sound decreases due to the lack of low tones. However this effect is masked by the high ambient noise level. The main application is to overcome high ambient noise levels (>80 dB) with limited power (amplifier or loudspeaker) but still retaining good speech intelligibility - this is the common application for use in Industrial Evacuation Systems.

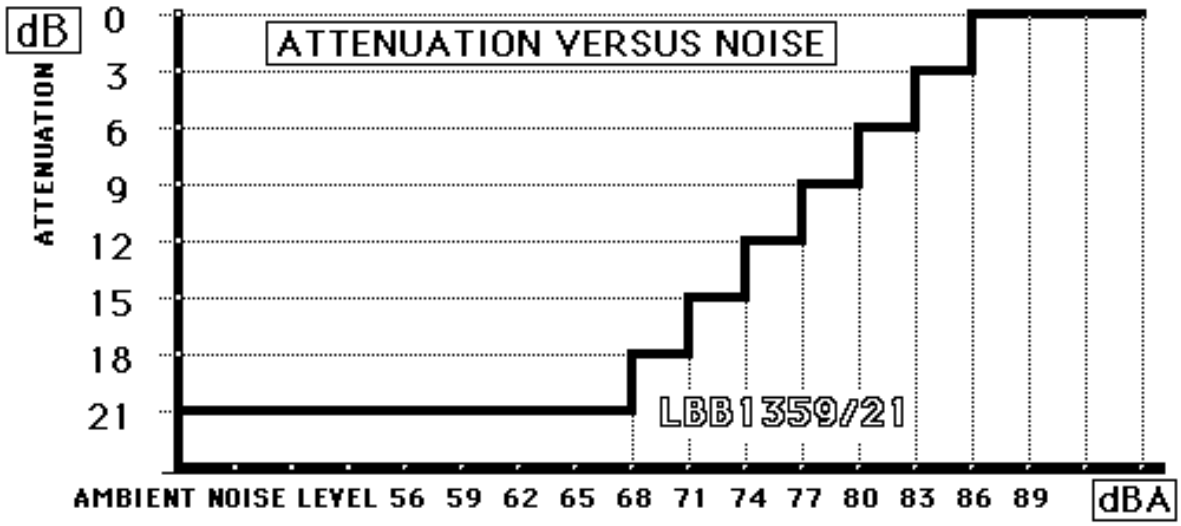
ANDAP card conditions:
Jumper J1 connected:
- Minimum gain: 0 dB
- Maximum gain: 12 dB at 2kHz (7 x 3dB steps = LBB 1359/21)

A combination of AVC and ANDAP is also possible. The call signal is first routed through an AVC channel and then through an ANDAP channel. The combination provides a full spectrum increase of 9 dB, plus a high spectrum increase of >10 dB. A small modification on a 2-channel AVC card is needed to combine the sensing microphone for both channels and to ensure take-over from AVC to ANDAP.

Due to the complexity of the adjustment procedure, expert advice can be sought from Philips Breda.


STEP 1
Turn
STEP 2
Check gain
Call level
≧80dB(SPL)
STEP 3
MAX.AMBIENT
NOISE
Adjust
to 5V DC
STEP 4
Adjust acc.
conditions
-20dB
MAX CALL LEVEL
J2
Nx3dB STEPS
0dBV
IN
J1
BLOCKING
SENSE
GAIN
J3
A/D
LIN/LOG
J4
J2
MAX LEVEL
J3
J1
BLOCKING
SENSE GAIN


dB
ATTENUATION
0
3
6
9
ATTENUATION VERSUS NOISE
LBB1359/09
AMBIENT NOISE LEVEL 43 47 50 53 56 59 62 65 68 71 74 77 80
dBA


dB
ATTENUATION
0
3
6
9
12
15
18
21
ATTENUATION VERSUS NOISE
LBB1359/21
AMBIENT NOISE LEVEL 56 59 62 65 68 71 74 77 80 83 86 89
dBA

5.9.1 Automatic Noise Dependent Volume Control (AVC)

Automatic Volume Control Card LBB 1359/09 or LBB 1359/21

Adjustments: 'Max Call Level' potentiometer:

1. Set SENSE GAIN potentiometer to maximum (anticlockwise). Set BLOCKING potentiometer to short (clockwise). Produce a constant audio signal at the sense input. Any level above 10 mV will produce a 5 Volt DC voltage on jumper J3 resp. J7. Remove jumpers J1 (CH.A) and J5 (CH.B) to interrupt the 0 dB bypass

2. Produce a constant audio signal (e.g. 300 mVolt) at the input of the AVC channel and check its output level of that AVC channel. The level should be equal to the to the input signal. Correction can be made by adjusting the MAX. CALL LEVEL potentiometer.

3. Check the control range of 9 dB (or 21 dB) by viewing the output level while turning the SENSE GAIN potentiometer to min (clockwise), or by disconnecting the audio signal at the same input.

Adjustment procedure for Automatic Volume Control (actual situation):

1. Set the SENSE GAIN potentiometer and BLOCKING potentiometer to minimum (clockwise). Remove jumpers J1 (CH.A) and J5 (CH.B). The bypass path is interrupted. The AVC channel now remains on a reduced level, but still senses continuously (not blocked).

2. Check the loudness of a regular call in the AVC controlled loudspeaker zone. Ensure the listening area is quiet i.e the ambient noise level is lower than 60 dB (SPL). The 9 dB (or 21 dB) reduced call level should be at a comfortable listening level (CLL) of 80 dB (SPL) peak-level or according to the specified level. If this level cannot be achieved, the selected AVC control range is incorrect.

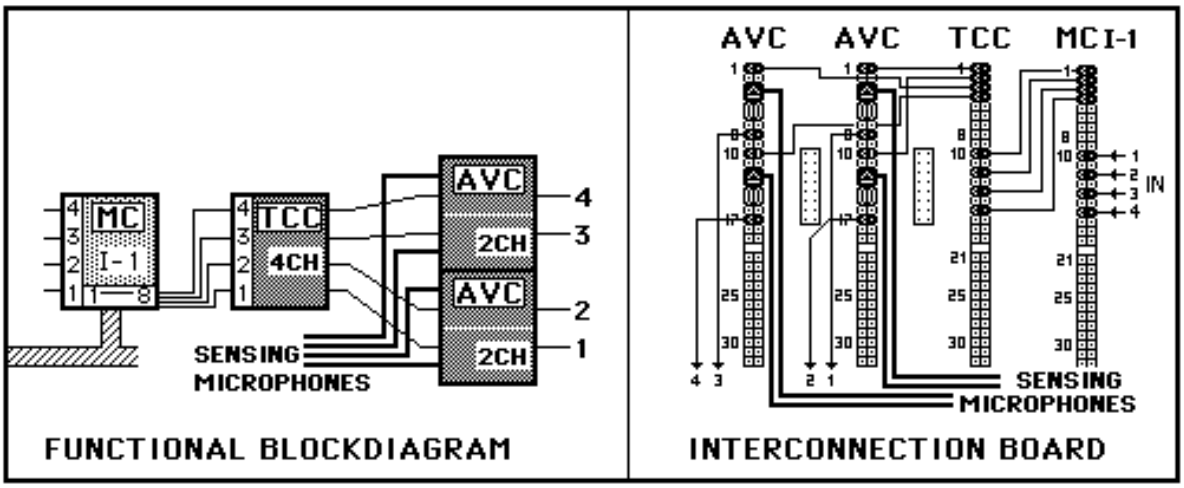
3. Check the ambient noise sensing microphone connection from the relevant loudspeaker zone to the sense input of the AVC channel. Set the SENSE GAIN potentiometer to maximum (anti-clockwise). Produce a pink noise signal at the input of the AVC channel. To produce a pink noise signal activate test signal 27 from the SM40 Signal Generator Card (SGC)

   Measure the pink noise signal in the area of the relevant loudspeaker zone. Adjust the disturbing LS-noise level to the level specified as the highest ambient noise level - for example 75 dB (SPL).
   Adjust the SENSE GAIN to the point where channel gain reduction begins. (See VU meter of the channel amplifier or monitor the DC voltage on Jumpers J3 (CH.A and J7 (CH.B).

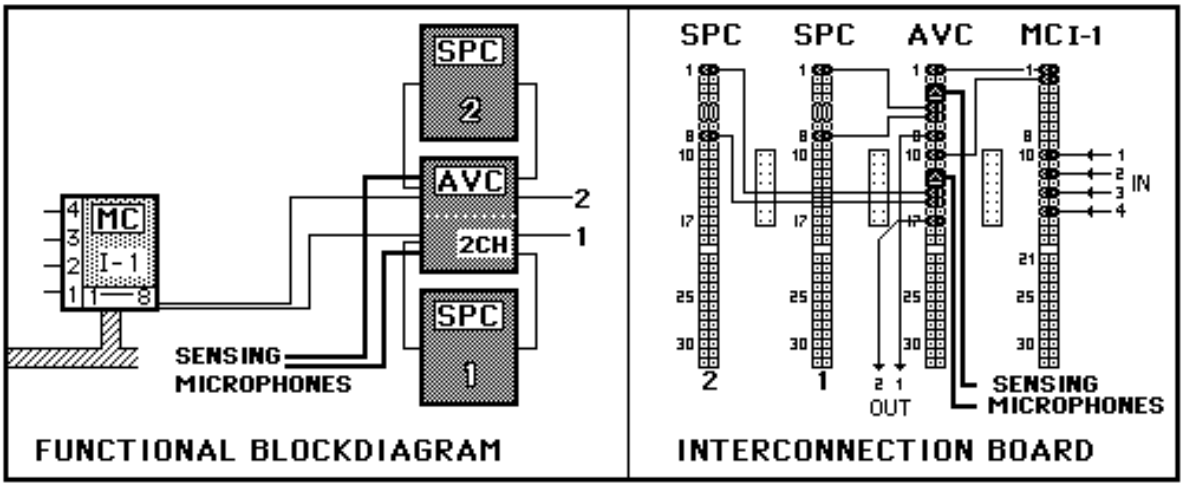
4. Put the sample BLOCKING potentiometer to its mid position. This allows approximately two seconds of silence before the AVC sensing alter the call output level. Turning the BLOCKING potentiometer further in a clockwise direction, shortens this time, thus allowing readjustment of the level during shorter call pauses. If the re-verberation time in the loudspeaker zone is too long,the sensing microphone could sense the reverberation of the call as ambient noise. This will cause the AVC to compensate for its own calls, therefore creating instability.

5. Carry out a listening test in order to check that it functions correctly.

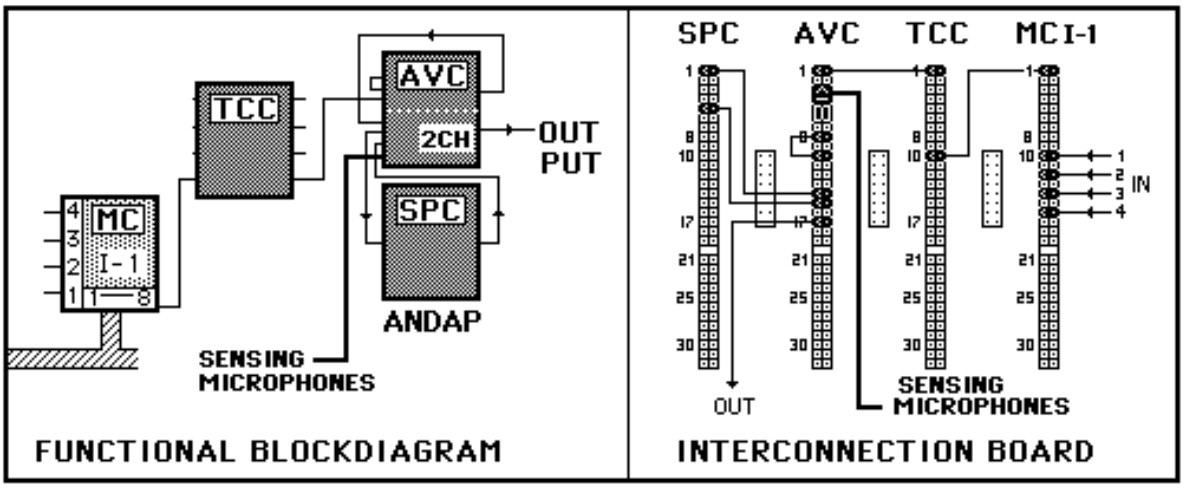
   Note: Jumper J1 (CH.A) and J5 (CH.B) should remain removed.



DETAILS OF THE AVC IMPLEMENTATION



DETAILS OF THE ANDAP IMPLEMENTATION



DETAILS OF THE AVC & ANDAP IMPLEMENTATION

5

5.9.2 Automatic Noise Dependent Audio Signal Processing (ANDAP)

Automatic Volume Control Card LBB 1359 & Signal Processing Card LBB 1358

In increasing ambient noise situations speech inteligibility of a call can be maintained by additional amplification of only the higher frequency spectrum (1-4 kHz) without using additional booster power.

The AVC card LBB 1359/21 with two channels (control range of 21 dB) should be used together with the SPC card LBB 1358/00.

Adjustment procedure for Automatic Processing (actual situation):

1. Check that jumpers J1 and J5 (0 dB bypass) are connected. Check that jumpers J2 and J6 (control path) are removed. Turn the SENSE GAIN and the BLOCKING potentiometer fully clockwise (min.).

2. Check the quality and loudness of a regular call in the relevant AVC controlled loud speaker zone. This is the not processed call level which should at least be at a Comfortable Listening Level (CLL) of 80 dB (SPL) peak-level. Ensure that the listening area is quiet i.e the ambient noise level is lower than 60 dB (SPL).

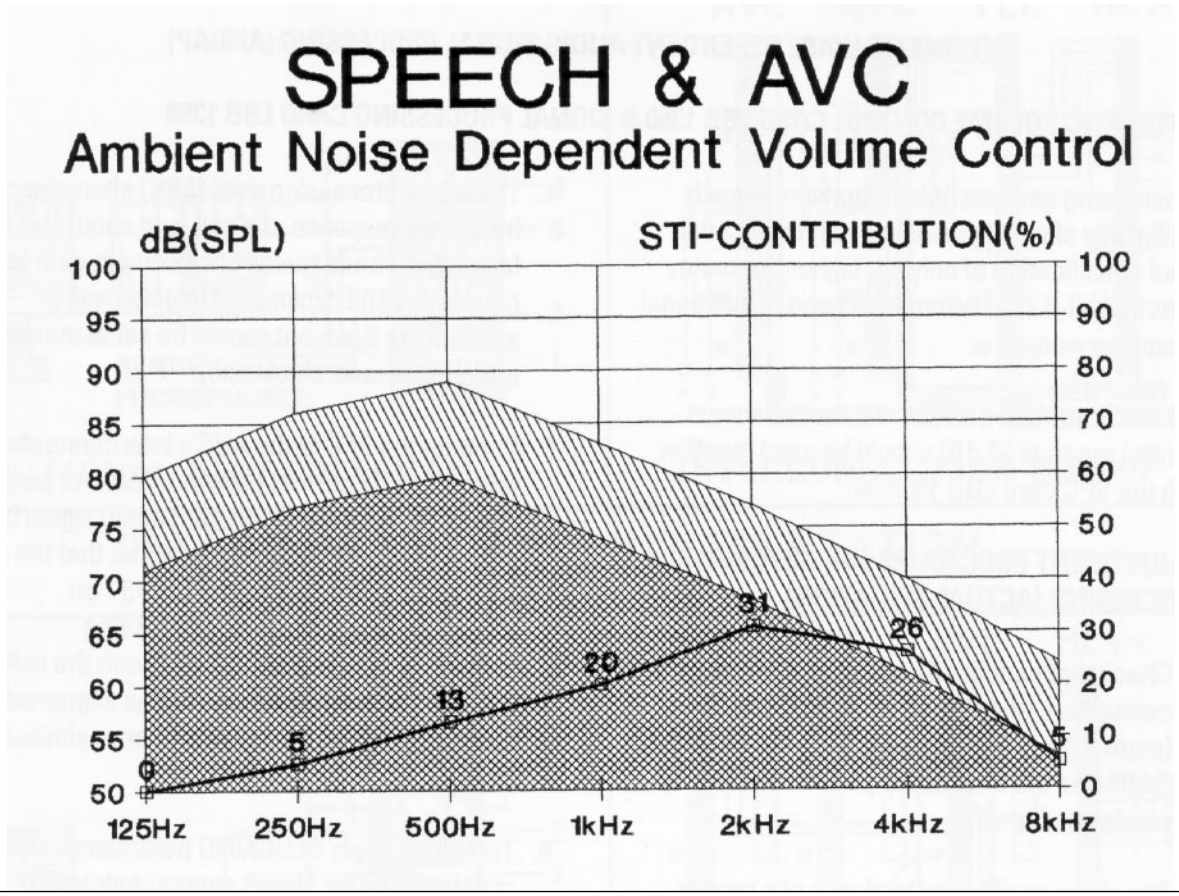
3. Check the connection of the ambient noise sensing microphone in the relevant loudspeaker zone is connected to the sense input of the AVC channel. Turn the SENSE GAIN potentiometer fully anti-clockwise (maximum). Turn the blocking potentiometer fully clock-wise (short). Produce a pink noise signal at the input of the AVC channel. To produce a pink noise signal activate test signal 27 from the SM40 Signal Generator Card (SGC). Measure the pink noise signal in the area of the relevant loudspeaker zone. Adjust the disturbing LS-noise level to the level specified as the highest ambient noise level - for example 80 dB (SPL). Adjust the SENSE GAIN so that DC voltage on J3 and J7 is 5V maximum. Replace jumper J2 and J6.

4. The signal processing card (SPC) alters the frequency response of a call, and should be set for all three frequencies on maximum gain (anti- clockwise) and minimum Q (clockwise). In addition the Bass-cut should be set to maximum attenuation (anti-clockwise).

5. Connect the SPC to the AVC's interconnection (check for the correct polarity). Produce a constant audio signal (>10 mV) at the sense input to guarantee that the AVC is set at maximum gain (DC=5V on J3 and J7. Adjust the max. processing (a lift of 10 - 15 dB around 2 kHz) with the MAX. CALL GAIN potentiometer. For this alignment use the NEUTRIK response plotter or similar plotter.

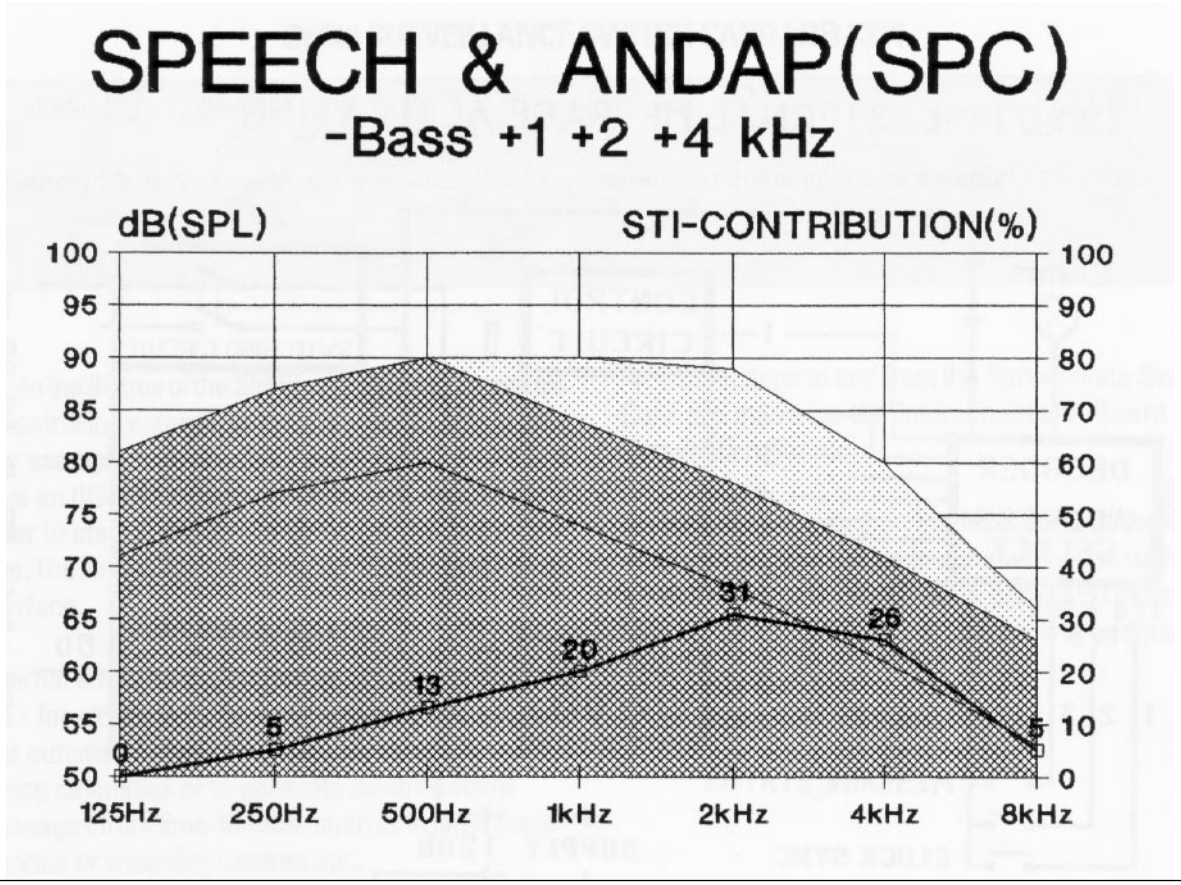
6. Turn the sample BLOCKING potentiometer to its mid position. This allows approximately two seconds of silence before the AVC sensing alters the call output level. Turning the BLOCKING potentiometer further in a clockwise direction, shortens this time, thus allowing readjustment of the level during shorter call pauses. If the reverberation time in the loudspeaker zone is too long, the sensing microphone could sense the reverberation of the call as ambient noise. This will cause the AVC to compensate for its own calls, therefore causing a malfunction. (i.e switches always to maximum call level).

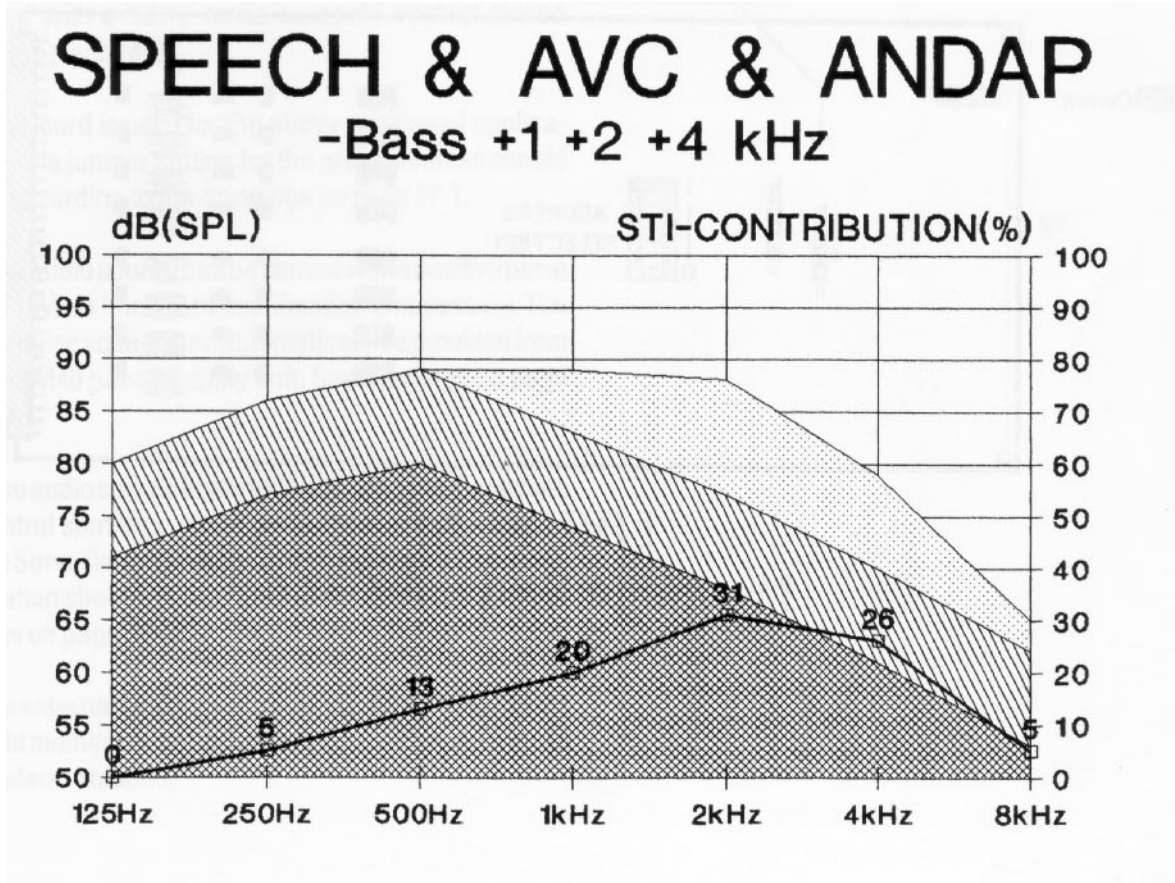
7. Carry out a listening test in order to check that it functions correctly.

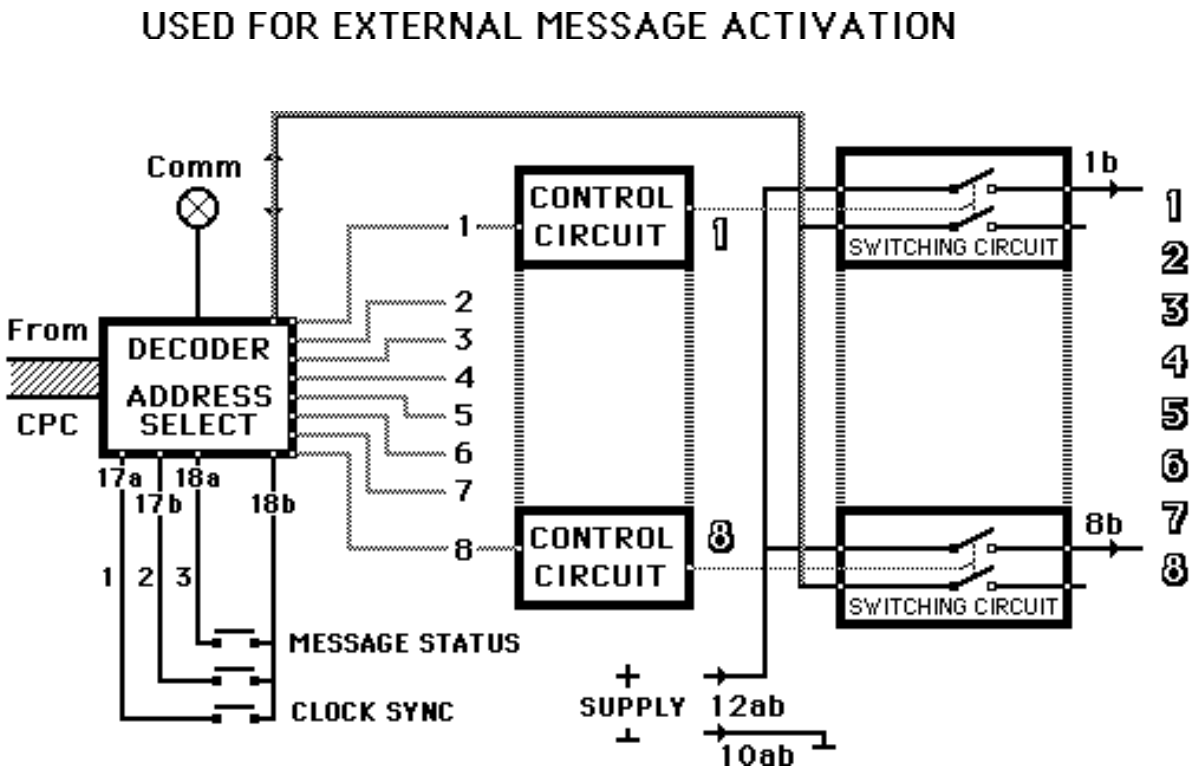


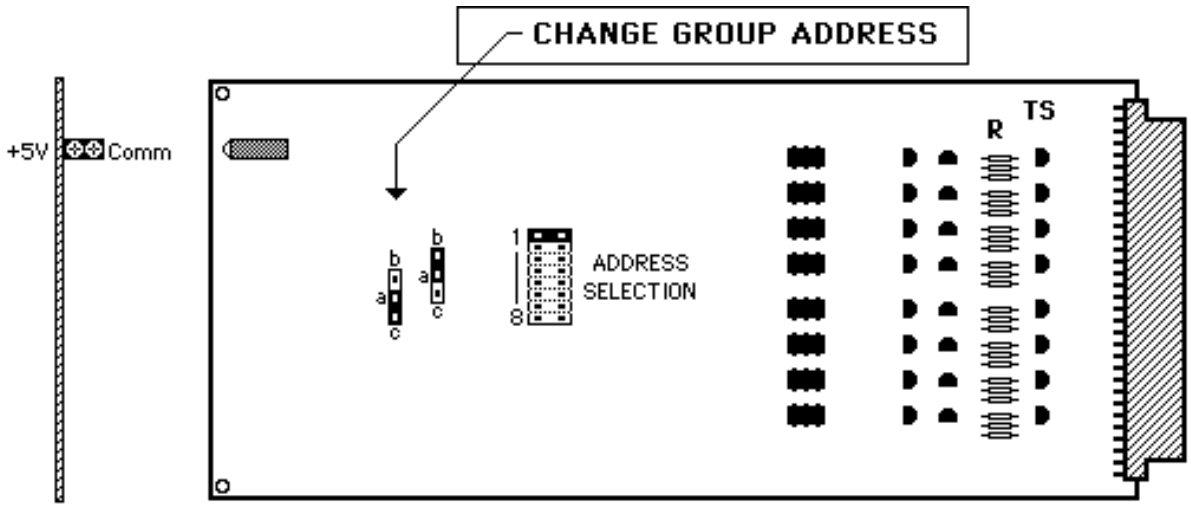
SPEECH & AVC
Ambient Noise Dependent Volume Control
dB(SPL)
STI-CONTRIBUTION(%)
100
95
90
85
80
75
70
65
60
55
50
100
90
80
70
60
50
40
30
20
10
0
0
5
13
20
31
26
5
125Hz
250Hz
500Hz
1kHz
2kHz
4kHz
8kHz

5


SPEECH & ANDAP(SPC)
-Bass +1 +2 +4 kHz
dB(SPL)
STI-CONTRIBUTION(%)
100
95
90
85
80
75
70
65
60
55
50
100
90
80
70
60
50
40
30
20
10
0
0
5
13
20
31
26
5
125Hz
250Hz
500Hz
1kHz
2kHz
4kHz
8kHz


SPEECH & AVC & ANDAP
-Bass +1 +2 +4 kHz
dB(SPL)
STI-CONTRIBUTION(%)
100
95
90
85
80
75
70
65
60
55
50
100
90
80
70
60
50
40
30
20
10
0
0
5
13
20
31
26
5
125Hz
250Hz
500Hz
1kHz
2kHz
4kHz
8kHz





LBB 1374

Surveillance (Message) Switch Card

5.10 Surveillance Switch Card - SSC LBB 1374

Eurocard 10 x 22 cm with 'a b' connector (2 x 32) containing 8 control points for external audio sources.

Due to the I^2C bus of the SM40 system being incapable of controlling external audio sources in a proper way - for example with priorities, (audio sources seldom have an I^2C control bus) an interface is necessary in order to start and stop the audio source at the right time. The surveillance Switch Card can act as such an interface and will be used in audio routing and matrix systems as a 'Message Switch Card'.

External audio sources often used in SM40 systems are - for example - pre-recorded message sources that automatically generate evacuation information during calamities or to generate advertisement messages from time-to-time- such as in large supermarkets or shopping centres etc..

Up to 8 audio sources can be controlled by the Surveillance Switch Card. These audio sources should have the possibility to be started and stopped from an external contact or voltage level, and should be provided with a "RUN" make-contact (contact closed during playback).

If this card is used for the above mentioned application, the jumper setting for the group address should be according to the drawings on the left.

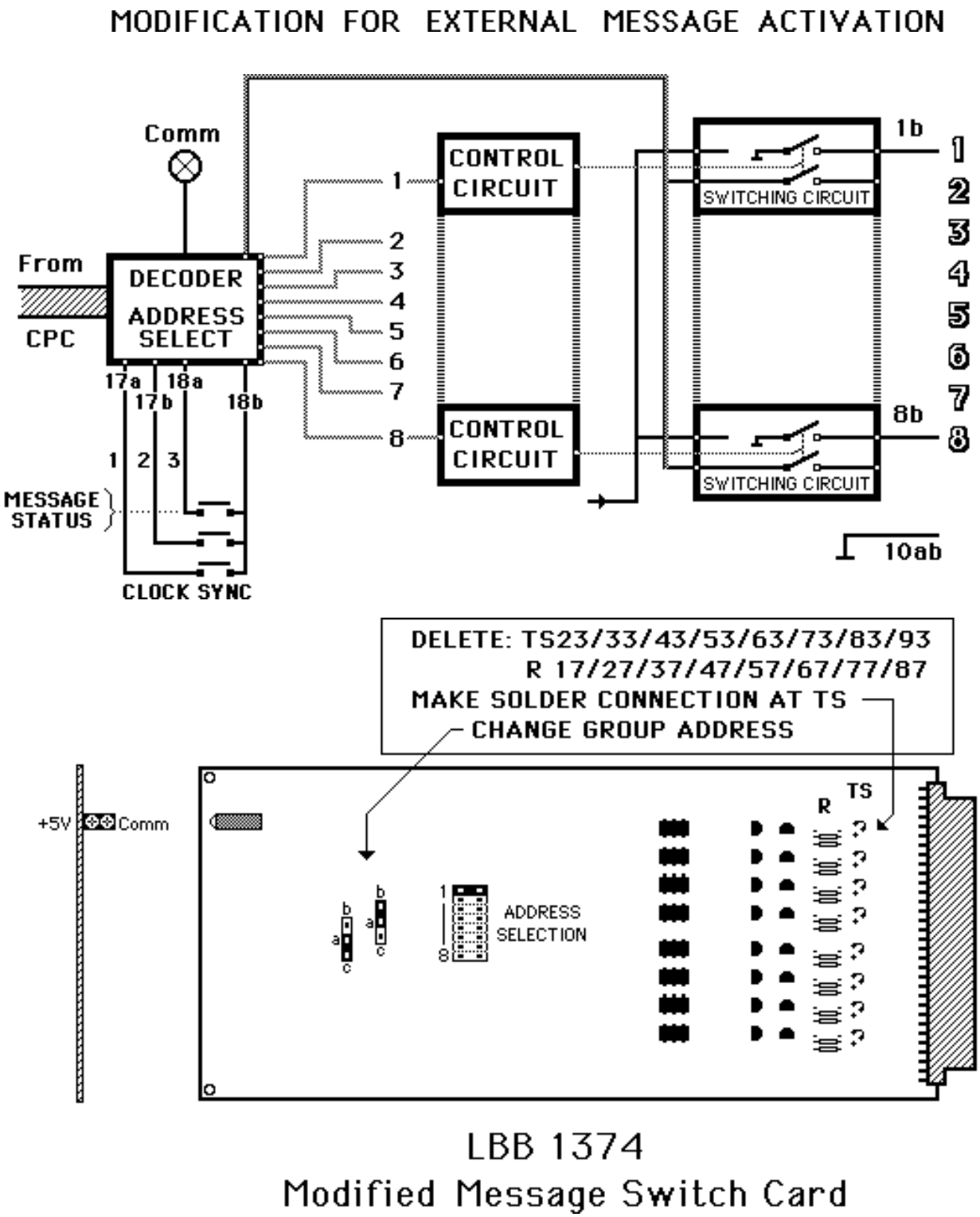
If the audio source can be started with a positive pulse of +15 V, no hardware modification is necessary. The 15 V pulse voltage can automatically be provided from the SM40 power supply unit. See drawings on the left.

If the audio source is started by connecting the remote control start/stop pin to earth then a modification of the Surveillance Switch Card is necessary. The modification should be carried out according to the drawings on the next page.

The external audio source can now be activated at the right moment by programming the user keys of the call or alarm stations.

All connections to and from the Surveillance Switch Card are made via the Interconnection Board and Termination Boards.

A yellow LED located on the front edge of the card indicates that the SSC is in communication with the central processor card (CPC). A green LED indicates that the supply voltages are present and adequate.



LBB 1374
Modified Message Switch Card

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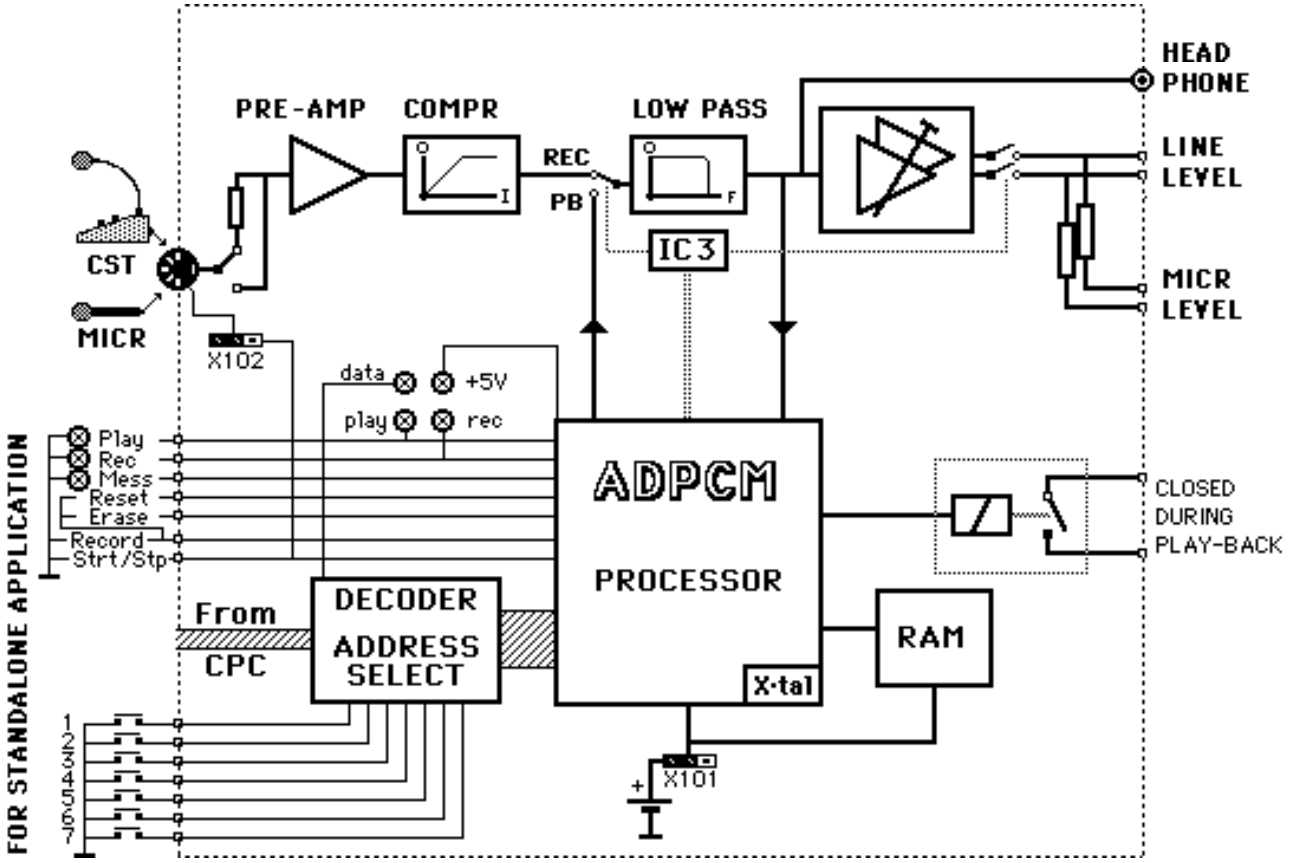
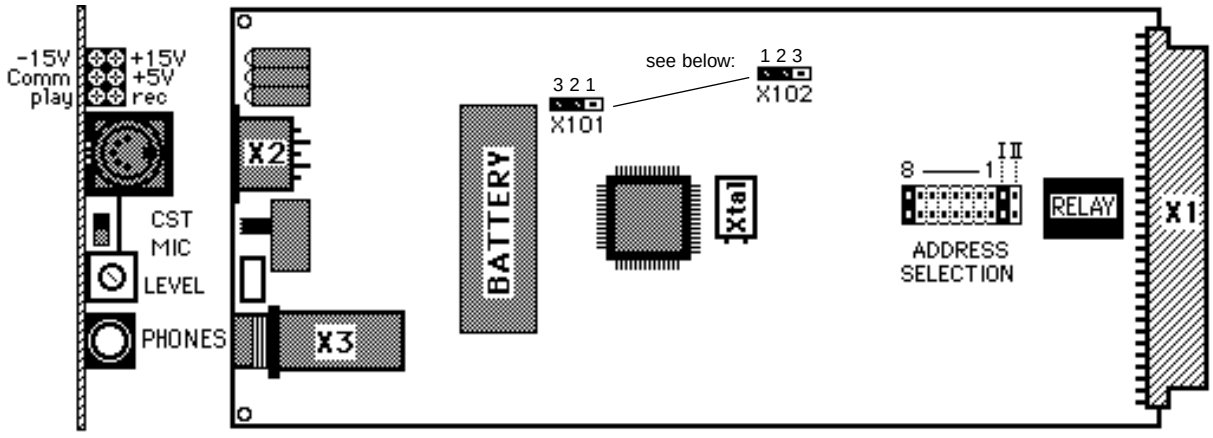




LBB 1378
Digital Message Card

X101 : Jumper normally set in position 2 - 3. For service purposes the jumper can be set in position 2 - 1, the battery will be disconnected (contents of message(s) therefore will be lost.

X102 : When the jumper is placed in position 1 - 2, the switch of the connected microphone can be used to start/stop a recording.

5.11 Digital Message Card - DMC LBB 1378

Optional Eurocard 10 x 22 cm with an 'ab' connector (2 x 32), capable of pre-recording up to 7 individual messages per card. Each message can be of varying duration (Max. 65 seconds per card) to be played back as desired. Max. No. of cards per centre 16.

This unique card allows up to 7 individual messages to be recorded and played back as desired. The analogue audio recording signals (audio bandwidth up to 6 kHz internally limited) are digitised and stored in memory chips, ensuring that the recording quality will not deteriorate. When the power is switched off, messages will remain intact in memory for up to 30 days.

The maximum recording time on each card is 65 seconds, this means that messages of varying duration can be recorded, as long as the sum of the message durations, does not exceed the maximum recording time (65 secs).

To record a message a separate microphone or Call Station can be connected to the card's microphone input (5-pole180° DIN socket). This socket can also provide phantom powering.

Due to the card's 'record' and 'monitor' functions being totally independent of the SM40 microprocessor, the card may be removed and transported to a remote location. With the aid of a suitable power supply and extra switches, the card may be used to record messages in a more suitable and convenient environment. To play back the message(s) either alone or preceding a call, the SM40 centre can be programmed so that playback can be initiated by a Call Station or by a defined user key.

A 6.3 mm headphone socket allows the recorded message(s) to be monitored both during and after recording.

A limiter in the card's Automatic Gain Control (AGC) circuit, ensures that the message is always recorded at a constant audio level. The output volume level is adjustable to the same values as those of other system sources (attention signals, music sources etc.).

Each Digital Message Card can be recognised by the SM40 centre's, Central Processor Card, via an 'address' achieved by a jumper setting on the DMC.

NOTES:

1. When installed in the SM40 system, contacts 10 to 18 should not be used to relay audio from other audio sources to the matrix cards. The audio output of the DMC should be connected directly to the appropriate input of the matrix card, on the matrix card itself.

2. The recording and playback procedures are described in the Installation and Programming procedures in chapter 4.3.4 - page: 4-32.

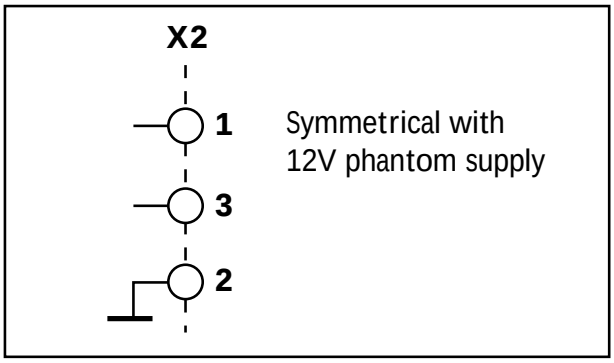
INPUTS SWITCH S1.

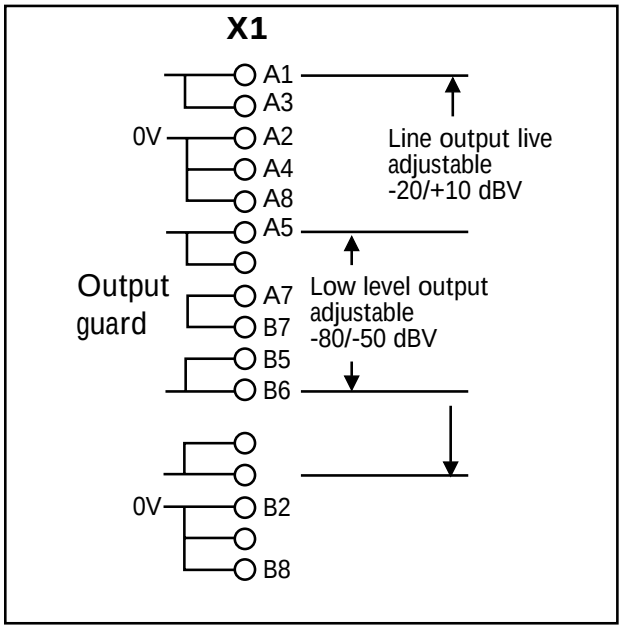
Position Mic.: Input X2 is symmetrical with 12V phantom supply according to DIN 41524
Input level -56.5 to -30.5 dBV
Input impedance 1.2 KOhm (using mic. LBB 9420)

Position Call station: Input X2 is Call station input for LBB 9567.

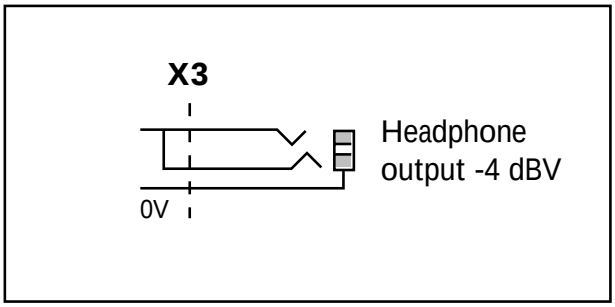
INPUTS & OUTPUTS

Audio input

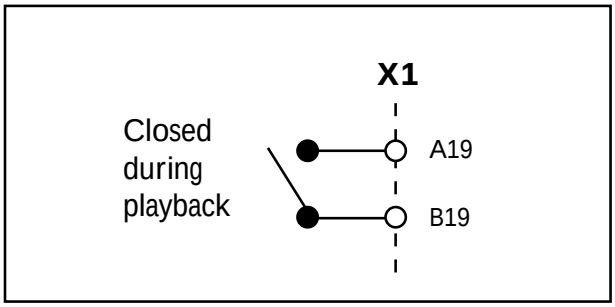




Audio outputs



Relay contact



5

5.11.1 Recording and Playback in a stand-alone application

The following accessories are needed to record and playback in a stand-alone application:

Power Supplies:
- + 5 V (> 50 mA) + 0.75/ - 0.25 V
- + 15 V (>100 mA) + 5 V / - 0 V
- - 15 V (>100 mA) - 5 V / +0 V

Connector:
- 'ab' connector 2 x 32 (female)

Switches:
- Block of 7, On/Off pushbutton switches, for message selection 1 - 7. The switches are mechanically linked so that only one switch at a time can be on, giving an active indication of which message is being recorded, erased or played back.
- 3 x Single-pole momentary pushbutton switches.
  Reset: Erase all Messages
  Erase: Erase one specific message depending on message selection switch 1 to 7.
  Start/Stop: To start and stop recording or playback.
- Single-pole On/Off switch
  Recording Switch to switch between recording and playback.

LEDs:
- 1 Green (Playback mode indication)
- 1 Red (Record mode indication)
- Yellow (Message present indication located at the position of the active message selection switch)

These LED indications are coupled to the status of the message selection switch.

Recording

1. Select Message number.

2. Push Record/ Play switch to Record.

3. Push Start/Stop switch to start recording. The Red LED illuminates.

4. Ensure microphone is connected to the 5-pole 180° DIN socket (X2). Speak the message in to the microphone. During recording, the message can be monitored by a headphone connected to the headphone socket (X3).

5. To stop recording push Start/Stop switch again. The recording will automatically stop when all the available recording time has been used. The green LED should now illuminate, indicating the presence of this message.

Playback

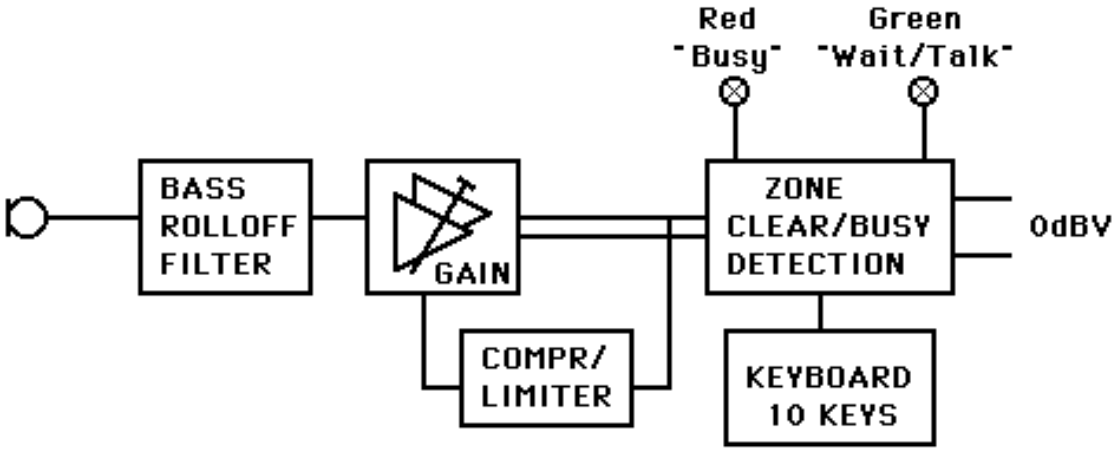
1. Select message number (1 of 7 switches).

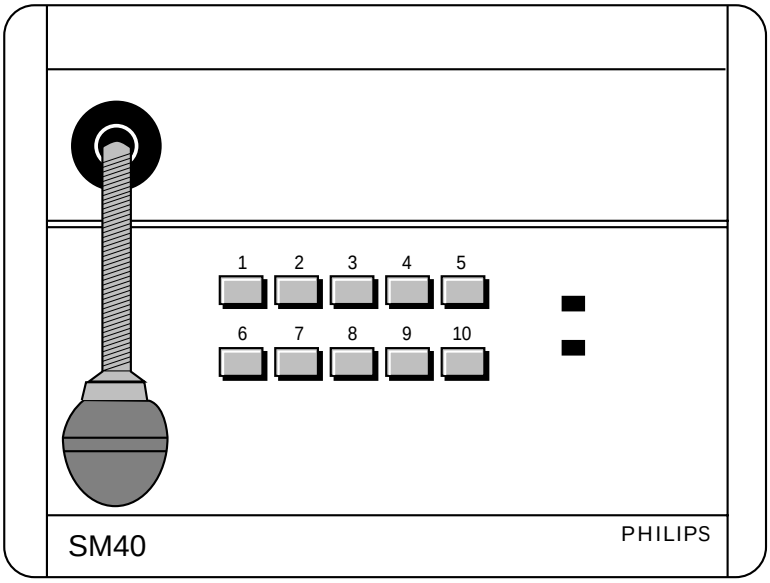
2. Switch Record/Play switch to Play.

3. Start playback by switching Start/Stop switch to Start. The Yellow LED illuminates.

4. Playback can be monitored by headphones connected to the headphone socket (X3).

5. To stop playback push Start/Stop switch again to stop. Playback will automatically stop at the end of the recorded message.





CALL STATION LBB 9567

5.12 Call Station - CST LBB 9567

Gooseneck Microphone with line level output, mounted on a table stand. A set of user keys, plus a red "busy" LED and a green "wait and talk" LED are mounted on the front panel. Each unit contains a preset gain control with built in limiter.

Call Station (CST) LBB 9567 is a table stand unit on which an electret condenser microphone (mounted on a goose-neck); 2 LEDs; and 10 pushbuttons ('user keys') are mounted. This is the standard input source of the SM40 Public Address Distribution Centre which will accept a maximum of 16 call stations when a 16 x 64 matrix is used and 32 call stations when a 32 x 32 matrix is used. If music inputs and/or Signal Generator Cards, and Digital Message Cards are used in the system less stations can be connected.

USER KEY FUNCTIONS are activated by pushing just one of the User Key pushbuttons. These functions: Key Priority, Signal Tone, Messages and Routing, are programmed at the microprocessor in the central rack unit.

1. Key Priority Level: can be set giving each key a priority of 0-9: 9 being highest priority, to cope with conflict situations (e.g. 2 stations attempting to call the same zones simultaneously).
The caller with the highest priority overrides any lower priority callers. When two callers with the same priority call the same zone, the first caller is switched through, while the microphone of the later caller is inactive. It is possible to program two user keys on a call station to the same zone but giving one of them a higher priority level to make announcements of more urgency.

2. Signal Tones: Chime tones are available to precede an announcement; alarm signals are according to international standards.

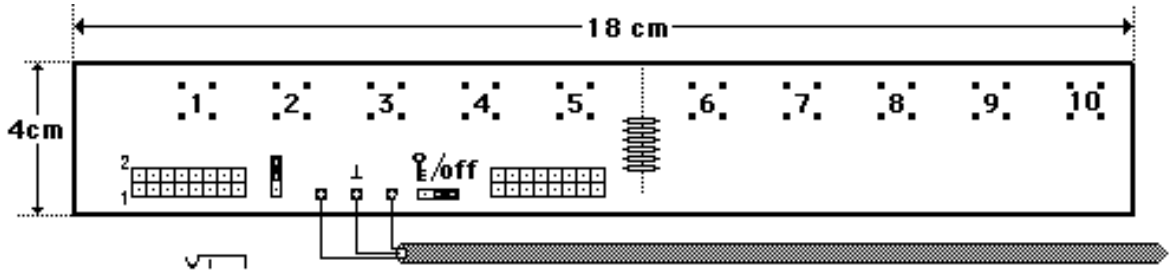
3. Digitally Stored Messages: If the system is installed with a Digital Message Card (DMC), up to 7 individual pre-recorded messages of varying duration (max. 65 seconds) can be played back. To play-back the stored message(s), the system can be programmed such that defined Call station keys will activate the stored message(s) individually or preceding a call.

4. Routing: assigns a user key to an amplifier, or combination of amplifiers, feeding loudspeakers located in geographical or functional zones.

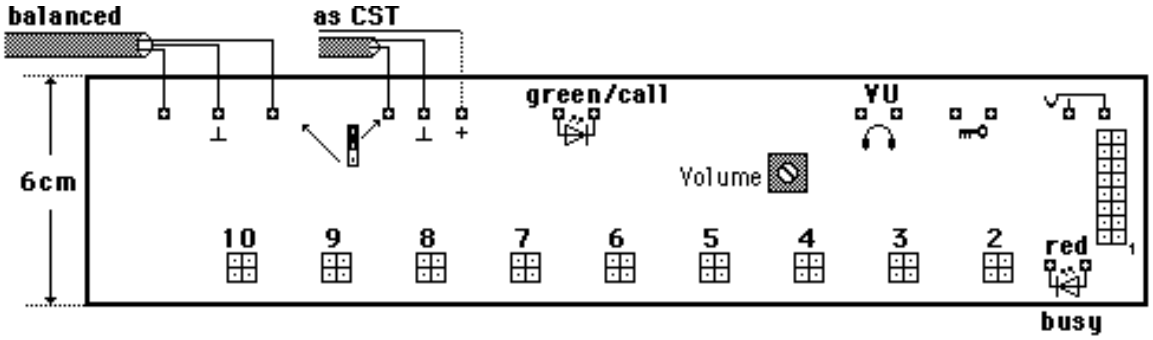
LED INDICATORS. Two LEDs are mounted on the Call Station's front panel to advise the caller whether the zone selected is clear to call. The green LED is titled 'wait and talk' and the red LED:'busy'. Led indicator functions are as follows:

Green Led flashing: Chime tone and/or message being broadcast. Wait to talk.
Green Led continuous: Ready to talk
Red Led continuous: Conflict situation (e.g. zone being called by a user with the same or higher priority). Release user key and try again later!
Red Led illuminates while caller is speaking: Call overridden by a caller with a higher priority. Release user key and try again later!

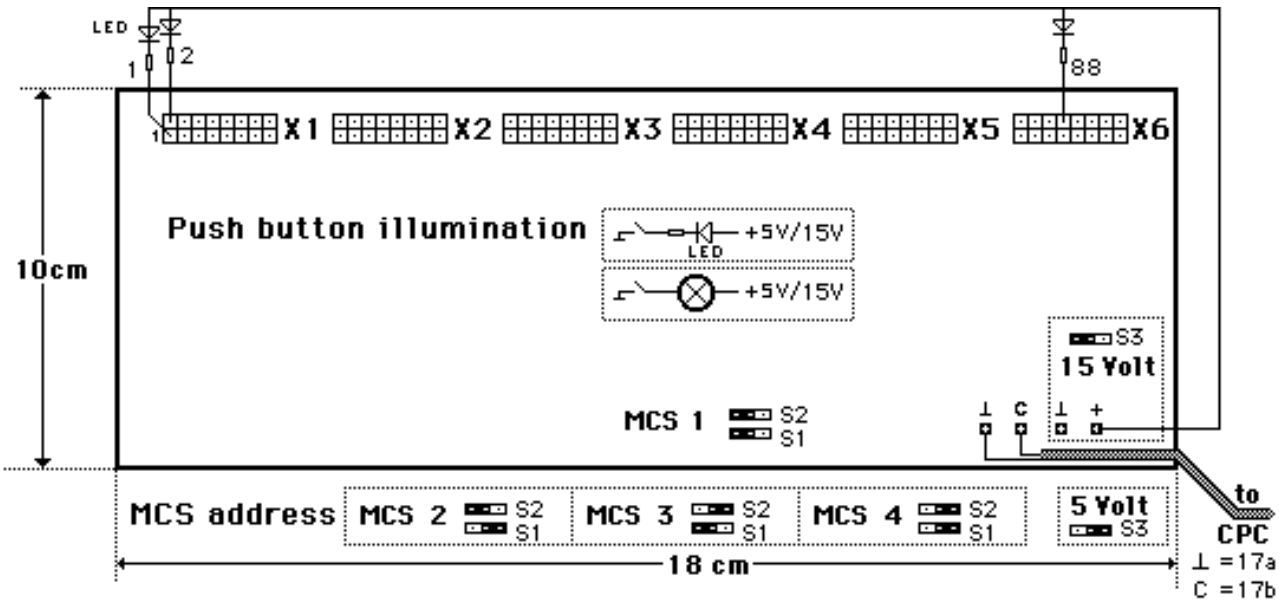
AMPLIFIER. The call station's amplifier has an in-built limiter and performs a double function. It gives the call station microphone a balanced line level output, enabling standard two core screened microphone cable lengths of up to 1000 metres to be used; and determines the user key current. The volume level of each call station may be preset, via a hole in the bottom plate. The potentiometer affects the gain before the limiter and should be matched to the announcer so that the output level is approximately 1 V RMS.
In order to label which zone(s) each User Key represents, paper 'overlays' are provided. These overlays are mounted on the front panel of the CST, and provide enough room to write the name of the zone(s) on.
To access the overlay for marking; remove the 3 screws holding the right hand cover plate, and simply remove the clear plastic panel.



LBB 1363
Key Sensing Pcb



LBB 1364
Microphone Amplifier Pcb



LBB 1365
Key Confirmation Pcb

5.12.1 Special Call Stations

The printed circuit boards which are used as the basis for standard Call Stations may be purchased as separate, unmounted, printed circuit boards.

These boards, called Microphone Amplifier PCB's (MAP)s, and Key Sensing PCB's (KSP)s, are used to make up Extended Call Stations (ECS)s, and Master Call Stations (MCS)s.

The Microphone Amplifier PCB differs from that used in the standard Call Station in that it has (see illustration):

(a) Phantom powering, allowing condenser, as well as dynamic, microphones to be used.

(b) A switch fitted to the board, allowing selection of either balanced or unbalanced microphone inputs.

(c) A VU meter may also be fitted, using the soldering points on the circuit board.

(d) Output for monitoring headphones (using the same solder contacts as the VU meter).

(e) Master On/Off - keyswitch contacts (make contact to enable key sensing).

(f) Telephone handset cradle switch contacts (break contact to enable key sensing).

Two jumpers on the Key Sensing PCBs allow functions e. and f. to be 'active' or 'non-active'. The diagrams on Page 5-48 show these jumpers in the normal 'non-active' position.

Other features: i.e. compressor/limiter; and volume control are identical to the standard Call Station amplifier.

The Key Sensing PCB, as the name implies, is the part of the call station to which the user keys are connected, and which informs the CPC which user key is being pressed.

Each KSP has holes pre-drilled for mounting 2 blocks of 5 user keys (provided). As an alternative, a flat-cable connector is provided for the connection of remote user keys.

Up to 5 KSP's may be connected to one Microphone Amplifier PCB, to create an Extended Call Station (ECS). This operates as a standard call station, but with 50 user keys instead of 10.

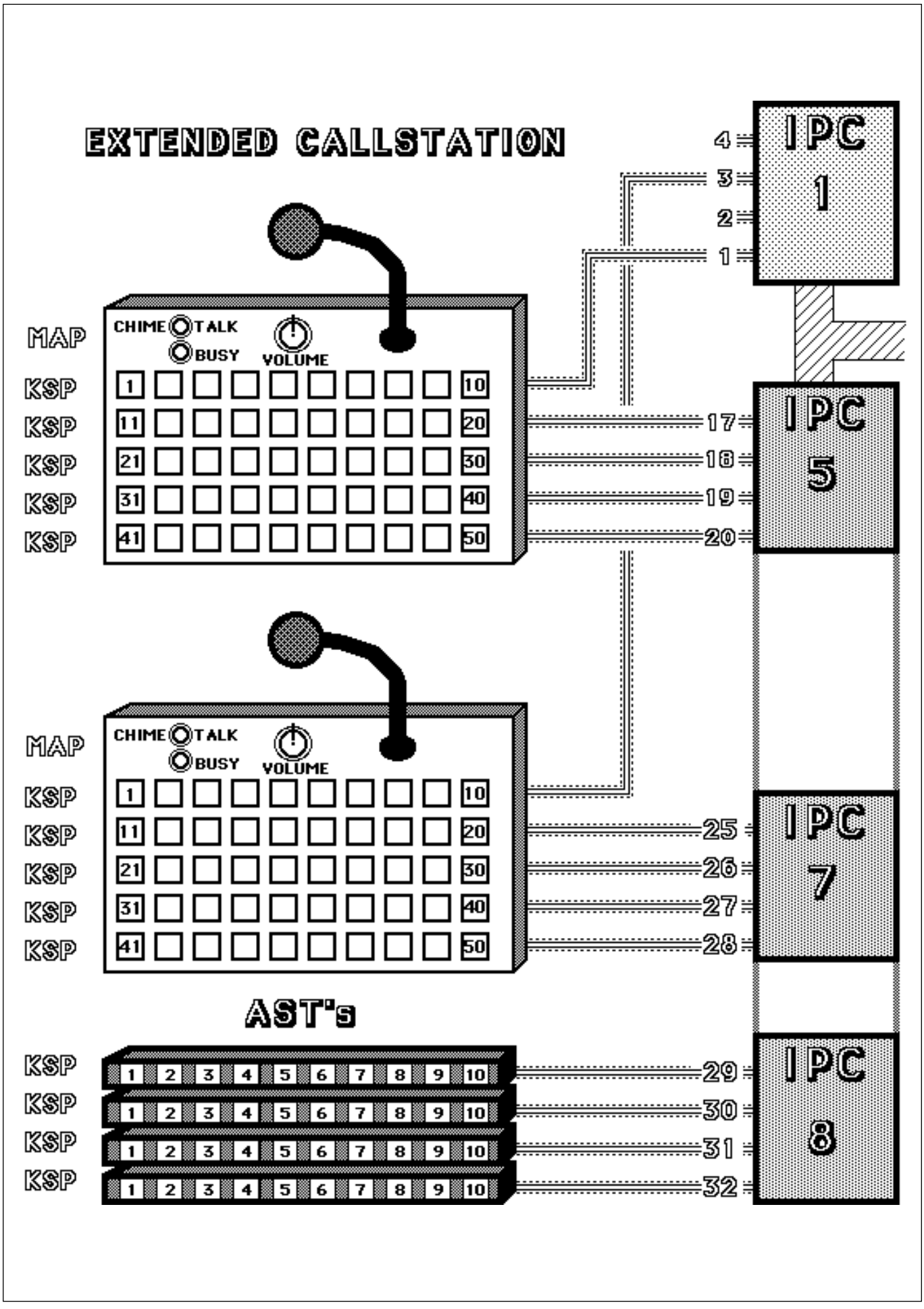
An ECS would normally have the Microphone Amplifier PCB, and its associated Key Sensing PCBs (called 'Key Sets' in Installer Program 'C', and 'Key Stations' in Program '5'), mounted in a suitable enclosure, with a microphone, volume control and LEDs mounted.

As the example on the following page shows, the master KSP of each ECS must be connected to one of the inputs of Input Card 1, and the slave KSP's to Input Cards 5 to 8 beginning in sequence at input 17.

A maximum of 4 ECS's may be used in an SM40 system.

KSP's can also be used without Microphone Amplifier PCBs, in applications where no live microphone "Call" is needed. In such a case the user key only can start the alarm tones and pre-recorded messages in the programmed zones. KSP's connected to IPC's, which are not connected to matrix cards are displayed as alarm stations ASP's.

Individual 'make' contact switches can be positioned around a building, or area, where they would act as "panic buttons". These switches (suitably protected against misuse or accidental activation) would be connected to the flat-cable connector of the KSP.
When an alarm tone of fixed duration is sounded in a combination of zones, it is possible for someone, with access to a suitably programmed call station, to override the tone in one or more of the zones with a call which has a higher priority. After the call, the alarm tone returns to the interrupted zones, except if a message of the DMC is programmed to that user key.


EXTENDED CALLSTATION
MAP
CHIME
TALK
BUSY
VOLUME
KSP
1
10
11
20
21
30
31
40
41
50
4
3
2
1
IPC
1
17
18
19
20
IPC
5
25
26
27
28
IPC
7
AST's
29
30
31
32
IPC
8

KSP's may also be used for loudspeaker zone pre-selection in Master Call Stations. A Master Call Station (MCS) consists of an activation section, and a pre-selection section containing a maximum of 90 Keys.

The activation section is made up from a Key Sensing PCB, and a Microphone Amplifier PCB. The KSP's keys are here used as 5 Chime selection keys (numbered 1 to 5); 4 Priority/Talk keys (numbered 6 to 9); and 1 Reset key (number 10). The MAP part of the activation section allows for connection of a microphone; a VU meter; headphones; key- and handset cradle switches; and "Talk/Busy" LEDs.

The Chime keys may be pre-programmed with the chime tones which are desired to precede a call, and the Priority/Talk keys with the required priorities.

The option exists, within the Installer Programming Menu, to combine the chime/alarm keys and Priority/Talk keys (this is the most used application for MCSs). This means that 9 keys can be programmed as such: Chime/ Alarm/ Message/ Priority and Activate. (see chapter 11 for a list of tones).

The pre-selection section of the MCS consists of up to 9 Key Sensing PCBs (called 'Key Sets' in Installer Program 'C', and 'Selection Stations' in Program '5'). These are connected to the Microphone Amplifier PCB of the activation section, and to Input Cards inputs 5 to 8.

The operator first presses:
a) a number of selection keys (each key is software programmed to route the call to 1 or more zones);
b) a "Chime" key to select a chime or attention tone; then
c) a "Priority/Talk" key to execute the call.

The Talk/Busy LEDs operate in the same way as a standard call station.
If a call has been cancelled, or has not taken place, because of a priority conflict, the selection keys will remain in their "selected" mode, ready for the call to be attempted again. When the call has been successfully made, the selected keys will automatically be cancelled (reset).

Individual keys may be reset by pushing the key again. The total key selection may be cancelled by pushing the "Reset" key on the Activation Section.

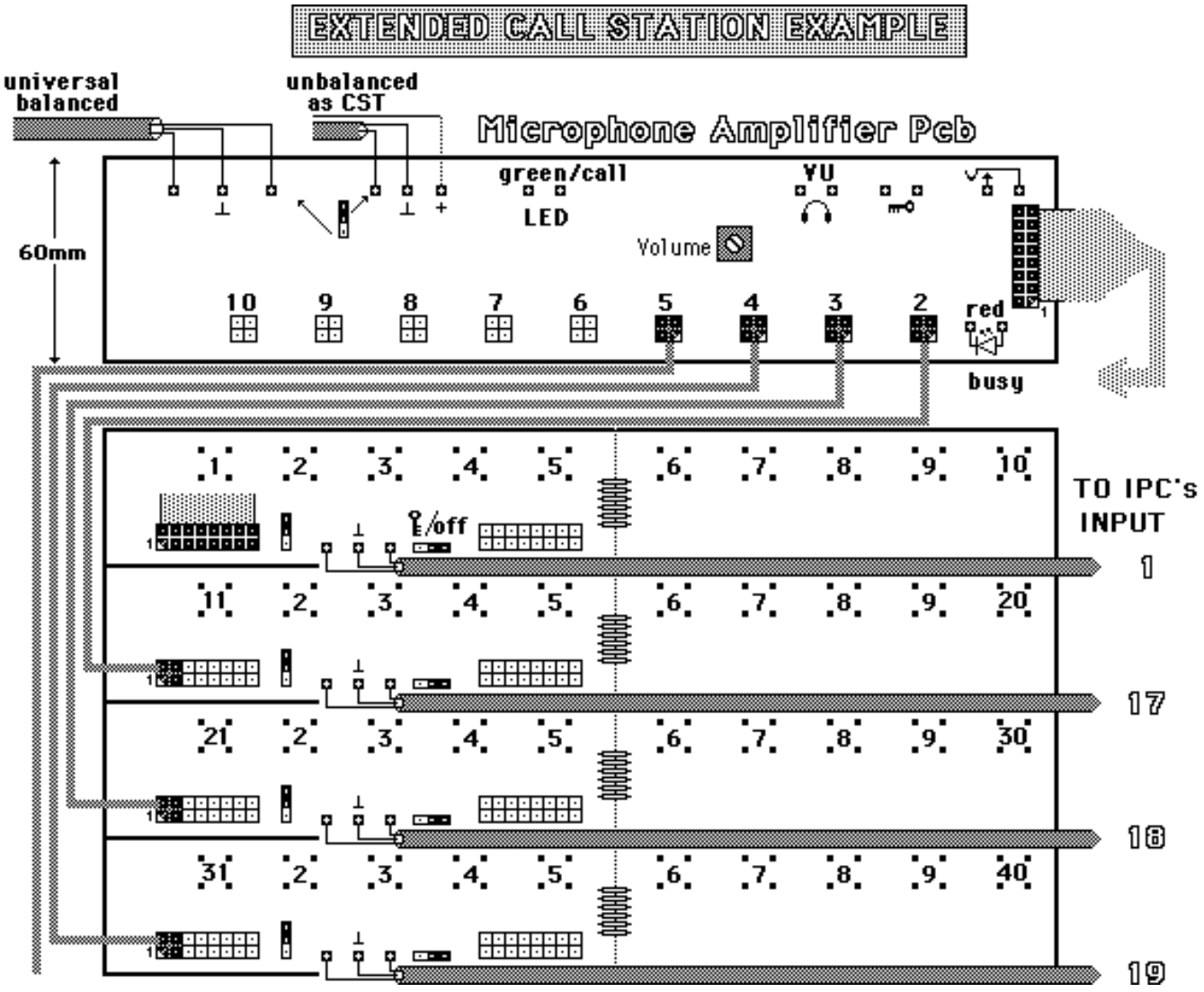
As the example at the left shows, the KSP of the Activation section must be connected to one of the inputs of Input Card 1, and the remaining KSP's to Input Cards 5 to 8.

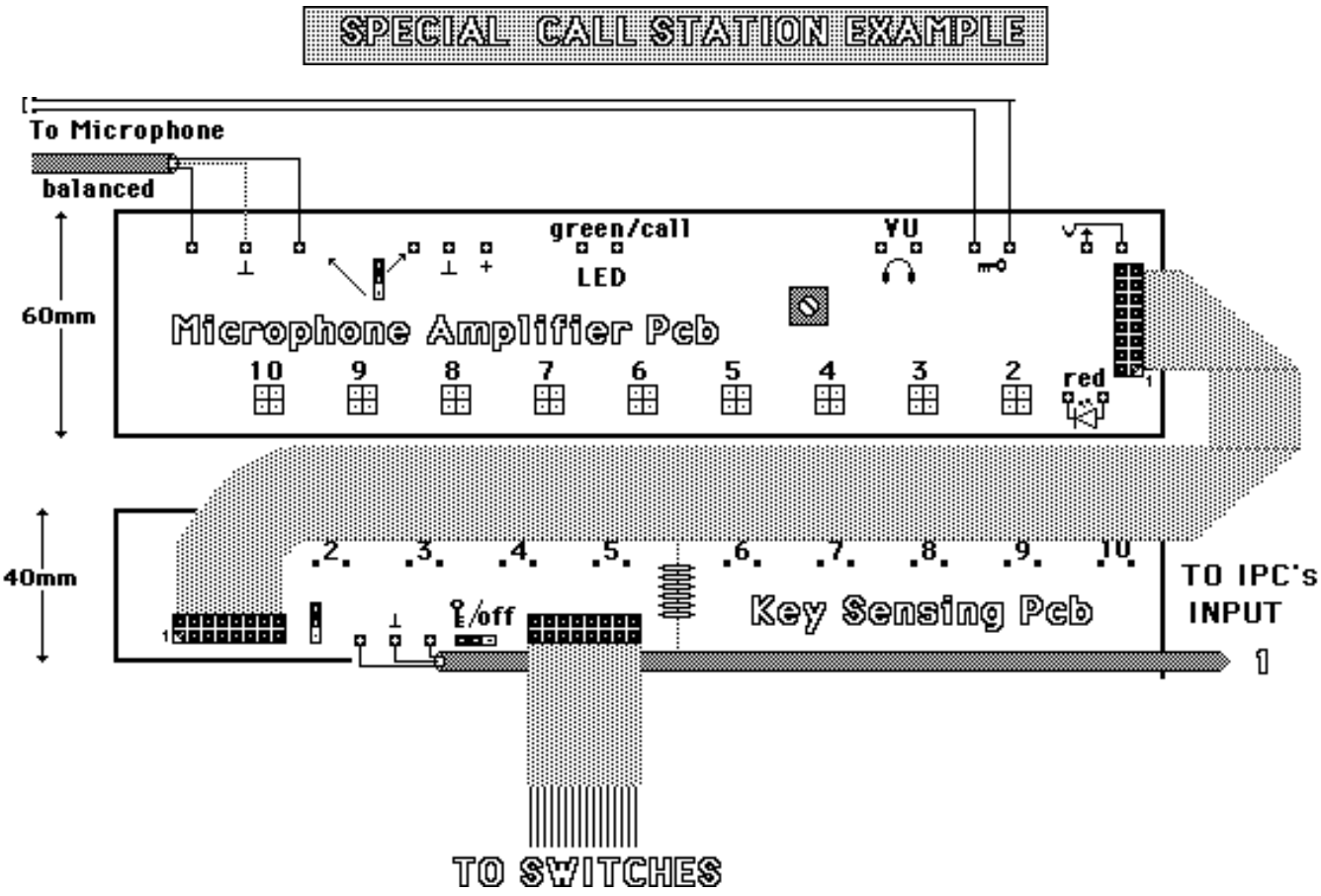
It is possible to use illuminated switches, or LED indicators, to show which keys are currently active.

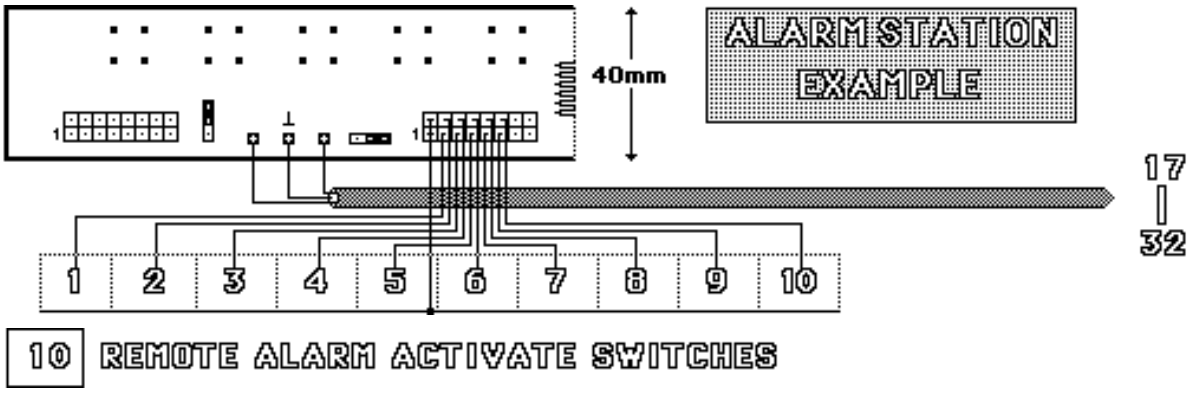
A Key Confirmation PCB (KCP) is available to activate these indicators. A maximum of 4 KCP's can be used in an SM40 system, each KCP capable of controlling up to 90 indicators. Because of the amount of power used by the indicator lamps, a separate power supply should be used. A jumper (S3) on the PCB allows selection of either 5 V or 15 V supply. The maximum distance between the SM40 system and a KCP is 200 m. The maximum d.c current per indicator is 500 mA and the maximum d.c voltage per indicator is 50 Volt.

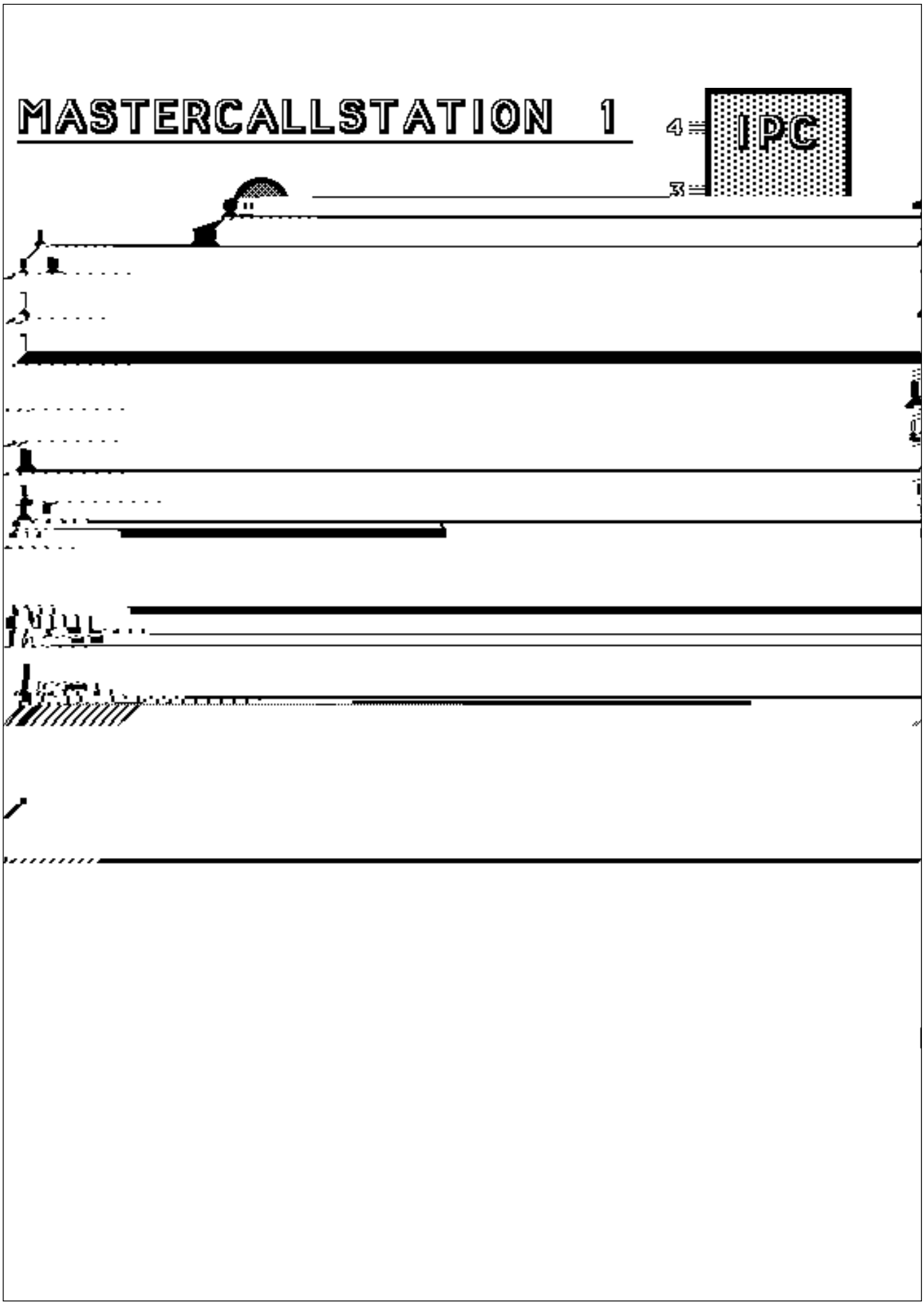
Each KCP includes two jumpers (S1 & S2) used for setting the address so that it corresponds with the Master Call Stations address.

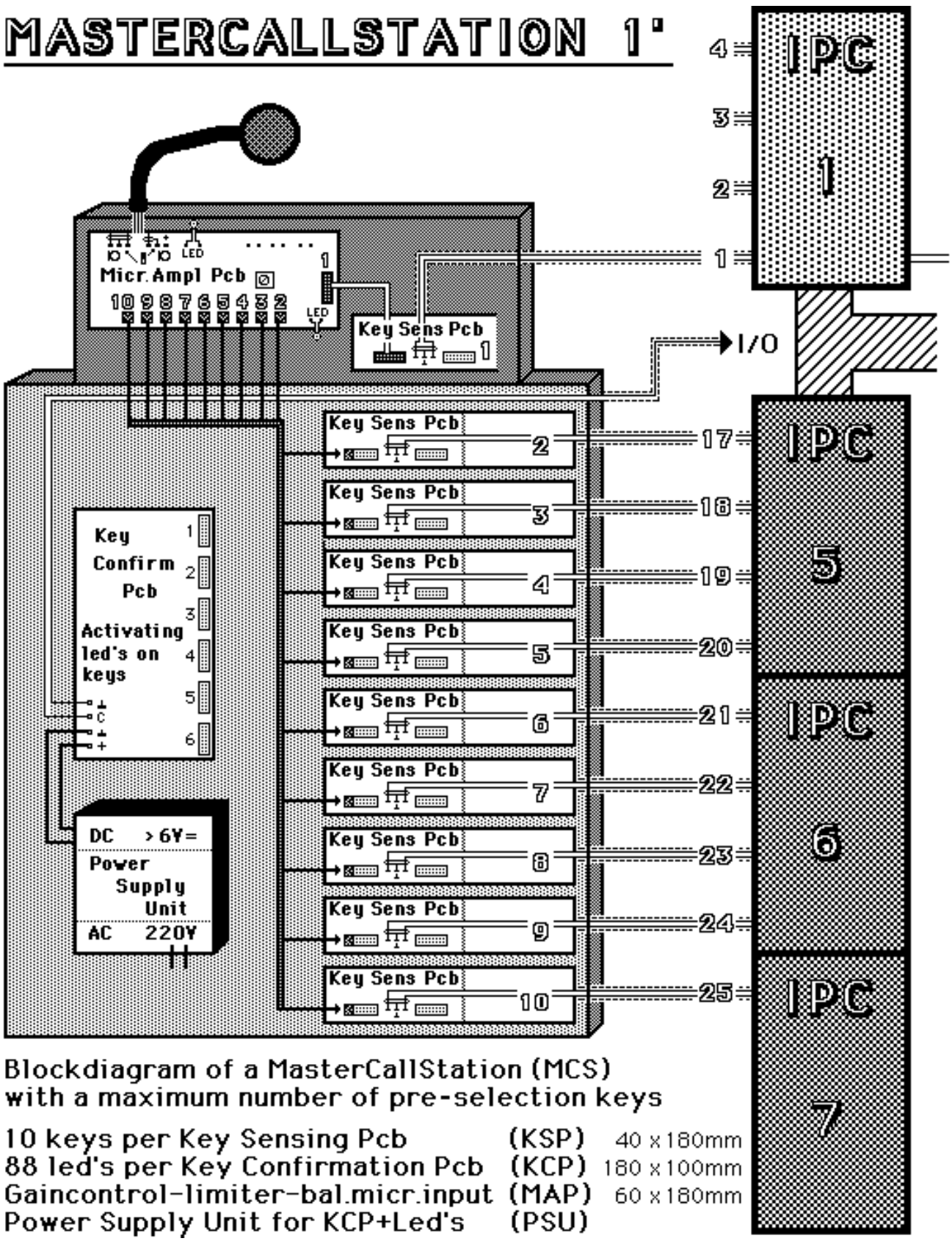
KCP's will only operate if the system's Central Processor is fitted with a Communications PCB (CMP) or an I/O PCB (see Chapter 5.13).


EXTENDED CALL STATION EXAMPLE
universal balanced
unbalanced as CST
Microphone Amplifier Pcb
green/call LED
VU
Volume
60mm
10 9 8 7 6 5 4 3 2
red
busy
1 2 3 4 5 6 7 8 9 10
on/off
TO IPC's INPUT
1
11 2 3 4 5 6 7 8 9 20
17
21 2 3 4 5 6 7 8 9 30
18
31 2 3 4 5 6 7 8 9 40
19


SPECIAL CALL STATION EXAMPLE
To Microphone
balanced
60mm
green/call
LED
VU
Microphone Amplifier Pcb
10 9 8 7 6 5 4 3 2
red
40mm
2 3 4 5 6 7 8 9 10
Key Sensing Pcb
TO IPC's
INPUT
1
TO SWITCHES

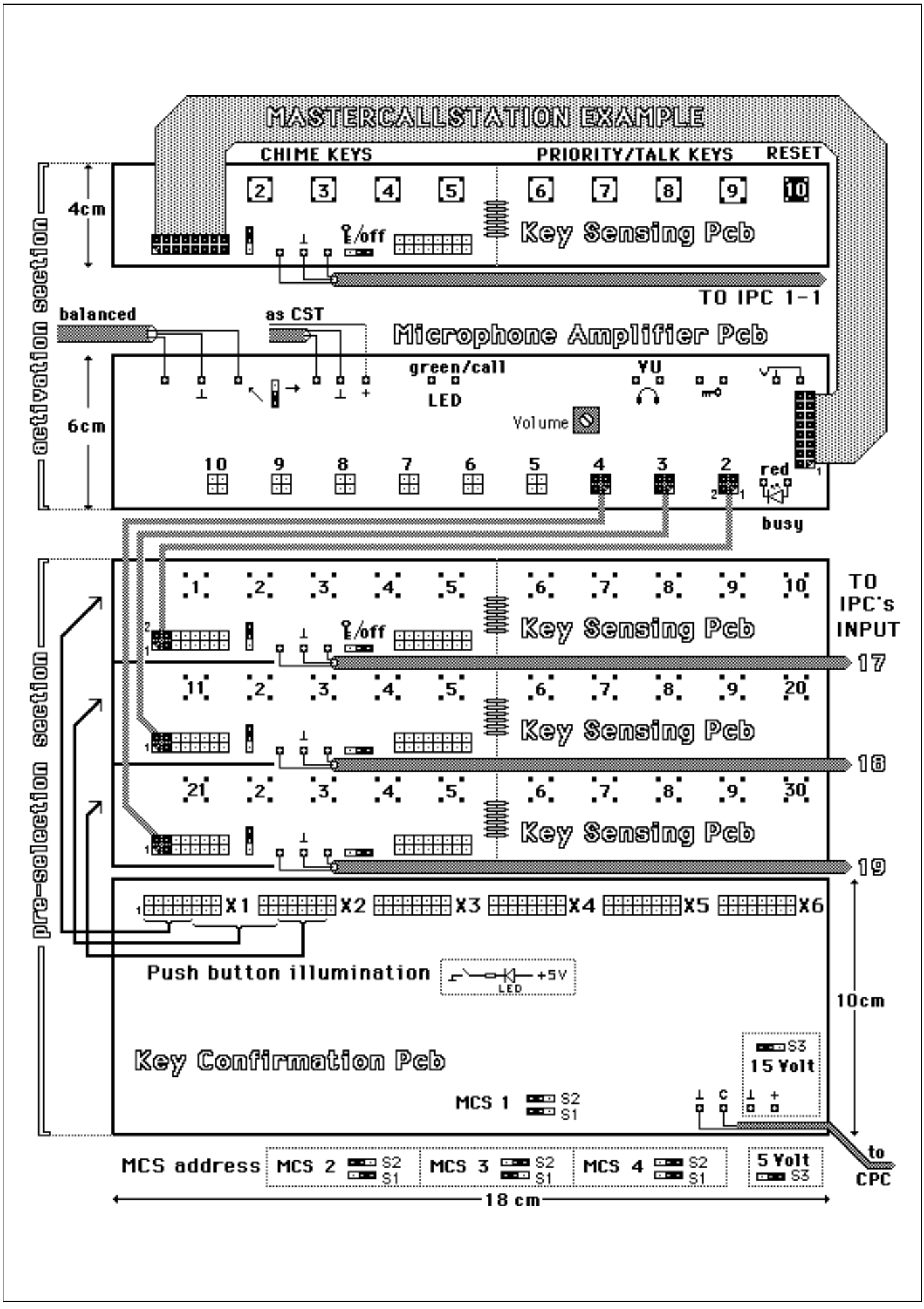

40mm
ALARM STATION
EXAMPLE
17
32
1 2 3 4 5 6 7 8 9 10
10 REMOTE ALARM ACTIVATE SWITCHES

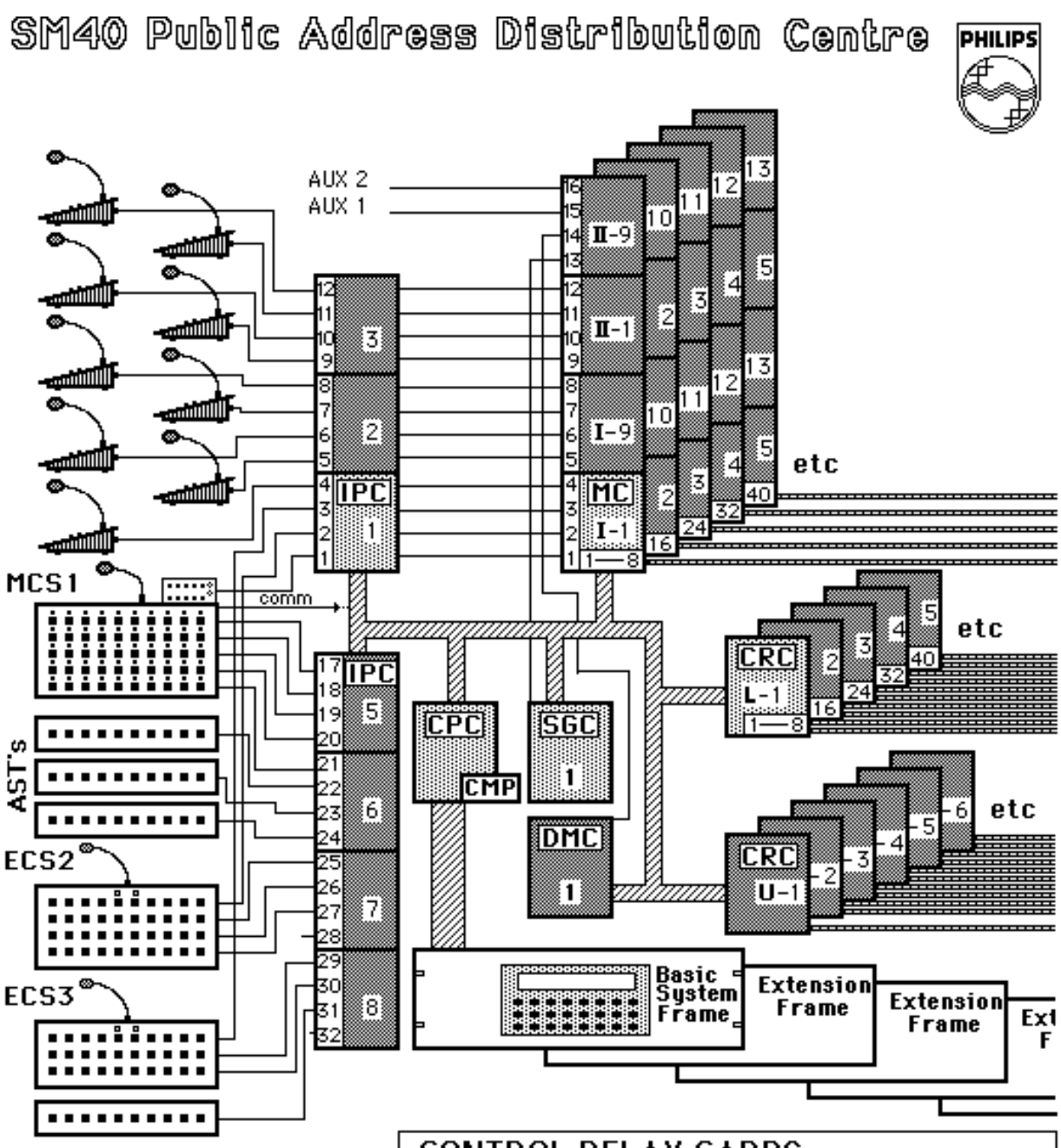

MASTERCALLSTATION 1
4
IPC
3

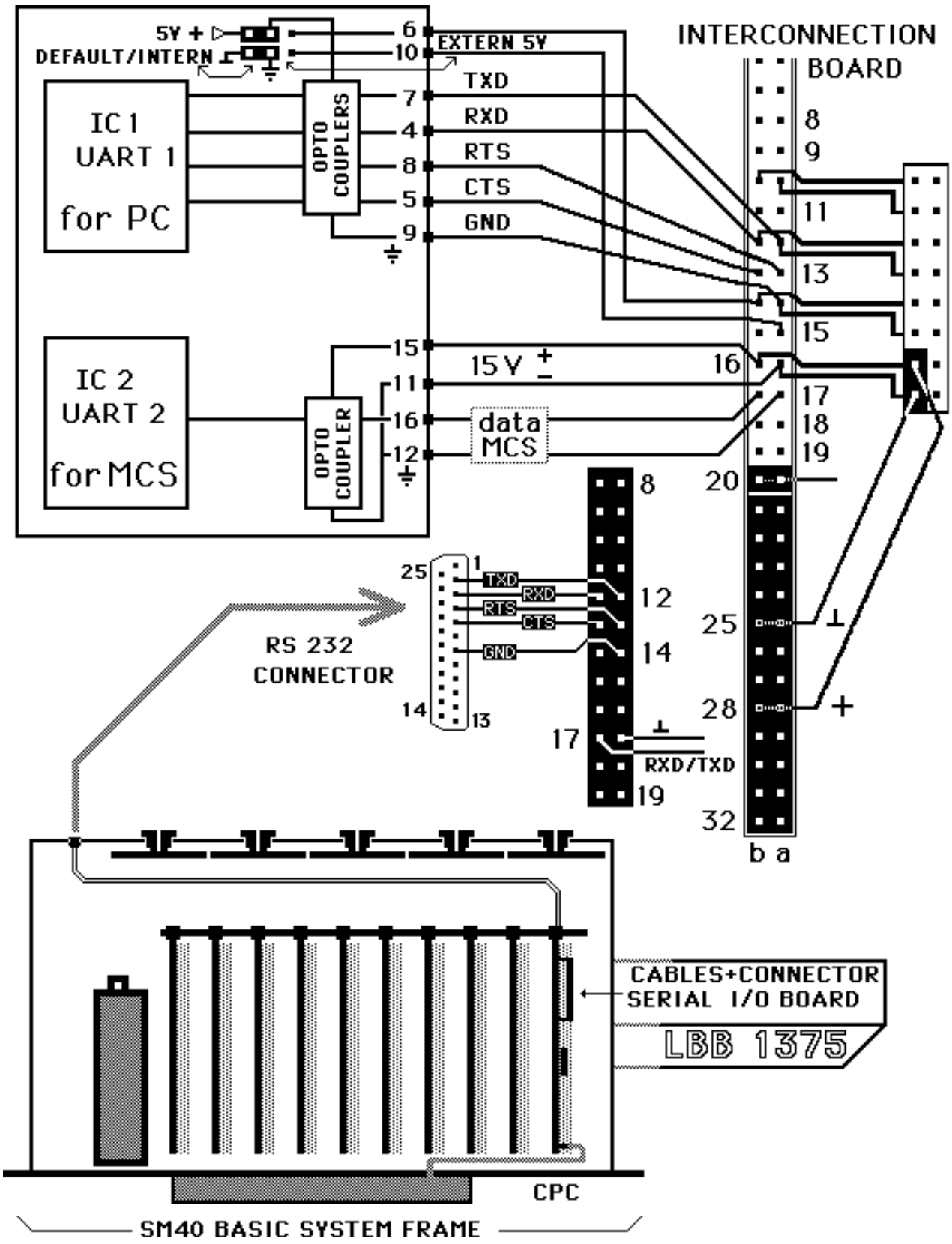


Blockdiagram of a MasterCallStation (MCS)
with a maximum number of pre-selection keys

10 keys per Key Sensing Pcb	(KSP)	40 x 180mm
88 led's per Key Confirmation Pcb	(KCP)	180 x 100mm
Gaincontrol-limiter-bal.micr.input	(MAP)	60 x 180mm
Power Supply Unit for KCP+Led's	(PSU)	


MASTERCALLSTATION EXAMPLE
CHIME KEYS
PRIORITY/TALK KEYS
RESET
2 3 4 5 6 7 8 9 10
t/off
Key Sensing Pcb
TO IPC 1-1
4cm
activation section
balanced
as CST
Microphone Amplifier Pcb
green/call
LED
VU
Volume
6cm
10 9 8 7 6 5 4 3 2 1
red
busy
pre-selection section
1 2 3 4 5 6 7 8 9 10
Key Sensing Pcb
TO IPC's INPUT
17
11 2 3 4 5 6 7 8 9 20
18
21 2 3 4 5 6 7 8 9 30
19
X1 X2 X3 X4 X5 X6
Push button illumination
+5V
LED
10cm
Key Confirmation Pcb
S3
15 Volt
MCS 1
S2
S1
C
MCS address
MCS 2
MCS 3
MCS 4
5 Volt
to CPC
18 cm


SM40 Public Address Distribution Centre
PHILIPS
AUX 2
AUX 1
MCS1
comm
AST's
ECS2
ECS3
IPC
MC
CPC
CMP
SGC
DMC
CRC
L-1
U-1
etc
Basic System Frame
Extension Frame
Extension Frame
CALLSTATIONS
MCS1=MAP+KSP(5)+KCP
ECS2=MAP+KSP(4)
ECS3=MAP+KSP(3)
AST =KSP
CONTROL RELAY CARDS
L-1.....8 Locked to corresponding routing
if Matrix Cards are present, if not
U-1 Error indication
U-2 Time activated switching(+ MC)
U-3 Time activated switching only
U-4 ... 8 Independently programmable switching, activated by userkeys


5V +
DEFAULT/INTERN
6
10
EXTERN 5V
TXD
RXD
RTS
CTS
GND
7
4
8
5
9
IC 1
UART 1
for PC
OPTO COUPLERS
INTERCONNECTION BOARD
8
9
11
13
15
IC 2
UART 2
for MCS
OPTO COUPLER
15
11
16
12
15 V ±
data MCS
16
17
18
19
20
25
28
32
b a
RS 232 CONNECTOR
25
1
14
13
TXD
RXD
RTS
CTS
GND
8
12
14
17
19
RXD/TXD
CABLES+CONNECTOR
SERIAL I/O BOARD
LBB 1375
CPC
SM40 BASIC SYSTEM FRAME

5.13 I/O Port (Communications Link) - I/O LBB 1375/30

Printed circuit board, for mounting on Central Processor Card.
Standard RS232 communication, plus connector bracket for link with outboard computers.
One wire asynchronous communication, for use with Master Call Stations.

The SM40 I/O port is designed to carry out two functions; to communicate with external computer equipment, and to control Key Confirmation indicators used with SM40's Master Call Stations.
The standard RS232 serial interface, provided by the I/O port, allows the system to communicate with a wide variety of personal, mini, and main-frame computers.

Dependent upon the software used, it is possible to use the outboard computer in 2 modes: Passive Mode, and Active Mode.

Passive mode	Active mode
a: read, or record "static" information: - Sources connected. - System configuration. b: read, or record "dynamic" information: - Call logging. - Failure information.	- Program the matrix of SM40. - Operate as a call station. - Operate as a master call station. - Up/Down-loading of programming. - Auxiliary routing.

To operate the communications link, a program must be provided on the computer. This would take the form of a simple communications program, which sends 3 character command information to the relevant serial port.

The communication has 8 data bits, and the baud-rate is selectable between 300, 1200, 2400, 4800 and 9600 baud. This, and the other I/O port parameters, such as number of Stop Bits, and Parity can be set in the installer programming menu.

SM40's standard default parameters are:
2400 baud, 8 data bits, 1 stop bit, even parity.

Each I/O port set, LBB 1375/00, comprises:
- I/O printed circuit board.
- RS232 connector, fitted to a mounting bracket.
- All necessary cables, connectors and mounting hardware.

The Asynchronous section of the I/O PCB is connected to the Key Confirmation PCB's of up to 4 master call stations. This facility transmits, to the KCPs, information which it has received from the CPC, telling it which Selection Keys have been pressed. The KCP then sends power to the relevant key indicators.

Standard screened microphone cable, of maximum 200 metres in length, can be used to connect the I/O card to the master call station(s).

The baud rate, and other parameters of the asynchronous port are all fixed, and therefore do not need to be set by the installer.

Note: Detailed information concerning the communication protocol of the I/O PCB and other relevant information can be found in the SM40 Installation Manual and the I/O documentation.

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6. REMOTE PROGRAMMING 1/O PROTOCOL

6.1 Introduction

Software version:	7.x	
Communication parameters:	Baud rate:	300, 1200, 2400, 4800 & 9600 Baud
	Data bits:	8
	Stop bits:	1 or 2
	Parity:	Odd, even, or no parity

All parameters except the number of data bits can be set via the SM40 installer menu (see Installer Programming Menu: Set-Up I/O Parameters). To enable remote system programming when the memory in the SM40 system was cleared, the serial I/O is set by default at:

2400 baud, 8 data bits, 1 stop bit, even parity.

Available functions:

6.2.1 Login of an external computer
6.2.2 Logout of an external computer
6.2.3 Enable call logging in SM40
6.2.4 Disable call logging in SM40
6.2.5 Clear all stored logs in SM40
6.2.6 Enable transmission of logs to external computer
6.2.7 Disable transmission of logs to external computer
6.2.8 Activate a user key of a call station
6.2.9 Deactivate a key of a call station
6.2.10 Set the routing of an auxiliary source
6.2.11 Program a user key of a call station
6.2.12 Program the complete matrix
6.2.13 Enable transmission of error messages to the external computer
6.2.14 Disable transmission of error messages to the external computer
6.2.15 Read user programming data from SM40
6.2.16 Store user programming in SM40
6.2.17 Read installer programming from SM40
6.2.18 Store installer programming from SM40
6.2.19 Read the SM40 status
6.2.20 Enable real time logging transmissions
6.2.21 Disable real time logging transmissions
6.2.22 Ask for transmission of next log
6.2.23 Ask for transmission of last transmitted log
6.2.24 Enable logging transmissions of only time, date, call station and key
6.2.25 Enable logging transmissions of all parameters
6.2.26 Enable logging of Master Call station zone selection
6.2.27 Disable logging of Master Call station zone selection
6.2.28 Ask for error message from SM40
6.2.29 Add a PC call station to the system
6.2.30 Remove a PC call station from the system
6.2.31 Set the SM40 real time clock
6.2.32 Read the SM40 real time clock

6. REMOTE PROGRAMMING 1/O PROTOCOL

6.2 Data Protocols

This chapter describes all available data protocols for communication between the SM40 System and a PC. All command strings are three characters wide and are preceded by the ASCII 'Start-of-Text' (STX) character, and are trailed by the ASCII 'End-of-Text' (ETX) character.

All characters in ASCII; 'STX' is actually Ø2 Hex; 'ETX' is actually Ø3 Hex. Dashes ('-') are only added to improve readability and are not transmitted nor part of the command codes). An ASCII character table is provided at the end of this chapter.

6.2.1 Login Protocol - Login of an external computer

String to be sent: **STX-C-O-N-ETX**

This is the signal to the SM40 system that an external computer is connected.
The SM40 system will respond with this message:

STX-SM␣40␣SYSTEM␣Version:7.xx␣Date:xx-xx-xx-[system status]**-ETX**

The ␣ represents a space (2Ø Hex).

The [system status] is transmitted as 2 ASCII characters. Interpretation of these characters must be done on bit-level. The table at the left shows the bit-values of the ASCII values of the status characters. The two tables at the right show the interpretation of the individual bits of these characters.

Status character	Bits (3, 2, 1, 0)
0	**0000**
1	**0001**
2	**0010**
3	**0011**
4	**0100**
5	**0101**
6	**0110**
7	**0111**
8	**1000**
9	**1001**
A	**1010**
B	**1011**
C	**1100**
D	**1101**
E	**1110**
F	**1111**

Bits	
Byte 1	**Meaning when value = 1**
bit **3**	Logging enabled
bit **2**	Logging transmission enabled
bit **1**	32 x 32 Matrix configuration
bit **0**	Reserved
Byte 2	**Meaning when value = 1**
bit **3**	Selection station logging enabled
bit **2**	Auto logging enabled
bit **1**	Logging only date, time, station and key
bit **0**	Error transmission enabled

Login will enable the system to transmit stored logs and errors.
It is not required to log in to enable the other commands.

6.2.2 Logout protocol - Logout of an external computer

String to be sent: **STX-D-I-S-ETX**

This is the signal to the SM40 system that the external computer is disconnected. All transmissions from the SM40 system to the PC (logging etc) will be inhibited until the PC had logged in again.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.3 Logging enable protocol - Enable call logging in SM40

String to be sent: **STX-L-O-N-ETX**

This string enables (internal) call logging in the SM40 system.
Both the start of call and end of call are logged.
The following events are stored:
Month, day, time, station, key, priority, signal number, message number, digital messages, routing and relay switching.

Calls from a master call station are also logged, but there is a limitation. The logging will only be reliable if the log is sent to the PC before a new call on the same master call station is made. Otherwise the buffer in the SM40 system will be overwritten with the last call.

Because the memory available for call logging is limited, the system will halt logging if buffer overflow will occur. The system will generate an error message on the display and transmit this message to the host too, even if error display was disabled.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.4 Logging disable protocol - Disable call logging in SM40

String to be sent: **STX-L-O-F-ETX**

This string disables (internal) stored logs in the SM40 system.
The already stored logs will not be affected.
Log buffer overflow error transmissions will be inhibited.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.5 Clear logging buffer protocol - Clear all stored logs in SM40

String to be sent: **STX-L-O-C-ETX**

This string clears the (internal) stored logs in the SM40 system.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.6 Logging display enable protocol - Enable transmission of logs to external computer

String to be sent: **STX-D-O-N-ETX**

This string causes the SM40 system to transmit the logs (stored previously or real-time) to the PC.

Log transmission protocol transmitted by SM40:

If it concerns a start of call: **STX-S-O-C-**[log entry]**-ETX**

If it concerns an end of call: **STX-E-O-C-**[log entry]**-ETX**

If it concerns a 'zone on' selection key (if enabled): **STX-Z-O-N-**[log entry]**-ETX**

If it concerns a 'zone off' selection key (if enabled): **STX-Z-O-F-**[log entry]**-ETX**

Where [log entry] contains the following information:

- Tens of month
- Units of month
- Tens of date
- Units of date
- Tens of hour
- Units of hour
- Tens of minutes
- Units of minutes
- Space
- Space
- Tens of station
- Units of station
- Tens of user-key
- Units of user-key

If the current logging mode is short, the [log entry] ends here. Otherwise it is followed by:

- Priority level
- Tens of signal
- Units of signal
- Routing zone 1-4
- Routing zone 5-8
- Routing zone 9-12
- Routing zone 13-16
- Routing zone 17-20
- Routing zone 21-24
- Routing zone 25-28
- Routing zone 29-32

16x64 matrix		32x32 matrix
- Routing zone 33-36	or	- Setting relay 1-4 of locked relay card 5
- Routing zone 37-40	or	- Setting relay 5-8 of locked relay card 5
- Routing zone 41-44	or	- Setting relay 1-4 of locked relay card 6
- Routing zone 45-48	or	- Setting relay 5-8 of locked relay card 6
- Routing zone 49-52	or	- Setting relay 1-4 of locked relay card 7
- Routing zone 53-56	or	- Setting relay 5-8 of locked relay card 7
- Routing zone 57-60	or	- Setting relay 1-4 of locked relay card 8
- Routing zone 61-64	or	- Setting relay 5-8 of locked relay card 8

- Setting relay 1-4 of locked relay card 4
- Setting relay 5-8 of locked relay card 4
- Setting relay 1-4 of locked relay card 5
- Setting relay 5-8 of locked relay card 5
- Setting relay 1-4 of locked relay card 6
- Setting relay 5-8 of locked relay card 6
- Setting relay 1-4 of locked relay card 7
- Setting relay 5-8 of locked relay card 7
- Setting relay 1-4 of locked relay card 8
- Setting relay 5-8 of locked relay card 8

- Message number

- Digital message (1)
- Digital message (1)
- Digital message (2)
- Digital message (2)
- Digital message (3)
- Digital message (3)
- Digital message (4)
- Digital message (4)
- Digital message (5)
- Digital message (5)
- Digital message (6)
- Digital message (6)
- Digital message (7)
- Digital message (7)

The digital message card-number is combined with the message-number.
The first byte contains the highest four bits of the card-number.
The MSB of the second byte contains the LSB of the card-number.
The 3 lower bits of the second byte contain the message number.

Example: received bytes '7' and '3'
'7' stands for binary 0111
'3' stands for binary 0011
Combined: 01110 011: this means card 14, message 3

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.7 Logging display disable protocol - Disable transmission of logs to external computer

String to be sent: **STX-D-O-F-ETX**

This string disables the call logging transmission to the PC, but internal logging continues if enabled until overflow of the log buffer.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.8 Activate a user-key of a station protocol - Activate a user key of a call station

String to be sent: **STX-S-S-T-**[key info]**-ETX**

Where [key info] exists of:

- Tens of station number
- Units of station number
- Tens of user-key number
- Units of user-key number

This string simulates the pressing of a user key.
Meant for activating Microphone Amplifier Boards.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.9 Deactivate a key of a station protocol - Deactivate a key of a call station

String to be sent: **STX-R-S-T-**[key info]**-ETX**

Where [key info] exists of:

- Tens of station number
- Units of station number
- Tens of user-key number
- Units of user-key number

This string simulates the release of an earlier simulated user-key.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.10 Set the routing of an auxiliary source - Set the routing of an auxiliary source

String to be sent: **STX-A-U-X-**[routing info]**-ETX**

Where [routing info] exists of:

- Tens of auxiliary input
- Units of auxiliary input
- Routing zone 1-4
- Routing zone 5-8
- Routing zone 9-12
- Routing zone 13-16
- Routing zone 17-20
- Routing zone 21-24
- Routing zone 25-28
- Routing zone 29-32

If the matrix size is 32x32, the [routing info] stops here. Otherwise it is followed by:

- Routing zone 33-36
- Routing zone 37-40
- Routing zone 41-44
- Routing zone 45-48
- Routing zone 49-52
- Routing zone 53-56
- Routing zone 57-60
- Routing zone 61-64

When receiving this command the system will reply with: **STX-A-C-K-ETX**

Explanation of routing coding:

One byte contains the information for 4 zones. A '0' stands for 'zone off', a '1' stands for 'zone on'. The most significant bit is the lowest zone number, so '1100' in the second zone byte means: zones 5 & 6 on, zones 7 & 8 off.

Zone bits	ASCII code	Meaning
0000	0	all four zones off
0001	1	fourth zone on
0010	2	third zone on
0011	3	third & fourth zone on
0100	4	second zone on
0101	5	second & fourth zone on
0110	6	second & third zone on
0111	7	second, third & fourth zone on
1000	8	first zone on
1001	9	first & fourth zone on
1010	A	first & third zone on
1011	B	first, third & fourth zone on
1100	C	first & second zone on
1101	D	first, second & fourth zone on
1110	E	first, second & third zone on
1111	F	all four zones on

6.2.11 Program a user-key protocol - Program a user key of a call station

String to be sent: **STX-P-D-B-**[user key info]**-ETX**

Where [user key info] exists of:

- Tens of station number
- Units of station number
- Tens of user-key number
- Units of user-key number
- Priority level
- Tens of signal number
- Units of signal number
- Routing zone 1-4
- Routing zone 5-8
- Routing zone 9-12
- Routing zone 13-16
- Routing zone 17-20
- Routing zone 21-24
- Routing zone 25-28
- Routing zone 29-32

16x64 matrix		32x32 matrix
- Routing zone 33-36	or	- Setting relay 1-4 of locked relay card 5
- Routing zone 37-40	or	- Setting relay 5-8 of locked relay card 5
- Routing zone 41-44	or	- Setting relay 1-4 of locked relay card 6
- Routing zone 45-48	or	- Setting relay 5-8 of locked relay card 6
- Routing zone 49-52	or	- Setting relay 1-4 of locked relay card 7
- Routing zone 53-56	or	- Setting relay 5-8 of locked relay card 7
- Routing zone 57-60	or	- Setting relay 1-4 of locked relay card 8
- Routing zone 61-64	or	- Setting relay 5-8 of locked relay card 8

- Setting relay 1-4 of locked relay card 4
- Setting relay 5-8 of locked relay card 4
- Setting relay 1-4 of locked relay card 5
- Setting relay 5-8 of locked relay card 5
- Setting relay 1-4 of locked relay card 6
- Setting relay 5-8 of locked relay card 6
- Setting relay 1-4 of locked relay card 7
- Setting relay 5-8 of locked relay card 7
- Setting relay 1-4 of locked relay card 8
- Setting relay 5-8 of locked relay card 8

- Message number

- Digital message (1)
- Digital message (1)
- Digital message (2)
- Digital message (2)
- Digital message (3)
- Digital message (3)
- Digital message (4)
- Digital message (4)
- Digital message (5)
- Digital message (5)
- Digital message (6)
- Digital message (6)
- Digital message (7)
- Digital message (7)

The digital message card-number is combined with the message-number.
The first byte contains the highest four bits of the card-number.
The MSB of the second byte contains the LSB of the card-number.
The 3 lower bits of the second byte contain the message-number.

Example: received bytes ‘7’ and ‘3’
‘7’ stands for binary 0111
‘3’ stands for binary 0011
Combined: 01110 011: this means card 14, message 3

For explanation of zone routingand relay setting: see auxiliary programming.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.12 Program matrix protocol - Program the complete matrix

String to be sent: **STX-M-A-T-**[matrix]**-ETX**

Where [matrix] exists of:

- routing input 1 zone 1-4
- routing input 1 zone 5-8
...
- routing input 1 zone 61-64/29-32

- routing input 2 zone 1-4
...
- routing input 2 zone 61-64/29-32
...

...
- routing input 16/32 zone 1-4
...
- routing input 16/32 zone 61-64/29-32

For explanation of zone routing: see auxiliary programming.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.13 Enable error message transmission - Enable transmission of error messages to the external computer

String to be sent: **STX-E-E-M-ETX**

This string causes the SM40 system to transmit system-error messages to the PC.
These messages are transmitted in coded form.

Error message protocol: **STX-E-R-R-**[error code]**-ETX**

Where [error code] exists of:

- Error number
- Tens of unit/card
- Units of unit/card

When receiving this command the system will reply with: **STX-A-C-K-ETX**

Error messages will be sent continuously if logging mode is auto. If logging mode is manual then error transmission is manual too. See command 28 (Chapter 6.2.28).

Meaning of the error number:

6.2.14

Error code	Meaning
0	No errors; tranmitted once after all errors solved
1	Input card error
2	Signal generator error
3	Locked relay card error
4	Unlocked relay card error
5	Matrix I 1-16 error
6	Matrix II 1-16 error
7	Call station error
8	Logging buffer overflow
9	Message card error
A	Digital message card error

Disable error message transmissions from SM40 - Disable transmission of error messages to the external computer

String to be sent: **STX-D-E-M-ETX**

This string disables system error messages to be transmitted from the SM40 system except log buffer overflow errors.

When receiving this command the system will reply with: **STX-A-C-K-ETX**

6.2.15 Read all programming data from SM40 - Read user programming data from SM40

String to be sent: **STX-G-E-T-ETX**

After reception of this string, SM40 will transmit:

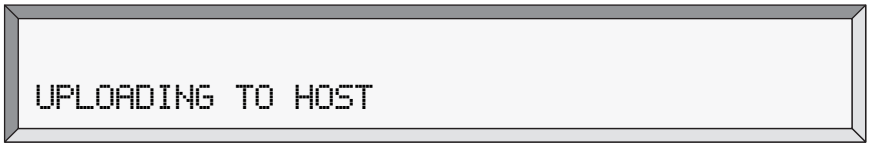
a: programming of call stations
b: programming of timers
c: programming of auxiliary routing

This data-stream is preceded by 4 bytes.
Two bytes indicating the total number of bytes, including the first 4.
Two bytes containing the checksum of the data that will follow.

Opposite to all other transmissions, protocols 15, 16, 17 and 18 are transmitted in hexadecimal and not in ASCII with an exception for the command string.

During uploading the SM40 keyboard will be disabled, but the system will work normally.

During the uploading process the display will show:



6.2.16 Store programming data in SM40 - Store user programming in SM40

String to precede the data-stream: **STX-D-M-P-ETX**

After reception of this string, the SM4 system will switch off all audio and stations and go down.

To indicate to the host that data transmission can start, the SM40 responds with: **STX-R-D-Y-ETX**

The host has to wait with transmission until this string is received.

SM40 expects the first 4 bytes to contain the number of bytes and the checksum.

After end of transmission SM40 responds with:

If the checksum was correct: **STX-T-O-K-ETX**
If a checksum error was detected: **STX-T-E-R-ETX**

6.2.17 Read all parameters form SM40 - Read installer programming from SM40

String to be sent: **STX-G-S-P-ETX**

After reception of this string, SM40 will transmit:

a: configuration of the call stations
b: configuration of the signal generators
c: configuration of the message sources
d: statusbytes of all cards

After reception of this string, the SM40 system will switch off all audio and stations and go down.
The data-stream is preceded by 4 bytes.
Two bytes indicating the total number of bytes, including the first 4.
Two bytes containing the checksum of the data that will follow.

6.2.18 Store parameters in SM40 - Store installer programming from SM40

String to precede the data-stream: **STX-D-S-P-ETX**

After reception of this string, SM40 expects the first 4 bytes to contain the number of bytes and the checksum.

After reception of this string, the SM40 system will switch off all audio and stations and go down.

To indicate to the host that data transmission can start, the SM40 responds with: **STX-R-D-Y-ETX**

The host has to wait with transmission until this string is received.
SM40 expects the first 4 bytes to contain the number of bytes and the checksum.

After end of transmission SM40 responds with:

If the checksum was correct: **STX-T-O-K-ETX**
If a checksum error was detected: **STX-T-E-R-ETX**

6.2.19 Read status from SM40 - Read the SM40 status

String to be sent: **STX-S-T-A-ETX**

The system will respond with: **STX-S-T-A-**[system status]**-ETX**

For status explanation: see the LOGIN protocol.
This mode can also be used to check the communication.

6.2.20 Set auto transmission of logs - Enable real time logging transmissions

Sting to be sent: **STX-A-U-T-ETX**

The system will respond with **STX-A-C-K-ETX**

If this string is sent and logging display is enabled, every log will be transmitted real-time to the PC.

6.2.21 Set auto transmission of logs off - Disable real time logging transmissions

String te be sent: **STX-M-A-N-ETX**

The system will respond with: **STX-A-C-K-ETX**

The system will transmit logs only on request.
See protocols 22 and 23 in Chapters 6.2.22 and 6.2.23.

6.2.22 Ask for next log - Ask for transmission of next log

String to be sent: **STX-N-X-T-ETX**

When the logging buffer is empty and no next log can be transmitted, the response is: **STX-C-L-R-ETX**

Otherwise the system will respond with: **STX-A-C-K-ETX**
and transmit the next log to the PC.

6.2.23 Repeat last log - Ask for transmission of last transmitted log

String to be sent: **STX-R-E-P-ETX**

The system will respond with: **STX-A-C-K-ETX**
and repeat the last log or: **STX-C-L-R-ETX**
if that was the last transmission.

6.2.24 Set short logging mode - Enable logging transmissions of only time, date, call station and key

String to be sent: **STX-S-R-T-ETX**

The system will respond with: **STX-A-C-K-ETX**

This command will cause the system only to transmit the date, time, station key and key number.

Meant for computer controller systems, where routing, priority and other parameters are already known by the external computer.

6.2.25 Set long logging mode - Enable logging transmissions of all parameters

String to be sent: **STX-L-N-G-ETX**

The system will respond with: **STX-A-C-K-ETX**

This command will reset the short logging mode.

6.2.26 Enable zone selection logging - Enable logging of Master Call station zone selection

String to be sent: **STX-E-S-L-ETX**

The system will respond with: **STX-A-C-K-ETX**

This command enables logging of the zone selection keys of a master call station.
Selection of a signal and pressing the reset-zones key will also be logged.
Release of these keys will nog be logged.
See also protocol 6 (Chapter 6.2.6).

6.2.27 Disable zone selection logging - Disable logging of Master Call station zone selection

String to be sent: **STX-D-S-L-ETX**

The system will respond with: **STX-A-C-K-ETX**

This command disables logging of selection keys.

6.2.28 Error message request - Ask for error message from SM40

String to be sent: **STX-E-R-R-ETX**

The system will respond with: **STX-A-C-K-ETX**

This command will cause an error transmission from the SM40 system.
This command only works if error messages are enabled and logging mode is manual.
Else the error messages will be transmitted automatically.
If there is more then one error, transmission will be cyclic.
No errors will be indicated too (errorcode 0)

6.2.29 Enable PC call station input - Add a PC call station to the system

String to be sent: **STX-E-P-C-**[tens of input]**-**[units of input]**-0-1-ETX**

The system will respond with: **STX-A-C-K-ETX**

This command causes the following action:

If a call station was connected to that input, it will not be scanned anymore, but only can be activated via the I/O. If only the signal generator has to be activated, any free input can be selected.

This mode has the advantage that new zones can be selected or deselected while a call or an alarm signal is busy.

This can be done by re-activating a call (protocol 8) after a new setting is sent (protocol 11).
Assigned PC inputs will be shown in the SM40 hardware display (program 5).

6.2.30 Disable PC call station input - Remove a PC call station to the system

String to be sent: **STX-D-P-C-**[tens of input]**-**[units of input]**-0-1-ETX**

The system will respond with **STX-A-C-K-ETX**

The earlier assigned PC input will become a normal input.

6.2.31 Set the SM40 real-time clock

String to be sent: **STX-S-C-L-**[tens of days]**-**[units of days]
-[tens of months]**-**[units of months]
-[tens of hours]**-**[units of hours]
-[tens of minutes]**-**[units of minutes]**-ETX**

The system will respond with: **STX-A-C-K-ETX**

6.2.32 Read the SM40 real-time clock

String to be sent: **STX-R-C-L-ETX**

The system will respond with: **STX-R-T-C-**[tens of days]**-**[units of days]
-[tens of months]**-**[units of months]
-[tens of hours]**-**[units of hours]
-[tens of minutes]**-**[units of minutes]**-ETX**

	0x	1x	2x	3x	4x	5x	6x	7x
x0	*NUL*	*DLE*		0	@	P	`	p
x1	*SOH*	*DC1*	!	1	A	Q	a	q
x2	*STX*	*DC2*	"	2	B	R	b	r
x3	*ETX*	*DC3*	#	3	C	S	c	s
x4	*EOT*	*DC4*	$	4	D	T	d	t
x5	*ENQ*	*NAK*	%	5	E	U	e	u
x6	*ACK*	*SYN*	&	6	F	V	f	v
x7	*BEL*	*ETB*	'	7	G	W	g	w
x8	*BS*	*CAN*	(	8	H	X	h	x
x9	*TAB*	*EM*	)	9	I	Y	i	y
xA	*LF*	*SUB*	*	:	J	Z	j	z
xB	*VT*	*ESC*	+	;	K	[	k	{
xC	*FF*	*FS*	,	<	L	\	l	|
xD	*CR*	*GS*	-	=	M	]	m	}
xE	*S0*	*RS*	.	>	N	^	n	~
xF	*S1*	*US*	/	?	O	_	o	*DEL*

ASCII Character Table

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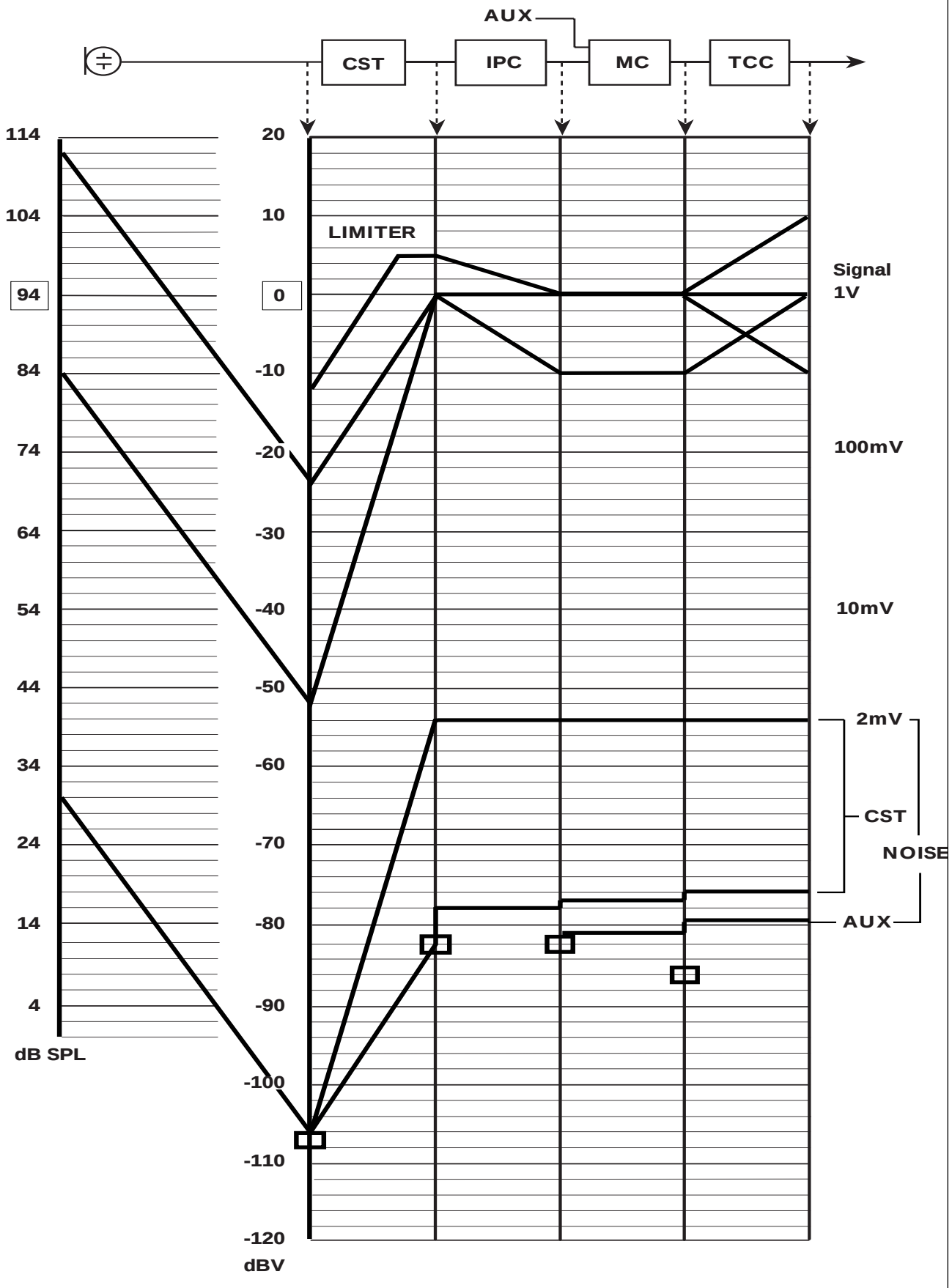
AUX
CST
IPC
MC
TCC
114
104
94
84
74
64
54
44
34
24
14
4
dB SPL
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
dBV
LIMITER
Signal
1V
100mV
10mV
2mV
CST
NOISE
AUX
= Equivalent Input Noise (RMS B = 20 kHz Flat)

7. TECHNICAL DATA

7.1 GENERAL TECHNICAL SPECIFICATIONS

SUPPLY

Mains voltage	: 220 V (187 - 264 V) 110 V (90 - 132 V) (by jumper placement)
Frequency	: 47 to 440 Hz
Power consumption	: 160 VA (fully loaded frame)
Extension frame	: (depending on the number of cards)
Data retention time	: >30 days
Safety standard	: According to IEC 65

MECHANICAL

Dimensions (w x d x h)	
- rack frame	: 483 x 376 x 133 (3HE)
- circuit cards	: 1.6 x 220 x 100 mm
Weight	
- Distribution Basic system	: 6.5 kg
- Extension frame	: 5.5 kg
Terminations	
- Termination boards	: screw connector blocks

ENVIRONMENTAL CONDITIONS

Temperature	: +5 to +55°C

7.2 CARD SUPPLY

	Typical supply currents (mA)		
	+15V	-15V	+5V
Distribution System Cards			
Input Card	45	35	140
Signal Generator Card	45	35	140
Matrix Card	75	75	10
Control Relay Card	105	105	10
Tone Control Card	80	80	–
Call Station	15	130	–
Signal Processing Card	130	60	–
Automatic Volume Control Card	65	50	125
Digital Message Card	50		25
Distribution Basic System			
without optional cards	290	245	345
max. available power:	1000	1000	4000
Extension Frame			
max. available power:	2000	2000	–

7. TECHNICAL DATA

7.3 AUDIO SIGNAL DATA

	Distortion [%] 1 kHz @ output level			Output [dBV]	S/N Ratio [dB]		Crosstalk [dB]			Frequency Response [Hz]	
	+0dBV	+10dBV	+15dBV	max	(A)	(flat)	5kHz	10kHz	15kHz	-3dB range	(-0.5dB)
Distribution Systems											
Input Card	<0.1	<0.2	<0.2	+20	>85	>81	>80	>74	>70	70-60,000	(20,000)
Signal Gen. Card	-	-	-	+0	>85	>81	-	-	-	-	-
Matrix Card - normal in	<0.1	<0.2	<0.5	+15	>84	>81	>85	>79	>75	30-60,000	(15,000)
- feed through	<0.1	<0.1	-	+15	>90	>87	-	-	-	30-60,000	(20,000)
Control Relay Card	-	-	-	-	-	-	-	-	-	-	-
Tone Control Card	<0.1	<0.1	-	+15	>88	>85	>85	-	>80	30-20,000	-
Call Station - 84 dB(SPL)	<0.1	-	-	+0	>64	>61	-	-	-	200-15,000	(12,500)
- 124 dB(SPL)	<0.5	-	-	+5	-	-	-	-	-	-	-
Optional Cards											
Signal Process. Card - compressor/ limiter	<0.1	-	-	+5	>78	>75	>85	-	>80	40-15,000	-
- filter	<0.1	<0.1	-	+15	>85	>83	>85	-	>80	30-20,000	-
Audio Volume Control Card	<0.5	-	-	-	>78	>75	>85	-	>80	40-20,000	-
Digital Message Card	<2	<4	-	-	>35	>35	-	-	-	320-6,000	-
Distribution Basic System (without optional cards)	<0.1	<0.2	<0.5	+15	>79	>76	>79	>73	>69	70-60,000	(15,000)

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