

**5-7 CARLTON GARDENS  
LONDON SW1**

**OPERATING & MAINTENANCE  
INSTRUCTIONS  
for the  
ELECTRICAL SERVICES**

**VOLUME 3  
3.3.4 – Section H (H8)**

**THIS FOLDER WAS CHECKED BY  
ARUP ON**

**21.3.03**

**The checking process was to ensure that 3 identical  
sets of each Volume of the Operating and  
Maintenance Manuals existed**

**5-7 CARLTON GARDENS  
LONDON SW1**

**OPERATING & MAINTENANCE  
INSTRUCTIONS  
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ELECTRICAL SERVICES**

**VOLUME 3  
3.3.4 – Section H (H8)**

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*Building Services Operating and Maintenance Instructions*  
5-7 Carlton Gardens, London SW1

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ITEM	GENERAL OPERATING INSTRUCTIONS	GENERAL MAINTENANCE INSTRUCTIONS	SPECIFIC SUPPLIER LITERATURE
FIRE ALARM SYSTEM & DETECTION & VOICE ALARM I.A.T. (Europe) Ltd.	D.1.3	E.1.7, E.1.2.1, E.1.3, E.1.5, E.2, E.3, E.7.3.1	H.8
STANDBY GENERATION AVK/SEG (UK) Ltd.	D.1.2, D.2, D.3, D4	E.1.2.1, E.1.3, E.1.5, E.2, E.3, E.7.1, E.7.1.1, E.7.1.2, E.7.1.3	H.3
L.V SWITCHGEAR & DIST. BOARDS (Anord Control Systems Ltd.)	D.1.1	E.1.1, E.1.2.1, E.1.3, E.1.5, E.2, E.3, E.7.1, E.7.1.1, E.7.1.2, E.7.1.3	H.1
SECURITY SYSTEM Blenheim Security Systems Ltd.	D.1.4	E.1.2.1, E.1.3, E.1.5, E.2, E.3, H.6	H.6

**5-7 CARLTON GARDENS  
LONDON SW1**

**OPERATING & MAINTENANCE  
INSTRUCTIONS  
for the  
BUILDING SERVICES**

**VOLUME 3.3 - BOOK 2  
Electrical Installation**

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**H**

**MANUFACTURERS INFORMATION**

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H.15.11 Multiload Technology Ltd. - L.V. Lighting Transformers  
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*5-7 Carlton Gardens, London SW1*

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H.8           **I.A.T. (Europe) Ltd. –**  
                **Fire Alarm System, Detection and Voice Alarm**



## **Operating & Maintenance Manual**

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- Section 1 - System Overview**
- Section 2 - Operating Instructions**
- Section 3 - Customer Device Text**
- Section 4 - System Test Sheets**
- Section 5 - Fire Alarm System Software**
- Section 6 - Fire Alarm Certification**
- Section 7 - Fire Alarm Log Book**
- Section 8 - Recommended Spares**
- Section 9 - Equipment Warranty/Guarantees  
/Service Life Schedule**
- Section 10 - Data Sheets**
- Section 11 - As-Fitted Drawings  
(Supplied by T. Clarke)**







## **System Overview**

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**1**



## 5-7 Carlton Gardens ~ System Overview

The system comprises of a combined fire detection and voice evacuation system installed throughout the building.

### **Fire Detection System**

A ten loop analogue addressable detection system is installed in the basement, additional display and control facilities are located in the Fire Control Room with two additional repeater panels at fire brigade access points.

This control panel and its associated detection loops cover the main core and floor levels of the building.

Additional control panels are installed within the tenant areas.

Throughout the building various interface units are installed to control plant shutdown facilities are part of the alarm organisation.

### **Voice Alarm System**

The audible fire warning is provided by a dedicated voice alarm system located adjacent to the main fire control panel.

Loudspeakers are provided throughout the building divided into eleven evacuation zones.

Each zone is supplied by two amplifiers with independent wiring to provide a high degree of system integrity.

## 5-7 Carlton Gardens System Overview

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The equipment rack contains the interface connections to enable a phased evacuation of the building under fire conditions.

A full operating description can be found in section 2 of this manual.



2



## **Operating Instructions**

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**2**



## **5-7 Carlton Gardens ~ Operating Instructions**

### **Interim Documentation**

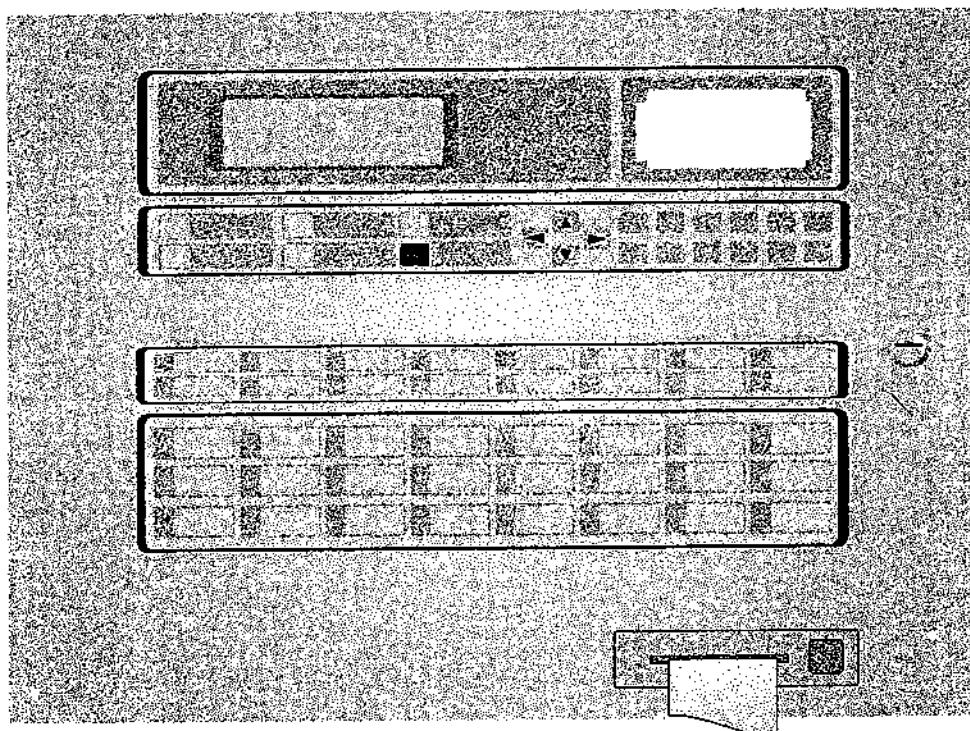
The fire control panels, which will be supplied on this project, will not be on release until December 1998.

The manufacturers final documentation is therefore provisional at this time.

As soon as the final documents are released a job specific version will be compiled and issued.



## IT 6500



# Fire Alarm Control Panel Operating Instructions

**IT 6500 Operating Instructions**

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## IT 6500 Operating Instructions

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**IT 6500 Operating Instructions**

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## IT 6500 Operating Instructions

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## SECTION 1 - ACCESS

The control panel has 3 separate access levels with access level 1 being available to user without entry of a special password. Each access level has its own operating criteria as shown in figure 1.0, which restricts operation of the panel by the user. Levels 2 and 3 can only be accessed by entry of a separate user password; the password is accessed via operation of the numeric keys on the membrane fascia.

Feature	Selection Option	Access Level 1	Access Level 2
Panel Controls	Silence Buzzer	Ü	ü
	Scroll	Ü	ü
	Silence Alarms	-	ü
	Reset	-	ü
	Delay Override	Ü	ü
	Evacuate	-	ü
	Enter Key (.)	Ü	ü
	Cancel Key (®)	Ü	ü
	Numeric Keys (0 to 9)	Ü	ü
	Arrow Keys	N/A	N/A
Isolate Menu	Zones	-	Ü
	Loop Devices	-	ü
	Output Group	-	ü
	Panel Functions	-	ü
	Plant	-	ü
List Menu	Zones	-	Ü
	Loop Devices	-	ü
	Output Groups	-	ü
	Panel Functions	-	ü
	Plant	-	ü
	Isolations	-	ü
Set Menu	Time and Date	-	Ü
	Printer Status	-	ü
	Activate Day Mode	-	ü

Figure 1.0

## IT 6500 Operating Instructions

When the control panel is operating correctly the LCD will display a Status Normal message, as shown in figure 1.1, and the "Power On" green status led will be illuminated.



Figure 1.1

To gain entry into the required access level levels 2 or 3, operate any numeric key once and the password prompt will appear on the display as shown in figure 1.2. Enter the required access level password number and then operate the Enter key, the password entry requires a four digit number. Once selected the panel will then verify the entry that will either be accepted or rejected. Each operation of a membrane key will be confirmed by a short operation of the internal panel buzzer and entry of the number will be shown on the display as a "#", for security reasons.

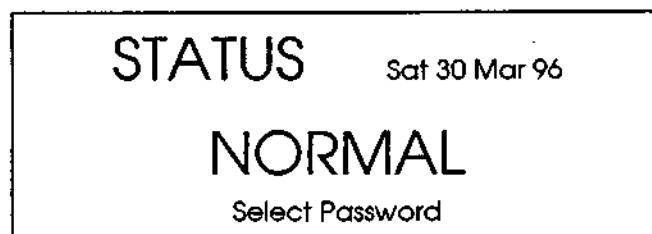


Figure 1.2

Upon acceptance of the entered password the control panel will request an entry of a numeric key, upon which the options which are capable of being selected at the selected access level will be displayed as per figure 1.0. Figure 1.3 shows the top-level menu features that are capable of being selected when access level 2 password is selected.

Access Level 2      Main menu

## IT 6500 Operating Instructions

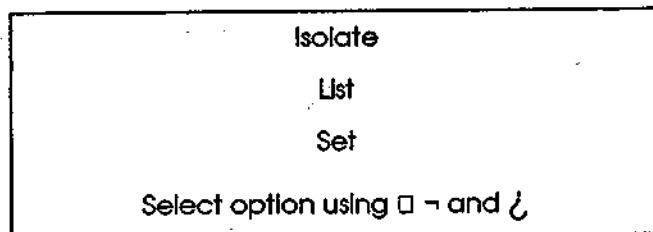


Figure 1.3

### 1.1 Silence Buzzer

Upon activation of the internal panel buzzer, operation of the Silence Buzzer membrane key will deactivate the buzzer. When the key is operated a text message will be displayed for a short time period confirming the operation as shown in figure 1.4.

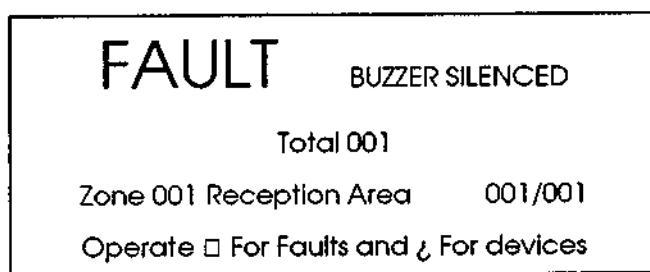


Figure 1.4

When an alarm activation occurs on the control panel and the activation has timers T1 and T2 programmed, operation of the Silence Buzzer key will affect the operation. Operation while timer T1 is counting down will cause timer to be accepted which will then initiate timer T2. While timer T2 is counting down each operation of Silence Buzzer will extend the countdown of the timer in 10-second increments to a maximum of 600 seconds. Extending T2 will cause the display to confirm that the timer has been extended by showing a "Timers Extended" message.

### 1.2 Scroll

When more than one activation is indicated on the control panel operation of the Scroll membrane key will allow the activation's to be shown on the display.

## IT 6500 Operating Instructions

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Each operation of the Scroll key will step through to the next activation in sequence of operation, this will be for the selected area only. Once the last activation has been displayed operation of Scroll key will continue to display from the first activation.

### 1.3 Silence Alarms

Operation of the Silence Alarms membrane key is only accessible at either access level 2 or 3 when operated a confirmation message will be shown on the display. Operation will cause any audible alarms, any outputs that may have been programmed to deactivate and cancel the operation of the countdown timers T1 and T2.

When an alarm condition is present on the control panel operation of this key will cause the pulsing Alarm and relevant Zonal LEDS to operate in a constant mode. If the Silence Buzzer key has not been operated then operation of the Silence Alarms key will cause the internal panel buzzer to operate intermittently.

The Panel Reset membrane key will not be capable of being operated until the Silence Alarm key has been operated.

### 1.4 Reset

Operation of the Reset membrane key is only accessible at access levels 2 and 3. When operated any activation that is existing on the control panel will be cleared and Status Normal will be reinstated.

### 1.5 Delay Override

The operation of the Delay Override is accessible at access level 1, and will when operated override the operation of any time delays that have been programmed to the panel (timers 0, 1 and 2). When operated a confirmation

## IT 6500 Operating Instructions

message will be displayed and the relevant countdown timer will then be cancelled.

### 1.6 Evacuate

When the evacuate membrane key is operated the sounder circuits and other outputs which are programmed to operate will activate. The display will have a confirmation message of the operation as shown in figure 1.5

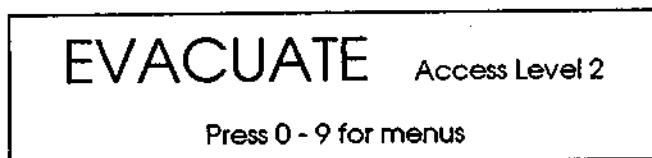


Figure 1.5

When in the Evacuate mode the output operation will remain until the Silence Alarms membrane key has been operated. Operation of the Evacuate membrane key while a priority alarm has been activated, will cause the display to confirm the operation as shown in figure 1.6, which will remain until deactivation.

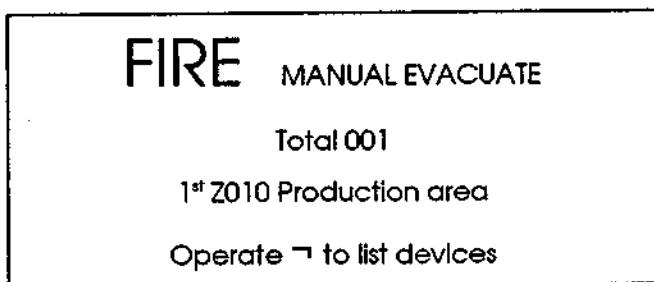


Figure 1.6

### 1.7 Enter Key (i)

In Status Normal operation the Enter membrane Key will be used for the acceptance of numeric data, access of menu selections and accepting the setting of system information. During priority alarm activations the Enter membrane key will be used for viewing the individual device data as shown in

figure 1.7.

## IT 6500 Operating Instructions

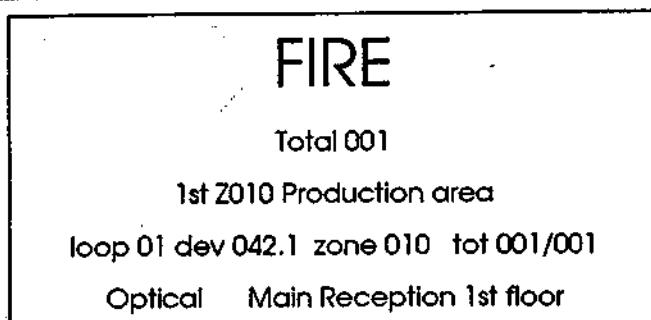


Figure 1.7

### 1.8 Cancel Key (®)

Operation of the Cancel membrane key will cancel/deselect the present access menu selection and continued operation will eventually return the display to access level 1. While the internal panel printer is printing operation of the Cancel key will cause a prompt message to be displayed, this can only be operated while in access levels 2 and 3. The message will request "Cancel Print?" operation of Enter will cause the printer to stop whereas Cancel will continue the operation of the printer.

### 1.9 Numeric keys (0 to 9)

The numeric keys are mainly used to select the access level password number as described in section 1.0 Access. The numeric keys can be used to select menu level options and the inputting of system data. To select the required menu option press the number required and the highlight will move to the corresponding option i.e. LIST = 1 and TEST = 4, operation of the Enter Key will access the menu.

### 1.10 Arrow Keys

The arrow keys UP, DOWN, LEFT and RIGHT are used for the selection of the access level menus, viewing activation's, pending priority activations and also for the programming of the control panel. The control panels display will give basic operating instructions on how the arrow keys can be used.

## SECTION 2 - ISOLATE MENU

The entry into access level 2 is explained in section 1.0, upon the selection of the ISOLATE menu feature it will be possible to select from the sub menu features as shown in figure 2.0. These sub menus can be selected by operation of either the arrow keys or by operation of the corresponding numeric key and confirming the selection by operation of the Enter key (↓).

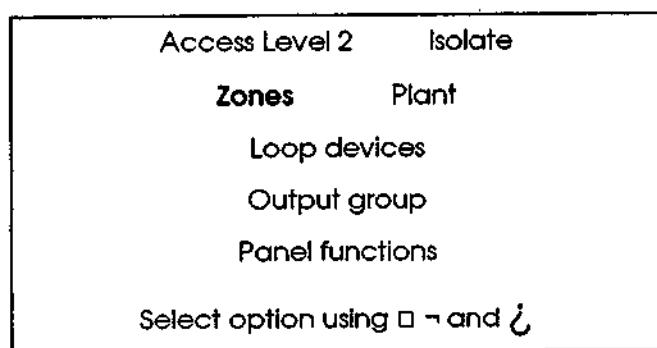


Figure 2.0

### 2.1 Zones

To isolate a specific zone, a zone number is required to be entered at the prompt, once selected the display will list the zones starting from the requested zone number as shown in figure 2.1.

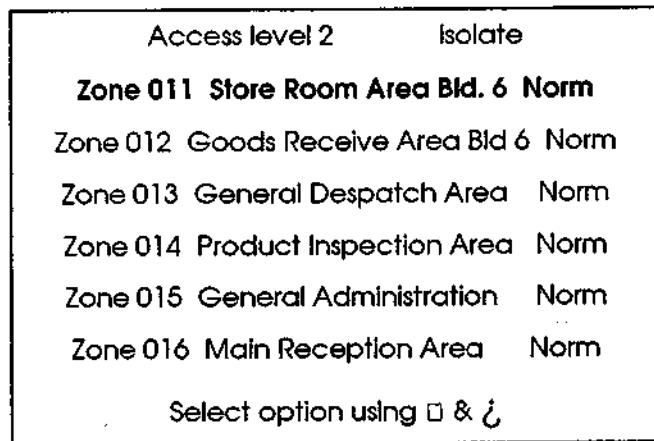


Figure 2.1

While the zone is in the normal status, operation of the Enter key will alter the "Norm" status of the selected zone to "ISOLATED", this will be displayed for a

## IT 6500 Operating Instructions

short time period. Upon the selection of Isolation the common isolate and the relevant zonal led will illuminate. After the short time period for the display of the "ISOLATED" text the display will revert to "Isol" which will pulse until the zone is returned to its "Norm" status as shown in figure 2.2.

Access level 2	Isolate
Zone 011 Store Room Area Bld.6	Norm
Zone 012 Goods Receive Area Bld 6	Isol
Zone 013	ISOLATED
Zone 014 Product Inspection Area	Norm
Zone 015 General Administration	Norm
Zone 016 Main Reception Area	Norm
Select option using □ & ↴	

Figure 2.2

To return the isolated zone to its normal operating status, "Norm", operate the Enter key on the required zone that is isolated and a confirmation message of "DE-ISOLATED" will appear. Repeated operation of the Cancel key will return the display through the menu selections and continued operation will return the panel to access level 1 where the display will show a devices isolated message as shown in figure 2.3.

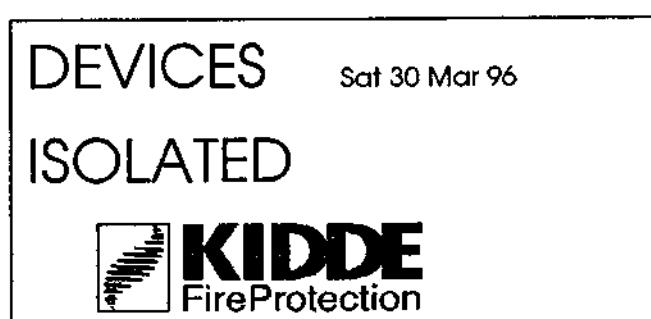


Figure 2.3

### 2.2 Loop Devices

## IT 6500 Operating Instructions

When selected the display will show the 2 options that are available as shown in figure 2.4. The required option can be highlighted by operation of the arrow keys and when correct the Enter key (→) will enter the selected option.

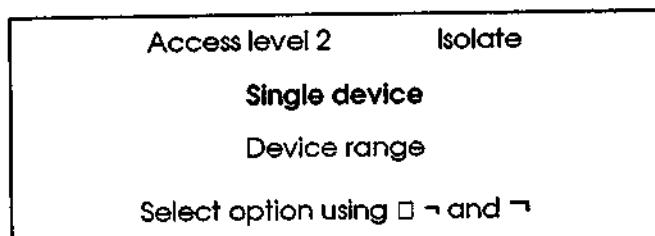


Figure 2.4

### 2.2.1 Single Device

To isolate a single device the display will request an entry of a loop number that will be via the appropriate numeric key(s) and accepted by operation of the Enter key. Operation of the Enter key will then request selection of the Device number which will also be entered by use of the appropriate numeric key as shown in figure 2.5.

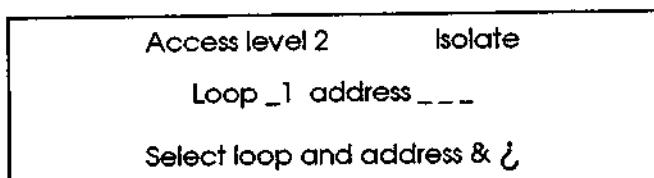
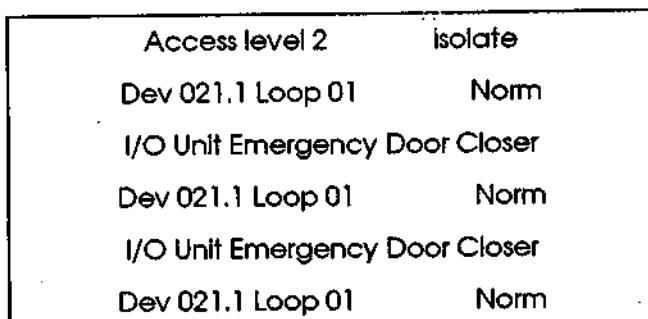


Figure 2.5

When the device has been selected operation of the Enter key will cause a list of device information to appear starting with the selected device number. By use of the arrow keys the required device maybe highlighted as shown in figure 2.6.



## IT 6500 Operating Instructions

I/O Unit Emergency Door Closer

□ to select, ↴ to (De-) Isolate

Figure 2.6

Operation of Enter key will cause the highlighted device to be "ISOLATED" which will be displayed for a short time period as confirmation, after which the display will allow the next device to be selected. Operation of the Cancel key will cause this selection to be cancelled and revert to the menu selection.

Upon Isolation of the device the common Isolate and device isolate LED's will be illuminated. To reinstate a device from isolation the procedure has to be repeated but the on screen message will show "De-Isolate?" when the Enter key is operated upon an existing isolated device.

### 2.2.2 Device Range

When Selected the display will request for a loop, start device and end device number to be selected as shown in figure 2.7.

Access level 2              Isolate

Device range Information

Loop \_1 Start \_ \_1 End \_ 10

Isolate      De-isolate

Enter information then operate ↴

Figure 2.7

Once entered a choice of "ISOLATE" or "DE-ISOLATE" is requested, by operation of the arrow keys the required option can be selected. The selection of either option will not depend upon the current status of the device i.e. if devices are already isolated and the "Isolate" option is made the devices will remain isolated.

If the isolation of a range of devices covers a full zone then the relevant zonal led will be illuminated, if however the selection does not cover a full zone then

## IT 6500 Operating Instructions

the device isolate led will be illuminated. Operation of the isolate will cause the common isolate led to illuminate. Operation of the Cancel key will return the display through the menu selections and continued operation will return the panel to access level 1, where the display will show a devices isolated message as shown in figure 2.3.

### 2.3 Output Group

Isolation and De-isolation of Output Groups is similar in format to that of Zones as per section 2.1, the significant difference is that the "Zone" reference is replaced with "Group" and that the output group isolation will inhibit the operation of all associated outputs. When an Output is isolated the "Common" and "Output Isolate" LEDS will be illuminated. Repeated operation of the Cancel key will return the display through the menu selections and continued operation will return the panel to access level 1 where the display will show a devices isolated message as shown in figure 2.3.

### 2.4 Panel Functions

Upon selection of this menu option the display will automatically list the sounder and relay circuits which are positioned within the panel on the master and slave basic loop controllers, this quantity is dependent upon the panel setup. The listing will start from the first sounder on the master basic loop controller and by operation of the arrow keys the individual outputs can be selected as per figure 2.8. The operation is similar to the selection of the zone as described in section 2.1.

Access Level 2      Isolate	
Mbic	Sect2 Production area sounder Norm
Mbic	Sect3 Reception area sounder Norm
Mbic	Sect4 Gate House Signal Isol
Mbic	vfc01 ISOLATED

## IT 6500 Operating Instructions

Mbic vfco2 Reception Indicator	Norm
Mbic vfco3 Production HVAC relay	Norm
Select option using □ & ↴	

Figure 2.8

When an Output is isolated the "Common" and "Output Isolate" LEDS will illuminate and when the display reverts to access level 1 the display will be as per figure 2.3. When ever a sounder circuit is isolated the "Sounder Fault" LED and "Common Isolate" LEDS will illuminate constantly signifying a sounder is isolated.

Operation of the Cancel key will return the display through the menu selections and continued operation will return the panel to access level 1 where the display will show a devices isolated message as shown in figure 2.3.

### 2.5 Plant

Upon the selection of this menu option and if the plant indications have not been setup within the "Panel Setup" menu selection a message will appear stating "Plants are not enabled". When the plants have been setup the isolate and de-isolate procedure for the plant indications is similar in format to that of Zones as section 2.1, however the only difference is that the zone reference is replaced with "Plant".

When a Plant area has been isolated the "Common" and "Device Isolate" LEDS will be lit and when the display reverts to access level 1 the display will be as per figure 2.3

Operation of the Cancel key will return the display through the menu selections and continued operation will return the panel to access level 1 where the display will show a devices isolated message as shown in figure 2.3.

## SECTION 3 - LIST

The entry into access level 2 is detailed in section 1.0, upon the selection of the List menu feature it will be possible to select any of the sub menu features as shown in figure 3.0. These sub menus feature can be selected by operation of either the arrow keys or by operation of the corresponding numeric key and confirming selection by operation of the Enter key.

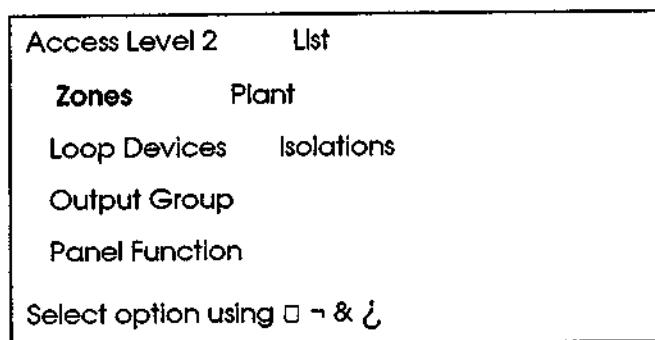


Figure 3.0

The format of listing will be dependent upon whether the internal panel printer has been selected within the panel setup menu selection. When a sub menu is selected it will be possible to make a selection as shown in figure 3.1. If the panel printer is not setup then the selection shown in figure 3.1 will not be displayed and the information will only be available on the display.

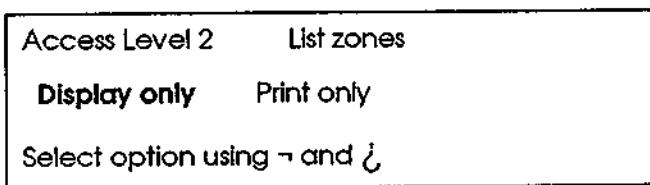


Figure 3.1

The print only selection will automatically print the selected information, whereas the display only option will show the information on the panel display. With the display only option the arrow keys will enable the scrolling of the information by highlighting each information line.

### .1 Zone

## IT 6500 Operating Instructions

Upon selection the display will show two options which are available within this selection as shown in figure 3.2. The required option can be highlighted by operation of either the relevant numeric key or by operation of the arrow keys. When the selection is correct operation of the Enter key will then enter the highlighted selected option.

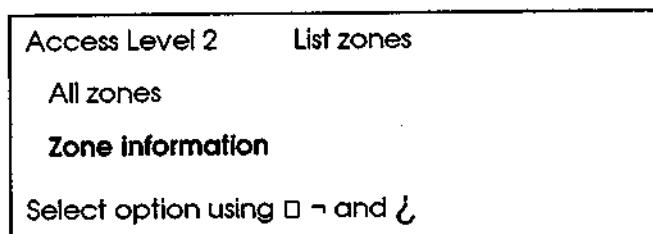


Figure 3.2

### 3.1.1 All Zones

This option selection will list all of the zone information, the listing will give the zone number, text and the status i.e. if it is isolated "I" as shown in figure 3.3.

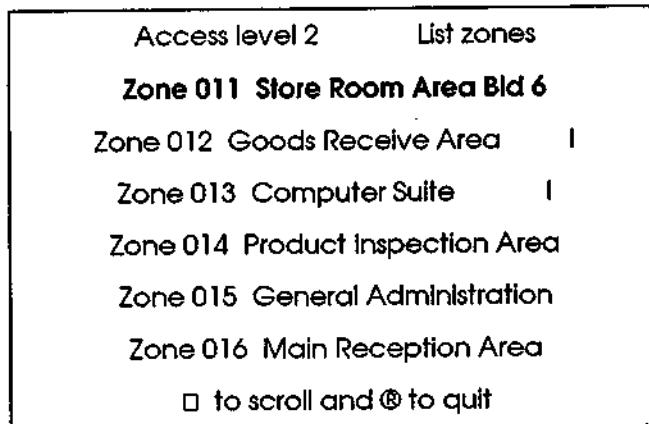


Figure 3.3

Operation of the arrow keys will scroll the zone information and operation of the Cancel key will return the display through the menu selections and continued operation will return the panel to access level 1.

### 3.1.2 Zone Information

Upon selection a request for the zone number will be made, once selected the zone and device information will be displayed as shown by figure 3.4.

## IT 6500 Operating Instructions

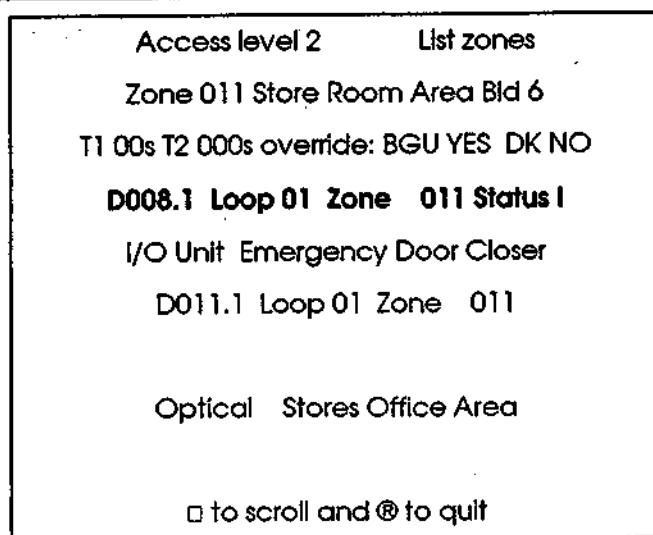


Figure 3.4

The Zone information will include the timer settings for T1 and T2; operation of the arrow keys will scroll the device information only. The device information includes the current status of the devices listed. Operation of the arrow keys will scroll the device information and operation of the Cancel key will return the display through the menu selections and continued operation will return the panel to access level 1.

### 3.2 Loop Devices

Upon selection of this menu option a list of sub menu options will appear which are capable of being selected as shown in figure 3.5.

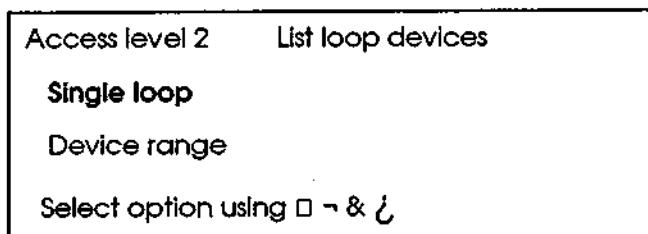


Figure 3.5

These sub menus feature can be selected by operation of either the arrow keys or by operation of the corresponding numeric key and confirming the selection by operation of the ENTER key.

#### 3.2.1 Single Loop

## IT 6500 Operating Instructions

Selection requests a loop number to be entered and once entered the display will show the total of devices attached to the selected loop. Upon the operation of any key the display will show the information on the devices attached to the selected loop as shown in figure 3.6.

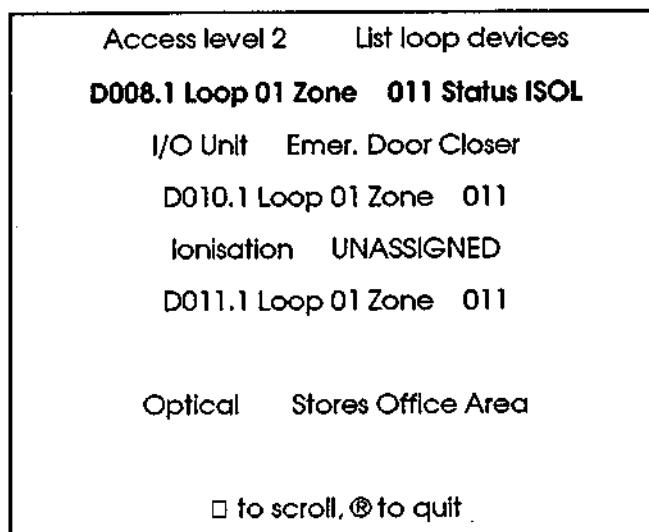


Figure 3.6

Operation of the arrow keys will scroll the devices on the display. When viewing is complete operation of the Cancel key will quit the display to the menu and continued operation will return the panel to access level 1.

### 3.2.2 Device Range

Selection requests a loop number to be entered and once entered the display will show the total of devices attached to the selected loop as shown in figure 3.7.

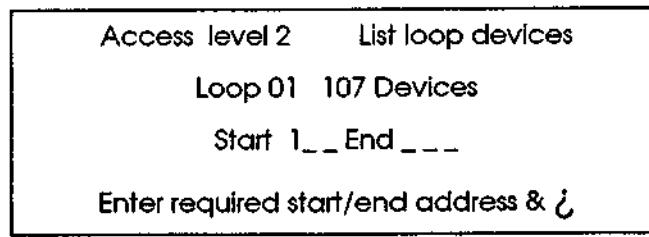


Figure 3.7

Upon the operation of any key the display will then request a Start and End device number. When entered the display will show the information for the selected device range as shown in figure 3.7.

## IT 6500 Operating Instructions

Operation of the arrow keys will scroll the devices on the display. When viewing is complete operation of the Cancel key will quit the display to the menu and continued operation will return the panel to access level 1.

### 3.3 Output Groups

Selection of this option will request another sub menu to be selected, as shown in figure 3.12. The required option can be highlighted by operation of the arrow keys and when correct the Enter key will enter the selected option menu.

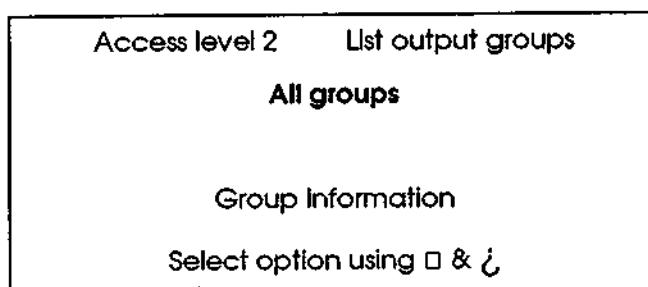


Figure 3.12

#### 3.3.1 All Groups

When selected the display will request for a start and end group number to be selected by use of either the arrow or numeric keys and operating Enter when the selection is complete. When entered the display will list the group information that has been programmed into the control panel. Operation and display is similar in format to the List All Zones option as in section 3.1.1. The main difference is that the zone text is replaced with "Group" text.

Operation of the arrow keys will scroll the information on the display. When viewing is complete operation of the Cancel key will quit the display to the menu and continued operation will return the panel to access level 1.

#### 3.3.2 Group Information

When selected this will list the group information that has been programmed in the control panel as shown in figure 3.13. Operation and display is similar in

## IT 6500 Operating Instructions

format to the List Zones Information option as in section 3.1.2. The main difference is that the zone text is replaced with "Group".

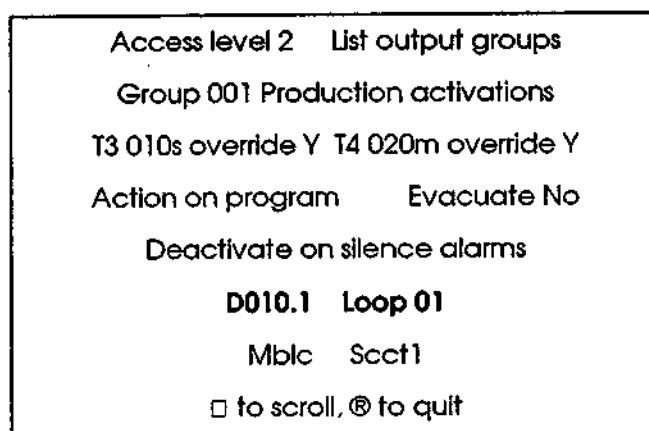


Figure 3.13

Operation of the arrow keys will scroll the information on the display. When viewing is complete operation of the Cancel key will quit the display to the menu and continued operation will return the panel to access level 1.

### 3.4 Panel Functions

Selection of this option will list the information which has been programmed to the sounder circuits and relay outputs of the master and slave basic loop controllers as shown in figure 3.14.

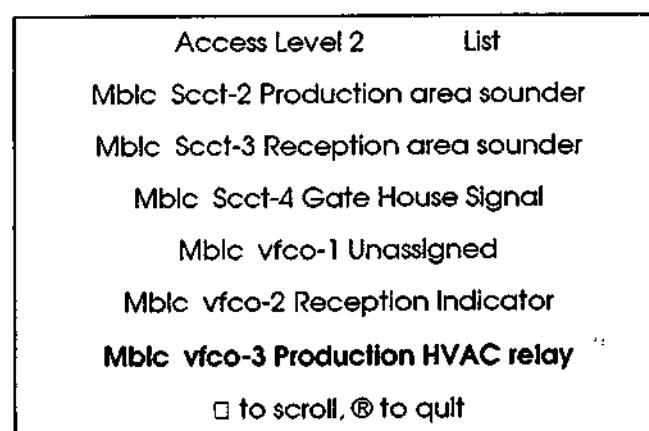


Figure 3.14

## IT 6500 Operating Instructions

Operation of the arrow keys will scroll the information on the display. When viewing is complete operation of the Cancel key will quit the display to the menu and continued operation will return the panel to access level 1.

### 3.5 Plant

Operation of this option is similar to that of the List Zone menu selection as explained in section 3.1; the only difference is the Zone text will be replaced with "Plant".

### 3.6 Isolations

Upon selection the display will show another set of sub menu options as shown in figure 3.15. The required option can be highlighted by operation of the either the relevant numeric key or by operation of the arrow keys. When the selection is correct operation of the Enter key will then enter the highlighted selected option.

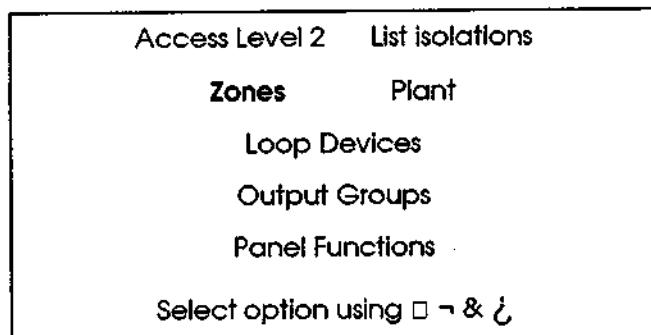


Figure 3.15

Selection will list all of the current isolations on the control panel for that particular option position. By operation of the arrow keys the information will be scrolled on the display. When viewing is completed operation of the Cancel key will quit the display to the menu and continued operation will return the panel to access level 1.

## IT 6500 Operating Instructions

### SECTION 4 - SET MENU

Selection of the Set menu feature will allow the selection of the sub menu features as shown in figure 4.0. These sub menus feature can be selected by operation of either the arrow keys or by operation of the corresponding numeric key and confirming selection by operation of the Enter key.

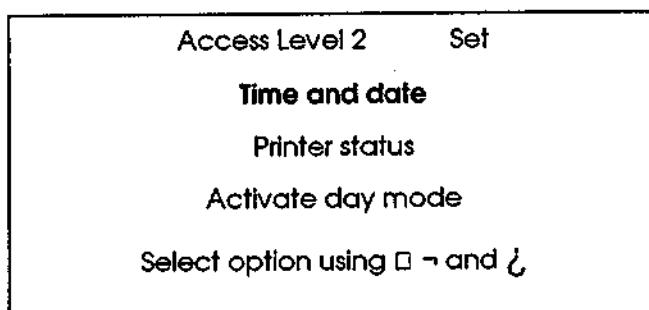


Figure 4.0

#### 4.1 Time and Date

This selection allows the time and date to be entered into the control panel. The time and date can be selected by operation of the arrow keys and/or the numeric keys and confirming the selection by operation of the Enter key. As the information is entered into the last position of the line operation of the Enter key will cause the next entry line to appear.

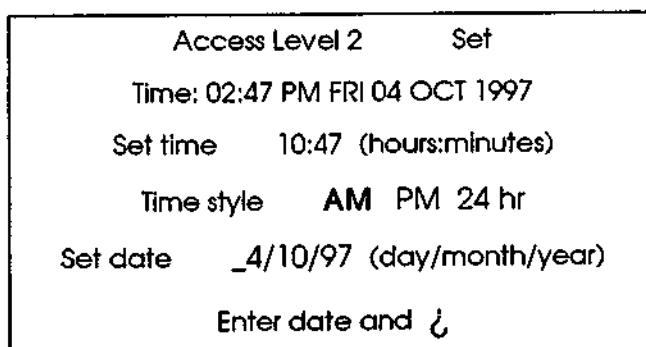


Figure 4.1

When entering information into the time and date lines entry of a two figured number via the numeric keys will move directly to the next entry position. If a

## IT 6500 Operating Instructions

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single number is entered operation of the Enter key will then move to the next position.

The existing time and date information will be displayed at the top of the display and each line will appear with the existing time setting. On either of the time and date lines if an incorrect numeric selection has been made then operation of the left arrow key will allow the user to return to the incorrect number and modify it as required.

The time may also be entered via operation of the arrow keys, operation of the up and down arrow keys will increment or decrement the setting and operation of the Enter key will accept the hour setting and move to the minutes.

Operation of the Left or Right arrow keys will select the "Time style" format by highlighting the position and operating the Enter key upon the required format. When the last entry of selection of the year has been completed operation of the Enter key will accept the new information and return the display to the menu selection. Operation of the Cancel key at any point will cancel this menu option and return to the menu selection.

### 4.2 Printer Status

This selection will depend upon whether the panel printer has been selected within the Panel Setup. If it has not been setup then when selected a warning message stating that the panel printer has not been installed will be displayed. When the printer has been setup upon selection the panel will display the current status of the printer and the enable/disable options as shown in figure 4.2.

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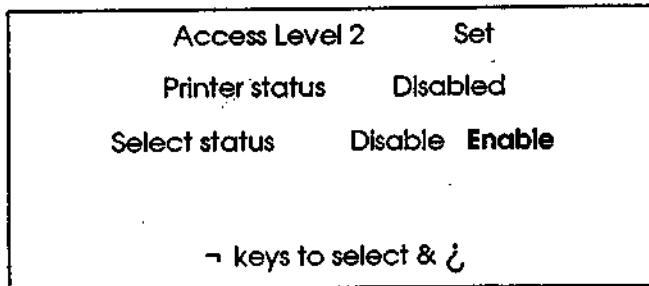


Figure 4.2

The display will show the current status of the printer and also the opposite selection status position will be highlighted. Operation of the Enter key will accept the highlighted option. The printer will give a confirmation signal when the selection has been made. Operation of the Left and Right arrow keys will allow the highlight position to be moved between the disable/enable options.

### 4.3 Activate Day Mode

Upon selection the current status of this option will be displayed and it will be possible to select the required status by highlighting the required option as shown if figure 4.3. Operation of the arrow keys will select the required position and operation of the Enter key will cause a confirmation signal to be displayed.

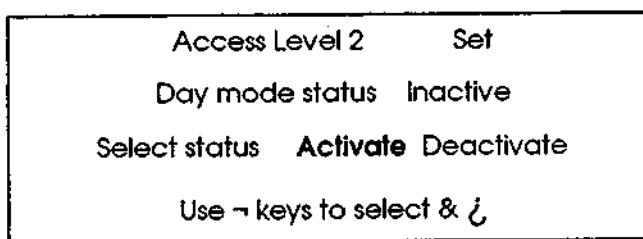


Figure 4.3

For this operation to operate correctly the "Day mode stop" time requires setting as explained in section 4.4.1.10. Once the day mode has been activated all of the inputs which have been programmed to operate in day mode will operate until the "Day mode stop" has expired. A confirmation will

## IT 6500 Operating Instructions

be shown on the panel display until the time out has occurred as shown in figure 4.4.



Figure 4.4

It is also possible to manually cancel the operation of the "Day mode" by selecting this option and selecting the required status option. Selection of "Deactivate" will cause a message to be displayed confirming the day mode has been deactivated.

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## **1.0 Introduction**

- 1.1** The new equipment is to be used as a voice alarm and public address system.
- 1.2** Tenderers must satisfy themselves as to the working practices of the site, particularly security, safety and hours of working. Tender costs must be fixed for the contract period and be all inclusive and sufficient.

## **2.0 Scope of Works**

- 2.1** The scope of works will include the design, manufacture, installation, commissioning, training and handover of the new voice alarm/public address system. It will include the supply and installation of all audio and electrical cabling and all electrical power distribution work to a standard approved by the Project Manager.
- 2.1.1** It is essential that Tenderers satisfy themselves as to the sufficiency and accuracy of all information provided and familiarise themselves as to the full scope of works. No increase to the contract sum can be made for errors or omissions from whatever source.
- 2.1.2** Tenderers should also provide full details of similar projects successfully completed with contact names and references.
- 2.1.3** The successful contractor must provide a designated on-site presence available for co-ordination both day to day and at formal meetings with the project Manager or his delegates. Comprehensive factory acceptance tests, commissioning tests and manuals for the entire system will be required and all design proposals issued for approval by the project manager prior to commencing manufacture. Factory acceptance tests will need to prove that all equipment is year 2000 compliant.
- 2.1.4** The tenderer will demonstrate their awareness of implications for risk management, health and safety, quality etc.
- 2.1.5** Tenderers are required to indicate any attendance required by the clients engineers or other third parties.

## **3.0 Standards and related Specifications**

- 3.1** The project must be operated within a quality management system which complies with the requirements of BS EN ISO 9001. Registration certificates should be submitted with tenders together with the scope of registration. Shoddy workmanship will not be accepted. The project implementation shall be in accordance with generally accepted principles of good engineering practice relating to performance, reliability, safety, accessibility, maintainability, neatness and installation methodology.
- 3.1.1** All software must be backed onto floppy discs and copies made available to the client.
- 3.1.2** All work must be in accordance with the site standards.

- 3.1.3 Terminology for characteristics and measurement techniques of sound system equipment shall be in accordance with BS6840 (IEC 2681). Electromagnetic compatibility standards BS EN 50081-1, General Emission Standard and BS EN 50082-1, General Immunity Standards, will apply.
- 3.1.4 Tenderers must provide quiescent average and peak power requirements of the entire system to allow for air conditioning requirements
- 3.1.5 The new installation must ensure that the performance of the system meets or exceeds the required intelligibility criteria of BS 7443 ( ie RASTI equal to, or greater than 0.5). The installation must ensure that current intelligibility figures are maintained. Monitoring of amplifiers is required, including loudspeaker lines.

## 4.0 Technical Requirements

### 4.1 General

4.1.1 The Voice Alarm (VA) specification Clauses form part of the Fire alarm specification, and shall be read as part of the whole specification.

### 4.2 System Outline

4.2.1 The system shall be fully interfaced with the fire detection and alarm system. The Electrical Contractor shall supply, deliver, install, test, commission and demonstrate the system.

4.2.2 The voice alarm system shall also be suitable for use as a public address system.

4.2.3 The system shall cover all accessible areas of the building, including staff and public areas.

4.2.4 The primary function of the system is to provide secure, fail safe and high intelligibility emergency speech broadcast to all areas. Visible alarms will be provided in staff areas exposed to high noise levels (i.e. plant rooms ) and as required in other areas of the building as a supplement for the hard of hearing.

4.2.5 The system shall also be suitable for general paging and background music.

4.2.6 The system shall comply with the requirements of BS 5839 (including Part 8), BS EN 60849 and IEC 849 except where these standards are overridden by clauses within this specification.

4.2.7 The loudspeaker levels are to be a minimum of 5db above the ambient levels.

4.2.8 Sound pressure levels of 72db should be assumed in all office areas unless indicated otherwise.

4.2.9 Terminology for characteristics and measurement techniques of Sound System Equipment shall be in accordance with BS 6840 ( IEC 268 )

4.3.0 This specification shall be read in conjunction with the following:-

- Schematics
- Loudspeaker Circuit Layouts
- Equipment Layouts

## 4.4 Functional Description

### 4.4.1 The system shall provide the following functional facilities

1. Live emergency speech broadcast to selectable areas
2. Pre-recorded emergency speech broadcasts to selectable areas, either manually initiated or automatically triggered by the fire alarm panel.
3. Public address announcement to selectable areas.
4. Receptionists microphone console
5. Fireman's Microphone console

## 5.0 System Overview

### 5.1 Central Equipment Racks

5.1.1 Standard 19 inch racks shall be provided for mounting of all equipment within the central equipment room. Proposed layouts of racks within the equipment room shall be submitted to the project manager for approval.

5.1.2 Racks shall be of metal construction with dimensions and colour to be agreed with the project manager. The racks shall be fitted with de-mountable rear panels. Unused rack space shall be fitted with blank panels.

5.1.3 Adequate space shall be allowed for expansion of future equipment. Tenderers are asked to advise the expansion capability of the proposed design in their bids. Tenderers should supply amplifier power calculations, showing both the amplifier power allocated and tapping requirement of each loudspeaker.

5.1.4 Loudspeaker and Microphone cables shall be terminated in wall mounted marshalling boxes and fed to the equipment racks by new dedicated carcassing.

5.1.5 An interconnecting schedule sheet is to be fitted to the inside of each marshalling box.

5.1.6 Equipment racks and amplifiers should not require forced air ventilation. Tenderers are required to advise the environmental conditions required for natural ventilation.

5.1.7 All equipment racks shall be laid out in a logical fashion with a view to ease of access and control. Monitor loudspeaker panels shall be available with source selection, volume control, vu meter bargraph and back lit selector display.

5.1.8 Equipment racks are required to have clear front access with front doors.

5.1.9 All incoming cabling must be connected to labelled distribution panels within the equipment racks. The cables must also be logically labelled and easily cross-referenced to issued drawings.

5.2 All internal rack fuses, breakers, equipment, cables and connectors will be labelled as per the system drawing designations.

### 5.3 System Inputs

5.3.1 Microphones:

5.3.2 All microphones must be ergonomically designed, compatible one to another and feature a simple "plug in" arrangement for substitution and maintenance purposes.

5.3.3 Microphone console designs will be the subject of Project Manager approval.

5.3.4 Each microphone shall contain the following:

1. Loudspeaker zone selection buttons
2. Press to talk switch
3. System fault indicator
4. Power on indicator
5. A built in limiter circuit capable of adjustment so as to avoid the problem of "saturation" during pauses in speech with the resultant problems of acoustic feedback from adjacent loudspeakers.
6. All microphone consoles should be provided with in-built microphone pre-amplifiers which raise the microphone signal level to line level.
7. The microphone pre-amplifier must also inject an in-band surveillance tone into the microphone capsule.
8. All microphone buttons should be plug in, to assist maintenance.
9. The microphone press to talk switch must be monitored for failure.

5.3.5 Control Matrix:

5.3.5.1 It is of paramount importance that the new system is modular and expandable in all its elements. This includes the control matrix which must cater for the requirements of this specification and be capable of considerable expansion of input sources, amplifiers and zones. A strong preference will be given to a software based solution .

5.3.5.2 The control matrix should be microprocessor controlled.

5.3.5.3 All priority, source selection, default conditions and zone selection of inputs must be stored on EPROM. The matrix must also provide the control signals to operate volume override relays or shop interface units.

5.3.5.4 The matrix must be capable of printing out faults to a dumb terminal and a serial printer via a RS 232 port. The matrix must have a minimum of 3 RS 232 ports to allow for expansion.

5.3.5.5 The matrix must be capable of sending and receiving audio and data via fibre optic interfaces fitted within the matrix, via a dedicated removable module.

- 5.3.5.6 The system must contain a monitor facility capable of indicating all amplifier outputs and any system faults on a back light liquid crystal display. Preference will be given to a matrix with a picture display buttons capable of scrolling through the events and faults independently.
- 5.3.5.7 All fault indications shall also be indicated on the appropriate matrix modules i.e. a microphone fault should be indicated on the appropriate input module.
- 5.3.5.8 All modules should have a status indicator and input/output indicator. All indicators should be green in colour. Any fault should change the indicator to a flashing amber indicator and when the fault is accepted the flashing indicator changes to a steady state.
- 5.3.5.9 Re-programming must not be capable of being carried out while the matrix is live.
- 5.3.6 The system modules must be capable of being inserted and removed from the front of the rack and not have to be stripped down to change faulty modules.
- 5.3.6.1 All modules must be watchdog monitored and capable of a software reset as well as a hardware reset.
- 5.3.6.2 The matrix must be capable of illuminating all module LED indicators via a lamp test button on the front of the matrix.
- 5.3.6.3 The matrix must be capable of monitoring line level and loudspeaker 100 volt level audio input via a dedicated module, fitted in the matrix.
- 5.3.6.4 All audio input and output level adjustment controls must be internal and be inaccessible from the front of the matrix without the use of an extender card.
- 5.3.6.5 An extender card will be provided in the cost of the tender to enabling module card settings to be adjusted.
- 5.3.6.6 Configuration data which relates to surveyed sources and destinations or to any default or selector settings must be EPROM protected and floppy disk backed.
- 5.3.6.7 A dedicated module must store the emergency messages and the chimes. The module must be capable of plug in memory expansion and be capable of playing two messages to different zones simultaneously. The module must have 2 output channels, with capability for a single VMC module to provide upto 64 messages with optional memory expansion for up to 23 minutes of messages.
- 5.3.6.8 The matrix must monitor and detect the surveillance tones generated and pass on any faults detected, to the printer/ P.C. (if fitted) and the LCD fault indicator display.
- 5.3.6.9 The programming of the matrix must be in C language and copies of all files to be handed over after acceptance of the system.
- 5.3.7.0 Memory in the matrix must hold the following programme data
1. The source that each button on a microphone console activates.
  2. A list of destinations relating to each button.
  3. The priority level for each selector.
  4. A list of sources and destinations.
  5. Volume override.

## **5.4 Amplifiers**

**5.4.1 The power amplifiers shall provide the minimum performance:-**

- 1. Frequency response 70hz to 15Khz .**
- 2. S/N ratio >60db.**
- 3. Total harmonic distortion <0.5% at 1Khz at rated output.**
- 4. Less than 2db level difference between full load and no load conditions.**

**5.4.2 Amplifier sizes must be sufficient to support the loudspeaker zone with a minimum 30 % spare capacity for expansion.**

**5.4.3 Power amplifiers shall be sized to allow for typical loudspeaker line loses.**

**5.4.4 The amplifier sizes shall be either 50 watts, 100 watts, 200 watts and 300 watts. Providing up to four loudspeaker circuits per amplifier output (see section 12.3).**

**5.4.5 All amplifiers must be capable of driving hard of hearing loops via a transformer.**

**5.4.6 The amplifier shall be fully protected against short and open circuit loudspeaker lines. Fuses shall be clearly marked and labelled with rating and type.**

**5.4.7 The volume gain control shall be internal on amplifiers.**

**5.4.8 The amplifier shall have green indicators for healthy and red indicators for faults.**

**5.4.9 The amplifier will be fitted with a 100 volt line indicator bargraph on the front panel.**

**5.5.9.1 The amplifier will have the following front panel indicators.**

- 1. 24vdc input.**
- 2. 24vdc input fail.**
- 3. Transistor fault.**
- 4. Temperature trip.**

**5.5.9.2 Amplifiers fitted in the same chassis and sharing the same mains supply must be capable of being polled, to check for faults.**

**5.5.9.3 The amplifier should be capable of current and volt monitoring of the loudspeaker line(s).**

**5.5.9.4 The amplifier or matrix shall store the amplifier load values in memory. A pre-set window will enable the matrix/amplifier to detect a load change and indicate a fault for the loudspeaker line(s).**

**5.5.9.5 All amplifiers fitted with more than 4 output transistors will require all transistors to be connector mounted to the PCB and not soldered in.**

**5.5.9.6 All amplifiers fitted with more than 4 output transistors shall have each transistor protected by its own dedicated fuse. Any fuse blown shall be indicated on the front panel of the amplifier with a red LED indicator.**

5.5.9.7 A power on indicator shall be fitted to the front of the amplifiers.

## 5.6 Power supplies

5.6.1 All rack low voltage power supplies are to be of the fully enclosed type.

## 6.0 UPS System

### 6.2 Battery Chargers

6.2.1 All essential battery charger functions and conditions are to be constantly monitored. Front panel mounted LED indication of system shall provide system ok, charger fault, battery disconnection and battery high/low faults. An internal buzzer should indicate fault condition, together with volt free contact for remote fault indication.

### 6.3 Batteries

6.3.1 The batteries are to be sealed, valve regulated, absorbed electrolyte type and spill proof.

6.3.2 All units connected to the battery's are to dc fused, externally to the equipment.

6.3.3 The fuse should be a combined rail mounted breaker/fuse.

### 6.4 Fuses

6.4.1 All fuses fitted in the equipment rack and internal to the equipment, need to be monitored. Any fuse failure condition will need to be reported, visibly, audibly and on the remote fault printer.

## 7.0 Printer

### 7.1 Remote Fault Logger

7.2 The remote printer/logger will record all faults in the voice alarm system and will date and time stamp faults to assist the engineer.  
The remote logger can be a free standing unit or rack mounted. The unit is to be powered from the equipment's internal 24v power and will be battery backed in the event of a mains failure.

## 8.0 Fault outputs

- 8.1 New Fault output
- 8.1.1 A new fault in the system will energise the relay. The relay outputs are volt free normally closed and normally open contacts. Acceptance of the fault will reset the relay to its normal mode of operation.
- 8.2 System Fault output
- 8.2.1 A fault condition in the system will energise the relay. The relay is to stay energised until there are no faults in the system.
- 8.3 Relays
  - 8.3.1 All internal rack relays shall be 24v dc powered.
  - 8.3.2 All internal rack relays shall be of the plug in base type and rail mounted.
  - 8.3.3 All internal relays shall have a LED indicator, to enable quick identification of energised units.

## 9.0 Audio Frequency Induction Loops ( AFILS)

- 9.1 The loop installation is to fully meet the requirements of BS6093 pt4 (1981). I.E the loop must provide an average long term field strength of 0.1 A/m and undistorted maximum RMS capability of 0.4 A/m whilst maintaining a frequency response of 100hz to 5Khz plus and minus 3db.
- 9.2 Loop amplifier technical requirements:
  - 9.2.1 Constant current design. Therefore the loop current is not affected by the loop inductance within the design limits of the product.  
Capable of delivering short term peaks upto 17 amperes.  
Short circuit, over temperature and overdrive protection and indication. The unit will have a "duck" facility with inbuilt compressor/expander circuits.

## 10.0 Floor Screed Loop Installation

- 10.1 The builder shall provide an area approximately 1.5m x 1.5m in which the floor screed will be devoid of reinforced mesh
- 10.2 Electrical Contractor shall install plastic conduit of 20mm diameter in positions shown on the architects layouts forming a loop, and shall terminate the conduit in a sealed plastic floor mounted box. From the box a metal conduit shall be provided to the transformer box fitted as shown on the supplied drawings.

## 11.0 Ambient Noise Sensing Units

11.1 All new ambient noise sensing units shall use a 'ramp' based system that smoothly follows the ambient noise level, i.e. It is not stepped. At all times the ambient noise sensing system shall ensure that the signal exceeds background noise sufficiently to maintain good intelligibility. The ambient noise sensing unit should not require a control to enable the unit.

11.2 The noise sensing unit is to be a standard 1u 19 inch mounted unit and is mains powered.

11.3 The noise sensing unit should be by-passed in the event of an emergency speech or emergency message broadcast.

11.4 In the event of mains failure the unit is to be bypassed..

## 12.0 Loudspeaker lines

12.1 All loudspeaker lines shall be monitored for open circuit, short circuit and earth faults.

12.2 All loudspeaker lines shall be fitted with end of line units.

12.3 All loudspeaker lines should be capable of being wired as a maximum of 4 spurs, fitted with separate end of line units and all 4 spurs connected to one amplifier output.

## 13.0 Loudspeakers

13.1 All loudspeakers shall be 100 volt working.

13.2 All loudspeakers shall be supplied with high quality audio transformers. The transformers shall have a minimum of 4 secondary tappings, with a ratio of at least 4:1 between the highest and lowest tappings (6dc power factor). Tappings should be clearly labelled with the wattage's.

13.3 Where used as part of a Voice alarm system, all loudspeakers shall conform to the latest BS5839 pt 8 requirements.

## 14.0 Interface with Fire Alarm system

14.1 Operation

14.1.1 All fire alarm evacuate and alert inputs shall be activated by a closing contact.

14.2 Monitoring

14.2.1 All fire alarm inputs are to be monitored for open circuit and short circuit.

14.3 Priorities

14.3.1 The priority's shall be as follows unless indicated else where in this specification:-

1. Fireman's microphones.
2. Evacuation messages.
3. Alert messages.
4. Secondary microphones.
5. Test message.

## 15.0 Pre-recorded Emergency broadcast messages

### 15.1 Evacuation Message

15.1.1 The system should be capable of providing messages in any language.. A standard pre-recorded message, including an attention drawing signal, shall be provided for the Evacuate message of the voice alarm system. The message should be constructed in accordance with BS 5839 Pt 8.

15.1.2 "ATTENTION PLEASE, ATTENTION PLEASE. THIS IS AN EMERGENCY. PLEASE LEAVE THE BUILDING BY THE NEAREST AVAILABLE EXIT. DO NOT USE THE LIFTS"

### 15.2 Alert message

15.2.1 The system should be capable of providing messages in any language.. A standard pre-recorded message, including an attention drawing signal, shall be provided for the Alert message of the voice alarm system. The message should be constructed in accordance with BS 5839 Pt 8

15.2.2 "ATTENTION PLEASE, ATTENTION PLEASE. WE ARE INVESTIGATING AN ALARM CONDITION. IT MAY BE NECESSARY TO EVACUATE THE BUILDING. PLEASE LISTEN FOR FURTHER ANNOUNCEMENTS".

### 15.3 Test message

15.3.1 The system should be capable of providing messages in any language.. A standard pre-recorded message, including an attention drawing signal, shall be provided for the Test message of the voice alarm system. The message should be constructed in accordance with BS 5839 Pt 8

15.3.2 "PUBLIC ADDRESS SYSTEM TEST. THIS IS A TEST OF THE PUBLIC ADDRESS SYSTEM. THIS IS A FUNCTIONAL TEST FOR SYSTEM OPERATION, LOUDSPEAKER COVERAGE, SIGNAL LEVEL AND SPEECH INTELLIGIBILITY".

## **16.0 Programme and Project Plan**

**16.1.1** Tenderers must submit a sustainable project plan with there tender returns.

## **17.0 Project Management**

**17.1.1** The successful contractor will be expected to attend meetings with the Project manager and to provide written progress reports. Weekly meetings will be expected during any problem periods and during the critical on-site implementation phases of the works.

**17.1.2** It is essential that the project is professionally managed, planned and documented throughout. Detailed method statements including the logistics of any change over from old to new systems will be required. Also a sustainable programme with key milestones and reviews, and a project specific plan and risk analysis will be required.

## **18.0 Site working**

**18.1.1** Where the building is manned by staff twenty-four hours a day, seven days a week, and the system is upgraded from old to new, it is essential that the change-over is carried out with the minimal amount of disruption and down time. The constant availability of the voice alarm system. During periods of down time the contractor will be responsible for liaising with the client to arrange temporary cover.

**18.1.2** All equipment being de-commissioned must be handed back to the site owner.

**18.1.3** The tenderer is to provide details of any primary or secondary fire walls which will be breached. These fire walls are to be made good to the original fire rating of the walls at completion of the works.

## **19.0 Spares**

**19.1.1** The voice alarm manufacturer must warrant that all equipment offered is supported with spares, replacements and additions for a minimum of ten years from project completion.

**19.1.2** The successful tenderer will be required to produce a schematic diagram indicating level set ups at different points in the signal chain. This is to assist engineers with fault finding and service work to ensure that matrix input levels can be correctly adjusted.

**19.1.3** Tenderers are requested to indicate ease of maintainability and repair of equipment within the tender return.

**19.1.4** Tenderers are requested to supply a spares list and price to cover a three year period

## **20.0 Documentation**

- 20.1 The system manuals must include all equipment supplied and be supported with overall block schematics etc. All the proposed documentation must be submitted in draft form for approval of the Project Manager at least two weeks before project completion. All documentation must be delivered at the time of system handover. The Project Manager will require four full sets of manuals. Where possible and practical drawings are to be issued in A3 format.

## **21.0 Training**

- 21.1 A minimum of two sessions of training will be required for the site technicians/maintenance engineers.
- 21.2 In addition, two sessions of user (operator) training to include good microphone techniques. A basic operator's guide sheet is to be provided within the manuals provided.
- 21.3 Training should be made available two weeks before project completion, preferably using a "mock-up" of the type of equipment installed.
- 21.4 Tenderers are asked to separately price for a one year maintenance contract providing next day response as a minimum and telephone support during normal working hours to cover the warranty period. The Tenderer is to price a similar one year contract outside the warranty period.

## **22.0 Tender Returns**

- 22.1 Standard generic components only may be used. Tenderers are requested to state any non-standard components being offered.
- 22.2 Tenders must include any costs for carrying out detailed surveys of existing cabling, loudspeaker loadings, induction loops, noise sensing etc. in order to verify all information given.
- 22.3 A report must be provided to highlight any problems critical to the satisfactory completion of the project, prior to undertaking of the work.
- 22.4 Any new technology including new generation software etc. must be declared at the tender stage.

## **23.0 Factory Acceptance Tests**

- 23.1 The VA Specialist shall arrange for works inspection of the central equipment rack and remote equipment. The VA Specialist shall advise the Architect when the equipment has been fully works tested and is ready for pre-delivery inspection. Temporary circuits shall be connected, as necessary, to enable complete testing of all audio paths, zoning, priority switching and fault warning circuits.

## **24.0 Performance Tests**

### **24.1 General**

**24.1.1** After complying with the procedure set out in the preliminaries, the Electrical Contractor shall carry out full tests on the Electrical Contract works to demonstrate that the works meet the requirement of the electrical Contract documents, in accordance with Section X of this Specification. A method statement shall be provided to the Architect for approval not less than 10 days before the tests are scheduled to commence. Upon successful completion of these tests, the Electrical Contractor shall carry out a full system demonstration for acceptance purposes.

**24.1.2** The Electrical Contractor should allow a minimum of 2 (7 hour) days for the acceptance demonstration.

**24.1.3** The Electrical Contractor shall cost for all or part of the above work to be carried out outside normal working hours as may be required and shall include for all costs in doing so.

**24.1.4** The Electrical Contractor shall have available at commissioning, the following electro-acoustic tests equipment:-

1. Sound level meter and calibrator, complying with BS 5969 ( IEC 651 ) Type 1 or 2.
2. Field strength meter for audio loops
3. Test set for audio analysis
4. Handheld transceivers approved for use on site
5. Amplifier for use with (3), and sufficient loudspeakers to produce a noise level within 5 dB of the overall area signal level(s) for each area containing an ambient noise sensing microphone and associated equipment.
6. The noise level shall be uniform throughout the area to within 2db of the mean, measured 1.5m above the ground.

**24.1.5** If required by the Architect ( in the event of apparent non-compliance of the installed system with the specification ), the Electrical Contractor shall provide precision test equipment for verification of both an electrical and acoustic audit of the system.

**24.1.6** The tests shall include, but not be limited to:-

- Full operational tests on the rack equipment and system inputs, including a complete check on input routing and priority.
- Test of interfaces to the fire detection system.
- Impedance of each loudspeaker line.
- Electrical safety and earth checks.
- Sound level measurements, to ensure the system sound levels for each input meet the specification requirements.
- Equalisation of the system in each zone.
- Set up and test of any noise sensing systems.
- Subjective assessment of the electro acoustic performance of the system, including the intelligibility of speech.

**24.1.7** The results of the tests shall be presented to the Architect no later than seven working days after the tests have been completed, and prior to the acceptance

testing. Three copies of each test reports shall be provided. The report shall include:

1. Test details, dates, times and test personnel
2. Measured values in appropriate format for the parameter measure, e.g. marked up drawings and tables showing electro acoustic performance and completed matrices proving correct priority and routing operation.

24.1.8 A copy of the report, including any amendments, shall be included within the system manual.

## 24.2 Sound pressure level tests

24.2.1 The sound level measurements procedure shall be as follows:-

- The sound level meter shall be calibrated immediately before commencing the measurements. The sound level meter shall be set to A weighted and slow response
- Measurements shall be taken at 1.5m above floor level
- The required sound level shall be set within one area( averaged of at least three measurement locations within one zone) using a pre-recorded test message. A pink noise signal shall then be fed into the system via the test input, and the test input gain ( not the amplifier or loudspeaker tappings) shall be adjusted to obtain the same level.
- The pink noise input gain setting shall be noted and used to set up the sound levels at other locations. One zone shall be selected at a time to minimise disturbance.
- Measurements shall be taken in all areas of the building covered by the system.
- Measurement locations shall be chosen to indicate the maximum range of sound levels within an area.
- The sound levels measured using a sound pressure level meter without an Leq facility shall be visual averages. When an Leq facility is available the sound pressure level shall be measured over a 15 second period.
- Measurement locations and corresponding sound levels shall be marked up on the Contractors loudspeaker layout drawings. The drawings shall also indicate the final tapping of each loudspeaker or set of similar loudspeakers.
- If the measurement sound levels do not meet the required levels then adjustments shall be made to the pre-amplifiers, amplifiers and/or loudspeaker tappings. The documented levels shall be measured levels after adjustments. Any areas where the required levels cannot be achieved shall be highlighted on the drawings
- The pink noise test shall ensure that the relative sound levels between different areas are correctly set. Once this is completed each system input needs to be set correctly. This shall only involve measurements and adjustment of the pre amplifier setting of each system.
- Each of the recorded messages shall be broadcast and measured in turn. The sound levels of any pre-announcement tone and of the spoken message shall be measured and noted separately. The sound level shall be the visual average Leq over the length of the pre-announcement tone or the spoken message. Adjustments shall be made to the pre-amplifier setting until the measured sound level of the spoken message meets the required sound level.
- The sound level produced by each microphone input shall be measured and adjusted until the required sound levels are reached. Three different voices, repeating the words of the test message, shall be used to assess each microphone output. The levels shall be set such that the arithmetic average of the three

measured levels agrees with the target level. The microphones should be used with the lips at the appropriate working distance from the microphone head. This distance shall be recorded with the documented sound levels.

## **25.0 Year 2000 Compliance**

**25.1** All equipment supplied must be year 2000 compliant.

## **26.0 System failure**

**26.1** If requested, the tenderer will supply mean time before failure (MTBF) figures for all amplifiers, printed circuit boards and internal rack equipment.

## **27.0 Computer Software**

**27.1** Any computers supplied must be fitted with first generation software, complete with certificates and packaging.

## **28.0 Wiring**

**28.1** General requirements

• **28.1.1** The VA system shall comply fully with the requirements of this specification.

**28.1.2** The electrical contractor shall take complete responsibility for compliance with BS5839, BS EN 60849, BS 6259, IEE regulations and local by-laws, and for the operation and performance of the system, including wiring.

## **28.2 Cables**

**28.2.1** Alternate loudspeakers shall be wired to independent circuits, on the 'inter-leaving' principle.

**28.2.2** All cables shall have a unique reference number, and shall be clearly and permanently labelled at each end.

**28.2.3** All cores shall be colour coded or numbered.

**28.2.4** All internal rack cable connections shall be terminated with ferrules, or crimps.

**28.2.5** Internal rack connections shall be either hard-wired or via professional type audio connectors, preferably of the latching type.

HANDBOOK  
FOR  
SYSTEM 3000  
PA/EVES SYSTEM

ISSUE 1

JANUARY 1997

CUSTOMER :  
VESSEL :  
ORDER NO. :  
RSPT ORDER NO. :

HANDBOOK FOR SYSTEM 3000 PA/EVES

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## HANDBOOK FOR SYSTEM 3000 PA/EVES

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## **HANDBOOK FOR SYSTEM 3000 PA/EVES**

**AMENDMENT RECORD**

When an amendment to this handbook is incorporated the brief details required below are to be filled in. The modification number will be shown on the Amendment Instruction page when the amendment is caused by an equipment modification.

## HANDBOOK FOR SYSTEM 3000 PA/EVES

### CAUTION

#### SAFETY

The equipment MUST NOT be mis-used or modified in any way that shall prevent the system from functioning correctly or adversely affect the reliability or the operational performance of the equipment.

This system must not be modified or altered in any way without the full written approval of the designer/manufacturer, Redifon MEL Limited, SPT Division.

All electrical and mechanical modifications MUST be authorised by Redifon MEL Limited, SPT Division.

#### MAINTENANCE

While in the normal operating mode, with all doors correctly fitted, closed and secured and all plates, covers, panels and lids correctly fitted and secured the equipment presents no hazard to personnel.

However, during maintenance, service or repair operations to the equipment, where the internal aspects of the equipments are exposed and possibly malfunctioning, the following hazards may be present:-

- a) High voltages
- b) Hot surfaces
- c) Ruptured components

To avoid danger and possible harm to personnel during Maintenance, Service or Repair operations, work must be carried out only by qualified, trained technical staff and in accordance with the appropriate standards and codes of practice.

#### ELECTROSTATIC (STATIC) DAMAGE

Many of the components in the equipment are susceptible to damage by levels of electrostatic discharge that may be generated by the human body, clothing, working surfaces tools etc.

To prevent electrostatic problems when undertaking component level repairs, work must be carried out only by suitably qualified personnel, familiar with the required techniques and precautions.

The PEC cards must not be handled any more than is necessary. Spare cards must be stored in suitable containers designed to protect the cards from physical damage and to minimise the build up of 'static' discharge levels.

### CAUTION

## HANDBOOK FOR SYSTEM 3000 PA/EVES

### ABBREVIATION LIST

DC	- Direct Current
AC	- Alternating Current
PCB	- Printed Circuit Board
V	- Volts
AGC	- Automatic Gain Control
Aux.	- Auxiliary
L/S	- Loudspeaker
H/S	- Headset
PTT	- Press to Talk
I/P	- Input
O/P	- Output
LED	- Light Emitting Diode
MIC	- Microphone
PSU	- Power Supply Unit
FAS	- Fire Alarm System
DIL	- Dual In Line
CCT	- Circuit
PLD	- Programmed Logic Device
EOL	- End of Line
SW	- Switch
LK	- Link
PL	- Plug
SKT	- Socket
SND	- Sounder
FDS	- Fire Detection System
EVES	- Emergency Voice Evacuation System

## HANDBOOK FOR SYSTEM 3000 PA/EVES

### **3. SAFETY**

The equipment is designed and built to a high standard to ensure safety and durability. However, during the life of the equipment it may become damaged through accident or misuse. It is essential that the person responsible for the equipment and any operators are familiar with the contents of this manual.

The system comprises various items of equipment. The following information applies principally to the amplifier equipment rack but many parts may also be applicable to the other equipment in the system.

If the equipment is powered from the 115/240V AC mains, if exposed this represents a hazard to life.

If the equipment contains high power batteries. When damaged or abused these present a hazard of fire, explosion and/or chemical contamination.

The equipment contains components which may have very hot surfaces during normal operation. During abnormal operation surfaces may become dangerously hot if exposed.

Provided that the equipment is correctly installed, properly earthed to a supply with correctly rated protection and provided that all covers and panels are in place there is no hazard to the user. Covers, panels and equipment items should only be removed by an authorised, competent and appropriately qualified engineer who is completely familiar with the content of this manual. If any doubt exists as to the state of the equipment, with regard to safety, then the advice of an expert should be sought.

Mains supplies should be isolated prior to working on the equipment, unless unavoidable.

The batteries are capable of delivering extremely high currents. The instruction in this manual, referring to batteries, should be carefully and diligently followed. If, at any time, the batteries are thought to be leaking then expert advice should be sought immediately.

Some parts of the equipment (e.g. power amplifiers) are very heavy and should be handled with appropriate care.

In the event of a fire only CO<sub>2</sub> type fire extinguishers should be used on the equipment.

This equipment is part of the Fire Alarm System and provides the primary means of evacuating staff and customers from the premises. The system is provided to protect life and property. The equipment should not be switched off at any time without proper authority.

## HANDBOOK FOR SYSTEM 3000 PA/EVES

### 5. GENERAL MAINTENANCE

#### General

The units comprising the PA/EVES Equipment require no regular or routine service during normal operation, except for the cassette mechanism/replay heads.

#### Equipment Rack, Front and Side Panels

The panels can be cleaned, when necessary with a soft cloth or chamois leather slightly moistened with water. Do not use cleaning agents containing abrasives, alcohol, ammonia or spirits.

#### Internal Equipment

Inspection of all terminals, plugs and sockets, switches and the overall condition of all units must be carried out at minimum monthly intervals.

Cleaning - Care must be exercised to ensure that the various components and switches are kept clean and free from dust, and are protected against the ingress of moisture.

Should a fault develop, normal fault finding practice must be followed.

Adjustments may be required after major component replacement, see the relevant equipment section of this handbook for instructions.

#### External Equipment

The external equipment described in this manual, including all control units, loudspeaker units, switches, terminals, plugs and sockets and all associated equipments, particularly if installed in exposed positions, must be thoroughly inspected for overall condition, ingress of water/moisture, corrosion, salt deposits etc. at minimum monthly intervals and after heavy seas/weather.

The loudspeaker units must also be inspected for correct alignment/elevation. The loudspeakers should be mounted in a horizontal plane or pointed downwards. The loudspeaker must NEVER be installed pointed upwards.

Ensure that no foreign objects or debris, rag, swarf, etc. has become lodged in the speaker horn.

Cleaning - Care must be exercised to ensure that the various components and switches are kept clean and free from dust, and are protected against the ingress of moisture.

## HANDBOOK FOR SYSTEM 3000 PA/EVES

Should a fault develop, normal fault finding practice must be followed.

Adjustments may be required after major component replacement, see the relevant equipment section of this handbook for instructions.

### Batteries

The batteries are sealed, valve regulated, absorbed electrolyte type and are spill proof. They are maintenance free and, provided that they are treated correctly, are designed to have a working life of 10 years.

If it is necessary to remove or otherwise work on the batteries remove all DC fuses and DO NOT replace them until the batteries have been correctly re-installed. The batteries are not correctly installed if the protective covers are not fitted to the terminals.

If the batteries are removed from the equipment for any reason they should not be left or stored without a suitable and secure cover to prevent shorting of the terminals.

## HANDBOOK FOR SYSTEM 3000 PA/EVES

### SECTION 6

#### SYSTEM 3000 CONTROLLER

#### CONTENTS

- 6.1 Overview
- 6.2 Technical Description
- 6.3 Module Data Sheets

Microphone I/P	-	A1005-01
Line I/P (Mic)	-	A1007-01
Line I/P (SW)	-	A1007-02
Line I/P O/P (0dB)	-	A1009-01
Line I/P O/P (SW)	-	A1009-02
Alarm Tone	-	A1011-01
Voice Message	-	A1013-01
Line O/P	-	A1015-01
Graphic Equaliser	-	A1017-01
Serial Control	-	A1019-01
Digital I/P O/P	-	A1021-01
Isolated I/O	-	A1023-01
Microprocessor	-	A1025-01
Audio Network	-	A1027-01
Data Network	-	A1029-01
PABX I/F	-	A1031-01
Master Supervisory	-	A1033-01
Master Supervisory	-	A1033-02
Supervisory	-	A1037-01
Monitor	-	A1051-01
100V Line Sense	-	A1055-01
Beacon Surveillance	-	A1057-01
PSU	-	A1059-01
PSU	-	25175
Audio Mixer I/O	-	A2480-01

## HANDBOOK FOR SYSTEM 3000 PA/EVES

### 6. SYSTEM 3000 CONTROLLER

#### 6.1 Overview

The system control is housed in a 19" 3U or 6U cardframe containing plug-in modules. Each module performs a different function in the system and a cardframe will contain a mixture of modules to perform the specific requirements of the system.

The cardframe contains 15 slots (30 slots for 6U) connected together on a common backplane which buses the audio, power and data between modules.

The modules are microprocessor controlled and all modules except one, contain standard software and are known as slaves. The exception is the module which contains the master software and configuration data which describes the individual aspects of a system.

DC voltage is connected via faston connectors located on the rear of the backplane and connections to the modules are via DIN 41612 connectors with latching hoods.

The P.A. Control Modules are based on the double extended Euro Card 3U format. (220 x 100mm) fitted to a front panel (HP) with LEDs or switches as appropriate to the module and a handle with the module part number label (see data sheets).

The standard module spacing is 5HP (25.4 mm). Larger front panels (multiples of SHP) are fitted to particular modules (see table).

The modules have a 64 pin DIN 41612 connector and are fitted with a DIN coding device. Each module is allocated a different code (see table).

Blank panels are fitted in unused positions.

The standard front panel colour is Dawn Grey BS4000 10A 03.

To perform any adjustments or testing to modules a extender PCB is supplied to enable modules to be withdrawn from the cardframe while still making connections to the backplane.

#### Part Numbers

Complete Fitted Controller	- A3000-EDN
3U Cardframe only	- A1000-01
6U Cardframe only	- A1001-01
Modules	- See Part 6.3
Blank Panel Assembly 5HP	- A2157-01
PSU Panel Assembly (for 25175)	- A2156-01
Extender PCB	- A1179-01

## HANDBOOK FOR SYSTEM 3000 PA/EVES

### 6.2 Technical Description

The system 3000 controller provides a flexible control system. Modules are selected and the system configured for each application:

Each module has a common backplane and front panel interface with function specific circuits (see data sheets).

The module PCBs have a common front panel interface.

Modules are either fitted with up to 9 dual colour LED's for module status and channel active/fault, green indicates active, amber indicates fault, or a switch PCB A1035-01. Switches can be labelled to indicate function.

#### Power

The cardframe power supply provides the internal rails from the 24 volt supply.

The backplane provides the following module supplies:-

<u>Supply</u>	<u>Current</u>	<u>Module (typical)</u>	<u>Application</u>
+5 Volts	5 Amps	150 mA	Logic Supply
+12 Volts	1 Amp	30 mA	Analogue Supply (low power)
-12 Volts	1 Amp	30 mA	Analogue Supply (low power)
+24 Volts	2 Amps		Lamp, relay drive, Amplifier etc.
Metalwork ground	Not Applicable		Cable screens, Earth leakage etc.

The logic, audio and power 0 volt are star connected at the power supply.

The AC mains input is converted to 24 volts elsewhere in the rack. In small, AC only systems, a mains to DC converter may be fitted in the cardframe. This module will have limited 24 volt output current.

#### Audio Signal Lines

The system 3000 3U backplane provides eight audio interconnections between modules.

Input modules drive audio signals onto a bus and output modules receive audio signals from a bus. The actual bus used to make an audio path is controlled by the master software.

Modules driving an audio bus have a nominal 600 ohm output impedance. Modules connected to an audio bus present a high impedance load (>10K ohms). Each audio bus has a resistor to 0V analogue ground on the backplane to provide DC bias for non driven buses.

## HANDBOOK FOR SYSTEM 3000 PA/EVES

The audio bus signal level is nominally 700 mV rms. for maximum output. The audio power amplifiers require a 770 mV rms. (0dBm) input signal for maximum 100V rms speaker line output.

The module audio inputs and outputs are referenced to the 0 volt analogue ground. DC offsets are minimised to limit switching noise.

### Digital Control Lines

The System 3000 modules communicate via two serial control buses. Dedicated control lines are provided for:-

- 1) Fault
- 2) Lamp test
- 3) Reset

The digital control lines operate at 5 volt logic levels. The control lines are driven low from open drain (collector) outputs. Input levels are CMOS (TTL compatible). The lines have pull up resistors to the 5 volt logic supply on the backplane.

Input protection resistors are fitted to each module.

### Control

All modules, except the supervisory module, have a control processor.

On simple modules, the micro controller is a 87C751. This is a 24 pin cut down version of the 8051 processor with a built in I2C interface. On other modules, the micro controller is a 80C652. This is also a 8051 processor with a built in I2C interface.

All modules have a processor watchdog circuit on board and backplane reset input. An overall cardframe watchdog circuit is provided on the supervisory module which drives the backplane reset line. The cardframe watchdog is continually pulsed by a message from the master control module. If this message is not sent due to a problem with the master controller the watchdog will time-out in approximately 1½ seconds and reset all the modules via the backplane reset line. This will increment the supervisory modules counter.

This does not preclude the use of other processors on specific modules. For example, the voice message module uses an ADSP2105 digital signal processor with a separate I2C interface IC.

The supervisory module does not contain a processor but has hardwired fault logic.

Inter Module Communication

Each slot in the cardframe has a unique address. This is set by hardwired address line 1 integral to the backplane. The slot addresses are 1 to 15 but backplane links allow up to 8 backplanes to be connected together.

The master controller sends to and receives messages from the slave modules via a two wire I2C bus.

Two buses are provided on the backplane. Each module is capable of operating on either bus. The bus is factory preset with links on the module.

The module backplane address is used to form the I2C message address.

The I2C message format between modules is as follows.

- 1) Destination Address
- 2) Source Address
- 3) Command
- 4) Data
- 5) Status

The module destination and source addresses are as follows:-

- |                            |                                  |
|----------------------------|----------------------------------|
| 1) 1 to 15 (1 to F Hex)    | Modules (3U)                     |
| 2) 17 to 31 (11 to 1F Hex) | Modules in second cardframe (6U) |
| 3) 32 (20 Hex)             | Supervisory module control       |
| 4) 80 (50 Hex)             | Supervisory module EEPROM        |

Each module is capable of I2C master and I2C slave operation. The I2C bus provides multi-master operation with bus arbitration. The data rate will be nominally 100 kbit/s. The data byte transfers are acknowledged as part of the I2C protocol.

The message format is instructional rather than card specific (e.g. connect input 1 to output 5).

Dedicated I2C peripherals are fitted on certain modules (e.g. supervisory module).

## HANDBOOK FOR SYSTEM 3000 PA/EVES

### Module Specification

The backplane is configured for a particular system by setting the coding device for each module position.

<u>Part No.</u>	<u>Module</u>	<u>Panel HP</u>	<u>Channels</u>	<u>Polarizing Code</u>
A1005-01	Mic input card	5	4	1,2
A1007-01/02	Line input	5	4	1,3
A1009-01/02	Line input/output	5	4	1,4
A1011-01	Alarm tone	5	2	1,5
A1013-01	Voice message	5	2	1,6
A1015-01	Line output	5	8	1,7
A1017-01	Graphic Equaliser	5	4	1,8
A1019-01	Serial Control	5	8	1,9
A1021-01	Digital I/O	5	24	1,10
A1023-01*	Isolated Digital I/O	5		1,11
A1025-01*	Microprocessor	5		1,12
A1027-01*	Audio network	5		2,3
A1029-01*	Data network	5		2,4
A1031-01	PABX interface	5	1	2,5
A1033-01/02	Master Supervisory	5		2,6
A1037-01	Supervisory	5		2,7
A1051-01	Monitor	20		2,8
A1055-01	100V Line Sense	5		2,9
A1057-01*	Beacon Surveillance	5		2,10
A1059-01*	PSU	9		2,11
A2480-01	Audio Mixer I/O	5		2,12

The modules are selected to provide the required functions.

\*Future (to be added at a later date).

The module locations within the cardframe are system specific and are defined by the software configuration and external connections.

### Backplane PCB A1003-01

The backplane PCB provides the power, control and audio interconnections between modules.

The backplane provides positions for 15 modules on a 5HP pitch (25.4 mm). Each position is fitted with a 64 way DIN 41612 connector with a DIN coding device.

The backplane has rear plug connectors. The DIN connectors have extended pins and shroud to form a 64 way connector for external connections to be made via a DIN 41612 connector with a latching hood.

The power supply has a 11 way DIN 41612 H connector. This is not PCB mounted and connections are made via faston connections to the backplane. This allows alternative power supplies to be fitted.

## HANDBOOK FOR SYSTEM 3000 PA/EVES

### Backplane Connector Pin Allocation

The module connector is a two part 64 pin DIN 41612 type C.

The 15 module positions are connected as shown below. The address connections will be linked to 0V logic and will identify each module (1 - 15). Address line 5 is used to identify the second backplane in a 6U cardframe.

<u>PIN No.</u>	<u>Function A</u>	<u>Function C</u>
1AC	0V Logic	5V Logic
2AC	Fault	Lamp Test
3AC	Serial data 1	Serial clock 1
4AC	Serial data 2	Serial clock 2
5AC	Address 0	Address 1
6AC	Address 2	Address 3
7AC	Address 4	Rest
8AC	Address 5	Address 6
9AC	-V Analogue	+V Analogue
10AC	0V Audio	Audio Line 0
11AC	Audio Line 1	Audio Line 2
12AC	Audio Line 3	Audio Line 4
13AC	Audio Line 5	Audio Line 6
14AC	Audio Line 7	0V Audio
15AC	0V Power	0V Power
16AC	24 Volt Power	24 Volt Power
17-31AC	Card Specific I/O	Card Specific I/O
32AC	Metalwork 0V	Metalwork 0V

### 6.3 Module Data Sheets

This sub section contains module data sheets applicable to the system supplied.

Unused slots are fitted with a 5 HP blank panel.

## **Voice Alarm System Description**

# Voice Alarm System Description

## 1 Introduction

The Voice Alarm System will be contained in a suitable enclosure (see notes below regarding environmental specification) such that it can be presented to the customer as a complete unit. The enclosure will contain a suitable approved proprietary modem connected to a motherboard providing the core functionality of the product. Additional low cost I/O boards may be accommodated within the housing to provide modular low cost solutions to customer's requirements for a mix of analogue and digital signal monitoring. The range of analogue and digital modules will cater for widely used industrial instrumentation signal standards and a range of isolation.

### 1.1 System Components

- A motherboard containing the main CPU and core functionality of the product. The limited input connections to the core product would be by means of terminals on the motherboard.
- A switch mode power supply, capable of powering a fully populated system.
- One or more input modules. These signal conditioning units would have terminals for field wiring and attach to the mother board by means of appropriate connectors and card supports. Variants of this unit could be available in the future depending on the type of signal (eg: mains, 24V, 12V, 0-10V, 20mA, etc). Both analogue and digital versions of the unit would be available.
- One or more output driver boards, also with terminals for field wiring, and a computer connection. They could have large or small relays, depending on the requirements.
- A proprietary modem connected to the motherboard via 25 way serial cable. This modem will be approved by the appropriate telecom authority in the customer territory and will be selected and approved by Ford Communications Ltd.

### 1.2 Motherboard Features

The motherboard would have the following hardware features:

- Interface bus connector(s), to connect to up to eight input and output modules.
- High-speed serial port for modem interface.
- Port for printer interface with D type connector.
- Status indicators to be visible through the housing.
- Power-fail detection inputs, and alarm outputs
- Hardware watchdog.
- Battery backup (one month).
- Minimum 512K Ram.
- 1Mb Non volatile reprogrammable memory (to hold 100 seconds of speech). The possibility of fitting 2Mb to hold 200 seconds would be an option.

The housing for the whole system could be available in two versions: commercial and heavy industrial. The heavy-industrial version would be a fully sealed unit to appropriate IP specification, with all connections via suitable industrial connectors, and will be able to withstand a severe industrial environment. The commercial version would be housed in a lower cost, lighter duty case, with connections made directly to the input output modules.

## **2 Alarm Reporting**

Each input will have an alarm definition. For digital inputs, there are 5 possibilities:

- 1 Alarm if input is on
- 2 Alarm if input is off
- 3 Alarm if input is on more than a programmed time
- 4 Alarm if input is off more than a programmed time
- 5 Input is not in use

- For analogue inputs, there would be two trigger thresholds: trigger and reset. (This is to provide hysteresis so that the system does not become unstable as the input hovers around the trigger threshold. The input is alarmed if the level goes beyond the trigger, and maintained until it drops below the reset threshold)
- Complete history log could be uploaded to the supervisor PC daily/weekly.
- Each input has a list of reporting categories, for instance: electrical engineers, plant fitters and technicians. The system will call one person in every category listed.
- A reporting category consists of a list of phone number entries together with a list of valid users in that category.
- Each phone number entry has the phone number and the type of the number (phone, fax, pager, etc). The system will continue dialling until a valid user in the category acknowledges the call.
- There will be a list of users (3 digit pin number) and passwords (4 digit)
- The local printer will log all events, calls and actions.

## **3 Interrogation**

- It will be possible for an authorised user to dial up the system from either a mobile, or fixed line phone and, using a spoken navigation menu be able to retrieve the status of any of the inputs and outputs. Pulse-dial phones will not be supported.
- The user will be able to connect to the system from a laptop or PC and be able to see the status of the inputs and outputs, and also generate a printed report.

## **4 Configuration**

- Recording of speech: This can only be done by the modem itself, as it compresses and encodes the speech digitally. This will normally be done from a remote phone.
- Alarm configuration: This may be carried out using a dialogue through the modem interface, or directly connecting to the configuration connector.

## **5 Security**

System will play an announcement message identifying itself and asking the recipient to enter his password. Then the system plays the alarm message.

Leaving a message on an answer phone could be a configuration option so that certain numbers are configured as answer phones. For these numbers no user identification would be required.

## **6 Control of Outputs**

Outputs will be able to be controlled by a modem connection from a remote PC, or by navigating spoken menus with a tone phone.

Two outputs will have reserved functions:

- 1 On when any alarm is active
- 2 On when there is any alarm active that has not been acknowledged by an engineer.

## **7 Other Points**

Hardware watchdog timer: the system will reset itself in the event of a software crash.

Two inputs will be reserved:

- 1 Mains supply OK. If this goes down, a power fail alarm will be reported.
- 2 UPS supply OK. If this goes down, the motherboard will not attempt to use the printer or modem

## **8 Mains Failure**

- The motherboard will have an on board battery, which will maintain the time/date functions, and internal logging for up to one month of power loss.
- As the external printer will not be powered, any further alarm messages will be stored and printed when the mains supply is restored.
- It is anticipated that the system will be powered by a UPS, which will provide sufficient power to run the modem and printer for a few minutes (long enough to phone an engineer to notify the mains failure).

## **9 Possible Configurations.**

### **9.1 Standalone**

This would be configured by telephone handset, with no PC present.

Alarms would be logged to the local printer, and engineers informed by phone.

### **9.2 Local PC**

PC connected to motherboard via serial line in place of the printer. This would allow easy configuration of the system by the PC. The printer would be on the PC, and the PC would do the printing.

### **9.3 Remote PC**

A PC in a central control room, or an engineers laptop, with a modem can dial out to each alarm system in an extended site, and upload current status, control or reconfigure, or backup the messages to disk.

# **Audio Line Sharing Unit**

## **Product Description**

**Rev 1 18/8/98**

### **Microtech Electronics Ltd**

Lancaster Road, Cressex Business Park, High Wycombe, Bucks HP12 3QA

Telephone: (01494) 464764 Fax: (01494) 464760

Email: [sales@microtech-electronics.co.uk](mailto:sales@microtech-electronics.co.uk)

## Overview

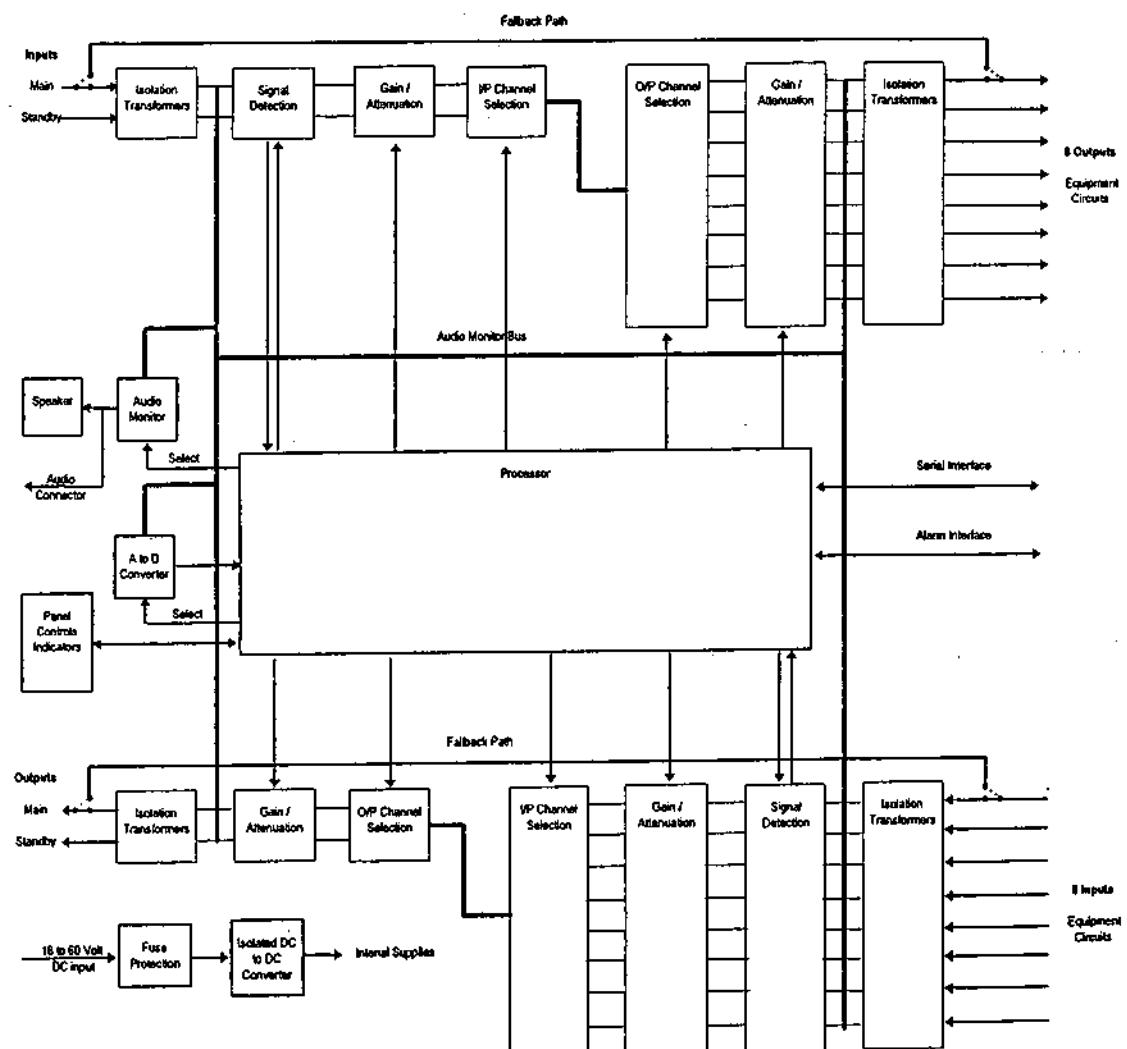
The Audio Line-Sharing Unit (ALSU) enables one of two voice frequency circuits ("main" and "Stand-by") to communicate with eight further "equipment" circuits in a multi-drop arrangement for telemetry purposes.

The unit can be controlled from a front panel or remotely via a serial interface. Using the serial interface the unit can be managed to assist with fault diagnosis and system installation.

## Cost Benefits

The ALSU significantly reduces system down time. When problems occur they can quickly and easily be identified then isolated. The remote diagnostics and configuration alleviates traveling time, traveling costs, plus removing the need for field engineers and or reduces the skill level required.

## Block Diagram



## Description

All circuits are 4 wire Private Analogue Circuits

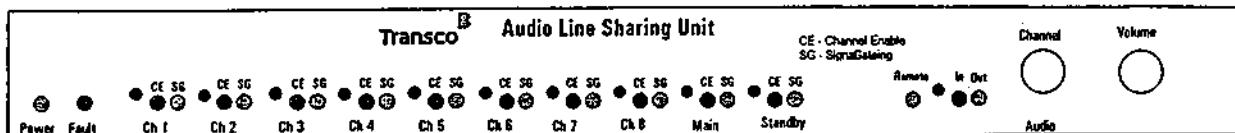
The main and standby circuit inputs are equipped with carrier detection circuitry to allow the processor to detect the active main circuit. This is normally on a 'first come, first served' basis, preventing collisions between polls on the "main" and "Stand-by" circuits.

The eight equipment circuit inputs are equipped with carrier detection circuitry to allow the processor to detect the active equipment circuit and gate it to the main and stand-by circuits. The gating system works on a 'first come, first served' basis, allowing one of the equipment circuits to be connected at a time.

The main functions of the unit are :

1. To prevent noise and rogue equipment tone faults on any individual equipment channel from preventing operation of equipment on other equipment channels.
2. To eliminate problems caused by cumulative noise by only passing signals from circuits exceeding a predetermined threshold through onto the main circuits.
3. To facilitate circuit monitoring and fault finding.

## Front Panel Controls



**Power**

Illuminates when the equipment is correctly connected to a power source

**Fault LED**

Illuminates when the unit's software has halted or is in the process of resetting.

**Channel Select Buttons**

The front panel has a press buttons associated with each channel for the disabling of any audio circuit. LED indication of the lock-out status of all channels is provided

**Signal Gating LEDs (SG)**

A tri-colour LED per channel is used to indicate signal gating:

- Red : Audio signal detected, circuit gate isolated
- Green : No audio detected, circuit gate forced enabled
- Not illuminated : No audio signal detected, circuit gate isolated
- Amber : Audio signal detected, circuit gate enabled

**Channel Enabled LEDs (CE)**

Red LED is illuminated when a channel has been locked out.

**Audio Channel Switch**

Selects the local audio monitoring of each channel for the purposes of fault detection. The monitoring facility can be disabled by turning the rotary knob to either of its two "OFF" positions.

**Audio Input / Output**

Push button and Indicators to allow selection of monitoring of input or output channel.

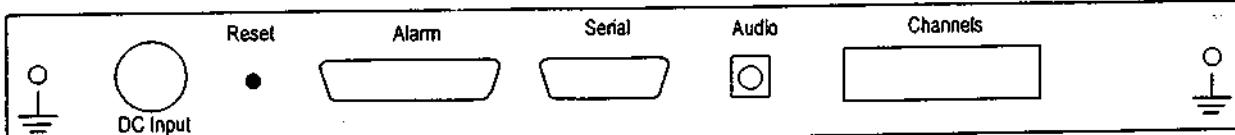
**Audio Volume Switch**

Controls the volume of the audio monitoring transducer.

**Remote LED**

Illuminates when a remote management session via the serial channel is in progress. In this mode of operation, the front panel controls become inoperative until the remote control session is ended.

## Rear Panel



**DC input**

18 - 60 Volts DC 100 mA Max. (Internally Fused)

**Alarm Port**

4 isolated inputs. 4 isolated outputs

**Serial Port**

The unit can be further configured and controlled via an RS232 compatible serial port

**Channels Port**

Connections for the 10 4 wire audio circuits

**Reset push button**

When pressed during power-up the unit will default to its factory settings.

**Audio output**

Allows remote monitoring of the audio signal.

**Earthing studs**

The unit must be permanently connected to Protective Earth via one or both of these studs.

## Port Specification

### DC Input

**Type**

3 pin panel plug, AXR/XLR Series. 3-32R

**Mating connector**

AXR/XLR Series. AC3F free socket

**Power Rating**

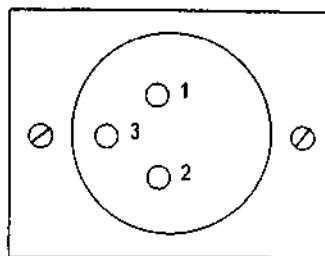
18 to 60 Volts DC 100 mA Max.

**Connections**

Pin 1: Chassis Ground

Pin 2 DC Positive Supply

Pin 3 DC Negative Supply



View of connector looking at rear of box

**Polarity**

Unit is diode protected against accidental connection to reverse polarity

### Alarm Port

**Type**

25 Way 'D' Type Socket

**Pin-out**

Pin	Signal	Pin	Signal
1	Chassis	14	Input 0-
2	Input 0+	15	Input 1-
3	Input 1+	16	Input 2-
4	Input 2+	17	Input 3-
5	Input 3+	19	Output 0 b
7	Output 0 a	20	Output 1 b
8	Output 1 a	21	Output 2 b
9	Output 2 a	22	Output 3 b
10	Output 3 a	24	Transmitter Control b
12	Transmitter Control a	13	Chassis
25	Chassis		

**Inputs**

5 to 24 volts DC. Polarity dependant. (protected against reverse polarity)  
Each circuit pair is optically isolated from all other connections.

**Outputs**

(including Transmitter Control).

100 mA max. dry isolated contact.

Polarity independent.

Applied voltage must not exceed 60V DC.

External circuit must provide the current limit.

### Serial Port

**Type**

9 Way 'D' Type Plug

**Pin-out**

Pin	Signal	Direction
1	DCD	input
2	RXD	input
3	TXD	output
4	DTR	output
5	OV	
6	DSR	input
7	RTS	output
8	CTS	input
9	RI	input

## **Audio Port**

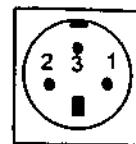
### **Connector**

3 Way miniature DIN

Pin 1: Signal

Pin 2: 0V

Pin 3: Not connected



### **Electrical Characteristics**

Capacitively coupled.  
Output 5 mV maximum.  
Output impedance 1KΩ

[View from Rear](#)

## **Channels Port**

### **Connector**

BT226 type Viking Receptacle / socket (VFR5VT50K1E).

### **Pin-out**

<b>Pin</b>	<b>Signal</b>	<b>Pin</b>	<b>Signal</b>
1	Main CH Tx a (see note)	26	Main CH TX b
2	Main CH RX a	27	Main CH RX b
3	Stby CH TX a	28	Stby CH TX b
4	Stby CH RX a	29	Stby CH RX b
5	CH 1 TX a	30	CH 1 TX b
6	CH 1 RX a	31	CH 1 RX b
7	CH 2 TX a	32	CH 2 TX b
8	CH 2 RX a	33	CH 2 RX b
9	CH 3 TX a	34	CH 3 TX b
10	CH 3 RX a	35	CH 3 RX b
11	CH 4 TX a	36	CH 4 TX b
12	CH 4 RX a	37	CH 4 RX b
13	CH 5 TX a	38	CH 5 TX b
14	CH 5 RX a	39	CH 5 RX b
15	CH 6 TX a	40	CH 6 TX b
16	CH 6 RX a	41	CH 6 RX b
17	CH 7 TX a	42	CH 7 TX b
18	CH 7 RX a	43	CH 7 RX b
19	CH 8 TX a	44	CH 8 TX b
20	CH 8 RX a	45	CH 8 RX b
21		46	
22		47	
23		48	
24	Chassis	49	Chassis
25	Chassis	50	Chassis

### **Note:**

Naming convention. Main and Standby are treated as DCE ports. i.e. circuit marked TX is a receive pair and circuit marked RX is a Transmit pair. Equipment channel ports are treated as DTE and their function is as marked.

### **Fall-back**

Under fault conditions or when the unit is powered off, the main channel RX pair is directly connected to Channel 1 TX pair and the TX pair is directly connected to Channel 1 RX pair.

## **Functionality**

### **Serial Port**

This port can be used with a serial terminal to allow configurations and settings to be changed during installation. Password protection is used to satisfy the requirement for "special knowledge / tools" before allowing alteration of the configuration menus, and hence to the unit's gain settings.

### **Alarm Port**

Not available in this software version. Port is designed to allow reading of alarm inputs and setting of alarm outputs.

Transmitter Control output will be active whilst valid polls are being detected by the ALSU.

## Statutory Notices

### CE Mark

#### Electromagnetic Compatibility

This device complies with the following standards in accordance with the European Directives 89/336/EEC and amending directives 91/263/EEC, 92/31/EEC, 93/68/EEC

- Immunity EN 50082-1 06/92
- Emission EN 55022 class B 08/87

Connection of unapproved cables or equipment may effect EMC product performance.

#### Safety

In accordance with the European Low Voltage Directives 73/23/EEC, 93/68/EEC and Telecommunication Terminal Equipment Directive 91/263/EEC amending directive 93/68/EEC, this device complies with the following standards: EN 60950:1992 + A5 and EN 41003 08/93

The ports on this unit have the following safety status:

- DC input = SELV
- Serial Port = SELV
- Alarm Port = SELV
- Audio Port = SELV
- Channels Port = TNV

SELV = Safety Extra Low Voltage

TNV = Telecommunication Network Voltages

(These definitions are classified as per standard EN 60950:1992 + A5.)

### BABT Approval

#### Approved by BABT for connection to:

Four wire Voice Frequency Leased Lines

**BABT Approval number: 608289**

### Environmental

The ALSU is designed to operate under the following conditions.

- Ambient temperature in the range of 5 to 45 degrees Celsius.
- Relative humidity of 10 to 90 percent (non-condensing).
- Atmospheric pressure 86 kPa to 106 kPa.

### Physical

The ALSU is design to be mounted in a standard 19" rack. and is 1U high.

- Size 483mm (19") wide .. 350mm (15.75") deep .. 45mm (1.75") high
- Desk top version as above but 432mm (17") wide
- Weight 5 Kilos (10 lb)

## SAFETY WARNINGS

- 1 The unit contains no user serviceable parts. All servicing must be carried out by qualified personnel only.
- 2 It is a statutory requirement that the maximum signal level supplied to line is -13 dBm. Incorrect settings for a channel's gain may produce transmit power levels in excess of this figure. Changes must only be made by qualified personnel.
- 3 The unit must be permanently earthed via one or both of the earthing studs on the rear panel.

## SYSTEM 3000

MODULE - LINE I/P O/P (0dB) A1009-01  
LINE I/P O/P (SW) A1009-02

The Audio Input and Output Module provides four circuits which can be configured for input, output or bi-directional operation.

Applications Low Level inputs  
Line Level inputs  
Entertainment (Radio, cassette, CD etc.)  
Control Unit Audio  
Dual system audio  
PABX Audio (Tie line)

Features 4 channels/module  
Transformer coupled inputs  
5 dual colour LEDs for module status and channel active/fault.  
Optional front panel with channel select switches  
Individual channel input and output level adjustment  
Surveillance support

Specification

1 x Module Width	5HP
3U 220 x 100 mm Euro-card	
Frequency response	30 Hz to 15 KHz
Output Impedance	600 ohms
Input Impedance	600 or 10k ohms (Link option)
Input Level	-10 to +10 dBm
Distortion	
Power	Approx. 0.7 watts

### Front Panel Controls

Status LED = Green, Module active  
Amber, Module fault

LED 1-8 = Green, Channel active  
Amber, Channel fault

Switches 1-4 = Channel Select

### Adjustments

RV1	Output Level Chan. 2
RV2	Input Level Chan. 2
RV3	Output Level Chan. 1
RV4	Input Level Chan. 1
RV5	Output Level Chan. 4
RV6	Input Level Chan. 4
RV7	Output Level Chan. 3
RV8	Input Level Chan. 3

### Links

LK1	2-3 & 4-5 1-2 & 5-6	12c Bus 1 12c Bus 2
LK2	1-2 Chan. 2 2-3 Chan. 2 N/F Chan. 2	600Ω I/O 600Ω I/P 10K
LK3		Chan. 1
LK4		Chan. 4
LK5		Chan. 3

### External Connections

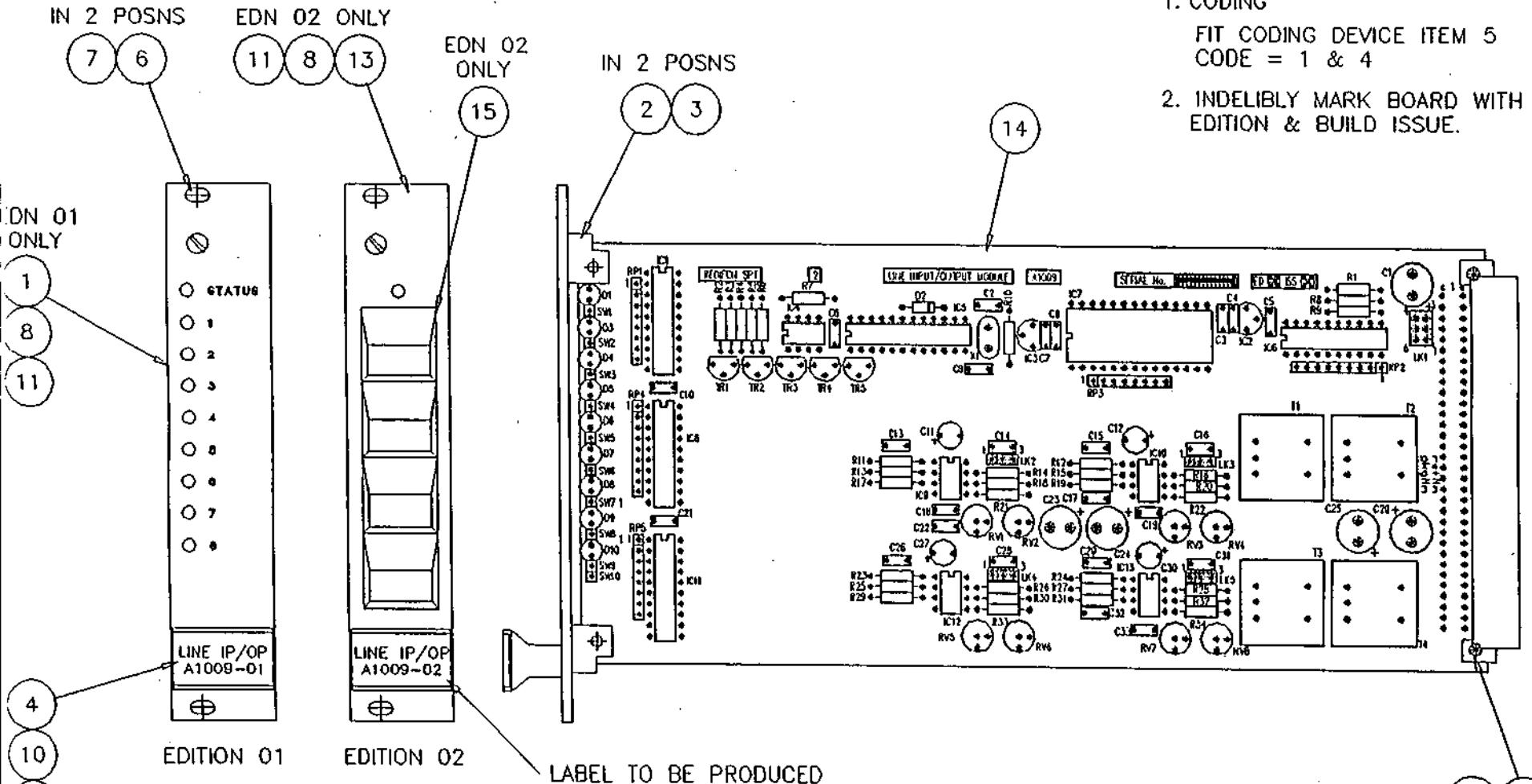
The module will provide the following inputs and outputs via 64 pin DIN 41612 connector.

Pin No.	Function A	Function C
17AC	Line 1 input A	Line 1 input B
18AC	Screen 1	
19AC	Line 2 input A	Line 2 input B
20AC	Screen 2	
21AC	Line 3 input A	Line 3 input B
22AC	Screen 3	
23AC	Line 4 input A	Line 4 input B
24AC	Screen 4	
25AC		
26AC		
27AC		
28AC		
29AC		
30AC		
31AC		

The screen pins connected to metalwork 0V (32AC).

### Drawings

G.A. A1009 Sht.1  
Block Diagram



## NOTES

## 1. CODING

FIT CODING DEVICE ITEM 5  
CODE = 1 & 4

**2. INDELIBLY MARK BOARD WITH EDITION & BUILD ISSUE.**

Issue Date
(C/N No.)
1 04/11/96
2 23/01/97
CN P0084/96

Used on  
SYSTEM  
3000

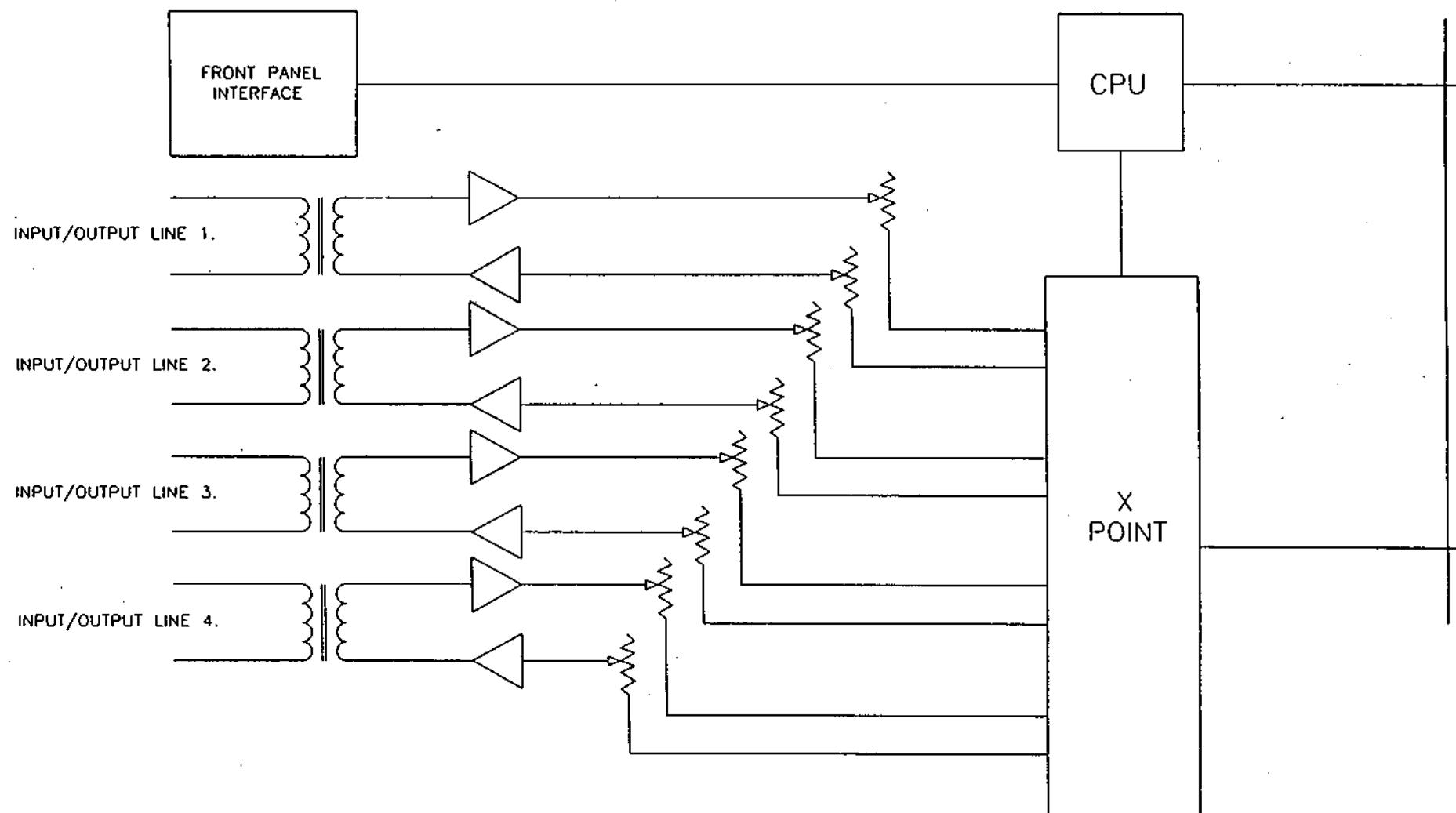
LABEL TO BE PRODUCED  
USING 'DYMO' MACHINE  
SET TO SMALLEST TEXT  
SIZE. BLACK CHARACTERS  
ON CLEAR BACKGROUND.

Drawn S.R.E.	Scale N.T.S.	 <b>REDIFON</b> SPT DIVISION	Woodrolfe Road, Tollesbury, Essex, ENGLAND.	Material _____	Finish _____	Tolerances _____	ALL DIMENSIONS IN MILLIMETRES	Drawing No. A1009	Sheet 1	Cont' 2
Checked/App'd	KM						REDIFON © SPT DIVISION 1996	TITLE LINE I/P & O/P MODULE		

Issue Date  
(C/N No.)  
1 03/03/97

BACKPLANE

Used on  
SYSTEM  
3000



Drawn S.R.E. Scale N.T.S.



Woodrolfe Road,  
Tollesbury,  
Essex, ENGLAND.

Material

Finish

Tolerances

ALL DIMENSIONS  
IN MILLIMETRES

Drawing  
No.

A1009

Sheet M1

Cont' /

REDIFON  
SPT DIVISION 1997

TITLE  
LINE IP/OP MODULE  
BLOCK DIAGRAM

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## SYSTEM 3000

MODULE - VOICE MESSAGE (LED) A1013-01  
VOICE MESSAGE (SW) A1013-02

The Voice Message Module will replay recorded audio sequences. These can be speech, music or alarm tone sequences.

Applications      Alarm tones  
                        Pre-announcement chime  
                        High quality voice messages

Features      2 output channels/module  
                        64 message capability  
                        Powerful message protocol (segment repeat, silence, linking)  
                        9 Dual colour LEDs for module status and message active/fault  
                        Optional memory expansion for up to 32M (23 minutes)  
                        Optional front panel with message select switches  
                        In band surveillance tone generation

Specification      1 x Module Width                5HP  
                        3U 220 x 100 mm Euro-card  
                        Frequency response                30 Hz to 8 KHz  
                        Sample                                12 bit, 16kHz, 170 seconds max  
                        Memory                                4 x 4M or 8M EPROM  
                        16 bit D/A  
                        Power                                Approx. 1.3 watts

### Front Panel Controls

Status LED      =      Green, Module active  
                        Amber, Module fault

LED 1-8      =      Green, Message active  
                        Amber, Message fault

Switches 1-4      =      Message select

### Adjustments

S1	0-9	Default Level 1.5dB steps
R19	Chan. 1	O/P level
R20	Chan. 2	O/P level

### Links

LK1	1-2 & 5-6 2-3 & 4-5	I2C Bus 1 I2C Bus 2
LK2	1-2	Watchdog
LK3	N/F	I2C Interrupt
LK4	1-2	4/8 M Eprom
LK5	N/F	Spare
LK6	1-2	Expansion Memory 1
LK7	1-2	Expansion Memory 2

### Connectors

PL5	Amp 1	Level/Link
PL6	Amp 2	Level/Link
PL4	Amp 1	Speaker
PL3	Amp 2	Speaker

### External Connections

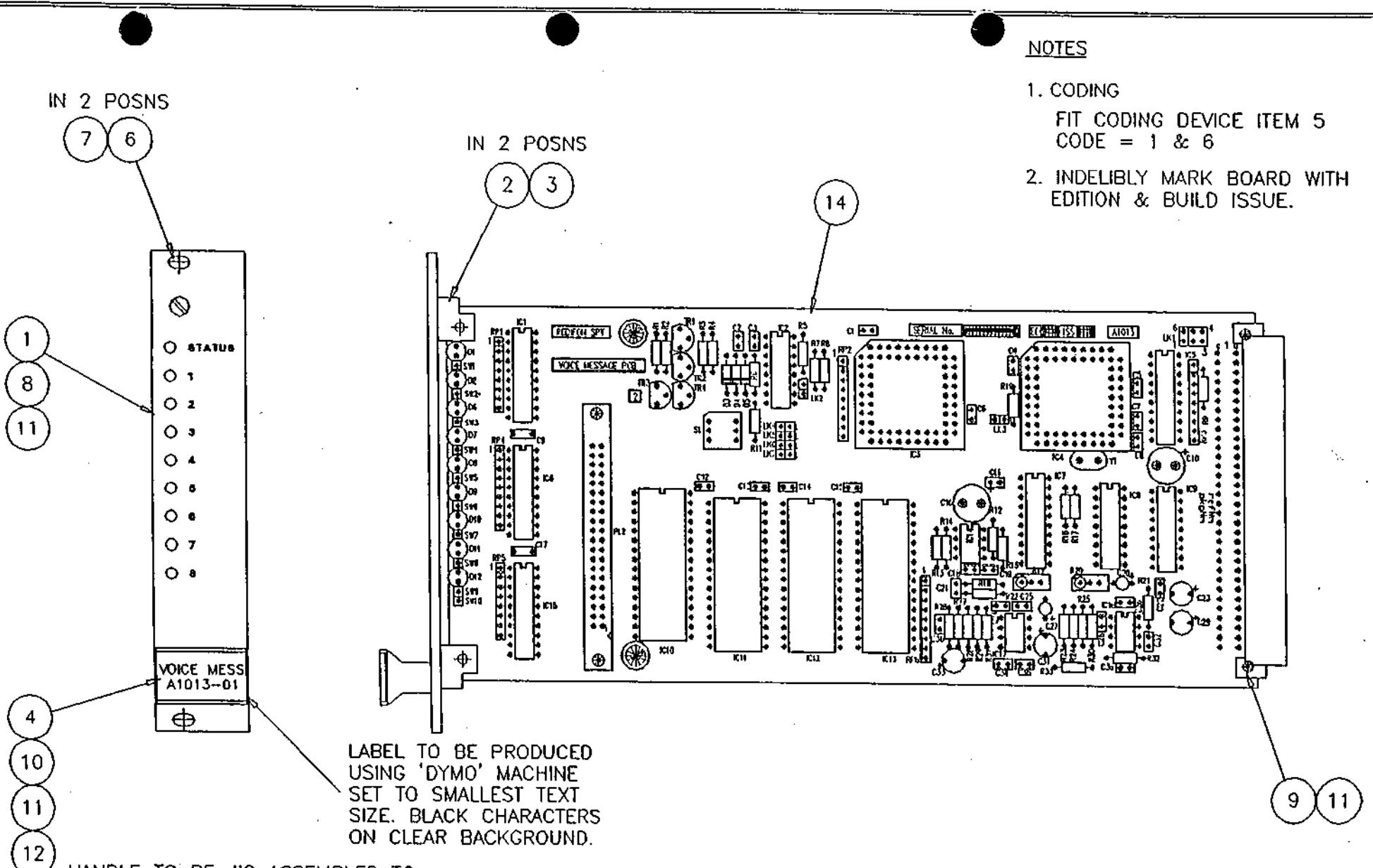
The module will provide the following inputs and outputs via 64 pin DIN 41612 connector.

<u>Pin No.</u>	<u>Function A</u>	<u>Function C</u>
17AC		
18AC	Watchdog O/P	
19AC		
20AC	Busy A	Busy B
21AC		
22AC	Analogue out A	Analogue out B

### Drawings

G.A. A1013 Sht.1

Block Diagram

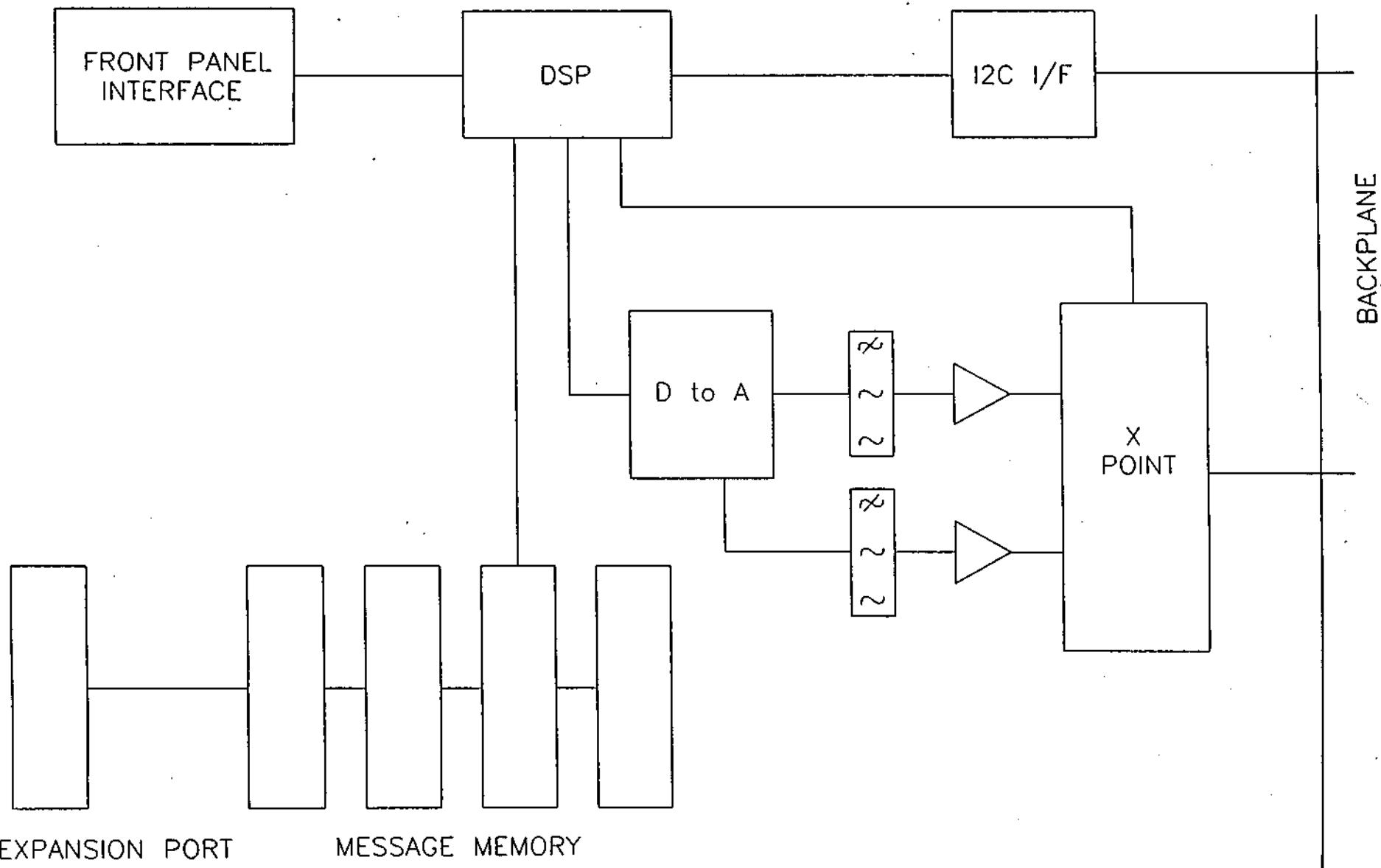


Issue No.	Date
1	04/11/96
2	23/01/97
CN	P0064/96

## NOTES

1. CODING  
FIT CODING DEVICE ITEM 5  
CODE = 1 & 6
  2. INDELIBLY MARK BOARD WITH  
EDITION & BUILD ISSUE.

Used on  
SYSTEM  
3000



Issue Date (C/N No.)
1 03/03/97

Used on  
SYSTEM  
3000

## EXPANSION PORT

## MESSAGE MEMORY

Drawn S.R.E.

Sonsle N.T.S.



Woodrolfe Road,  
Tollesbury,  
Essex, ENGLAND.

## Material

**Finish**

## Tolerances

**ALL DIMENSIONS**

Drawing No A1013

Sheet M1 Cont'd

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TITLE VOICE MESSAGE  
MODULE BLOCK DIAGRAM

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## SYSTEM 3000

### MODULE - LINE O/P A1015-01

The 600 ohm Line Output Module is used to drive the power amplifiers in larger systems.

Application      Audio output drive to power amplifiers

Features

- 8 channels/module
- Balanced output drive (IC line driver)
- 9 dual colour LEDs for module status and channel active/fault
- Individual channel output level adjustment
- Surveillance support

Specification

1 x Module Width	5HP
3U 220 x 100 mm Euro-card	
Frequency response	30 Hz to 15 KHz
Output Impedance	600 ohms
Input Impedance	600 or 10k ohms (Link option)
Input Level	-10 to +10 dBm
Distortion	
Power	Approx. 2.2 watts

### Front Panel Controls

Status LED	=	Green, Module active Amber, Module fault
LED 1-8	=	Green, Channel active Amber, Channel fault

### Adjustments

RV1	Chan. 1	Output Level
RV2	Chan. 2	Output Level
RV3	Chan. 3	Output Level
RV4	Chan. 4	Output Level
RV5	Chan. 5	Output Level
RV6	Chan. 6	Output Level
RV7	Chan. 7	Output Level
RV8	Chan. 8	Output Level

### Links

LK1	2-3 & 4-5	12c	Bus 1
	1-2 & 5-6	12c	Bus 2

## Connectors

PL5	Amp 1	Level/Link
PL6	Amp 2	Level/Link
PL4	Amp 1	Speaker
PL3	Amp 2	Speaker

## External Connections

The module will provide the following inputs and outputs via 64 pin DIN 41612 connector.

<u>Pin No.</u>	<u>Function A</u>	<u>Function C</u>
17AC	Line 1 output A	Line 1 output B
18AC		
19AC	Line 2 output A	Line 2 output B
20AC		
21AC	Line 3 output A	Line 3 output B
22AC		
23AC	Line 4 output A	Line 4 output B
24AC		
25AC	Line 5 output A	Line 5 output B
26AC		
27AC	Line 6 output A	Line 6 output B
28AC		
29AC	Line 7 output A	Line 7 output B
30AC		
31AC	Line 8 output A	Line 8 output B

## Drawings

G.A. A1015 Sht.1  
Block Diagram

Issue Date  
(C/W No.)  
1 04/11/96  
2 23/01/97  
CN P0064/96

NOTES

1. CODING

FIT CODING DEVICE ITEM 5  
CODE = 1 & 7

2. INDELIBLY MARK BOARD WITH  
EDITION & BUILD ISSUE.

IN 2 POSNS

7 6

IN 2 POSNS

2 3

14

1  
8  
11

- STATUS
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

LINE O/P  
A1015-01

4  
10  
11  
12

LABEL TO BE PRODUCED  
USING 'DYMO' MACHINE  
SET TO SMALLEST TEXT  
SIZE. BLACK CHARACTERS  
ON CLEAR BACKGROUND.

HANDLE TO BE JIG ASSEMBLED TO  
FACILITATE ALIGNMENT IN CARDFRAME

Drawn S.R.E. Scale N.T.S.

 **REDIFON**  
SPT DIVISION

Woodrolfe Road,  
Tollesbury,  
Essex, ENGLAND.

Material

Finish

Tolerances

ALL DIMENSIONS  
IN MILLIMETRES

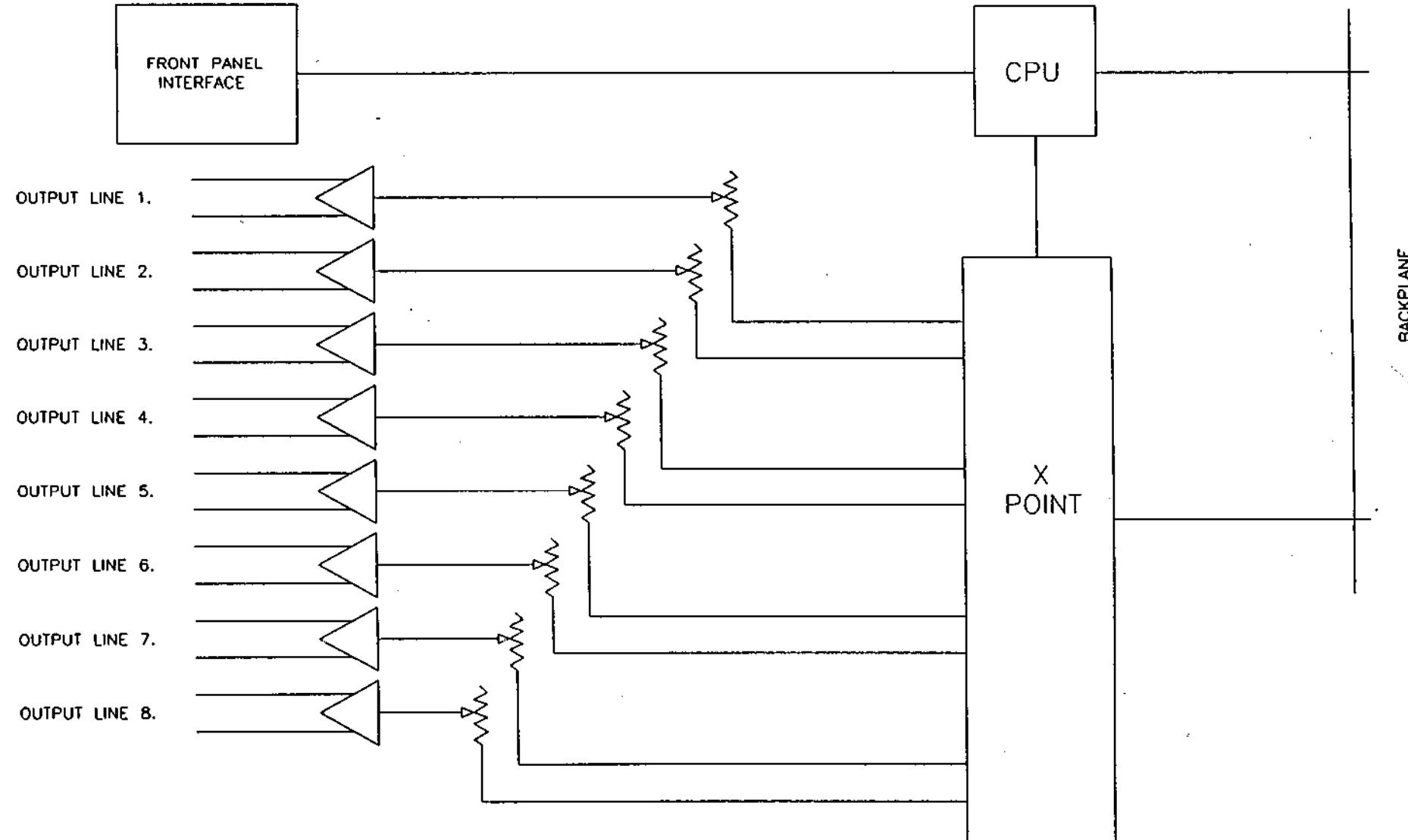
REDIFON  
SPT DIVISION 1996

Drawing No. A1015 Sheet 1 Cont' 2

TITLE 600R LINE OUTPUT  
MODULE

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Used on  
SYSTEM  
3000

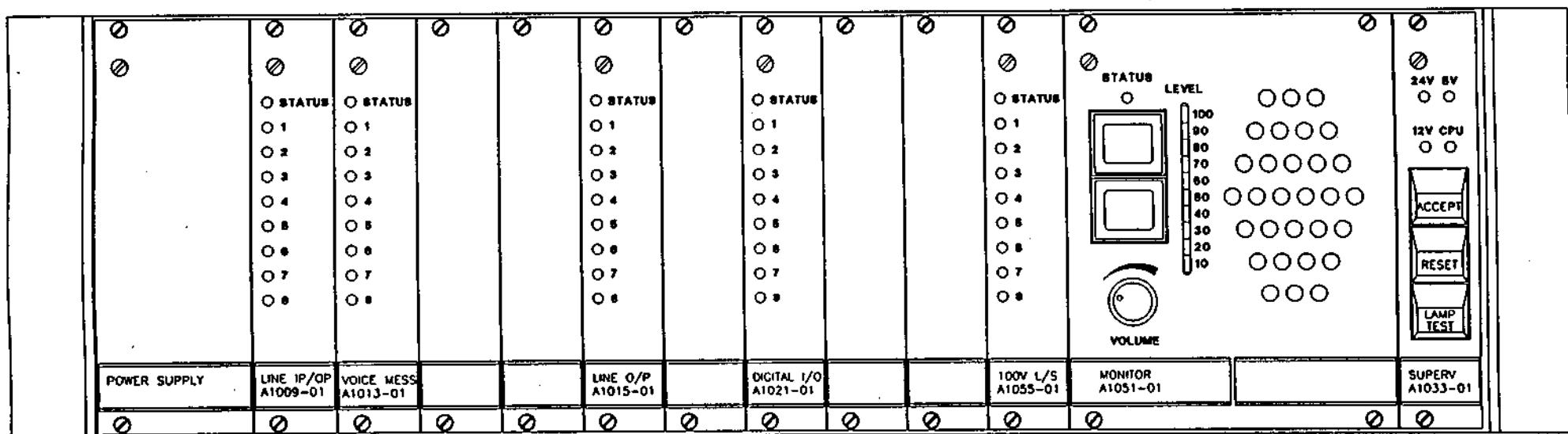


Issue Date  
(C/N No.)  
1 03/03/97

BACKPLANE

Used on  
SYSTEM  
3000

SLOT No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

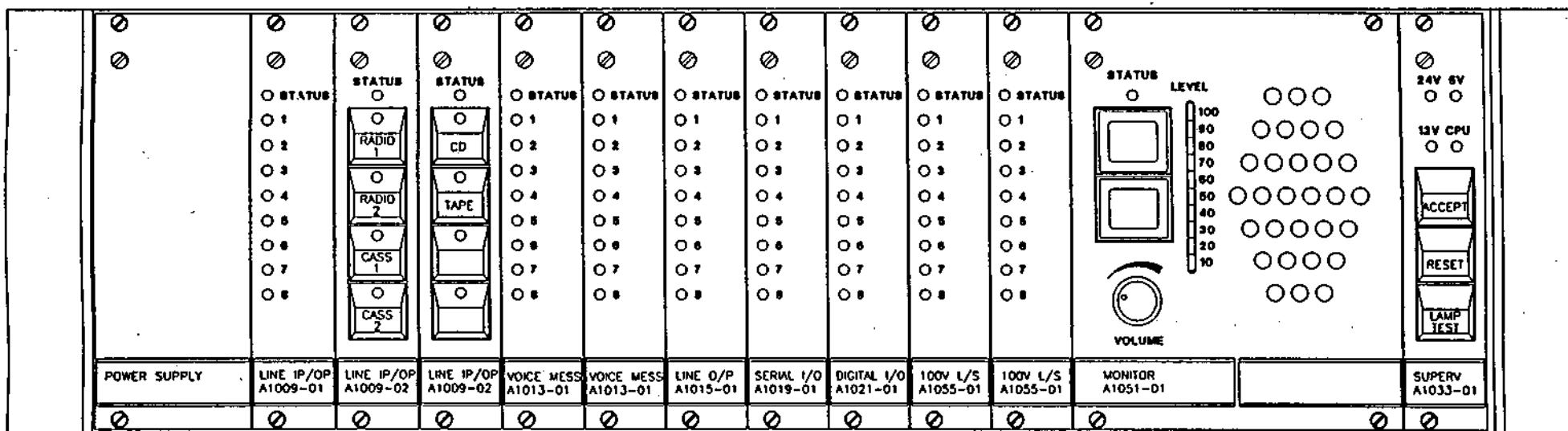


MODULES	SLOT No.
PSU 25175	1
LINE I/P O/P A1009-01	2
VOICE MESSAGE A1013-01	3
BLANK PANEL A2157-01	4 & 5
LINE O/P A1015-01	6
BLANK PANEL A2157-01	7
DIGITAL I/P O/P A1021-01	8
BLANK PANEL A2157-01	9 & 10
100V LINE SENSE A1055-01	11
MONITOR A1051-01	12
MASTER SUPERVISORY A1033-01	16

LED/ SWITCH	SLOT 2	SLOT 3	SLOT 6	SLOT 8	SLOT 11
1	RECEPTION MIC	CHANNEL 1	ZONE 1	ALARM 1 I/P	AMP 1
2		CHANNEL 2	ZONE 2	ALARM 2 I/P	AMP 2
3			ZONE 3	FAS I/P	AMP 3
4			ZONE 4		AMP 4
5			ZONE 5	PSU FAIL	AMP 5
6				CHARGER FAULT	
7				MAINS FAIL	
8					

The LEDs are green when the channel is active, flashing amber when a fault is detected & steady amber when the fault has been accepted.

SLOT No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16



MODULES	SLOT No.
PSU 25175	1
LINE I/P O/P A1009-01	2
LINE I/P O/P A1009-02	3 & 4
VOICE MESSAGE A1013-01	5 & 6
LINE O/P A1015-01	7
SERIAL CONTROL A1019-01	8
DIGITAL I/P O/P A1021-01	9
100V LINE SENSE A1055-01	10 & 11
MONITOR A1051-01	12
MASTER SUPERVISORY A1033-01	16

LED/ SWITCH	SLOT 2	SLOT 3	SLOT 4	SLOT 5	SLOT 6	SLOT 7	SLOT 8	SLOT 9	SLOT 10	SLOT 11
1	WHEELHOUSE	RADIO 1	CD	CHAN. 1		ENT CHAN. 1	OUTSTATION 1	FAS FAULT	AMP 1A	AMP 1B
2	INFO DESK	RADIO 2	TAPE	CHAN. 2		ENT CHAN. 2	OUTSTATION 2		AMP 2A	AMP 2B
3	PAX	CASS. 1			CHAN. 3	ENT CHAN. 3			AMP 3A	AMP 3B
4		CASS. 2			CHAN. 4	ENT CHAN. 4			AMP 4A	AMP 4B
5						AMP 5A/B			AMP 5A	AMP 5B
6						AMP 6A/B			AMP 6A	AMP 6B
7						AMP 7A/B			AMP 7A	AMP 7B
8						AMP 8			AMP 8A	

The LEDs are green when the channel is active, flashing amber when a fault is detected & steady amber when the fault has been accepted.

# SYSTEM 3000

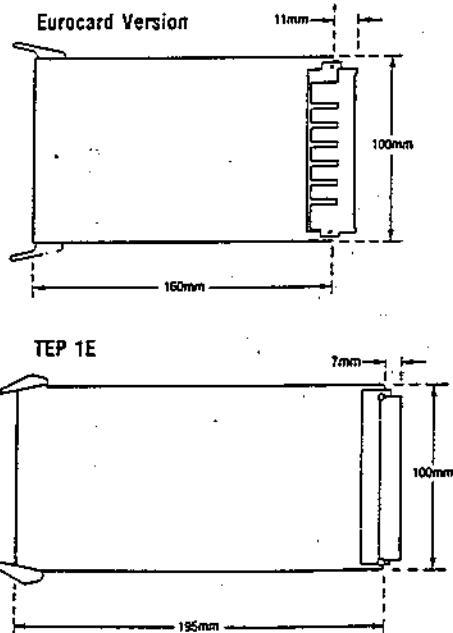
## MODULE - PSU 25175

The "S" series DC-DC converter is primarily intended for use in telecommunication systems, particularly telephone exchange battery powered equipment but has many other applications in vehicle and battery powered electronics. It is available as a standard 3U Eurocard or in TEP 1E format. It offers the following features:

- Approved to B.T. specification BTR 2511
- Nominal input voltages from 12 to 50V DC
- 60 watts output power
- up to 3 outputs, power sharing within wide limits
- Input/Output isolation 1KV DC
- Logic power fail output

Component height 45 max.

### dimensions



### technical specification

Input voltage ranges	10-20, 20-40 and 40-60 volts DC.
Output voltage/current	5V/5A-8A peak for 50msec 12 or 15V/1A -12 or -15V/1A Above are stock items. Variations can be manufactured to special order.
Line regulation	±0.1% for full input range.
Load regulation	5V output: ±1% from 10% to full load. 12/15V outputs: ±5% from 10% to full load with 5V output loaded 100%.
Cross regulation	5V outputs: ±0.2% with other outputs varied from 10% to 100%. 12/15V outputs: ±4% at 10% load with 5V output varied from 10% to 100%.
Ripple and noise	5V output: 50mV Pk-Pk max. 12/15V outputs: 80mV Pk-Pk max.
Voltage accuracy	5V output: adjustable ±5%. Other outputs: ±5% when 5V set to nominal.
Switching frequency	80 KHz
Efficiency	80% Typ: depends on load and V in.
Isolation: input/output	1KV peak min.
Protection	Over voltage crowbar on 5V output. All outputs indefinitely short circuit proof.
No load input power	<3 watts.
Power fail	Will sink one LSTTL load when 5V output is within specified range.
Temperature coefficient	±0.01% per Deg. C typ. (5V output).
Temperature range	0-80 Deg. C. - derate 2.5% per Deg. C above 45 Deg. C.
Weight	Approx. 400gms.

### DIN 41612-H15 connector

Pin No.	Function
4	-V in 48V version
6	-V in 24V version
8	-V in 48V version
10	-V in 24V version
12	Power Fail
14	0V or +V in
16	0V or +V in
18	+12 or 15V out
20	Common out
22	-12 or 15V out
24	Common out
26	Common out
28	+5V out
30	+5V out
32	N.C.

### DIN 41612-D connector

Pin No.	Function
2a.c	-V in
4a.c	-V in
6a.c	N.C.
8a.c	0V or +V in
10a.c.	0V or +V in
12a.c	N.C.
14a.c	Power Fail
16a.c	N.C.
18a.c	+12 or 15V out
20a.c	Common for ±12 or 15V out
22a.c	-12 or 15V out
24a.c	N.C.
26a.c	Common out for 5V
28a.c	Common out for 5V
30a.c	5V out
32a.c	5V out

### pin allocation

N.B. Pins 20 and 26/28 can be connected on PCB if required.

# SYSTEM 3000

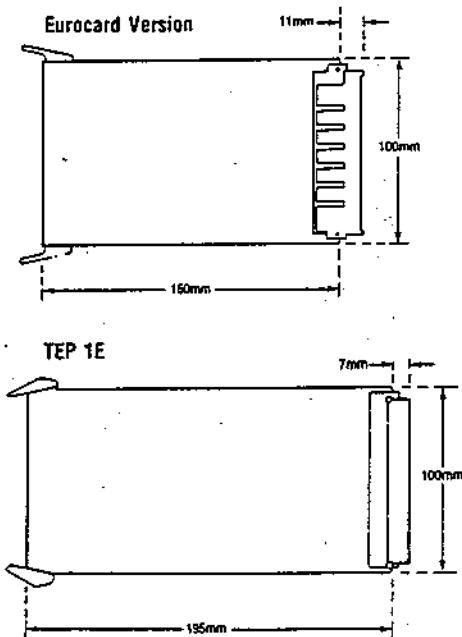
## MODULE - PSU 25175

The "S" series DC-DC converter is primarily intended for use in telecommunication systems, particularly telephone exchange battery powered equipment but has many other applications in vehicle and battery powered electronics. It is available as a standard 3U Eurocard or in TEP 1E format. It offers the following features:

- Approved to B.T. specification BTR 2511
- Nominal input voltages from 12 to 50V DC
- 60 watts output power
- up to 3 outputs, power sharing within wide limits
- Input/Output isolation 1KV DC
- Logic power fail output

Component height 45 max.

### dimensions



### technical specification

Input voltage ranges	10-20, 20-40 and 40-60 volts DC.
Output voltage/current	5V/5A-8A peak for 50msec 12 or 15V/1A -12 or -15V/1A Above are stock items. Variations can be manufactured to special order.
Line regulation	±0.1% for full input range.
Load regulation	5V output: ±1% from 10% to full load. 12/15V outputs: ±5% from 10% to full load with 5V output loaded 100%.
Cross regulation	5V outputs: ±0.2% with other outputs varied from 10% to 100%. 12/15V outputs: ±4% at 10% load with 5V output varied from 10% to 100%.
Ripple and noise	5V output: 50mV Pk-Pk max. 12/15V outputs: 80mV Pk-Pk max.
Voltage accuracy	5V output: adjustable ±5%. Other outputs: ±5% when 5V set to nominal.
Switching frequency	80 KHz
Efficiency	80% Typ: depends on load and V in.
Isolation: input/output	1KV peak min.
Protection	Over voltage crowbar on 5V output. All outputs indefinitely short circuit proof.
No load input power	<3 watts.
Power fail	Will sink one LSTTL load when 5V output is within specified range.
Temperature coefficient	±0.01% per Deg. C typ. (5V output).
Temperature range	0-80 Deg. C. - derate 2.5% per Deg. C above 45 Deg. C.
Weight	Approx. 400gms.

### DIN 41612-H15 connector

Pin No.	Function
4	-V in 48V version
6	-V in 24V version
8	-V in 48V version
10	-V in 24V version
12	Power Fail
14	0V or +V in
16	0V or +V in
18	+12 or 15V out
20	Common out
22	-12 or 15V out
24	Common out
26	Common out
28	+5V out
30	+5V out
32	N.C.

### DIN 41612-D connector

Pin No.	Function
2a.c	-V in
4a.c	-V in
6a.c	N.C.
8a.c	0V or +V in
10a.c	0V or +V in
12a.c	N.C.
14a.c	Power Fail
16a.c	N.C.
18a.c	+12 or 15V out
20a.c	Common for ±12 or 15V out
22a.c	-12 or 15V out
24a.c	N.C.
26a.c	Common out for 5V
28a.c	Common out for 5V
30a.c	5V out
32a.c	5V out

### pin allocation

N.B. Pins 20 and 26/28 can be connected on PCB if required.

HANDBOOK  
FOR  
PA50B AUDIO AMPLIFIER

RSPT PART NO.	A2300 - 01/06	AUTHOR	S EDWARDS
RSPT ORDER NO.		APPROVED	
CUSTOMER		ISSUE	1
ORDER NO.		DATE	01-10-97

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## HANDBOOK FOR THE PA50B AUDIO AMPLIFIER

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## HANDBOOK FOR THE PA50B AUDIO AMPLIFIER

### SECTION 1

#### INTRODUCTION

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## **1. INTRODUCTION**

### **1.1 General**

This handbook provides information for the operation and maintenance of the PA50B Audio Amplifier which is manufactured by Redifon MEL Ltd SPT Division for use as an amplifier in public address, broadcast and alarm systems.

### **1.2 Overview**

The power amplifier module is an addressable microcomputer controlled unit, mounted in a 3U 19 inch cardframe. The frame is able to hold a maximum of six 50 watt modular power amplifiers. The frame is fitted with a backplane circuit board. There are ten connector sockets fitted to the board. Six amplifier backplane sockets, one power socket, one audio input socket, one 100 volt line out socket and one RS485/Fault socket. The backplane board splits the amplifiers into two banks of three 50 watt power amplifier units for the power requirements. The 9 pin high current voltage connector supplies the 24V DC to each bank of amplifier modules. The 24V AC power transformer is fitted behind the cardframe in the rack.

The modular power amplifier front panel is fitted with a LED bargraph, power indication LED, fault LED and a access hole to enable adjustment of the amplifier gain. The power indicator is a dual colour LED device, green when healthy and orange if a mains or DC supply problem is present. The fault indicator is a dual colour LED device, green when the unit healthy and orange if a fault has been detected. The LED bargraph is a visual indication of the voltage of the 100 volt line. The amplifier adjustment is a PCB mounted multitern potentiometer and is factory set at the preset load and temperature and should only be adjusted by a competent, qualified audio technician.

The modular amplifier is fitted with its own 100V output transformer. Each power amplifier cardframe communicates to the main controller, using a RS485 link.

If a power amplifier module is replaced, the new module will require the onboard address code to be set as that of the removed faulty unit. The setting of the module address is by SW1 and SW2 on the main board (see Para.2.6). Each module is fitted with a 5 amp fuse on the main amplifier board.

### **1.3 System Description**

The System consists of the following items:-

- 1) PA50B Amplifier Assembly A2300-EDN.
- 2) Mains Transformer Assembly A2342-01.

The Amplifier Assembly A2300 comprises of a standard 3U cardframe with backplane, plus PA50B amplifier module(s) and/or blank panel assemblies.

The amplifier module A2323 is a standard 14hp 200mm deep unit, a maximum of six amplifiers can be fitted into one cardframe producing an output ranging from 50W to 300 Watts.

The Mains Transformer Assembly A2342-01 consists of a mains toroidal transformer, surge resistor and mounting bracket suitable for mounting in the rear or side of a rack.

#### 1.4 Module Description

The PA50B amplifier module consists of a main amplifier PCB A2320 containing the audio, surveillance and fault logic circuits together with the front panel LEDs.

The transistor PCB A2322 is a sub-board that plugs into the main amplifier PCB and contains the output transistors.

The output transformer, heatsink and transistor PCB A2322 are plugged into the main amplifier PCB.

The front panel is standard 3U 14hp size with handle with the following LED indicators supply, fault and output level 20-100 Volts. The output level is set by a multi-turn potentiometer accessed through the front panel by a screwdriver.

The rear connector is a standard 15 pin DIN41612.

#### 1.5 Specification

Audio Input	Balanced input, 0dBm level, 20 kohms
Audio output	Transformer isolated 100 volt rms.
Power	50 watts at 100 volts rms output (200 ohm load)
Efficiency	>60% at maximum output
Power supply	Main 18 volts AC/24 volts DC Standby 24 volts DC (fused inputs)
Output Regulation	<1.7dB
Distortion (THD)	<0.5% at rated output
Noise	<-85dB (ref. rated output)
Input common mode rejection	<-50dB (50-30kHz)
Fuse 20mm Ceramic	5 Amp

### Amplifier Mechanical Requirements

Format	Euro cardframe
Size	3U, 14HP module, 200mm deep
Front Panel	14HP with handle
Connector	15 pin DIN 41612
Module Weight	1.6Kg

### General

Reliability, MTBF	>250,000 hours
MTTR	<10 minutes
EMC, emissions	EN50081-2
immunity	EN50082-2
Safety	Compliance with low voltage directive
Shock	BS EN60068-2-27
Vibration	BS2011.2.1Fd

### External Connection (Amplifier)

The external connections are via a 15 pin DIN connector

PL1-	<u>Function</u>
4	Input +
6	Input -
8	0 volts (power)
10	24 volts (standby)
12	24 volts AC or DC
14	24 volts AC or DC
16	0 volt (power)
18	control +
20	control -
22	N/O )
24	N/C ) Fault Relay
26	common )
28	100 volt line
30	100 volt line
32	Metal work ground (earth leakage common)

### Front Panel

The front panel contains the following LEDs. The LED positions will match the system 3000 modules.

1.	Power	Green/Amber
2.	Fault	Green/Amber
5.	100V	Amber
6.	80 volts	Green
7.	60 volts	Green
8.	40 volts	Green
9.	20 volts	Green

The output level is set by a multi-turn potentiometer accessed through the front panel.

### Colour

Front panels Dawn Grey BS4800 10A 03.

### Environmental

Operating temperature range -10°C to +50°C

Storage temperature range -40°C to +70°C

Relative humidity 95% at 40°C

## **HANDBOOK FOR THE PA50B AUDIO AMPLIFIER**

### **SECTION 2**

#### **OPERATION**

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## 2. OPERATION

### 2.1 Mains input Voltage (Rack Transformer Assembly)

The mains input voltage can be set by link connections made in the mating half of transformer molex connector. Check before connecting to any supplies and reset only while NO mains supplies are connected.

110 V	L : 3 & 4 N: 6 & 1
125 V	L : 3 & 2 N: 5 & 1
235 V	L : 3 N : 1 Link 4 & 5
250 V	L : 3 N : 1 Link 2 & 5

### 2.2 Pre-set Adjustments

Equipment required:

Multimeter

Audio Test Set

### 2.3 Output Stage

The Bias RV2 control is factory-set and should require adjustment only when one or more of the output transistors or associated components have been replaced.

To adjust:

1. Set the multimeter to the 10A range and place a short circuit across its terminals.
2. Switch OFF the amplifier. Remove Fuse F1.  
Connect the multimeter in series with this fuse.
3. Switch ON the amplifier. Wait until the overload trip resets, this allows the switch-on transients to subside. Remove the short circuit from the meter terminals.  
Switch the meter to the 100mA range.
4. Allow the amplifier to warm up for at least fifteen minutes. With no signal input, adjust RV2 for a reading of 20 - 30 mA.
5. Switch OFF the amplifier. Remove the test connections and replace the fuse.

## 2.4 Adjusting the Gain Control

1. Remove the amplifier from the rack assembly and set up on the bench.
2. Connect a suitable 200 ohm 50 Watt resistor to the 100 V output of the amplifier. The resistor should have adequate heat sinking to dissipate the heat which will be generated.
3. Connect a 1 KHz sine wave to the input of the amplifier in parallel with a 600 ohm dummy load (600 ohm 0.1 Watt resistor).
4. Connect a multimeter across the 200 ohm load resistor, switch to the AC. volt scale, (able to read at least 130 V).
5. Apply the appropriate mains supply to the amplifier. Switch ON.
6. Adjust RV1 (gain control) on the amplifier front panel. Increase clockwise until the multimeter reads 100V AC on the output terminals.
7. Check front panel power and fault LEDs are showing green.

## 2.5 Installing a PA50B Amplifier Cardframe Assembly into the rack.

**WARNING: THE AMPLIFIER ASSEMBLY IS HEAVY (12 kg)  
PERSONAL INJURY MAY RESULT FROM MIS-HANDLING**

The cardframe is fitted to the rack using standard slide rails and plug in flying leads.

Backplane connectors are as follows:-

PL1 - Line Input - 25 way 'D' type plug.

PL2 - Power - 9 way amp plug.

PL3 - Control - 9 way 'D' type plug.

SK7 100V output - 15 way 'D' type socket.

The transformer assembly (A2342) is mounted in the rack behind the cardframe to supply the DC power. Link connector to suit mains input voltage. See Operation 2.1.

The PA50B modules are fitted into the cardframe on plastic runners, mating rear DIN 41612 connector with backplane. The module is secured in position using four front panel screws.

Up to six PA50B modules can be fitted into a cardframe.

A 14hp blank panel assembly is fitted in any unused positions.

## **2.6 Amplifier Module Address**

When a number of amplifier modules are fitted into a system each module is allocated an address code starting at number one i.e. Cardframe 1 fitted with 6 modules, would be 1-6 left to right. Cardframe 2 would be 7-12 etc.

The registration of each module is required to send surveillance and fault data from the system controller.

Each module is coded by setting the two switches SW1 and SW2 on the main amplifier PCB (see drawing A2320 Sht.1).

To set module address -

- Number 1 - Set SW1 to 0 and SW2 to 1
- Number 2 - Set SW1 to 0 and SW2 to 2 etc.
- Number 10 - Set SW1 to 1 and SW2 to 0 etc.

## **2.7 Fault Finding**

Switch on power.

Check power and fault LEDs are showing green.

Fault Indicators

Power LED illuminated amber -

Indicates loss of either mains power or 24V DC.

Check mains circuit breaker or fuse in the system.

Fault LED illuminated amber - This indicates one of the following:-

- a) Amplifier overload. The trip will reset automatically, if the amplifier repeatedly trips check input signal level and 100 volt output cables for short circuit.
- b) Failure of fuse F1. Check fuse and replace if failed (5A 20mm ceramic).  
Check associated transistors and replace if necessary.
- c) Heatsink temperature is above 90°C. The thermal cut out will reset automatically when the temperature drops below 90°C.

## HANDBOOK FOR THE PA50B AUDIO AMPLIFIER

### SECTION 3

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3.3 Amplifier Surveillance and Fault reporting .....	3.2
3.4 Common Fault Relay .....	3.2
3.5 Electrical Requirements .....	3.2

### **3. TECHNICAL DESCRIPTION**

#### **3.1 General**

This section contains the technical description of the components comprising the PA50B Audio Amplifier.

#### **3.2 Circuit Description (Drawing A2330)**

##### **3.2.1 Audio Circuit**

The balanced input is transformer coupled and provides an input impedance of 10 kohm. This is matched to a standard 600 ohm line by means of a 600 ohm resistance across PL1 pins 4 and 6. If more than one amplifier is employed on the system, matching is applied at the input of one only. The input signal is buffered and filtered (50 Hz to 25 KHz) by IC2. The output from the level control (RV1) feeds the phase splitter and feed back amplifier IC3. The feedback differential amplifier isolates the output transformer feedback winding from output loading effects.

The splitter output drives the push/pull transformer coupled output stage.

A regulated  $\pm 12V$  supply for the input amplifier and phase splitter is derived from the main supply rail by means of the integrated regulator IC7.

##### **3.2.2 Fault Indicators**

A number of fault conditions are detected by circuitry within the amplifier and indicated by means of front-panel mounted LED's. These are dual colour LEDs green/amber.

###### **1. Power Indicator**

The green amber power LED is driven by IC1. The LED is green if both supplies are on, amber if either AC or DC supplies are missing.

With mains present, the low voltage AC keeps C4 charged via diodes D2 and D3 and TR1 conducting.

With DC present, the DC voltage keeps C11 charged via diode D5 and TR2 conducting.

If either TR1 or 2 turn off IC1 will drive the LED amber.

LK1 can be fitted for single supply operation.

## **2. Fault Indicator**

The fault LED on the front panel indicates a number of different fault conditions on the amplifier as listed below.

### **a) Output Transistor Fuse**

The output transistor supply is monitored by R14, R15 and TR3. Failure of fuse F1 will turn off TR3. This is detected by IC1 which illuminates the Fault LED amber.

### **b) Overload Trip**

The amplifier overload is detected by monitoring the output drive current. This is amplified by IC8B and compared with a reference threshold of IC4B. If the threshold is exceeded, IC1 will illuminate the fault LED and disable the amplifier.

### **c) Temperature Trip**

The output transistor heat sink is fitted with a 100°C thermal cut-out, which is in series with RP2C across the logic supply rail. Under normal conditions, the cut out is closed. If the cut-out opens IC1 will light the fault indicator amber. IC4 will also remove the output transistor drive. The cut-out will reset automatically when the heat sink temperature drops below 100°C returning the amplifier to the normal working condition.

## **3.3 Amplifier Surveillance and Fault reporting**

The amplifier status and line surveillance are monitored by microcontroller IC10. The amplifier number is set on BCD switches SW1 and 2.

The microcontroller reports faults to the main controller via an RS485 serial link IC6.

Watchdog reset IC11 monitors the processor function.

## **3.4 Common Fault Relay**

IC1 provides the amplifier fault monitoring and prioritisation functions. If any input indicates a fault, the fault relay is de-energised.

## **3.5 Electrical Requirements**

Main - 18 volts RMS AC

Standby - 24 volts DC (fused inputs)

## **HANDBOOK FOR THE PA50B AUDIO AMPLIFIER**

### **SECTION FOUR**

#### **MAINTENANCE**

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## **4. MAINTENANCE**

### **4.1 Preventive Maintenance**

The PA50B Audio Amplifier requires no preventive maintenance.

#### **4.1.1 Servicing**

No special tools or test equipment are required for servicing.

### **4.2 Replacements**

In the event of a fault occurring, care should be taken to replace components with types of similar quality and tolerance to maintain the original noise and performance specifications.

Set amplifier number (module address) on BCD switches to match original amplifier. (See Section 2 para. 2.6).

### **MAIN FUSE**

The main fuse is rated a 5A and is located on the main amplifier PCB (F1) at the top rear between capacitors C6 and C7.

Replacement should be 5A 20mm ceramic.

Disconnect module from any power source when changing the main fuse.

### **WARNING:**

### **STATIC SENSITIVE DEVICES.**

**Caution:** The system contains components which are sensitive to and can be permanently damaged by static electricity which can be carried by hands or tools. Within the closed bay they are not at risk, but it is essential that full anti-static precautions are carried out before touching or handling the printed circuit board assemblies or the components on them. When being replaced they must be put into closed anti-static conductive packaging.

## HANDBOOK FOR THE PA50B AUDIO AMPLIFIER

### SECTION FIVE

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5.4 PA50B AMPLIFIER MODULE A2323-01 .....	5.2

## 5. PARTS LISTS

### 5.1 PA50B AMPLIFIER ASSEMBLY A2300-EDN

EDN 01 = 50W	EDN 04 = 200W
EDN 02 = 100W	EDN 05 = 250W
EDN 03 = 150W	EDN 06 = 300W

Item	Description	Part No.	Qty
1	CARDFRAME ASSEMBLY	A2345 -01	1
2	PA50B MODULE	A2323 -01	1
3	14HP BLANK PANEL	A2344 -01	1

### 5.2 CARDFRAME ASSEMBLY A2345-01

Item	Description	Part No.	Qty.
1	BACKPLANE PCB ASSEMBLY	A2330 -01	1
2	SIDE PLATE	25170	1
3	TAPPED STRIP	16577	1
4	CARDGUIDES	26062 -01	1
5	INSULATING STRIP	26063	1
6	FRONT COVER PLATE	A2138 -01	1
7	SCREW SPECIAL	17788	1
8	FRONT RAIL	26237	1
9	REAR RAIL	26238	1
10	COVER	26239	1

### 5.3 MAINS TRANSFORMER ASSEMBLY A2342-01

Item	Description	Part No.	Qty.
1	MOUNTING BRACKET	A2341 -01	1
2	TRANSFORMER	25310	1
3	CONNECTOR MOLEX	26186 -6	1
4	CRIMP MOLEX	26185	1
5	SURGE RESISTOR	25439 /16	1

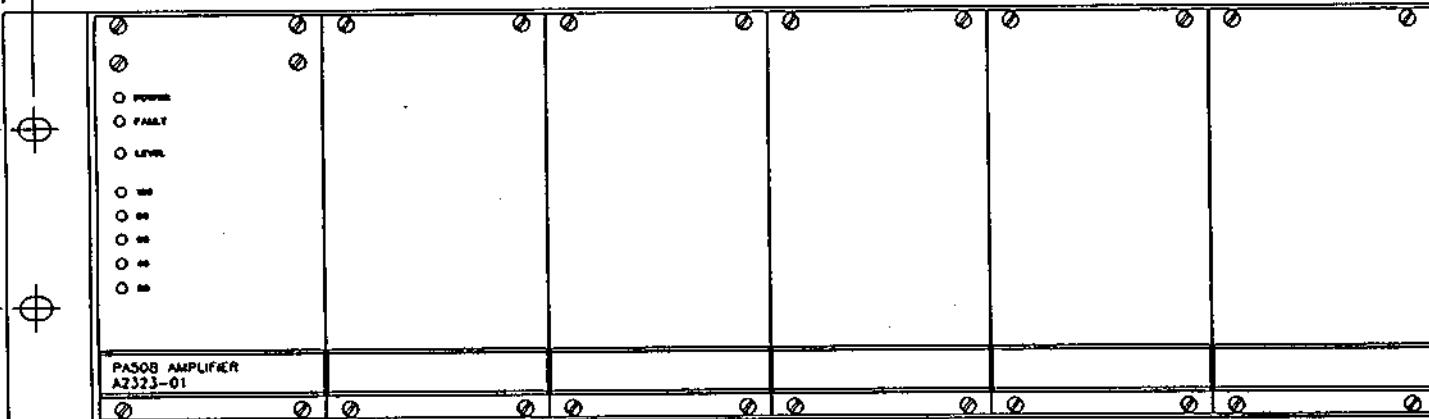
**5.4 PA50B AMPLIFIER MODULE A2323-01**

Item	Description	Part No.	Qty.
1	FRONT PANEL	A2325 -01	1
2	AMPLIFIER PCB ASSEMBLY	A2320 -01	1
3	TRANSISTOR PCB ASSEMBLY	A2322 -01	1
4	SIDE MOUNTING PLATE	A2326 -01	1
5	HEATSINK	A2327 -01	1
6	BRACKET	A0638 -01	1
7	PILLAR M3 X 63	A2328 -01	1
8	TRANSFORMER ASSEMBLY	A2349 -01	1
9	PB HOLDER	24733	1
10	HANDLE 14hp	26168	1
11	FUSE 20mm CERAMIC	19083 -5A	1

## HANDBOOK FOR THE PA50B AUDIO AMPLIFIER

### SECTION SIX DRAWINGS AND DIAGRAMS

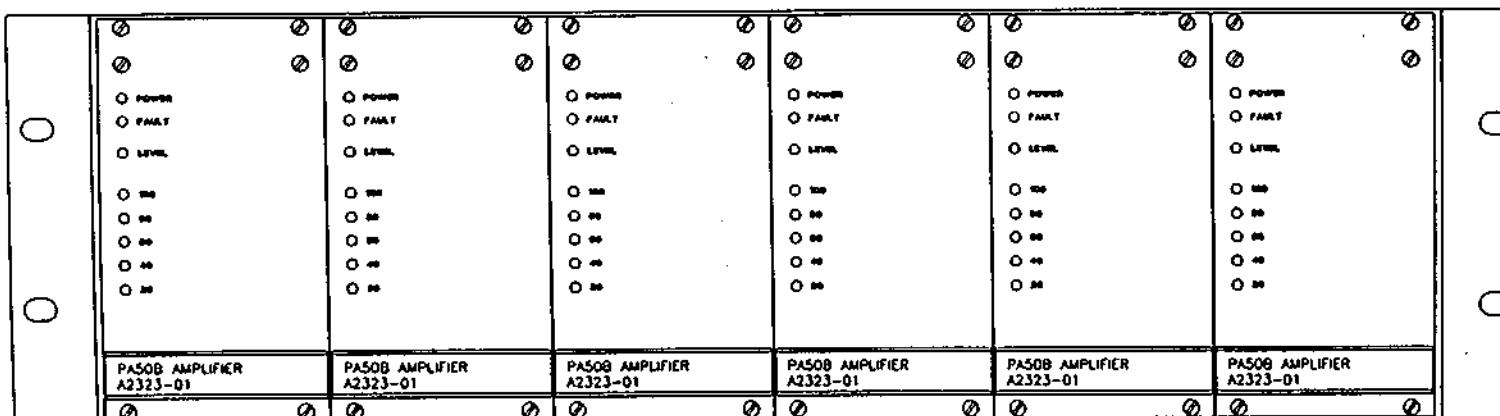
<u>DRAWING NO.</u>	<u>EQUIPMENT</u>
A2300 SHT.M1	PA50B AMPLIFIER ASSEMBLY
A2323 SHT.M1	PA50B MODULE
A2320 SHT.1	AMPLIFIER PCB ASSEMBLY
A2322 SHT.1	TRANSISTOR PCB ASSEMBLY
25310 SHT.1	MAINS TRANSFORMER
A2320 SHT.2	AMPLIFIER CIRCUIT DIAGRAM
A2320 SHT.3	AMPLIFIER CIRCUIT DIAGRAM
A2320 SHT.4	AMPLIFIER CIRCUIT DIAGRAM
A2322 SHT.2	TRANSISTOR PCB CCT DIAGRAM
A2330 SHT.2	BACKPLANE CIRCUIT DIAGRAM



483.0

465.1

Issue Date  
(C/N No.)  
1 05/09/97

FRONT VIEW

EDITION 01 = 1 x PA50B = 50W

4 FIXING SLOTS 7.5 x 10.4

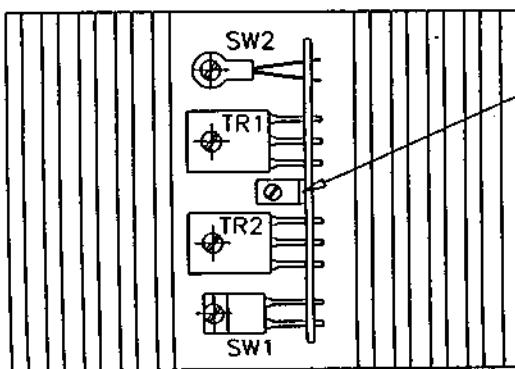
Used on  
**PA50B  
AMPLIFIER**

FRONT VIEW  
EDITION 06 = 6 x PA50B = 300W

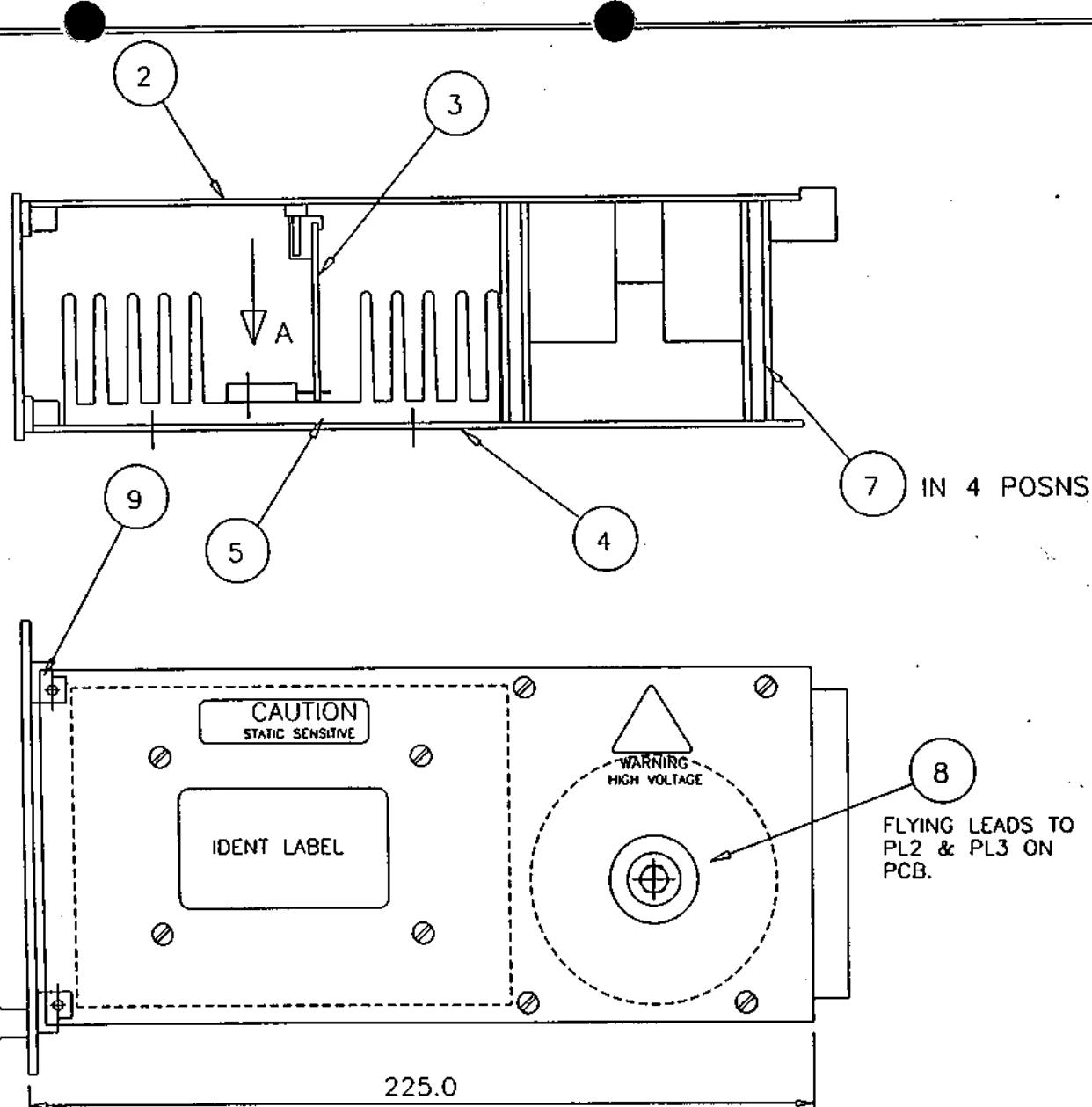
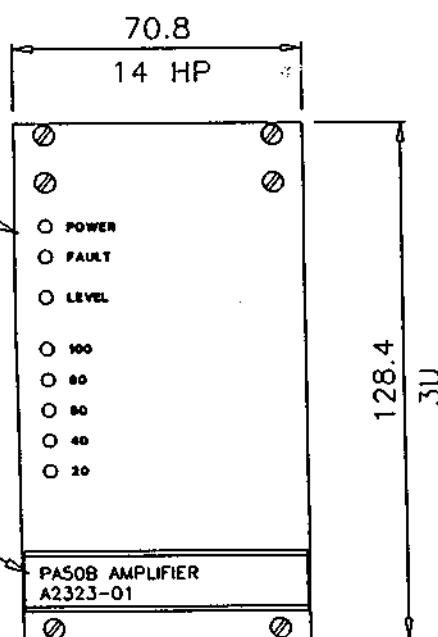
Drawn S.R.E.	Scale N.T.S.	REDIFON SPT DIVISION	Woodrolfe Road, Tollesbury, Essex, ENGLAND.	Material	Finish	Tolerances	ALL DIMENSIONS IN MILLIMETRES	Drawing No.	A2300	Sheet M1	Cont' /
Checked/App'd	<i>[Signature]</i>			-----	-----	-----	REDIFON SPT DIVISION 19				
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TITLE PA50B AMPLIFIER  
ASSEMBLY

Issue Date  
(C/N No.)  
1 06/09/97



VIEW ON ARROW A  
HEATSINK



Used on

## REDIFON SPT PA 50B AMPLIFIER PCB

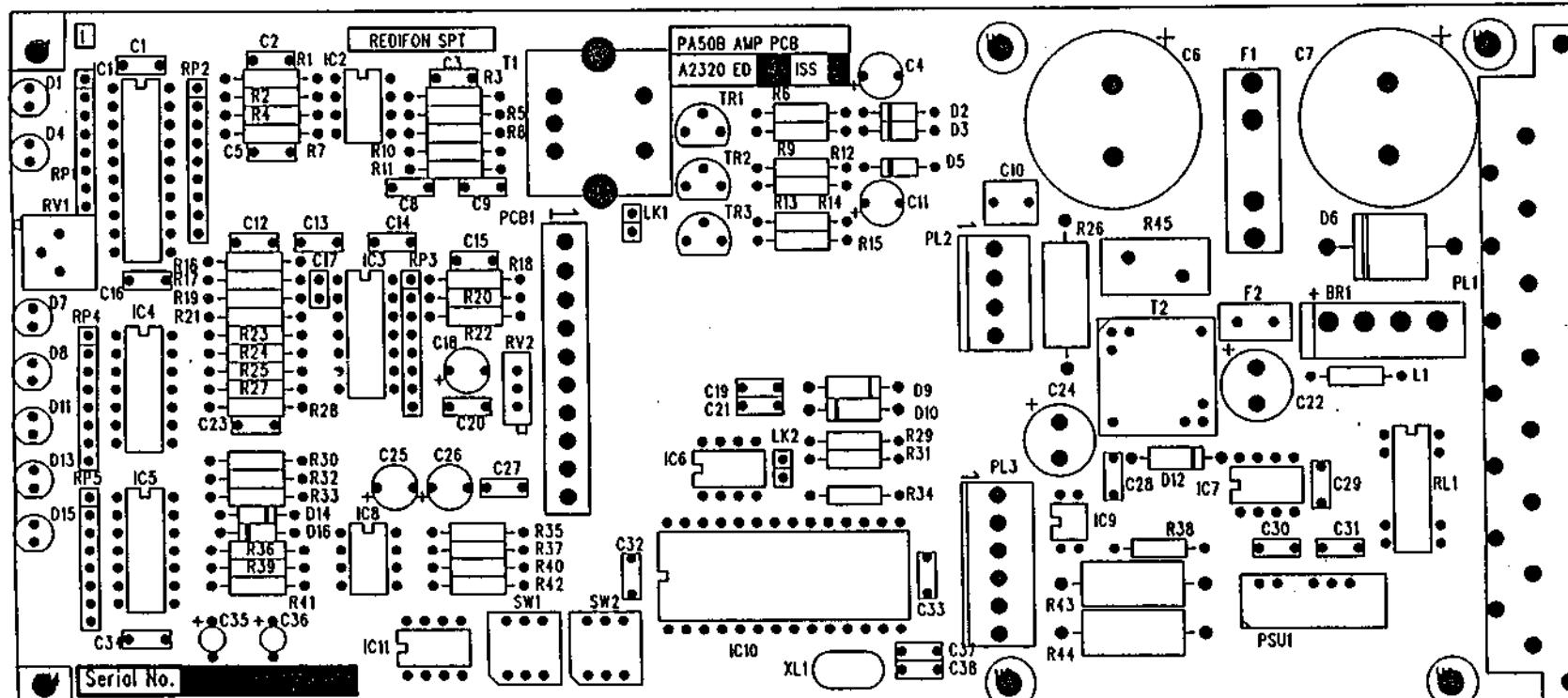
ISSUE 1 24-06-97 A2319

## LEGEND

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8.600 INCHES

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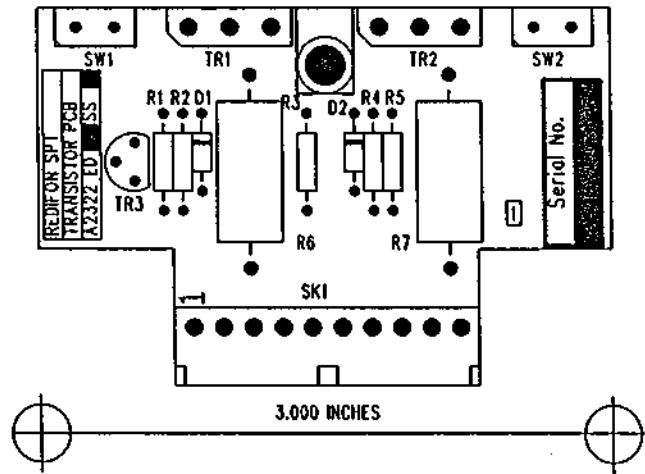
Drawing No. A2320 Sheet 1 Cont 2

TITLE  
PA 50B AMPLIFIER  
AMPLIFIER PCB ASSEMBLY

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A 19/03/97
I 19/06/97

REDIFON SPT PA 50B TRANSISTOR PCB  
 ISSUE I 19-06-97 A2321      Designed by  
 LEGEND      REDIFON MEL SPT DIVISION



Used on

Drawn John Day  
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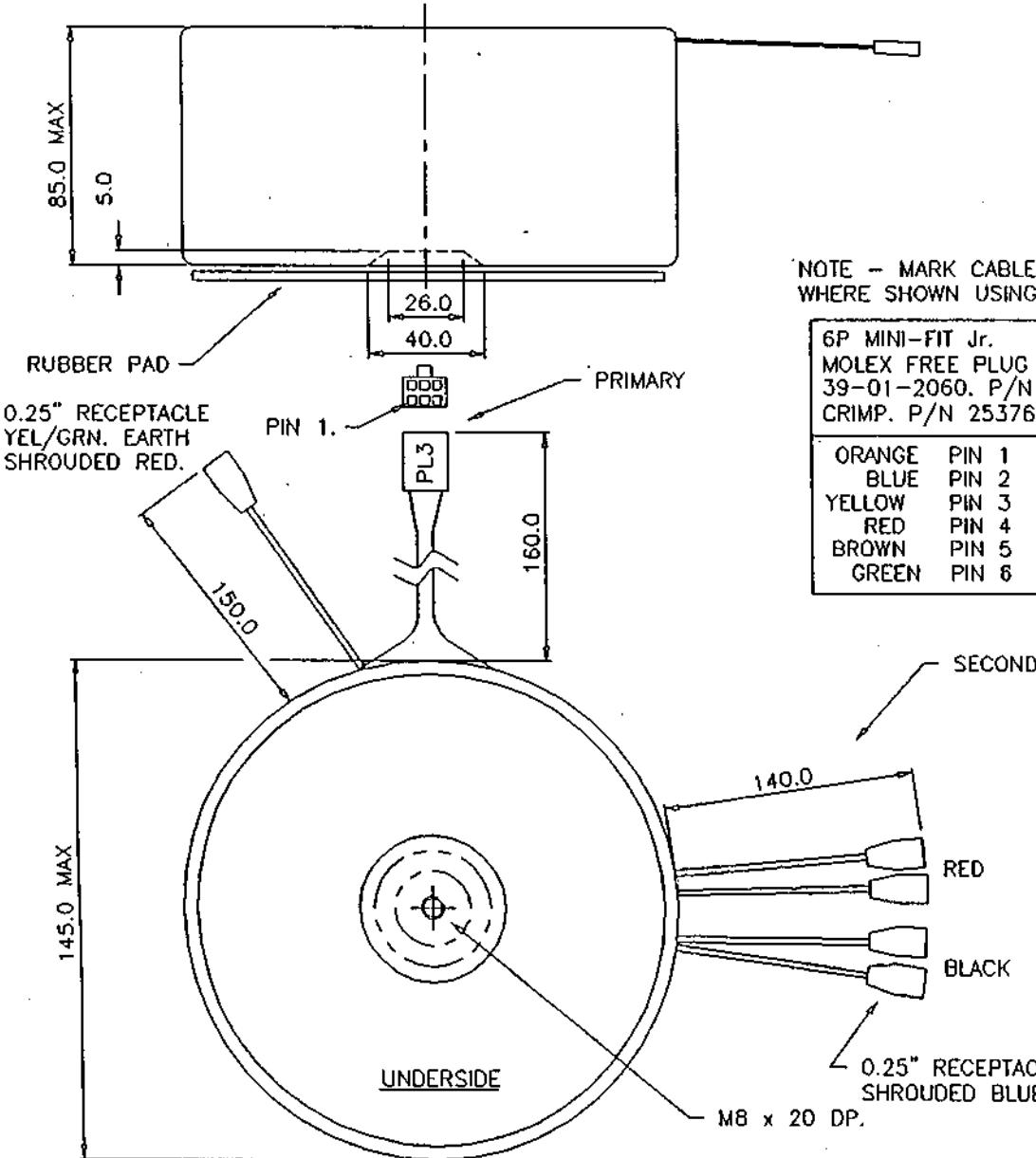
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Drawing No. A2322      Sheet 1      Cont 2

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 PA 50B AMPLIFIER  
 TRANSISTOR PCB ASSEMBLY

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## TECHNICAL DETAILS

FULL LOAD CURRENT = 800 VA.

MAX OPERATING TEMP. = 100°C

FREQUENCY RANGE = 50-60Hz

WEIGHT = 6.3 Kg.

**CONSTRUCTION -**  
**MELINEX FILM WRAPPED,**  
**RESIN FILLED CENTRE WITH**  
**M8 PLUSH**

FLYING LEADS -  
PRIMARY 32/0.2  
SECONDARY 48/0.2  
SCREEN 24/0.2

MANUFACTURER - FERRO-MAG  
ELECTRICAL LTD.  
REF. VT 31268

The diagram illustrates a power supply circuit. On the left, a vertical dashed line represents the core of a transformer. To its right, two sets of windings are shown. The primary winding consists of four horizontal lines with wavy tops, labeled from top to bottom: 0V, 110V, 125V, 0V, 15V, and 125V. The secondary winding consists of two sets of three horizontal lines each, also with wavy tops. The top set is labeled BLACK, 2, BLACK, RED, and 2. The bottom set is labeled RED, 2, and RED. A diagonal line labeled 'SCRN' connects the bottom 125V line of the primary to the bottom RED line of the secondary.

Issue (C/N No.)	Date
1	20/10/93
2	05/10/94 CN P0022/94
3	01/05/95 CN D0030/95
4	22/11/95 CN D0047/96

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PA3000 -  
A0700-01

S.R.E.	Scale N.T.S	<b>REDIFON SPT</b> Woodrolfe Road, Tollesbury, Essex, ENGLAND.	Material	Finish	Tolerances GEN $\pm 1$ LEAD LENGTHS $\pm 5$	ALL DIMENSIONS IN MILLIMETRES	Drawing No.	25310	Sheet 1	Cont' /
checked <i>[initials]</i>	App'd <i>[initials]</i>					REDIFON SPT Ltd © 19 93	TITLE	MAINS TRANSFORMER (TOROIDAL)		

6

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C

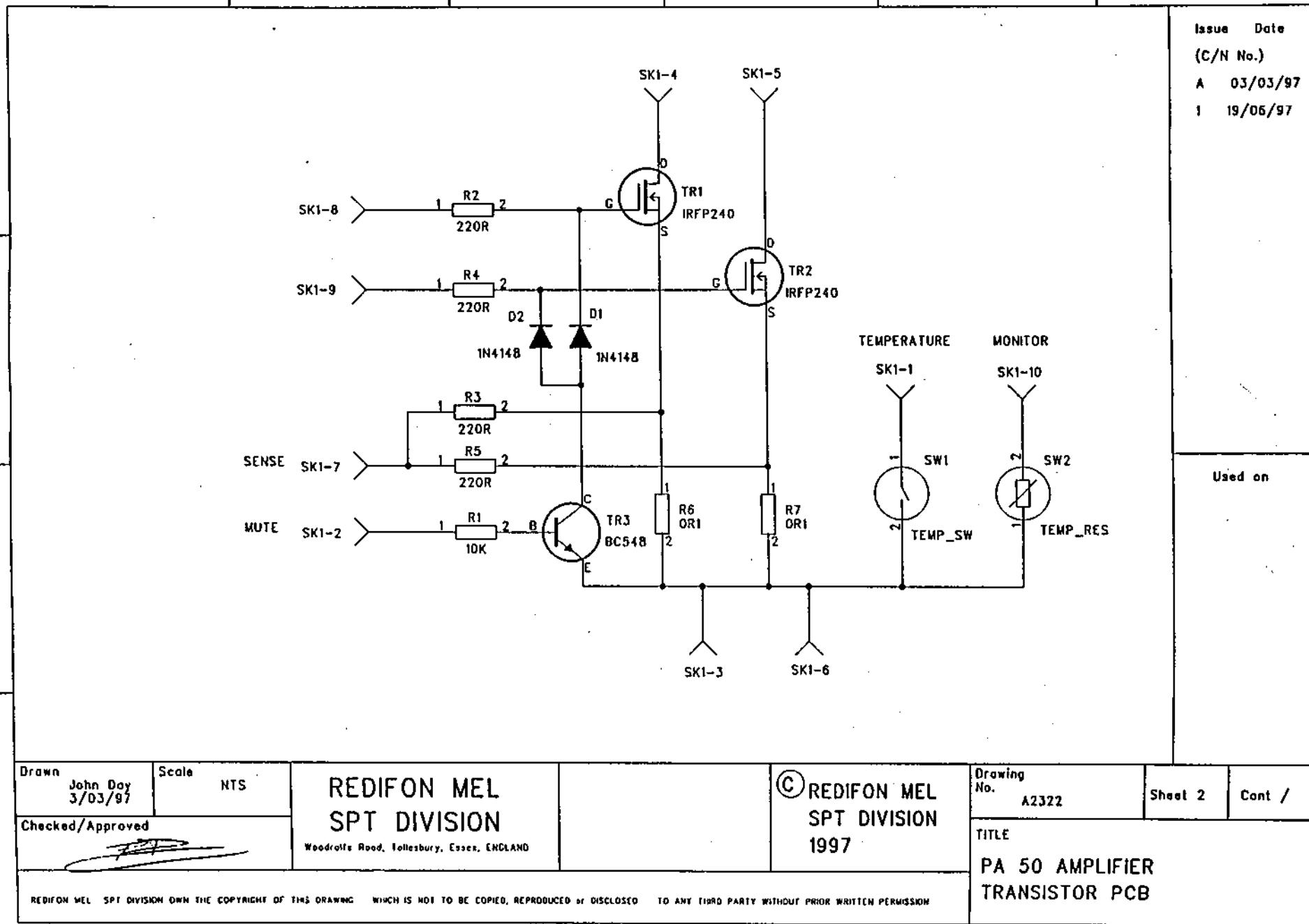
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HANDBOOK  
FOR  
PA100B AUDIO AMPLIFIER

RSPT PART NO.	A0790	AUTHOR	<i>S. Edwards</i>
RSPT ORDER NO.		APPROVED	<i>J.D</i>
CUSTOMER		ISSUE	2
ORDER NO.		DATE	01.10.97.

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## HANDBOOK FOR THE PA100B AUDIO AMPLIFIER

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## HANDBOOK FOR THE PA100B AUDIO AMPLIFIER

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## 1. INTRODUCTION

### 1.1 General

This handbook provides information for the operation and maintenance of the PA100B Audio Amplifier which is manufactured by Redifon MEL Ltd SPT Division for use as an amplifier in public address, broadcast and alarm systems.

### 1.2 System Description

The PA100B Audio Amplifier provides an output of 100 watts at 100V line level.

The amplifier is constructed on a metal chassis designed for accommodation in a nineteen inch rack, either by slides for land based applications or by runners to facilitate access to the unit interior without complete removal from the rack in mobile applications.

All sockets for the connection of power supplies, signal input, loudspeaker output etc. are mounted at the rear of the chassis adjacent to the output transistor heatsinks.

The unit is of modular construction with the majority of circuit components being mounted on two plug in circuit boards as follows:

The main amplifier PCB A0622 contains the complete audio circuitry including the output transistors.

The display PCB A0624 contains the circuitry to provide drive to the appropriate indicators in the event of a fault.

Power supply components comprising the mains transformers, bridge rectifiers and smoothing capacitors are all mounted directly on the amplifier chassis.

The mains transformer is of the toroidal type which can be connected for either 115 V or 230V AC operation as required.

The output transformer is also a toroidal type, the secondary of which can be connected for a 50 V or 100 V line output level.

### **1.3 Specification**

#### **1.3.1 Power Amplifier Performance**

Power output	100 Watts, line level 100 V.
Frequency response	50 Hz - 20 kHz (-3 dB referred to level at 1 kHz)
Total Harmonic Distortion	1.5% max. at maximum rated output.
Input sensitivity	An input of 0 dB produces an output of 100 V, set by the output level control.
Input impedance	10 kohm balanced.
Protection	Self-resetting thermal protection for output transistors. Self-resetting output overload trip.
	Mains and DC. rail fuses. All output transistors individually fused.
Indicators	Mains and supply rail status indicators. Transistor, overload and thermal trip indicators. An output is provided to drive an external fault indicator. Output level indication.
Controls	Amplifier ON/OFF switch. output level control, screwdriver operated.

#### **1.3.2 Mechanical**

Overall height	89 mm (3.50 inch)
Width	482 mm (19 inch)
Depth	368 mm (14.5 inch)
Weight	15 kg

#### **1.3.3 Electrical**

Input voltage	115 V or 230 V AC/ 600 VA max. 50-60 Hz, (105 mA quiescent) 24V DC. at 8.5 A.
---------------	-------------------------------------------------------------------------------------

#### 1.3.4 Environmental

Operating temperature range -10°C to +50°C

Storage temperature range -40°C to +70°C

Relative humidity 95% at 40°C

Shock and vibration as normally encountered in shipping and handling.

## HANDBOOK FOR THE PA100B AUDIO AMPLIFIER

### SECTION 2 OPERATION

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## 2. OPERATION

### 2.1 Mains input Voltage

The mains input voltage can be set by link connections in plug PL1 mounted on the display PCB on the rear of the front panel. Check before connecting to any supplies and reset only while no mains supplies are connected.

110 V	Link Pins 1 to 6 & 3 to 4
125 V	Link Pins 1 to 5 & 2 to 3
235 V	Link Pins 4 to 5
250 V	Link Pins 2 to 5

100 Volt / 50 Volt Output Option

### 2.2 Pre-set Adjustments

Equipment required:

Multimeter                                  Avometer Model 8 or equivalent.

Audio Test Set                              Ferrograph RTS or equivalent.

### 2.3 Output Stage

The Bias RV1 control is factory-set and should require adjustment only when one or more of the output transistors, driver transistors or associated components have been replaced.

To adjust:

1. Set the multimeter to the 10A range and place a short circuit across its terminals.
2. Switch OFF the amplifier. Disconnect the output transformer centre tap from C1+. Connect the multimeter in series with this lead.
3. Switch ON the amplifier. Wait until the overload trip resets, this allows the switch-on transients to subside. Remove the short circuit from the meter terminals. Switch the meter to the 100mA range.
4. Allow the amplifier to warm up for at least fifteen minutes. With no signal input, adjust RV1 for a reading of 20 - 30 mA.
5. Switch OFF the amplifier. Remove the test connections and replace the transformer lead.

## **2.4 Output Level Indicator**

### **Pre-set RV3**

To adjust:

1. Connect a dummy load of 600 ohm across the amplifier input. Using the test set apply a signal of 1 kHz at 0 dB.
2. Connect the multimeter set on the 250 V AC. range to the amplifier output.
3. Switch ON the amplifier. Adjust the Output level control for a reading of 100V r.m.s. on the multimeter.
4. Adjust RV3 until the red 100 volt LED on the Output Level Indicator is just on.
5. Switch OFF the amplifier. Disconnect and remove all the test equipment.

Notes:

- A 0 dBm input signal produces a full scale output indication.
- The amplifier is set for a bar graph display (LK2 1-2).
- LK2 can be moved to pins 2.3 if a moving dot display is preferred.

## **2.5 Adjusting the overload Trip and Gain Control**

1. Remove the amplifier from the rack assembly and set up on the bench.
2. Adjust the output level indicator pre-set RV3.

Note: The audio test set in para. 2.2 is being used to provide a sine wave of 1 kHz at a level of 0 dB (700 mV). Any high quality signal generator could be used in this application.

3. Connect a suitable 100 ohm 100 Watt resistor to the 100 V output of the amplifier. The resistor should have adequate heat sinking to dissipate the heat which will be generated.
4. Connect a 1 kHz sine wave to the input of the amplifier in parallel with a 600 ohm dummy load (600 ohm 0.1 Watt resistor).
5. Connect a multimeter across the 100 ohm load resistor, switch to the AC. volt scale, (able to read at least 130 V).
6. Apply the appropriate mains supply to the amplifier. Switch ON.

7. Adjust RV4 (gain control) on the amplifier PCB. Increase clockwise until the multimeter reads 115 V AC. on the output terminals.
8. Slowly adjust RV2 on the Main Amplifier PCB. until the amplifier trips.
9. Reduce RV4 until the output is again 100 V AC.
10. Check amplifier stops tripping
11. Increase RV4 slowly until the output is 115 V AC. Check that the amplifier trips. If not repeat (7).
12. Reset RV4 gain control for 100 volt AC output on the multimeter.

## 2.6 Installing a PA100B Amplifier into the rack (runner mounting)

**WARNING: THE AMPLIFIER IS VERY HEAVY (15 kg)  
PERSONAL INJURY MAY RESULT FROM MIS-HANDLING**

1. Fully extend the runner arms so the amplifier can be seated in the supporting brackets.
2. Carefully lift the amplifier into position in the supporting brackets.
3. Connect the leads PLA, SKB, PLC and SKD, the earth tag and the DC connections on to the rear of the amplifier. See A0790-M3.
4. Depress the catches on each side of the slider arms and push the amplifier fully home.
5. Secure to the rack using the four screws through the front panel flanges.
6. Depress the Mains Supply switch, ensure that the green indicating light is ON.
7. NB - If a replacement amplifier is being fitted the slide inner beams must be removed from the old amplifier and fitted to the replacement.

## 2.7 Removing a PA100B from the Rack

1. Isolate the mains supply by depressing the red button of the appropriate circuit breaker. All indicators of that particular amplifier should be extinguished.
2. Remove the four fixing screws at the corners of the amplifier panel.
3. Withdraw the amplifier to the limit of its slide.

4. Disconnect the leads connecting the rear of the amplifier to the rack. The two halves of connectors B and C are released by centralising the slider lock (on the chassis side). The DIN plug D is released by pulling the aluminium ring (not the black plastic) away from the rear of the amplifier.
5. Depress the catches on the slides.
6. Carefully withdraw the amplifier completely.

## 2.8 Operation

### 2.8.1 Switch On:

Depress the AMP ON rocker switch.

Ensure that all the green LED's are illuminated and all red LED's are off.

Note: The mains or 24 V DC input LED's may be off on single supply operation.

### 2.8.2 Fault finding

Supply Fail Red LED Illuminated

Loss of either mains or 24 V DC input. If mains supply green LED is off, check mains fuse in PLA is OK and input breaker is on. If 24 V DC input green LED is off, check remote DC switch (PLC) and input breaker is ON.

O/P Overload Trip Red LED Illuminated

Amplifier overload. The trip will reset automatically. If the amplifier repeatedly trips, check input signal level and 100 Volt output cables for short circuit.

20 V Red LED Illuminated

Pre-amplifier 20 Volt supply is outside permissible limits.

Transistor Fuse Red LED Illuminated

Failure of Fuses F1 to F12. Check fuses and replace any failed fuses. Check and replace associated transistor(s).

Temperature Trip Red LED Illuminated

Heatsink temperature is above 100°C. The thermal cut out will reset automatically when the temperature drops below 100°C.

24 V Fuse Green LED Not Illuminated Failure of Fuse F13 which supplies the pre-amplifier and bias circuits.

Transistor Bias Green LED Not Illuminated Fault logic is active. If this LED is not illuminated, check fuse F14

Note: FOR SINGLE SUPPLY APPLICATIONS SET LK1 PINS 1-2

## HANDBOOK FOR THE PA100B AUDIO AMPLIFIER

### SECTION 3 TECHNICAL DESCRIPTION

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### **3. TECHNICAL DESCRIPTION**

#### **3.1 General**

This section contains the technical description of the components comprising the PA100B Audio Amplifier.

#### **3.2 Circuit Description (Drawing A0622)**

##### **3.2.1 Audio Circuit**

The balanced input is transformer coupled and provides an input impedance of 10 kohm. This is matched to a standard 600 ohm line by means of a 600 ohm resistance across SKD pins 1 and 2. If more than one amplifier is employed on the system, matching is applied at the input of one only. The input signal is buffered and filtered (50 Hz to 25 kHz) by IC6. The output from the level control (RV4) feeds the phase splitter and feed back amplifier IC3. The feedback differential amplifier isolates the output transformer feedback winding from output loading effects.

A regulated 20 V supply for the input amplifier and phase splitter is derived from the main supply rail by means of the integrated regulator VR1.

The splitter output drives the push/pull transformer coupled output stage. The pre-driver transistors (TR17, TR7 and TR15, TR8) drive 6 output power transistors in parallel (TR2, 4, 6, 9, 11 and 13). Negative feedback derived from the output emitter resistors is applied to the respective driver stages.

##### **3.2.2 Fault Indicators**

A number of fault conditions are detected by circuitry within the amplifier and indicated by means of front-panel mounted LED's. (See A0790-M2).

The Amplifier Fault Display PCB. (A0624) receives inputs from various parts of the amplifier and provides outputs as follows:

###### **1. Mains Indicator**

The green mains LED together with C1, R2 and the internal LED of the opto-isolator IC1 monitors the AC supply across half of the mains transformer primary.

With mains present, the green LED lights and IC1 provides a 50 HZ positive-going output via R119 which keeps C36 charged to maintain TR25 conducting. Failure of the mains supply extinguishes the green LED and, by removing IC1 output, allows C36 to discharge. When C36 is discharged TR25 switches off de-energising RL2 which provides the external mains failure indicator via PLC/2.

## 2. Supply Fail Indicator

This indicator is used to indicate failure of either mains or 24 volt input supplies. The mains input monitor (IC1) and 24 volt input via D47 are monitored by IC4. The LED is illuminated when both supplies are lost (LK1 1-2) or either supply is lost (LK1 2-3).

## 3. 20V Under/Over Volts Indicator

IC2C and IC2D form a window detector which provides indication of 20 V rail fluctuations in excess of the permissible limits (low 18.5 V, high 21.7 V). The 20 V rail is sampled at the junction and compared by IC2 with reference voltage derived from the +5V logic supply. Normally, the output from both is high. Supply rail movements above or below permissible limits drive the outputs of IC2 low, thereby lighting the red 20 V LED via IC4. The 24V fuse (F13) fault masks this indicator.

## 4. Output Transistor Fuse Indicator

The voltage at each of the output transistor collectors is sampled and de-coupled by one of the networks. Under normal conditions the diodes D23 to D34 are reverse biased. TR23 is turned off via R87. Failure of any fuse F1 to F12 results in the associated diode (D23 to D34) being forward biased which turns on TR23, this is detected by IC4 which drives the red transistor fuse LED.

## 5. Overload Trip Indicator

Amplifier overload is detected by monitoring the output transistor current. The output drive voltage is rectified (D21/D22) and the resulting voltage filtered (C24). This triggers TH1 when the trip threshold set by RV2 is exceeded. The thyristor discharges C23. The amplifier output drive is clamped off by IC4, TR19, 20 and 22 while C23 recharges via R96. The amplifier is enabled when the capacitor voltage exceeds the capacitor threshold IC2B. The C23 time delay also inhibits the output during power up to allow the amplifier to stabilise.

## 6. Temperature Trip

The output transistor heat sink is fitted with a 100°C thermal cut-out, which is in series with RP2D across the logic supply rail. Under normal conditions, the cut out is closed. If the cut-out opens IC4 will light the temperature trip LED, the IC4 will also remove the output transistor drive via TR22, 19 and 20. The cut-out will reset automatically when the heat sink temperature drops below 100°C returning the amplifier to the normal working condition.

## 7. 24V Supply Indicator

The green 24 V supply indicator LED monitors the DC supply rail via R4 and is normally on if an external DC supply is connected. Non illumination indicates failure of the external 24 V DC supply or the remote DC switch (PLC) is off.

### 8. 24V fuse indicator

The status of the 24 V rail following F13 is monitored by IC4 and indicated by the green 24 V fuse LED. Failure of F13 causes the LED to extinguish.

### 9. Logic 5V0 Indicator

A 5.0 V stabilised rail is derived from the 24 V supply rail by IC7 for use by the fault logic circuitry. Status of the rail is monitored directly by the green logic 5V0 LED which is normally on.

### 10. Transistor Bias Indicator

The transistor bias LED is on when the output stage is enabled. IC4 monitors the fault status and turns the amplifier on if no faults are detected.

### 11. Remote Indicator Driver

IC4 provides the amplifier fault monitoring and prioritisation functions. If any input indicates a fault, the fault relay is de-energised via TR26.

## 3.3 Mains Failure Change-over

Automatic change-over occurs from AC to DC operation in the event of failure of the mains supply or mains-derived DC rail. Reversion to mains operation on restoration of the supply is also automatic.

At switch on, with an AC supply present, the DC rail is established at 30-35 V from the bridge rectifier BR1 and BR2. TH1 and D1 are therefore reverse-biased, isolating the amplifier from the 24 V DC supply. If the mains supply fails, the 30-35 V rail falls until it is below the TH1 gate voltage, at which point the thyristor conducts, connecting the amplifier to the 24 V DC supply. If the AC supply is restored, TH1 again becomes reverse-biased and ceases to conduct.

When the amplifier is switched on with only a DC supply present, C1 is partially charged via D45/81 before TH1 is turned on in order to prevent a possibly damaging surge current through the thyristor. The voltage across R81 due to C1 charging current, charges C20 via R90 until TH1 cathode-gate voltage is sufficient to fire the thyristor, completing connection to the 24 V DC input.

When operating from the mains supply, TH1 is non-conducting, and switch-off is achieved merely by removal of the supply by means of S1. However, to switch off from DC operation, it is necessary to remove the TH1 holding current. This is achieved by means of TR21/18 and RL1.

When operating from either the mains supply or 24 V DC supplies, TR21 is held on by current via R120 or D47/R101 (or both if both supplies are present) thereby biasing TR18 off and hence RL1A is de-energised, (contacts open).

When switching off from DC operation, bias is removed from TR21, switching TR18 on and momentary energising RL1 using current supplied by C25 which is charged during operation via D48/R82. The momentary closing of RL1 contacts is sufficient to commutate TH1 which fails to switch on again when the contacts open in the absence of gate voltage from C20. IC4 monitors both AC and DC inputs. If both supplies are off, IC4 will mute the amplifier by removing the output bias. This ensures that commutation of TH1 occurs while the amplifier current is at its quiescent level.

## HANDBOOK FOR THE PA100B AUDIO AMPLIFIER

### SECTION FOUR

#### MAINTENANCE

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## 4. MAINTENANCE

### 4.1 Preventive Maintenance

The PA100B Audio Amplifier requires no preventive maintenance.

#### 4.1.1 Servicing

No special tools or test equipment are required for servicing.

#### 4.1.2 Replacements

In the event of a fault occurring, care should be taken to replace components with types of similar quality and tolerance to maintain the original noise and performance specifications.

#### **WARNING:**

**THE UNIT IS FITTED WITH A MAINS INPUT FILTER UNIT AND THEREFORE VOLTAGES MAY EXIST ON COMPONENTS EVEN THOUGH NO SUPPLY IS AVAILABLE TO THE UNIT.**

**Caution:** The system contains components which are sensitive to and can be permanently damaged by static electricity which can be carried by hands or tools. Within the closed bay they are not at risk, but it is essential that full anti-static precautions are carried out before touching or handling the printed circuit board assemblies or the components on them. When being replaced they must be put into closed anti-static conductive packaging.

**Precautions:** When replacing PCB's ensure that the power is switched OFF, but the earth stud is connected. Always wear an anti static wrist strap when handling PCB's. Handle PCB's only by the edges and avoid contact with any exposed electrical connections. When removing a new PCB from its packing, touch an earth connection first to release any static voltage build-up prior to inserting it into the equipment.

Anti-static bags should be grounded prior to opening them to remove the contents, and similarly grounded prior to placing a PCB in the package. Suspected faulty PCB's should be placed in conductive packages to prevent further possible damage to them. PCBs that are not correctly packed in anti static bags when returned will not be covered by any warranty.

## HANDBOOK FOR THE PA100B AUDIO AMPLIFIER

### SECTION FIVE

#### PARTS LISTS

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## 5. PARTS LISTS

### 5.1 AMPLIFIER PA100B PARTS LIST

Part No A0790

Item	Description	Part No.	Qty.
1	FRONT PANEL	A0791 -EDN	1
2	CHASSIS	A0792 -01	1
3	HEATSINK/PCB ASSY	A0793 -EDN	1
7	DISPLAY PCB ASSY	A0624 -01	1
8	COVER	A0374 -01	1
9	MOUNTING BRACKET	A0834	1
10	GUIDE BRACKET	A0634	1
11	GUIDE BRACKET	A0635	1
13	TRANSFORMER	25403	1
14	TRANSFORMER	25404	1
15	CAPACITOR 10000uF	24635	1
16	SWITCH	22317	1
17	MAINS PLUG	25303	1
18	FUSE 20mm 6.3A	18967 /6.3	1
19	THYRISTOR	14241	1
20	DIODE	25392	1
21	MOUNTING KIT	14244	1
22	MOUNTING KIT	12206	1
24	BRIDGE RECTIFIER	14248	1
26	CONNECTOR	14179	1
27	TERMINAL POST RED	25516	1
28	TERMINAL POST BLK	25517	1
29	RETAINER KIT	20582	1
31	STUD 1/4 TURN	25305	4
32	RECEPTACLE	25306	4
33	RETAINER	25307	4
34	PILLAR	25372	1
35	FRONT PANEL LABEL	25312	1
36	SPACER No 4 x 3/16	25419	3
37	HANDLE	25413	2
39	D CONNECTOR LATCH	25309	2 PAIR
40	CARDGUIDE	25322	1
41	CARDGUIDE	25321	1
49	LEAD ASSY (LINE O/P)	A0631 -EDN	1
50	LEAD ASSY (FAULT)	A0632 -01	1
51	LEAD ASSY (I/P)	A0633 -01	1

Item	Description	Part No.	Qty.
52	LEAD ASSY (MAINS)	A0639 -01	1
55	VOLTAGE SELECT (115V)	A0746 -01	1
	VOLTAGE SELECT (240V)	A0746 -02	1
56	LEAD ASSY	A0750 -01	1
57	LEAD ASSY	A0750 -02	1
58	LEAD ASSY	A0750 -03	1
60	LEAD ASSY	A0750 -05	1
61	LEAD ASSY	A0750 -06	1
63	LEAD ASSY	A0750 -08	1
66	LEAD ASSY	A0751 -01	1
67	LEAD ASSY	A0751 -02	1
68	LEAD ASSY	A0751 -03	1
69	LEAD ASSY	A0751 -04	1

## 5.2 AMPLIFIER PA100B HEATSINK/PCB ASSY.

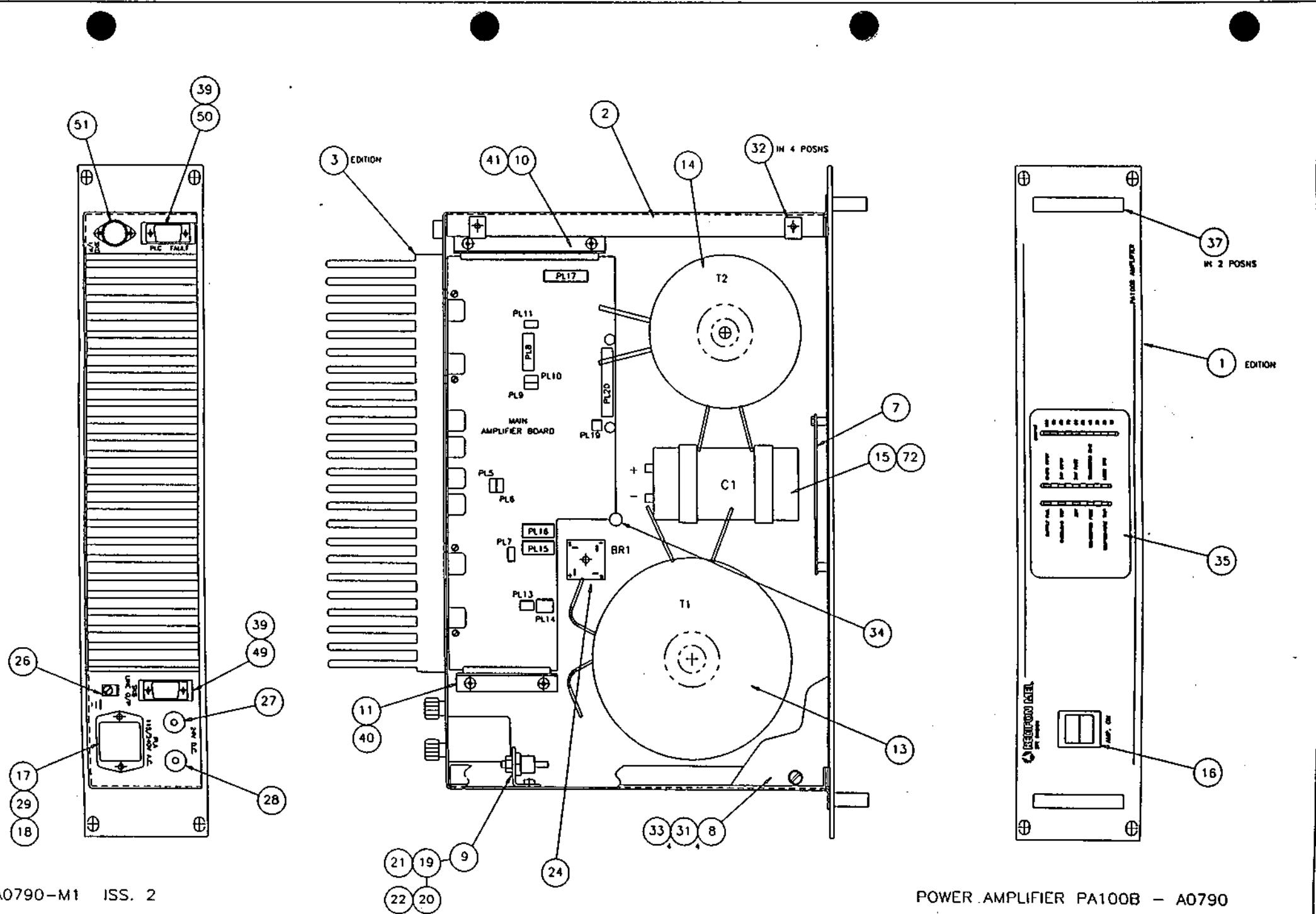
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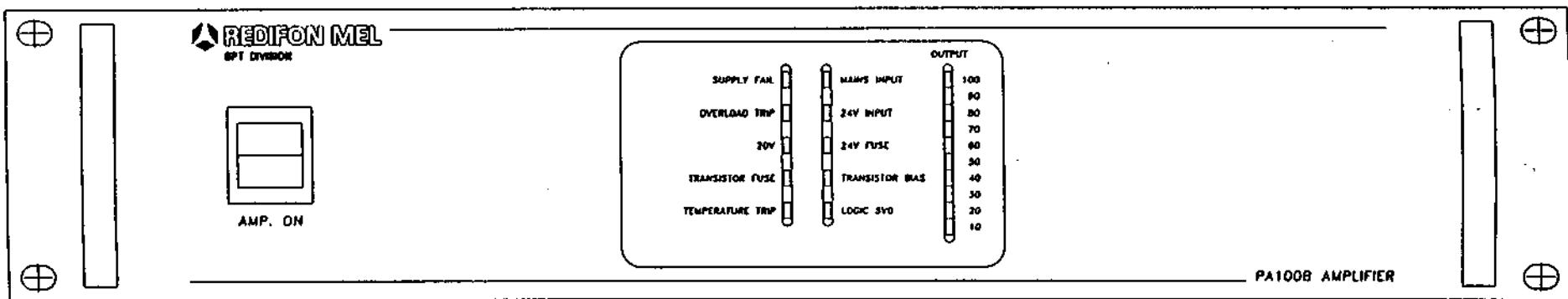
Item	Description	Part No.	Qty.
1	HEATSINK	A0789 -01	1
3	AMPLIFIER PCB ASSY	A0622 -EDN	1
4	SIL-PAD	25379	8
5	INSUL BUSH	25380	8
6	BRACKET	A0638	4
8	TRANSISTOR MNT6337J	25542	6
9	TRANSISTOR TIP34A	14172	2
10	RESISTOR 100R	11920	1
11	CAPACITOR 0 $\mu$ 1	14249	1
12	THERMAL SWITCH	13945	1
14	LEAD ASSY.	A0742	1
15	LEAD ASSY.	A0743	1
16	RESISTOR 27 $\Omega$	11920	1
17	CAPACITOR 0.47 $\mu$ f	14249	1

## HANDBOOK FOR THE PA100B AUDIO AMPLIFIER

### SECTION SIX DRAWINGS AND DIAGRAMS

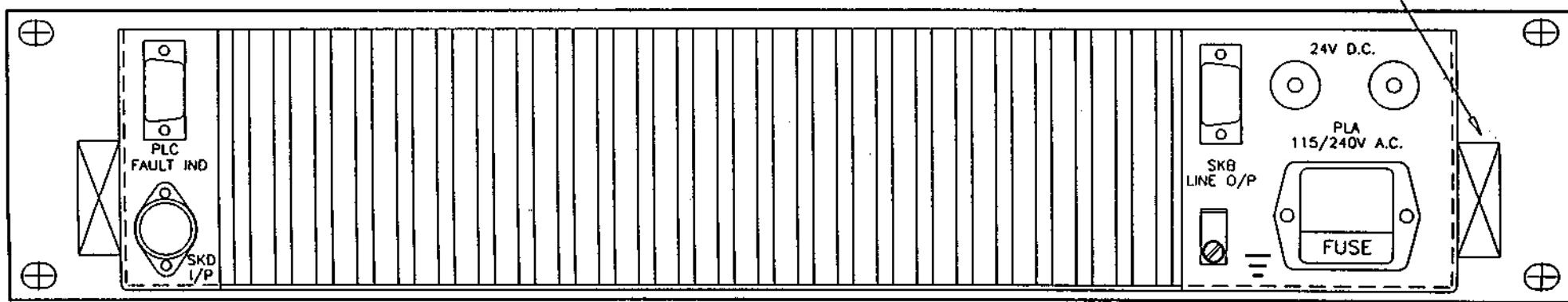
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A0790 SHT.M1	AMPLIFIER PANEL PA100B
A0790 SHT.M2	AMPLIFIER FRONT PANEL
A0790 SHT.M3	AMPLIFIER REAR PANEL
A0790 SHT.2	AMPLIFIER PANEL PA100B CIRCUIT DIAGRAM
A0793 SHT.M1	HEATSINK/PCB ASSEMBLY
A0622 SHT.1	MAIN AMPLIFIER PCB LAYOUT
A0622 SHT.2	MAIN AMPLIFIER PCB CIRCUIT DIAGRAM
A0624 SHT.1	AMPLIFIER DISPLAY PCB LAYOUT
A0624 SHT.2	AMPLIFIER DISPLAY PCB CIRCUIT DIAGRAM





A0790-M2 ISS. 1

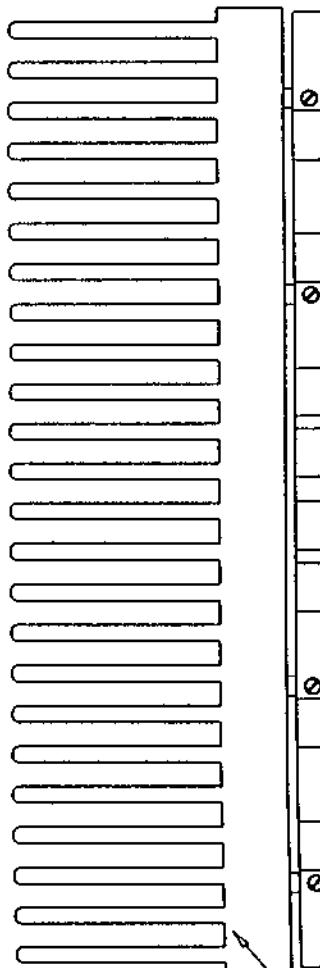
PA100B AMPLIFIER FRONT PANEL



RUNNER BEAMS

A0790-M3 ISS. 1

PA100B AMPLIFIER. REAR PANEL



AMPLIFIER PCB (COMPONENT SIDE)

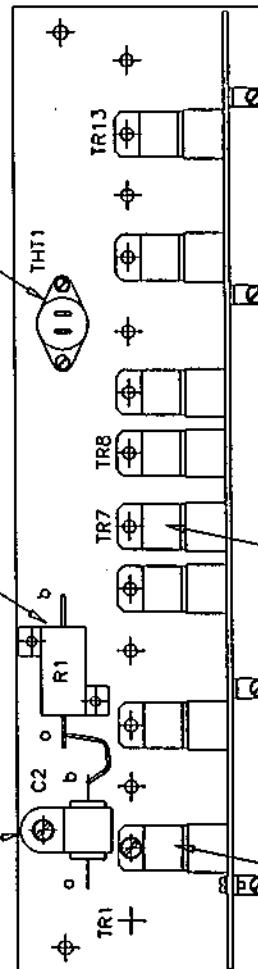
1

3 EDITION

12

EDN 01/02 10  
EDN 03/04 16

EDN 01/02 11  
EDN 03/04 17

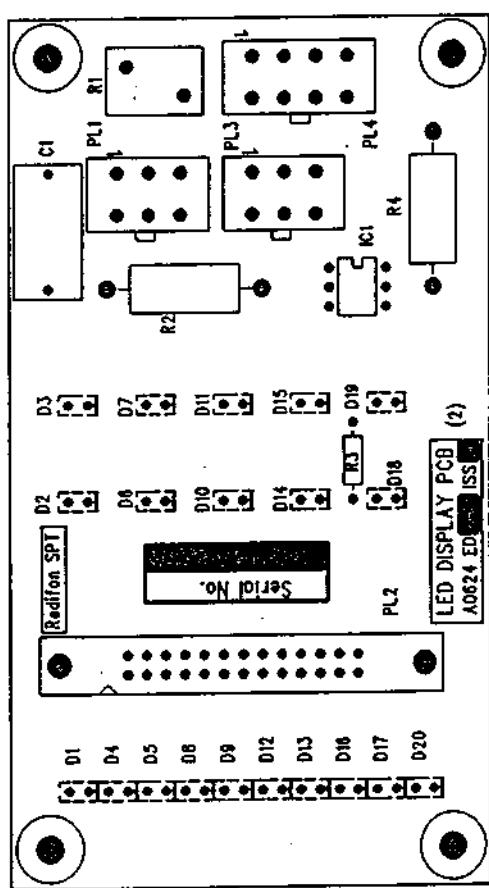


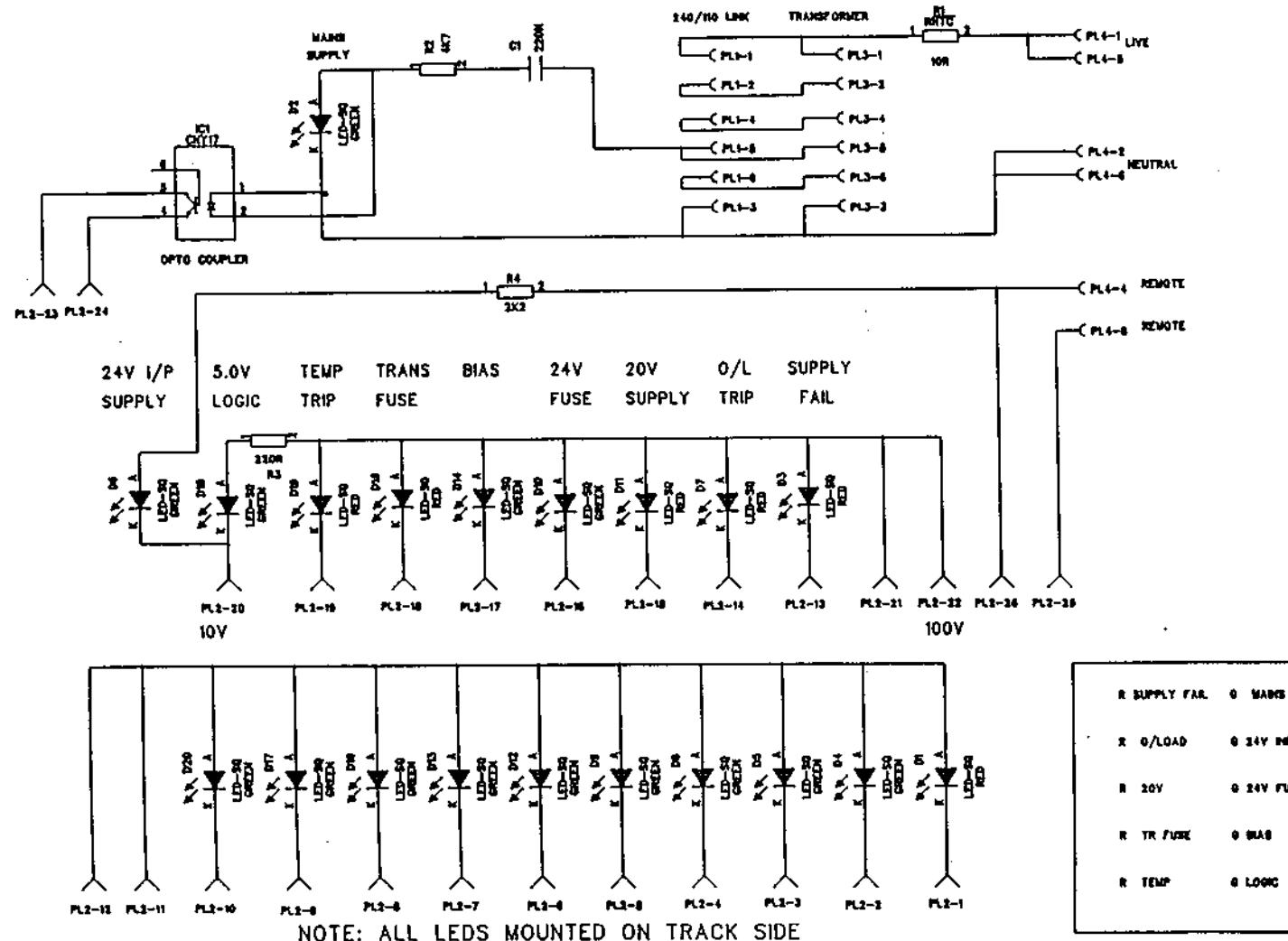
6  
IN 4 POSNS

9 4 5  
IN 2 POSNS  
TR7 & TR8

8 4 5  
IN 6 POSNS  
TR2, TR4, TR6,  
TR9, TR11, TR13.

A0624 SHT1 AMPLIFIER DISPLAY PCB LAYOUT





A0624 SHT2 AMPLIFIER DISPLAY PCB CIRCUIT DIAGRAM

HANDBOOK  
FOR  
PA200B AUDIO AMPLIFIER

RSPT PART NO.	A0850	AUTHOR	
RSPT ORDER NO.		APPROVED	
CUSTOMER		ISSUE	2
ORDER NO.		DATE	01.10.97.

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## HANDBOOK FOR THE PA200B AUDIO AMPLIFIER

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## HANDBOOK FOR THE PA200B AUDIO AMPLIFIER

### SECTION 1

#### INTRODUCTION

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## 1. INTRODUCTION

### 1.1 General

This handbook provides information for the operation and maintenance of the PA200B Audio Amplifier which is manufactured by Redifon MEL Ltd SPT Division for use as an amplifier in public address, broadcast and alarm systems.

### 1.2 System Description

The PA200B Audio Amplifier provides an output of 200 watts at 100V line level.

The amplifier is constructed on a metal chassis designed for accommodation in a nineteen inch rack, either by slides for land based applications or by runners to facilitate access to the unit interior without complete removal from the rack in mobile applications.

All sockets for the connection of power supplies, signal input, loudspeaker output etc. are mounted at the rear of the chassis adjacent to the output transistor heatsinks.

The unit is of modular construction with the majority of circuit components being mounted on two plug in circuit boards as follows:

The main amplifier PCB A0622 contains the complete audio circuitry including the output transistors.

The display PCB A0624 contains the circuitry to provide drive to the appropriate indicators in the event of a fault.

Power supply components comprising the mains transformers, bridge rectifiers and smoothing capacitors are all mounted directly on the amplifier chassis.

The mains transformer is of the toroidal type which can be connected for either 115 V or 230V AC operation as required.

The output transformer is also a toroidal type, the secondary of which can be connected for a 50 V or 100 V line output level.

### **1.3 Specification**

#### **1.3.1 Power Amplifier Performance**

Power output	200 Watts, line level 100 V.
Frequency response	50 Hz - 20 kHz (-3 dB referred to level at 1 kHz)
Total Harmonic Distortion	1.5% max. at maximum rated output.
Input sensitivity	An input of 0 dB produces an output of 100 V, set by the output level control.
Input impedance	10 kohm balanced.
Protection	Self-resetting thermal protection for output transistors. Self-resetting output overload trip.
	Mains and DC. rail fuses. All output transistors individually fused.
Indicators	Mains and supply rail status indicators. Transistor, overload and thermal trip indicators. An output is provided to drive an external fault indicator Output level indication.
Controls	Amplifier ON/OFF switch. output level control, screwdriver operated.

#### **1.3.2 Mechanical**

Overall height	89 mm (3.50 inch)
Width	482 mm (19 inch)
Depth	368 mm (14.5 inch)
Weight	18 kg

#### **1.3.3 Electrical**

Input voltage	115 V or 230 V AC/ 600 VA max. 50-60 Hz, (105 mA quiescent) 24V DC. at 25 A.
---------------	------------------------------------------------------------------------------------

#### 1.3.4 Environmental

Operating temperature range -10°C to +50°C

Storage temperature range -40°C to +70°C

Relative humidity 95% at 40°C

Shock and vibration as normally encountered in shipping and handling.

## HANDBOOK FOR THE PA200B AUDIO AMPLIFIER

### SECTION 2

#### OPERATION

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## 2. OPERATION

## 2.1 Mains input Voltage

The mains input voltage can be set by link connections in plug PL1 mounted on the display PCB on the rear of the front panel. Check before connecting to any supplies and reset only while no mains supplies are connected.

110 V Link Pins 1 to 6 & 3 to 4  
 125 V Link Pins 1 to 5 & 2 to 3  
 235 V Link Pins 4 to 5  
 250 V Link Pins 2 to 5

#### **100 Volt / 50 Volt Output Option**

## 2.2 Pre-set Adjustments

#### **Equipment required:**

Multimeter Avometer Model 8 or equivalent.

### 2.3 Output Stage

The Bias RV1 control is factory-set and should require adjustment only when one or more of the output transistors, driver transistors or associated components have been replaced.

To adjust:

1. Set the multimeter to the 10A range and place a short circuit across its terminals.
  2. Switch OFF the amplifier. Disconnect the output transformer centre tap from C1+. Connect the multimeter in series with this lead.
  3. Switch ON the amplifier. Wait until the overload trip resets, this allows the switch-on transients to subside. Remove the short circuit from the meter terminals. Switch the meter to the 100mA range.
  4. Allow the amplifier to warm up for at least fifteen minutes. With no signal input, adjust RV1 for a reading of 20 - 30 mA.
  5. Switch OFF the amplifier. Remove the test connections and replace the transformer lead.

## **2.4 Output Level Indicator**

Pre-set RV3

To adjust:

1. Connect a dummy load of 600 ohm across the amplifier input. Using the test set apply a signal of 1 kHz at 0 dB.
2. Connect the multimeter set on the 250 V AC. range to the amplifier output.
3. Switch ON the amplifier. Adjust the Output level control for a reading of 100V r.m.s. on the multimeter.
4. Adjust RV3 until the red 100 volt LED on the Output Level Indicator is just on.
5. Switch OFF the amplifier. Disconnect and remove all the test equipment.

Notes:

- A 0 dBm input signal produces a full scale output indication.
- The amplifier is set for a bar graph display (LK2 1-2).
- LK2 can be moved to pins 2.3 if a moving dot display is preferred.

## **2.5 Adjusting the overload Trip and Gain Control**

1. Remove the amplifier from the rack assembly and set up on the bench.
2. Adjust the output level indicator pre-set RV3.

Note: The audio test set in para. 2.2 is being used to provide a sine wave of 1 kHz at a level of 0 dB (700 mV). Any high quality signal generator could be used in this application.

3. Connect a suitable 50 ohm 200 Watt resistor to the 100 V output of the amplifier. The resistor should have adequate heat sinking to dissipate the heat which will be generated.
4. Connect a 1 kHz sine wave to the input of the amplifier in parallel with a 600 ohm dummy load (600 ohm 0.1 Watt resistor).
5. Connect a multimeter across the 50 ohm load resistor, switch to the AC. volt scale, (able to read at least 130 V).
6. Apply the appropriate mains supply to the amplifier. Switch ON.

7. Adjust RV4 (gain control) on the amplifier PCB. Increase clockwise until the multimeter reads 115 V AC. on the output terminals.
8. Slowly adjust RV2 on the Main Amplifier PCB. until the amplifier trips.
9. Reduce RV4 until the output is again 100 V AC.
10. Check amplifier stops tripping
11. Increase RV4 slowly until the output is 115 V AC. Check that the amplifier trips. If not repeat (7).
12. Reset RV4 gain control for 100 volt AC output on the multimeter.

## 2.6 Installing a PA200B Amplifier into the rack (runner mounting)

**WARNING: THE AMPLIFIER IS VERY HEAVY (18 kg)  
PERSONAL INJURY MAY RESULT FROM MIS-HANDLING**

1. Fully extend the runner arms so the amplifier can be seated in the supporting brackets.
2. Carefully lift the amplifier into position in the supporting brackets.
3. Connect the leads PLA, SKB, PLC AND SKD, the earth tag and the DC connections on to the rear of the amplifier. See A0850-M3.
4. Depress the catches on each side of the slider arms and push the amplifier fully home.
5. Secure to the rack using the four screws through the front panel flanges.
6. Depress the Mains Supply switch, ensure that the green indicating light is ON.
7. NB - If a replacement amplifier is being fitted the slide inner beams must be removed from the old amplifier and fitted to the replacement.

## 2.7 Removing a PA200B from the Rack

1. Isolate the mains supply by depressing the red button of the appropriate circuit breaker. All indicators of that particular amplifier should be extinguished.
2. Remove the four fixing screws at the corners of the amplifier panel.
3. Withdraw the amplifier to the limit of its slide.

4. Disconnect the leads connecting the rear of the amplifier to the rack. The two halves of connectors B and C are released by centralising the slider lock (on the chassis side). The DIN plug D is released by pulling the aluminium ring (not the black plastic) away from the rear of the amplifier.
5. Depress the catches on the slides.
6. Carefully withdraw the amplifier completely.

## 2.8 Operation

### 2.8.1 Switch On:

Depress the AMP ON rocker switch.

Ensure that all the green LED's are illuminated and all red LED's are off.

Note: The mains or 24 V DC input LED's may be off on single supply operation.

### 2.8.2 Fault finding

Supply Fail Red LED Illuminated	Loss of either mains or 24 V DC input. If mains supply green LED is off, check mains fuse in PLA is OK and input breaker is on. If 24 V DC input green LED is off, check remote DC switch (PLC) and input breaker is ON.
O/P Overload Trip Red LED Illuminated	Amplifier overload. The trip will reset automatically. If the amplifier repeatedly trips, check input signal level and 100 Volt output cables for short circuit.
20 V Red LED Illuminated	Pre-amplifier 20 Volt supply is outside permissible limits.
Transistor Fuse Red LED Illuminated	Failure of Fuses F1 to F12. Check fuses and replace any failed fuses. Check and replace associated transistor(s).
Temperature Trip Red LED Illuminated	Heatsink temperature is above 100°C. The thermal cut out will reset automatically when the temperature drops below 100°C.

24 V Fuse Green LED Not Illuminated      Failure of Fuse F13 which supplies the pre-amplifier and bias circuits.

Transistor Bias Green LED Not Illuminated      Fault logic is active. If this LED is not illuminated, check fuse F14

Note: FOR SINGLE SUPPLY APPLICATIONS SET LK1 PINS 1-2

## HANDBOOK FOR THE PA200B AUDIO AMPLIFIER

### SECTION 3

#### TECHNICAL DESCRIPTION

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3.2 Circuit Description (Drawing A0622) .....	3.1
3.3 Mains Failure Change-over .....	3.3

### **3. TECHNICAL DESCRIPTION**

#### **3.1 General**

This section contains the technical description of the components comprising the PA200B Audio Amplifier.

#### **3.2 Circuit Description (Drawing A0622)**

##### **3.2.1 Audio Circuit**

The balanced input is transformer coupled and provides an input impedance of 10 kohm. This is matched to a standard 600 ohm line by means of a 600 ohm resistance across SKD pins 1 and 2. If more than one amplifier is employed on the system, matching is applied at the input of one only. The input signal is buffered and filtered (50 Hz to 25 kHz) by IC6. The output from the level control (RV4) feeds the phase splitter and feed back amplifier IC3. The feedback differential amplifier isolates the output transformer feedback winding from output loading effects.

A regulated 20 V supply for the input amplifier and phase splitter is derived from the main supply rail by means of the integrated regulator VR1.

The splitter output drives the push/pull transformer coupled output stage. The pre-driver transistors (TR17, TR7 and TR15, TR8) drive 6 output power transistors in parallel (TR1-6, TR9 - 14). Negative feedback derived from the output emitter resistors is applied to the respective driver stages.

##### **3.2.2 Fault Indicators**

A number of fault conditions are detected by circuitry within the amplifier and indicated by means of front-panel mounted LED's. (See A0850-M2).

The Amplifier Fault Display PCB. (A0624) receives inputs from various parts of the amplifier and provides outputs as follows:

###### **1. Mains Indicator**

The green mains LED together with C1, R2 and the internal LED of the opto-isolator IC1 monitors the AC supply across half of the mains transformer primary.

With mains present, the green LED lights and IC1 provides a 50 HZ positive-going output via R119 which keeps C36 charged to maintain TR25 conducting. Failure of the mains supply extinguishes the green LED and, by removing IC1 output, allows C36 to discharge. When C36 is discharged TR25 switches off de-energising RL2 which provides the external mains failure indicator via PLC/2.

## 2. Supply Fail Indicator

This indicator is used to indicate failure of either mains or 24 volt input supplies. The mains input monitor (IC1) and 24 volt input via D47 are monitored by IC4. The LED is illuminated when both supplies are lost (LK1 1-2) or either supply is lost (LK1 2-3).

## 3. 20V Under/Over Volts Indicator

IC2C and IC2D form a window detector which provides indication of 20 V rail fluctuations in excess of the permissible limits (low 18.5 V, high 21.7 V). The 20 V rail is sampled at the junction and compared by IC2 with reference voltage derived from the +5V logic supply. Normally, the output from both is high. Supply rail movements above or below permissible limits drive the outputs of IC2 low, thereby lighting the red 20 V LED via IC4. The 24V fuse (F13) fault masks this indicator.

## 4. Output Transistor Fuse Indicator

The voltage at each of the output transistor collectors is sampled and de-coupled by one of the networks. Under normal conditions the diodes D23 to D34 are reverse biased. TR23 is turned off via R87. Failure of any fuse F1 to F12 results in the associated diode (D23 to D34) being forward biased which turns on TR23, this is detected by IC4 which drives the red transistor fuse LED.

## 5. Overload Trip Indicator

Amplifier overload is detected by monitoring the output transistor current. The output drive voltage is rectified (D21/D22) and the resulting voltage filtered (C24). This triggers TH1 when the trip threshold set by RV2 is exceeded. The thyristor discharges C23. The amplifier output drive is clamped off by IC4, TR19, 20 and 22 while C23 recharges via R96. The amplifier is enabled when the capacitor voltage exceeds the capacitor threshold IC2B. The C23 time delay also inhibits the output during power up to allow the amplifier to stabilise.

## 6. Temperature Trip

The output transistor heat sink is fitted with a 100°C thermal cut-out, which is in series with RP2D across the logic supply rail. Under normal conditions, the cut out is closed. If the cut-out opens IC4 will light the temperature trip LED, the IC4 will also remove the output transistor drive via TR22, 19 and 20. The cut-out will reset automatically when the heat sink temperature drops below 100°C returning the amplifier to the normal working condition.

## 7. 24V Supply Indicator

The green 24 V supply indicator LED monitors the DC supply rail via R4 and is normally on if an external DC supply is connected. Non illumination indicates failure of the external 24 V DC supply or the remote DC switch (PLC) is off.

## 8. 24V fuse indicator

The status of the 24 V rail following F13 is monitored by IC4 and indicated by the green 24 V fuse LED. Failure of F13 causes the LED to extinguish.

## 9. Logic 5V0 Indicator

A 5.0 V stabilised rail is derived from the 24 V supply rail by IC7 for use by the fault logic circuitry. Status of the rail is monitored directly by the green logic 5V0 LED which is normally on.

## 10. Transistor Bias Indicator

The transistor bias LED is on when the output stage is enabled. IC4 monitors the fault status and turns the amplifier on if no faults are detected.

## 11. Remote Indicator Driver

IC4 provides the amplifier fault monitoring and prioritisation functions. If any input indicates a fault, the fault relay is de-energised via TR26.

### 3.3 Mains Failure Change-over

Automatic change-over occurs from AC to DC operation in the event of failure of the mains supply or mains-derived DC rail. Reversion to mains operation on restoration of the supply is also automatic.

At switch on, with an AC supply present, the DC rail is established at 30-35 V from the bridge rectifier BR1 and BR2. TH1 and D1 are therefore reverse-biased, isolating the amplifier from the 24 V DC supply. If the mains supply fails, the 30-35 V rail falls until it is below the TH1 gate voltage, at which point the thyristor conducts, connecting the amplifier to the 24 V DC supply. If the AC supply is restored, TH1 again becomes reverse-biased and ceases to conduct.

When the amplifier is switched on with only a DC supply present, C1 is partially charged via D45/81 before TH1 is turned on in order to prevent a possibly damaging surge current through the thyristor. The voltage across R81 due to C1 charging current, charges C20 via R90 until TH1 cathode-gate voltage is sufficient to fire the thyristor, completing connection to the 24 V DC input.

When operating from the mains supply, TH1 is non-conducting, and switch-off is achieved merely by removal of the supply by means of S1. However, to switch off from DC operation, it is necessary to remove the TH1 holding current. This is achieved by means of TR21/18 and RL1.

When operating from either the mains supply or 24 V DC supplies, TR21 is held on by current via R120 or D47/R101 (or both if both supplies are present) thereby biasing TR18 off and hence RL1A is de-energised, (contacts open).

When switching off from DC operation, bias is removed from TR21, switching TR18 on and momentary energising RL1 using current supplied by C25 which is charged during operation via D48/R82. The momentary closing of RL1 contacts is sufficient to commutate TH1 which fails to switch on again when the contacts open in the absence of gate voltage from C20. IC4 monitors both AC and DC inputs. If both supplies are off, IC4 will mute the amplifier by removing the output bias. This ensures that commutation of TH1 occurs while the amplifier current is at its quiescent level.

## HANDBOOK FOR THE PA200B AUDIO AMPLIFIER

### **SECTION FOUR**

#### **MAINTENANCE**

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4.1 Preventive Maintenance.....	4.1

## 4. MAINTENANCE

### 4.1 Preventive Maintenance

The PA200B Audio Amplifier requires no preventive maintenance.

#### 4.1.1 Servicing

No special tools or test equipment are required for servicing.

#### 4.1.2 Replacements

In the event of a fault occurring, care should be taken to replace components with types of similar quality and tolerance to maintain the original noise and performance specifications.

#### **WARNING:**

**THE UNIT IS FITTED WITH A MAINS INPUT FILTER UNIT AND THEREFORE VOLTAGES MAY EXIST ON COMPONENTS EVEN THOUGH NO SUPPLY IS AVAILABLE TO THE UNIT.**

**Caution:** The system contains components which are sensitive to and can be permanently damaged by static electricity which can be carried by hands or tools. Within the closed bay they are not at risk, but it is essential that full anti-static precautions are carried out before touching or handling the printed circuit board assemblies or the components on them. When being replaced they must be put into closed anti-static conductive packaging.

**Precautions:** When replacing PCB's ensure that the power is switched OFF, but the earth stud is connected. Always wear an anti static wrist strap when handling PCB's. Handle PCB's only by the edges and avoid contact with any exposed electrical connections. When removing a new PCB from its packing, touch an earth connection first to release any static voltage build-up prior to inserting it into the equipment.

Anti-static bags should be grounded prior to opening them to remove the contents, and similarly grounded prior to placing a PCB in the package. Suspected faulty PCB's should be placed in conductive packages to prevent further possible damage to them. PCBs that are not correctly packed in anti static bags when returned will not be covered by any warranty.

## HANDBOOK FOR THE PA200B AUDIO AMPLIFIER

### SECTION FIVE

#### PARTS LISTS

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5.2 AMPLIFIER PA200B HEATSINK/PCB ASSY. ....	5.3

## 5. PARTS LISTS

### 5.1 AMPLIFIER PA200B PARTS LIST

Part No A0850

Item	Description	Part No.	Qty.
1	FRONT PANEL	A0826 -EDN	1
2	CHASSIS	A0792 -01	1
3	HEATSINK/PCB ASSY	A0730 -EDN	1
7	DISPLAY PCB ASSY	A0624 -01	1
8	COVER	A0374 -01	1
9	MOUNTING BRACKET	A0834 -01	1
10	GUIDE BRACKET	A0634	1
11	GUIDE BRACKET	A0635	1
13	TRANSFORMER	25534	1
14	TRANSFORMER	25311	1
15	CAPACITOR 22000uF	24627	1
16	SWITCH	22317	1
17	MAINS PLUG	25303	1
18	FUSE 20mm 10A	18967 /10A	1
19	THYRISTOR	14241	1
20	DIODE	25392	1
21	MOUNTING KIT	14244	1
22	MOUNTING KIT	12206	1
24	BRIDGE RECTIFIER	14248	2
26	CONNECTOR	14179	1
27	TERMINAL POST RED	25516	1
28	TERMINAL POST BLK	25517	1
29	RETAINER KIT	20582	1
31	STUD 1/4 TURN	25305	4
32	RECEPTACLE	25306	4
33	RETAINER	25307	4
34	PILLAR	25372	1
35	FRONT PANEL LABEL	25312	1
36	SPACER No 4 x 3/16	25419	3
37	HANDLE	25413	2
39	D CONNECTOR LATCH	25309	2 PAIR
40	CARDGUIDE	25322	1
41	CARDGUIDE	25321	1
49	LEAD ASSY (LINE O/P)	A0631 -EDN	1
50	LEAD ASSY (FAULT)	A0632 -01	1
51	LEAD ASSY (I/P)	A0633 -01	1

Item	Description	Part No.	Qty.
52	LEAD ASSY (MAINS)	A0639 -01	1
55	VOLTAGE SELECT (115V)	A0746 -01	1
	VOLTAGE SELECT (240V)	A0746 -02	1
56	LEAD ASSY	A0750 -01	1
57	LEAD ASSY	A0750 -02	1
58	LEAD ASSY	A0750 -03	1
59	LEAD ASSY	A0750 -04	1
60	LEAD ASSY	A0750 -05	1
61	LEAD ASSY	A0750 -06	1
62	LEAD ASSY	A0750 -07	1
63	LEAD ASSY	A0750 -08	1
66	LEAD ASSY	A0751 -01	1
67	LEAD ASSY	A0751 -02	1
68	LEAD ASSY	A0751 -03	1
69	LEAD ASSY	A0751 -04	1

## 5.2 AMPLIFIER PA200B HEATSINK/PCB ASSY.

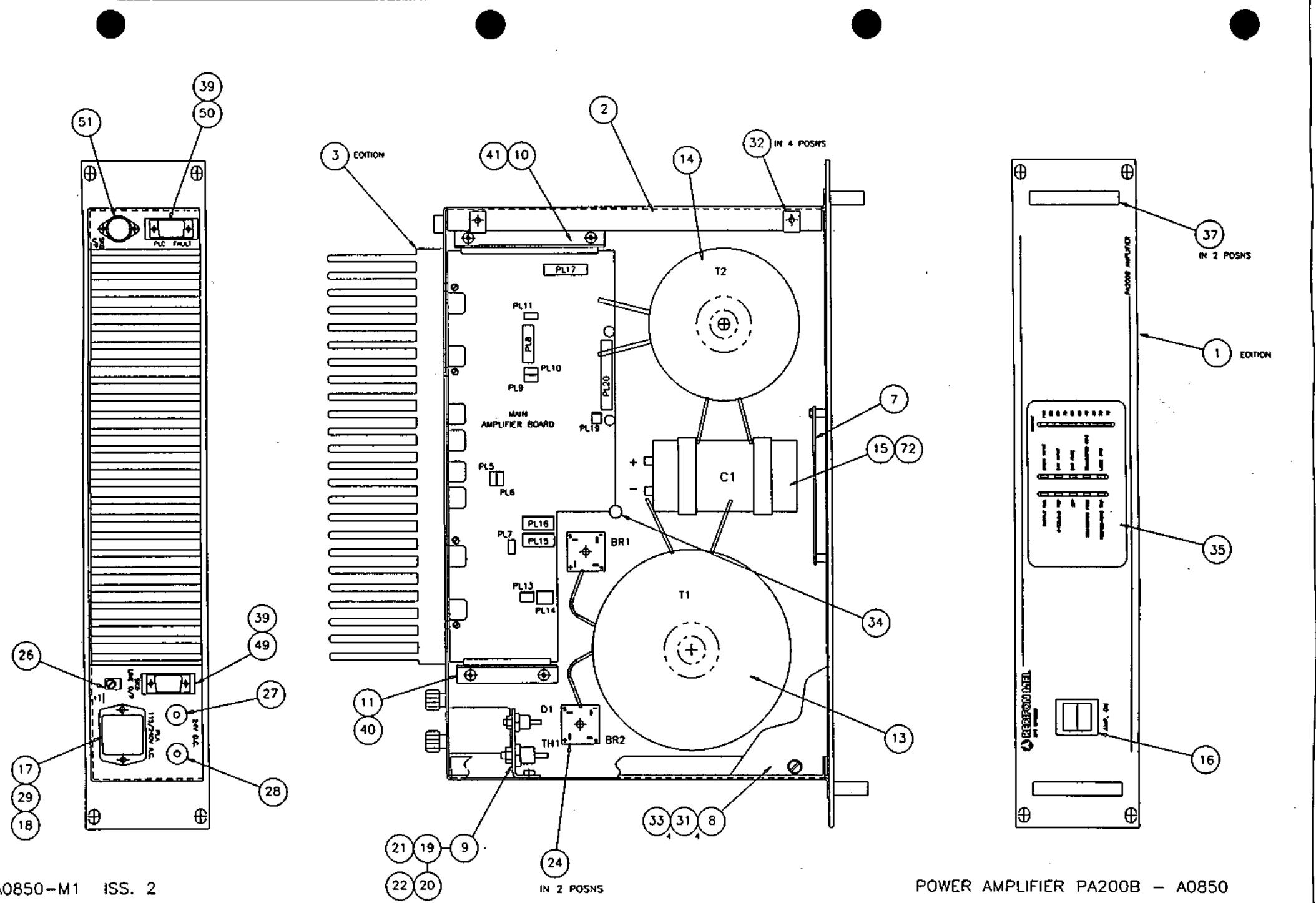
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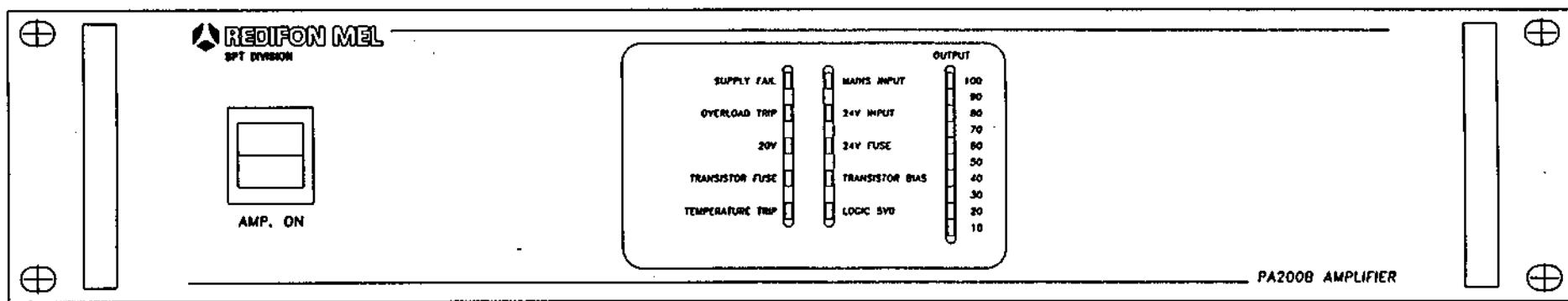
Item	Description	Part No.	Qty.
1	HEATSINK	A0789 -01	1
3	AMPLIFIER PCB ASSY	A0622 -EDN	1
4	SIL-PAD	25379	14
5	INSUL BUSH	25380	14
6	BRACKET	A0638	4
8	TRANSISTOR MNT 6337J	25542	12
9	TRANSISTOR TIP 34A	14172	2
10	RESISTOR 100R	11920	1
11	CAPACITOR 0 $\mu$ 1	14249 /0 $\mu$ 1	1
12	THERMAL SWITCH	13945	1
14	LEAD ASSY.	A0742	1
15	LEAD ASSY.	A0743	1
16	RESISTOR 27 $\Omega$	11920	1
17	CAPACITOR 0.47 $\mu$ f	14249	1

## HANDBOOK FOR THE PA200B AUDIO AMPLIFIER

### SECTION SIX DRAWINGS AND DIAGRAMS

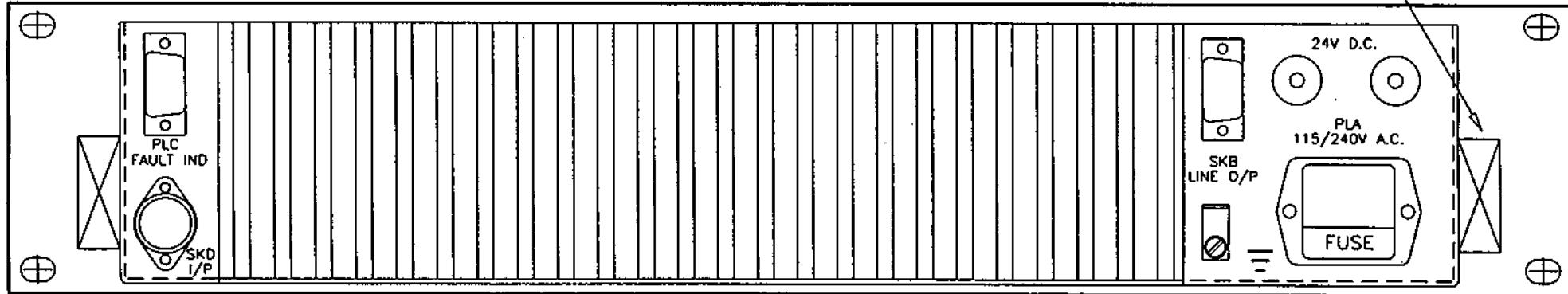
<u>DRAWING NO.</u>	<u>EQUIPMENT</u>
A0850 SHT.M1	AMPLIFIER PANEL PA200B
A0850 SHT.M2	AMPLIFIER FRONT PANEL
A0850 SHT.M3	AMPLIFIER REAR PANEL
A0850 SHT.2	AMPLIFIER PANEL PA200B CIRCUIT DIAGRAM
A0730 SHT.M1	HEATSINK/PCB ASSEMBLY
A0622 SHT.1	MAIN AMPLIFIER PCB LAYOUT
A0622 SHT.2	MAIN AMPLIFIER PCB CIRCUIT DIAGRAM
A0624 SHT.1	AMPLIFIER DISPLAY PCB LAYOUT
A0624 SHT.2	AMPLIFIER DISPLAY PCB CIRCUIT DIAGRAM



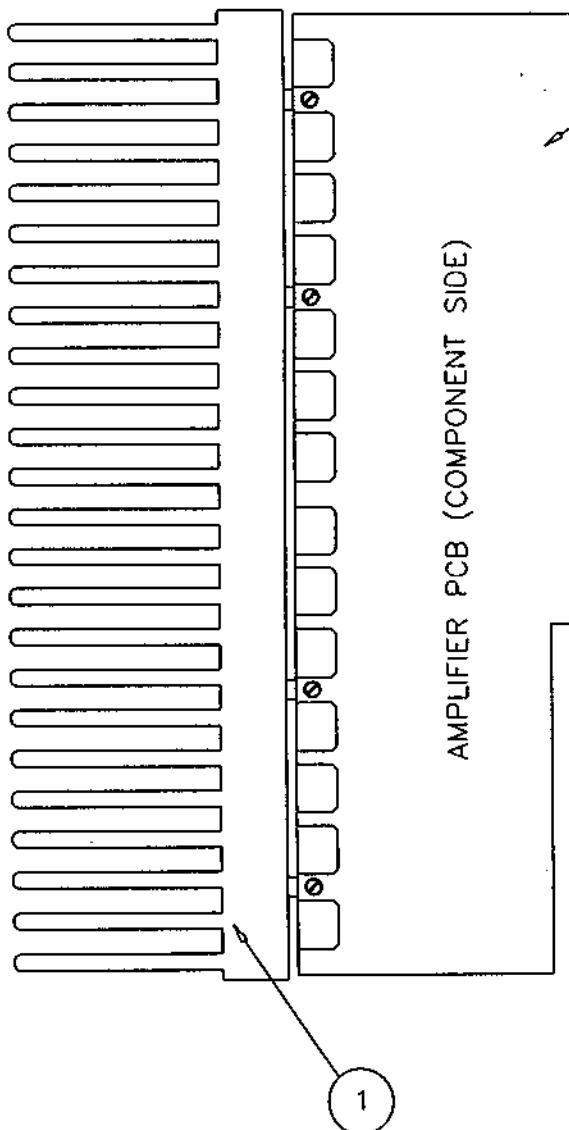


A0850-M2 ISS. 1

PA200B AMPLIFIER FRONT PANEL



RUNNER BEAMS



AMPLIFIER PCB (COMPONENT SIDE)

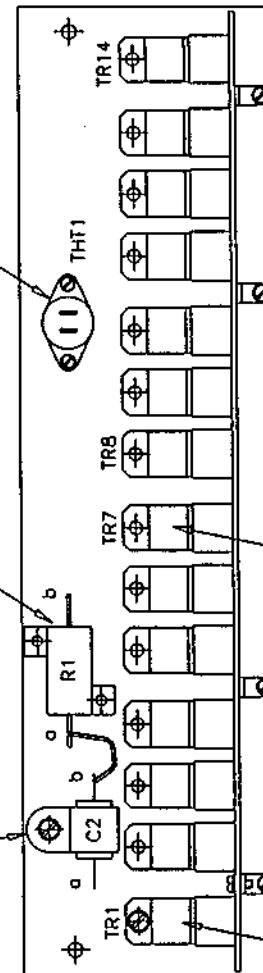
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EDN 01/02 10  
EDN 03/04 16

EDN 01/02 11  
EDN 03/04 17

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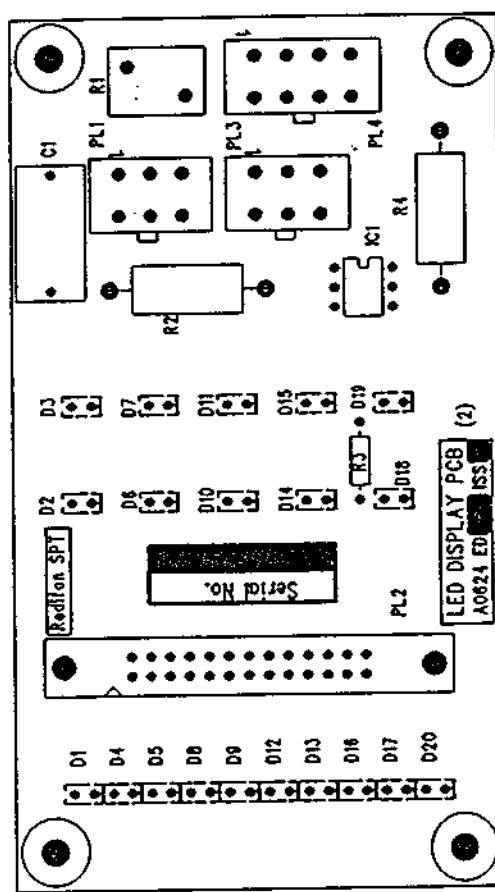


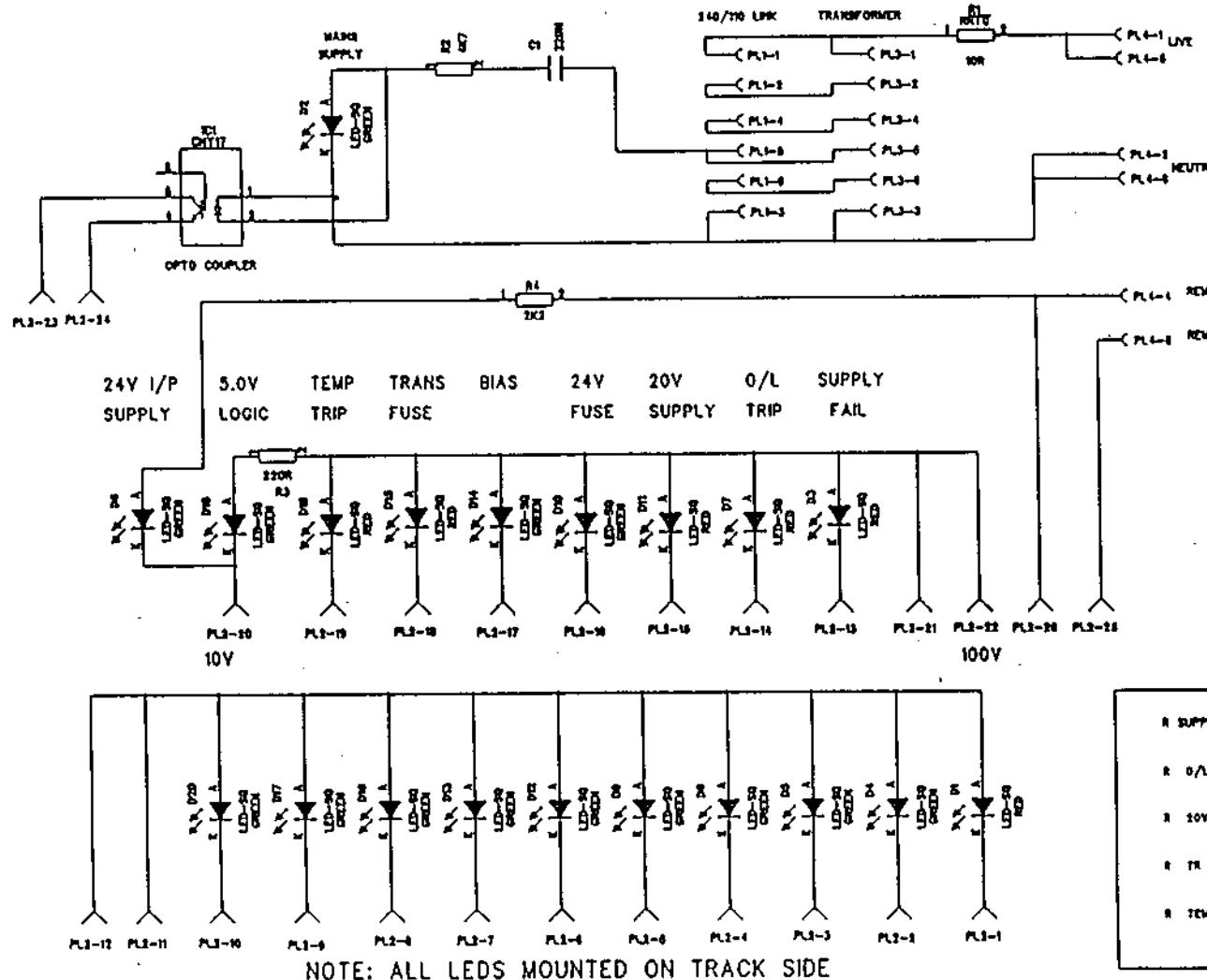
6  
IN 4 POSNS

9 4 5  
IN 2 POSNS  
TR7 & TR8

8 4 5  
IN 12 POSNS

A0624 SHT1 AMPLIFIER DISPLAY PCB LAYOUT





R SUPPLY FAIL	0 VARIO	2 100V
R O/LOAD	0 24V INPUT	0 90V
R 20V	0 24V FUSE	0 60V
R TR FUSE	0 BIAS	0 40V
R TEMP	0 LOGIC	0 20V
		0 10V

A0624 SHT2 AMPLIFIER DISPLAY PCB CIRCUIT DIAGRAM

HANDBOOK  
FOR  
PA300B AUDIO AMPLIFIER

RSPT PART NO.	A0700	AUTHOR	
RSPT ORDER NO.		APPROVED	
CUSTOMER		ISSUE	2
ORDER NO.		DATE	01.10.97.

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## HANDBOOK FOR THE PA300B AUDIO AMPLIFIER

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## HANDBOOK FOR THE PA300B AUDIO AMPLIFIER

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## 1. INTRODUCTION

### 1.1 General

This handbook provides information for the operation and maintenance of the PA300B Audio Amplifier which is manufactured by Redifon MEL Ltd SPT Division for use as an amplifier in public address, broadcast and alarm systems.

### 1.2 System Description

The PA300B Audio Amplifier provides an output of 300 watts at 100V line level.

The amplifier is constructed on a metal chassis designed for accommodation in a nineteen inch rack, either by slides for land based applications or by runners to facilitate access to the unit interior without complete removal from the rack in mobile applications.

All sockets for the connection of power supplies, signal input, loudspeaker output etc. are mounted at the rear of the chassis adjacent to the output transistor heatsinks.

The unit is of modular construction with the majority of circuit components being mounted on two plug in circuit boards as follows:

The main amplifier PCB A0622 contains the complete audio circuitry including the output transistors.

The display PCB A0624 contains the circuitry to provide drive to the appropriate indicators in the event of a fault.

Power supply components comprising the mains transformers, bridge rectifiers and smoothing capacitors are all mounted directly on the amplifier chassis.

The mains transformer is of the toroidal type which can be connected for either 115 V or 230V AC operation as required.

The output transformer is also a toroidal type, the secondary of which can be connected for a 50 V or 100 V line output level.

### 1.3 Specification

#### 1.3.1 Power Amplifier Performance

Power output	300 Watts, line level 100 V.
Frequency response	50 Hz - 20 kHz (-3 dB referred to level at 1 kHz)
Total Harmonic Distortion	1.5% max. at maximum rated output.
Input sensitivity	An input of 0 dB produces an output of 100 V, set by the output level control.
Input impedance	10 kohm balanced.
Protection	Self-resetting thermal protection for output transistors. Self-resetting output overload trip.
	Mains and DC. rail fuses. All output transistors individually fused.
Indicators	Mains and supply rail status indicators. Transistor, overload and thermal trip indicators. An output is provided to drive an external fault indicator Output level indication.
Controls	Amplifier ON/OFF switch. output level control, screwdriver operated.

#### 1.3.2 Mechanical

Overall height	133 mm (5.25 inch)
Width	482 mm (19 inch)
Depth	368 mm (14.5 inch)
Weight	20 kg

#### 1.3.3 Electrical

Input voltage	115 V or 230 V AC/ 600 VA max. 50-60 Hz, (105 mA quiescent) 24V DC. at 25 A.
---------------	------------------------------------------------------------------------------------

#### 1.3.4 Environmental

Operating temperature range -10°C to +50°C

Storage temperature range -40°C to +70°C

Relative humidity 95% at 40°C

Shock and vibration as normally encountered in shipping and handling.

## HANDBOOK FOR THE PA300B AUDIO AMPLIFIER

### SECTION 2 OPERATION

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## 2. OPERATION

### 2.1 Mains input Voltage

The mains input voltage can be set by link connections in plug PL1 mounted on the display PCB on the rear of the front panel. Check before connecting to any supplies and reset only while no mains supplies are connected.

110 V	Link Pins 1 to 6 & 3 to 4
125 V	Link Pins 1 to 5 & 2 to 3
235 V	Link Pins 4 to 5
250 V	Link Pins 2 to 5

100 Volt / 50 Volt Output Option

### 2.2 Pre-set Adjustments

equipment required:

Multimeter                                  Avometer Model 8 or equivalent.

Audio Test Set                              Ferrograph RTS or equivalent.

### 2.3 Output Stage

The Bias RV1 control is factory-set and should require adjustment only when one or more of the output transistors, driver transistors or associated components have been replaced.

To adjust:

1. Set the multimeter to the 10A range and place a short circuit across its terminals.
2. Switch OFF the amplifier. Disconnect the output transformer centre tap from C1+. Connect the multimeter in series with this lead.
3. Switch ON the amplifier. Wait until the overload trip resets, this allows the switch-on transients to subside. Remove the short circuit from the meter terminals. Switch the meter to the 100mA range.
4. Allow the amplifier to warm up for at least fifteen minutes. With no signal input, adjust RV1 for a reading of 20 - 30 mA.
5. Switch OFF the amplifier. Remove the test connections and replace the transformer lead.

## **2.4 Output Level Indicator**

Pre-set RV3

To adjust:

1. Connect a dummy load of 600 ohm across the amplifier input. Using the test set apply a signal of 1 kHz at 0 dB.
2. Connect the multimeter set on the 250 V AC. range to the amplifier output.
3. Switch ON the amplifier. Adjust the Output level control for a reading of 100V r.m.s. on the multimeter.
4. Adjust RV3 until the red 100 volt LED on the Output Level Indicator is just on.
5. Switch OFF the amplifier. Disconnect and remove all the test equipment.

Notes:

- A 0 dBm input signal produces a full scale output indication.
- The amplifier is set for a bar graph display (LK2 1-2).
- LK2 can be moved to pins 2.3 if a moving dot display is preferred.

## **2.5 Adjusting the overload Trip and Gain Control**

1. Remove the amplifier from the rack assembly and set up on the bench.
2. Adjust the output level indicator pre-set RV3.

Note: The audio test set in para. 2.2 is being used to provide a sine wave of 1 kHz at a level of 0 dB (700 mV). Any high quality signal generator could be used in this application.

3. Connect a suitable 33 ohm 300 Watt resistor to the 100 V output of the amplifier. The resistor should have adequate heat sinking to dissipate the heat which will be generated.
4. Connect a 1 kHz sine wave to the input of the amplifier in parallel with a 600 ohm dummy load (600 ohm 0.1 Watt resistor).
5. Connect a multimeter across the 33 ohm load resistor, switch to the AC. volt scale, (able to read at least 130 V).
6. Apply the appropriate mains supply to the amplifier. Switch ON.

7. Adjust RV4 (gain control) on the amplifier PCB. Increase clockwise until the multimeter reads 115 V AC. on the output terminals.
8. Slowly adjust RV2 on the Main Amplifier PCB. until the amplifier trips.
9. Reduce RV4 until the output is again 100 V AC.
10. Check amplifier stops tripping
11. Increase RV4 slowly until the output is 115 V AC. Check that the amplifier trips. If not repeat (7).
12. Reset RV4 gain control for 100 volt AC output on the multimeter.

## 2.6 Installing a PA300B Amplifier into the rack (runner mounting)

**WARNING: THE AMPLIFIER IS VERY HEAVY (20 kg)  
PERSONAL INJURY MAY RESULT FROM MIS-HANDLING**

1. Fully extend the runner arms so the amplifier can be seated in the supporting brackets.
2. Carefully lift the amplifier into position in the supporting brackets.
3. Connect the leads PLA, SKB, PLC, SKD, the earth tag and the DC connections on to the rear of the amplifier. See A0700-M3.
4. Depress the catches on each side of the slider arms and push the amplifier fully home.
5. Secure to the rack using the four screws through the front panel flanges.
6. Depress the Mains Supply switch, ensure that the green indicating light is ON.
7. NB - If a replacement amplifier is being fitted the slide inner beams must be removed from the old amplifier and fitted to the replacement.

## 2.7 Removing a PA300B from the Rack

1. Isolate the mains supply by depressing the red button of the appropriate circuit breaker. All indicators of that particular amplifier should be extinguished.
2. Remove the four fixing screws at the corners of the amplifier panel.
3. Withdraw the amplifier to the limit of its slide.

4. Disconnect the leads connecting the rear of the amplifier to the rack. The two halves of connectors B and C are released by centralising the slider lock (on the chassis side). The DIN plug D is released by pulling the aluminium ring (not the black plastic) away from the rear of the amplifier.
5. Depress the catches on the slides.
6. Carefully withdraw the amplifier completely.

## 2.8 Operation

### 2.8.1 Switch On:

Depress the AMP ON rocker switch.

Ensure that all the green LED's are illuminated and all red LED's are off.

Note: The mains or 24 V DC input LED's may be off on single supply operation.

### 2.8.2 Fault finding

**Supply Fail Red LED Illuminated**

Loss of either mains or 24 V DC input. If mains supply green LED is off, check mains fuse in PLA is OK and input breaker is on. If 24 V DC input green LED is off, check remote DC switch (PLC) and input breaker is ON.

**O/P Overload Trip Red LED Illuminated**

Amplifier overload. The trip will reset automatically. If the amplifier repeatedly trips, check input signal level and 100 Volt output cables for short circuit.

**20 V Red LED Illuminated**

Pre-amplifier 20 Volt supply is outside permissible limits.

**Transistor-Fuse Red LED Illuminated**

Failure of Fuses F1 to F12. Check fuses and replace any failed fuses. Check and replace associated transistor(s).

**Temperature Trip Red LED Illuminated**

Heatsink temperature is above 100°C. The thermal cut out will reset automatically when the temperature drops below 100°C.

24 V Fuse Green LED Not Illuminated      Failure of Fuse F13 which supplies the pre-amplifier and bias circuits.

Transistor Bias Green LED Not Illuminated      Fault logic is active. If this LED is not illuminated, check fuse F14

Note: FOR SINGLE SUPPLY APPLICATIONS SET LK1 PINS 1-2

## HANDBOOK FOR THE PA300B AUDIO AMPLIFIER

### SECTION 3 TECHNICAL DESCRIPTION

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### **3. TECHNICAL DESCRIPTION**

#### **3.1 General**

This section contains the technical description of the components comprising the PA300B Audio Amplifier.

#### **3.2 Circuit Description (Drawing A0622)**

##### **3.2.1 Audio Circuit**

The balanced input is transformer coupled and provides an input impedance of 10 kohm. This is matched to a standard 600 ohm line by means of a 600 ohm resistance across SKD pins 1 and 2. If more than one amplifier is employed on the system, matching is applied at the input of one only. The input signal is buffered and filtered (50 Hz to 25 kHz) by IC6. The output from the level control (RV4) feeds the phase splitter and feed back amplifier IC3. The feedback differential amplifier isolates the output transformer feedback winding from output loading effects.

A regulated 20 V supply for the input amplifier and phase splitter is derived from the main supply rail by means of the integrated regulator VR1.

The splitter output drives the push/pull transformer coupled output stage. The pre-driver transistors (TR17, TR7 and TR15, TR8) drive 6 output power transistors in parallel (TR1-6, TR9 - 14). Negative feedback derived from the output emitter resistors is applied to the respective driver stages.

##### **3.2.2 Fault Indicators**

A number of fault conditions are detected by circuitry within the amplifier and indicated by means of front-panel mounted LED's. (See A0700-M2).

The Amplifier Fault Display PCB. (A0624) receives inputs from various parts of the amplifier and provides outputs as follows:

###### **1. Mains Indicator**

The green mains LED together with C1, R2 and the internal LED of the opto-isolator IC1 monitors the AC supply across half of the mains transformer primary.

With mains present, the green LED lights and IC1 provides a 50 HZ positive-going output via R119 which keeps C36 charged to maintain TR25 conducting. Failure of the mains supply extinguishes the green LED and, by removing IC1 output, allows C36 to discharge. When C36 is discharged TR25 switches off de-energising RL2 which provides the external mains failure indicator via PLC/2.

## 2. Supply Fail Indicator

This indicator is used to indicate failure of either mains or 24 volt input supplies. The mains input monitor (IC1) and 24 volt input via D47 are monitored by IC4. The LED is illuminated when both supplies are lost (LK1 1-2) or either supply is lost (LK1 2-3).

## 3. 20V Under/Over Volts Indicator

IC2C and IC2D form a window detector which provides indication of 20 V rail fluctuations in excess of the permissible limits (low 18.5 V, high 21.7 V). The 20 V rail is sampled at the junction and compared by IC2 with reference voltage derived from the +5V logic supply. Normally, the output from both is high. Supply rail movements above or below permissible limits drive the outputs of IC2 low, thereby lighting the red 20 V LED via IC4. The 24V fuse (F13) fault masks this indicator.

## 4. Output Transistor Fuse Indicator

The voltage at each of the output transistor collectors is sampled and de-coupled by one of the networks. Under normal conditions the diodes D23 to D34 are reverse biased. TR23 is turned off via R87. Failure of any fuse F1 to F12 results in the associated diode (D23 to D34) being forward biased which turns on TR23, this is detected by IC4 which drives the red transistor fuse LED.

## 5. Overload Trip Indicator

Amplifier overload is detected by monitoring the output transistor current. The output drive voltage is rectified (D21/D22) and the resulting voltage filtered (C24). This triggers TH1 when the trip threshold set by RV2 is exceeded. The thyristor discharges C23. The amplifier output drive is clamped off by IC4, TR19, 20 and 22 while C23 recharges via R96. The amplifier is enabled when the capacitor voltage exceeds the capacitor threshold IC2B. The C23 time delay also inhibits the output during power up to allow the amplifier to stabilise.

## 6. Temperature Trip

The output transistor heat sink is fitted with a 100°C thermal cut-out, which is in series with RP2D across the logic supply rail. Under normal conditions, the cut out is closed. If the cut-out opens IC4 will light the temperature trip LED, the IC4 will also remove the output transistor drive via TR22, 19 and 20. The cut-out will reset automatically when the heat sink temperature drops below 100°C returning the amplifier to the normal working condition.

## 7. 24V Supply Indicator

The green 24 V supply indicator LED monitors the DC supply rail via R4 and is normally on if an external DC supply is connected. Non illumination indicates failure of the external 24 V DC supply or the remote DC switch (PLC) is off.

## 8. 24V fuse indicator

The status of the 24 V rail following F13 is monitored by IC4 and indicated by the green 24 V fuse LED. Failure of F13 causes the LED to extinguish.

## 9. Logic 5V0 Indicator

A 5.0 V stabilised rail is derived from the 24 V supply rail by IC7 for use by the fault logic circuitry. Status of the rail is monitored directly by the green logic 5V0 LED which is normally on.

## 10. Transistor Bias Indicator

The transistor bias LED is on when the output stage is enabled. IC4 monitors the fault status and turns the amplifier on if no faults are detected.

## 11. Remote Indicator Driver

IC4 provides the amplifier fault monitoring and prioritisation functions. If any input indicates a fault, the fault relay is de-energised via TR26.

### 3.3 Mains Failure Change-over

Automatic change-over occurs from AC to DC operation in the event of failure of the mains supply or mains-derived DC rail. Reversion to mains operation on restoration of the supply is also automatic.

At switch on, with an AC supply present, the DC rail is established at 30-35 V from the bridge rectifier BR1 and BR2. TH1 and D1 are therefore reverse-biased, isolating the amplifier from the 24 V DC supply. If the mains supply fails, the 30-35 V rail falls until it is below the TH1 gate voltage, at which point the thyristor conducts, connecting the amplifier to the 24 V DC supply. If the AC supply is restored, TH1 again becomes reverse-biased and ceases to conduct.

When the amplifier is switched on with only a DC supply present, C1 is partially charged via D45/81 before TH1 is turned on in order to prevent a possibly damaging surge current through the thyristor. The voltage across R81 due to C1 charging current, charges C20 via R90 until TH1 cathode-gate voltage is sufficient to fire the thyristor, completing connection to the 24 V DC input.

When operating from the mains supply, TH1 is non-conducting, and switch-off is achieved merely by removal of the supply by means of S1. However, to switch off from DC operation, it is necessary to remove the TH1 holding current. This is achieved by means of TR21/18 and RL1.

When operating from either the mains supply or 24 V DC supplies, TR21 is held on by current via R120 or D47/R101 (or both if both supplies are present) thereby biasing TR18 off and hence RL1A is de-energised, (contacts open).

When switching off from DC operation, bias is removed from TR21, switching TR18 on and momentary energising RL1 using current supplied by C25 which is charged during operation via D48/R82. The momentary closing of RL1 contacts is sufficient to commutate TH1 which fails to switch on again when the contacts open in the absence of gate voltage from C20. IC4 monitors both AC and DC inputs. If both supplies are off, IC4 will mute the amplifier by removing the output bias. This ensures that commutation of TH1 occurs while the amplifier current is at its quiescent level.

## HANDBOOK FOR THE PA300B AUDIO AMPLIFIER

### SECTION FOUR

#### MAINTENANCE

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## **4. MAINTENANCE**

### **4.1 Preventive Maintenance**

The PA300B Audio Amplifier requires no preventive maintenance.

#### **4.1.1 Servicing**

No special tools or test equipment are required for servicing.

#### **4.1.2 Replacements**

In the event of a fault occurring, care should be taken to replace components with types of similar quality and tolerance to maintain the original noise and performance specifications.

#### **WARNING:**

**THE UNIT IS FITTED WITH A MAINS INPUT FILTER UNIT AND THEREFORE VOLTAGES MAY EXIST ON COMPONENTS EVEN THOUGH NO SUPPLY IS AVAILABLE TO THE UNIT.**

**Caution:** The system contains components which are sensitive to and can be permanently damaged by static electricity which can be carried by hands or tools. Within the closed bay they are not at risk, but it is essential that full anti-static precautions are carried out before touching or handling the printed circuit board assemblies or the components on them. When being replaced they must be put into closed anti-static conductive packaging.

**Precautions:** When replacing PCB's ensure that the power is switched OFF, but the earth stud is connected. Always wear an anti static wrist strap when handling PCB's. Handle PCB's only by the edges and avoid contact with any exposed electrical connections. When removing a new PCB from its packing, touch an earth connection first to release any static voltage build-up prior to inserting it into the equipment.

Anti-static bags should be grounded prior to opening them to remove the contents, and similarly grounded prior to placing a PCB in the package. Suspected faulty PCB's should be placed in conductive packages to prevent further possible damage to them. PCBs that are not correctly packed in anti static bags when returned will not be covered by any warranty.

## HANDBOOK FOR THE PA300B AUDIO AMPLIFIER

### SECTION FIVE

#### PARTS LISTS

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## 5. PARTS LISTS

### 5.1 AMPLIFIER PA300B PARTS LIST

Part No A0700

Item	Description	Part No.	Qty.
1	FRONT PANEL	A0371 -EDN	1
2	CHASSIS	A0372 -01	1
3	HEATSINK/PCB ASSY.	A0737 -EDN	1
7	DISPLAY PCB ASSY.	A0624 -01	1
8	COVER	A0374 -01	1
9	MOUNTING BRACKET	A0625 -01	1
10	GUIDE BRACKET	A0634	1
11	GUIDE BRACKET	A0635	1
12	FRONT PANEL	A0371 -03	1
13	TRANSFORMER	25310	1
14	TRANSFORMER	25311	1
15	CAPACITOR 22000uF	24627	1
16	SWITCH	22317	1
17	MAINS PLUG	25303	1
18	FUSE 20mm 10A	18967 /10A	1
19	THYRISTOR	14241	1
20	DIODE	25392	1
21	MOUNTING KIT	14244	1
22	MOUNTING KIT	12206	1
24	BRIDGE RECTIFIER	14248	2
26	CONNECTOR	14179	1
27	TERMINAL POST RED	25516	1
28	TERMINAL POST BLK	25517	1
29	RETAINER KIT (MAINS PLUG)	20582	1
31	STUD 1/4 TURN	25305	4
32	RECEPTACLE	25306	4
33	RETAINER	25307	4
34	PILLAR	25372	1
35	FRONT PANEL LABEL	25312	1
36	SPACER No 4 x 3/16	10174	3
37	HANDLE	25304	2
39	D CONNECTOR LATCH	25309	2 PAIR
40	CARDGUIDE	25322	1
41	CARDGUIDE	25321	1
42	PCB SUPPORT	25418	1
48	LEAD ASSY. (LINE O/P)	A0631 -01	1
49	LEAD ASSY. (LINE O/P)	A0631 -02	1
50	LEAD ASSY. (FAULT)	A0632 -01	1
51	LEAD ASSY. (I/P)	A0633 -01	1

Item	Description	Part No.	Qty.
52	LEAD ASSY. (MAINS)	A0639 -01	1
55	VOLTAGE SELECT (115V)	A0746 -01	1
	VOLTAGE SELECT (240V)	A0746 -02	1
56	LEAD ASSY.	A0750 -01	1
57	LEAD ASSY.	A0750 -02	1
58	LEAD ASSY.	A0750 -03	1
59	LEAD ASSY.	A0750 -04	1
60	LEAD ASSY.	A0750 -05	1
61	LEAD ASSY.	A0750 -06	1
62	LEAD ASSY.	A0750 -07	1
63	LEAD ASSY.	A0750 -08	1
66	LEAD ASSY.	A0751 -01	1
67	LEAD ASSY.	A0751 -02	1
68	LEAD ASSY.	A0751 -03	1
69	LEAD ASSY.	A0751 -04	1

## 5.2 AMPLIFIER PA300B HEATSINK/PCB ASSY.

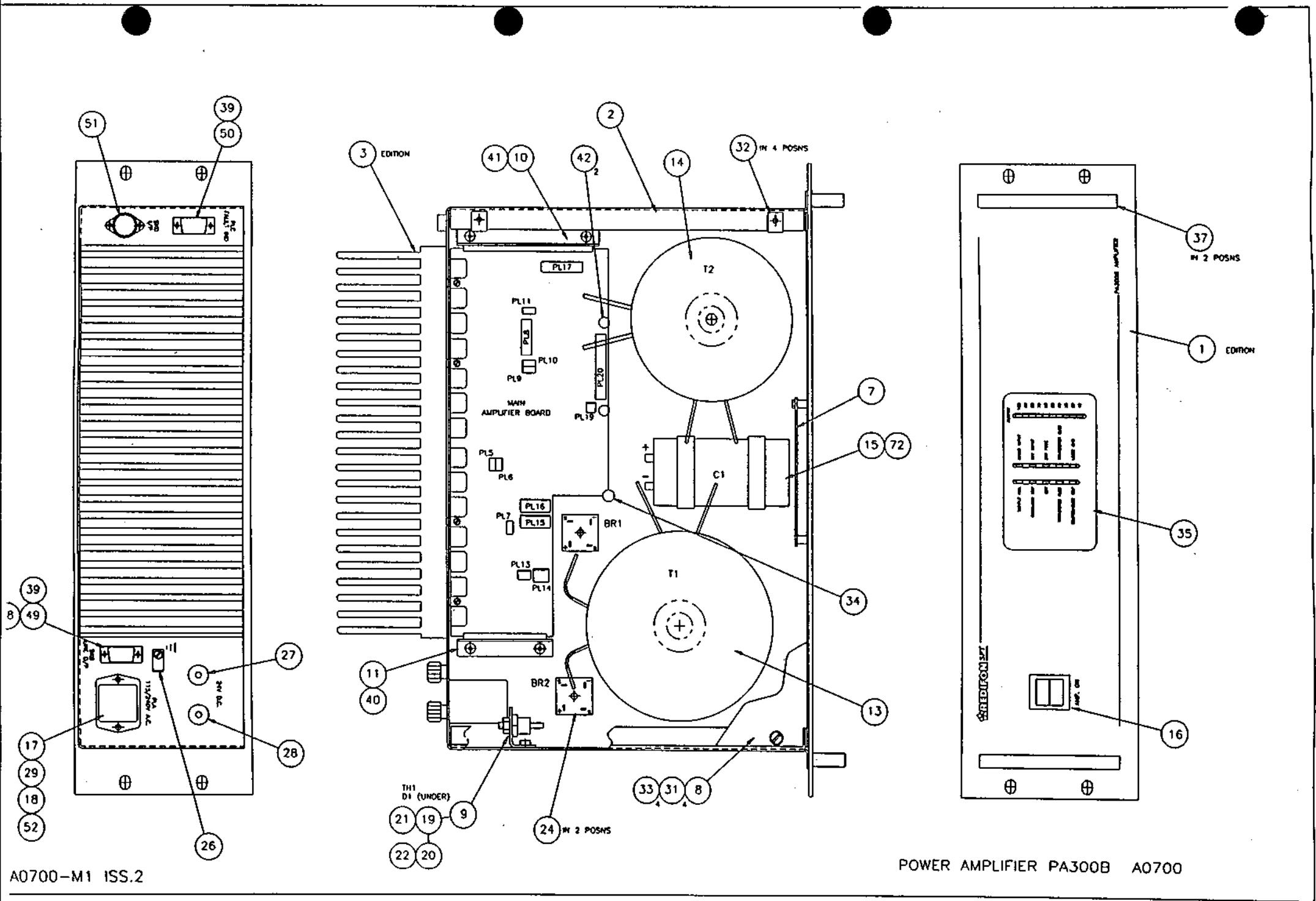
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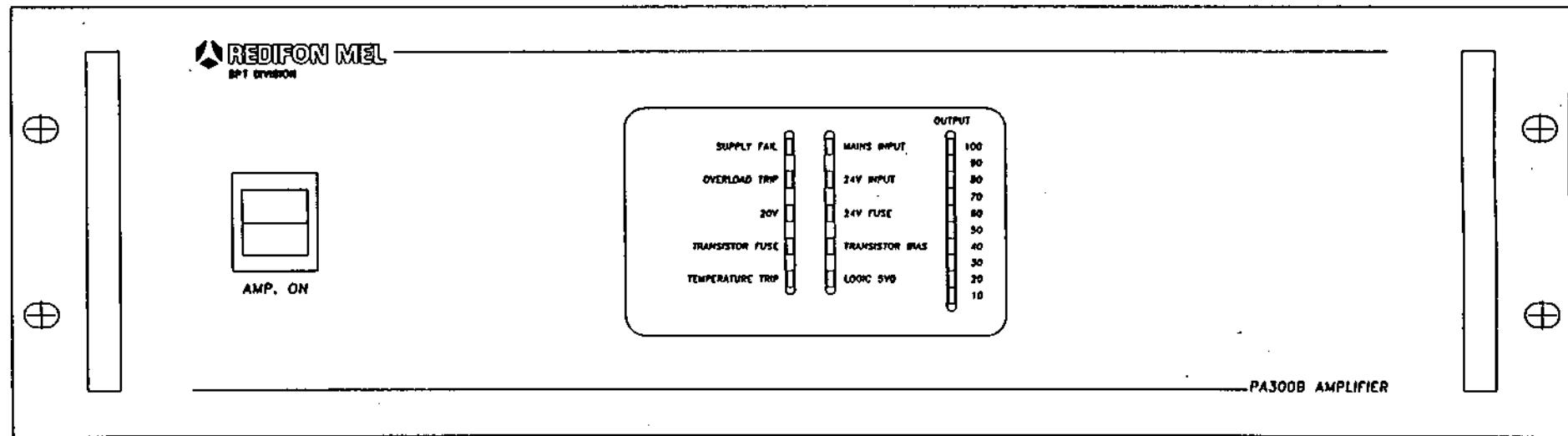
Item	Description	Part No.	Qty.
1	HEATSINK	A0373 -01	1
3	AMPLIFIER PCB ASSY.	A0622 -EDN	1
4	SIL-PAD	25379	14
5	INSUL BUSH	25380	14
6	BRACKET	A0638	4
8	TRANSISTOR MNT6337J	25364	12
9	TRANSISTOR TIP34A	14172	2
10	RESISTOR 100R	11920	1
11	CAPACITOR 0 $\mu$ 1	14249	1
12	THERMAL SWITCH	13945	1
14	LEAD ASSY.	A0742	1
15	LEAD ASSY.	A0743	1
16	RESISTOR 27 $\Omega$	11920	1
17	CAPACITOR 0.47 $\mu$ f	14249	1

## HANDBOOK FOR THE PA300B AUDIO AMPLIFIER

### SECTION SIX DRAWINGS AND DIAGRAMS

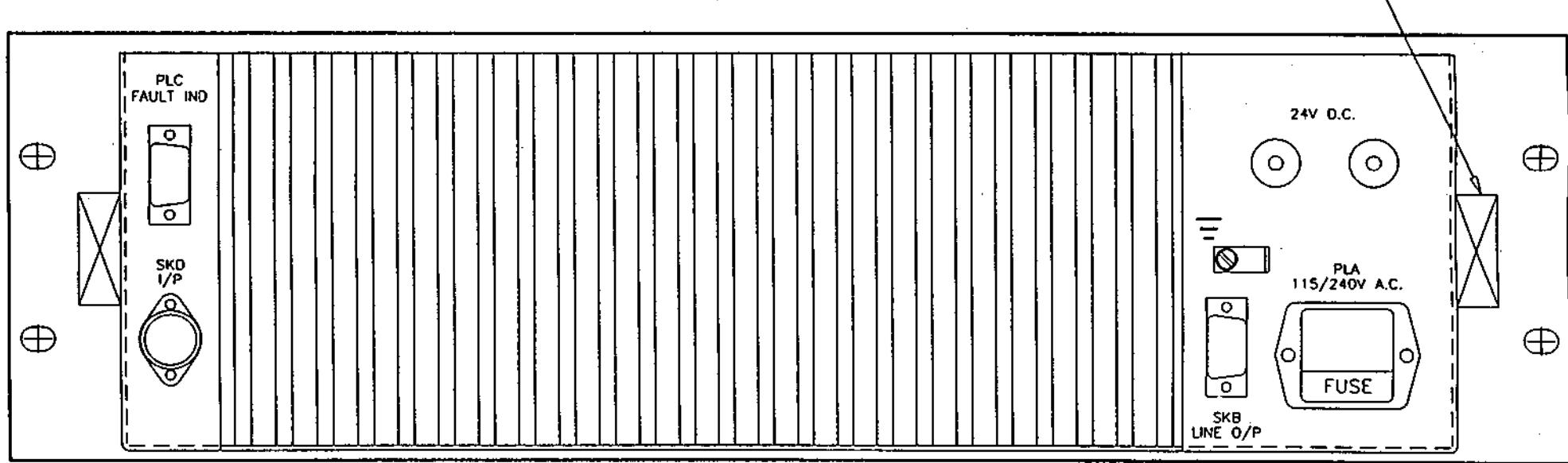
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A0700 SHT.M1	AMPLIFIER PANEL PA300B
A0700 SHT.M2	AMPLIFIER FRONT PANEL
A0700 SHT.M3	AMPLIFIER REAR PANEL
A0700 SHT.2	AMPLIFIER PANEL PA300B CIRCUIT DIAGRAM
A0737 SHT.M1	HEATSINK/PCB ASSEMBLY
A0622 SHT.1	MAIN AMPLIFIER PCB LAYOUT
A0622 SHT.2	MAIN AMPLIFIER PCB CIRCUIT DIAGRAM
A0624 SHT.1	AMPLIFIER DISPLAY PCB LAYOUT
A0624 SHT.2	AMPLIFIER DISPLAY PCB CIRCUIT DIAGRAM





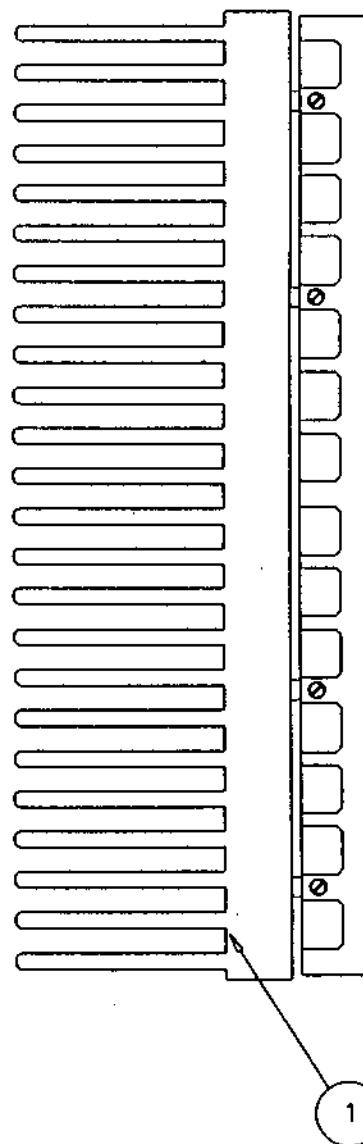
A0700-M2 ISS. 1

PA300B AMPLIFIER FRONT PANEL



A0700-M3 ISS. 1

PA300B AMPLIFIER. REAR PANEL



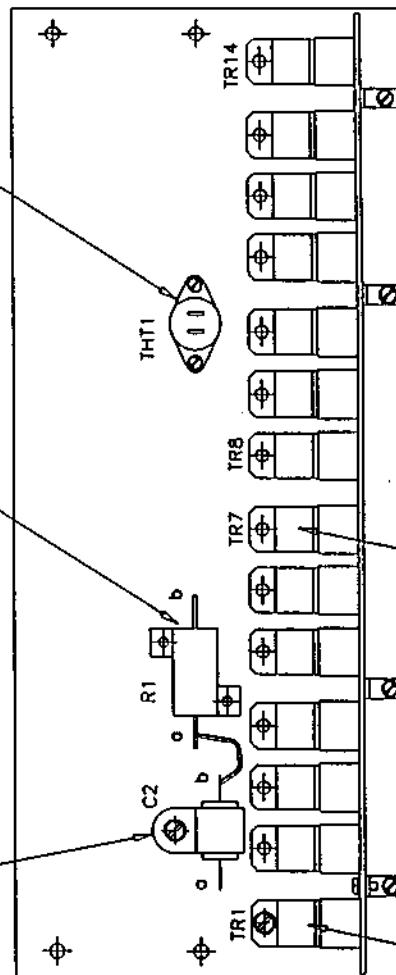
AMPLIFIER PCB (COMPONENT SIDE)

2 EDITION

12

EDN 01/02 10  
EDN 03/04 16

EDN 01/02 11  
EDN 03/04 17

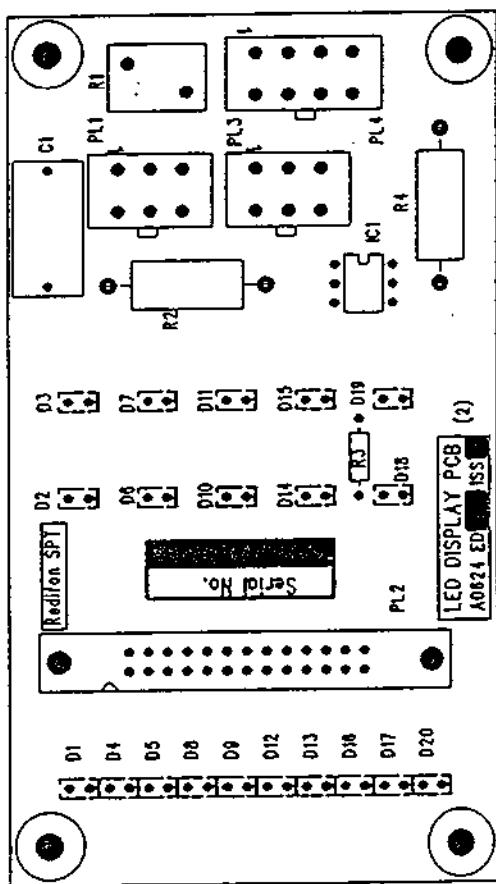


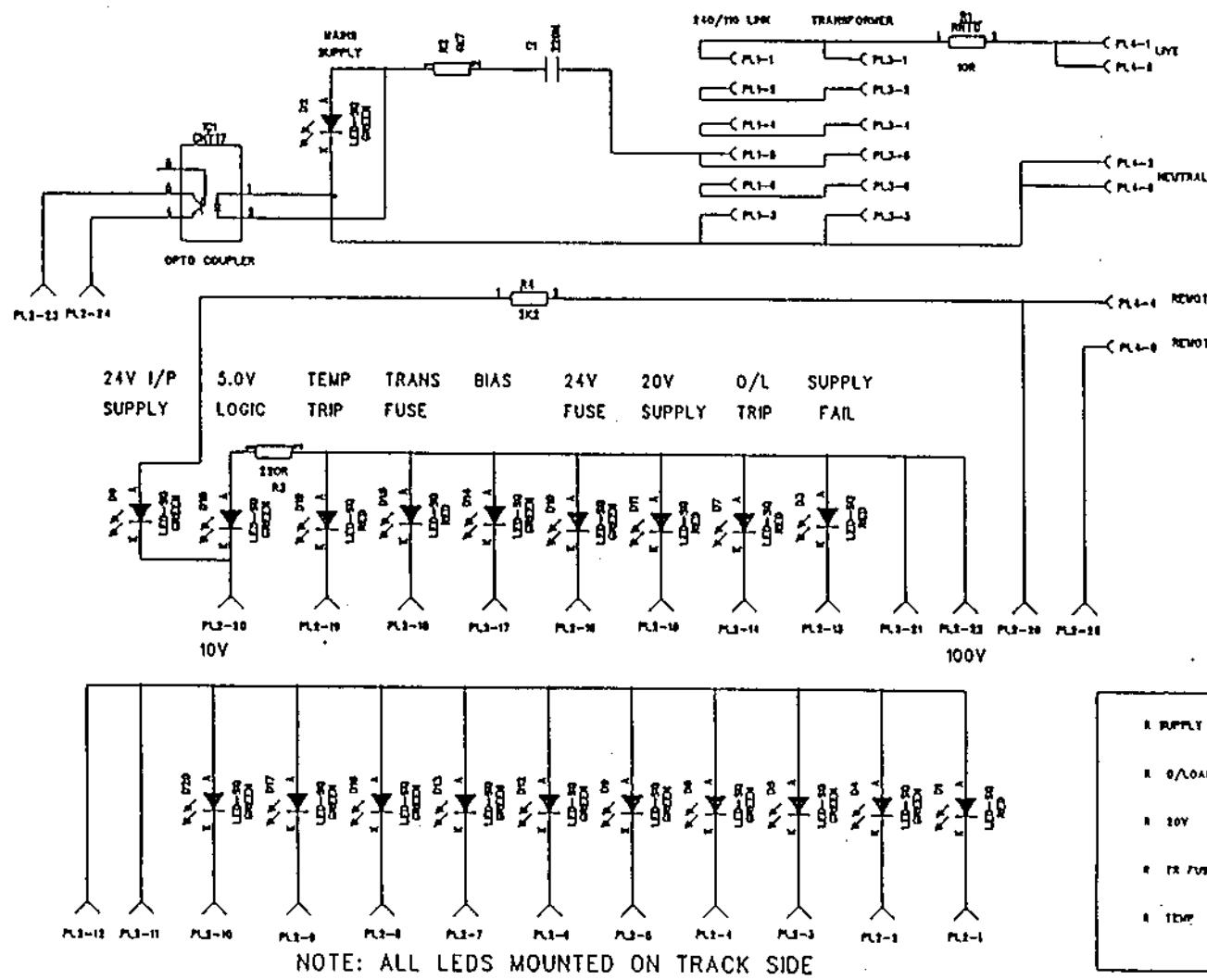
6  
IN 4 POSNS

9 4 5  
IN 2 POSNS  
TR7 & TR8

8 4 5  
IN 12 POSNS

A0624 SHT1 AMPLIFIER DISPLAY PCB LAYOUT





A0624 SHT2 AMPLIFIER DISPLAY PCB CIRCUIT DIAGRAM



**3**



## **Customer Device Text**

---



4



## **System Test Sheets**

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**Integrated Alarm Technology (Europe) Limited**  
**Commissioning Test Sheet**  
**5-7 Carlton Gardens**

Sheet: I494-CT1  
Date:  
Pages: 1 of 1

Test Details	Site Details:	Test Equipment Details:
Electrical Tests: _____	Site: _____	Type: _____
Work Element: _____	Area: _____	Serial No: _____
	Drwg. Ref: _____	Calib. Cert. No: _____

**Pre-Requisites:** 1. The cables to be tested are completely and satisfactorily installed as verified by signed Installation Sheets  
2. When tested, all cables should be disconnected at both ends and free from all equipment  
**N.B.** All tests to be carried out using instruments of 500V DC Output



**Integrated Alarm Technology (Europe) Ltd.**

Sheet: I494-SD1

Date:

## **Smoke Detector Check Sheet**

5-7 Carlton Gardens

**WORK ELEMENT: SMOKE DETECTOR**

**SITE:**

DRAWING REF:

**AREA:**

**LOOP NO.:**

**RECORD FORM NO :**

**DATE OF CHECK :**

SHEET OF

**PRE-REQUISITES: PRIOR TO COMMISSIONING WORKS, ALL INSTALLATION AS FITTED DRAWINGS AND TEST SHEETS WILL BE IN PLACE.**

**GENERAL REMARKS:**

	COMMISSIONING MANAGER	COMMISSIONING ENGINEER	INDEPENDENT WITNESS
COMPANY			
PRINT NAME			
SIGNATURE			



Integrated Alarm Technology (Europe) Ltd.

**Quote:** I494-CP1

Date:

## **Heat Detector Check Sheet**

5-7 Carlton Gardens

#### **WORK ELEMENT: HEAT DETECTOR**

**SITE:**

DRAWING REF:

**AREA:**

**LOOP NO:**

**RECORD FORM NO :**

**DATE OF CHECK :**

SHEET OF

**PRE-REQUISITES: PRIOR TO COMMISSIONING WORKS, ALL INSTALLATION AS FITTED DRAWINGS AND TEST SHEETS WILL BE IN PLACE.**

**GENERAL REMARKS:**

	COMMISSIONING MANAGER	COMMISSIONING ENGINEER	INDEPENDENT WITNESS
COMPANY			
PRINT NAME			
SIGNATURE			

IAT/ HT/ 001



**Integrated Alarm Technology (Europe) Ltd.**

## **Callpoint Check Sheet**

5-7 Carlton Gardens

Sheet: 1494-CP1

Dgfe:

WORK ELEMENT: CALL POINT	SITE: 5-7 Carlton Gardens	
DRAWING REF:	AREA:	
LOOP NO:		
RECORD FORM NO :	DATE OF CHECK :	SHEET OF

**PRE-REQUISITES: PRIOR TO COMMISSIONING WORKS, ALL INSTALLATION AS FITTED DRAWINGS AND TEST SHEETS WILL BE IN PLACE.**

**GENERAL REMARKS:**

	COMMISSIONING MANAGER	COMMISSIONING ENGINEER	INDEPENDENT WITNESS
COMPANY			
PRINT NAME			
SIGNATURE			



Integrated Alarm Technology (Europe) Ltd.

Quote: I494-IO1

Input/Output Unit Check Sheet

Date:

5-7 Carlton Gardens

WORK ELEMENT :	I/O UNIT	SITE :	
DRAWING REF :		AREA :	
LOOP NO. :			
RECORD FORM NO. :		DATE OF CHECK :	SHEET OF

PRE-REQUISITES: PRIOR TO COMMISSIONING WORKS, ALL INSTALLATION AS FITTED DRAWINGS AND TEST SHEETS WILL BE IN PLACE.

PHYSICAL/ OPERATIONAL CHECKS	CORRECT	NOT CORRECT	DEVICE NO.
MESSAGE AND OUTPUTS LOADED INTO MFCP			
I/O WIRED TO EQUIPMENT TO BE CONTROLLED			
ASSOCIATED DETECTOR PUT INTO FIRE			
FIRE CONTROL PANEL REGISTERS FIRE			
I/O UNIT ACTIVATES AND SHUTS EQUIPMENT DOWN			
ADDRESS INFORMATION CORRECT WITH INSTALLATION			
PRINTOUT CORRECT AGAINST DEVICE, AREA, ZONE			
PRINTOUT CORRECT AGAINST MESSAGES			
FIRE CONTROL PANEL RESET			
I/O UNIT RESET			
EQUIPMENT SHUTDOWN RESET			
CHECK ANALOGUE LEVEL			
Cause & Effects			

GENERAL REMARKS:

COMPANY PRINT NAME SIGNATURE	COMMISSIONING MANAGER	COMMISSIONING ENGINEER	INDEPENDENT WITNESS



**Integrated Alarm Technology (Europe) Ltd.**

**Quote:** 1494-CI1

Date:

## **Short Circuit Isolator Check Sheet**

5-7 Carlton Gardens

**WORK ELEMENT:**

DRAWING REF:

**LOOP NO.:**

**SITE:**

**AREA:**

SHEET OF

**PRE-REQUISITES: PRIOR TO COMMISSIONING WORKS, ALL INSTALLATION AS FITTED DRAWINGS AND TEST SHEETS WILL BE IN PLACE.**

**GENERAL REMARKS:**

	COMMISSIONING MANAGER	COMMISSIONING ENGINEER	INDEPENDENT WITNESS
COMPANY			
PRINT NAME			
SIGNATURE			



**5**



**Fire Alarm System Software**

**5**



# Viper Operating Manual

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# CHAPTER 1

## GENERAL DESCRIPTION

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### 1. INTRODUCTION

The Vega Integrated Panel Engineering Resource (Viper) software package provides the end user with a means to create a configuration program that will allow the Vega control panel to operate correctly to meet site specific operational requirements.

The VIPER program enables information, which may either be simple or complexed and which may vary in amount, which may be configured by use of a standard PC. When a program is complete it maybe downloaded to the Vega control panels main control processor by use of the interface lead.

Configuration programs can be generated on a desk top computer within an office environment which can then be stored on floppy disc for archive purposes or for transfer to the control panel. The Viper program is a DOS based program that can also run and communicate with the Vega control panel using the latest Windows 95 Microsoft Desk Top management software.

The VIPER software program supplied by Kidde can be freely copied and distributed by end users. Kidde Fire Protection Ltd however may upgrade the software to allow for future updates to both the VIPER software and the Vega control panels.

#### 1.1 MENU STRUCTURE

The Viper program has been designed as a user friendly software package by use of a pull down window menu selection structure. The menu structure activates the various user screens which will allow the site specific information to be entered and for other operation of the VIPER program. The layout for the menu structure has been set out in a logical order to cater for the programming of both simple and larger more complexed site configurations. The Viper software provides what is termed as "Hot Keys", these keys are highlighted on the screen and allows the user to move around the program quicker by the operation of the relevant keys on the PCS keyboard.

#### 1.2 ZONE AND DEVICE PROGRAMMING

Information relevant to the site layout can be entered such as specific text for both individual zones and devices, device threshold information for operation during normal and day mode operation periods. It is also possible to program priority alarm levels, alarm header text and custom device type text can be defined to allow the customisation of the system to meet the site specific requirements.

The Vega control panels are available with 24, 56, 88 and 120 zone facia membrane layouts which is catered for within the Viper program. There are 24 characters of zone description text available that can be assigned to the zonal fire and fault indications. Detection devices can either be assigned as non fire related events or as alarm inputs by use of the priority alarm structure. Devices may be assigned within the system as plant alarm where a text description can be assigned. These non fire related Plant alarms can also be displayed on a 64 LED plant alarm membrane facia.

The Viper program can cater from a single loop control panel up to a maximum of 16 detection loops. Each detection loop is capable of communicating with up to a maximum of 127 addressable points. Each address will be given a master address and a number of sub addresses which will be dependant upon each individual device type. A text message comprising of up to 24 characters may be assigned to each sub address which will provide precise detector location information to the end user during the event of an alarm or fault conditions.

Another customization of the control panel is the Custom device type text facility, which provides 12 characters per device, allowing the user to assign an alternative device description to that of the true (default) device type. The Custom device information once assigned will replace the default text during any alarm or fault conditions on the system.

### 1.3 OUTPUT GROUP PROGRAMMING

Output devices which maybe located upon the detection loop or within the Vega control panel maybe used to control sounder circuits and relay outputs to plant equipment can be programmed into site specific cause and effect routines. Output devices located on the detection loops or sounder and relay outputs derived direct from the Vega control panel itself can be assigned to output groups.

The control panel can cater for a maximum of 512 output groups. Information relevant to the output group can be entered such as specific text to describe the location of the group, time delays for alert\evacuation operation along with action and reset commands. When the output devices have been assigned within an "Output Group" the Group will require activation programming assigned to them. This programming maybe carried out in various means by control panel operations, activations of individual zones/ devices / plant inputs or by activations of other output groups

### 1.4 PROGRAMMING THEORY AND OUTPUT CONTROL

The general concept to the configuration of the control by event programming must be understood to allow the enhanced benefits that the Vega panel has to offer to be utilized. To enable the Vega control panel to cater for sites with simple cause and effect requirements a zonal programming option has been designed additional options will be implemented in future upgrades of the VIPER software. This enables zone to output group programming to be achieved for both alert and phased evacuation requirements.

It must therefore be understood that Device types will fall into two types of categories these being:

**INPUT DEVICES** This covers Call points, Ionisation, Photoelectric, Heat Devices, input channels of Input/Output devices and Panel Inputs. These are all assigned to ZONE locations.

**OUTPUT DEVICES** This covers Loop Sounder Circuit Controllers, Relay Output Units, Panel Sounder, output channels of Input/Output devices. These are all assigned to OUTPUT GROUP locations.

Site installations requiring complex special cause and effect programming of output groups can also be achieved in a simple and logical manner. It is possible to trigger output groups in many variations initiated by either fire zones, plant alarms, link groups or single devices activation.

Coincidence programming is also catered for and can be programmed to the output groups by zone, plant alarm or single device activations.

## 1.5 TIME DELAYS FOR OUTPUT CONTROL

The Vega panel itself has five software adjustable timers that can be programmed using the Viper. The time delay options have been designed within the Vega operating program to minimise the occurrence of nuisance alarms, to cater for a wide and varied alarm cause and effect program and control the alarm management.

The default settings for all timers are set at zero (no time delay).

### 1.5.1 T0 - Device Alarm Validation (D.A.V)

This option has not been implemented.

### 1.5.2 T1 - Alarm Acknowledgment.

This timer is an alarm management time period which allows the control panel operator a time period of up to 60 seconds to accept the alarm condition by use of the control panel operator keys. Upon acceptance of the Alarm Acknowledgment (T1) the Alarm Investigation (T2) will begin however if not accepted the procedure will then move to the T3 timer period upon time out. During T1 time period none of the output groups are activated. T1 is controlled by the zone or plant alarm going active. Refer to the Engineers Operator Manual (TM0003) for further control panel operation information.

#### **1.5.3 T2 - Alarm Investigation.**

The next level of alarm management is where the operator has a maximum time period of up to 10 minutes to investigate the alarm condition. If during this time period should another pre-programmed alarms occur such as a call point or a second alarm within the same zone (double knock) then the panel will go into full alarm sequence. T2 is also controlled by the zone or plant alarm going active.

#### **1.5.4 T3 - Silent Time Delay.**

This delay timer provides a delay to the operation of programmed output groups which can be used to control phased evacuation of buildings. The timer maybe selected from 0 to 600 seconds and maybe overridden by the operation of call points.

#### **1.5.5 T4 - Alert Time Delay.**

The Alert time delay provides an alert (pulsed) time period for the operation of sounder circuits located either within the control panel or upon the detection loops. Panel relay outputs or relay loop devices do not facilitate an alert operation therefore, should they be programmed to a group using T4 this will result in a delay to the operation of the output unit only. The timer maybe selected from 0 to 60 minutes and maybe overridden by the operation of call points or a selection of infinity is available.

#### **1.5.6 Timer Override Facility**

All time delay timers programmed to the initiating device or zone, except that of T4, can be overridden using the Delay Override button located on the panel facia.

### **1.6 FILE MANAGEMENT**

The Viper program has been designed to cater for the storage and recovery of valuable site data files and enable them to be handled in a controlled manner. A file browser screen enables data to be stored for a number of Vega control panels and viewing prior to uploading into the Vega control panel. Additional information relating to the installation such as the site location, site I.D and the date the program was last changed are also available to the engineer. This valuable information is also down loaded and stored within the Vega control panel. This option is to allow engineers attending site who maybe unfamiliar with the site configuration to service or amend the program then the last details entered can always be accessed. The engineer can then upload the information for inspection \ modification purposes before then down loading back to the panel.

The Viper data programs are stored as a single directory on either the computer hard disc or floppy disc drives. The "Save" and "Save As" options enable the end user to store the operating panel program at various stages during construction with other options enabling the user to open, update, create and delete old programs form the VIPER program.

## 1.7 FILE BROWSER AND TRANSFER

The Viper program generates at least one directory for each Vega panel program generated. Data within the directory may be broken up into modules or files to facilitate the storage of information. The engineer does not need to access these files to enable programming of the control panel therefore, making computer knowledge a minimal factor to the programming of a Vega control panel. Site configuration data may also be recovered from the Vega control panel and again, the data will be stored as a directory and automatically broken up into modules or files. The Viper provides a facility for transmitting the full site configuration files generated within to the target panel. The data files created are transmitted as one package of information, therefore, the larger and more complex the program is, the longer the data will take to download to the Vega control panel.

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## CHAPTER 2

### INSTALLATION OF VIPER

#### 2. P.C REQUIREMENTS

The lowest specification machine recommended is a 486 processor speed 25Mhz using VGA graphics and High resolution colour monitor, although the program will run on a 286 processor it may be slow in operation.

The Viper program has been designed and written for use on a Pentium computer running Windows 3.1 or Windows 95 as a Dos session. It will also run on computers with a lower specification. Due to the increased amount of data the Viper program has to access it is not possible to guarantee successful operation on pre IBM compatibles or early types of note pad machines. It must also be noted that slow processor computers may not operate to the optimum performance that the Vega control panel and Viper programming software have to offer.

A selection of either a laser printer or that of a Centronics IBM parallel printer is available. The printouts are to allow copies of cause and effect activations and that of the other programmed information.

#### 2.1 INSTALLING VIPER USING DOS

Using the DOS command follow the following procedure to create and install the VIPER Software. Insert the VIPER software disc into the floppy disc drive, for example drive "A". Select drive "A" by typing "A:" followed by ENTER ( $\leftarrow$ ) so that the screen prompts as follows:

A:>

At this point type "install" followed by operation of the ENTER ( $\leftarrow$ ) key. The VIPER software will request for a drive specification at which point the selection should be made of the required drive to which the program should be saved. Upon operation of ENTER key the VIPER software will automatically make a directory called Viper and instal the software program. Once the installation is complete the software will request if the VIPER software is to be run by an on screen prompt.

#### 2.2 INSTALLING VIPER USING WINDOWS 95

Using Windows 95 to install the VIPER software it is recommended that the "Run" option is used by operating "Left Click" key of the mouse on the "Start" point of the Windows bar. By operation of the mouse "Run" can be selected and then by entering "A:\Install" the software will be installed in the same manner as explained in section 2.1.

## 2.3 RUNNING VIPER

When running the VIPER software in Windows 95 it is recommended that the parameters, as detailed below, should be set. To carry out these settings operate the "Ctrl" and "ENTER" keys together to cause the program to run within a window. Once the VIPER software is running within a window move the arrow to the status bar of the window then "Right Click" upon the mouse. This operation will cause a selection window to appear, from this window select the option of "Priorities" which will then cause another window to appear. This window is the "VIPER Priorities" window and from this select the "Misc" selection and then set the parameters as detailed.

Foreground - Screen Saver "OFF"  
Background - Suspend "OFF"  
Idle Sensitivity "LOW"

- Once the parameters have been set the selection of "Apply" can be made and this window can then be cancelled.

The installed software will create a directory called VIPER on the hard drive. All files made by Viper will exist in sub-directories within the Viper directory, except for directories made on the "A: drive" which will exist in the root directory upon the removable floppy disc.

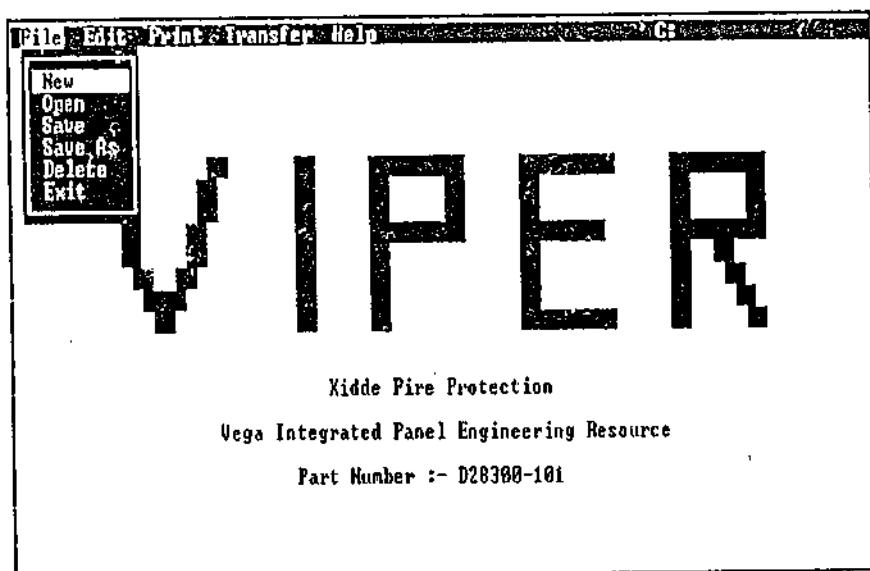


Figure 1.0

All directories made by Viper will automatically be given a recognisable extension, e.g. "VPR". This will enable the software to recognise and identify directories where panel configuration data has been stored.

The user will enter a name for the sub-directory which will refer to the sit and panel being worked upon. Viper will then store the data files for that site into the named directory. Viper will create its own names for the individual files. File handling is not visible to the user and is not necessary. The sub-directory will be referred to as the 'PROJECT', and the user is not required to see the names of the individual files.

VIPER will segment a complete block of site configuration data into a suite of files. Each file will be protected with a checksum and a byte count. The checksum and byte count will be tested before data is read in from the file. In this way, any corruption will be limited to a single file, and will not jeopardise the entire block of site-config data.

Each directory will automatically hold two generations of the information configured. These files these being a "DAT" which is the current file and a "BAK" which is a previous version of the current file. These files can only be seen or accessed when using DOS commands, the "BAK" file is useful in the event of the loss or corruption of the current work file.

#### 2.4 KEYBOARD CONTROLS

The keys detailed in Table 1.0 are used to step through and allow easier use of the various screens within the Viper program.

KEY	DESCRIPTION
Up Cursor	Move up a line or scroll through parameters
Down Cursor	Move down a line or scroll through parameters
Right Cursor	Move right across an option column
Left Cursor	Move left across an option column
Enter	Select option to enable text or selection changes (edit)
Escape	Exit the option selected after edit complete
Ctrl & "C"	Copy the selected text message to a temporary buffer
Ctrl & "V"	Copy the buffer text message to the selected location
Ctrl & "END"	Removes the current text entry.
F1	Displays the HELP screen within selected option field

Table 1.0

The mouse can also be used to move the cursor around the various option fields.

## 2.5 MAIN MENU SELECTION

The standard front screen enables the user to make selections from the top level menu options File, Edit, Print, Transfer and Help using the left or right cursor keys. The "File" sub-menu is shown in figure 1.0 and will be automatically displayed when VIPER is started.

Located on the top right hand side of the screen is the details of the current PC drive and the directory name of the project being written or modified.

# CHAPTER 3

## FILE OPTIONS

### 3.0 FILE OPTIONS

When the VIPER program is initialised the display will start with this option being automatically selected. This will show a pull down window which will have a set sub menu selections as shown in figure 2.0. By use of either the "UP" and "DOWN" arrow keys or via operation of the mouse the required selection can be highlighted and then selected by operation of the appropriate Enter key.

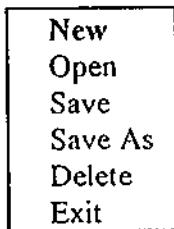


Figure 2.0

### 3.1 NEW OPTION

Upon selection of NEW option the display will prompt the request that the information, as shown in figure 2.1, to be entered by the user.

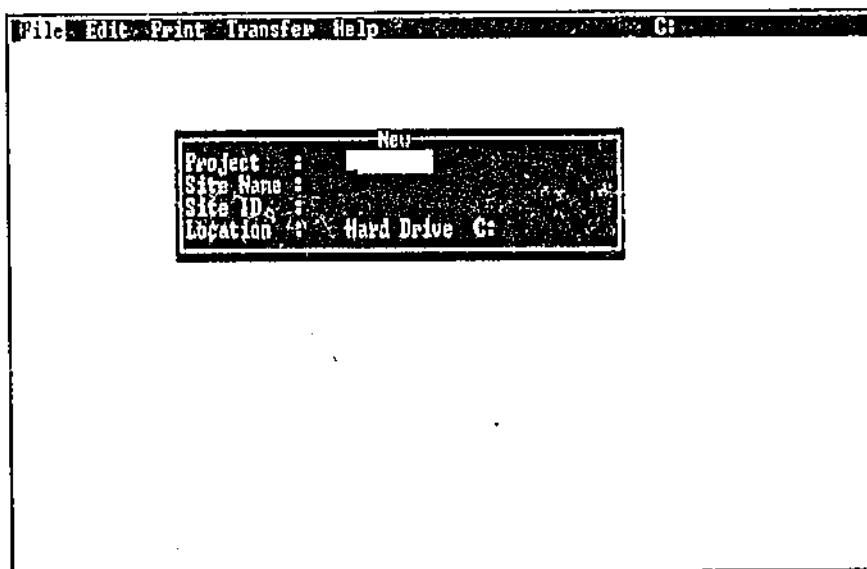


Figure 2.1

### 3.1.1 Project

The operator will be required to enter a new 'Project' name for the file which will be used to create a new sub-directory within the Viper directory. A maximum of 8 characters can be entered and once complete the Enter key will move to the next insertion line.

### 3.1.2 Site Name and ID

The operator will then be required to enter text for both the SITE NAME and for the SITE I.D lines. This enables 2 lines of 24 characters of text to be entered. This text is stored within the Vega control panel after the down loading of the program. Once complete operation of the Enter key will move to the next insertion line.

### 3.1.3 Location

Once the Site name and ID have been entered the selection will automatically request to which drive the information is to be stored under as shown in figure 2.2.

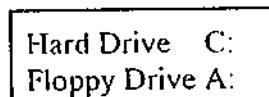


Figure 2.2

The selection of NEW will also cause the Viper software to check if a project is currently open for editing. If this is the case, then Viper will issue a warning to the effect of "If you continue, you will lose data - Continue? Yes/No"

## 3.2 OPEN OPTION

Upon selection of OPEN option the screen will prompt the required drive which is to be accessed for the selection of the required project.

Upon selection of the required drive the display will list all projects within the VIPER directory on a browser screen as shown in figure 2.3. The display will list the Project, Site Name, SITE I.D previously given to the projects and also the date the program was Last Changed.

Open Project			
Project	Site-Name	Site-ID	Last-Changed
BGAS	British Gas Disbury	0695 Job No. Exp 01291	01 Oct 97
CBLDG	CBL Building (Singapore)	Project No. 12672	13 Aug 97
HEATH	HEATHROW AIRPORT	TERMINAL 12 (16 loop)	29 Jul 97
NISSAN	NISSAN UK - WASHINGTON	ASSEMBLY PLANT Panel 12	12 Aug 97
SUPASHOP	DENTON SHOPPING CENTRE	MAIN ENTRANCE (PANEL 1)	15 Oct 97

figure 2.3

The operator will use the highlight bar to select a project and upon operation of the Enter key the selected highlighted project will be selected. The data in the selected project will then be read into memory for editing. Data which is being held in the VIPER memory already will be overridden upon selection of another project. Care must therefore be taken to ensure that the previous project data files are stored using SAVE or SAVE AS.

### 3.3 SAVE OPTION

The selection of SAVE will cause the following operations:-

When a displayed work file is complete or finished with operation of this selection will allow this work files to be saved. If the work file has not been assigned to a sub-directory name it is classified as a unnamed file it will automatically enable the SAVE AS option to enable the full site details to be entered. If the work files has been assigned with an existing sub-directory name, selection of this option will update the working files with the data held in memory.

Use of this option also automatically updates the backup data files located within each sub-directory.

### 3.4 SAVE AS OPTION

The selection of SAVE AS option using the enter key will prompt the display as shown in figure 2.4 to be shown.

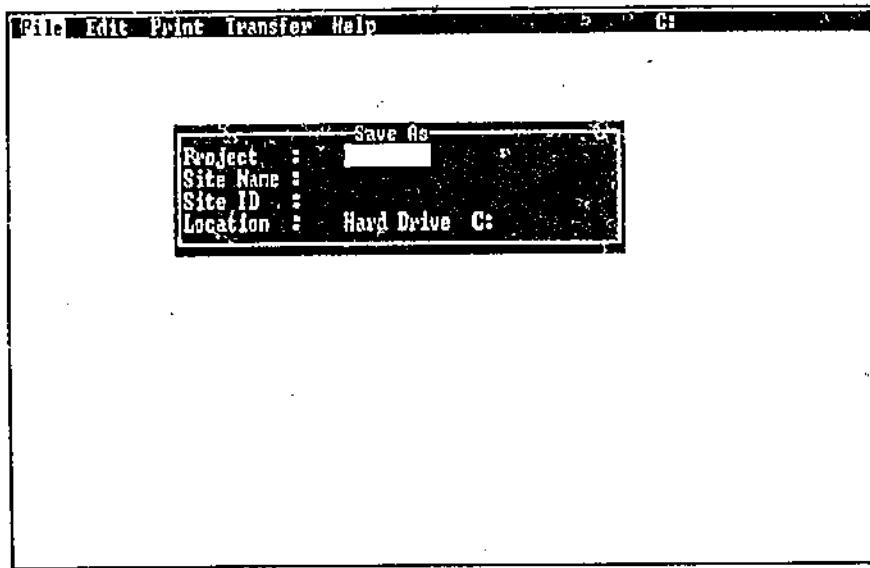


figure 2.4

Entry of the information is in the same manner as described within 3.1.

### 3.5 DELETE OPTION

Upon selection of the DELETE option the display will prompt the required drive which is to be accessed for the selection of the required project. Upon selection of the drive a browser screen will be displayed to enable the user to select the project for deletion as shown in figure 2.5.

Delete Project >			
Project	Site-Name	Site-ID	Last-Changed
BGAS	British Gas Disbury	0695 Job No. Exp 01291	01 Oct 97
GBBLDG	G.B Building (Singapore)	Project No. 12672	13 Aug 97
HEATH	HEATHROW AIRPORT	TERMINAL 12 (16 Loop)	29 Jul 97
NISSAN	NISSAN UK - WASHINGTON	ASSEMBLY PLANT Panel 12	12 Aug 97
SUPASHOP	DEMON SHOPPING CENTRE	MAIN ENTRANCE (PANEL 1)	15 Oct 97

figure 2.5

By use of the Up and Down cursor keys the required line maybe highlighted and the Enter key

is used to delete the file. All data files within the sub-directory selected will be lost including the backup data file.

Viper will issue a warning: "Do you want to delete this project? Yes/No". before the deletion is made as a confirmation. If Yes is entered, the entire contents of the project will be deleted.

#### 4.7 EXIT OPTION

Upon selection of this item the program will prompt if the program is to be terminated as shown in figure 2.5 and to return the system to it normal operating function.

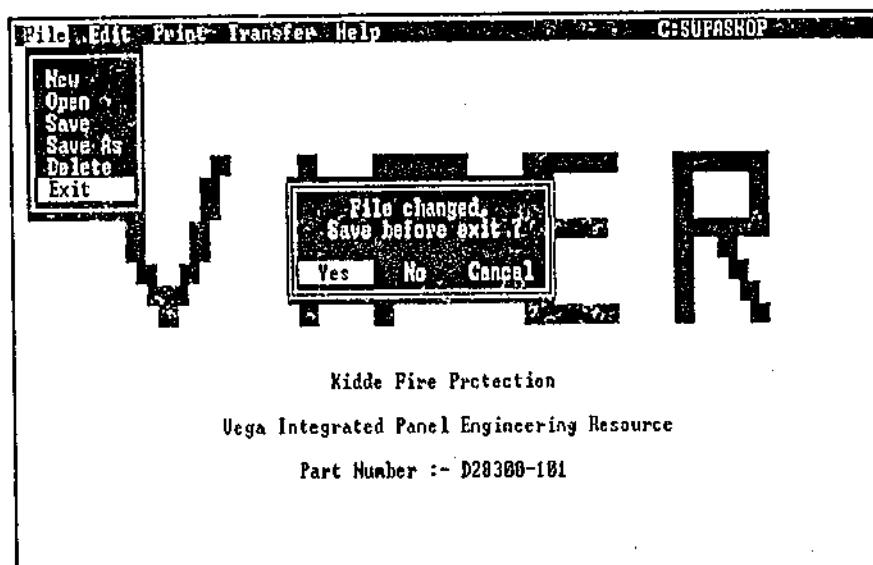


Figure 2:5

Viper will determine if the contents of the current working files have been changed since they were last SAVED. If true, VIPER will warn the user. A reply of "NO" will exit VIPER without saving the changes. Whereas a reply of "YES" will EXIT the file but causing the file to be saved before quitting the VIPER program.

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# CHAPTER 4

## EDIT OPTIONS

### 4.0 EDIT OPTIONS

When this position is selected a pull down window will appear showing the options available as shown in figure 3.0.



Figure 3.0

#### 4.1 Standard Features

Selection of the "Standard Features" option will contain another set of menu options as shown in figure 3.1. The up, down and the Enter keys are used to make the option selection from the options shown below.

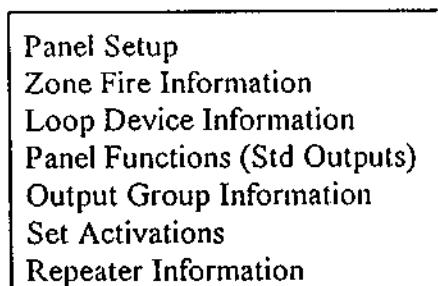


Figure 3.1

##### 4.1.1 Panel Setup

This option will allow for the configuration of the Vega control panel for both the software and hardware that is to be used upon the site installation. The panel setup data file is downloaded to the control panel and is verified with the hardware installed within, any major discrepancies are flagged and reported as a fault on the panel display as a configuration fault.

Within the setup data file there are many options that determine the operation of the panel, therefore these options must be configured at the commissioning stage. Upon selection of this option the main setup page will be displayed as shown in figure 3.2. The required line can be highlighted by use of the up, down keys or via operation of the mouse and operation of Enter will then select the position for entry of information.

Standard Panel Details	
Site Name/Location	DENTON SHOPPING CENTRE
Site I.D	MAIN ENTRANCE (PANEL 1)
Company Name or Message (Line 1)	KIDDE FIRE PROTECTION
Company Name or Message (Line 2)	VEGA FIRE ALARM PANEL
Install Logo	Yes
Author of Initial Program	[REDACTED]
Date File Created	15 Oct 97
Date File Last Changed	20 Oct 97
Number of Detection Loops	1
Detection Protocol	Apollo
Number of Fire or Fault Zones	24
Number of Plant Indications	8
Install Repeaters	No
Repeater Printer Active	No
No. Active Repeaters	00
Day Mode Operation Stop Line	18:00
Device Alarm Validation Time	0
Recalibration Time	04:00
Serial Port 1	UNDEFINED
Serial Port 2	UNDEFINED
Serial Port 3	UNDEFINED
Serial Port 4	UNDEFINED
	Select Port Function from

Figure 3.2

#### 4.1.1.1 Site Name and Site I.D

This option provides two lines of 24 characters of text that can be used to provide site location information relevant to the Viper and Vega programs. The information is entered at the SAVE AS stage of the procedure refer to section 3.4 but is available within this screen for the user to view or alter. The text is retained within the Vega panel to enable the information to be uploaded into a NEW sub-directory by a user without access to the original thus enabling modifications to the system cause and effect data files to occur. This line is useful when identifying different files during the storage and logging of valuable data files.

#### 4.1.1.2 Company Message

This option provides a means of entering two lines of 24 characters of text that can be displayed on the Vega control panel LCD during status normal conditions i.e when there are no alarms present on the system. The option can be used for displaying either the company or the installation company name. These two lines of text will be displayed when the Kidde Fire Protection logo option is set to "NO" refer section 5.1.3.

#### 4.1.1.3 Install Logo

This option is defaults to "YES" and is capable of being altered to "NO" by selection of the Enter key and selecting the required setting. This option enables and disables the "Kidde Fire Protection" text and the "flaine" logo when set to "NO" the information set within the Company message lines will be displayed on the Vegas LCD.

#### 4.1.1.4 Author of Initial Program

This option enables the person responsible for the initial programming of the control panel within the company to enter their name. This will obviously help with any future modifications to be made on the system by a second engineer as they may call upon the help of the initial author. 24 characters of text are available for this information.

#### 4.1.1.5 Date File Created and Date File Last Changed

This information will be automatically stored by the program and will show the date the program was created and the date the program was last altered. This information is taken automatically from the internal calendar of the PC

#### 4.1.1.6 Number of Detection Loops

This option enables the user to determine the quantity of detection loops to be installed on the Vega control panel. The program will show as default loop number "1" and when selected will enable the user to scroll through from loops 1 to 16 and selecting the appropriate loop quantity. The quantity is verified with the actual number of loop cards installed within the panel after download of the VIPER program.

#### 4.1.1.7 Detection protocol

This option allows the engineer to select the desired device protocol which is being used within the Vega control panel. The options are either Apollo XP95 or Hochiki ESP. Upon selection this enables the VIPER program to provide the user with the correct device library when assigning devices to Zones and Groups. The default setting is Apollo and by operation of the Enter key the relevant protocol maybe selected.

#### 4.1.1.8 Number of Fire/Fault Zones

The Vega panel is available in four Zone Fire and Fault LED option these being 24, 56, 88 and 120. This option enables the user to specify the quantity of zones the software is to be configured for within the VIPER software. This option must be set to the correct number of zonal indications which are being used on the Vega panel fascia. The default setting of this option is 24 and by operation of the Enter key the relevant quantity maybe selected.

#### 4.1.1.9 Number Plant Zones

As with zonal indications on the panel fascia the Vega panel can also indicate non fire related indications and are termed as "Plant Alarms". To enable the Plant Alarm indications this option must be set to 64 which is the maximum number of indications available. The indication card does NOT have to be installed for this to be used however, this option should be set to 64. The default setting of this option is 0 and by operation of the Enter key the relevant quantity maybe selected.

#### **4.1.1.10 Install Repeaters**

This option is used to enable and disable the repeater output port within the Vega control panel. It must be noted that the hardware output port (PCB 44782-K076) must be present within the control panel for communication and monitoring of remote Repeater panels to be achieved. This option is a YES or NO selection which defaults to NO and by operation of the Enter key the relevant setting maybe selected. When set to YES the communications to the repeaters will be enabled.

#### **4.1.1.11 Repeater Printers Active**

This option allows for the repeater panels internal printer to operate form a command transmitted by the main control panel. This option is a YES or NO selection and will default NO which will not allow printer within the repeater panels to operate. By operation of the Enter key the relevant setting maybe selected, when set to YES this will enable the printers within the repeaters to operate.

#### **4.1.1.12 Number of Repeaters**

This option allows a quantity of repeater panels to have controls over the main control panel, this can be a quantity from 1 to 15 this represents the addresses assigned to the repeater panels. Once this quantity has been set and then down loaded into the control panel the panel checks that the correct number of repeaters are transmitting correctly. The default setting is 0 and by operation of the Enter key the correct quantity maybe set by use of the relevant keys.

#### **4.1.1.13 Day Mode Operation Stop Time**

This option is used to set the day mode automatic stop time for the Vega control panel. A 24 hour clock setting is provided in hours and minutes that can be defined by the commissioning engineer. The day mode is manually started by the end user using the control panel menu option and once set will automatically de-activate at the time set within this option. This setting defaults to "18:00" and once selected by operation of the Enter key the require time can be entered by use of the numeric keys.

#### **4.1.1.14 Device Alarm Validation (D.A.V) Time**

This option is not as yet implemented.

#### **4.1.1.15 Recalibration Time**

This option allows the commissioning engineer to specify the desired time for the control panel to undergo its internal 24 hour Recalibration check. It is at this critical period that the system may locate faults within its own system and therefore display these as indication on the display.

The control panel internally checks various parts of the system during this time period such as device analogue values on the detection loop devices, loop cable integrity, memory checksum values and hardware fault monitoring.

#### 4.1.1.16 Serial Port 1 to 5 Options

The Vega control panel has the capability of providing protocol interfaces to a variation of additional equipment. This is provided the hardware is installed within the control panel these output ports can be specified as and when required. Selection of the required option enables the relevant software protocols that reside within the core panel software program to be enabled. The selectable options available are listed below.

- a) Network Interface (KFP defined).
- b) Remote Printer (KFP defined).
- c) Pager (KFP defined).

NOTE Only one option will be available per selection port.

Each port defaults to a setting of "UNDEFINED" and by operation of the Enter key the required serial port may be selected. By use of the arrow keys the required setting can be selected and operation of the Enter key will allow the next line selection to be made.

#### 4.1.1.16 Motherboard Options

The Vega control panel has the facility to interface with up to a maximum of 4 motherboard cards. Each mothercard provides a maximum of 5 expansion slots therefore providing a maximum of 16 expansion position. Due to the fact that different cards can be installed within the motherboards which have to be monitored in different ways, it is critical that the control panel processor is provided with the installed hardware configuration. This is achieved by selecting the relevant extension card which is assigned to the relevant position. Each extension card is provided with an individual address switch which allows the card to have its own unique location address within the control panel. The five types of extension cards available for insertion are :-

- a) 8 Way Monitored Sounder Output Card.
- b) 8 Way Volt Free Change Over Relay Card.
- c) 16 Way Open Collector Output Card.
- d) 16 Way Non monitored Input Card.
- e) 8 Way Monitoring Input Card - NOT YET AVAILABLE.

The control panel monitors all of the above cards for various fault conditions and the desired setup is checked with the actual hardware installed after the program is downloaded. Any cards missing will be reported on the panel LCD.

Each position defaults to a setting of "UNDEFINED" and by operation of the Enter key the required extension card may be selected from a selection window which appears. By use of the arrow keys the required setting can be made and operation of the Enter key will allow the next line selection.

#### 4.1.2 Zone Fire Information

Selection of the zone fire information option from the standard features as shown in figure 3.2 enables the operator to edit the zone parameters. The Zone Fire Information screen is shown in figure 3.3 and allows the operator to enter valid information dedicated to alarms going active within each zone(s).

Zone Number	Text Message	Zone Information		Override B.G.U	Delay 2 x Device
		Ack \ Search T1 - Sec	Delay T2 - Sec		
001	Stationary cupboard	00	000	Yes	No
002	Main Clerical Office	00	000	Yes	No
003	Telecommunications room	00	000	Yes	No
004	[REDACTED]	00	000	Yes	No
005	Unassigned Message	00	000	Yes	No
006	Unassigned Message	00	000	Yes	No
007	Unassigned Message	00	000	Yes	No
008	Unassigned Message	00	000	Yes	No
009	Unassigned Message	00	000	Yes	No
010	Unassigned Message	00	000	Yes	No
011	Unassigned Message	00	000	Yes	No
012	Unassigned Message	00	000	Yes	No
013	Unassigned Message	00	000	Yes	No
014	Unassigned Message	00	000	Yes	No
015	Unassigned Message	00	000	Yes	No
016	Unassigned Message	00	000	Yes	No
017	Unassigned Message	00	000	Yes	No
018	Unassigned Message	00	000	Yes	No
019	Unassigned Message	00	000	Yes	No

Figure 3.3

##### 4.1.2.1 Zone Number

Each zone number is located down the left hand side of the screen which allows the user to select the relevant zone for the entry of the information. The required zone can be selected by use of the arrow keys or by use of the mouse. Operation of the Enter key allows for the information to be inserted and operation of the Enter key will allow for the selection of the next entry. The keys as detailed within table 1.0 also allow for the easier operation of the screen.

##### 4.1.2.2 Text Message

Text can be edited by moving the highlight band to the adjacent zone number field, and making the field live by operating the enter key. Note the way the display changes to indicate that the field is live by bracketing the area. Once selected the operator may now edit the text message with up to a maximum of 24 characters of zone specific location text. When the information is downloaded into the Vega Control Panel this is the information which will appear with the zone number when ever it is displayed. This is used to locate the zone and identify the area.

The cursor position may be moved with the left and right keys. Entries to the right of the cursor may be deleted by pressing the delete key, entries to the left of the cursor may be deleted with the backspace key. The space bar can be used to move text right of the cursor to the right. The default setting for Viper is in insert mode where over type can be selected using the insert key. Once the text entry is complete operate the Enter key to exit or if the entry is incorrect operate the "Esc" key and the original text will reappear.

Ctrl C enables text in the highlighted field to be copied to a temporary buffer.  
Ctrl V enables the contents of the buffer to be inserted into the highlighted field.  
Ctrl End deletes the text within the field.

#### 4.1.2.3 T1 Acknowledge Search Delay

The T1 time can be edited by moving the highlight to the with reference to the relevant zone number and by pressing enter the required parameter can be selected. Selection of the required desired time delay can be carried out by use of the up/down cursor keys, the numeric keys or via the mouse. Operation of the Enter key will allow the entry to be accepted and allow the next selection.

#### 4.1.2.4 T2 Acknowledge Search Delay

The T2 time can be edited by moving the highlight to the with reference to the relevant zone number and by pressing enter the required parameter can be selected. Selection of the required desired time delay can be carried out by use of the up/down cursor keys, the numeric keys or via the mouse. Operation of the Enter key will allow the entry to be accepted and allow the next selection.

#### 4.1.2.5 BGU Override Delays

The BGU override delay is selectable for each zone, this is carried out by moving the highlight to the override column of the required zone number. The BGU override is set at a default setting of "YES" which will allow operation of any BGU within the zone to override the set acknowledge time delays. This can be altered by operating the Enter key and by use of the arrow keys the "NO" selection maybe set. The "NO" selection will allow the acknowledge timers to continue upon operation of a BGU within the zone. Operation of the Enter key will confirm the selection and allow for the next entry to be selected.

#### 4.1.2.6 2 x Device (Double Knock)

The Double Knock override delay is selectable for each zone, this is carried out by moving the highlight to the override column of the required zone number. The override is set at a default setting of "NO" which will allow the the acknowledge timers to continue upon operation of any activation within the zone. This can be altered by operating the Enter key and by use of the arrow keys the "YES" selection maybe set. The "YES" selection will cause the override of the timers upon the operation of any 2 devices within the zone. Operation of the Enter key will confirm the selection and allow for the selection of the next entry.

### 4.1.3 Loop Device Information

Selection of the Loop Device Information option from the standard features as shown in figure 3.2 allows the operator to edit the loop device parameters. The parameters which are selectable are shown in figure 3.4.

Address	Device Info Protocol	Device Information		Zone No	Sensitivity Level	Day	Output Group	Other Param
		Text Message						
01:001.1	Optical	Lift Lobby Area		002	Std	N/A	810	No
01:002.1	Sound							No
01:003.1	Heat	Unassigned		000	Std	N/A		No
01:004.1	*Unas	Manual Call Point						
01:005.1	*Unas	Ionisation						
01:006.1	*Unas	Photo Electric						
01:007.1	*Unas	Temperature - Normal						
01:008.1	*Unas	Temperature - High						
01:009.1	*Unas	Sounder Circuit Controller						
01:010.1	*Unas	Sync Sounder Circuit Controller						
01:011.1	*Unas	Single Channel Input/Output						
01:012.1	*Unas	Switch Monitor Unit/Input/Output						
01:013.1	*Unas	Switch Monitor						
01:014.1	*Unas	Mini Switch Monitor						
01:015.1	*Unas	Control Unit Monitor						
01:016.1	*Unas	Zone Monitor Unit						
01:017.1	*Unas							
01:018.1	*Unassigned*	Unassigned Text						
01:019.1	*Unassigned*	Unassigned Text						

Figure 3.4

The "Device Info Type :" will indicate the protocol that has been selected in the panel set up routine. The device type selection is designated by moving the highlight to the field of interest and operating the enter key, there will activate a select menu enabling the correct device type to be inserted. This is achieved by moving the highlight to the designated device type and operating the enter key. Depending upon the type of device selectable a number of actions will automatically occur.

#### 4.1.3.1 Address

The device address is shown down the left hand side of the screen. The displayed address is broken down into three parts these being the loop number, device address and the device sub address. Dependant upon the device type selected the quantity of sub addresses may increase, the selection of the device type is carried out in "Device Info Type" column.

#### 4.1.3.2 Device Info

The selected protocol is displayed in the header box of this column. The selection of the correct protocol is important to the device description displayed as there are differences between that of Apollo and Hochiki protocols.

It will not be possible to select any entry point until a Device Type has been selected against an address. The Device types fall into two categories Input and Output device types. The assigned device type defines the information which can be selected against each device.

##### 4.1.3.2.1 Input Devices

A selection of input devices will force a prompt in the "zone" column as an indication the device is to be allocated to a zone number. Selection will also cause prompts to appear within the "Sensitivity" and "Other Param" columns. If the device is a multi channel device then the "Address" column will increase in lines for the address quantity by the relevant number of channels.

##### 4.1.3.2.2 Selection of Output Devices

Selection of an output device will force a prompt into the "output group" column as an indication the device is to be allocated to an output group number. If the device is a multi channel device then the "Address" column will increase in lines for the address quantity by the relevant number of channels.

##### 4.1.3.3 Text Message

The text message consists of 24 characters of text which can be assigned to each channel of a device. The field can be edited by moving the highlight to the required device and operating the enter key. This will 'bracket' the text entry which will then allow text editing to be conducted. To confirm the edit operate the enter key. Operation of the "Esc" key at any time will remove the newly entered text and revert the entry of the previous text entry. When the information is down loaded into the Vega Control Panel this is the information which will appear with the device when ever it is displayed. This is used to locate the device to a specific point within a zone and is used in conjunction with the zone text.

##### 4.1.3.4 Zone Number

The zone number column is only available to input channel devices, a numeric value can be inserted by moving the highlight to the relevant position and by operating the Enter key. The numeric zone number can be selected by operation of the cursor keys, numeric keys or by the mouse. Selection of the zone number can be confirmed by operation of the Enter key which will allow the selection of the next position. The quantity of zone is restricted by the set up of the zone quantity which is allocated in the panel set up menu.

#### 4.1.3.5 Sensitivity

The Sensitivity allows the threshold of the device to be altered during either a "Day Mode" or "Continuously" from that of its factory set threshold levels. The alterations in sensitivity are only available to device types of Photoelectric, Ionisation and Heat detectors. The setting of the Day Mode parameter will override the setting of the Level when the panel is manually set to the Day Mode operation. Selection is made by highlighting the required position and operating the Enter key and by using the arrow or mouse to select the required setting. The selection is confirmed by use of the Enter key.

##### 4.1.3.5.1 Level

The "Level" selection is the sensitivity level of the detector in its normal operation mode. "Level" selection is determined by moving the highlight to the designated area and operating the Enter key, the device will default to "STD" (Standard) sensitivity. The Standard setting will allow the device to respond within its normal operating characteristics. Selection to the setting of Low will cause the Pre Alarm and Fire values to be raised causing the device to be more sensitive, whereas High will cause the device to be less sensitive. For the normal operating characteristics of these devices refer to the relevant device literature.

##### 4.1.3.5.2 Day

The "Day" selection allows the sensitivity level of the detector to be altered during the day mode operation of the Vega control panel. The day mode is a manual operation of the control panel within the menu structure of the control panel which can cause device to be either Isolated or have the sensitivity altered. The selection defaults to a setting of "N/A" which allows the detector to operate within its normal operating parameters. Selection of "High", "Std" and low operate as explained in 4.3.5.1. Selection of the "Isolated" option will cause the device to become isolated when the control panel is set within Day Mode.

#### 4.1.3.6 Other Parameters

The "other parameters" column is applicable to input devices only. The setting will be set to a default of "NO" this means no information has been set for this device. If information has been programmed within this selection then the setting will "YES". Selection of this option will provide a menu option screen which enables the following parameters to be assigned against the selected device:-

"Priority Level"	Allows the selection of priority levels 0-9. Priority Level 1 is the default alarm level for all Input device types.
"Latching Alarm"	Option to have the input device latching or non latching. The default setting is latching - "YES". This can be altered to "NO" for Non latching.
"Program by"	The default setting for this option is by "Zone" which allows the device to operate within the Zone programming to output groups. If "Device" is selected then the device will not activate outputs allocated on a zone allocation basis.

#### "Custom Text"

This selection allows a Custom device text to be assigned to the device. The default setting is "DEFAULT". The Custom device text is assigned as explained in section 4.2.3. Once assigned the custom text will be displayed on the panel during any activation or listing of the device in place of its true device type.

Selection of the required line is carried out by highlighting the required line and operating the Enter key. The position can then be altered by use of the arrow keys or the mouse and then confirmed by operation of the Enter key which will allow for the next selection. To quit from the selection the "Esc" key has to be operated which will allow the next entry to be selected.

#### 4.1.3.1.7 Output Group

The output group column is specifically associated with output device channels. The default of the column is set at "000", a numeric value is therefore required to be inserted for each output device. To assign the device to a specific output group number between 1 and 512, highlight the required output group number and operate Enter. By use of the arrow keys, the numeric keys or via the mouse the relevant output group can be assigned. Operation of the Enter key will confirm and allow selection of the next entry where as "Esc" will return the original entry.

#### 4.1.4 Panel Function (Std Outputs)

Selection of the Panel Function (Std Outputs) option from the standard features as shown in figure 3.2 allows the operator to edit the information for the internal sounders and VFCO relay contacts. These internal sounders and VFCO relay contacts are situated upon the Master and Slave basic Loop Controllers (MBLC and SBLC). As shown in figure 3.5 the Sounder circuits 1 to 4 of the MBLC are listed first followed by the VFCO.

Output Location	Details Type	Panel Function(Standard Outputs)			Output Group	Man Snd	Clear
		Custom Type	Device Text	Text Message (24 characters)			
M:blc.01	Mon-Cir.01	Default	Gatehouse Elect. Jct Box	002	N/A	N/A	
	Mon-Cir.02	Default	Unassigned	Cnn	Yes	Silence	
	Mon-Cir.03	Default	Unassigned	Cnn	Yes	Silence	
	Mon-Cir.04	Default	Unassigned	Cnn	Yes	Silence	
	V.F.C.0.01	Default	[REDACTED]	Cnn	No	Reset	
	V.F.C.0.02	Default	Unassigned	Cnn	No	Reset	
	V.F.C.0.03	Default	Unassigned	Cnn	No	Reset	
	V.F.C.0.04	Default	Unassigned	Cnn	No	Reset	

Figure 3.5

The quantity of sounders and VFCO relays is dependant upon the quantity of loops selected within the Panel Setup. If the Panel setup was selected for a quantity of 5 loops then the display will have a second set of sounders and VFCO relay outputs.

#### 4.1.4.1 Output Details

This column is not selectable and is for information purposes only and gives details of the type of output and upon which Basic loop controller it is situated upon.

##### 4.1.4.1.1 Location

This area details the actual Basic loop controller (BLC) the sounders and VFCO relay outputs are situated on. Table 2.0 details the Basic loop controllers and how they are identified within the Vega control panel.

Basic Loop Controller (BLC) Output Information								
Output Details	Mon - Cir (Sounder Circuit)				VFCO Relay Circuit			
	cct 1	cct 2	cct 3	cct 4	cct 1	cct 2	cct 3	cct 4
M:blc.01	1	2	3	4	1	2	3	4
S:blc.02	5	6	7	8	5	6	7	8
S:blc.03	9	10	11	12	9	10	11	12
S:blc.04	13	14	15	16	13	14	15	16

Table 2.0

##### 4.1.4.1.2 Type

This column details the Device type of output which is being selected, the displayed device type is the default text which appears upon the panels display during fault conditions. This text can be overwritten by use of the "Custom Type Device Text" which will replace the default text during fault conditions.

#### 4.1.4.2 Custom Type Device Text

This selection is at a default setting of "DEFAULT" which allows the Location device type information to appear on the Vega control panel. Upon selection by operation of the Enter key it is possible to select a "Custom Device Text" from a list which appears on the screen. The user is able to select from a list of 1 to 50 which is programmable as explained in section xx. When the selection is complete operation of the Enter key will close the custom text selection box and allow for the next selection within this menu selection.

#### 4.1.4.3 Text Message (24 Characters)

The text message consists of 24 characters of text which can be assigned to each output of the Basic Loop Controllers. The field can be edited by moving the highlight to the required output device and operating the enter key. This will 'bracket' the text entry which will then allow text editing to be conducted. To confirm the edit operate the enter key. Operation of the "Esc" key at any time will remove the newly entered text and revert the entry of the previous text entry. When the information is downloaded into the Vega Control Panel this is the information which will appear with the device when ever it is displayed. This is used to locate and identify the device to a specific point within an output group and is used in conjunction with the output text.

#### 4.1.4.4 Output Group

This selection allows the sounders and VFCO relay outputs to be assigned to an output group, however they default to a "Common" (Cmn) setting. When the program is downloaded to the Vega control panel and the setting are still set to common this will allow the sounder and VFCO relays to operate for any activation which is at Priority 0 and 1. However if they have been assigned to an output group of 1 to 512 then they will operate as programmed within the output programming of the selected group. To select the required group highlight the required position and operate the Enter key this will cause the area to be bracketed and "000" is displayed. The "000" represents the "Common" setting and by use of the arrow keys, the numeric keys or by use of the mouse the required group number maybe selected. Once the required group number has been selected operation of the Enter key will close the selection and allow the next selection to be made. Operation of the "Esc" key will also close the selection and will cause the original setting to be returned if information has been selected.

#### 4.1.4.5 Manual Sound (Man Snd)

This selection allows the Sounder and VFCO relay outputs to operate upon operation of the "Evacuate" button situated on the Vega panel facia. This selection will be at the default setting of "YES" for sounder circuits and "NO" for the relay outputs. When selected operation of the arrow keys will allow the setting to be altered between the settings of "YES" and "NO". Once the required setting is displayed operation of the Enter key will accept the selection and allow the selection of the next option. Operation of the "Esc" key will return the original value and allow selection of the next option. Assignment to the "YES" selection will activate the output device when Evacuate is activated.

#### 4.1.4.6 Clear

This selection will be at the default setting of "SILENCE" for sounder circuits and "RESET" for the relay outputs. When selected operation of the arrow keys will allow the setting to be altered between the settings of "SILENCE" and "RESET". Once the required setting is displayed operation of the Enter key will accept the selection and allow the selection of the next option. Operation of the "Esc" key will return the original value and allow selection of the next option. Assignment to the silence position will deactivate the output device upon operation of the "Silence Alarms" button whereas the reset selection will deactivate on operation of the "Reset" button of the panel facia.

#### 4.1.5 Output Group Information

Selection of the Output Group Information option from the standard features as shown in figure 3.2 allows the operator to edit the information for the output groups. This selection allows the parameter of the groups to be set as shown in figure 3.6 for each output group from 1 to 512.

O/P Group	Text Message	Output Group Information			Delay T3sec	Alert T4min	BGU Override	
		Group Action	Man Sound	Clear			I 3	I 4
001	First Floor Sounders	Program	No	Silence	015	03	No	Yes
002	GateHouse Link Outputs	Program	No	Reset	000	00	No	No
003	Unassigned Text	Program	No	Silence	000	00	No	No
004	Unassigned Text	Program	No	Silence	000	00	No	No
005	[REDACTED]	Program	No	Silence	000	00	No	No
006	Unassigned Text	Program	No	Silence	000	00	No	No
007	Unassigned Text	Program	No	Silence	000	00	No	No
008	Unassigned Text	Program	No	Silence	000	00	No	No
009	Unassigned Text	Program	No	Silence	000	00	No	No
010	Unassigned Text	Program	No	Silence	000	00	No	No
011	Unassigned Text	Program	No	Silence	000	00	No	No
012	Unassigned Text	Program	No	Silence	000	00	No	No
013	Unassigned Text	Program	No	Silence	000	00	No	No
014	Unassigned Text	Program	No	Silence	000	00	No	No
015	Unassigned Text	Program	No	Silence	000	00	No	No
016	Unassigned Text	Program	No	Silence	000	00	No	No
017	Unassigned Text	Program	No	Silence	000	00	No	No
018	Unassigned Text	Program	No	Silence	000	00	No	No
019	Unassigned Text	Program	No	Silence	000	00	No	No

Figure 3.6

##### 4.1.5.1 Output Group (O/P Group)

Each Group number is located down the left hand side of the screen which allows the user to select the relevant group for the entry of the information. The required group can be selected by use of the arrow keys or by use of the mouse. Operation of the Enter key allows for the information to be inserted and operation of the Enter key will allow for the selection of the next entry.

##### 4.1.5.2 Text Message

The text message consists of 24 characters of text which can be assigned to each individual output group. The field can be edited by moving the highlight to the required output device and operating the enter key. This will 'bracket' the text entry which will then allow text editing to be conducted. To confirm the edit operate the Enter key which will allow the selection of the next position. Operation of the "Esc" key at any time will remove the newly entered text and revert the entry of the previous text entry. When the information is downloaded into the Vega Control Panel this is the information which will appear an output device activate within a Fault condition. This is used to locate and identify the device to a specific point within an output group.

#### 4.1.5.3 Group Action

This position is set at a default setting of "Program" upon selection of this position another box will appear as detailed by figure 3.7.

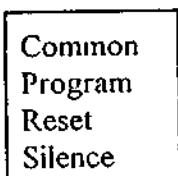


Figure 3.7

##### 4.1.5.3.1 Common

Selection of "Common" will cause the output group to operate for any activation of an input device which is assigned to priority 0 and 1.

##### 4.1.5.3.2 Program

The Program selection is the default selection and when selected will cause the output group to activate when the assigned input device(s) become active. The assigning of input devices is carried out within the "Set Activations" section as explained within section xx.

##### 4.1.5.3.3 Reset

This option is not implemented as of yet.

##### 4.1.5.3.4 Silence

This option is not implemented as of yet.

#### 4.1.5.4 Manual Sound (Man Sound)

This selection will be at the default setting of "NO" and when selected operation of the arrow keys will allow the setting to be altered between the settings of "YES" and "NO". Once the required setting is displayed operation of the Enter key will accept and allow selection of the next option. Operation of the "Esc" key will return the original value and allow selection of the next line. Assignment to the Yes position will activate the Groups assigned output devices when the Evacuate key is operated upon the Vega control panel.

#### 4.1.5.5 Clear

This selection will be at the default setting of "Silence" which will cause the activation of the output group to clear upon operation of Silence Alarms button on the vega control panel. When selected the setting can be altered by use of the arrow keys to the "Reset" setting which will cause the output group to clear upon operation of Panel Reset. When the selection is correct operation of Enter key will confirm the displayed setting where as operation of "Esc" key will return the setting to its original state and allow selection of the next position.

#### 4.1.5.6 Delay T3sec

Timer T3 is a Pre Alert time delay which, once set to an output group, will not allow the assigned output devices to activate until the set time has expired. The timer is set at a default setting of "000", upon selection the required time can be entered by use of the arrow keys, the numeric keys or via the mouse. Each operation will increment or decrement the time setting in 5 second intervals. If the selected time value is not within its default settings of 0 to 600 seconds the time will not be accepted until a valid time is entered. When the required time has been selected operation of the Enter key will confirm the setting , where as operation of "Esc" will revert the setting to its original value. Operation of either of the keys will allow the next position to be selected.

#### 4.1.5.7 Alert T4min

Timer T4 is the time period in which the output devices will remain in an alert condition until they operate into an evacuate condition, the alert condition is only applicable for sounder outputs. The timer will be at a default setting of "00", the timer has a maximum setting of 60 minutes and also a setting of infinity (INF).

Selection of the infinity option will allow the alert condition to operate until the output group is deactivated by the operation of either Silence Alarms or Reset. Setting of the time can be entered by use of the arrow keys which will increment or decrement the time setting in 1 minute intervals. If the selected time value Is not within its default settings, of 0 to 60 minutes, it will not be accepted until a valid time has been entered.

When the required setting has been selected operation of the Enter key will accept the setting, where as operation of Cancel will revert the setting to its original value. Operation of either of the keys will allow the next position to be selected.

#### 4.1.5.8 BGU Override

This position is a "YES" or "NO" selection, the default setting for this position is "NO" which will allow the relevant timers to operate. Upon selection operation of the arrow keys will allow the setting to be altered, when correct operation of Enter key will confirm the displayed setting. Operation of the "Esc" key will return the setting to its original state and allow selection of the next position.

When set to the Yes position and either of the timers T3 or T4 are running activation of a break glass device type will cause the relevant timer to be overridden.

#### 4.1.6 Set Activations

Selection of the Set Activations option from the standard features as shown in figure 3.2 allows the operator to assign various inputs to operate the output groups. Upon selection of this option another pull down window will appear as shown in figure 3.7. This box allows the user to select the relevant input type which is required to operate the output group as per the cause and effect. Selection is carried out by highlighting the required selection and operation of the Enter key.

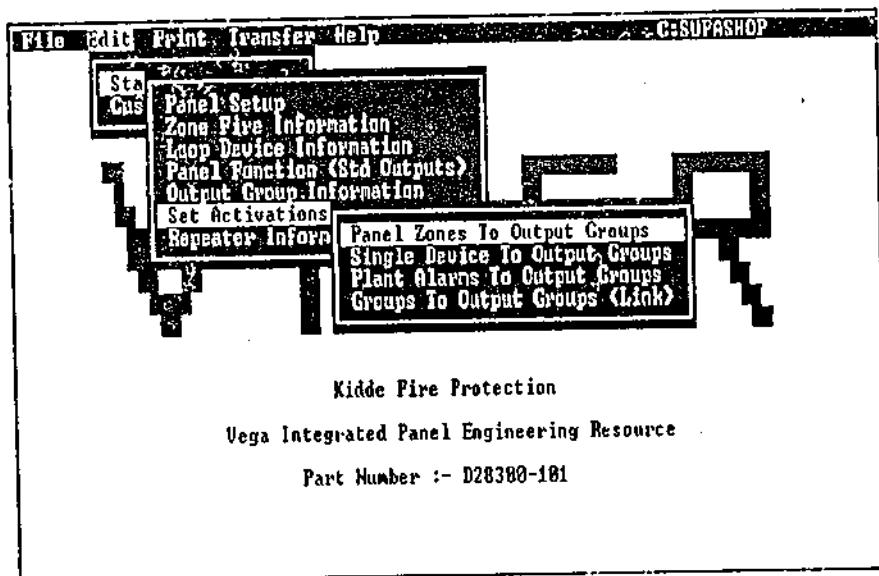


Figure 3.7

##### 4.1.6.1 Panel Zones To Output Groups

Upon selection of this option the display will show a matrix of output groups against zones, as shown in figure 3.8. The screen lists the output group number and its associated text down the left hand side of the display, this information is not selectable and is for information purposes only. The output groups from 1 to 512 will be listed and can be viewed by operation of the arrow keys (up and down) or operation of the mouse.

O/P Group	Text Message	Zone-Group Assignment									
		Zones Covered By This Panel									
001	First Floor Sounders	[ ]	-	-	-	-	-	-	-	-	-
002	GateHouse Link Outputs	-	-	-	-	-	-	-	-	-	-
003	1st Floor Beams RESEI	-	-	-	-	-	-	-	-	-	-
004	Unassigned Text	-	-	-	-	-	-	-	-	-	-
005	Unassigned Text	-	-	-	-	-	-	-	-	-	-
006	Unassigned Text	-	-	-	-	-	-	-	-	-	-
007	Unassigned Text	-	-	-	-	-	-	-	-	-	-
008	Unassigned Text	-	-	-	-	-	-	-	-	-	-
009	Unassigned Text	-	-	-	-	-	-	-	-	-	-

Activation Options

- = Clear
A = Alert
E = Evacuate
1 = 1st Dev Alert, 2nd Dev Evac (Same Zone)
2 = 2nd Dev In 1st Zone = Evacuate
3 = 1 Dev 1st Zone Alert, 1 Dev 2nd Zone Evac
4 = 1 Dev 1st Zone and 1 Dev 2nd Zone = Evac
5 = Infinite Alert (T3 Ignored)
6 = Infinite Alert (including T3)

Figure 3.8

The main box titled “Zones Covered By This Panel”, where the highlighted position is located list the zones quantity which will of been previously selected within the Panel Setup option. It is important that the correct zone quantity is correctly selected to allow for the true operation of the required cause and effect. The zones can be viewed by operation of the arrow keys (left and right) or by operation of the mouse. This operation is used to select the required zone within the relevant output group, once the correct zone is highlighted operation of the Enter key will select the zone. The matrix defaults to an unprogrammed configuration shown by the symbol “-”. Upon operation of Enter key a window titled “Activation Options” will appear which allows the operating parameter of the zone to be selected, as shown in figure 3.8.

#### 4.1.6.1.1 'Activation Options

This window allows the user to select the relevant operating parameter from the list provided, this is information with regards to the operation of each selection. To select the required operation the user will select the associated key from the list ie. “A” for Alert or “2” for “2nd Dev in 1st Zone = Evacuate”. When the correct operation has been selected operation of Enter key will confirm the displayed setting where as the “Esc” key will return the setting to its original state either allow selection of the next position. Table 2.1 describes the operation of each selection.

<b>Input Parameter</b>	<b>Operational Description</b>
Clear	This is the default setting and shows that no information has been assigned for this input for the selected output group.
Evacuate	This setting will cause the assigned output devices to operate in a constant operation.
Alert	This setting will cause the assigned output devices to operate in a pulsed operation. Sounder outputs only.
Type 1	This setting will cause the assigned output devices to operate in a pulsed operation for the first device in activation and constant for the second device within the same zone or plant area.
Type 2	This setting will cause the assigned output devices to operate in a constant operation for the activation of two devices within the same Zone or Plant area.
Type 3	This setting will cause the assigned output devices to operate in a pulsed operation for the first device activation in one area and to then go constant upon the activation of another device within a separate area. (Zones or Plant).
Type 4	This setting will cause the assigned output device to operate in a constant mode upon activation of two separate devices in separate Zone or Plant areas.
Type 5	This setting will cause the assigned output devices to operate in a pulsed operation for an infinite time period unless another activation occurs. Overrides the operation of T3.
Type 6	This setting on the input will cause the selected output group to operate in a pulsed operation. T3 will be allowed to operate before taking affect.

Table 2.1

#### 4.1.6.2 Single Device To Output Groups

This option is not available.

#### 4.1.6.3 Plant Alarms To Output Groups

This option is not available.

#### 4.1.6.4 Groups to Output Groups (Link)

This option is not available.

#### 4.1.7 Repeater Information

Selection of the Repeater Information option from the standard features as shown in figure 3.2 allows the operator to assign information to repeater panels which have controls only. Upon selection of this option screen will show the repeater information as shown in figure 3.9. This box allows the user to select the relevant repeater by use of the associated address number from 1 to 15. Selection is carried out by highlighting the required position and operating the Enter key.

Repeater Information			
Repeater Address	Location Text Message	Sounder Circuit Output	UPCO Contact Output
01	Unassigned Text	000	000
02	Unassigned Text	000	000
03	Unassigned Text	000	000
04	Unassigned Text	000	000
05	Unassigned Text	000	000
06	Unassigned Text	000	000
07	Unassigned Text	000	000
08	Unassigned Text	000	000
09	Unassigned Text	000	000
10	Unassigned Text	000	000
11	Unassigned Text	000	000
12	Unassigned Text	000	000
13	Unassigned Text	000	000
14	Unassigned Text	000	000
15	Unassigned Text	000	000

Figure 3.9

##### 4.1.7.1 Location Text Message

The text message consists of 24 characters of text which can be assigned to each repeater panel. The field can be edited by moving the highlight to the required repeater panels address and operating the Enter key. This will 'bracket' the text entry which will then allow text editing to be conducted. To confirm the edit operate the Enter key which will allow the selection of the next position. Operation of the "Esc" key at any time will remove the newly entered text and revert the entry of the previous text entry. When the information is down loaded into the Vega Control Panel this information will be displayed if the repeater loses communication or raises a fault condition. This information is used to locate and identify the repeater to a specific point upon the site.

#### 4.1.7.2 Sounder Circuit Output

Each Repeater panel with controls is capable of having the internal sounder circuit programmed to operate within the cause and effect. This selection allows the sounder to be assigned to an output group, however they default to a "Common" (000) setting. When the program is downloaded to the Vega control panel and the setting are still set to common this will allow the sounder to operate for any activation which is at Priority 0 and 1. However if it has been assigned to an output group of 1 to 512 then it will operate as programmed within the output programming of the selected group. To select the required group highlight the required position and operate the Enter key, this will cause the area to be bracketed. By use of the arrow keys, the numeric keys or by use of the mouse the required group number maybe selected. Once the required group number has been selected operation of the Enter key will close the selection and allow the next selection to be made. Operation of the "Esc" key will also close the selection and will cause the original setting to be returned if information has been selected and also allow the next selection to be made.

#### 4.1.7.3 VFCO Contact Output

Selection and operation is as described in 5.7.2.

### 4.2 Custom Features

Selection of the "Custom Features" option will contain another set of menu options as shown in figure 3.10. The up, down and the Enter keys are used to make the option selection from the options shown below.

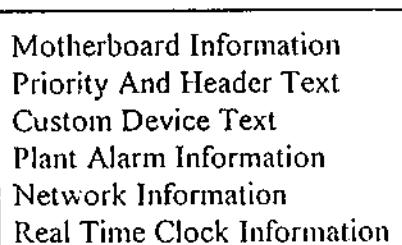


Figure 3.10

#### 4.2.1 Motherboard Information

This selection will be dependant upon the selection already set up within the Panel Setup as explained in section 4.1.1.16. When selected the assigned motherboard extension cards will be displayed as shown in figure 3.11.

Motherboard Information						
Base Address	Circuit Type	Text Message	Zone No	Day Mode	O/P Group	Set other parameters
Mb-01.01	Monit. O/P	OFFICE BLOCK FIRST FLOOR			000	No
Mb-01.02	Monit. O/P	OFFICE BLOCK 2ND FLOOR			000	No
Mb-01.03	Monit. O/P	OFFICE BLOCK 3RD FLOOR			000	No
Mb-01.04	Monit. O/P	OFFICE BLOCK 4TH FLOOR			000	No
Mb-01.05	Monit. O/P	OFFICE BLOCK 5TH FLOOR			000	No
Mb-01.06	Monit. O/P	OFFICE BLOCK 6TH FLOOR			000	No
Mb-01.07	Monit. O/P	OFFICE BLOCK 7TH FLOOR			000	No
Mb-01.08	Monit. O/P	OFFICE BLOCK BASEMENT			000	No
Mb-02.01	Switch I/P	[REDACTED]	000	N/A		No
Mb-02.02	Switch I/P	Unassigned Text	000	N/A		No
Mb-02.03	Switch I/P	Unassigned Text	000	N/A		No
Mb-02.04	Switch I/P	Unassigned Text	000	N/A		No
Mb-02.05	Switch I/P	Unassigned Text	000	N/A		No
Mb-02.06	Switch I/P	Unassigned Text	000	N/A		No
Mb-02.07	Switch I/P	Unassigned Text	000	N/A		No
Mb-02.08	Switch I/P	Unassigned Text	000	N/A		No
Mb-02.09	Switch I/P	Unassigned Text	000	N/A		No
Mb-02.10	Switch I/P	Unassigned Text	000	N/A		No
Mb-02.11	Switch I/P	Unassigned Text	000	N/A		No

Figure 3.11

##### 4.2.1.1 Base Address

This area details the mother board address number and the sub addresses which relates to the address set upon the card within the Vega control panel. Table 2.3 details the motherboard extension cards and how they are identified within the Vega control panel. This information is not selectable and is used for selection purposes upon this screen.

MOTHERBOARD INFORMATION			
DESCRIPTION	VIPER REF.	TYPE	CHANNELS
8 Way Sounder	Monit. O/P	Output	8
8 Way Relay	Relay O/P	Output	8
16 Way Output	Output	Output	16
16 Way Input	Switch I/P	Input	16
8 Way Monitored Input	Monit. I/P	Input	8

Table 2.3

#### 4.2.1.2 Circuit Type

This column details the Device type of extension card which is being selected, the displayed device type is the default text which appears upon the panels display during fault conditions. For input device types only the text can be overwritten by use of the "Custom Type Device Text" which will replace the default text during fault conditions.

#### 4.2.1.3 Text Message

The text message consists of 24 characters of text which can be assigned to each channel of the motherboard extension card. The field can be edited by moving the highlight to the required repeater panels address and operating the Enter key. This will 'bracket' the text entry which will then allow text editing to be conducted. To confirm the edit operate the Enter key which will allow the selection of the next position. Operation of the "Esc" key at any time will remove the newly entered text and revert the entry of the previous text entry. When the information is downloaded into the Vega Control Panel this information will be displayed if the device losses communication, activates or enters a fault condition. This information is used to locate and identify the output.

#### 4.2.1.4 Zone Number

If the device type is an Input device then it will be allowed to assign the channels to a required zone number. A numeric value can be inserted by moving the highlight to the relevant position and by operating the Enter key. The numeric zone number can be selected by operation of the cursor keys, numeric keys or by the mouse. Selection of the zone number can be confirmed by operation of the Enter key which will allow the selection of the next position. The quantity of zone is restricted by the set up of the zone quantity which is allocated in the panel set up menu. Operation of the "Esc" key will revert the selection to the original setting and also allow for the selection of the next position.

#### 4.2.1.5 Day Mode

If the device type is an Input device then it will be allowed to assign the channels to a operate in the Day Mode function. The day mode is a manual operation within the menu structure of the control panel which will allow the device to be Isolated. The selection defaults to a setting of "N/A" which allows the detector to operate within its normal operating parameters. Selection of the "Isolated" option will cause the device to become isolated when the control panel is set within Day Mode. The selection is confirmed by operation of the Enter key where as the "Esc" key will cancel the selection and revert to the original setting, both operations will allow selection of the next position.

#### 4.2.1.6 O/P Group

If the device type is an output device then it will be allowed to assign the channels to a required output group. The setting is set at a default of "000", these can be assigned to an output group of 1 to 512. Once assigned to group number they will operate as programmed within the output programming of the selected group. To select the required group highlight the required position and operate the Enter key this will cause the area to be bracketed. By use of the arrow keys, the numeric keys or by use of the mouse the required group number maybe selected. Once the required group number has been selected operation of the Enter key will close the selection and allow the next selection to be made. Operation of the "Esc" key will also close the selection and will cause the original setting to be returned if information has been selected.

#### 4.2.1.7 Set Other Parameters

Dependant upon the device type this selection will have different selections to allow for the correct operation of the device. Upon selection a window will appear which will detail the board address and the channel number which has been selected. The other parameters selection will be displayed within the box. The setting will be set to a default of "NO" this means no information has been set for this device. If information has been programmed within this selection then the setting will "YES".

##### 4.2.1.7.1 Output Device Other Parameters

Output devices will only allow the selection of "Manual Sound" "Clear On", refer to sections 4.1.4.5 and 4.1.4.6 respectively for operating information.

##### 4.2.1.7.2 Input Device Other Parameters

Refer to section 4.1.3.6 for operating information.

#### 4.2.2 Priority And Header Text

Selection of the Priority and Header text option from the custom features as shown in figure 3.10 allows the operator to assign information to the priority text. Upon selection of this option screen will show the repeater information as shown in figure 3.12.

Priority	Priority Text
Priority: 0	EVACUATE
Priority: 1	FIRE
Priority: 2	ALERT
Priority: 3	PREALARM
Priority: 4	FAULT
Priority: 5	EVACUATION
Priority: 6	UNASSIGNED
Priority: 7	UNASSIGNED
Priority: 8	UNASSIGNED
Priority: 9	UNASSIGNED

Figure 3.12

##### 4.2.2.1 Priority

The Priority column details the different levels of priority activations which the input device types can be assigned against. This is user information used during the selection and programming of the associated text.

##### 4.2.2.2 Text

This selection allows the header text which appears in the top left hand corner of the display during an activation to be reconfigured. On selection the default settings will be displayed and by operation of the arrow keys the required header text can be highlighted. Once highlighted operation of the Enter key will select the position and allow the 12 characters of text to be assigned. To confirm the edit operate the Enter key which will allow the selection of the next position. Operation of the "Esc" key at any time will remove the newly entered text and revert the entry of the previous text entry. When the information is downloaded into the Vega Control Panel the programmed text will be displayed during the relevant priority activation.

#### 4.2.3 Custom Device Text

Selection of the Custom Device Text option from the custom features as shown in figure 3.11 allows the operator to assign information for the custom device text which can be used to replace the actual device type text. Upon selection of this option screen will list 1 to 50 possible custom type selections, each entry being individually numbered. The Description text will have a 12 character default message of "Cust Text XX" where the XX is the numeric position of the text. To select the required text highlight the required position by use of the arrow keys or by operation of the mouse and operate the Enter key. Upon operation of the Enter key the 12 characters of text can then be assigned. To confirm the edit operate the Enter key which will allow the selection of the next position. Operation of the "Esc" key at any time will remove the newly entered text and revert the entry of the previous text entry. When the information is down loaded into the Vega Control Panel the programmed custom text will be displayed during the activation of the relevant devices which the text has been programmed against.

#### 4.2.4 Plant Alarm Information

This option is not available.

#### 4.2.5 Network Information

This option is not available.

#### 4.2.6 Real-Time Clock Information

This option is not available.

## CHAPTER 5

### PRINT OPTIONS

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#### 5.0 PRINT OPTIONS

When this position is selected a pull down window will appear showing the options available as shown in figure 4.0. Select the required option by highlighting the required position by operation of the arrow keys or by use of the mouse and confirming by pressing the Enter key.

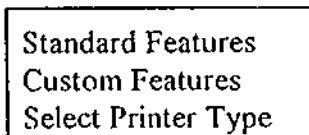


Figure 4.0

This feature allows the user to printout the information which has been programmed within both the "EDIT" top line menu selection. Selection of either "Standard" or "Custom" features will allow the selection of relevant sub menu and for the information to be selected for print.

Selection of the relevant option will allow for the selection form the menu selections as shown in figure 3.1 and 3.11 as shown in chapter 4. Each printout will print the information programmed within the relevant sub menu selection. To print the information highlight the required menu and operate the Enter key. This will cause a gauge to appear upon the screen as a guide to the quantity of information which is being printed.

#### 5.1 Select Printer Type

This option allows the user to select the type of printer being used to print out the information, it is important that this setting is correct. Upon selection a window will appear which will allow the selection of either "Laser" or "Other". The selection of the appropriate printer type will initiate the correct codes to allow the correct printout of the information. Select the required option by highlighting the required position by operation of the arrow keys or by use of the mouse and confirming by pressing the Enter key.

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# CHAPTER 6

## TRANSFER OPTIONS

### 6.0 TRANSFER OPTIONS

When this position is selected a pull down window will appear showing the options available as shown in figure 5.0. Select the required option by highlighting the required position by operation of the arrow keys or by use of the mouse and confirming by pressing the Enter key. To transfer the information to and from the Vega control panel it is necessary to connect the MT0021 to the PC and to the Vega control panel. The connection inside the Vega control panel is to the Main Control Processor board (44782-K071) to "SKT1".

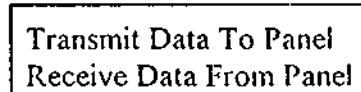


Figure 5.0

#### 6.1 Transmit Data To Panel

Selection of this option allows the user to transmit the programmed information to the Vega Control panel. Upon selection the display will confirm it is communicating with the Vega control panel. This is carried out by the "Data to Panel" and the "Response from Panel" prompts within the top corners of the display. If communications is correct a rotating line will be displayed. If communications is not taking place the display will display "REQUESTING ATTENTION OF PANEL"; if the panel does not respond the program will suspend communications and display "TRANSFER ABANDONED on COMMS ERROR". If this is the case the user should check that the communications lead is correctly attached or that the lead is not faulty.

When Communications is taking place the Vega control panel will display "PC ACTIVE" it will also display that it is "Receiving" the groups of information from the VIPER program. The Viper program will confirm that is transmitting the information by displaying a gauge on the screen detailing that it is down loading the individual groups of information and by the "PANEL RESPONDING" text. The transfer of the information can be cancelled by operating the "Esc" key which will cause the "Transfer Abandoned" to appear on the screen.

Completion of the transfer of the program will cause the display to show "TRANSFER COMPLETE", at which point the display will prompt the user to "Hit Any Key to Continue". Operation of any key will allow the next selection to be made.

## 6.2 Receive Data From Panel

Selection of this option allows the user to receive information from the Vega Control panel and is a very useful commissioning tool. This option can be used to save time of the programming of large quantity of detection loops for the device types against the correct addresses. This can be achieved by allowing the Vega control panel to log the detectors correctly, refer to manual TM0003 for panel operating information, then down loading the information into the Viper program.

Upon selection the display will confirm it is communicating with the Vega control panel. This is carried out by the "Data to Panel" and the "Response from Panel" prompts within the top corners of the display. If communications is correct a rotating will be displayed. If communications is not taking place the display will display "REQUESTING ATTENTION OF PANEL", if the panel does not respond the program will suspend communications and also display "TRANSFER ABANDONED on COMMS ERROR". If this is the case the user should check that the communications lead is correctly attached or that the lead is not faulty.

When Communications is taking place the Vega control panel will display "PC ACTIVE" it will also display that it is "Sending" the groups of information to the VIPER program. The Viper program will confirm that is receiving the information by displaying a gauge on the screen detailing that it is down loading the individual groups of information and by the "PANEL RESPONDING" text. The transfer of the information can be cancelled by operating the "Esc" key which will cause the "Transfer Abandoned" to appear on the screen.

Completion of the transfer of the program will cause the display to show "TRANSFER COMPLETE", at which point the display will prompt the user to "Hit Any Key to Continue". Operation of any key will allow the next selection to be made, it is advisable to "SAVE" the information at this point.

## **CHAPTER 7**

### **HELP OPTIONS**

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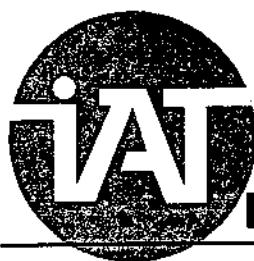
#### **7.0      HELP OPTIONS**

When this position is selected a pull down window will appear allowing the Viper user controls to be displayed. When selected the display will show the relevant control keys used in operating the Viper program. To quit from this selection operate the "Esc" key which will allow the selection of the next position within the Viper program.

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6



**Fire Alarm Certification**

**6**



**Integrated Alarm Technology (Europe) Ltd.**

**Certificate of Fire Alarm System  
Installation & Commissioning**

<b>Client</b>	<b>Protected Property</b>
T. Clarke Plc.  Stanhope House,  116/118 Walworth Road,  London SE1 1JL.	5-7 Carlton Gardens  London SW1Y 5AD

Our attention has been drawn to the recommendations of **BS 5839 part 1: 1988** In particular to clauses 14 (false alarms), 28 and 29 (user responsibilities)

In accordance with **BS 5839 part 1: 1988**, subclause 26.1, record drawings and operating instructions have been supplied and received by:

Signed: \_\_\_\_\_ Status: \_\_\_\_\_ Date: \_\_\_\_\_

For and on behalf of (user) \_\_\_\_\_

In accordance with **BS 5839 part 1:1988** subclause 26.2 the installation has been inspected and been found to comply with the recommendations of the code.

In accordance with **BS 5839 part 1: 1988** subclause 26.3 the insulation of cables and wires has been tested.

In accordance with **BS 5839 part 1: 1988** subclause 26.4 the earthing has been tested.

In accordance with **BS 5839 part 1: 1988** subclause 26.5 the entire system has been tested for satisfactory operation.

In accordance with **BS 5839 part 1: 1988** subclause 26.5 it is certified that the installation complies with the recommendations of the code, other than the following exceptions:

Signed: \_\_\_\_\_ Status: **(Commissioning Engineer)** Date: \_\_\_\_\_

For and on behalf of: **(Installer) Integrated Alarm Technology (Europe) Limited.**

The Fire Alarm Log Book and System Documentation is located in:



7



**Fire Alarm Log Book**

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**7**



Integrated Alarm Technology (Europe) Limited

## Fire Alarm Log Book

5-7 Carlton Gardens



**Integrated Alarm Technology (Europe) Limited**

## **| Fire Alarm Log Book**

5-7 Carlton Gardens



Integrated Alarm Technology (Europe) Limited

## **Fire Alarm Log Book**

5-7 Carlton Gardens



**Integrated Alarm Technology (Europe) Limited**

## **Fire Alarm Log Book**

5-7 Carlton Gardens







## **Recommended Spares**

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**Integrated Alarm Technology (Europe) Ltd.**
**Recommended Spares**
**5 - 7 Carlton Gardens - Fire Detection System**

Quote: I494-RF1

Date: 21/09/98

Page: 1 of 2

ITEM	ICON	DESCRIPTION OF EQUIPMENT	SPARES
01		IT 67/6900 Analogue Addressable Control Panel including VA/PA Amplifier Rack in Basement & 10-Customisable Firemans' Control Switches	0
02		IT 6400 Analogue Addressable Repeater Panel (not shown on Drawings)	0
03	FAP	FAP Residential Tenant Fire Alarm Panel	0
04	SCP	IT 90SD Smoke Damper Control Interface	1
05	SV	IT 90SV Sprinkler Valve Interface	1
06	W	IT 95IO Window-Release Control I/O (Lev7)	0
07	DH	IT 95IO Magnetic Door Retainer I/O Unit Door Holders by others	0
08	M	IT 95IO MCC Interface/MCP Interface	0
09	L	IT 95IO Lift Interface	1
10	DR	IT 95IO Door-Release Control I/O (Lev 6)	0
11	SP	Monitored Pressure Switch Interface	0
12	S	*3 Sprinkler Flow Interface *4	0
13		IT 95M Addressable Manual Callpoint	1
14	O	IT 95O Analogue Addressable Optical Detector	1
15	H	IT 95H Analogue Addressable Heat Detector	1
16	O	*1 IT 95DP Analogue Addressable Duct-Probe *2 (Including Detector)	1
17	O	IT 95C Combined Analogue Addressable Smoke Detector & Electronic Sounder	1

**Integrated Alarm Technology (Europe) Ltd.****Recommended Spares****5 -7 Carlton Gardens - Fire Detection System**

Quote: I494-RF1

Date: 21/09/98

Page: 2 of 2

ITEM	ICON	DESCRIPTION OF EQUIPMENT	SPARES
18		IT 80ES Beacon	1
19		IT 80RI Remote Indicator	0
20		IT 95I Analogue Addressable Optical Detector for Ceiling-Void & Remote Indicator	1
21		IT 85WS Wall-Mounted Speaker as SVT	1
22		IT 80CS Recessed Ceiling Speaker (above metal tiling on Office Floors)	1
23		IT 80CS Recessed 4' Ceiling Speakers	1
24		IT 85WS Wall-Mounted Speaker as VT Including Waterproof on Roof	1
25		IT 95CI Circuit Isolators/Isolator Bases as required	3
<b>Additional Items based on Clarifications</b>			
26		IT 90SV Sprinkler Valve Interface	1
27		IT 95IO MCC Interface/MCP Interface	1
28		IT 95IO Lift Interface	1



**Integrated Alarm Technology (Europe) Ltd.**

**Recommended Spares**

**5 -7 Carlton Gardens - Fire Telephone System**

**Quote: I494-RT1**

**Date: 21/09/98**

**Page: 1 of 1**

ITEM	ICON	DESCRIPTION OF EQUIPMENT	SPARES
01		 Stand-Alone Firemans' Control Panel Incorporating Duplex Communication 10-Zone System with facility to upgrade up to 32-Zones within the standard enclosure Including Area-Call Buttons and full Fault Monitoring and Firemans' Handset	○
02		IT 850T Recessed Fire Telephone Unit painted red with lockable door including Integral Sounder with the ability to have up to 5 Phones	○

We have provided a specification covering the full range of our equipment for your information. cross-reference this bill with the specification for details on the individual products offered







**Equipment Warranty/Guarantees/**

**9**

**Service Life Schedule**



*Life Safety Solutions*

The equipment on the following 3 sheets is guaranteed for a period of 12 months from the date of Commissioning.

This guarantee would be automatically extended to 3 following acceptance of a Maintenance Agreement with IAT (Europe) Limited



**Integrated Alarm Technology (Europe) Ltd.**

**Product Support**

**5 -7 Carlton Gardens - Fire Detection System**

**Quote: 1494-YK2**

**Date: 21/09/98**

**Page: 1 of 2**

ITEM	ICON	DESCRIPTION OF EQUIPMENT	SUPPORT
01		IT 67/6900 Analogue Addressable Control Panel including VA/PA Amplifier Rack in Basement & 10-Customisable Firemans' Control Switches	
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04	<b>SCP</b> 	IT 90SD Smoke Damper Control Interface	
05	<b>SV</b> 	IT 90SV Sprinkler Valve Interface	
06	<b>W</b> 	IT 95IO Window-Release Control I/O (Lev7)	
07	<b>DH</b> 	IT 95IO Magnetic Door Retainer I/O Unit Door Holders by others	
08	<b>M</b> 	IT 95IO MCC Interface/MCP Interface	
09	<b>L</b> 	IT 95IO Lift Interface	
10	<b>DR</b> 	IT 95IO Door-Release Control I/O (Lev 6)	
11	<b>SP</b> 	Monitored Pressure Switch Interface	
12	<b>S</b> <sup>*3</sup> <sup>*4</sup> 	Sprinkler Flow Interface	
13		IT 95M Addressable Manual Callpoint	
14	<b>O</b> 	IT 95O Analogue Addressable Optical Detector	
15	<b>H</b> 	IT 95H Analogue Addressable Heat Detector	
16	<b>O</b> <sup>*1</sup> <sup>*2</sup> 	IT 95DP Analogue Addressable Duct-Probe (including Detector)	
17		IT 95C Combined Analogue Addressable Smoke Detector & Electronic Sounder	



**Integrated Alarm Technology (Europe) Ltd.**

**Product Support**

**5 - 7 Carlton Gardens - Fire Telephone System**

**Quote:** I494-YK2

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**Page:** 1 of 1

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**Product Support**

**5 -7 Carlton Gardens - Fire Detection System**

**Quote: I494-YK2**

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**Page: 2 of 2**

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Additional Items based on Clarifications			
26		IT 90SV Sprinkler Valve Interface	
27		IT 95IO MCC Interface/MCP Interface	
28		IT 95IO Lift Interface	







**Data Sheets**

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**10**

## XP95 SPECIFICATION SUMMARY

	XP95 Ionisation	XP95 Optical	XP95 Temperature	XP95 High Temperature	XP95 Manual Call Point	XP95 Isolator
Device Part No.	55000-500	55000-600	55000-400	55000-401	55000-910	55000-700
Base Part No.	45681-210	45681-210	45681-210	45681-210	-	45681-211
Size of Device in Base Height x Diameter (mm)	50 x 100	50 x 100	50 x 100	50 x 100	87 x 87 (Height & Width)	30 x 100
Supply Voltage	17-28 VDC	17-28 VDC	17-28 VDC	17-28 VDC	17-28 VDC	17-28 VDC
Quiescent Current	280µA	340µA	250µA	270µA	230µA	40 ± 5µA
Normal Surge Current (Synchronised to ADC Operation)	500µA	600µA	310µA	310µA	270µA	-
Alarm Indication	Red LED	Clear LED Red in Alarm	Red LED	Red LED	Red LED	Yellow flashing LED (Loop short circuit)
Alarm LED Current	2mA	4mA	2mA	2mA	2mA	30mA pulsed
Normal Operating Temperature (no icing)	-20°C to +60°C	-20°C to +60°C	-20°C to +70°C	-20°C to +120°C	-20°C to +70°C	-20°C to +70°C
Humidity (no condensation)	0-95%	0-95%	0-95%	0-95%	0-95%	0-95%
Max wind (continuous)	10 m/s	unaffected	unaffected in fixed temperature use	unaffected in fixed temperature use	unaffected	unaffected

### XP95 MOUNTING BASE AND XPERT CARD

The base has been designed to enable monitors to be plugged in without any need for force and to have a "one-way-only" fit.

By means of a unique, patented "XPERT card" the address information is held in the base while keeping the base entirely free of electronic parts. This coded plastic card is inserted into the base on commissioning, so that the address remains the same, no matter how often the monitor is replaced by similar devices for servicing purposes.

Part no. 45681-210



### AUTOMATIC ADDRESSING WITH THE XPERT CARD

Depending on the combination of pips removed, switches in the monitor head are operated to produce the correct address when the monitor head is inserted.

XP95 smoke and heat monitors have been designed to comply with both European and North American standards for components of fire protection systems.

The range is currently undergoing approval testing at the LPCB laboratories at Borehamwood and Underwriters Laboratories in the United States.

**apollo**

6 Solent Road, Havant, Hampshire, England PO9 1JH. Tel: (0705) 492412 Fax: (0705) 492754. Telex: 86292 Apollo G.

Cl (68.5) Xy  
PP1040/1993/Issue 1

**ANALOGUE, ADDRESSABLE  
SMOKE & HEAT MONITORS**

- EXTENDED PROTOCOL
- ADDRESSED BY XPERT CARD
- ELECTRONICS FREE BASE

**apollo**  
FIRE DETECTORS LIMITED

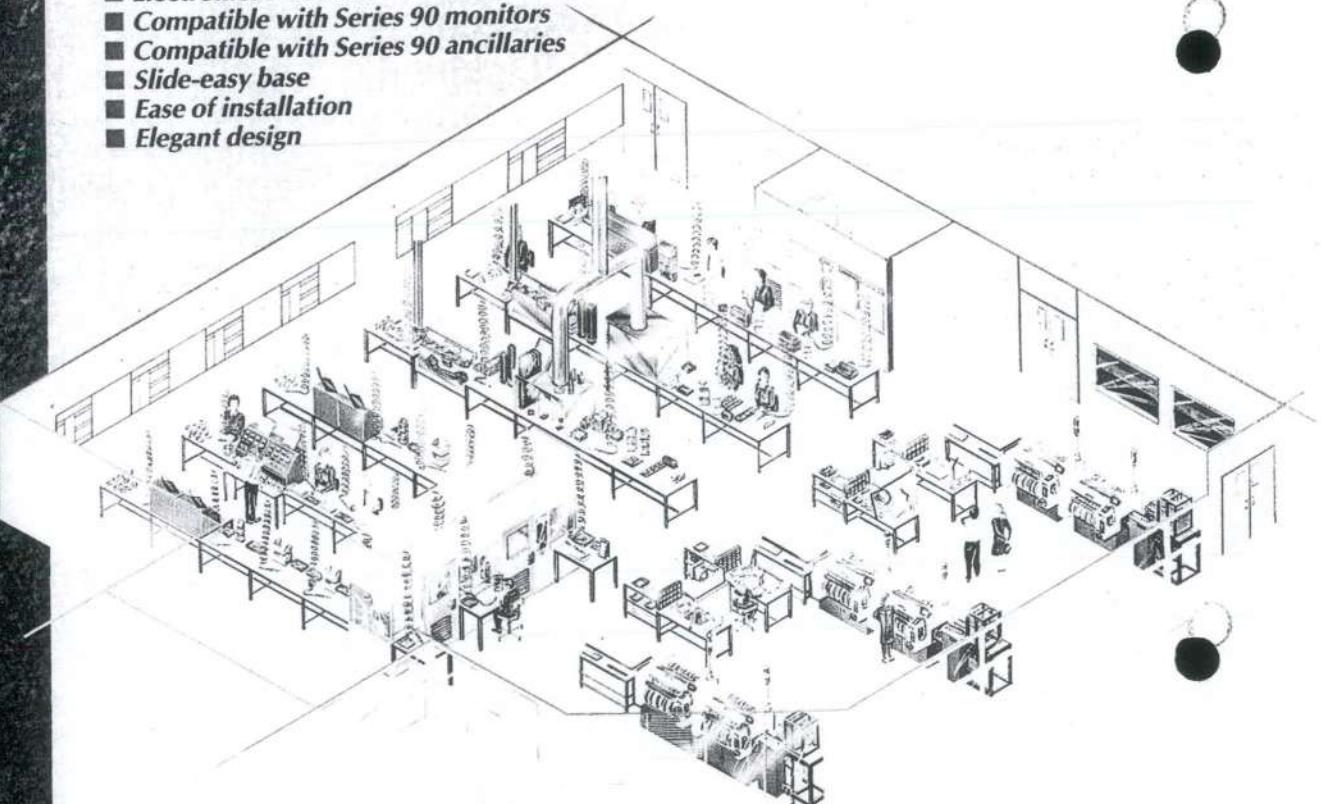
# XP95

## XP95 ANALOGUE, ADDRESSABLE FIRE MONITORS

XP95 fire monitors are a major development of the Apollo Series 90 range of monitors. They are advanced in design, improved in performance and offer benefits to both the installer and the end user.

The XP95 range comprises an ionisation and optical smoke monitor, temperature monitors and a compatible manual call point. A communications chip has been developed by Apollo's Research and Development team to provide an extension to the Series 90 protocol. The use of this chip virtually doubles the amount of information that XP95 monitors can relay to control equipment. A unique, patented address mechanism ensures that the address data is stored in the base while keeping the base free of electronic parts that could be damaged during installation. XP95 monitors incorporate all the design advances of Series 60, including high environmental performance, ease of installation and maintenance and a design to meet approvals world-wide.

- Alarm Flag for fast alarm reporting
- Alarm Address for fast location of alarm
- Automatic addressing with XPERT card
- Electronics free base
- Compatible with Series 90 monitors
- Compatible with Series 90 ancillaries
- Slide-easy base
- Ease of installation
- Elegant design



Apollo's corporate story is one of achievement, with fire detection products that are among the most reliable in the world. The many awards won by Apollo are a testimony to this.

Apollo Fire Detectors Limited is part of the Halma Group of companies. Apollo carries out all its design, development and manufacturing at one site in Havant on the south coast of England – this is also the home of the Finance, Sales and Marketing departments.

The company is Quality Assured to BS 5750, Pt. 2, (ISO 9002 and EN 29002) and has been assessed by BSI and LPCB.



**apollo**  
FIRE DETECTORS LIMITED

## XP95 SMOKE AND HEAT MONITORS

The XP95 range uses the same outer casing as the Series 60 range of conventional detectors, maintaining the elegant, unobtrusive design, finished in pure white polycarbonate. XP95 monitors are distinguished from Series 60 by the XPERT address card bearing the address number of the individual fire monitor.

## XP95 IONISATION SMOKE MONITOR

The sensing chamber of the XP95 ionisation smoke monitor operates in exactly the same way as the Series 60 ionisation smoke detector. The air in the dual chambers is irradiated to produce ions that travel to the positive and negative electrodes and hence create a current flow in the chambers. Smoke entering the outer chamber causes a drop in the current flow and an increase in the voltage measured at the junction between the outer and inner chambers. Unlike the Series 60, however, XP95 does not operate on a threshold basis. The analogue voltage signal produced in the sensing chamber is converted to a digital signal by the electronic circuitry and transmitted to the control equipment on interrogation. The micro-processor in the control equipment then compares the signal with stored data and initiates a pre-alarm or fire alarm as smoke density increases. When the equipment determines that a fire condition exists, it instructs the monitor to switch on its indicator LED and the pre-planned alarm routine is initiated.

Part no. 55000-500

## XP95 OPTICAL SMOKE MONITOR

The XP95 optical smoke monitor uses the same optical arrangement as the Series 60 optical smoke detector, with an internal pulsing LED and a photo-diode at an obtuse angle. In clear air conditions the photo-diode in the XP95 monitor receives no light from the LED and produces a corresponding analogue signal. This signal increases when smoke enters the chamber and light is scattered onto the photo-diode. The signal is processed by the electronic circuitry and transmitted to the control equipment in exactly the same way as in the case of the ionisation smoke monitor. The optical smoke monitor is externally identical to the ionisation monitor but is distinguished by having a clear indicator LED which emits red light when the monitor is in alarm.

Part no. 55000-600

## XP95 TEMPERATURE MONITOR

The XP95 temperature monitor is distinguishable from XP95 smoke monitors by its low air-flow resistance case which allows good contact between the sensing thermistor and the surrounding air. The device monitors temperature by using a single thermistor network which provides a voltage output proportional to the external air temperature. The voltage signal is processed and transmitted to the control equipment in the same way as in the case of the ionisation smoke monitor. A temperature monitor for use in ambient safe temperatures of up to 50°C and which reaches the alarm level at 90°C is also available.

Part nos. 55000-400 (standard)  
55000-401 (high temperature)

## XP95 MANUAL CALL POINT

When activated, the XP95 manual call point not only interrupts the polling cycle to indicate to the control panel that it has been operated, but also reports its address. Thus an alarm and its location can be reported in less than 0.2 seconds.

Part no. 55000-910

## ANCILLARIES

XP95 fire monitors are compatible with the full range of Series 90 ancillary products.

## XP95 ISOLATOR

Isolators are designed to protect the XP95 loop in the event of a short circuit fault. They divide a loop of fire monitors and ancillary devices into groups of 20 as a rule, so that, in the event of a short circuit, no more than 20 devices will be inoperable. The XP95 isolator has particularly low non-isolating resistance.

Part no. 55000-700





## ... PRODUCT INFORMATION & NEWS ...

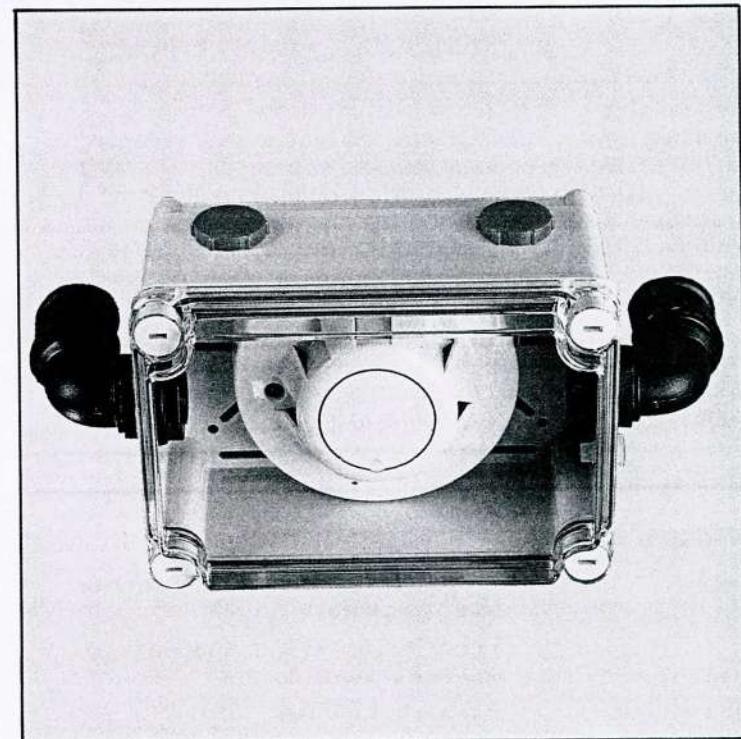
# AIR SAMPLING UNIT

**Part Nos: 53546-014 (Series 60)**  
**53546-016 (XP95)**

The Apollo air sampling unit is designed for use with Apollo Series 60 conventional smoke detectors (part no. 53546-014) and for XP95 smoke monitors (part no. 53546-016). The unit enables smoke detectors to be sited within ventilation extract ducts in order to assist in the prevention of the spread of smoke by the ventilation system (as required by Building Regulations) and in addition to form part of the fire alarm system. When designing fire detection systems incorporating smoke detectors in air sampling units reference must be made to Standards such as BS 5839: Pt 1: 1988, CEA Guidelines for automatic fire alarm installations or locally acceptable Codes of Practice.

Under no circumstances should a duct smoke detection system be used as the sole method of detecting fire. Open area detectors must also be used.

The air sampling unit enables smoke detectors to monitor ventilation ducts without subjecting the detectors to high air velocities which could alter their sensitivity.



### FEATURES

- Fully specified performance between 1m/s and 25m/s ducted air flow
- removable transparent viewing window to save on remote indicators and simplifying commissioning and servicing
- sampling probes suitable for ducts from 300mm to 1500mm wide
- probe sealing grommets supplied in two sizes
- strong, lightweight and small size design
- fitted with standard Apollo mounting base
- installation aid for accurate and easy fitting
- colour coded inlet and exhaust probes
- minimum effect on ventilation system functioning.



THE QUEEN'S AWARD FOR  
EXPORT ACHIEVEMENT 1990



A  
**HALMA**  
GROUP  
COMPANY

## OPERATION

The Apollo air sampling unit works by taking a sample of air from the duct through a black perforated inlet probe into its sampling chamber, which should contain an Apollo Series 60 ionisation smoke detector, a Series 60 optical smoke detector, or an Apollo XP95 ionisation or optical smoke monitor. This air is removed through a white exhaust probe. The design of the probes and sampling chamber is arranged so that air passes through the sampling chamber at approximately 25% of the air speed in the duct.

## CONSTRUCTION

The sampling chamber of the Apollo air sampling unit consists of a grey polycarbonate box fitted with a transparent polycarbonate cover. An Apollo mounting base is supplied ready fitted in this chamber. The perforated inlet probe is black PVC and is sealed at its end. The exhaust probe is distinguished by being white PVC and has a chamfer at its end. Sealing grommets in two sizes are supplied for each probe. The probes are connected by compression joints onto the sampling chamber which also has provision for fixing to the duct and removable plugs on one side for cable entry. The probes project approximately 161mm into the duct.

The transparent window which has a built-in sealing gasket can be removed by undoing four screws to provide access during installation or maintenance. During normal use the smoke detector and its LED indicator are visible through this window. During commissioning and use, smoke sampled from the duct may be visible and any accumulations of dust can be seen and removed during routine servicing.

A drilling template is provided to assist in the location of the probe entry holes into the duct. The template is in the form of a label which acts as a reminder to help ensure that each probe is fitted correctly in relation to the air flow in the duct.

The complete unit is packed with probes disassembled in a robust cardboard carton.

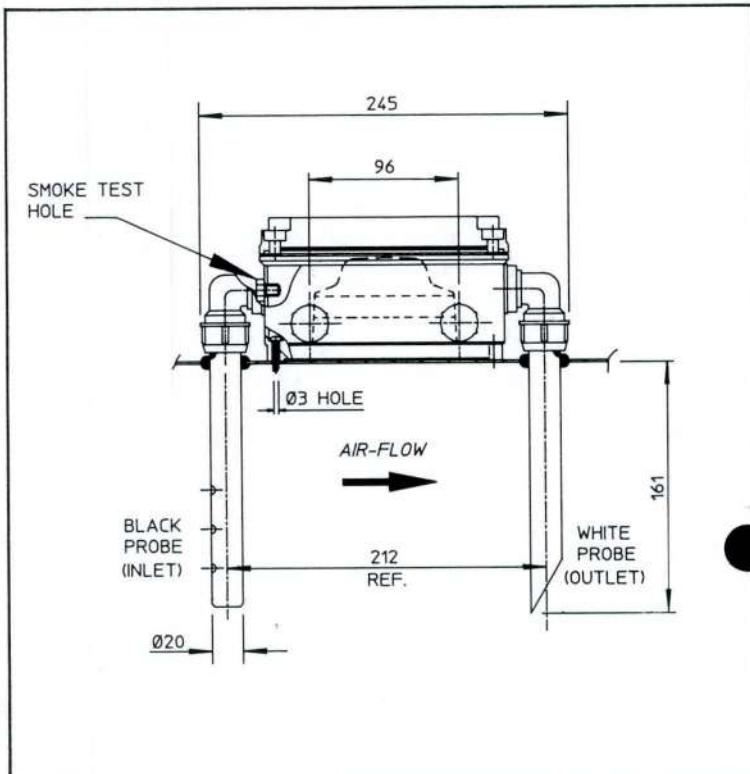
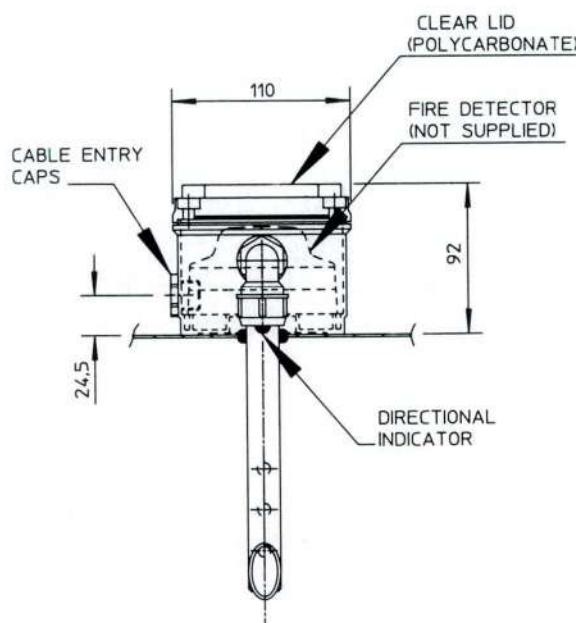
## SPECIFICATION

<b>Part No.</b>	53546-014 (for Series 60 ionisation or optical detectors).
	53546-016 (for XP95 ionisation or optical monitors).
<b>Duct widths:</b>	300mm to 1500mm
<b>Air speeds:</b>	1 m/s to 25 m/s
<b>Operating Temperature Range:</b>	0°C to 60°C

## TESTING

Apollo Fire Detectors Limited have conducted a full testing programme for the air sampling unit using wind tunnel test facilities in Apollo's Development Department and at Fareham Technical College.

These tests included measuring the proportion of air-flow sampled by the air sampling unit.



## OUTPUT FIGURES – SQUASHNI

No.	Tones	2nd Tone	Code I2345	Description	Typical current (average mA)		Typical Sound Output ±2dBA at 1m	
					12V	24V	12V	24V
1	Alternating Tones 800/970 at 2 Hz	14	IIII1		10	18	87	93
2	Sweeping 800/970 Hz at 7 Hz	14	IIII0	Fast Sweep (LF)	10	18	87	93
3	Sweeping 800/970 Hz at 1 Hz	14	IIIO1	Medium Sweep (LF)	10	18	87	93
4	Continuous at 2850 Hz	14	IIIO0		16	32	96	102
5	Sweeping 2400-2850 Hz at 7 Hz	4	II011	Fast Sweep	18	30	97	102
6	Sweeping 2400-2850 Hz at 1 Hz	4	II010		17	30	97	102
7	Slow Whoop	14	II001	Slow Whoop	12	20	87	91
8	Sweep 1200-500 Hz at 1 Hz	14	II000	Din Tone	9	16	87	91
9	Alternating Tones 2400/2850 2 Hz	4	I0111		19	30	95	101
10	Intermittent Tone of 970 Hz at 1Hz	14	I0110	Back-up Alarm (LF)	9	12	86	91
II	Alternating Tones 800/970 Hz at 1Hz	14	I0101		10	18	87	92
I2	Intermittent Tone at 2850 Hz at 1Hz	4	I0100	Back-up Alarm (HF)	14	24	94	98
I3	970 Hz at 1/4 sec. on 1 sec. off	14	I0011		5	8	82	87
I4	Continuous at 970 Hz	14	I0010		11	20	87	92
I5	554 for 100 ms and 440 Hz for 400ms	14	I0001	French Fire Sound	7	12	83	87
I6	Intermittent 660 Hz 150ms On/150 ms Off	16	I0000	Swedish Alarm Tone	6	9	85	88
I7	Intermittent 660 Hz 1.8s On/1.8s Off	17	01111	Swedish Alarm Tone	7	12	87	92
I8	Intermittent 660 Hz 6.5s On/13s Off	18	01110	Swedish Alarm Tone	8	14	88	93
I9	Continuous 660 Hz	19	01101	Swedish Alarm Tone	8	14	88	93
I20	Alternating 554/440 Hz at 1 Hz	20	01100	Swedish Alarm Tone	7	13	84	90
I21	Intermittent 660 Hz at 1 Hz	21	01011	Swedish Alarm Tone	6	10	83	90
I22	Intermittent 2850 Hz 150 ms On/100 ms Off	14	01010	Pelican Crossing	13	22	92	98
I23	Sweep 800-970 Hz at 50 Hz	14	01001	Low Frequency Buzz	10	18	87	92
I24	Sweep 2400-2850 Hz at 50 Hz	4	01000	High Frequency Buzz	14	25	97	102
I25	Intermittent 970Hz 500ms On/500ms Off	25	00111	ISO 8201 Low Frequency	9	14	82	88
I26	Intermittent 2850Hz 500ms On/500ms Off	26	00110	ISO 8201 High Frequency	12	20	91	97
I27	Continuous at 4kHz	27	00101		18	35	90	98
I28	Alternating tones 800/970 at 2Hz	10	00100	FPI063.I	10	17	87	92

### ORDERING CODES

SQ/ - - / -

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C - Supplied with blank cover for use as a stand alone sounder  
nn - Tone number  
SQ - Squashni

We reserve the right to change, without notice, the specification of these products from that detailed.

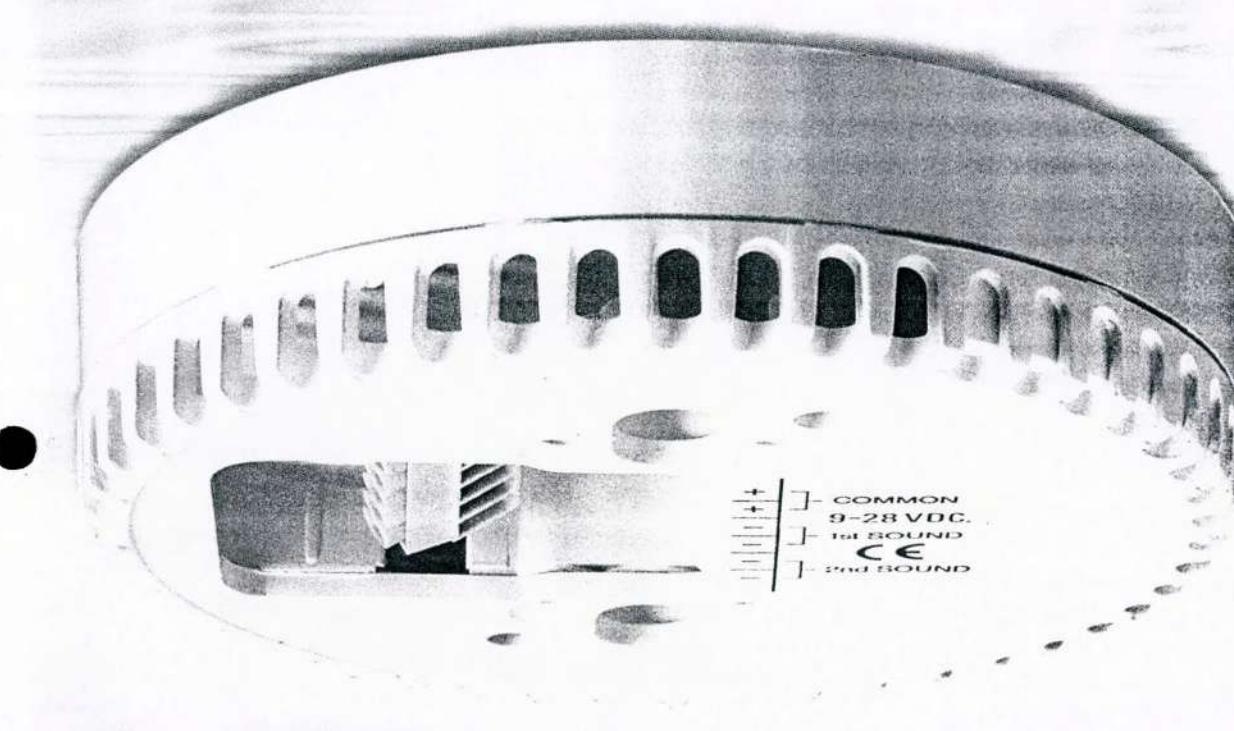
### EXAMPLE:

SQ/03

Squashni / Tone 3

# Squashni

## • Electronic Sounder



The Squashni Electronic Sounder is the original innovative ceiling sounder with a universal fire detector mounting platform.

The ultra slim profile provides for an unobtrusive sounder installation when combined with a smoke or heat detector. A blank cover can also be supplied to enable the Squashni to be used as a normal stand alone wall or ceiling mounted sounder.

Whilst most detectors will fit the standard Squashni, a large diameter unit is also available if required. This versatile sounder has a wide range of applications and is ideal for use in multi occupancy dwellings.

- ULTRA SLIM PROFILE FOR UNOBTRUSIVE INSTALLATION

- FIXING PLATFORM FOR DETECTOR BASES AND OTHER DEVICES

- REDUCED INSTALLATION COSTS

- BLANK COVER FOR USE AS STAND ALONE SOUNDER

- COLOUR MATCHED TO LEADING MANUFACTURERS' DETECTORS

- CHOICE OF 28 DIFFERENT PRE-SET TONES

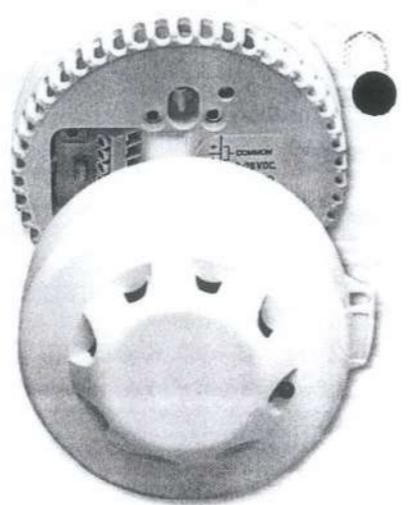
- VOLUME CONTROL AS STANDARD

# Squashni Electronic Sounder

## Application Flexibility

The Squashni is designed for use in a wide range of fire alarm and other system applications. Whilst primarily designed for use with smoke and heat detectors to enable the detector to be mounted directly onto the sounder. The Squashni is suitable for use with many other devices for example, Xenon Beacons and ceiling pull cord switches to provide an audible warning where required (device fixing screws are supplied with the Squashni).

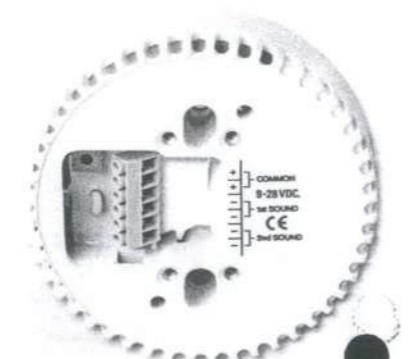
A colour matching cover is also available to enable the Squashni to be used as an exceptionally unobtrusive stand alone wall or ceiling mounted sounder.



Squashni with fire detector



Squashni with cover



Squashni

## Product Flexibility

A choice of any one of 28 tones is available as detailed on the tones table on the back page of this leaflet. The tones are factory pre-set and must be specified when ordering the unit. A second tone is available and requires a third wire installed in the sounder circuit. Terminals are provided to facilitate the looping in and looping out of cabling.

The Squashni has a wide range of operating voltages from 10V DC to 28V DC.

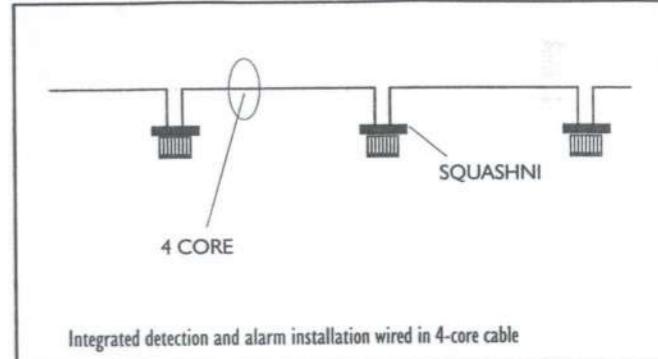
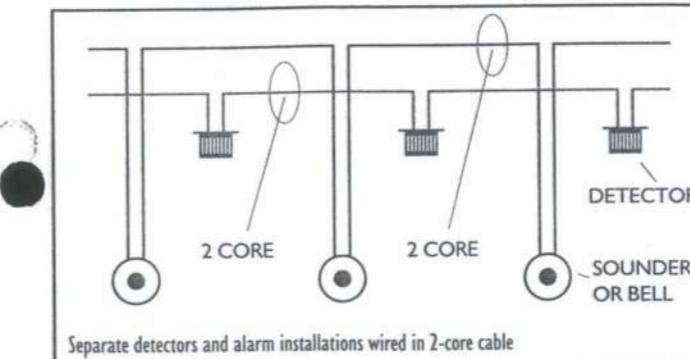
Whilst the standard unit is suitable for most detectors available, a larger diameter unit is available if required.

The electronics are fully encapsulated in polyurethane resin to provide weather resistance.

## Reduced Installation Costs

The Squashni itself provides excellent value for money and also helps reduce installation costs.

In many situations single four core cable can be used to install detector and sounder circuits, instead of separate two core cables with significant cost savings. By combining the detector and sounder positions the number of separate fixing points within a room are reduced which apart from any cost savings is an important aesthetic consideration in prestige environments and ancient buildings.

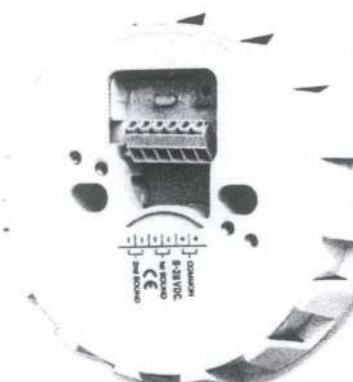


## SPECIFICATION

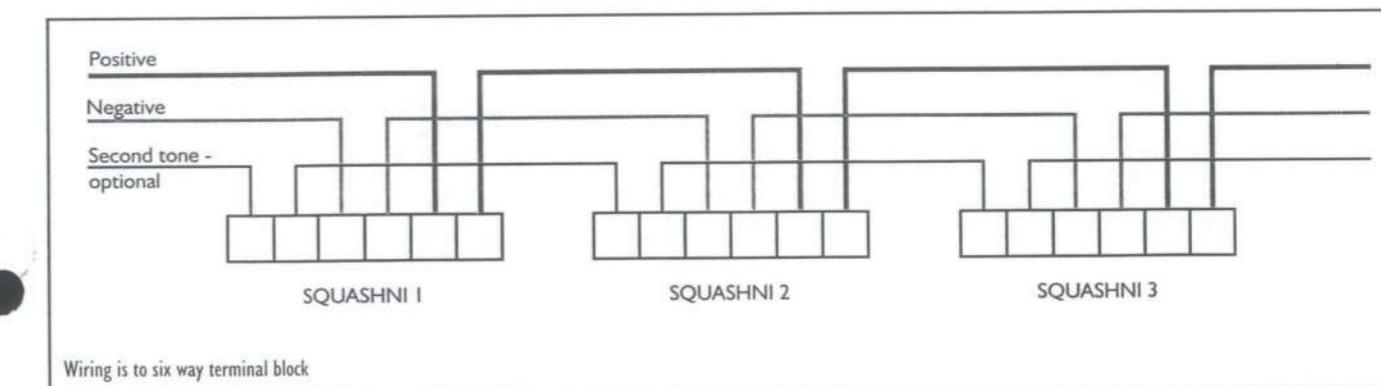
Model	Squashni
Operation	Continuously rated
Operating Voltage Range	10-28V DC
Sound Output 24V DC (tone 3)	93dBA at 1 metre
Current Consumption 24V DC (tone 3)	18mA
Starting Current	30mA for 2 milliseconds
Starting Time	1.5 milliseconds
Automatic Synchronisation	Phased start
Frequency Stability	+/- 0.5%
Operating Temperature Range	-40°C to +80°C
Line Monitoring Method	Polarised input
Construction	ABS plastic case
Colours	White, Red and to match leading detector manufacturers
Ingress Protection (with blank cover)	IP54
Dimensions	112mm dia. x 27mm deep
Weight	0.15kg



Xenon Beacon mounted on a Squashni



The large diameter Squashni

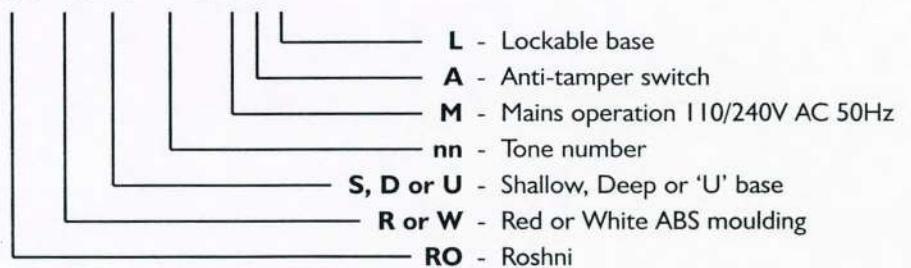


## OUTPUT FIGURES – ROSHNI

No.	Tones	2nd Tone	Code I2345	Description	Typical current (average mA)		Typical Sound Output ±2dBA at 1m	
					12V	24V	12V	24V
1	Alternating Tones 800/970 at 2 Hz	14	IIII		10	18	96	103
2	Sweeping 800/970 Hz at 7 Hz	14	IIII0	Fast Sweep (LF)	10	18	93	100
3	Sweeping 800/970 Hz at 1 Hz	14	IIIOI	Medium Sweep (LF)	10	18	93	100
4	Continuous at 2850 Hz	14	IIIOO		16	32	104	111
5	Sweeping 2400-2850 Hz at 7 Hz	4	II0II	Fast Sweep	18	30	99	106
6	Sweeping 2400-2850 Hz at 1 Hz	4	II0IO		17	30	99	106
7	Slow Whoop	14	II0OI	Slow Whoop	12	20	93	100
8	Sweep 1200-500 Hz at 1 Hz	14	II0OO	Din Tone	9	16	92	98
9	Alternating Tones 2400/2850 2 Hz	4	I0III		19	30	102	109
10	Intermittent Tone of 970 Hz at 1Hz	14	I0II0	Back-up Alarm (LF)	9	12	92	100
II	Alternating Tones 800/970 Hz at 1Hz	14	I0I0I		10	18	97	103
I2	Intermittent Tone at 2850 Hz at 1Hz	4	I0I00	Back-up Alarm (HF)	14	24	103	110
I3	970 Hz at 1/4 sec. on 1 sec. off	14	I00II		5	8	93	100
I4	Continuous at 970 Hz	14	I00IO		11	20	99	105
I5	554 for 100 ms and 440 Hz for 400ms	14	I000I	French Fire Sound	7	12	88	94
I6	Intermittent 660 Hz 150ms On/150 ms Off	16	I0000	Swedish Alarm Tone	6	9	87	92
I7	Intermittent 660 Hz 1.8s On/1.8s Off	17	01111	Swedish Alarm Tone	7	12	89	95
I8	Intermittent 660 Hz 6.5s On/13s Off	18	01110	Swedish Alarm Tone	8	14	89	95
I9	Continuous 660 Hz	19	01101	Swedish Alarm Tone	8	14	89	95
I20	Alternating 554/440 Hz at 1 Hz	20	01100	Swedish Alarm Tone	7	13	89	95
I21	Intermittent 660 Hz at 1 Hz	21	01011	Swedish Alarm Tone	6	10	87	93
I22	Intermittent 2850 Hz 150 ms On/100 ms Off	14	01010	Pelican Crossing	13	22	102	109
I23	Sweep 800-970 Hz at 50 Hz	14	01001	Low Frequency Buzz	10	18	92	98
I24	Sweep 2400-2850 Hz at 50 Hz	4	01000	High Frequency Buzz	14	25	99	107
I25	Intermittent 970Hz 500ms On/500ms Off	25	00111	ISO 8201 Low Frequency	9	14	97	103
I26	Intermittent 2850Hz 500ms On/500ms Off	26	00110	ISO 8201 High Frequency	12	20	102	109
I27	Continuous at 4kHz	27	00101		18	35	90	98
I28	Alternating tones 800/970 at 2Hz	10	00100	FPI063.I	10	17	96	103

### ORDERING CODES

RO/ - / - / - - / - - -



We reserve the right to change, without notice, the specification of these products from that detailed.

### EXAMPLE:

RO/R/S/3

Roshni / Red moulding / shallow base / Tone 3

# Fulleon Synchrobell

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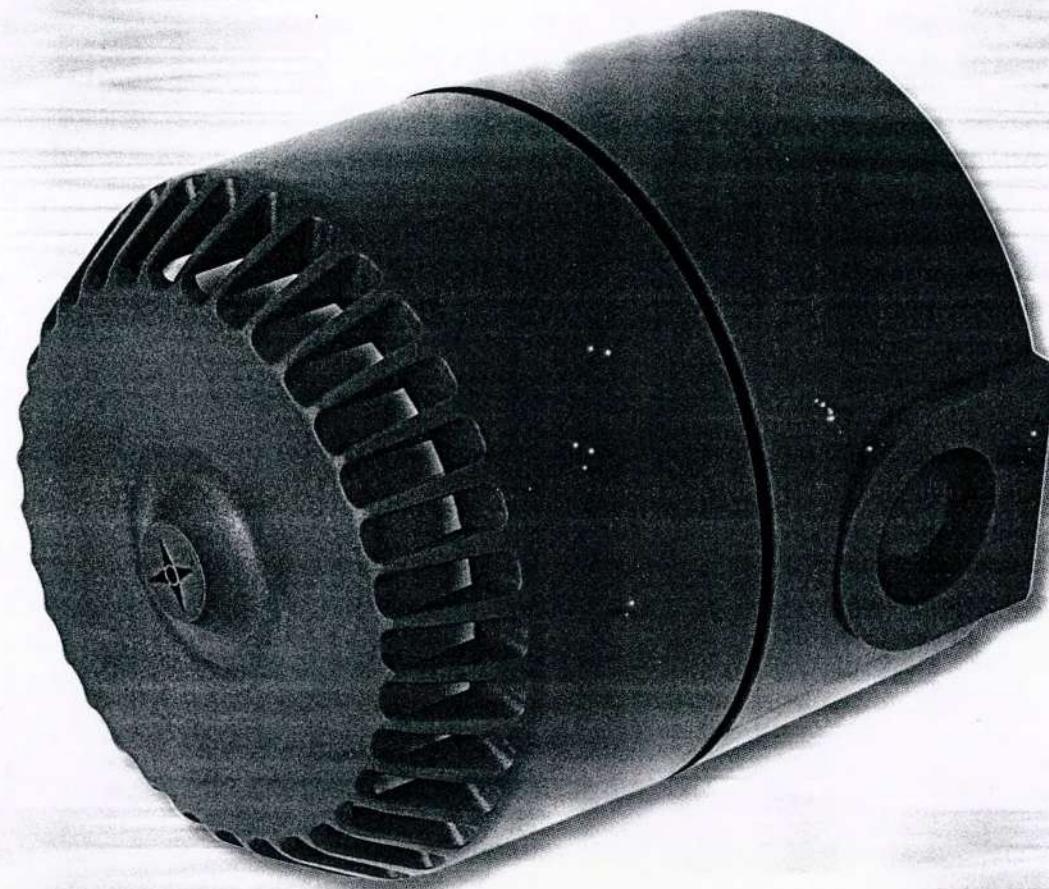
Web Page: <http://www.ftech.net/~fullsync/>

**BFPSA**  
THE BRITISH FIRE PROTECTION SYSTEMS ASSOCIATION LTD.



# Roshni

## Electronic Sounder



The Roshni range of electronic sounders has become the industry standard for use within fire alarm systems, intruder alarm systems and industrial signalling systems. Designed for reliability in operation, the standard Roshni is a high specification wall mounting sounder and is suitable for signalling within open areas or corridors and passages.

The rugged casing and encapsulated electronics provide a high degree of strength and weatherproofing.

With twenty eight signal tones available, the Roshni is compatible with the majority of fire and signalling tones required throughout the world.

- 28 SIGNALLING TONES AVAILABLE
- HIGH SOUND OUTPUT WITH LOW CURRENT CONSUMPTION
- 111 dB(A) SOUND OUTPUT (tone 4)
- 12V DC AND 24V DC OPERATION IN THE SAME SOUNDER - NO ADJUSTMENT REQUIRED
- AUTOMATIC SYNCHRONISED PHASED START
- VOLUME CONTROL AS STANDARD
- IP65 WEATHERPROOF WHEN USED WITH DEEP BASE OR 'U' BASE
- AVAILABLE IN RED OR WHITE ABS MOULDING

Fulleon Synchrobell Fulleon Synchrobell Fulleon Synchrobell Fulleon Synchrobell

## The Roshni Sounder

The Roshni sounder is widely accepted as the industry standard choice amongst specifiers, installers and distributors of electronic sounders. It has set the standard in what it provides.

A value for money high output highly durable sounder designed to be the mainstay component of any alarm system installation.

Automatic synchronised phased start and excellent frequency stability provides enhanced signal clarification on multi sounder systems, which is a standard feature for the Roshni as with all sounders in the range.

The Roshni can now provide 28 different tones (see tone table), switch selectable during installation. Each sounder is supplied with the switch setting according to customer requirements, where a particular tone is not specified sounders will be supplied with the switch set to tone number 3 for use with fire alarm systems complying to BS5839 Part 1 : 1988.

A second tone is available if a third wire is installed and connected to the second tone terminals (see tones table). Each electrical connection has two terminals for looping in and out, eliminating the need for a separate terminal block and therefore making installation easier.

The Roshni sounder is weatherproof to IP65 when used with the deep base or 'U' base.

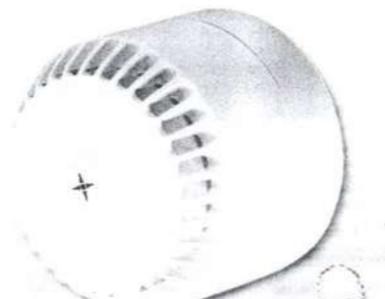
The standard Roshni sounders will operate on 12V DC or 24V DC without the need for adjustment or modification. A 9 - 30V AC or DC version is also available on request.

## Roshni Bases

Three basic designs of mounting base are available to facilitate different wiring methods. The shallow base is normally used for flush wiring whereas the deep base and 'U' bases are used for surface wiring and have the facility for 20mm dia. conduit entry. All bases have the unique bayonet for ease of installation and are interchangeable with other products in the range such as Flashni and Xenon Beacons. The deep base and 'U' bases are also available as lockable versions requiring a special tool to remove the sounder offering improved system security and preventing unauthorised access.



Roshni, red with deep base



Roshni, white with shallow base



Roshni, red with shallow base



Roshni, red with 'U' base



Roshni, white with deep base

## Roshni Mains Operated

A mains operated version working between 110V AC and 240V AC at 50 / 60Hz is available, and is supplied with a lockable base only.

## Roshni Anti-Tamper

Designed primarily for use in security systems the anti-tamper version of the Roshni is suitable for any situation where attempted removal of the sounder can be remotely monitored. The unit is available with a shallow base only and can emit any one of the 28 tones available with the addition of a micro switch which operates when the sounder is removed from the base.

## Intrinsically Safe Roshni

The intrinsically safe Roshni has been designed to cope with the harsh environmental conditions found offshore and onshore in the oil, gas and petrochemical industries. The unit is BASEEFA certified, suitable for Zone 0 use and is available in two models, 12V DC only (DB5 1NR) and 12/24V DC (DB5 2NR).

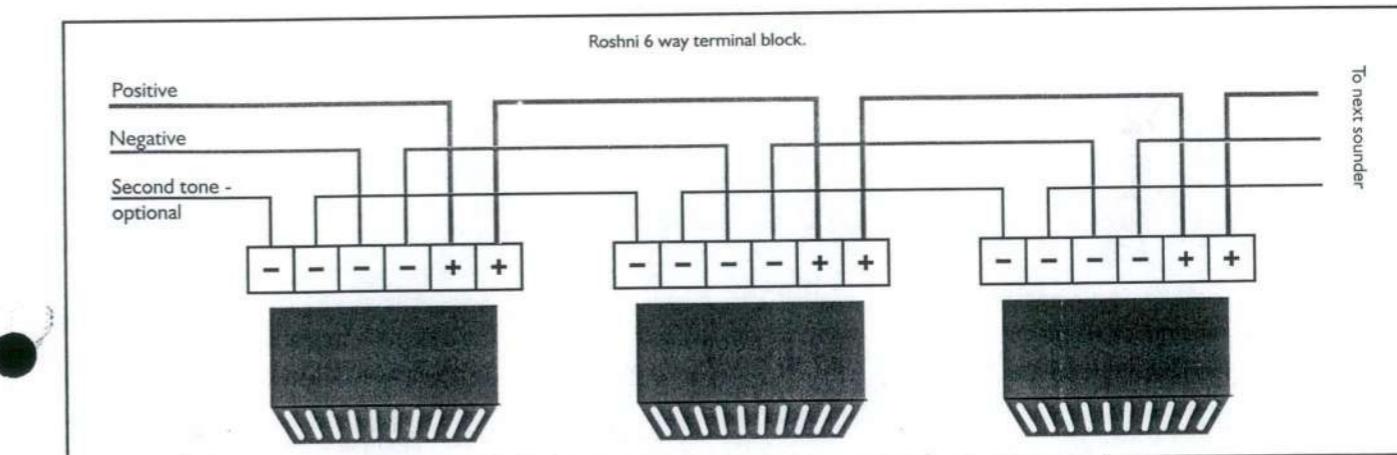
For the full specification and details please see separate Hazardous Area brochure reference FS0012.



Intrinsically Safe Roshni

## SPECIFICATION

Model	Roshni Shallow Base	Roshni Deep Base	Roshni 'U' Base	Mains Roshni
<b>Operation</b>	Continuously Rated			
<b>Operating Voltage Range</b>	9 - 28V DC			
Sound Output dB(A) at 1 metre	12V DC 24V DC 93 100	93 100	93 100	110 - 240V AC 100 (at 240V AC)
Current Consumption (tone 3)	12V DC 24V DC	8mA 18mA		35mA (at 240V AC)
Starting Current		30mA for 2 milliseconds		
Starting Time		1.5 milliseconds		1.5 milliseconds
Automatic Synchronisation		Synchronised phase start		Synchronised phase start
Frequency Stability		+/- 0.15%		+/- 0.15%
Operating Temperature		-40°C to +80°C		-20°C to +55°C
Line Monitoring Method		Polarised Input		N/A
Construction		ABS Plastic Case		ABS Plastic Case
Ingress Protection	IP54	IP65		IP65
Dimensions	93mm dia. x 75mm deep	93mm dia. x 105mm deep		93mm dia. x 105mm deep
Weight	290g	311g	311g	312g



# Xenon • Beacons



A range of Xenon Beacons designed for a wide variety of fire, security and industrial applications where reliability, efficiency and flexibility are of prime importance. Available in 12V DC, 24V DC and 240V AC all offering high efficiency energy to light conversion and consequently a lower current consumption. The xenon beacons have a heavy duty polycarbonate housing and lens which is available in a choice of colours.

The beacons can be supplied coupled to a Roshni electronic sounder to provide a high output audio visual unit (AV) to complement the range.

- **ENHANCED OPTICAL DESIGN ENSURES MAXIMUM LIGHT DISSIPATION**
- **BUILT IN TERMINAL BLOCK SAVES EXPENSE OF EXTERNAL TERMINAL BOXES**
- **ALL UNITS AVAILABLE WITH SHALLOW BASE, DEEP BASE OR 'U' BASE FOR SURFACE WIRING**
- **WEATHER RESISTANT TO IP65 WHEN USED WITH DEEP OR 'U' BASE**
- **CHOICE OF LENS AND BODY COLOURS TO SUIT MOST APPLICATIONS**
- **ROBUST CONSTRUCTION WITH POLYCARBONATE LENS AND BODY**

# XENON BEACONS

The Xenon Beacons have been designed to complement other products in the range both technically and aesthetically. The beacons will mount neatly onto a Squashni base sounder to provide a low profile sounder/beacon. Similarly the beacon can be supplied coupled to a Roshni electronic sounder to provide a high output audio visual unit.

The beacons have a built in terminal block for ease of installation and utilise the same range of bayonet fitting bases as other products in the range. (The mains beacon is supplied with a lockable deep or 'U' base only.)

A range of lens colours is available which must be specified when ordering as they are not interchangeable.

Beacons for use in hazardous areas are also available, for the full specification and details please see separate *Hazardous Area* brochure reference FS0012.



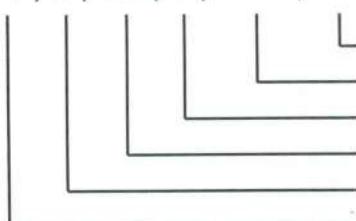
Audio-visual unit (AV)

## SPECIFICATION

Model	24V 0.5 Joule	24V 1.0 Joule	24V 2.0 Joule	12V 1.0 Joule	12V 2.0 Joule	Mains 2.0 Joule						
<b>Operation</b>	Continuously Rated											
<b>Operating Voltage Range</b>	20 - 30V DC	20 - 30V DC	20 - 30V DC	10 - 15V DC	10 - 15V DC	240V AC						
<b>Average Current Consumption</b>	40mA @ 24V	90mA @ 24V	155mA @ 24V	200mA @ 12V	310mA @ 12V	12mA						
<b>Power Rating</b>	1.0 W	2.1 W	3.6 W	2.4 W	3.6 W	2.9 W						
<b>Flash Energy</b>	0.5 J	1.45 J	2.0 J	1.45 J	2.0 J	2.0 J						
<b>Operating Temperature</b>	-20°C to +55°C											
<b>Line Monitoring Method</b>	Polarised Input											
<b>Construction</b>	Polycarbonate											
<b>Ingress Protection</b>	IP54 (shallow base), IP65 (deep or 'U' base)											
<b>Base Options</b>	Shallow, Deep, Deep lockable, 'U', 'U' lockable											
<b>Lens Colours</b>	Red, Amber, Green, Blue, Clear											
<b>Dimensions</b>	93mm dia. x 72mm high (shallow base) 93mm dia. x 100mm high (deep or 'U' base)											
<b>Weight</b>	0.31kg (deep or 'U' base), 0.28kg (shallow base)											
<b>EXAMPLE:</b>												
BE/R/DB/R/2.0/24												
Xenon Beacon / Red Lens / Deep Base / Red / 2.0 Joules / 24 Volt.												

### ORDERING CODES

- - / - / - - / - / - - - / - -



Voltage: 12 = 12V DC, 24 = 24V DC, AC = Mains

Flash Energy (Joules): 0.5 = 0.5J, 1.0 = 1.0J, 2.0 = 2.0J

Base Colour: R = Red, W = White

Base Type: DB = Deep, SB = Shallow, UB = 'U', DL = Deep lockable, UL = 'U' lockable

Lens Colour: R = Red, A = Amber, G = Green, B = Blue, C = Clear

Xenon Beacon: BE = 12V DC or 24V DC Xenon beacon, XB = Mains operated Xenon Beacon

We reserve the right to change, without notice, the specification of these products from that detailed.

# Fulleon Synchrobell

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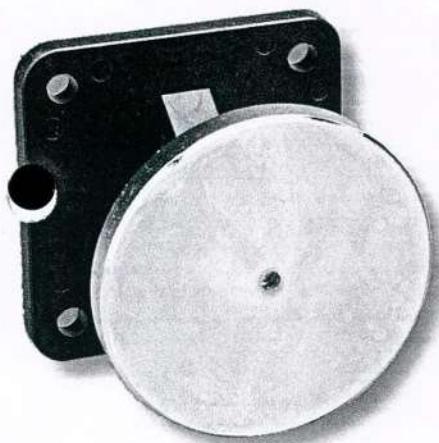
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Web Page: <http://www.ftech.net/~fullsync/>

  
THE BRITISH FIRE PROTECTION  
SYSTEMS ASSOCIATION LTD.



# **Magnetic Door Release Unit**



An attractively styled Door Release Unit suitable for

use in hospitals, hotels, elderly persons homes, schools etc., where fire doors are in frequent use.

The unit is designed for use with automatic fire alarm systems in buildings where doors are normally required to be kept open. When the system is in alarm power is removed and the door is released.

The door must be fitted with a self closing mechanism so that it closes automatically.

The unique spring release design of this unit provides a high holding force of 40kg without the associated problems of residual magnetism, thus ensuring a quick release of the door when required.

- **24V DC & 240V AC MODELS AVAILABLE**

- **40KG HOLDING FORCE**

- **SPRING ACTION ELIMINATES RESIDUAL MAGNETISM**

- **PUSH BUTTON RELEASE FACILITY**

- **FIXED TERMINAL CONNECTORS**

- **BRACKET FOR FLOOR MOUNTING**

- **DI-CAST ALUMINIUM BACK BOX**

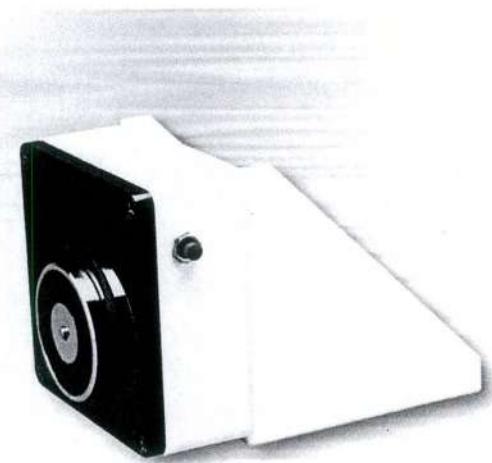
- **FIXING TEMPLATE PROVIDED**

# MAGNETIC DOOR RELEASE UNIT

Each unit consists of two parts - a door plate, which is fitted to the fire door, and a solenoid unit which is normally positioned on the adjacent wall. A floor mounting bracket is available for use if wall mounting of the solenoid unit is not convenient.

The solenoid is controlled by the fire alarm system so that it is continuously energised, thus magnetically attracting the door plate and holding the door open. A relay may be required to interface the door release unit with the fire alarm control panel.

A manual release button, that can be fitted to either side of the solenoid, is provided to enable the doors to be closed without operating the fire alarm system.



## SPECIFICATION

Model No.	FSMD/024	FSMD/240
Nominal Voltage	24V D.C.	240V A.C.
Holding Force	40kg	
Power Consumption	2VA	
Solenoid Unit	Di-cast aluminium back box with thermoplastic cover	
Connection	Fixed - screw terminal connectors	
Mountings : Solenoid Unit	Surface mounting to wall or floor	
: Door Plate	4 hole fixings for mounting on door face	
Dimensions : Solenoid Unit	95mm x 95mm x 47mm	
: Door Plate	65mm x 65mm	
Magnet	48mm diameter	
Weight	0.84kg	
Colour	White back box with black cover	
Extras	Floor mounting bracket	
<b>FLOOR MOUNTING BRACKET</b>		
Dimensions	100mm height x 95mm width x 100mm depth	
Weight	0.44kg	
Colour	White	

We reserve the right to change, without notice, the specification of these products from that detailed.







**As-Fitted Drawings (T. Clarke)**

**11**