

**BALDWIN BOX▲LL**  
COMMUNICATIONS

Specialist manufacturer to the communications industry



**Installation  
and Operating  
Instructions**

# The Adept Amplifier Range

The Adept range of equipment is modular in concept and satisfies public address and fire alarm requirements alike.

Adept systems consist of the following:

## A. THE AMPLIFIERS

- (i) The mixer amplifier which has 8 Input Module Pre-amplifier (IMP) locations.
  - (ii) The slave amplifier which offers a single unbalanced or balanced line input.
- Both types of amplifier offer 60, 120 and 260 Watt power options at 100 volt line.

## B. THE INPUT MODULES

- (i) The IMP range of pre-amplifiers (IMPX, etc)
- (ii) The MS range of Mixer stages (MS1, MS2, etc)

All ADEPT amplifiers or mixers can be either rack mounted or housed within a free standing case. (C2u or C3u)

All ADEPT units are mains or battery operated (240V/120V AC - 24V DC).

## Checklist

	No of Input Pre-amp Locations	Sub-Socket Fitted	OUTPUTS				MS Location	Power Output (Watts)	Height	24 DC Battery Facility	Rack Mountable	Freestanding Case Requirement
			100v	50v	Low Z	0dB Line						
A60 Mixer Amplifier	8	✓	✓	✓	✓	–	✓	60	2u	✓	✓	A2UM
A120 Mixer Amplifier	8	✓	✓	✓	✓	–	✓	120	2u	✓	✓	A2UM
A260 Mixer Amplifier	8	✓	✓	✓	✓	–	✓	260	3u	✓	✓	A3UM
A120 Slave Single Input	–	–	✓	✓	✓	–	–	120	2u	✓	✓	A2UM
A260 Slave Single Input	–	–	✓	✓	✓	–	–	260	3u	✓	✓	A3UM

# Preparation for Use - 60, 120, 260 Watt Amplifiers



## AC Supply

All amplifiers leave the factory wired for 220/240V, 50/60 Hz.  
110/120V amplifiers are available on request.

Connect to mains socket, as shown on rear of amplifier, using lead supplied.

**IMPORTANT:** This equipment must be earthed.

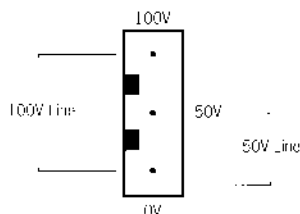
## Loudspeaker Output

100V Line:

All amplifiers are supplied wired for 100V or 50V line.  
70V and 25V lines are available on request.

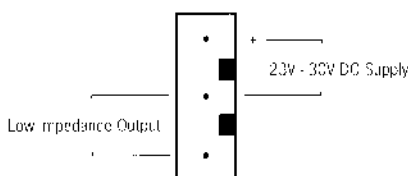
Low Impedance Output:

Utilises the same socket as DC supply shown below.



## DC Supply Input

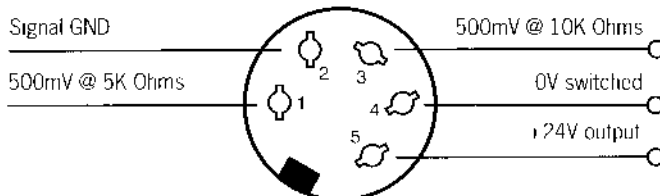
23V - 30V DC Note: Negative Earth



## Sub-Socket

The sub-socket found on the rear of the unit can be used for a variety of purposes: tape recording, feeding other ADEPT integrated or power amplifiers, feeding mixers, operating busy lamps, relays, etc.

**Pin 1** Provides 500mV signal output for driving slave amplifiers or tape recorder. This output is direct from the power amplifier input after the master gain and tone controls. Output impedance 5k ohms.



**Pin 2** Output signal ground.

**Pin 3** As pin 1 but signal is derived prior to master gain and tone controls. Output impedance 10k ohms.

**Pin 4** Open collector 'busy' indicator: 0V switched output used in conjunction with pin 5.

**Pin 5** 1A fused DC output at + 24V, used in conjunction with pin 4 to provide an electrical relay control supply for zoning purposes, priority circuit indicators or DC power for external tuner and also for signal processing and line pre-amplifiers.

## NOTES

1. All sockets are shown as viewed from the rear of the chassis.
2. The front of the amplifier is completed by the insertion of Infill Panels (BP1, BP3) or a combination of Input Pre-amplifiers and Infill Panels on mixer amplifiers.
3. When a pre-amplifier is fitted, a Mixer Stage is normally used (eg. MS1).
4. Always ensure amplifier is turned off when inserting modules.
5. Always earth equipment.
6. Ensure correct fuses are inserted.
7. Provide adequate air-flow around amplifier.

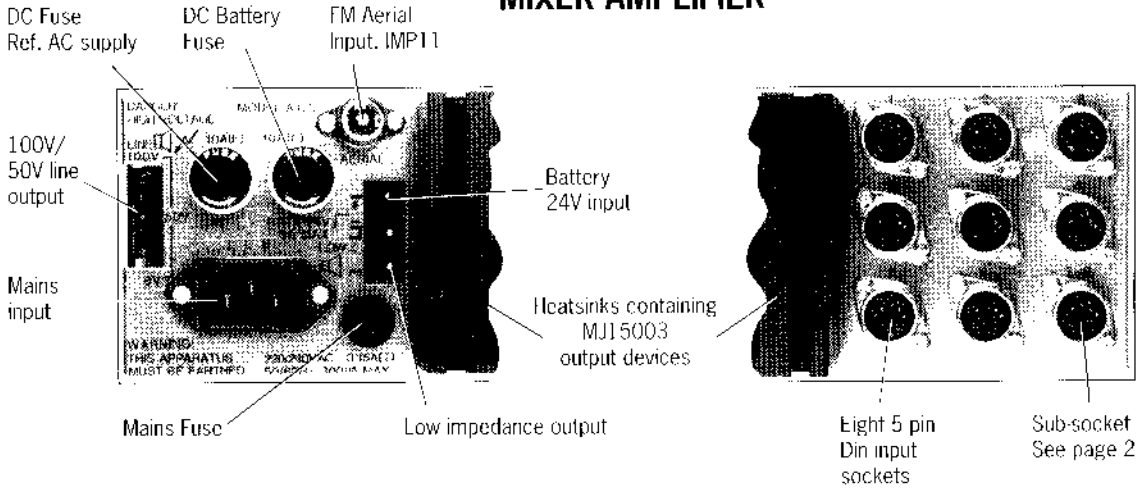
8. When fitting DIN plugs, ensure screen connection is not in contact with the casing of the plug, thus avoiding earth loops.

**AVOIDING GROUND LOOPS:** As supplied all Adept main frames have the common negative battery supply input bonded to the chassis, mains earth. For some applications it may be necessary to remove this bond to avoid for example ground loops by disconnecting the green yellow wire between pin 4 of input socket 8 and the chassis.

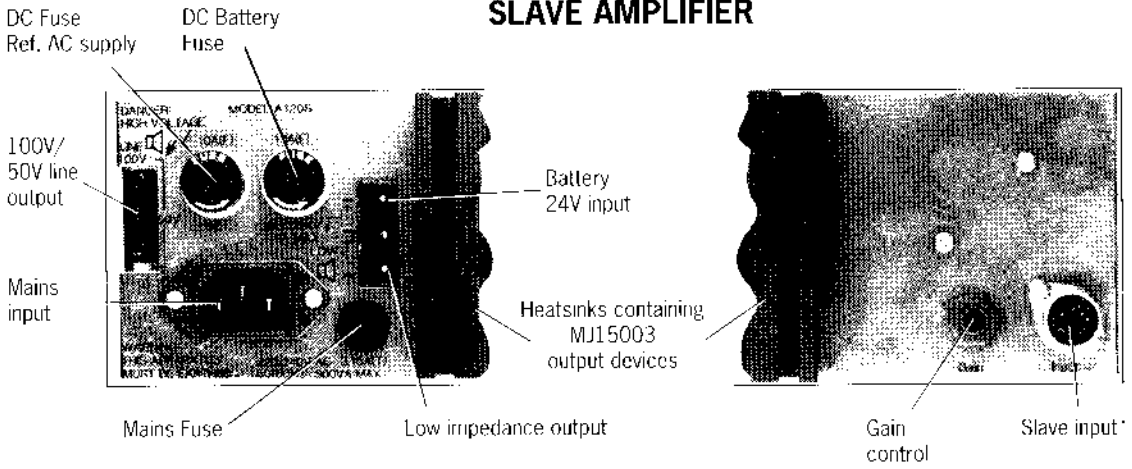
Ground loops on a system will cause a line frequency hum to be produced from the loudspeakers and is best avoided using isolated input modules for example IMPX selected to line input, etc especially if inputs are required to be wired in parallel.

# Inputs and Outputs

## MIXER AMPLIFIER

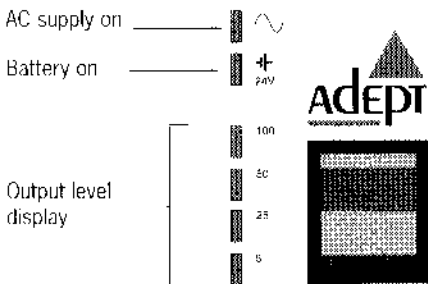


## SLAVE AMPLIFIER



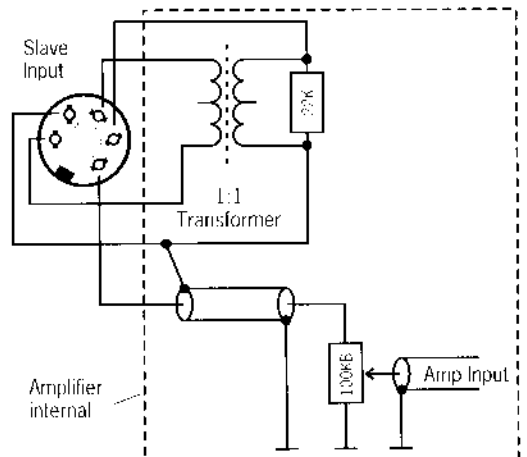
### Status Panel

The level display indicates amplifier loudspeaker output voltage. The appropriate LED's operate as shown.



### ※ Slave Input Connections

Unbalanced		Balanced	
Pin 1	Not applicable	Pin 1	Signal input
Pin 2	Screen	Pin 2	Ground
Pin 3	Not applicable	Pin 3	Signal input
Pin 4	Not applicable	Pin 4/5	Link together in plug only
Pin 5	Signal input		



## Fitting the Input Modules

Input Pre-amplifiers, Mixer Stage and Infill Front Panels are inserted into the front of the amplifier by slackening the four self-tapping screws (two on either side) which hold the top aluminium extrusion in place. Raise the front of the extrusion and insert the module by locating bottom tab on module into the bottom extrusion and press the PCB into the edge connector. When all Pre-amplifiers, Mixer Stage and Infill Panels are in position re-locate top extrusion and secure. See diagram below.

Prior to inserting inputs ensure that the dual in line switch has been adjusted in accordance with the notes on later pages - see relevant IMP data.

All input modules have detachable knobs and spindles, thus any input module can be converted to a pre-set mode.

NOTE: Ensure that AC and DC power are disconnected before removing or inserting modules.

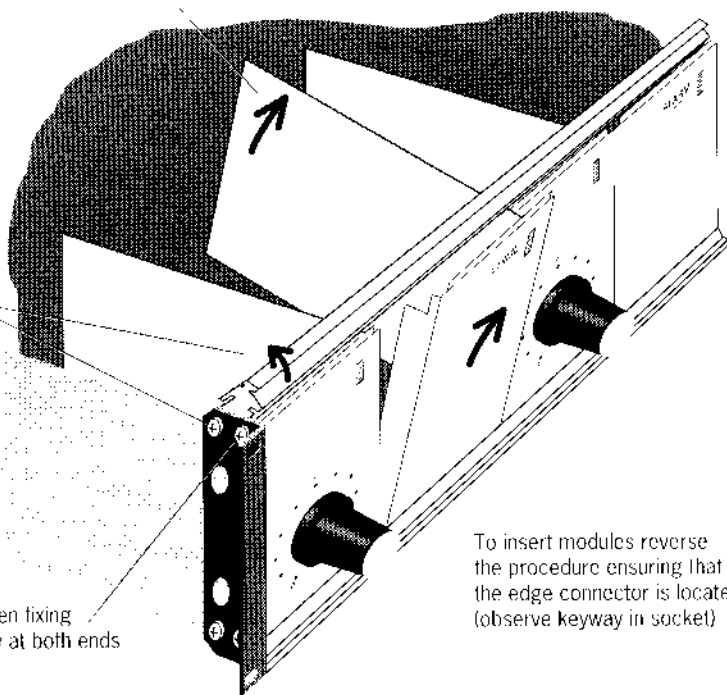
- 3 To remove module, tip forward by lifting circuit card at rear and remove module by lifting front panel away from bottom aluminium extrusion

2

Slacken pivot screw at both ends and twist the top aluminium extrusion bar upwards

1

Slacken fixing screw at both ends



### MS & PA DUAL BUS LINES

The input mother board on all mixer amplifiers has 2 Bus Lines, which are selectable via the DIL switch on most IMP modules.

Audio routed on the MS Bus passes through tone and gain controls on the MS stage.

Audio routed on the PA Bus pass directly to the power amplifier stage via a level raising amplifier on the mother board itself.

This bus is normally used to route critical audio signals such as 20 KHz for line surveillance, emergency announcements and alarm signals.

The following IMP modules feed this bus automatically IMP20, 21, 22, 23, and 33. An MS1 need not be fitted if the MS Bus is not required.

If however any of the IMP modules are configured to use the MS bus, then an MS stage must be fitted.



### IMPX Universal input module.

It accepts a low impedance microphone or line level input. It is possible to select the limiter, voice access operation and phantom powering. There are internal presets for adjustment of preset gain, limiter threshold and vox sensitivity. The priority system is selectable, either cascade, equal access or fully mixing. The output is routable either via

the mixer stage or direct to the power amplifier. Surveillance of the microphone can be achieved by integration with the IMP18 and MICSUUV modules.

#### Technical Specification

	Microphone	Line A	Line B
Max Input Sensitivity	400µV	10mV	80mV
Input Impedance	600 Ohms	14 KOhms	13.5 KOhms

Input Overload Without Limiter	Better than 30dB		
Signal/Noise Rate Ratio	Better than 60dB		
Distortion (THD) @1KHz	Less than 0.1%		
Frequency Response	-3dB @30Hz - 20KHz		
Preset Gain Control Range	20dB (Factor of 10)		
Presence Tone Control	-7 10dB @1.5KHz ref to 100Hz and 12KHz		
Phantom Power	20V via 1K8 Resistor		

#### Limiter Selected

Limiter Dynamic Range	Better than 40dB		
Output Change for 20dB <sup>1</sup> Input Change	Less than 4dB		
Attack for 20dB Input Change	4 mS typical		
Release for 20dB Recovery	2 Sec typical		

#### Vox Selected

Max VOX sensitivity @1.5 KHz			
Flat	300µV	7.5mV	60mV
1.5KHz Filter	40µV	1mV	8mV
Vox Attack	4 mS typical		
Release	4 Sec typical		
Max Surveillance Sensitivity @20KHz	2mv		

### To Use IMPX

- SW1 Select microphone, line and phantom powering
- SW2 Select if limiter required. Adjust VR2 to set threshold.
- SW3 Select signal routing to MS bus or PA bus.
- SW4 Priority selection. If VOX required select position 1. On.
- SW5 Select the VOX frequency response and adjust VR5 to the required VOX sensitivity.
- SW6 Select position 1 ON to operate IMP33 chime. OFF if OPT33 fitted.  
Select position 2 ON to activate DC output.
- VR1 Set to limit range of volume control.
- VOLUME Adjust as required.
- TONE Rotate clockwise for microphone presence lift.  
Rotate anti-clockwise for music bass and treble lift.

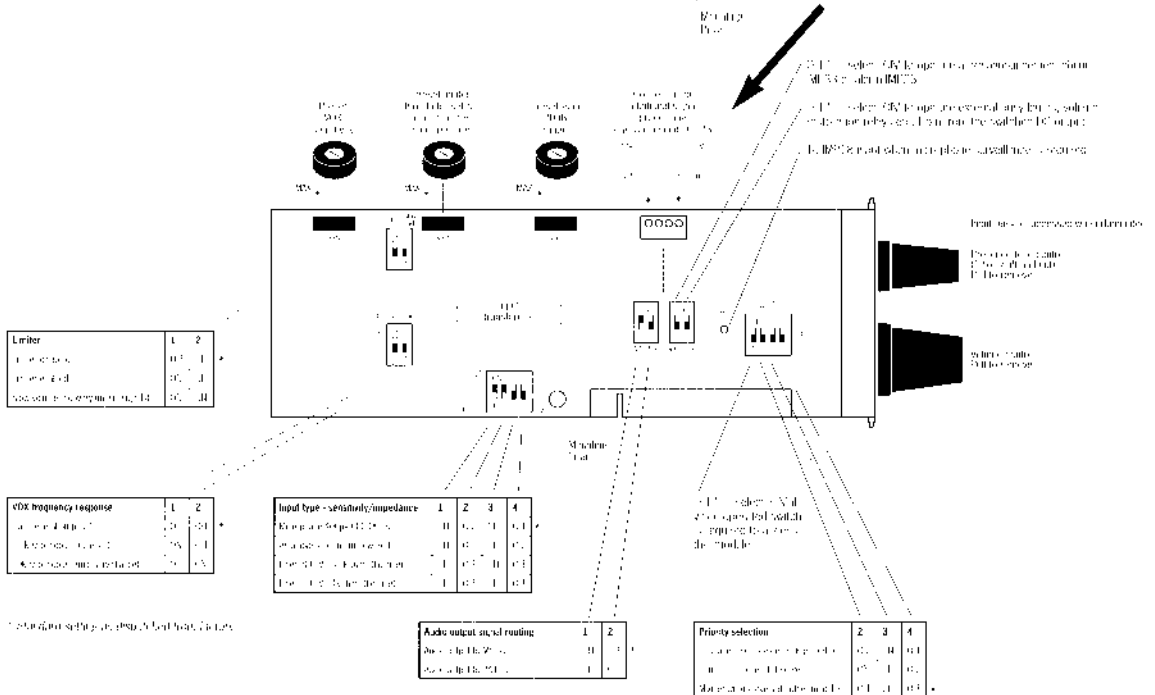
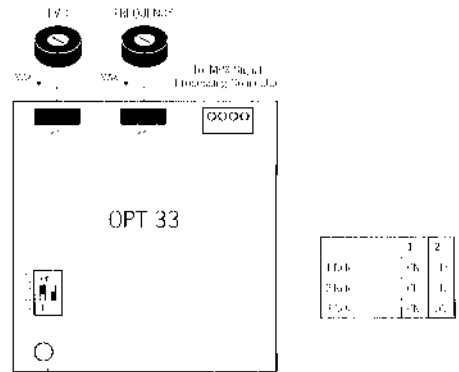
#### Chime Module OPT33

A chime either 1, 2 or 3 note can be added easily by the addition of a small module. This module code OPT33 plugs into the signal processing connector and locates onto a mounting pillar.

Selection of either 1, 2 or 3 notes is by a DIL switch.

Both the output level and chime frequency are adjusted using the preset controls.

Further modules will be added as our systems develop.



# IMP11

## FM tuner

This module occupies 2 IMP positions with a flying aerial coax lead which connects to a socket on the rear panel of the amplifier.

When installing this unit it is important to connect a suitable aerial. A dipole or multi-element directional antenna, mounted externally should give optimum FM reception. After connecting your aerial your tuner is ready for programming.

The programme selector selects 5 preset FM controls and 1 auxiliary. Using a small screwdriver, from the left (programme 1) you can tune the desired station.

By turning the tuning presets clockwise the unit will tune to the lower end of the frequency range, i.e. 88MHz.

By turning them anti-clockwise the unit will tune to the higher end of the frequency range, i.e. 108MHz.

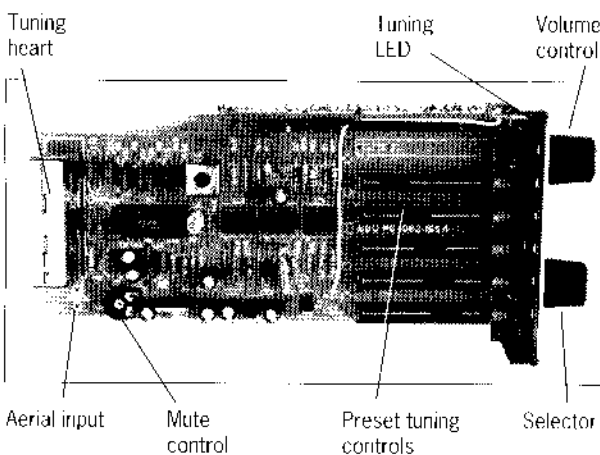
The tuning LED will illuminate to maximum intensity at the correct station setting.

The volume control for the tuner is next to the programme selector switch.

The tuner can be overridden by priority inputs as required. To operate, pins 4 & 5 on the input socket must be linked and could be connected to a remote time switch.

### Specification

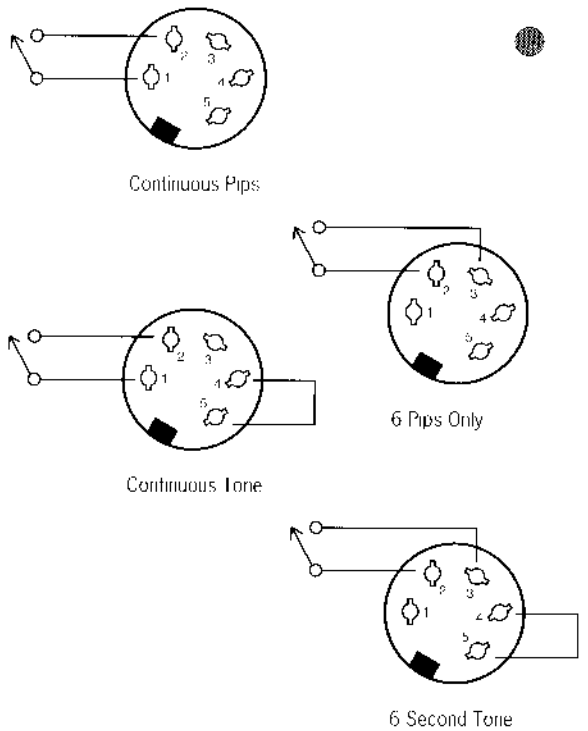
Main Features	: 5 Varicap Preset Stations, LFD Tuning Indicator, AFC, AGC, Muting and Auxiliary input.
Tuning Method	: 4 Stage Varicap
Tuning Range	: 88 - 108 MHz
Sensitivity	: 3µV for 40dB SN ratio
IF Frequency	: 10.7 MHz
IF Rejection	: 74dB
AGC	: RF Amplifier 22dB
Antenna Impedance	: 75Ohms
Muting	: Adjustable via Internal Preset
IHD	: Less than 1% 10µV Input ± 60KHz deviation
Auxiliary input sensitivity	: 80mV @ 22k Ohm pin 1 500mV @ 120k Ohm pin 3
Front panel controls	: Volume and programme selector
Internal controls	: Muting



# IMP20

## 1kHz Tone Oscillator

Input DIN connections to switch contacts (normally open).

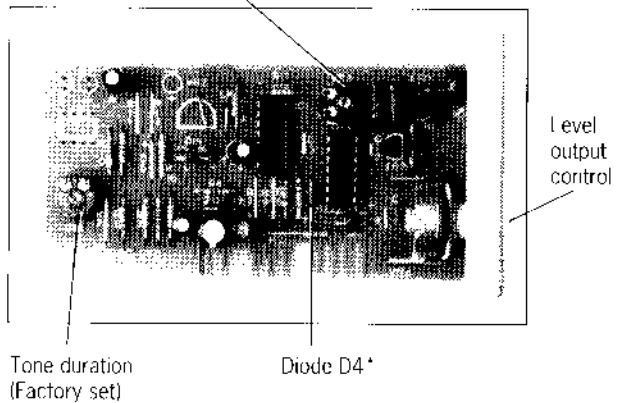


### Specification

1kHz generator, by input pre-selection will provide the following

	: Continuous pips
	: 6 pips only
	: Continuous tone
	: 6 second tone
Internal control	: Volume

Frequency adjustment (Factory set)



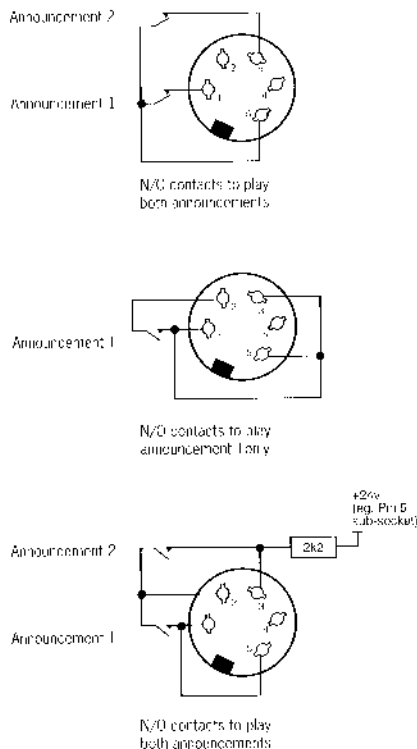
\* As supplied the IMP20, IMP21 and IMP22 will provide a 24V DC switched output (volume restoration) from the mainframe sub socket. If volume restoration is not required, remove diode D4.

In the fault condition the fault indicator will illuminate, the OK indicator will extinguish, the relay will de-energise (see figure 2) and the buzzer will sound. The buzzer may be silenced by pressing the buzzer mute button when it will only sound for 1 second every 30 seconds.

The drawings below, Fig. 1, illustrates methods of interfacing both normally open and normally closed contacts to playback message one or two. It is necessary to employ an external resistor if both messages are required using normally open switching.

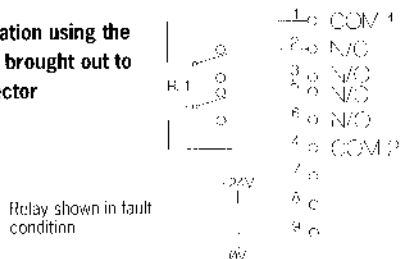
**Playback contact arrangement when installed in Adept.**

**Fig. 1.**



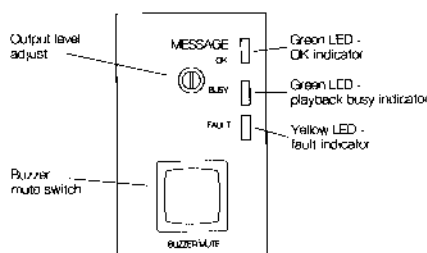
**Remote fault indication using the relay contacts are brought out to the 9 way D connector**

**Fig. 2.**



**IMP402**

**Digital Message Repeater**



The IMP402 Digital Message Repeater is used in Voice Alarm systems in particular to replay Alert and Evacuation messages. The module can be used in all systems that require a pre-recorded message to be available. Messages can be activated by a time clock or by integration with the Fire Alarm system. The module is EPROM based for playback only of messages. A single message can be a maximum of 64 seconds long.

We will record onto the module your pre-recorded messages, or you can select a suitable message from our library. A list of our standard messages is available on request. It is important that your recordings are professionally made, giving clear reproduction. Also give consideration to the suitability of the voice for the type of message being replayed. For example should it be male or female.

**IMP402 Specification**

Overall frequency response, record to playback -3dB	: 100 Hz to 6 KHz
Sampling frequency	: 16 KHz
Maximum message duration	: 64 seconds one message
Signal to noise ratio	: Better than 60dB
Monitor loudspeaker amplifier output	: 300mW
Fault relay contacts to remote indicator	: 2 changeover contacts 100V @ 1A max. See Fig. 3
Front panel controls	: Volume (preset) : Buzzer mute (lamp test, message listen)
Front panel indicators	: Fault, busy & module OK
Internal controls	: Dual in line switches to select facilities
Message initialisation	: Normally open or normally closed contacts. See Fig. 4
Power consumption (Standby no fault)	: 45 mA

The audio output signal may be routed via the master gain and tone controls on an MS1 stage etc. by selecting the MS switch 'ON', or direct to the main output of the mixer or amplifier that the IMP402 is installed in by selecting PA switch 'ON'.

*NOTE Only one of these switches should be selected on at any one time.*

If a pre-alarm tone i.e. IMP23 or a chime IMP33 is required to precede the message, select chime switch 'ON' to trigger the appropriate IMP module.

Under normal, i.e. non fault conditions, the green OK LFD will illuminate, the internal relay will be energised and the buzzer will be silent. The fault indicator may be checked by pressing the buzzer mute button.

The internal fault surveillance system will announce a fault if any of the following conditions arise

- (a) Absence of satisfactory audio output level.
- (b) Abnormal DC off set present on the digital to analogue converter (DAC) output. This could be due to a faulty EPROM, DAC or other digital processing devices within the IMP402.
- (c) Higher priority input over-riding but not providing a restoration signal.

*PLEASE NOTE If an IMPX is required to over-ride an IMP402, the IMPX REST switch must be selected 'ON' to prevent a fault condition.*

A fault is indicated by a flashing LED indicator together with the buzzer sounding 1 second on, 1 second off. By pressing the buzzer mute switch the LED will illuminate continuous and the buzzer will only sound 1 second every 30 seconds. Operation of the buzzer mute does not affect the fault output produced by the relay contacts.

## IMP21

### Universal Alarm Tone Generator

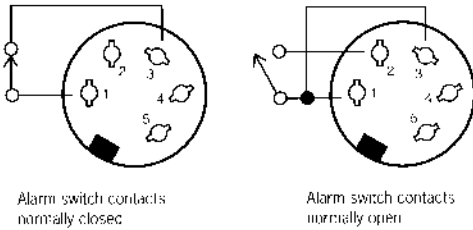
ALARM

Volume control 

Select DIL switches for the desired sound as follows:

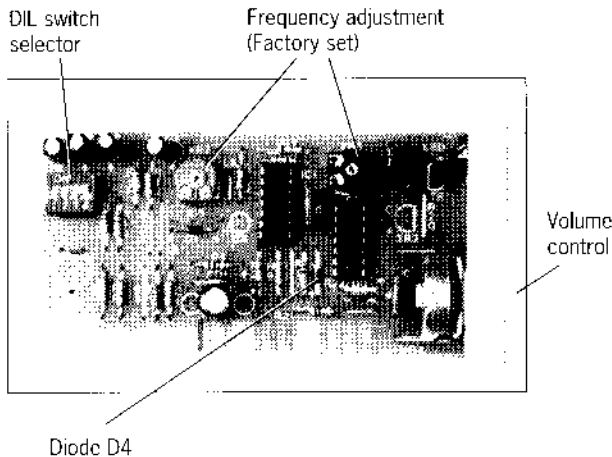
Alarm Sound	S1	S2	S3	S4
Low frequency slow whoop	On	On	Off	Off
Low frequency fast whoop	On	Off	Off	Off
High frequency slow whoop	On	On	On	Off
High frequency fast whoop	On	Off	On	Off
Low frequency slow 'Dee' 'Daa'	Off	Off	Off	On
Low frequency fast 'Dee' 'Daa'	Off	Off	Off	Off
High frequency slow 'Dee' 'Daa'	Off	Off	On	On
High frequency fast 'Dee' 'Daa'	Off	Off	On	Off

### Input DIN connections to alarm switch contact



### Specification

Frequency sweep LF mode	: 360 to 500Hz
Frequency sweep HF mode	: 594 to 834Hz
Output wave shape	: Square
Modulation sweep speed slow	: 3 seconds
Modulation sweep speed fast	: 0.5 second
Modulation sweep wave shape	: Selectable sawtooth or square
Front panel controls	: Volume
Internal selectors	: 4 way DIL switch (Tone mode selection)



## IMP22

Repeating gong module. Usually used as a non urgent alarm. It will alert people without making them panic. This makes it easier to evacuate people quietly and efficiently.

GONG

Volume control 

### Specification


Gong frequency	: 414Hz
Repetition rate	: 1 second
Internal controls	: Volume

NOTE As supplied the IMP20, IMP21 and IMP22 will provide a 24V DC switched output (volume restoration) from the mainframe sub-socket. If volume restoration is not required, remove diode D4. See IMP21 photograph. Input DIN connections as IMP20.

## IMP23

Pre-announcement alarm tone module. To satisfy the demand for a distinctive alarm that is always heard before announcements. Designed specifically for use in stadia, sports grounds and similar venues where there must be a clear distinction between announcements made by the police and those by the general announcer.

ALARM

Volume control 

### Specification

Frequency sweep LF mode	: 360 to 500 Hz
Frequency sweep HF mode	: 594 to 834 Hz
Output wave shape	: Square
Modulation sweep speed slow	: 3 seconds
Modulation sweep speed fast	: 0.5 seconds
Modulation sweep wave shape	: Selectable sawtooth or square
Tone duration	: 3 to 7 seconds adjustable
Front panel controls	: Volume
Internal controls	: Tone duration
Internal selectors	: 4 way DIL switch (Tone mode selection)

NOTE See IMP21 for alarm sound selection.


## IMP33

### Chime Module

This module generates a chime signal for initiating paging announcements. The 'Speak now' LED on the microphone base can be illuminated by connecting the yellow conductor from the microphone to Pin 5 of the chime input. This switch function incorporates a 1 Amp (f) fuse internally mounted on chime card.

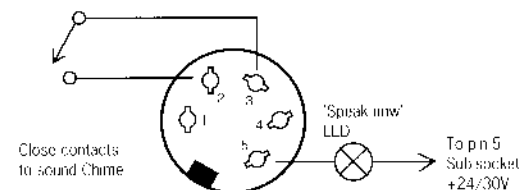
CHIME

The Chime can be operated independently of any input by closing pins 2 and 3 on the Chime Input socket. The chime level is preset and adjustable behind the front panel.

Volume control 

The preset control marked VR1 on the PCB controls the duration and frequency of the chime. This is factory set and can be adjusted to suit operational requirements as required.

Master gain and tone controls on the MS module do not have any effect.



## Specification

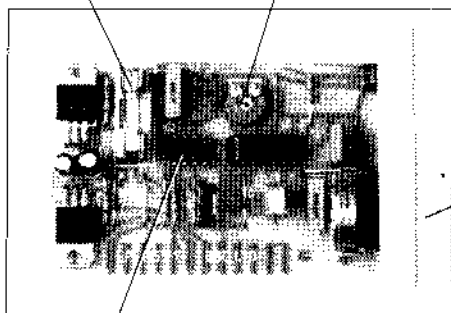
Access : by any microphone input module that has the chime switch selected 'on'

Front panel controls : Volume

Internal controls : Chime frequency/duration pre-set

(Speak now) 1A fuse link input socket pin 5

Chime frequency & duration control



Volume control

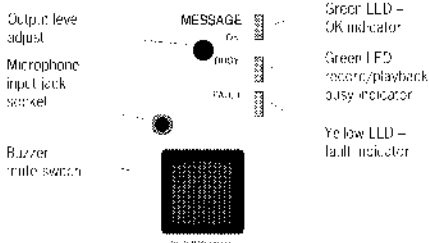
Chime tone generator IC

## IMP41

### Digital Message Repeater – with record/playback

The IMP41 can record messages up to 16 seconds each or one message up to 32 seconds.

Recordings can be made on site and playback is selected by contacts wired to the input connector.



### IMP41 Specification

Record mic. input sensitivity : 0.5mV at 600 Ohms balanced 3.5mm jack (automatic record level)

Overall frequency response, record to playback -3dB : 200 Hz - 6.5KHz

Sampling frequency : 15.625KHz

Maximum message duration : 32 seconds one message  
: 16 seconds each two messages

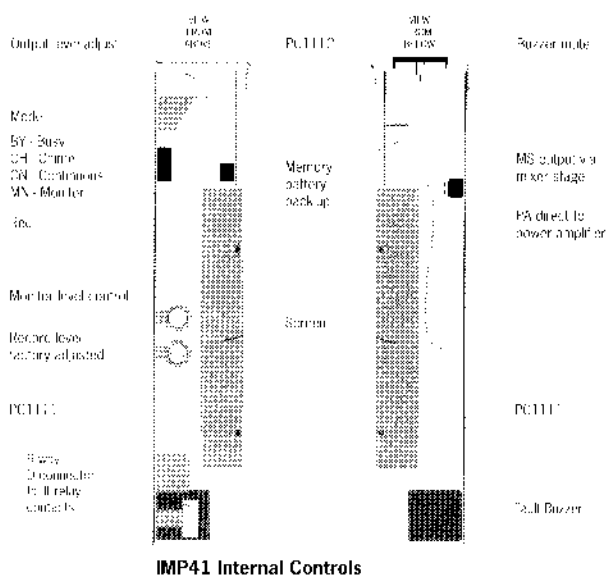
Fault relay contacts to remote indicator : 2 changeover contacts 100V @ 1A max. See Fig. 2.

Front panel controls : Volume (preset)  
: Buzzer mute (lamp test, record)

Front panel indicators : Fault, busy & module OK

Internal controls : Fault monitor sensitivity  
: Dual in line switches to select facilities

Message initialisation : Normally open or normally closed contacts. See Fig. 1.



### Method for Recording

To make a recording on announcement channel 1 select the internal DIL switches thus; MODE, MN AND CN 'OFF' REC 'ON'. Plug in the microphone and press the buzzer mute button (the busy indicator will illuminate). Speak clearly into the microphone at a distance of approximately 6 inches. At the end of the message release the buzzer mute button and the busy indicator will extinguish. If a recording is required on announcement channel 2 select the MODE switch 'ON' and repeat the above procedure. Remove the microphone at the end of the recording session and it is recommended that the REC switch is selected to the 'OFF' position as this will prevent accidental message corruption.

### Self Check Monitor

This module has an internal self check circuit essential for voice evacuation and alarm systems which is enabled by selecting MN and MODE switches 'ON'. Set the monitor control in the anti-clockwise position and the fault indicator will illuminate and the buzzer will sound. Slowly increase the monitor control until the fault indicator extinguishes, the okay indicator illuminates and the buzzer ceases to sound.

*NOTE* On no account adjust the record level.

To ensure correct operation of the self check circuit, select the MODE switch to 'OFF'. After approximately 16 seconds the fault indicator will illuminate and the buzzer will sound. Set the MODE switch 'ON' and the fault conditions will cease.

### General

The audio output signal may be routed via the master gain and tone controls on an MS1 stage etc. by selecting the MS switch 'ON', or direct to the main output of the mixer or amplifier that the IMP41 is installed in by selecting PA switch 'ON'.

*NOTE* Only one of these switches should be selected on at any time.

By selecting the CN switch 'ON' the audio output gate is permanently switched 'ON', enabling the output irrespective of playback commands.

If a pre-alarm tone i.e. IMP23 or a chime IMP33 is required to precede the message, select CH switch 'ON' to trigger the appropriate IMP module.

The busy output from the mixer or amplifier may be operated by selecting the BY switch 'ON' when the IMP41 is busy.

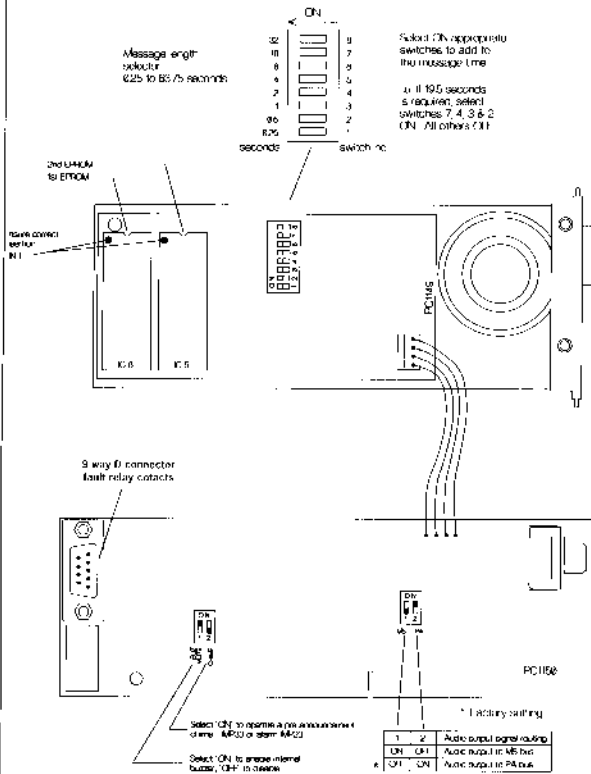
### In Operation with the Self Check Monitoring selected

Under normal, i.e. non fault conditions, the green OK will illuminate, the internal relay will be energised and the buzzer will be silent. The busy and fault indicators may be checked by pressing the buzzer mute button.

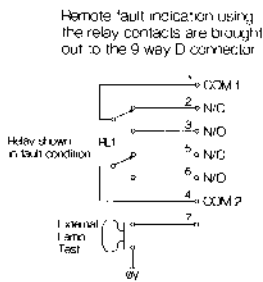
The fault indicator and message content may be tested by pressing the buzzer mute button.

The message is played back on an internal speaker and not broadcast through the system unless there is an alarm condition. Figure 4 illustrates methods of interfacing both normally open and normally closed contacts to playback the message.

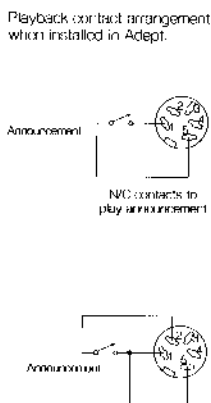
**Fig 1. IMP402 Connector and Selector Locations**



**Fig 3. Fault indicator wiring**



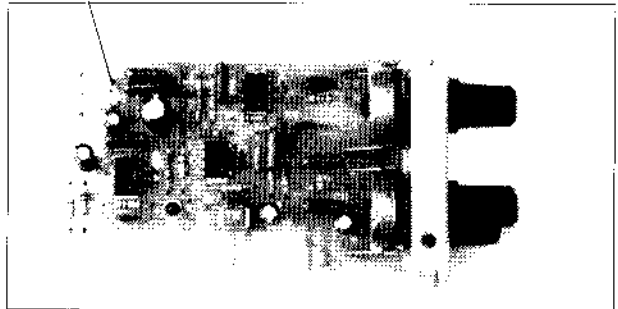
**Fig 4. Amplifier contact arrangements**



## Mixer Stages

All mixer stages locate next to the LCD status panel in the front of the amplifier (observe the keyway in the socket).

200Hz filter link (yellow)



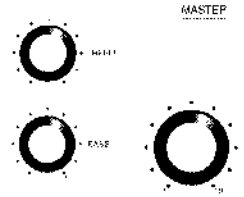
*This is Mixer Stage MSI, it is typical of all the mixer stages*

### MIXER STAGE MSI

This module has bass and treble controls together with an overall master gain control.

Internally a 200 Hz high pass filter is incorporated which can be accessed by removing the fixed yellow link on the printed circuit board.

These features are common to all MS Stages

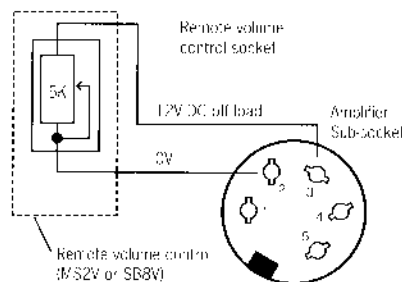
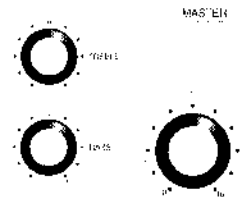


#### Specification

- Input overload : Better than 20dB
- Frequency response : -3dB @ 25Hz and 25kHz
- High pass filter (selectable) : 200Hz @ 12dB per octave
- Tone controls Bass : ±12dB @ 100Hz
- Tone controls Treble : ±12dB @ 10kHz
- Output noise : Better than 80dB (master at min)
- Signal to noise ratio : Better than 70dB (master at max)
- Distortion 1kHz nominal output : Less than 0.1%
- Facilities @ sub socket
  - Input/output pin 1 : 500mV @ 5k Ohms
  - Input/output pin 3 : 500mV @ 10k Ohms
- Front panel controls : Master gain, bass and treble (all removable)
- Internal selectors : High pass filter selection link

### MIXER STAGE MS2

The output level of any ADEPT main frame can be remotely controlled by fitting an MS2 mixer stage. A DC volume control (type MS2V or SB8V) can be remotely installed and connected by a pair of wires to the MS2 mixer stage across Pins 2 and 3 of the amplifier sub socket.



NB The master gain control on the MS2 adjusts the threshold output level of the amplifier, the remote volume control will take this level as its maximum reference level. The range of the remote volume control may be reduced by adjustment of the internal pre-set VR2.

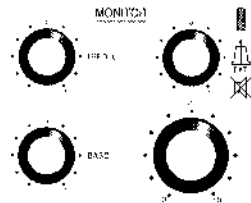
**Specification**

- Input overload : Better than 20dB
- Frequency response : 3dB @ 25Hz and 25kHz
- High pass filter (selectable) : 200Hz @ 12dB per octave
- Tone controls Bass : ±12dB @ 100Hz
- Treble : ±12dB @ 10kHz
- Output noise : Better than 75dB (master at min)
- Signal to noise ratio : Better than 70dB (master at max)
- Distortion 1kHz nominal output : Less than 0.2 %
- Facilities @ sub socket
  - Input/output pin 1 : 500mV @ 5k Ohms
  - Input/output pin 3 : 500mV @ 10k Ohms
- Front panel controls : Master gain, bass and treble (all removable)
- Internal controls : Preset range control for the remote volume control
- Internal selectors : High pass filter selection link
- Remote control : 4k7 linear potentiometer

**MIXER STAGE MS3**

As MS1 with Internal Loudspeaker, specifically used for audio monitoring purposes.

When the monitor volume control is pulled, only the MS bus is muted leaving audio on the PA bus unaffected.



**Specification**

- Input overload : Better than 20dB
- Frequency response : 3dB @ 25Hz and 25kHz
- High pass filter (selectable) : 200Hz @ 12dB per octave
- Tone controls Bass : ±12dB @ 100Hz
- Treble : ±12dB @ 10kHz
- Output noise : Better than 80dB (master at min)
- Signal to noise ratio : Better than 70dB (master at max)
- Distortion 1kHz nominal output : Less than 0.1%
- Facilities @ sub socket
  - Input/output pin 1 : 500mV @ 5k Ohms
  - Input/output pin 3 : 500mV @ 10k Ohms
- Monitor section output power : 0.3 Watts
- Front panel controls : Master gain, bass and treble (all removable)
- Front panel indicator LED : Illuminates when main output muted
- Internal selectors : High pass filter selection link

**MIXER STAGE MS41**

This mixer stage output module provides ambient noise sensing. When used with a BDNS1 noise sensing microphone it will automatically adjust the gain of the amplifier in sympathy with the varying noise levels in the area being monitored. The MS41 must be used in conjunction with an IMPX to accept the sensor microphone input.

The output of the IMPX is taken from the wiper of its volume control via a cable and connector to the MS41 via a single pin connector. The IMPX DIL switches should be set as shown in Fig. 1.

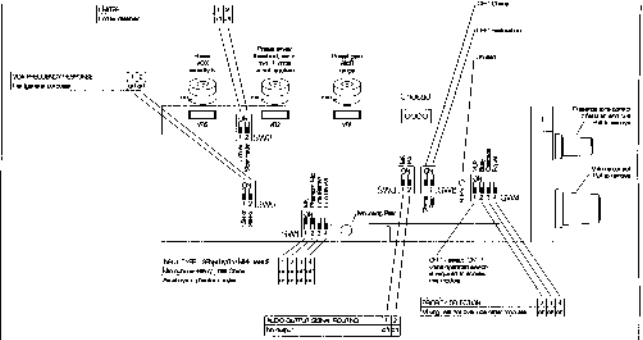


Fig. 1.

This input will accept either a dynamic or capacitor type sensor microphone. If a capacitor type is used e.g. BDNS1, ensure that phantom power switch 4 of SW1 is selected ON. Connections to the BDNS1 are shown in Fig. 2.

(N.B. The sensor microphone should be located so that it can receive the ambient noise within the area but away from any system loudspeakers.)

The MS41 output module plugs into the normal MS position of an Adopt mainframe amplifier. The IMPX must be in position 8 i.e. adjacent to the MS41 as shown in Fig. 3. Please note that only signals routed via the MS bus will be controlled by the MS41.

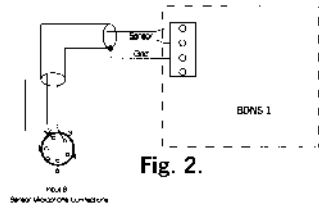


Fig. 2.

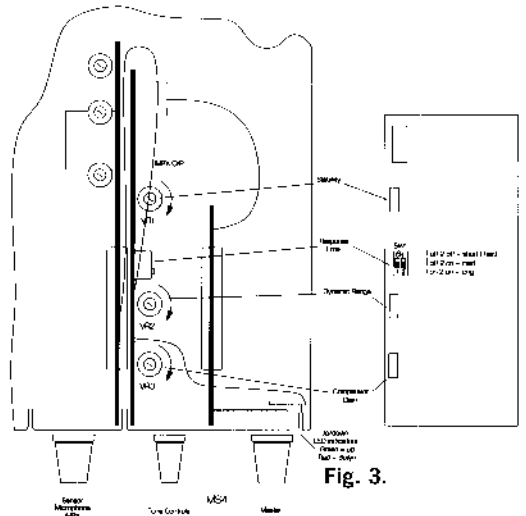


Fig. 3.

**Setting up**

Set the sensor microphone IMPX volume control to minimum and the presence control to mid position.

**Setting maximum level**

On the MS41, select both DIL switches "Response" to the OFF "Test" position. Set VR1 "Stability" minimum (anti-clockwise), VR2 "Dynamic Range" clockwise and VR3 comparator gain mid-position.. Set the master volume to 8 and adjust all input modules for the required maximum loudspeaker output in the area being sensed, i.e. when ambient noise is present. Adjust tone controls as required.

### Setting minimum level

Slowly adjust VR2 "Dynamic Range" anti-clockwise until the minimum loudspeaker output level is achieved, i.e. when there is no ambient noise.

### Setting sensor sensitivity

If the remote sensor microphone has a sensitivity control similar to the BDNS1, set it to the mid position. Select a previously set music source and carefully adjust the sensor IMPX volume control clockwise until the UP indicator starts to flicker, with no ambient noise. If the sensor sensitivity is too high the output level will rise without ambient noise and the system will become unstable.

Introduce ambient noise and the loudspeaker volume should increase. If necessary fine adjustment of the sensor sensitivity may be required either using the local sensor microphone control BDNS1 or the IMPX. If the loudspeaker output increases higher than the ambient noise adjust VR1 "Stability" clockwise on the MS41 to reduce the sensor effect at high output levels. Simply reducing the sensor sensitivity may have the desired effect at low output levels, but adjustment of both may be necessary in some cases. By using the IMPX presence control the frequency response of the sensor can be tailored to suit the ambient noise.

### Selecting response time

In the test mode the response to ambient noise is fast to enable setting sensitivity etc. and must be set at a slower rate to suit the environment. By using the DIL switch "Response" on the MS41 it is possible to select either 1.6, 7.8, or 9.4 minutes response time. See Fig. 3.

Carefully remove the control knobs from the sensor IMPX to prevent unauthorised adjustments.

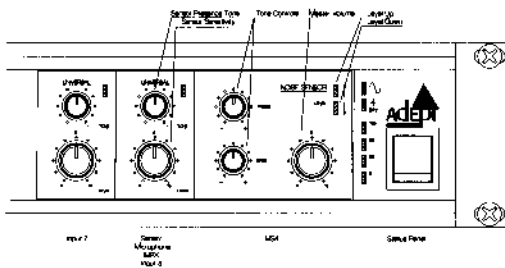


Fig. 4.

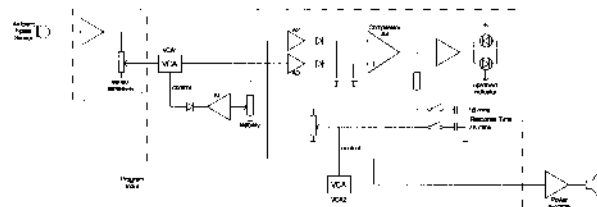


Fig. 5.

### Circuit Description (Refer to Figure 5)

With no ambient noise signal the output of A5 is in a low state and the voltage controlled amplifier VCA2 is set to its minimum gain by the dynamic range control. If we assume that the stability control is set to minimum the gain of VCA1 will be fixed at maximum. In the absence of ambient noise the sensor only receives signals emanating from the system loudspeakers for example background music. This received signal is amplified by the IMPX, VCA1 and A3 where it is converted to DC by a precision rectifier. This DC signal is presented to the non inverting input of A4. The output of A4 under these conditions will rise and increase the gain of VCA2 which would render the system unstable. In order to overcome this problem the output signal from VCA2 is amplified, rectified and presented to the inverting input of A4. As A4 is a linear voltage comparator the output will decrease if the inverting input is higher than the non inverting, therefore stability is achieved. When true ambient noise is received this is added to the non inverting input of A4 and the gain of VCA2 is increased to combat the noise. If the sensor gain is too high, it would cause the system to be unstable, so care must be taken.

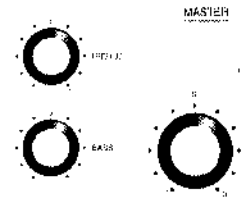
The stability control allows sensor gain reduction as the output of VCA2 increases. Using this feature decreases the chances of instability by decreasing sensor effect when loudspeaker output is high.

The response time is selectable to 1.6, 7.8 or 9.4 minutes depending on the application. If the level of ambient noise is fast changing, for example a railway station where trains are the source of noise, a short response time would be probably suitable. However in a Shopping Centre where people generate the main source of noise a slow response should satisfy.

The UP/DOWN indicator is a useful feature when setting up and testing the system.

## MIXER STAGE MS6

As MS1 with a 12 band frequency equaliser each band is controlled internally by a preset control.



### Specification

Input overload	: Better than 20dB
Frequency response	: -3dB @ 25Hz and 25kHz
High pass filter (selectable)	: 200Hz @ 12dB per octave
Tone controls Bass	: ±12dB @ 100 Hz
Treble	: ±12dB @ 10kHz
Equaliser controls ±12dB @	: 400, 500, 630, 800Hz 1, 1.25, 1.6, 2, 2.5, 3.15, 4 and 5kHz (MS bus only)
Output noise	: Better than 80dB (master at min)
Signal to noise ratio	: Better than 70dB (master at max)
Distortion 1kHz nominal output	: Less than 0.1%
Facilities @ sub socket	
Input/output pin 1	: 500mV @ 5k Ohms
Input/output pin 3	: 500mV @ 10k Ohms
Front panel controls	: Master gain, bass and treble (all removable)
Internal controls	: 12 x frequency equaliser presets
Internal selectors	: Equaliser in/out selection link High pass filter selection link

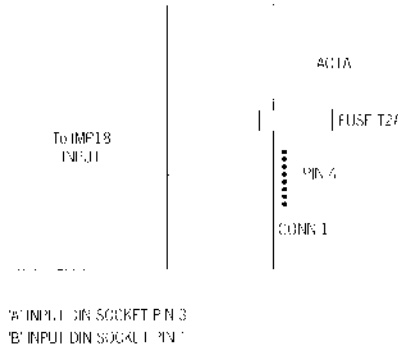
## BATTERY CHARGER AC1A

This Module can be fitted to any Adept mainframe and provides a 27V DC charging voltage at a maximum of 1 amp. It is ideally suited for charging lead acid sealed batteries.

This unit is fitted free of charge if ordered together with any Adept mainframe and is only used on small amplifier systems.

Monitoring on the unit is achieved in conjunction with an IMP18.

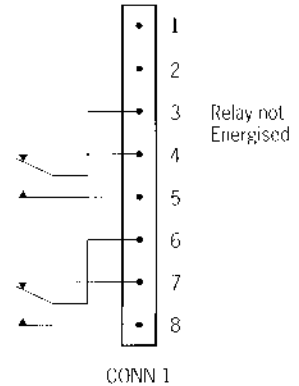
The output voltage is interrupted periodically in order for surveillance to take place. The functions monitored are 'charger fail' and 'battery disconnected'. Should one of these conditions exist the relay is activated. The relay contacts are brought out on an 8 way SIL pin header.



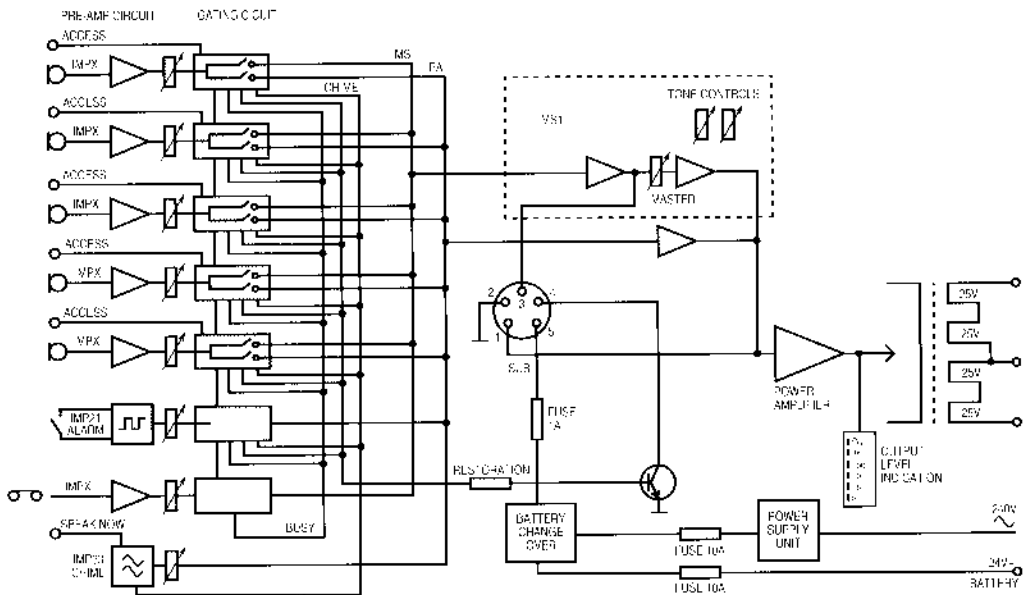
## Fitting your AC1A

The AC1A printed circuit board is mounted into the Adept amplifier on the right hand side of the chassis using two self tapping screws which screw into the AC1As heatsink. The printed circuit board is mounted in the chassis solder side uppermost.

Three flying leads are connected to the PCB. The red wire is connected to the I.I.T. fusoholder on the rear panel. The orange wire is connected to the Batt 24V fuseholder on the rear panel. The black wire is connected to the negative terminal of the large smoothing capacitor on the base of the chassis.



## A typical block diagram for an ADEPT Amplifier



## ADEPT Technical Specifications

	ADEPT 60	ADEPT 120	ADEPT 260
<b>RATED OUTPUT POWER:</b>			
RMS 100V line (240V AC supply)	60 Watt 166 Ohms	120 Watt 83 Ohms	260 Watt 38 Ohms
<b>Typical Output Power RMS:</b>			
Low impedance (240V supply)			
8 Ohms	36 Watt	40 Watt	46 Watt
4 Ohms	66 Watt	77 Watt	80 Watt
3 Ohms	85 Watt	95 Watt	105 Watt
2 Ohms	-	140 Watt	148 Watt
1 Ohms	-	-	300 Watt
<b>OUTPUT VOLTAGE:</b>			
(floating)			
Pin selection	50V & 100V	50V & 100V	50V & 100V
Internal link selection	25V & 70V	25V & 70V	25V & 70V
<b>OUTPUT REGULATION:</b>			
(1KHz 100V line)	<1.3dB	<1.3dB	<1.3dB
<b>DISTORTION:</b> 1KHz rated output (240V AC supply)	<0.5%	<0.5%	<0.5%
<b>FREQUENCY RESPONSE:</b> -3dB @	30Hz - 20KHz	30Hz - 20KHz	30Hz - 20KHz
<b>INPUT SENSITIVITY:</b> Depends on IMP module used (Slave versions only, Balanced)	0.5V @ 50K 0.5V @ 20K	0.5V @ 50K 0.5V @ 20K	0.5V @ 50K 0.5V @ 20K
<b>OUTPUT NOISE:</b> ref rated output	80dB	80dB	-80dB
<b>SUPPLY VOLTAGE:</b>			
AC supply 50 - 60Hz	110, 120, 220, 240V	110, 120, 220, 240V	110, 120, 220, 240V
DC supply	23 - 30V	23 - 30V	23 - 30V
<b>POWER CONSUMPTION:</b>			
Quiescent AC	12VA	18VA	26VA
Quiescent DC	0.25A	0.25A	0.25A
Rated output power @ 1KHz, AC	150VA	300VA	700VA
Rated output power @ 1KHz, DC	4.5A	9A	19A
<b>FUSE PROTECTION:</b>			
AC 5 x 20mm	2A(I)	3.15A(T)	6.3A(T)
DC 6.3 x 31.75mm	5A(F)	10A(F)	20A(F)
Battery 6.3 x 31.75mm	5A(F)	10A(F)	20A(F)
24V DC Aux output 5 x 20mm	1A(F)	1A(I)	1A(F)
<b>TERMINATIONS:</b>			
AC supply input	3 pin DIN - ILC 6A	3 pin DIN - ILC 6A	3 pin DIN - ILC 6A
DC supply input (battery)	3 pin screw terminated connector	3 pin screw terminated connector	3 pin screw terminated connector
Signal input	240 deg 5 pin DIN locking	240 deg 5 pin DIN locking	240 deg 5 pin DIN locking
Aux input/output	240 deg 5 pin DIN locking	240 deg 5 pin DIN locking	240 deg 5 pin DIN locking
Loudspeaker	3 pin screw terminated connector	3 pin screw terminated connector	3 pin screw terminated connector
<b>DIMENSIONS:</b>			
Depth (front to rear)	380mm (15")	380mm (15")	407mm (16")
Width (rack mounted)	482.6mm (19")	482.6mm (19")	482.6mm (19")
Width (free standing)	455mm (18")	455mm (18")	455mm (18")
Height	88mm (3 5/8") 2 Unit	88mm (3 5/8") 2 Unit	132mm (5 1/4") 3 Unit
<b>WEIGHT</b>	5.2Kg (11 1/2 lb)	7.6Kg (16 7/8 lb)	12.8Kg (28 1/2 lb)



**CE** Low Voltage Directive  
73/23/EEC as amended  
by 93/68/EEC

EMC Directive  
89/336/EEC as amended  
by 92/31/EEC and 93/68/EEC

Applies only when the items  
are correctly fitted and operated  
in or with products of our  
manufacture and are installed  
in a recommended enclosure.

### Baldwin Boxall Communications Ltd

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