▼ VIGILANT

Building Occupant Warning Systems (BOWS)

Installation & Operation Manual

LT0554
Issue 1.20

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Table of Contents

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Chapter 1
Introduction

Introduction   The VIGILANT Building Occupant Warning System (BOWS) is a self-contained AS 2220 or ISO 8201 Alert and Evacuate tone generator, with integral power supply, speaker line supervision, digitised speech messages and PA microphone. It has been designed to connect directly to a fire alarm panel, but can be alternatively used stand-alone.

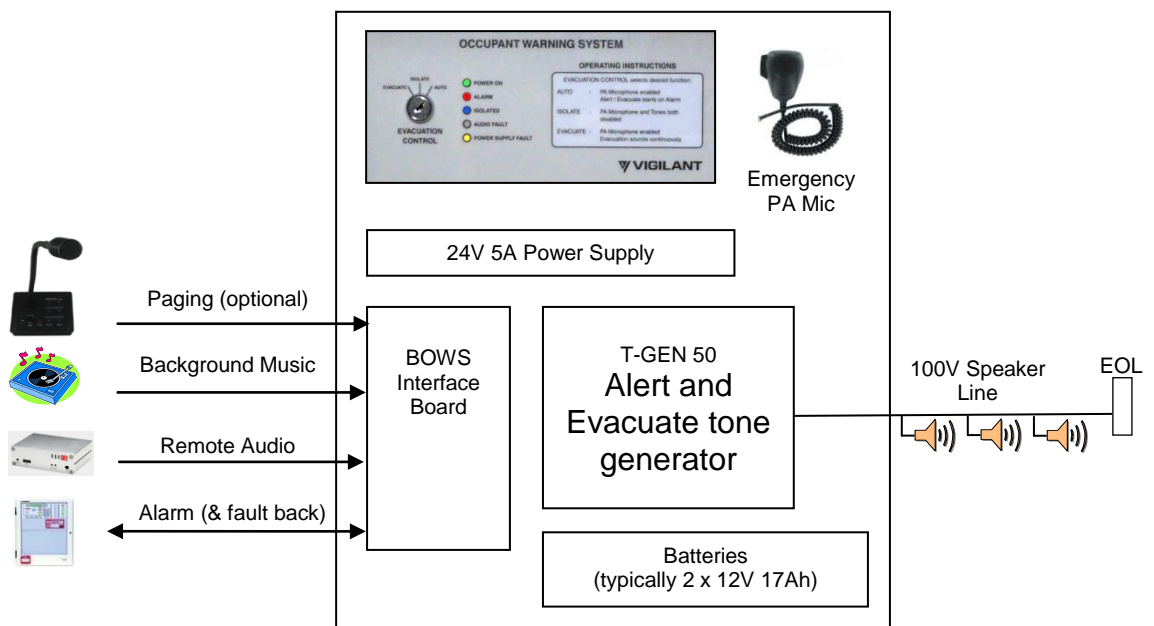A block diagram of the BOWS is shown in Figure 1.

Figure 1. BOWS Block Diagram

The BOWS has a microphone for emergency public address, fault and status indicators, and an Evacuation Control key switch to select its operating mode. It has audio inputs for background music, remote audio (which can be used when streaming audio over IP networks), and non-emergency paging (zone-selective with an add-on option).

The BOWS has a 24V 5A power supply / battery charger compatible with 17Ah batteries.

The VIGILANT BOWS is available in two standard configurations:
- **FP1021 single 50W audio output.**
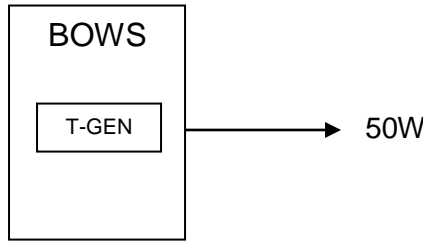- **FP1022 single 100W audio output.**

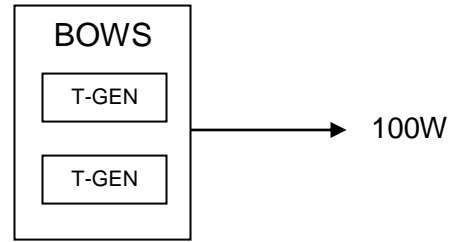

Figure 2.
1 x 50W output (FP1021)

Figure 3.
1 x 100W output (FP1022)

The FP1021 50W BOWS may be upgraded in the field by adding a second T-GEN 50 to provide a second 50W output.

The FP1022 is fitted with a master T-GEN 50 and a slave T-GEN 50, with the outputs arranged in a bridge configuration to provide a single 100W output.

Note: it is <u>not</u> possible to convert a FP1021 50W BOWS to an FP1022 100W BOWS in the field.

The BOWS can optionally be fitted with a speaker distribution module (SDM-4) which allows the single 100V 50W/100W output to be split into four separately selectable 100V line outputs. Each output has separate line supervision (o/c & s/c). The SDM-4 will isolate a shorted output allowing the other outputs to operate. Each output is rated at 40W max. The total load cannot exceed the BOWS rating (50W or 100W).
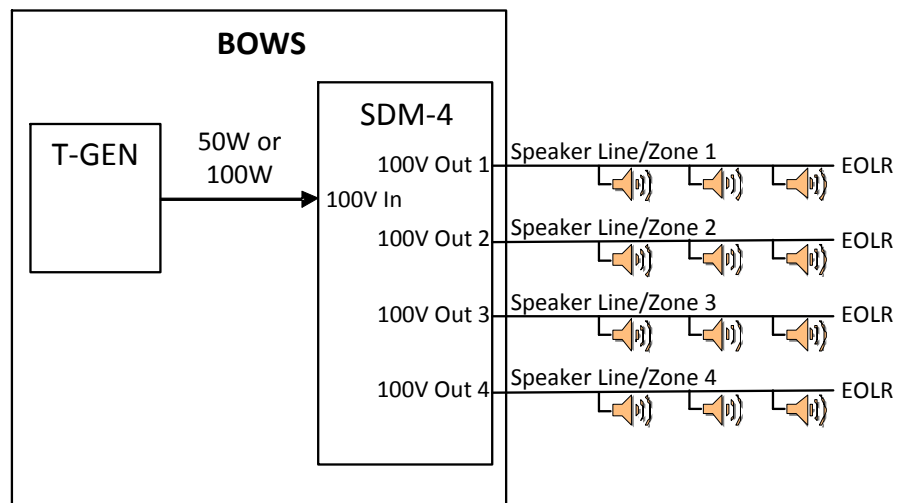

Figure 4. BOWS fitted with an SDM-4 Speaker Distribution Module

The SDM-4 is included with the optional paging kits to provide up to 4 selectable paging zones.

Zone Paging Console

The BOWS supports zone selectable paging using the A4485 4-Zone Paging Console (see Figure 5).

For this paging option the **FP1023 BOWS ZONE PAGING KIT** is required.

This kit includes the following items:

- SDM-4 Speaker Distribution Module
- SDM-4 mounting bracket & screws
- A4485 4 zone paging console
- Connectors and wire (excluding CAT5 cable)
- BOWS Zone Paging Kit Installation Guide (LT0558)

It addition to the FP1023 kit you will also require a suitable length of standard CAT5 (Ethernet) cable terminated with RJ45 connectors for connecting the paging console to the BOWS. This cable can be up to 300m in length.

Refer to the BOWS Zone Paging Kit Installation Guide (LT0558) supplied with the kit for further details.

Figure 5.
A4485 Paging

Zone Paging Using the Emergency PA Mic

The BOWS supports zone selectable paging using the Emergency PA Microphone.

For this paging option the **FP1024 EMERGENCY MIC ZONE PAGING KIT** is required.

This kit includes all the required parts including:

- SDM-4 Speaker Distribution Module
- SDM-4 mounting bracket & screws
- Zone selector switch
- Panel label
- Connectors and wire
- BOWS Zone Paging Kit Installation Guide (LT0558)

Figure 6.
BOWS fitted with the Zone Select switch

Note that the zone selector switch and label are mounted on the 3U blank panel of the BOWS (see Figure 6) and two holes (4mm & 10mm dia) must be drilled in this panel by the installer to mount the switch.

Refer to the BOWS Zone Paging Kit Installation Guide (LT0558) supplied with the kit for further details.

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Chapter 2
Operation

Summary   The BOWS has 5 front panel indicators (LEDs) and an Evacuation Control key switch (003) located on the inner front door (Figure 7), plus an emergency PA microphone with its press-to-talk (PTT) switch.
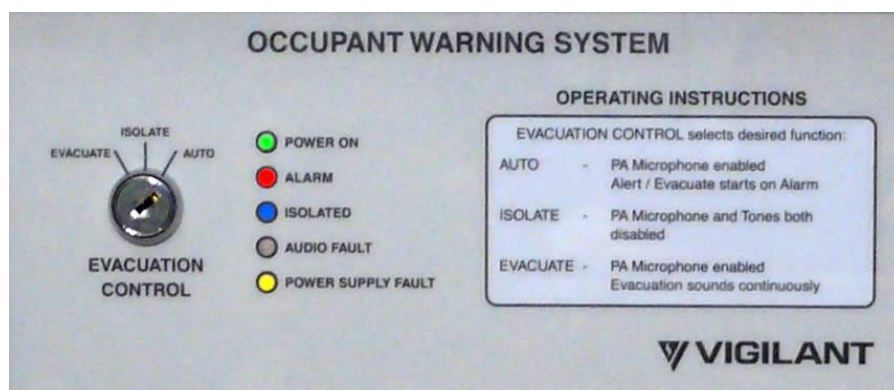

Figure 7. Inner Door Controls and Indicators

Indicators   The BOWS has 5 indicators on the front panel as shown in Table 1.

Table 1. BOWS Front Panel Indicators

Indicator	Colour	Description
🟢 Power On	Green	On when power is on
🔴 Alarm	Red	Alarm input (ALM-) is activated by the fire alarm system
🔵 Isolated	Blue	Evacuation Control switch is in the ISOLATE position
🟡 Audio Fault	Yellow	100V speaker line is open or short circuit or amplifier fault
🟡 Power Supply Fault	Yellow	Power supply is in fault (e.g., battery charge low or disconnected)

Evacuation Control Switch

Operation of the BOWS is controlled by the Evacuation Control 003 key switch. In the "AUTO" position the Alarm input (ALM-) is enabled. In the "ISOLATE" position the Alarm input is disabled and any latched fault or alarm conditions are reset. In the "EVACUATE" position the Evacuate tone is generated.

In Auto mode activation of the Alarm (ALM-) input starts a six-stage rising amplitude Alert tone. This continues until one of the following occurs:

- the Alarm input returns to normal (Alarm input in non-latching mode), or
- the Evacuation Control switch is changed to Isolate, or
- the Evacuation Control switch is changed to Evacuate, or
- the Alert to Evacuate change-over time is reached.

If the Alert to Evacuate change-over time is set to 0 sec, then no Alert tone is generated and the Evacuate tone is generated immediately. If the change-over time is set to Alert only, no Evacuate tone is generated and must be initiated manually. Alert and Evacuate voice messages are automatically inserted in the Alert and Evacuate tone sequences respectively. Messages shorter than 0.5 seconds are not inserted.

Generally with the Evacuation Control switch in the "AUTO" position the operation of the BOWS is controlled via the ALM- input from the fire panel.

Test Mode

A test mode is provided for testing the 100V line and speakers. To activate this put the BOWS into Auto and fit the Test Link (LK4) on the (master) T-GEN 50. The BOWS will produce a short 500Hz tone burst every 4 seconds at low volume (-30dB).

Fault Monitoring

If the 100V line is overloaded (e.g. short circuit), the BOWS will shut down its amplifier output until the fault is removed. Detection of an open or short circuit on the 100V line output will also cause a fault condition.

If the Alarm input fault supervision is enabled, an open circuit on the ALM- input will cause a fault condition.

These fault conditions will turn on the Audio Fault indicator and activate the Fault output. Note that the 100V line is not supervised for the first 60 seconds after power up to allow the monitoring capacitors to charge up.

Note that the BOWS fault outputs are put into the fault state when the BOWS Evacuation Control switch is in the "ISOLATE" position.

**Evacuation
Messages**

The BOWS contains four digitised speech messages, defined as Msg1, Msg2, Alert and ISO 8201 keywords. Refer to the Recorded Message table in the Configuration section for the actual pre-recorded phrases. The BOWS will play the alert message during alert, Msg1 (or Msg1 + Msg2 if recording is longer than 4 seconds) during AS 2220 or ISO 8201 Evac if SW8 is off, Msg2 during AS 2220 if SW8 is on, and just the ISO 8201 keywords during ISO8 201 if SW8 is on.

Public Address

The operator may use the PA microphone for emergency public address. This is activated when the microphone's PTT button is pressed while the Evacuation Control switch is in either the AUTO or EVACUATE position. Emergency PA overrides the Alert and Evacuate tones.

**Paging Using
the Paging
Console**

The BOWS supports remote paging using the A4485 4 zone paging console (Figure 8).

To use this feature the FP1023 BOWS ZONE PAGING KIT option (includes an SDM-4 and Paging Console) must have been installed.

The A4485 paging console has the following controls and indicators (Figure 8):

Talk switch	Off	Microphone is turned off
	Page	Microphone is turned on (turns off when released)
	Lock On	Microphone is turned on
Zone Select switches		Push to select / deselect a zone
		A blue indicator on the button is turned on when the zone is selected
All Call		Selects all 4 zones
Cancel		Deselects all zones
Busy (indicator)		Turned on if the console is not ready for paging

Operation
* Select the zone or zones to be paged using the zone select buttons on the paging console.
* Move the talk switch on the console forward to the Page position.
* Make the announcement and then release the talk switch.

Paging can be configured to override, or not override, the Alert/Evacuate tones. If configured to not override tones the paging will operate only when the BOWS is not in Alarm and the Evacuation Control switch is in the AUTO position (e.g. not generating tones).

If configured to override tones the paging will also operate when the BOWS is in Alarm or the Evacuation Control switch is in the EVAC position (e.g. generating tones). In this mode the paging console will operate in a similar manner to the emergency PA microphone and announcements will be automatically broadcast to all zones overriding

the tones. Note that the operator must still select at least one zone on the paging console to activate the microphone.

The A4485 paging console has a pre-announcement chime option that can be selected via a DIP switch located at the rear of the console. Refer to the A4485 Paging Microphone Operating Instructions supplied with the console for further details.

Figure 8.
Paging Console

Paging Using the PA Microphone

The BOWS supports selectable paging of up to 4 zones using the BOWS emergency PA microphone.

To use this feature the FP1024 BOWS EMERGENCY MIC ZONE PAGING KIT option (includes an SDM-4) must have been installed.

Operation:
- Select the zone to be paged using the PAGING ZONE SELECT switch (Figure 9).
- Make the announcement using the BOWS Emergency PA microphone by pushing the microphone's push to talk button.

Zone-by-zone paging is available only when the BOWS is not in Alarm and the Evacuation Control switch is in the AUTO position. If the Emergency PA microphone is used when the BOWS is generating tones the PA announcements will be broadcast to all zones, irrespective of the Paging Zone Select switch position.

Figure 9.
Zone Selector Switch

Background Music

The BOWS has a 3.5mm audio jack and screw terminals for connecting an external background music audio source to the BOWS. The background music will play whenever the Evacuation Control switch is in the AUTO position, the BOWS is not generating tones, and no other audio source (such as the emergency PA microphone or paging console) is being used.

Remote Audio

The BOWS has a 3.5mm audio jack and screw terminals for connecting an external remote audio source to the BOWS. The remote audio input has an Active input signal, which must be activated by the external audio source to broadcast the audio. The remote audio input can be configured to either override the T-GEN tones (similar to the emergency PA microphone) or not override tones (similar to the background music input). This input has been designed to be compatible with the BARIX range of audio-over-IP devices. Refer to the *IP Networking Using Barix Modules* section later in this manual.

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Chapter 3
Configuration

Summary   The operation of the BOWS is configured via links on the BOWS Interface board and an 8-way DIP switch and links on the (Master) T-GEN 50.
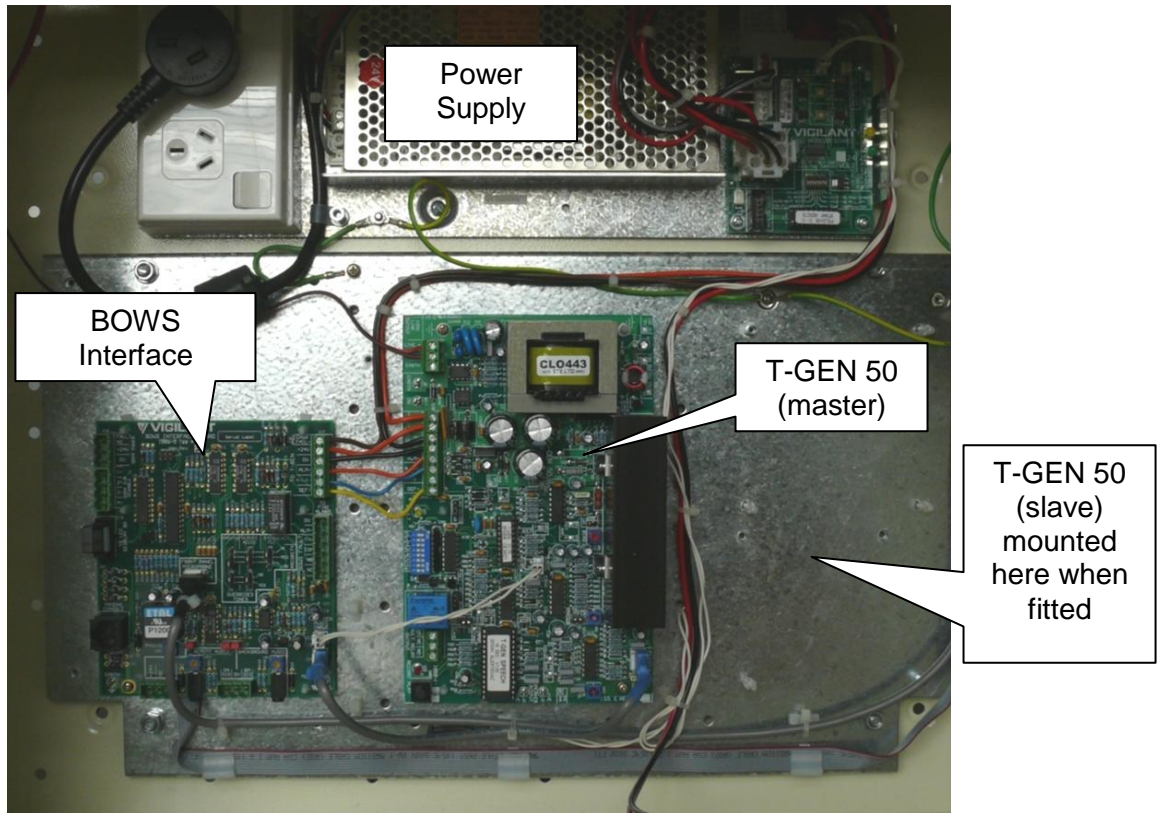

Figure 10. View inside 50W BOWS cabinet

BOWS Interface Board

The BOWS Interface board has 5 links to configure the priority of the Paging, Remote Audio, and Emergency Mic audio inputs, plus volume (level) controls for background music, paging, and remote audio. The Issue B boards also have an ACTIVE LOW link.
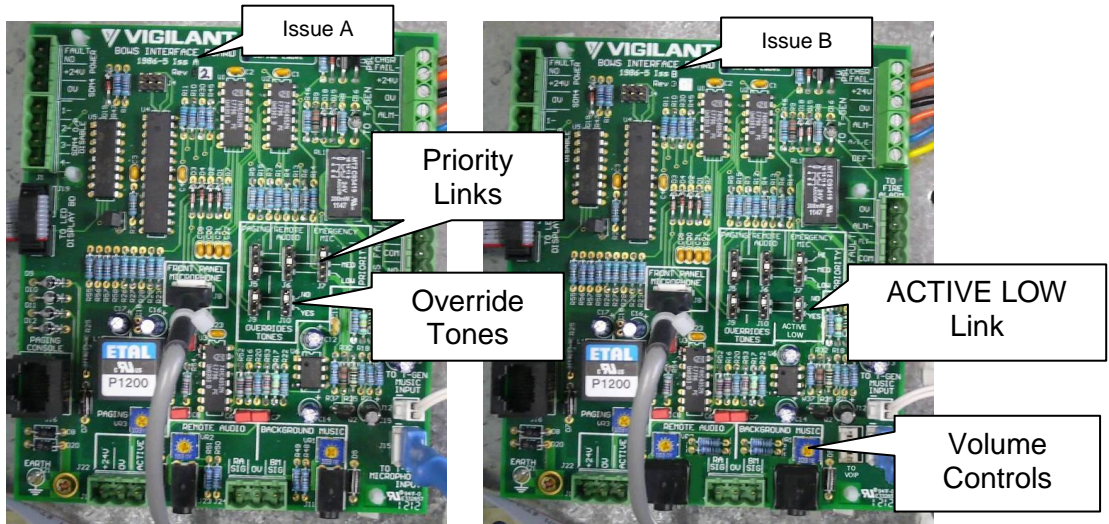

Figure 11. BOWS Interface Board

Priority Links

Each of the 3 audio sources (Paging, Remote Audio, Emergency Mic) must be configured with a priority level of HI, MED or LOW. When 2 or more audio sources are selected at the same time this priority determines which source will be played.

The valid combinations are shown in Table 2.

Table 2. BOWS Interface Priority Links

LK1 Paging	LK2 Remote Audio	LK3 Emergency Mic	Comment
LOW	MED	HI	**Factory default**
LOW	HI	MED	
MED	HI	LOW	
MED	LOW	HI	
HI	MED	LOW	
HI	LOW	MED	
HI	LOW or MED	HI	Emergency PA Mic used for paging

If any other (invalid) combinations are selected the BOWS will double flash its Audio Fault LED every 2 seconds, activate its Fault outputs, and use the factory default setting.

Override Tones Links

The Paging and Remote Audio sources each have an additional link as per Table 3 to determine if the audio source is to override the Alert/Evacuate tones or not.

Table 3. BOWS Interface Override Tones Links

Link	Audio Source	Link Position	Operation
LK4	Paging	No	Tones override paging audio **(Factory default)**
		Yes	Paging overrides tones
LK5	Remote Audio	No	Tones override remote audio **(Factory default)**
		Yes	Remote audio overrides tones

Note that the Emergency PA Mic always overrides Alert/Evacuation tones.

ACTIVE LOW Link

The Issue B boards also include an ACTIVE LOW link. This is used to configure the ACTIVE input on the Remote Audio port as per Table 4. If the ACTIVE input is open (not used) it will be inactive in either link position.

Table 4. Remote Audio ACTIVE LOW Link

Link	Audio Source	Link Position	ACTIVE Input Operation
LK6	Remote Audio	No	-30V to +2V Inactive, +2V to +30V Active **(Factory default)**
		Yes	-30V to +1V Active, +1V to +30V Inactive

Note that on Issue A boards the ACTIVE input is always active High.

Volume Controls

The BOWS Interface board has the following 3 volume adjustment controls as listed in Table 5.

Table 5. BOWS Interface Volume Controls

Control	Name	Function
VR1	BM VOL	Background Music volume control.
VR2	RA VOL	Remote Audio volume control.
VR3	PC VOL	Paging Console volume control.

Note that the volume of the Emergency PA Mic is set by VR3 PA VOL on the (master) T-GEN 50.

When an audio source is configured to 'Override Tones' the audio source is fed into the T-GEN PA Mic input, and therefore the output level will be determined by both the volume control on the BOWS Interface board and the PA VOL (VR3) on the master T-GEN 50. It is therefore recommended to set the master T-GEN Emergency PA Mic level (VR3) first (if required) before adjusting the volume controls on the BOWS Interface board.

T-GEN 50 (Master)

An 8-way DIP switch (SW1) and 7 jumpers are used to configure the operation of the T-GEN 50.
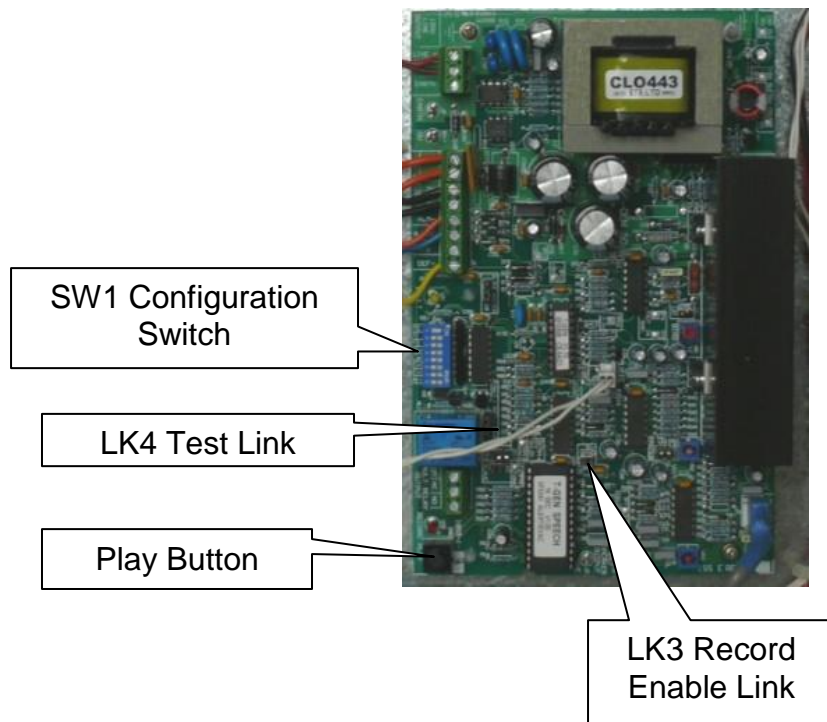

SW1 Configuration Switch

LK4 Test Link

Play Button

LK3 Record Enable Link

Figure 12. T-GEN 50

Level Controls

The T-GEN 50 has 3 level adjustment controls as shown in Table 6.

Table 6. T-GEN 50 Level Controls

Control	Name	Function
VR1	BIAS	Amplifier Bias – Factory adjust only.
VR2	SPEECH VOL	Volume adjustment for recorded messages.
VR3	PA VOL	Volume adjustment for emergency PA microphone.

Note that the BIAS (VR1) level must not be adjusted.

Configuration Switch

The 8-way switch on the T-GEN 50 is used to select the alert to evacuate change-over time, Alarm input options, Evacuation tone, and Evacuation message selection as per Table 7 below. The factory default settings are shown as "**(default)**".

Table 7. T-GEN 50 Configuration Switch Settings

Sw1 (T0)	Sw2 (T1)	Sw3 (T2)	Alert to Evacuate Change-Over Time
OFF	OFF	OFF	0 sec
ON	OFF	OFF	30 sec **(default)**
OFF	ON	OFF	1 min
ON	ON	OFF	1.5 min
OFF	OFF	ON	3 min
ON	OFF	ON	5 min
OFF	ON	ON	10 min
ON	ON	ON	Alert Only

Sw4 (Mon)	Alarm I/P Fault Supervision
OFF	Disabled
ON	Enabled **(default)**

Sw5 (Lat)	Alarm I/P
OFF	Non-Latching **(default)**
ON	Latching

Sw6 (Ev0)	Sw7 (Ev1)	Evacuate Tone
OFF	OFF	AS2220
ON	OFF	RH3
OFF	ON	ISO8201 + keywords **(default)**
ON	ON	Wail (LK4 not fitted)
ON	ON	Hee Haw (LK4 fitted)

Sw8 (Att)	Evacuate Message Selection
	(relative to Evac Tone)
OFF	Msg1 or field recorded
ON	Msg2 in AS2220 or Keywords only in ISO8201 **(default)**

Name	Recorded Message
Msg1	"Evacuate the building using the nearest fire exit"
Msg2	"Evacuate as directed" x2
Alert	"The fire alarm system has operated. Standby for further instructions"
ISO8201 Keywords	"Emergency" "Evacuate Now"

Links

The T-GEN 50 has 7 links for configuring options such as Master/Slave operation as shown in Table 8, Test Tone generation and recording messages. Generally, only the REC EN and TEST links should be changed on the master T-GEN.

Table 8. T-GEN Link Settings

Link	Name	Function
1	BIAS	Amplifier bias disable. Fit link to reduce quiescent current if the BOWS is to be used with tones only (no speech or background music). **Default Position : Not Fitted**
2	MASTER	Fit for master, remove for slave. **Default Position : Fitted**
3	REC EN	Fit to record message. Refer Recording Messages. **Default Position : Not Fitted**
4	TEST	Fit for test tone (500Hz pulsing on/off at -30dB). Operates in "Auto" only and excludes Wail & Hee Haw. **Default Position : Not Fitted**
5	SLAVE	Fit for slave mode only. Read only on power up. **Default Position : Not Fitted**
6	SLAVE / MASTER	Selects slave or master mode - fit as appropriate. **Default Position : MASTER**
7	FAULT= DEF-/RELAY	Enables the operation of either the Fault Relay or the DEF- output. **Default Position : DEF-.**

Recording Messages

The BOWS supports 2 recordable messages, Alert and Evac. Alert can be up to 4 seconds long. Evac consists of two factory-programmed messages (Msg1 and Msg2) that can be up to 7.2 seconds in total length. The Alert and Evac messages can be re-recorded using the Emergency PA microphone.

To record a message use the following steps (when the BOWS is not in alarm or evacuate or test mode):

1.   Fit link LK3 - REC EN on the T-GEN (master). This enables the recording and playback of messages.

2.   Select the message to be recorded (played) using switch 2 - T1 as follows:
T1 Off - Evac message   T1 On - Alert message

3.   Press the Emergency PA microphone button to start recording. Recording will continue until either the button is released or the maximum message length has been reached (see NOTE).

4.   The recorded message can be played back using the Play button on the T-GEN board. Note that if the Evacuation Control switch is not in the Isolate position the played back message will be broadcast over the speaker system. Recording is not broadcast.

5.   When recording has been completed, re-set T1 to its original position and remove Link LK3 to disable the record function.

NOTE: Messages less than 0.5 seconds will not be broadcast (this can be used to delete an unwanted message). Note that if Evac Msg1 is replaced with a message of more than 4 seconds duration, Evac Msg2 will also be overwritten.

T-GEN 50 (Slave)

If the BOWS is fitted with a slave T-GEN 50 (e.g., 100W BOWS or 50W BOWS fitted with a 2nd T-GEN), the switches on the slave T-GEN are not used and should be left in the Off position. The links must be set in the following positions (NF = Not Fitted): LK1 – NF, LK2 – NF, LK3 – NF, LK4 – NF, LK5 – SLAVE, LK6 – SLAVE, LK7 – DEF-.

Power Supply   The BOWS power supply has an 8-way DIP switch to configure its
operation as shown in Table 9.

Table 9. BOWS Power Supply DIP Switch Settings

Switch	BOWS Factory Default	Function
1	OFF	12A select – this must be set to **OFF**
2	OFF	• Switch **ON** to select NZ mode **-** Charger High, Charger Low, Mains Fail do not activate the general fault output Self-timed battery tests every 24 hours after 72 hours with no externally initiated tests. Battery Capacity fault indication is non-latching. • Switch **OFF** to select Standalone Australian mode **-** All fault conditions contribute to general fault output. Self-timed battery tests occur every hour until failure then every half hour until success. Battery Low capacity is latching until successful retest.
3	ON	Switch **ON** to enable self-timed "Battery Disconnected" and "Battery Low Capacity" tests.
4	OFF	Switch **ON** to enable earth fault detection. Only for current production versions with firmware (SF0445) version V1.1 or later. Switching this off will leave any other earth fault detection unaffected.
5	ON	Switch **ON** to enable temperature-compensated output voltage. Switching this off means that a temperature probe is not required.
6 7	OFF ON	• Switch 6 ON and 7 OFF to make the Fault output pull up to near +24V for Normal, switching low to near 0V on any fault. The Fault output is current limited, good for at least 20mA, suitable for driving a fault relay if desired. • Switch 6 OFF and 7 ON to make the Fault output an open collector, switching to below 1V on any fault.
8	OFF	Not currently used. Has no effect.

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Chapter 4
Installation & Wiring

Checking the Kit

Before commencing installation, please ensure that the following items are present and undamaged:

    1 x BOWS Unit (50W or 100W)
    1 x Installation & Operation Instructions (LT0554 – this document)
    1 x Factory Checklist (LT0555)
    1 x 003 lock key
    1 x LM0359 Battery lead
    4 x M5 screws, nuts and washers for attaching battery leads to batteries
    6 x SU0020 cable ties, for general wiring fastening requirements
    6 x HW0302 cable tie holders
    End-of-Line devices (ELD) as follows:
      1 x 3k3 resistor   ELD for MX4428 & F3200 Ancil Relays
      2 x 10k resistor   ALM- Input ELD resistor, MX4428 Ancil Relay ELD
      1 x 56k resistor   100V line ELD
      2 x 100k resistor 2 branch 100V line ELD

Mounting

The BOWS cabinet is typically fixed to a wall with four 6 mm screws or bolts (not included). The drilling details are shown in Figure 13.

The following conditions are required:

1. Dry Area, moderate ambient temperature, 45°C maximum.
2. Not exposed to direct sunlight.
3. Not subject to outdoor conditions without suitable protection.
4. The display should be at average eye level and must not be higher than 1850 mm or lower than 750 mm above floor level (see Figure 13).
5. Clear access and viewing for operators.
6. At least 1 metre free space should be provided in front of the panel for installation and maintenance.
7. Must not be installed in hazardous areas as defined in AS3000.
8. If recessed into a wall allow room for the door to open at least 145deg.

> It should not be necessary to drill within the cabinet, but if drilling or filing is required, remove the circuit boards first.
> **Clean out all swarf before replacing the boards.**

Use antistatic precautions when handling the circuit boards.

CAUTION

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.
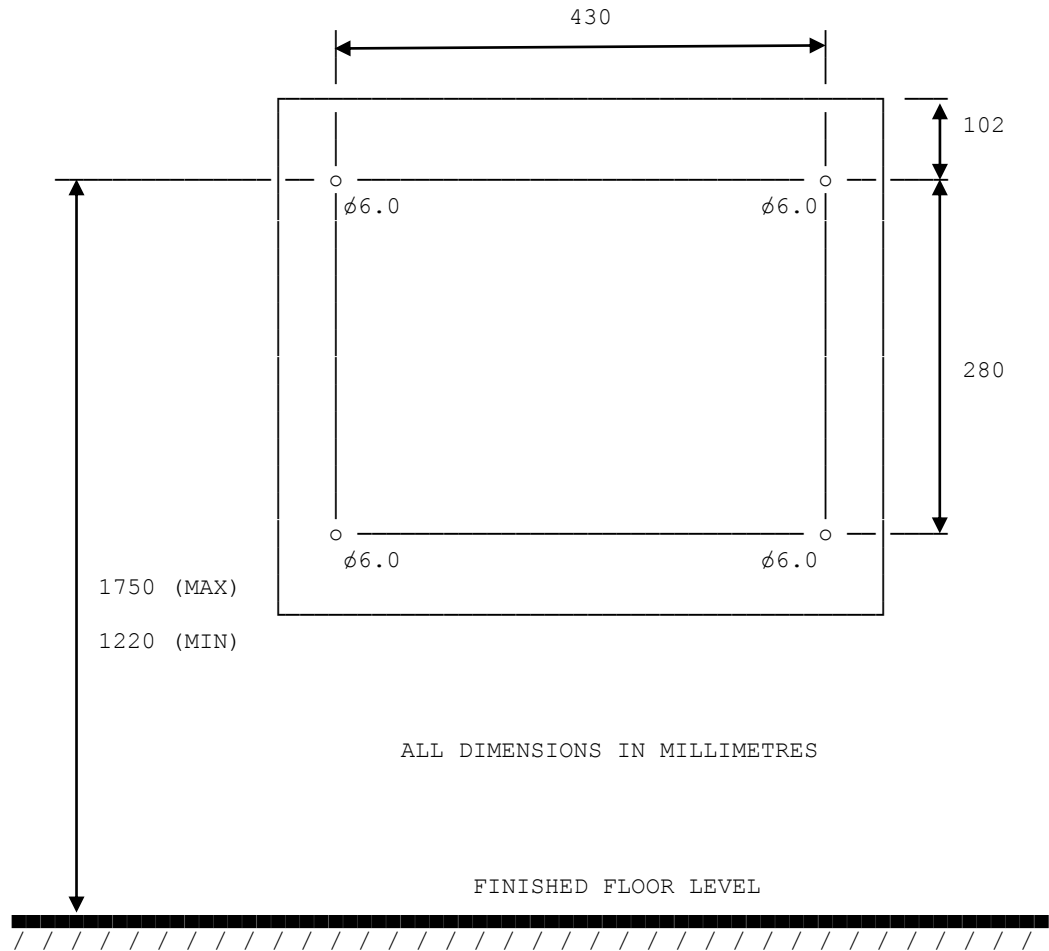

Figure 13. BOWS Cabinet Mounting Details

External Wiring

Cable Entry

There are eight 20mm knockouts provided in the top and eight knockouts in the bottom of the cabinet. Other entry holes can be drilled as required.

To prevent water entering the cabinet, seal unused knockouts and any top cable entries. Where possible, use bottom cable entry with cables going down 100 mm below the cabinet before rising.
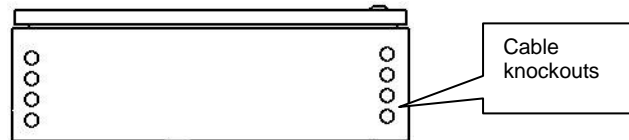
Figure 14. Cabinet Cable Knockouts

Mains Wiring

The General Purpose Outlet (GPO) must be wired by a suitably qualified technician.

IMPORTANT: The factory-fitted earth loom under the mounting block must be wired to the earth terminal of the mains outlet in order to correctly earth the BOWS cabinet.

Battery Wiring

The cabinet has space for a pair of 12V 17Ah batteries which will provide over 24hrs standby and ½ hr alarm load for a 100W system with paging. This should be sufficient for most systems.

The BOWS is supplied with a red battery lead for joining the neg(-) terminal on the 1st battery to the pos(+) on the 2nd battery, and the screws, washers and nuts required for attaching the leads to the batteries.
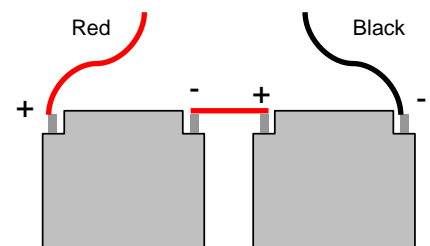

Figure 15. Battery wiring

Alarm Input

The BOWS has an Alarm input (ALM-) which is used to put the BOWS into alarm, activating the Alert/Evacuate tones (when the Evacuation Control switch is in the AUTO position). This signal is normally open circuit or has a 10k EOL to 0V fitted if the Alarm input supervision is configured (refer T-GEN 50 Configuration switch settings). Pulling the ALM- signal to 0V (Table 10) will put the BOWS into Alarm.

Table 10. BOWS Interface J2 Pin Allocation

J2 Pin	Name	Description
1	0V	Signal ground.
2	ALM-	Alarm input signal. Pulled to 0V to put the BOWS into Alarm.

BOWS Fault Outputs

The BOWS has a common fault relay (Table 11) which is normally energised when the BOWS is powered up and normal (not in fault). This relay is de-energised on:

- Audio Fault (e.g. 100V speaker line fault)
- Power Supply Fault (e.g. battery fault)
- Loss of power (mains & battery)
- The Evacuation Control switch in the ISOLATE position.

Table 11. BOWS Fault Relay Connections

J2 Pin	Name	Description
3	FLT-	BOWS fault output. Pulled to 0V when the BOWS fault relay is de-energised (e.g., BOWS is in fault).
4	COM	BOWS Fault Relay Contacts (voltage free)
5	NO	NO connected to COM when BOWS is not in fault
6	NC	NC connected to COM when BOWS is in fault

Speaker Wiring   The standard BOWS provides a single 100V line output for connecting to 100V speakers. The speakers can be connected to the BOWS as a single line terminated with a 56k EOLR at the far end, or using two 100V lines with each line terminated with a 100k EOLR. Each speaker must be fitted with a 10V (or higher) bipolar capacitor with a capacitance value of 1uF to 5uF per watt of speaker load. For example a 5W 100V speaker would typically be fitted with a 10uF 10V Bipolar capacitor.
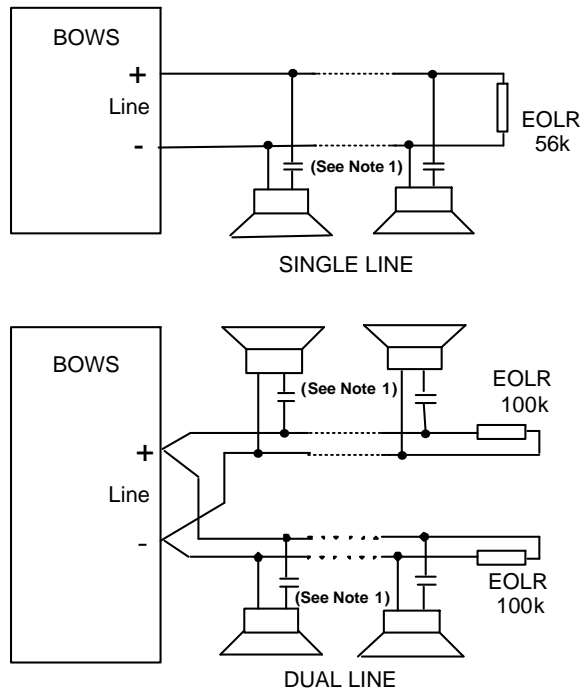
Note 1: Capacitor 10V bipolar. Value 1-5uF per watt of speaker load.

Figure 15. Speaker Wiring (100V Line Output)

100V a.c. audio line wiring is defined as LV Telecommunications circuits and is subject to the Australian Standard AS/ACIF S009:2006. Ensure that this wiring is appropriately separated and insulated from LV power wiring, ELV and other customer cabling such as detection and control circuits. 100V wiring is required to be double insulated.

If the FP1021 50W BOWS has been fitted with a 2nd T-GEN 50 the BOWS will have two 100V 50W line outputs. Each line output must be terminated with one or two EOL resistors as per Figure 15.

If the BOWS is fitted with an SDM-4 speaker distribution module (to support one of the paging options) each of the four 100V line outputs on the SDM-4 must be terminated with one or two EOL resistors as per Figure 16. Note that the SDM-4 uses 47k EOL resistors, which are supplied with the SDM-4. Unused lines must still be terminated with a 47k resistor.
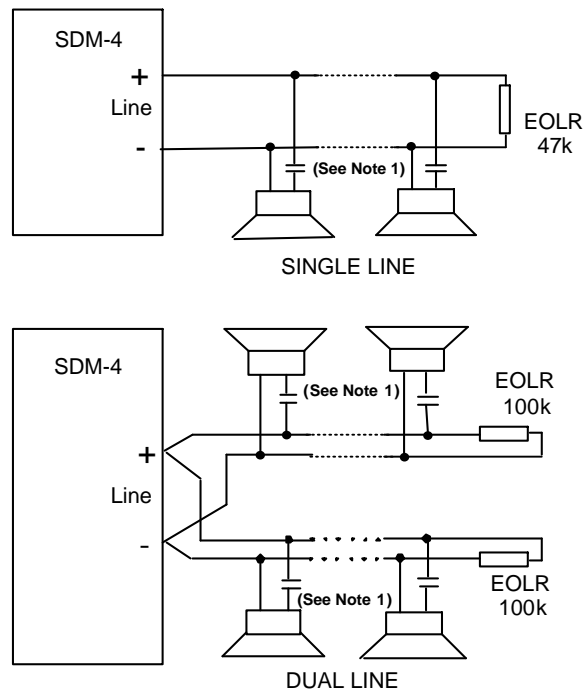
Note 1: Capacitor 10V bipolar. Value 1-5uF per watt of speaker load.

Figure 16. Speaker Wiring (SDM-4 100V Line Outputs)

Background Music Input

The BOWS has a background music input compatible with most audio sources fitted with 3.5mm audio socket outputs, such as iPods, radios, etc. The background music input is located on the BOWS Interface board as shown in Figure 17. A level adjustment control (VR1) is provided to adjust the output volume.

Two connection options are available:
  a) 3.5mm audio socket (J11)
  b) screw terminals on connector J24 (Table 12)

The audio socket is a stereo socket. The BOWS will combine the left and right channels to provide a single mono output. Note that if a mono plug is inserted the effective audio level will be halved.

Table 12. BOWS Interface BGM Screw Terminals

0V	0V
BM SIG	Background Music Signal +

The input will support audio levels up to 1Vrms, and will allow maximum output volume at an input level of approximately 200mVrms.

Background Music Input
screw terminal option.

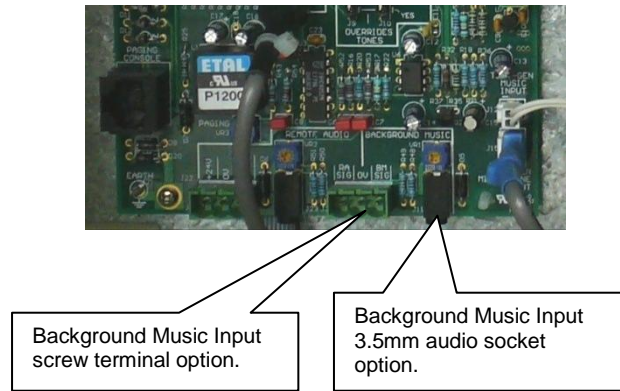Background Music Input
3.5mm audio socket
option.

Figure 17. Background Music

Remote Audio Input

The BOWS has a remote audio input compatible with the BARIX range of audio-over-IP devices (but can be used with other devices). The remote audio input is located on the BOWS Interface board as shown in Figure 18. A level adjustment control (VR2) is provided to adjust the output volume.
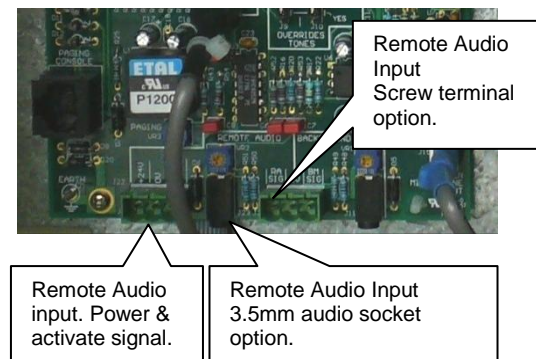

Remote Audio
Input
Screw terminal
option.

Remote Audio
input. Power &
activate signal.

Remote Audio Input
3.5mm audio socket
option.

Figure 18. Remote Audio Input

Two connection options are available:
  a) 3.5mm audio socket (J23)
  b) screw terminals on J24 (Table 13)

The audio socket is a stereo socket. The BOWS will combine the left and right channels to provide a single mono output. Note that if a mono plug is inserted the effective audio level will be halved.

Table 13. BOWS Interface Remote Audio Screw Terminals

0V	0V
RA SIG	Remote Audio Signal +

The input will support audio levels up to 1Vrms, and will allow maximum output volume at an input level of approximately 200mVrms.

Connector J14 provides a 24V output to power the Barix module and an ACTIVE input signal to enable the audio input.

The ACTIVE signal must be pulled above 2V (30V maximum) to enable the remote audio input. Refer to *IP Networking Using Barix Modules* later in this manual for further details on using this input.

Paging Console Input

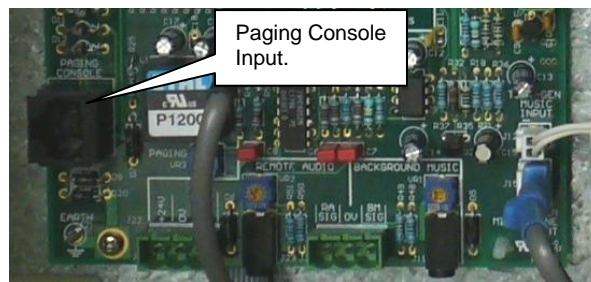The BOWS has a paging console input that is used with the paging options to provide zone selective paging.

Figure 19. Paging Console Input

The connector J16 PAGING CONSOLE is an RJ45 socket with terminals as shown in Table 14.

Table 14. BOWS Interface Paging Console Inputs

Pin	Function	Description
1	+V	Power to Paging Console (24V)
2	0V	
3	Line Cold (-)	Balanced Audio from Paging Console
4	Line Hot (+)	1Vrms max. Input impedance 600Ω
5	Zone Sel 1-	Zone selection inputs
6	Zone Sel 2-	Pull to <1V to select each zone
7	Zone Sel 3-	At least one input must be selected to enable the audio input
8	Zone Sel 4-	

VIGILANT Fire Alarm Panel Wiring

Separate Alarm & Fault Wiring

The BOWS can be wired to a fire alarm system using separate alarm and fault wiring. Figure 20 shows examples using VIGILANT fire alarm panels.
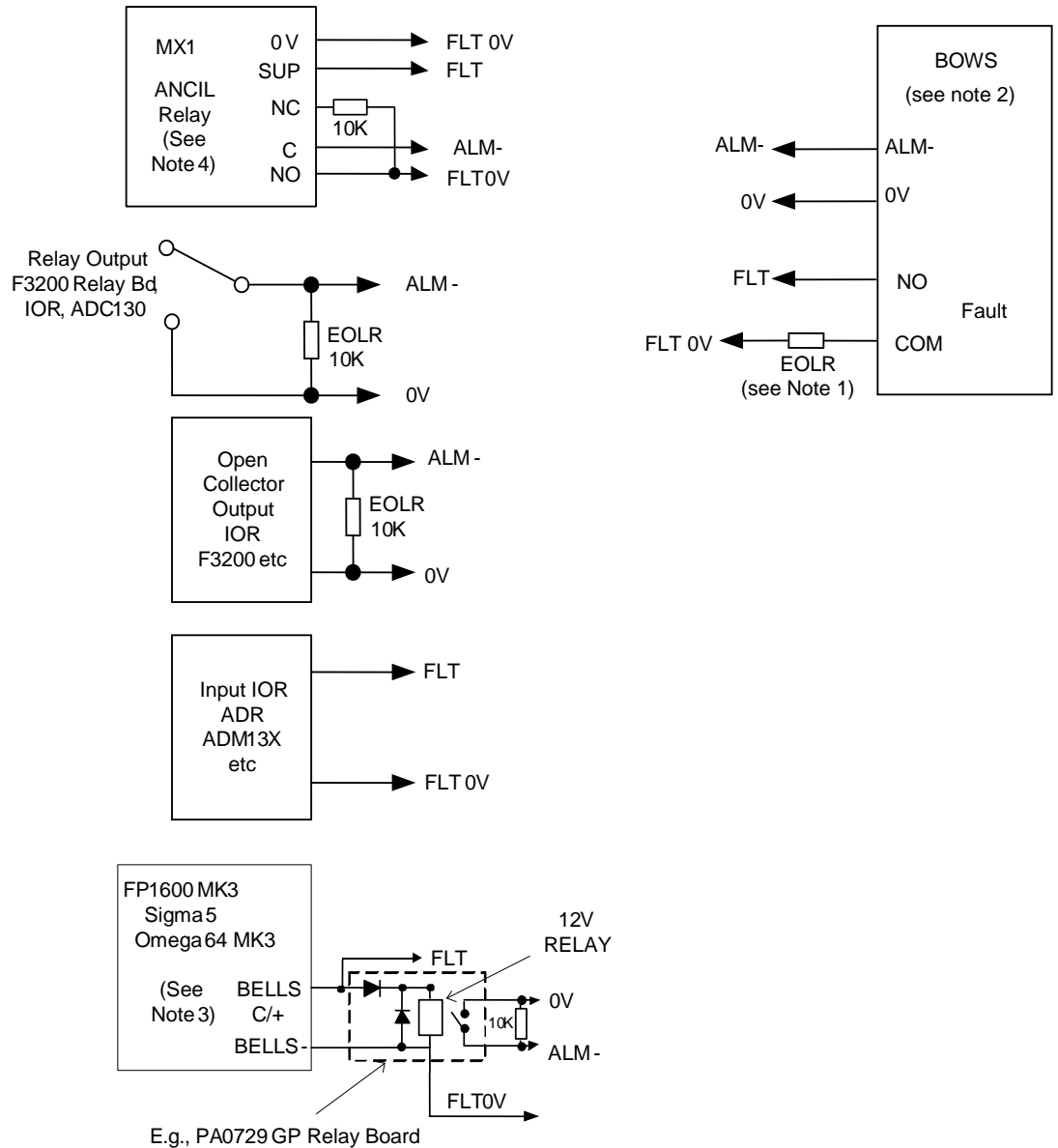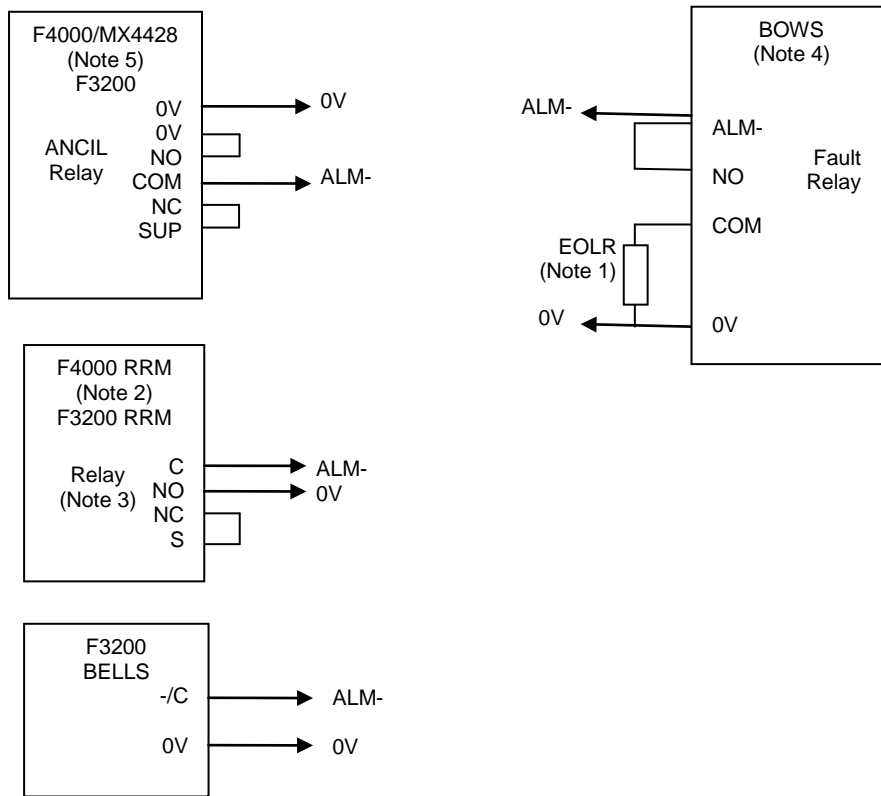

Notes
1. EOLR value depends upon the fire alarm system's input type.
   (Not fitted when used with MX1 or 4100ES).
2. Switch SW4 ON on the master T-GEN.
3. FP1600/Omega 64 MK3 boards have three 7-segment displays.
4. Please refer to MX1 LT0360 Installation Manual (NZ) or
   LT0439 Operator Manual (Australia) for more information.

Figure 20. Separate Alarm/Fault Wiring

Combined Alarm/Fault Wiring

The BOWS can be wired to a fire alarm system using a single twin core cable with combined alarm and fault supervision. Figure 21 shows examples using VIGILANT fire alarm panels.

Notes
1. 3k3 EOLR for MX4428 Ancil Relay and RRM, F3200 Ancil Relay and RRM. (2k5 (3k3//10k) for F3200 Bells.
2. AAR must be inside FIP and wired to RESP IN.
3. Connect wire from NC terminal of relay to "S" pin of supervision link. Do not fit Sup link at all.
4. Turn T-GEN master SW4 off.
5. Cut "Ancil Sup link" on F4000, MX4428 Main Board.

Figure 21. Combined Alarm/Fault Wiring

SIMPLEX 4100+/4100U/4100ES Fire Alarm Panel Wiring

4100-3003/ 4100-3204 Relay Module

The BOWS can be wired to a SIMPLEX 4100-3003 / 4100-3204 Relay Module as shown in Figure 22.
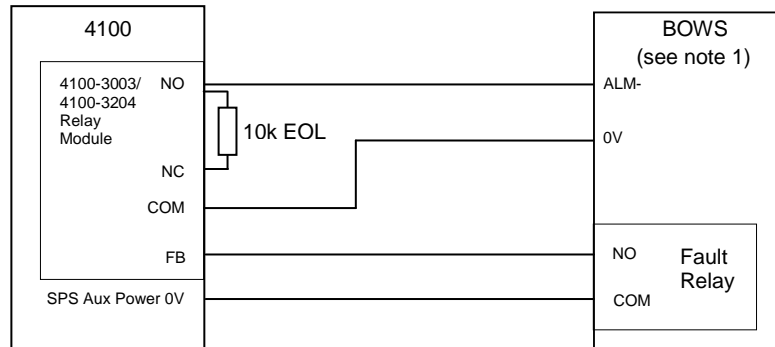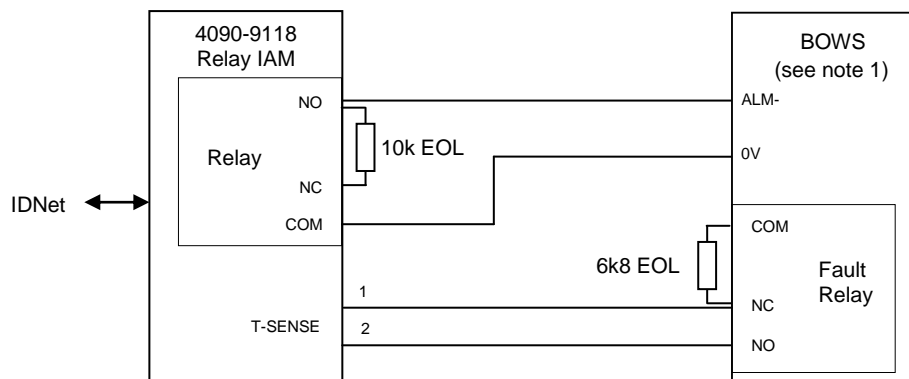

Note 1. Switch SW4 ON on the master T-GEN.

Figure 22. SIMPLEX 4100-3003 Relay Module Wiring

The relay must be configured as a Signal Output, and the FB input as a Fault Point. Please refer to the Programming Guide for your panel type for further details.

4090-9118 Relay IAM

The BOWS can be wired to a SIMPLEX 4090-9118 Relay IAM as shown in Figure 23.

Note 1. Switch SW4 ON on the master T-GEN.

Figure 23. SIMPLEX 4090-9118 Relay IAM Wiring

The relay must be configured as a Signal Output, and the T-SENSE input as a Fault Point. The Relay IAM can be mounted inside the BOWS cabinet. Please refer to the Programming Guide for your panel type for further details.

NAC

It is not recommended to use the 4100ES NAC output as it is not possible to monitor the required 0V connection between the 4100ES panel and the BOWS.

Installing a Second T-GEN 50 in the FP1021 50W BOWS

A second T-GEN 50 may be installed in the FP1021 50W BOWS to provide an additional 50W output. This will require a PA0766 T-GEN 50 to be mounted to the right of the master T-GEN on the standoffs provided on the gear plate.

This T-GEN must be configured as a slave and wired to the PSU and master T-GEN as per Figure 24.
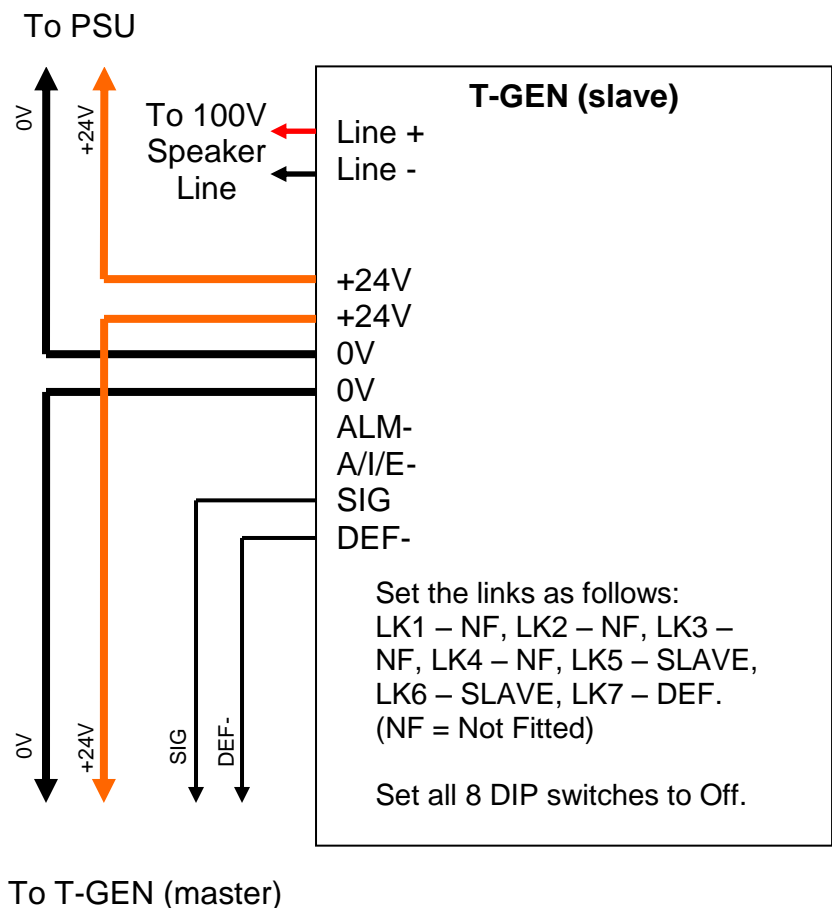
Figure 24. Wiring the T-GEN Slave

The SIG and DEF- inputs on the slave must be connected to the SIG and DEF- inputs on the master T-GEN respectively.

The 2nd 100V speaker line is connected to the slave T-GEN 100V Line + / Line – terminals.

IP Networking Using Barix Modules

The BOWS supports streaming audio over IP Networks using the BARIX Audio-over-IP modules. There are many possible configurations that can be used, depending on the application. Please refer to the BOWS IP Networking Manual (LT0561) and the BARIX website (www.barix.com) for further details.

One typical application is to use the BARIX modules to allow a master BOWS to make emergency PA announcements to 1 or more slave BOWS connected together on a LAN.

For this application an Annuncicom 200 is used in the master BOWS and either an Annuncicom 200 or Exstreamer 100 at each slave BOWS as shown in Figure 25.
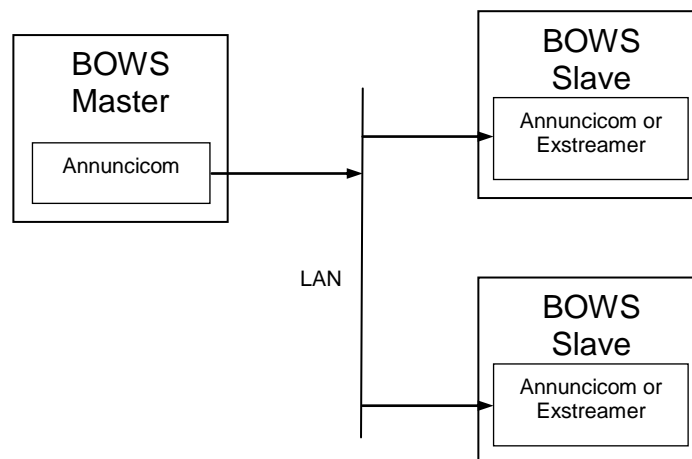

Figure 25. Master BOWS connected to multiple slave BOWS

At the master BOWS the Annuncicom 200 is connected to the BOWS Interface board as per Figure 26. The J15 *TO T-GEN MICROPHONE* signals from the BOWS Interface board are connected to both the T-GEN master J1 MIC input connector and to the Line Level and Input 0 inputs on the Annuncicom 200.
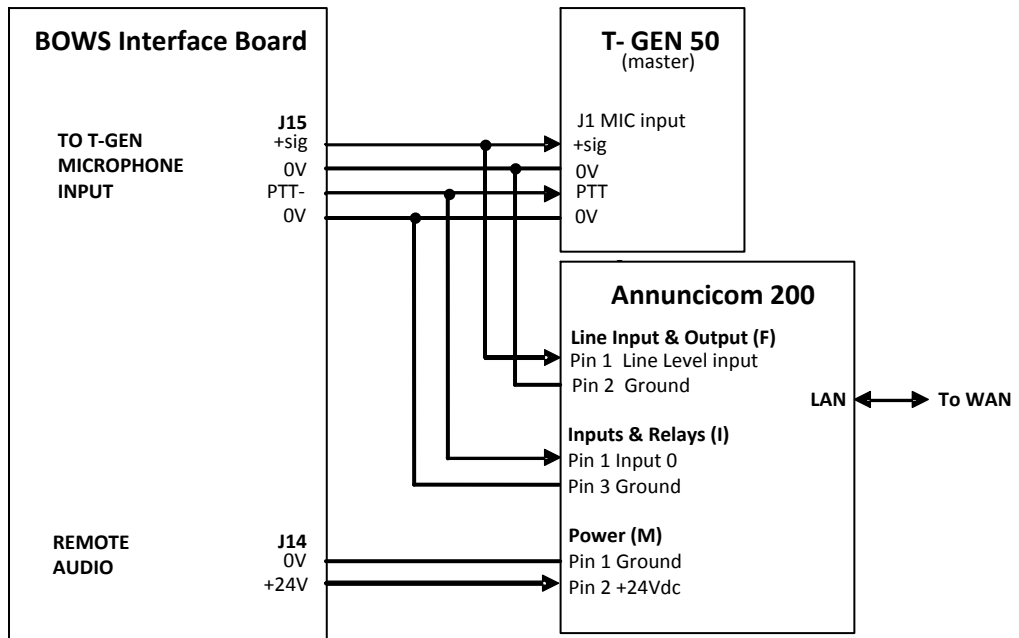
Figure 26. Annuncicom Wiring at the master BOWS

An Annuncicom 200 or an Exstreamer 100 is used at each slave BOWS. As the Exstreamer is generally less expensive it would normally be used at the slave BOWS.

Figure 27 shows how to wire an Exstreamer 100 to the BOWS Interface board at a slave.
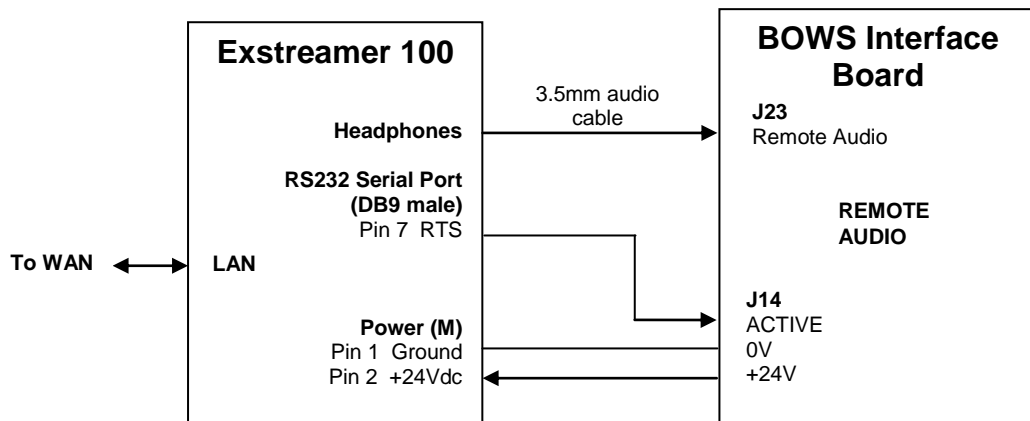

Figure 27. Wiring an Exstreamer 100 to the Slave BOWS Remote Audio Input

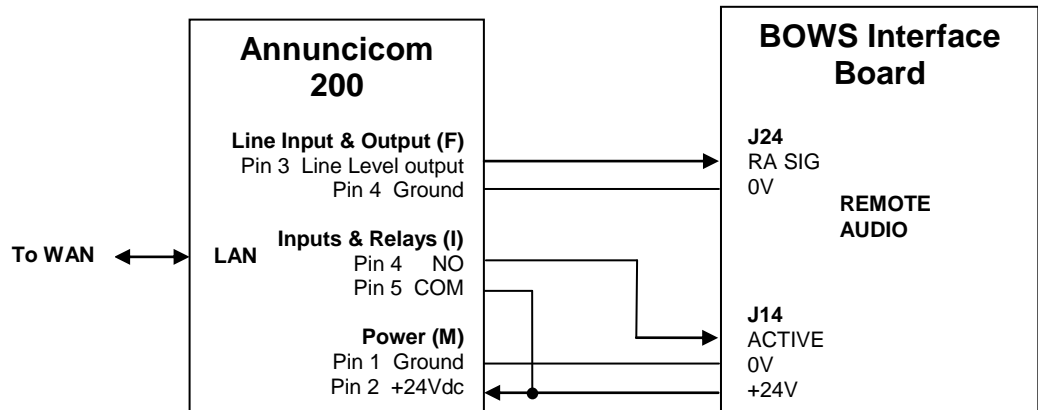Figure 28 shows how to wire an Annuncicom 200 to the BOWS Interface board at a slave.

Figure 28. Wiring an Annuncicom 200 to the Slave BOWS Remote Audio Input.

The Annuncicom 200 in the master is configured to broadcast audio to the modules in the slave BOWS when its Input 0 input is activated (by the BOWS emergency PA Mic's PTT switch). The master Annuncicom 200 is also configured to activate the output relay on Annuncicom 200 or the RTS output on the Exstreamer 100 module at the slave BOWS. This output is used to control the ACTIVE signal on the Remote Audio port.

If the PA announcements are not required to override the Alert/Evacuation tones at the slave BOWS, the audio output of the module can be connected to the background music input on the Slave BOWS as shown in Figure 29.
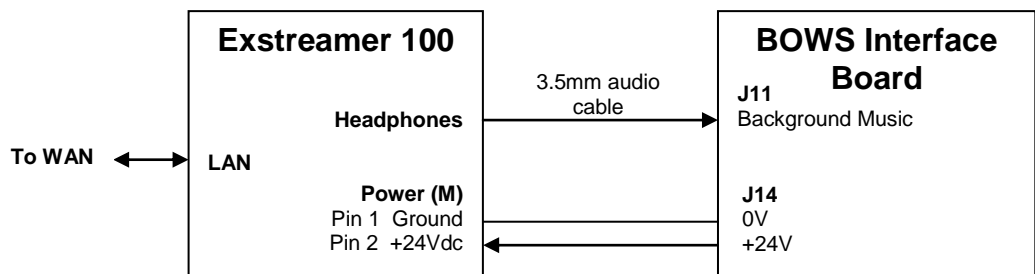

Figure 29. Wiring an Exstreamer 100 to the Slave BOWS Background Music Input

Please refer to BOWS IP Networking Manual (LT0561) for further details, including configuration of the BARIX modules.

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Chapter 5
Diagnostics

AUDIO FAULT or POWER SUPPLY FAULT LED On

The BOWS has two fault indicators on its front panel: Audio Fault and Power Supply Fault. If either of these two LEDs are on check the following to determine the source of the fault.

AUDIO FAULT On

The BOWS AUDIO FAULT LED is turned on steady if:
- T-GEN 50 (master or slave) is in fault, or
- SDM-4 (if fitted) is in fault.

If a master T-GEN FAULT LED is on check the following:
- 100V line open or short circuit
- 56k (or 2 x 100k) EOL resistor missing from the end of the 100V line
- Alarm I/P monitoring turned on (T-GEN SW4 On) and EOL resistor missing or cable fault on wiring to the BOWS ALM- input
- SIG wire between the master and slave T-GEN faulty
- T-GEN Amplifier faulty or over loaded.

If a slave T-GEN FAULT LED is on check the following:
- 100V line open or short circuit
- EOL resistor missing from the end of the 100V line. Note that on the 100W BOWS a 56k EOL resistor is fitted directly across the 100V line terminals of the slave T-GEN
- SIG wire between the master and slave T-GEN faulty
- T-GEN Amplifier faulty or over loaded.

The SDM-4 card has an O/C and S/C FLT LED per speaker zone (100V Line).
If one or more yellow fault LEDs on the SDM-4 are turned on check:
- O/C FLT LED: 100V line open circuit or EOL resistor missing on the indicated zone
- S/C FLT LED: Short on the indicated zone.

AUDIO FAULT Flashing

- Single flash: Faulty BOWS Interface board (replace).
- Double flash: Check the link settings on the BOWS Interface board (invalid setting)

POWER SUPPLY FAULT On

This indicates a fault on the power supply or the battery. Check:

- The configuration of the power supply's DIP switch is correct (normally set to: 1-Off, 2-Off, 3-On, 4-Off, 5-On, 6-Off, 7-On, 8-Off)
- Fault LED on the power supply. When a fault is present, this will flash seven or eight times then pause, repeatedly. Each flash will be short if a particular fault is not present, or long if the fault is present, indicating the following in order - Charger High, Charger Low, Battery Low, Battery Test Fail, Battery Disconnected, Battery Low Capacity, Mains Failed, Earth Fault. A temperature sensor open or short circuit is indicated by Charger High and Charger Low indications at the same time.

No or Low Audio Level

Note that the audio sources are disabled when the Evacuation Control switch is in the ISOLATE position.

The background music, remote audio and paging inputs on the BOWS Interface board have individual volume controls. Check that the volume control is set correctly (turn clockwise to increase the volume).

For the Remote Audio port check that the external audio source is pulling the Active signal above 2V on the BOWS Interface Board to enable the input.

For the Paging port check that the wiring to the paging console is correct and the volume is correctly adjusted on the paging console. Note that at least one zone must be selected on the console to make a paging announcement.

Chapter 6
Specifications

	FP1021 50W BOWS	FP1022 100W BOWS
Power		
Mains Voltage	230/240Vac	
Battery Voltage & Size	24V 17 Ahr	
Current (24V Supply)	FP1021 50W BOWS	FP1022 100W BOWS
Quiescent		
Base unit	95mA	140mA
With FP1023 Zone Paging option and paging console	155mA	200mA
With FP1024 Zone Paging option	115mA	160mA
Active - 50W/100W at 27Vdc	2.3A	4.5A
100V Line Output		
Line Power – Tones	50W rms	100W rms
- Audio	25W rms	50W rms
AC (Tones)	100V rms	
DC (Supervision)	2.5V (56k EOLR 5.5V (O/C))	
Supervision	Yes	
EOLR - 1 Branch	56k 0.4W	
- 2 Branches	100k 0.4W	
SDM-4 100V Line Output		
Number of line outputs	4	
Max speaker load per line output	40W	
Supervision per line output	Yes	
EOLR	47K 0.4W	
Alarm Input		
Levels	O/C = Fault 3V – 5V (if supervision enabled) 3k3 – 10k = Normal 1V – 3V S/C = Alarm 0V – 1V	
Input Current	0.7mA at 0V	
Fault Output		
FLT-	Normal: FLT- = O/C, Fault: FLT- = 0V ELV only 30V, 2Adc max	
COM, NO, NC	Normal: COM = NO, Fault: COM = NC Voltage free contacts, ELV only 30V, 2Adc resistive max; 30V, 1Adc inductive max	
Audio Inputs		
Background Music	Non-isolated. Input impedance: 10k	
Remote Audio	0.2Vrms min – 1Vrms max for full power	
Remote Audio ACTIVE input	(see table below)	
Paging	Isolated. Input impedance: 600Ω 0.2Vrms min – 1Vrms max for full power	
A4485 Paging Console		
Supply	24Vdc	
Current	Quiescent: 40mA, Audio Active: 100mA	
Audio Cable	CAT5, 300m maximum length	
Physical		
Cabinet Dimensions	440mm (H) x 550mm (W) x 210mm (D)	
Weight (excluding batteries)	20kg	
Material	1.2mm mild steel	
Colour	Powdercoat BFF-998-CW Cream Wrinkle	
IP Rating	IP41	
Environmental	-5˚C to 45˚C, 0 to 95% RH (non-condensing)	

Remote Audio ACTIVE input:

	ACTIVE LOW link	
Input Level	No	Yes
Inactive	-30V to +2V	+1V to +30V
Active	+2V to +30V	-30V to +1V
Input impedance: 56k to 0V		

Standards Compliance	
CISPR22	Class A
AS1670.1	Designed to comply with AS1670.1 clause 3.22(b)

Part Numbers	
FP1021	BOWS 50W
FP1022	BOWS 100W
FP1023	BOWS Zone Paging Kit C/W SDM-4 and Paging Console
FP1024	BOWS Emergency Mic Zone Paging Kit C/W SDM-4 and Zone Selector Switch
PA0766	T-GEN 50 for FP1021 or as spare part
PA1090	BOWS Interface Board spare part
ME0476	PSU spare part – keep loom in BOWS that plugs into J7 of PSU