

# Mini-Gen

## Multi Tone Generator

### INSTALLATION AND OPERATING INSTRUCTIONS

#### PA0895 Mini-Gen - 24V

Mini-Gen is a self-contained tone generator that produces a 100Vrms "Line" output for powering suitable 100V line loud speakers. It has been designed to connect directly to fire alarm panels, but may be connected to other suitable panels. It utilizes the fire alarm panel's output supervision (e.g. Bells) to supervise the wiring (from the panel to the unit and from the unit to the speakers) for open and short circuit faults.

Mini-Gen is available in 2 versions: PA0894 for 12V Operation; PA0895 for 24V Operation. (Refer to LT0257 for 12V instructions).

**Note:**

The first release of Mini-Gen (Oct 2000) had version V1.00 software which produces only the AS2220 Evacuate tone and ignores the selection links. The second release (March 2001) has version V2.00 software which allows link selection of: AS2220 Alert; AS2220 Evacuate; 1 minute auto changeover of Alert to Evacuate; 3 minute auto changeover of Alert to Evacuate; and RH3.

**Operation**

A functional diagram is included in Fig 2. Mini-Gen has no control input. It illuminates its green "ON" LED and generates the selected tone whenever power is applied to the DC IN terminals. With power reversed it draws no current. Tone selection (for V2.00 and higher software) is by fitting 2 mini-jumpers V-Z & A-B, allowing up to 10 tones. The tone selection links may be changed while Mini-Gen is running and the new selection will take effect at the end of the tone cycle in progress. If the 100V line is over-loaded (e.g. short circuit), Mini-Gen will stop generating the tone and illuminate the yellow LED until the overload is removed.

**Connection and Fault Monitoring**

The simplest method of connection is 2-wires in, 2-wires out. This is ideal for unsupervised alarm system outputs, and those supervised by polarity reversal (FP4000, Bell Monitor Bd, F3200 Bells). For these the 2-W (2 Wire) supervision link must be fitted. Refer to Figs 1 & 2.

Removing the 2-W mini-jumper link allows use of the dedicated Supervision terminal on Mini-Gen for a 4-wires in, 2-wires out supervised connection to a panel with clean relay contacts and a separate supervision input (as with F08 Ancillary, F3200 Anc 1 & 2, 8RM, F4000 Ancil, ARR and IOR). See the following pages for detail. The fire alarm panel supervises the 100V speaker line while the output is not active.

Capacitively coupled 100V line speakers must be used, and the appropriate end-of-line resistor (EOLR) must be installed at the end of the speaker run and sometimes at the input to Mini-Gen itself. The speaker circuit end-of-line resistor must be capable of handling 100Vrms. For values below 27k this will need to be a higher power device. The power dissipated in the 100V EOLR must be included in the total load calculations.

The capacitors must be bipolar, rated at 10V minimum, and their value should be 1 - 5uF per Watt of their speaker's load (see below), though may be higher (but this will increase the Fault delay after turnoff). Note that for capacitors connected in parallel the values add.

Speaker Load	0.33W - 0.5W	1W - 5W	10W - 20W
Recommended Capacitor	1uF	10uF	33uF

**Table 1  
Speaker Capacitor**

Bipolar capacitors available from are: CA0624 10uF, 63V; CA0623 33uF, 25V.

Due to the charge time of the blocking capacitor at each speaker, a supervision defect/fault condition may occur each time Mini-Gen is de-activated (e.g. after sounder test). This will clear and can be reset after a few seconds. A label to this effect is included to stick in the panel as a reminder.

For FP4000, Bell Monitor Bd and F3200 Bells which provide supervision of up to three branches, the following combinations are possible. Fit the 2-W Supervision link on the Mini-Gen. Where an EOLR is fitted to the Mini-Gen it is fitted to the DC Looping terminals of the last unit (i.e. furthest from panel). Refer to Fig 1.

Number of Mini-Gens	EOLR on DC Terminals	Number Spkr Line Branches per unit	EOLR on Each Branch
1	2 x 27k (10k) in parallel	1	27k (10k)
1	27k (10k)	2	27k (10k)
1	-	3	27k (10k)
2	27k (10k)	1	27k (10k)
2	-	1 & 2 (3 total)	27k (10k)
3	-	1	27k (10k)

**Table 2  
Branch Supervision**

(10k 2W applies to F3200 Bells). For more than 3 branches, multiple Bell Monitor Bds can be used, but check total loading of relays and fuses.

**Mini-Gen Specifications (PA0895)**

Board Dimensions: 93mm x 67mm. Height 36mm from bottom of pcb.  
 Mounting Pattern: Ø4.0 x 4, 83mm x 57mm, 4 standoffs supplied for Ø6.0 in 0.8-1.6mm sheet metal. Height 9.5mm.  
 Shipping Weight: 0.25kg.  
 Temperature: Operating 0°C – 45°C Storage 0°C – 70°C.  
 Humidity: 0% to 95% RH (non-condensing).  
 Operating Voltage: 18 – 29Vdc.  
 Operating Current: 0.9A @ 27Vdc.  
 Non-operating Current: Nil.  
 Power Output: 20Wrms @ 100V line at 27Vdc, 50nF line capacitance (500m maximum of TPS).  
 15Wrms @ 100V line at 27Vdc, 100nF line capacitance (1km maximum of TPS).  
 Power reduces with reduction of input voltage.  
 Automatic shutdown at 180% nominal overload.  
 Indicators: On (Green), Overload (Yellow).  
 Controls: Select 2-wire or 4-wire input supervision (link 2-W).  
 Tone Selection: Mini-jumper Links (10 combinations of 2 links).  
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## Fire Panel Connections

(Refer to Figs 1, 2 and 3)

### F4000

#### **Main Board**

A single Mini-Gen can be driven by the single pole Ancil Relay. Connect the relay and Ancil supervision as per Fig 2.

- Cut the link on the F4000 Main Board which connects Ancil Supervision to Ancil COM (i.e., disconnect).
- Remove the 2-Wire Supervision link on the Mini-Gen.
- Use a 15k 2W EOLR on the end of the 100V line (dissipates 0.66W).

Only 1 Mini-Gen with one speaker line is allowed.

In NZ a 24V Bell Monitor Bd (PA0494) can be used to connect up to 3 branches of speaker line as per Fig 1 and Table 2.

Refer to LT0126, F4000 NZ Technical Manual Section 2.4.2.

#### **RRM**

Use two relays of an RRM with both programmed to operate together. (Similar to Fig 3, but with the RRM having link selectable integral positive voltage supervision to the COM of each relay.) The amount of power drawn from the RRM +24V terminals is limited to 100mA max and by the loop restrictions. This is little more than Mini-Gen's active power with no load, and so is not a practical option.

Where more power is needed an external 24V PSU is required (with a back-up battery and supervision depending on the application). If using the Fire Panel +24V run both +ve and -ve and do not short out part of the responder loop.

- Connect the NO of one relay to 0V supply (PSU -ve), COM to Mini-Gen DC IN -ve, and program this relay for supervision but do **not** fit the link. Use the 3 way housing and crimp terminal supplied to connect the 'S' end pin of the 3 way header on the RRM to the S input terminal on the Mini-Gen.
- Connect the NO of the other relay to +24V supply, NC to RRM 0V, COM to Mini-Gen DC IN +ve, and select this relay as un-supervised.
- Do **not** fit the 2-W Supervision link on the Mini-Gen.

Use a 15k 2W EOLR at the end of the 100V line (dissipates 0.66W). Only 1 Mini-Gen with one speaker line is allowed.

#### **IOR**

Use one relay of a Relay Board and configure the corresponding IOR input for supervision. (Wiring is similar to Fig 2).

The amount of power drawn from the IOR +24V terminals is limited to typically 650mA and by the loop restrictions.

Where more power is needed an external 24V PSU is required (with a back-up battery and supervision for many applications). The PSU -ve must be connected to the IOR 0V for supervision to work.

- Connect the relay NO to +24V supply (PSU +ve), NC to Mini-Gen DC IN -ve, COM to Mini-Gen DC IN +ve, and 0V supply (PSU -ve) to the second DC IN -ve and IOR 0V.

The corresponding IOR input terminal for supervision is connected to SUP+ on Mini-Gen.

- Remove the 2-W Supervision link on the Mini-Gen.
- Use 2 x 15k 2W resistors in parallel as EOLR at the end of the 100V line (dissipates 1.33W).

Only 1 Mini-Gen with one speaker line is allowed.

### F3200

#### **MAF/PSU RELAYS**

The **Bells** relay has integral supervision which supports 1, 2 or 3 branches with 3k3, 6k8, and 10k EOLR values respectively.

See Fig 1 and Table 2, noting that the 10k value applies and that any 10k EOLR connected to the 100V line must be rated at 2 Watts.

Note also that each EOLR on a speaker line dissipates 1 Watt of power, which must be included when calculating the total load.

**Ancillary 1 or 2** relays can also be used, with the Supervision connected as per Fig 2.

- Connect the relay NO to +24V supply, NC to Mini-Gen DC IN -ve, COM to Mini-Gen DC IN +ve, and 0V supply to the second DC IN -ve.
- Connect Anc SUP to SUP+ on Mini-Gen.
- Remove the 2-W Supervision link on the Mini-Gen.
- Use a 15k, 2W EOLR at the end of the 100V line (dissipates 0.66W).

Only 1 Mini-Gen with one speaker line is allowed.

#### **8 Relay Module (8RM)**

Use two relays of an 8RM programmed to operate together. (Similar to Fig 3, but with the module having integral positive voltage supervision to the COM of each relay, link selectable). Alternatively you could fit a 3 way 5mm (or 0.2") pitch connector to the second pole of one relay. parts CN0260 & CN0488 form a suitable, demountable pair. (Each relay has 2 poles, but only 1 set of connectors is fitted as standard.)

- Connect the NO of one relay to 0V supply, COM to Mini-Gen DC IN -ve.
- Connect the NO of the other relay to +24V supply, NC to 0V, COM to Mini-Gen +ve.
- Select supervision on the relay connected to Mini-Gen DC IN -ve only (i.e., fit link in S position).
- Fit the 2-W Supervision link on the Mini-Gen.
- Use a 15k 2W EOLR at the end of the 100V line (dissipates 0.66W).

Only 1 Mini-Gen with one speaker line is allowed.

Alternatively, the single pole of one relay can be used and connection made directly to the supervision input on the 3 way Supervised / Un-supervised (S/U) link. Refer to Fig 2. Remove the supervision jumper altogether, plug a single connector onto the pin furthest from the screw terminals and wire this to the SUP+ terminal of the Mini-Gen. Do not bridge the two 'S' pins on the 3 way link. (A suitable 3-way housing is supplied with two crimp terminals, but requires an appropriate crimp tool and 0.1 - 0.35sqmm wire. Fit the spare terminal to the other end to help hold it on).

Remove the 2-W Supervision link on the Mini-Gen, and use a 15k EOLR as per above.

### F08

#### **Ancillary Relay**

A single Mini-Gen can be driven by the single pole Ancil Relay. Connect the relay and Ancil supervision as per Fig 2.

- Remove the 2-W Supervision link on the Mini-Gen.
- Use a 15k 2W EOLR at the end of the 100V line (dissipates 0.66W).

Only 1 Mini-Gen with one speaker line is allowed.

A **24V Bell Monitor Bd** (PA0494) driven from the Bells relay can be used to connect up to 3 branches of speaker line as per Fig 1 and Table 2. Refer to LT0082, F08 Programming And Installation Manual Section 2.8.2.

## **FP4000**

### **Main Board**

The **Evac** output can be used to connect up to 3 branches of speaker line as per Fig 1 and Table 2.

### **ARR**

Use two relays of an ARR to connect a single 24V Mini-Gen.

Refer to the FP4000 System Manual Section 4.3.4.2 for ARR configuration and programming.

Use a 15k 2W EOLR at the end of the 100V line (dissipates 0.66W). Fit the 2-Wire Supervision link on the Mini-Gen.

Only 1 Mini-Gen with one speaker line is allowed.

## **BELL MONITOR BOARD**

A 24V Bell Monitor Bd (PA0494) can be used to connect up to 3 branches of speaker line as per Fig 1 and Table 2. It is suitable for use with panels with a DEF- (Defect/Fault) input.

(Refer to LT0190 Bell Monitor Data Sheet for details.)

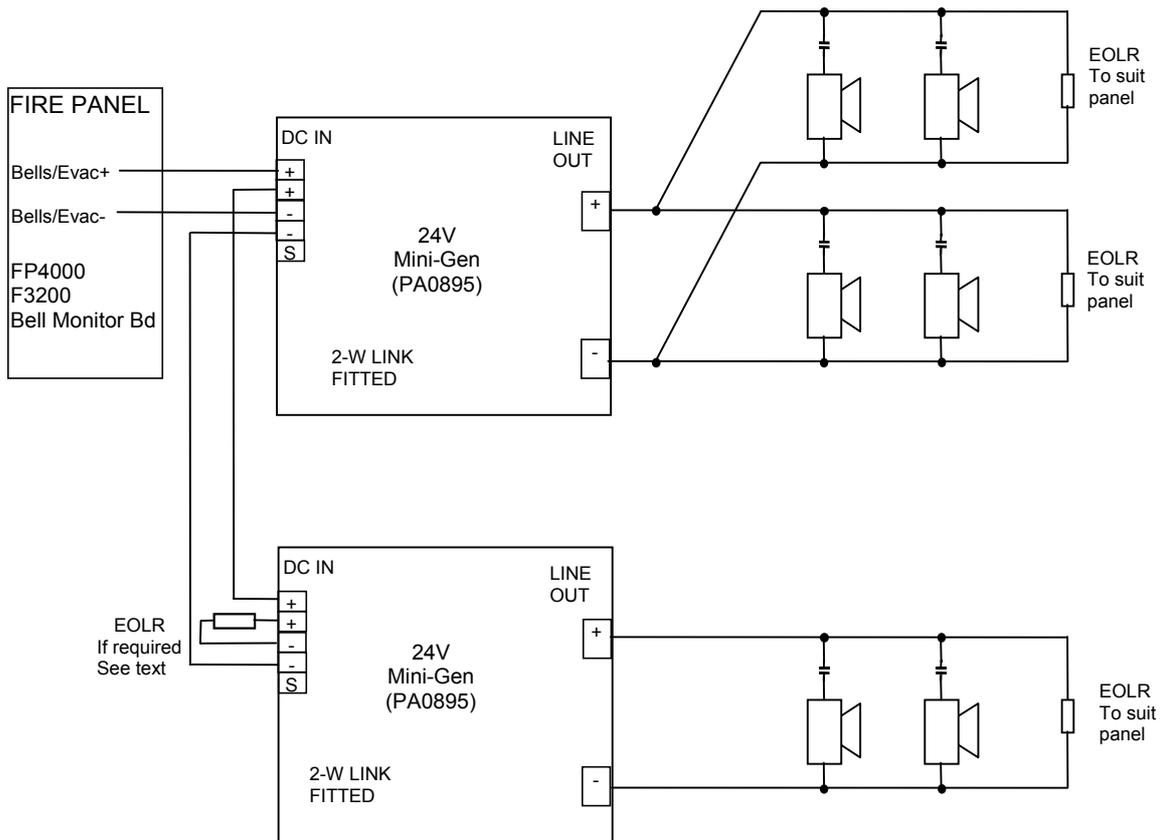
## **100V Speaker Line Wiring**

100V wiring is not SELV and so must be segregated as per the appropriate wiring regulations. Note also the line capacitance limits - Mini-Gen is not designed for driving very long lines. Full 20W output loading is only permitted on lines less than 500m of total cable length (TPS). Shorter distances will apply to highly capacitive cable (e.g. MIMS) - consult the cable manufacturer's specifications.

## **WARNINGS**

Some components on Mini-Gen will get hot when it has been running for a time into a heavy load, especially if a long line is used. This applies mainly to the transformer, which should therefore not be touched.

The current drawn by Mini-Gen must not exceed the fuse rating and the relay rating of the Fire Panel.



**Fig 1**  
**Example of Multiple Branches on Fire Panel with Bell 3 Branch Supervision**

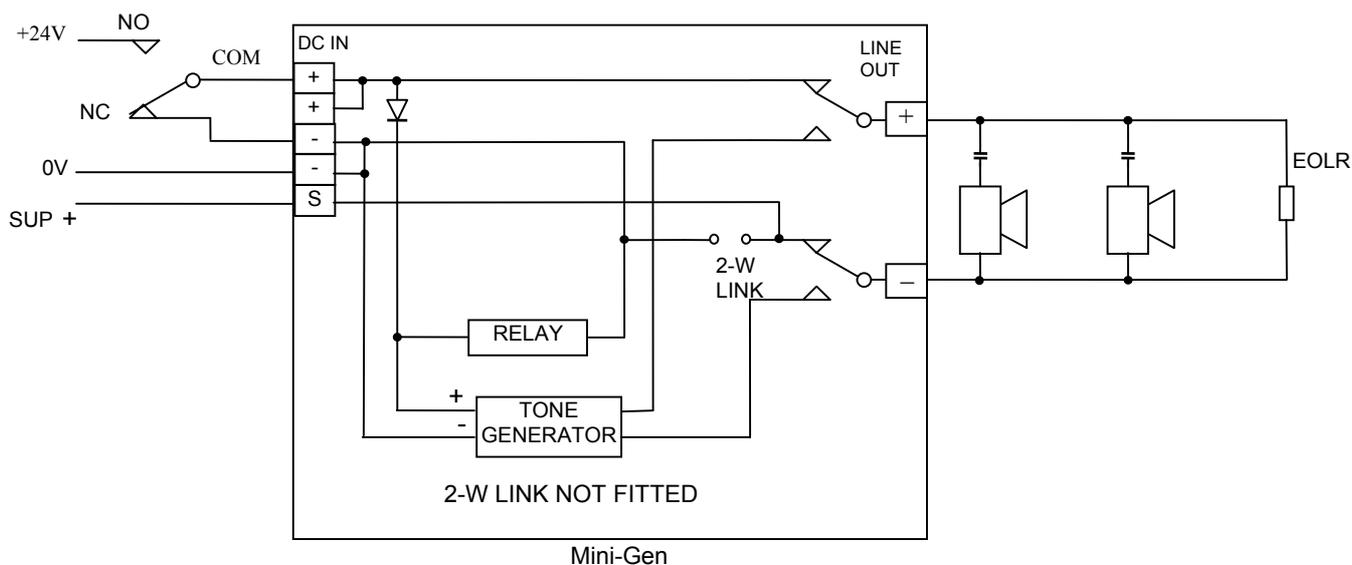


Fig 2  
Mini-Gen Connection With Separate Supervision (single pole / 4 wire)

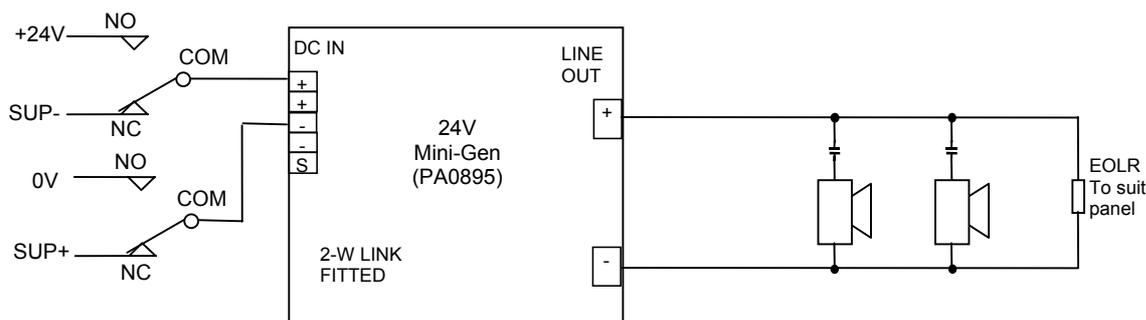


Fig 3  
Mini-Gen Connection For Two Pole With Integral Supervision (2 pole / 2 wire)

**Tone Selection**

Links	V	W	X	Y	Z
A	Evac	RH3	1 min Alert then Evac	(Evac)	(Evac)
B	Alert	(Evac)	3 min Alert then Evac	(Evac)	(Evac)

Position one mini-jumper on V to Z, the other on A or B, as appropriate. For selection V, a separate relay contact connected across the B position 2 pins of link A/B could be used to switch between Alert and Evac. Open = Evac. Use a 3 way 0.1" plug-on connector e.g. CN0313 (for 0.1 - 0.35sqmm stranded wire). **Warning.** Links are unprotected inputs. Use only a local relay, and use anti-static procedures.

**ACCESSORIES INCLUDED WITH PA0895**

PART NO	DESCRIPTION	QTY	WHERE USED
CN0313	0.1" Connector Housing, 3 Way	2	F3200 8RM Supervision, Alert/Evac Link A/B
CN0249	Crimp Terminal for above	4	F3200 8RM Supervision, Alert/Evac Link A/B
HW0130	PBR10 PCB Standoff	4	For mounting Mini-Gen
LB0565	Warning Label	1	Fit to panel door if required
RR0234	15k 2W resistor	2	EOLR for F4000 Main Board Ancil, IOR, FP4000 ARR
RR0762	27k0 1% resistor	3	EOLR for Bell Monitor Bd, FP4000 Evac
RR0839	10k 2W resistor	3	EOLR for F3200 Bells

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