VIGILANT
FIRE & EVACUATION SYSTEMS

MICROVAC
OWNER'S MANUAL

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AMENDMENT LOG

Date	Issue	Description
17 August 1992	Issue 1	Original
16 November 1992	Issue 1.1	Added 2.2.13 External DC Power Input Added Wiring/Setup Diagram
18 April 1995	Issue 1.2	Added Booster Amplifier Wiring, external Power Supply details
1 June 1999	Issue 1.3	Modified High Power Amplifier wiring, added networking.
05 April 2000	Issue 1.31	Cabinet dimensions updated (pages 1-1, 1-6). Networked wiring diagrams added (pages 2-14, 15, 16). Section 0 re-issued.

CHAPTER 1 SYSTEM DESCRIPTION & SPECIFICATION

1.1 OVERVIEW

The Vigilant MICROVAC is a self-contained single zone emergency warning system designed to facilitate the orderly evacuation of a zone in the event of an emergency.

Microprocessor-based, MICROVAC has been designed to perform the functions specified by Australian Standard AS2220.1 (1989) for emergency warning systems in buildings. When used in a standalone mode it contains no facilities for the emergency intercommunication system requirements of AS2220. These are an option in networked systems.

The MICROVAC emergency warning system generates the emission of audible warning signals throughout the zone via loudspeakers. In areas where the background noise level is high, the loudspeakers can be supplemented by the use of visible warning strobe lights.

Two standard 25W versions are available, wall mounting (FP0530), and rack mounting (FP0533). The rack mounting version is designed for integration within a Fire Panel, and to use the Fire Panel's power supply.

In addition models are available with integrated 100W or 200W booster amplifiers.

All models may be supplied with or without networking facilities. Networking enables a Microvac to be integrated with a QE90 system and controlled by one or more QE90 ECPs.

The product line-up and part numbers are given below.

Networked	Power	Mounting	Part Number	Size H*W*D (mm)
No	25W	Wall	FP0530	555*380*125
No	25W	Rack	FP0533	133*483*275
No	100W (1.5A PSU)	Wall	FP0626	440*550*211
No	100W (6A PSU)	Wall	FP0598	440*550*211
No	200W (6A PSU)	Wall	FP0599	750*550*211
Yes	25W (1.5A PSU)	Wall	FP0762	750*550*222
Yes	100W (6A PSU)	Wall	FP0763	750*550*222
Yes	200W (6A PSU)	Wall	FP0764	885*575*380

WIP facilities can be added to the networked versions in two ways (separately or combined).

Firstly a single WIP can be connected to the ECM module and used as a WIP for that zone. Picking up this WIP will automatically call the programmed ECPs in the system. The WIP may be called from these ECPs.

Secondly an 8 circuit WIP module (or more depending on the cabinet size) may be installed in the Microvac to provide up to 8 field WIPs. In addition a WIP connected to the ECM module may be used as a Master WIP. All these WIPs may be called from designated ECPs in the network, and may call to these ECPs. Calls from the field WIPs may in addition be answered by the Microvac master WIP. However as there are no WIP controls at the Microvac it is not possible to call the field WIPs from the Microvac master WIP.

1.2 SYSTEM CONCEPT

MICROVAC is a single zone EWS unit, contained in a wall mounting cabinet with the electronic functions located on a two PCBs, the Main PCB and the Keyboard/Display PCB. High Powered versions and networked versions contain additional PCBs.

Figures 1.1 - 1.4 show block diagrams of the various MICROVAC control units.

The Main PCB provides tone generation, visual alarm output (strobes), 100V line output, FIP and BGA inputs, auxiliary control inputs, auxiliary audio inputs, and BGM attenuator override and fault relay outputs.

The Keyboard/Display PCB provides the switches and LEDs for the front panel.

A microprocessor located on the Main PCB handles all control tasks. In AUTO mode it monitors the FIP and BGA control inputs for activation. If one is activated then the beeper will sound and if an "Initial Delay Before Alert" has been set this delay will occur and then the ALERT tone(and optional speech message) will be generated on the 100V speaker lines and the ALERT strobe output will be activated. This will continue for the "Alert to Evacuate Delay" time, then the EVACUATE tone and speech message will be generated, and the EVACUATE strobe output will be activated.

At any time, MANUAL mode may be selected from the front panel, and ALERT, EVACUATE and PA may be manually controlled.

The warning signals are prioritised so that PA Speech is highest, Evacuate next highest, and Alert lowest.

The microprocessor also monitors the control inputs, speaker lines, strobe lines, and the amplifier and battery charger for fault conditions.

Non emergency functions of Paging and Background Music are also provided. These are over-ridden in the event of an emergency.

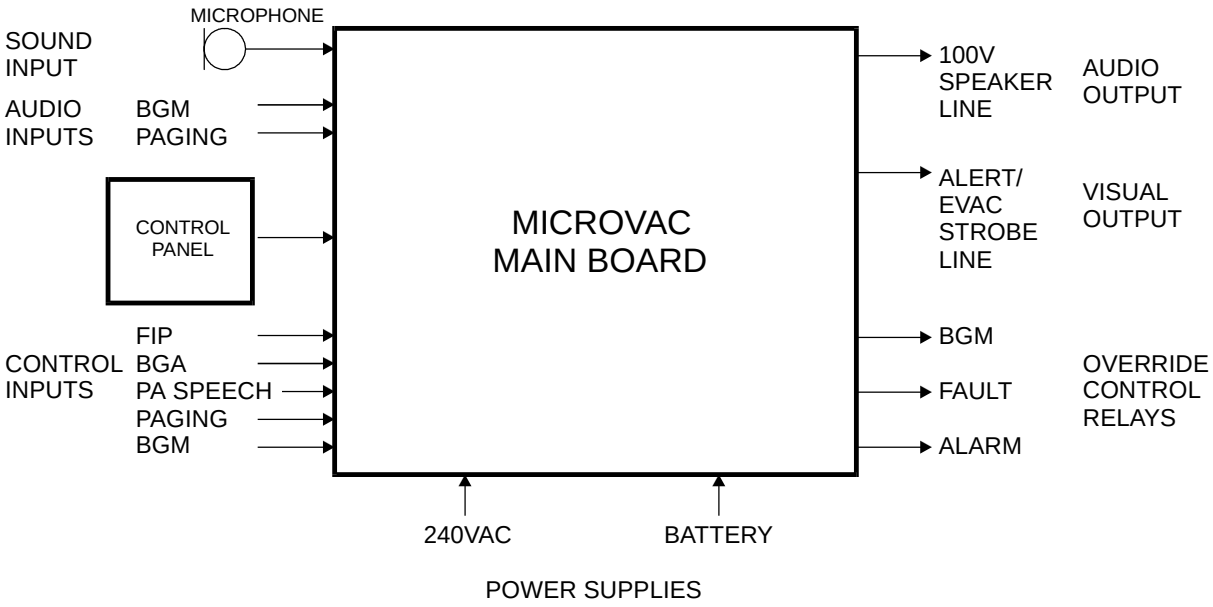


FIGURE 1.1
STANDARD MICROVAC CONTROL UNIT

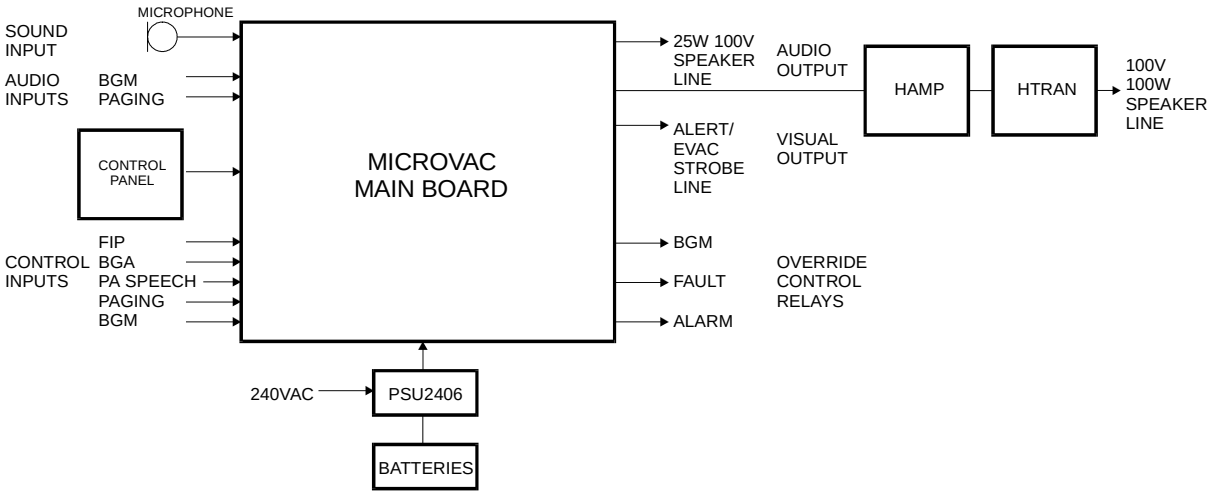


FIGURE 1.2
100W MICROVAC CONTROL UNIT

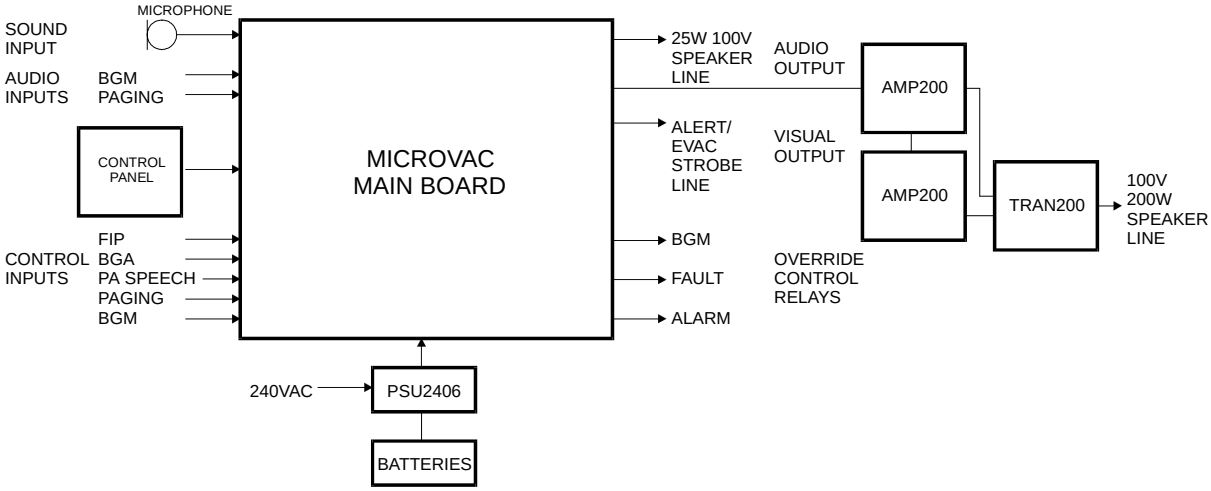


FIGURE 1.3
200W MICROVAC CONTROL UNIT

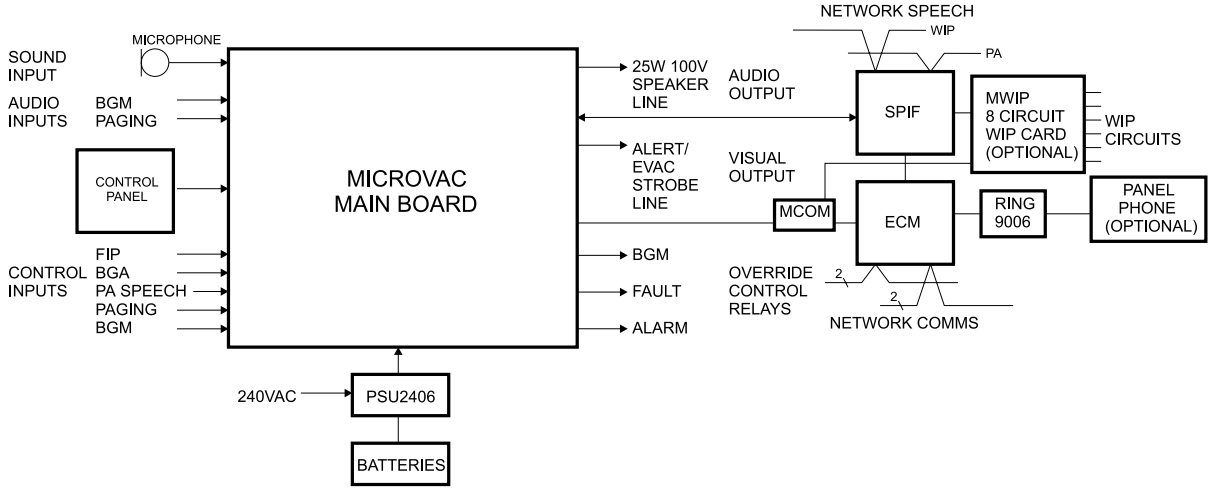


FIGURE 1.4
NETWORKED MICROVAC CONTROL UNIT

1.2.1 OPERATOR FUNCTIONS

MICROVAC contains the following operator functions -

AUTOMATIC - MANUAL - ISOLATE keyswitch.

This keyswitch defines MICROVAC's operating mode - AUTOMATIC for normal use, MANUAL for manual control of an evacuation (or manual announcements after a false alarm), and ISOLATE for test and training use.

PA Pushbutton.

In conjunction with the PTT button on the microphone, this pushbutton selects the PA (Speech) signal while in the Manual mode.

EVACUATE Pushbutton.

This pushbutton selects the EVACUATE signal while in the Manual mode.

ALERT Pushbutton.

This pushbutton selects the ALERT signal while in the Manual mode.

LAMP TEST Pushbutton.

This pushbutton can be used to test the indicators and beeper.

1.2.2 EMERGENCY WARNING AND AUXILIARY FUNCTIONS

1.2.2.1 Audio Functions

MICROVAC generates the standard ALERT and EVACUATE tones and a stored digital voice message. It contains a 25W RMS power amplifier and 100V line transformer to distribute the signals to external loudspeakers within the zone. Models are also available with 100W or 200W booster amplifiers fitted.

1.2.2.2 Control Inputs

MICROVAC monitors two control input lines for emergency functions, FIP and BGA, and two for non-emergency functions, PAGING and BACKGROUND MUSIC.

1.2.2.3 Visual Alarm Functions

MICROVAC provides facilities for controlling a pair of visual alarm lights (strobes) via two wires (one pair) to the Strobe Termination module STBT9008. This output is current limited to 0.9 amps.

1.2.3 POWER SUPPLY

The wall mounting MICROVAC contains its own power supply with a temperature-compensated battery charger for charging its 24V batteries. The batteries are protected by a 5 amp slow blow fuse mounted on the Main PCB.

Monitoring of the battery voltage is carried out to detect charger voltage out of specification, battery low, and battery fail fault conditions.

100W and 200W versions are fitted with a PSU2406 6 amp supply for charging the batteries.

1.3 SPECIFICATIONS

1.3.1 GENERAL

Mains Supply:	240Vac @ 50Hz, +6% -10%, 100VA (Not applicable to Rack Mounting model FP0533)
Power Supply/Charger:	27.3 Vdc* nominal at 20° C (Adjustable)
Rated Current:	Standard Models 1.5 Amps minimum (Typically 2.2 Amps) High Power Models 6A nominal
Charger High Threshold:	28.15 ± 0.25 Vdc*
Charger Low Threshold:	26.45 ± 0.25 Vdc*
Battery Low Threshold:	24.10 ± 0.25 Vdc*
	* Temperature compensated, -36mV / °C
Battery Fail Threshold:	19.25 ± 0.25 Vdc
Battery Requirements:	24V nominal, sealed lead acid, capacity to meet AS2220.2. See Appendix A. Sizes up to 9.5Ah fit inside FP0530 cabinet.
Operating Temp:	-5°C to 45°C
Operating Humidity:	10% to 95% RH non-condensing
System Capacity:	1 Zone
Current Consumption:	All figures typical @ 27.3 Vdc

Standard Models, 25W output.

Quiescent (no BGM):	0.21A
Full Load (sinewave):	2.1A
Full Load (tones):	1.6A
No Load (tones):	0.45A

100W Amplifier fitted.

Quiescent (no BGM):	0.3A
Full Load (sinewave):	7A
Full Load (tones):	5A
No Load (tones):	0.8A

200W Amplifier fitted.

Quiescent (no BGM):	0.4A
Full Load (sinewave):	14A
Full Load (tones):	10A
No Load (tones):	1.3A

Note : Any strobe or auxiliary load currents must be added to the above figures.

1.3.2 CABINET

(a) Wall Mounting Microvac FP0530

Type:	Wall mounting, outer door hinged on the right
Material:	1.2mm Mild Steel
Size:	555(H) x 380(W) x 125(D) mm
Mounting Holes:	4 x 8mm diameter positioned 450 (H) x 300 (W) mm
Cable Access:	4 x 20mm diameter knock-outs in case bottom and bottom
Weight:	14 kg (without batteries)
Colour	Cream Wrinkle Powdercoat
IP rating:	IP51

(b) Rack Mounting Microvac FP0533

Type:	19" Rack Mounting
Material:	1.6mm Mild Steel
Size:	133(H) (3 Rack Units) x 483(W) x 275(D) mm
Colour	Grey Gloss

(c) 100W Microvac FP0626 (with 1.5A PSU) and FP0598 (with 6A PSU)

Type:	Wall mounting, outer door hinged on the left
Material:	1.6mm Mild Steel
Size:	440(H) x 550(W) x 211(D) mm
Colour	Cream Wrinkle Powdercoat

(d) 200W Microvac FP0599

Type:	Wall mounting, outer door hinged on the left
Material:	1.6mm Mild Steel
Size:	750(H) x 550(W) x 211(D) mm
Colour	Cream Wrinkle Powdercoat

(e) 25W Networked Microvacs FP0762 (with 1.5A PSU) and 100W Network Microvac FP0763 (with 6A PSU)

Type:	Wall mounting, outer door hinged on left
Material:	1.6mm Mild Steel
Size:	750(H) x 550(W) x 222(D) mm
Colour	Cream Wrinkle Powdercoat

(f) 200W Networked Microvac FP0764 (with 6A PSU)

Type:	18U Rack cabinet, outer door hinged on either side
Material:	1.6mm Mild Steel
Size:	885(H) x 575(W) x 380(D) mm
Colour	Cream Wrinkle Powdercoat

1.3.3 INPUTS & OUTPUTS

Control Inputs: FIP, BGA
Input Type: Clean Contact

Monitoring: 15k End of Line Resistor
If DIP Switch 2:2 is ON -

Short Circuit	(< 8k2)	= Alarm
15k nominal	(12k - 27k)	= Normal
Open Circuit	(>56k)	= Fault

If DIP Switch 2:2 is OFF -

Short Circuit	(<1k)	= Fault
7.5k nominal	(2k7 - 8k2)	= Alarm
15k nominal	(12k-27k)	= Normal
Open Circuit	(>56k)	= Fault

Description: These two inputs, in AUTOMATIC mode, will initiate the evacuation of the building. They are latching in AUTOMATIC mode i.e. once the input is recognised the evacuation sequence will continue even if the input returns to its normal condition.

Control Inputs: PAGING, BGM/AFTER-HOURS
Input Type: Clean Contact
Description: These two inputs are used to select the auxiliary audio inputs, and the BGM/AFTER-HOURS input can alternatively be used to switch to the after hours mode of operation. See sections 2.2.9 and 2.2.10.

Audio Inputs: BGM, PAGING, AUX
Input Type: Balanced Line Input

Level: 0.3 - 2.0 V RMS (Individual attenuators)

Description: These auxiliary audio inputs are selected as described in sections 2.2.9 and 2.2.10. They are disabled in the event of mains failure.

Auxiliary Outputs: BGM Override, Fault, Alarm.

Type: Single Pole Change-over Relay

Rating: 1A @ 30 Vdc

Normal state:

Alarm :	Normally de-energised
Fault,BGM override :	Normally energised

Visual Alarm Output: Alert and Evacuate Strobes
0.9 Amp available at battery voltage - 7V.
Open and short circuit monitored - 2.7k ohm EOL resistor contained in STBT9008 module

1.3.4 AMPLIFIER CHARACTERISTICS

Output Type:	100 Volt Line	
Power:	Standard Model	25W RMS @ 1KHz Sine wave input
	100W Models	100W RMS @ 1KHz Sine wave input
	200W Models	200W RMS @ 1KHz Sine wave input
Bandwidth (±1dB):	100Hz - 10KHz	
Distortion:	< 2%	
Signal-to-Noise Ratio:	Better than 60dB	
Alert Signal:	As defined in AS2220.1 420Hz repetitive square wave. Initial tone burst 50dB below max output, then 5 successive tone bursts in 10dB steps until maximum output level. Optional 5 second verbal message interspersed.	
Evacuate Signal:	As defined in AS2220.1 Frequency modulated square wave 500Hz to 1200Hz with interspersed 5 second verbal message. (Verbal message may be 10 seconds if no verbal message on alert signal.)	
Tone Priority:	PA Speech (Highest) Evacuate Tone Alert Tone Paging Background Music	
Speaker Line Monitoring:	Open circuit and short circuit monitored with 56k ohm EOL resistor	

CHAPTER 2 INSTALLATION, WIRING, SETUP & COMMISSIONING

2.1 INSTALLATION

The MICROVAC control unit should be mounted on a wall in a location convenient to the provision of:

- 240V Mains
- Speaker & Strobe Cabling
- FIP and BGA interconnection cabling
- BGM and PAGING interconnection cabling if required
- Easy Operation
- It is desirable to allow the door to open fully to allow easy access inside the cabinet.

2.2 WIRING

2.2.1 MAINS

240V Mains wires into the unit via one of the cable entry holes in the top or bottom of the case.

Mains earth terminates on the earth stud and phase and neutral on terminals 2 and 3 of the Mains ON/OFF switch respectively. On models with a PSU2406 fitted, mains connects to the mains cord fitted to the PSU2406.

2.2.2 BATTERIES

For the FP0530, FP0533, and FP0626 (which use the Microvac main board PSU) a 24V battery must be connected to screw terminals J5 and J6.

J5 Battery +ve
J6 Battery -ve

For the remaining models (which use a PSU2406) a 24V battery must be connected to the battery leads of the PSU2406

Red Battery +ve
Black Battery -ve

2.2.3 AUXILIARY 24V OUTPUT

The internal 24Vdc supply is available on screw terminals J7 - J10:

J7 +24Vdc (Unprotected - for voltmeter)
J8 0V
J9 +24Vdc (Fused - for auxiliary loads)
J10 0V

2.2.4 FAULT RELAY OUTPUT

The fault relay output is available on screw terminals J21, J22 and J23. It is normally energised and drops out on the existence of one or more fault conditions in the MICROVAC control unit or its monitored lines. The relay contacts can be used to send the fault condition to a monitoring system or other annunciation device.

The contacts are rated at 1A @ 30Vdc and any external relay or inductive load must be clamped for transient suppression.

J21 Fault Relay Normally Open
J22 Fault Relay Normally Closed
J23 Fault Relay Common

Note The relay is normally energised so the NC terminal will be connected to common when a fault is present.

2.2.5 STROBE OUTPUT

The strobe output must be terminated with either a 2k7 resistor (factory fitted) or with an STBT9008 Strobe Terminator module (Part number PA0668) if strobe lights are to be used.

The strobe line is monitored for short and open circuit faults, thus the need for the end of line device.

The wiring for the strobe output is shown in Fig 2.2.

The cable size should be selected so that minimal voltage loss occurs in the cable during strobe activation. The maximum current is 0.9A and cable voltage drops should be kept below 1V.

J11 Strobe Line -
J12 Strobe Line +

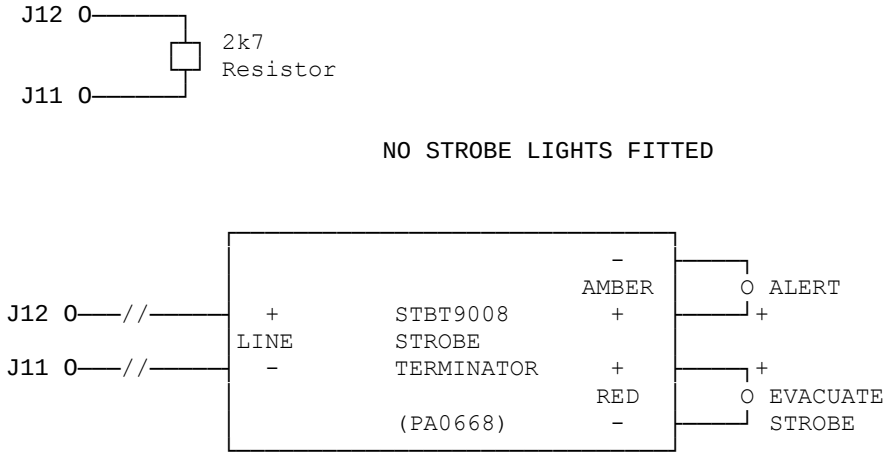


FIG 2.2
STROBE OUTPUT WIRING

If multiple strobe lamps are fitted, a strobe terminator module should be used for each lamp. Remove the 2k7 resistor R4 from all the strobe terminator modules except the last on the line.

2.2.6 BGM OVERRIDE RELAY OUTPUT

A BGM override relay output is provided to control remote level attenuators that may be used to reduce the volume when background music is active.
These attenuators must be by-passed when the Alert, Evacuate, PA Speech, or (non-emergency) Paging functions are selected.

The relay contacts are rated at 1A @ 30Vdc and any external relay or inductive load must be clamped for transient suppression.

J15 BGM Override Normally Open
J16 BGM Override Normally Closed
J17 BGM Override Common

Note The relay is normally energised so the NC terminal will be connected to common when any of the Alert, Evacuate, PA Speech, or Paging functions is selected.

Possible wiring of a remote level attenuator and the BGM override relay is shown in Fig 2.3.

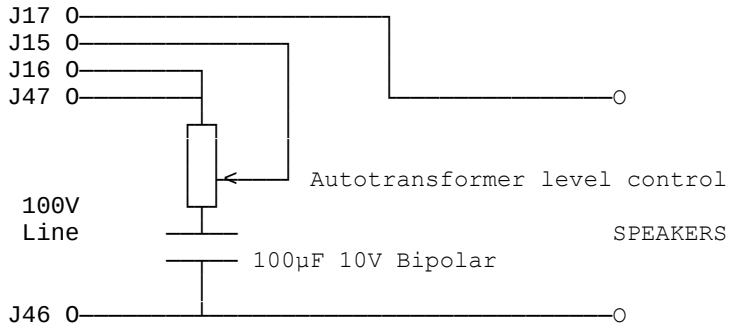


FIG 2.3
BGM LEVEL ATTENUATOR WIRING

2.2.7 ALARM RELAY OUTPUT

An Alarm relay output is provided to indicate that an active FIP or BGA alarm input has been detected.

The relay contacts are rated at 1A @ 30Vdc and any external relay or inductive load must be clamped for transient suppression.

J18 Alarm Normally Open
J19 Alarm Normally Closed
J20 Alarm Common

Note The relay is normally not energised so the NO terminal will be connected to common when one or both of the FIP or BGA inputs is in alarm.

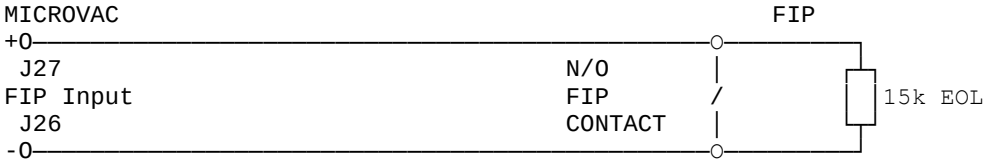
2.2.8 FIP AND BGA INPUTS

The FIP and BGA inputs are designed to be connected to the Fire Panel and one or more Break-Glass-Alarm switches respectively.

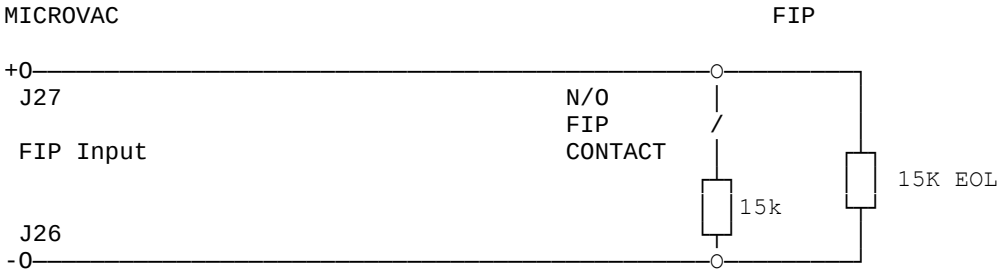
A 15k End-Of-Line resister must be fitted in both cases to allow open circuit fault monitoring. In addition, it is optional to include short circuit fault monitoring. This is controlled by DIP Switch 2:2. If ON, short circuit is alarm, if OFF short circuit is a fault and the alarm condition is obtained by terminating in a resistance of 7.5k. (i.e. a resistance of 15k in parallel with the EOL resistor.)

Note the switch 2:2 position applies to both the FIP and BGA inputs.

The wiring for the FIP input is shown in Figure 2.4, and the wiring for the BGA input in Figure 2.5.



Short Circuit Fault Monitoring not used. (Switch 2:2 ON)



Short Circuit Fault Monitoring used. (Switch 2:2 OFF)

FIG 2.4
FIP INPUT WIRING

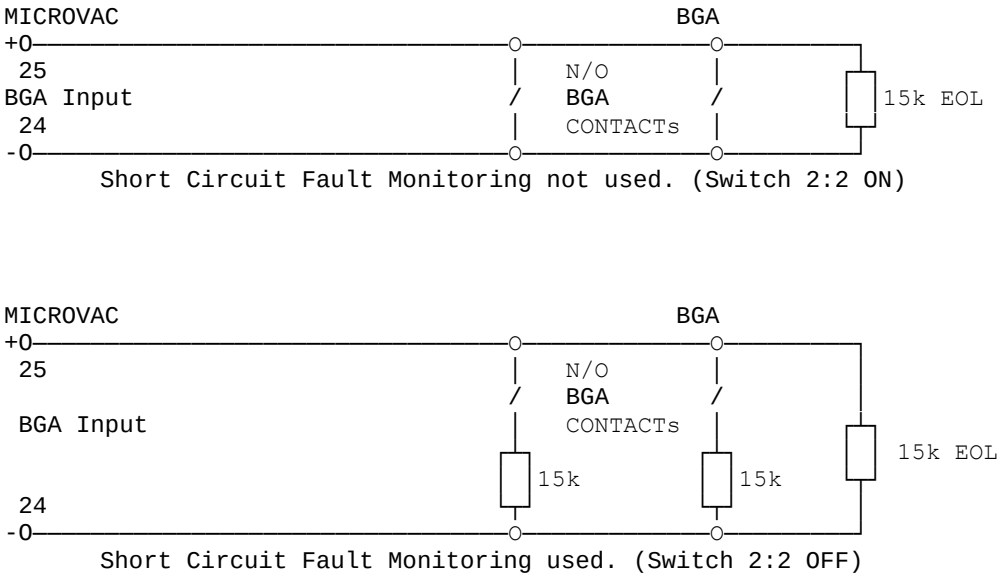


FIG 2.5
BGA INPUT WIRING

Note: FIP and BGA contacts should close to operate the alarm function.
In the case where short circuit fault monitoring is used, no more than 4 switches + resistors may be connected in parallel.

2.2.9 PAGING CONTROL INPUT

To enable the (non-emergency) paging function, it is necessary to connect a switch to connections J28 and J29 on the MICROVAC, and the switch should be wired so that closure indicates that the Paging function is active. This will enable the PAGING audio input provided no emergency functions are active.

If a 15k resistor is connected across the paging control inputs, the AUX audio input will be selected. This could be used for secondary paging, a second channel of music, etc.

2.2.10 BGM / AFTER HOURS CONTROL INPUT.

The function of the BGM / After hours input depends upon the setting of DIP Switch 2:6. If this switch is ON, a contact closure between Connectors J30 and J31 on the MICROVAC will enable BGM.

If DIP Switch 2:6 is OFF, BGM is always selected provided no higher priority function is active, and the input functions as follows -

(a) 6k8 ohm resistor connected across terminals:
This selects the "After Hours" mode of operation, i.e. any Alarm (FIP or BGA) will cause the MICROVAC to immediately generate the EVACUATE tones and speech, bypassing the ALERT phase and any "Delay before action" which may be set.

(b) Short circuit briefly connected across terminals:
This will switch on the Alert signal for a duration of 10 minutes while the MICROVAC is in Automatic.

(c) Nothing connected across terminals:
Normal Operation.

The wiring for this mode is shown in Figure 2.6.

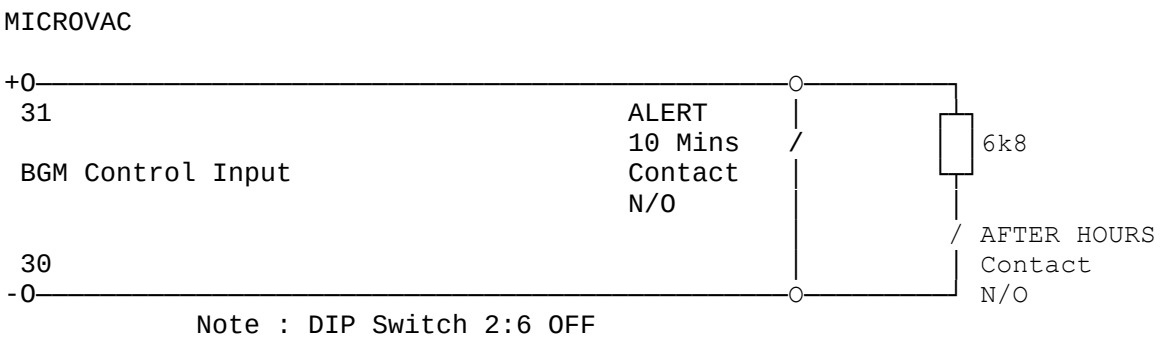


FIG 2.6
AFTER-HOURS / ALERT INPUT WIRING

2.2.11 BGM, PAGING AND AUX AUDIO INPUTS

Balanced line audio inputs are provided for background music, non-emergency PAGING and a further auxiliary function (AUX input). The signals are selected as described in 2.2.9 and 2.2.10.

The devices generating the background music, paging, and AUX should provide between 0.3 and 2.0 VRMS at the input terminals. Volume control can be individually achieved with the AUX pot VR3, Paging pot VR4 and BGM pot VR5 respectively.

Note the OUTPUT volume pot VR1 should be set to provide the required Alert/Evacuate level first and then the BGM, Paging, and AUX levels set afterwards.

2.2.12 100V SPEAKER LINE

Wiring of the 100V speaker line should be carried out using cable of adequate cross-sectional area to keep the voltage drop over the required length to less than 5%.

As the line is DC monitored for open and short circuit conditions, each speaker needs to be capacitively coupled so that the matching transformer resistance does not upset the DC line monitoring. A capacitor of between 1uF and 5uF per watt of speaker power should be used at each speaker. The capacitor should be a bipolar type and have a voltage rating of 25V or more.

For example if only one speaker of 25 Watts is used, a 33uF 25V Bipolar capacitor could be used. If 10 speakers each rated at 2.5 Watts are used, then a capacitor of 3.3 - 10uF, 25V should be used at each speaker.

The end of the speaker line must be terminated with a 56k resistor.

If it is desired to have two branches on the speaker line, it is necessary to use an EOL resistor of 150k on each branch, since 150k is a fault condition and two 150k resistors in parallel (75k) is a normal condition.

Wiring of the speaker line is shown in Fig 2.8.

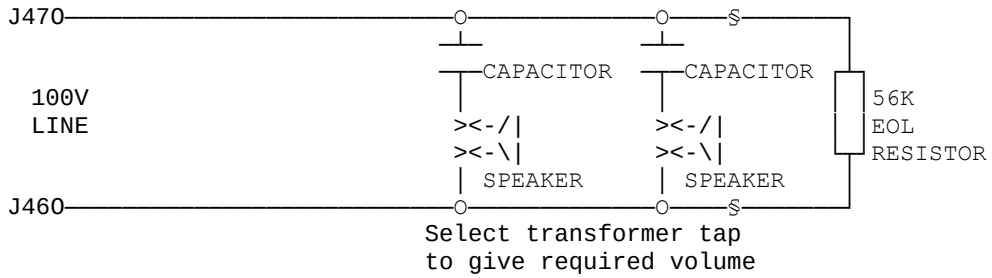


FIG 2.8
SPEAKER WIRING

Note - see further details in section 2.2.14 for details of the wiring to 100W and 200W speaker outputs.

2.2.13 EXTERNAL DC POWER INPUT

The Rack Mounting Microvac is intended to be powered from the FIP DC power supply. The standard Microvac can also be powered from an external DC supply if one is available and Mains is not.

The 24V DC supply from the FIP should be connected to J5 (Battery +ve) and J6 (Battery -ve). There are two options available regarding the monitoring of this supply -

1. Disable monitoring of this input and the Mains input by switching DIP switch 2:7 ON. This option can be used if the supply is fully monitored by the FIP.

2. Enable monitoring by switching DIP switch 2:7 OFF. In this case it is essential that the DC voltage is always between the Charger High and Charger Low voltages as detailed in section 1.3 Specifications and temperature compensated at -36mV per °C, otherwise faults will be indicated.

If you connect a wire from J5 (Battery +ve) to either of the 27V AC terminals, then the Mains On LED will illuminate, and Mains Failure will not be indicated as a fault (option 2).

Alternatively, the Microvac could be powered by its own PSU, for example a PSU2406 or PSU308. If one of these is used then it should be wired as shown in Figure 2.9. DIP Switch 2:7 should be ON, enabling monitoring. Any fault in the power supply will then indicate as a Mains Fail Fault on the Microvac.

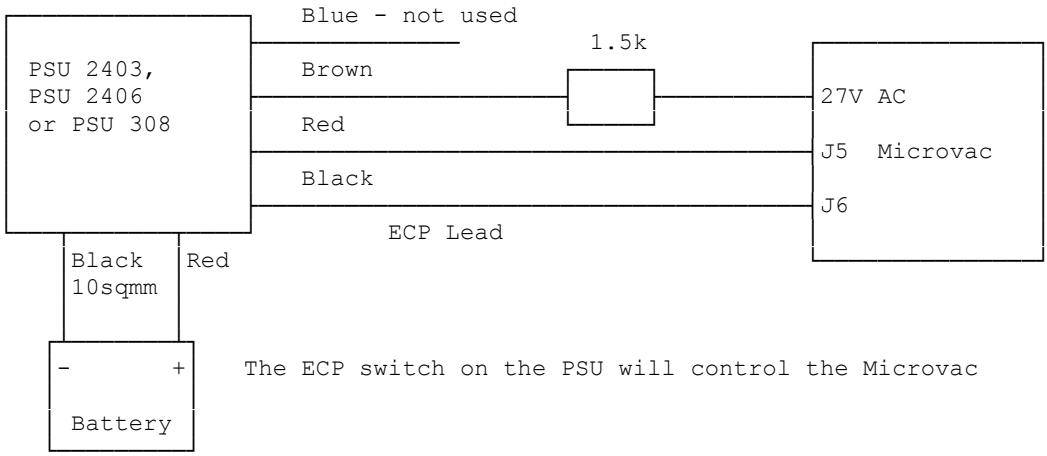


FIGURE 2.9
PSU308 / PSU2406 WIRING TO RACK MOUNTING MICROVAC

2.2.14 VIGILANT HIGH POWER AMPLIFIER WIRING

This applies to 100W and 200W Microvacs purchased after 1 June 1999. For older models, refer to the Issue 1.2 manual supplied with them.

100W and 200W Microvacs supplied by Vigilant will be wired in the factory. The 100W or 200W output is taken from the fitted transformer module, HTRN9308 or TRAN200. On all models except the 1.5A 100W FP0626, an additional 25W output is available on the speaker terminals J46 and J47 of the Microvac Main board.

The output level should be adjusted with the level control on the Microvac, and the level control on the HAMP9308 or AMP200 left in its maximum position.

2.2.15 THIRD PARTY BOOSTER AMPLIFIER WIRING

This has been tested with an Audio Telex SA250B 250 watt booster amplifier. This is not an endorsement of that amplifier by Vigilant, or an indication that similar amplifiers from Audio Telex or another manufacturer will be suitable. Vigilant has not tested any amplifiers for compatibility with AS2220.

A suggested arrangement for powering the Microvac and a booster amplifier from a PSU2406 or PSU308 is shown in Figure 2.10.

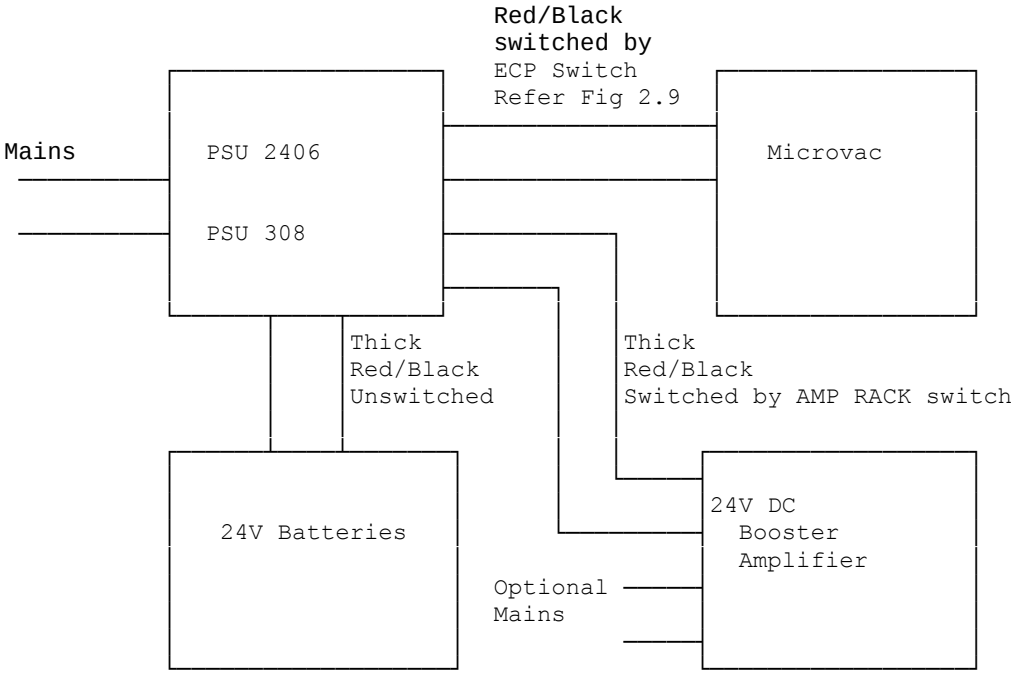


FIGURE 2.10

To connect the audio inputs and outputs of the Booster amplifier -

(a) Remove the output transformer wiring from pins J42-J45 on the Microvac PCB.

(b) Connect the amplifier audio as shown in Figure 2.11

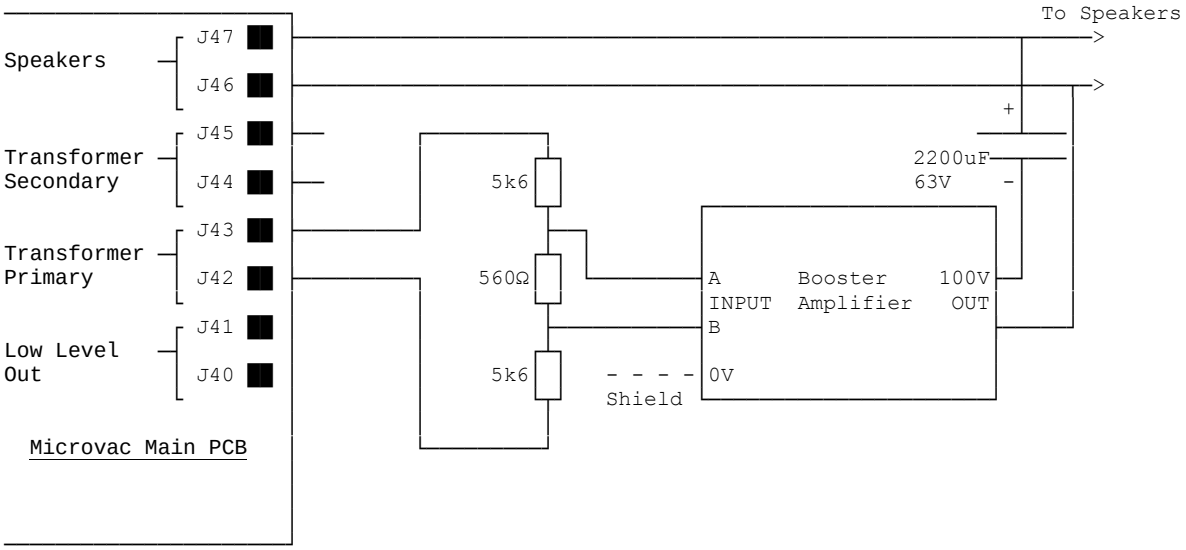


FIGURE 2.11

This will provide line monitoring for short and open circuits on the speaker line and amplifier monitoring for faults in the Microvac or booster amplifier.

The steps for commissioning a Microvac with a third party booster amplifier are as follows -.

(a) Adjust the volume controls on the Microvac and Booster Amplifier to approximately mid position.

(b) Power up the Microvac and Booster amplifier. The Microvac will show a line fault ('L' on the 7 segment display) approximately 40 seconds after power up. You should be able to reset it using the MUTE button on the PCB after approximately 3 minutes. This is the time it takes for the large capacitor on the Booster output to charge up. (This time will also apply for recovery from a speaker line fault.) During the time the Microvac is announcing the line fault it will not produce any tones, as it thinks the line is short circuited.

(c) If the Microvac is announcing an amplifier fault ('A') on the 7 segment display, increase the setting of the volume control on the Booster amplifier to well past the point where the Microvac goes out of fault. This will increase the level of the 28kHz monitoring tone.

(d) Select the Evacuate tone on the Microvac and adjust the level control on the Microvac to get suitable sound levels. If the resulting voltage is much less than 100V, then the speaker transformer taps should be set to a lower wattage, and the level control re-adjusted.

2.2.16 NETWORK WIRING

On a networked Microvac an ECM board and a SPIF board will be fitted. These should be wired to the rest of the QE90 system, and their links setup, as described in LT0088 "QE90 Installation and Commissioning Manual" Chapter 20. This manual will have been supplied with the QE90 ECP(s) supplied with the networked system. The ECM will also need programming as described in the same chapter of this manual.

2.2.17 MASTER WIP WIRING

On a networked Microvac, a "Master" WIP may optionally be fitted. This is wired to the solder terminals on a RING9006 PCB which plugs into the RING9006 position of the ECM. No end of line resistor should be fitted.

2.2.18 FIELD WIP WIRING

On a networked Microvac, an 8 circuit WIP board may optionally be fitted. Up to 8 field WIPs may be wired to the terminals labelled +1–, +2–, +3–, +4–, +5–, +6–, +7–, +8–. Each field WIP requires a 10k end of line resistor wired in parallel with the WIP.

2.3 SETUP - DIP SWITCH SETTINGS

These settings apply to Microvacs with version 3.00 or later software.

Please note that the DIP switches are read only on power up, so that if any changes are made, power must be removed and reapplied for the changes to have effect. If batteries are connected, they must be temporarily disconnected.

In the following paragraphs, switch A:B refers to package "A" switch "B".

2.3.1 NETWORKED MODE

Networked mode is selected by switching switches 1:2, 1:3, 1:4, 1:5, and 1:6 ON.
Switch 1:1 should be
ON for a normal Microvac
OFF for a "faceless" Microvac with no control panel.

Switches 1:7 and 1:8 select the board address, to allow for multiple Microvac boards connected to one ECM.

Switch 1:8 OFF, switch 1:7 OFF : 1st or only board
Switch 1:8 OFF, switch 1:7 ON : 2nd board
Switch 1:8 ON, switch 1:7 OFF : 3rd board
Switch 1:8 ON, switch 1:7 ON : 4th board

In networked mode, the time delays are set up with a terminal connected to the ECM, as described in LT0088 "QE90 Installation and Commissioning Manual", Chapter 20.

2.3.2 ALERT TO EVACUATE DELAY (NON NETWORKED MODE)

Switches 1:1 to 1:6 allow the "Alert to Evacuate Delay" to be set to any time between 0 seconds and 600 seconds in 10 second increments. The time selected will be the sum of the weightings of each switch which is ON, as given below -

Switch 1:1 : 10 seconds
Switch 1:2 : 20 seconds
Switch 1:3 : 40 seconds
Switch 1:4 : 80 seconds
Switch 1:5 : 160 seconds
Switch 1:6 : 320 seconds

For example, to select a time of 2 minutes (120 seconds), switches 1:3 and 1:4 should be ON and 1:1, 1:2, 1:5, and 1:6 should be OFF.

Do not switch all of switches 1:2 to 1:6 on to select a time longer than 600 seconds as this will select networked mode.

2.3.3 INITIAL DELAY BEFORE ALERT (NON NETWORKED MODE)

Switches 1:7 and 1:8 allow various times from 0 to 120 seconds to be set up for the "Initial Delay before Alert".

Switch 1:8 OFF, switch 1:7 OFF : 0 seconds
Switch 1:8 OFF, switch 1:7 ON : 30 seconds
Switch 1:8 ON, switch 1:7 OFF : 60 seconds
Switch 1:8 ON, switch 1:7 ON : 120 seconds

2.3.4 PTT / PA MODE

Switch 2:1 allows one of two modes for PA and PTT to be set up.

OFF : PA is automatically activated by pressing the microphone PTT button.
ON : PA toggles i.e. press ON, press OFF. PA must be set on and the microphone PTT button pressed to speak.

2.3.5 FIP / BGA SHORT CIRCUIT FAULT MONITORING

Switch 2:2 allows short circuit fault monitoring on the BGA and FIP inputs to be enabled or disabled.

OFF : Short circuit fault monitoring is enabled. Alarm state of input is a resistance of 2k7 to 8k2.
ON : Short circuit fault monitoring is disabled. Alarm state of input is a short circuit.

2.3.6 25W OR 100W/200W

Switch 2:3 when ON allows monitoring of an external 100W or 200W amplifier.

OFF : Normal mode (25W).
ON : Vigilant 100W or 200W Amplifier fitted.

2.3.7 NUMBER OF EVACUATE MESSAGES

Switch 2:4 allows the number of 5 second digitised voice messages included in the EVACUATE tones to be set.

OFF : One 5 second message with EVACUATE. (Standard)
ON : Two 5 second messages with EVACUATE. (To use this a second speech EPROM must be installed in the SPEECH2 position. This option cannot be used in conjunction with ALERT speech.)

2.3.8 NUMBER OF ALERT MESSAGES

Switch 2:5 allows the number of 5 second messages included in the ALERT tones to be set.

OFF : No speech messages with ALERT. (Standard)
ON : One 5 second message with ALERT. (To use this a second speech EPROM is required. A suitable EPROM is fitted as standard, although it is not selected by the factory default setting of the DIP switch. This option can not be used in conjunction with a second EVACUATE message.)

2.3.9 USE OF BGM CONTROL INPUT : BGM OR AFTER-HOURS

Switch 2:6 allows the use of the BGM control input to be set.

OFF : BGM is permanently selected if no higher priority function is enabled. The BGM control input is used to control after-hours operation (6k8 ohm resistor connected across BGM control inputs) or to initiate ALERT for 10 minutes (BGM control inputs shorted)
ON : BGM is controlled by BGM control input. (Short on BGM control input means select BGM if no other function selected. Open on BGM control input means select no signal if no other function selected.) There is no After-Hours function and no 10 Minute Alert function.

2.3.10 DISABLE MAINS AND CHARGER FAULT MONITORING

Switch 2:7 allows fault monitoring of the mains input and charger output to be disabled in the case where MICROVAC is powered from a DC supply which is already fault monitored.

OFF : Normal, mains and charger fault monitoring is enabled.
ON : Mains and charger fault monitoring is disabled.

2.3.11 SPEECH IN MANUAL MODE

Switch 2:8 controls whether speech messages will occur with the EVACUATE tones (and ALERT tones if configured) in MANUAL mode.

OFF : No speech in MANUAL mode. (Standard)
ON : Speech messages will occur in MANUAL mode.

2.4 COMMISSIONING

After MICROVAC is installed and wired as described above, and the DIP switches set as desired the unit may be switched on and its operation tested.

2.4.1 POWERING UP

Provided the speaker and strobe load is not too high, MICROVAC may be mains powered in the initial stages, with the batteries connected later. This will make it easier to switch the power off and on as required. Note that the DIP switches are read only on power-up so if any changes in the DIP switches are made, the power must be removed and re-applied.

Switch the keyswitch to the MANUAL position, liven the mains and switch the MICROVAC's internal mains switch on. Check that the MAINS ON LED and the MANUAL LED turn on and that no faults or alarms are displayed - if any are power down, check the wiring and rectify the faults. Be sure to wait at least 40 seconds before deciding that no faults are present as Speaker Line faults are suppressed for 40 seconds after power-up to allow the DC voltage on the speaker capacitors to stabilise.

Checked ( )

2.4.2 CHECKING AND ADJUSTING THE CHARGER VOLTAGE

The battery charger is set in the factory for 27.3 volts at 20°C with a temperature coefficient of -36mV / °C (i.e. at higher temperatures the voltage will be lower and lower temperatures the voltage will be higher). This is satisfactory for the vast majority of sealed lead acid batteries. To set the output voltage of the charger to some other voltage, adjust it with the BATTERY VOLTAGE control, while measuring the voltage across the battery terminals J5 and J6. Be sure to allow for the temperature when setting the voltage. After adjusting the charger voltage, the monitoring voltages must be adjusted in sympathy. To do this connect a voltmeter between the test points labelled "Null Adjust" and adjust the BATTERY CHECK control to give a zero reading.

(Note on a Microvac with a PSU2406 adjust the voltage with the 'Output Volts Adjust" control in the PSU2406.)

Connect the battery and check the voltage is correct. If the battery is very heavily discharged the voltage may be low for a time, and may even result in a Charger Low Fault being displayed. After a few minutes, check that the voltage is 27.3V at 20°C or as adjusted. Remember to allow for the temperature coefficient if the temperature is not 20°C.

Checked ( )

2.4.3 TESTING THE OUTPUTS & ADJUSTING THE LEVEL CONTROLS

Press the EVACUATE pushbutton in MANUAL mode then switch to AUTOMATIC. This will generate a signal consisting of the EVACUATE tones interspersed with the speech message. Check that the EVACUATE and AUTO LEDs are on. Check that the volume from all speakers is uniform adjusting the speaker transformer tappings as required. Adjust the overall level with the OUTPUT control on the MICROVAC PCB. Also check any EVACUATE Strobe Lights which may be installed.

Checked ( )

Return the keyswitch to Manual, and press EVACUATE again to deselect the Evacuate signal. Press ALERT to select the Alert signal. Check that the ALERT tones are heard, and check any ALERT Strobe Lights which may be installed.

Checked ( )

Select the PA signal according to the manner in which you set the mode for PA and PTT (see 2.3.3) and speak into the microphone. Adjust the level with the SPEECH control on the Main PCB.

Checked ( )

If you have non-emergency paging, deselect any other signals which may be selected and select Paging. Adjust the level with the PAGING control on the Main PCB.

Checked ( )

If you have background music, deselect all other signals. If you have set up the DIP switch to require BGM to be externally selected then select it. Adjust the level of the music with the BGM control on the Main PCB.

Checked ( )

2.4.4 CHECKING THE FIP INPUT

Switch the keyswitch to the MANUAL position, deselect any signals which may be selected and switch the keyswitch to the AUTO position. At the Fire Panel isolate the brigade output, put the zone connected to MICROVAC into alarm, and check that MICROVAC's FIP alarm indication is on, and that the ALERT signal is generated after the selected "Initial Delay before ALERT". Check also that the EVACUATE signal is then generated after the selected "ALERT to EVACUATE delay". Return the Fire Panel to normal.

Checked ( )

2.4.5 CHECKING THE BGA INPUT

Switch the keyswitch to the MANUAL position, deselect any signals which may be selected and switch the keyswitch to the AUTO position. Activate a BGA input connected to MICROVAC and check that MICROVAC's BGA alarm indication is on, and that the ALERT signal is generated after the "Initial Delay before ALERT". Check also that the EVACUATE signal is then generated after the selected "ALERT to EVACUATE delay". Return the BGA to normal.

Checked ( )

2.5 WIRING DIAGRAMS

The following drawings are included –

1923-13 MICROVAC WIRING/SETUP DIAGRAM

1923-20 FP0598 100W WIRING DIAGRAM

1923-30 FP0626 100W 1.5A WIRING DIAGRAM

1923-38 FP0599 200W WIRING DIAGRAM

1923-39 25W NETWORK MICROVAC WIRING DETAIL

1923-41 125W NETWORK MICROVAC WIRING DETAIL

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CHAPTER 3 OPERATION

3.1 CONTROLS

3.1.1 AUTOMATIC - MANUAL - ISOLATE KEYSWITCH

The keyswitch selection defines MICROVAC's operating mode. In AUTOMATIC mode, MICROVAC operates entirely automatically, and generates the tones in the sequence described above in the event of the FIP or the BGA input going into alarm. This is the only mode in which the key can be removed. MICROVAC should be left in this mode at all times unless a building warden is attending to an emergency, or MICROVAC is being tested or used for training.

In MANUAL mode the PA, EVACUATE, and ALERT pushbuttons are enabled, and will generate the tones directly or allow the Microphone to be used. FIP and BGA inputs going into alarm will result in the beeper sounding but no tones will be automatically generated. This mode is intended for Manual control during an emergency or to broadcast verbal messages to negate previous instructions in the event of a false alarm.

In ISOLATE mode the pushbuttons will illuminate the associated indicator but not generate any tones. FIP and BGA inputs going into alarm will sound the beeper but not generate any tones.

For a networked Microvac, one or more QE90 ECPs will be capable of selecting the MANUAL or ISOLATE mode for the Microvac. When this happens, the MANUAL or ISOLATE LED will flash with a flash-flash-pause cadence. The PA, EVACUATE, and ALERT controls on the Microvac will not be enabled when it is being controlled remotely. If the Microvac keyswitch is switched to manual **and** a remote QE90 which controls the Microvac is also switched to Manual, the one to receive control will have been configured as part of the factory programming.

3.1.2 PA PUSHBUTTON

The PA pushbutton has a toggle action : pushing it once will turn the PA function on, and pushing it again will turn the PA function off. When the PA function is on, as indicated by the yellow LED, PA announcements may be made by holding in the PTT button on the microphone and speaking into the microphone.

Alternatively, if DIP Switch 2:1 is off pressing PTT on the microphone will activate the PA function automatically.

The PA pushbutton does not operate in AUTOMATIC mode. In ISOLATE mode, the LED will illuminate but no sounds will be produced.

3.1.3 EVACUATE PUSHBUTTON

The EVACUATE pushbutton has a toggle action : pushing it once will turn the EVACUATE function on, and pushing it again will turn the EVACUATE function off. When the EVACUATE function is on, as indicated by the red LED, the EVACUATE tones will be generated and the EVACUATE strobe output turned on.

This pushbutton does not operate in AUTOMATIC mode. In ISOLATE mode, the LED will illuminate but no signals will be produced.

3.1.4 ALERT PUSHBUTTON

The ALERT pushbutton has a toggle action : pushing it once will turn the ALERT function on, and pushing it again will turn the ALERT function off. When the ALERT function is on, as indicated by the yellow LED, the ALERT tones will be generated and the ALERT strobe output turned on.

This pushbutton does not operate in AUTOMATIC mode. In ISOLATE mode, the LED will illuminate but no signals will be produced.

In the event that two or more of the three functions ALERT, EVACUATE, and PA are selected a priority method is used to select the output - PA has highest priority, EVACUATE second highest, and ALERT lowest priority.

3.1.5 LAMP TEST PUSHBUTTON

The LAMPTEST pushbutton will illuminate all LED indicators and sound the beeper. (NB the MAINS ON indicator is derived directly from mains input, and is not affected by the LAMP TEST facility.)

3.1.6 SILENCE PUSHBUTTON

The SILENCE pushbutton, when pressed briefly, will silence the beeper and cause any flashing fault/alarm indicators to become steady. In MANUAL mode, if held in for 2 seconds, it will clear any latched fault/alarm indicators if the fault or alarm no longer exists.

3.2 FRONT PANEL FAULT/ALARM INDICATORS

All fault and alarm indicators flash and the beeper sounds while the associated fault or alarm is active and not acknowledged. (Conditions are acknowledged by a brief press on the silence button.) Once the fault or alarm has been acknowledged or goes away the indicator will be steady. Steady indicators can be cleared (for those conditions which have been removed) by holding the SILENCE button for 2 seconds.

BGA Alarm
Indicates an alarm condition on the BGA input.

FIP Alarm
Indicates an alarm condition on the FIP input.

BGA/FIP Fault
Indicates a fault condition on the BGA or FIP input wiring.

Battery/Charger Fault
Indicates a fault in the battery or charger circuitry.

Audio Fault
Indicates a fault in the amplifier circuitry, output transformer, or in the speaker line wiring.

Strobe Fault
Indicates a fault in the strobe wiring.

Silence
Indicates any of the above fault or alarm conditions.

Beeper
Indicates a fault or alarm which is still present and has not been acknowledged.

3.3 STATUS INDICATORS

EVACUATE
Indicates an automatic or manually-generated activation of the Evacuate signal.

ALERT
Indicates an automatic or manually-generated activation of the Alert signal.

PA
Indicates that the PA (Speech) function has been manually activated. (Note the PTT button on the microphone will need to be pressed before the microphone is activated.)

MAINS ON
Indicates that Mains power is available. Note that this indicator is derived directly from incoming mains and is not affected by the LAMP TEST function.

AUTO
Indicates that the keyswitch is in the AUTO position, and in networked mode also indicates that no other ECP in the system has manual or isolate control.

MANUAL
When steady indicates that the keyswitch is in the MANUAL position and manual control is available. In networked mode, will flash with a flash-flash-pause cadence to indicate that another ECP has manual control.

ISOLATE
When steady indicates that the keyswitch is in the ISOLATE position and all outputs are disabled. In networked mode, will flash with a flash-flash-pause cadence to indicate that another ECP has isolated the zone and all outputs are disabled.

3.4 INTERNAL FAULT DISPLAY & MUTE SWITCH

The 7 segment display on the Main PCB is used to indicate any fault or alarm conditions that are or have been present. The display value indicates the source as follows :

1 BGA Input in alarm
2 FIP Input in alarm
3 Networked mode selected but no communication with ECM
4 In networked mode, a network fault exists. Details of the fault may be displayed at another panel, or the ECM may be interrogated with a terminal.
6 BGA Input in fault
7 FIP Input in fault
A Amplifier or line transformer fault
b Battery voltage low
C Battery charger voltage low
F Battery voltage below a battery fail level
H Battery charger voltage high
L Speaker line in fault
S Strobe line in fault
E Mains failure

When more than one of the above conditions is or has been active, the display will cycle through the conditions in no particular order. To clear the display (or at least those conditions which have been cleared), select MANUAL and hold the MUTE button on the PCB for 2 seconds. When all faults or abnormal conditions have been cleared the display will cycle around its seven segments.

When a fault is detected the type of fault is shown on the front panel and the 7 segment display, the buzzer beeps and the fault relay de-energises (it is normally energised). If the fault returns to normal then the buzzer will stop and the relay will energise but the display will latch the cause of the fault.

The MUTE button on the PCB has the same function as the SILENCE button on the front panel, but with the added effect of clearing the latched fault codes on the 7 segment display when it is held for 2 seconds.

If the 7 segment display is slowly scanning through all its segments then the system is operating normally with no faults present or latched.

Note that charger voltage low monitoring is disabled when Alert, Evacuate, or PA Speech are selected, however battery low voltage monitoring is continued. This is because the total load placed on the Microvac may exceed the PSU capacity and the batteries will be discharging rather than charging.

3.5 NETWORKED MICROVAC WIP OPERATION

Provision of WIP facilities at a Networked Microvac is optional. The WIP facilities may consist of a master WIP at the Microvac and/or up to 8 field WIPs.
However there are no controls on the Microvac corresponding to the WIP controls on a QE90.

The WIPs operate as follows.

- The Microvac master WIP may be called from designated ECPs in the QE90 system. The call is answered by picking up the Microvac master WIP handset when it is ringing.
- The Microvac master WIP calls the same designated ECPs when the handset is picked up when it is not ringing. A confidence tone will be generated until the call is answered at any of the ECPs in the normal manner.
- Any field WIPs connected to the Microvac will call the Microvac and designated QE90 ECPs when they are picked up. A confidence tone will be heard until the call is answered. The call may be answered at the Microvac by picking up the master WIP handset, or answered at a QE90 ECP in the usual manner.
- Field WIPs connected to the Microvac may be called by designated QE90 ECPs, but not by the Microvac.

CHAPTER 4 APPENDIX

4.1 GLOSSARY

Ah	Amp-hours
BGA	Break glass alarm
BGM	Background music
ECP	Emergency control panel
EOL	End of line device
EPROM	(U.V.) Erasable PROM
EWIS	Emergency warning and intercommunications system
EWS	Emergency warning system
FIP	Fire indicator panel
FRC	Flat ribbon cable
LED	Light emitting diode (Visual indicator)
NC or N/C	Normally closed
NO or N/O	Normally open
P-P	Peak to peak
PA	Public address
PCB	Printed circuit board
PROM	Programmable read only memory
PTT	Press to talk

4.2 COMPATIBLE EQUIPMENT

Loudspeakers

Redford extended range loudspeakers with	C0626
M1109 multi-tapped transformer	C2000
Audio Telex Extended range with	
ATC 5006R multi-tapped transformer	ATC 5010

Microphones (NB one of the following will be supplied with MICROVAC)

Merry Electronic microphone	DM-538
Telex microphone	NC450D
University sound microphone	US602FL

Emergency alarm break glass

KAC of Alcester (England)	KW901/SW
Carters of Burnley (England)	P30

Visible alarm devices

KOBISHI 24V DC 250mA strobe light	SL-5

4.3 BATTERY CALCULATIONS

The required battery capacity depends on the load connected to MICROVAC. The batteries must be able to supply the quiescent consumption for 8 hours followed by the operating consumption for 1.5 hours.

Note that when considering the operating consumption, the load current will be higher than the current at which the battery manufacturer specifies the batteries and a derating factor of 1.5 should be applied. The following formula therefore applies -

CAPACITY (Ah) = (8 * QUIESCENT CURRENT) + (1.5 * OPERATING CURRENT * 1.5)

In the case where MICROVAC is fully loaded, the operating current is 2.1A plus the strobe current of 0.9A i.e. 3A. The quiescent current is 0.21A. Applying the above formula, the required battery capacity is 8.43 Ah. A pair of 12V 9.5Ah or better batteries would be suitable.

In the event that MICROVAC is 50% loaded on the audio output and has no strobes connected the operating current would be approximately 1.2A. Applying the above formula, the required battery capacity is 4.4Ah. A pair of 12V 5.7Ah or better batteries would be suitable.

For the 100W model, the operating current is 7A and the quiescent current is 0.3 amps. This gives a required battery capacity of 18AH if no strobes are fitted.

For the 200W model, the operating current is 14A and the quiescent current is 0.4 amps. This gives a required battery capacity of 35AH if no strobes are fitted.