GLENSOUND ELECTRONICS LTD

GS-MPI004 – GSM Beltpack Unit & GS-MPI005 – GSM Subrack Unit

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HANDBOOK CONTENTS

DESCRIPTION **PAGE No.**

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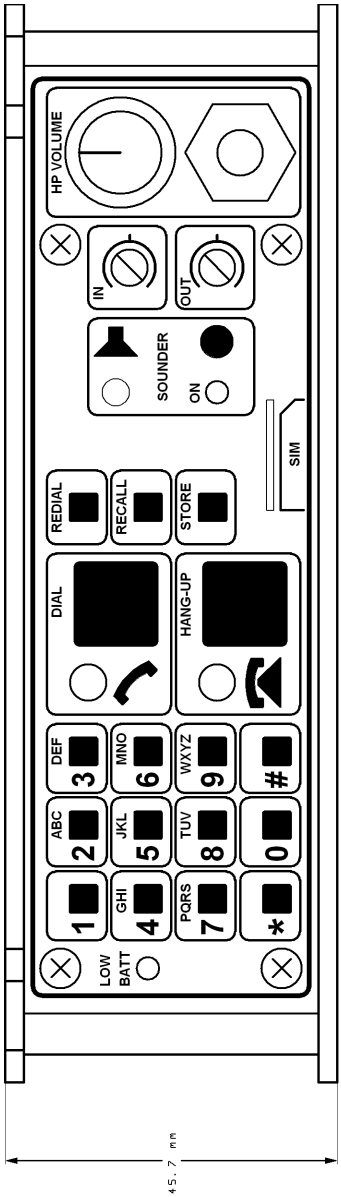
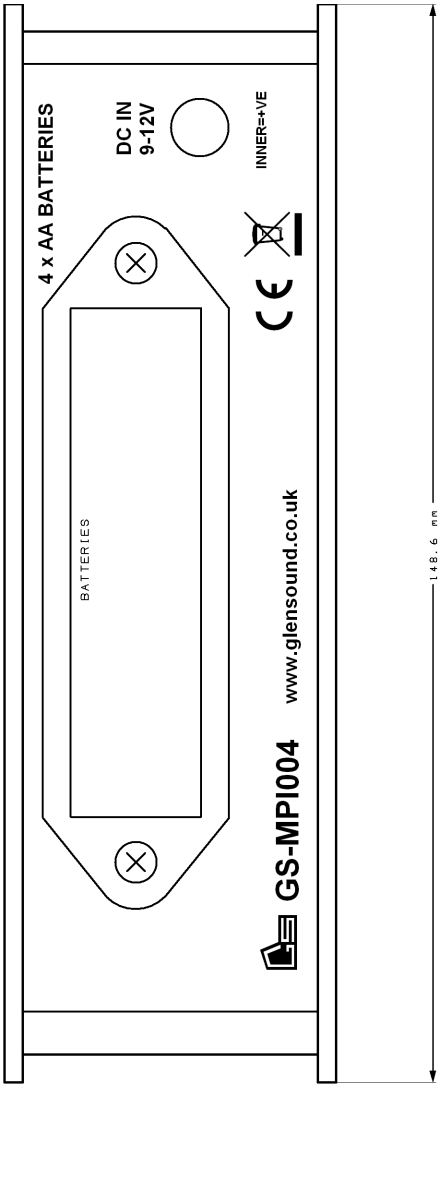
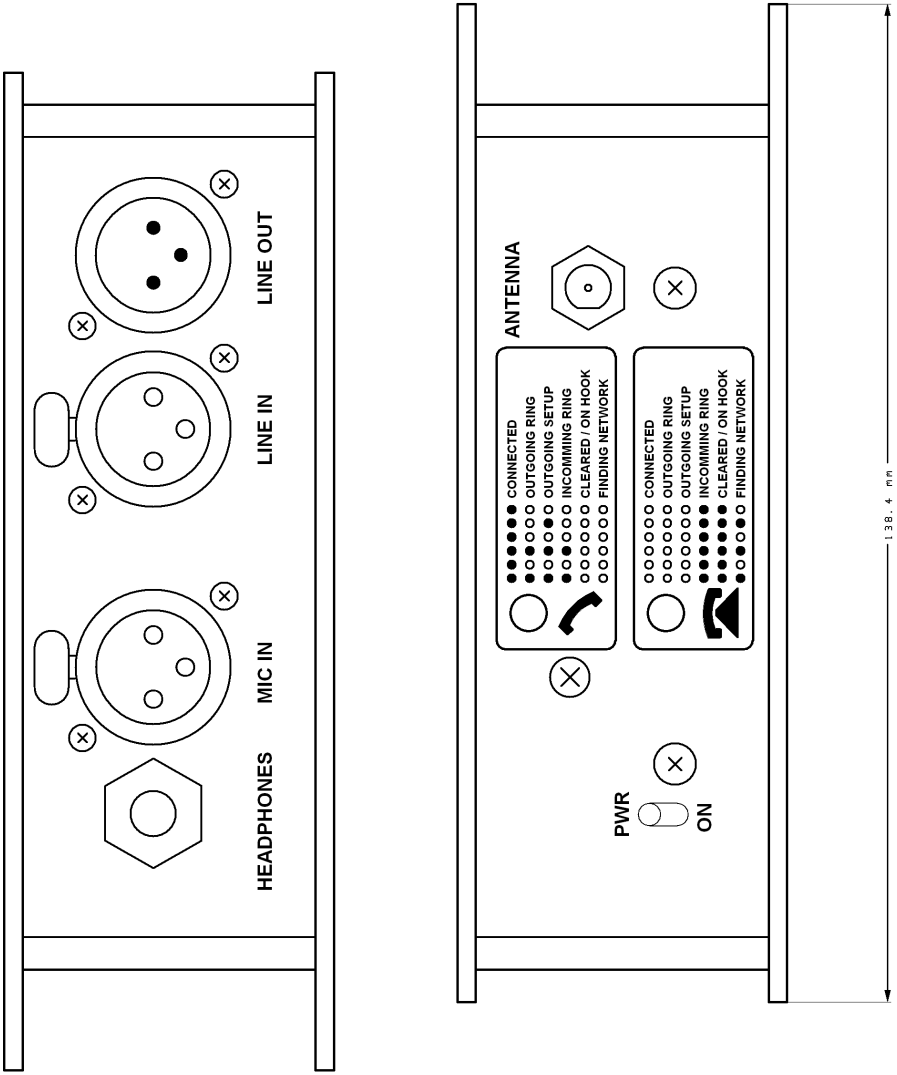
PANEL DRAWINGS & BLOCK DIAGRAM

GS-MPI004 FRONT & BACK

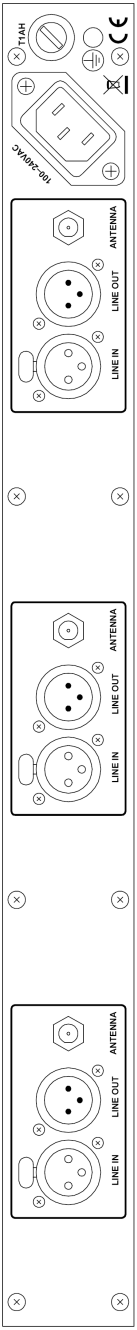


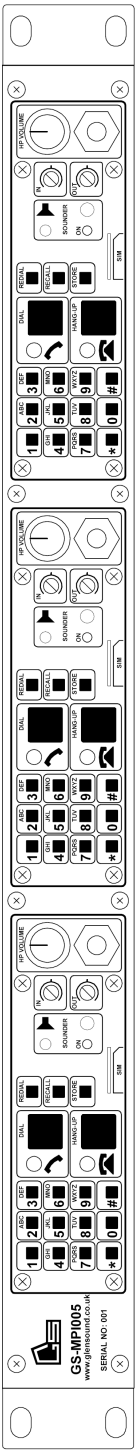


GS-MPI004 SIDES

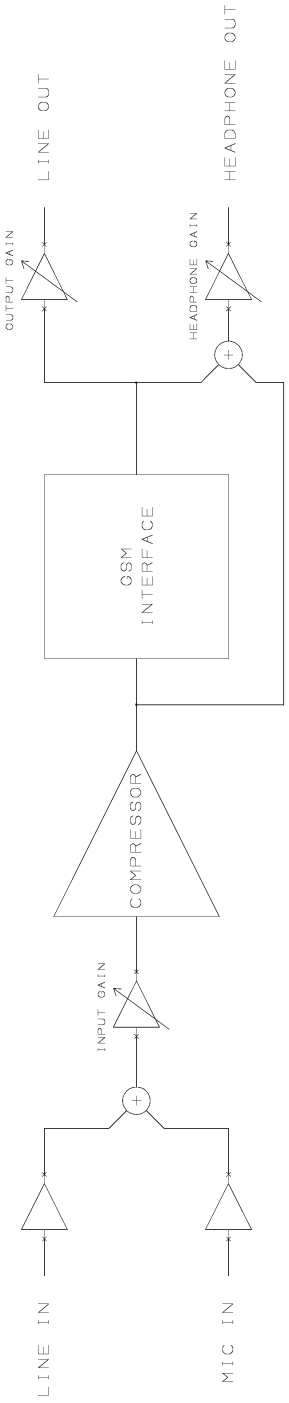


GS-MPI005 FRONT & BACK





BLOCK DIAGRAM



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ISSUE	1					(c) GLENSOUND	
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PRINCIPLE OF OPERATION

The GS-MPI004 is a portable (belt-pack) quad-band GSM mobile phone unit, with Mic and Line inputs, and a Line output. The GS-MPI005 is a 1U sub-rack unit, designed for use in a 19" sub-rack, and contains three functionally separate GSM mobile phone units, each equivalent to one GS-MPI004 unit.

POWER SUPPLY

The GS-MPI004 can be powered from either an external DC supply (9 – 12V), or from 4 x AA batteries. The use of Lithium Manganese Dioxide batteries will yield longer talk times than standard Alkaline batteries. If both an external DC supply and batteries are connected, the external DC supply will take precedent. Note that the external DC supply cannot be used to charge the batteries.

A *"LOW BATT"* LED is fitted onto the front panel of the GS-MPI004. This LED will remain off while the battery voltage is above 1.1V per cell. Between 1.1V and 0.92V per cell, the LED will flash with increasing regularity, indicating an increased urgency to replace the battery. Below 0.92V per cell, the LED will remain on permanently, indicating that the unit is no longer operational due to low voltage.

The GS-MPI005, being a sub-rack unit, is powered by a 100 – 240V a.c. mains supply. The single mains supply is used to power all three GSM mobile phones inside the unit. Neither the battery box nor the *"LOW BATT"* LED are fitted.

ANTENNA

Both the GS-MPI004 and GS-MPI005 use SMA Bulkhead female connectors, requiring an antenna with an SMA Bulkhead male connector. One antenna is required per GSM mobile phone unit. The GS-MPI004 contains one mobile phone, and therefore requires one antenna. The GS-MPI005 contains three mobile phone units, and therefore requires up to three antennae for full operation.

AUDIO INTERFACE

The GS-MPI004 has separate balanced Mic and Line XLR inputs, which are mixed together internally. Each mobile phone in the GS-MPI005 has a Line input, but no Mic input. The input signal is adjusted by an input gain preset on the front panel, before being passed through a compressor to the GSM interface. Phantom power is not available on the Mic input of the GS-MPI004. Therefore, only dynamic microphones can be used.

The audio output from the GSM interface is split between the Line output and the headphones output. The Line output is adjusted by an output gain preset on the front panel. The headphones output is mixed with a feed from the input (to provide sidetone) and adjusted by the "HP VOLUME" knob on the front panel, before being output on a ¼" Jack socket. On the GS-MPI004, this Jack socket is located

on the right-hand side panel. On the GS-MPI005 mobile phones, it is located on the front panel. The headphones output is designed to drive high impedance headphones. Use of other types of headphones will significantly reduce battery life.

VISUAL INTERFACE

Each mobile phone unit has a standard 4x3 keypad, a large green *"DIAL"* push-button and corresponding *"OFF-HOOK"* LED, and a large red *"HANG-UP"* push-button and corresponding *"ON-HOOK"* LED. The DIAL push-button is used to dial a phone number entered on the keypad, or to answer an incoming call. The HANG-UP push-button is used to end a call, reject an incoming call, or to clear a number that has been entered incorrectly.

When the unit is turned on, it will check if the PIN code is enabled. If it is, the phone will quickly flash the *"SOUNDER"* LED four times, every three seconds. This prompts the user to input the four digit PIN code in order to unlock the phone.

When the PIN code has been successfully entered, or if no PIN code was set on the SIM card, the red ON-HOOK LED will flash, indicating that the unit is attempting to register with a GSM network. Once registration is complete, the ON-HOOK LED will be on solid and the OFF-HOOK LED will be off. This is the phone's idle state, indicating that it is on-hook, and ready to dial or receive calls.

When a phone number is entered on the keypad and the DIAL push-button is pressed, the ON-HOOK LED will be turned off and the OFF-HOOK LED will start to flash, indicating that the phone is off-hook, and waiting for the phone at the other end to start ringing. When this happens, the sounder will play a slow ringing cadence, and the OFF-HOOK LED will flash in-time with the cadence. When the remote phone is picked up, the OFF-HOOK LED will be turned on solid, indicating that a call is in progress.

When an incoming call is received and the phone is on-hook, the ON-HOOK LED will remain on, the sounder will play a fast ringing cadence, and the OFF-HOOK LED will flash in-time with the cadence.

If a keypad button is pressed during a call, the phone will generate the corresponding DTMF tone.

MEMORY SLOTS

Each mobile phone unit has nine numbered memory slots, plus one redial memory slot. These are accessed using three yellow buttons: *"REDIAL"*, *"RECALL"* and *"STORE"*. These three buttons can only be used when the phone is on-hook. Pressing the REDIAL button will cause the phone to go off-hook and dial the last number dialled. To store a number in a memory slot, type the number on the keypad and press the STORE button, then press a button between 1 – 9 to select a memory slot. The OFF-HOOK LED will quickly flash twice, indicating that the number was successfully stored. To dial a number stored in memory, press the RECALL button, then press a button between 1 – 9 to select a memory slot. The

phone will go off-hook and dial the number. If no valid phone number is stored in the selected memory slot, the sounder will give an indication of input error.

Note that the phone book stored on the SIM card is not accessible.

SIM CARD

Each mobile phone unit requires a separate SIM card. The SIM card must be inserted **upside down** into the horizontal slot on the front panel, with the mitred corner facing forwards, and the gold-plated contacts facing upwards. The SIM card should be pressed in using a finger nail until it latches.. It can be removed by pressing with the finger nail until it unlatches.

Note that the phone book stored on the SIM card is not accessible.

PIN CODE

When the mobile phone unit is turned on, it will check whether the PIN code on the SIM card is enabled or not, and will prompt the user accordingly (as described in the *"Visual Interface"* section, above. The mobile phone cannot be used to activate, deactivate, or change the SIM PIN. These actions should be performed by placing the SIM card in a standard mobile phone.

AUTO-ANSWER

By default, the mobile phone will not attempt to automatically answer an incoming call. However, each mobile phone can be separately configured to automatically answer after 1 – 9 rings. To achieve this, hold down the appropriate keypad button (0 – 9) while powering on the unit. This will configure the phone to auto-answer at the beginning of the n^{th} ring, where n is the number of the keypad button held down. If n is 0, auto-answering will be disabled. The auto-answer setting is stored, and recalled when the power is next turned on.

Note that many GSM networks activate a remote answering service after a fixed number of rings. The auto-answer setting is unable to affect this, however the GSM network provider may disable the remote answering service on request.

SOUNDER

Each mobile phone unit has a simplistic sounder, which provides ringing cadences and indication of input error. The sounder can be toggled on and off using a push-button on the front of the panel. The on/off state of the sounder is stored, and recalled when the power is next turned on.

OPERATING INSTRUCTIONS

SETUP

To setup the GS-MPI004 beltpack unit ready for use:

1. Screw suitable antenna onto SMA Bulkhead antenna connector.
2. Insert SIM card **upside down** into slot, following directions given in the previous chapter.
3. Place 4xAA batteries into battery holder, and / or connect external DC supply.
4. Turn unit on.
5. If sounder LED starts flashing, type in SIM PIN code.
6. Wait for red ON-HOOK LED to stop flashing, indicating that the GSM unit has successfully registered with the GSM network.

   (GS-MPI004 unit is now ready for use)

To setup the GS-MPI005 subrack unit ready for use:

1. Screw suitable antenna onto each SMA Bulkhead antenna connector, as required.
2. Insert each SIM card **upside down** into slot, as required, following directions given in the previous chapter.
3. Connect subrack unit to mains supply.
4. If any sounder LEDs start flashing, type in SIM PIN code.
5. Wait for all red ON-HOOK LEDs to stop flashing, indicating that each GSM unit has successfully registered with the GSM network.

   (GS-MPI005 unit is now ready for use)

DIALLING

1. Type in phone number on keypad. Press the red *"HANG-UP"* button and start again if the number was entered incorrectly.
2. Press the green *"DIAL"* button.

   (ON-HOOK LED will turn off and OFF-HOOK LED will start to flash, indicating that the phone is off-hook, and waiting for the phone at the other end to start ringing)

   (Phone will return to on-hook condition if call fails. Otherwise, when remote phone starts ringing, the sounder will play a slow ringing cadence, and the OFF-HOOK LED will flash in-time with the cadence)

   (When remote phone is picked up, OFF-HOOK LED will turn on solid)

ENABLE / DISABLE AUTO-ANSWER

1. Turn off mobile phone unit.
2. Hold down numeric key corresponding to the ring number that auto-answering is desired on (0 for disable).
3. Turn on mobile phone unit, with numeric key still pressed.
4. Release key.

STORE NUMBER IN MEMORY

1. Type in phone number on keypad. Press the red *"HANG-UP"* button and start again if the number was entered incorrectly.
2. Press the yellow *"STORE"* button.
3. Press a numeric key, between 1 – 9, indicating the memory slot desired.

   (OFF-HOOK LED will quickly flash twice, indicating that the number was successfully stored)

DIAL NUMBER FROM MEMORY

1. Press the yellow *"RECALL"* button.
2. Press a numeric key, between 1 – 9, indicating the memory slot desired.

   (The mobile phone will go off-hook and start dialling the phone number)

TROUBLESHOOTING

Problem	**Cause**	**Solution**
"BATT LOW" LED is flashing.	Battery voltage is low, but unit should continue to operate correctly for the moment. A shorter flash period denotes a flatter battery.	Consider changing batteries, or connect external DC supply.
"BATT LOW" LED is on solid.	Battery voltage is sufficiently low that the device will not operate correctly.	Change batteries, or connect external DC supply.
GSM unit fails to register with network (Red *"ON-HOOK"* LED and green *"OFF-HOOK"* LED are both off, *"SOUNDER"* LED is not flashing).	SIM card has not been inserted.	Insert SIM card, then turn unit off and on again.
"SOUNDER" LED starts flashing after power-on.	SIM PIN code is enabled on SIM card.	Type in 4-digit SIM PIN code.
GSM unit fails to register with network (Red *"ON-HOOK"* LED continues to flash for more than a few seconds at start-up), but *"BATT LOW"* LED is <u>not</u> on or flashing.	2) Signal strength is too low.	Move unit within range of a mobile phone mast.
	3) Unsuitable GSM antenna is fitted.	Fit a suitable GSM antenna.
	4) Momentary glitch on GSM network.	Turn unit off then on again.

Problem	**Cause**	**Solution**
Red *"ON-HOOK"* LED starts to flash after GSM registration is complete, or when phone goes off-hook	1) Battery voltage is sufficiently low that the device will not operate correctly, as indicated by state of *"BATT LOW"* LED.	Change batteries, or connect external DC supply.
	2) Signal strength is too low.	Move unit within range of a mobile phone mast.
	3) Unsuitable GSM antenna is fitted.	Fit a suitable GSM antenna.
Phone returns to on-hook state after dialling.	1) Call failed (possibly invalid number, remote phone line busy, call cancelled by remote phone, etc.)	Try again later.
	2) No credit left on SIM card.	Put SIM card into an ordinary mobile phone and top-up credit.
Call fails when attempting to dial phone number stored in memory slot.	Selected memory slot does not contain a valid phone number.	Store a valid phone number in the slot, or select another slot.
Incoming call appears to fail after fixed number of rings.	GSM network is activating a remote answering service.	Contact GSM network provider and request remote answering service be disabled.
Phantom-powered microphone does not work when connected to device.	Phantom power is not available on this device.	Use a dynamic microphone instead.

WIRING INFORMATION

Type	Function	
3-pin XLR Socket/Plug	MIC IN / LINE IN / LINE OUT	
	Pin 1	= Ground
	Pin 2	= In Phase
	Pin 3	= Mate
6.35mm Jack Socket	HEADPHONES	
	Tip	= In Phase
	Ring	= Mate
	Sleeve	= Ground
2.5mm DC Plug	External DC Power In (9 – 12V)	
	Centre	= DC Positive
	Sleeve	= DC Negative
SMA Bulkhead Socket	ANTENNA	
	Centre	= RF Signal
	Sleeve	= Chassis

Note: The HEADPHONES output is designed to drive high impedance headphones. The use of other types of headphones will significantly reduce battery life.