



Redbox RB-IPE
IP Extender for GPIO &
Analogue Control Signals

User Handbook



RB-IPE USER HANDBOOK



RB-IPE USER HANDBOOK

This handbook is for use with the following product:
Redbox RB-IPE IP Extender for GPIO & Analogue Control Signals

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Warranty

Warranty and Liability

Important: the purchaser is advised to read this clause

- (a) The Company agrees to repair or (at its discretion) replace Goods which are found to be defective (fair wear and tear excepted) and which are returned to the Company within 12 months of the date of despatch provided that each of the following are satisfied:
- (i) notification of any defect is given to the Company immediately upon its becoming apparent to the Purchaser;
 - (ii) the Goods have only been operated under normal operating conditions and have only been subject to normal use (and in particular the Goods must have been correctly connected and must not have been subject to high voltage or to ionising radiation and must not have been used contrary to the Company's technical recommendations);
 - (iii) the Goods are returned to the Company's premises at the Purchaser's expense;
 - (iv) any Goods or parts of Goods replaced shall become the property of the Company;
 - (v) no work whatsoever (other than normal and proper maintenance) has been carried out to the Goods or any part of the Goods without the Company's prior written consent;
 - (vi) the defect has not arisen from a design made, furnished or specified by the Purchaser;
 - (vii) the Goods have been assembled or incorporated into other goods only in accordance with any instructions issued by the Company;
 - (viii) the defect has not arisen from a design modified by the Purchaser;
 - (ix) the defect has not arisen from an item manufactured by a person other than the Company.

In respect of any item manufactured by a person other than the Company, the Purchaser shall only be entitled to the benefit of any warranty or guarantee provided by such manufacturer to the Company.

- (b) In respect of computer software supplied by the Company the Company does not warrant that the use of the software will be uninterrupted or error free.
- (c) The Company accepts liability:
- (i) for death or personal injury to the extent that it results from the negligence of the Company, its employees (whilst in the course of their employment) or its agents (in the course of the agency);
 - (ii) for any breach by the Company of any statutory undertaking as to title, quiet possession and freedom from encumbrance.



WARRANTY

WARRANTY



WARRANTY

- (d) Subject to conditions (a) and (c) from the time of despatch of the Goods from the Company's premises the Purchaser shall be responsible for any defect in the Goods or loss, damage, nuisance or interference whatsoever consequential economic or otherwise or wastage of material resulting from or caused by or to the Goods. In particular the Company shall not be liable for any loss of profits or other economic losses. The Company accordingly excludes all liability for the same.
- (e) At the request and expense of the Purchaser the Company will test the Goods to ascertain performance levels and provide a report of the results of that test. The report will be accurate at the time of the test, to the best of the belief and knowledge of the Company, and the Company accepts no liability in respect of its accuracy beyond that set out in Condition (a).
- (f) Subject to Condition (e) no representation, condition, warranty or other term, express or implied (by statute or otherwise) is given by the Company that the Goods are of any particular quality or standard or will enable the Purchaser to attain any particular performance or result, or will be suitable for any particular purpose or use under specific conditions or will provide any particular capacity, notwithstanding that the requirement for such performance, result or capacity or that such particular purpose or conditions may have been known (or ought to have been known) to the Company, its employees or agents.
- (g) (i) To the extent that the Company is held legally liable to the Purchaser for any single breach of contract, tort, representation or other act or default, the Company's liability for the same shall not exceed the Price of the Goods.
 - (ii) The restriction of liability in Condition (g)(i) shall not apply to any liability accepted by the Seller in Condition (c).
- (h) Where the Goods are sold under a consumer transaction (as defined by the Consumer Transactions (Restrictions on Statements) Order 1976) the statutory rights of the Purchaser are not affected by these Conditions of Sale.

Unpacking the RB-IPE

The RB-IPE is shipped with the following equipment. Please check your packaging to ensure that you have all of the items below. If anything is missing, please contact the supplier of your equipment immediately.

Item	Quantity RB-IPE
RB-IPE	1
IEC Mains lead fitted with moulded mains plug	1
Handbook and warranty card	1

Fig A: Packing List



Each RB-IPE is shipped in protective packaging and should be inspected for damage before use. Where an item is found to have transit damage, notify the carrier immediately with all the relevant details of the shipment. Packing materials should be kept for inspection and also for if the product needs to be returned.

Returning the Warranty Card

In order to register the date of purchase so that we can keep you informed of any design improvements or modifications, it is important to complete the warranty registration document that is enclosed and return it to Sonifex Ltd in the UK.

For your own records you should write down the serial number (which can be found on the rear of the RB-IPE).

Serial Number
---------------	-------



WARRANTY

SAFETY INFORMATION



SAFETY INFORMATION

Safety Information

Safety of Mains Operated Equipment



This equipment has been designed to meet the safety regulations currently advised in the country of purchase and it conforms to the safety regulations specified by use of the CE Mark.

Warning : There are no user serviceable parts inside the equipment. If you should ever need to look inside the unit, always disconnect the mains supply before removing the equipment covers.

Voltage Setting Checks

Ensure that the machine operating voltage is correct for your mains power supply by checking the box in which your Redbox was supplied. The voltage is shown on the box label. The available voltage settings are 115V, or 230V. Please note that all Redboxes are either switchable between 115V and 230V, or have a universal power supply.

Fuse Rating

The RB-IPE is supplied with a single fuse in the live conducting path of the mains power input. For reasons of safety it is important that the correct rating and type of fuse is used. Incorrectly rated fuses could present a possible fire hazard, under equipment fault conditions. The fuse rating for the RB-IPE is:

230 or 115 V operation - 1A 5 x 20mm SB

The active fuse is fitted on the outside rear panel of the unit.

Power Cable and Connection

An IEC power connector is supplied with the RB-IPE which has a moulded plug attached – this is a legal requirement. If no moulded plug has been supplied with your RB-IPE, please contact your supplier, because an IEC connector is always supplied from the Sonifex factory.

If for any reason, you need to use the RB-IPE with a different power cable, you should use the following wiring guidelines.

Wire Colour	Connection
Green, or green and yellow	Earth (E)
Blue, or Black	Neutral (N)
Brown, or Red	Live (L)

Fig B: Power Connections

Connect the equipment in accordance with the connection details and before applying power to the unit, check that the machine has the correct operating voltage for your mains power supply.



Important Note : The terminal marked on the rear panel must be earthed.

Ordering the Correct Mains Lead

When ordering a Redbox from Sonifex, it is helpful if you can specify your required operating voltage and mains lead. After the product code add:





UK, for 230V, UK 3 pin to IEC lead	
EC, for 230V, European Schuko 2 pin to IEC lead	
US, for 115V, 3 pin to IEC lead	
AU for 230V, Australasian 3 pin to IEC lead	

Fig C: Mains Lead Table

E.g. order RB-IPE UK for a UK IEC lead to be supplied.

Installation Information

Atmosphere

The units should be installed in an area that is not subject to excessive temperature variation (<0°C, >50°C), moisture, dust or vibration.

Electromagnetic Radiation

The cover is connected to earth by means of the fixing screws. It is essential to maintain this earth ground connection to ensure a safe operating environment and provide electromagnetic shielding.

Fitting Redboxes

Redboxes can be fixed to the underside of a mixing desk, or other surfaces using 4.2mm holes in the sides and fixed with 2 x M4 screws or 2 x No. 6 countersink wood screws.

They can also be rack-mounted, with either the front, or rear of the Redbox positioned at the front of the rack:

Rear Mounting The RB-IPE: The **RB-RK3** 1U rear panel rack kit can be used for large Redboxes such as the RB-IPE.



Fig D: RB-RK3 Large Redbox Rear Rack-mount Kit



SAFETY INFORMATION

INSTALLATION INFORMATION



INSTALLATION INFORMATION

Note: When fitting the rear-mounting rack-kits, a notch has been left on the inside of the right-hand rack-piece for the mains cable to pass through. Make sure that the mains cable has been put through the notch before attaching the right hand rack-piece.

Opening the RB-IPE

Warning: The power must be switched off at the supply or the power lead must be disconnected before attempting to open the unit. Removal of the cover can expose dangerous voltages.

Follow these instructions to recover the unit to boot mode:

1. Remove the 4 screws in the corners of the rear panel.
2. Remove the 4 screws on the top and bottom panels which hold the rear panel in place (2 on the top and 2 on the bottom).
3. Remove the screw in the centre of the front panel.
4. Slide the rear panel and main PCB backwards out of the metal chassis giving you internal access.
5. Locate jumper J1 (near the board number / barcode) and short the two pins using the jumper.
6. Upon reset the unit will default to boot mode and you will be able to connect and perform a firmware update as normal.
7. Once updated, remove the link on jumper J1 and upon the next power cycle the unit will load the updated firmware.

To put the unit back together, slide the PCB back into the chassis and refit the screws in reverse order.



WEEE & RoHS Directives - Sonifex Statement



The Waste Electrical and Electronic Equipment (WEEE) Directive was agreed on 13 February 2003, along with the related Directive 2002/95/EC on Restrictions of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS).

The **Waste Electrical and Electronic Equipment Directive (WEEE)** aims to minimise the impacts of electrical and electronic equipment on the environment during their life times and when they become waste. It applies to a huge spectrum of products. It encourages and sets criteria for the collection, treatment, recycling and recovery of waste electrical and electronic equipment. All products manufactured by Sonifex Ltd have the WEEE directive label placed on the case. It gives a contact for individuals who are unsure about the correct procedure when the product has reached its "end of use".

Sonifex Ltd will be happy to give you information about local organisations that can reprocess the products, or alternatively all products that have reached "end of use" can be returned to Sonifex and will be reprocessed correctly free of charge.

Sonifex Ltd has phased out the use of certain hazardous substances identified in the European Union's **Restriction of Hazardous Substances (RoHS)** directive. The RoHS directive limits the use of certain hazardous substances currently used in EEE manufacture, including lead, mercury, cadmium, hexavalent chromium, and halide-containing compounds PBB (polybrominated biphenyl) and PBDE (polybrominated diphenyl ether). Elimination of these substances will result in more environmentally friendly recycling of electronic equipment. For the products which Sonifex manufacture, the main area where products were affected was in the use of lead for manufacturing and assembling electronics circuit boards.

Sonifex Ltd practices lead-free (LF) manufacturing processes. LF solder is used on the surface-mount PCB manufacturing processes and for hand soldering. The printed circuit boards (PCBs) used are either gold plated, or immersion tin plated, both of which use no lead. Historically the PCBs were hot air solder levelled (HASL) PCBs which used tin/lead based solder.

The manufacturing processes include the assembly of purchased components from various sources. Product is offered as RoHS compliant, or LF, only after sufficient evidence is received from the component manufacturers that their components are RoHS compliant. Sonifex Ltd relies solely on the distributor, or manufacturer, of the components for identification of RoHS compliance. Thus whilst every effort is made to ensure compliance, Sonifex Ltd makes no warranty, or certification, or declaration of compliance concerning said components.



REPORTING FAULTS

REPORTING FAULTS



Sonifex Ltd defines “Lead Free” as pertaining to any product, which has been manufactured by Sonifex Ltd using components which have been declared by the manufacturers as “Lead Free”. All statements by Sonifex Ltd of RoHS compliance are based on component manufacturer documentation.



REPORTING FAULTS



Introduction



Fig 1-1: RB-IPE Front Panel

The RB-IPE is a 1U rack-mount unit designed to provide remote control of GPIO and analogue control voltages over an Ethernet network. Configured using a built-in web server, two units can control each other across an Ethernet network, or a single unit can be controlled via Ethernet commands and the web server interface. The unit can be used in any position where you need to remotely acquire GPIO signals or remotely control equipment, for example controlling equipment at unmanned posts, outstations or transmitter sites.

The unit connectivity is incredibly flexible, allowing a wide range of input signals for both the digital and analogue ports. This flexibility continues with many configuration options; each port can be configured to behave independently and the webserver allows you to monitor and adjust the status / configuration of all ports on any networked unit.

Each unit has 16 general purpose inputs on 8 RJ45 connectors, consisting of 8 opto-isolated current sink inputs and 8 pull to ground protected inputs. There are 16 general purpose outputs on 8 RJ45 connectors consisting of 8 isolated relay changeover contacts and 8 opto-isolated contacts. The status of each GPIO is indicated by LEDs associated with each RJ45 socket.

On another 8 RJ45 connectors are the analogue control voltage inputs and outputs. Each input has 3 hardware fixed voltage ranges where 3 separate pins allow for input ranges of 0 – 3.3V, 0 – 5V or 0 – 12V. The 8 analogue outputs offer the same 3 ranges on a single pin controlled by software.

All output ports can be controlled by the inputs of a remote unit, Ethernet commands (see page 7) or directly from the webserver.

This allows any tallies and control signals, together with potentiometer movements to be sent across a network, e.g. for remote alarm points, to trigger failure alarms at a transmitter site and to control remote equipment.

For example when two units are connected together at different sites (remote and local), the pair can be configured such that, when a local general purpose input state changes the unit sends the new status to the remote unit where a corresponding general purpose output is operated. Similarly the local analogue control voltage inputs can be monitored and forwarded to corresponding output ports of the remote unit.



INTRODUCTION

1

INTRODUCTION



INTRODUCTION

The signal routing and distribution options are numerous.

For the GPIO ports:

- Each local input port can be assigned to control any remote output port.
- A single local input can be used to control multiple remote outputs.
- Local general outputs can be configured to respond to a threshold voltage on a local analogue input
- Local outputs can be status locked and the logic can be inverted.

For the analogue control voltage ports:

- Each local input port can be assigned to control any remote output port.
- A single local input can be used to control multiple remote outputs
- A local input port can be used to control any number of local general outputs with respect to a preset threshold voltage (e.g. for sending an instruction to a GPO when a volume knob is turned too high).
- Each local output can be locked off, or pinned to a programmable preset voltage level.
- Any local input voltage range can be mapped to any remote output voltage range.
- A local linear input can be converted to a logarithmic output voltage scale.

The configuration of each unit is stored locally and in the event of a power cycle the unit will continue to operate as previously configured. You can also store a start-up state for each GPO and a start-up voltage for each analogue output allowing more reliable recovery of external connected equipment from a power-fail condition.

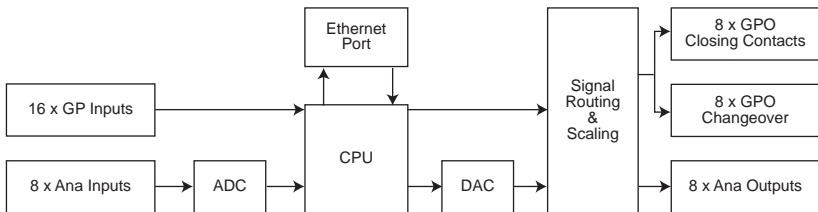


Fig 1-2: RB-IPE Block Diagram

The web server in the RB-IPE can be configured with a static IP address or by using DHCP.

The RB-IPE is powered from a universal mains input between 85-264V AC at 47-63Hz.

Controls & Indicators

Front Panel Controls and Indicators

The Power LED in the front panel is red to indicate power to the unit.

CONNECTED LED

Solid ON or OFF indicates the Presence or Absence of an active TCP/IP connection to the unit. This LED will FLASH when the unit is seeking to establish a connection with another IPE unit.

GPIO LED

Illuminates when there is Ethernet activity relating to the GPIO ports.

ANALOGUE LED

Illuminates when there is Ethernet activity relating to the Analogue Control Voltage ports.

Reset Button

After completing a firmware update or in the unlikely event that the RB-IPE becomes unresponsive, press the reset button to reboot the unit (see Fig 2-1 for location).

The reset button can also be used to perform a factory reset, to bring the unit back to original defaults, including network settings:

- Notice that when the reset button is pressed, each of the three front LEDs light up in sequence.
- You need to press the reset button four times in total:
Press it once to start the sequence.
The second press should be made whilst the first (Connected) LED is lit up.
The third press should be made when the second (GPIO) LED is lit.
The fourth press should be made when the third (Analogue) LED is lit.
- Upon the fourth reboot the unit will load factory default settings and all three LEDs will flash to signal that the factory reset has been performed.



Fig 2-1: Front Panel Controls and Indicators

Rear Panel

There are no physical controls other than the reset button. The LEDs on the two banks of GPIO ports show the current state of each port (illuminated when active) and are numbered accordingly. The green Ethernet LED shows link status/activity, and the amber LED indicates Speed (On = 100Mbps, Off = 10 Mbps).

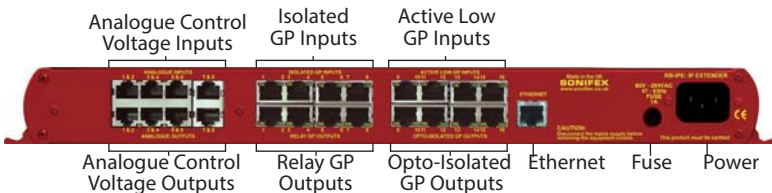


Fig 2-2: RB-IPE Rear Panel





Input & Output Port Specifications

RB-IPE Inputs

Isolated General Purpose Inputs

Inputs 1 – 8 are Opto-Isolated, Active High, Current Sink inputs. These ports read as active if input voltage exceeds approximately 1V.



Fig 3-1: Isolated General Purpose Inputs

Note: The maximum input range is 0 to +24VD.

Each RJ45 Socket handles two GPIs and provides access to a +5VD fused power supply as well as the Digital Ground for the unit.

1. GPI_1_IN
2. GPI_1_RETURN
3. GPI_2_IN
4. Not Connected
5. +5VD (Fused)
6. GPI_2_RETURN
7. Not Connected
8. DGND

Each of the first four top sockets follow this pattern from left to right.

Note: The TOTAL CURRENT that can be drawn from the +5VD fused supply is 200mA.

Active Low General Purpose Inputs

Inputs 9 – 16 are Active Low, pull to rail protected inputs. These ports read as active if the input voltage is below 1VD and are inactive at above 1.7VD, relative to the Digital ground of the unit.



Fig 3-2: Active Low General Purpose Inputs

Note: The maximum input range is -24VD to +24VD.

Each RJ45 handles two GPIs and provides access to Digital ground.

1. GPI_9
2. GPI_10
3. Not Connected
4. Not Connected
5. Not Connected
6. Not Connected
7. Not Connected
8. DGND

Each of the four top sockets follow this pattern from left to right.



Analogue Control Voltage Inputs

Inputs 1 – 8 with 3 off hardware preset, voltage ranges.

Note: The maximum voltage input range is equal to the range for the pins being used.



Fig 3-3: Analogue Control Voltage Inputs

Each RJ45 socket handles two Inputs, with three voltage ranges for each.

1. Analogue Input 1, 0V – 12V Range
2. Analogue Input 1, 0V – 5V Range
3. Analogue Input 1, 0V – 3.3V Range
4. Analogue Input 2, 0V – 12V Range
5. Analogue Input 2, 0V – 5V Range
6. Analogue Input 2, 0V – 3.3V Range
7. Not Connected
8. Analogue Ground

Each of the top four sockets follows this pattern from left to right.

RB-IPE Outputs

Relay General Purpose Outputs

Outputs 1 – 8 are Isolated Relay Changeover Contacts.

Note: The nominal switching capacity (resistive load) is 1A @ 30V DC (0.5A @ 125V AC).



Fig 3-4: Relay General Purpose Outputs

Each RJ45 sockets handles two GPO Relays and provides 3 contacts for each.

1. Output Relay 1, Contact: Common 1
2. Output Relay 2, Contact: Common 2
3. Output Relay 1, Contact: Normally Open 1
4. Output Relay 1, Contact: Normally Closed 1
5. Output Relay 2, Contact: Normally Closed 2
6. Output Relay 2, Contact: Normally Open 2
7. Not Connected
8. Not Connected

Each of the first four bottom sockets follow this pattern from left to right.

Note: Outputs 1 – 8 are mechanical relays. As such they have relatively slow switching times and have a limited lifetime in terms of mechanical operations. Commanding these ports to switch at high speeds could prove unreliable and will wear the hardware out more quickly.



3

PORT SPECIFICATIONS



PORT SPECIFICATIONS

Opto-Isolated General Purpose Outputs

Outputs 9 – 16 are Opto-Isolated closing contacts.

Note: The maximum collector/emitter voltage peak is 35V DC @ 7mA.

The maximum collector/emitter current is 80mA @ 2.5V DC.

Each RJ45 socket handles two GPO Opto-Isolators and provides access to a fused +5VDC supply and the Digital Ground for the unit.

1. GPO_9_COLLECTOR
2. GPO_9_EMITTER
3. GPO_10_COLLECTOR
4. Not Connected
5. +5VDC (Fused)
6. GPO_10_EMITTER
7. Not Connected
8. DGND

Each of the second four bottom sockets follow this pattern from left to right.

Note: In order to achieve the best response time ensure the output is loaded.

Analogue Control Voltage Outputs

Outputs 1 – 8 have 3 off software controlled voltage ranges.

Note: The maximum current per output is 5mA @ 12V / 30mA @ 5V / 25mA @ 3.3V.

Each RJ45 socket handles two outputs, with three voltage ranges for each.

1. Analogue Output 1
2. Analogue Output 2
3. Not Connected
4. Not Connected
5. Not Connected
6. Not Connected
7. Not Connected
8. Analogue Ground

Each of the four bottom sockets follow this pattern from left to right.

Ethernet Port

Standard CAT5 cable and configuration, 10Mbps or 100Mbps speed selectable.



Fig 3-5: Opto-Isolated General Purpose Outputs



Fig 3-6: Analogue Control Voltage Inputs

Ethernet Interface Commands and Responses

Most of the commands follow the same structure: a 3 letter command followed by a colon, followed by one or more parameters delimited with a comma, and terminated by Carriage Return with optional Line Feed. A Line Feed character may be sent but it will be ignored by the RB-IPE. Commands are case sensitive.

Responses are CR & LF terminated and all commands may be issued by UDP or TCP/IP to port 31781 on the RB-IPE.

Following are the commands and the expected responses. Because there are quite a few commands, they are grouped into relevant subsections:

Identification and Network Commands:

Please Note: The unit defaults with DHCP enabled. If no DHCP server is found, after 45 seconds the unit applies the default static network settings:

IP Address = 192.168.0.100

Net Mask = 255.255.255.0

Gateway = 192.168.0.1

Otherwise, DHCP can be turned on / off using the NOP: command. The Static Network settings can be modified using the NET: command.

Communication Sequencing:

For tracking / debugging purposes the IPE will accept a 5 character identifier in front of any command it receives. This identifier must be in the form:

NNNN# - where N = any character, and # is the delimiter between the identifier and the command itself.

An example Command might be:

30CB#GPI:? - which could be the 12491st request for GPI Statuses or a single request from a source identified as "30CB".

The IPE will automatically copy this identifier (if in the correct format) to its response message. In this way you can monitor the order and number of commands processed, as well as differentiating between responses to commands from different sources to the same IPE.



4

ETHERNET INTERFACE COMMANDS & RESPONSES



ETHERNET INTERFACE COMMANDS AND RESPONSES

Command	Description	Parameters	Response
UID:?	Identify Units on the Network	'?' Character	UID:RB-IPE-01,SSSSSS,Example Name,Status (Device Model, 6 Digit Serial Number, User Assigned Name, Pairing Status)
NET:ipaddr, netmask,gw	Set the Static Network settings for the unit	ipaddr = IP Address e.g. 192.168.0.100 netmask = Network Mask e.g. 255.255.255.0 gw = Gateway	ACK:
NET:x	Return the current network configuration	x = 0 to return static address x = 1 to return current address assigned by DHCP	NET:x,ipaddr,netmask,gw NET:1, 192.168.0.100, 255.255.255.0, 192.168.9.1 (for example)
NOP:x{,y}	Get or Set the Network options for DHCP	x = option (0 = DHCP option) y = 0 or 1 (0 = Disable, 1 = enable)	NOP:x,y (return current option settings) or ACK: (acknowledge changes)
SER:?	Get the device Serial Number	'?' Character	SER:SSSSSS Six digit serial as a decimal string.
MAC:?	Get the device Hardware or MAC address	'?' Character	MAC:nnnnnnnnnnnn Hardware Address string in Hex format
VER:?	Get the current firmware version	'?' Character	VER:{BOOT}M.m.b BOOT is only sent when device is in bootstrap mode M = Major version number m = Minor version number b = Build number
WID:sssssss sssss	Set the User Configured Name for the unit	Name should be a string of up to 12 characters	ACK:

Port Configuration Commands:

Command	Description	Parameters	Response
GPI:?	Get Status of GPI ports	'?' Character	GPI:x e.g. GPI:01000001001001001 16 bit number corresponding to 16 GPI ports: 0 = Inactive 1 = Active
GPI:x	Set GPO ports according to response from paired unit	x = 16 bit number representing the status of the input ports on the paired unit	None
GPO:p,x{,y}	Set GPO port state, or set GPO port Start-Up State	p = GPO port number 1 -16 x = State: 1 Active, 0 Inactive y = 1 to set Power Up State	ACK:
GPO:x	Get the current GPO Port Status of the unit	x = '?'	GPO:n where n = 16 bit number with each bit corresponding to the state of each GPO port
MAP:x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x	Set the routing from remote GPI ports to the local GPO ports	x = GPI port number 0 – 15 (corresponding to 1 – 16) Each x value from left to right corresponds to a GPO port on the local unit. Insert the number of the remote input port that you want to forward to each output.	ACK:



4

ETHERNET INTERFACE COMMANDS & RESPONSES



ETHERNET INTERFACE COMMANDS AND RESPONSES

Command	Description	Parameters	Response
GLK:x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x	Set Permissions for GPO state changes	x = number from 0 – 10 0 = Locked to remote GPI via mapping 1 – 8 = Locked to local Analogue Input 1 – 8, via Thresholds 9 = locked high 10 = locked low	ACK:
INV:x	Set inversion state for the GPO ports	x = 16 bit number where each bit corresponds to GPO ports 1 – 16 x = 1 Output is inverted with respect to remote GPI x = 0 Output logic is Non-Inverted	ACK:
ADC:?	Get the analogue input values as a series of decimal numbers	'?' Character	ADC:x,x,x,x,x,x,x,x,x x = a 10 bit ADC read value corresponding to channels 1 to 8 from left to right
ADC:x,x,x,x,x,x,x,x	Set Analogue outputs according to response from a paired unit	x = a 10 bit ADC read value corresponding to channels 1 – 8 from left to right	None
DAC:p,x	Set Analogue output level	p = port number 1 – 8 x = 10 bit number from 0 – 1023 (full scale)	ACK:

Command	Description	Parameters	Response
DAC:x	Get the current Analogue Output Port Status of the unit	x = '?'	DAC:n,n,n,n,n,n,n,n where n = 10 bit number corresponding to the level of each analogue output port
DAC:p,x,l,r,m	Configure the Analogue Outputs	<p>p = Port Number 1 – 8</p> <p>x = 16 bit Start up Value 0 – 65535</p> <p>l = 16 bit Limit Value</p> <p>r = Voltage Range (0 = 3V3, 1 = 5V, 2 = 12V)</p> <p>m = conversion (0 = linear, 1 = logarithmic)</p>	ACK:
MAP:x,x,x,x,x,x,x,x	Set the routing from remote Analogue inputs to local Outputs	<p>x = Analogue port number 0 – 7 (corresponding to 1 – 8)</p> <p>Each x value from left to right corresponds to a local output port. Insert the number of the remote input port that you want to forward to each output.</p>	ACK:
ALK:x,x,x,x,x,x,x,x	Set permissions for Analogue output state changes	<p>x = 0 port locked to remote analogue input via mapping</p> <p>x = 1 port locked to a single preset level</p> <p>x = 2 port Locked to zero output level</p>	ACK:



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ETHERNET INTERFACE COMMANDS & RESPONSES



ETHERNET INTERFACE COMMANDS AND RESPONSES

Command	Description	Parameters	Response
THR:x,x,x,x ,x,x,x,x	Set Threshold values for each analogue input	x = analogue input threshold level between 0 – 1023 corresponding to ports 1 – 8 from left to right	ACK:
ACT:x,x,x,x ,x,x,x,x	Set the GPO state to be enforced when each input threshold is exceeded	x = 0 GPO inactive above threshold, active below x = 1 GPO active above threshold, inactive below	ACK:
LVL:x,x,x,x,x, x,x,x	Preset the values to which each analogue output can be locked	x = 16 bit number between 0 – 65535 corresponding to Analogue voltage full-scale output range.	ACK:
UPD:x,y or UPD:x,y,ms,s,m,h or UPD:x,y,ms, s,m,h,z	Set how the unit communicates the status of the input ports. (This command accepts 2, 6 or 7 parameters)	x: GP (0) or Analogue (1) Selection y: Update Setting: Passive(0) On Change(1) Periodic(2) Update period setting: ms: 0 – 999 Milliseconds s: 0 – 59 Seconds m: 0 – 59 Minutes h: 0 – 24 Hours z: Step change required at Analogue input before a Status Update occurs: 1 - 50	ACK:

Error Messages:

The following error messages can be returned for illegal commands:
 ERR:02-Returned if command unknown
 ERR:03-Returned if invalid number of parameters
 ERR:04-Returned if any parameter is invalid



RB-IPE Webserver

The built in webserver on each RB-IPE allows you to control the unit remotely through a web browser. The webpage interface has multiple tabs including; Home, Network, Configuration and Update.

To access the webpage simply type the IP address of the unit you wish to connect with, into the address bar of your internet browser.

Version: 1.0
 MAC address: 00:50:C2:05:A6:6E
 IP address: 192.168.0.190
 Netmask: 255.255.255.0
 Default gateway: 192.168.0.1

Home | Network | Configuration | Discover | Update | Set to Defaults

HOME

GPI Status:
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
 ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■

GPO Status:
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
 ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■

Analogue Control Input Status:
 1 2 3 4 5 6 7 8
 0% 0% 0% 0% 0% 0% 0% 0%

Analogue Control Output Status:
 1 2 3 4 5 6 7 8
 0% 0% 0% 0% 0% 0% 0% 0%

Home Page

GPI Status
 The current status of the GPI ports where green is active and red is inactive.

GPO Status
 The current status of the GPO port where green is active and red is inactive.

Analogue Control Input Status
 The current voltage across the analogue input ports, displayed as a percentage of the total range.

Analogue Control Output Status
 The current voltage set at the analogue output ports, displayed as a percentage of the total range.

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Fig 5-1: Screen shot of the RB-IPE Webserver home page

The top banner contains useful current information about the unit you are connected to, such as Version Number and Network Address settings. The Menu Bar just below this banner allows you to navigate through various pages to configure different aspects of the unit. Each page follows the same standard layout as the home page, with current status / configuration settings on the left hand side and tooltip explanations in the red box to the right. The bottom banner contains contact details for Sonifex Ltd.

- Home – Shows the current status of all input/output ports of the RB-IPE.
- Network – For configuration of the static/dynamic network settings and naming of the unit.
- Configuration – Separate pages for the configuration of General Purpose and Analogue I/O as well as Communication settings for the unit. There is also a page for the configuration of the IPE port and remote (inter-network) link settings.
- Discover – Allows the unit to locate and pair with other RB-IPE units on the local network.



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WEBSERVER INTERFACE



WEBSERVER INTERFACE

- Update – Performs a firmware update.
- Default – This resets all port configurations back to default settings.

Updating the RB-IPE

Firmware updates may be downloaded by visiting:

<http://www.sonifex.com/technical/software/>

To check if your RB-IPE requires an update, compare the version number displayed on the webpage of the unit, with the latest firmware download for the RB-IPE on the Sonifex website.

- If your firmware is out of date, download the new file and save it to an appropriate location.
- Navigate to the update page of the unit you wish to update.
- Click 'Browse' then locate the files you have just downloaded and select the '.DWN' file.
- Once the correct file has been selected, hit 'Update'.
- Once the update process is complete you will need to restart the RB-IPE in order to run the new firmware.

Technical Specification For RB-IPE

Rear Panel Connections

Isolated GPI:	4 x RJ45 sockets, with LED status indicator per input
Active Low GPI:	4 x RJ45 sockets, with LED status indicator per input
Relay GPO:	4 x RJ45 sockets, with LED status indicator per output
Isolated GPO:	4 x RJ45 sockets, with LED status indicator per output
Analogue Control Inputs:	4 x RJ45 sockets
Analogue Control Outputs:	4 x RJ45 sockets
Ethernet Port:	RJ45 with status LEDs
Mains Input:	Filtered IEC, continuously rated 85-264VAC @ 47-63Hz, 10W max
Fuse Rating:	Anti-surge fuse 1A 20 x 5mm

Input & Output Detail

General Purpose Inputs:

8 x isolated current sink inputs from Inputs: 3.3V to +24V (Max input range: 0V to +24V)
 8 x pull to ground protected inputs (Max input range -24V to +24V)

General Purpose Outputs:

8 x isolated relay change-over contacts: Nominal switching capacity (resistive load):
 1A @ 30V DC (0.5A @ 125V AC)
 8 x opto-isolated contacts: Maximum collector/emitter voltage peak: 35V DC @ 7mA
 Maximum collector/emitter current: 80mA @ 2.5V DC
 (Note: There is a 200 mA fused +5V power supply available on GPI ports 1 – 8 and GPO ports 9 – 16.)

Analogue Control Inputs: 8 x 0V-3.3V, 5V or 12V input signals

Analogue Control Outputs: 8 x output signals, nominally 0V-3.3V, 5V or 12V

Front Panel Indicators

Power On:	Red LED
CONNECTED:	Green link status LED
GPIO:	Green GPIO change status LED
ANALOGUE:	Green analogue control I/O change status LED



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TECHNICAL SPECIFICATION



TECHNICAL SPECIFICATION

Equipment Type

RB-IPE: IP extender for GPIO & analogue control signals

Physical Specification

Dimensions (Raw): 48cm (W) x 10.8cm (D) x 4.2cm (H) (1U)
19" (W) x 4.3" (D) x 1.7" (H) (1U) Dimensions

(Boxed): 58.5cm (W) x 22.5cm (D) x 7cm (H)
23" (W) x 8.9" (D) x 2.75" (H)

Weight: Nett: 1.6kg Gross: 2.2kg
Nett: 3.5lbs Gross: 4.8lbs

Accessories

RB-RK3 1U Rear panel rack kit for large Redboxes



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