



Pump Station 16-R
Installation & User Guide v2.1

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Pump Station 16-R Installation and operation manual

Contents

Section	Page
1 Safety Notes.....	2
2 General	2
3 The RJ45 Connection	2
4 Schematic Diagram	3
5 Installation	3
6 RH-8 Installation.....	3
7 WP-8 Installation	5
8 Music Inputs	7
9 Sensitivity & Gain Control.....	7
10 Global Input.....	7
11 Global Input Gain Control.....	7
12 Global Input - High Pass Filter	8
13 Global Input Priority.....	8
14 Balanced Line Output – Channel 16 only	8
15 Remote Music Mute – Fire Alarm Interface	8
16 Chassis Ground Terminal.....	9
17 Solving Problems	9
17.1 Ground Loops (aka Earth Loops).....	9
17.2 Connecting balanced signals to the unbalanced line inputs	9
18 EMC Considerations	10
19 Technical Specifications.....	10
20 General Specifications	10

1 Safety Notes

- Do not expose this unit to water or moisture
- Do not expose the unit to naked flames.
- Do not block or restrict any air vent
- Do not operate the unit in ambient temperatures above 35°C
- The unit has no internal user adjustable parts. Do not remove any panel.
- Refer any servicing to qualified service personnel.
- Do not replace the power transformer with any other type

For more detailed information refer to the rear of the manual.

2 General

The Cloud Pump Station 16-R is a headphone distribution processor primarily designed to provide headphone monitoring of up to eight stereo sound sources to a person using exercise machines. The Pump Station 16-R has eight stereo line inputs and a balanced 'global' input with priority.

A total of 16 remotely located 'RH-8' or 'WP-8' remote control units can be wired to the Pump Station 16-R – the 'RH-8' is fitted with a headphone socket, rotary source select switch and volume control and can be fitted to the exercise machine or wall mounted. The WP-8 however is a dedicated wall-mounting version of the RH-8 with the provision to connect low power speakers.

Eight core Category 5 (Cat 5) cable should be used to wire each remote control unit to the Pump Station 16-R. The RH-8 comes supplied with an RJ45 patch cable that can be terminated into any RJ45 socket (commonly used as part of a computer network).

A remote music mute facility is also provided on the Pump Station 16-R that may be used to satisfy the requirements of the Local Fire Officer.

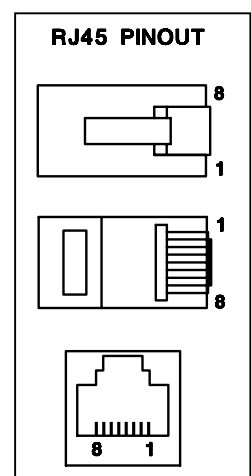
The Sub Station 16-R provides the capacity to add up to sixteen extra RH-8 or WP-8 remote control devices; the Pump Station 16-R can drive up to 15 Sub Station 16-R units providing a maximum capacity of 256 control panels. A multi-core expansion cable is supplied with each unit and the system is wired in the 'daisy chain' configuration.

The front panel controls on both units are reduced to a power switch, all the input and output terminations and gain controls are mounted on the rear panel. The unit can be positioned in a protected area with just the remote control units positioned in the most appropriate location.

3 The RJ45 Connection

The RJ45 plug is a compact 8-pole connector primarily designed for CAT5 cable. Special tools are available making termination both easy and quick.

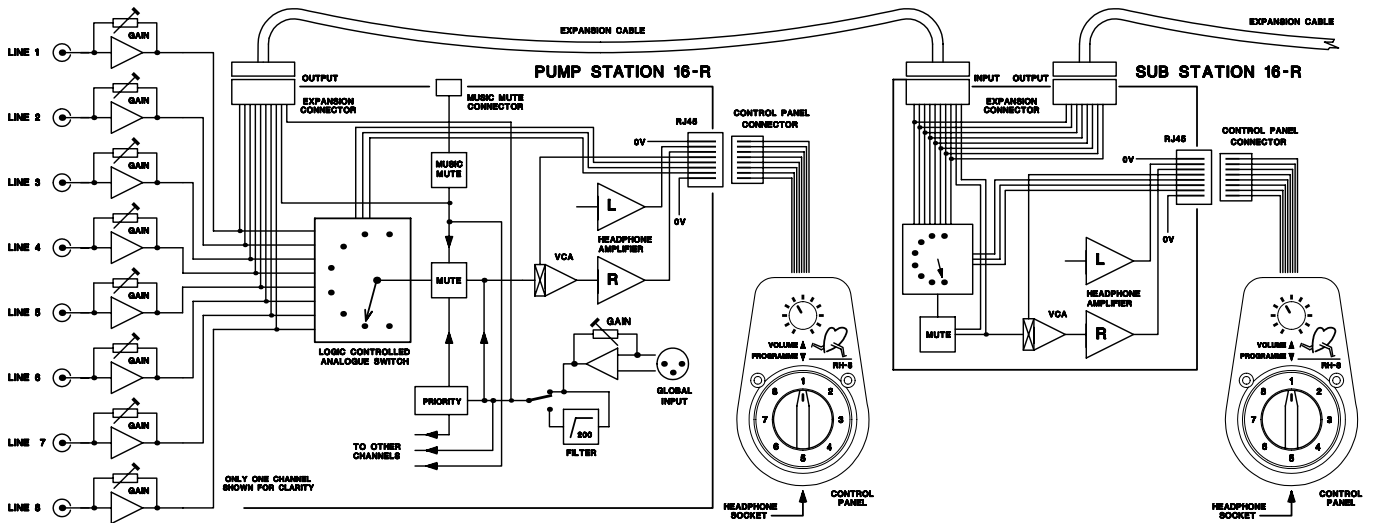
- 1) Strip approximately 1" of outer sheath from the cable.
- 2) Remove extraneous material such as plastic wrap or foil screen from the 8 exposed cores but do not strip their sheaths.
- 3) Cut the 8 exposed cores down so that when the cable is inserted into the RJ-45 the outer core can be held by the plugs cable retention system.
- 4) Insert the 8 cores into the RJ-45 plug fully making sure that they are all correctly arranged. Information on the correct arrangement of cores for the RH-8 can be found in section 6 and the WP-8 details are in section 7.
- 5) Place the plug/cable assembly into the assembly tool and operate the mechanism.
- 6) You should now have a firmly connected plug/cable assembly that is ready for installation.



These notes are for guidance only: always follow the instructions supplied with the assembly tool

4 Schematic Diagram

Pump Station 16-R & Sub Station 16-R



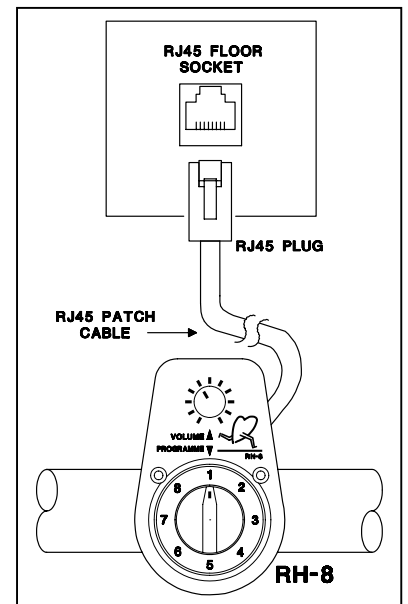
5 Installation

The Cloud Pump Station 16-R is suitable for mounting in a standard 19" equipment rack where it will occupy two units of rack space. The Pump Station 16-R is 170mm deep, but a depth of 235mm should be allowed to clear the rear panel connectors. When possible, avoid positioning the unit in close proximity to magnetic fields or equipment operating at a high temperature. The Pump Station 16-R operates from an external plug-top transformer and a provision should be made to plug this into a suitably positioned power socket. The Pump Station 16-R is fitted with an RJ45 socket for each remote control unit; terminate using eight core category 5 cable (4 pair Cat 5). The total cable length from an RH-8 to the rack should not exceed 100m (328ft).

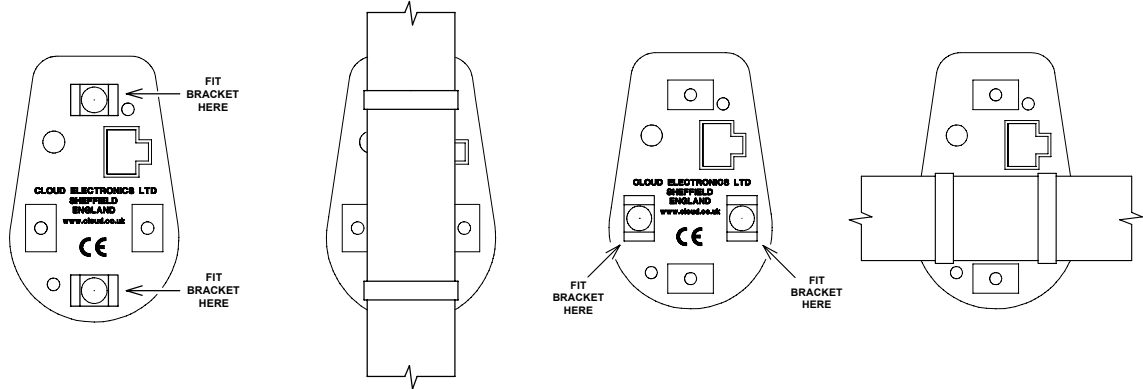
6 RH-8 Installation

When installing the RH-8 we suggest that an RJ45 data socket is floor mounted adjacent to each one. Wire each data socket individually back to the equipment rack pin to pin using CAT 5 cable. The RH-8 is fitted with an RJ45 compatible data socket and supplied with a 3m patch cord to link to the floor mounted data socket; this approach simplifies maintenance.

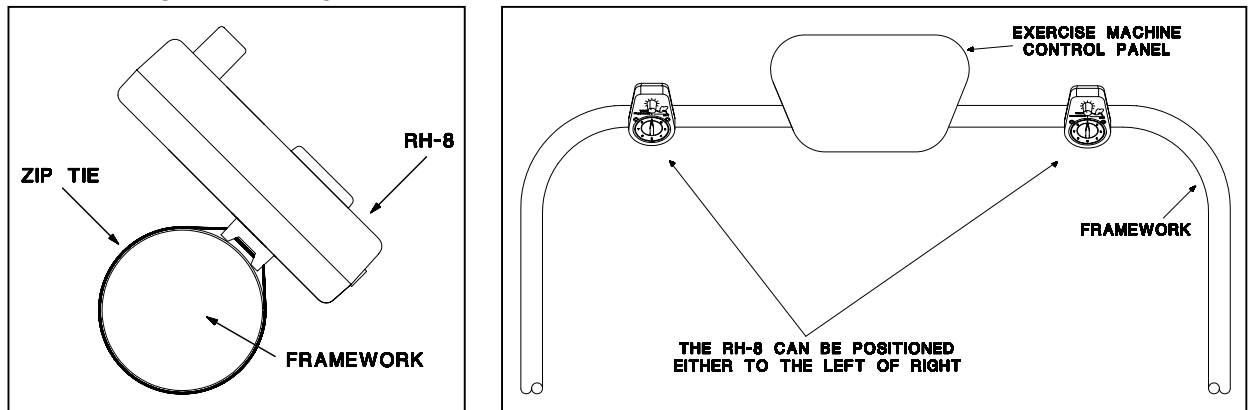
Cable Information for Wiring the RH-8 to a Floor Socket		
RH-8 (RJ45)	Pump Station 16-R (RJ45)	CAT 5*
Pin 8	Pin 8	Brown/White
Pin 7	Pin 7	White/Brown
Pin 6	Pin 6	Green/White
Pin 5	Pin 5	White/Blue
Pin 4	Pin 4	Blue/White
Pin 3	Pin 3	White/Green
Pin 2	Pin 2	Orange/White
Pin 1	Pin 1	White/Orange



The RH-8 is supplied with mounting accessories allowing it to be mounted onto the frame of an exercise machine or fixed to a flat surface such as a wall or bulkhead. When the RH-8 is mounted onto the framework, two small nylon brackets should be fastened to the body of the moulding using the nylon rivets provided. With the brackets in place, loop a nylon tie through each of the two brackets and use these to securely fasten the RH-8 to the frame. To prevent rotation on smooth surfaces, we suggest that self-amalgamating electrical insulating tape is wound around the tube before the ties are fitted. The nylon brackets can be fitted in two positions to suit the exercise machine.



When mounted to framework the RH-8 should be positioned at 45° (see left hand diagram below), Ideally the RH-8 should also be positioned to one side of the user instead of directly in front (See right hand diagram below)



When mounted directly on to a wall or perhaps the bulkhead of an exercise machine, it may be preferable to hard wire a cable directly to the RH-8 using its internal screw terminals, a diagram and wiring information for this are shown below.

Cable for Hard Wiring an RH-8 to a Pump Station 16-R



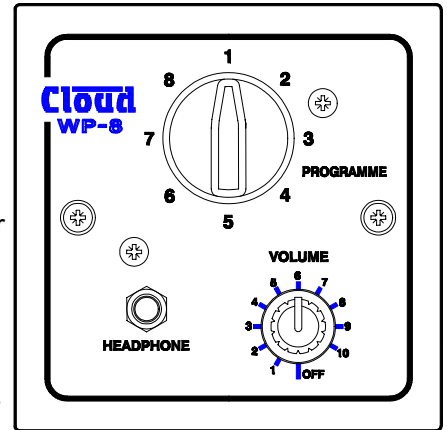
Cable Information for Hard Wiring the RH-8		
RH-8 (Screw Terminals)	Pump Station 16-R (RJ45)	CAT 5*
Pin 1	Pin 8	Brown/White
Pin 2	Pin 7	White/Brown
Pin 3	Pin 6	Green/White
Pin 4	Pin 5	White/Blue
Pin 5	Pin 4	Blue/White
Pin 6	Pin 3	White/Green
Pin 7	Pin 2	Orange/White
Pin 8	Pin 1	White/Orange

*The CAT 5 colour is described as the dominant colour first with the tracer second.

7 WP-8 Installation

The WP-8 is a dedicated wall-mounting unit that has all of the features of the RH-8 plus a provision for low power speakers. The module is primarily aimed at applications such as tanning suites and treatment rooms where users may wish to listen to music. The WP-8 has two low impedance, low power speaker outputs each with a different operation:

- The first is a normal low impedance speaker output.
- This second provides a similar low impedance output that is disconnected when headphones are connected to the WP-8.



The WP-8 should be wired directly to the equipment rack using unscreened 'Category 5' cable (4 pair CAT 5), an IDC insertion tool will be required to connect the WP-8 to the CAT-5 cable. Cable length should not exceed 100m (328ft).

Cable for Hard Wiring a WP-8 to a Pump Station 16-R



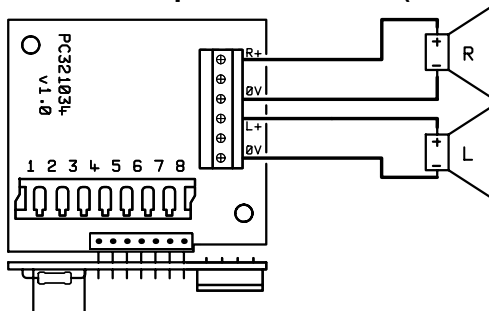
CABLE SHOWN WITHOUT OUTER SHEATH FOR CLARITY

Cable Information for Wiring the WP-8		
WP-8 (IDC)	Pump Station 16-R (RJ45)	CAT 5*
Pin 1	Pin 8	Brown/White
Pin 2	Pin 7	White/Brown
Pin 3	Pin 6	Green/White
Pin 4	Pin 5	White/Blue
Pin 5	Pin 4	Blue/White
Pin 6	Pin 3	White/Green
Pin 7	Pin 2	Orange/White
Pin 8	Pin 1	White/Orange

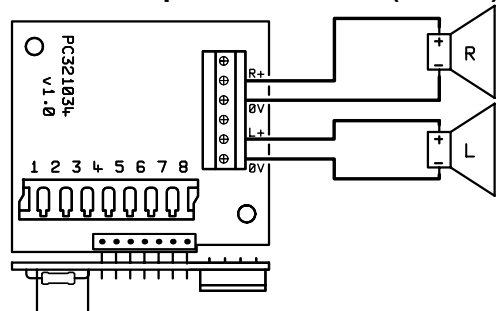
*The CAT 5 colour is described as the dominant colour first with the tracer second.

The following diagrams show how to wire either speaker output in stereo or mono.

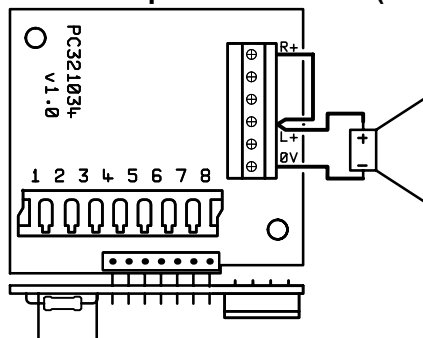
Permanent Speaker Network (Stereo)



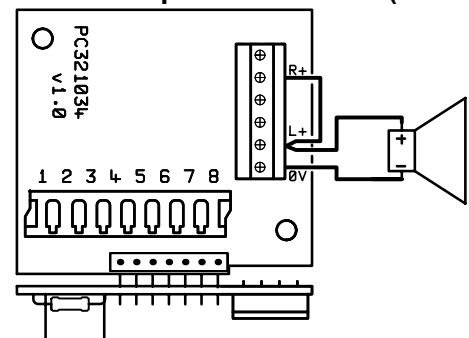
Switched Speaker Network (Stereo)



Permanent Speaker Network (Mono)



Switched Speaker Network (Mono)



The WP-8 will provide 150mW of power in stereo configuration and 300mW in mono into 8Ω speakers. The impedance of the speakers is not critical however the unit will deliver more power into speakers with an impedance of $>8\Omega$.

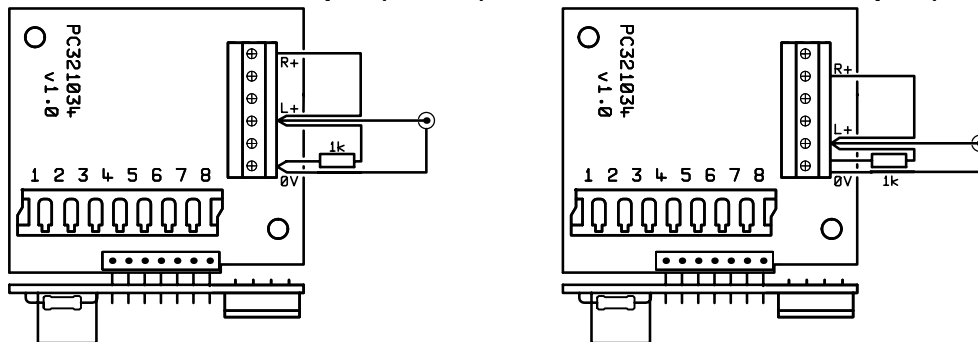
Be vigilant when wiring the WP-8 since wiring errors can cause flawed operation. If a problem is experienced, turn off the power, disconnect the WP-8 and double-check the wiring.

The Cloud WP-8 is designed to be wall mounted. The WP-8 is the same physical size as a single UK electrical socket (13A Type) and can be mounted in the recessed back box provided or be surface mounted in a standard 25mm deep housing.

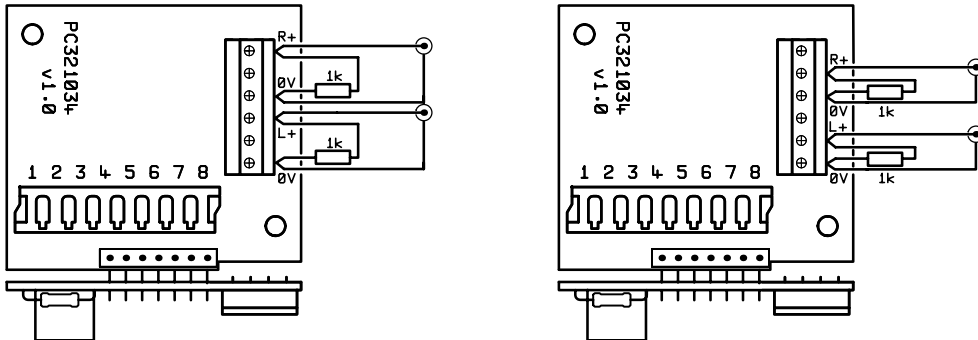
The Cloud WP-8 is fitted with a 3.5mm stereo jack socket that will accept a pair of stereo headphones. We recommend the use of headphones with 32-ohm impedance for example, the Cloud CP-32.

It is also possible to obtain a line level output from the WP-8 by wiring it as follows:

Permanent Line Level Output (Stereo) Switchable Line Level Output (Stereo)

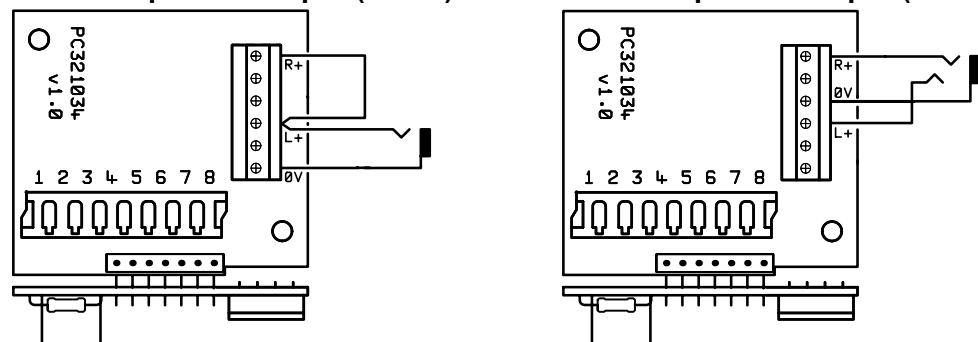


Permanent Line Level Output (mono) Switchable Line Level Output (mono)



The output of the WP-8 can be used to drive a pair of powered speakers if extra volume is required. The diagram below shows how this can be achieved.

Powered Speaker Output (mono) Powered Speaker Output (stereo)



8 Music Inputs

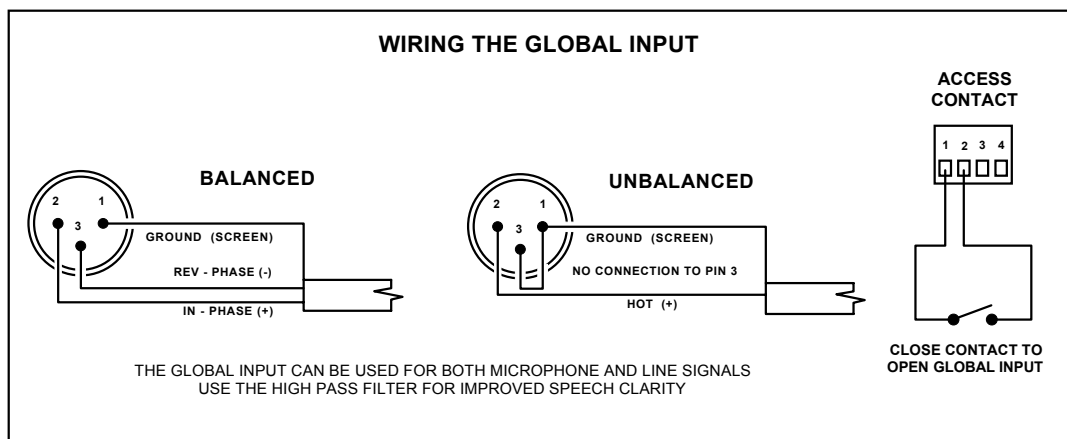
The Pump Station 16-R has eight stereo line inputs; these are suitable for most music sources such as CD players, tape players, satellite receivers and television sets etc. All the stereo inputs are unbalanced and use RCA type phono sockets. The input impedance is 47k Ω . Try to plan the installation so that the length of the signal leads is as short as possible.

9 Sensitivity & Gain Control

All eight stereo line inputs have a pre-set gain control on the rear panel, adjacent to the respective input sockets. The input sensitivity can be varied from -14dBu (155mV) to +6dBu (1.55V). The pre-set gain controls should be set using the 'signal' LED so that all the input signals operate at the same level within the mixer so that there is no perceivable change in level when switching sources. Position the pre-set gain control in the fully anti-clockwise position; rotate the gain control clockwise until the LED illuminates briefly on signal peaks only. Repeat this process on the other seven inputs. Do not increase the gain control above the suggested level as this may result in a distorted signal when the RH-8 or WP-8 volume control is set to the maximum level position.

10 Global Input

A 'global' microphone/line input is provided for paging, spot announcements or evacuation messages. The input amplifier is an electronically balanced, transformer-less design configured for optimum low noise performance. The 'global' signal is routed to all the headphone amplifiers with automatic, signal sensing priority over the music signal. The 'global' signal is fed into the signal path before the VCA so that any announcement will be heard at the level set by the user. The input impedance is 5k Ω and is suitable for 600 Ω microphones and general line level signals. The input is via a female 3 pin XLR type connector positioned on the rear panel. The global input is compatible with general purpose paging microphones fitted with a 'push to talk' switch or open collector switching device. To open the global channel the access switching terminals should be shorted. If the input is used with other signal sources, it will be necessary to link pins 1 & 2 on the 4 way screw terminal to open the global input permanently.



For balanced signals, connect the cable screen to pin 1, the in-phase signal (+) to pin 2 and the reverse phase signal (-) to pin 3.

For unbalanced signals, connect a wire link from pin 1 (ground) to pin 3 inside the XLR cable mounted plug; use pin 1 as ground (cable screen) and pin 2 as hot.

11 Global Input Gain Control

A pre-set gain control is provided adjacent to the XLR input connector, the gain can be adjusted from 0dB to 50dB. This large variation in gain allows direct connection to a wide range of devices from microphones to high output units (such as radio microphones), without the need for additional attenuation. A high overload margin is maintained at all gain settings.

12 Global Input - High Pass Filter

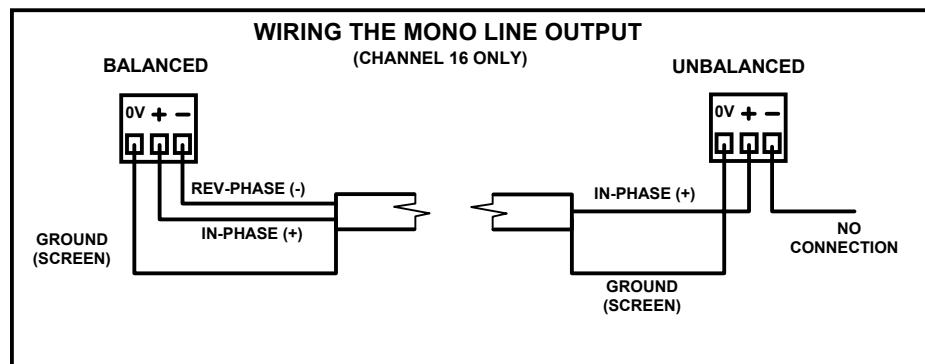
The global input channel features a 3 pole high pass filter operating at 200Hz that can be switched into the signal path to improve the intelligibility of speech; it also provides effective attenuation of breath blasts and low frequency handling noises. If the global input is used for music signals the filter should be switched to the 'out' position.

13 Global Input Priority

This feature provides the user with a fully automatic signal sensing input that has priority over all channels. When a global input signal is detected, the music signals fed to every remote control unit connected to the system will attenuate by approximately 30dB; once the global signal ceases, the music signals will restore smoothly to their former level.

14 Balanced Line Output – Channel 16 only

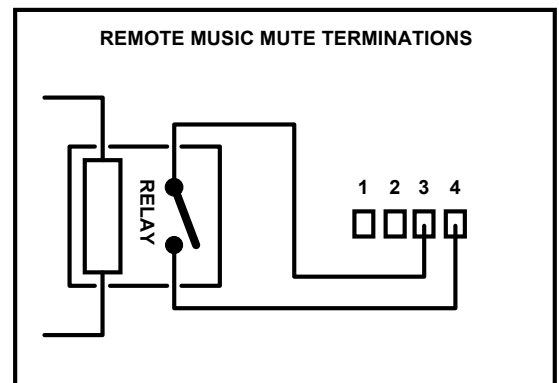
Channel 16 on the Pump Station 16-R is fitted with a balanced line level output using a 3 pin plug-in screw terminal type connector.



This output satisfies the occasional requirement to provide a signal to a separate sound system such as a general background music system providing sound within a sports hall or gym. We suggest that the channel 16 remote control unit be wall mounted in a convenient location. We do not advocate that any headphones are connected to the remote control unit but the volume control and source selector can be used to control the signal fed into the separate system. The nominal output level is 0dBu (775mV). For balanced interconnections, 2 core screened cable should be used. Connect the screen to left terminal (0V), the centre pin (+) is the in-phase signal (normally red) and the right terminal (-) is the reverse phase signal (normally blue or black). If you wish to connect this balanced output to an unbalanced input, connect the cable screen to (0V) with the hot connection (inner core) connected to the centre pin (+). Make no connection to pin on the right (-).

15 Remote Music Mute – Fire Alarm Interface

In certain circumstances, there may be a Local Authority or Fire Service requirement to mute the music signals via a fire alarm control panel in an alarm condition. The Cloud Pump Station 16-R provides a facility to mute the music signals of the whole system by connecting pins 3 & 4 of the four pole connector to the contacts of a relay which is controlled by the fire alarm control panel. The two-wire connection should not be connected to any other circuit or voltage. In most instances, the fire alarm installation company will provide an auxiliary relay, normally located close to the sound equipment rack. The global input will operate normally when the music mute is operating. (See section 10)



16 Chassis Ground Terminal

The rear panel of the Pump Station 16-R is fitted with a Chassis Ground Terminal – this should be terminated to a convenient earth terminal on the mains distribution system. The termination is provided for protection purposes; this unit is normally connected to a number of TV sets, FM receivers and satellite receivers and the grounding of the Pump Station 16-R is a safety measure to protect the users of the system.

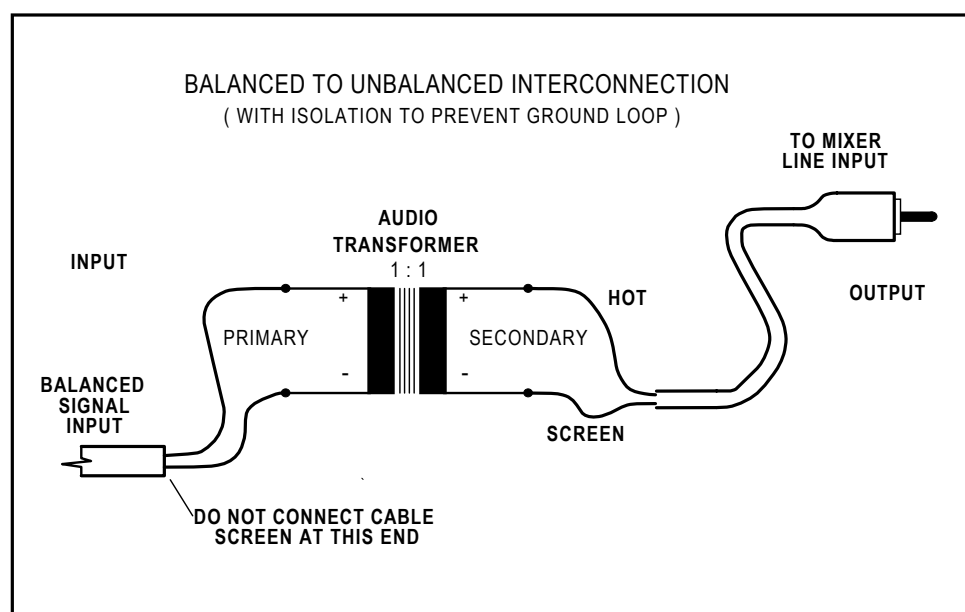
17 Solving problems

17.1 Ground loops (aka Earth loops)

Despite your best efforts, the completed sound system may have some audible ‘hum’, if this is the case you probably have a ‘ground loop’; this is usually caused by introducing an additional ground on one of the signal sources. One technique to find the offending signal source can be undertaken by monitoring the ‘hum’ then disconnecting the input leads (both left & right channels) on each line input until the ‘hum’ disappears. This problem is often caused by terminating a screened input cable into a signal source positioned a significant distance from the mixer. A good way of avoiding this potential problem is to use signal sources (CD players and the like) that are double insulated with no connection to the mains supply earth. In some instances the problem can be resolved by insulating the front panel of the signal source from the equipment rack. If a signal feed is derived from a second mixer (a club or microphone mixer for example) it would be perfectly normal to expect this to be earthed; we suggest that a transformer be used to isolate the signal and prevent a noisy loop.

17.2 Connecting balanced signals to the unbalanced line inputs.

We recommend the use of a transformer to convert a balanced signal to an unbalanced signal suitable for direct connection to the mixer line inputs. The transformer should be mounted close to the Pump Station 16-R and the unbalanced output lead should be kept as short as possible. Where both the source unit and destination mixer are earthed, it is important to isolate the primary and secondary windings to avoid a potential ground loop; if there is any doubt about this, we suggest that the balanced cable screen is not connected at the transformer end. Suitable transformers for this application are the RS Components 210-6447 (primary & secondary series connected) we recommend the fitting of a screening can also from RS (part number 210-6469); Canford Audio supply a similar transformer OEP Z1604 we again recommend that this should be fitted in a similar screened housing. All transformers should be wired to give a ratio of 1:1. A diagram showing the transformer wiring can be seen below.



18 EMC Considerations

The Cloud Pump Station 16-R fully conforms to the relevant electromagnetic compatibility (EMC) standards and is technically well behaved; you should experience no operational problems and under normal circumstances, no special precautions need to be taken. If the unit is to be used within close proximity to potential sources of HF disturbance such as high power communications transmitters, radar stations and the like, the performance of the unit may be reduced. We suggest that the global input cable screen be connected to the shell of the XLR type connector and the line input leads are kept as short as possible.

19 Technical Specifications

Line Inputs

Frequency response	20Hz – 20kHz ± 0.5 dB
Input level	-14dBu (155mV) to +6dBu (1.55V)
Input impedance	47k Ω
Input gain range	20dB
Input level indicator	LED – illuminates above a fixed threshold
Input connector	2 x RCA phono jack (stereo)

Global Input

Frequency response	20Hz – 20kHz ± 1 dB
High pass filter	-3dB @ 200Hz – 3 pole (with in/out switch)
Gain range	0dB to 50dB
Input impedance	5k Ω
CMR	>70dB @ 1kHz
Access contact	Channel off/on by closing contact

Headphone Output – via RH-8

Nominal output level	100mW rms per channel with 32 Ω load
Optimum load impedance	32 Ω
Recommended headphones	Cloud CP32

Headphone Output – via WP-8

Nominal output level	100mW rms per channel with 32 Ω load
Optimum load impedance	32 Ω
Recommended headphones	Cloud CP32

Speaker Output – via WP-8

Nominal output level	150mW rms per channel with 8 Ω load
Optimum load impedance	>8 Ω

Line Output – Channel 16

Nominal output level	0dBu (775mV)
Minimum load	600 Ω

20 General Specifications

Pump Station 16-R

Power consumption	25VA with approved external transformer
Width	482.6mm (19.0")
Height	88.0mm (3.50") – 2U
Depth	170.0mm (6.70") + connectors
Weight	4.0kg net

Power Transformer

Output	15V AC 1.25A 18.5VA
Weight	0.52kg net

This Pump Station 16-R conforms to the following European EMC Standards:



BS EN 55103-1:1997
BS EN 55103-2:1997

This product has been tested for normal use in the commercial and light industrial environment. If the equipment is used in controlled EMC environments, the urban outdoors, heavy industrial environments or close to railways, transmitters, overhead power lines etc. the performance of the unit may be degraded.

The Pump Station 16-R conforms to the following European electrical safety standard.

BS EN 60065:1998

The power transformers for the Pump Station 16-R conform to the following standards:

Power transformer for the UK market (Friwo 11.8367)	BS EN60742 + BABT
Power transformer for the European market (Friwo 11.8366)	EN60742 + EN60950
Power transformer for USA and Canada (SHOGYO A5727100T)	C-UL Approved

Safety Considerations and Information

When the mains switch is in the off 'O' position the Pump Station 16-R is disconnected from the power transformer

CAUTION – Installation

Do not expose the unit to water or moisture
Do not expose the unit to naked flames.
Do not block or restrict any air vent
Do not operate the unit in ambient temperatures above 35°C

CAUTION – Servicing

The unit contains no user serviceable parts. Refer servicing to qualified service personnel. Do not perform servicing unless you are qualified to do so.

Disconnect the power cable from the unit before removing the top or bottom panel
Only reassemble the unit using bolts/screws identical to the original parts

In the interest of continuing improvements Cloud Electronics Limited reserves the right to alter specifications without prior notice.

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