MC² AUDIO

I - Series

Multi-Channel - Installation Audio Power Amplifier

i-68/i-38/i-64

Operating Instructions V2.2

MC² AUDIO

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DECLARATION OF CONFORMITY

We, the manufacturer:

MC² Audio,
Units 6-8 Kingsgate
Heathpark Industrial Estate
Honiton, Devon
England
EX14 1YG

acknowledge our responsibility that the following products:

Kind of equipment:	**Audio amplifier**
Commodity Code:	**8518408099**
Type Designation:	**i-68, i-64,i-38,i-34,Delta40DSP, Delta80DSP, Delta100DSP** **Delta40S, Delta80S, Delta100S, Delta120S** **T500, T1000, T1500, T2000, T3500, T4-250** **Ti500, Ti1000, Ti1500, Ti2000, Ti3500, Ti4-250** **E15, E25, E45, E60, E90, E100, E475** **S800, S1400, D80DSP** **and all OEM variants of these models**

are manufactured:

in accordance with EMC Directive 2004/108/EC,
in compliance with the following norm(s) or document(s):
Technical Regulations: EN55103-1:1996, EN55103-2:1996

and

in accordance with the Low Voltage Directive 2006/95/EC,
in compliance with the following norm(s) or document(s):
Technical Regulations: EN/IEC60065:2002 7th Edition

Signed: .....

Name: Alex Cooper
Position: Research and Development Manager
Date: January 2017

THANKS

Thank you for choosing a i Series amplifier for your application.
Please spend a little time reading through this manual, so that you obtain the best possible performance from the unit and become familiar with its operating requirements.

All MC² products are carefully designed and engineered for cutting-edge performance and world-class reliability. If you would like further information about this or any other MC² product, please contact us.

We wish you many years of service from this amplifier and look forward to hearing from you in the near future.

INTRODUCTION

The i Series has been designed to combine flexible audio power delivery and high performance for lo and high impedance loads. The exemplary audio signal path assure Hifi class audio is delivered to low impedances and high impedances alike. This results is quality audio delivery to both cinemas / clubs and 70/100V ceiling loudspeakers.

Accepting analogue and optional Dante/ AES67 networked audio, these 4 and 8 channel amplifiers provide numerous GPIO options for integrating with 3rd party control / monitoring.

Transformerless 70V / 100V operation selectable per channel on the rear combined with bridging capability provide real out of the box flexibility for the system designer.

With a range of power levels available in the i Series, these non-DSP amplifiers can be networked to a single Delta DSP model, creating a powerful, efficient system that's easy to expand and adapt for use any sound system.

IMPORTANT SAFETY INSTRUCTIONS

CAUTION: RISK OF ELECTRIC SHOCK.
DO NOT OPEN

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation mark within an equilateral triangle is intended to alert the user of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: Apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection.

WARNING: To prevent injury, this apparatus must be securely attached to the rack in accordance with the installation instructions.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.

7. Do not block any ventilation openings, install in accordance with the manufacturer's instructions.

8. Do not install near any heat sources, such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. Use only with the cart, tripod, bracket or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from a tip over.

13. Unplug this apparatus during lightning storms or when unused for a long period of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as if the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped. This equipment contains a non-user replaceable lithium battery for memory retention. Should this battery fail and user settings be lost, do not attempt to replace the battery yourself but return the equipment to an authorised service centre.

15. Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.

16. To completely disconnect this equipment from the AC mains, disconnect the power cord from the mains circuit breaker.

17. This unit is supplied with a 3-wire power cord. For safety reasons, THE EARTH LEAD SHOULD NOT BE DISCONNECTED IN ANY CIRCUMSTANCE.

18. Correct disposal of this product: This symbol indicates that this product must not be disposed of with household waste, according to the WEEE Directive (2012/19/EU) and your national law. This product should be taken to a collection center licensed for the recycling of waste electrical and electronic equipment (EEE). The mishandling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the efficient use of natural resources. For more information about where you can take your waste equipment for recycling, please contact your local city office, or your household waste collection service.

INSTRUCTIONS DE SECURITE IMPORTANTES

ATTENTION: RISQUE DE CHOC ELECTRIQUE.
NE PAS OUVRIR

Le symbole représentant un éclair fléché dans un triangle équilatéral a pour but d'alerter l'utilisateur de la présence d'une "tension dangeruese" non isolée à l'intérieur du boitier, pouvant être d'une force suffisante pour constituer un risqué d'électrocution.

Le point d'exclamation dans un triangle équilatéral a pour but d'alerter l'untilisateur de la présence d'instructions importantes concernant le fonctionnement et la maintenance, dans la documentation qui accompagne l'appariel.

ATTENTION: Appareils de construction de CLASSE I doit être raccordé au réseau électrique via une prise de courant reliée à la terre.

ATTENTION: Pour éviter toute blessure, cet appareil doit être solidement fixé à la torture, conformément aux instructions d'installation.

1. Lisez ces consignes.
2. Conservez ces consignes.
3. Respectez tous les avertissements.
4. Respectez toutes les consignes d'utilisation.
5. N'utilisez jamais l'appareil à proximité d'un liquide.
6. Nettoyez l'appareil avec un chiff on sec.

7. Veillez à ne pas empêcher la bonne ventilation de l'appareil via ses ouïes de ventilation. Respectez les consignes du fabricant concernant l'installation de l'appareil.

8. Ne placez pas l'appareil à proximité d'une source de chaleur telle qu'un chauff age, une cuisinière ou tout appareil dégageant de la chaleur (y compris un ampli de puissance).

9. Ne supprimez jamais la sécurité des prises bipolaires ou des prises terre. Les prises bipolaires possèdent deux contacts de largeur diff érente. Le plus large est le contact de sécurité. Les prises terre possèdent deux contacts plus une mise à la terre servant de sécurité. Si la prise du bloc d'alimentation ou du cordon d'ali-mentation fourni ne correspond pas à celles de votre installation électrique, faites appel à un électricien pour eff ectuer le changement de prise.

10. Installez le cordon d'alimentation de telle façon que personne ne puisse marcher dessus et qu'il soit protégé d'arêtes coupantes. Assurez-vous que le cordon d'alimentation est suffisamment protégé, notamment au niveau de sa prise électrique et de l'endroit où il est relié à l'appareil; cela est également valable pour une éventuelle rallonge électrique.

11. Utilisez exclusivement des accessoires et des appareils supplémentaires recommandés par le fabricant.

12. Utilisez exclusivement des chariots, des diables, des présentoirs, des pieds et des surfaces de travail recommandés par le fabricant ou livrés avec le produit. Déplacez précautionneusement tout chariot ou diable chargé pour éviter d'éventuelles blessures en cas de chute.

13. Débranchez l'appareil de la tension secteur en cas d'orage ou si l'appareil reste inutilisé pendant une longue période de temps.

14. Les travaux d'entretien de l'appareil doivent être eff ectués uniquement par du personnel qualifié. Aucun entretien n'est nécessaire sauf si l'appareil est endommagé de quelque façon que ce soit (dommages sur le cordon d'alimentation ou la prise par exemple), si un liquide ou un objet a pénétré à l'intérieur du châssis, si l'appareil a été exposé à la pluie ou à l'humidité, s'il ne fonctionne pas correctement ou à la suite d'une chute. Pour la mémorisation des paramètres, cet appareil contient une pile au lithium non remplaçable par l'utilisateur. En cas de défaillance de la pile et perte des réglages, n'essayer pas de remplacer la pile par vous-même. Retourner votre appareil vers une station technique habilité.

15. N'exposez pas cet équipement au fait de tomber goutte à goutte ou au fait d'éclabousser et garantissez qu'aucun objet rempli des liquides, comme les vases, n'est placé sur l'équipement.

16. Pour complètement débrancher cet équipement de la conduite principale de courant alternatif, débranchez la corde de pouvoir du disjoncteur de conduite principale.

17. Cet appareil est fourni avec un cordon d'alimentation à 3 fils. Pour les raisons de sécurité, L'AVANCE DE TERRE NE DEVRAIT ÊTRE DÉBRANCHÉE DANS AUCUNE CIRCONSTANCE.

18. Mise au rebut appropriée de ce produit: Ce symbole indique qu'en accord avec la directive DEEE (2012/19/EU) et les lois en vigueur dans votre pays, ce produit ne doit pas être jeté avec les déchets ménagers. Ce produit doit être déposé dans un point de collecte agréé pour le recyclage des déchets d'équipements électriques et électroniques (EEE). Une mauvaise manipulation de ce type de déchets pourrait avoir un impact négatif sur l'environnement et la santé à cause des substances potentiellement dangereuses généralement associées à ces équipements. n même temps, votre coopération dans la mise au rebut de ce produit contribuera à l'utilisation efficace des ressources naturelles. Pour plus d'informations sur 'endroit où vous pouvez déposer vos déchets d'équipements pour le recyclage, veuillez contacter votre mairie ou votre centre local de collecte des déchets.

MC² AUDIO

Installing Your Amplifier: Electrical Considerations

The amplifier has been manufactured to comply with your local power supply requirements, but before connecting the unit to the supply, ensure that the voltage (printed on the rear panel) is correct.

The amplifier is fitted with either Auto sensing power supply operation from 110V to 230V

Make sure power outlets conform to the power requirements listed on the back of the unit. Damage caused by connecting to improper AC voltage is not covered by the warranty.

SAFETY WARNING

Connection to the mains supply must be either via an industrial plug, such as a "C Form" or permanently connected to the mains supply.

Where the amplifier is mounted in a rack and permanently connected to the mains, then the rack should be installed with a readily accessible connector or an ALL POLE circuit breaker with 3mm breaking distances.

This unit is supplied with a 3-wire power cord.

For safety reasons,
THE EARTH LEAD SHOULD NOT BE DISCONNECTED IN ANY CIRCUMSTANCE.

If ground loops are encountered consult the section on connecting your amplifier on page 11.

The wiring colours are:

230V AREAS: EARTH = GREEN AND YELLOW
NEUTRAL = BLUE
LIVE = BROWN

110V Area: EARTH = GREN or GREEN / YELLOW
NEUTRAL = WHITE
LIVE = BLACK

DO NOT USE THE UNIT IF THE ELECTRICAL POWER CORD IS FRAYED OR BROKEN. The power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs and the point where they exit from the appliance.

ALWAYS OPERATE THE UNIT WITH THE AC GROUND WIRE CONNECTED TO THE ELECTRICAL SYSTEM GROUND. Precautions should be taken so that the means of grounding of a piece of equipment is not defeated.

DO NOT REMOVE THE LID. Removing the lid will expose you to potentially dangerous voltages. There are no user serviceable parts inside.

ESD strikes to the unit's front panel that are in excess of 4000 volts may cause disturbance to the status LEDs on the unit. This will not affect audio performance and will be corrected on the next power up cycle.

Terminals marked with the ⚡ symbol are HAZARDOUS LIVE – external wiring connected to these terminals requires installation by an INSTRUCTED PERSON or the use of ready-made leads or cords.

Installing Your Amplifier: Mechanical Considerations

To ensure that this equipment performs to specification, it should be mounted in a suitable rack or enclosure as described below. Like all high power amplifiers, it should be kept away from other equipment which is sensitive to magnetic fields. Also, this amplifier may suffer a substantial reduction in performance if it is subjected to, or mounted close to equipment which radiates high RF fields.

Warning: To prevent injury, this apparatus must be securely attached to the rack in accordance with the installation instructions

When mounting the amplifier in a rack or enclosure:

Be aware that...

THE FRONT PANEL IS NOT CAPABLE OF SUPPORTING THE UNIT ON ITS OWN.
Make sure that the rear of the unit is adequately supported. The amplifier side feature integral holes which cage nut can be fixed to for rear support

ENSURE THERE IS ADEQUATE VENTILATION.
The cooling fans suck cool air in through the front and blow hot air out at the rear and side of the unit through the ventilating grills. The front and rear of the amplifier should have free exposure to the air (i.e. in a rack leave the front & rear doors off), with 2cm air gap at the sides.

IF AIR IS NOT ALLOWED TO ESCAPE FROM THE REAR, OVER-HEATING WILL OCCUR.
Take care when mounting other equipment in the same rack.

Make sure that the rack unit has a separate earth connection (technical earth).

Please also see the notes regarding maintenance on page 26.

Installing Your Amplifier: RF Emissions

The high frequency resonant converters in the your `i` Series amplifiers have been designed to have very low radio frequency (RF) emissions; however even these low level emissions can cause interference with other equipment.

In order for this to be minimised, the amplifier should be mounted in a metal rack enclosure, which should have a separate (technical) Earth. Alternatively, a separate earth should be attached to the amplifier at the rear rack mounting bracket.

About Your Amplifier: Dynamic Amplifier Performance Measurements

The I Series amplifiers are the very latest examples of a 'dynamic amplifier'. This new 'breed' of power amplifiers provide very high peak power levels in a much smaller, and lighter, package than previously possible with conventional designs.

They are designed specifically for today's high power audio installations, which use multiple speakers with electronic crossovers or speaker controllers. These systems can handle very high transient signals that far exceed their RMS power rating. The i-Series amplifiers have been designed to match this requirement and can deliver huge levels of power for short durations.

In order to protect themselves and the loudspeakers that they are driving, continuous signals such as sine waves, are automatically detected and reduced (ramped down) to a safe level.

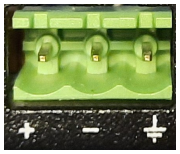
When trying to **measure the power output** however, continuous signals will give totally incorrect results. A dynamic signal, such as a tone burst, should be used and the levels measured by monitoring the waveform on an oscilloscope. The power envelope can then be accurately measured.

Our power output figures are measured using signals with known Crest Factors and are quoted at the rear of this manual on page 27 and on our website.

Please refer to the technical area of our website for further information – here you can download a set of Crest Factor tailored audio samples to allow you to compare our specifications with any other amplifier.

Connecting To Your Amplifier: Line Inputs

The inputs are made via 3-pin phoenix / eurostyle connectors, which are electronically balanced and should be connected via a high grade twin core screened cable, as follows. A small, flat blade screwdriver is required to terminate connections in these connectors.



Left : Hot (signal +)
Middle: Cold (signal -):
Right: Screen (see note below)

The amplifier is designed to operate with fully balanced equipment, ground loops or loss of performance may be experienced if connected to unbalanced sources. If it is unavoidable however, the following wiring should be used. The cable should still be twin core plus screen.

Balanced Connections
PIN+: Hot (signal +V)
PIN-: Cold (signal -V)
PIN Ground Screen

Unbalanced Connection
PIN+: Hot (signal +V)
PIN-: Screen
PIN Ground Screen

NOTE: This amplifier is wired to the latest industry recommendations. PIN1 is connected directly to the chassis/mains earth. If ground loops (mains hum) are encountered remove the screen connection from the other end of the cable and leave it open circuit. If problems persist, consult your dealer/supplier.

DO NOT TAMPER WITH OR ALTER ANY GROUND (EARTH) CONNECTIONSINSIDE THE AMPLIFIER.

For bridged operation input should be made to channels 1, 3, 5, or 7 as required and the channels set for bridged mode for the appropriate pair of channels. Please see following page for appropriate wiring information.

Connecting To Your Amplifier: Speaker Outputs

The speaker outputs are barrier strip screw terminals, the screw terminals are designed to suit wire terminations or U type crimps with a 3.3mm / 0.13 inch mouth .
The wiring polarity is printed on the rear panel, for **standard wiring** / Lo-Z / Hi-Z please see below :-

Normal Operation

When operating in normal mode minimum load = 2/2.7 ohms
Class 3 Wiring is required.
General cable gauge advice :-
750w @ 2 ohms = 2.5mm / 12AWG
650W @ 4 ohm = 1.5mm / 14AWG
350W @ 8 ohms = 1mm / 16AWG

Bridged Operation
Should **bridged connection** for high powers be required, channel pairs can be bridged eg (1&2), (3&4), (5+6) and (7&8) – there is a corresponding bridge switch for each channel pair.
The picture below shows all outputs wired in bridged configuration :-

.
When operating in bridged mode, the minimum impedances are doubled.
The minimum load in bridged mode is 4 ohms.
Class 3 Wiring is required.
General cable gauge advice :-
750w @ 2 ohms = 2.5mm / 12AWG
650W @ 4 ohm = 1.5mm / 14AWG
350W @ 8 ohms = 1mm / 16AWG

There must be not be shared connections between channels.

Negative output terminals must not be joined together as they are not both at ground potential, there may be signal on them. Connecting them together will damage the amplifier and void the warranty!

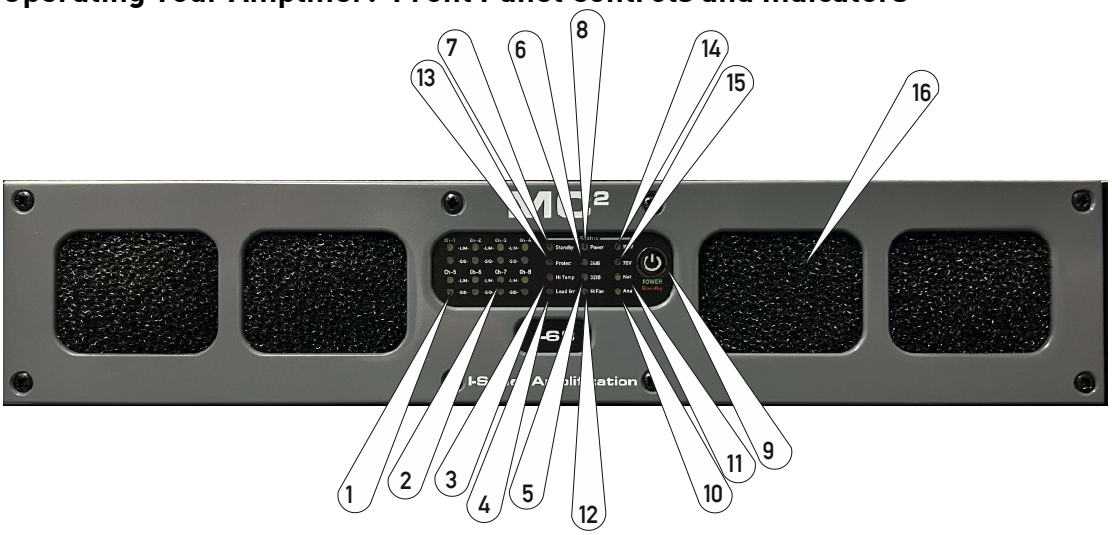
Connecting To Your Amplifier: Speaker Outputs

As the currents involved are very high, and to ensure best performance, the speaker cables should be kept as short as possible and conform to the following minimum requirements:
Connecting To Your Amplifier: Speaker Outputs

Do not connect the inputs/outputs to any other voltage source such as a battery, mains source or power supply, regardless of whether the amplifier is turned on or off.

Do not run the output of any amplifier channel back into another channel's input and do not parallel or series-connect an amplifier output with any other amplifier output.

Operating Your Amplifier: Front Panel Controls and Indicators



1: SIG: Signal present LED, 1 led for each channel, indicates signal is approx -15dB below full output.

2: LIM: Limit LED, 1 led for each channel, indicates the output level is at maximum and the amplifiers limiters are operational. The limit threshold per channel is determined by it loz / hiz mode, if hi z mode is enable the 70V or 100V dip will set the limiter threshold accordingly

3: HI TEMP: Indicates an amplifier channel or the power supply is getting hot. This may be normal but checking air inlets / outlets are not blocked is advised, checking system is operating as expected is advised

4: LOAD ERR: i-Series amplifiers feature load monitoring, this detects the speaker load impedance sits in a window, this window is defined by a corresponding rear preset. This led is global load error led. Should any of the channel loads measure outside the window, the led will illuminate. This may be normal in operation – please see appendix on load testing.

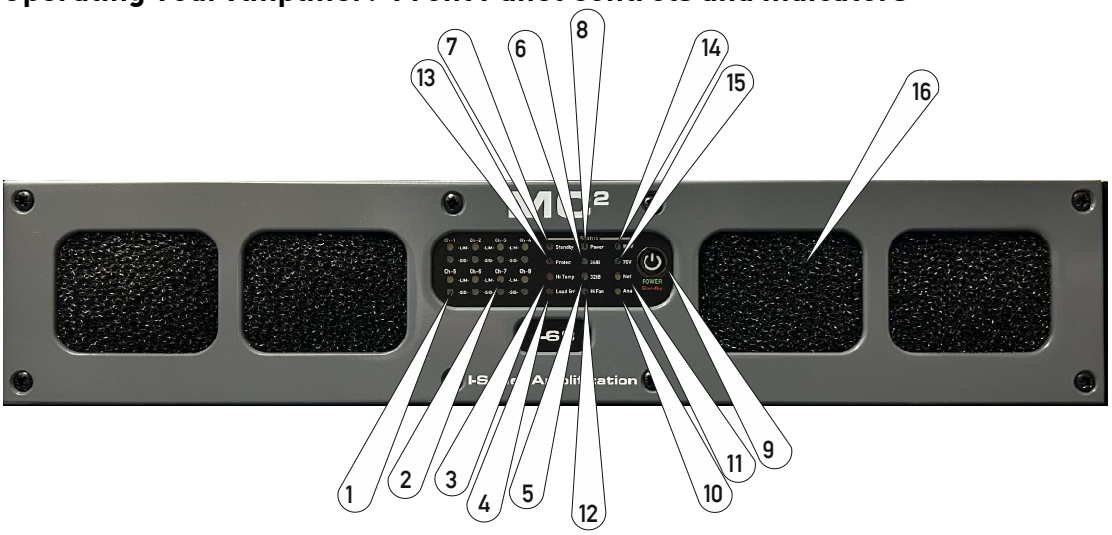
5: 32dB: A rear dip switch selects 32dB gain or 26dB gain – this led indicates the 32dB gain is currently selected

6: 26dB: A rear dip switch selects 32dB gain or 26dB gain – this led indicates the gain 26dB gain is currently selected.

7: STDBY: indicates the amplifier is in standby, this means it is in a low power mode and the speaker outputs are NOT operational.

8: POWER: – indicates the amplifier is turned on and operating. The speaker outputs are operational.

Operating Your Amplifier: Front Panel Controls and Indicators



9: POWER / SLEEP SWITCH: Switches the amplifier between ON & SLEEP.
Green = On, RED = Standby, not lit = SLEEP or no power connected.

10: ANA: Indicates either channel 1 – 4 or 4 – 8 have analog inputs selected.
11: NET: Indicates either channel 1 – 4 or 4 – 8 have network audio inputs selected.
Network Audio could be either Dante or AES67 from the optional network card.

12: HI FAN : This indicates the user selectable cooling fan mode, consider low speed fan for HiFi or Cinema operation, for low impedance(less 4 ohms) or ambient temperatures greater than 30 degrees Celsius hi speed/normal fan mode may be a better choice.

13: PROTECT: Typical conditions that could cause the protection to be triggered include very high frequency or subsonic input signals, short-circuited outputs, or internal high temperatures.

The protection circuit can affect all channels or a 'channel pairs depending on the type of fault. It is possible for two channels (a channel pair) to go into protect and other channels work normally. A channel pair would be 1+2, 3+4, 5+6 or 7+8.

Temperature related faults will reset automatically if the unit has cooled sufficiently. Output short circuit faults will reset once the short is removed. Short circuits on any channel will affect channel pairs.

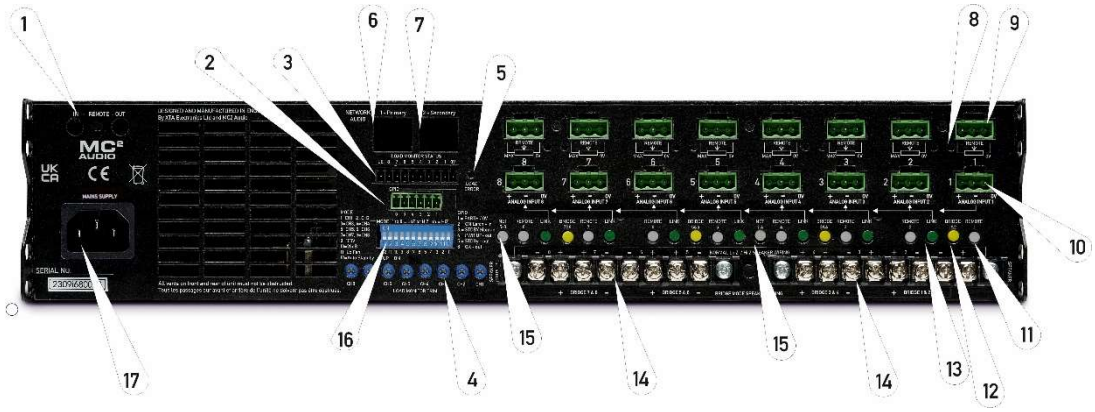
14: 100V: **DO NOT OPERATE WHILE SWITCHED ON** Individual amplifier channels can be changed from Hi-Z to Lo-Z mode using rear DIP switches. This LED indicates the global selection of the Hi-Z mode voltage. The LED operation is interlocked with the 70V led. This has **nothing** to do the mains power operation.

15: 70V: **DO NOT OPERATE WHILE SWITCHED ON** Individual amplifier channel can be changed from Hi-Z to Lo-Z mode using rear DIP switches. This LED indicates the global selection for the Hi-Z mode voltage. The LED operation is interlocked with the 100V led. This has **nothing** to do the mains power operation.

16: Foam filter for air inlet, the advanced cooling system incorporated in the I series amplifier requires air sucked in through front of the amplifier, this air is blown from the exhaust vents on the amplifier rear and side. DO NOT OBSTRUCT amplifier vents – blocking vents will result in a risk of over heating.

Operating Your Amplifier: Rear Panel Sockets and Switches

I-68 Rear Panel



1: Remote: 3.5mm stereo jack input and output for remote enabling power on / sleep. This is normally high, Pull low to switch OFF/SLEEP. For example connecting the tip / ring of the 3.5mm jack to each other will enable sleep.

2:GPIO : 6 way mini phoenix / euro style connector providing remote control and reporting of amplifier status.
Pin 1: Earth / 0V
Pin 2: Input : Power on – latched. Normally high – pull low to enable SLEEP.
Pin 3: Input : Standby - Momentary. A momentary 0V voltage for 300mS will toggle the amplifiers current standby state. This line is normally HIGH
Pin 4: Output : Indicates amplifier is ON - A 15mA current limited 5V voltage indicate the amplifiers in ON
Pin 5: Output : Indicates amplifier is in standby mode. A 15mA current limited 5V voltage indicates the amplifiers in in standby.
Pin 6: Output :Indicates amplifiers is OK / Healthy. This can be also be used to indicate a fault condition/ not OK. A 15mA current limited 5V voltage indicates the amplifier is running normally.

3: Load Monitor Status: this mini phoenix / euro style connector socket carries outputs indicating the status of the channel loads. There is 1 output per channel and a global load status pin. A 15mA current limited 5V voltage indicate the load has deviated from its calibrated normal. Please note this may be normal in operation as speaker impedance vary considerable with frequency. For this to be a valid alert the original test signal the load presets were set with should be used. Please check the section on load monitoring for more information.

4: Load Monitor Trim: These allow the user to set the load window which is classed as ok. 1 preset is provided per channel. When the load measures outside of this window it will be indicated on 3) Load Monitor status. Please note this may be normal in operation as speaker impedances vary considerably with frequency. For this to be a valid alert the original test signal signal the presets were set with should be used. Please check the section on load monitoring for more information.

5: Load Error Led : This is global load error indicator, should the load monitoring circuits measure a load (on any channel)which is outside that the window set by the load monitor trims this led will illuminate. Please check the section on load monitoring for more information.

Please note this may be normal in operation as speaker impedances vary considerably with frequency. For this to be a valid alert the original test signal signal the load presets were set with should be used.

Operating Your Amplifier: Rear Panel Sockets and Switches

6: 7: Audio network connections[1]: These are 2 x RJ45 connectors for the network audio interface. This is an optional network card, it can be specified with order, it can also be retrofitted by a competent technician. It provides 8 audio paths from the network. Currently a Dante / AES67 card is available. The NET 1-4 switch allows network audio delivery to channels 1 -4, the NET 5-8 switch allows network audio deliver to channels 5 – 8.

8: Gain Preset : 8 gain preset are provided, 1 per channel, when set at max the amplifier gain is indicated by illumination of the 26dB or 32dB status led. Should this need reducing / or simply output level in some zones reduced, the recessed preset will reduce gain to -infinity/ no output. It is a linear type control, this means the mid position is the -6dB for the gain indicated. The gain preset can be bypassed / disable if required by setting internal jumpers.

9: Remote Volume: A standard 3 pins phoenix / euro style connector is provided for the remote level control, a pot can be connected as per the wiring on the rear panel for remote level / volume control. Screened cables are essential for these connections, this is NOT a vca type control, it should be treated as an unbalanced connection to / from a potentiometer (pot). Avoid excessive cable lengths to the pot. A 5K – 20K log taper pot is recommended for best performance . To enable the Remote Volume input the 11) Remote switch needs enabling. The remote volume function can be bypassed / disabled if required by setting internal jumpers or 11).

10: Analog Input: A standard 3 pins phoenix / eurostyle connector is provided for the connector of analog input signal. Balanced / unbalanced signal can be connected here. The amplifiers has balanced inputs ensuring better rejection of common mode noise.

11: Remote: Pressing this button enables the 9) Remote Volume input.

12: Bridge 1&2: The i68 is an 8 channel amplifier, channel pairs can be bridged to deliver increased power levels into 4 or 8 ohms loads. **Do not bridge into 2 and 2.7ohms loads**. Channel pairs have corresponding bridge button i.e. 3&4, 5&6 and 7&8.
Please take note of the output polarity when bridge mode wiring is required, this is printed on the rear panel. There is a drawing below which display wiring for all channels in bridge mode. Class 3 wiring is required.

13:Link: This button allow adjacent channel inputs to be linked together, for example if a user injected a signal into Analog input A, pressing all the LINK buttons would route input A to all speaker outputs. This makes linking combinations possible eg if 1+2, 2+3, 3+4, 4+5, 6+7, 7+8.

Operating Your Amplifier: Rear Panel Sockets and Switches

14: Speaker Outputs: These are barrier strip outputs for connecting loudspeakers, 70V or 100V line. While wires can be connected directly here, they are designed for U type crimp with a 3.3mm / 0.13 inch mouth. When connecting loudspeaker please take note of the loudspeaker polarity, standard polarity speaker wiring is displayed below. For bridge mode wiring please go to 12) Bridge.
Class 3 wiring is required.

15: Net 1-4 & Net 5 – 8
If the optional network card is fitted, pressing this button allows routing of network audio signal to the speaker outputs.
Pressing NET 1-4 will deliver audio from the network card to the speaker outputs 1 - 4, 1 – 4 analog inputs will be ignored.
Pressing NET 5 - 8 will deliver audio from the network card to the speaker outputs 5 - 8, 5 - 8 analog inputs will be ignored.

16: Mode: **These should only be operated when the amplifier is OFF/SLEEP.** This is 12 way dip switch which allow selection of 100V / 70V operation, individual Lo-Z or Hi-Z channel operation, auto standby, amplifier gain and low noise fan modes. These are detailed below :-

SW1 : to SW8: DOWN = Lo-Z, UP = Hi-Z
Individual channels can be in Lo-Z mode, typically for 2 – 32ohms loudspeaker or Hi-Z mode requiring 70V or 100V voltage. Down = Lo -Z , Up = Hi -Z.
When Hi – Z mode is enable a 70Hz hi pass filter is in circuit and the output limiter is adjusted in accordance with the SW9, the global 70V/ 100V mode switch.

SW9: DOWN = 70V, UP = 100V
This is global setting for the Hi-Z mode, this can be 70V (USA) or 100V(rest of the world)

SW10: GAIN : DOWN = 26dB .This adjusts the amplifier gain to suit your application it can be set to 26dB or 32dB. The status of this switch is indicated on the front panel. Please note adjustment of amplifier gain has an affect on the correct limiter setting in your processor – if connected to a MC2 Delta dsp or XTA amplifiers aux outs, the Audiocore Amped edition preset library assumes amplifier gain = +32dB. Should your application be home cinema / hifi you may find the 26dB gain setting more suitable.

SW11:Lo Fan : DOWN = Normal mode. The user can select a low speed fan mode if required, this may be useful where the amplifier is located in a listening room / residential cinema. Please note for power hungry applications eg 8 channels of 2 / 2.7 ohms loudspeakers, this may compromise thermal performance resulting in thermal shutdown. The 3) Hi – Temp led will illuminate should internal operating temperatures have the potential for concern.
If Hi-Temp illuminates when Lo Fan is enabled we suggest disabling Lo Fan mode.

Operating Your Amplifier: Rear Panel Sockets and Switches

SW12:Auto standby DOWN = OFF. The amplifier has power saving feature which switches the amplifier to a low power standby mode when audio is not present. When auto standby is enable (switch : up), it will wake up / unmute in less than 1 second.
Amplifier OFF(SLEEP) power consumption = less than 1W
Auto Standby mode power consumption = 10 W
On / Idle Power consumption = 120W

17: IEC mains inlet: A iec mains inlet is provided for connection of mains power, a universal power supply allows compatibility with nominal mains voltages of 110V – 230V.
Power consumption (in use) typically 300-781W depending on speaker load/ program material. Standby power consumption is in the 2 -10W range.

18: Exhaust vents : I series amplifier suck air in the front panel foam filters. They blow air out through these exhaust vents on the side and rear.. DO NOT OBSTRUCT amplifier vents – blocking vents will result in a risk of overheating. They are not for photon torpedoes

Operating Your Amplifier: Initial Set-up and Switching On

Please read all documentation before operating your amplifier and retain all documentation for future reference.

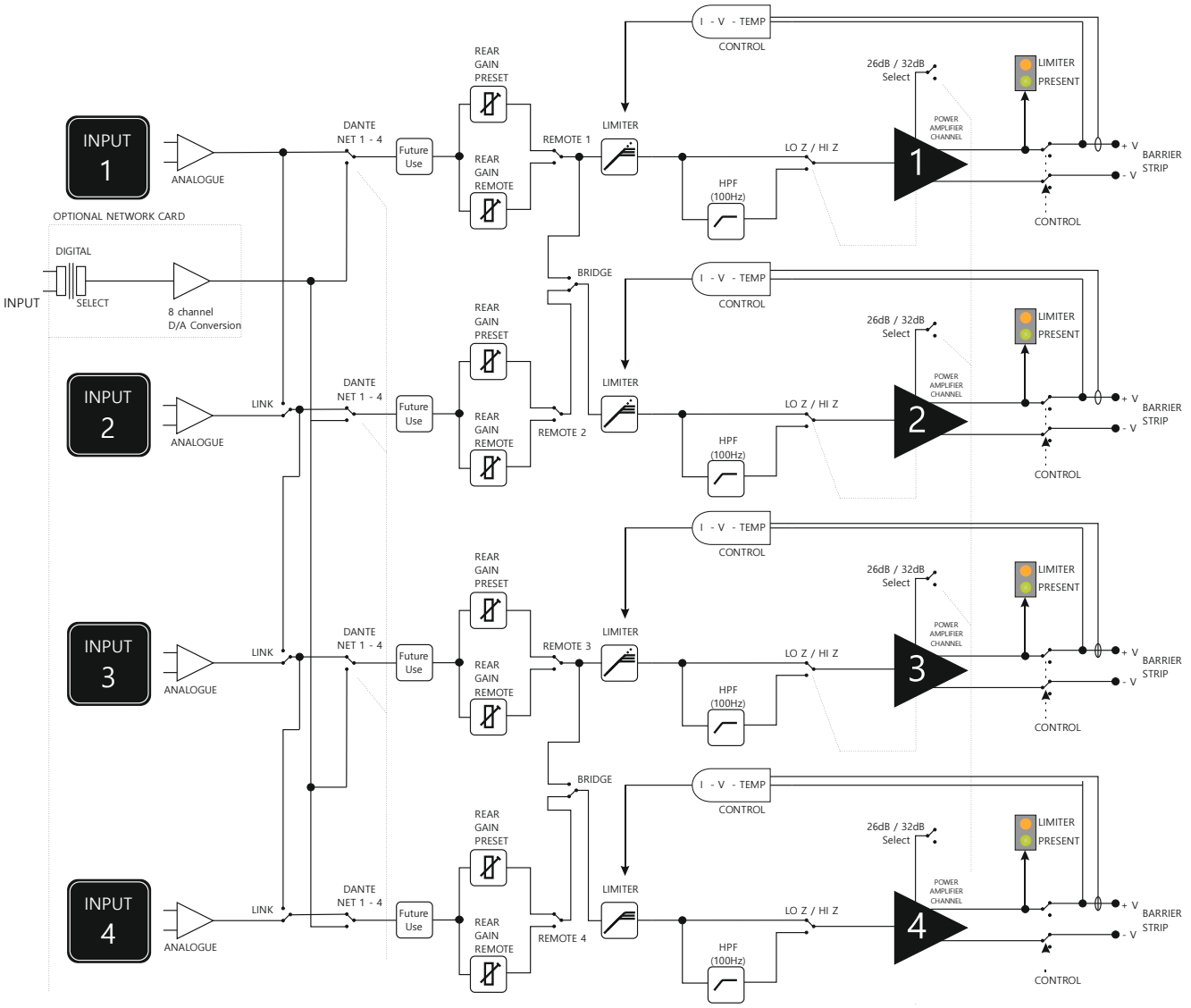
Do not spill water or other liquids into or on the unit and do not operate your amplifier while standing in liquid.

Do not block fan intake or rear ventilation outlets or operate the unit in an environment that could impede the free flow of air around the unit. Air is suck in through the front foam and blown out of the rear vents.

If your amplifier is used in an extremely dusty or smoky environment, it should be cleaned of any collected debris at regular intervals. Please also see the notes regarding maintenance on page 25.

It is important that the power output of your amplifier is matched to the power handling capacity of your loudspeaker. If not, damage to the loudspeaker could occur.

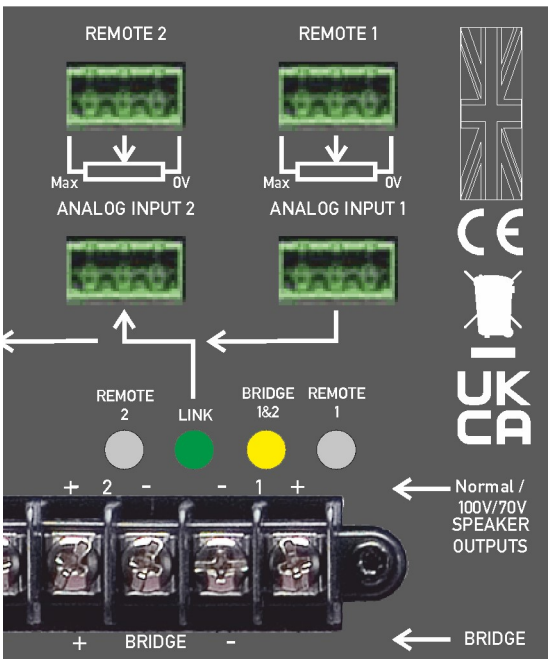
Inside Your Amplifier: i68 / i64 Block Diagram



Operating your amplifier

Operating Your Amplifier: Initial Set-up and Switching On

Source Choices and Selection



Your amplifier can source audio from analogue or network locations (if a network card is fitted).

Analogue audio via the balanced rear phoenix / eurostyle connects is standard. An optional audio network card can be specified with order or retrofitted (see appendix).

Link switches allow convenient input linking of adjacent channels i.e, 1 to 2, 2 to 3 , 3 to 4 and so on.
This means input parallel wiring using the phoenix / eurostyle connector is not needed.

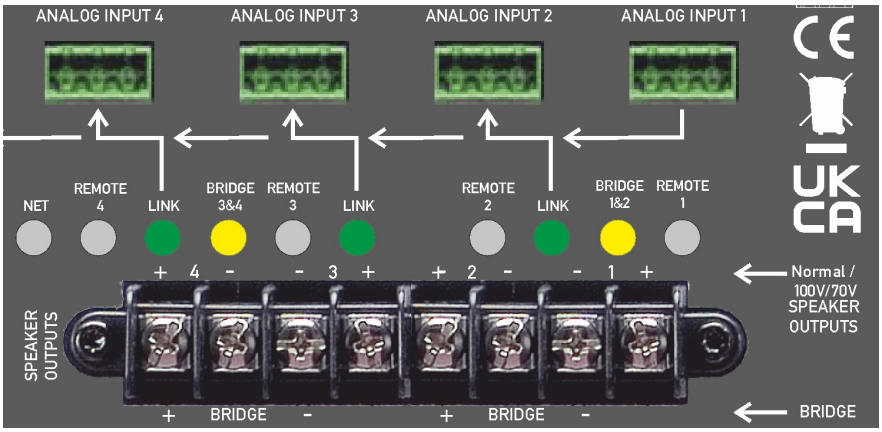
The Link switch work on the analog inputs not the network audio inputs.
Linking of Network audio input should be done in you network audio routing software e.g. Dante Controller.

Important - the top row of phoenix connectors are NOT audio connections, they are remote control inputs for VCA type remote volume controls. These can be wired to potentiometers for remote control of the volume / audio level.

Network Audio can be selected in block of 4, i.e. Output 1 – 4 and or outputs 5 – 8 using the appropriate rear push button switch NET 1-4 / Net 5-8

Operating Your Amplifier:

Loudspeaker Selection



Your I series amplifier allow easier connection of hi z and lo z speaker via the rear barrier strips. **The DIP switches which change Lo Z and Hi modes should only be operated when the amplifiers is OFF/ SLEEP.**

Normal operation is Lo-Z mode, typically for direct connection of 2 - 30 ohms loudspeakers.

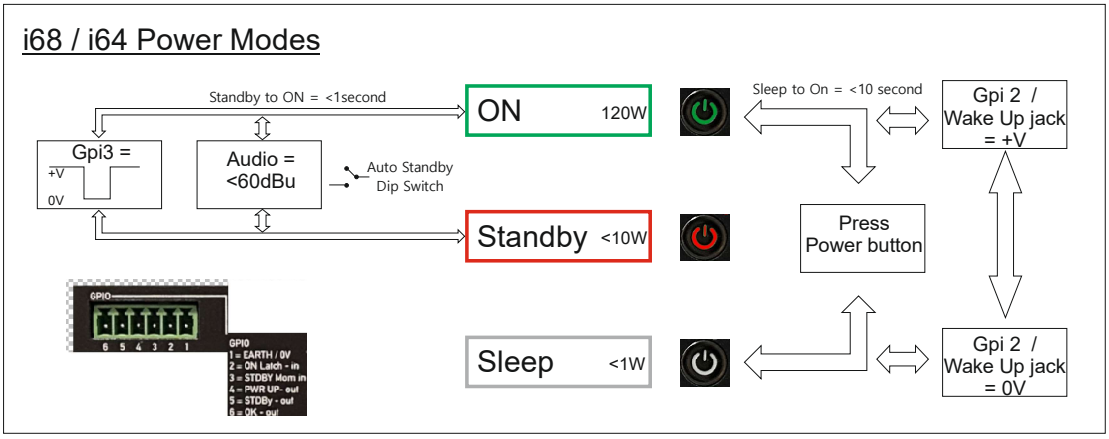
Should high powers be required bridging channel pairs can be done using the rear panel bridge push button switch.

Should 70V / 100V line speakers be used there is a global dip switch which selects this.
USA typically use 70V, the rest of the world preferring 100V.
Individual channels can set to Hi – Z mode, enabling Hi-Z mode on a channel enables a 70Hz high filter and the output limiter is determined by the global 70V / 100V switch.

The amplifier direct drives 70V / 100V loudspeaker, i.e. no internal /external transformers are required, typically a step down transformer is located within or near the speaker enclosure, often with tapped power options on the rear of the loudspeaker.

Operating Your Amplifier:

GPIO Operation – Power/ Standby and Sleep



Your amplifier has 3 power modes On, standby and sleep. There are various method to move between these modes – these methods are displayed in the above diagram.

Pressing the Power button moves the amplifier between ON & SLEEP
The amplifier can be connected to 3rd party systems and moved between ON and SLEEP using either GPI 2 or the 3.5mm wake up jack.
The amplifier changes from SLEEP to ON in approx. 8-10seconds
SLEEP power consumption is less than 1W.
SLEEP is the most energy efficient state for the amplifier and should be considered where green credentials are required.

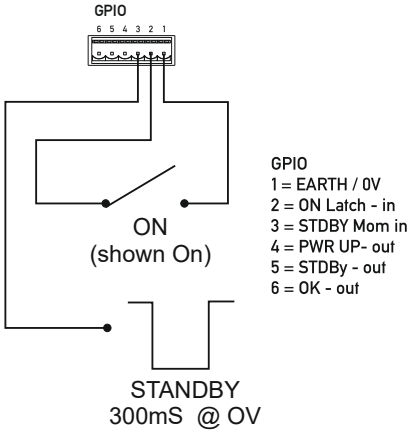
Should a project require quick power up, i.e. 8 seconds in unacceptable and less than 1 second is desired, consider use Standby as an alternative to Sleep.
Standby can be considered a mute for many purposes due to its sub 1sec start time, fast audio fade in time.

Once the amplifier is On there are 2 methods to get the amplifier into Standby.

1) A momentary low voltage (300mS) on GPi 3 will put the amplifier in Standby. The same low pulse (300mS) will turn the amplifier back On
2) The amplifier can be configured to wake up when the audio input greater than -60dBu. The Auto standby dip switch enable this mode.

The amplifier changes from STANDBY to ON in less 1 second.
STANDBY Power consumption is less than 10W.

GPIO Operation – Power/ Standby and Sleep



Last takes precedence rules apply to Power button, Wake up Jack, GPi 2 and GPi 3 logic.

GPIO Operation – Power/ Standby and Sleep

The amplifier power mode is displayed by the colour of the mains switch :-

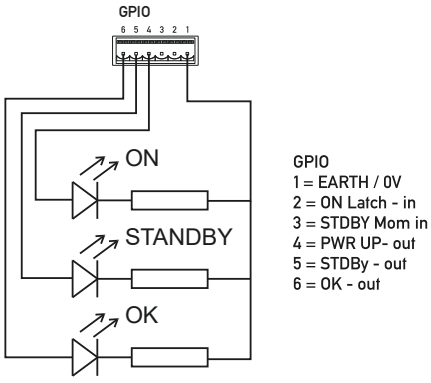
OFF = Sleep or no power is connected
Red = Standby
Green = ON – fully operational

GPO reporting / Output

The amplifier has 3 x GPO which provide useful status information, these can be connected to third party control system or simply via resistor to an LED status panel
These are pins 4, 5, 6 on the GPIO header.

Pin 4 = ON : 5V = On
Pin 5 = Standby : 5V = standby
Pin 6 = OK : 5V = OK

They are 5V outputs, they can sink 15mA, these can drive an led via a 470r-10K resistor.
They are active high outputs – e.g. a low output on Pin 6 could indicate - fault / no power.



Operating Your Amplifier:

Load Monitoring

The amplifier features advanced load monitoring for each channel, the status of each load is reported to the LOAD MONITOR STATUS header. There is an individual output per channel and a global output. These outputs, can provide reporting to 3rd party systems or drive an led via 470r – 10K resistor.

The global load status is reported to the `LE' connection, the load error led on the front and rear.

The load monitoring provides status only - it does not does not affect the normal running of the amplifier.

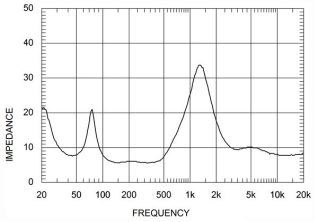
To configure the load monitoring :-
Simply connect the test signal eg pink noise / sine wave or music.
Ensure the load is connected.

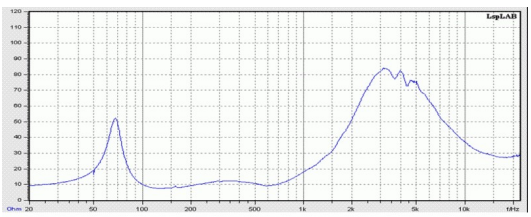
Adjust the LOAD MONITOR TRIM for each channel whilst monitoring the associated channel output pin. The trim adjusts a reference voltage for a comparator, adjustment will cause the output pin go from high to low then high, when monitored with volt meter, if monitored with an led it will begin On, go OFF, then come back ON.
The TRIM is correctly set when in the middle of the low gpo voltage or the LED is off.

The load monitoring is optimised for current in the following range :40mA – 4A
The load monitoring is optimized for voltage in the following range : 7V – 100V
This give a impedance range 3 ohms to 150 ohms.

The window load OK window = approximately +/- 50%
In loz mode creates a nominal range of 3 - 150r +/-50%
In hix mode creates a nominal range of 12 – 600r +/-50%

This means load monitoring can be accomplished on both lo-z and hi-z loads.





As you can see from the above examples speaker impedance can vary considerably with frequency, setting the TRIM presets should be done with same source signal as when future measurements are planned. This test signal could be pink noise, in the 2nd example above band limited pink noise centered around 400Hz would be better, sine waves also work well, music / speech would not work as accurately because the frequency content is so variable. Ensure if using a sine wave or band limited noise the impedance of the speaker at these frequencies falls within amplifier (Z) test window- eg while moving coil driver typically fall in 2 - 50 ohm range, piezo devices can be greater than greater than 1000 ohms in the audio band.

When implementing these different test strategies if the TRIMs are set with Pink noise at xx dBu at the output of the console driving the system, ensure the same situation is used when the system is tested.
This could be part of test plan implemented on match day, at a sports venue, to ensure all speakers are operational, essentially conducted in the same way fire alarms are routinely tested.

Operating Your Amplifier: Switching between analogue & networked audio

Interface Configuration

Your amplifier may be fitted with a Dante network audio card, which includes 24-bit 96kHz high performance analogue to digital converters, allowing the amplifier to use up 8 channels chosen from a Dante network. This is optional card and can be retrofitted if required.

As the digital audio network will most likely be running at a higher level compared to your analogue inputs, we strongly recommend you turn the rear attenuators to minimum before switching modes.

To switch to network audio mode, depress the rear panel switch marked "NET 1-4" and / or "NET 5-8" as required.

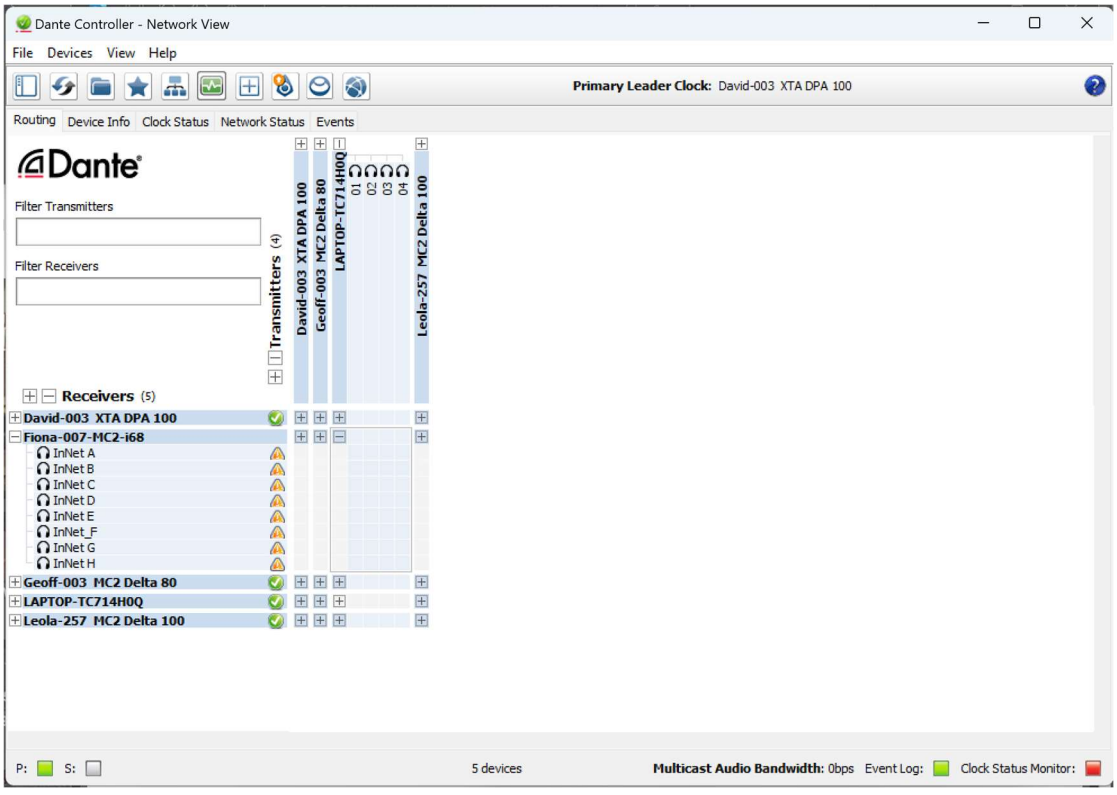
When changing between analog inputs to network inputs, be aware 0dBu from an analog source and 0dBFS from a digital source, 0dbFS is approximately 10 x louder than 0dBu.

Slowly increase the source output levels again after the mode has been changed.

You will need to use Dante Controller to choose which channels to feed to the amplifier's inputs. It can be downloaded free here:

https://www.audinate.com/products/software/dante-controller

The amplifier's inputs will appear in a manner similar to the example below:



Note that the rear panel "Link" switches do not function on the Network Audio inputs. If linking is required this can be set up as part of the source selection within Dante Controller.

Looking after your amplifier: Maintenance

These maintenance instructions are for use by qualified personnel only. Before any routine maintenance, please ensure that your amplifier is disconnected from the mains supply!

The filter behind the air intake apertures on the front of your amplifier should be cleaned or replaced periodically, e.g. 3 -6 months. (Filters in amplifiers located in more 'dirty' atmospheres may require more frequent maintenance).

The filter should be cleaned, using a vacuum cleaner preferably. Running the unit without a filter is not recommended. We recommend replacement of filters every 2-3 years, depending on usage. Replacement filter material is available directly from us.

If the fan vents on the rear of the amplifier develop a build-up of dust/debris on the finger guards, they can be cleaned with a dry paintbrush and a vacuum cleaner.

The casework of the amplifier may be cleaned with a lightly dampened cloth – do not use any solvents as they will damage the paint finish and could remove printing.

If you have any doubts about carrying out maintenance, please refer to a service engineer or contact your local dealer.

Looking After Your Amplifier: Warranty

Your amplifier is guaranteed for a period of five (5) years from the date of manufacture. Please note that this does not apply to OEM versions of the amplifier – please consult your manufacturer for their warranty terms. We hope that it gives you many more years of reliable service than this, but should anything go wrong, please contact us to advise you about repairs or any spares you might require.

Please do not attempt to repair the amplifier yourself as doing so will invalidate the warranty.

Our contact details are:

MC² Audio,
Units 6-8 Kingsgate
Heathpark Industrial Estate
Honiton, Devon
England
EX14 1YG

Tel: +44(0)1404 44633
Fax: +44(0)1404 44660

email: sales@mc2-audio.co.uk for general enquiries

Our website is a great place to get started if you have any questions regarding the general use of your amplifier or need copies of this manual in digital form, or datasheets and photographs. The datasheets also contain architect's and engineer's specifications.

www.mc2-audio.co.uk

Performance Of Your Amplifier: Specifications

Main Specifications

Parameter (Units)	i-68/i-64	i-38
Output Power per channel (Watts)	2 / 8 channel	2 / 8 Channel
8 Ohms	370/350	330/430
4 Ohms	640/600	460/378
2.7 Ohms	800/600	367/326
2 Ohms	650/600	275/294
Output Power per channel bridged [Crest Factor = 4.8] (Watts)		
8 Ohms	1280/1200	920/756
4 Ohms	1280/1200	Not useful
THD+N, 4 Ohms (%)		
@1kHz, 1dB below max output power <	0.08	0.08
@20Hz - 20kHz, 1dB below max output power <	0.1	0.1
Gain Options (dB)	26/32 rear switch	26/32 Rear switch
Sensitivity Options for max power (dBu)	+11/+5	
Sensitivity Options for max power (Volts)	2.75/1.4	
Frequency Response, +0/0.5dB (Hz)	20 – 20000	20 – 20000
Power Consumption, Nominal @ 240V, 4 Ohms (A)	3.0	2
Power Consumption, Nominal @ 120V, 4 Ohms (A)	5.58	3.73
Dimensions H x W x D (mm)		
Amplifier	88 x 482 x 428	88 x 482 x 428
Boxed	230 x 580 x 560	230 x 580 x 560
Boxed Shipping – all except UK	250 x 610 x 600	250 x 610 x 600
Weight (kgs)		
Amplifier	10.0	10.9
Boxed – shipping	11.5	12.4

Additional Specifications

Parameter (Units)	i-68/i-64	i-38
Input Impedance – Active Balanced (Ohms)	20k	20k
Input CMRR (dB)	> 60	> 60
Damping Factor, 1kHz, 8 ohms	> 400	> 400
Signal Limiters Present	Yes	Yes
Protection Present – Short Circuit / DC Output / Temperature	Yes	Yes
Mains In-rush Control Present	Yes	Yes
Output Power per channel, 8 Ohms (Watts)		
Continuous music [Crest Factor of 2.8 or 9dB]	320	171
Continuous music [Crest Factor of 4.8 or 14dB]	340	171
Continuous music [Crest Factor of 7.8 or 18dB]	340	162
Output Power per channel, 4 Ohms (Watts)		
Continuous music [Crest Factor of 2.8 or 9dB]	570	340
Continuous music [Crest Factor of 4.8 or 14dB]	650	340
Continuous music [Crest Factor of 7.8 or 18dB]	650	320
Output Power per channel, 2 Ohms (Watts)		
Continuous music with Crest Factor of 2.8 [9dB]	570	390
Continuous music with Crest Factor of 4.8 [14dB]	670	390
Continuous music with Crest Factor of 7.8 [18dB]	670	390

Due to continuing product improvement, the above specifications are subject to change.

Power Consumption and Thermal Emissions – i-68

Mains (V)	Load (R)	Current Draw (A)				Thermal Emissions (W)			
		No Sig'l	**Light**	**Average**	**Heavy**	**No Sig'l**	**Light**	**Average**	**Heavy**
240	**8**	0.5	0.96	1.67	4.08	115	341	340	300
240	**4**	0.5	1.5	3.0	3.96	115	650	640	330
240	**2**	0.5	1.5	3.0	4.08	115	672	640	350
120	**8**	1	1.88	3.38	8.17	115	341	340	300
120	**4**	1	3.00	5.58	7.92	115	640	600	330
120	**2**	1	3.00	6.25	8.17	115	640	600	300

Power Consumption and Thermal Emissions – i-64

Mains (V)	Load (R)	Current Draw (A)				Thermal Emissions (W)			
		No Sig'l	**Light**	**Average**	**Heavy**	**No Sig'l**	**Light**	**Average**	**Heavy**
240	**8**	0.5	.64	1.12	2.73	115	228	238	210
240	**4**	0.5	1.0	2.0	2.65	115	436	436	231
240	**2.7**	0.5	1.0	2.0	2.73	115	450	450	245
120	**8**	1	1.26	2.26	5.47	115	302	229	210
120	**4**	1	2.00	3.74	5.31	115	436	400	231
120	**2.7**	1	2.00	4.19	5.47	115	450	452	210

Power Consumption and Thermal Emissions – i-38

Mains (V)	Load (R)	Current Draw (A)				Thermal Emissions (W)			
		No Sig'l	**Light**	**Average**	**Heavy**	**No Sig'l**	**Light**	**Average**	**Heavy**
240	**8**	0.5	0.94	1.63	2.92	115	331	330	220
240	**4**	0.5	0.96	1.67	2.42	115	341	338	172
240	**2**	0.5	0.79	1.25	2.38	115	172	170	130
120	**8**	1	1.88	3.25	5.83	115	331	330	220
120	**4**	1	1.92	3.33	4.83	115	341	338	172
120	**2**	1	1.58	2.5	2.28	115	172	170	130

No Sig'l = Quiescent, Light = Crest Factor of 7.8(18dB),
Average = Crest Factor of 4.8(14dB), Heavy = Crest Factor of 2.8(9dB)
For details of measurement methods please refer to the Technical Support area of our website.