ARC-5

Technical Manual

March 21, 2019

Dante AES67

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Introduction

Thank you for purchasing this product by Arrakis Systems. Our company has provided professional audio equipment to the broadcast, commercial audio, and consumer audio markets for more than 30 years. Our products are sold worldwide and are well known for leading edge technology, quality, and reliability.

How to contact Arrakis Systems

Arrakis Systems inc. is located at:

Arrakis Systems inc
6604 Powell Street
Loveland, Colorado
80538

Business Hours: 8:00am - 4:30pm mountain time

Voice: 970-461-0730 x316

Fax: 970-663-1010

Email: consolesupport@arrakis-systems.com

Having difficulty contacting Arrakis?
Refer to the website (www.arrakis-systems.com) for current contact information

Safety Instructions

1. Read All Instructions. All safety and operating instructions must be read before operating the product.
2. Retain All Instructions. All safety and operating instructions must be retained for future reference.
3. Heed All Warnings. All warnings on the product and those listed in the operating instructions must be adhered to.
4. Follow All Instructions. All operating and product usage instructions must be followed.
5. Heat. This product must be situated away from any heat sources such as radiators, heat registers, stoves, or other products (including power amplifiers) that produce heat.
6. Ventilation. Slots and openings in the product are provided for ventilation. They ensure reliable operation of the product, keeping it from overheating. These openings must not be blocked nor covered during operation. This product should not be placed into a rack unless proper ventilation is provided through following the manufacturer's recommended installation procedures.
7. Water and Moisture. Do not use this product near water—for example; near a bath tub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool or the like.
8. Attachments. Do not use any attachments not recommended by the product manufacturer as they may cause hazards.
9. Power Sources. This product must be operated from the type of power source indicated on the marking label and in the installation instructions. If you are not sure of the type of power supplied to your facility, consult your local power company.
10. Grounding and Polarization. This product is equipped with a polarized AC plug with integral safety ground pin. Do not defeat the safety ground in any manner.
11. Power Cord Protection. Power supply cords must be routed so that they are not likely to be walked on nor pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord plugs into the product.
12. Lightning. For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the AC wall outlet. This will prevent damage to the product due to lightning and power line surges.
13. Overloading. Do not overload AC wall outlets, extension cords, or integral convenience outlets as this can result in a fire or electric shock hazard.
14. Object and Liquid Entry. Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
15. Accessories. Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious damage to a child or adult, and serious damage to the product. Any mounting of the product needs to follow manufacturer's installation instructions.
16. A Product and Cart Combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and the cart combination to overturn.
17. Servicing. Refer all servicing to qualified servicing personnel.
18. Damage Requiring Service. Unplug this product from the wall AC outlet and refer servicing to qualified service personnel under the following conditions: a. When the AC cord or plug is damaged. b. If liquid has been spilled or objects have fallen into the product. c. If the product has been exposed to rain or water. d. If the product does not operate normally (following operating instructions). e. If the product has been dropped or damaged in any way. f. When the product exhibits a distinct change in performance. This indicates a need for service.
19. Replacement Parts. When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazards.
20. Safety Check. Upon completion of any repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
21. Cleaning. Do not use liquid cleaners or aerosol cleaners. Use only a damp cloth for cleaning.

Hazard / Warning Label Identification

WARNING: SHOCK HAZARD - DO NOT OPEN
AVIS: RISQUE DE CHOC ELECTRIQUE - NE PAS OUVRIR

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE ANY COVER OR PANEL. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THE CONSOLE TO RAIN OR MOISTURE.

The Exclamation Point symbol, within an equilateral triangle, alerts the user to the presence of important operating and maintenance (servicing) instructions in product literature and instruction manuals.

The Lightning Flash With Arrowhead symbol, within an equilateral triangle, alerts 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.

WARNING— This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions in this manual it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device (pursuant to Subpart J of Part 15 FCC Rules), which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Warranty

This console carries a manufacturer's warranty subject to the following guidelines and limitations:
A) Except as expressly excluded herein, Arrakis Systems inc. ("Seller") warrants equipment of its own manufacture against faulty workmanship or the use of defective materials for a period of one (1) year from date of shipment to Buyer. The liability of the Seller under this Warranty is limited to replacing, repairing or issuing credit (at the Seller's discretion) for any equipment, provided that Seller is promptly notified in writing within five (5) days upon discovery of such defects by Buyer, and Seller's examination of such equipment shall disclose to its satisfaction that such defects existed at the time shipment was originally made by Seller, and Buyer returns the defective equipment to Seller's place of business in Loveland, Colorado, packaging and transportation prepaid, with return packaging and transport guaranteed.

B) Equipment furnished by Seller, but manufactured by another, shall be warranted only to the extent provided by the other manufacturer.

C) Thermal filament devices (such as lamps and fuses) are expressly excluded from this warranty.

D) The warranty period on equipment or parts repaired or replaced under warranty shall expire upon the expiration date of the original warranty.

E) This Warranty is void for equipment which has been subject to abuse, improper installation, improper operation, improper or omitted maintenance, alteration, accident, negligence (in use, storage, transportation or handling), operation not in accordance with Seller's operation and service instructions, or operation outside of the environmental conditions specified by Seller.

F) This Warranty is the only warranty made by Seller, and is in lieu of all other warranties, including merchantability and fitness for a particular purpose, whether expressed or implied, except as to title and to the expressed specifications contained in this manual. Seller's sole liability for any equipment failure or any breach of this Warranty is as set forth in subparagraph (A) above; Seller shall not be liable or responsible for any business loss or interruption, or other consequential damages of any nature whatsoever, resulting from any equipment failure or breach of this warranty.

For the latest warranty information, please visit our website.

Product Description

ARC-5 Analog Broadcast Console

- 5 Channels
- Inputs – 2 Mic, 1 Stereo Line, 1 USB (A/B for additional input), 1 Mix-Minus.
- Outputs – 1 Stereo Program Mixing bus.
- 2 high quality mic channels (with optional 48VDC phantom power).
- 2 stereo line inputs. Channel 3 & 4.
- USB input/output. Record or playback.
- Mix minus telephone output for interfacing with an external phone hybrid.
- Conductive plastic slide faders & LED switch lamps for long life.
- 4 dry contact button for connecting to 3rd party equipment, such as a studio camera system.

Technical Description

Mechanical

Switch type:	Mechanical, 4 pole, double throw.
Switch illumination:	LED, for long life.
Linear Fader type:	Conductive plastic for highest possible resolution and life. 30,000 cycles.
PC Boards:	Single motherboard.
IC sockets:	All IC's, except for one, are socketed for ease of service.
VU Meters:	Long life LED meters.

Electronic

Stereo Line Input
- Freq Response- +(-).5dB 20-20kHz
- S/N- -82dB typ, +8dBu in, +8 dBu out
- THD- .01% typ, +8dBu in, +8 dBu out
- CMRR- -75dB typ 1kHz
- Max Input- +23dBu, balanced

Mono Mic Input
- Freq Response- +(-).5dB 20-20kHz
- EIN- -115dBu typ, -50dBu in, +8 dBu out
- THD- .05% typ , -50dBu in, +8 dBu out
- CMRR- -60dB typ 1kHz

Impedances
- Mic Input- > 2000 ohms
- Line Input- > 10000 ohms
- Outputs- < 100 ohms

System
- Max Output- +23dBu balanced
- Stereo Separation- -75dB typ 1KHz
- Cue to Pgm XTalk- -90dB typ 1KHz-75dB typ 20kHz

Power Supply
- 110vac - 220 VAC, 50-60 hz, autosensing
- Certified: UL, CE, CS, CB
- External inline module: 3"W x 5 3/4"L x 1 3/4"D

Logic

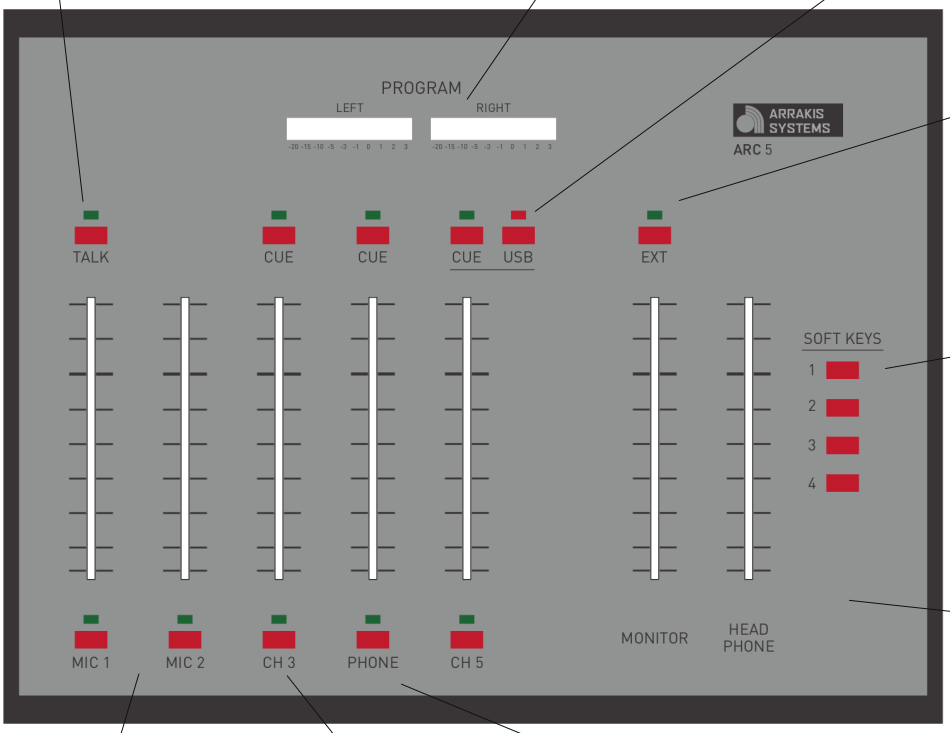
On Air Light Logic: reed relay closure, 50mA max
Source Start Logic: Dry contact closure buttons, qty 4. Can be setup to send 5V.
Mic Turret Logic: none

Operating Instructions

Talk Button
Push to talk to a caller off line.

VU Meters
LED meters for accurate ballistics. Program bus.

CH5 A/B switch
Select between a stereo line Level input and an internal USB sound card.



EXT
Selects an external audio input (such as off air) as the source for the monitor & headphone systems.

SOFT KEYS
Press to trigger a dry contact closure. This can control 3rd party hardware, such as switch camera views.

MONITOR & HEAD PHONE Level Control
Slide faders to control audio level for Monitor & Headphones.

Mic Channels
2 Mic channels for a standard host/guest format.

Stereo Line Input
For connecting external audio equipment, such as an automation system or MP3 player.

Phone
Channel 4 can be used as a telephone input and generates a mix-minus output to send to a phone hybrid.
Press the Talk switch on Mic 1 to talk to a caller off-line. To place the caller on air, just turn the channel on.

Channel 5 USB
The 'B' input on channel 5 is an internal USB sound card that can be utilized by a PC. This allows you to play audio from your PC onto the board, or record audio coming from the Program output to the PC. The PC will recognize the sound card as a 'USB Audio Codec.'

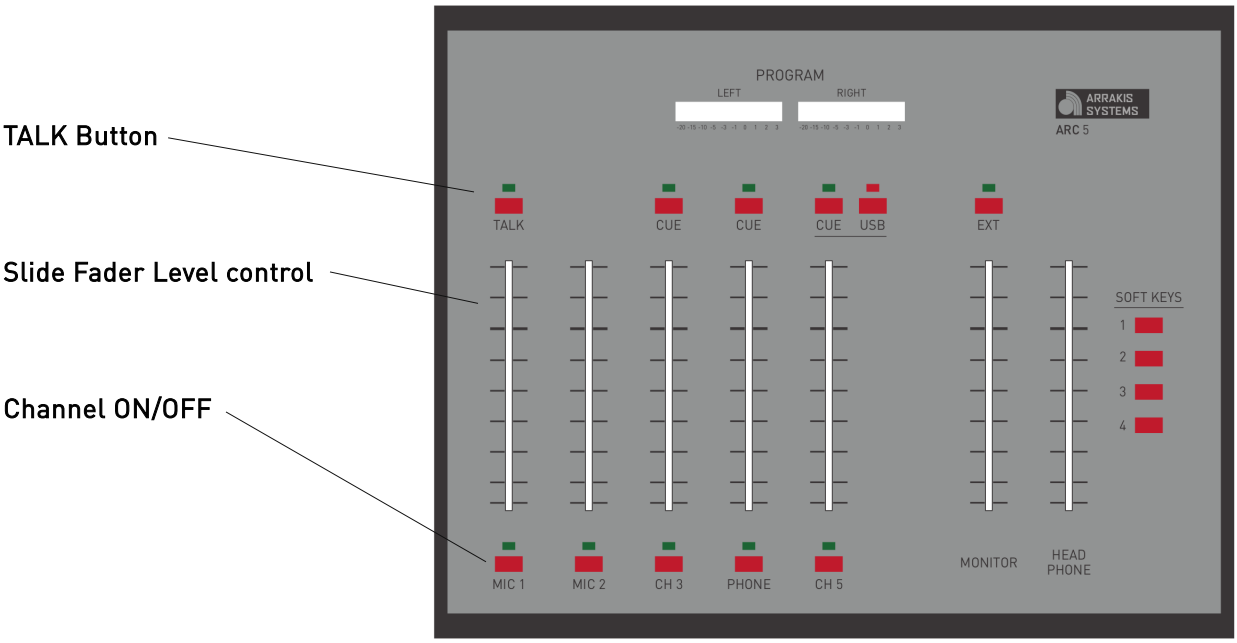
Mono Mic Level
Input Channels 1 & 2

Channels 1 & 2 are both designated as mic channels. These are mic-preamps, ready to be connected to dynamic microphones. If you are using condensor microphones, then you will need the ARC-48V Phantom Power supply, which can be purchased on our website.

Channel On & Off
To turn the channel on, simply push the red on switch at the bottom of the fader. When the channel is on, the LED will be lighted. To turn the channel off, simply push the red on button again.

Channel On & Off Mute Monitor
Mic channels are programmed to mute the Monitor speakers when activated (Monitor output). This prevents audio feedback through the mic channel. Audio may still be heard through the headphone output.

TALK
This button activates a bi-directional off air talkback between mic one and the channel 4 phone input if an external hybrid is connected. The mic feeds the caller while the caller feeds the console cue system. The caller is heard on the monitor speakers and in the headphones. The switch is a push-push interlocking type. Push once for on, push again for off.



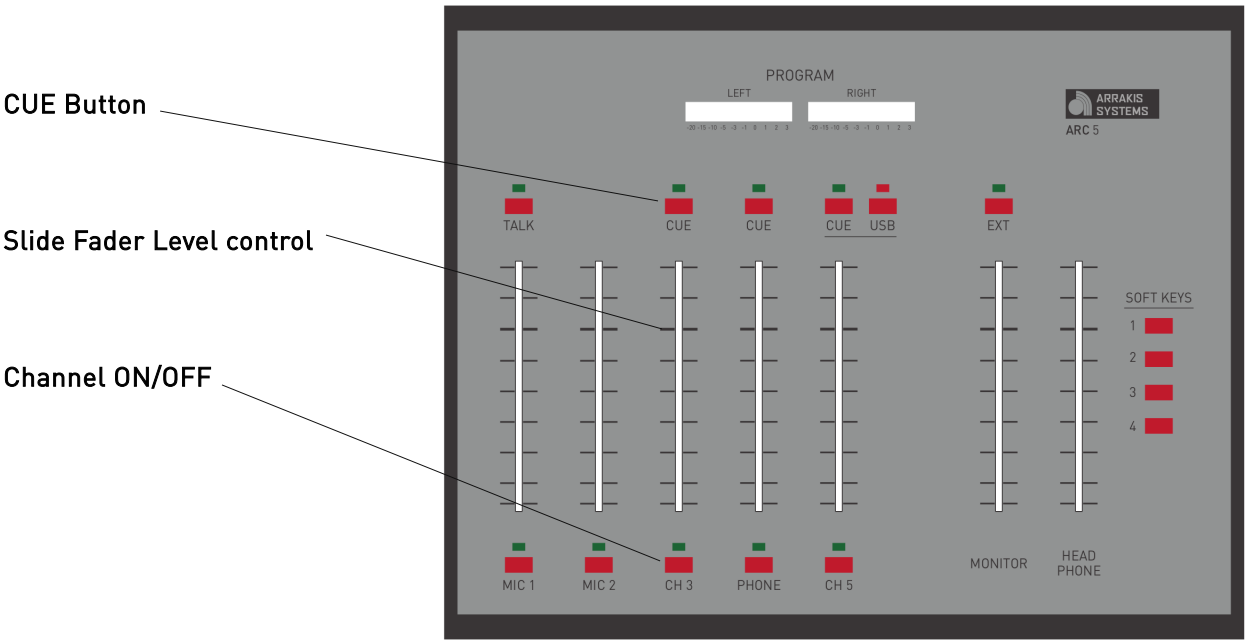
Stereo Line Level
Input Channels 3 & 4

Channel 3 & 4 are stereo line level input channels. Channel 3 has both balanced RJ45 & unbalanced RCA inputs. Channel 4 can be used with an external phone hybrid. Channel 4 is balanced RJ45 only.

Channel On & Off
To turn the channel on, simply push the red on switch at the bottom of the fader. When the channel is on, the switch will be lighted. To turn the channel off, simply push the red on button again.

CUE
To activate cue, click on the CUE button above the fader. To exit the cue mode, click on the CUE button again.

Cue audio will be heard on the Monitor & Head Phone outputs. Cue audio levels are prefader.



Telephone
Input Channel 4

The ARC-5 console supports a single phone caller for live on-air or off-line applications on channel 4.

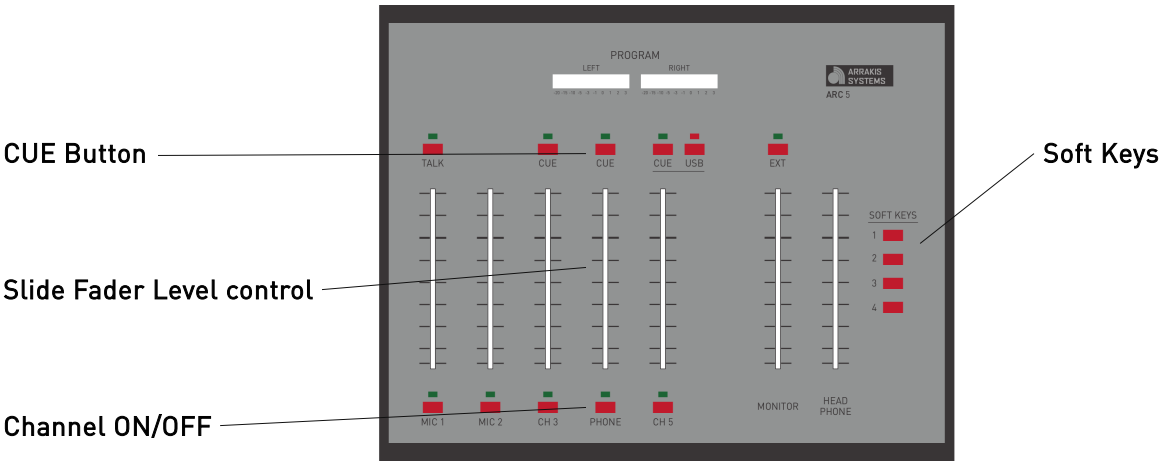
Channel On & Off
To turn the channel on, simply push the red on switch at the bottom of the fader. When the channel is on, the switch will be lighted. To turn the channel off, simply push the red on button again.

Channel On & Off Logic (Hybrid control)
The ARC-5 does not have external control of the hybrid. The hybrid must be activated manually from the front panel of the hybrid.

One of the SOFT KEY buttons may be assigned to control an external phone hybrid. IMPORTANT NOTE, it is likely necessary to use a resistor (values supplied by hybrid manufacturer) when connecting to the hybrid logic. Consult the phone hybrid manual for details. Additional information about the SOFT KEY buttons and logic control may be found later in this manual.

Hybrid Audio Feed
The output to the phone hybrid will be a mix of channels 1-3 and channel 5. The output to the phone hybrid will not include the channel seven phone callers voice so that there will not be feedback.

Talking to the Caller (off line)
Push the 'TALK' button on the channel one mic to feed the control room mic to the caller. When the button is down, the program audio fed to the caller is muted and only the control room mic audio is heard by the caller. The caller will be heard in the monitor and earphone systems (Program audio dimmed below the caller's voice).



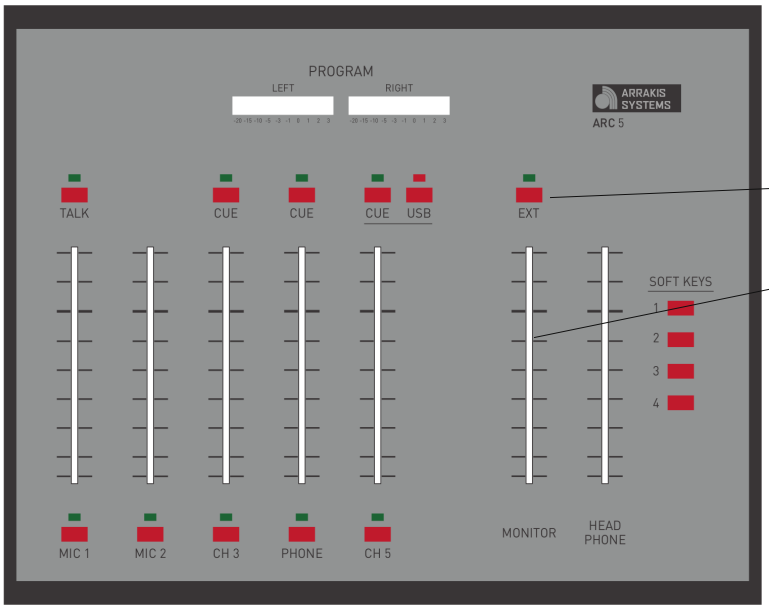
Control Room
Monitor System

The Control Room Monitor system is the main audio monitoring system for the studio. It features an input selector switch and a volume level control. The output of the monitor system is connected to an external audio power amplifier and speakers. The level control on the external amplifier should be set for the maximum sound level desired in the studio.

Monitor Muting
When a control room microphone is turned on, the monitor system will mute (audio is turned off) so that there will not be feedback from the speakers to the microphone.

Monitor Selector Switch
This switch selects the audio source for the Monitor system. Push the switch down (LED will light) to select an external input to the monitor speakers. This is usually an off-air source so that the final output of the station can be monitored. When the switch is up(unlighted) the Program bus output of the console is being monitored.

Monitor Volume Level Control
Sets the monitor level into the external audio amplifier and speaker.



The Cue System

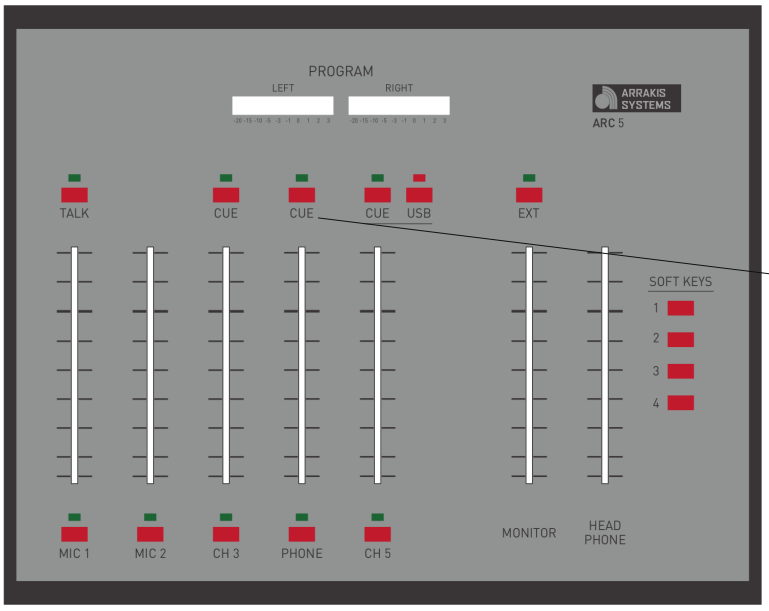
The cue system is designed for monitoring an audio source without placing it on air. This feature is useful for listening to a network feed before bringing it to air, listening to a CD to be certain it is the correct song, etc. The cue system features 'Auto-cue,' where cue is heard in the Monitor speakers and separate Cue speakers are not required.

Activating Cue

To activate cue, click on the CUE button on an input source channel. To exit the cue mode, click on the CUE button again. The cue signal is PRE-fader and therefore the fader level and the channel ON-OFF status has no effect on the cue signal.

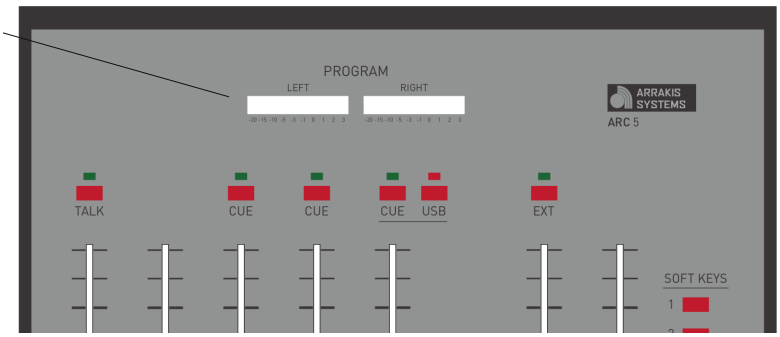
Cue Audio

Cue audio will be heard in the Monitor speakers and the Headphones. In the Monitor and Headphone system, Autocue will dim the Program in the headphones and play the cue audio over top of program audio.



VU Meters

The ARC-5 features a single set of fixed LED VU meters that monitor the stereo Program output of the console. The meters feature standard 'VU' ballistics.



Soft Keys

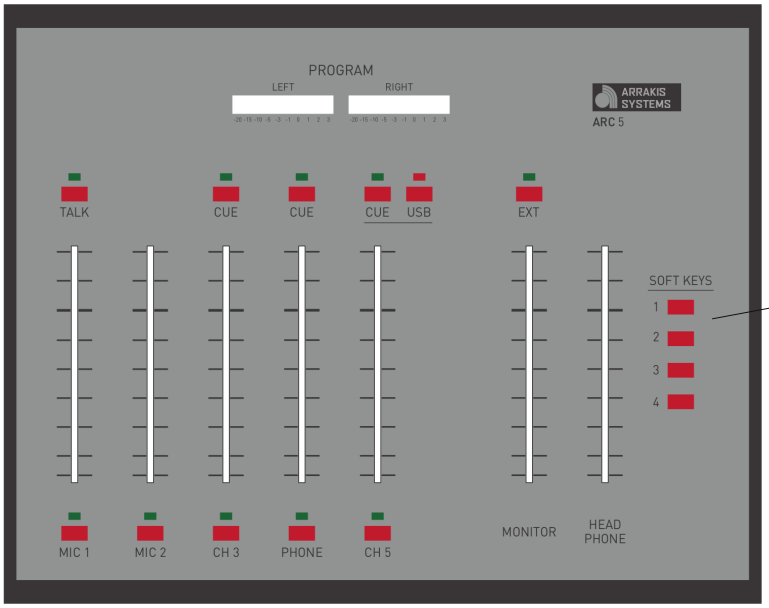
The ARC-5 includes 4 'Soft Key' buttons that can be setup to perform various operations with 3rd party hardware. Some examples are:

-Control the APEX Automation software. Such as Start & Stop the automation, play hot keys, etc...
-Control 3rd party camera hardware. This would allow you to switch between cameras, and select which camera is viewing the studio.
-Control a telephone hybrid, for picking up or ending calls.

By default, the ARC-5 is setup to connect a dry contact closure from Pins 1 – 4 to the 'GND' pin on pin 5. This would give a command to a piece of 3rd party hardware that complete the particular circuit.

An optional cable may be purchased from the Arrakis website, that allows you to connect to various equipment.

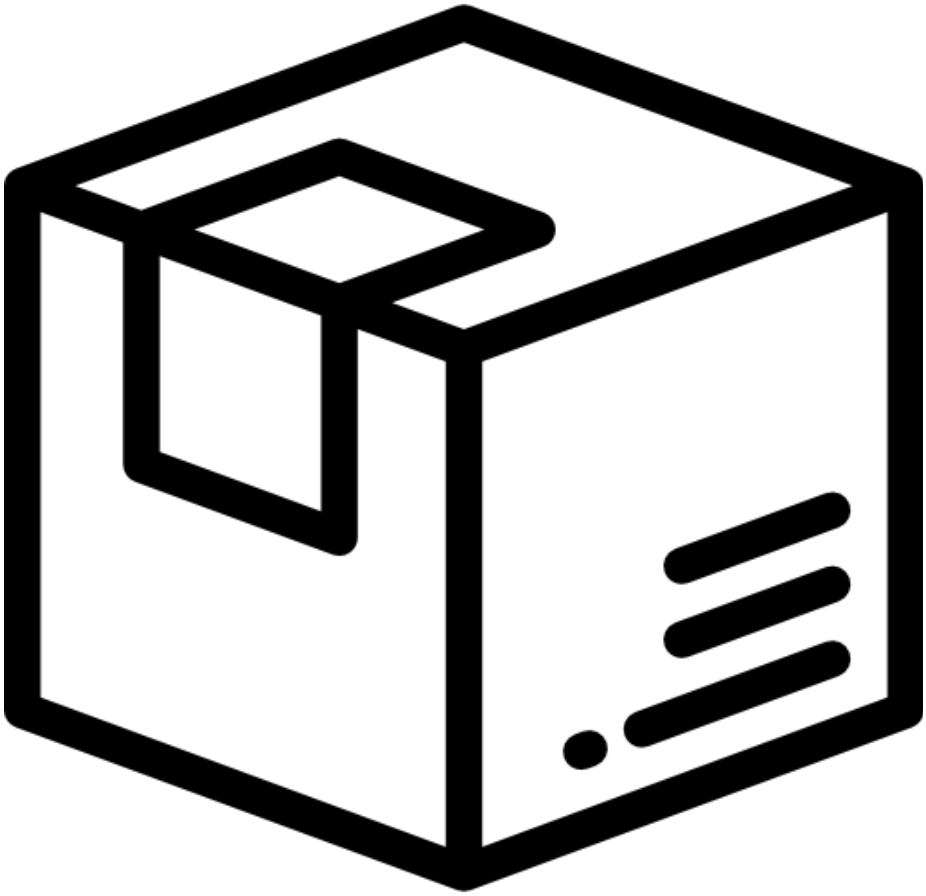
Additional instructions for setup may be found later in this manual.



Installation Instructions

Unpacking

A) Packing slips – Check the packing slips that come with the shipment, to be certain that all packages have been received.



B) Check for damage – Check all packages and equipment for damage immediately upon receipt. If damage is found, contact Arrakis Systems immediately to report the damage. Refer to the website for the latest contact information.

C) Carefully go through each box – Arrakis inspects every shipment for accuracy. You will receive all of the appropriate documentation, install kit, spare parts kit, and equipment. Be very careful to not throw away anything if you decide to throw out shipping materials.

D) Keep all packing materials – Arrakis consoles are shipped in custom shipping containers. Keep all containers at least until the installation is complete. This is in case some piece of equipment may need to be returned to the factory for service.

It is a good idea to keep the shipping materials for the life of the product. Arrakis is not responsible for shipping damage to products not shipped to the factory in the original packing materials.

Before you start

A) Physical space – It is important to install the console with sufficient space around it to operate and service the console easily.

B) Adequate ventilation – It is important to provide adequate ventilation to electronic equipment. High temperatures can reduce the life of the equipment.

C) 110V – 220VAC Operation – The console comes with a 110VAC – 220VAC autosensing external power supply as standard equipment.

D) Static – Static discharge to electronic devices can cause damage, reduce performance, or cause noise in the system. Proper choice of carpet is important consideration when building a studio. There are ways to reduce static in rooms, and should be researched and implemented prior to installation. You may also ground the chassis if necessary.

E) Console power supply – The console is powered by an external, regulated power supply. The supply simply plugs into the back of the console. There are no high voltages within the console.

F) AC Power considerations – If possible, plug all of the equipment in your studio into a single AC Power strip. A good policy would be to have each room on the same AC outlet. A single power outlet will have a 1500-2000 watt capacity. That is plenty of power for most studios. Simply plug a multi-outlet AC power strip into the single wall outlet and then all of your equipment into the power strip. If possible, the power strip should be the kind that has internal surge protection, and battery backup.

G) 60 Cycle Hum & Audio interference – Most consumer audio equipment will have a 2 prong AC power plug. Some equipment has a 3 prong AC power plug. The third plug on a 3 prong plug is a "Safety Ground" which grounds the chassis to reduce shock hazard. The 3rd prong must never be removed even though it creates a 2nd ground path along with the audio cable shield ground. Two ground paths creates a Ground Loop antenna, which picks up 60 cycle AC hum. If possible, use only equipment that has 2 prong AC power plugs. This is often less expensive than making custom audio cable with audio transformer isolation.

If there are no other ground connected to the studio, a single piece of equipment with a 3 prong AC plug does not create a ground loop. However, if there is another ground, or a 2nd piece of equipment with a 3 prong AC power plug, then a ground loop is completed. If you can not change to two prong equipment, it may be necessary to use an audio isolation transformer on the audio cable to break the audio ground path. Contact a technician or factory on how to build a transformer isolated audio cable.

In some stubborn cases of hum (or RF interference), the best solution is to make the ground resistance between ALL of the equipment as low as possible. To do this, connect all of the equipment chassis' together with #12 stranded, insulated wire. Each piece of equipment is to have its own wire that returns in a star configuration to a single point in the studio. That single point should return by a single ground wire back to the main station ground. A 2"-4" copper ground strap to station ground is best.

IMPORTANT NOTE: Audio cables should be kept well away from AC power cables. A magnetic field is created by an electric current. The larger the current, the larger the magnetic field. AC ground and power wires have large currents and create significant AC magnetic fields. If an audio cable is physically close to an AC ground or power cable, then a 60 cycle AC noise voltage can be magnetically coupled into the audio signal cable.

H) Connecting multiple studios - When connecting multiple studios, long audio cables are sometimes necessary. These long cables can introduce AC hum into your audio. In these cases, it may be necessary to use distribution amplifiers with balanced inputs and outputs (or audio isolation transformers) to break the ground path and to cancel the AC hum.

I) Setup your studio, one piece at a time - When building a studio, it is important to be able to isolate problems that may be causing noise, hum, or even not passing audio. To do this properly, the studio should be assembled and tested one piece of equipment at a time. Each problem is detected and eliminated as it occurs. This manual provides a basic step by step process to assemble and test your studio.

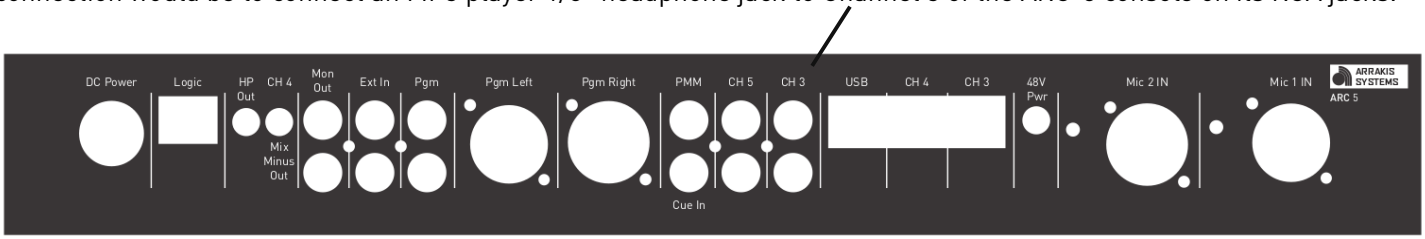
Step by Step
Installation Instructions

IMPORTANT NOTE: Follow this step by step procedure. Each step has specific tests to determine if the console installation has been performed correctly to that point.

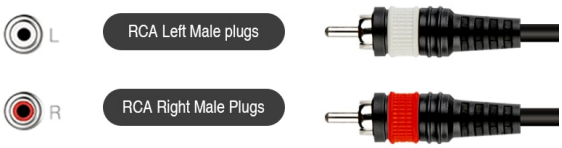
STEP 1 - Power Supply Installation. The console power supply should be plugged into a surge protected outlet. First plug the power supply into the back of the console and then plug the power supply into the AC outlet.

TEST- The console should now be on. To test for power, simply push one of the console On/off switches to see that the Channel On LED lights.

STEP 2 – Connect an audio source. Connect an audio source to the Channel 3 on the rear of the board. A simple connection would be to connect an MP3 player 1/8" headphone jack to Channel 3 of the ARC-5 console on its RCA jacks.



On Channel 3, turn the channel on by pushing the red button(the red on LED should now be on), and bring the slide fader on that channel to the in hand setting (0).

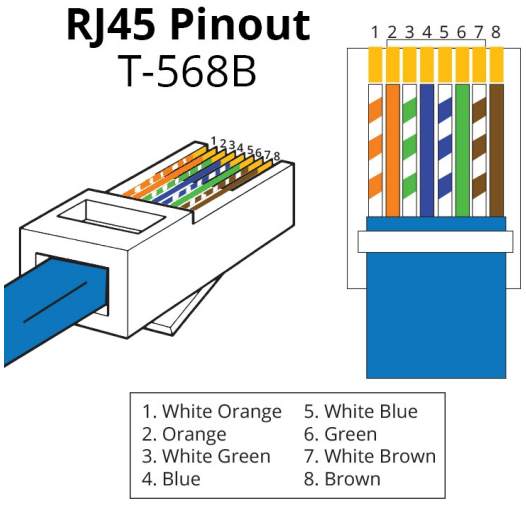


Press play on your MP3 player.

TEST- The VU meters on the console should move as the MP3 player plays a song.

Balanced CH 3 input. Channel 3 also includes a balanced RJ45 input, that is set to a +4dBu gain.

<u>Pinout</u>
Pin 1 – Left (+)
Pin 2 – Left (-)
Pin 3 – Right (+)
Pin 4 – Ground
Pin 5 – NC
Pin 6 – Right (-)
Pin 7 – NC
Pin 8 – NC



STEP 3 – Listen to audio on the headphones. Plug headphones into the headphone jack on the back (**HP Out**) right side of the console. The console supports only high impedance (>20 ohm) headphones. On the console, the Monitor Selector switch should be off (assigned to the Program bus) and set the Headphone Volume control to 1/2. Play audio on your MP3 player as in Step 2. Adjust the headphone level control on the console to a comfortable audio level.

TEST- You should hear the song on the MP3 player clearly. There should be no audible hum or noise. If you hear no audio or there is hum or noise, then repeat Steps 1,2,&3. You may review the Before you start section of this manual, as this will help with any noise issues.

Pinout

Tip – Left
Ring – Right
Sleeve - Ground

STEP 4 – Monitor Speaker Connection. The console has a low level monitor audio output that is designed to connect to an external audio power amplifier. The console output will not directly drive speakers. Connect the audio amplifier input to the console Monitor Output on the back panel of the console.

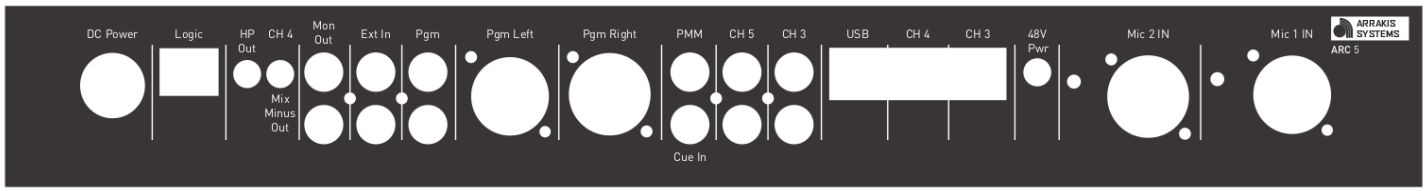
The monitor output of the console is unbalanced, consumer level and will use an RCA cable (usually supplied with the amplifier). Follow the amplifier's instructions and connect speakers to the amplifier.

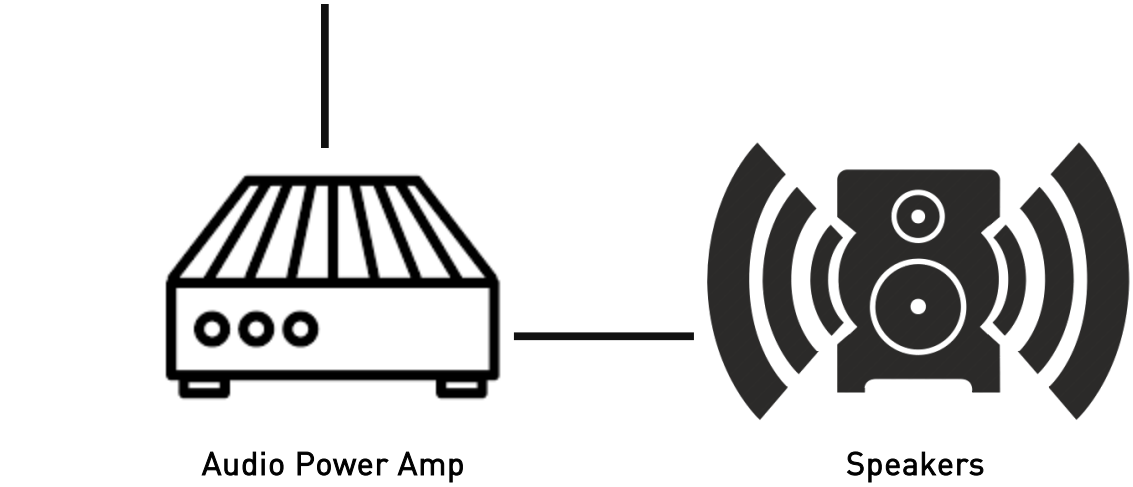
Turn the console power on and the amplifier power on. On the console, the Monitor Selector switch should be off (assigned to the Program bus) and set the Monitor Volume control to 1/2. Set the audio power amplifier level and front panel switches per the amplifier instruction manual.

WARNING- do not have all levels controls at maximum. Too much audio level through your speakers can damage the speakers.

There should be an audio source (such as MP3 player) connected to the console as described in Steps 1,2, & 3. Turn the console source channel on and play a song. The VU meters should move with the audio and audio should be present at the headphone jack at the back of the console. Be certain that any mic channel is turned off because it will mute the audio out of the speakers so that there is no feedback. Audio should now be audible through the monitor speakers.

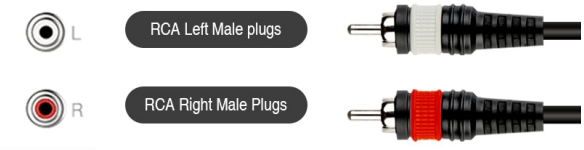
TEST- The audio through the monitor speakers should be clear and without significant noise or hum.





Audio Power Amp

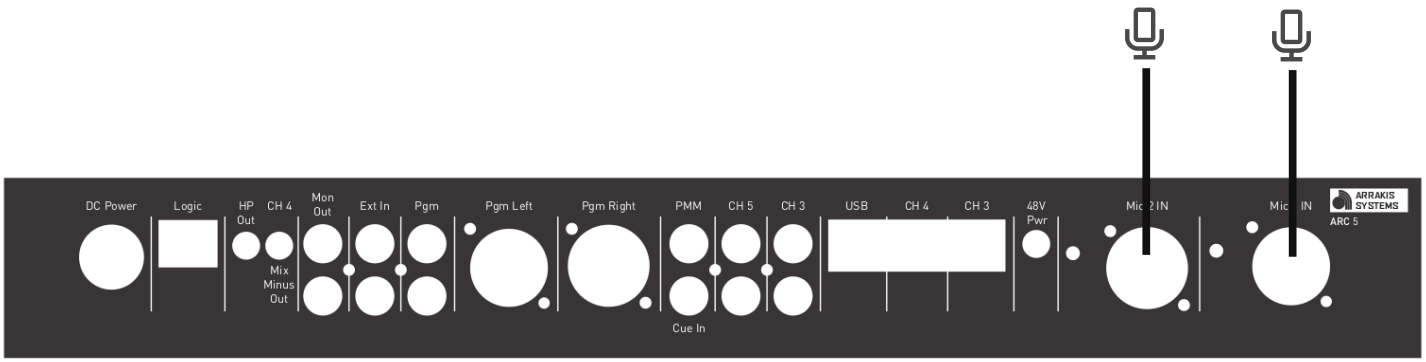
Speakers



STEP 5 – Connect a Dynamic mic to the console. Using a mic to XLR cable, connect a dynamic mic to the Mic 1 input on the console. Turn Channel One on (the red LED should be on) and set the channel one fader to the in hand position (middle). If the mic itself has an on/off switch, then turn it on.

TEST- Speak into the microphone and the console VU meters should follow your voice. There should be no audio out of the monitor speakers (they are muted to eliminate feedback) but there should be audio in the Headphones.

If mic level is low, use a small screwdriver to adjust the 25 turn trimpot on the back of the console located next to the mic XLR connector.

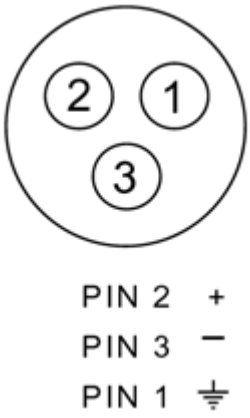


IMPORTANT NOTE: If you are using a condenser microphone, you will need the ARC-48V phantom power supply. This may be purchased on our website.

Connecting a Condenser mic to the console (optional). With the console main power & 48V power supplies unplugged, connect the condenser microphone. Then connect the main console power, along with the 48V power supply.

IMPORTANT NOTE: If using a condenser microphone, and have the ARC-48V phantom power supply, be sure to NOT unplug or plug in microphones while the 48V supply is connected to the board. This may damage the mic preamp IC.

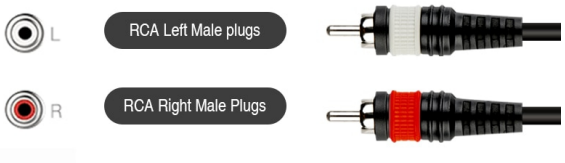
Pinout



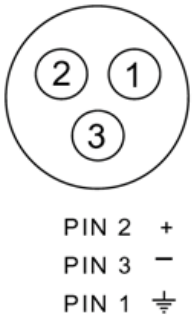
Additional microphones. The ARC-5 comes with 2 mic preamps. This gives you two mic inputs by default. You may however choose to buy a 3rd party external mic pramp, which you can connect to either channels 3 or 4, which can give you up to 4 microphones inputs.

STEP 6 – Connect the Program (PGM) output. The console has both balanced and unbalanced Program bus outputs

UNBALANCED PROGRAM OUTPUT - The console program output (PGM) is located on the console back panel. It is an unbalanced (-10dBu) audio output on RCA connectors.

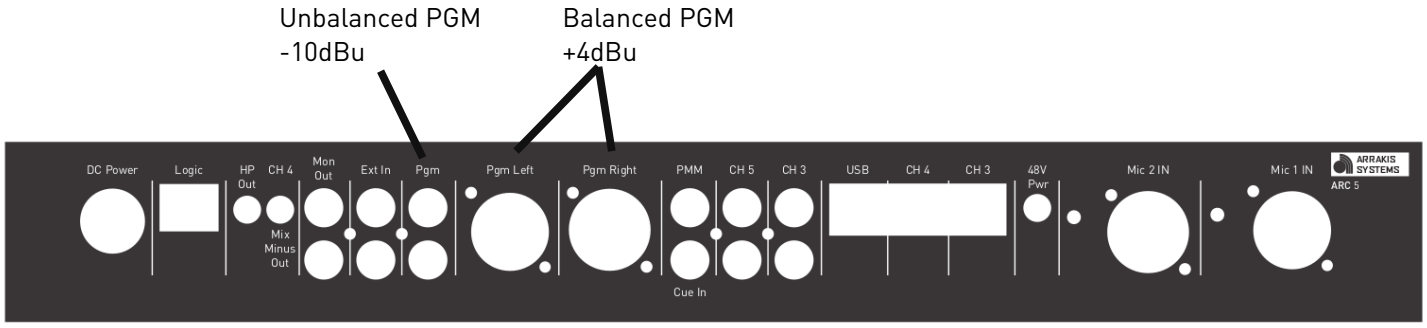


BALANCED PROGRAM OUTPUT - The console program output (PGM) is located on the console back panel. It is a balanced (+4dBu) audio output on XLR connectors.



CONNECTING THE PROGRAM OUTPUT TO THE SIGNAL CHAIN - The console Program output is both unbalanced analog (-10dBu level) and balanced (+4dBu). The equipment that the Program output drives must accept one of these input types and levels. You must refer to the product manual for that product. In some cases, it may be useful to connect the Program output of the console to an audio distribution amplifier which is designed to connect analog audio products that are of different types and levels.

TEST- The Program output of the console is connected to additional equipment (processor, distribution amp, etc) to form a signal chain. Check for presence and quality of audio at each point along the signal chain.



Connecting recording equipment (optional). With a Balanced & Unbalanced output, it is simple to connect a separate recording device. Simply connect the recorder to either the balanced or unbalanced PGM output.

STEP 7 – Connect a telephone hybrid.

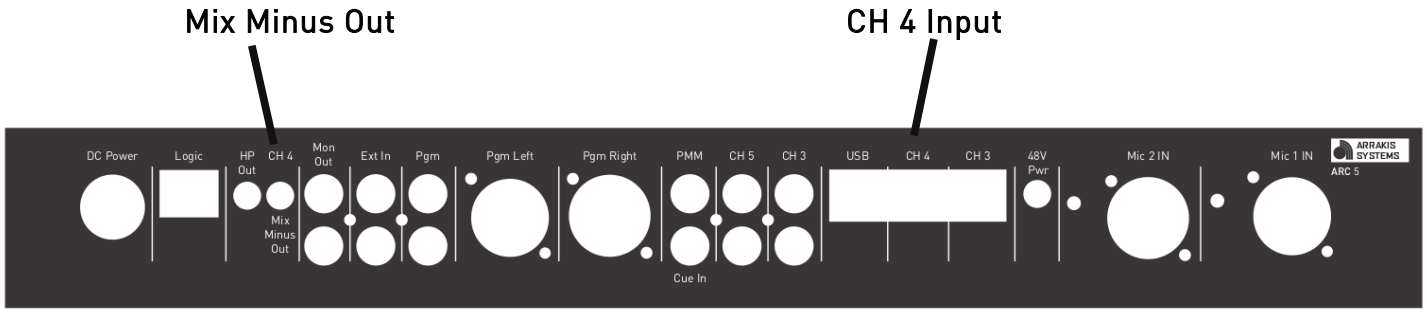
CONSOLE PHONE INPUT- A telephone hybrid has an audio input and an audio output. The hybrid audio output is the callers voice and is connected to the source input channel 4 on the console.

CONSOLE MIX MINUS OUTPUT- The input to the hybrid is from the console MIX MINUS OUT connector on the back of the console. A mix minus bus is a special audio mixing bus that contains all audio on the console program bus MINUS the callers voice. In this way the caller hears everything except himself. If he was not "minused" from the mix, then the caller would feed back to himself. The mix minus output is balanced (+4dBu) located on a 1/8" TRS phone jack.

CONTROL LOGIC- The ARC-5 does not have external control of the hybrid. The hybrid must be activated manually from the front panel of the hybrid.

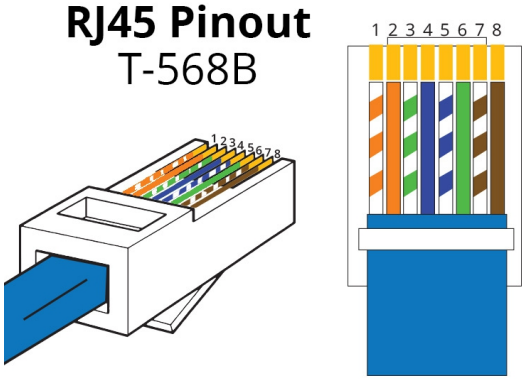
However, one of the SOFT KEY buttons may be assigned to control an external phone hybrid. IMPORTANT NOTE, it is likely necessary to use a resistor (values supplied by hybrid manufacturer) when connecting to the hybrid logic. Consult the phone hybrid manual for details. Additional information about the SOFT KEY buttons and logic control may be found later in this manual.

LEVELS- The console PHONE IN and PHONE OUT connectors are set for +4dBu levels.



CH 4
Pinout
Pin 1 – Left (+)
Pin 2 – Left (-)
Pin 3 – Right (+)
Pin 4 – Ground
Pin 5 – NC
Pin 6 – Right (-)
Pin 7 – NC
Pin 8 – NC

RJ45 Pinout
T-568B



1. White Orange	5. White Blue
2. Orange	6. Green
3. White Green	7. White Brown
4. Blue	8. Brown

Talkback to another Studio. The ARC-5 does not have a talkback output or input for use as an intercom between studios. Many stations use the intercom system on their telephones for that purpose.

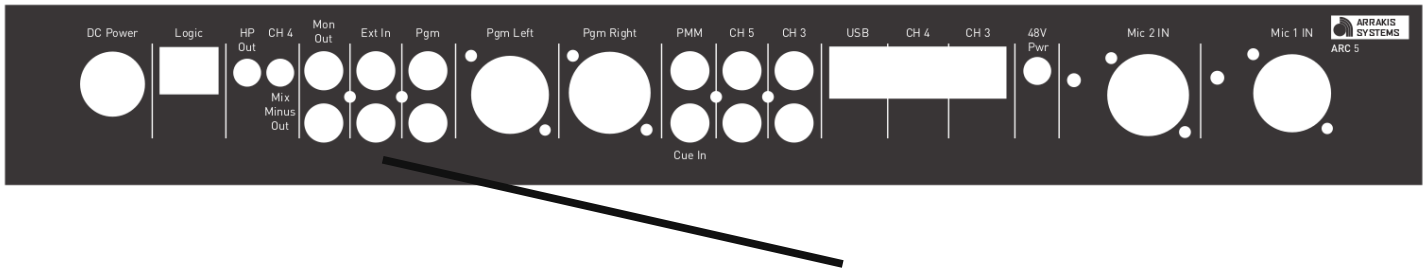
If a phone hybrid is NOT being used on channel 4 and it is desired to have a studio as an input to the console, it is possible to place that studio on console channel 4. In that case, the 'TALK' switch on the mic one channel acts as an intercom with the studio. Push the 'TALK' switch and mic one will feed the 'Mix Minus' console output (which would be wired to the talkback input of the other studio). The program audio from the other studio would then be heard in the console monitor/headphone system.

IMPORTANT NOTE: Never directly connect any phone landline to the Channel 4 input. This will likely damage the ARC-5 console along with the phone hybrid.

STEP 8 – External monitor input.

OFF AIR MONITORING - The Monitor Selector Switch (EXT) is usually used to monitor the actual radio station on air signal from a radio tuner.

NOTE: it is important to monitor the actual signal from the radio station and not just the output of the console. This is so as to monitor the entire radio chain from the console to the transmitter.

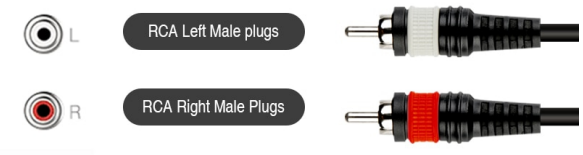


Connect the output of a radio tuner or professional on air monitor to the EXT IN connector on the back of the console.

IMPORTANT: if using a consumer tuner, use a line level output and not the speaker output.

CALIBRATION. The EXTERNAL IN is calibrated to -10dBu input level.

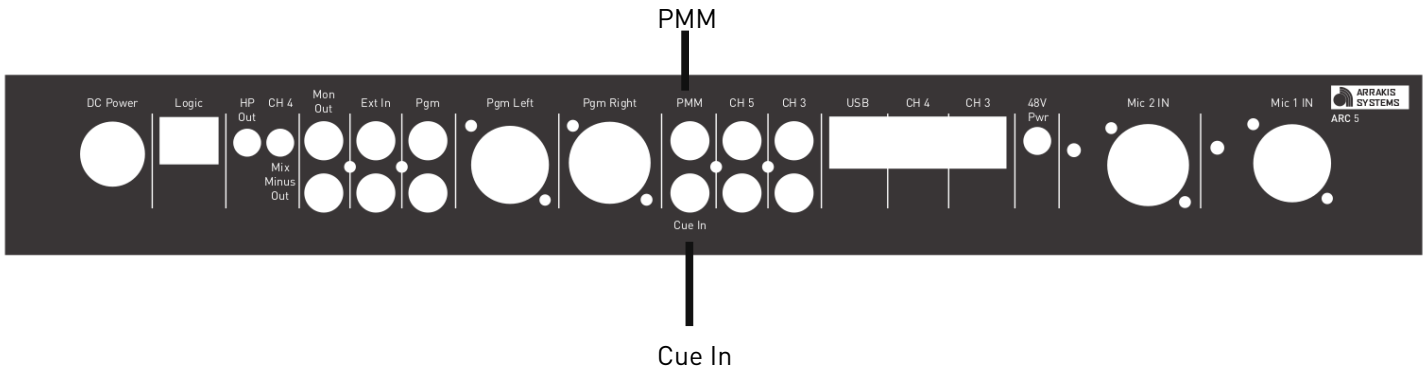
TEST - Set up the tuner or monitor to your station's frequency and switch the console control room monitor to the EXT position. You should hear the audio output of the tuner. Audio quality should be high and there should be no objectionable audio hum.



STEP 9 – PMM & Cue In

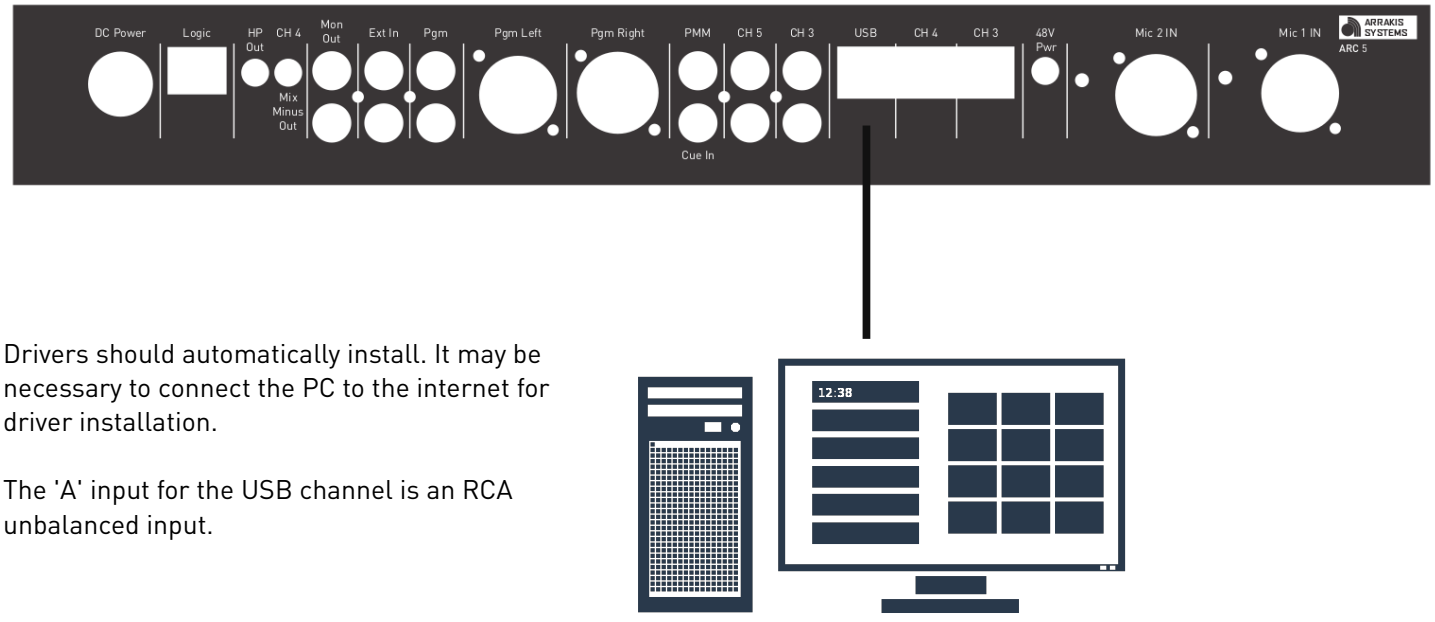
PMM - The ARC-5 comes with a mono mixdown of the Program output. This gives you a mono signal that you can use for AM playback, recording, or other needs.

CUE IN – The console has an unbalanced (-10dBu) input to the cue system on a single RCA jack on the rear panel of the console. The cue input sums into the cue bus and appears on the Monitor output and Headphones.



STEP 10 – USB Channel

The ARC-5 console features a built in sound card on Channel 5 'B' of the console. This enables the console to play & record audio directly from a Windows or MAC PC using Arrakis APEX-Live software. Because the electronics is USB HID compliant, it will be recognized as a soundcard by the Windows or MAC operating system and can be used with any Windows or MAC compliant audio software (such as Adobe Audition).



Drivers should automatically install. It may be necessary to connect the PC to the internet for driver installation.

The 'A' input for the USB channel is an RCA unbalanced input.

Logic Output & Soft Keys

The ARC-5 comes with a logic output for an On-Air light, along with 4 'soft keys' that can control 3rd party hardware, or APEX software.

ON-AIR LIGHT

The console has a logic output for triggering an external On Air Light. This installation procedure requires a professional technician to select an interface for driving the On Air light that you have chosen. Some lights require low voltages (such as 24VDC) and others require 110VAC. Some have built in drivers, but most do not.

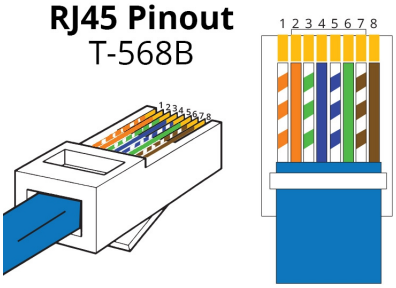
MUTING LOGIC Sustained, dry reed relay closure. Maximum of 50 milliamps. The relay closure is between Pin 7 & 8 on the RJ45 Logic connector.

IMPORTANT- The logic output will not directly drive an AC light bulb and will be destroyed if AC is applied to any console logic pin.

Logic Pinout

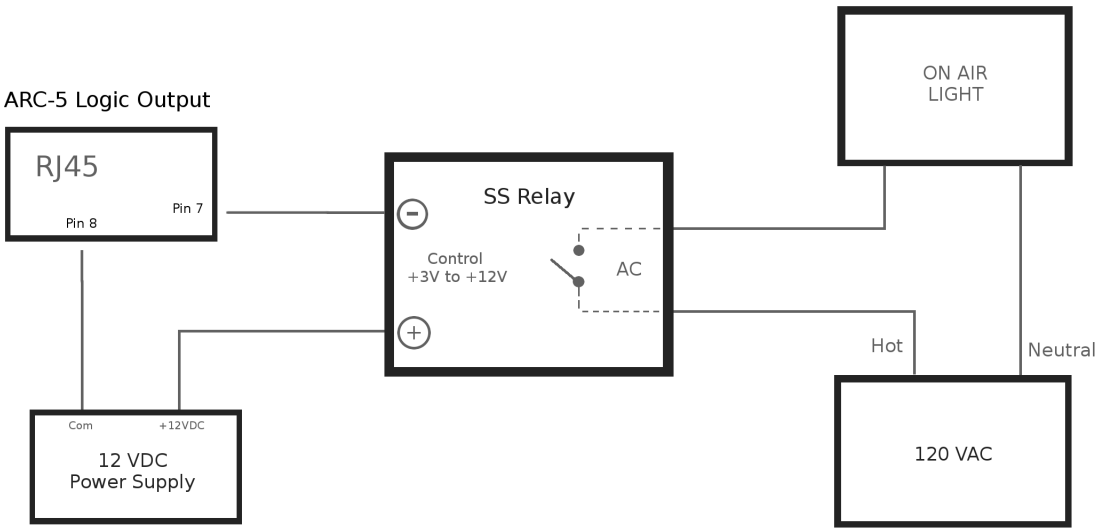
Pin 1 – Logic 1
Pin 2 – Logic 2
Pin 3 – Logic 3
Pin 4 – Logic 4
Pin 5 – Logic Ground
Pin 6 – Logic Ground 2
Pin 7 – On-Air Relay 1
Pin 8 – On-Air Relay 2

RJ45 Pinout
T-568B



1. White Orange	5. White Blue
2. Orange	6. Green
3. White Green	7. White Brown
4. Blue	8. Brown

The diagram on the right shows a basic circuit for connecting an external relay, that could then turn power on/off for an external on-air light. On-Air light kit wiring/relays can be purchased from the Arrakis Systems website.



TEST - Activating the On Air Light should not produce an audio pop in the console audio.

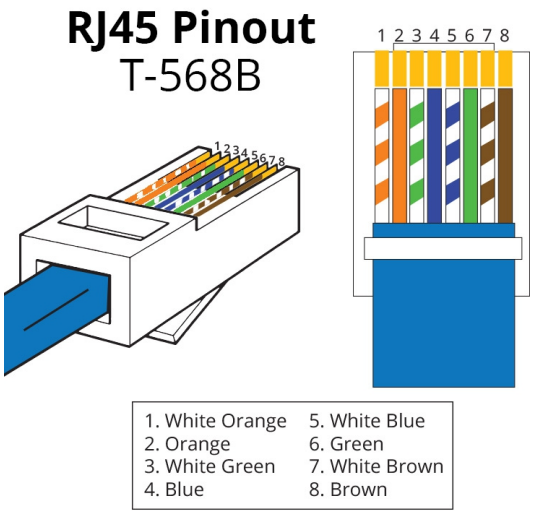
SOFT KEYS

The console has 4 hot key buttons that can be setup to perform different operations. Custom cabling can be purchased from the Arrakis Systems website, which allows you to plug and play.

The soft keys are by default, trigger dry contact closures, connecting Pins 1 – 4 to the common Pin 5 'Ground'. This is to work with 3rd party equipment that are looking for dry contact closures. These soft keys are also locking buttons, and therefore produce sustained connections.

Logic Pinout

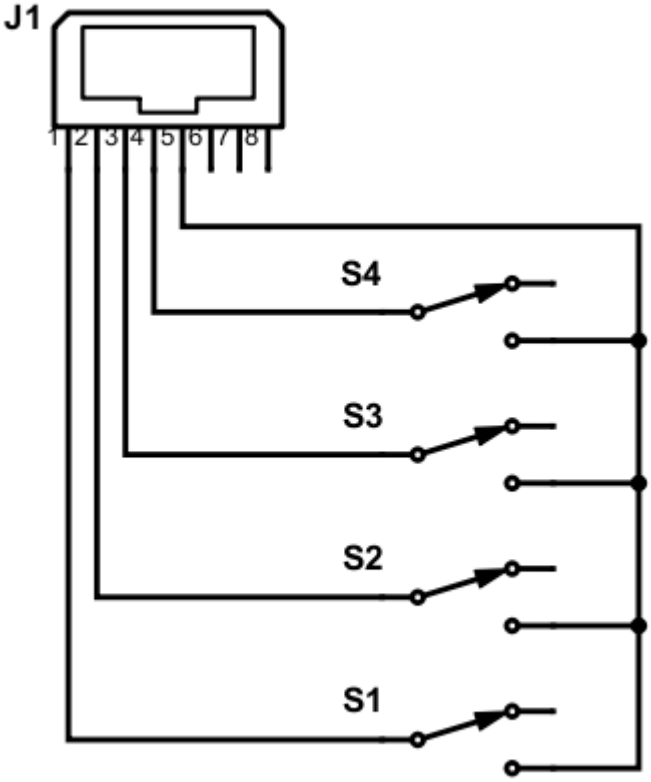
Pin 1 – Logic 1 (Soft Key 1)
Pin 2 – Logic 2 (Soft Key 2)
Pin 3 – Logic 3 (Soft Key 3)
Pin 4 – Logic 4 (Soft Key 4)
Pin 5 – Logic Ground
Pin 6 – Logic Ground 2
Pin 7 – On-Air Relay 1
Pin 8 – On-Air Relay 2



The diagram on the right shows the default configuration for the Soft Keys. Pin 1 on the RJ45 Logic connector corresponds to Pin 1 on the connector.

When Soft Key 1 is pressed, it will connect Pin 1 to Pin 5 on the Logic connector. Same for the other 3 buttons.

Pin 5 is not connected to the console ground.



IMPORTANT NOTE: By default, Pin 5 is common for all 4 buttons, it is therefore not capable of connecting two ore more separate pieces of hardware, such as a phone hybrid & a camera system at the same time.

Audio Calibration

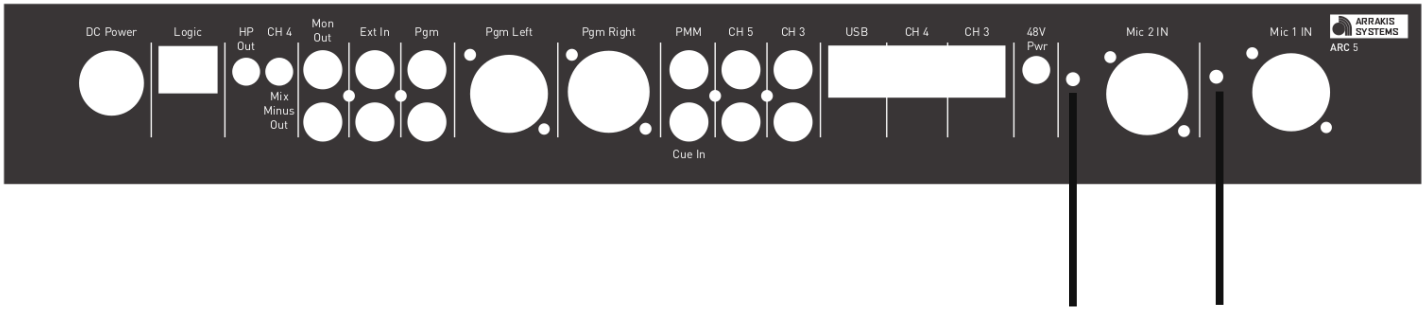
VU METER ADJUSTMENT

The VU meters are factory set for +4dBu at 0VU. These levels should not be changed from factory settings unless directed by factory service technicians.

The console has been calibrated at the factory to normal -10dBu and +4dBu levels and should not require field calibration. Because the console has BOTH -10dBu consumer AND +4dBu professional inputs and outputs for every feature, level adjustment is usually not required. Also, it is better to adjust the level out of the source device than to adjust the console levels. In this way, a source device can be moved from one studio to another without requiring recalibration.

MIC GAIN ADJUSTMENT

The only user level adjustments are on the two mic channels. These trim pots are set at the factory for typical microphone gain levels. These trim pots can be adjusted if different mic gains are required. To adjust, the simplest method is to speak into the mic and adjust the trim pot with a small straight edge screwdriver until the desired level is reached.



Mic gain trim pots.

Service & Maintenance

General Repair Considerations

WARNING

The console should be repaired by qualified, professional, & experienced, audio technicians ONLY. Before beginning any type of repair or opening the console CALL Arrakis customer support for recommendations.

DESIGNED FOR MODULAR PART REPLACEMENT

The ARC series console is designed for modular replacement rather than repair. The power supply is external and plug in. The rotary faders are plug in. All ICs are plug in. ICs can be individually replaced to test for functionality. A small amount of disassembly is required.

PC BOARD COMPONENT LEVEL REPAIR

If possible, PC board component level repair requiring soldering should be performed at the factory. In particular, replacement of slide faders and switches should be performed at the factory. If the repair must be made in the field, then extreme care must be taken to not damage the PC board or other components. Arrakis can not warranty non-factory service.

POWER SUPPLY

The power supply is a sealed module that must be replaced in whole if there is a problem. Using the incorrect power supply, not supplied by Arrakis, will void the warranty.

REPEATED EQUIPMENT FAILURES

If a specific part of the console is failing regularly, it is likely that it is being subject to unusual stresses. Examples are;
(1) Switch or fader failure- rough physical treatment.
(2) Mic channel IC failure- static discharge to mic.
(3) Input op amp failure- lightning, power surge, or other transient on this cable.
(4) Output op amp failure- lightning, power surge, or other transient on this cable.
(5) Power Supply failure- lightening, power surge, or other transient on the AC power line.

Suggested Repair Procedures

NO AUDIO OUT OF ONE INPUT CHANNEL- (Swap Cables) Be certain that the problem is in the console itself. If mic channel two doesn't function but mic channel one functions properly, then plug the cable from the good mic into the channel that you suspect to be bad. If the channel that you suspect to be bad now functions, then the problem is external to the console and is in the source or the wiring. This is a very fast and easy way to test your system.

VU METERS MOVE BUT NO AUDIO OUT OF THE CONSOLE- The VU meters measure the actual output of the console itself. If the meters move but no audio is present, the problem is after the console output and is in the following signal chain. Plug a set of headphones into the output of the console and listen to the Program output to confirm this.

LOUD LOW FREQUENCY HUM IN AUDIO- Many years ago this would mean a power supply failure. In today's electronics, this is an installation problem such as a ground loop. To confirm the problem is not in the console, remove ALL wiring from the console and connect a pair of headphones to the output you are testing. The hum should be absent. All wiring must be removed and headphones only used. A very common problem is for an audio power amp and speakers to create the ground loop with the console.

NO AUDIO OUT OF THE MONITORS- Be certain that the monitor system is not muted due to a mic channel being on or talkback being activated.

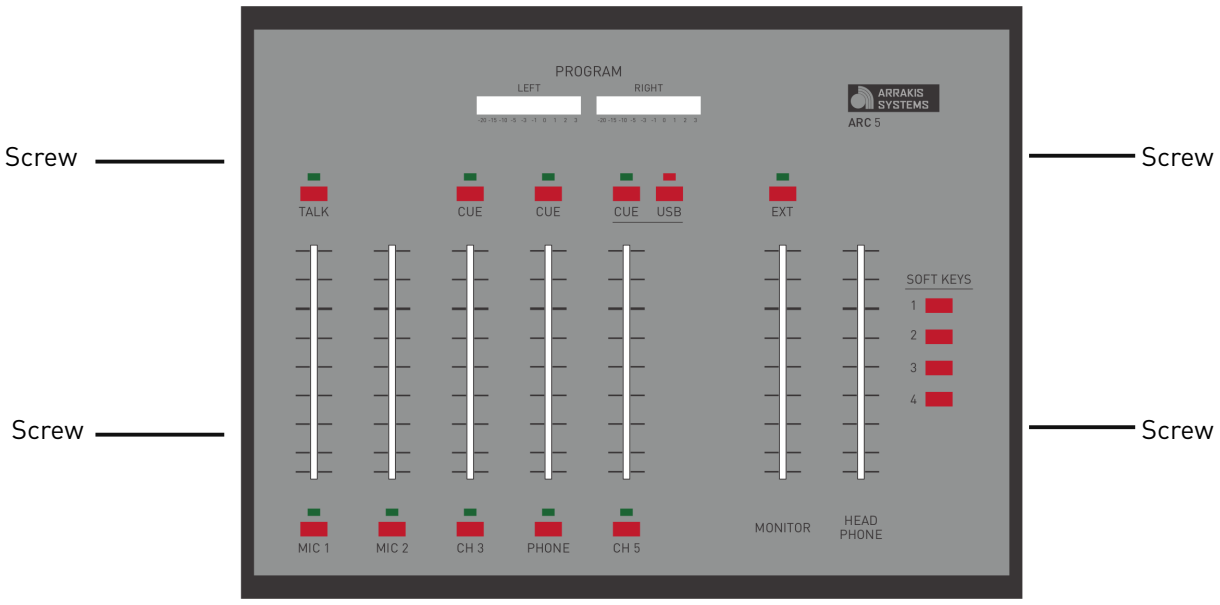
Opening the Console

WARNING

The console should be repaired by qualified, professional, & experienced, audio technicians ONLY. Before beginning any type of repair or opening the console CALL Arrakis customer support for recommendations.

ACCESSING THE MOTHERBOARD

The motherboard is accessed from the bottom of the console. Four screws must be removed from the side panels (2 on each side) to have access to the console electronics for test and IC replacement. Be careful to not scratch the console when turning the console over.



REMOVING THE MOTHERBOARD

The motherboard is attached to the front panel with screws on the bottom of the motherboard. This requires access to the inside of the console. When replacing the motherboard, be certain to replace all of the screws so that switches and faders will operate properly.

Replacing Slide Faders, Switches, and other parts

Slide faders and switches are soldered onto the PC board and should be replaced at the factory if at all possible. The procedure requires proper tools, and it can be difficult to remove the parts without damaging traces or pads on the PC board. Also, the switches are very sensitive to temperature and duration during the soldering process and can be electronically damaged or destroyed when being soldered. If a slide fader, switch, or other part must be replaced in the field, then extreme care must be taken.

Tools required:
1) Hand held solder sucker (stranded solder wick is not suggested)
2) Temperature controlled soldering iron with pencil tip (soldering guns should not be used)

Procedure:
1) Suck the solder from all holes until the damaged component is entirely free from the PC board. Remove the damaged part.
2) Place the new part onto the PC board. Slide faders and switches (and some other parts) ARE oriented and MUST be replaced in the correct orientation.
3) Carefully solder the new part to the PC board.
    a) Clean the tip of the soldering iron on a wet sponge.
    b) Tin the tip of the soldering iron (cover the tip of the soldering iron with a small amount of solder).
    c) Set the soldering iron to 734 degrees Fahrenheit (390 degrees Celsius).
    d) Touch the tip of the 'soldering iron' to the junction of the PC board pad AND the component lead.
    e) Immediately touch the 'solder' to the junction of the soldering iron and the PC board pad.
    f) Flow only enough solder to fill the hole. Immediately remove the soldering iron from the part.
    g) Do not keep the soldering iron on the part for more than 2 seconds.
    h) Clean the solder rosin from the PC board if required. (See Note #1 below)

Note: Arrakis uses aqueous core (water soluble) solder that requires the solder joint to be cleaned by water after soldering. Aqueous core solder is acidic and must be cleaned so as to not damage the PC board over time. Rosin core solder is not water soluble and requires a flux remover if it is to be cleaned. The rosin residue however does not have to be removed for rosin core solder.

Warranty: Arrakis can only warranty service performed at the factory. All field service is performed at the customer's risk.

Replacing ICs

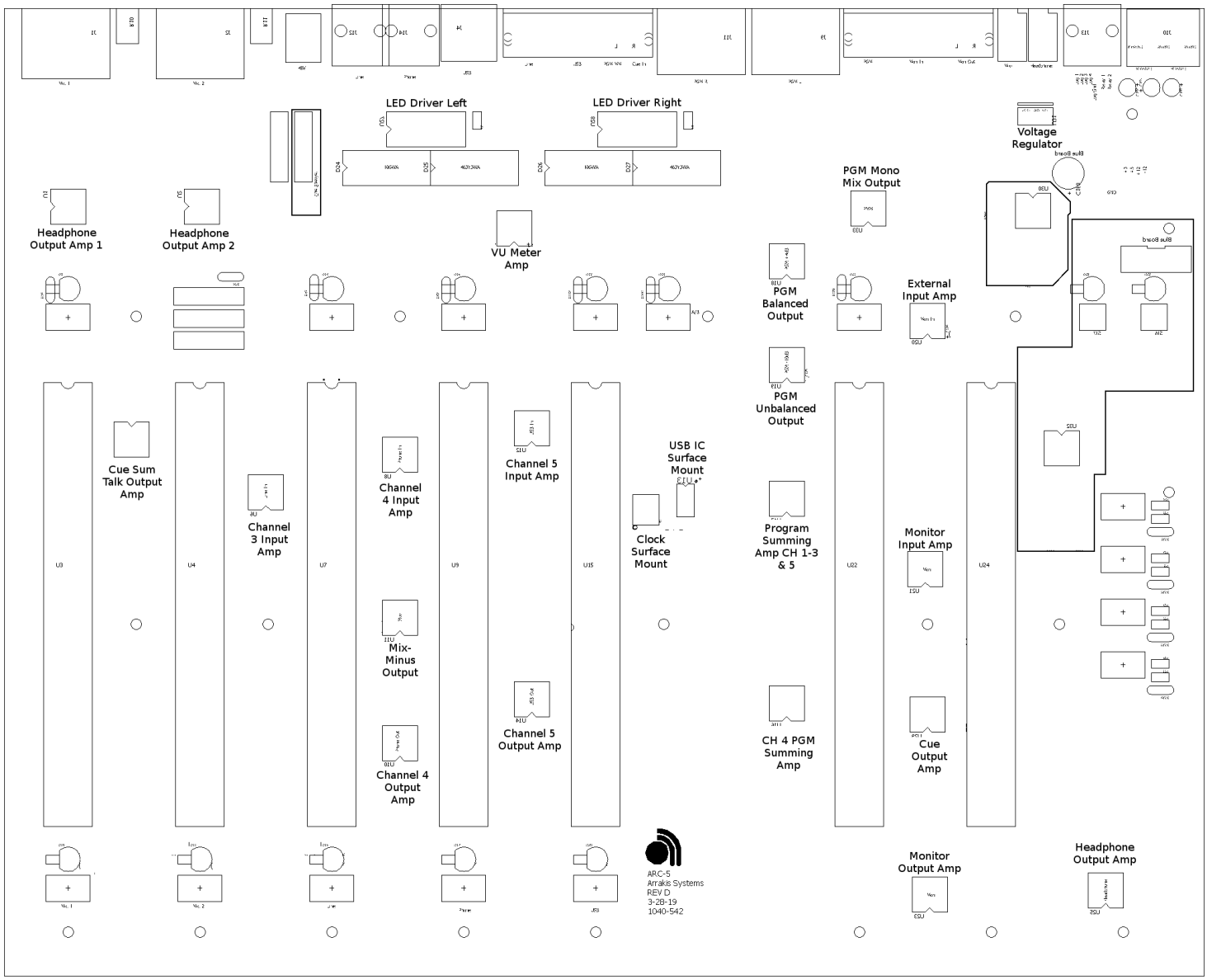
ICs must be replaced with care. All ICs in the console are socketed so that they can be replaced.

When replacing an IC, be careful to not bend legs under the IC or outside the socket. Be extremely careful to not shock an IC or the motherboard with a static discharge. In some cases, you must use a grounded arm or anklet if there is a possibility of a static discharge. Make sure the IC is being placed in the proper orientation.

In all cases, retain the old IC because it may be found to not be damaged.

IMPORTANT NOTE: Disconnect power to the console before opening the console & while swapping IC's. IC's should never be swapped while the board is still connected to power.

Motherboard Parts Layout



Warranty Replacement of Parts

To have a part replaced under warranty, you must:
1) Provide a valid product serial number that is within the warranty period

2) Contact the Arrakis customer service department and describe what parts need replacement and the circumstances of the failure. (The customer service department may require on site test by your technician to confirm the part replacement is appropriate for your problem.)

3) A Return Merchandise Authorization Number (RMA #) will be issued when a part s to be returned to the factory.

4) Return ALL defective parts to the factory (shipping prepaid) to the attention of the "Customer Service Department" with a letter including your name, address, call letters, serial number, date, and valid RMA #.

5) Parts replaced under warranty will be shipped at Arrakis expense by UPS ground. Any expense over and above UPS ground will be born by the customer.

IMPORTANT- If the defective parts are not returned to the factory within 30 days, you will be invoiced for them and it will be assumed that they do not fall under warranty. Further customer service will be denied until the defective parts are returned of paid for.

Purchased Parts
An Arrakis customer may purchase spare or replacement parts from the factory. The cost of the parts will include a service charge, the cost for the parts, and the cost of the shipping.

Details for purchasing parts may be found on our website.

IMPORTANT- Non payment or late payment for parts will result in refusal of further customer service until the problem is resolved.