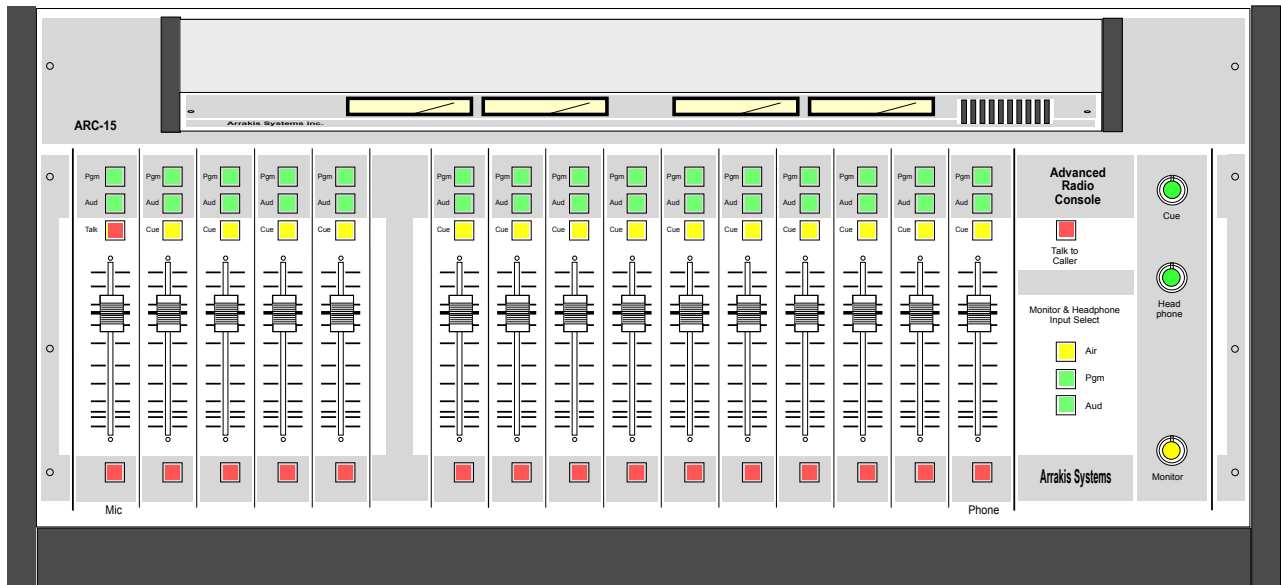# ARC-15
Broadcast Console
family

Technical Manual

June 23, 2011

ARRAKIS
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Thank you from Arrakis Systems inc.

Thank you for purchasing this product by Arrakis Systems inc. Our company has provided professional audio equipment to the broadcast, commercial audio, and consumer audio markets for more than 20 years. Our products are sold worldwide and are well known for leading edge technology, quality, and reliability.

Telephone Support for the 'Free' Xtreme software

Digilink Xtreme (ARC mode) software for the ARC console is provided at no charge and does not include the cost of telephone support. The software is specifically designed to be easy to use for people with average PC computer and radio industry experience. Support is limited to the product manual and the on screen help system in the software itself. Refer to the Arrakis website at www.arrakis-systems.com for updated training materials. In a case where telephone support is a necessity, Arrakis has per minute and per incident support available that can be paid for by valid credit card. For comprehensive support and advanced automation features, the 'Xtreme Solutions' program may be purchased. Refer to the website or contact the factory for details.

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

Contact:
Voice: 970-461-0730
Fax: 970-663-1010
email: support@arrakis-systems.com
web: arrakis-systems.com

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

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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.

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Hazard / Warning Label
Identification

⚠	**C A U T I O N** RISK OF ELECTRIC SHOCK DO NOT OPEN	⚡

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 equip-ment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take what-ever measures may be required to correct the interference.

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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.

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Software End User License Agreement

This product contains software licensed from Arrakis Systems inc. and possibly from other software companies. Ownership of this product constitutes acceptance of this agreement.

1- This product contains intellectual property (i.e. software programs) that are licensed for use by the end user customer (hereinafter "End user").

2- This is not a sale of such intellectual property

3- The End user shall not copy, disassemble, or reverse compile software programs

4- The software programs are provided to the End user "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, and fitness for particular purpose. The entire risk of the quality and performance of the software program is borne by the End user.

5- Arrakis and its suppliers shall not be held to any liability for any damages suffered or incurred by the end user (including, but not limited to, general, special, consequential, or incidental damages including damages for loss of business profits, business interruption, loss of business information and the like), arising from or in connection with the delivery, use or performance of the software program.

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PRODUCT DESCRIPTION
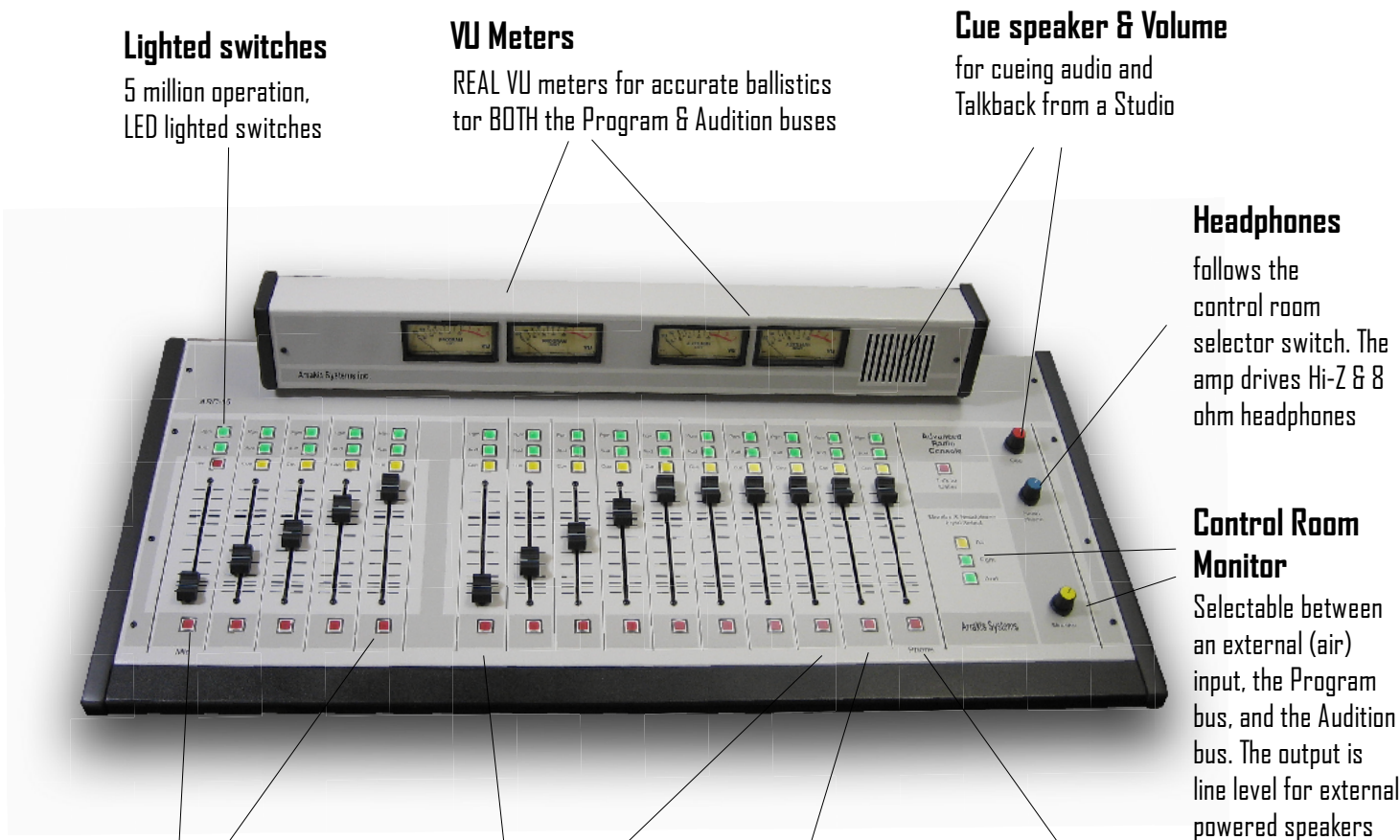
Product Description

ARC-15

Advanced Radio Console family

The ARC-15 is a general purpose console that meets the needs for most On Air Radio & Radio Production studio applications. Channel One is a high performance mic channel while channels 2-5 are selectable as mic or line inputs. Channel 15 is an advanced telephone interface to an external hybrid for Live callers or an Off-line contest call. Seven stereo line input channels easily handle the other audio sources, such as CD players, found in most studios. Channel fourteen is selectable as either a Windows PC USB interface or an unbalanced stereo consumer level input. Windows software for Live On Air, Automation, & Production is provided standard. With 5 million operation, LED lighted, switches; long life faders; and electronic switching of all audio signal paths; the ARC-15 is a rugged, reliable, and versatile console for professional Radio studio applications.

- Two stereo Program output mixes (with mono mixdowns) plus Monitor, Headphone, and Cue systems

- Fifteen input source channels (plus optional 16 in x 3 out stereo remote select switcher)

  - Two high performance mic channels with optional 48V phantom power

  - Seven stereo line channels (model ARC-10U: unbalanced -10dBu, ARC-10BP: balanced +4dBu)

  - Channel 14 is selectable as either a PC computer sound card channel for Play and Record or a consumer stereo input

  - One telco / phone hybrid input channel for fast Live or Off-line telephone interface (hybrid required)

- Real VU meters for Program and Audition buses

- Headphone system with stereo amp for 8 ohm (or Hi-Z) headphones

- Cue-talkback system with built-in amplifier and speaker

- Input channel logic for Remote channel on-off-tally and source start-stop

- Provides monitor audio and logic for a Studio /Announce booth

- Optional 16 x 3 stereo switcher for remote input select... handles large studio jobs

Operational features

Lighted switches
5 million operation, LED lighted switches

VU Meters
REAL VU meters for accurate ballistics tor BOTH the Program & Audition buses

Cue speaker & Volume
for cueing audio and Talkback from a Studio

Headphones
follows the control room selector switch. The amp drives Hi-Z & 8 ohm headphones

Control Room Monitor
Selectable between an external (air) input, the Program bus, and the Audition bus. The output is line level for external powered speakers

1-5 Mic channels
For normal on air talent or a Host and Guest talk format. Channel one features a 'Talk' button to talk to the 'Studio monitor' if a separate talk studio is used.

Line channels
For CD players, MP3 players, and other analog sources.

PC channel
When connected to a Windows PC (via a USB cable) running Arrakis Xtreme software, the channel On-off button will start and stop playback of audio from the PC.

Phone channel
The phone channel works with an external hybrid (user supplied) through both audio and logic connections. Turn the Cue button on to listen off-line to the caller. Push the Talk switch to use the Control room mic to talk off-line to the caller. To place the caller on air just select a bus and turn the channel on.

Studio Monitor Audio Output & Control

The ARC-15 supports a Talk studio through the Logic connector on the rear of the console. The studio monitor audio follows the control room monitor select switch or may be internally jumper selected to be dedicated to the Program or Audition bus. For flexibility, channel On-off logic with tally is provided for the five mic channels. Talkback audio is sent to the studio from Mic 1 by pushing the 'Talk' switch. An audio input to the console cue system is used for the studio to talk back to the control room. The ARC-15 fully supports sophisticated Control Room with Talk Studio applications.

Key features

The ARC-15 console is designed specifically for On air broadcast, Internet radio, and Podcast applications. The 1-5 mic channels support a host and guest talk format. The phone channel is perfect for a live on air talk segment or Off-line contests. The PC sound card channel with logic provides easy access to PC audio files for play or recording. Last, the stereo line channels easily handle the number of other audio sources (such as CDs, DATS, MDs, MP3s, etc) found in the average modern studio. The Program bus has both a balanced +4dBu output and an unbalanced (-)10dBu output plus a mono mixdown of the stereo signal. The ARC-15 is a powerful, flexible, reliable, and low cost solution for your radio studio needs.

Easy to install
Fully connectorized with XLRs, RCA phono jacks, RJ45s, etc., the ARC-15 is easy to install with off the shelf cables.

Rugged and reliable
Professional throughout, with multi-million operation LED lighted switches and electronic audio switching, the ARC-15 is ideal for demanding environments.

1-5 mic channels for Host and Guest in the Control room or Studio
Channels one- five are very high quality mic preamps (with optional 48V phantom power) for talk applications in the control room itself.

Telephone Channel for Live On Air Talk or Off-line Contests
Channel fifteen is a dedicated telephone channel that easily connects to an external telephone hybrid. The caller can talk to you through the Cue system while a Talkback button enables the Control Room mic to talk off-line to the caller. Just select the Air or Recording bus then turn the channel on. What could be easier?

Built-in PC sound card on Channel14 for Play & Record
The ARC-15 contains a built-in, Windows compatible, USB sound card on Channel 14 for USB connection to a PC. A serial (or USB with adapter) connection between the console and PC provides a control logic interface for starting and stopping playback on the PC. Arrakis Digilink-Xtreme software will recognize the ARC-15 console and operate in the 'free' ARC mode to provide 'Live On Air' features that are ideal for broadcast, internet, or podcast style radio applications. For the ultimate in Automation, Digilink-Xtreme software (optional) provides complete hard disk based automation features for the ARC-15.

LED lighted electronic switching
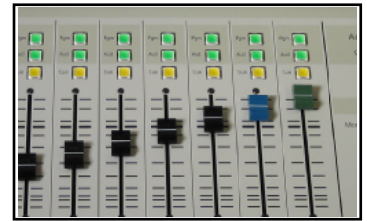
an easy to use Telephone channel
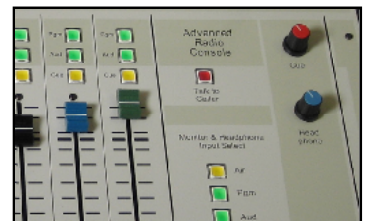
powerful software for PC options

Fully connectorized for easy installation

Software Features

The ARC-15 merges the console and PC into a single integrated play and record studio. The PC and the console are linked together via USB cable. Audio played from the PC plays through channel fourteen on the console. The channel fouteen on-off button starts and stops audio playback on the PC. The Audition bus output from the console can be recorded directly in digital to the PC.

Digilink-Xtreme (basic Arc Console mode) software for the ARC
This software is provided standard with ARC model consoles. It is designed for Live On Air play, basic automation, & radio production. It is specifically designed to be easy to use!
- 500 event Play List for assembling a show (play lists may be created, saved to file, and then reloaded for playback)
- Start & stop the Play List by turning console channel nine on and off
- Cue audio files through the console while playing On Air (uses PC sound card for 2nd play)
- Jingle box supports playing any 3 of up to 300 carts at the touch of a button
- Set the fade parameters on Songs for perfect crossfades in the Play List
- Record the console Audition bus mix direct to the PC
- Phoner recorder / editor for recording callers
- supports up to 1,000 audio files in the Library
- much much, more...

Digilink-Xtreme (Advanced ARC console mode) Software (optional)
For the ultimate in sophisticated Radio Automation, advanced Digilink-Xtreme software for the ARC-15 provides complete hard disk based automation features: cart rotations, start & kill dates, timed events, a one week automation schedule, & much more. Unlike standard Xtreme for satellite automation which includes the 'Bridge' routing switcher, Xtreme for the ARC-15 uses the console for audio playback & recording. Where satellite based automation selects between multiple satellite network audio feeds, Xtreme for the ARC-15 plays entirely from audio files stored on the hard disk. This makes Xtreme for the ARC-15 ideal for hard disk file based automation for broadcast radio, internet radio, podcasting, and church applications. Digilink-Xtreme (Advanced ARC console mode) is provided under the Arrakis 'Xtreme Solutions' program which includes software, phone training, phone & email support, and software upgrades for a low monthly fee. The program requires no contract, may be canceled at any time, and is less than the monthly cost of most cell phone, cable TV, & wideband internet services.
- Supports large libraries with many thousands of audio files
- Cart rotations, start & kill dates, timed events, overshedule with drops, & much more...
- Automate up to a Week in advance with up to 100 events per hour
- Voice track automated hours quickly and easily
- Music Scheduling with 20 categories, unlimited format hours, back to back limitations, more
- 'X-sched' traffic software for a separate traffic office is standard with Xtreme
- Arrakis 'X-Edit-Pro' production software is 'Free' with the Solutions Program
- 'Xtreme-studios' software for PC only News rooms and Remotes is standard with Xtreme

Download Xtreme from the Arrakis website and try it out (www.arrakis-systems.com)

Technical features

The ARC-15 console by Arrakis Systems inc. is the culmination of > 25 years of leadership in the design of analog and digital Radio consoles and > 15 years as the leader in hard disk automation for Radio.

Mechanical

Switch type:	momentary, 5 million operation, for all front panel switches
Switch illumination:	LED, no incandescent lamps to burn out
Linear Fader type:	conductive plastic for highest possible resolution and life, 30,000 cycles
Rotary Fader type:	conductive plastic for highest possible resolution and life, 15,000 cycles
Rotary fader attachment:	ribbon cable to a plug on the motherboard
PC boards:	single motherboard
IC sockets:	one IC is surface mounted, all of the rest are socketed for ease of service
VU meters:	true VU ballistics

Electronic

Audio switching:	electronic switching with CMOS ICs for ultra high performance and reliability (no switches to clean)
Audio level adjust:	for the ultimate in audio performance, audio is passed through the linear and rotary faders
Operational amplifiers:	NE5532
Mic preamp:	SSM2019, high performance IC with 1.5dB noise figure and .01% THD at gain = 100
Phantom power:	48VDC, with optional external power supply
Logic ICs:	advanced CMOS logic for high noise immunity

Logic

Muting (On air light):	logic level output, Muted = +12VDC, Not-muted = ground, 50mA max current
	Requires a custom, relay isolated, interface circuit to drive an on air light
Channel On-off Tally:	On & Off switches: momentary, SPST, dry contact closure.
	Tally LED: logic level, requires a driver transistor or IC driver
Channel Source control:	logic level output, On = +12VDC, Off = ground, 20mA max current
	Requires a custom interface for the specific source device
Circuit diagrams:	refer to the ARC-15 manual for typical circuit schematics

Back panel for ARC-15

Note: all XLR inputs and outputs feature multi-turn trimpot level adjust

RJ45 balanced audio connectors

Electronic specifications

SPECIFICATIONS

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
	+17dBu unbalanced

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
	+17dBu unbalanced
Stereo Separation-	-75dB typ 1KHz
Pgm to Aud XTalk-	-80dB typ 1KHz
	-70dB typ 20kHz
Cue to Pgm XTalk-	-90dB typ 1KHz
	-75dB typ 20kHz

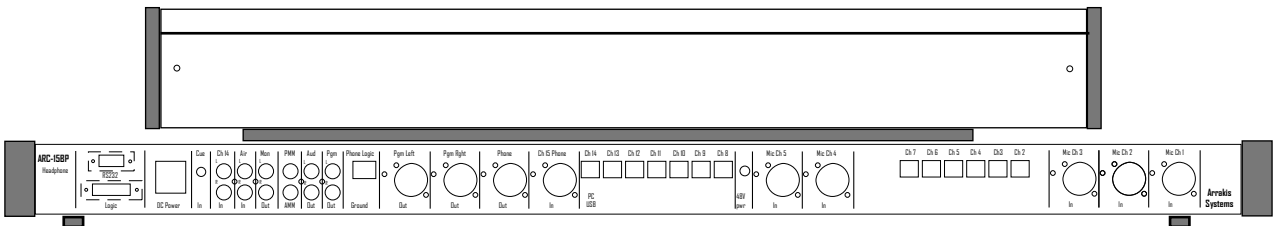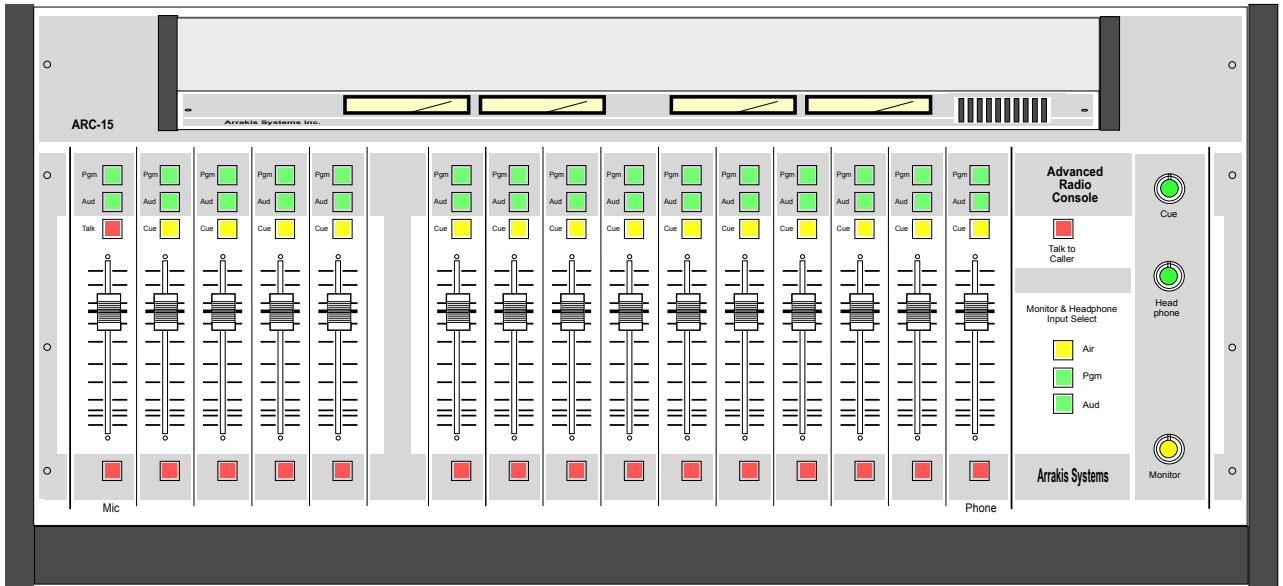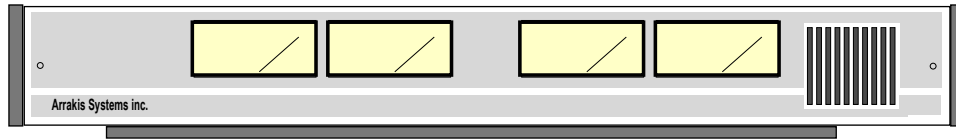|	
On Air Light Logic:	open collector transister to ground, 20mA max

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

PHYSICAL DIMENSIONS

Depth - 15",
Height - 6"
Width- 33"

Physical specifications

Depth - 15",
Height - 6"
Width- 33"

OPERATING INSTRUCTIONS

Quick Start

The ARC-15 console is designed to be very easy to use. The two sets of VU meters follow the Program and Audition buses. The single input source per channel reduces operator errors by eliminating the accidental selection of a wrong A/B source input. The phone system is very easy tp use for off line talking to the caller as well as supporting a Live call in show or Off-line contest call application.

Lighted switches
5 million operation, LED lighted switches

VU Meters
REAL VU meters for accurate ballistics tor BOTH the Program & Audition buses

Cue speaker & Volume
for cueing audio and Talkback from a Studio

Headphones
follows the control room selector switch. The amp drives Hi-Z & 8 ohm headphones

Control Room Monitor
Selectable between an external (air) input, the Program bus, and the Audition bus. The output is line level for external powered speakers

1-5 Mic channels
For normal on air talent or a Host and Guest talk format. Channel one features a 'Talk' button to talk to the 'Studio monitor' if a separate talk studio is used.

Line channels
For CD players, MP3 players, and other analog sources.

PC channel
When connected to a Windows PC (via a USB cable) running Arrakis Xtreme software, the channel On-off button will start and stop playback of audio from the PC.

Phone channel
The phone channel works with an external hybrid (user supplied) through both audio and logic connections. Turn the Cue button on to listen off-line to the caller. Push the Talk switch to use the Control room mic to talk off-line to the caller. To place the caller on air just select a bus and turn the channel on.

Mono mic level Input Channel (channel 1)

Channels one is a dedicated mono microphone channel for the console operator.

CHANNEL ON AND OFF
To turn a 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 AND OFF LOGIC
Channels One and Two are assumed to be located in the control room and therefore do not require remote channel on/off logic.
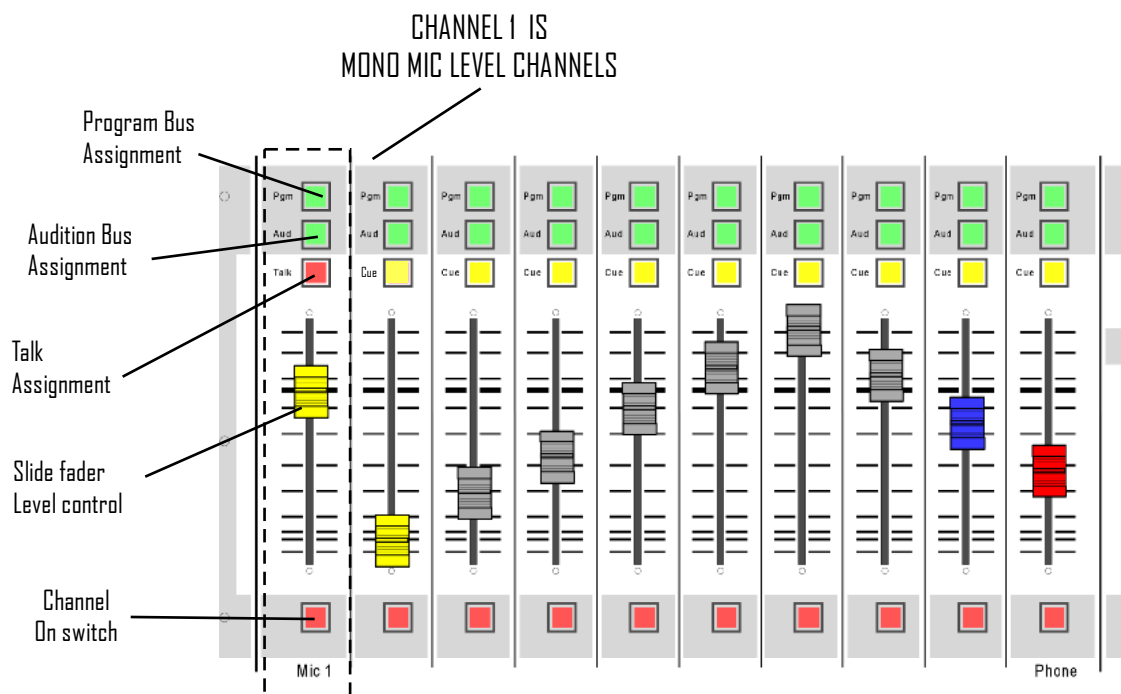
PROGRAM AND AUDITION BUS ASSIGNMENT
The green PGM and AUD buttons above the slide fader assign the channel to either (or both) of the main audio mixing buses: Program & Audition. Push the button once to light the button and assign it to the bus. Push the lighted button again to unassign the channel from the bus.

TALKBACK
Talkback is a simple 2 way intercom system to communicate with another studio such as an Announce booth, Interview room, News room, or Production studio.

The ARC-15 has an audio output from the control room microphone that can be connected into a console in another studio. The ARC-15 has an audio input into the cue system for the other studio to talk to the ARC-15 console.

To activate talkback, simply cick on the red 'Talk' switch. To exit the talkback mode, click on the 'Talk' button again.

CHANNEL 1 IS
MONO MIC LEVEL CHANNELS

Program Bus Assignment
Audition Bus Assignment
Talk Assignment
Slide fader Level control
Channel On switch

Mono mic level Input Channel (channel2-5)

Channels one is a dedicated mono microphone channel for the console operator. Channels 2-5 are selectable to be either mono mic level or stereo line level channels. The selection is by internal jumpers on the individual channels. The console can therefore support just a single mic for the console operator or a talk studio with a host and three guests.

CHANNEL ON AND OFF
To turn a 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 AND OFF LOGIC
Channels One and Two are assumed to be located in the control room and therefore do not require remote channel on/off logic.

PROGRAM AND AUDITION BUS ASSIGNMENT
The green PGM and AUD buttons above the slide fader assign the channel to either (or both) of the main audio mixing buses: Program & Audition. Push the button once to light the button and assign it to the bus. Push the lighted button again to unassign the channel from the bus.

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CHANNELS 2-5 ARE SELECTABLE AS MONO
MIC OR STEREO LINE LEVEL CHANNELS

Program Bus Assignment

Audition Bus Assignment

Talk Assignment

Slide fader Level control

Channel On switch

Stereo Line Level Input Channels

On the ARC-15, channels 6-13 are stereo line level channels. Channel 2-5 are internally selectable as mic or stereo line channels.
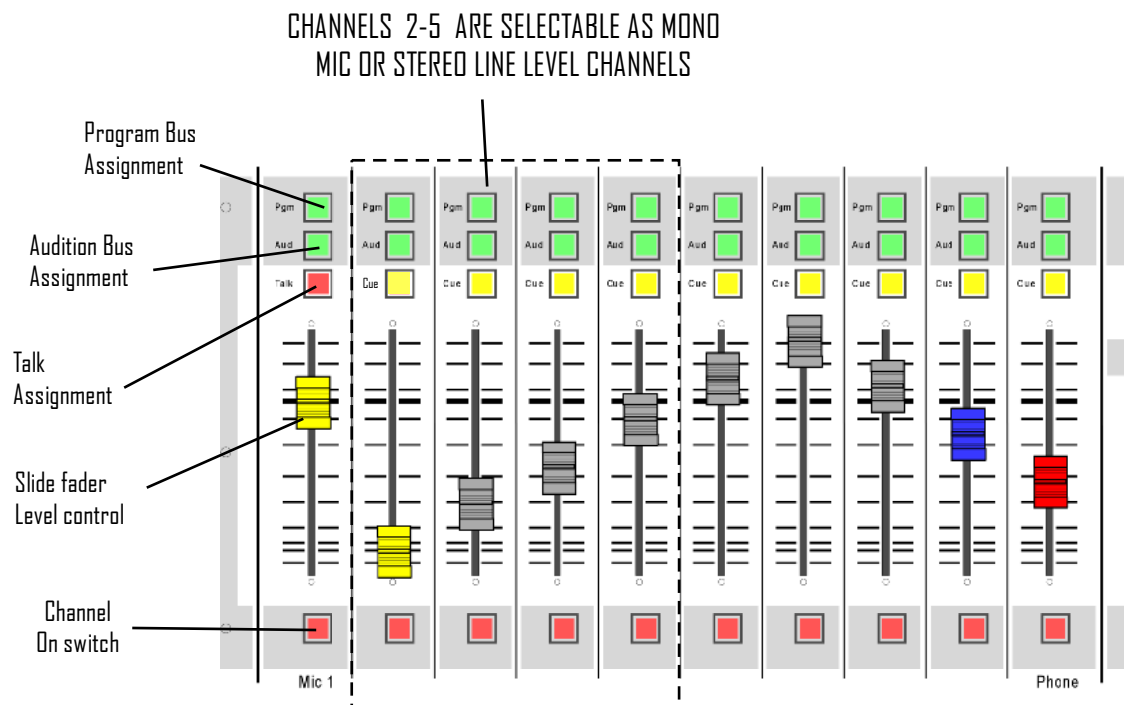
CHANNEL ON AND OFF
To turn a channel on, simply push the red ON switch at the bottom of the fader. When the channel is on, the switch will be lighted. To turn the channel off, simply push the red ON button again.

CHANNEL ON AND OFF LOGIC
The line level output channels have a logic control output on the REMOTE LOGIC connector. That logic line can be made to remotely turn the channel on & off or to remotely start and stop the audio source connected to the channel when the channel is turned on or off.
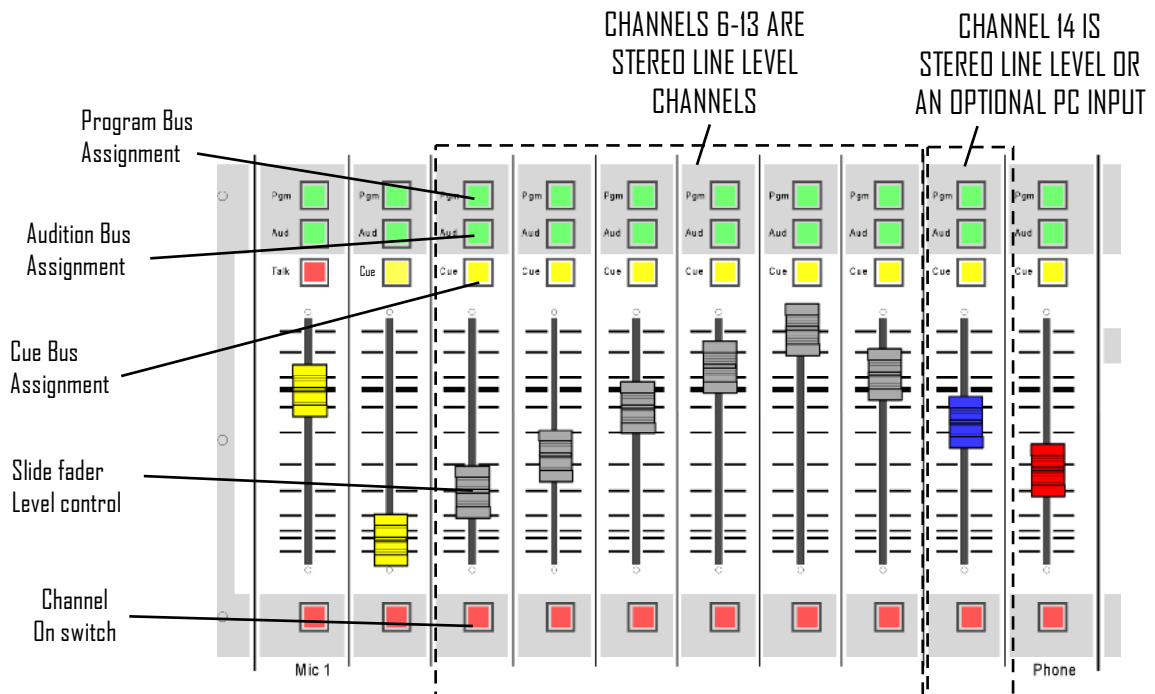
PROGRAM AND AUDITION BUS ASSIGNMENT
The green PGM and AUD buttons above the slide fader assign the channel to either (or both) of the main audio mixing buses: Program & Audition. Push the button once to light the button and assign it to the bus. Push the lighted button again to unassign the channel from the bus.

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

Cue audio will be heard in the speaker in the VU meter housing and in the Headphones. Cue logic automatically switches the Headphones from the selected audio source to the cue audio bus whenever any channel is placed into cue.

The Telephone Input Channel (channel 15)

The ARC-15 supports a single phone caller for Live On Air or Off-line (contest caller, etc.) applications on channel 15 of the console.

CHANNEL ON AND OFF
To turn a 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 AND OFF LOGIC (Hybrid control)
The phone channel provides momentary, relay isolated logic to pick up the caller line (start) and to release the phone line (stop)

PROGRAM AND AUDITION BUS ASSIGNMENT
The green PGM and AUD buttons above the slide fader assign the channel to either (or both) of the main audio mixing buses: Program & Audition. Push the button once to light the button and assign it to the bus. Push the lighted button again to unassign the channel from the bus.
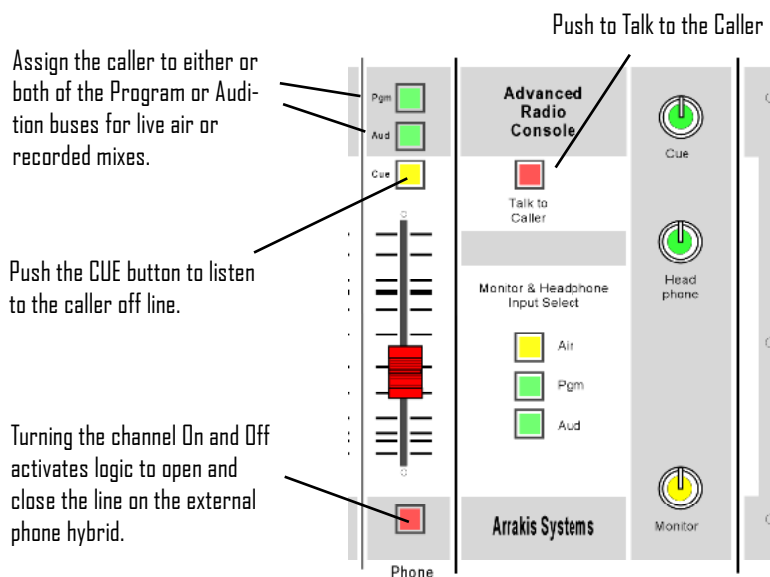
HYBRID AUDIO FEED
The output to the phone hybrid that the caller will hear is determined by channel ten's output bus assignments: Pgm only, Aud only, or a mix of Pgm & Aud. The output to the phone hybrid will NOT include the phone callers voice which eliminates feedback.

TALKING TO THE CALLER (off line)
Push the red 'TALK TO CALLER' button 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. The button is a momentary operation. Push down to talk, release the button to return the caller to the normal bus audio.

LISTENING TO THE CALLER (off line)
To listen to the caller before airing (or during a talkback conversation), place the phone channel ten into cue by clicking on the CUE button.

Push to Talk to the Caller

Assign the caller to either or both of the Program or Audition buses for live air or recorded mixes.

Push the CUE button to listen to the caller off line.

Turning the channel On and Off activates logic to open and close the line on the external phone hybrid.

The 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 the control room microphone is turned on (channel one), the monitor system will mute (audio is turned off) so that there will not be feedback from the speakers to the microphone.

Note: channels 2-5 are selectable as mic channels and have jumpers to assign them to mute the monitor if those mics are also located in the control room.

MONITOR SELECTOR SWITCH
This switch selects the audio source for the Monitor system.
1) AIR-   this is usually an off air audio feed to monitor the actual transmitted signal
2) PGM- the main Program output bus from the console
3) AUD-   a secondary Program bus that can be used for several purposes such as Recording

MONITOR VOLUME FADER
Sets the monitor level into the external audio amplifier and speaker.

MONITOR SELECTOR SWITCH

CONTROL ROOM
MONITOR LEVEL CONTROL
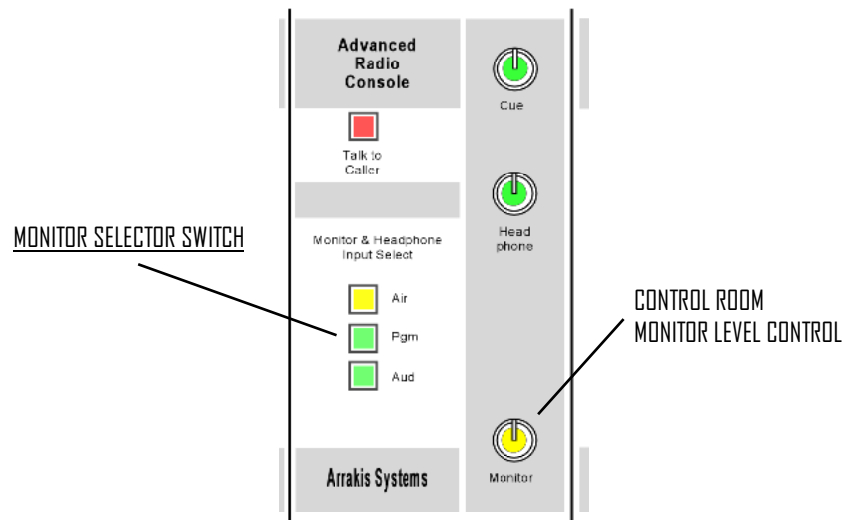
The Headphone system

The Headphone (earphone) system in the ARC-15 console is provided so that audio can be listened to while the microphone is active and the monitor speakers are muted. The Headphone system receives the same audio feed as the Monitor system but does not mute when the microphone channel is turned on. The Headphone system has a 1/4" headphone jack on the rear of the console. The headphone amplifier connected to the headphone jack is designed to work with high impedance and 8 ohm headphones.

CUE
The ARC-15 console features Autocue. Whenever a channel is placed into cue, the audio in the Headphone system will mute and the Cue audio will play over the Program signal.

TALKBACK
When talkback logic is activated from another studio, then Auto-cue is activated, Headphone program audio is muted, and the audio from the Talkback input is placed into the Headphone system for intercom.

MUTING
The headphone system is not muted. When the 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. The headphone system can not have audio feedback so muting is not required.

MONITOR SELECTOR SWITCH
This switch selects the audio source for the Monitor & Headphone systems.
1) AIR-   this is usually an off air audio feed to monitor the actual transmitted signal
2) PGM- the main Program output bus from the console
3) AUD-   a secondary Program bus that can be used for several purposes such as Recording

HEADPHONE VOLUME FADER
Sets the headphone level to the internal headphone amplifier.
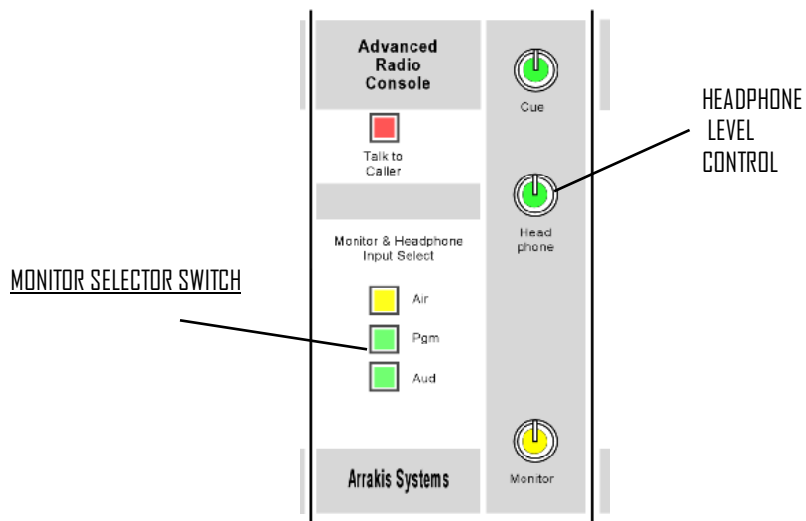
The Cue system

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.

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 built in Cue speaker and the Headphones. In the Headphone system, Autocue will mute the Program in the headphones and play the cue audio over top of program audio.

CUE FADER
The cue fader adjusts the level in the internal cue speakers. It does not adjust the level of the cue in the headphones.

EXTERNAL CUE INPUT
The console has an unbalanced (-10dBu) input to the cue system on a 1/8" stereo headphone jack on the rear panel of the console & a cue logic pin on the REMOTE LOGIC connector. The cue input sums into the cue bus and appears on the Cue speaker and Headphones.

MUTING
The cue speaker audio will be muted to stop feedback whenever Mic channels One or Two are turned on by their respective On-off switches.

CUE SPEAKER

CUE LEVEL CONTROL

CUE SWITCHES
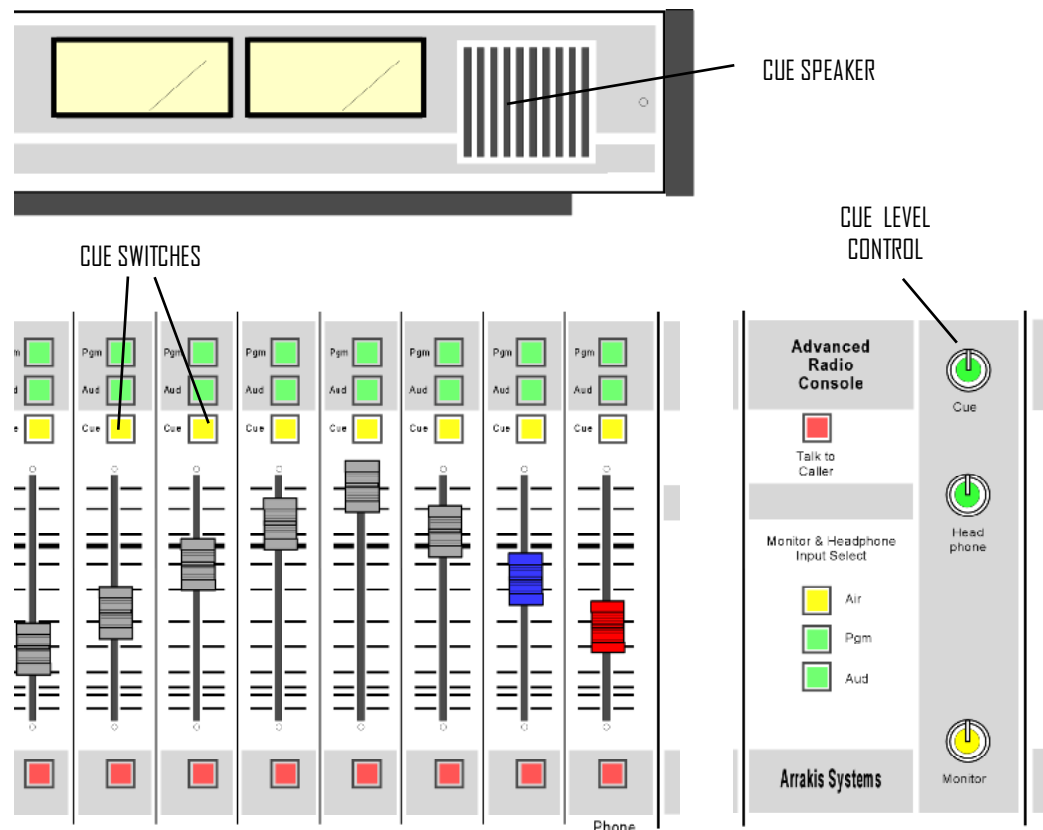
The VU meters

The ARC-15 console features a set of vue meters for both of the console mixing buses (Pgm and Aud). This simplifies operation and reduces operator error.

Program Meters   Audition Meters

Arrakis Systems inc.
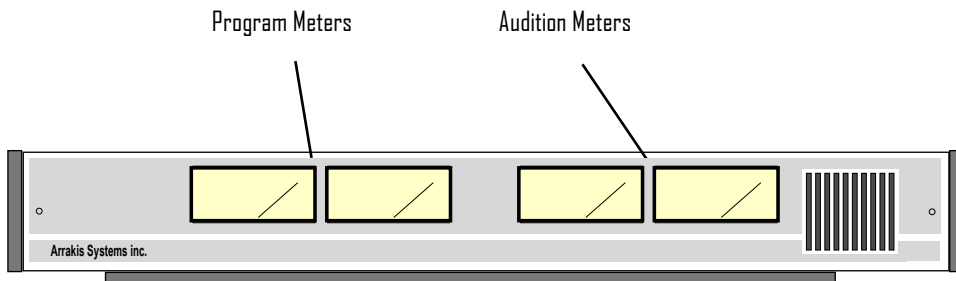
INSTALLATION INSTRUCTIONS

Unpacking

a) PACKING SLIPS- do you have everything?
Check the Packing Slips that come with the shipment t
certain that all packages have been received.

b) CHECK FOR DAMAGE
Check all packages and equipment for damage IMMEDI/
upon receipt.

If damage is found, contact Arrakis Systems immediately to
report the damage. (refer to inside cover of this manual for
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 the shipping mate-
rials.

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.
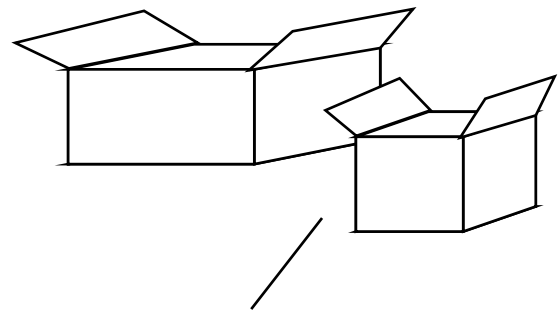
SAVE ALL PACKING MATERIAL

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) AREA IN FRONT OF THE CONSOLE

It is normal to have 8-10" between the front of the console and the front of the table so that a piece of paper may be laid on the table in front of the console.

c) SCRIPT OR COPY BOARD

Are you going to use a copy bridge that span the top of the console for paper or other objects. A copy bridge can allow the console to be placed close to the front of the table in tight rooms.

d) ADEQUATE VENTILATION

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

e) 110V - 220VAC OPERATION

The console comes with a 110VAC-220VAC autosensing external power supply as standard equipment.

f) STATIC

Static discharge to electronic devices can cause damage, reduce performance, or cause noise in the system. Proper choice of carpet is an important consideration when building a studio.

g) THE 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

Getting started... a MUST Read !

a) CONSUMER SOURCE EQUIPMENT

The ARC-15 console is designed to be used with balanced professional & unbalanced consumer type audio source equipment such as CD players, MDs, DAT machines, cassette machines, etc. Unbalanced consumer equipment is designed to perform well in compact studios where audio cables are short. Balanced audio is required when connecting multiple studios or with long audio cable runs (> 10 feet). When choosing consumer audio equipment, choose equipment that has 2 prong AC power plugs (not the 3 prong plugs).

b) AC POWER CONSIDERATIONS

Plug all of the equipment in your studio into a single AC power strip!

Unbalanced consumer source equipment is not designed to reject AC power line hum. This makes it important to put ALL of the equipment in the studio on the same branch of the AC power and preferably on a single AC power 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.

Because many buildings have as many as 8-12 duplex wall outlets on a single 1500-2000 watt branch, you must have NO other equipment on any of those 8-12 other outlets. Make sure the branch your outlet is on does not also power the lights or any other building equipment.

c) SOME THOUGHTS ABOUT 60 CYCLE HUM (or some ideas about what to do if you get it)

The RCA audio cables used in consumer audio equipment connect the chassis ground and signal ground of all of the equipment in the studio together through the cable shield. All shield ground connections should be as tight and low impedance as possible. Use only high quality RCA (IHF) audio cables.

Most consumer audio equipment will have a 2 prong AC power plug. Some equipment has a 3 prong AC power plug. The third prong 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. With stubborn hum, replace the equipment with 3 prong AC power plugs with equipment with 2 prong AC power plugs. This is often less expensive that making a custom audio cable with audio transformer isolation.

If there is 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 (such as from another studio) 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 the 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.

d) 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.

e) STEP BY STEP INSTALLATION PROCEDURE

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 Instructions

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

a) 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.

b) STEP 2- CONNECT AN AUDIO SOURCE
Select a single audio source such as a CD player. Choose a console channel for the source (such as Channel 6), and connect the audio source to the console with a stereo audio cable.

On the channel that you have chosen for the source (such as channel 3), turn the channel on by pushing the red on button(the red on LED should now be on), and bring the slide fader on that channel to the in hand setting (0).

Insert a CD into the CD player and push the Play button on the CD player to begin play.

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

c) STEP 3- LISTEN TO AUDIO ON HEADPHONES
Plug the headphones into the headphone jack on the back right side of the console as illustrated. The console supports both low impedance (8 ohm) and high impedance (>20 ohm) headphones. Play a CD as in Step 2. Select PGM on the Monitor Select Switch. Adjust the headphone level control on the console to a comfortable audio level.

TEST- You should hear the song on the CD 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.

STEP 3- PLUG IN HEADPHONES TO LISTEN

Plug in a pair
of high impedance
headphones and listen
to the CD player

STEP 1- CONNECT THE AC POWER SUPPLY

STEP 2- CONNECT AN AUDIO SOURCE

Connect a CD player to
Channel 6 on the console
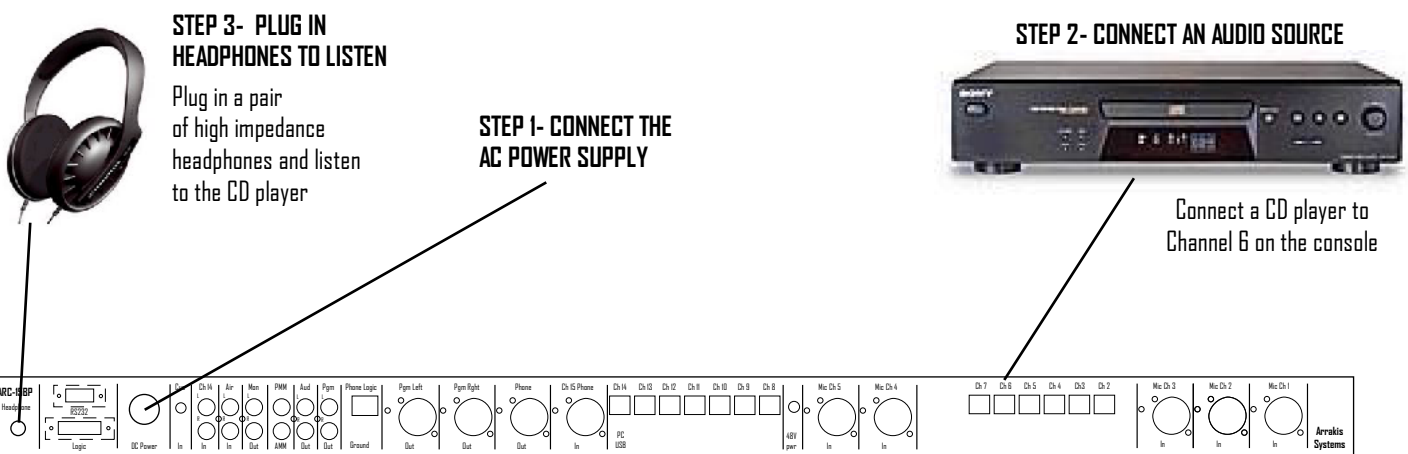
Back panel Diagram for ARC-15BP console

Monitor amp & Speakers

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. Follow the amplifier's instructions and connect speakers to the amplifier.

Turn the console power on and the amplifier power on. On the console, select PGM on the Monitor Selector switch and rotate 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 CD 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.
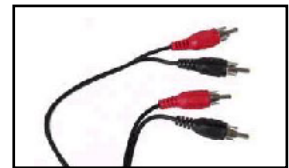
TEST- The audio through the monitor speakers should be clear and without significant noise or hum.

STEP 4- CONNECT AN AMP & SPEAKERS

Connect an audio power amp and speakers to the MON output of the console

Audio power amp

RCA AUDIO CABLE

The Black connector is right and the Red connector is left

Back panel Diagram for ARC-15BP console

Microphones

STEP 5- CONNECT A MIC TO THE CONSOLE

Using a mic to XLR cable, connect a 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, refer to "Calibration" later in this section.

STEP 5- CONNECT A MIC TO THE CONSOLE

MIC ONE

Connect a mic to the
XLR mic inputs and
test the mic
into the headphones

Back panel Diagram for ARC-15BP console

Program Output

STEP 6- CONSOLE PROGRAM 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.

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 Audition output is unbalanced. In either case, 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.

STEP 6- connect the console Program output to the station's Signal Chain

Unbalanced Pgm out (-10dBu)   Balanced Pgm out (+4dBu)
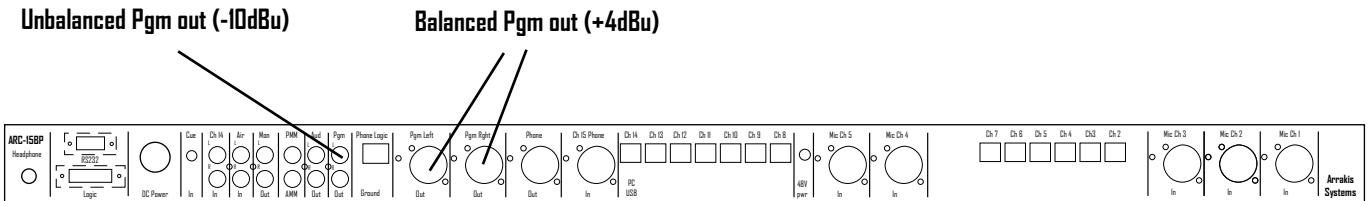
Back panel Diagram for ARC-15BP console

Record Output

STEP 7- CONSOLE RECORD OUTPUT

The console AUDITION output (AUD) is usually the bus that is used for recording. By using the Audition bus for recording, a recording can be occurring at the same time as the Program bus is used On Air. If you want to record the On Air signal on the Program bus, simply assign all of the channels in PGM also to AUD.

The Audition output connectors are located on the console back panel. It is an unbalanced (-10dBu) audio output.

CONNECTING TO AN AUDIO RECORDER

Most audio recorders will directly connect to consumer type unbalanced sources such as the Audition (Record) output of the console. Connect to the recorder with the analog cable supplied with the recorder.

TEST

Once connected, send audio from the console output to the recorder and view the input signal on the recorder. Refer to the recorder manual for more information.

RCA AUDIO CABLE

The Black connector is right and the Red connector is left
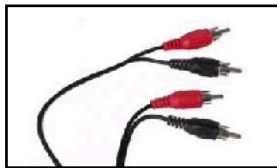
EXAMPLE: MARANTZ CD RECORDER

STEP 7- ANALOG AUDITION (RECORD) OUTPUT

Back panel Diagram for ARC-15BP console

Telephone hybrids

STEP 8- CONNECT A TELEPHONE HYBRID

1) 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 TEN on the console.

2) CONSOLE MIX MINUS OUTPUT- The input to the hybrid is from the console PHONE 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.

3) CONTROL LOGIC- The hybrid has two ways to "answer" the caller and pick up the telephone line: front panel manual control of the hybrid itself and remote control. For manual control, an On and Off button will be located on the front panel of the hybrid. For remote control, the PHONE LOGIC back panel connector (RJ45) must have a custom cable connecting it to the console source start/stop logic. The logic is dry reed relay closures for both Start and Stop as shown below.

4) CALIBRATION- The console PHONE IN and PHONE OUT connectors are set for +4dBu levels. These connectors have trim pots next to their respective XLR connectors

5) FACTORY CABLES- Arrakis has prebuilt cables for audio and logic available for a variety of source equipment. Refer to "Factory Cables" later in this section and on the Arrakis website (www.arrakis-systems.com)

BACK PANEL HYBRID LOGIC CONNECTOR

RJ45 WIRING STANDARD COLORS

PIN	Wire Color	Audio
1	White w/Orange Stripe	Start w 100 ohms
2	Orange w/White Stripe	Start w 100 ohms
3	White w/Green Stripe	Stop w 100 ohms
4	Blue w/White Stripe	Stop w 100 ohms
5	White w/Blue Stripe	Start
6	Green w/White Stripe	Start
7	White w/Brown Stripe	Stop
8	Brown w/White Stripe	Stop

1,2,3,4,5,6,7,8

RJ45
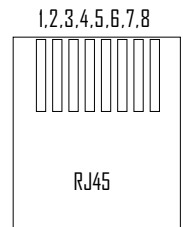
A reed relay makes a momentary closure between the two START contacts (pins 5 & 6) and a second reed relay makes a momentary closure between the two STOP contacts (pins 7 & 8). The same reed relays make the same closures with a 100 ohm series resistance to Pins 1,2,3,4

STEP 8- CONNECT A TELEPHONE HYBRID

On/off Logic   Audio Input   Audio Output

Back panel Diagram for ARC-15BP console

Talkback to another Studio

STEP 9- TALKBACK

The Talkback feature is designed so that a console can easily communicate with another studio. In the ARC-15 studio, the operator pushes the TALK button on mic channels One or Two and speaks through his control room mic into the Monitor/cue system of the other studio. The second studio responds back to the ARC-15 studio and the audio is heard through the CUE system.

INSTALLATION

The ARC-15 has a talkback audio output to be sent to the remote studio and an audio input to the Cue system (with logic) to receive audio from the remote studio. All connections are made to the 15 pin, D-sub LOGIC connector on the rear of the console. On site installation requires the building of a custom cable to link the console to the studio at the other end.

       a) TALKBACK INPUT-   on the 15 pin D-sub LOGIC connector, (refer to 4.14 for pin number)

       b) INPUT LOGIC-   on the 15 pin D-sub LOGIC connector, (refer to 4.14 for pin number)
                                           +12VDC to enable autocue into the headphones.
                                           (If logic is not used, then the talkback will appear in the Cue speaker only)

       c) TALKBACK OUTPUT-   on the 15 pin D-sub LOGIC connector, (-10dBu, unbalanced, analog), (refer to 4.14 for pin number)

       d) OUTPUT LOGIC-   None

OTHER CONSOLES

Talkback can be accomplished between non ARC-15 series consoles and studios. Care should be taken to assure compatibility between logic voltages.

GROUND LOOPS AND HUM

Because of long cable lengths between studios, it is possible for the talkback system to introduce hum into one or both studios. Isolation transformers may be required on the analog inputs and outputs.
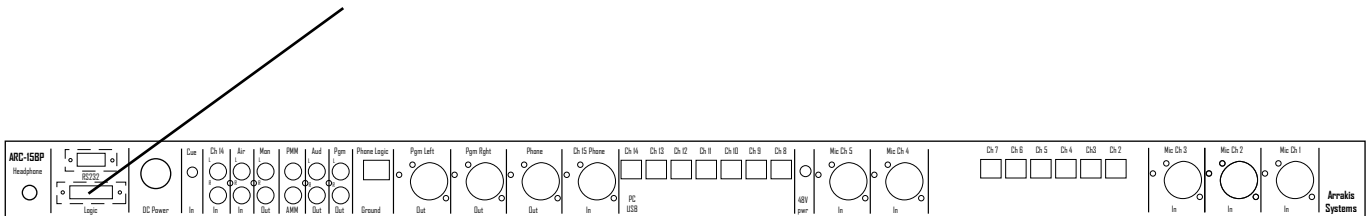
FACTORY CABLE

Arrakis has an optional cables available in various lengths from the factory.

TEST

Test talkback between the two studios. It is important to also listen for hum or noise in the Program output on the control room monitor speakers.

STEP 9- TALKBACK

LOGIC connector with
talkback in-out and logic

Back panel Diagram for ARC-15BP console

External Monitor Input

STEP 10- OFF AIR MONITORING

The Monitor Selector Switch has an External Input position (AIR). This position 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.

INSTALLATION

Connect the output of a radio tuner or professional on air monitor to the AIR 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 AIR IN is calibrated to -10dBu input level. Interior trimpots may be factory adjusted to different levels.
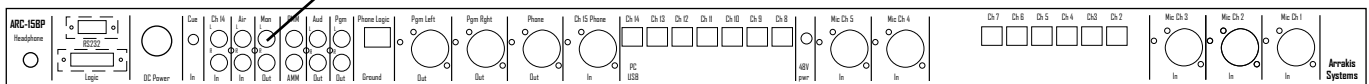
TEST

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

STEP 10- OFF AIR MONITORING

RADIO RECEIVER
Tuner or Off Air
Monitor Output

Back panel Diagram for ARC-15BP console

The On Air Light

STEP 11- CONNECT AN ON AIR LIGHT

The console has a logic output for triggering an external On Air Light.

This installation procedure requires a professional technician to build an interface circuit 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.

Contact the factory for some typical circuits to drive an On Air light.

MUTING LOGIC

This is on PIN One of the 15 pin D-sub LOGIC connector on the rear of the console.

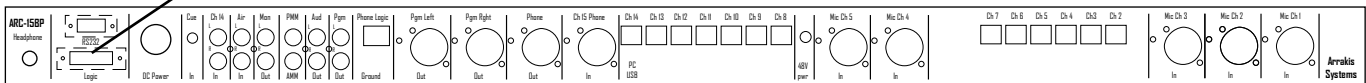Muted: open collector transistor to ground, 20millamps
Unmuted: floating

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.

TEST

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

LOGIC connector with
On Air light (Miting) logic on Pin One

Back panel Diagram for ARC-15BP console

Factory built Cables

The factory has a number of factory built cables available for purchase. These cables interface typical source and other equipment to the console.

Contact the factory for a current listing of cables and supported equipment.

Console Logic

IMPORTANT- improper connection to console logic can damage the console.

The DB-15 connector on the rear panel of the console has the logic & audio signals required for supporting a talk studio and controlling the starting & stopping of sources.

Sample interface circuits for control are illustrated in 4.15.

DB15 CONNECTOR PINOUT (Solder Cup)

```
   8  7  6  5  4  3  2  1
  ○○○○○○○○
   ○○○○○○○
  15 14 13 12 11 10  9
```

CONSOLE BACK PANEL VIEW

| PIN	DESCRIPTION
1	Control Room Mute Logic (will switch to Pin 13 ground)
2	Autocue Logic In (switch to ground to turn on)
3	Channel Eight Logic (+12VDC channel on, 0VDC channel off)
4	Channel Seven Logic (+12VDC channel on, 0VDC channel off)
5	Channel Six Logic (+12VDC channel on, 0VDC channel off)
6	Channel Five Logic (+12VDC channel on, 0VDC channel off)
7	Channel Four Logic (+12VDC channel on, 0VDC channel off)
8	Channel 3 Logic (+12VDC channel on, 0VDC channel off)
9	Channel 10 Logic (+12VDC channel on, 0VDC channel off)
10	Studio Monitor Left Audio Output
11	Studio Monitor Right Audio Output
12	Talkback audio from Mic 1 and Mic 2
13	Ground
14	+ 12 VDC
15	Talkback Audio Input to Cue

Console Logic

IMPORTANT- improper connection to console logic can damage the console.

Channel Logic

Several channels on the console feature channel logic for use in talk studios or starting and stopping source devices. The logic requires an interface circuit to be built by a qualified broadcast technician.
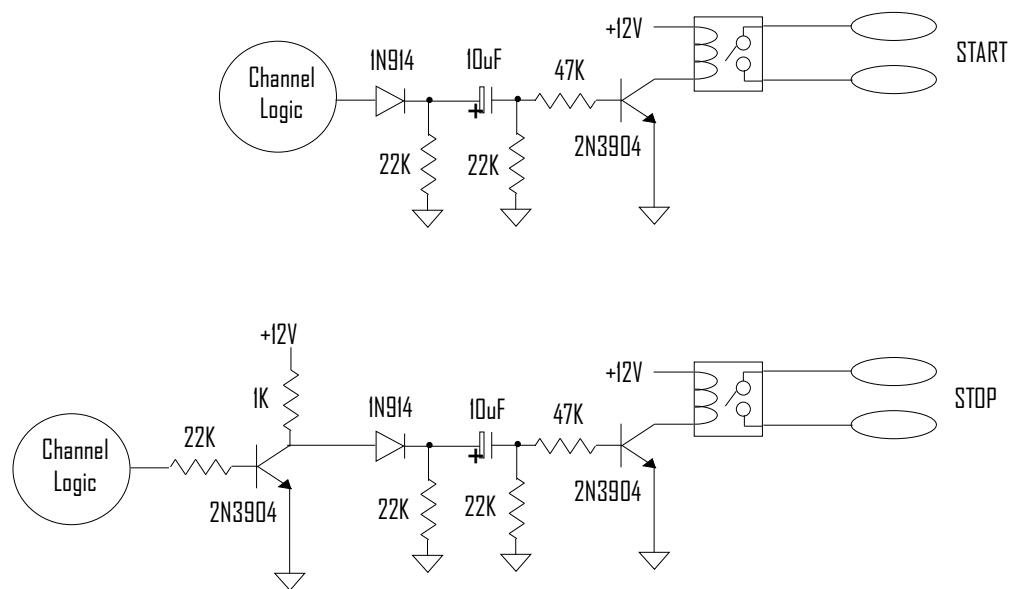
a) Remote Channel On-off w Tally

The circuit shown at the right will remotely turn a console channel on and off and drive a tally lamp to display the On-off satus.
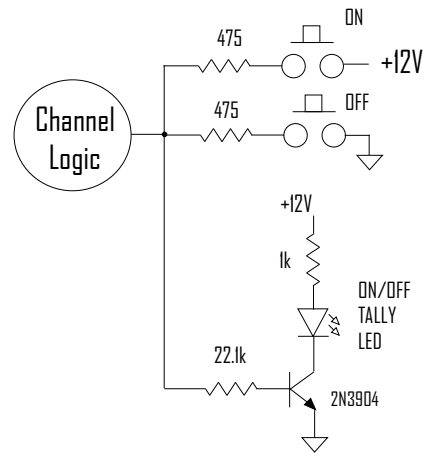
b) Source Start-stop Circuit

The circuit shown at the right will close the relay for ~ 0.5 seconds to start & stop an audio source device such as a CD player.
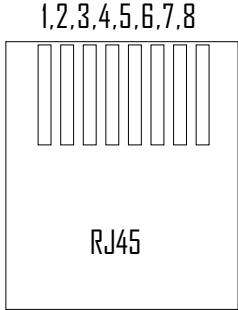
Balanced Inputs

Input channels with balanced audio using RJ45 connectors as illustrated below. Pins 5,7,8 are not connected.

The balanced inputs are >10,000 ohm input impedance and levels are set for +4dBu signals.

EIA/TIA 568B   WIRING STANDARD COLORS

1,2,3,4,5,6,7,8

PIN	Wire Color	Audio
1	White w/Orange Stripe	Left (+)
2	Orange	Left (-)
3	White w/Green Stripe	Right (+)
4	Blue	Ground
5	White w/Blue Stripe	
6	Green	Right (-)
7	White w/Brown Stripe	
8	Brown	

RJ45

PC Setup

The ARC-15 console features a built in sound card on Channel Fourteen of the console. This enables the console to play audio directly from a Windows PC using Arrakis Digilink-Xtreme software. The console can play audio from the PC, record audio to the PC, and control the start and stop of play on the PC.

RECOMMENDED OPERATING SYSTEM
The minimum PC operating system is Windows XP or VISTA. Windows XP is currently the recommended operating system

CONNECTIONS
 The PC is connected to the console by:
> 1) USB cable (USB 1 or USB 2)
> 2) RS232 serial port cable (or RS232 to USB converter, contact the factory for recommended products)
> 3) Audio cable (1/8" stereo phone jack)

INSTALLING & OPERATING THE SOFTWARE
refer to the Section Five of this manual

LAPTOP OR DEKTOP PC

PC LINE OUT

RS232
CONTROL
PORT

9 PIN
SERIAL
CABLE

AUDIO CABLE WITH
1/8" PHONE JACKS

USB
cable

CUE
IN

USB
PORT

Back panel Diagram for ARC-15BP console

IF YOUR PC DOES NOT HAVE AN RS232 PORT   such as: IOGEAR GUC232A

RS232 to USB adapter

ARC RS232 PORT

USB
HUB

PC USB PORT

ARC CH 9 USB PORT
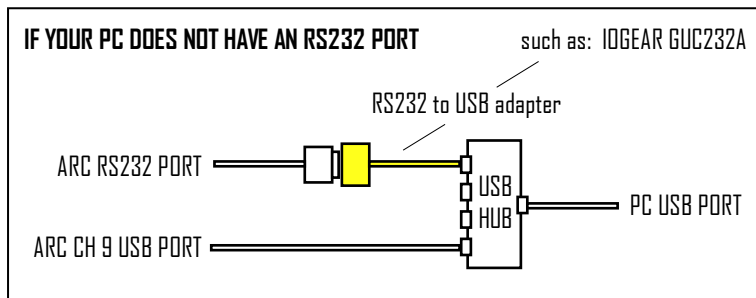
ARC-16SW 16 in X 3 out Remote Selector for the ARC-10

Adding more Inputs to the ARC-10 Console

For applications requiring more than the ten inputs supported by the ARC-10, the ARC-16SW provides up to 16 more stereo inputs that can be selectable to any 3 console channels. The switcher features balanced inputs that are all trim pot adjustable from consumer levels (-10dBu) to professional levels (+4dBu).

The ARC-16SW

The ARC-16SW is a custom configuration of the Arrakis BROADCAST DOCKING STATION. The BROADCAST AUDIO DOCKING STATION is a multipurpose product with applications that vary depending on the firmware loaded into the hardware and the PC software used to control it. In the ARC-16SW application the firmware in the hardware is internally configured to support only the 16 x 3 router functions.

PC Control

The ARC-16SW is controlled via RS232 serial cable from a PC computer. While the console does not have direct control of the switcher from its front panel, the PC software adds ease of use and flexibility with on screen labeling, support of touch screen monitors, and much more.

Network control from ANY Studio

Client/Server software comes standard with the ARC-16SW so you can view and control the switcher from ANY Windows PC computer on the network in your station.

PC Configuration

The ARC-16SW supports both Windows XP and Windows VISTA for control. The computer must have an RS232 serial cable or a USB to serial converter.

Contact the factory for suggested converters.

16 Stereo Sources

Control the Switcher
by Windows PC
software

3 stereo Outputs
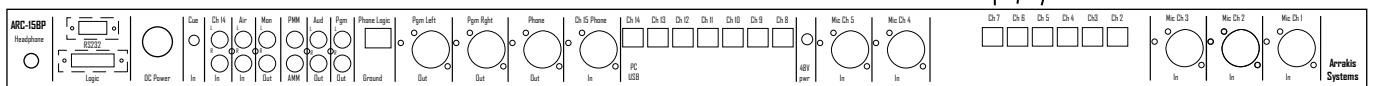
Back panel Diagram for ARC-15BP console

ARC-16SW Software

FEATURES

▮ Client/Server network control from ANY studio

▮ Manual Pushbutton control of 16 inputs & 3 outputs

▮ Customized Labeling of all Inputs & Outputs

▮ Source lockout to prevent feedback

▮ Touchscreen size buttons

▮ One Week Source Automation play list

▮ Copy & Paste Hour and Day schedules

▮ Play log for reconciliation

▮ Emergency Silence Sensor on Main Output

▮ Programmable delay time

▮ Automatically switches to a Backup source channel w relay

The ARC-16SW software is extremely easy to use. The software searches for the switcher automatically when opened and displays the current switcher status. The 17 by 3 button array makes it very easy to manually select a source channel for a console input or even for the station output to the transmitter chain. The automation schedule is a one week rotating schedule and is easy to set up. Schedule a basic hour (or day) and then copy & paste it into other hours & days. A count down clock displays time to the next scheduled event. A log documents the operation of the schedule. Very little training is required and the ability to name every source and output makes operation totally intuitive. The ability to lock out sources from an output makes feedback impossible. The software is ideal for use as an input expander for a console or as a station switcher.
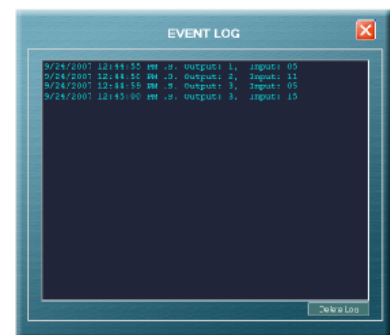
Push button Array for Manual Control

One Week Automation Play List
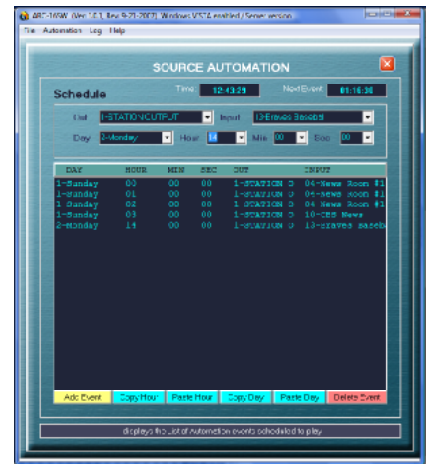
Play Log screen

ARC-16SW 16 in X 3 out Remote Selector for the ARC-15

SWITCHER WIRING

a) WHITE MOLEX CONNECTORS

As viewed looking down on the switcher .
Pin 7 is engraved on the connector housing. Pins are .090"

```
 _/\_/\_/\_
| 1   2   3 |
| 4   5   6 |
| 7   8   9 |
 ------------
```

> **NOTE:** the BROADCAST AUDIO DOCKING STATION is a multipurpose product with applications that vary depending on the firmware loaded into the hardware and the PC software used to control it. In the ARC-16SW application the firmware in the hardware is internally configured to support only the 16 x 3 router functions. Therefore the logic and other connectors that support other functions should be ignored.

b) DESCRIPTION

The switcher has active balanced audio inputs & outputs to the switcher. The pin out is shown below. Each of the 16 inputs, the Program output, and Cue output has a trim pot level adjust. The balanced Record output is a fixed level, however the Record output also has an unbalanced 1/8" headphone jack output with trim pot. Gain is increased by turning the trimpot counterclockwise. Levels are set from the factory for +4dBm input and output. Only a qualified technician with appropriate test equipment should adjust the levels.

c) IMPORTANT

none of the audio outputs should be grounded. Grounding an audio output will result in the destruction of the audio output driver IC.

d) 'CHANNEL 1' to 'CHANNEL 16' Input Connectors

1) Audio ground
2) Right + input
3) Right - input
4) na
5) Left + input
6) Left - input
7) na
8) na
9) na

e) 'PROGRAM' Connector (Program Output)

1) Audio ground
2) Right - input
3) Right + input
4) Start relay to pin 9 (momentary)
5) Left - input
6) Left + input
7) na
8) na
9) na

f) 'CUE' Connector (Cue & Record outputs)

1) Audio ground
2) Cue Right - output
3) Cue Right + output
4) Record R - output
5) Cue Left - output
6) Cue Left + output
7) Record Right + output
8) Record Left - output
9) Record Left + output

Cue & Record Output

Program Output

Inputs 1-16
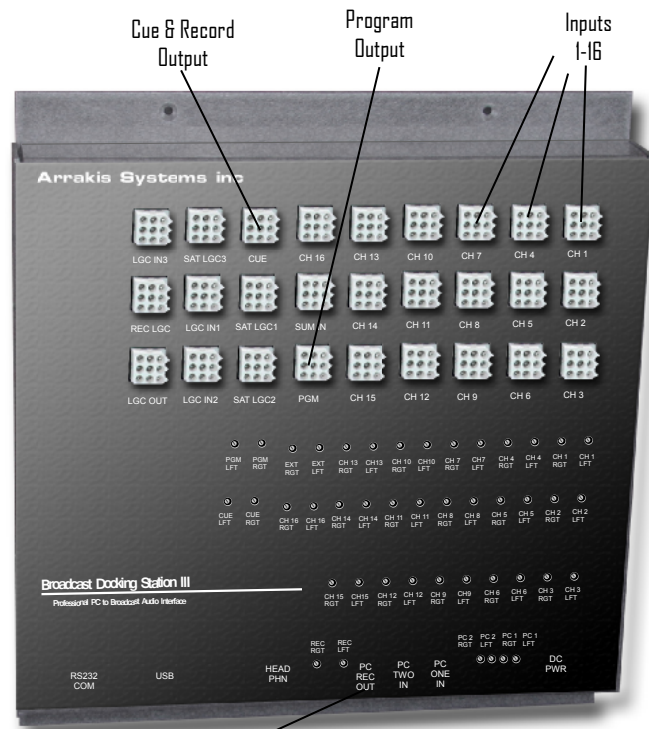
Unbalanced Record output (1/8" headphone jack)

BROADCAST AUDIO DOCKING STATION

Basic Calibration

The console has trim pot level adjustment for several inputs and outputs.

WARNING

The console has been calibrated at the factory to normal -10dBu and +4dBu levels and should not require field calibration. Usually, it is better to adjust the level out of the source device than to adjust the console trim levels. Field calibration should only be done with proper test equipment and by a qualified audio technician.

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.

MIC GAIN ADJUSTMENT
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 gain is reached.

UNBALANCED SOURCE CHANNEL GAIN ADJUSTMENT
No gain adjust is required for unbalanced -10dBu source devices

BALANCED SOURCE CHANNEL GAIN ADJUSTMENT
These channels are set at the factory for +4dBu levels. If the levels must be adjusted, trim pots are available on the bottom of the motherboard. This requires the bottom panel of the console to be removed. Care must be taken when adjusting the trimpots to not short any electronics. Refer to the motherboard diagram in Section Six, Service and Maintenance.

PHONE CHANNEL TEN LEVEL ADJUST
The phone in and out audio connectors are balanced +4dBu outputs that may be adjusted on the rear panel by the trimpots located beside each XLR connector.

PROGRAM & AUDITION OUTPUT LEVEL ADJUST
The Program balanced output has a trim pot level adjust on the rear panel beside the XLR.
The Audition output is unbalanced -10dBu consumer level and does not require trimming.
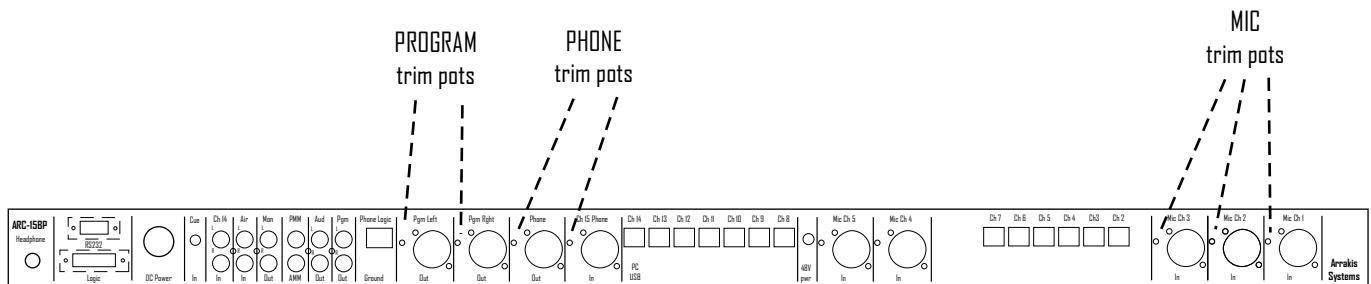
Back panel Diagram for ARC-15BP console

XTREME FOR
THE ARC CONSOLE

'Free' Digilink-Xtreme (ARC mode) software

Arrakis Systems and 'Free' Digilink software
Arrakis has a long history of providing free on air & production software to the radio industry as promotional and support products for our core business: Digilink-Free, Xtreme-Studios, Xedit-pro, X-sched, and now Xtreme (ARC mode).

Xtreme for the ARC console is designed to be Easy to Use
Xtreme for the ARC console is a powerful live on air, basic automation, and recording program that meets many station's needs and is a useful promotional tool for our ARC-10 console line. It is specifically designed to be easy to use to reduce the operational learning curve and eliminate customer service.

How Xtreme works with an ARC console
Xtreme for the ARC console is actually the full current version of Arrakis Xtreme software. When a PC running Arrakis' full version Digilink-Xtreme software is connected by a USB cable to an ARC-15BP console, the software recognizes the console and self-configures for the features appropriate for the ARC console.

Xtreme for the ARC console will only function with an ARC console
The Xtreme software provided with the ARC-5BP console model will function only when connected to an ARC-15 console. Because the software is actually the full version of Arrakis Xtreme automation software, it will run in the Xtreme-Studios mode if the software is run without an ARC console.

The ARC-15 is a Windows compatible soundcard that supports most Windows Audio software
The electronics in the ARC-15 emulates a USB HID compatible sound card. A Windows PC will recognize the card and most Windows compatible software will be able to play and record from the ARC console.

Customer Support
Digilink Xtreme (ARC mode) software for the ARC console is provided at no charge and does not include the cost of telephone support. The software is specifically designed to be easy to use for people with average PC computer and radio industry experience. Support is limited to the product manual and the on screen help system in the software itself. Refer to the Arrakis website at www.arrakis-systems.com for updated training materials. In a case where telephone support is a necessity, Arrakis has per minute and per incident support available that can be paid for by valid credit card. For comprehensive support and advanced automation features, the 'Xtreme Solutions' program may be purchased. Refer to the website or contact the factory for details.

<u>a short History of Digilink</u>
Arrakis has been building hard disk automation systems since the early 1990s under the family name of Digilink. More than 4,000 DL1, 2, 3 & 4 systems have been sold. In 2001, Arrakis introduced a Windows automation program named Digilink-Free. As its name implies, this software was free. More than 10,000 copies of the program have been downloaded. In 2004, Arrakis introduced Digilink-Xtreme which is a full featured version of Digilink-Free and costs $100 per month. Digilink-Free has since been replaced by Digilink-Xtreme(studios mode) which is also free. In 2003, Arrakis introduced X-edit as a free production tool in support of our Xtreme automation systems. As of today, Digilink-Xtreme is one of the top radio automation systems in the world and the free software that we provide in support of Xtreme have proven to be valuable tools for many radio stations around the world.

Loading the Software

The software is self-installing. Drag the 'Install Xtreme.exe' file from the CDROM to the PC desktop. Then simply double click on the 'Install Xtreme.exe' file and it will install itself. Short cuts will be placed on the desktop, Start menu, and Programs menu.

Note: the software is extracted by default to the 'C:\Arrakis' directory

Connecting the PC to the Console

To fully interface the console and the PC, three cables must be connected between the two pieces of equipment.
(1) USB cable: transfers play and record audio between the PC and the console
(2) RS232 cable: transfers logic commands such as play and stop between the PC and the console
(3) Audio cable: 1/8" stereo phone jack from the 'Cue In' on the console to the 'Line out (or speaker out)' on the PC

Some PCs do not have an RS232 com port. This will require the user to purchase an 'RS232 to USB' adapter and a 'USB hub'. The adapter and the hub will combine the RS232 cable and USB cable into one and then connect to the PC with only a single USB cable.

LAPTOP OR DEKTOP PC

PC LINE OUT

RS232
CONTROL
PORT

9 PIN
SERIAL
CABLE

AUDIO CABLE WITH
1/8" PHONE JACKS

USB
cable

CUE
IN

USB
PORT

Back panel Diagram for ARC-15BP console

IF YOUR PC DOES NOT HAVE AN RS232 PORT   such as: IOGEAR GUC232A

RS232 to USB adapter

ARC RS232 PORT

USB
HUB

PC USB PORT

ARC CH 9 USB PORT
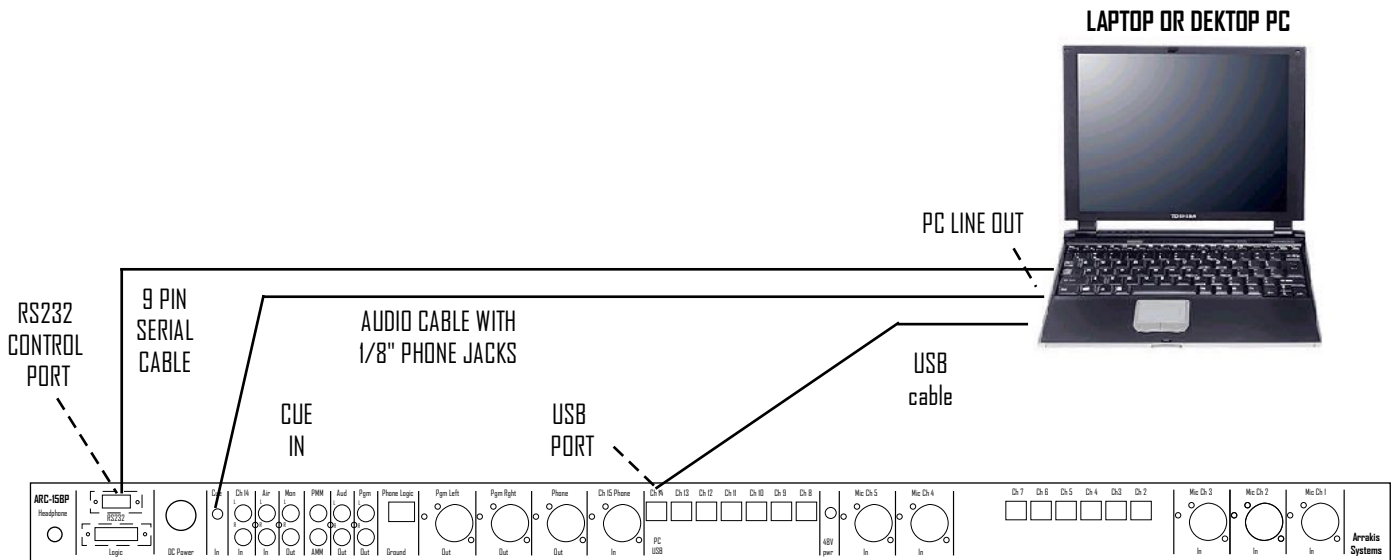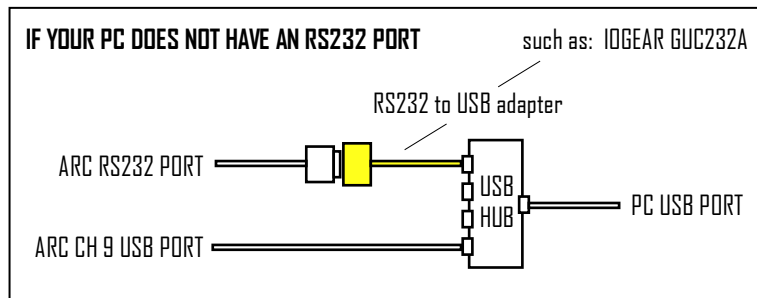
The Menu

The main MENU button is located in the upper left corner of the Xtreme screen. Click on the button to view the menu.

NOTE: the SCHEDULER & RECORDER menu items are not active in Digilink-Xtreme (basic ARC console mode). They are retained on the menu because they are active in the Advanced mode option.
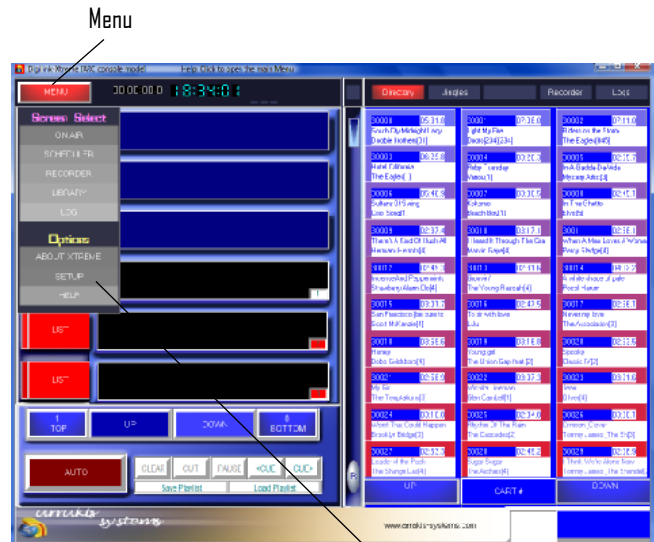
Menu

Click to open the Setup screen

Software Setup

To open the Setup screen, click on MENU and then SETUP. There are only four setup options in this software mode.

1) Sound Cards
displays the sound cards in the Windows sound resources list. This is a display only window.

2) Serial Ports
select the RS232 serial communications port that will be connected between the PC and the ARC-10 console.

3) Random List Play
enables the Random List play feature by placing a button in the bottom center of the On Air screen.

4) Change Audio Directory
by default, the audio library path is C:\Arrakis\Xtreme\Library. This feature allows the user to select a different directory (folder) for the audio library.

Note: refer to the following pages for specifics concerning these options.
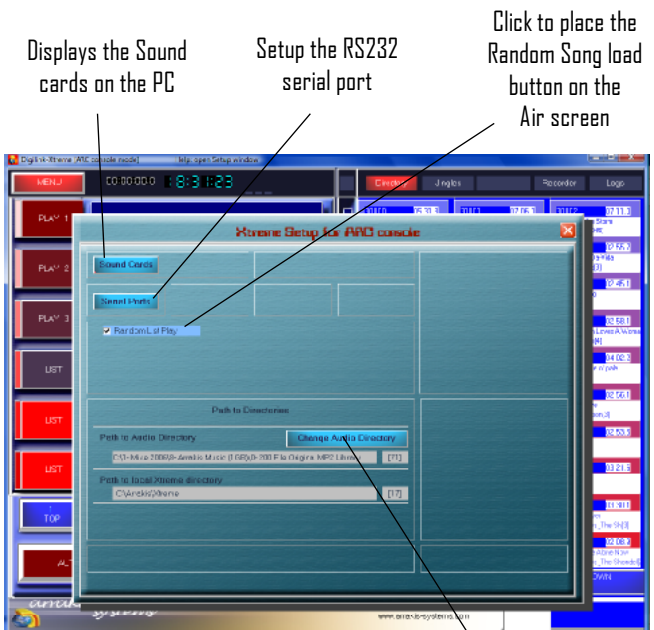
Displays the Sound cards on the PC

Setup the RS232 serial port

Click to place the Random Song load button on the Air screen

Browse to find the path to the Audio Library folder

Selecting the Library Folder

All audio files must be located in a single audio directory (folder) for Xtreme to play from them. By default, this folder is C:\Arrakis\Xtreme\Library.

A different path from the default path can be selected by clicking on the CHANGE AUDIO DIRECTORY button. A standard Windows Find File dialog will open. Browse to your new library and click on an audio file in that directory to select it. The new library will be loaded into the Xtreme directory and the new path will be saved.

Setting the Com port

Xtreme uses the USB port on the ARC console to play and record audio. Xtreme uses the RS232 serial communications port on the ARC console to send commands back and forth between the PC and console.

Selecting the Com port
To communicate between the console and the PC, only a Com Port number must be selected. (The Baud rate is fixed at 38400). The Port box in the setup window is a drop down list that will display a list of all available comports on the PC. Select the com port that you have connected from the PC to the console. Click on the SET button.

Testing Communications
If the port that you have selected is not connected to the console and has a conflict, then an error message will pop up and you should select another com port. If you have selected the correct com port, then turning console channel nine on and then off will flash one of the four buttons yellow.

Viewing the Sound cards

This is a display only window. It will display a list of all Sound cards that Windows has detected. If the PC is properly connected to the ARC console by the USB cable and the console power is on, it should show the ARC console sound card in the list named 'USB Audio Codec'. Also, the 'USB Audio Codec' should be displayed as the 'Program Sound Card.' The 'Cue Sound Card' should be assigned as the sound card in the PC computer itself.

Note: if the 'USB Audio Codec 'is displayed as the 'Program Sound Card', then program audio from the Xtreme software will play through channel nine on the ARC console. Cue audio from the Xtreme software will play out the PC speaker or out the Cue speaker in the console (if the line(speaker) out of the PC is wired to the Cue input on the ARC console).

Browse to locate the Library folder
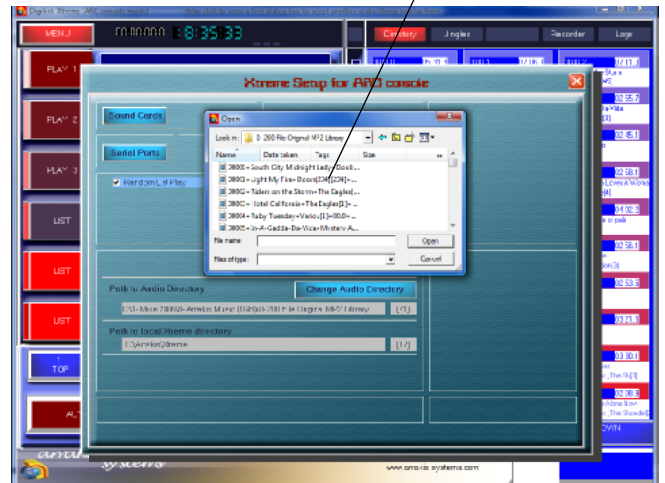
Once the Com port has been selected then click on the SET button

Select the Com port that the ARC-10 console is connected to
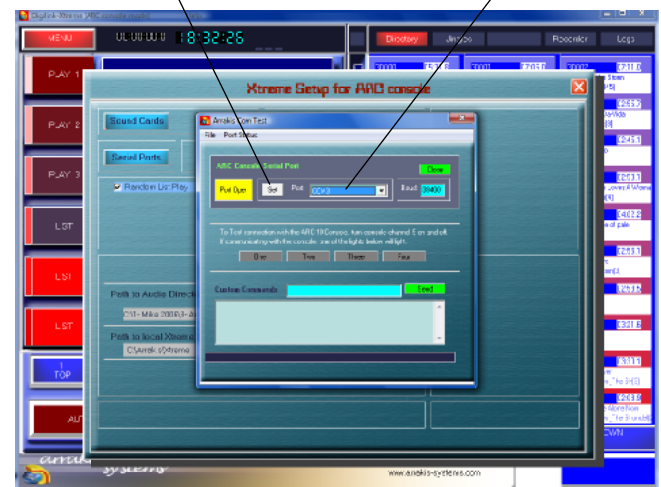
Displays the Sound cards that Windows recognizes
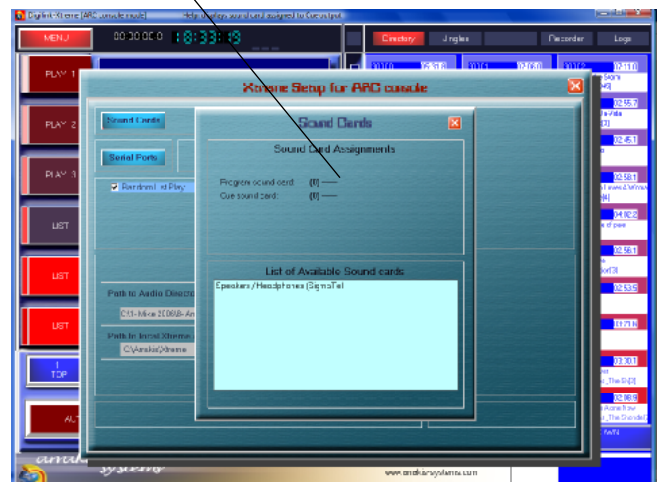
Assigning Jingles

Xtreme has ten pages of thirty jingles per page. To select the Jingles window, click on the JINGLES button at the top right of the screen. To assign jingles to the jingle array, click on the JINGLES button at the bottom right of the screen. The screen will move the 30 button jingles window to the left of the screen and display the Directory wall on the right. To assign an audio file to a jingle button, click on a jingle button (which will turn blue) and then click on the desired audio file in the directory on the right of the screen. The selected audio file will then appear in the Jingle button. Repeat this process until you are finished.

Important: once a jingle begins playing, the jingle page can not be scrolled. Therefore, if it is desired to play more than one jingle at a time then they must be assigned to the same page. This is important to consider when assigning Jingles.

(1) Click on a jingle button to prepare to load a new file

Click to select the Jingles window

(2) Browse through the directory and then click on the desired file

Click on the JINGLES button open the jingles assignment window as displayed here

Playing Jingles

Jingles are audio files that might occasionally be played as beds, sound effects, etc. during a live show. Xtreme features ten pages of thirty buttons for use as jingles.

Up to three jingles can be played at the same time if the play list is not playing. If the play list is playing, only a single jingle can be played since two plays are assigned to the play list. Click a button to play a jingle and click again to stop play.

Important: once a jingle begins playing, the jingle page can not be scrolled. Therefore, if it is desired to play more than one jingle at a time then they must be assigned to the same page.

Play up to 3 jingles at the same time

The Directory

The right side of the on air screen can be selected to display a directory of all of the audio files in your library. The directory can be sorted by (1) cart number, (2) title, (3) text/artist, and (4) runtime. To search for a specific file by the sort order, type into the text box at the bottom right of the screen.

Playing in the Directory
A file can be played in the directory by clicking on it just like a jingle. Click once to play, click again to stop play.

Cueing in the Directory
To cue the beginning or end of a file in the directory, click on the cue button (turns grey) and then click on the button in the directory. The audio will play out of the PC sound card and not on air.

Click on this button to display the Directory for the audio library

Click on this button to display the four Sorting options

To cue the beginning or end of a file in the directory, click on the cue button (turns grey) and then click on the button in the directory.

Search box: type into this box to search for a specific file in the directory

Loading the Play List

The play list on the left side of the on air screen is a list of up to 500 audio events. The list is filled by clicking on a line in the play list (turns brown) and then selecting on an audio file from the directory on the right side of the screen. Events in the play list can be cleared or cut and pasted. Once a list is created, it can be saved to a file for later use.

(1) click on a line in the play list (turns brown)

(2) click on an audio file in the Directory to load it into the play list

click to open a Windows Save File dialog to save this play list to a file for later playback

click to open a Window Find File dialog to load a saved play list to the on air play list

Song & Break events

There are two special non-audio events displayed in the directory. These are (1) BREAK, and (2) SONG. They can be added to and manipulated in the play list just as any audio file can be.

BREAK event
Place this event into the play list wherever you would like the play list to Stop play. The break event can be used to break up commercial stopsets, insert a time when the live announcer may enter the news, etc. Once the live event is completed, the operator must then click on the AUTO button again to start the play of the play list.

SONG event
In Xtreme, audio files are assigned a single letter as a 'TYPE'. Examples are 'M' for music, 'S' for commercials, 'J' for jingles. The SONG event uses the type 'M' music audio files to automatically select a song for play in the play list. All type 'M' audio files are treated as a single large category. Songs are randomly selected out of the category but will not be played twice within a minimum back to back setting (usually 100 songs). The specific song is selected when the SONG event is loaded into the top two lines in the play list for play.

The SONG event is particularly useful when you are saving a play list as a template for repeated play on air.

BREAK event   SONG event
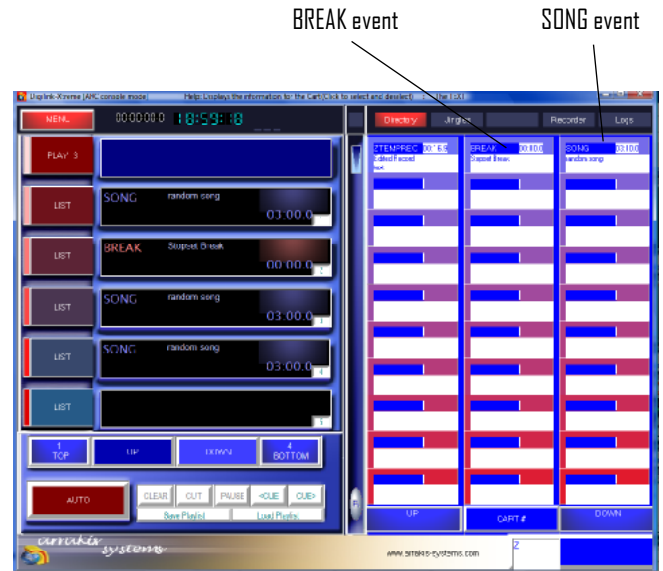
Random List Play

Random List Play is a powerful feature for filling on air time between live programs. It will play three songs in a row followed by a jingle and then three songs again until the mode is turned off.

Activating Random Play
If the 'Random List Play' check box is check in the Setup screen, then the 'R' button will appear in the bottom center of the on air screen. Click on the button to activate random play (turns yellow). Click on it again to stop random play.

How Random Play Schedules
If the 'R' button is on (yellow), then Xtreme will automatically fill the play list if the number of files in the list is less than four. It will automatically and repeatedly schedule three type 'M' SONG events followed by a type 'J' jingle event. If there are no type 'M' or 'J' events, then the mode will play randomly from the entire audio library.

Random List Play
button (yellow
when active)

Recording Audio

Xtreme for the ARC console has a built in recorder and single block editor for recording and quickly editing audio files. The recorder records from the Audition audio bus from the ARC console.

Record Format
The recorder records in uncompressed WAV format for ease of editing. The specific WAV format can be selected with the recorder SETUP button.

Recording
Click on the red RECORD button to start recording. Click on the PAUSE or STOP buttons to pause-stop recording. Once a recording has been stopped, it will be displayed in the edit window.

Playing the File
Once a file has been recorded, click on the green PLAY button. The audio will play out the cue sound card and not On Air.

Editing a File
Sometimes it may be desire to edit the beginning and end of the audio file before saving it. To do this, left mouse click on the window to set the start point. Right mouse click at the end of the audio file to set the stop point. Four buttons in the editor (<<|, etc) will loop scrub the start and stop points to get an exact point. Once edited, save the edited recording to a file.

Saving the Recording to a File
The audio file can be quick saved by clicking on the yellow 'SAVE' button to a file named 'ZTEMPREC' which will automatically appear at the end of the audio directory to be easily found. (Note that ZTEMPREC will be repeatedly recorded over). Click on the blue 'SAVE AS' button to save the file to the library with the cart number and title in the text boxes at the bottom of the recorder window. The file will appear in the directory with the assigned cart number and title.
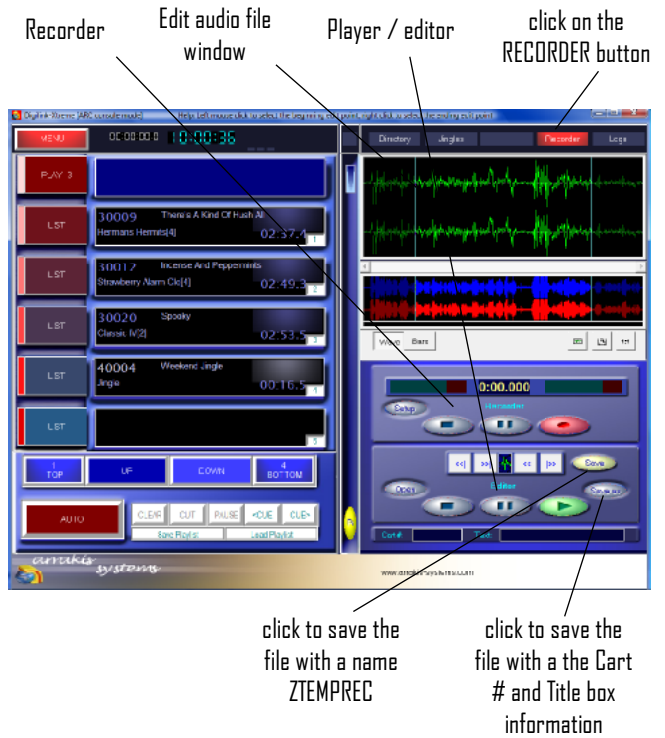
The On Air Play Log

The On Air screen play log displays recently played audio events since the software was opened. This is useful for reviewing recently played events.

Recorder Edit audio file window Player / editor click on the RECORDER button

click to save the file with a name ZTEMPREC

click to save the file with a the Cart # and Title box information

click on the LOG button
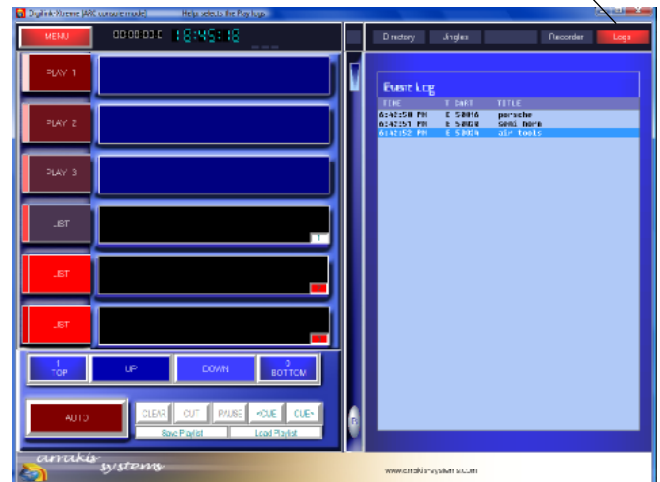
The Audio Library

All of the audio tracks that you will use with Digilink-Xtreme must be in a single directory. The Arrakis\Xtreme directory has a directory inside it titled 'Library'. When first opened, Digilink-Xtreme will look to the 'Library' directory. If there are audio files there, it will load them as your audio library. If you want to use a different directory as your audio library (perhaps on the network), you must change the path to the audio directory in Menu\Setup

THE PATH TO THE AUDIO LIBRARY
Digilink-Xtreme can play audio from anywhere across the network. Click on the 'Change Audio Directory' button in the Setup window and a Windows Find File dialog box will open. Browse the network and click on an audio file in the audio directory that you wish to choose. Digilink-Xtreme will save the new path as the path for your audio directory.

AUDIO FORMATS THAT XTREME SUPPORTS (wav, mp2, mp3)
Digilink supports simultaneous play of any combination of uncompressed audio files (WAV), MPEG 1 Layer 2 (MP2) , and MPEG 1 Layer 3 (MP3) audio formats. WAV audio files are uncompressed while MP2 and MP3 audio files are compressed audio formats. For CD quality audio, sampling rates should be 44.1kHz (the CD standard) which provides full 20-20kHz audio bandwidths. For CD quality in compressed audio, MP2 files should be at least a 192k bit rate while MP3 files should be at least 128k bit rate. Lower bit rates will result in higher compression ratios but listening tests indicate a lower than CD audio quality for most listeners.

SILENCE AT THE FRONT & BACK OF AN AUDIO FILE
It is important when producing audio files to NOT have silence at the front or back of the audio file. While overlap times can sometimes deal with silence, it is not possible to use overlaps to handle loose production if the adjacent audio files in the list are very short. It is better to follow careful production rules and eliminate silence from the file. To facilitate converting problematic audio files to tight files, Arrakis provides a waveform editor to trim the silence.

NAMING AUDIO FILES
Radio specific data must be assigned to every audio file in your library for many of Xtreme's features to operate. Each file must have a unique cart number to identify it, usually a title, artist, type of audio event such as 'M' for music, etc. This data can be easily added in the 'LIBRARY' window accessible from the main MENU.

THE ARRAKIS NAMING FORMAT
In its simplest form, a filename must at least have a unique cart number followed by a plus (+) sign and the file extension.
Valid formated filenames are...
>   Cartno + .Ext
>   Cartno + Type + .Ext
>   Cartno + Artist + Type + .Ext
>   Cartno + Title + Artist + Type + .Ext

where:
  Cartno: is a unique name with a maximum of 8 characters (example = '12345678')
  Title: is the title of the audio file with a maximum of 26 characters (example = 'Black Moon Rising')
  Artist: is the song artist or other text appropriate for the file (max length 20 characters) (example = 'Credence')
  Type: a single character for the type of file ('M'= music, 'S'= spot, 'J'= jingle, etc)
  Ext: the file extension (.wav, .mp2, .mp3)
  +:   the plus (+) sign must separate the various audio fields as shown

The Audio Library (continued)

WHEN YOU FIRST START XTREME
When you first open the software it will look to the library folder and attempt to load those files into the audio directory. If the files are not in the Arrakis naming format, then Xtreme will attempt to auto-rename them into the Arrakis format so that they can be placed into the directory. If the file is locked and can not be renamed, is not an authorized audio format, or is not an audio file, then Xtreme will ignore that file and not load it into the directory for play.

HOW XTREME WILL AUTO-RENAME FILES
Xtreme will automatically assign an unrecognized filename a unique cart number between 90000 and 99999 and enter the first characters of the old filename as the title so that it can be identified. If the audio file has an ID3V1 tag, as many music files do that have been ripped by a CD ripper from a CD onto a hard drive, then Xtreme will use the title and artist information from the ID3V1 tag to name the file. If the file is successfully renamed, it will be placed into the audio directory for play in Xtreme.

ADDING AUDIO FILES TO YOUR LIBRARY
When Xtreme is open, new audio files should not be placed into the Library folder. Xtreme will ignore new files in the Library folder. Instead, new audio files should be placed into the C:\Arrakis\Xtreme\!!!Audio Update directory. Xtreme tests this directory every 30 seconds. When Xtreme finds a new file in the directory it tests the name, renames it if necessary, moves the file to the Library folder, and then adds the file into the Xtreme directory for play. If the file is being recorded into this folder, Xtreme will not process the file until the recording is complete.

DELETING AN AUDIO FILE WHILE XTREME IS OPEN
To delete an audio file from the library, In Xtreme go to MENU, LIBRARY, WINDOWS FILES. Select the file(s) that you want to delete and click on the DELETE FILE button. The file will be permanently deleted (it is NOT in the Trash) and removed from the Xtreme audio directory. Do not use Windows to delete an audio file while Xtreme is open because Xtreme can not know that the file is gone.

RENAMING AN AUDIO FILE WHILE XTREME IS OPEN
To rename an audio file or change its data while Xtreme is open, go to MENU, LIBRARY and change the data. Xtreme will reflect those changes in its internal directory. Do not use Windows to change data in an audio file while Xtreme is open because it can not know that the file data has been changed.

Notes about Filepaths...

1) MAX PATH OF 255 CHARACTERS FOR PLAYING AUDIO FILES
The Windows operating system has a maximum total path length of 255 characters. This includes the network path. This can be important when selecting an audio path. The shortest path to the audio files is typically: 'C:\Arrakis\Xtreme\Library\.' This is 26 characters. The max filename for an Arrakis audio file is 120 characters. This leaves 109 characters for the network path.

2) MAX PATH OF 129 CHARACTERS FOR RECORDING AUDIO FILES
Digilink-Xtreme has a max total path length of 129 characters when recording audio. This includes the network path. This easily supports the normal library path of 'C:\Arrakis\Xtreme\Library\' which is where it is extracted to during installation. Selecting an audio library folder on the desktop however may play audio files but not record audio files due to the long path lengths.

The normal 'C:\Arrakis\Xtreme\Library\.' path is 26 characters. In the worst case, the a file has a max filename length of 94 characters. This sets a max path length to the audio library of 35 characters (129 - 94). A PC in another room recording files to the on air library can then only have a 9 character network path. This is sufficient if path names are kept short. If a longer path is required, place the on air library in a folder such as 'C:\Lib\' which lengthens the network path to a minimum of 28 characters.

The Library Manager screen

Radio specific data must be assigned to every audio file in your library for many of Xtreme's features to operate. Cross fading files in the play list and autoscheduling music are only two examples. The Library Manager screen is designed to make it fast and easy to manage the radio specific data for your audio files.

displays your audio library by TYPE
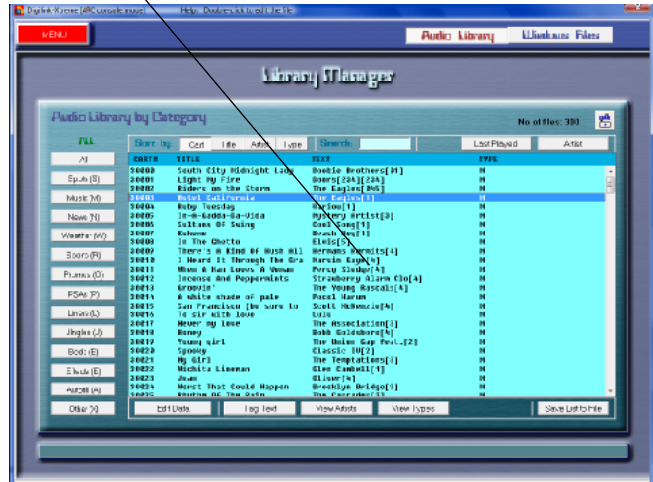
Setting Audio File data

Audio file data is stored in the actual filename of the audio file. To edit this data easily, double-click on a line in the library manager list so that the Edit Audio File Data window opens. Enter a unique cart number, title, artist (or just text), and Type into the window.

Use the audio Type designations in the Library manager. 'M' for music, 'S' for spot/commercial, 'J' for jingle, etc.

The 'In Time to Voice' and 'EOM' times can be manually entered but are more easily set by listening to the actual audio file. To set those times, click on the button next to the SAVE button which will open the player. The player's operation is discussed on the next page. Once the changes are complete, click on the SAVE Button to save the changes to the file.

Edit Audio File Data Window

ALWAYS click on the SAVE button to save your changes
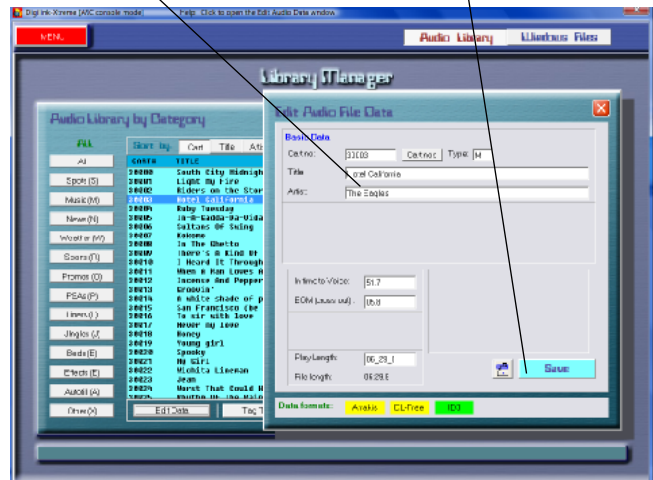
Setting Crossfade points

In the play list, Xtreme will use the crossfade points to...
(1) display the time to the voice at the start of the file &
(2) start play of the next event at the EOM time at the end of the file.

The time to voice timer is useful because it tells a live announcer how long he can talk over the beginning of the audio file. The EOM time is the time from the end of the file when the next event will start play-ing. This creates a professional sound as music segues properly and audio events don't unpleasantly play over each other.

Using the Player
The player is a quick and easy way to set the overlap points based on listening to the actual audio event. The audio will start playing when the player is opened. Click on the VOICE button when voice begins in the file. Click on the EOM button at the point at the end of the file where the audio is low enough to start the next event. Notice that the time in the data panel changes to match the point where you clicked the button.

The green PLAY and red STOP buttons start and stop play. The <<< button will start play at the beginning of the file while the >>> button will start play at the end of the file minus the time in the text edit box (default is 10 seconds).

Important: always click on the SAVE button in the edit data window to save your times.

click to set TIME TO VOICE at the beginning of the file

click to set EOM (crossfade) time at the end of the file

Deleting Audio Files

This window displays the actual audio file with the Windows filename.

To delete a file (permanently delete), select an audio file in the list and click on the DELETE FILE button.

IMPORTANT: this deletes the file immediately. It is NOT placed in the trash bin where it could be recovered !!!!!

Click on a line to select a file for delting
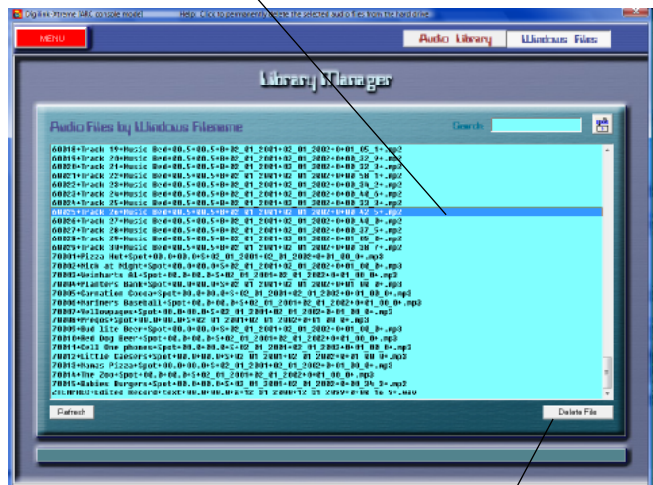
click to delete the audio file

The Play Log

The play log displays all of the events played in Xtreme as well as important data such as when the program was started or closed for problem solving.

Recent Events
The recent events log displays all events since the Xtreme program was last opened.

Total Log
This displays all of the events since the play log was last rolled over.

Spot Log
This displays a log of only the type 'S' audio events which is typically the station's billable commercial inventory.

Automatically Saved Logs
The play log is renamed and saved when it reaches approximately 19,000 events in the log. For an active radio station, this is approximately one week of activity. When renamed, the log is dated and placed in the   C:\Arrakis\Xtreme\DigilinkLogs directory. To view an old saved log, click on the OPEN button at the top right of the screen.

click on the OPEN button to open logs that have been automatically renamed and saved to file
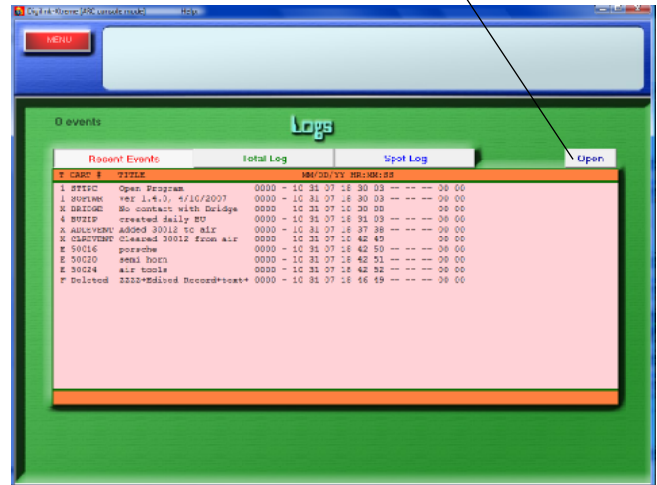
Creating Reports

Both the TOTAL LOG and the SPOT LOG have the feature where a selected portion of the log can be exported in the Digilink Reporting format for reconciliation with all popular Traffic and Billing software programs.

To export a log, select a portion of the list, click on the VIEW SELECTION button, click on the red EXPORT SELECTION button, and then give the report a filename to be saved to disk.

Select a range of events in the list to create a report

The SPOT log
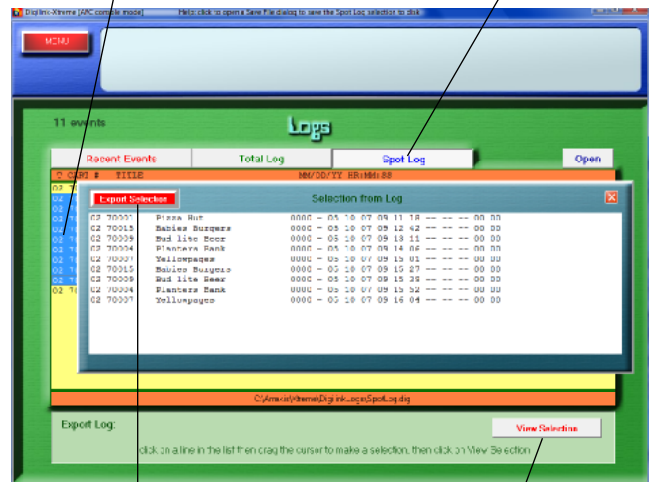
click to save the selected log to a text file

click to view the selected events in the log format

The Exported Play Log Text Format

Xtreme uses the standard Digilink file export format as shown below.

FIELD	COL	SIZE	TYPE	DESCRIPTION
Record type	1	2	numeric	02-traffic, 03-music
Cart #	4	8	alpha-numeric	
Title	13	24	alpha-numeric	
Runtime	38	4	numeric	0-3600 seconds
na	43	1	na	
Air month	45	2	numeric	1-12
Air day	48	2	numeric	1-31
Air year	51	2	numeric	0-99
Air hour	54	2	numeric	0-23
Air minute	57	2	numeric	0-59
Air second	60	2	numeric	0-59
na	63	2	na	
na	66	2	na	
na	69	2	na	
Cross in time	72	2	numeric	0-9
Cross out time	75	2	numeric	0-9
na	78	1	na	
na	80	8	na	
na	89	8	na	
na	98	20	na	
na	119	2	na	
na	122	2	na	
na	125	2	na	
CRLF	127	1	CRLF	

Notes:
a) Each record is 128 bytes long beginning with column 1.
b) Records must be in sequential order by date and time
c) Time is 24 hour format
d) All fields are ASCII characters
e) Unused fields and columns must be blank
f) Alpha-numeric fields must be left justified

Audio Glitches & Dropouts

Initial Setup Problems

If the audio on a play channel (or recording) glitches or drops out when another play channel is played (or recorded), then the PC is not setup properly. An example would be for the main Program output to have a half second of silence whenever an audio file is cued. This kind of problem is created when the PC does not have sufficient resources available to do two things at once without a pause between them. This can be caused by:

1) too little RAM memory in the PC for both the operating system and Xtreme application
2) too many background processes running and using up CPU power
3) too many programs in the START menu so that they run all of the time in the background
4) certain system programs such as FIND FAST, or Windows updates automatically running while Xtreme is running
5) power setup features on the PC such as the screen saver that slows the PC down if there is no user input
6) other audio programs running in the background reassigning Windows audio resources
7) virus protection (and other security) programs running in the background
8) scheduled events on the PC such as automatic updates
9) other background programs having a higher Windows priority than Xtreme
10) etc.

Problems that occur over Time

A PC can have no audio problems out of the box but begin having audio glitches after a period of time. This can be caused by:

1) same problems as listed above
2) Windows software updates that have changed security settings
3) viruses and other damaging programs getting onto the PC
4) new programs, network settings, etc that you may have added or changed

Resolving these Problems

These problems are specific to and different for every PC. If they occur, they will require time and effort to resolve. The Windows Task Manager program is helpful in seeing what unnecessary programs are open and using resources.

It is important to remember that PCs create these types of audio problems for all audio programs. However, the symptoms may be different for different programs due to their different features. As an example, Windows Media Player only plays one thing at a time while Xtreme (1) decompresses and mixes up to 3 audio files to the Program output, (2) plays a second audio file out the cue output, and (3) simultaneously executes up to two records at the same time.

User notes...

SERVICE & MAINTENANCE INSTRUCTIONS

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. Most ICs are plug in, and a physical board layout is provided with descriptions of the functions of each IC. ICs can be individually replaced to test for functionality. A small amount of disassembly is required. Diagrams on the following pages explain the required disassembly.

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.

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

(1) 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.

(2) 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.

(3) 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.

(4) 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. Six screws must be removed from the bottom panel 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 on the top of the front panel (slide fader screws) and with screws on the bottom of the motherboard, requiring 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.

ACCESSING THE INTERIOR OF THE VU METER PANEL

The VU meter panel is opened by removing the screw at the left and right front of the panel.

Arrakis Systems inc.

ACCESS SCREWS
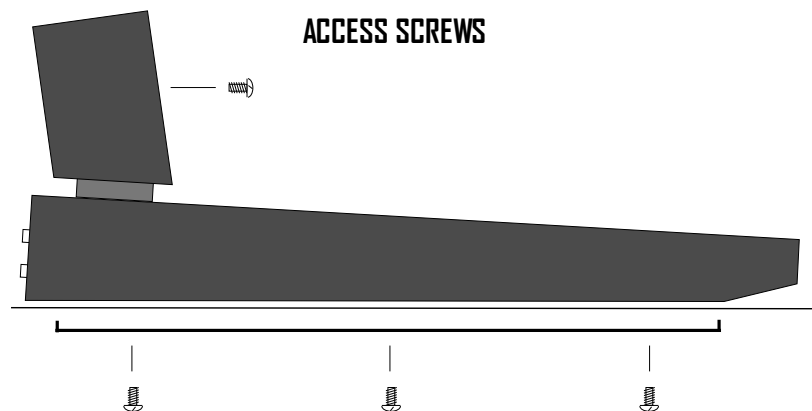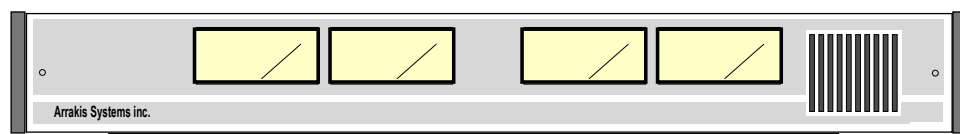
Replacing Slide Faders, Switches, and other parts

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 #1: 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 Rotary Faders

All 3 rotary faders are in a single wiring harness that plugs into the motherboard. The entire harness should be replaced with all three pots. Contact the factory for a replacement harness.

To remove a rotary fader
(1) Remove the knob cover as illustrated
(2) Remove the nut and nut plate.
(3) The pot will now remove from the rear of the front panel.
(4) Unplug the pot from the motherboard.

To put a new rotary fader in place:
Reverse the removal procedure

REMOVING THE KNOB

KNOB
COVER

Pry cover from
top of the Knob
to reveal a lock
nut. Unscrew the
lock nut to remove
the knob

KNOB
LOCK
NUT
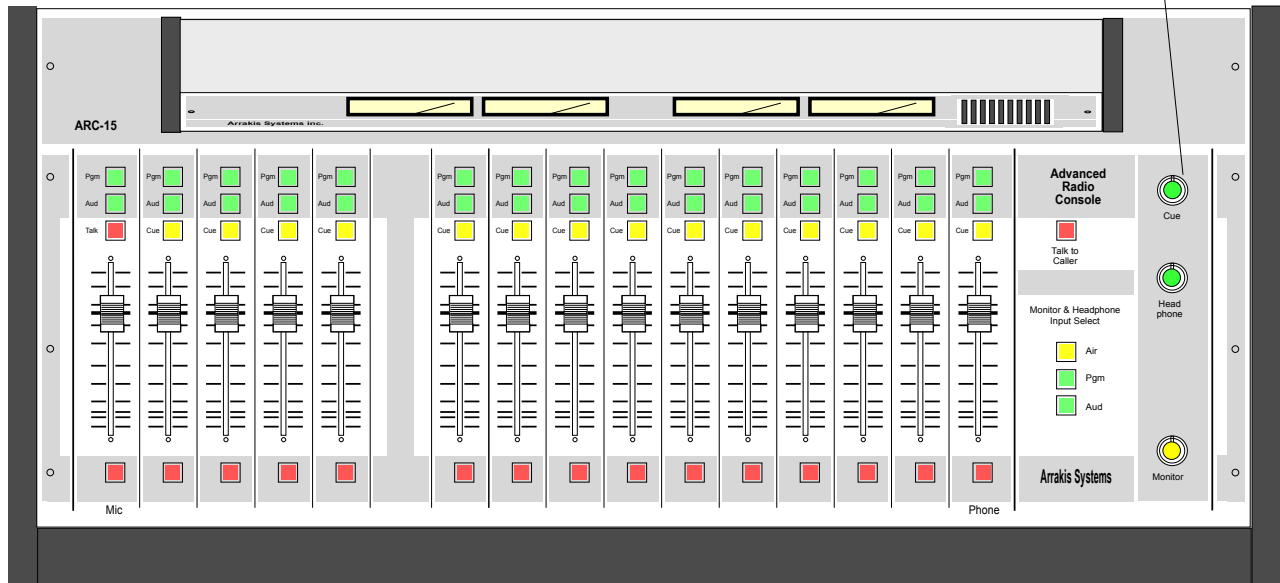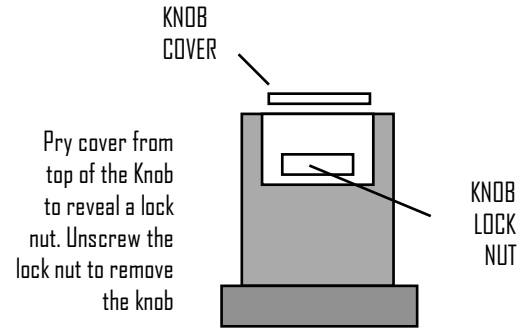
Replacing ICs

ICs must be replaced with care. Most 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.

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

Electronic Block Diagram

OUTPUTS / MONITORING

CONTROL ROOM MONITOR OUTPUT
to powered speakers
(-10dBu RCA phono)

INTERNAL CUE SPEAKER
in VU meter bridge

HEADPHONE OUTPUT
for 8 ohm or Hi-Z headphones
(1/4" Headphone Jack)

CUE INPUT
for Cueing a PC or Talkback
(-10dBu, 1/8" Headphone Jack)

AIR MONITOR INPUT
(-10 dBu RCA phono)

LOGIC OUTPUT (15 pin D-sub)
1) Control Room Mute Logic
   (for On Air light)
2-7) Ch 2,3,4,5,13,15 On-off logic
8) Talkback audio to Studio
9) Talkback audio from Studio
   (into Cue bus)
10) Autocue logic (for TB)
11) Ch 2 Cue logic for TB
12) Studio Monitor L out
13) Studio Monitor R out
14) +12VDC
15) Ground

PROGRAM OUTPUT - BALANCED
(+4 dBu XLR)

PROGRAM OUTPUT - UNBALANCED
(-10dBu RCA phono)

PROGRAM MONO MIX OUTPUT
(unbalanced, -10dBu, RCA phono)

AUDITION MONO MIX OUTPUT
(unbalanced, -10dBu, RCA phono)

AUDITION OUTPUT - UNBALANCED
(-10dBu RCA phono)

OUTPUT TO PHONE HYBRID
(balanced, +4 dBu XLR)

L R

MUTE
FADER
VU meter LEFT
Trim
VU meter RIGHT
Trim

Pwr
MUTE
FADER

FADER
FET SW
Cue Sum
Cue Logic ->

Pwr
Pwr

L/R
L/R
L
R

SW out
Monitor Selector
Air in
Pgm in
Aud in
FET SW
LOGIC
AIR
PGM
AUD

Trim
Trim
PGM Sum
Phone Mix
AUD Sum

L R
L R
L+R
L+R
L R

Trim
FET SW
Talk to Caller
TALK

PL-PR-AL-AR-G-TB
PL-PR-AL-AR-G-TB

INPUT CHANNELS

MIC CHANNELS

MIC INPUT
balanced
(-50dBu, XLR)

48V PHANTOM POWER
(2mm PLUG)

Talk to Studio
TALK
AUD
PGM
ON
Logic
Logic
Logic
Logic
PGM SW
AUD SW
TALK SW
FADER
Trim

LINE CHANNELS

STEREO LINE
Balanced, +4 dBu.
stereo inputs
(RJ45)

CUE
AUD
PGM
ON
Logic
Logic
Logic
PGM SW
AUD SW
CUE SW
FADER
Trim
L/R

CHANNEL 14

LOGIC
RS232 serial
connection to PC
(9 pin D-SUB)

PC PLAY / RECORD
USB connection
to WINDOWS PC
(USB connector)

CUE
AUD
PGM
ON
Logic
Logic
Logic
PGM SW
AUD SW
CUE SW
FADER
Play
CODEC
Str/Stp
DB9
Record

NOTE #1
if this option is installed but not
being used, internal jumpers can
convert the input into a stan-
dard unbalanced, stereo, -10dBu,
line input channel (RCA phono)

CHANNEL 15

HYBRID LOGIC
On-off
(RJ45)

INPUT FROM PHONE HYBRID
balanced, mono
(+4 dBu XLR)

CUE
AUD
PGM
ON
Logic
Logic
Logic
PGM SW
AUD SW
CUE SW
FADER
Str/Stp
Trim

NOTE #2
if a phone hybrid is not used, this channel can be
used as a standard mono channel with a balanced
+4dBu source

Parts Layout (Ten Ch Main bd)

Parts Layout
(5 ch Expansion bd)

Note
All unmarked ICs
are NE5532 op amps

Stereo Line Channel Inputs

| CH 7 In | CH 6 In | CH 5 In | CH 4 In | CH 3 In | CH 2 In |

Mono Mic Channel Inputs

Mic 3 In   Mic 2 In   Mic 1 In

Stereo Line Channel Input Preamps

CH 7 In   CH 6 In   CH 5 In   CH 4 In   CH 3 In   CH 2 In

CN1

Mic 3 amp (SSM2019)   Mic 2 amp (SSM2019)   Mic 1 amp (SSM2019)

none
mic jumper position
line jumper position

CH 6 select   CH 5 select   CH 3 select   CH 2 select

none
mic jumper position
line jumper position

CN2

CH 5 P-A-Q Lgc (CD4049)
CH 4 P-A-Q Lgc (CD4049)
CH 3 P-A-Q Lgc (CD4049)
CH 2 P-A-Q Lgc (CD4049)
CH 1 P-A-Q Lgc (CD4049)

CN3

CH 5 fader makeup gain amp
CH 4 fader makeup gain amp
CH 3 fader makeup gain amp
CH 2 fader makeup gain amp
CH 1 fader makeup gain amp

CN4

Add jumper to mute the channel

CH 5 Mute   CH 4 Mute   CH 3 Mute   CH 2 Mute

CH 5 On Lgc (CD4049)
CH 4 On Lgc (CD4049)
CH 3 On Lgc (CD4049)
CH 2 On Lgc (CD4049)
CH 1 On Lgc (CD4049)

CN5

CH 5 FET Sw P-A-Q (CD4053)
CH 4 FET Sw P-A-Q (CD4053)
CH 3 FET Sw P-A-Q (CD4053)
CH 2 FET Sw P-A-Q (CD4053)
CH 1 FET Sw P-A-Q (CD4053)

CN6

CN1
1 Mic 1
2 +12VDC
3 Mic 2
4 -12VDC
5 Ground (audio)
6 Ground (audio)
7 +48VDC
8 +48VDC
9 Ground (shield)
10 Ground (shield)

CN2
1 Ch 5 Start logic
2 nc
3 Ch 4 Start Logic
4 nc
5 Ch 3 Start logic
6 nc
7 Ch 2 Start logic
8 nc
9 Ch 2 Cue Logic for TB to CR
10 nc

CN3
1 +12VDC
2 Gorund (audio)
3 Ground (audio)
4 Ground (audio)
5 CH1 L
6 nc
7 Ch 2 L
8 Ch 1R
9 Autocue
10 Ch 2R

CN4
1 nc
2 nc
3 nc
4 nc
5 +5VDC
6 +5VDC
7 Ground
8 Gorund
9 -5VDC
10 -5VDC

CN5
1 nc
2 nc
3 nc
4 nc
5 +5VDC
6 +5VDC
7 +14VDC
8 +12VDC
9 Gorund
10 Ground

CN6
1 nc
2 Mute logic
3 CR Mic to Hybrid talkback
4 Ground
5 CR MicTakback to Studio
6 Cue
7 Aud L bus
8 Aud R bus
9 Pgm L bus
10 Pgm R bus

Factory Service

Technical Questions

Arrakis Systems maintains a staff of friendly broadcast engineers, design engineers, and technicians who have many years of in depth field experience in broadcasting. All of our technical resources are available to you to answer installation questions, solve problems, and repair equipment. If you have a question or problem, please feel free to call us. We can not solve every problem, but our people are here to try.

Our customer support department is open from: 8AM - 4:30PM, Monday -Friday (except for Holidays)
      Voice: 970-461-0730
      Fax: 970-663-1010
      email: support@arrakis-systems.com

IMPORTANT: Collect calls will not be accepted

Technical Questions for the 'Free' Xtreme software included with the ARC console

Digilink Xtreme (ARC mode) software for the ARC console is provided at no charge and does not include the cost of telephone support. The software is specifically designed to be easy to use for people with average PC computer and radio industry experience. Support is limited to the product manual and the on screen help system in the software itself. Refer to the Arrakis website at www.arrakis-systems.com for updated training materials. In a case where telephone support is a necessity, Arrakis has per minute and per incident support available that can be paid for by valid credit card. For comprehensive support and advanced automation features, the 'Xtreme Solutions' program may be purchased. Refer to the website or contact the factory for details.

Warranty Service Procedure for the ARC console hardware

Arrakis Systems assumes that its customers have on staff (or access to) competent technical personnel and adequate test equipment.

If a product fails, Arrakis will first seek to ascertain the problem over the phone and solve it at the modular replacement level where we find the specific part(s) that have failed and repair or replace them. This is the least expensive and time consuming solution for you. Depending on the circumstances and at our discretion, Arrakis will replace the specific PC board suspected to be at fault. If replacing PC boards does not resolve the problem, then the console is to be returned to the factory where it will we repaired and returned to you. Repair time at the factory is normally two week days. If the customer chooses to repair the console in the field, then Arrakis will, at its sole discretion, send replacement parts under warranty. Arrakis can not warranty labor performed in the field.

Shipping- The customer is responsible for payment for shipping to the factory. Parts returned to the factory freight collect will be refused. Return shipping over and above the cost of UPS ground will be born by the customer. In the case of international shipments, all cost of shipping and duties are born by the customer, both to and from the factory.

Under no circumstances will Arrakis replace a defective console with a replacement console.

IMPORTANT- Under no circumstances does Arrakis take any responsibility for non-factory technical expenses.

Factory Service (continued)

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 Departent" 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.

Spare Parts (not provided with the ARC-15 console)

A spare parts kit may be provided with the console. These parts are provided in case of emergency failure and normal infant mortality. These parts, when used to replace failures, are not replaced under warranty.

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.

Parts may be purchased by:
     1) C.O.D. shipping
     2) Valid and approved Credit Card (below our current credit limit)
     3) Prepaid by company check (shipment after check clears the bank)
     4) Wire transfer of funds
     5) Through an Arrakis authorized dealer

Arrakis does not sell items on open account.

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