ARRAKIS SYSTEMS

APEX
Automation

Operations Manual

REVISION 1.0
March 1, 2018

END USER LICENSING AGREEMENT
This Product contains software licensed from Arrakis Systems inc. and possibly other software companies. Use of this Product constitutes acceptance of this agreement. APEX contains intellectual property, i.e., software programs, that are licensed for use by the end user customer (hereinafter “End user”). This is not a sale of such intellectual property. The End User shall not copy, disassemble, or reverse compile the software program. 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 you. 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.

FEATURES AND SPECIFICATIONS MAY BE CHANGED WITHOUT NOTICE
The features and specifications associated with the Arrakis APEX product will change over time. These changes are determined at the sole discretion of Arrakis Systems inc.

DISCLAIMER
Arrakis has reviewed this manual thoroughly in order to make it an easy to use guide. All statements, technical information and recommendations in this guide and in any guides or related documents are believed reliable, but the accuracy and completeness thereof are not guaranteed or warranted, and they are not intended to be, nor should they be understood to be, representations or warranties concerning the products described.

Table of Contents

Resources

There are numerous resources available to the APEX user. Here is a list of some of those resources:

WEBSITE TRAINING
There are extensive and up to date training material that can be found on our website:
www.arrakis-systems.com
This training material covers everything that is needed to get started with the automation software, and covers some basic troubleshooting.

PHONE TRAINING SESSIONS
As part of the APEX program, you are entitled to receive free phone training sessions. These phone training sessions are extremely helpful in getting you acquainted with the different screens within the software and basic operation. They typically last from a half hour to as much as 2 hours, depending on your needs. It is excellent for getting your toes wet and helping you get started with the program. Please visit our website to setup a training time.

CUSTOMER SUPPORT
Customer support is available Monday - Friday, 8am to 4:30pm Mountain Standard Time, excluding U.S. holidays. Customer support is available to answer specific questions, provide general training, and help resolve APEX software and Harmony hardware issues. A basic understanding of using a PC is a prerequisite for using the automation. Customer support is not able to train on the basics of running a PC or any 3rd party software or equipment. Any issues pertaining to the PC or 3rd party software/hardware must be directed toward the PC/software/hardware manufacturer, not Arrakis Systems customer support.

Contact information for the Arrakis Systems customer support team:
Email: support@arrakis-systems.com
Telephone: 970-461-0730
Fax: 970-663-1010

FACTORY TRAINING
Take a trip to Loveland Colorado and visit us for a training at our factory. Classes are offered regularly and typically require a 1 month advance notice. We only schedule one station at a time, so that we may concentrate on the specific training needs of your station. Training's are typically scheduled for Tuesday/Wednesday, but can be scheduled for any day Mon-Fri, excluding holidays & weekends. These classes typically go from 9am till 3pm each day.

Visit our website to learn more about how to setup a factory training session.

ON SITE TRAINING
Schedule a 3 day (minimum) training session with one of our support staff. On-site classes are offered regularly and typically require a 1 month advance notice. Training's may be scheduled Monday through Saturday, excluding holidays.

Training's only cover the software portion of the automation systems and wiring/networking must be setup prior to the visit. It also does not cover any 3rd party software or hardware. Visit our website for more information.

PRODUCT & CUSTOMER SUPPORT FEEDBACK
Our website includes a product & customer support feedback page. This is excellent for giving your thoughts on possible feature additions for the software/hardware as well as feedback on our customer support. We are always striving to improve your experience, and highly recommend visiting our website and giving us your thoughts.

SECTION 1 - APEX Software

Thank you for your purchase of the APEX automation system. This software is the culmination of decades of experience and fueled by the feedback of thousands of users. We hope that you enjoy your experience, and ask that you keep us posted on your progress for getting your automation setup. We also ask that you give us your feedback, whether positive, or in ways that we can improve.

QUICK START STEPS

1) **CONFIGURE YOUR ON-AIR PC** - It is recommended that you contact our support department and have your On-Air computer configured for optimal use with the APEX automation software. This is a free service so long as it is in warranty.
2) **CONNECT YOUR HARDWARE** – This will either be the Harmony Sound Card if you are Hard Disk only. OR the Bridge Switcher, if you are doing satellite automation. Detailed instructions can be found later in this manual.
3) **SETUP A TRAINING SESSION** – As part of the automation program, you can receive training sessions for getting started. Please visit our website to setup a training session.

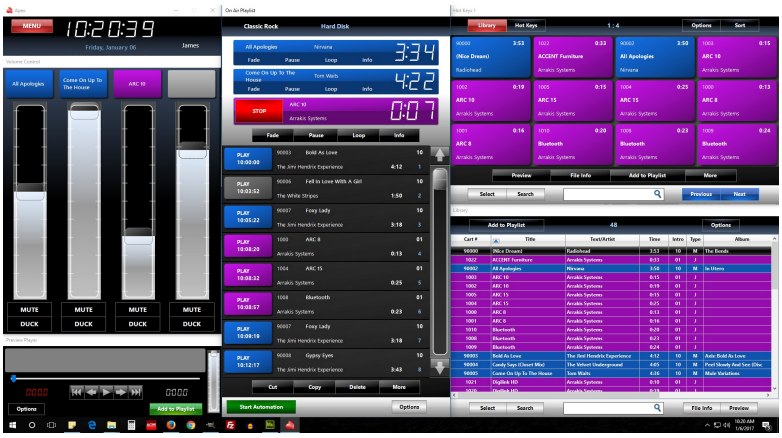
THE VERY BASICS

The APEX software is divided into two distinct pieces:

APEX on-air software

This software will display what is currently playing out your automation system, and have all the tools for live assist. It includes:

- Playlist
- Hot Keys
- Recent Play Log
- Audio Library
- File Info



APEX-Tools

This software is the auxiliary software that can be used on the on-air computer, or any networked PC. It includes features such as:

- Audio Library Manager
- Scheduler
- Voice Tracker
- Production
- and more...

SUPPORT MATERIAL FOR APEX SOFTWARE

All training, troubleshooting and support material for the APEX software can be found online. The reason for this is that the software is constantly changing and being updated. As such, it is better to visit our website for up to date training and troubleshooting information: www.arrakis-systems.com

SECTION 2 – Harmony Sound Card

Installation Steps

1) Unpack the Harmony Sound Card. Take note for what is included in the installation kit, and make sure to not lose any supplies contained in the kit.
NOTE: SAVE THE PACKING MATERIAL FOR IF YOU EVER NEED TO SHIP THE HARMONY SOUND CARD FOR REPAIR

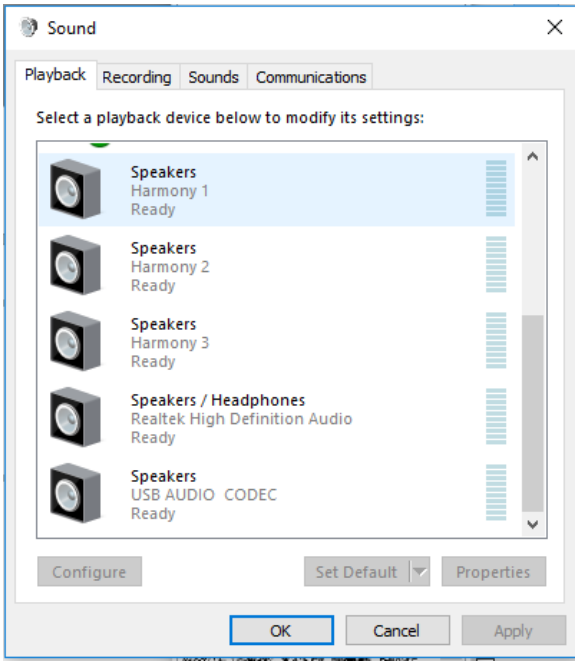
2) The Harmony Sound Card should be located in the on-air studio, which has the PC with the APEX software on it. Power up your PC with the APEX software. Make sure the PC has an internet connection.

3) Connect the provided Power Supply from the installation kit, to the Harmony Sound Card first, then your power source second.

4) Connect the provided USB cable from the rear of the Harmony Sound Card to your PC running the APEX software.

5) Press the **Power** button on the front of the Harmony Sound Card to turn the power on.

6) On the APEX PC, open **Control Panel**.
Select **Sound**. Click on the **Playback** tab to see the playback sound card devices. You should see 4 new sound cards listed. Their names are:



Windows Device Name	Physical Output Name
Harmony 1	Output 1
Harmony 2	Output 2
Harmony 3	Output 3
USB AUDIO CODEC	Audition Out

If you are not seeing these names listed on your PC, you may need to restart the Harmony Sound Card, by pressing the Power button, off and then back on.

7) Make sure that none of these sound cards are selected for the Windows Default Device for either the Playback or Recording.

Your on-board PC sound card should be used as the Default Device.

8) Connect Output 1 on the rear of the Harmony Sound Card, using an RJ45 cable, to your audio console input. Pinouts are described in detail, later in the manual. The RJ45 connection is a direct connect pinout for our ARC or MARC series balanced RJ45 inputs.

It may be necessary to get proper cabling for if you have other types of audio inputs on your console. Premade cables can be purchased direct from Arrakis Systems. Please note what types of inputs you have on your console for when you are placing your order for custom cables.

9) Using APEX, you may now test the audio on Output 1. If the audio quality sounds great, please continue onto the next steps. IF you are having issues with audio quality, please contact the Arrakis Systems support team for assistance.

10) You may now connect Output 2, Output 3 & Audition to other channels on your board. Be sure to test the audio quality each time you add a new connection. If audio problems are introduced as you add more connectors, please note the details, and contact our support team for assistance.

More details about the Harmony Sound Card, along with its connections may be found later in the manual.

HARMONY SOUND CARD WIRING

The Harmony Sound Card is a 4 audio output, 2 audio input, rack mountable sound card, for use with the APEX automation software.

Rear Connection Types

DC Power

Provided in the install kit is a power supply. Connect the power supply to the Harmony Sound Card, then plug the supply into the electrical outlet. It is recommended to never plug, or unplug the supply to the Harmony Sound Card, while the power supply is connected to the outlet. Always use the provided supply and never any other type of power supply.

USB connector

Connect the Harmony Sound Card to your on-air PC, that has the APEX software, using the USB connector. This USB cable should never be longer than 15 feet, or it may perform unreliably. For this reason, it is recommended to put the sound card in the studio with your PC running the APEX software.

Click on the power button on the front of the Harmony Sound Card to power up. On your on-air PC, you should notice a USB device driver installation. This may require an internet connection for these drivers to properly load.

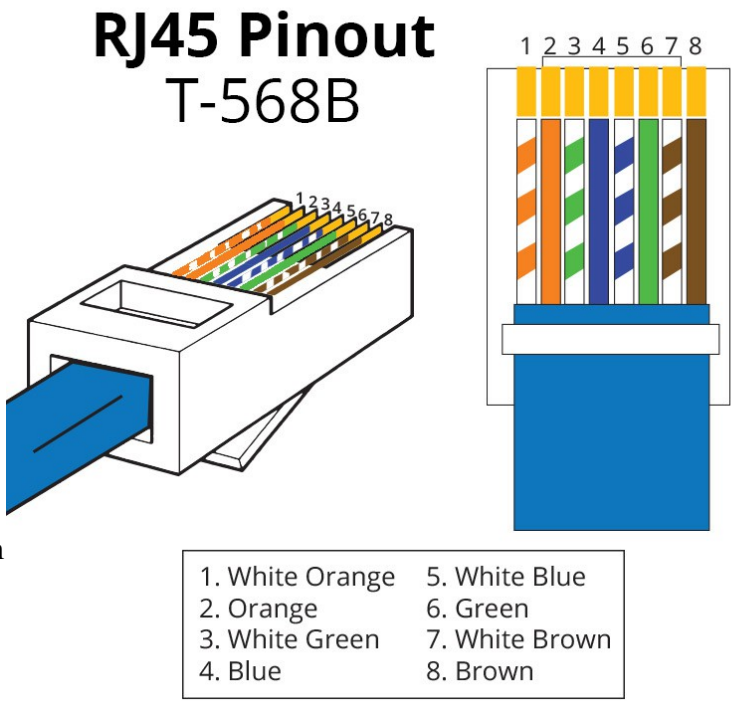
Rear Audio Inputs [REC IN] & [SUM IN]

All audio inputs are RJ45 with a standard audio pinout. This enables for quick connecting to standard audio equipment.

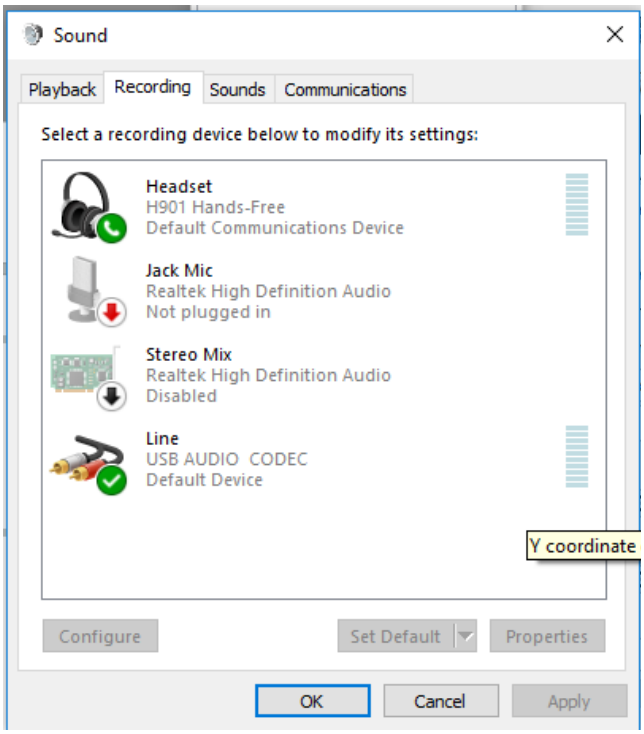
It is however recommended to verify the correct pin assignments for equipment that you are connecting.

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

REC IN
The REC IN, or Record In, is an input that allows you to record an audio source. This is typically used in conjunction with the Harmony Switcher, for recording your satellite sources. But, if you are not using the Harmony



Switcher, you may use it to record any audio source, such as from your PC, or an external audio source.
On your Windows PC, you will see this audio input as a USB AUDIO CODEC.



To view your PC sound card settings:
1) Open **Control Panel**.
2) Select **Sound**.
3) Click on the **Recording** tab to see the recording sound card devices.

Typically you will not want the USB AUDIO CODEC to be your default recording device. Otherwise this will mix PC audio into your REC IN stream.

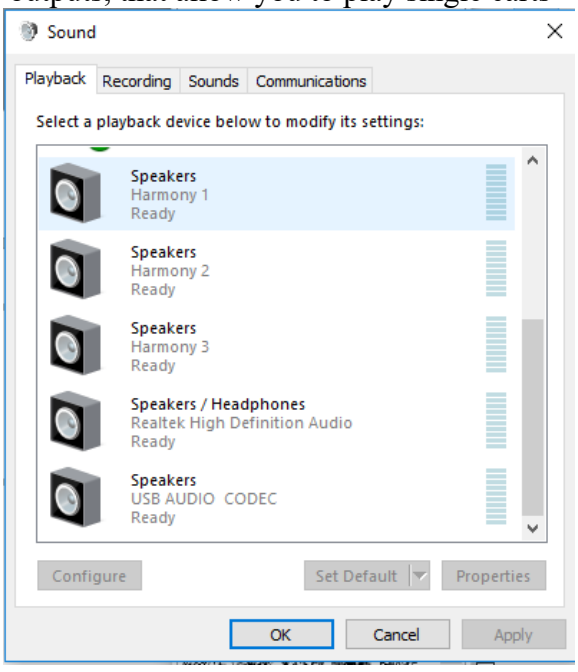
SUM IN
The SUM IN is an input that sums with Output 1. This is typically used with the Harmony Switcher, for passing live satellite audio. But, if you are not using the Harmony Switcher, you may choose to sum any audio source to play through Output 1.

Rear Audio Outputs [Output 1], [Output 2], [Output 3] & [Audition Out]

These are your audio outputs to run to your console input channels. Output 1 will typically be used as your main output. This Output will be used as the default channel for playing audio for your automation. Outputs 2 & 3 are your secondary outputs, that allow you to play single carts at a time, while in live assist. This gives you the ability to control the volume for the specific tracks as they go through the playlist.

Audition Out is used for cueing audio files within the APEX software.

These Playback devices are viewed in Windows as:



Windows Device Name	Physical Output Name
Harmony 1	Output 1
Harmony 2	Output 2
Harmony 3	Output 3
USB AUDIO CODEC	Audition Out

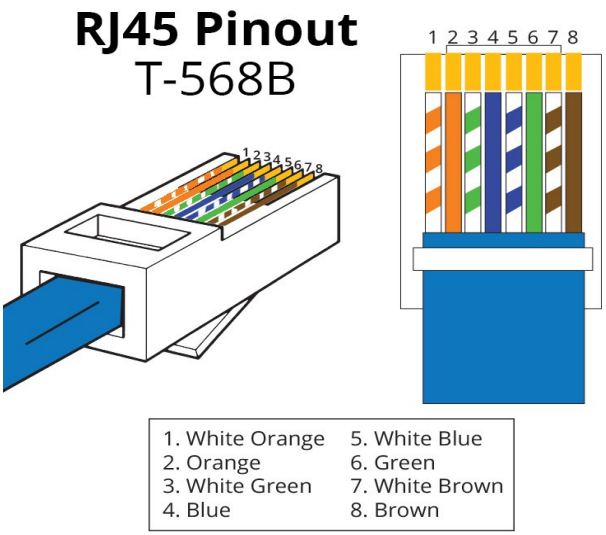
If you do not see these sound cards listed on your PC, you will need to restart the sound card,

using the power button on the front of the Harmony Sound Card.

Typically you will not want these sound cards to be your default playback device. Otherwise this will mix PC audio into your output stream.

These outputs also use RJ45 connectors, and utilize the same pin configuration as the inputs. It is recommended to verify the correct pin assignments for equipment that you are connecting.

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



Front Connection Types

Power

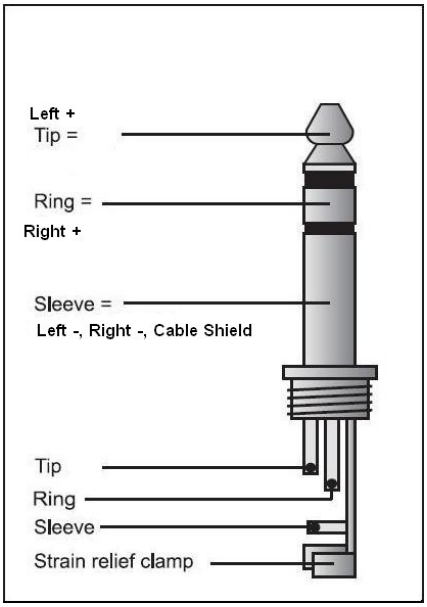
On the front panel of the Harmony Sound Card, is a power button. This power button is used to turn the sound cards on & off. The LED indicator on the button will be lit if there is power going to the sound card. If it is not lit, then you will need to check the power supply and power source to verify that the sound card is receiving power.

Use the Power button to quickly and easily reset the sound card.

Front Audio Outputs [Output 1], [Output 2], [Output 3] & [Audition Out]

These outputs will have the same audio as the outputs on the rear of the sound card. These outputs are designed to work with 1/4" TRS cables, and are useful for connecting headphones. This gives you the ability to quickly listen to any of the audio outputs on the front of the unit.

These outputs are not intended to be used for checking or adjusting audio levels, but rather as a test to confirm that audio is being passed through the unit.



Installation Notes

It is recommended that you keep the box and packing material that the box came in, for if you ever need to ship the Harmony Sound Card back to us for repairs.

Harmony Sound Card: AC POWER

The Harmony Sound Card is powered by an external AC to DC power supply. The supply is approximately 6" x 3" x 1 1/2.“ It comes with a 6 foot AC power cable and an attached 4 foot DC power cable that plugs into the Harmony Sound Card. The power supply is a CE and UL approved switching power supply rated at 100-240VAC and 50/60 Hz operation. It supplies +12VDC(2A), -12VDC(0.5A), and 5V(4A)DC. The supply should be located in a well ventilated area at a normal ambient temperature.

NO OTHER POWER SUPPLY SHOULD BE USED WITH THE HARMONY SOUND CARD. THIS WILL VOID ANY WARRANTY.

IMPORTANT NOTE: Make sure the power supply is constant to the Harmony Sound Card. If power drops below 90VAC, the Harmony Switcher will power down and freeze the automation program. It may be appropriate to use a backup power supply to keep power supplied to the Harmony Sound Card and other studio equipment in case of power fluctuations and loss.

IMPORTANT NOTE: Connect the Harmony Sound Card Power Supply to the same Uninterruptible Power Supply that the On-Air PC is connected to. It is critical that the On-Air PC and Harmony Sound Card Switcher Hardware is connected to the same power outlet.

Harmony Sound Card: AUDIO WIRING

The Harmony Sound Card features high quality, active, balanced, analog audio inputs and outputs. Inputs are high impedance (>10K ohms). Outputs are low impedance (<100 ohm) for driving typical shielded, twisted pair, audio cable. Audio cables should not be run beside AC power cables (so as not to introduce 60 cycle hum) but should cross them at 90 degrees when required. Standard broadcast facility grounding practices should be employed, such as grounding cables shields at only one end (to avoid ground loops and their associated 60 cycle hum).

Harmony Sound Card: GROUNDING

A proper broadcast facility ground system should be used with the Harmony Sound Card. Because the Harmony Sound Card is often connected to equipment located in rooms scattered around the facility. This creates a potential problem with ground loops, transients, RF interference, and even damage to equipment. It is therefore essential that a proper facility wide grounding system be used. A discussion of this type of system is beyond the scope of this manual.

VOLUME LEVEL CALIBRATION

As set from the factory, all trimpots are adjusted for +4dBu in and +4dBu out balanced. Trimpots can adjust an input range of -20dBu to +8dBu to match a +4dBu output. The wide range in the trimpots makes it an easy matter for an input or output to be badly maladjusted.

Whenever possible, the level output of the source device itself should be adjusted for +4dBu out and the switcher trimpot remain untouched. If an unbalanced consumer type source device is being connected to the sound card, it is recommended to adjust the trimpots by applying a tone from a test signal generator set for -10dBu. Then connect the source device and adjust its level to match the calibrated switcher input. In this way, you can plug different -10dBu devices into any switcher channel adjusted to -10dBu without a level mismatch. Avoid the temptation to simply connect a source to a switcher input and then adjust the trimpots with a typical audio signal.

To INCREASE volume on the trimpots - Turn the Trimpot CLOCKWISE
To DECREASE volume on the trimpots - Turn the Trimpot COUNTER CLOCKWISE

Adjustments should also be made using ½ turn increments.

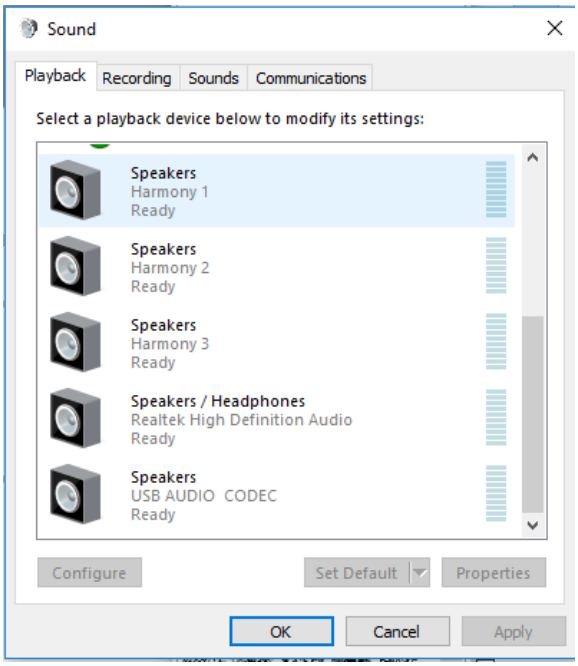
Trimpots are located on the inside of the Sound Card. There are 4 screws on the rear that need to be removed on the left and right side. Once removed, two clips will come off, and the top panel should slide off.

Harmony Sound Card Troubleshooting

Harmony Sound Cards Missing

There may be scenarios where fluctuations in power, or other causes, may make you lose your PC connection to the Harmony Sound Card. In which case, it will be necessary to reset the Harmony Sound Card:

1) Press the **Power** button on the front of your Harmony Sound Card to turn off, and then again to turn back on.
2) Open **Control Panel**.
3) Select **Sound**.
4) Click on the **Playback** tab to see the playback sound card devices.



These Playback devices are viewed in Windows as:

Windows Device Name	Physical Output Name
Harmony 1	Output 1
Harmony 2	Output 2
Harmony 3	Output 3
USB AUDIO CODEC	Audition Out

5) If you still do not see these sound cards listed on your PC, you may need to restart the sound card again, using the power button on the front.

6) If you still do not see the sound cards listed, you may need to check the USB cable, and make sure there are no HUB's, extenders or adapters.

7) If you still do not see the sound cards listed in Windows, check to make sure that the Power button on the front of the Harmony Sound Card is lit. If the power button on the Harmony Sound Card is not lit, then check the power supply to see if the LED on the brick is lit. If not, then move the power supply to another outlet. After checking a handful of outlets, and the power supply does not light up, then you may need to replace the power supply.

If you continue to have problems, please contact our support department for assistance.

Additional troubleshooting and tips may be found on our website: www.arrakissystems.com.

SECTION 3 – Bridge Switcher Hardware

If you are going to do satellite automation, or ball games, then the APEX software requires a Bridge Switcher for hardware. The hardware acts as a switcher, as well as provides 2 sounds cards for playback & recording. This hardware is also what unlocks the APEX software to operate. If the hardware isn't connected properly, it will not operate correctly. It is critical to follow these installation instructions exactly and not cut any corners.

Basic Installation Steps

1) Unpack the configured PC.

2) Assemble the PC.

3) Unpack the Bridge.
NOTE: SAVE THE PACKING MATERIAL FOR IF YOU EVER NEED TO SHIP THE BRIDGE FOR WARRANTY REPAIR

4) Load ‘Bridge Tools’ software on the PC (supplied with the Bridge on USB).

5) Connect the Bridge to the PC with a USB and Serial cable (supplied with the Bridge). IF your PC does not have a RS232 serial connection, then you are required to purchase the ATEN USB to RS232 adapter. This may be purchased from Arrakis Systems, or from another vendor. No other adapters are supported.

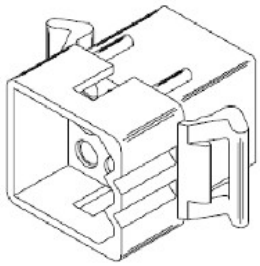
6) Connect an amp and speakers to both the Play 1 (PGM) & Play 2 (CUE) outputs on the Bridge (Note: the cue has a 1/8" headphone jack output for headphones or powered computer speakers).

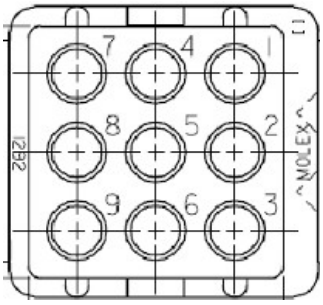
7) Open the ‘Bridge Tools’ software by double-clicking on the icon. Bridge Tools will auto-detect the Bridge and display switcher and audio status. (Note: all of the following tests require that Bridge Tools is properly connecting to the Bridge. If Bridge Tools does not properly detect the Bridge, turn the PC and Bridge off, check all wiring and then power up the Bridge and PC and open the software again.)

8) Play audio: using Bridge Tools, select and play an audio file out of the Play 1 & Play 2 outputs.

9) Record audio: connect an audio source to the switcher and use the Bridge Tools recorder to record an audio file. Play the file back through the Bridge Tools Program player or Cue player. (Note: you may use the test cable supplied with the Bridge to patch the Bridge Cue output into one of the 16 inputs on the switcher. Play an audio file on the Bridge Cue player and then record that audio through the switcher and the Bridge Recorder onto the PC. This tests the recorder without using an external source as first described).

10) Test the Logic inputs: momentarily connect a jumper wire between ground (Pin 9) on one of the other Molex pins (1 through 8) to a Logic input pin (SAT LOGIC 1, SAT LOGIC 2, SAT LOGIC 3, LOGIC IN 1, LOGIC IN 2, LOGIC IN 3). You will see the appropriate logic pin displayed in the Bridge Tools software momentarily turn red.





11) Test the Logic Outputs: plug the test cable supplied with Bridge from the 'LOGIC OUT' connector to one of the logic input connectors (ie: SAT LOGIC 1). Click on one of the pins in the LOGIC OUT section of Bridge Tools and watch the associated pin connected through the test cable momentarily turn red on the screen. This confirms that the logic output (and associated input) closures are operating.

12) Basic Tests are Completed: at this point, basic Bridge and PC functionality has been tested. Audio quality should be good, without 60 cycle hum or noise. The Bridge and PC are functioning successfully as a standalone device. This is the best performance that the product will provide. Any problems must be solved now. Adding additional sources, logic, etc will add hum and noise to the system.

13) One by One Connect external audio Sources: one by one, connect external audio sources to the switcher and test their audio performance. Any hum or noise in the audio output indicates a ground loop or wiring problem. Remove the ground loop hum from this source before going on to the next source.

14) One by One Connect external logic: one by one, connect external logic to the Bridge from satellite receivers (etc). Any hum or noise in the audio output indicates a ground loop or wiring problem. Remove the ground loop hum from this logic connection before going on to the next one. Bridge Tools software will display and log any closures received from the logic wiring.

15) Connect the Play 1 (PGM) & Play 2 (CUE) outputs to the Studio: with all inputs and logic successfully connected, connect the Program and Cue outputs one at a time into the studio monitors, console, etc. Any hum or noise in the audio output indicates a ground loop or wiring problem. Remove the ground loop hum before going on.

16) Bridge Audio Calibration: refer to the calibration section of this manual

17) System Test Complete: with the Bridge & PC tested as a standalone unit, and then the Bridge wired into the studio and every function retested, Step One of the product installation process is complete. Every single function of the radio station side of the automation system has been tested twice and is known to be operational. If there are any problems in the system they need to be resolved before going on to the next step.

18) The Customer Service Boundary Line: this point in time represents a key customer service boundary line. Installation and hardware problems exist on the Bridge side of the line while Scheduling and Operational problems exist on the other side of the line (the Step Two side). This is important because Arrakis customer support is divided into (1) Bridge support, and (2) Operational support.

19) Step Two: is loading the APEX automation software, loading actual audio files, setting up automation schedules, and beginning off-line testing of your new automation system.

20) On Air: once the automation system has been fully tested in parallel with your current on air system, then you are ready to take your new automation system on air.

Important Installation Notes

BRIDGE: UNPACKING

Be certain to keep all packing for the Bridge so that it can be returned to the factory if service is required. Carefully look through the packaging for the installation packet, manual, and all other accessory parts.

BRIDGE: PHYSICAL INSTALLATION

The Bridge is 12 3/4" wide, 13 1/2" high, and 2" deep (approximately 4" deep when connectors are plugged in). Most of the connectors and all of the trimpots are located on the large flat 12 x 13 inch side. There are also connectors along the bottom edge that add about 3" to the height when installed. The Bridge cabinet is designed to be mounted to a vertical surface (wall of side of pedestal) or to a bottom surface (such as furniture pedestal). The Bridge has two screw holes on mounting flanges located along the top and bottom of the cabinet to be screwed into the surface it is mounted to. The cabinet should be securely attached to the mounting surface because of its weight and the weight of cables attached to it. The cabinet should be located in a well ventilated area at a normal ambient temperature.

BRIDGE: AC POWER

The Bridge is powered by an external AC to DC power supply. The supply is approximately 6" x 3" x 1 1/2.“ It comes with a 6 foot AC power cable and an attached 4 foot DC power cable that plugs into the Bridge. The power supply is a CE and UL approved switching power supply rated at 100-240VAC and 50/60 Hz operation. It supplies +12VDC(2A), -12VDC(0.5A), and 5V(4A)DC. The supply should be located in a well ventilated area at a normal ambient temperature.

IMPORTANT NOTE: Make sure the power supply is constant to the Bridge. If power drops below 90VAC, the Bridge will power down and freeze the Xtreme program. It may be appropriate to use a backup power generator to keep power supplied to the Bridge and other studio equipment in case of power fluctuations and loss.

IMPORTANT NOTE: Connect the Bridge Power Supply to the same Uninterpretable Power Supply that the On-Air PC is connected to. It is critical that the On-Air PC and Bridge Switcher Hardware is connected to the same power outlet. If possible, connect the satellite receiver to this UPS as well.

BRIDGE: AUDIO WIRING

The Bridge features high quality, active, balanced, analog audio inputs and outputs. Inputs are high impedance (>10K ohms). Outputs are low impedance (<100 ohm) for driving typical shielded, twisted pair, audio cable. Audio cables should not be run beside AC power cables (so as not to introduce 60 cycle hum) but should cross them at 90 degrees when required. Standard broadcast facility grounding practices should be employed, such as grounding cables shields at only one end (to avoid ground loops and their associated 60 cycle hum).

BRIDGE: GROUNDING

A proper broadcast facility ground system should be used with the Bridge. Because the Bridge is largely a routing switcher with control logic, it is often connected to equipment located in rooms scattered around the facility. This creates a potential problem with ground loops, transients, RF interference, and even damage to equipment. It is therefore essential that a proper facility wide grounding system be used. A discussion of this type of system is beyond the scope of this manual.

VOLUME LEVEL CALIBRATION

As set from the factory, all trimpots are adjusted for +4dBu in and +4dBu out balanced. Trimpots can adjust an input range of -20dBu to +8dBu to match a +4dBu output. The wide range in the trimpots makes it an easy matter for an input or output to be badly maladjusted. **Whenever possible, the level output of the source device itself should be adjusted for +4dBu out and the switcher trimpot remain untouched.** If an unbalanced consumer type source device is being connected to the switcher, it is recommended to adjust the trimpots by applying a tone from a test signal generator set for -10dBu. Then connect the source device and adjust its level to match the calibrated switcher input. In this way, you can plug different -10dBu devices into any switcher channel adjusted to -10dBu without a level mismatch. Avoid the temptation to simply connect a source to a switcher input and then adjust the trimpots with a typical audio signal.

To INCREASE volume on the trimpots - Turn the Trimpot COUNTER CLOCKWISE
To DECREASE volume on the trimpots - Turn the Trimpot CLOCKWISE

Adjustments should also be made using ½ turn increments.

IMPORTANT NOTE: DO NOT *connect another automation system logic to the Bridge docking station. This will crash the automation system. Contact Arrakis Systems support for questions related to connecting other automation systems.*

Wiring Basics

BRIDGE HARDARE CONNECTION TYPES:

The Bridge unit has 7 different types of connections that have various functions:

White Molex Connectors: Connections for receiving Channel Audio and Logic Commands from a Satellite Receiver.

USB: Connects to the On Air PC for audio to and from the PC and Bridge.

RS232 COM: Connects to the On Air PC for logic commands to and from the PC and Bridge.

HEAD PHN OUT: 1/8" Headphone jack – connection for headphones and plays the Play 2 (CUE) output.

PC REC OUT: 1/8" Headphone jack – connects to a PC and plays audio for whichever source is selected on the Recorder screen.

PC ONE IN: 1/8" Headphone jack – audio input that sums through to the Program output.

PC TWO IN: 1/8" Headphone jack – audio input that sums through to the Cue output.

BRIDGE: LOGIC INPUT WIRING

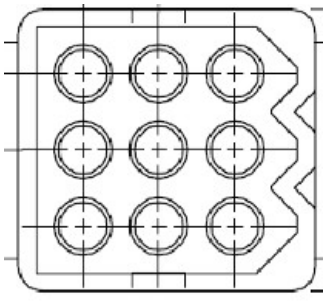
Logic inputs are triggered by grounding the logic line. All inputs should be grounded through an isolation relay to the ground on the Bridge itself. By using an isolation relay, ground loops and their associated 60 cycles hum are avoided.

```
                 ____
Source      -----O    O-------(X)  Logic input on Bridge connector
Logic       |_____________(X)   Ground on Bridge connector
Relay
```

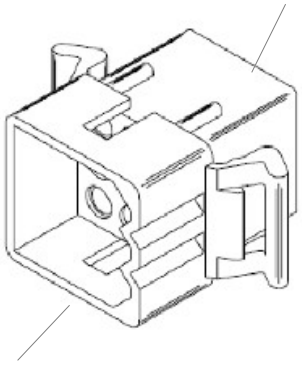
BRIDGE: LOGIC OUTPUT WIRING

Logic outputs are open collector transistor logic to ground. Output current should not exceed 50 milliamps. To avoid ground loops, the output logic should drive a relay whose contacts interface to the external device.

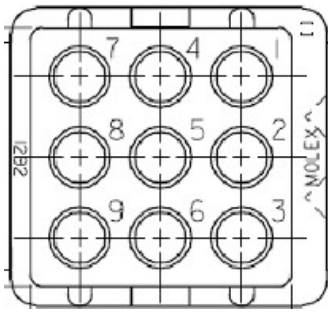
```
        12VDC _____
                    ) O------------------------(X) External device
Bridging Stn        ) | 12 VDC Relay              being controller by
Logic Out (X) _____ ) O------------------------(X) the Logic output
```



TOP VIEW



BOTTOM



Pin Layout – TOP VIEW

Wiring for Audio

PLAY 1 (PGM) & PLAY 2 (CUE) OUTPUT

The Bridge has active balanced audio outputs. The pin out is shown below. Each of the outputs has a trimpot level adjust. 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.

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

Play 1 and Play 2 outputs should be connected to 2 different audio channel inputs on your console. Please note which channels on the console they are connected to for Arrakis customer support.

Some Bridge units will have PGM & CUE printed on the unit. Other units may have Play 1 & Play 2. Functionality is the same, but will be labeled differently. The manual will notate both.

Play 1 (PGM) Output Pin Configuration:

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

Play 2 (CUE) Output Pin Configuration:

Pin 1 – Audio ground
Pin 2 – Right + input
Pin 3 – Right - input
Pin 4 – Record R - output
Pin 5 – Left + input
Pin 6 – Left - input
Pin 7 – Record Right + output
Pin 8 – Record Left - output
Pin 9 – Record Left + output

Pins 4, 7, 8, 9 on the Play 2 (CUE) output are for an balanced audio output of what the Timed Recorder is currently recording. You may also use the PC REC OUT for an unbalanced output of what the Timed Recorder is currently recording. This is excellent for monitoring your timed records.

CHANNEL 1 TO 16 INPUTS

The Bridge has active balanced audio inputs to the switcher. The pin out is shown below. Each of the 16 inputs has a trimpot level adjust. 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. Routing switcher inputs, selectable to Program, Cue, and Record outputs. Connector is pinned the same as the Switcher inputs on models DL2 and DL3

Channel 1 to Channel 16 Input. Pin Configuration:

Pin 1 - Audio ground
Pin 2 - Right + input
Pin 3 - Right - input
Pin 4 - Start relay to pin 9 (momentary)
Pin 5 - Left + input
Pin 6 - Left - input
Pin 7 - Steering logic (sustained ground)
Pin 8 - Source Stop (momentray ground)
Pin 9 - Start relay to pin 4 (momentary)

Sum In

The Bridge has a balanced Sum In input for summing in another audio source.

Sum In Pin Configuration:

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

Wiring for Logic Commands

Record Logic

The single logic connector on the Bridge is labeled ‘Rec Logic’. The connections are displayed below. All closures are ‘GLOBAL‘ closures and not dependent on the satellite channel selected in the APEX automation software. The pins should be wired to the satellite receiver logic. The inputs are triggered on a ground closure transition.

Rec Logic Pin Configuration:

Pin 1 – FUTURE FEATURE
Pin 2 – FUTURE FEATURE
Pin 3 – Time Sync (global, sets Windows clock to sync time)
Pin 4 – FUTURE FEATURE
Pin 5 – FUTURE FEATURE
Pin 6 – Start Automation. This closure will start the Automation play list.
Pin 7 – Stop Automation. Stops the play list, but lets the current file finish.
Pin 8 – Stop Automation. Stops the play list, and fades out the currently playing file.
Pin 9 – Logic ground

Logic Out

The Bridge has one output logic connector. The Bridge Test software displays each of the pins (1-8) on the connector as buttons. Clicking on any software button will cause a one second closure to ground on that pin number. The output logic and input logic of the Bridge can be tested by connecting a one-to-one cable from the ‘Logic Out’ connector to any of the seven ‘Logic In’ connectors. In the Bridge test software, you can then click on any pin in the ‘Logic Out’ connector and the corresponding pin in the ‘Logic In’ connector will momentarily light red in the software.

Logic Out Pin Configuration:

Pin 1 - Logic out 1
Pin 2 - Logic out 2
Pin 3 - Logic out 3
Pin 4 - Logic out 4
Pin 5 - Logic out 5
Pin 6 - Logic out 6
Pin 7 - Logic out 7
Pin 8 - Logic out 8
Pin 9 - Logic ground

Wiring for Satellite Automation

The APEX allows for the use of Satellite automation. Below are the layouts for a Full Logic, Partial Logic and a Game pin configuration.

Full Logic Pin Configuration:	**Partial Logic Pin Configuration:**	**Game Pin Configuration:**
Pin 1 - Commercial Break	Pin 1 - Commercial Break	Pin 1 - Commercial Break
Pin 2 - Station ID	Pin 2 - Station ID	Pin 2 - Station ID
Pin 3 - Liner #1 folder	Pin 3 - Commercial Break	Pin 3 - Liner #1 folder (Jock 20 folders)
Pin 4 - Liner #2 folder	Pin 4 - Station ID	Pin 4 - Liner #2 folder (Jock 20 folders)
Pin 5 - Liner #3 folder	Pin 5 - Commercial Break	Pin 5 - Rain Delay
Pin 6 - Liner #4 folder	Pin 6 - Station ID	Pin 6 - Return to Game
Pin 7 - na	Pin 7 - Commercial Break	Pin 7 - Start Game
Pin 8 – Start Record	Pin 8 - Station ID	Pin 8 - End Game
Pin 9 - Logic Ground	Pin 9 - Logic Ground	Pin 9 - Logic Ground

The Bridge acts as a 16 channel switcher and can have up to 16 audio inputs with 6 correlating Logic controls (Sat Logic 1, Sat Logic 2, Sat Logic 3, Logic In 1, Logic In 2, Logic In 3). These logic inputs trigger commercial breaks as well as liners, ID's and other special functions. You may have to use partial logic configurations since there are only 6 Logic control inputs for 16 audio channels. Listed below are the 4 different combinations of Full Logic and Partial Logic to chose from. Chose the option that best fits the station for what you are using currently and may use in the future. You may choose the number of Full logic in the software by going to the Setup screen and changing the # of Full Logic.

Option 1

3 Full Logic / 12 Partial Logic:

Logic	**Audio**
Sat Logic 1 (full logic) ----------	Channel 1
Sat Logic 2 (full logic) ----------	Channel 2
Sat Logic 3 (full logic) ----------	Channel 3
Logic In 1 (partial logic)	
Pins 1 – 2 ----------	Channel 4
Pins 3 – 4 ----------	Channel 5
Pins 5 – 6 ----------	Channel 6
Pins 7 – 8 ----------	Channel 7
Logic In 2 (partial logic)	
Pins 1 – 2 ----------	Channel 8
Pins 3 – 4 ----------	Channel 9
Pins 5 – 6 ----------	Channel 10
Pins 7 – 8 ----------	Channel 11
Logic In 3 (partial logic)	
Pins 1 – 2 ----------	Channel 12
Pins 3 – 4 ----------	Channel 13
Pins 5 – 6 ----------	Channel 14
Pins 7 – 8 ----------	Channel 15
NA ----------	Channel 16

Option 2

4 Full Logic / 8 Partial Logic:

Logic	Audio
Sat Logic 1 (full logic) ----------	Channel 1
Sat Logic 2 (full logic) ----------	Channel 2
Sat Logic 3 (full logic) ----------	Channel 3
Logic In 1 (full logic) ----------	Channel 4
Logic In 2 (partial logic)	
Pins 1 – 2 ----------	Channel 5
Pins 3 – 4 ----------	Channel 6
Pins 5 – 6 ----------	Channel 7
Pins 7 – 8 ----------	Channel 8
Logic In 3 (partial logic)	
Pins 1 – 2 ----------	Channel 9
Pins 3 – 4 ----------	Channel 10
Pins 5 – 6 ----------	Channel 11
Pins 7 – 8 ----------	Channel 12

Option 3

5 Full Logic / 4 Partial Logic:

Logic	Audio
Sat Logic 1 (full logic)	Channel 1
Sat Logic 2 (full logic)	Channel 2
Sat Logic 3 (full logic)	Channel 3
Logic In 1 (full logic)	Channel 4
Logic In 2 (full logic)	Channel 5
Logic In 3 (partial logic)	
Pins 1 – 2	Channel 6
Pins 3 – 4	Channel 7
Pins 5 – 6	Channel 8
Pins 7 – 8	Channel 9

Option 4

6 Full Logic / 0 Partial Logic:

Logic	Audio
Sat Logic 1 (full logic)	Channel 1
Sat Logic 2 (full logic)	Channel 2
Sat Logic 3 (full logic)	Channel 3
Logic In 1 (full logic)	Channel 4
Logic In 2 (full logic)	Channel 5
Logic In 3 (full logic)	Channel 6

Connecting the Bridge to the PC

The Bridge has two digital control connections to the host PC. Those are (1) a USB and (2) an RS232 serial port connection. The USB connection provides the audio interconnect for the sound cards. The RS232 Serial port connection provides logic control and interface to the Bridge. Both connections are required for the Bridge to be operated properly.

The USB connection: The Bridge is USB type 1 (one). It may therefore be connected to USB 1 or USB Type 2 (two) PCs and hubs.

The RS232 serial connection: The Bridge communicates with the PC through a standard RS232 serial port (N,8,1, no flow control) at 38,400 baud. No configuration of the PC should be required because the software automatically searches for the Bridge.

RS232 USB Power

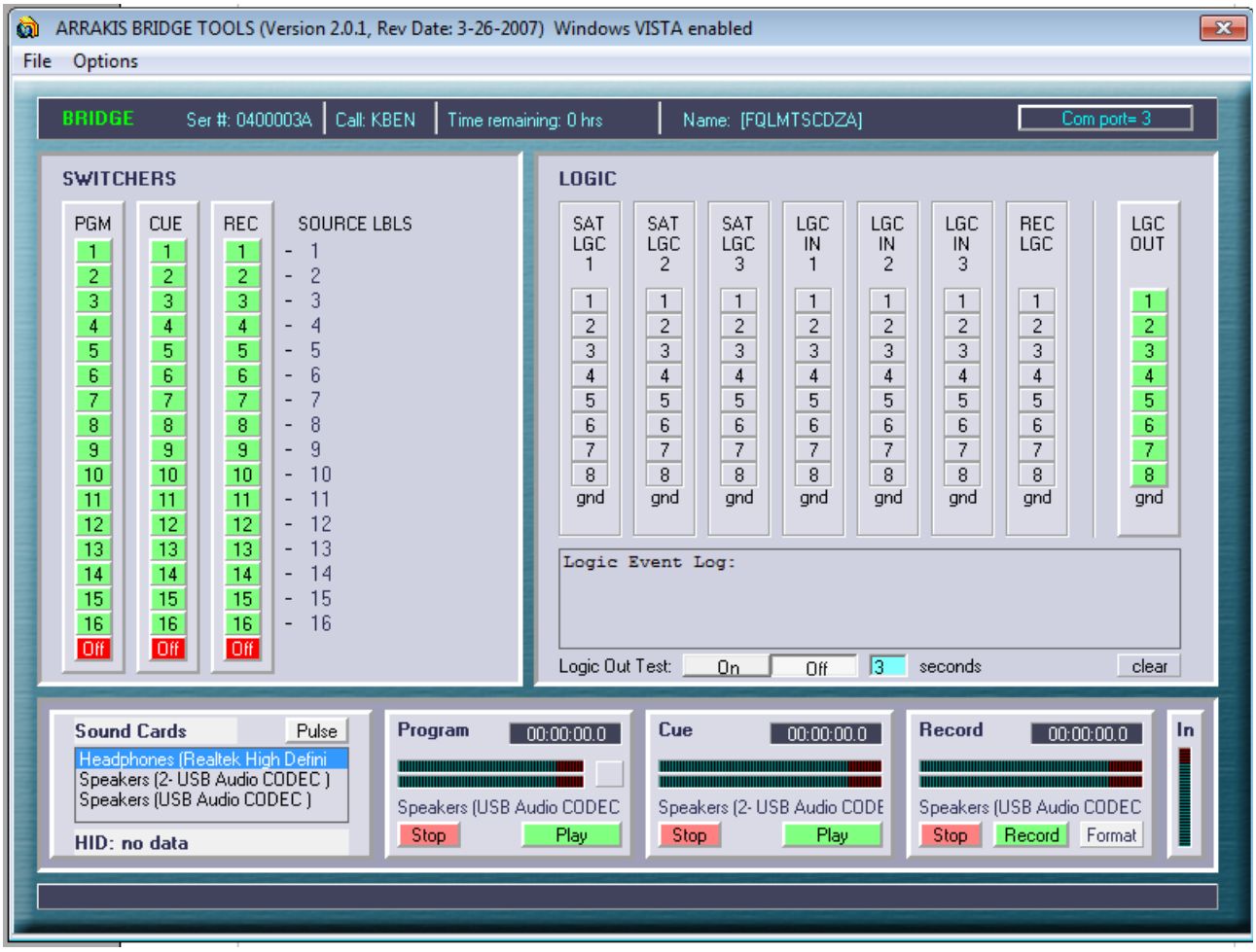
IMPORTANT NOTES:

PC serial ports: Where possible, a PC should be used that has a built-in RS232 serial port. However, many PCs no longer have an RS232 serial port. If your PC does not have an RS232 port built in to the PC, then you will be required to purchase a specific RS232 adapter: ATEN USB to Serial RS232 Converter (UC-232A). We require this, and will not support any other model or type of adapter.

Com port Selection: the software will automatically search through com ports 1-20 for the port that the Bridge is attached to. If it finds the Bridge, it uses that port. It searches for the Bridge every time that the software is opened.

USB hubs: Do not ever use a USB hub or extender for connecting the Bridge to the PC. The USB cable should go directly to the PC with the provided cable. It should never go farther than 15ft.

Bridge Tools Software



The Bridge Tools Bridge Test software is intended to be used during the installation and wiring of an Arrakis Bridge. It therefore has control over all of the various functions built into a Bridge: (1) routing switcher, (2) control logic, (3) sound cards. For identification of the Bridge, the software also displays the Bridge data such as serial number, call letters, and customer name.

To test the Program (Play 1) Output – click on the **Play** button for **Program**, and select an audio file. Audio will now be played out the Program output on the Bridge.

To test the Cue (Play 2) Output – click on the **Play** button for **Cue**, and select an audio file. Audio will now be played out the Cue output on the Bridge.

To test audio coming in on a specific channel – In the **SWITCHERS** box, under the **REC** column, select a channel number 1- 16. The **In** on the bottom right of the screen will display audio levels for that channel.

To test a closure coming in on one of the Logic channels – simply view the **LOGIC** box. Anything that blinks red from green, means that there is a closure coming in at that time. To test this manually, you may take a jumper cable and connect Pin 9 on **Sat Logic 1** on the Bridge to Pin 2 on **Sat Logic 1**. This would display **2** as red on **SAT LGC 1** for as long as those two pins are jumpered.

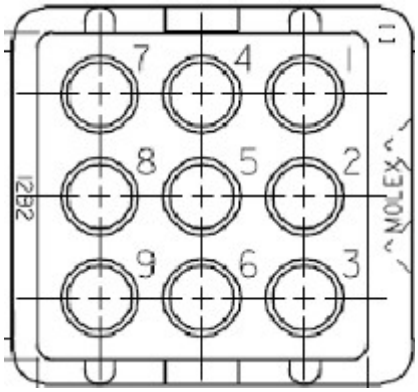
Logic Outputs and Serial Control Commands

Xtreme currently supports three types of control outputs including; momentary relay closures, sustained logic, and RS232 control. All can be included in your schedules in the APEX software.

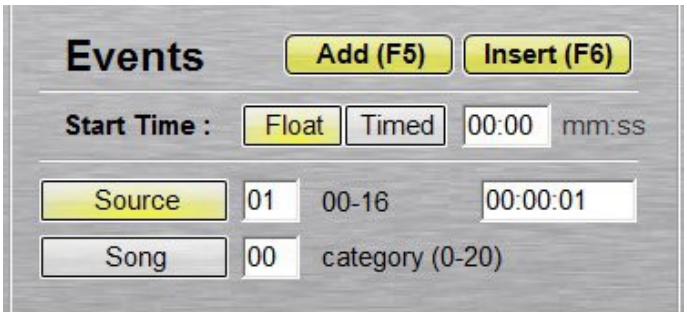
These events can be added manually in the APEX scheduling screen or can be scheduled using your third party Traffic software. Applications include: control of satellite receivers, locally triggering satellite liners or IDs locally (i.e. when a network does not provide a rejoin liner closure at the end of a break), and scheduling control of external devices.

TO SCHEDULE A CONTACT CLOSURE FOR CONTROL OF OUTSIDE DEVICES:
If you wish to schedule a contact closure to control an outside device, just add an unused audio source channel event into your schedule, and wire the momentary start relay pins from audio channel connector to the device being controlled:

Wiring:
1) select an unused audio channel on the Bridge. This will be used to provide a logic output, either a momentary relay closure or a sustained ground sync that can be used to drive an external control relay.
2) connect the selected AUDIO channel's Start Relay pin's (#'s 4 and 9) to the device to be triggered. This is a momentary closure.



TO MANUALLY SCHEDULE THE EVENT:
1) Go into the APEX-Tools software. Select **Scheduling** then select **Edit Schedule.**
2) Choose the Day, Hour, and stopset that you wish to add the logic event.
3) Click on **Source** button in the **Events** field.
4) Enter the Audio Channel that you have selected for wiring the logic command.
5) Enter in a minimum length of 1 second.
6) Click on **Add** to add the event into the schedule.



SCHEDULING LOCAL LINERS & ID'S:

If you wish to schedule a rejoin liner at the end of a local break (i.e. if your satellite network does not provide rejoin logic), just add an unused source channel to the end of your local stopset, and wire the sustained logic connector to the Liner or ID pin on the active Satellite Channel's Sat Logic (or Logic In) connector. I.e. To schedule a locally trigger rejoin liner with network rejoin under the last few seconds of the liner:

WIRING:

1) decide which unused audio channel on the Bridge will be used to provide a logic output. This will be used to provide a logic output, either a momentary relay closure or a sustained ground sync that can be used to drive an external control relay
2) connect the selected AUDIO channel's Pin #7 (Steering Logic, Sustained Ground)
to the active Satellite Source channel's Logic connector's pin for the appropriate Liner or ID pin
To manually schedule the event:

TO MANUALLY SCHEDULE THE EVENT:

1) Go into the APEX-Tools software. Select **Scheduling** then select **Edit Schedule.**
2) Choose the Day, Hour, and stopset that you wish to add the logic event.
3) Click on **Source** button in the **Events** field.
4) Enter the Audio Channel that you have selected for wiring the logic command.
5) Enter the length of time that you want to wait before the network rejoins under the liner. For example. If you are scheduling a 7 second liner and want the network to rejoin under the last 3 seconds, schedule the source channel for 4 seconds. Note: The minimum allowable length is 1 second.
6) Click on **Add** to add the event into the schedule.

Safety Instructions

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

Hazard / Warning Label Identification

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

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

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

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

The Lightning Flash With Arrowhead symbol, within an equilateral triangle, alerts the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute risk of electric shock.

a

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