ARRAKIS SYSTEMS

Bridge Tools

Installation & Test Manual

Revision: 1.0.2, 8/19/2014

Section 12: Bridge Installation & Setup

Getting Started

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Bridge Model #:   Broadcast Docking Station III

A TWO-PART PRODUCT
Digilink-Xtreme is a radio automation product comprised of a 'PC computer' and the 'Bridge'. The PC computer stores audio, schedules, and text files on hard disk. The Bridge provides the physical interface between the PC and the rest of the radio station. Even the audio sound cards are located in the 'Bridge' and not in the PC. By cleanly dividing the automation system into two parts, installation, support, and upgrading becomes vastly easier. The PC is a standard off the shelf PC without any customization so that it can be easily supported by local PC technicians. The Bridge is a broadcast audio product that can be easily installed and supported by local broadcast engineering services. This is an important advantage of Digilink-Xtreme over the typical custom PC radio automation products.

A TWO-STEP INSTALLATION PROCESS
Installation of Digilink-Xtreme is a two step process. First the Bridge is installed and setup. Second, the Automation software is installed and setup. The Bridge must be fully installed and tested before the second step is begun. It is required that this process be followed to install this product.

WHY A TWO-STEP INSTALLATION PROCESS?
A two-step process is used to make installation faster and easier. By physically installing, wiring, and testing the Bridge before the automation system, you can quickly and methodically find and resolve problems before the system is so complex that they become difficult to find.

WHAT YOU SHOULD ALREADY KNOW
For installing and operating this product, this manual assumes that you are already familiar with the use of the Microsoft Windows operating system and the basics of operating a PC computer. An in depth understanding of PC computers is not required for the installation and operation of this product. For PC software and hardware installation, setup, and network configuration, the services of a qualified PC computer technician is highly recommended and may be required. It is beyond the scope of this manual to adequately document these subjects.

REQUIRED HARDWARE
Digilink-Xtreme software and hardware require a Windows compatible PC computer. In basic, a current model IBM compatible PC with a Windows XP operating system is required. Refer to the detailed specifications elsewhere in this manual for exact configuration requirements.

REQUIRED SOFTWARE
No software is required beyond the software provided with this product.

'BRIDGE TOOLS' SOFTWARE
During the Bridge installation step, an Arrakis software utility named 'Bridge Tools' will be used to setup and test the Bridge. The Digilink-Xtreme automation software will not be used until Step one is fully completed.

PC COMPUTER: MODEL & OPERATING SYSTEM
For Digilink-Xtreme, Arrakis Systems recommends using a new model Windows PC with a Windows XP Pro operating system. This is the type of PC and operating system that Arrakis is using to develop and test Digilink-Xtreme. While the software will function on operating systems as old as Windows 98SE and PCs with a CPU speed as low as 300MHz, Arrakis can not guarantee functionality or perform customer support on systems below the recommended level.

Specifications

MINIMUM PC SPECIFICATIONS:
1. PC: IBM compatible (Macintosh not supported)
2. OS: Windows XP Pro (recommended), Windows XP Home (minimum)
3. CPU speed: 1GHz (minimum),
4. RAM: 256MB (minimum),
5. Video Resolution: 1024 x 768, 24 bit video, (800 x 600 minimum, 16 bit)
6. CDROM: required
7. Floppy disk drive: not required
8. Hard Drive: size determined by audio requirements (18GB is 160 hours stereo, 256k bitrate, MP2)
9. Networking: CAT-5 ethernet, (wireless not recommended)
10. Printer port: parallel (recommended), USB (if necessary)
11. USB ports: (qty 1 rqrd for Bridge), type 2.0 (recommended), 1.0 (minimum),
12. RS232 COM port: (qty 1 rqrd for Bridge) internal (recommended), USB (minimum), (N.8.1, 38400 baud)
13. Modem: not required, useful if access to internet or faxing is desirable
14. Control hardware: mouse, keyboard, or any Windows compatible IO device

The PC specifications are typical only, vary from vendor to vendor, and suitability can not be guaranteed by the factory.

THE ARRAKIS 'BRIDGE':
The Bridge is a black box that contains a 16in x 3out routing switcher for selecting network sources, comprehensive logic IO for control by satellite automation systems, and two Windows compatible audio sound cards. It connects to the host PC by an RS232 serial cable and a USB cable. In general, the Bridge should be located within ten feet of the host PC. However, USB extender systems can be purchased that allow the Bridge and PC to be separated by hundreds of feet over CAT5 cable.

BRIDGE SPECIFICATIONS
Model: Broadcast Bridge III
1) Routing Switcher
  a) IO: 16 stereo inputs to 3 stereo outputs
  b) inputs: 16, analog, active balanced, trimpot adjust from -20dBu to +8dBu
  c) outputs: 3, analog, to Program, Record, Cue, +4dBu output
  d) control: RS232 serial control from PC
  e) connectors   .090 Molex
2) Bridge Sound Cards
  a) type: USB from Windows sound compatible PC
  b) quantity: two, internal to Bridge
  b) play: dual play, for Program and Cue buses
  c) record: single
3) Headphone outputs
  a) cue   1/8" phone jack, fixed level, from cue output.
  b) record: 1/8" phone jack, fixed level, from record output.
4) Logic
  a) input logic   trigger: dry closure to ground
  b) output logic open collector to ground when active
  c) connectors   .090 Molex
5) Physical
  a) Dimensions 13 1/2" high, 12 3/4" wide, 2" deep
  b) Power   110-220VAC, 50-60 Hz, external, line lump

Basic Installation Process

Check each item after completion:
[ ] (1) Purchase a compatible PC.
[ ] (2) Assemble the PC.
[ ] (3) Unpack the Bridge (save the packaging).
[ ] (4) Load 'Bridge Tools' software on the PC (supplied with the Bridge on CDROM).
[ ] (5) Connect the Bridge to the PC with a USB and Serial cable (supplied with the Bridge).
[ ] (6) Connect an amp and speakers to both the Program and Cue outputs of 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 Program and Cue 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 on one of the Molex pins to a Logic input pin. 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, log ic, 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 Program and 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 Xtreme 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.

Factory and On-site support

FACTORY TECHNICAL SUPPORT DURING INSTALLATION

Arrakis provides comprehensive support for the local installation services available to the station. We do not provide on-site services.

An example of one important service that we offer is setup of your PCs at our factory. If desired (and an approved model PC) the PC(s) may be sent to our factory where software will be loaded and the PC(s) will be setup and tested. The network (if appropriate) will be setup and tested as well. The PC(s) are then returned to the station where local professionals install and test the system. Arrakis' phone support department is setup to support qualified installation professionals. The services that Arrakis provides are intended to augment, not replace, local on-site technical support.

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TYPES OF FACTORY SUPPORT FOR OPERATIONAL TRAINING

Digilink Xtreme has many built in help systems: electronic, paper, software, and human. The Xtreme Solutions program is designed to help you find the answers that you need quickly and easily. Because meeting your needs as efficiently as possible is the goal of our support, our staff may answer your questions in person or by email. Also the answer may be specific to the question or a referral to a section in the manual or to an application note. Support is logically divided into installation, training, ongoing support, and service. Answers to each type of support will be tailored to the type of support required.

a. COMMENT LINE HELP... *the most valuable help*

Simply place the mouse cursor over most on screen controls and a text line is displayed at the top of the screen explaining the purpose of the control. This is the most valuable help system for the product.

b. ON SCREEN MANUAL... *searchable for the quickest answer*

An on screen text manual is provided within the software itself to aid in training on the product. The manual is searchable by topic and is the quickest way to find an answer to a question or problem.

c. PRINTED MANUAL... *a powerful visual learning tool*

This printed manual (one copy) is provided with each Xtreme product and is the most comprehensive visual aid to learning the system.

d. ADOBE PDF MANUAL FOR USER PRINTING... *for printing more manuals*

The printed manual is provided in Adobe pdf format for printing extra copies of the manual at the station.

e. INTERNET... *the most up to date information*

Go to www.arrakis-systems.com and to the Xtreme section of the website for the most up to date information on the product.

f. EMAIL... *for documented questions to Arrakis support*

Send an email to Arrakis support for a written response

g. TELEPHONE... *for one on one answers*

Call Arrakis support for installation, training, ongoing operation, or service support

RECOMMENDED ON-SITE TECHNICAL SERVICES

Installation, calibration, and support of professional audio broadcast products require technical knowledge and hands-on experience. The same is true for networked PC computer systems. The level of on-site support required varies widely depending on the size of the system. One or two studio facilities may not require the same degree of care in wiring and grounding systems that a larger facility certainly requires. Depending on the specific site conditions however, even a single studio system may require significant technical support during installation. The nature of a satellite automation system is that there are several widely separated audio sources that can create ground loops and other problems. One of the strengths of Digilink-Xtreme and its Bridge hardware is that the PC and Radio station worlds are cleanly separated. This makes it possible to use a PC professional to work on the PC and network side of the system while you use a broadcast professional to work on the audio and control side of the system.

PC Computer Considerations

PC COMPUTER: RUNNING SOFTWARE
Most PCs as shipped from the manufacturer have MANY software applications running in the background when you turn your computer on for the first time. Examples are hard disk utilities (such as Norton), visus scanning software (such as McAfee), even Microsoft Works. These programs reduce the amount of Windows resources available to Digilink-Xtreme and they can periodically take control of the PC for a few seconds. For a PC computer to reliably play quality audio without skipping (missing audio) or stuttering (looping a short piece of audio), it must not have other programs take over control of the PC. When the other program takes control for a time longer than the length of the audio buffer in your sound card, then your audio will either skip or stutter on the air. That is obviously not acceptable. For that reason, your PC must be configured so that NO programs other than the Windows operating system are running concurrently with Digilink-Xtreme.

PC COMPUTER: DATE & TIME
The PC should be setup for 4 digit dates (ie: 2001, 2023, etc.) and in the month/day/year format (ie: 12/31/2004)

PC COMPUTER: NETWORK
Digilink-Xtreme supports a networked PC environment. It does this by allowing a PC running Xtreme to play from an audio library located anywhere on the network. The software also supports scheduling across the network. The subject of network setup and maintenance is a topic beyond the scope of this manual.

 PC COMPUTER: HARD DISK BACKUP
Audio and schedules are stored on hard drive. This places valuable data at risk since hard drives have a wide variety of failure modes: motor failure, physical damage to the magnetic disk(s), directory corruption, etc. It is therefore important that your station have one or more standardized backup methodologies. When evaluating backup methods, it is necessary to consider (1) will station personnel really perform the backup or should it be an automated process, (2) when and how to check to make certain the backup is actually valid, (3) whether a failure can destroy both the original files and the backup, (4) the possible value of a hard copy of your most important files on CDROM or DVD, and (5) how fast the backup can go on air if the primary drive/PC has a problem.

The following list contains several possible ways to perform backup.
(a) Typical Backup: The simplest and most common backup method is to periodically create a backup copy of your audio and schedule files on each individual PC. Depending on the drive size, the copy can be to CDROM, DVD, Tape, a second drive in the PC, an external USB/firewire hard drive, or to another drive on the network. This can be done daily, weekly, etc. It depends on how much data you are willing to risk losing. The problems with this method are that people often forget to back up their data and that it takes some time to reload the data before your station is back on the air.
(b) Dual PC Backup: An easy and natural method for backup is to produce all of your audio on a production PC and then network transfer it to a separate on air PC for play to air. In that way, your station has every audio file stored in two places. If necessary, you can go on air from your production PC. This method works well for stations with relatively few studios.
(c) Mirrored Drive Backup: A third method is to use drive mirroring and have the PC automatically create a duplicate of your files on a second hard drive inside the PC. The problem with this method is that the mirroring can not distinguish between good and bad files so it will replace a good copy with a bad copy. Also, it takes time to restore files and to get the station back on the air.
(d) Network Storage: A fourth method is to use a network drive. This is really a specialized PC that is designed to run all of the time and function simply as data storage on the network. The drive can be a RAID storage array that will rebuild the data if any single drive is lost. This type of storage is common in large networked systems. The problem is that the station is off the air whenever the network is down.

From long experience, it is clear that there is no perfect backup for data in a PC based radio station or perfect way to get back on the air in the case of a problem. The best solution for both cases is to have a duplicate of the on air system ready to go on air. Even this method is at risk in the case of a lightning strike or other problem that can damage much or all of the electronics in the station. Having a physical backup of your most valuable files on CDROM or DVD is the only way to protect this data in those cases.

Adding a Bridge

PC computers can be configured with internal and external sound cards, routing switchers, control logic interfaces, etc. so as to be able to be integrated into a modern radio facility. This type of system is not easy to assemble, test, and maintain. To dramatically simplify the interface between the PC and the radio station, Arrakis has built what it calls the BRIDGE (Broadcast Bridge model III). When used with the Bridge, the PC computer does only what it does best; stores and sources audio data, schedules, and logs. The PC is connected to the Bridge with just an RS232 serial cable and a USB serial cable. The PC sends commands and data to the Bridge. The Bridge converts that data into audio and control. The sound decoders, routing switchers, and logic are contained in Bridge away from the PC. If there is a problem with the PC, just plug a new PC into Bridge. If there is an audio problem, it is confined to just a single compact cabinet that can be simply unplugged and replaced. This is the right way to build a PC workstation for radio.

Bridge Installation

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!!! 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.

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.

Wiring

Bridge Unit Connections:

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
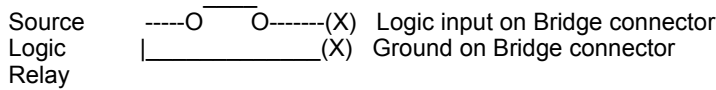**HEAD PHN OUT:** 1/8" Headphone jack – connection for headphones and plays the CUE output
PC REC OUT: 1/8" Headphone jack – connects to a PC and plays audio for whichever source is selected on the Recorder
                           screen
PC ONE IN: 1/8" Headphone jack – audio input that sums through to the Program output
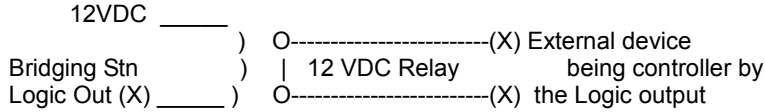**PC TWO IN:** 1/8" Headphone jack – audio input that sums through to the Cue output

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
```
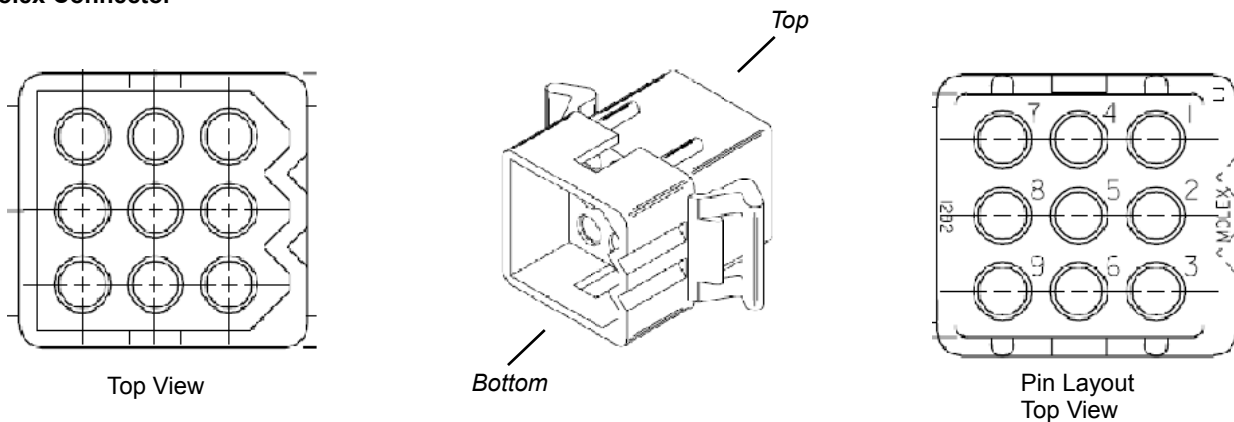
BRIDGE: LOGIC OUTPUT WIRING

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
```

Molex Connector

Top

Top View

Bottom

Pin Layout
Top View

It is essential to correctly wire your Bridge when setting up the white Molex connectors. The Bridge uses standard White Molex connectors in the Pin format listed in the pictures above. Pins are .090"

12-8

Wiring

WIRING FOR AUDIO

Program 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.

Program 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) (Note: this was not available on model DL2 and DL3)
Pin 8 - Stop relay to pin 7 (momentary) (Note: this was not available on model DL2 and DL3)
Pin 9 - Start relay to pin 4 (momentary)

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. Cue output is mix of Cue routing switcher output and PC play 2 output. The Record output on this connector is the Record output from the routing switcher. The Record output was not available on models DL2 and DL3

Cue Output Pin Configuration:
Pin 1 - Audio ground
Pin 2 - Cue Right + output
Pin 3 - Cue Right - output
Pin 4 - Record R - output
Pin 5 - Cue Left + output
Pin 6 - Cue Left - output
Pin 7 - Record Right + output
Pin 8 - Record Left - output
Pin 9 - Record Left + output

Channel 1 to Channel 16
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)

12-9

Wiring

WIRING FOR AUDIO (CONTINUED)

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 Xtreme 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 - Record Start (global, starts record event independent of selected switcher channel)
>Pin 2 - EOM Return (global, stop playing event and go to next event in automation list)
>Pin 3 - Time Sync (global, sets Windows clock to sync time)
>Pin 4 - Satellite Break (global, starts sat break independent of selected sat channel)
>Pin 5 - Live Assist Play (closure from console logic to start manual break)
>Pin 6 - Mute On Air audio coming from the Xtreme software
>Pin 7 - Un-Mute On Air audio coming from the Xtreme software
>Pin 8 - Stop record (global, stop record independent of all other parameters)
>Pin 9 - Logic ground

Logic Out
The Bridge has one output logic connector. Output closures on these eight pins can be triggered in the Xtreme automation software play list to control external events.

The connector has 9 pins. Pins 1-8 are individual logic outputs while pin 9 is ground. When output logic is activated on a pin by the software, the pin is pulled momentarily to ground. 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

WIRING FOR SATELLITE AUTOMATION

The Digilink-Xtreme allows for the use of Satellite automation. Below are the layouts for a Full Logic, Partial Logic and a Game pin configuration. To learn more about the Game pin configuration and how to use it, go to page 4-7 of the Xtreme manual.

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 - na
Pin 8 - na	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 chose 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 / 13 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
Rec Logic	
Pins 6 – 7 ----------------------------	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

12-11

Wiring

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 misadjusted. 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

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.

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. In that case, a USB to serial port adapter may be used. The USB to serial port adapter by IOGear (model GUC232a) is one example.

USB to RS232 serial port adapters: some USB to serial port adapters are designed for specific applications (such as interface to PDAs) and do not have full capability. They may not operate reliably at 38,400 baud or may have small data buffers which will lose or corrupt data. Only use adapters that fully support USB1.1 and RS232 protocols up to 115Kbps and have buffers of at least 96 bytes.

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: if a USB to serial adapter is used, then the Bridge is connected to the PC through two USB connections. These can be combined into a single USB connection by using a multiport hub. A current model USB 2 hub should be used.

TROUBLESHOOTING "BRIDGE MISSING"

Com port Selection Problem: Windows XP loads the driver for the USB to Serial port adapter. In some PCs, XP will load the driver each time the adapter is plugged in and increment the port number. Eventually, the Bridge Test software will no longer find the Bridge because the port number has incremented past the highest port number that it searches for (20). In these cases, Windows XP must be told what port number to assign to the adapter. This is accomplished by:
(1) right-clicking on the 'My Computer' icon, then clicking on 'Properties', 'Hardware', 'Device Manager'
(2) then select 'Ports (COM & LPT)', 'USB to Serial Bridge', 'Port Settings', and 'Advanced'
(3) on this page, a box labeled 'COM Port Number' displays the currently selected comport. A pop up box displays all port numbers from 1-100 and those that are in use
(4) select an unused port number below 20 and follow the instructions

Problem: Can't Find the Bridge: if the Bridge Tools test software can not find the Bridge, then follow the steps in the procedure below in the order they are listed.
(1) close the Bridge Tools test software. Shut down your computer (do not simply restart).
(2) turn power off to the Bridge by unplugging it from the wall
(3) recheck your USB and RS232 connections between the PC and the Bridge are connected properly
(4) turn power on to the Bridge by plugging it back into the wall. Make certain that the Bridge is connected to AC power
(5) turn your PC back on and wait until the PC is waiting at the desktop. This may take a couple of minutes. Just because the desktop is visible does not mean that the PC is ready to be used
(6) start the Xtreme program and see if the Bridge Missing icon has disappeared, if not, then follow steps 7 and 8
(7) open the Bridge Tools test software. The Bridge Test software will test the Com port connection to the Bridge and the USB audio connection to the Bridge. If either is missing, then messages will display the problem. If the connections are good, then the Bridge Tools test software will display a message indicating it is ready to be used
(8) if it still does not recognize the Bridge at all, then follow these steps again from 1 - 6. If the Bridge does not recognize the RS232 port, then follow steps outlined in Com port Selection Problem from above. USB to RS232 adapters typically have problems being recognized by the computer

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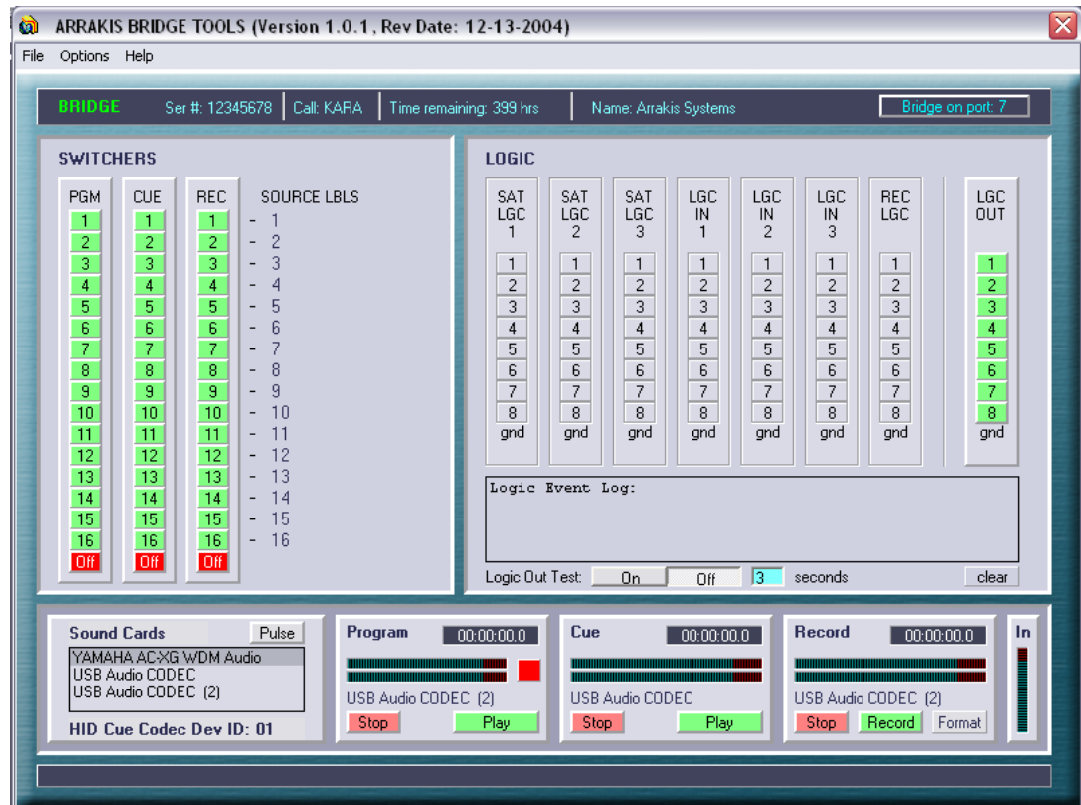
Basic Operation
Bridge Test software is intended to be used during the installation and wiring of an Arrakis Bridge. It therefore has control over all of the various functions built into a Bridge: (1) routing switcher, (2) control logic, (3) sound cards. For identification of the Bridge, the software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

Bridge Data
The Bridge has data stored in internal hardware for identification purposes. That data is (1) serial number, (2) station Call letters, and (3) Customer name. This data is displayed at the top of the software screen.

Firmware Version
The internal software stored in the Bridge has a version ID. The ID may be retrieved from the Bridge by selecting one of the 'Options' in the main menu at the top of the screen. This ID is important because it may be necessary to update the firmware to the latest version.

The Switchers
The Bridge has a 16 input by 3 stereo output switcher. The three outputs are (1) Program, (2) Cue, (3) Recording. The switcher inputs are typically wired to the satellite networks in the station. The Bridge Test software displays the currently selected input in red and allows you to change that selection by clicking on a button. When the Bridge is first powered up, the switchers are off and therefore no buttons are lit red.

Labeling the Switcher inputs
The 16 switcher inputs can be labeled to the appropriate name for the input. This is done simply by clicking on the text box and typing in the label. A yellow 'Save' button will pop up that mst be clicked to save the changes to the labels.

12-14

Wiring

Input Logic
The Bridge has seven input logic connectors. The connectors are designed to be connected to satellite control logic (i.e.- station ID, liners, break, record start-stop, etc).

The connectors each have 9 pins. Pins 1-8 are individual logic inputs while pin 9 is ground. Input logic is activated when any pin is connected to ground. The Bridge Test software displays each of the pins on those connectors and will light red when any of those pins are connected to ground. It is easy to test any logic input by using a wire jumper to connect an input logic pin to pin 9 (ground) on any input logic connector.

Molex connector viewed looking down on the Bridge
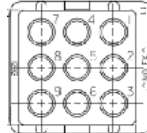
Output Logic (Logic Out)
The Bridge has one output logic connector. Output closures on these eight pins can be triggered in the Xtreme automation software play list to control external events.

The connector has 9 pins. Pins 1-8 are individual logic outputs while pin 9 is ground. When output logic is activated on a pin by the software, the pin is pulled momentarily to ground. 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.

Molex connector viewed looking down on the Bridge
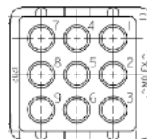
Switcher Audio Input wiring
The Bridge has 16 active balanced audio inputs to the switcher. The connector audio pins are wired to match the Program and Cue output connectors. It is possible to test a switcher input by connecting the test cable provided with the Bridge from the Cue output to a switcher input.

Sound Cards
The Bridge features two internal, Windows XP compatible sound cards. The sound cards use the USB audio standard. The Windows drivers for the PC come with Windows XP but not with any earlier operating system. It is possible, but not recommended, to download drivers for earlier operating systems.

The sound cards are driven from a PC computer via a USB connection between the Bridge and the PC. The Bridge sound cards are USB 1 (one) and can therefore be connected to a PC or hub that is USB 1 or 2.

Sound Card List Box
The Bridge Test software has a list of the sound cards available to Windows in the bottom left corner of the software screen. If properly connected to the Bridge, it will display two 'USB Audio CODECs' which are the Bridge codecs. In most cases, it will display a 3rd codec which will be the audio codec built into the PC itself.

If the 'Bridge codecs are not present in the list, recheck your USB connections and then turn both the PC and the Bridge off and then on again. Once the Bridge and the PC are on, then open the Bridge Test software. The Bridge Test software reflects changes in the sound cards available to Windows only when the software is first opened. If the USB connection to the Bridge sound cards is changed, then the Bridge Test software must be closed and then opened again.

Testing the Audio Output of the Sound Cards
To test the audio output of the sound cards, select a card n the list and click on the 'Pulse' button above the list. A one second audible tone will be played through that sound card.

Bridge Tools Software

Program Audio Player
One of the Bridge sound cards is allocated to the Program channel for the Bridge. When audio is played through this sound card it is mixed with audio selected from the Program switcher. The Program audio output from the PC is designed to play hard disk audio events from the Xtreme automation play list such as liners, spots, music, etc.

The Bridge Test software has a basic hard disk audio player to test the system. To select an audio file and to begin play, click on the Program 'Play' button. A Find File dialog box will pop up enabling you to browse for an audio file. Once an audio file is selected, it will begin play. To stop playback, click on the 'Stop' button.

The Program audio player has a text line displaying the sound codec chosen for that player. It should be a 'USB audio CODEC' which is the Arrakis codec in the Bridge. For test purposes, it is possible to change the codec selected for that player. To do this, click on one of the sound cards in the 'Sound Cards' list box, then click on the codec text line. The text line will change to display the newly selected codec. The player must not be playing to change codecs. For test purposes, it can be convenient to change the codec to the PC codec where you can use the PC speakers to listen to the player.

Program Audio Output
The Bridge has active balanced audio outputs. The main program output is a mix of the Program routing switcher and the Program sound card output from the PC. The connector audio pins are wired to match the switcher input connectors. It is possible to test the Program output by connecting the test cable provided with the Bridge from the Program output to a switcher input.

Cue Audio Player
One of the Bridge sound cards is allocated to the Cue channel for the Bridge. When audio is played through this sound card it is mixed with audio selected from the Cue switcher. The Cue audio output from the PC is designed to cue hard disk audio events from the Xtreme automation software.

The Bridge Test software has a basic hard disk audio player to test the system. To select an audio file and to begin play, click on the Cue 'Play' button. A Find File dialog box will pop up enabling you to browse for an audio file. Once an audio file is selected, it will begin play. To stop playback, click on the 'Stop' button.

The Cue audio player has a text line displaying the sound codec chosen for that player. It should be a 'USB audio CODEC' which is the Arrakis codec in the Bridge. For test purposes, it is possible to change the codec selected for that player. To do this, click on one of the sound cards in the 'Sound Cards' list box, then click on the codec text line. The text line will change to display the newly selected codec. The player must not be playing to change codecs. For test purposes, it can be convenient to change the codec to the PC codec where you can use the PC speakers to listen to the player.

Cue Audio Output
The Bridge has active balanced audio outputs. The main cue output is a mix of the Cue routing switcher and the Cue sound card output from the PC. The connector audio pins are wired to match the switcher input connectors. It is possible to test the Cue output by connecting the test cable provided with the Bridge from the Cue output to a switcher input.

Bridge Tools Software

Recorder
One of the Bridge sound cards has a PC record channel. It is connected to the Record switcher so that any of the 16 switcher inputs may be manually or timed recorded for production or net catching.

The Bridge Test software has a hard disk recorder for testing the system. The input to the recorder is from the Bridge record switcher if the Bridge Program codec is selected (default setup). The record format (wav, mp2, mp3 etc) may be chosen by clicking on the 'Format' button in the recorder. The available record formats will depend on the Windows ACM (audio compression manager) encoders loaded into your PC. To begin recording, click on the 'Record' button. A 'Save dialog' window will open allowing you to browse to a folder and enter a new for your audio file. Once the name is entered then the recording begins. To stop the recording, click on the 'Stop' button.

The Bridge recorder has a text line displaying the sound codec chosen for the recorder. It should be the 'USB audio CODEC' selected for the Program player. For test purposes, it is possible to change the codec selected for the recorder. To do this, click on one of the sound cards in the 'Sound Cards' list box, then click on the codec text line. The text line will change to display the newly selected codec. The recorder must not be recording to change codecs. For test purposes, it can be convenient to change the codec to the PC codec where you can use the PC microphone or PC line in to test the recorder itself.

The 'In' Level Meter
The 'In' level meter to the right of the recorder displays the audio level at the input of the recorder. It displays the levels even when the recorder is not recording and is useful to visually see whether there is an audio signal output from the record switcher.

The Terminal Window (Custom Testing)
A com port terminal window may be opened under the 'Options' selection in the main menu. It is useful for observing the actual control dialog between the PC and the Bridge over the RS232 com port. Custom ASCII text commands can also be sent to the Bridge from the terminal window text line.

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 Xtreme software. These events can be added manually in the Xtreme's scheduling screen or can be scheduled using your third party Traffic software.

<u>Applications include:</u> 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.

The input channel connector pin outs are detailed on page 14-9
The "logic output wiring" specifications are detailed on pages 14-8

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:
(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
<u>To manually schedule the event:</u>
(1) go into the Xtreme software. Select MENU, then SCHEDULER
(2) choose the Day, Hour, and stopset that you wish in which you want to add the logic event
(3) click on the Select Event Type button
(4) click on the event type "Source Switcher Event"
(5) click on the Select Source button
(6) select the Audio Channel that you have selected and wired for this logic command.
(7) click in the yellow length box.
(8) enter in a minimum length of 1 second

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:
(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
<u>To manually schedule the event:</u>
(1) select MENU, then SCHEDULER
(2) choose the Day, Hour, and stopset that you wish in which you want to add the logic event
(3) click on the Select Event Type button
(4) click on the event type "Source Switcher Event" from the drop down list
(5) click on the Select Source button
(6) select the Audio Channel that you have selected and wired for this logic command
(7) click in the length box. 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.

SCHEDULING RS232 SERIAL CONTROL EVENTS
You may also insert RS232 serial control commands into your schedule to control satellite receivers or other
devices. To send a serial command, simply select a Serial Command event and enter the serial command
string into the cart TITLE box. In order to support control characters needed by some devices such as
satellite receivers, Xtreme provides a serial command editor as part of the scheduling screen. Help is built
into this screen so that you can easily create and test your commands. When using Xtreme to manually
schedule, you can define and use a list of predefined custom serial commands. When using a third party
traffic scheduler, just create a unique cart #, i.e. COMxxxx (where xxxx is a unique number) for each serial
command that you will need, and enter the command pre-defined into the cart title. Then schedule the serial
commands as you would any other audio cart.

Logic Outputs and Serial Control Commands

SCHEDULING RS232 SERIAL CONTROL EVENTS (CONTINUED)

To manually schedule an RS232 command:

(1) make sure that your PC is configured with two available serial ports. The first will be connected to the Xtreme Bridge. The second will be connected to the device to be controlled

(2) go into the Xtreme software, select Menu, then Setup, then click on the SERIAL PORTS button

(3) set the Port # and baud rate of PORT TWO, referring to the on-screen help

(4) connect the PC's second serial port to the device to be controlled

To manually schedule the event:

(1) select Menu, then Scheduler

(2) choose the Day, Hour, and stopset that you wish in which you want to add the logic event

(3) click on the Select Event Type button,

(4) select the SERIAL COMMAND EVENT

(5) the Cart # field will turn white and will display COMMAND

(6) the Title field will turn white and will display ENTER SERIAL STRING HERE

(7) click on the Cart # COMMAND to open the custom command editor, which allows you to predefine a list of commands for repeated use

notes:

-RS232 Serial Commands

Serial output commands are placed in the title of a cart with a COM cart number. They have a maximum length of 26 characters. Com commands must be printable ASCII characters (A,B,C,0,1,?,$,etc). To allow special characters (such as carriage return) to be placed into the output stream sent to the device being controlled, Xtreme has a special format for these characters. Because any character has an associated number (E = 69 as an example), you can place that character into the command text box by bracketing the number with 'less than' and 'greater than' signs... <69>. By placing a <69> into the command line the <69> is replaced with an E in the output serial stream. A carriage return is #13 so <13> will place a carriage return into the stream.

-The audio connector's momentary Start Relay Closure and sustained logic are only activated when the input is selected in Program. Assignment to Cue and/or Record does not trigger neither the input closure, nor the steering logic.

12-19