Radio Systems Millenium Digital Console
Livewire® Model

Additional Operating Instructions

Radio Systems Millenium-D Livewire® Console

Installation and Operation Manual

Radio Systems Millenium Digital- Livewire® Broadcast Manual — Part # MAN-MILLCONLIV

Manual Revision 02-29-2012
for serial numbers 100859 and higher

Utilizing Millenium Livewire Digital Console Software V1.3.1.1

New features and modifications in Millenium Livewire version 1.3.1.1

1. Multiple GPIO Livewire profiles supported.

2. Source locking - source name flashes to indicate that it is in use on another Livewire source. Flashing clears when other user de-selects the source.

3. Iprobe - IP address is now recognized and displayed by Axia "Iprobe" program

4. Scenes a new scene source selection is not loaded (only) onto channels that are on. If the channel is on, the new scene source (if there is a new source for that channel as part of the new scene) will be displayed on the lower LCD line and the ON button will flash. Then when that channel is turned off, the scene will load.

5. IP/SUBMASK addresses display and change - IP AND submask addresses are now displayed and can be changed by holding the last rotary encoder knob down for 10 seconds.

Table of Contents

Technical support: +1-856-467-8000 or tech@radiosystems.com

EXTERNAL +/- 15VDC

+15 Volts
GND
-15 Volts

J1, J2, J3

(Connectors provided to power various optional and external accessories)

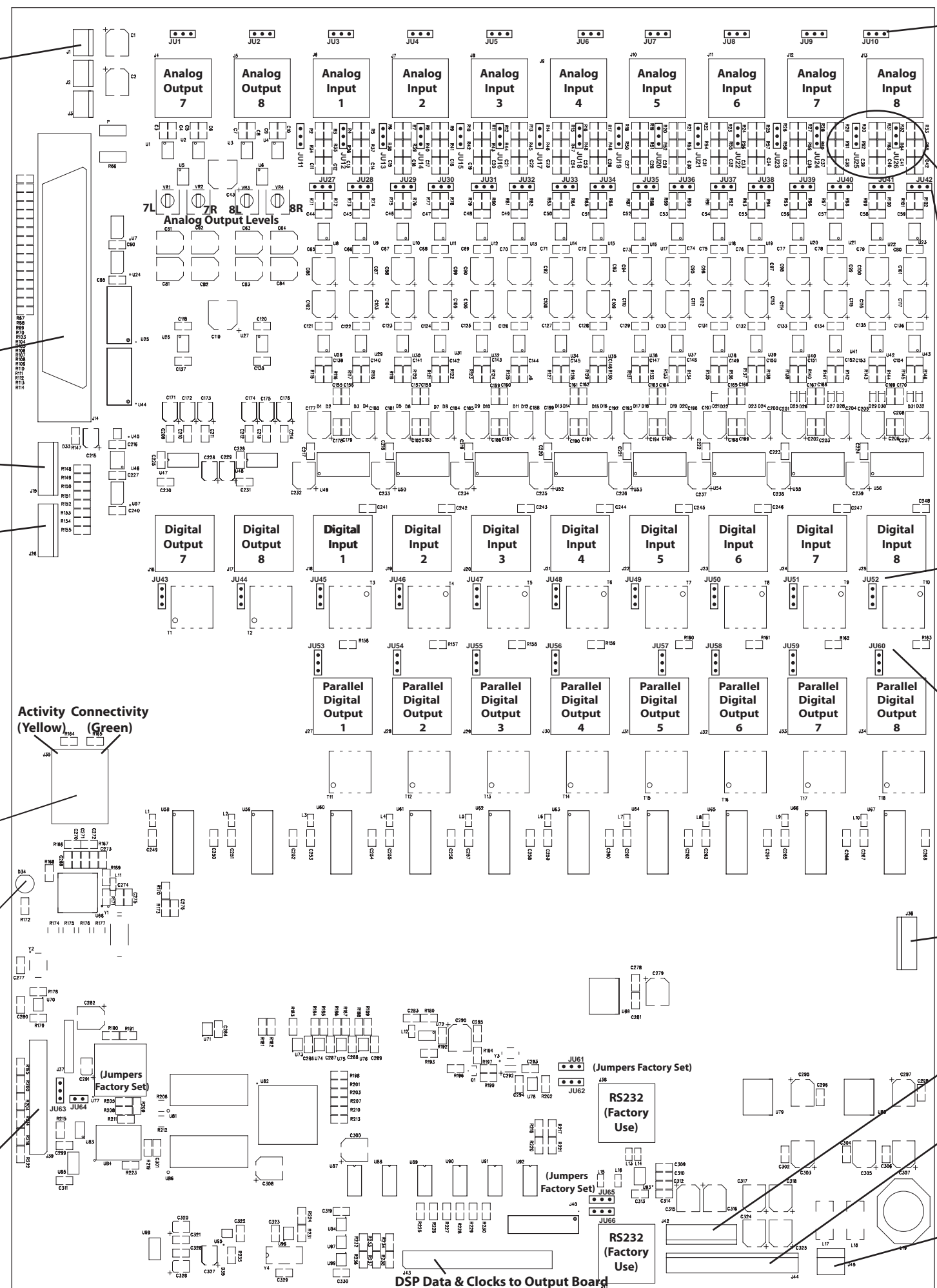**GPIO Connector**

From 8 position selector outputs 5-8

From 8 position selector outputs 1-4

Activity Connectivity
(Yellow)   (Green)

Livewire

100 BaseT

Factory Programming

Analog Output 7
Analog Output 8
Analog Input 1
Analog Input 2
Analog Input 3
Analog Input 4
Analog Input 5
Analog Input 6
Analog Input 7
Analog Input 8

Analog Output Levels
7L   7R   8L   8R

Digital Output 7
Digital Output 8
Digital Input 1
Digital Input 2
Digital Input 3
Digital Input 4
Digital Input 5
Digital Input 6
Digital Input 7
Digital Input 8

Parallel Digital Output 1
Parallel Digital Output 2
Parallel Digital Output 3
Parallel Digital Output 4
Parallel Digital Output 5
Parallel Digital Output 6
Parallel Digital Output 7
Parallel Digital Output 8

(Jumpers Factory Set)

(Jumpers Factory Set)

RS232 (Factory Use)

(Jumpers Factory Set)

RS232 (Factory Use)

DSP Data & Clocks to Output Board

OUTPUT GROUNDING JUMPERS

J1-J10 IN
Connect left and center pins for inside ground

J1-J10 CH
Connect center and right pins for chasis ground

(See Manual for Grounding Instructions)

ANALOG INPUT MONO/STEREO JUMPERS

Connect upper pins on both jumpers under each channel's RJ-45 for **stereo** (factory default)

JU11/12 thru JU25/26

Connect lower pins on both jumpers under each channel's RJ-45 for **mono**

JU11/12 thru JU25/26

ANALOG INPUT GAIN JUMPERS

Connect no pins for unity gain

Connect left and center pins for +20dB gain

Connect center and right pins for +10dB gain

DIGITAL INPUT GROUNDING JUMPERS

JU43 thru JU52 IN
Connect upper pins for inside ground

JU43 thru JU52 CH
Connect lower pins for chasis ground

(See Manual for Grounding Instructions)

DIGITAL OUTPUT GROUNDING JUMPERS

JU53 thru JU60 IN
Connect lower pins for inside ground

JU53 thru JU60 CH
Connect upper pins for chasis ground

(See Manual for Grounding Instructions)

Analog Grounds

To Upper LiveWire Control Board

Power, Mute, Timer Signalling to Output Board

+5v from Power Supply

MILLENIUM LIVEWIRE CONTROL BOARD
Part # 16144

radio SYSTEMS • Main Menu

Source Profiles

Scenes

Console Outputs

Console Inputs

Livewire GPIO

Livewire I/O Meters

Livewire/QoS

System

1.0 Millenium Source Profile Properties
Define, allocate to various faders and label sources (Axia inputs to the Millenium Livewire Console).

1.1 Setting Up 2-Way (mix-minus) source profiles

2.0 Millenium Scene Properties
Name and define up to 8 front panel selectable scene presets (and startup default "scene").

3.0 Console Outputs (Livewire Sources)
Name, define and label destinations (Millenium Livewire Console outputs to Axia Livewire).

4.0 Console Inputs (Livewire Destinations) Select and label sources (Axia inputs to the Millenium Livewire Console).

5.0 Remote Control (GPIO) - 2 screens
5.1 GPIO Overview and Setup Instructions
5.2 GPIO Wiring and Pin-Out Diagram

6.0 Livewire I/O Meters
Level test meters and input gain trims for all sources and destinations.

7.0 Livewire / QoS
Quality of service parameter selections.

8.0 System
IP, password, and software update options.

9.0 Console Node Parts Layout for Physical Connector Locations

Millenium Source Profile Properties
Define and allocate to various faders and label sources (Axia inputs to the Millenium Livewire Console)

Millenium Scene Properties

Name and define up to 8 front panel selectable scene presets (and startup default "scene")

Console Outputs (Livewire Sources)
Name, define and label destinations (Millenium Livewire Console outputs to Axia Livewire)

#	Name:	Channel:		Type:
		Destinations		
1	Livewire Channel 1			From Source
2	Livewire Channel 2			From Source
3	Livewire Channel 3			From Source
4	Livewire Channel 4			From Source
5	Livewire Channel 5			From Source
6	Livewire Channel 6			From Source
7	Aux 7	7 <Aux 5@Millenium>		From source
8	Aux 8	8 <Aux 6@Millenium>		From source

Apply

Console Inputs (Livewire Destinations)

Select and label sources (Axia inputs to the Millenium Livewire Consoles)

radio SYSTEMS ● Livewire GPIO

Source Profiles

Scenes

Console Outputs

Console Inputs

Livewire GPIO

Livewire I/O Meters

Livewire/QoS

System

Livewire Port		
#	Channel:	
1	[ ]	program pins
2	[ ]	program pins
3	[ ]	program pins
4	[ ]	program pins
5	[ ]	program pins
6	[ ]	program pins
7	[ ]	program pins
8	[ ]	program pins

Apply

GPI Channel Assignment

Select 1-8 Livewire sources that you wish to control (start/stop) or to control (turn on/off) console channels.

Consult details on page 19

Livewire GPIO - Pin mapping

Livewire GPIO port number: ☑ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8

Livewire port 1	Millenium GPIO Input pins

input pin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	⦿	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2	○	⦿	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Livewire port 1	Millenium GPIO Output pins

output pin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	⦿	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2	○	⦿	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Apply

Navigation menu:
- Source Profiles
- Scenes
- Console Outputs
- Console Inputs
- Livewire GPIO
- Livewire I/O Meters
- Livewire/QoS
- System

GPI Pin Assignments

For each (of eight) GPIO control sources, use this sub-screen to map up to five input and five output physical pins on the RJ-21 GPIO connector. Note that pins can be multiply assigned to different GPIO ins and outs, but that this is not recommended. Consult details on page 19.

radio SYSTEMS • QoS

Source Profiles

Scenes

Console Outputs

Console Inputs

Livewire I/O Meters

Livewire/QoS

System

Synchronization / Livewire Clock:

Livewire clock master priority:	0 (always slave)
Livewire clock mode:	IP low rate (default)

Fast Audio / Clock Streams:

802.1p tagging:	Enabled
802.1p VLAN ID:	0
802.1Q priority:	6 (recommended)
DSCP Class of Service:	48 CS6 (recommended)

Slow Audio Streams:

Receive buffer size [ms] (default 100):	100 (15 - 100)
802.1p tagging:	Disabled
802.1p VLAN ID:	0
802.1Q priority:	5 (recommended)
DSCP Class of Service:	0 switchport default

Apply

Livewire / QoS
Quality of service parameter selections
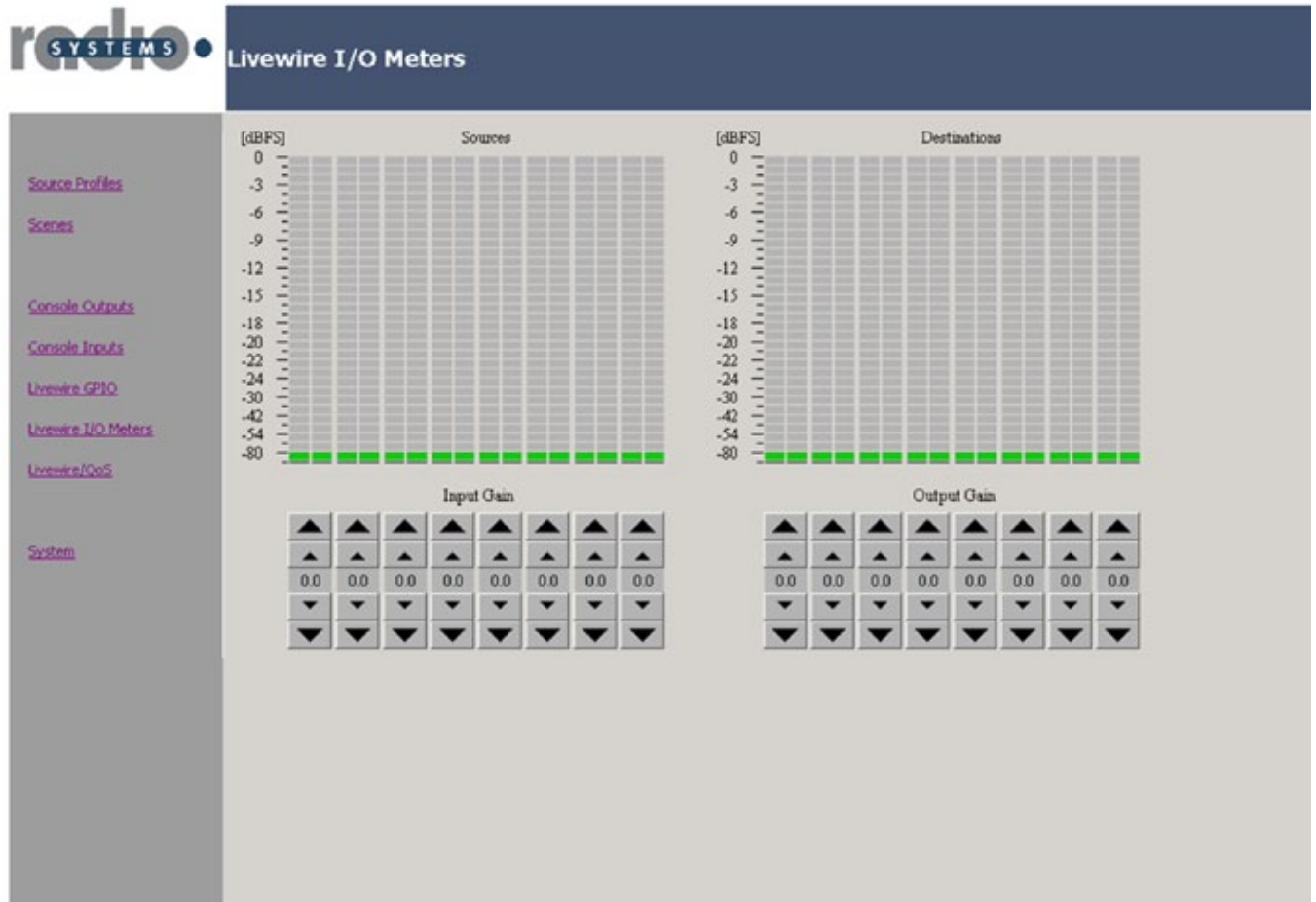
Livewire I/O Meters
Level test meters and input gain trims for all sources and destinations

radio SYSTEMS ● System

Source Profiles

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Livewire I/O Meters

Livewire/QoS

System

IP settings:

Host name: Millenium   (letters and digits only, no spaces)

Network address: 192.168.93.101

Netmask: 255.0.0.0

Gateway: 0.0.0.0

Syslog server (IP address):   0.0.0.0

Syslog severity level filter: Notice: normal but significant condition ▼

User password:

New password: ••••••••   (5 to 8 characters, letters and numbers)

Retype new password: ••••••••   (verify)

Firmware version:

Hardware revision: Radio Systems Millenium

⦿ Bank 0   ver. 0.9.0.6 (build Sun Oct 21 16:33:46 EDT 2007)

◯ Bank 1   empty

update: [   ]   Browse...

Warning: System will reboot after changing current bank.

System

IP, password, and software update options

Note: Default username is "user," default password is "user."

See last page of manual for password reset in case of forgotten password.

Millenium - Livewire Console Software

Creating Backstreams (Mix-Minus feeds for 2-way devices)

Gaining Perspective

A Millenium output is a Source (input) to Livewire.

A Millenium input is a Destination (output) of Livewire.

Nomenclature assumes the Livewire network as the point of reference, so;

   A Livewire Destination is an Input to the Millenium Console.

   A Livewire Source is an output from the Millenium Console.

Connecting the Two-Way Devices

On the source node's browser page, set a unique Axia channel number (for example, "1021", where 102 is the last 3 digits of the node's IP address, and 1 represents the physical port into which the device is connected).

Define the Source Properties in the Millenium Browser

Check all applicable boxes, including ENABLING the Backwards Feed check box.

Select Backstream Mode

In the Millenium browser Console Output section, set one of the outputs (from Outputs 3-8 - Outputs 1 and 2 are reserved) in the Backstream (Mix-Minus) Stream Mode. Ensure that the faders chosen have source "1021" (for example) available on the Source Profile Menu.

Connect the Two-Way Devices' Input to a Destination Node

On the destination node's browser page (ie. feeding the codec's mix-minus), click on the Destination page, then change Type to "To Source" on the channel whose physical destination is the codec's mix-minus. Put "1021"(for example) in the Channel Number field.

Confirm Selection

As a visual verification, when the codec is selected on a Millenum fader, two dots will appear above the Destination Node's corresponding output channel.

Utility Bus Programming

Using the Millenium Console Utility Bus setup screen, create the appropriate mix minuses for Utility Bus 1-6.

Millenium console outputs (Sources to Livewire) are factory default configured as:

Livewire - Input #1	from	Console Program Output*
Livewire - Input #2	from	Console Audition Output*
Livewire - Input #3	from	Console Utility Output #1*
Livewire - Input #4	from	Console Utility Output #6*
Livewire - Input #5	from	Console Utility Output #2*
Livewire - Input #6	from	Console Utility Output #7*
Livewire - Input #7	from	Console Utility Output #3*
Livewire - Input #8	from	Console Utility Output #8**

Note: All outputs have been factory hard-wired between the console digital output board and Livewire input board as shown. The 6 utility outputs have been factory configured as mix-minus outputs so that program is sent "minus" that channels program audio is sent.

E.G. -Utility output #1 is configured to be program (A or B input / post on-off switch post fader / mono mix) minus the program output of the first Livewire fader.

Remote Control - "GPIO" Interface

Overview

The Millenium Axia internal console node features a GPIO connector with 16 inputs and 16 outputs. Via programming these inputs and outputs can be assigned to any network audio source. In this way, the Millenium Livewire console channel can exercise start/stop control or a device can turn a Millenium console channel on and off when selected as a source on the LCD display above that fader.

Physical Connectivity

All GPIO inputs and outputs are located on the on-board RJ-21 50-pin male connector. Inputs are opto-isolated and are activated by being "pulled low" (connected to ground). Outputs are open collector and provide a path to ground when activated. Consult the Illustration on the following page for RJ-21 pin-outs and wiring illustrations

Assigning GPIO via software set-up screens

Source Configuration

An existing audio source connected to the Millenium console or any Livewire node must first be set for GPIO control. On the source profile screen, select BOTH the appropriate GPIO profile and GPIO enable radio button. The GPIO source profile automatically sets up to 5 GPIO input and output functions for each source. These functions are listed in Illustration XXX on the following page.

GPIO Channel assignment

The Millenium console provided 8 GPIO "ports", thus allowing up to 8 devices (Livewire audio sources) to have GPIO connectivity. These devices must be assigned as GPIO channel 1-8 on the Livewire GPIO port assignment

GPIO Pin Mapping

Source GPIO inputs and outputs (up to 5 of each for each source) must be "mapped" to the physical pins on the GPIO connector. This is accomplished on the GPIO "Pin Mapping" page accessed by clicking the "program pins" link alongside each Livewire GPIO port channel selection. For each active port channel assign an input or output GPIO pin by clicking the adjacent radio box.

For example:

If GPIO channel #1 is assigned to a CD player and that CD player's start control is wired to GPIO port physical output pin#1 and the CD player's EOM relay is wired to GPIO port physical input #1.

Mapping Livewire port 1 / output pin#1 to GPIO output pin#1 and selecting this CD player on a Livewire console channel will cause the CD player to start when the CD's console channel is turned on.

Mapping Livewire port 1 / input pin#1 to GPIO input pin#1 and selecting this CD player on a Livewire console channel will cause the console channel to turn off when the CD's EOM relay fires

Livewire Console Remote Profiles

There are 6 available preconfigured remote profiles. You must choose the appropriate profile when configuring Livewire Remote Control. The profiles available are below and are detailed on the following pages.

Operator

Producer

Control Room Guest

Studio Guest

Line

Computer Player

GPIO Operator's Microphone Logic

Name	Pin	Type	Notes
INPUTS			
ON Command	IN-1	Active Low Input	Turns channel ON
OFF Command	IN-2	Active Low Input	Turns channel OFF
TALK (to Monitor 2) Command	IN-3	Active Low Input	Activates the Element TALK to MON2 function and routes mic audio to the Talkback bus
MUTE Command	IN-4	Active Low Input	Mutes channel outputs
TALK (to PREVIEWED SOURCE) Command	IN-5	Active Low Input	Activates the TALK button on every source currently in preview and routes mic audio to the Talkback bus
OUTPUTS			
ON Lamp	OUT-1	Open Collector to Logic Common Return	Illuminates when the channel is ON unless TALK or MUTE is active
OFF Lamp	OUT-2	Open Collector to Logic Common Return	Illuminates when channel is OFF
TALK (to Monitor 2) Lamp	OUT-3	Open Collector to Logic Common Return	Illuminates when TALK TO MON2 is active
MUTE Lamp	OUT-4	Open Collector to Logic Common Return	Illuminates when MUTE is active
TALK (to PREVIEWED SOURCE)	OUT-5	Open Collector to Logic Common Return	Illuminates when TALK to Lamp PREVIEWED SOURCE is active

GPIO Producer's Microphone Logic

Name	Pin	Type	Notes
INPUTS			
ON Command	IN-1	Active Low Input	Turns channel ON
OFF Command	IN-2	Active Low Input	Turns channel OFF
TALK (to Monitor 2) Command	IN-3	Active Low Input	Activates the Element TALK to MON2 function and routes mic audio to the Talkback bus
MUTE Command	IN-4	Active Low Input	Mutes channel outputs
TALK (to PREVIEWED SOURCE) Command	IN-5	Active Low Input	Activates the TALK button on every source currently in preview and routes mic audio to the Talkback bus
OUTPUTS			
ON Lamp	OUT-1	Open Collector to Logic Common Return	Illuminates when the channel is ON unless TALK or MUTE is active
OFF Lamp	OUT-2	Open Collector to Logic Common Return	Illuminates when channel is OFF
TALK (to Monitor 2) Lamp	OUT-3	Open Collector to Logic Common Return	Illuminates when TALK TO MON2 is active
MUTE Lamp	OUT-4	Open Collector to Logic Common Return	Illuminates when MUTE is active
TALK (to PREVIEWED SOURCE) Lamp	OUT-5	Open Collector to Logic Common Return	Illuminates when TALK to PREVIEWED SOURCE is active

GPIO Control Room Guest Microphone Logic

Name	Pin	Type	Notes
INPUTS			
ON Command	IN-1	Active Low Input	Turns channel ON
OFF Command	IN-2	Active Low Input	Turns channel OFF
TALK (to CR) Command	IN-3	Active Low Input	Mutes channel outputs and routes source audio to PVW speakers
MUTE Command	IN-4	Active Low Input	Mutes channel outputs
TALK (to SOURCE) Command	IN-5	Active Low Input	Activates the TALK button on every source currently in preview and routes mic audio to the Talkback bus
OUTPUTS			
ON Lamp	OUT-1	Open Collector to Logic Common Return	Illuminates when the channel is ON unless TALK or MUTE is active
OFF Lamp	OUT-2	Open Collector to Logic Common Return	Illuminates when channel is OFF
TALK (to CR) Lamp	OUT-3	Open Collector to Logic Common Return	Illuminates when TALK is active
MUTE Lamp	OUT-4	Open Collector to Logic Common Return	Illuminates when MUTE is active
TALK (to SOURCE) Lamp	OUT-5	Open Collector to Logic Common Return	Illuminates when the channel TALK To SOURCE function is active (Element only; Smart Surface not used)

GPIO Studio (Monitor 2) Guest Microphone Logic

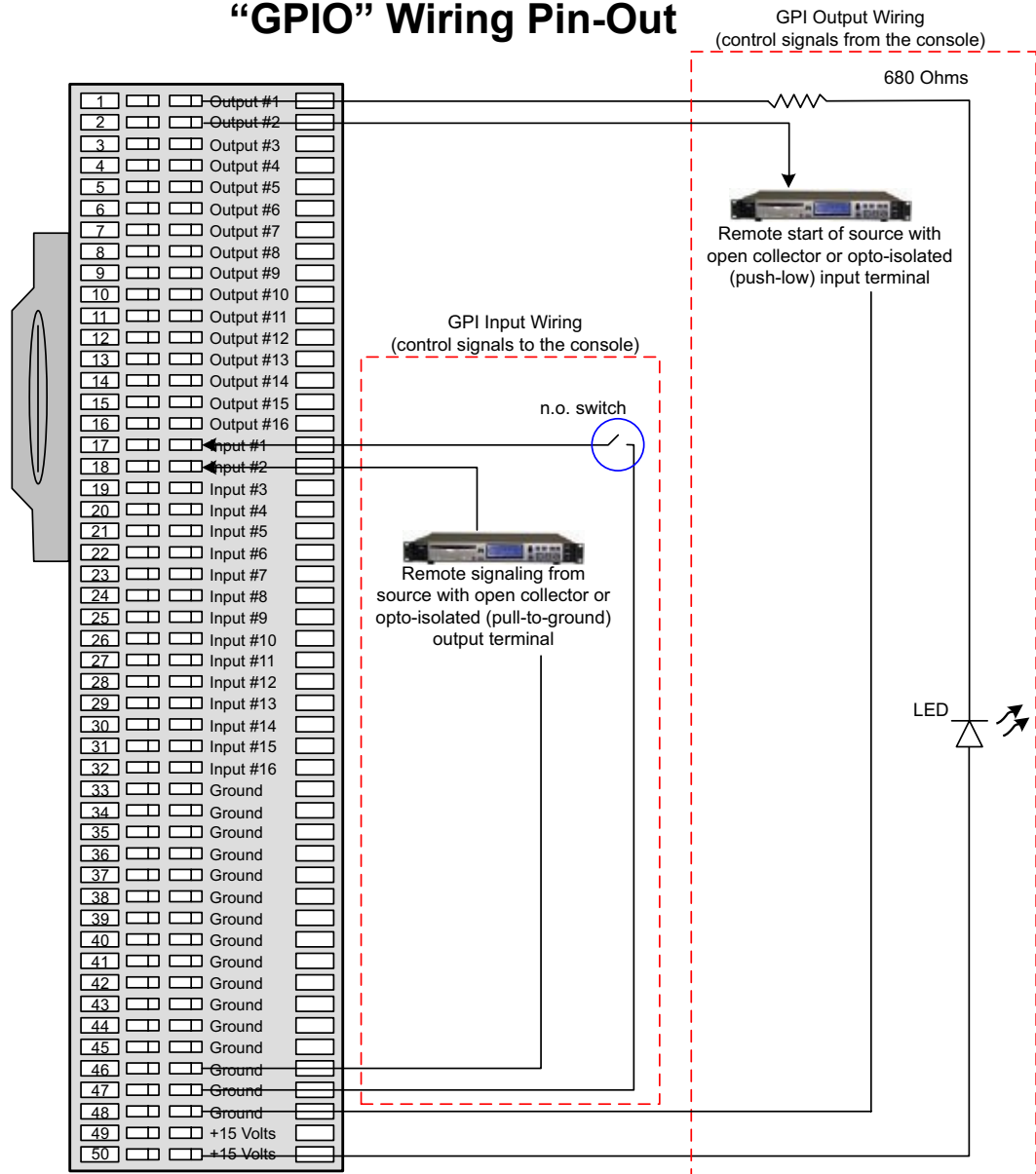| Name	Pin	Type	Notes
INPUTS			
ON Command	IN-1	Active Low Input	Turns channel ON
OFF Command	IN-2	Active Low Input	Turns channel OFF
TALK (to CR) Command	IN-3	Active Low Input	Mutes channel outputs and routes source audio to PVW speakers
MUTE Command	IN-4	Active Low Input	Mutes channel outputs
TALK (to SOURCE) Command	IN-5	Active Low Input	Allows an external button to active channel TALK TO SOURCE FUNCTION. (Element only; SmartSurface not used)
OUTPUTS			
ON Lamp	OUT-1	Open Collector to Logic Common Return	Illuminates when the channel is ON unless TALK or MUTE is active
OFF Lamp	OUT-2	Open Collector to Logic Common Return	Illuminates when channel is OFF
TALK (to CR) Lamp	OUT-3	Open Collector to Logic Common Return	Illuminates when TALK is active
MUTE Lamp	OUT-4	Open Collector to Logic Common Return	Illuminates when MUTE is active
TALK (to SOURCE) Lamp	OUT-5	Open Collector to Logic	Illuminates when the channel TALK TO SOURCE function is active (Element only; Smart Surface not used)

GPIO Line Input Logic

Name	Pin	Type	Notes
INPUTS			
ON Command	IN-1	Active Low Input	Turns channel ON
OFF Command	IN-2	Active Low Input	Turns channel OFF & sends 100 msec STOP pulse
PREVIEW Command	IN-3	Active Low Input	Turns preview ON
RESET Command	IN-4	Active Low Input	"Turns channel OFF, while not sending a STOP pulse"
READY Command	IN-5	Active Low Input	Illuminates OFF lamp to indicate source's readiness
OUTPUTS			
ON Lamp	OUT-1	Open Collector to Logic Common Return	Illuminates when channel is ON
OFF Lamp	OUT-2	Open Collector to Logic Common Return	Illuminates when channel is OFF and READY is active
PREVIEW Lamp	OUT-3	Open Collector to Logic Common Return	Illuminates when PREVIEW is ON
START Pulse	OUT-4	Open Collector to Logic Common Return	A 100 msec pulse when the channel status changes from OFF to ON
STOP Pulse	OUT-5	Open Collector to Logic Common Return	A 100 msec pulse when the channel status changes from ON to OFF

GPIO Computer Playback Logic

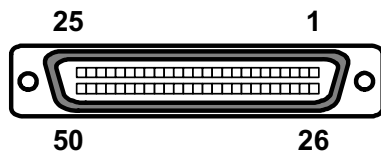| Name	Pin	Type	Notes
INPUTS			
ON Command	IN-1	Active Low Input	Turns channel ON
OFF Command	IN-2	Active Low Input STOP pulse	Turns channel OFF & sends 100 msec
PREVIEW Command	IN-3	Active Low Input	Turns preview ON
Not Used	IN-4	Active Low Input	"Turns channel OFF, while not sending a STOP pulse"
READY Command	IN-5	Active Low Input	Illuminates OFF lamp to indicate source's readiness
OUTPUTS			
NEXT Pulse	OUT-1	Open Collector to Logic Common Return	A 100 mS PULSE sent when ON button is depressed except when initially turned ON
OFF Lamp	OUT-2	Open Collector to Logic Common Return	Illuminates when channel is OFF and READY is active
PREVIEW Lamp	OUT-3	Open Collector to Logic Common Return	Illuminates when PREVIEW is ON
START Pulse	OUT-4	Open Collector to Logic Common Return	A 100 mS PULSE sent when channel is first turned ON
STOP Pulse	OUT-5	Open Collector to Logic Common Return	A 100 mS PULSE sent when channel is first turned OFF

Millenium Livewire Console
"GPIO" Wiring Pin-Out

GPI Output Wiring
(control signals from the console)

680 Ohms

Remote start of source with open collector or opto-isolated (push-low) input terminal

GPI Input Wiring
(control signals to the console)

n.o. switch

Remote signaling from source with open collector or opto-isolated (pull-to-ground) output terminal

LED

Use of 66B punch block with integrated RJ-21 female connector is recommended. Specify RS Part #11616 with companion RS Part #RJ21RC-010 10' RJ-21 male to male 25-pair cable.

50-Pin internal console node "GPIO" connector

25   1

50   26

16 Inputs - Pull to Ground	**16 Outputs - Open Collector**
Input #1 - Pin 34	Output #1 - Pin 26
Input #2 - Pin 9	Output #2 - Pin 1
Input #3 - Pin 35	Output #3 - Pin 27
Input #4 - Pin 10	Output #4 - Pin 2
Input #5 - Pin 36	Output #5 - Pin 28
Input #6 - Pin 11	Output #6 - Pin 3
Input #7 - Pin 37	Output #7 - Pin 29
Input #8 - Pin 12	Output #8 - Pin 4
Input #9 - Pin 38	Output #9 - Pin 30
Input #10 - Pin 13	Output #10 - Pin 5
Input #11 - Pin 39	Output #11 - Pin 31
Input #12 - Pin 14	Output #12 - Pin 6
Input #13 - Pin 40	Output #13 - Pin 32
Input #14 - Pin 15	Output #14 - Pin 7
Input #15 - Pin 41	Output #15 - Pin 33
Input #16 - Pin 16	Output #16 - Pin 8

GND Pins 17, 18, 19, 20, 21, 22, 23 ,24, 42, 43, 44, 45, 46, 47, 48, 49
+15 Volts Pins 25, 50 (each is individually current limited)

Password Reset for Livewire Browser Screens

- Locate the gray Millenium RS-232 adapter shipped with your console originally; it is a DB-9 to RJ45 adapter (pinouts below). Use a standard Ethernet patch cord of sufficient length to go between your PC and the console.

- Plug in DB-9 side of the adapter to your PC

- Plug the RJ45 side (using the above-mentioned cable) to the AUX RS232 port on the Livewire audio board. This port is located directly behind the MAIN port

- Start a HyperTerminal (hypertrm) connection with the following characteristics:
  - 19200 Baud
  - 8/N/1 bits
  - None for Flow Control
  - ANSI for language
  - Turn off Local Echo

- Re-boot the Millenium console once the HyperTerminal connection is made. You should see a boot sequence scroll on your PC screen.

- Once the console boots, press ENTER a few times on your PC to get to a command prompt

- Type: "cp /etc/default/passwd /etc/config/"

- Do not type the quotes (") and notice the space between passwd and /etc

- This will reset the password to "user"

Rear of Connector Shown
Adapter Connector is a DB9 female
(Mating Connector on the equipment is a DB9 male)
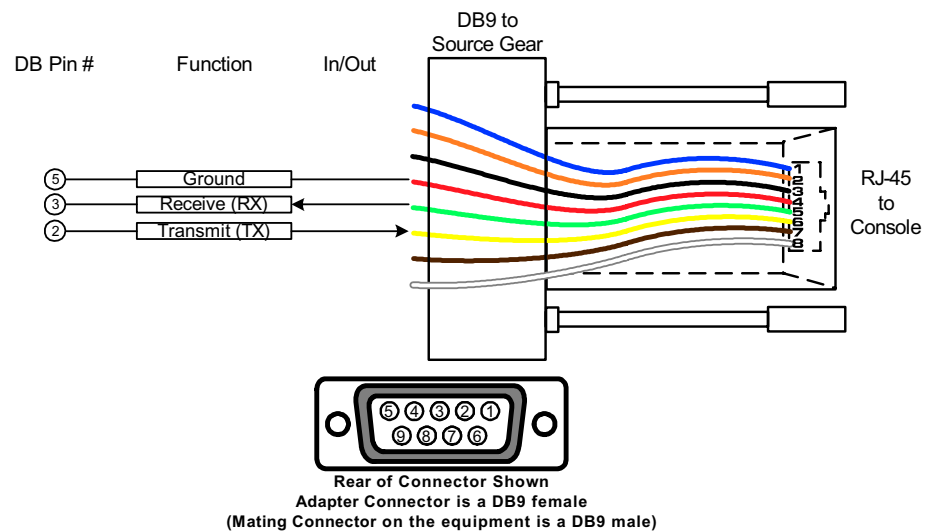
Complete Millenium Digital RS-232 Data Remote Control Functions

DB-9 PIN #	Function	Input/Output
1	N/C	
2	Transmit (TX)	Output
3	Receive (RX)	Input
4	N/C	
5	Signal Ground	
6	N/C	
7	N/C	
8	N/C	
9	N/C	