



momentum™

mcy

Momentum Control Interface for the Yamaha Console Manual



Pro Co Sound, Inc.
225 Parsons Street | Kalamazoo, MI 49007
1-888-253-7360 | www.procomomentum.com

Warranty

Pro Co Sound guarantees Momentum for five years, any excuse, even abuse. If you need to return the Momentum unit(s), ship them to Pro Co Sound in the original carton or a suitable shipping container via insured freight. Pro Co will return the Momentum unit(s) to you, free of charge including return postage. Once out of Warranty, Pro Co also offers service on all its products.

Customer Responsibility:

Please read the owner's manual thoroughly before operating the system. Complete the Warranty Card within ten days after receipt of your Momentum system. Mail the card to us or register your product on line at www.procomomentum.com.

The Warranty is subject to the following conditions:

1. Pro Co Sound or its authorized representative or dealer must perform all warranty servicing of the units, otherwise all aspects of this warranty are void.
2. All tamper-proof seals on the unit(s) must be intact in order for the unit(s) to be serviced as a warranty claim.

How obtain Warranty services:

If, after following all of the operating instructions in this manual, you find that service or support is still needed:

1. First contact the dealer or contractor from which you purchased your Momentum product for help.
2. If your problem is not resolved after contacting your dealer, call Pro Co Sound at 1-800-253-7360 and ask for Momentum Service. Our hours are 8:00 a.m. to 6:00 p.m. EST, Monday through Friday.

If the problem cannot be resolved remotely, Pro Co Sound may, at its discretion, advance the replacement of the defective unit(s) and at that time provide a Return Authorization number by which the defective unit(s) can be returned for credit or repair.

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Safety Precautions

Always follow the basic precautions listed below to avoid the possibility of physical injury to you or others, or damage to the device or other property. These precautions include, but are not limited to, the following:



To reduce the risk of fire or electrical shock, do not expose any part of your Momentum System to rain or moisture.



To reduce the risk of electrical shock, do not remove cover. There are no user serviceable parts inside. Refer servicing to service personnel.

Use Extreme Caution!

Before making adjustments to your Momentum system, be aware that certain actions could possibly damage your hearing and/or the audio system itself. Think through your actions and the possible ramifications of your adjustments. Proceed with caution and follow these important Safety Instructions:

1. Read these instructions carefully.
2. Retain these instructions for future reference.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use any part of this apparatus near water.
6. Do not block any ventilation openings.
7. Do not install near any heat source.
8. Do not defeat the safety purposes of the polarized or grounding type plugs.
9. Do not use the Momentum power supply for any purpose other than stated in this manual.
10. Only use Pro Co recommended accessories with any Momentum device.

Welcome

Thank You

Thank you for your recent purchase of the Pro Co Momentum **mcy**. We hope you find our product to be versatile and flexible. The entire line of Momentum products was designed with the intention of offering optimal flexibility for multitude of applications.

Pro Co Sound, a Michigan based business, was founded in 1974. We build audio interface products, in-ear monitor controllers and facility distribution systems. We continue to live by our mission;

"To become our customers' very best partner, by building a world class organization, through continual, rapid improvement in all that we do, and to share in the successes and failures of our efforts."

Welcome to the Pro Co Family.

Receiving Your Momentum **mcy**

Upon receiving your **Momentum** System, please check all cartons for damage. If there is damage, notify the shipper and dealer in that order. Before removing any components of your Momentum System from the shipping cartons, be sure that the order is complete as expected. Do this by checking each Momentum System component on your packing slip to be sure it matches the number of packing boxes and the specific type and number of components contained within. Fill out the warranty cards and send them in! You should find one Pro Co Momentum **mcy** with its accompanying PC software in the carton.

Chapter 1

Overview

1

Momentum System

The Momentum digital snake system by Pro Co is designed to replace traditional analog audio wiring anywhere audio distribution is needed. By capturing audio at the source, converting it to digital audio and distributing it over a standard Ethernet network, many of the difficulties in executing the increasingly complicated audio systems of today can be simplified. By reducing the amount of field terminations, installation becomes less time consuming. Texas Instruments, Burr Brown mic preamps and Cirrus Logic digital converters provide a platform that is as close to analog as possible without the inherent problems that are associated with traditional wiring.

Flexibility and expandability are enhanced through the use of modules for inputs, outputs and DSPs. Signal routing becomes as easy as clicking a button. You can place inputs, outputs, DSPs and controls anywhere on the Momentum network. Also digital interfaces are available for seamless system integration into many of the popular formats.

Features

Your new **mcy** allows you to connect your Yamaha console to the Momentum network. It allows control over Momentum Input Devices through the Yamaha console.

- 100 Mbit Ethernet Connection
- Firmware upgradable in the field
- Control via free pc software

The mcy Enclosure

The **mcy** requires an external 5VDC power supply. The flanges on the **mcy** allow you to mount the unit at various locations near the control device.

mcy Front View



mcy Rear View



Front Panel

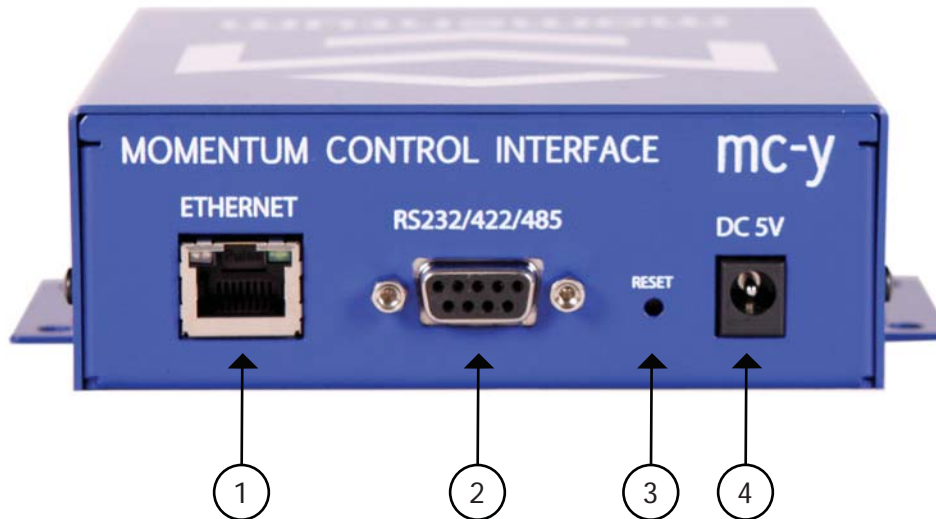
The front of the **mcy** has three LED's indicating the Momentum network connection, control connection and the **mcy** status. The USB connection is not currently implemented on the **mcy**.



	Connector/LED	Description
1	USB Connector	Not currently implemented on the mcy .
2	Momentum LED	RED = Associated device connection error GREEN = All associated devices are online Flashing GREEN = Communication with any Momentum device
3	Control LED	RED = Signal lost from the control device GREEN = Connection to control device present Flashing GREEN = Communicating with control device
4	mcy Status	RED = Associated device setup has not been completed GREEN = Associated device setup has been completed Flashing GREEN = Synchronizing

Rear Panel

On the back on the mcy is the 100 Mb Ethernet connection, Yamaha RS422 connection, power connection and reset button.



	Connector	Description
1	Ethernet Connection	Standard 100Mb Network connection
2	Yamaha RS422 Connection	DB-9 connection to Yamaha console
3	Reset button	Resets settings
4	Power Connector	5VDC input supplied

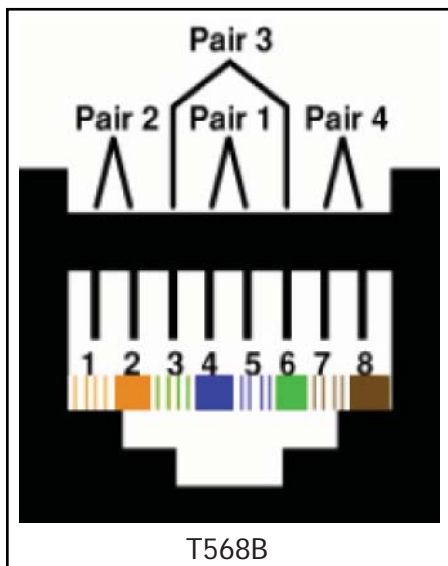
Network Wiring

Copper Wiring

- Use a **CAT6** network cable
- Maximum cable length is 100 meters
- Maximum cable length with POE is 50 meters

Copper Connection

- Use T568B or equivalent connectors when wiring your system. This view shows the color code as viewed from the front of the female socket or the rear of the male connector.
- Crossover wiring is not needed; the Momentum network interface compensates for unit-to-unit connections.



Pin	T5688 (female)	Description
1	Orange/White	Bi-directional pair +A
2	Orange	Bi-directional pair - A
3	Green/White	Bi-directional pair +B
4	Blue/Power	Bi-directional pair +C
5	Blue/White	Bi-directional pair - C
6	Green Receive	Bi-directional pair - B
7	Brown/White	Bi-directional pair +D
8	Brown Power	Bi-directional pair - D

Yamaha Wiring

Pin-out for Yamaha Connection

Pin	Function
1	No Connect
2	Tx-
3	Rx-
4	Rx
5	Ground
6	Tx
7	No Connect
8	No Connect
9	Ground

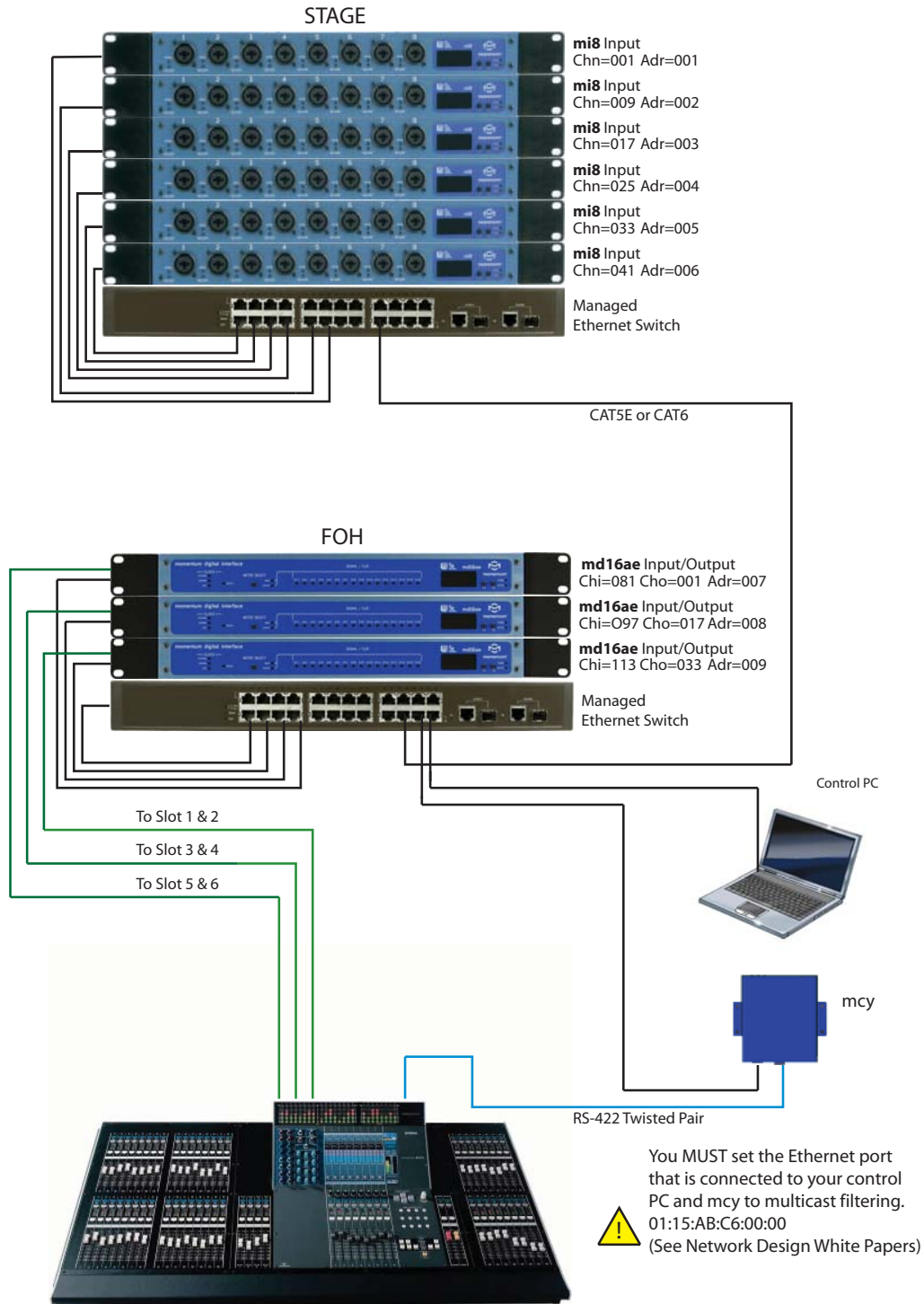
Network Configurations

The **mcy** requires a DB-9 connection between the **mcy** and the Yamaha console. The Ethernet port that is connected to your **mcy** must be set to multicast filtering. Multicast MAC 01:15:AB:C6:00:00 (See page 11 for network setup diagram.)

Diagram: Connecting the Momentum Network to the Yamaha Console using the mcy



Chn 001 must be present on the network at all times. This unit will sync the network clock.



You MUST set the Ethernet port that is connected to your control PC and mcy to multicast filtering. 01:15:AB:C6:00:00 (See Network Design White Papers)

Setup

Background Information on using the Yamaha Console to control the Momentum network through the mcy

- **Associated Device**

An associated device will be either a **mo8** or **md16ae**. These Momentum output units can be connected in two different ways depending on which unit is being used.

- ▶ The **md16ae** must be connected to the Yamaha MY16-AE card.
- ▶ The **mo8** will connect directly into the analog channel input.

When changes are made on the Yamaha console, the **mcy** will automatically make the appropriate adjustments to the specified Momentum input channels. An **md16ae** will always occupy two virtual rack spaces in the Yamaha console. If the routing is changed in the output unit, it will be automatically resolved by the **mcy** within 15 seconds.

- **Other Momentum Devices**

The other **Momentum** devices are automatically detected by the **mcy** and no further setup is required. New devices and network topology changes are automatically detected by the **mcy**. There is a maximum of 60 **mi8** or **md16ae** devices allowed on the network with one **mcy**. There can be an unlimited number of **mo8** or **mo8me's** on the network.

- **Error Reporting**

If a change is made on the Yamaha console, the **mcy** will attempt to apply the change to the associated input channel. If the set fails or the output is routed to a channel that does not currently exist on the network, the change will automatically be undone on the Yamaha console to alert the user of the failure.

- **Master**

The Yamaha console becomes the master and takes control over the inputs it is associated with. Hence, if a user attempts to change an input with either another **mcy** or the PC control software, the changes will automatically revert back to the Yamaha settings.

Program States of the mcy

After powering up the **mcy**, the unit will go through a number of “states.” These states are displayed by the three LEDs on the front of the unit. The following diagrams describe the **mcy** program states and what they mean.

- **Boot State – Check Setup Status**



- ▶▶ If associated devices have been setup the **status LED** will be **green**, otherwise it will remain **red** until setup has been completed with a PC using the Momentum Control Software v1.2.0.0 or greater.

- **Establish Momentum Connection State**



- ▶▶ If the associated devices have been setup, the **mcy** will attempt to establish connection with the devices. The **mcy** will also detect the Momentum devices on the wire. If connection with all of the associated devices is successful the **Momentum LED** will be **green**. Otherwise, it will remain **red** until connection with all associated devices has been made.
- ▶▶ The **mcy** will also receive the gain and phantom power settings from the mi8s.

- **Boot complete. All three LED's should be green.**



- ▶▶ The **mcy** will take the Momentum gain and phantom power state and send it to the Yamaha console. If any of the gain settings are out of the range of the console they will be **PHYSICALLY** changed to the closest gain setting within range. (See reference table on page 14.)

Gain Reference Table

Key: Gray = not applicable
The lowest gain setting is -1 on the Yamaha console.

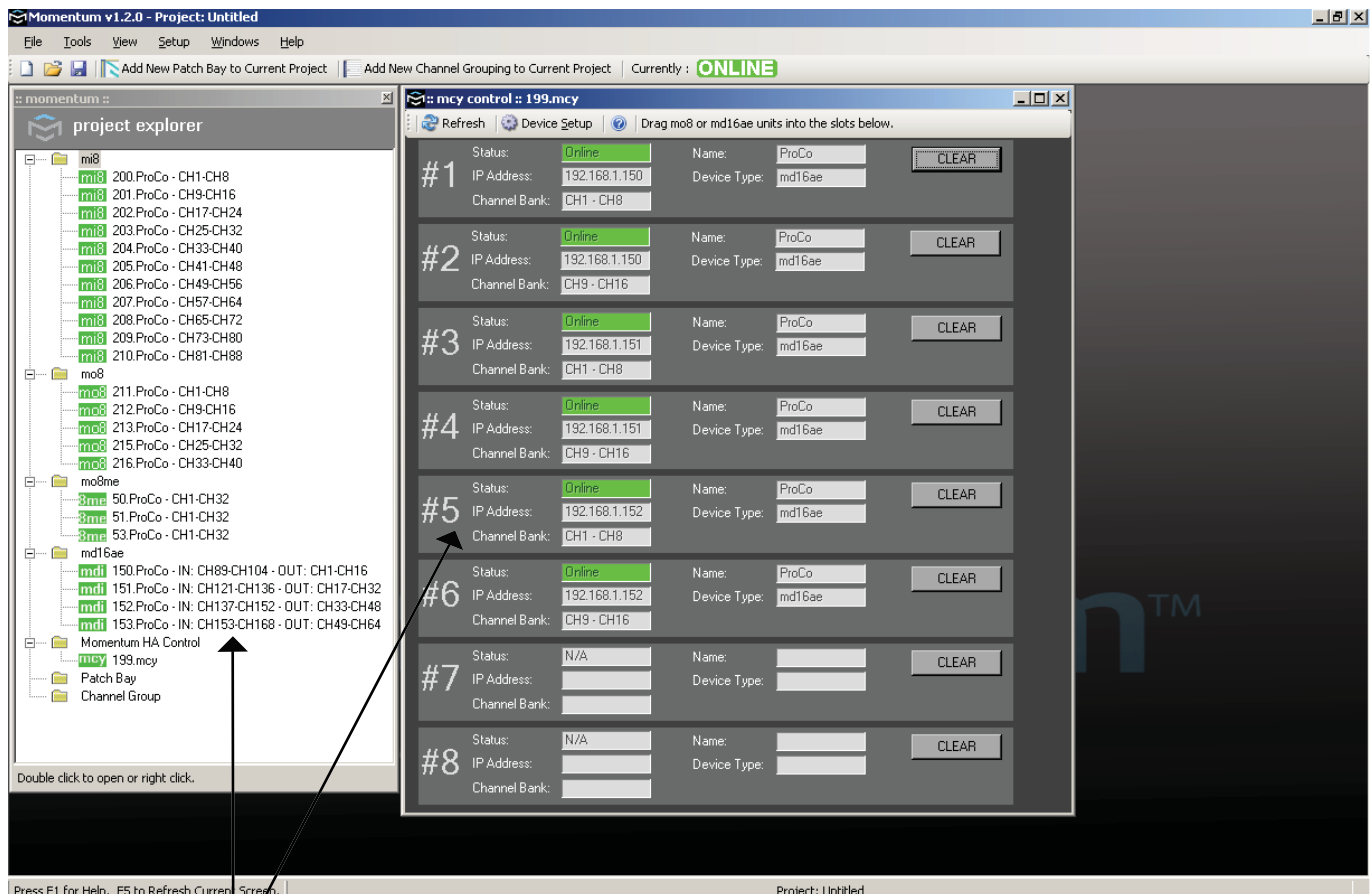
Yamaha Gain	Momentum Gain	
	Gain	Pad
10	LINE	ON
9	LINE	ON
8	LINE	ON
7	LINE	ON
6	LINE	ON
5	LINE	ON
4	LINE	ON
3	LINE	ON
2	LINE	ON
1	LINE	ON
0	LINE	ON
-1	LINE	ON
-2	10	ON
-3	11	ON
-4	12	ON
-5	13	ON
-6	14	ON
-7	15	ON
-8	16	ON
-9	17	ON
-10	18	ON
-11	19	ON
-12	20	ON
-13	21	ON
-14	22	ON
-15	23	ON
-16	24	ON
-17	25	ON
-18	26	ON
-19	27	ON
-20	28	ON
-21	12	OFF
-22	13	OFF
-23	14	OFF
-24	15	OFF
-25	16	OFF
-26	17	OFF
-27	18	OFF
-28	19	OFF
-29	20	OFF
-30	21	OFF

Yamaha Gain	Momentum Gain	
	Gain	Pad
-31	22	OFF
-32	23	OFF
-33	24	OFF
-34	25	OFF
-35	26	OFF
-36	27	OFF
-37	28	OFF
-38	29	OFF
-39	30	OFF
-40	31	OFF
-41	32	OFF
-42	33	OFF
-43	34	OFF
-44	35	OFF
-45	36	OFF
-46	37	OFF
-47	38	OFF
-48	39	OFF
-49	40	OFF
-50	41	OFF
-51	42	OFF
-52	43	OFF
-53	44	OFF
-54	45	OFF
-55	46	OFF
-56	47	OFF
-57	48	OFF
-58	49	OFF
-59	50	OFF
-60	51	OFF
-61	52	OFF
-62	53	OFF

Creating Network Setting with the mcy using Momentum Software

The **mcy** must be associated with the Momentum output devices that are connected to the slots on the Yamaha console.

Momentum Software



Drag and place output channels into the appropriate slot. Please note that the Md16ae and mo8 output units have different setups:

- **Md16ae Setup (See page 17 for diagram)**

In this setup, once the Yamaha channels are routed to the AES-3 slots, the Yamaha channel controls (gain and phantom power) are automatically sent out the DB-9 control port to the **mcy**. The **mcy** then sends the changes to the corresponding input.

- **Mo8 Setup (See page 18 for diagram)**

In this setup, the individual Yamaha channel still controls the Yamaha pre-amp (gain and phantom power) because it is still in use. However, control of the **mi8s** is still possible by navigating through the External Head Amp screen on the Yamaha console. (See page 16 for illustration of the Yamaha External Head Amp screen.) If the **mo8** is physically connected channels 1 through 8, then the **mcy** should be setup with the **mo8** in slot 1 using the PC software, if the **mo8** is physically connected to channels 9 through 16, then the **mcy** should be setup with **mo8** in slot 2 using the PC software.

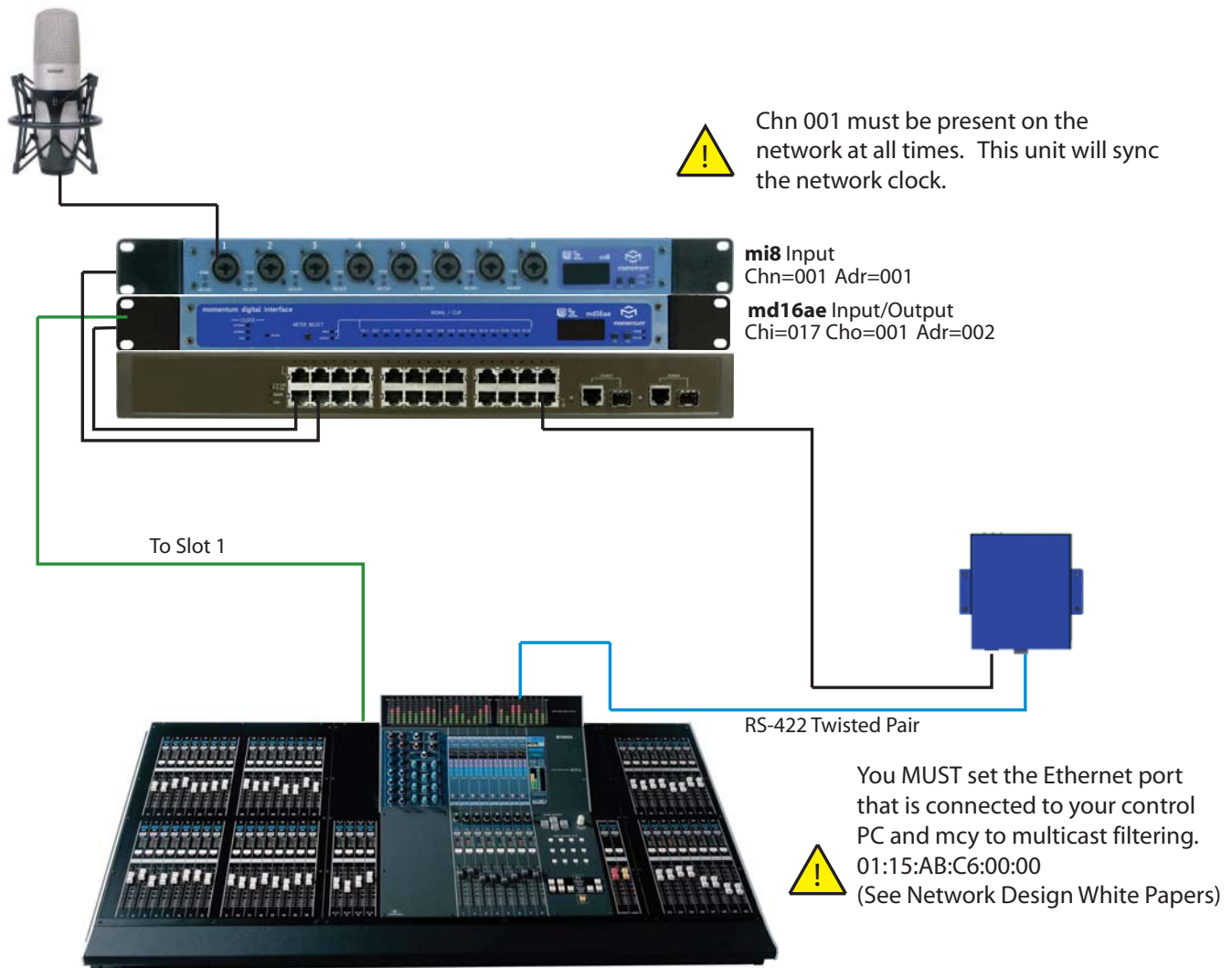
The Yamaha External Head Amp (HA) screen



IMPORTANT: Note Input Control Differs whether using the mcy with the md16ae or mo8

When using the Yamaha console with the **md16ae**, the input controls on the channel are now directly controlling the Momentum devices.

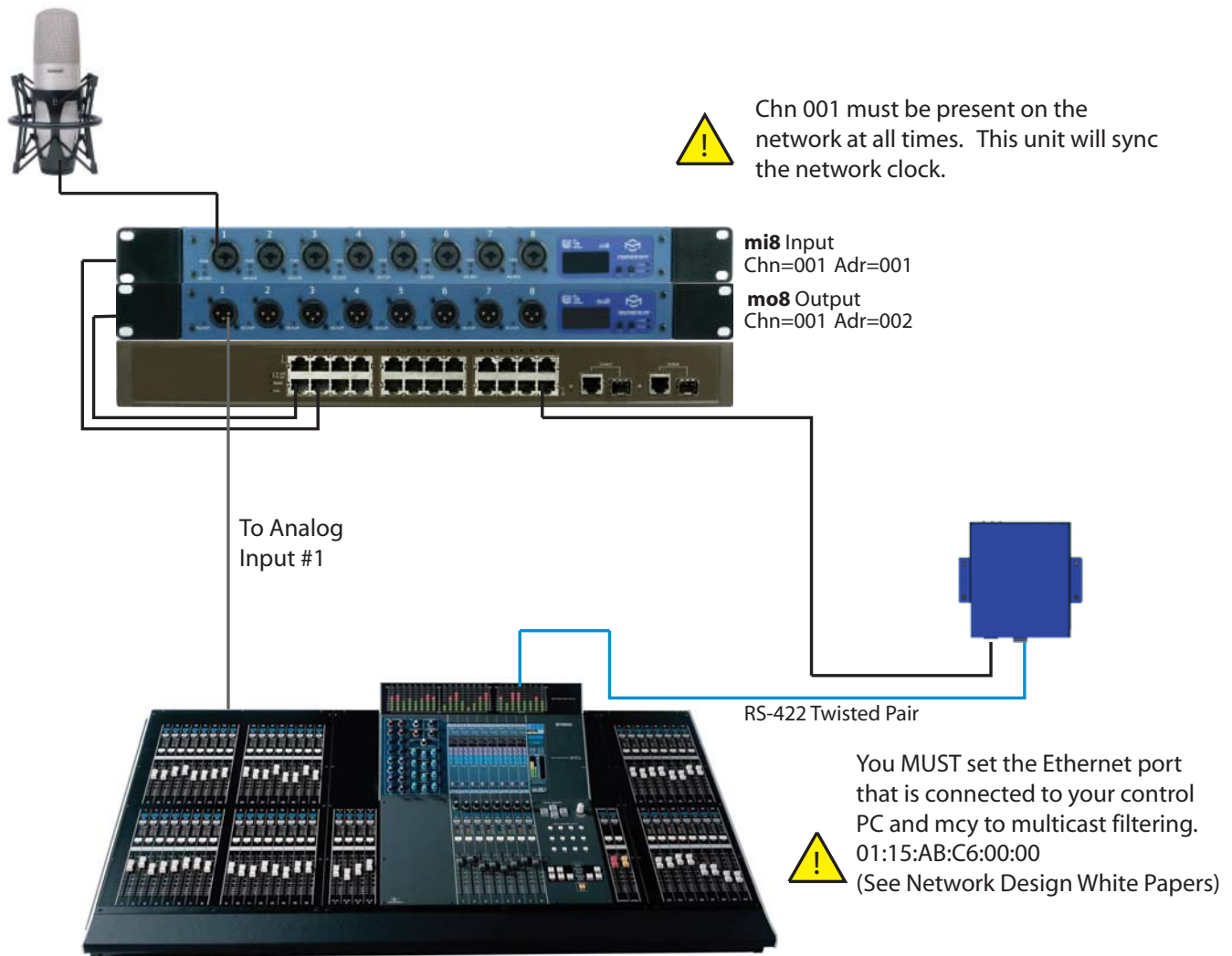
Yamaha Console receiving inputs from the md16ae



IMPORTANT: Note Input Control Differs whether using the mcy with the md16ae or mo8

When using the Yamaha console with **mo8s**, the input controls are only accessible from the "External HA (Head Amp)" screen. The input controls on the channel still control the Yamaha input.

Yamaha Console receiving inputs from the mo8





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