Axium AX-400DA

Multi-Zone Digital Amplifier
Instruction Manual

Important Safety Instructions

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

CAUTION:
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

1 Read these instructions.
2 Keep these instructions
3 Heed all warnings
4 Follow all instructions
5 Do not use this apparatus near water
6 Clean only with dry cloth
7 Do not block any ventilation openings, Install in accordance with the manufacturer's instructions
8 Ensure that the ventilation is not impeded by covering the ventilation openings with items such as newspapers, table cloths, curtains, etc.
9 Do not install near any heat source such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
10 Use the apparatus only in moderate climates (not in tropical climates).
11 Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
12 Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
13 Only use the attachments/accessories specified by the manufacturer.
14 If you install the apparatus in a built-in installation, such as a bookcase or rack, ensure that there is adequate ventilation. Leave 20cm (8") of free space at the top and sides and 10cm (4") at the rear. The rear edge of the shelf or board above the apparatus shall be set 10cm (4") away from the rear panel or wall, creating a flue-like gap for warm air to escape. Good airflow is necessary to help ensure proper operation. Not only should you provide enough free space around the unit, but also ensure that air can flow freely and escape from the amplifier surroundings. Failure to do so may cause thermal shutdown of the unit, and reduced life expectancy.
15 Unplug this apparatus during lightning storms or when unused for long periods of time.
16 Never expose the unit to moisture
17 Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus. The apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
18 Damage requiring service
Unplug the apparatus from the wall outlet and refer servicing to qualified service personnel under the following conditions:
A) When the power supply cord or plug is damaged
B) If liquid has been spilled, or objects have fallen into the apparatus.
C) If the apparatus has been exposed to rain or water,
D) If the apparatus does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the apparatus to its normal operation.
E) If the apparatus has been dropped or damaged in any way, and
F) When the apparatus exhibits a distinct change in performance this indicates a need for a service.
19 Object and Liquid Entry
Never push objects of any kind into the apparatus through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock.
The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.
Don't put candles or other burning objects on top of this apparatus.

Precautions

1. **AC Fuse -** The AC fuse inside the unit is not user-serviceable. If you cannot turn on the unit, contact the dealer from whom you purchased this unit.

2. **Care -** Occasionally you should dust the unit all over with a soft cloth. For stubborn stains, use a soft cloth dampened with a weak solution of mild detergent and water. Dry the unit immediately afterwards with a clean cloth. Don't use abrasive cloths, thinners, alcohol, or other chemical solvents, because they may damage the finish or remove the panel lettering.

3. **Power**
   WARNING
   BEFORE PLUGGING IN THE UNIT FOR THE FIRST TIME, READ THE FOLLOWING SECTION CAREFULLY.
   AC outlet voltages vary from country to country. Make sure that the voltage in your area meets the voltage requirements printed on the unit's rear panel. (e.g. AC 110V – 240V 50/60HZ)
   The power cord is used to disconnect this unit from the AC power source. Make sure that the plug is readily operable (easily accessible) at all times.
   If you do not intend to use the unit for an extended period, remove the power cord from the AC outlet.

4. **Earth –** The unit is defined as Class1 in EN60065 (low voltage directive) and MUST BE EARTHED. Connect only to a mains socket outlet with protective earth, and only use the power cord supplied.
   Finland:
   "Laite on Liitettävä suojamaadoituskoskettimilly varustettun pistorasiaan"
   Norway:
   "Apparatet må tilkoples jordet stikkontakt"
   Sweden:
   „Apparaten skall anslutas till jordat uttag"

5. **Never Touch This Unit With Wet Hands** – Never handle this unit or its power cord while your hands are wet or damp. If water or any other liquid gets inside this unit, have it checked by your Axium dealer.

6. **Handling Notes**
   - If you need to transport this unit, use the original packaging to pack it how it was when you brought it.
   - Do not leave rubber or plastic items on this unit for a long time, because they may leave marks on the case.
   - This unit's top and rear panels may get warm after prolonged use. This is normal.
   - If you do not use this unit for a long time, it may not work properly the next time you turn it on, so be sure to use it occasionally.

7. **Speaker Shorts**
   Under no circumstances should the speaker output terminals of the unit be short circuited, grounded or connected to another output.

8. **Direct Sun light -** Avoid installing the amplifier in positions where the front panel is exposed to direct sunlight – may cause control to become sluggish.

9. **Controller Connection -** Never connect more than eight Axium controllers. The supply is internally fused (self resetting) and may open circuit. Never connect the unit's 12VDC terminal ('Bus Run' port) to an external power supply.

DECLARATION OF CONFORMITY
We declare under our sole responsibility that this product, to which this declaration relates, is in conformity with the following standards: EN60065, EN55013, EN55020, EN61000-3-2 and EN61000-3-3.
Following the provisions of Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC, the EC regulation 1275/2008 and its frame work Directive 2009/125/EC for Energy-related Products (ErP).

A NOTE ABOUT RECYCLING:
This product's packaging materials are recyclable and can be reused. Please dispose of any materials in accordance with the local recycling regulations.
When discarding the unit, comply with local rules or regulations. Batteries should never be thrown away or incinerated but disposed of in accordance with the local regulations concerning battery disposal.
This product and the supplied accessories constitute the applicable product according to the WEEE directive.

For U.S. models
FCC information for User
CAUTION:
The user changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For Canadian Models
NOTE: THIS CLASS B DIGITAL APPARATUS COMPLIES WITH CANADIAN ICES-003
For models having a power cord with a polarized plug:
CAUTION: TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT FULLY INSERT.

Modèle pour les Candadien
REMARGUE: CET APPAPEIL NUMÉRIQUE DE LA CLASSE B EST CONFORME À LA NORME NMB-003 DU CANADA.
Sur les modèles don't la fiche est polarisée:
ATTENTION: POUR ÉVITTER LES CHOCS ÉLECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQU' AU FOND.

Supplied Accessories

Make sure you have the following accessories:

VDE CEE 7/7
European Plug
Schuko
to IEC60320
C13 socket

AS3112
Australasian Plug
to IEC60320
C13 Socket

Axium CD

Table of Contents

Features

Thank you for purchasing an Axium AX-400DA Multi-Zone Amplifier.
Please read this manual thoroughly before making connections and plugging in the unit.
Following the instructions in this manual will enable you to obtain optimum performance and listening enjoyment from your new Multi-Zone Amplifier.
Please retain this manual for future reference.

Multi-Zone, Multi-Source, Video Switching

The 400DA amplifier has four separate amplifiers providing 4 zones of independent yet integrated control.
There are 6 input sources comprising the following:
Sources 1 – 3 are either Analog Stereo, or Coax Digital Audio (PCM).
Sources 4 & 6 are Coax Digital Audio (PCM)
In addition there is a internally generated Door-Bell source - .wav playback source - typically used for paging applications.

Zone Outputs

Each zone has bass, treble, balance and loudness control.
A feature called 'Maximum Volume limiting', is useful for protecting connected speakers.

Amplifier Power, Protection, and Clipping Indicators

50 Watts RMS per channel into 8 ohm loads.
Capable of driving into 4 ohm loads.
The amplifiers are protected against output shorts, and have algorithms that prevent hard clipping when the zone amplifiers are overdriven.

Thermal Control

There are two progressive levels of thermal control:

- The amplifier volume is reduced 20dB.
- The amplifiers are shutdown until the temperature reduces below the first level.

Care should be taken to ensure adequate ventilation – see "Important safety instructions" on page 1

Ethernet, RS232, USB and IR control

The 400DA amplifier may be controlled and monitored via the rear Panel USB, RS232 serial interface or Ethernet.
A Web application is available where full control can be accessed using a suitable Web browser running on a PC, Tablet or Smart Phone.

In multi amplifier installations where the amplifiers are interconnected using an expansion bus cable, only one Ethernet or RS232 connection is required to control the stack of amplifiers.
The 400DA amplifier may receive IR directly from the front panel receiver or via the four 'Controller' connections.
There are zone specific IR commands and also a set of global IR commands.
The commands are: ON, OFF, Standby (toggling), Mute, Volume Up, Volume Down, Source Selects, Discrete Audio Source Selects, On with Source Specific commands.
The Global commands also include PRESET1 – PRESET 14, Alarm Enable, Alarm OFF, & 5 minute Sleep.

Real Time Clock

The 400DA amplifier is equipped with a real time clock.
The amplifier may be set up to function as an alarm clock, so that at 6.30am in the morning 5 days a week, the master bedroom zone could be made to turn on, select tuner, and go to a specific volume. Multiple Alarms are feasible (max of 14) however the Alarm Enable & OFF commands act upon all programmed Alarms.
The Clock automatically compensates for daylight saving.
The clock continues to operate typically > 48 hours without power – more than enough to keep the time current during lengthy power outages.

IR Emitter Ports

There are 8 Buffered IR emitter Ports.
Ports 1 – 6 have IR routing, and are intended to control specific input source components. Two IR ports; 'SUM IR1-IR6' are the sum of all IR sources and control the 'All' zone source components.

Presets and Paging

There are 14 amplifier presets and two page presets.
Presets 1 - 14 are momentary and cause the amplifier to go to a predetermined setup, i.e. standby, volume & source selection.
The presets may also be programmed with event scheduling, and are used by the alarm clock.
The 'Page Preset' mode is for paging applications and is invoked by a contact closure between the 0V and PG1 or PG2 terminals.
The contact closure must have an external power source i.e. a 12 – 24V AC/DC powered door bell.
When the contact closure is released (power sensed across PG – 0V terminals) the amplifier zones return to their previous states.
PG1 is always assigned to the Page Preset.
PG2 may be assigned to any one of the 15 available Presets.

Zone Linking

A zone may be programmed to link multiple zones. Zone linking ties the source selection together. It may also tie the volume, and standby. This is useful for closely coupled audio areas where it is advantageous to have different volume control but the same source, or the same volume with separate standby control. Zone linking is setup using the AMC program, or Web server application.

96 Zones

There are 96 zones of possible control.
On a 400DAV amplifier each zone must be different, however in a multiple amplifier stack same zone amplifiers are possible – they simply mimic every parameter.

Expansion Bus

Data, IR & Amp-On are interconnected via the expansion bus.
One amplifier is connected to another using a standard RJ45 patch cable. Connections are made between amplifiers using either of the two RJ45 expansion bus sockets.

Door Bell

Up to 10 seconds of 44.1 KHz 16 Bit stereo sounds may be generated as part of a page preset. Suitable 'wav' files are uploaded to the unit using the AMC program.

Amplifier ON Status – "Amp-On"

Each zone has AMP-ON status: 12VDC OUT on the rear panel connector: (1, 2, 3, 4). The 'AMP ON' output's are protected against shorts.

Power Failure Restoration

After an AC power outage the 400DA amplifier restores its settings to the pre-interrupted state. All internal settings are stored in non-volatile memory, except the clock that runs for at least 48 hours on stored power.

Restore Defaults

The 400DA amplifier may be readily set to the default settings.
Restoring Defaults clears all memory and resets the zone allocations to zones 1 – 4.

Setup Lockout

Locks access to the System Setup and More menus where installation critical adjustments can be made.
Password = 1396

Firmware Upgradable

The 400DA amplifier may be updated with the latest operational firmware, using the Axium AMC program.

Front Panel Guide

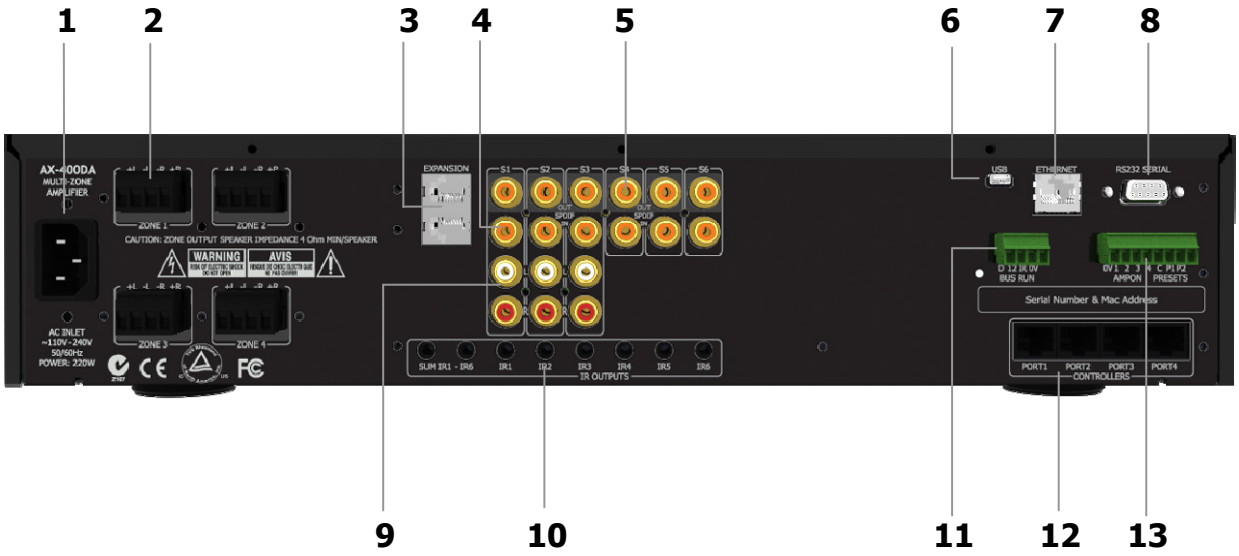
1 **Front Panel**
Solid Aluminium front Panel

2 **Infra-Red Receiver**
Receiver for front panel IR control – Used only for amplifier control, not IR pass through.

3 **Power Indicator**
The power indicator glows blue whenever AC power is applied.

4 **Chassis Feet**
Set high enough to provide unrestricted air-flow through the chassis for convection cooling.

Rear Panel Guide



1 AC Inlet
IEC socket

2 Speaker Terminals
Plug in terminal clamp connectors accept 1.5mm² speaker wires

3 Expansion Bus
RJ45 patch cable connects between expansion bus ports of amplifiers in a stack.

4 Coax Digital Input Terminals
Coax digital (SPDIF) inputs.

5 Coax Digital Source Output Terminals
Coax digital outputs for expansion to further amplifier zones.

6 USB for programming
USB mini B socket for programming and firmware updates.

7 Ethernet Port
This port is used for control, monitoring and data access.

8 RS232 Communication Port
The port is used for setup, control or monitoring. A straight through cable must be used when connecting to a PC or control system.

9 Analog Input Terminals
Analog Audio L/R inputs

10 IR Emitter Ports
3.5mm mono jacks.
IR1 and IR6 are used to control specific source equipment, where full IR routing is assigned by the connected controller.
SUM IR1 – IR6 are used to control source equipment common to all zones. These ports output the combined IR1 – IR6 infra-red strings.

11 Bus Run Controller Interface
Legacy 'BUS RUN' port (4 way terminal block)

12 Controller Interface
For connection to keypads and IR receivers.
4 controller interface ports - RJ45 sockets

13 AMP ON Control
12 – 24V AC/DC powered doorbell - contact closure between PG1 or PG2 and Common (C) terminals invokes a preset, enabling paging or doorbell function.
AMP-ON 1 - 4 output 12VDC when their Zone Standby is ON.

Typical System Configuration

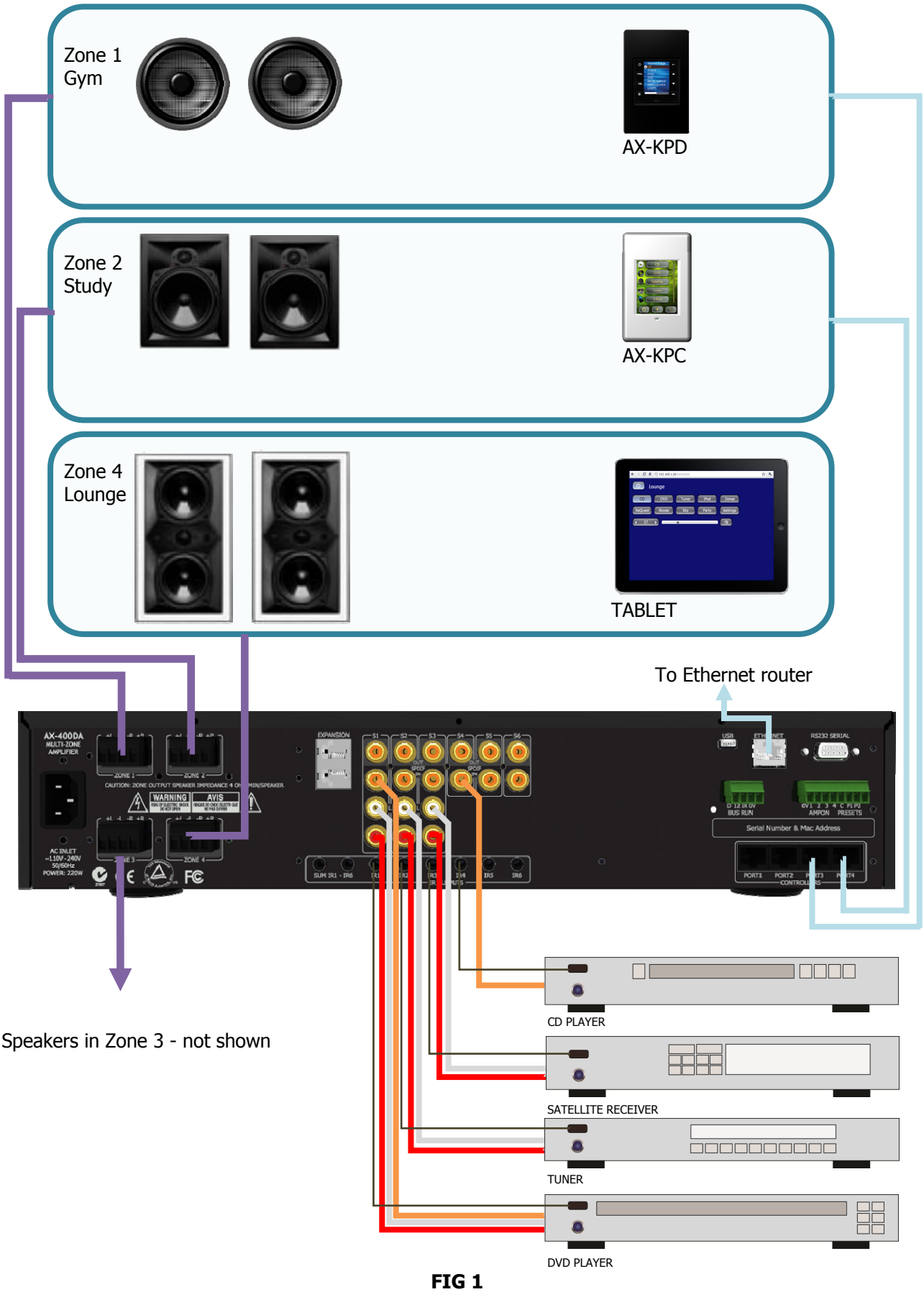


FIG 1

Typical System Configuration – *Continued*

FIG 1 depicts a typical configuration where the 400DA amplifier is providing audio into three of the possible four listening zones.
Each zone consists of a room with a pair of speakers and a suitable controller.
Each zone may be listening to any of the connected sources: Satellite, DVD, Tuner, Internet Radio, Media server, CD etc.

Controllers

Each zone has a specific control requirement. Choose controllers that best suit the application.

- Zone 1 – The Gym: Keypad with IR receiver
- Zone 2 – The Study: Touch Panel Keypad
- Zone 3 – The Lounge: Tablet

The Axium Keypad's may be plugged into any of the four Controller ports.
Source control IR emitters are plugged into the IR Ports. There are eight IR ports: IR1 – IR6, and SUM IR1 – IR6.
IR1 – IR6 route source specific IR signals from connected controllers, while SUM IR1 – IR6 output the common IR or the sum of all received IR signals. These Ports may be used for source equipment that is common to all zones.

When controlling the 400DA using an iPad or other Web tablet, the 400DA must be connected to a WIFI enabled Ethernet router and the Web Tablet browser must be directed to the 400DA's IP Address. The 400DA's WEB application also provides Source control functionality.
The 400DA can store and regenerate source equipment IR commands.
The 400DA can be directed to output the IR commands to a specific IR output port as required. This advanced feature is programmed using the Axium Keypad manager program (AKM)

Source Equipment

The 400DA amplifier has three stereo RCA audio inputs for connecting to source equipment. These input channels also feature Coax Digital inputs.
If a signal is present on the Digital input it takes precedence over the Analog input.
There are three additional Coax Digital only input channels.
A zone may select from any of the connected sources. Someone in the Lounge may be listening to the DVD, while another in the Study may be listening to music from the media server.
All four zones may select the same source, in such circumstances there is a possibility that all four zones may be trying to control that source – not always desirable – so a system should be well planned and where appropriate additional source equipment installed.

Speakers

Speakers in each zone are connected to the amplifier by "Home Run" speaker cables.

Multiple Amplifier Stacks

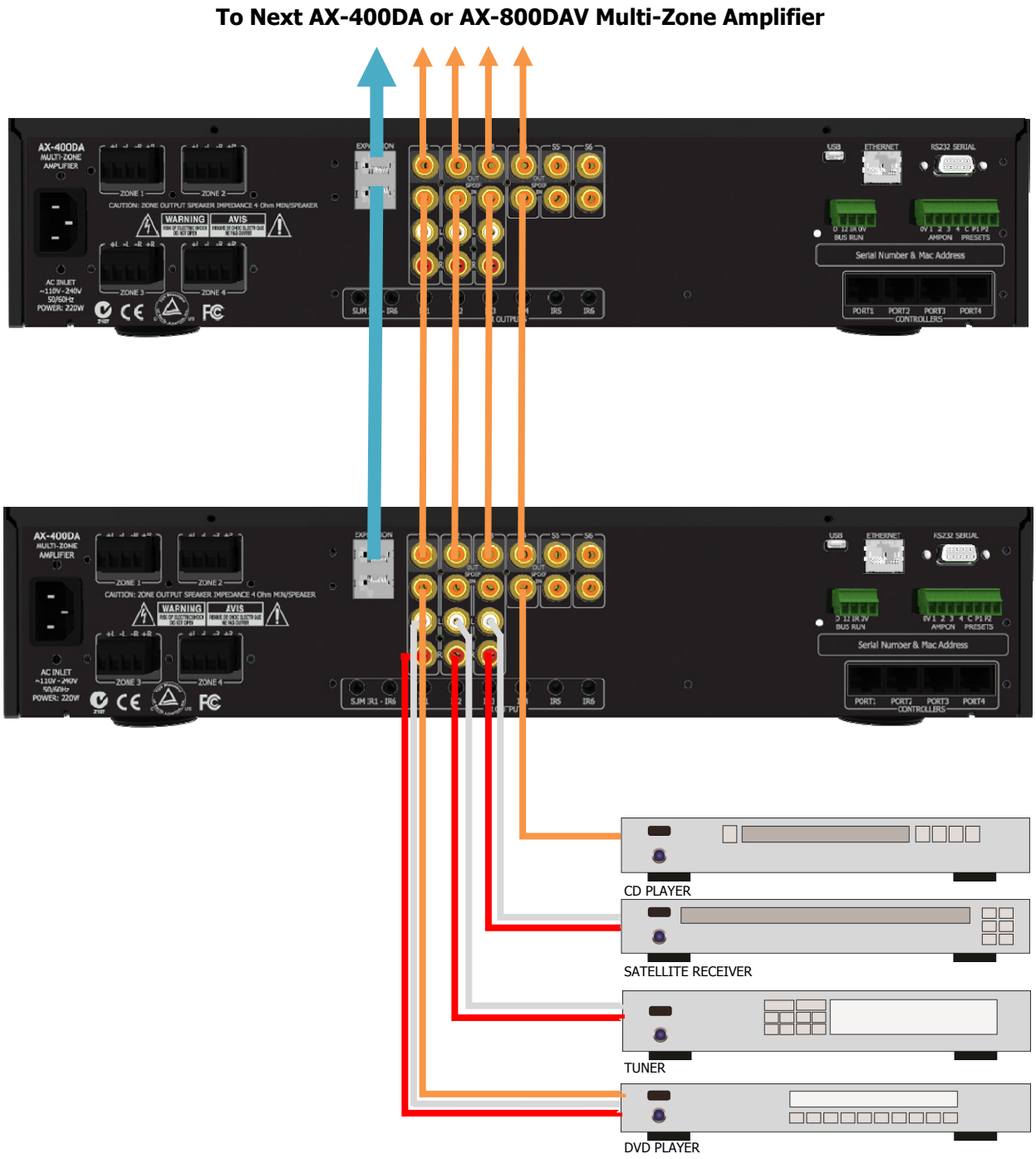


FIG 2

In large installations where multiple 400DA or 800DAV amplifiers are required, the expansion bus may be used to convey inter-amplifier control, and common IR control.
The source equipment audio must be plugged into the first amplifier where they are buffered and sent to the next amplifier in the stack. The maximum recommended expansion is eight units.
FIG 2 shows inter-connected amplifiers using an RJ45 expansion bus lead, and RCA leads for the source Digital coax signals.
Amplifier Control using Ethernet, RS232 or USB may be connected to any one of the amplifiers in the stack.

Controller Termination

The 400DA is packed with control options:

- **USB:** Intended for initial installation Programming or firmware update. Not intended for permanent connection to a PC or other control system.
- **ETHERNET:** 100BaseT connection to a Home network router or switch.
- **RS232 Serial:** Electrically isolated Prevents hum in analog input circuits.
- **CONTROLLERS:** Conveys +12VDC, IR and Data between the 400DA and Axium keypad controllers, connected using CAT5 cables.
- **BUS RUN:** (Legacy) Port conveys +12VDC, IR & Data to remotely connected IR controllers.
- **AMPON:** +12VDC 100mA trigger output when a Zone is ON.
- **PRESETS:** P1 and P2 Inputs are active low. Connect C (common) and either P1 or P2 across an illuminated door bell switch. The illuminated doorbell switch must have an External 12V – 24V AC/DC supply and current limiting resistor connected. If a dry contact is to be used for PRESET Activation, it must be normally closed or a Push to break contact. The BUS RUN 0V and +12V can be connected as shown in FIG 3

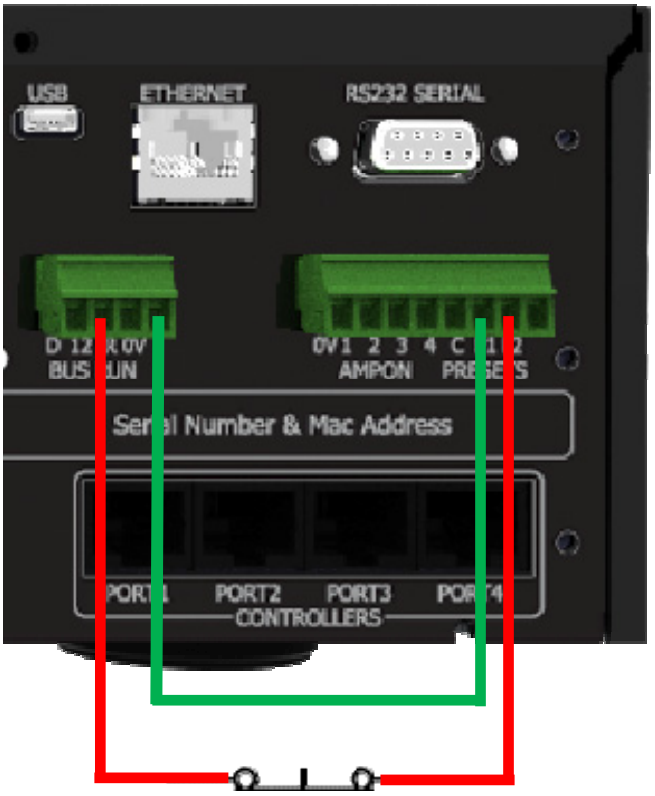
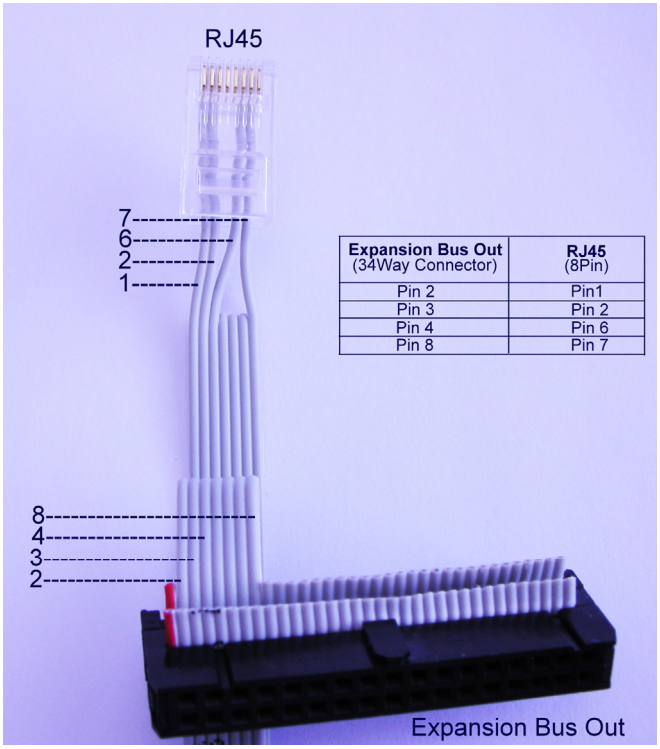


FIG 3

- **EXPANSION BUS:** Simple Patch cable interconnection for Axium amplifiers that conveys control and data between amplifiers in a stack. The cable length must be < 0.5m.

  Interconnection to older Axium amplifier models is possible only for the Control functions. A special cable must be made. See FIG 4. In older Axium amplifier models Analog audio was conveyed through a 34 way IDC cable. This is no longer supported, and connections must be done using RCA splitters in the analog audio inputs.



Expansion Bus Out (34Way Connector)	RJ45 (8Pin)
Pin 2	Pin1
Pin 3	Pin 2
Pin 4	Pin 6
Pin 8	Pin 7

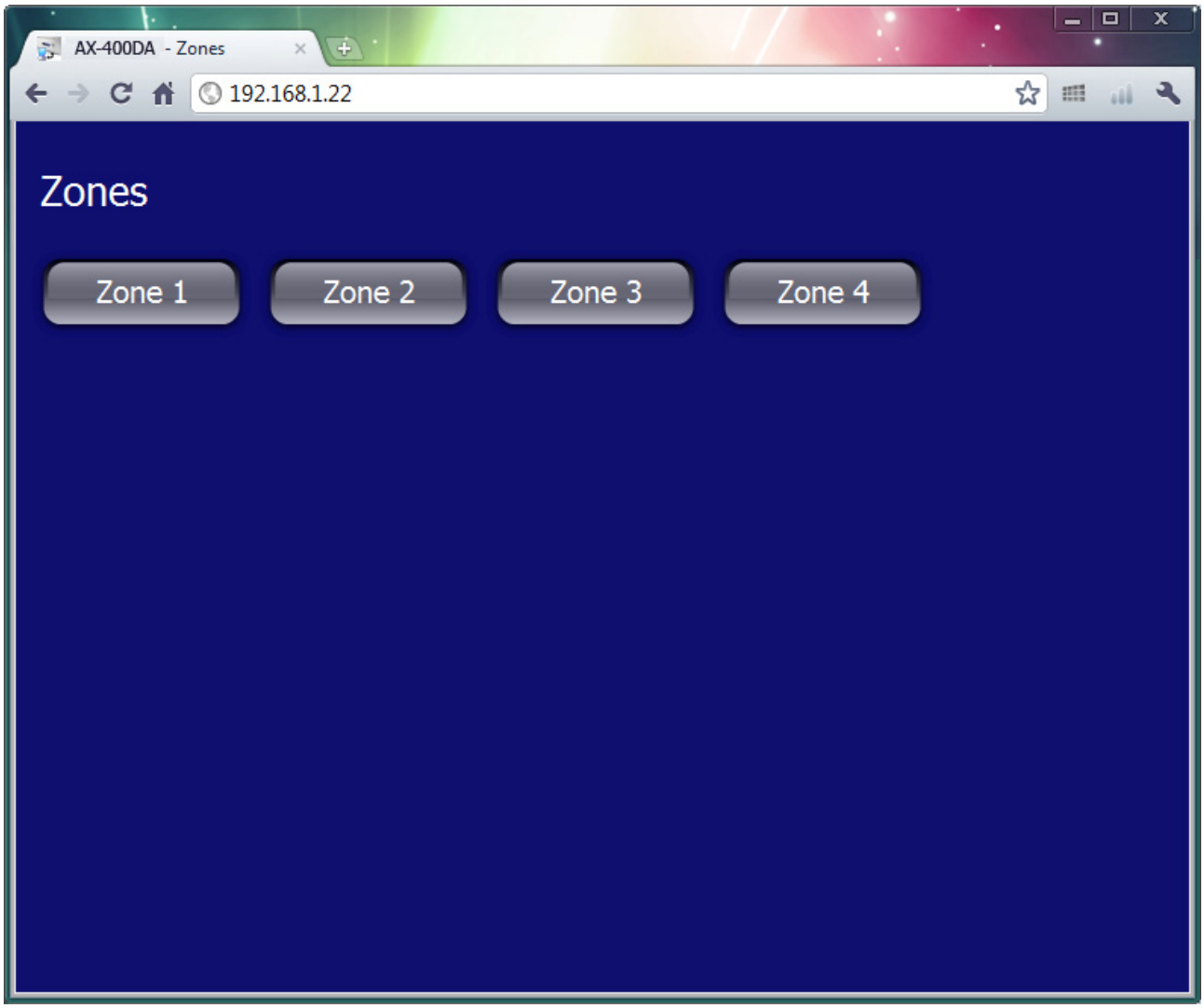
FIG 4

WEB Application

The Axium 400DA amplifier has a WEB application which may be used for control and monitoring of amplifier and source functions.

Home Page

The home page provides access to the Amplifier zones.
Selecting a Zone opens its control page.

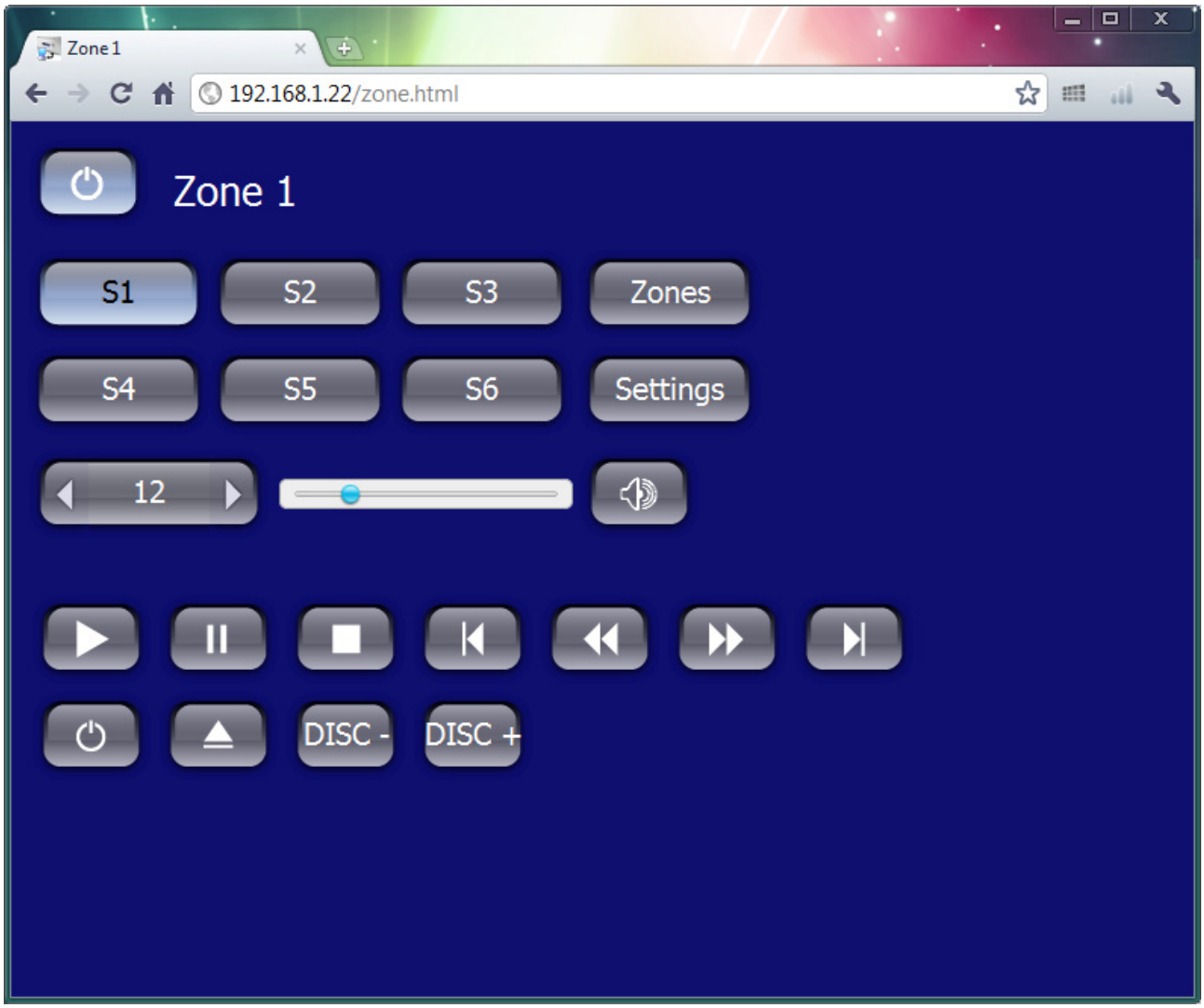


Zone Control Page

The Zone Control Page provides status & control of:

- Standby
- Volume: Slider or Up/Down button with readout.
- Source Selection: S1 – S6
- Mute

If the button is blue it indicates selection or ON status.
Because of Web browser limitations, Slider setting changes are made using a positional touch on the slider



The 'Zones' button is the Home Page return.

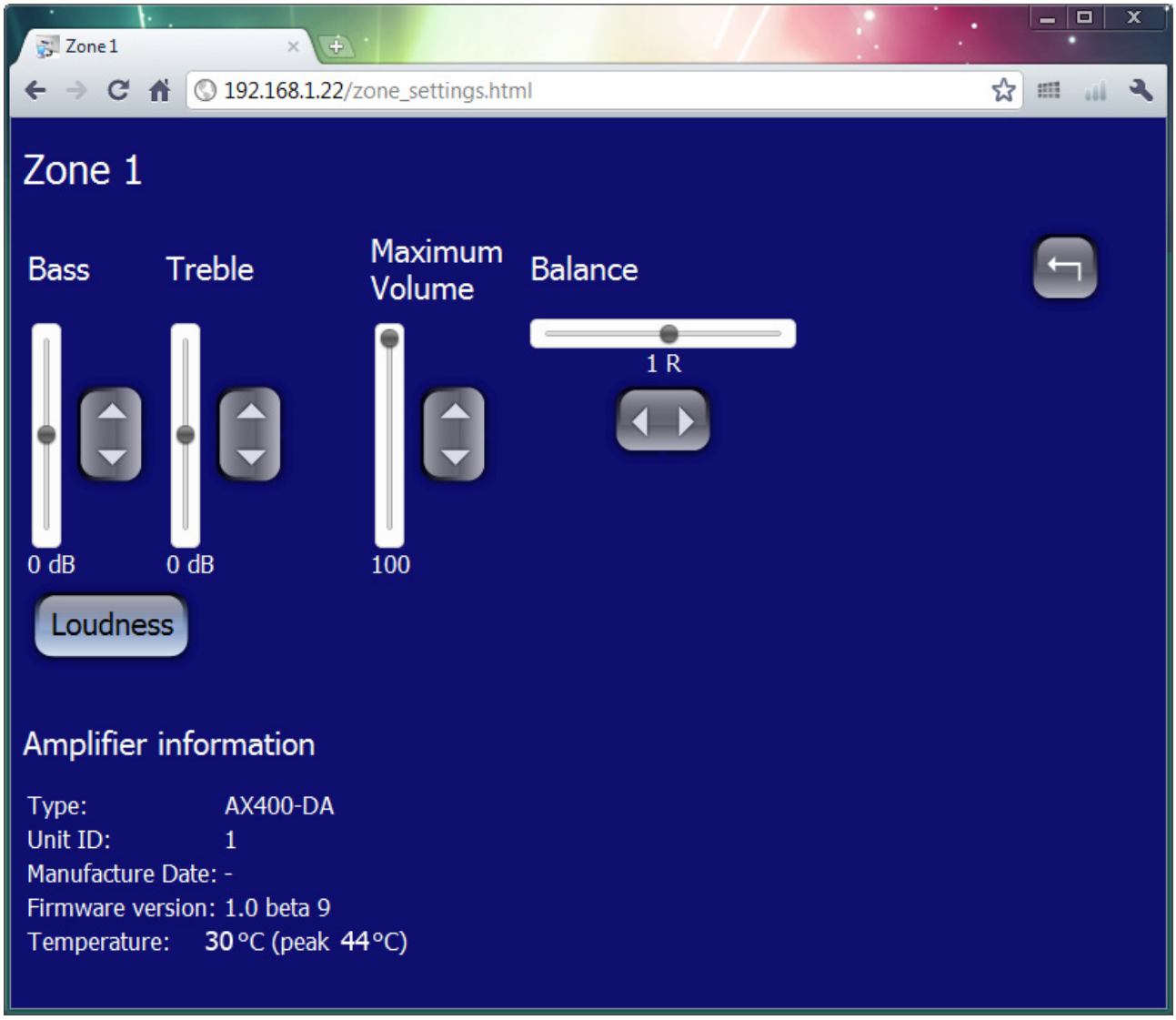
Selecting the 'Settings' button will open the Settings page.

Source control may be provided - is setup using the Axium Keypad Manager program.

Zone Settings Page

The Zone Settings Page provides status & control of:

- Bass: Slider or Up/Down button
- Treble: Slider or Up/Down button
- Loudness
- Balance: Slider or Left / Right button
- Maximum Volume Limit: Slider or Up/Down button



There is information displayed about the connected amplifiers Model and Unit ID and current Firmware version. The amplifier heatsink temperature is also displayed.

The Back arrow button returns to the Zone Control Page.

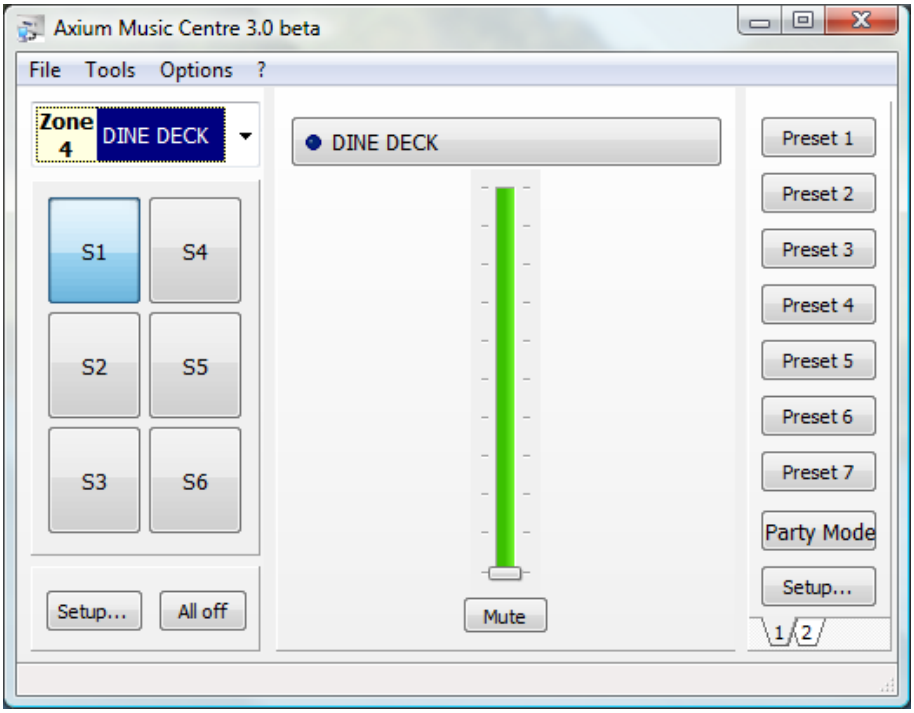
Axium Music Centre Program

AMC is an amplifier setup program, full control and tracking of the Axium amplifier zone is provided. The program runs on PC's running Win XP, Win 7 or VISTA operating systems, and communicates via RS232, USB or Ethernet.

AMC's main window provides user functionality for real-time access and control of any amplifier zone.

When an Axium amplifier is first attached to a PC running AMC the amplifiers clock is automatically set to the PC's current time, date and location.

The Zone and Source buttons may be named by using a right mouse click over the button.
A naming window opens where the name is entered. The name is saved in the connected 400DA.



File menu contains the commands:

- **New window:** Opens another AMC main window. This is useful for displaying and controlling multiple zones simultaneously
- **Keypad window:** A keypad window is displayed where a user can cause the selected keypad on the network to emit its stored IR strings.
- **Download and save configuration**: A configuration file contains all information in an installation stack, i.e. Zone allocation, Zone & Source naming, bass, treble, loudness, max volume limits, preset programming etc.
- **Upload a saved configuration:**
- **Upload Audio file:** Direct AMC to the file location of suitable "wav" files. Click Open & upload the file(s) to the amplifier.
- **Exit:** Shuts down AMC.

Tools menu contains the commands:

- **Zone Assignment:** Opens a window where the 400DA Zones can assigned to between 0 & 95. Zones on one unit must be different.
- **IR Routing Tables:** Opens a window with a selection table where the IR output ports can be mapped to specific Controller ports.
- **Network Settings:** Opens a window where a Network name can edited, and the IP address can be set to either DHCP or static input. A selection is provided for synchronizing with an internet time server.
- **Media Servers:** not implemented on 400DA.
- **Party Mode Setup:** not implemented on 400DA
- **Event Viewer:** Open a window which displays a log of significant events in the amplifiers history.
- **Advanced:** Provides selections for Firmware update and a Real time log.

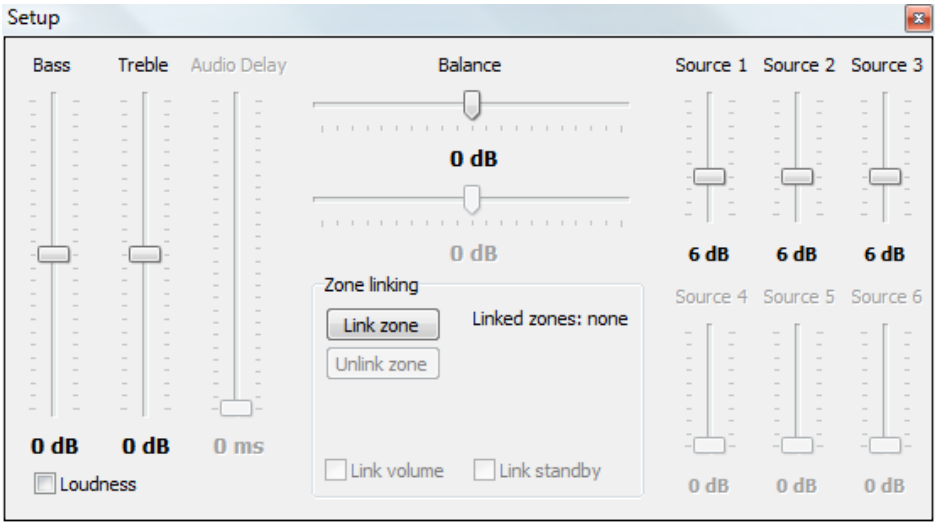
Options Menu contains the port assignments, where the program lists the detected ports. Select USB, Ethernet or a suitable COM port for RS232. Note: Firmware update can only be performed using the USB connection.

The **Setup** button opens the Setup window.

Provides adjustments for Zone Equalisation, Balance, Delay, and Zone linking assignment.

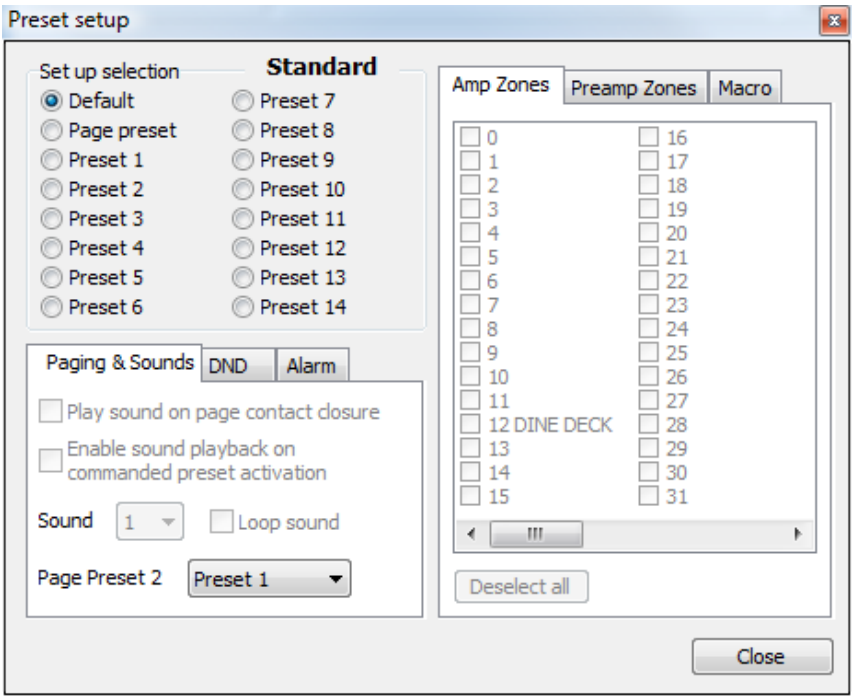
The Analog source input levels can be adjusted.
If the source is a DVD player, the level should be set to 0dB.
A Source will pulse red if input clipping is detected.

Nominally the input should be set to 6dB.



The Preset **Setup** on the AMC main page opens the Preset window.

Preset programming can be entered for the Presets.
Paging or Door Bell sound playback and triggers can be allocated.
Do Not Disturb (DND), and Alarms or timed events may be allocated.
Macros may be programmed where timer, Source & amplifier control may be involved in the Preset.



RS232 Protocol

The RS232 serial port provides data acquisition and control of the Axium amplifiers by a home automation system, or PC.
The interconnecting cable must be 'Null modem': 9 pin female 'D' connectors at both ends (pin connections 2 and 3 swapped at one end) only RX, TX & 0V (pin 5) are used.
Baud Rate = 9600, Characters are all ASCII.
Command Structure: <**command**><**zone**><**data**>**line feed**.

Command

Command	Description
01	Standby
02	Mute
03	Source Selection
04	Volume
05	Bass
06	Treble
07	Balance
09	Send All parameters
0B	Cause key press on Keypad
0C	Amplifier features
0D	Maximum Volume Limit
0F	Link Zone
11	Volume Up
12	Volume Down
14	Request Device information
1C	Zone Name
1D	Preamplifier Volume Mode
1E	Preset Selection / status
26	Volume BCD format
28	Video Source selection

Zone

Amplifiers are encoded with up to 32 zones
The zone byte is used for checking if the command is applicable to the device receiving the command and if so, for optionally selecting a "sub-device", e.g. a bank or part of a device. All Zones are addressed using FF.

- The lower 5 bits of the zone byte represent the zone 0 – 31 selection, i.e:
  - 00000 bin = 00 (hex) = zone 0
  - 00001 bin = 01 (hex) = zone 1
  - 01010 bin = 0A (hex) = zone 10
  - 11111 bin = 1F (hex) = zone 31

- The upper 3 bits represent the sub-device. The sub-device codes for an Axium amplifier are:
  - standard amplifier = 000
  - page preset amplifier = 001
  - standard preamplifier = 010
  - page preset preamplifier= 011

Examples: Addressing a zone 10 preamplifier: Binary 010-01010 or 2A hex — Send ASCII "2A"
Addressing a zone 10 amplifier: Binary 000-01010 or 0A hex — Send ASCII "0A"
Addressing all Zone amp & preamplifier: FF hex — Send ASCII "FF"

Data

Command	Content
Standby (01)	**00** – Standby OFF **01** – Standby ON **04** – Toggle
Mute (02)	**00** – Mute **01** – Un-mute **02** – Toggle Mute
Source Selection (03)	**00** – S5 **01** – S6 **02** – S7 **03** – S4 **04** – S8 **05** – S1 **06** – S2 **07** – S3 **08** **09** **10** **11** **12** **13** **14** **40** – S5 Audio only **41** – S6 Audio only **42** – S7 Audio only **43** – S4 Audio only **44** – S8 Audio only **45** – S1 Audio only **46** – S2 Audio only **47** – S3 Audio only
Volume (04)	**00 – A0** range
Bass (05)	**F4 – 0C** (-12db - +12db)
Treble (06)	**F4 – 0C** (-12db - +12db)
Balance (07)	**EC – 14** (Left –20db – Right –20db)
Send all parameters (09)	**XX –** value ignored
Amplifier features (0C)	**00** – Loudness enabled **01** – Loudness disabled
Maximum Volume Limit (0D)	**00 – A0** range
Link Zone (0F)	**00 – 31** zone to be linked **FF** – for no zone linking
Volume Up (11)	**XX** – value ignored
Volume Down (12)	**XX** – value ignored
Zone Name (1C)	Data field contains the ASCII string
Preamplifier Volume Mode (1D)	**00 – A0** range **FF** = Independent mode.

Command	Content
Preset Selection (1E)	All Zone function: Zone byte = FF **00** – Default : exit preset mode **01** – Force "Page Preset" **02** – Select Preset 1 **03** – Select Preset 2 **04** – Select Preset 3 **05** – Select Preset 4 **06** – Select Preset 5 **07** – Select Preset 6
Volume BCD Format (26)	**0 – 99** in BCD format same as Front Panel display
Video Source selection (28)	**00** – S5 Video **01** – S6 Video **02** – S7 Video **03** – S4 Video **04** – S8 Video **05** – S1 Video **06** – S2 Video **07** – S3 Video

Notes:

- Commands are used as notifications. If an amplifier is switched ON, it will notify the other devices on the Control Bus by sending the Standby command (01). Any amplifiers with the same zone will take the notification as a command and also switch ON.
- When a command is sent to an amplifier it will first be transmitted on the control bus and then returned to the PC (Home automation system). If an error occurs an error will be returned instead of the original command. The PC (Home automation system) needs to ignore its command when it is returned
- A Standby ON command implies that the amplifier is not muted, if the amplifier was previously Off, a mute command must follow the Standby command if it is muted.
- Not all Command and Data commands are covered in this document.
- The expected reply for the "Send all Parameters" command (09) is >144 bytes. All command fields listed in this document are contained in the reply. The reply also contains advanced commands not listed in this document. The home automation or PC's buffer should be large enough to receive and process the 144-byte reply.
- If two pairs of zones are linked on an Axium amplifier, i.e. zones 1 & 2 and zones 3 & 4, and a "Link Zone" command is sent that links zones 2 & 3, then the amplifier has the following implications:
  - Zone 2 links to Zone 3
  - Since zone 2 is no longer linked to zone 1, zone 1 shall no longer be linked to zone 2.
  - Since Zone 3 is no longer linked to zone 4, zone 4 shall no longer be linked to zone 3.

Example strings:

010A01: Standby ON command for zone 10 amplifier
012A01: Standby ON command for zone 10 preamplifier
060002: +2db Treble setting on zone 0
03IF02: Tuner source selection on zone 31

Specifications

Amplifier Section

Rated Output Power (FTC)	
All Channels:	50 Watts /channel, 8Ω loads
THD (Total Harmonic Distortion)	0.1% (40Watt, 8Ω load)
Speaker Impedance (Z1 – Z4 L/R)	4Ω - 8Ω
Input Sensitivity and Impedance (S1 – S3 L/R)	0.72 V / 22KΩ (Unbalanced)
Coax digital input level and Impedance	0.5V ± 0.05V / 75Ω
Frequency Response	20Hz – 20 KHz / – 3dB (8Ω)
Tone Control	±12dB, 100 Hz (Bass) ±12dB, 10 KHz (Treble)
Signal to Noise Ratio	100dB (IHA-A, 1V input / unbalanced)

Interface

IR Output	Eight 3.5mm Jack: IR1 – IR6 and SUM IR1-IR6: Current limited to 25mA
Expansion Bus	One Dual RJ45 Socket: Axium Bus, Summed IR
Ethernet	One Shielded RJ45 socket – 100Base T
RS232	One Isolated DB9 – 9600 Baud
USB	One USB mini-B 5 pin
Controller	Four RJ45 socket: PORT1 – PORT4 One 4 way terminal plug (0V, IR, 12V & Data)
Amp On & PG Control	One 8 way terminal plug with Amp ON 1 – 4 and Two Page preset contact closure inputs: PG1 & PG2.

General

Power Supply	110 – 240VAC 50/60 HZ
Power Consumption	320 W
Standby Power Consumption	4W
Dimensions	435 x 90 x 390 mm
Height including feet	105mm
Weight	7Kg

Specifications and features are subject to change without notice.

Axium

Audio Engineering Ltd
75 Parnell Rise
Parnell, Auckland
New Zealand
www.axium.co.nz