INSTRUCTION MANUAL

AXB-DMX512

DMX512 INTERFACE

IMPORTANT SAFETY INSTRUCTIONS

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. DO NOT install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. 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 wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. PROTECT the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. ONLY USE attachments/accessories specified by the manufacturer.
12. USE ONLY with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. UNPLUG this apparatus during lightning storms or when unused for long periods of time.
14. 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.
15. DO NOT expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.
16. To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
17. Where the mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.
18. DO NOT overload wall outlets or extension cords beyond their rated capacity as this can cause electric shock or fire.

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 product.

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 electrical shock to persons.

ESD Warning: The icon to the left indicates text regarding potential danger associated with the discharge of static electricity from an outside source (such as human hands) into an integrated circuit, often resulting in damage to the circuit.

WARNING: To reduce the risk of fire or electrical shock, do not expose this apparatus to rain or moisture.
WARNING: No naked flame sources - such as lighted candles - should be placed on the product.
WARNING: Equipment shall be connected to a MAINS socket outlet with a protective earthing connection.
WARNING: To reduce the risk of electric shock, grounding of the center pin of this plug must be maintained.

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AXB-DMX512

Overview

The AXB-DMX512 DMX512 Interface creates a bi-directional DMX512 AxLink connection, transmitting and receiving up to 512 DMX channels for lighting dimmers, spotlights, and other DMX control applications. Onboard processing and memory can create and store channel groups, faders, patches, and up to 72 presets. A DMX lighting board can operate in tandem with the AXB-DMX512, generate levels for storing presets, or pass through the AXB-DMX512 for direct control of channels.
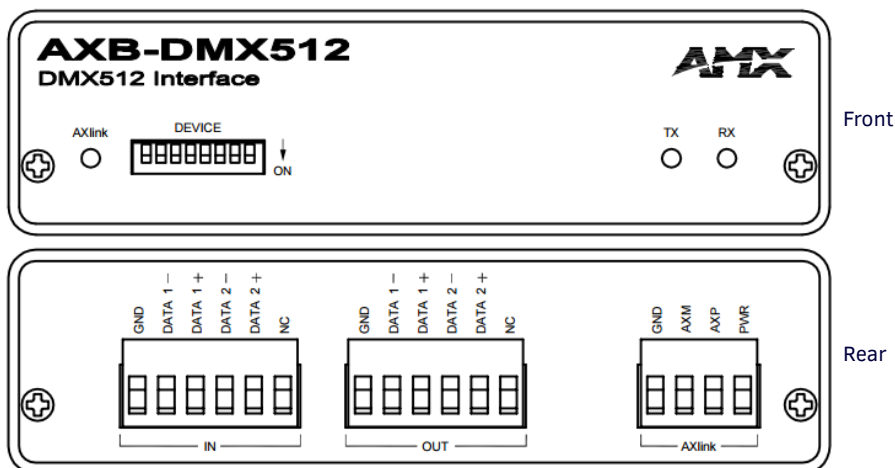
FIG. 1 AXB-DMX512

Specifications

AXB-DMX512 Specifications	
Power consumption	160 mA @ 12 VDC
Power supply	12 VDC
Front Panel Components	
LED Indicators	• AxLink LED (green and blinks to indicate AxLink communication activity and power: Full-Off indicates no power is being received or the controller is not functioning properly. *One blink per second* indicates power is active and AxLink communication is functioning. *Full-On* indicates there is no AxLink control or activity, but power is On. • RX LED (red) indicates the AXB-DMX512 is receiving DMX512 data. Corresponds to the IN and OUT ports on the rear panel. • TX LED (red) indicates the AXB-DMX512 is transmitting DMX512 data. Corresponds to the IN and OUT ports on the rear panel.
DIP switches	• 8-position DEVICE DIP switch sets the AxLink address for the DMX512. • The DIP Switch to the right of the DEVICE DIP is reserved - no settings are required.
Rear Panel Components	
DMXIN port	5-wire, captive-wire connector for receiving data.
DMXOUT port	5-wire, captive-wire connector for transmitting data.
AxLink	4-wire, captive-wire connector for data and power.
Dimensions (HWD)	1.5" x 5.5" x 5.5" (38 mm x 140 mm x 140 mm)
Enclosure	Metal with black matte finish
Mounting	Rack mounting with the optional AC-RK Accessory Rack Kit
Weight	1.1 lb (0.5 kg)

Configuration and Installation

Setting the Device DIP Switch

The 8-position DEVICE DIP switch on the front panel (see FIG. 1 on page 5) sets the AxLink identification number for the AXB-DMX512. Make sure the device number matches the number assigned in the Axcess software program. The following table describes the values on the DEVICE DIP switch.

Device DIP Switch Settings								
Position	1	2	3	4	5	6	7	8
Value	1	2	4	8	16	32	64	128

Terminating the Device

When using the DMX input and if this device is the last device in a chain of DMX512 devices, you must terminate the line. To terminate the device, position jumpers on jumper pin trios JP4 and JP5 (FIG. 2):

Termination Jumpers (JP4 / JP5)

The DIP Switch located to the right of the DEVICE DIP switch is not used - no settings are required, and any setting will work.

front

DEVICE DIP Switch
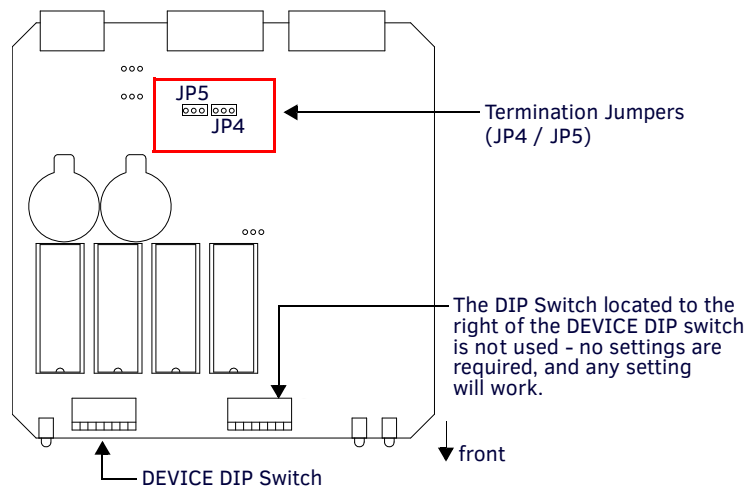
FIG. 2 Location of termination jumpers pins (JP1-JP5) and lithium batteries

1. Remove the jumper that is on pins 1 and 2 of jumper trios JP4 and JP5. (Pins 1 and 2 are marked HIZ - see FIG. 3).

2. Place the jumper on pins 2 and 3 of jumper trios JP4 and JP5. (Pins 2 and 3 are marked TERM -see FIG. 3). This terminates the incoming DMX input with a 120 ohm resistor.
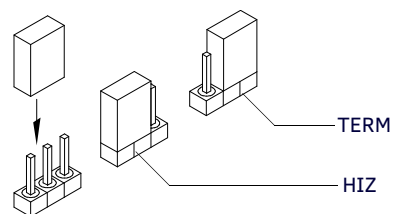

TERM

HIZ

FIG. 3 Termination jumper pin settings for JP4 and JP5

Wiring Devices to the AXB-DMX512

The AXB-DMX512 has three captive-wire connectors on the rear panel for DMX512 transmit and receive, and AxLink (see FIG. 1 on page 5).

Preparing/connecting captive wires

1. Strip 0.25 inch of wire insulation off all wires.
2. Insert each wire into the appropriate opening on the connector according to the wiring diagrams and connector types described in this section. Do not tighten the screws excessively; doing so may strip the threads and damage the connector.

Wiring guidelines

The interface requires a 12 VDC power to operate properly. The Central Controller supplies power via the AxLink cable or external 12 VDC power supply. The maximum wiring distance between the Central Controller and interface is determined by power consumption, supplied voltage, and the wire gauge used for the cable. The table below lists wire sizes and maximum lengths allowable between the AXB-DMX512 and Central Controller. The maximum wiring lengths for using AxLink power are based on a minimum of 13.5 volts available at the Central Controller's power supply.

Wiring Guidelines at 160 mA	
Wire Size	Maximum Wiring Length
18 AWG	733.57 feet (223.59 m)
20 AWG	464.11 feet (141.46 m)
22 AWG	289.35 feet (88.19 m)
24 AWG	182.39 feet (55.59 m)

Using AxLink

Connect the AxLink wiring to the connector on the AXB-DMX512 as shown in FIG. 4:i
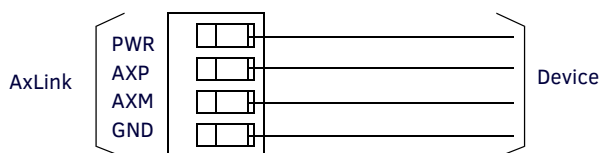
FIG. 4 AxLink bus and +12 VDC power wiring

Using IN and OUT DMX512 data communication

NOTE: *Some DMX devices only use DATA+ and DATA-. Connect these to DATA1+ and DATA1-, leaving DATA2+ and DATA- unconnected. The DATA2 In and Out ports are not Currently supported.*

Transmit Wiring

For transmit wiring, connect the DMX512 wiring to the OUT connector, as shown in FIG. 5.
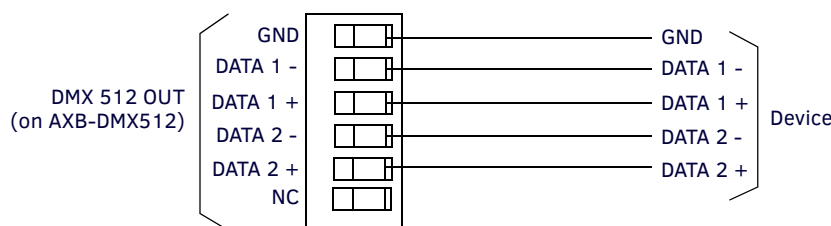
FIG. 5 DMX512 TX wiring

Receive Wiring

For receive wiring, connect the DMX512 wiring to the IN connector, as shown in FIG. 6.
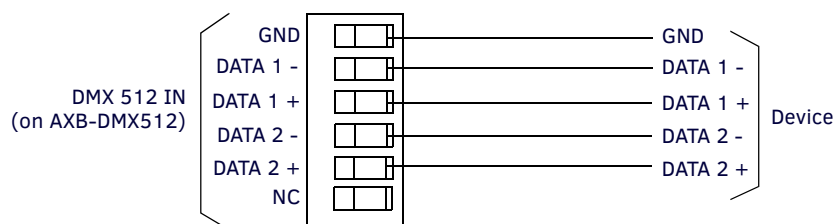
FIG. 6 DMX512 RX wiring

Mounting the AXB-DMX512 in a Rack

To mount the AXB-DMX512 in an equipment rack, you will need an AC-RK rack mounting kit.

1. Remove the two screws on the front panel of the AXB-DMX512.
2. Remove the front panel and the space bracket behind the panel.
3. Remove the rubber feet on the bottom of the unit, if necessary. Insert a scissors blade or other sharp object into the side of one of the rubber feet and pull it off. Do the same to remove the other three rubber feet.
4. Place the unit in the appropriate opening in the AC-RK.
5. Place the front panel of the AXB-DMX512 on the front of the rack over the unit and secure the screws.

Replacing the Lithium Battery

A lithium battery (FIG. 7) with a life of approximately 5 years, protects stored presets if a power loss occurs. The battery is not used when DC power is supplied to the AXB-DMX512. Write down the replacement date on a sticker or label by adding 5 years to the date of installation, and then attach it to the bottom of the AXB-DMX512.

Battery (CR2032 type - 20mm coin cell)

socket

FIG. 7 Lithium battery and socket

**NOTE:** *All control commands in AXB-DMX512 memory are lost when the lithium battery is replaced*

Contact your AMX dealer before you replace the lithium battery and verify that they have a current copy of the Axcess program for your AXB-DMX512. This will avoid any inadvertent loss of data or a service outage. You will need a flat-blade tool (non-conducting) that can be slipped under the lithium battery to pry it up and out of the socket.

NOTE: *Static electricity can damage electronic circuitry. Before removing the lithium battery from the enclosure, discharge any accumulated static electricity from your body by touching a grounded metal object.*

1. Discharge the static electricity from your body.
2. Unplug all cables from the AXB-DMX512.
3. Remove the AC-RK and AXB-DMX512 from the mounting rack. Otherwise, go to step 4.
4. Remove the five pan-head screws on the top of the AXB-DMX512 enclosure.
5. Pull the two enclosure halves apart and set the bottom portion of the enclosure on a flat surface.
6. Locate the battery on the circuit card.
7. Carefully pry the battery out of its socket and insert the new battery. Write down the next replacement date on a sticker or label by adding 5 years to the replacement date, and then attach it to the bottom of the AXB-DMX512.
8. Plug all cables back into the AXB-DMX512.
9. Place the top portion of the enclosure back onto the bottom portion. Then, refasten the five pan-head screws.
10. Reconnect the cables removed for battery replacement.

CAUTION: There is a danger of explosion if you replace the battery incorrectly. Replace the battery with the same or equivalent type recommended by the manufacturer. Dispose of used battery according to the manufacturer's instructions. Never recharge, disassemble, or heat the battery above 212 °F (100 °C). Never solder directly to the battery or expose the contents of the battery to water.

Programming

Overview

The AXB-DMX512 is controlled with Axcess Send_Commands. Use the programming information in this section along with the Axcess Programming Language Instruction Manual to program the AXB-DMX512.

NOTE: *All Send Commands are limited to 64 characters.*

Buffers

The AXB-DMX512 uses a "highest value takes precedence" to determine which DMX value is actually output (see FIG. 8). There are three output buffers: patch, group, and direct control. Each buffer represents all 512 DMX outputs. The highest value in any buffer is the value transmitted from the output port. The actual DMX output refers to the value being transmitted.
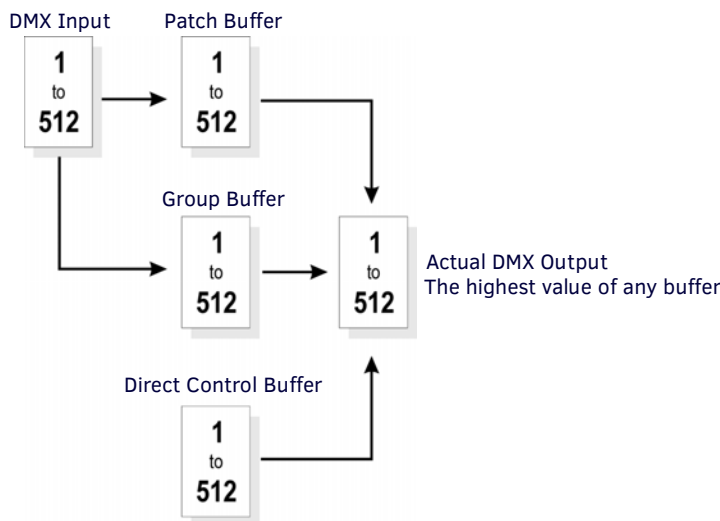
FIG. 8 DMX Flow Chart

The levels in the patch buffer are modified by DMX Input. The patch buffer commands determine which, if any, DMX inputs modify the level of the patch buffer. A patch disconnect automatically clears the value in the patch buffer to zero. If there is no DMX Input for 5 seconds, all values in DMX Input buffer are set to zero. Any outputs tied those DMX Inputs will then be zero.

The group buffer is modified by changing group commands. Groups can ramp over time. Groups can be tied to Axcess levels or DMX Inputs. The groups can be absolute or proportional. For groups that are absolute, the value of all outputs are the same as the group level. Proportional group outputs depend on a specified value or the Actual DMX output at the time the output is added to the group. That value sets the maximum value the outputs can reach when controlled by group 55.

The direct control buffer is modified by individual output ramps or by preset recalls. Presets are also called snapshots or scenes.

Direct Control Buffer Send_Commands

The direct control buffer is modified by individual output ramps or by preset recalls. The following table lists the Direct Control Buffer Send_Commands.

Direct Control Buffer Send_Commands	
Command	**Description**

DL	Recalls a snapshot of all DMX output channel in T tenths of seconds. Time is required. This affects all DMX512 channels. Syntax:
	`"'DL<preset number>T<time>'"`
	If a Direct Ramp is in progress the last command sent will win for each output.
	Variables:
	    preset number =1-72
	    time = 0-65535 (time is in tenths of seconds, except where noted).
	Examples:
	`SEND_COMMAND DMX,'DL1T0'`
	Recalls preset 1 instantly (in zero seconds).
	`SEND_COMMAND DMX,'DL72T15'`
	Recalls preset 72 in 1.5 seconds.
	Use the groups and group ramp ('GR') command to store and recall scenes with specific channels. Any other snapshot recall or direct ramp in progress is halted and the ramp to the new level starts from the current level.

Direct Control Buffer Send_Commands (Cont.)	
Command	**Description**

DR	Ramps the DMX output to the L level in T tenths of seconds. Time is required. Sends all specified DMX outputs to the same level. The list can be single outputs and/or ranges of outputs separated by commas. If a Snapshot Preset is in progress then the last command sent will win for each output.
	Syntax:
	`"'DR<List of DMX Outputs>L<level>T<time>'"`
	Variables:
	List of DMS Output = 1,2,3,5-10 is a list of single DMX channels with ranges of DMX channels.
	level = 0-255 or 0%-100%. The value can be given in actual steps 0-255 or given as a percentage 0%-100%.
	time = 0-65535. Time is in tenths of seconds.
	Example:
	`SEND_COMMAND DMX,'DR1L100%T10'`
	Ramps DMX Output channel 1 to 100% (full) in 1 second.
	Any other snapshot recall or direct ramp in progress for the specified channels is halted and the ramp to the new level starts from the current level.
	Example:
	`SEND_COMMAND DMX,'DR1-512L50%T10'`
	Sends all channels to 50% in 1 second.
	`SEND_COMMAND DMX,'DR1-512L127T25'`
	Sends all channels to 50% in 2.5 seconds.
	`SEND_COMMAND DMX,'DR10,20-30,35L0T0'`
	Sends channels 10,20 through 30, and 35 to 0%.

DS	Stores a snapshot of all DMX output channels. This is the final output of the DMX512 box and is also affected by the values in the Patch and Group Buffers. Note that this command stores all DMX512 channels, even channels that are not currently being transmitted through the use of the 'ML' command (refer to the *Miscellaneous Send_Commands* section on page 18).
	Syntax:
	`"'DS<preset number>'"`
	Variable:
	preset number = 1-72
	Examples:
	`SEND_COMMAND DMX,'DS1'`
	Stores preset 1.
	`SEND_COMMAND DMX,'DS72'`
	Stores preset 72 (there is a max of 72 presets with standard memory).
	To exclude (undefine) channels, the Group Buffer Commands must be used, **NOT** the Direct Buffer Commands.

DZ	Sends all outputs in the Direct Control buffer immediately to zero. Clears all values in the Direct Control Buffer to zero. Syntax: `"'DZ'"` Stops all 'DR' ramps.

Patch Buffer Send_Commands

The patch buffer Send_Commands determine which if any DMX inputs modify the patch buffer. The following table lists the Patch Buffer Send_Commands.

Patch Buffer Send_Commands	
Command	**Description**
PA	Patches inputs 1-512 in a one-to-one relationship with outputs 1-512. This is typically the second step (after clearing the memory), when setting up the DMX512 box to sit between a lighting console and its dimmers. The outputs immediately change to reflect the inputs and will track any input changes. Syntax: `"'PA'"` Globally connects all DMX inputs to DMX outputs in a 1 to 1 relationship.

PC	Patches an input to one or more outputs. The list can be single outputs and/or ranges of outputs separated by commas. If the output is currently already patched to another input, then it is automatically disconnected from that input.
	Syntax:
	`"'PC<DMX input>D<list of DMX outputs>'"`
	Variables:
	    DMX Input = 1-512. The actual DMX inbound data is stored in the DMX Input Buffer
	    DMX Output = 1-512
	Example:
	`SEND_COMMAND DMX,'PC1D1,3,5-7'`
	Connects DMX Input 1 to DMX Outputs 1,3,4,6.
	`SEND_COMMAND DMX,'PC1D1-512'`
	Connects input 1 to all outputs.
	`SEND_COMMAND DMX,'PC1D10-20,25'`
	Patches input 2 to outputs 10 through 20 and 25.

PX	Disconnects a DMX output from any DMX input by unpatching one or more DMX outputs.
	The list can be single outputs and/or ranges of outputs separated by commas. These outputs immediately go to zero in the Patch buffer.
	Syntax:
	`"'PX<list of DMX outputs>'"`
	Do not put more 64 characters total in this command. A Disconnect will clear the Patch Buffer for that output to 0.
	Variable:
	    list of DMX outputs
	Example:
	`SEND_COMMAND DMX,'PX512'`
	Unpatches all DMX outputs (the same as the 'PZ' command).
	`SEND_COMMAND DMX,'PX15,20-25'`
	Unpatches DMX outputs 15 and 20 through 25.

PZ	Unpatches all DMX inputs from all DMX outputs. Global delete all DMX outputs from any DMX input. Syntax: `"'PZ'"` All DMX outputs in the Patch Buffer immediately go to zero.

Group Buffer Commands

The group buffer is modified by changing group commands.

NOTE: *There is a maximum of 96 groups in software version 1.10. Adding outputs to a group while the group is still connected to an Axcess level DMX output can cause the value of outputs, which are already a member of the group, to change.*

The following table lists the Group Buffer Send_Commands.

Group Buffer Commands	
Command	**Description**

GA	The list can be single outputs and/or ranges of outputs separated by commas. A DMX output can only belong to one group at a time. Any of these outputs, that are currently members of another group, are automatically removed from that group. Adding an output to the group does not change the current DMX value for that output in the Group Buffer. This means that its possible to have different DMX values for the channels in this group at the time the channels are added, but this command is intended for the control of a group of outputs that will have the same value at all times.
	Syntax:
	`"'GA<group>D<list of DMX output>'"`
	Variables:
	    group = 1-96
	    list of DMX output = 1,2,3,5 - 10
	If this group is direct ramped ('GR') to a level, then the offset between channels will be lost.
	If this group is ramped up ('GU') or down ('GD'), then the channels maintain their relative values until these channels hit zero or full. This effectively '**clips**' the channels and eliminates the offsets between the values.
	Example:
	`SEND_COMMAND DMX,'GA1D1,3,5-7'`
	Adds DMX Output Channels 1, 3, 5, 6, 7 to Group 1.
	`SEND_COMMAND DMX,'GA1D-5'`
	Adds DMX outputs 1 through 5 to Group 1.
	`SEND_COMMAND DMX,'GA96D6,10'`
	Adds DMX Outputs 6 and 10 to Group 96.

GC	Connects one or more groups to an Axcess level or to a DMX input. A group can only be tied to one or the other not both. The list can be single groups and/or ranges of groups separated by commas.
	Syntax:
	`"'GC<list of groups><A or D><Axcess level or DMX input>'"`
	Variables:
	    Axcess level = 1-8
	    DMX input = 1-512
	If a single group is connected to an unconnected Axcess level, then the Axcess level value will change to the group value. Otherwise, the group value will change to the Axcess level.
	There are 4 possible scenarios with this command:
	Connecting a single group to an Axcess level: The Axcess level changes immediately to reflect the current level of the group for normal groups. The group level immediately changes to reflect the Axcess level for proportional groups and fixed groups. The group can now be ramped up and down via the Axcess level ramp commands ('AU', 'AD', and 'AS'). It is no longer possible to use the group ramp up ('GU') or down ('GD') commands, but the direct ramp command ('GR') and Axcess channels still work, and also affects the Axcess level. If the group is disconnected using the 'GX' command, the group ramp up and down will work again.
	Example:
	`SEND_COMMAND DMX,'GC1A2'`
	Connects Group 1 to Axcess level 2.
	Connecting multiple groups to an Axcess level: The group levels change immediately to reflect the current Axcess level. The group can now be ramped up and down via the Axcess level. It is no longer possible to use the group ramp up ('GU') or down ('GD') commands. The direct ramp command ('GR') and Axcess channels still work but now controls all groups connected to this Axcess level, as well as the Axcess level itself.
	Example:
	`SEND_COMMAND DMX,'GC1,2A3'`
	Connects Groups 1 and 2 to Axcess level 3.
	Connecting a single group to a DMX level: The group level changes immediately to reflect the current DMX input level. The group can now be ramped up and down by the DMX input level. There are no other means of affecting the group output.
	Example:
	`SEND_COMMAND DMX,'GC4D5'`
	    Connects Group 4 to DMX input 5.
	Connecting multiple groups to a DMX level: The group levels change immediately to reflect the current DMX input level and behave the same as connecting a single group to the DMX input.
	Example:
	`SEND_COMMAND DMX,'GC1-3,5D8'`
	    Connects Groups 1 through 3 and 5 to DMX input 8.

Group Buffer Commands (Cont.)

Command	Description

GD	Ramps down one or more groups at the current ramp rate set by the 'GT' command. The group stop ('GS'), group ramp down ('GD'), or group direct ramp command ('GR') will interrupt this command. It is not possible to use this command on groups that are connected to an Axcess level or to a DMX input. The list can be single groups and/or ranges of groups separated by commas. If this command is sent for multiple groups, only those that are connected to an Axcess level or DMX input will ramp.
	 Syntax:
	 `"'GD<list of groups>'"`
	 Example:
	 `SEND_COMMAND DMX,'GD1,3-4'`
	    Starts a ramp down on groups 1, 3, and 4.

GE	Erases groups. Removes all output channels from one or more groups. These outputs go immediately to 0% in the Group buffer and do not disconnect an Axcess level or DMX input from the group, if it is currently connected. If a programmer later adds channels back to the groups, they will be immediately be connected to the Axcess level or the DMX input. The list can be single groups and/or ranges of groups separated by commas.
	 Syntax:
	 `"'GE<list of groups>'"`
	 Example:
	 `SEND_COMMAND DMX,'GE1'`
	 Removes all output channels from Group 1. Sets all levels in the group buffer to zero.
	 `SEND_COMMAND DMX,'GE5,8-10'`
	 Removes all output channels from Groups 5 and 8 through 10. Sets all levels in the group buffer to zero.

GF	Functions like the 'GP' command, except the Max value for each output is specified in the Send Command. This is useful for creating "blind" presets, meaning that its not necessary to drive the actual DMX outputs to these levels in order to store the preset. All other rules for use are identical to those of the 'GP' command. After the output there is an ampersand (@), then the maximum value for that output. That means the highest the DMX output can ever be is the value given at the time of the add. Ranges are allowed but can only have one maximum value for whole range.
	 Syntax:
	 `"'GF<group>D<special list of DMX outputs with maximum value>'"`
	 Variables:
	    group = 1-96
	    special list of DMX outputs with maximum value = 1-512
	 Example:
	 `SEND_COMMAND DMX,'GF1D1@100%,2@50%,8@75%'`
	 Adds channels 1,2, and 8 to Group 1 at levels of 100%, 50%, and 75% respectively.
	 `SEND_COMMAND DMX,'GF10D5-10@255,20@50%'`
	 Adds channels 5 through 10 at 100% (255) and channel 20 at 50% to Group 10.

GL	Deletes DMX outputs from any group. This command removes one or more output channels from the group that they are connected to. These outputs go immediately to 0% in the Group buffer.
	 DO NOT specify which group these are to be removed from, because a channel can only be a member of one group at a time. The list can be single outputs and/or ranges of outputs separated by commas.
	 Syntax:
	 `"'GL<list of DMX outputs>'"`
	 Variable:
	    list of DMX outputs = 1-512
	 Example:
	 `SEND_COMMAND DMX,'GL1-50'`
	 Removes DMX channels 1 through 50 from any group.
	 `SEND_COMMAND DMX,'GL5,10,20-25'`
	 Removes DMX channels 5, 10, and 20 through 25 from any group.

Group Buffer Commands (Cont.)

Command	Description

GO	Sets the current output values in the Groups to the same value as the current actual DMX output. This command copies the actual output levels for the AXB-DMX512 box to the Group buffer for one or more groups.
	Syntax:
	`"'GO<list of groups>'"`
	This has the effect of copying the highest value from the patch or direct control buffer into the group buffer if they are higher than the value in the Group buffer. This is useful in the event a programmer wishes to add a group and then ramp it down from its current level. To do this:
	    Use the Direct or Patch buffer to set the DMX outputs as needed.
	    Add one or more groups using the 'GP' command.
	    Use group copy ('GO') to copy the box outputs to the group buffer for these groups.
	    Disconnect the Patch buffer ('PZ') or send the Direct buffer ('DZ') to 0%.
	Example:
	`SEND_COMMAND DMX,'GO1'`
	Copies outputs for all channels in Group 1 to the Group buffer.
	`SEND_COMMAND DMX,'GO5-8'`
	Copies outputs for all channels in Groups 5 through 8 to the Group buffer.
	Warning: The 'GO' command only works normal (non-proportional) groups. To work around this, use the direct ramp ('DR') command to set each group to full, instead of using the 'GO' command.

GP	Same as 'GA' command, except the DMX outputs are added so they will remain proportional to the value they had at the time of adding the output. The highest the DMX output can ever be is the value at the time of the add. A DMX output can only belong to one group at a time. The outputs will not ramp to a value above that which they had at the time they were added. This is the command typically used to store scenes that were created on a DMX console that is providing the DMX inputs to the AXB-DMX512 unit. When the group is ramped, the outputs retain their same proportional level to each other. *Warning: Rounding errors occur in the algorithym that controls the proportional levels (this function is unsuitable for precision control).* Syntax: `"'GP<group>D<list of DMX output>'"` Variables: group = 1-96 list of DMX output = 1,2,3,5 -10 If an output is added to an existing group, the its proportional value is determined by its value when compared to the maximum values for each channel in a group; not by its value compared to the current values for each channel in the group. As with the 'GA' command, this can cause things to be a bit out of sync at the time of adding. When any channel is added, its output value in the Group Buffer does not change, regardless of what level other outputs in the group might currently be at. When ramping up ('GU') or down ('GD'), the other levels will reach their maximum or minimum before the currently added level does. Once all levels have reached maximum or minimum, they will ramp together from that point forward.

GR	Ramps a single group to a L level in T tenths of seconds. Time is optional and if no time is specified, the group time (set by the 'GT' command) is used and then it will ramp at the current ramp rate for that group. If a group is tied to a DMX input, then this command is ignored. If the group is tied to an Axcess level the group will ramp. This can be interrupted by the group up ('GU'), group down ('GD'), or group stop ('GS') commands. Inaccuracies in the value, as a result of rounding, are common with fixed and proportional groups. Even if the group is set to 100%, some of the channels will still not be at their stored levels. The group up ('GU') command can be issued to take the groups to their true 100% level.
	Syntax:
	`"'GR<group>L<level>{T<time>}'"`
	Variables
	    group = 1-96. The group of DMX output that act together. Outputs can only belong to one group at a time.
	    level = 0-255 or 0%-100%
	    time = 0-65535
	    {}-Parameters in commands that are optional.
	Examples:
	`SEND_COMMAND DMX,'GR1L0T10'`
	Ramps all DMX output channels in group 1 to zero (lowest) in 1 second.
	`SEND_COMMAND DMX,'GR1L50%T20'`
	Ramps Group 1 to 50% in 2 seconds.
	`SEND_COMMAND DMX,'GR2L255'`
	Ramps Group 2 to 100% using the group time.

GS	Stops any ramping that was started by the group up ('GU'), group down ('GD'), or group direct ramp ('GR') commands.
	Syntax:
	`"'GS<list of groups>'"`
	The list can be single groups and/or ranges of groups separated by commas. DMX outputs freeze at their current level.
	Example:
	`SEND_COMMAND DMX,'GS1,3-4'`
	Stops a ramp on Groups 1, 3, and 4.

Group Buffer Commands (Cont.)

Command	Description
GT	Sets the current ramp rate for one or more groups in tenths of a second. This affects any future group up ('GU'), group down ('GD'), or group direct ramp ('GR') commands. The specified time determines how long it takes to go full range. If the group is proportional then Individual Output rates will be proportional.
	Optionally, the up ('U') or down ('D') times may be specified. Without an U or D, both up and down ramp rates are set the same. Ramp rates determine how long the group will take to ramp from 0% to 100% (and 100% to 0%). If, for example, there is a ramp time of 10 seconds, and the level is currently at 50%, it will take only 5 seconds to ramp to either 0% or 100%. 100% for proportional ('GP') and fixed ('GF') groups is the maximum level in the group for each channel that is not necessarily fully at 100% (255).
	Syntax:
	`"'GT<list of groups>R<time>{U or D}'"`
	Variables:
	{}-Parameters in commands that are optional.
	Example:
	`SEND_COMMAND DMX,'GT1R5'`
	Sets Group 1 to ramp rate to 0.5 second both up and down.
	`SEND_COMMAND DMX,'GT1-2R50'`
	Sets the up and down ramp times for Groups 1 and 2 to 5 seconds.
	`SEND_COMMAND DMX,'GT3,5-8R35U'`
	Sets the up ramp time for groups 3 and 5 through 8 to 3.5 seconds.
	`SEND_COMMAND DMX,'GT10R5D'`
	Sets the down ramp time for Group 10 to 0.5 seconds.
GU	Ramps up one or more groups at the current ramp rate set by the 'GT' command. The group stop ('GS'), group ramp down ('GD'), or group direct ramp command ('GR') will interrupt this command. It is not possible to use this command on groups that are connected to an Axcess level or to a DMX input. The list can be single groups and/or ranges of groups separated by commas. If this command is sent for multiple groups, only those that are connected to an Axcess level or DMX input will ramp.
	Syntax:
	`"'GU<list of groups>'"`
	Example:
	`SEND_COMMAND DMX,'GU1,3-4'`
	Starts a ramp up on groups 1, 3, and 4.
GX	This command disconnects one or more groups from Axcess levels or DMX inputs to which they are connected. The list can be single groups and/or ranges of groups separated by commas.
	Syntax:
	`"'GX<list of groups>'"`
	Example:
	`SEND_COMMAND DMX,'GX1'`
	Disconnects Group 1.
	`SEND_COMMAND DMX,'GX5,10-15'`
	Disconnects Groups 5 and 10 through 15.
GZ	This command removes all outputs from all groups and disconnects these groups from Axcess levels or DMX inputs to which they are connected. Removes **all** DMX outputs from all groups in addition to disconnecting any levels or inputs.
	Syntax:
	`"'GZ'"`
	Sets all levels in the group buffer to zero.

Axcess Level Send_Commands

There are eight levels tied to the Axcess system. The following table lists the Axcess level Send_Commands.

Axcess Level Send_Commands	
Command	**Description**

AC	Connects one DMX input to one Axcess level. Only one DMX input can be connected to an Axcess level at one time. The Axcess level value is then only affected by a change in the DMX input value. If the Axcess level is connected to a group, then the groups will change with the DMX input.
	Syntax:
	`"'AC<Axcess level>D<DMX input>'"`
	Variables:
	    Axcess level = 1 - 8
	    DMX input = 1-512
	Example:
	`SEND_COMMAND DMX,'AC1D512'`
	Connects DMX Input 512 to Axcess level 1.
	`SEND_COMMAND DMX,'AC1D2'`
	Connects DMX Input 2 to Axcess level 1.

AD	Ramps down one Axcess level at the ramp rate set by the 'AT' command. Ramps until 'AS', 'AR', or 'AU'. Note that it is not possible to ramp an Axcess level if it has not been connected to a DMX input (using the 'AC' command).
	Syntax:
	`"'AD<Axcess level>'"`
	Variable:
	    Axcess level = 1 - 8
	Example:
	`SEND_COMMAND DMX,'AD1'`
	Ramps down Axcess level 1.

AR	Ramps a single Axcess level to the chosen L level in T tenths of seconds. If no time is given, the level ramp time (set by the 'AT' command) is used and can be interrupted by the level up ('AU'), level down ('AD') or level stop ('AS') command. If a group is tied to the Axcess level then the group will ramp with the Axcess level. If another command affects this level - last command sent wins.
	Syntax:
	`"'AR<Axcess level>L<level> {T<time>}'"`
	Variables:
	    Axcess level = 1 - 8
	    level = 0-255 or 0%-100%
	    time = 0-65535
	    {}-Parameters in commands that are optional.
	Example:
	`SEND_COMMAND DMX,'AR1L255T5'`
	Ramps Axcess level 1 to step 255 (full) in 0.5 second.
	`SEND_COMMAND DMX,'AR1L50%T20'`
	Ramps Axcess level 1 to 50% in 2 seconds.
	`SEND_COMMAND DMX,'AR1L255'`
	Ramps Axcess level 2 to 100% using the group time.

AS	Stops Axcess level ramp using the Axcess level up ('AU') command, Axcess level down ('AD'), or Axcess level direct ramp ('AR') commands on one Axcess level. The level and any connected groups freeze at their current levels.
	Syntax:
	`"'AS<Axcess level>'"`
	Variable:
	    Axcess level = 1 - 8
	Example:
	`SEND_COMMAND DMX,'AS1'`
	Stops any ramp on Axcess level 1.

Axcess Level Send_Commands (Cont.)

Command	Description

AT	Sets the ramp rate for one Axcess level in tenths of a second. This affects any future level up ('AU'), level down ('AD'), or level direct ramp ('AR') commands. The specified time determines how long it takes to go full range. If the group is proportional then Individual Output rates will be proportional.
	Optionally, the up ('U') or down ('D') times may be specified. Ramp rates determine how long the level will take to ramp from 0% to 100% (and 100% to 0%). If, for example, there is a ramp time of 10 seconds, and the level is currently at 50%, it will take only 5 seconds to ramp to either 0% or 100%.
	Syntax:
	`"'AT<Axcess level>R<time>{U or D}'"`
	Variables:
	Axcess level = 1 - 8
	time> = 0-65535
	{}-Parameters in commands that are optional.
	Example:
	`SEND_COMMAND DMX,'AT1R5'`
	Sets Axcess level 1 to ramp rate to 0.5 second both up and down.
	`SEND_COMMAND DMX,'AT1R50'`
	Sets the up and down ramp times for Axcess level 1 to 5 seconds.
	`SEND_COMMAND DMX,'AT3R35U'`
	Sets the up ramp time for Axcess level 3 to 3.5 seconds.
	`SEND_COMMAND DMX,'AT8R5D'`
	Sets the down ramp time for Axcess level 8 to 0.5 seconds.

AU	Ramps up one Axcess level at the ramp rate set by the 'AT' command. Ramps until 'AS', 'AR', or 'AD'. Note that it is not possible to ramp an Axcess level if it has not been connected to a DMX input (using the 'AC' command).
	Syntax:
	`"'AU<Axcess level>'"`
	Variable:
	Axcess level = 1 - 8
	Example:
	`SEND_COMMAND DMX,'AU1'`
	Ramps up Axcess level 1.

AX	Disconnects a single Axcess level from a single DMX input.
	Syntax:
	`"'AX<Axcess level>'"`
	Variable:
	Axcess level = 1 - 8
	Example:
	`SEND_COMMAND DMX,'AX1'`
	Disconnects Axcess level 1 from any DMX input.

AZ	Globally disconnects all Axcess levels from any DMX inputs. Stops all ramps. Syntax: `"'AZ'"`

Miscellaneous Send_Commands

The following table lists other miscellaneous Send_Commands.

Miscellaneous Send_Commands	
Command	**Description**

MB	Sets the break time. The range is from 88 to 10,000 microseconds.
	Syntax:
	`"'MB<Time in uS>'"`
	Variable:
	   Time in uS = Default and minimum is 88uS. Maximum is 10000uS.
	Example:
	`SEND_COMMAND DMX,'MB88'`
	Sets the break to 88 microseconds (default).

MD	Sets the idle time after the DMX packet in 10 microsecond increments.
	Syntax:
	`"'MD<Time in uS>'"`
	Variable:
	   Time in uS = Default and minimum is 1 x 10us. Maximum is 10000 x 10uS.
	Example:
	`SEND_COMMAND DMX,'MD1'`
	Sets the idle time after the packet to 10 microseconds (default).

MG	Requests that the DMX512 return a string indicating the current average of all outputs in a single group.
	Syntax:
	`"'MG<group>?'"`
	Variable:
	   group = Returns the current average of all the outputs in a group.
	Causes a string to be sent to the master.
	Example:
	`SEND_COMMAND DMX,'MG1?'`
	Sent to the AXB-DMX512 box. The box replies "'MG1@255',13,10" indicating that DMX outputs in Group 1 are at full (255).
	`SEND_COMMAND DMX,'MG2?'`
	Sent to the AXB-DMX512 box. The box replies "'MG2@127',13,10" indicating that average of all outputs in Group 2 is at 50% (127).

MI	Causes a string to be sent to the master indicating the current 8-bit value of an input channel.
	Syntax:
	`"'MI<DMX Output>?'"`
	Variable:
	   DMX Output = 1-512
	Example:
	`SEND_COMMAND DMX,'MI1?'`
	Sent to the AXB-DMX512 box. The box replies "'MI1@255',13,10" indicating that DMX input 1 is at 100% (255).
	`SEND_COMMAND DMX,'MI2?'`
	Sent to the AXB-DMX512 box. The box replies "'MI2@127',13,10" indicating that DMX input 2 is at 50% (127).

ML	Defines the number of output that are transmitted. Limits the number of channels in the transmitted DMX packet. Default and maximum is 512. The number of packets sent per second will increase accordingly, this can cause the break-to-break time to drop below the official minimum time of 1,196 microseconds. This takes place downstream from the AXB-DMX512s' output buffer and has no affect on any other commands. The DMX box still keeps track of its DMX output values internally, even though these are no longer a part of the transmitted packet. Always transmit at least one channel (ML0 is not allowed).
	Syntax:
	`"'ML<number>'"`
	Example:
	`SEND_COMMAND DMX,'ML128'`
	Sends out only 128 outputs per packet. This will cause 88 packets per second with no other changes.
	`SEND_COMMAND DMX,'ML512'`
	Sends out only 512 channels per packet at 44 packets per second.
	`SEND_COMMAND DMX,'ML256'`
	Sends out only 256 channels per packet at 88 packets per second.

Miscellaneous Send_Commands	
Command	**Description**

MM	Sets the length of the mark-after-break in microseconds. Range is from 8 to 10,000 microseconds.
	Syntax:
	`"'MM<Time in uS>'"`
	Variable:
	Time in uS = Default and minimum is 8uS. Maximum is 10000uS.
	Example:
	`SEND_COMMAND DMX,'MM8'`
	Sets the mark-after-break to 8 microseconds (default).

MO	Causes a string to be sent to the master indicating the current 8-bit value of an output channel.
	Syntax:
	`"'MO<DMX Output>?'"`
	Variable:
	DMX Output = 1-512
	Example:
	`SEND_COMMAND DMX,'MO1?'`
	Sent to the AXB-DMX512 box. The box replies "'MO1@255',13,10" indicating that DMX output 1 is at 100% (255).
	`SEND_COMMAND DMX,'MI2?'`
	Sent to the AXB-DMX512 box. The box replies "'MO2@127',13,10" indicating that DMX output 2 is at 50% (127).

MP	Returns a string from the DMX512 indicating the maximum number of available presets.
	Total available presets, including those already in use. This is currently fixed at 72.
	Syntax:
	`"'MP'"`
	Causes a string to be sent to the master.
	Example:
	`SEND_COMMAND DMX,'MP'`
	When MP is sent to the DMX512 box, the box replies MP72, indicating that there are a total of 72 presets available (with standard memory).

MR	This macro command sets 'MB', 'MD', 'ML, and 'MM' to send either 44 or 22 packets per second with 512 channels of DMX outputs.
	Type is optional.
	Syntax:
	`"'MR{ <Type> }'"`
	Variable:
	No Type or Type = 0: 44 packets per second.
	Type = 1 is 22 packets per second.
	{}-Parameters in commands that are optional.
	Example:
	`SEND_COMMAND DMX,'MR0'`
	Sets the parameters for 44 packets per second at 512 packets per packet.
	`SEND_COMMAND DMX,'MR1'`
	Sets the parameters for 2 packets per second at 512 packets per packet.

MZ	Deletes all groups, presets, patches, times and everything else. Resets everything to a factory state. Syntax: `"'MZ'"` This is a total memory clear.

Channel Commands

The following table lists the channel commands for the AXB-DMX512:

Channel Commands	
Channel	**Command**
1-8	Axcess level 1-9 ramp up
9-16	Axcess level 1-8 ramp down
17-112	Group 1-96 ramp up
113-208	Group 1-96 ramp down

Ramp time is set by the 'GT' command, unless the group is set to a level using the 'GC' command; in which case, the ramp time is set by the 'AT' command. The group can still be ramped using these Axcess channels even if it has been connected to an Axcess level. Groups that are connected through an Axcess level will ramp together. It is not possible to use these channels to ramp groups that have been connected to a DMX input through an Axcess channel.

Channel Trigger Send_Commands

Almost all methods of control using an Axcess system require the use of channels on devices. The following table lists the channel trigger Send_Commands.

Channel Trigger Send_Commands	
Command	**Description**

CA	Sets up a trigger that causes an Axcess channel to be On whenever a single specified DMX input is within a range of values. The minimum value must be specified, but the maximum value is optional. If not specified, the maximum value is assumed to be 100% (255). When the DMX input is equal to low, then the Axcess channel will turn on. If a Level High is given, then the Axcess channel will go high if DMX Input is >= Low and DMX Input <= High. The Axcess channel will stay on as long as the DMX input is the right value or in the range of values. Only Axcess channel 209 through 248 are available for use as triggers; all others will be ignored.
	Syntax:
	`"'CA<Axcess channel>D<DMX level>L<low>H<high>'"`
	Variables:
	Channels = 209-248 = Programmable DMX input triggers
	Example:
	`SEND_COMMAND DMX,'CA209D1L64H128'`
	Axcess channel 209 will go On if 64 <= DMX Input 1 <= 128.
	`SEND_COMMAND DMX,'CA209D1L100H200'`
	Axcess channel 209 will go On if 100 <= DMX Input 1 <= 200.
	`SEND_COMMAND DMX,'CA248D5L127'`
	Axcess channel 248 will go On if DMX Input 5 >= 127.

CL	Deletes a single channel trigger.
	Syntax:
	`"'CL<Axcess channel>'"`
	Variables:
	Channels = 209-248 = Programmable DMX input triggers
	Example:
	`SEND_COMMAND DMX,'CL209'`
	Deletes Axcess channel trigger 209.

CZ	Deletes all channel triggers.
	Syntax:
	`"'CZ'"`
	Example:
	`SEND_COMMAND DMX,'CZ'`
	Deletes all channel triggers.

Troubleshooting

Overview

Thi section addresses and provides solutions to most frequently asked questions.

AXB-DMX512 Troubleshooting	
Problem	**Solution:**
The transmit LED on the DMX512 is always On. Is this a failure?	• Unlike most serial protocols, the DMX512 transmits a constant stream of data. This means that since the DMX512 is constantly receiving data, its receive LED should always be On during that process.
Some channels will not ramp below a certain level. They can be ramped above this certain level but not below it.	• The DMX512 box contains 3 internal buffers (DIrect, Patch, and Group) for sending, each with its' own use. The actual DMX output is the highest value for that channel from among the group of three. • EXAMPLE: If a programmer is ramping channel 1 down in the Direct buffer, but this channel is at 50% in the Group buffer. The programmer can't ramp the actual DMX output below 50%. To avoid this situation, each of the three buffers should be cleared out before doing any programming. • Solution: The Send Commands used to do this are: **DZ** - To clear the Direct Buffer **PZ** - To clear the Patch buffer **GZ** - To clear the Group buffer **MZ** - To reset everything *(WARNING: This also deletes all Presets)*
The AXB-DMX512 is connected between a lighting console and the dimmers. If I bypass the AXB-DMX512 box, I have control of the dimmers, but when I put the box in the system, I have no control.	• The DMX512 box needs to have a patch created to connect the inputs to the outputs, After issuing the above commands to clear out any pre-existing patches or groups, send the **PA** Send Command to connect all inputs to all outputs (one to one).
The AXB-DMX512 is connected between a lighting console and the dimmers. I am using the **DS** Send Command to store snapshots of the DMX outputs. When I send the **DL** command to recall these snapshots, I am affecting dimmers that I do not want to be recalled in this scene. Is there any way to leave certain channels out of the scene?	• The DS and DL commands store a snapshot of all DMX 512 channels. • To store and recall scenes, the GP command must be used to proportionally add a group in the Group buffer. The programmer must select which channels are included in the group. • EXAMPLE: **GP1D1-100** adds DMX outputs 1 through 100 to group 1. The scene can then be recalled by sending the group to 100% using the command **GR1L100%**. Channels above 100 will not be affected by this command.