MX160 Serial Control Manual

McIntosh Laboratory Inc.

Document history:

Version	Date		Comments
1	10-6-15		First draft
2	10-13-15		Added 9-Pin connector details
			Added 24 new TRIM commands
3	10-16-15		Added IR Remote control info

Table of Contents

1   INTRODUCTION

1.1   Purpose of the document

The purpose of this document is to describe how the serial control interface of the device works.

The functionality below is contained in MX160 Firmware version 1.0.1-50 and above.

(Web update firmware file name: *update_1.0.1-50-g5fcacbf.zip*)

2   Serial settings

RS232-over-IP is available using Crestron/AMX, etc. or by using a terminal program called PuTTY. (Free).
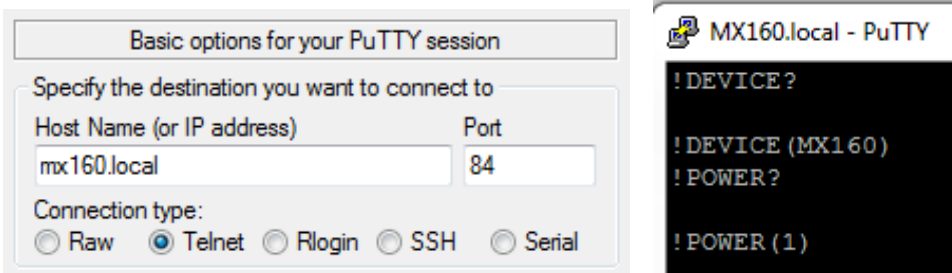
The connection should be made to the NET1 jack in the upper left corner of the rear panel.
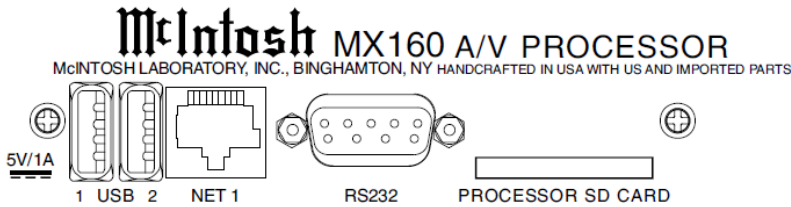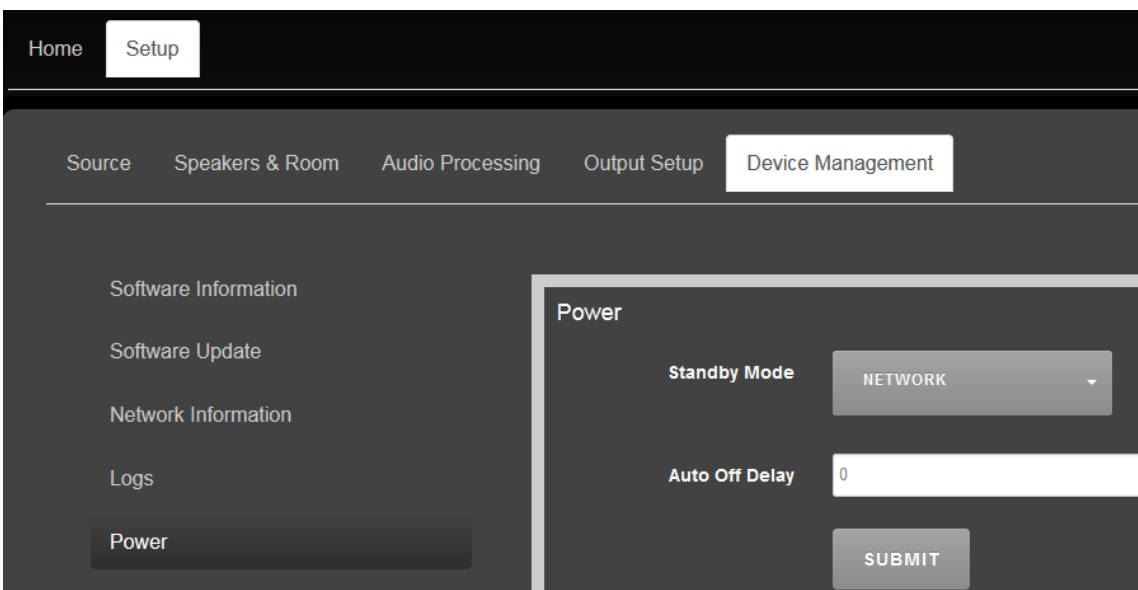

Here are the port settings:

Host Name: MX160.local (or IP address) , Port 84 , Connection Type: Telnet.
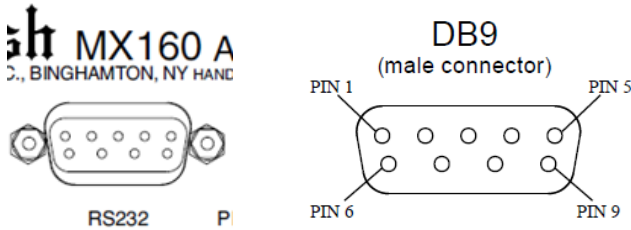
Terminal window example:

To maintain control of the MX160 in Standby, the following menu setting must be changed from "Deep Sleep" to "Network".

Setup / Power / Standby Mode / Network.

RS232 is also available using the conventional 9-pin DIN connector.

Pin 2 = RX-In, Pin 3 = TX Out, Pin 5 - GND. A NULL MODEM WILL BE REQUIRED FOR MOST INSTALLATIONS.


The port settings should always be 8 data bits, no parity and one stop bit. The baud rate is fixed at 115200 bits per second. All commands and responses are in ASCII form.

The VERB(2) level is recommended for most installations. The VERB command should be sent each time the control system is initialized.

RS232 is also available over USB, but is not available when the MX160 is in StandBy. (Therefor there is no way to turn the unit back On after turning Off.) A discrete IR Power On command can be used to turn the unit On, where after USB/RS232 commands can be used.

The USB 1 and USB2 Type-A jacks are available forRS232.
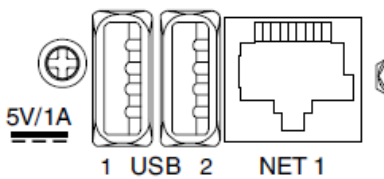
A **!VERB(2)** command should be sent each time the unit is turned On. (This setting is not saved after putting the unit into Standby)

An inexpensive adapter like this can be used:

http://www.amazon.com/TRENDnet-TU-S9-USB-Serial-Converter/dp/B0007T27H8

A 9-pin null modem and 9-pin gender changer is required for most systems.

3   Serial protocol

3.1   Commands

Every command starts with '!' character and ends with carriage return. There are two types of commands, direct commands and status requests. Direct commands are used to emulate remote key presses or to set a certain volume etc. Status requests are used to query the current state of the controller (volume, current source etc.). Status commands have the "**?**" suffix.

Commands are case sensitive. Backspace is not supported.

3.2   Responses and verbosity level

There are three levels of responsiveness and they are called verbosity levels. Each level adds something new on top of the previous level. Verbosity level can be set from the UI or by command "!VERB(X)<CR>" from the serial port (X can be 0, 1 or 2). All responses start either with '!' (status messages) or '#' (echo messages) and end with <CR>.

The VERB(2) level is recommended for most installations. The VERB command should be sent each time the control system is initialized.

4   Command List

Command	Description for MX160
!AUDMODE-	Audio processing mode down button.
!AUDMODE?	Request audio processing mode.
!AUDMODE(x)	Set audio processing mode
!AUDMODE+	Audio processing mode up button.
!AUDMODEL?	Get list of audio processing modes.
!AUDTYPE?	Get input audio type. Returns a string with the type. (Still not final format.)
!BACK	Back button
!DEVICE?	Returns the name of the device. !DEVICE(MX160) for MX160.
!DIM-	Reduce brightness of the VFD display
!DIM?	Request brightness of the VFD display. (0 – 3; 0=100%, 1=75%, 2=50%, 3=25%)
!DIM(x)	Set brightness of the VFD display. (0 – 3; 0=100%, 1=75%, 2=50%, 3=25%)
!DIM+	Increase the brightness of the VFD display
!DIRD	Direction Down button
!DIRL	Direction Left button
!DIRR	Direction Right button
!DIRU	Direction Up button
!ENTER	Enter button
!EXIT	Exit button
!INFO	Info button
!INTERFACE?	Returns the active interface for this section, !INTERFACE(IP) or !INTERFACE(SERIAL)
!LIPSYNC-	Reduces the lipsync value.
!LIPSYNC?	Requests the lipsync value.
!LIPSYNC(x)	Sets the lipsync value.
!LIPSYNC+	Increases the lipsync value.
!LIPSYNCRANGE?	Returns the valid range for lipsync values.
!LOUDNESS?	Requests loudness status (0 or 1)
!LOUDNESS(x)	Sets loudness status (0 or 1)
!MENU	Menu Button
!MUTE	Mute toggle button
!MUTE?	Requests mute
!MUTEOFF	Mute off
!MUTEON	Mute on
!NUM(x)	Numeric button 0 to 9.
!PING?	Returns pong…
!POFF	Power off
!PON	Power on
!POWER?	Requests power status (0 or 1)
!POWEROFFMAIN	Power off
!POWEROFFZONE2	Zone B power off
!POWERONMAIN	Power on
!POWERONZONE2	Zone B power on
!POWERZONE2?	Requests power status for Zone B (0 or 1)
!PTOGGLE	Toggle power
!RPFOC-	Previous RoomPerfect position button
!RPFOC?	Request RoomPerfect position (0=bypass, 1-8=focus1-8, 9=global)
!RPFOC(x)	Set RoomPerfect position (0=bypass, 1-8=focus1-8, 9=global)
!RPFOC+	Next Roomperfect position button
!RPFOCS?	Get available RoomPerfect positions
!RPVOI-	Previous voicing button
!RPVOI?	Request active voicing
!RPVOI(x)	Set voicing
!RPVOI+	Next voicing button
!RPVOIS?	Request list of available voicings
!SETUP	Setup button

!SRC-	Previous source button
!SRC?	Request active source
!SRC(x)	Select source
!SRC(x)?	Get info for source x
!SRC+	Next source button
!SRCOFF-	Decrease Source volume offset
!SRCOFF?	Request source volume offset for current source
!SRCOFF(x)	Set source volume offset for current source
!SRCOFF+	Increase source volume offset
!SRCS?	Request list of available sources
!SWINFO?	Request SW information (prints a list of version numbers)
!TRIMBASS-	Decreases bass level trim (10 = 1dB)
!TRIMBASS?	Return bass level trim (10 = 1dB)
!TRIMBASS(x)	Sets bass level trim (10 = 1dB)
!TRIMBASS+	Increases bass level trim (10 = 1dB)
!TRIMCENTER-	Decreases center channel level trim (10 = 1dB)
!TRIMCENTER?	Return center channel level trim (10 = 1dB)
!TRIMCENTER(x)	Sets center channel level trim (10 = 1dB)
!TRIMCENTER+	Increases center channel level trim (10 = 1dB)
!TRIMHEIGHT-	Decreases height channels level trim (10 = 1dB)
!TRIMHEIGHT?	Return height channels level trim (10 = 1dB)
!TRIMHEIGHT(x)	Sets height channels level trim (10 = 1dB)
!TRIMHEIGHT+	Increases height channels level trim (10 = 1dB)
!TRIMLFE-	Decreases LFE channel level trim (10 = 1dB)
!TRIMLFE?	Return LFE channel level trim (10 = 1dB)
!TRIMLFE(x)	Sets LFE channel level trim (10 = 1dB)
!TRIMLFE+	Increases LFE channel level trim (10 = 1dB)
!TRIMSURRS-	Decreases surround channels level trim (10 = 1dB)
!TRIMSURRS?	Return surround channels level trim (10 = 1dB)
!TRIMSURRS(x)	Sets surround channels level trim (10 = 1dB)
!TRIMSURRS+	Increases surround channels level trim (10 = 1dB)
!TRIMTREB-	Decreases treble level trim (10 = 1dB)
!TRIMTREB?	Return treble level trim (10 = 1dB)
!TRIMTREB(x)	Sets treble level trim (10 = 1dB)
!TRIMTREB+	Increases treble level trim (10 = 1dB)
!VERB(x)	Set verbosity level of active interface. (0-2)
!VERB?	Request verbosity level of active interface. (0-2)
!VOL-	Decrease volume
!VOL-(x)	Decrease volume by x
!VOL?	Request current volume
!VOL(x)	Set volume to x
!VOL+	Increase volume
!VOL+(x)	Increase volume by x
!ZMUTE	Toggle Zone B Mute
!ZMUTE?	Request Zone B Mute
!ZMUTEOFF	Zone B Mute off
!ZMUTEON	Zone B Mute on
!ZPOFF	Zone Power Off
!ZPON	Zone Power On
!ZPTOGGLE	Zone Power Toggle
!ZSRC-	Previous zone B source button
!ZSRC?	Request current Zone B source

!ZSRC(x)	Set zone B source
!ZSRC(x)?	Request info about zone B source x
!ZSRC+	Next zone B source button
!ZSRCS?	Get list of available Zone B sources
!ZVOL-	Decrease zone B volume
!ZVOL-(x)	decrease zone B volume by X
!ZVOL?	Request current zone B volume
!ZVOL(x)	Set zone B volume
!ZVOL+	Increase zone B volume
!ZVOL+(x)	Increase zone B volume by x

5   Direct IR Input Selection Codes

Fourteen IR codes are available for direct Input selection. This allows a third-party programmable remote controls to directly select MX160 inputs.

The input code assignment can be made in the Installer Menu: Source/Edit/select name/IR Command.

Hex Code   MX160 Installer Menu Source Name

08H   SAT

09H   TV

0AH   Server

0BH   DVR

0CH   VCR2

0DH   DVD

10H   CD1

11H   CD2

12H   TUNER

13H   Rec1

14H   Rec2

15H   TAPE3

16H   VIDEO

17H   AUX

Some of these IR codes are contained in hidden pre-programmed pages of the HR085 Remote Control. See HR085 Learning Guide, part number 041613, for more information. These commands can be transmitted by the HR085 and captured by other learning remotes.

Additional commands can be programmed into third-party remotes using the Hex codes above.

MX160 Serial Control Manual

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KEY	CODE	Command List (Not used by MX160)
1	00H	--------
2	01H	PLAY
3	02H	NEXT
4	03H	BACK
5	04H	STOP
6	05H	ACC "ON"
7	06H	ACC "OFF"
8	07H	PAUSE
9	08H	SAT
10	09H	TV
11	0AH	SERVER
12	0BH	DVR
13	0CH	VCR2
14	0DH	DVD
15	0EH	TRIM
16	0FH	PRESET
17	10H	CD
18	11H	CD2
19	12H	TUNER
20	13H	REC1
21	14H	REC2
22	15H	TAPE3
23	16H	VIDEO
24	17H	PH/AUX
25	18H	LEFT
26	19H	UP
27	1AH	RIGHT
28	1BH	DOWN
29	1CH	SELECT
30	1DH	INFO(TITLE)
31	1EH	DISPLAY
32	1FH	MENU

33	40H	POWER (Cycle)
34	41H	SYSTEM OFF
35	42H	VOLUME UP
36	43H	VOLUME DN
37	44H	LEVEL UP
38	45H	LEVEL DN
39	46H	MUTE
40	47H	MODE
41	48H	2ND (Setup Menu, Blue button)
42	49H	TAPE MON1
43	4AH	RECORD
44	4BH	POWER ON
45	4CH	SPEAKER1
46	4DH	SPEAKER2
47	4EH	INPUT UP
48	4FH	INPUT DN
49	50H	1
50	51H	2
51	52H	3
52	53H	4
53	54H	5
54	55H	6
55	56H	7
56	57H	8
57	58H	9
58	59H	0
59	5AH	CHAN DN (REW) <<
60	5BH	CHAN UP (FF) >>
61	5CH	BAND
62	5DH	AM, DISC
63	5EH	FM, TRACK
64	5FH	POWER OFF

NEC IR Format (Custom Code CA55 hex):