



MUSICATM

MU4601

RS-232 Integration Manual

Rev.2.0



Integration Manual for *Musica* MU4601 2.0

This document explains how to connect and control the *Musica*™ Audio Distribution System with an external control system.



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INTRODUCTION

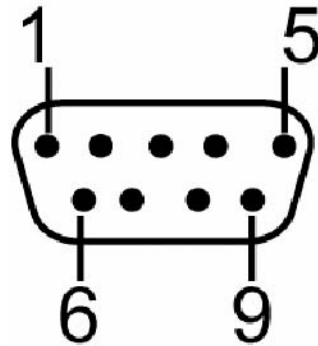
The *NetStreams Musica*™ MU4601 is a multi-source multi-zone audio distribution system that can be integrated to work with external control systems and servers such as Crestron, AMX and Vantage controllers, or control software such as Premise System's 'SYS'. This integration is accomplished via a simple connection to *Musica*'s RS-232 port on the rear of the *Musica* Audio Distribution Center (ADC). *Musica*'s RS-232 interface contains a very rich, two-way protocol with over 1,250 command sets, allowing an installer to achieve impressive two-way interfaces, easily. *Musica*'s RS-232's protocol includes a command set for subscribing to status or reports, which allows the installer to use the button pushes on a *Musica* keypad to create events within the other control system.

This manual contains diagrams and a list of the command parameters, ranges, and command sets and examples that will help you easily integrate the *Musica* system with your control system.



SERIAL PORT PARAMETERS

Command Standard:	RS-232c
Baud Rate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	N
Pacing:	None
Hardware Handshaking:	None
Software Handshaking:	None



SERIAL PORT PARAMETERS

PIN	FUNCTION	ABBREVIATION
1	NOT USED	
2	Received Data	RD / RX / RXD
3	Transmitted Data	TD / TX / TXD
4	NOT USED	
5	Signal Ground	GND
6	NOT USED	
7	NOT USED	
8	NOT USED	
9	NOT USED	

RS-232c CONTROL

The protocol described in this document provides the following commands, which are described in detail below:

- **Status(Stat)** – Amp, Balance(Bal), Bass, Backlight Color(BaCo), Backlight Level(BaLi), Doorbell(Door), Loud, Phone, mute, Switched Outlet(SwOu), Source(Src), Treble(Treb), and Volume(Vol)
- **Change** – Amp, Balance(Bal), Bass, Backlight Color(BaCo), Backlight Level(BaLi), Doorbell(Door), Loud, Phone, mute, Switched Outlet(SwOu), Source(Src), Treble(Treb), and Volume(Vol)
- **Nudge** – Single adjustments in one direction, Bass, Balance(f), Backlight Level(l), Loud, Source, Treble(t), and Volume(v)
- **Execute(Exe)** – The selected keypad button action Press, and Hold
- **Group** – Selects a Source for multiple zones
- **Page** – Page
- **All Off** – All zones off command
- **Event** – These commands control the unsolicited data; Source, Source Name, Button Press, Room Data

The system will send unsolicited data after any changes in the system are made. Input lines are to be terminated with a CR or a CR/LF combination.

COMMAND PARAMETERS AND RANGES

The following parameter types are used in the command table below. Parameters are entered and returned as ASCII strings.

Parameter	Description
Z	Zone number. Range is 0-6. The 0 parameter is for all zones.
S	Source. 0 = Off. 1 to 4 = source number
V	Volume 0 - 35
B	Bass 1- 15
T	Treble 1- 15
X	Logic Level Parameter. Values are 0=Off, and 1=On. (Loudness use the X parameter in 2.0)
D	Direction to ramp. 0=down, 1=up
P	Page Group to enable/disable.
C	Registered Source Command
F	Balance 1- 15
N	Source Names 1-30 (see list page 10)
L	Brightness Level 1-15
A	Room = 0, Room+EXT=1, EXT=2

NS-MU4601 COMMAND SET

All Commands are sent and received in ASCII characters.

1st	2rd	3th	Action	Parameter(s)	Example String
Stat	Src	/	StatSrc/	Z	StatSrc/1
	Bass	/	StatBass/	Z	StatBass/1
	Treb	/	StatTreb/	Z	StatTreb/1
	Bal	/	StatBal/	Z	StatBal/1
	Loud	/	StatLoud/	Z	StatLoud/1
	Vol	/	StatVol/	Z	StatVol/1
	Mute	/	StatMute/	Z	StatMute/1
	BaCo	/	StatBaCo/	Z	StatBaCo/1
	BaLi	/	StatBaLi/	Z	StatBaLi/1
	Door		StatDoor	-	StatDoor
	Phone		StatPhone	-	StatPhone
	SwOu		StatSwOu	-	StatSwOu
	Amp	/	StatAmp/	Z	StatAmp/1
	AllOff	AllOff		AllOff	-
Change	Src	/	ChangeSrc/	Z/S	ChangeSrc/1/2
	Bass	/	ChangeBass/	Z/B	ChangeBass/1/15
	Treb	/	ChangeTreb/	Z/T	ChangeTreb/1/15
	Bal	/	ChangeBal/	Z/F	ChangeBal/1/7
	Loud	/	ChangeLoud/	Z/X	ChangeLoud/1/1
	Vol	/	ChangeVol/	Z/V	ChangeVol/1/11
	Mute	/	ChangeMute/	Z/X	ChangeMute/1/0
	BaCo	/	ChangeBaCo/	Z/X	ChangeBaCo/1/0
	BaLi	/	ChangeBaLi/	Z/L	ChangeBaLi/1/0
	Door	/	ChangeDoor/	X	ChangeDoor/0
	Phone	/	ChangePhone/	X	ChangePhone/0
	SwOu	/	ChangeSwOu/	X	ChangeSwOu/0
	Store	/	ChangeStore/	S/N	ChangeStore/1/30
	Amp	/	ChangeAmp/	Z/A	ChangeAmp/1/1 or 0
Nudge	Bal	/	NudgeBal/	Z/D	NudgeBal/1/0
	Src	/	NudgeSrc/	-	
	Bass	/	NudgeBass/	Z/D	NudgeBass/1/0
	Treb	/	NudgeTreb/	Z/D	NudgeTreb/1/0
	Vol	/	NudgeVol/	Z/D	NudgeVol/1/0
	BaLi	/	NudgeBaLi/	Z/D	NudgeBaLi/1/0
Exe	Press	/	ExePress/	S/C	ExePress/1/12
	Hold	/	ExeHold/	S/C	ExeHold/1/12

SAMPLE COMMANDS

The following commands are examples of the control and status functions for the NS-MU4601.

Action	# Params	Parameter(s)	Description	Example String
ChangeSrc/	2	Z/S	Changes Zone Z to Source S, turns on keypad if off.	"ChangeSrc/1/2"
StatSrc/	1	Z	Status Zone Z's source	"StatSrc/1"
ChangeVol/	2	Z/V	Changes Zone Z's volume. Volume immediately changes to volume V. NudgeVol described below can also be used to ramp volume.	"ChangeVol/1/11"
StatVol/	1	Z	Status Zone Z's volume	"StatVol/1"
NudgeVol/	2	Z/D	Ramp zone Z's volume in direction D one step.	"NudgeVol/1/0"
ChangeBass/	2	Z/B	Changes Zone Z's bass.	"ChangeBass/1/15"
StatBass/	1	Z	Status Zone Z's bass	"StatBass/1"
NudgeBass/	2	Z/D	Ramp zone Z's bass in direction D one step.	"NudgeBass/1/0"
ChangeTreb/	2	Z/T	Change Zone Z's treble	"ChangeTreb/1/15"
StatTreb/	1	Z	Status Zone Z's treble	"StatTreb/1"
NudgeTreb/	2	Z/D	Ramp zone Z's treble in direction D one step.	"NudgeTreb/1/0"
ChangeMute/	2	Z/X	Change Zone Z's mute	"ChangeMute/1/0"
StatMute/	1	Z	Zone Z's mute status	"StatMute/1"
ExePress/	2	S/C	Execute source S's registered command C. This is the equivalent function to pressing one of the keypad source transport buttons.	"ExePress/1/12"
ExeHold/	2	S/C	Execute source S's registered command C.	"ExeHold/1/12"
All On	2	Z/S	Changes or turns on all keypads to source 1.	"Changesrc/0/1"
AllOff	0		Turn off all zones	"AllOff"
ChangeBaCo/	2	Z/X	Changes Zone Z's Backlight Color. (0=Green, 1=Amber)	"ChangeBaCo/1/0"
StatBaCo/	1	Z	Status of Zone Z's Backlight Color. (0=Green, 1=Amber)	"StatBaCo/1"
ChangeDoor/	1	X	Doorbell mode 0=Off, 1=On	"ChangeDoor/0"
StatDoor	0	-	Status of Doorbell mode	"StatDoor"
ChangeBal/	2	Z/F	Changes Zone Z's Balance	"ChangeBal/1/7"
StatBal/	1	Z	Status of Zone Z's Balance	"StatBal/1"
NudgeBal/	2	Z/D	Ramp Zone Z's Balance in direction D one step.	"NudgeBal/1/0"
ChangePhone/	1	X	Phone mode 0=Off, 1=On	"ChangePhone/0"
StatPhone	0	-	Status of Phone mode	"StatPhone"
ChangeBaLi/	2	Z/L	Changes Zone Z's Backlight Level (L). 0=off	"ChangeBaLi/1/0"
StatBaLi/	1	Z	Status of Zone Z's Backlight Level. 0=off	"StatBaLi/1"
NudgeBaLi/	2	Z/D	Ramp Zone Z's Backlight Level in direction D one step.	"NudgeBaLi/1/0"
ChangeSwOu/	1	X	Switched Outlet mode 0=Off, 1=On	"ChangeSwOu/0"
StatSwOu	0	X	Status of Switched Outlet	"StatSwOu"
ChangeStore/	2	S/N	Changes source name for source on all keypads.	"ChangeStore/1/12"
ChangeLoud/	2	Z/U	Changes Zone z's Loudness, Loudness immediately changes to Loud U.	"ChangeLoud/1/1"
StatLoud	1	Z	Status Zones Z'z Loudness	"StatLoud/2"

UNSOLICITED DATA COMMANDS

<u>1st</u>	<u>2rd</u>	<u>3th</u>	<u>Action</u>	<u>Parameter(s)</u>	<u>Example String</u>
Event	Src	/	EventSrc/	E	EventSrc/1
	Store	/	EventStore/	Z/E	EventStore/3/1
	Press	/	EventPress/	E(0 or 1)	EventPress/1/1~24
	Data	/	EventData/	Z/E	EventData/2/1

EXPLANATION: Subscribing to these commands will render unsolicited data which can be used to update status feedback on touch panels, software, or keypads.

- i. e. EventData/2/1 – this command subscribes you to Room #2 so that any data point that changes, such as volume, treble, bass, etc., is reported, at time of change, unsolicited.
- To unsubscribe to Room #2, in our example above, simply send an EventData/2/0 command.

EVENT STORE VALUES

<u>Return value</u>	<u>Store name</u>	<u>Return value</u>	<u>Store name</u>
1	CD	16	LIGHTS
2	AUX	17	INTERNET
3	TAPE	18	JAZZ
4	TUNER	19	REQUEST
5	TUNER2	20	MOM
6	AM	21	XM RADIO
7	FM	22	POP
8	MP3	23	R&B
9	BLUES	24	RAP
10	CHILDREN	25	HD RADIO
11	CLASSIC	26	ROCK
12	COUNTRY	27	SAT
13	DAD	28	SAT2
14	DANCE	29	SOUL
15	DVD	30	WESTERN

UNSOLICITED DATA MESSAGES

When a message like EventData/0/1 is sent the *Musica*, it will start to send back messages unsolicited. This means that any data point that changes will automatically generate an message that can be used to update data on an integrated system. These tables below will describe the messages that are sent by *Musica*. These messages can be used in a number of ways. For example: when using a Crestron, the volume information of the system needs to be represented accurately. By subscribing to the *Musica* the Crestron can now see the data that it needs for updating graphics on a touch panel.

Example String:EventData/3/28/10/12/8/1/0/0/8/1/0/0/0

This message describes what specified room values are such as volume, bass, treble etc. This is definition of each value in the string:

EventData/Z/V/B/T/Ba/L/Mu/C/Br/E/A/Me/O

Z	Which Zone or Room 1-6
V	Volume level of the above zone 0-35
B	Bass 1-15 8 being center
T	Treble 1-15 8 being center
Ba	Balance 1-15 8 being center
L	Loudness 0-Off 1-On
M	Mute 0-Off 1-On
C	Back Light Color 0=Green 1=Amber Check Brightness for Off
Br	Brightness 0-8, 0 indicates backlight is off
E	Audio Port 0=not connected 1=connected
A	Amp 0=Room Amp, 1=Room Amp + External, 2=External
Me	Menu Lock 0=Unlocked 1=Locked
O	Overheat 0=Normal 1=Overheat

An X in any position either means not available or not connected

Example: EventStore/2/3/1/4/5

This string will describe the source name used in the keypad set by the user.

EventStore/Z/S1/S2/S3/S4

Z	Zone
S1	Source 1 Name 1-30
S2	Source 2 Name 1-30
S3	Source 3 Name 1-30
S4	Source 4 Name 1-30

These numbers associate with the list of names on Page 7.

UNSOLICITED DATA MESSAGES

Example: EventSrc/E/X/1/2/3/4
EventSrc/R1/R2/R3/R4/R5/R6

This message describes which source is playing in which room or zone. The R value represents the room in the string but the values that are sent are as follows:

1	Source 1
2	Source 2
3	Source 3
4	Source 4
E	External Source from Audio Port
X	Room Off or keypad not on

Example: EventPress/1/11/6
EventPress/S/B/Z

S	Source 1-4
B	Button 1-24, 1-12 is the tap and 13-24 is the hold
Z	Zone 1-6

This Subscription return allows all buttons to be used as a discrete command for any control system. There are 576 discrete commands that can be sent system wide, 96 commands per keypad.

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