

## **MRC88 RS232 "DIGITAL" INTERFACE**

This document describes the bi-directional RS232 interface of the MRC88 using the COM port on the back of the system. This interface allows an external device to control the MRC88 via a set of ASCII text commands.

The protocol was designed to be similar to the one used in the Xantech ZPR68 so that it would be familiar to the installers. It is different from the ZPR68 in that the MRC88 has a buffered UART and is therefore able to receive a complete command/query string at one time.

The parsing of incoming data on the COM port can be disabled via a setting in the Dragon project. This might be necessary if the COM port is to be used to control an external device and any incoming data from that device is to be ignored. This setting can be found with the settings for configuring the COM port.

**COMMANDS**

*Note: An explanation of items in parenthesis ( {} ) can be found below.*

NAME	COMMAND	REMARKS
Zone Power	!{z#}PR{0/1}+	To turn on Zone 2: !2PR1+
		To turn off Zone1: !1PR0+
Zone Power Toggle	!{z#}PT+	
All Zones Off	!AO+	
Input (Source) Select	!{z#}SS{s#}+	To set Zone 1 to Source Input 5: !1SS5+
Volume	!{z#}VO{v#}+	
Volume Increment	!{z#}VI+	
Volume Decrement	!{z#}VD+	
SubZone Volume	!{z#}VZ{v#}+	
SubZone Volume Increment	!{z#}VX+	
SubZone Volume Decrement	!{z#}VY+	
Mute	!{z#}MU{0/1}+	To mute Zone 3: !3MU1+
		To unmute Zone 4: !4MU0+
Mute Toggle	!{z#}MT+	
SubZone Mute	!{z#}MZ{0/1}+	To mute the subzone in Zone 3: !3MZ1+
		To unmute the subzone in Zone 4: !4MZ0+
SubZone Mute Toggle	!{z#}MX+	
Treble	!{z#}TR{bt#}+	
Treble Increment	!{z#}TI+	
Treble Decrement	!{z#}TD+	
Bass	!{z#}BS{bt#}+	
Bass Increment	!{z#}BI+	
Bass Decrement	!{z#}BD+	
Balance	!{z#}BA{b#}+	
Balance Step Left	!{z#}BL+	
Balance Step Right	!{z#}BR+	

NAME	COMMAND	REMARKS
Execute RS232 Macro	! <i>{m#}</i> <b>MC</b> +	
Execute Keypad Button	! <i>{z#}</i> <b>MK</b> <i>{k#}</i> <b>X</b> <i>{i#}</i> +	Ignores any preset pages - always executes macro on the home page (the page with the sources) .
Zone Activity Auto Update	! <b>ZA</b> <i>{0/1}</i> +	Enable/Disable Auto Update of the Zone Information when Zone Activity is Detected. (See below for format of the output.)
Zone Periodic Auto Update	! <b>ZP</b> <i>{X seconds}</i> +	Enable/Disable Auto Update of the Zone Information every <i>X</i> seconds. If <i>X</i> is 0, this is disabled. (See below for format of the output.)

**QUERIES**

*Note: An explanation of items in parenthesis ( {} ) can be found below.*

NAME	QUERY	RESPONSE	EXAMPLE RESPONSE	EXPLANATION
Zone Power	?{z#} <b>PR</b> +	?{z#}PR{0/1}+	?7PR0+	Power in zone 7 is OFF.
Input Select	?{z#} <b>SS</b> +	?{z#}SS{s#}+	?5SS3+	Zone 5 currently has source 3 selected.
Volume	?{z#} <b>VO</b> +	?{z#}VO{v#}+	?4VO49+	Zone 4 is currently at volume level 49.
SubZone Volume	?{z#} <b>VX</b> +	?{z#}VX{v#}+	?4VX54+	The subzone in Zone 4 is currently at volume level 54.
Mute	?{z#} <b>MU</b> +	?{z#}MU{0/1} +	?8MU1+	Zone 8 is currently muted.
SubZone Mute	?{z#} <b>MX</b> +	?{z#}MX{0/1} +	?8MX1+	The subzone in Zone 8 is currently muted.
Treble	?{z#} <b>TR</b> +	?{z#}TR{bt#}+	?1TR7+	Zone 1 currently has a treble value of 7 (flat)
Bass	?{z#} <b>BS</b> +	?{z#}BS{bt#}+	?1BS7+	Zone 1 currently has a bass value of 7 (flat)
Balance	?{z#} <b>BA</b> +	?{z#}BA{t#}+	?2BA31+	Zone 2 currently has a balance value of 31 (even)
Current Sense Query	?{s#} <b>CS</b> +	?{s#}CS{0/1}	?3CS1+	Source 3 Current Sense is TRUE.
Video Sense Query	?{s#} <b>VS</b> +	?{s#}VS{0/1}	?1VS0+	Source 1 Video Sense is FALSE.
Zone Activity Auto Update	? <b>ZA</b> +	?ZA{0/1}+	?ZA1+	Zone Activity Auto Update is enabled
Zone Periodic Auto Update	? <b>ZP</b> +	?ZP{seconds}+	?ZP20+	Zone Periodic Auto Update is set to 20 seconds.
Zone Status	?(z#) <b>ZS</b> +	See Below	See Below	Returns the complete status of the Zone, including Metadata
Zone Data	?(z#) <b>ZD</b> +	See Below	See Below	Returns the status of the zone, minus the Metadata.
Zone Metadata	?(z#) <b>ZM</b> +	See Below	See Below	Returns all of the Metadata that is currently being displayed in the zone.

Where:

- {z#} - Zone Number. Range is 1..8 (1..16 if expanded)
- {s#} - Source Input Number. Range is 1..8
- {O/I} - Either 0 (zero) or 1 (one). 0 – Off, 1 – On.
- {v#} - Volume Setting. Range is 0..38. See VOLUME LEVEL table below.
- {bt#} - Bass/Treble Setting. Range is 0..14. See BASS/TREBLE LEVEL table below.
- {b#} - Balance Setting. Range is 0..63. See BALANCE LEVEL table below.
- {m#} - Macro Number. Range is 0..127.
- {k#} - Keypad Address. Range is 0..3.
- {i#} - Keypad Button ID. Range is 1..20. See KEYPAD BUTTON ID table below.
- {l#} - Line Number (for Metadata). Range is 1..3. See description of **Zone Info** / **Zone Status** below.

## **Zone Info / Zone Status**

The MRC88 (& MRAUDIO8X8) now supports multiple ways of getting complete zone info without having to query each individual piece of zone data.

In addition to two new queries (Zone Status request and Zone Metadata request), there are now two types of auto updates that are supported – a Periodic (or Timed) Update, and an Activity Update.

The new commands/queries for zone status:

ZA – Zone Activity Auto Update Enable Command. Format - **!ZA{0/1}+**

ZP – Zone Periodic Auto Update Enable Command. Format - **!ZP{X seconds}+**

ZS – Zone Status Query. Format - **?(z#)ZS+**

ZM – Zone Metadata Query. Format - **?(z#)ZM+**

### **Zone Activity Auto Update Enable Command**

The Activity Update will cause the system to send out the complete Zone State whenever something in the zone changes. The State string will be sent out one second after activity in the zone stops. Also, the Metadata will be sent out whenever it changes.

### **Zone Periodic Auto Update Enable Command**

The Periodic Update will cause the system to send out the complete Zone State of all zones in the system on a regular basis (Zone Metadata will not be sent out, as it would cause the MRC88 to bog down). How often the data is sent out is specified with the command that enables the Periodic Update, and is in number of seconds.

### **Zone Status Query**

The Zone Status Query will cause the system to send out the full Zone State string along with the Zone Metadata string(s), for the specified zone.

### **Zone Metadata Query**

The Zone Metadata Query will cause the system to send out the Zone Metadata string(s) for the specified zone.

### **Zone Data Query**

The Zone Data Query will cause the system to send out the Zone State string for the specified zone.

**Important Note: Any Zone Information output line that is sent out because of either of the two Auto Update commands will be sent out all of the RS232 ports in the system that have the "Parse Incoming Data" field checked.** In order to keep from excessively slowing down the MRC88, please make sure that only those ports that need to get the Auto Updates have this field checked! Also, use the highest baud rate that the receiving system can support.

When the MRC88 sends out complete Zone Status, (either due to an explicit query or due to an Auto Update, the data is formatted a bit differently than the standard responses to a Command or Query.

**All of the Zone Info / Zone Status output lines will begin with the character '#' (the sharp, or number sign).**

The Zone State data contains the Zone power, source, volume, mute state, treble, bass, balance, link state, and page state fields all in a single line.

The format of the Zone State is:

**# $\{z\}$ ZS PR $\{0/1\}$  SS $\{s\}$  VO $\{v\}$  MU $\{0/1\}$  TR $\{bt\}$  BS $\{bt\}$  BA $\{b\}$  LS $\{0/1\}$  PS $\{0/1\}$ +**

An example:

**#6ZS PR1 SS4 VO8 MU0 TR7 BS7 BA32 LS0 PS0+**

This line tells us the following info about Zone 6:

Power – On  
Source – 4  
Volume – 8  
Mute – Off  
Treble – 7  
Bass – 7  
Balance – 32  
Linked – No  
Paged – No

The Zone Status also includes any Metadata that is being displayed in the zone. Each zone currently can have up to two lines of Metadata being displayed at any one time. The MRC88 will output one Metadata status line for each line of Metadata currently active in the zone, plus one line with an empty Metadata string.

The format of the Zone Metadata is:

**# $\{z\}$ ZM SS $\{s\}$  LT $\{l\}$  "{metadata}"+**

**Note:** The following format was supported in version 2.18. It was replaced with the current format in version 2.19.

**# $\{z\}$ ZM $\{l\}$  "{metadata}"+**

An example, from an iPort on Source 4:

**#11ZM SS4 LT1 "Vanishing"<CR>  
#11ZM SS4 LT2 "Barenaked Ladies"<CR>**

#11ZM SS4 LT3 ""+<CR>

These lines give us the following Metadata information about Zone 11:

Zone 11 is currently on Source 4.

Line 1 of the Metadata is "Vanishing". This is the song title.

Line 2 of the Metadata is "Barenaked Ladies". This is the song artist.

Since Line 3 contains an empty Metadata string, there are only 2 lines of Metadata.

Another example, from a Xantech Dual Tuner source in Zone 4 on Source 2:

#4ZM SS2 LT1 "FM 98.70 SL P01"+<CR>

#4ZM SS2 LT2 ""+<CR>

This tells us that in Zone 4 there is one line of Metadata, and it is "FM 98.70 SL P01".



**VOLUME LEVEL**  
(39 steps)

<b>MRC88 SETTING</b>	<b>ATTENUATION LEVEL (in dB)</b>
38	0
37	-1.25
36	-2.50
35	-3.75
34	-5.00
33	-6.25
32	-7.50
31	-8.75
30	-10.00
29	-11.25
28	-12.50
27	-13.75
26	-15.00
25	-16.25
24	-17.50
23	-18.75
22	-20.00
21	-21.25
20	-22.50
19	-23.75
18	-25.00
17	-27.50
16	-30.00
15	-32.50
14	-35.00
13	-37.50
12	-40.00
11	-42.50
10	-45.00
9	-47.50
8	-50.00
7	-52.50
6	-56.25
5	-60.00
4	-63.75
3	-67.50
2	-71.25
1	-75.00
0	-78.75

**KEYPAD BUTTON ID**

<b>MRC88 SETTING</b>	<b>Keypad Button Label</b>
1	VOL +
2	VOL -
3	Source Select 1
4	Source Select 2
5	Source Select 3
6	Source Select 4
7	Source Select 5
8	Source Select 6
9	Source Select 7
10	Source Select 8
11	CH +
12	CH -
13	POWER
14	<b>NOT AVAILABLE</b>
15	MUTE
16	PAUSE
17	STOP
18	FF
19	REW
20	SELECT/PLAY
21	<b>NOT AVAILABLE</b>
22	<b>NOT AVAILABLE</b>
23	Tier 2 Source Select 1
24	Tier 2 Source Select 2
25	Tier 2 Source Select 3
26	Tier 2 Source Select 4
27	Tier 2 Source Select 5
28	Tier 2 Source Select 6
29	Tier 2 Source Select 7
30	Tier 2 Source Select 8
31	Tier 2 CH +
32	Tier 2 CH -
33	Tier 2 POWER
34	<b>NOT AVAILABLE</b>
35	Tier 2 MUTE
36	Tier 2 PAUSE
37	Tier 2 STOP
38	Tier 2 FF
39	Tier 2 REW
40	Tier 2 SELECT/PLAY

**BASS/TREBLE LEVEL**  
(15 steps)

<b>MRC88 SETTING</b>	<b>LEVEL (in dB)</b>
14	+14
13	+12
12	+10
11	+8
10	+6
9	+4
8	+2
7	0
6	-2
5	-4
4	-6
3	-8
2	-10
1	-12
0	-14

**BALANCE LEVEL**  
(63 steps)

<b>MRC88 Setting</b>	<b>Left Speaker Attenuation (in dB)</b>	<b>Right Speaker Attenuation (in dB)</b>
0	0	Mute
1	0	-37.5
2	0	-36.25
...	...	...
29	0	-2.5
30	0	-1.25
31	0	0
32	0	0
33	-1.25	0
34	-2.5	0
...	...	...
62	-37.5	0
63	Mute	0