

CLOCKAUDIO

MR88 Automatic Microphone Mixer
RS232 Programming
Version 4.2

Clockaudio Limited, 9 Stratfield Park
Elettra Avenue, WATERLOOVILLE
Hampshire. UK
Tel : +44 (0)2392 251193 Fax : +44 (0)2392 251201
Email : sales@clockaudio.demon.co.uk

CONTENTS

INTRODUCTION	3
RS232 Physical Parameters	3
RS232 Packets	3
Checksum	3
Reserved Bytes	3
Data Field	4
Commands	5
Get Output Channels	6
Get Input Channels	7
Get System.....	10
Get Headphone Monitor	12
Get Channel Meters and Status	14
Set Output Channels	16
Set Input Channels.....	17
Set System	20
Set Monitor	22
Set Defaults	24
Get Version.....	25

INTRODUCTION

The purpose of this manual is to assist programmers in successfully writing code to control the MR88 automatic mixer. This manual describes the RS232 interface to the MR88 automatic mixer.

When more than one MR88 is linked via the Link In/Out connectors, the RS232 control will extend through the link. Any MR88 in the chain can be used as the RS232 input. The MR88's are automatically addressed from 1 to n. The first MR88 in the chain is Mixer 1

RS232 Physical Parameters

The MR88 is controlled via RS232: 38400 baud, no parity, 8 data bits 1 stop bits.

The physical connection is to the DB9 way connector on the MR88 rear panel.

Pin 2 Rx data to PC.
Pin 3 Tx data from PC.
Pin 5 Ground.

RS232 Packets

All RS232 packets, whether they are transmitted to, or received from the MR88 mixer, use the same packet format. All values are in bytes using unique headers and footers with byte stuffing. In this manual, a byte is represented by a hexadecimal number in the form 0xNN.

Packet Header	Data	Checksum	Packet Footer
1 byte (0x7E)	N bytes	1 byte	1 byte (0x7D)

Checksum

The one-byte checksum is calculated as the 1's complement of the sum of the data bytes, modulo 256 before byte stuffing. Therefore the sum of all the data bytes including the checksum will be 0xFF. If the data or checksum contains any reserved bytes they are replaced with a 2 byte sequence.

Reserved Bytes

0x7D becomes 0x7F 0xFD

0x7E becomes 0x7F 0xFE

0x7F becomes 0x7F 0xFF

Data Field

Commands are sent in the form

Address	Command	Data
1 byte	1 byte	N bytes

All commands respond as follows

Address	Command	Data
1 byte	1 byte OR 0x80	N bytes

Commands

Command Number	Command
0x00	Get Output Channel
0x01	Get Input Channel 1
0x02	Get Input Channel 2
0x03	Get Input Channel 3
0x04	Get Input Channel 4
0x05	Get Input Channel 5
0x06	Get Input Channel 6
0x07	Get Input Channel 7
0x08	Get Input Channel 8
0x09	Get System Settings
0x0A	Get Monitor Settings
0x0B	Get Status and Meters
0x0C	Set Output Channels
0x0D	Set Input Channel 1
0x0E	Set Input Channel 2
0x0F	Set Input Channel 3
0x10	Set Input Channel 4
0x11	Set Input Channel 5
0x12	Set Input Channel 6
0x13	Set Input Channel 7
0x14	Set Input Channel 8
0x15	Set System
0x16	Set Monitor
0x17	Reset to Factory Defaults
0x7F	Get Version

Get Output Channels

Command 0x00

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x00	Get Output channels

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x80	Get Output Channels Ack
3	Gain A	0xC4 – 0x00	-60dB to 0dB
4	Gain B	0xC4 – 0x00	-60dB to 0dB
8	Source A	0x00 – 0x03	0x00 = Off 0x01 = Channel X 0x02 = Channel Y 0x03 = Channel X+Y
9	Source B	0x00 – 0x03	0x00 = Off 0x01 = Channel X 0x02 = Channel Y 0x03 = Channel X+Y

Example to get the output settings for mixer address 2 :-

0x7E, 0x02, 0x00, 0x7F, 0xFD, 0x7D

The mixer would respond with, for example :-

0x7E, 0x02, 0x80, 0xFC, 0xF0, 0x01, 0x02, 0x8E, 0x7D

Get Input Channels

All input channel Get commands are of the form

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x01 – 0x08	Get Input Channel 1 - 8

Where command is

Command	Description
0x01	Get Input Channel 1
0x02	Get Input Channel 2
0x03	Get Input Channel 3
0x04	Get Input Channel 4
0x05	Get Input Channel 5
0x06	Get Input Channel 6
0x07	Get Input Channel 7
0x08	Get Input Channel 8

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x81 – 0x88	Get Input Channel n Ack
3	Mono/Stereo	0x00 – 0x01	0x00 = Mono 0x01 = Stereo
4	Input Level	0x00 – 0x02	0x00 = Mic + Phantom 0x01 = Microphone 0x02 = Line
5	Input Gain	0xD8 – 0x14	-40db – +20dB
6	Compression	0x00 – 0x09	0 = Off 9 = Max
7	Eq Low	0xF4 – 0x0C	-12dB – +12dB
8	Eq High	0xF4 – 0x0C	-12dB – +12dB
9	Output to	0x00 – 0x03	0 = Off 1 = Bus X 2 = Bus Y 3 = Bus X and Bus Y
10	Priority Level	0x01 – 0x04	1 = Priority 1 4 = Priority 4
11	Gate Level	0x00 – 0x22, 0x23	6dB – 40dB and Mute
12	Detector Type	0x00 – 0x04	0x00 = Auto Speech 0x01 = Auto Music 0x02 = Manual 0x03 = Force Off 0x04 = Force On
13	Manual Level	0xD8 – 0x00	-40dB – 0dB
14	Hold Time	0x00 – 0x05	0 = 50mS 1 = 100mS 2 = 200mS 3 = 500mS 4 = 1S 5 = 2S
15	NOMA	0x00 – 0x01	0 = Exclude from Noma 1 = Include in NOMA

Example to get the input settings for Channel 1 from Mixer address 3 :-

0x7E, 0x03, 0x01, 0xFB, 0x7D

The mixer would respond with, for example :-

0x7E, 0x03, 0x81, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x03,
0x03, 0x01, 0x0C, 0x00, 0xEC, 0x02, 0x01, 0x79, 0x7D

Get System

Command 0x09

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x09	Get System

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x89	Get System Ack
3	Priority 1	0x00 – 0x01	0x00 = Inclusive 0x01 = Exclusive
4	Priority 2	0x00 – 0x01	0x00 = Inclusive 0x01 = Exclusive
5	Priority 3	0x00 – 0x01	0x00 = Inclusive 0x01 = Exclusive
6	Priority 4	0x00 – 0x01	0x00 = Inclusive 0x01 = Exclusive
7	Last Channel On	0x00 – 0x01	0x00 = Disabled 0x01 = Enabled
8	Code 1	0x00 – 0x09	1 st Code digit 1 - 9
9	Code 2	0x00 – 0x09	2 nd Code digit 1 - 9
10	Code 3	0x00 – 0x09	3 rd Code digit 1 - 9
11	Code 4	0x00 – 0x09	4 th Code digit 1 - 9
12	Control Outputs	0x00 – 0x01	0x00 = High 0x01 = Low
13	Control Inputs	0x00 – 0x01	0x00 = Force off 0x01 = Force on

Byte	Name	Value	Detail
14	VCA	0x00 – 0x04	0x00 = VCA1 to OFF, VCA2 to OFF 0x01 = VCA1 to ChA, VCA2 to OFF 0x02 = VCA1 to ChB, VCA2 to OFF 0x03 = VCA1 to ChA+B, VCA2 to OFF 0x04 = VCA1 to ChA, VCA2 to ChB
15	Locked	0x00 – 0x01	0x00 = Unlocked 0x01 = Locked

Example to get the system settings from Mixer address 2 :-

0x7E, 0x02, 0x09, 0xF4, 0x7D

The mixer would respond with, for example :-

0x7E, 0x02, 0x89, 0x01, 0x00, 0x00, 0x00, 0x01, 0x02, 0x03, 0x04, 0x05,
0x00, 0x00, 0x00, 0x00, 0x64, 0x7D

Get Headphone Monitor

Command 0x0A

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x0A	Get Monitor

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x8A	Get Monitor Ack
3	Left	0x00 – 0x09	Left channel source
4	Right	0x00 – 0x09	Right channel source
5	Gain	0xC4 – 0x00	-60dB to 0dB

Where left and right sources are

Source	Description
0x00	Input Channel 1
0x01	Input Channel 2
0x02	Input Channel 3
0x03	Input Channel 4
0x04	Input Channel 5
0x05	Input Channel 6
0x06	Input Channel 7
0x07	Input Channel 8
0x08	Output Channel A
0x09	Output Channel B

Example to get the monitor settings from Mixer address 2 :-

0x7E, 0x02, 0x0A, 0xF3, 0x7D

The mixer would respond with, for example :-

0x7E, 0x02, 0x8A, 0x01, 0x01, 0xEC, 0x85, 0x7D

Get Channel Meters and Status

Command 0x0B.

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x0B	Get Status

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x8B	Get Status Ack
3	Channel 1 Meter	0xC4 – 0x0D	-60 dB – +13 dB
4	Channel 2 Meter	0xC4 – 0x0D	-60 dB – +13 dB
5	Channel 3 Meter	0xC4 – 0x0D	-60 dB – +13 dB
6	Channel 4 Meter	0xC4 – 0x0D	-60 dB – +13 dB
7	Channel 5 Meter	0xC4 – 0x0D	-60 dB – +13 dB
8	Channel 6 Meter	0xC4 – 0x0D	-60 dB – +13 dB
9	Channel 7 Meter	0xC4 – 0x0D	-60 dB – +13 dB
10	Channel 8 Meter	0xC4 – 0x0D	-60 dB – +13 dB
11	Output A Meter	0xC4 – 0x0D	-60 dB – +13 dB
12	Output B Meter	0xC4 – 0x0D	-60 dB – +13 dB
13	Enabled Channels	0x00 – 0xFF	A 1 in the corresponding bit position indicates that the channel is detected and on. Bit 0 = Channel 1 Bit 1 = Channel 2 Bit 2 = Channel 3 Bit 3 = Channel 4 Bit 4 = Channel 5 Bit 5 = Channel 6 Bit 6 = Channel 7 Bit 7 = Channel 8

Byte	Name	Value	Detail
14	Disabled Channels	0x00 – 0xFF	<p>A 1 in the corresponding bit position indicates that the channel is detected, but disabled.</p> <p>Bit 0 = Channel 1 Bit 1 = Channel 2 Bit 2 = Channel 3 Bit 3 = Channel 4 Bit 4 = Channel 5 Bit 5 = Channel 6 Bit 6 = Channel 7 Bit 7 = Channel 8</p>
15	Overload	0x00 – 0x01	<p>0x00 = No overloads 0x01 = An input or output channel is overloaded.</p>

Example to get the meter settings from Mixer address 2 :-

0x7E, 0x02, 0x0B, 0xF2, 0x7D

The mixer would respond with, for example :-

0x7E, 0x02, 0x8B, 0x01, 0x00, 0x00, 0x00, 0x01, 0x02, 0x03, 0x04, 0x05,
 0x00, 0x00, 0x00, 0x00, 0x62, 0x7D

Set Output Channels

Command 0x0C

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x0C	Set Output Channels
3	Gain A	0xC4 – 0x00	-60dB – 0dB
4	Gain B	0xC4 – 0x00	-60dB – 0dB
5	Source A	0x00 – 0x03	0x00 = Off 0x01 = Channel X 0x02 = Channel Y 0x03 = Channel X+Y
6	Source B	0x00 – 0x03	0x00 = Off 0x01 = Channel X 0x02 = Channel Y 0x03 = Channel X+Y

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x8C	Set Output Channels Ack

Example to set Gain A to –20dB, Gain B to –10dB, Source A to Channel X, Source B to Channel Y for mixer address 2

0x7E, 0x02, 0x0C, 0xEC, 0xF6, 0x01, 0x02, 0x0C, 0x7D

The mixer would respond with :-

0x7E, 0x02, 0x8C, 0x71, 0x7D

Set Input Channels

All Set input channel commands are of the form

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x0D – 0x14	Set Input Channel 1 – 8
3	Mono/Stereo	0x00 – 0x01	0x00 = Mono 0x01 = Stereo
4	Input Level	0x00 – 0x02	0x00 = Mic + Phantom 0x01 = Microphone 0x02 = Line
5	Input Gain	0xD8 – 0x14	-40db – +20dB
6	Compression	0x00 – 0x09	0 = Off 9 = Max
7	Eq Low	0xF4 – 0x0C	-12dB – +12dB
8	Eq High	0xF4 – 0x0C	-12dB – +12dB
9	Output to	0x00 – 0x03	0 = Off 1 = Bus X 2 = Bus Y 3 = Bus X and Bus Y
10	Priority Level	0x01 – 0x04	1 = Priority 1 4 = Priority 4
11	Gate Level	0x00 – 0x22, 0x23	6dB – 40dB and Mute
12	Detector Type	0x00 – 0x04	0x00 = Auto Speech 0x01 = Auto Music 0x02 = Manual 0x03 = Force Off 0x04 = Force On
13	Manual Detector Level	0xD8 – 0x00	-40dB – 0dB

Byte	Name	Value	Detail
14	Hold Time	0x00 – 0x05	0 = 50mS 1 = 100mS 2 = 200mS 3 = 500mS 4 = 1S 5 = 2S
15	NOMA	0x00 – 0x01	0 = Exclude from Noma 1 = Include in NOMA

Where command is

Command	Description
0x0D	Set Input Channel 1
0x0E	Set Input Channel 2
0x0F	Set Input Channel 3
0x10	Set Input Channel 4
0x11	Set Input Channel 5
0x12	Set Input Channel 6
0x13	Set Input Channel 7
0x14	Set Input Channel 8

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x8D – 0x94	Set Input Channel 1 – 8 Ack

Example to set Channel 1 to Mono, Line level, Gain -10dB, Compression 4, Eq low +6dB, Eq High -6dB, Output to bus Y, Priority 2, Gate level 20dB, Detector type Manual, Detector level -25dB, Hold time 200mS, NOMA Exclude for Mixer Address 2 :-

0x7E, 0x02, 0x0D, 0x00, 0x02, 0xF6, 0x04, 0x06, 0xFA, 0x02, 0x02, 0x16,
0x02, 0xE7, 0x02, 0x00, 0xEF, 0x7D

The mixer would respond with :-

0x7E, 0x02, 0x8D, 0x70, 0x7D

Set System

Command 0x15

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x15	Set System
3	Priority 1	0x00 – 0x01	0x00 = Inclusive 0x01 = Exclusive
4	Priority 2	0x00 – 0x01	0x00 = Inclusive 0x01 = Exclusive
5	Priority 3	0x00 – 0x01	0x00 = Inclusive 0x01 = Exclusive
6	Priority 4	0x00 – 0x01	0x00 = Inclusive 0x01 = Exclusive
7	Last Channel On	0x00 – 0x01	0x00 = Disabled 0x01 = Enabled
8	Code 1	0x00 – 0x09	1 st Code digit 1 – 9
9	Code 2	0x00 – 0x09	2 nd Code digit 1 – 9
10	Code 3	0x00 – 0x09	3 rd Code digit 1 – 9
11	Code 4	0x00 – 0x09	4 th Code digit 1 – 9
12	Control Outputs	0x00 – 0x01	0x00 = High 0x01 = Low
13	Control Inputs	0x00 – 0x01	0x00 = Force off 0x01 = Force on
14	VCA	0x00 – 0x04	0x00 = VCA1 to OFF, VCA2 to OFF 0x01 = VCA1 to ChA, VCA2 to OFF 0x02 = VCA1 to ChB, VCA2 to OFF 0x03 = VCA1 to ChA+B, VCA2 to OFF 0x04 = VCA1 to ChA, VCA2 to ChB
15	Locked	0x00 – 0x01	0x00 = Unlocked 0x01 = Locked

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x95	Set System Ack

Example to set mixer address 2 to Priority 1 exclusive priority 2 – 4 inclusive, Last Channel On = true, Code = 2345, Control outputs active high, Control inputs to Force off, VCA = off, Unlocked

0x7E, 0x02, 0x15, 0x01, 0x00, 0x00, 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x00, 0x00, 0x00, 0x00, 0xD8, 0x7D

The mixer would respond with :-

0x7E, 0x02, 0x95, 0x68, 0x7D

Set Monitor

Command 0x16

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x16	Set Monitor
3	Left	0x00 – 0x09	Left channel source
4	Right	0x00 – 0x09	Right channel source
5	Gain	0xC4 – 0x00	-60dB – 0dB

Where left and right sources are

Source	Description
0x00	Input Channel 1
0x01	Input Channel 2
0x02	Input Channel 3
0x03	Input Channel 4
0x04	Input Channel 5
0x05	Input Channel 6
0x06	Input Channel 7
0x07	Input Channel 8
0x08	Output Channel A
0x09	Output Channel B

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x96	Set Monitor Ack

Note if the left and right channels are set differently they must be to the same input or output channel pair.

Example to set Gain A to -20dB, Gain B to -10dB, Source A to Channel X, Source B to Channel Y for mixer address 2

0x7E, 0x02, 0x16, 0x00, 0x01, 0xF6, 0x06, 0x7D

The mixer would respond with :-

0x7E, 0x02, 0x96, 0x67, 0x7D

Set Defaults

Command 0x17

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x17	Set Factory Defaults

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x97	Set Factory Defaults Ack

Example to restore the factory defaults for mixer address 2

0x7E, 0x02, 0x17, 0xE6, 0x7D

The mixer would respond with :-

0x7E, 0x02, 0x97, 0x66, 0x7D

Get Version

Command 0x7F

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0x7F	Get Version

Response from MR88

Byte	Name	Value	Detail
1	Address	Byte	Address
2	Command	0xFF	Get Version Ack
3	ID1	0x02	
4	ID2	0x01	
5	Hardware Version	0x00 – 0xFF	Currently 4
6	Hardware State	0x00 – 0xFF	Currently 2
7	Boot Version	0x00 – 0xFF	Currently 1
8	Firmware Major	0x00 – 0xFF	Currently 4
9	Firmware Minor	0x00 – 0xFF	Currently 2

Example to get the version for mixer address 2 :-

0x7E, 0x02, 0x7F, 0xFF, 0x7F, 0xFE, 0x7D

The mixer would respond with, for example :-

0x7E, 0x02, 0xFF, 0x02, 0x01, 0x04, 0x02, 0x01, 0x04, 0x02, 0xEE, 0x7D