QUANTEC YARDSTICK 249x Series

MIDI Interface Rev. M 3.0

Revision history

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CE Conformity

The equipment described within this document conforms to applicable EC directives 73/23/EWG (Low Voltage Directive), amended by 93/68/EWG, and 89/336/EWG (EMC Directives – Electromagnetic Compatibility), amended by 91/263/EWG, 92/31/EWG and 93/68/EWG.

The standards applied here are for Low Voltage directive **EN60065:1993** (4.94 – formerly VDE0860) **– "Safety requirements for mains operated electronic and related apparatus for household and similar general use"**, and for EMC directive **prEN55103-1:1995** (Emission) and **prEN55103-2:1995** (Immunity) **– "Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use."**

The equipment satisfies **all** of the operating environments of classes **E1** to **E5** described in EN55103:

- E1   **Residential (including both of the classes rural residential and urban residential as described in IEC 1000-2-5)**
- E2   **Commercial and light industrial (including theaters)**
- E3   **Urban outdoors**
- E4   **Controlled EMC environment (for example TV studios) and rural outdoors environment (far away from railways, transmitters, overhead power lines, etc.)**
- E5   **Heavy industrial (see EN 50081-2) and environments close to broadcast transmitters**

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Advice for printing

The layout of this operations guide allows both to be printed in single or dual-sided A4 (~Letter) format, or as an A5 (~Invoice) booklet (4 pages per sheet). In both cases there is enough space for a spiral binding.

MIDI Interface

On the rear panel, there are the customary three MIDI connectors: MIDI IN, MIDI THRU, and MIDI OUT *("MIDI Trio")*. For the 249x YARDSTICK series, MIDI channel number is assigned in the **MIDI Channel** submenu item of the **System Setup** main menu item (**MIDI** menu group).

The following pages document how a YARDSTICK handles incoming MIDI messages.

For example, you can adjust the YARDSTICK's parameters with *Note On* MIDI messages. Which note has been assigned to what parameter is registered within the *Note On* Table. This table can be edited from the **Note On Table** menu item (**System Setup, MIDI** menu group).

As expected, the YARDSTICK's presets may be altered from MIDI, too. Presets are assigned to *Program Change* messages. The preset slot number corresponds to *program number+1*. As *program number* can hold values from 0 to 127, the first 128 preset slots can be reached only. *Any* preset slot may be reached by *System Exclusive* messages.

Administration of presets is only possible with *System Exclusive* messages. This is also an alternative method to control all the parameters.

Quantec's R&D team members always welcome suggestions and enhancements for the MIDI Interface - preferably via email at midi@quantec.de

Caution!

We urgently recommend not to control the device from *both* the front panel (or another remote control) and the MIDI interface at the same time. Standard MIDI editors and sequencers don't typically detect manual intervenience automatically. When provoking such kind of inconsistencies, don't be surprised from an unexpected behavior of your device.

MIDI Implementation

The following table lists the types of MIDI messages that can be accepted *(»Receive«)* or emitted *(»Transmit«)*.

Function		Transmit	Receive	Comments
MIDI Channel		No	1 – 16	adjustable from 1..16
Note Off		No	No	
Note On		No	Yes	adjustable from 0..127
After Touch		No	No	
Pitch Bend		No	No	
Control Change	0..127	No	No	
Program Change		No	Yes	= Slot Number - 1
System Exclusive		Yes	Yes	
System Common		No	No	
System Real Time		No	No	
Aux message	All sound off	No	No	
	Reset all contr.	No	No	
	Local on/off	No	No	
	All Notes off	No	No	
	Active Sense	No	No	
	System Reset	No	No	

SysEx message

From *System Exclusive messages* (abbr: "*SysEx*"), all YARDSTICK parameters can be set, and also read back. The composition of a SysEx is structured like this:

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID** (**System Setup** / **MIDI**)
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0nnn nnnn	$nn	every type of plug-in has an individual number
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0nnn nnnn	$nn	version of Preset data
12	Command ID	0nnn nnnn	$nn	see **Command IDs** chapter (p. 6)
13..n	Data			number depends on Command ID
n+1	EOX	1111 0111	$F7	

Byte 5 *Model ID* corresponds to the rightmost digit from model number, e.g. $02 for 2492, $03 for 2493, $06 for 2496, or $08 for 2498. When received, *Family ID* (byte 4) and *Model ID* are not verified. So it is also possible to exchange data between different types of devices.

Byte 6 *Device ID* is assigned from the **Device ID** menu item (**System Setup** / **MIDI**). If the unit is set to Device ID **000** (default), the incoming Device ID is not verified. Any Device ID will be accepted. If a specific Device ID is set, SysEx messages with non-matching IDs trigger an error (see pp. 19), and will be ignored in any regard. By configuring different Device IDs, several units can be operated independently within a single MIDI chain.

Byte 7 *MIDI Version* and byte 11 *Preset Version* (currently $32) are **not** identical with the plug-in's software version. FAQ 080 (www.quantec.com?faq080) illustrates the relationship between MIDI Version, Preset Version and the plug-in's software version. Non-compatible SysEx messages trigger an error (see pp. 19), and will be ignored in any regard.

Byte 8 *Plug-in ID* of a received SysEx message must match the ID of the currently active plug-in. Otherwise, the SysEx message triggers an error (see pp. 19) and will be ignored. The ID for plug-ins of type QRS – described in this document – is 043h.

For byte 9 *Inputs* and byte 10 *Outputs,* the number of the plug-in's inputs and outputs, not those of the unit, is relevant. It is quite possible that a plug-in with 2 output is being operated on a unit with 6 outputs.

Command IDs

This is a table of all Command IDs. The *Data Bytes* column lists the number of bytes between Command ID and EOX (byte 13..n). Whenever byte 13 has a special meaning, it is expressively mentioned in its column.

Command ID	Type	Byte 13	Data Bytes	Comment
$01	Preset Request	Slot Number	2	Slot Number = 1..250 byte 13 = 7 LSB, byte 14 = 1 MSB
$02	Preset Dump	Slot Number	158	Slot Number = 1..250 byte 13 = 7 LSB, byte 14 = 1 MSB
$03	Scratch Request	Scratch	1	0=Scratch A, 1=Scratch B
$04	Scratch Dump	Data Byte	152	0=Scratch A, 1=Scratch B
$07	Hotkey Request	-	0	
$08	Hotkey Dump	Data Byte	2	
$09	Parameter Request	Parameter Number	1..2	$7E: extended parameter number located in 2nd byte
$0A	Parameter Dump	Parameter Number	2..4	$7E: extended parameter number located in 2nd byte
$0D	Load Request	Scratch	3	byte 13: Scratch A = 0, Scratch B = 1 Slot Number = 1..250 byte 14 = LSB, byte 15 = MSB
$0E	Save Request	Slot Number	2	Slot Number = 1..250 byte 13 = LSB, byte 14 = MSB

Whenever a YARDSTICK detects a SysEx message with a *Request for data* command, it responds with the corresponding *Dump*. A YARDSTICK itself cannot initiate Request commands.

On a YARDSTICK, a user can trigger a *Scratch Dump* via Hotkey menu or remote control. At the start of a session, the Preset located in a Scratch can thus be recorded on a MIDI track. When replaying the track, the YARDSTICK is set up identically from the recorded *Scratch Dump*, regardless of existing or non-existing presets.

For extended *Scratch Dump* and *Preset Dump* SysEx messages, the content ot the data bytes is verified using a checksum. If ok, the data will continue being processed. For the checksum, all bytes are summed up, then subtracted from 0. Only 7 LSBs are used.

Composition of a command may be very complex, so all available commands are listed with all their details on the following pages.

Preset Request

A *Preset Request* will never be emitted by a YARDSTICK.

A *Preset Request* received by a YARDSTICK triggers a MIDI transfer of the Preset stored in the specified Slot. Preset will be read directly from Flash memory, and **not** loaded to Scratch! Thus a *Preset Request* creates only a memory dump. The requested data is not related to the currently audible signal, and does not change it.

A YARDSTICK responds to a correctly-received *Preset Request* with a *Preset Dump*.

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID** (**System Setup** / **MIDI**)
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
12	Command ID	0000 0001	$01	see **Command IDs** chapter (p. 6)
13	Slot number LSB	0nnn nnnn	$nn	7 LSB Slot number of Preset requested
14	Slot number MSB	0000 000n	$0n	1 MSB Slot number of Preset requested
15	EOX	1111 0111	$F7	

Slot number (1..250) is composed of byte 13 and byte 14.

Preset Dump

A *Preset Dump* sent by a YARDSTICK is always triggered by a previous *Preset Request*.

When a YARDSTICK receives an error-free *Preset Dump*, the included Preset will be installed in the referenced Slot. Previous slot data will be overwritten. A *Preset Dump* will always be dumped to the 249x's internal Flash memory. Dump data will **never** be loaded to Scratch, and therefore do **not** change the currently audible signal!

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID** (**System Setup** / **MIDI**)
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
12	Command ID	0000 0010	$02	see **Command IDs** chapter (p. 6)
13	Slot number LSB	0nnn nnnn	$nn	7 LSB Slot number of Preset transmitted
14	Slot number MSB	0n00 0000	$n0	1 MSB Slot number of Preset transmitted
15.. 169	Preset Data			142 bytes for parameter values, 8 ASCII bytes for the name, and 5 bytes for calendar data (see pp. 21)
170	Checksum	0ccc cccc	$cc	checksum across all Preset data bytes (byte 10..164)
171	EOX	1111 0111	$F7	

Slot number (1..250) is composed of byte 13 and byte 14.

In *Preset Data,* starting at byte 15, Parameter values, Preset name, and date of last change will be transmitted. Order and range of parameters are of course different for every type of plug-in. For plug-ins of type QRS, comprehensive information is available on pp. 21.

Across all bytes of *Preset Data*, a checksum is calculated. Byte 15 up to byte 169 inclusive are summed up, then subtracted from 0. The 7 LSBs of the result are stored in byte 170. For verification, byte 15 up to byte 170 inclusive are summed up. The 7 LSBs of the result must all be 0.

Note: Installing of a Preset can take up to 1s worst case. It is therefore recommended to account for an appropriate pause before sending the next *Preset Dump*.

Scratch Request

A *Scratch Request* will never be emitted by a YARDSTICK.

A *Scratch Request* received by a YARDSTICK triggers a transfer of the Preset stored in the specified Scratch. The requested data is related to the currently audible signal, if the requested Scratch is identical to the one currently active on the YARDSTICK. But a *Scratch Request* does not change the currently audible signal.

A YARDSTICK responds to a correctly-received *Scratch Request* with a *Scratch Dump*.

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID** (**System Setup** / **MIDI**)
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
12	Command ID	0000 0011	$03	see **Command IDs** chapter (p. 6)
13	Scratch	0000 000s	$0s	0=Scratch A, 1=Scratch B
14	EOX	1111 0111	$F7	

Byte 13 selects Scratch. Scratch A can be edited, Scratch B cannot.

Scratch Dump

A *Scratch Dump* sent by a YARDSTICK is triggered by a previous *Scratch Request,* or by the user via Hotkey menu or remote control.

When a YARDSTICK receives an error-free *Scratch Dump,* the included Preset will be loaded immediately to the assigned Scratch. But the new values are only audible, if the assigned Scratch is currently active. Therefore, a *Scratch Dump* may change the currently audible signal.

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID** (**System Setup** / **MIDI**)
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
12	Command ID	0000 0100	$04	see **Command IDs** chapter (p. 6)
13	Scratch	0000 000s	$0s	0=Scratch A, 1=Scratch B
14.. 163	Scratch Data			142 bytes for parameter values and 8 ASCII bytes for the name (see p. 21)
164	Checksum	0ccc cccc	$cc	checksum across all data bytes (byte 8..158)
165	EOX	1111 0111	$F7	

Byte 13 selects Scratch. Scratch A can be edited, Scratch B cannot.

In *Scratch Data*, starting at byte 14, *Parameter value*, and *Preset name* will be transmitted. Order and range of parameters are of course different for every type of plug-in. For plug-ins of type QRS, comprehensive information is available on pp. 21.

Across all bytes of *Scratch Data* a checksum is calculated. Byte 14 up to byte 163 inclusive are summed up, then subtracted from 0. The 7 LSBs of the result are stored in byte 164. For verification, byte 14 up to byte 164 inclusive are summed up. The 7 LSBs of the result must all be 0.

Hotkey Request

A *Hotkey Request* will never be emitted by a YARDSTICK.

A *Hotkey Request* received by a YARDSTICK triggers a transfer of audio-related settings from the Hotkey menu. A *Hotkey Request* does not change the currently audible signal.

A YARDSTICK responds to a correctly-received *Hotkey Request* with a *Hotkey Dump*.

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID** (**System Setup** / **MIDI**)
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
12	Command ID	0000 0111	$07	see **Command IDs** chapter (p. 6)
13	EOX	1111 0111	$F7	

Hotkey Dump

A *Hotkey Dump* sent by a YARDSTICK is triggered by a previous *Hotkey Request*.

When a YARDSTICK receives an error-free *Hotkey Dump,* included data will immediately be transferred to the Hotkey menu. Therefore, a *Hotkey Dump* may change the currently audible signal.

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID** (**System Setup** / **MIDI**)
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
12	Command ID	0000 1000	$08	see **Command IDs** chapter (p. 6)
13..14	Hotkey Data	0hhh hhhh	$hh	see p. 26
15	EOX	1111 0111	$F7	

Hotkey Data from byte 13 and byte 14 are explained on p. 26.

Parameter Request

A *Parameter Request* will never be emitted by a YARDSTICK.

A *Parameter Request* received by a YARDSTICK triggers a transfer of the requested Parameter value from Scratch A. A Parameter Request does not change the currently audible signal.

A YARDSTICK responds to a correctly-received *Parameter Request* with a *Parameter Dump*.

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID (System Setup / MIDI)**
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
12	Command ID	0000 1001	$09	see **Command IDs** chapter (p. 6)
13/ 13..14	Parameter Number	0nnn nnnn	$nn	an index that identifies a Parameter (see pp. 21)
14/15	EOX	1111 0111	$F7	

A parameter is identified by a number starting with byte 13. For some plug-ins, 127 numbers are not enough to identify all parameters. In such situations, byte 13 is defined as $7E, and an extended parameter number will be added as byte 14. The parameter numbers are of course different for every type of plug-in. The numbers for plug-ins of type QRS are listed on pp. 21.

Parameter Dump

A *Parameter Dump* sent by a YARDSTICK is triggered by a previous *Parameter Request*.

When a YARDSTICK receives an error-free *Parameter Dump,* included data will immediately be transferred to the assigned Scratch A parameter. Therefore, a *Parameter Dump* does change the currently audible signal.

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID (System Setup / MIDI)**
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
12	Command ID	0000 1010	$0A	see **Command IDs** chapter (p. 6)
13/ 13..14	Parameter Number	0nnn nnnn	$nn	an index that identifies a Parameter (see p. 21)
14..n/ 15..n	Parameter Data			1 or 2 Parameter bytes (see p. 21)
n+1	EOX	1111 0111	$F7	

A parameter is identified by a number starting with byte 13. For some plug-ins, 127 numbers are not enough to identify all parameters. In such situations, byte 13 is defined as $7E, and an extended parameter number will be added as byte 14. The parameter numbers are of course different for every type of plug-in.

Various parameters may have different value ranges. Depending on spread or range of values, one or two bytes may be required to transfer the values.

Parameter numbers and value ranges for plug-ins of type QRS are listed on pp. 21.

Load Request

A *Load Request* will never be emitted by a YARDSTICK.

Upon receiving a *Load Request,* the assigned Scratch will be overwritten with the preset located in the assigned Slot. This happens without the preset being transferred via MIDI interface.

This command behaves similar to a *Program Change* message. However, with a *Load Request*, slots above 128 can be addressed and, unlike *Program Change,* it is also possible to load the currently inaudible Scratch.

A *Load Request* may change the audible audio signal.

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID** (**System Setup** / **MIDI**)
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
12	Command ID	0000 1101	$0D	see **Command IDs** chapter (p. 6)
13	Scratch	0000 000s	$0s	0=Scratch A, 1=Scratch B
14	Slot number LSB	0nnn nnnn	$nn	LSB Slot number of the Preset to be loaded
15	Slot number MSB	0000 000n	$0n	MSB Slot number of the Preset to be loaded
16	EOX	1111 0111	$F7	

Byte 13 selects the Scratch the Preset will be loaded to. Scratch A can be changed by a *Parameter Dump*, Scratch B cannot.

Slot number (1..250) – where the Preset will be picked from – is composed of byte 14 and byte 15.

Save Request

A *Save Request* will never be emitted by a YARDSTICK.

Save Request triggers a writeback from Scratch A to the assigned Slot. The current Preset name will be replaced by the name being transferred. This happens locally within the unit – no Preset will be transferred on the MIDI port.

A Preset from Scratch B cannot be written back, nor is such possible from front-panel operations.

A Save Request cannot change the currently audible signal.

Byte #	Type	Binary Value	Hex Value	Comment
0	SysEx	1111 0000	$F0	
1..3	Manufacturer ID	0000 0000 0000 0000 0000 0000	$00 $00 $00	QUANTEC has not been assigned a unique ID yet
4	Family ID	0010 0100	$49	
5	Model ID	0000 nnnn	$0n	rightmost digit from model number (2492:$02, 2493:$03, 2496:$06, 2498:$08)
6	Device ID	0nnn nnnn	$nn	see **Device ID** (**System Setup** / **MIDI**)
7	MIDI Version	0011 0000	$30	version of SysEx syntax
8	Plug-in ID	0100 0011	$43	ID of QRS plug-in
9	Inputs	0nnn nnnn	$nn	number of inputs for that plug-in
10	Outputs	0nnn nnnn	$nn	number of outputs for that plug-in
11	Preset Version	0011 0010	$32	current version of Preset data
7	Command ID	0000 1101	$0E	see **Command IDs** chapter (p. 6)
8	Slot number LSB	0nnn nnnn	$nn	7 LSB number of destination Slot
9	Slot number MSB	0000 000n	$0n	1 MSB number of destination Slot
10..17	Name	0aaa aaaa	$aa	8 ASCII bytes for new name
18	EOX	1111 0111	$F7	

Slot number (1..250) – where the Preset will be stored to – is composed of byte 13 and byte 14.

The ASCII characters in byte 15 up to byte 22 inclusive determine the new name of the preset.

Note On Message

All Scratch A parameters can also be controlled by *Note On* messages. For the changes to be audible, Scratch A must be active.

To avoid conflicts with other MIDI devices, which parameter listens to what *Note On* message can be freely assigned. As expected, there is an additional *off* position. More details are available from the device's Operations Guide under the **Note On Table** (**System Setup**, menu group **MIDI**) menu item.

Byte #	Type	Binary Value	Hex Value	Comment
0	Note On	1001 xxxx	$9x	X = MIDI channel (0..15)
1	Note Number	0nnn nnnn	$nn	number according to Note On table
2	Value	0vvv vvvv	$vv	Parameter value

The range of legal values for each parameter in the context of QRS-type plug-ins can be found on pp. 21. Parameters which cannot operate from the limited range of 0 to 127 need to be split into *coarse* and *fine*.

Program Change message

YARDSTICK presets from Slots 1..128 may alternatively be called from *Program Change* messages. They will be copied to the currently audible Scratch Preset (A or B).

Byte #	Type	Binary Value	Hex Value	Comment
0	Program Change	1100 xxxx	$Cx	X = MIDI channel (0..15)
1	Program Number	0nnn nnnn	$nn	Slot number-1 (0..127)

Slots 129..250 and the currently *inactive* (inaudible) Scratch can be accessed via *System Exclusive* messages only.

Error Messages

Since version M 3.0, errors are indicated by both a red MIDI LED and an error message that appears for a few seconds on the overview display. For additional assistance in troubleshooting, there is a **MIDI Error Count** menu item (**System Setup**, menu group **MIDI**) where errors are recorded.

General Error Messages

General error messages are indicated by the **MIDI ERROR** header. Right now, there is only *one* general error message:

Rx Buffer   The receive buffer for MIDI data has overflown. Data arrives
overflow   faster than the 249x can handle it. Before backlogged data will be
                       overwritten, reception is stopped. The data packet received
                       incompletely will be discarded.

SysEx Error Messages

SysEx error messages are indicated by the **MIDI SYSEX** header. The following messages may appear:

Device ID   If an ID unequal 0 has been set in the **MIDI Device ID** menu
does not match   item, it will be compared with the Device ID (byte no. 6) of an
                       incoming SysEx message. If the IDs do not match, an error will be
                       flagged, and the message discarded.

Plug-in ID   The plug-in ID (byte no. 8) of a SysEx message is compared to the
does not match   ID of the current plug-in. If the IDs do not match, an error will be
                       flagged, and the message discarded. The ID for plug-ins of type QRS
                       is 043h.

Checksum   In a SysEx message with command ID *Dump Preset* or *Dump*
does not match   *Scratch,* the sum of digits across data bytes and checksum (byte no.
                       13..164 or rather 15..169) is calculated. The lower 7 bits of the sum of
                       digits must all be 0, otherwise an error will be flagged, and the
                       message discarded.

MIDI version   The MIDI version of every SysEx message is checked. Excessively
does not match   old versions are incompatible and will flag an error. The message will
                       be discarded. Old incompatible versions have a number less than 030h
                       on byte no. 7.

Preset version does not match The version of the Preset data (byte no. 11) of every SysEx message is checked. If incompatible, an error will be flagged, and the message discarded.

Unknown Command ID The command ID (byte no. 12) of a SysEx message is not known. An error will be flagged, and the message discarded.

Assignment of Data and Parameters

The tables state both the position within the preset data array of a *Preset Dump* or *Scratch Dump* SysEx message, and a parameter's number for a *Parameter Request* or *Parameter Dump* SysEx message.

Whenever a parameter's range is exceeded, it will be forced to its minimum or maximum legal value.

Parameters for all QRS plug-ins

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Plug-in ID $43, Preset Version $32

Name	Byte # Preset Data	Param. Number	Param. Range	Comment
Dry Level 1	0	$01	0..31 ($0..$1F)	0=OFF, 1=-30dB .. 31=0dB
Dry Level 2	1	$02		
Dry Level 3	2	$03		
Dry Level 4	3	$04		
Dry Level 5	4	$05		
Dry Level 6	5	$06		
Dry Level 7	6	$07		
Dry Level 8	7	$08		
1st Level 1	8	$09	0..31 ($0..$1F)	0=OFF, 1=-30dB .. 31=0dB
1st Level 2	9	$0A		
1st Level 3	10	$0B		
1st Level 4	11	$0C		
1st Level 5	12	$0D		
1st Level 6	13	$0E		
1st Level 7	14	$0F		
1st Level 8	15	$10		
2nd Level 1	16	$11	0..31 ($0..$1F)	0=OFF, 1=-30dB .. 31=0dB
2nd Level 2	17	$12		
2nd Level 3	18	$13		
2nd Level 4	19	$14		
2nd Level 5	20	$15		
2nd Level 6	21	$16		
2nd Level 7	22	$17		
2nd Level 8	23	$18		

Name	Byte # Preset Data	Param. Number	Param. Range	Comment
Dry Delay 1	24..25	$19	1..250 ($01 $00 .. $7A $01)	Value will be transferred with two bytes as a 14-bit number (LSB first).
Dry Delay 2	26..27	$1A		
Dry Delay 3	28..29	$1B		
Dry Delay 4	30..31	$1C		
Dry Delay 5	32..33	$1D		
Dry Delay 6	34..35	$1E		
Dry Delay 7	36..37	$1F		
Dry Delay 8	38..39	$20		
1st Delay 1	40..41	$21	1..250 ($01 $00 .. $7A $01)	Value will be transferred with two bytes as a 14-bit number (LSB first).
1st Delay 2	42..43	$22		
1st Delay 3	44..45	$23		
1st Delay 4	46..47	$24		
1st Delay 5	48..49	$25		
1st Delay 6	50..51	$26		
1st Delay 7	52..53	$27		
1st Delay 8	54..55	$28		
2nd Delay 1	56..57	$29	1..250 ($01 $00 .. $7A $01)	Value will be transferred with two bytes as a 14-bit number (LSB first).
2nd Delay 2	58..59	$2A		
2nd Delay 3	60..61	$2B		
2nd Delay 4	62..63	$2C		
2nd Delay 5	64..65	$2D		
2nd Delay 6	66..67	$2E		
2nd Delay 7	68..69	$2F		
2nd Delay 8	70..71	$30		
Hi Cut 1	72	$31	0..9 ($0..$9)	0=2.5kHz .. 8=16kHz, 9=FULL
Hi Cut 2	73	$32		
Hi Cut 3	74	$33		
Hi Cut 4	75	$34		
Hi Cut 5	76	$35		
Hi Cut 6	77	$36		
Hi Cut 7	78	$37		
Hi Cut 8	79	$38		
RT60 High	80	$39	0..10 ($0..$A)	0=0.1 .. 5=LIN .. 10=10
RT60 Main	81	$3A	0..41($00..$29) 6..47($06..$2F) 14..55($0E..$37) 20..61($14..$3D) 26..67($1A..$43) 34..75 ($22..$4B) 40..81($28..$51)	1E0: 0=0.01s .. 40=1s, 41=FREEZE 1E1: 6=0.02s .. 46=2s, 47=FREEZE 1E2: 14=0.05s .. 54=5s, 55=FREEZE 1E3: 20=0.1s .. 60=10s, 61=FREEZE 1E4: 26=0.2s .. 66=20s, 67=FREEZE 1E5: 34=0.5s .. 74=50s, 75=FREEZE 1E6: 40=1s .. 80=100s, 81=FREEZE
RT60 Low	82	$3B	0..10 ($0..$A)	0=0.1 .. 5=LIN .. 10=10
Density	83	$3C	0..9 ($0..$9)	0=0% .. 9=200%
Roomsize	84	$3D	0..6 ($0..$6)	0=1E0 .. 6=1E6
Dummy	85	-	-	Reserved
High Edge	86	$7A	61..67 ($3D..$43)	61=1kHz .. 67=16kHz
Low Edge	87	$7B	60..68 ($3C..$44)	60=25Hz .. 68=1kHz

Name	Byte # Preset Data	Param. Number	Param. Range	Comment
Pre Level 1	88	$7E $00	0..31 ($0..$1F)	0=OFF, 1=-30dB .. 31=0dB
Pre Level 2	89	$7E $01		
Pre Level 3	90	$7E $02		
Pre Level 4	91	$7E $03		
Pre Level 5	92	$7E $04		
Pre Level 6	93	$7E $05		
Pre Level 7	94	$7E $06		
Pre Level 8	95	$7E $07		
Pre Delay 1	96..97	$7E $08	1..250 ($01 $00 .. $7A $01)	Value will be transferred with two bytes as a 14-bit number (LSB first).
Pre Delay 2	98..99	$7E $09		
Pre Delay 3	100..101	$7E $0A		
Pre Delay 4	102..103	$7E $0B		
Pre Delay 5	104..105	$7E $0C		
Pre Delay 6	106..107	$7E $0D		
Pre Delay 7	108..109	$7E $0E		
Pre Delay 8	110..111	$7E $0F		
Pre Hi Cut 1	112	$7E $20	0..9 ($0..$9)	0=2.5kHz .. 8=16kHz, 9=FULL
Pre Hi Cut 2	113	$7E $21		
Pre Hi Cut 3	114	$7E $22		
Pre Hi Cut 4	115	$7E $23		
Pre Hi Cut 5	116	$7E $24		
Pre Hi Cut 6	117	$7E $25		
Pre Hi Cut 7	118	$7E $26		
Pre Hi Cut 8	119	$7E $27		
Dry Source 1	120	$7E $28	0..7	0=Input 1 .. 7= Input 8
Dry Source 2	121	$7E $29		
Dry Source 3	122	$7E $2A		
Dry Source 4	123	$7E $2B		
Dry Source 5	124	$7E $2C		
Dry Source 6	125	$7E $2D		
Dry Source 7	126	$7E $2E		
Dry Source 8	127	$7E $2F		
1st Source 1	128	$7E $30	0..7	0=Input 1 .. 7= Input 8
1st Source 2	129	$7E $31		
1st Source 3	130	$7E $32		
1st Source 4	131	$7E $33		
1st Source 5	132	$7E $34		
1st Source 6	133	$7E $35		
1st Source 7	134	$7E $36		
1st Source 8	135	$7E $37		
Bass Gain	136	$7C	54..74 ($36..$4A)	54=-20dB .. 64=LIN .. 74=+20dB
Bass Edge	137	$7D	58..68 ($3A..$44)	58=10Hz .. 44=1kHz
Correlation	138	$76	62..64 ($3E..$42)	62=-0.5 .. 64=0 .. 66=0.5
Correlation	139	$77		
Correlation	140	$78		
Correlation	141	$79		

Name	Byte # Preset Data	Param. Number	Param. Range	Comment
Preset Name	142..149	-	7-bit ASCII	
Date	150..154	-	$0..(2^{32}-1)$	Value will be transferred with five bytes as a 32-bit number (LSB first). The number corresponds to the seconds elapsed since 1970.
Dry Delay 1 coar.	-	$3E	0..125 ($0..$7D)	One step corresponds to 2 ms worth of Delay.
Dry Delay 2 coar.	-	$3F		
Dry Delay 3 coar.	-	$40		
Dry Delay 4 coar.	-	$41		
Dry Delay 5 coar.	-	$42		
Dry Delay 6 coar.	-	$43		
Dry Delay 7 coar.	-	$44		
Dry Delay 8 coar.	-	$45		
1st Delay 1 coar.	-	$46	0..125 ($0..$7D)	One step corresponds to 2 ms worth of Delay.
1st Delay 2 coar.	-	$47		
1st Delay 3 coar.	-	$48		
1st Delay 4 coar.	-	$49		
1st Delay 5 coar.	-	$4A		
1st Delay 6 coar.	-	$4B		
1st Delay 7 coar.	-	$4C		
1st Delay 8 coar.	-	$4D		
2nd Delay 1 coar.	-	$4E	0..127 ($0..$7D)	One step corresponds to 2 ms worth of Delay.
2nd Delay 2 coar.	-	$4F		
2nd Delay 3 coar.	-	$50		
2nd Delay 4 coar.	-	$51		
2nd Delay 5 coar.	-	$52		
2nd Delay 6 coar.	-	$53		
2nd Delay 7 coar.	-	$54		
2nd Delay 8 coar.	-	$55		
Dry Delay 1 fine	-	$56	0/64 ($0/$40)	There a two target values only: 0..63 will be evaluated as 0, and 64..127 as 64. This corresponds to a Delay of 0 or 1ms.
Dry Delay 2 fine	-	$57		
Dry Delay 3 fine	-	$58		
Dry Delay 4 fine	-	$59		
Dry Delay 5 fine	-	$5A		
Dry Delay 6 fine	-	$5B		
Dry Delay 7 fine	-	$5C		
Dry Delay 8 fine	-	$5D		
1st Delay 1 fine	-	$5E	0/64 ($0/$40)	There a two target values only: 0..63 will be evaluated as 0, and 64..127 as 64. This corresponds to a Delay of 0 or 1ms.
1st Delay 2 fine	-	$5F		
1st Delay 3 fine	-	$60		
1st Delay 4 fine	-	$61		
1st Delay 5 fine	-	$62		
1st Delay 6 fine	-	$63		
1st Delay 7 fine	-	$64		
1st Delay 8 fine	-	$65		

Name	Byte # Preset Data	Param. Number	Param. Range	Comment
2nd Delay 1 fine	-	$66	0/64 ($0/$40)	There a two target values only: 0..63 will be evaluated as 0, and 64..127 as 64. This corresponds to a Delay of 0 or 1ms.
2nd Delay 2 fine	-	$67		
2nd Delay 3 fine	-	$68		
2nd Delay 4 fine	-	$69		
2nd Delay 5 fine	-	$6A		
2nd Delay 6 fine	-	$6B		
2nd Delay 7 fine	-	$6C		
2nd Delay 8 fine	-	$6D		
Pre Delay 1 coar.	-	$7E $10	0..125 ($0..$7D)	One step corresponds to 2 ms worth of Delay.
Pre Delay 2 coar.	-	$7E $11		
Pre Delay 3 coar.	-	$7E $12		
Pre Delay 4 coar.	-	$7E $13		
Pre Delay 5 coar.	-	$7E $14		
Pre Delay 6 coar.	-	$7E $15		
Pre Delay 7 coar.	-	$7E $16		
Pre Delay 8 coar.	-	$7E $17		
Pre Delay 1 fine	-	$7E $18	0/64 ($0/$40)	There a two target values only: 0..63 will be evaluated as 0, and 64..127 as 64. This corresponds to a Delay of 0 or 1ms.
Pre Delay 2 fine	-	$7E $19		
Pre Delay 3 fine	-	$7E $1A		
Pre Delay 4 fine	-	$7E $1B		
Pre Delay 5 fine	-	$7E $1C		
Pre Delay 6 fine	-	$7E $1D		
Pre Delay 7 fine	-	$7E $1E		
Pre Delay 8 fine	-	$7E $1F		
Mute Dry	-	$6E	0/64 ($0/$40)	As defined here, these parameters do only exist for *Note On* messages. 0..63 turns off the function, 64..127 turns it on. Scratch A/B have been defined as: 0..63 = Scratch A, 64..127 = Scratch B.
Mute 1st	-	$6F		
Mute 2nd	-	$70		
Bypass	-	$71		
Freeze	-	$72		
Gate Room	-	$73		
Kill Room	-	$74		
Scratch A/B	-	$75		

Hotkeys

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Plug-in ID $43, Preset Version $32

Name	Bit Position in Hotkey Data	Comment
Mute Dry	Byte 0, Bit 0	
Mute 1st	Byte 0, Bit 1	
Mute 2nd	Byte 0, Bit 2	
Bypass	Byte 0, Bit 3	
Gate Room	Byte 0, Bit 4	*Gate Room* and *Kill Room* are independent of Freeze. Setting Freeze automatically shifts RT60Main to the upper stop value, and disables audio input by setting *Gate Room*.
Kill Room	Byte 0, Bit 5	
Freeze	Byte 0, Bit 6	
Scratch A/B	Byte 1, Bit 0	