MIDI-CI Profile for Rotary Speaker

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PREFACE

MIDI Association Document M2-122-UM
MIDI-CI Profile for Rotary Speaker

The MIDI-CI specification and the Common Rules for MIDI-CI Profiles define how Devices with similar applications or of a similar Device type can negotiate to use a common set of MIDI messages, called a MIDI-CI Profile, or simply a Profile.

Devices which implement a Profile have a high level of interoperability with each other. Profiles are a beneficial component in enabling intelligent auto-configuration.

A Profile is a defined set of rules for how a MIDI receiver Device implementing the Profile shall respond to a chosen set of MIDI messages, to achieve a particular purpose or to suit a particular application. In addition to defining response to MIDI messages, a Profile may optionally also define other Device functionality requirements. This definition also then implies MIDI implementation of a sender or in some cases may require a defined MIDI implementation of a sender.

This MIDI-CI Profile Specification for Rotary Speaker defines a set of messages to control parameters of many Devices with Rotary Speaker capabilities.

For details of MIDI-CI Profile Negotiation mechanisms, please read the MIDI-CI and Common Rules for MIDI-CI Profiles specifications.

http://www.amei.or.jp

https://www.midi.org

Version History

Table 1 Version History

Publication Date	Version	Changes
2024-01-24	1.0.2	Initial release

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1   References

1.1   Normative References

[MA01]   ***Complete MIDI 1.0 Detailed Specification***, Document Version 96.1, Third Edition, Association of Musical Electronics Industry, *http://www.amei.or.jp/*, and The MIDI Association, *https://www.midi.org/*

[MA02]   ***M2-100-U MIDI 2.0 Specification Overview***, Version 1.1, Association of Musical Electronics Industry, *http://www.amei.or.jp/*, and The MIDI Association, *https://www.midi.org/*

[MA03]   ***M2-101-UM MIDI Capability Inquiry (MIDI-CI)***, Version 1.2, Association of Musical Electronics Industry, *http://www.amei.or.jp/*, and The MIDI Association, *https://www.midi.org/*

[MA04]   ***M2-102-U Common Rules for MIDI-CI Profiles***, Version 1.1, Association of Musical Electronics Industry, *http://www.amei.or.jp/*, and The MIDI Association, *https://www.midi.org/*

[MA05]   ***M2-103-UM Common Rules for Property Exchange***, Version 1.1, Association of Musical Electronics Industry, *http://www.amei.or.jp/*, and The MIDI Association, *https://www.midi.org/*

[MA06]   ***M2-104-UM Universal MIDI Packet (UMP) Format and MIDI 2.0 Protocol***, Version 1.1, Association of Musical Electronics Industry, *http://www.amei.or.jp/*, and The MIDI Association, *https://www.midi.org/*

[MA07]   ***M2-115-U MIDI 2.0 Bit Scaling and Resolution***, Version 1.0.1, Association of Musical Electronics Industry, *http://www.amei.or.jp/*, and The MIDI Association, *https://www.midi.org/*

[MA08]   ***M2-121-UM MIDI-CI Profile for Drawbar Organs***, Version 1.0, Association of Musical Electronics Industry, *http://www.amei.or.jp/*, and The MIDI Association, *https://www.midi.org/*

1.2 Terminology

1.2.1 Definitions

AMEI: Association of Musical Electronics Industry. Authority for MIDI Specifications in Japan.

Controller Message: Any MIDI Message from the following list:

MIDI 1.0 and MIDI 2.0 Protocol:

- Control Change
- Channel Pressure (Aftertouch)
- Poly Pressure (Key Aftertouch)
- Registered Controller (RPN)
- Assignable Controller (NRPN)
- Pitch Bend

MIDI 2.0 Protocol only:

- Per-note Registered Controller (including Relative versions)
- Per Note Assignable Controller (including Relative versions)
- Per Note Pitch Bend

Device: An entity, whether hardware or software, which can send and/or receive MIDI messages.

Device ID: A one-byte field in Universal System Exclusive messages, as defined in the MIDI 1.0 Specification *[MA01],* to indicate which device in the system is supposed to respond. The more specific application of Device ID in MIDI-CI messages is defined in the MIDI Capability Inquiry specification *[MA03]*. The use of "Device" in this context is not the same as a Device as defined above.

Group: A field in the UMP Format addressing some UMP Format MIDI messages (and some UMPs comprising any given MIDI message) to one of 16 Groups. See the M2-104-UM Universal MIDI Packet (UMP) Format and MIDI 2.0 Protocol specification *[MA06]*.

MA: MIDI Association. Authority for MIDI specifications worldwide except Japan. See also MMA.

MIDI 1.0 Protocol: Version 1.0 of the MIDI Protocol as originally specified in *[MA01]* and extended by MA and AMEI with numerous additional MIDI message definitions and Recommended Practices. The native format for the MIDI 1.0 Protocol is a byte stream, but it has been adapted for many different transports. MIDI 1.0 messages can be carried in UMP packets. The UMP format for the MIDI 1.0 Protocol is defined in the M2-104-UM Universal MIDI Packet (UMP) Format and MIDI 2.0 Protocol specification *[MA06]*.

MIDI 1.0 Specification: Complete MIDI 1.0 Detailed Specification, Document Version 96.1, Third Edition *[MA01]*.

MIDI 2.0: The MIDI environment that encompasses all of MIDI 1.0, MIDI-CI, Universal MIDI Packet (UMP), MIDI 2.0 Protocol, MIDI 2.0 messages, and other extensions to MIDI as described in AMEI and MA specifications. See the MIDI 2.0 Specification Overview *[MA02]*.

MIDI 2.0 Protocol: Version 2.0 of the MIDI Protocol. The native format for MIDI 2.0 Protocol messages is UMP as defined in M2-104-UM Universal MIDI Packet (UMP) Format and MIDI 2.0 Protocol specification *[MA06]*.

MIDI-CI: MIDI Capability Inquiry *[MA03]*, a specification published by The MIDI Association and AMEI.

MIDI Manufacturers Association: A California nonprofit 501(c)6 trade organization, and the legal entity name of the MIDI Association.

MMA: See MIDI Manufacturers Association.

MUID (MIDI Unique Identifier): A 28-bit random number generated by a Device used to uniquely identify the Device in MIDI-CI messages sent to or from that Device.

Profile: An MA/AMEI specification that includes a set of MIDI messages and defined responses to those messages. A Profile is controlled by MIDI-CI Profile Negotiation Transactions. A Profile may have a defined

minimum set of mandatory messages and features, along with some optional or recommended messages and features. See the MIDI-CI specification *[MA03]* and the Common Rules for MIDI-CI Profiles *[MA04]*.

Protocol: There are two defined MIDI Protocols: the MIDI 1.0 Protocol and the MIDI 2.0 Protocol, each with a data structure that defines the semantics for MIDI messages. See the M2-104-UM Universal MIDI Packet (UMP) Format and MIDI 2.0 Protocol specification *[MA06]*.

RPN: Registered Parameter Number, a type of controller message defined in the MIDI 1.0 Protocol. RPNs have equivalent messages in the MIDI 2.0 Protocol, called Registered Controllers (see *[MA06]*).

UMP: Universal MIDI Packet.

UMP Format: Data format for fields and messages in the Universal MIDI Packet.

UMP MIDI 1.0 Device: any Device that sends or receives MIDI 1.0 Protocol messages using the UMP Format. Such Devices may use UMP Message Types that extend the functionality beyond Non-UMP MIDI 1.0 Systems.

Universal MIDI Packet (UMP): The Universal MIDI Packet is a data container which defines the data format for all MIDI 1.0 Protocol messages and all MIDI 2.0 Protocol messages. UMP is intended to be universally applicable, i.e., technically suitable for use in any transport where MA/AMEI elects to officially support UMP. For detailed definition see M2-104-UM Universal MIDI Packet (UMP) Format and MIDI 2.0 Protocol specification *[MA06]*.

1.2.2 Reserved Words and Specification Conformance

In this document, the following words are used solely to distinguish what is required to conform to this specification, what is recommended but not required for conformance, and what is permitted but not required for conformance:

Table 2 Words Relating to Specification Conformance

Word	Reserved For	Relation to Specification Conformance
shall	Statements of requirement	**Mandatory** A conformant implementation conforms to all 'shall' statements.
should	Statements of recommendation	**Recommended but not mandatory** An implementation that does not conform to some or all 'should' statements is still conformant, providing all 'shall' statements are conformed to.
may	Statements of permission	**Optional** An implementation that does not conform to some or all 'may' statements is still conformant, providing that all 'shall' statements are conformed to.

By contrast, in this document, the following words are never used for specification conformance statements; they are used solely for descriptive and explanatory purposes:

Table 3 Words Not Relating to Specification Conformance

Word	Reserved For	Relation to Specification Conformance
must	Statements of unavoidability	Describes an action to be taken that, while not required (or at least not directly required) by this specification, is unavoidable. Not used for statements of conformance requirement (see 'shall' above).
will	Statements of fact	Describes a condition that as a question of fact is necessarily going to be true, or an action that as a question of fact is necessarily going to occur, but not as a requirement (or at least not as a direct requirement) of this specification. Not used for statements of conformance requirements (see 'shall' above).
can	Statements of capability	Describes a condition or action that a system element is capable of possessing or taking. Not used for statements of conformance permission (see 'may' above).
might	Statements of possibility	Describes a condition or action that a system element is capable of electing to possess or take. Not used for statements of conformance permission (see 'may' above).

1.3   Protocol and Data Format Conventions

1.3.1   MIDI 1.0 Protocol and MIDI 2.0 Protocol

This document describes the use of messages in the MIDI 2.0 Protocol. However, Devices which conform to the Profiles in this specification may implement either the MIDI 2.0 Protocol or the MIDI 1.0 Protocol. For a comparison of the 2 Protocols and for mechanisms to select a Protocol see the M2-104-UM Universal MIDI Packet (UMP) Format and MIDI 2.0 Protocol specification *[MA06]*.

1.3.2   Registered Controllers (RCs) and Registered Parameter Numbers (RPNs)

This document describes the use of RC messages in the MIDI 2.0 Protocol. These translate directly to RPN messages in the MIDI 1.0 Protocol. Devices which conform to the Profiles in this specification may implement the MIDI 2.0 Protocol with RC messages or the MIDI 1.0 Protocol with RPN messages. Scaling of values between RCs and RPNs is addressed in Section *1.3.3*.

1.3.3   Resolution and Bit Scaling

In this document, values are expressed according to the ranges and resolutions defined in fields of the MIDI 2.0 Protocol. Any MIDI 1.0 Protocol Device or system that is using this Profile must scale the values to suit the Device or system. For example, a 32-bit value of a Registered Controller might be scaled to a 14-bit value or a 7-bit value in the corresponding Registered Parameter Number.

Scaling methods are defined in the M2-115-UM MIDI 2.0 Bit Scaling and Resolution specification *[MA07]*.

2 Introduction

2.1 Executive Summary

Rotary Speaker Profile Specification defines a common set of basic features and MIDI messages to control a rotary speaker. The typical model is a rotating speaker cabinet with a horn and woofer that rotate at different speeds. The Device that implements the specification might be a rotating speaker or an effects unit that emulates the sound of a rotating speaker. The goal of the specification is to encourage implementation of a chosen set of MIDI messages for control for the parameters that are most common to all such Devices.

2.2 Background

This Rotary Speaker Profile Specification defines Device requirements and MIDI implementation of a conforming Device.

This Profile specification relies on mechanisms defined by the MIDI-CI (Capabilities Inquiry) specification. MIDI-CI allows Devices to communicate their capabilities to each other. Devices can use that capabilities information to self-configure their MIDI connections and related settings. Profiles are a beneficial component in enabling intelligent auto-configuration between 2 Devices.

Profiles define specific implementations of a set of MIDI messages chosen to suit a particular instrument, Device type, or to accomplish a particular task. Two Devices that conform to the same Profile will generally have greater interoperability between them than Devices using MIDI without Profiles. Profiles increase interoperability and ease of use while lowering the need for manual configuration of Devices by users.

Further information required for implementing this Device Profile is found in the Common Rules for MIDI Profiles specification *[MA04]*.

3   Device Requirements

This section outlines basic Device design or functional goals of a Device that conforms to the Rotary Speaker Profile. The basic model and functionality is patterned after a Leslie* rotating speaker. Such a rotating speaker is most typically used with Hammond B3* organ, which is the pattern or model for the closely related Drawbar Organ Profile *[MA08]*. Additional properties of the Profile are features that are commonly found on many other rotating speakers or emulators from a wide range of manufacturers. The Rotary Speaker Profile Device is typically one of 3 types of a Device:

- A speaker cabinet with a horn and woofer that rotate at different speeds.
- An effect device or plugin designed to emulate a rotating speaker.
- The effects section of an instrument, such as an organ or synthesizer, is designed to emulate a rotating speaker.

Selection of Fast and Slow rotation is set by a Registered Controller. Control of other optional features are also defined.

   * *Hammond and Leslie are trademarks of SUZUKI MUSICAL INST.MFG.CO.,LTD.*

3.1   MIDI-CI Profile Configuration

MIDI-CI Profile Configuration Messages identify and control each Profile uniquely using several fields in the Profile Configuration message. The Profile identifiers for this Rotary Speaker Profile are as follows:

Table 4 Five Bytes Profile ID

Profile ID Byte 1	0x7E (Standard Defined Profile)
Profile ID Byte 2	0x22 (Rotary Speaker Profile Number MSB)
Profile ID Byte 3	0x00 (Rotary Speaker Profile Number LSB)
Profile ID Byte 4	0x01 (Rotary Speaker Profile Version)
Profile ID Byte 5	0x01 (Rotary Speaker Profile Level)

3.2   Response to Channel Messages

3.2.1   Required Registered Controllers

A Device that conforms to the Rotary Speaker Profile shall respond to Registered Controllers as defined below.

Table 5 Optional Registered Controllers

Registered Controller	Value Range	Description	Default Value
0x60 0x20	0x00000000-0x7FFFFFFF = Slow, 0x80000000-0xFFFFFFFF = Fast	Rotary Speed (Slow/Fast) Slow (Traditionally labeled Chorale) Fast (Traditionally labeled Tremolo)	0x00000000

Note: The Device may also respond to Rotary Speed Registered Controller as a continuous controller to control a variable speed from slow to fast. Therefore, controllers with a 2-position switch for this Registered Controller should send values of 0x00000000(Slow) and 0xFFFFFFFF (Fast).

3.2.2   Optional Registered Controllers

The Device may optionally respond to any of the Registered Controllers as defined below.

Table 6 Optional Registered Controllers

Registered Controller	Value Range	Description	Default Value
0x60 0x21	0x00000000-0x7FFFFFFF = Off, 0x80000000-0xFFFFFFFF = On	Rotary Effect	0xFFFFFFFF
0x60 0x22	0x00000000-0x7FFFFFFF = Rotate, 0x80000000-0xFFFFFFFF = Stop	Rotary Brake	0x00000000
0x60 0x23	0x00000000-0xFFFFFFFF (Slowest to Fastest)	Horn Slow Speed	0x80000000
0x60 0x24	0x00000000-0xFFFFFFFF (Slowest to Fastest)	Horn Fast Speed	0x80000000
0x60 0x25	0x00000000-0xFFFFFFFF (Slowest to Fastest)	Woofer Slow Speed	0x80000000
0x60 0x26	0x00000000-0xFFFFFFFF (Slowest to Fastest)	Woofer Fast Speed	0x80000000
0x60 0x27	0x00000000-0xFFFFFFFF (Slowest to Fastest)	Horn Accelerate Time	0x80000000
0x60 0x28	0x00000000-0xFFFFFFFF (Slowest to Fastest)	Horn Decelerate Time	0x80000000
0x60 0x29	0x00000000-0xFFFFFFFF(Slowest to Fastest)	Woofer Accelerate Time	0x80000000
0x60 0x2A	0x00000000-0xFFFFFFFF (Slowest to Fastest)	Woofer Decelerate Time	0x80000000
0x60 0x2B	0x00000000-0xFFFFFFFF (Off to Full)	Horn Level	0xC8000000
0x60 0x2C	0x00000000-0xFFFFFFFF (Off to Full)	Woofer Level	0xC8000000
0x60 0x2D	0x00000000-0xFFFFFFFF (Off to Full)	Rotary Overdrive Amount	0x00000000

3.2.3   Mode Messages

3.2.3.1   Reset All Controllers (CC#121)

Default Value: 0x00000000

When a Device receives a Reset All Controllers message (cc#121) it shall reset all of the parameters that the Device supports to the default values as defined in Section 3.2.1 and 3.2.2.