MIDI-CI Profile for General MIDI 2

GM2 Function Block

MIDI Association Document: M2-118-UM

Document Version 1.0.0
Draft Date 2023-11-14

Published 2024-01-24

Developed and Published By
The MIDI Association
and
Association of Musical Electronics Industry (AMEI)

PREFACE

MIDI Association Document M2-118-UM
MIDI-CI Profile for General MIDI 2

This document defines how to use General MIDI 2 as a MIDI-CI Profile, defining how all the capabilities of General MIDI 2 can be enabled using MIDI-CI Profile Configuration messages. MIDI-CI's bidirectional mechanisms enable a more reliable and predictable result from the connection between two devices than possible with the original General MIDI 2 specification. A Sender can know that a Receiver can properly interpret MIDI messages intended for a General MIDI 2 device.

http://www.amei.or.jp

MIDI® Association

https://www.midi.org

Version History

Table 1 Version History

Publication Date	Version	Changes
2024-01-24	1.0	Initial release

Contents

Tables

1 References

1.1.1 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] ***General MIDI 2***, RP-24, Version 1.2a, 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.

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.

Function Block: A single logical entity which describes the functional components available on a UMP Endpoint of a Device, A Function Block operates on a set of one or more Groups.

General MIDI 2: A design and set of features for a Device as defined by the General MIDI 2 specification ***[MA07]***.

GM2: General MIDI 2.

GM2 Profile: The MIDI-CI Profile for General MIDI 2 (this specification).

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.

MIDI Transport: A hardware or software MIDI connection used by a Device to transmit and/or receive MIDI messages to and/or from another Device.

MMA: See MIDI Manufacturers Association.

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]***.

Receiver: A MIDI Device which has a MIDI Transport connected to its MIDI In.

Sender: A MIDI Device which transmits MIDI messages to a MIDI Transport which is connected to its MIDI Out or to its MIDI Thru port.

UMP: Universal MIDI Packet.

UMP Endpoint: A MIDI Endpoint which uses the UMP Format.

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).

2 Introduction

2.1 Executive Summary

The General MIDI specifications were written many years before MIDI 2.0 and the concept of MIDI Profiles enabled by MIDI-Capability Inquiry (MIDI-CI). General MIDI describes a minimum number of voices, sound locations, drum note mapping, octave registration, pitch bend range, and controller usage, thereby defining a given set of capabilities to expect in a given synthesizer which claims General MIDI compatibility.

This document defines how to use General MIDI 2 as a MIDI-CI Profile.

This new definition allows all the capabilities of General MIDI 2 devices to be enabled or disabled using MIDI-CI Profile Configuration messages. The MIDI-CI Profile for General MIDI 2 defines bidirectional mechanisms for devices to discover whether General MIDI 2 functionality is available on a Receiver, enabling a more reliable and predictable result from the connection between two devices.

2.2 Background

This General MIDI 2 Profile specification defines certain device requirements and MIDI implementation of a conforming device.

This Profile specification relies on mechanisms defined by the MIDI Capability Inquiry (MIDI-CI) specification ***[MA03]***. 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-CI Profiles specification ***[MA04]***.

3 Device Requirements

3.1 General MIDI 2

The General MIDI 2 specification ***[MA07]*** defines the fundamental device design and minimum requirements of a GM2 compatible Device. This specification makes no changes to those requirements other than adding implementation of MIDI-CI Profile Configuration messages.

All Devices which support the MIDI-CI Profile for General MIDI 2 shall implement the minimum requirements which are defined by the General MIDI 2 specification.

3.2 MIDI-CI Profile Configuration

All Devices which support the MIDI-CI Profile for General MIDI 2 shall respond to MIDI-CI Profile Configuration messages to enable or disable GM2 functionality.

3.2.1 Original GM System On/Off Mechanisms

MIDI-CI Profile Configuration mechanisms are an improvement over the original GM2 mechanisms for turning on/off GM functionality. However, some Devices may continue to also use the original GM2 mechanisms for compatibility with older devices that do not implement MIDI-CI.

Devices which support the MIDI-CI Profile for General MIDI 2 may also respond to the original GM1 System On, GM2 System On, and GM System Off messages (see ***[MA07]***).

- If a Device which supports the MIDI-CI Profile for General MIDI 2 turns on GM functionality in response to receiving a GM1 System On or GM2 System On, then the Device shall send a MIDI-CI Profile Enabled message.
- If a Device which supports the MIDI-CI Profile for General MIDI 2 turns off GM functionality in response to receiving a GM System Off, then the Device shall send a MIDI-CI Profile Disabled message.

3.3 Channels, Groups, and Function Blocks

The MIDI-CI Profile for General MIDI 2 is a Function Block Profile (see the Common Rules for Profiles ***[MA04]***). The Device ID: Source or Destination field in all MIDI-CI Profile Configuration messages for this GM2 Profile shall be set to 0x7F (Function Block).

The GM2 Profile supports 16 Channels on a Device connected by a MIDI 1.0 transport. On a MIDI 2.0 transport using UMP Format, the Profile supports any multiple of 16 up to 256 Channels. When using the UMP Format, the number of Channels which will be used when the GM2 Profile is enabled is determined by the Function Block design of the Receiver. The Sender may discover the number of Channels in the Receiver's Function Block(s) by mechanisms defined in the Universal MIDI Packet (UMP) Format and MIDI 2.0 Protocol specification ***[MA06]***.

When the Function Block spans 2 or more Groups, the rules of Channel usage from General MIDI 2 shall apply individually to each Group.

> For example, if the Profile is operating on Groups 7 and 8, Channel 10 of both Groups defaults to a Rhythm Channel and all other Channels default to a Melody Channel. See the General MIDI 2 specification ***[MA07]*** for rules of implementation for each set of 16 Channels (each Group).

As defined in the Common Rules for Profiles, if no Function Blocks are declared by the Receiver, then the Profile will operate on a single UMP Group (with 16 Channels) or on 16 Channels of a MIDI 1.0 connection.

3.4 Profile Id

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

Table 4 GM2 Profile Id

5 bytes	Profile ID	
	Byte 1	0x7E (Standard Defined Profile)
	Byte 2	0x00 (General MIDI 2 Profile Bank)
	Byte 3	0x00 (General MIDI 2 Profile Number)
	Byte 4	0x01 (General MIDI 2 Profile Version)
	Byte 5	0x01 (General MIDI 2 Profile Level)

3.5 MIDI Protocols and Data Formats

The MIDI-CI Profile for General MIDI 2 may be implemented using messages in the following protocols and data formats:

- MIDI 1.0 Protocol in MIDI 1.0 data format
- MIDI 1.0 Protocol in Universal MIDI Packet data format
- MIDI 2.0 Protocol in Universal MIDI Packet data format

The choice of Protocol which will be used by Sender and Receiver is not defined by this specification. See the Universal MIDI Packet (UMP) Format and MIDI 2.0 Protocol specification ***[MA06]***.

http://www.amei.or.jp

MIDI® Association

https://www.midi.org