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6 **Management Component Transport Protocol**
7 **(MCTP) Memory-Mapped Buffer Interface (MMBI)**
8 **Transport Binding Specification**

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Foreword

69 *The Management Component Transport Protocol (MCTP) Memory-Mapped Buffer Interface (MMBI)*
70 *Transport Binding Specification (DSP0284)* was prepared by the DMTF PMCI Working Group.

71 DMTF is a not-for-profit association of industry members dedicated to promoting enterprise and systems
72 management and interoperability. For information about DMTF, visit dmtf.org.

73 This version supersedes version 1.0.0. For a list of changes, see the change log in ANNEX B.

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Introduction

95 The Management Component Transport Protocol (MCTP) Memory-Mapped Buffer Interface (MMBI)
96 transport binding defines a transport binding for facilitating communication between platform components,
97 typically host software and a management controller.

98 The [Management Component Transport Protocol \(MCTP\) Base Specification](#) describes the protocol and
99 commands used for communication within and initialization of an MCTP network. The MCTP MMBI
100 transport binding definition in this specification includes a packet format, physical address format, and
101 discovery mechanisms for MCTP over MMBI communications.

102 **1 Scope**

103 This document provides the specification for the Management Component Transport Protocol (MCTP)
104 transport binding for MMBI.

105 **2 Normative references**

106 The following referenced documents are indispensable for the application of this document. For dated or
107 versioned references, only the edition cited (including any corrigenda or DMTF update versions) applies.
108 For references without a date or version, the latest published edition of the referenced document
109 (including any corrigenda or DMTF update versions) applies.

110 DMTF, DSP0236, *Management Component Transport Protocol (MCTP) Base Specification 1.3*,
111 https://www.dmtf.org/standards/published_documents/DSP0236_1.3.pdf

112 DMTF, DSP0239, *Management Component Transport Protocol (MCTP) IDs and Codes 1.10*,
113 https://www.dmtf.org/standards/published_documents/DSP0239_1.10.pdf

114 DMTF, DSP0282, *Memory-Mapped Buffer Interface (MMBI) 1.0*,
115 https://www.dmtf.org/standards/published_documents/DSP0282_1.0.pdf

116 **3 Terms and definitions**

117 In this document, some terms have a specific meaning beyond the normal English meaning. Those terms
118 are defined in this clause.

119 The terms “shall” (“required”), “shall not”, “should” (“recommended”), “should not” (“not recommended”),
120 “may”, “need not” (“not required”), “can” and “cannot” in this document are to be interpreted as described
121 in [ISO/IEC Directives, Part 2](#), Clause 7. The terms in parentheses are alternatives for the preceding term,
122 for use in exceptional cases when the preceding term cannot be used for linguistic reasons. Note that
123 [ISO/IEC Directives, Part 2](#), Clause 7 specifies additional alternatives. Occurrences of such additional
124 alternatives shall be interpreted in their normal English meaning.

125 The terms “clause”, “subclause”, “paragraph”, and “annex” in this document are to be interpreted as
126 described in [ISO/IEC Directives, Part 2](#), Clause 6.

127 The terms “normative” and “informative” in this document are to be interpreted as described in [ISO/IEC](#)
128 [Directives, Part 2](#), Clause 3. In this document, clauses, subclauses, or annexes labeled “(informative)” do
129 not contain normative content. Notes and examples are always informative elements.

130 Refer to [Management Component Transport Protocol \(MCTP\) Base Specification](#) for the terms and
131 definitions that are used across the MCTP specifications.

132 For the purposes of this document, the following terms and definitions apply.

133 **3.1**

134 **MMBI**

135 Memory-Mapped Buffer Interface

136 **3.2**

137 **MMIO**

138 Memory-Mapped Input/Output

139 4 Conventions

140 The conventions described in the following clauses apply to this specification.

141 4.1 Reserved and unassigned values

142 Unless otherwise specified, any reserved, unspecified, or unassigned values in enumerations or other
143 numeric ranges are reserved for future definition by DMTF.

144 Unless otherwise specified, numeric or bit fields that are designated as reserved shall be written as 0
145 (zero) and ignored when read.

146 4.2 Byte ordering

147 Unless otherwise specified, byte ordering of multi-byte numeric fields or bit fields is “Big Endian” (that is,
148 the lower byte offset holds the most significant byte, and higher offsets hold less-significant bytes).

149 5 MCTP over MMBI Transport

150 The MCTP over MMBI transport binding defines how MCTP packets are delivered over a MMBI. See
151 [Memory-Mapped Buffer Interface \(MMBI\)](#) for details about MMBI.

152 A single MMBI instance shall serve as a communication channel between two communicating entities
153 (typically a host software component and a management controller)¹. MCTP packet bridging to other
154 interfaces is out of scope for this revision of the specification.

155 5.1 MCTP Endpoint ID Use and MCTP Bus Owner

156 5.1.1 MCTP Endpoint IDs

157 This specification only uses MCTP physical addressing as defined in [Management Component Transport
158 Protocol \(MCTP\) Base Specification](#). The sender of an MCTP over MMBI message shall set the Source
159 EID and the Destination EID fields to zero. The receiver of an MCTP over MMBI message shall ignore the
160 Source EID and the Destination EID fields.

161 5.1.2 MCTP Bus Owner and MCTP Discovery

162 As defined in [Management Component Transport Protocol \(MCTP\) Base Specification](#), the MCTP Bus
163 Owner device is responsible for MCTP endpoint discovery and management of MCTP EID assignments.
164 EID assignment is not applicable to MMBI, and a Bus Owner is not used. The *Set Endpoint ID* command
165 should not be generated by MCTP over MMBI implementations. MCTP over MMBI implementations that
166 receive such a command shall respond with the `ERROR_UNSUPPORTED_CMD` code (defined in
167 [Management Component Transport Protocol \(MCTP\) Base Specification](#)). The *Discovery Notify, Prepare
168 for Endpoint Discovery*, or *Endpoint Discovery* MCTP control messages shall not be used to discover
169 MCTP endpoints over MMBI.

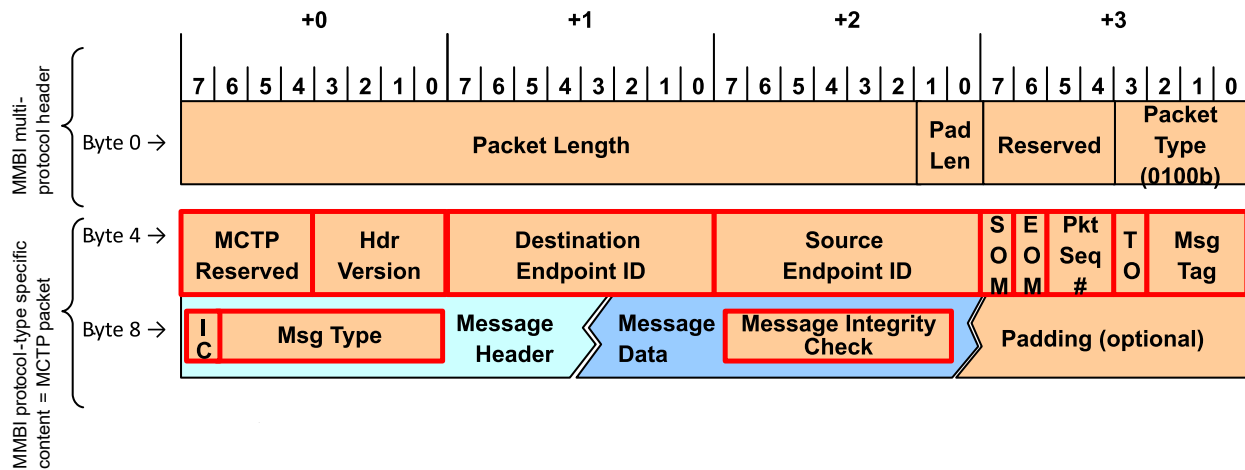
170 5.1.3 Packet Sizes

171 The normal packet size requirements and fragmentation and reassembly rules apply for MCTP packet
172 size over MMBI, as defined in [Management Component Transport Protocol \(MCTP\) Base Specification](#).

¹ Note that multiple endpoints in the system can be supported using a plurality of MMBI instances.

173 **5.2 MCTP Packet Encapsulation**

174 The MCTP message header and MCTP message data fields map to MMBI payload as shown in Figure 1.



175

176 **Figure 1 – MCTP over MMBI Encapsulation**

177 The length of the MCTP packet is determined by the MMBI header. Because of the 4-byte alignment
 178 requirement, padding must be added if necessary so that the packet length is a multiple of 4-bytes.

179 **Table 1 – MCTP Packet over MMBI – Field Descriptions**

Byte	Description
0:2	[23:2] MMBI packet length, as defined in Memory-Mapped Buffer Interface (MMBI) specification [1:0] Padding length, as defined in Memory-Mapped Buffer Interface (MMBI) specification
3	[7:4] reserved [3:0] Packet Type = MCTP = 0100b, as defined in Memory-Mapped Buffer Interface (MMBI) specification
4	[7:4] reserved [3:0] Header Version = 0001b for MCTP, as defined in Management Component Transport Protocol (MCTP) Base Specification
5	Destination endpoint ID = Null Destination EID value, as defined in Management Component Transport Protocol (MCTP) Base Specification
6	Source endpoint ID = Null Source EID value, as defined in Management Component Transport Protocol (MCTP) Base Specification
varies	Padding as defined in Memory-Mapped Buffer Interface (MMBI) specification

180 The definitions of all other fields follow [Management Component Transport Protocol \(MCTP\) Base](#)
 181 [Specification](#),

182 **5.3 Supported media**

183 The MMBI media type identifier for this binding spec is defined in [Management Component Transport](#)
 184 [Protocol \(MCTP\) IDs and Codes](#), section 7 "MCTP physical medium identifiers".

185 **5.4 Physical address format for MCTP control messages**

186 The physical address format for MCTP control messages is not defined in the revision of the document.
 187 This is because MCTP over MMBI disallows bridging, and the physical address format is only used by
 188 commands related to bridging:

- 189 • *Resolve Endpoint ID*
- 190 • *Resolve UUID*
- 191 • *Routing Information Update*
- 192 • *Get Routing Table Entries*

193 MCTP over MMBI and implementations shall not generate these commands. If received, they shall
 194 respond with the `ERROR_UNSUPPORTED_CMD` code (defined in [Management Component Transport](#)
 195 [Protocol \(MCTP\) Base Specification](#)).

196 **5.5 Get endpoint ID medium-specific information**

197 The medium-specific information shown in Table 2 shall be used for the medium-specific Information field
 198 returned in the response to the *Get Endpoint ID* MCTP control message. Note that the *Get Endpoint ID*
 199 MCTP control message should not be typically employed by MCTP over MMBI implementations because
 200 this specification only defines the use of the special endpoint ID values: Null Destination EID and Null
 201 Source EID—as defined in [Management Component Transport Protocol \(MCTP\) Base Specification](#).

202 **Table 2 – Medium-specific information**

Description	
[7:0]	reserved

203 **5.6 MCTP packet and control message timing requirements**

204 With MMBI, which uses a memory-mapping mechanism, the sender and receiver are able to determine if
 205 packets have been retrieved from the shared memory buffer. This mechanism can be used as an
 206 additional indication to optionally stop MCTP packet retransmissions (i.e., there is no reason to resend a
 207 packet if the previous one has not been retrieved from the buffer by the receiver). See Table 3.

Table 3 – Timing specifications for MCTP control messages on MMBI

Timing Specification	Symbol	Min	Max	Description
Number of request retries	MN1	2	none	Total of three tries, minimum: the original try plus two retries. The maximum number of retries for a given request is limited by the requirement that all retries shall occur within MT4, max of the initial request.
Request-to-response time	MT1	—	100 ms	This interval is measured at the responder from the end of the reception of the MCTP Control Protocol request to the beginning of the transmission of the response.
Time-out waiting for a response	MT2	MT1 max ^[1] + 2 * MT3 max	MT4, min ^[1]	This interval at the requester sets the minimum amount of time that a requester should wait before retrying an MCTP control request. This interval is measured at the requester from the end of the successful transmission of the MCTP control request to the beginning of the reception of the corresponding MCTP control response. NOTE: This specification does not preclude an implementation from adjusting the minimum time-out waiting for a response to a smaller number than MT2 based on the measured response times from responders. The mechanism for doing so is outside the scope of this specification.
Transmission delay	MT3	—	20 ms	Time to take into account the transmission delay of an MCTP Control Protocol message. Measured as the time between the end of the transmission of an MCTP Control Protocol message at the transmitter to the beginning of the reception of the MCTP Control Protocol message at the receiver.
Inter-packet delay for multi-packet messages	MT3a	—	100 ms	Allowed time measured from the end of the transmission of an MCTP packet with EOM=0 to the beginning of the following MCTP packet of the same Message (see Message assembly in Management Component Transport Protocol (MCTP) Base Specification), measured at the transmitter. The receiver can drop the incomplete message after this timeout.
Instance ID expiration interval	MT4	5 sec ^[2]	6 sec	Interval after which the instance ID for a given response will expire and become reusable if a response has not been received for the request. This is also the maximum time that a responder tracks an instance ID for a given request from a given requester.
NOTE 1: Unless otherwise specified, this timing applies to the mandatory and optional MCTP commands.				
NOTE 2: If a requester is reset, it may produce the same sequence number for a request as one that was previously issued. To guard against this, it is recommended that sequence number expiration be implemented. Any request from a given requester that is received more than MT4 seconds after a previous matching request should be treated as a new request, not a retry.				

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ANNEX A (informative)

Notations

214 Examples of notations used in this document are as follows:

- 215 • 2:N In field descriptions, this will typically be used to represent a range of byte offsets
216 starting from byte two and continuing to and including byte N. The lowest offset is on
217 the left, the highest is on the right.
- 218 • (6) Parentheses around a single number can be used in message field descriptions to
219 indicate a byte field that may be present or absent.
- 220 • (3:6) Parentheses around a field consisting of a range of bytes indicates the entire range
221 may be present or absent. The lowest offset is on the left, and the highest offset is on
222 the right.
- 223 • [PCle](#) Underlined blue text is typically used to indicate a reference to a document or
224 specification called out in 2, "Normative References" or to items hyperlinked within the
225 document.
- 226 • [4] Square brackets around a number are typically used to indicate a bit offset. Bit offsets
227 are given as zero-based values (that is, the least significant bit offset = 0).
- 228 • [7:5] A range of bit offsets. The most significant bit is on the left, and the least significant bit
229 is on the right.
- 230 • 1b A number consisting of 0s and 1s followed by a lowercase "b" indicates that the
231 number is in binary format.
- 232 • 0x12A A leading "0x" indicates that the number is in hexadecimal format.

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ANNEX B (informative)

Change log

Version	Date	Description
1.0.0	2023-07-14	Initial release
1.0.1	2024-10-09	Document title change ("Memory-Mapped BMC Interface" to "Memory-Mapped Buffer Interface") to better reflect potential broader uses of MMBI beyond just BMC

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