### GM-70 MIDI IMPLEMENTATION version 1.00  Nov. 11 1986

### TRANSMITTED DATA

<table>
<thead>
<tr>
<th>Status</th>
<th>Second</th>
<th>Third</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>101 nnn</td>
<td>Blank</td>
<td>xxxx</td>
<td>Note Off</td>
</tr>
<tr>
<td>100 nnn</td>
<td>Blank</td>
<td>xxxx</td>
<td>Note On</td>
</tr>
<tr>
<td>101 nnn</td>
<td>0000</td>
<td>0111</td>
<td>Volume</td>
</tr>
<tr>
<td>101 nnn</td>
<td>0000</td>
<td>1011</td>
<td>Program change</td>
</tr>
<tr>
<td>110 nnn</td>
<td>0000</td>
<td>xxxx</td>
<td>Pitch bender change</td>
</tr>
<tr>
<td>111 nnn</td>
<td>1111</td>
<td>xxxx</td>
<td>End of System Exclusive</td>
</tr>
</tbody>
</table>

Notes:
1. Onn represents the MIDI channel number assigned to each branch of A, B, C, and D.
2. Any Control Number can be selected.
3. Bulk Dump (or Load) the internal memory. See 3. EXCLUSIVE
4. At power-up, The following message is transmitted to all the branches.

### EXCLUSIVE

#### 3.1

**3.1.1 Exclusive Description**

System Exclusive is used to Dump or Load into the internal memory. The format to be used is followed by a "One Way Transfer" with 21 bit logical address.

**Standard Forest** (treat this as a block)

#### Byte Description

- **1111 0000** Exclusive status
- **0000 0001** Channel 0
- **0001 0001** Device-ID # control channel
- **0002 0001** where onn is the channel number
- **0003 0001** Model-ID # (GM-70)
- **0004 0001** Command-ID # (one way transfer data set)
- **0005 0001** Data byte 1
- **0006 0001** Data byte 2
- **0007 0001** Data byte 3
- **0008 0001** Data byte 4
- **0009 0001** Data byte 5
- **000A 0001** Data byte 6
- **1111 1111** End of System Exclusive

#### Data Format

The following are the contents of data transmitted and received.

**One Patch Memory (60 bytes)**

#### Address Descriptions

<table>
<thead>
<tr>
<th>Address</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 11</td>
<td>12 letter name, ASCII characters</td>
</tr>
<tr>
<td>12 - 15</td>
<td>Unidentified/reserved, standard is 0</td>
</tr>
<tr>
<td>16</td>
<td>Branch A, first string bit 1</td>
</tr>
<tr>
<td>17</td>
<td>Branch A, first string Transpose</td>
</tr>
<tr>
<td>18</td>
<td>Branch A, second string</td>
</tr>
<tr>
<td>19 - 20</td>
<td>Branch A, 3th string</td>
</tr>
<tr>
<td>21</td>
<td>Branch A, 3th string</td>
</tr>
<tr>
<td>22 - 23</td>
<td>Branch A, 4th string</td>
</tr>
<tr>
<td>24 - 25</td>
<td>Branch A, 5th string</td>
</tr>
<tr>
<td>26 - 27</td>
<td>Branch A, 5th string</td>
</tr>
</tbody>
</table>

#### Status Second Third Description

<table>
<thead>
<tr>
<th>Status</th>
<th>Second</th>
<th>Third</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1111 0000</td>
<td>Blank</td>
<td>xxxx</td>
<td>System exclusive</td>
</tr>
</tbody>
</table>

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**Notes:**

1. Onn is the value of Control Channel stored in the System Memory. The value can be changed freely, but the data is fixed to ON/OFF.
2. Bulk Dump (or Load) the internal memory. (See 3. EXCLUSIVE.)
Between two blocks, an inter block gap (more than 20ms) is placed to allow low speed receivers to recognize the signals.

The number of bytes in the above mentioned MDI messages are as follows:
- all data: 21834 bytes
- 64 patch: 10488 bytes
- System: 74 bytes

3.2.1 Entire Data in Memory
First, the Patch Memory data from 1 to 128 is sent, then the System Memory. The form and logical address of each block are as follows.
- block-001 (catch-11)
  - FO 41 On 11 12 00 00 00 [.data 160bytes.] sum F7
- block-002 (catch-12)
  - FO 41 On 11 12 00 01 00 [.data 160bytes.] sum F7
- block-003 (catch-13)
  - FO 41 On 11 12 00 02 00 [.data 160bytes.] sum F7
- block-016 (catch-88)
  - FO 41 On 11 12 01 1E 60 [.data 160bytes.] sum F7
- block-032 (catch-88)
  - FO 41 On 11 12 01 20 00 [.data 58bytes..] sum F7

3.2.2 First 64 Patches
The form and logical address of each block are as follows.
- block-001 (catch-11)
  - FO 41 On 11 12 02 00 00 [.data 160bytes.] sum F7
- block-002 (catch-12)
  - FO 41 On 11 12 02 01 00 [.data 160bytes.] sum F7
- block-003 (catch-13)
  - FO 41 On 11 12 02 02 00 [.data 160bytes.] sum F7
- block-004 (catch-88)
  - FO 41 On 11 12 02 4E 60 [.data 160bytes.] sum F7

System Memory (32 bytes)

Address Descriptions
- 0 CV 1 assign
- 1 CV 1 note
- 2 CV 3 the contents of data are the same as CV 1’s.
- 3 CV 2 the contents of data are the same as CV 1’s.
- 4 CV 2 the contents of data are the same as CV 1’s.
- 7 CV 3 the contents of data are the same as CV 1’s.
- 8 CV 3 the contents of data are the same as CV 1’s.
- 9 SW 1 the contents of data are the same as CV 1’s.
- 10 SW 2 the contents of data are the same as CV 1’s.
- 11 SW 2 the contents of data are the same as CV 1’s.
- 12 FC 1 the contents of data are the same as CV 1’s.
- 13 FC 1 the contents of data are the same as CV 1’s.
- 14 FC 2 the contents of data are the same as CV 1’s.
- 15 FC 2 the contents of data are the same as CV 1’s.
- 16 RS 1 the contents of data are the same as CV 1’s.
- 17 RS 2 the contents of data are the same as CV 1’s.
- 18 RS 2 the contents of data are the same as CV 1’s.
- 19 21 RDM the contents of data are the same as CV 1’s.
- 22 Control Channel
- 23 Undefined/reserved, standard is 00
- 24 Master Tone
- 25 - 31 Undefined/reserved, standard is 00

3.2 TRANSMIT
One of the following data groups can be transmitted through panel operation.
1) entire memory data
2) first half of patches of the 128 Patch Memories (11 to 64)
3) System Memory (11 to 88)
4) System Memory

The data in one block is transmitted as follows:
1) 1 byte (4 bits) is divided into two 4 bits each.
2) A patch consists of 80 bytes and sent by a block including 160 data bytes.
3) The system memory consists of 32 bytes and sent by a block including 64 bytes.

3.3.1 The following conditions should be fulfilled to start receiving data.
- Roland Format being received is correct. (If not, the GM-70 will wait until the correct block is transmitted.)
- The received Device ID is equal to the Control Channel. (If not, the GM-70 will wait until the correct block is transmitted.)
- The address of the first block is one of the following. (If not, the GM-70 shows DATA ERROR in the display and returns to the playing mode.)
  - Address(3 bytes) MSB LSB
  - 01 00

3.2.3 Last 64 Patches
The form and logical address of each block are as follows.
- block-001 (catch-11)
  - FO 41 On 11 12 02 50 00 [.data 160bytes.] sum F7
- block-002 (catch-12)
  - FO 41 On 11 12 02 51 00 [.data 160bytes.] sum F7
- block-003 (catch-13)
  - FO 41 On 11 12 02 52 00 [.data 160bytes.] sum F7
- block-004 (catch-88)
  - FO 41 On 11 12 02 1E 60 [.data 160bytes.] sum F7

3.2.4 System Memory Data
Contains only one block. The form and address are as follows.
- block-001 (system)
  - FO 41 On 11 12 02 20 00 [.data 58bytes.] sum F7

3.3 Receive
Enter to the receive standby mode by operating the panel.
- Select whether to receive the first or later 64 Patches. (See 3.2 Transmit, 3.3.2, and 3.3.3.)
- This procedure is not necessary when receiving the entire data of memory.

3.3.2 Depending on the first address received, the GM-70 stores the data into a proper location in memory. After this, the following conditions should be fulfilled.
- Roland Format being received is correct. (If not, the GM-70 will wait until the correct block is transmitted.)
- The received Device ID is equal to the Control Channel. (If not, the GM-70 will wait until the correct block is transmitted.)
- The next logical address is correct. (If not, the GM-70 shows DATA ERROR in the display and returns to the playing mode.)
- Check Sum is correct. (If not, the GM-70 shows DATA ERROR in the display and returns to the playing mode.)
- CKD follows at the end. (If not, the GM-70 shows DATA ERROR in the display and returns to the playing mode.)
- The correct number of the blocks received. (When less blocks are received; the GM-70 waits until all are received.)
- When more blocks are transmitted, the GM-70 ignores the exceeding blocks.
- Even if the loading does wrong in the middle, the data received so far is stored in memory.
- Loading can be aborted at any time by pressing any button on the panel.
- The Control Channel resides in the System Memory. Therefore, the Control Channel (Device ID) is not changed until the System Memory Blocks is fully received.