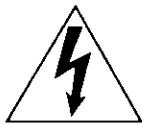
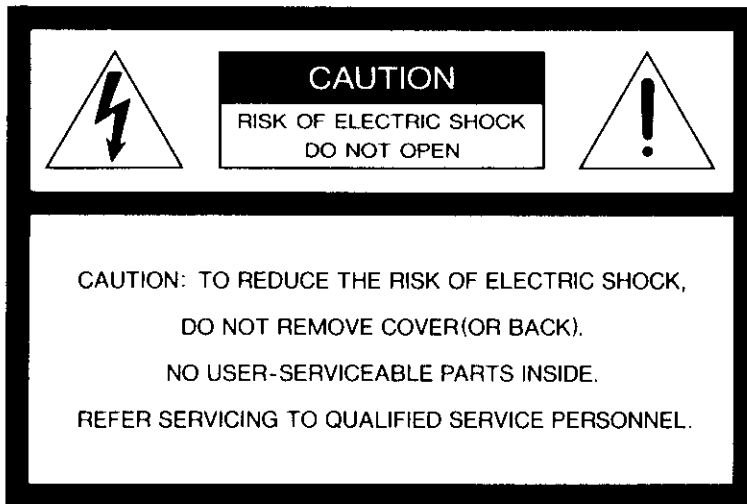




Model MTC-1

Owner's Manual



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

"WARNING"

"TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE"

SAFETY INSTRUCTIONS

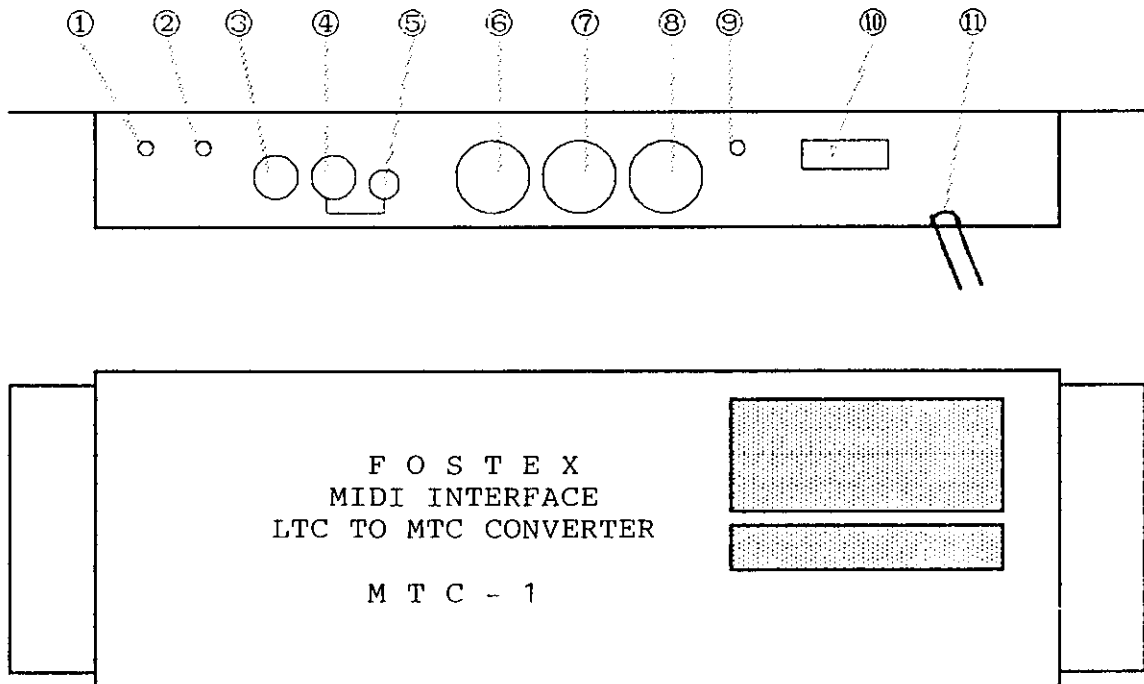
1. Read Instructions – All the safety and operating instructions should be read before the appliance is operated.
2. Retain Instructions – The safety and operating instructions should be retained for future reference.
3. Heed Warnings – All warnings on the appliance and in the operating instructions should be adhered to.
4. Follow Instructions – All operating and use instructions should be followed.
5. Water and Moisture – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, and the like.
6. Carts and Stands – The appliance should be used only with a cart or stand that is recommended by the manufacturer.
7. Wall or Ceiling Mounting – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. Ventilation – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. Heat – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. Power Sources – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. Grounding or Polarization – The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
12. Power Cord Protection – Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. Cleaning – The appliance should be cleaned only as recommended by the manufacturer.
14. Nonuse Periods – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
15. Object and Liquid Entry – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
16. Damage Requiring Service – The appliance should be serviced by qualified service personnel when:
 - A. The power supply cord or the plug has been damaged; or
 - B. Objects have fallen, or liquid has been spilled into the appliance; or
 - C. The appliance has been exposed to rain; or
 - D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
 - E. The appliance has been dropped, or the enclosure damaged.
17. Servicing – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

Thank you for purchasing the Model MTC-1.
 Model MTC-1 allows various modes of communication between MIDI equipment and recorders provided with an exclusive MTC-1 serial port such as the Fostex Model R-8 multi-track recorder.
 Please read through this manual before operating to ensure correct operation over the many years to come.

T A B L E O F C O N T E N T S

SECTION 1. NAME AND FUNCTION OF THE CONTROLS	1-1~3
SECTION 2. GENERAL OUTLINE OF MODEL MTC-1	2-1-1
2-1 . Function and features	2-1-1
2-2 . Installing and connecting methods.....	2-2-1
2-3 . The mode select DIP switch	2-3-1~5
2-4 . MIDI messages: Receiving message	2-4-1~2
Transmitting message	2-4-1
Communicating methods.....	2-4-2
SECTION 3. DETAILS ON RECEIVE/TRANSMIT MESSAGES	3-1-1~3-2-18
3-1 Control by channel message	3-1-2~22
3-2 Control by system message	3-2-1~18
SECTION 4. SPECIFICATIONS	4-1

1. NAME AND FUNCTION OF THE CONTROLS



- 1) Power LED
Power to the Model MTC-1 is supplied from the recorder. With the MTC-1 connected to the recorder, this LED is lit when the recorder power is switched on.
- 2) SMPTE time code LED (LTC=Longitudinal Time Code)
Model MTC-1 contains a SMPTE time code generator/reader. This LED indicates the operating state of the generator and reader as shown in the table below. Only one of either can operate at any time and if the generator is in RUN, the reader will not operate. RUN/STOP of the generator is selected by an external MIDI message (cannot be selected from the main unit).

LED	Mode of generator	Mode of reader
○ (off)	STOP mode	Cannot read LTC
○ (blink)	RUN mode	
● (on)		Reading of LTC

NOTICE: The following condition is necessary for the reader to operate and for this unit to read the LTC.

- 1) Generator is in STOP mode.
- 2) LTC speed is within $1/2 \sim 2$ times tape speed (in either forward or reverse direction).
- 3) Time reference is set to other than "TACH & DIR." (Refer to "Time reference selection" in page 3-1-9)

The MTC-1 will automatically read the LTC when the above items 1) ~ 3) are satisfied.

- 3) SMPTE time code input jack (LTC IN)
The recorder time code track output (normally track 8 for Model R-8) or time code output from other equipment is connected here.
- 4) SMPTE time code output jack (LTC OUT)
The recorder time code track input (normally track 8 for Model R-8) or time code input of other equipment is connected here.
- 5) SMPTE time code output level control (LEVEL)
This adjusts output level of the SMPTE time code from LTC OUT (4). In Model R-8, it is ideally set for about "0" meter indication with Dolby C ON.
- 6) MIDI OUT connector (MIDI OUT)
Responding messages to MTC (MIDI time code) and to MIDI equipment which control this unit are output here.
- 7) MIDI through connector (MIDI THRU)
Signals input to MIDI IN (8) are directly output here.
- 8) MIDI input connector (MIDI IN)
This is connected to MIDI OUT of the MIDI equipment which control this unit.
- 9) MIDI IN LED (MIDI IN)
This is lit when a MIDI message which have a meaning to this unit is received.
- 10) Mode set DIP switch (MODE SET)
Switches for setup of various initial settings before using this unit. Refer to "The mode set DIP switch," page 2-3-1 for details.
- 11) Model R-8 connecting cable (TO R8)
This is connected to the R8 serial port connector, "SERIAL PORT/MODEL MTC-1."

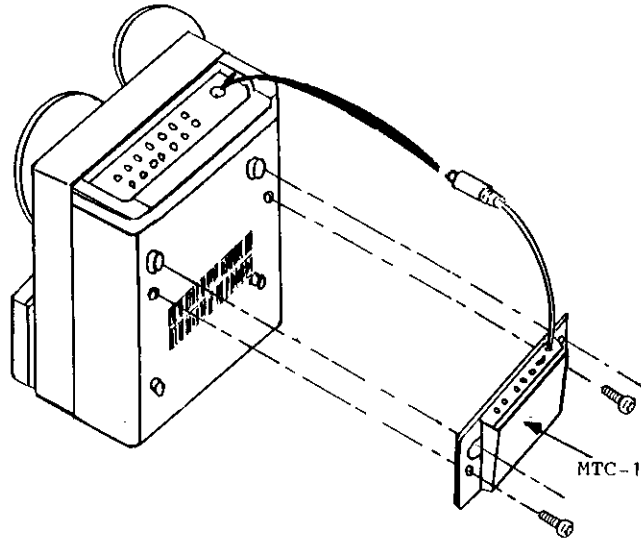
2. GENERAL OUTLINE OF MODEL MTC-1

2-1 • Function and features

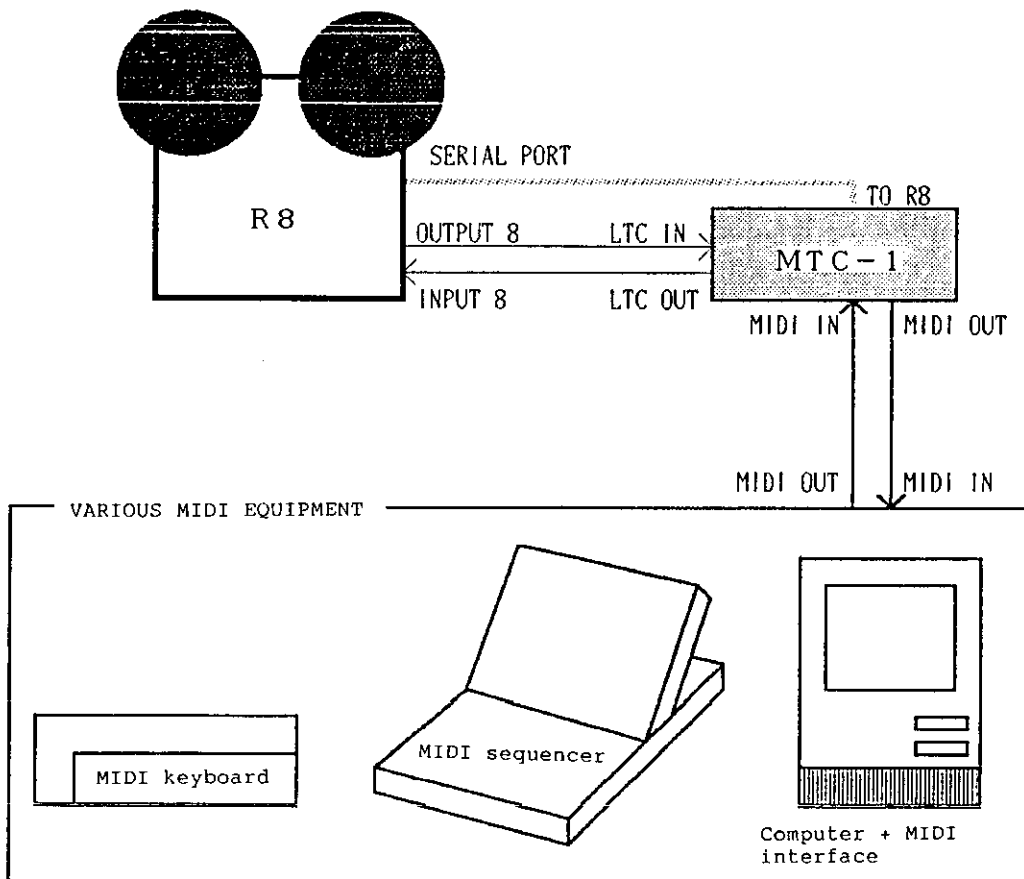
- A. Model MTC-1 is a MIDI interface for tape recorders.
 - B. Fostex Model R-8 is the only tape recorder which can be connected and used by this unit as of May 1, 1989.
 - C. Its features are:
 - 1. When a MIDI message is received from external MIDI equipment, MTC-1 will control operation of the recorder in accordance to the commands.
 - 2. Operating mode and tape position of the recorder is output from MIDI OUT.
 - 3. SMPTE time code (hereon written LTC) read in is converted to MIDI time code (hereon written MTC) and direct time lock signal (*1) and output.
- *1 Direct time lock signal:
The MIDI signal for synchronizing obtained by the LTC → MIDI conversion method employed by South Worth Co. There are some versions in the sequence software "Performer" for McIntosh from the Mark of Unicorn Co. which comply to this signal. Namely, they are the input LTC converted to that equivalent to the MTC full message and that to MIDI timing clock.
- D. As the tape recorder can be elaborately controlled by a standard MIDI interface, it is very helpful in standardizing the controlling and automation at music creation and various events.
 - E. If the sequencer to be connected and sequence software comply to the MTC, and in addition provided with a tempo map, a sync system consisting of a recorder master/MIDI slave can be made very easily.

2-2 • Installing and connecting methods

Model MTC-1 is installed and connected to the Model R-8 as shown in the diagram below.



[Connecting example to external equipment]



2-3. The mode select DIP switch

The mode selecting DIP switch (10) for initial setting of the various modes functions as follows.

[MODE SET map]

SW	0	1
1	A1=0	A1=1
2	A2=0	A2=2
3	A4=0	A4=4
4	A8=0	A8=8
5	ADRS=FREE	ADRS=A
6	VOICE MSG OFF	VOICE MSG ON

$$A = A1+A2+A4+A8+1$$

FRAME	24	25	ND	DF
7	0	0	1	1
8	0	1	0	1

ADDRESS SETTING (Switch 1 ~ 4)

Address of this unit is setup by switches 1 ~ 4.

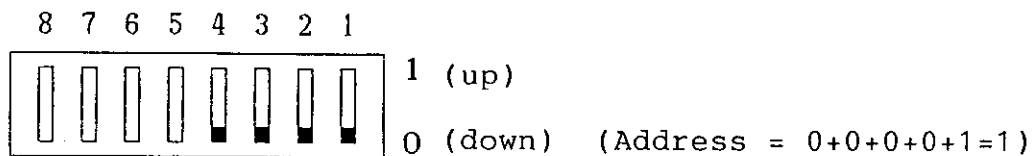
Address is applied both to the so-called "MIDI channel" in the channel voice message, and the so-called "device number" in the universal system exclusive message. In other words, in this unit, MIDI channel and device number will always be the same (cannot be separately numbered) and this number is called the "address." In the MIDI specification, it is said that device number can be specified in the range of 1 ~ 128 but in this unit, please note that the range is limited to 1 ~ 16. The setup address is common at both transmitting and receiving.

• Setup procedure

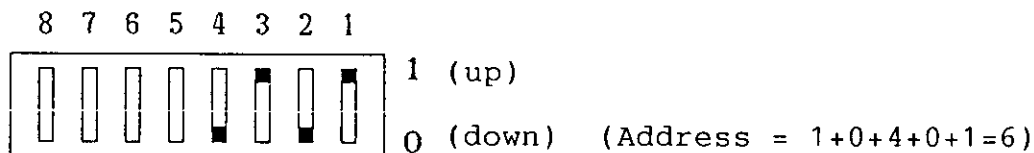
Values 1, 2, 4 and 8 are assigned to switches 1, 2, 3 and 4. The value will be "0" when switch is at "0" (down) and will respectively be the value assigned to that switch when it is at "1" (up). The address value of 1 ~ 16 can thus be setup by adding "1" to the total value setup by switches 1 ~ 4. Examples of this procedure will be shown in the following.

$$\text{Address value} = A1(\text{Value of SW1}) + A2(\text{Value of SW2}) + A4(\text{Value of SW3}) + A8(\text{Value of SW4}) + 1$$

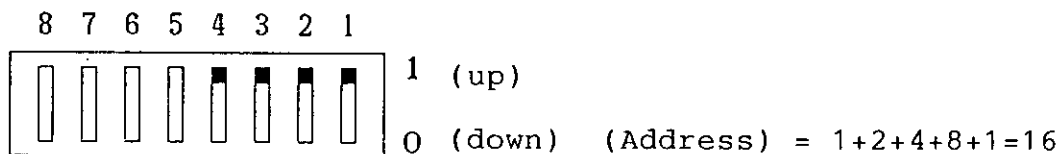
Example 1: Setup address to 1



Example 2: Setup address to 6



Example 3: Setup address to 16



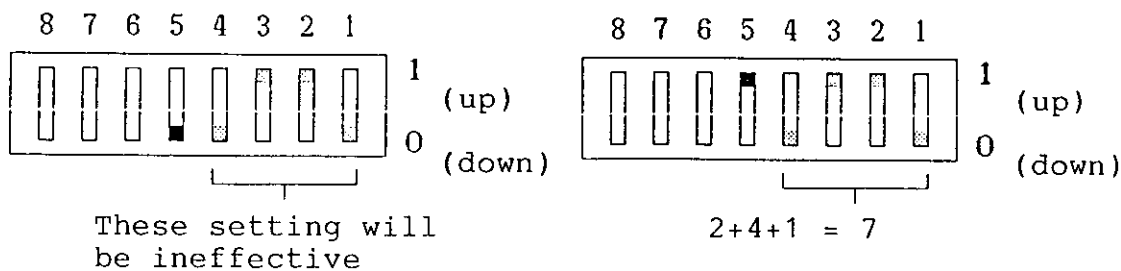
ADDRESS FREE SETTING (Switch 5)

Address free mode is setup by switch 5.

Address free mode is the mode in which the message will be accepted even though its MIDI channel and device number do not match the address of this unit (MTC-1). When not in this mode, those whose address match this unit only, from among the messages received, will be processed. It will be in the address free mode when switch 5 is set to "0" (down).

Example 1: Address free mode

Example 2: Address = 7 (fixed)



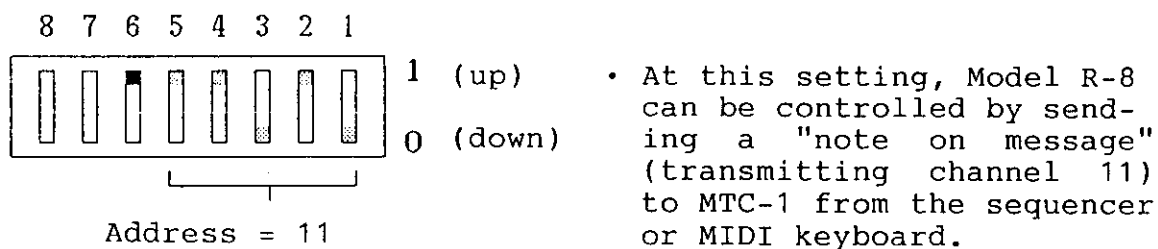
NOTE 1: When the device number received is 128 (7FH), MTC-1 will go to receive processing regardless to whether it is address setting (switch 1 ~ 4) or address free setting (switch 5). This is due to the MIDI rule that "The equipment receiving the 128 (7FH) message must respond to it regardless to what its own device number is."

NOTE 2: When this unit transmits a message containing its own address, it will be sent by the address setup by switches 1 ~ 4 regardless to the address free setting (switch 5).

CHANNEL VOICE MESSAGE RECEIVE/IGNORE SETTING (Switch 6)

When a channel voice message is received by MTC-1, the setting of switch 6 determines whether this should be received or ignored. It will be ignored when switch 6 is set to "0" (down) or received when set to "1" (up).

Example 1: Receiving channel voice message of MIDI channel "11"



SMPTE TIME CODE FRAME SETTING (Switch 7, 8)

LTC frame rate output from the internal SMPTE time code generator are setup by switches 7 and 8.

Basically, this setting will not affect the time code reader but if "tach & dir" is specified in the "time reference" by the channel voice message or Fostex system exclusive message (Refer to "3. DETAILS ON RECEIVE/TRANSMIT MESSAGES"), MTC-1 will acknowledge the recorder position by this rate setting. In other words, if MTC-1 is in the mode for acknowledging the recorder position by the tach (Tach pulse signal: signal which indicate amount of tape travel) and dir (Direction signal: signal indicating tape travel direction) signals, it will forcibly convert under the frame rate set by this switch. The following four type of setting is permissible.

24	24 frame (Film spec.)	SW7: 0 (down) SW8: 0 (down)
25	25 frame (EBU spec.)	SW7: 0 (down) SW8: 1 (up)
ND	29.97 frame (Non-drop type)	SW7: 1 (up) SW8: 0 (down)
DF	29.97 frame (Drop type)	SW7: 1 (up) SW8: 1 (up)

REVIEW OF MODE SET DIP SWITCHES

Example 1: Address = 1; Voice message = Receive; Output LTC = 29.97 (Non-drop) frame. (Device number 7FH, however, will be received.)



- Operating example: To control Model R-8 by channel 1 note on message or device number 1 setup message.

Example 2: Address = Free mode; Voice message = Ignore; Output LTC = 25 frame. (Address = 7 when transmitting its own address)



- Operating example: Model R-8 not to be controlled by note on message. Model R-8 to be controlled by the setup message, etc. of a random device number.

Example 3: Address = 16; Voice message = Inifinitive; Output LTC = 29.97 (drop) frame. (Device number 7FH, however, will be received.)



- Operating example: Model R-8 not to be controlled by note on message. Model R-8 to be controlled by setup message, etc. of device number 16.

2-4. MIDI message

The function of this unit can be manifested in full by using the Fostex system exclusive message. Control is possible, of course, by channel voice message (note on message, etc.) or universal system exclusive message (setup message, etc.) but in these cases, all functions of this unit cannot be extracted.

Messages which can be received and transmitted by this unit are as follows:

Receive messages

Model MTC-1 acknowledges the following type messages and ignore any other types. Also, even though it may be the types listed below, those whose parameter values are not in the range defined for this unit (undefined note number, etc.), will be ignored.

Please refer to "3. DETAILS ON RECEIVE/TRANSMIT MESSAGES" on operation at receiving of the various messages.

- Channel voice message
 - Note on/off
- channel mode message
 - Local control on/off
 - All note off
 - Omni on/off
- System real time message
 - System reset
- System common message
 - MTC quarter frame message
- Universal system exclusive message
 - Identity request (Inquiry message)
 - MTC full message
 - MIDI cueing setup message
- Fostex system exclusive message

Transmit messages

Model MTC-1 transmits messages of the type in the following. Transmission will occur when it receives various messages in the request category (In short, when a response is requested) or when it is set to such a mode (For example, MTC output mode). Also, for example, when transmitting a message of the type containing a device number such as in identity reply, it will be sent by the address setup by switches 1 ~ 4 of the mode set DIP switch (10) (It will not be affected by switch 5).

- System common message
 - MTC quarter frame message
- System real time message
 - Timing clock
- Universal system exclusive message
 - Identity reply (Inquiry message)
 - MTC full message
 - MTC user bit message
 - MIDI cueing setup message
- Fostex system exclusive message

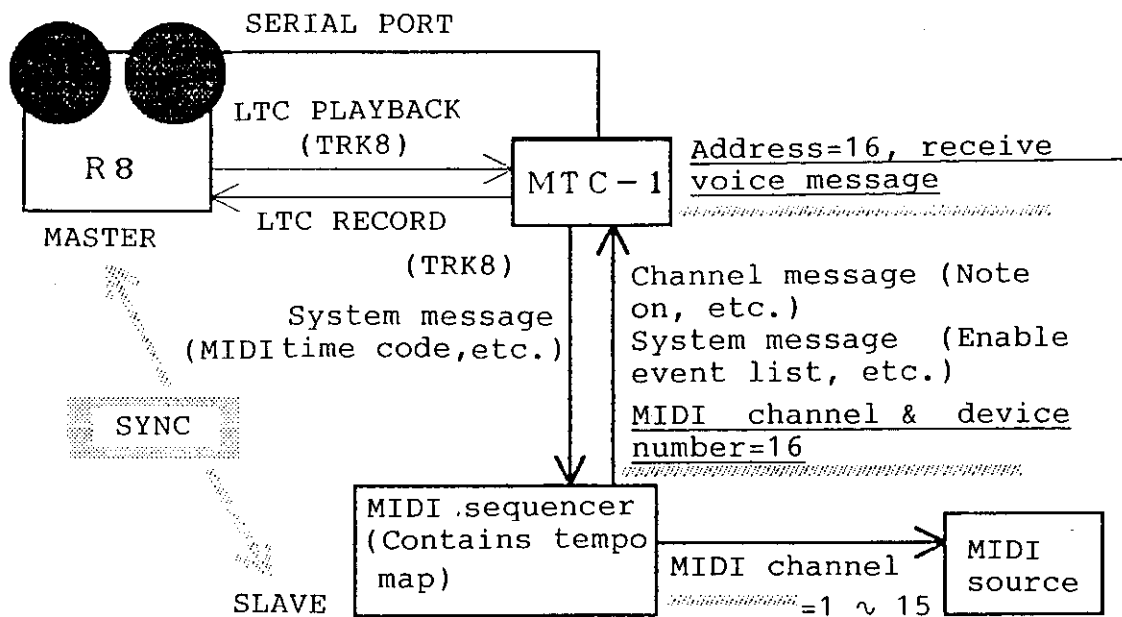
Communicating methods

Transmission is by open loop. In other words, a response message will not be output for other than a command requesting a response, in the same way as for common MIDI equipments. This is the same for the Fostex system exclusive message.

3. DETAILS ON RECEIVE/TRANSMIT MESSAGES

In the following, various MIDI messages (channel message and system message) necessary for controlling the MTC-1 without using the Fostex system exclusive message (message exclusively for Fostex which utilizes the Fostex ID code) will be explained.

As interchangeability is maintained in the format between manufacturers by the MIDI specification in these messages, it is very convenient at controlling the MTC-1. A representative example in using these messages to construct a system is shown below.

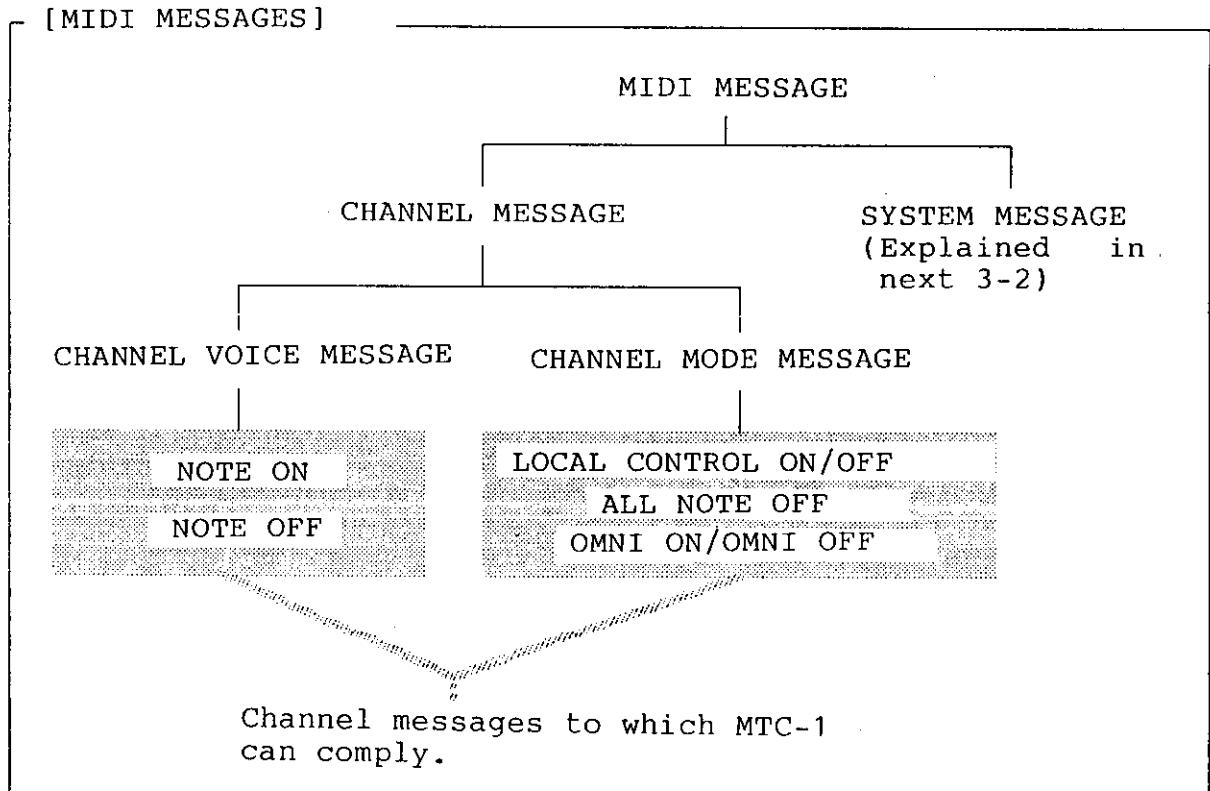


NOTE 1: Sync between R8 and sequencer is possible when LTC is recorded on R8, sequencer comply to the MIDI time code, and the sequencer has its own tempo map.

NOTE 2: Even when sync is not applied, it is recommended to record LTC on R8. This is because LTC is absolutely necessary for accurate auto punch in/out, etc. RUN/STOP of the LTC generator will be by a MIDI message. It is not possible from the MTC-1 main unit.

3-1. Control by channel message

Channel messages to which MTC-1 comply are shown below. How the MTC-1 behaves when these messages are received will be explained in the following.



- Channel mode message

Local control on/off

Originally, local control on/off is used to select whether the keyboard and sound source is to be separated or not in a MIDI synthesizer which receives it but the MTC-1 operates as in the following.

LOCAL CONTROL ON/OFF

R8 and the controller will be separated. In other words, when MTC-1 receives this message, the control panel of R8 will not be able to control the R8 main unit.

LOCAL CONTROL ON

It will return to the original state (R8 main unit can be controlled by its control panel).

All note off

All note off, originally, is a message to force to a stop the sound which is heard from the MIDI sound source (except for the note played by the sound source main unit keyboard) but at the instant MTC-1 receives it, it will operate as if note

off messages were received for all note numbers which MTC-1 acknowledges as "on."

Omni on/omni off

Omni on/omni off, originally, is used to setup whether the MIDI equipment which receives it should acknowledge it or not but when it is received by MTC-1, it will operate as follows.

Omni on

MTC-1 will enter the address free mode. In other words, it will operate as if switch 5 (set to address free) of the mode set DIP switch (10) is set to "0 (down)."

Omni off

MTC-1 will enter the address fixed mode. In other words, it will operate as if switch 5 (set to address free) is set to "1 (up)." In this case, the address figures will be as set by switches 1 ~ 4.

This message and switch 5 is effective in late-arrive-priority when used such as to create a change in the address mode setting. For example, when omni off is received with switch 5 set to "0," it will change to the address fixed mode, and later on when switch 5 is set to "1," then returned to "0," it will change to the address free mode.

ESSENCE OF THE CHANNEL MODE MESSAGES

Message received	MTC-1 Operation
Local control off	Controller will be cut off from R8 thus disabling it.
Local control on	R8 main unit will be controllable from the controller.
All note off	All notes "on" will be turned off.
Omni on	Will be address free mode.
Omni on	Will be address fixed mode.

NOTE: Byte status of each message are as follows (Status and data 2 are expressed in hexadecimal).

Byte Message	Status	Data 1 (Control number)	Data 2
Local control off	Bn	122	00
Local control on	Bn	122	7F
All note off	Bn	123	
Omni on	Bn	125	
Omni off	Bn	124	

(n indicates the channel number)

- Channel voice message

Note on/note off

Note on/note off are, originally, messages which have the same meaning as pressing and releasing keys of a MIDI synthesizer, etc. which receive it but MTC-1 will operate as follows when it receives it.

For the sake of simplifying the explanation here, "note on/note off is received" by MTC-1 will be replaced with "press/release the key." In other words, the explanation will be on the assumption that MIDI OUT of the MIDI keyboard is connected to MIDI IN (8) of MTC-1.

How to enter the message

There are two different methods in entering a message (method of operating the MIDI keyboard) to the MTC-1.

Normal method (Single pressing)

Single pressing of the MIDI keyboard. In other words, key manipulation for sending a "single tone" to the MTC-1.

Shift method (Multiple pressing)

Pressing another key while pressing a certain key. In other words, the method of sending a "double tone" to the MTC-1. In this operation, the first key pressed is called the SHIFT key, and the key pressed pursuant to this is called the NORMAL key.

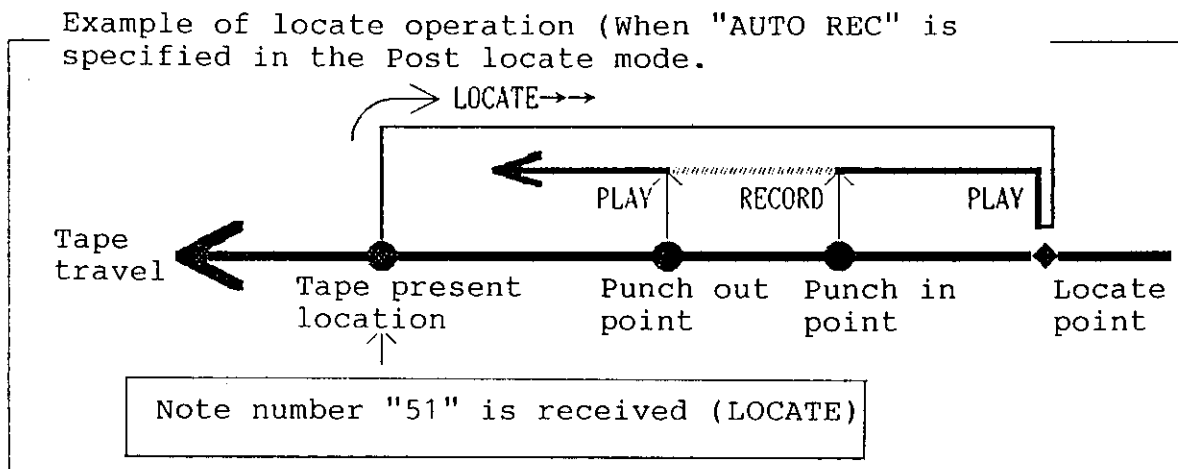
Operation by the Normal Method (single pressing)

When note on/off output by the normal method is received, MTC-1 will control the recorder that is connected to it as follows. Content of the control will be determined by the note number. Note Off can be replaced by Note On at velocity "00."

Note number (Hexadecimal)	Note on	Note off	Remarks
48 (30H)	PLAY		Recorder will immediately enter play.
49 (31H)	RECORD		Recorder will immediately enter record. (Note 1)
51 (33H)	LOCATE		Recorder will immediately locate. (Note 2)
52 (34H)	REVIEW		Recorder will immediately enter review. (Note 3)
53 (35H)	REWIND		Recorder will immediately rewind.
55 (37H)	CUE ON	CUE OFF	Recorder will be in the cue mode while key is pressed. Cueing is cancelled when key is released.
57 (39H)	F.FORWARD		Recorder will immediately enter fast forward.
59 (3BH)	PUNCH OUT		Recording is cancelled if recorder is in record mode.
60 (3CH)	STOP		Recorder will immediately stop.
61 (3DH)	LOOP		Recorder will immediately enter the loop mode. (Note 5)

NOTE 1: In order to enter the recording mode, any one record track selector on the recorder must be ON (This can be set by shift operation explained later). When this message is received with all in the OFF state, it will operate as if the recorder REC and PLAY were pressed simultaneously.

NOTE 2: Generally speaking, "locate" means fast winding the recorder toward a random point and stopping it at this point. In the MTC-1, this point is set beforehand by shift operation etc. as the "locate point" (Method of setting explained later). Additionally, in the MTC-1, the next operation the recorder should enter, after arriving at the locate point, is also setup. This is called "post locate mode" and is set by shift operation, etc. (Setup method in PLAY, STOP, RECORD etc. to be explained later). In other words, if STOP is specified in the post locate mode, the MTC-1 locate operation will be same as the general locate operation.

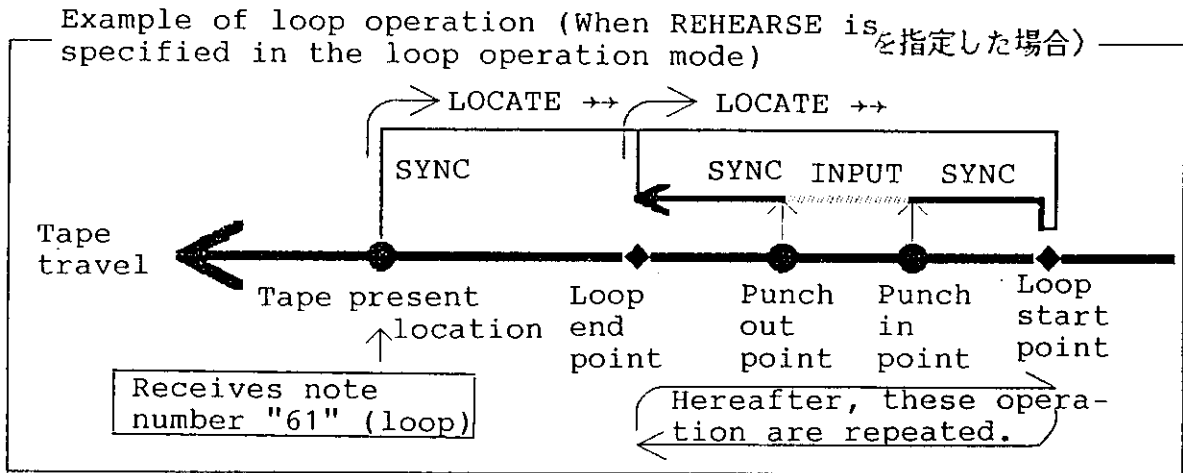


NOTE 3: Review is the operation of the recorder locating to a certain length of time before the present location and then immediately entering the play mode upon completing the locate operation. This "certain length of time" is preset to 5 seconds inside MTC-1 but can be edited by the Fostex system exclusive message.

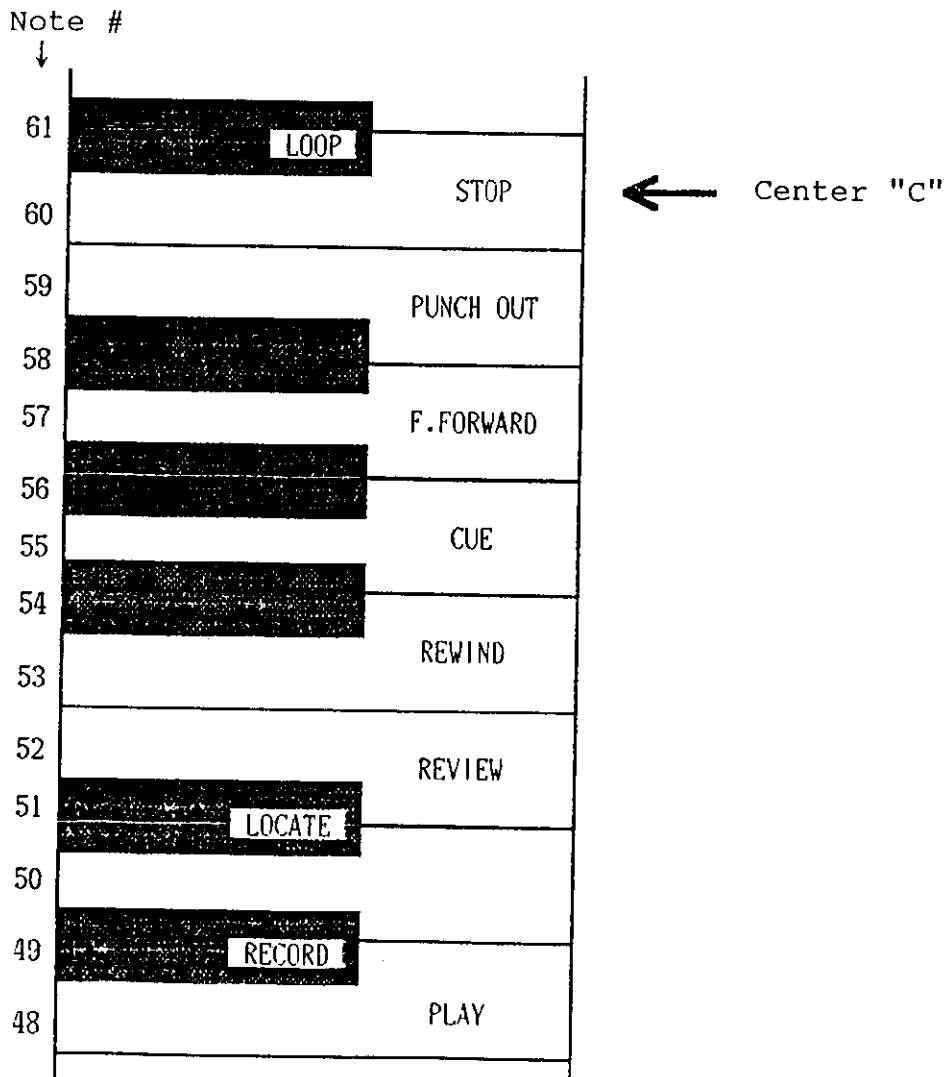
NOTE 4: It will punch out and enter the play mode when this message is received. When the recorder is not in the record mode, this message will have no meaning.

NOTE 5: In the loop operation, the recorder will locate toward the loop start point (Method of setup to be explained later) registered in the MTC-1, immediately enter the status specified by the loop operation mode (Setting method in PLAY, STOP, RECORD etc. explained later) upon arriving there, and thereafter enter the

same state as if the loop mode is ON. Loop mode ON/OFF means whether the chain of operation of [The tape running in the play mode (or record mode), automatically locates toward the loop start point upon reaching the loop end point, then enter the mode specified in the loop operation mode] will be entered or not (ON/OFF setup method explained later).



• The above expressed on the MIDI keyboard is shown below.

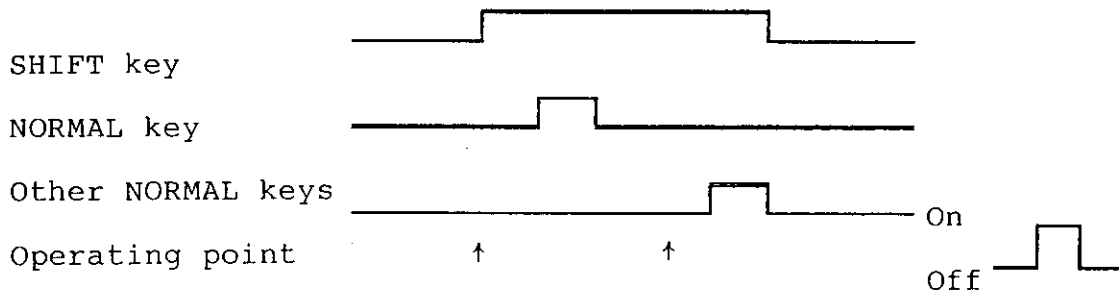


Operation by shift operation (Multiple press)

When the shift operation message is received, not only control of the recorder but its own mode setup/change can be done in the MTC-1. These operation will be explained in this section. In the same way as in normal operation, the operation content is determined by the SHIFT key and NORMAL key note numbers received. Note off can be replaced with velocity "00" note on.

- On the operation timing

At shift operation, after arrival of the SHIFT key (first key to be pressed) note on, operation of MTC-1 is triggered at the instant the NORMAL key (key to be pressed next) note on arrives ahead of note off of this key.



ON/OFF for remote control of MTC-1 by MIDI

In order to select whether MTC-1 should respond to the MIDI message sent from external equipment or not, or in other words, whether MTC-1 should be rendered controllable by various MIDI messages, the SHIFT key and note number keys 78/79 are used as shown below.

SHIFT key = 78, NORMAL key : Remote control on
SHIFT key = 79, NORMAL key : Remote control off

However, even though MTC-1 is in the not remote controllable state, it will respond to the remote controllable message (It will enter the remote controllable state when received.).

RUN/STOP selection of the LTC generator

The SHIFT key and note number keys 78/79 are used to RUN or STOP the MTC-1 internal SMPTE time code generator.

SHIFT key = 78, NORMAL key = 56 : RUN
SHIFT key = 79, NORMAL key = 56 : STOP

Time reference selection

From where time information for the MTC-1 reference should be obtained can be setup. For this setup, the note number 82 key is used as shown below.

SHIFT key = 82, NORMAL key = 49 : MTC (1)
SHIFT key = 82, NORMAL key = 50 : LTC with TACH & DIR .. (2)
SHIFT key = 82, NORMAL key = 51 : LTC (3)
SHIFT key = 82, NORMAL key = 52 : TACH & DIR (4)

[Explanation]

- (1) At selection: MTC-1 manages time information based on the MIDI time code (Full message and quarter frame message) sent from an outside source.
- (2) At selection: MTC-1 manages time information based on the LTC sent from the recorder and TACH & DIR (the signal indicating the tape travel amount and its direction of travel.). LTC is read when recorder is in the play mode, and the TACH & DIR when in the fast wind mode.
- (3) At selection: MTC-1 manages time information based on the LTC sent from the recorder. When the recorder is in the fast wind mode, its position cannot be acknowledged.
- (4) At selection: MTC-1 manages time information based on TACH & DIR (the signal indicating the tape travel amount and its direction of travel.) sent from the recorder. Even though the recorder is in the play mode, not the absolute time on the tape by LTC but the relative time by TACH & DIR, is managed.

Setup of recorder record permit/prohibit

Whether recording should be permitted or not in the recorder connected to MTC-1 can be setup. If not permitted, the recorder will not enter the recording mode even though a recording track is selected and the record and play buttons are simultaneously pressed. The note number 78, 79 keys are used as the SHIFT key, as shown in the following, for this setup.

SHIFT key = 78, NORMAL key = 62 : Recording permitted
SHIFT key = 79, NORMAL key = 62 : Recording prohibited

Setup of local control ON/OFF

In the same way as local control ON/OFF of the channel mode message, whether R8 and its controller is to be disconnected or not can be setup. Note number keys 78/79 are used as the SHIFT key to set this up as shown below.

SHIFT key = 78, NORMAL key = 58 : Not disconnect
SHIFT key = 79, NORMAL key = 58 : Disconnect

Setup of MIDI time code output ON/OFF

Whether or not the LTC sent from the recorder is to be converted to MIDI time code and output can be setup. Note number keys 78/79 are used as the SHIFT key to setup as shown below.

SHIFT key = 78, NORMAL key = 61 : To output
SHIFT key = 79, NORMAL key = 61 : Not output

[Explanation]

MIDI time code is output by the following process.

First, when the recorder enters the play mode and MTC-1 has read LTC, the MTC full message is output once. After this, the MTC quarter frame message will be continuously output until the recorder cannot remain in the play mode (until MTC-1 becomes unable to read LTC).

Setup of the recorder monitor mode

Monitor mode of the recorder connected to MTC-1 can be setup. Note number key 82 is used as the SHIFT key for this setup as shown below.

SHIFT key = 82, NORMAL key = 45 : SYNC (1)
SHIFT key = 82, NORMAL key = 47 : INDIV. INPUT (2)
SHIFT key = 82, NORMAL key = 48 : ALL INPUT (3)

[Explanation]

- (1) At selection: Recorder enters the sync playback mode. In R8, this will be the normal playback mode as it is the two head type.
- (2) At selection: Recorder will be in the individual input monitor mode. The track specified by the record track selector only will be in the input monitor mode.
- (3) At selection: Recorder will be in the all input monitor mode. All tracks will be in the input monitor mode.

Method of record track select

Record track select (specifying of the recording track) of the recorder connected to MTC-1 can be done. Note number keys 83, 84 are used as the SHIFT key to setup as shown below.

SHIFT key = 83, NORMAL key = 36 ~ 38: Specifying the record track (1)
SHIFT key = 84, NORMAL key = 36 ~ 68: Specifying the non-record track (2)

[Explanation]

(1) At selection: Track number of the recordable track (record track select ON) can be determined by the NORMAL key as shown below.

NORMAL key	Track No. which will be recordable
36	All tracks will be recordable
37	Track 1
38	Track 2
39	Track 3
40	Track 4
41	Track 5
42	Track 6
43	Track 7
44	Track 8
45	(Track 9) Refer to NOTE 1
↓	↓
68	(Track 32)

NOTE 1: As R8 has 8 tracks, no change will occur if the NORMAL key note number is in the range of 45 ~ 68.

(2) At selection: The track made recordable in above (1) can be made non-recordable (record track select OFF). Method of specifying the track number is the same as in above (1).

Setup of the recorder loop mode ON/OFF

Whether the following control should be done or not against the recorder connected to MTC-1, can be setup.

When loop mode is ON and the tape running in the play mode (or record mode) reaches the loop end point (setup method explained later), it automatically starts locating toward the loop start point (setup method explained later), and upon reaching the destination, it immediately enters the mode (PLAY, STOP, RECORD ... etc.; specification method explained later) specified in the loop operation mode (these operations will not

be carried out if OFF). If PLAY is specified in the loop operation mode, for example, the recorder will enter the so-called "Shuttle repeat run" in which this operation is repeated again upon reaching the loop end point.

Note number keys 78/79 are used as the SHIFT key for this setup as follows.

SHIFT key = 78, NORMAL key = 65 : Loop mode ON
SHIFT key = 79, NORMAL key = 65 : Loop mode OFF

Setup of loop start point and loop end point

Note number key 82 is used as the SHIFT key for setup of the loop start point and loop end point as shown below.

SHIFT key = 82, NORMAL key = 61 : Registering of loop start point
SHIFT key = 82, NORMAL key = 62 : Registering of loop end point

[Explanation]

The value of each to be registered is the "present time" of the time information used for the time reference by MTC-1. If "LTC with TACH & DIR" is selected for the time reference, the value that is registered will be "the present location of the recorder at the instant the NORMAL key is pressed." In other words, if the NORMAL key of note number 61 is pressed at the instant the recorder in play or fast wind passes (or is stopped) the "00H15M30S20F" point, the value of "00H15M30S20F" will be registered at the loop start point. This figure will be renewed each time this procedure is carried out.

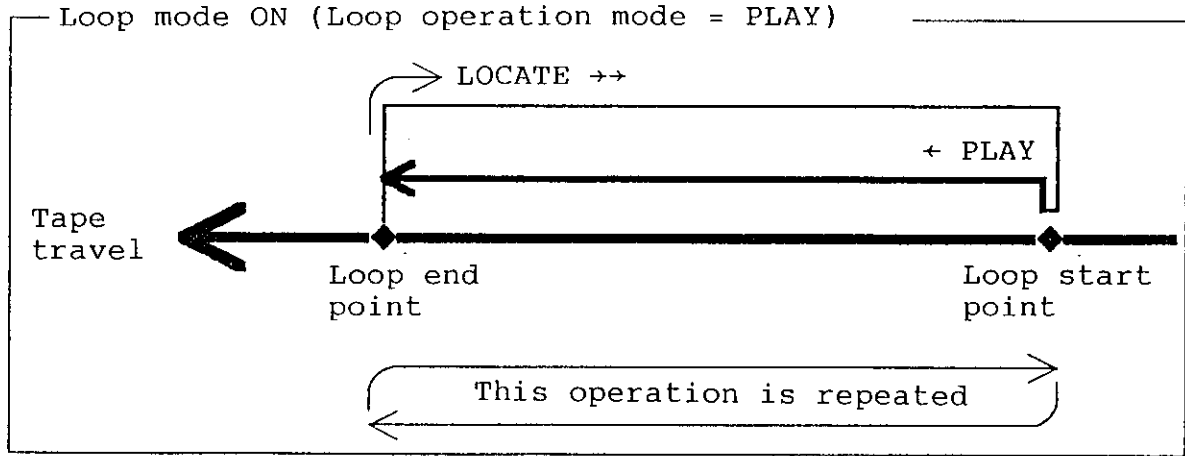
On the other hand, it should be kept in mind that if MTC is selected for the time reference, not the present time of the recorder but the present time of the MIDI time code received from outside, will be registered.

Setup of the loop operation mode

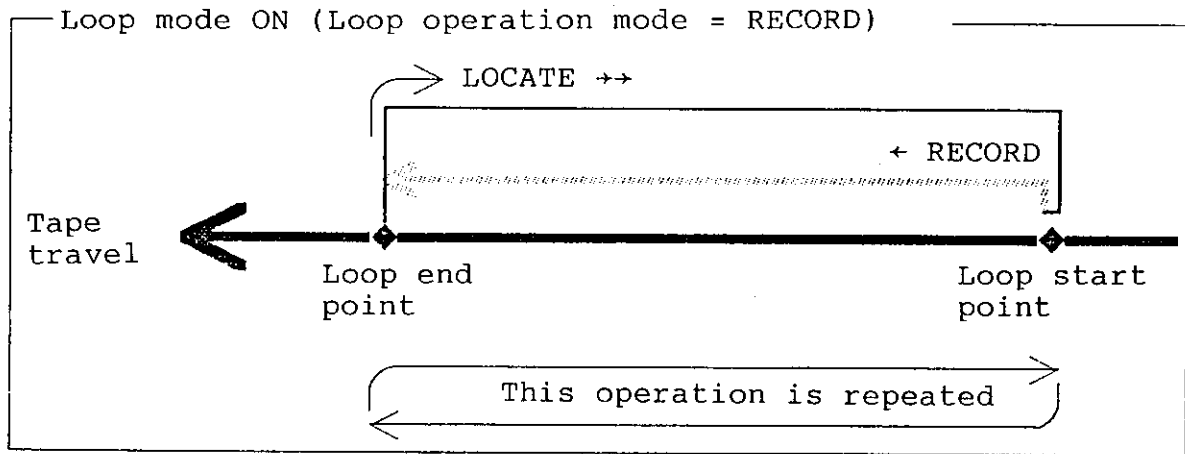
In the loop operation mode of a recorder in the loop mode ON state, what mode the recorder should enter after it locates to the loop start point from the loop end point must be set. The note number 80 key is used as the SHIFT key at setting this mode as shown below.

SHIFT KEY = 80, NORMAL key = 48 : PLAY mode (1)
SHIFT key = 80, NORMAL key = 49 : RECORD mode (2)
SHIFT key = 80, NORMAL key = 50 : REHEARSE mode (3)
SHIFT key = 80, NORMAL key = 51 : AUTO REC mode (4)
SHIFT key = 80, NORMAL key = 60 : STOP mode (5)

(1) At setup: The recorder will repeat run between the start point and end point (Monitor mode will not change).

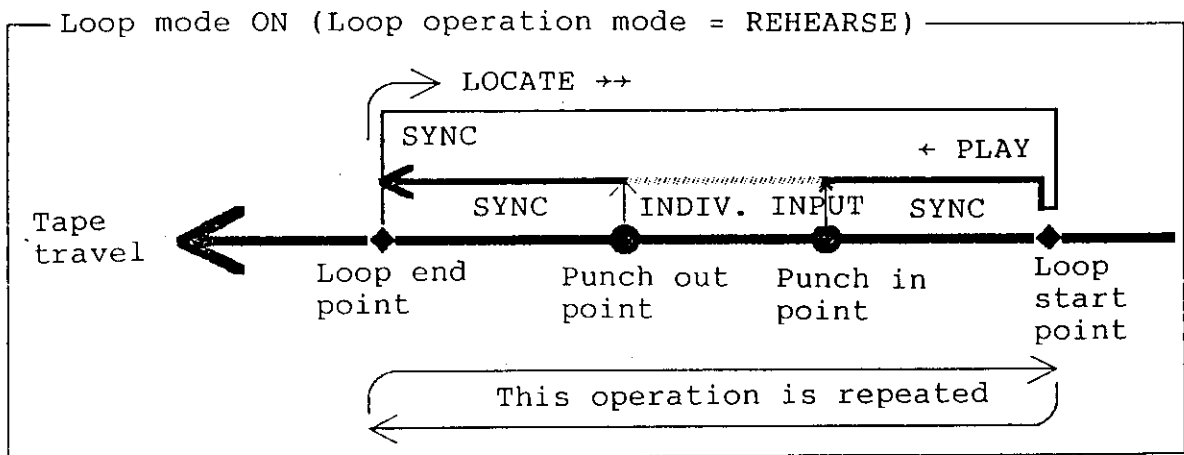


(2) At setup: When any record track select is ON (Track for recording is specified) the recorder will repeat run in the record mode between the start point and end point (Monitor mode will not change but the track being recorded will be forced into input monitor).



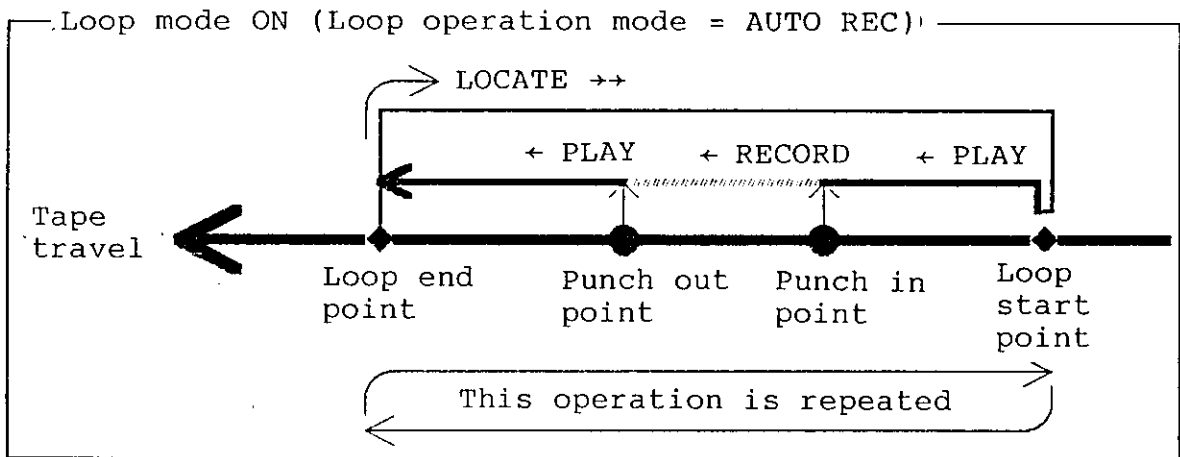
(3) At setup: When any track select is ON (Track for recording is specified), the recorder will repeat run in the rehearsal mode between the start point and end point. Rehearsal is the operation whereby the tape in the play mode arriving at the punch in point (Setup method explained later) is automatically entered into "INDIV. INPUT" monitor mode and later arriving at the punch out point (Setup

method explained later), switches automatically into the "SYNC" monitor mode. In other words, the track set to record track select ON will be in the input monitor mode between the punch in point and punch out point. As one example in use of this mode, before replace recording of a tape section by punch in/out in the AUTO REC mode, this replace tape section can be repeatedly practiced (rehearsed) in the play mode.

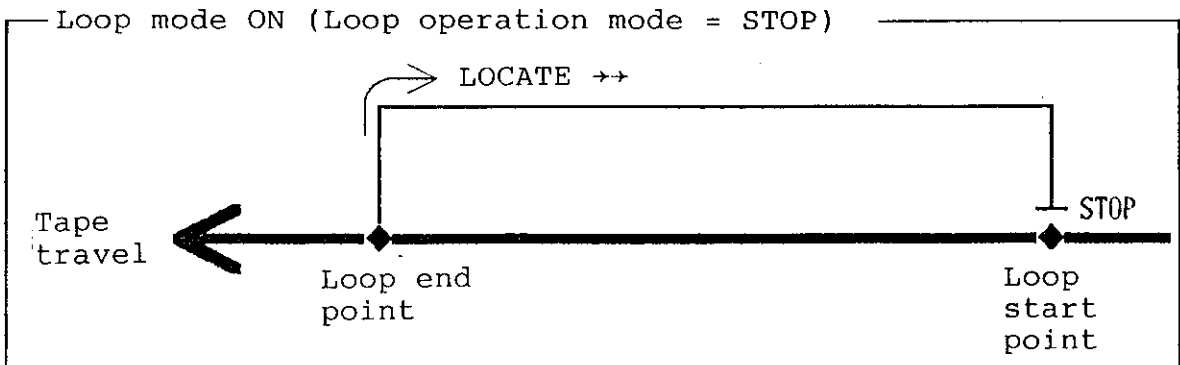


NOTE: Please note that monitor mode at the "PLAY" point in the drawing will be the monitor mode selected at the loop end point. For example, if it is "INDIV. INPUT" and "ALL INPUT" at the first locating (before repeat is entered), or the monitor mode that was "SYNC" after passing the punch out point, is changed to "INDIV. INPUT" and "ALL INPUT," then the case of not being able to monitor sound of the desired track, although it is before the punch in point, will occur when entered in "+ PLAY."

(4) At setup: When any track is in record track select ON (track to be recorded is specified). the recorder will repeat run in the AUTO REC mode between the start point and end point. AUTO REC is the operation whereby the tape running in play mode upon arriving at the punch in point (Setup method to be explained later), the recorder enters the record mode, then later upon reaching the punch out point (Setup method to be explained later), the recorder switches to the play mode. In other words, the track selected to record track select ON can be automatically recorded between the punch in point and punch out point. The monitor mode will not change but the track in the record mode will be forced to the input monitor mode.



(5) At setup: As the recorder will be stopped at the start point, repeat run such as in above (1) ~ (4) will not occur.



Setup of the recorder rehearsal mode ON/OFF

The rehearsal mode can be setup in the recorder connected to the MTC-1.

When the rehearsal mode is ON, when the tape in play mode arrives at the punch in point (setup method to be explained later), the monitor mode automatically enters "INDIV. INPUT," then later on arriving at the punch out point (setup method to be explained later), the monitor mode automatically switches to "SYNC." In other words, the track specified in record track select ON will be in the input monitor mode between the punch in point and punch out point. This operation will not be carried out in the rehearsal OFF mode. If "REHEARSE" is specified in the loop operation mode and post locate mode, this setup will go ON automatically at the instant REHEARSE is carried out.

Note number 78/79 keys are used as the SHIFT key for this setup as shown below.

SHIFT key = 78, NORMAL key = 63 : Rehearsal mode ON
SHIFT key = 79, NORMAL key = 63 : Rehearsal mode OFF

Setup of the punch in point and punch out point

Note number 82 key is used as the SHIFT key to setup the punch in point and punch out point as shown below.

SHIFT key = 82, NORMAL key = 64 : Registering of the punch
in point
SHIFT key = 82, NORMAL key = 65 : Registering of the punch
out point

[Explanation]

The values registered in each are the "present time" of the time information which MTC-1 uses as the time reference. For example, if "LTC with TACH & DIR" is selected for the time reference, the value registered will be the "the present location of the recorder at the instant the NORMAL key is pressed." In other words, if the note number 64 NORMAL key was pressed at the instant the recorder in play or fast wind mode passes the "00H15M30S20F" point (or is stopped there), the value of "00H15M30S20F" will be registered in the punch in point. This value will be renewed each time this operation is carried out. If "MTC" is selected for the time reference, please note that not the recorder present location but the present location of the MIDI time code received from outside, will be registered.

Setup of the recorder AUTO REC mode ON/OFF

AUTO REC mode ON/OFF for the recorder connected to MTC-1 can be setup.

When AUTO REC mode is ON and the tape reaches the punch in point in the play mode, the recorder enters the record mode and then upon reaching the punch out point later, the recorder will switch to the play mode. In other words, the track setup to record track select ON will automatically record between the punch in point and punch out point. This operation will not be carried out if the AUTO REC mode is OFF.

In the above operation, the monitor mode will not change but the track in the record mode will be forced to the input monitor mode.

Also, if "AUTO REC" is specified in the loop operation mode or post locate mode, this setting will automatically go ON at the instant AUTO REC is entered.

Note number keys 78/79 are used for the SHIFT key to set this up as shown in the following.

SHIFT key = 78, NORMAL key = 64 : AUTO REC mode ON
SHIFT key = 79, NORMAL key = 64 : AUTO REC mode OFF

Setup of locate point

Note number key 82 is used as the SHIFT key to setup the locate point as shown below.

SHIFT key = 82, NORMAL key = 63 : Register of locate point

[Explanation]

The value to be registered is the "present time" of the time information which MTC-1 uses as the time reference. For example, if "LTC with TACH & DIR" is selected for the time reference, the value registered will be "the present location of the recorder at the instant the NORMAL key is pressed." In other words, if the NORMAL key of note number 63 is pressed at the instant the recorder in play or fast wind mode passes the "00H15M30S20F" point (or is stopped there), the value of "00H15M30S20F" will be registered in the locate point. This value will be renewed each time this operation is carried out. Also, if "MTC" is selected for the time reference, please note that not the present location of the recorder but the present time of the MIDI time code received from outside, will be registered.

Setup of the post locate mode

In the post locate mode is set the mode in which the recorder should automatically enter next after it arrives at the locate point by locate operation (LOCATE by normal operation). In setting this, note number key 81 is used as the SHIFT key. As content of each operation is the same as for Please refer to "Setup of the loop operation mode" (This mode, however, will not repeat run) as content of each operation is the same.

SHIFT key = 81, NORMAL key = 48 : PLAY mode
SHIFT key = 81, NORMAL key = 49 : RECORD mode
SHIFT key = 81, NORMAL key = 50 : REHEARSE mode
SHIFT key = 81, NORMAL key = 51 : AUTO REC mode
SHIFT key = 81, NORMAL key = 60 : STOP mode

Setting the direct time lock signal output ON/OFF

Whether MTC-1 should convert or not the LTC sent from the recorder into a direct time lock signal can be set. Direct time lock signal is a synchronizing MIDI signal exclusively for the "Performer" a sequence software for the MacIntosh by Mark Of Unicorn Co. and there is the one equivalent to the input LTC converted to MTC full message and the one converted to the MIDI

timing clock. In setting this, note number keys 78/79 are used as the SHIFT key as shown below.

SHIFT key = 78, NORMAL key = 55 : Will be output
SHIFT key = 79, NORMAL key = 55 : Will not be output

[Explanation]

The direct time lock signal is output by the following process.

First, when the recorder enters play and reads LTC, a signal equivalent to MTC full message is output once. After this, a MIDI timing clock (F8H) is output once for each frame continuously until the recorder ceases to be in the play mode (until MTC-1 becomes unable to read LTC).

SHIFT key = 78, NORMAL key = 64 : AUTO REC mode ON
SHIFT key = 79, NORMAL key = 64 : AUTO REC mode OFF

Setup of locate point

Note number key 82 is used as the SHIFT key to setup the locate point as shown below.

SHIFT key = 82, NORMAL key = 63 : Register of locate point

[Explanation]

The value to be registered is the "present time" of the time information which MTC-1 uses as the time reference. For example, if "LTC with TACH & DIR" is selected for the time reference, the value registered will be "the present location of the recorder at the instant the NORMAL key is pressed." In other words, if the NORMAL key of note number 63 is pressed at the instant the recorder in play or fast wind mode passes the "00H 15M30S20F" point (or is stopped there), the value of "00H15M30S 20F" will be registered in the locate point. This value will be renewed each time this operation is carried out. Also, if "MTC" is selected for the time reference, please note that not the present location of the recorder but the present time of the MIDI time code received from outside, will be registered.

Setup of the post locate mode

In the post locate mode is set the mode in which the recorder should automatically enter next after it arrives at the locate point by locate operation (LOCATE by normal operation). In setting this, note number key 81 is used as the SHIFT key. As content of each operation is the same as for Please refer to "Setup of the loop operation mode" (This mode, however, will not repeat run) as content of each operation is the same.

SHIFT key = 81, NORMAL key = 48 : PLAY mode
SHIFT key = 81, NORMAL key = 49 : RECORD mode
SHIFT key = 81, NORMAL key = 50 : REHEARSE mode
SHIFT key = 81, NORMAL key = 51 : AUTO REC mode
SHIFT key = 81, NORMAL key = 60 : STOP mode

Setting the direct time lock signal output ON/OFF

Whether MTC-1 should convert or not the LTC sent from the recorder into a direct time lock signal can be set. Direct time lock signal is a synchronizing MIDI signal exclusively for the "Performer" a sequence software for the Macintosh by Mark Of Unicorn Co. and there is the one equivalent to the input LTC converted to MTC full message and the one converted to the MIDI

timing clock. In setting this, note number keys 78/79 are used as the SHIFT key as shown below.

SHIFT key = 78, NORMAL key = 55 : Will be output
SHIFT key = 79, NORMAL key = 55 : Will not be output

[Explanation]

The direct time lock signal is output by the following process.

First, when the recorder enters play and reads LTC, a signal equivalent to MTC full message is output once. After this, a MIDI timing clock (F8H) is output once for each frame continuously until the recorder ceases to be in the play mode (until MTC-1 becomes unable to read LTC).

SUMMARY OF SHIFT OPERATION (MULTIPLE PRESS)

(Figures are note numbers. Shaded lines ineffective for R8. DTL = Direct Time Lock signal)

SHIFT key NORMAL key	84 REC TRK select OFF 83 REC TRK select ON	82 HR VALUE REGISTER /time ref. /monitor mode	81 POST LOCATE mode 80 LOOP OPERATION mode	79 OFF 78 ON
68	Track 32			
67	Track 31			
66	Track 30			
65	Track 29	Punch out point		Loop mode
64	Track 28	Punch in point		AUTO REC mode
63	Track 27	Locate point		Rehearsal
62	Track 26	Loop end point		modePermit
61	Track 25	Loop start point		recording
60	Track 24		STOP	MIDI time
59	Track 23			code output
58	Track 22			
57	Track 21			
56	Track 20			
55	Track 19			
54	Track 18			
53	Track 17			
52	Track 16	TACH & DIR		
51	Track 15	LTC	AUTO REC	Local control
50	Track 14	LTC W/TACH & DIR	REHEARSE	Remote control
49	Track 13	MTC	RECORD	possible
48	Track 12	ALL INPUT	PLAY	LTC generator
47	Track 11	INDIV.INPUT		RUN
46	Track 10			DTL signal
45	Track 9	SYNC		output
44	Track 8			
43	Track 7			
42	Track 6			
41	Track 5			
40	Track 4			
39	Track 3			
38	Track 2			
37	Track 1			
36	All tracks			

NOTE 1: Default of MTC-1 are as follows.

Loop operation mode	STOP
Post locate mode	STOP
Loop mode	OFF
Rehearsal mode	OFF
AUTO REC mode	OFF
MIDI time code output	OFF (=Will not output)
CUE ON/OFF	OFF (=Cancell cueing. Refer to "Normal operation")
Monitor mode	SYNC
Record permit/prohibit	Permit
Record track select	All OFF
Time reference	LTC with TACH & DIR
PLAY TO PARK	OFF (Refer to Fostex system exclusive message")
ZONE LIMIT	OFF (Refer to Fostex system exclusive message

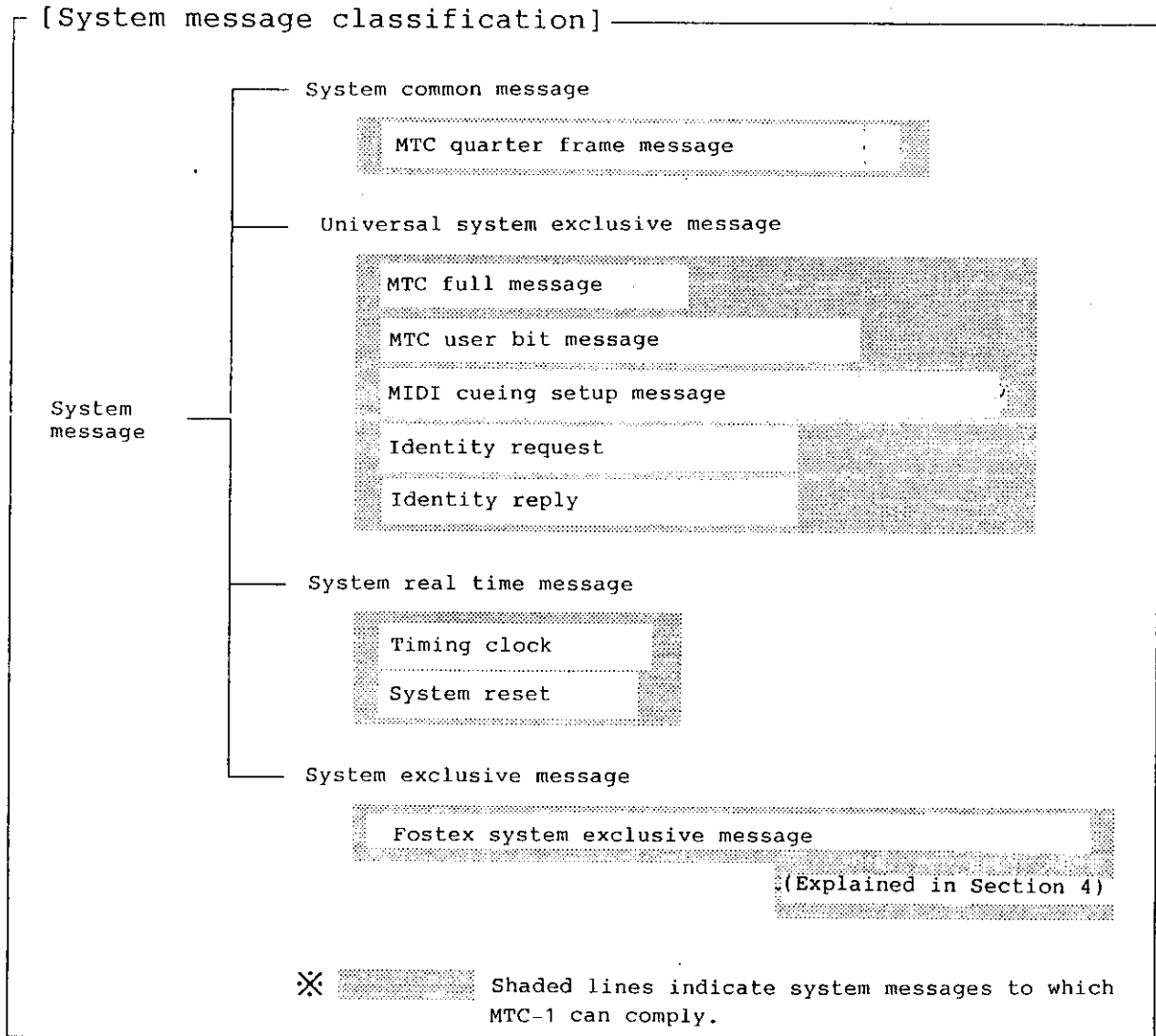
NOTE 2: Number of bytes for note on/off are as follows.
(Numbers are hexadecimal)

Byte Message	Status	Data 1	Data 2
Note on	9n	kk	vv
Note off	8n	kk	vv
	9n	kk	00

- n indicates the channel number.
- kk indicates the note number.
- vv indicates velocity.
- Velocity "00" of status "9n" can also be used for note off.

3-2. Control by system message

System messages to which MTC-1 comply are as follows. In this section will be explained, how MTC-1 operates when it receives these messages and what type of format it conforms to at transmitting the messages.



- System common messages

MTC quarter frame message (Hereafter called "MTC QF")

MTC QF is a MIDI message representing Hour/Second/Minute/Frame (and time code type) in the same way as for LTC. As each Hour, Minute, Second and Frame data is represented by two MTC QF for each, one unit of Hour/Minute/Second/Frame is completed by a total of 8 messages. Thus, as these messages are transmitted at the rate of four messages to each frame, or in other words, one message in 1/4 frame intervals, time figure of one unit is completed at each two frames (It is about 66.7ms for the "ND" type time code).

Receive]

When time reference is set to MTC, MTC-1 will read this even though its own address is set.

[Transmit]

MTC-1 will send MTC QF when all conditions below are satisfied.

- MIDI code time code output is set to "ON."
- Time reference is set to other than "TACH & DIR."
- The recorder connected is in the play mode and at the same time, MTC-1 is reading the LTC output from the recorder; or MTC-1 is reading LTC sent from external equipment (generator, etc.).

When these conditions are satisfied, MTC-1 will transmit the time code type (24, 25, ND, DF) of the received LTC and the MTC QF signal indicating the time figure. If LTC is proceeding in the opposite direction, it transmits MTC QF for the opposite direction.

Whether MTC-1 is reading the LTC or not can be confirmed by the SMPTE time code LED (2) (Refer to item on the SMPTE time code LED (2), page 1-2, on condition which make it possible for reading it.).

- Universal system exclusive message

MTC full message (Hereafter called MTC FM)

MTC FM is a message indicating the time figure and time code type in the same way as for MTC QF but one unit of Hour/Minute/Second/Frame can be sent in one process. This is used, for example, to inform the present position as the initial figure to the recipient before transmitting MTC QF at entering the play mode after locating the recorder.

[Receive]

When time reference is set to "MTC," MTC-1 will read it. As MTC FM is specified at 7FH (Device number) by the MIDI specification, MTC-1 will receive it even though its own address is set.

[Transmit]

With the MTC-1 MIDI time code output set to "ON" and the condition permits transmitting of MTC QF, it will transmit once (by device number=7FH) immediately prior to start transmitting MTC QF.

MTC user bit message (Hereafter called "MTC UB")

MTC UB is a message equivalent to the SMPTE time code binary group No. 1 ~ 8 and the binary group flag bit.

MTC-1 will ignore this message even though it is received. Also, this message can be transmitted (output) only by the Fostex system exclusive message which urges transmitting (This cannot be done by the shift operation).

[Transmit]

MTC UB is transmitted only once when the Fostex system exclusive message (Refer to Section 4.) which urges transmission, is received. Its content will be the same as the user bit of the LTC last read by MTC-1 (transmitted by device number 7FH).

MTC UB of the same content can be transmitted by writing the user bit in the LTC generator of MTC-1 (Can be written in by the Fostex system exclusive message) and recording it on the tape, then playing it back and reading it by the MTC-1 reader.

MIDI cueing setup message

The setup message is used mainly for the purpose of carrying out various events such as specifying the punch in/out in Hour/Minute/Second/Frame/Fractional frame, then executing it or make the MTC-1 or recorder to carry out a particular function by a previously specified cue point.

Device number is included in the setup message. Consequently, if MTC-1 is to receive this, it is necessary for its device number to coincide with the MTC-1 address setup or MTC-1 must be set to address free. Setup messages to which MTC-1 comply are explained in the following.

Enable event list

[Receive]

When this message is received, MTC-1 will be able to execute the event list (Method in specifying explained later) that is specified.

This message puts MTC-1 in the "executable condition" and is not for triggering the operation. In order for each event to be actually executed, the present time of MTC or LTC which MTC-1 has read, and the "Hour/Minute/Second/Frame/Fractional frame" figures written in each event, must coincide.

It must be noted, therefore, that the conditions required to execute the event list should allow, not only receiving of this message but to allow MTC-1 to read the MTC or LTC by setting up other than "TACH & DIR" for the time reference.

MTC-1 will ignore the event time field contained in this message.

[Transmit]

MTC-1 cannot transmit this message.

Disable event list

[Receive]

When this message is received, MTC-1 will not be able to execute the event list specified (Method of specifying explained later).

This message only puts MTC-1 in the "unexecutable condition" and does not erase each event from the list. The events will again be in the executable condition upon receiving the enable event list.

MTC-1 will ignore the event time field contained in this message.

[Transmit]

MTC-1 cannot transmit this message.

Clear event list

[Receive]

When this message is received, the entire event list (Method in specifying explained later) will be erased.

MTC-1 will ignore the event time field contained in this message.

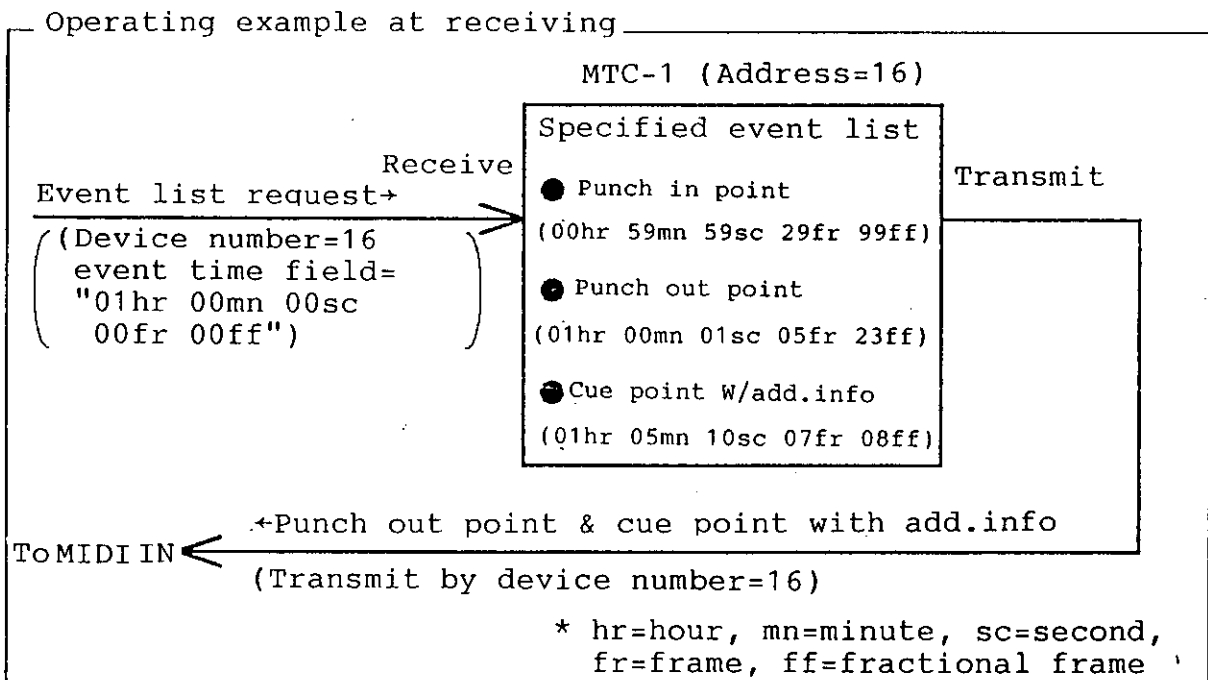
[Transmit]

MTC-1 cannot transmit this message.

Event list request

[Receive]

When this message is received, MTC-1 will transmit the entire event list subsequent to the time figures specified by the event time field contained in this message, in the setup message format.



CAUTION: When no event list is specified in MTC-1 or if there is no event existing subsequent to the time figure specified by the event time field, MTC-1 will not transmit anything even though this message is received.

[Transmit]

MTC-1 cannot transmit this message.

Punch in point

[Receive]

When this message is received, MTC-1 will be able to punch in the recorder connected to it at the point (time figure) specified by event time field contained in this message. This message is for specifying the punch in "point" and not for actually triggering the operation. In order to actually execute punch in, it is necessary for MTC-1 to enter in the "executable state" upon receiving the enable event list, and at the same time, that the present time of MTC or LTC which MTC-1 have received and the event time field "Hour/Minute/Second/Frame/fractional frame" figures coincide.

Event number (Total two bytes of sl and sm) in the message is acknowledged as the track number in which punch in is to be executed as shown below.

	sl (Lower 7 bit)	ms (Upper 7 bit)
Track 1	01	00
Track 2	02	00
↓	↓	↓
Track 8	08	00

- Total 14 bits of sl, sm (binary).
- Indicated by hexadecimal.
- For the sl and sm figures, any other combination data that is received will be ignored by the MTC-1.

One time figure and one track number can be specified in one message. Therefore, when punch in is to be done in a multiple number of tracks in the same hour, it is necessary to transmit to MTC-1 a multiple number of messages whose event time field is the same and, at the same time, the figure of "sl" which is different.

CAUTION: Only one type of punch in point time figure can be stored in the memory of MTC-1. Therefore, a multiple number of tracks can be specified in the same point, as shown above, but a multiple number of punch in point with a different event time field content cannot be specified. It must be noted that should a message with a different time figure be received, punch in point which had been set up to that point will be cleared.

[Transmit]

When the event list request is received, MTC-1 transmits the corresponding message (transmitted by sm=00H) once. Refer to previous "Event list request" for details.

Punch out point

[Receive]

When this message is received, it will enable MTC-1 to punch out the recorder connected to it at the point (time figure) specified by the event time field contained in this message. Conditions for punch out execution, handling of the event number and other precautionary items are all the same for the punch in point explanation.

[Transmit]

Same as for the punch in point explanation.

Delete punch in point

[Receive]

When this message is received, MTC-1 acknowledges the event time field and event number figure contained in this message and deletes the punch in point which is identical to it.

In short, it picks out the same time figure and track specified in this message, from among the punch in points specified, and deletes the punch in point whose figure matches it.

[Transmit]

MTC-1 cannot transmit this message.

Delete punch out point

[Receive]

When MTC-1 receives this message, it acknowledges the event time field and event number figure in this message and deletes the punch out point whose figure matches it.

In short, it picks out the same time figure and track, from among the punch out points specified in this message, and deletes it.

[Transmit]

MTC-1 cannot transmit this message.

Cue point with additional information

Subsequent to the event time field and event number, this message has a byte for "additional information." This is a MIDI data split into four bits (lower bit is ahead) and, for example, is contained in the message as shown below.

Example) When sending note on message "91 30 7F" as additional information:

Additional information = "01 09 00 03 0F 07"

- In regards to MTC-1, additional information in this example means "to enter in PLAY the recorder which is connected to it." (Refer to "Normal operation," page 3-1-5 .)

[Receive]

When this message is received, MTC-1 will be able to perform the operation indicated in the additional information at the point (time figure) specified in the event time field contained in this message.

In the above example, the recorder can be entered in PLAY at the specified point (Accurate auto start referenced to MTC and MTC is possible).

MTC-1 will ignore this message if the event number (Total 2 byte of sl and sm) in this message is other than "00H 00H."

This message is to specify the "executing point" indicated by the additional information and is not for triggering the actual operation. In order to actually execute the operation, MTC-1 must first enter the "executable state" by receiving the enable event list, and at the same time, present time of MTC or LTC read by MTC-1 and the event time field "Hour/Minute/Second/Frame/fractional frame" figure in this message must coincide.

CAUTION: Only one cue point w/additional information can be stored in the MTC-1 memory. Therefore, a multiple number of cue point w/additional information whose event time field and additional information content are different, cannot be setup. Note that cue point w/additional information set so far will all be cleared when a new message is received.

[Transmit]

When the event list request is received, MTC-1 will transmit once (transmit by 00h for both sl and sm) this corresponding message. Refer to explanation on "Event list request."

Delete cue point

[Receive]

When this message is received, MTC-1 will acknowledge the time figure of the event time field contained in this message and the "cue point with additional information" whose figure coincide with it will be deleted.

In other words, time figure identical with this message is picked out from among the specified cue point with additional information.

MTC-1 will ignore this message if the event number (Total 2 bytes of sl and sm) in the message is other than "00H 00H."

[Transmit]

MTC-1 cannot transmit this message.

Identity request and identity reply

Identity request and identity reply are messages defined as "Inquiry messages" and are used mainly for inquiring the maker ID of the receiving side.

Device number is included in the inquiry message. Therefore, in order for MTC-1 to receive this, either this device number and the MTC-1 address setting must coincide or MTC-1 should be set to address free.

Identity request

[Receive]

When this message is received, MTC-1 will immediately transmit an identity reply.

[Transmit]

MTC-1 cannot transmit this message.

Identity reply

[Receive]

MTC-1 will ignore this message even though it is received.

[Transmit]

When an identity request is received, MTC-1 will transmit this message. Device number at transmitting will be the same figure as the MTC-1 address setting (This figure will be transmitted even though MTC-1 is set to the address free mode).

Various data in the message will be as follows (Indications in hexadecimal).

Byte	Specification	Transmitting figure	Definition
mm	System exclusive maker ID code	51	Fostex ID code (fixed)
ff ff	Family code (Lower bit ahead)	01 00	No meaning (fixed)
dd dd	Family number code (Lower bit ahead)	01 00	Recorder connected=R8
		02 00	Recorder connected=undefined
ssss \$sss	Software version, etc.	01 00 7F 7F	01 00:Ver.=1.0 7F 7F: No meaning (7F 7F are fixed)

- System real time message

Timing clock

[Receive]

MTC-1 will ignore this message even though received.

[Transmit]

MTC-1 can transmit this message when the direct time lock signal output is set to "ON" by shift operation, etc. Refer to "Direct time lock signal output ON/OFF setting," page 3-1-19 for details on transmitting condition and others.

System reset

[Receive]

When this message is received, MTC-1 will be in the default state (Refer to NOTE 1, page 3-1-22 for details on the default state.).

[Transmit]

MTC-1 cannot transmit this message.

Supplement: Byte composition list of the system message

The byte composition of the system message to which MTC-1 comply are shown below.

- MTC QF (2 byte/transmit-receive is possible)

F1 <Message>

F1: Status byte of the system common message

<Message>: Onnndddd

nnn : Indicates message type as shown below.

dddd: 4 bit binary data of each message.

nnn = 0: Frame LS
nnn = 1: Frame MS
nnn = 2: Second LS
nnn = 3: Second MS
nnn = 4: Minute LS
nnn = 5: Minute MS
nnn = 6: Hour LS
nnn = 7: Hour MS and time code type

Transmitting pattern of MTC QF

F1 7X		

F1 0X (Frame LS)	0X: 0000 XXXY	XXX: Not defined
F1 1X (Frame MS)	1X: 0001 YYYY	YYYYY: Frame No. (0 ~ 29)
F1 2X (Sec. LS)	2X: 0010 XXYY	XX: Not defined
F1 3X (Sec. MS)	3X: 0011 YYYY	YYYYYY: Second (0 ~ 59)
F1 4X (Min. LS)	4X: 0100 XXYY	XX: Not defined
F1 5X (Min. MS)	5X: 0101 YYYY	YYYYYY: Minute (0~59)
F1 6X (Hour LS)	6X: 0110 XYYZ	X: Not defined
F1 7X (Hour MS)	7X: 0111 ZZZZ	YY: TC type ZZZZZ: Hour (0 ~ 23)

F1 0X		YY = 0 (24)
		YY = 1 (25)
Frame advance		YY = 2 (DF)
direction		YY = 3 (ND)

Example) The case of converting 01H 35M 49S 18F to MTC QF
(Time code type is ND)

F1 02	
F1 11	12H = Decimal 18 frame
F1 21	
F1 33	31H = Decimal 49 seconds
F1 43	
F1 52	23H = Decimal 35 minutes
F1 61	
F1 76	01H = Decimal 01 hour (It will be "6" as ND → bit 5,6 (YY) will be 1,1.

- MTC FM (10 byte/transmit-receive is possible)

F0 7F 7F 01 01 hr mn sc fr F7

F0 7F : Universal system exclusive real time header
 7F : Device number (fixed)
 01 : Sub ID#1 (MIDI time code)
 01 : Sub ID#2 (Full message)
 hr : Time/time code type (0YYZZZZZ)
 YY = 0 (24)
 YY = 1 (25)
 YY = 2 (DF)
 YY = 3 (ND)
 ZZZZZ: Hour (0 ~ 23)
 mn : Minute (0 ~ 59)
 sc : Second (0 ~ 59)
 fr : Frame (0 ~ 29)
 F7 : End of exclusive

- MTC UB (15 byte/transmit only is possible)

F0 7F 7F 01 02 u1 u2 u3 u4 u5 u6 u7 u8 u9 F7

F0 7F : Universal system exclusive real time header
 7F : Device number (fixed)
 01 : Sub ID#1 (MIDI time code)
 02 : Sub ID#2 (User bit message)

 u1 : 0000aaaa
 u2 : 0000bbbb
 u3 : 0000cccc
 u4 : 0000dddd
 u5 : 0000eeee Equivalent to SMPTE time code binary
 u6 : 0000ffff group 1 ~ 8.
 u7 : 0000gggg
 u8 : 0000hhhh
 u9 : 000000ii --- Equivalent to binary group flag bit.

 F7 : End of exclusive

- Enable event list (13 byte/receive only is possible)

```
F0 7E <ch> 04 00 ** ** ** ** ** ** 01 00 F7
```

```
F0 7E : Universal system exclusive non real time header
<ch>  : Device number
04    : Sub ID#1 (MIDI cueing setup message)
00    : Sub ID#2 (Special)
**~** : Event time field ..... MTC-1 will ignore this.
01 00 : Event number (enable event list)
F7    : End of exclusive
```

- Disable event list (13 byte/receive only is possible)

```
F0 7E <ch> 04 00 ** ** ** ** ** ** 02 00 F7
```

```
F0 7E : Universal system exclusive non real time header
<ch>  : Device number
04    : Sub ID#1 (MIDI cueing setup message)
00    : Sub ID#2 (special)
**~** : Event time field ..... MTC-1 will ignore this.
02 00 : Event number (disable event list)
F7    : End of exclusive
```

- Clear event list (13 byte/receive only is possible)

```
F0 7E <ch> 04 00 ** ** ** ** ** ** 03 00 F7
```

```
F0 7E : Universal system exclusive non real time header
<ch>  : Device number
04    : Sub ID#1 (MIDI cueing setup message)
00    : Sub ID#2 (special)
**~** : Event time field ..... MTC-1 will ignore this.
03 00 : Event number (clear event list)
F7    : End of exclusive
```


- Total 14 bits of sl, sm (binary).
- Indications in hexadecimal.
- MTC-1 will ignore this message if any data in combinations other than these, for sl and sm, are received.

- Punch out point (13 byte/transmit-receive is possible)

```
F0 7E <ch> 04 02 hr mn sc fr ff sl sm F7
```

- * These are all identical with the punch in point except when sub ID#2 is "02."

```
F0 7E <ch> 04 03 hr mn sc fr ff sl sm F7
```

- * These are all identical with the punch in point except when sub ID#2 is "03."

- Delete punch out point (13 byte/receive only is possible)

```
F0 7E <ch> 04 04 hr mn sc fr ff sl sm F7
```

- * These are all identical with the punch in point except when sub ID#2 is "04."

- Cue point with additional information (13 byte + additional information/transmit-receive is possible)

```
F0 7E <ch> 04 0C hr mn sc fdr ff 00 00 <nibblized MIDI data>F7
```

```
F0 7E : Universal system exclusive non real time header
<ch>  : Device number
04    : Sub ID#1 (MIDI cueing setup message)
0C    : Sub ID#2 (cueing point with additional information)
hr    : Time/time code type (0YYZZZZZ)
      YY = 0 (24)
      YY = 1 (25)
      YY = 2 (DF)
      YY = 3 (ND)
      ZZZZ: hour (0 ~ 23)
mn    : minute (0 ~ 59)
sc    : Second (0 ~ 59)
fr    : Frame (0 ~ 29)
ff    : Fractional frame (0 ~ 99)
00 00 : Event number (fixed)
<nibblized MIDI data>: Additional information by MIDI data
                        which is split composed in 4 bits
                        (lower bit ahead). See the follow-
                        ing.
F7    : End of exclusive
```

Example) Recorder will be stopped (assuming the MTC-1 address = 16) when the LTC or MTC being reaches "10H 46M 28S 27F 63FF."

F0 7E 0F 04 0C 0A 2E 1C 1B 3F 00 00 0F 09 0C 03 0F 07 F7

10H 46M 28S 27F 63FF

<nibblized MIDI data>
 "9F 3C 7F" converted
 to 4 bits (note on
 message meaning STOP)

- Delete cue point (13 byte/receive only is possible)

F0 7E <ch> 04 0D hr mn sc fr ff 00 00 F7

* It is the same with the cue point with additional information in other than when sub ID#2 is "00" and there is no <nibblized MIDI data>.

- Identity request (6 byte/receive only is possible)

F0 7E <ch> 06 01 F7

F0 7E : Universal system exclusive non real time header
 <ch> : Device number
 06 : Sub ID#1 (Inquiry message)
 01 : Sub ID#2 (Identity request)
 F7 : End of exclusive

- Identity reply (15 byte/transmit only is possible)

F0 7E <ch> 06 02 51 01 00 dd 00 01 00 7F 7F F7

F0 7E : Universal system exclusive non real time header
 <ch> : Device number
 06 : Sub ID#1 (Inquiry message)
 02 : Sub ID#2 (Identity reply)
 51 : System exclusive maker ID code (Fostex ID)
 01 00 : Family code (Fixed to this figure in MTC-1)
 dd 00 : Family number code (Note 1)
 01 00 7F 7F : Software version, etc. (Note 2)
 F7 : End of exclusive

Note 1) dd: Indicates recorder

When recorder is R8: dd = 01
* Presently, dd = 02 and
after not defined.

Note 2)

01 00: Indicates Ver. 1.0
7F 7F: Fixed

- Timing clock (1 byte/Transmit only is possible)

F8

* This is transmitted once for each frame when direct time lock signal output is ON.

- System reset (1 byte/receive only is possible)

FF

* MTC-1 will enter the default state when this is received.

4. SPECIFICATIONS

LTC reader

Connector : RCA pin jack
 Input impedance : Higher than 20K Ω
 Input level : 200mVp-p ~ 10Vp-p
 Readable speed range : Forward/reverse 1/2 ~ 2 times

LTC generator

Connector : RCA pin jack
 Load impedance : Higher than 10K Ω
 Output level (variable) : Max. 3v p-p
 Frame mode : 24,25, DROP FRAME, NON DROP
 FRAME; setup by DIP switch

MIDI IN/OUT

Connector and electrical specs. : Comply to MIDI spec.
 IN : Input to MTC-1
 THRU : Signal input to IN is directly (waveform shaped) output.
 OUT : Output from MTC-1

Connections with recorder

Cable length : 500mm direct from unit.
 Content : Communicating line between recorder and MTC-1
 +5v supply from recorder to MTC-1
 Direction signal from recorder to MTC-1
 TACH PULSE from recorder to MTC-1

Power supply

: Supplied from recorder (+5V)

Dimensions

: 292 x 86 x 30 (mm) not including jack protrusion.

Weight

: 600g

Fostex

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