FOSTEX

Multimedia Recorder

GT10

Owner's Manual

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.

An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

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.

TABLE OF CONTENTS

Introduction

Thank you for purchasing the Fostex Model GT10.

The GT10 is a five track five channel multitrack recorder that features four tracks for recording audio and one track for recording time code.

To achieve high quality sound during recording playback, the GT10 employs Dolby S noise reduction, as well as, double tape speed (3 3/4 ips).

In addition to basic recording functions, control by commands from external MIDI equipment is possible. The GT10 has an exclusively designed, MIDI interface containing a simplified generator and reader function. Accurate locating by SMPTE time code (LTC) is possible, and the input SMPTE time code can be converted into MIDI time code (MTC) and output. The GT10 can be controlled by connecting an optional remote controller.

Also, because it can be synchronized, it can be used as a post production editing machine. All of these functions add up to a recorder that will be "user friendly" in a variety of settings where high quality recorded sound is necessary.

In order to get maximum performance from the GT10, please read this manual carefully. With proper care, we are confident that you will have many years of satisfying use with your recorder.

Section 1.
Before Using Your GT10 Multimedia Recorder

1. Cassette Format

The GT10 uses 5 tracks on A side only. No recording can be made on the B side as in conventional cassette transports.

<NOTES>

* Tapes recorded on other 4 track recorders can be used in the GT10.
* It is also possible to use tapes recorded on the GT10 in other 4 track recorders.

STANDARD CASSETTE DECK   GT10
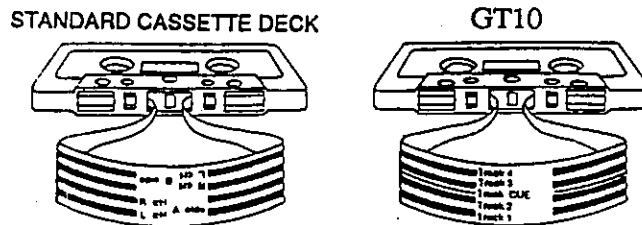
2. The Proper Tape

The GT10 is designed to be used with high bias 70 μsec EQ tape. CrO2 and Type II designations are common, but always look for the 70 μsec EQ identification.

* Maxell XL II and TDK SA are recommended, as are other tapes of comparable quality.
* Metal tape should not be used.
* Never use 120-minute cassettes; the backing is too thin and will stretch and may break.
* Because of thier strength, tapes of 60/90 minutes are recommended for withstanding the physical strains of recording.

3. Method of Installation

When installing this unit, use it in the correct position as shown below.
If it is placed sideways, it may malfunction or damage to the recorder.
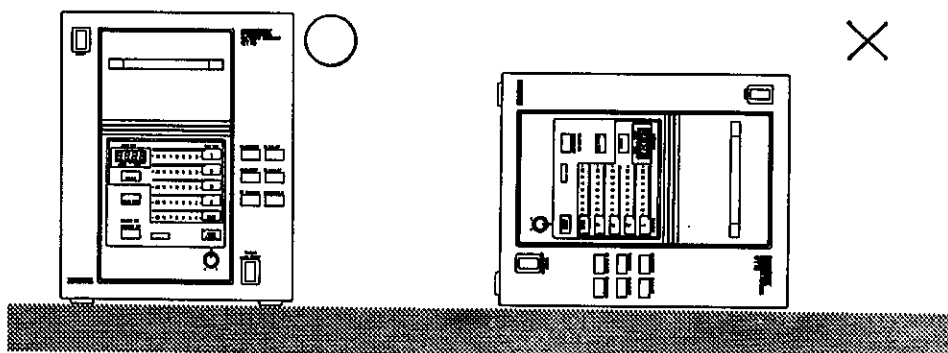
4. Connecting the Cable Extending from the MIDI Interface Board to the Recorder Main Unit

For packing and shipment, the cable extending from the MIDI interface board is disconnected from the main unit.

This cable must be plugged into the main unit ACCESSORY 2 connector as shown in the drawing below.

<NOTE>

* The MIDI interface board will not function if this cable is not properly connected.
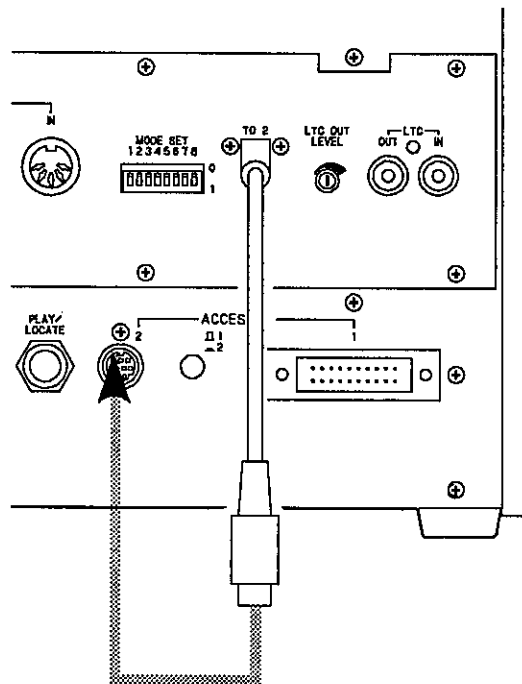
Section 2.

ON DOLBY S NR

The Dolby S noise reduction System, used for the first time in a cassette format, is employed in the GT10. Dolby S NR is based on Dolby SR NR, the preferred noise reduction system developed for commercial studio use. Dolby S NR, with its rationalized circuit and other modifications, is a revolutionary noise reduction circuit. At Fostex, we feel it is the ultimate noise reduction system for consumer and professional cassette recording.

Dolby S NR

IN Dolby S NR, as shown in "Basic Concept of Dolby S NR", the entire frequency band is divided into low and high ranges at around 400Hz. The low range is processed from 200Hz and down. Further, the level is divided from Dolby level to -25dB as high level and below this down to - 50dB as low level. A maximum of 12dB processing is applied to each high and low level groups.

One stage of the fixed band type (*1) processor for the low level group, and two stages each of the fixed and sliding band type (*2) are provided for the high level group.

Comparison to Conventional Dolby C Type Noise Reduction

Dolby C NR type has a sliding band for the high region in the high and low levels indicated in "Basic concept of Dolby S NR". The reason for dividing it into two levels is to compress, in one step only for the high level input signal and in two steps for the low level signal. This is to maintain optimum processing figures against the signals while attaining noise reduction.

By providing one stage of fixed band in the low region, the noise reduction effect is applied to the entire frequency band, As a result, it can reduce noise in the low region by 10dB. Furthermore, the high region noise suppression amounts to 24dB acquired by two stages of maximum 12dB each which exceeds 20dB in the C type.

Operating merits of each system can be expected in the S type by combining the fixed band system with the sliding type. The real value of Dolby S NR is clearly shown here and the improvement in sound quality is tremendous.

Input Level(dB)
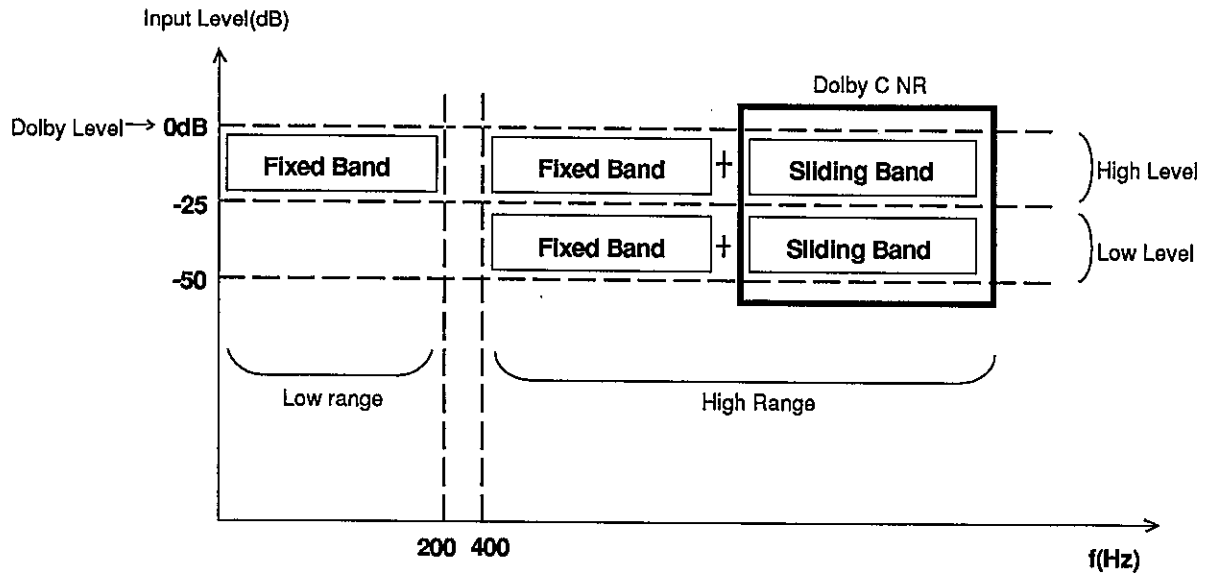
Basic concept of Dolby S NR

*1. Fixed Band

Sliding band, while superior in many ways to fixed band, also has faults. If the music signal is concentrated in the comparatively high frequencies (3kHz and higher), the noise reduction effect drops in the band lower than the music signal since cutoff slides toward the higher side. To compensate for this, the noise reduction effect is maintained by using a fixed band for the region below 6kHz.

*2. Sliding Band

Compared to full band type noise reduction, even when music signals around 400~1,000Hz exist, sliding band has the superior feature of not degrading the noise reduction effect above 1kHz (hiss noise is concentrated around 1~2kHz) compared to no music signal. This characteristic is employed in the C type.

Therefore, an ideal noise reduction effect throughout the entire band is obtained by combining the two types of processing circuit to utilize the merits of both systems.

All Dolby NR products are based on the principle of least treatment. While Dolby S NR may sound complicated it is, in principle and practice, the noise reduction system with the least processing in reference to the sonic signal. For this reason, we have employed Dolby S NR in our GT10.

① ②

FOSTEX
MULTIMEDIA RECORDER
GT10

EJECT

③

④

⑰

□NR OFF   REC TRK

○ ◄◄ REW   ○ ►► FF

⑯

⑮   RESET

○ ■ STOP   ○ ► PLAY

⑤

⑥

⑭   INPUT MON

○ ○ ● REC   ○ LOCATE 0

⑧

□LOCK ON
□CHASE ON   PITCH
                                 LOCAL

⑦

POWER
ON □OFF

⑨

□□ DOLBY S NR

⑬   ⑪   ⑫   ⑩
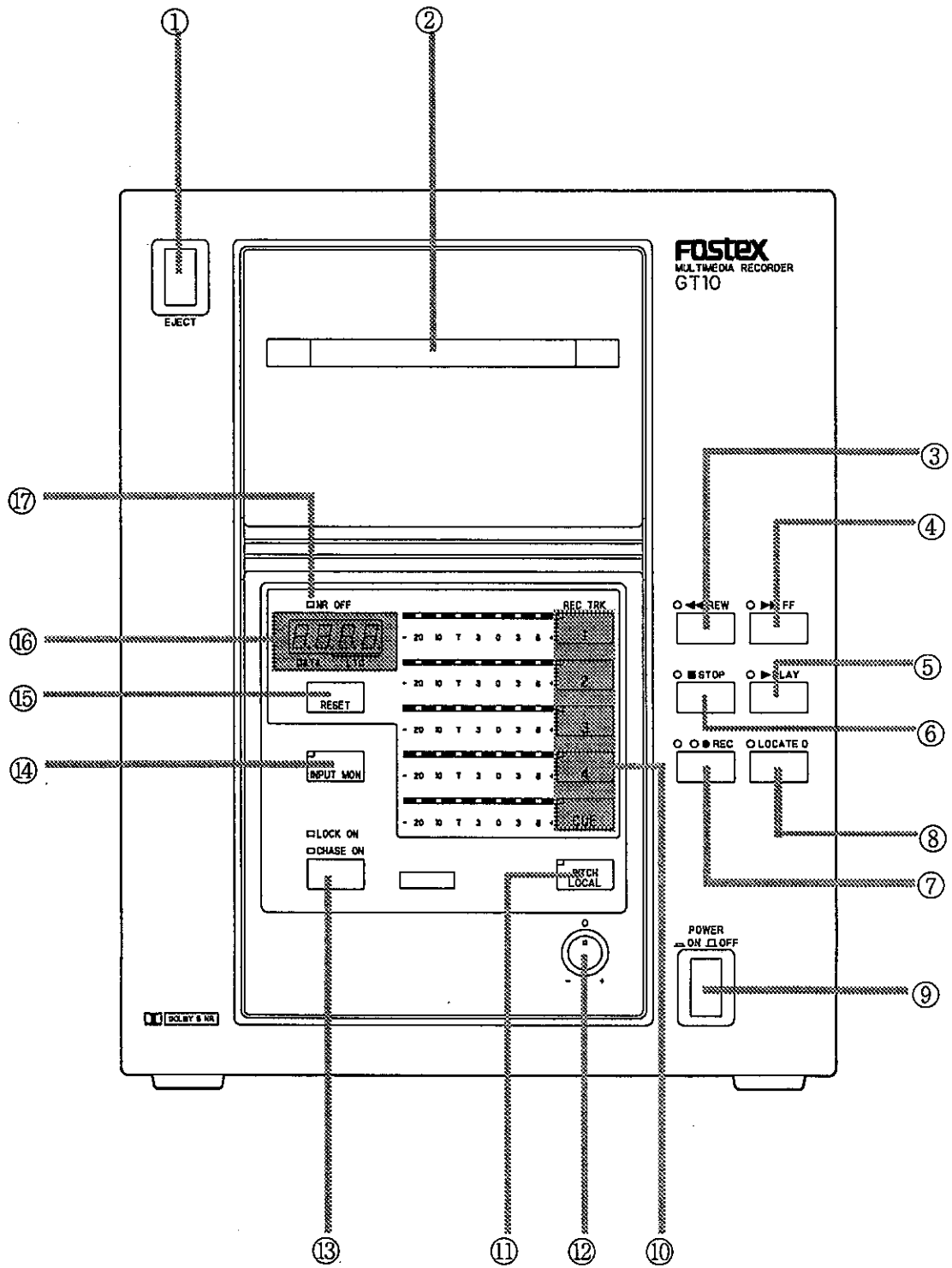
Section 3.

Controls and Functions

FRONT PANEL

1. [Eject] button

Press this button to load or unload the tape. Be sure that the transport is stopped before pressing this button.

2. Tape Transport

Insert recording tape here.

3. [REW] button

Press this button to rewind the tape.

4. [FF] button

Press this button to fast forward the tape.

5. [PLAY] button

Press this button for play.

6. [STOP] button

Press this button to stop the transport.

7. [REC] button

To start recording, press this button and the play button simultaneously. The two respective LED's will be lit as follows:

Red	This is lit when either record tracks 1 to 4 or CUE is in the record mode.
Yellow	This is lit when in the record standby mode.

8. [LOCATE 0] button

When this button is pressed, tape is fast forward wound or fast rewound to the tape counter "0000" position and the recorder stops. Also, if the play button is pressed during the locate "0" operation, the recorder will enter the locate/play mode and the play button LED will blink. After the tape stops at "0000" it will enter play (the LED of the "LOCATE 0" button will extinguish. Additionally, the play button LED will change from blinking to lit.).

If you wish to cancel the locate/play mode at an intermediate point, press again either the "LOCATE 0" button or the play button. The play button LED will extinguish and only the "LOCATE 0" button LED will be lit.

9. POWER switch [POWER ON(▬) , OFF(■)]

Power is ON when this button is depressed once and OFF when depressed again. Note the position of the buttons on the diagram above the power switch.

10. [REC TRK1 to 4,CUE] keys

This selects the track(s) to be recorded. The LEDs will change as follows by operating the key to indicate each condition.

Alternate red/ green ligth	These are lit when the selected track is in record standby.
Red ligth	This is lit when the selected track is in record mode.
Green ligth	This is lit when no tracks are selected.

11. [PITCH LOCAL] key

When controlling the pitch with the remote controller connected to the GT10, whether pitch is controlled by the GT10 or the remote controller is selected via this key (when this key is pressed and the LED is lit, pitch can controlled by the GT10; if it is not lit, the remote controller controls the pitch and the remote controller pitch control LED will be lit.).
The LED will blink on and off with each press of this key but will remain lit and not extinguish if the remote controller is disconnected.

12. PITCH CONTROL

Tape speed can be controlled over a $\pm 12\%$ range. This knob is effective only when the pitch control select key LED is lit.
<NOTES>
* This knob will not be effective when the remote controller is connected and the pitch control key LED is not lit.
* The knob center "0" point is for normal tape speed.

13. [LOCK ON/CHASE ON] key

When using the optional synchronizer, on and off of lock and chase modes can be selected via this key.

Lock On LED(Red)	This is lit when the lock enable on mode is entered.
Chase On LED(Yellow)	This is lit when the chase enable on mode is entered.

14. [INPUT MON] key

Input signals of all channels can be monitored by switching on this key (LED is lit).

<NOTES>

* Please refer to "Operating Method to Monitor Individual Inputs" page 31, to individually monitor each track).

* The input level cannot be set on the GT10.

15. COUNTER RESET KEY [RESET]

Pressing this key resets the tape counter to "0000".

16. TAPE COUNTER

Tape counter is displayed. Each dot (DATA/LTC) at the lower side of the counter indicates the following content:
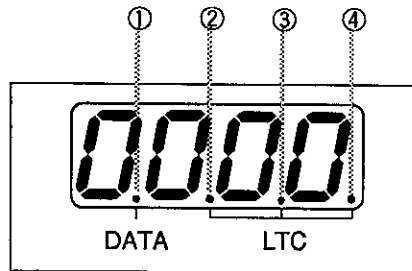
① (DATA)   : This is lit when a valid MIDI command is input to the GT10.

② (LTC IN)   : Extinguished when LTC (timecode) is not input from LTC IN. Also, if LTC is being input and GT10 is in learning mode, this dot will blink. It will change to constant lighting upon finishing learning.

③ (LEARN)   : Indicates learning mode.

Constant light	The GT10 is in learning mode. However, the GT10 will not learn if it is within the previously learned range.
Blink	The learned results are being saved.

④ (LTC GEN)   : Extinguished when generator is stopped and will blink when generator is Running.

17. [NR OFF] indicator

This indicator will blink or be extinguished when the main unit rear panel Dolby S noise reduction switch is, respectively, switched OFF or ON.
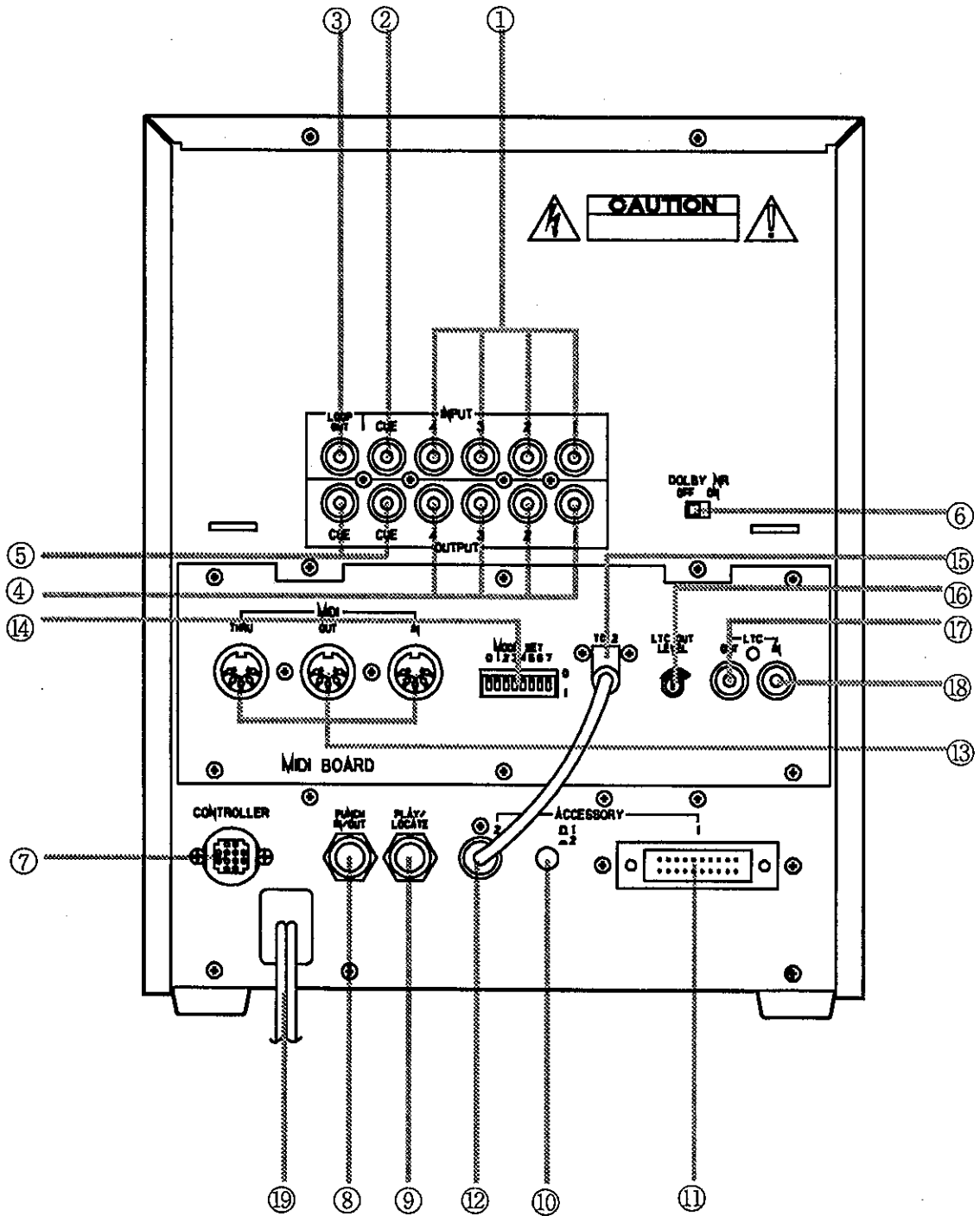
REAR PANEL

1. [INPUT 1-4] jacks

Audio signals from the mixer and MIDI equipment are input here.

2. [INPUT CUE] jack

SMPTE time code is input here.
This is connected to the LTC OUT jack of the MIDI interface
board contained in the main unit.

3. [LOOP OUT] jack

The signal (time code) input to the INPUT CUE jack is directly
output here. This is used when splitting the signal for other
equipment.

4. [OUTPUT 1-4] jacks

Audio signals recorded on tape tracks 1-4 are output here.
These are connected to the mixer input jacks.

5. [OUTPUT CUE] jacks

The signal (time code) recorded in the cue track is output here.
This is connected to the LTC IN jack of the MIDI interface
board contained in GT10 or the optional synchronizer.

6. [DOLBY NR ON/OFF] switch

This is to switch the Dolby S noise reduction system on or off. The
front panel NR OFF LED indicates if noise reduction is on or off.

7. [CONTROLLER] jack

The optional remote controller is connected here. Refer to the
Remote Controller Owners Manual for details.

8. [PUNCH IN/OUT] remote jack

Punch in/out can be done by connecting the optional Model 8051
foot switch here.
<NOTE>
Please refer to page 29, Operating Method for Punch In/Out.

9. [PLAY/LOCATE] remote jack

The model 8051 foot switch is connected here.
* If this foot switch is stepped on when the transport is stopped, the recorder will enter play mode.
* If the foot switch is stepped on in any other modes, tape will be rewound to the "0000" point and stop.
* If the foot switch is stepped on during locate mode, the recorder will enter locate/play.

10. [ACCESSORY 1(■),2(▬)] switch

Equipments connected to Accessory 1/2 are selected.
Accessory 1 or Accessory 2 are selected, respectively, when the switch button is raised (■) or depressed (▬).

11. [ACCESSORY 1] connector

A synchronizer can be connected here.
The optionally available Fostex 4030 synchronizer is connected to this port. Be certain to place the 4030 in 460 mode. This is accomplished via the 4030's "2nd mode" function. Additionally, set the 4030's FREQ-VOLT selector to the VOLT setting and use "Servo Characteristic C". Refer to the 4030 Owners Manual for details.

12. [ACCESSORY 2] connector

The MIDI interface board contained in the GT10 is connected here. This is connected to TO 2 of the interface board.

13. [MIDI IN/OUT/THRU] terminals

MID IN	This is connected to MIDI OUT of the MIDI equipment which is to control the GT10.
MIDI OUT	Response message to the equipment which is to control the GT10 is output here.
MIDI THRU	Signal input to MIDI IN is wave shaped and output here.

14. [MODE SET] digital switches

These switches are for initial setup prior to operating the GT10.
Please refer to page 35~ for details on setup.

15. [TO 2] connector

This is connected to ACCESSORY 2 on the rear panel of the GT10. As power to the interface board and others are supplied through this connector from the main unit, be sure the connection is positively made.

16. TIME CODE OUTPUT LEVEL CONTROL [LTC OUT LEVEL]

The SMPTE time code output level from LTC OUT is adjusted by this knob. On the GT10, the ideal setting is in the vicinity of the meter "0" point.

17. [LTC OUT] jack

Time code from the MIDI interface board is output here.
This is connected to the INPUT CUE jack of the GT10 or to the synchronizer time code input jack.

18. [LTC IN] jack

Time code to the MIDI interface board is input here.
It is connected to the OUTPUT CUE jack of the GT10 or the synchronizer time code output jack.

Section 4.
Basic Operation

Section 5. Basic Recording 18
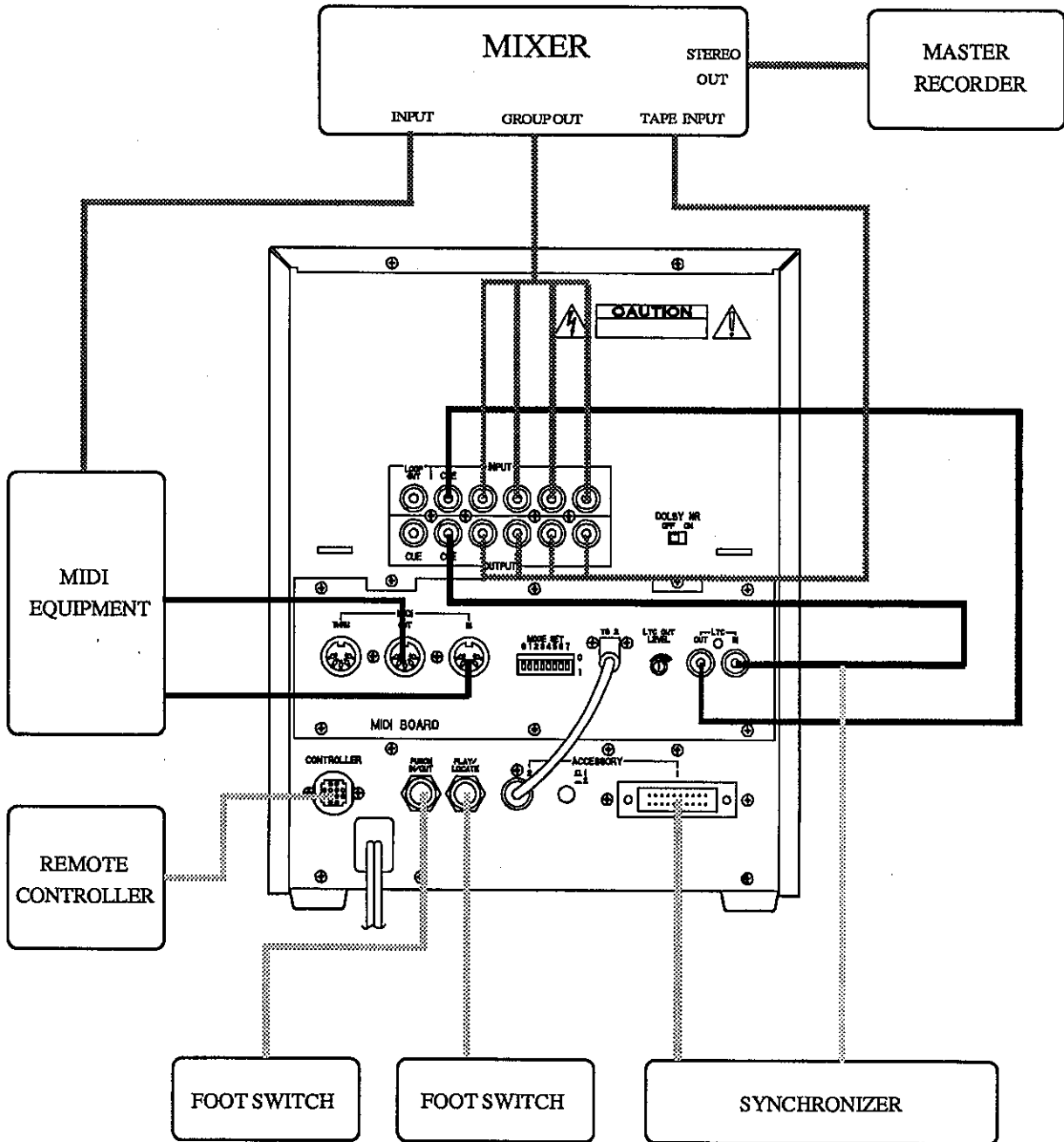
Section 5.

Basic Recording Procedure

The Fostex Model GT10 is a five channel multitrack recorder that features four tracks for recording audio and a cue track for recording MIDI time code (MTC). The following explains basic operating procedures in normal recording of musical instruments/vocals.
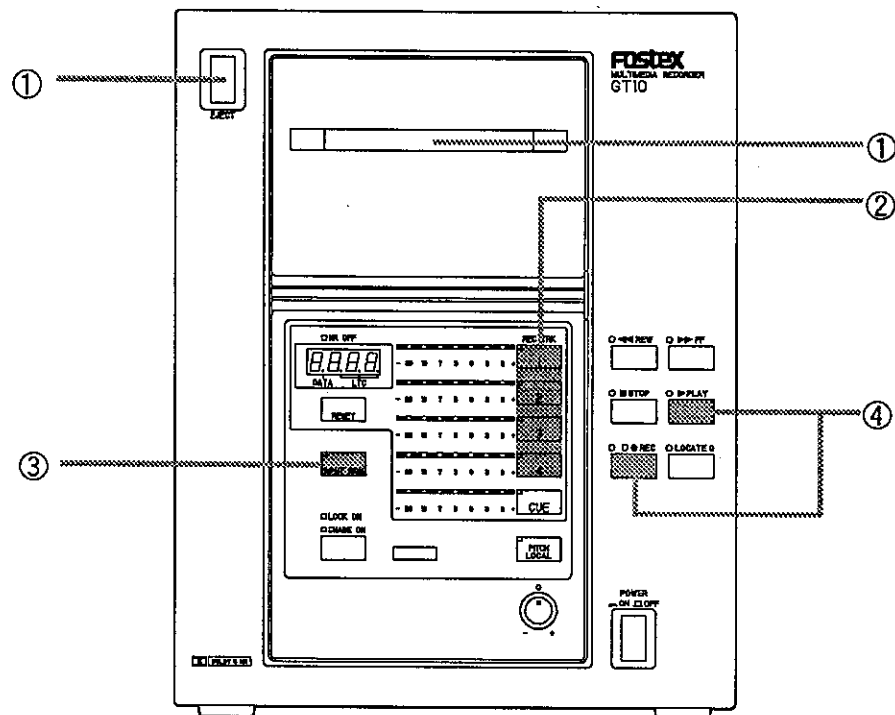
Operating Procedure:

① Load cassette tape.
  * Be sure the cassette tape record protect hole is closed.
    This is important since the cassette cannot record if this hole is open.
② Select track for recording with the record track select key.
  * The LED of the selected key will alternately light in green and red to indicate the recorder is in record standby (this LED will change to constant red at the start of recording).
  * Musical instruments/vocals signals are recorded on tracks 1~4 and MIDI time code (MTC) on the CUE track.
③ Check the input level by pressing the input monitor [INPUT MON] key and adjust the level via the mixer side.
  * Although all tracks can be monitored by pressing this key, a specific track can be monitored via the individual input procedure (Refer to P. 31).
④ Start recording by simultaneously pressing the play and record buttons.
  Stop the tape upon completing recording by pressing the STOP button.

Section 6.

Basic Overdubbing

Basic overdubbing procedures are explained in the following.

What is overdubbing?

Overdubbing is the process of recording while playback monitoring a prerecorded track.

As an example, assume the following combination of musical instruments;

Track 1	Drum machine,
Track 2	Bass (synth bass or electric bass),
Track 3	Play backup with a musical instrument (guitar, synth, etc.)
Track 4	Sing melody (vocal),

Recording procedures are carried out in steps from 1 to 4.

Step 1 : Record drum machine on track 1.

```
4 |_____|
3 |_____|
2 |_____|
1 |░░░░░░░░░░| ◄── | Drum machine |
```
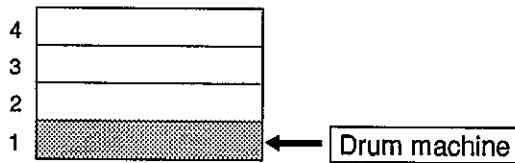
Step 2 : Overdub bass on track 2 while monitoring track 1.

```
4 |_____|
3 |_____|
2 |░░░░░░░░░░| ◄── | Bass (synth bass or E.bass) |
1 |▒▒▒▒▒▒▒▒▒▒|
```
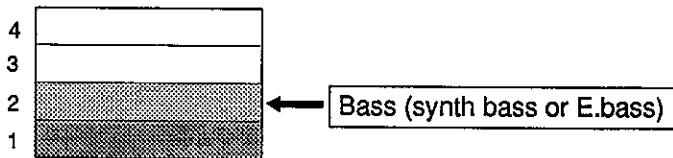
Step 3 : Record chord on track 3 while monitoring tracks 1 and 2.

```
4 |_____|
3 |░░░░░░░░░░| ◄── | Play chord by synthesizer or E. guitar |
2 |▒▒▒▒▒▒▒▒▒▒|
1 |▓▓▓▓▓▓▓▓▓▓|
```
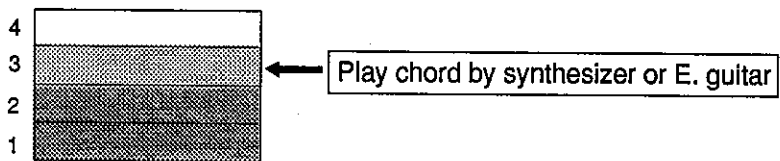
Step 4 : Record song (vocal) on track 4 while monitoring tracks 1, 2 and 3.

```
4 |░░░░░░░░░░| ◄── | Sing melody (vocal) |
3 |▒▒▒▒▒▒▒▒▒▒|
2 |▓▓▓▓▓▓▓▓▓▓|
1 |██████████|
```
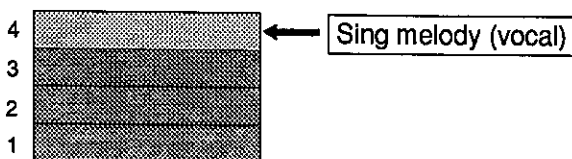
Because the GT10 do not have a mixer function provided in conventional multitrackers, it must be connected to a recording mixer during record/playback of a tape.

Because operation of mixers vary, explanations will be on the assumption that each sound source signal coming from the mixer shall be input to the GT10, then its output applied again to the mixer as shown in the connecting schematic below.

Therfore, in regards to the operation of your mixer, please refer to its operating manual.

TAPE IN 1~4   GROUP OUT 1~4

RECORDING MIXER

INPUT

Drum machine
E.bass (synth bass or E.bass)
Synthesizer or E.guitar
Vocal

EFFECTOR

MASTER RECORDER
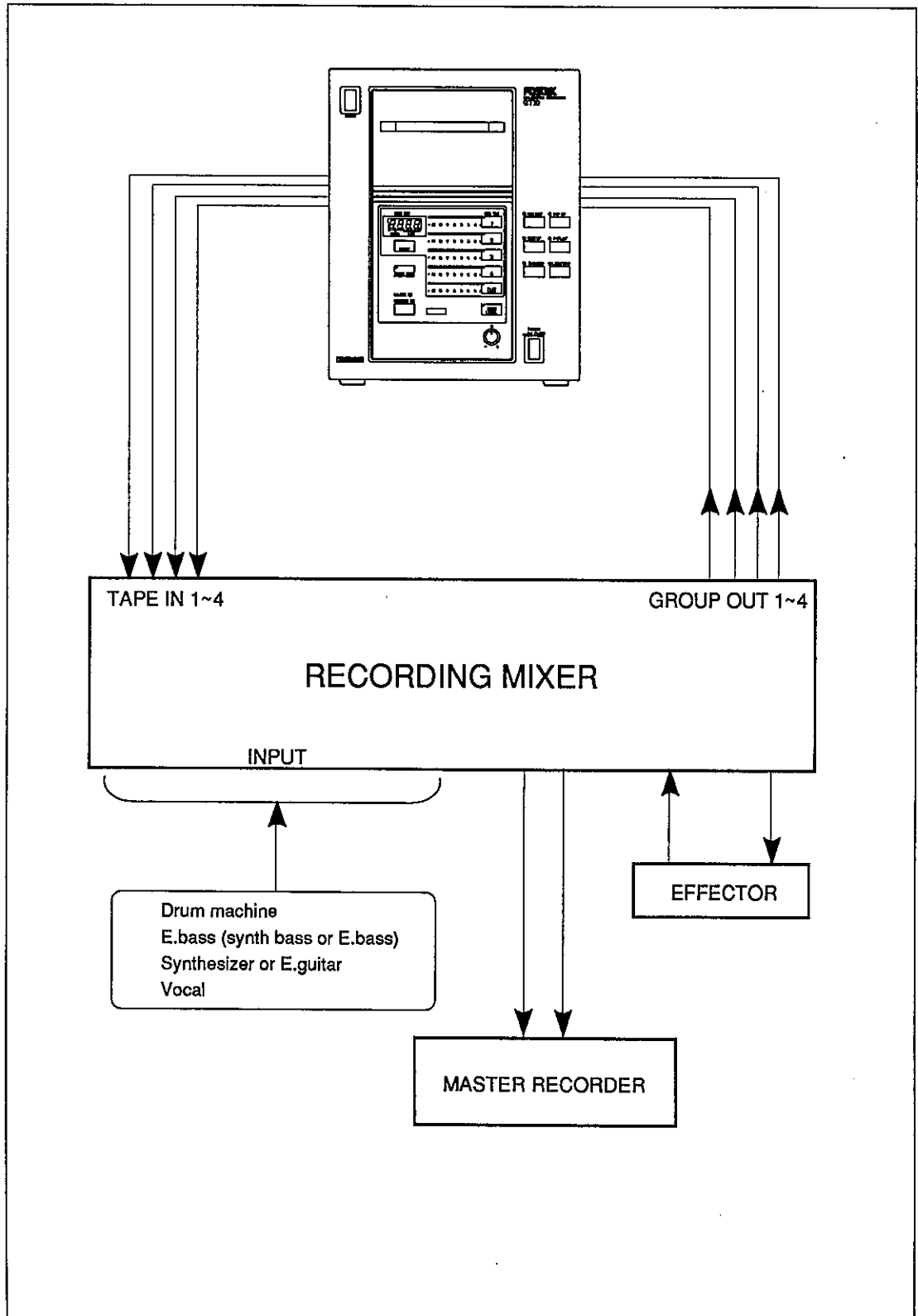
<Step 1> Recording the drum machine on track 1

The signal from the drum machine connected to the mixer is input to track 1 of the GT10 (output level/tone are controlled at the mixer).
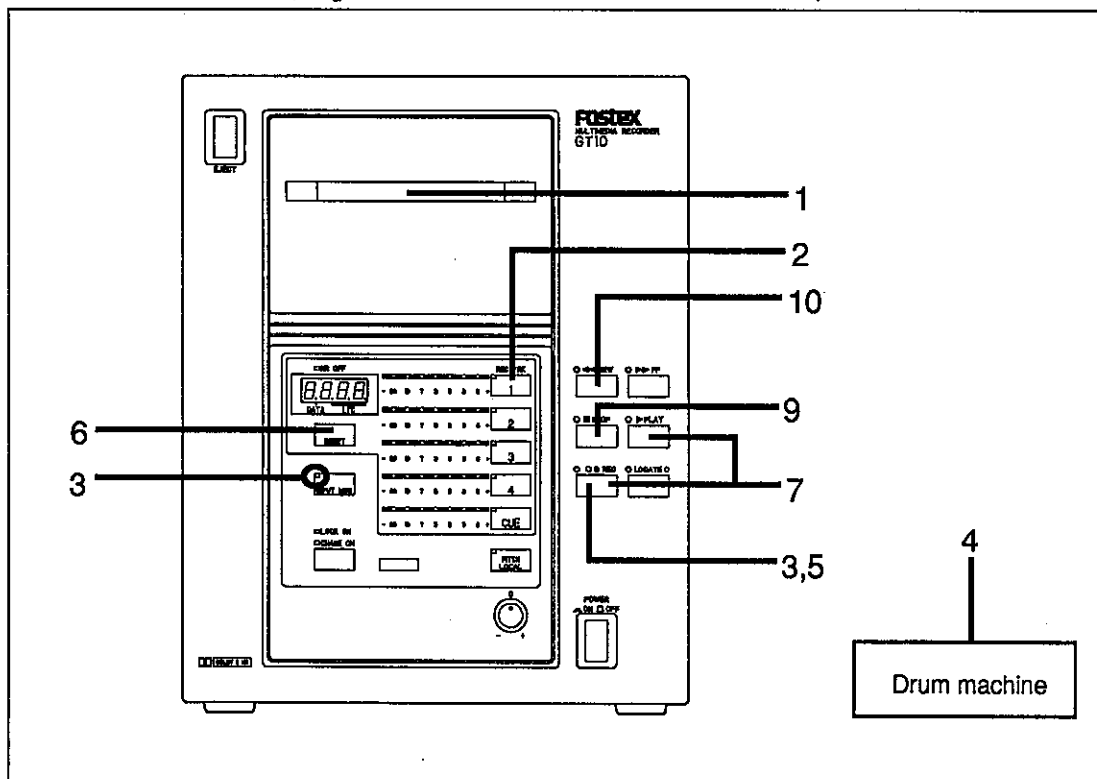
Setting Up the GT10

1. Load cassette tape in the recorder.
2. Press the record track select key for track 1 so that the key LED alternately lights in red and green (record standby).
3. Press the record button and set track 1 only to input monitor (individual input monitor), LED of the input monitor key will blink.
4. Start the drum machine and, using the mixer control, set input level to 0 ~ +3 on the meter.
5. After the input level is set, press the record button again to cancel the input monitor mode.

Start Recording

6. Reset tape counter to "0000" by pressing the reset key.
7. Start recording by simultaneously pressing play and record buttons.
8. Start the drum machine.

Playback Monitor

9. Press the stop button upon completing recording.
10. Rewind the tape and listen to the recording.

* When rewinding the tape, either press rewind or the [LOCATE 0] button. If the tape counter is set to "0000" the head (beginning) of the recording can be simply found by pressing the [LOCATE 0] button.

<Step 2> Overdubbing electric bass on track 2.

Next, while listening to the drum machine on track 1, overdub the electric bass on track 2.

The electric bass signal connected to the mixer is input to track 2 of the GT10 (for best results with bass tone, set the output singal low from the mixer to track 1).
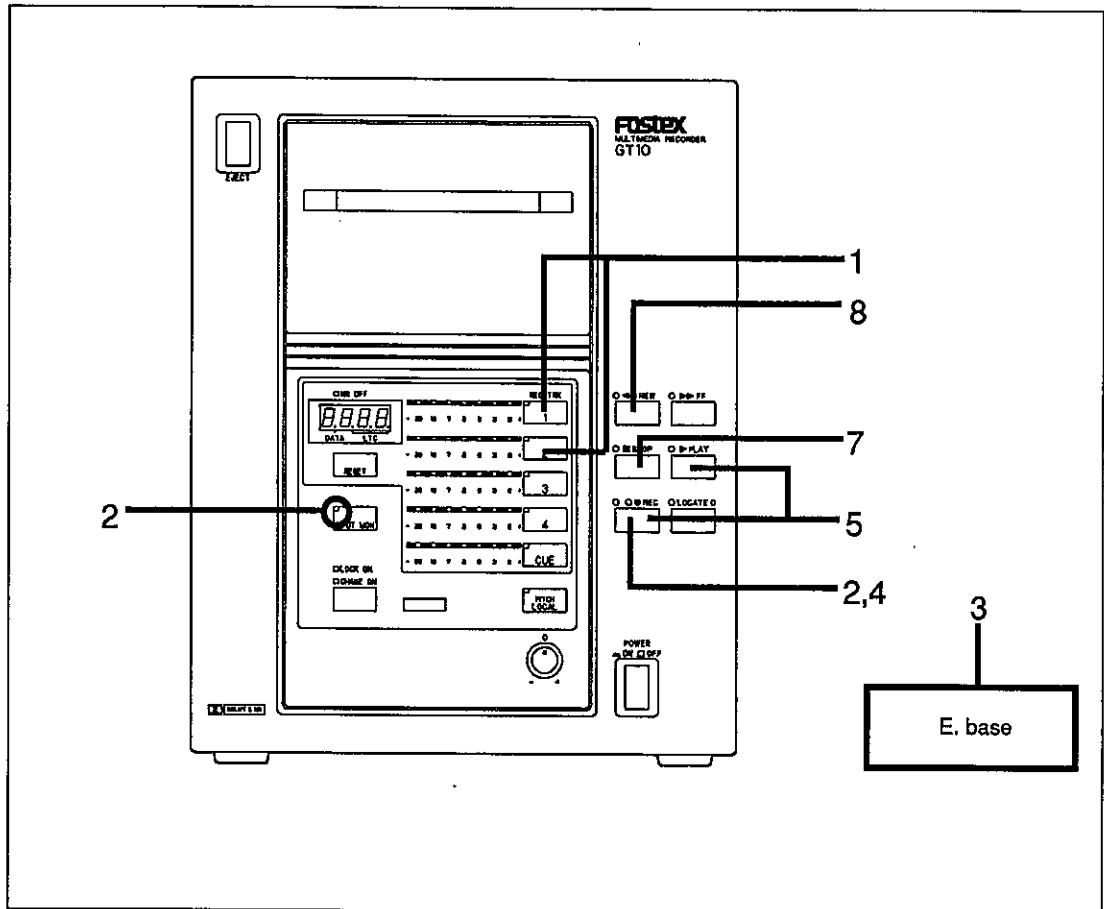
Setting Up the GT10 for Rehearsal

1. Set to off the record track key selected for track 1 in step 1 and set to on the record track key for track 2.

   The select key LED for track 2 only will alternately blink in red and green.
   Note:
   Always be sure to turn off all track select keys which are not to be recorded.

2. Press the record button to select track 2 only for input monitoring (the input monitor key LED will blink to indicate it has entered the individual input monitor mode).

3. Play the electric bass and set the GT10 input level by adjusting the mixer output.

   Do a rehearsal by pressing the play button only.

   Rewind the tape after setting up above items 1 and 2, and start the tape by pressing the play button. Then, while listening to the drum machine, play the bass to determine its level and do a rehearsal (it will not be recorded).

4. After setting the level, press the record button again to cancel input monitor (the input monitor key LED will extinguish).

Start Recording

5. Start recording by simultaneously pressing the play and record buttons. At the same time, set the mixer so that track 1 sound can be monitored (playback).
6. Next, play the bass in accompaniment with the playback of track 1 (drum machine).

Playback Monitor

7. Upon completing recording, stop the tape by pressing the stop button.
8. Rewind the tape and listen to the recording of tracks 1 and 2.

At this point, recording of the bass on track 2 while monitoring the drum machine recorded on track 1 is completed.

Next, by the same procedures as in step 2, record tracks according to steps 3 and 4 to complete recording of tracks 1 ~ 4.

Section. 7
Mixdown

The last stage to complete the master tape is to mixdown the sounds recorded on tracks 1~4, copy (dub) it in the master recorder.

In making a mixdown, balance adjustment of sound volume/position and effects processing of each track, are carried out in the mixer.

For detailed operation of the mixer, refer to its operating manual.
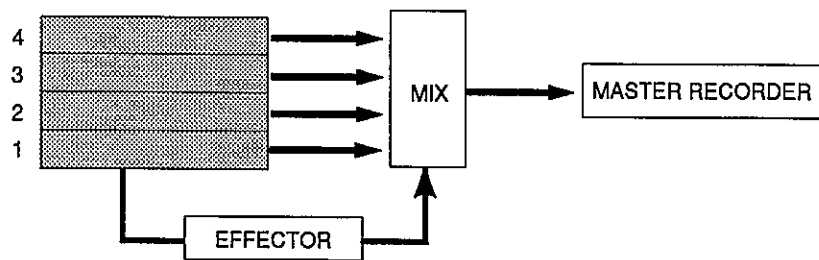
In this manner, the multitrack recorder makes it possible to complete a tune by repeated overdubbing and mixdown recording. However, in all analog multitrack recorders, sound quality deterioration is unavoidable throughout this production process.

In order to achieve the best sound quality without sonic deterioration and attain better sound, the GT10 employs Dolby S noise reduction system and double tape speed.

Employment of these features is recommended for producing high quality master tapes.

Section. 8
Ping Pong Recording

Throughout the explanation of basic recording (overdubbing) procedures up to this point, it is assumed that you have gained some understanding on how to use each of the four tracks. The following will explain how to apply these procedures to do ping pong recording.

Ping pong recording is a method in which multiple numbers of recorded tracks are played back, the reproduced sound mixed and then recorded on another track. When ping pong recording is utilized, new sound can be overdubbed onto the original tracks, thus allowing more tracks to be dubbed in.

Example: One person septet via ping pong recording

1. Sound sources A, B and C are separately recorded on tracks 1 ~ 3.

Track 4	
Track 3	C
Track 2	B
Track 1	A

2. Sound sources A, B and C are mixed and ping pong recorded on track 4.

Track 4	A+B+C
Track 3	
Track 2	
Track 1	

3. New sound sources D and E are recorded on tracks 1 and 2.

Track 4	A+B+C
Track 3	
Track 2	E
Track 1	D

4. Sound sources D and E are mixed and ping pong recorded on track 3.

Track 4	A+B+C
Track 3	D+E
Track 2	
Track 1	

5.Sound sources F and G are further recorded on tracks 1 and 2.

Track 4	A+B+C
Track 3	D+E
Track 2	G
Track 1	F

With the above procedures this septet, consisting of sound sources A ~ G, is completed.

When making a ping pong recording the following items should be kept in mind.

* Due to the inherent nature of all analog recorders, the highs will be attenuated (lost) and the lows emphasized by repeated recording. Therefore, at ping pong recording, the mixer equalizer should be properly adjusted to anticipate these changes in sound quality.

* Sound sources of each tarck mixed when ping pong recording cannot be then separately balanced thereafter. Therefore, make the necessary mixing adjustments during the rehearsal stage.

Section 9.

Operating Method of Punch In/Out

Punch in/out on the GT10 is possible on the GT10. Additionally, the model
8051 foot switch may be used for this purpose.

1. Independent Punch In/Out With the GT10.
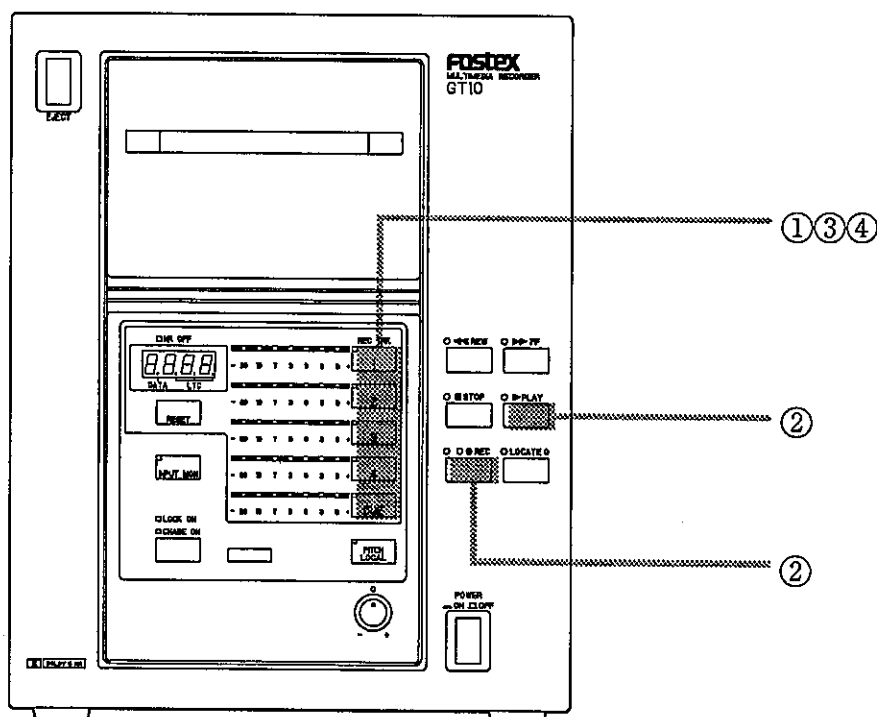
Operating procedure:

①   Press the keys so that all record track select key LEDs are lit green.

②   Start tape by simultaneously pressing the record and play buttons.
The record button LED will be lit yellow and the tape will start running
in the record standby mode.

③   When tape reaches the punch in point, press the record track select key for
the track on which the punch in is to be made.

Example: Press REC TRK2 only to punch in sound to track 2.
Then, LED's for record track select key 2 and the record button will light
in red.

④   When tape reaches the punch out point, press the record track select key
selected in above ③ and it will punch out.

2. Independent Punch In/Out on the GT10
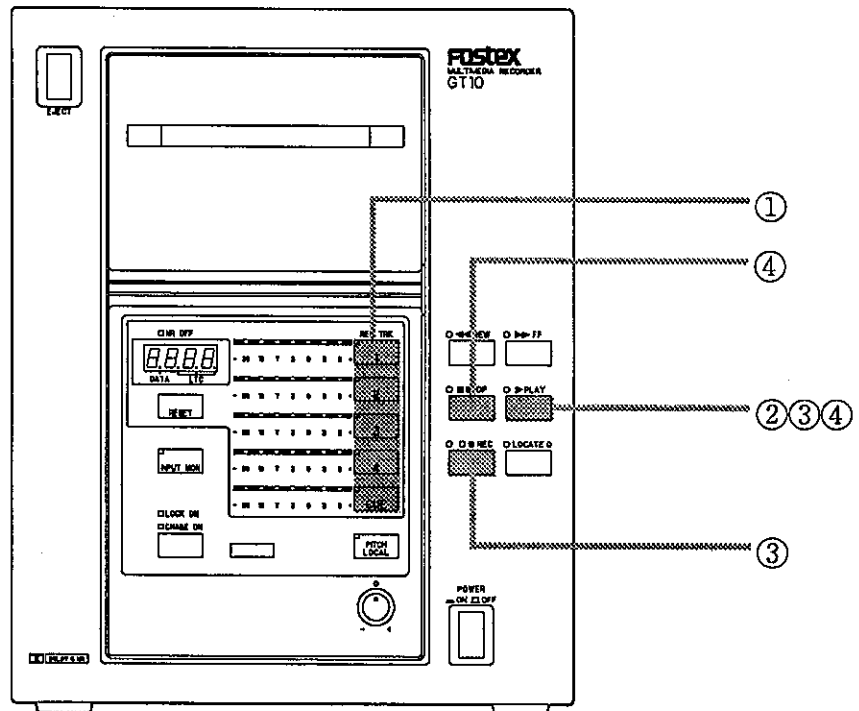
Operating procedure:

① Press the record track select key for the track to be punched in/punched out. The selected key LED will be lit, alternately red and green, and enter in record standby.

② Playback the tape.

③ Upon reaching the punch in point, press the record button while pressing the play button to enter the record mode (punch in).
The LEDs of the record button and the selected record track select key will be lit red.

④ After reaching the punch out point, press the stop button while pressing the play button and it will punch out.

3.Punch In/Out Using the Foot Switch (Model 8051).

The following procedure requires the use of the optionally available model 8051 foot switch which would be connected to the remote punch in/out jack located on the GT10 rear panel.

Model 8051 Foot Switch
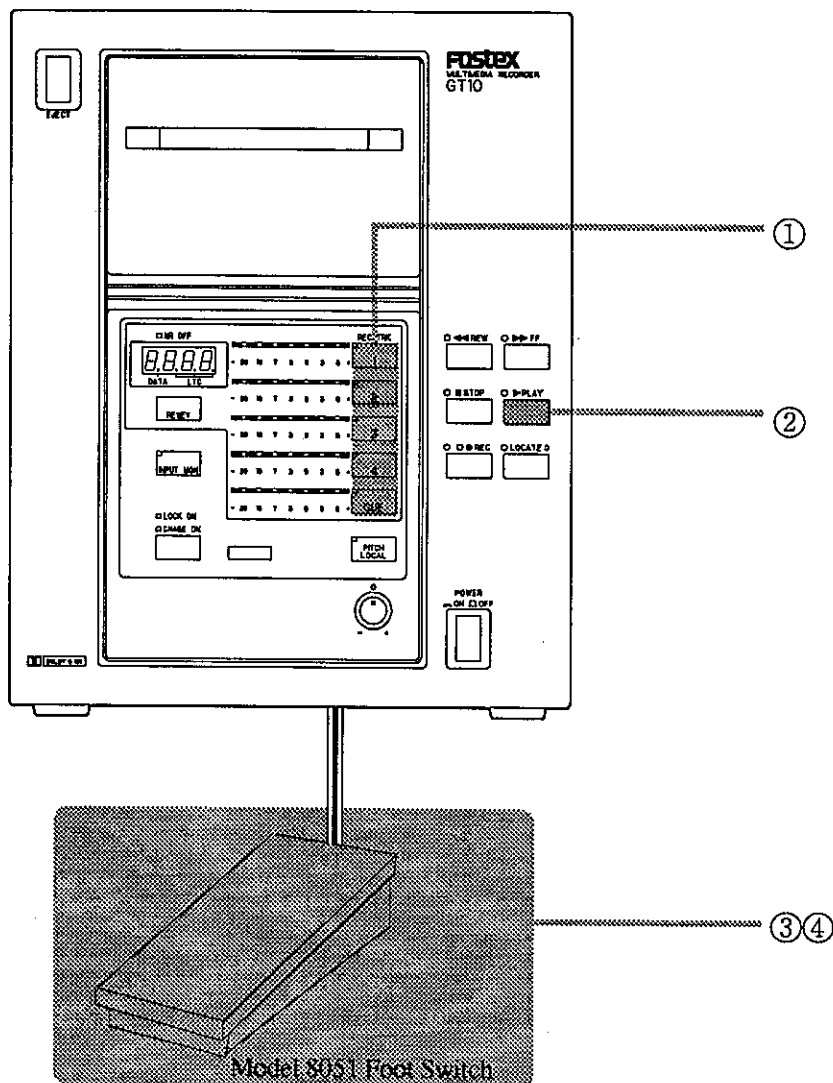
Operating procedure:

① Press the record track select key for the track in which punch in/out is to be carried out, and the LED will be lit alternately red and green.

② Playback the tape.

③ Press the foot switch once upon reaching the punch in point.
This completes punch in and LEDs for the record button and the record track select key which was selected in above ①, will be lit red.

④ Next, press the foot switch once more upon reaching the punch out point, and the recorder will punch out (return to normal play mode).

Section 10.

Operating Procedure for the Cue Function.

Cueing is possible while the tape is in fast winding or rewinding modes.
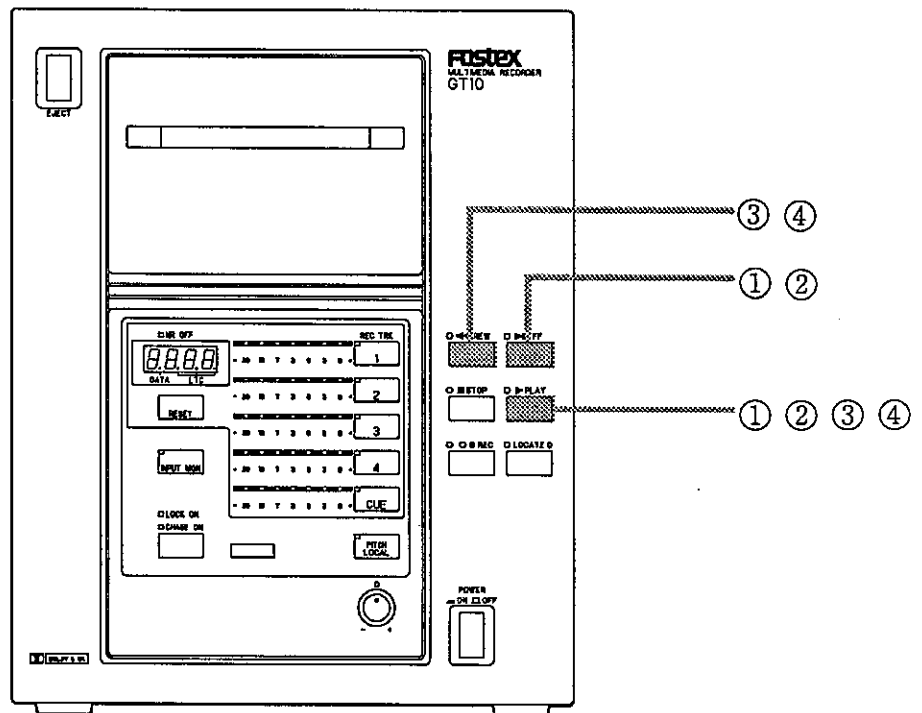
Operating procedure:

[When tape is fast winding]

① While the tape is fast winding, the cue function can be entered by pressing the play button while pressing down on the fast button.
The fast forward button LED will blink.

② To cancel cueing and return to fast winding, repeat the above step.

[When tape is rewinding]

③ While tape is rewinding, the cue function can be entered by pressing the play button while pressing down on the rewind button.
The rewind button LED will blink.

④ To cancel cueing and return to the rewind mode, repeat the above step.

Section 11.

Operation of Individual Input Monitor.

The input monitor key is used to monitor input signal levels off all tracks on the GT10.

The following will be explain individual input monitoring in which any one track among 1 thru 5 is selected for monitoring.
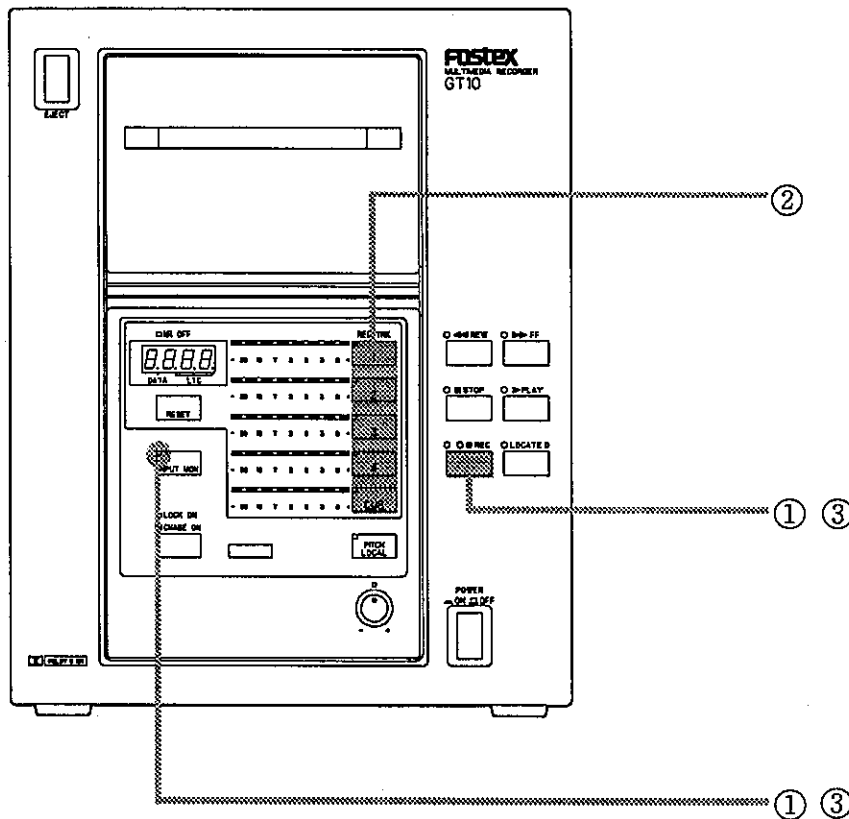
Operating procedure:

① Press the record button. The input monitor key LED will blink to indicate that the individual input monitor mode has been entered.

② Next, press the record track select key for the track to be monitored. The selected record track select key LED will be lit alternately red and green. This allows monitoring only the tracks selected.

③ Press the record button again to cancel this individual input monitor mode. The input monitor key LED will extinguish.

Section 12.
MIDI INTERFACE BOARD GT10

Table of contents

1. General Outline of the MIDI Interface Board GT10

1-1. Function and features

The following is an explanation of the MIDI interface board provided in the GT10. By including this MIDI interface board, communication between MIDI equipment and the recorder is possible.

As explained before, this is indispensable to utilizing all of the functions in the GT10 multi-media recorder.

Please read this explanation carefully to ensure correct operation.

Features Include:

1. MIDI devices can control operation of the GT10.

2. Operating mode and tape position of the GT10 is output from MIDI OUT.

3. LTC (SMPTE time code) input is converted to MTC (MIDI time code) and direct time lock signal* and output.

* Direct time lock signal

This is a MIDI signal for synchronization derived from the LTC →MIDI conversion method used by South Worth Co. There are some versions in the "Performer" sequence software for Mcintosh (from Mark of Unicorn Co.) that comply to this signal. These are the input LTC converted to the MTC equivalent message and that signal to MIDI timing clock signal.

4. Because the interface board contains an LTC reader function, various locating operations are possible if time code is recorded on the tape.

5. The GT10 MIDI interface board contains a simplified LTC generator functions.

   By utilizing a MIDI interface containing these functions, the GT10 can do the following operations. Because the GT10 is controlled by a regular MIDI interface, standardized control and automation is possible in a variety of situations.

If the sequencer to be connected and sequencing software comply to MTC, and a tempo map is also provided, a sync system consisting of a recorder master/ MIDI slave can be created easily.

1-2. Installation and Connection Methods
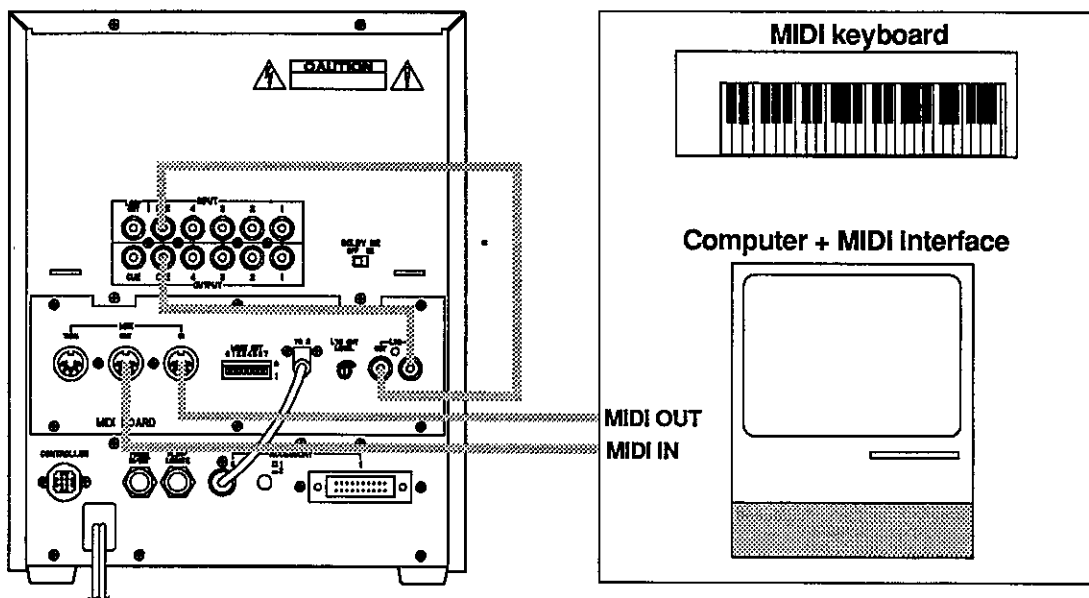
2. Mode Select DIP Switches

Initially, set the mode selecting DIP switches as follows.

<NOTE>

When shipped from the plant, DIP switches (1~8) are set to "0" (pointing up).

[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	DF	30
7	0	1	0	1
8	0	0	1	1

2-1. Address Setting (Switches 1 ~ 4)

The address of the GT10 is set via switches 1 ~ 4.

The address is applied both to the "MIDI channel" in the channel voice message and the "device number" in the universal system exclusive message. In the GT10, the MIDI channel and the device number are always the same (they cannot be separately numbered). This number is called the "address". MIDI specifications state that device numbers can be specified in the range of 1 ~ 128. However, in the GT10, please note that the range is limited to 1 ~ 16. The setup address is common in 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" (up) and be the value assigned to that switch when it is at "1" (down). The address value of 1 ~ 16 can thus be setup by adding "1" to the total value setup by swithes 1 ~ 4. An example of this procedure will be shown in the following:

```
Address value = A1(Value of SW1) + A2(Value of SW2) + A4(Value of SW3) + A8(Value of
              SW4) + 1
```

Example 1: Address (MIDI channel) = 1

(Address=0+0+0+0+1=1)
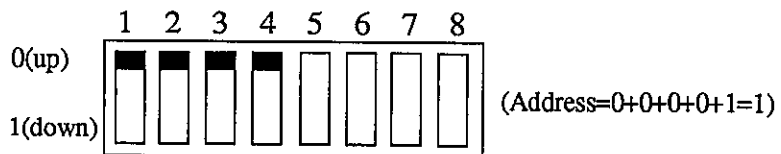
Example 2: Address (MIDI channel) = 6

(Address=1+0+4+0+1=6)
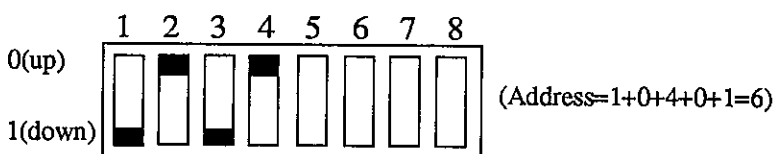
Example 3: Address (MDI channel) = 16

(Address=1+2+4+8+1=16)
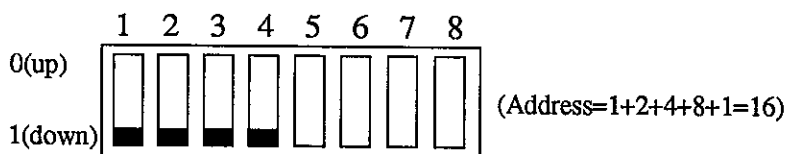
2-2. Address Free Setting (Switch 5)

Address free mode is setup via 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 the GT10. When not in this mode, only those messages whose address match the GT10 will be processed. Set switch 5 to "0" (up) for address free mode.

Example 1: Address Free Mode

```
        1  2  3  4  5  6  7  8
0(up)  [▓][ ][ ][▓][█][ ][ ][ ]
1(down)[ ][▓][▓][ ][ ][ ][ ][ ]
        └─────────────┘
```
These setting will be ineffective
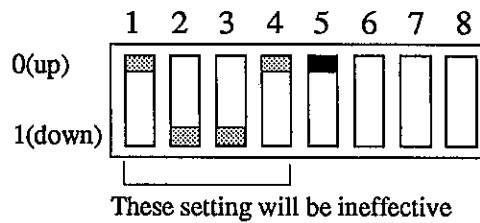
Example 2: Address = 7 (fixed)

```
        1  2  3  4  5  6  7  8
0(up)  [▓][ ][ ][▓][ ][ ][ ][ ]
1(down)[ ][▓][▓][ ][█][ ][ ][ ]
        └──────────┘
          2+4+1=7
```
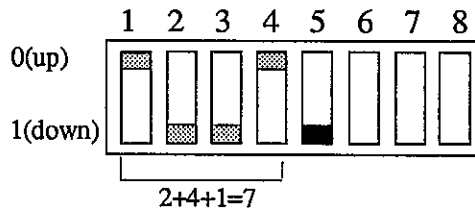
<NOTE 1> : If the device number received is 128 (7FH), the GT10 will enter
           receive processing mode regardless of whether it is has an address
           set (switches 1~4) or has the address free setting (switch 5). This is
           due to the MIDI rule that equipment receiving a 128 (7FH)
           message must respond regardless of its own device number.

<NOTE 2> : When the GT10 transmits a message containing its own address,
           it will be sent via address switches 1-4 regardless of the address
           free setting (switch 5).

2-3. Channel Voice Message Receive/Ignore Setting (Switch 6)

When a channel voice message is received by the GT10, the setting of switch 6
determines whether to receive or ignore the channel voice message.

0 (up): Ignore   **1 (down): Receive**

Example 1: Receiving channel voice message of MIDI channel 11

*At this setting, the GT10 can be controlled by sending a "note on
message" (transmitting channel 11) to the GT10 from the
sequencer or MIDI keyboard.

```
        1  2  3  4  5  6  7  8
0(up)  [▓][ ][▓][ ][ ][ ][ ][ ]
1(down)[ ][▓][ ][▓][▓][█][ ][ ]
        └──────────┘
          Address=11
```
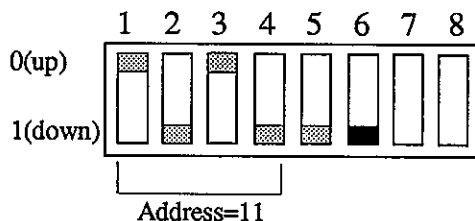
2-4. SMPTE Time Code Frame Setting (Switches 7 and 8)

LTC frame rate output from the internal SMPTE time code generator is setup
via switches 7 and 8.
This setting will not effect the time code reader but if tach and direction is
specified in the time reference via the channel voice message or Fostex system
exclusive message, the GT10 will acknowledge the recorder position by this rate

setting. Please refer to "5. Details on Receive/Transmit Message". If the GT10 is in the mode for acknowledging the recorder position via the tach (tach pulse signal is the signal which indicate the amount of tape travel) and dir (direction signal is the signal indicating tape travel direction) signals, it will forcibly convert under the frame rate set by this switch. The following four settings are possible.

24	24 frame (Film spec.)	SW7 : 0 (up)	SW8 : 0 (up)
25	25 frame (EBU spec.)	SW7 : 1 (down)	SW8 : 0 (up)
DF	29.97 frame (Drop type)	SW7 : 0 (up)	SW8 : 1 (down)
30	30 frame	SW7 : 1 (down)	SW8 : 1 (down)

2-5. Review of Mode Set DIP Switches

Example 1: Address = 1; Voice message = Receive; Output LTC = 30 frame. (Device number 7FH, However, will be received.)
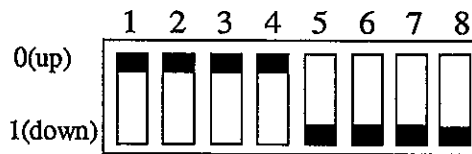
*Operating example: To control the GT10 by channel 1 "note on" message or device number 1 setup message.

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

*Operating example: GT10 not to be controlled by "note on" message.
GT10 to be controlled by the setup message, etc. of a random device number.

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

*Operating example: GT10 not to be controlled by "note on" message.
GT10 to be controlled by setup message, etc. of device number 16.

3. Learning the Tach Pulse Rate

The GT10 can learn the relation between the tach pulse and LTC, and learn the correct position.

* The learning mode is automatically entered when power is switched on or when a cassette tape is loaded.

1. Put the GT10 into play mode and input LTC.
2. The LTC indicator will blink to indicate that the GT10 is in learning mode.
3. After a few seconds, the LTC indicator will change to constant light to indicate that learning is completed. This ends the tach pulse learning process.

<NOTE>

After learning, the LTC indicator will light only when LTC is normally input.

The GT10 Learning Mode

In a regular open reel multitrack recorder, a constant cycle pulse is continuously sent as the tach pulse is obtained from the footage roller. The rate converted to the time code is also constant. However, as the tach pulse in the GT10 is produced from the reel pulse, it changes at a constant rate. It should be noted that a cassette reel pulse, compared to an open reel footage roller pulse, fluctuates. Accurate rate conversion is impossible in a short learning period. This can effect locating accuracy.

In the GT10, when the [LTC IN] display changes from blinking to lit, the conversion function from tach pulse to time code operates. However, the learning function continues. Although the learning mode operates if the GT10 is able to accurately read the time code in play mode, the wider this range is, the higher the rate conversion accuracy will be, and thus accurate locate operation is possible.

To reference the learning mode, watch the learn display state of the second dot from the right in the main GT10 tape counter. Learning is performed if this LED is extinguished.
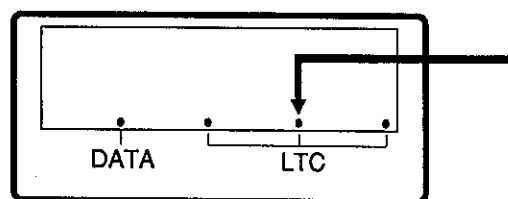
Because data will be accumulated in the averaging buffer whether time code can be read or not, the learning process will not be carried out and the LED will remain extinguished.

When a certain amount of data is stored in the buffer, conversion rate learning is started and the LED will be lit or blinking. The difference between constant lighting and blinking is:

Constant lighting	The conversion rate will not be renewed as it is within the already learned range.
Blinking	The conversion rate will be renewed as it is in the unlearned range.

Therefore, in order to accomplish effective learning in a short period, learning must be carried out at the head portion of the tape and then moved (fast forward) to the end of the tape, and enter play mode until the [LEARN] LED starts blinking.

Conversion accuracy will be improved with this process and locating can be carried out smoothly.

<NOTE>

The GT10 automatically resets to the unlearned state when power is switched on or when the cassette tape is replaced with a new one. Therefore, learning must always be carried out at this point.

4. MIDI Message

The functions of the GT10 can be used in full by implementing the Fostex
system exclusive message. Control is possibe, of course, by channel voice
messages ("note on" message, etc.), universal system exclusive messages, and
MMC (MIDI machine control). In these cases, all functions of the GT10 cannot
be used.

Messages which can be received and transmitted by the GT10 are as follows:

4-1. Receive Messages

The GT10 can acknowledge the following type messages but will ignore other
types. Additionally, even if message may be of the type listed below, those
whose parameter values are not in the range defined for the GT10 (undefined
note number, etc.), will be ignored.

Please refer to "5. Details on Transmit and Receive Messages" for information
about receiving 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
> *** Fostex system exclusive message**
> *** MMC (MIDI machine control)**

4-2. Transmit Messages

The GT10 transmits the following type of messages. Transmission will occur
when it receives request category message (when a response is requested) or if
it is set to such a mode (example: MTC output mode.). Also, when transmitting
a message of the type containing a device number such as "identity reply", it will
be sent by the address setup of switches 1 ~ 4 of the mode set DIP switches. This
is not effected by switch 5.

*System common message

    MTC quarter frame message

*Systm real time message

    Timing clock

*Universal system exclusive message

    Identity reply (Inquiry message)

    MTC full message

    MTC user bit message

*Fostex system exclusive message

*MMC (MIDI machine control)

4-3. Communicating Methods

This transmission is by open loop. A response message will not be output for anything other than a command requesting a response, in the same way as common MIDI equipment. This is the same for the Fostex system exclusive message.

5. Details on Receive/Transmit Messages

In the following, various MIDI messages necessary for controlling the GT10 without using Fostex system exclusive messages will be explained. Because manufacturers maintain MIDI specification format interchangeability, this is very convenient for controlling the GT10. An example of using these messages to construct a system is shown below.
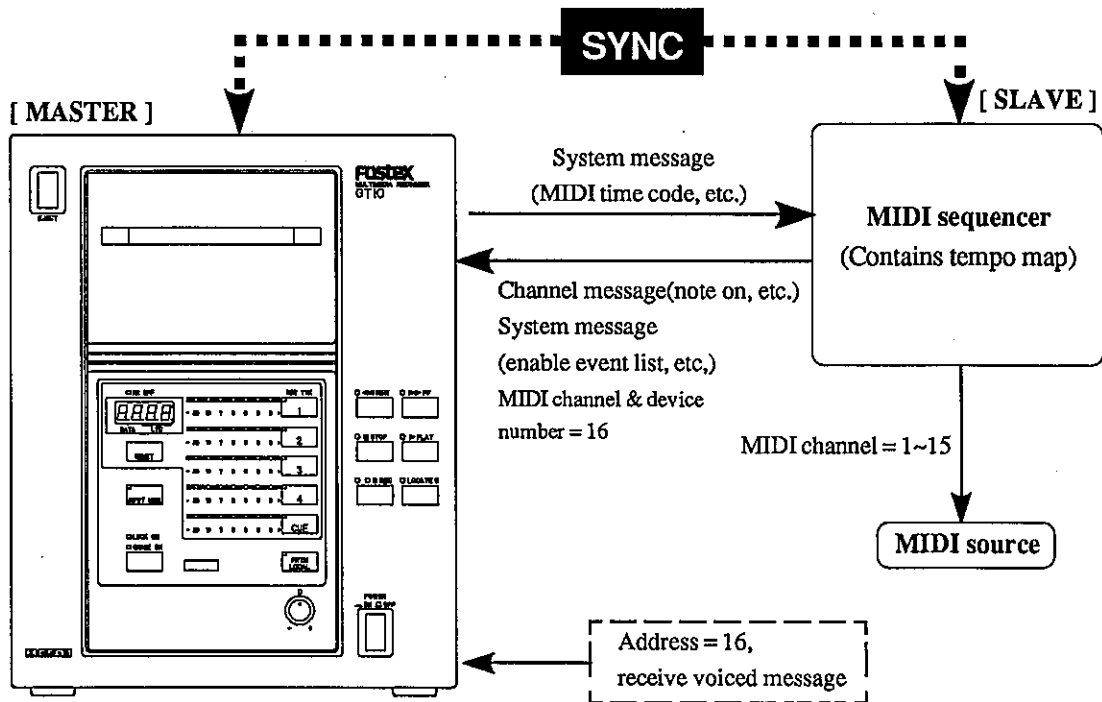
<NOTE 1>   : Sync between the GT10 and the sequencer is possible when:
* LTC is recorded on the GT10.
*The sequencer complies to MIDI time code.
*The sequencer has its own tempo map.

<NOTE 2>   : Even if sync is not applied, it is recommended to record LTC on the GT10. This is because LTC is absolutely necessary for accurate auto punch in and out, etc. Also, run and stop of the LTC generator will be by a MIDI message. This is not possible from the main unit of the GT10.

5-1. Control by Channel Message

Channel messages to which the GT10 comply are shown below. What the GT10 dose when these messages are received will be explained in the following.

```
┌─ MIDI MESSAGE ─────────────────────────────────────────────┐
│                                                             │
│                      ┌─────────────────┐                    │
│                      │  MIDI MESSAGE   │                    │
│                      └─────────────────┘                    │
│                               │                             │
│              ┌────────────────┴──────────┐                  │
│      ┌─────────────────┐        ┌──────────────────┐        │
│      │ CHANNEL MESSAGE │        │  SYSTEM MESSAGE  │        │
│      └─────────────────┘        │(Explained in next 6)│     │
│               │                 └──────────────────┘        │
│      ┌────────┴────────┐                                    │
│ ┌──────────────────────┐  ┌──────────────────────┐          │
│ │CHANNEL VOICE MESSAGE │  │ CHANNEL MODE MESSAGE │          │
│ └──────────────────────┘  └──────────────────────┘          │
│      ┌──────────────┐      ┌────────────────────────┐       │
│      │  NOTE ON     │      │ LOCAL CONTROL ON/OFF   │       │
│      │  NOTE OFF    │      │    ALL NOTE OFF        │       │
│      └──────────────┘      │  OMNI ON/OMNI OFF      │       │
│              └──────────┬───────────────────────────        │
│                         ▽                                   │
│            Channel messages to whitch the unit can comply.  │
└─────────────────────────────────────────────────────────────┘
```
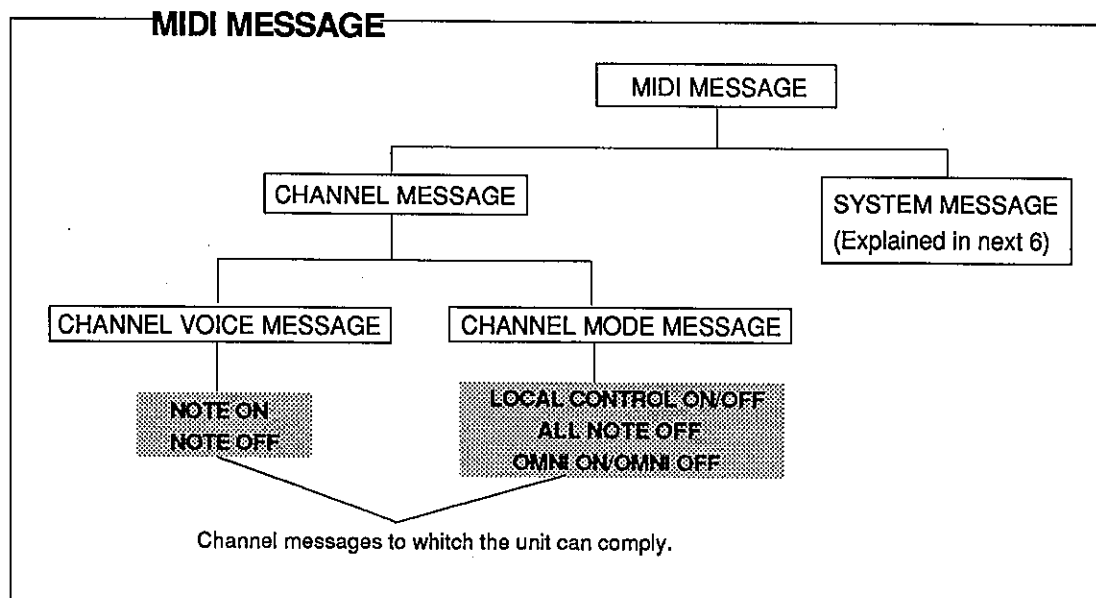
☐ Channel Mode Message

Local Control On/Off

Originally, local control on/off is used to select whether the keyboard and sound source is to be separate or not in a MIDI synthesizer which receives this message but the GT10 operates as in the following.

Local Control Off

The GT10 and the controller are separated. When the GT10 receives this message, its control panel will not control the GT10 main unit.

Local Control On

The GT10 main unit can be controlled by its control panel.

All Note Off

Originally, this is a message to force to a stop the sound sent from the MIDI sound source (except for the note played by the sound source main keyboard) but when the GT10 receives it, it will operate as if note off messages were received for all note numbers which the GT10 acknowledges as "on".

Omni On/Omni Off

Omni On/Omni Off, originally, is used to setup whether the MIDI equipment receiving it should acknowledge it or not but when it is received by the GT10, it will operate as follows.

Omni On

The GT10 will enter the address free mode. It will operate as if switch 5 (set to address free) of the mode set DIP switch is set to "0" (up).

Omni Off

The GT10 will enter the address fixed mode. It will operate as if switch 5 (set to address free) is set to "1" (down). In this case, the address figures will be the same as those set by switches, 1 ~ 4.

This message (and switch 5) is effective in "late-arrive-priority" when used 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, or when switch 5 is set to "1", then returned to "0", it will change to the address free mode.

Basic of Channel Mode Messages

MESSAGE RECEIVED	MIDI INTERFACE BOARD UNIT OPERATION
Local control off	Controller will be cut off from GT10 thus disabling it.
Local control on	GT10 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 off	Will be address fixed mode.

<NOTE>
Byte status of each message is as follows (Status and Data 2 are expressed in hexadecimal).

MESSAGE \ BYTE	STATUS	DATA 1 (CONTROL NUMBER)	DATA2
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

Originally, note on and note off are messages which have the same meaning as pressing and releasing keys of a MIDI synthesizer, etc. which receive these messages. The GT10 will operate as follows when it receives them.

For the sake of simplifying the explanation here, "note on/note off is received" by the GT10 will be replaced with "press/release the key". The explanation will be on the assumption that MIDI out of the MIDI keyboard is connected to MIDI in of the GT10.

How to Enter a Message

There are two different methods for sending a message to the GT10:

*Normal method

Press one key of the MIDI keyboard to send a signal tone to the GT10.

*Shift method

Shift means pressing one key while holding down another key. In other words, the method of sending a "double tone" to the GT10. In this operation, the first key pressed is called the shift key, and the key pressed afterwards is called the normal key.

5-2. Normal method

When note on/off output by the normal method is received, the GT10 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		Recoder 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, at least one record track
selector on the recorder must be on. However, if this message is
received with all record track selectors set to off, the GT10 will
operate as if the recorder play and record buttons were pressed
simultaneously.

<NOTE 2> : Generally speaking, "locate" means fast winding the recorder
toward a point and stopping it at that point. In the GT10, this
point is set beforehand (by a shift operation etc.) as the "locate
point". Additionally, in the GT10, whatever the operation the
recorder should enter after arriving at the locate point is also setup.
This is called the post locate mode and is set by shift operation, etc.

<Note>

If stops is the specified post locate mode, the locate operation will
be the same as the general locate operation.

Example of locate operation (When "AUTO REC is specified in the Post locate mode.)

Note number "51" is received (LOCATE)
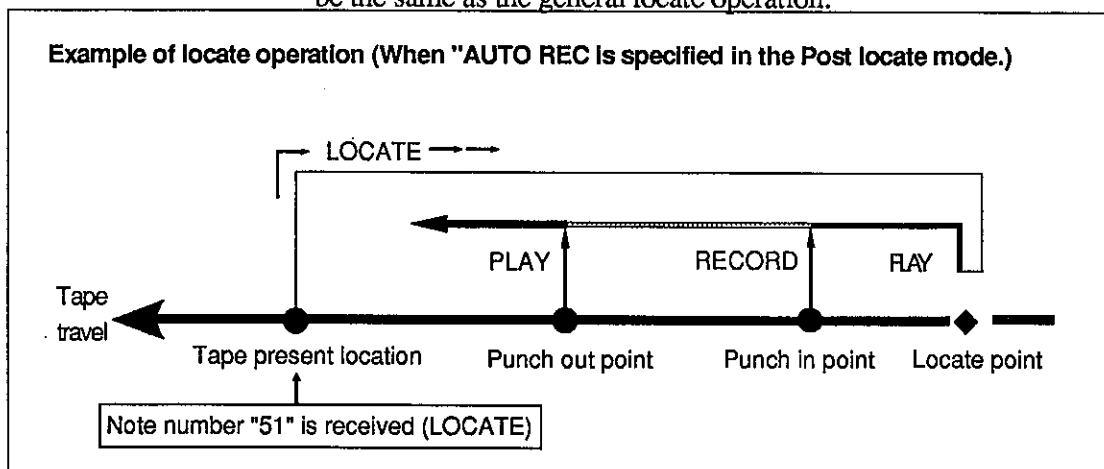
<NOTE 3> : "Review" is when the GT10 locates to a certain point before the
present location and immediately enters the play mode upon
completing this locate operation. The point is preset to 5 seconds
inside the GT10 but can be edited by the Fostex system exclusive
message.

<NOTE 4> : The GT10 will punch out and enter the play mode when this
message is received. If the recorder is not in record mode, this
message will have no effect.

<NOTE 5> : In the loop operation, the recorder will locate toward the loop start
point (setup method explained later) registered in the GT10,
immediately enter the status specified by the loop operation mode
upon arriving there, and thereafter enter the same state as if loop
mode is on. Loop mode on or off means whether the specified
looping sequence will be entered or not.

Example of loop operation (When REHEARSE is specified in the loop operation mode.)

LOCATE ———   LOCATE ———

SYNC   SYNC   INPUT   SYNC

Tape travel

Tape present location   Loop end point   Punch out point   Punch in point   Loop start point

Receives note number "61" (loop)

Hereafter, these operation are repeated.
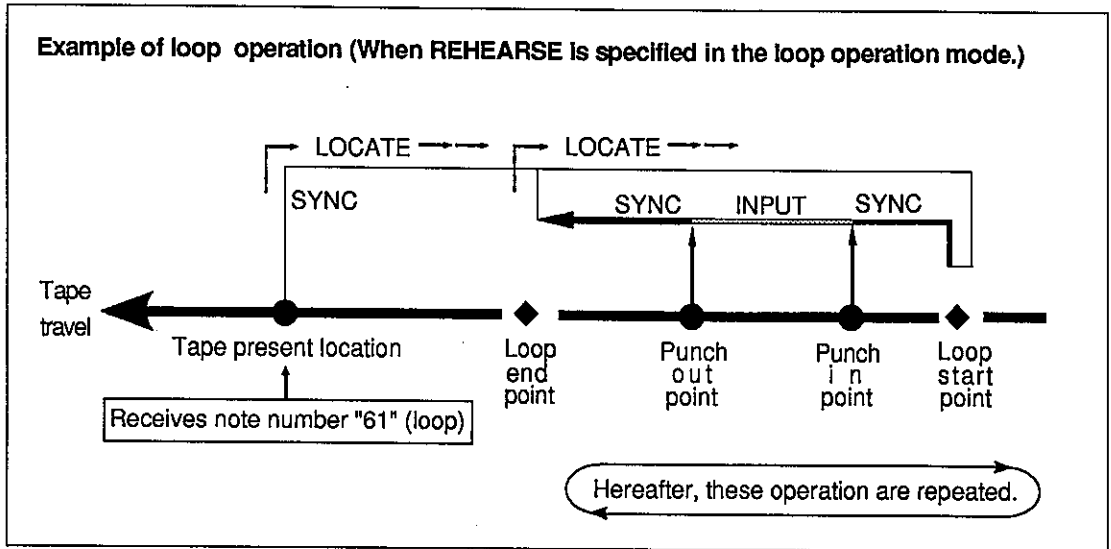
The above expressed on the MIDI keyboard is shown below.

NOTE #

Note #	Function
61	LOOP
60	STOP ← Center "C"
59	PUNCH OUT
58	
57	F.FOWARD
56	
55	CUE
54	
53	REWIND
52	REVIEW
51	LOCATE
50	
49	RECORD
48	PLAY

5-2. Operation Via Shift Operation (Multiple Press)

When the shift operation message is received, control of the recorder and its own mode setup/change can be done in the GT10. These operations will be explained in this section. 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.

☐ Timing of the Shift Operation

After arrival of the shift key (first key to be pressed) note on, operation of the GT10 is triggered the instant the normal key (key to be pressed next) note on arrives ahead of note off of this key.

```
SHIFT key          _____|‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾‾|_____

NORMAL key         _____|‾‾‾|_____

Other NORMAL key   _____|‾‾|_____

Operating point              ↑       ↑          on  ‾|_|‾|_
                                                 off_|  |_
```
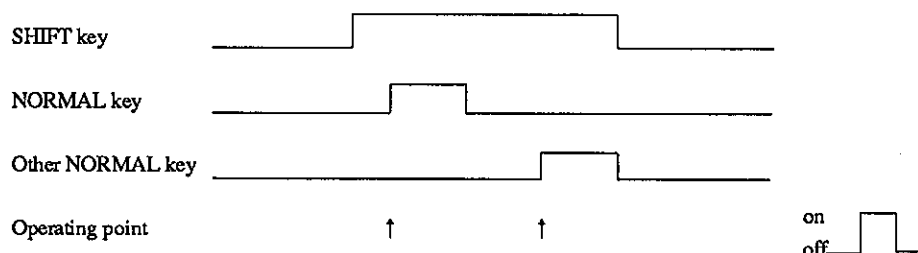
On/Off for Remote Control of the GT10 by MIDI

In order to select whether the GT10 should respond to MIDI messages sent from external equipment or not, shift key and note number keys 78/79 are used as shown below.

Shift key = 78, Normal key = 57 : Remote control on
Shift key = 79, Normal key = 57 : Remote control off

However, even if the GT10 is not set to remote control, it will enter remote control when received.

Run and Stop Selection of the LTC Generator

Shift key and note number keys 78/79 are used to run or stop the GT10 internal SMPTE time code generator.

Shift key = 78, Normal key = 56 : Run
Shift key = 79, Normal key = 56 : Stop

Time Reference Selection

Setup of where time information for the GT10 reference should be obtained. For this setup, 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 and direction...*2
Shift key = 82, Normal key = 51 : LTC..*3
Shift key = 82, Normal key = 52 : Tach and Direction..................*4

Explanation

*1 When selected, the GT10 manages time information based on MIDI time code (full message and quarter frame message) sent from an outside source.

*2 When selected, the GT10 manages time information based on the LTC sent from the recorder and tach and direction (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 and direction when in the fast wind mode.

*3 When selected, the GT10 manages time information based on the LTC sent from the recorder. When the recorder is in the fast wind mode, its position cannot be ascertained.

*4 When selected, the GT10 manages time information based on tach and direction (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 and direction, is managed.

Setup of Recorder Record Permit/Prohibit

Whether or not recording can be done or in a recorder connected to the GT10 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 possible
Shift key = 79, Normal key = 62 : Recording not possible

Setup of Local Control On/Off

In the same way as local control On/Off of the channel mode message, whether or not the GT10 and its controller is to be disconnected 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 the GT10 has read LTC, the MTC full message is output once. After this, the MTC quarter frame message will be continuously output until the GT10 cannot read LTC.

Setup of the Recorder Monitor Mode

The monitor mode of the recorder connected to the GT10 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 When selected, the GT10 will enter the sync playback mode. In the GT10, this will be the normal playback mode because it is a two head type recorder.

*2 When selected, the GT10 will be in the individual inpiut monitor mode. Only the track specified by the record track selector will be in the input monitor mode.

*3 When selected, the GT10 will be in the all input monitor mode. All tracks will be in the input monitor mode.

Method of Selecting the Record Track

Record track select (specifying of the recording track) of a recorder connected to the GT10 can be done. Note number keys 83, 84 are used as the shift keys as shown below.

Shift key = 83, Normal key = 36 ~ 68: Specifying the record track............*1
Shift key = 84, Normal key = 36 ~ 68: Specifying the non-record track....*2

Explanation

*1 When selected, the track numbers of the tracks set to 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 Refer to NOTE 1

<NOTE>

Because the GT10 has 5 tracks, no change will occur if the normal key note number is in the range of 42~ 68.

*2 When selected, the record track in the above can be turned to record track select off. The method of specifying the track number is the same as above.

Setup of the Recorder Loop Mode On/Off

Whether or not the following control can be done to the recorder connected to the GT10, can be setup.
If the loop mode is on and the tape running in the play mode (or record mode) reaches the loop end point, the GT10 will automatically start locating toward the loop start point, and upon reaching this point will immediately enters the mode specified in the loop operation mode.

Example:

If play is specified in the loop operation mode, for example, the recorder will enter "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 point to be registered is the "present time" of the time information used for the time reference by the GT10. If "LTC with tach and direction" 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. It should be kept in mind that if MTC is selected for the time reference, the present time of the MIDI time code received from outside and not the present time of the recorder, will be registered.

Setup of the Loop Operation Mode

This sets the mode the GT10 enters after completing a loop operation. 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.

Loop mode ON (When "Loop operation mode = PLAY)

LOCATE →·→

← PLAY

Tape
travel

Loop end point   Loop start point

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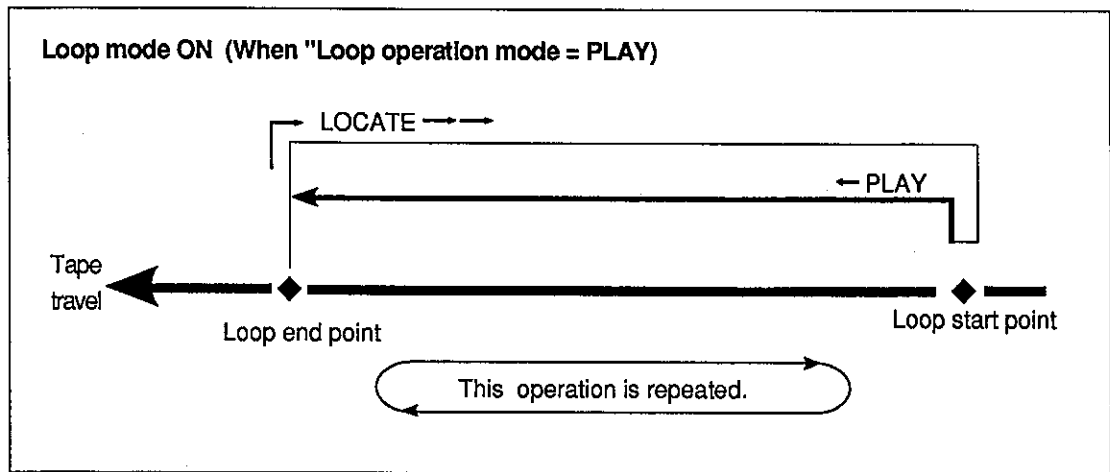
*2 At setup : When any record track select is on (the track for recording is
specified) the recorder will repeat run in the record mode between
the start point and end point. Monitor mode will not change but
the track being recorded will be entered into input monitor.

Loop mode ON (When "Loop operation mode = RECORD)

LOCATE →·→

← RECORD

Tape
travel

Loop end point   Loop start point

This operation is repeated.
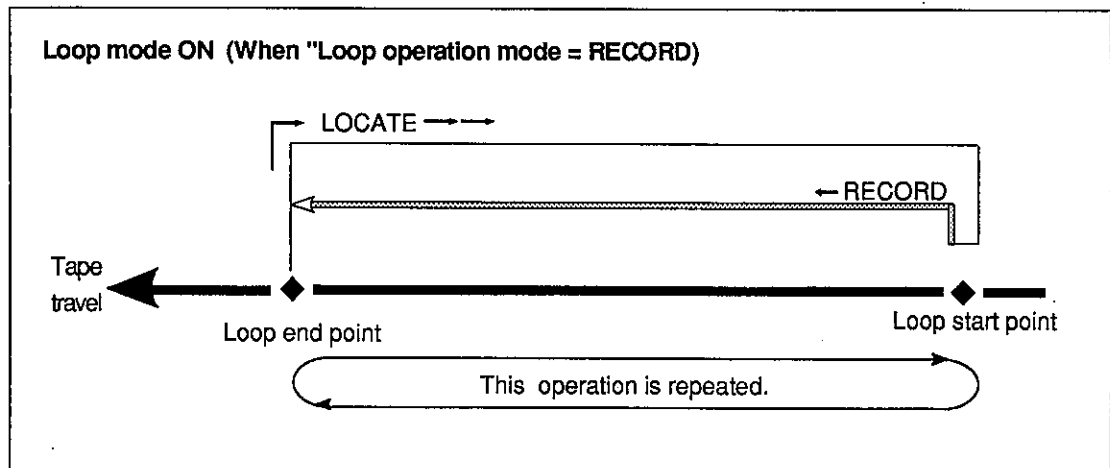
*3 At setup : When any track select is on (a track for recording is specified), the
recorder will repeat run in the rehearsal mode between the start
point and end point. Rehearsal is the operation whereby the tape
in the play mode arriving at the punch in point is automatically
entered into individual input monitor mode and later, arriving at
the punch out point, will switch 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. One use of this mode is, before replacing the
recording of a tape section via punch in/punch out in the auto
record mode, the section can be repeatedly practiced (rehearsed) in
the play mode.

Loop mode ON (Loop operation mode = REHEARSE)

LOCATE ⟶⟶

SYNC

⟵ PLAY

SYNC   INDIV. INPUT   SYNC

Tape travel

Loop end point   Punch out point   Punch in point   Loop start point

This operation is repeated.

<NOTE>
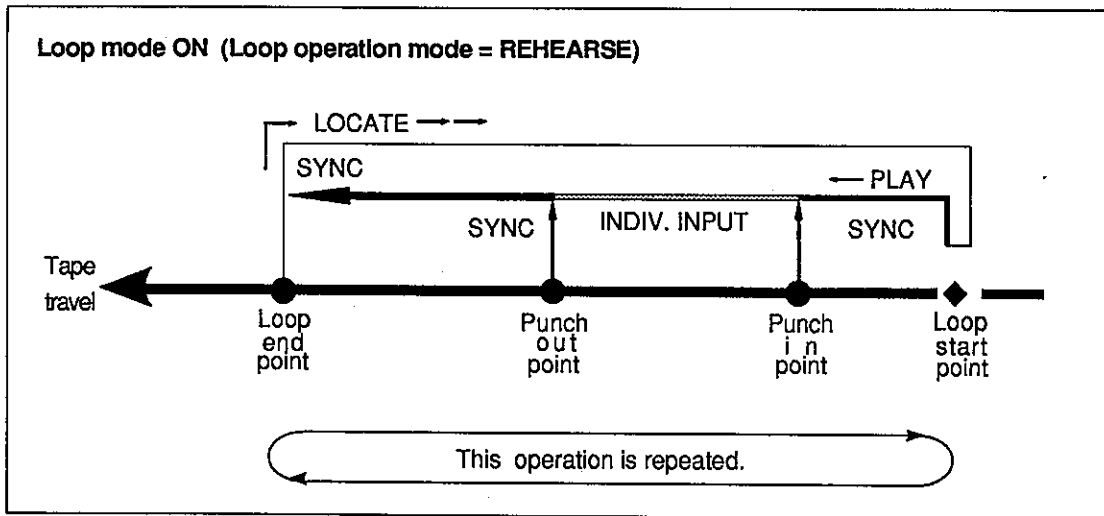
Please note that monitor mode at the play point in the drawing will be the monitor mode selected at the loop end point.

For example, if it is "individual 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 "individual input" and "all input", then the case of not being able to monitor the 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" (a track to be recorded is specified), the recorder will repeat run in the auto record mode between the start point and end point. Auto record is the operation whereby the tape running in play mode, upon arriving at the punch in point, the recorder will enter the record mode and, upon reaching the punch out point, switch to the play mode. In this way, 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 entered into input monitor mode.

Loop mode ON (Loop operation mode = AUTO REC)

LOCATE ⟶⟶

⟵ PLAY   ⟵ RECORD   ⟵ PLAY

Tape travel

Loop end point   Punch out point   Punch in point   Loop start point

This operation is repeated.
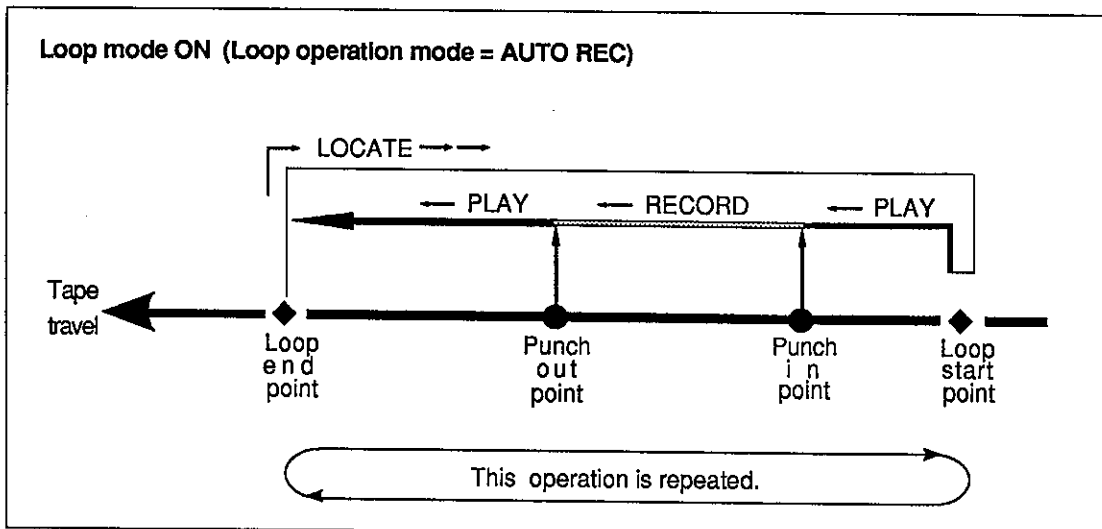
*5 At setup : As the recorder will be stopped at the start point, repeat run
described in the above notes 1 to 4 will not occur.

Loop mode ON (Loop operation mode = STOP)

LOCATE ──▶──▶

Tape
travel ◀━━━━━━━━━━━━━━━━━━━━━━━━━━━◆━━━

Loop end point   Loop start point
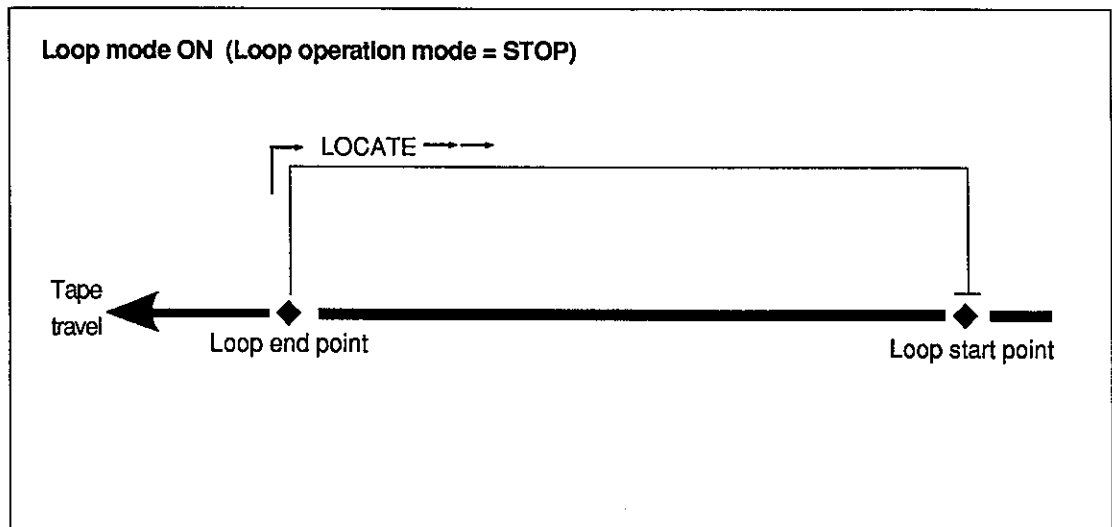
Setup of the Recorder Rehearsal Mode On/Off

The rehearsal mode can be setup in the recorder connected to the GT10.
When the rehearsal mode is on, when the tape in play mode arrives at the punch
in point, the monitor mode automatically enters individual input, then later on
arriving at the punch out point, 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 pumch 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 specified
operation 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 the GT10 uses as the time reference. For
example, if "LTC with tach and direction" is selected as 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 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 as 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 locaion but the present location of the MIDI time code received from outside, will be registered.

Setup of the Recorder Auto Record Mode On/Off

Auto record mode on or off for the recorder connected to the GT10 can be setup. When auto record mode is on and the tape reaches the punch in point in the play mode, the recorder will enter the record mode and, upon reaching the punch out point, will switch to the play mode. This operation will not be carried out if the auto record mode is turned off.

In the above operation, the monitor mode will not change but tracks in record mode will be entered into input monitor mode.

Also, if auto record is specified in the loop operation mode or post locate mode, this setting will automatically go on at the instant auto record is entered.

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

Shift key = 78, Normal key = 64: Auto record mode on
Shift key = 79, Normal key = 64: Auto record 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 locate point

Explanation

The value to be registered is the "present time" of the time information which the GT10 uses as time reference. For example, if "LTC with tach and direction" is selected for the time reference, the value registered will be "the present location of the recorder at the instant the normal key is prssed". For example, 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 the present time of the MIDI time code received from outside and not the present location of the recorder 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. Because the content of each operation is the same as "Setup of the loop operation mode" (This mode, however, will not repeat run). Please refer to the loop operation mode, page 53.

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 record mode
Shift key = 81, Normal key = 60 : Stop mode

Setting the Direct Time Lock Signal Output On/Off

Whether or not the GT10 should convert 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 performer, a sequencing software for the Macintosh by Mark of Unicorn Co. There is the one equivalent to the input LTC converted to MTC full message and the one converted to the MIDI timing clock signal.
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

Direct time lock signal can be 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 GT10 becomes unable to read LTC.

SUMMARY OF Shift OPERATION (MULTIPLE PRESS)

<Notes>

*Figures are note numbers.

*Shaded lines ineffective for GT10.

*DTL=Direct Time Lock signal.

NORMAL KEY \ SHIFT KEY	84 REC TRK SELECT OFF 83 REC TRK SELECT ON	82 HR VALUE REGISTER /TIME REF. /MONITER 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 mode
62	Track 26	Loop end point		Permit recording
61	Track 25	Loop start point		MIDI time code output
60	Track 24		STOP	
59	Track 23			
58	Track 22			Local control
57	Track 21			Remote control possible
56	Track 20			LTC generator Run
55	Track 19			DTL signal output
54	Track 18			
53	Track 17			
52	Track 16	TACH & DIR		
51	Track 15	LTC	AUTO REC	
50	Track 14	LTC W / TACH & DIR	REHEARSE	
49	Track 13	MTC	RECORD	
48	Track 12	ALL INPUT	PLAY	
47	Track 11	INDIV. INPUT		
46	Track 10			
45	Track 9	SYNC		
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 the GT10 are as follows.

Loop operation mode	PLAY
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	ON (Function given by Fostex system exclusive message.)
ZONE LIMIT	OFF (Function given by Fostex system exclusive message.)

<NOTE 2>

Number of bytes for note on/off are as follows.

(Numbers are hexadecimal)

MESSAGE \ BYTE	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.

6. Control by System Message

System messages that the GT10 complies to are as follows. This section will explained how the GT10 operates when receiving these messages and what type of format it conforms to at the transmission the messages.

[System message classification]

```
                        ┌──System common message
                        │    ┌─────────────────────────────────┐
                        │    │  MTC quarter frame message       │
                        │    └─────────────────────────────────┘
                        │
                        ├──Universal system exclusive message
                        │    ┌─────────────────────────────────┐
                        │    │  MTC full message                │
              System ───┤    │  MTC user bit message            │
              message   │    │  Identity request                │
                        │    │  Identity reply                  │
                        │    └─────────────────────────────────┘
                        │
                        ├──System real time message
                        │    ┌─────────────────────────────────┐
                        │    │  Timing clock                    │
                        │    │  System reset                    │
                        │    └─────────────────────────────────┘
                        │
                        └──System exclusive message
                             ┌─────────────────────────────────┐
                             │  Fostex system exclusive message │
                             └─────────────────────────────────┘
```

*▦▦Shaded lines indicate system messages to which the unit can comply.

6-1. 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 per 1/4 frame intervals, time figure of one unit is completed every two frames (it is about 66.7ms for "ND" type time code).

[Receive]

When time reference is set to MTC, the GT10 will read this even though its own address is set.

[Transmit]

The GT10 will send MTC QF when all conditions below are satisfied.

* MIDI time code output is set to "ON".
* MIDI reference is set to other than "TACH & DIR".
* The recorder connected is in the play mode and at the same time, the GT10 is reading the LTC output from the recorder; or the GT10 is reading LTC sent from external equipment (generator, etc.).

When these conditions are satisfied, the GT10 will transmit the time code type (24, 25, DF, ND) of the received LTC and the MTC QF signal indicating the time figure. If LTC is proceeding in the opposite direction, it will transmit MTC QF for the opposite direction.

Whether the GT10 is reading the LTC or not can be confirmed by the SMPTE time code LED (Refer to item on the SMPTE time code LED, page 12, on condition which make it possible for reading it.).

6-2. 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 GT10 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", the GT10 will read it. As MTC FM is specified at 7FH (Device number) by the MIDI specification, the GT10 will receive it even though its own address is set.

[Transmit]

With the GT10 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.

The GT10 will ignore this message even though it is received. Also, this message can be transmitted (output) only by the Fostex system exclusive message which initiates transmitting. This cannot be done by the shift operation.

[Transmit]

MTC UB is transmitted only once when the Fostex system exclusive message which urges transmission, is received.

Its content will be the same as the user bit of the LTC last read by the GT10 (transmitted by device number 7FH).

MTC UB of the same content can be transmitted by writing the user bit in the LTC generator of the GT10 (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 GT10 reader.

6-3. Identity Request and Identity Reply

Identity request and indentity reply are messages defined as inquiry messages and are used mainly for learning the maker ID of the receiving side.

The device number is included in the inquiry message. Therefore, in order for the GT10 to receive this, either this device number and the GT10 address setting must coincide or the GT10 should be set to address free.

Identity Request

[Receive]

When this message is received, the GT10 will immediately transmit an identity reply.

[Transmit]

The GT10 cannot transmit this message.

Identity Reply

[Receive]

The GT10 will ignore this message even though it is received.

[Transmit]

When an identity request is received, the GT10 will transmit this message. The device number at transmission will be the same figure as the GT10 address setting. This figure will be transmitted even though the GT10 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)	05 00	Recorder connected = GT10
sssssss	Software version, etc.	01 00 7F 7F	01 00 : Ver. = 1.0 7F 7F : No meaning (7F 7F are fixed)

6-4. System Real Time Message

Timing Clock

[Receive]

The GT10 will ignore this message even though received.

[Transmit]

The GT10 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 58 for details on transmitting condition and others.

System Reset

[Receive]

When this message is received, the GT10 will be set to the default state. Refer to NOTE 1, page 60 for details on the default state.

[Transmit]

The GT10 cannot transmit this message.

6-5. Supplement : Byte Composition List of the System Message

The byte composition of the system message to which the GT10 complies 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
      │                                      ├── YYYYY: Frame No. (0 ~ 29)
      │ F1  1X (Frame MS)    1X : 0001 YYYY ─┘

      │ F1  2X (Sec. LS)     2X : 0010 XXYY ─┐   XX: Not defined
      │                                      ├── YYYYYY: Second (0 ~ 59)
      │ F1  3X (sec. MS)     3X : 0011 YYYY ─┘
2 frame│
      │ F1  4X (Min. LS)     4X : 0100 XXYY ─┐   XX: Not defined
      │                                      ├── YYYYYY: Minute (0 ~ 59)
      │ F1  5X (Min. MS)     5X : 0101 YYYY ─┘

      │ F1  6X (Hour LS)     6X : 0110 XYYZ ─┐   X: Not defined
      │                                      │   YY: TC type
   ↓  │ F1  7X (Hour MS)     7X : 0111 ZZZZ ─┘   ZZZZZ: Hour (0 ~ 23)
─ ─┴─ ┤ ─ ─
      │ F1  0X
      ▼                                          YY = 0 (24)
Frame advance direction                          YY = 1 (25)
                                                 YY = 2 (DF)
                                                 YY = 3 (ND)
```

Example : 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 group 1 ~ 8.
u6	: 0000ffff	
u7	: 0000gggg	
u8	: 0000hhhh	
u9	: 000000ii---Equivalent to binary group flag bit.	

| F7 | : End of exclusive |

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 the unit)
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 GT10 : dd = 05

*presently, dd=06 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

The unit will enter the default state when this is received.

[**MIDI Interfase**]

Model   **MIDI Implementation Chart**

Function.....		Transmitted	Recognized	Remarks
Basic	Default	X	1-16	rem.1
Channnel	Changed	X	1-16	
Mode	Default	X	OMNI ON/OFF	rem.1
	Message	X	OMNI ON/OFF	
	Altered	*****************************	X	
Note		X	36-84	
Number	:True voice	*****************************		
Velocity	Note ON	X	X	
	Note OFF	X	X	
After	Key's	X	X	
Touch	Ch's	X	X	
Pitch Bend		X	X	
Control Change		X	X	
Prog		X	X	
Change	:True #	*****************************	X	
System Exclusive		O rem.2	O rem.3	
Common	:Song Pos	X	X	rem.4
	:Song Sel	X	X	
	:Tune	X	X	
System	:Clock	O	X	
Real Time	:Commands	X	X	
Aux	:Local ON/OFF	X	O	
	:All Notes OFF	X	O	
Mes-	:Active Sense	X	X	
sages	:Reset	X	O	
Notes		rem.1 Set by mode select switches		
		rem.2 MTC (FM, UB), Identity reply, FOSTEX exclusive, Direct Time Lock		
		rem.3 Identity request, FOSTEX exclusive		
		rem.4 MTC QF is transmitted.		

Mode 1 : OMNI ON. POLY   Mode 2 : OMNI ON. MONO   O : Yes

Mode 3 : OMNI OFF. POLY   Mode 4 : OMNI OFF. MONO   X : No

MMC (MIDI Machine Cotrol) Implementation Chart

Command List

Hex	Command	Type	Number of data bytes	Guideline Min. Sets	GT10
00	reserved for extensions	-	-	1234	
01	STOP(MCS)	Ctrl	-	1234	O
02	PLAY(MCS)	Ctrl	-	-234	O
03	DEFERRED PLAY(MCS)	Ctrl	-	1234	O
04	FAST FOWARD(MCS)	Ctrl	-	1234	O
05	REWIND(MCS)	Ctrl	-	1234	O
06	RECORD STROBE	Ctrl	-	1234	O
07	RECORD EXIT	Ctrl	-	1234	O
08	RECORD PAUSE	Ctrl	-	----	
09	PAUSE(MCS)	Ctrl	-	----	
0A	EJECT(MCS)	Ctrl	-	----	
0B	CHASE(MCP)	Sync	-	---4	
0C	COMMAND ERROR RESET	I/O	-	-234	O
0D	MMC RESET	Ctrl	-	1234	O
40	WRITE	I/O	n	1234	O
41	MASKED WRITE	I/O	n	--3-	O
42	READ	I/O	n	-234	O
43	UPDATE	I/O	n	-234	O
44	LOCATE(MCP)	Ctrl	1	1234	O
45	VARIABLE PLAY SPEED(MCS)	Ctrl	3	-234	
46	SEARCH(MCS)	Ctrl	3	--34	
47	SHUTTLE(MCS)	Ctrl	3	----	
48	STEP(MCS)	Ctrl	1	----	
49	ASSIGN SYSTEM MASTER	Sync	1	----	
4A	GENERATOR COMMAND	Gen	1	----	O
4B	MIDI TIME CODE COMMAND	MTC	1	----	O
4C	MOVE	Math	2	1234	O
4D	ADD	Math	3	-234	
4E	SUBTRACT	Math	3	-234	
4F	DROP FRAME ADJUST	Math	1	--34	
50	PROCEDURE	Proc	n	--34	
51	EVENT	Evnt	n	--34	
52	GROUP	Comm	n	-234	O
53	COMMAND SEGMENT	Comm	n	1234	
54	DEFERRED VARIABLE PLAY	Ctrl	3	-234	
55	RECORD STROBE VARIABLE	Ctrl	3	----	
7C	WAIT	Comm	-	-234	O
7F	RESUME	Comm	-	-234	O

MMC (MIDI Machine Cotrol) Implementation Chart

Response/Information Field List

Hex	Response/Information Field Name	Type	Number of data bytes	R/W	Guideline Min. Sets	GT10
00	reserved for extensions	-	-	-	1234	
01	SELECTED TIME CODE {st}	Time	5	RW	1234	O
02	SELECTED MASTER CODE {st}	Sync	5	r	---4	
03	REQUESTED OFFSET {ff}	Sync	5	RW	---4	
04	ACTUAL OFFSET [ff}	Sync	5	r	---4	
05	LOCK DEVIATION {ff}	Sync	5	r	---4	
06	GENERATOR TIME CODE {st}	Gen	5	RW	----	O
07	MIDI TIME CODE INPUT [st}	MTC	5	r	----	O
08	GPO/LOCATE POINT {ff}	Math	5	RW	1234	O
09	GP1 [ff]	Math	5	RW	-234	O
0A	GP2 [ff]	Math	5	RW	-234	O
0B	GP3 [ff]	Math	5	RW	-234	O
0C	GP4 {ff}	Math	5	RW	----	
0D	GP5 {ff}	Math	5	RW	----	
0E	GP6 {ff}	Math	5	RW	----	
0F	GP7 {ff}	Math	5	RW	----	
21	SHORT forms of 01	Time	2	r	-234	O
:	:	:	:	:	:	
2F	SHORT forms of 0F	Math	2	r	----	
40	SIGNATURE	1/0	n	r	-234	O
41	UPDATE RATE	1/0	2	RW	-234	O
42	RESPONSE ERROR	1/0	n	-	-234	O
43	COMMAND ERROR	1/0	n	r	-234	O
44	COMMAND ERROR LEVEL	1/0	1	RW	-234	O
45	TIME STANDARD	Time	1	RW	-234	
46	SELECTED TIME CODE SOURCE	Time	1	RW	----	O
47	SELECTED TIME CODE USERBITS	Time	9	r	----	
48	MOTION CONTROL TALLY	Ctrl	3	r	-234	O
49	VELOCITY TALLY	Ctrl	3	r	----	
4A	STOP MODE	Ctrl	1	RW	----	
4B	FAST MODE	Ctrl	1	RW	----	
4C	RECORD MODE	Ctrl	1	RW	-234	O
4D	RECORD STATUS	Ctrl	1	r	-234	
4E	TRACK RECORD STATUS	Ctrl	n	r	--3-	
4F	TRACK RECORD READY	Ctrl	n	RW	--3-	O

MMC (MIDI Machine Cotrol) Implementation Chart

Response/Information Field List

Hex	Response/Information Field Name	Type	Number of data bytes	R/W	Guidline Min. Sets	GT10
50	GLOBAL MONITOR	Ctrl	1	RW	--3-	○
51	RECORD MONITOR	Ctrl	1	RW	----	
52	TRACK SYNC MONITOR	Ctrl	n	RW	----	
53	TRACK INPUT MONITOR	Ctrl	n	RW	----	
54	STEP LENGTH	Ctrl	1	RW	----	
55	PLAY SPEED REFERENCE	Ctrl	1	RW	-23-	
66	FIXED SPEED	Ctrl	1	RW	----	
57	LIFTER DEFEAT	Ctrl	1	RW	----	○
58	CONTROL DISABLE	Ctrl	1	RW	---4	
59	RESOLVED PLAY MODE	Sync	1	RW	---4	
5A	CHASE MODE	Sync	1	RW	---4	
5B	GENERATOR COMMAND TALLY	Gen	2	r	----	○
5C	GENERATOR SET UP	Gen	3	RW	----	
5D	GENERATOR USERBITS	Gen	9	RW	----	
5E	MIDI TIME CODE COMMAND TALLY	MTC	2	r	----	○
5F	MIDI TIME CODE SETUP	MTC	1	RW	----	
60	PROCEDURE RESPONSE	Proc	n	-	--34	
61	EVENT RESPONSE	Evnt	n	-	--34	
62	TRACK MUTE	Ctrl	n	RW	--3-	
63	VITC INSERT ENABLE	Gen	3	RW	----	
64	RESPONSE SEGMENT	Comm	n	-	-234	
65	FAILURE	Ctrl	n	-	-234	
7C	WAIT	Comm	-	-	-234	○
7F	RESUME	Comm	-	-	-234	○

<NOTES>

MMC and Its Limitations in This Equipment

The unit already contains "FEX" (Fostex Exclusive), a protocol for controlling the recorder by MIDI.

These MMC commands implemented in this recorder replace the FEX commands. They have been adopted so that MMC compatible equipment may be connected to the recorder. Because of the increasing number of outboard gear that can be controlled via MMC, we at Fostex want to make our recorders as versatile as possible.

IMPORTANT

Please note that there are some commands and information fields for MMC whitch are not included in V1.04. In particular, please note the following information.

4A   :Generator Command

Operations whitch can be specified.

    00   :Stop

    01   :Run. Free run only is possible in this equipment.

There is no GENERATOR SET UP information field, and other operations cannot be specified.

4B   :MIDI Time Code

Operations whitch can be specified.

    00   :Off

    02   :On. MTC(QFM) will be output for the duration that the recorder main unit is able to read LTC in the PLAY mode.

However, there is no MIDI time code set up information field and other operations cannot be specified.

52   :Group

Assignment is possible up to 16 groups.

7C   :Wait

After receiving this command, all transmission of MCR message from this equipment will be suspended. However, transmission of MTC and FEX (Fostex Exclusive) will not be effected.

Section 15.
Specifications

(RECORDER SECTION)

Record tracks	: 5 tracks, one direction Simultaneous recording of up to 5 tracks
Noise reduction	: Dolby S NR (ON/OFF Switchable)
Heads	: 4 channel REC/PLAY (1~4)
	: 1 channel REC/PLAY (CUE)
	: 5 channel ERASE
Tape speed	: 9.5cm/sec
Wow and flutter	: 0.1% (IEC/ANSI) WTD
Fast wind time	: 100 seconds (C-60 cassette tape)

INPUTS(Inputs 1~4,CUE)

Normal input level	: -10dBV
Input impedance	: 20kΩ or higher

OUTPUTS(Outputs 1~4,CUE)

Normal output level	: -10dBV
Output load impedance	: 10kΩ or higher

Pitch control	: $\pm$12%
Recording time	: 22.5 minutes (C-90 cassette tape)
Frequency response	: 30Hz~18kHz
S/N ratio	: 64dB WTD (Dolby S NR ON)
	: 73dB CCIR/ARM (Dolby S NR ON)
Crosstalk	: 45dB or higher (at 1kHz)
Erasure ratio	: 70dB or higher (at 1kHz)
T.H.D.	: 1.5% or less (1kHz/0dB)

(MIDI INTERFACE BOARD SECTION)

LTC Reader

Connector	: RCA pin jack
Input impedance	: 20kΩ or higher
Input level	: 200mV p-p~10V p-p
Readable speed range	: 1/2~2 times play speed in forward/reverse

LTC Generator

|	
Connector	: RCA pin jack
Load impedance	: 10k Ω or higher
Output level (adjustable)	: maximum 3V p-p
Frame mode	: 24, 25, 29.97 drop frame, 30
	These can be set by the DIP switch.

MIDI In/Thru/Out

Connector and electrical specs	:Complies to MIDI specifications.

Connection with recorder

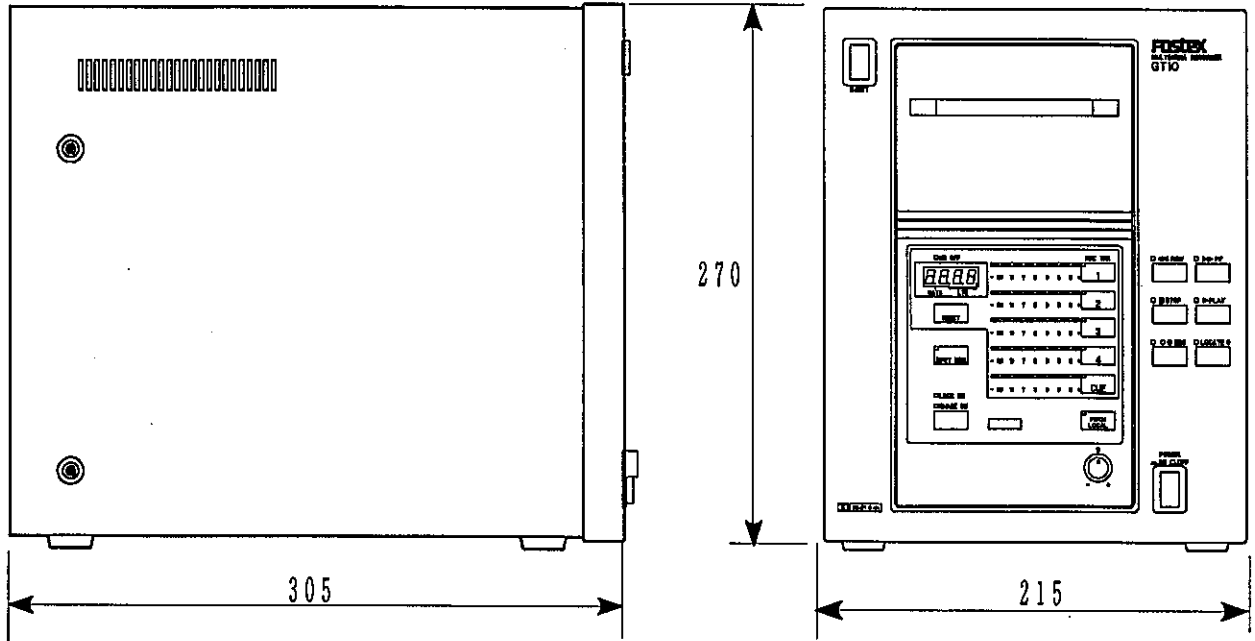|	
Contents	: Communication signal cable between recorder and MIDI interface board
	: +12V power supply added to MIDI interface board from recorder
	: Direction signal added to MIDI interface board
	: TACH PULSE added to MIDI interface board from recorder
Power supply	: Supplied by recorder (+12V,500mA)

(GENERAL)

Power requirement	120VAC, 60Hz, 17W
	230V ⌒⌄ , 50/60Hz, 17W
	240V ⌒⌄ , 50Hz, 17W
Physical dimensions	215 (W) x 270 (H) x 305 (D) mm
Weight	Approx. 8.5kg

*Specifications subject to change without notice.

*Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "DOLBY " and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

Dimensional Drawings