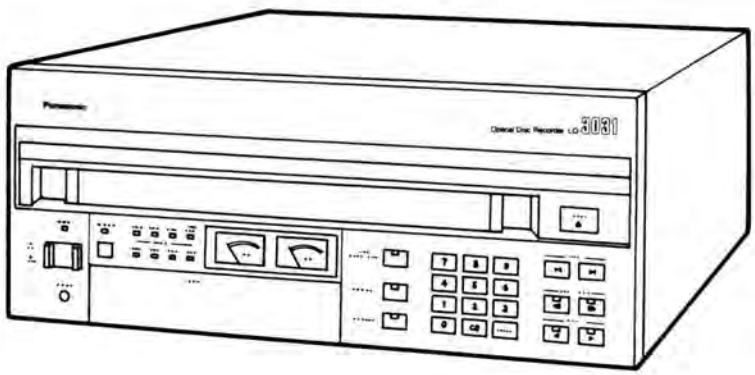
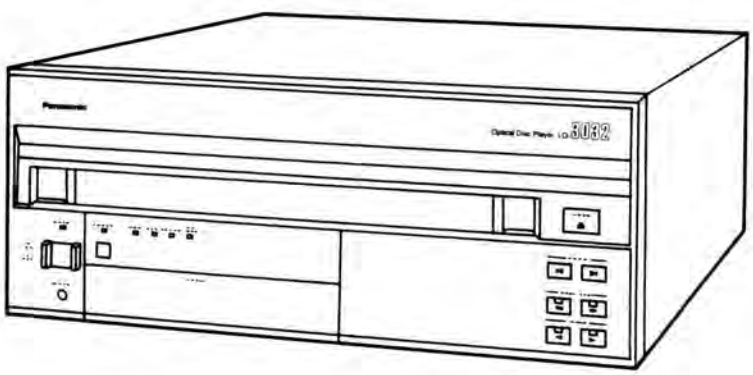
Panasonic®

# OPERATING INSTRUCTIONS

## Optical Disc Recorder
## LQ-3031T



## Optical Disc Player
## LQ-3032T



Read these instructions completely, before operating this set.

JQB0134

# Dear Panasonic Customer

Welcome to the Panasonic family of customers. We are sure that you will have many years of service from your new Panasonic Optical Disc Recorder/Player. Therefore, please read these operating instructions carefully.

## ■ CUSTOMER'S RECORD

The serial number of this unit may be found on the rear panel. You should note the serial number of this unit in the space provided and retain this instructions as a permanent record of your purchase to aid in identification in the event of theft or loss.

Model number: **LQ-3031T/LQ-3032T** Serial number:

# CONTENTS

# IMPORTANT SAFETY NOTICE

## ■ CLASS I LASER PRODUCT

This unit complies with DHHS Rule 21 CFR Chapter 1, Subchapter J in effect as of data of manufacture. This unit contains an INVISIBLE LASER RADIATION SYSTEM which is classified as a Class I Level Laser Product with its required safety protection.

**CAUTION:**
**Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.**

- Do not remove CASE COVER of this unit and never touch anything internal in order to avoid EXPOSURE TO LASER RADIATION.
- If the unit fails to operate properly, please follow the "TROUBLE SHOOTING" section of this manual which lists a few simple checks in order to determine the cause of failure.
- When the POWER ON/OFF switch is ON, do not put your eyes close to the front panel opening to look inside the unit with the disc cartridge ejected.

**LASER SPECIFICATION:**

Class I Level Laser Product
Wave Length: 780 nm or 790 nm [LQ-3031T] / 790 nm [LQ-3032T]
Laser Power: No hazardous radiation is emitted with safety protection.

**WARNING:**
**To prevent damage which might result in a fire or shock hazard, do not expose this appliance to rain or moisture.**

## ■ CLASS A DIGITAL DEVICE

This equipment complies with the requirements in Part 15 of the FCC Rules for a Class A digital device.

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**FCC Warning:** To assure continued FCC emission limit compliance, use only the provided grounded power supply cord and the shielded interface cable when connecting this device to the computer.
Also, any unauthorized changes or modifications to this equipment would void the user's authority to operate this device.

## •CANADIAN DEPARTMENT OF COMMUNICATIONS (DOC) RADIO FREQUENCY INTERFERENCE REGULATIONS

**Notification:** This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

**Notification:** L'interférence radioélectrique générée par cet appareil numérique de type A ne dépasse pas les limites énoncées dans le Règlement sur les perturbations radioélectriques, section appareil numérique, du Ministère des Communications.


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

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

# SAFETY PRECAUTIONS

■ This unit incorporates many sensitive optical components. To ensure optimum performance at all times, avoid using this unit under the following conditions.

- In a closed vehicle or other location where the temperature could exceed 35°C (95°F).
- For long periods of time in direct sunlight.
- Very cold places (Below 5°C, 41°F).
- Very humid locations (70% or above).
- Near a heat outlet or heating appliance.
- Dusty or smoky locations.
- Locations prone to vibrations or shock.
- When placed on an uneven or unstable surface.
- Near appliances generating strong magnetic fields.
- Immediately above or below a radio, television monitor, tuner or other receiving equipment.
- Where there are significant temperature or humidity changes.
- Within reach of children.

■ Do not place near a tuner or TV (television) monitor.

- This unit uses high frequency signals and can cause interference with radio and television reception. If this occurs, move this unit farther away from the radio or television or change from an interior to an exterior television antenna.

■ Do not block the ventilation opening.

- This unit is equipped with ventilation openings and a cooling fan to prevent the internal temperature from rising too high. Therefore, do not operate it with any covering placed over the top or with the unit placed on a bed, deep carpet or other soft surface. If proper ventilation is obstructed, the internal temperature will rise and the laser diode protection circuit will be activated to shut off the unit.

■ Do not place in locations where the rear panel is less than 3 inches away from the wall or back of a rack.

■ Do not place this unit where ventilation is insufficient.

■ Do not place any heavy objects on top of this unit.

■ Never try to remove the cabinet screws or make any adjustments. Serious harm to both the user and unit may result.

■ Place the unit horizontally on a hard, level and stable surface.

- Vibrations reaching the unit during operation will cause erratic operation and may cause critical adjustments to change.

■ Severe mechanical shock should be avoided during shipping. Use proper packaging.

■ When the unit is not in use for a long period of time, always unplug the AC cord from the outlet.

■ Do not allow the AC power cord to become damaged by crushing or abrasion.

**CAUTION:**
In case the disc compartment is cracked or bent, please contact the dealer from whom you purchased the unit and replace the disc compartment in order to avoid EXPOSURE TO LASER RADIATION.

**WARNING TO PURCHASERS:**
The unauthorized recording of copyrighted broadcast programs for commercial purposes is a Copyright infringement.

**CAUTION:**
This disc contains tellurium which may be considered hazardous. Check applicable Federal, State, and Local regulations in your jurisdiction prior to disposal. Do not incinerate.

# FEATURES

1 Reproduction of clear, high quality image by new signal recording formats.

| | | |
|---|---|---|
| Horizontal Resolution: | Normal mode | ..... more than 380 lines |
| | Hi-Res. mode | ..... more than 450 lines |
| S/N ratio (Signal to Noise): | More than 45 dB | |

2 12" (300mm) diameter disc greatly increases image capacity.

It is possible to record/playback for; (LQ-3032T is playback only)

| | | |
|---|---|---|
| Single side: | Normal mode ..... | 54,000 video frames (30 minutes motion) |
| | Hi-Res. mode ..... | 36,000 video frames (20 minutes motion) |
| Double side: | Normal mode ..... | 108,000 video frames (60 minutes motion) |
| | Hi-Res. mode ..... | 72,000 video frames (40 minutes motion) |

3 A newly developed tilt servo system is employed, promoting stable recording and playback features (LQ-3032T is playback only). The unit keeps a certain parallel line between lens and disc, maintaining a high quality image.

4 Composite Video, S-Video, and RGB input/output terminals (LQ-3032T is output terminals only), make connection of various video signals possible.

5 Seamless Search (keeping the previous image on the screen during the search mode) and Fine Slow (slow-motion playback with smooth movement, without picture vibration) can be performed by controlling the dedicated time base corrector.

6 A modular interface card is making, software applications in ROM, dubbing, video guide.....etc. possible. (optional)

7 Total computer control is in the On-line mode.

8 Other features.

1) Erase function: [LQ-3031T only]
   Erase poor or unnecessary frames and record alternate frame search information.
   * Picture mute on/off designation is possible activated/deactivated by SETUP.

2) Alternate control function:
   Read the address information of recorded alternate frame, and automatically search alternate frame (address information is in 5 digits figure).
   * Functions at search completion time.
   * Activated/deactivated by SETUP menu.

3) Disc ID record function: [LQ-3031T only]
   Possible to rewrite disc volume number record/playback (5 digits) up to 10 times.

4) Automatic start function:
   a) Still Playback start by disc loading.
   b) Automatic program run.
   * Power on Automatic program on/off designation. Activated/deactivated by SETUP.

5) SETUP function:
   Drive initialization function.
   * On-screen indicator system set up.
   * Communications mode, alternate control, automatic start, buzzer, white flag, frame servo.....etc.

6) Deck number function:
   The unit can be assigned a logical unit number.
   0-99 numbers can be assigned to the unit.
   * Effective for multi unit structure system.

7) User's area SETUP function:
   Functions to divide 54,000 frames of user's area into small sections.
   * Effective for dividing information on disc, classifying according to items, users, and effective for the Remote Controller and On-line combined applications.

# SPECIFICATIONS

**Note:** All specifications are subject to change without notice.

| GENERAL | Optical Disc Recorder < LQ-3031T > | Optical Disc Player < LQ-3032T > |
|---|---|---|
| Power Source | AC 120V ± 10%, 60Hz | |
| Power Consumption | 125W | 100W |
| Television System | EIA standard (525 lines, 60 fields per second) | |
| Record/Playback Mode | Luminance; frequency modulation<br>Color signal; frequency modulation R-Y/B-Y line sequential color difference signal | |
| Horizontal Resolution | Normal mode; more than 380 lines<br>Hi-Res. mode; more than 450 lines | |
| Video S/N Ratio | Luminance; more than 45dB<br>Color; more than 45dB | |
| Audio Dynamic Range | More than 70dB | |
| Audio Frequency Characteristic | 20Hz ~ 20kHz | |
| Access Time | Average 0.7 seconds (at Gen Lock OFF) | |
| Operating Temperature | 5°C ~ 35°C (41°F~95°F) | |
| Operating Humidity | 30% ~ 70% (Non condensing) | |
| Dimensions (W × H × D) | 430mm × 155mm × 546mm ( $16^{15}/_{16}$" × $6^{1}/_{8}$" × $21^{1}/_{2}$" ) | |
| Weight | 18kg (40 lbs.) | |

| INPUT TERMINALS | | |
|---|---|---|
| Composite Video Input | BNC type of connector<br>1.0Vp-p, 75Ω, unbalanced | |
| Analog RGB Input | BNC type of connectors<br>R.G.B inputs; 0.7Vp-p, 75Ω, unbalanced<br>SYNC input; 4.0Vp-p, 75Ω, unbalanced | |
| S-Video Input | Mini DIN 4 pin type of connector<br>Y input; 1.0Vp-p, 75Ω, unbalanced<br>C input; 0.286Vp-p, 75Ω, unbalanced | |
| Dubbing Input | 5 pin multiple type of connector<br>Y input; 1.0Vp-p, 75Ω, unbalanced<br>R-Y/B-Y line sequential color difference input; 1.0Vp-p, 75Ω, unbalanced | |
| External Sync. Input | BNC type of connector<br>4.0Vp-p, 75Ω or looping through, unbalanced | |
| External SC Input | BNC type of connector<br>2.0Vp-p, 75Ω or looping through, unbalanced | |
| Audio Line Input | RCA Phono pin type of connector<br>316mV, 47kΩ, unbalanced | |

## OUTPUT TERMINALS

| | |
|---|---|
| Composite Video Output | BNC type of connector<br>1.0Vp-p, 75Ω, unbalanced |
| Analog RGB Output | BNC type of connectors<br>R,G,B outputs; 0.7Vp-p, 75Ω, unbalanced<br>SYNC output; 4.0Vp-p, 75Ω, unbalanced |
| S-Video Output | Mini DIN 4 pin type of connector<br>Y output; 1.0Vp-p, 75Ω, unbalanced<br>C output; 0.286Vp-p, 75Ω, unbalanced |
| Dubbing Output | 5 pin multiple type of connector<br>Y output; 1.0Vp-p, 75Ω, unbalanced<br>R-Y/B-Y Line sequential color difference output;<br>1.0Vp-p, 75Ω, unbalanced |
| Audio Line Output | RCA Phono pin type of connector<br>400mV, 1kΩ, unbalanced |

## CONTROL TERMINAL

| | |
|---|---|
| Remote Control Input | Mini Jack (1 pc.) |
| Interface Terminals | RS-232C; 25pin D-Sub connector (Female)<br>I/O terminal; half pitch 20 pin connector (Female)<br>matched connector; 10120-6000EL sumitomo 3M |

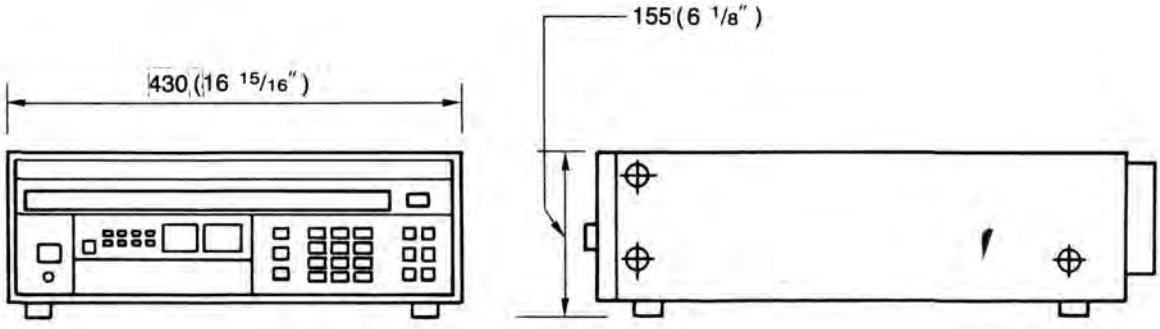
## ACCESSORIES

(See page 149.)

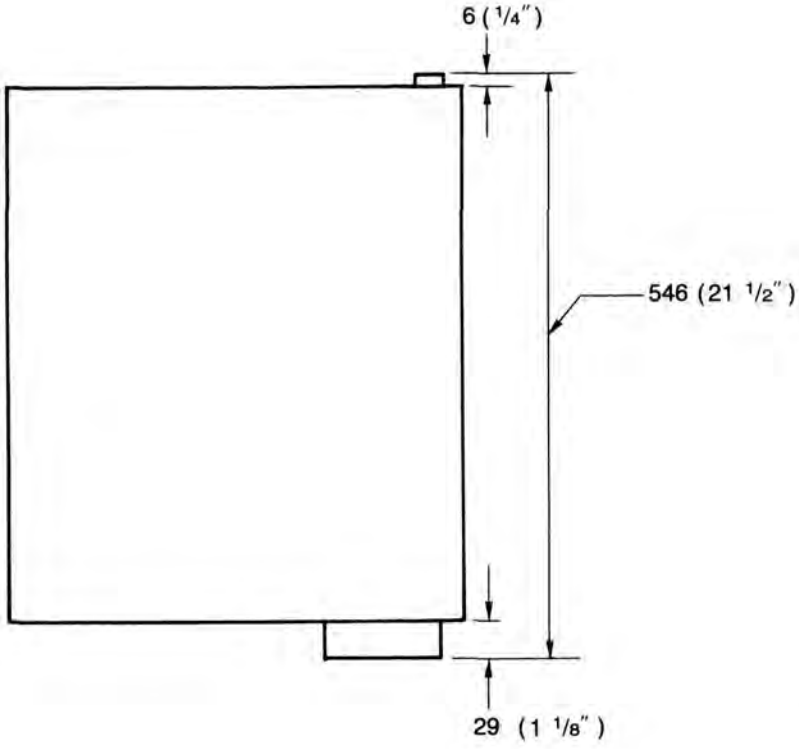
## DISC/CARTRIDGE

| | |
|---|---|
| Disc | TQ-FH331 (single side), TQ-FH332 (double side) |
| Record/Playback Luminance Source | Semiconductor laser |
| Disc Rotation Speed | 1800 $min^{-1}$ (r.p.m.) |
| Disc Diameter | 300mm (ø12") |
| Track Pitch | 1.6μm |
| Record/Playback Capacity | Single side (TQ-FH331) ..... Normal mode; 54,000 video frames (30 minuites)<br>Hi-Res. mode; 36,000 video frames (20 minuites)<br>Double side (TQ-FH332) ..... Normal mode; 108,000 video frames (60 minuites)<br>Hi-Res. mode; 72,000 video frames (40 minuites) |
| Storage Temperature | 5°C–45°C (41°F–113°F) |
| Storage Humidity | 10%–80% (Non condensing) |
| Cartridge Dimensions (W × H × D) | 340mm × 18mm × 350mm ($13^{3}/_{8}$" × $^{11}/_{16}$" × $13^{25}/_{32}$") |
| Weight | 1 kg ($2^{7}/_{32}$ lbs.) |

# DIMENSIONS




[LQ-3031T]




| UNIT | mm (inches) |
|---|---|

**Note:** LQ-3031T and LQ-3032T are common dimensions.

# PREPARATIONS BEFORE USE

**STEP 1:** Decide where to place this unit observing the safety precautions on page 3.
**STEP 2:** Connect the unit to the external equipment, following the procedures below.
Consider that you are working with an analog unit!

A. CONNECT A TELEVISION MONITOR TO THE VIDEO OUT AND/OR VIDEO DISPLAY OUT TERMINALS.
- ■ Verify that the TV monitor to be used will accept a standard NTSC video signal (1Vp-p).
- ■ Read the operating instructions for the monitor completely.
- ■ Connect the Video Out and/or Video Display Out terminals of this unit (BNC type of connector) to the video input terminal of the TV monitor. Be sure to use a high quality cable, such as RG-59U. (No audio cable with adapters or zip cord)
  - • When connected to the Video Display Out terminal, the address information and the any other data of the units movement is indicated on the monitor display.
  - • When connected to the Video Out terminal, the TV monitor indicates no data, just images, unless display is activated "ON".

**Note:** The above procedures may be followed for any equipment that will be connected to the Video Out and/or Video Display Out terminals. These are composite video outputs.

B. CONNECT THE EXT. SYNC IN TERMINAL TO THE EXT. SYNC SIGNAL GENERATOR [If desired].
- ■ An external sync signal (4Vp-p, 75Ω, BNC type of connector) may be connected to the unit. This input is provided to assist in synchronizing many pieces of equipment, such as in a broadcast application.
- ■ Verify the level and impedance of the signal to be supplied to the unit.
- ■ Connect the desired signal to the appropriate terminal. For Gen Lock applications, a sync delay adjustment display must be used. A waveform monitor is best suited.

**Note:** The Ext. Sync In terminal is looping through with the Ext. Sync Out terminal.
If no connection is made to the output terminal, this input is 75Ω terminated.

C. CONNECT THE EXT. SC INPUT TO THE EXT. SYNC SIGNAL GENERATOR [If desired.]
- ■ An external subcarrier signal (2Vp-p, 75Ω, BNC type of connector) may be connected to the unit in order to synchronize the video signal subcarrier with other device.
- ■ For Gen Lock applications, a vectorscope is used to adjust SC phase.

**Note:** The Ext. SC In terminal is looping through with the Ext. SC Out terminal.
If no connection is made to the output terminal, this input terminal is 75Ω terminated.

D. CONNECT THE RS-232C CONNECTOR TO A COMPUTER [If desired].
- ■ Be sure you have the proper configuration of the RS-232C cable.

E. CONNECT THE EXT. SYNC AND/OR EXT. SC OUT TERMINALS TO THE RESPECTIVE INPUT TERMINALS OF THE OTHER DEVICE [If desired].

F. CONNECT THE VIDEO IN TERMINAL TO THE VIDEO OUT TERMINAL OF THE SOURCE [If desired]. [LQ-3031T only]

G. CONNECT THE REMOTE CONTROLLER [If desired]. (It is not an infared remote controller)

H. CONNECT THE R.G.B. SYNC IN/OUT TERMINALS TO THE OTHER DEVICE THAT HAS THE R.G.B. TERMINALS [If desired]. [Input terminals are LQ-3031T only]

I. CONNECT THE AUDIO IN/OUT TERMINALS [If desired]. [Input terminals are LQ-3031T only]

J. CONNECT THE S-VIDEO IN/OUT TERMINALS TO THE OTHER DEVICE WHICH HAS THE S-VIDEO TERMINALS [If desired]. [Input terminal is LQ-3031T only]

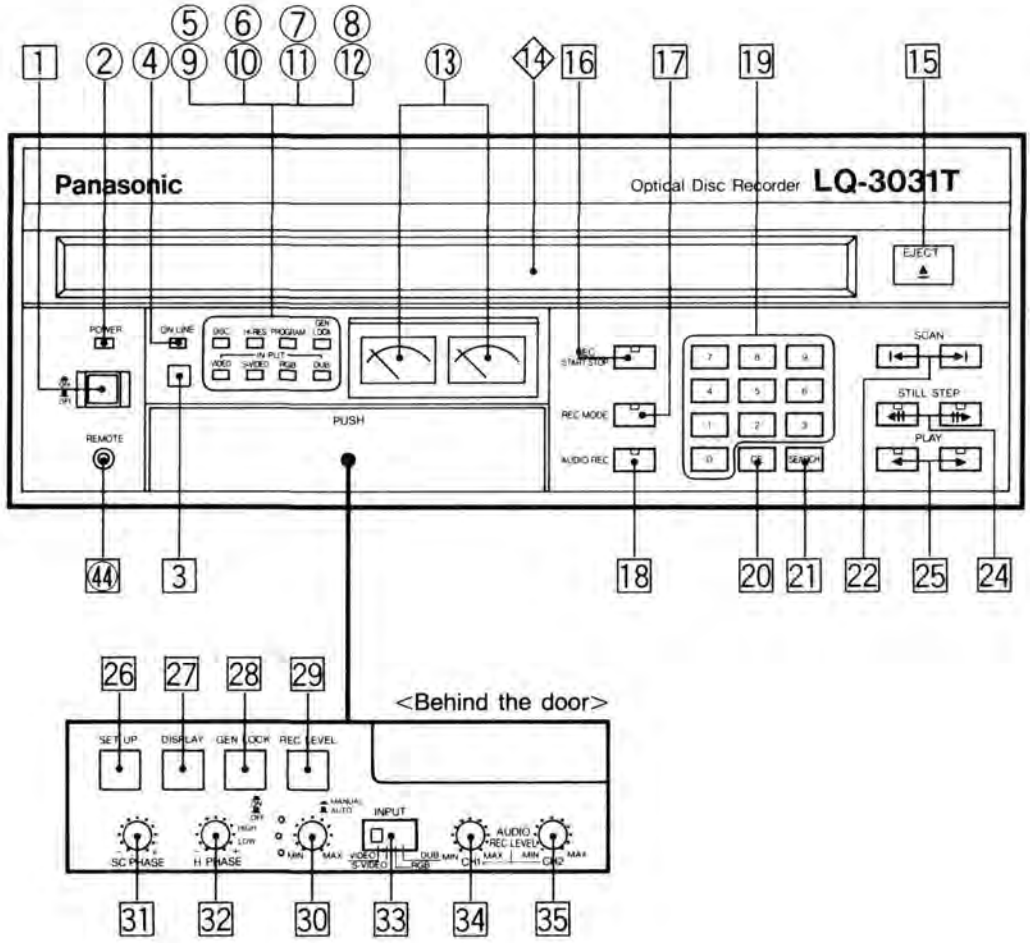
K. CONNECT THE DUB IN/OUT TERMINALS TO THE OTHER UNIT TO OPERATE DUBBING [If desired]. [Input terminal is LQ-3031T only]

L. CONNECT THE UNIT TO THE CORRECT POWER SOURCE.
- ■ The unit is designed for 120 V ±10%, 60 Hz AC power. The use of any other power source may damage the unit. If you are not sure that the power source to be used is correct, contact your local power company.
- ■ Verify that the output to be used is 3 prong grounded type. The unit must have a good grounding at all times.
- ■ Connect the power cord to the unit first, and then to the AC outlet.

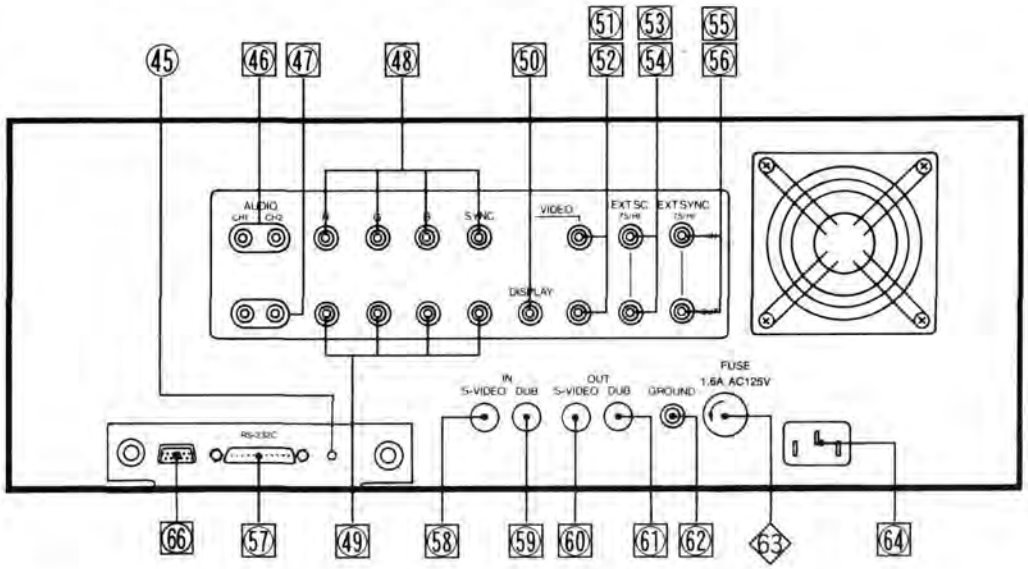
# NOMENCLATURE AND FUNCTIONS

## ■ Optical Disc Recorder [LQ-3031T]

**FRONT**



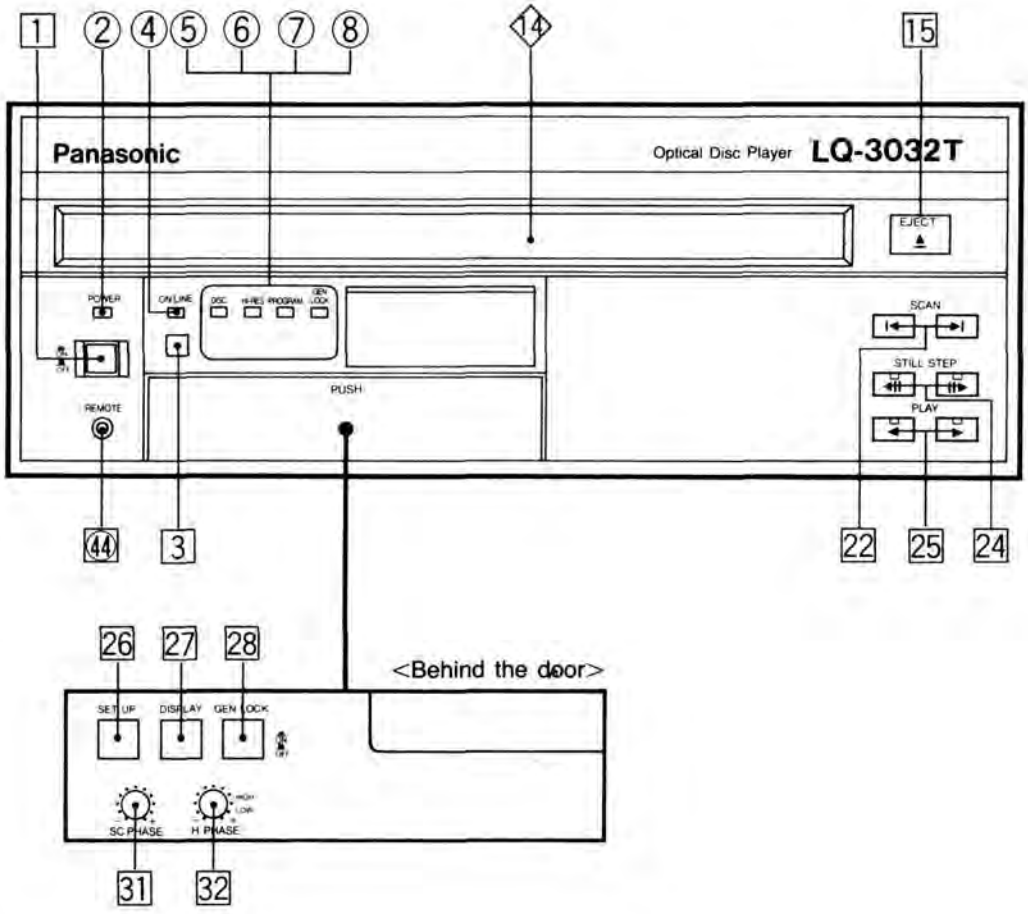

**REAR**



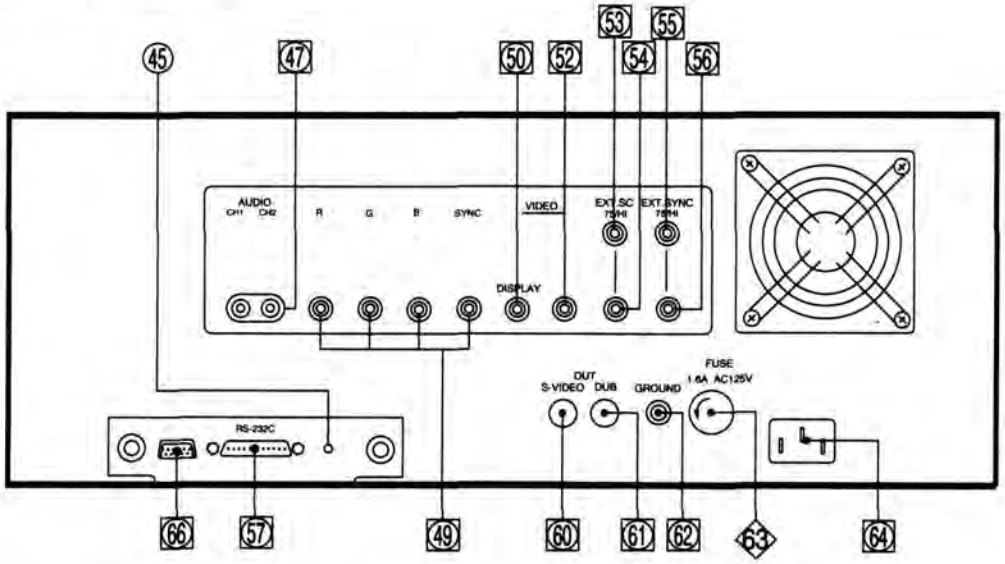

**Note:** □ ····· controls, ○ ····· indicators, ◘ ····· terminals, ◇ ····· others

## ■ Optical Disc Player [LQ-3032T]

**FRONT**

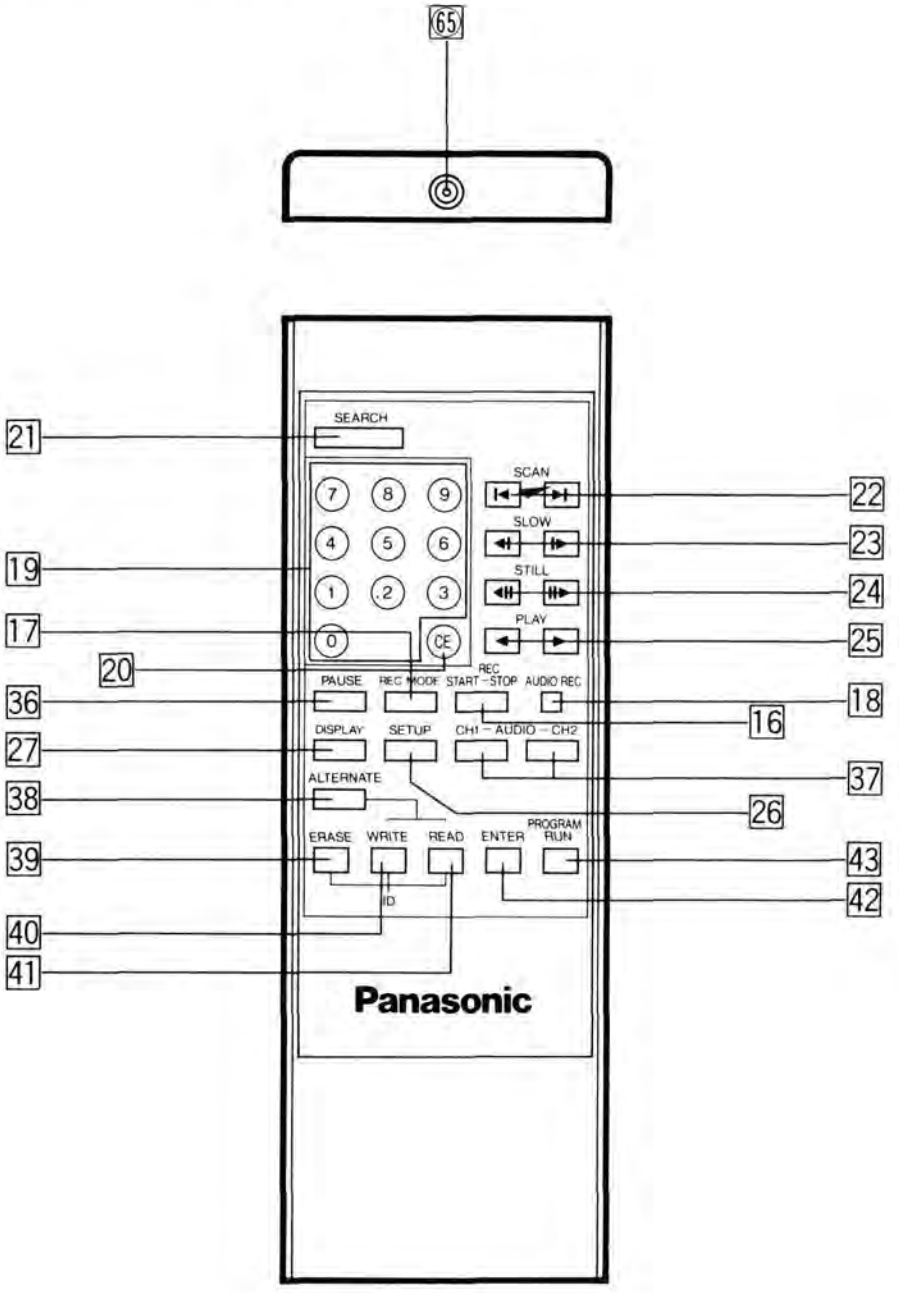



**REAR**




**Note:** □ ····· controls, ○ ····· indicators, ◘ ····· terminals, ◇ ····· others

## ■ Remote Controller (Optional)



| ITEM NO. | PURPOSE |
|---|---|
| [1] **POWER ON/OFF SWITCH** | ■ POWER ON/OFF SELECTION.<br>• Press this button, Power indicator ((2)) lights, indicating that the power of the unit is ON.<br>• Press this button again, the power of the unit is turned OFF.<br>**Note:** When this button is pressed turning the power ON, and when disc is already loaded into the unit, disc startup is automatic. |
| (2) **POWER INDICATOR** | • This indicator lights with power ON. |
| [3] **ON-LINE BUTTON (ON-LINE/OFF-LINE SELECT BUTTON)** | ■ ON-LINE/OFF-LINE SELECTION.<br>• Press this button, On-line indicator ((4)) lights, indicating the unit is in the On-line mode.<br>• Press this button again, the unit returns to manual operation.<br>[ON-LINE mode]: Control of all functions are transferred to an external computer. (This is controlled by signals sent through RS-232C terminal.)<br>[OFF-LINE mode]: Computer control is disabled and control of all functions are transferred to the front panel of the unit and Remote Controller.<br>**Note:** 1) When in On-line mode, both the front panel and Remote Controller do not function, except for the ones below:<br>• POWER ON/OFF • ON-LINE ON/OFF • GEN LOCK<br>• REC LEVEL [LQ-3031T only]<br>2) When this button is depressed, the operation status in the mode before On-line is set will continue until an instruction is given from the On-line side. |
| (4) **ON-LINE INDICATOR** | • This indicator lights when ON-LINE button ([3]) is pressed, or unit is brought On-line by computer, and indicates the unit is in On-line mode. |
| (5) **DISC INDICATOR** | • This indicator lights when a disc cartridge is loaded in the unit. |
| (6) **HI-RES INDICATOR** | • This indicator lights when a disc cartridge (in HI-Res. mode) is loaded. |
| (7) **PROGRAM INDICATOR** | • This indicator lights if PROGRAM RUN button ([43]) of remote controller is pressed. This indicates the unit is in Program Run mode. It can also be activated through the RS-232C interface. |
| (8) **GEN LOCK INDICATOR** | • This indicator lights only when Gen Lock function is operating.<br>**Note:** Gen Lock indicator indicates that video In/Out phase is locked. |
| (9) **INPUT INDICATOR (VIDEO INPUT) [LQ-3031T only]** | • This indicator lights when Input Select switch ([33]) is set to "VIDEO" position, and indicates that the composite video input signal is selected. |
| (10) **INPUT INDICATOR (S-VIDEO INPUT) [LQ-3031T only]** | • This indicator lights when Input Select switch ([33]) is set to "S-VIDEO" position, and indicates that the S-Video input signal is in operation. |
| (11) **INPUT INDICATOR (RGB INPUT) [LQ-3031T only]** | • This indicator lights when Input Select switch ([33]) is set to "RGB" position, and indicates that the RGB input signal is in operation. |

| ITEM NO. | PURPOSE |
|---|---|
| ⑫ **INPUT INDICATOR (DUB INPUT) [LQ-3031T only]** | • This indicator lights when Input Select switch (33) is set to "DUB" position, and indicates that the dubbing input signal is in operation. |
| ⑬ **AUDIO LEVEL METERS (CH1. CH2) [LQ-3031T only]** | • *Used to monitor audio input/output levels.* |
| ⑭ **DISC COMPARTMENT** | • This is the slot to insert/eject the disc cartridge. |
| 15 **EJECT BUTTON** | • Press this button to eject the disc cartridge.<br>When this button is pressed, Disc indicator and Hi-Res. indicator go out, and the unit stops. |
| 16 **REC START-STOP BUTTON [LQ-3031T only]** | ■ RECORDING START/STOP (REC MODE ONLY).<br>• When this button is pressed in recording ready conditions in the RECORD mode the LED indicator on this button lights, and the recording operation is started.<br>• Before pressing this button, input the number of frames to record with the number buttons (19).<br>**Note:** If this button is pressed without inputing the frame number desired to record to only one frame will be recorded.<br>• After finishing recording, this again returns to recording ready conditions.<br>• When this button is pressed again, the LED indicator goes off, and stops the recording operation. |
| 17 **REC MODE BUTTON [LQ-3031T only]** | ■ ON/OFF SELECTION OF THE REC MODE.<br>• If this button is pressed, the LED indicator on this button lights, and the unit goes into RECORD mode. It then automatically searches for a non-recorded area of the disc, the unit is then ready for the recording operation.<br>• If button is pressed again, the LED indicator goes out a RECORD mode is exited.<br>• *If the number of frames to record is input with the number buttons prior to pressing this button,* it searches only the area that corresponds to the number of frames wanted to record. This reduces search time. |
| 18 **AUDIO REC BUTTON [LQ-3031T only]** | ■ SELECT AUDIO RECORDING OR NOT (REC MODE ONLY).<br>• If this button is pressed immediately after pressing REC MODE button (17), the LED indicator lights, and audio recording (synchronized to video signal) is enabled.<br>• If button is pressed again, the LED indicator goes out and audio recording is disabled.<br>• Once recording starts by pressing REC START-STOP button (16), audio recording cannot be enabled even if this button is pressed during recording. If audio recording is desired, do not forget to press this button before recording. |
| 19 **NUMBER BUTTONS [LQ-3031T only]** | ■ INPUT NUMERICAL DATA.<br>• These buttons "0~9" are used when specifying the frame address to be searched, recorded, or played back, and when specifying the playback speed in each playback mode, or when entering any numerical data.<br>• When "E01 OVERFLOW" is displayed on the TV monitor, data from these number buttons is wrong. Press the CE button (20) to clear the incorrect entry and reenter. |

| ITEM NO. | PURPOSE |
|---|---|
| 20 **CE BUTTON** **[LQ-3031T only]** | ■ CLEAR THE NUMERICAL DATA THAT WAS INPUT BY THE NUMBER BUTTONS.<br>• This button functions to clear incorrect entries input with the number buttons. If an incorrect entry was made with the number buttons, press this button to clear the previous entry. The correct entry can be reinput with the number buttons again. |
| 21 **SEARCH BUTTON** **[LQ-3031T only]** | ■ SEARCH TO ADDRESS FRAME.<br>• After selecting the target address using the number buttons at the playback mode, press this button to make the selected frame appear on monitor screen.<br>• When search operation exceeds the specified range, "E01 OVERFLOW" is displayed on the TV monitor, and no operation will occur.<br>• If this button is pressed without designating the target address to be searched via the number buttons, the first frame of the user's define area will be searched.<br>• This button functions only in playback mode. |
| 22 **SCAN BUTTONS** | ■ SKIP PLAYBACK.<br>• When playing back in the Play, Step, Fast and Slow modes, press this button for a high speed On-screen search. (Skip playback operation is performed at a speed approximately 50 times the normal playback speed.)<br>[FWD. SCAN]<br><Playback Operation><br>1) When playback operation is performed up to the final user's define area address frame, the STILL mode is selected automatically.<br>2) If button is pressed, about 280 frames will be jumped in a forward direction, then playback therefor 4 frames (about from 281 to 284) will be displayed in sequence.<br>3) Hold the button for continuous scanning.<br>[REV. SCAN]<br><Playback Operation><br>1) If button is pressed, about 280 frames will be jumped in a reverse direction, then playback for 4 frames.<br>2) Hold the button for continuous scanning.<br>3) When Reverse Scanning is performed to the first frame of the user's define area, the STILL mode is selected automatically. |
| 23 **SLOW BUTTONS** **[remote controller only]** | ■ SLOW PLAYBACK<br>• SLOW playback operation is performed in the playback mode.<br>(The SLOW playback speed is 1/3 of the standard playback speed 10 FPS.)<br>• Any SLOW playback speed, from 1/2 to 1/256 normal speed, may be selected by entering the desired speed (2~256) by pressing the value on the number buttons before touching this button.<br>[ 1/2; 15 FPS.<br>1/256; 1 frame every 8.5 sec. ] |

| ITEM NO. | PURPOSE |
|---|---|
| | [FWD. SLOW]<br>1) If button is pressed when unit is not playing, it starts SLOW playback in a forward direction.<br>2) If button is pressed when operation mode is in "ERASE" it first clears the ERASE mode then starts SLOW playback in the forward direction.<br>3) If button is pressed when operation mode is in "RECORD" it first clears the RECORD mode then starts SLOW playback in the forward direction from the first frame recorded at this time.<br><br>[REV. SLOW]<br>1) If pressed when unit is not playing it performs STILL playback.<br>2) If pressed when operation mode is in "ERASE" it first clears the ERASE mode then starts SLOW playback in the reverse direction.<br>3) If button is pressed when operation mode is in "RECORD" it first clears the RECORD mode then starts SLOW playback from the last frame recorded at this time in the reverse direction. |
| 24 **STILL/STEP BUTTONS** | ■ STILL OR STEP PLAYBACK.<br>• Press this button to stop the disc playing clear the playback mode operation, and have the unit display a single frame continuously.<br>• To move one frame or for automatic frame advance, enter a figure between 1 and 256 via the number buttons before pressing this button.<br>• To return to playback mode, press the appropriate button for that mode.<br>• Holding this button depressed for more than 2 seconds causes frames to be advanced at a rate of four per second.<br><br>[FWD. STEP]<br><Playback Operation><br>1) If button is pressed when unit is in STILL playback or STEP playback, it advances 1 frame in the forward direction.<br>2) If button is pressed after inputing figures from 1 to 256 with the number buttons, it begins STEP playback at 1~256 second intervals.<br>3) If button is pressed when unit is not booted, it performs STILL playback from the first frame of the user's define area.<br>4) If button is pressed when operation mode is in "ERASE" it clears the ERASE mode first then performs STILL playback, then starts STEP playback in the forward direction.<br>5) If button is pressed when operation mode is in "RECORD" it clears RECORD mode then starts STILL playback of the first frame recorded at this time, then starts STEP playback in the forward direction.<br><br>[REV. STEP]<br><Playback Operation><br>If pressed when unit is not activated, it performs STILL playback from the first frame of the user's define area. |
| 25 **PLAY BUTTONS** | ■ NORMAL OR FAST PLAYBACK.<br>• Press this button to begin normal disc playback.<br>(One times normal speed = 30 frames/second)<br>• If pressed after inputing a figure of 1~10 with the number buttons, it starts FAST playback at 1~10 times normal speed. (I.e. 3 would cause 90 FPS play) |

| ITEM NO. | PURPOSE |
|---|---|
| | [FWD.PLAY]<br><Playback Operation><br>When playback operation is performed up to the final frame, the STILL playback is selected automatically.<br><br>[REV.PLAY]<br><Playback Operation><br>When playback operation is performed down to the first frame of the user's define area, the STILL playback is selected automatically. |
| 26 **SETUP BUTTON** | ■ ON/OFF SELECTION OF SETUP MODE.<br>• If pressed it selects SETUP mode.<br>• If pressed again SETUP mode is cleared.<br>**Note:** concerning SETUP function, refer to page 25. |
| 27 **DISPLAY BUTTON** | ■ ON/OFF SELECTION OF ON-SCREEN DISPLAY.<br>• If pressed, various On-screen data is displayed on the TV monitor, which is connected to each output terminal of Video/S-Video/RGB, if pressed again the On-screen indication is turned OFF.<br>**Note:** Data indicated On-screen.<br>• Frame No. • Input Data • Operation Mode • Error Message |
| 28 **GEN LOCK BUTTON** | ■ ON/OFF SELECTION OF GEN LOCK OPERATION.<br>• If pressed, Gen Lock function is activated, and Video Output Signal is automatically synchronized to Ext. Sync. Phase adjustment is done with the H-PHASE control (32) and SC PHASE control (31).<br>• Gen Lock indicator lights only when Gen Lock function of unit is operating correctly.<br>**Note:** Do not attempt Gen Lock when using external TBC.<br>See SETUP Operation at page 25, for TBC ON/OFF. |
| 29 **REC LEVEL BUTTON [LQ-3031T only]** | ■ SELECT THE REC LEVEL ADJUSTMENT AUTO OR MANUAL.<br>• This button selects the manual or automatic level adjustment of the video recording signal.<br><MANUAL><br>The video recording level can be adjusted by Rec Level control (30).<br>RED .....Video recording level is too high.<br>GREEN .....Video recording level is suitable.<br>ORANGE .....Video recording level is too low.<br><AUTO><br>The video input level is adjusted automatically. |
| 30 **REC LEVEL CONTROL [LQ-3031T only]** | • This control adjusts the recording level of the video input signal when REC LEVEL button is in the MANUAL mode.<br>Turn the control knob and set the knob to the position where the green lamp lights.<br>**Note:** The Rec level indicator may take a few seconds to stabilize.<br>The indicator measures sync level. |

<table>
<tr><th>ITEM NO.</th><th>PURPOSE</th></tr>
<tr><td>31 SC PHASE CONTROL</td><td>• Be sure the GEN LOCK button is on. Observe vectorscope while locked to an external reference for accurate setting.<br>• Match SC phase of unit to the other video source at final mixing point (P.V.W. or P.B.M. output) of Special Effect Generator.<br>Note: This function will not work for the cases below.<br>• Gen lock to Ext. Video input signal in Black and White video.<br>• Gen lock to Ext. Sync, Ext. SC and Ext. Video input signal are not connected.</td></tr>
<tr><td>32 H-PHASE CONTROL</td><td>• The horizontal phase of the video output signals can be adjusted to that of a (another) signal at the Ext. Sync signal of this unit by turning this control while comparing the horizontal sync of the input versus the output video.<br>Be sure the GEN LOCK button is on, and adjust this control knob until the H-SYNC phases are coincident.<br>• Horizontal phase adjustable approx. ±3μsec with respect to reference.</td></tr>
<tr><td>33 INPUT SELECT SWITCH [LQ-3031T only]</td><td>■ SELECT THE INPUT SIGNALS.<br>• This switch is for choosing which of the video input signal formats desired to record.<br>Set the switch to the signal format desired (indicator lamp will indicate format selected).</td></tr>
<tr><td>34 AUDIO LEVEL<br>35 CONTROLS [LQ-3031T only]</td><td>• This unit is provided with a sound recording level adjustment control for CH 1 and CH 2 respectively.<br>Note: Adjust the audio level to read 100% at peak program input.<br>Recording levels above 100% will distort the sound.</td></tr>
<tr><td>36 PAUSE BUTTON [remote controller only]</td><td>■ ON/OFF SELECTION FOR A STOP OPERATION.<br>• If pressed during playback, it stops current playback operation, and invokes STILL playback at the current frame.<br>• If pressed again, STILL playback operation is released and forward playback operation is resumed.</td></tr>
<tr><td>37 AUDIO BUTTONS (CH 1/CH 2) [remote controller only]</td><td>■ ON/OFF SELECTION OF AUDIO OUTPUT IN PLAYBACK MODE (CH 1 AND CH 2).<br>• These buttons change the audio output conditions of the audio channels. When these buttons are pressed, button set up is displayed on the monitor screen.<br>• Based on the set up, audio output changes as following chart.
<table>
<tr><th colspan="2">BUTTON SETTING</th><th colspan="2">AUDIO OUTPUT</th></tr>
<tr><td>AUDIO CH 1</td><td>AUDIO CH 2</td><td>CH 1</td><td>CH 2</td></tr>
<tr><td>ON</td><td>ON</td><td>CH 1</td><td>CH 2</td></tr>
<tr><td>ON</td><td>OFF</td><td>CH 1</td><td>CH 1</td></tr>
<tr><td>OFF</td><td>ON</td><td>CH 2</td><td>CH 2</td></tr>
<tr><td>OFF</td><td>OFF</td><td>MUTE</td><td>MUTE</td></tr>
</table></td></tr>
</table>

| ITEM NO. | PURPOSE |
|---|---|
| 38 **ALTERNATE BUTTON [remote controller only]** | ■ ON/OFF SELECTION OF ERASE MODE.<br>• If button is pressed when in playback mode unit shifts to ERASE mode and displays STILL playback on the frame currently in playback. If pressed again, ERASE mode is cleared.<br>• In ERASE mode, writing and reading of alternate picture address data is possible. |
| 39 **ERASE BUTTON [remote controller only]** | ■ ERASE DISC ID No.<br>• When in playback mode, if ERASE button is pressed after Disc ID No. is input with the number buttons, it erases the written Disc ID No. only when the input Disc ID No. and written Disc ID No. are the same.<br>After erasing, unit searches in the first frame of the user's define area. |
| 40 **WRITE BUTTON [remote controller only]** | ■ INPUT DISC ID No.<br>• When in playback mode, if pressed after Disc ID No. is input with the number buttons, the Disc ID No. is written to the disc.<br>• Select Disc ID No. from 0.....99999 range.<br>• After finishing Disc ID No. writing, it performs STILL playback in the first frame of the user's define area.<br>• When in ERASE mode, if pressed after input of alternate picture address data, it is written on frame in STILL playback. |
| 41 **READ BUTTON [remote controller only]** | ■ READ DISC ID No.<br>• If pressed when in the playback mode, unit reads the Disc ID No. and an On-screen indication is displayed on the TV monitor, after read is finished, unit performs a STILL playback on the first frame of the user's define area.<br>• If pressed when in ERASE mode, unit reads the alternate picture frame address which is written in the STILL playback frame, and displays an On-screen message on the TV monitor. |
| 42 **ENTER BUTTON [remote controller only]** | ■ INPUT FIGURES WHILE IN A PROGRAM OPERATION.<br>• When a figure is input while the program is in execution, press this button after desired figure has been input with the number buttons. |
| 43 **PROGRAM RUN BUTTON [remote controller only]** | ■ SELECT START/STOP OF THE PROGRAM OPERATION.<br>• If button is pressed after inputting new medical data of 0~4 (default values are designated via SETUP) with the number buttons.<br>Program Run Indicator lights and the designated program is retrieved from programs stored in the units' program memory, the unit starts operation according to the command of the chosen program.<br>**Note:** If this button is pressed again, the program currently executing is stopped, RECORD mode and ERASE mode are cleared, then STILL playback is performed at the current playback address. |
| 44 **REMOTE TERMINAL** | • Jack for wired remote controller (optional). |
| 45 **ON-LINE MONITOR INDICATOR** | • Red LED shows Transmitting On-line Signal (Command Completion Response).<br>Green LED shows Receiving On-line Signal (Command). |
| 46 **AUDIO IN TERMINALS [LQ-3031T only]** | • Audio signal input terminals. (RCA phono pin type of connector)<br>An audio signal is connected to this terminal when audio is to be recorded. The audio input is looped through to the audio output terminal during recording. Observe proper signal input voltage. |

| ITEM NO. | PURPOSE |
|---|---|
| (47) **AUDIO OUT TERMINALS** | • Audio signal output terminals. (RCA phono pin type of connector)<br>In playback mode, the audio from a recorded disc is output. |
| (48) **RGB & SYNC IN TERMINALS [LQ-3031T only]** | • Terminal to connect to color video source (camera,.....etc.) which has RGB & Sync output terminals, and to record video signal sent from there. (BNC type of connector) |
| (49) **RGB & SYNC OUT TERMINALS** | • Terminal to connect equipment which has RGB & Sync input terminals, such as a color monitor, video printer,.....etc. (BNC type of connector) |
| (50) **VIDEO DISPLAY OUT TERMINAL** | • Terminal to connect to video input terminal of NTSC monitor when disc data on the monitor screen is desired (example of data; address information, operational condition,.....etc). (BNC type of connector) |
| (51) **VIDEO IN TERMINAL [LQ-3031T only]** | • Video signal input terminal. (BNC type of connector)<br>Composite signals to be recorded are input (attached) here. (NTSC STD.1.0Vp-p max. when terminated by 75Ω) |
| (52) **VIDEO OUT TERMINAL** | • The output through this terminal is a 1 Vp-p, 75Ω NTSC composite video signal. (BNC type of connector) |
| (53) **EXT. SC IN TERMINAL** | • This terminal accepts a 2 Vp-p, 3.58MHz subcarrier input in order to synchronize the video signal subcarrier with other devices when the unit is used in a system. (BNC type of connector) |
| (54) **EXT. SC OUT TERMINAL** | • This terminal is a loop through for the Ext. SC input terminal. (BNC type of connector)<br>If no connection is made to this output terminal, the input terminal is 75Ω terminated. (See "GEN LOCK" item) |
| (55) **EXT. SYNC IN TERMINAL** | • This terminal accepts a 4 Vp-p RS-170A composite synchronizing signal (See "GEN LOCK" item). (BNC type of connector) |
| (56) **EXT. SYNC OUT TERMINAL** | • This terminal is a loop through for the Ext. Sync input terminal. (BNC type of connector)<br>If no connection is made to this output terminal, the input terminal is 75Ω terminated. |
| (57) **RS-232C CONNECTOR** | • Standard serial interface (RS-232C) is provided to facilitate control using computers with a serial interface (Serial interface port card on computer required). |
| (58) **S-VIDEO IN TERMINAL [LQ-3031T only]** | • Connect to color video camera.....etc, that has on S-Video output terminal to record separated Y/C signal. (Mini DIN 4 pin type of connector)<br>Y: luminance, C: chromanance. |
| (59) **DUB IN TERMINAL [LQ-3031T only]** | • Connect from another unit that has a dubbing output terminal to make a copy (dub) of a recorded disc. (5 pin multiple type of connector) |
| (60) **S-VIDEO OUT TERMINAL** | • Connect to a color monitor.....etc, that has on S-Video input terminal, to playback separated Y/C component type signal. (Mini DIN 4 pin type of connector) |

| ITEM NO. | PURPOSE |
|---|---|
| [61] **DUB OUT TERMINAL** | • Connect to another unit, that has dubbing input terminal to make a copy (dub) of a recorded disc. (5 pin multiple type of connector) |
| [62] **GROUND TERMINAL** | • This terminal is for grounding. It is used mainly when the unit is placed on metallic table. It is preferable however, to have the unit solidly grounded at all times. |
| [63] **FUSE HOLDER** | • Unscrew screwcap to remove fuse 1.6A. For use by serviceman only. |
| [64] **POWER SOCKET** | • Attach the power cord to this socket ***before*** inserting the power plug into the wall socket. |
| [65] **JACK FOR CABLE** | • For the wired Remote Controller use. |
| [66] **I/O TERMINAL** | • Recording or playback control by an external switch. (See pages 52–53.)<br>• Controlling the dedicated time base corrector. (See pages 45–46.) |

**Note:** EXT. SC and EXT. SYNC TERMINALS.

These terminals have an automatic termination switch. If no connection to the Throughout Terminal, input impedance is 75Ω terminated. If the Throughout Terminal is connected, the 75Ω terminator is automatically released.

# REMOTE CONTROLLER (OPTIONAL)

## ■ FUNCTION

All functions of the unit are enabled through the use of the Remote Controller with the exception of the following:

### Optical Disc Recorder [LQ-3031T]

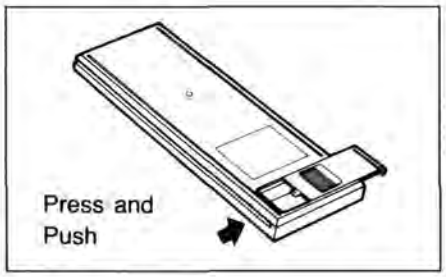
- POWER ON/OFF
- ON/OFF-LINE
- REC LEVEL CONTROL
- REC LEVEL AUTO/MANUAL SELECT
- SC PHASE CONTROL
- H-PHASE CONTROL
- EJECT
- GEN LOCK ON/OFF
- INPUT SELECT
- AUDIO REC LEVEL CONTROL

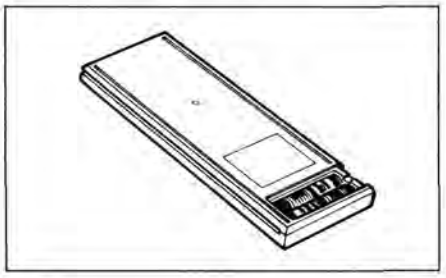
### Optical Disc Player [LQ-3032T]

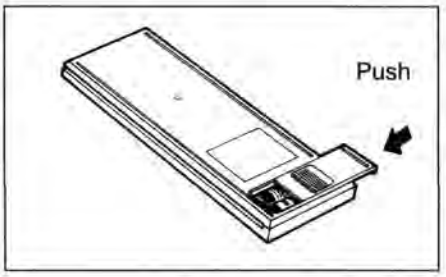
- POWER ON/OFF
- ON/OFF-LINE
- SC PHASE CONTROL
- H-PHASE CONTROL
- GEN LOCK ON/OFF
- EJECT

## ■ BATTERY INSTALLATION AND REPLACEMENT

1. Remove the cover.
2. Insert two UM-4 (AAA) batteries (supplied) into the battery compartment.
3. Replace the cover.



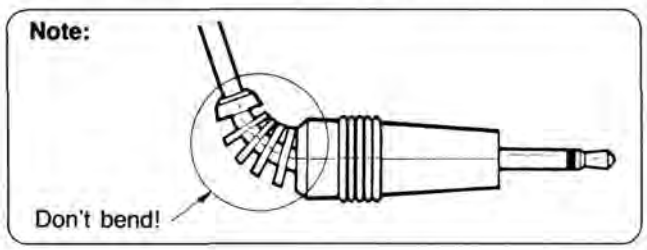



**Note:** 1. Use only UM-4 (AAA) type batteries.
2. Be sure the batteries are inserted properly.
3. Do not use old batteries with new ones.
4. Panasonic Alkaline Batteries are recommended for use in this unit.

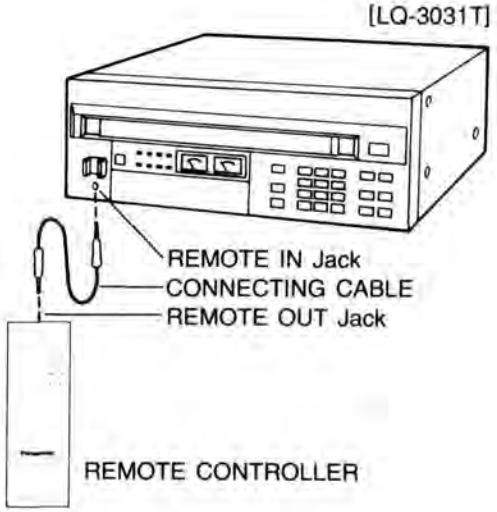
## ■ WIRED REMOTE CONTROLLER USE

Connect remote jack of the unit to the top of the remote controller transmitter using the remote controller's accessory cable. The length of the cable is 2.5m.

**Note:** Avoid bending the cable at its terminal connection.




[LQ-3031T]



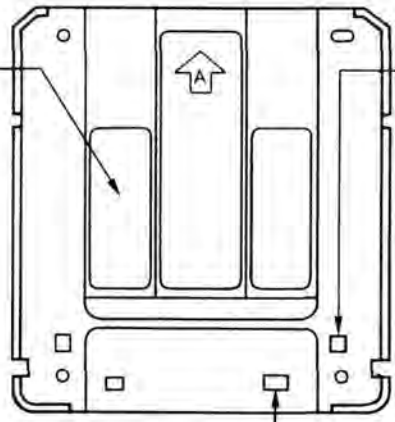
# DISC

■ **Panasonic offers two kinds of disc.**

| | | |
|---|---|---|
| TQ-FH331 (single side): | Normal mode ..... | 54,000 video frames (30 minutes motion) |
| | Hi-Res. mode ..... | 36,000 video frames (20 minutes motion) |
| TQ-FH332 (double side): | Normal mode ..... | 108,000 video frames (60 minutes motion) |
| | Hi-Res. mode ..... | 72,000 video frames (40 minutes motion) |

■ **THE OPTICAL DISC CARTRIDGE**

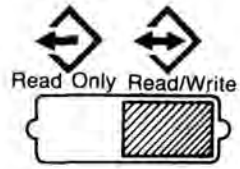
**Index Label**
A side: Left side
B side: Right side




**Hi-Res./Normal Mode Selector Hook**
When in "Hi-Res." mode, snap off the hook. (Hi-Res./Normal Mode Selector Hook is also available at B side.)

**CAUTION:**
Do not change from Hi-Res. → Normal
Only change from Normal ⟶ Hi-Res.

**Write Protect Tab**
"Read Only" position: Playback only.
"Read/Write" position: Recording and playback.




**Note:** If you want to keep recorded picture or signal, set to "Read Only" position.

■ **CAUTIONS**

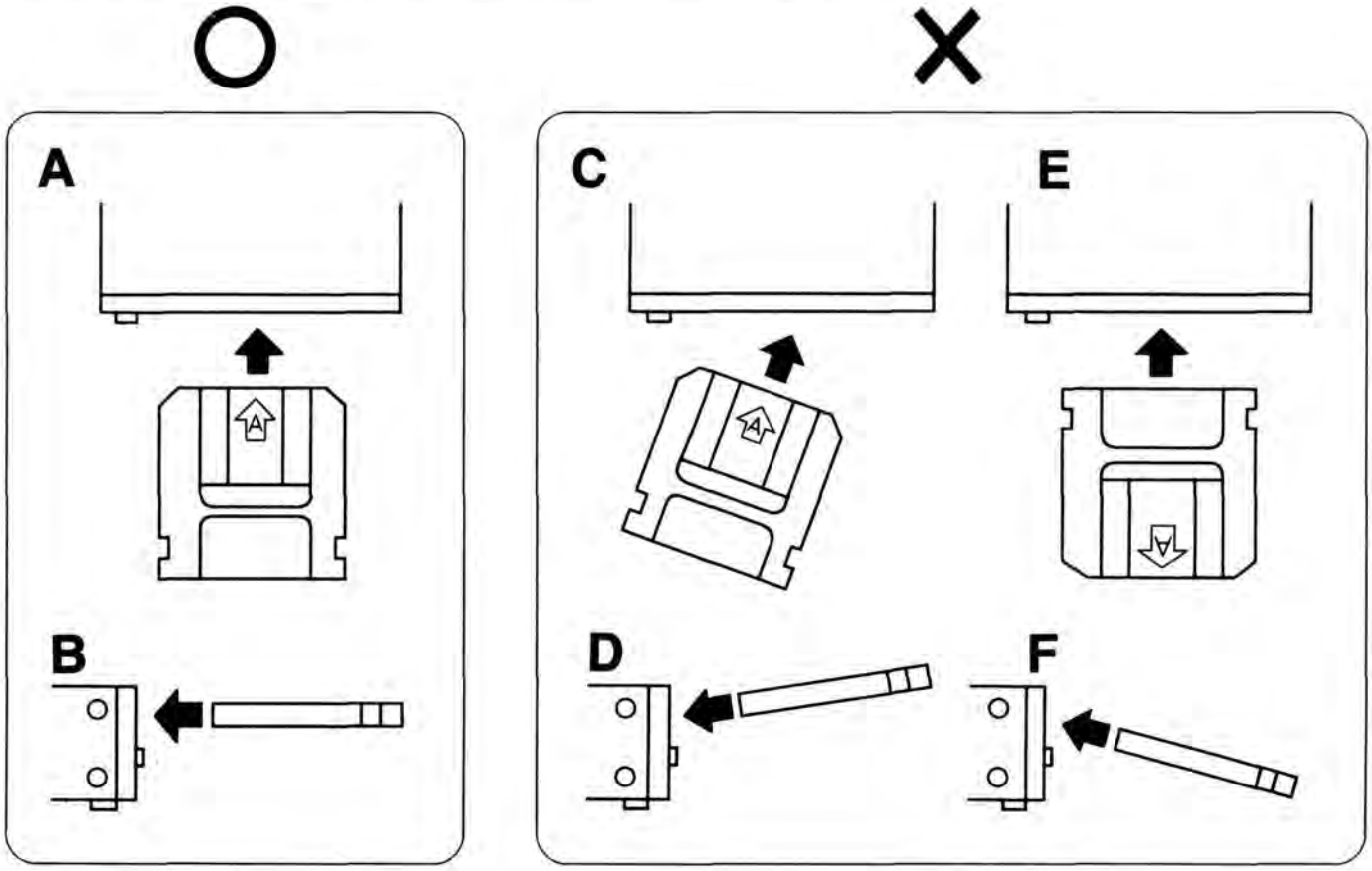
1. Never touch the disc surfaces.
2. Avoid direct sun light, keep in a moderate environment. (5 – 45°C, 10 – 80%)
3. Insert the cartridge with the shutter mark for desired side face up.
4. Store it in the case after use.
5. Don't force the shutter open.
6. Don't drop it.
7. Don't change Hi-Res. disc back to Normal by putting tape over Hi-Res./Normal Mode Selector Hook, it will cause unit address malfunction.
8. Store disc cartridge in a vertically standing position.
9. Eject disc, before turn off the power switch.

**WARNING TO PURCHASERS:**
The unauthorized recording of copyrighted broadcast programs for commercial purposes is a Copyright infringement.

**CAUTION:**
This disc contains tellurium which may be considered hazardous. Check applicable Federal, State, and Local regulations in your jurisdiction prior to disposal. Do not incinerate.

## ■ ATTENTIONS FOR DISC CARTRIDGE INSERTION

Insert disc cartridge properly as indicated in drawings Ⓐ and Ⓑ.
If inserted as in Ⓒ ~ Ⓕ damage to the unit or disc cartridge, or both, could occur.



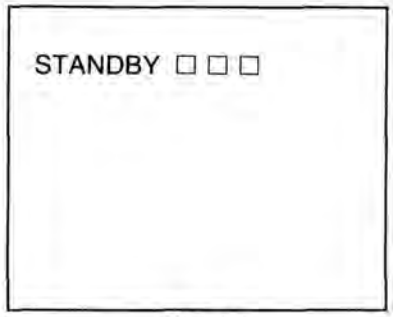
# BASIC OPERATION

## 1. INITIAL OPERATION

1. Press the POWER button on the front panel of the unit, Power indicator will light, the power is ON.
2. On-screen display [Fig. 1] is indicated on the TV monitor.
   **Note:** If the unit detects abnormalities in the unit, the On-screen indication changes from a □ mark to ☎ mark, and blinks on and off. In such cases, turn the power off, and call an authorized Panasonic service technician.
3. Insert a disc cartridge into the disc compartment, the disc indicator on the front panel will light.
4. When the disc cartridge is set to designated position, the On-screen indication changes to STANDBY [Fig. 3], While the disc gains the proper RPM for operation.
   **Note:** As start up advances, "□" mark of On-screen indication disappears from right to left.
5. Disc indicator lights and the first address of disc displays. (when loaded disc is in Hi-Res. mode, HI-RES indicator also lights)
   **Note:**
   1) If FWD. PLAY, FWD. STEP, or FWD. SLOW is pressed before Still Playback starts, unit starts playback operation according to the button from the first frame of disc.
   2) In cases of start up by program, starting frame and operation are done according to the program.
   3) When POWER button is pressed, if disc is already loaded into unit, disc start up automatically begins.
      In this case, only [Fig. 1] is indicated On-screen.
   4) When POWER button is pressed turning on power, when program Auto Start is set up, unit will start operation according to the program.


**[Fig. 1]**

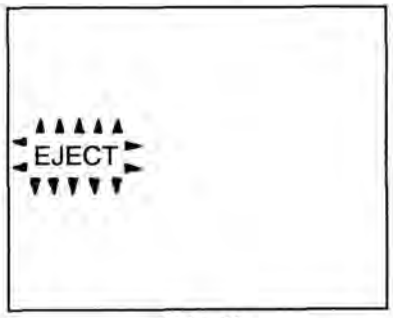

**[Fig. 2]**




**[Fig. 3]**

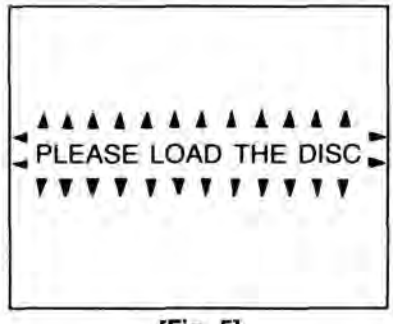
## 2. DISC EJECTION

1. Press the EJECT button.
2. Disc indicator and HI-RES indicator disappear (when in Hi-Res mode), and On-screen message indicate "EJECT" and blinks on and off. [Fig. 4]




**[Fig. 4]**

3. The On-screen indication changes to "PLEASE LOAD THE DISC" and blinks on and off. [Fig. 5]




**[Fig. 5]**

# SETUP OPERATION

■ SETUP functions are the initializing functions of the unit, ex. Communication Mode, Automatic Start, Alternate Control, White Flag Response,.....etc.
Settings are performed via the On-screen indicator.

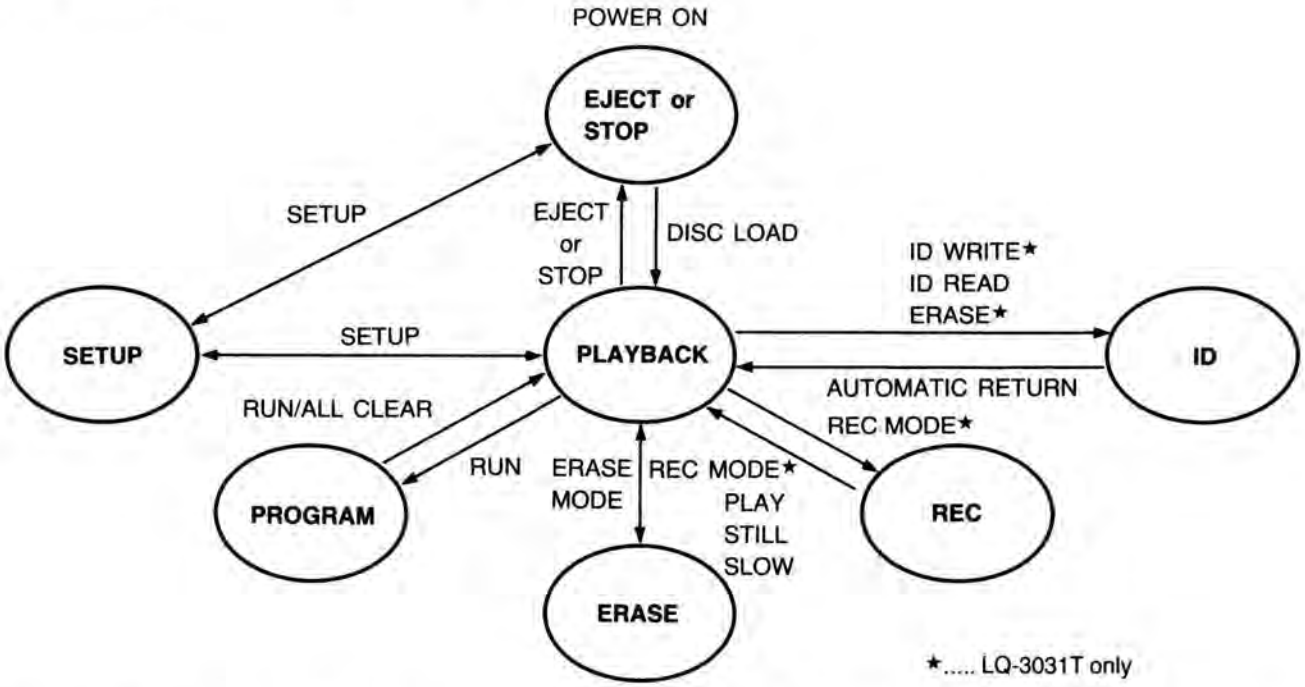
## 1. SET ITEMS

| No. | ITEM | CONTENT |
|---|---|---|
| 1 | **Communication Mode Setup** | RS-232C, RS-422A computer interface set up communication speed, parity,.....etc. transfer format. |
| 2 | **Beep Sound Setup** | On/Off set up for beep sound for button input feed back. |
| 3 | **White Flag Control Setup** | On/Off, to control playback of White Flag recorded frame as the first frame of picture at still playback time. When 2-3 pull down is effected, picture is played back, set to on. |
| 4 | **Frame Servo Setup [LQ-3031T only]** | When video signal is recorded (when not field controlled by a general use VCR,.....etc.), set to OFF. Normally set to ON. |
| 5 | **TBC Setup** | When big skew video signal is recorded and played back, set to OFF, Normally set to ON. When playback images are badly distorted, set to OFF. |
| 6 | **Program Automatic Start Setup** | It sets the unit executes program automatically or not with power ON. |
| 7 | **Deck Number Setup** | Set up individual No. (0~99) for a unit. It is possible to select unit with On-line commands. Allows multiple units to be On-line. |
| 8 | **Record Mode Automatic Clear Setup [LQ-3031T only]** | Set up whether Record Mode is to be automatically cleared or not after entire reserved record area is completely recorded. |
| 9 | **Audio Output Automatic Control Setup** | On/Off functions to limit audio output for Normal Playback, in other playback mode mutes automatically. |
| 10 | **Alternate Picture Processing Function Setup** | Selection of On/Off for alternate picture processing. |
| 11 | **Mute For Erased Picture** | Selection for mute function On/Off when erased picture is played back. |
| 12 | **Record Area Guarantee Function Setup [LQ-3031T only]** | On/Off function to ensure a desired record available area. |
| 13 | **System Setup** | Selection of the auto online function, the external control function and the playback mode (with a time base corrector). |

## 2. BUTTON FUNCTION IN SETUP MODE

| No. | ITEM | CONTENT |
|---|---|---|
| 1 | **SETUP button** | Set/Reset of SETUP mode (toggle operation). |
| 2 | **FWD. SCAN button** | Changes menu (when pressed, changes over to next menu). |
| 3 | **REV. SCAN button** | Changes menu (when pressed, returns to previous menu). |
| 4 | **FWD. STEP button** | Changes set up item (when pressed, changes to next item). |
| 5 | **REV. STEP button** | Changes set up item (when pressed, returns to previous item). |
| 6 | **FWD. PLAY button** | Changes set up content (when pressed, changes to next figure). |
| 7 | **REV. PLAY button** | Changes set up content (when pressed, changes to previous figure). |

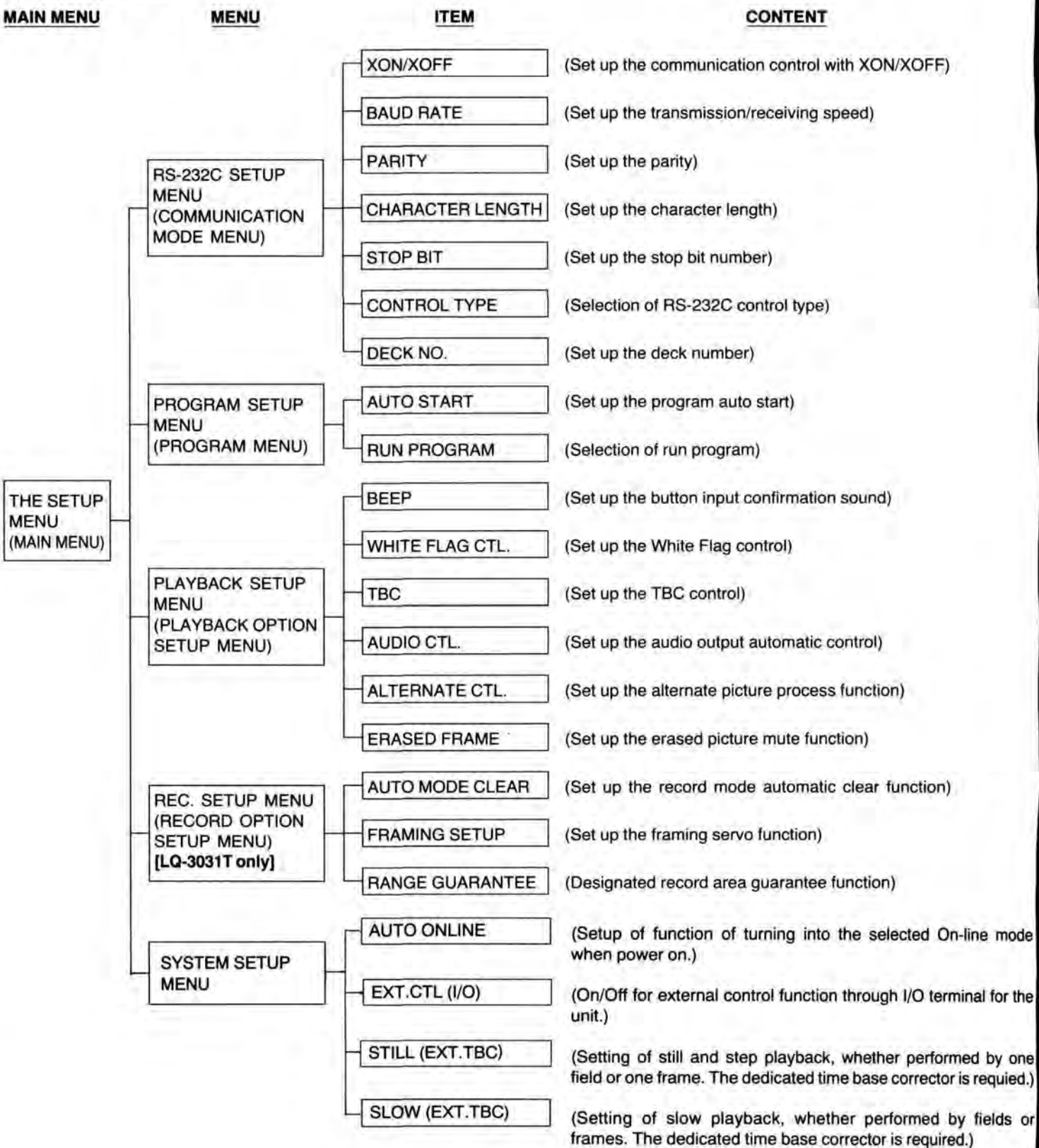
## 3. SETUP MODE CONDITIONAL CHANGE




■ As shown in above diagram, SETUP button is effective only when in the Off-line Mode, and Eject, Stop and Playback Modes. When SETUP button is pressed, it toggles SETUP mode set up/clear.

■ When in SETUP mode, unit operates as follows.
Address indication mute; Operating mode does not change.
**Note:** Playback SETUP and Rec. SETUP are possible to set up by the On-line command.

## 4. SETUP LEVEL



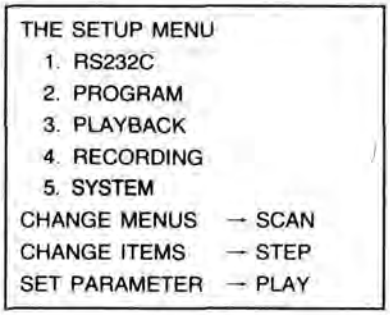
## 5. SETUP PROCEDURE

### [1] SETUP mode set up

**STEP 1.** Press SETUP button and enter SETUP mode.

**STEP 2.** When in SETUP mode, the following On-screen display appears [Fig. 6].

- SCAN buttons are used to change menus as 1 – 5.
- STEP buttons are used to change items within each menu.
- PLAY buttons are used to change set up content of each item.
  When the menu is selected, it is also possible to press the number buttons and directly select.




**[Fig. 6]**

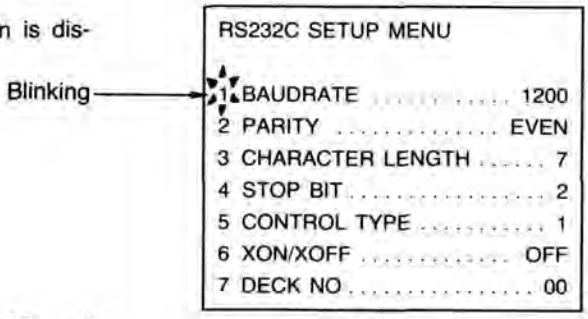
※ "4. RECORDING" is LQ-3031T only.

**Note:**

1. SETUP button is effective only in Eject or Playback condition.
2. SETUP button is not effective while in On-line mode.

### [2] RS-232C Asynchronous Communication Mode set up (from [1])

**STEP 1.** Press FWD. SCAN button, the following On-screen indication is displayed. [Fig. 7]




**[Fig. 7]**

**STEP 2.** Transmission/Receiving speed set up (BAUD RATE).

1) This can be set when "1" is blinking.
2) Possible set up speeds: 300, 600, 1200, 2400, 4800, 9600, and 19200.
   Change is made by pressing FWD. PLAY button or REV. PLAY button.
   If FWD. PLAY button is pressed, transmission and receiving speed is increased, and if REV. PLAY button is pressed, speed rate is reduced.

**STEP 3.** Parity set up (PARITY)

Select Item 2 with STEP button and select one of the following with PLAY button.

- No parity check .....NONE
- Even parity .....EVEN
- Odd parity .....ODD

**STEP 4.** 1 character length set up (CHARACTER LENGTH).

Select Item 3 with STEP button, and select one of the following with PLAY button.

- Character length 7 bits .....7
- Character length 8 bits .....8

**STEP 5.** Stop bit set up (STOP BIT).

Select Item 4 with STEP button and select one of the following with PLAY button.

- Stop bit 1 bit .....1
- Stop bit 2 bits .....2

**STEP 6.** Control type set up (CONTROL TYPE).
Select Item 5 with STEP button and select one of the following with PLAY button.

- Type 1 .....1
- Type 2 .....2

1) Type 1:
   - Transmission is possible only when DSR/CTS line is ON (more than +3V).
   - Indicates receiving is possible with RTS, DTR.
     (When both are ON, receiving is possible).

2) Type 2:
   - When CTS line is OFF, set RTS line to ON. Then when CTS line is ON, transmit.
   - RTS line is used for request to transmit.

**STEP 7.** XON/XOFF protocol set up (XON/XOFF).
This is the On/Off for communication control function. It is effective when program is being loaded.

**STEP 8.** Deck number set up (DECK NO.).
Select Item 6 with STEP button and set up 0~99 with PLAY button.
When deck No. is at beginning of the command, only the command of the unit of that number is accepted.

**[3] Set up for PROGRAM execution**

**STEP 1.** Press FWD. SCAN button, and following On-screen indication is displayed. [Fig. 8]

**Note:** • 0 ..... RAM program (loaded via On-line)
• 1~4 ..... Option ROM program
※ Only one program can be loaded from On-line in RAM.

```
PROGRAM SETUP MENU

1 AUTO START ..... OFF
2 RUN PROGRAM
*0: PLAYBACK TEST
 1: Program 1 file name
 2:         2
 3:         3
 4: Program 4 file name
```

**[Fig. 8]**

"PLAYBACK TEST" program in RAM is loaded at time of shipment for DEMO program.

**STEP 2.** Program Auto Start set up (AUTO START).

- ON .....When power is ON, program automatically executes.
- OFF .....Executes program by remote controller's button or On-line command.

**STEP 3.** Execution program designation (RUN PROGRAM No.).
Select program to execute with PLAY button.
To select program number, "*" (asterisk) is attached.

**• Instruction on how to stop internal program execution**

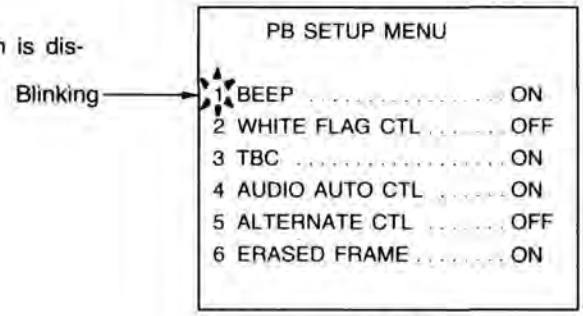
When the AUTO START is enabled (set to "ON") the unit will automatically execute one of the programs which are loaded on the interface card of the unit. If it is necessary to stop the program execution, follow one of the following procedures:

**Remote Control:** Press execution PROGRAM RUN key and program will be stopped.
**On-Line Control:** Transmit the "AC" (All Clear) command.
**Manual Method:** This method can be used when no computer or remote control is available.

1. Turn the power off.
2. While holding SETUP key down turn the power on.
   Hold the key until the SETUP MENUS appear on the screen.
3. Follow the instructions for PROGRAM SETUP in the Operating Instructions. The AUTO START should be disabled by switching it to "OFF".
4. Press SETUP key to clear the setup mode, and turn the power off.
5. Turn the power on again. The program will not run until PROGRAM RUN key on the remote is pressed or the unit receives the ON-LINE command "RN" (program run).

**4 Playback option set up**

**STEP 1.** Press FWD. SCAN button, and following On-screen indication is displayed. [Fig. 9]




**[Fig. 9]**

**STEP 2.** Button input feed back sound set up (BEEP).
Set up of On/Off of button input feed back sound.

- ON .....Output button feed back sound.
- OFF .....No output.

**STEP 3.** Set up of picture head field change control via White Flag (WHITE FLAG CTL).
When in Still or Step Playback, it plays back white flag field at the picture starting field.

- ON .....Performs control based on white flag.
- OFF .....Does not perform based on white flag.

**Note:** White flag used to convert 24 FPS. to 30 FPS. (2-3 Pull Down).

**STEP 4.** Time Base Correction function set up (TBC).
When the unit plays back many skewed video, which is recorded from VCR, this is set to OFF.
Normally set to ON.

- ON .....Performs TBC control.
- OFF .....Does not perform TBC control, at this time Gen Lock is also OFF.

**Note:** We discourage recording from RAW VCR output.
Any VCR source should be put through an external TBC before recording.

**STEP 5.** Audio output automatic control set up (AUDIO AUTO CTL).
Change of audio output control methods, when in playback of frame audio is recorded to.

- ON .....Only FWD, PLAY outputs Audio.
- OFF .....Audio outputs in all playback modes.

**Note:** When audio mute is designated by command, mute always functions.

**STEP 6.** Alternate picture processing function set up (ALTERNATE CTL).
When purpose is to chain from erased frame address to frame address of re-recorded frame (alternate picture address), this set up determines if alternate picture address is searched or not.

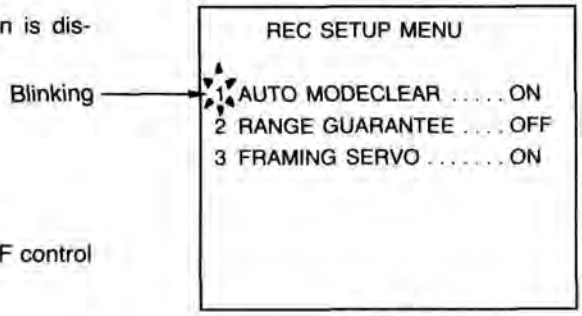
- ON .....Alternate picture address is searched.
- OFF .....Alternate picture address is not searched.

**STEP 7.** Erased picture mute control set up.

- ON .....Playback of erased frame.
- OFF .....Erased frame is muted during playback.

## [5] Record option set up [LQ-3031T only]

**STEP 1.** Press FWD, SCAN button, and following On-screen indication is displayed. [Fig. 10]




**[Fig. 10]**

**Note:** When the unit is to be controlled by program built for TQ-2026F control use, set to following.

- AUTO MODE CLEAR .....ON
- RANGE GUARANTEE .....OFF

**STEP 2.** Set up of record mode automatic clear function (AUTO MODE CLEAR).
Set up of function to automatically clear the Record Mode when possible record frames are reduced to 0. (After reserved record range is recorded).

- ON .....Automatic clear
  a) When On-line, transmit "CS" when clear.
  b) After clearing, playback the last frame recorded.
- OFF .....Cleared by command (clearing method is selectable)
  a) When cleared by REC MODE button or "CS" command, it plays back the last frame recorded.
  b) If cleared by forward direction playback command (or button) ie, FWD. PLAY, playback is from starting frame recorded.
  (review function)
  c) If cleared by reverse direction playback command (or button) ie, REV. PLAY, playback is from last frame recorded.

**STEP 3.** Recording area guarantee function (RANGE GUARANTEE).

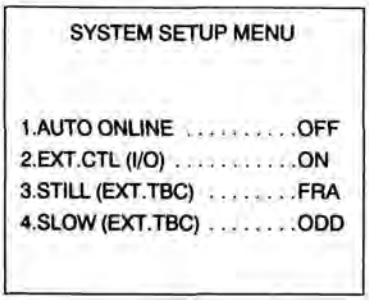
- ON .....Keep searching area until designated number of frames is guaranteed.
- OFF .....Even if designated area is not guaranteed, this function guarantees closest non-recorded area as the recording area.

**STEP 4.** Framing servo set up (FRAMING SERVO).

- ON .....Records only video signal which is frame controlled.
- OFF .....Records video signal which is not frame controlled.
  Gen Lock function does not operate.

**Note:** If video signal without equivalent pulse (when it is not an NTSC signal) or sync signal is input, this may not operate properly, even though the framing servo is ON.

## [6] SYSTEMS SETUP



1) On-Line Auto Resume Function
**Setup:** Press [►] or [◄] key and select from OFF to 0, 1, 2, 3... 15.
**Function:** OFF: When power on, the unit is NOT in On-line.
ON—When the power is turned off while the unit is online, it will resume online operation when power is restored.
[0] to [15]: When power on, the unit is in the selected On-line mode (mode 0–15).
[0] to [15]—Turning power off in online mode turns it on in this selected online mode.
Refer to description on ON Command in Online Specification. Set the proper online mode for your software application.

2) External Control Functions
**Setup:** Press [►] or [◄] key and select ON, or OFF.
**Function:** Switch a part of the port functions of I/O terminals as shown below.
In program run, however, it will be forced OFF.

| Mode / Port (I/O) | ON | OFF |
|---|---|---|
| **I1 (Pin 4)** | 1 frame REC or FWD STEP when low | General purpose input (GE command control) |
| **I0 (Pin 3)** | REC or FWD PB while low | |
| **O1 (Pin 12)** | Monitor output of I1 port | Output Port (PU command control) |
| **O0 (Pin 11)** | Monitor output of I0 port | |

**Note:** A short beep sound is heard at the start of record or playback. Refer the pin assignment of I/O terminal to page 47.

3) Still (External TBC) Function
**Function:** *After connecting the dedicated time base corrector (refer to page 45–46), set still and step playback whether* performed by one field or one frame.
[FRA]: Still and step playback is performed by frame. Set the FRA mode if the dedicated time base corrector is not connected.
[FIE]: Still and step playback is performed by field. In this mode, no vibration of still picture can be seen.
**Note:** After FIE is selected, each time the [◄II] or [II►] button is pressed, the still picture is reversed or advanced by one field. Therefore, the playback address is changed by pressing the [◄II] or [II►] button twice.

4) Slow (External TBC) Function
**Function:** After connecting the dedicated time base corrector (refer to page 45–46), set slow playback whether performed by one field or one frame.
[ODD]: Slow playback of 1st field of each frame is performed.
[O/E]: Slow playback of 1st field and 2nd field alternately is performed.
[FRA]: Slow playback is performed by frame.

Set STILL (EXT. TBC) and SLOW (EXT. TBC) according to the playback picture. Refer to the table below.

| **Dedicated TBC** | **No** | **Yes** | | |
|---|---|---|---|---|
| **Content of picture** | Motion picture/ Still picture | Still picture | Motion pitcure at lower speed | Motion picture at higher speed |
| **STILL (EXT. TBC)** | FRA | FRA | FIE | FIE |
| **SLOW (EXT. TBC)** | FRA | FRA | ODD | O/E |

# PLAYBACK METHODS

## 1. SEARCH FOR THE FRAME

**STEP 1.** Press the DISPLAY button.
The frame address and any input data are displayed on the TV monitor. [Fig.11]
If TV monitor is connected to Video Display Out Terminal, the frame address and input data are always displayed.

**STEP 2.** Input a target frame address using the number buttons.

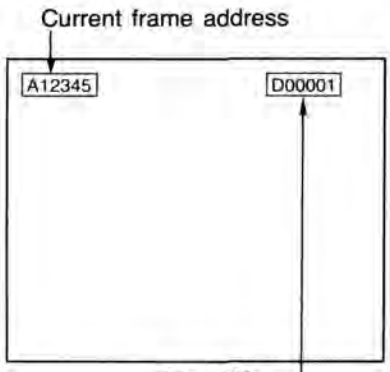
**STEP 3.** Press SEARCH button.

**STEP 4.** The unit searchs to the frame (average 0.7 second), and starts playback automatically in the previous mode.

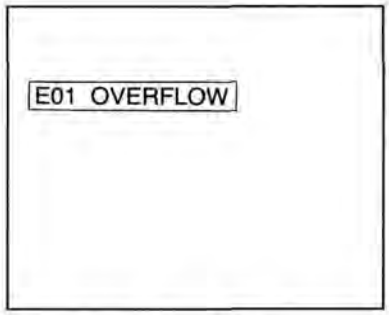
**Note:** 1) When selected frame address is not within limits of the user area, "E01 OVERFLOW" is displayed on TV monitor, and search operation will not occur. [Fig.12]

2) If the SEARCH button is depressed without designating a specific frame address with the number buttons, the unit will search the first address of the user area.

< **Example** >
Search to the frame address "1115"
**STEP 1.** Press the number buttons ① → ① → ① → ⑤.
**STEP 2.** Press the SEARCH button.




**[Fig. 11]**
Target data inputted via number buttons




**[Fig. 12]**

## 2. START THE PLAYBACK OPERATION

**STEP 1.** Select a Playback Mode using which ever of the 8 playback buttons and the number buttons suit the desired operation per the diagrams on the following page.
You can select from 10 modes of playback operations.

**STEP 2.** The unit starts playback in the selected mode.

**Note:** Slow Mode can be effected only by using an Optional Remote Controller.
However, slow motion can be effected by use of the forward or reverse step technique. (see following page)

## 3. STOP THE PLAYBACK OPERATION

**STEP 1.** Press FWD. STILL/STEP button or REV. STILL/STEP button.

**STEP 2.** The unit stops the playback operation and displays the still frame at the current address.

## ■ CHOICE OF THE PLAYBACK OPERATION

<table>
<tr><th>PLAYBACK MODE</th><th>BUTTONS</th><th>OPERATION</th></tr>
<tr><td>FORWARD PLAY</td><td>FWD. PLAY<br>  </td><td rowspan="2">• When this button is pressed, the unit starts forward/reverse playback at normal speed (30 frames/sec.).<br>• Audio playback is available only in the forward play mode.</td></tr>
<tr><td>REVERSE PLAY</td><td>REV. PLAY<br>  </td></tr>
<tr><td>FORWARD FAST PLAY</td><td>NUMBER BUTTONS<br>+<br>FWD. PLAY<br>  </td><td rowspan="2">• From 1 to 10 times normal speed forward/reverse may be selected via the number buttons.<br>• After input of the desired speed rate, press FWD. PLAY/REV. PLAY button.<br><br>< Example ><br>5 times normal speed forward (150 frames/sec.)<br>STEP 1. Press the number button ⑤.<br>STEP 2. Press FWD. PLAY button.</td></tr>
<tr><td>REVERSE FAST PLAY</td><td>NUMBER BUTTONS<br>+<br>REV. PLAY<br>  </td></tr>
<tr><td>FORWARD STEP</td><td>NUMBER BUTTONS<br>(if neccessary)<br>+<br>FWD. STEP<br>  </td><td rowspan="2">• Press this button to enter the Step/Still Mode.<br>Present frame will be played back in Still Mode.<br>(This does not harm the disc in anyway.)<br>• If button is hold depressed, the unit will shift after a few seconds to 4 frames per second Step Playback.<br>• Interval speed may be selected via the number buttons between 1 to 256 seconds.<br><br>< Example ><br>Display each frame for 30 seconds forward.<br>STEP 1. Press the number buttons ③ → ⓪.<br>STEP 2. Press FWD. STEP button.</td></tr>
<tr><td>REVERSE STEP</td><td>NUMBER BUTTONS<br>(if neccessary)<br>+<br>REV. STEP<br>  </td></tr>
<tr><td>FORWARD SCAN</td><td>FWD. SCAN<br>  </td><td rowspan="2">• When this button is pressed, On-screen scanning is obtained at a rate of approx. 1500 frames per second. (Gen Lock will be disable.)<br>• SCAN buttons may be pressed during other playback modes. When this button is released, the unit automatically returns to the forward play mode.</td></tr>
<tr><td>REVERSE SCAN</td><td>REV. SCAN<br>  </td></tr>
</table>

| PLAYBACK MODE | BUTTONS | OPERATION |
|---|---|---|
| **FORWARD SLOW** | NUMBER BUTTONS<br>(if neccessary)<br>+<br>FWD. SLOW<br>  <br>(on the remote controller) | • From 1/2 to 1/256 times normal speed, forward/reverse, may be selected via the number buttons.<br><br>< **Example** ><br>1/10 normal speed (3 frame/sec.) forward playback.<br>**STEP 1.** Press the number buttons ① → ⓪.<br>**STEP 2.** Press FWD. SLOW button on the Remote Controller.<br><br>• If the SLOW button is pressed without designating slow speed with a number input. Slow Playback at 1/3 the normal playback speed will be effected (10 FPS). |
| **REVERSE SLOW** | NUMBER BUTTONS<br>(if neccessary)<br>+<br>REV. SLOW<br>  <br>(on the remote controller) | |

# RECORDING METHODS [LQ-3031T only]

## 1. SETTING OF RECORIDNG MODE

■ There are 3 kinds of Record Mode based on the recording space area available on the disc as ascertained by the check method as below.

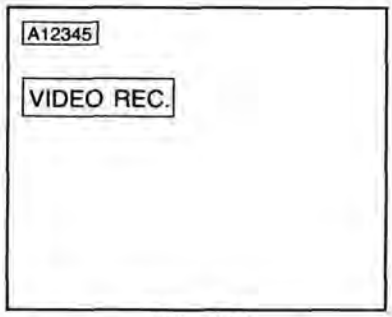
**CASE 1:** When desired to get any available recording area beginning with the first (lowest) non-recorded frame address.
[OPERATION]
**STEP 1.** Press REC MODE button.

**CASE 2:** When desired to check a designated recording area is available or not starting at the first recording available space area.
[OPERATION]
**STEP 1.** Set 'RANGE GUARANTEE' OFF, which is one of items of the RECORD option set up (refer to SETUP function specifications).
**STEP 2.** Input the number of frames to be recorded with the number buttons.
**STEP 3.** Press REC MODE button.

**CASE 3:** Guarantee the designated record area.
[OPERATION]
**STEP 1.** Set 'RANGE GUARANTEE' (verify frames requested are available to record) ON, which is one of items of the RECORD option set up.
**STEP 2.** Input the number of frames to be recorded with the number buttons.
**STEP 3.** Press REC MODE button.

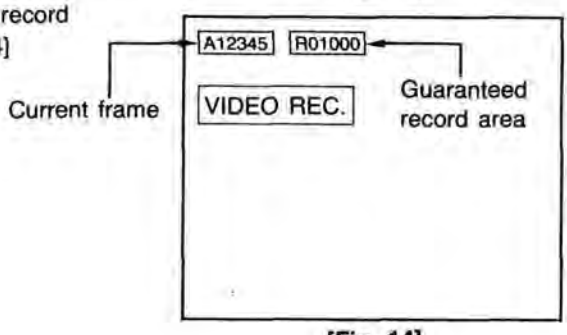
■ After setting Record Mode according to one of the above mentioned operations, the LED indicator on REC MODE button will light, and the On-screen display will indicate the following:

1. On-screen indicates the message "VIDEO REC.", and the unit performs a record area inspection. [Fig. 13]




**[Fig. 13]**

2. When the record area inspection has been completed, the guaranteed record area (recordable frame number) is indicated on TV monitor. [Fig. 14]

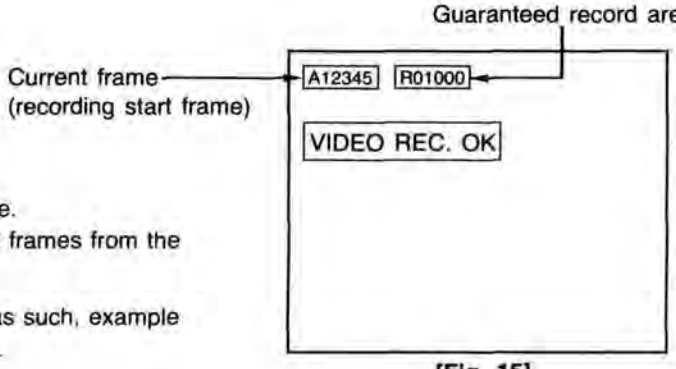



**[Fig. 14]**

3. After a check at about 2,500 frames/sec. and the blank area has been scanned and recording is determined to be possible.
Then "VIDEO REC. OK" is indicated on TV monitor. [Fig. 15]

< **Example** >
On-screen indication indicating that recording is possible.
Indicates that recording is possible and that 1,000 blank frames from the starting frame of the disc side A.

**Note:** If disc side B, then address indication is indicated as such, example "B1000".




**[Fig. 15]**

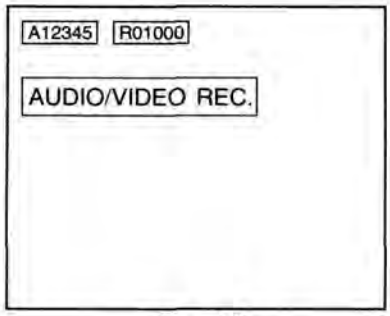
## 2. AUDIO RECORD SELECTION

■ When an audio signal is to be recorded at the same time as the video, set the Record Mode, then perform the following operation.

**STEP 1.** Press AUDIO REC button.

**STEP 2.** LED indicator on AUIDO REC button will light, and "AUDIO/VIDEO REC." will be indicated on TV monitor. [Fig. 16]

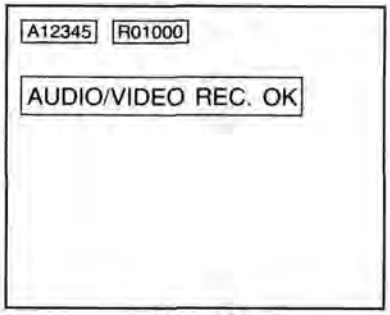
**Note:** AUDIO REC button is effective only when in the Record Mode.




**[Fig. 16]**

**STEP 3.** Approximately 1 second after pressing this button, and if a record area inspection has been completed, On-screen indication will change [Fig. 17], and indicate that recording is possible.

**Note:** The delay times mentioned above should be considered when in the On-line Mode.




**[Fig. 17]**

## 3. RECORD

■ As indicated in [Fig. 15] or [Fig. 17], the On-screen message indicates a "recording possible" condition. Record according to the following operation:

**STEP 1.** Input recording frame number with the number buttons.

**STEP 2.** Press REC. START/STOP button.

**STEP 3.** LED indicator on REC. START/STOP button will light and "VIDEO REC. IN" or "VIDEO/AUDIO REC. IN" will be indicated on TV monitor. [Fig. 18, 19]

**STEP 4.** Residual recording frame number is indicated instead of the residual recordable frame number, and designated number of frames are going to be recorded.

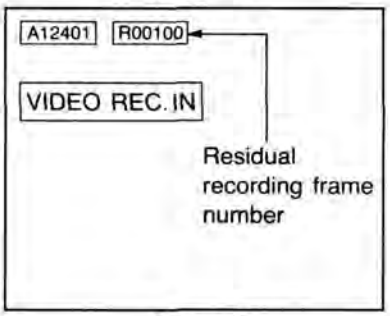
**Note:** When a number of record frames is not input, only one frame will be recorded. Recording of multiple frames is at 30 FPS.

**STEP 5.** When recording is completed, unit returns to the previous recording possible condition at the next recording start frame. If the guaranteed record area is 0, the following occures; (the residual recordable frame number becomes example "R00000").

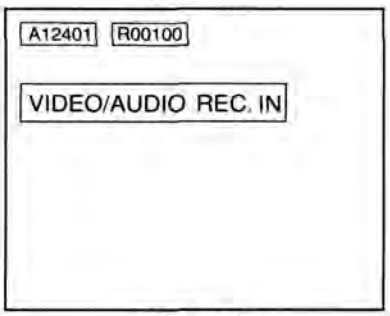
1) When 'AUTO MODE CLEAR' (auto clear function setting of Record Mode) of 'RECORDING' (record option setting) of Setup Mode is selected ON, recording is cleared, and Still Playback in the last recorded frame is performed.

2) When 'AUTO MODE CLEAR' of Setup Mode is selected OFF, recording possible condition in the last recorded frame is cleared ("VIDEO REC." or "AUDIO/VIDEO REC." is indicated on TV monitor). [Fig. 20]

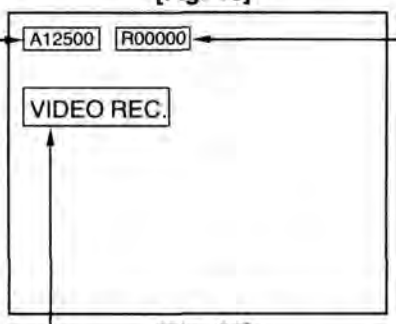
**Note:** In order to perform next operation, clearing Record Mode is neccessary.




**[Fig. 18]**




**[Fig. 19]**




**[Fig. 20]**

Last recorded frame address

Residual recordable frame number

When selected Audio REC. Mode indicates "VIDEO/AUDIO REC."

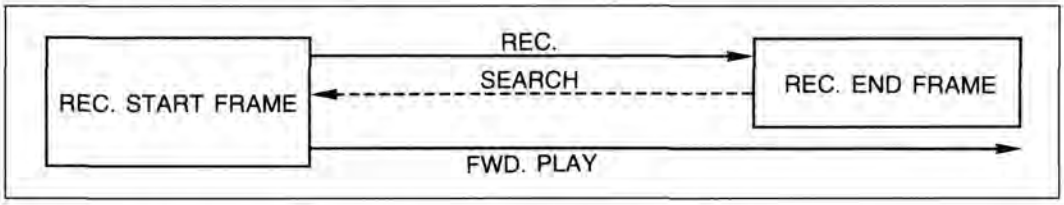
## 4. CLEARING RECORDING MODE

■ There are 3 ways to clear the recording mode, generally classified as follows:

**CASE 1:** Clearing with REC MODE button.
[OPERATION]
**STEP 1.** Press REC MODE button.
**STEP 2.** LED indicators on REC MODE button and on AUDIO REC button go out, Record Mode is cleared, then Still Playback in the last recorded frame is performed.

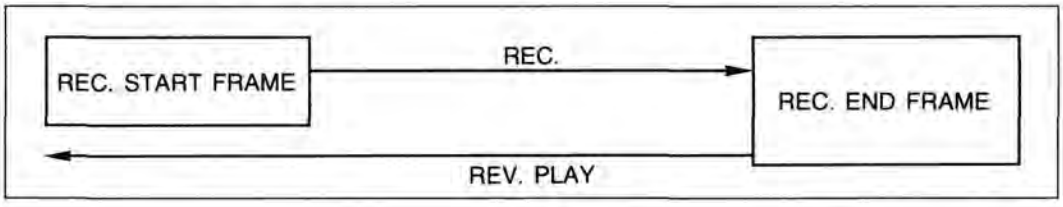
**CASE 2:** Clearing with forward direction playback button example FWD. PLAY. (review function)
[OPERATION]
**STEP 1.** Press FWD. PLAY or FWD. STEP or FWD. SLOW (on the Remote Controller).
**Note:** It is possible to input playback speed with the number buttons, before pressing these playback buttons.
**STEP 2.** LED indicators on REC MODE button and on AUDIO REC button go out, and Record Mode is cleared, then playback action of each button from the first recorded started frame is performed.

[Example] Clearing with FWD. PLAY




**CASE 3:** Clearing with backward direction playback button example REV. PLAY.
[OPERATION]
**STEP 1.** Press REV. PLAY or REV. STEP or REV. SLOW button.
**Note:** It is possible to input playback speed with the number buttons, before pressing these playback buttons.
**STEP 2.** LED indicator on REC MODE button and on AUDIO REC button go out, and Record Mode is cleared, then playback action of each button from the last recorded frame is performed.

[Example] Clearing with REV. PLAY



# DISC ID (RECORD/PLAYBACK METHODS)

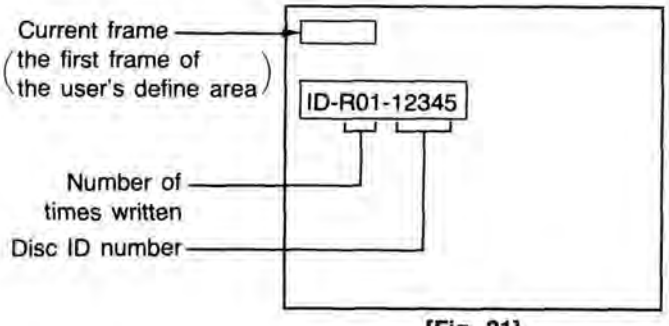
## 1. DISC ID FUNCTION

Disc ID numbers are 5 digit numbers from 0~99999, which can be recorded on one side of the disc.
Rewriting the disc ID number is possible 9 times only.

## 2. DISC ID NUMBER READING METHOD

**STEP 1.** Press ID/ALTERNATE CORD READ button (READ button) on the Remote Controller in Playback Mode.

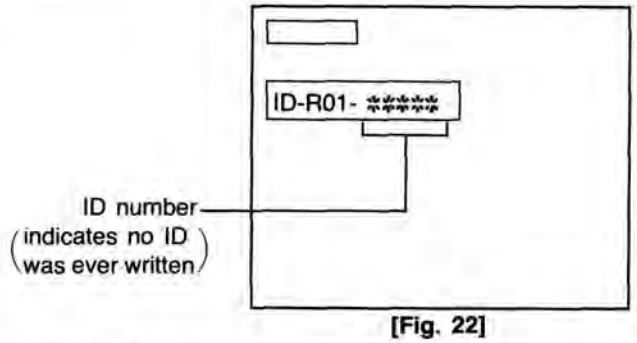
**STEP 2.** The unit mutes the On-screen picture and reads the disc ID number.
When completed it performs Still Playback at the first frame of the user's define area, and displays read disc ID number On-screen as indicated in [Fig. 21].




**[Fig. 21]**

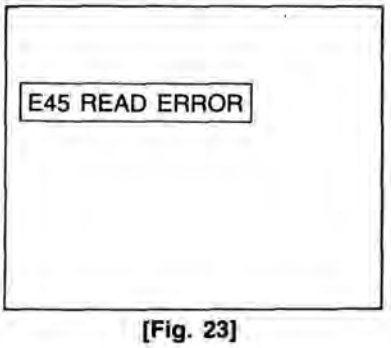
(Disc ID number was written once, and the ID was 12345)

When no disc ID number has ever been written, On-screen indication is as follows. [Fig. 22]




**[Fig. 22]**

**Note:** If disc ID number cannot be read due to disc dirt,.....etc., error message "E45 READ ERROR" is indicated on TV monitor. [Fig. 23]



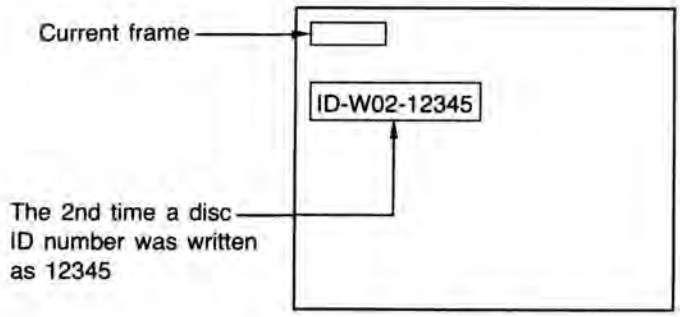

**[Fig. 23]**

## 3. DISC ID NUMBER WRITING METHOD [LQ-3031T only]

**STEP 1.** Input disc ID number with the number buttons in Playback Mode.

**STEP 2.** Press ID/ALTERNATE CODE WRITE button (WRITE button) on the Remote Controller.

**STEP 3.** Mutes screen and writes disc ID number.
When completed, Still Playback is performed at the first frame of the user's define area, then displays completion message On-screen as indicated in [Fig. 24].

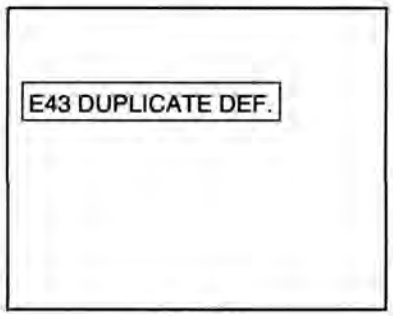



**[Fig. 24]**

**Note:**

1. When attempting to define disc ID number a second time, disc ID number is not written, instead the error message "E43 DUPLICATE DEF." is indicated on TV monitor. [Fig. 25]

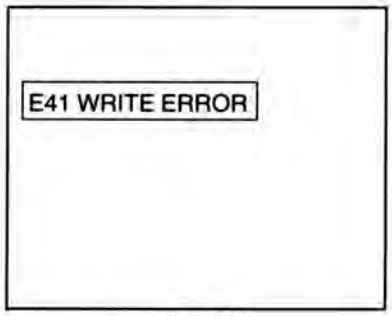
   When the disc ID number is to be changed, the current disc ID number is erased then the new disc ID number is written.




**[Fig. 25]**

2. If the disc ID number was written incorrectly, the error message "E41 WRITE ERROR" is indicated on TV monitor. [Fig. 26]

3. Notes 1 and 2 are executed by performing Still Playback at the first frame of the user's define area.



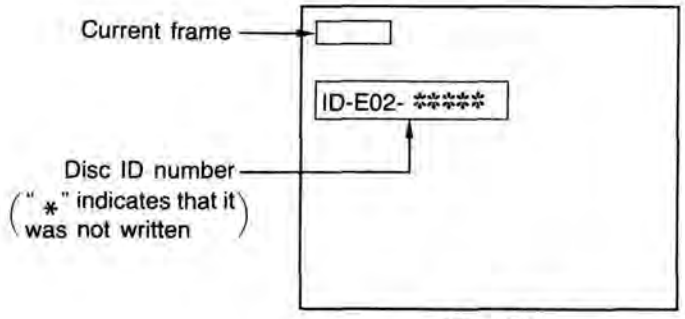

**[Fig. 26]**

## 4. DISC ID NUMBER ERASING METHOD [LQ-3031T only]

**STEP 1.** Input a 5 digit disc ID number with the number buttons while in the Playback Mode.

**STEP 2.** Press ID CODE ERASE button (ERASE button) on the Remote Controller.

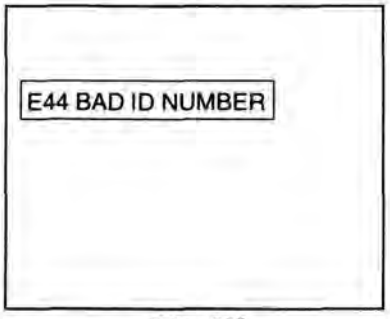
**STEP 3.** Mutes screen and erases current disc ID number. (about 10 seconds) When completed, Still Playback is performed at the first frame of the user's, define area, and a completion message is displayed On-screen as indicated in [Fig. 27].




**[Fig. 27]**

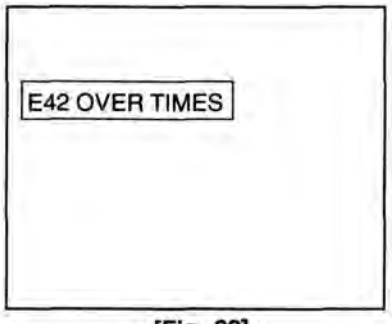
**Note:**

1. When the input disc ID number and the disc ID number of disc are different, it does not erase and Still Playback is effected at the first frame of the user's define area. And the error message "E44 BAD ID NUMBER" is indicated on TV monitor. If the disc ID number cannot be read correctly, a new number can be designated. [Fig. 28]




**[Fig. 28]**

2. The maximum number of disc IDs that can be written is 10. If a designation above 10 is attempted then the error message "E42 OVER TIMES" will be displayed on TV monitor and the unit will go to the Still Mode at the first frame of the user's define area. [Fig. 29]




**[Fig. 29]**

# ERASE AND ALTERNATE PICTURE MANAGEMENT

## 1. ALTERNATE PICTURE MANAGEMENT FUNCTION

This function executes the following actions by writing the alternate picture address information to the recording finished frame.

1) Erased function:
   The frame written alternate picture address (called erase frame) mutes at playback time.
2) Alternate picture management function:
   When above mention erased frame is searched, it automatically searches the frame to the alternate picture address.

**Note:** The action of 1) and 2) make ON/OFF possible, and perform the function setting in each following items on the PLAYBACK MENU (playback option setting) in the SETUP function.

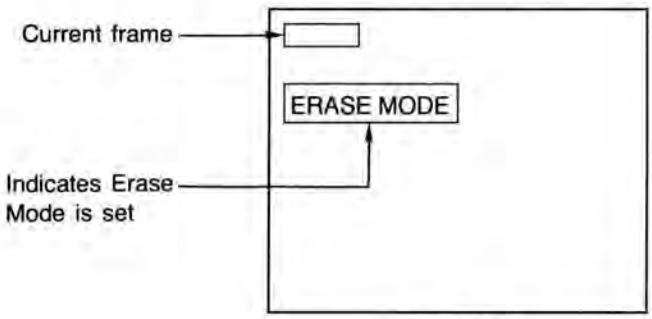
1. ERASED FRAME (erased picture mute control setting)
2. ALTERNATE CTL. (alternate picture processing function setting)

For details, refer to "SETUP OPERATION".

*1.....Reading and writing of alternate picture address information is performed in Erase Mode.
*2.....The alternate picture address information can be written once per frame.
Erase or changing of this information is not possible.
*3.....The frame alternate picture address information is written once, it is treated as a completed record frame during the video non-recorded area inspection time.

## 2. SETTING OF ERASE MODE

**STEP 1.** Press ALTERNATE button in Playback Mode.
**STEP 2.** Erase Mode is invoked and, On-screen indication is displayed (as in [Fig. 30]), and Still Playback is performed in current frame being played back.

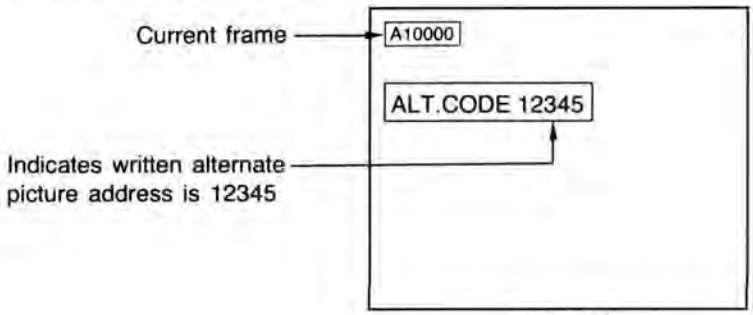



**[Fig. 30]**

**Note:** When Erase Mode in the non-recorded frame is attempted, the error message "E09 UNRECORDED FRAME" is displayed on TV monitor, and Still Playback at that frame is performed.

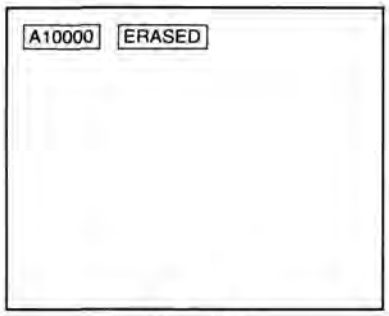
## 3. WRITING ALTERNATE PICTURE ADDRESS INFORMATION (ERASE OF FRAME) [LQ-3031T only]

**STEP 1.** Input alternate picture address with the number buttons in the Erase Mode.
**STEP 2.** Press ID/ALTERNATE CODE WRITE button on the Remote Controller.
**STEP 3.** Alternate picture address information is written in frame performing Still Playback, then reads the alternate picture address information in frame, then displays it on TV monitor as in [Fig. 31].



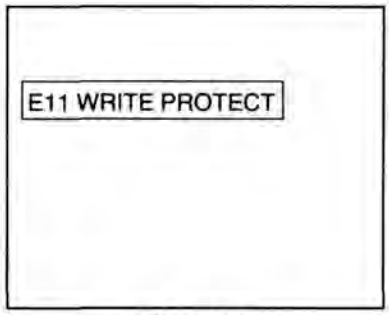

**[Fig. 31]**

**Note:** When ERASE FRAME is OFF in SETUP (erased frame mutes playback) the screen is muted after this code is written.
When ERASE FRAME is ON, the erased image is displayed on TV monitor in a set up format. [Fig. 32]



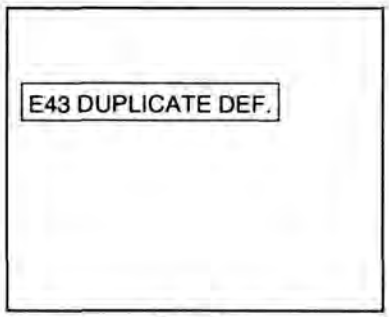

**[Fig. 32]**

**Note:** 1. When write protect is set, no data is written and the error message "E11 WRITE PROTECTED" is indicated on TV monitor. [Fig. 33]



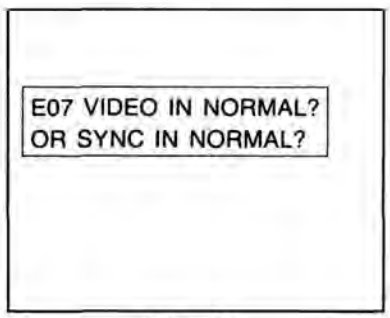

**[Fig. 33]**

2. When the alternate picture address was previously written, no data is written and the error message "E43 DUPLICATE DEF." is indicated on TV monitor. [Fig. 34]




**[Fig. 34]**

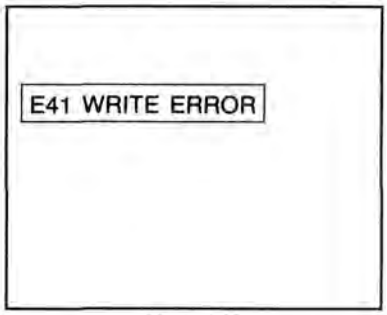
3. When a disc rotation sync. abnormality has occurred, the error message "E07 VIDEO IN NORMAL? OR SYNC IN NORMAL?" is indicated on TV monitor. [Fig. 35]




**[Fig. 35]**

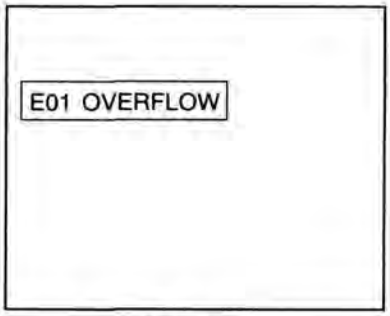
4. When the written alternate picture address was written incorrectly upon verification (read after write), the error message "E41 WRITE ERROR" is indicated on TV monitor. [Fig. 36]

   In this case, rewrite the same alternate picture address with the number buttons, and press ID/ALTERNATE CODE WRITE button again.




**[Fig. 36]**

5. When the alternate picture address which was input with the number buttons is not in the user's define area, no data is written and the error message "E01 OVERFLOW" is displayed on TV monitor. [Fig. 37]

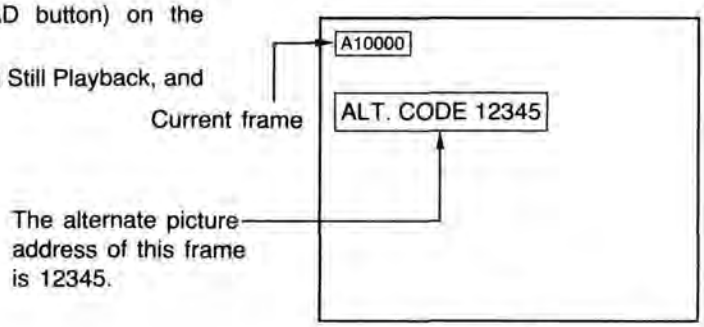



**[Fig. 37]**

## 4. READING OF ALTERNATE PICTURE ADDRESS INFORMATION

**STEP 1.** Press ID/ALTERNATE CODE READ button (READ button) on the Remote Controller.

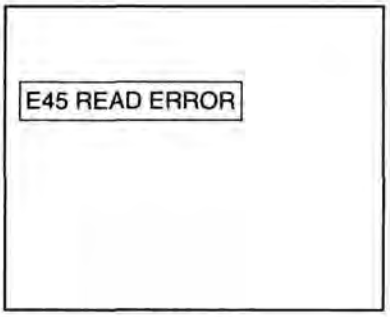
**STEP 2.** Read alternate picture address information of frame in Still Playback, and indicate it on TV monitor as in [Fig. 38].




**[Fig. 38]**

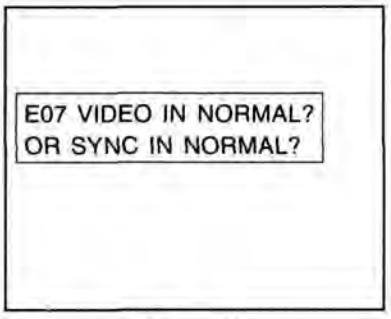
**Note:**

1. When an error has occurred concerning the reading of alternate picture address information, the error message "E45 READ ERROR" is displayed on TV monitor. [Fig. 39]




**[Fig. 39]**

2. When a disc rotational sync abnormality has occurred, the error message "E07 VIDEO IN NORMAL? OR SYNC IN NORMAL?" is displayed on TV monitor. [Fig. 40]




**[Fig. 40]**

## 5. CLEARING ERASE MODE

1. When ALTERNATE button is pressed, Erase Mode is cleared, and Still Playback occurs at the current frame.
2. If the playback button is pressed (FWD. PLAY, REV. PLAY, FWD. STEP, REV. STEP, FWD. SLOW, or REV. SLOW) Erase Mode is cleared, and the Playback Mode is pressed executed.
3. When the EJECT button is pressed, Erase Mode is cleared and the disc is ejected.

# TIME BASE CORRECTOR CONTROL FUNCTION

LQ-3031T/LQ-3032T can be connected to an external TBC (Time Base Corrector)/Frame Synchronizer. When connected to the equipment as outlined below the following functions can be enabled:

- **Seamless Search**

  The still image of the current frame will be retained when the player engages the search mode. After the optical head searches the new target frame, the memory in the TBC is refreshed and the new image is displayed on the monitor. This function is referred to as Seamless Search because the output of the TBC does not cut to black during search time, but keeps the previous image on the screen during the search mode.

- **Field Still, Fine Slow**

  Since each TV frame is mode from two independent TV fields, flicker will sometimes appear on the screen when fast motion images are recorded. To counter this negative image artifact there is a provision for successive field playback with this TBC interface card. *This effect is available in the slow and still playback modes.*

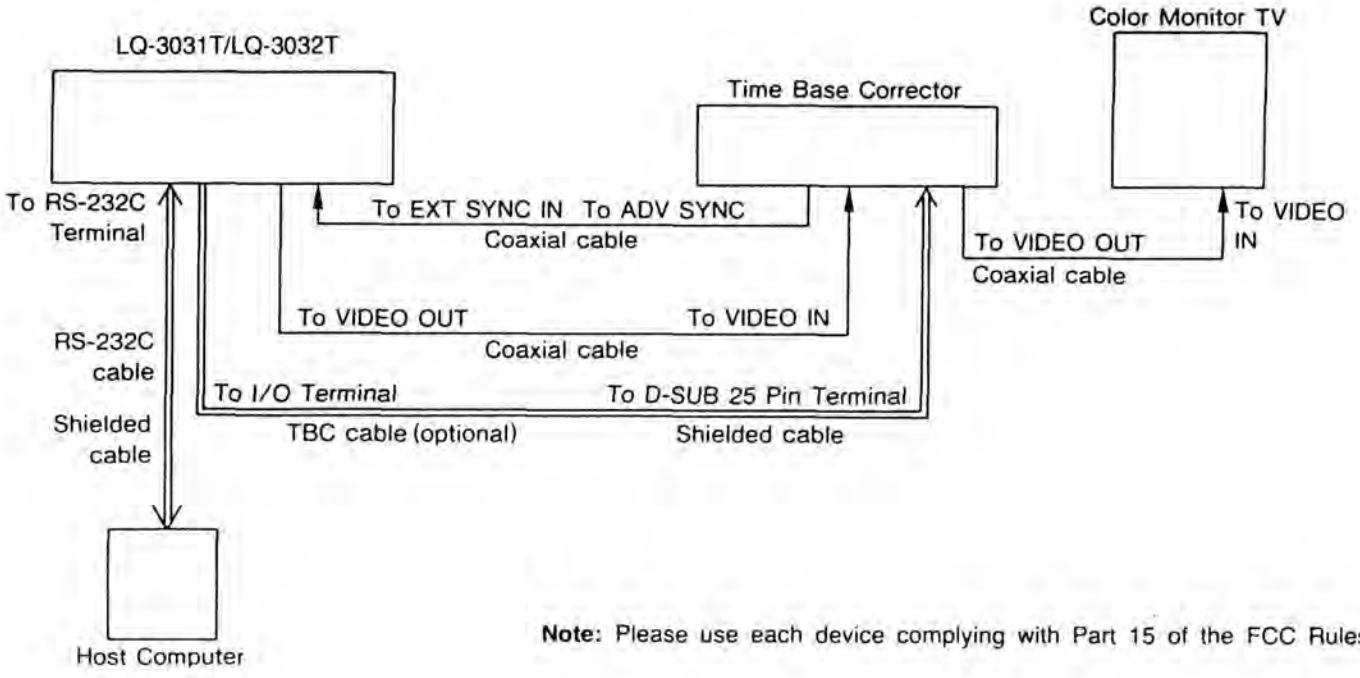
Please connect according to the figure, and set the "3 STILL (EXT. TBC)" in the SYSTEM SETUP MENU of the SETUP function to "FIE" and "4 SLOW (EXT. TBC)" to the "O/E" or "ODD". (Refer to page 32.)

- **Field Still Mode**

  After a frame is searched only the first field of that frame will be played back. Then each time the ◄II or the II► button is pressed, the still picture is advanced or retarded only one field at a time (not and entire frame). When this function is activated the pictures on the screen will be displayed without annoying vibration.

- **Fine Slow**

  When the unit is placed in the slow playback mode (1/2 speed or less) playback is performed one field at a time. This function assures ultra-smooth slow-motion playback without picture vibration.




**Note:** Please use each device complying with Part 15 of the FCC Rules.

## ■ Timing chart

$\overline{\text{FREEZE}}$, $\overline{\text{FRAME}}$/FIELD and $\overline{\text{ODD}}$/EVEN signals from I/O terminal control a time base corrector as follows.

Signal output voltage . . . High: High impedance
Low : 30 mV
output current . . . max : −20 mA

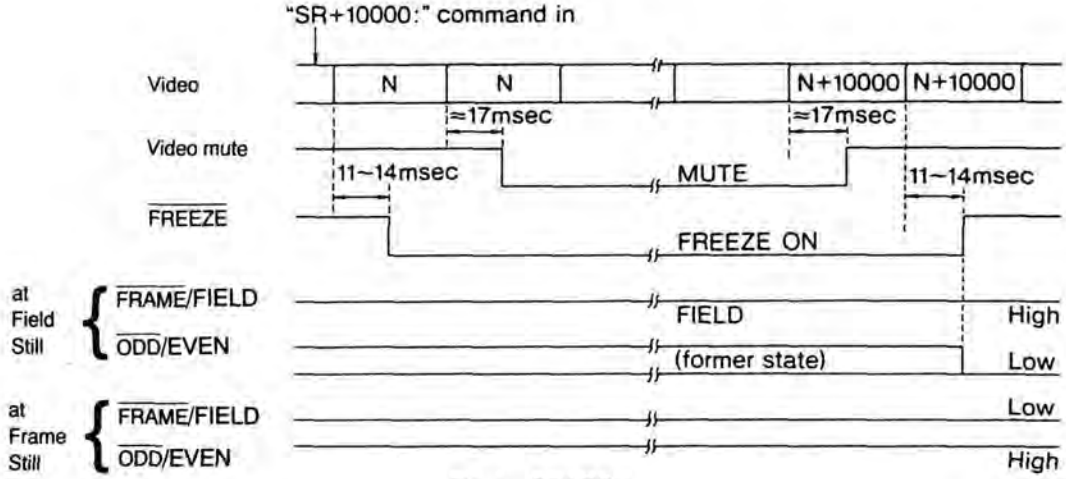



Fig. 1 SEARCH

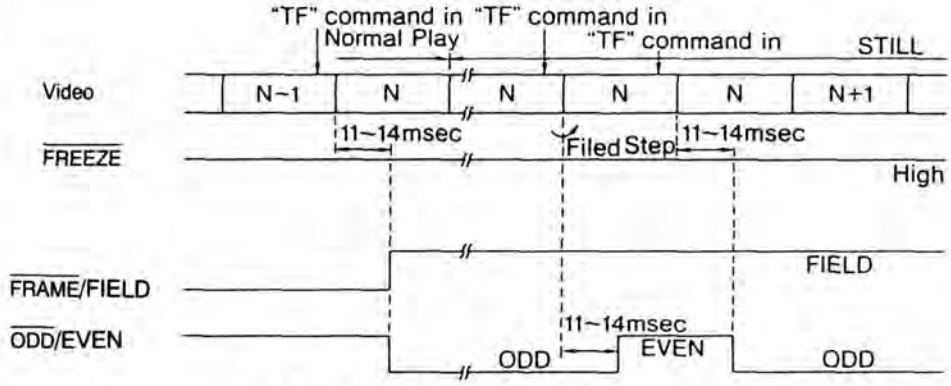



Fig. 2 Field STILL with field STEP

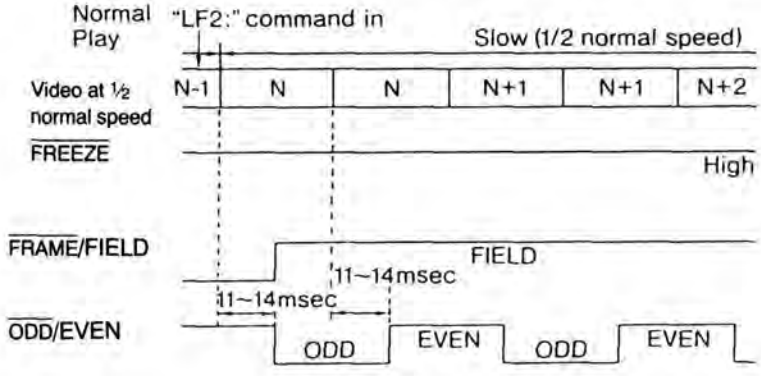
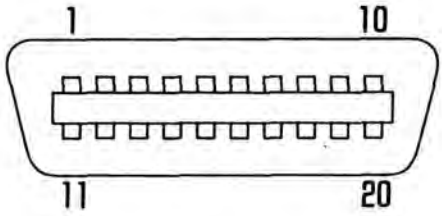


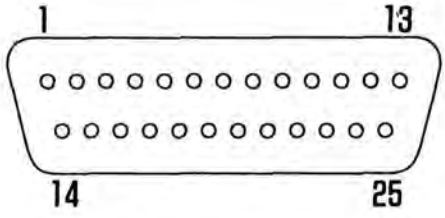

Fig. 3 Slow (½ normal speed)

# PIN ASSIGNMENTS OF TBC CABLE (OPTIONAL)

■ **PIN ASSIGNMENTS OF TBC CABLE LV-K003 (OPTIONAL)**

- Half pitch 20 pin connector (male)
  connect to I/O terminal
- D-SUB 25 pin connector (male)
  connect to the dedicated time base corrector




| Pin No. | Signal |
|---|---|
| 1 | $\overline{\text{FREEZE}}$ (TBC) |
| 2 | $\overline{\text{FRAME}}$/FIELD (TBC) |
| 3 | I0 (Input port 0) |
| 4 | I1 (Input port 1) |
| 5 | I2 (Input port 2) |
| 6 | I3 (Input port 3) |
| 7 | I4 (Input port 4) |
| 8 | I5 (Input port 5) |
| 9 | I6 (Input port 6) |
| 10 | I7 (Input port 7) |
| 11 | O0 (Output port 0) |
| 12 | O1 (Output port 1) |
| 13 | O2 (Output port 2) |
| 14 | O3 (Output port 3) |
| 15 | O4 (Output port 4) |
| 16 | O5 (Output port 5) |
| 17 | O6 (Output port 6) |
| 18 | O7 (Output port 7) |
| 19 | $\overline{\text{ODD}}$/EVEN (TBC) |
| 20 | GND |

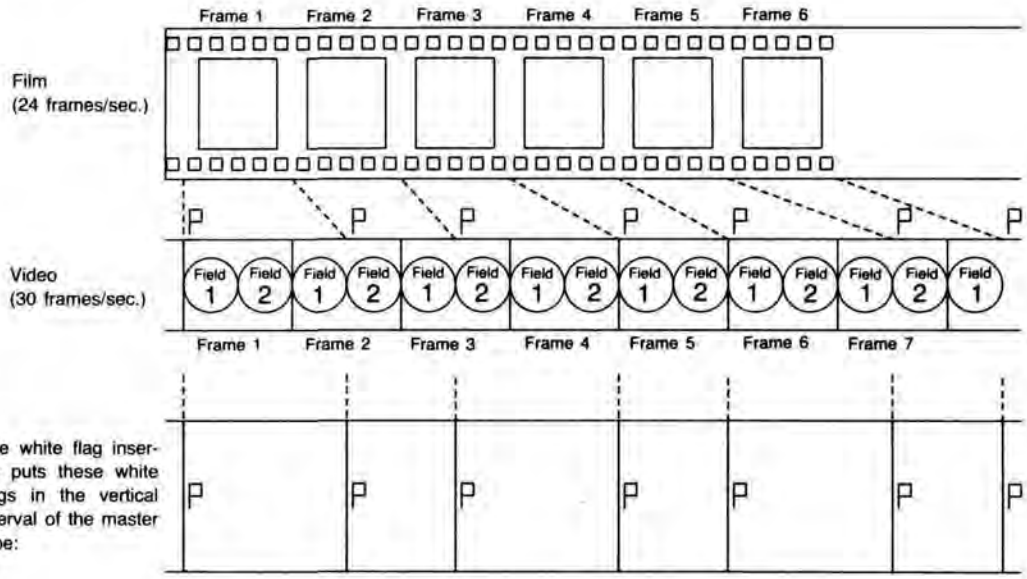
| Pin No. | Signal |
|---|---|
| 1 | $\overline{\text{FREEZE}}$ (TBC) |
| 2 | $\overline{\text{FRAME}}$/FIELD (TBC) |
| 3 | I0 |
| 4 | I1 |
| 5 | I2 |
| 6 | I3 |
| 7 | I4 |
| 8 | I5 |
| 9 | I6 |
| 10 | I7 |
| 11 | GND |
| 12 | |
| 13 | |
| 14 | O0 |
| 15 | O1 |
| 16 | O2 |
| 17 | O3 |
| 18 | O4 |
| 19 | O5 |
| 20 | O6 |
| 21 | O7 |
| 22 | $\overline{\text{ODD}}$/EVEN (TBC) |
| 23 | GND |
| 24 | |
| 25 | |

# VARIOUS MANUAL OPERATIONS

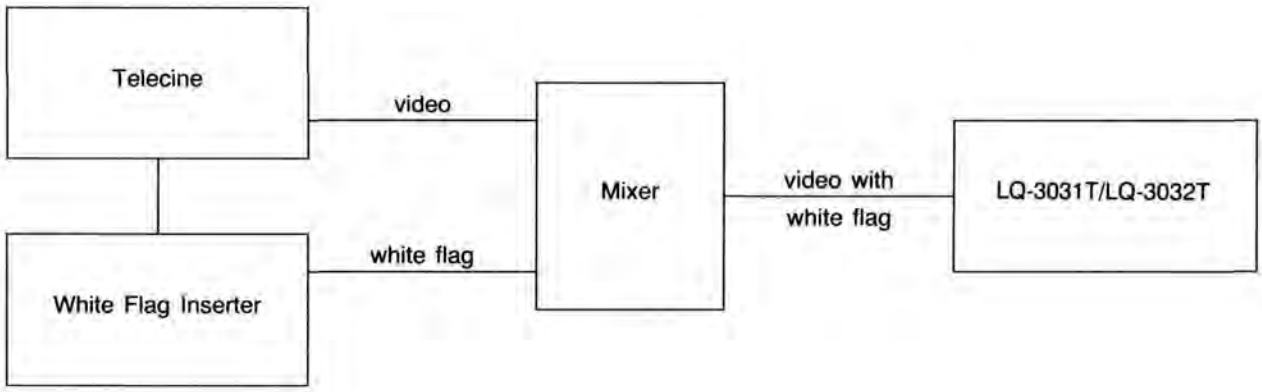
## ■ WHITE FLAG DETECTOR (Still Playback only)

1. The white flag is a signal (100% white peak) for inputting before the field to be played back so that each picture can be played back correctly during Still Picture playback.
   When a disc in which a white flag is entered is played back, the starting frame with the white flag is displayed.
2. White flag is convenient, as illustrated below, when 24 frames/sec. film is converted to 30 frames/sec. NTSC disc, for example.

• Motion picture film (24 frames/sec.) converted to video signal (30 frames/sec.).




• Block diagram.




• Location of white flag.
On 18th or 281th line of the vertical interval of the video signal to be recorded.
**Note:** Set up the white flag before attempting this function.

## ■ RECORDING VIDEO SIGNALS SPECIAL INSTRUCTIONS [LQ-3031T only]

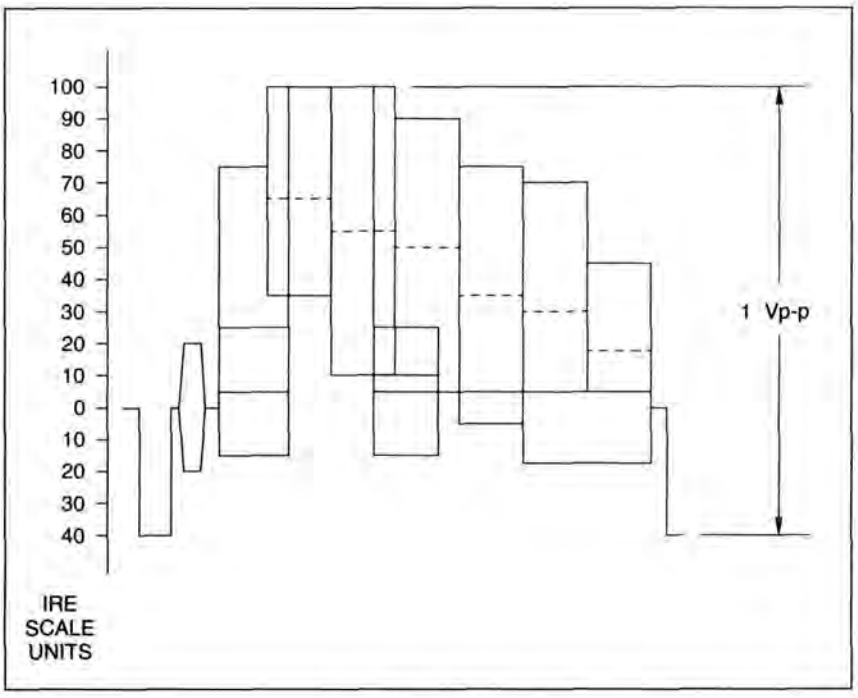
The following points require special attention when using a LQ-3031T to record video signals.

1. Standard Video signals

   Please use standard video signals conforming to RS-170A. (See Fig. 41)

   RS-170A specifies the following values,

| | |
|---|---|
| Color subcarrier frequency: | 3.579545MHz ± 10Hz |
| Synchronizing signal amplitude: | 0.286Vp-p |
| Amplitude of video signal: | 0.714Vp-p |




**[Fig. 41]**
Monitor showing standard signal waveform

Attempting to record signals that differ substantially from standard signals may result in the problems indicated below.

2. Color subcarrier frequency

   The color subcarrier frequency used should comply with the 3.579545MHz ± 10Hz specification described above.
   Since standard signal generators are generally expensive, there may be cases where use of non-standard signals is unavoidable. In these cases, the error should be kept to within ± 50Hz.
   Color may be lost if the frequency differs substantially.

3. Adjusting the recording level

The LQ-3031T recording level can be adjusted both automatically or manually.
When recording with automatic level adjustment, the recording level is adjusted by an AGC circuit as specified below.

1) Input amplitude less than 1.1Vp-p
   Gain is controlled to give a synchronizing signal amplitude of 0.286Vp-p.
2) Input amplitude greater than 1.1Vp-p
   Gain is controlled to give an amplitude no greater than 1.1Vp-p for the whole video signal.

The amplitude of the input signal should therefore be set to no more than 1.1Vp-p. If signals with larger amplitudes are input, the size of the synchronizing signal component of the recorded signal may be reduced. If this happens, the following problems may result:

1) Wavering images
2) Distorted images
3) Vertical Jitter
4) Inability to Gen Lock

When recording manually, the amplitude of the input signal synchronizing signal is detected, and a green LED lights up when the level reaches the standard value. Excessive inputs do not compress the synchronizing signal when the recording level is controlled manually.

However, when recordings are made manually, there may be points where there are extremely high level input video signals. The following problems may occur at these points.

1) Black or white "grass" distortion, similar to dropouts.
2) White-out, or loss of detail.

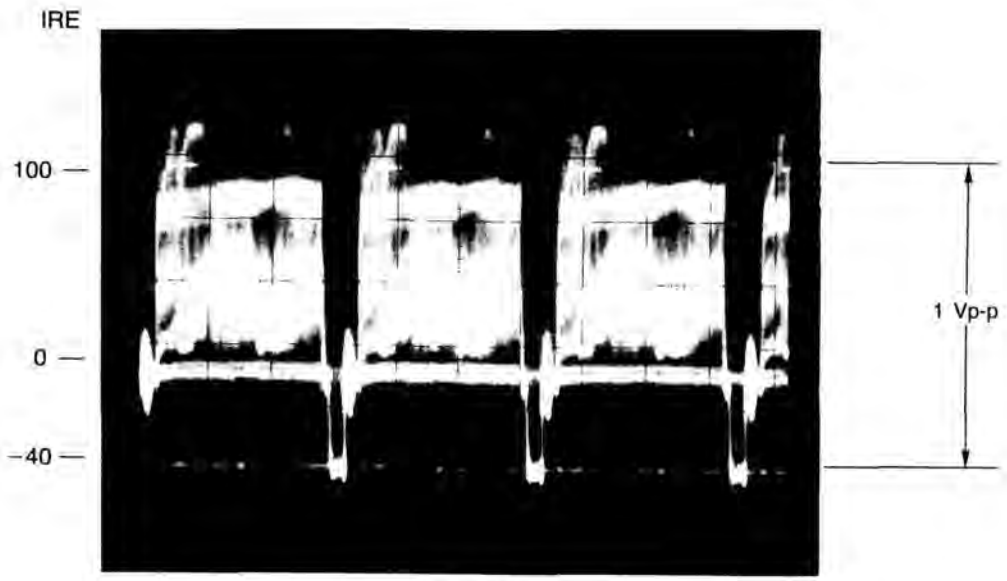
The output signal from the camera should therefore be monitored by a waveform monitor or oscilloscope, to set the signal to a standard level.

4. Input signals from the camera

The level of input signals from the camera varies greatly by adjustment of the camera and differences in lighting conditions. In particular, if a light shines directly into the camera, part of the camera input is a very strong light. If this happens, the exact result depends on the characteristics of the camera, but parts of the signal may have excessive amplitudes, even if the camera adjustment is set with an auto-iris. This may result in the problems described in the preceding section. (See Fig. 42)

To prevent this sort of problem, the video signals from the camera should be monitored by a waveform monitor or oscilloscope, so that if the output becomes too large, it can be adjusted manually or the illumination angle or distance and be altered.

Particular care should be taken to control the input signal level if the recording is to be used as a master for taking copies.




**[Fig. 42]**
Signal with areas of excessive amplitude.

5. Special consideration when shooting small objects

The following special considerations apply when a camera is taking pictures of small object with a close-up lens or similar device.

(1) The type of close-up lense, lighting considerations and aperture greatly affect the depth of field. If the depth of field is small, the parts that are not in focus appear blurred on the screen. This may produce color smear. One way of avoiding this is increasing the lighting intensity to increase the depth of field. Another method is to raise the camera sensitivity and reduce the aperture.

(2) When the object and the illumination are brought close together, there is a greater chance of the illumination entering the camera directly or reflecting strongly into the camera lens. The camera output should be monitored carefully to adjust the illumination untill a good output signal is obtained.

(3) If the background is while and is very close to the object, the color of the object may be reflected, coloring the background. This can be avoided by moving the object and background further apart or by changing the background color so that the reflected color is not obtrusive.

(4) Keep color saturation low. It provides a much better looking duplicate. Avoid recording images which have large amounts of chroma which fall below 0 I.R.E. units.

6. Disc duplication considerations

When making a master disc for making copies be careful so time base errors and sync dropouts are not recorded into the master; otherwise the duplicate will have the same errors, and they will tend to be magnified in the duplication process.

For this reason it is strongly recommended that a Time Base Corrector (TBC) be used to ASSURE quality recordings time after time.(*1)

(*1) Be sure to connect advanced vertical sync from the TBC when employing automatic frame duplication. This will assure frame accurate duplication.

Also any playback source such as VCR or off air TV signal should be passed through a TBC or frame synchronizer to assure quality recordings.

## ■ RECORDING FROM A VCR [LQ-3031T only]

A. Direct recording from a VCR is possible, but .....

(1) The recording will be interrupted if a loss of video input is encountered.

(2) Time base errors will cause the image to waver or jitter upon playback (edit points are a good example). The disc will not Gen Lock.

(3) Poor framing or poor sync on the source tape can cause random frames to be misrecorded or not recorded at all.

(4) Time base error from the tape will be impregnated into the disc; hence Gen Lock will be poor and copies will look terrible.

The examples cited here, and others, can cause only one field of the frame to be recorded; therefore the frame will be damaged and unusable .....

..... *the recorded check will detect the frame as blank but you will not be able to record there*

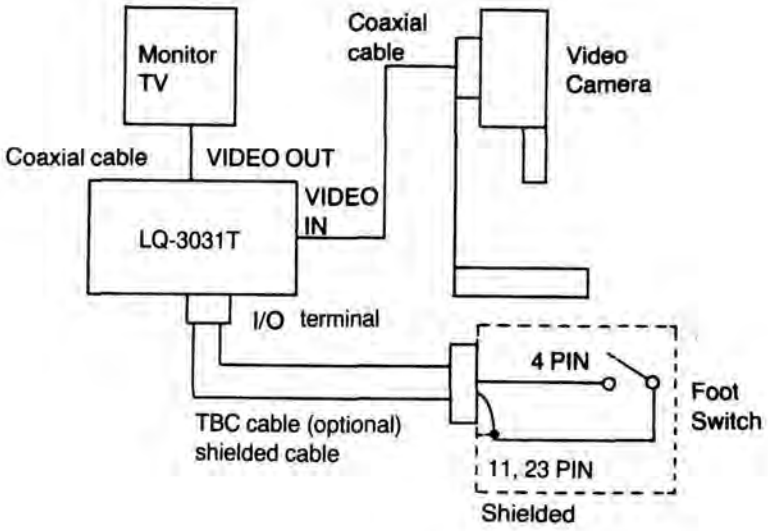
..... the picture will blink on and off or be very unstable

..... and the Gen Lock function will be adversely affected.

# RECORDING BY EXTERNAL SWITCH [LQ-3031T only]

## 1. STILL PICTURE RECORDING BY EXTERNAL SWITCH (LIKE A FOOT SWITCH ETC)

It is possible to record still frames, one at a time, by using an external control switch. To do so, set 'EXT.CTL (I/O)' in SYSTEM SETUP to ON and connect pin No. 4 (port I1) and Ground pin to an external switch. (Refer pin connection of TBC cable to page 47.)




**OPERATION**

1. Search the desired address number where recording starts with SEARCH button.
2. Set recording mode with REC MODE button.
3. Start recording by external switch "ON".

**Note:**

1. Keep switch "ON" longer than 50 m sec.
2. Keep switch "OFF" longer than 100 m sec.

# RECORDING BY EXTERNAL SWITCH [LQ-3031T only]

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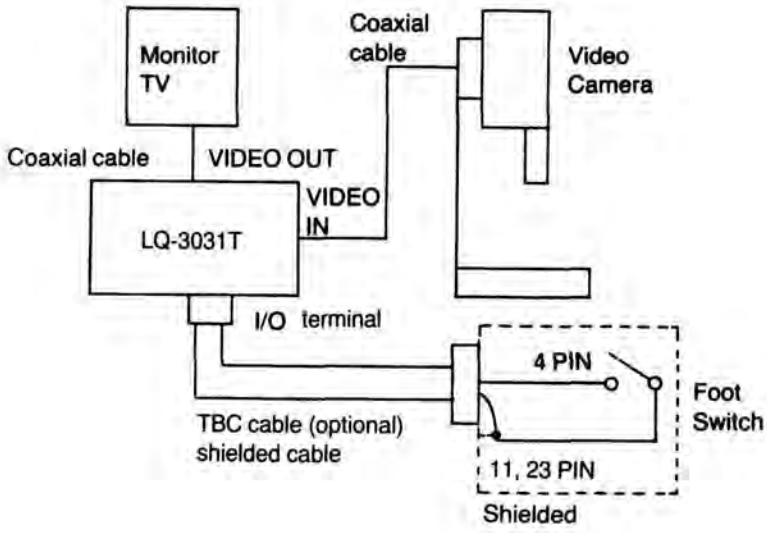



**OPERATION**

1. Search the desired address number where recording starts with SEARCH button.
2. Set recording mode with REC MODE button.
3. Start recording by external switch "ON".

**Note:**

1. Keep switch "ON" longer than 50 m sec.
2. Keep switch "OFF" longer than 100 m sec.

# ON-LINE OPERATIONS

■ The unit has been provided with an RS-232C interface to allow easy upgrade to computer system and also to allow operation of the unit remotely.

## 1. RS-232C INTERFACE

### 1. SPECIAL FEATURES OF SYSTEM

RS-232C interface of this unit has the following features;

(1) Full duplex(*1)
(2) ASCII code
(3) Baud rate variable (7 rates from 300 to 19200 baud; 300/600/1200/2400/4800/9600/19200)
(4) Character length variable (7 bit or 8 bit)
(5) Parity selection (Non parity, Odd parity, Even parity)
(6) Stop bit selection (1 or 2)
(7) Selectable communication control type (Control type 1 or 2)
(8) Transmission control by XON/XOFF is possible
(9) A 512 bytes buffer for receiving and a 256 bytes buffer for transmission

(*1) Some completion responses have a delay time. It is noted in format for ON-LINE COMMAND.

### 2. DATA COMMUNICATION CONTROL

The unit can select 2 types of data communication control methods.
The main difference of these types is the Request To Send line (RTS) control. The following is the outline of each type.

(1) Data communication control type 1
Feature of type 1 is that the Request To Send line (RTS) indicates a receivable state. Consequently, the transmission from the linked transmitter is controled by RTS.
**Note:**
«1» When RTS is in mark (OFF) condition, data is not received.
«2» When CTS and DSR are in the space (ON) condition, transmission is started.

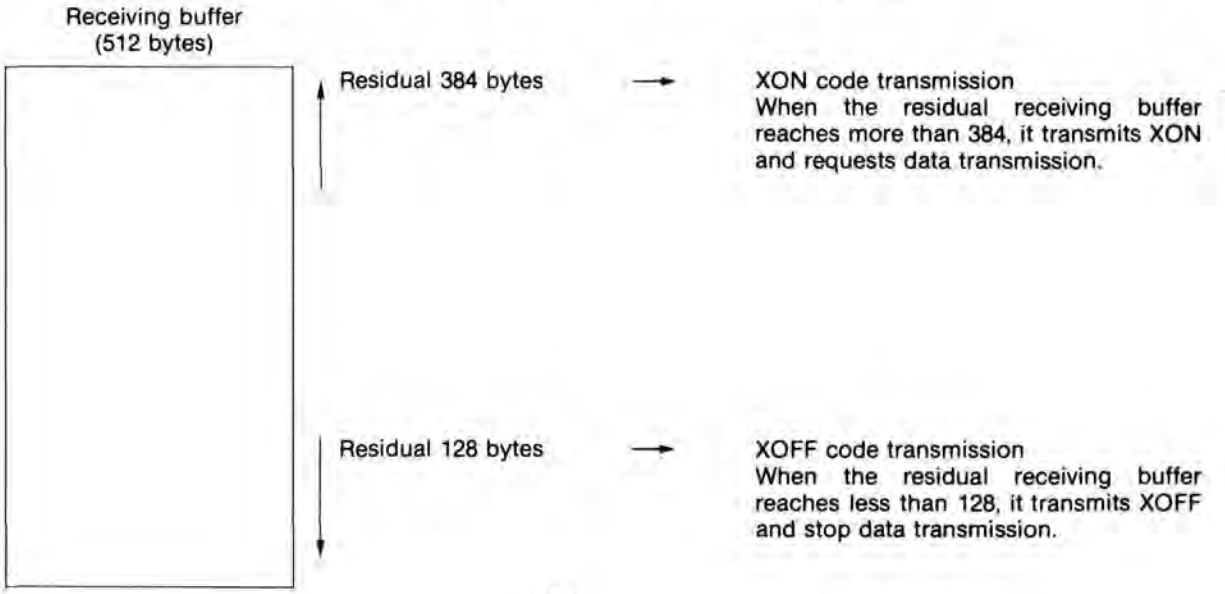
(2) Data communication control type 2
Feature of type 2 is that the Request To Send line (RTS) indicates the transmission request condition to the linked transmitter.
**Note:**
«1» When transmission request occurs and CTS is in mark (OFF) and DSR, DTR is in the space (ON) condition, RTS in ON. When CTS is ON, data is transmitted.
«2» CTS starting depends on RTS.

### 3. TRANSMISSION CONTROL BY XON/XOFF

XON/XOFF controls data during transmission from receiver to transmitter, communicating that the receiving buffer is full, and no more data can be received. This is governed by DC1 (11H=XON) and DC3 (13H=XOFF) of the transmission control code.

When the residual receiving buffer becomes less, this operation transmits an XOFF code to the transmitter, requesting a transmission stop. When buffer data processing advances, and some space become available in buffer, it transmits the XON code, and causes the transmitter to transmit data.

With the unit, when the residual receiving buffer reaches 128 bytes, XOFF code is transmitted, and when it reaches 384 bytes, XON code is transmitted. The XON/XOFF operation is indicated in following diagram.



## 4. COMMUNICATION MODE SET UP

RS-232C communication mode can be set up with front button and the Remote Controller via SETUP function. Battery back-up is provided, so communication mode, once set up, is maintained.
The communication mode, at shipping time, is set as follows.

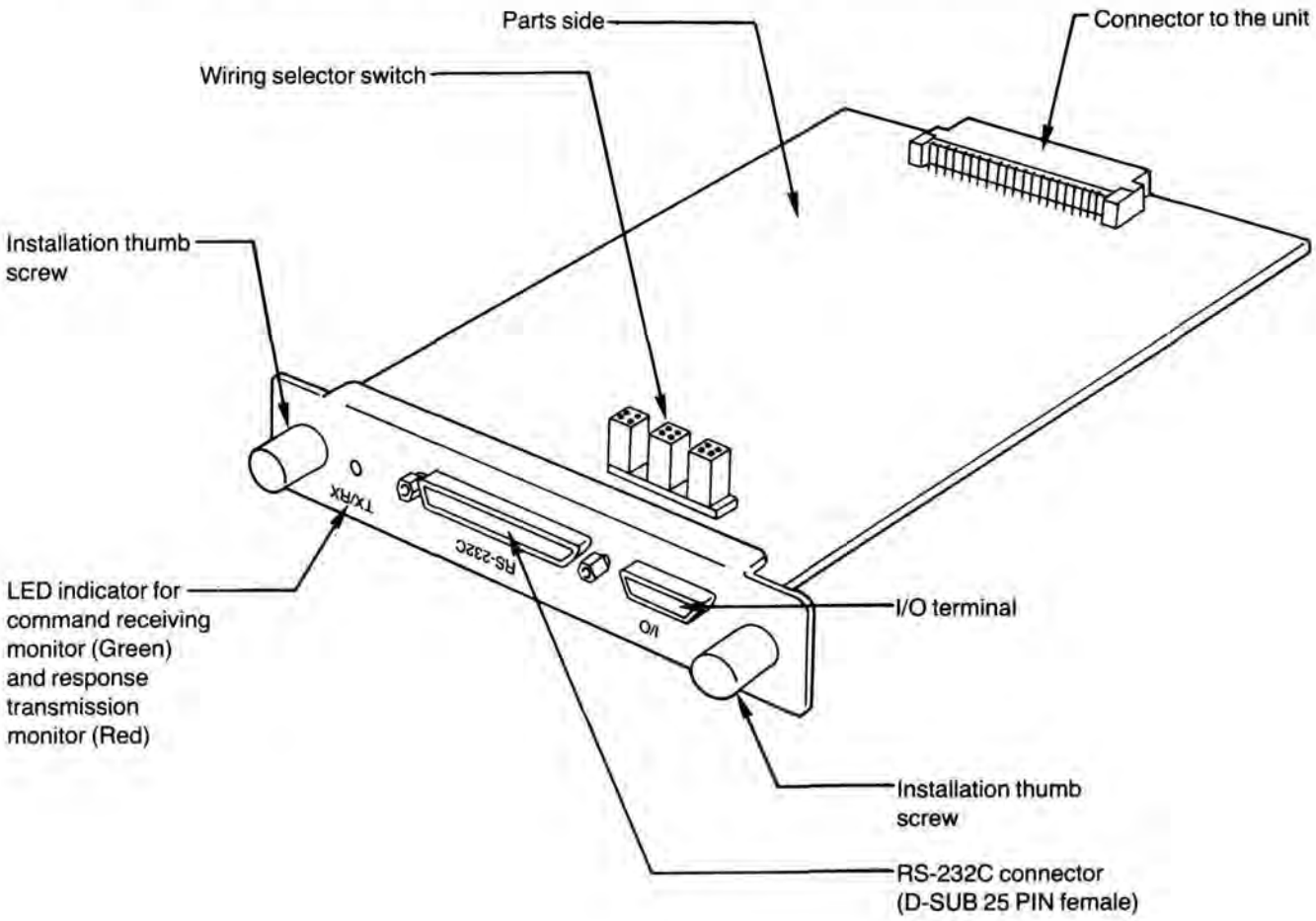
| | | |
|---|---|---|
| (1) | Baud rate: | 1200 baud |
| (2) | Character bit: | 7 bit |
| (3) | Parity: | EVEN parity |
| (4) | Stop bit: | 2 |
| (5) | Communication type: | Type 1 |
| (6) | XON/XOFF: | Not done |

## 5. RS-232C INTERFACE CARD

In this unit, host interface is a card type. In addition to the RS-232C, optional interface can be exchanged with RS-422A, interface for editing use, interface for editing system, . . . etc.

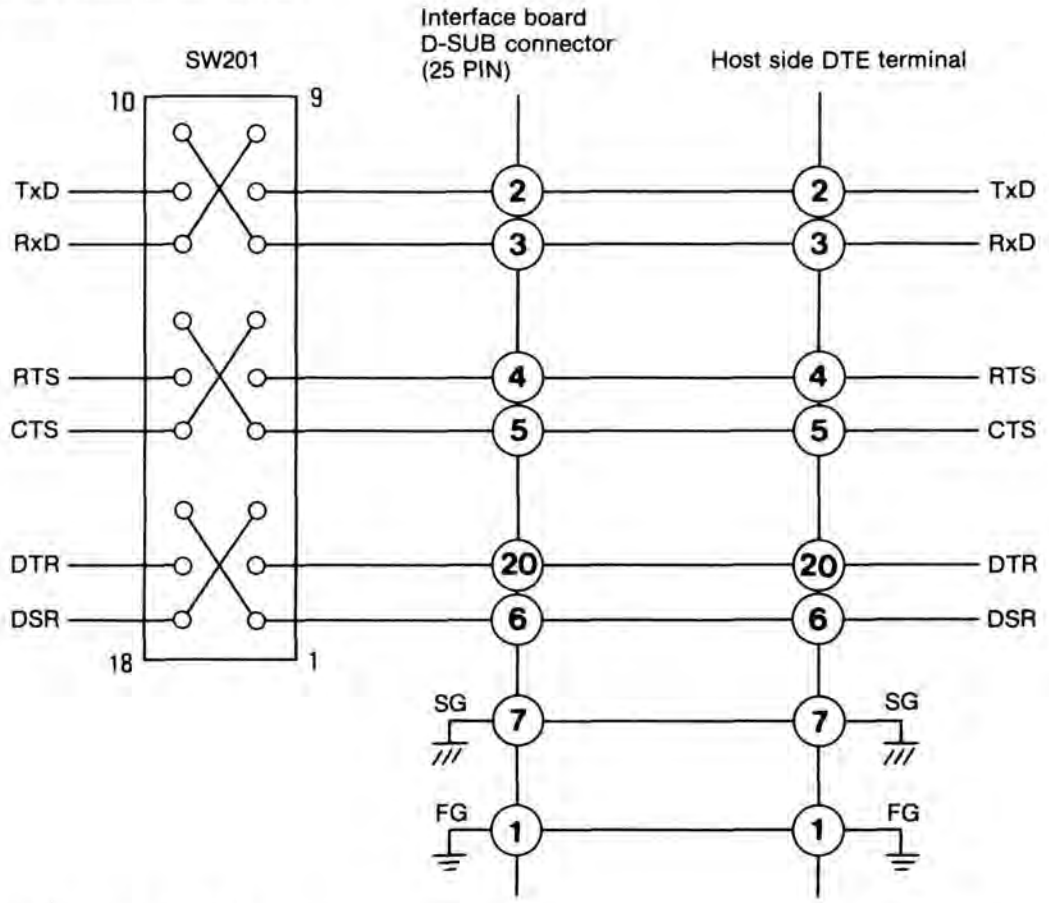
(1) Appearance

LED indicator for receiving monitor use (green)/LED indicator for transmission monitor use (red)/Back panel side RS-232C connector (D-SUB 25 pin female)/Installation thumb screws.

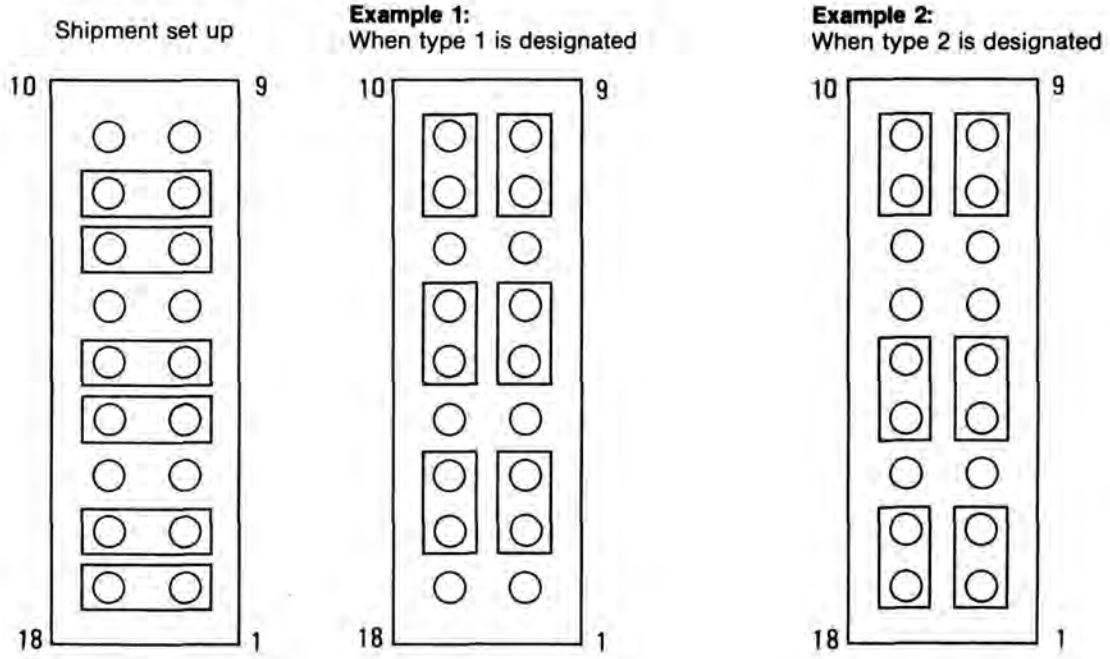


2) Wiring selector switch set up

① Wiring selector switch (SW201)



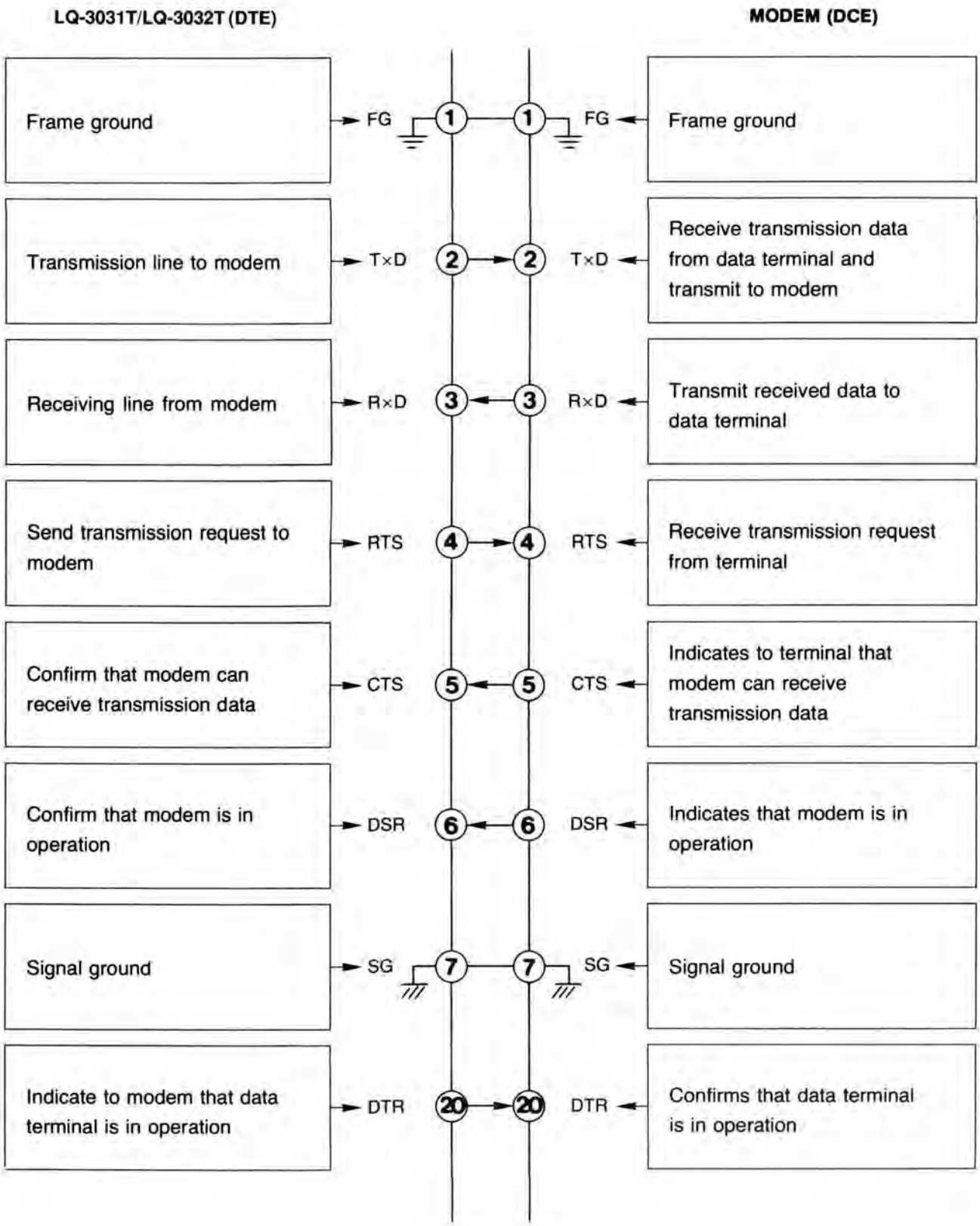

② Short pin set up method




* Wiring selector switch is straight wired at time of shipment. When DTE terminal by straight RS-232C cable, wiring selection should be done as examples indicate.

## 6. CONNECTION OF DATA CIRCUIT TERMINATING EQUIPMENT (DCE)

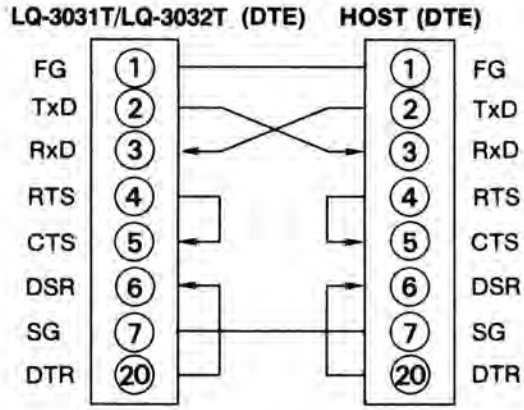
When this unit is connected with DCE, it is better to use a TYPE 2 Data Communication Control.



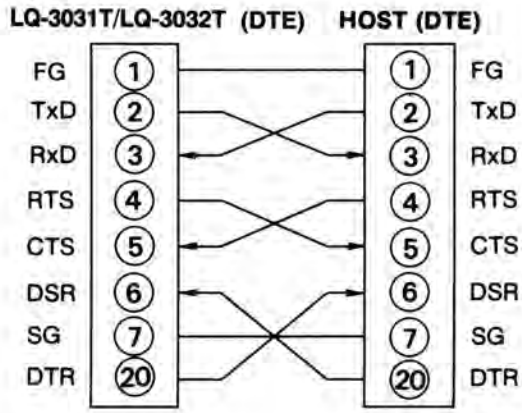
## 7. CONNECTION WITH DATA TERMINAL EQUIPMENT (DTE)

When the unit is connected with DTE, mutual communication can be done by connecting mutual input/output intervals with selector switch (on the RS-232C interface card).
Another method of performing mutual communication is to use the cable connecting mutual input/output.

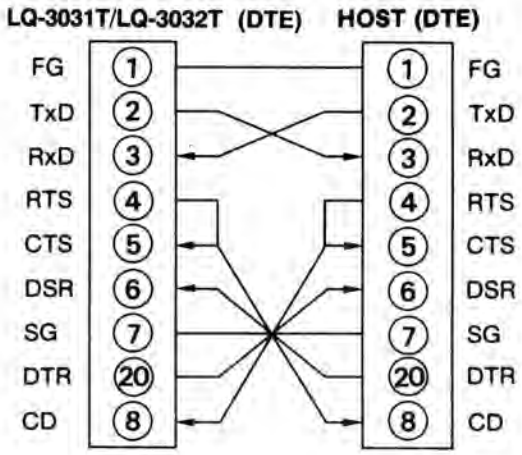
**Example 1**
Each data terminal reaches transmission possible status, regardless conditions at the other side. In order to prevent data loss it is necessary to handshake each command, or use the XON/XOFF control.
(use type 2 control)




**Example 2**
Host recognizes if the unit is in operation or not via the DSR line. By connecting mutual RTS-CTS, transmitter can transmit response to transmission request by CTS line. (For this connection, type 1 control should be used. In type 1, the unit is set to RTS ON at receivable {more than +3V}. In type 2, RTS is always OFF. Only at transmission time is RTS set to ON {more than +5V}.)




**Example 3**
Host recognized whether the unit is in operation or not via the DSR line. it can also control the transmission from the unit by the DTR. Host can detect that the unit is transmitting by CD. (type 2 control should be used)



## 2. ON-LINE PROCESSING OUTLINE

### 1. PURPOSE OF ON-LINE FUNCTION

This On-line function controls the unit via host computer, by using RS-232C standard asynchronous communication, between host computer and the unit.

### 2. COMMAND FORMAT

Command transfers form host computer to the unit are character strings enclosed with [STX] ~ [ETX] (or [EOT] ). Individual commands indicate a character string divided by [STX] ~ [ ; ] or [ETX] or ASCII code is used for character code.

### 3. COMMAND LENGTH

The unit stores received character strings of [STX] ~ [ETX] or [EOT] in receiving buffer.
The number of characters which can be received once is up to 256, including [ETX] or [EOT] . When more than 256 characters are received, data overflow occurs, and the received data becomes invalidated, so [NAK] 20 or [STX] E20 [ETX] is transmitted.

### 4. INTERRUPT COMMAND

When a decoded command is an interrupt command, the interrupt command is executed first, even if other execution commands are waiting in command buffer. The interrupt command with @ is stored in the command buffer as a sequential command.

### 5. SEQUENTIAL COMMAND

The sequential command is stored in the command buffer, and is executed as a stored order. However, an ! (exclamation mark) added sequential command is executed with priority as an interrupt command.

### 6. DESIGNATION OF THE STOP FRAME

Stop frame can be designated by relative address from the current frame, with an +, − added command, it can also be designated by absolute address. (ex.; PF + 1000 ; )

### 7. PROGRAMMING FUNCTION

The unit has program memory (memory area for program use). When program writing command "MS" is transmitted from host computer, the commands transmitted after are loaded in program memory, the loading is stopped by writing completion command "ME", then are stored in program memory. Stored content is sequentially executed, when program run command is executed.

### 8. PROGRAMMING CAPACITY

Program memory has 8 k bytes. When larger than 8 k, the unit transmits [STX] E34 [ETX] as a memory overflow error.

### 9. BACK-UP IN PROGRAM

The content of program memory is backed up by a built-in battery, hence, even when power is OFF, program content is maintained.

### 10. PROTOCOL OF THE EXECUTION END RESPONSE

Concerning protocol of On-line response, 16 selections are possible by ON-LINE commands.

### 11. HOW TO RETURN THE EXECUTION END RESPONSE

In the unit, messages are stored in transmission buffer as they are generated, and are transmitted in the same sequence.

### 12. CAPACITY OF TRANSMIT BUFFER

If the transmission buffer is full, or when the character string waiting transfer exceeds 256 bytes, the subsequent transmission data generated after this is not stored in the transmission buffer, it is truncated.

### 13. XON/XOFF CONTROL

When XON/XOFF control is enabled, if the residual receiving buffer exceed 128 bites. XOFF (11H) is transmitted and stops host computer transmission, If the residual receiving buffer becomes less than 384 bites, XON (13H) is transmitted, and allows host computer to transmit.
When XOFF (11H) is received, the unit stops transmission, then when XON (13H) is received, the unit restarts transmission.

### 14. EFFECTIVE ASCII CODE

Concerning received data, [STX] , [ETX] , [EOT] , [DC1] , [DC3] , [NAK] , [ ! ] , [ " ] , [ # ] , [ $ ] ~ [ . ] , [ - ] , [ ? ] ~ [ z ] , [ ~ ] becomes valid due to ASCII code, received data is ignored by the ASCII codes.
Consequently, even if invalid ASCII code is inserted as a command, data transfer is validated.

## 15. CONTROL CHARACTERS

- [STX] ..... Starts the transfer of commands and messages to be communicated between the host computer and the unit.
  (code 02)

- [ETX] ... [EOT] Terminates the transfer of commands and messages to be communicated between the host computer and the unit.
  (code 03) (code 04)

- [:] ..... Decodes any numerical data received prior to this character. If no numerical data exist, the decoded result is set to "0" and processed as a default value. Data with no colon (:) at the end are processed as invalid.
  (code 3A)

- [,] ..... Delimits commands in the command group.
  (code 3B)

- [ACK] ..... Indicates that the unit has received data normally.
  (code 06)

- [NAK] ..... Indicates the occurrence either of a communication error or receive buffer overflow during the receiving.
  (code 15)
  * When parity error, etc. communication error occurs, [NAK] 21 is returned as a receiving error response. The content received during this time invalidated.
  * When receiving buffer overflows, [NAK] 20 is returned as a receiving error response. The content received during this time is invalidated.

- [@] ..... Converts the interrupt command to the sequential execution command.
  (code 21)

- [!] ..... Changes sequential instruction to interrupt instruction.
  (code 40)

- [*] ..... Indicates the next number of general register and timer register content. Valid only during programming time. Except during program execution time, content cannot be guaranteed.
  (code 2A)
  Register value 0 ~ 130. (For detail, please refer to page 122)

- [[] ..... Indicates data address (indicated by next number register content).
  [Valid only during programming time]. (For detail, please refer to page 122)
  (code 5B)

- [#] ..... Indicates content of next number of status register.
  [Valid only at programming time]. (For detail, please refer to page 122)
  (code 23)

- [+] ..... Makes the subsequent value a relative frame number and the number added to the present number an argument.
  (code 2B)

- [−] ..... Makes the subsequent value a relative frame number and the number substracted from the present number an argument.
  (code 2D)

- [.] ..... Inhibits the command execution completion response.
  (code 2E)

## 16. DECK NUMBER (Logical unit number)

The unit has its own deck number (0-99). By adding this deck number at the beginning of command, only the designated unit can be operated. Deck number is set up by using SETUP function.

At time of shipment, deck number is 0.
A command without deck number is effective in the unit having any deck number.

**Note:**

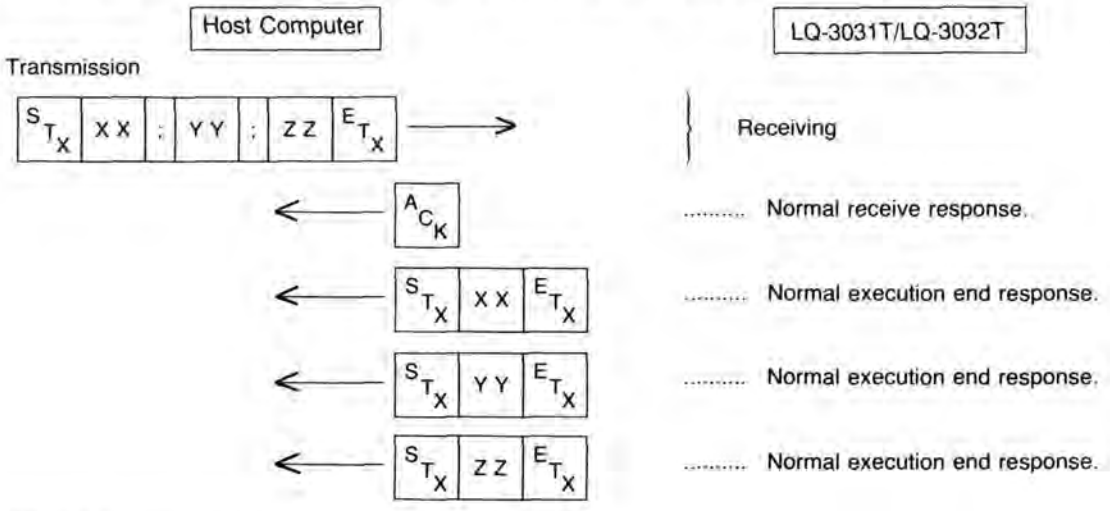
1. When RS-422A is used in multipoint connection, the controller has to allow only one unit's response and inhibit others.
2. Concerning command which can not stop execution completion response, ie "NO", *when used in a multipoint connection, be certain to transmit with deck number on.*

If above notes are not followed, transmissions of each unit will collide with each other, causing data transfer error or drive IC destruction.

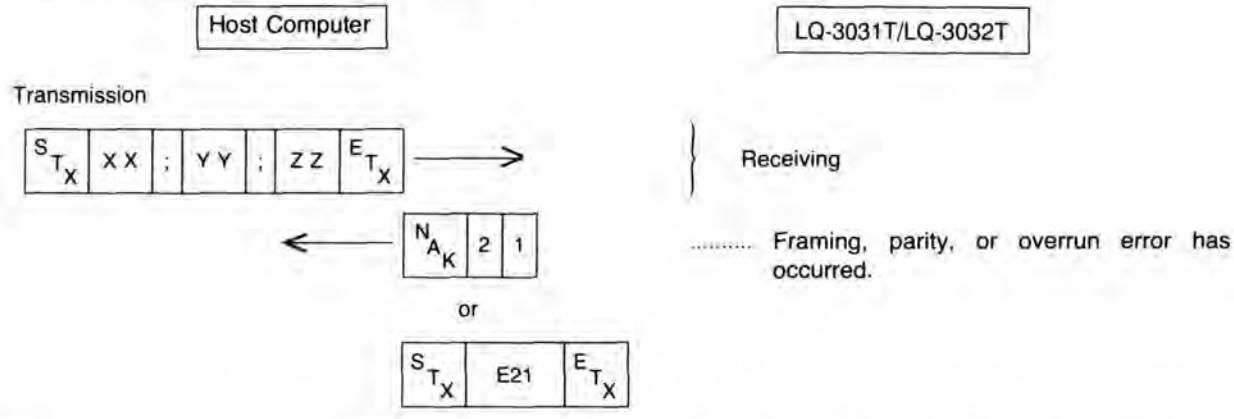
## 3. DATA COMMUNICATION PROTOCOL

When the unit normally executes commands from the host, it returns the execution completion response, (except monitor commands, the first 2 characters of the command are used).
When commands cannot be executed, or when executions are stopped due to an abnormality, an error response is returned, explaining the abnormality, instead of an execution completion response. Abnormal responses are generally divided into communication errors and command execution errors.
The following are basic examples of data communications with host computers.

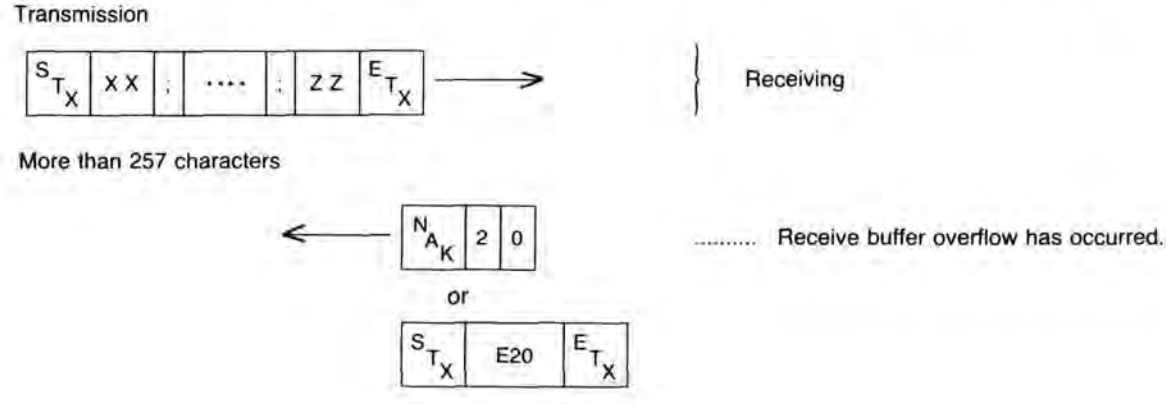
1. When data communication and command execution are normally completed.



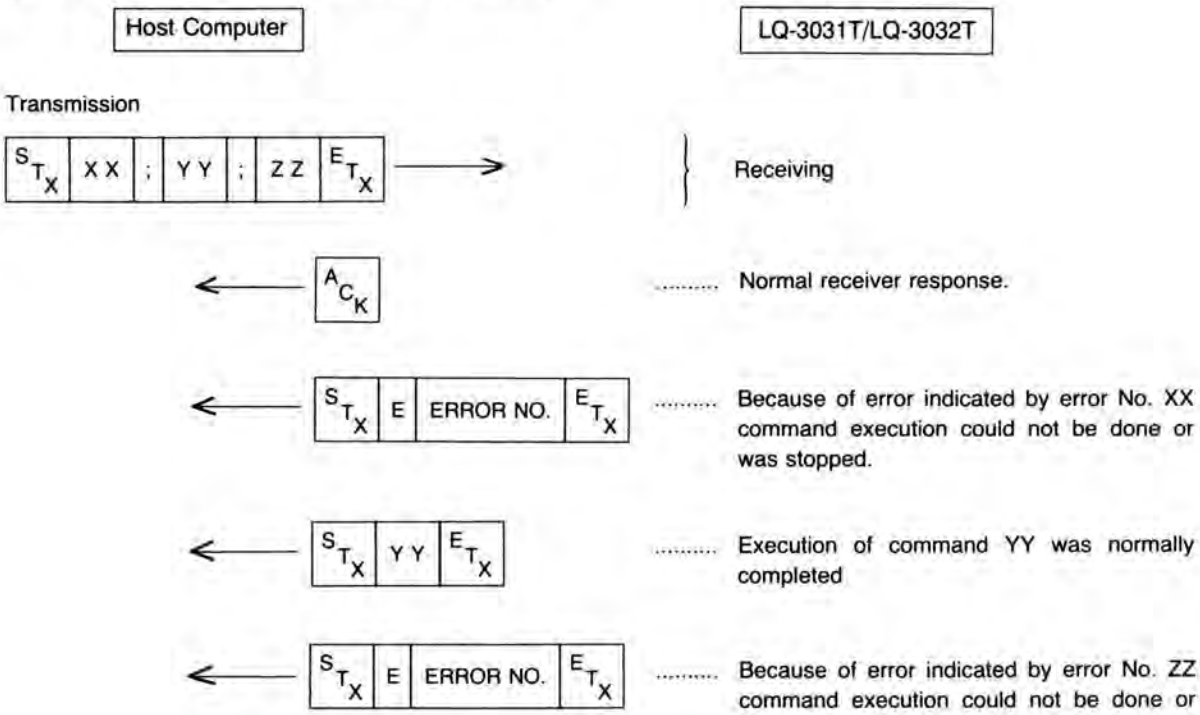

2. When data communication abnormalities occur




**Note:** Some commands take longer to execute. The host will not get the completion response until the operation is finished.



3. When command execution was abnormally completed

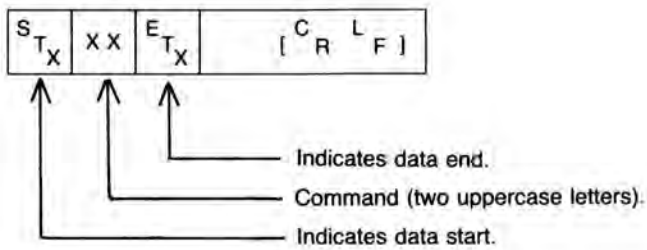



## 4. ON-LINE DATA FORMAT

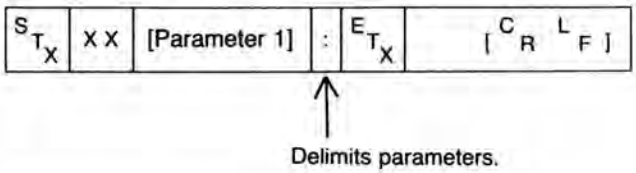
[ ] ..... possible to select

### 1. COMMAND FORMAT

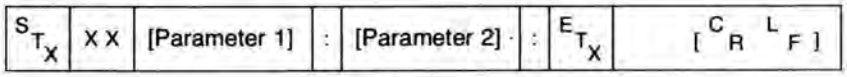
1) Basic style



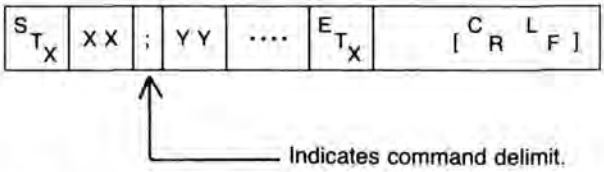

2) Command with 1 parameter



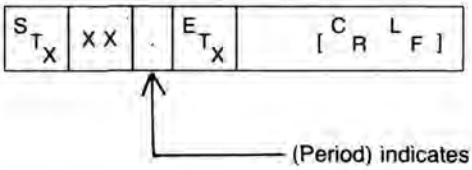

3) Command with 2 parameters



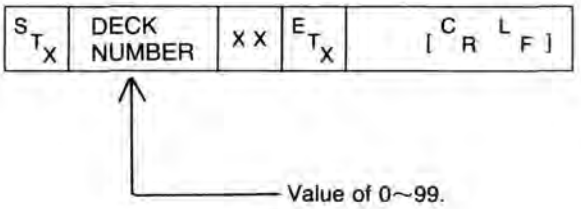
4) Multiple command




5) Disabling of execution completion response

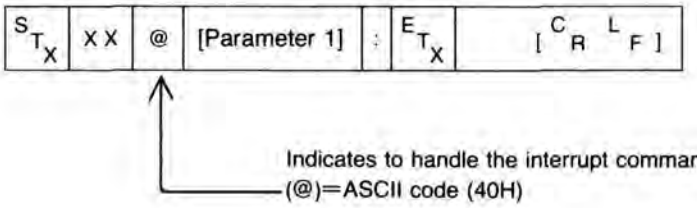



6) The unit designation



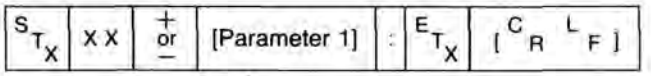

※ This command is valid only for the unit with the designated deck number.

7) Interrupt command to sequential command



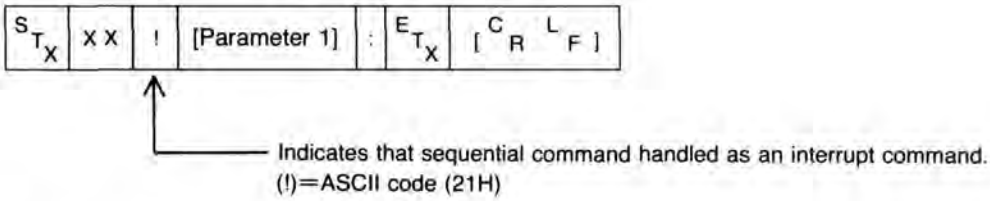

**Note:** For [Parameter] up to 5 digits can be used within the upper range limit. For data, 100, expressions such as 100, 00100 can be used. The data exceeding 5 digits are OVERFLOW (E01) error.

8) Relative address control

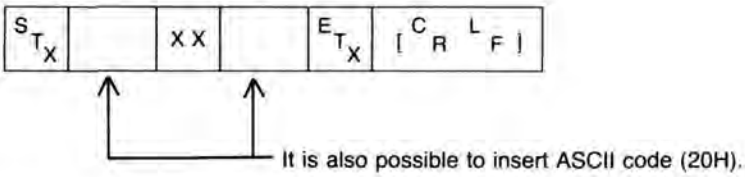



Number of address from current address to stop frame,
<Example>
+1000..... Playback or search until (current address +1000) address.
−1000..... Playback or search until (current address −1000) address.

9) Change sequential command to interrupt command




10) Space insertion

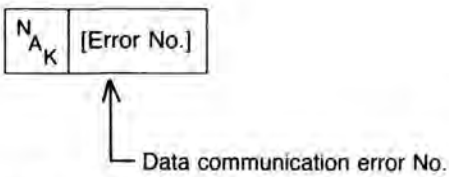


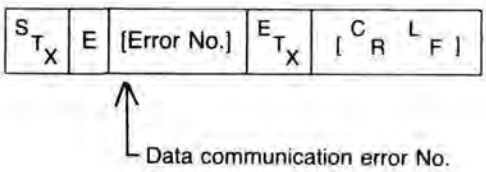

## 2. RESPONSE FORMAT

1) Receive response

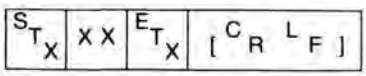
[ ] ..... possible to select

..... Normal data communication end.

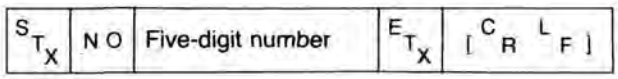



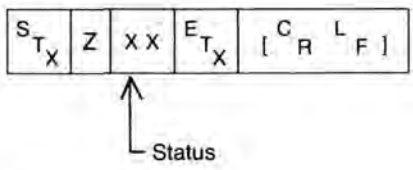

2) Execution end response



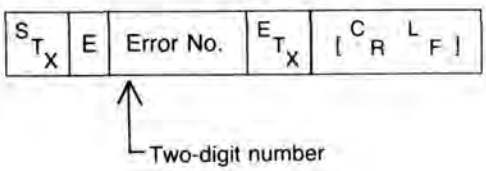

3) Frame number (ADDRESS)



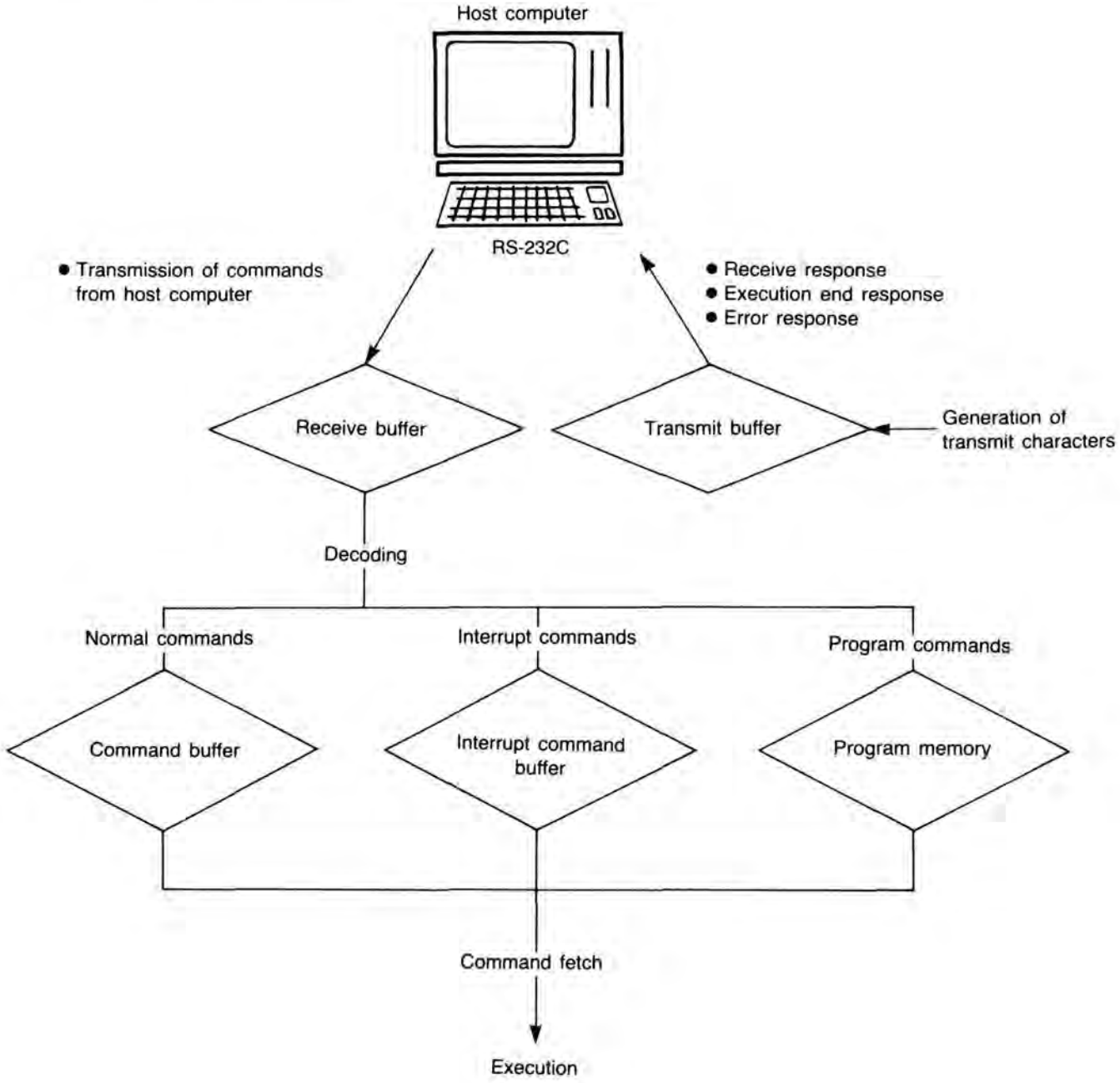

4) Status




5) The unit error response



## LQ-3031T/LQ-3032T BUFFER DIAGRAM




**Note:** When receiving the program run command, the unit fetches commands from the program memory for execution, and in response to the other commands, it fetches commands from the command or interrupt buffer for execution. The commands in the interrupt command buffer are executed prior to those in the command buffer.

## 5. ON-LINE FUNCTION

**Note:** 1. ★ ····· LQ-3031T only
2. Forward frame ····· Higher address frame
Backward frame ····· Lower address frame
3. Int. : Interrupt command
Seq.: Sequential command

### 1. PLAYBACK COMMANDS

| No. | Function | Int./ Seq. | Command | First parameter | Second parameter | Operation description |
|---|---|---|---|---|---|---|
| 1 | FWD. PLAY | Seq. | P F | Stop frame | | Play to the forward frames |
| 2 | REV. PLAY | Seq. | P R | Stop frame | | Play to the backward frames |
| 3 | FWD. STEP | Seq. | T F | Step time | Stop frame | Step playback to the forward frames |
| 4 | REV. STEP | Seq. | T R | Step time | Stop frame | Step playback to the backward frames |
| 5 | FWD. SLOW | Seq. | L F | Slow speed | Stop frame | Slow playback to the forward frames |
| 6 | REV. SLOW | Seq. | L R | Slow speed | Stop frame | Slow playback to the backward frames |
| 7 | FWD. FAST | Seq. | F F | Fast speed | Stop frame | Fast playback to the forward frames |
| 8 | REV. FAST | Seq. | F R | Fast speed | Stop frame | Fast playback to the backward frames |
| 9 | DUBBING PLAY | Seq. | D P | Stop frame | | Dubbing play playback |
| 10 | FWD. SCAN | Seq. | C F | | | Approx. 280 frame jump to the forward frames |
| 11 | REV. SCAN | Seq. | C R | | | Approx. 280 frame jump to the backward frames |
| 12 | SEARCH | Seq. | S R | Target frame | | Mandatory jump to target frame |
| 13 | REPEAT SET/RESET | Seq. | R P | 0...RESET<br>1...SET | | Set or reset the repeat playback operation |
| 14 | FWD. JUMP | Int. | J F | Length of jump | | Frame jump to the forward frames (※1) |
| 15 | REV. JUMP | Int. | J R | Length of jump | | Frame jump to the backward frames (※1) |
| 16 | PAUSE | Int. | P A | | | Pause the playback operation |
| 17 | RESTART | Int. | R S | | | Pause release |
| 18 | EJECT | Int. | E J | | | Eject the disc cartridge |
| 19 | LOAD | Int. | L D | | | Load the disc cartridge |
| 20 | STOP | Int. | S P | | | Stop the unit |

※1 The unit does not confirm address after a jump.

### 2. RECORDING COMMANDS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ★ | 21 | RECORD MODE | Seq. | R M | Record region | | Set Record Mode |
| ★ | 22 | RECORDING MODE CLEAR | Seq. | R C | | | Clear Record Mode |
| ★ | 23 | RECORD START | Seq. | G S | Record quantity | Recording speed | Start recording |
| ★ | 24 | RECORD STOP | Int. | G R | | | Terminate recording |
| ★ | 25 | AUDIO RECORD SET | Seq. | A S | | | Set audio recording |
| ★ | 26 | AUDIO RECORD RESET | Seq. | A R | | | Reset audio recording |

### 3. ERASE COMMANDS (ALTERNATE PICTURE WRITE/READ)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 27 | ERASE MODE | Seq. | E M | | | Set Erase Mode |
| ★ | 28 | ALTERNATE PICTURE ADDRESS WRITE | Seq. | A W | Alternate picture address | | Write the alternate picture address |
| | 29 | ALTERNATE PICTURE ADDRESS MONITOR | Seq. | A M | | | Monitor the alternate picture address |

## 4. DISC ID COMMANDS

**Note:** ★ ····· LQ-3031T only

| | No. | Function | Int./ Seq. | Command | First parameter | Second parameter | Operation description |
|---|---|---|---|---|---|---|---|
| ★ | 30 | DISC ID. WRITE | Seq. | I W | Disc ID. code | | Write of Disc ID. code |
| ★ | 31 | DISC ID. ERASE | Seq. | I E | Disc ID. code | | Erase of Disc ID. code |
| | 32 | DISC ID. READ | Seq. | I R | | | Monitor of Disc ID. code |
| | 33 | DISC ID. REWRITABLE TIME | Seq. | I T | | | Monitor the remaining of Disc ID. code region |

## 5. ON-LINE CONTROL COMMANDS

| | | | | | | |
|---|---|---|---|---|---|---|
| 34 | ON-LINE | Int. | O N | Mode No. | | Open the communication channel |
| 35 | OFF-LINE | Int. | O F | | | Close the communication channel |
| 36 | ON-LINE LOCK | Seq. | O L | 0...Lock off<br>1...Lock on | | Disable front panel on/off-line button |

## 6. MONITOR COMMANDS

| | | | | | | |
|---|---|---|---|---|---|---|
| 37 | PLAYER STATUS | Int. | PS | 0 | | Request for transmission of the unit condition |
| | | | | 1 | | Request for transmission of the unit or disc condition |
| | | | | 4 | | Request for transmission of Unit type |
| 38 | FRAME NUMBER | Int. | NO | | | Request for transmission of the unit or disc condition |
| 39 | ERROR STATUS | Int. | ES | 0 | | RS-232C Setup |
| 40 | SETUP STATUS | Seq. | SS | 0 | | RS-232C Setup |
| | | | | 1 | | Program Setup |
| | | | | 2 | | Playback Setup |
| | | | | 3 | | Recording Setup |
| | | | | 4 | | System Setup |
| | | | | 5 | | TBC Control Setup |
| 41 | RECORDING SPACE CHECK | Seq. | RE | 1 or 2 | | Check recording space of video |
| 42 | NON-RECORDED AUDIO RANGE CHECK | Seq. | AE | 1 or 2 | | Check non-redorded range of audio |
| ★ | 43 | RECORD REMAIN | Int. | RR | | | Request for transmission of next recordable region |

## 7. INPUT/OUTPUT COMMANDS

**Note:** ★ ····LQ-3031T only

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 44 | PUT | Seq. | PU | Data | | Data output to the output port |
| | 45 | GET | Seq. | GE | 1 . . . Keycode<br>2 . . . Input port | Destination ※ register | Request for keycode of the front panel/remote controller and input port data |
| | 46 | KEY IN | Seq. | IN | Destination register | | Request for the figure input from the front panel/remote controller |
| ※ | 47 | TRANSMIT | Seq. | TX | Characters (Transmit) | | Transmit characters to terminal |
| ※ | 48 | RECEIVE | Seq. | RX | Characters (Receive) | Set register number | Receive characters from terminal |

**Note:** ※ ····· Program only

## 8. COMMAND EXECUTION CONTROL COMMANDS

| | | | | | | |
|---|---|---|---|---|---|---|
| 49 | ALL CLEAR | Int. | AC | | | Clear execution mode, transmit buffer and command buffer |
| 50 | CANCEL | Int. | CS | | | Cancel execution command |
| 51 | HALT | Seq. | HT | Time (second) | | Await next command execution halt. Restart execution by CS command input, or wait time |

## 9. DISPLAY/VIDEO/AUDIO CONTROL COMMANDS

| No. | Function | Int./ Seq. | Command | First parameter | Second parameter | Third parameter | Description |
|---|---|---|---|---|---|---|---|
| 52 | DISPLAY SET | Seq. | DS | | | | Set frame No., data, playback Mode, error display |
| 53 | DISPLAY RESET | Seq. | DR | | | | Reset frame No., data, Playback Mode, error display |
| 54 | VIDEO SET | Seq. | VS | | | | Check video (mute off) |
| 55 | VIDEO RESET | Seq. | VR | | | | Check video (mute on) |
| 56 | INTERNAL VIDEO | Seq. | VI | | | | Set internal video |
| ★ 57 | EXTERNAL VIDEO | Seq. | VE | | | | Set external video |
| ★ 58 | VIDEO MODE SELECT | Seq. | VM | 0...NTSC<br>1...RGB<br>2...S-VIDEO<br>3...DUBBING | | | Select the video input signal |
| 59 | AUDIO CH1 (L) | Seq. | A1 | Data (ON)<br>---- ( OFF) | | | Set/reset audio left channel (CH-1) |
| 60 | AUDIO CH2 (R) | Seq. | A2 | Data (ON)<br>---- ( OFF) | | | Set/reset audio right channel (CH-2) |
| 61 | AUDIO SET | Seq. | AS | | | | Set audio playback (at Playback Mode) |
| 62 | AUDIO RESET | Seq. | AR | | | | Mute audio playback (at Playback Mode) |
| 63 | VERTICAL POSITION | Seq. | VP | Position data (0-2) | | | Set vertical position of screen display (three ranks) |
| 64 | DISPLAY WRITE | Seq. | DW | Row (1-9) | Character strings | | Caption On-screen without Background |
| 65 | CHARACTER WRITE | Seq. | CW | Row (1-9) | Column (1-20) | Character strings | Caption On-screen without Background |

## 10. FUNCTION SET & BEEP COMMANDS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 66 | USER AREA LIMITATION | Seq. | UA | first address | End address | | Set the user area (※2) |
| 67 | BEEP | Seq. | BP | 0...Short<br>1...Long | | | Beep sound output |
| 68 | VALUE | Seq. | VL | Characters | Register number to transfer or to be transfered | | Characters → Cpde number (PROGRAM only) |
| 69 | SETUP | Seq. | SE | 0...Set up shipment<br>1...Set up playback<br>2...Set up record<br>3...Set up communication<br>4...Set up system<br>5...Set up TBC Control | Setup data | | SETUP operation<br>(Set up each item for ex –factory, playback, record, communication, system, and TBC control) |
| 70 | NO OPERATION | Seq. | NP | | | | Delay execution timing or set timing of command |

※2 User area = User's define area

## 11. PROGRAM CONTROL COMMANDS

| No. | Function | Command | First parameter | Second parameter | Third parameter | Description |
|---|---|---|---|---|---|---|
| 71 | MEMORY START | MS | Program name | | | Start writing of program command |
| 72 | MEMORY END | ME | | | | End writing of program command |
| 73 | PROGRAM RUN | RN | Program No. | | | Execute program command |
| (※3) 74 | PROGRAM END | EN | Program No. | | | Terminate & restart program run |

※3 "EN" command is program only.

**Note:** MEMORY START. MEMORY END and PROGRAM RUN commands are On-line commands. These commands are impossible to execute as program commands.

## 12. DATA TRANSFER COMMANDS (PROGRAM ONLY)

| No. | Function | Command | First parameter | Second parameter | Third parameter | Description |
|---|---|---|---|---|---|---|
| 75 | STORE | ST | Destination register | *Source register<br>*Source data | | (Destination) ← (Source)<br>Set register No. contents |
| 76 | MOVE | MV | Destination register | *Source register<br>*Source data | | (Destination) ← (Source)<br>Transfer register No. contents |

## 13. BRANCH/CALL COMMANDS (PROGRAM ONLY)

| | | | | | | |
|---|---|---|---|---|---|---|
| 77 | GOTO | G O | Label No. | | | Compulsory jump |
| 78 | IF EQUAL THEN GOTO | E Q | Destination register | *Source register *Source data | Destination label No. | IF (Destination) EQUAL (Source) THEN branch [conditional jump] |
| 79 | IF NOT EQUAL THEN GOTO | N E | Destination register | *Source register *Source data | Destination label No. | IF (Destination)NOT EQUAL (Source) THEN branch [conditional jump] |
| 80 | IF GREATER THAN THEN GOTO | G T | Destination register | *Source register *Source data | Destination label No. | IF (Destination) > (Source) THEN branch [conditional jump] |
| 81 | IF LESS THAN THEN GOTO | L T | Destination register | *Source register *Source data | Destination label No. | IF (Destination) < (Source) THEN branch [conditional jump] |
| 82 | CALL | C A | Label No. | | | Branch to subroutine |
| 83 | RETURN | R T | | | | Return from subroutine |
| 84 | SWITCH | S W | Destination register | | | Branch to the label number |

## 14. LOGICAL COMMANDS (PROGRAM ONLY)

| | | | | | | |
|---|---|---|---|---|---|---|
| 85 | AND | AN | Destination register | *Source register *Source data | | (Destination) ← (Source) AND (Destination) |
| 86 | OR | OR | Destination register | *Source register *Source data | | (Destination) ← (Source) OR (Destination) |
| 87 | EXCLUSIVE OR | EO | Destination register | *Source register *Source data | | (Destination) ← (Source) XOR (Destination) |

## 15. ARITHMETIC COMMANDS (PROGRAM ONLY)

| | | | | | | |
|---|---|---|---|---|---|---|
| 88 | ADD | AD | Destination register | *Source register *Source data | | (Destination) ← (Source) + (Destination) |
| 89 | SUBTRACT | SB | Destination register | *Source register *Source data | | (Destination) ← (Source) - (Destination) |
| 90 | MULTIPLY | MU | Destination register | *Source register *Source data | | (Destination) ← (Source) × (Destination) |
| 91 | DIVIDE | DV | Destination register | *Source register *Source data | | (Destination) ← (Destination)/ (Source) |

## 6. FORMAT FOR ON-LINE COMMANDS

**Note:** 1. [STX], [ETX], [CR], [LF] and the reception responses are omitted from the following explanation.
2. Forward frame = Higher address frame
Backward frame = Lower address frame
3. User area = User's defined area set by "UA" command (See page 106)

### 1. PLAYBACK COMMANDS

## 1 FWD. PLAY

**Function**

● Playback to forward frames at normal speed (30 frames per sec.).

**Commands**

● **P F** STOP - FRAME **:** ..... Segment command

● **P F** ..... Point command

※ Extent of stop frame: user area
Default values: last frame in user area

**Completion responses**

● P F ——— The Forward Playback operation has been attained (point command).
——— The stop frame has been reached (segment command).

● E 0 1 ——— The stop frame is beyond the limits of user area.
eg: Overflow of the input data.

## 2 REV. PLAY

**Function**

● Playback to backward frames at normal speed (30 frames per sec.).

**Commands**

● **P R** STOP - FRAME **:** ..... Segment command

● **P R** ..... Point command

※ Extent of stop frame: user area
Default values: first frame in user area

**Completion responses**

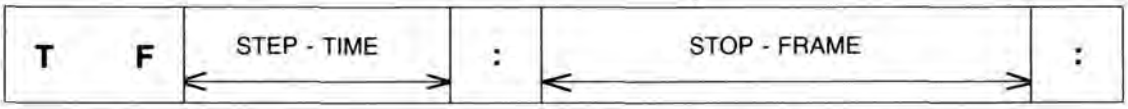
- P R
  - The Backward Playback operation has been attained (point command).
  - The stop frame has been reached (segment command).
- E 0 1
  - The stop frame is beyond the limits of user area.
    eg: Overflow of the input data.

# 3 FWD. STEP

**Function**

- Still/Step Playback to forward frames.
  ① Still Playback at the frame address now being played back (point command.)
  If this command is received during Still Playback, the unit will step one frame (STEP) to forward frames and then Still Playback will resume.
  ② Playback from present frame at specified Step-Time.
  ③ Playback from present frame at specified Step-Time until stop frame (segment command).

**Commands**

- 


..... Segment command

- 


..... Point command

※ Extent of step time: 1 sec.~256 sec.
Default values: 1 sec.

※ Extent of stop frame: user area
Default values: last frame in user area

**Completion response**

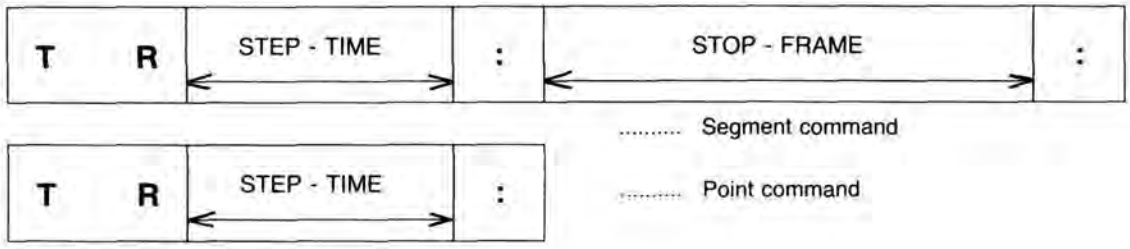
- T F
  - The Still/Step Playback operation has completed (point command).
  - The automatic frame-Step Playback operation has been started (point command with a specified step time).
  - Automatic frame-Step Playback operation has been completed and a stop frame was reached (segment command).
- E 0 1
  - The stop frame is beyond the limit of user area (overflow of the input data).
  - Number of step time is greater than 256, it is an overflow.

# 4 REV. STEP

**Function**

- Still/Step Playback to backward frames.
  ① Still Playback at the frame address now being played back (point command).
  If this command is received during Still Playback, the unit will step one frame to backward frames and then Still Playback will resume.
  ② Playback from present frame at specified Step-Time.
  ③ Playback from present frame at specified Step-Time until stop frame (segment command).

**Commands**




※ Extent of step time: 1 sec.~256 sec.
Default values: 1 sec.

※ Extent of stop frame: user area
Default values: first frame in user area

**Completion response**

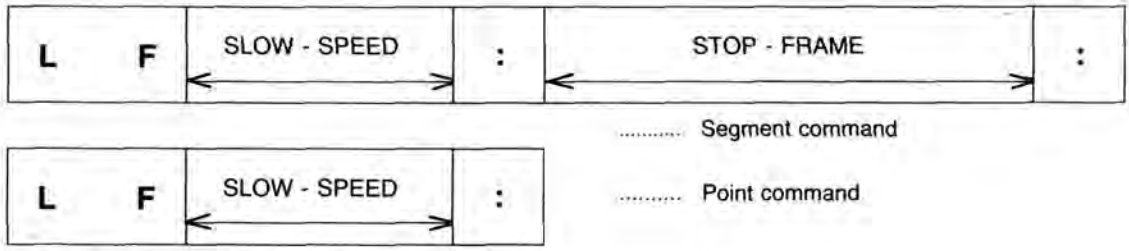
- T R
  - The Still/Step Playback operation has completed (point command).
  - The automatic frame-Step Playback operation has been started (point command with a specified step time).
  - Automatic frame-Step Playback operation has been completed and a stop frame was reached (segment command).
- E 0 1
  - The stop frame is beyond the limit of user area (overflow of the input data).
  - Number of step time is greater than 256, it is an overflow.

# 5 FWD. SLOW

**Function**

- Slow Playback to forward frames (1/2 to 1/256 times the normal speed).

**Commands**




※ Extent of slow speed data: 2~256
Default values: 3

※ Extent of stop frame: user area
Default values: last frame in user area

**Completion response**

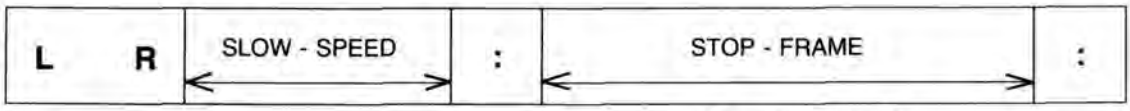
- L F
  - The Forward Slow Playback operation has begun (point command)
  - The Slow Playback operation has been completed and a stop frame has been reached (segment command).
- E 0 1
  - The stop frame is beyond the limit of user area (overflow of the input data).
  - Number of slow speed is 1/257 or below, it is an overflow.

# 6 REV. SLOW

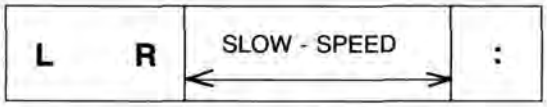
**Function**

- Slow Playback to backward frames (1/2 to 1/256 times the normal speed).

**Commands**

- 


..... Segment command

- 


..... Point command

※ Extent of slow speed data: 2～256
Default values: 3

※ Extent of stop frame: user area
Default values: last frame in user area

**Completion response**

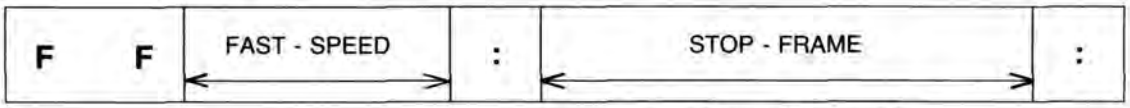
- L R — The Forward Slow Playback operation has begun (point command).
  The Slow Playback operation has been completed and a stop frame has been reached (segment command).
- E 0 1 — The stop frame is beyond the limit of user area (overflow of the input data).
  Number of slow speed is 1/257 or below, it is an overflow.

# 7 FWD. FAST

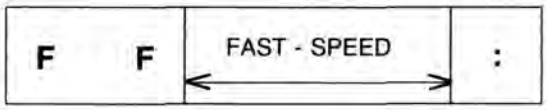
**Function**

- Fast Playback to forward frames (2 to 10 times the normal speed).

**Commands**

- 


..... Segment command

- 


..... Point command

※ Extent of fast speed: 2～10
Default values: 3

※ Extent of stop frame: user area
Default values: last frame in user area

**Completion responses**

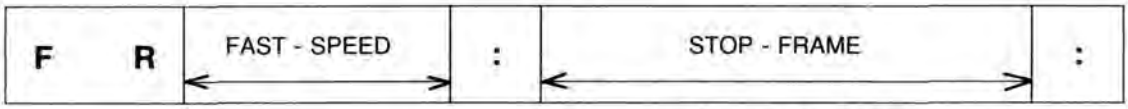
- F F — The Forward Fast Playback operation has been started (point command).
  The Fast Playback operation has been completed and a stop frame has been reached (segment command).
- E 0 1 — The stop frame is beyond the limit of user area (overflow of the input data).
  Number of fast speed is greater than 10, it is an overflow.

# 8 REV. FAST

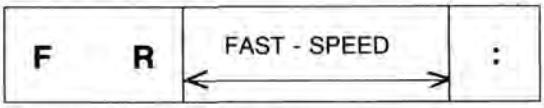
**Function**

- Fast Playback to backward frames (2 to 10 times the normal speed).

**Commands**

- 

..... Segment command

- 

..... Point command

※ Extent of fast speed: 2~10
Default values: 3

※ Extent of stop frame: user area
Default values: last frame in user area

**Completion responses**

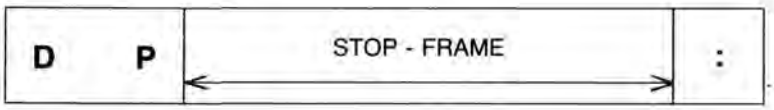
- F R — The Backward Fast Playback operation has been started (point command).
  The Fast Playback operation has been completed and a stop frame has been reached (segment command).
- E 0 1 — The stop frame is beyond the limit of user area (overflow of the input data).
  Number of fast speed is greater than 10, it is an overflow.

# 9 DUBBING PLAY

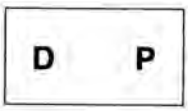
**Function**

- FWD. PLAY used for dubbing.
  After decoding the command, the system makes one jump at the vertical-blanking of the next field to backward direction and executes the FWD. PLAY command.

**Commands**

- 

..... Segment command

- 

..... Point command

※ Extent of stop frame: user area
Default values: last frame of user area

**Completion response**

- D P — The Dubbing play has been started (point command).
  The playback operation continued until the stop-frame was reached (segment command).
- E 0 1 — The stop frame is beyond the limit of user area (overflow of the input data ).

# 10 FWD. SCAN

**Function**

- This scans once to forward frame.
  (One scanning causes about 280 frames of jumping, then about 4 frames of normal playback)

**Command**

- **C F**

**Completion response**

- C F ——— Indicates that FWD. SCAN has been completed.

# 11 REV. SCAN

**Function**

- This scans once to backward frame.
  (Causes about 280 frames of jumping, then about 4 frames of normal playback)

**Command**

- **C R**

**Completion response**

- C R ——— Indicates that REV. SCAN has been completed.

# 12 SEARCH

**Function**

- This searches a target frame.

**Command**

- **S R** TARGET - FRAME **:**

※ Extent of target frame: user area

**Completion responses**

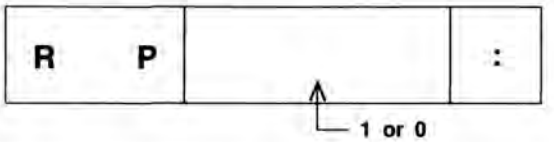
- S R ——— Indicates that SEARCH has been completed.
- E 0 1 ——— The target frame is beyond the limit of user area (overflow of the input data).
- E 0 4 ——— Indicates that SEARCH has failed within 10 seconds.
- E 0 8 ——— Indicates that SEARCH has failed, and optical head is locked.

# 13 REPEAT SET/RESET

**Function**

- Set/Reset the Repeat Playback Mode.

**Command**

- 


※1 ..... set
0 ..... reset

**Completion responses**

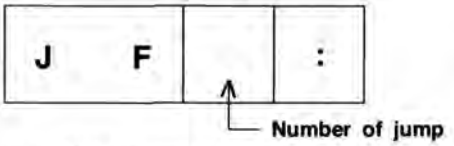
- R P ——— Indicates that Repeat Playback Mode has been set or reset.
- E 0 1 ——— The data has been input other than 1 or 0.
  (overflow of the input data)

# 14 FWD. JUMP

**Function**

- Asynchronous jump of the specified number of frames (1~5) to forward frames.
  **Note:** An asynchronous jump is a jump that is done at a position other than during V-blanking.

**Commands**

- 


※ Extent of number of jump: 1~5

**Completion responses**

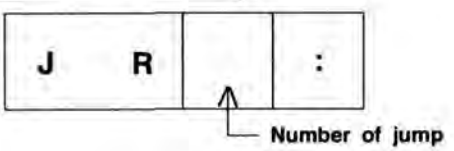
- J F ——— Execution completion of FWD. JUMP command.
- E 0 1 ——— Number of jump is 6 or greater, it is an overflow.

# 15 REV. JUMP

**Function**

- Asynchronous jump of the specified number of frames (1~5) to backward frames.
  **Note:** An asynchronous jump is a jump that is done at a position other than during V-blanking.
  **Note:** Address number is not confirmed after a jump command. It is possible, although uncommon to land on the wrong frame due to vibration.

**Commands**

- 


※ Extent of number of jump: 1~5

**Completion responses**

- J R ——— Execution completion of REV. JUMP command.
- E 0 1 ——— Number of jump is 6 or greater, it is an overflow.

## 16 PAUSE

**Function**

- Pause on playback at a present address, and execute the Still Playback.

**Command**

- **P A**

**Completion responses**

- P A ——— The playback has been paused, and playback Still Mode.
- E 0 1 ——— Indicates when the unit is scanning, searching or at the Record Mode (invalid key).

## 17 RESTART

**Function**

- This cancel the pause mode.

**Command**

- **R S**

**Completion responses**

- R S ——— The pause mode has been canceled.
- E 0 1 ——— Indicates when the unit is scanning, searching or at the Record Mode (invalid key).

# 18 EJECT

**Function**

- This stops the unit, then ejects the disc cartridge.

**Command**

- **E J**

**Completion responses**

- E J ——— Ejection completed.
- E 1 7 ——— When the disc cartridge cannot be ejected.

# 19 LOAD

**Function**

- This loads the disc cartridge into the unit.

**Commands**

- **L D**

**Completion responses**

- L D ——— Loading completed.
- E 1 7 ——— When the disc cartridge cannot be loaded.
- E 0 3 ——— When there is no disc to be loaded.

# 20 STOP

**Function**

- This stops the unit's disc motor.

**Command**

- **S P**

**Completion response**

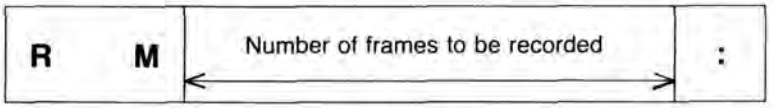
- S P ——— "SP" command has been executed, and the unit has stopped its movement.
- E 0 3 ——— The disc is not stored in the unit.

# 21 RECORD MODE [LQ-3031T only]

**Function**

- Set to Record Mode and check the recordable frames.

**Command**

- 


※ Extent of recording area: 1~[(last frame of user area)-(present address frame)+1]
Default values: [(last frame of user area)-(present address frame)+1]

**Completion response**

- R M ——— Set to Record Mode and complete the recording frame check.
- E 0 1 ——— The number of frames to be recorded is greater than default values.
- E 0 9 ——— 1) When recorded area guarantee function is ON. The designated recording area cannot be secured to forward frame.
  The unit cancels the Record Mode automatically and sends "CS" after "E09".
  2) When recorded area guarantee function is OFF. The non-recorded area which is adjacent to the inspeciton starting frame, is less than the number of frames to be recorded.
  The unit keeps the Record Mode.
- E 1 1 ——— Write protect error has been set.
- E 1 6 ——— The unit has detected an error in "Blank area inspection". Please retry the "RM" command.

# 22 RECORDING MODE CLEAR [LQ-3031T only]

**Function**

- This clears the Record Mode. Unlike the "CS" command, the command is a sequential command and is executed after a previous command is completed.
  ex. It will not interrupt a motion recording sequence.

**Command**

- **R C**

**Completion response**

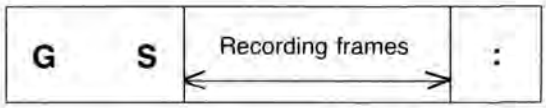
- R C ——— The RECORD MODE CLEAR command has been executed.

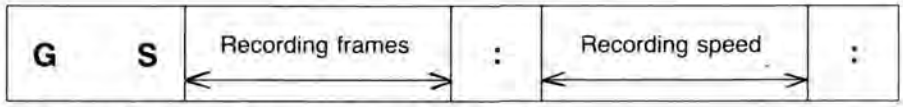
# 23 RECORD START [LQ-3031T only]

**Function**

- Open the recording gate. (Recording speed is selectable between 1~1/65535 times normal speed.)

**Command**

- 

- 


※ Extent of recording frame: remaining space in blank area
Default values: 1 frame

※ Extent of recording speed data: 1~65535 (×1 ~ ×1/65535)
Default values: 1

**Completion responses**

- G S ——— Completed recording the designated number of frames, and more recording is possible.
- G S C S ——— There is non-recorded area remaining, or because all designated frames have been recorded when the auto mode clear function is ON.
- E 0 1 ——— The number of frames to be recorded is more than non-recorded frames in the record guarantee area (overflow of the input data).
  The recording speed data is 65535 and above, it is an overflow.
- E 0 7 ——— A disc motor rotational sync abnormality has occurred.
- E 1 0 ——— The video signal is not present, or an abnormality of input signal selection has occurred.
- E 1 6 ——— The Off Traking error has occurred.

ex. E07 and E10 will be indicated if input signal is not RS-170A standard.

# 24 RECORD STOP [LQ-3031T only]

**Function**

- Close the recording gate, and stop recording (except to one frame recording).

**Command**

- G R

**Completion responses**

- G R ——— Indicates that recording gate is closed.

## 25 AUDIO RECORD SET [LQ-3031T only]

**Function**

- Request for audio recording.

**Commands**

- **A S**

**Completion response**

- A S ——— Indicates that the unit is set to record audio.

## 26 AUDIO RECORD RESET [LQ-3031T only]

**Function**

- Disable audio recording.

**Commands**

- **A R**

**Completion response**

- A R ——— Indicates that the unit is not set to record audio.

### 3. ERASE COMMANDS (ALTERNATE PICTURE WRITE/READ)

## 27 ERASE MODE

**Function**

- Set the Erase Mode and executes Still Playback.

**Command**

- **E M**

**Completion responses**

- E M ——— The setting Erase Mode has been completed.
- E 0 9 ——— Indicates that the unit has been designated to erase a non-recorded frame.

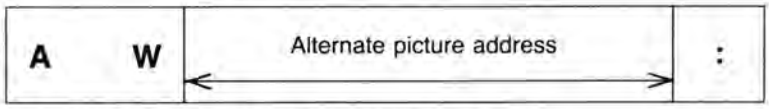
# 28 ALTERNATE PICTURE ADDRESS WRITE

## [LQ-3031T only]

**Function**

- Write the alternate picture address to playing back frame at the Erase Mode.

**Command**

- 


※ Extent of the alternate picture address: user area

**Completion responses**

- A W ——— The writing of an alternate picture address has been completed
- E 0 1 ——— An invalid error has occurred.
  The alternate picture address is beyond a limit of user area. (overflow of the input data).
- E 0 7 ——— A disc motor rotational sync abnormality has occurred.
- E 1 1 ——— A write protect error has been set.
- E 4 1 ——— A write error has occurred in written frame.
  (Transmit "AW" command again)
- E 4 3 ——— An alternate picture address already has been written.

# 29 ALTERNATE PICTURE ADDRESS MONITOR

**Function**

- Monitor the alternate picture address at the Erase Mode.

**Command**

- **A M**

**Completion responses**

- A M | Alternate picture address ——— Transmit the alternate picture address that has been read.
- A M | * * * * * ——— This shows no alternate picture address.
- E 0 1 ——— Not the Erase Mode.
- E 0 7 ——— A disc motor rotational sync abnormality has occurred.
- E 4 5 ——— A read error has occurred.

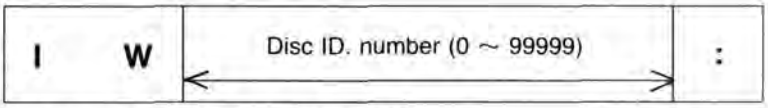
## 4. DISC ID. COMMANDS

# 30 DISC ID. WRITE [LQ-3031T only]

**Function**

- Writes the disc ID. number.

**Command**

- 


※ Extent of disc ID. number: 0~99999

**Completion response**

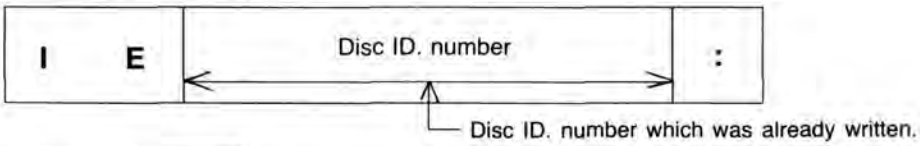
- I W ——— Indicates that the disc ID. has been written.
- E 0 1 ——— The disc ID. number has not been designated.
- E 0 7 ——— A disc motor rotational sync abnormality has occurred.
- E 1 1 ——— A disc write protect has been set.
- E 4 1 ——— A write error has occurred in written frame.
- E 4 3 ——— A duplicate def. has occurred.
  eg: You tried to write the ID. number two times.

# 31 DISC ID. ERASE [LQ-3031T only]

**Function**

- Erases the disc ID. number.

**Command**

- 


**Completion response**

- I E ——— Indicates that the disc ID. number has been erased.
- E 0 7 ——— A disc motor rotational sync abnormality has occurred.
- E 1 1 ——— A disc write protect has been set.
- E 4 1 ——— A disc ID. number could not be erased.
- E 4 2 ——— Attempt to erase the 10th disc ID. number.
- E 4 4 ——— A disc ID. which you want to erase cannot be found.

# 32 DISC ID. READ

**Function**

- Reads the disc ID. number.

**Command**

- | I R |

**Completion response**

- | I R | Disc ID. number | ——— Indicates that the disc ID. has been read.
- | I R | * * * * * | ——— The disc ID. number was erased or has not been written.
- | E 0 7 | ——— A disc motor rotational sync abnormality has occurred.
- | E 4 5 | ——— The disc ID. number cannot be read correctly.

# 33 DISC ID. REWRITABLE TIMES

**Function**

- Indicates how many times the disc ID. number can be changed.

**Command**

- | I T |

**Completion responses**

- | I T | REWRITABLE TIMES (5 DIGITS) | ——— Indicates the disc ID. number can be changed.
- | E 0 7 | ——— A disc motor rotational sync abnormality has occurred.

# 34 ON-LINE

**Function**

- Set to On-line condition.
  Change On-line condition.
  Designate the response format of unit by designation of the response mode.

**Command**

- | O N | Mode number | : |

※ Range of the response mode data: 0~15 (refer to following table 1)
Default values: 0

**Completion response**

- O N ———— Indicates On-line operation.
- E 0 1 ———— A value of 16 and above is an overflow.

※ In the On-line condition, the unit disables the function of the button on the front panel and the Remote Controller except the ON-LINE button.

**[Table 1]**
On-line Modes

| Mode No. | CR LF addition | A C K · N A K | Completion response | Error response |
|---|---|---|---|---|
| 15 | × | × | × | × |
| 14 | × | × | × | ○ |
| 13 | × | × | ○ | × |
| 12 | × | × | ○ | ○ |
| 11 | × | ○ | × | × |
| 10 | × | ○ | × | ○ |
| 9 | × | ○ | ○ | × |
| 8 | × | ○ | ○ | ○ |
| 7 | ○ | × | × | × |
| 6 | ○ | × | × | ○ |
| 5 | ○ | × | ○ | × |
| 4 | ○ | × | ○ | ○ |
| 3 | ○ | ○ | × | × |
| 2 | ○ | ○ | × | ○ |
| 1 | ○ | ○ | ○ | × |
| 0 | ○ | ○ | ○ | ○ |

× ····· OFF ○ ····· ON

# 35 OFF-LINE

**Function**

- Set to Off-line operation.

**Command**

- | O F |

**Completion response**

- | O F | ——— Indicates Off-line operation.

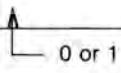
# 36 ON-LINE LOCK

**Function**

- Enable/disable the function of the button on the front panel and the Remote Controller.

**Command**

- | O L | | : |




0 or 1 ※0: Lock OFF
1: Lock ON
Default values: 0

**Completion response**

- | O L | ——— Data input of buttons completed (enable/disable).
- | E 0 1 | ——— A value of 2 and above is an overflow.

## 6. MONITOR COMMANDS

# 37 PLAYER STATUS

**Function**

- Transmits a unit status (operation mode) and information to the host computer.

**Command**

- | P S | | : |

0~4 ※ 0: player status
1: disc information 1
4: type of deck
Default value: 0

0~4

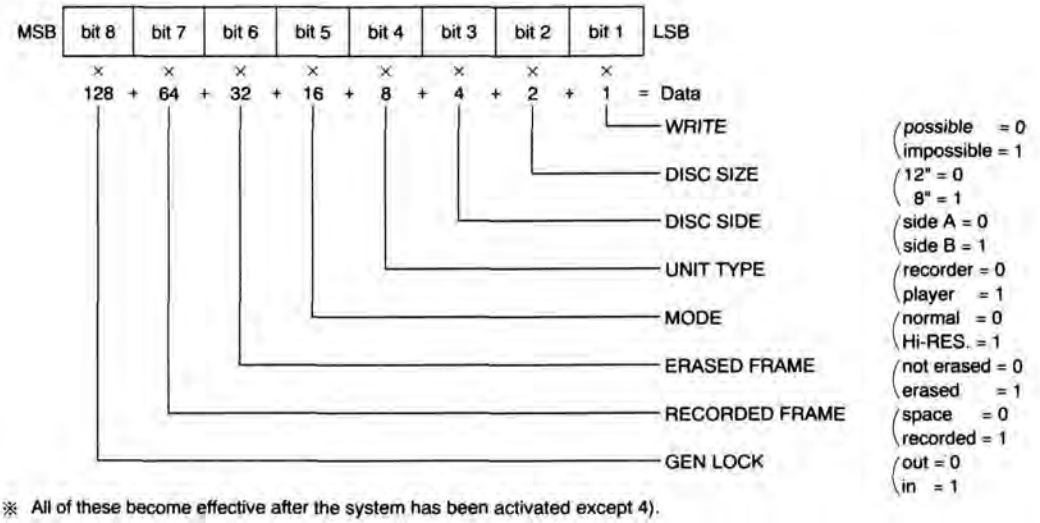
**Completion responses**

- | Z | Player status | ——— Transmits player status according to following [Table 2] (in case of PS,PSO:)
- | Z | information | ——— Transmits information by 5 digits (0~65535). (in case of PS1:, PS4:)
- | E 0 1 | ——— A value of 5 and above is an overflow.

**[Table 2]**

| PLAYER STATUS | DESCRIPTION | PLAYER STATUS | DESCRIPTION |
|---|---|---|---|
| PF | FWD.PLAY mode playback | IW | Disc ID. number writting |
| PR | REV.PLAY mode playback | IE | Disc ID. number erasing |
| TF | FWD. STEP/STILL mode playback | RM | Recording mode |
| TR | REV.STEP/STILL mode playback | GS | Recording |
| LF | FWD.SLOW mode playback | RE | Video non-recorded area being inspected. |
| LR | REV.SLOW mode playback | AE | Audio non-recorded area being inspected. |
| FF | FWD.FAST mode playback | EM | Erase stand-by |
| FR | REV.FAST mode playback | AW | Alternate picture address writing |
| DP | DUBBING PLAY mode playback | AM | Alternate picture address reading |
| SR | SEARCH | LD | Loading condition or executes |
| PA | PAUSE | EJ | Eject condition or executes |
| HT | HALT | SP | Stop condition or executes |
| IR | Disc ID. number reading | SD | System down |
| IT | Check disc ID. code post times | | |

**Note:** Disk information 1




※ All of these become effective after the system has been activated except 4).

**Note:** Type of deck ····· expressed by a decimal number from 0 to 255.
Z00000 ····· LQ-3031T/TQ-3031F series
Z00001 ····· LQ-4000 series

# 38 FRAME NUMBER

**Function**

- Transmits present frame address to the host computer.

**Command**

- **N O**

**Completion response**

- N O | Frame address

# 39 ERROR STATUS

**Function**

- This transmits error information.

**Command**

- **E S**

**Completion response**

- E S | Error number (2 digits)

※ Refer to [Table 3].

**[Table 3]**

| No. | NAME | No. | NAME | No. | NAME |
|---|---|---|---|---|---|
| 0 | NO ERROR | 9 | INSUFFICIENT REC. SPACE | 30 | CHANGE BATTERY |
| 1 | INVALID KEY | 9 | UNRECORDED FRAME | 32 | NESTING ERROR |
| 1 | OVERFLOW | 10 | CHECK VIDEO IN & INPUT | 33 | PROGRAM ERROR |
| 2 | CHECK DISC | 11 | WRITE PROTECTED | 34 | TOO LARGE PROG. |
| 3 | NON DISC | 12 | DEW | 36 | BACKUP ERROR |
| 4 | TIME OUT RETRY SEARCH | 16 | OFF TRACK RETRY REC. | 41 | WRITE ERROR |
| 5 | CHECK LASER | 17 | LOADER STOP | 42 | OVER TIMES |
| 6 | FOCUS | 18 | CHECK DISC (TILT) | 43 | DUPLICATE DEF. |
| 7 | DISC MOTOR SPEED | 20 | TOO MANY COMMAND | 44 | BAD ID. NUMBER |
| 7 | NORMAL VIDEO/SYNC IN? | 21 | TRANSMISSION ERROR | 45 | READ ERROR |
| 8 | HEAD IS LOCKED | | | | |

# 40 SETUP STATUS

**Function**

- Transmits a setup information to the host computer.

**Command**

- S S | | :

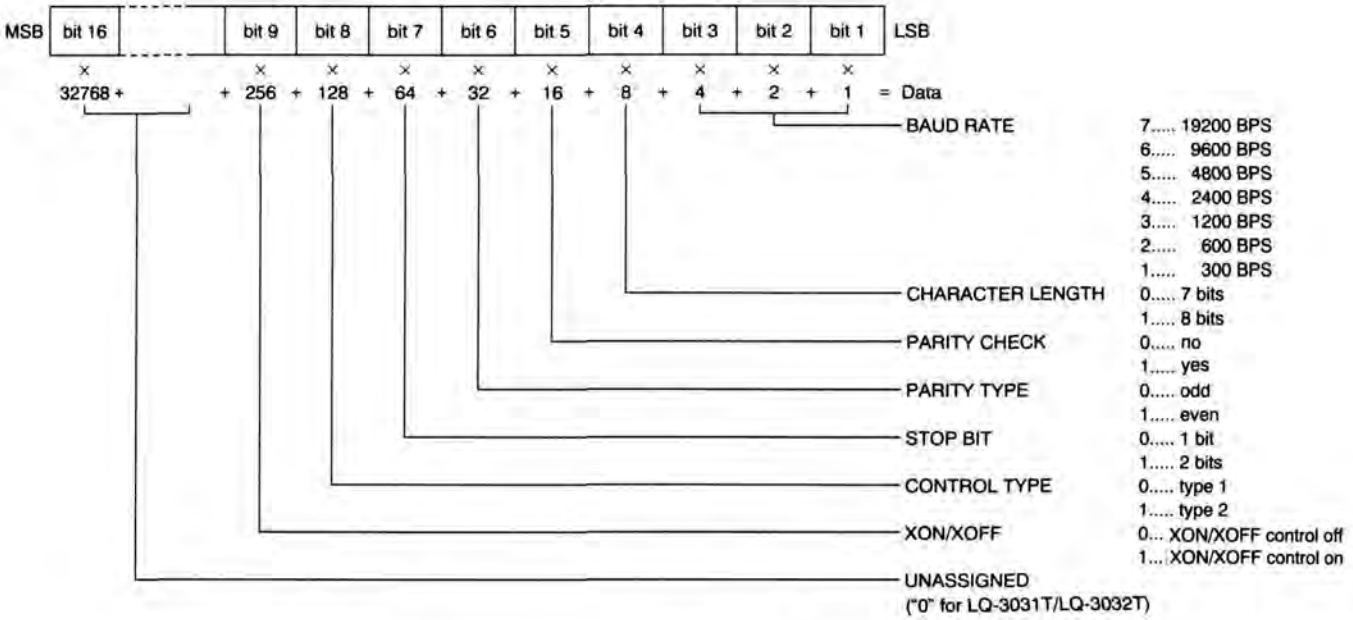
0~5

※ 0: RS-232C items
1: program items
2: playback items
3: recording items
4: system items
5: TBC control items
Default values: 0

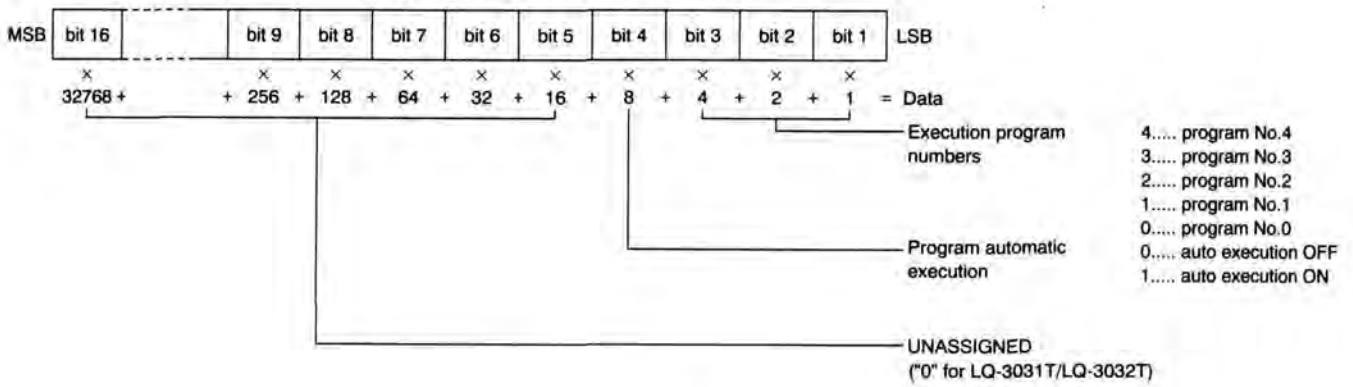
**Completion responses**

- S S ——— Each setup information.
- E 0 1 ——— A value of 6 and above is an overflow.

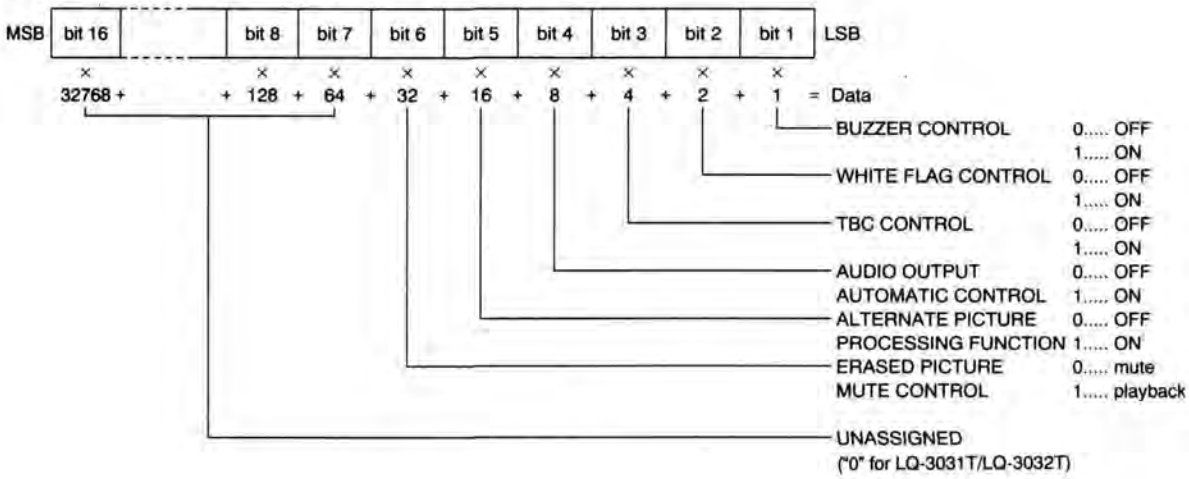
**Note:** RS-232C items



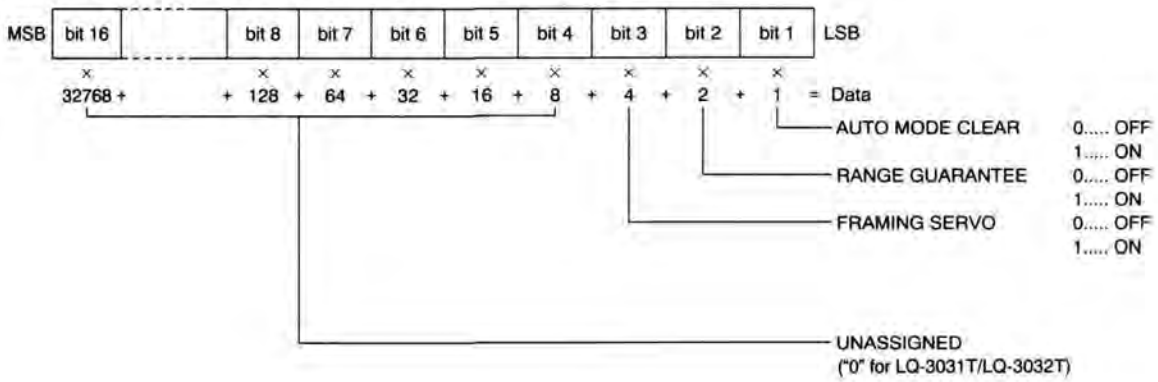

**Note:** Program items ····· expressed by a decimal number of 0 to 65535.



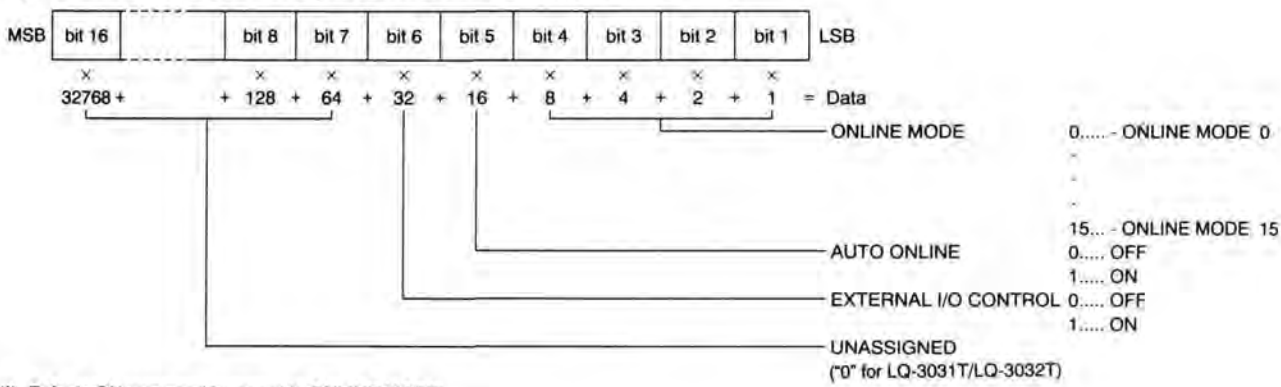
**Note:** Playback items ····· expressed by a decimal number of 0 to 255.




**Note:** Recording items ····· expressed by a decimal number of 0 to 65535.

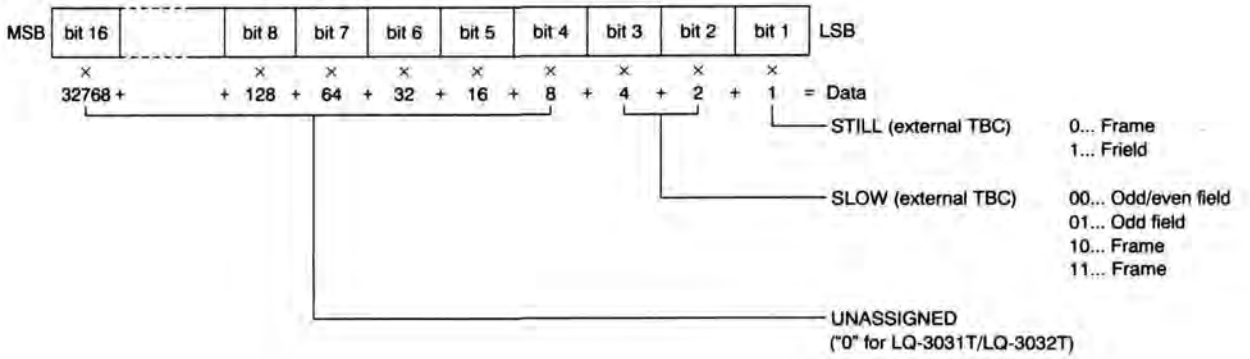



**Note:** System items ····· expressed by a decimal number of 0 to 65535.




※ Refer to ON command in regard to ONLINE MODE.

**Note:** TBC control items ····· expressed by a decimal number of 0 to 65535.




# 41 RECORDING SPACE CHECK

**Function**

- This inspects unrecorded area outer than a present playback frame.

**Command**

- R E : 1 or 2

※ 1: inspects the first frame number of the unrecorded area.
2: inspects unrecorded area
Default values: 1

**Completion response**

- R E | The first frame number of the unrecorded area
  Response of [RE1:] command.
- R E | The first frame number of the unrecorded area | The last frame number of the unrecorded area
  Response of [RE2:] command.
- E 0 1 — A value of 3 or greater, it is an overflow.

# 42 NON-RECORDED AUDIO RANGE CHECK

**Function**

- This inspects frames where audio recording is not done. (Looks for audio carrier)

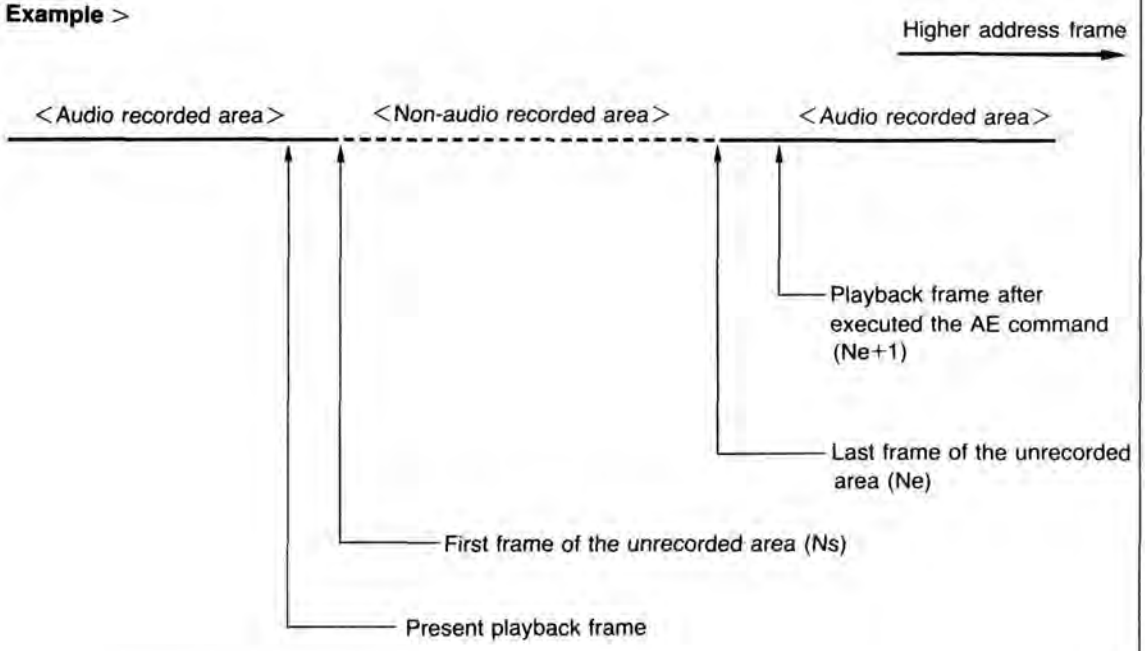
**Command**

- | A E | : |

1 or 2

※ 1: inspects the first frame number of the unrecorded area.
2: inspects unrecorded area
Default values: 1

< **Example** >




Number of the unrecorded tracks = (Ne+1)−Ns

**Note:** When non-audio recorded area is unrecorded area, last frame of the audio unrecorded area (Ne) cannot be detected exactly.

**Completion responses**

- | A E | The first frame number of the unrecorded area |
  Response of [AE1:] command.

- | A E | The first frame number of the unrecorded area | The last frame number of the unrecerded area |
  Response of [AE2:] command.

- | E 0 1 | A value of 3 or greater, it is an overflow.

# 43 RECORD REMAIN [LQ-3031T only]

**Function**

- Transmits the number of continuoulsy recordable frames within the recorded area.

**Commands**

- R R

**Completion response**

- R R | Number of continuously recordable frames (5 digits)
- E 0 1 ——— Invalid key: the Record Mode has not been set yet.

## 7. INPUT/OUTPUT COMMANDS

# 44 PUT

**Function**

- Output data to output port. (See page 47.) Data logic 1...High impedance status
  0...Low (output current = max -20mA)

**Command**

- P U | Output data ← → | :

※ Extent of data: 0~255
Default values: 0

**Completion responses**

- P U ——— Data output to the output port (8 bit).
- E 0 1 ——— The output data has been 256 and above, it is an overflow.

# 45 GET

**Function**

- Key code input from the front panel of the unit or the Remote Controller.
- Input the data (8 bit) from the input port. Data logic 1...High (greater than 3.5V, smaller than 5V)
  0...Low (greater than GND, smaller than 1.5V)

**Command**

- G E | ← → | : | * | Destination register number | :

1 or 2

[Program only]

※ 1: key code input (refer to [Table 4]).
2: Data input from the input port
Default values: 1

**Completion responses**

- G E | Key code (5 digits) ——— Extent of key code: 0~63. No key: 255
- G E | Port data (5 digits) ——— Extent of port data: 0~255.
- E 0 1 ——— This shows a value of 3 or greater, it is an overflow.

**[Table 4]**

| KEYS | CODE | KEYS | CODE |
|---|---|---|---|
| REV. SCAN | 2 | 7 | 22 |
| FWD. SCAN | 3 | 8 | 23 |
| REV. STEP | 6 | 9 | 24 |
| REV. SLOW | 7 | 0 | 25 |
| REC. ON/OFF | 8 | CE | 26 |
| AUDIO REC. ON/OFF | 9 | ON-LINE ON/OFF | 27 |
| FWD. PLAY | 10 | REC. MODE | 28 |
| REV. PLAY | 11 | ERASE MODE | 30 |
| FWD. STEP | 12 | EJECT | 31 |
| DISPLAY ON/OFF | 13 | PROGRAM RUN | 33 |
| SEARCH | 14 | AUDIO 1 ON/OFF | 39 |
| FWD. SLOW | 15 | AUDIO 2 ON/OFF | 40 |
| 1 | 16 | ENTER | 42 |
| 2 | 17 | ID./ALT. READ | 45 |
| 3 | 18 | ID./ALT. WRITE | 46 |
| 4 | 19 | ID. ERASE | 47 |
| 5 | 20 | PAUSE | 52 |
| 6 | 21 | | |

# 46 KEY IN

**Function**

- Wait <Number buttons +Enter button> accept input from the front panel of the unit or the Remote Controller, and send it back.

**Command**

- I N | * | Destination register number | :

[Program only]

**Completion response**

- I N | Data from number buttons (5 digits) ——— Extent of data: 0~99999

# 47 TRANSMIT [Program command only]

**Function**

- Transmit characters from RS232C terminal on ASCII code.

**Command**

- | T X | * or # or [ | Register number |

Transmit content of the designated register in ASCII code.

- | T X | ^ | Characters | ^ |

Transmit characters.

**Completion response**

- E 0 1 — The register number has been set at a value of 131 or more, it is an overflow.
  — The status register number has been set at a value of 19 or more, it is an overflow.
  — The length of characters has been set at a value of 31 or more, it is an overflow.

# 48 RECEIVE [Program command only]

**Function**

- Store characters from host through RS232C to designated data area or designated register.

**Command**

- | R X | * | Register number | : | * or [ | Register number | : |
  | | Number of Characters | | | | |

**Completion response**

- R X
- E 0 1 — Register number has been set at a value of 131 or more, it is an overflow.
  — The number of characters has been set at a value of 21 or more, it is an overflow.

## 49 ALL CLEAR

**Function**

● Clear communication buffer and command buffer. Any operation mode under execution is also cleared and the mode changes to the Still Playback.

**Command**

● **A C**

**Completion response**

● A C

## 50 CANCEL

**Function**

● Cancel the command being executed now, or REC/ERASE mode operation.

**Command**

● **C S**

**Completion response**

● C S ——— The mode has been canceled.

## 51 HALT

**Function**

● Except for interrupt commands, temporarily stops command execution.

**Commands**

● **H T**

● **H T** WAIT TIME :

※ Extent of wait time: 1~255 (unit=second)
Default values: 0 (wait the cancel command)

**Completion response**

● H T ——— It temporarily stops the execution of sequential command. (with no designation of wait time)
——— It has been delayed as long as the designated time.

● E 0 1 ——— The wait time of 256 or greater is an overflow.

# 52 DISPLAY SET

**Function**

- Display the frame address, input data and playback operation message are displayed on the monitor screen.
  **Note:** This sets the display on composite, Y/C and RGB outputs.

**Command**

- **D S**

**Completion response**

- D S

# 53 DISPLAY RESET

**Function**

- Do not display the frame address, input data and playback operation message on the monitor screen.
  **Note:** Display on "DISPLAY" output cannot be turned OFF.

**Command**

- **D R**

**Completion response**

- D R

# 54 VIDEO SET

**Function**

- Video ON.

**Command**

- **V S**

**Completion responses**

- V S ——— Indicates that the video has been switched ON.
- E 0 1 ——— This command has been executed while in the Record/Erase Mode.

# 55 VIDEO RESET

**Function**

- Mute video.

**Command**

- V R

**Completion responses**

- V R ——— Indicates that the video has been muted.
- E 0 1 ——— This command has been executed while in the Record/Erase Mode.

# 56 INTERNAL VIDEO

**Function**

- Output audio and video from the disc (playback disc).

**Command**

- V I

**Completion responses**

- V I ——— It has been changed to the playback output mode.
- E 0 1 ——— At the Record Mode.

# 57 EXTERNAL VIDEO [LQ-3031T only]

**Function**

- Set E-E mode.

**Command**

- V E

**Completion responses**

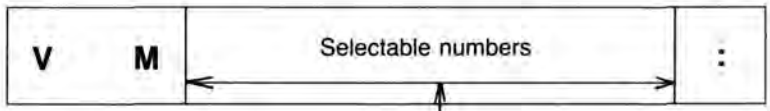
- V E ——— Set E-E mode.
- E 0 1 ——— At the Record Mode.

# 58 VIDEO MODE SELECT [LQ-3031T only]

**Function**

- Select the input video signal.

**Command**

- 


Selectable numbers
0: NTSC signal
1: RGB signal
2: S-Video (Y/C)
3: Dubbing
※ Default values: 0

**Completion responses**

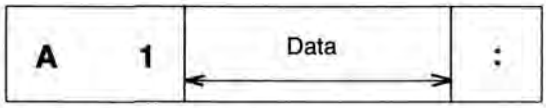
- V M ——— The input video signals have been selected.
- E 0 1 ——— The selectable number has been changed to a value of 4 or greater, it is an overflow.

# 59 AUDIO CH1 (L)

**Function**

- Set/Reset Audio CH 1 (left channel).

**Commands**

- 

(set the audio channel 1)

※ Range of data: 0~65535

- A 1 (reset the audio channel 1)

**Completion responses**

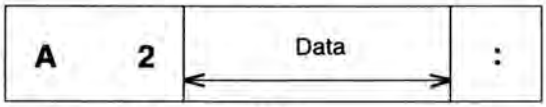
- A 1 ——— The audio channel 1 has been set or reset.
- E 0 1 ——— The data has been 65536 and above, it is an overflow.

# 60 AUDIO CH2 (R)

**Function**

- Set/Reset Audio CH 2 (right channel).

**Command**

- 

(set the audio channel 2)

※ Range of data: 0~65536

- A 2 (reset the audio channel 2)

**Completion response**

- A 2 ——— The audio channel 2 has been set or reset.
- E 0 1 ——— The data has been 65536 and above, it is an overflow.

# 61 AUDIO SET

**Function**

- Request for audio output.

**Command**

- A S

**Completion response**

- A S ——— Indicates that the unit is set to play audio.

# 62 AUDIO RESET

**Function**

- Mute audio output.

**Command**

- A R

**Completion response**

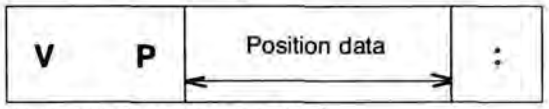
- A R ——— Indicates that the unit audio output is muted.

# 63 VERTICAL POSITION

**Function**

- Determines the vertical position of caption on the monitor.

**Command**

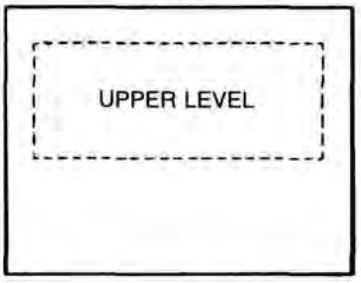



※ Extent of position data: 0~2
Default values: 0

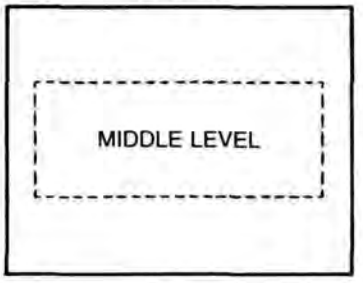
**Completion response**

- V P ——— The display position has been set.
- E 0 1 ——— The position data has been 3 or above, it is an overflow.

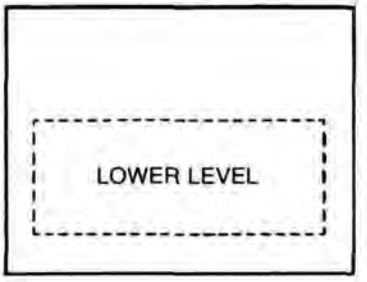
[Data 0]




[Data 1]




[Data 2]

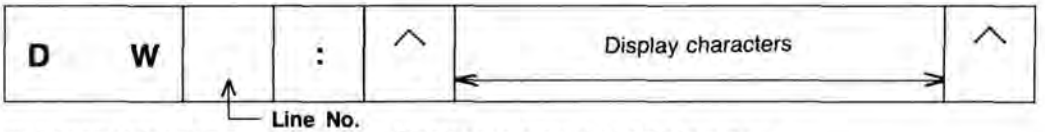



# 64 DISPLAY WRITE

**Function**

- Display or remote characters on the monitor screen.

**Commands**




※ Range of line number: 1~9
Default values: 1

Display characters: 1~20 characters
* non-character=erase the designated lines.
* "^" is omissible in this command.

**Completion response**

- D W ——— Indicates that the DISPLAY WRITE command has been executed. The monitor displays the characters.

**Note:** Display characters

| Display character | ASCII code | Display character | ASCII code |
|---|---|---|---|
| (space) | 20H | ? | 3FH |
| ! | 21H | A~Z | 41H~5AH |
| & | 26H | ~ | 7EH |
| ' (apostrophe) | 27H | _ (underline) | 5FH |
| ( | 28H | ↑ | 25H+41H |
| ) | 29H | ↓ | 25H+42H |
| * | 2AH | ← | 25H+43H |
| + | 2BH | → | 25H+44H |
| , (comma) | 2CH | · (dot) | 25H+45H |
| - | 2DH | ☎ | 25H+46H |
| . (period) | 2EH | □ | 25H+47H |
| / | 2FH | (space) | 25H+48H |
| 0~9 | 30H~39H | | |
| : | 3AH | | |
| = | 3DH | | |

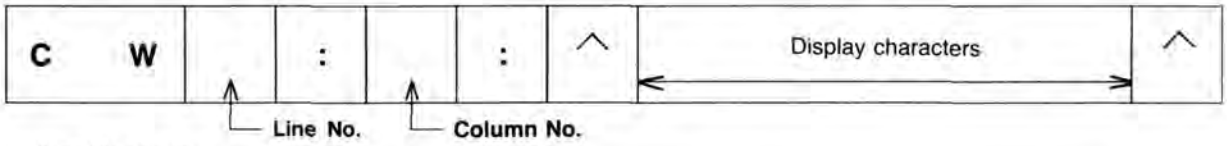
※ 25H = % (ASCII character)

# 65 CHARACTER WRITE

**Function**

- Display characters on TV monitor by designated lines/columns.

**Commands**

- 


※ Line No.: 1~9
Default values: 1
※ Column No.: 1~20
Default values: 1
※ Display characters: 1~20 characters
(When no characters, characters below the designated lines and columns are erased.)

**Completion response**

- C W ——— Indicates that the display characters have been displayed on the designated position.
- E 0 1 ——— 1) Line No. is 10 or above (overflow).
  2) Column No. is 21 or above (overflow).
  3) Display character is 21 or above (overflow).
  4) No designation ":"after the line No. (invalid key).
  5) No designation ":" after the column No. (invalid key).

**Note:** Display characters.

| Display character | ASCII code | Display character | ASCII code |
|---|---|---|---|
| (space) | 20H | ? | 3FH |
| ! | 21H | A~Z | 41H~5AH |
| & | 26H | ~ | 7EH |
| ' (apostrophe) | 27H | _ (underline) | 5FH |
| ( | 28H | ↑ | 25H+41H |
| ) | 29H | ↓ | 25H+42H |
| * | 2AH | ← | 25H+43H |
| + | 2BH | → | 25H+44H |
| , (comma) | 2CH | · (dot) | 25H+45H |
| – | 2DH | ☎ | 25H+46H |
| . (period) | 2EH | □ | 25H+47H |
| / | 2FH | (space) | 25H+48H |
| 0~9 | 30H~39H | | |
| : | 3AH | | |
| = | 3DH | | |

※ 25H = % (ASCII character)

# 66 USER AREA LIMITATION

**Function**

- This limits the user area.

**Command**

- | U A | First frame address | : | End frame address | : |

※ Area between first frame and end frame: Normal mode ..... 1~54,000
Hi-Res. mode ..... 1~36,000

Default values: First frame address ..... 1
End frame address ..... 54,000(Normal mode)
..... 36,000(Hi-Res. mode)

**Completion responses**

- U A ——— The user area has been set.
- E 0 1 ——— The first frame address or end frame address have been set at 54001 or greater, it is an overflow. (at the Hi-Res. mode, it is a 36001 and above)

# 67 BEEP

**Function**

- Produce audible tones.

**Command**

- | B P | 0 or 1 | :

※ 0: short (60 msec.)
1: long (500 msec.)
Default values: 0

**Completion responses**

- B P ——— The beep has been set.
- E 0 1 ——— A value of 2 or above is an overflow.

# 68 VALUE [Program command only]

**Function**

- Transfer characters in register or memory to digit number.

**Command**

| | | | | | | |
|---|---|---|---|---|---|---|
| V L | * | Register number | : | * or [ | Register number of the first character | : |
| | Number of Characters | | | | | |

**Completion response**

- V L
- E 0 1 — The register number has been set at a value of 131 or more, it is an overflow.
  — The number of characters has been set at a value of 6 or more, it is an overflow.

# 69 SETUP

**Function**

- Sets the visual items of playback and recording function in Setup Mode.

**Command**

| | | | | |
|---|---|---|---|---|
| S E | Setup item | : | Setup data | : |

※ Setup items (default=0)
0: set up items in factory shipment.
1: playback items
2: recording items
3: communication items
4: system items
5: TBC control items

※ Setup data
playback items: 0～63(default=0)
recording items: 0～7(default=0)
communication items: 0～511(default=115)
system items: 0～63(default=0)
TBC control items: 0～7(default=0)

**Completion responses**

- S E — Setup has been designated.
- E 0 1 — Setup item has been set at 3 or above, it is an overflow.
  Setup data has been set at 64 or above for playback item, or 8 or above for recording items, it is an overflow.

**Note:** Setup items in factory shipment.

1) Playback items

| | |
|---|---|
| BEEP | ON |
| WHITE FLAG CTL | OFF |
| TBC | ON |
| AUDIO AUTO CTL | ON |
| ALTERNATE CTL | OFF |
| ERASED FRAME | ON |

| MSB | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit1 | LSB on=1 off=0 |
|---|---|---|---|---|---|---|---|
| | × | × | × | × | × | × | |
| | 32 | + 16 | + 8 | + 4 | + 2 | + 1 | =Data |

2) Recording items

| | |
|---|---|
| AUTO MODE CLEAR | ON |
| RANGE GUARANTEE | OFF |
| FRAMING SERVO | ON |

| MSB | bit 3 | bit 2 | bit 1 | LSB on=1 off=0 |
|---|---|---|---|---|
| | × | × | × | |
| | 4 | + 2 | + 1 | =Data |

3) Communication items (Setup items in factory shipment are indicated by underlines.)

BAUD RATE .....

| | | | |
|---|---|---|---|
| 1 | 300 BPS | 5 | 4800 BPS |
| 2 | 600 BPS | 6 | 9600 BPS |
| 3 | 1200 BPS | 7 | 19200 BPS |
| 4 | 2400 BPS | | |

CHARACTER LENGTH .....

| | |
|---|---|
| 1 | 8 bits |
| 0 | 7 bits |

PARITY CHECK .....

| | |
|---|---|
| 1 | Yes |
| 0 | No |

PARITY .....

| | |
|---|---|
| 1 | Even |
| 0 | Odd |

STOP BIT .....

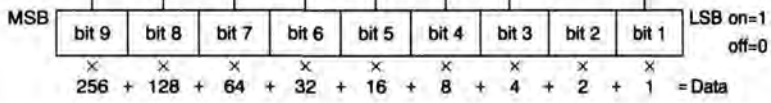
| | |
|---|---|
| 1 | 2 bits |
| 0 | 1 bit |

CONTROL TYPE .....

| | |
|---|---|
| 1 | Type 2 |
| 0 | Type 1 |

XON/XOFF .....

| | |
|---|---|
| 1 | Yes |
| 0 | No |




× × × × × × × × ×
256 + 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = Data

4) System items (Setup items in factory shipment are indicated by underlines.)

ONLINE MODE .....

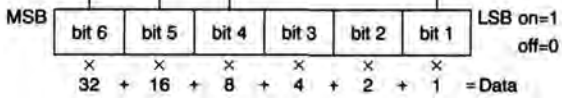
| | |
|---|---|
| 0 | Online mode 0 |
| . | . |
| . | . |
| . | . |
| 15 | Online mode 15 |

AUTO ONLINE .....

| | |
|---|---|
| 1 | ON |
| 0 | OFF |

EXTERNAL CONTROL FUNCTION .....

| | |
|---|---|
| 1 | ON |
| 0 | OFF |




× × × × × ×
32 + 16 + 8 + 4 + 2 + 1 = Data

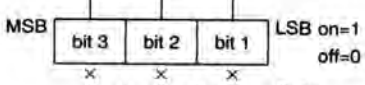
5) TBC Control items (Setup items in factory shipment are indicated by underlines.)

STILL (EXT.TBC) .....

| | |
|---|---|
| 1 | Field |
| 0 | Frame |

SLOW (EXT.TBC) .....

| | |
|---|---|
| 10 | Frame |
| 01 | Odd field |
| 00 | Odd/Even field |




× × ×
4 + 2 + 1 = Data

## 70 NO OPERATION

**Function**

- Commmand goes to next command without any execution.

**Command**

- N P

**Completion response**

- N P

## ■ EXCLUSIVE PROGRAM COMMANDS

### 11. PROGRAM CONTROL COMMANDS

## 71 MEMORY START

**Function**

- Enable start of program loading.

**Command**

- **M S** ^ Program name ^

※ ^ Program name ^ is omissible.

**Completion response**

- M S ——— The unit has been set the program load mode.
- E 0 1 ——— The program name has been 17 or more characters, it is an overflow.
  MS command has been used for a program command (invalid key).

## 72 MEMORY END

**Function**

- Finish loading of program.

**Command**

- **M E**

**Completion response**

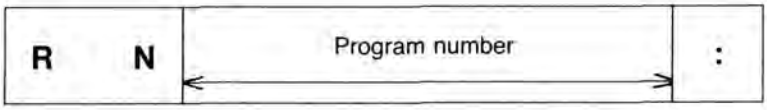
- M E ——— The unit has completed the loading of a program.

# 73 PROGRAM RUN

**Function**

- Execute previously stored commands in program memory.

**Command**

- 


※ Program number : is omissible.

※ Default values are designated via SETUP.

**Completion response**

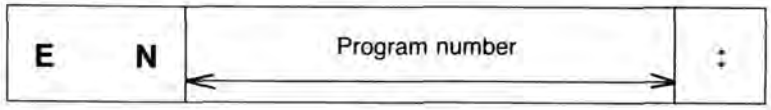
- R N ——— Indicates the start of a program execution.
- E 0 1 ——— Shows value of program number is 5 or greater, it is an overflow.
  ——— It has been used for a program command (invalid key).

# 74 PROGRAM END (Program only)

**Function**

- This non-optional command marks the end of the program.
  Designated Program if any follow this command.

**Command**

- 


※ Program number : is omissible.

※ E N Program number : means program end and execution of the designated program.

**Completion response**

- E N ——— Indicates that program has been completed.
- E 0 1 ——— The program number is 5 or greater, it is an overflow.
  ——— It has been executed except for program execution mode (invalid key).

# 75 STORE

**Function**

- Store data into the register (first parameter) from the register / DATA (second parameter).

**Command**

- S T | * or [ | Register number | : | * or # or [ | Register number | : | DATA

**Completion response**

- S T — STORE command has been executed.
- E 0 1 —
  - The register number has been set at a value of 131 or above, it is an overflow.
  - The data has been set up at a value of 65536 or above, it is an overflow.
  - The parameter has been designated 3 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).

# 76 MOVE

**Function**

- *This transports data from the register/DATA (second parameter) to register (first parameter).*

**Command**

- M V | * or [ | Register number | : | * or # or [ | Register number | DATA

**Completion response**

- M V — MOVE command has been executed.
- E 0 1 —
  - The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The data has been set up at a value of 65536 or above, it is an overflow.
  - The parameter has been designated 3 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).

## 13. BRANCH/CALL COMMANDS (PROGRAM ONLY)

# 77 GOTO

**Function**

- Unconditional branch to command indicated by label number.

**Command**

- 


**Completion response**

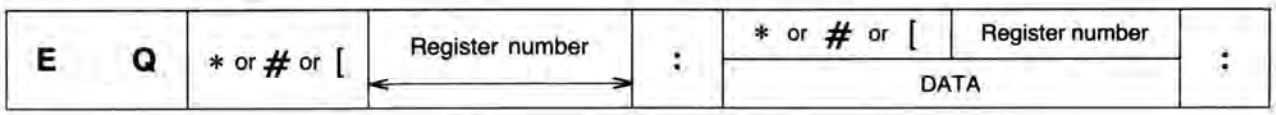
- G O ——— GOTO command has been executed.
- E 0 1 ——— The label number has been set at a value of 256 or above, it is an overflow.
  ——— The label number has not been integer (invalid key).
  ——— The parameter has been designated 2 or above (invalid key).
  ——— The command has been executed in On-line Mode (invalid key).

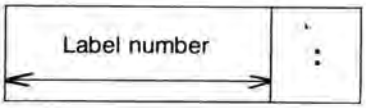
# 78 IF EQUAL THEN GOTO

**Function**

- Branch to command indicated by label number only if data of first parameter and second parameter are equal.

**Command**

- 


**Completion responses**

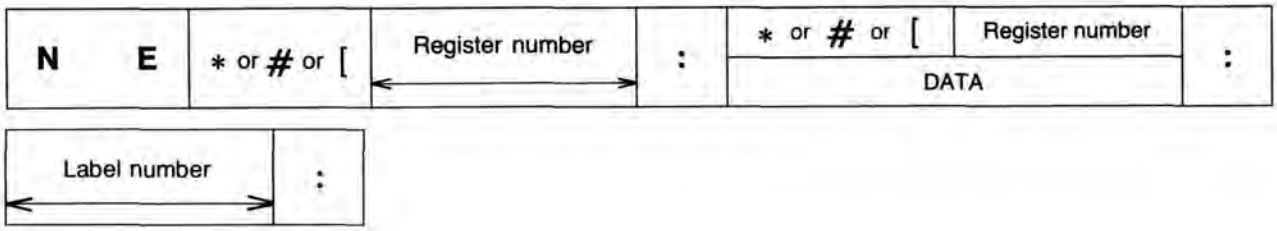
- E Q ——— IF EQUAL THEN GOTO command has been executed.
- E 0 1 ——— The register number has been set at a value of 131 or above, it is an overflow.
  ——— The status register number has been set at a value of 19 or greater, it is an overflow.
  ——— The parameter has been designated 4 or above (invalid key).
  ——— The command has been executed in On-line Mode (invalid key).
- E 3 3 ——— Label number which is ahead of branching has never been designated (Program error).

# 79 IF NOT EQUAL THEN GOTO

**Function**

- Branch to command indicated by label number only if data of first parameter and second parameter are not equal.

**Command**




**Completion responses**

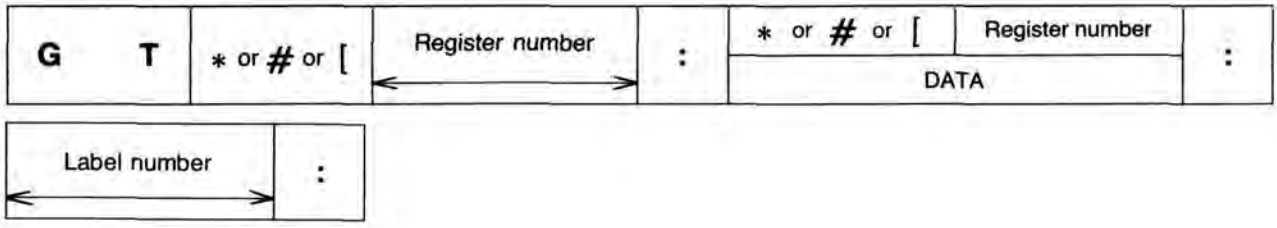
- N E — IF NOT EQUAL THEN GOTO *command has been executed.*
- E 0 1
  - The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The parameter has been designated 4 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).
- E 3 3 — Label number which is ahead of branching has never been designated (Program error).

# 80 IF GREATER THAN THEN GOTO

**Function**

- Branch to command indicated by label number only if data of first parameter is greater than second parameter.

**Command**




**Completion responses**

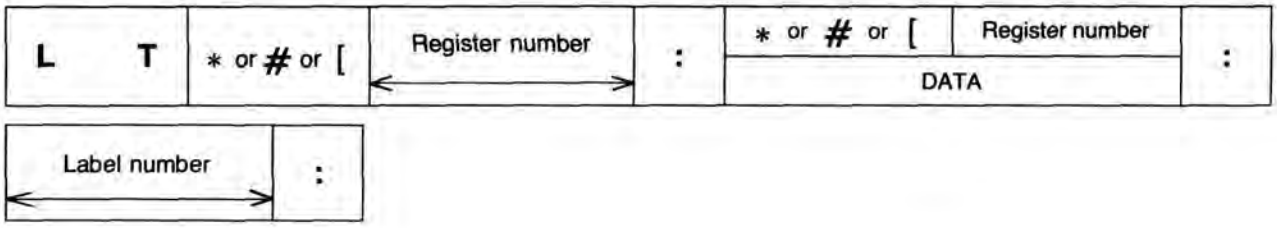
- G T — IF GREATER THAN THEN GOTO command has been executed.
- E 0 1
  - The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The data has been designated a value of 65536 or above, it is an overflow.
  - The parameter has been designated 4 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).
- E 3 3 — Label number which is ahead of branching has never been designated (Program error)

# 81 IF LESS THAN THEN GOTO

**Function**

- Branch to command indicated by label number only if data of first parameter is less than second parameter.

**Command**




**Completion responses**

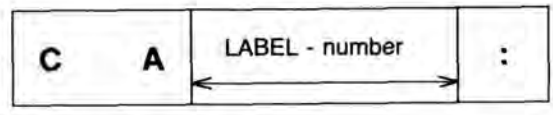
- L T — IF LESS THAN THEN GOTO command has been executed.
- E 0 1 — The register number has been set at a value of 131 or above, it is an overflow.
  The status register number has been set at a value of 19 or greater, it is an overflow.
  The data has been designated a value of 65536 or above, it is an overflow.
  The parameter has been designated 4 or above (invalid key).
  The command has been excuted in On-line Mode (invalid key).
- E 3 3 — Label number which is ahead of branching has never been designated (Program error).

# 82 CALL

**Function**

- Branch to subroutine indicated by label number.

**Command**




**Completion response**

- C A — Indicates that CALL command has been executed.
- E 0 1 — The label number has been set at value of 256 or above, it is an overflow.
  The parameter has been designated 2 or above.
  The command has been executed in On-line command (invalid key).
- E 3 2 — This command has been executed continuously more than 128 times, without execution of RT command from subroutine. (nesting error)
- E 3 3 — Label number which is ahead of branching has never been designated (Program error).

# 83 RETURN

**Function**

- End subroutine and branch to command following the CALL command which initiated branch.

**Command**

- R T

**Completion response**

- R T ——— Indicates that RETURN command has been executed.
- E 3 2 ——— The command has been executed without the CALL command being executed.

# 84 SWITCH

**Function**

- Branch to Label number indicated by data of the first parameter.

**Command**

- S W | * or # or [ | Register number ← → | :

**Completion response**

- S W
  - Execution of the program has been branched to the label number indicated by the register of the first parameter.
  - Execution of the program could not be branched to the label number. The label number (equal to data of the register) does not exist.
- E 0 1
  - The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or above, it is an overflow.
  - The parameter has been designated 2 or above (invalid key).
  - The command has been executed in On-Line Mode (invalid key).

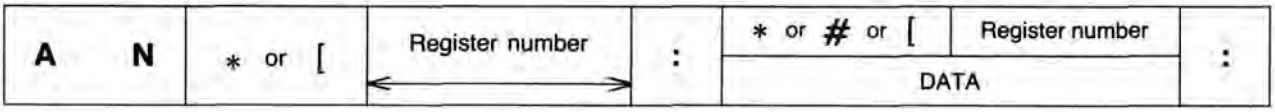
## 14. LOGICAL COMMANDS (PROGRAM ONLY)

# 85 AND

**Function**

- Performs the logical product of the first parameter and second parameter, then the result is stored in the register of the first parameter.

**Command**

- 


**Completion response**

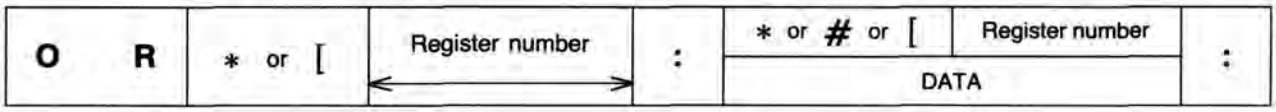
- A N — The logical product has been executed.
- E 0 1 — The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The data has been designated a value of 65536 or above, it is an overflow.
  - The parameter has been designated 3 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).

# 86 OR

**Function**

- Performs the logical sum of the first parameter and second parameter, then the result is stored in the register of the first parameter.

**Command**

- 


**Completion responses**

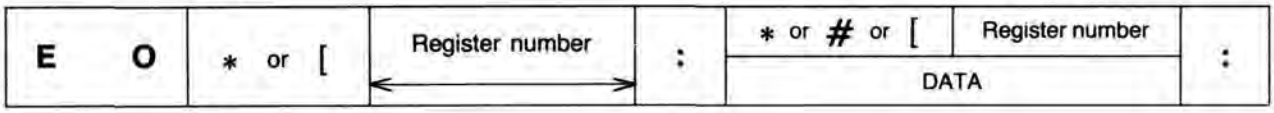
- O R — The logical sum has been executed.
- E 0 1 — The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The data has been designated a value of 65536 or above, it is an overflow.
  - The parameter has been designated 3 or above (invalid key).
  - The command has been executed in On-line Mode.

# 87 EXCLUSIVE OR

**Function**

- Performs the logical exclusive or of the first parameter and second parameter, then the result is stored in the register of the first parameter.

**Command**

- 


**Completion responses**

- E O ——— The exclusive logical sum has been executed.

- E 0 1 ———
  - The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The data has been designated a value of 65536 or above, it is an overflow.
  - The parameter has been designated 3 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).

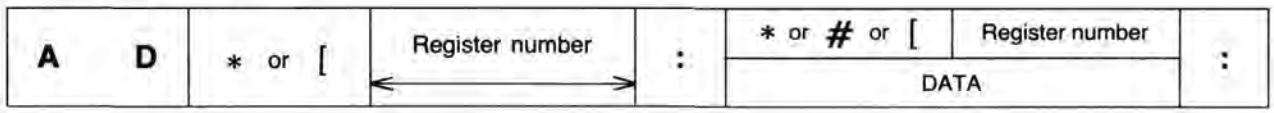
## 15. ARITHMETIC COMMANDS (PROGRAM ONLY)

# 88 ADD

**Function**

- Performs the addition of the first parameter and second parameter, then the result is stored in the register of the first parameter.

**Command**

- 


**Completion responses**

- A D ——— The addition has been executed.

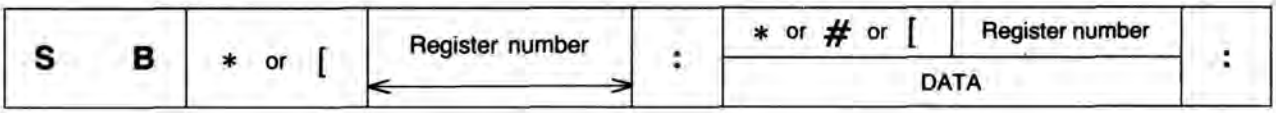
- E 0 1 ———
  - The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The data has been designated a value of 65536 or above, it is an overflow.
  - The parameter has been designate 3 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).

# 89 SUBTRACT

**Function**

- Subtract the second parameter from the first parameter, then the result is stored in the register of the first parameter.

**Command**

- 


**Completion responses**

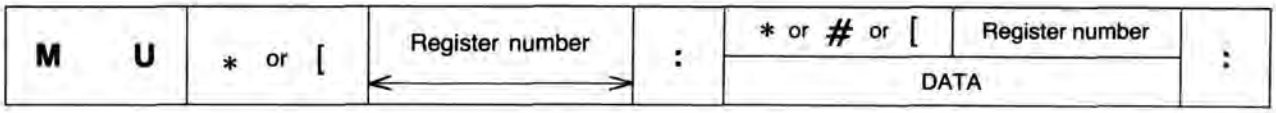
- S E — The subtraction has been executed.
- E 0 1 — The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The data has been designated a value of 65536 or above, it is an overflow.
  - The parameter has been designated 3 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).

# 90 MULTIPLY

**Function**

- Performs the multiplication of the first parameter and second parameter, then the result is stored in the register of the first parameter.

**Command**

- 


**Completion responses**

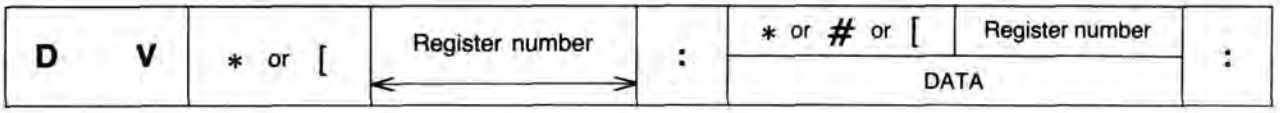
- M U — The multiplication has been executed.
- E 0 1 — The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The multiplier and multiplicand have been designated a value of 256 or above, it is an overflow.
  - The parameter has been designated 3 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).

# 91 DIVIDE

**Function**

- Divide the first parameter by the second parameter, then the result is stored in the register of the first parameter.

**Command**

- 


**Completion responses**

- D V — The division has been executed.
- E 0 1 — The register number has been set at a value of 131 or above, it is an overflow.
  - The status register number has been set at a value of 19 or greater, it is an overflow.
  - The dividend has been designated a value of 256 or above, it is an overflow.
  - The parameter has been designated 3 or above (invalid key).
  - The command has been executed in On-line Mode (invalid key).

# PROGRAMMING

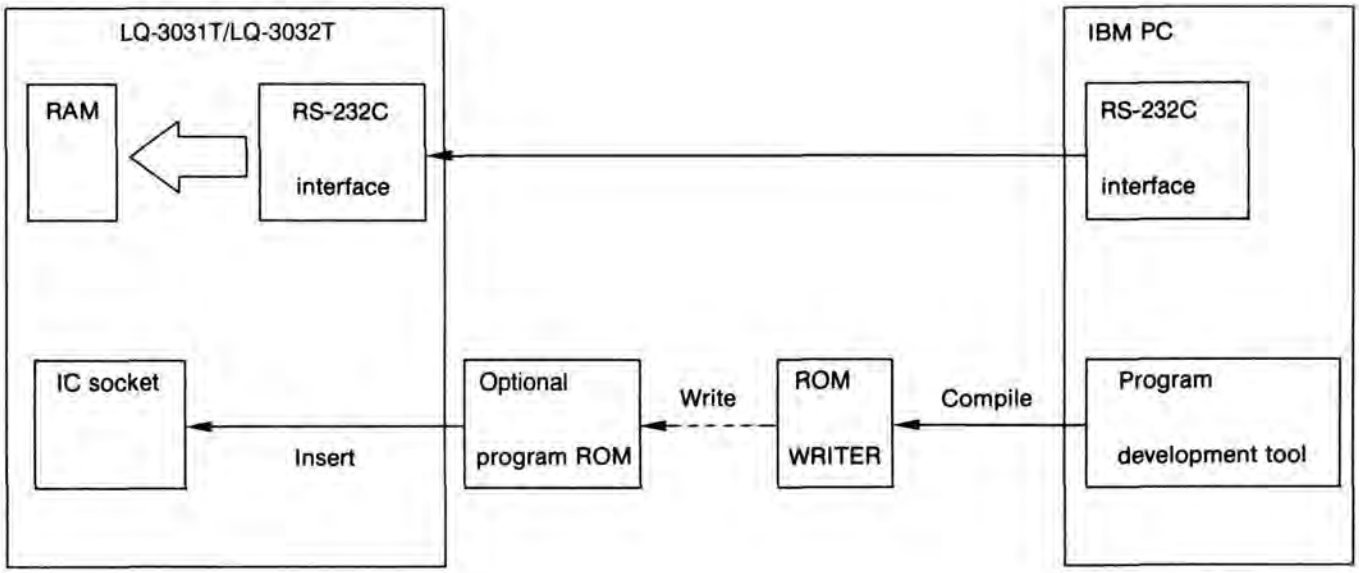
## 1. PROGRAM FUNCTION

One program can be loaded to RAM (which is battery backed-up) via RS-232C interface and four programs can be loaded to ROM (optional). Hence a total of 5 progrmas can be loaded at the same time.
However, some programs use common data area inside RAM.
If such a program is started, the data used another program may be destroyed.
Program can be started/stopped with the Remote Controller or computer. It also can be started automatically by SETUP, when power is turned ON.

## 2. PROGRAM SUPPLY TYPES

Programs are of two types; RAM programs and ROM programs.

1. RAM programs: Compiles program commands (in ASCII code) loaded through a communication line i.e. RS-232C, then internally writes it to installed RAM (program memory).
2. ROM programs: With special development tools, develop and compile the program, then writes it to ROM.




## 3. PROGRAM CAPACITY

| PROGRAM TYPE / CONTENTS | RAM PROGRAM | ROM PROGRAM | NOTES |
|---|---|---|---|
| PROGRAM AREA | 8kB | 32 kB | |
| LABEL AREA | 512 B (256 labels) | | In ROM program, more than 256 label are acceptable |
| DATA AREA/WORK AREA | 20 kB | | To ROM, only data can be written |
| GENERAL REGISTER AREA (Include Timer Register) | 262 B (131 registers) | 262 B (131 registers) | |
| STACK AREA | 256 B | 256 B | |
| STATUS REGISTER AREA | 38 B (19 registers) | 38 B (19 registers) | Read only |

**Notes:**

1. Data is used for searching tables, etc. The content of the area in ROM is used by loading to ROM when program is executed. Hence, the content of the data area can be rewritten.
   Rewritten data is battery backed up, and when the next program starts, the backed up data is used.
2. The program area, label area and data area of ROM program are set at ROM program development time.
3. Status register; register that indicates the unit operational conditions.

## 4. PROGRAM LOADING METHOD

1. Program loading via On-line

   Method of loading program to program memory through RS-232C . . etc., communication line.

   STEP 1. Transmit "MS" command and direct program to start writing.

   **Example**

   [STX] MS^TEST^ [ETX]
   File name

   STEP 2. Write program

   **Example**
   Until button input is performed from the Remote Controller, this program repeats between 1000 and 2000 addresses, and plays back.

   [STX] UA 1000 : 2000 : [ETX] ..... Limit user's playback area from 1000 to 2000.

   [STX] RP1 : [ETX] ..... Repeat action ON.

   [STX] PF [ETX] ..... Start playback.

   [STX] 1 : IN 1 : [ETX] ..... Wait for button input from the Remote Controller if input is the number buttons + ENTER button, execute next step.

   [STX] EN [ETX] ..... Complete program execution.

   STEP 3. Transmit "ME" command, and complete program writing.

   **Example**

   [STX] ME [ETX]

2. Load ROM program

   Insert ROM program into "APPLICATION" labelled IC socket of interface card.
   **Note:** Special ROM development package available.
   It is developed with an exclusive tool, and written to EP ROM.

## 5. PROGRAM EXECUTION

Methods for program execution:

1. Automatic start with power ON.
2. Start with the Remote Controller button.
3. Start with an On-line command.

1. Automatic start with power On.

   Set on program automatic start via SETUP, the program designated by SETUP is automatically executed at power ON.

2. Start with the Remote Controller button

   The designated program via SETUP, is executed with the RUN button of the Remote Controller. If the number buttons pressed before pressing RUN button, the program designated by the number buttons is executed.
   Program numbers are 0 ~ 4.

3. Start with an On-line command
   The designated program via SETUP is executed with an "RN" command.
   The execution program can be designated ie. "RN3:".

## 6. STOPPING PROGRAM EXECUTION

There are three ways to stop program execution:

1. Stopping with a program function ("EN" command)
2. Stopping with the Remote Controller ("RUN" button)
3. Stopping with an On-line command ("AC" command)

1. Stopping with a program function
   When "EN" command is executed by program, program execution is stopped.
   When the next execution program is designated, ie. "EN2" the number two program is executed next.

2. Stopping with the Remote Controller
   By pressing the RUN button on the Remote Controller, program execution is stopped.
   **Note:** This is a toggle function.

3. When On-line command
   The ALL CLEAR ("AC") command, stops execution.

## 7. REGISTERS FOR PROGRAMMING

### 1. Kinds of registers

There are three kinds of registers for programming:

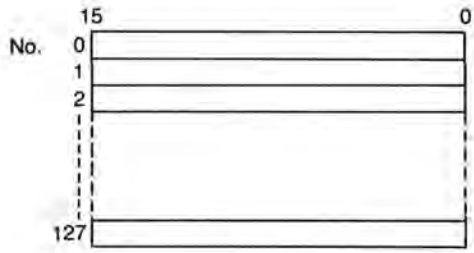
1. General register ..... 128 words (16 bits each)
2. Status register ..... 19 words (16 bits each)
3. Timer register ..... 3 words (16 bits each)

1. General Register
   A general register, used for designating command parameters with a variable, has write and read capabilities, and is used as a destination register and source register for each command. Adding an " * " (asterisk) before the register No. declares it a general register.

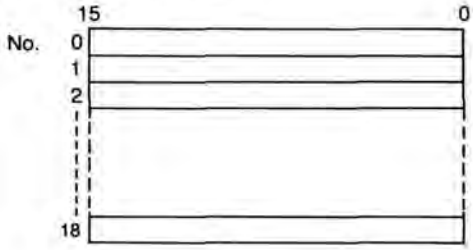
2. Status register
   Deck conditions are stored in a status register. With a read only capability, it is used as a source register for operation instructions and data transfer instructions, and as a destination register and source register for Branch Commands. Adding "#" (pound sign) before the register No. declares it a status register. (Refer to detailed explanation of status register.)

3. Timer register
   There are 3 constantly counting timer registers that indicate seconds, minutes and hours. Both write and read capabilities are possible, and timer registers are used as a destination register and source register for each command. Timer registers are designated by adding an " * " (asterisk) before register No.128 (hours), register No.129 (minutes) and register No.130 (seconds.)

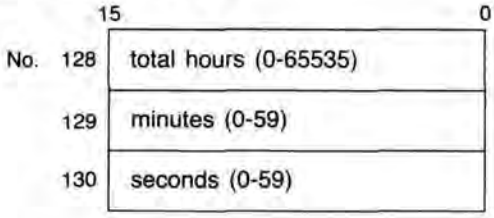
- General register area: 16 bits x 128



- Status register area: 16 bits x 19



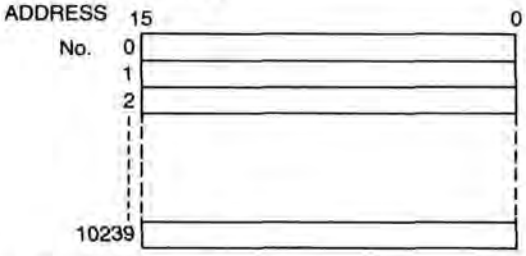

- Timer register area: 16 bits x 3




**2. Index register**

In addition to the above register areas, there is a 20 K bytes (10 K words) data area inside the unit. In order to write and read in this data area, it is necessary to access indirectly by using a general register as an index register. By adding an " [ " (left bracket) before the general register No., the general register can be used as an index register.

- Data area: 16 bits x 10240




- Example of index register use:
  Transfer content of data area No. 1-100 to data area No.101-200.

| | |
|---|---|
| MV * 1:1: ..... | Set data address 1 in general register 1 |
| MV * 2:101: .... | Set data address 101 in general register 2 |
| 1:MV [2:[: ..... | Transfer data in data area indexed by general register 1 (1) to data area indexed by general register 2 (101) |
| AD * 1:1: ..... | Add 1 to general register 1 content |
| AD * 2:1: ..... | Add 1 to general register 2 content |
| LT * 1:101:1: ... | Branch to label No.1 if general register 1 content is less than 101 |
| EN ..... | End of Program |

## ■ Status register

**1. Outline**

1. In program mode, beside the general register, the status register is provided to monitor deck conditions.
2. A status register has read only capabilities, and can be used as a source register for data transfer instructions and arithmetic instructions, and used as a destination register and source register for Branch command.
3. When transfer operation etc., of status register is performed, add a "#" (pound sign) symbol before the register No. to distinguish it from a general register.

**2. Details**

1. The status register No. and its content are indicated in the list below:

| Statas register No. | Content | Applicable On-line command | When valid |
|---|---|---|---|
| 0 | The unit executing instruction code | PS | Constantly |
| 1 | Deck and disc condition | PS1: | During record/ playback time |
| 2 | Frame address | NO | During record/ playback time |
| 3 | Disc ID write enable frequency/alternate picture address | IT/AM | After command at left is executed |
| 4 | Disc ID | IR | |
| 5 | Video/audio unrecorded area beginning address | RE/AE/RM | |
| 6 | Video/audio unrecorded area ending address | RE/AE/RM | |
| 7 | Unrecorded area residual frame number | RR | Within Record Mode |
| 8 | Error information 1 | ES | Constantly |
| 9 | Error information 2 | | |
| 10 | Overflow after executing addition subtraction instruction | | After AD/SB execution |
| 11 | not use | | |
| 12 | not use | | |
| 13 | Type of the unit | PS4: | constantly |
| 14 | RS-232C items of SETUP | SS | constantly |
| 15 | Program items of SETUP | SS1: | constantly |
| 16 | Playback items of SETUP | SS2: | constantly |
| 17 | Recording items of SETUP | SS3: | constantly |
| 18 | System items of SETUP | SS4: | constantly |

2. Status register 0

Status register 0. Below is a list of running instructions and instruction codes. (refer to "PS" command)

| Instruction | Content | Instruction code |
|---|---|---|
| EJ | Eject condition during running | 13 |
| LD | Loading condition during running | 21 |
| PF | Forward Standard Playback | 33 |
| PR | Reverse Standard Playback | 34 |
| TF | Forward frame Feed/Still Playback | 35 |
| TR | Reverse frame Feed/Still Playback | 36 |
| LF | Forward Slow Playback | 37 |
| LR | Reverse Slow Playback | 38 |
| FF | Forward Fast Playback | 39 |
| FR | Reverse Fast Playback | 40 |
| DP | For dubbing use in Standard Playback | 41 |
| SP | Stop | 43 |
| HT | Command execution is suspended | 47 |
| EM | Erase Mode (erase standby) | 49 |
| RM | Record Mode (record standby) | 51 |
| RE | Video unrecorded area during examining | 52 |
| AE | Audio unrecorded area during examining | 53 |
| CF | Forward Scan Playback | 57 |
| CR | Reverse Scan Playback | 58 |
| SR | During searching | 59 |
| GS | During recording | 68 |
| IR | Disc ID during reading | 72 |
| IW | Disc ID during writing | 73 |
| IE | Disc ID during erasing | 74 |
| IT | Disc ID during examining write enable frequency | 75 |
| PA | Pause | 107 |
| AM | Alternate picture information during reading | 115 |
| AW | Alternate picture information during writing | 116 |

3. Status register 1

In status register 1, the unit and disc conditions are stored as bit images. The meaning of each bit is as follows: (refer to "PS" command)

MSB LSB

| (8) | (7) | (6) | (5) | (4) | (3) | (2) | (1) |
|---|---|---|---|---|---|---|---|
| × | × | × | × | × | × | × | × |
| 128 | + 64 | + 32 | + 16 | + 8 | + 4 | + 2 | + 1 = DATA |

(1) Write protect
1... protect
0... enable

(2) Disc size
1... 20 cm
0... 30 cm

(3) Disc side
1... side B
0... side A

(4) Player/Recorder
1... player
0... recorder

(5) Normal/High resolution
1... high resolution
0... normal

(6) Erased frame
1... erased
0... unerased

(7) Recorded frame
1... recorded
0... unrecorded

(8) Gen Lock monitor
1... genlocked
0... not genlocked

4. Status register 2

The present frame address is stored in status register 2.
* Besides reocrd - playback time, status register 2's. Default value is 0.

5. Status register 3-4

In status register 3, the disc ID number rewrite enable frequency or alternate picture address is stored. The disc ID number is stored in status register 3 and 4.

(1) Disc ID number
After executing the disc ID number read command (refer to IR command), the disc ID number is stored in status register 3 (low-order 16 bits) and 4 (high-order 16 bits.)

Since the disc ID number takes the value of 0 to 99999, it is stored in both register 3 and 4. When ID numbers exceed 65535, 1 is stored in status register 4, and the value minus 65536 from the disc ID number is stored in status register 3.

(2) Disc ID number rewrite enable frequency
After execution of the disc ID number rewrite enable frequency reading command (refer to "IT" command), the disc ID number rewrite enable frequency is stored in status register 3. At this time, status register 4 becomes 0.

(3) Alternate picture address
After execution of alternate picture address reading command (refer to "AM" command), alternate picture address is stored in status register 3. At this time, status register 4 becomes 0.

6. Status register 5

In status register 5, unrecorded video or audio area beginning address is stored.

(1) After execution of unrecorded video area examination command (refer to "RE" command) or Record Mode setting command (refer to "RM" command) the unrecorded video area beginning address is stored in status register 5.

(2) After execution of unrecorded audio area examination command (refer to "AE" command), unrecorded audio area beginning address is stored in status register 5.

7. Status register 6

In status register 6, unrecorded video or audio area ending address is stored.

(1) After execution of unrecorded video area examination command (refer to "RE" command), or Record Mode setting command (refer to "RM" command), unrecorded video area ending address is stored in status register 6.

(2) After execution of audio unrecorded area examination command (refer to "AE" command), the unrecorded audio area ending address is stored in status register 6.

8. Status register 7

In status register 7, recorded video or audio area remaining frames address is stored.

(1) After execution of unrecorded video area examination command (refer to "RE" command) or Record Mode setting command (refer to "RM" command), the unrecorded video area remaining frames number is stored in status register 7.

(2) After execution of the unrecorded audio area examination command (refer to "AE" command), the unrecorded audio area remaining frames number is stored in status register 7.

9. Status register 8 – 9

In status register 8 and 9, present error information is stored as a bit image. What follows is the meaning of each bit: (refer to "ES" command)

[1] Status register number 8

- DATA becomes the value of DATA 1 + DATA 2

MSB LSB

| (8) | (7) | (6) | (5) | (4) | (3) | (2) | (1) |
|---|---|---|---|---|---|---|---|
| × | × | × | × | × | × | × | × |

128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = DATA 1

(1) Write protect error (E11 WRITE PROTECT)
(2) Non-disc error (E03 NON DISC)
(3) Condensation error (E12 DEW)
(4), (5), (6), (7), (8) Reserved

MSB LSB

| (16) | (15) | (14) | (13) | (12) | (11) | (10) | (9) |
|---|---|---|---|---|---|---|---|
| × | × | × | × | × | × | × | × |

32768 + 16384 + 8192 + 4096 + 2048 + 1024 + 512 + 256 = DATA 2

(9) Reserved
(10) Laser error (E05 CHECK LASER)
(11) Optical Head is locked (E08 HEAD IS LOCKED)
(12) Optical Head is locked (E08 HEAD IS LOCKED)
(13) Disc error (E02 CHECK DISC)
(14) Tilt error (E18 CHECK DISC (TILT))
(15) Focus error (E06 FOCUS)
(16) Motor speed error (E07 DISC MOTOR SPEED)

[2] Status register number 9

- DATA becomes the value of DATA 1 + DATA 2

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (8) | (7) | (6) | (5) | (4) | (3) | (2) | (1) |
| × | × | × | × | × | × | × | × |
| 128 | + 64 | + 32 | + 16 | + 8 | + 4 | + 2 | + 1 = DATA 1 |

(1) Reserved
(2) Reserved
(3) Unrecorded error (E09 UNRECORDED FRAME)
(4) Off tracking error (E16 OFF TRACK)
(5) Record error (E10 CHECK VIDEO IN INPUT SELECT)
(6) Record area error (E09 INSUFFICIENT REC. SPACE)
(7) Search error (E04 TIME OUT)
(8) Rotary sync error (E07 VIDEO IN NORMAL? OR SYNC IN NORMAL?)

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (16) | (15) | (14) | (13) | (12) | (11) | (10) | (9) |
| × | × | × | × | × | × | × | × |
| 32768 | + 16384 | + 8192 | + 4096 | + 2048 | + 1024 | + 512 | + 256 = DATA 2 |

(9) Invalid key error (E01 INVALID KEY)
(10) Input data overflow error (E01 OVERFLOW)
(11) Loading error (E17 LOADER STOP)
(12) ID/alternate picture address read error (E45 READ ERROR)
(13) ID duplicate write error (E43 DUPLICATE DEF)
(14) ID/alternate picture address write error (E41 WRITE ERROR)
(15) Erase ID number designation error (E44 BAD ID. NUMBER)
(16) ID erased number of times (more than 10 times) error (E42 OVER TIMES)

10. Status register 10

In status register 10, condition flags accompanying program execution is stored. What follows are the meanings of each bit:

- DATA becomes the value of DATA 1 + DATA 2.

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (8) | (7) | (6) | (5) | (4) | (3) | (2) | (1) |
| × | × | × | × | × | × | × | × |
| 128 | + 64 | + 32 | + 16 | + 8 | + 4 | + 2 | + 1 = DATA 1 |

(1) Overflow
1... after addition/subtraction command ("AD", "SB") has been executed, carry or borrow has occurred, or greater than 65535 is input by input command ("IN").
0... after addition/subtraction command ("AD", "SB") has been executed, carry and borrow did not occur, or less than 65536 is input by input command ("IN").

(2) – (8) Reserved

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (16) | (15) | (14) | (13) | (12) | (11) | (10) | (9) |
| × | × | × | × | × | × | × | × |
| 32768 | + 16384 | + 8192 | + 4096 | + 2048 | + 1024 | + 512 | + 256 = DATA 2 |

(9) – (16) Reserved

11. Status register 11
(Not use)

12. Status register 12
(Not use)

13. Status register 13

In status register 13, the type of the unit is stored.

The type code of the disc

| Unit | Code (decimal) |
|---|---|
| LQ-3000 series | 00000 |

14. Status register 14

In status register 14, RS-232C items of SETUP is stored as bit images. The meaning of each bit is as follows:

- DATA becomes the value of DATA 1 + DATA 2

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (8) | (7) | (6) | (5) | (4) | (3) | (2) | (1) |
| × | × | × | × | × | × | × | × |
| 128 | + 64 | + 32 | + 16 | + 8 | + 4 | + 2 | + 1 = DATA 1 |

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (16) | (15) | (14) | (13) | (12) | (11) | (10) | (9) |
| × | × | × | × | × | × | × | × |
| 32768 | + 16384 | + 8192 | + 4096 | + 2048 | + 1024 | + 512 | + 256 = DATA 2 |

| | | |
|---|---|---|
| (1)-(3) Baudrate | 7 | 19200 BPS |
| | 6 | 9600 BPS |
| | 5 | 4800 BPS |
| | 4 | 2400 BPS |
| | 3 | 1200 BPS |
| | 2 | 600 BPS |
| | 1 | 300 BPS |
| (4) Character Length | 1 | 8 bits |
| | 0 | 7 bits |
| (5) Parity Check | 1 | YES |
| | 0 | NO |
| (6) Parity | 1 | EVEN |
| | 0 | ODD |
| (7) Stop Bit | 1 | 2 bits |
| | 0 | 1 bit |
| (8) Control Type | 1 | type 2 |
| | 0 | type 1 |
| (9) XON/XOFF | 1 | YES |
| | 0 | NO |

(10)-(16) Reserved ("0" for LQ-3031T/LQ-3032T)

15. Status register 15

In status register 15, program items of SETUP is stored.

- DATA becomes the value of DATA 1 + DATA 2

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (8) | (7) | (6) | (5) | (4) | (3) | (2) | (1) |
| × | × | × | × | × | × | × | × |

128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = DATA 1

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (16) | (15) | (14) | (13) | (12) | (11) | (10) | (9) |
| × | × | × | × | × | × | × | × |

32768 + 16384 + 8192 + 4096 + 2048 + 1024 + 512 + 256 = DATA 2

| | | |
|---|---|---|
| (1)~(3) Run Program No. | 4 | program No.4 |
| | 3 | program No.3 |
| | 2 | program No.2 |
| | 1 | program No.1 |
| | 0 | program No.0 |
| (4) Auto Start | 1 | ON |
| | 0 | OFF |

(5)~(16) Reserved ("0" for LQ-3031T/LQ-3032T)

16. Status register 16

In status register 16, playback items of SETUP is stored.

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (8) | (7) | (6) | (5) | (4) | (3) | (2) | (1) |
| × | × | × | × | × | × | × | × |

128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = DATA 1

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (16) | (15) | (14) | (13) | (12) | (11) | (10) | (9) |
| × | × | × | × | × | × | × | × |

32768 + 16384 + 8192 + 4096 + 2048 + 1024 + 512 + 256 = DATA 2

DATA becomes the value of DATA 1 + DATA 2

| | | |
|---|---|---|
| (1) Beep | 1 | ON |
| | 0 | OFF |
| (2) White Flag Control | 1 | ON |
| | 0 | OFF |
| (3) TBC Control | 1 | ON |
| | 0 | OFF |
| (4) Audio Auto Control | 1 | ON |
| | 0 | OFF |
| (5) Alternate Control | 1 | ON |
| | 0 | OFF |
| (6) Erased Frame | 1 | playback |
| | 0 | mute |

(7)~(16) Reserved ("0" for LQ-3031T/LQ-3032T)

17. Status register 17

In status register 17, recording items of SETUP is stored.

- DATA becomes the value of DATA 1 + DATA 2

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (8) | (7) | (6) | (5) | (4) | (3) | (2) | (1) |
| × | × | × | × | × | × | × | × |
| 128 | + 64 | + 32 | + 16 | + 8 | + 4 | + 2 | + 1 = DATA 1 |

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (16) | (15) | (14) | (13) | (12) | (11) | (10) | (9) |
| × | × | × | × | × | × | × | × |
| 32768 | + 16384 | + 8192 | + 4096 | + 2048 | + 1024 | + 512 | + 256 = DATA 2 |

(1) Auto Mode Clear
1 ON
0 OFF

(2) Range Guarantee
1 ON
0 OFF

(3) Framing Servo
1 ON
0 OFF

(4)-(16) Reserved ("0" for LQ-3031T/LQ-3032T)

18. Status register 18

In status register 18, system items of SETUP is stored.

- DATA becomes the value of DATA 1 + DATA 2

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (8) | (7) | (6) | (5) | (4) | (3) | (2) | (1) |
| × | × | × | × | × | × | × | × |
| 128 | + 64 | + 32 | + 16 | + 8 | + 4 | + 2 | + 1 = DATA 1 |

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| (16) | (15) | (14) | (13) | (12) | (11) | (10) | (9) |
| × | × | × | × | × | × | × | × |
| 32768 | + 16384 | + 8192 | + 4096 | + 2048 | + 1024 | + 512 | + 256 = DATA 2 |

(1)~(4) Online Mode 0~15 See "ON" command

(5) Auto Online
1 ON
0 OFF

(6) External Control (I/O)
1 ON
0 OFF

(7)~(16) Reserved ("0" for LQ-3031T/LQ-3032T)

# BASIC CONNECTIONS

**Note:**

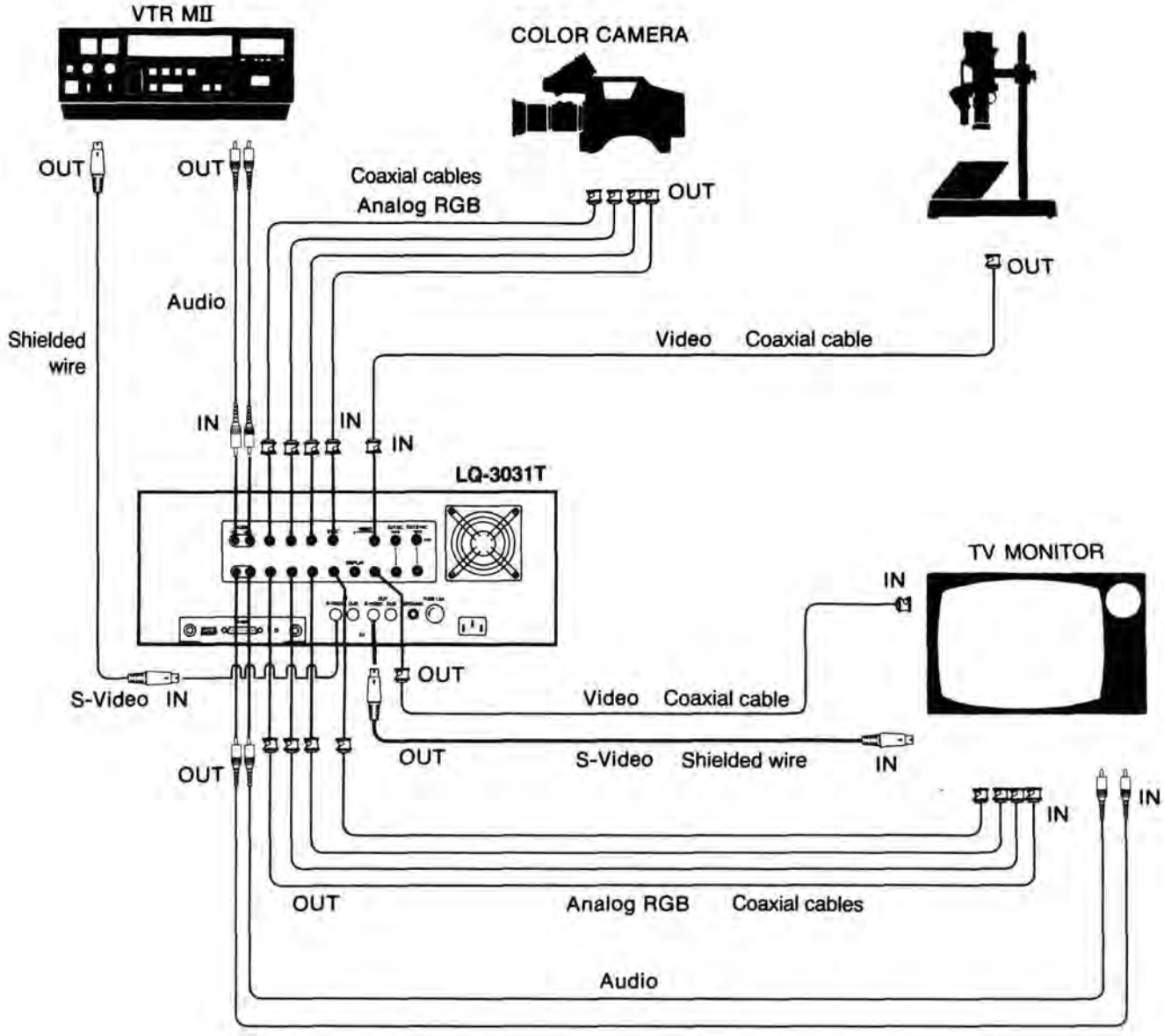
(1) Always use a connecting cable (RS-232C cable) between LQ-3031T/LQ-3032T and personal computer which is protected against electromagnetic waves (shielded cable).

(2) Do not leave the cables connected to input and output terminals unless they are used.

1. CONNECTION WITH AV RELATED APPLIANCES

In this unit, a NTSC standard video signal, S-Video signal and/or an analog RGB signal, a total of three systems, can be connected for a video input/output signal.
Select an appropritate input and output terminal for the input device, i.e. camera etc., connected TV monitor.
(LQ-3032T has no input terminals)

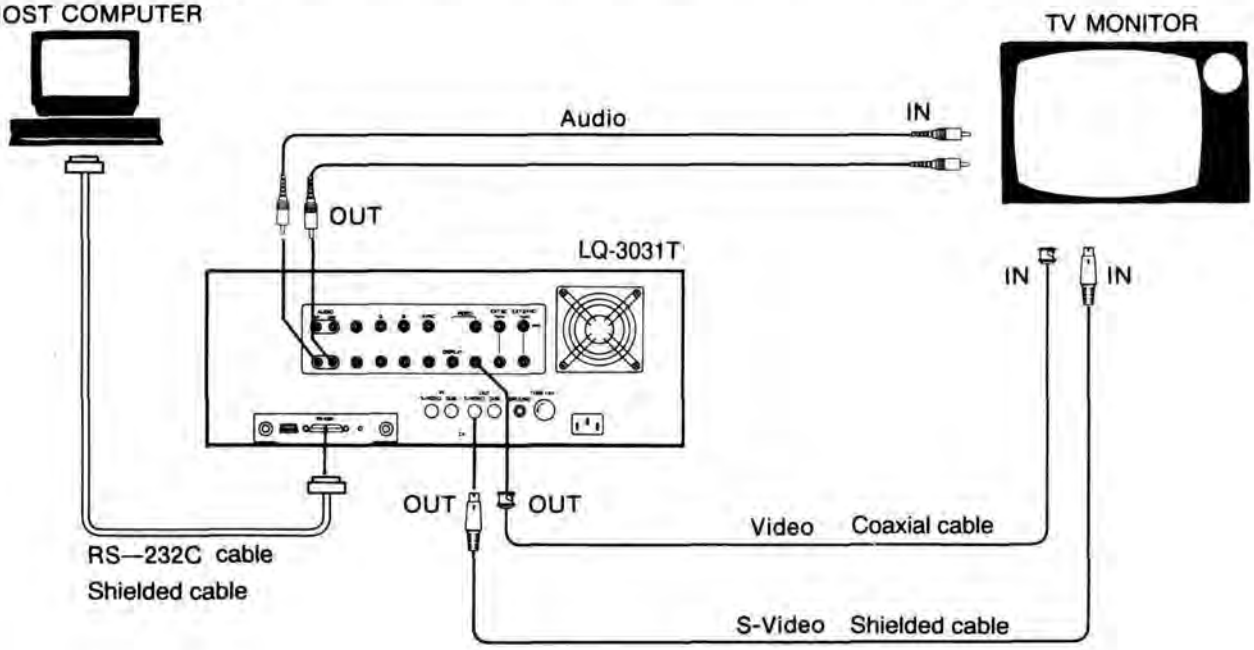
<Example of LQ-3031T>



2. CONNECTION WITH HOST COMPUTER

Connect interface connecting cable of computer with RS-232C terminal (D-Sub 25 pin), which is on rear of this unit.

<Example of LQ-3031T>

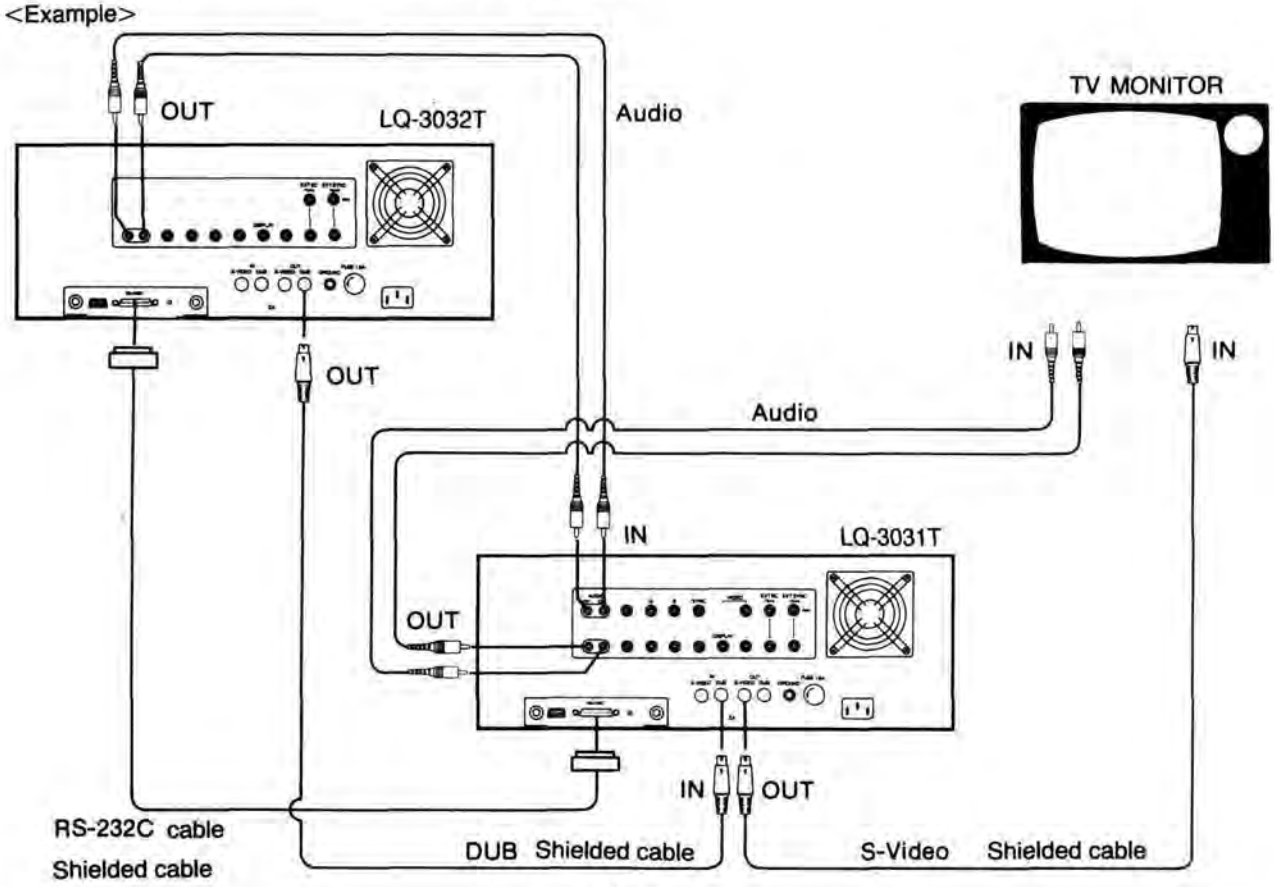



3. CONNECTION FOR DUBBING

By using the dubbing cable (5 pin multi-connector) attached to this unit, connect it in the following manner. The figure below is the connection example when dubbing is performed manually 1 frame by 1 frame.

**Note:** Dubbing ROM is necessary for the dubbing operation.

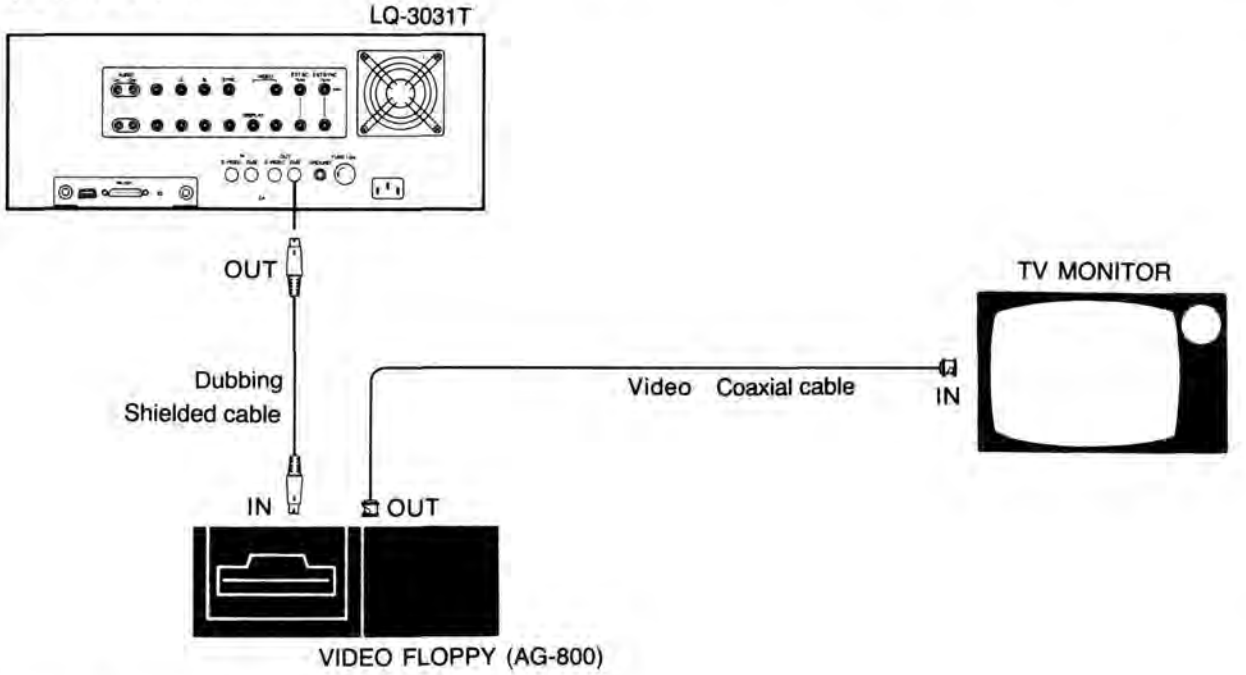
<Example>



4. DUBBING CONNECTION TO VIDEO FLOPPY

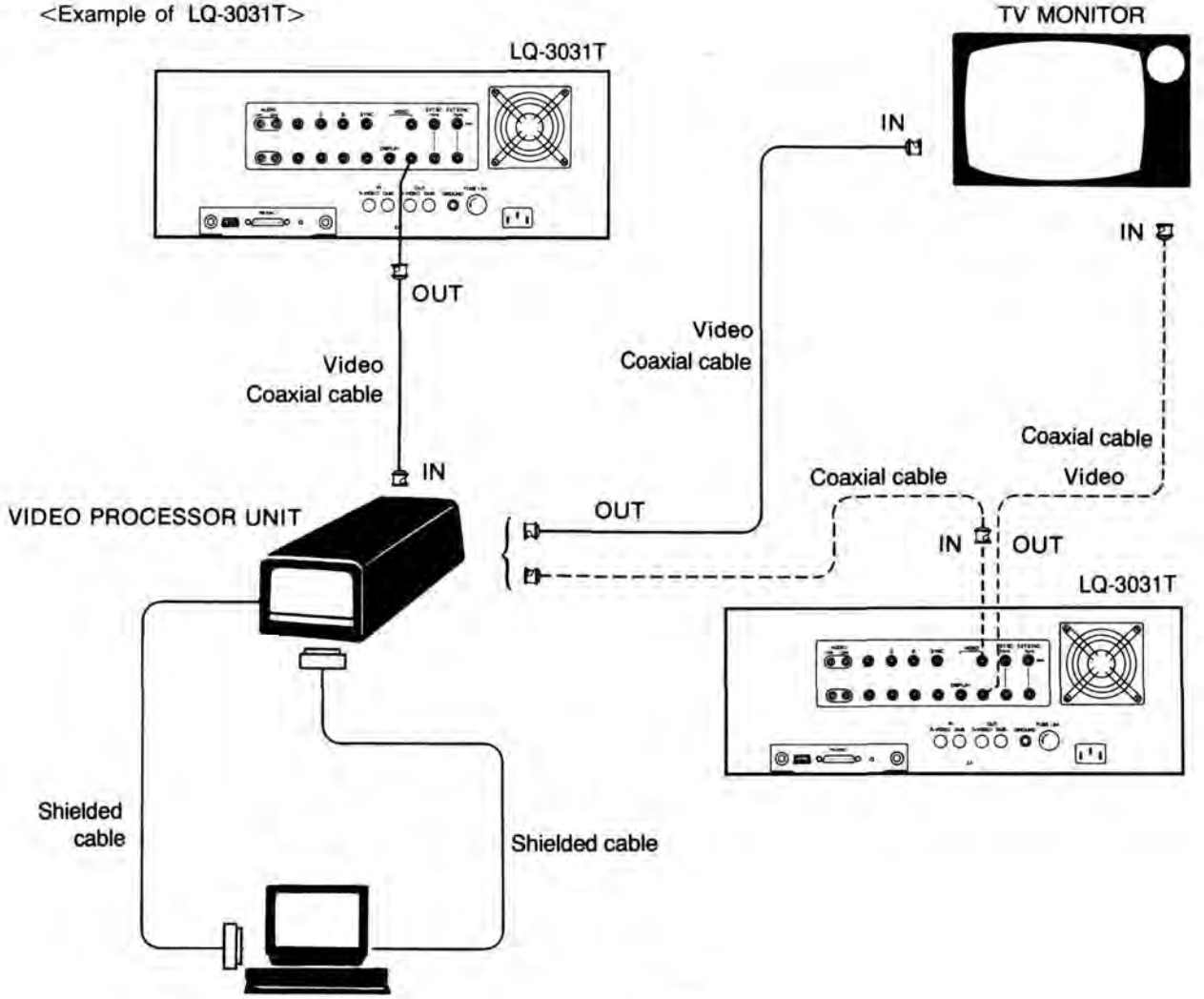
It is possible to connect with a video floppy only when it has a dubbing cable (5 pin multi-connecter) attached to unit.

<Example of LQ-3031T>




5. CONNECTION WITH VIDEO PROCESSOR

<Example of LQ-3031T>



# ERROR HANDLING

## 1. OUTLINE OF ERROR TREATMENT

1. This displays error codes to explain the reason why a command cannot be executed, instead of displaying normal completion command responses, when the unit has accepted a command, or when the unit has stopped a command execution.
2. The unit has an error monitoring function, and can monitor errors occuring when on-line.
3. On-screen error displays are indicated an error is occuring (minimum 2 seconds).
4. Errors which require system reset are of the following 6 kinds: disc abnormality, focus servo abnormality, disc motor rotational speed abnormality, head lock error, laser error and tilt error. In these cases the unit stops operation, and errors are indicated. (Power should be cycled)
5. Program automatically stops execution when nesting error, or programming format error have been occured.
6. During programming, error information can be obtained by reading the status register.
   (it is desirable to include error treatment modules in the program)

**Note:** The program automatically shuts down when a nesting error or program error has occured.
Other errors should be handled by monitoring the software program.

## 2. ERROR TABLE

| | No. | ERROR No. | ON-SCREEN DISPLAY | ERROR NAME | CAUSE | SYSTEM RESET |
|---|---|---|---|---|---|---|
| | 1 | E01 | E01 INVALID KEY | Invalid command input | Operation | |
| | 2 | E01 | E01 OVERFLOW | Input data overflow | Operation | |
| | 3 | E02 | E02 CHECK DISC | Disc abnormality | Operation/Disc/Unit | ○ |
| | 4 | E03 | E03 NON DISC | Non disc | Operation | |
| | 5 | E04 | E04 TIMEOUT<br>RETRY SEARCH | Search timeout | Unit | |
| | 6 | E05 | E05 CHECK LASER | Laser error | Unit | ○ |
| | 7 | E06 | E06 FOCUS<br>EJECT & CHECK DISC | Focus servo abnormality | Unit /Disc | ○ |
| | 8 | E07 | E07 DISC MOTOR SPEED<br>EJECT & CHECK DISC | Disc motor rotational speed abnormality | Unit | ○ |
| | 9 | E07 | E07 VIDEO IN NORMAL?<br>OR SYNC IN NORMAL? | Disc motor rotational sync abnormality | Disc/Unit/Operation | |
| | 10 | E08 | E08 HEAD IS LOCKED<br>EJECT & RETRY PLAY | Head is locked | Unit | ○ |
| ★ | 11 | E09 | E09 INSUFFICIENT<br>REC. SPACE | Insufficient Rec. space | Unit | |
| | 12 | E09 | E09 UNRECORDED FRAME | Erase mode setting error | Operation | |
| ★ | 13 | E10 | E10 CHECK VIDEO IN<br>& INPUT SELECT | Recording video signal sync abnormality | Operation | |
| ★ | 14 | E11 | E11 WRITE PROTECTED | Write protect error | Operation | |

**Note:** ★... LQ-3031T only

| | No. | ERROR No. | ON-SCREEN DISPLAY | ERROR NAME | CAUSE | SYSTEM RESET |
|---|---|---|---|---|---|---|
| ★ | 15 | E12 | E12 DEW<br>POWER OFF & WAIT | Dew | Unit has moisture | |
| | 16 | E16 | E16 OFF TRACK<br>RETRY REC/SPACE CHK | OFF tracking | Operation/Disc/ Vibration | |
| | 17 | E17 | E17 LOADER STOP | Loader stop | Operation/Unit | |
| | 18 | E18 | E18 CHECK DISC (TILT) | Tilt error | Disc/Unit | ○ |
| | 19 | E20 | E20 TOO MANY COMMAND | Receiving buffer overflow | Operation | |
| | 20 | E21 | E21 TRANSMISSION ERR<br>CHECK SETUP MENU | Transmission error | External equipment/ Operation | |
| | 21 | E30 | E30 CHANGE BATTERY | Battery change indication | Unit/(I/F Card) | |
| | 22 | E32 | E32 NESTING ERROR | Nesting error | Operation | |
| | 23 | E33 | E33 PROGRAM ERROR | Program error | Operation | |
| | 24 | E34 | E34 TOO LARGE PROG. | Program memory overflow | Operation | |
| | 25 | E36 | E36 BACKUP ERROR | Memory backup error | Unit/(I/F Card) | |
| ★ | 26 | E41 | E41 WRITE ERROR | Disc ID/alternate picture address write error | Unit/Disc/Vibration | |
| ★ | 27 | R42 | E42 OVER TIMES | Disc ID code renewal times over | Operation | |
| ★ | 28 | E43 | E43 DUPLICATE DEF. | Disc ID code renewal times address double write | Operation | |
| ★ | 29 | E44 | E44 BAD ID. NUMBER | Erase disc ID code designation error | Operation | |
| | 30 | E45 | E45 READ ERROR | Disc ID/alternate picture address reading error | Unit/Disc/Vibration | |

**Note:** ★... LQ-3031T only

## 3. DISCRIPTION OF ERROR TREATMENT

### 1. INVALID COMMAND INPUT

[ON-SCREEN DISPLAY]

ON-LINE RESPONSE:

| STX | E | 0 | 1 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted when command execution started.

CAUSE:

- User input command can not be executed.

REMEDY:

- Input correct command

ex. When unit tries to execute reocrd starting command in Playback Mode.
Receiving command .....STX GS ETX
Command response .....STX E01 ETX

E01 INVALID KEY

- Indicate 2 sec.

### 2. INPUT DATA OVERFLOW

ON-LINE RESPONSE:

| STX | E | 0 | 1 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted when command execution started.

Examples:

- Playback time;
  When the input value is too large.
- Recording time;
  When inputting recording command, data values too large. (exceeding recording area)

ex. Input figure more than 11 times normal speed.
Receiving command .....STX FF11: ETX
Command response .....STX E01 ETX

REMEDY:

- Input correct command.

E01 OVERFLOW

- Indicate 2 sec.

### 3. DISC ABNORMARITY

ON-LINE RESPONSE:

| STX | E | 0 | 2 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Unit system reset condition is released, this is transmitted every time command is input, ie. standard playback command (PF).

CAUSE:

- When the type of disc is different from TQ-FH331 or TQ-FH332.
- When the disc is upside down.
- When the address signal cannot be read due to contamination.

E02 CHECK DISC

- Indicate until system reset is released.

REMEDY:
- Eject the disc and replace, and then re-start operation from the beginning.
- Release system reset with one of the followings.
  1) Press EJECT button.
  2) Transmit EJ, LD command.

ex.
Receiving command .....STX PF ETX
Command response .....STX E02 ETX

## 4. NON DISC

ON-LINE RESPONSE:

| STX | E | 0 | 3 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a completion response to activation command (PF. TF....etc).

CAUSE:
- When disc cartridge has not been loaded and activation command was input.

REMEDY:
- Insert disc cartridge properly, then restart.

[ON-SCREEN DISPLAY]

E03 NON DISC

- Indicate 2 sec.

## 5. SEARCH TIMEOUT

ON-LINE RESPONSE:

| STX | E | 0 | 4 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- This is transmitted as a completion response to search command (SR) or user area setting command (UA), search time limit is 10 seconds.

CAUSE:
- Address reading is unstable.
- Address drift is occuring due to dirt or scratch on disc.
- Transfer base is struck (locked), and it will not move.
- Poor adjustment or disorder in linear motor system, tracking system.

REMEDY:
- Search again.
- When search error occurs in Record Mode, release the Record Mode once, there reset to the Record Mode.
- When search error continues, it is due to disc damage, disorder in linear motor system, or tracking system.

E04 TIMEOUT
RETRY SEARCH

- Indicate 2 sec.

## 6. LASER ERROR

ON-LINE RESPONSE:

| STX | E | 0 | 5 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Until system reset condition is cleared, it is transmitted every time with a starting command like the standard playback command (PF) input.

CAUSE:
- Deterioration of semi-conductor laser.

REMEDY:
- After ejecting cartridge, turn power OFF, then contact a service person.

E05 CHECK LASER

## 7. FOCUS SERVO ABNORMALITY

[ON-SCREEN DISPLAY]

ON-LINE RESPONSE:

| STX | E | 0 | 6 | ETX | [CR/LF] |
|---|---|---|---|---|---|

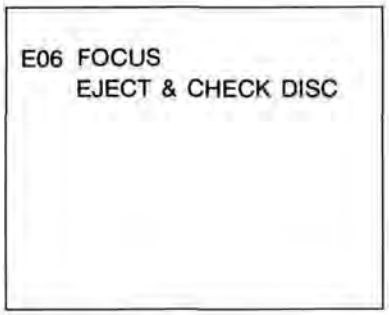
- Until system reset condition is released, this is transmitted every time starting command is input ie. activation command (PF).

CAUSE:

- Because of external shock, focus is released.
- Disc is not in the cartridge.
- Laser diode malfunction.
- Focus servo circuit adjustment is poor or in disorder.
- Linear motor operation malfunction, hence pickup is not at correct location.

REMEDY:

- Take cartridge out, then re-start. If focus is still off, even after repeated re-start, this due to a hardware malfunction.
- System reset condition is released by one of the following.
  1) Press EJECT button.
  2) Transmit EJ, LD command.




- Indicate until system reset is released.

## 8. DISC MOTOR ROTATIONAL SPEED ABNORMALITY

ON-LINE RESPONSE:

| STX | E | 0 | 7 | ETX | [CR/LF] |
|---|---|---|---|---|---|

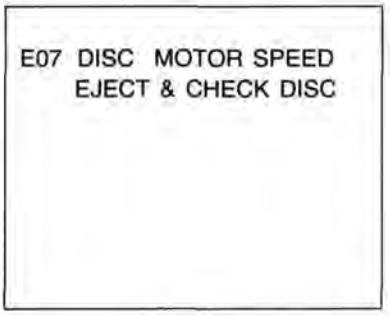
- Until system reset condition is released, this is transmitted every time activation command is input, ie. play command (PF).

CAUSE:

- Disc or cartridge is damaged.
- Disc motor servo circuit is out of adjustment or needs to be reset.
- Disc motor is in disorder.

REMEDY:

- Take cartridge out, then start again. If the same thing occurs after repeated restarting the problem is in the hardware.
- Release system reset condition by one of the following.
  1) Press EJECT button.
  2) Transmit EJ, LD command.




- Indicate until system reset is released.

## 9. DISC MOTOR ROTATIONAL SYNC. ABNORMALITY

ON-LINE RESPONSE:

| STX | E | 0 | 7 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- This is transmitted as response of a record and ID/alternate command (GS.IW.IR.IE.AW.AM).

CAUSE:
- Illegal external sync signal or illegal external VIDEO signal is input or is not RS-170A standard.
- Disc motor servo circuit adjustment is poor or malfunctioning.
- Disc clamper adjustment is poor.

REMEDY:
- Input external synchronous signal or external input video signal that meets standards.
- Change disc.
- Adjust clamper.

[ON-SCREEN DISPLAY]

E07 VIDEO IN NORMAL ?
OR SYNC IN NORMAL ?

- When in Record Mode, this is indicated until sync occurs.

## 10. HEAD IS LOCKED

ON-LINE RESPONSE:

| STX | E | 0 | 8 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Until system reset condition is released, this is output every time activation command is input, ie. play command (PF).

CAUSE:
- Due to external shock, control of unit is not possible.
- Disc motor servo circuit adjustment is poor or malfunction.
- Tracking servo circuit adjustment is poor or malfunction.

REMEDY:
- If error is displayed even if re-started, it is necessary to check linear motor servo circuit and tracking servo circuit, also check for blown out fuse (reset should be done after releasing system reset condition).
- Call service personnel.
- Resease system reset condition by one of the following.
  1) Press EJECT button
  2) Transmit EJ, LD command.

E08 HEAD IS LOCKED
EJECT & RETRY PLAY

- Indicate until system reset is released.

## 11. INSUFFICIENT REC. SPACE [LQ-3031T only]

ON-LINE RESPONSE:

| STX | E | 0 | 9 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted when RM, GS command execution is being attempted.

CAUSE:
- Designated recording area can not be confirmed.
- There is no non recorded area in the user area.
- Recording start track is recorded. (response for GS command)

REMEDY:
- After confirming recording area, and if there is no problem, do *recording (in the case of recording area guarantee/insurance function OFF).*
- Reset recording area or exchange with a new disc, and reperform area inspection (in the case of recording area insurance function ON).
- If there is no non-recorded area, exchange the old disc with a new one.
- *When this error was occurred by recording commands ("GS" or* REC. START button), Record Mode should be canceled. Then set the Record Mode once again.

[ON-SCREEN DISPLAY]

E09 INSUFFICIENT
REC. SPACE

- Indicate 2 sec.

## 12. ERASE MODE SETTING ERROR

ON-LINE RESPONSE:

| STX | E | 0 | 9 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted when EM command execution.

CAUSE:
- *Erasure was attempted but applicable frame was not a recorded one.*

REMEDY:
- Confirm if frames to erase is recorded.

E09 UNRECORDED FRAME

- *Indicate 2 sec.*

## 13. RECORDING VIDEO SIGNAL SYNC. ABNORMALITY [LQ-3031T only]

ON-LINE RESPONSE:

| STX | E | 1 | 0 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response every time recording gate command is input.

CAUSE:
- Either the input record video signal is not standard or there is no input.

REMEDY:
- Input correct external input VIDEO, Y/C.
- Set the Input Select switch correctly.

E10 CHECK VIDEO IN
& INPUT SELECT

- Indicated until recording video signal becomes normal when in recording mode.

## 14. WRITE PROTECT ERROR [LQ-3031T only]

ON-LINE RESPONSE:

| STX | E | 1 | 1 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as command completion response of Record Mode setting command RM, AW, IW and IE.

CAUSE:

- Attempt to set Record Mode or ID/alternate code write/erase with a write protected disc.

REMEDY:

- Take cartridge out, remove write protection, start again, then set in Record or Erase Mode.

[ON-SCREEN DISPLAY]

E11 WRITE PROTECTED

- Indicate 2 sec.

## 15. DEW [LQ-3031T only]

ON-LINE RESPONSE:

| STX | E | 1 | 2 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- When dew is present, it is transmitted every time activation command is input, ie. play command (PF).

CAUSE:

- Dew is caused by rapid temperature changes.

REMEDY:

- Wait until dew is evaporated.

E12 DEW
POWER OFF & WAIT

- Indicate until dew is cleared.

## 16. OFF TRACKING

ON-LINE RESPONSE:

| STX | E | 1 | 6 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response to record area inspection (RM, RE, AE) record command (GS) completion.

CAUSE:

- Tracking servo has slipped off by scratch or dirt on both sides of disc.
- Tracking servo has slipped off by external shock.

REMEDY:

- When address drift occurs during recording, release the Record Mode and reset to the Record Mode.
- When address drift occurs during inspection of recording area or during disc ID number read, reset the Record Mode.

E16 OFF TRACK
RETRY REC/SPACE CHK

- Indicate 2 sec.

## 17. LOADER STOP

ON-LINE RESPONSE:

| STX | E | 1 | 7 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted by EJECT or LOAD operational command.

CAUSE:

- When loader is operating, obstacles etc. stops the loader's movement.

REMEDY:

- Confirm if any obstacle is in cartridge or in front door of unit.
- Remove obstacle, and restart.

[ON-SCREEN DISPLAY]

E17 LOADER STOP

- Indicate 2 sec.

## 18. TILT ERROR

ON-LINE RESPONSE:

| STX | E | 1 | 8 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Until system reset condition is released, this is transmitted every time starting command is input, ie. standard playback command (PF).

CAUSE:

- Disc has been warped by heat.

REMEDY:

- Take disc cartridge out.
- Insert disc which is not warped.

E18 CHECK DISC (TILT)

- Indicate until system reset is released.

## 19. RECEIVING BUFFER OVERFLOW

ON-LINE RESPONSE:

| STX | E | 2 | 0 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted when ACK/NAK receiving response indicates OFF on On-line command (ON) condition.

| NAK | 2 | 0 |
|---|---|---|

- Transmitted when ACK/NAK receiving response indicates ON on On-line command (ON) condition.

CAUSE:

- There are greater than 255 characters between STX and ETX.
- There are too many commands waiting to be executed, hence, stack area receiving data overflows.

REMEDY:

- Make the number of characters between STX and ETX less than 256, then transmit again (number of characters which can be transmitted at one time is 257 maximum, including STX and ETX).
- Wait until the command waiting to be executed in stack area becomes less, then transmit command.
- Execution of ALL CLEAR command (AC) eg., cancel all commands waiting to be executed, then transmit a new command.

E20 TOO MANY COMMAND

- Indicate 2 sec.

## 20. TRANSMISSION ERROR

ON-LINE RESPONSE:

| STX | E | 2 | 1 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted when ACK/NAK receiving response indicates OFF on On-line command (ON) condition.

| NAK | 2 | 1 |
|---|---|---|

- Transmitted when ACK/NAK receiving response indicates ON on On-line command (ON) condition.

CAUSE:
- Noise in on the RS-232C communication line.
- RS-232C communication mode setting due to set up, does not match host.

REMEDY:
- Match RS-232C communication mode with host.
- Resend data.

[ON-SCREEN DISPLAY]

E21 TRANSMISSION ERR
CHECK SETUP MENU

- Indicate 2 sec.

## 21. BATTERY CHANGE INDICATION

ON-LINE RESPONSE:

| STX | E | 3 | 0 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response to error status when monitor command (ES) is performed.

CAUSE:
- Battery is weak, and output voltage is low.

REMEDY:
- Change battery as soon as possible.
- When BAT. BACKUP ERROR is indicated, memory contents are destroyed, it is necessary to reset memory contents.
  Memory contents mean SETUP and PROGRAM.

E30 CHANGE BATTERY

- Indicate 2 sec. when power is on.

## 22. NESTING ERROR

ON-LINE RESPONSE:

| STX | E | 3 | 2 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response to call command (CA) or return command (RT) is completed.

CAUSE:
- Call command (CA) was executed continuously more than 128 times, hence depth of program stack become larger than the 128 level.
- Return command (RT) which is paired with the call command (CA) was used more than call command.

REMEDY:
- Correct program nesting error.

E32 NESTING ERROR

- Indicate 2 sec.

## 23. PROGRAM ERROR

ON-LINE RESPONSE:

| STX | E | 3 | 3 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response to program command execution.

CAUSE:

- Program has not been loaded to unit.
- Program was lost due to poor battery backup.
- Although branch command was executed, there was no jumping destination.
- Nonexistent program execution was directed.
- Attempt to divide by 0.

REMEDY:

- Load program to the unit again.
- Correct jumping destination with branch command, then reload program to unit.
- Designate correct program number.

[ON-SCREEN DISPLAY]

E33 PROGRAM ERROR

- Indicate 2 sec.

## 24. PROGRAM MEMORY OVERFLOW

ON-LINE RESPONSE:

| STX | E | 3 | 4 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted while loading program.

CAUSE:

- Program was too big and program memory (8k byte) overflowed.

REMEDY:

- Make program smaller then reload.

E34 TOO LARGE PROG.

- Indicate 2 sec.

## 25. MEMORY BACKUP ERROR

ON-LINE RESPONSE:

| STX | E | 3 | 6 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response to error status monitor (ES) command.

CAUSE:

- Due to short circuit of backup battery memory contents were destroyed.

REMEDY:

- Load program again.
- If CHANGE BATTERY is also indicated, change battery.

E36 BACKUP ERROR

- Indicated for 2 seconds when power is on.

## 26. DISC ID/ALTERNATE PICTURE ADDRESS WRITE ERROR [LQ-3031T only] ]

ON-LINE RESPONSE:

| STX | E | 4 | 1 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response of disc ID number write command (IW), and alternate picture address write command (AW).

CAUSE:
- Disc was dirty or scratched.
- Tracking servo is slipped off during writing operation, due to shock, etc.

REMEDY:
- Writes disc ID number or alternate picture address again (writing code is the same code).

[ON-SCREEN DISPLAY]

E41 WRITE ERROR

- Indicate 8 sec.

## 27. DISC ID CODE POSTS TIMES OVER [LQ-3031T only]

ON-LINE RESPONSE:

| STX | E | 4 | 2 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response to DISC ID number erase command (IE).

CAUSE:
- Attempt to erase the 10th disc ID number.

E42 OVER TIMES

- Indicate 8 sec.

## 28. DISC ID/ALTERNATE PICTURE ADDRESS DOUBLE WRITE [LQ-3031T only]

ON-LINE RESPONSE:

| STX | E | 4 | 3 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response to completion of disc ID number write command (IW), and to alternate picture address write command (AW).

CAUSE:
- Without erasing the previous disc ID number, you attempted to write a new disc ID number.
- Even though alternate picture address was correctly written, you attempted to write a new code.

REMEDY:
- After erasing previous disc ID number, then write a new disc ID number.
- Cannot post alternate picture address if once written.

E43 DUPLICATE DEF.

- Indicate 8 sec.

## 29. ERASE DISC ID CODE DESIGNATION ERROR [LQ-3031T only]

ON-LINE RESPONSE:

| STX | E | 4 | 4 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response to disc ID number erase command (IE).

CAUSE:
- Disc ID number you attempted to erase and written disc ID number were different.

REMEDY:
- Confirm the written disc ID number with the disc ID number read command (IE) then try to erase it.

[ON-SCREEN DISPLAY]

E44 BAD ID. NUMBER

- Indicate 8 sec.

## 30. DISC ID/ALTERNATE PICTURE ADDRESS READING ERROR

ON-LINE RESPONSE:

| STX | E | 4 | 5 | ETX | [CR/LF] |
|---|---|---|---|---|---|

- Transmitted as a response to disc ID number read command (IR), disc ID number possible rewrites command (IT), and alternate picture address monitor command (AM).

CAUSE:
- Disc is dirty or scratched.
- During reading, address drift occurred due to shock, etc.

REMEDY:
- Reads disc ID number again.
- Read is not possible, even though reread was done, clear the dirt or damage (internal – external) from disc.
- When the read error of the alternate picture address has been occurred, take following process.
  ex.
  STEP 1: When data cannot be written by alternate picture address write error, write the data to the next frame.
  STEP 2: If alternate picture address read-error occurs at the searched frame, host computer re-searches the next frame of the searched address.
  STEP 3: Recorder will search alternate picture address which has been written on the re-searched frame automatically.

E45 READ ERROR

- Indicate 8 sec.

# CLEANING AND MAINTENANCE

As a safety precaution, always unplug the unit when cleaning it.

■ MAINTENANCE OF THE UNIT

When the cabinet needs cleaning, wipe it clean using a soft dry piece of cloth. If any polishing liquid or sticky substance is used the coating may come off or it may stain. When heavily soiled, soak a piece of cloth in a mild soap detergent solution, wring it tightly, and wipe the cabinet. then wipe dry with a soft cloth. Be careful not to allow any liquids to fall into the cabinet. Cover the unit with the dust cover while the unit is not in use.

# TROUBLESHOOTING

| Symptom | Where to check |
|---|---|
| Picture are not clear | • Is the disc clean?<br>• Is the exposure lens clean?<br>• Is disc type correct Normal/Hi-Res? |
| Normal recording can not be done | • Is the disc clean?<br>• Is the exposure lens clean?<br>• Is the equipment connected to this unit operating normally? |
| Search speed is slow | • Is the unit tilted? (not level)<br>• Is the disc tilted? |
| Unable to playback | • Is the disc loaded properly?<br>• Is a picture recorded in that address? |
| Frequent display of error messages | • Is there any dirt or scratch on the disc?<br>• Is this unit or the disc tilted?<br>• Are the correct operating procedures being followed?<br>• Is the disc loaded?<br>• Is the operating environment of this unit acceptable?<br>• Is there condensation on this unit? |
| Malfunction of EJECT button | • Is the POWER switch turned on? |
| Unable to operate by the optional Remote Controller | • Is the disc loaded?<br>• Is the battery of the Remote Controller old?<br>• Is the connecting cable of the Remote Controller broken? |
| No power | • Is the fuse (1.6A) broken?<br>• Is this unit plugged in? |
| On-Screen character or picture is distorted | • Is the REC LEVEL button "AUTO" position?<br>• Is the Rec video level acceptable? **[LQ-3031T only]** |

# ACCESSORIES

- Operating Instructions ..... 1
- Important Safeguards ..... 1
- Warranty Card ..... 1
- AC Power Cord ..... 1
- Fuse (1.6A) ..... 1
- S-Video Connecting Cable ..... 1
- Dubbing Cable ..... 1 [LQ-3031T only]
- Optical Disc Cartridge (TQ-FH331) ..... 1 [LQ-3031T only]
- Disc Cleaning Kit ..... 1

**IMPORTANT NOTICE (User Note):**

- Included with this booklet is a questionnaire which requests important information required by the U.S Center for Devices and Radiological Health.
- It should be filled out by the end-user purchaser of this unit not the dealer.
- If you are the end-user and this questionnaire is missing, please call Panasonic at 1-800-222 0584 and another will be promptly mailed to you.

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