Digital Time Lapse VCR
SDR-2000

Operating Instructions

● Features

Time Lapse Function

- Time lapse function: L12H ~ 000H record/play.
- Up to 960 hours can be recorded and played (T-120 tape)
- For L12H/L20H Time Lapse recording/play, voice is generated as well.

Trigger Function

- This allows the user to switch over the camera input of outside equipment while recording in Time Lapse Mode.

REC Lock Function

- This function prevents the record disable caused by someone who presses a button.

Tape Compatibility Function

- Play of the tape which is recorded at the standard or triple mode of the general video is possible.

Various Search Function

- Search for the recording time/date and time code.

Operating Hour Display

- Operating hours are displayed.

Alarm Function

- Alarm recording, alarm turn-off, alarm confirm, alarm counter, and other functions are available.

Series Recording

• By connecting more than two sets of the equipment, consecutive recording can be performed.

Warning Signal

• Warning signal will be generated when the motion status of the equipment changes.

Automatic Voltage Adjustment

When using 220V:
Connect the 220V plug to an electrical outlet.
Then the voltage is automatically adjusted.

When using 110V:
Put 110V plug to the cable and then connect it to an electrical outlet.
Then voltage is automatically adjusted.

2

●Contents

Search

PREPARATION

MENU

PLAY BACK

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Safety Warnings and Precautions

Before you start using the product, please make sure that you understand the information contained here and stick to the rules to prevent any personal and material damage.

Distinction between Warning and Notice

⚠ Warning	it may cause a person to die or heavily injured.
⚠ Notice	it may cause a person to get injured or cause some materialistic damage.

Indication of a Sign.

🚫	Prohibited.
🚫	Disassemble prohibited.
🚫	Touch or contact prohibited.
❗	You must stick to the rule.
🔌	Power plug should be disconnected from an electrical outlet.

⚠ Warning

Do not plug in a multiple number of electrical appliances to one electrical outlet.

• It may cause over-heating or fire.

Prohibited

Do not put water-containing vessel on top of the product.

• Leak or spill of the water may cause a trouble.

Prohibited

Do not bend the electrical cord too much or damage it.

• It may cause fire.

Prohibited

Do not clean the product with water, thinner or organic solutions.

• It may cause a trouble or electric shock, so clean it with dry cloth.

Prohibited

Do not install the device in high-humidity environment.

• It may cause an electric shock or fire.

Prohibited

Do not hold the cord when plugging off.

• Damaged cord may cause fire or electric shock.

Prohibited

Never take apart, repair or reassemble the product yourself.

• It may cause fire, electric shock or injury due to malfunction.

Disassemble prohibited

Do not plug in or plug off with a wet hand.

• It may cause an electric shock.

Contact prohibited

Do not put your hand inside the tape-inserting-mouth..

• Children might get injured if they put their hands inside the mouth.

⚠ Notice

Do not connect the plug into an electrical outlet when the hole is not tight.

• It may cause an electric shock or fire.

The hole does not match

Prohibited

Install the device in a safe area to avoid damage resulting from vibration or impact.

• Do not place the device new magnetic materials or severe vibration.

Prohibited

Keep the device in a proper temperature and humidity.

• Do not keep the device in too high- (40°C or above) or too low-temperature (5°C or below) or high humidity environment.

Prohibited

Do not move the device with the tape in play mode.

• It may cause a trouble.

I am in play mode now

Prohibited

Do not insert any foreign materials into the device.

• It may cause a trouble.

Prohibited

Do not put heavy materials on top of the device.

• It may cause a trouble.

Prohibited

Install the device in an area with good ventilation.

• Keep the device more than 10cm away from the back and 5cm away from the side-walls.

Install the device out of direct rays of the sun or heater.

Install the device on a flat and stable place.

• Otherwise, it may not function well.

Pull off the plug when the device is not in use for a long time or when there is lightning/thunder.

Disconnect the plug

Disconnect immediately if there is any strange smell or sound coming out of the device and contact Samsung Electronics' Service Center.

Disconnect the plug

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Video Player Overview
(Main Components and Their Functions)

9 11 1 2 3 12 13 5 4 21 10 7 6 8

CLEAR COUNT CNT.MEMO DATA CODE

POWER

MENU ▼ - SHIFT - ► TRACKING/SET

RESET REC LOCK TIME MODE

REC LOCK
DIGITAL

Included

MANUAL

Manual   **CD-ROM**

No	Name	Description	Reference page
1	**POWER**	**Press for power on/off**	**27**
2	**MENU**	**Press to display menu on the screen.**	**13**
3	**SHIFT** ▽, ▷	**Press to set menu or time**	**13**
4	**TRACKING/ SET** ⊖, ⊕	**Press to adjust the screen, set menu or time.**	**28**
5	**TIME MODE** ⊖ ⊕	**Press to change time mode in playback or record mode.**	**24, 36**
6	**REC LOCK LED**	**Record locking mode on/off indicator.**	**34**
7	**DIGITAL LED**	**Digital record/playback indicator.**	
8		**Indication window.**	**9**
9	**COUNT**	**Initial - Display tape counter.**	
		Once - Press to display alarm counter.	**40**
		Twice - Press to display operating hour.	**39**
10	**CNT.MEMO**	**Initial - Display tape counter.**	
		Once - Press to display counter memory.	**31**
		Twice - Press to display alarm memory.	**40**
11	**CLEAR**	**Press to clear counter.**	**31, 40**
12	**RESET**	**Press to reset this unit.**	**37**
13	**REC LOCK**	**Use to select record locking mode.**	**34**
14	**REC CHECK**	**Use to check a recorded tape during recording. (check whether alien substances are on the head)**	**35**
15	**P/STILL**	**Press to freeze frame on the playback or pause on the record mode**	**32**
16	**REC**	**Press to record.**	**35**
17	**SHUTTLE**	**Use to operate a tape.**	**28**
18	**PLAY**	**Press to play a tape.**	**28**
19	**STOP/EJECT**	**Press to stop/eject a tape.**	**28**
20	**JOG**	**Turn to advance or reverse a frame by frame.**	**32**
21	**DATA CODE**	**Press to control the display of the recorded information.**	**22**

REC   REW   F.F   REC CHECK

PLAY   P/STILL   STOP/EJECT

16   20   18   15   19   14   17

Display Indications (Front Panel)

Description

Front Panel

REC: recording display *Lights during recording

Indicates the time for which recording is reserved

Alarm record
• Lights during alarm recording and flickers upon completion of recording.

REC LOCK
• Lights during record locking mode

Tape presence and operation display

Record/Play Time mode display

● REC LOCK

● DIGITAL

REC
FAULT

T-END

8888

C.MEMO
A.MEMO
HOUR

888 H

Digital: Indicates digital mode
• Lights during digital record/play mode

FAULT: Power failure return display
• Flashes upon return of power
• Press any button to turn it off

Alarm/Counter Memory Display
• Counter memory: C. MEMO.
• Alarm memory: A. MEMO.
• Operating hour display: HOUR.

Counter Indicator
• Operating hour display
• Alarm counter display

A - 88

• Indicate an error

T-END: Indicates the end of a tape
• Lights when VCR reaches then end of tape

Operation Status Indication

Playback Display		Display other than playback		
Playback	Rotates clockwise	Recording	Rotates clockwise	REC
Still	Blinks in still status	Pause	Blinks in pause status	REC
Slow Playback	Blinks and rotates clockwise	Timer Recording	Rotates clockwise	REC ⏀
Forward Search	Rotates rapidly clockwise	Alarm Recording	Rotates clockwise	REC ♩
Reverse Search	Rotates rapidly counterclockwise	Rewinding	Rotates rapidly counterclockwise	
Reverse Playback	Rotates counterclockwise	Fast Forwarding	Rotates rapidly clockwise	
Reverse Slow Playback	Slowly rotates and blinks counterclockwise			

Description of the Rear panel

Rear Panel

External Equipment Terminal

Video In/Output Jack
(BNC Type)

Power Plug Slot

Audio In/Output Jack
(RCA Type)

S-VHS
In/Output Jack

Digital
In/Output Jack

External Equipment Terminal Information

GND

Terminal Name	Signal Level		Remark
1 ALARM IN	VIH / VIL / T	VIH : 4 ~ 5V VIL : 0 ~ 0.6 V T : 0.5sec or longer	Input
2 ALARM OUT	VIH / VIL / T	VIH : 4 ~ 5V VIL : 0 ~ 0.6 V T : Alarm recording	Output
3 ALARM RESET	VIH / VIL / T	VIH : 4 ~ 5V VIL : 0 ~ 0.6 V T : 0.5sec or longer	Input
4 ERROR OUT	VIH / VIL / T	VIH : 4 ~ 5V VIL : 0 ~ 0.6 V T : Until a button is pressed	Output
5 TRIGGER OUT	VIH / VIL / T	VIH : 4 ~ 5V VIL : 0 ~ 0.6 V T : 8m Sec or longer	Output
6 TAPE END OUT	VIH / VIL / T	VIH : 4 ~ 5V VIL : 0 ~ 0.6 V T : During input any buttonOutput	Output
7 SERIES OUT	VIH / VIL / T	VIH : 4 ~ 5V VIL : 0 ~ 0.6 V T : 1 sec or longer	Output
8 GND		0V	Grounding
9 SERIES IN	VIH / VIL / T	VIH : 4 ~ 5V VIL : 0 ~ 0.6 V T : 0.5sec or longer	Input
10 1 SHOT REC	VIH / VIL / T	VIH : 4 ~ 5V VIL : 0 ~ 0.6 V T : 0.5sec or longer	Input

10

Getting Started

Before starting to use the video player, follow the steps below.

1 Connect the monitor and this video player.

(Monitor)

Image Input

S-VIDEO Input

Audio Input

Video Input

IN

OUT

VIDEO

S-VHS

IN

OUT

AUDIO

2 Connect the CCD camera to this video player.

IN

OUT

S-VHS

CCD Camera

3 **Insert the power plug of this unit into the wall outlet.**

● Connect the SDR-2000 to an electrical outlet. If your plug is not adapted to your outlet, attach the voltage converting socket.

4 **Turn on the monitor.**

● Simply turn on the monitor.
● If using a TV, turn on power and switch to video input mode by pressing TV/VIDEO button.

Power

Menu Display

1 Press the Menu button.

```
MENU
```

```
            MAIN MENU
1▶ SEARCH MODE  SETUP
2   DISPLAY MODE SETUP
3   ALARM REC SETUP
4   REC MODE SETUP
5   VCR MODE SETUP
6   PROGRAM SETUP
7   CLOCK SET/ADJUST

(▼▶)                    END:MENU
```

2 Select a menu item using the SHIFT▽Button.

– The '▶' sign will move down once with each press.

3 After positioning ▶ sign to the desired menu item, press the SHIFT▷Button.

● Displays the selected menu on the screen. (Refer to 15 to 26 pages for detailed information)

1. SEARCH MODE SETUP

```
        SEARCH MODE SETUP

1▶ DATE TIME SEARCH
2   TIME CODE SEARCH
3   POWER LOSS MEMORY
4   ALARM HISTORY


(▼▶)                    END:MENU
```

2. DISPLAY MODE SETUP

```
        DISPLAY MODE SETUP
1▶ DATE --------------------------(ON)
2   TIME --------------------------(ON)
3   TIME CODE--------------------(ON)
4   CASSETTE ID --------------(OFF)



(▼▶)                    END:MENU
```

3. ALARM REC SETUP

```
        ALARM REC SETUP
1▶ MODE--------------------------(L4H)
2   DURATION ----------------(AUTO)
3   BUZZER-----------------------(ON)




(▼▶/– +)               END:MENU
```

4. REC MODE SETUP

```
        REC MODE SETUP
1▶ TRIGGER ----------------(1FIELD)
2   REPEAT REC ----------------(OFF)
3   SERIES REC----------------(OFF)
4   1-SHOT REC----------------(OFF)
5   ID START--------------------(11H)


(▼▶)                    END:MENU
```

5. VCR MODE SETUP

```
        VCR MODE SETUP
1▶ BUZZER-----------------------(ON)
2   AUDIO --------------------------(ON)
3   PC INTERFACE ----------(RS232)
4   DEVICE ID------------------(– – –)
5   CASSETTE NO-------------(– – –)
6   SVHS PB MODE ------------(DGT)

(▼▶/– +)               END:MENU
```

6. PROGRAM SETUP

```
        PROGRAM SETUP1
     START   STOP   DATE  MODE
● ▶
●
●
●
●
●   PROGRAM SETUP2
(▼▶/– +, CLEAR)     END:MENU
```

PROGRAM SETUP 1

```
        PROGRAM SETUP2
     START   STOP   DATE  MODE
● ▶
●
●
●
●
●   PROGRAM SETUP1
(▼▶/– +, CLEAR)     END:MENU
```

PROGRAM SETUP 2

7. CLOCK SET/ADJUST

```
        CLOCK SET/ADJUST
1▶ SUMMER TIME SET
2   DISPLAY MODE     (YY-MM-DD)
3   CLOCK SET/ADJUST

   YEAR    DATE           TIME
   2001    01/01    MON  12:00


(▼▶/– +)               END:MENU
```

Date/Time Search

1 Search Mode Setup

```
        SEARCH MODE SETUP

1▶ DATE TIME SEARCH
2   TIME CODE SEARCH
3   POWER LOSS MEMORY
4   ALARM HISTORY


(▼▶)                    END:MENU
```

1.1 Date/Time Setup for Search

* When completed normally

[Initial Display]

```
    DATE TIME FOR SEARCH

    YY     MMDD    H M S

    2001    01/01   12:00:00
            ▲
    SET UP AND TURN THE
    SHUTTLE RING

(▶/− +)              END:MENU
```

*Year, Month and Time recorded on the tape is displayed.

[Date Time Setup]

```
    DATE TIME FOR SEARCH

    YY     MMDD    H M S

    2001    01/01   12:00:00
                    ▲
    SET UP AND TURN THE
    SHUTTLE RING

(▶/− +)              END:MENU
```

*Use SHIFT(▷) and TRACKING/SET (⊖, ⊕) buttons to enter the year, month, date, time, and minute
*Turn the Shuttle Ring to start search

[When search is completed OK]

```




              01-06-08 XXX
              12:00:XX XXH
```

When the data wanted is found, the screen will be transferred to the still status and OSP window disappears. Only those items set in the Display Mode will be displayed on OSD.

[During Search]

```
IN SEARCHING

    YY     MMDD    H M S

    2001    06/08  12:00:00


                    PLEASE WAIT
```

E-E is indicated on the screen. Blue Screen will show up when there is no input from the video.

15

∗ **When wanted data is not found**

[During Search]

```
IN SEARCHING

  YY      MMDD    H M S

  2001    06/08   12:00:00


                  PLEASE WAIT
```

E-E is indicated on the screen.
Blue Screen will show up when there
is no input from the video.

[End of Search - NOT FOUND]

```
END OF SEARCH

  YY      MMDD    H M S

  2001    06/08   12:00:00


                  NOT FOUND
```

[Getting out of the Search Mode]
Press the MENU Button to move to
the menu item one level higher.

```
         SEARCH MODE SETUP

  1▶ DATE TIME SEARCH
  2   TIME CODE SEARCH
  3   POWER LOSS MEMORY
  4   ALARM HISTORY



  (▼▶)                 END:MENU
```

Notice

● The tape comes to a stop at its end or start if no recording section
  with the date and time was found as a result of the search.
● When the tape is stopped during recording, it will stop at the border
  between the new recording and old recording, and the continuity in
  the date and time recorded on the tape will be lost.
  In this state, searches may not be performed properly.
● During programmed recording, the continuity in the date and time
  recorded on the tape will be lost.
  In this state, searches may not be performed properly.

Time Code Search

1.2 Time Code Setup for Search

[Initial Screen]

```
TIME CODE FOR SEARCH

        H  M  S

TIME CODE : 01:12:12
            ▲
SET UP AND TURN THE
SHUTTLE RING

(▶/− +)          END:MENU
```

*Time code recorded on the current position of the tape is displayed.
*Rest of the procedures is the same with Date Time Search.

[Time code Setup]

```
TIME CODE FOR SEARCH

        H  M  S

TIME CODE : 01:02:02
            ▲
SET UP AND TURN THE
SHUTTLE RING

(▶/− +)          END:MENU
```

*Enter the time code (hour, minute, second) that you want to search in the same procedures described on page 15 for Date Time Search.
Turn the Shuttle Ring to start search.

[When search is completed OK]

```
                    01:02:02:00




             01-01-01 MON
             12:00:00 L4H
```

When the data wanted is found, the screen will be transferred to the Still status and OSP window disappears. Only those items set in the Display Mode will be displayed on OSD.

[In Searching]

```
IN SEARCHING

              H  M  S

   TIME CODE : 01:02:02


              PLEASE WAIT
```

E-E is indicated on the screen.
Blue Screen will show up when there is no input from the video.

[Getting out of the Search Mode]

```
   SEARCH MODE SETUP

1 ▶ DATE TIME SEARCH
2   TIME CODE SEARCH
3   POWER LOSS MEMORY
4   ALARM HISTORY



(▼▶)            END:MENU
```

Press the Menu Button to move to the menu item one level higher.

[End of Search - NOT FOUND]

```
END OF SEARCH

              H  M  S

   TIME CODE : 01:02:02


              NOT FOUND
```

Checking Power Failure, Alarm REC Time and Date

1.*3* Power Loss Memory

```
      POWER LOSS MEMORY
            YEAR   DATE    TIME
•  OFF    2001   12/25   15:00:00
   ON     2001   12/25   15:15:37
•  OFF    2001   12/24   13:25:00
   ON     2001   12/24   13:26:00
•  OFF    2001   12/23   17:30:30
   ON     2001   12/23   17:40:00


                          END:MENU
```

●Time for power loss and recovery is recorded and
  displayed.
※ Example) Power was off on 17:30:30 December 23,
            2001 and recovered on 17:40 December
            23, 2001.

1 OFF 2001   12/23   17:30:30
  ON 2001   12/23   17:40:00
※ Example) Power was off again on 13:25 December
            24, 2001 and recovered on 13:26
            December 24, 2001.
1 OFF 2001   12/24   13:25:00
  ON 2001   12/24   13:26:00
2 OFF 2001   12/23   17:30:30
  ON 2001   12/23   17:40:00
3 OFF
  ON

●The most recent three events are recorded and
  displayed.
  And the most recent one out of the three is indicated
  on top.

1.*4* Alarm History

Check Alarm REC (Refer to page 39)

● Setting the Current Time

How to set the current time

1 Example) 13:30 January 1, 2002
Press the MENU button.

● Press the MENU button to see the MAIN MENU.

```
                    MENU
```

```
           MAIN  MENU
   1▶SEARCH  MODE  SETUP
   2   DISPLAY  MODE  SETUP
   3   ALARM REC SETUP
   4   REC MODE SETUP
   5   VCR  MODE  SETUP
   6   PROGRAM SETUP
   7   CLOCK  SET/ADJUST

   (▼▶)                END:MENU
```

2 ### Press the SHIFT button.

● Press the SHIFT ▽ button to move it to the CLOCK SET/ADJUST and press the SHIFT ▷ button to see the CLOCK SET/ADJUST.

```
           ▼ - SHIFT - ▶
```

```
          CLOCK SET/ADJUST
   1▶SUMMER TIME SET
   2   DISPLAY MODE   (YY-MM-DD)
   3   CLOCK SET/ADJUST

       YEAR   DATE          TIME
       2001   01/01  MON  12:00

   (▼▶/-+)              END:MENU
```

2.1 ### Summer Time Set

● Press the SHIFT Button to see the menu screen as follows.
● Select Summer Time Use/No Use
● When wanting to use the summer time, press the SHIFT ▷button (USE) on number 1
● When not wanting to use the summer time, select (NO USE) on number 1

```
          SUMMER TIME SET
   1▶SUMMER TIME ----(NO USE)
   2   SUMMER TIME IN
   3   SUMMER TIME OUT

       WEEK    DAY  MONTH  TIME
   IN   FIRST/  SUN    4    02:00
   OUT  LAST/   SUN   10    01:00

   (▼▶/-+)              END:MENU
```

2.2 ### Summer Time In

● When summer time use is selected

```
          SUMMER TIME SET
   1   SUMMER TIME--------(USE)
   2▶SUMMER TIME IN
   3   SUMMER TIME OUT

       WEEK    DAY  MONTH  TIME
   IN   SECOND/SUN    4    12:00
        ▲

   (▼▶/-+)              END:MENU
```

● WEEK:
  FIRST/SECOND/THIRD/FOURTH/LAST
● DAY: SUN/MON/TUE/WED/THU/FRI/SAT
● MONTH: 1/2/3/4/5/6/7/8/9/10/11/12
● TIME: 0:00 - 23:00

2.3 Summer Time Out

● Enter the time when the summer time is over in the same way that you set the starting summer time.

● Press the MENU when setting is completed to move to CLOCK SET/ADJUST.

```
        SUMMER TIME SET
1    SUMMER TIME ----------(NO USE)
2    SUMMER TIME IN
3▶ SUMMER TIME OUT

     WEEK    DAY  MONTH   TIME
OUT SECOND/SUN     10     12:00
           ▲

(▼▶/− +)              END:MENU
```

3 Press the SHIFT ▽ button.

● Whenever pressing the SHIFT ▷ button, the display mode changes.

● The display changes as follows: (YY-MM-DD) (DD-MM-YY) (MM-DD-YY).


```
        CLOCK SET/ADJUST
1    SUMMER TIME SET
2▶ DISPLAY MODE     (YY-MM-DD)
3    CLOCK SET/ADJUST

     YEAR    DATE         TIME
     2001    01/01  MON  12:00


(▼▶/− +)              END:MENU
```

4 Press the SHIFT ▽ Button.


```
       CLOCK SET/ADJUST
1    SUMMER TIME SET
2    DISPLAY MODE (YY-MM-DD)
3▶ CLOCK SET/ADJUST

     YEAR   DATE        TIME
     2001   01/01  MON  12:00


(▼▶/− +)             END:MENU
```

```
       CLOCK SET/ADJUST
1    SUMMER TIME SET
2    DISPLAY MODE (YY-MM-DD)
3 ▶CLOCK SET/ADJUST

     YEAR   DATE        TIME
     2001   01/01  MON  12:00
        ▲

(▼▶/− +)             END:MENU
```

5 Use the TRACKING/SET ⊖ ⊕ Button to set year, month and date.

(When the display mode is YY-MM-DD)

● Press the TRACKING/SET ⊕ Button once to set "2002".

● Once it is set, press the SHIFT ▷ Button. Then the ▲ symbol will be placed next to the month.

● The date works in the same way.


```
         CLOCK SET/ADJUST
1    SUMMER TIME SET
2    DISPLAY MODE (YY-MM-DD)
3▶ CLOCK SET/ADJUST

     YEAR   DATE        TIME
     2002   01/01  TUE  12:00
        ▲

(▼▶/− +)             END:MENU
```

Setting the Current Time

6 Use the TRACKING/SET ⊖ ⊕ Button to set year, month and date.

(When the display mode is YY-MM-DD)

● Press the TRACKING/SET ⊕ Button once to set "13".
● Press the SHIFT ▷ Button. Then the ▲ symbol will be placed next to the minute.
● The minute works in the same way.

TRACKING/SET

```
         CLOCK SET/ADJUST
 1  SUMMER TIME      (NO USE)
 2  DISPLAY MODE  (YY-MM-DD)
 3▶ CLOCK SET/ADJUST

    YEAR   DATE  DAY  TIME
    2002  01/01  TUE  13:00
                         ▲

(▼▶/-+)              END:MENU
```

7 Press the MENU button twice.

● Check year, month, day and hour again and press the MENU button twice to complete the setting.

MENU

```
                  02-1-01 TUE
                  13:30:00 L20H
```

Tip

Regarding time display:

● There is no display of AM or PM
● 1 PM will be displayed as 13
   11 PM will be displayed as 23
   12 PM will be displayed as 0

● Setting Display and Alarm REC

How to set screen display

1 Display Mode Setup

```
    DISPLAY MODE SETUP
1▶ DATE-----------------------(ON)
2   TIME ----------------------(ON)
3   TIME CODE ----------------(ON)
4   CASSETTE ID------------(OFF)



(▼▶)                        END:MENU
```

※ To turn the time on or off

1. Place the ▽ sign in the "TIME"
   position using the SHIFT ▷Button.
2. Press the SHIFT ▷ Button to toggle
   the time ON and OFF.
3. The other items work in the same
   way.

※ Use of Data Code

   The details above are setup functions
   that show what is displayed on the
   screen only. You can utilize only
   those items you want using DATA
   CODE Button. Recording is made
   normally even in off mode.

● Date: Select date display ON/OFF

ON	OFF
01-12-25 TUE	
12:45:30 L4H	12:45:30 L4H

● Time: Select time display ON/OFF

ON	OFF
01-12-25 TUE	01-12-25 TUE
12:45:30 L4H	

● Time Code: Frame unit elapsed time

● Cassette ID:
   D-ID : 000 ~ 999, Device ID
   C-NO : 000 ~ 999, Cassette Number
   R-NO : 000 ~ 999, number of recording
   When "ON" is selected, number 4 and 5 on VCR
   MODE SETUP MENU will be displayed.
   (Refer to page 24)

Record number doesn't guarantee exact recording times

If user use tape from beginning to end repeatedly, R-NO provide lifetime of tape.

Record number is added to present recording number by 1.

Record number is read only when tape is inserted.

<Example>

Number of recording times :	2	5	3
R-NO in PB :	R-NO : 002	R-NO : 005	R-NO : 003
Location of REC start :	Tape insert	Tape insert	Tape insert
R-NO after REC :	002 003	006	004

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Setting Display and Alarm REC

How to set Alarm REC

2 ALARM REC SETUP

```
        ALARM REC SETUP
1▶ MODE ---------------(L4H)
2  DURATION----------(AUTO)
3  BUZZER--------------(ON)



(▼▶/-+)            END:MENU
```

※In Sel 1Min status in Duration, change can be made as following using -/+ key.
(SEL 5 SEC). (SEL 10 SEC). (SEL 15 SEC). (SEL 20 SEC). (SEL 30 SEC). (SEL 40 SEC). (SEL 1 MIN). (SEL 2 MIN). (SEL 3 MIN). (SEL 4 MIN). (SEL 5 MIN).

● Mode: Select Alarm REC speed
　　　　Select out of L4H, L12H, L20H, and OFF
　　　　L4H, L12H, L20H: Alarm record available
　　　　OFF: This unit does not Alarm REC whether
　　　　　　Alarm signal comes in or not.

● Duration: Set Alarm REC time
　　　　AUTO
　　　　SEL40SEC
　　　　∗ When wanting to change the Alarm
　　　　　 REC time:at the SEL40SEC mode, use
　　　　　 the TRACKING/SET button to select
　　　　　 from SEL 20SEC to SEL5MIN.

　　　　∗ AUTO : If an alarm signal is received,
　　　　　　　　ALARM REC will begin and
　　　　　　　　continue until alarm signal is
　　　　　　　　interrupted. The ALARM REC will
　　　　　　　　then stop.
　　　　∗ TAPE END : If an alarm signal is received,
　　　　　　　　　　ALARM REC will begin and
　　　　　　　　　　continue to the end of the
　　　　　　　　　　tape.

● BUZZER : Selects if the beeper sound is on or off
　　　　　　 during Alarm REC

Setting REC Mode and VCR Mode

How to Set Record Mode

1 REC MODE SETUP

```
       REC MODE SETUP
1 ▶TRIGGER -------------(1FIELD)
2  REPEAT REC-------------(OFF)
3  SERIES REC -------------(OFF)
4  1-SHOT REC -------------(OFF)
5  ID START------------------(11H)


(▼ ▶)                END:MENU
```

SHIFT ▽ : MOVE Button
SHIFT ▷ : Enter (Select) Button

● TRIGGER
  - Select one field if a one-field(picture) per camera sequence recording is desired.
    Select two field if you want the recorder to record two fields from a camera before switching to the next camera.

● REPEAT REC: Selects ON/OFF for repeat recording
  - On : If the tape reaches end during recording, it will automatically rewind to the beginning and the recording will continue.
  - If an alarm record is recorded even once, the tape is ejected once it reaches its end.

● SERIES REC: Series recording is a convenient function for using two or more SDR-2000S.
  The second unit automatically begins recording when the tape in the first unit reaches its end.
  - How to connect: Refer to the Series REC (series recording) method on page 43
  * This function cannot be used at the same time with the REPEAT FUNCTION.

● 1-SHOT REC: Used by selecting 000H on REC TIME MODE.
  OFF : Records one frame when REC button is pressed once.
  1MIN : Records one frame on one minute intervals with one press of the REC button
  2MIN : Records one frame on two minute intervals with one press of the REC button
  3MIN : Records one frame on three minute intervals with one press of the REC button

● ID START: 11H/13H
  This is used to select the starting point of ID, which is created at Frame Switcher. This is Horizontal Line Number that starts to process input signals.

How to setup Video Mode

2 VCR MODE SETUP

```
       VCR MODE SETUP
1 ▶BUZZER --------------------(ON)
2  AUDIO -----------------------(ON)
3  PC INTERFACE --------(RS232)
4  DEVICE ID ----------------(- - - )
5  CASSETTE NO ------------(- - - )
6  SVHS PB MODE ----------(DGT)


(▼ ▶/-+)             END:MENU
```

SHIFT ▽ : MOVE Button
SHIFT ▷ : Enter (Select) Button

● BUZZER
  - Selects the beeper sound on or off. (Refer to the page 40)
● AUDIO
  - Selects audio output for playback.
● PC INTERFACE
  - PC communications interface selection. RS-232C/RS-485 selected.
● DEVICE ID
  - Device ID is required to distinguish equipment connected with PC for PC communications. It is set at VCR (000 - 999).
  - Use TRACKING/SET for setup.
● CASSETTE NO
  - Information required to distinguish cassette recorded in the equipment (000 - 999).
  - Setup procedures are the same with those for DEVICE ID setup.
● SVHS PB MODE
  - Playback of the VHS signals recorded at S-VHS tape can be performed only after switching to analog.
  - When S-VHS tape is ejected, it is automatically converted to digital.
  - General VHS tape auto playback is possible.
  - When the setup is opposite to the tape, which is already inserted, playback is not performed.

Menu

Setting Programmed Recording

How to set PROGRAM REC 1

1 PROGRAM SETUP 1

```
      PROGRAM SETUP 1
  START    STOP    DATE  MODE
● ▶ 13:03 ➡ 13:15    SUN    L4H
●   13:03 ➡ 13:15    DAILY L12H
●
●   OFF
●   13:03 ➡ 13:15    MON    L20H
● PROGRAM SETUP 2

(▼▶ /-+, CLEAR)      END:MENU
```

Notice

1. None of the other buttons except for POWER and Reset can be used during the reserved recording.

2. Press the POWER Button to cancel the program while reserved recording is under way.

3. When trying to cancel the reservation program place ▷ next to the program that you want to delete and press the CLEAR button (then off sign will show up). Press the SHIFT ▷ Button to see the time set previously.

4. Reserved recording can be done only in Power Off Status. Make sure to turn off the power after setting up the reservation program.

● **How to set PROGRAM REC:**
Example) To set up a programmed recording from 13:03 to 13:15 on Sunday in the L4H mode.

1. Press the SHIFT ▽ Button to move the cursor to the vacant program position.

2. Press SHIFT ▷ Button to display the current time.

3. Press the TRACKING/SET ⊖ ⊖ button to set the hour of starting time at 13.

4. Press SHIFT ▷ Button to move to the minute.

5. Press the TRACKING/SET ⊖ ⊖ button to set the minute of the starting time at 03.

6. Set the finishing time at 13:15 following the same procedures described above and then press SHIFT ▷ Button to move to the date.

7. Press the TRACKING/SET ⊖ ⊖ button to set SUNDAY and then press SHIFT ▷ Button.

8. Press the TRACKING/SET ⊖ ⊖ button to set L4H and press SHIFT ▷ Button.

9. By the same method, set up the NEXT PROGRAM REC which you may want.

10. Get out of the menu screen and turn off the power.
   • Daily: Use when programmed recording is made at the same time every day.
   • When a certain day is selected, programmed recording is made only on the day selected (on weekly basis).

Tip

You can set up to 10 programs a week.

How to set programmed recording 2

2 **PROGRAM SETUP 2**

```
  PROGRAM SETUP2
  START    STOP    DATE   MODE
● ▶13:03 ➜ 13:15    FRI    L4H
●  13:03 ➜ 13:15    SAT    L4H
●
●  OFF
●  13:03 ➜ 13:15    MON    L12H
● PROGRAM SETUP1

(▼▶/− +, CLEAR)        END:MENU
```

● When five programs are set in Program Setup 1, select Program Setup 2.

● Procedures are the same with the Programs Setup 1.

※ When finished with PROGRAM SETUP1, 2 press Menu to end and press POWER to begin standby.

⏻ POWER

⊕ *OFF*

※ The tape will be ejected and the beeper will sound if the safety tab has been removed or when there is not tape inserted. (If the tape is not S-VHS or D-VHS tape).

※ Recording can be made only with S-VHS or D-VHS tapes.

※ You can enjoy a good-quality screen if you use tape T-120 or lower.

Operation

Basic Playback Operation

1 Turn on the SDR-2000 and insert a tape.
In case there is no safety tab attached to the tape.

● When a tape is inserted, the SDR-2000 is automatically turned on.

VIDEO

S-VHS TAPE

Insert a tape with the transparent window facing up.

※ In the operation mode transition, it sounds like "tick tick". But it is not a trouble.

■■■

Note the following when playing the tape recorded in time-lapse mode

● L4H playback cannot be made for the tapes recorded in the interval mode from L12H to 960H. (Automatically L12H playback can be performed after the initial auto tracking and only those from L12H to 960H are available)

● Playback in time-lapse mode can create some vibrating pictures or noise but it is not an indication of any malfunction or trouble.

● Sometimes sound may not be heard in recording L12H or L20H mode. But it does not indicate any malfunction or trouble.

● Tape recorded in time-lapse mode cannot be played back in L4H mode (automatically switched to L12H Mode).

● You cannot hear normal sound when paying back the tape recorded with sound if the recording time mode is different from the playback time mode.

● The screen may jitter when changing the Playback Time Mode, or during the initial stage of various screens (still, slow play, fast viewing, etc) or playback/return.

2 Press the button when necessary.

Playback
(for tapes with safety tab)

PLAY
►

Stop

STOP/EJECT
■/▲

Eject

STOP/EJECT
■/▲

During normal playback

For still	P/STILL ❚❚
For forward search	
For reverse search	

To return to normal playback

| P/STILL ❚❚ ⟷ PLAY ► |
| Shuttle Ring Return |
| Shuttle Ring Return |

During Pause

| For fast forwarding | |
| For fast rewinding | |

- You can not use pause or slow jog functions on normal VHS tape
- When playing VHS signals on S-VHS tape, switch the "SVHS PB MODE" in the VCR MODE SETUP MENU to "Analogue" first to see the image.

Note the screen adjustment

When the tape is inserted, the screen is automatically adjusted in L4H. If not, adjust it by pressing the TRACKING/SET button.

TRACKING/SET
⊖ ⊕

- If the screen is not adjusted using TRACKING/SET buttons, adjust it by pressing simultaneously the TRACKING/SET ⊖ ⊕ buttons.

When Block Noise is generated in slow play or pause mode.

Press TRACKING/SET ⊖ ⊕ button.

- If the screen shows noise or jitters during slow playback, correct by pressing the TRACKING/SET ⊖ ⊕ buttons.
- Block noise can be created when trying to switch to the previous data in a situation there is error or conceal is applied

28

Various Playbacks

Insert a tape and press the PLAY button.

1 Screen search

Turn the shuttle ring clockwise or counterclockwise in the playback mode.

- The screen will fast forward or fast rewind.
- The speed varies depending on the angle of turning of the shuttle ring (3.5/5.5 times).

To return to normal playback

- Release the Shuttle ring.

When viewing special playback pictures

- Vibrating picture in the fast search mode is not a sign of a trouble.
- The tape recorded in other digital time lapse may not be played back at all.
- If the screen shows noise or jitters during playback, correct by pressing the TRACKING/SET $\ominus$, $\oplus$ buttons.
- When video noise in blocks interferes with playing the tape recorded in other SDR-2000, press the TRACKING/SET $\ominus$, $\oplus$ buttons.

2 When viewing slow picture

Press TIME MODE ⊖ , ⊕ button during playback.

TIME MODE
⊖ ⊕

- Then you cannot hear the sound.
- Press the TIME MODE Button and view the picture at the desired slow speed.

3 When viewing a forward/reserve slow picture

- Press the P/STILL Button in the playback mode to pause the picture. Turn the Jog/Shuttle to left or right.
- F.F shows slow screens in the normal direction while REW in the reverse direction.
- Press the PLAY Button to view the normal picture again.
- When the slow play is continued for about five minutes, the tape is automatically set to the playback mode.

REW   F.F

※ When the RSLOW play is continued for about 30 seconds, the tape is automatically set to the playback mode. Then after 2~3 seconds, return to RSLOW play.

When it sounds?

● Sound can be recorded only in L4H, L12H, and L20H and sound can be heard only when playing at the recorded speed. Turn the AUDIO off in VCR MODE SETUP on MENU to mute the sound.

Various Playbacks

4 Playback in L12H, L20H mode

- Press TIME MODE button in playback mode to see L12H/L20H on the front panel.
- Playback can be made slower than in L4H mode.
- For tapes recorded in L12H or L20H, sound is reproduced only when the same mode for the recording time is selected.
- Noise can be generated.

6

5

4

TIME MODE

When rewinding the tape

- Set the counter at the original position(*0000*) by pressing the CLEAR button when starting the recording or playback. Press the CNT.MEMO button. When pressing REW button in the stop mode after completion of recording and progressing of playback, the tape stops at the starting position(*0000*) of the recording or playback.

Front Display

0000 C.MEMO

Display of current counter position

Display of counter memory

5 Still picture

Press P/STILL Button in playback mode.

● You can see a still picture.
● Then you cannot hear the sound.
● Do not leave the picture in pause for long periods of time as it may cause damage to the video head and the tape.
● When the picture is continually paused for about five minutes, the tape is played automatically.

To return to normal playback

● Press the PLAY button to return to normal playback.
● Still function cannot be applied to tapes recorded in VHS.

6 When viewing still scene by scene

● Press P/STILL button in playback mode.
● Then you cannot hear the sound.
● Turn the jog dial in the still mode to see one frame after another.
● Press the PLAY button.
● Turn the jog dial in the reverse direction to see one frame after another. In this case, screens at Frame Switcher cannot be reproduced.

Comparison of Playback and Record as modes

REC ╲ PB	L4H	L12H	L20H	28H	36H~960H
L4H	○	✗	✗	✗	○
L12H	✗	○	○	✗	○
L20H	✗	○	○	✗	○
28H	✗	○	○	✗	○
36H~960H	✗	○	○	✗	○

Notice : In time of recording or playback at time-lapse mode, picture distortion may happen.

Before Recording

Did you set the current time?

For programmed recording, the current time should be set correct. If the current time is not correct, refer to page 19.

Is a tape with a safety tab inserted?

With the tab in place:
● The tape can be recorded over again.

— Safety strip

Without the tab in place:
● The tape cannot be recorded over unless the tab is replaced by a piece of scotch tape.

— scotch tape

※ **Only S-VHS, D-VHS can be used for recording.**

Tip **Condensation**

● When the video player is moved from a cold to a warm place suddenly, installed in high-humidity environment or exposed to cold air from an air conditioner, water drops can be formed on the video head drum due to the abrupt change in temperature.
Using the video player in this condition may cause a malfunction in this product or the tape. If the video player is moved from a cool to warm place, plug the power cord in, press the power button and maintain the ON state for 1 to 2 hours before using.

Record Locking

This product features record locking and other various recording functions for multi-purpose applications including monitoring and observation. The more you know about the usage, the wider the scope of the usage can be.

How to select	How to operate	Description of operation
When you wan to secure recording REC LOCK	● Press the REC LOCK switch	● Press the REC LOCK switch in the record mode to switch it to the record locking mode ● REC LOCK lamp will be on ● In REC LOCK mode, no other button can be entered except the RESET button ● Recording continue even after the power restore
When you turn-off the record locking REC LOCK	● Press the REC LOCK switch again	● REC LOCK lamp will be off

Motion when the end of a tape is reached while recording is under way

∗ When the tape reaches the end during recording:
● Repeat record after automatic rewind.
   If the REPEAT is ON in MENU, recording is made again after automatic rewind.
   (However, when even one alarm recording is made, the SDR-2000 will eject the tape and power on).
∗ Power on after tape is ejected.
● When reaching the end of tape except repeat recording after automatic rewind.

Basic Recording

4,7

5

6,7

1

1 **Press the SDR-2000 power button.**

4 **Press the REC button.**

- When the tape does not have a safety tab or general VHS tape is inserted, the tape is ejected (alarm sounds five times).
- Recording starts.

REC

5 **Press the REC CHECK button.**

- You can check the record quality while recording.
- The SDR-2000 will playback the video recorded a few seconds prior to pressing the REC CHECK button.

REC CHECK

Tip

What is a safety tab?

- Safety tab is a device that protects the contents of recoding on the tape or allows to record over it again.

To protect a recording

- Remove the safety tab.

Safety tab

To record again

- Attach scotch tape to the area where the safety tab was removed.

Safety tab

Minimum record time from chart below must be made before REC CHECK will function.

TIME MODE	MIN. REC TIME	TIME MODE	MIN. REC TIME
L4H	5 seconds	96H	2 minutes
L12H	15 seconds	120H	2 min 30 seconds
L20H	25 seconds	168H	3 min 30 seconds
28H	35 seconds	240H	5 minutes
36H	45 seconds	480H	10 minutes
48H	1 minute	960H	20 minutes
72H	1 minute 30 seconds		

2 Insert a tape with a safety tab (make sure that you insert S-VHS or D-VHS.)

Safety tab

3 Select the recording speed.
● Use TIME MODE ⊖ , ⊕ to select the recording speed. (Refer to page 24)
● The recording speed selected is shown on the display.
● Refer to the recording function timetable below.

If you want to change TIME MODE in the Record Mode

6 Press the P/STILL button. Change the record TIME MODE.
● When the video player is in pause mode for more than five minutes, the video player stops automatically for self-protection. Make sure to press the STOP button if pausing for long periods of time.

P/STILL

7 Press the P/STILL button to start recording again.

REC **P/STILL**

<div style="text-align: right">Record</div>

Recording Time Table

● This model is designed based on the T-120 tape.
● Use T-120 minute tapes if possible.

Tape	Maximum Recording Time												
Type	L4H	L12H	L20H	28H	36H	48H	72H	96H	120H	168H	240H	480H	960H
T-120	4 hr	12 hr	20hr	28hr	36hr	48hr	72hr	96hr	120hr	168hr	240hr	480hr	960hr

36

Series Recording

This is a convenient function in which when two or more SDR-2000 are connected the second unit starts recoding when the tape on the first unit reaches the end.

How to connect	How to operate	Description of operation
Refer to the connection method for series recoding (refer to page 43)	● Select REC MODE SETUP in the MENU ● Select to "ON" for SERIES REC using the SHIFT ▽ and SHIFT ▷button.	● The second video player start recording right after the tape in the first one reaches the end. When the tape in the second video player reaches its end, the next player starts recording if connected. ● When the series recording is selected, the second unit performs recording even if the power is turned off. ● Warning signal can be cleared if you press any button

■ ■

Tip

RESET Button

● Use the RESET Button when the SDR-2000 or display does not operate normally even though the power is turned on.
● RESET button is on the left side of Front Panel.
● Use a ball pen or pencil to press the RESET Button.

When pressing the RESET button,

● All the data set such as the time for programmed recording, current time or alarm information will be all erased.
● The power is turned off and there is no picture at all. When power is turned on again, 01-1-1 MON 12:00:00 L4H will flash on the display of the screen.

● Current time will be erased and must be reset.
※ Make sure that children will not press the button.

Alarm Recording

If the SDR-2000 is connected to equipment with an alarm output such as Frame Switcher or Door Switch, the SDR-2000 will function according to the time and mode selected on the ALARM REC SETUP/RECALL in the MENU when an alarm is received. The operation information below is given for the circumstance when the alarm recording speed is set at L4H.

L12H ～ 960H Mode Record	L4H Mode record	L12H ~ 960H Mode Record	L4H Mode Record
Time lapse recording	Alarm recording	Time lapse recording	Alarm recording
Start of recording	Enter the alarm signal	Enter alarm reset or complete the set time	Enter the alarm signal

How to connect	**How to operate**	**Description of operation**
Connect alarm output equipment as follows: SDR-2000 *[connection diagram]* Frame Switcher Refer to page 43	●Select mode and duration from ALARM REC SETUP in MENU. (Refer to the Alarm REC Setup on page 23) ●Set it in the automatic position when connecting with Samsung's FS-81MA (Frame Switcher).	●Automatic selection: alarm record timing is determined by input of the alarm signal ●5 sec - 5 min: alarm recording is performed for 5 sec to 5 min after input of the alarm signal ●End of tape: Alarm recording is performed up to the end of the tape after input of the alarm signal ● Alarm signal is entered, the " 🔔 " sign on the front display is turned on ●The " 🔔 " sign flashes when the alarm recording is completed ●When wanting to cancel the alarm during alarm recoding, make a connection between the alarm release and the alarm grounding for longer than 0.5 second. When the alarm release is entered, the alarm recoding is stopped. ●If the alarm signal is received, the alarm sounds continuously. Press any button to silence the buzzer.

Alarm Function

Alarm functions include the alarm recording, alarm checking, alarm time indication, alarm counter memory, etc.
(Refer to page 38 for alarm recording).

Checking Alarm Recording

1 Press MENU button.

1. Press the SHIFT ▽ Button to position ▷ sign next to the SEARCH MODE SETUP.
2. Press SHIFT ▷ Button to see the Alarm HISTORY screen.
3. Press MENU button after setting is confirmed.

● No indication on the screen display if alarm recording is not made.
● The screen displays the six most recent alarm recorded events with the date and time of each.
● If the alarm recording was performed at 12:00, 13:00, 15:00, 17:00, 19:00 on December 25, 2001.

```
            ALARM HISTORY
        YEAR   DATE     TIME
  1  2001    12/25   19:00:00
  2  2001    12/25   17:00:00
  3  2001    12/25   15:00:00
  4  2001    12/25   13:00:00
  5  2001    12/25   12:00:00
  6

                          END:MENU
```

3

1 5 4 2

Tip

Display of operating hour

● Press the COUNTER button twice when ⫿⫿⫿⫿ is displayed on the front display. Then you can see the operating hours. Ex) When operated for 11 hours, you will see

⫿ ⫿ ⫿ ⫿**HOUR**

● If the COUNTER button is not pressed within 5 seconds while checking the operating hour, status of the front display returns to the status prior to checking the operating hour.

Alarm Counter Memory

● Available only with the tapes for which alarm recording is made on L4H.

2 CNT.MEMO

● Press CNT.MEMO button twice to see "A.MEMO"sign.

CNT.MEMO

$$0000 \quad \text{A.MEMO}$$

3 Turn the Shuttle ring to F.F. or REW.

● Turn the shuttling forward or backward to find the point where alarm recording is made in L4H. It pauses on this spot for five seconds and turned into a stop mode.

Alarm CLEAR

4 Press the COUNT button.
Ex) When alarm recording is made at No. 12

● A-12 is shown on the Display.
● In $A - 12$, 12 indicates the frequencies of alarm recording.
● It is possible to display up to " $A - 99$ "
● If alarm recording is made, " 🔔 " sign on the front display flashes

COUNT

$$A - 12 \quad L04_H$$

5 Press the CLEAR button.

● $A - 00$ is shown on the front display.
● " 🔔 "sign is turned off.
● When pressing the Clear button while the alarm check screen is displayed, all the data and time in memory are erased.
● Alarm frequency and other information regarding alarm are erased even after the tape is ejected. However, what is recorded on the actual tape will not be erased.

CLEAR

$$A - 00 \quad L04_H$$

Function

Tip

The alarm sound five times in the following cases:

● Tape without safety tab is inserted.
  - If the series signal is entered (long sound)
  -Alarm signal is entered
  -REC button is pressed
● REC button is pressed in a situation when there is no tape inside the player.
● Alarm signal is entered while alarm recording is performed (long beep)

The alarm sounds continuously in the following cases:

● Tape reaches the end in the recording mode.
● Alarm recording starts since alarm signal is entered.
  - Alarm is released when the alarm recording is completed.
  - The alarm is released when pressing any button.
  - Alarm signal is entered in a condition that there is no tape in (long beep).

Repeat recording

● When rewinding is completed after the tape reaches its end, recording starts again.
  (Alarm sounds during rewinding)
● The tape will be ejected if alarm recording is made.

Other Functions

You can use the device more conveniently if you know the following functions.

Situation	How to operate	Description of operation
When you want to see the alarm record fast	Use CNT.MEMO button to see A.MEMO and press rewind button in this condition.	Pauses for 5 seconds on the spot where alarm recording starts. Press the play button to see the recorded picture. If no button is pressed for five seconds, the tape is stooped automatically.
When you want to check the alarm recorded day and time	Press the MENU button in STOP mode. Press the SHIFT ▽ Button and ▷ to select SEARCH MODE SETUP/ALARM HISTORY. (page 39)	You will see the monitor screen as follows: ALARM HISTORY 　YEAR　DATE　　TIME 1　2001　12/25　19:00:00 2　2001　12/25　17:00:00 3　2001　12/25　15:00:00 4　2001　12/25　13:00:00 5　2001　12/25　12:00:00 6 END:MENU
When you want to check the alarm recording frequency	Press Count Button once to see the alarm counter on the front display. Ex) A-11	The figure indicates the number of times of alarm recording is made. It is possible up to 99. In A-11, 11 indicates that alarm recording is made 11 times
When you want to switch over the camera input of outside equipment automatically (using the trigger function)	Connect the trigger output of the external equipment. Record in time- lapse mode referring to the connection method on page 42.	This SDR-2000 records the input of each camera frame by frame or field by field and then switches. It is easy to playback.
When you want to view the high speed picture recorded in the time lapse mode (L12H - 960H)	L4H play is not available when recorded in L12H - 960H.	
When you want to playback what is recorded in L12H/L20H in L12H/L20H	Press the Time Mode button (in case of L12H/L20H)	Press the button to hear sound. (Applicable only when sound is recorded)

Connection with External Equipment

Connection with FS-81MA (Samsung Frame Switcher)

- Refer to FS-81MA Manual for the details of FS-81MA or trigger function.
- R/T: REC TRIGGER IN
- A/O: Alarm Out

- When connecting with FS-81MA, it is convenient if the Alarm Duration is set on Auto.
- It is not necessary to connect Alarm Out of the video with Alarm Reset Input.

Series Recording and Alarm Recording

Connection for Interlocking Record

First SDR-2000 Second SDR-2000 Third SDR-2000

⑦ SERIES OUT ⑧ GND ⑨ SERIES IN

Connection jack on SDR-2000 rear panel

- Select the Series REC ON in the menu. (Refer to page 24)
- Connect the Series Out of the first SDR-2000 with the Series IN of the second SDR-2000.
- Connect GND of the first SDR-2000 with GND of the second SDR-2000.

- Connect the Series Out of the second SDR-2000 with the Series In of the third SDR-2000. Connect GND of the second SDR-2000 with GND of the third SDR-2000.

Connection for Alarm Recording

Rear panel of SDR-2000

External Equipment

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① ② ③ ④ ⑤

① ALARM IN   ② ALARM OUT   ① GND   ② ALARM RELEASE
③ ALARM RESET   ⑤ TRIGGER OUT   ③ ALARM INPUT   ④ ALARM OUTPUT
⑧ GND   ⑤ TRIGGER IN

Note) Numbers might differ depending on external equipment, so make sure to connect the right jack.

- Connection is not required if the alarm turn-off output or alarm input are not included in the external equipment.

Recording time table

The table below shows the correlation between recording time modes.
(When an S-VHS 120-minute tape is used)
Set the modes according to what is to be accomplished.

Field Recording

Recording time mode	No. of fields to be recorded per sec.	Time taken to switch cameras (sec)	Maximum Recording Time
L4H	59.94	0.017	4hr
L12H	19.98	0.05	12hr
L20H	11.99	0.083	20hr
28H	8.56	0.117	28hr
36H	6.66	0.15	36hr
48H	5	0.2	48hr
72H	3.33	0.3	72hr
96H	2.5	0.4	96hr
120H	2	0.5	120hr
168H	1.43	0.7	168hr
240H	1	1	240hr
480H	0.5	2	480hr
960H	0.25	4	960hr

Connection

NOTE **The actual time will be slightly longer than the picture indicated by the recording time mode.**

Connecting with PC

Connection with IBM compatible PC

RS-232C (Refer to a separate PC application manual for usage)

Connecting with the 9-pin series port

SDR-2000 Rear panel
PC Connection Jack

● Connect RS-232C cable to the 9-pin series port on the rear panel of PC.

● Connect RS-232C cable to the PC connection jack on SDR-2000 rear panel.

9-pin

Connecting with the 25-pin series port

Use D-SUB adapter to connect 25-pin series port on PC rear panel.

● D-SUB adapter is an adapter that switches into series port DB9 from series port DB25.

D-sub adapter

25-pin

RS-232C connection

Pin Number	Description
2	TxD : PC → SDR-2000
3	RxD : SDR-2000 → PC
5	GND

Only 3 pin is used.

9-pin D-Sub connector (female)

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RS-485 (Refer to a separate PC application manual for usage)

When using RS-232C/RS-485 Converter

● You can connect a multiple number of VCR to one PC set.

SDR-2000 VCR Rear panel PC Connection Jack

SDR-2000 VCR Rear pane PC Connection Jack

● Connect RS-232C cable to the 9-pin series port on the rear panel of PC.

● Connect RS-485 cable to the PC connection jack on SDR-2000 rear panel.

9-pin

Other equipment

RS-232C to RS-485 Converter

When using RS-485 Card on PC

SDR-2000 VCR Rear panel PC Connection Jack

SDR-2000 VCR Rear panel PC Connection Jack

SDR-2000 VCR Rear panel PC Connection Jack

Another equipment

✻ Characteristic impedance of communication line is to be 120 ohm.

✻ When connecting multiple number of SDR-2000 using a 485 card, the switch of the final SDR-2000 termination should be set ON.

NOTE **Refer to the PC S/W user's manual for more information.**

RS-485 connection

Pin Number	Description
2, 3	Rx$^+$: Tx$^+$
4, 5	Rx$^-$: Tx$^-$

3 4

RS-485 connector

Connection

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RS-232C Remote Control
(System Specification)

PC Communications Block Diagram

```
┌──────────────────────────────────────────────────┐
│                                                    │
│                    ┌──────────┐   ┌──────────┐     │              ┌────────┐
│                    │  MICOM   │◄─►│   ASIC   │     │  RS-232C     │        │
│                    └──────────┘   │(Capture &│◄────┼─────────────►│   PC   │
│                                   │ Transmit)│     │              │        │
│                                   └──────────┘     │              └────────┘
│                          ┌─────────────►▲          │
│  ┌──────────┐  ┌────────────┐   ┌──────────┐       │
│◄─┤   NTSC   │◄─┤MPEG-I-CODEC│◄──┤ CHANNEL  │       │
│  │ ENCODER  │  └────────────┘   └──────────┘       │
│  │ /DECODER │                                      │
│  └──────────┘                                      │
└──────────────────────────────────────────────────┘
```

<Block Diagram>

Communication path

Communication between devices is made in the form of command, response or data. Basically command is launched from PC, goes through ASIC and processed at MICOM while response is delivered in the reverse process.

Command code is a code that demands a certain status from the system.

Response code is generated after command is interpreted at ASIC or MICOM once after command is delivered and the system is switched into a preparation mode.

Data here refer to the image data delivered to PC from ASIC.

```
┌──────────┐   command   ┌──────────┐   command   ┌──────────┐
│          │────────────►│          │────────────►│          │
│   PC     │             │   ASIC   │             │  MICOM   │
│ RS232-C  │   response  │          │   response  │          │
│          │◄────────────│          │◄────────────│          │
└──────────┘             └──────────┘             └──────────┘
```

<data transmit path>

General System Spec.

Item	PC to ASIC	ASIC to MICOM
Sync Type	Asynchronous	Synchronous
Communication	RS-232C	3-Line serial
Master	PC	MICOM
Start/Stop Condition	start/stop bits	strobe
Clock Rate	115.2 Kbps	MICOM clock(1MHz)
Wire Number	3 (TX/RX/GND)	4 (MA_SD/AM_SD/SCLK/A_STRB)
Transmission Unit	8 bits data	8 bits data
Parity	no	no

<General system spec.>

<hardware connection wire>

Item	Control flow
CTS	Disable
DRS	Disable
DTR	Disable
XON/XOFF	Disable

<Control Setting for a serial communication device>

RS-232C Remote Control
(System Specification)

Communication Protocol

∗ Communication between PC and ASIC uses RS-232-C Data Encoding Format.

	D0	D1	D2	D3	D4	D5	D6	D7	

Data 8 bits

start
1 bits

stop
1 bits

<Data Transmission Format 1 between PC and ASIC>

∗ When it comes to communication between MICOM and ASIC, data transmission is performed through Strobe signal generated at MICOM. Edge triggering is performed to distinguish sending/receiving. In other words, a signal is received after falling edge and sent after rising edge.

A-STRB

SCLK

MA-SD

AM-SD

<Data Transmission Format 1 between MICOM and ASIC>

min : 1 μs

A-STPB

SCLK

MA-SD

| D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | | D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | |

AM-SD

| D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | | D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | |

<Data Transmission Format 2 between MICOM and ASIC>

PC Command to ASIC

The table below shows the register for the communication protocol between PC, ASIC and MICOM, in which command and response are handled in the unit of 2 bytes.
Command based on the table below is sent from Master PC to ASIC, which determines where command belongs and sends command or response to MICOM or PC.

Register	Function
AC-reg[15]	Command for ASIC or MICOM (0:1)
AC-reg[14]	Flag for current or fixed camera picture (0:1)
AC-reg[13]	Flag for Field or Frame mode (0:1)
AC-reg[12 ~ 8]	0 : Reset
	1 : Reset register & Quit Processing
	2 : Transfer Nth block data
	3 : Set limit value of frame loop counter
	4 : Set camera number to be captured
	5 : Capturing picture
	6 : Transferring image data
	7 ~ 31 : Reserved
AC-reg[7 ~ 0]	Number of Nth block (1 ~ 101)
	Limit value of frame loop counter (1 ~ 31)
	Number of Camera (1 ~ 31)

< Register field table to communicate among PC, ASIC and MICOM >

ex)
reset	: 01 00
capture(any field)	: 05 00
capture(any frame)	: 25 00
capture(desired field)	: 45 xx
capture(desired frame)	: 65 xx
transfer(any field)	: 06 00
transfer(any frame)	: 26 00
transfer(desired field)	: 46 xx
transfer(desired frame)	: 66 xx

RS-232C Remote Control
(System Specification)

PC to MICOM data format

* PC command to MICOM
  When a certain control command code is sent from PC to DTLV system, code is delivered to MICOM through ASIC. MICOM interprets this code, undergoes relevant processing and sends back the command code that it received. This code is transmitted to PC again through ASIC.

1. Communication Specifications

1) 1 word (2 bytes) between PC and MICOM

2) MICOM cannot send data not requested since PC is the master

3) PC can request data using the defined command to MICOM

4) PC - MICOM

Command (1'st byte)							
D7	D6	D5	D4	D3	D2	D1	D0
Command							

Command (2'nd byte)							
D7	D6	D5	D4	D3	D2	D1	D0

5) MICOM → PC

Response 1 (1'st byte)							
D7	D6	D5	D4	D3	D2	D1	D0

Response 2 (2'nd byte)							
D7	D6	D5	D4	D3	D2	D1	D0
Response Data							

2. COMMAND (first byte) configuration

Command(HEX)		Function Item
00H ~ 7FH		PC → ASIC Command
80H ~ FFH		PC → MICOM Command
80H ~ FFH	80H ~ 8FH	Communication setting
	90H ~ 9FH	Clock, REC mode setting related
	AOH	Reserved for DSS → VSS : Start code
	A1H~AFH	Alarm REC event, date, and recording timing inquiry command
	B0H~BFH	
	C0H~CFH	
	D0H~DFH	Recording start, finish, date request command
	E0H~EFH	Status request, source control information request
	F0H	Function mode for VCR System
	F1H~FEH	
	FFH	Do not use

✽ This is the top-level byte that distinguishes command (from PC to ASIC) from one (from PC to MICOM).

2-1. Communication command

Item	mode	Command (HEX)	Function	Response
RESET	set	80H, XXH	Reset Communication	80H, XXH
DEVICE ID 1 & COM START REQUEST	set	EEH, XXH	Third digit of the Device ID setting and communication with the device whose ID xxx starts	EE, XXH
DEVICE ID 100 & 10	set	EFH, XXH	Device ID second and third digit setting	None
CMD PACKET END	set	8DH, 8DH	PACKET END	8DH, 8DH
COM END REQUEST	set	8EH, 8EH	Communication channel return request for all devices	NONE
Command progress status request	set	8FH, 8FH	Send the command and progress status request Wait(11H), Denial(12H), Completion(13H)	8FH, XXH
Reserved for VSS		A0H, XXH	DSS → VSS : Start code	90H, XXH
Before Device ID Reguest	set	EDH, ECH	Insert command before starting communication	NONE

2-2. Cassette number command Item

Item	mode	Command (HEX)	Function	Response
SET CASSETTE NUMBER	set	9AH, XXH	CASSETTE NUMBER MSB[4]	9AH, XXH
	get	DBH, 10H		DBH, XXH
	set	9BH, XXH	CASSETTE NUMBER LSB[8]	9BH, XXH
	get	DBH, 11H		DBH, XXH
SET ENCRYPTION CODE	set	9CH, XXH	ENCRYPTION CODE MSB[8]	9CH, XXH
	get	--		--
	set	9DH, XXH	ENCRYPTION CODE LSB[8]	9DH, XXH
	get	--		--

2-3. Alarm REC command

Item	mode	Command (HEX)	Function	Response
ALARM REC EVENT NUMBER	set	A8H, XXH	ALARM REC EVENT NUMBER MSB [4]	A8H, XXH
	get	D9H, 40H		D9H, XXH
	set	A9H, XXH	ALARM REC EVENT NUMBER LSB [8]	A9H, XXH
	get	D9H, 41H		D9H, XXH
ALARM REC TIME MODE	set	C2H, 1XH	ALARM REC MODE	C2H, 1XH
	get	D2H, 1FH	L4H(10H), L12H(11H), L20H(12H), OFF(13H)	D2H, 1XH
ALARM REC DURATION	set	C2H, 2XH	ALARM DURATION	C2H, 2XH
	get	D2H, 2FH	AUTO(20H), TAPE END(21H), 5S(22H), 10S(23H), 15S(24H), 20S(25H), 30S(26H), 40S(27H), 1M(28H), 2M(29H), 3M(2AH), 4M(2BH), 5M(2CH)	D2H, 2XH
ALARM BUZZER OFF/ON	set	C2H, 3XH	ALARM BUZZER OFF/ON	C2H, 3XH
	get	D2H, 3FH	OFF(30H), ON(31H)	D2H, 3XH

RS-232C Remote Control
(System Specification)

2-4. TIMER REC setup command

Item	mode	Command (HEX)	Function	Response
TIMER REC PROGRAM STATE	set	C5H, 1FH	TIMER REC PROGRAM STATE	C5H, 1FH
	get	D5H, 1FH		D5H, 1FH
Program Number state	set	C5H, 2XH	TIMER REC PROGRAM NUMBER 1~10 SET PROGRAM1 SET(21H), PROGRAM2 SET(22H), PROGRAM3 SET(23H), PROGRAM4 SET(24H), PROGRAM5 SET(25H), PROGRAM6 SET(26H), PROGRAM7 SET(27H), PROGRAM8 SET(28H), PROGRAM9 SET(29H), PROGRAM10 SET(2AH)	C5H, 2XH
	get	D5H, 2XH	TIMER REC PROGRAM NUMBER 1~10 SET PROGRAM1 SET(21H), PROGRAM2 SET(22H), PROGRAM3 SET(23H), PROGRAM4 SET(24H), PROGRAM5 SET(25H), PROGRAM6 SET(26H), PROGRAM7 SET(27H), PROGRAM8 SET(28H), PROGRAM9 SET(29H), PROGRAM10 SET(2AH)	D5H, 2XH
TIMER REC START TIME 1	set	ABH, XXH	TIMER REC START TIME HOUR	ABH, XXH
	get	D5H, 3FH		D5H, XXH
TIMER REC START TIME 2	set	ACH, XXH	TIMER REC START TIME MINUTE	ACH, XXH
	get	D5H, 4FH		D5H, XXH
TIMER REC STOP TIME 1	set	ADH, XXH	TIMER REC STOP TIME HOUR	ADH, XXH
	get	D5H, 5FH		D5H, XXH
TIMER REC STOP TIME 2	set	AEH, XXH	TIMER REC STOP TIME MINUTE	AEH, XXH
	get	D5H, 6FH		D5H, XXH
Timer REC WEEK	set	C5H, 7XH	TIMER REC WEEK (SUN~SAT, DAYILY) SUN(70H), MON(71H), TUE(72H), WED(73H),	C5H, 7XH
	get	D5H, 7FH	THU(74H), FRI(75H), SAT(76H), DAILY(77H),	D5H, 7XH
TIMER REC MODE	set	C5H, 8XH	TIMER REC MODE	C5H, 8XH
	get	D5H, 8FH	L4H(80H), L12H(81H), L20H(82H), 28H(83H), 36H(84H), 48H(85H), 72H(86H), 96H(87H), 120H(88H), 168H(89H), 240H(8AH), 480H(8BH), 960H(8CH)	D5H, 8XH
CLEAR PROGRAM NUMBER	set	C5H, 9XH	TIMER REC PROGRAM NUMBER CLEAR	C5H, 9XH
	get	D5H, 9XH	PROGRAM1 SET(91H), PROGRAM2 SET(92H), PROGRAM3 SET(93H), PROGRAM4 SET(94H), PROGRAM5 SET(95H), PROGRAM6 SET(96H), PROGRAM7 SET(97H), PROGRAM8 SET(98H), PROGRAM9 SET(99H), PROGRAM10 SET(9AH)	D5H, 9XH

2-5. REC mode setup command

Item	mode	Command (HEX)	Function	Response
REC TIME MODE	set	C3H, 1XH	REC TIME MODE SET L4H(10H), L12H(11H), L20H(12H), 28H(13H),	C3H, 1XH
	get	D3H, 1FH	36H(14H), 48H(15H), 72H(16H), 96H(17H), 120H(18H), 168H(19H), 240H(1AH), 480H(1BH), 960H(1CH), 000H(1DH)	D3H, 1XH
REPEAT REC OFF/ON	set	C3H, 2XH	REPEAT REC OFF/ON	C3H, 2XH
	get	D3H, 2FH	OFF(20H), ON(21H)	D3H, 2XH
SERIES REC OFF/ON	set	C3H, 3XH	SERIES REC OFF/ON	C3H, 3XH
	get	D3H, 3FH	OFF(30H), ON(31H)	D3H, 3XH
SET 1-SHOT REC	set	C3H, 4XH	1-SHOT REC (OFF/1MIN/2MIN/3MIN)	C3H, 4XH
	get	D3H, 4FH	OFF(40H), 1MIN(41H), 2MIN(42H), 3MIN(43H)	D3H, 4XH
ID START	set	C3H, 5XH	ID START (AUTO)/11H/13H/(17H)	C3H, 5XH
	get	D3H, 5FH	AUTO(50H), 11H(51H), 13H(52H), 17H(53H)	D3H, 5XH

2-6. VCR mode setup command

Item	mode	Command (HEX)	Function	Response
TRIGGER OUT FRAME/FILED	set	C4H, 1XH	TRIGGER OUT FRAME/FIELD(Default)	C4H, 1XH
	get	D4H, 1FH	FRAME(10H), FIELD(11H)	D4H, 1XH
VCR BUZZER OFF/ON	set	C4H, 2XH	VCR BUZZER OFF/ON	C4H, 2XH
	get	D4H, 2FH	OFF(20H), ON(21H)	D4H, 2XH
AUDIO OUT OFF/ON	set	C4H, 3XH	AUDIO OUT OFF/ON	C4H, 3XH
	get	D4H, 3FH	OFF(30H), ON(31H)	D4H, 3XH
TAPE LENGTH	set	C4H, 4XH	TAPE LENGTH (T120, T150, T160, DF420)	C4H, 4XH
	get	D4H, 4FH	T120(40H), T150(41H), T160(42H), DF420(43H)	D4H, 4XH
SVHS PB MODE	set	C4H, 5XH	DIGITAL/ANALOG	D4H, 5XH
	get	D4H, 5FH	DIGITAL(50H), ANALOG(51H)	D4H, 5XH

Connection

RS-232C Remote Control
(System specification)

2-7. Current time setup command

Item	mode	Command (HEX)	Function	Response
CURRENT TIME	set	C6H, 10H	CURRENT TIME SET,	C6H, 10H
	get	D6H, 10H	by common command	D6H, 10H
DISPLAY MODE	set	C6H, 2XH	SET DISPLAY MODE	C6H, 2XH
	get	D6H, 2FH	YY-MM-DD(20H), DD-MM-YY(21H), MM-DD-YY(22H)	D6H, 2XH
SUMMER TIME USE	set	C6H, 3XH	SUMMER TIME USE/NO	C6H, 3XH
	get	D6H, 3FH	USE(30H), NO(31H)	D6H, 3XH
SUMMER TIME IN	set	C6H, 50H	SUMMER TIME IN,	C6H, 50H
	get	D6H, 5FH	by common command	D6H, 5FH
SUMMER TIME OUT	set	C6H, 60H	SUMMER TIME OUT,	C6H, 60H
	get	D6H, 6FH	by common command	D6H, 6FH

2-8. Search Command

Item	mode	Command (HEX)	Function	Response
ALARM REC DATE TIME FORWARD SEARCH START	set	C7H, 1FH	ALARM REC DATE TIME FORWARD SEARCH START	C7H, 1FH
	set	C7H, 2FH	ALARM REC DATE TIME REVERSE SEARCH START	C7H, 2FH
DATE TIME SEARCH	set	C7H, 3FH	REC DATE TIME SEARCH,	C7H, 3FH
	get	D7H, 3FH	by common command	D7H, 3FH
DATE TIME SEARCH START	set	C7H, 4FH	Implement REC date time search	C7H, 4FH
TIME CODE SEARCH START	set	C7H, 6FH	Implement Time Code Search	C7H, 6FH
TIME CODE DATA SEARCH	set	C7H, 7FH	TIME CODE FOR SEARCH,	C7H, 7FH
	get	D7H, 7FH	by common command	D7H, 7FH
TIME CODE	get	D7H, 8FH	TIME CODE DISPLAY, by common command	D7H, 8FH

2-9. Display Mode Setup Command

Item	mode	Command (HEX)	Function	Response
DISPLAY MODE SETUP	set	C1H, XXH	Set on/off of each display mode item	C1H, XXH
	get	D1H, FFH	Bit4 : DATE DISPLAY ON(1)/OFF(0) Bit3 : TIME DISPLAY ON(1)/OFF(0) Bit2 : TIME CODE DISPLAY ON(1)/OFF(0) Bit1 : SOURCE STATUS DISPLAY ON(1)/OFF(0) Bit0 : CASSETTE ID DISPLAY ON(1)/OFF(0)	D1H, XXH

2-10. Common command (set/get packet)

Item	mode	Command (HEX)	Function	Response
TIME ZONE	set	B1H, XXH	TIME ZONE(DATE 1) data	B1H, XXH
	get	B1H, B1H	TIME ZONE(DATE 1) data	B1H, XXH
YEAR	set	B2H, XXH	YEAR (DATE 2) data	B2H, XXH
	get	B2H, B2H	YEAR (DATE 2) data	B2H, XXH
MONTH/WEEK	set	B3H, XXH	MONTH (DATE 3) data	B3H, XXH
	get	B3H, B3H	MONTH (DATE 3) data	B3H, XXH
DAY	set	B4H, XXH	DAY (DATE 4/ TIME CODE 1) data	B4H, XXH
	get	B4H, B4H	DAY (DATE 4/ TIME CODE 1) data	B4H, XXH
HOUR	set	B5H, XXH	HOUR (TIME 1/ TIME CODE 2) data	B5H, XXH
	get	B5H, B5H	HOUR (TIME 1/ TIME CODE 2) data	B5H, XXH
MINUTE	set	B6H, XXH	MINUTE (TIME 2/ TIME CODE 3) data	B6H, XXH
	get	B6H, B6H	MINUTE (TIME 2/ TIME CODE 3) data	B6H, XXH
SECOND	set	B7H, XXH	SECOND (TIME 3/ TIME CODE 4) data	B7H, XXH
	get	B7H, B7H	SECOND (TIME 3/ TIME CODE 4) data	B7H, XXH
FRAME	set	B8H, XXH	FRAME (TIME CODE 5) data	B8H, XXH
	get	B8H, B8H	FRAME (TIME CODE 5) data	B8H, XXH
Summer time week	set	B9H, XXH	Summer time week, (1,2,3,4, LAST) 1(00H), 2(01H), 3(02H), 4(03H), LAST(04H)	B9H, XXH
	get	B9H, B9H	Summer time week, (1,2,3,4, LAST) 1(00H), 2(01H), 3(02H), 4(03H), LAST(04H)	B9H, XXH

Connection

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2-11. COMMAND, E0H~EFH

Item	mode	Command (HEX)	Function	Response
System Status Request	get	E0H, 00H	System Status request BIT7 : CASSETTE OUT(0)/IN(1) BIT6 : REC START NOT(0)/REC START(1) BIT5 : REC END, NOT(0)/ REC END(1) BIT4: TAPE END. In the process of program information recording or in a standby-mode BIT3 : ALARM, NOT(0)/Alarm mode(1) BIT2 : ENCRYPTION, DEC(0)/ ENC(1), key locked BIT1 : Not used, USED(0)/ tape(1) BIT0 : POWER ON/OFF, OFF(0)/ ON(1)	E0H, XXH
Source Status Request	get	E1H, 00H	Source Status request BIT7 : FF, Field(1) /Frame(0) BIT6 : BW, Black&White(1) / Color(0) BIT5/4 : ID_START, 11H(01) / 13H(10) BIT3 : REC/PB, PB(0)/REC(1) BIT2 : - BIT1 : - BIT0 : -	E1H, XXH
SYSTEM MODE REQUEST	get	E2H, E2H	SYSTEM MODE REQUEST STOP(00H) PLAY(01H) STILL(02H) R-STILL(03H), F.F.ADV(FORWARD FIELD/FRAME ADVANCE)(04H) R.F.ADV(REVERSE FIELD/FRAME ADVANCE)(05H) FPS(FORWARD PICTURE SEARCH x5) 1(06H) RPS(REVERSE PICTURE SEARCH x5) 1(07H) FPS(FORWARD PICTURE SEARCH x7) 2(08H) RPS(REVERSE PICTURE SEARCH x7) 2(09H) FF(FAST FORWARD)(0AH) REW(REWIND)(0BH) EJECT(0FH) NORMAL RECORD(10H) ALARM REC REQUEST DUE TO CAMERA LOSS(11H) ALARM REC REQUEST DUE TO MOTION DETECT(12H) PAUSE(13H) REC CHECK(14H) ALARM SEARCH(20H) DATE TIME SEARCH(21H) TIME CODE SEARCH(22H)	E2H, XXH

2-12. Command (E2H - EDH) + Data

Item	Mode	Command (HEX)	Function	Response
SYSTEM OPERATION STATUS REQUEST	get	E3H, E3H	SYSTEM OPERATION STATUS REQUEST TRANSITION(00H) STEADY(01H) WAIT(10H) ALARM FOUND(11H) ALARM NOT FOUND(12H) DATE TIME FOUND(13H) DATE TIME NOT FOUND(14H) TIME CODE FOUND(15H) TIME CODE NOT FOUND(16H)	E3H, XXH
POWER LOSS	get	E4H, 0XH	1-OFF(00H), by common command 1-ON(01H), by common command 2-OFF(02H), by common command 2-ON(03H), by common command 3-OFF(04H), by common command 3-ON(05H), by common command	E4H, 0XH
ALARM RECALL	get	E5H, 0XH	1(00H),by common command 2(01H),by common command 3(02H),by common command 4(03H),by common command 5(04H),by common command 6(05H),by common command	E5H, 0XH
DEVICD ID	get	E5H, 01H	Second and third digit of the Device ID	E5H,XXH
DEVICD ID	get	E5H, 02H	First digit of the Device ID	E5H,FXH
COMPARE DECRYPTION CODE MSB	set	EDH, XXH	Code comparison command + Decryption code MSB (8)	EDH, XXH
COMPARE DECRYPTION CODE LSB	set	EEH, XXH	Code comparison command + Decryption code MSB (8)	EEH, XXH
CODE COMPARE REQUEST	get	EFH, EFH	Key code comparison result transmission request + Key code Match (00H) Mismatch (01H)	EFH, XXH

RS-232C Remote Control
(System specification)

2-13. Key command

Item	mode	Command	Function	Response
POWER	set	F0H, 00H	POWER BUTTON CODE	F0H, 00H
MENU	set	F0H, 01H	MENU BUTTON CODE	F0H, 01H
CLEAR	set	F0H, 02H	CLEAR BUTTON CODE	F0H, 02H
COUNT	set	F0H, 03H	COUNT BUTTON CODE	F0H, 03H
CNT. MEMO	set	F0H, 04H	CNT. MEMO BUTTON CODE	F0H, 04H
DATA CODE	set	F0H, 05H	DATA CODE BUTTON CODE	F0H, 05H
SHIFT DOWN/VLOCK -	set	F0H, 06H	SHIFT DOWN/VLOCK - BUTTON CODE	F0H, 06H
SHIFT RIGHT/VLOCK +	set	F0H, 07H	SHIFT RIGHT/VLOCK + BUTTON CODE	F0H, 07H
TRACKING -	set	F0H, 08H	TRACKING - BUTTON CODE	F0H, 08H
TRACKING +	set	F0H, 09H	TRACKING + BUTTON CODE	F0H, 09H
EJECT	set	F0H, 0AH	EJECT BUTTON CODE	F0H, 0AH
REC LOCK	set	F0H, 0BH	REC LOCK BUTTON CODE	F0H, 0BH
TIME MODE -	set	F0H, 0CH	TIME MODE - BUTTON CODE	F0H, 0CH
TIME MODE +	set	F0H, 0DH	TIME MODE + BUTTON CODE	F0H, 0DH
REC	set	F0H, 10H	REC	F0H, 10H
REC CHECK	set	F0H, 11H	REC CHECK	F0H, 11H
PLAY	set	F0H, 12H	PLAY	F0H, 12H
PAUSE/STILL	set	F0H, 13H	PAUSE/STILL	F0H, 13H
STOP	set	F0H, 14H	STOP	F0H, 14H
R.F.ADV	set	F0H, 15H	R.F.ADV	F0H, 15H
F.F.ADV	set	F0H, 16H	F.F.ADV	F0H, 16H
F.SHUTTLE 1	set	F0H, 17H	F.SHUTTLE 1	F0H, 17H
F.SHUTTLE 2	set	F0H, 18H	F.SHUTTLE 2	F0H, 18H
R.SHUTTLE 1	set	F0H, 19H	R.SHUTTLE 1	F0H, 19H
R.SHUTTLE 2	set	F0H, 1AH	R.SHUTTLE 2	F0H, 1AH
MOTION DETECT REC	set	F0H, 20H	ALARM REC REQUEST DUE TO MOTION DETECT	F0H, 20H
CAMERA LOSS REC	set	F0H, 21H	ALARM REC REQUEST DUE TO CAMERA LOSS	F0H, 21H
REC ENABLE	set	FOH, 40H	REC ENABLE KEY CODE COINCIDENCE	FOH, 40H
REC DISABLE	set	F0H, 41H	REC Disable Key Code Mismatch	F0H, 41H

2-14. Menu display command

Item	mode	Command	Function	Response
REC DATE TIME SEARCH MENU	set	FEH, 01H	DATE SEARCH MENU DISPLAY	FEH, 01H
TIME CODE SEARCH MENU	set	FEH, 02H	TIME CODE SEARCH MENU DISPLAY	FEH, 02H
POWER LOSS MENU	set	FEH, 03H	POWER LOSS MENU DISPLAY	FEH, 03H
ALARM RECALL MENU	set	FEH, 04H	ALARM RECALL MENU DISPLAY	FEH, 04H
Menu Finish	set	FEH, FFH	Get out of Menu	FEH, FFH
Transfer Next word	set	FFH, XXH	Command to transmit the next data	
SYSTEM MENU	ON	FEH, F0H	System Menu on/off	FEH, F0H
	OFF	FEH, F1H		FEH, F1H
	–	FFH, FFH	Do not use	–

2-15. RS-485 Communication Specification

Item	Description
Transmission mode	Half Duplex Balanced Modulation
Data Rate	115 Kbps(Fixed)
cable	RS-485 exclusive cable
Cable Length	RS-485 : 100m below
Maximum Number of Drivers	1 unit loads
Maximum number of receivers	20 unit loads(Recommendation)
RS-485 Converter	Transmission Rate 115.2 Kbps above

❋ When using repeater, contact specialist.

Using a Cleaning Tape

Use the cleaning tape if the picture is not clear on the screen.
You can purchase a cleaning tape at videotape rent shop or service center.

✽ Make sure you do not clean the tape too long. Long cleaning may by harmful for the head.

1 **Apply 6 to 7 drops of the cleaning solution to the cleaning tape.**

2 **Insert the cleaning tape and press the ▶ PLAY button.**

3 **After about 15 seconds, press the ■/▲ STOP/EJECT button.**

● If you do not get a good and normal picture yet, repeat the same procedures.

Tape Keeping

Do not keep your tapes in high-humidity or high-dust environment.

Keep them away from direct rays of the sun or magnetic materials.

Do not apply any shock.

Q & A with regard to PC Connection

Q **There is no spare port left.**

A In most of computers, communication port for RS-232C is COM1 and COM2. In some computers, only one out of these two is installed. For SDR-2000, we need one spare communication port since it is a peripheral that uses RS-232C. If you are using the communication port described above with a series mouse or modem, you cannot use SDR-2000, so you need to prepare communication port first. Refer to the Help Menu in PC S/W or contact the store that sold your PC.

Q **There is no 9-pin port available.**

A Use an adapter that converts 25 pins out of the 25-pin port into 9-pin.

Q **Impact with other peripherals.**

A As shown on the table here, COM1, COM3, COM2, and COM4 use the same IRQ. Therefore, in some cases the device does not work well if peripherals that use the same IRQ are connected. Check the communication port that peripherals use and change the communication port setting or remove some so that no impact is created.

Port Number	Interrupt	I/O Address
COM1	IRQ4	3F8-3FF
COM2	IRQ3	2F8-2FF
COM3	IRQ4	3E8-3EF
COM4	IRQ3	2E8-2EF

Q **I use Samsung Computer's M5XX Series.**

A Please make sure to use 25Pin Communication Port (COM2) using 9 to 25 Pin D-SUB adapter.

Maintenance

Daily Check

The equipment is designed to be used on a continual basis, but check the status of SDR-2000 every day before starting to use.

● This equipment is designed for use on a consistent basis. Please check SDR-2000 before starting to use on a daily basis and take actions when some trouble is found during the daily checking process. (Refer to page 61 and 62). When a trouble or malfunction remains unresolved, pull out the power cable and contact your dealer.

1 Turn on SDR-2000.

● Check the screen on TV monitor.
● Check the current time and date setting.

2 Rewind a little of the tape recorded on the previous day.

3 PLAY Press the PLAY button.

● Check to see whether there is any problem during playback.
● Check to see whether the recording time and date are properly set.

4 TIME MODE Set the Time Mode to "L4H".

5 In case of too much noise on the screen.

● Clean the head using a cleaning tape. (Refer to page 61). Contact your dealer when the problem remains unresolved even after you take actions.

Before Requesting Service

1 **Careless handling by the user is not covered. So please make sure that you handle the equipment properly.**

- Strong impacts
- Damage to the video head due to improper cleaning (using other materials rather than the cleaning tape)
- Foreign substances entering the equipment
- Unauthorized internal modification by the user
- Use in prohibited areas such as high-humidity environment or smoky areas
- Operation other than described in the instructions
- Use of power sources other than specified for the unit

2 **Operating Hour Counter**

- Up to 9999 hours indicated
- Refer to page 39 for proper operation

Notice ● **According to the monitor and multiplexer, it will appear a black bar in the screen which is located in the left and right side or top and bottom side.**

Maintenance

Product Specifications

Recording Type	Rotation head azimuth recording type, Modulation I-NRZI
Signal Type	NTSC type
Tape Speed	16.675mm/sec (L4H mode)
Videotape	Less than T-120, High quality S-VHS Tape Recommended manufacturer: MAXELL, FUJI, TDK, SONY, PANASONIC, BASF, JVC
Recording Duration	L4H/L12H/L20H/28H/36H/48H/72H/96H/120H/168H/240H/480H/ 960H/000H (for T-120 tape)
Rewinding Time	Max. 120 seconds (for T-120 tape)
Image Input	1.0Vp-p (unbalanced) 75Ω
Image Output	1.0Vp-p (unbalanced) 75Ω (same with S-Video out)
Image S/N	50dB or above (L4H mode)
Resolution	400 lines or above (L4H mode)
Voice Input	-8dBm (based on L4H)
Voice Output	-8dBm (based on L4H)
Voice S/N	45dB or above (based on L4H, a-weighted)
Voice frequency feature	100Hz - 7kHz (L4H mode)
Proper Voltage	AC 120V
Frequency	60Hz
Power Consumed	21W
Temperature	5°C~40°C
Installation Condition	Flat floor where the equipment can be operated in a stable position. Relative humidity less than 80%
Dimensions	430 (W) ✕ 97.5 (H) ✕ 287 (D) mm
Weight	4.7kg
Accessories	Manual, CD-ROM

Appearance design and product specifications are subject to change without any prior notice with the purpose of enhancing the quality of the product.

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SDR-2000 Web Site : http://www.samsungelectronics.com/products/cctv/sdr2000.html

: http://www.samsungelectronics.com/support/downloads/cctv/index.html