DIGITAL VIDEO RECORDING SYSTEM
Single-Channel Digital Video Recorders and Multiplexers

**Basic Single-Channel Digital Video Recorder**

- C-DR0105: HDD 500GB (2 X 250GB)
- C-DR0101: HDD 240GB (2 X 120GB)
- C-DR0100: HDD 120GB

**9-Channel Digital Video Recording System**

- C-DR0105:
  - HDD 500GB (2 X 250GB)
- C-DR0101:
  - HDD 240GB (2 X 120GB)
- C-DR0100:
  - HDD 120GB
- C-MS91D

**16-Channel Digital Video Recording System**

- C-DR0105:
  - HDD 500GB (2 X 250GB)
- C-DR0101:
  - HDD 240GB (2 X 120GB)
- C-DR0100:
  - HDD 120GB
- C-MS161D
The C-DR0100 incorporates a 120GB HDD while the C-DR0101 is equipped with 240GB (2 x 120GB) HDDs and C-DR0105 is equipped with 500GB (2 x 250GB) HDDs. Large capacity hard disk drives such as these make it easy to achieve extended recording times for effective monitoring. The use of large hard disk drives eliminates having to change tapes and perform periodical maintenance as such tasks are essential when using conventional time-lapse VCRs. In addition, only digital recording can offer such high picture quality, extended recording periods and effective high-speed searching. In order to achieve the most extended recording times while maintaining picture and audio quality for recording and playback, digital compression is utilized. Motion JPEG compression is employed for pictures of 720 x 240 pixel resolution.

### Recording Functions

#### 500GB storage with 2 250GB HDDs built-in (C-DR0105)
An immense storage capacity of 500GB is provided in the C-DR0105 that features two 250GB disk drives built-in. This allows recording over many hours, raising overall system effectiveness and significantly adding to ease of use for monitoring applications. If less recording capacity is desired, the C-DR0101 equipped with two 120GB disk drives built-in and the C-DR0100 equipped with a single 120GB hard drive can be used.

#### High picture quality
Advanced digital compression technology provides picture quality with a resolution that exceeds 400 lines. Full digital operation means picture quality with clarity that easily surpasses S-VHS. Since all video is recorded directly to the HDD, there is no picture deterioration even with repeated playback.

#### Versatile recording with a choice of three modes: general recording, internal timer recording and alarm recording.
- Picture quality from a choice of levels and recording interval from can be set independently in each mode.
- Picture quality can be selected from 5 different file sizes ranging from a standard picture quality file size of 16KB to a high picture quality file size of 64KB.

### File Size and Picture Quality

<table>
<thead>
<tr>
<th>Setting value</th>
<th>Angle of view</th>
<th>File size</th>
<th>Picture quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1</td>
<td>720 x 240</td>
<td>64KB</td>
<td>S-VHS or much greater</td>
</tr>
<tr>
<td>LEVEL 2</td>
<td>720 x 240</td>
<td>40KB</td>
<td>S-VHS or greater</td>
</tr>
<tr>
<td>LEVEL 3</td>
<td>720 x 240</td>
<td>32KB</td>
<td>S-VHS</td>
</tr>
<tr>
<td>LEVEL 4</td>
<td>720 x 240</td>
<td>24KB</td>
<td>VHS</td>
</tr>
<tr>
<td>LEVEL 5</td>
<td>720 x 240</td>
<td>16KB</td>
<td>VHS-like</td>
</tr>
</tbody>
</table>

- Internal timer recording allows setting up to 10 different timer programs.
- Alarm recording offers two different alarm input modes, each allowing different items to be set to suit different monitoring requirements.

#### Pre- and Post-Alarm recording
Since the C-DR0101/C-DR0100/C-DR0105 are all digital units, they are able to offer advantages that analog systems cannot such as the pre-alarm feature which allows setting a time in eight increments from 0 second to 5 minutes. If an alarm is generated, the unit has already been recording from the preset time period. This makes sure nothing is missed when viewing footage from the alarm. A post-alarm function with similar time increments is also provided.

### Alarm Input Mode
The Alarm input mode for alarm recording can be set to “Edge” or “Level.” Each input mode operates as follows:

**Recording period when input mode is set to “Edge”**

- ON

**Alarm Input**

**Recording Status**

- Pre-alarm Period
- Alarm Recording Period

**Alarm Output**

- 1 Sec

When an alarm output duration is set to 1 second:

**Recording period when input mode is set to “Level”**

- ON

**Alarm Input**

**Recording Status**

- Pre-alarm Period
- Recording Period
- Post-alarm Period

**Alarm Output**

When an alarm output is provided during alarm recording.

**Note**

- Pre-alarm recording is operated by the Alarm recording setting. It does not operate even if an alarm is activated during General recording or Internal Timer Recording since they are operated by their own settings.

### Lower-priority recording stops whenever higher-priority recording is commenced.

**General Recording**

<table>
<thead>
<tr>
<th>Setting value</th>
<th>Angle of view</th>
<th>File size</th>
<th>Picture quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Alarm Recording**

<table>
<thead>
<tr>
<th>Setting value</th>
<th>Angle of view</th>
<th>File size</th>
<th>Picture quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Internal Timer Recording**

<table>
<thead>
<tr>
<th>Setting value</th>
<th>Angle of view</th>
<th>File size</th>
<th>Picture quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**

- Internal Timer recording does not operate even if the Timer key is pressed during General or Alarm recording.
Comprehensive high-speed search functions
Because the hard disks can store a significant amount of recorded data, it is important that sophisticated search functions provided:

Time Search
Inputting the date and time desired activates searching by date/time. Once a value is input, the frame starting at the time selected will be displayed. This makes it easy to search forward and backward from that point.

Block Search
Selecting a block* of dates/times performs searching by block. Once a block is selected, it will playback repeatedly.

Time Shift Search
Increasing or decreasing the amounts of time as desired from a designated time activates searching by time shift. The frame at the designated time will be displayed, facilitating searching.

Time Lapse recording
The C-DR0105/C-DR0101/C-DR0100 digital recorders offer versatile time-lapse recording with recording intervals that can be set in 15 different steps from 1/60th second to 60 seconds.

Audio recording
Audio recording during video recording can be enabled or disabled as required. An audio output terminal is provided on the rear panel for dubbing recorded audio signals.

Mirroring enhances reliability
(C-DR0105/C-DR0101)
The C-DR0105/C-DR0101 includes two hard disk drives that can be used to record simultaneously, significantly increasing reliability and preserving important data. Even if one HDD should fail, the other will continue to record and playback.

Playback Functions

Flexible playback modes enhance system operation
- Forward and reverse playback modes
- Fast forward and fast reverse playback modes with selectable X2, X4 and X8 speeds
- Forward Frame Playback and Reverse Frame Playback
- Forward Block and Reverse Block Playback

Convenient simultaneous recording and playback
While the C-DR0105/C-DR0101/C-DR0100 are recording, they are also capable of playing back recorded images without any interruption to the recording process.

*Recorded data from start to end of each recording constitutes a single recorded block.
Other Functions

- **Network connectivity**
  A 100 BASE-TX ethernet port is built-in to make it easy to distribute recorded images via LAN and WAN systems such as the Internet.
  *Requires dedicated software

- **Logging**
  Logging options for general recording, alarm recording and failure are provided.

- **Useful status indication**
  When an alarm is activated, a buzzer will sound for notification. It can be muted if desired. A built-in indicator will provide notification for various conditions such as HDD almost full with less than an hour of recording remaining, recorder malfunctioning including hard disk failure, cooling fan failure and video loss.

- **Summer Time (Daylight Savings Time)**
  The timer function can be adjusted for daylight savings time and can also be adjusted to automatically switch times as well. When a TOA digital recorder is used together with a TOA multiplexer, there is no need to adjust both units, as the adjusted unit will synchronize with the other unadjusted TOA unit.

- **Key-lock function**
  A useful key lock can be activated to prevent unauthorized access to unit controls and keeps the digital recorder tamper-proof.

- **Compact single rackmount (1U) size**
  Each of the 1-channel digital recorder models feature a space-saving 1U size to facilitate installation while incorporating multiple useful features.

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**Recording Time Table**

<table>
<thead>
<tr>
<th>Recording Intervals (sec)</th>
<th>C-DR0105 (500GB)</th>
<th>C-DR0101 (240GB)</th>
<th>C-DR0100 (120GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Recording time is given as a guideline reference.

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**Audio Recording:**

- **ON**
- **OFF**

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**Disk Mode:**

- **Extended**
- **Normal**
- **Compact**

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**Unit:** hours
The menu screens are comprised of the following setting item screens.

### Playback Settings
- Playback Mode
- Simultaneous Recording/Playback

### Clock Settings
- Year/Month/Day
- Time Synchronization
- Synchronization Time
- Summer Time

### Disk Settings
- Disk Mode
- Recording Mode

### Recording Settings
#### General Recording Settings
- Picture Quality
- Audio
- Recording Intervals
- Switcher Control Period

#### Internal Timer Recording Settings
- Timer Setting List
- Timer Setting 01–10
- Recording Start Date
- Preset Time
- Picture Quality
- Audio
- Recording Intervals
- Recording Pattern
- Motion Detection Pattern

#### Alarm Recording Settings
- Alarm Settings
- Alarm Input Modes
- Pre-Alarm Recording Periods
- Alarm Recording Periods
- Post-Alarm Recording Periods
- Picture Quality
- Audio
- Recording Intervals
- Buzzer Sound
- Alarm Output Time

### Screen Display Settings
- Picture Quality Indication
- Audio ON/OFF Indication
- Recording Mode Indication
- Recording Indication
- Playback Indication
- Remaining Time Indication
- Date Indication
- Time Indication
- Date/Time Display Position
- Disk Mode Indication

### Key Lock

### Communication Settings
- RS232C Baud Rate
- RS232C Flow Control
- IP Address
- Subnet Mask
- Default Gateway
- Switcher Synchronization

### Log Display
- General/Timer Recording Log
- Alarm Recording Log
- Failure Log

### System Maintenance
- Menu Default Settings
- Disk Formatting
- Disk Selection

*This setting item is only applicable to the C-DR0105/C-DR0101 Recorders, and not displayed on the screen when the C-DR0100 Recorder is used.*
## NOMENCLATURE

### Front Panel

- Video Output Terminal
- Audio Output Terminal
- Up [▲] and Down [▼] Shift Keys
- [+ and [–] Set Keys
- Block Shift Key
- Disk Full/Failure Indicator
- Timer Key
- Recording [●■] Key
- Reverse Playback [◄] Key
- Frame Reverse [◄▼] Key
- Pause [■] Key
- Playback [►] Key
- Frame Advance [►■] Key
- Playback Stop [■] Key
- Select Key
- Menu Key
- Power Switch
- Buzzer Stop Key
- Alarm Reset Key
- Search Key
- Control Input/Output Terminal
- Alarm Reset Input Terminal
- Alarm Input Terminal
- Ground Terminal
- Switcher Control Output Terminal
- Alarm Output Terminal
- System Failure Output Terminal
- Disk Full Output Terminal
- Control Input/Output Terminal
- Alarm Reset Input Terminal
- Recording Start Input Terminal
- Recording Stop Input Terminal
- Time Sync Input/Output Terminals
- Alarm Output Terminal
- System Failure Output Terminal
- Disk Full Output Terminal
- 100BASE-TX Terminal

### Rear Panel

- Video Input Terminal
- Video Output Terminal
- Switcher Video Input Terminal
- Switcher Image Output Terminal
- Audio Output Terminal
- AC Inlet
- Main Power Switch
- RS-232C Terminal
- Audio Input Terminal
- Audio Output Terminal
- Alarm Reset Output Terminal
- Alarm Input Terminal
- Ground Terminal
- Switcher Control Output Terminal
- 100BASE-TX Terminal
# SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model No.</th>
<th>C-DR0105 (NTSC)</th>
<th>C-DR0101 (NTSC)</th>
<th>C-DR0100 (NTSC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Channel Digital Video Recorder</td>
<td>1 Channel Digital Video Recorder</td>
<td>1 Channel Digital Video Recorder</td>
</tr>
<tr>
<td>Power Source</td>
<td>110 – 120V AC, 50/60Hz</td>
<td>110 – 120V AC, 50/60Hz</td>
<td>110 – 120V AC, 50/60Hz</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>36W</td>
<td>35W</td>
<td>24W</td>
</tr>
<tr>
<td>Image Compression System</td>
<td>Motion JPEG</td>
<td>Motion JPEG</td>
<td>Motion JPEG</td>
</tr>
<tr>
<td>Recording Medium</td>
<td>E-IDE Hard Disk 500GB (250GB x 2)</td>
<td>E-IDE Hard Disk 240GB (120GB x 2)</td>
<td>E-IDE Hard Disk 120GB (120GB x 1)</td>
</tr>
<tr>
<td>Video Input</td>
<td>Front: 1 output, VBS 1.0V (p-p), 75Ω, RCA pin jack/Rear: 1 output, VBS 1.0V (p-p), 75Ω, BNC</td>
<td>Front: 1 output, VBS 1.0V (p-p), 75Ω, BNC</td>
<td>Front: 1 output, VBS 1.0V (p-p), 75Ω, BNC</td>
</tr>
<tr>
<td>Switcher Video Input</td>
<td>1 input, VBS 1.0V (p-p), 75Ω, BNC</td>
<td>1 input, VBS 1.0V (p-p), 75Ω, BNC</td>
<td>1 input, VBS 1.0V (p-p), 75Ω, BNC</td>
</tr>
<tr>
<td>Audio Recording System</td>
<td>8 bits, Linear PCM, sampling frequency: 16kHz</td>
<td>8 bits, Linear PCM, sampling frequency: 16kHz</td>
<td>8 bits, Linear PCM, sampling frequency: 16kHz</td>
</tr>
<tr>
<td>Audio Input</td>
<td>1 input, -10dB*, 10kΩ, RCA pin jack</td>
<td>1 input, -10dB*, 10kΩ, RCA pin jack</td>
<td>1 input, -10dB*, 10kΩ, RCA pin jack</td>
</tr>
<tr>
<td>Audio Output</td>
<td>Front: 1 output, -10dB*, 600Ω, RCA pin jack/Rear: 1 output, -10dB*, 600Ω, RCA pin jack</td>
<td>Front: 1 output, -10dB*, 600Ω, RCA pin jack/Rear: 1 output, -10dB*, 600Ω, RCA pin jack</td>
<td>Front: 1 output, -10dB*, 600Ω, RCA pin jack/Rear: 1 output, -10dB*, 600Ω, RCA pin jack</td>
</tr>
<tr>
<td>Frequency Response</td>
<td>300 – 6,000Hz</td>
<td>300 – 6,000Hz</td>
<td>300 – 6,000Hz</td>
</tr>
<tr>
<td>Alarm Input</td>
<td>1 input (EDGE, LEVEL); no-voltage make contact input, open voltage: 2V DC, short-circuit current: 0.5mA, loop resistance: under 100Ω, screwless connector</td>
<td>1 input (EDGE, LEVEL); no-voltage make contact input, open voltage: 2V DC, short-circuit current: 0.5mA, loop resistance: under 100Ω, screwless connector</td>
<td>1 input (EDGE, LEVEL); no-voltage make contact input, open voltage: 2V DC, short-circuit current: 0.5mA, loop resistance: under 100Ω, screwless connector</td>
</tr>
<tr>
<td>Picture Quality</td>
<td>Changeable in 5 steps</td>
<td>Changeable in 5 steps</td>
<td>Changeable in 5 steps</td>
</tr>
<tr>
<td>Pixels</td>
<td>720 x 482 (fixed)</td>
<td>482 x 320</td>
<td>320 x 240</td>
</tr>
<tr>
<td>Recording Intervals</td>
<td>15 steps (1/60, 1/30, 1/15, 1/10, 1/5, 1/3, 1/2, 1, 2, 3, 5, 10, 20, 30, 60 sec)</td>
<td>15 steps (1/60, 1/30, 1/15, 1/10, 1/5, 1/3, 1/2, 1, 2, 3, 5, 10, 20, 30, 60 sec)</td>
<td>15 steps (1/60, 1/30, 1/15, 1/10, 1/5, 1/3, 1/2, 1, 2, 3, 5, 10, 20, 30, 60 sec)</td>
</tr>
<tr>
<td>Pre-Alarm Recording</td>
<td>0 sec, 10 sec, 15 sec, 20 sec, 30 sec, 1 min, 2 min, 3 min, 4 min, 5 min</td>
<td>0 sec, 10 sec, 15 sec, 20 sec, 30 sec, 1 min, 2 min, 3 min, 4 min, 5 min</td>
<td>0 sec, 10 sec, 15 sec, 20 sec, 30 sec, 1 min, 2 min, 3 min, 4 min, 5 min</td>
</tr>
<tr>
<td>Post Alarm Recording</td>
<td>10 sec, 15 sec, 20 sec, 30 sec, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min (Edge mode)</td>
<td>10 sec, 15 sec, 20 sec, 30 sec, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min (Edge mode)</td>
<td>10 sec, 15 sec, 20 sec, 30 sec, 1 min, 2 min, 3 min, 4 min, 5 min, 10 min (Edge mode)</td>
</tr>
<tr>
<td>Date/Time</td>
<td>Year/month/date/hour/minute/sec, 24-hours format display</td>
<td>Year/month/date/hour/minute/sec, 24-hours format display</td>
<td>Year/month/date/hour/minute/sec, 24-hours format display</td>
</tr>
<tr>
<td>Internal Timer Recording</td>
<td>10 independent programs (date, daily, weekly, designated day-of-the-week)</td>
<td>10 independent programs (date, daily, weekly, designated day-of-the-week)</td>
<td>10 independent programs (date, daily, weekly, designated day-of-the-week)</td>
</tr>
<tr>
<td>Search Function</td>
<td>Date/Time search, block search, time shift search</td>
<td>Date/Time search, block search, time shift search</td>
<td>Date/Time search, block search, time shift search</td>
</tr>
<tr>
<td>System Failure Output</td>
<td>1 output (HDD failure, Video loss, Fan failure) open collector output, Withstand voltage: 30V DC, control current: 20mA, screwless connector</td>
<td>1 output (HDD failure, Video loss, Fan failure) open collector output, Withstand voltage: 30V DC, control current: 20mA, screwless connector</td>
<td>1 output (HDD failure, Video loss, Fan failure) open collector output, Withstand voltage: 30V DC, control current: 20mA, screwless connector</td>
</tr>
<tr>
<td>Control Input Terminal</td>
<td>Alarm reset, Recording start, Recording stop, Clock synchronization No-voltage make contact input, open voltage: 2V DC, short-circuit current: 0.5mA Loop resistance: under 100Ω, screwless connector</td>
<td>Alarm reset, Recording start, Recording stop, Clock synchronization No-voltage make contact input, open voltage: 2V DC, short-circuit current: 0.5mA Loop resistance: under 100Ω, screwless connector</td>
<td>Alarm reset, Recording start, Recording stop, Clock synchronization No-voltage make contact input, open voltage: 2V DC, short-circuit current: 0.5mA Loop resistance: under 100Ω, screwless connector</td>
</tr>
<tr>
<td>Control Output Terminal</td>
<td>Alarm reset, Clock synchronization, Disk full: Open collector output, withstand voltage: 30V DC, Control current: 20mA, screwless connector Switcher control: TTL level negative logic pulse, pulse width over 17ms, Screwless connector</td>
<td>Alarm reset, Clock synchronization, Disk full: Open collector output, withstand voltage: 30V DC, Control current: 20mA, screwless connector Switcher control: TTL level negative logic pulse, pulse width over 17ms, Screwless connector</td>
<td>Alarm reset, Clock synchronization, Disk full: Open collector output, withstand voltage: 30V DC, Control current: 20mA, screwless connector Switcher control: TTL level negative logic pulse, pulse width over 17ms, Screwless connector</td>
</tr>
<tr>
<td>Communication Function</td>
<td>RS-232C (External control function)*2, D-sub connector (9 P, male) 100BASE-TX Ethernet terminal</td>
<td>RS-232C (External control function)*2, D-sub connector (9 P, male) 100BASE-TX Ethernet terminal</td>
<td>RS-232C (External control function)*2, D-sub connector (9 P, male) 100BASE-TX Ethernet terminal</td>
</tr>
<tr>
<td>Memory Backup</td>
<td>720 hours (full charge), clock date retention</td>
<td>720 hours (full charge), clock date retention</td>
<td>720 hours (full charge), clock date retention</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>+5°C to +40°C</td>
<td>+5°C to +40°C</td>
<td>+5°C to +40°C</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>Under 80% RH (no dew condensation)</td>
<td>Under 80% RH (no dew condensation)</td>
<td>Under 80% RH (no dew condensation)</td>
</tr>
<tr>
<td>Finish</td>
<td>Panel: Aluminum extrusion, black, 30% gloss Case: Surface-treated steel plate, black, 30% gloss</td>
<td>Panel: Aluminum extrusion, black, 30% gloss Case: Surface-treated steel plate, black, 30% gloss</td>
<td>Panel: Aluminum extrusion, black, 30% gloss Case: Surface-treated steel plate, black, 30% gloss</td>
</tr>
<tr>
<td>Dimensions</td>
<td>420 (W) x 53.8 (H) x 331 (D) mm</td>
<td>420 (W) x 53.8 (H) x 331 (D) mm</td>
<td>420 (W) x 53.8 (H) x 331 (D) mm</td>
</tr>
<tr>
<td>Weight</td>
<td>5.3kg</td>
<td>5.3kg</td>
<td>4.5kg</td>
</tr>
<tr>
<td>Accessory</td>
<td>Power supply cord (2m) x 1</td>
<td>Power supply cord (2m) x 1</td>
<td>Power supply cord (2m) x 1</td>
</tr>
</tbody>
</table>

*0dB = 1V
*2 Control software is not supplied as standard.

### APPEARANCE AND DIMENSIONAL DIAGRAMS (C-DR0105/C-DR0101/C-DR0100)

![Dimentional Diagram](image-url)
Multi-Channel Digital Video Recording System

Cost-effective and high-performance digital video recorder systems to meet a user's specific requirements can be assembled. A maximum 16 channel recording system can be flexibly configured by combining a C-DR0105/C-DR0101/ C-DR0100 single-channel recorder with a TOA multiplexer such as the C-MS91D and C-MS161D model by utilizing the RS-232C interface to link the units. Such a system comprising TOA digital video recorders and multiplexers offer significant system advantages such as automatic mode switching by the multiplexer on playback and automatic time synchronization between the digital video recorder and multiplexer.

Multiple Split Screen Display

Live monitoring and digital video recorder playback can be seen in all split screen options (16 segment only with C-MS161D).

For live camera monitoring segments, cameras can be assigned to the desired position.

In a 4-segment screen, live cameras can be selected in sequence.

With camera selection, a required camera can be assigned priority to always be shown (camera 1 selected).
Electronic Zoom, Auto Tilt and Auto Panning Features Included.

TOA multiplexers enable electronic 2X zooming to be selected along with desired position. In addition, electronic Auto Pan and Auto Tilt functions enhance monitoring and surveillance capability.

Motion Detection Mode

TOA's new multiplexers incorporate an extremely useful function of smart image detection. The object size and detection areas can be set for each camera individually.

Object Size Settings

The full screen is divided into 192 frames (16 horizontal x 12 vertical) which do not appear on the screen. Size of the object for detection can be set by selecting horizontal and vertical frames and inputting these values.

For example, when wishing to detect a person but not wishing to detect a dog, set the object size to be larger than the dog and smaller than a person. If the object size is set for 2 horizontal x 5 vertical frames, such as in the figure at right, a person's motion can be detected, but motion of the dog will not be detected.

Motion Detection Area setting

The full screen is divided into 16 areas (4 horizontal x 4 vertical) and motion detection can be set to activate in any of the 16 areas.

For example, when wishing to eliminate constantly moving portions such as trees swayed by wind from the motion detection area, set the corresponding area to OFF ( ).

The multiplexer detect the change of brightness in the area that is larger than the set object size in the activated areas.

Sensitivity Settings

To minimize detection errors, five levels of sensitivity settings are provided to allow fine adjustment control.

Alarm Recording

The number of recording frames for the camera that detected motion can be set to increase.

Maximum 1,000GB recording time possible.

To gain the very maximum recording time possible, two TOA C-DR0105 digital video recorders can be set up for serial recording in conjunction with a TOA multiplexer. Connected in this manner, a digital recorder will signal the second digital video recorder when its hard disk drive is full, automatically starting the second recorder so nothing will be missed.

When first digital video recorder storage is full, the second unit will start to record.

Motion Detection Operation

When Camera 3 detected motion

Increase the number of recording frames for camera 3

Display Configuration Table

<table>
<thead>
<tr>
<th>Sequence</th>
<th>C-MS161D</th>
<th>C-MS91D</th>
<th>C-MS161D</th>
<th>C-MS91D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split(4)-screen sequence</td>
<td>✓</td>
<td>✓</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Full-Screen display</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Split(4)-screen display</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Split(9)-screen display</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Split(10)-screen display</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Split(16)-screen display</td>
<td>✓</td>
<td>–</td>
<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>Zoom display (2x)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Auto-panning and tilt display</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Freeze</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* Robotic motion

Maximum 1,000GB recording time possible.

To gain the very maximum recording time possible, two TOA C-DR0105 digital video recorders can be set up for serial recording in conjunction with a TOA multiplexer. Connected in this manner, a digital recorder will signal the second digital video recorder when its hard disk drive is full, automatically starting the second recorder so nothing will be missed.

When first digital video recorder storage is full, the second unit will start to record.

Electronic Zoom, Auto Tilt and Auto Panning Features Included.

TOA multiplexers enable electronic 2X zooming to be selected along with desired position. In addition, electronic Auto Pan and Auto Tilt functions enhance monitoring and surveillance capability.

• 2x Zoom (adjustable zoom position)

• The auto-panning and tilt functions electronically simulate eye-movement of a sentry
Versatile Alarm Functions

TOA multiplexers offer many alarm functions that are easily set in the setup menu.

Sensor Alarm: Each camera connected is equipped with a sensor input terminal. Alarm activation triggers a buzzer while onscreen display warning and video recording speed is automatically set to standard speed. Multiple Alarm Inputs allow prioritizing cameras when an alarm is generated. When multiple alarms are generated, video image switching is suspended and the alarms are put on hold so that the operator can select the alarm’s corresponding camera’s images to view in desired order. In addition, each alarm terminal can be set to notify on a break-or-make or make basis.

Digital Video Recorder Reproduction Alarm: A buzzer sounds when playing back the part of a recording that contains a sensor alarm event.

Video Loss Alarm: Alerts when power or signal from a particular camera is lost. Letters “VL” and the camera ID number will be displayed.

Alarm Information: Dates, times and camera ID number of sensor and video loss alarms can be reviewed on an independent alarm information screen. A maximum of 64 events will be recorded and a new event will record over the oldest event.

Multi-Language Ability

Offering flexible use for multi-language environments, TOA multiplexers will show onscreen information and allow menu-driven set-up and operation in English, French, and Spanish.

Summer Time (daylight savings)

The timer function can be adjusted for summer time and can also be set to adjust automatically for it.

Remote control

Each multiplexer is equipped with an RS-232C port on the rear panel so that it can be linked for control externally from a remote location. The C-RM500 Remote Controller can be used to switch and select cameras individually or by group, sequence-display, multi-split screen modes. It connects to the multiplexer via the remote control terminal on the rear panel.

Key-lock function

A key-lock function can be set to prevent unauthorized access to unit controls and tampering.

Frame Recording Function

Mechanism of a Multiplexer

The frame recording system switches cameras for each frame while recording. For every frame, a multiplexer sends a different picture taken by a different camera to a Digital Video Recorder so that a single Digital Video Recorder is able to make recordings for multiple cameras. Continuous images can be reproduced during replay by reading corresponding frames for each camera. Recorded images may be viewed as full-screen display for each independent camera or in a split-screen display that shows multiple camera views at the same time. A conventional sequential switcher changes camera feeds every few seconds, making continuous motion replay impossible. Allocating a Digital Video Recorder for each camera is also prohibitive in terms of costs. Multiplexers that use the frame recording system records images from all cameras and are cost-effective.
### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Option</th>
<th>C-MS161D (NTSC)</th>
<th>C-MS91D (NTSC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power source</td>
<td>110 ~ 120V AC, 50/60Hz</td>
<td>110 ~ 120V AC, 50/60Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>18W</td>
<td>18W</td>
</tr>
<tr>
<td>Video Input</td>
<td>Camera input: 16 channels, VBS 1.0V(p-p) 75Ω, BNC, 2:1 interface<em>1 9 channels, VBS 1.0V(p-p) 75Ω, BNC, 2:1 interface</em>2</td>
<td>Camera input: 16 channels, VBS 1.0V(p-p) 75Ω, BNC, 2:1 interface<em>1 9 channels, VBS 1.0V(p-p) 75Ω, BNC, 2:1 interface</em>2</td>
</tr>
<tr>
<td>VCR input</td>
<td>2 channels, VBS 1.0V(p-p) 75Ω, BNC</td>
<td>2 channels, VBS 1.0V(p-p) 75Ω, BNC</td>
</tr>
<tr>
<td>Video output</td>
<td>Camera output: 16 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output 9 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output</td>
<td>Camera output: 16 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output 9 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output</td>
</tr>
<tr>
<td>Monitor output</td>
<td>2 channels (Either channel can be set as spot output), 2 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output</td>
<td>2 channels (Either channel can be set as spot output), 2 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output</td>
</tr>
<tr>
<td>VCR output</td>
<td>2 channels, VBS 1.0V(p-p) 75Ω, BNC</td>
<td>2 channels, VBS 1.0V(p-p) 75Ω, BNC</td>
</tr>
<tr>
<td>Alarm</td>
<td>Alarm Input: 16 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: 5mA, D-sub connector (25 P)</td>
<td>Alarm Input: 9 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: 5mA, D-sub connector (25 P)</td>
</tr>
<tr>
<td></td>
<td>make/break is selectable by menu setting</td>
<td>make/break is selectable by menu setting</td>
</tr>
<tr>
<td></td>
<td>Video loss alarm output: 1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
<td>Video loss alarm output: 1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
</tr>
<tr>
<td></td>
<td>Alarm hold output: 1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
<td>Alarm hold output: 1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
</tr>
<tr>
<td></td>
<td>Alarm cancel output: 1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
<td>Alarm cancel output: 1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
</tr>
<tr>
<td></td>
<td>Motion detection output: 1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
<td>Motion detection output: 1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
</tr>
<tr>
<td></td>
<td>Alarm time: MANUAL, 10s, 15s, 20s, 30s, 1 – 5min (adjustable in 1-minute steps), Infinite</td>
<td>Alarm time: MANUAL, 10s, 15s, 20s, 30s, 1 – 5min (adjustable in 1-minute steps), Infinite</td>
</tr>
<tr>
<td>Buzzer</td>
<td>ON or OFF (selectable)</td>
<td>ON or OFF (selectable)</td>
</tr>
<tr>
<td>Remote</td>
<td>Remote input: 12 channels (6 channels: binary input), no-voltage make contact input, open voltage: 5V DC, short-circuit current: 5mA, D-sub connector (25 P)</td>
<td>Remote input: 10 channels (6 channels: binary input) NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
</tr>
<tr>
<td></td>
<td>Remote output: 10 channels (6 channels: binary output) NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
<td>Remote output: 10 channels (6 channels: binary output) NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)</td>
</tr>
<tr>
<td>Other Function</td>
<td>Motion detection, Selection of the motion detection pattern, Key lock, Automatic recognition on time-lapse recording, Selection of the recording pattern, Selection of the language (English/Spanish/French) on the menu screen</td>
<td>Motion detection, Selection of the motion detection pattern, Key lock, Automatic recognition on time-lapse recording, Selection of the recording pattern, Selection of the language (English/Spanish/French) on the menu screen</td>
</tr>
<tr>
<td>VCR Control</td>
<td>Switcher control input: 2 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: 0.3mA, Screwless connector</td>
<td>Switcher control input: 2 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: under 0.3mA, Screwless connector</td>
</tr>
<tr>
<td></td>
<td>Alarm output: 2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector</td>
<td>Alarm output: 2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector</td>
</tr>
<tr>
<td></td>
<td>Alarm cancel output: 2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector</td>
<td>Alarm cancel output: 2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector</td>
</tr>
<tr>
<td>Audio</td>
<td>VCR input: 2 channels, –10dB*1, over 50kΩ, RCA pin jack</td>
<td>VCR input: 2 channels, –10dB*1, over 50kΩ, RCA pin jack</td>
</tr>
<tr>
<td></td>
<td>Monitor output: 1 channel, –10dB*1, low impedance, RCA pin jack</td>
<td>Monitor output: 1 channel, –10dB*1, low impedance, RCA pin jack</td>
</tr>
<tr>
<td>External control</td>
<td>RS-232C: 1 channel, D-sub connector (9 P, male)</td>
<td>RS-232C: 1 channel, D-sub connector (9 P, male)</td>
</tr>
<tr>
<td>Dedicated Remote Controller</td>
<td>Controlled by dedicated remote controller C-RM500 (option), C-RM500 (option)</td>
<td>Controlled by dedicated remote controller C-RM500 (option), C-RM500 (option)</td>
</tr>
<tr>
<td>Recording Output</td>
<td>Recording Output: At least 1 frame intervals</td>
<td>Recording Output: At least 1 frame intervals</td>
</tr>
<tr>
<td>Screen display</td>
<td>Camera screen: Full screen selection is by the menu.</td>
<td>Camera screen: Full screen selection is by the menu.</td>
</tr>
<tr>
<td></td>
<td>Multiple-split screen: 4-, 9-, and 16-segment screen (all intermittent displaying, changeable positioning on the segment screen).</td>
<td>Multiple-split screen: 4-, 9-, and 16-segment screen (all intermittent displaying, changeable positioning on the segment screen).</td>
</tr>
<tr>
<td></td>
<td>Zoom: Electronic 2x zoom for the desired camera (zooming position changeable, auto tilt, panning possible)</td>
<td>Zoom: Electronic 2x zoom for the desired camera (zooming position changeable, auto tilt, panning possible)</td>
</tr>
<tr>
<td></td>
<td>Freeze: Freeze screen for individual cameras</td>
<td>Freeze: Freeze screen for individual cameras</td>
</tr>
<tr>
<td></td>
<td>Automatic sequence: Full screen (individual cameras), 4-segment screen (camera groups), switch time intervals of 0 – 99 sec. that can be set in 1 sec. units.</td>
<td>Automatic sequence: Full screen (individual cameras), 4-segment screen (camera groups), switch time intervals of 0 – 99 sec. that can be set in 1 sec. units.</td>
</tr>
<tr>
<td>VCR reproduction screen</td>
<td>Full screen selection: Selection of the desired camera</td>
<td>Full screen selection: Selection of the desired camera</td>
</tr>
<tr>
<td></td>
<td>Multiple-split screen: 4-, 9-, and 16-segment screen</td>
<td>Multiple-split screen: 4-, 9-, and 16-segment screen</td>
</tr>
<tr>
<td></td>
<td>Zoom: Electronic 2x zoom for the desired camera (zooming position changeable, auto tilt, panning possible)</td>
<td>Zoom: Electronic 2x zoom for the desired camera (zooming position changeable, auto tilt, panning possible)</td>
</tr>
<tr>
<td></td>
<td>Freeze: Freeze screen for individual cameras</td>
<td>Freeze: Freeze screen for individual cameras</td>
</tr>
<tr>
<td>[Spot screen]</td>
<td>Selection of the desired camera</td>
<td>Selection of the desired camera</td>
</tr>
<tr>
<td>Automatic sequence</td>
<td>Full screen (individual cameras), switch time intervals of 0 – 99 sec. that can be set in 1 sec. units.</td>
<td>Full screen (individual cameras), switch time intervals of 0 – 99 sec. that can be set in 1 sec. units.</td>
</tr>
<tr>
<td>Number of Effective Pixels</td>
<td>720 x 484 pixels</td>
<td>720 x 484 pixels</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0˚ to +40˚C</td>
<td>0˚ to +40˚C</td>
</tr>
<tr>
<td>Dimensions</td>
<td>420 (W) x 96.6 (H) x 330.9 (D) mm</td>
<td>420 (W) x 51.8 (H) x 334.1 (D) mm</td>
</tr>
<tr>
<td>Weight</td>
<td>4.3kg</td>
<td>3.9kg</td>
</tr>
<tr>
<td>Accessory</td>
<td>Power cord (2m) x 1</td>
<td>Rack mounting bracket: MB-22B</td>
</tr>
</tbody>
</table>

*1 0dB = 1V

*2 That line-locked cameras cannot be connected to the C-MS161D and C-MS91D.