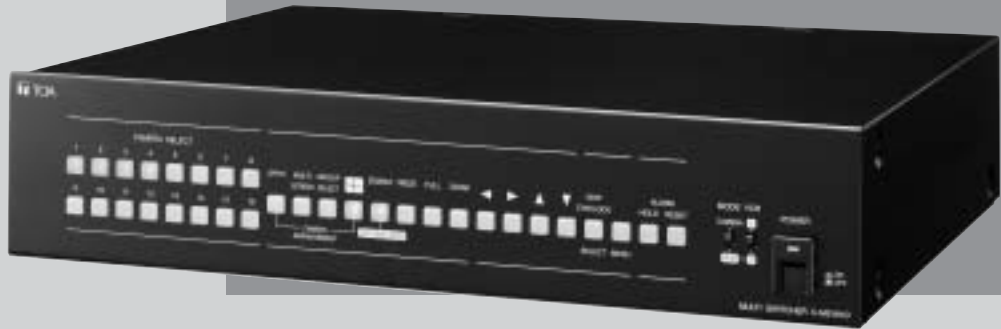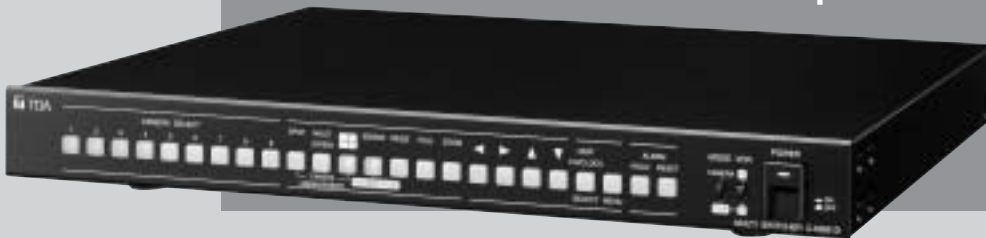# MULTIPLEXER

C-MS161D
16-Channel Duplex Multiplexer

C-MS91D
9-Channel Duplex Multiplexer

DESCRIPTION

The C-MS161D and C-MS91D multiplexer allows connecting multiple cameras (16 for the C-MS161D, 9 for C-MS91D) for monitoring real-time images as well as recording the images onto a VCR and playing them back. Also included is a frame recording function that records all the images from connected cameras to a VCR sequentially while displaying real-time images on multiple split screens (4-, 9-segment screen etc.), a full screen or zoom screen. The recorded images can also be played back on a split, full or zoom screen. Both offer effective surveillance through the motion detection function which can be selected for desired areas. While recording in this mode, the frame rate is also increased for those areas and when motion is detected, an alarm can be activated.

FEATURES

■ **Superb picture quality in a class of its own**
  • High resolution images
    • PAL: **720 × 552 pixels**
    • NTSC: **720 × 464 pixels**
  • Proprietary LSI
  • Digital filter
  • V-SYNC Position Compensation Circuit (P.A.F.)

■ **Versatile, user-friendly operation**
  • Illuminated keys
  • Multiple display configurations
  • Zoom, freeze and auto-panning functions
  • Menu-driven setup
  • Multi-language ability
  • Various alarm functions
  • Motion detection function
  • 2 VCR connections
  • Key-lock function
  • Remote control by C-RM500

TOA

C-MS161D/C-MS91D

Proprietary TOA LSI ensures high picture quality.

Special Video Signal Processor

A newly developed TOA LSI incorporates all the specialized technology required for signal processing for split screen displays, zoom, VCR recording and playback.

Optimizes split-screen displays

TOA's specialized LSI eliminates the common phenomenon seen when objects that move in a direction from left to right often appear separated when viewed in a top to down direction. It is caused by frequency differences of camera inputs and output signals during a split-screen display.
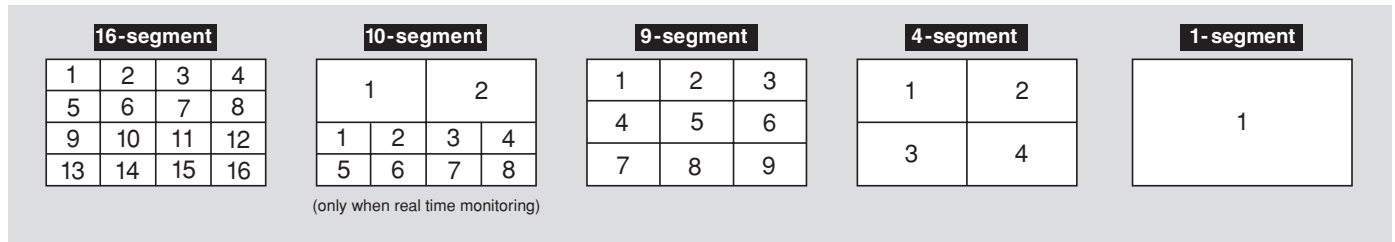
Digital Filter

Incorporated into the LSI´s functions is a high-performance digital filter that supports high quality display requirements. The digital filter averages both vertical and horizontal pixel gap luminance and crops pixels in split-screen display modes. Visually, diagonal lines take on increased definition while flickering is minimized for bright objects. The edges of magnified images are also smoothed during zooming in or out.
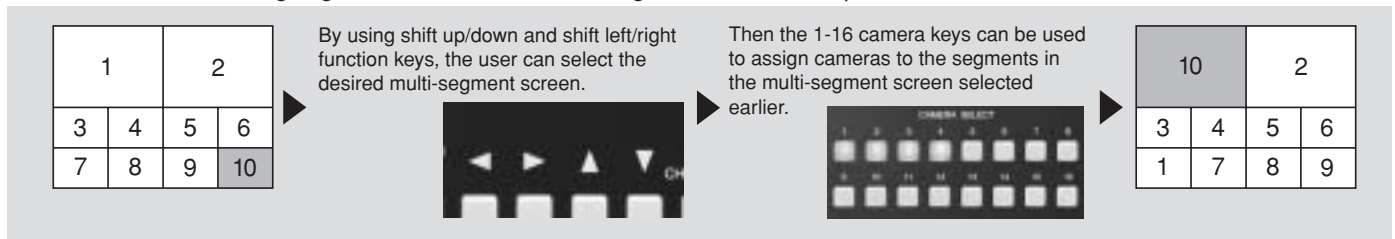
V-SYNC Position Compensation Circuit

Newly developed V-SYNC Position Compensation Circuit precisely corrects and minimizes any unintentional shaking of reproduced video images that can be caused by the quasi-V-SYNC signal that a time-lapse VCR can introduce.
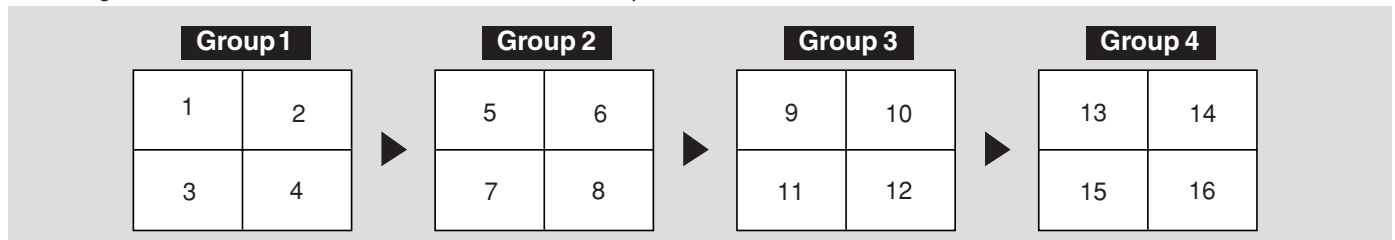
Multiple Split Screen Display

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

16-segment

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

10-segment

1		2	
1	2	3	4
5	6	7	8

(only when real time monitoring)

9-segment

1	2	3
4	5	6
7	8	9

4-segment

1	2
3	4

1-segment

1

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

1		2	
3	4	5	6
7	8	9	10

By using shift up/down and shift left/right function keys, the user can select the desired multi-segment screen.

Then the 1-16 camera keys can be used to assign cameras to the segments in the multi-segment screen selected earlier.

10		2	
3	4	5	6
1	7	8	9

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

Group 1

1	2
3	4

Group 2

5	6
7	8

Group 3

9	10
11	12

Group 4

13	14
15	16

With camera selection, a required camera can be assigned priority to always be shown (camera 1 selected).

Group 1

1	2
3	4

Group 2

1	5
6	7

Group 3

1	8
9	10

Group 4

1	11
12	13
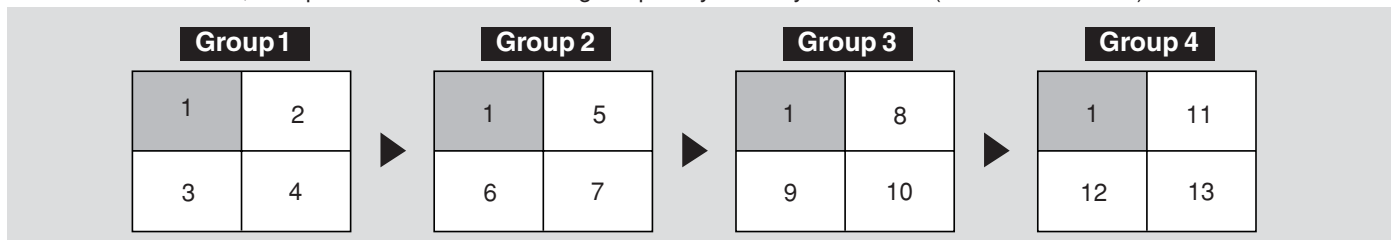
C-MS161D/C-MS91D

Display Configuration Table

|	Live		VCR Playback	
	C-MS161D	C-MS91D	C-MS161D	C-MS91D
Sequence	√	√	–	–
Split(4)-screen sequence	√	√	–	–
Full-Screen display	√	√	√	√
Split(4)-screen display	√*	√*	√	√
Split(9)-screen display	√*	√*	√	√
Split(10)-screen display	√*	√*	–	–
Split(16)-screen display	√*	–	√	–
Zoom display (2x)	√	√	√	√
Auto-panning and tilt display	√	√	√	√
Freeze	√	√	√	√

* Robotic motion

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 detected can be set by selecting horizontal and vertical frames and inputting these values.

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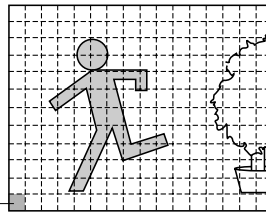
For example, when wishing to detect a person but not wishing to detect a dog, set the object size to be larger than the dog and smaller than a person. If the object size is set for 2 horizontal x 5 vertical frames, such as in the figure at right, a person's motion can be detected, but motion of the dog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

Detection size: 2 horizontal x 5 vertical frame
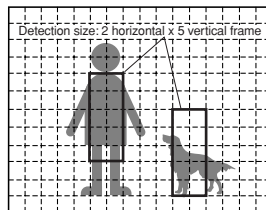
Motion Detection Area setting

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(- -).

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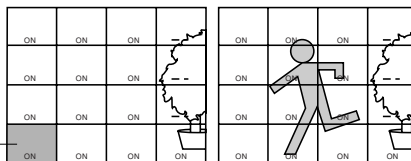
The multiplexer detect the change of brightness in the area that is larger than the set object size in the activated areas.

Sensitivity Setting

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.

CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Motion Detection Operation
When Camera 3 detected motion

CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA	CAMERA
1	3	2	3	4	3	5	3	6	3	7	3	8	3

Increase the number of recording frames for camera 3

"Seamless Operation" by Connecting 2 Time-Lapse VCRs.

• You can connect 2 time-lapse VCRs to TOA multiplexers. You can change or rewind a video tape without interrupting recording.
• The duplex multiplexers C-MS161D and C-MS91D also allow you to review previous recording (VCR2) without stopping new, real-time recording (VCR 1).

Real-time multiple surveillance + recording.

C-MS91D
C-MS161D

CAMERA

VCR
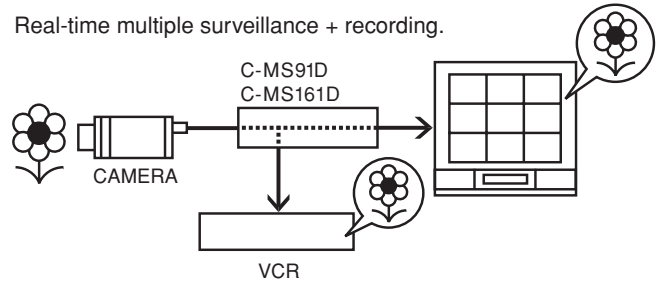
Real-time recording + multiple playback.

CAMERA

C-MS91D
C-MS161D

VCR-1   VCR-2
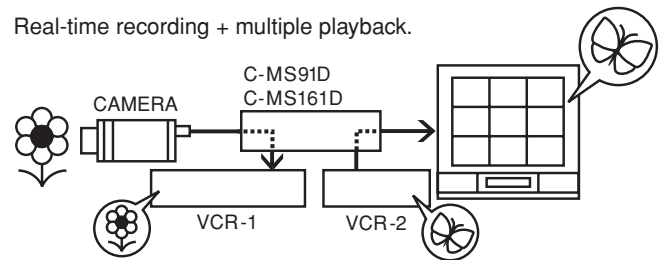
Electronic Zoom, Auto Tilt and Auto Panning Features Included.

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)
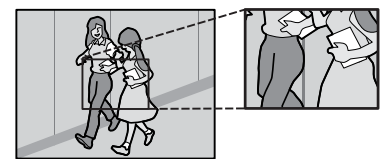
• The auto-panning and-tilt functions electronically simulate eye-movement of a sentry

C-MS161D/C-MS91D
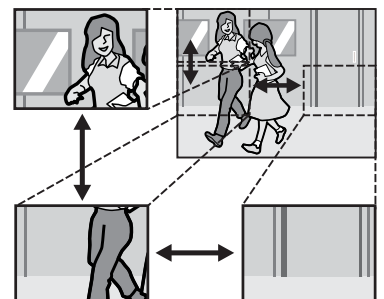
Versatile Alarm Functions

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.

VCR 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 davings)

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
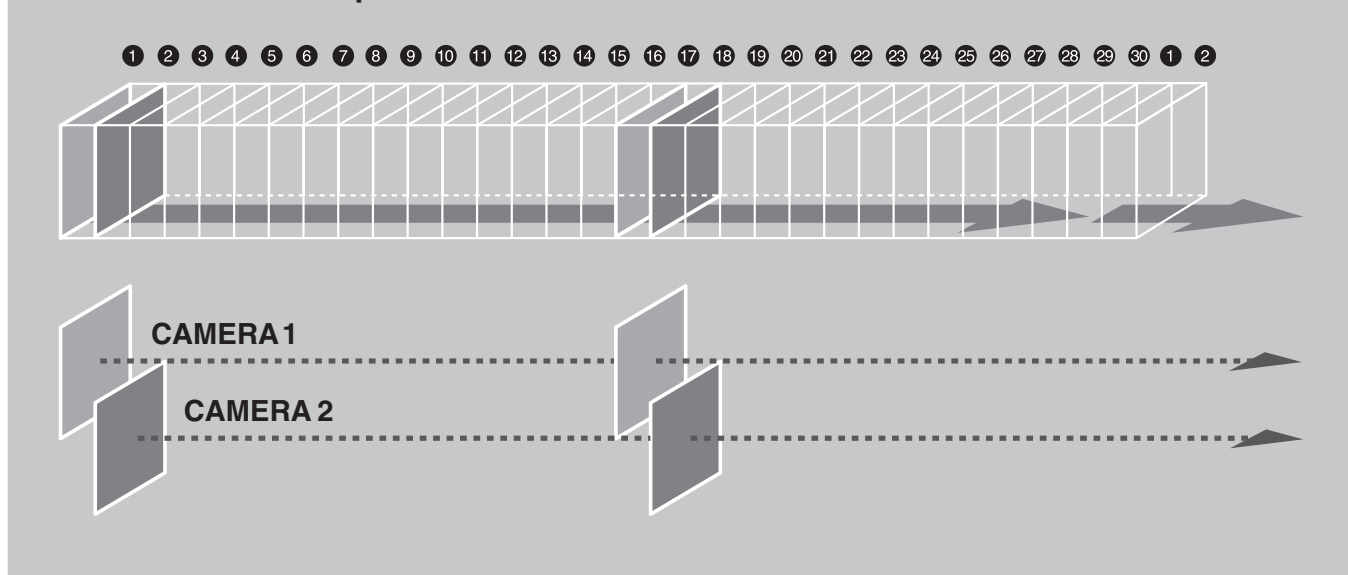
The frame recording system switches cameras for each frame while recording. For every frame (25 frames/sec for PAL and 30 frames/sec for NTSC), a multiplexer sends a different picture taken by a different camera to a VCR so that a single VCR is able to make recordings for multiple cameras. Continuous 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 VCR 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.

C-MS161D/C-MS91D

MULTIPLEXER

The tables below indicate numbers and the interval of recorded fields using various setups for both PAL and NTSC

PAL — Conventional time-lapse VCR

		Standard	Time-lapse mode									
Recording Time (hour)		02	12	24	48	72	120	168	240	480	720	960
Number of recorded frames per second [Frame/sec]	4 cameras	6.25	1.79	0.96	0.50	0.34	0.20	0.15	0.10	0.05	0.03	0.03
	8 cameras	3.13	0.89	0.48	0.25	0.17	0.10	0.07	0.05	0.03	0.02	0.01
	16 cameras	1.56	0.45	0.24	0.13	0.08	0.05	0.04	0.03	0.01	0.01	0.01
Recording intervals [sec]	4 cameras	0.16	0.56	1.04	2.00	2.96	4.88	6.80	9.68	19.28	28.88	38.48
	8 cameras	0.32	1.12	2.08	4.00	5.92	9.76	13.60	19.36	38.56	57.76	76.96
	16 cameras	0.64	2.24	4.16	8.00	11.84	19.52	27.20	38.72	77.12	115.52	153.92

PAL — Real-time VCR, continuous mode

		Standard	Time-lapse mode						
Recording Time (hour)		06	18	30	48	72	96	168	
Number of recorded frames per second [Frame/sec]	4 cameras	6.25	4.17	2.50	1.39	0.96	0.74	0.43	
	8 cameras	3.13	2.08	1.25	0.69	0.48	0.37	0.22	
	16 cameras	1.56	1.04	0.63	0.35	0.24	0.18	0.11	
Recording intervals [sec]	4 cameras	0.16	0.24	0.40	0.72	1.04	1.36	2.32	
	8 cameras	0.32	0.48	0.80	1.44	2.08	2.72	4.64	
	16 cameras	0.64	0.96	1.60	2.88	4.16	5.44	9.28	

NTSC — Conventional time-lapse VCR

		Standard	Time-lapse mode									
Recording Time (hour)		02	12	24	48	72	120	168	240	480	720	960
Number of recorded frames per second [Frame/sec]	4 cameras	7.49	2.14	1.15	0.60	0.41	0.25	0.18	0.12	0.06	0.04	0.03
	8 cameras	3.75	1.07	0.58	0.30	0.20	0.12	0.09	0.06	0.03	0.02	0.02
	16 cameras	1.87	0.54	0.29	0.15	0.10	0.06	0.04	0.03	0.02	0.01	0.01
Recording intervals [sec]	4 cameras	0.13	0.47	0.87	1.67	2.47	4.07	5.67	8.07	16.08	24.09	32.10
	8 cameras	0.27	0.93	1.74	3.34	4.94	8.14	11.34	16.15	32.17	48.18	64.20
	16 cameras	0.53	1.87	3.47	6.67	9.88	16.28	22.69	32.30	64.33	96.36	128.40

NTSC — Real-time VCR, continuous mode

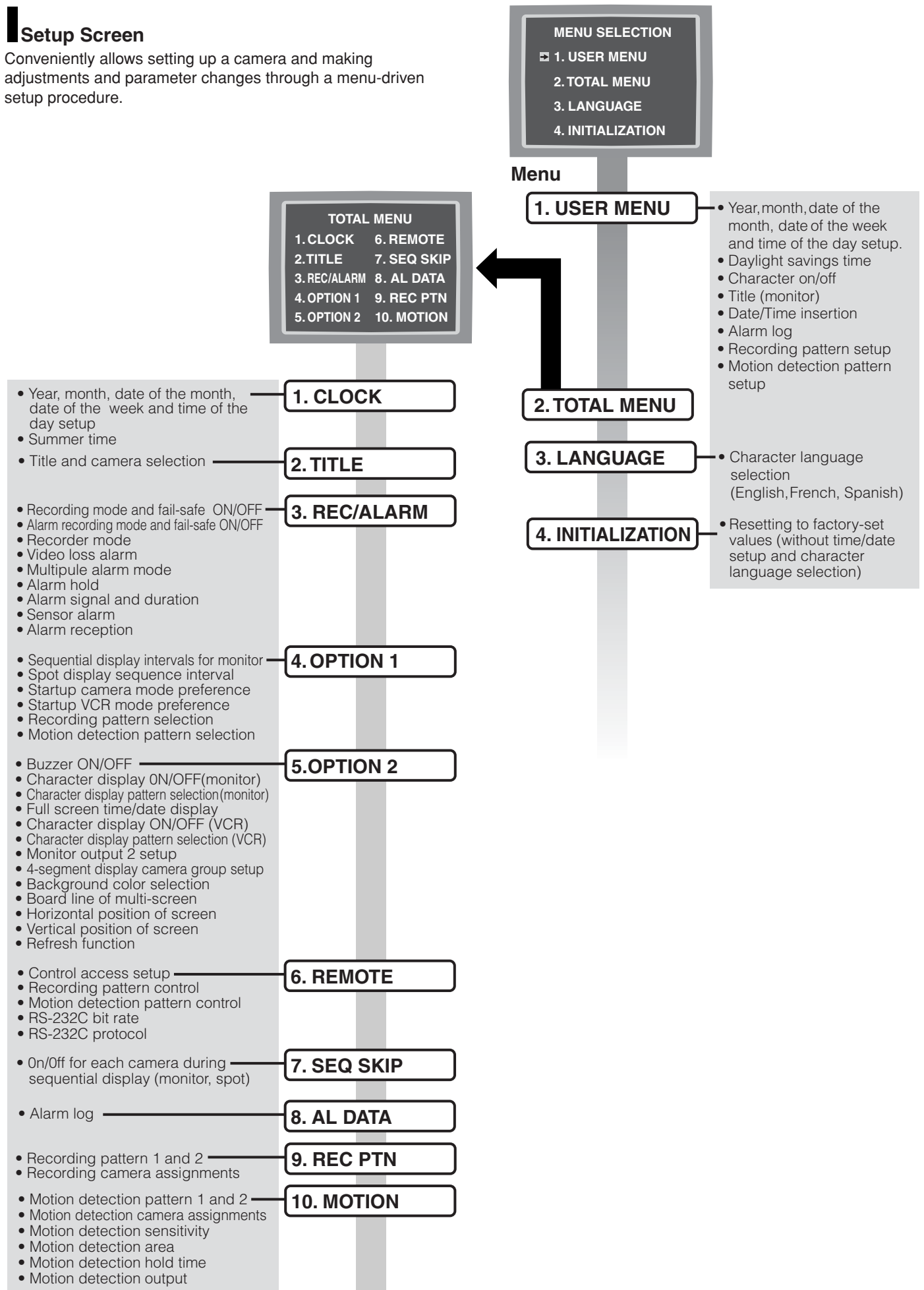|		Standard	Time-lapse mode						
Recording Time (hour)		06	18	30	48	72	96	168	
Number of recorded frames per second [Frame/sec]	4 cameras	7.49	5.00	3.00	1.67	1.15	0.88	0.52	
	8 cameras	3.75	2.50	1.50	0.83	0.58	0.44	0.26	
	16 cameras	1.87	1.25	0.75	0.42	0.29	0.22	0.13	
Recording intervals [sec]	4 cameras	0.13	0.20	0.33	0.60	0.87	1.13	1.94	
	8 cameras	0.27	0.40	0.67	1.20	1.74	2.27	3.87	
	16 cameras	0.53	0.80	1.33	2.40	3.47	4.54	7.74	

* Indicated figures show standard values. The actual values may vary slightly depending on connected VCR models.
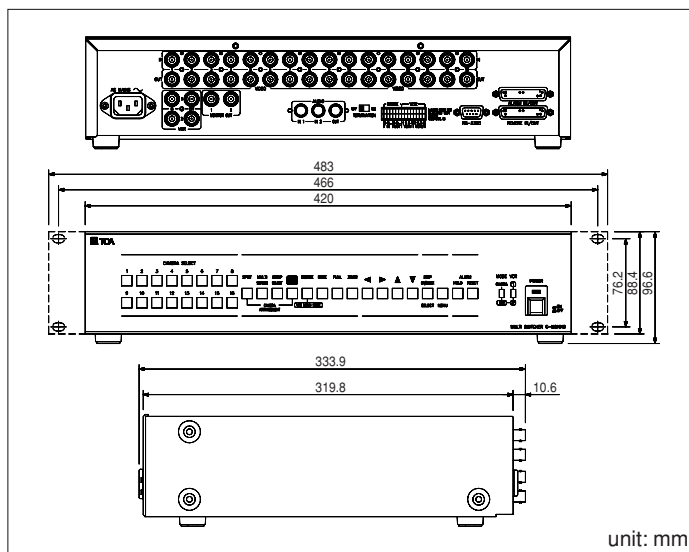
C-MS161D/C-MS91D

MULTIPLEXER

Setup Screen

Conveniently allows setting up a camera and making adjustments and parameter changes through a menu-driven setup procedure.
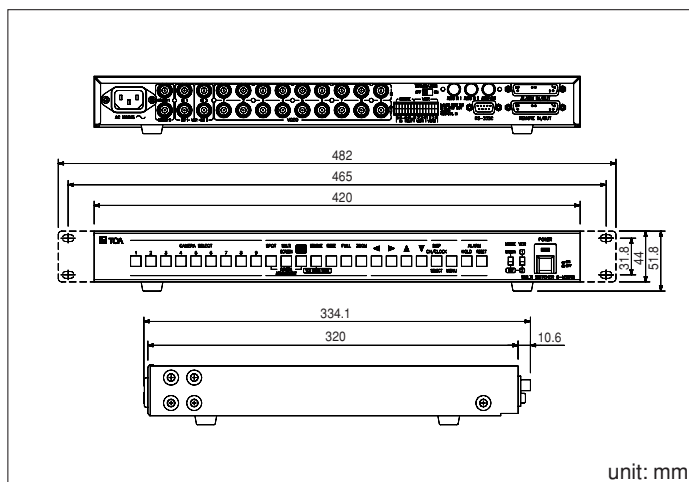
MENU SELECTION
➡ 1. USER MENU
2. TOTAL MENU
3. LANGUAGE
4. INITIALIZATION

Menu

TOTAL MENU

1. CLOCK	6. REMOTE
2. TITLE	7. SEQ SKIP
3. REC/ALARM	8. AL DATA
4. OPTION 1	9. REC PTN
5. OPTION 2	10. MOTION

1. USER MENU
- Year, month, date of the month, date of the week and time of the day setup.
- Daylight savings time
- Character on/off
- Title (monitor)
- Date/Time insertion
- Alarm log
- Recording pattern setup
- Motion detection pattern setup

2. TOTAL MENU

3. LANGUAGE
- Character language selection (English, French, Spanish)

4. INITIALIZATION
- Resetting to factory-set values (without time/date setup and character language selection)

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1. CLOCK
- Year, month, date of the month, date of the week and time of the day setup
- Summer time

2. TITLE
- Title and camera selection

3. REC/ALARM
- Recording mode and fail-safe ON/OFF
- Alarm recording mode and fail-safe ON/OFF
- Recorder mode
- Video loss alarm
- Multipule alarm mode
- Alarm hold
- Alarm signal and duration
- Sensor alarm
- Alarm reception

4. OPTION 1
- Sequential display intervals for monitor
- Spot display sequence interval
- Startup camera mode preference
- Startup VCR mode preference
- Recording pattern selection
- Motion detection pattern selection

5. OPTION 2
- Buzzer ON/OFF
- Character display 0N/OFF(monitor)
- Character display pattern selection(monitor)
- Full screen time/date display
- Character display ON/OFF (VCR)
- Character display pattern selection (VCR)
- Monitor output 2 setup
- 4-segment display camera group setup
- Background color selection
- Board line of multi-screen
- Horizontal position of screen
- Vertical position of screen
- Refresh function

6. REMOTE
- Control access setup
- Recording pattern control
- Motion detection pattern control
- RS-232C bit rate
- RS-232C protocol

7. SEQ SKIP
- 0n/0ff for each camera during sequential display (monitor, spot)

8. AL DATA
- Alarm log

9. REC PTN
- Recording pattern 1 and 2
- Recording camera assignments

10. MOTION
- Motion detection pattern 1 and 2
- Motion detection camera assignments
- Motion detection sensitivity
- Motion detection area
- Motion detection hold time
- Motion detection output

C-MS161D
16-Channel Duplex
Multiplexer

unit: mm

C-MS91D
9-Channel Duplex
Multiplexer

unit: mm

C-MS161D
16-CHANNEL DUPLEX MULTIPLEXER

SPECIFICATIONS (PAL)

Power source		220 – 240V AC, 50/60Hz
Power consumption		20W
Video Input	Camera input	16 channels, VBS 1.0V(p-p) 75Ω, BNC, 2:1 interlace[*2]
	VCR input	2 channels, VBS 1.0V(p-p) 75Ω, BNC
Video output	Camera output	16 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output
	Monitor output	2 channels (Either channel can be set as spot output.), VBS 1.0V(p-p) 75Ω, BNC
	VCR output	2 channels, VBS 1.0V(p-p) 75Ω, BNC
Alarm	Alarm Input	16 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: 5mA, D-sub connector (25 P) make/brake is selectable by menu setting
	Alarm output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Video loss alarm output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm hold output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm cancel output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Motion detection output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm time	MANUAL, 10s, 15s, 20s, 30s, 1 – 5min (adjustable in 1-minute steps), Infinite
	Buzzer	ON or OFF (selectable)
Remote	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)
	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)
Other Functions		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
VCR Control	Switcher control input	2 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: under 0.3mA, Screwless connector
	Alarm output	2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector
	Alarm cancel output	2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector
Audio	VCR input:	2 channels, –10dB[*1], over 50kΩ, RCA pin jack
	Monitor output	1 channel, –10dB[*1], low impedance, RCA pin jack
External control	RS-232C	1 channel, D-sub connector (9 P, male)
	Remote control terminal	1 each of input and output, screwless connector
Dedicated Remote Controller		Controlled by dedicated remote controller C-RM100 (option), C-RM500 (option)
Recording Output		At least 1 frame intervals
Screen display	**[Camera screen]**	
	Full screen selection	Selection of the desired camera
	Multiple-split screen	4-, 9-, 10- and 16-segment screen (all intermittent displaying, changeable positioning on the segment screen.)
	Zoom	Electronic 2x zoom for the desired camera (zooming position changeable, auto panning and auto tilting possible)
	Freeze	Freeze screen for individual cameras
	Automatic sequence	Full screen (individual cameras), 4-segment screen (camera groups), switching time intervals of 0 – 99 sec. that can be set in 1 sec. units.
	[VCR reproduction screen]	
	Full screen selection	Selection of the desired camera
	Multiple-split screen	4-, 9-, and 16-segment screen
	Zoom	Electronic 2x zoom for the desired camera (zooming position changeable, auto panning and auto tilting possible)
	Freeze	Freeze screen for individual cameras
	[Spot screen]	
	Full screen selection	Selection of the desired camera
	Automatic sequence	Full screen (individual cameras), 4-segment screen (camera groups), switching time intervals of 0 – 99 sec. that can be set in 1 sec. units.
Indication	Camera title	Up to 8 characters (alphanumeric and symbols) camera No. and time/date can be displayed.
Number of Effective Pixels		720 × 552 pixels
Operating Temperature		0° to +40°C
Finish	Panel:	aluminum extrusion, black, 30% gloss
	Case:	Surface-treated steel plate, black, 30% gloss, paint
Dimensions		420(W) × 96.6 (H) × 333.9 (D) mm
Weight		4.3kg
Accessory		Power cord (2m) × 1
Option		Rack mounting bracket: MB-23B

[*1] 0dB = 1V
[*2] That line-locked cameras cannot be connected to the C-MS161D.

SPECIFICATIONS (NTSC)

Power source		110 – 120V AC, 50/60Hz
Power consumption		18W
Video Input	Camera input	16 channels, VBS 1.0V(p-p) 75Ω, BNC, 2:1 interlace[*2]
	VCR input	2 channels, VBS 1.0V(p-p) 75Ω, BNC
Video output	Camera output	16 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output
	Monitor output	2 channels (Either channel can be set as spot output.), VBS 1.0V(p-p) 75Ω, BNC
	VCR output	2 channels, VBS 1.0V(p-p) 75Ω, BNC
Alarm	Alarm Input	16 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: 5mA, D-sub connector (25 P) make/brake is selectable by menu setting
	Alarm output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Video loss alarm output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm hold output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm cancel output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Motion detection output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm time	MANUAL, 10s, 15s, 20s, 30s, 1 – 5min (adjustable in 1-minute steps), Infinite
	Buzzer	ON or OFF (selectable)
Remote	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)
	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)
Other Functions		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
VCR Control	Switcher control input	2 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: under 0.3mA, Screwless connector
	Alarm output	2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector
	Alarm cancel output	2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector
Audio	VCR input:	2 channels, –10dB[*1], over 50kΩ, RCA pin jack
	Monitor output	1 channel, –10dB[*1], low impedance, RCA pin jack
External control	RS-232C	1 channel, D-sub connector (9 P, male)
	Remote control terminal	1 each of input and output, screwless connector
Dedicated Remote Controller		Controlled by dedicated remote controller C-RM100 (option), C-RM500 (option)
Recording Output		At least 1 frame intervals
Screen display	**[Camera screen]**	
	Full screen selection	Selection of the desired camera
	Multiple-split screen	4-, 9-, 10- and 16-segment screen (all intermittent displaying, changeable positioning on the segment screen.)
	Zoom	Electronic 2x zoom for the desired camera (zooming position changeable, auto panning and auto tilting possible)
	Freeze	Freeze screen for individual cameras
	Automatic sequence	Full screen (individual cameras), 4-segment screen (camera groups), switching time intervals of 0 – 99 sec. that can be set in 1 sec. units.
	[VCR reproduction screen]	
	Full screen selection	Selection of the desired camera
	Multiple-split screen	4-, 9-, and 16-segment screen
	Zoom	Electronic 2x zoom for the desired camera (zooming position changeable, auto panning and auto tilting possible)
	Freeze	Freeze screen for individual cameras
	[Spot screen]	
	Full screen selection	Selection of the desired camera
	Automatic sequence	Full screen (individual cameras), 4-segment screen (camera groups), switching time intervals of 0 – 99 sec. that can be set in 1 sec. units.
Indication	Camera title	Up to 8 characters (alphanumeric and symbols) camera No. and time/date can be displayed.
Number of Effective Pixels		720 × 464 pixels
Operating Temperature		0° to +40°C
Finish	Panel:	aluminum extrusion, black, 30% gloss
	Case:	Surface-treated steel plate, black, 30% gloss, paint
Dimensions		420(W) × 96.6 (H) × 333.9 (D) mm
Weight		4.3kg
Accessory		Power cord (2m) × 1
Option		Rack mounting bracket: MB-23B

[*1] 0dB = 1V
[*2] That line-locked cameras cannot be connected to the C-MS161D.

C-MS91D

9-CHANNEL DUPLEX MULTIPLEXER

SPECIFICATIONS (PAL)

Power source		220 – 240V AC, 50/60Hz
Power consumption		18W
Video Input	Camera input	9 channels, VBS 1.0V(p-p) 75Ω, BNC, 2:1 interlace*²
	VCR input	2 channels, VBS 1.0V(p-p) 75Ω, BNC
Video output	Camera output	9 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output
	Monitor output	2 channels (Either channel can be set as spot output.), VBS 1.0V(p-p) 75Ω, BNC
	VCR output	2 channels, VBS 1.0V(p-p) 75Ω, BNC
Alarm	Alarm Input	16 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: 5mA, D-sub connector (25 P) make/brake is selectable by menu setting
	Alarm output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Video loss alarm output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm hold output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm cancel output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Motion detection output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm time	MANUAL, 10s, 15s, 20s, 30s, 1 – 5min (adjustable in 1-minute steps), Infinite
	Buzzer	ON or OFF (selectable)
Remote	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)
	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)
Other Functions		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
VCR Control	Switcher control input	2 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: under 0.3mA, Screwless connector
	Alarm output	2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector
	Alarm cancel output	2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector
Audio	VCR input:	2 channels, –10dB*¹, over 50kΩ, RCA pin jack
	Monitor output	1 channel, –10dB*¹, low impedance, RCA pin jack
External control	RS-232C	1 channel, D-sub connector (9 P, male)
	Remote control terminal	1 each of input and output, screwless connector
Dedicated Remote Controller		Controlled by dedicated remote controller C-RM100 (option), C-RM500 (option)
Recording Output		At least 1 frame intervals
Screen display	**[Camera screen]**	
	Full screen selection	Selection of the desired camera
	Multiple-split screen	4-, 9 and 10-segment screen (all intermittent displaying, changeable positioning on the segment screen.)
	Zoom	Electronic 2x zoom for the desired camera (zooming position changeable, auto panning and auto tilting possible)
	Freeze	Freeze screen for individual cameras
	Automatic sequence	Full screen (individual cameras), 4-segment screen (camera groups), switching time intervals of 0 – 99 sec. that can be set in 1 sec. units.
	[VCR reproduction screen]	
	Full screen selection	Selection of the desired camera
	Multiple-split screen	4- and 9-segment screen
	Zoom	Electronic 2x zoom for the desired camera (zooming position changeable, auto panning and auto tilting possible)
	Freeze	Freeze screen for individual cameras
	[Spot screen]	
	Full screen selection	Selection of the desired camera
	Automatic sequence	Full screen (individual cameras), 4-segment screen (camera groups), switching time intervals of 0 – 99 sec. that can be set in 1 sec. units.
Indication	Camera title	Up to 8 characters (alphanumeric and symbols) camera No. and time/date can be displayed.
Number of Effective Pixels		720 × 552 pixels
Operating Temperature		0˚ to +40˚C
Finish	Panel:	aluminum extrusion, black, 30% gloss
	Case:	Surface-treated steel plate, black, 30% gloss, paint
Dimensions		420(W) × 51.8 (H) × 334.1 (D) mm
Weight		3.5kg
Accessory		Power cord (2m) × 1
Option		Rack mounting bracket: MB-15B

*¹ 0dB = 1V   *² That line-locked cameras cannot be connected to the C-MS91D.

SPECIFICATIONS (NTSC)

Power source		110 – 120V AC, 50/60Hz
Power consumption		17W
Video Input	Camera input	9 channels, VBS 1.0V(p-p) 75Ω, BNC, 2:1 interlace*²
	VCR input	2 channels, VBS 1.0V(p-p) 75Ω, BNC
Video output	Camera output	9 channels, VBS 1.0V(p-p) 75Ω, BNC, loop-through output
	Monitor output	2 channels (Either channel can be set as spot output.), VBS 1.0V(p-p) 75Ω, BNC
	VCR output	2 channels, VBS 1.0V(p-p) 75Ω, BNC
Alarm	Alarm Input	16 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: 5mA, D-sub connector (25 P) make/brake is selectable by menu setting
	Alarm output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Video loss alarm output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm hold output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm cancel output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Motion detection output	1 channel, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, D-sub connector (25 P)
	Alarm time	MANUAL, 10s, 15s, 20s, 30s, 1 – 5min (adjustable in 1-minute steps), Infinite
	Buzzer	ON or OFF (selectable)
Remote	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)
	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)
Other Functions		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
VCR Control	Switcher control input	2 channels, no-voltage make contact input, open voltage: 5V DC, short-circuit current: under 0.3mA, Screwless connector
	Alarm output	2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector
	Alarm cancel output	2 channels, NPN open collector output, withstand voltage: 20V DC, control current: under 20mA, Screwless connector
Audio	VCR input:	2 channels, –10dB*¹, over 50kΩ, RCA pin jack
	Monitor output	1 channel, –10dB*¹, low impedance, RCA pin jack
External control	RS-232C	1 channel, D-sub connector (9 P, male)
	Remote control terminal	1 each of input and output, screwless connector
Dedicated Remote Controller		Controlled by dedicated remote controller C-RM100 (option), C-RM500 (option)
Recording Output		At least 1 frame intervals
Screen display	**[Camera screen]**	
	Full screen selection	Selection of the desired camera
	Multiple-split screen	4-, 9- and 10-segment screen (all intermittent displaying, changeable positioning on the segment screen.)
	Zoom	Electronic 2x zoom for the desired camera (zooming position changeable, auto panning and auto tilting possible)
	Freeze	Freeze screen for individual cameras
	Automatic sequence	Full screen (individual cameras), 4-segment screen (camera groups), switching time intervals of 0 – 99 sec. that can be set in 1 sec. units.
	[VCR reproduction screen]	
	Full screen selection	Selection of the desired camera
	Multiple-split screen	4- and 9-segment screen
	Zoom	Electronic 2x zoom for the desired camera (zooming position changeable, auto panning and auto tilting possible)
	Freeze	Freeze screen for individual cameras
	[Spot screen]	
	Full screen selection	Selection of the desired camera
	Automatic sequence	Full screen (individual cameras), 4-segment screen (camera groups), switching time intervals of 0 – 99 sec. that can be set in 1 sec. units.
Indication	Camera title	Up to 8 characters (alphanumeric and symbols) camera No. and time/date can be displayed.
Number of Effective Pixels		720 × 464 pixels
Operating Temperature		0˚ to +40˚C
Finish	Panel:	aluminum extrusion, black, 30% gloss
	Case:	Surface-treated steel plate, black, 30% gloss, paint
Dimensions		420(W) × 51.8 (H) × 334.1 (D) mm
Weight		3.5kg
Accessory		Power cord (2m) × 1
Option		Rack mounting bracket: MB-15B

*¹ 0dB = 1V   *² That line-locked cameras cannot be connected to the C-MS91D.

OPTIONS

C-CC554S
Combination Dome Camera

- 255 preset positions
- 230X zoom
  (optical 23X, electronic 10X)
- Tilt rotation range 0° – 180°
  (using Auto-Flip function)
- Pan rotation range continuous 360°
- Pan/tilt maixmum high speed
  rotating speed is 360°/sec
- 1/4 type CCD image device
- 480 lines high resolution
- Wide dynamic range
- Autofocus
- High-sensitivity function
  (color and B/W modes)
- Preset sequence function
  (number/random sequence)
- Privacy masking function
- Auto-trace function
- Autopan function
- Preset image freeze function

C-CC504S
Combination Dome Camera

- 64 preset positions
- 176X zoom
  (optical 22X, electronic 8X)
- Tilt rotation range 0° – 90°
- Pan rotation range continuous 360°
- Pan/tilt maixmum high speed
  rotating speed is 360°/sec
- 1/4 type CCD image device
- 480 lines high resolution
- Wide dynamic range
- Autofocus
- High-sensitivity function
  (color mode)
- Preset sequence function
  (number/random sequence)
- Autopan function

C-RM500
Remote Controller

The C-RM500 Remote Controller is designed for use in camera-based systems that allow remote control from up to 1.2km away over RS-485 communication lines. It allows video images to be switched remotely and can handle a maximum of 16 cameras when used together with the TOA Multiplexer. Easy-to-see LEDs inform status of control, alarm, focus and other functions.

SYSTEM EXAMPLE

RS-485

RS-485

C-RM500

C-MS161D

Monitor

TOA Corporation

TOA