

Operation Manual

NAC *MEMRECAM* fx RX-6



NAC Image Technology Corporation

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INTRODUCTION

The **MEMRECAM** fx RX-6 meets the need for analyzing events that move swiftly beyond the capability of human eyesight.

The **MEMRECAM** fx RX-6 is a digital high-speed camera that offers many distinct advantages. Since a camera head is separated from the recorder incorporating an IC memory, a recording medium, it is small in size comparable with an ordinary high-speed film camera. Like a high-speed video camera, it can play back images on the spot. Another advantage is that it is capable of handling all recorded images digitally.

With a separate small camera head, the **MEMRECAM** fx RX-6 offers optimum performance in any shooting and installation environment.

Using an optional cable, the camera head can be kept from the main body to a distance of as long as 9 meters.

The **MEMRECAM** fx RX-6 facilitates high-speed shooting that usually requires excellent sleight of hand. Computer-applied remote control, needless to say, is available using software supplied. Other features include simple operation from the panel attached to the main unit and a remote controller; storing images on a memory card inserted into the camera body; and a live scene seen through a viewfinder or a monitor, allowing shooting and analysis without recourse to a computer.

The **MEMRECAM** fx RX-6 satisfies the customer needs for faster operation and higher image quality. At a shooting speed of 6,000 framers per second, effective pixels number 512 horizontally by 384 vertically. With a split-frame shooting, operating speed can increase up to 210,000 frames a second (512(H) x 8(V)). On the other hand, images can be transferred to the computer through a high-speed communications network (Ethernet, fiber channel).

The **MEMRECAM** fx RX-6 is designed with electromagnetic compatibility in mind, while it is sturdily compact and well resistant to the extremes of impact and vibration when used in a harsh environment where it must shoot rapidly moving objects.

This instruction manual describes the specifications, operating procedures, interfaces with the peripherals, expected system extension, and other useful information.

Trademark

MEMRECAM is a trademark of NAC Image Technology Inc.

Please Read Carefully Before Use

Safety Precautions

Please read the following safety precautions carefully before operating the **MEMRECAM** fx RX-6 camera system. Depending on the device, particular safety precautions are required during handling. Please follow these guidelines carefully to ensure safe and proper operation of the camera system. As always there are instances where some unforeseen condition may exist which may not have been taken to account. As a result, operate the camera system only after sufficient understanding of the contents written in this manual. Contact your retail outlet if there are any questions regarding the operations of this system.

DANGER

If the indications shown are ignored, dangerous conditions could result in death or serious injury.

WARNING

If the indications shown are ignored, potentially dangerous conditions could result in death or serious injury.

CAUTION

If the indications shown are ignored, potentially dangerous conditions could result in slight or moderate injury. This is also a warning sign of unsafe operation and indicates the potential of damage to this device or connected devices.

Handling Precautions



Safety alert symbol

This symbol alerts you or others to the danger and/or items or operating concerns related to the use of this device. This symbol is also used when there is important information relating to operation methods. Read the message adjacent to this symbol carefully and follow the instructions for safe and proper use of this device



Grounding terminal symbol

This symbol indicates the location of a protective grounding terminal. If not grounded, electrical shock could result from metallic and other parts of this device. Due to this danger, please make sure it is properly grounded. When connecting to an electric outlet using a 3P-2P converter plug, connect the converter plug grounding wire to a common ground.



High voltage warning symbol

When replacing fuses, proceed only after the power cable is unplugged from the electric outlet. Do not open the cover. Depending on the device, there may be parts that generate high voltage internally so opening the cover could result in electrical shock.

Precautions for Use

Caution - Confirm Input Power supply

Before connecting electric power to the camera system, confirm that the voltage, frequency and polarity are correct. The camera system requires 20 to 32VDC when using a DC power supply or battery. The optional AC power supply adapter requires an electric input of 90 to 240VAC/47 to 63Hz. The AC power supply adapter is designed to deliver 20 to 32VDC to the camera system.

Caution - Input Power Voltage

When the DC power and the related battery are to be used, provide means for input voltage warning and set the buzzer to ON.

- For setup refer to Warning Settings (page 3-45) described in Setup from SYSTEM MENU under Section 3.2.5.

Failure to follow this instruction can lead to erratic operations, such as destruction of stored image data.

Caution - Ambient Environment

- For optimum performance operate the system where the ambient temperature is within 0 to +40°C and humidity is 30 to 80%RH. Do not expose to dew.
- Do not operate or store where the ambient temperature is below -10 and above +60°C or the humidity is not within 20 to 80%RH.
- Avoid using in locations where there is smoke, where corrosive gases are generated or where there is a strong magnetic field.
- Do not place in direct sunlight or in locations near rain or salt water.
- Do not use where there is trash, dust, sand or high humidity.
- To prevent increasing the internal temperature, do not place in front of, or near ventilation openings .

Caution - Vibration and Shock

Do not expose the **MEMRECAM** fx RX-6 and related accessories to strong vibration and shock.

 **Caution - CAMERA HEAD and DRP Handling**

The internal components of the CAMER HEAD and DRP are intricately manufactured and assembled in the unit. Keep the screws on the cover tight and do not for any reason (even if there is a malfunction), open the cover. Reassembly of the camera is difficult.

 **Caution - Heat Generation**

The system generates heat while it is operating. This heat generation is not a sign of failure.

When the system seems to be excessively heated, turn off the power and unplug the power cable.

When in doubt, please feel free to contact your local dealer or directly the manufacturer.

 **Caution - Lens Mount Handling**

Handle camera and lenses with care. Always keep the camera sensor and lenses covered by protective caps. Do not allow the camera sensor and rear of lenses to be exposed to dust and foreign matter. Do not put fingers or any other items inside. If the internal optics is damaged or foreign objects are present, image quality will deteriorate.

 **Warning - Connecting Cables**

Confirm that the power is OFF before connecting or disconnecting camera cables.

Damage to the device and potential of electrical shock could occur if the camera cables are connected or disconnected with the power ON. It is acceptable to leave the power ON when connecting or disconnecting the J-PAD2, D-VGA, TRIG-IN and network cables.

 **Caution - Handling of Cables**

When the camera cable or remote control cable is to be bent, its bending radius must not exceed 140 mm.

Do not bend it sharply, place objects on it, or fasten it too tight with a clamp or other tool.

Failure to follow the directions can lead to failure of the system.

 **Caution - Handling of CF Card**

When inserting the CF card, do not force it into the system.

Handle it, using utmost care about electrostatic (discharge from your body if it is considered to be charged).

Failure to follow the directions can lead to failure of the system.

 **Caution - Battery Use**

Do not expose or store the optional Memory Backup Unit to high Temperatures. Avoid prolonged exposure to the sun, keep away from fire and heated surfaces . Exposure to high temperatures will cause the battery to leak and reduce battery performance and life. Do not use a Memory Backup Unit battery for other applications. Excessive current draw may cause battery leakage, excessive heat or rupture. Contact your retail outlet to acquire replacement batteries used in the Memory Backup Unit.

 **Caution - Mounting**

The DRP should be securely mounted on tripods or by any other means available. Use caution when pulling cables which could tip tripods over.

 **Caution - Handling During Shipment and Transport**

Use the special shipping case for shipping and transport this product.

 **Caution - Increased Sensor Noise**

The *MEMRECAM* fx series feature technology to address screen noise patterns due to sensor temperature. The sensor temperature rises when the system is set to ARM mode. At the time the system is set to ARM mode, the sensor is calibrated to its current temperature. As temperature changes it is necessary re-calibrate to the current sensor temperature.

To maintain proper sensor calibration and to obtain images with greater quality, follow these guidelines:

- Prepare to photograph in VIEW mode, and switch to ARM mode immediately prior to begin recording.
- Prepare to photograph in ARM mode and temporarily change the mode from ARM → READY → VIEW → ARM immediately prior to begin recording.
- After the system has been set to ARM mode for more than an hour, re-calibrate by changing the mode from ARM → READY → VIEW → ARM. With this method, it is possible to continue recording without the need to re-calibrate.

NOTICE:

There may be problems, conditions and circumstances regarding use and operation this device not stated above. As a result, take time to sufficiently understand the general provisions noted in his Operation Manual before using. Please contact your retail outlet as soon as possible if there are any questions about this device.

Regular Replacement of Parts

It is recommended that the internal backup battery be replaced 5 years after purchase. This battery keeps the clock and menu setting in memory when power is disconnected. Disassembly of the system is required. Since the user cannot replace, please return system to your retail outlet to perform maintenance.

Warranty

NAC warrants products of its manufacture to be free from defects in design, workmanship and material under normal and proper use and service for a period of twelve (12) months after the date of NAC's shipment or delivery.

NAC agrees to repair or replace at the place of manufacture, without charge, all parts of said products which are returned for inspection, to NAC within the applicable warranty period, provided such inspection discloses that the defects are as above specified and provided also that the equipment has not been altered or repaired other than with authorization from NAC and its procedures, subjected to misuse, improper maintenance, negligence, accident, damage by excessive current, or had its serial number or any part thereof altered, defaced or removed.

Shipping expenses to and from NAC will be to the account of the customer. Consumer goods such as lamps, fuses, etc. are considered by NAC not to be covered under this warranty.

Application Standards

FCC

FCC Part 15 Class A This device conforms to tests related to Class A computer devices, FCC regulation No. 15.

EMC Statement

This product conforms to EMC directive (89/336/EEC, 92/31/EEC) and has obtained CE marks for the following standards.

EN55022

EN55024

MEMRECAM® is the registered trademark of NAC Image Technology Corporation.

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1

***MEMRECAM* RX-6**

Overview

1. **MEMRECAM** RX-6 Overview

1.1 **MEMRECAM** RX-6 Standard Components

The standard high-speed digital camera system **MEMRECAM** RX-6 is comprised of the following items:

<u>Part Name</u>	<u>Model</u>	<u>Qty.</u>
RX-6 Camera Head (COLOR or B/W)	V-163	1
RX-6 DRP	V-335	1
RX-6 Camera Cable (5m)	583075-4	1
F/C Mount Adapter	4H2021	1
J-PAD2	4H2003	1
Carrying case	4H2089-4	1
Trigger connector	J50500008	1
Operation Manual (this document)	800075	1
Smart Capture / fx Link CD-ROM	SP-614	1
Smart Capture / fx Link Operation Manual	800054	1

1.2 **MEMRECAM** RX-6 External Components

The exterior features of the **MEMRECAM** RX-6 are shown in Photo 1



Photo-1 **MEMRECAM** fx RX-6 (Shown with optional lens)

Caution

When connecting the camera cable to the fx RX-6 CAMERA HEAD and fx RX-6 DRP, securely insert the connector and turn the camera cable knob until tight.

When unplugging the camera cable, make sure that the power is already turned off (PWR LED should not be indicated on the CAMERA HEAD rear panel; see Photo 2 showing this rear panel).

Note that, being dedicated to MEMRECAM fx RX-6 alone, this camera cable (with a yellow connector) cannot be used for any other products of the similar kind.

1.2.1 MEMRECAM RX-6 Camera Head

The front panel of the **MEMRECAM** RX-6 Camera Head is shown in Photo 2. Any C-mount lens available on the market can be used (excluding some specialty lenses). A F-mount adapter (not shown) is also available. There are four screw holes in the front panel for mounting lenses. Use four M3 (8mm depth) screws to attach the optional lens support holder (not shown) directly to the RX-6 camera head.



Photo-2 Camera Head Front , Rear and Bottom Panel

Caution

When not using the **MEMRECAM** RX-6, replace the F-mount cap (cover) and do not leave the mounting holes uncovered. Use caution not to let dust and dirt into to the interior of the camera.

1.2.2 **MEMRECAM** RX-6 DRP Front Panel

The **MEMRECAM** RX-6 DRP front panel is shown in photo 3.



Photo-3 **MEMRECAM** RX-6 DRP Front Panel

1.2.3 **MEMRECAM** RX-6 DRP Side Panel

The **MEMRECAM** RX-6 DRP side panel is shown in photo 4 , photo 5.

There are four screws in the side panel. Use four M4 (5mm depth) screws to attach the optional unit etc. directly to the RX-6 DRP .

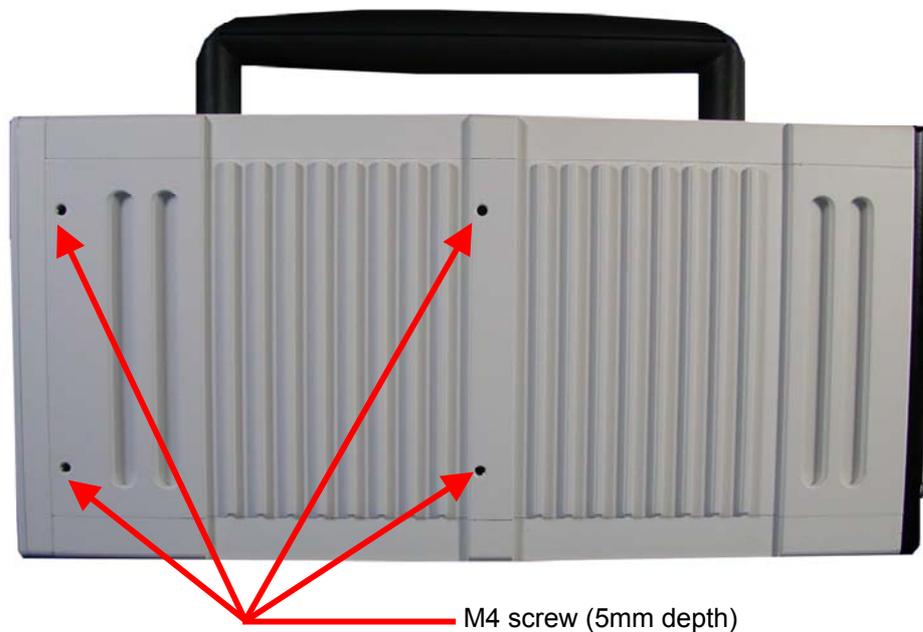


Photo-4 **MEMRECAM** RX-6 DRP Side Panel

When equipped with the MEMORY BACKUP UNIT of an option, an operation part is in this portion.
Refer to MEMORY BACKUP UNIT, section 7.3 for details.

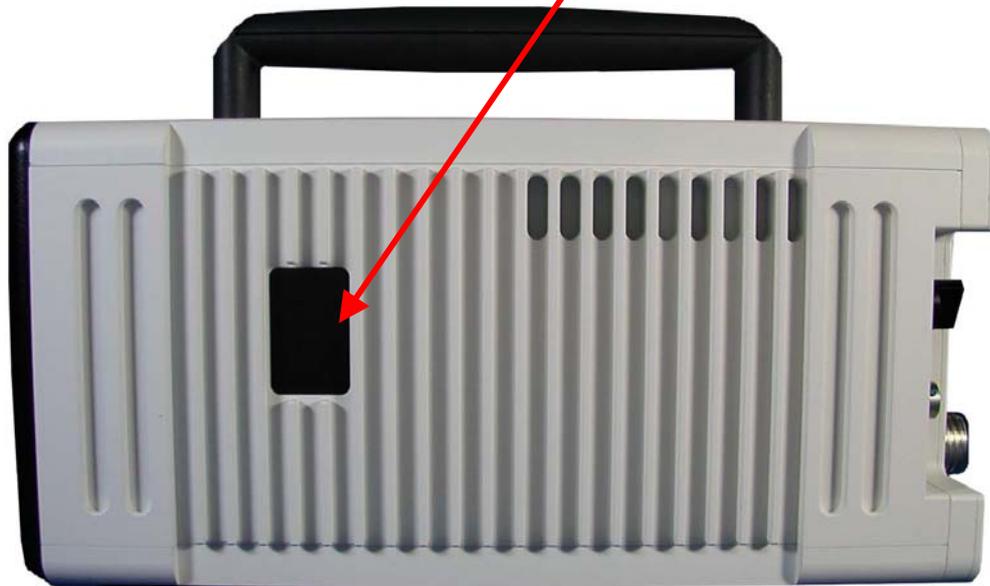


Photo-5 **MEMRECAM** RX-6 DRP Side Panel

1.2.4 **MEMRECAM** RX-6 DRP Rear Panel

The **MEMRECAM** RX-6 DRP rear panel is shown in photo 6. The rear panel includes the Power Panel, Camera Control Touch Pad and the Rear Connector Panel.



Photo-6 **MEMRECAM** RX-6 DRP Rear Panel

- 1** - Power Panel
- 2** - Rear Camera Control Touch Pad
- 3** - Rear Connector Panel

1.2.4(1) Power Panel

The Power Panel is comprised of the power input connector and the power switch. The power switch has three positions as shown below.



Photo-7 Power Panel

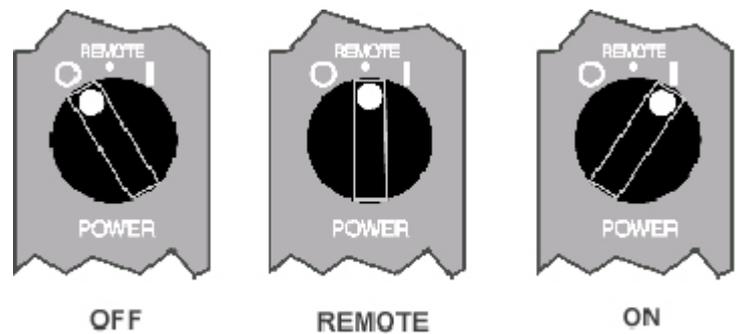


Diagram-1 Power Switch

The power input connector accepts DC voltage of 20~32V. Use the optional AC Power Adapter (DC24V) output. Use the optional battery system when AC power is not available. Contact your retail outlet for power supply options.

1.2.4(2) Rear Camera Control Touch Pad

The Rear Camera Control Touch Pad is located on the top of the **MEMRECAM** RX-6 DRP rear panel.

There are 12 keys and 8 LED as follows:

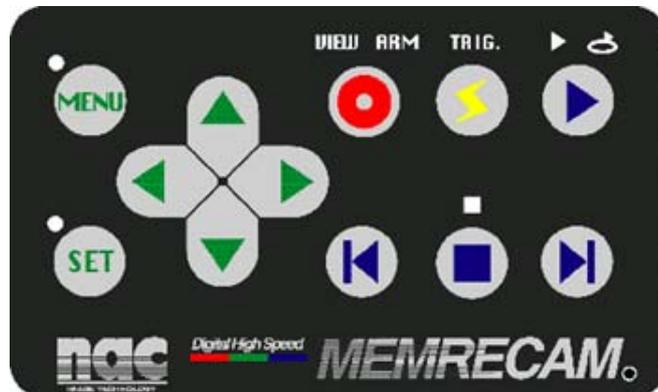


Diagram-2 Camera Control Touch Pad

■ Setup Mode keys



LEFT/RIGHT keys (arrow keys)



UP/DOWN keys (arrow keys)



MENU key



SET key

■ Setup Mode keys

STOP key

PLAY key

REV STEP key

FWD STEP key

VIEW / ARM key



TRIGGER key

■ LED (Near various keys)



MENU LED (Lit during MENU mode)



STOP LED (Lit during **READY** mode)

VIEW ARM

VIEW / ARM LED (Lit during **VIEW** or **ARM** modes)

TRIG.

TRIGGER LED (Lit during recording after trigger signal is received)



PLAY / LOOP LED (Lit during **PLAY** or **LOOP** modes)

■ The following diagrams depict the recording and playback operation of the Rear Camera Control Touch Pad.

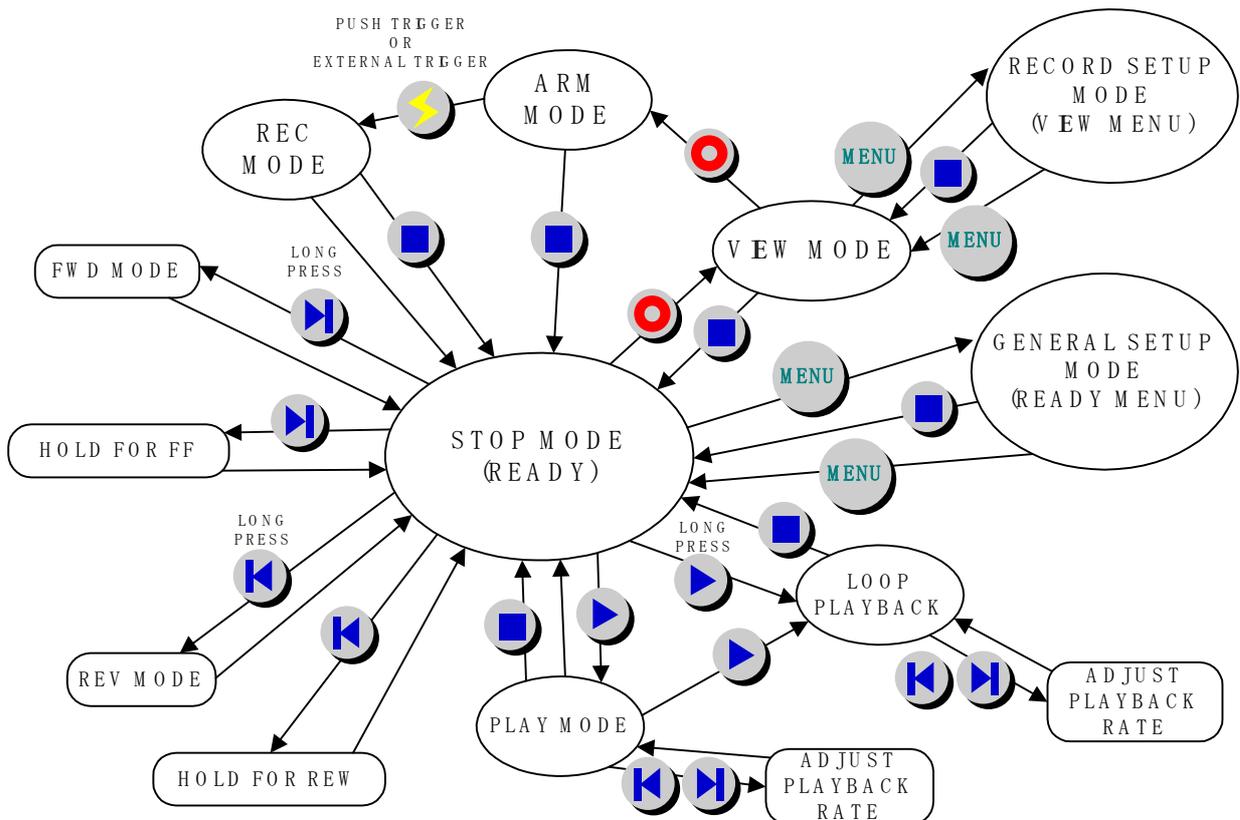


Diagram-3 Camera Control Touch Pad operation (MODE CHANGES)

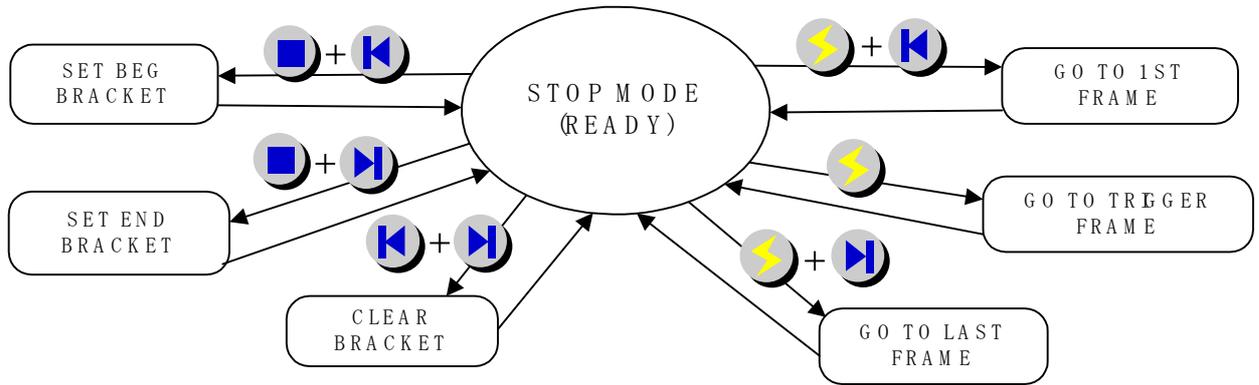


Diagram-4 Camera Control Touch Pad operation
(FRAME JUMP & LOOP PLAYBACK SETUP)

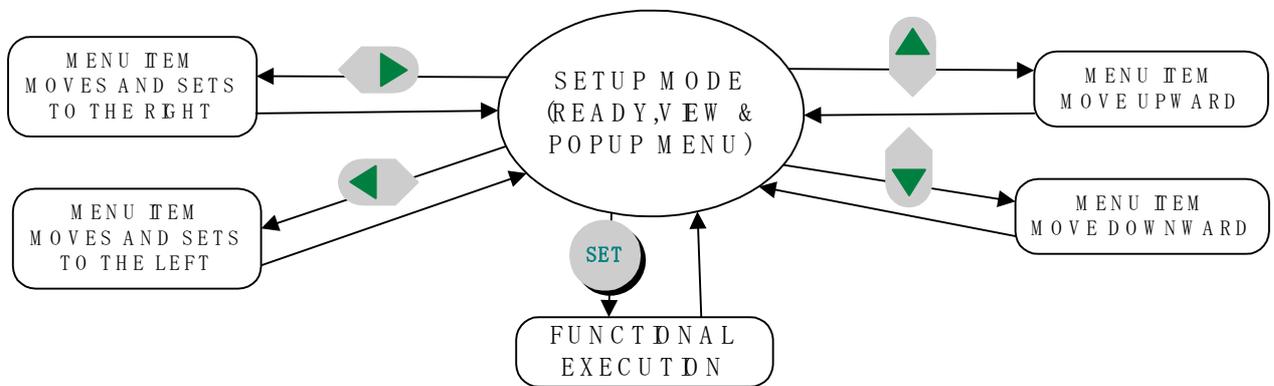


Diagram-5 Camera Control Touch Pad operation (SETUP MODE)

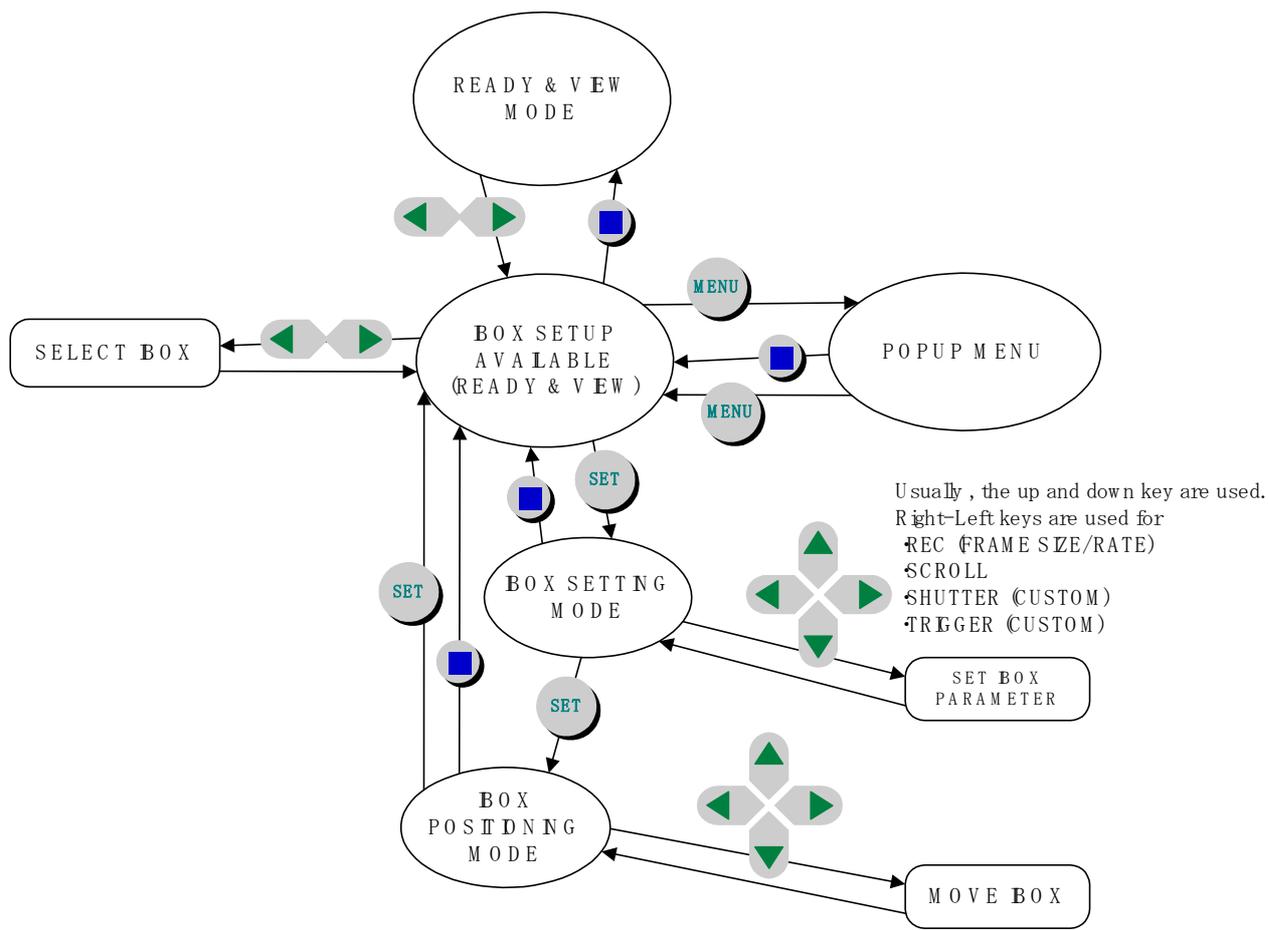


Diagram-6 Camera Control Touch Pad operation (IBOX RELATION)

■ Reset Switch

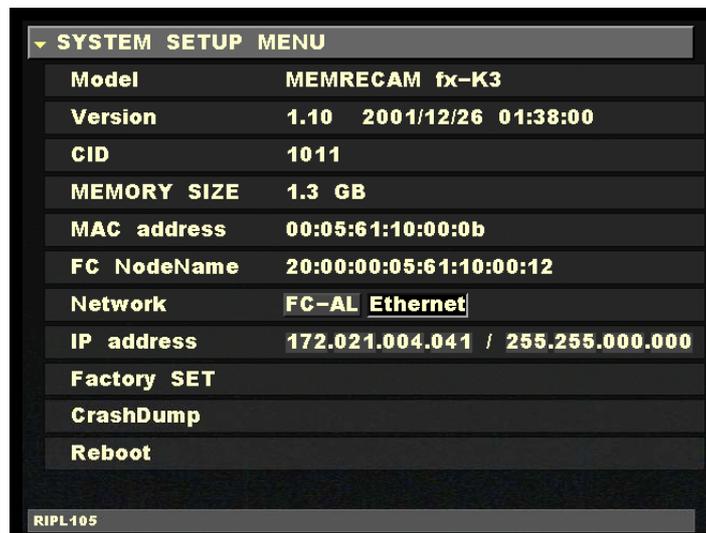
The Reset Switch is inside a small hole at the bottom right hand side of the Rear Camera Control Touch Pad. Gently insert and remove a thin wooden stick into the hole to access the SYSTEM SETUP MENU.



Diagram-7 Rear Camera Control Touch Pad

The **MEMRECAM** fx SYSTEM SETUP MENU displays the current firmware version, serial number, CID and other system settings. The following settings can be modified in this menu.

- IP address** To change the DRP IP address and subnet mask
- Factory SET** To reload original factory settings. Reboot to complete.
- Crash Dump** In the event of a system crash, the error information is stored to CF
- Reboot** Reboot to restart the system. Rebooting from the SYSTEM SETUP MENU prevents images stored in memory from being lost.



SYSTEM SETUP MENU

1.2.4(3) Rear Connector Panel

There are eight types of input/output connectors in the Rear Connector Panel.



D-VGA OUT

Digital VGA output signal
Connects to a D-VGA compatible monitor, optional View Box or optional D-VGA Image Converter.



AUX

Strobe control and RS232C auxiliary port



CONTROL

Connect to the J-PAD2 remote control



100B-T

Ethernet connectivity. Use 100Base-T crossover cable to connect to control PC. When connecting to a 100Base-TX hub (optional) use a straight cable.



FCAL

Fibre Channel connectivity. Use a FCAL cable to connect to control PC or optional FCAL hub.



REMOTE I/O

Use special copper cable for connectivity to optional M-HUB.



TRIG. IN

External Trigger input (voltage or contact closure)

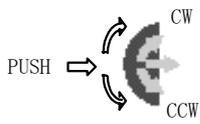
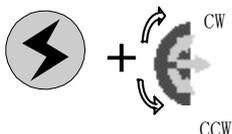
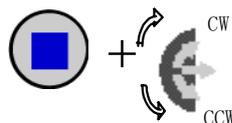
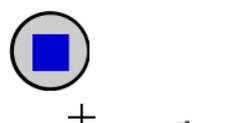
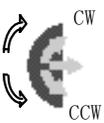
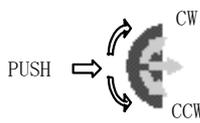


CF

Compact Flash storage media slot

1.3 J-PAD2 Operation

The J-PAD2 remote control connects to the CONTROL port on the **MEMRECAM** fx Rear Connector Panel. There are twelve keys on the J-PAD 2; the same as the Rear Camera Control Touch Pad. The Rear Camera Control Touch Pad and the J-PAD2 cannot be used at the same time. When the J-PAD2 is connected, key operation is done from the remote control pad. When the J-PAD2 is disconnected, the Rear Camera Control Touch Pad keys become effective. The DRP power switch cannot be operated from the J-PAD2.

	During Playback ready mode	CW: Step forward CCW: Reverse Step	
	During Playback ready mode	PUSH+CW: Fast forward PUSH+CCW: Rewind	
	During Playback ready mode	CW: Jump to final frame CCW: Jump to top frame	
	During Playback ready mode	CW: Set final playback frame CCW: Set start playback frame	
	During Playback ready mode	PUSH: Cancel playback range setting	
	During Playback or loop play	CW: Increase playback speed CCW: Decrease playback speed	
	During Setup Mode	CW: Moves and sets right menu item or moves to the top of the menu CCW: Moves and sets left menu item or moves to the bottom of the menu PUSH: Switches top/bottom/left/right, executes function	

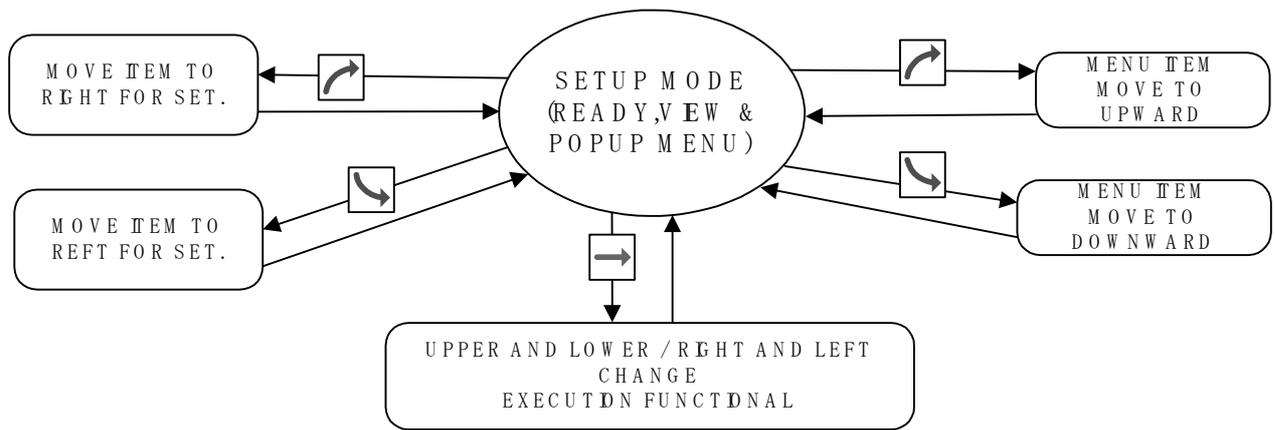


Diagram-10 J-PAD 2 Control Touch Pad operation (SETUP MODE)

1.4 Trigger Connector (External Trigger Input)

The Amphenol MS3116F8-4S four pin circular MIL connector is used to terminate the external trigger signal input cable (refer to External Trigger Input, section 4.2.3 for details). Connect the external signal input cable to the TRIG IN connector in the DRP Rear Connector Panel.



Photo-7 Amphenol MS3116F8-4S circular MIL connector

1.5 AC Power Adapter (Optional)

The optional AC Power Adapter has been designed specifically for **MEMRECAM** fx series cameras. Do not use with other devices. It converts AC 100V~240V input to DC24V output. The DC power cable is terminated with a three pin circular MIL connector which connects to the DRP Power Panel. The AC input uses a standard power cable with a 3P plug.



Photo-8 AC Power Adapter



Warning



This device is dangerous due to the high voltage. Do not open the cover. When connecting to an outlet using a 3P-2P convertible plug, make sure the convertible plug is grounded. If used without it being grounded, electrical shock can be received from the **MEMRECAM** fx metal or other parts.

1.6 fxLink Software CD-ROM

Use the included fxLink software when operating the **MEMRECAM** fx from a control computer. For details on using the fxLink software, refer to the “fxLink Software User’s Manual”.

2

MEMRECAM fx

Basic Operation

2. Basic Operation

This section describes basic connectivity and record/playback operation of the **MEMRECAM** fx.

The **MEMRECAM** fx supports five connection methods between the control computer and the DRP (Digital Recording Processor).

1. CF (Compact Flash) card storage media (Record function only)
2. Ethernet connectivity to a Single **MEMRECAM** fx DRP
3. Fibre Channel connectivity to a single **MEMRECAM** fx DRP
4. Ethernet connectivity to multiple **MEMRECAM** fx DRP's
5. Fibre Channel connectivity to multiple **MEMRECAM** fx DRP's

Note: Ethernet and Fibre Channel connections cannot be used simultaneously.

■ PC hardware requirements to operate fx Link software

PC	IBM PC compatible (DOS/V), single processor
CPU	Pentium III 750 MHz or higher (with MMX) (Recommended Pentium IV 2.5GHz or higher, compression and display processing speed depends on CPU capability)
Memory	256MB RAM or higher (recommended 512MB or higher)
Graphics	Full color, 1024×768 resolution or higher (recommended 1280×1024 or higher)
OS	Windows NT 4.0 Service Pack 5 or higher, Windows 2000 Professional, Windows XP Professional, Internet Explorer 5.0 Service Pack 2 or higher
Hard Disk	Minimum 42MB of disk space for program, 512MB of disk space or higher recommended.
Network	Ethernet (IEEE8023u 100BASE-TX)
CD Drive	1 (for installation)

Compression and display processing speeds depend on CPU capability. There should be sufficient free disk space for data. Depending on the PC configuration and hardware version, fx Link may not operate well under conditions as listed above. (Consult your retail outlet for recommended PC systems).

Note: Refer to the fx Link software Operation Manuals for handling and operation of the control computer.

2.1 MEMRECAM fx System Connectivity and Applications

2.1.1 CF (Compact Flash) card storage media

Connect as shown in Diagram 1 before turning the **MEMRECAM** fx power on. The CF (Compact Flash) card is used after images have been recorded.

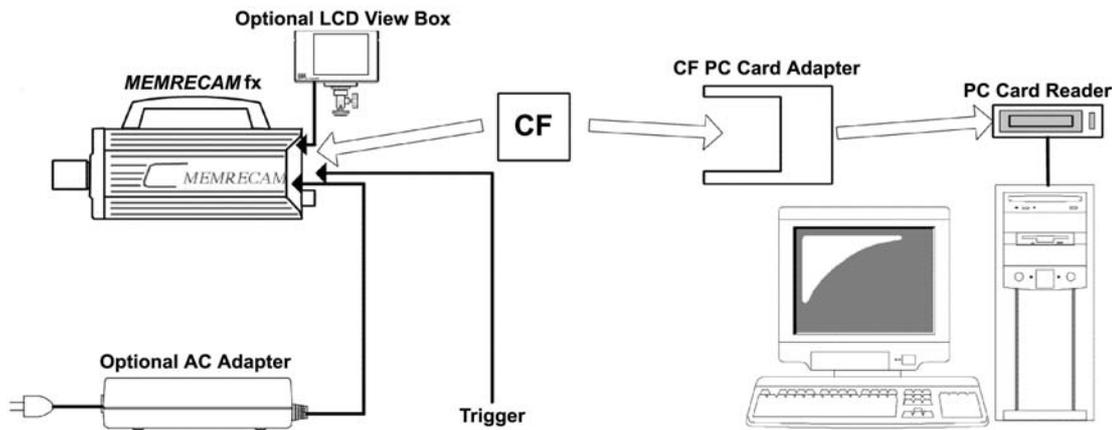


Diagram 1 CF Card application

The **MEMRECAM** fx supports CF (Compact Flash) card or a CF hard disk (micro drive) storage media to save previously photographed images and setup data (record and trigger settings). Depending on your particular control computer, an additional CF PC Card Adapter or PC Card Reader may be required. The **MEMRECAM** fx can be operated using the Rear Camera Control Touch pad or the J-PAD 2 remote control panel (Not shown in Diagram 1).

■ The following optional accessories can be used to display menu settings and image record/playback operation:

- LCD Viewfinder directly connected to **MEMRECAM** fx (standard D-VGA connector)
- LCD View Box directly connected to **MEMRECAM** fx (standard D-VGA connector)
- Use a readily available monitor compatible with NTSC, S Video or analog VGA signals converted from the **MEMRECAM** fx D-VGA signal by an Image Converter. (Not shown in Diagram 1)



Caution

The optional LCD Viewfinder, LCD View Box and the optional Image Converter (Not shown in Diagram 1) must be connected to the **MEMRECAM** fx rear panel D-VGA OUT connector.

2.1.2 Ethernet connectivity to a single **MEMRECAM** fx DRP

Connect as shown in Diagrams 2 and 3 before turning the **MEMRECAM** fx power on. For proper operation ensure that the **MEMRECAM** fx DRP is configured for Ethernet connectivity (Refer to Section 3, System Setup).

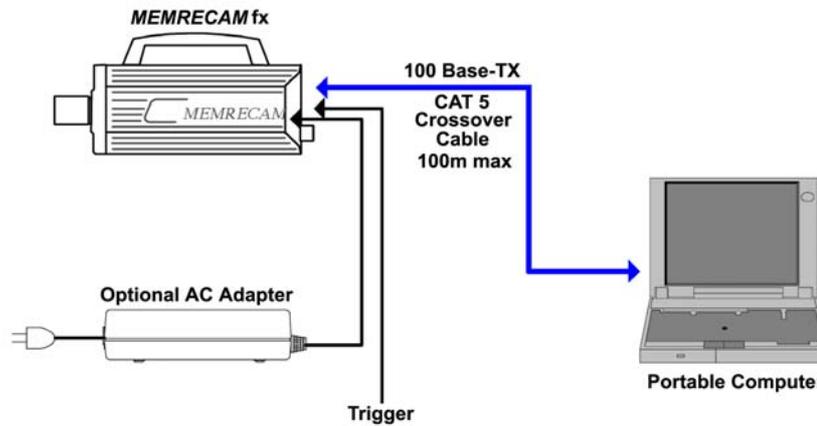


Diagram 2 Direct Ethernet Connectivity to a single **MEMRECAM** fx DRP

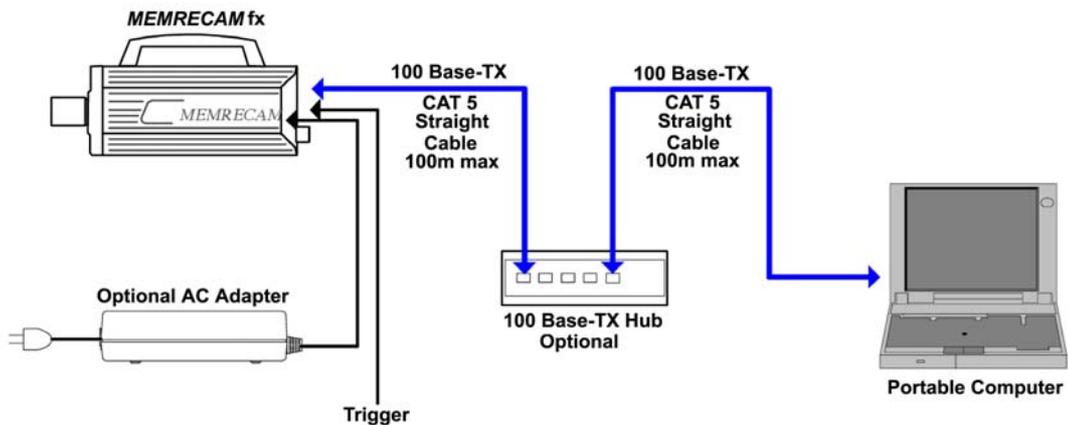


Diagram 3 Ethernet Connectivity via optional Ethernet Hub to a single **MEMRECAM** fx DRP

The **MEMRECAM** fx supports 100 Base-TX connectivity either direct to a control computer or via an optional 100 Base-TX Ethernet Hub. The control computer must have either Smart Capture or fx Link software installed to operate the DRP remotely. For direct connectivity a CAT 5 crossover cable is necessary. When the optional Ethernet Hub is used, straight CAT 5 cables are required. While connected to the control computer, the **MEMRECAM** fx can also be operated using the Rear Camera Control Touch Pad or the J-PAD 2 remote control panel (not shown).

2.1.3 Fibre Channel connectivity to a single **MEMRECAM** fx DRP

Connect as shown in Diagrams 4, 5 and 6 before turning the **MEMRECAM** fx power on. For proper operation ensure that the **MEMRECAM** fx DRP is configured for Fibre Channel connectivity (Refer to Section 3, System Setup).

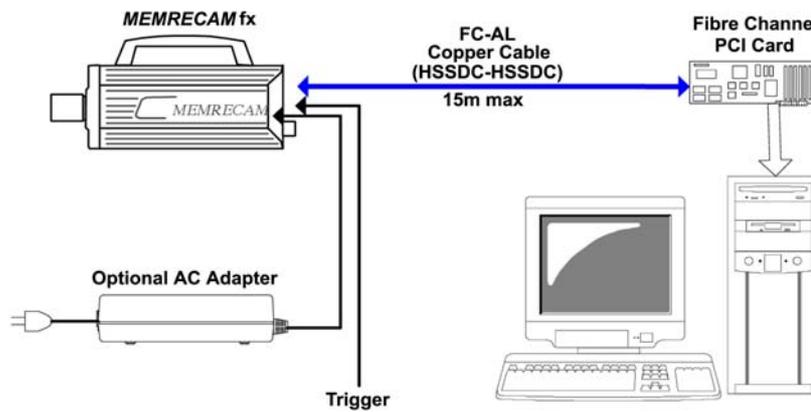


Diagram 4 Direct Fibre Channel Connectivity to a Single **MEMRECAM** fx DRP (Copper)

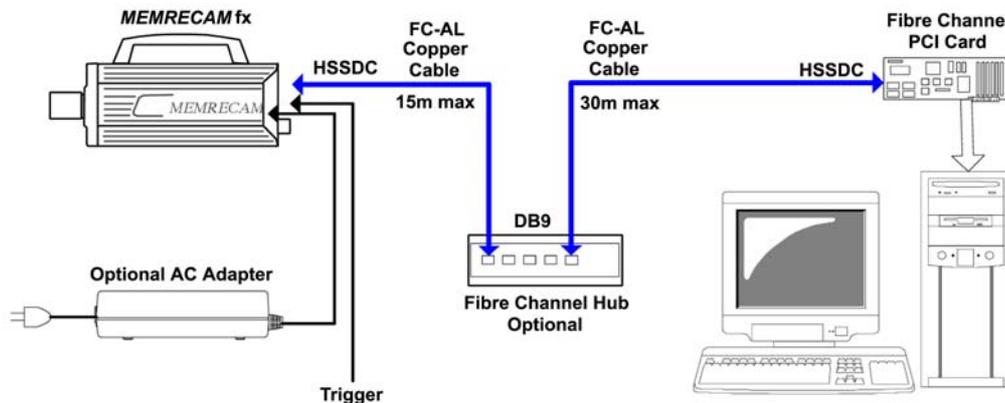


Diagram 5 Fibre Channel Connectivity via optional Fibre Channel Hub to a single **MEMRECAM** fx DRP (Copper)

The **MEMRECAM** fx supports Fibre Channel connectivity either direct to a control computer or via an optional Fibre Channel Hub. The control computer must have either Smart Capture or fx Link software installed to operate the DRP remotely. For direct connectivity use a FC-AL cable with HSSDC Connectors at both ends. The maximum cable length for a direct copper connection is 15m. When the optional Fibre Channel Hub is used, FC-AL cables with DB9 and HSSDC connectors at opposite ends are required. The combined maximum distance is 45m. While connected to the control computer, the **MEMRECAM** fx can also be operated using the Rear Camera Control Touch Pad or the J-PAD 2 remote control panel (not shown).

The optional Media Interface Adapter (MIA) system can be used where distances are greater than 45m (using FC Hub).

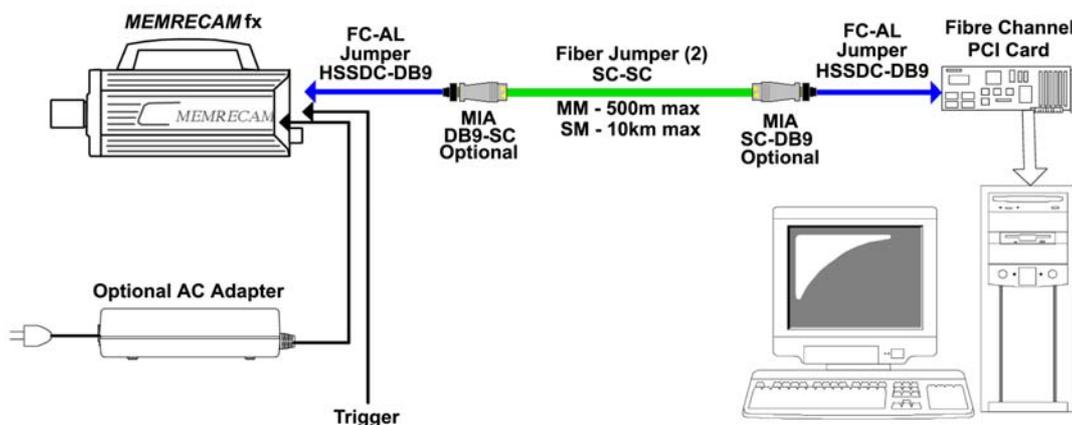


Diagram 6 Direct Fibre Channel Connectivity to a Single **MEMRECAM** fx DRP (Fiber Optic)

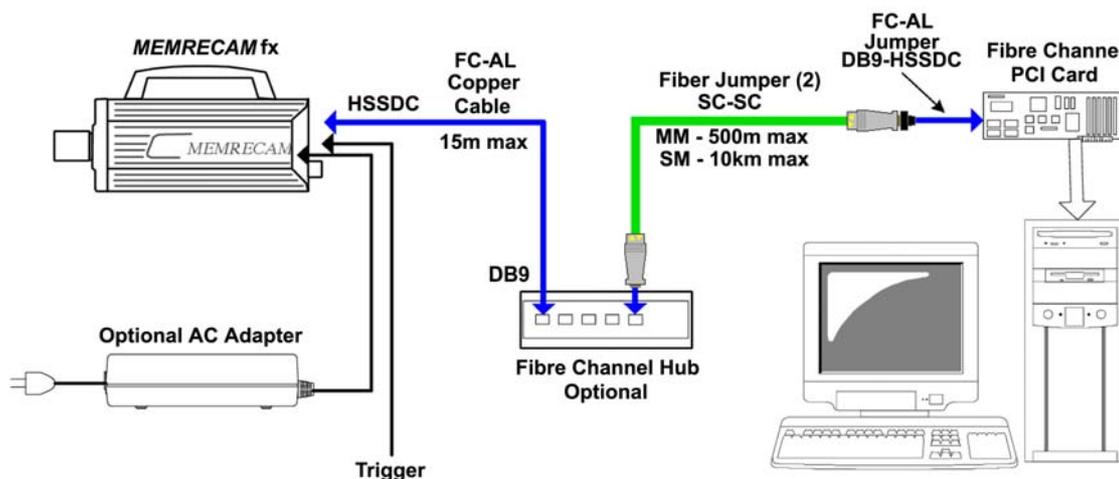


Diagram 7 Fibre Channel Connectivity via optional Fibre Channel Hub to a single **MEMRECAM** fx DRP (Fiber Optic)

The MIA system can transmit data using either Single Mode (SM) or Multi Mode (MM) fiber with SC connectors. The MIA lasers are fiber type specific. Please specify either SM or MM when ordering. The maximum jumper length using MM fiber is 500m. When using SM fiber the maximum jumper length increases to 10km. The MIA's are connected to the control computer and the FC-AL Hub using short jumpers with HSSDC and DB9 connectors at opposite ends. When the optional Fibre Channel Hub is used, the MIA connects directly to the FC-AL Hub DB9 connector. While connected to the control computer, the **MEMRECAM** fx can also be operated using the Rear Camera Control Touch pad or the J-PAD 2 remote control panel (not shown).

2.1.4 Ethernet connectivity to multiple **MEMRECAM** fx DRP's

Connect as shown in Diagram 8 before turning the **MEMRECAM** fx power on. For proper operation ensure that the **MEMRECAM** fx DRP is configured for Ethernet connectivity (Refer to Section 3, System Setup).

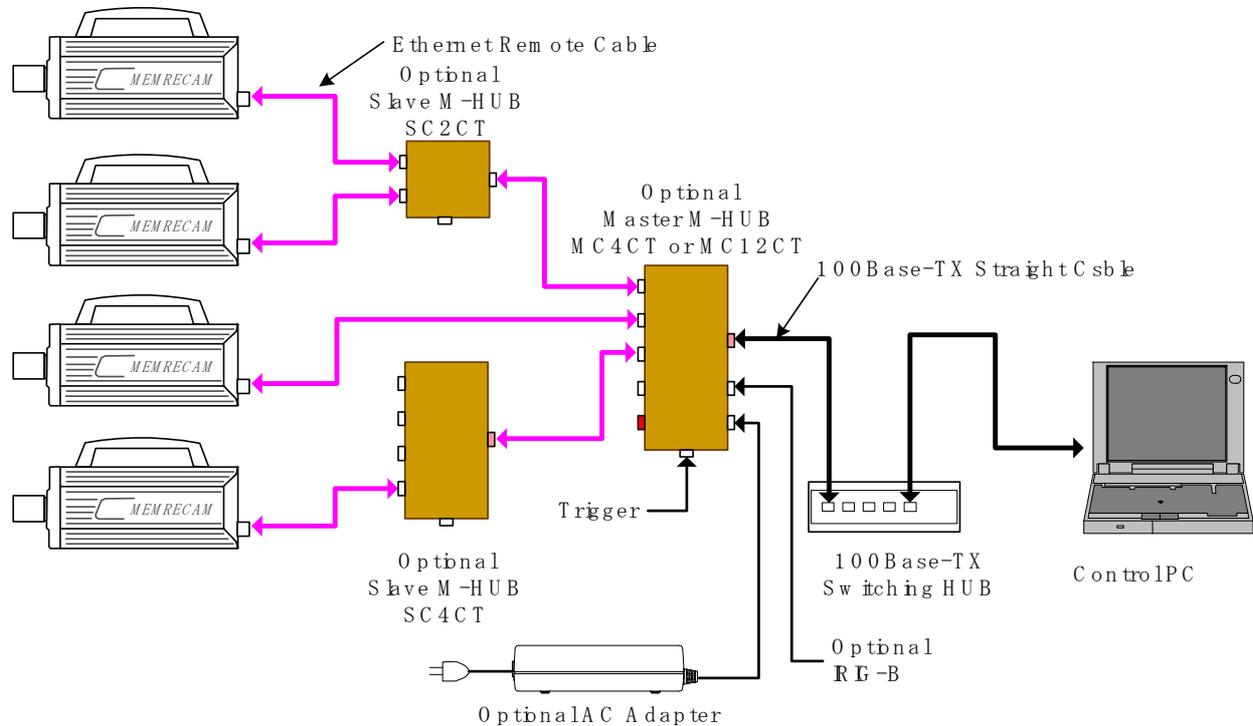


Diagram 8 Ethernet connectivity to four **MEMRECAM** fx DRP (AC Adapters for DRP's not shown)

Multiple **MEMRECAM** fx DRP's can be connected using the optional M-HUB system. The maximum number of DRP's that can be connected using the M-Hub system is 48. The M-HUB system features timing synchronization. The Master M-HUB internal clock sends a timing signal to all connected DRP's to lock on during image capture. Each DRP can be set to different recording speeds and still maintain synchronized image capture. When an external timing signal (e.g. IRIG B) is used, it takes precedence over the Master M-HUB internal clock.

Special copper Remote Cables (100m max) connect the Master M-HUB (up to 12 ports) directly to the **MEMRECAM** fx DRP's or to Slave M-HUB (up to 4 ports). If the Slave M-HUB is used, additional Remote Cables connect to the **MEMRECAM** fx DRP's. In the configuration shown the control computer has a single 100 Base-TX Ethernet connection to the Master M-HUB. The maximum cable length for a direct 100 Base-TX Ethernet copper connection to the control computer is 100m. For direct connectivity a CAT 5 crossover cable is necessary. When the optional Ethernet Hub (not shown) is used, straight CAT 5 cables are required. The control computer must have either Smart Capture or fx Link software installed to operate the DRP's remotely.

While connected to the control computer, the **MEMRECAM** fx can also be operated using the Rear Camera Control Touch Pad or the J-PAD 2 remote control panel (not shown).

2.1.5 Fibre Channel connectivity to multiple **MEMRECAM** fx DRP

Connect as shown in Diagrams 9 and 10 before turning the **MEMRECAM** fx power on. For proper operation ensure that the **MEMRECAM** fx DRP is configured for Fibre Channel connectivity (Refer to Section 3, System Setup).

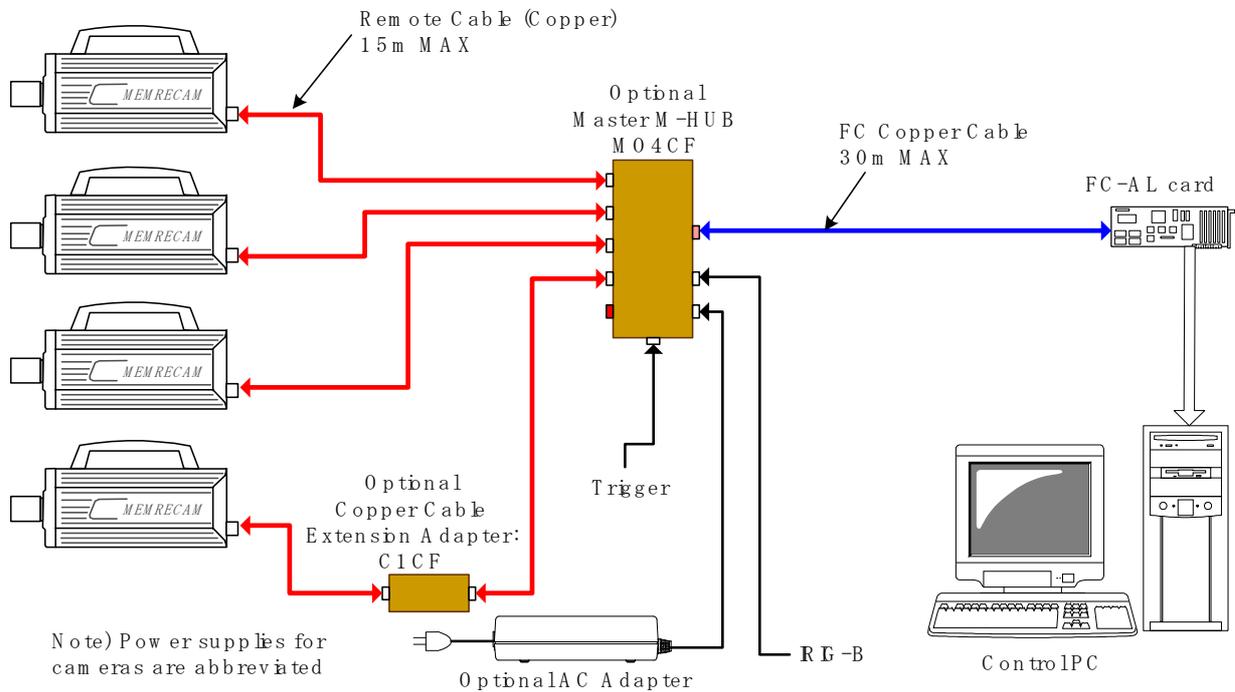


Diagram 9 Fibre Channel connectivity to four **MEMRECAM** fx DRP (AC Adapters for DRP's not shown)

Multiple **MEMRECAM** fx DRP's can be connected using the optional M-HUB system. The maximum number of DRP's that can be connected using the M-Hub system is 48. The M-HUB system features timing synchronization. The Master M-HUB internal clock sends a timing signal to all connected DRP's to lock on during image capture. Each DRP can be set to different recording speeds and still maintain synchronized image capture. When an external timing signal (e.g. IRIG B) is used, it takes precedence over the Master M-HUB internal clock.

Special copper Remote Cables (15m max) connect the Master M-HUB (up to 12 ports) directly to the **MEMRECAM** fx DRP's. If longer distance is needed, the optional Junction Box can be used to boost the signal. Using the Junction Box, the combined maximum distance is 30m. In the configuration shown the control computer has a single Fibre Channel connection to the Master M-HUB. The maximum cable length for a direct Fibre Channel copper connection to the control computer is 30m. When the optional Fibre Channel Hub (not shown) is used, FC-AL cables with DB9 and HSSDC connectors at opposite ends are required. With the optional Fibre Channel hub the combined maximum distance increases to 45m. The control computer must have either Smart Capture or fx Link software installed to operate the DRP's remotely.

While connected to the control computer, the **MEMRECAM** fx can also be operated using the Rear Camera Control Touch Pad or the J-PAD 2 remote control panel (not shown).

The optical Master and Slave M-HUB system can be used for distances greater than 30m between the Master M-HUB and the **MEMRECAM** fx DRP.

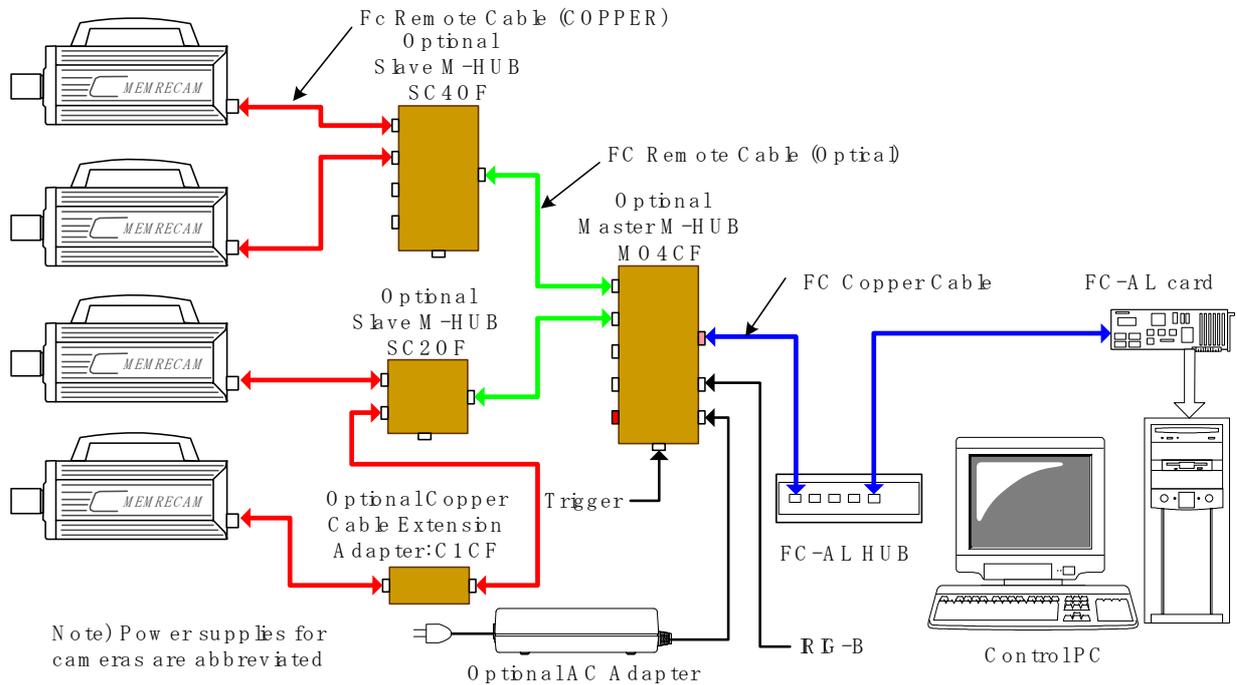


Diagram 10 Fibre Channel connectivity to multiple **MEMRECAM** fx DRP (AC Adapters for DRP's not shown)

The optical version of the Master M-HUB system transmits data using special optical cables to a maximum of 300m. The **MEMRECAM** fx DRP's can only connect to the special copper cables. When using the optical Master M-HUB, the optional Slave M-HUB is also needed to convert the signal from optical to copper. While connected to the control computer, the **MEMRECAM** fx can also be operated using the Rear Camera Control Touch pad or the J-PAD 2 remote control panel (not shown).

2.2 Basic **MEMRECAM** fx Operation

2.2.1 Power

As shown in Diagram 11, connect the AC adapter, J-PAD2 remote control and the optional LCD Viewfinder (or optional Image Converter with compatible monitor) to the **MEMRECAM** fx DRP and turn the power switch to the **ON** position.



Diagram 11

During the **MEMRECAM** fx startup sequence a long beeping sound will be heard as the auto diagnostics are conducted. The startup sequence will be completed in approximately 30 seconds and the Startup Screen 1 will appear in the center of the LCD View Box screen.



Startup Screen 1

■ **READY** Mode

Next, the Startup screen 2 will appear in the LCD Viewfinder screen. The **MEMRECAM** fx displays a test image and the IBOX will appear in **READY** mode. The IBOX operation will be described later. It displays the current **MEMRECAM** fx record/playback settings. These settings can also be changed with using the IBOX.



Startup Screen 2 (**READY** mode)

The IBOX **READY Status** appears indicating that the **MEMRECAM** fx is in **READY** mode. In addition, the Rear Camera Control Touch Pad and the J-PAD2 remote control **STOP** LED (green) is lit.

- The IBOX Status box displays the current DRP mode as follows,

READY Status	READY Status – DRP in READY mode
VIEW Status	VIEW Status – DRP in VIEW mode
ARM Status	ARM Status – DRP in ARM mode
REC Status	REC Status – DRP in RECORD mode
PLAY Status	PLAY Status – DRP in PLAY mode
LOOP Status	LOOP Status – DRP in LOOP PLAY mode

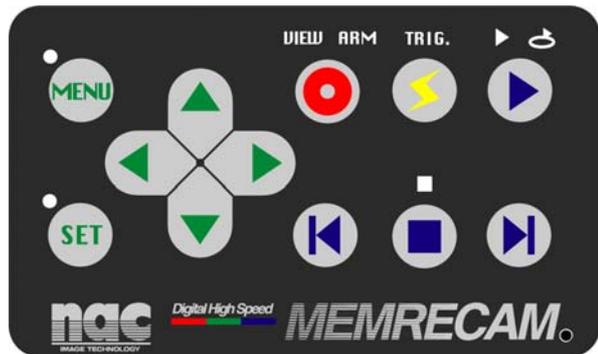
2.2.2 Initial Recording

Operation of the **MEMRECAM** fx DRP is done using the Rear Camera Control Touch Pad or the J-PAD2 remote control keys. The Rear Camera Control Touch Pad and the J-PAD2 cannot be used at the same time. When the J-PAD2 is connected, key operation is done from the remote control pad. When the J-PAD2 is disconnected, the Rear Camera Control Touch Pad keys become effective. Refer to the Smart Capture/fx Link software Operation Manuals for operation with a control computer.

For key movement descriptions refer to 1.2.3(1) Operation Panel.



J-PAD2 (operation panel)



MEMRECAM fx rear panel (operation panel)

- The following keys are used to operate the record and playback functions of the **MEMRECAM** fx,

VIEW/ARM key



TRIGGER key



PLAY key



STOP key



REV STEP key



FWD STEP key

■ **VIEW** Mode

To enter the **VIEW** mode, the **MEMRECAM** fx DRP must be in **READY** mode. Press the **VIEW/ARM** key once to enter the **VIEW** mode. A confirmation beep will sound. The Rear Camera Control Touch Pad and the J-PAD2 remote control **VIEW** LED (continuous blue) will light. After approximately three seconds, the IBOX **Status** display will change from **READY** to **VIEW**.



VIEW mode display

While in **VIEW** mode, a live image is displayed in the LCD View Box. At this time adjustments to the **MEMRECAM** fx camera location, lens adjustments (focus, aperture, zoom) and record settings can be performed.

The **MEMRECAM** fx DRP stores the record settings from the previous session. When operating the **MEMRECAM** fx for the first time the IBOX displays the original factory settings as follows.



Trigger: CENTER



Shutter (speed): OPEN

Rec (recording speed): 1000



Frame size: 512 vertical mode (512x512)*

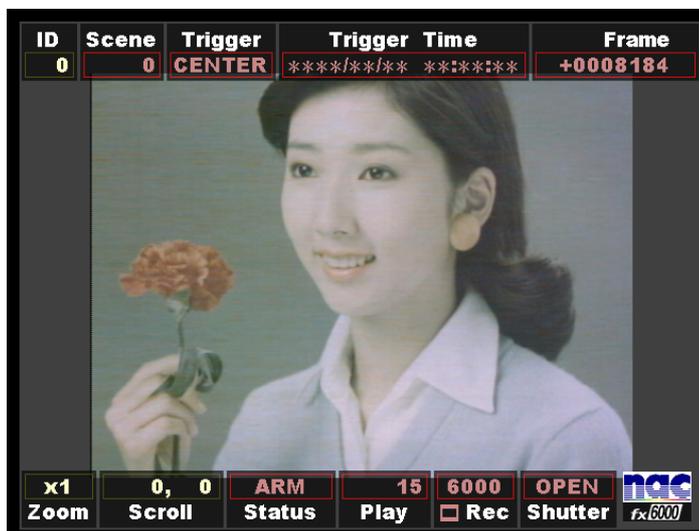


Frame size: 384 vertical mode (512x384)

* Frame size is shown by the small square before **Rec**

■ **ARM** Mode

From the **VIEW** mode press the **VIEW/ARM** key once to enter the **ARM** mode. A confirmation beep will sound. The Rear Camera Control Touch Pad and the J-PAD2 remote control **ARM** LED changes from continuous blue to flashing red. After approximately three seconds, the IBOX **Status** display will change from **VIEW** to **ARM**.



ARM mode display

Once in **ARM** mode, the buffer begins to be updated by input from the camera. The percentage of memory used as a buffer is determined by the Trigger setting (e.g. **CENTER Trigger** equals 50% memory buffer). Any previous recording stored in memory is immediately deleted and replaced by the new recording. Simultaneously the live image continues to be displayed in the LCD View Box. At this time the **MEMRECAM** fx awaits a trigger signal input. The IBOX **Frame** (frame counter) box shows the value of remaining frames (recordable frames) available for recording after the trigger signal is received.



■ Trigger input and completion of recording

From the **ARM** mode press the **TRIGGER** key once. A confirmation beep will sound and recording will begin. The Rear Camera Control Touch Pad and the J-PAD2 remote control **ARM** LED stops flashing and the **TRIG** LED (yellow) will remain lit while recording. Simultaneously, the IBOX **Status** display changes from **ARM** to **REC** and the **Frame** (frame counter) box begins to count the recorded frames.

The IBOX **Status** display changes from **REC** to **READY** and the **Frame** box stops counting when recording is complete. A long beep will sound and the LCD View Box will display the image captured when the trigger input was received. The Rear Camera Control Touch Pad and the J-PAD2 remote control **STOP** LED (green) is lit. The image is now ready for playback (as a default, the image will begin to play from the trigger frame).

2.2.3 Playback of Recorded Images

■ **PLAY** Mode

When recording is complete, the **MEMRECAM** fx returns to **READY** mode and the image is ready for playback (as a default, the image will begin to play from the trigger frame). Press the **PLAY** key once to enter the **PLAY** mode. A confirmation beep will sound and playback will begin. The Rear Camera Control Touch Pad and the J-PAD2 remote control **STOP** LED (green) turns off and the **PLAY** LED (green) is lit. The IBOX **Status** display changes from **READY** to **PLAY**. When final frame is reached, playback will stop and the **MEMRECAM** fx returns to **READY** mode.

■ **LOOP PLAY** Mode

The **LOOP PLAY** mode plays the image in a continuous loop. While in **PLAY** mode press the **PLAY** key once again to enter **LOOP PLAY** mode (If the **PLAY** key is held down while in **READY** mode, it will automatically enter **LOOP PLAY** mode.) A confirmation beep will sound and loop playback will begin. The Rear Camera Control Touch Pad and the J-PAD2 remote control **PLAY** LED (green) turns off and the **LOOP PLAY** LED (green) is lit. The IBOX **Status** display changes from **PLAY** to **LOOP**. To stop loop playback press the **STOP** key and the **MEMRECAM** fx returns to **READY** mode.

■ Navigation of Recorded Image

Step Back to Previous Frame

In **READY** mode, press the **REV STEP** key.

Step Forward to Next Frame

In **READY** mode, press the **FWD STEP** key.

Fast Scroll Back

In **READY** mode, hold down the **REV STEP** key.

Fast Scroll Forward

In **READY** mode, hold down the **FWD STEP** key.

Jump to Trigger Frame

In **READY** mode, press the **TRIGGER** key.

Jump to Top Frame

In **READY** mode, while pressing the **TRIGGER** key, then press the **REV STEP** key.

Jump to Final Frame

In **READY** mode, while pressing the **TRIGGER** key, then press the **FWD STEP** key.

Decrease Playback Speed

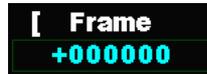
In **PLAY** mode, press the **REV STEP** key.

Increase Playback Speed

In **PLAY** mode, press the **FWD STEP** key.

■ Setting Playback Range

To save time during playback and disk space when storing images, set the playback range to select only the area of interest. In **READY** mode, navigate to the first frame of the desired playback range. While holding down the **STOP** key, press the **REV STEP** key. A bracket [will appear on the left side of the IBOX **Frame** box.



Then navigate to the last frame of the desired playback range. Hold down the **STOP** key, press the **FWD STEP** key. A bracket] will appear on the right side of the IBOX **Frame** box. The area of interest is now selected and is represented by the bracketed frame box [Frame] .



■ Cancellation of Playback Range Set

While in **READY** mode, press the **REV STEP** key and **FWD STEP** key simultaneously. The brackets will disappear from the IBOX **Frame** box.



2.2.4 Turning Power Off

While in **READY** mode, turn the **MEMRECAM** fx POWER switch to the OFF position (if not in **READY** mode press the **STOP** key). The current record/playback settings are saved for the next session.



Caution

When using a control computer with Smart Capture or fx Link software, close the programs first before turning the DRP power off. System errors in the control computer may occur when the connection is severed by the power loss.



Caution

Turning the power off deletes any image data recorded in RAM. If necessary, download image data to Compact Flash or control computer before turning power off. The optional Memory Backup Module can protect images from being deleted because of accidental power loss. Contact your retail outlet to inquire about the Memory Backup Module option.

3

MEMRECAM fx

Setup

3. MEMRECAM fx Setup

Before beginning to setup the **MEMRECAM** fx DRP record and playback options, ensure that the AC adapter, the J-PAD2 remote control and the optional LCD View Box, LCD Viewfinder or Image Converter (with compatible monitor) are connected to the **MEMRECAM** fx DRP. The power switch should be in the ON position, after a few seconds the Startup Screen 2 appears and the IBOX **Status** box indicates that the DRP is in **READY** mode (Refer to Section 2.2.1, Basic **MEMRECAM** fx Operation, Power).

3.1 IBOX (Information Box) and Screen Display

The IBOX is represented by the two menu bars above and below the image. The top bar contains the **ID**, **Scene**, **Trigger**, **Trigger Time** and **Frame** boxes. The bottom bar contains the **Zoom**, **Scroll**, **Status**, **Play**, **Rec**, **Shutter** and **Logo Graphic** boxes. The IBOX displays the current setting of the most common record and playback functions. After a recording these settings are stamped to the raw image file for future reference.



Startup Screen 2 (**READY** mode)

After initial startup of the **MEMRECAM** fx, the IBOX will display four asterisks (********) in boxes where record settings have not been entered (e.g. **Scene**, **Trigger**, **Frame**, **Rec** and **Shutter**). During the setup operation, these asterisks will be replaced by the record setting values.

The **MEMRECAM** fx setup settings can be done using the Rear Camera Control Touch Pad or the J-PAD2 remote control keys. The Rear Camera Control Touch Pad and the J-PAD2 cannot be used at the same time. When the J-PAD2 is connected, key operation is done from the J-PAD2. When the J-PAD2 is disconnected, the Rear Camera Control Touch Pad keys become effective.

3.1.1 IBOX and Popup Menu

The **MEMRECAM** fx record and playback settings can be changed using the IBOX main display or the Popup Menu. The color of the IBOX display boxes changes depending on the DRP mode.

- The following keys are used to navigate and change the **MEMRECAM** fx IBOX settings,



LEFT/RIGHT keys (arrow keys)

UP/DOWN keys (arrow keys)



MENU key



SET key

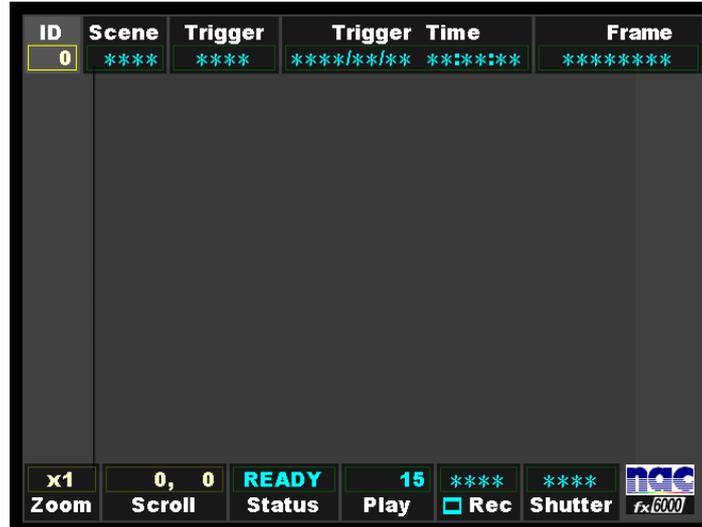
The IBOX display boxes are accessed by using the **LEFT/RIGHT** keys while in **READY** or **VIEW** modes. Once the particular box is selected, use either of the following methods to change the settings,

- 1) Press the **MENU** key and the Popup Menu appears. Use the **UP/DOWN** keys to select the item to be modified. Press the **SET** key to access the item to be modified. The **UP/DOWN** and **LEFT/RIGHT** keys are used to change the settings. Press the **SET** key to lock the value and return to the Popup Menu. Once finished making changes press the **MENU** key to exit back to the IBOX main display.
- 2) Press the **SET** key to modify the settings within the selected IBOX display box. Use the **UP/DOWN** keys to make the settings change. Once finished making changes press the **SET** key twice (when pressing it once, a white border surrounds the box allowing for it to be repositioned on the screen using the arrow keys) to exit back to the IBOX main display.

■ **ID** box

In the **ID** box, the **MEMRECAM** fx identification number can be set. It can be any number between 0 and 127. This identification number setting allows the user to easily identify the source DRP after the images are recorded.

To set the identification number select the **ID** box using the **LEFT/RIGHT** keys while in **READY** or **VIEW** modes.



IBOX display screen

- 1) To access the **ID** box Popup Menu press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the **ID** row and press the **SET** key to enable editing. Using the **UP/DOWN** keys enter any unique number between 0 and 128. Press the **SET** key to lock the value and return to the Popup Menu. Once finished making changes press the **MENU** key to exit back to the IBOX main display. The **ID** box now reflects the new value. The **ID** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.



ID box Popup Menu

2) To modify the settings from within the **ID** box press the **SET** key. Use the **UP/DOWN** keys to enter any unique number between 0 and 128.



Once finished making changes press the **SET** key twice (when pressing it once, a white border surrounds the box [as shown below] allowing for it to be repositioned on the screen using the arrow keys) to lock the value and return to the IBOX main display. Display options can only be set using the Popup Menu.



■ **Scene** box

The **Scene** box displays the current scene number. It can be any number between 0 and 65535 and automatically increments on each recording. The scene number can be set to begin counting at any particular number or reset to zero.

To set the scene numbers select the **Scene** box using the **LEFT/RIGHT** keys while in **VIEW** mode.



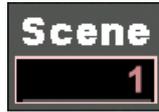
IBOX display screen

- 1) To access the **Scene** box Popup Menu press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the **SCENE No.** row and press the **SET** key to enable editing. Using the **UP/DOWN** keys enter any unique number between 0 and 65535 (by holding down the **UP/DOWN** keys the number changes by increments of 10). Press the **SET** key to lock the value and return to the Popup Menu. Once finished making changes press the **MENU** key to exit back to the IBOX main display. The **Scene** box now reflects the new value. The **Scene** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.



Scene box Popup Menu

- 2) To modify the settings from within the **Scene** box press the **SET** key. Use the **UP/DOWN** keys to enter any unique number between 0 and 65535.



Once finished making changes press the **SET** key twice (when pressing it once, a white border surrounds the box [as shown below] allowing for it to be repositioned on the screen using the arrow keys) to lock the value and return to the IBOX main display. Display options can only be set using the Popup Menu.



■ **Trigger** box

The **Trigger** box displays the current trigger setting. The percentage of memory used as a buffer during recording is determined by the trigger setting. There are five trigger settings,

- START** The trigger point is about 5% after the top of memory
 - CENTER** The trigger point is at the center of the memory. (Factory default setting)
 - END** The trigger point is about 5% before the end of memory
 - BURST** No Memory Buffer. (Records only when trigger signal is present)
 - CUSTOM (%)** Any percentage of the Memory may be set as Buffer Ring and Delay Start.
- 100% DELAY Start**
 - 0% START Trigger**
 - +50% CENTER Trigger**
 - +100% END Trigger**

To modify the trigger settings select the **Trigger** box using the **LEFT/RIGHT** keys while in **VIEW** mode.



IBOX display screen

- 1) To access the **Trigger** box Popup Menu press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the **TRIGGER** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired trigger setting. Press the **SET** key to lock the value and return to the Popup Menu. Once finished making changes press the **MENU** key to exit back to the IBOX main display. The **Trigger** box now reflects the new value. The **Trigger** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.



Trigger box Popup Menu

- 2) To modify the settings from within the **Trigger** box press the **SET** key. Use the **UP/DOWN** keys to select the desired trigger setting.



Once finished making changes press the **SET** key twice (when pressing it once, a white border surrounds the box [as shown below] allowing for it to be repositioned on the screen using the arrow keys) to lock the value and return to the IBOX main display. Display options can only be set using the Popup Menu.



Note: When selecting the **CUSTOM** trigger setting use the **LEFT/RIGHT** keys to change the percentage value (by holding down the **LEFT/RIGHT** keys the percentage changes at increasing speed). Once finished making changes press the **SET** key twice to lock the value and return to the IBOX main display.



TRIGGERING ; Refer section 4.1.2 for details.

■ **Zoom** box

The **Zoom** box displays the current magnification setting (**x1**, **x2**, and **x4**).

To modify the magnification settings select the **Zoom** box using the **LEFT/RIGHT** keys while in **READY** or **VIEW** modes.



IBOX display screen

- 1) To access the **Zoom** box Popup Menu press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the **ZOOM** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired zoom setting. Press the **SET** key to lock the value and return to the Popup Menu. Once finished making changes press the **MENU** key to exit back to the IBOX main display. The **Zoom** box now reflects the new value. The **Zoom** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.



Zoom box Popup Menu

2) To modify the settings from within the **Zoom** box press the **SET** key. Use the **UP/DOWN** keys to select the desired magnification value. Once finished making changes press the **SET** key twice (when pressing it once, a white border surrounds the box allowing for it to be repositioned on the screen using the arrow keys) to lock the value and return to the IBOX main display. The **Zoom** box display options can only be set using the Popup Menu.

x1
Zoom



x2
Zoom



x4
Zoom



■ **Scroll** box

The **Scroll** box displays the horizontal and vertical position of the magnified section of the image shown while using **Zoom**. The X and Y coordinate originate from the upper left hand corner of the display. By changing the coordinates in the Scroll box the user can navigate around the image.

To modify the coordinate settings select the **Scroll** box using the **LEFT/RIGHT** keys while in **READY** or **VIEW** modes.



IBOX display screen

- 1) To access the **Scroll** box Popup Menu press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the **Scroll** row and press the **SET** key to enable editing of the Y (horizontal) coordinate. Use the **LEFT/RIGHT** to select the digit to be modified and the **UP/DOWN** keys to change its value. Press the **SET** key once to select the X (vertical) coordinate. Again use the **LEFT/RIGHT** to select the digit to be modified and the **UP/DOWN** keys to change its value. Press the **SET** key again to lock the value and return to the Popup Menu. Once finished making changes press the **MENU** key to exit back to the IBOX main display. The **Scroll** box now reflects the new coordinates and the image display changes to this new location. The **Scroll** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.



Scroll box Popup Menu

- 2) To navigate the image from within the **Scroll** box press the **SET** key. Use the **UP/DOWN** and **LEFT/RIGHT** keys to navigate around the image (by holding down arrow keys the coordinates change at increasing speed). Once finished making changes press the **SET** key twice (when pressing it once, a white border surrounds the box allowing for it to be repositioned on the screen using the arrow keys) to lock the value and return to the IBOX main display. Display options can only be set using the Popup Menu.

Use the **LEFT/RIGHT** keys to change the X (vertical) coordinate.



Use the **UP/DOWN** keys to change the Y (horizontal) coordinate.



■ Play box

The **Play** box displays the current playback speed in frames per second. The image playback can be forward or reverse.

Forward playback increments in frames per second,

1.0, 1.8, 3.7, 7.5, 15, 30, 60, 120, 240, 480, 960, 1920

Reverse playback increments in frames per second,

-1920, -960, -480, -240, -120, -60, -30, -15, -7.5, -3.7, -1.8, -1.0

To modify the playback speed settings select the **Play** box using the **LEFT/RIGHT** keys while in **READY** or **VIEW** modes.



IBOX display screen

- 1) To access the **Play** box Popup Menu press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the **Play Rate** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired playback speed setting. Press the **SET** key to lock the value and return to the Popup Menu. Once finished making changes press the **MENU** key to exit back to the IBOX main display. The **Play** box now reflects the new playback speed. The **Play** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.



Scroll box Popup Menu

- 2) To set the playback speed from within the **Play** box press the **SET** key. Use the **UP/DOWN** keys to set the desired playback speed.



Once finished making changes press the **SET** key twice (when pressing it once, a white border surrounds the box [as shown below] allowing for it to be repositioned on the screen using the arrow keys) to lock the value and return to the IBOX main display. Display options can only be set using the Popup Menu.



■ **Rec** box

The **Rec** box displays the current recording speed and image resolution.

To modify the record settings select the **Rec** box using the **LEFT/RIGHT** keys while in **VIEW** mode.



IBOX display screen

- 1) To access the **Rec** box Popup Menu press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the **Frame Rate** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired recording speed. Press the **SET** key to lock the value and return to the Popup Menu. Repeat the process on the **Frame Size** row to set the image resolution. Once finished making changes press the **MENU** key to exit back to the IBOX main display. The **Rec** box now reflects the new recording speed and image resolution. The image resolution is represented by the small square left of the **Rec** label. The **Zoom** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.

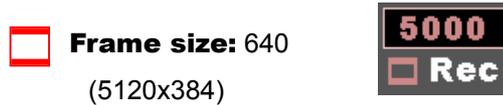


Scroll box Popup Menu

- 2) To modify the record settings from within the **Scroll** box press the **SET** key. Use the **UP/DOWN** keys to modify the recording speed. The **LEFT/RIGHT** keys change the image resolution (notice changes in the small square located left of the **Rec** label).



In the case of 4000pps or less, it is 512x512.



Once finished making changes press the **SET** key twice (when pressing it once, a white border surrounds the box [as shown below] allowing for it to be repositioned on the screen using the arrow keys) to lock the value and return to the IBOX main display. Display options can only be set using the Popup Menu.



■ Shutter box

The **Shutter** box displays the current electronic shutter setting.

To modify the electronic shutter settings select the **Shutter** box using the **LEFT/RIGHT** keys while in **VIEW** mode.



IBOX display screen

- 1) To access the **Shutter** box Popup Menu press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the **Frame Rate** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired shutter setting. Press the **SET** key to lock the value and return to the Popup Menu. Once finished making changes press the **MENU** key to exit back to the IBOX main display. The **Shutter** box now reflects the new shutter speed. The **Shutter** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.



Scroll box Popup Menu

- 2) To modify the electronic shutter settings from within the **Shutter** box press the **SET** key.
Use the **UP/DOWN** keys to modify the shutter speed.



Once finished making changes press the **SET** key twice (when pressing it once, a white border surrounds the box [as shown below] allowing for it to be repositioned on the screen using the arrow keys) to lock the value and return to the IBOX main display. Display options can only be set using the Popup Menu.



Use the **LEFT/RIGHT** keys to change the micro-second (μ s) shutter speed setting.



■ **SEG** box

The **SEG** box displays the segment memory.



1) The segment can be changed referring to the segment number shown on the screen.



2) Pressing the **LEFT/RIGHT** keys causes the system to enter the IBOX selection mode.



3) Pressing the **LEFT/RIGHT** keys goes to the IBOX.



4) Pressing the **LEFT** key again calls up the segment IBOX.



5) In the segment IBOX, pressing the **SET** key enters the segment changing mode (the segment number indication box turns black).

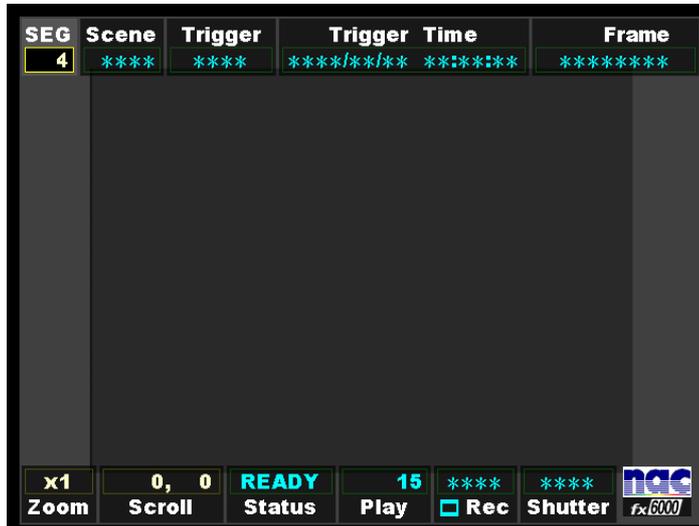
In this mode, pressing the **UP/DOWN** keys changes the segment.



6) Change the segment No. to 2.



7) Change the segment No. to 3.

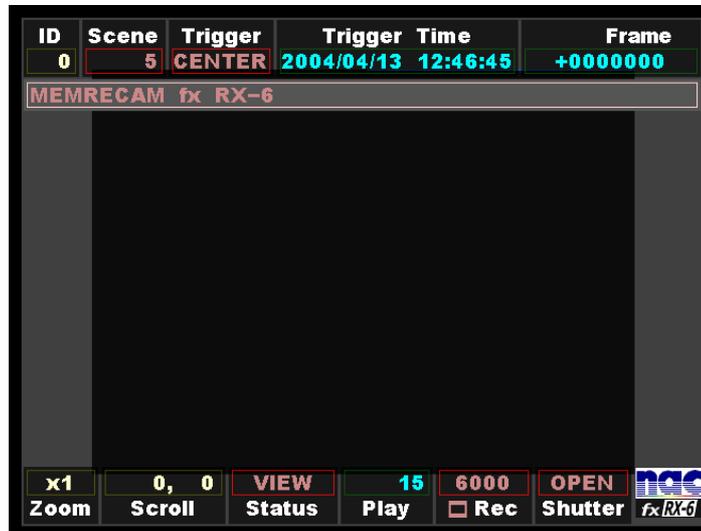


8) Change the segment No. to 4.

Note: Refer to Segment Recording under Section 4.1.5, Chapter 4.

■ **Comment** box

The **Comment** box displays the comment that has been entered through Smart Capture, fx Link (refer to the instruction manual for Smart Capture Software). In the absence of the comment, only the outer frame is on display.



IBOX display screen



Comment box Popup Menu

- 1) To set the comment while in **VIEW** mode, select the Comment IBOX using the **LEFT/RIGHT** keys. To access the **Comment** box Popup Menu, press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the COMMENT row and press the **SET** key to enable editing. Using the **UP/DOWN** keys and the **LEFT/RIGHT** keys, select the comment to be changed and change it. Press the **SET** key to lock the comment and return to the Popup menu. Once finished making changes, press the **MENU** key to exit back to the IBOX main display. The **Comment** box now reflects the new comment and the image display changes to this new location. The **Comment** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.

Note: Photo shows the comment entered through Smart Capture, fx Link.



IBOX display screen



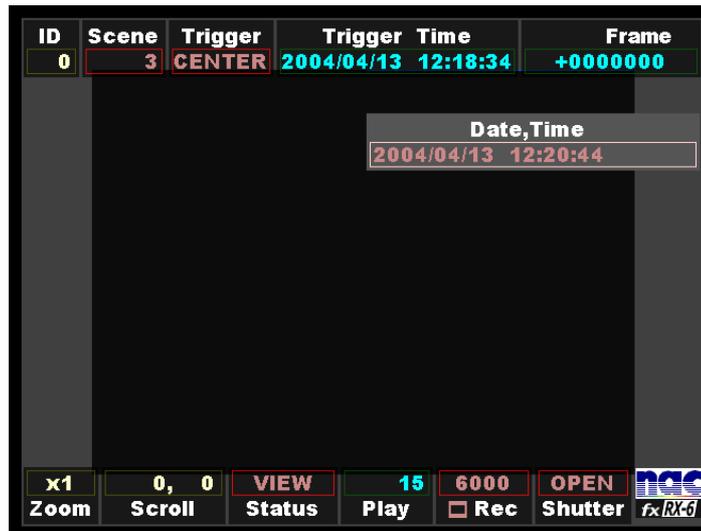
Comment box Popup Menu

- To set the comment while in **READY** mode, select the Comment IBOX using the **LEFT/RIGHT** keys. To access the Comment box Popup Menu, press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the **COMMENT** row and press the **SET** key to enable editing. Using the **UP/DOWN** keys and the **LEFT/RIGHT** keys, select the comment to be changed and change it. Press the **SET** key to lock the comment and return to the Popup menu. Once finished making changes, press the **MENU** key to exit back to the IBOX main display. The **Comment** box now reflects the new comment and the image display changes to this new location. The **Comment** box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.

Note: Photo shows the comment entered through Smart Capture, fx Link.

■ **Date, Time** box

The **Date, Time** box displays the date and time-of-day.



IBOX display screen



Date, Time box Popup Menu

- 1) To set the current date and time-of-day while in **VIEW** mode, select the Date, Time IBOX using the **LEFT/RIGHT** keys. To access the **Date, Time** box Popup Menu, press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the Date, Time row and press the **SET** key to enable editing. Using the **UP/DOWN** keys and the **LEFT/RIGHT** keys, select the date and time-of-day to be changed and change them. Press the **SET** key to lock the date and time-of-day and return to the Popup menu. Once finished making changes, press the **MENU** key to exit back to the IBOX main display. The Date The Date, Time box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.



IBOX display screen



Date, Time box Popup Menu

- 2) When the Date, Time IBOX is displayed by pressing the **LEFT/RIGHT** keys in the **READY** mode, Trigger Time and the date and time-of-day to which the duration from the entry of Trigger (Frame0000000) to the playback time has been added are displayed. To access the Date, Time box Popup Menu, press the **MENU** key once. In the popup menu, use the **UP/DOWN** keys to select the Date, Time row and press the **SET** key to enable editing. Using the **UP/DOWN** keys and the **LEFT/RIGHT** keys, select the date and time-of-day when Trigger has entered. Press the **SET** key to lock the date and time-of-day and return to the Popup menu. Once finished making changes, press the **MENU** key to exit back to the IBOX main display. The Date, Time box Display options (ON, ON at READY, OFF) and screen Position (in pixels) can also be modified while in the Popup Menu.

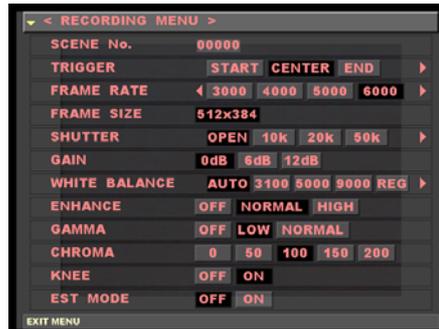
3.2 Setup Menu

The **MEMRECAM** fx setup menus allow the user to fully customize the record, playback and system settings. There are three setup menus as follows.

■ RECORDING MENU (Record settings)

Used to fully customize the record settings including frame rate, frame size and trigger settings.

Enter the **RECORDING MENU** by pressing the **MENU** button while in **VIEW** mode.



RECORDING MENU

■ TOP MENU (Playback settings)

Used to fully customize the playback settings including GAIN and ENHANCE settings. Enter

the **TOP MENU** by pressing the **MENU** button while in **READY** mode.



TOP MENU

■ SYSTEM MENU (Overall system settings)

Overall system options like ID number, Date/Time settings and whether or not to display the

IBOX are set at the **SYSTEM MENU**. Enter the **SYSTEM MENU** from the **TOP MENU**.



SYSTEM MENU

Caution

Combined use of the **MEMRECAM** operation panel and the J-PAD2 key is not permitted. When J-PAD2 has been connected to **MEMRECAM** fx, key operation from J-PAD2 alone is permitted. On the other hand, when J-PAD2 is not connected, keys may be actuated at the **MEMRECAM** fx operation panel.

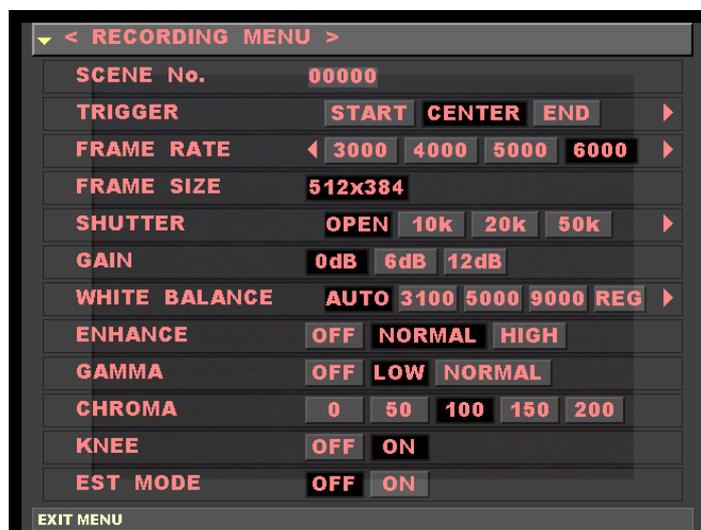
3.2.1 RECORDING MENU Setup

The **RECORDING MENU** administers settings related to recording. Enter the **RECORDING MENU** by pressing the **MENU** button while in **VIEW** mode.



Startup Screen 2 (**VIEW** mode)

The **RECORDING MENU** lettering is red in color. Use the **UP/DOWN** keys to select the desired row and press the **SET** key to enable editing. The **LEFT/RIGHT** keys are used to change the settings. Press the **SET** key to confirm the setting. Once finished making changes, press the **MENU** or **STOP** key to exit the setup menu and return to **VIEW** mode.

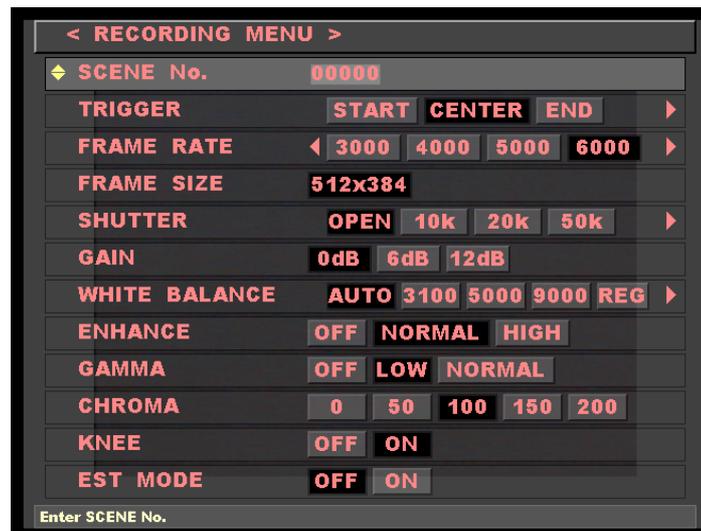


RECORDING MENU

■ SCENE No.

The **Scene No.** row displays the current scene number. It can be any number between 0 and 65535 and automatically increments on each recording. The scene number can be set to begin counting at any particular number or reset to zero.

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **SCENE No.** row and press the **SET** key to enable editing. Using the **UP/DOWN** keys enter any unique number between 0 and 65535 (by holding down the **UP/DOWN** keys the number changes by increments of 10). Press the **SET** key to lock the value and return to confirm the setting.



RECORDING MENU - SCENE No.

■ TRIGGER

The **TRIGGER** row displays the current trigger setting. The percentage of memory used as a buffer during recording is determined by the trigger setting. There are five trigger settings,

START	The trigger point is about 5% after the top of memory
CENTER	The trigger point is at the center of the memory. (Factory default setting)
END	The trigger point is about 5% before the end of memory
BURST	No Memory Buffer. (Records only when trigger signal is present)
CUSTOM (%)	Any percentage of the Memory may be set as Buffer

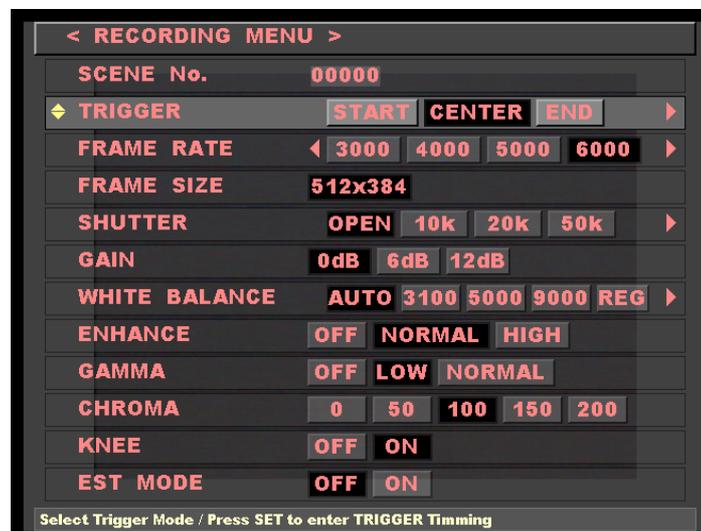
-100% START Trigger

0% CENTER Trigger

+100% END Trigger

TRIGGERING ; Refer section 4.1.2 for details.

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **TRIGGER** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired trigger setting. When selecting the **CUSTOM** trigger setting use the **LEFT/RIGHT** keys to change the percentage value (by holding down the **LEFT/RIGHT** keys the percentage changes at increasing speed). Press the **SET** key to confirm the setting.

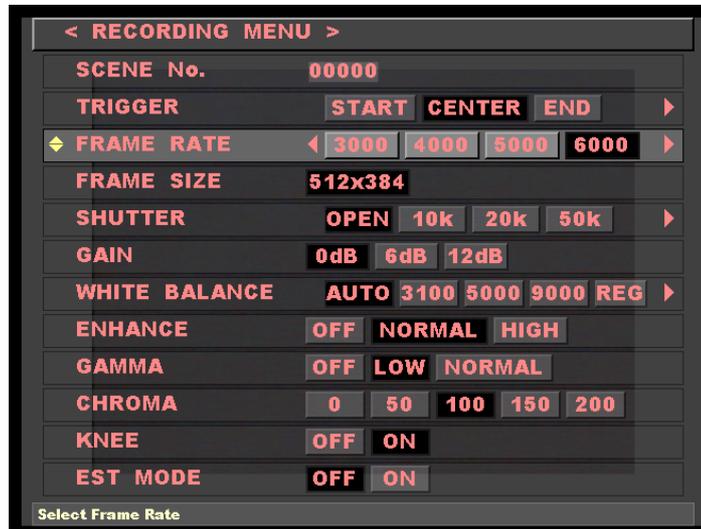


RECORDING MENU - TRIGGER

■ FRAME RATE

The **FRAME RATE** row displays the current recording speed in frames per second.

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **FRAME RATE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired recording speed setting. Press the **SET** key to confirm the setting.

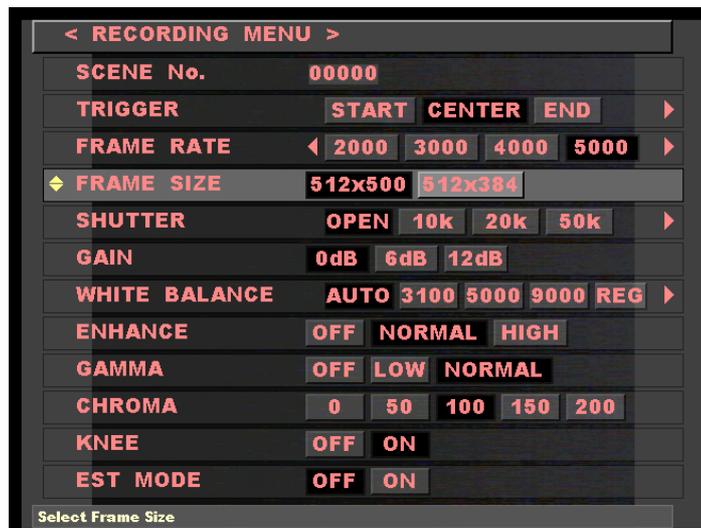


RECORDING MENU - FRAME RATE

■ FRAME SIZE

The **FRAME SIZE** row displays the current image resolution in pixels.

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **FRAME SIZE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired image resolution setting. Press the **SET** key to confirm the setting.

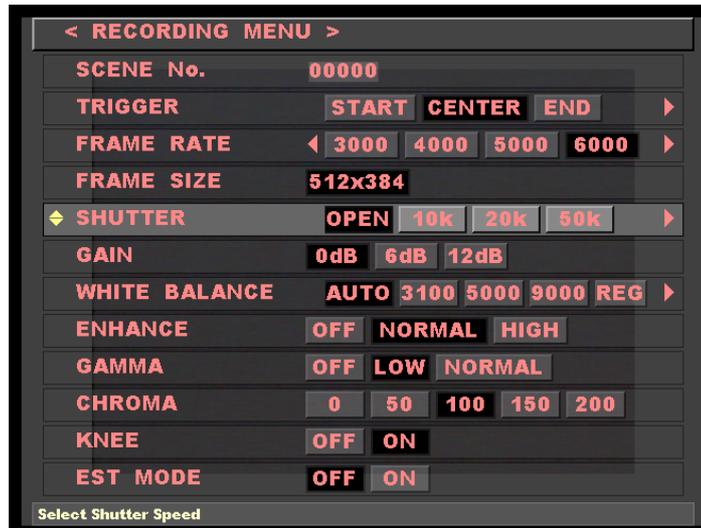


RECORDING MENU - FRAME SIZE

■ SHUTTER

The **SHUTTER** row displays the current electronic shutter setting.

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **SHUTTER** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired shutter speed (when selecting the micro-second (μ s) shutter speed press the **SET** key again to enable editing and use the **UP/DOWN** keys to change value). Press the **SET** key to confirm the setting.



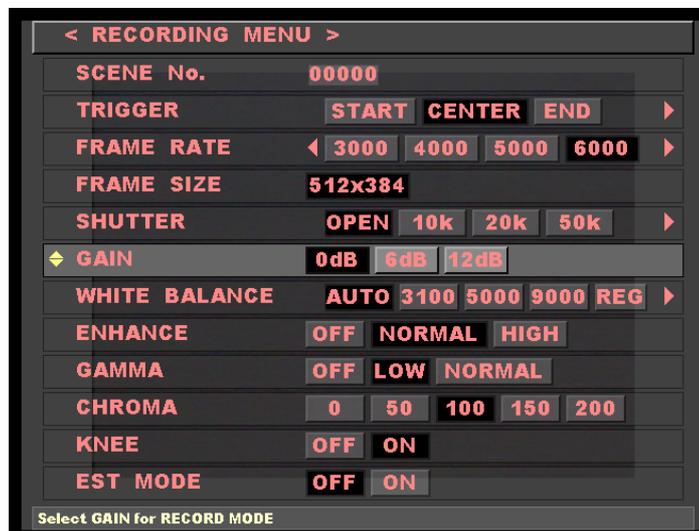
RECORDING MENU - SHUTTER

■ GAIN

The **GAIN** feature enhances light sensitivity electronically. This is a post-processing enhancement. When an image is recorded, the raw data in memory is not affected by this setting. The setting can be changed later at playback.

0dB	Factory Setting
6dB	Increases light sensitivity by one lens stop compared to 0dB
12dB	Increases light sensitivity by two lens stops compared to 0dB

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **GAIN** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



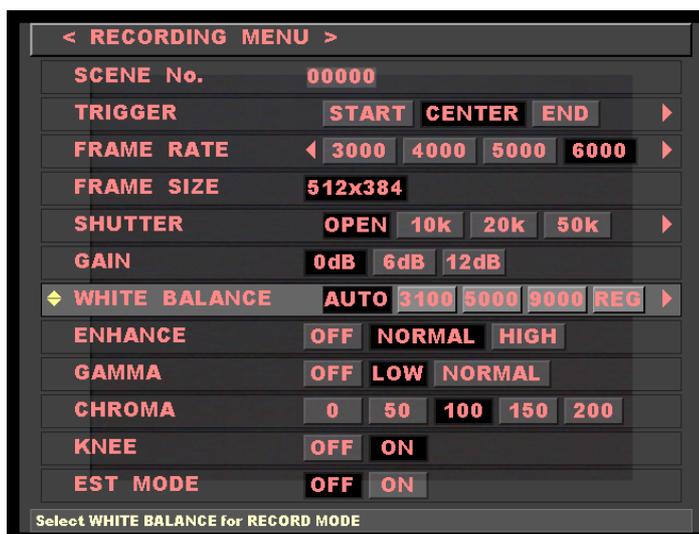
RECORDING MENU - GAIN

■ **WHITE BALANCE** (Color Camera only MENU)

The **WHITE BALANCE** row displays the current white balance setting of a color image. This is a post-processing enhancement. When an image is recorded, the raw data in memory is not affected by this setting. The setting can be changed later at playback.

AUTO	Automatic tracking mode (Factory Setting)
3100	Set at 3100K
5000	Set at 5000K
9000	Set at 9000K
REG	Register mode
SET	Current white balance register entry, automatically returns to REG when completed.

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **WHITE BALANCE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



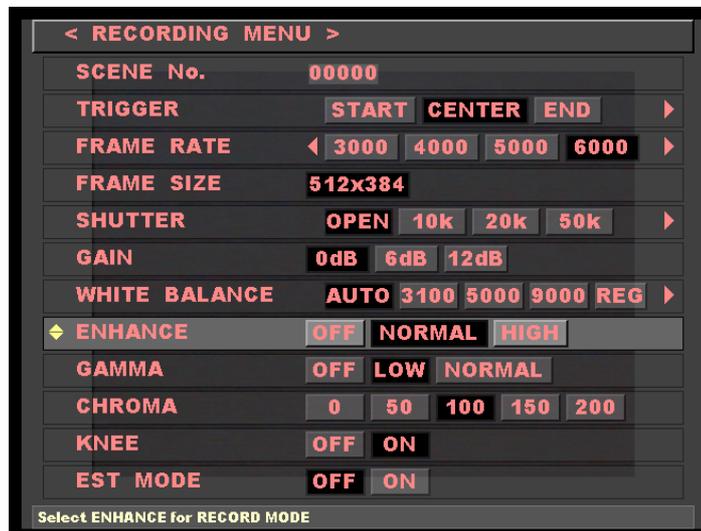
RECORDING MENU - WHITE BALANCE

■ ENHANCE

The **ENHANCE** row displays the current edge sharpness setting. This is a post-processing enhancement. When an image is recorded, the raw data in memory is not affected by this setting. The setting can be changed later at playback.

OFF	No sharpness enhancement
NORMAL	Standard sharpness enhancement (Factory setting)
HIGH	High sharpness enhancement

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **ENHANCE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



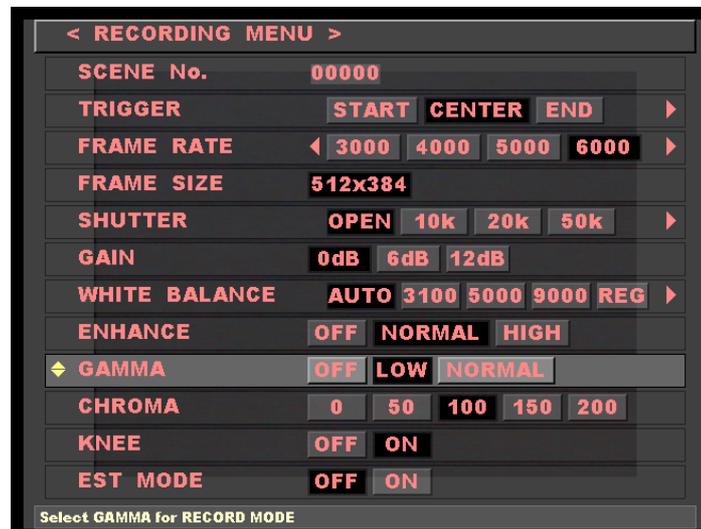
RECORDING MENU - ENHANCE

■ GAMMA

The **GAMMA** row displays the current gamma correction (gradation) setting. This is a post-processing enhancement. When an image is recorded, the raw data in memory is not affected by this setting. The setting can be changed later at playback.

OFF	No gamma correction (Gamma is about 1)
LOW	Low gamma correction (Factory setting)
NORMAL	Standard gamma correction

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **GAMMA** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



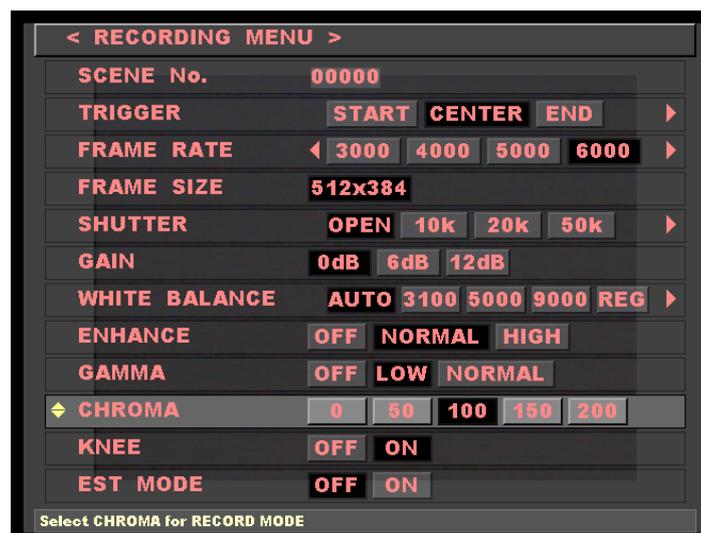
RECORDING MENU - GAMMA

■ CHROMA (Color Camera only MENU)

The **CHROMA** row displays the current color intensity (brilliance) setting. The higher the adjustment, the greater is the color intensity. This is a post-processing enhancement. When an image is recorded, the raw data in memory is not affected by this setting. The setting can be changed later at playback.

0	Set at 0% (Black/White image)
50	Set at 50%
100	Set at 100% (Standard color intensity) (Factory setting)
150	Set at 150%
200	Set at 200%

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **CHROMA** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



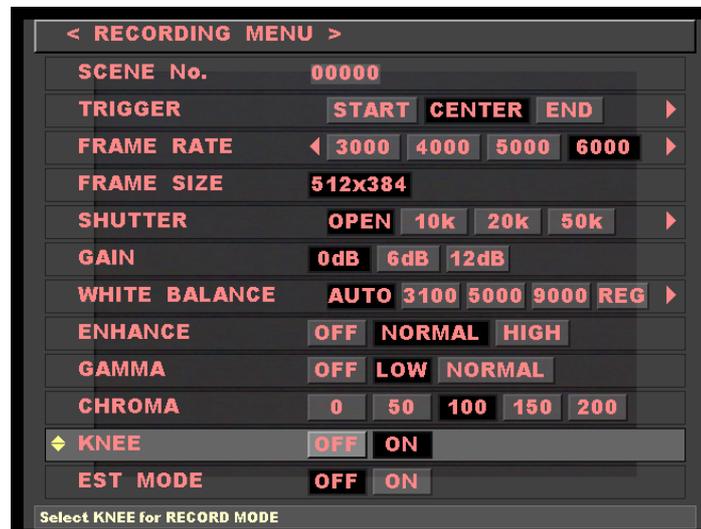
RECORDING MENU - CHROMA

■ KNEE

The **KNEE** feature suppresses bright areas enhancing image definition. This is a post-processing enhancement. When an image is recorded, the raw data in memory is not affected by this setting. The setting can be changed later at playback.

- OFF** Bright areas exceeding the fixed level will be clipped (No knee correction)
- ON** Bright areas up to about 1-2 times the fixed level will be suppressed (Factory setting)

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **KNEE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



RECORDING MENU - KNEE

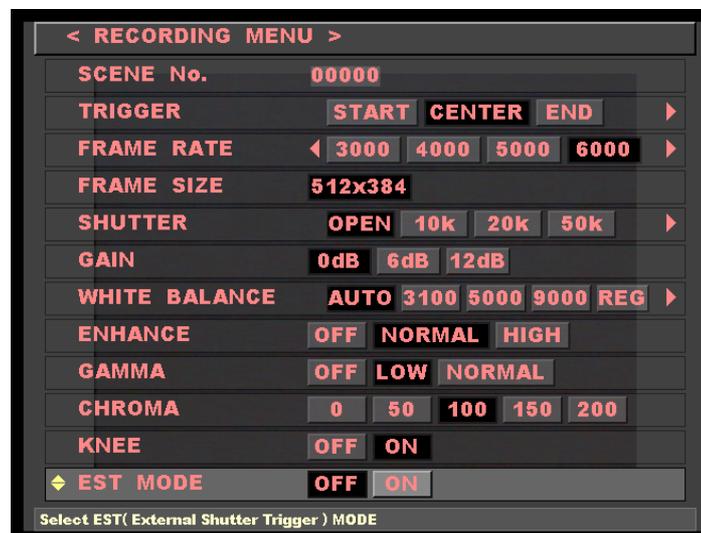
■ EST MODE

In the **EST** mode, only one frame of image can be recorded by the any timing signal that is synchronized with the external exposure signal.

OFF The system enters an ordinary continuous recording mode (factory set prior to shipment).

ON Recording is done in the **EST** mode.

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **KNEE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys selects the desired setting. Press the **SET** key to confirm the setting.



State where **EST** has been selected.

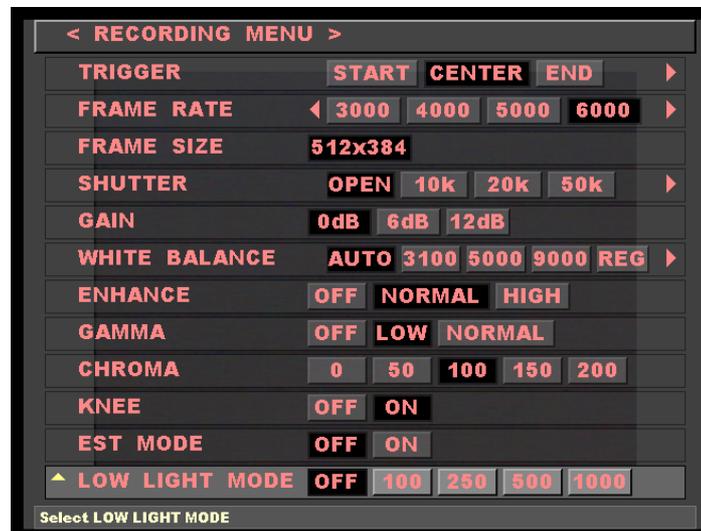
Note: Refer to Exposure Start Signal Input (**EST MODE**) under Section 4.8, Chapter 4.

■ LOW LIGHT MODE

The **LOW LIGHT MODE** allows for lens adjustments (e.g. focus) when using high frame rates and high shutter speeds. It may also be used to make such adjustments with supplemental lighting turned off. When in **LOW LIGHT MODE** the shutter is normally open. Depending on the brightness of the subject, the recording speed can be adjusted to 100, 250, 500, 1000 frames per second. Once the DRP is set to ARM mode the **LOW LIGHT MODE** is disabled and resumes recording in the previously set shutter and recording speed.

OFF	Normal mode instead of low light mode (image display for set shutter time) (Factory setting)
100	1/100sec exposure
250	1/250sec exposure
500	1/500sec exposure
1000	1/1000sec exposure

In the **RECORDING MENU**, use the **UP/DOWN** keys to select the **LOW LIGHT MODE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



RECORDING MENU - LOW LIGHT MODE

3.2.2 Termination of operation with **RECORDING MENU**

Upon completion of necessary setting required for recording on **RECORDING MENU**:

- (1) Select **<RECORDING MENU>** that is located at top of menus and press the **SET** key; or
- (2) Press the **STOP** key.

Following either of the foregoing steps terminates the operation with **RECORDING MENU** and the **VIEW** mode is re-entered. At the same time, the preset conditions are displayed in IBOX.

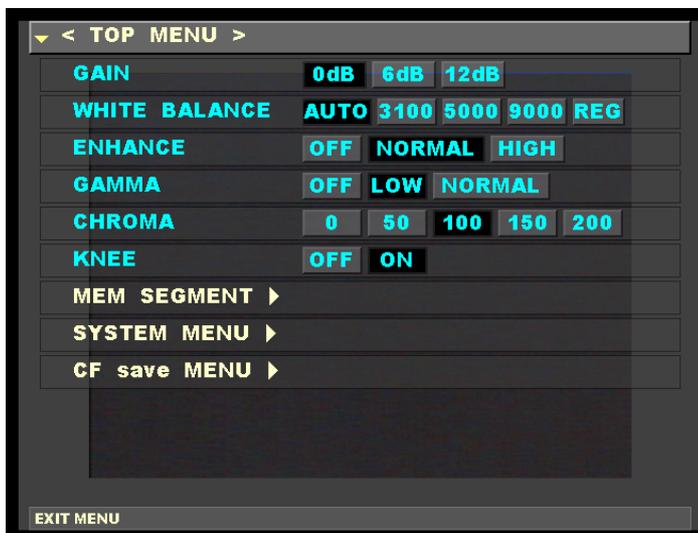
3.2.3 **TOP MENU** Setup

The **TOP MENU** administers settings related to playback. Enter the **TOP MENU** by pressing the **MENU** button while in **READY** mode.



Startup Screen 2 (**READY** mode)

The **TOP MENU** lettering is blue in color. Use the **UP/DOWN** keys to select the desired row and press the **SET** key to enable editing. The **LEFT/RIGHT** keys are used to change the settings. Press the **SET** key to confirm the setting. Once finished making changes, press the **MENU** or **STOP** key to exit the setup menu and return to **READY** mode.



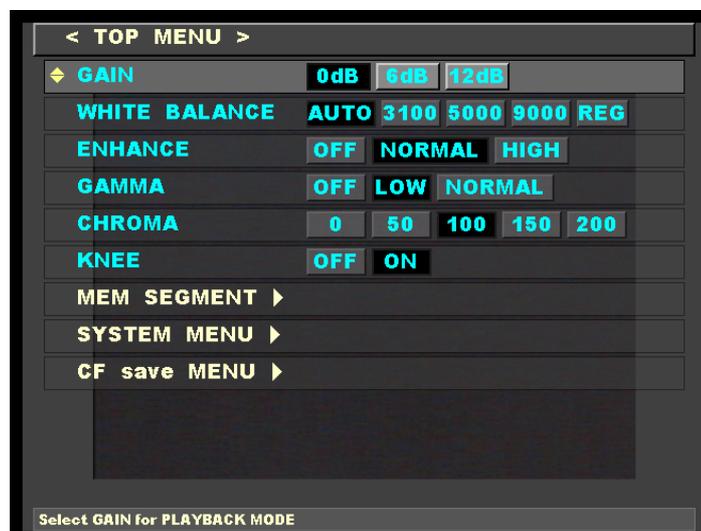
TOP MENU

■ GAIN

The **GAIN** feature enhances light sensitivity electronically. This is a post-processing enhancement. When the image was recorded, the raw data in memory was not affected by this setting. The setting can now be changed at playback.

0dB	Factory Setting
6dB	Increases light sensitivity by one lens stop compared to 0dB
12dB	Increases light sensitivity by two lens stops compared to 0dB

In the **TOP MENU**, use the **UP/DOWN** keys to select the **GAIN** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



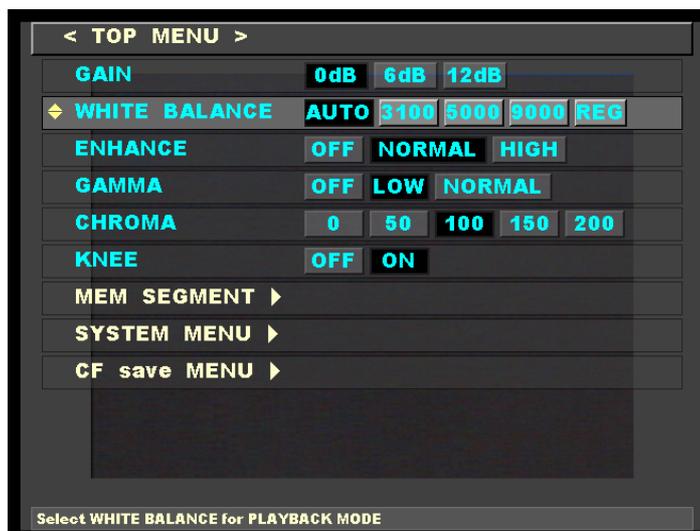
TOP MENU - GAIN

■ **WHITE BALANCE** (Color Camera only MENU)

The **WHITE BALANCE** row displays the current white balance setting of a color image. This is a post-processing enhancement. When the image was recorded, the raw data in memory was not affected by this setting. The setting can now be changed at playback.

AUTO	Automatic tracking mode (Factory Setting)
3100	Set at 3100K
5000	Set at 5000K
9000	Set at 9000K
REG	Register mode
SET	Current white balance register entry, automatically returns to REG when completed.

In the **TOP MENU**, use the **UP/DOWN** keys to select the **WHITE BALANCE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



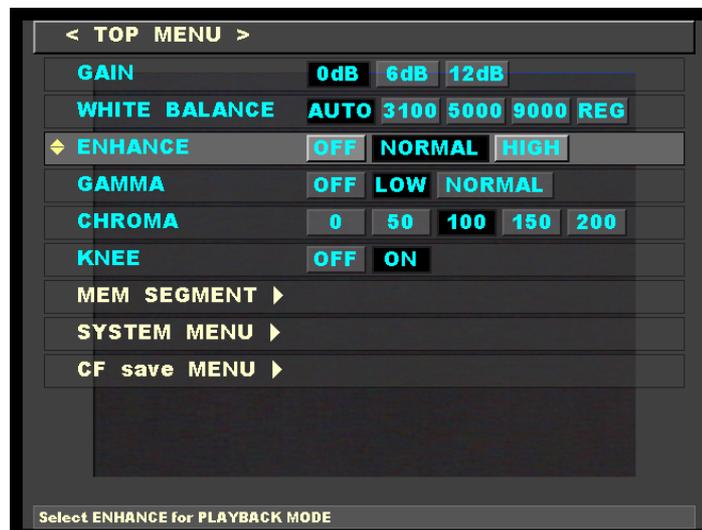
TOP MENU - WHITE BALANCE

■ ENHANCE

The **ENHANCE** row displays the current edge sharpness setting. This is a post-processing enhancement. When the image was recorded, the raw data in memory was not affected by this setting. The setting can now be changed at playback.

OFF	No sharpness enhancement
NORMAL	Standard sharpness enhancement (Factory setting)
HIGH	High sharpness enhancement

In the **TOP MENU**, use the **UP/DOWN** keys to select the **ENHANCE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



TOP MENU - ENHANCE

■ GAMMA

The **GAMMA** row displays the current gamma correction (gradation) setting. This is a post-processing enhancement. When the image was recorded, the raw data in memory was not affected by this setting. The setting can now be changed at playback.

OFF	No gamma correction (Gamma is about 1)
LOW	Low gamma correction (Factory setting)
NORMAL	Standard gamma correction

In the **TOP MENU**, use the **UP/DOWN** keys to select the **GAMMA** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



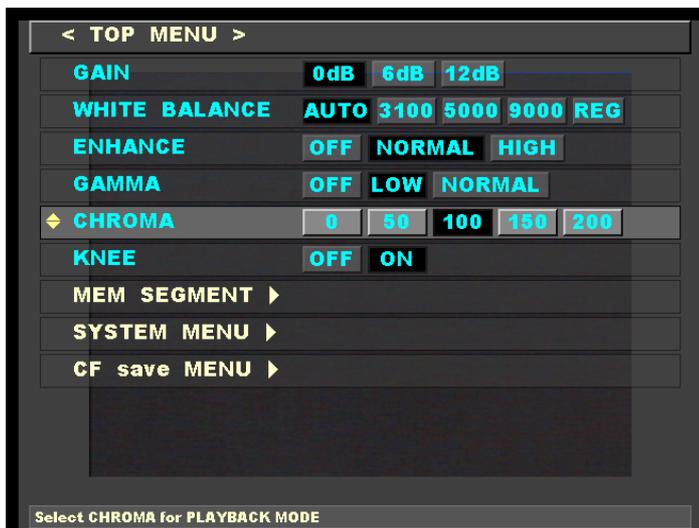
TOP MENU - GAMMA

■ **CHROMA** (Color Camera only MENU)

The **CHROMA** row displays the current color intensity (brilliance) setting. The higher the adjustment, the greater is the color intensity. This is a post-processing enhancement. When the image was recorded, the raw data in memory was not affected by this setting. The setting can now be changed at playback.

0	Set at 0% (Black/White image)
50	Set at 50%
100	Set at 100% (Standard color intensity) (Factory setting)
150	Set at 150%
200	Set at 200%

In the **TOP MENU**, use the **UP/DOWN** keys to select the **CHROMA** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



TOP MENU - CHROMA

■ KNEE

The **KNEE** feature suppresses bright areas enhancing image definition. This is a post-processing enhancement. When the image was recorded, the raw data in memory was not affected by this setting. The setting can now be changed at playback.

- OFF** Bright areas exceeding the fixed level will be clipped (No knee correction)
- ON** Bright areas up to about 1-2 times the fixed level will be suppressed (Factory setting)

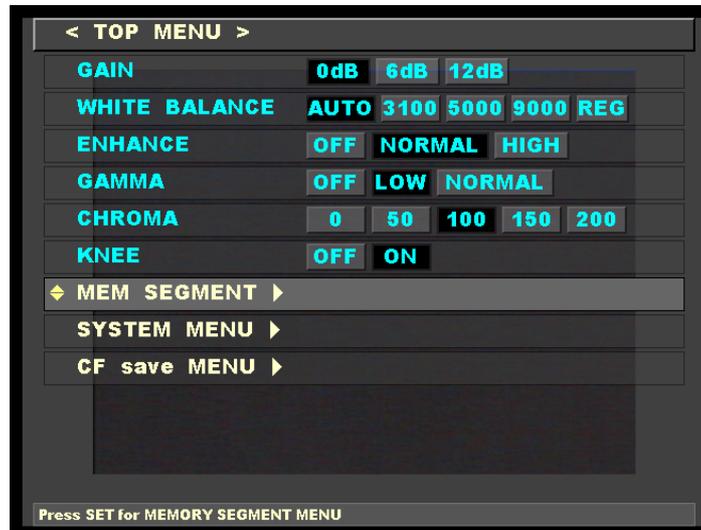
In the **TOP MENU**, use the **UP/DOWN** keys to select the **KNEE** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.



TOP MENU - KNEE

MEM SEGMENT

Call up the **MEM SEGMENT MENU** and press the **SET** key. The following screen should appear. After selecting the desired segment row, press the **SET** key to play back the recorded image.



TOP MENU – MEM SEGMENT

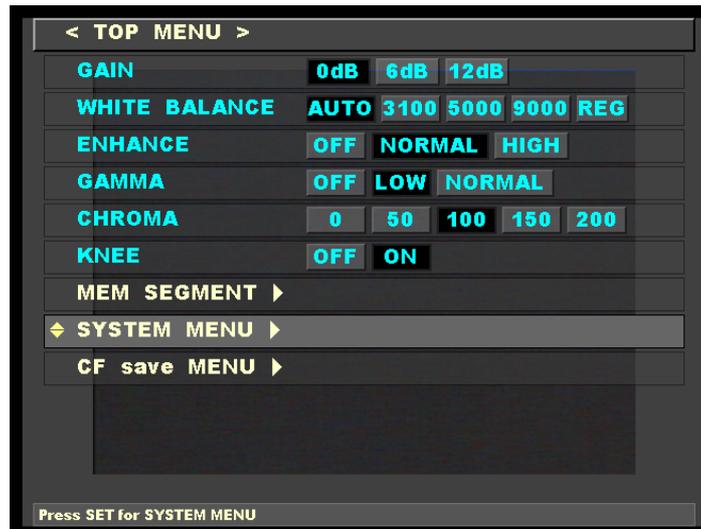


MEMORY SEGMENT Sub Menu

Note: Depending on the segment size, the data appearing on sub menu screen varies.

■ SYSTEM MENU

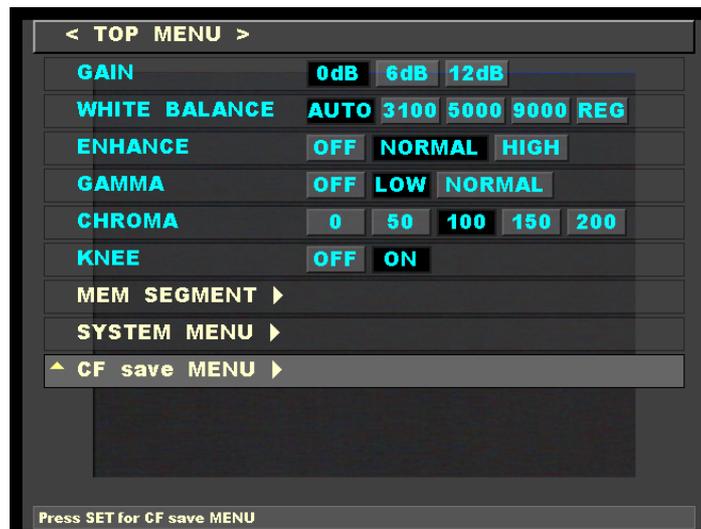
Enters the **SYSTEM MENU**, refer to section 3.2.2 for more details.



TOP MENU - SYSTEM MENU

■ SYSTEM MENU

Enters the **CF save MENU** (Compact Flash), refer to section 3.4 for more details.



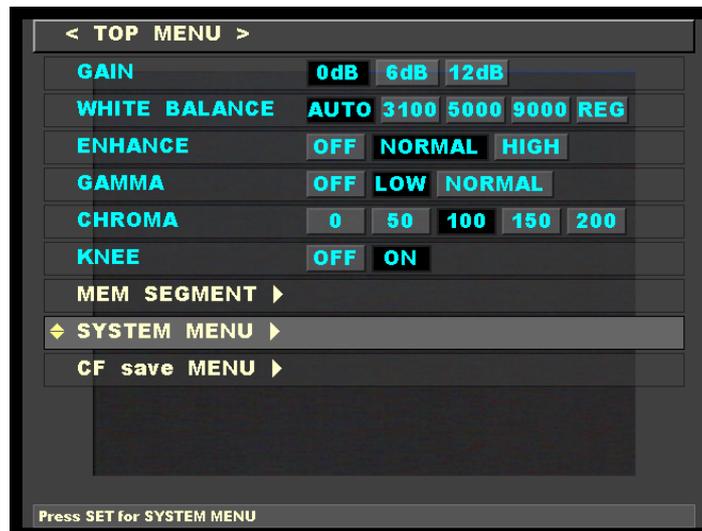
TOP MENU – CF save MENU

3.2.4 Termination of operation with **TOP MENU**

To terminate operation with **TOP MENU**, press either the **MENU** or **STOP** key.

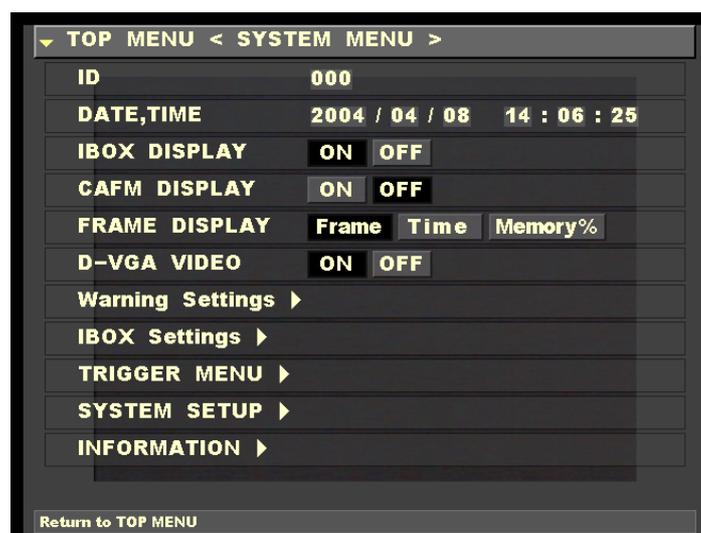
3.2.5 **SYSTEM MENU** Setup

Overall **MEMRECAM** fx system options are administered in the **SYSTEM MENU**. Enter the **SYSTEM MENU** by pressing the **RIGHT** key while in the **TOP MENU – SYSTEM MENU** row.



TOP MENU

The **SYSTEM MENU** lettering is yellow in color. Use the **UP/DOWN** keys to select the desired row and press the **SET** key to enable editing. The **LEFT/RIGHT** keys are used to change the settings. Press the **SET** key to confirm the setting. Once finished making changes, press the **MENU** or **STOP** key to exit the setup menu and return to **READY** mode.

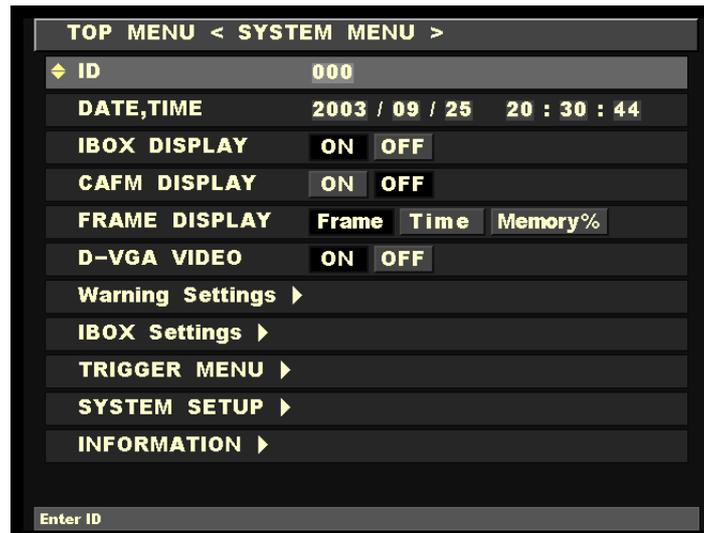


SYSTEM MENU

■ ID

In the **ID** row, the **MEMRECAM** fx identification number can be set. It can be any number between 0 and 127. This identification number setting allows the user to easily identify the source DRP after the images are recorded.

In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **ID** row and press the **SET** key to enable editing. Using the **UP/DOWN** keys enter any unique number between 0 and 127. Press the **SET** key to confirm the setting.

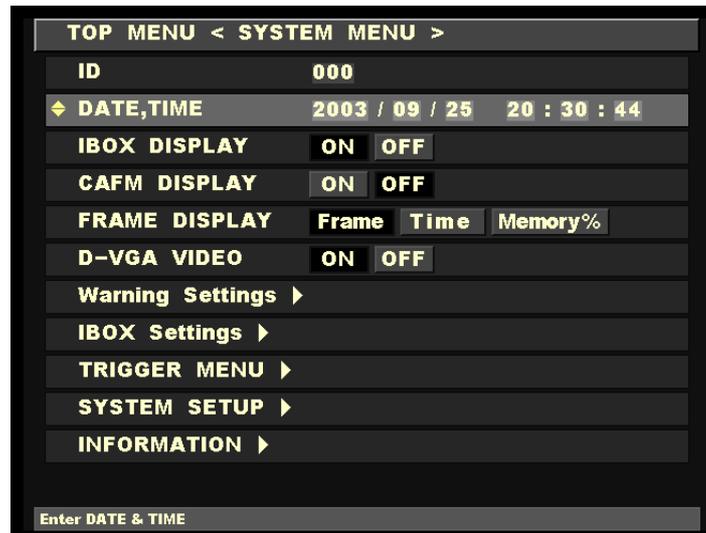


SYSTEM MENU - ID

■ DATE, TIME

In the **DATE, TIME** row, the normal date and time stamp can be set.

In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **DATE, TIME** row and press the **SET** key to enable editing. Use the **UP/DOWN** keys to enter the current year and press the **SET** key to confirm the setting. Repeat the process for the remaining (day, hour, minute, second) fields and press the **SET** key to confirm each setting.

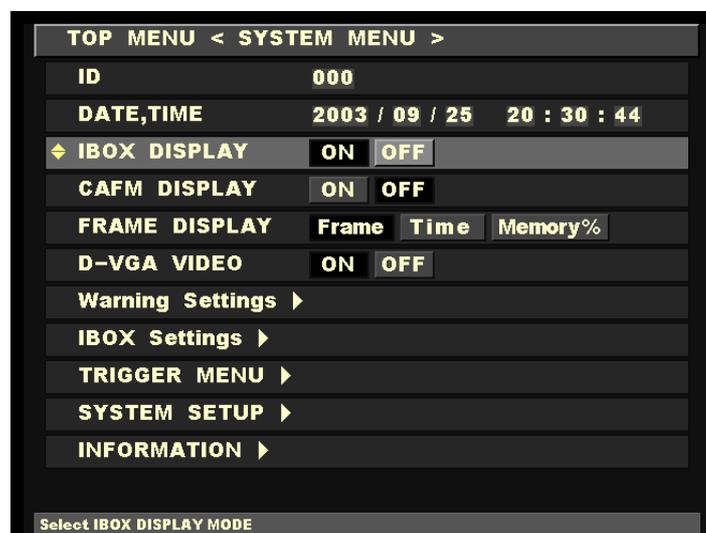


SYSTEM MENU – DATE, TIME

■ IBOX DISPLAY

In the **IBOX DISPLAY** row, the IBOX can be turned ON or OFF.

In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **IBOX DISPLAY** row and press the **SET** key to enable editing. Use the **LEFT/RIGHT** keys to turn the IBOX on or off. Press the **SET** key to confirm the setting.

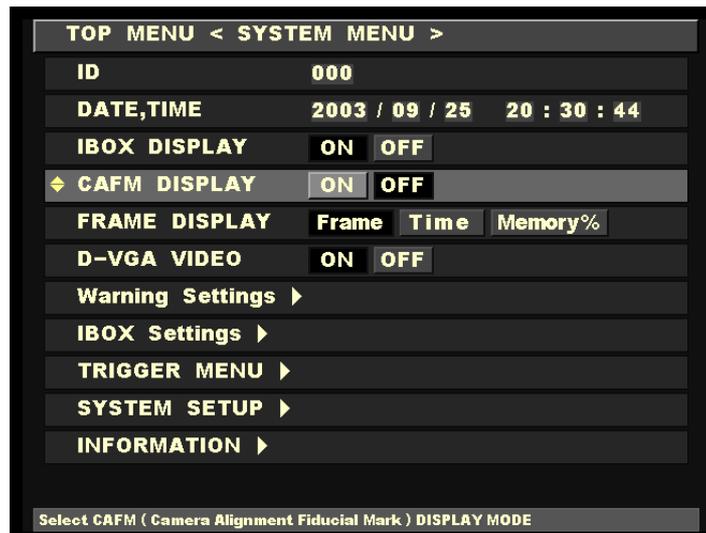


SYSTEM MENU – IBOX DISPLAY

■ CAFM DISPLAY

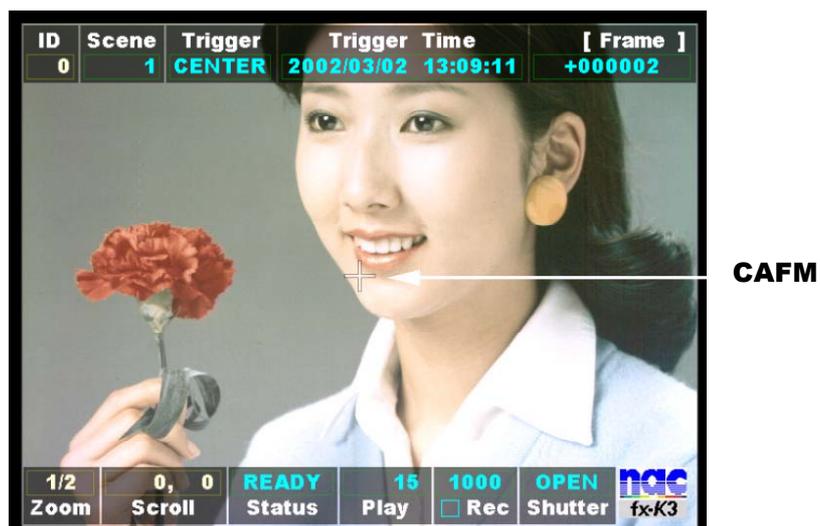
In the **CAFM DISPLAY** row, the CAFM (Camera Alignment Fiducial Mark) can be turned ON or OFF. The CAFM is used for adjusting the camera before recording. The CAFM cross is not displayed in a previously recorded image.

In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **IBOX DISPLAY** row and press the **SET** key to enable editing. Use the **LEFT/RIGHT** keys to turn the IBOX ON or OFF. Press the **SET** key to confirm the setting.



SYSTEM MENU – CAFM DISPLAY

When the **CAFM DISPLAY** is set to the ON position a cross is displayed in the center of the image.



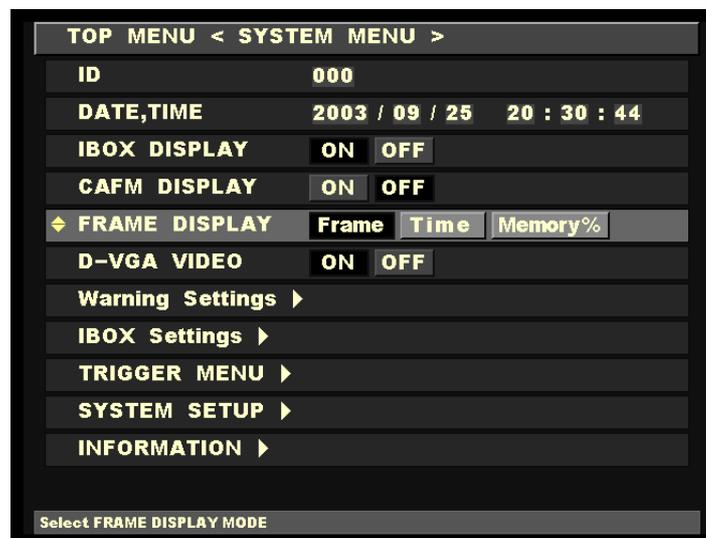
Startup Screen 2 (**READY** mode) – **CAFM**

■ FRAME DISPLAY

The IBOX **Frame** counter can be set to display its contents in frame numbers, time or percentage of memory used / remaining. The desired setting can be selected in the **FRAME DISPLAY** row.

Frame	Counter set to display frame numbers
Time	Counter set to display minutes and seconds
Memory %	Counter set to display percentage of memory used

In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **FRAME DISPLAY** row and press the **SET** key to enable editing. Using the **LEFT/RIGHT** keys select the desired setting. Press the **SET** key to confirm the setting.

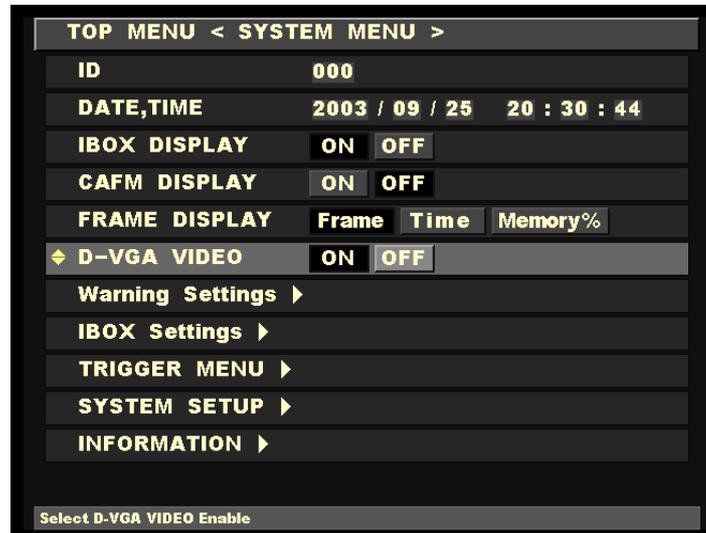


SYSTEM MENU – FRAME DISPLAY

■ D-VGA VIDEO

In the **D-VGA VIDEO** row, the D-VGA video output port can be turned ON or OFF.

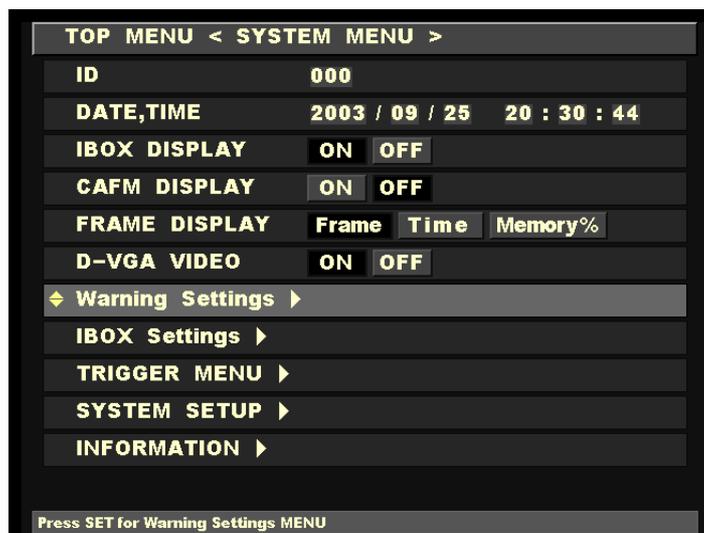
In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **D-VGA VIDEO** row and press the **SET** key to enable editing. Use the **LEFT/RIGHT** keys to turn the D-VGA video output port ON or OFF. Press the **SET** key to confirm the setting.



SYSTEM MENU – D-VGA VIDEO

■ Warning Settings

In the Warning Settings row, the data related to warning can be set.



SYSTEM MENU – Warning Settings

Pressing the **SET** key calls up the following screen. This screen is used to turn ON or OFF an alarm buzzer when the input power voltage from the battery is too low or too high.

- OFF:** There is neither alarm indication nor buzzer sound (factory set prior to shipment).
- ON:** There are alarm indication and buzzer sound.

Alarm buzzer sounds when the input power voltage has dropped below 20V or exceeded 32V.

Pressing the **STOP** key silences the buzzer.



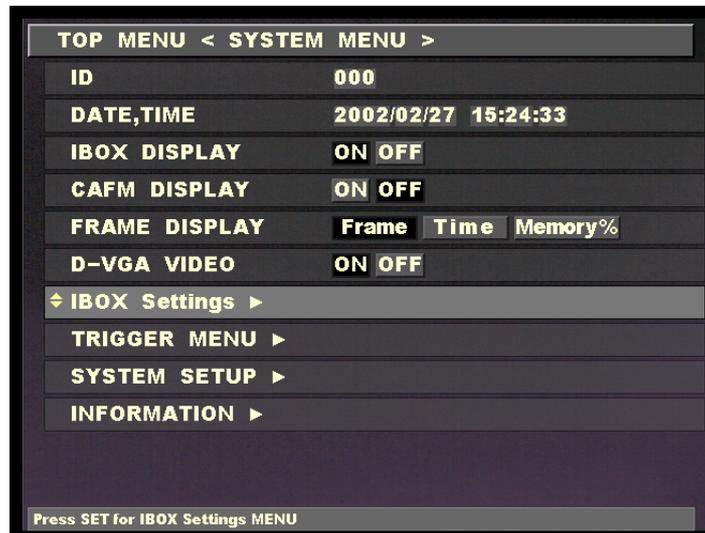
Warning Settings Sub Menu

[Alarm indication screen]

■ IBOX Settings

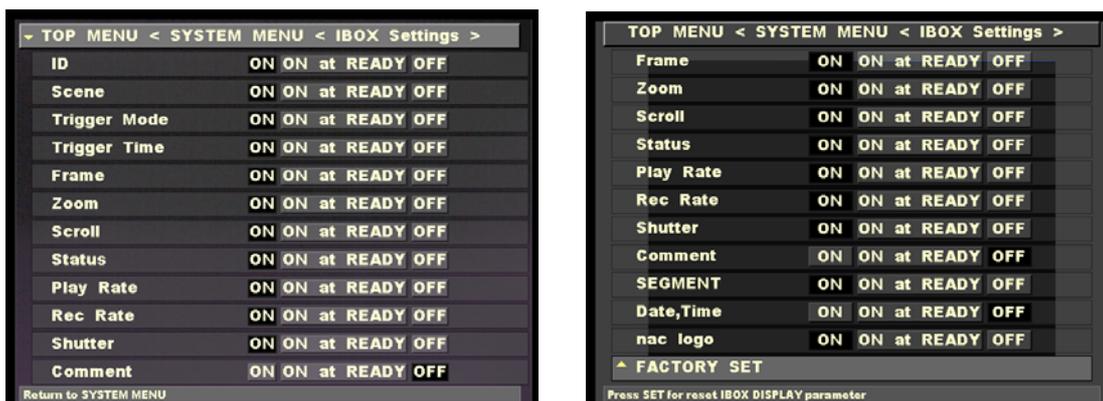
The **IBOX Settings** row opens the IBOX Settings Sub Menu. In the IBOX Settings Sub Menu each display box can be individually turned ON or OFF.

In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **IBOX Settings** row and press the **RIGHT** key to enter the Sub Menu.



SYSTEM MENU – IBOX Settings

In the **IBOX Settings** Sub Menu, use the **UP/DOWN** keys to select the desired row and press the **SET** key to enable editing. Use the **LEFT/RIGHT** keys to turn the display box ON or OFF. Press the **SET** key to confirm the setting. Once finished making changes press the **LEFT** key to return to the **SYSTEM MENU**.



IBOX Settings Sub Menu

FACTORY SET returns a display and position of IBOX to a setup at the time of factory shipments.

■ TRIGGER MENU

The **TRIGGER MENU** row opens the trigger settings Sub Menu (Refer to External Trigger Input, Section 4.2.2). The TRIGGER I/F defines the external trigger signal type.

TRIGGER I/F **Voltage** : Contact or 5V CMOS (Schmidt trigger) input

Current : Current loop trigger input

EVENT FRAME When feature is ON, an event mark is recorded at every external trigger signal

 EVENT FRAME RECORDING; Refer section 4.5 for details.

Number of The number of blocks in multi-trigger recording is set up.

Blocks

Recording Mode All Blocks : Record is finished with the set-up number of blocks.

Continuous : Record is continued regardless of the set-up number of blocks.

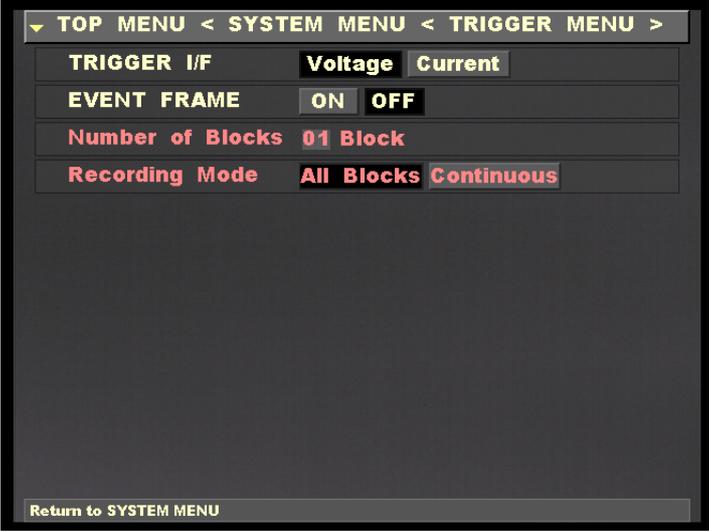
 MULTI-TRIGGER RECORDING; Refer section 4.7 for details.

In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **TRIGGER MENU** row and press the **RIGHT** key to enter the Sub Menu.



SYSTEM MENU – IBOX Settings

In the **TRIGGER MENU**, use the **UP/DOWN** keys to select the desired row and press the **SET** key to enable editing. Use the **LEFT/RIGHT** keys to select the desired setting. Press the **SET** key to confirm the setting. Once finished making changes press the **LEFT** key to return to the **SYSTEM MENU**.

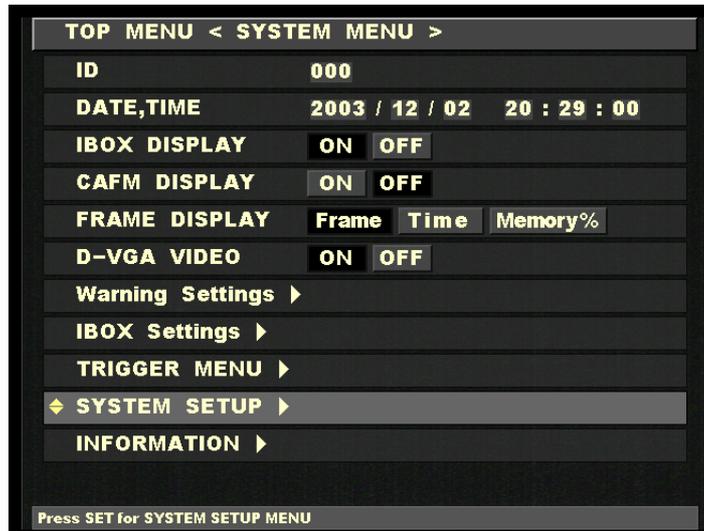


IBOX Settings Sub Menu

■ SYSTEM SETUP

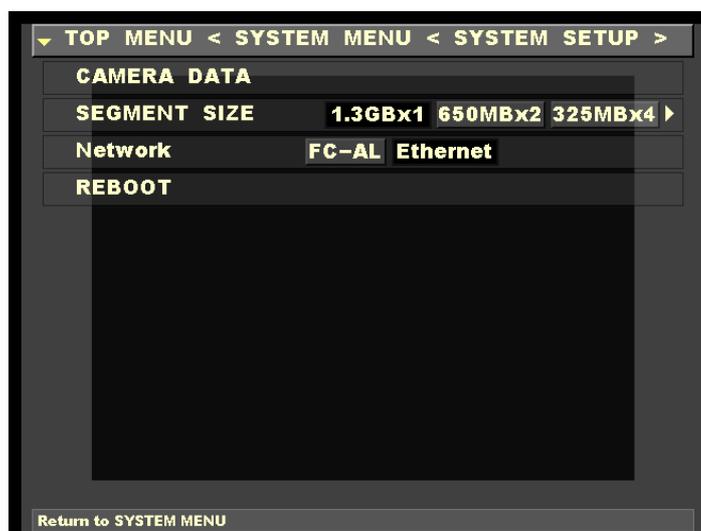
The **SYSTEM SETUP** row opens the SYSTEM SETUP Sub Menu. Here camera data , memory segment size and the network connection type can be specified to be either Fibre Channel (FC-AL) or Ethernet (100Base-T)

In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **SYSTEM SETUP** row and press the **RIGHT** key to enter the Sub Menu.



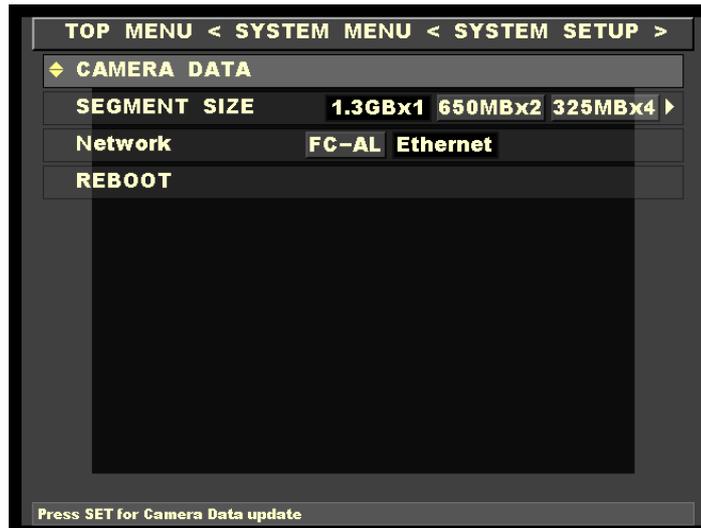
SYSTEM MENU – SYSTEM SETUP

In the **SYSTEM SETUP** Sub Menu, use the **UP/DOWN** keys to select the **Network** row and press the **SET** key to enable editing. Use the **LEFT/RIGHT** keys to select the desired connection setting. Press the **SET** key to confirm the setting. Use the **UP/DOWN** keys to select the **REBOOT** row and press the **SET** key to reboot and apply changes. (For information on the **CAMERA DATA** row see section 3.5, Camera Head Exchange)



Network Connection Sub Menu

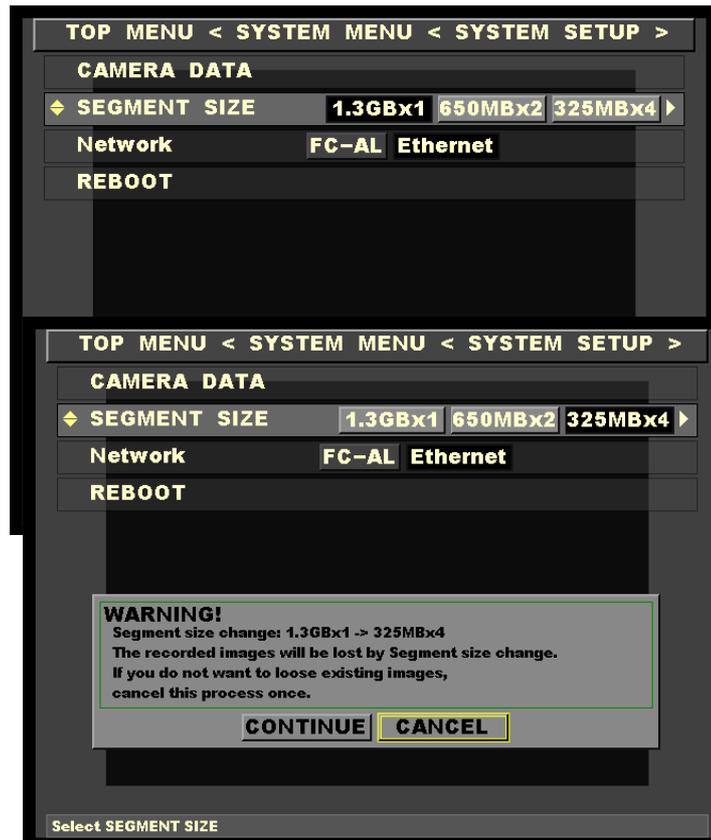
• **CAMERA DATA**



When the camera data is to be re-acquired after exchange of the camera head, press the **UP/DOWN** keys to select the **CAMERA DATA** row and then press the **SET** key.

(For details refer to Section 3.5.)

• SEGMENT SIZE



Use the **UP/DOWN** keys to select the **SEGMENT SIZE** row and use the **LEFT/RIGHT** keys to select the desired size.

When an attempt is made to exit this item, the confirmation window as shown at left appears.

Here, select the **CONTINUE** button and press **SET**. Then, a new segment size can be set.

To reflect the new setting, it is necessary to select **REBOOT** using the **UP/DOWN** keys and to reboot the system by pressing the **SET** key.

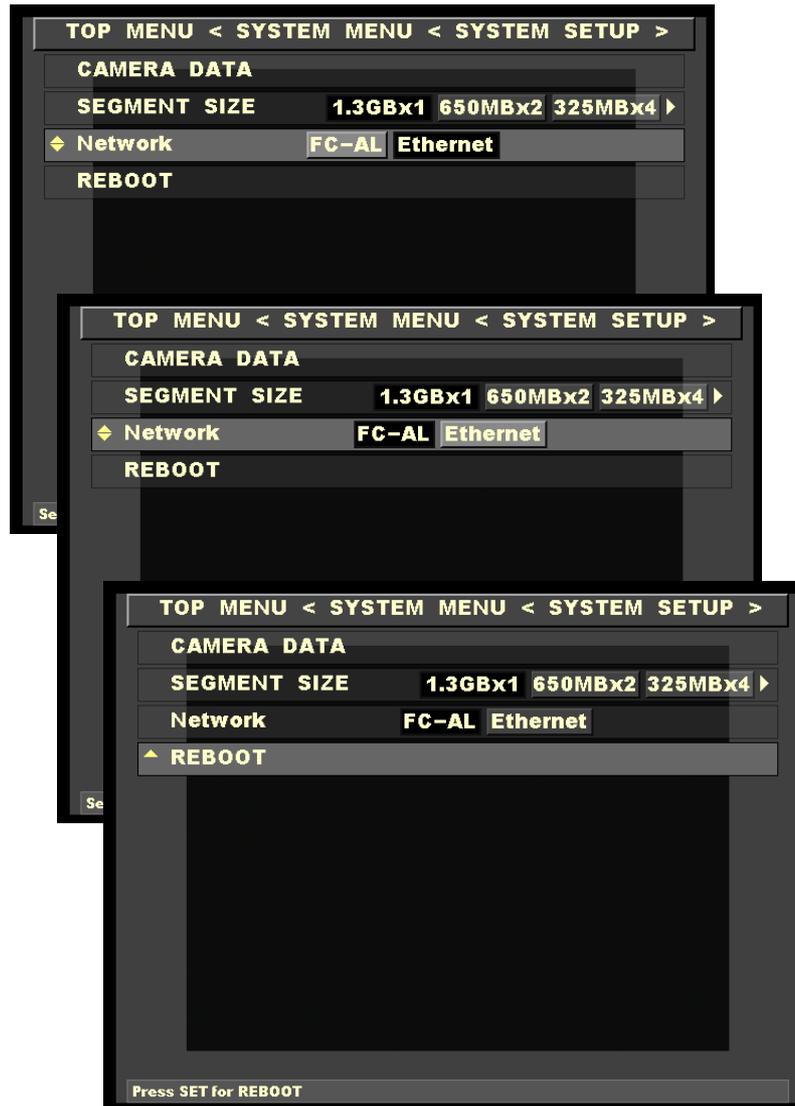
The segment size that has been set can be confirmed under [TOP MENU > MEM SEGMENT].

Note: Refer to Trigger Input under Section 4.1.2, Chapter 4.

Caution

Changing the memory segment size erases the images recorded in **MEMRECAM** so that recorded images become not to be able to read out.

• Network



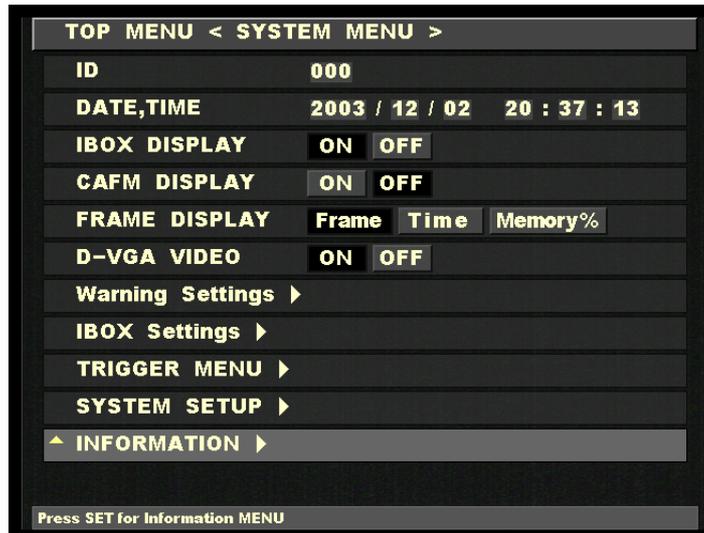
To change the network, select the Network row using the **UP/DOWN** keys. Press the **LEFT/RIGHT** keys to select FC-AL or Ethernet.

When the new setting is to be reflected, it is necessary to select the **REBOOT** row using the **UP/DOWN** keys and press the **SET** key to reboot the system.

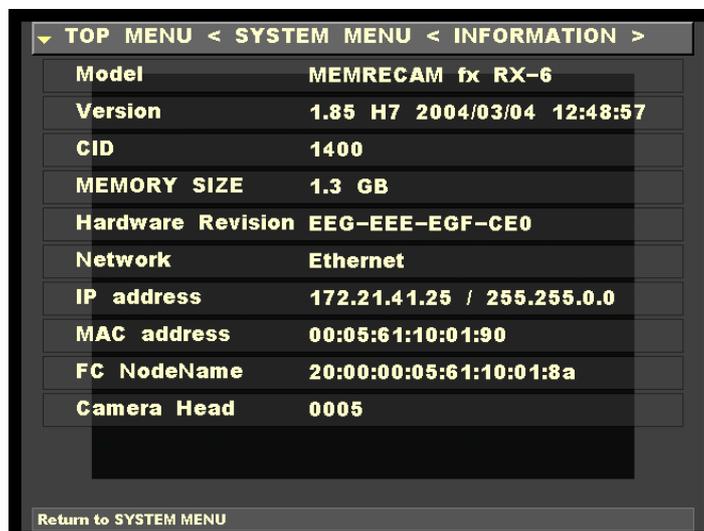
■ INFORMATION

The **INFORMATION** row opens the information Sub Menu. Here additional system information such as model type, CID, IP address, Camera Head Number and memory size of the **MEMRECAM** fx DRP is shown.

In the **SYSTEM MENU**, use the **UP/DOWN** keys to select the **INFORMATION** row and press the **RIGHT** key to enter the Sub Menu.



SYSTEM MENU – INFORMATION



INFORMATION Sub Menu

3.3 User Settings Storage

The user settings entered in the **MEMRECAM** fx **RECORDING MENU**, **TOP MENU** and **SYSTEM MENU** are saved in the internal memory. All settings from the previous session are loaded when the **MEMRECAM** fx power is turned ON.

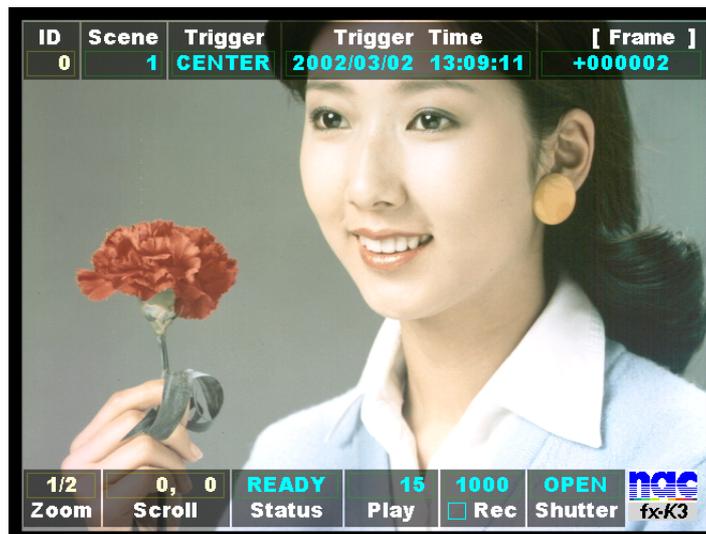
3.4 Saving Images to Compact Flash (CF) Storage Media

After an image is recorded and reviewed, it can be stored using Compact Flash (CF) Storage Media. Images stored in CF cards can be loaded to a computer for analysis and processing.

Caution

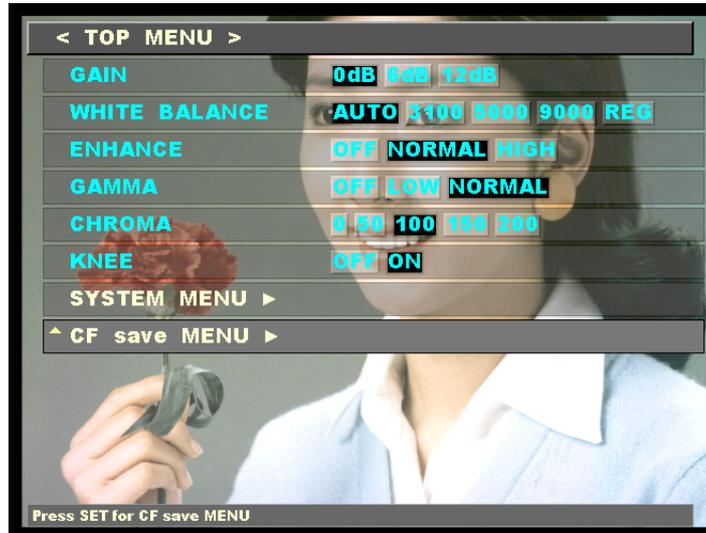
Images recorded by the **MEMRECAM** fx can be saved to CF Storage Media. These images cannot be uploaded back to **MEMRECAM** fx memory from the CF Storage Media.

1. After recording, review the image and select the area of interest by setting the playback range. (refer to Setting Playback Range, Chapter 2)



Startup Screen 2 (**PLAY** mode)

2. Enter the **TOP MENU** by pressing the **MENU** button while in **READY** mode. Using the **UP/DOWN** keys, select the **CF save MENU** row and press the **SET** key to enter the Sub Menu.



TOP MENU – CF save MENU

Enter the **TOP MENU** by pressing the **MENU** button while in **READY** mode. Using the **UP/DOWN** keys, select the **CF save MENU** row and press the **LEFT** key to enter the Sub Menu.

- MCFF SAVE** To save the raw image data to CF (Displays available storage space in MB and frames)
- PLAY FRAME** Displays the range of frames to be saved to the CF card
- REC FRAME** Displays the frame range of the recorded image
- YC TIFF SAVE** To save still images to CF
- CF FORMAT** Formats the CF card (**ALL DATA SAVED IN CF CARD IS ERASED**)



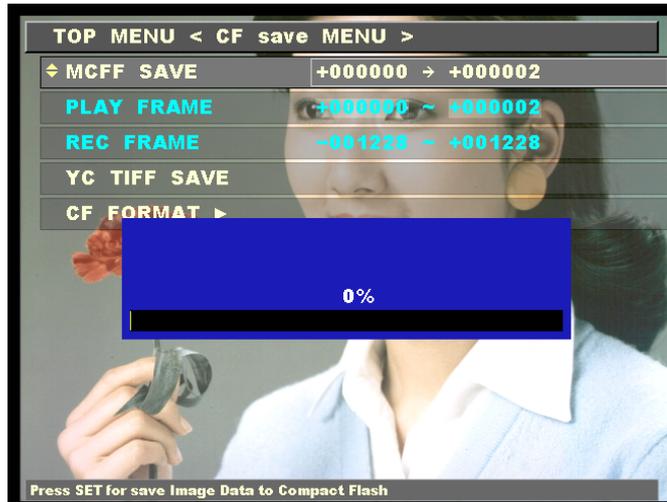
CF save MENU

- In the **CF save MENU** Sub Menu, use the **UP/DOWN** keys to select the **MCFF SAVE** row and press the **SET** key to start saving.



CF save MENU – MCFF SAVE

- Please wait while the image data is saved to CF.



CF save MENU – MCFF SAVE

- Once the data is saved to CF the filename is shown in the **MCFF SAVE** row.



CF save MENU – MCFF SAVE

3.5 Exchanging of Camera Head

■ General Description

If you have two or more fx RX-6 camera heads on hand, their combined use with DRP may be as many. Though the **MEMRECAM** fx RX-6 camera head is interchangeable with respect to DRP, the camera data (unique to the camera head) required for image processing is acquired and held by DRP. Therefore, the camera data is automatically updated when DRP senses that the camera data has been replaced.

Caution

Do not start exchanging the camera head until the power is turned off. Failure to follow this direction may damage it. Strictly follow the exchange procedure given on the screen. When the procedure is incorrectly followed, defect-free images may not be obtained.

■ Light Shielding

While the camera data is being exchanged, cover the lens with a lens cap to intercept light to the image sensor for proper acquisition of camera data.

If data acquisition or storage is made without attaching the lens cap, defect-free images may not be obtained. In addition, automatic camera data update cannot be done since DRP is unable to detect the fact that the camera head has been replaced. In that event, update the camera data again by performing the menu operation: [TOP MENU > SYSTEM MENU+SET > SYSTEM SETUP +SET > CAMERA DATA+SET] so as to accomplish its proper exchange.

■ Choosing Camera Head Exchange Method

As far as camera data update is concerned, choice can be made between the case where the data is to be temporarily stored in the internal RAM and the case where it is to be permanently stored in the built-in flash memory.

Time required for camera head exchange consists of several minutes for the camera data acquisition and storage in the internal RAM and of another several minutes for the data to be stored in the built-in flash memory.

■ Storage of Images

Caution

If an attempt is made to update the camera data with the pre-recorded image data being stored in DRP (in cases where optional memory back-up is in use), the pre-recorded image data may not agree with the changed camera data. In that event, defect-free images cannot be obtained. It is recommended that necessary image data be saved in a supervisory computer or a compact flash memory before onset of camera head exchange.

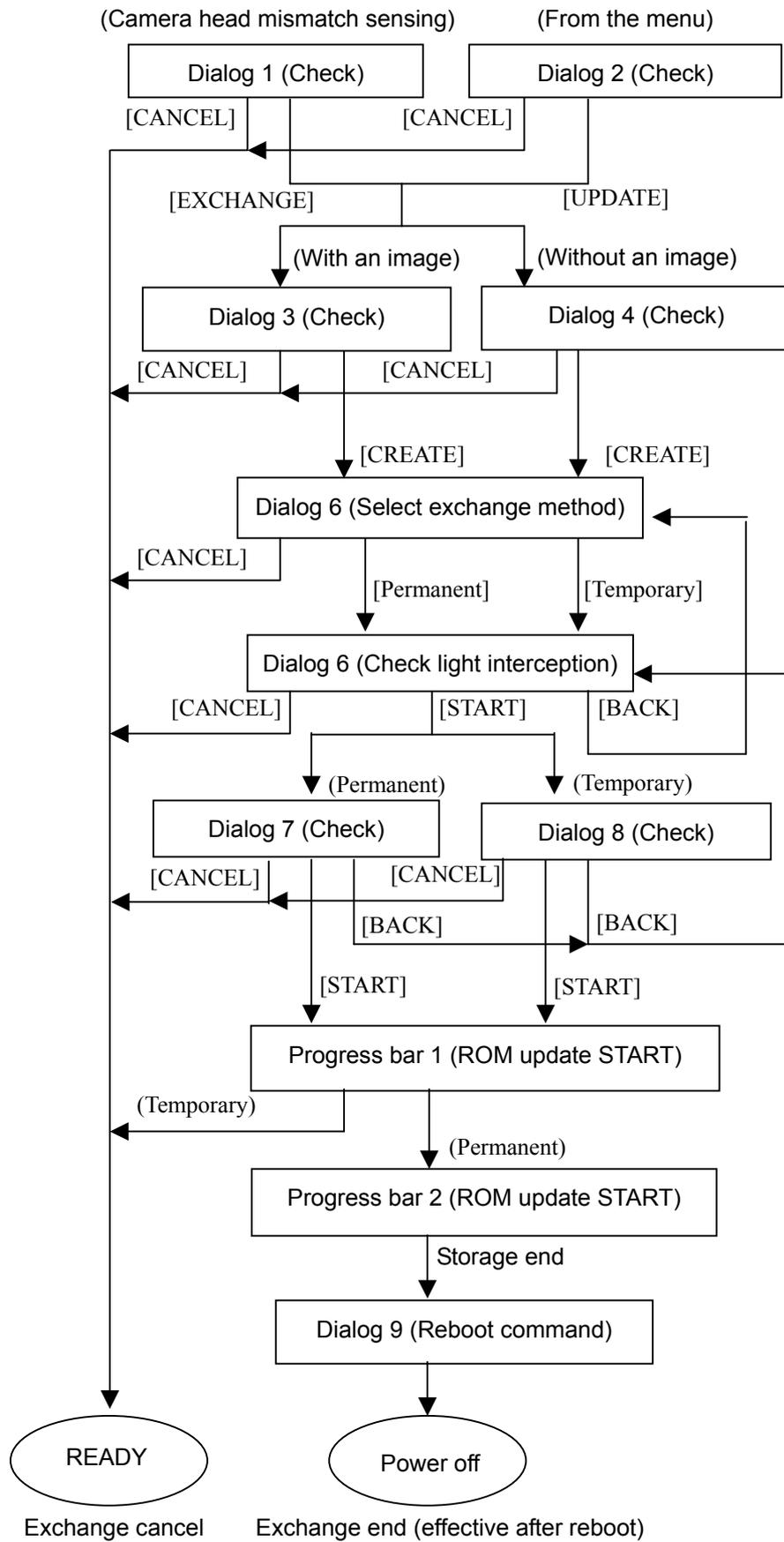
■ **Necessary Equipment**

Caution

As described at the beginning of this chapter, camera head exchange should be preceded by attachment of a viewfinder or a D-VGA converter unit plus a monitor. Operation can be performed from the J-PAD2 or DRP operation panel.

The camera head exchange procedure is described on the next pages.

• Camera Head Exchange Flow



• **Onscreen display and operation**

(1) Upon sensing of camera head exchange, the following dialog 1 appears on the screen.



Dialog 1

Using the **LEFT/RIGHT** keys, choose between **EXCHANGE** and **CANCEL**, and press the **SET** key. When **EXCHANGE** has been chosen, operation proceeds to step (3) or (4), while, upon choice of **CANCEL**, the system returns to the Ready mode without executing camera data update.

(2) The following dialog 2 appears upon execution of camera data update that is accomplished with menu operation: [TOP MENU > SYSTEM MENU+SET > SYSTEM SETUP+SET > CAMERA DATA+SET].



Dialog 2

Using the **LEFT/RIGHT** keys, choose between **UPDATE** and **CANCEL**, and press the **SET** key. When **UPDATE** has been chosen, operation proceeds to step (3) or (4), while, upon choice of **CANCEL**, the system returns to the Ready mode without executing camera head exchange. Upon execution of **EXCHANGE** in step (1) or of **UPDATE** in step (2), the screen to appear subsequently depends on whether the image data is stored in DRP. When the data is stored there, dialog 3 referred to in step (3) appears. On the other hand, when the data is not stored, dialog 4 referred to in step (4) appears.

(3) Dialog 3 for confirmation is displayed.



Dialog 3

Using **LEFT/RIGHT** keys, choose between **CREATE** and **CANCEL** and press the **SET** key. When **CREATE** has been chosen, operation proceeds to step (5), while, upon choice of **CANCEL**, the system returns to the Ready mode without executing camera data update.

(4) Dialog 4 for confirmation is displayed.



Dialog 4

Using **LEFT/RIGHT** keys, choose between **CREATE** and **CANCEL** and press the **SET** key. When **CREATE** has been chosen, operation proceeds to step (5), while, upon choice of **CANCEL**, the system returns to the Ready mode without executing camera data update.

(5) Dialog 5 for selecting the camera head exchange method is displayed.



Dialog 5

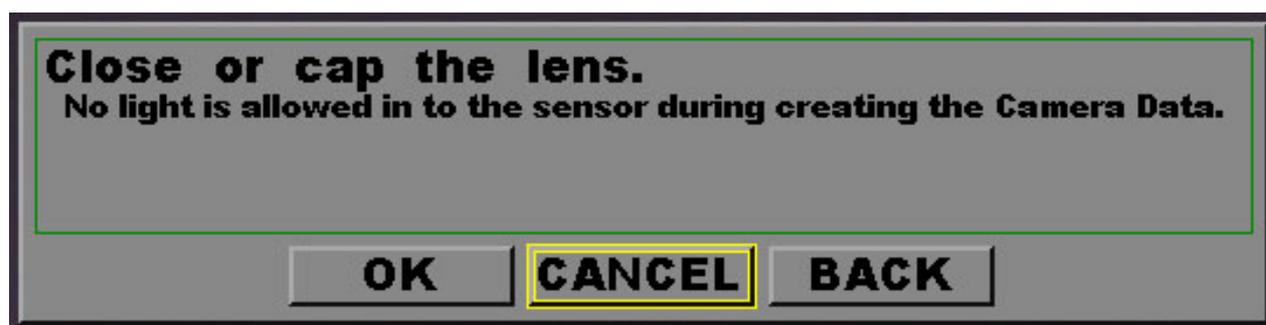
Using **LEFT/RIGHT** keys, select any one of **Permanent**, **Temporary**, and **CANCEL** and press the **SET** key.

When **Permanent** or **Temporary** has been selected, operation proceeds to the subsequent step (6), while, upon selection of **CANCEL**, the system returns to the Ready mode without executing camera head exchange.

Select **Permanent** when the new camera head that has been installed is to be put in continuous use. The camera data is written into the built-in flash ROM. Upon completion of camera head exchange, it is necessary to turn off the power and to reboot the system.

Select **Temporary** when the new camera head that has been installed is to be put in temporary use. The camera data is written not into the built-in flash ROM but into the internal RAM alone. Turning the power OFF and reboot the system permits restoration of the original camera head settings. Whenever turning the power OFF, never forget the necessity of this restoration.

(6) Dialog 6 is displayed, prompting sensor light interception with a lens cap.



Dialog 6

Using the **LEFT/RIGHT** keys, select any one of **OK**, **CANCEL**, and **BACK**, and press the **SET** key.

Select **OK** only when light has been intercepted to the sensor using a lens cap. Pressing the **SET** key allows the operation to proceed to step (7) or (8).

When **CANCEL** has been selected, the system returns to the Ready mode without executing camera data update.

Upon selection of **BACK**, the system returns to step (5) for camera head exchange method.

- (7) Dialog 7 is displayed, prompting confirmation of the data to be written into the built-in flash ROM with respect to the installation of the camera head to be used permanently.



Dialog 7

Using the **LEFT/RIGHT** keys, select any one of **OK**, **CANCEL**, and **BACK**, and press the **SET** key. When **OK** has been selected, data update is started and operation proceeds to the next step (9). When **CANCEL** has been selected, the system returns to the Ready mode without executing camera data update. Upon selection of **BACK**, the system returns to step (6) where attachment of the lens cap is confirmed.

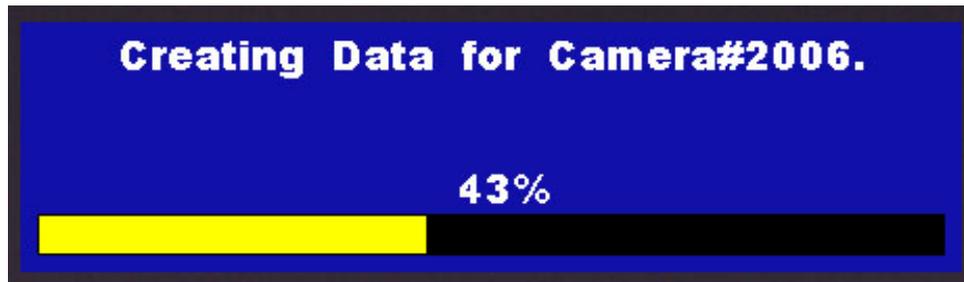
- (8) Dialog 8 is display, prompting confirmation of the data to be written into the internal RAM with respect to the installation of the camera head to be used temporarily.



Dialog 8

When **OK** has been selected, data update is started and operation proceeds to the next step (9). When **CANCEL** has been selected, the system returns to the Ready mode without executing camera data update. Upon selection of **BACK**, the system returns to step (6) where attachment of the lens cap is confirmed.

(9) Progress bar 1 is displayed, indicating the progress of camera data acquisition.

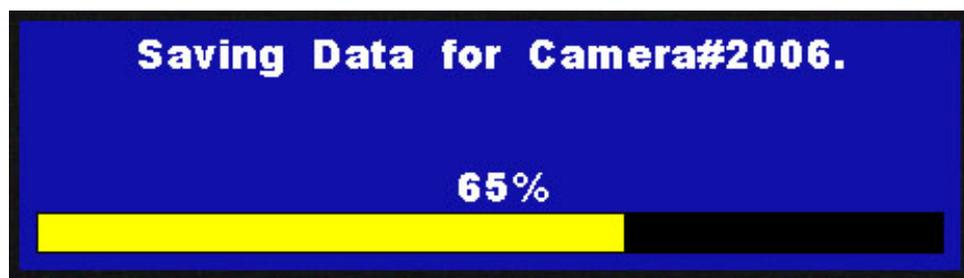


Progress bar 1

When the camera head to be used temporarily has been selected, the system goes into the Ready mode upon completion of camera data acquisition and operation is now ready for start using the new camera head. There is no need for power down or reboot.

When the camera head to be used permanently has been selected, operation automatically proceeds to step (10).

(10) Progress bar 2 is display, indicating the progress of camera data write into the built-in flash ROM.



Progress bar 2

(11) Dialog 9 is displayed, indicating completion of camera head exchange.



Dialog 9

Appearance of dialog 9 indicates that the camera head to be used permanently has been installed. Turn off the power and then turn it on again for reboot. After reboot, operation with the new camera head is available.

4

MEMRECAM fx

Recording

4. MEMRECAM fx Recording

4.1 Memory Ring Buffer

The **MEMRECAM** fx semiconductor memory is structured as a ring buffer. In general, the images are saved to the ring buffer in series from the initial step to final step. Since the memory is comprised of a single ring, it greatly enhances its performance.

The storage of images to memory starts when the DRP is set to **ARM** mode. While in **ARM** mode, the images are sent sequentially to memory at the frame rate selected by the user. After circling the ring buffer, new images are updated in sequence. The updating of the ring buffer continues while in **ARM** mode until a trigger input is received.

In addition to the images being stored to the buffer ring, record settings are also stored to memory when the trigger input is received. This information is stored separately but displayed jointly. The information captured includes scene number, trigger mode setting, frame rate, frame size, shutter, image quality setting during recording, recording comments and trigger date/time.

4.2 Triggering

4.2.1 Trigger Settings

The percentage of memory used as a buffer during recording is determined by the trigger setting. There are five trigger settings,

START	The trigger point is about 5% after the top of memory
CENTER	The trigger point is at the center of the memory. (Factory default setting)
END	The trigger point is about 5% before the end of memory
BURST	No Memory Buffer. (Records only when trigger signal is present)
CUSTOM (%)	Any percentage of the Memory may be set as Buffer Ring and Delay Start.

-100% DELAY Start
0% START Trigger
+50% CENTER Trigger
+100% END Trigger

- The **START**, **CENTER** and **END** are predefined trigger settings. The trigger setting determines how much of the Buffer Ring is being refreshed while in **ARM** mode. When the trigger input is received the images are saved to the remainder of the memory Buffer Ring. Recording stops once the Buffer Ring has circled. There is a 5% offset to ensure that important image data is not lost in the **START** and **END** trigger settings.

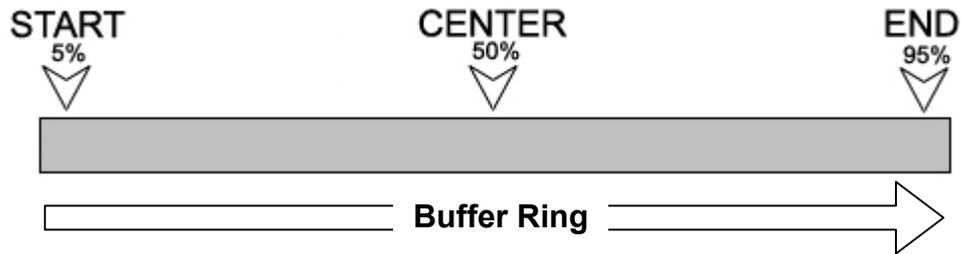


Diagram 1 **START**, **CENTER** and **END** trigger locations in Buffer Ring

- The **CUSTOM** trigger setting allows for any percentage value to be entered for the trigger setting or trigger delay. The percentage value can be any value from -100% to 100% and is based on the memory installed. To set a trigger setting, enter a positive percentage value. The negative percentage values delay the recording start time. At the -100% setting, recording will be delayed for a period of time equal to the recording time available in memory.

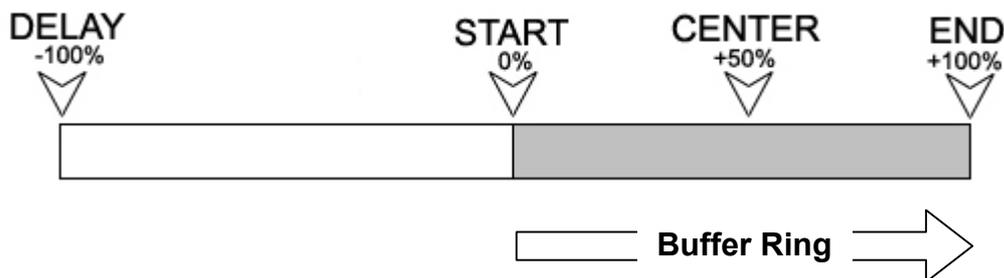


Diagram 1 **CUSTOM** trigger locations in Buffer Ring

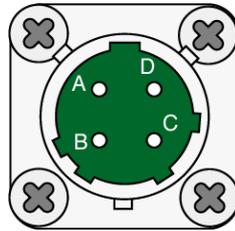


Caution

When the DRP is set to **ARM** mode, even before a trigger input is received, writing to memory begins. Any previously recorded images are lost and cannot be played back.

4.2.2 External Trigger Input

Use pins A and B for Contact Closure, 5V CMOS (Schmidt / Negative) or Current Loop trigger input. For Photo Isolate (Positive) trigger input use pins C and D.



■ Contact Closure

A contact closure circuit triggers the DRP to complete the recording session.



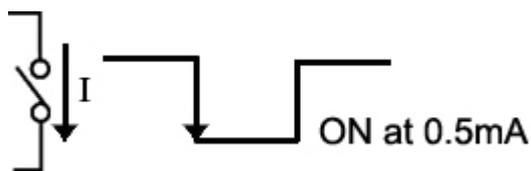
■ 5V CMOS (Schmidt / Negative)

A 5V voltage transition from High-Low triggers the DRP to complete the recording session.



■ Current Loop

When the current draw is greater than 0.5mA the DRP is triggered and completes the recording session.



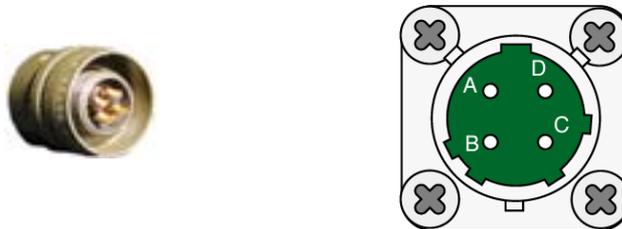
4.2.3 Trigger Connector

The Amphenol MS3116F8-4 four pin circular MIL connector is used to terminate the external trigger signal input cable. Use pins A and B for Contact Closure, 5V CMOS (Schmidt / Negative) or Current Loop trigger input. For Photo Isolate (Positive) trigger input use pins C and D.

- 1) Disassemble the trigger connector included as follows.



- 2) Use pins A and B for Contact Closure, 5V CMOS (Schmidt / Negative) or Current Loop trigger input. For Photo Isolate (Positive) trigger input use pins C and D.



- 3) Insert the cables through the Rear of the connector and the cable separation collar. Solder the cables to the appropriate pins. Use pins A and B for Contact Closure, 5V CMOS (Schmidt / Negative) or Current Loop trigger input. For Photo Isolate (Positive) trigger input use pins C and D.



- 4) Reassemble the connector and tighten securely.



4.3 Storing data while recording

Closed caption system (Image and data are separately recorded, but are displayed jointly.).

The following sets of data are recorded in the system controller at input of trigger: scene number, trigger mode setting, frame rate, frame size, shutter, recorded image quality setting, recording comments, and trigger date/time-of-day.

4.4 Segment recording

This feature is used to segment the recording memory. The recording time of each memory segment decreases as the number of segmentations increases. However, different recorded scenes that amount to the equivalent to the specific number of segmentations can be stored in the memory.

■ Segment size

The number of memory segmentations and the segment size determined through segmentation are classified according to the **MEMRECAM** fx memory size and listed below. (Combination of the memory capacity with the segment size is invalid when the related boxes are blank.)

		Total recording memory capacity			
		1.3Gbyte	4Gbyte	8Gbyte	16Gbyte
Memory segment size	162Mbyte	8			
	250Mbyte		16	32	64
	325Mbyte	4			
	500Mbyte		8	16	32
	650Mbyte	2			
	1Gbyte		4	8	16
	1.3Gbyte	1			
	2Gbyte		2	4	8
	4Gbyte		1	2	4
	8Gbyte			1	2
16Gbyte				1	

■ Memory segmentation setting

Set the memory segmentation using the menu:

[TOP MENU > SYSTEM MENU > SYSTEM SETUP > SEGMENT SIZE]

Caution

Changing the number of memory segmentations erases the images recorded in MEMRECAM fx so that recorded images become not to be able to read out.

■ Memory segment selection setting

Set the memory segment selection using the menu:

[TOP MENU < MEM SEGMENT]

■ Recording system by memory segment

The following recording systems are selectable from one memory segment to another:

- Event frame recording
- Burst recording
- Multi-trigger recording

In cases where all the foregoing recording systems have been selected at the same time, their priorities are as follows:

Multi-trigger recording > Burst recording > Event frame recording

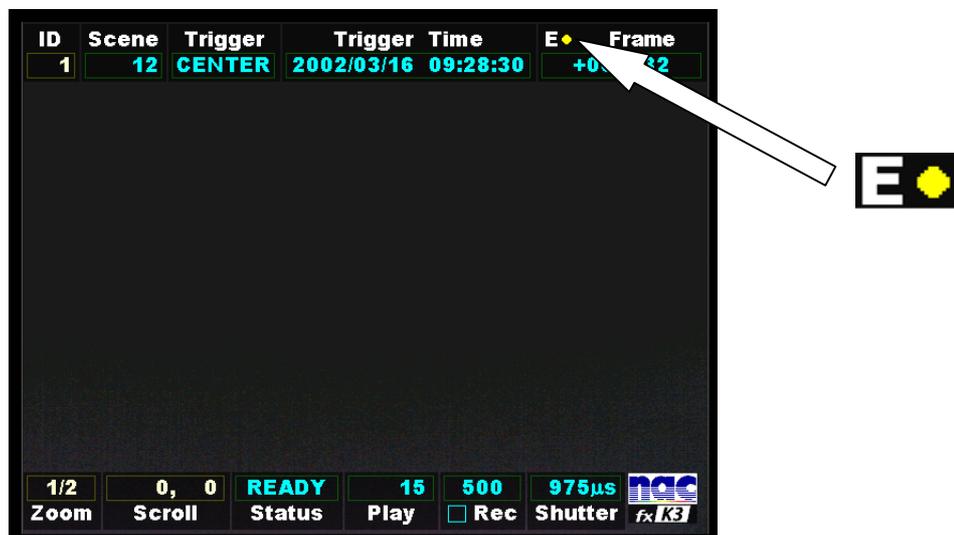
4.5 Event frame recording

The **EVENT FRAME** feature records a mark at the particular frames where an external trigger signal is received. The first trigger signal is recorded as the original trigger frame. All trigger signals following the original are marked as event trigger frames for future reference.

When the **EVENT FRAME** feature is ON a capital **E** is shown in the IBOX between **TRIGGER Time** and **FRAME**.



When the recorded image is being reviewed, a yellow mark appears to the right of the capital **E** identifying this particular frame as an event trigger frame. The original trigger frame is not marked; instead the IBOX **Frame** counter is set to zero. Every external trigger input after the original trigger will cause a yellow mark to be recorded. While in **READY** mode press the **TRIGGER** key to jump to the original trigger frame. Every time the TRIGGER key is pressed the image jumps to the next event trigger frame.



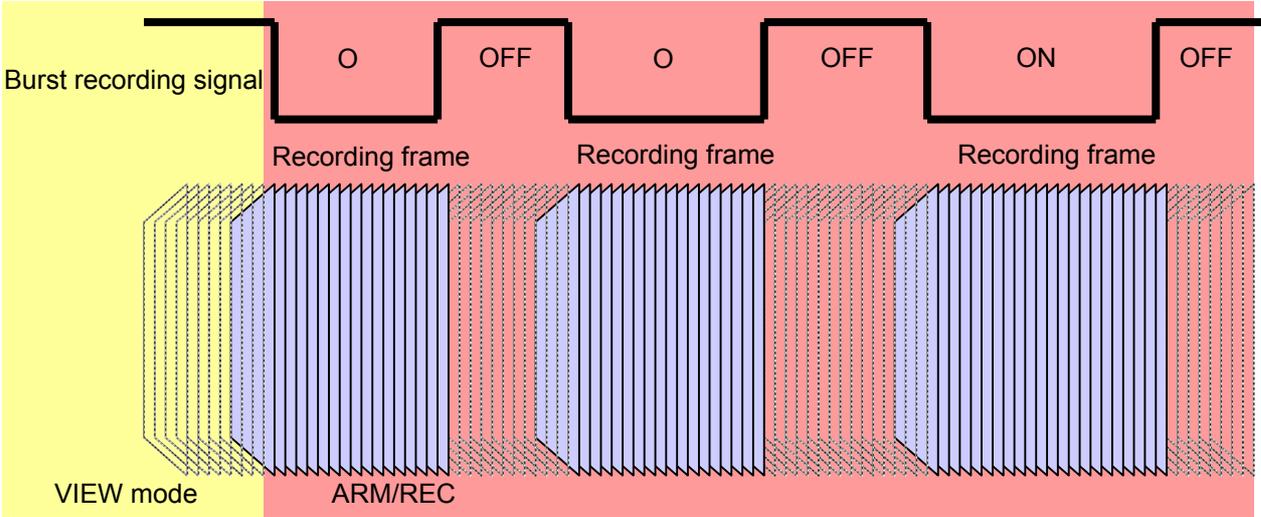
4.6 Burst recording

Recording is placed under control by sending the burst recording signal to the external trigger input connector of **MEMRECAM** fx. Maximum recording block number in (16).

When burst recording is to be done, set the **MEMRECAM** fx trigger to BURST and, after initiation of ARM, turn ON/OFF the burst recording signal.

 **Caution**

With the trigger set to BURST, recording cannot be done from the trigger key on the jog pad or operation panel. Do not start recording until the burst signal has reached the trigger connector.



■ Main burst recording functions (For further details see the timing charts on the pages that follow.)

1. The burst recording signal ON/OFF check is made at 1-ms intervals. When the relationship between the recording time and the recording frame image is to be accurately recorded, separation between input of the burst recording ON signal and that of the next burst recording ON signal should be not smaller than 5 ms. If this separation is less than 5 ms, images may not be recorded or the time-of-day at which an image is recorded may not be properly recorded.
2. When images have been recorded at less than 1000pps, the number of their frames is at least 2. On the other hand, when images have been recorded at 1000pps, the number of their frames is 3 at the minimum. At any pps following that, this number is recorded according to the duration of burst recording signal ON.

The minimum number of frames for an image recorded at 2000pps or more is given by

$$F_{\min} = 3 \times Fr$$

$$\text{Where } Fr = \text{frame rate (pps)} / 1000$$

After that, the number of frames is recorded in multiples of Fr according to the duration of burst recording signal ON.

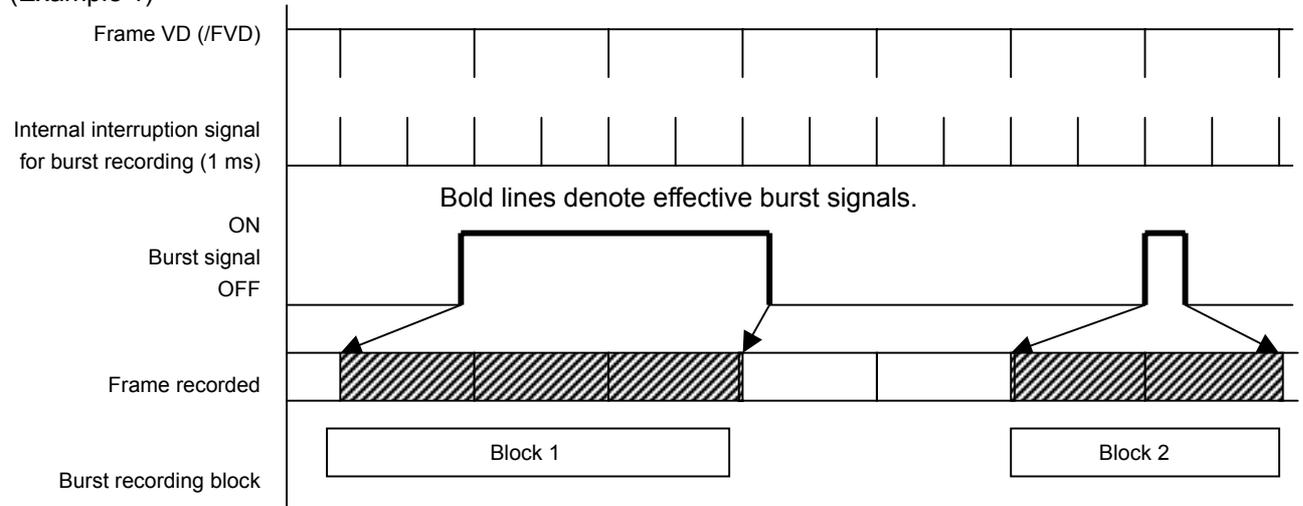
3. When a scene is being shot at a recording rate of 1000pps or less, the image being acquired is placed in the foremost frame of burst blocks upon sensing of the burst recording signal ON. On the other hand, when a scene is being shot at a recording rate of 2000pps or more, the image being acquired may not be placed in the foremost frame of burst blocks. In this instance, difference in time between the burst recording signal ON sensing time and the burst block foremost frame image recording time is within ± 2 ms at the maximum.
4. Burst recording is terminated under any one of the following conditions:
 - Recording into all recording memories has been finished.
 - Recording over all preset recording segments has been finished.
 - Recording that uses a maximum number (16) of burst blocks has been finished.
 - Recording has been brought to a stop (using the STOP key or STOP command).

■ Burst recording timing

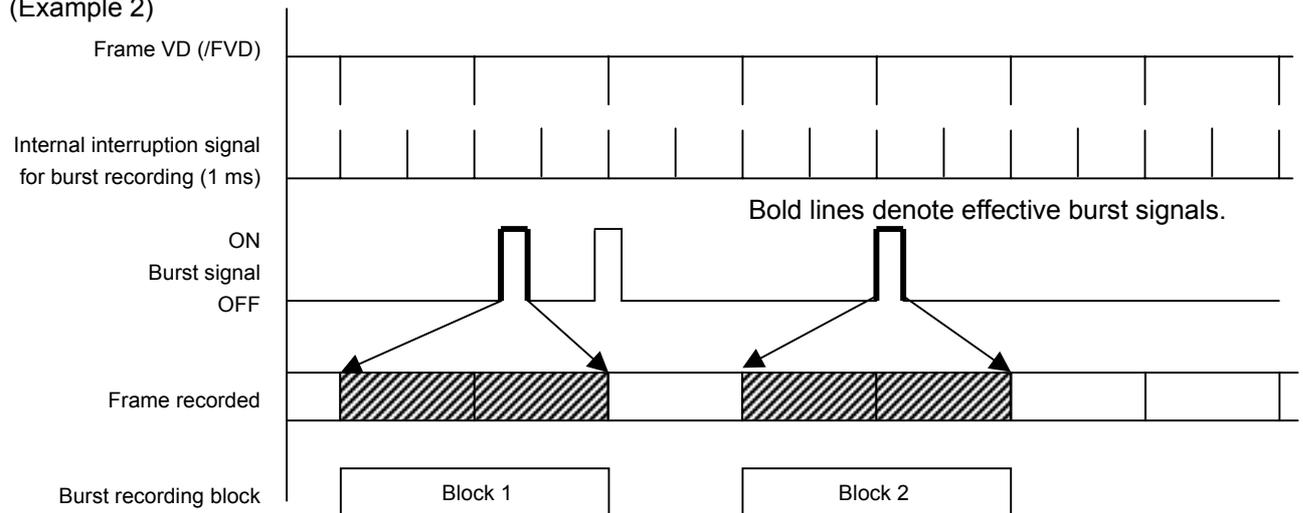
1. Recording at 100 to 500pps (typically at 500pps)

 Image recorded
 Image not recorded

(Example 1)



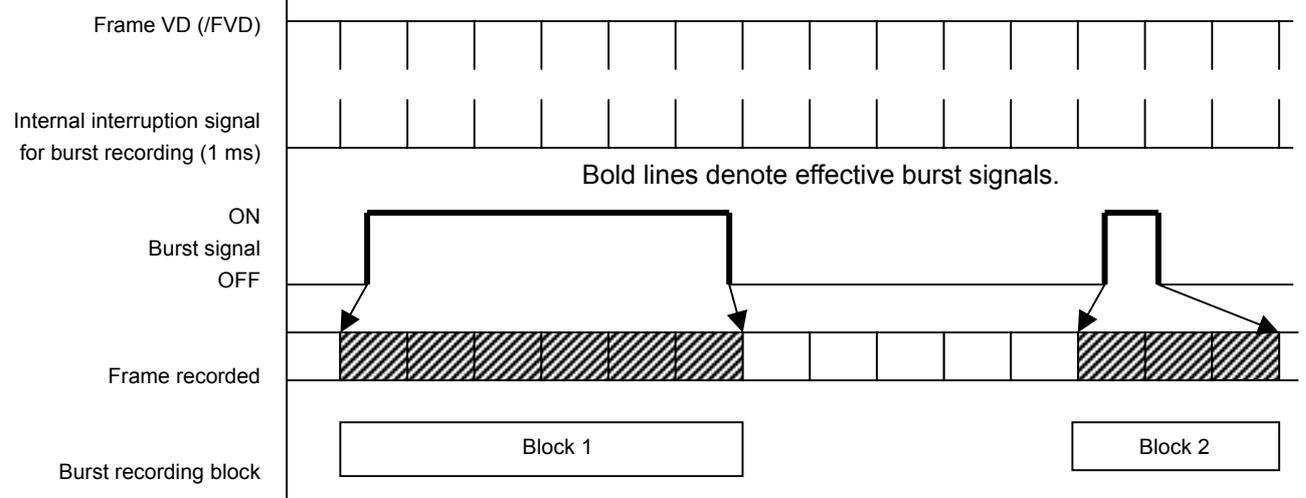
(Example 2)



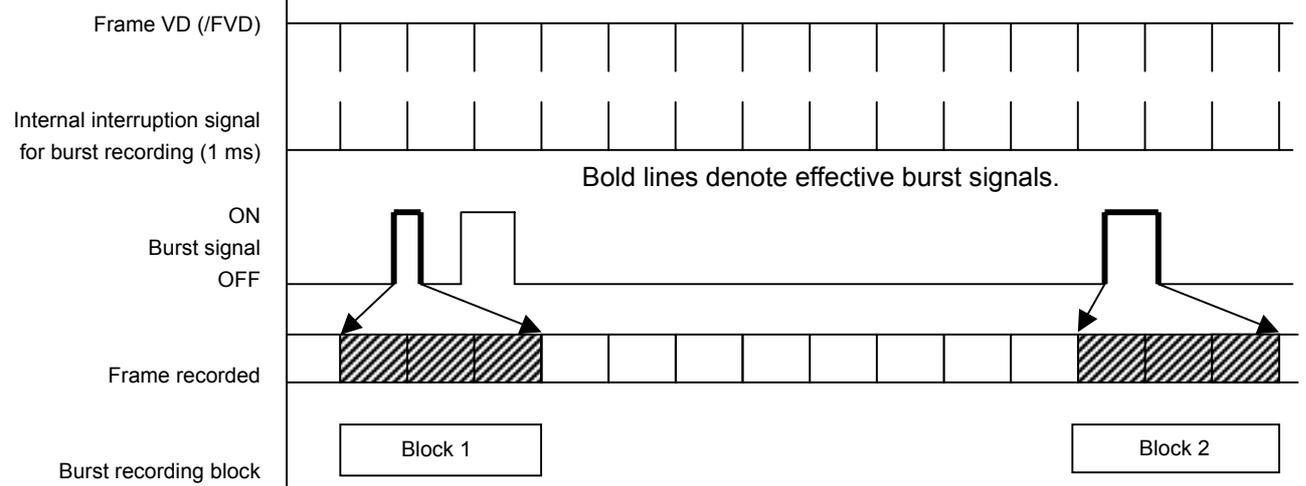
2. Recording at 1000pps

 Image recorded
 Image not recorded

(Example 1)



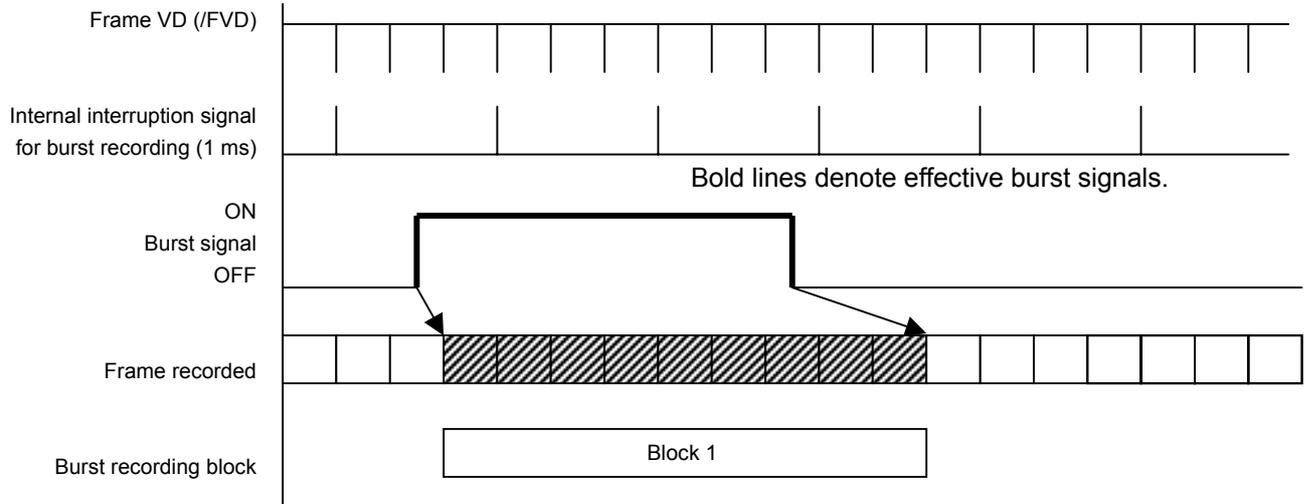
(Example 2)



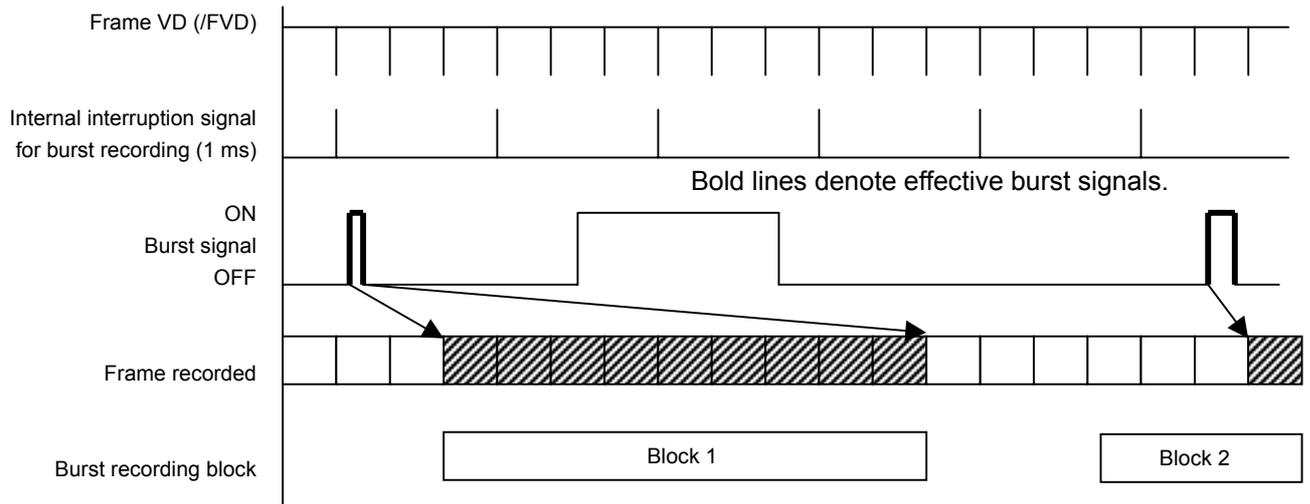
3. Recording at 2000pps or more (Typically 3000pps)

 Image recorded
 Image not recorded

(Example 1)



(Example 2)



■ Frame number for burst recording

Frame number 0 is assigned to the image that is recorded when the burst recording signal has been turned ON for the first time. Subsequently, frame numbers are successively given to the images in order that they are recorded.

When 1000pps recording is finished with the burst recording signal set to ON for 5 ms, OFF for 20 ms and ON for 5 ms, the total number of recording frames amounts to 10. In this case, each frame number and frame relative time are as given below.

Frame number	Frame relative time	
0	0.000000	(1st burst recording signal ON)
1	0.001000	
2	0.002000	
3	0.003000	
4	0.004000	
5	0.025000	(2nd burst recording signal ON)
6	0.026000	
7	0.027000	
8	0.028000	
9	0.029000	

■ Burst recording signal level and input method

For electrical specifications for input section, refer to “4.1.3 External trigger input”.

- Contact/current loop input / 5V_CMOS signal

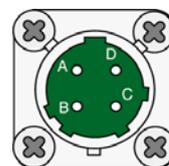
Use pins A and B of the external trigger input connector.

The burst recording signal is turned ON when the contact/current loop input signal contact is made or the 5V_CMOS signal is brought Low. On the other hand, it is turned OFF when the contact is opened and the signal is brought Hi.

- Photo Isolate input

Use pins C and D of the external trigger input connector.

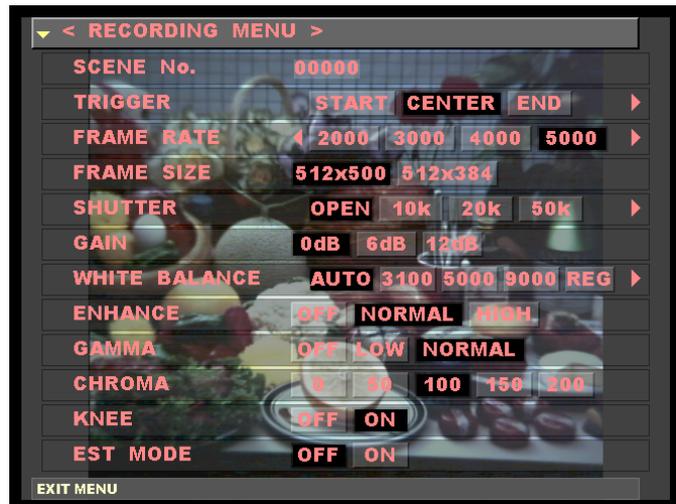
The burst recording signal is turned ON when the C-D voltage has exceeded 5 V (maximum 32 V) and remains OFF when that voltage is between 0 and 0.8 V.



■ Selection of burst recording mode

Step 1

Press the **MENU** key in the **VIEW** mode to call up **RECORDING MENU**.



Step 2

Select to the **TRIGGER** row using the **UP/DOWN** key.



Step 3

Using the **LEFT/RIGHT** keys, select **BURST**. Press the **MENU** key to return to the **VIEW** mode.



■ Selection of burst recording mode using IBOX

Step 1

Press the **LEFT/RIGHT** keys to enter the IBOX selection mode.



Step 2

Press the **SET** key to enter the trigger setting change mode (the area inside the Trigger setting box turns black).



Step 3

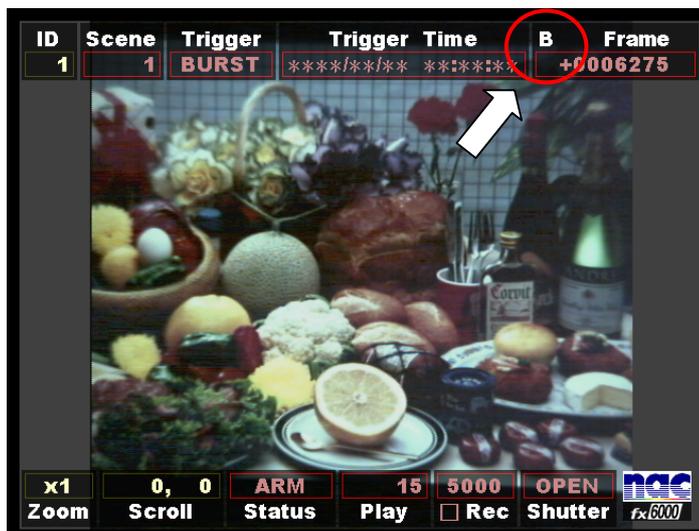
Using the **UP/DOWN** keys, change the Trigger setting to **BURST**.

Here, press the **STOP** key to return to the **VIEW** mode.



- In relation to playback in the burst recording mode

Explanation 1



Press the **VIEW/ARM** key to change the VIEW mode to the ARM mode.

Then, a letter **B** appears in the Frame IBOX on the upper right-hand corner of the screen, indicating that the current trigger setting is in the BURST mode.

Pressing the **TRIGGER** key in this mode does not start recording. To initiate recording, be sure to send the burst recording signal from the external trigger input connector.

Explanation 2



When the burst-recorded image is to be invoked, press the **TRIGGER** key so that the foremost image in each burst-recorded block is reached.

Then, a letter and a symbol "**B**•" appear in the Frame IBOX on the upper right-hand corner of the screen, indicating that the current onscreen image is the foremost in the burst-recorded block.

Each time the **TRIGGER** key is pressed, the foremost image in each burst-recorded block is successively reached.

4.7 Multi-trigger recording

Each selected memory segment is divided into 1 to 16 blocks (these can be incremented or decremented in units of 1) and recording proceeds while blocks are automatically changed one by one in response to each trigger signal.

When multi-trigger recording is to be done, set the number of blocks to 2 or more (1 in normal state) and input the trigger after the onset of ARM.

■ Multi-trigger recording modes

- All Blocks: Recording is terminated when the preset number of blocks is reached.
- Continuous: Recording continues irrespective of the preset number of blocks.



Caution

When the amount of images that have been recorded in the Continuous mode has exceeded the capacity of the preset number of blocks, the block containing previously recorded images is overwritten by the most recent images. As a result, only images last recorded in the blocks whose number is preset remain stored in the memory.

■ Main functions of multi-trigger recording

1. As far as multi-trigger recording is concerned, there are periods between recording blocks during which recording cannot be done. Therefore, blocks must be spaced between them for at least the following periods (space of time between the end of a given one-block recording and the beginning of recording images into the next block) before recording is initiated so as to accurately record the relationship between the recording time and the recording frame image. If this requirement is not satisfied (that is, intervals between blocks are too short), the recording time and the time-of-day recorded for a given image may not agree with each other.

Intervals between blocks

1000pps or more	5 ms	(Common to All Blocks and Continuous modes)
500pps	10 ms	(Common to All Blocks and Continuous modes)
250pps	20 ms	(Common to All Blocks and Continuous modes)
100pps	50 ms	(Common to All Blocks and Continuous modes)

By way of a peculiar example, it should be noted that intervals between triggers have their restrictions in the cases of an end trigger and a 100% custom trigger. Likewise, if these restrictive conditions are not satisfied, there may be cases where the recording time and the time-of-day recorded for a given image may not agree with each other.

Restrictions on intervals between triggers

All Blocks mode	1000pps or more	10 ms
All Blocks mode	500pps	20 ms
All Blocks mode	250pps	30 ms
All Blocks mode	100pps	50 ms
Continuous mode	All recording rates	200 ms

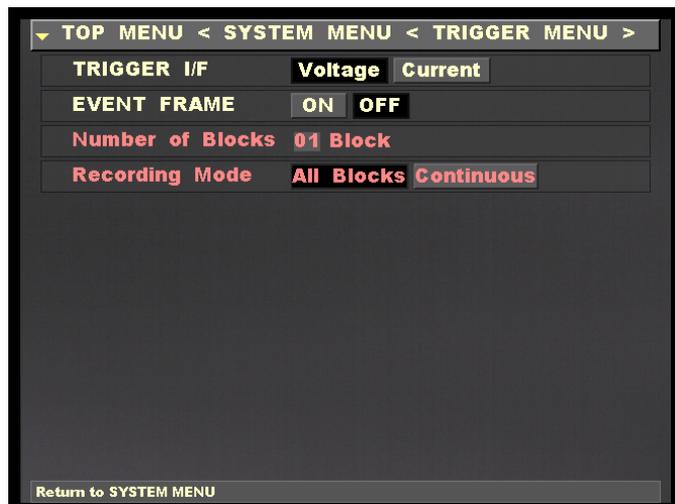
2. Multi-trigger recording is allowed to end under any one of the following conditions.
 - Recording into all recording memories has been finished (only in the All Blocks mode)
 - Stoppage of recording (in response to the user's STOP key operation or the STOP command) (in All Blocks and Continuous modes)

Note: In the Continuous mode, recording is terminated exclusively depending on "Stoppage of recording".

■ Setting of the number of blocks for multi-trigger recording

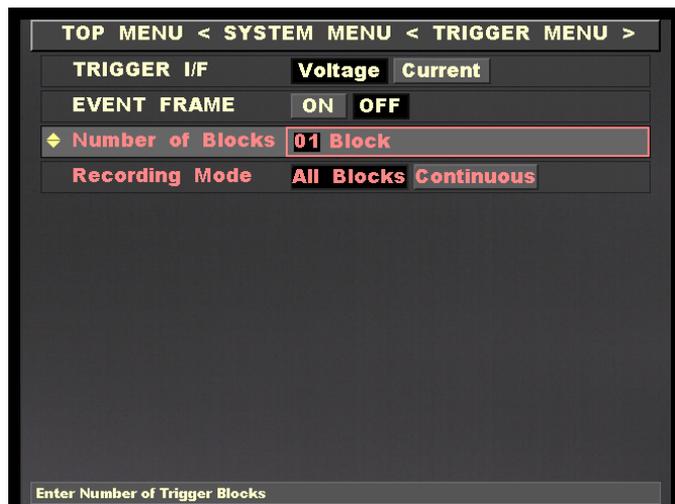
Step 1

Press the **SET** key with TOP MENU > SYSTEM MENU > TRIGGER MENU.



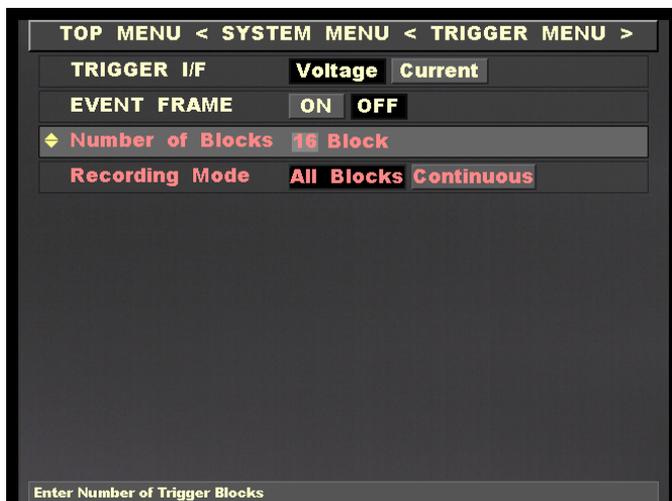
Step 2

Use the **UP/DOWN** keys to select the Number of Blocks row and press the **SET** key.



Step 3

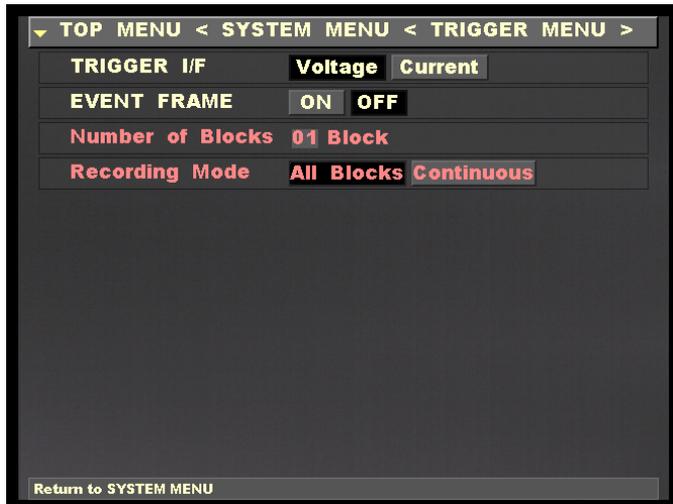
Using the **UP/DOWN** keys, change the number of blocks and set it by pressing the **SET** key.



■ Setting of multi-trigger recording mode

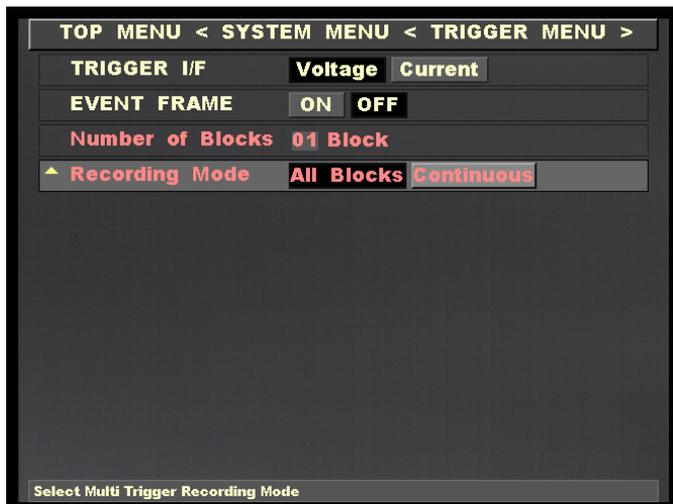
Step 1

Press the **SET** key with TOP MENU > SYSTEM MENU > TRIGGER MENU



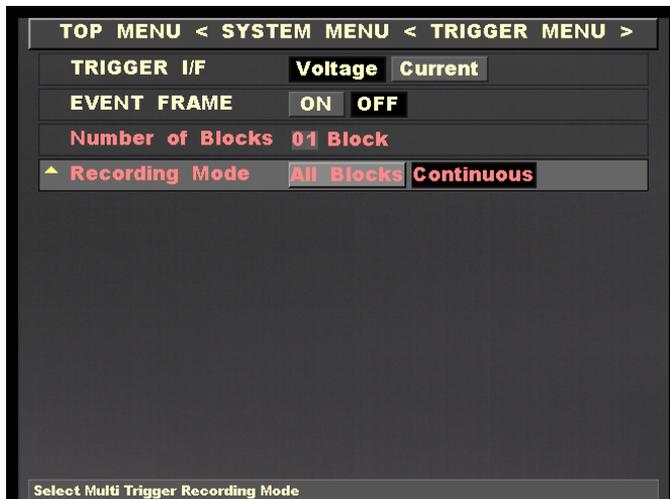
Step 2

Use the **UP/DOWN** keys to select the **Recording Mode** row



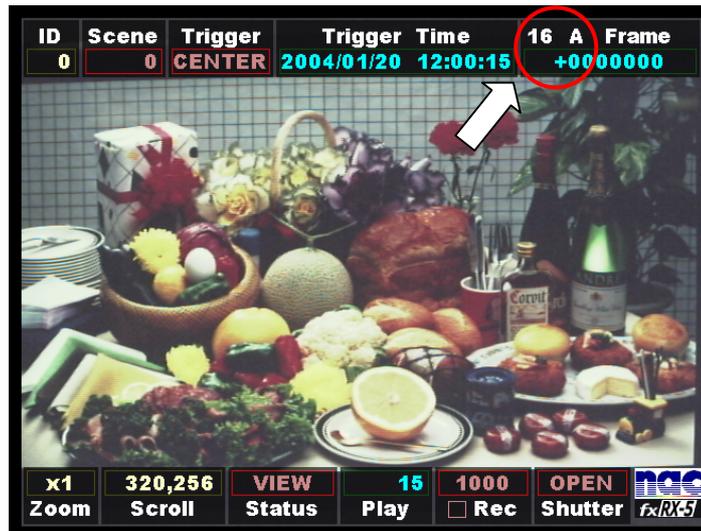
Step 3

Using the **UP/DOWN** keys, select the recording mode and set it.



- In relation to playback for multi-trigger recording

Explanation 1



Press the **VIEW/ARM** key to change the **VIEW** mode to the **READY** mode.

Then, a letter and a numeral appear in the Frame IBOX on the upper right-hand corner of the screen.

This indicates that the multi-trigger screen is now on display.

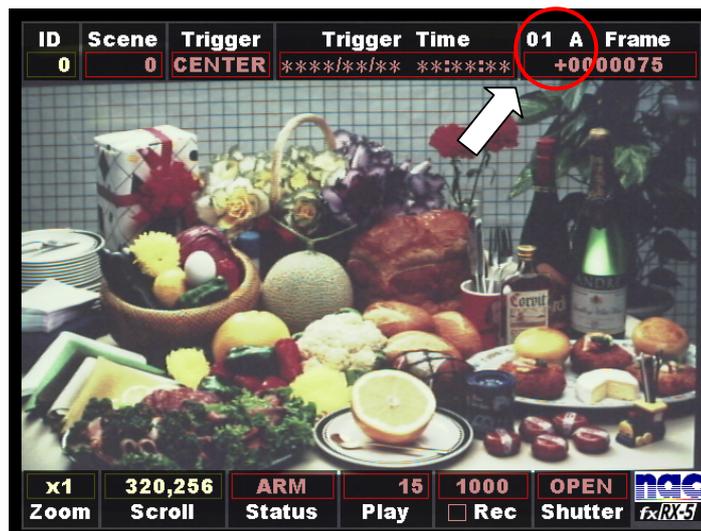
The numeral and the letter denote the preset number of blocks and the preset recording mode, respectively.

A: All Blocks mode

C: Continuous mode

(The photo given at above shows that the number of blocks is 16 and that the recording mode is All Blocks.)

Explanation 2



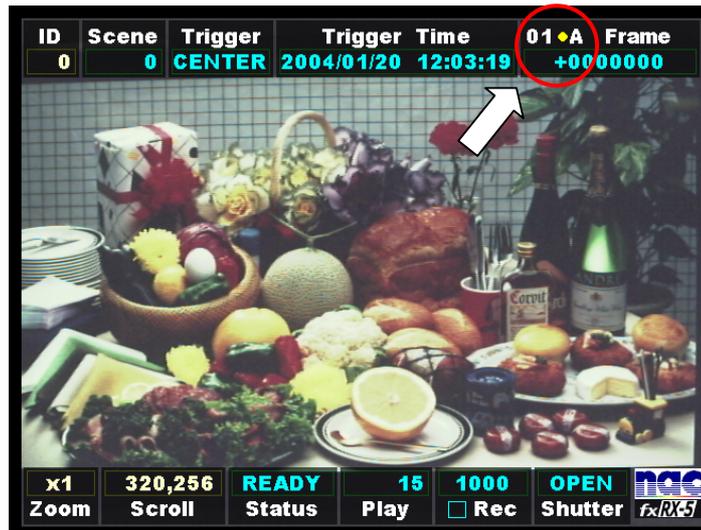
Press the **VIEW/ARM** key to change the **VIEW** mode to the **ARM** mode.

Then, the numeral appearing in the Frame IBOX on the upper right-hand corner of the screen is changed to **01**.

Pressing the **TRIGGER** key in this mode initiates recording. Each time recording is done, the numeral appearing in the Frame IBOX on the upper right-hand corner of the screen increases until the preset number of blocks is reached.

(However, the number continues to increase beyond the preset number of blocks when in the Continuous mode.)

Explanation 3



When the multi-trigger-recorded images are being played back, pressing the **TRIGGER** key allows the operator to go to the trigger frame in each recording block.

Then, numerals and a symbol “**01 •**” appear in the Frame IBOX on the upper right-hand corner of the screen.

This indicates that the currently appearing image represents the trigger frame in a recording block.

Each time the **TRIGGER** key is pressed, the operator goes to one trigger frame to another in each recording block.

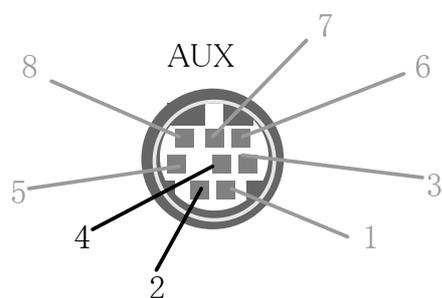
4.8 Exposure start signal input (EST MODE)

This feature enables a desirably timed acquisition of a one-frame equivalent of image when an exposure start signal is received from an external source.

In order to use this feature, it is required that the shooting speed be more than double the inverse of the shortest period of the exposure start signal.

Example: Supposing that the shortest period of the exposure start signal is 2.5 ms, its inverse is 400. Doubling 400, we have 800. Therefore, the shooting speed must be set to 1000 frames or more per second.

■ Connector



■ Usage

Use pin 4 and pin 2.

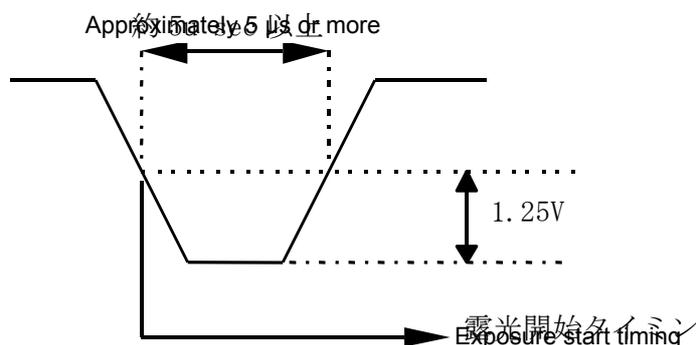
Pin 4: /EST Exposure start signal input

Pin 2: GND Exposure start signal input return

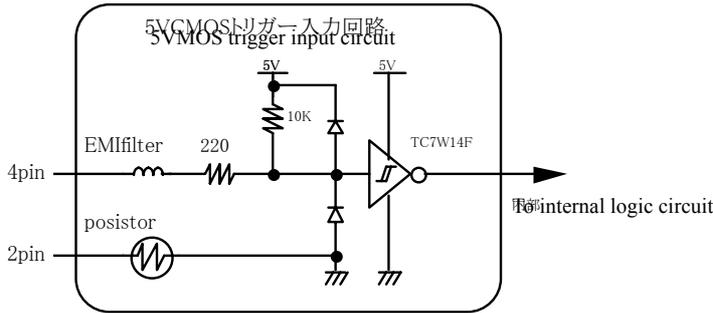
5 V CMOS (Schmidt trigger) input. Exposure starts upon H-to-L transition. Time difference, $\pm 0.4 \mu\text{s}$.

H level: 3.5 VDC or more; L level: 1.25 VDC or less. The minimum pulse width is 5 μs .

See the following figure.

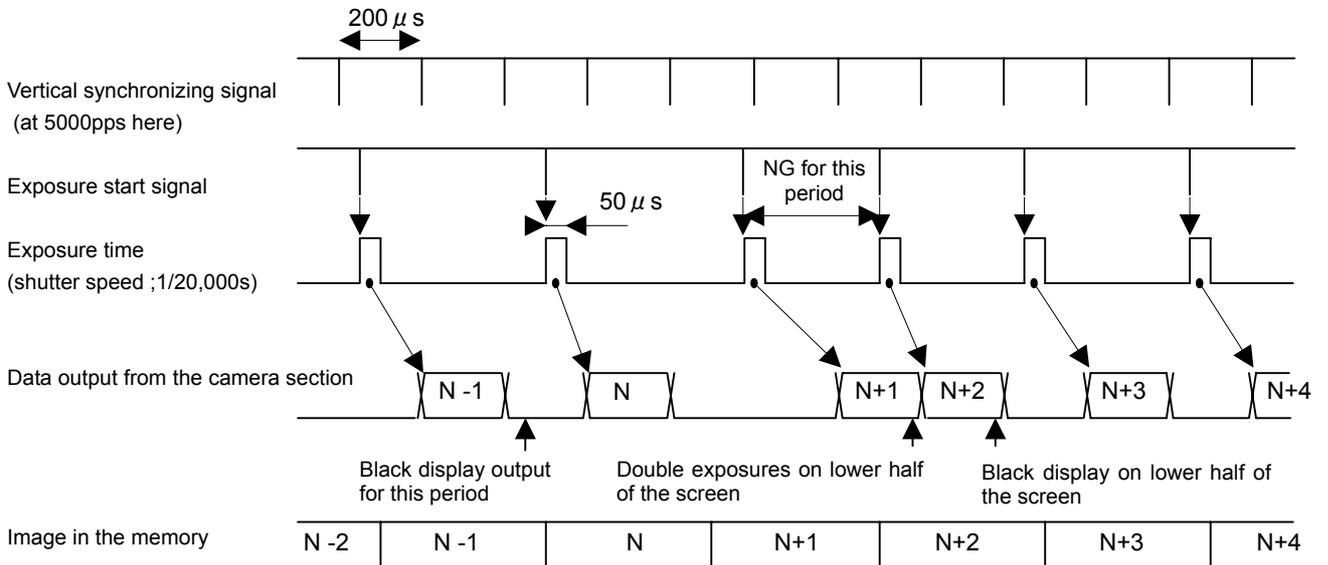


■ Interface circuit



■ Explanation of limitations on timing

Exposure starts in response to the exposure start signal and lasts for the period which has been determined upon setup. Double exposure or image-absent shooting occurs when exposure and image data transfer take place concurrently. Limitations on the related timings are schematically given below.



In the above figure, N+1 under “Data output from the camera section” partly overlaps the exposing operation (exposure that forms the N+2 image) under “Exposure time”. Therefore, part of an image is subject to double exposure or is blackened and lost.

One typical example of such a defect is given to the right. As is shown here, the upper half of an image is also exposed in the lower half.



4.9 Color Balance Operation

4.9.1 White Balance

White Balance is a post-processing enhancement. When an image is recorded, the raw data in memory is not affected by this setting. The setting can be changed later at playback. There are six White Balance settings.

■ AUTO TRACKING

The corresponding color temperature is determined from the image signal. The proper white balance and the color temperature are automatically maintained in a range of approximately 3000~9000K. Proper white balance might not be maintained if the image is saturated with excessive color (such as only red). To set the proper white balance, select a white area (without coloring) as large as possible on the screen.

■ 3100

Select this setting when the light source has a color temperature of 3100 Kelvin. This corresponds to tungsten type lamp illumination.

■ 5000

Select this setting when the light source has a color temperature of 5000 Kelvin. This corresponds to strobe or metal halide lamp illumination.

■ 9000

Select this setting when the light source has a color temperature of 9000 Kelvin.

■ SET REG

Select when a more precise color white balance setting is desired, or when there is a possibility of modifying the color temperature during recording. Choose this menu to access the internal AUTO TRACKING mode for white balance. Next, press the **SET** key to confirm the proper white balance on the screen. This saves the white balance data for that instance. This data can be played back by selecting REG mode.

■ REG

To use the color temperature setting selected in SET REG mode.

4.9.2 Auto-Track White Balance (AWB)

The Automatic White Balance function of the **MEMRECAM** fx employs a method where the corresponding color temperature is detected based on the signal of the image received. To match the proper white balance, it is necessary to extract the colorless data from the image signal. This is accomplished by integrating the entire image until it becomes colorless. This the method allows for variations to be corrected. Theoretically there is the potential of error when there is a large area of the screen with a specific color. Our control algorithm has been developed to the point where problems with the Automatic White Balance application are minimal.

5

MEMRECAM fx Troubleshooting

5. **MEMRECAM** fx Troubleshooting

5.1 When Not Functioning Normally

The following are common troubleshooting practices when components are not functioning normally. Contact your retail outlet to perform maintenance when normal operation does not occur after following these instructions (refer to section 5.3 “Repair and Contact Information”).

5.1.1 Does Not Startup

Restart by reverting to factory settings. Press and hold the STOP key and turn the power switch ON. Hold the STOP key until the firmware version startup screen is displayed. If startup does not occur, repairs are needed.

5.1.2 J-PAD2 Does Not Work

When connecting the J-PAD2, or during **MEMRECAM** fx startup, confirm that the J-PAD2 LED lights up in sequence. If the LED lights up and the J-PAD2 does not work properly, then there may be a J-PAD2 or **MEMRECAM** fx malfunction.

5.1.3 **MEMRECAM** fx TRIG IN Connector Does Not Recognize the External Trigger (M-HUB Application)

The external trigger cable is connected to the MASTER M-HUB TRIG IN connector when using multiple cameras. The DRP TRIG IN connector is deactivated when connecting to an M-HUB.

5.2 Handling a System Crash

A system crash occurs when display continues but there is no operation. If many alphanumeric and exception patterns are displayed on the screen, there is a problem detected by the internal software and operation has been suspended. The cause varies according to the specific malfunction of the device.

When there is a system crash, make notes (memo or photograph) of all of the characters displayed on the screen. When recording is complete, run a test to see if the loss of images in the memory can be prevented.

! When the optional memory backup is operational

Turn the switch OFF and after several seconds turn the power switch ON. It should revert to the state it was immediately after recording. Save the images to CF as soon as possible. If it does not startup normally, the images will be lost.

! When the optional memory backup not available

To prevent loss of the image in the memory, restart without turning the power off to memory. Enter the SYSTEM SETUP MENU by pressing the Reset Switch in the Rear Camera Control Touch Pad. Use the (00001)A

UP/DOWN keys to select the Reboot row and press the SET key to reboot the system. The system should startup normally and if the image remains, playback can be conducted in the same manner as immediately after recording. Save the images to the CF as soon as possible. If it does not startup normally, the images will be lost.

5.3 Repair and Contact Information

Contact your retail outlet with the following information during a system crash or when normal operation does not occur.

- For system crash, make a note of the characters displayed on the screen
- For other problems, make a note of the items displayed
- Status of panel LED lighting
- **MEMRECAM** fx model name and serial number
- Specifics of problem, operation immediately prior to problem, frequency of problem
- Components
 - ‡ J-PAD2
 - ‡ Color LCD Viewfinder
 - ‡ Memory Backup Option
 - ‡ Master M-HUB (serial number, number and type of other MEMRECAM)
 - ‡ Slave M-HUB (number)
 - ‡ Smart Capture Software (version, OS of PC, type of PC)
 - ‡ CF
 - ‡ Type of Power input (AC / DC)
 - ‡ Other specifics

6

MEMRECAM fx RX-6

Specifications

6.1 Imager

- 1) Photographic Element About 3/4 inch, 0.26MM solid color/monochrome photographic element (CMOS sensor)
- 2) Recording Speed 100,250,1000,2000,3000,4000,5000,6000,8000,10000,20000 , 40000,60000,70000,84000,105000,120000,210000 frames/sec
- 3) Image Size and Area

Frame Size	File Size	Valid Area
Full (less than 4000pps)	512(H) × 512(V)	8.2(H) × 8.2(V) mm
Full (at 5000pps)	512(H) × 500(V)	8.2(H) × 8.0(V) mm
Standard (less than 6000pps)	512(H) × 384(V)	8.2(H) × 6.2(V) mm
Split (at 8000pps)	512(H) × 308(V)	8.2(H) × 0.52(V) mm
Split (at 10000pps)	512(H) × 248(V)	8.2(H) × 4.0(V) mm
Split (at 20000pps)	512(H) × 120(V)	8.2(H) × 2.0(V) mm
Split (at 30000pps)	512(H) × 80(V)	8.2(H) × 1.3(V) mm
Split (at 40000pps)	512(H) × 60(V)	8.2(H) × 1.0(V) mm
Split (at 60000pps)	512(H) × 36(V)	8.2(H) × 0.58(V) mm
Split (at 70000pps)	512(H) × 32(V)	8.2(H) × 0.52(V) mm
Split (at 84000pps)	512(H) × 24(V)	8.2(H) × 0.40(V) mm
Split (at 105 000 pps)	512(H) × 20(V)	8.2(H) × 0.34(V) mm
Split (at 1 20000 pps)	512(H) × 16(V)	8.2(H) × 0.27(V) mm
Split (at 210000 pps)	512(H) × 8(V)	8.2(H) × 0.13(V) mm

Note 1) pps (picture per second) refers to the unit for photographic speed in frames/second

Note 2) The number of images stored in the memory is the same as the file size

Note 3) Selection of the file size for the lens used is conducted in the menu (RECORDING MENU).

With the 512(H) × 512(V) and 512(H) × 500(V) pixel setting using the 2/3 inch C-mount lens, the corners of the image are not photographed (rejected).

4) Shutter

- Shutter Method Electronic Shutter
- Shutter Speed Fixed exposure time 1/photographic speed to 1/200,000sec
Variable exposure time 1 to 999uS (custom shutter)

5) Lens Mount

F-mount (with adapter) or C-mount (no adapter).

6) Back LED

Green light lit POWER ON

Not lit POWER OFF

(Orange or Red light lit: It is shown that the power supply voltage supplied to a camera head is falling from the regulation value.)

6.2 Recorder

1) Recording Time

The recording time depends on the amount of memory, recording speed and frame size shown in the following chart (unit: seconds).

Amount of Memory	Recording Speed (pps)	Standard Vertical 512	Full	Split
1.3GB	100	54	40 (vertical 512)	NA
	250	21	16 (vertical 512)	NA
	500	10	8.1 (vertical 512)	NA
	1000	5.4	4.0 (vertical 512)	NA
	2000	2.7	2.0 (vertical 512)	NA
	3000	1.8	1.3 (vertical 512)	NA
	4000	1.3	1.0 (vertical 512)	NA
	5000	1.0	0.8 (vertical 500)	NA
	6000	0.9	NA	NA
	8000	NA	NA	0.8 (vertical 308)
	10000	NA	NA	0.8 (vertical 248)
	20000	NA	NA	0.8 (vertical 120)
	30000	NA	NA	0.8 (vertical 80)
	40000	NA	NA	0.8 (vertical 60)
	60000	NA	NA	0.9 (vertical 36)
	70000	NA	NA	0.9 (vertical 32)
	84000	NA	NA	1.0 (vertical 24)
105000	NA	NA	0.9 (vertical 20)	
120000	NA	NA	1.0 (vertical 16)	
210000	NA	NA	1.2 (vertical 8)	
4GB	100	163	122 (vertical 512)	NA
	250	65	49 (vertical 512)	NA
	500	32	24 (vertical 512)	NA
	1000	16	12 (vertical 512)	NA
	2000	8.1	6.1 (vertical 512)	NA
	3000	5.4	4.0 (vertical 512)	NA
	4000	4.0	3.0 (vertical 512)	NA
	5000	3.2	2.5 (vertical 500)	NA
	6000	2.7	NA	NA
	8000	NA	NA	2.5 (vertical 308)
	10000	NA	NA	2.5 (vertical 248)
	20000	NA	NA	2.6 (vertical 120)
	30000	NA	NA	2.6 (vertical 80)
	40000	NA	NA	2.6 (vertical 60)
	60000	NA	NA	2.9 (vertical 36)
	70000	NA	NA	2.8 (vertical 32)
	84000	NA	NA	3.1 (vertical 24)
105000	NA	NA	2.9 (vertical 20)	
120000	NA	NA	3.2 (vertical 16)	
210000	NA	NA	3.7 (vertical 8)	
8GB	100	327	245 (vertical 512)	NA
	250	131	98 (vertical 512)	NA
	500	65	49 (vertical 512)	NA
	1000	32	24 (vertical 512)	NA
	2000	16	12 (vertical 512)	NA
	3000	10	8.1 (vertical 512)	NA
	4000	8.1	6.1 (vertical 512)	NA
	5000	6.5	5.0 (vertical 500)	NA
	6000	5.4	NA	NA
	8000	NA	NA	5.1 (vertical 308)
	10000	NA	NA	5.0 (vertical 248)

	20000	NA	NA	5.2 (vertical 120)
	30000	NA	NA	5.2 (vertical 80)
	40000	NA	NA	5.2 (vertical 60)
	60000	NA	NA	5.8 (vertical 36)
	70000	NA	NA	5.6 (vertical 32)
	84000	NA	NA	6.2 (vertical 24)
	105000	NA	NA	5.9 (vertical 20)
	120000	NA	NA	6.5 (vertical 16)
	210000	NA	NA	7.4 (vertical 8)
16GB	100	655	491 (vertical 512)	NA
	250	262	196 (vertical 512)	NA
	500	131	98 (vertical 512)	NA
	1000	65	49 (vertical 512)	NA
	2000	32	24 (vertical 512)	NA
	3000	21	16 (vertical 512)	NA
	4000	16	12 (vertical 512)	NA
	5000	13	10 (vertical 500)	NA
	6000	10	NA	NA
	8000	NA	NA	10 (vertical 308)
	10000	NA	NA	10 (vertical 248)
	20000	NA	NA	10 (vertical 120)
	30000	NA	NA	10 (vertical 80)
	40000	NA	NA	10 (vertical 60)
	60000	NA	NA	11 (vertical 36)
	70000	NA	NA	11 (vertical 32)
	84000	NA	NA	12 (vertical 24)
	105000	NA	NA	11 (vertical 20)
	120000	NA	NA	13 (vertical 16)
	210000	NA	NA	14 (vertical 8)

2) Recording Pixel Data recording at 10bit/pixel

3) Recording Live Display

The live image displayed during color photography is in color. The live image is updated at 1/1000 seconds of each segment block. Thus updating one screen requires approximately 1/15 seconds for 1000pps. (at 32 block, there is a time lag in image updating)

There is no segment lock at less than 1000pps in VIEW mode.

4) Recording Trigger Mode

- START Trigger goes to the frame about 5% past the start of the recording memory.
- CENTER Trigger goes to the center frame (about 50%) of the recording memory.
- END Trigger goes to the frame about 5% before the end of the recording memory.
- CUSTOM Trigger goes to the frame with the preset value (100~100%). Can be set in 1% increments.

5) Storing Data while Recording

Closed caption method (method where image and information are stored separately but displayed jointly). The scene number, trigger mode setting, frame rate, frame size, shutter, image quality setting during recording, recording comments and trigger date/time are all stored on the system controller at trigger input.

6.3 Image Processor

1) Settings

- GAIN 0dB,6dB,12dB
- WHITE BALANCE AUTO,3100K,5000K,9000K,REG (Color camera only)
- ENHANCE OFF, NORMAL, HIGH
- GAMMA OFF, LOW, NORMAL
- CHROMA 0,50,100,150,200 (Color camera only)
- KNEE ON, OFF

2) Display

- Zoom magnification of 1, 2, 4
- Scroll Scrolls through the zoomed image display area (640 × 480).
Can set the display location

3) Playback

- Speed 1 to1920 frames/second, in both directions
- Frame Jump trigger point, recording start point, recording end point
- Playback Mode Single playback, loop playback
- Playback Range Settings Can be set at both start and end points

4) D-VGA Output

- Output Size VGA (640 × 480)
- Output Signal TMDS (Transition Minimized Differential Signaling) standards
1 system for specialty connector
- Gradation R, G, B each 8Bit

6.4 Controller/Digital Data Input/Output

- | | |
|--|---|
| 1) TRIG. IN | Trigger input |
| · LED Display | Light off: off; Flashing light: awaiting trigger signal; Light on: recording |
| 2) CONTROL | J-PAD2 connection |
| · LED Display | Light off: disconnected; Flashing light: connected; Light on: recording |
| 3) AUX | Synchronized recording signal and external device control serial signal |
| · Synchronized VD recording signal | 100 to 210,000pps (only during recording), TTL signal, shutdown |
| · External device control series signal | Tx, Rx, CTS, RTS (RS-232C) |
| 4) 100B-T | Ethernet 100Base-TX connection (no joint use with FC-AL) |
| · Transmission speed | 100Mbps Half Duplex |
| · LED Display | Link Status (displays status with red/green 2-color light/flashing/off) |
| 5) FC-AL | FC-AL connection (no joint use with 100Base-TX) |
| · Transmission setting | None |
| · Transmission protocol | FCP-SCSI |
| · Transmission speed | 1.062Gbps |
| · LED Display | Green light: receiving valid data with this connector
Orange light: receiving valid data with REMOTE I/O connector |
| 6) REMOTE I/O | M-Hub connection |
| · LED Display | Off: disconnected, On: connected |
| 7) D-VGA OUT | Special VGA converter, special viewfinder connection |
| · Transmission method | TMDS |
| 8) CF | CF card port |
| · Interface | Compact Flash standard |
| · Connector | Compact Flash Type I, II standard |
| · Storage device (example), data storage speed (example) | Micro Drive 1GB? about 0.5MByte/sec
Compact Flash 128MB? about 0.3MByte/sec |
| · Save frame amount | Depends on storage device and frame size |
| · Save scene amount | Depends on storage device and save frames/scene amount |
| · Save data | Movie file (MCFE)? tagged image file (TIFF) |
| · LED Display | Green light: power on, green/red simultaneously ON: accessing |

6.5 Power Supply

1) Input Power	20 - 32DCV; about 60W (during ARM mode, DC24V when adjacent devices are disconnected)
2) Power Switch	Rotary type (OFF, REMOTE , ON)
3) Remote Power Control	With the REMOTE power switch, simultaneous ON/OFF with master M-Hub power
4) Delayed Power Off	NA

6.6 Environment

1) Operating Temperature/Humidity	0 to 40°C, 30 to 80%RH (no condensation)
2) Storage Temperature/Humidity	-10 to 60°C, 20 to 80%RH (no condensation)
3) Vibration	MIL-STD-810D METHOD 514.3 CATEGORY1 standards (Common carrier environment) FIGURE514.3-1 to 514.3-3
4) Shock	
Camera	Half-sign, 11msec, 150G, 1000 times
DRP	Half-sign, 11msec, 100G, 1000 times

Notes) for shock and vibration

* A G-force resistant lens is required. The attached lens is insufficient.

* Corresponds only to POWER, TRIG IN, REMOTE IN connectors. Other connectors are insufficient.

6.7 Dimensions

1) External Dimensions excluding the connector, handle, protrusions, options and cable	
Camera	Approximately W80 × Approximately H 80 × Approximately D77mm
DRP	Approximately W145 × Approximately H142 × Approximately D298mm
2) Weight	Excluding handles and options
Camera	About 0.7 kg (excluding plate, lens and adapter)
Tripod plate	About 0.03kg
Attachment plate	About 0.11kg
FC mount adapter	About 0.49kg
DRP	About 7kg (4GB model excluding cables, handle, plate and options)
Handle	About 0.11kg
Tripod plate	About 0.43kg

6.8 Precision

1) Recording time accuracy

less than $\pm 0.01\%$ (or 10^{-4}). This value is the accuracy of the recording speed in reverse (frequency) during a temporary period (more than 1 second).

2) Inspection method for recording time accuracy

The frequency of the /FRMVD (synchronized recording) signal output from the AUX connector is measured by the frequency counter for the recording speed during a temporary period (more than 1 second).

6.9 Specifications of Main Accessories

6.9.1 AC POWER ADAPTER (Optional)

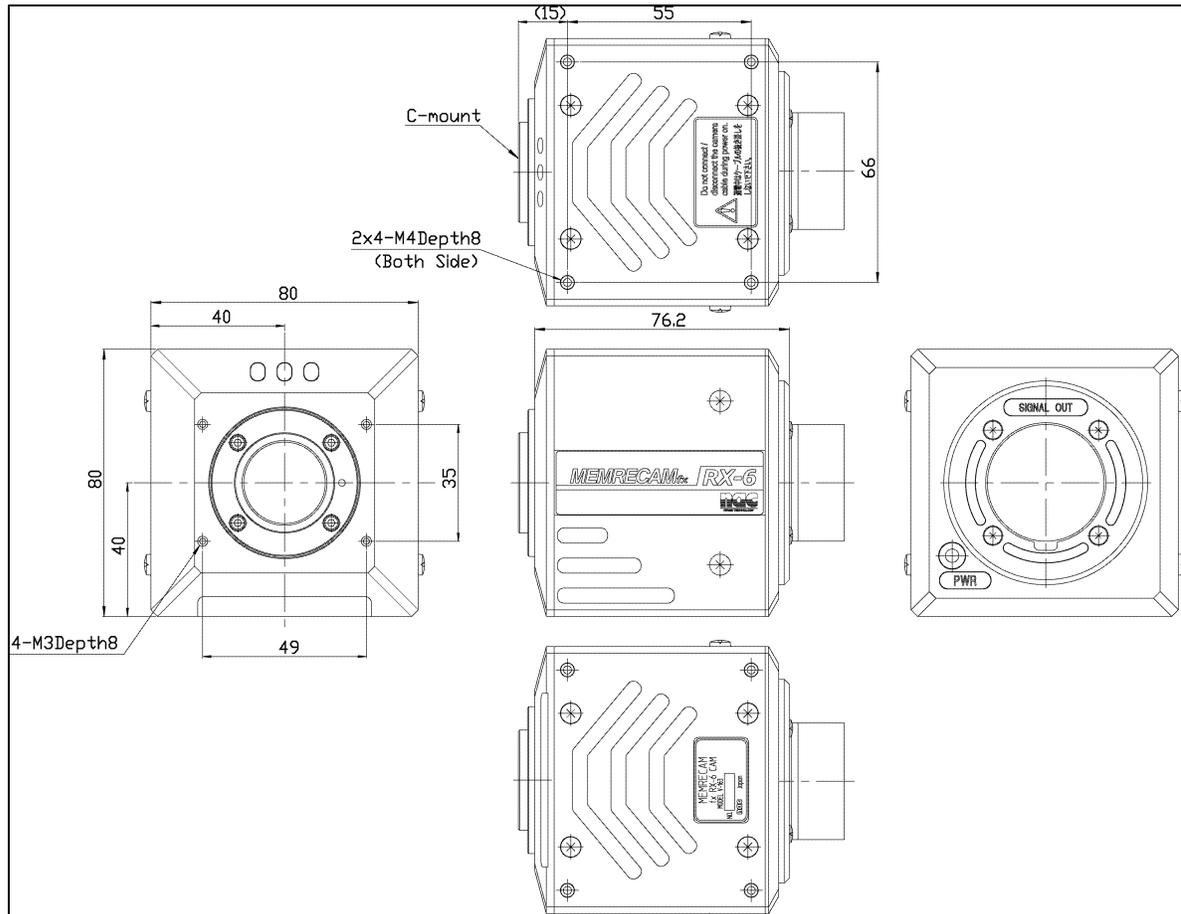
1) Input	85 to 264 ACV, 47 to 63Hz
2) Output	24DCV, 4.5A (max), minimum efficiency 62% at this point
3) Operating Temperature/Humidity	0 to +40°C, 30 to 80%RH? no condensation
4) Storage Temperature/Humidity	-10 to +60 °C, 20 to 80%RH? no condensation
5) External Dimensions	About W127 × H72 × D255 mm (not including connector)
6) Weight	About 1.4kg

6.9.2 J-PAD2

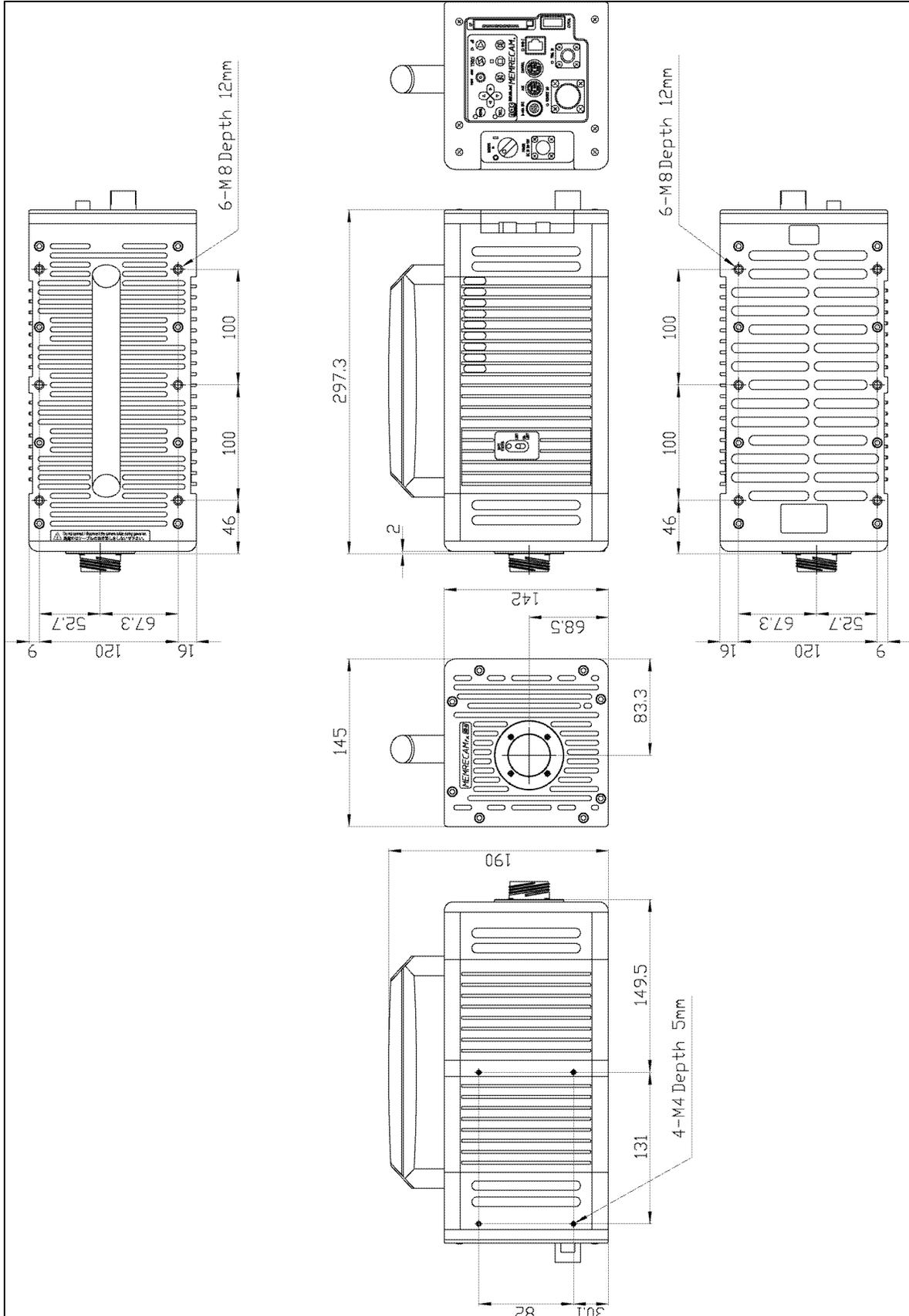
1) Power Source	Supplied from the camera unit
2) Operating Temperature/Humidity	0 to +40°C, 30 to 80%RH? no condensation
3) Storage Temperature/Humidity	-10 to +60 °C? 20 to 80%RH? no condensation
4) External Dimensions	About W54 × H113 × D16.5 mm (not including connector)
5) Weight	About 200g

6.10 Exterior Diagrams

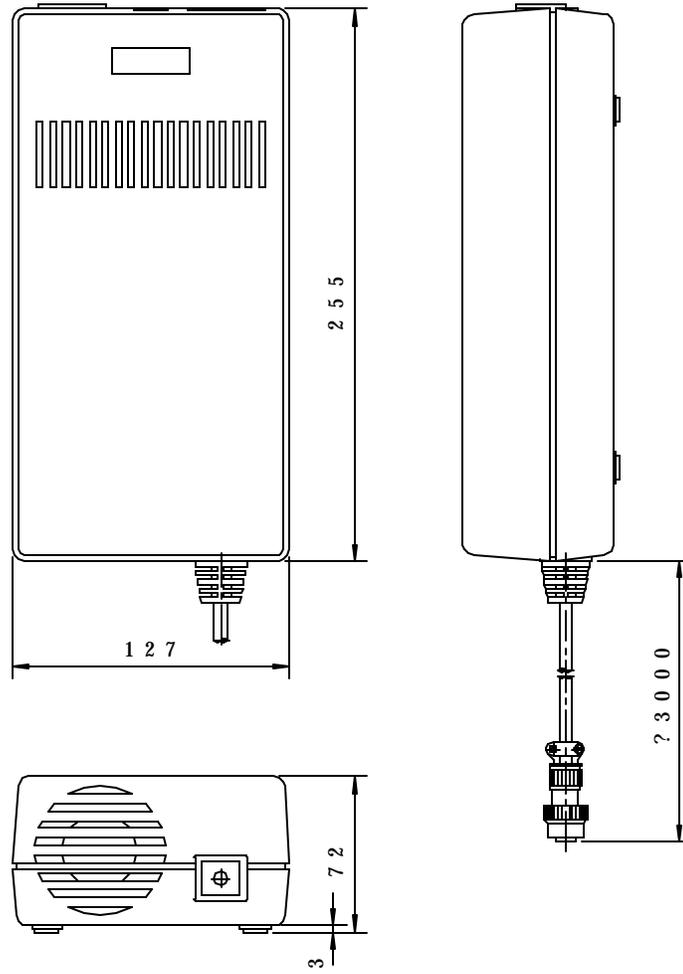
6.10.1 fx RX-6 Camera Head Exterior Diagram



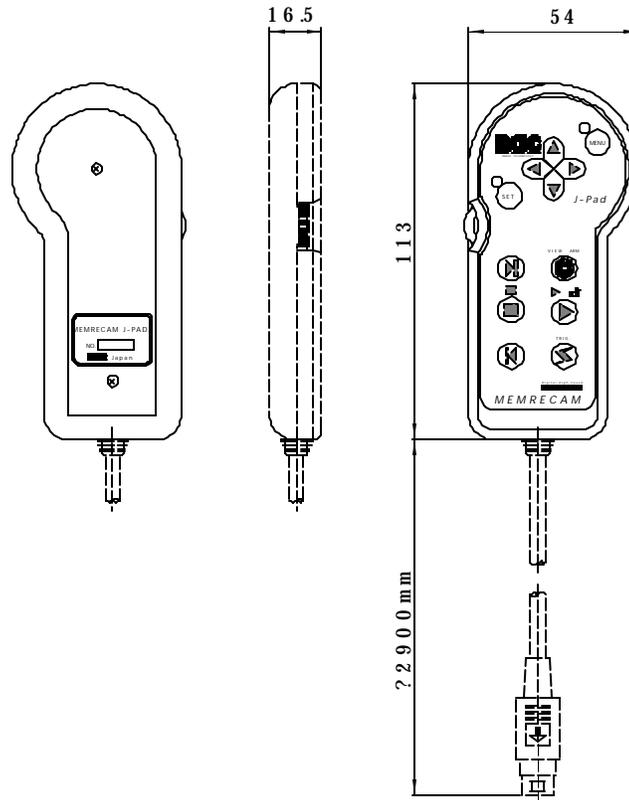
6.10.2 fx RX-6 DRP Exterior Diagram



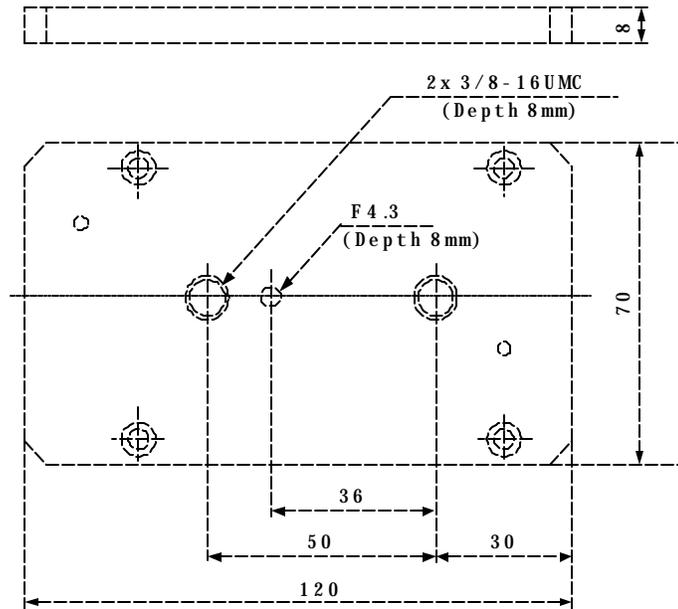
6.10.3 AC Adapter (Optional) Exterior Diagram



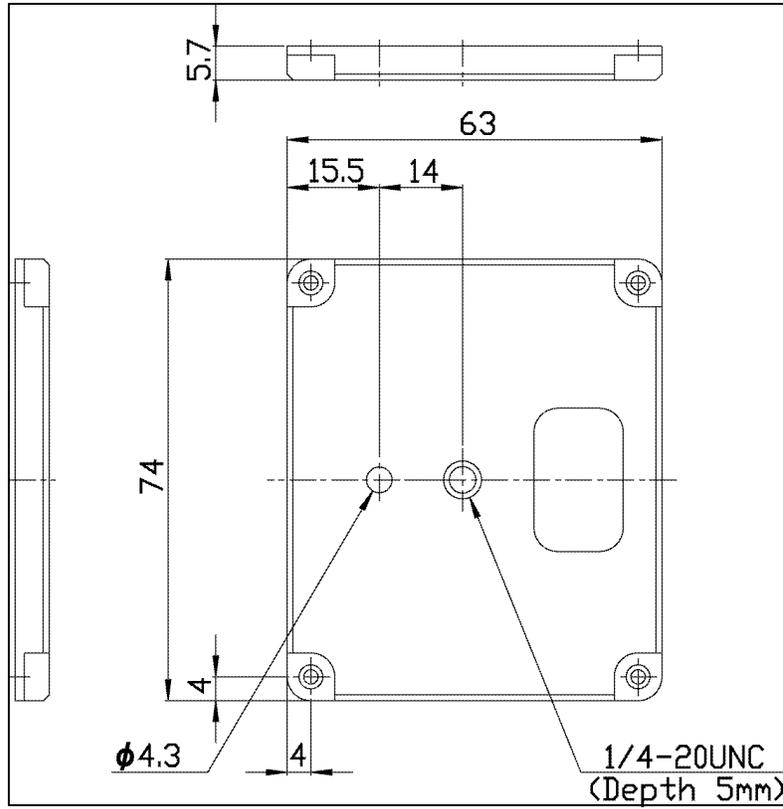
6.10.4 J-PAD2 Exterior Diagram



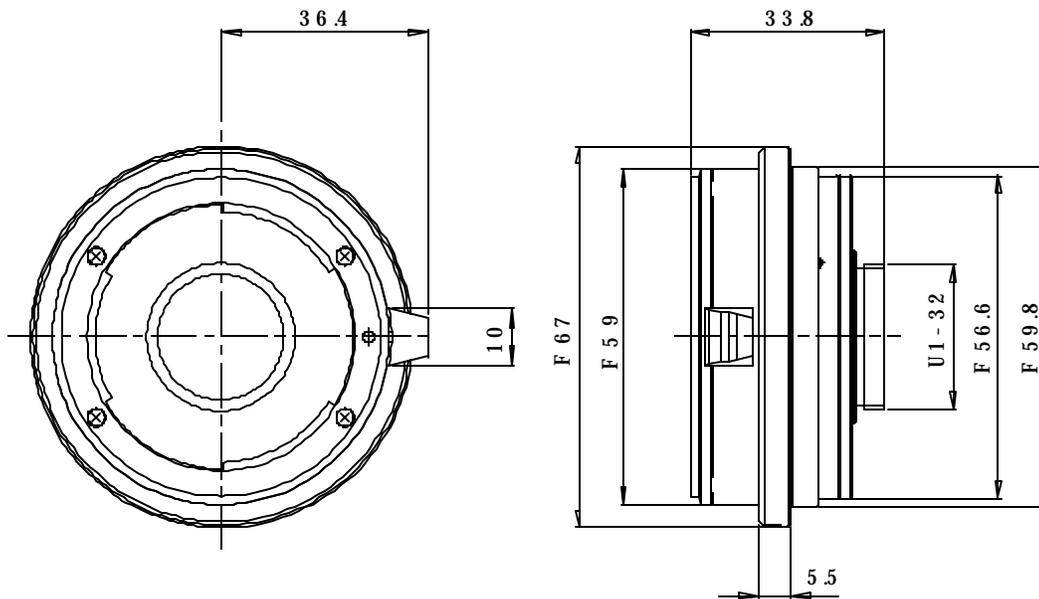
6.10.5 DRP Tripod Plate Exterior Diagram



6.10.6 Camera Head Tripod Plate Exterior Diagram



6.10.7 FC Mount Adapter Exterior Diagram

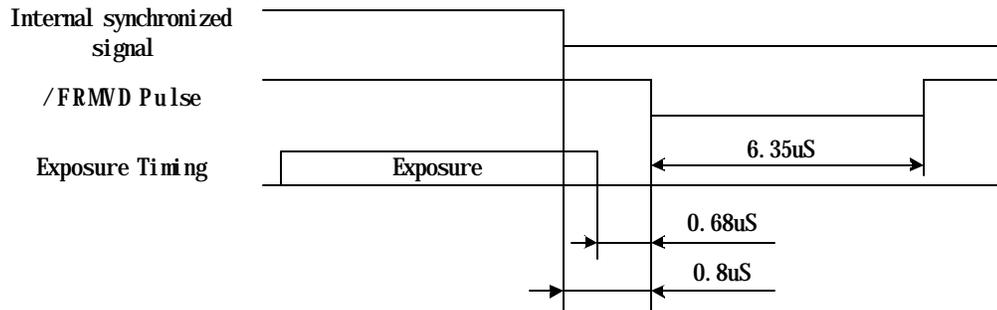


6.11 Input/Output Connector

1 TRIG. IN	Platform: PT02H-8-4P (BENDIX), Plug: PT06E-8-4S (SR)															
	<table border="0"> <thead> <tr> <th>PIN No.</th> <th>Pin Assign</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>/TRIG. in</td> <td>non-insulated input, 5V CMOS or contact signal</td> </tr> <tr> <td>B</td> <td>GND</td> <td>non-insulated input grounding</td> </tr> <tr> <td>C</td> <td>V⁺</td> <td>insulated input, input impedance 1500Ω</td> </tr> <tr> <td>D</td> <td>V⁻</td> <td>insulated input, input impedance 1500Ω</td> </tr> </tbody> </table>	PIN No.	Pin Assign	Description	A	/TRIG. in	non-insulated input, 5V CMOS or contact signal	B	GND	non-insulated input grounding	C	V ⁺	insulated input, input impedance 1500Ω	D	V ⁻	insulated input, input impedance 1500Ω
PIN No.	Pin Assign	Description														
A	/TRIG. in	non-insulated input, 5V CMOS or contact signal														
B	GND	non-insulated input grounding														
C	V ⁺	insulated input, input impedance 1500Ω														
D	V ⁻	insulated input, input impedance 1500Ω														
	Note) AB pin: max+5.5V, -0.6V, CD pin: max±32V															

2 AUX	Platform: TCS7698-01-201 (HOSHIDEN), Plug: MINI DIN 8pin																											
	<table border="0"> <thead> <tr> <th>PIN No.</th> <th>Pin Assign</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+5V</td> <td>100mA (MAX)</td> </tr> <tr> <td>2</td> <td>GND</td> <td></td> </tr> <tr> <td>3</td> <td>/FRMVD</td> <td>recorded frame pulse output, TTL</td> </tr> <tr> <td>4</td> <td>/HSVD</td> <td>internal pulse output, TTL</td> </tr> <tr> <td>5</td> <td>RXD</td> <td>RS-232C standard</td> </tr> <tr> <td>6</td> <td>RTS</td> <td>RS-232C standard</td> </tr> <tr> <td>7</td> <td>TXD</td> <td>RS-232C standard</td> </tr> <tr> <td>8</td> <td>CTS</td> <td>RS-232C standard</td> </tr> </tbody> </table>	PIN No.	Pin Assign	Description	1	+5V	100mA (MAX)	2	GND		3	/FRMVD	recorded frame pulse output, TTL	4	/HSVD	internal pulse output, TTL	5	RXD	RS-232C standard	6	RTS	RS-232C standard	7	TXD	RS-232C standard	8	CTS	RS-232C standard
PIN No.	Pin Assign	Description																										
1	+5V	100mA (MAX)																										
2	GND																											
3	/FRMVD	recorded frame pulse output, TTL																										
4	/HSVD	internal pulse output, TTL																										
5	RXD	RS-232C standard																										
6	RTS	RS-232C standard																										
7	TXD	RS-232C standard																										
8	CTS	RS-232C standard																										

Timing Diagram



Note1) The internal synchronized signal is the timing received in the camera

Note2) The synchronized internal synchronized signal is output at a 0mS phase differential to the 1KHz carrier IRIG-B signal from the master M-HUB.

Note3) The /HSVD signal is the same signal as the /FRMVD at above 1000pps.

At less than 1000pps, it becomes a 1 KHz signal synchronized with /FRMVD.

3 CONTROL	Platform: TCS7963-01-201 (HOSHIDEN), Plug: MINIDIN 9pin																														
	<table border="0"> <thead> <tr> <th>PIN No.</th> <th>Pin Assign</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>RTS</td> <td>RS-232C standard</td> </tr> <tr> <td>2</td> <td>CTS</td> <td>RS-232C standard</td> </tr> <tr> <td>3</td> <td>TXD</td> <td>RS-232C standard</td> </tr> <tr> <td>4</td> <td>GND</td> <td></td> </tr> <tr> <td>5</td> <td>+5V</td> <td>100mA (MAX)</td> </tr> <tr> <td>6</td> <td>RXD</td> <td>RS-232C standard</td> </tr> <tr> <td>7</td> <td>-</td> <td></td> </tr> <tr> <td>8</td> <td>-</td> <td></td> </tr> <tr> <td>9</td> <td>-</td> <td></td> </tr> </tbody> </table>	PIN No.	Pin Assign	Description	1	RTS	RS-232C standard	2	CTS	RS-232C standard	3	TXD	RS-232C standard	4	GND		5	+5V	100mA (MAX)	6	RXD	RS-232C standard	7	-		8	-		9	-	
PIN No.	Pin Assign	Description																													
1	RTS	RS-232C standard																													
2	CTS	RS-232C standard																													
3	TXD	RS-232C standard																													
4	GND																														
5	+5V	100mA (MAX)																													
6	RXD	RS-232C standard																													
7	-																														
8	-																														
9	-																														

4 POWER

Platform: AFD50-8-33PN-1A (DOITCH), Plug: AFD56-8-33SN-059

PIN No.	Pin Assign	Description
A	DC in	20 - 32DC V power input
B	F.G.	frame GND
C	DC RTN	power GND

5 REMOTE I/O

Platform: ACT90MC35SA, Plug: ACT96MC35SN

PIN No.	Pin Assign	Description
1	FCAL RX+	FC input
2	CMPX TX-	RS-422A output
3	CMPX RX+	RS-422A input
4	CMPX TXCLK-	RS-422A output
5	CMPX TXCLK+	RS-422A output
6	CMPX RXCLK-	RS-422A input
7	FCAL TX+	FC output
8	FCAL TX-	FC output
9	100BASE TX+	100Base-TX output
10	24V	24V power output
11	GND	24V power return
12	100BASE RX-	100Base-TX input
13	CS+	detect cable connection
14	FCAL RX-	FC input
15	CMPX TX+	RS-422A output
16	CMPX RX-	RS-422A input
17	CMPX RXCLK+	RS-422A input
18	PWRCNT	power control signal
19	100BASE TX-	100Base-TX output
20	100BASE RX-	100Base-TX input
21	CS-	detect cable connection
22	PWRCNT RTN	power control signal return

6 100B-T

Platform: 636180-1 (AMP), Plug: RJ-45 connector

PIN No.	Pin Assign	Description
1	TX+	100Base-TX output
2	TX-	100Base-TX output
3	RX+	100Base-TX input
4	-	
5	-	
6	RX-	100Base-TX input
7	-	
8		

7 FC-AL

Platform: 558342-1 (AMP), Plug: HSSDC connector

PIN No.	Pin Assign	Description
1	TX+	FC output
2	GND	
3	TX-	FC output
4	-	
5	GND	
6	RX-	FC input
7	VCC	5V power output
8	RX+	FC input

8 CF

Platform: MI21-50PD-SF-EJR (HIROSE), Plug: C F card

<u>PIN No.</u>	<u>Pin Assign</u>	<u>Description</u>
1	GND	
2	D3	
3	D4	
4	D5	
5	D6	
6	D7	
7	/CE1	
8	A10	
9	/OE	
10	A9	
11	A8	
12	A7	
13	VCC	
14	A6	
15	A5	
16	A4	
17	A3	
18	A2	
19	A1	
20	A0	
21	D0	
22	D1	
23	D2	
24	/IOIS16	
25	/CD2	
26	/CD1	
27	D11	
28	D12	
29	D13	
30	D14	
31	D15	
32	/CE2	
33	/VS1	
34	/IORD	
35	/IOWR	
36	/WE	
37	/IREQ	
38	VCC	
39	-	
40	/VS2	
41	/RESET	
42	/WAIT	
43	/INPACK	
44	/REG	
45	/SPKR	
46	/STSCHG	
47	D8	
48	D9	
49	D10	
50	GND	

9 D-VGA OUT

Platform: HR25-9R-16SA (HIROSE), Plug: HR25-9P-16P

<u>PIN No.</u>	<u>Pin Assign</u>	<u>Description</u>
1	TX1-	TMDS output (G)
2	-	
3	TX0-	TMDS output(B)
4	TX2-	TMDS output(R)
5	TX1+	TMDS output(G)
6	GND	
7	TX0+	TMDS output(B)
8	TXC-	TMDS output(CK)
9	TX2+	TMDS output(R)
10	GND	
11	GND	
12	GND	
13	TXC+	TMDS output(CK)
14	VFRTN	24V power output return
15	VF24V	24V power output
16	FG	frame GND

10 SIGNAL OUT(Camera Head)

<u>PIN No.</u>	<u>Pin Assign</u>	<u>Description</u>
1	DC+24V	DC power
2	DC+24V ^{RTN}	DC power return
3	D1+	data
4	D1-	data
5	C1+	data
6	C1-	data
7	A1+	data
8	A1-	data
9	C4+	data
10	C4-	data
11	A4+	data
12	A4-	data
13	CLK5+	clock
14	CLK5-	clock
15	A5+	data
16	A5-	data
17	CLK6+	clock
18	CLK6-	clock
19	B6+	data
20	B6-	data
21	D3+	data
22	D3-	data
23	C3+	data
24	C3-	data
25	A3+	data
26	A3-	data
27	CLK2+	clock
28	CLK2-	clock
29	C2+	data
30	C2-	data
31	CLK1+	clock
32	CLK1-	clock
33	B1+	data
34	B1-	data
35	CLK4+	clock
36	CLK4-	clock
37	B4+	data
38	B4-	data
39	C5+	data
40	C5-	data

41	D6+	data
42	D6-	data
43	C6+	data
44	C6-	data
45	A6+	data
46	A6-	data
47	CLK3+	clock
48	CLK3-	clock
49	D2+	data
50	D2-	data
51	B2+	data
52	B2-	data
53	A2+	data
54	A2-	data
55	D4+	data
56	D4-	data
57	D5+	data
58	D5-	data
59	B5+	data
60	B5-	data
61	RX2+	command
62	RX2-	command
63	EXTSYNC+	synchronized signal
64	EXTSYNC-	synchronized signal
65	B3+	data
66	B3-	data
67	DC+24V	DC power
68	DC+24VRTN	DC power return
69	DC+24V	DC power
70	DC+24VRTN	DC power return
71	EST+	EST PLUSE
72	EST-	EST PLUSE
73	CLK7+	clock
74	CLK7-	clock
75	A7+	data
76	A7-	data
77	-	
78	-	
79	-	

11 SIGNAL IN (DRP)

“ 10 SIGNAL OUT and Identical Pin Arrangement”

7

MEMRECAM fx

Options

7.1 D-VGA LCD Viewfinder (D-LCD VF)

D-LCD VF is the LCD unit that displays the digital image signal output from the D-VGA OUT port of the **MEMRECAM** fx with VGA resolution.

7.1.1 Overview and Features

Since there is one cable for the video signal and power input, it is only possible to show video by connecting to the **MEMRECAM** fx main unit viewfinder connector.

- | Four types of VGA (640 × 480) LCD modules are used to verify the lens focus and image quality of the subject.
- | High precision image pitch (200ppi) and high quality images can be displayed. ppi: pixels per inch

7.1.2 List of Components

The D-LCD VF is comprised of the following items.

D-LCD VF (ZO-906) 1

1) D-LCD VF main unit 1

2) Bracket 1



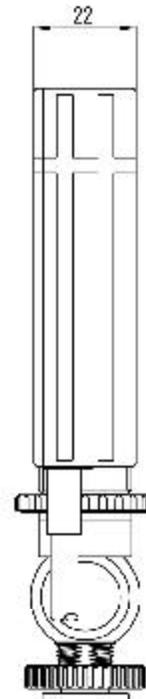
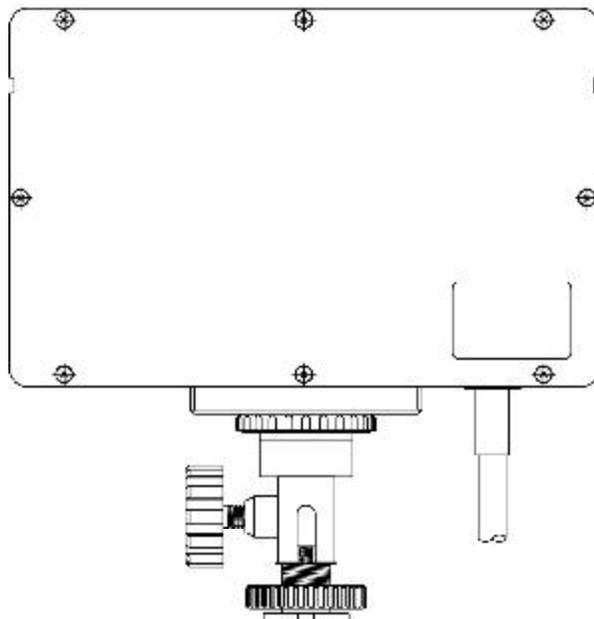
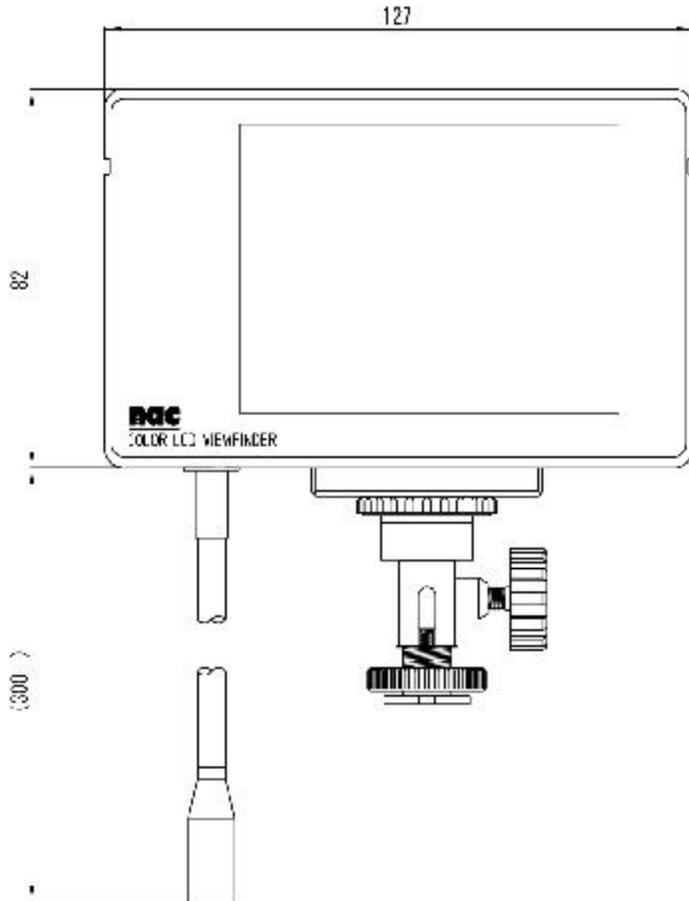
Photo-1 Bracket

D-LCD VF Screws
(1/4-20 UNC)



Screw hole for BRACKET attachment
Photo-2 D-LCD VF main unit

7.1.3 Exterior Diagram



7.1.4 Installation and Connection to the **MEMRECAM** fx D-LCD VF

Attach the bracket to the D -LCD VF as shown in Photo-3.



Photo-3

Adjust the D-VGA LCD VF and bracket (after adjusting, tighten the screws.)

Angle adjustment screw (after adjusting, tighten the screw.)

Fix by turning the screw.

Install the D-VGA VF to the **MEMRECAM** fx BRACKET shoe.



Photo-4

Adjust the angle and direction by tightening the angle adjustment screw. (after adjusting, tighten the screw.)

Set the BRACKET on the shoe.

Insert the D-VGA LCD VF cable to the D-VGA OUT connector.

(insert above the plug connector white mark.)

At this point, connection is complete. The video signal and required power for the D-LCD VF is supplied by the cable connection. After attaching the **MEMRECAM** fx, modifications to the D-VGA VF angle and direction can be performed using the bracket angle adjustment screw.

7.1.5 D-LCD VF Specifications

1 Product Type

MEMRECAM fx series

2 Input

- | | |
|-------------------|---|
| 1) Image format | VGA (640 × 480)
vertical synchronizing signal frequency: 59.94MHz
horizontal synchronizing signal frequency: 31.468MHz |
| 2) Signal cable | pigtail construction: approx. 30cm in length
(can be extended to 9m)*
* 3 optional extension cables (H10963-3 3m cable) can be connected. |
| 3) Plug connector | Plug connector: HR25-9P-16P(HIROSE) discharge frequency 1000 times |
| 4) Input signal | a. Power +24v
b. TMDS Rch
c. TMDS Gch
d. TMDS Bch
e. TMDS CLOCK
TMDS: Transition Minimized Differential Signaling |

3 Display

- | | |
|------------------|----------------------------|
| 1) Image size | 640(H) × 480(V) x3 |
| 2) Image pitch | 0.126(W) × 0.126(H) mm |
| 3) Precision | 202ppi (pix per inch) |
| 4) Drive process | TFT active matrix process |
| 5) Gradation | R,G,B each 64 gradations |
| 6) Luminance | typ 130 cd /m ² |

4 Power

- | | |
|------------|--|
| 1) Voltage | 24 to 32DCV (supplied from MEMRECAM fx) |
| 2) Wattage | 1.6W |

5 Dimensions

- | | |
|---------------|---|
| 1) Dimensions | About 127(W) × 82(H) × 22 (D) mm (excludes protrusions) |
| 2) Weight | About 35 0g (includes cable and attachments) |

6 Ambient Conditions

- | | |
|-----------------------------------|---|
| 1) Operating Temperature/Humidity | 0 to 40°C, 30 to 80%RH (no condensation) |
| 2) Storage Temperature/Humidity | -10 to 60°C, 20 to 80%RH (no condensation) |
| 3) Electromagnetic Conformity | EN61000-6-2, EN50081 -2, FCC Part15 Class "A" |
| 4) G-force resistance | NA |

7.2 D-VGA Conversion Unit

This product is a unit to convert the digital image signal output from the **MEMRECAM** fx D-VGA OUT port into analog VGA and NTSC(PAL) signals.

7.2.1 Overview and Features

- Since there is one cable for the video signal and power input, it is only possible to connect it to the D-VGA OUT of the DRP unit to convert the image signal into analog VGA or NTSC (PAL) signals. This unit has two types, the NTSC type and PAL type, which correspond with the output signal.



Caution

It is possible to turn the VIDEO output ON/OFF using the D-VGA conversion unit but there is no VIDEO output ON/OFF switch on the D-VGA conversion unit itself. ON/OFF is controlled by the CAM-RECORDER. This is conducted on the **MEMRECAM** fx setup menu [TOP MENU] or the PC software [Smart Capture].

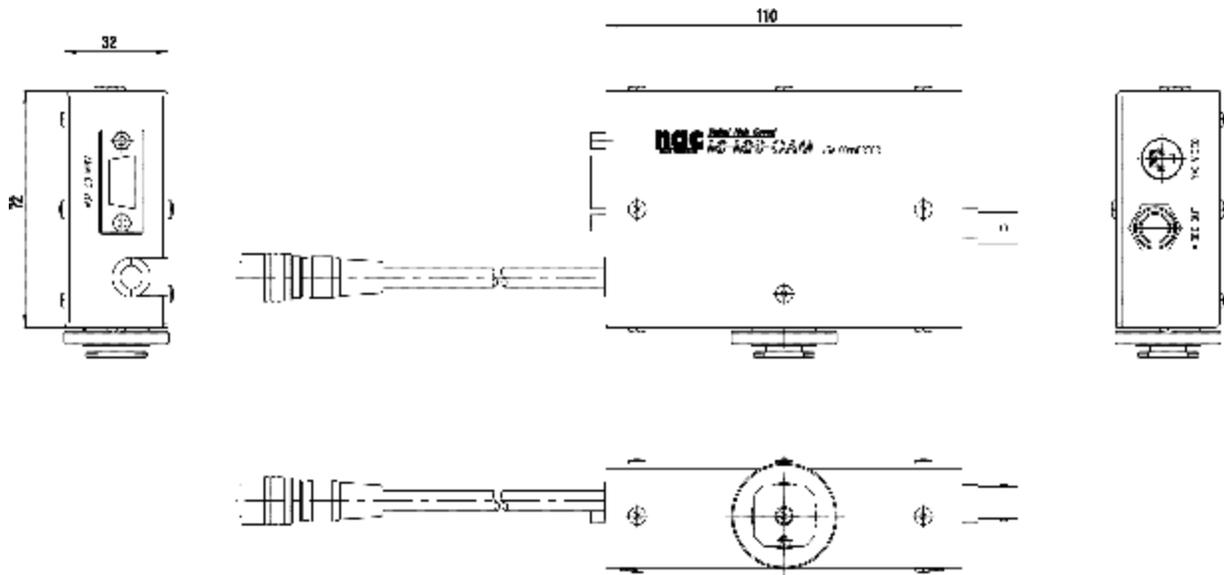
7.2.2 List of Components

The D-VGA conversion unit is configured as follows.

1) 4H2024-1 (NTSC)	D-VGA conversion unit(Z0-907)	1
2) 4H2024-2 (PAL)	D-VGA conversion unit(Z0-907)	1



7.2.3 Exterior Diagram



7.2.4 Installation and Connection to the **MEMRECAM** fx D-VGA Conversion Unit

- 1) Using the attachment fittings on the back of the D-VGA conversion unit, attach to the **MEMRECAM** fx shoe.
- 2) Connect the D-VGA conversion unit cable to the **MEMRECAM** fx D-VGA OUT connector.
(insert above the cable plug connector white mark)

attachment shoe



D-VGA OUT Connector



Fitting



Connect to the analog VGA multiscan monitor



Connect to the television monitor VBS,S terminal.

 **Caution**

When there is no VGA conversion unit VIDEO output, the **MEMRECAM** fx output settings may be OFF. Control using the **MEMRECAM** fx setup menu [TOP MENU] or the PC software [Smart Capture].



The COLOR ? B/W is changed with the switch.

7.2.5 D-VGA Conversion Unit Specifications

1 Product Type

MEMRECAM fx series

2 Input

- 1) Image format
VGA (640 × 480)
vertical synchronizing signal frequency: 59.94MHz
horizontal synchronizing signal frequency: 31.468MHz
- 2) Signal cable
pigtail construction: approx. 25cm in length
(can be extended to 9m)*
* 3 optional extension cables (H10963-3 3m cable) can be connected.
- 3) Plug connector
Plug connector: HR25-9P-16P(HIROSE) discharge frequency: 1000 times
- 4) Input signal
 - a. Power +24v
 - b. TMDS Rch
 - c. TMDS Gch
 - d. TMDS Bch
 - e. TMDS CLOCKTMDS: Transition Minimized Differential Signaling

3 Output

- 1) Video signal
VBS, Y/C(1 system each)/ 1Vp-p (75Ω)
Analog VGA (1 system)/ R, G, B, HD, VD
- 2) Connector
VBS: BNC, Y/C: S connector
Analog VGA: Mini DSub 15pin

4 Control Items

- 1) Video output
Simultaneous ON/OFF possible for VBS and S video output by control computer commands (cannot turn VGA output control ON/OFF)
- 2) Chroma signal
Chroma signal can be turned ON/OFF with the SW on the case

5 Power

- 1) Voltage/wattage
less than 20 to 32DCV / 4W (supplied from **MEMRECAM** fx)

6 Dimensions

- 1) Dimensions
about 110 (W) x 72 (H) x 32 (D) mm (excluding protrusions)
- 2) Weight
about 350g (including cables)

7 Ambient Conditions

- | | |
|-----------------------------------|---|
| 1) Operating Temperature/Humidity | 0 to 40°C, 30 to 80%RH (no condensation) |
| 2) Storage Temperature/Humidity | -10 to 60°C, 20 to 80%RH (no condensation) |
| 3) Electromagnetic Conformity | EN61000-6-2, EN50081 -2, FCC Part15 Class "A" |
| 4) G-force resistance | NA |

8 Limitations

- | When recording the image from this unit to the VTR, one of the following may occur to the recorded image.
 - (1) Recording without the frame image.
 - (2) Recording with distorted frame image.
 - (3) Recording but the frame image recorded and the frame counter displayed on the image do not match.
- | When recording to the VTR, if played back at a speed of less than 15 frames/second, the entire image is recorded but there is a possibility that the problems described in (2) and (3) above may occur.

7.3 Memory Backup Unit

7.3.1 Overview

This unit is the memory backup unit used for the **MEMRECAM** fx series. It is possible to store completely recorded images in the memory to combat unexpected power outages.

7.3.2 Overview of Functions

- | When the power switch is OFF due to unexpected conditions after the completion of recording or the power cable has been disconnected, it is possible to protect the contents of the recorded image. When next turning on the power, it will return to all of the same conditions immediately after recording.
- | The backup battery has broader operating temperatures and humidity. To reduce the danger of sparking, smoldering and explosion due to overcharging or short circuits, please use 2 Ni-Cd batteries due to their excellent safety record.
- | It is possible to monitor the backup mode control and operation/charging with the LED display with the switch.



[BATT.STATUS] display Backup mode setting switch

7.3.3 Components

The memory backup unit has the following components.

1. Standard

1) 4H2023	Memory Backup Unit (Z0-912)	1
-----------	-----------------------------	---

* This unit is an option included at the factory.

2. Options

2) 582865	Backup battery replacement	1
-----------	----------------------------	---

* Replacement can be done either at the factory or the dealer.

7.3.4 Frequency of Battery Replacement

The expected life of the battery included in the memory backup unit is approximately one year within the temperature specifications of the **MEMRECAM** (such as charging several times per day), but varies according to the storage temperature, frequency of battery charging and infrequent use. For normal replacement, when the [BATT.STATUS] indicator on the backup is flashing, there is sufficient charge but when it turns red, the time is limited and there may be problems during use.

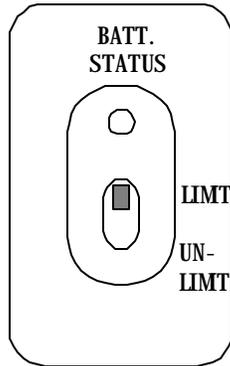
7.3.5 Mode Setting Switch for Memory Backup Unit

1. Backup Mode Setting Switch

In this section, the backup mode setting is explained. It is set with the setting switch.

┆ LIMIT

The setting switch on the side of the unit is set to LIMIT as shown in the diagram below.



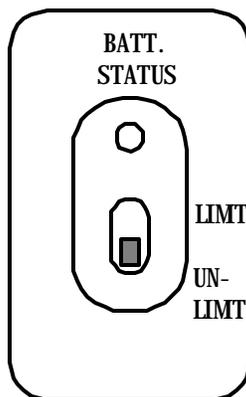
In this mode, there is approximately 1 hour of memory backup. (memory: 4GB)

If backup is not needed, automatic backup is cancelled to prevent battery discharge. (The images after cancellation are lost).

If there is insufficient battery charge (a charge that will not allow for more than one hour of backup), the battery protection function will cancel the backup operation. Use with the battery sufficiently charged. Verify that the [BATT. STATUS] indicator shows green.

┆ UNLIMIT

The setting switch on the side of the unit is set to UNLIMIT as shown in the diagram below.



In this mode, the battery has backup until it is completely charged.

* When the [BATT. STATUS] indicator switches from flashing yellow to red during image backup, it should be quickly charged.

7.3.6 Startup Conditions for Memory Backup

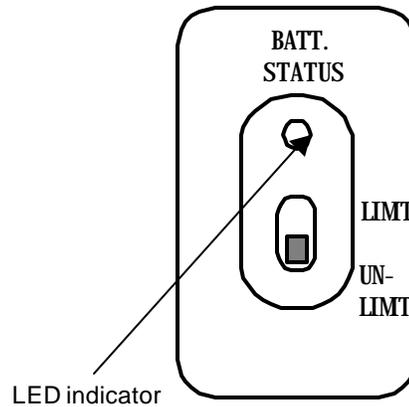
When the image data is stored in the memory, backup is activated if the **MEMRECAM** fx power switch is OFF, when the external power supply is disconnected or if the DC input voltage is less than 19.0V.

7.3.7 "BATT. STATUS" Indicator

There is an LED indicator [BATT. STATUS] next to the mode setting switch on the side of the memory backup unit.

The color of this LED indicator shows the amount of the battery charged and the battery remaining.

LED COLOR	BATTERY STATUS
RED	SMALL
YELLOW	MEDIUM
GREEN	FULL



- Due to the impact of ambient temperatures and other factors, precise indications are not possible. Please use as an estimate.
- When the [BATT. STATUS] indicator switches from flashing yellow to red during image backup, it should be quickly charged. If not, the battery protection function will activate and the images in the memory will be lost.

The LED indicator lit/blinking shows the memory backup status.

LED INDICATOR	MEMRY BACKUP STATUS
ON	Memory backup by main power supply
BLINKING	Memory backup by built-in battery
OFF	Not memory backup

Backup cannot be conducted if the image data is not stored in the memory.

7.3.8 Battery Charging

When there is external power (20 to 32V) supplied to the **MEMRECAM** fx, the power switch and backup mode switch are charging normally. The charging status can be verified when the [BATT. STATUS] indicator is lit.

! Charging Time

- * It takes about 10 hours (at ambient temperatures of 25°C) to reach a full charged state.
- * Full charge: Activate the backup with the backup mode at UNLIMIT and the red indicator will go off when completed.

! Precautions for Charging

- * It is set to minimize deterioration due to battery overcharging. Avoid charging for more than 3 days to extend the life of the battery.
- * When used under the temperatures established in the specifications, the life of the battery is 1 year, but the battery life can be extended by avoiding use or storage in areas with high temperatures.
- * There is no guarantee on the backup time and charging time specifications during use beyond the expected battery life. Please have our company replace the battery.

7.3.9 Battery Discharge

There is a function to prevent battery discharge so there should be no damage to the battery due to depletion.

Since a Ni-Cd battery is used as the secondary battery for backup, it is possible to extend the life of the battery to improve the memory efficiency by completely depleting once in several scores of times.

7.3.10 Backup Time

1 UNLIMIT mode

More than 2 hours from the fully charged state. (25°C, memory: 4GB)

2 LIMIT mode

About 1 hour. (25°C, memory: 4GB)

(when the battery is not sufficiently charged, the depletion prevention circuit will cancel the backup after 1 hour.)

7.3.11 Memory Backup Unit Specifications

1 Product Type

MEMRECAM fxRX-6

Only available from this company.

2 Battery

Battery used	Ni-Cd battery
Form	6N-600AAK
Battery life	about 1 year

This battery is a cycle charge model with heat resistance to resist overcharging so there is no sparking even if overcharged.

The life of the battery used in the memory backup option is about one year under standard use (used according to **MEMRECAM** temperature specifications and charging several times per day). However, it varies according to the storage temperatures, frequency of repetitive charging and intermittent charging. The rule of thumb for replacement states that there is sufficient charge when the [BATT. STATUS] indicator is flashing during backup but the time is nearly expired when it changes to red, so there may be problems if used beyond that point.

3 Battery Replacement

Battery replacement can be done at the factory or a dealer.

4 Power Supply

1) Voltage/ Wattage 20 - 32DCV/about 2W (supplied from **MEMRECAM** fx)

5 Dimensions and Weight

1) Dimensions about 220 (W) × 94 (H) × 20 (D) mm (excludes protrusions)
2) Weight about 300g (includes case and battery)

6 Ambient Conditions

1) Operating Temperature and Humidity 0 to 40°C, 30~80%RH (no condensation)
2) Storage Temperature and Humidity -10 to 60°C, 20~80%RH (no condensation)
3) Electromagnetic Conformity EN61000-6-2, EN50081-2, FCC Part15 Class "A"
4) Shock Half sign 11ms, 100G, 1000times
5) Vibrati conforms to MIL-STD-810D METHOD 514.3
C ATEGORY (Common carrier environment)
FIGURE514.3-1to514.3-3

7.4 M-HUB Units

7.4.1 Overview

The M in M-HUB is the first M in **MEMRECAM**. When connecting multiple **MEMRECAM** fx series (**MEMRECAM** fx) as a bundle, this unit has the function to distribute the required signals.

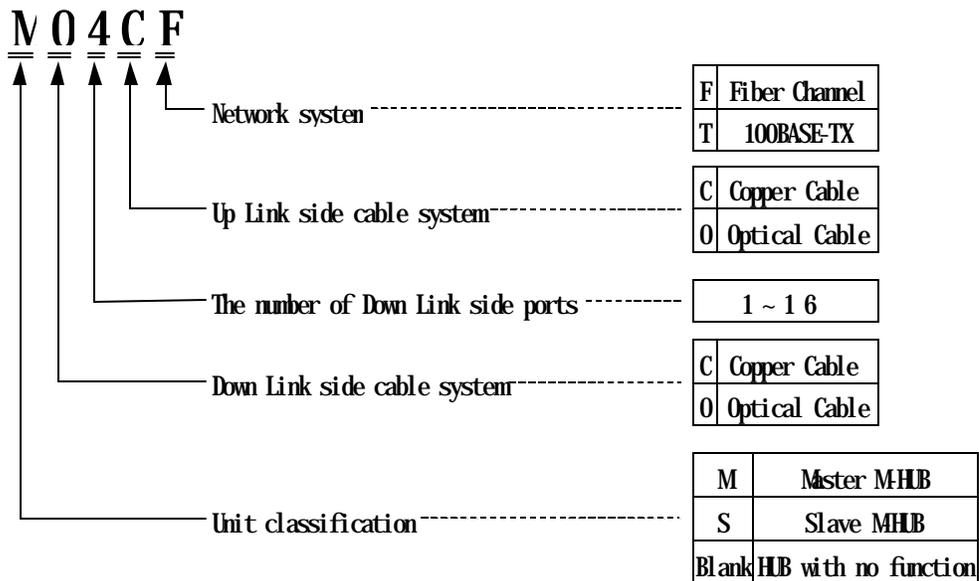
There are both master MHUB units as well as slave MHUB units that can be arranged to provide the flexibility to handle multiple **MEMRECAM** fx connections and locations.

7.4.2 M-HUB Units Naming Method

Depending on the different number of ports and functions, there are 10 types of units.

- FC-AL system: M012CF, M04CF, SC40F, SC20F, C1CF, MC4CF
- Internet system: MC12CT, MC4CT, SC4CT, SC2CT

These names are assigned using the following method so the unit functions are known from the name.



Terminology

The following is an explanation of specific terms used frequently in this section.

Term	Meaning of Abbreviation	Description
Down Link And Up Link	-----	Indicates the downlink and uplink of the multiple MEMRECAM fx connection system using M-HUB. For example, the slave M-HUB is connected on a downlink from the master M-HUB and the MEMRECAM fx is connected on a downlink from the slave M-HUB. Also, the master M-HUB is connected on an uplink from the slave M-HUB.
FC-AL	Fiber Channel-Arbitrated Loop	A serial SCSI interface comprised of 2 sets of transmission lines and receiving lines (4 lines). High-speed transmission of 100MB/second over one FC-AL cable is possible.
HSSDC	High Speed Serial Data Connector	A connector between the FC -AL devices, primarily utilized for compact devices. 8 pin terminal.
IRIG-B	InterRange Instrumentation Group-B	A serial time code standard used when transmitting date and time information on global standards.
PORT	-----	Exchange of signals required for multiple MEMRECAM fx control when connected to the slave M-HUB or MEMRECAM fx via a connector. (example: Since MO4CF has a maximum of 4 slave M-HUB, there are 4 PORTs.)

7.4.3 Fiber Channel (FC-AL) M-HUB Units

1. Overview

- Connects multiple **MEMRECAM** fx series **MEMRECAM** fx and the M-HUB unit can bundle control using the fiber channel network.
- Master M-HUB: MO12CF, MO4CF, MC4CF
- Slave M-HUB: SC4OF, SC2OF
- Cable extension unit: C1CF lineup

2. General Functions and Features

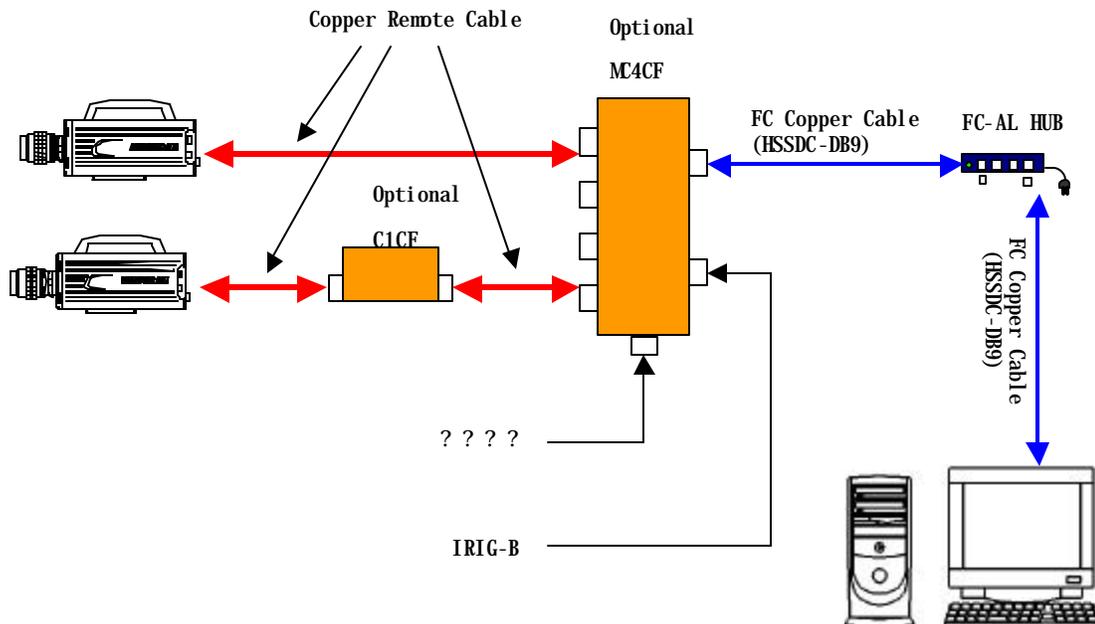
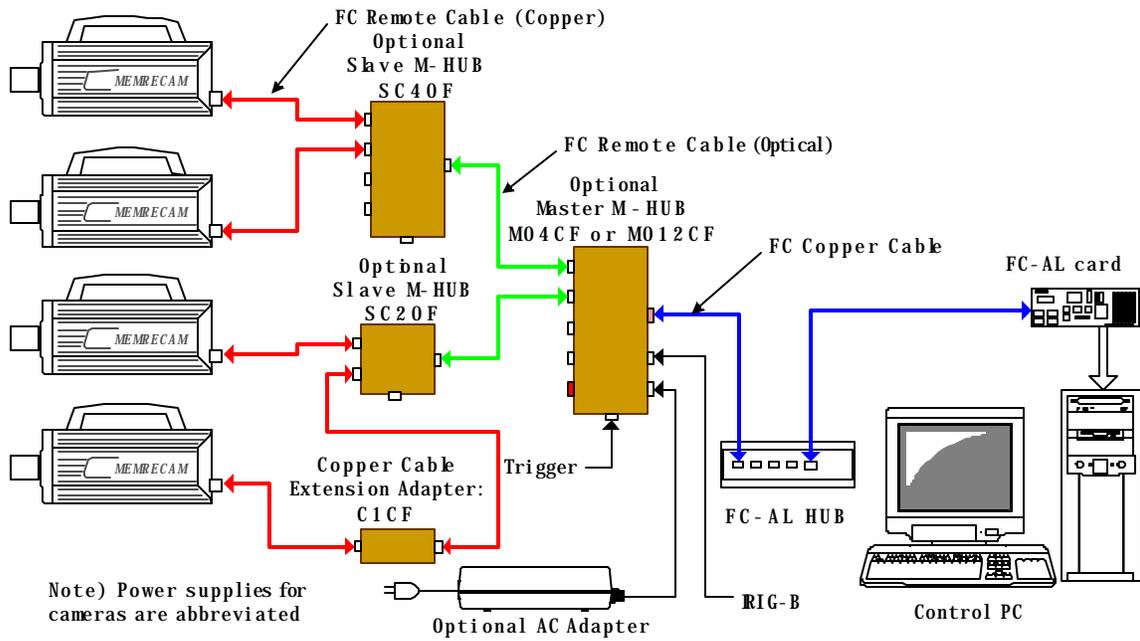
- The master unit can connect a maximum of 12 slave units
- The slave unit can connect a maximum of 4 **MEMRECAM** fx
- The maximum length between the master and slave unit connection is 300m
- The maximum length between the **MEMRECAM** fx and slave unit connection is 15m
- With synchronizing pulses, high precision synchronizing recording between CAM-RECORDERS is possible
- Can synchronize with IRIG -B time code

3. Functions and Characteristics of Each Unit

Unit	Functions/Characteristics
MO12CF	<ul style="list-style-type: none">· the number of ports connecting the slave M-HUB can vary from 5 to 12· additional ports available after shipment· requires external DC power· no G-force resistance guarantee standard
MO4CF	<ul style="list-style-type: none">· can connect up to 4 slave M-HUB· requires external DC power· no G-force resistance guarantee standard
SC4OF	<ul style="list-style-type: none">· can connect up to 4 MEMRECAM fx· does not require external DC power (supplied from MEMRECAM fx)· standard G-force resistance guarantee
SC2OF	<ul style="list-style-type: none">· can connect up to 2 MEMRECAM fx· does not require external DC power (supplied from MEMRECAM fx)· standard G-force resistance guarantee
C1CF	<ul style="list-style-type: none">· with this unit, slave M-HUB and MEMRECAM fx can be extended a maximum of 30m· does not require external DC power (supplied from MEMRECAM fx)· standard G-force resistance guarantee
MC4CF	<ul style="list-style-type: none">· can connect up to 4 MEMRECAM fx· does not require external DC power (supplied from MEMRECAM fx)· standard G-force resistance guarantee

4. Connection Diagram

When connecting **MEMRECAM** fx using fiber channel



5. Configuration

1) fixed M-HUB with port

Model Name	Part Number	Part Name	Comments
ST-605	582535--	MO4CF System	Configured so AC power system (4H0596-3) can be added to the MO4CF (4H2027)
CR-985	4H2027--	MO4CF	4port master M-HUB
CR-985	4H2030	SC4OF	4port slave M-HUB
CR-985	4H2025	SC2OF	2port slave M-HUB
CR-985	583013--	MC4CF	4port master M-HUB

2) variable M-HUB with port

Model Name	Part Number	Part Name	Comments
ST-605	582561-1	MO12CF System	Configured so AC power system (4H0596-3) can be added to the MO12CF UNIT 5Port (582561-1)
ST-605	582561-2	MO12CF System	Configured so AC power system (4H0596-3) can be added to the MO12CF UNIT 6Port (582561-2)
ST-605	582561-3	MO12CF System	Configured so AC power system (4H0596-3) can be added to the MO12CF UNIT 7Port (582561-3)
ST-605	582561-4	MO12CF System	Configured so AC power system (4H0596-3) can be added to the MO12CF UNIT 8Port (582561-4)
ST-605	582561-5	MO12CF System	Configured so AC power system (4H0596-3) can be added to the MO12CF UNIT 9Port (582561-5)
ST-605	582561-6	MO12CF System	Configured so AC power system (4H0596-3) can be added to the MO12CF UNIT 10Port (582561-6)
ST-605	582561-7	MO12CF System	Configured so AC power system (4H0596-3) can be added to the MO12CF UNIT 11Port (582561-7)
ST-605	582561-8	MO12CF System	Configured so AC power system (4H0596-3) can be added to the MO12CF UNIT 12Port (582561-8)
V-833	582562-1	MO12CF UNIT	MO12CF model 5port master M-HUB
V-833	582562-2	MO12CF UNIT	MO12CF model 6port master M-HUB
V-833	582562-3	MO12CF UNIT	MO12CF model 7port master M-HUB
V-833	582562-4	MO12CF UNIT	MO12CF model 8port master M-HUB
V-833	582562-5	MO12CF UNIT	MO12CF model 9port master M-HUB
V-833	582562-6	MO12CF UNIT	MO12CF model 10port master M-HUB
V-833	582562-7	MO12CF UNIT	MO12CF model 11port master M-HUB
V-833	582562-8	MO12CF UNIT	MO12CF model 12port master M-HUB

3) Extension Cable Unit

Model Name	Part Number	Part Name	Comments
CR-985	4H2045	C1CF	FC-AL remote copper cable extension unit

4) port addition options

Model Name	Part Number	Part Name	Comments
CR-985	582571-1	FC PORT addition	Option to add 1 port to the MO12CF UNIT (582562-1~7) only at shipment

6. Specifications

! Product Type

MEMRECAM fx series

! The position and form of panel switch and LED

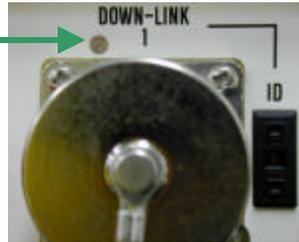
(1) Master M-HUB(MO12CF,MO4CF)



master M-HUB: power source monitor LED

master M-HUB: power switch

Master M-HUB port connection monitor LED

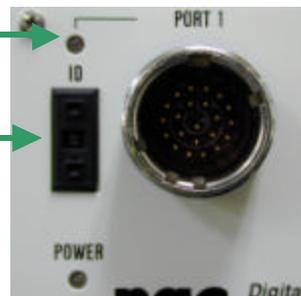


Manual setting port ID switch

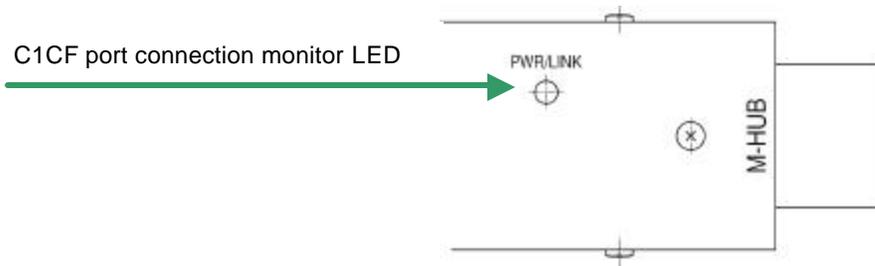
(2) Slave M-HUB(SC20F,SC40F)

Slave M-HUB port connection monitor LED

Manual setting port ID switch



(3) C1CF



(4) MC4CF



MC4CF: power source monitor LED

MC4CF: power switch

FC-AL Link monitor LED



MC4CF port connection monitor LED

! The functions of switches and LED

(1) Power Switch

- The power ON/OFF switch readies the master M-HUB but not the slave M-HUB. Power for the slave M-HUB is driven by the master M-HUB ON/OFF.
- After turning the master M-HUB power ON /OFF, it will take about 5 seconds to turn the slave M-HUB and camera power ON/OFF.
- When the remote cable connecting the slave M-HUB and master M-HUB is disconnected, the slave M-HUB will remain ON. (when power is supplied by the **MEMRECAM** fx)
- It takes approximately 5 seconds until the internal power unit is turned ON and OFF, after the MC4CF power switch has been turned ON or OFF.

(To power on the MC4FC, at least one of **MEMRECAM** fx units that is connected to it must be turned ON or placed in the REMOTE position.)

(2) Power Monitor LED

- master M-HUB
 - green light lit: ON
 - not lit: OFF
- slave M-HUB
 - green light lit: ON
 - not lit: OFF

(**MEMRECAM** fx not supplying power)

 - orange light lit: OFF

(**MEMRECAM** fx supplying power but slave M-HUB is in OFF state)

(3) Manual Setting Port ID Switch

- Can be set for any integer 0~15
 - Confirmation of the setting for this switch can be done from Smart Capture. The user can easily verify the contents of which **MEMERECAM** fx or M-HUB is connected to which port.

(4) Port Connection Monitor LED

- Displays the remote cable connection status
 - green light lit: connected to the camera, DRP or M-HUB
(no relation to the fiber channel link set)
 - not lit: not yet connected

(5) Port Connection Monitor LED (MC4CF)

- Displays the remote cable connection status
 - green light lit: FC-AL LINK with camera (DRP) established
 - orange light lit: FC -AL LINK with camera (DRP) failure
 - not lit: FC -AL LINK with camera (DRP) failure (not yet connected)

(6) FC-AL LINK Monitor LED

- Displays the FC -AL cable connection status
 - green light lit: FC-AL LINK with PC established
 - not lit: FC -AL LINK with PC failure

(7) C1CF LINK Monitor LED

- Displays the FC -AL LINK and power status
 - green light lit: FC-AL LINK with camera (DRP) established
 - red light lit: FC-AL LINK with camera (DRP) failure
 - not lit: power OFF

7. Input/Output Connector

(1) master M-HUB

Panel name	Connector model	Function
DC IN	AFD50-8-33PN-1A	Input power: DC20~32V
IRIG IN	BNC123-BR-3	Modulated IRIG-B input 0.5 to 10Vp-p/10Ω
TRIG IN	PTO2H-8-4P	Trigger input: same as MEMRECAM fx Trigger distributes to each DOWNLINK port 1~xx
PORT Ci	ACT90MC35SN	Ci series remote control: not yet operational
DOWN-LINK 1~xx	ACT90MC99SN	For slave M-HUB connection
FC-AL	636180-1	For controlling PC connection: HSSDC connector

(2) Slave M-HUB

Panel name	Connector model	Function
PORT 1~ x	ACT90MC35PA	For CAM-RECORDER connection
UPLINK	ACT90ME99PN	For master M-HUB connection
TRIG IN	PTO2H-8-4P	Trigger input: same as MEMRECAM fx Trigger distributes to each DOWNLINK port 1~xx Not operational when connected to master M-HUB
	650HS010M17	Dummy receptacle (for dust cap)

(3) C1CF

Panel name	Connector model	Function
CAM	ACT90MC35PA	For CAM-RECORDER connection
M-HUB	ACT90ME35SA	For slave M-HUB connection

(4) MC4CF

Panel name	Connector model	Function
IRIG IN	BNC123-BR-3	Modulated IRIG-B input 0.5 to 10Vp-p/10Ω
TRIG IN	PTO2H-8-4P	Trigger input: same as MEMRECAM fx Trigger distributes to each DOWNLINK port 1~xx Not operational when connected to master M-HUB
PORT 1 to x	ACT90MC35PA	For CAM-RECORDER connection
FC-AL	636180-1	For controlling PC connection: HSSDC connector

8. Power

Unit	Input Voltage	Watts consumed	Remarks
MO12CF	20~32V	About 41W	External power source required
MO4CF	20~32V	About 18W	External power source required
SC40F	20~32V	About 13W	Supplied from MEMRECAM fx
SC20F	20~32V	About 12W	Supplied from MEMRECAM fx
C1CF	22~32V*	About 2.5W	Supplied from MEMRECAM fx
MC4CF	20~32V	About 14W	Supplied from MEMRECAM fx

* When using the C1CF, use the watts supplied from the **MEMRECAM** fx at greater than 22V.

9. Dimensions and Weight

Unit	W(mm)	H(mm)	D(mm)	Weight (kg)	Remarks
MO12CF	408	133	275	4.5	Protrusions and fittings not included
MO4CF	292	88	142	2.0	Protrusions and fittings not included
SC40F	198	61	122	1.3	Protrusions and fittings not included
SC20F	112	59	115	0.9	Protrusions and fittings not included
C1CF	120	33	35	0.3	Protrusions and fittings not included
MC4CF	220	80	129	1.5	Protrusions and fittings not included

10. Ambient Conditions

(1) Ambient Temperature

Unit	Operating Temperature	Storage Temperature
MO12CF	0 to 40°C, 30~80%RH (no condensation)	-10 to 60°C, 20~80%RH (no condensation)
MO4CF	?	?
SC4OF	?	?
SC2OF	?	?
C1CF	?	?
MC4CF	?	?

(2) EMC

Unit	Electromagnetic conformance
MO12CF	EN61000-6-2 EN50081-2 FCC Part15 Class A
MO4CF	?
SC4OF	?
SC2OF	?
C1CF	?
MC4CF	?

(3) Vibration, Shock

Unit	Vibration	Shock
MO12CF	No standard guarantee	No standard guarantee
MO4CF	?	?
SC4OF	MIL-STD -810D METHOD 514.3 CATEGORY1 standard (Common carrier environment) FIGURE514.3-1 to 514.3-3	Half sign 11ms,100G,1000 times
SC2OF	?	?
C1CF	?	?
MC4CF *1	?	?

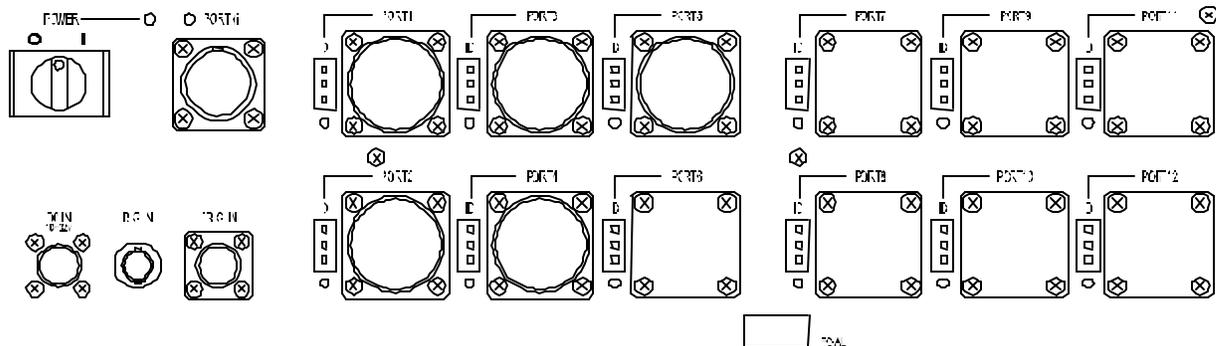
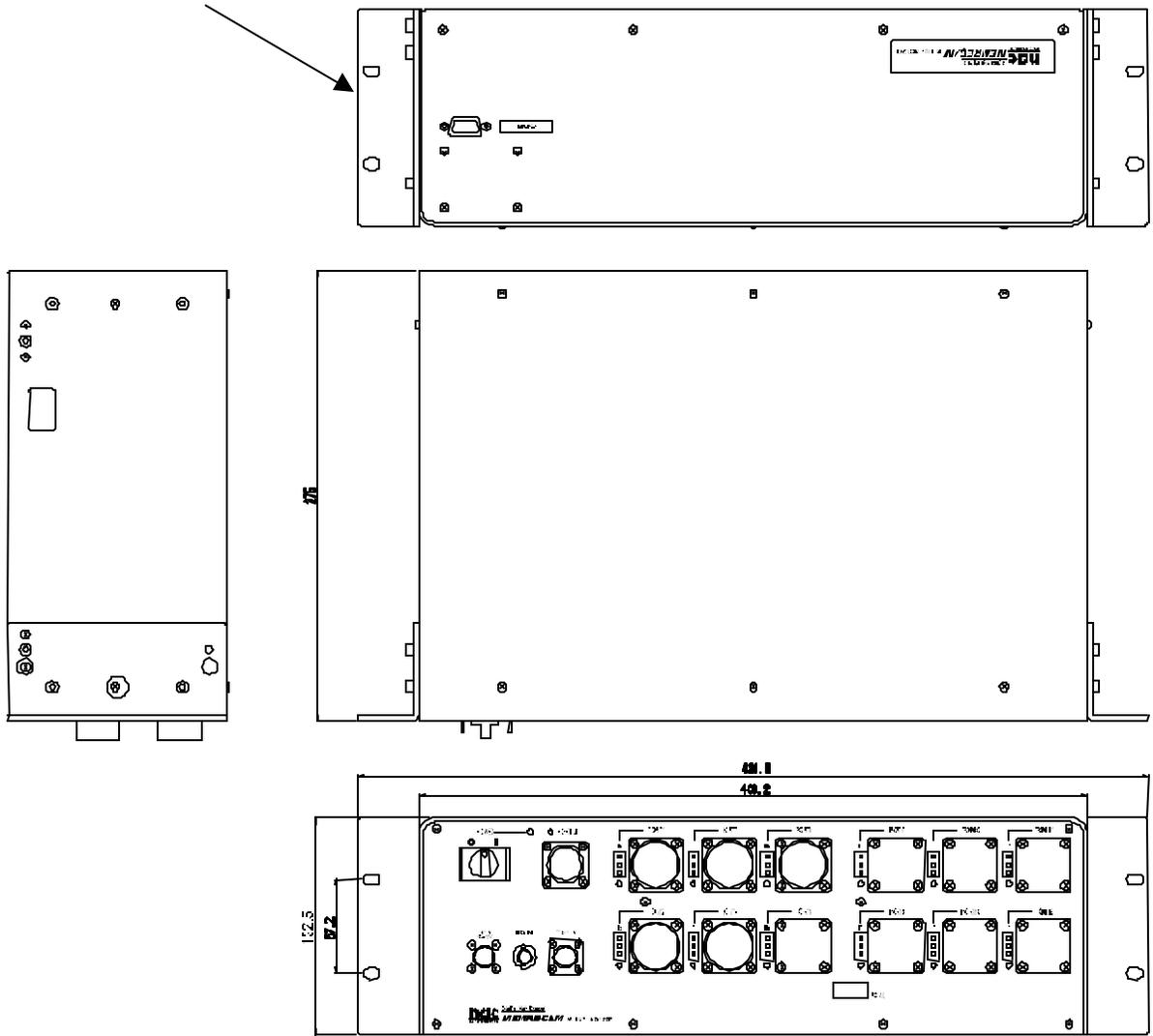
*1: Performance of MC4CFs FC -AL connector (HSSDC) or IRIG IN connector (BNC) is not guaranteed against excessive vibrations or impact.

11. Exterior Diagram

(1) MO12CF

Rack Mounting Plate

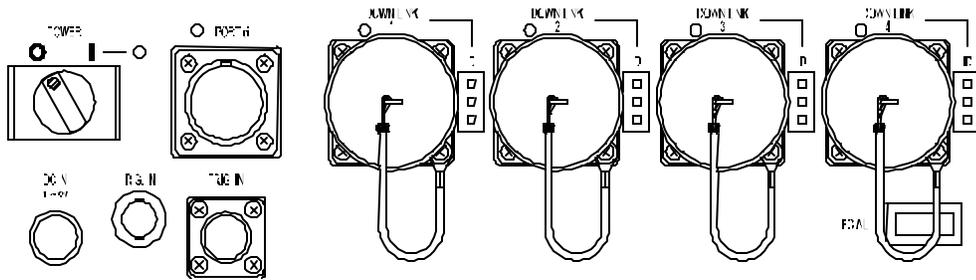
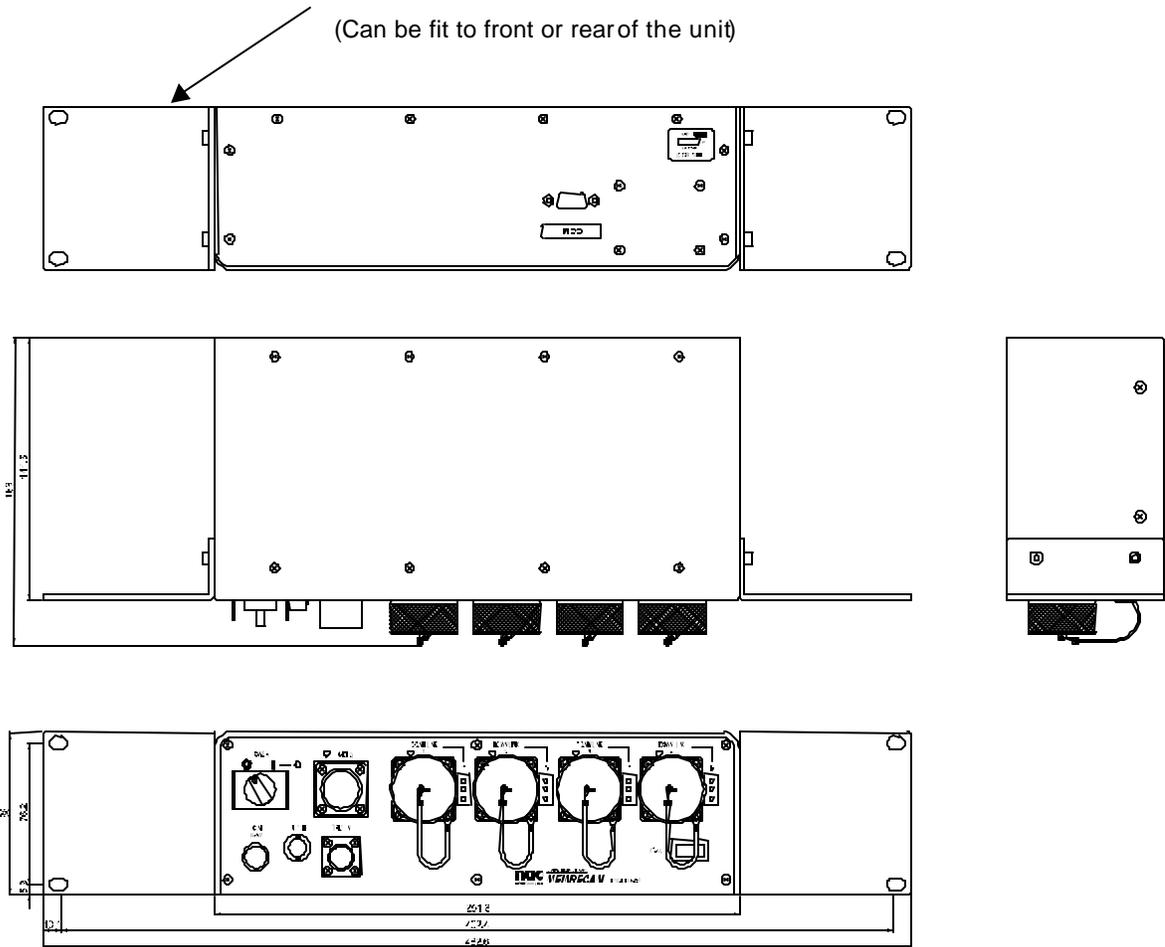
(Can be fit to front or rear of the unit)



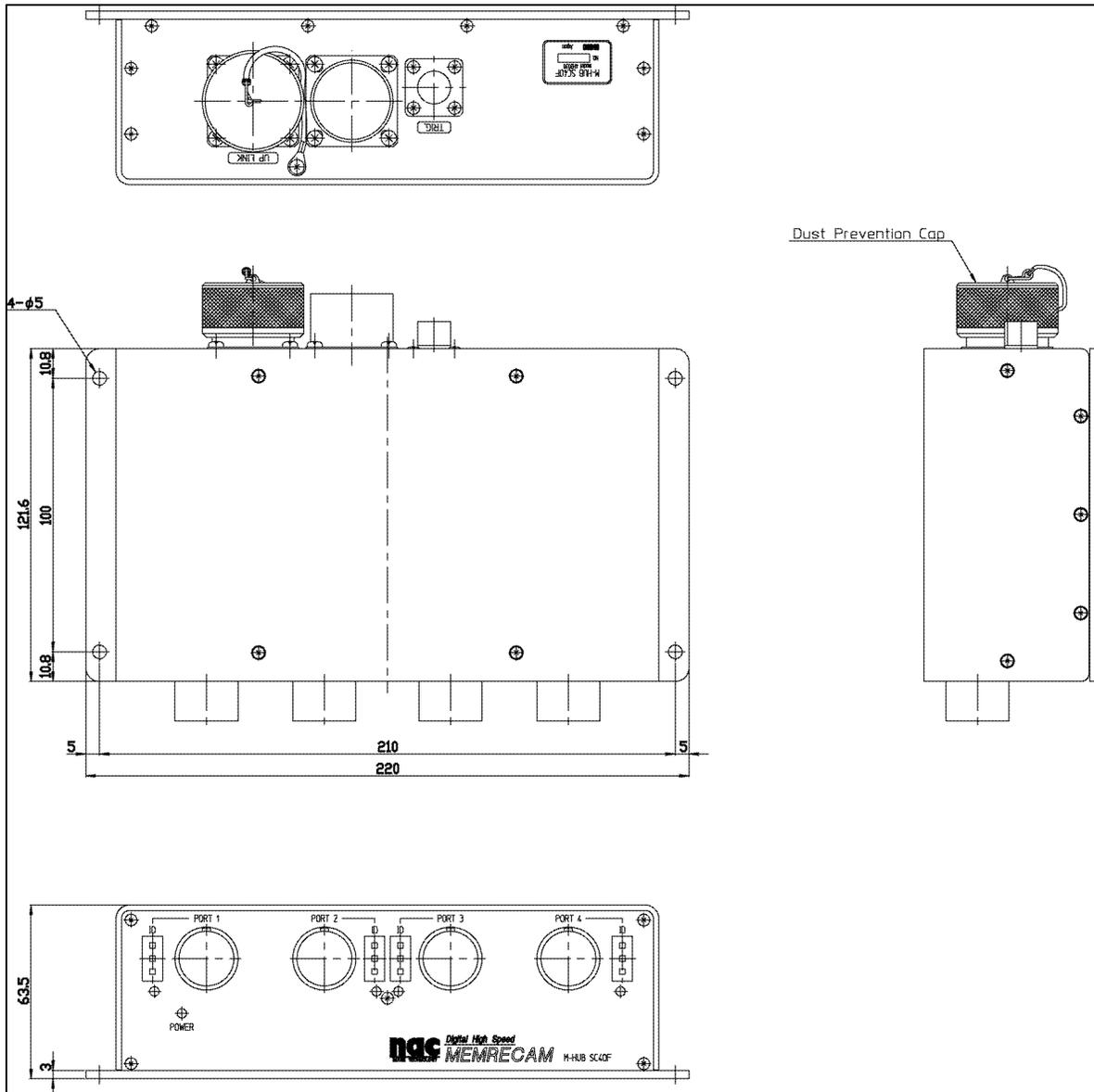
(2) MO4CF

Rack Mounting Plate

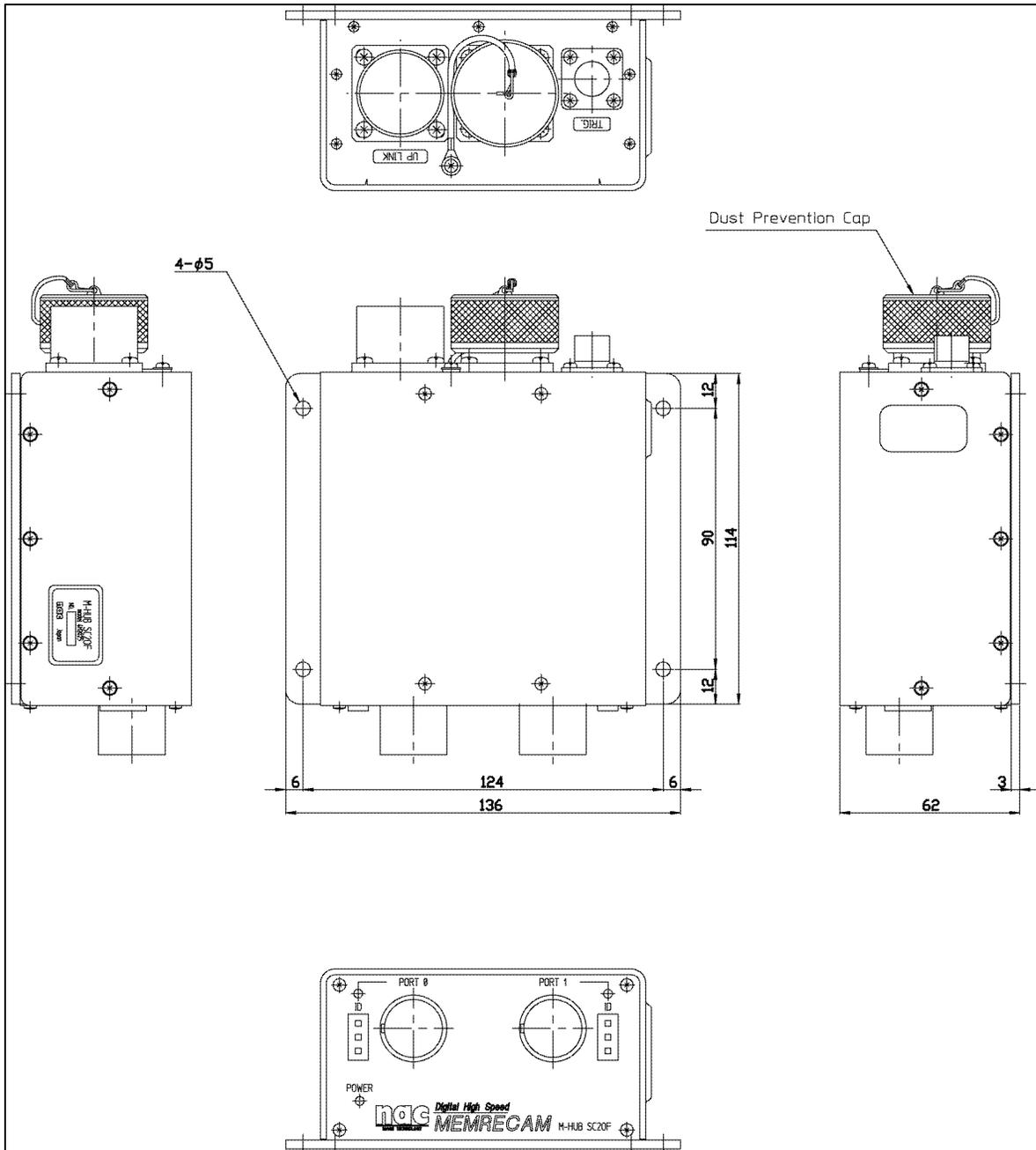
(Can be fit to front or rear of the unit)



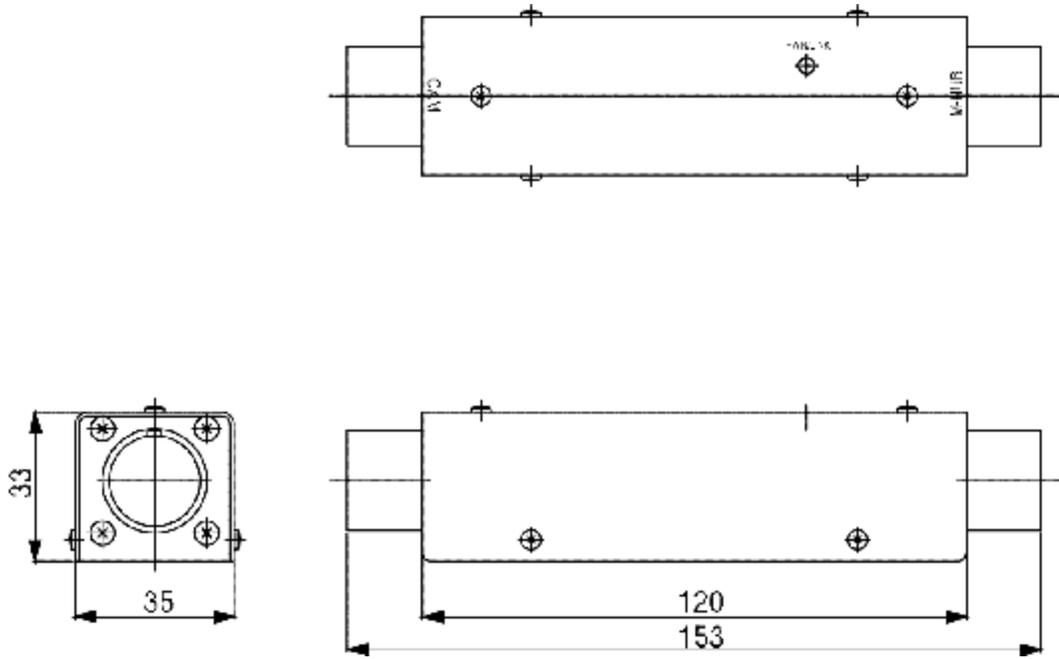
(3) SC40F



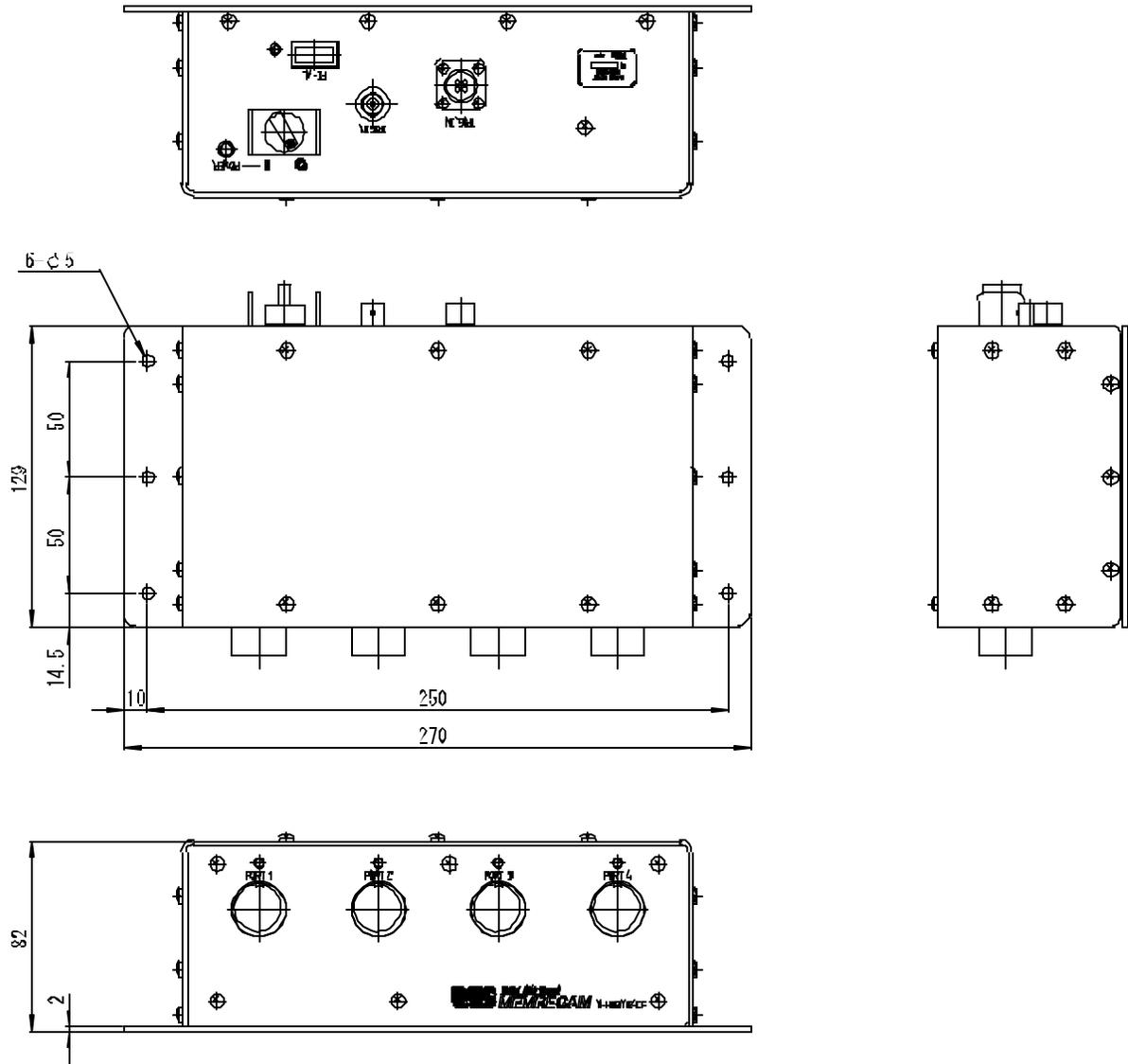
(4) SC20F



(5) C1CF



(6) MC4CF



12. Notes on Handling

- (1) There is an exposed optical fiber contact terminal on the master M-HUB Down-Link port and the slave M-HUB Up-Link port. Since dust will cause a bad connection, please cover the port with the dust cap when not in use.
- (2) There is an exposed optical fiber contact terminal on the FC-AL optical remote cable connector. Please cover the cable connector with the dust cap when not in use.
- (3) Please remove the remote cable connecting the master M-HUB and the slave M-HUB as quickly as possible. If not fully inserted into the connector, the power to the slave M-HUB and **MEMRECAM** fx may be turned OFF.
- (4) The FC -AL transmission rate for the M-HUB is 1.062Gbps.
- (5) The maximum number of **MEMRECAM** fx that can be connected is as follows.
 - FC-AL limit: 127 units
 - M-HUB products: 48 units
 - Factory tested: 8 units

(When the number of units to be delivered exceed 9, they are tested for performance prior to system shipment.)
- (6) When operation is to be performed with remote cables that connected to the slave M-HUB's Down-Link port are open (camera not connect), terminate the remote cable on the **MEMRECAM** fx side with a cable terminator (582680).

13.Connector Signal Arrangement

(1) DC IN (Master M-HUB)

Receptable: AFD50-8-33PN-1A (DEUTSCH)

Plug: AFD56-8-33SN-059 (DEUTSCH)

A	DC IN	20 - 32DC V power input
B	F.G	Frame GND
C	DC RTN	Power GND

(2) IRIG IN (Master M-HUB)

Receptable: BNC123-BR-3

Plug: BNC plug connector

--	IRIG IN	Modulated IRIG -B 0.5-10Vp-p/10kΩ
----	---------	--------------------------------------

(3) TRIG IN(Master or Slave M-HUB)

Receptable: PT02H-8-4P (BENDIX)

Plug: PT06E-8-4S(SR) (BENDIX)

A	/TRIG IN	The voltage mode and current mode can be switched using the unit switch (the default is the voltage mode) During voltage mode: non-insulated input, 5V CMOS (Schmidt trigger) or contact signal During current mode: non-insulated input, contact signal (contact ON: less than 1kΩ; contact OFF: more than 100kΩ)
B	GND	non-insulated input grounding
C	V+	insulated positive input? Zin=1500Ω
D	V-	insulated negative input ? Zin=1500Ω

* About trigger detection timing.

- Non-insulated input voltage mode (5v CMOS) : H → L (H: more than 3.5v L: less than 1.25v)
- Non-insulated input voltage mode (point of contact) : OFF → ON
- Non-insulated input current mode : point of contact OFF → ON
- insulated input(Voltage between V+ and V-)

(4) PORT Ci (Master M-HUB except MC4CF) not operational

Receptacle: ACT90MC35SN (DEUTSCH)

Plug: ACT96MC35PN (DEUTSCH)

1	ROSENS	-----
2	ROBYD-	RS-422A standard
3	ROBYD+	RS-422A standard
4	ROSCLK-	RS-422A standard
5	ROSCLK+	RS-422A standard
6	ROIRIG-	RS-422A standard
7	ROIRIG+	RS-422A standard
8	ROTRIG+	RS-422A standard
9	ROTRIG-	RS-422A standard
10	ROSCLKout+	RS-422A standard
11	ROSCLKout-	RS-422A standard
12	ROTXDout+	RS-422A standard
13	ROTXDout-	RS-422A standard
14	REMOTGND	-----
15	RODRIVE	-----
16	RO_RTS-	RS-422A standard
17	RO_RTS+	RS-422A standard
18	AGND	-----
19	RO_CTSin+	RS-422A standard
20	RO_CTSin-	RS-422A standard
21	REMOTPWR	-----
22	VBSout	0.3Vp-p/75Ω

(5) DOWN-LINK 1 to xx (Master M-HUB except MC4CF)

Receptacle: ACT90ME99SN (DEUTSCH)

Plug: ACT96ME99PN (DEUTSCH)

S	CPXT+	Composite Signal TX+: RS-422A standard
Y	CPXT-	Composite Signal TX: RS-422A standard
N	CPXTCK+	Composite Signal TXCLK+: RS-422A standard
P	CPXTCK-	Composite Signal TXCLK -: RS-422A standard
M	CPXR+	Composite Signal RX+: RS-422A standard
L	CPXR-	Composite Signal RX: RS-422A standard
X	CPXRCK+	Composite Signal RXCLK+: RS-422A standard
K	CPXRCK-	Composite Signal RXCLK -: RS-422A standard
B	100BASE TX+	Not in use:100BaseTX TX+: IEEE 802.3u standard
T	100BASE TX -	Not in use :100BaseTX TX: IEEE 802.3u standard
C	100BASE RX+	Not in use :100BaseTX RX+: IEEE 802.3u standard
U	100BASE RX -	Not in use :100BaseTX RX-: IEEE 802.3u standard
D	TBD+	For detecting cable connection
E	TBD-	For detecting cable connection
A	PCNT	Power control signal
R	PCNRTN	Power control signal return
F	PRIM24	Not in use
G	PRIM24 RTN	Not in use
W	FCAL TX OPT	FC-AL TX: optical fiber
Z	FCAL RX OPT	FC-AL RX: optical fiber
H	-----	Not in use
J	-----	Not in use
V	(VGA OPT)	Not in use

(6) FC-AL (Master M-HUB except MC4CF)

Receptacle: 636180-1 (AMP)

Plug: HSSDC Plug connector

1	FC TX+	FC-AL TX+ signal
2	-----	Not in use
3	FC TX-	FC-AL TX- signal
4	-----	Not in use
5	-----	Not in use
6	FC RX-	FC-AL RX- signal
7	-----	Not in use
8	FC RX+	FC-AL RX+ signal

(7) FC-AL(MC4CF)

Receptacle: 636180-1 (AMP)

Plug: HSSDC Plug connector

1	FC TX+	FC-AL TX+ signal
2	GND	Power GND
3	FC TX-	FC-AL TX- signal
4	-----	Not in use
5	GND	ODIS+ : Optical Output Disable +
6	FC RX-	FC-AL RX- signal
7	POWER	DC+5V 500mA MAX
8	FC RX+	FC-AL RX+ signal

(8) PORT 1 to x (Slave M-HUB,MC4CF)

Receptacle: ACT90MC35PA (DEUTSCH)

Plug: ACT96MC35SA (DEUTSCH)

1	FC RX+	FC-AL RX+ signal
14	FC RX-	FC-AL RX- signal
7	FC TX+	FC-AL TX+ signal
8	FC TX-	FC-AL TX- signal
3	CPXR+	Composite signal RX+: RS-422A standard
16	CPXR-	Composite signal RX-: RS-422A standard
17	CPXRCK+	Composite signal RXCLK+: RS-422A standard
6	CPXRCK-	Composite signal RXCLK-: RS-422A standard
15	CPXT+	Composite signal TX+: RS-422A standard
2	CPXT-	Composite signal TX-: RS-422A standard
5	CPXTCK+	Composite signal TXCLK+: RS-422A standard
4	CPXTCK-	Composite signal TXCLK-: RS-422A standard
12	100T RX+	Not in use: 100BaseTX RX+: IEEE 802.3u standard
20	100T RX-	Not in use: 100BaseTX RX-: IEEE 802.3u standard
9	100T TX+	Not in use: 100BaseTX TX+: IEEE 802.3u standard
19	100T TX-	Not in use: 100BaseTX TX-: IEEE 802.3u standard
10	PRIM24	DC24V
11	PRIM24 RTN	GND: DC24V return
19	PCNT	Power control signal
20	PCNTRTN	Power control signal return
13	TBD+	For detecting cable connection
21	TBD-	For detecting cable connection

(9) UPLINK (Slave M-HUB)

Receptacle: ACT90ME99PN (DEUTSCH)

Plug: ACT96ME99SN (DEUTSCH)

S	CPXT+	Composite signal TX+: RS-422A standard
Y	CPXT-	Composite signal TX-: RS-422A standard
N	CPXTCK+	Composite signal TXCLK +: RS-422A standard
P	CPXTCK-	Composite signal TXCLK -: RS-422A standard
M	CPXR+	Composite signal RX+: RS-422A standard
L	CPXR-	Composite signal RX: RS-422A standard
X	CPXRCK+	Composite signal RXCLK+: RS-422A standard
K	CPXRCK-	Composite signal RXCLK -: RS-422A standard
B	100BASE TX+	Not in Use: 100BaseTX TX+: IEEE 802.3u standard
T	100BASE TX -	Not in Use: 100BaseTX TX-: IEEE 802.3u standard
C	100BASE RX+	Not in Use: 100BaseTX RX+: IEEE 802.3u standard
U	100BASE RX -	Not in Use: 100BaseTX RX-: IEEE 802.3u standard
D	TBD+	Not in Use: RS-422A standard
E	TBD-	Not in Use: RS-422A standard
A	PCNT	Power control signal
R	PCNTRTN	Power control signal return
F	PRIM24	Not in Use
G	PRIM24 RTN	Not in Use
W	FCAL TX OPT	FC-AL TX: optical fiber
Z	FCAL RX OPT	FC-AL RX: optical fiber
H	-----	Not in Use
J	-----	Not in Use
V	(VGA OPT)	Not in Use

(10) CAM(C1CF)

Receptacle: ACT90MC35PA (DEUTSCH)

Plug: ACT96MC35SA (DEUTSCH)

1	FC RX+	FC-AL RX+ signal
14	FC RX-	FC-AL RX- signal
7	FC TX+	FC-AL TX+ signal
8	FC TX-	FC-AL TX- signal
3	CPXR+	Composite signal RX+: RS-422A standard
16	CPXR -	Composite signal RX-: RS-422A standard
17	CPXRCK+	Composite signal RXCLK+: RS-422A standard
6	CPXRCK-	Composite signal RXCLK -: RS-422A standard
15	CPXT+	Composite signal TX+: RS-422A standard
2	CPXT-	Composite signal TX-: RS-422A standard
5	CPXTCK+	Composite signal TXCLK+: RS-422A standard
4	CPXTCK -	Composite signal TXCLK-: RS-422A standard
12	100T RX+	Not in use: 100BaseTX RX+: IEEE 802.3u standard
20	100T RX-	Not in use : 100BaseTX RX-: IEEE 802.3u standard
9	100T TX+	Not in use : 100BaseTX TX+: IEEE 802.3u standard
19	100T TX-	Not in use : 100BaseTX TX-: IEEE 802.3u standard
10	PRIM24	DC24V
11	PRIM24 RTN	GND: DC24V return
19	PCNT	Power control signal
20	PCNTRTN	Power control signal return
13	TBD+	For detecting cable connection
21	TBD-	For detecting cable connection

(11) M-HUB (C1CF)

Receptacle: ACT90MC35SA (DEUTSCH)

Plug: ACT96MC35PA (DEUTSCH)

1	FC RX+	FC-AL RX+ signal
14	FC RX-	FC-AL RX- signal
7	FC TX+	FC-AL TX+ signal
8	FC TX-	FC-AL TX- signal
3	CPXR+	Composite signal RX+: RS-422A standard
16	CPXR -	Composite signal RX-: RS-422A standard
17	CPXRCK+	Composite signal RXCLK+: RS-422A standard
6	CPXRCK-	Composite signal RXCLK -: RS-422A standard
15	CPXT+	Composite signal TX+: RS-422A standard
2	CPXT-	Composite signal TX-: RS-422A standard
5	CPXTCK+	Composite signal TXCLK+: RS-422A standard
4	CPXTCK-	Composite signal TXCLK -: RS-422A standard
12	100T RX+	Not in use: 100BaseTX RX+: IEEE 802.3u standard
20	100T RX-	Not in use : 100BaseTX RX-: IEEE 802.3u standard
9	100T TX+	Not in use : 100BaseTX TX+: IEEE 802.3u standard
19	100T TX-	Not in use : 100BaseTX TX-: IEEE 802.3u standard
10	PRIM24	DC24V
11	PRIM24 RTN	GND: DC24V return
19	PCNT	Power control signal
20	PCNTRTN	Power control signal return
13	TBD+	For detecting cable connection
21	TBD-	For detecting cable connection

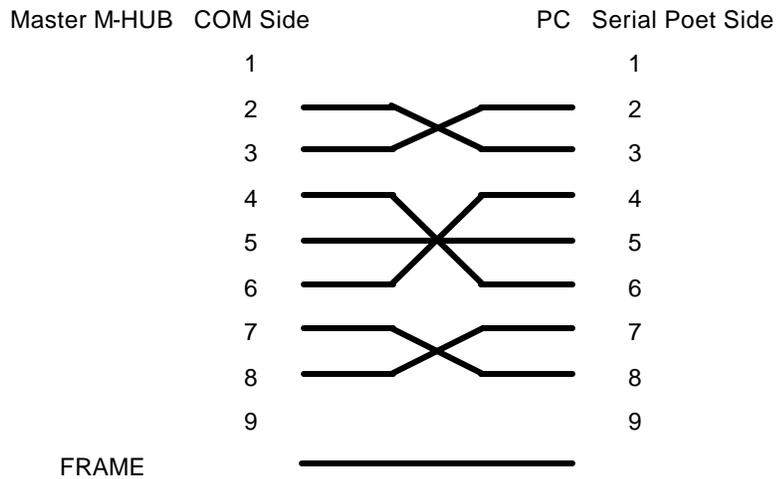
(12) COM (Master M-HUB except MC4CF)

Receptacle: DE-9PF-N (JAE)

Plug: DE-9SF-N (JAE)

1	-----	Not in Use
2	RX	RS-232C standard
3	TX	RS-232C standard
4	DTR	RS-232C standard (It connects with NO.6 pin inside.)
5	GND	Signal GND
6	DSR	RS-232C standard (It connects with NO.4 pin inside.)
7	RTS	RS-232C standard
8	CTS	RS-232C standard
9	-----	Not in Use

** Connection diagram (CARS?) * *



14. Optional Products

(1) Remote Cable (Copper)

Model Name	Product Number	Product Name	Remarks
CR-985	582292-4	CABLE FC 7.5m	7.5m remote cable for MEMRECAM fx->slave M-HUB connection
CR-985	582292-6	CABLE FC 15m	15m remote cable for MEMRECAM fx->slave M-HUB connection

- Cable Diameter: max 15.4mm
- Maximum Outer Diameter of Connector: max 29.4mm
- Approved bending radius: use at greater than 150mm
- References: Male plug is on the **MEMRECAM** fx, female plug is on the slave M-HUB.

(2) Terminator

Model Name	Product Number	Product Name	Remarks
582680	582680--	Cable terminator	Male plug terminator for remote copper cable

(3) Remote Cable (Optical)

Model Name	Product Number	Product Name	Remarks
CR-985	582294-1	Cable FF 7.5m	7.5m remote cable for slave M-HUB<->master M-HUB connection
CR-985	582294-2	Cable FF 15m	15m remote cable for slave M-HUB<->master M-HUB connection
CR-985	582294-3	Cable FF 25m	25m remote cable for slave M-HUB<->master M-HUB connection
CR-985	582294-4	Cable FF 50m	50m remote cable for slave M-HUB<->master M-HUB connection
CR-985	582294-5	Cable FF 75m	75m remote cable for slave M-HUB<->master M-HUB connection
CR-985	582294-6	Cable FF 100m	100m remote cable for slave M-HUB<->master M-HUB connection
CR-985	582294-7	Cable FF 150m	150m remote cable for slave M-HUB<->master M-HUB connection
CR-985	582294-8	Cable FF 300m	300m remote cable for slave M-HUB<->master M-HUB connection

- Cable Diameter: max 14.2mm
- Maximum Outer Diameter of Connector: max 45mm including the dust cap fitting
- Approved bending radius: use at greater than 140mm
- Approved tensile strength: use at less than 100N
- References: Male plug is on the master M-HUB, female plug is on the slave M-HUB.

(4) Power

Model Name	Product Number	Product Name	Remarks
4HO596-1	4HO596-1	AC POWER SYSTEM	For domestic use, includes 2P AC cable
4HO596-2	4HO596-2	AC POWER SYSTEM	Includes loose end AC cable
4HO596-3	4HO596-3	AC POWER SYSTEM	Includes 3P AC cable
4HO592	4HO592	Battery system	55WHX2
31047	*31047	Battery charger	
34074	*34074	WBH	Dual battery holder
34713	*34713	Coil cable	
32017	*32017	battery	Pro-pack 13 digital battery
481404	481404	DC power cable	Loose end, 1m
J53900006	J53900006	Power connector	

7.4.4 Ethernet(100Base-TX) M-HUB Units

1. Overview

- Connects multiple **MEMRECAM** fx series **MEMRECAM** fx and the M-HUB unit can bundle control using the Ethernet
- Master M-HUB: MC12CT, MC4CT Slave M-HUB: SC4CT, SC2CT lineup

2. General Functions and Features

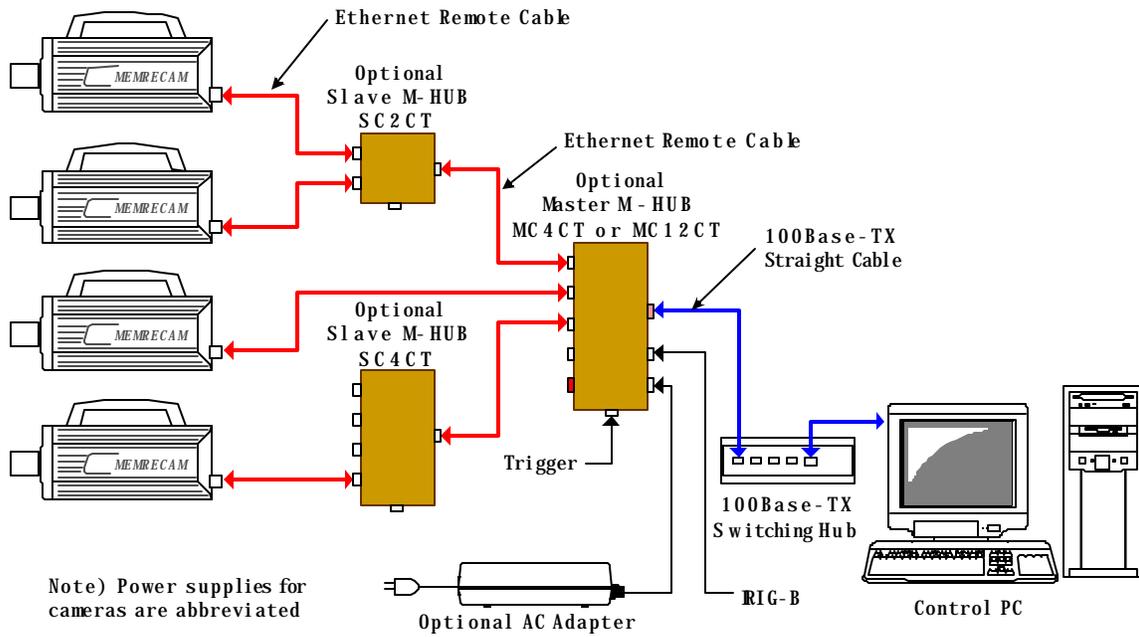
- The master unit can connect a maximum of 12 slave units
- The slave unit can connect a maximum of 4 **MEMRECAM** fx
- The maximum length between the master and slave unit connection is 100m
- The maximum length between the **MEMRECAM** fx and slave unit connection is 25m
- With synchronizing pulses, high precision synchronized recording between **MEMRECAM** fx is possible
- Can synchronize with IRIG-B time code

3. Functions and Characteristics of Each Unit

Unit	Functions and Characteristics
MC12CT	<ul style="list-style-type: none">· the number of ports connecting the slave M-HUB can vary from 5-12· additional ports available after shipment· requires external DC power· no G-force resistance guarantee standard
MC4CT	<ul style="list-style-type: none">· can connect up to 4 slave M-HUB· requires external DC power· no G-force resistance guarantee standard
SC4CT	<ul style="list-style-type: none">· can connect up to 4 MEMRECAM fx· does not require external DC power (supplied from MEMRECAM fx)· standard G-force resistance guarantee
SC2CT	<ul style="list-style-type: none">· can connect up to 2 MEMRECAM fx· does not require external DC power (supplied from CAM-RECORDER)· standard G-force resistance guarantee

4. Connection Diagrams

When connecting multiple **MEMRECAM** fx using the Ethernet 100Base-TX.



5. Composition

(1) fixed M-HUB with port

Model Name	Part Number	Part Name	Comments
ST-605	582533	MC4CT System	Configured so AC power system (4H0596-3) can be added to the MC4CT (4H2026)
CR-985	4H2026	MC4CT	4port master M-HUB
CR-985	582576	SC4CT	4port slave M-HUB
CR-985	582578	SC2CT	2port slave M-HUB

(2) variable M-HUB with port

Model Name	Part Number	Part Name	Comments
ST-605	582580-1	MC12CT System	Configured so AC power system (4H0596-3) can be added to the MC12CT UNIT 5Port (582582-1)
ST-605	582580-2	MC12CT System	Configured so AC power system (4H0596-3) can be added to the MC12CT UNIT 6Port (582582-2)
ST-605	582580-3	MC12CT System	Configured so AC power system (4H0596-3) can be added to the MC12CT UNIT 7Port (582582-3)
ST-605	582580-4	MC12CT System	Configured so AC power system (4H0596-3) can be added to the MC12CT UNIT 8Port (582582-4)
ST-605	582580-5	MC12CT System	Configured so AC power system (4H0596-3) can be added to the MC12CT UNIT 9Port (582582-5)
ST-605	582580-7	MC12CT System	Configured so AC power system (4H0596-3) can be added to the MC12CT UNIT 11Port (582582-7)
ST-605	582580-6	MC12CT System	Configured so AC power system (4H0596-3) can be added to the MC12CT UNIT 10Port (582582-6)
ST-605	582580-8	MC12CT System	Configured so AC power system (4H0596-3) can be added to the MC12CT UNIT 12Port (582582-8)
V-834	582582-1	MC12CT UNIT	MC12CT model 5port master M-HUB
V-834	582582-2	MC12CT UNIT	MC12CT model 6port master M-HUB
V-834	582582-3	MC12CT UNIT	MC12CT model 7port master M-HUB
V-834	582582-4	MC12CT UNIT	MC12CT model 8port master M-HUB
V-834	582582-5	MC12CT UNIT	MC12CT model 9port master M-HUB
V-834	582582-6	MC12CT UNIT	MC12CT model 10port master M-HUB
V-834	582582-7	MC12CT UNIT	MC12CT model 11port master M-HUB
V-834	582582-8	MC12CT UNIT	MC12CT model 12port master M-HUB

(3) port addition options

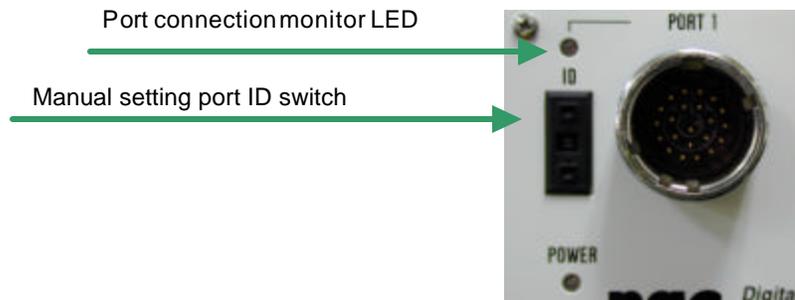
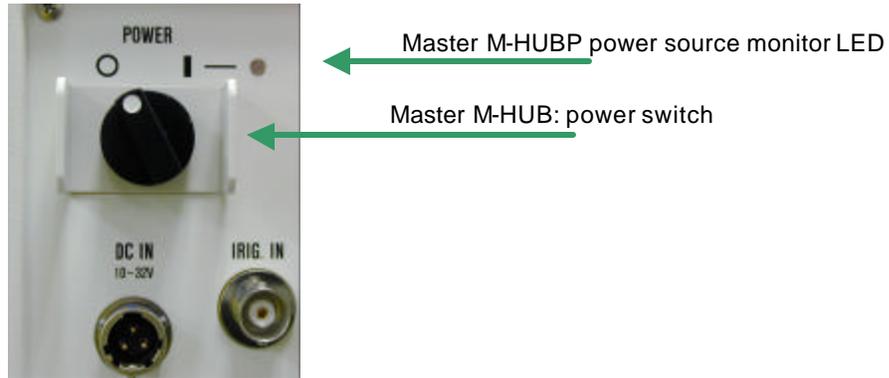
Model Name	Part Number	Part Name	Comments
CR-985	582587-1	100T PORT addition	Option to add 1 port to the MC12CT UNIT (582582-1~7) only at shipment

6. Specifications

! Product Type

MEMRECAM fx series

! Panel switch and LED



(1) Power Switch

- The power ON/OFF switch readies the master M-HUB but not the slave M-HUB. Power for the slave M-HUB is driven by the master M-HUB ON/OFF.
- After turning the master M-HUB power ON/OFF, it will take about 5 seconds to turn the slave M-HUB and camera power ON/OFF.
- When the remote cable connecting the slave M-HUB and master M-HUB is disconnected, the slave M-HUB will remain ON. (when power is supplied by the **MEMRECAM** fx)

(2) Power Monitor LED

- master M-HUB
 - green light lit: ON
 - not lit: OFF
- slave M-HUB
 - green light lit: ON
 - not lit: OFF
 - (**MEMRECAM** fx not supplying power)
 - white: OFF
 - (**MEMRECAM** fx supplying power but slave M-HUB is in OFF state)

(3) Manual Setting Port ID Switch

- Can be set for any integer 0~15
 - Confirmation of the setting for this switch can be done from Smart Capture. The user can easily verify the contents of which **MEMRECAM** fx or M-HUB are connected to which port.

(4) Port Connection Monitor LED

- Displays the remote cable connection status
 - Green light lit: connected to the camera, DRP or M-HUB
(no relation to the fiber channel link set)
 - not lit: not yet connected

7. Input/Output Connector

(1) Master M-HUB

Panel name	Connector model	Function
DC IN	AFD50-8-33PN-1 A	Input power: 20 to 32DCV
IRIG IN	BNC123-BR-3	Modulated IRIG-B input 0.5 to 10Vp-p/10kΩ
TRIG IN	PT02H-8-4P	Trigger input: same as MEMRECAM fx Trigger distributes to each DOWNLINK port 1 to xx
PORT Ci	ACT90MC35SN	Ci series remote control: not yet operational
PORT 1 to xx	ACT90MC35PA	For slave M-HUB connection
100B -TX	558342-1	For controlling PC connection: RJ-45 connector

(2) Slave M-HUB

Panel name	Connector model	Function
PORT 1 to x	ACT90MC35PA	For MEMRECAM fx connection
UP LINK	ACT90ME99PN	For master M-HUB connection
TRIG IN	PT02H-8-4P	Trigger input: same as MEMRECAM fx Trigger distributes to each port 1 to x Not operational when connected to master M- HUB

8. Power

Unit	Input Voltage	Watts consumed	Remarks
MC12CT	20 to 32V	About 18W	External power source required
MC4CT	20 to 32V	About 5W	External power source required
SC4CT	20 to 32V	About 7W	Supplied from MEMRECAM fx
SC2CT	20 to 32V	About 5W	Supplied from MEMRECAM fx

9. Dimensions and Weight

Unit	W(mm)	H(mm)	D(mm)	Weight (kg)	Remarks
MC12CT	408	133	275	5.7	Protrusions and fittings not included
MC4CT	292	88	142	1.9	Protrusions and fittings not included
SC4CT	198	62	122	1.2	Protrusions and fittings not included
SC2CT	112	62	122	0.8	Protrusions and fittings not included

10. Ambient Conditions

(1) Ambient Temperature

Unit	Operating Temperature	Storage Temperature
MC12CT	0 to 40°C, 30 to 80%RH (no condensation)	-10 to 60°C, 20 to 80%RH (no condensation)
MC4CT	?	?
SC4CT	?	?
SC2CT	?	?

(2) EMC

Unit	Electromagnetic conformance
MC12CT	EN61000-6-2 EN50081-2 FCC Part15 Class A
MC4CT	?
SC4CT	?
SC2CT	?

(3) Vibration, Shock

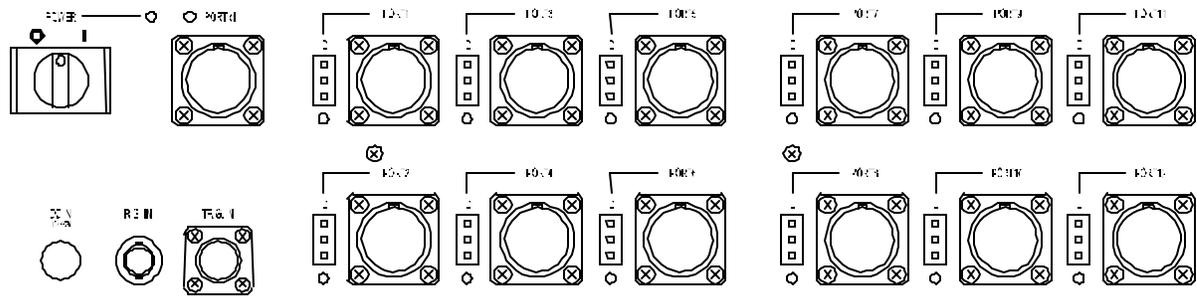
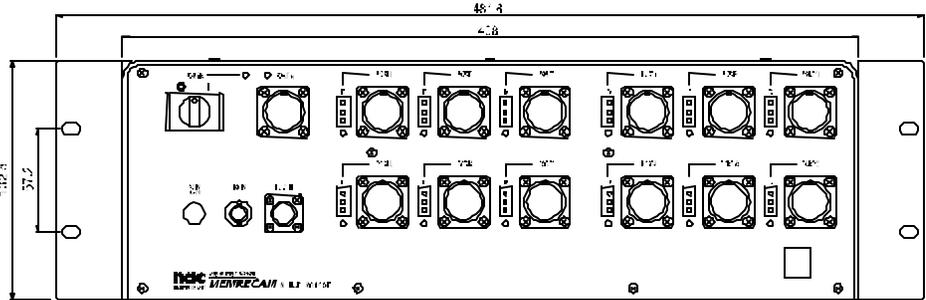
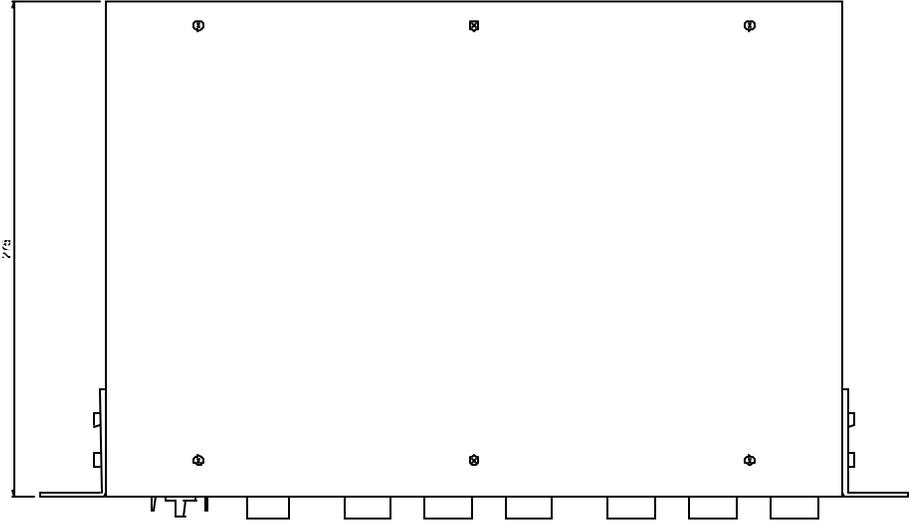
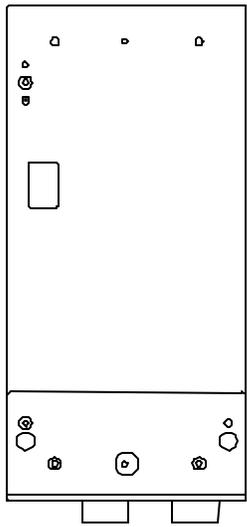
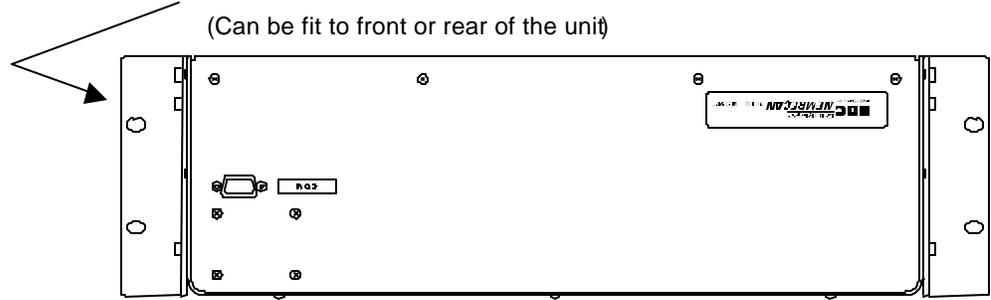
Unit	Vibration	Shock
MC12CT	No standard guarantee	No standard guarantee
MC4CT	"	"
SC4CT	THOD 514.3 CATEGORY1 standard (Common carrier environment) FIGURE514.3-1 to 514.3-3	Half-sign 11ms, 100G, 1000 times
SC2CT	?	?

11. Exterior Diagrams

(1) MC12CT

Rack Mounting Plate

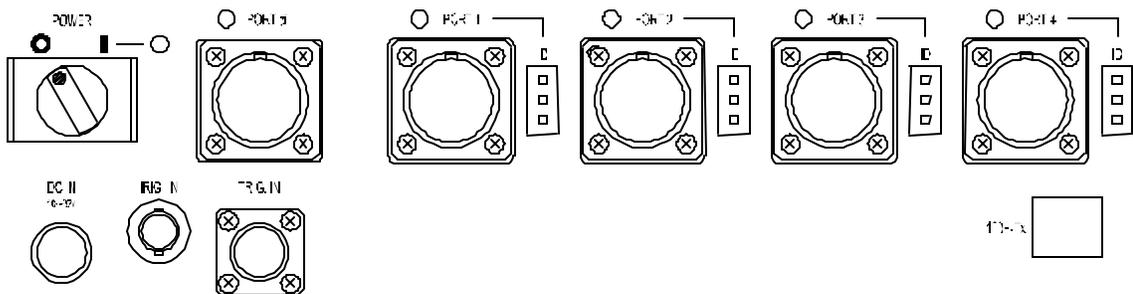
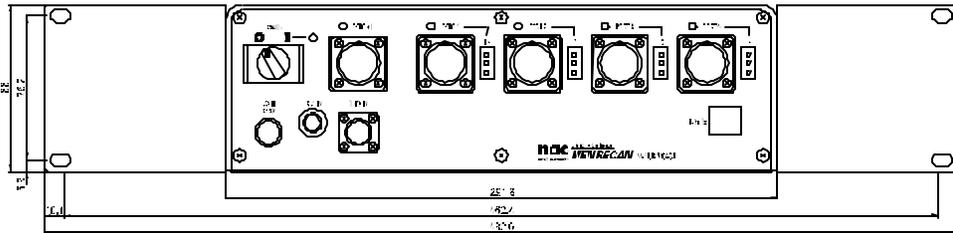
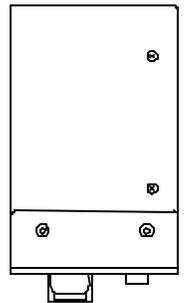
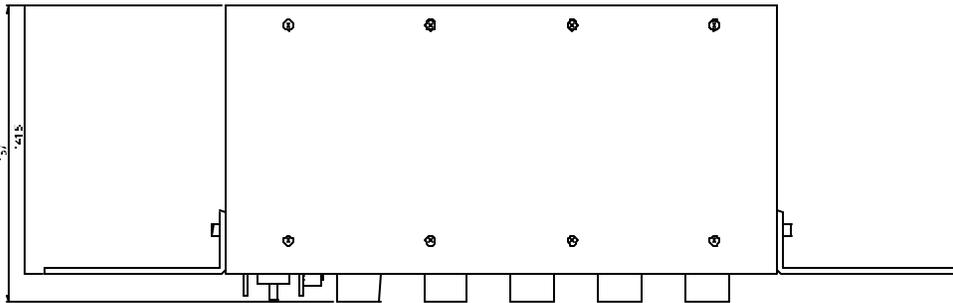
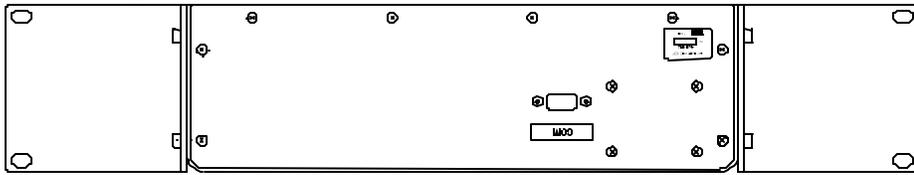
(Can be fit to front or rear of the unit)



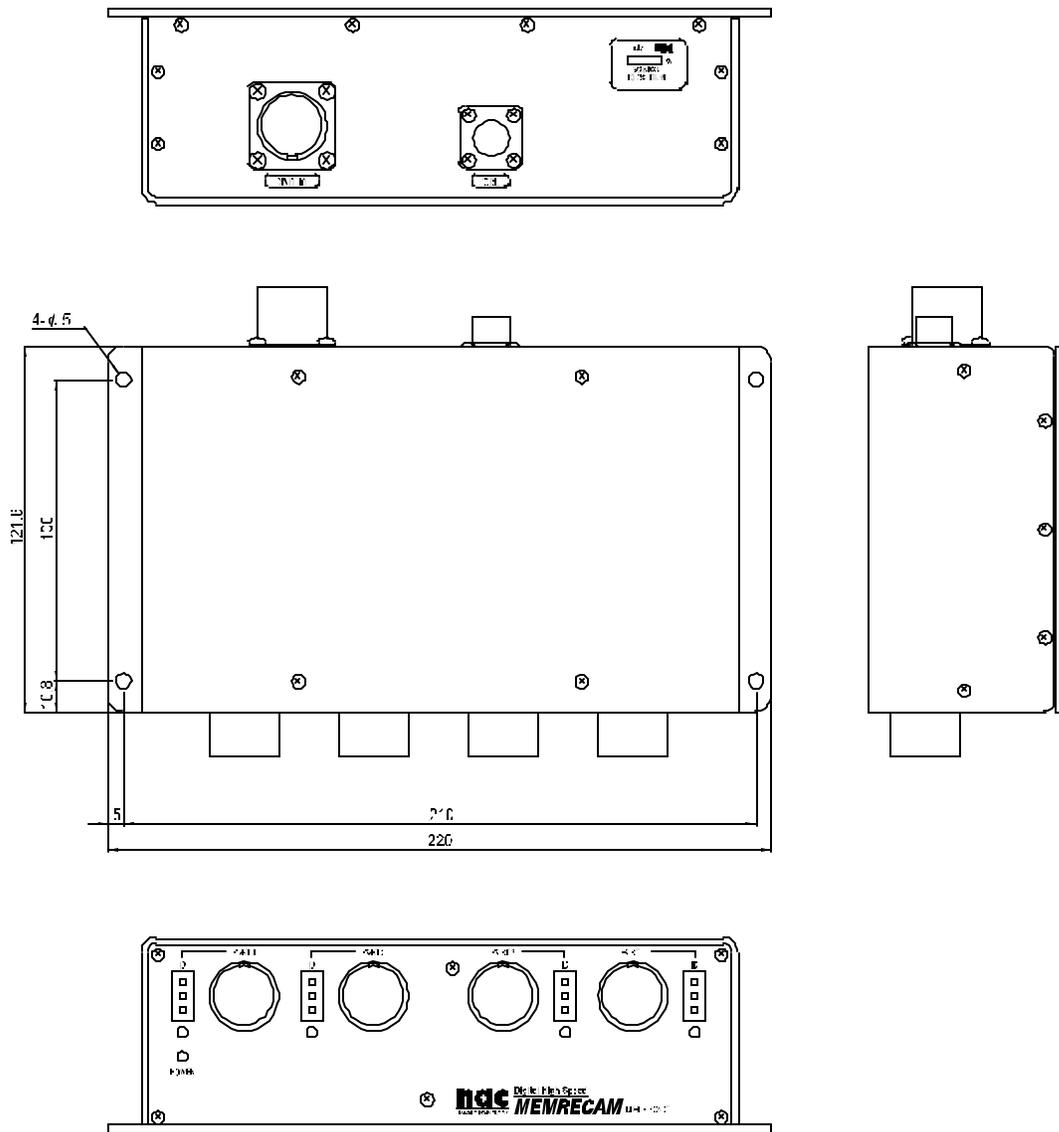
(2) MC4CT

Rack Mounting Plate

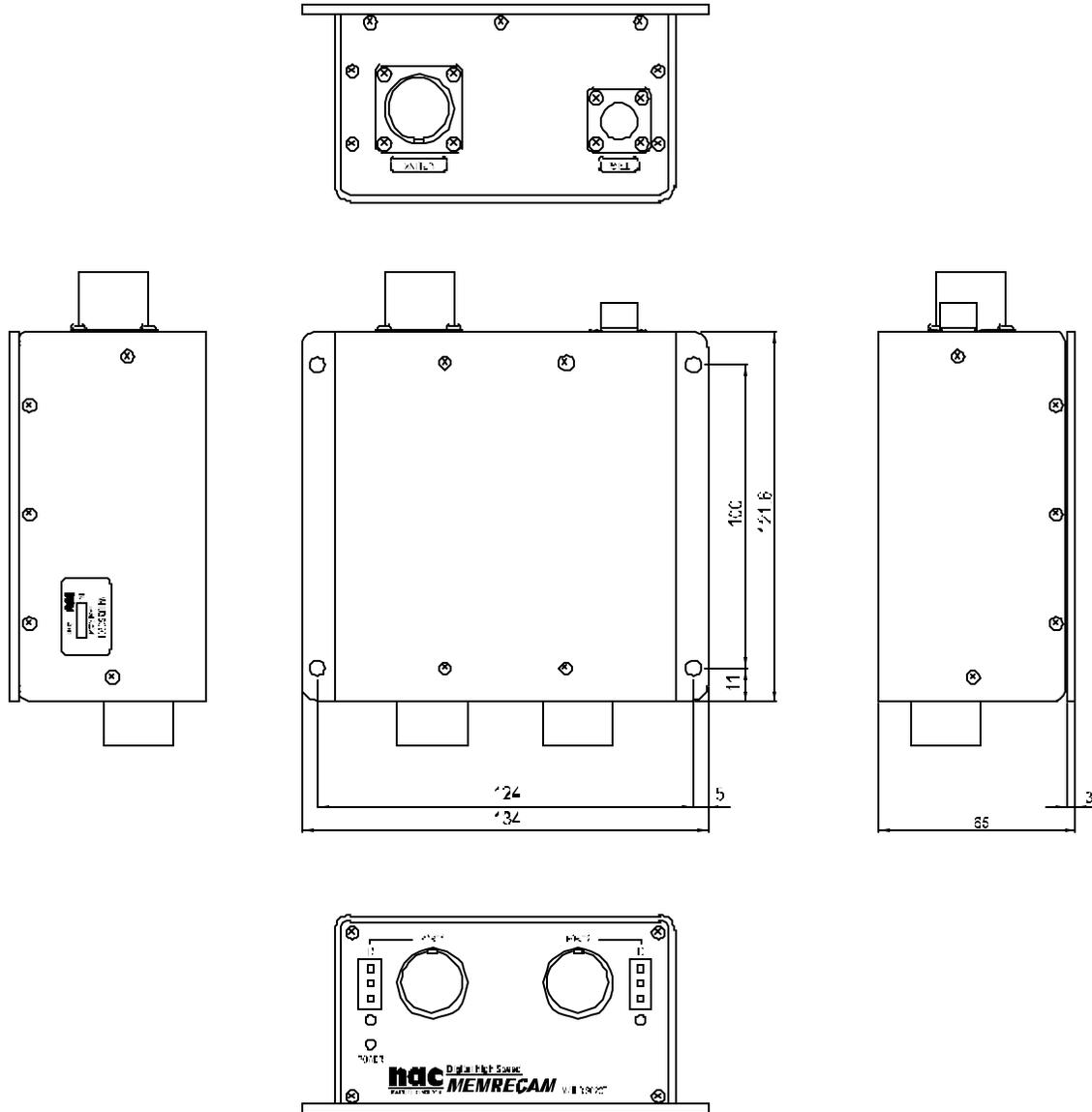
(Can be fit to front or rear of the uni)



(3) SC4CT



(4) SC2CT



12. Notes on Handling

- (1) Please remove the remote cable connecting the master M-HUB and the slave M-HUB as quickly as possible. If not fully inserted into the connector, the power to the slave M-HUB and **MEMRECAM** fx may be turned OFF.
- (2) The remote cable between the useable slave M-HUB and **MEMRECAM** fx has a maximum length of 25m.
(If more than 50m, the slave M-HUB will require an external power source. This unit would require special handling.)
- (3) The 100Base-TX M-HUB uses the halfduplex communication method.
- (4) The maximum number of **MEMRECAM** fx that can be connected is as follows.
* M-HUB products: 48 units
- (5) The connection process between the **MEMRECAM** fx and the master M-HUB is the same as all of the ports. If the master M-HUB and **MEMRECAM** fx are directly connected, a mixed connection via the slave M-HUB cannot be used. One or the other must be used.

13.Connector Signal Arrangement

(1) DC IN (Master M-HUB)

Receptacle: AFD50-8-33PN-1A (DEUTSCH)

Plug: AFD56-8-33SN-059 (DEUTSCH)

A	DC IN	20 - 32DC V power input
B	F.G	Frame GND
C	DC RTN	Power GND

(2) IRIG IN (Master M-HUB)

Receptacle: BNC123-BR-3

Plug: BNC plug connector

-	IRIG IN	Modulated IRIG-B 0.5-10Vp-p/10kΩ
---	---------	-------------------------------------

(3) TRIG IN (Master or Slave M-HUB)

Receptacle: PT02H-8-4P (BENDIX)

Plug: PT06E-8-4S (SR) (BENDIX)

A	/TRIG IN	The voltage mode and current mode can be switched using the unit switch (the default is the voltage mode) During voltage mode: non-insulated input, 5V CMOS (Schmidt trigger) or contact signal During current mode: non-insulated input, contact signal (contact ON: less than 1kΩ; contact OFF: more than 100kΩ)
B	GND	non-insulated input grounding
C	V+	insulated positive input? Zin=1500Ω
D	V-	insulated negative input? Zin=1500Ω

* About trigger detection timing.

- Non-insulated input voltage mode (5v CMOS) : H→L (H: more than 3.5v L: less than 1.25v)
- Non-insulated input voltage mode (point of contact) : OFF → ON
- Non-insulated input current mode : point of contact OFF → ON
- insulated input(Voltage between V+ and V-)

(4) PORT Ci (Master M-HUB) not operational

Receptacle: ACT90MC35SN (DEUTSCH)

Plug: ACT96MC35PN (DEUTSCH)

1	ROSENS	-----
2	RORXD-	RS-422A standard
3	RORXD+	RS-422A standard
4	ROSCLK-	RS-422A standard
5	ROSCLK+	RS-422A standard
6	ROIRIG-	RS-422A standard
7	ROIRIG+	RS-422A standard
8	ROTRIG+	RS-422A standard
9	ROTRIG-	RS-422A standard
10	ROSCLKout +	RS-422A standard
11	ROSCLKout =	RS-422A standard
12	ROTXDout+	RS-422A standard
13	ROTXDout-	RS-422A standard
14	REMOTGN D	-----
15	RODRIVE	-----
16	RO_RTS-	RS-422A standard
17	RO_RTS+	RS-422A standard
18	ACND	-----
19	RO_CTSin+	RS-422A standard
20	RO_CTSin-	RS-422A standard
21	REMOTPW R	-----
22	VBSout	0.3Vp-p/750

(5) PORT 1 to xx (Master M-HUB)

Receptacle: ACT90MC35PA (DEUTSCH)

Plug: ACT96MC35SA (DEUTSCH)

1	FC RX+	FC-AL RX+ signal
14	FC RX-	FC-AL RX- signal
7	FC TX+	FC-AL TX+ signal
8	FC TX-	FC-AL TX- signal
3	CPXR+	Composite signal RX+: RS-422A standard
16	CPXR -	Composite signal RX-: RS-422A standard
17	CPXRCK+	Composite signal RXCLK +: RS-422A standard
6	CPXRCK-	Composite signal RXCLK -: RS-422A standard
15	CPXT+	Composite signal TX+: RS-422A standard
2	CPXT-	Composite signal TX-: RS-422A standard
5	CPXTCK+	Composite signal TXCLK +: RS-422A standard
4	CPXTCK-	Composite signal TXCLK -: RS-422A standard
12	100T RX+	Not in use: 100BaseTX RX+: IEEE 802.3u standard
20	100T RX-	Not in use: 100BaseTX RX-: IEEE 802.3u standard
9	100T TX+	Not in use: 100BaseTX TX+: IEEE 802.3u standard
19	100T TX-	Not in use: 100BaseTX TX-: IEEE 802.3u standard
10	PRIM24	Not in use
11	PRIM24 RTN	Not in use
19	PCNT	Power control signal
20	PCNTRTN	Power control signal return
13	TBD+	For detecting cable connections
21	TBD-	For detecting cable connections

(6) 100B-Tx(Master M-HUB)

Receptacle: 558341-1 (AMP)

Plug: RJ-45 plug connector

1	100T TX+	100Base-TX TX+ signal
2	100T TX-	100Base-TX TX- signal
3	100T RX+	100Base-TX RX+ signal
4	-----	Not in Use
5	-----	Not in Use
6	100T RX-	100Base-TX RX- signal
7	-----	Not in Use
8	-----	Not in Use

(7) PORT 1 to x (Slave M-HUB)

Receptacle: ACT90MC35PA (DEUTSCH)

Plug: ACT96MC35SA (DEUTSCH)

1	FC RX+	Not in Use: FC-AL RX+ signal
14	FC RX-	Not in Use: FC-AL RX- signal
7	FC TX+	Not in Use: FC-AL TX+ signal
8	FC TX-	Not in Use: FC-AL TX- signal
3	CPXR+	Composite signal RX+: RS-422A standard
16	CPXR -	Composite signal RX-: RS-422A standard
17	CPXRCK+	Composite signal RXCLK +: RS-422A standard
6	CPXRCK-	Composite signal RXCLK -: RS-422A standard
15	CPXT+	Composite signal TX+: RS-422A standard
2	CPXT-	Composite signal TX-: RS-422A standard
5	CPXTCK+	Composite signal TXCLK +: RS-422A standard
4	CPXTCK-	Composite signal TXCLK -: RS-422A standard
12	100T RX+	100BaseTX RX+: IEEE 802.3u standard
20	100T RX-	100BaseTX RX-: IEEE 802.3u standard
9	100T TX+	100BaseTX TX+: IEEE 802.3u standard
19	100T TX-	100BaseTX TX-: IEEE 802.3u standard
10	PRIM24	DC24V
11	PRIM24 RTN	GND: DC24V return
19	PCNT	Power control signal
20	PCNTRTN	Power control signal return
13	TBD+	For detecting cable connection
21	TBD-	For detecting cable connection

(8) UP LINK (Slave MHUB)

Receptacle: ACT90MC35SA (DEUTSCH)

Plug: ACT96MC35PA (DEUTSCH)

1	FC RX+	Not in Use: FC-AL RX+ signal
14	FC RX-	Not in Use: FC-AL RX- signal
7	FC TX+	Not in Use: FC-AL TX+ signal
8	FC TX-	Not in Use: FC-AL TX- signal
3	CPXR+	Composite signal RX+: RS-422A standard
16	CPXR -	Composite signal RX-: RS-422A standard
17	CPXRCK+	Composite signal RXCLK +: RS-422A standard
6	CPXRCK-	Composite signal RXCLK -: RS-422A standard
15	CPXT+	Composite signal TX+: RS-422A standard
2	CPXT-	Composite signal TX-: RS-422A standard
5	CPXTCK+	Composite signal TXCLK +: RS-422A standard
4	CPXTCK-	Composite signal TXCLK -: RS-422A standard
12	100T RX+	100BaseTX RX+: IEEE 802.3u standard
20	100T RX-	100BaseTX RX-: IEEE 802.3u standard
9	100T TX+	100BaseTX TX+: IEEE 802.3u standard
19	100T TX-	100BaseTX TX-: IEEE 802.3u standard
10	PRIM24	Not in Use
11	PRIM24 RTN	Not in Use
19	PCNT	Power control signal
20	PCNTRTN	Power control signal return
13	TBD+	For detecting cable connection
21	TBD-	For detecting cable connection

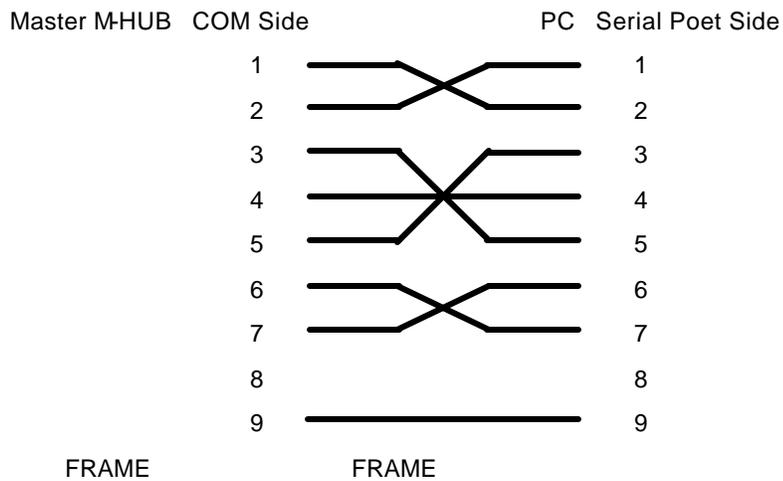
(12) COM (Master M-HUB)

Receptacle: DE-9PF-N (JAE)

Plug: DE-9SF-N (JAE)

1	-----	Not in Use
2	RX	RS-232C standard
3	TX	RS-232C standard
4	DTR	RS-232C standard (It connects with NO.6 pin inside.)
5	GND	Signal GND
6	DSR	RS-232C standard (It connects with NO.4 pin inside.)
7	RTS	RS-232C standard
8	CTS	RS-232C standard
9	-----	Not in Use

** Connection diagram (CARSII)**



14.Optional Products

(1) Remote Cable

Model Name	Product Number	Product Name	Remarks
CR-985	582290-3	CABLE EC 7.5m	7.5m remote cable for MEMRECAM fx<->slave MHUB connection
CR-985	582290-4	CABLE EC 15m	15m remote cable for MEMRECAM fx<->slave MHUB connection
CR-985	582290-5	CABLE EC 25m	25m remote cable for MEMRECAM fx<->slave MHUB connection
CR-985	582290-6	CABLE EC 50m	50m remote cable for MEMRECAM fx<->slave MHUB connection
CR-985	582290-7	CABLE EC 75m	75m remote cable for MEMRECAM fx<->slave MHUB connection
CR-985	582290-8	CABLE EC 100m	100m remote cable for MEMRECAM fx<->slave MHUB connection

- Cable Diameter: max 14.2mm
- Maximum Outer Diameter of Connector: max 29.4mm
- Approved bending radius: use at greater than 140mm
- References:
 - CAM-RECORDER <-> Slave M-HUB: Male plug is on the CAM-RECORDER
female plug is on the slave M-HUB
 - Slave M-HUB<-> master M-HUB: Male plug is on the slave M-HUB
Female plug is on the master M-HUB

(2) Power

Model Name	Product Number	Product Name	Remarks
4H0596-1	4H0596-1	AC POWER SYSTEM	For domestic use, includes 2P AC cable
4H0596-2	4H0596-2	AC POWER SYSTEM	Includes loose end AC cable
4H0596-3	4H0596-3	AC POWER SYSTEM	Includes 3P AC cable
4H0592	4H0592--	Battery system	55WHX2
31047	*31047	Battery charger	
34074	*34074	WBH	Dual battery holder
34713	*34713	Coil cable	
32017	*32017	battery	Pro-pack 13 digital battery
481404	481404--	DC power cable	Loose end, 1m
J53900006	J53900006	Power connector	

7.5 View Box

The View Box converts digital video signals output from the **MEMRECAM** fx D-VGA OUT port into analog VGA and NTSC (PAL) signals. It also functions as a high precision color image monitor during photography and playback.

7.5.1 Overview and Features

- Since the View Box is comprised of an input digital video signal and a power cable, analog VGA and NTSC (PAL) signals are output only when connected to the DRP D-VGA OUT connector. VGA video images can be displayed on the LCD.

There are two types of View Box, the NTSC type and the PAL type, depending on the output signal.

- Confirmation of the lens focus and image quality of the subject can be done using the high precision pixel pitch (200ppi: $640 \times 480 \times 3$ pixel) 4 model LCD module. ppi: pixels per inch

Caution

There is an ON/OFF function on the View Box VIDEO output (digital video signal) but there is no VIDEO output ON/OFF switch on the View Box itself. Control using the **MEMRECAM** fx ON/OFF.

Control with the **MEMRECAM** fx setup menu [TOP MENU] or the PC software [Smart Capture].

7.5.2 List of Components

The View Box is comprised of the following items.

View Box (ZO -915)	1set
1) View Box	1
2) BRACKET	1



Photo-1 BRACKET

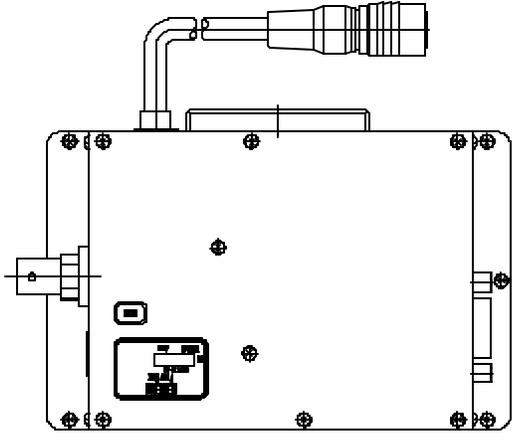
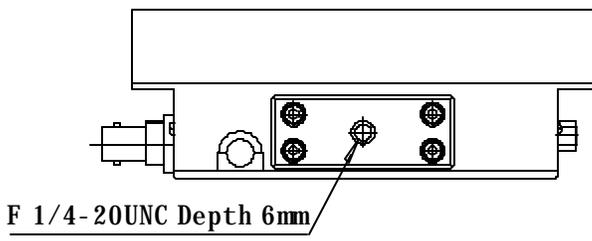
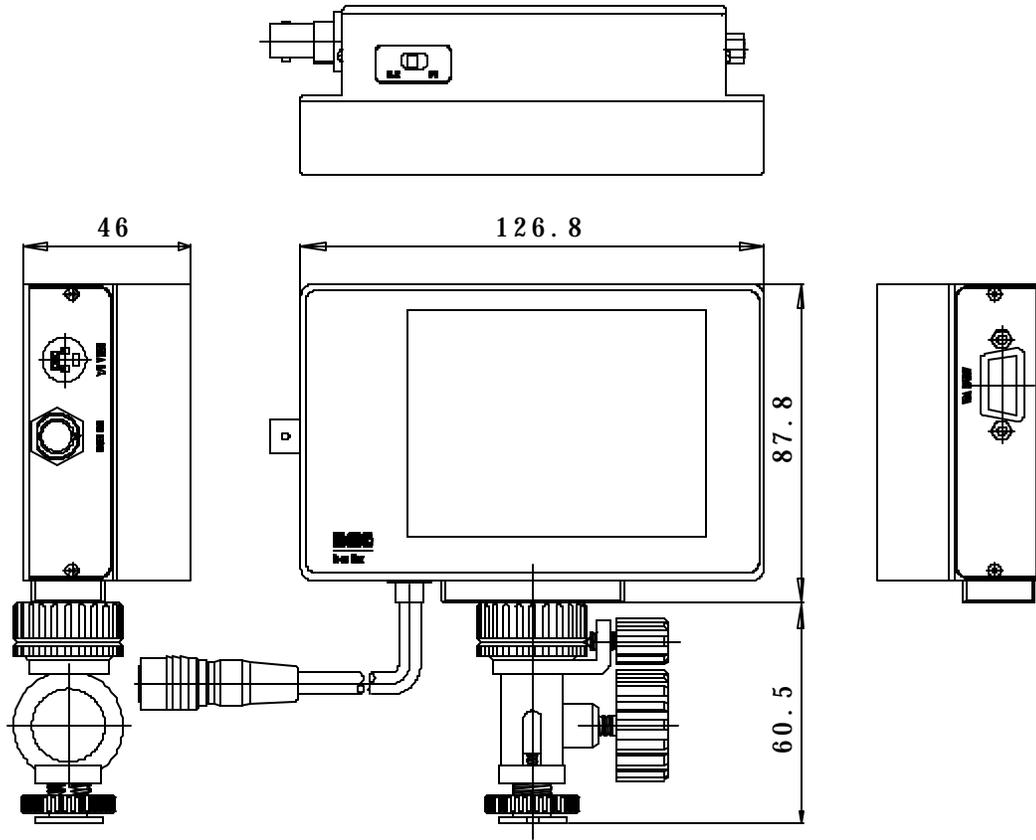
View Box attachment screw
(1/4-20 UNC)



BRACKET attachment screw hole

Photo-2 View Box

7.5.3 Exterior Diagrams



7.5.4 Installation and Connection of **MEMRECAM**fx View Box

As shown in Photo-3, install the View Box and the BRACKET.

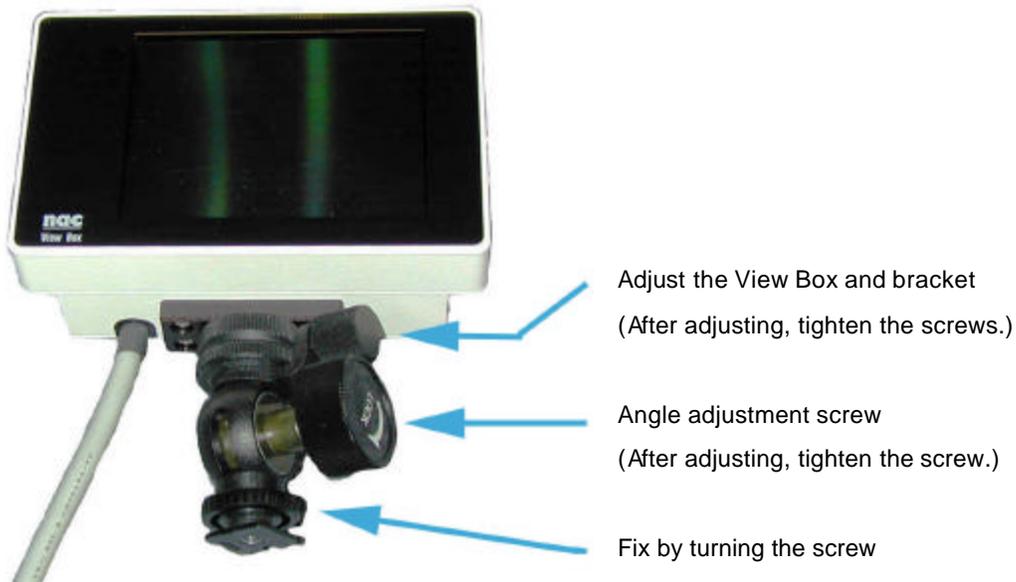


Photo-3

Install the View Box to the **MEMRECAM** fx BRACKET shoe

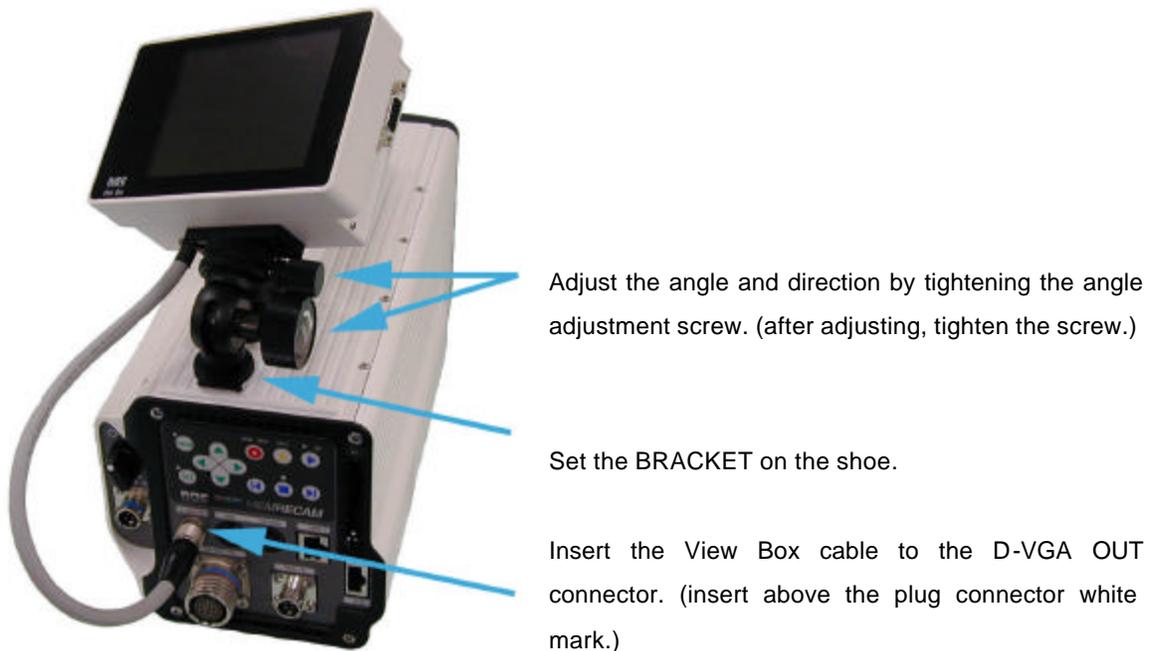


Photo-4

At this point, connection is complete. The video signal and required power for the View Box is supplied by the cable connection. After attaching the **MEMRECAM** fx, modifications to the View Box angle and direction can be performed using the bracket angle adjustment screw.



Connect to the analog VGA multiscan monitor



Connect to the VBS,S-VHS terminal television monitor.

 **Caution**

When there is no View Box VIDEO output, the **MEMRECAM** fx output settings may be OFF. Control using the **MEMRECAM** fx setup menu [TOP MENU] or the PC software [Smart Capture].



Change COLOR? B/W with the switch.

7.5.5 View Box Specifications

1 Product Type

MEMRECAM fx series

2 Input

- | | |
|-------------------|--|
| 1) Image format | VGA (640 × 480)
vertical synchronizing signal frequency: 59.94MHz
horizontal synchronizing signal frequency: 31.468MHz |
| 2) Signal cable | pigtail construction: approx. 30cm in length (can be extended to 9m)*
* 3 optional extension cables (H10963-3 3m cable) can be connected. |
| 3) Plug connector | Plug connector: HR25-9P-16P (HIROSE) discharge frequency: 1000 times |
| 4) Input signal | a. Power +24v
b. TMDS Rch
c. TMDS Gch
d. TMDS Bch
e. TMDS CLOCK
TMDS: Transition Minimized Differential Signaling |

3 Display

- | | |
|------------------|----------------------------|
| 1) Image size | 640(H) × 480(V) x3 |
| 2) Image pitch | 0.126(W) × 0.126(H) mm |
| 3) Precision | 202ppi (pix per inch) |
| 4) Drive process | TFT active matrix process |
| 5) Gradation | R,G,B each 64 gradations |
| 6) Luminance | typ 130 cd /m ² |

4 Output

- | | |
|-----------------|---|
| 1) Video signal | VBS, Y/C (1 system each) / 1Vp-p (75Ω)
Analog VGA (1 system) R, G, B, HD, VD |
| 2) Connector | VBS: BNC, Y/C: S connector
Analog VGA: Mini DSub 15pin |

5 Control Items

- | | |
|------------------|--|
| 1) Video output | Simultaneous ON/OFF possible for VBS and S video output by control computer commands (cannot turn VGA output control ON/OFF) |
| 2) Chroma signal | Chroma signal can be turned ON/OFF with the SW on the case |

6 Power

- | | |
|--------------------|---|
| 1) Voltage/wattage | less than 20 to 32DCV / 4W (supplied from MEMRECAM fx) |
|--------------------|---|

7 Dimensions

- | | |
|---------------|---|
| 1) Dimensions | about 126.8 (W) × 87.8(H) × 46 (D) mm (excluding protrusions) |
| 2) Weight | about 600g (including cables and attachments) |

8 Ambient Conditions

- | | |
|-----------------------------------|--|
| 1) Operating Temperature/Humidity | 0 to 40°C, 30 to 80%RH (no condensation) |
| 2) Storage Temperature/Humidity | -10 to 60°C, 20 to 80%RH (no condensation) |
| 3) Electromagnetic Conformity | EN61000-6-2, EN50081-2, FCC Part15 Class "A" |
| 4) G-force resistance | NA |

9 Limitations

- | When recording the image from this unit to the VTR, one of the following may occur to the recorded image.
 - (1) Recording without the frame image.
 - (2) Recording with distorted frame image.
 - (3) Recording but the frame image recorded and the frame counter displayed on the image do not match.
- | When recording to the VTR, if played back at a speed of less than 15 frames/second, the entire image is recorded but there is a possibility that the problems described in (2) and (3) above may occur.

7.6 Camera Cable

Model Name	Product Number	Product Name	Remarks
583075-3	583075-3	CAMERA CABLE 3m	
583075-4	583075-4	CAMERA CABLE 5m	Standard
583075-6	583075-6	CAMERA CABLE 9m	