1-1. SPECIFICATIONS

**Input connectors**

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite video input</td>
<td>BNC connector, 1.0 Vp-p, 75 ohms unbalanced, sync negative</td>
</tr>
<tr>
<td>S video input</td>
<td>S connector</td>
</tr>
<tr>
<td></td>
<td>Y: 1.0 Vp-p, 75 ohms unbalanced, sync negative</td>
</tr>
<tr>
<td></td>
<td>C: 0.28 Vp-p, 75 ohms unbalanced</td>
</tr>
<tr>
<td>R.G.B.</td>
<td>BNC connector, 0.7 Vp-p, 75 ohms unbalanced</td>
</tr>
<tr>
<td></td>
<td>SYNC: BNC connector, 4.0 Vp-p, 75 ohms unbalanced, sync negative</td>
</tr>
<tr>
<td></td>
<td>R-Y: 0.7 Vp-p, 75 ohms unbalanced</td>
</tr>
<tr>
<td></td>
<td>B-Y: 0.7 Vp-p, 75 ohms unbalanced</td>
</tr>
<tr>
<td>Reference video</td>
<td>1.0 Vp-p, 75 ohms unbalanced, sync negative</td>
</tr>
</tbody>
</table>

* RGB input/output signal and R-Y/Y/B-Y input/output signal can be selected by the DIP switch.

**Output connectors**

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite video output</td>
<td>BNC connector, 1.0 Vp-p, 75 ohms unbalanced, sync negative</td>
</tr>
<tr>
<td>S video output</td>
<td>S connector</td>
</tr>
<tr>
<td></td>
<td>Y: 1.0 Vp-p, 75 ohms unbalanced, sync negative</td>
</tr>
<tr>
<td></td>
<td>C: 0.28 Vp-p, 75 ohms unbalanced</td>
</tr>
<tr>
<td>R.G.B.</td>
<td>BNC connector, 0.7 Vp-p, 75 ohms unbalanced</td>
</tr>
<tr>
<td></td>
<td>SYNC: BNC connector, 4.0 Vp-p, 75 ohms unbalanced, sync negative</td>
</tr>
<tr>
<td></td>
<td>R-Y: 0.7 Vp-p, 75 ohms unbalanced</td>
</tr>
<tr>
<td></td>
<td>B-Y: 0.7 Vp-p, 75 ohms unbalanced</td>
</tr>
</tbody>
</table>

**Control signal connectors**

- RS-232C: 25-pin, D-sub
- Control 1 (A): 9-pin, D-sub (male)
- Control 1 (B): 9-pin, D-sub (female)
- External control: Mini jack

**Others**

- Memory input: Odd field, even field, and frame
- Display effects: Lap dissolve (Transition duration 1.2 sec)
- Mosaic
- Posterization (solarization)
- Multi-picture (3 x 3)
- Sync lock: Horizontal sync phase: -0.5 to +1 μsec
- Subcarrier phase: 0° to 360°
- Operating temperature: 5° to 35°C (41° to 95°F)
- Storage temperature: -10° to 60°C (14° to 140°F)
- Power requirements: 120 V AC, 60 Hz
- Power consumption: 35 W
- Dimensions: Approx. 424 x 54 x 446 mm (wxhxd)
- Weight: 6.5 kg (14 lb 5 oz)
- Supplied accessories: Power cable (1), Rack angles (2), Washers (4), Screws (+RK5 x 14) (4), Screws (+B4 x 8) (4), Interface manual (1)
- Optional accessory: IFC-100 interface cable

Design and specifications subject to change without notice.
1-2. PRECAUTIONS

On safety
- Before operating the unit, check that the operating voltage and the power frequency of your unit are identical with those of your local power supply.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it will not be used for a long time. To disconnect the power cable, pull it out by grasping the plug. Never pull the cable itself.

On installation
- Place the unit in a location with adequate air circulation to prevent internal heat built up in the unit.
- Do not place the unit on a soft surface, such as a rug that would block the ventilation holes.
- Do not install the unit:
  - near heat sources such as radiators or air ducts.
  - in place subject to moisture, direct sunlight, excessive dust, mechanical vibration or shock.
  - in an inclined position.
- Do not place any heavy object on the unit.

When the unit is not used, turn the power off to conserve energy and to extend the life of your unit.

On cleaning
Clean the cabinet, panel and controls with a dry soft cloth, or soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine, which might damage the finish.

On repacking
Do not throw away the carton and the packing material. They make an ideal container when transporting the unit or shipping it for servicing.

If you have any questions or problems concerning your unit, please contact your Sony dealer.

For the customers in the U.S.A.
For detailed safety precautions, see the leaflet "IMPORTANT SAFEGUARDS".

1-3. OVERVIEW OF THE MPU-F100A FRAME MEMORY UNIT

The MPU-F100A is a frame memory/frame synchronizer unit for a variety of professional video applications. The MPU-F100A grabs the picture in memory and adds picture effects. The MPU-F100A works as a time base corrector to offer pictures without jitter or skew errors.

Accepts a variety of video playback sources
You can use the MPU-F100A with ProMavica recorders/players, VCR, or videodisc players.

Works as a frame synchronizer
The MPU-F100A synchronizes the input video signal with the reference video signal. Therefore, you can obtain video pictures without jitter or skew errors. This synchronization permits you to use video equipment in a production system for computer graphics.

Interlocked operation with ProMavica
When you connect the MPU-F100A to ProMavica recorders/players, and select the interlocked operation with the ProMavica, the picture on the ProMavica is automatically grabbed in the frame memory of the MPU-F100A. During this interlocked operation, the screen does not become blank when the picture switches from one to the other.

To make more elaborate pictures
The mosaic, posterization (solarization) and multi-picture effects permit you to make more elaborate pictures.

Adjustments of the input signal
Hue and chroma adjustments of the composite video signal and the S-video signal are possible. Adjusting of the video level and set-up level of all input signals is also available.

Auto-grabbing function when the input signal is stopped
By selecting the automatic freeze function with the SWB of the DIP switch on the rear panel to OFF, even if the input signal is disconnected, the MPU-F100A automatically grabs the picture in the memory and outputs it until the next picture is transmitted. In auto-grabbing, the noise may appear on the screen.
1-4. SUGGESTED APPLICATIONS AND CONNECTIONS

**Products Presentation for Sales Promotion and Advertisement**

When you use the MPU-F100A with the ProMavica recorder/player, the pictures on the screen take the place of a catalog or brochure. The picture effects allow you the presentation more attractive for a variety of merchandise, such as cars, interior design or travel plans.

**System examples**

![Diagram of a product presentation setup](image1)

**For Creation of Software Combining Graphics with Characters**

When you use the MPU-F100A with a computer, the jitter-free, skew-error eliminated pictures of the MPU-F100A allow you to create a high quality software combining with characters or with computer graphics.

**System examples**

![Diagram of a software creation setup](image2)
1-5. SETTING THE DIP SWITCH

Make the following settings with the DIP switch on the rear panel:
- Baud rate setting for computer communication interface configuration
- H CENTER setting of the RGB input
- Selecting the INPUT/OUTPUT signals
- Selecting EXT CTRL operation mode
- AUTO GRAB setting to ON or OFF

The DIP switch is located as illustrated below.

**Setting the baud rate**

When controlling the MPU-F100A with the computer connected to the RS-232C connector, select the appropriate baud rate with SW1 and SW2. Refer to the interface manual for further information about baud rate setting.

<table>
<thead>
<tr>
<th>BAUD RATE</th>
<th>SW1</th>
<th>SW2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2400</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>4800</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>~600</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

**Setting the H CENTER (RGB)**

The position of the picture on the monitor screen can be moved to the left or to the right, when the RGB signal is used. Use SW3 and SW4.

This adjustment does not affect the picture stored in memory.

<table>
<thead>
<tr>
<th>H CENTER (RGB)</th>
<th>SW3</th>
<th>SW4</th>
</tr>
</thead>
<tbody>
<tr>
<td>To the left</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>Slightly to the left</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Slightly to the right</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>To the right</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>
Selecting the INPUT/OUTPUT signals

Either the RGB signal or COMPONENT (R-Y/Y/8-Y) signal can be selected. Use SW5 to select the type of the input signal. Use SW6 to select the type of the output signal.

<table>
<thead>
<tr>
<th>INPUT SELECT</th>
<th>OUTPUT SELECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input signal</td>
<td>Output signal</td>
</tr>
<tr>
<td>COMPONENT</td>
<td>COMPONENT</td>
</tr>
<tr>
<td>RGB</td>
<td>RGB</td>
</tr>
</tbody>
</table>

When selecting the COMPONENT (R-Y/Y/8-Y) signal, each RGB connector on the rear panel corresponds to the component signal as follows:

- R: R-Y
- G: Y
- B: B-Y

Selecting the EXT CTRL operation mode

When controlling the unit's grabbing function with the external control signals via the EXT CTRL connector, use the SW7 to select EXT CTRL operation mode either from the edge trigger mode or the level mode.

<table>
<thead>
<tr>
<th>EXT CTRL</th>
<th>SW7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge trigger mode: grabs a picture with the fall edge signal (↓)</td>
<td>OFF</td>
</tr>
<tr>
<td>Level mode: grabs a picture with the low level (when a signal is shorted)</td>
<td>ON</td>
</tr>
</tbody>
</table>

When edge trigger mode is selected, note the following:
- When an asynchronous signal is input, the unit may skip the first two fields and grab the next two fields.
- The unit cannot grab the varied-speed playback pictures.
- You may not select multi-picture mode even if you press the MULTI key.

Setting the AUTO GRAB

When the input signal intermitted, the last signal can be grabbed automatically. Use SW8 to set to ON or OFF.

<table>
<thead>
<tr>
<th>AUTO GRAB</th>
<th>SW8</th>
</tr>
</thead>
<tbody>
<tr>
<td>to grab automatically</td>
<td>OFF</td>
</tr>
<tr>
<td>not to grab automatically</td>
<td>ON</td>
</tr>
</tbody>
</table>

1-6. PREPARING THE MPU-F100A

Start playing the connected equipment, then select the input signal on the MPU-F100A.

Selecting the Input Signal

1 Press the POWER switch. The unit is turned on.

2 Start the playback of the source equipment connected.

3 Press either key of the VIDEO, S VIDEO, or RGB/COMPONENT which corresponds to the source signal connector.
   - The indicator of the selected key lights up.
   - VIDEO: Selects the source connected to the VIDEO IN connector on the rear panel.
   - S VIDEO: Selects the source connected to the S VIDEO IN connector on the rear panel.
   - RGB/COMPONENT: Selects the source connected to the RGB (R-Y/Y/8-Y) SYNC IN connector on the rear panel.
   - When the source is RGB, the indicator lights in green. When the source is a COMPONENT one, the indicator lights in orange.
   - If the selected connector has no input signal, the indicator of the key selected blinks in one sec. cycle.
Selecting the Interlock Mode between the MPU-F100A and the ProMavica Recorder/Player

If you do not connect a ProMavica recorder/player, skip this step and go to the next page.

When connecting the ProMavica recorder/player, the still video picture on the ProMavica recorder/player is grabbed automatically in the memory of the MPU-F100A. To do this, use the IFC-100 interface cable (not supplied) to connect the MPU-F100A and the ProMavica recorder/player.

The following three interlock control modes between the MPU-F100A and the ProMavica recorder/player are available.

ON mode: The MPU-F100A grabs the picture in memory and displays the picture from the memory. Switching of pictures does not blank out the screen.

OFF mode: The MPU-F100A displays the through picture and does not grab the picture in memory. Switching of pictures blanks out the screen.

TIMER STOP mode: As in the ON mode, the MPU-F100A grabs the picture and displays the picture from the memory. In addition, the MPU-F100A outputs the control signal to automatically stop the ProMavica recorder/player, when the ProMavica recorder/player plays back the same picture for 10 minutes. However, the MPU-F100A keeps the picture in the memory and displays it on the monitor, even after the ProMavica recorder/player stops.

1 Turn on the ProMavica recorder/player.

2 Press ON, OFF, or TIMER STOP key.
   The indicator of the selected key lights up.
   When the connected ProMavica recorder/player is turned off, the indicator of the TIMER STOP or ON blinks.

Note
When using the MVR-5300 or MVR-5400 ProMavica recorder/player, you cannot select the interlock mode.
However, when you connect the EXT CTRL connector of MPU-F100A and the EXT CONT OUT connector of either of the above two models, the unit is set in interlock ON mode. (Set the SW7 of the DIP switch of MPU-F100A to ON. For details, see page 10.)

1-7. SYNCHRONIZING WITH OTHER VIDEO EQUIPMENT

Make the subcarrier phase adjustment and the horizontal sync signal phase adjustment to precisely synchronize the MPU-F100A's output to the external reference signal. Refer to page 31 for connection.

Adjusting the subcarrier phase

Turn the SC PHASE control. The subcarrier phase is adjustable from 0° to 180° by turning the SC PHASE control. If a phase of over 180° is to be adjusted, set the SC PHASE switch to 180°, then turn the SC PHASE control.

Adjusting the horizontal sync signal phase

Turn the H PHASE control. The adjustable range is -0.5 to +1µsec.
1-8. ADDING THE PICTURE EFFECTS

You can add the picture effects of mosaic, posterization (solarization) and multi-picture (3 x 3).

Adding the Mosaic Effect

The mosaic effect can be selected in four sizes.

Adding the Posterization (Solarization) Effect

The posterization effect can be selected in three levels.

Display a picture on the monitor and press the MOSAIC key.
The indicator of the key lights up.

Press either the + or - key to select the size of the mosaic piece.

Canceling the mosaic effect
Press the OFF key. The indicator of the MOSAIC key goes off.

Display a picture on the monitor and press the POSTER key.
The indicator of the key lights up.

Press either the + or - key to adjust the posterization level.

Canceling the posterization effect
Press the OFF key. The indicator of the POSTER key goes off.

1-8. ADDING THE PICTURE EFFECTS

Mosaic picture
Posterization (solarization) picture
Multi-picture

Adding the Mosaic Effect

The mosaic effect can be selected in four sizes.

Adding the Posterization (Solarization) Effect

The posterization effect can be selected in three levels.

Display a picture on the monitor and press the MOSAIC key.
The indicator of the key lights up.

Press either the + or - key to select the size of the mosaic piece.

Canceling the mosaic effect
Press the OFF key. The indicator of the MOSAIC key goes off.
Adding the Multi-picture Effect

The monitor screen is divided into 9 areas and the live picture can be placed at any of them.

1. Display a picture on the monitor and press the MULTI key. The indicator of the key lights up. A live picture appears on the upper left area.

2. Press either the + or - key to select the area where the live picture appears.

3. When you display the picture at the desired position, press the SET key. The picture is set to the selected area and the live picture moves to the next area.

4. Repeat steps 2 and 3 to set the picture to other area.

Displaying the live picture in the upper left area
Press the MULTI key and the live picture appears on the initial position (the upper left area).

Canceling the multi-picture effect
Press the OFF key. The indicator of the MULTI key goes off.

Note
Do not disconnect the input signal during multi-picture display. If you press the OFF key to cancel the multi-picture effect while the input signal is disconnected, the picture may be disturbed.

Cross-fading (Lap-dissolve) Pictures

The lap-dissolve effect allows you to switch the picture smoothly when using the MPU-F100A with the ProMavica recorder/player. With this effect one picture fades in while the other fades out. When the moving picture from other video equipment is input, the after-image effect can be obtained.

You can use this with the mosaic and posterization effects.

1. Display a picture on the monitor and press the LAP DISSOLVE key to switch the picture with lap dissolve effect. The indicator of the key lights up.

2. Canceling the lap-dissolve effect
Press the LAP DISSOLVE key again. The indicator of the key goes off.

Note
When you connect the unit and the ProMavica recorder/player using the IFC-100 interface cable (not supplied), set the unit to the interlock ON mode. When using the MVR-5300 or MVR-5400 ProMavica recorder/player, connect the EXT CTRL connector of the unit and the EXT CONT OUT connector of either of the above two models. (Set the SW7 of the DIP switch of MPU-F100A to ON. For details, see page 10.)
1-9. GRABBING PICTURES (STORING PICTURES IN MEMORY)

Frame and Field of the Grabbed Picture

The picture on the screen is composed of two rough pictures, each picture is called "odd number field and even number field". By combining the two field pictures, a frame picture is obtained. The MPU-F100A grabs a picture as a frame one.

The outline of the picture may be doubled when grabbing high-speed motion picture. This is because the odd and even number field pictures are slightly different in motion. In such a case, display either field picture on the screen to eliminate the double image.

When grabbing a picture which is moving in high speed

Grabbing a Picture

1. Display a picture on the monitor screen and then grab it as follows.
   When the Interlock mode with the ProMavica recorder/player is set to ON or TIMER STOP
   The picture is automatically grabbed in the memory of the MPU-F100A.
   When the Interlock mode with the ProMavica recorder/player is set to OFF or when using with other video equipment
   Press the MEMORY IN key. The indicator of the key lights up.

2. Press either FIELD ODD, FIELD EVEN, or FRAME key to select the picture to be displayed.
   The indicator of the key selected lights up.
   FIELD EVEN: To display an even number field picture.
   FIELD ODD: To display an odd number field picture.
   FRAME: To display a frame picture.

Canceling the grabbing mode

Press the CLEAR key. The indicators of the selected keys go off.

To grab other pictures

When the Interlock mode with the ProMavica recorder/player is set to ON or TIMER STOP
Play back other picture.

When the Interlock mode with the ProMavica recorder/player is set to OFF or when using with other video equipment
Press the CLEAR key to clear the memory and display the live picture. Then select the desired picture to grab in memory.

Note
When a picture is played back in varied speed, you may not be able to grab the picture properly.
1-10. ADJUSTING THE INPUT SIGNAL LEVEL

Adjust the hue, color, video level, set up level, and noise reduction level of the input signal. You can obtain the factory-preset level of each control when it is pushed in.

**Adjusting the Hue**
Adjust the hue for the VIDEO input or S VIDEO input signal.
Push the HUE control so that the control comes out, and turn the control while monitoring the screen to obtain the appropriate hue.
This adjustment does not affect the picture grabbed in memory.

**Adjusting the Color**
Adjust the color of the VIDEO input or S VIDEO input signal.
Push the COLOR control so that the control comes out, and turn the control to obtain the appropriate color.
This adjustment does not affect the picture grabbed in memory.

**Adjusting the Video Level**
Adjust the video level for all video source signal.
Push the VIDEO control so that the control comes out and turn the control to obtain the appropriate contrast.
This adjustment also affects the picture grabbed in memory.

**Adjusting the Set-up Level**
Increase the set-up level for all video signals, if necessary.
Push the SET UP control so that the control comes out and turn the control while monitoring the screen.
This adjustment also affects the picture grabbed in memory.

---

**Adjusting the Noise Reduction Level**

When the picture is noisy, use the NR LEVEL switch to decrease the noise in the chroma and luminance signals.
The noise reduction function of the NR LEVEL switch is as listed below.

<table>
<thead>
<tr>
<th>Setting position</th>
<th>Noise reduction for chroma signal (CNR)</th>
<th>Noise reduction for luminance (YNR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>2</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>3</td>
<td>ON</td>
<td>Slightly</td>
</tr>
<tr>
<td>4</td>
<td>ON</td>
<td>Deep</td>
</tr>
</tbody>
</table>

When adjusting the noise reduction level for the moving pictures, set the NR LEVEL switch to 2 or 3.
1-11. LOCATION AND FUNCTION OF PARTS AND CONTROLS

**Front panel**

1. **POWER switch**
   - Turns the MPU-F100A on or off.

2. **HUE control**
   - Adjusts the hue of the VIDEO or S VIDEO input signal. This control does not affect the hue of the picture grabbed in memory.

3. **COLOR control**
   - Adjusts the color of the VIDEO or S VIDEO input signal. This control does not affect the color of the picture grabbed in memory.

4. **VIDEO level control**
   - Adjust the contrast of all the video input signals. This control affects only the video signal level, and does not affect the sync level.

5. **SET UP level control**
   - Increase the set-up level of the input signal.

6. **REMOTE Indicator**
   - Lights up when controlling the MPU-F100A externally with the equipment connected to the RS-232C connector on the rear panel.

7. **INPUT SELECT keys and indicators**
   - Press to select the input signal. The indicator of the selected signal lights up.
     - VIDEO: Composite video signal connected to the VIDEO IN connector on the rear panel.
     - S VIDEO: S video signal connected to the S VIDEO IN connector on the rear panel.
     - RGB/COMPONENT: RGB signal or component video signal connected to the RGB (R/Y/B-Y) connectors on the rear panel.
   - When the source is RGB, the indicator lights in green.
   - When the source is a COMPONENT one, the indicator lights in orange.

8. **STILL VIDEO CONTROL keys and indicators**
   - Press to select the interlock mode with the ProMavica recorder/player. The selected mode indicator lights up.
     - TIMER STOP: Every time the ProMavica recorder/player plays back a picture, the MPU-F100A grabs it automatically. When the ProMavica recorder/player plays back the same picture for 10 minutes, the MPU-F100A outputs a control signal to stop the recorder/player automatically.
     - ON: Every time the ProMavica recorder/player plays back a picture, the MPU-F100A grabs it automatically.
     - OFF: The interlock operation between the MPU-F100A and the ProMavica recorder/player is disabled. The picture is not grabbed in memory of the MPU-F100A, and the throughout picture appears on the screen.

9. **PICTURE EFFECT keys and indicators**
   - Press to select a picture effect. The indicator of the selected effect lights up.
     - MOSAIC: Adds a mosaic effect. The size of the mosaic piece can be changed by pressing the + and - keys.
     - POSTER: Adds a posterization effect. The level of the effect can be changed by pressing the + and - keys.
     - MULTI: The screen is divided into 9 areas (3x3). The live picture can be moved by pressing the + and - keys and the picture can be set to the desired area by pressing the SET key.
     - OFF: Cancels the picture effect.
     - +/-: Used for mosaic, posterization and multi-picture effects.
     - SET: Sets the picture to the desired area in the multi-picture effect.
     - LAP DISSOLVE: Switches the picture from one to the other with the fade-out and fade-in effect. To cancel the lap dissolve effect, press this key again.

10. **Keys for grabbing pictures and indicators**
    - Used to grab a picture in the MPU-F100A memory and to select the display mode of the picture grabbed in memory.
    - The indicator of the selected mode lights up.
      - FIELD EVEN: Displays an odd field picture.
      - FIELD ODD: Displays an even field picture.
      - FRAME: Displays a frame picture.
      - MEMORY IN: Grabs a picture in the memory of the MPU-F100A.
      - CLEAR: Clears the picture grabbed.

11. **SC PHASE control and switch**
    - Adjust the subcarrier phase of the input signal to the reference sync signal. The adjustable range is 360°. Turn the SC PHASE control to adjust the range between 0° and 180°. To adjust the range above 180°, set the SC PHASE switch to 180°, then turn the SC PHASE control.

12. **H PHASE control**
    - Adjusts the horizontal sync phase to the reference sync signal. The adjustable range is -0.5 to +0.5usec.

13. **NR LEVEL switch**
    - Reduces the noise in the chroma and luminance signal. Three reduction levels are available. The noise reduction function is more effective for still pictures.
**Rear Panel**

1. **REF IN and OUT connectors (BNC type), and 75Ω switch**
   - Connect to the external reference sync signal generator which supplies the reference signal of composite video or black burst. When the MPU-F100A accepts the reference signal, the video signal synchronized automatically.
   - For distributing the reference sync signal to other equipment, use either connector as an output one for loop-through connection and set the 75Ω switch to OFF.

2. **VIDEO IN connectors (BNC type) and 75Ω switch**
   - Connect to the VIDEO OUT connector of the ProMavica recorder/player or VCR.
   - For distributing the video signal to the other equipment, use either connector as an output one for loop-through connection and set the 75Ω switch to OFF.

3. **RGB (R-Y/Y/B-Y)/SYNC IN connectors (RGB Input)**
   - Connect to the R, G, B, and SYNC output connectors of the ProMavica recorder/player. Either RGB input or R-Y/Y/B-Y input can be selected with the DIP switch. For the DIP switch setting, refer to page 10.

4. **S VIDEO IN connector (S type)**
   - Accepts S video input signal. Connect the ProMavica recorder/player or VCR having S video output.

5. **CONTROL-1(A) connector (9-pin)**
   - Connect the ProMavica recorder/player using the DIP-100 interface cable (not supplied) for interlock operation.

6. **RS-232C connector**
   - Connect the computer for controlling the MPU-F100A. Details on the computer control refer to the interface manual of the MPU-F100A.

7. **AC IN**
   - Connect the supplied power cable.

8. **VIDEO OUT connector (BNC type)**
   - Connect the video input connector of a color video monitor or a computer.

9. **RGB (R-Y/Y/B-Y)/SYNC OUT connectors (RGB output)**
   - Connect the R, G, B, and SYNC input connectors of a color monitor or a computer. The RGB or the R-Y/Y/B-Y output signal can be selected by the DIP switch. For details, refer to page 10.

10. **S VIDEO OUT connector (S type)**
    - Connect a monitor having S video input.

11. **CONTROL-1(B) connector (9-pin)**
    - Connect the RM-52 remote control unit (not supplied) for remotely controlling the ProMavica recorder/player which is connected to the MPU-F100A.

---

**DIP switches**
- Set the switches for baud rate setting of the RS-232C connector, the picture position adjustment of RGB input, input signal selection, output signal selection of RGB or R-Y/Y/B-Y, EXT CTRL operation mode selection and auto-grab setting. For switch settings, refer to page 9 to 10.

**EXT CTRL (external control input signal) connector (mini jack)**
- Used for controlling the MPU-F100A with an open/short signal (level mode) or fall edge signal for TTL level (edge trigger mode). The MPU-F100A grabs a picture in memory when the signal is shorts or the fall edge signal input. For setting the EXT CTRL operation mode with the DIP switches, refer to page 10. For the timing of the edge trigger mode, refer to page 26.
1-12. CONNECTIONS

The acceptable equipment is illustrated on the following pages. For connection diagram of each equipment, refer to each section listed below.

- Connecting source signal equipment
- Connecting a monitor
- Connecting a house sync line
- Connecting a computer
- Connecting a remote control unit

Notes on connection
- Connect the power cable last.
- Disconnect the power cable after you turn off the POWER switch.
- Be sure to plug in each connector securely. Loose connection may cause a malfunction of the system.

Equipment Connected to the Inputs
You can connect the following video sources and reference sync signal generator to the inputs of the MPU-F100A.

- Color video camera
- VCR
- Video disc player
- Computer (NTSC 525)
- ProMavica recorder/player
- Color video camera
- Camera control unit
- Camera control unit
- Reference sync signal generator
- to VIDEO IN
- to RGB (R-Y/Y/B-Y) /SYNC IN
- to REF IN
- to S VIDEO IN
- to AC IN (supplied)

Connecting source signal equipment
- Connecting a monitor
- Connecting a house sync line
- Connecting a computer
- Connecting a remote control unit

Notes on connection
- Connect the power cable last.
- Disconnect the power cable after you turn off the POWER switch.
- Be sure to plug in each connector securely. Loose connection may cause a malfunction of the system.

Equipment Connected to the Inputs
You can connect the following video sources and reference sync signal generator to the inputs of the MPU-F100A.

- Color video camera
- VCR
- Video disc player
- Computer (NTSC 525)
- ProMavica recorder/player
- Color video camera
- Camera control unit
- Camera control unit
- Reference sync signal generator
- to VIDEO IN
- to RGB (R-Y/Y/B-Y) /SYNC IN
- to REF IN
- to S VIDEO IN
- to AC IN (supplied)
**Equipment Connected to the Outputs**

You can connect the following equipment to the output connectors of the MPU-F100A.

- Color TV monitor
- Color video projector
- VCR
- ProMavica recorder/player
- Computer (NTSC 525)

**Connecting Source Signal Equipment**

Connect the video source equipment such as ProMavica recorder/player or VCR as illustrated below. The video source signal can be connected to either VIDEO IN connector (1), RGB (R-Y/Y-B-Y)/SYNC connectors (2) or S VIDEO IN connector (3). For interlock operation with the ProMavica recorder/player (excluding MVR-5300 and MVR-5400), be sure to connect the IFC-100 interface cable (not supplied). For interlock operation, refer to "Selecting the Interlock Mode between the MPU-F100A and the ProMavica Recorder/Player" on page 12.
Connecting a Monitor

Connect a monitor for displaying the pictures output from the MPU-F100A. The monitor can be connected to either VIDEO OUT connector (1), RGB (R-Y/Y/B-Y)/SYNC OUT connectors (2), or S VIDEO OUT connector (3).

Connecting a House Sync Line

Connect the MPU-F100A to the house sync line at studios. For distributing the reference signal to the other equipment, use either REF connector for loop-through output and set the 75Ω switch to OFF.

Connecting a Computer

Connect a computer having an RS-232C connector for external computer control.
Connecting a Remote Control Unit

Connect the RM-52 remote control unit (not supplied) for remotely control the ProMavica recorder/player (excluding MVR-5300 and MVR-5400). For operation of the remote control unit, refer to the instruction manual of RM-52.

1-13. RACK MOUNTING

The MPU-F100A can be mounted in an EIA standard 19-inch rack.

Note on rack mounting
If the MPU-F100A is loaded over 5 kg (11 lb) of weight when wiring or removal, be sure to use the brackets recommended by the rack.

Parts to be used (supplied with the MPU-F100A)

<table>
<thead>
<tr>
<th>Rack angles (2)</th>
<th>Washers (4)</th>
<th>Philips head screws (4) (+RK5 x 14)</th>
<th>Philips head screws (4) (+B4 x 8)</th>
</tr>
</thead>
</table>

1. Fix the rack angles to the MPU-F100A with the +B4 x 8 screws (supplied).
2. Mount the MPU-F100A in the rack with the washers and the +RK5 x 14 screws.

Remove the feet from the bottom of the unit, if necessary.

Dimensions when parts attached
### 1-14. TROUBLESHOOTING GUIDE

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Cause/Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The MPU-F100A does not turn on when the POWER switch is ON.</td>
<td>The power cable is not connected securely.</td>
</tr>
<tr>
<td>The TIMER STOP indicator or the ON indicator blinks during the interlock operation with the ProMavica recorder/player.</td>
<td>The MPU-F100A and the ProMavica recorder/player are not connected using the IFC-100 interface cable. The ProMavica recorder/player is not turned on.</td>
</tr>
<tr>
<td>The INPUT SELECT indicator blinks in 0.5 sec cycle.</td>
<td>The ventilation fan is in trouble. Consult your Sony dealer.</td>
</tr>
<tr>
<td>The INPUT SELECT indicator blinks in 1 sec cycle.</td>
<td>Signal is not supplied to the input connector selected. Check the source equipment.</td>
</tr>
<tr>
<td>The screen does not show the live picture but it shows the picture grabbed last, even though the MEMORY IN indicator is off.</td>
<td>The input signal is not supplied. Check the source equipment.</td>
</tr>
</tbody>
</table>

### 1-15. INTRODUCTION (INTERFACE MANUAL)

This manual explains how to control the Sony MPU-F100A Frame Memory Unit from a computer connected through the RS-232C serial interface. To take fullest possible advantage of the MPU-F100A's many features, always refer to this manual when writing control programs for the MPU-F100A.
1-16. CONTROLLING THE MPU-F100A FRAME MEMORY UNIT
(INTERFACE MANUAL)

You can use any of the following methods to control the MPU-F100A:

- Control from the MPU-F100A control panel
- External control using the RS-232C serial interface
- Control through the CONTROL 1 connector
- Control through the EXT CONTR connector

This manual describes procedures for controlling the MPU-F100A through the RS-232C serial interface from an external computer.

Controlling operation of the MPU-F100A from an external computer

External control of MPU-F100A operation requires sending the EXT CPU REMOTE ON (87h) command from the computer to place the MPU-F100A in the remote ON state. External control of the MPU-F100A is possible only in this state.

Note

- While the MPU-F100A is in the remote ON state, the control panel's INPUT SELECT, STILL VIDEO CONTROL, and PICTURE EFFECT keys and all keys used for grabbing pictures (FRAME, FIELD EVEN, FIELD ODD, MEMORY IN, and CLEAR) are disabled.
- Although limited external control of the MPU-F100A is possible in the remote OFF state, some commands are not accepted in this state. Therefore, always place the MPU-F100A in the remote ON state before using external control.
- For additional information on communication and control, see pages 12 through 18 in Chapter 2, "Communication."

Types of commands

You can use commands sent through the RS-232C interface to control all of the functions that are available from the front panel of the MPU-F100A. In addition, the following functions are available when using external control:

- Status read-out (by the STATUS 1-4 INQ commands)
- Direct specification of mosaic level (by the MOSAIC DIRECT command)
- Direct specification of posterization level (by the POSTERIZATION DIRECT command)
- Direct specification of the MULTI display area (by the MULTI DIRECT command)
- Display muting (by the MUTE ON and MUTE OFF commands)

The external control commands are divided into three categories as follows:

- 1-word commands
  - CANCEL
  - CLEAR
  - MUTE ON
  - MUTE OFF
  - PICTURE EFFECT+
  - PICTURE EFFECT-
  - FIELD EVEN ON
  - FIELD EVEN OFF
  - FIELD ODD ON
  - FIELD ODD OFF
  - FRAME ON
  - FRAME OFF
  - LAP DISSOLVE ON
  - LAP DISSOLVE OFF
  - MEMORY IN
  - MEMORY OUT
  - MOSAIC
  - MULTI
  - MULTI SET
  - VIDEO ON

With these commands, the MPU-F100A returns an ACK character (80h) upon receiving one word. If it is in the ready state, the MPU-F100A then performs the relevant operation.

- 2-word commands
  - MOSAIC DIRECT
  - MULTI DIRECT
  - POSTERIZATION DIRECT

With these commands, operation is completed immediately upon receiving the relevant two words of data code.

- INQ commands
  - STATUS 1 INQ
  - STATUS 2 INQ
  - STATUS 3 INQ
  - STATUS 4 INQ

These commands are used for interrogating the MPU-F100A to determine its status. The MPU-F100A returns one word of data in response to each of these commands.

The table on the next page summarizes the external control commands. See Chapter 3, "MPU-F100A Control Commands" for details on individual commands.
1-17. COMMUNICATION THROUGH THE RS-232C INTERFACE
(INTERFACE MANUAL)

Outline

The term 'RS-232C' refers to an EIA standard defining connection for communication between modems and terminal devices. With this interface standard, data is transferred serially, one bit at a time.

The RS-232C interface is used for a wide variety of purposes by nearly all personal computers. It is also provided on the MPU-F100A, with the corresponding connector located on the unit's rear panel.

Signal Connections

Signals used by the MPU-F100A's serial interface are as shown in the following table:

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Symbol</th>
<th>Signal name</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FG</td>
<td>Frame ground</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>TxD</td>
<td>Transmit data</td>
<td>EXT. CPU → MPU-F100A</td>
</tr>
<tr>
<td>3</td>
<td>RxD</td>
<td>Receive data</td>
<td>EXT. CPU → MPU-F100A</td>
</tr>
<tr>
<td>4</td>
<td>RTS</td>
<td>Request to send</td>
<td>EXT. CPU → MPU-F100A</td>
</tr>
<tr>
<td>5</td>
<td>CTS</td>
<td>Clear to send</td>
<td>EXT. CPU → MPU-F100A</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
<td>Data set ready</td>
<td>EXT. CPU → MPU-F100A</td>
</tr>
<tr>
<td>20</td>
<td>DTR</td>
<td>Data terminal ready</td>
<td>EXT. CPU → MPU-F100A</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>Signal ground</td>
<td></td>
</tr>
</tbody>
</table>

All signals conform to the RS-232C standard. (Output level is +5V or greater when ON, and -5V or less when OFF.)
Standard and 'Null Modem' Cables

The MPU-F100A is set to use the computer's serial interface as a terminal device. The cable that is used for connecting the MPU-F100A to the computer will differ depending on whether the RS-232C interface of the computer is set up for connection to a modem (DTE, or Data Terminal Equipment), or to a terminal (DCE, or Data Communication Equipment). Be sure to check the computer's RS-232C pin assignments to determine the type of setup.

Connection with a Standard Cable

If the computer's RS-232C interface is configured as data communication equipment, a standard cable is required for connection. Cable connections are as follows:

<table>
<thead>
<tr>
<th>Computer</th>
<th>MPU-F100A</th>
</tr>
</thead>
<tbody>
<tr>
<td>FG 1</td>
<td>FG (Frame ground)</td>
</tr>
<tr>
<td>TxD 2</td>
<td>TxD (Transmit data)</td>
</tr>
<tr>
<td>RxD 3</td>
<td>RxD (Receive data)</td>
</tr>
<tr>
<td>RTS 4</td>
<td>RTS (Request to send)</td>
</tr>
<tr>
<td>CTS 5</td>
<td>CTS (Clear to send)</td>
</tr>
<tr>
<td>DSR 6</td>
<td>DSR (Data set ready)</td>
</tr>
<tr>
<td>DTR 20</td>
<td>DTR (Data terminal ready)</td>
</tr>
<tr>
<td>GND 7</td>
<td>GND (Signal ground)</td>
</tr>
</tbody>
</table>

Connection with a Null Modem Cable

If the computer's RS-232C interface is configured as data terminal equipment, a 'null modem' cable is required because no modem exists in the link. The difference between the null modem cable and the standard cable is that certain pins are cross-connected. Cable wiring is as follows:

<table>
<thead>
<tr>
<th>Computer</th>
<th>MPU-F100A</th>
</tr>
</thead>
<tbody>
<tr>
<td>FG 1</td>
<td>FG (Frame ground)</td>
</tr>
<tr>
<td>TxD 2</td>
<td>TxD (Transmit data)</td>
</tr>
<tr>
<td>RxD 3</td>
<td>RxD (Receive data)</td>
</tr>
<tr>
<td>RTS 4</td>
<td>RTS (Request to send)</td>
</tr>
<tr>
<td>CTS 5</td>
<td>CTS (Clear to send)</td>
</tr>
<tr>
<td>DSR 6</td>
<td>DSR (Data set ready)</td>
</tr>
<tr>
<td>DTR 20</td>
<td>DTR (Data terminal ready)</td>
</tr>
<tr>
<td>GND 7</td>
<td>GND (Signal ground)</td>
</tr>
</tbody>
</table>

Note:
- With the IBM PC/AT's 9-pin connector, pin assignments are:
  1-FG  4-DTR  7-RTS
  2-RxD  5-GND  8-CTS
  3-TxD  6-DSR

Data Format

The MPU-F100A's data format is preset as follows:

- Mode: Asynchronous
- Character length: 8 bits
- Baud rate: 9600 bps
- Parity: None
- Stop bits: 1 bit
- Bit sequence: Lowest bit first

Changing the data format

To change the baud rate, use positions SW1 and SW2 of the DIP switch on the MPU-F100A's rear panel as follows. Other format parameters (mode, character length, parity, and stop bits) are fixed and cannot be changed.

Selecting the baud rate

Selectable baud rates are 1200, 2400, 4800, and 9600 bps. Using the DIP switch on the MPU-F100A's rear panel, select the baud rate that matches that of the computer's RS-232C interface as follows:

Note:
- The factory setting of the baud rate is 9600 bps.
I-J

ACK (BDh)
Upon receiving each byte from the computer, the MPU-F100A returns a 1-byte code (ACK, NAK, or a status byte) to the computer. The computer receives the 1-byte code, then sends subsequent code to the MPU-F100A. This sequence forms the basic RS-232C communication protocol between the MPU-F100A and the computer. The communication protocol uses the following return codes for handshaking:

NAK (BFh)
If the MPU-F100A cannot accept a received command, it returns a NAK character (No Acknowledge, BFh) to the computer. Return of a NAK indicates either that the MPU-F100A is not ready to receive commands, or that it received an undefined command. In such situations, check the validity of commands sent to the unit.

Exception to Communication Handshaking Format
Upon receiving a STATUS 1 INQ, STATUS 2 INQ, STATUS 3 INQ, or STATUS 4 INQ inquiry code, the MPU-F100A returns a 1-byte code indicating the unit's status, but does not return an ACK or NAK character.

Command Execution Time
The command execution time is the interval between receipt of a command and (if the command is a valid one) return of an ACK code and switchover to the mode specified by that command.

Command execution and return code transmission by the MPU-100A take place over a period lasting approximately 20 msec, as shown in Figure 2-1 below.

Fig. 2-1 Timing of command execution

Accordingly, at 1200 baud, the MPU-F100A might complete execution of a 1-word command before it completes transmission of ACK transmission, as shown in Figure 2-2.

Fig. 2-2

Under certain circumstances, the MPU-F100A will not accept multiple commands in succession. This occurs when the second of two successive commands is received before the start of transmission of the ACK code in response to the first command. ACK transmission (which takes place at the fixed timing shown in Figure 2-1) must start before the MPU-F100A receives the latter command. Otherwise, the MPU-F100A does not accept the second command and does not send a return code in response to the second command.
In order to ensure proper operation, write all control programs so that the computer never sends a command until it receives a response to the preceding command from the MPU-F100A.

1-19. TURNING ON THE POWER (INTERFACE MANUAL)

Observe the following procedures when turning on the power:

1. Connect the interface cable to the RS-232C connectors on the MPU-F100A and the computer.
2. Initialize the RS-232C port on the computer.
3. Turn on the MPU-F100A's power.
4. Send the EXT CPU REMOTE ON (87h) command from the computer to place the MPU-F100A in the remote ON state (The REMOTE indicator lights).

**Note**
- While the MPU-F100A is in the remote ON state, the control panel's INPUT SELECT, STILL VIDEO CONTROL, and PICTURE EFFECT keys and all keys used for grabbing pictures (FRAME, FIELD EVEN, FIELD ODD, MEMORY IN, and CLEAR) are disabled.
- Although external control is also possible while the MPU-F100A is in the remote OFF state, some commands are not accepted. Therefore, always place the unit in the remote ON state when using external control.

Switching to the manual mode

Send the EXT CPU REMOTE OFF (89h) command from the host to the MPU-F100A when you wish to switch from the remote ON state to the remote OFF state without turning off the power.

**Note**
- Disconnecting the interface cable from the RS-232C connectors does not switch control back to the remote OFF state.

Troubleshooting

1. If you experience problems with RS-232C communication, use an RS-232C line tester to diagnose the problem. A Tektronix Model 834 or 834R is recommended.
2. If a Tektronix tester is not available, use the following procedure:
   (a) Verify that the baud rate, stop bits, character length, and baud rate factor are correctly set on the computer.
   (b) Verify that the voltage on the TxD and RxD lines is less than 8V.
   (c) Send data to the MPU-F100A from the computer and verify that the voltage of the TxD and RxD lines is greater than 8V.
Numeric Commands 0-8 (12h, 00h, 02h, 04h, 06h, 08h, 0Ah, 0Ch, 0Eh)

The hexadecimal numbers 12h, 00h, 02h, 04h, 06h, 08h, 0Ah, 0Ch, and 0Eh are numeric values that are used for setting parameters with the following commands.

- MOSAIC DIRECT (F3h)  Direct specification of the mosaic level
- MULTI DIRECT (EBh)  Direct specification of the multi-display position
- POSTERIZATION DIRECT (F1h)  Direct specification of the posterization level

<table>
<thead>
<tr>
<th>Data</th>
<th>Command</th>
<th>Data</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12h</td>
<td>5</td>
<td>08h</td>
</tr>
<tr>
<td>1</td>
<td>00h</td>
<td>6</td>
<td>0Ah</td>
</tr>
<tr>
<td>2</td>
<td>02h</td>
<td>7</td>
<td>0Ch</td>
</tr>
<tr>
<td>3</td>
<td>04h</td>
<td>8</td>
<td>0Eh</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOSAIC DIRECT</td>
<td>0 to 4</td>
</tr>
<tr>
<td>MULTI DIRECT</td>
<td>0 to 8</td>
</tr>
<tr>
<td>POSTERIZATION DIRECT</td>
<td>0 to 3</td>
</tr>
</tbody>
</table>

- Positions in the multi-display screen are numbered as follows.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

- For details, see the explanations of the individual commands.

ACK (8Dh)
Valid command receipt acknowledgement

The MPU-F100A returns this code to the computer to acknowledge receipt of a valid command and to signal that it is ready to accept the next command. ACK is a code returned by the MPU-F100A, and is not an executable command.

CANCEL (59h)
Cancel direct command

The CANCEL command is used to abort execution of the MOSAIC DIRECT (F3h), MULTI DIRECT (EBh), or POSTERIZATION DIRECT (F1h) direct commands. Upon receiving this command, the MPU-F100A returns ACK and cancels all of these direct commands.

Note
- If no direct command is being executed, the MPU-F100A returns ACK in response to the CANCEL command, but no change in status takes place.

CLEAR (E6h)
Cancel grab

The CLEAR command is used to cancel the MPU-F100A's MEMORY IN (image storage) state. The MPU-F100A returns ACK in response to this command.

Note
- If memory does not contain any image, the MPU-F100A returns ACK in response to this command but no change in status takes place.

Program example
EXT. CPU REMOTE ON (87h)

Remote ON

The EXT. CPU REMOTE ON command places the MPU-F100A in the remote ON state. Upon receiving this command, the MPU-F100A returns ACK and disables the INPUT SELECT, STILL VIDEO CONTROL, and PICTURE EFFECT keys and all keys used for grabbing pictures (FRAME, FIELD EVEN, FIELD ODD, MEMORY IN, and CLEAR). You can find out whether the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.

Note
- Although external control is also possible while the MPU-F100A is in the remote OFF state, some commands are not accepted. Therefore, always place the unit in the remote ON state when using external control.
- The MPU-F100A accepts the EXT. CPU REMOTE ON command at any time.
- When the power is turned on, MPU-F100A operation starts in the remote OFF state.

Program example

```
TxD --- 87h

RxD --- 8Ch
```

EXT. CPU REMOTE OFF (89h)

Remote OFF

The EXT. CPU REMOTE OFF command places the MPU-F100A in the remote OFF state. Upon receiving this command, the MPU-F100A returns ACK to the computer. You can find out whether the MPU-F100A is in the remote ON state by checking status byte 7 with the STATUS 1 INQ command.

Note
- Upon switching from the remote ON state to the remote OFF state, INPUT SELECT, STILL VIDEO CONTROL, and LAP DISSOLVE revert to the states set by the keys on the MPU-F100A's front panel. If display muting has been turned on with the MUTE ON (E3h) command, it reverts to the MUTE OFF state.
- The MPU-F100A accepts the EXT. CPU REMOTE OFF command at any time.
- When the power is turned on, MPU-F100A operation starts in the remote OFF state.

Program example

```
TxD --- 89h

RxD --- 8Ch
```

FIELD EVEN ON (D2h)

Select grab mode - FIELD EVEN

The FIELD EVEN ON command switches the grab mode to FIELD EVEN. The MPU-F100A provides three grab modes: FIELD EVEN, FIELD ODD, and FRAME. The other two grab modes can be selected with the FIELD ODD ON (D0h) and FRAME ON (D4h) commands. The FIELD EVEN mode is automatically cancelled whenever another mode is selected.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

Note
- This command is valid even if no display has been grabbed with the MEMORY IN (E2h) command.
- When the power is turned on, MPU-F100A operation starts in the FRAME mode.

Program example

```
TxD --- D2h

RxD --- 8Ch
```

FIELD ODD ON (D0h)

Select grab mode - FIELD ODD

The FIELD ODD ON command switches the grab mode to FIELD ODD. The MPU-F100A provides three grab modes: FIELD EVEN, FIELD ODD, and FRAME. The other two grab modes can be selected with the FIELD EVEN ON (D2h) and FRAME ON (D4h) commands. The FIELD ODD mode is automatically cancelled whenever another mode is selected.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

Note
- This command is valid even if no display has been grabbed into memory with the MEMORY IN (E2h) command.
- When the power is turned on, MPU-F100A operation starts in the FRAME mode.

Program example

```
TxD --- D0h

RxD --- 8Ch
```
The FRAME ON command switches the grab mode to FRAME.

The MPU-F100A provides three grab modes: FIELD EVEN, FIELD ODD, and FRAME. The other two grab modes can be selected with the FIELD EVEN ON (D2h) and FIELD ODD ON (D0h) commands. The FRAME mode is automatically cancelled whenever another mode is selected.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

**Note**
- This command is valid even if no display has been grabbed into memory with the MEMORY IN (E2h) command.
- When the power is turned on, MPU-F100A operation starts in the FRAME mode.

**Program example**

```
TxD --e...
RxD     80h
```

The LAP DISSOLVE ON command turns on the MPU-F100A's lap dissolve function. This command is valid only when the MPU-F100A is in the remote ON state.

The lap dissolve function can be used together with other special effect functions such as the mosaic function and the posterization function.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

**Note**
- If the MPU-F100A receives this command while in the remote OFF state, it returns NAK to the computer and disregards the command.
- You can find out whether the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.

**Program example**

```
TxD        80h
RxD        80h
```

This command is used for bringing an image into memory (for grabbing an image).

Upon receiving this command, the MPU-F100A returns ACK to the computer.

**Note**
- The type of image output (FIELD ODD, FIELD EVEN, or FRAME) is determined by the currently selected grab mode.
- The current grab mode can be checked with the STATUS 3 INQ command.
- Upon receiving this command, any image currently in memory is replaced with the image currently displayed.

**Program example**

```
TxD        E2h
RxD        80h
```
MOSAIC (F2h)

This command turns on the mosaic picture effect.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

Note
- If picture effects are OFF or some other picture effect is currently selected, the mosaic level is set to 0 upon receiving this command.
- If the mosaic effect is currently selected, the MPU-F100A returns ACK upon receiving this command, but no change in status takes place.
- The mosaic level range is from 0 to 4. The level can be changed with the PICTURE EFFECT + (DEh) and PICTURE EFFECT - (E9h) commands. The current mosaic level can be checked with the STATUS 4 INQ command.

Program example

| TxD | 0x0Fh |
| RxD | 0x80h |

MOSAIC DIRECT (F3h)

The MOSAIC DIRECT command is used for directly specifying the level of the mosaic picture effect. This is a 2 word command.

Upon receiving the MOSAIC DIRECT command, the MPU-F100A returns ACK to the computer. Upon subsequently receiving a numeric command (0 to 4) specifying the level, it sends another ACK to the host, then switches the mosaic picture effect to the specified level.

Note
- If the code following the MOSAIC DIRECT command is anything other than a numeric command, the MOSAIC DIRECT command is automatically cancelled and NAK is returned to the computer.
- The MOSAIC DIRECT command is also automatically cancelled and NAK returned to the host if the level specified by the subsequent numeric command is not in the range from 0 to 4.
- If it becomes necessary to cancel the MOSAIC DIRECT command, use the CANCEL (59h) command. The MPU-F100A then returns ACK and cancels the MOSAIC DIRECT command.
- The current level of the mosaic picture effect can be checked with the STATUS 4 INQ command.

Program example

The following sequence sets the mosaic level to 3.

| TxD | 0x0Fh |
| RxD | 0x80h |
|     | 0x83h |
MUTE ON (E3h)

The MUTE ON command turns on mute display. This command is valid only when the MPU-F100A is in the remote ON state.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

- If the MPU-F100A receives this command while in the remote OFF state, it returns NAK to the computer and disregards the command.
- You can find out whether the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.
- If the MPU-F100A is in the MEMORY IN (grab) state, this command does not mute the display. However, display is muted if the MEMORY IN state is cancelled by the CLEAR (E6h) command.
- If mute display is already off upon receiving this command, the MPU-F100A returns ACK but no change in status takes place.

Program example

```
TxD  E3h
RxD  80h
```

MUTE OFF (E5h)

The MUTE OFF command is used to cancel display muting set with the MUTE ON (E3h) command. The command is valid only when the MPU-F100A is in the remote ON state.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

- If the MPU-F100A receives this command while in the remote OFF state, it returns NAK to the computer and disregards the command.
- You can find out whether the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.
- If mute display is already off upon receiving this command, the MPU-F100A returns ACK but no change in status takes place.

Program example

```
TxD  E5h
RxD  80h
```

NAK (8Fh)

Negative acknowledgement of command receipt

The MPU-F100A returns this code to the computer to notify the host that it could not accept a command. This indicates either that the MPU-F100A is currently not ready to receive commands, or that the command sent was not a valid one. (Check correctness of the command.)

NAK is a code returned by the MPU-F100A, and is not an executable command.

Program example

```
TxD  8Fh
RxD  80h
```
The PICTURE EFFECT+ and PICTURE EFFECT- commands are used for changing the level of picture effects produced by the mosaic and posterization functions, and for changing the display position during multi-display.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

**Note**
- The following table shows the range of levels or display positions that can be specified for relevant functions:

<table>
<thead>
<tr>
<th>Picture effect</th>
<th>Level range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosaic</td>
<td>0 to 4</td>
</tr>
<tr>
<td>Posterization</td>
<td>0 to 3</td>
</tr>
<tr>
<td>Multi-display</td>
<td>0 to 8</td>
</tr>
</tbody>
</table>

- When the mosaic or posterization picture effect is selected and set to level 0, the MPU-F100A returns ACK in response to the PICTURE EFFECT+ command, but no change in status takes place. Likewise, when the maximum level (3 or 4) is set, the MPU-F100A returns ACK in response to the PICTURE EFFECT+ command, but status remains unchanged.
- When multi-display is selected as the picture effect and the display position is set to 0, the PICTURE EFFECT- command changes the display position to 8. When the display position is 8 and the PICTURE EFFECT+ command is received, the display position changes to 0.

<table>
<thead>
<tr>
<th>Multi-display areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1 2</td>
</tr>
<tr>
<td>3 4 5</td>
</tr>
<tr>
<td>6 7 8</td>
</tr>
</tbody>
</table>

- If all picture effects are OFF upon receiving these commands, ACK is returned but no change in status takes place.

Program example:

```
TxD       DCh
RxD       80h
```

**POSTERIZATION (F0h)**

The POSTERIZATION command turns on the screen posterization (solarization) function.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

**Note**
- If picture effects are OFF or some other picture effect is currently selected, the posterization level is set to 0 upon receiving this command.
- If posterization is currently selected, the MPU-F100A returns ACK upon receiving this command, but no change in status takes place.
- The posterization level range is from 0 to 3. The level can be changed with the PICTURE EFFECT+ (DEh) and PICTURE EFFECT- (EOh) commands. The current posterization level can be checked with the STATUS 4 INQ command.

Program example:

```
TxD       F0h
RxD       80h
```

**PICTURE EFFECT OFF (DCh)**

The PICTURE EFFECT OFF command cancels all picture effects (the mosaic, posterization, and multi-display effects).

Upon receiving this command, the MPU-F100A returns ACK to the computer.

**Note**
- When picture effects are turned off, the MPU-F100A returns ACK in response to the PICTURE EFFECT OFF command, but no change in status takes place.

Program example:

```
TxD       DCh
RxD       80h
```
POSTERIZATION DIRECT (F1h)

The POSTERIZATION DIRECT command is used for directly specifying the level of the posterization (solarization) picture effect. This is a 2-word command.

Upon receiving the POSTERIZATION DIRECT command, the MPU-F100A returns ACK to the computer. Upon subsequently receiving a numeric command (0 to 3) specifying the level, it sends another ACK to the host, then switches the posterization picture effect to the specified level.

Note
- If the code following the POSTERIZATION DIRECT command is anything other than a numeric command, the POSTERIZATION DIRECT command is automatically nullified and NAK is returned to the computer.
- The POSTERIZATION DIRECT command is also automatically nullified and NAK returned to the host if the level specified by the subsequent numeric command is not in the range from 0 to 3.
- If it becomes necessary to cancel the POSTERIZATION DIRECT command, use the CANCEL (59h) command. The MPU-F100A then returns ACK and cancels the POSTERIZATION DIRECT command.
- You can check the current posterization level with the STATUS 4 INQ command.

Program example

The following sequence sets the posterization level to 2.

```
TaD F1h
 02h (2)
RxD 08h 08h
```

RGB/COMPONENT ON (64h)

The RGB/COMPONENT ON command is used for selecting RGB/COMPONENT (Y/R-Y/B-Y) as the MPU-F100A input signal. This command is effective only when the MPU-F100A is in the remote ON state.

The MPU-F100A also has VIDEO and S VIDEO inputs. If one of these inputs is selected with the VIDEO ON (62h) or S VIDEO ON (68h) commands, the RGB/COMPONENT input is automatically switched OFF.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

Note
- If the MPU-F100A receives this command while in the remote OFF state, it returns NAK to the computer and disregards the command.
- You can find out whether the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.
- Whether this command selects RGB input or COMPONENT input depends on the setting of DIP SWS on the rear panel. Settings are as follows:

<table>
<thead>
<tr>
<th>DIP SWS</th>
<th>RGB</th>
<th>COMPONENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>RGB</td>
<td>OFF</td>
</tr>
<tr>
<td>OFF</td>
<td>COMPONENT</td>
<td></td>
</tr>
</tbody>
</table>

- You can find out whether DIP SWS is set for RGB or COMPONENT by checking bit 3 of status byte 2 with the STATUS 2 INQ command.

Program example

```
TaD 64h
RxD 08h
```
The STATUS 1 INQ, STATUS 2 INQ, STATUS 3 INQ, and STATUS 4 INQ commands request status information from the MPU-F100A. Upon receiving any of these commands, the MPU-F100A returns a 1-byte status code (STATUS 1, STATUS 2, STATUS 3, or STATUS 4) instead of ACK.

Contents of the various status bytes are as shown on the following pages.

Use of the STATUS INQ commands is recommended both before and after sending other commands to confirm that the MPU-F100A is in the remote ON state and that operations are carried out properly. The STATUS INQ commands can be used at any time.

Program example

```
STATUS 1

b7 REMOTE ON
  1: Remote ON state
  0: Remote OFF state

b6 busy
  1: Mode transition in progress
  0: Mode transition not in progress

b5 CONTROL-1 signal state
  1: CONTROL-1 signal abnormality state
  0: CONTROL-1 signal normal state

b4 Cooling fan motor state
  1: Cooling fan motor abnormality state
  0: Cooling fan motor normal state

b3 Input signal state
  1: Selected signal state is normal
  0: Selected signal state is abnormal

b2 Reserved

b1 Reserved

b0 Reserved
```

 STATUS 2

```

b7 TIMEROFF STOP
  1: '1' when still video control is in the TIMER STOP mode

b6 CONTROL MODE
  1: '1' when still video control is in the ON mode
  0: '1' when still video control is in the OFF mode

b5 COMPONENT/RGB (DIP SW5 setting)
  1: COMPONENT (Y/R-Y/B-Y) selected
  0: RGB selected
  (Note: b3 is significant only when b2 is '1')

b4 RGB/COMPONENT
  1: '1' when RGB/COMPONENT input is selected

b3 SELECT
  1: '1' when S VIDEO input is selected
  0: '1' when VIDEO input is selected
```
**STATUS 3**

<table>
<thead>
<tr>
<th>b7</th>
<th>GRAB ON</th>
<th>MEMORY IN state</th>
</tr>
</thead>
<tbody>
<tr>
<td>b6</td>
<td>CONTROL</td>
<td>FRAME</td>
</tr>
<tr>
<td>b5</td>
<td>MODE</td>
<td>FIELD EVEN</td>
</tr>
<tr>
<td>b4</td>
<td></td>
<td>FIELD ODD</td>
</tr>
<tr>
<td>b3</td>
<td>Reserved</td>
<td></td>
</tr>
<tr>
<td>b2</td>
<td>MUTE ON</td>
<td>'1' when image muting is turned on with the MUTE ON (E3h) command</td>
</tr>
<tr>
<td>b1</td>
<td>Reserved</td>
<td></td>
</tr>
<tr>
<td>b0</td>
<td>LAP DISSOLVE ON</td>
<td>1: LAP DISSOLVE ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0: LAP DISSOLVE OFF</td>
</tr>
</tbody>
</table>

**STATUS 4**

<table>
<thead>
<tr>
<th>b7</th>
<th>PICTURE EFFECT</th>
<th>MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>b6</td>
<td>0 OFF</td>
<td></td>
</tr>
<tr>
<td>b5</td>
<td>1 Mosaic</td>
<td>2 Postenization</td>
</tr>
<tr>
<td>b4</td>
<td>3 Multi-display</td>
<td></td>
</tr>
<tr>
<td>b3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b2</td>
<td>PICTURE EFFECT</td>
<td>LEVEL</td>
</tr>
<tr>
<td>b1</td>
<td>When b7-b4 = 0 (OFF), b3-b0 are 0. When b7-b4 = 1 (mosaic), b3-b0 indicate the mosaic effect level (0 to 4). When b7-b4 = 2 (postenization), b3-b0 indicate the postenization effect level (0 to 3). When b7-b4 = 3 (multi-display), b3-b0 indicate the current multi-display position (0 to 8).</td>
<td></td>
</tr>
<tr>
<td>b0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**STILL VIDEO CONTROL ON (DFh)**

This command sets interlocked operation between the MPU-F100A and a ProMavica video recorder in the ON mode. This command is effective only when the MPU-F100A is in the remote ON state.

When interlocked operation is placed in the ON mode, each ProMavica image played back is automatically grabbed into memory. This makes it possible to eliminate the muted screens that appear during screen switching when the ProMavica still video recorder is used by itself to play back images.

Still video control can also be placed in the OFF mode or the TIMER STOP mode. These can be selected with the STILL VIDEO CONTROL OFF (DDh) and STILL VIDEO CONTROL TIMER STOP (E1h) commands.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

*Now*

- If the MPU-F100A receives this command while in the remote OFF state, it returns NAK to the computer and disregards the command.
- You can find out whether or not the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.
- Operation in the ProMavica video recorder interlock mode is only possible when the MPU-F100A is connected to the ProMavica video recorder through the IFC-100 interface cable.
- Any picture stored in MPU-F100A memory will be lost if the ProMavica video recorder is stopped while the MPU-F100A is in the still video control ON mode.

Program example

```
TxD ----- DFh
        |
       /|
RxD ----- 80h
```
STILL VIDEO CONTROL OFF (DDh)  

This command turns off the MPU-F100A's ProMavica interlock mode. This command is effective only when the MPU-F100A is in the remote ON state.

Still video control can also be placed in the ON mode or the TIMER STOP mode. These can be selected with the STILL VIDEO CONTROL ON (DFh) and STILL VIDEO CONTROL TIMER STOP (E1h) commands.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

- If the MPU-F100A receives this command while in the remote OFF state, it returns NAK to the computer and disregards the command.
- You can find out whether the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.
- If this command is received while still video control is ON or in the TIMER STOP mode, any picture stored in MPU-F100A memory will be lost.

Program example

TxD --- DDh

RxD --- B0h

STILL VIDEO CONTROL TIMER STOP (E1h)  

This command sets interlocked operation between the MPU-F100A and a ProMavica video recorder in the TIMER STOP mode. This command is effective only when the MPU-F100A is in the remote ON state.

In the TIMER STOP mode, operation is the same as in the normal mode. However, if an image is continuously played back for more than about 10 minutes, playback stops automatically. (The image remains in memory even when playback stops.)

Still video control can also be placed in the ON mode or the OFF mode. These can be selected with the STILL VIDEO CONTROL ON (DFh) and STILL VIDEO CONTROL OFF (DDh) commands.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

- If the MPU-F100A receives this command while in the remote OFF state, it returns NAK to the computer and disregards the command.
- You can find out whether the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.
- Operation in the ProMavica video recorder interlock mode is only possible when the MPU-F100A is connected to the ProMavica video recorder through the IFC-100 interface cable.

Program example

TxD --- E1h

RxD --- B0h
This command is used to select the S VIDEO input as the MPU-F100A's input signal source. This command is effective only when the MPU-F100A is in the remote ON state.

The MPU-F100A also accepts VIDEO and RGB/COMPONENT signal input. Either of these can be selected using the VIDEO ON (62h) or RGB/COMPONENT ON (64h) commands. When another source is selected, the S VIDEO input is automatically turned OFF.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

• If the MPU-F100A receives this command while in the remote OFF state, it returns NAK to the computer and disregards the command.

• You can find out whether the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.

Program example

| TwO | 62h |
| RxO | 80h |

This command is used to select the VIDEO input as the MPU-F100A's input signal source. This command is effective only when the MPU-F100A is in the remote ON state.

The MPU-F100A also accepts S VIDEO and RGB/COMPONENT signal input. Either of these can be selected using the S VIDEO ON (6Bh) or RGB/COMPONENT ON (64h) commands. When another source is selected, the VIDEO input is automatically turned OFF.

Upon receiving this command, the MPU-F100A returns ACK to the computer.

• If the MPU-F100A receives this command while in the remote OFF state, it returns NAK to the computer and disregards the command.

• You can find out whether the MPU-F100A is in the remote ON state by checking bit 7 of status byte 1 with the STATUS 1 INQ command.

Program example

| TwO | 62h |
| RxO | 80h |