FOR.A
INNOVATIONS IN VIDEO
and AUDIO TECHNOLOGY

OPERATION MANUAL

MFR-1616
MFR-1616R
MFR-3216
MFR-3232
MFR-1616A

Multi Format Routing Switcher

*S

MFR-39RU
MFR-40RU
MFR-18RU
MFR-16RU/16RUD
MFR-16RUW/32RUW
MFR-GPI
MFR-TALM

7th Edition - Rev. 2

FOR-A COMPANY LIMITED

Edition Revision History

Edit.	Rev.	Date	Description	Section
1	-	2011/03/24		
2		2012/01/24	Rear Panel figures and External Dimensions. Amended TAKE function, enhanced MFR-18RU, etc.	2-1-2, 2-1-4, 3, 4
3	-	2012/05/30	Changed alarm description. RS Series compatibility option is cancelled. Added LAN interface support, etc.	2-1-3 1-2, 2-1-2, 9-1-1 7, etc.
4	-	-	(Not released)	-
5	-	2013/01/08	Added MFR-16RU and MFR-16RUD. Changed SERIAL and ALARM connectors. Changed Multi-panel Operation.	 2-1-3 5-6-1
6	-	2013/04/30	Added MFR-TALM. Factual errors corrected.	2-4, 3-2, 9-1-7, 9-2-11
7	-	-	(Not released)	
7	1	2013/09/05	Changed Power Consumption Added MFR-1616A Added MFR-16RUW and MFR-32RUW Added Setup Menu for MFR-18RU Added Setup Menu for other MFR RU units	9-1 2-2-1, 2-2-2, 5-1-2-1, 9-1-6, 9-1-7, 9-2-10, 9-2-11 5-6 5-7
7	2	2013/09/10	Changed MFR-1616A power LED indication Factual errors corrected.	2-1-1

Precautions

Important Safety Warnings

[Power]

 Caution	Operate unit **only** on the specified supply voltage.
	Disconnect power cord by connector only. **Do not** pull on cable portion.
 Stop	**Do not** place or drop heavy or sharp-edged objects on power cord. A damaged cord can cause fire or electrical shock hazards. Regularly check power cord for excessive wear or damage to avoid possible fire / electrical hazards.

[Grounding]

 Caution	**Ensure** unit is properly grounded at all times to prevent electrical shock hazard.
 Hazard	**Do not** ground the unit to gas lines, units, or fixtures of an explosive or dangerous nature.
 Caution	**Ensure** power cord is firmly plugged into AC outlet.

[Operation]

 Hazard	**Do not** operate unit under hazardous or potentially explosive atmosphere conditions. Doing so could result in fire, explosion, or other dangerous results.
 Hazard	**Do not** allow liquids, metal pieces, or other foreign materials to enter the unit. Doing so could result in fire, other hazards, or unit malfunction.
	If foreign material does enter the unit, turn the power off and **immediately** disconnect the power cord **.** Remove the material and contact an authorized service representative if damage has occurred.

[Transportation]

 Caution	**Handle** with care to avoid impact shock in transit, which may cause malfunction. When you need to transport the unit, use the original or adequate packing material.

[Circuitry Access]

	**Do not** remove covers, panels, casing, or access the circuitry with power applied to the unit! Turn the power off and disconnect the power cord prior to removal. Internal servicing / adjustment of unit should only be performed by qualified personnel.
 Stop	**Do not** touch any parts / circuitry with a high heat factor. Capacitors can retain enough electric charge to cause mild to serious shock, even after the power has been disconnected. Capacitors associated with the power supply are especially hazardous. Avoid contact with any capacitors.
 Hazard	Unit **should not** be operated or stored with cover, panels, and / or casing removed. Operating unit with circuitry exposed could result in electric shock / fire hazards or unit malfunction.

[Potential Hazards]

 Caution	If abnormal odors or noises are noticed coming from the unit, immediately turn the power off and disconnect the power cord to avoid potentially hazardous conditions. If problems similar to the above occur, contact an authorized service representative **before** attempting to operate the unit again.

[Rack Mount Brackets, Ground Terminal, and Rubber Feet]

 Caution	To rack-mount or ground the unit, or to install rubber feet, **do not** use screws or materials other than those supplied. Otherwise, doing so may cause damage to the internal circuitry or components of the unit. If you remove the rubber feet that are attached to the unit, **do not** reinsert the screws securing the rubber feet.

[Consumables]

 Caution	Consumable items that are used in the unit must be periodically replaced. For further details on which parts are consumables and when they should be replaced, refer to the specifications at the end of the Operation Manual. Since the service life of consumables varies greatly depending on the environment in which they are used, such items should be replaced at an early date. For details on replacing consumable items, contact your dealer.

Upon Receipt

Unpacking

MFR-1616 /MFR-1616R /MFR-3216 /MFR-3232 /MFR-1616A units and their accessories are fully inspected and adjusted prior to shipment. Operation can be performed immediately upon completing all required connections and operational settings.

Check your received items against the packing lists below.

◆ **Main Unit**

ITEM	QTY	REMARKS
MFR-1616, MFR-1616R, MFR-3216, or MFR-3232 MFR-1616A	1	
AC Cord	1 set	AC cable and retaining clip
Rack Mount Brackets	1 set	EIA standard type
CD-ROM	1	Operation Manual (PDF)
Quick Setup Guide	1	

◆ **Remote Control Panel**

ITEM	QTY	REMARKS
MFR-39RU, 40RU, 18RU, 16RU 16RUD, 16RUW or 32RUW	1	
AC Adaptor	1	
AC cable	1	
DC cable retaining clip	1 set	
Rack Mount Brackets	1 set	EIA standard type * MFR-16RUW/32RUW are supplied w/o Rack Mount Brackets.
Tool used for changing button labels	1	
LAN Cable (straight) *	1	MFR-39/40/18RU: UTP cable, 5m MFR-16RU/16RUD: STP cable, 5m * MFR-16RUW/32RUW are supplied w/o LAN Cable.

* User-prepared LAN cables are also available and Shielded Twist Pair cables are recommended for MFR-16RU/16RUD/16RUW/32RUW.

◆ **Option (for MFR-1616/1616R/3216/3232)**

ITEM	QTY	REMARKS
MFR-SRCPU	1	Redundant CPU card (MFR-1616R/3216/3232 only)
MFR-SRPS	1 set	Redundant power supply unit (with AC cord and AC cord retaining clip.)

◆ **Interface Expansion Unit**

ITEM	QTY	REMARKS
MFR-GPI	1	
AC Adaptor	1	
AC cable	1	
DC cable retaining clip	1 set	
Rack Mount Brackets	1 set	EIA standard type
LAN Cable (straight)	1	

◆ **Tally Manager Unit**

ITEM	QTY	REMARKS
MFR-TALM	1	
AC Adaptor	1	
AC cable	1	
DC cable retaining clip	1 set	
Rack Mount Brackets (optional)	1 set	Single- or Dual-unit type EIA standard type

Check

Check to ensure no damage has occurred during shipment. If damage has occurred, or items are missing, inform your supplier immediately.

Installing the AC Cable Retaining Clip (Main Unit)

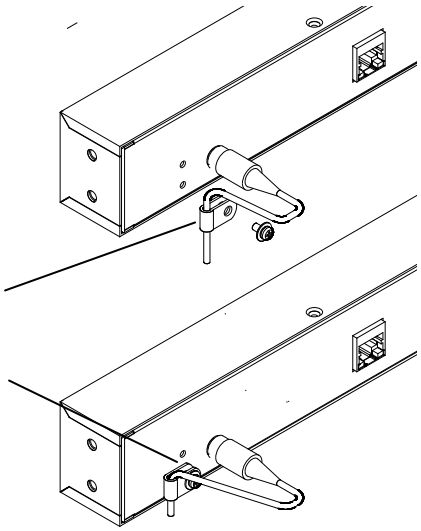
Secure the AC cable with the supplied AC cable retaining clip to prevent accidental removal from the unit.
Procedure
1) Securely plug the AC cable into the AC connector.
2) Attach the Retaining clip on to the side of the AC cable.
3) Thread both ends of the retaining clip into the holes of the retaining clip base attached on the unit.

Installing the DC Cable Retaining Clip

Install the supplied retaining bracket onto the rear panel of devices, such as a Control Unit as shown below.

1) Bundle the cable with the supplied clip.

2) Secure the clip with the supplied screw.



About This Manual

This manual is intended to help the user easily operate this product and make full use of its functions during operation. Before connecting or operating your unit, read this operation manual thoroughly to ensure you understand the product. After reading, it is important to keep this manual in a safe place and available for reference.

Font Conventions
The following conventions are used throughout this manual:

- Shaded text (such as OFF) indicates the setting **parameters** or **values** in the menu.
- Text enclosed by a square (such as MODE, SALVO) indicates remote control panel **buttons**.

Table of Contents

1. Prior to Starting

1-1. Welcome

Congratulations! By purchasing MFR-1616/MFR-1616R/MFR-3216/MFR-3232/MFR-1616A Multi Format Routing Switcher (hereafter called MFR main unit) you have entered the world of FOR-A and its many innovative products. Thank you for your patronage and we hope you will turn to FOR-A products again and again to satisfy your video and audio needs.
FOR-A provides a wide range of products, from basic support units to complex system controllers, which have been increasingly joined by products for computer video based systems. Whatever your needs, talk to your FOR-A representative. We will do our best to be of continuing service to you.

1-2. Features

The MFR-1616, MFR-1616R, MFR-3216, MFR-3232, and MFR-1616A comprise a group of multi-format routing switchers with a variety of input/output numbers supporting 3G-SDI, HD-SDI, SD-SDI, ASI, and AES (MFR-1616A only) signals. In the compact body, the units have inherited various functions of the MFR-5000 such as the capability of linking multiple cases, tally connections with peripheral devices, and automatic source name tracking, to allow the units to be the core product in small to medium size systems.

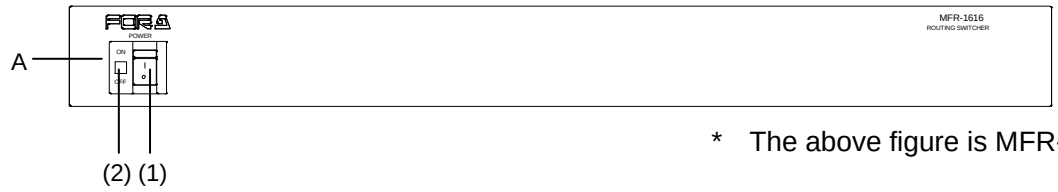
- Support for 3G-SDI, HD-SDI, SD-SDI, ASI, and AES (MFR-1616A only) signals with automatic signal recognition that enables operation without concern for the type of signal.
- Various crosspoint control functions such as Salvo, Take, Link, Level operation, and Chop
- Tally linking with FOR-A's video switchers (HANABI Series) and multi viewers. Source name displays on video switchers and multi viewers can be switched in conjunction with switchings controlled in the main unit. MFR routers support TSL and Harris protocol, enabling linkage to other companies' products.
- Built-in webserver for remote control through a web browser
- SNMP support enabling SNMP monitoring system configuration
- Status monitoring for power supply, fan, CPU, SDI input/output, etc.
- CPU board redundancy (MFR-SRCPU option) allowing monitoring of primary CPU board operation via the secondary board
- Immediate and smooth switch over to the secondary board without down time in case of irregularities, as well as stable remote control operation supported by the network redundancy (Supported by MFR-SRCPU option)
- Power unit redundancy for stable power supply against power unit failure or power supply troubles
- Matrix partition and level setting capabilities support a flexible control environment
- Remote control over a main unit from multiple remote control panels (maximum of 128 units can be connected in total including the main unit)
- Remote control panel connectivity for configuring a huge control panel
- Interface expansion unit (MFR-GPI) for additional 128 (32 x 4) GPI/O and 4 serial ports (9-pin D-sub, male)
- MFR-TALM Tally Manager Unit is designed specifically to manage tally and signal name data in the MFR system and the exchange of this data with external devices such as a video switcher, multiviewer etc.. The unit performs the task of tally data computation, which is ordinarily undertaken by the MFR main unit, to accelerate the task.

2. Panel Descriptions

2-1. Main Unit

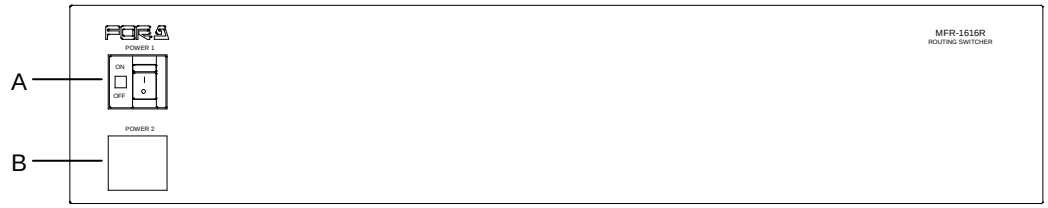
2-1-1. Front Panel

◆ **MFR-1616 / MFR-1616A**



* The above figure is MFR-1616.

◆ **MFR-1616R / MFR-3216 / MFR-3232**



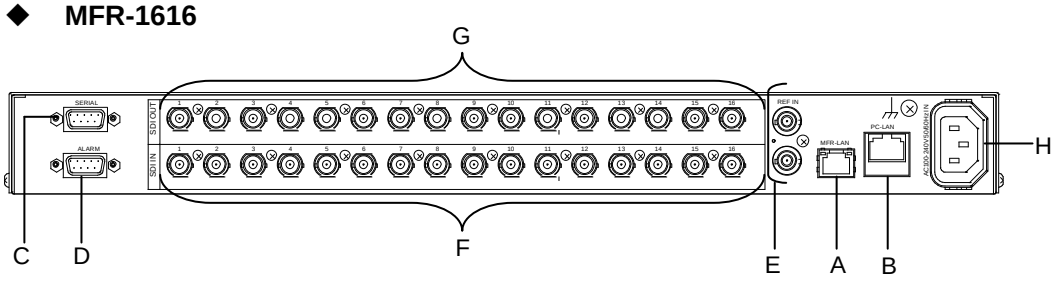
* The above figure is MFR-1616R.

No.	Name	Description
A	POWER1	Power switch 1 (standard equipment) (1) Switch to turn unit power On/Off. (2) LED indicator Lit green — DC power supply: Normal Unlit — DC power supply: Error Lit orange — No MFR-LAN connection (MFR-1616A only)
B	POWER2	Power switch 2 (optional equipment) (1) and (2) the same as POWER1.

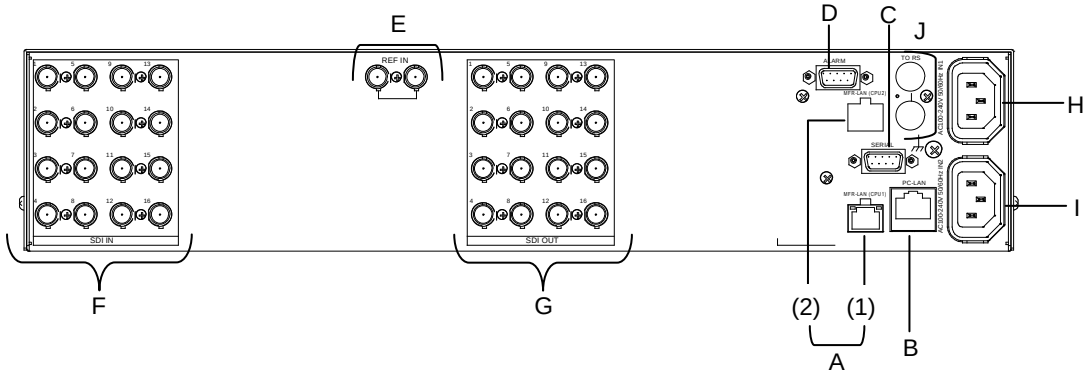
IMPORTANT
Whenever restarting the main unit, restart the web browser as well.

2-1-2. Rear Panel

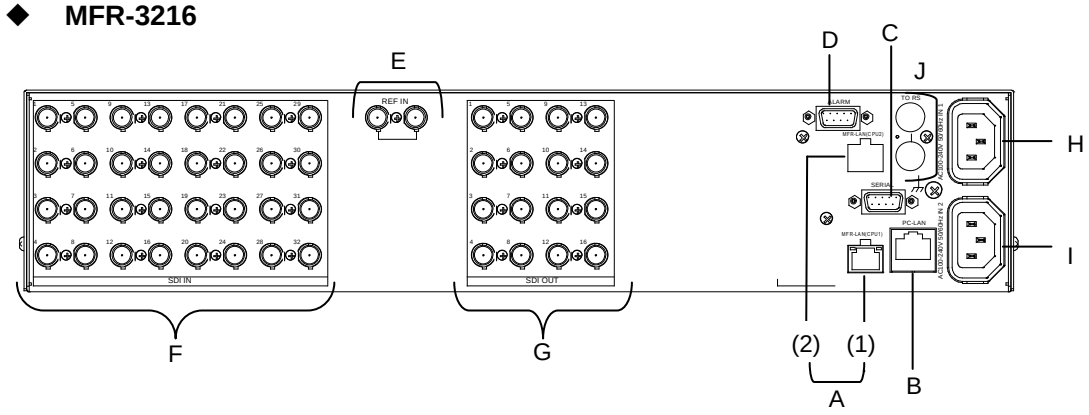
◆ **MFR-1616**



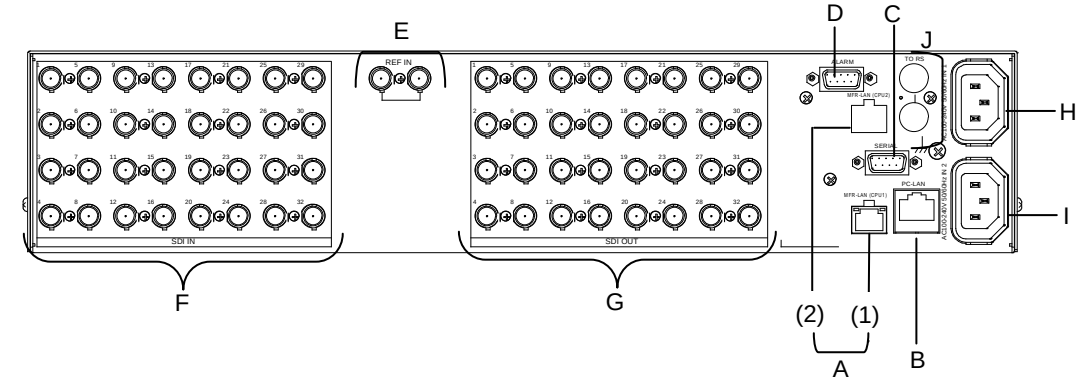
◆ **MFR-1616R**



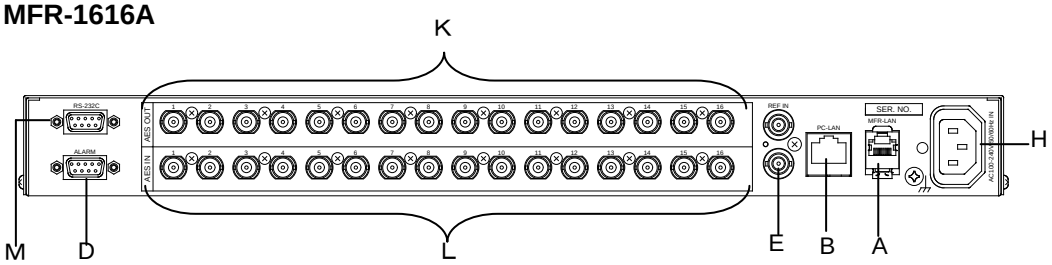
◆ **MFR-3216**



◆ **MFR-3232**



◆ **MFR-1616A**



No.	Name	Description
A	MFR-LAN *1 (1) MFR-LAN (CPU1) *1 (2) MFR-LAN (CPU2) *1	Ethernet ports for connection to MFR Remote Control Units and MFR-GPI. An Ethernet port (10/100BASE-T RJ-45) (1) for the MAIN CARD (2) for the MFR-SRCPU (option)
B	PC-LAN *1	Used to connect to a PC or other external unit. An Ethernet port (10/100BASE-TX RJ-45)
C	SERIAL *2	Used to control via a serial interface (RS-232C/RS-422 selectable)
D	ALARM	Used for alarm output
E	REF IN	Used to input a reference signal (BB or Tri-level sync signal) (looping, or 75 ohm terminated)
F	SDI IN	Used to input digital component video signals
G	SDI OUT	Used to input digital component video signals
H	AC IN1	Used to connect Power Supply Unit 1 to an AC power source
I	AC IN2	Used to connect Power Supply Unit 2 (optional) to an AC power source.
J	TO RS	Unused
K	AES OUT	Used to output AES/EBU audio signals.
L	AES IN	Used to input AES/EBU audio signals.
M	RS-232C	Used to control via RS-232C.

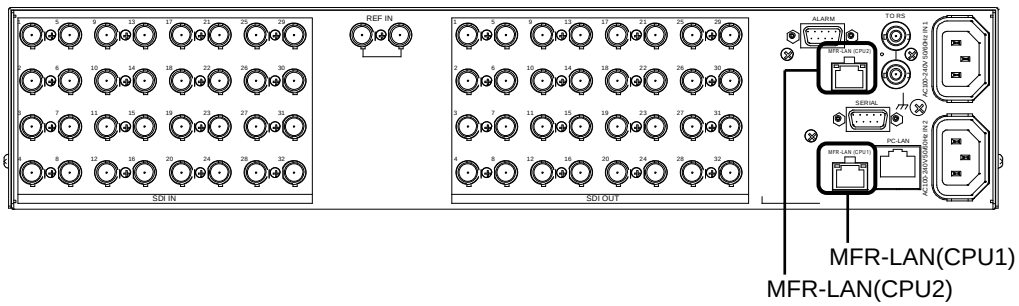
*1 The MFR-LAN/MFR-LAN(CPU1, 2) connector may be labeled as TO RU, and the PC-LAN connector as TO PC on units shipped before Sep. 16, 2011.

*2 The SERIAL connector is set to RS-232C as factory default. Consult your FOR-A reseller if you wish to change the setting.

IMPORTANT
The MFR-LAN/MFR-LAN (CPU1, 2) ports must be connected to a LAN to enable operation. The LAN connections for MFR Series devices must be separated from the network segment of other devices.

◆ **When Installing MFR-SRCPU**

Installing the MFR-SRCPU card enables MFR-1616R/MFR-3216/MFR-3232 units to have redundant CPU cards and Ethernet ports, which can be used for remote control panel connection.



IMPORTANT
When using the MFR-SRCPU, be sure to connect both MFR-LAN(CPU1) and MFR-LAN(CPU2) connectors to a LAN interface.

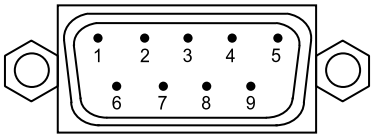
See the separate MFR SERIES Web-based Control Operation Manual for more information on MFR-SRCPU.

2-1-3. Interfaces

◆ **SERIAL Connector (9-pin D-sub, male)**

RS-232C or 422 interface is selectable. The factory default setting is RS-232C. Consult your FOR-A reseller if you wish to change the setting.

9-pin D-sub, male



RS-232C Connector Pin Assignments

Pin No.	Signal Name	Description
1	NC	Not used
2	RxD	Received Data
3	TxD	Transmitted Data
4	DTR	Data Terminal Ready
	NC	Not used (MFR-1616A only)
5	SG	Signal Ground
6	DSR	Data Set Ready
	NC	Not used(MFR-1616A only)
7	RTS	Request To Send
8	CTS	Clear To Send
9	NC	Not used

* The maximum cable length is 10 m.

* DTR/DSR and RTS/CTS are internally connected respectively.

RS-422 connector pin assignment (9-pin, D-sub male)

Pin No.	Signal Name	Description
1	FG	Frame Ground
2	T-	Transmit data (-)
3	R+	Receive data (+)
4	SG	Signal Ground
5	NC	Not used
6	SG	Signal Ground
7	T+	Transmit data (+)
8	R-	Receive data (-)
9	FG	Frame Ground

* The maximum cable length is 100 m.

◆ **ALARM Connector (9-pin D-sub, female)**

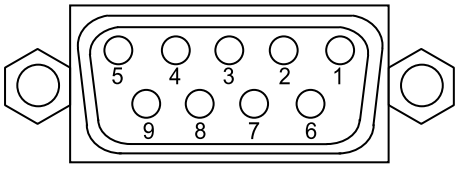
Alarm 1 Output:

Under normal operation:	Pins 1 and 6 are open.
In a malfunction or power-off state:	Pins 1 and 6 are closed.

Alarm 2 Output:

Under normal operation:	Pins 2 and 7 are open.
In a malfunction or power-off state:	Pins 2 and 7 are closed.

Reset:
To reset the unit externally, short Pin 5 and a signal ground pin (8 or 9).



9-pin D-sub, female

ALARM Connector Pin Assignments

Pin No.	Signal Name	Description
1	ALARM1 OUT	Alarm 1 output (Default : FAN)
2	ALARM2 OUT	Alarm 2 output (Default: POWER)
3	NC	Not used
4	NC	Not used
5	RESET IN	Reset in, active low
6	ALARM1 COMMON	Alarm 1 output, Common
7	ALARM2 COMMON	Alarm 2 output, Common
8	GND	Signal ground
9	GND	Signal ground

The following items can be set for ALARM1 OUT and ALARM2 OUT. The alarms can be assigned in the Web-Based Control.

- Fan alarm

Alarm signals are output (including power unit cooling fans) if any failure occurs in cooling fans.

- Power alarm

Alarm signals are output if any failure occurs in power supply units.

- Secondary CPU alarm

Alarm signals are output if any failure occurs in the secondary CPU.

- CPU Changeover alarm

Alarm signals are output if the secondary CPU is activated to change over the operation.

- Crosspoint Error alarm

Alarm signals are output if any crosspoint switch error occurs.

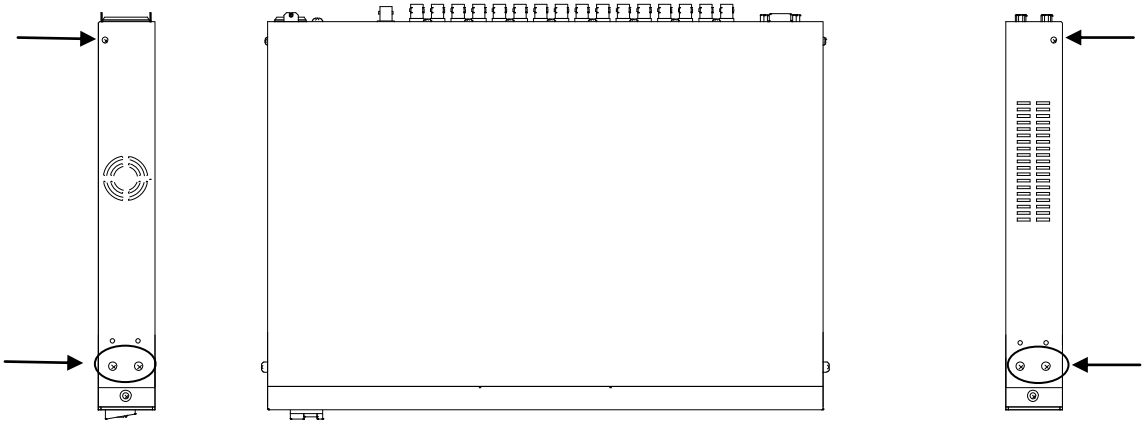
2-1-4. RS-232C / RS-422 Selection

IMPORTANT
Be sure to consult your FOR-A reseller when you wish to change the RS-232C setting to RS-422.

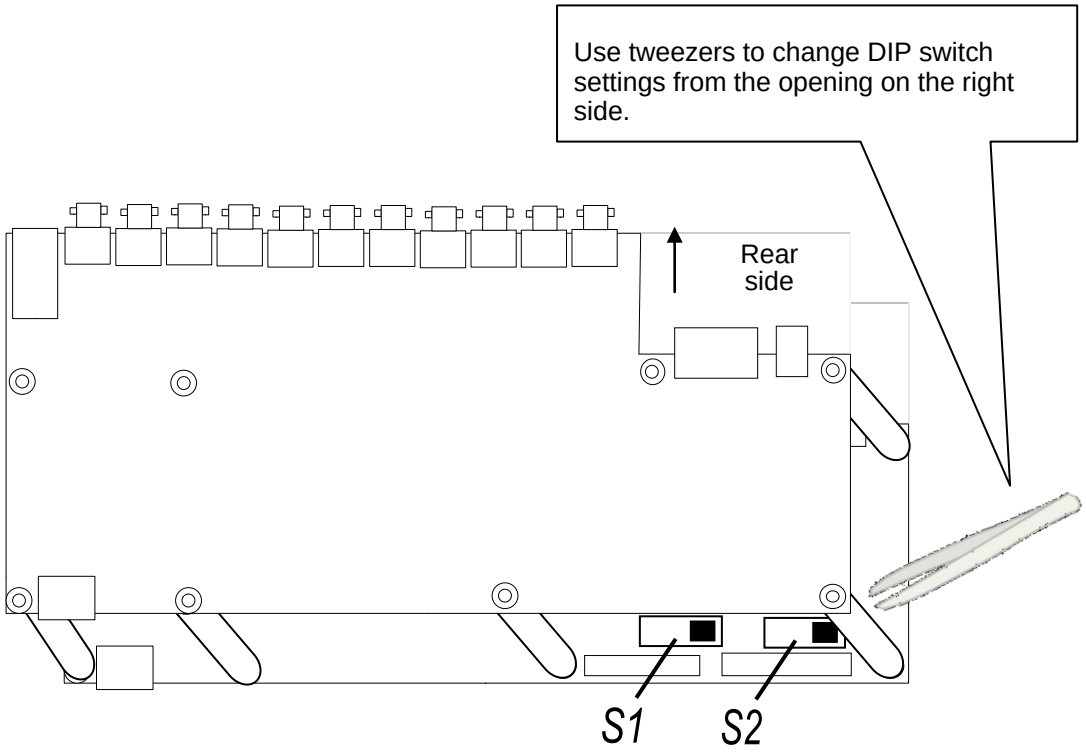
CAUTION
Do not access internal cards with the unit power ON. Always power OFF all connected units / disconnect power cords prior to accessing the interior. Adjustment and maintenance procedures that require accessing the unit interior should only be performed by qualified technical personnel familiar with the equipment.

◆ **MFR-1616**

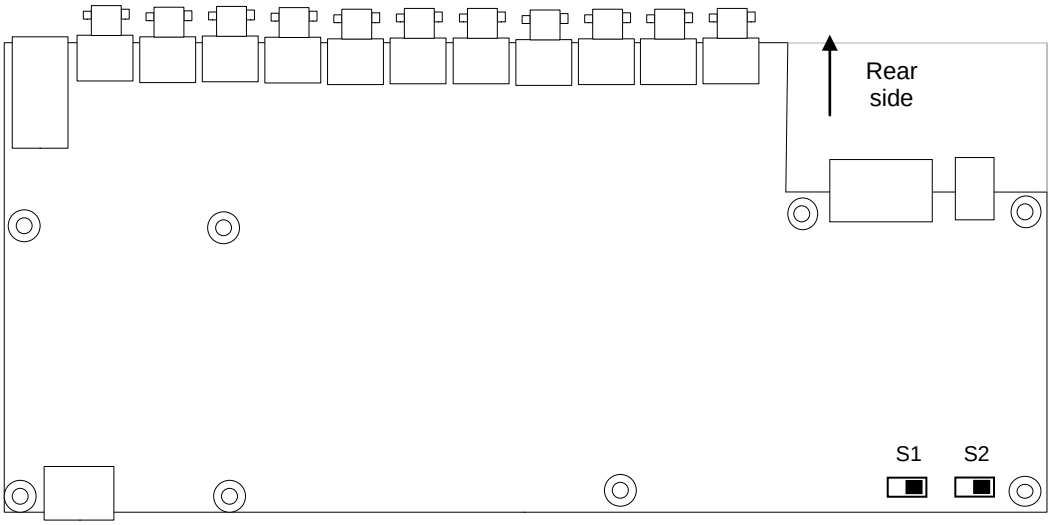
(1) Remove the 6 screws as shown below from both sides of the unit, slide the top panel toward the back of the unit, and detach the panel from the unit.



(2) Change DIP switch settings with tweezers through the opening on the right side.



Default DIP switch settings are as shown below.



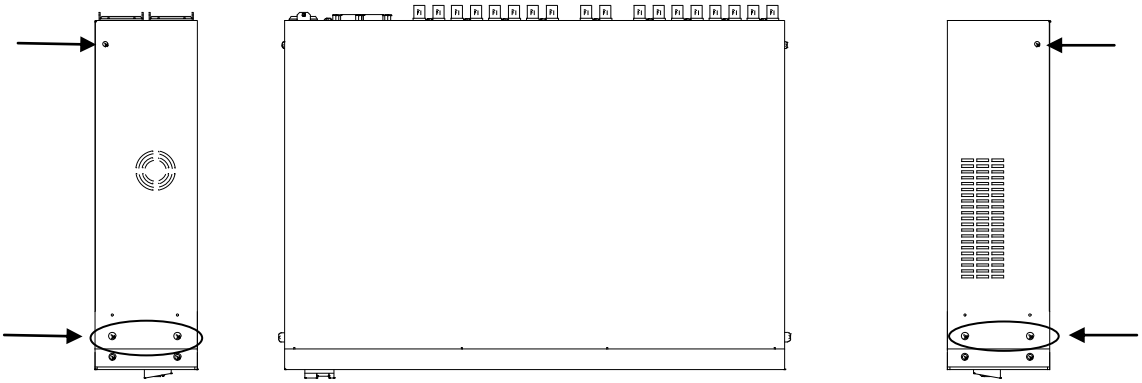
◆ **DIP switch settings**

Switch	Description			
S1, S2	Used to select RS-232C/RS-422. To change the selection, refer to the setting position figures on the right. Be sure to change both switch positions so that they match the selected settings.	Switch settings	RS-232C (Factory default)	
			RS-422	

IMPORTANT
S3 and S4 are for maintenance only. Do not change their settings.

◆ **MFR-1616R/MFR-3216/MFR-3232**

(1) Remove the 6 screws as shown below from both sides of the unit, slide the top panel toward the back of the unit, and detach the panel from the unit.



(2) Change the DIP switch settings. Default DIP switch settings on the main card are as shown below.

◆ **DIP switch settings**

Switch	Description			
S1, S2	Used to select RS-232C/RS-422. To change the selection, refer to the setting position figures on the right. Be sure to change both switch positions so that they match the selected settings.	Switch settings	RS-232C (Factory default)	
			RS-422	

IMPORTANT
S3 and S4 are for maintenance only. Do not change their settings.

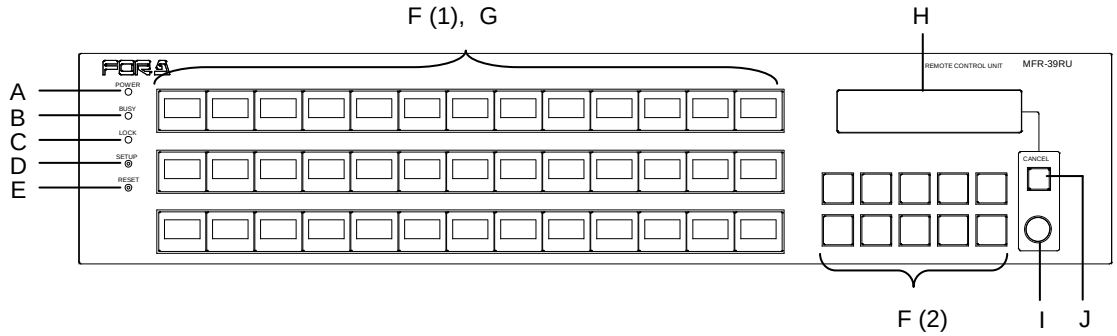
◆ **MFR-1616A**

IMPORTANT
The serial interface on MFR-1616A is fixed to RS-232C and cannot be changed.

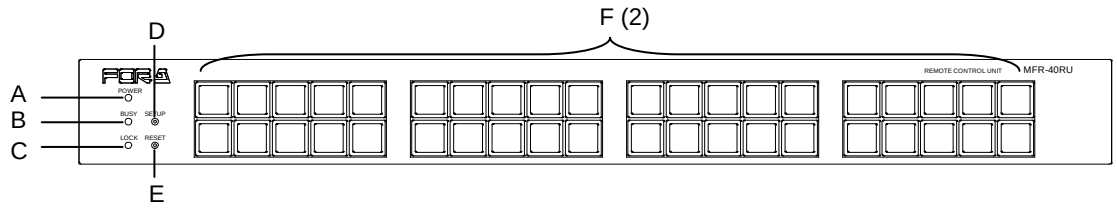
2-2. Remote Control Panel

2-2-1. Front Panel

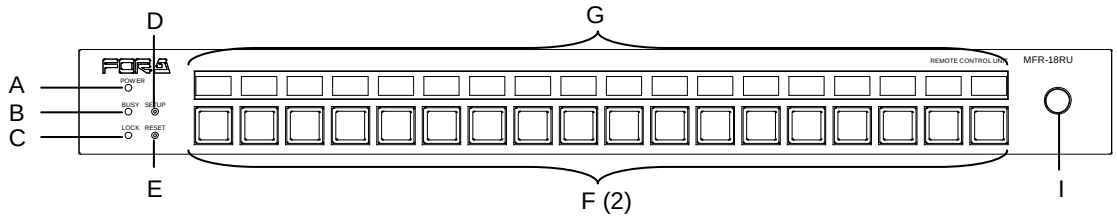
◆ **MFR-39RU**



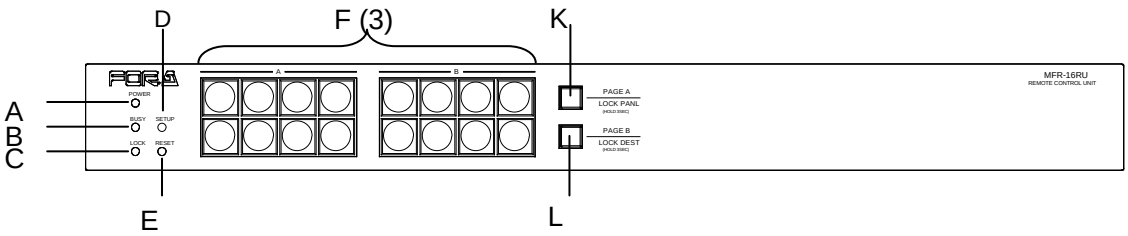
◆ **MFR-40RU**



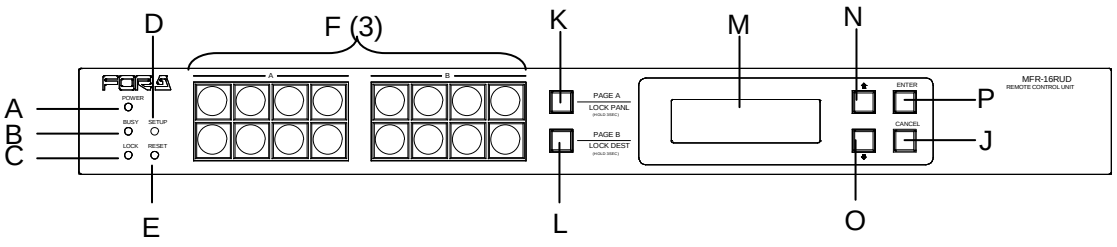
◆ **MFR-18RU**



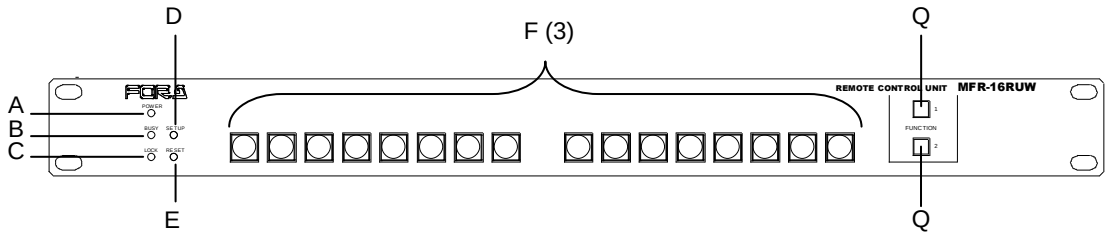
◆ **MFR-16RU**



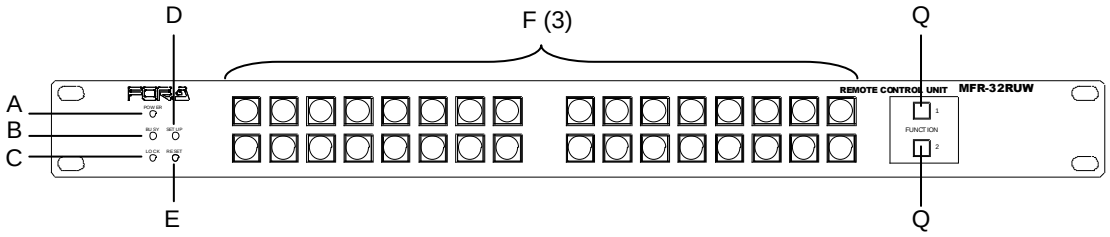
◆ **MFR-16RUD**



◆ **MFR-16RUW**



◆ **MFR-32RUW**



No.	Item	Description
A	POWER	Displays the power status. ▶ See the table on the next page for details on indications.
B	BUSY	Displays the writing status of the flash memory for backup settings. ▶ See the table on the next page for details on indications.
C	LOCK	Displays the LOCK status. ▶See the table on the next page for details on indications. ▶See section 6-3. "Lock" for details on the lock function.
D	SETUP	Used for IP address or other settings. ▶See section 5-5 "Setup Menu" for details on the SETUP menu.
E	RESET	Used to re-initialize the remote control panel.
F	Buttons	All buttons are user assignable. (1) 7-color selectable button name indication (red, green, yellow, blue, white, cyan or magenta) (hereafter called LCD) (2) 3-color selectable button illumination (red, green or orange) (3) Green illumination
G	NAME DISPLAY	7-color selectable button name/assignment indications (red, green, yellow, blue, white, cyan or magenta) (hereafter called LCD)
H	MENU	Displays setting menus and status.
I	CONTROL	Used to enter menu settings.
J	CANCEL	Used to cancel menu settings.
K	PAGE A / LOCK PANL	Page switch button. Pressing the button switches Page 1 and Page 2 of Group A. The button is unlit if Page 1 is applied. The button is lit orange if Page 2 is applied. To use the button as LOCK LOCAL, press and hold down (within 3 seconds). (*)
L	PAGE B / LOCK DEST	Page switch button. Pressing the button switches Page 1 and Page 2 of Group B. The button is unlit if Page 1 is applied. The button is lit orange if Page 2 is applied. To use the button as LOCK ALL, press and hold down (within 3 seconds). (*)
M	Display	Displays crosspoints and button assignments.
N	↑	UP / DOWN buttons, used to select items to be viewed on the Display.
O	↓	
P	ENTER	Used to confirm settings on the Display.
Q	FUNCTION	Function assignable buttons. (Green illumination)

(*) PAGE Switch and LOCK features are initially enabled and can be disabled in the [Web-based Control: **Button Assign** page], respectively.

◆ **Color indications on the MFR-RU front panel**

LED color / LED	Green	Red	Orange
POWER LED	Normal	Power alarm	
BUSY LED	Normal processing		Writing to flash memory
LOCK LED	Operation locked by Lock Local	Operation locked by Lock All, or locked by Lock Other from another unit.	Lock Other is activated in own unit.

* LOCK LED flashes if the locked operation is accessed. The operation will not perform.
* POWER LED lights up red if the unit is turned on while it is not connected to a network.
* All indicators, POWER, BUSY and LOCK, light orange while the SETUP menu is displayed.

NOTE
After finishing settings, do **not power OFF** the unit while BUSY LED is **lit orange**, since the system is writing to Flash. (It takes about two minutes at max.)

◆ **Changing Button Labels**

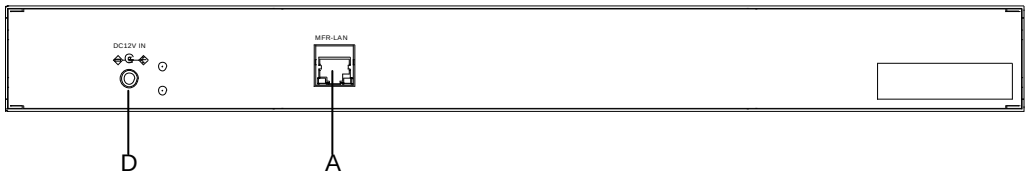
Button labels can be changed for the user assignable buttons. Use the appendix "Button Labels" at the end of this manual as a template.
To remove button caps, use the supplied tool.

2-2-2. Rear Panel

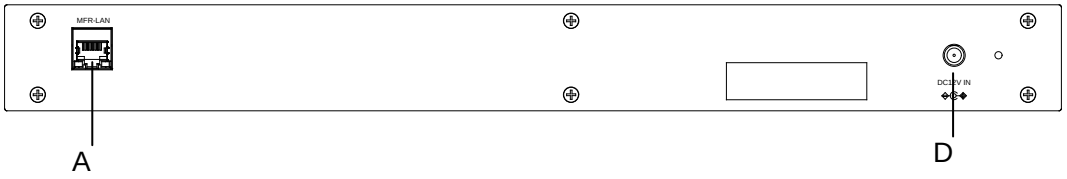
◆ **MFR-39RU**

◆ **MFR-40RU / MFR-18RU**

◆ **MFR-16RU / MFR-16RUD**



◆ **MFR-16RUW / MFR-32RUW**

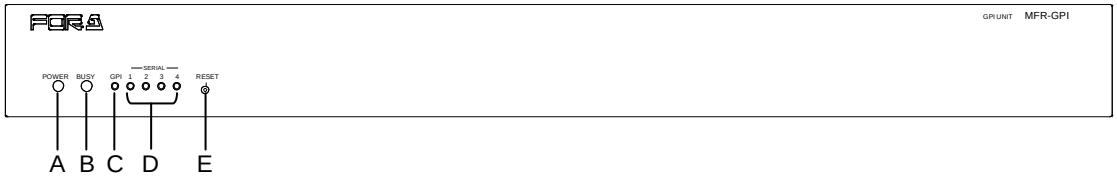


No.	Item	Description
A	MFR-LAN *1	Used to connect the MFR main unit Ethernet port (10/100BASE-TX, RJ-45)
B	SERVICE	Used for maintenance only. Do not use.
C	DC 12 V IN 1,2	Used to supply 12 V DC power.
D	DC 12 V IN	Used to supply 12 V DC power.

*1 The MFR-LAN connector may be labeled 10/100BASE-T on the previous model.

2-3. MFR-GPI

2-3-1. Front Panel



No.	Item	Description
A	POWER	Displays the power status. ▶ See the table below for details on indications.
B	BUSY	Displays the writing status of the flash memory for backup settings. ▶ See the table below for details on indications.
C	GPI	When the GPI function is assigned using Web-based Control, the LED lights green. The LED remains unlit when there is no assignment.
D	SERIAL 1-4	When serial ports are assigned using Web-based Control, the LED lights green. The LED remains unlit when there is no assignment.
E	RESET	Used to re-initialize the GPI unit.

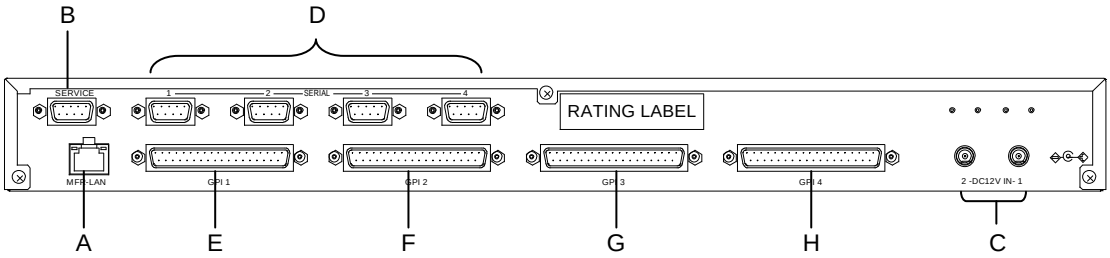
◆ **Color indications on the MFR-GUI front panel**

LED \ LED Color	Green	Red	Orange
POWER	Normal	Power alarm	
BUSY	Normal processing		Writing to flash memory

* POWER LED lights up red if the unit is turned on while it is not connected to a network.

NOTE
After finishing settings, do **not power OFF** the unit while BUSY LED is **lit orange**, since the system is writing to Flash. (It takes about two minutes at max.)

2-3-2. Rear Panel

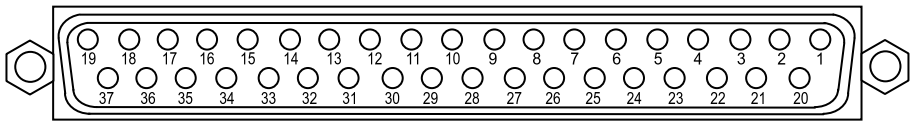


No.	Item	Description
A	MFR-LAN *1	Used to connect the MFR main unit Ethernet port (10/100BASE-TX, RJ-45)
B	SERVICE	Used for maintenance only. Do not use.
C	DC12V IN 1 and 2	Used to supply 12 V DC power.
D	SERIAL 1 to 4	Used for control via a serial interface. The default setting is RS-422. RS-232C is also selectable using switches on the card. (See section 2-3-4. Switch Settings on the Internal Board.) Pin assignments are the same as those of the MFR main unit. (See section 2-1-3. “Interfaces.")
E	GPI 1 (Port no.: 1)	Used for GPI input / output connections. (32 total assignable inputs and outputs)
F	GPI 2 (Port no.: 2)	Used for GPI input / output connections. (32 total assignable inputs and outputs)
G	GPI 3 (Port no.: 3)	Used for GPI input / output connections. (32 total assignable inputs and outputs)
H	GPI 4 (Port no.: 4)	Used for GPI input / output connections. (32 total assignable inputs and outputs)

*1 The MFR-LAN connector may be labeled 10/100BASE-T on the previous model..

2-3-3. Interfaces (MFR-GPI)

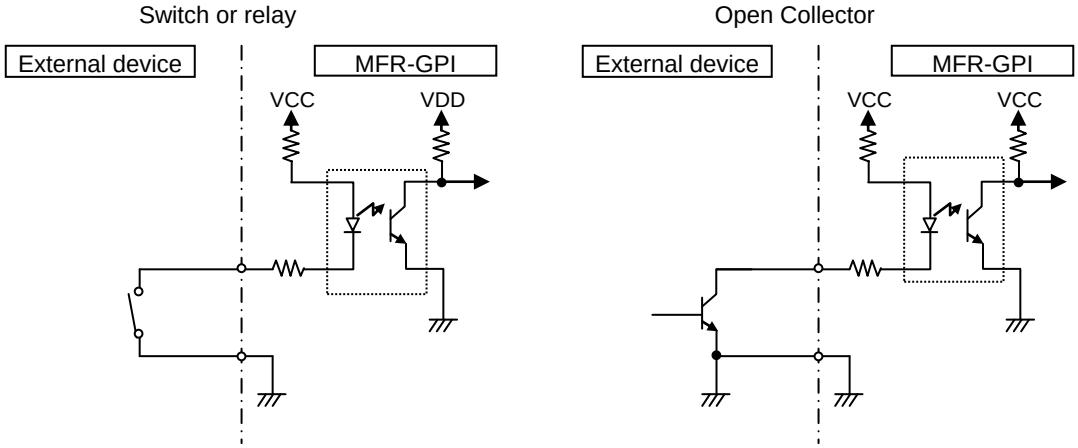
◆ **GPI IN / TALLY OUT Connector (37-pin D-sub, female)**



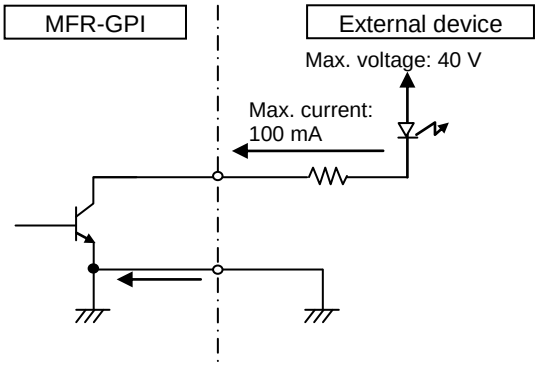
Pin No.	Signal	Pin No.	Signal
1	GPI_IN / TALLY_OUT 01 #	20	GPI_IN / TALLY_OUT 20 #
2	GPI_IN / TALLY_OUT 02 #	21	GPI_IN / TALLY_OUT 21 #
3	GPI_IN / TALLY_OUT 03 #	22	GPI_IN / TALLY_OUT 22 #
4	GPI_IN / TALLY_OUT 04 #	23	GPI_IN / TALLY_OUT 23 #
5	GPI_IN / TALLY_OUT 05 #	24	GPI_IN / TALLY_OUT 24 #
6	GPI_IN / TALLY_OUT 06 #	25	GPI_IN / TALLY_OUT 25 #
7	GPI_IN / TALLY_OUT 07 #	26	GPI_IN / TALLY_OUT 26 #
8	GPI_IN / TALLY_OUT 08 #	27	GPI_IN / TALLY_OUT 27 #
9	GPI_IN / TALLY_OUT 09 #	28	GPI_IN / TALLY_OUT 28 #
10	GPI_IN / TALLY_OUT 10 #	29	GPI_IN / TALLY_OUT 29 #
11	GPI_IN / TALLY_OUT 11 #	30	GPI_IN / TALLY_OUT 30 #
12	GPI_IN / TALLY_OUT 12 #	31	GPI_IN / TALLY_OUT 31 #
13	GPI_IN / TALLY_OUT 13 #	32	GPI_IN / TALLY_OUT 32 #
14	GPI_IN / TALLY_OUT 14 #	33	Frame ground
15	GPI_IN / TALLY_OUT 15 #	34	Frame ground
16	GPI_IN / TALLY_OUT 16 #	35	Frame ground
17	GPI_IN / TALLY_OUT 17 #	36	+5V output
18	GPI_IN / TALLY_OUT 18 #	37	+5V output
19	GPI_IN / TALLY_OUT 19 #		

* The symbol "#" at the end of signals represents the port number (1, 2, 3 or 4).
* The maximum total output current for all +5 V outputs is 1.5 A.

◆ **GPI IN Circuits**



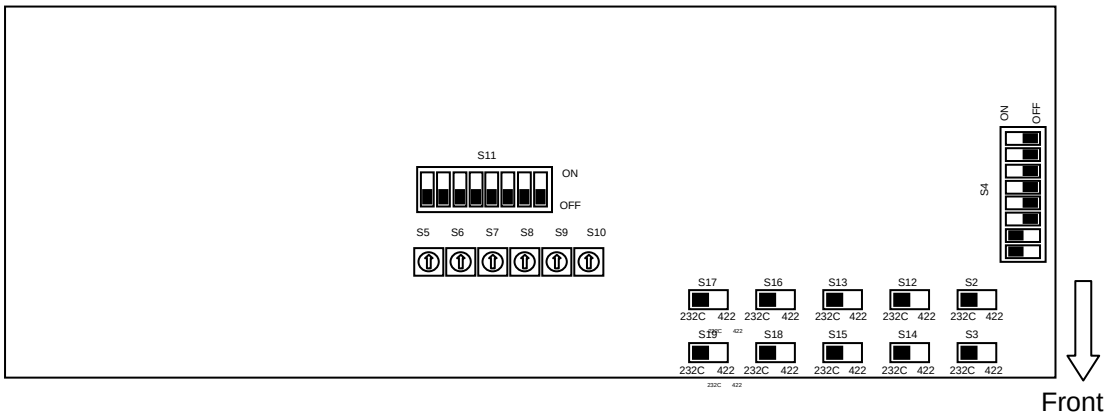
◆ **GPI OUT / TALLY OUT Circuit**



2-3-4. Switches on the Card

CAUTION
Do not access internal cards or make connections with the unit powered ON. Always power OFF all connected units / disconnect power cords prior to accessing the interior. Further note that adjustments and maintenance should only be performed by qualified technical personnel familiar with FOR-A equipment.

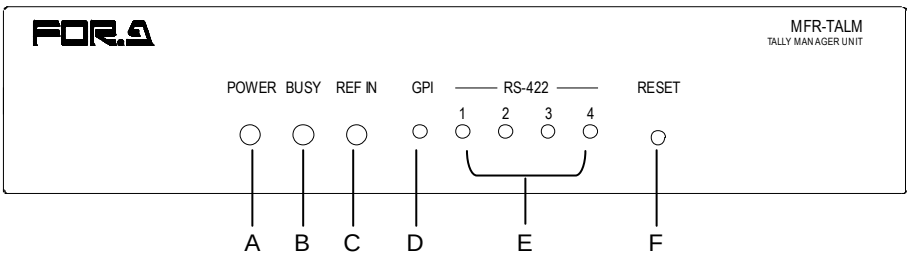
Remove two screws on both sides of the MFR-GPI to access the internal card as shown below. The figure below shows the factory default switch settings.



Switch	Function / Settings			
S2, S3	Used for maintenance. Do not use.			
S4	Used for maintenance. Do not use. (The factory default setting is as shown at right. The black boxes (■) represent switches.)	ON OFF		
S5,S6,S7, S8,S9,S10	Used for IP address setting.	⇧		
S11	Used for maintenance. Do not use.	ON OFF		
S12, S14	Used to select RS-232C/RS-422 for SERIAL 1. Default setting is RS-422 (both switches to the right). To change to RS-232C, set both switches to the left.	Switch Settings	RS-232C (Factory default setting)	
S13, S15	Used to select RS-232C/RS-422 for SERIAL 2. Default setting is RS-422 (both switches to the right). To change to RS-232C, set both switches to the left.			
S16, S18	Used to select RS-232C/RS-422 for SERIAL 3. Default setting is RS-422 (both switches to the right). To change to RS-232C, set both switches to the left.		RS-422	
S17, S19	Used to select RS-232C/RS-422 for SERIAL 4. Default setting is RS-422 (both switches to the right). To change to RS-232C, set both switches to the left.			

2-4. MFR-TALM

2-4-1. Front Panel



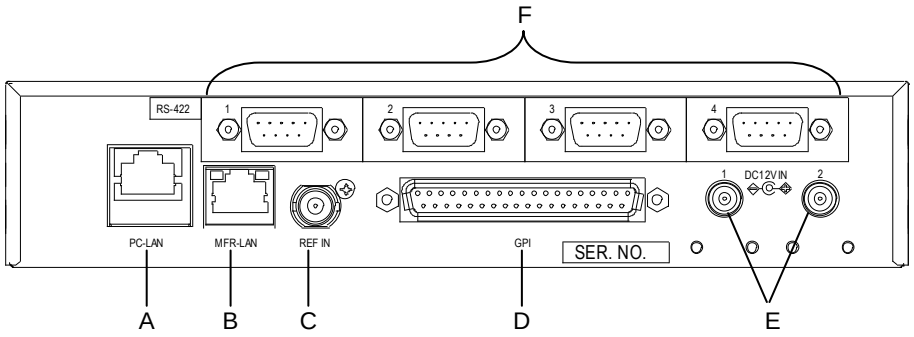
No.	Item	Description
A	POWER	Displays the power status. ▶ See the table below for details on indications.
B	BUSY	Displays the writing status of the flash memory for backup settings. ▶ See the table below for details on indications.
C	REF IN	Lights green when an external reference signal is present.
D	GPI	Lights green a GPI function is assigned. Turns off when no GPI function is assigned.
E	RS-422 1 - 4	Lights green when a port function is assigned. Turns off when no port function is assigned.
F	RESET	Resets MFR-TALM.

◆ **Color indications on the MFR-TALR front panel**

LED color / LED	Green	Red	Orange
POWER	Normal	Power alarm	
BUSY	Normal processing		Writing to flash memory

NOTE
After finishing settings, do **not power OFF** the unit while BUSY LED is **lit orange**, since the system is writing to Flash. (It takes about two minutes at max.)

2-4-2. Rear Panel

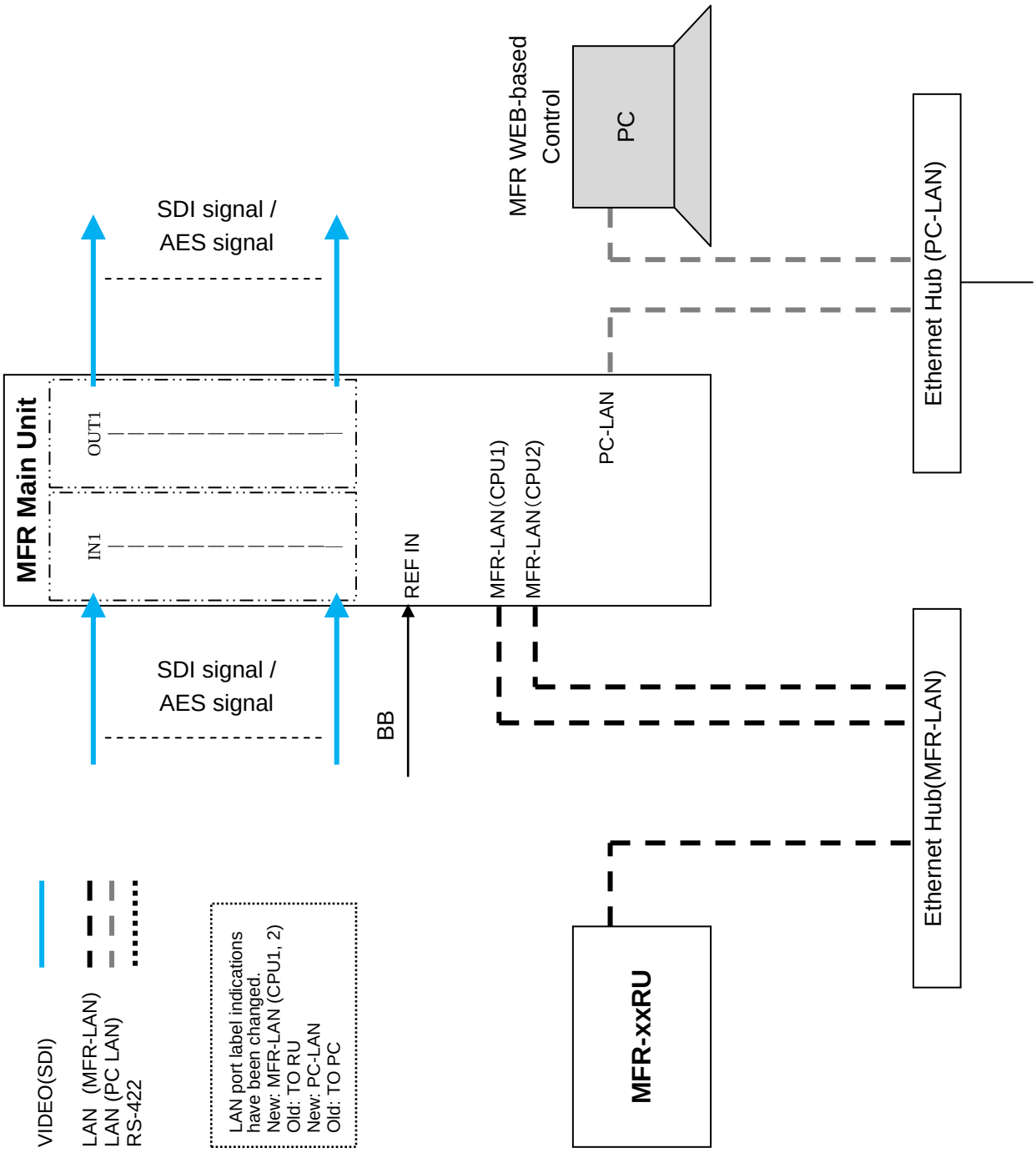


No.	Name	Description
A	PC-LAN	Used to connect to a PC or other external unit. An Ethernet port (10/100BASE-TX RJ-45)
B	MFR-LAN	Used to connect to an MFR main unit. An Ethernet port (10/100/1000BASE-T RJ-45)
C	REF IN	Used to input a reference signal (BB or Tri-level sync signal)
D	GPI	Used to input/output GPI signals for external control. (32 total assignable inputs and outputs) Pin assignments are the same as those of the MFR-GPI connectors. ▶See section 2-3-3. "Interfaces (MFR-GPI)."
E	DC12V IN 1 and 2	Used to supply 12 V DC power.
F	RS-422 1 to 4	Used for control via an RS-422 interface. Pin assignments are the same as those of the MFR main unit. ▶See section 2-1-3. “Interfaces."

3. System Configuration Example

3-1. Basic Configuration

The block diagram below shows an example of the basic MFR routing system that consists of an MFR Main Unit, Remote Unit and the Web-based Control accessed from a computer.
Make sure to connect both MFR-LANs (CPU1) and (CPU2) to a LAN respectively for CPU redundancy. Their LAN connections must be separated from the network segment of PC-LAN and other devices.



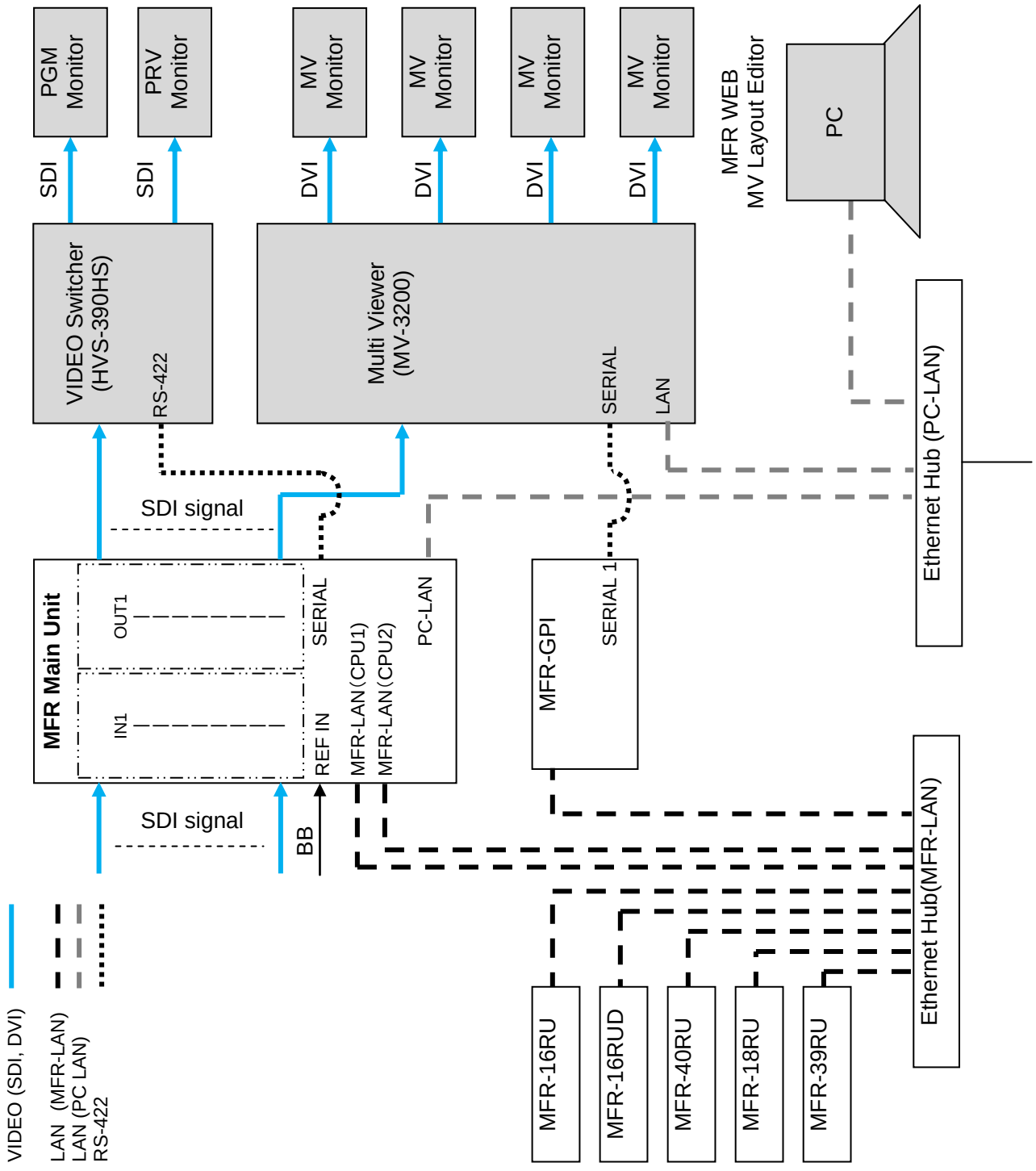
3-2. Signal Name and Tally Link System

3-2-1. Configuration Example 1

The block diagram below shows an example signal name and tally link system comprised of a FOR-A video switcher and multiviewer.

To configure this system, connect the SERIAL port on an MFR main unit or SERIAL 1 to 4 on an MFR-GPI unit to the video switcher's serial port. RS-422 ports are required for the signal name and tally link system. Before connection, change the MFR serial ports from RS-232C to RS-422 using the internal switches.

▶See section 2-3-4. "Switches on the Card."

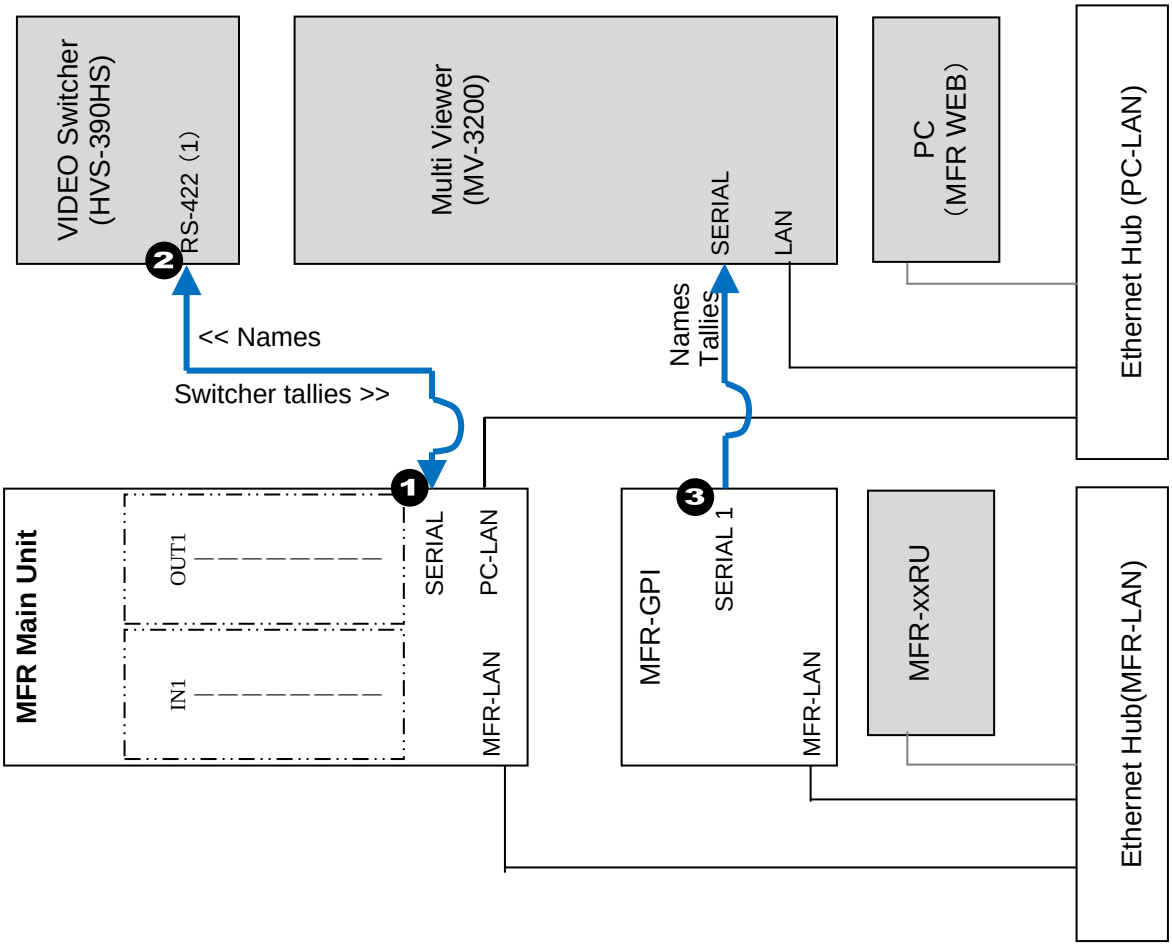


◆ **Transmitting Signal Name and Tally Data**

The figure below shows the routing of signal name and tally data.

Set each serial port following the table on this page using the MFR Web Control and on the switcher.

Each tally information setting should be performed in the [Web-based Control: **Tally System Settings** page].



Serial Port Settings

Port	Menu	[Port Settings] - [Serial Port]			
		Connector	Function	Baud rate	Parity
❶	Web-based Control [Router System Settings]	(MU) -	Router/HVS connection	38400	NONE
❷	HVS-390HS [EXT INTERFACE - RS-422]	RS-422 (1)	ROUTER	38400	NONE
❸	Web-based Control [Router System Settings]	(GPI) No. 1	Tally out (TSL Ver. 3.1)	38400	EVEN

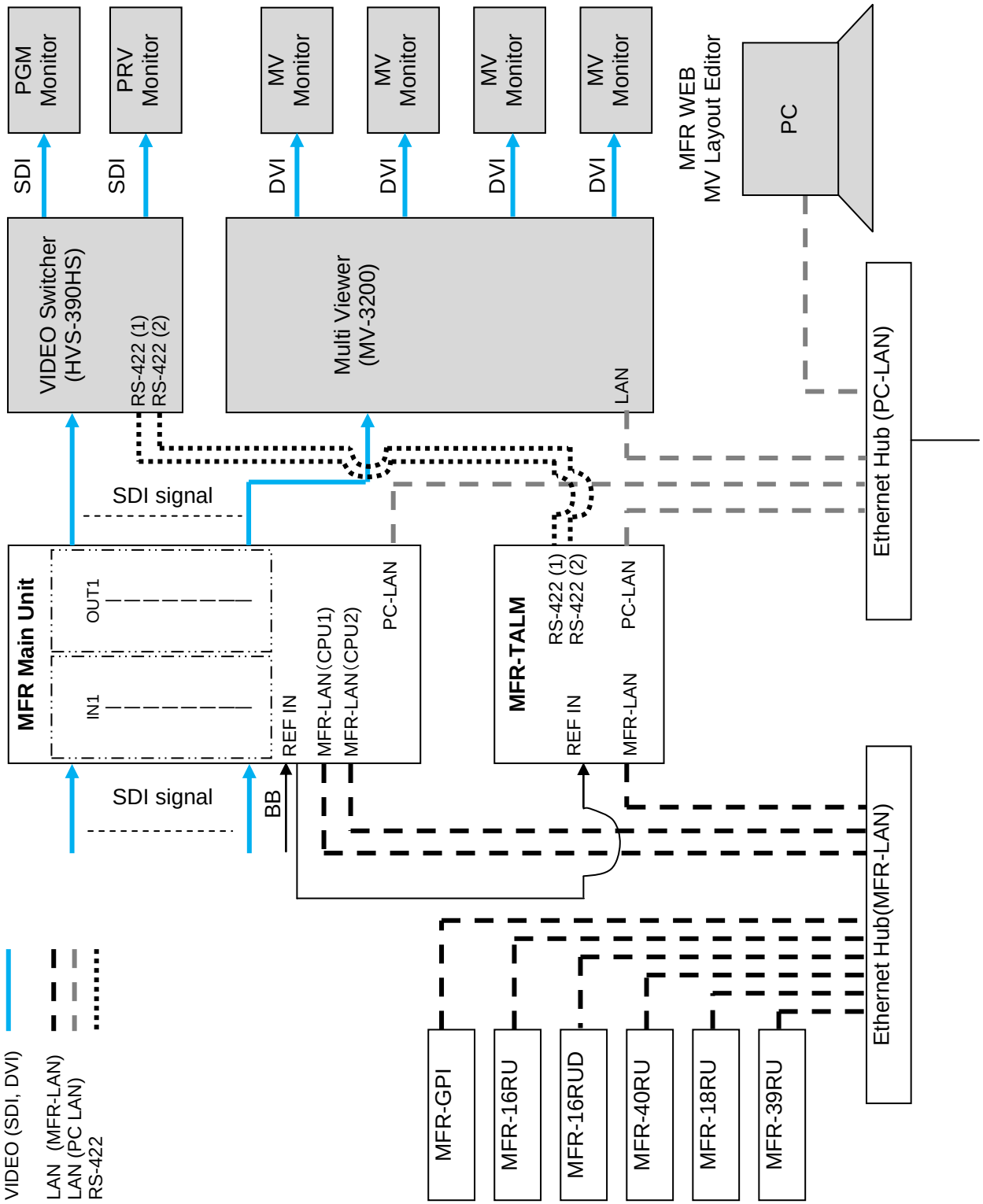
Other Parameter Setting (in HVS-390HS)

To display the signal names received from the MFR system, set the [LINK] parameter to [MFR] in the [SETUP - EXT I/F - ROUTER] (6/6) menu.

3-2-2. Configuration Example 2

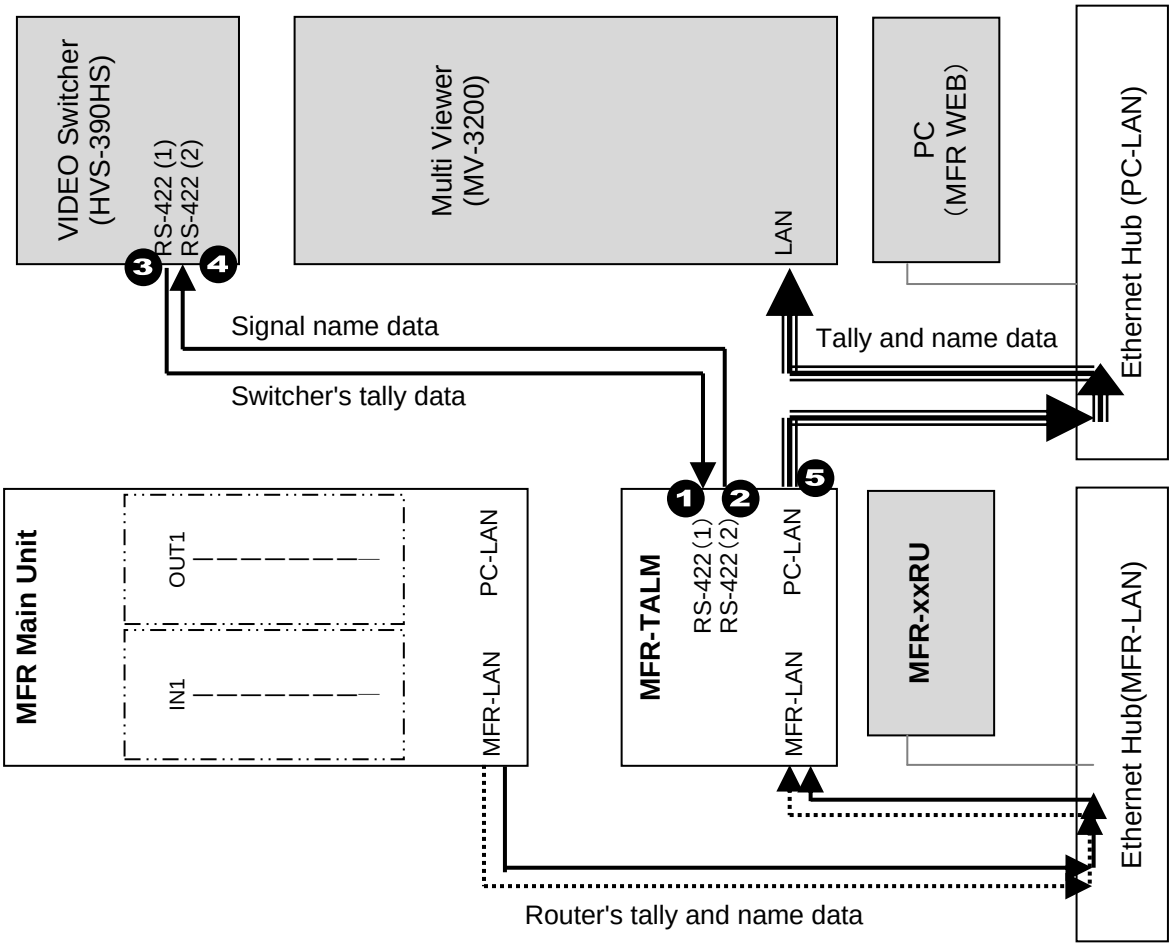
The block diagram below shows an example signal name and tally link system comprised of a FOR-A video switcher and multiviewer using an MFR-TALM unit. The MFR-TALM is specifically designed to perform the task of tally data computation, which is ordinarily undertaken by the MFR main unit, to accelerate the computation. RS-422 ports (1) to (4) are available for video switcher connection.

Before using an MFR-TALM unit for the system, change **Tally Control Unit** to **MFR-TALM** in the [Main unit Web-based Control: **MU Settings** page].



◆ **Transmitting Signal Name and Tally Data**

The figure below shows an example signal name and tally data routing system using the MFR-TALM.



Each serial port should be set as shown in the table below in the relevant page of the **MFR-TALM** Web-based Control accessed from "**http://192.168.1.62**" (default IP address) on your web browser.

Serial Port Settings

Open the [MFR-TALM Web-based Control: **Port Settings** page] and perform port settings under **Serial Port**.

As for the HVS-390HS unit, perform port setting in the [EXT INTERFACE - RS-422] menu.

Port	Menu	[Port Settings] - [Serial Port]			
		Connector	Function	Baud rate	Parity
❶	Web-based Control [TALM Settings]	No. 1	HVS-TAL Protocol Reception	38400	EVEN
❷	Web-based Control [TALM Settings]	No. 2	Router/HVS connection	38400	NONE
❸	HVS-390HS [EXT INTERFACE - RS-422]	RS-422 (1)	TALLY	38400	EVEN
❹	HVS-390HS [EXT INTERFACE - RS-422]	RS-422 (2)	ROUTER	38400	NONE

TCP/IP Setting
Open the [MFR-TALM Web-based Control: **Port Settings** page] and perform port settings under **TCP/IP Port**.

Port	Menu	[Port Settings] - [TCP/IP Port]			
		Access Method	IP Address	Port	Function
❺	Web-based Control [TALM Settings]	Client	(MV IP address)	(MV TCP/IP port number)	TSL UMD protocol V5.0 Tally out

Encode	DLE	Screen No.
Unicode	ON	(Set the same as in MV)

Settings for data transmission between HVS-390HS and MFR-TALM
<HVS-390HS side>
- To apply the name data received from the MFR system on the switcher, set [LINK] to [MFR] in the [SETUP - EXT I/F - ROUTER] (6/6) menu.
- Perform the TALLY COLOR and TALLY UNIT settings so that the MFR-TALM unit can receive switcher tally data.

<MFR-TALM side>
- Open the [MFR-TALM Web-based Control: **HVS-TAL Protocol Reception** page] and perform the same tally settings as those in HVS-390HS.

  Setting Example)
  In the switcher's TALLY COLOR menu, set the TALLY COLOR for the **M/E1 PGM** bus to **RED**. Then, assign **RED TALLY IN01-IN08** to Tally Out **Pin 1-8** for a Tally Unit.
  Open the [MFR-TALM Web-based Control: **HVS-TAL Protocol Reception** page] and set the same tally settings. Now the MFR system can receive the relevant tally data from the switcher.

  The MFR system can transmit the received tally data to the multiviewer in which these tally and name data are displayed, or use them for GPI outputs on MFR-GPI or MFR-TALM .
  - To display the received data on the multiviewer screen, assign the same bus and signal sources used in the switcher in the multiviewer's [**DP-MV Tally** page].
  - To use the received data for GPI outputs, perform Tally Out settings in the [**GPI Pin Assign** page] of the MFR Web-based Control.

The tally settings in the MFR system must be entered in the [MFR-TALM Web-based Control: **Tally System Settings** page]. When using MFR-TALM for tally control, the [Main unit Web-based Control: **Tally System Settings** page] and its subpages are all disabled.

Refer to your mulitviewer's user guide for the details on how to handle tally data on the multiviewer.

4. Function / Operation Chart

Control the MFR-1616, MFR-1616R, MFR-3216, MFR-3232, and/or MFR-1616A using the remote control panel (RCU) and/or Web-based Control (GUI). Certain functions can only be controlled either by the remote control panel or Web-based Control as shown in the below chart.

* For details on Web-based Control operation, see the separate MFR SERIES Web-based Control Operation Manual.

Description on Control

○: Changing settings and execution are both supported
●: Execution is supported
▲: Changing settings is supported
39: Supported by the MFR-39RU
18: Supported by the MFR-18RU
16D: Supported by the MFR-16RUD

Function \ Controller		Remote Control Units	Web-based Control	Ref.
Crosspoint change (1 channel)	By changing source and/or destination	○	○	6-1-1
	Using bus buttons	○	---	6-1-2
	Using buttons and the CONTROL knob	18	---	5-3-2
	Using the display	16D	---	5-4-1
	CHOP function	●	---	6-1-3
	TAKE function	●	○	6-1-4
Crosspoint change (Simultaneous)	Main unit stored SALVO	●	▲	6-2-1
	Control panel button assigned SALVO	39, ●	▲	6-2-2
	TAKE function	●	○	6-2-3
	LINK function	●	▲	6-2-4
Erroneous operation protection	LOCK LOCAL	○	---	6-3-1
	LOCK OTHER/ALL	○	○	6-3-2
	Crosspoint inhibit	---	○	Web
	Monitor output function (*1)	●	---	---
	Operation Preview function	●	---	6-4
Main unit and system setting change	Source/destination name settings	---	○	Web
	System tally settings	---	○	Web
Remote control setting change	Mode menu	39, 18 (*2)	---	5-3-2
	Button assignment	39, 18 (*3) 16D	○	5-3-3-12 5-4-2
	PAGE function	○	---	5-1-2
	Multi-remote control panel operation	39 (*4)	▲	5-6
	IP address setting	▲	▲	5-5-1
	Other settings	39	○	5-3-3
Status display		●	●	---
Alarm indication		●	●	---

*1 This function is supported only for the MFR-5000. MFR-1616, MFR-1616R, MFR-3216, MFR-3232, and MFR-1616A are not supported.

*2 MFR-18RU is supported for crosspoint switching using destination buttons in the setting mode selected in the mode menu.

*3 MFR-18RU button assignment is supported only for source button channel assignments using source buttons in the setting mode, which can be selected in the mode menu.

*4 MFR-39RU can change multi-remote control panel operation settings while other remote control panels can only be used for operation.

5. Remote Control Panel Operation

5-1. Basic Operation

This section describes basic operation of the remote control panel and how to set and execute various functions.

5-1-1. Buttons

1) Assign functions to buttons (change assignments)

To use buttons on the remote control panel, assign functions to the buttons in the [Web-based Control: **Assign Function** page].

Any function can be assigned to any button except CANCEL, PAGE A, PAGE B, UP, DOWN and ENTER. Normally, assign functions via Web-based Control.

➢ How to Assign Functions to Buttons

(1) Click a remote control unit to display the menu tree in the left pane. Click [Assign Function] to display the **Assign Function** page in the right pane.
(2) Select a page, button and function to be set. Buttons can be selected under **Button ID** or by pressing buttons on the remote control image.
(3) Set the relevant parameter(s) according to the function.
(4) Press [Send] to apply the button assignment.

MFR-39RU units allow you to assign functions in the "**SETTING > BTN ASSIGN**" menu.
▶See section 5-3-3-12. "BTN ASSIGN" for details.

MFR-18RU units allow you to assign sources to **Source** buttons.
▶See section 5-3-2. "Mode Menu" for details.

MFR-16RUD units allow you to assign functions using the display.
▶See section 5-4-2. "Button Assignment Change" for details.

2) Press buttons to execute functions

Press a button to execute the assigned function. Button LED indication, NAME DISPLAY, MENU and display will change according to the assigned function.

5-1-2. Page Function

A set of button assignments on a remote control panel can be saved and recalled as a page. Therefore, all or multiple panel buttons can change their function simultaneously by loading a page with a single button press. Pages can be changed either by pressing PAGE buttons or by using the control knob in **Page** mode. (See section 5-3-2. "Mode Menu")

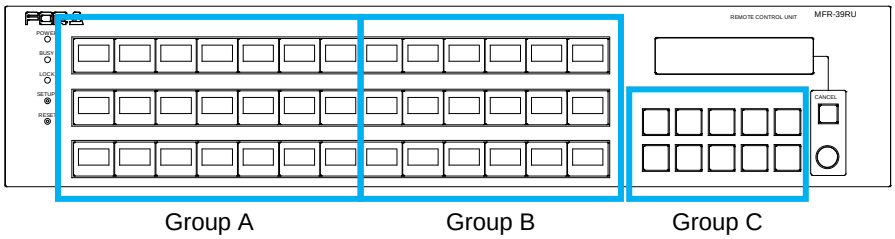
There also are settings for the Page function in the Mode and Setting menus. Please also refer to the following sections.

▶ For PAGE button assignment:5-3-3-5 “PAGE ASSIGN”
This section describes the setting whether to assign the PAGE button in all pages. Having PAGE buttons assigned to all pages helps you not to have to look for the PAGE button.
▶ For the Mode menu settings: 5-3-3-4 “PAGE MODE”
This section describes how to select pages using the control knob.

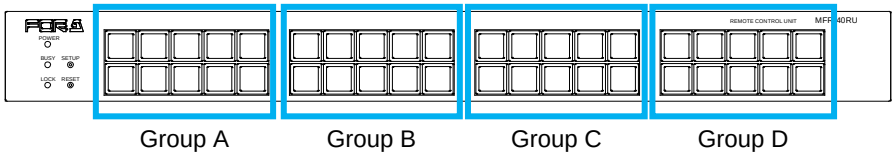
5-1-2-1. Page Switch by Group

Page switches can be performed by specifying a group. Groups are defined for each remote control unit as shown below and cannot be changed.

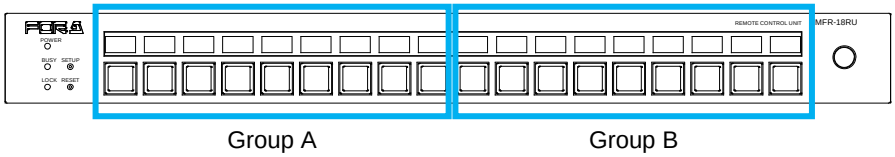
◆ **MFR-39RU**



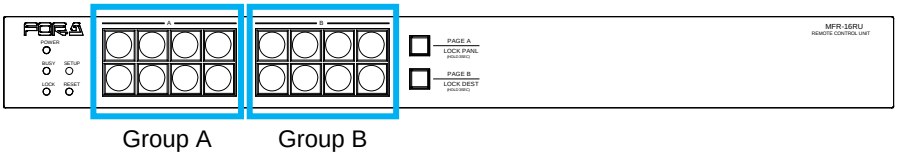
◆ **MFR-40RU**



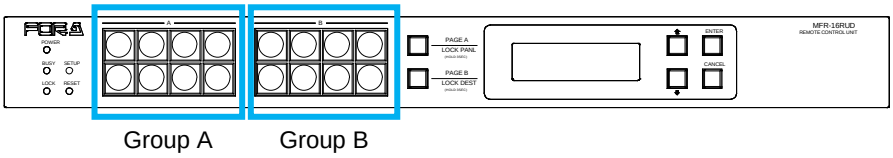
◆ **MFR-18RU**



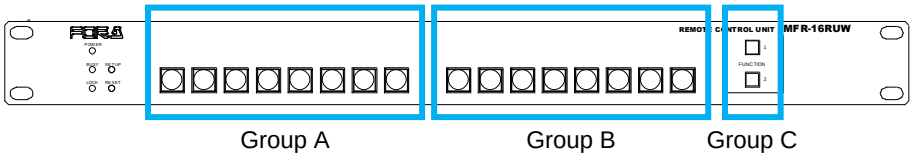
◆ **MFR-16RU**



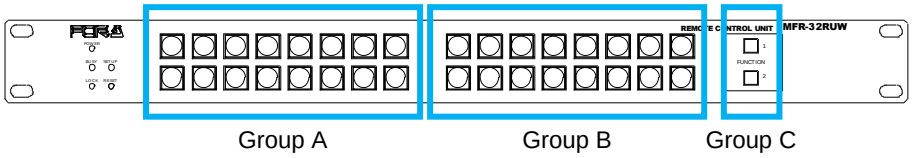
◆ **MFR-16RUD**



◆ **MFR-16RUW**



◆ **MFR-32RUW**



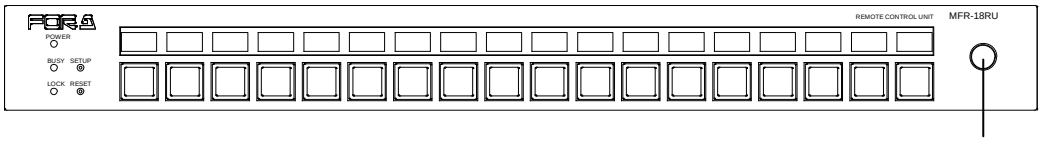
◆ **Page Limit and Maximum Page Number Setting**

- The maximum number of assignable pages (page limit) is:
  32 for MFR-39RU /40RU /18RU /16RUW /32RUW
  2 for MFR-16RU/16RUD
- The maximum number of pages, within which the page can be changed by the Mode menu or Page buttons, can be set within the page limit (excluding MFR-16RU/16RUD).
- The maximum page number setting is shared by all groups.
- Any page assignments or jumps are possible, but have no effect if they exceed the maximum page number. ("x" will appear instead of buttons on the MFR-39RU/18RU units.)
- The maximum page number can be set under **Page-Max number** in the [Web-based Control: **RU Settings** page]. A warning dialog box will appear when the number is reduced and sent.
- If the page limit is set to the number less than the displayed page, the displayed page is automatically changed to the limit number page.

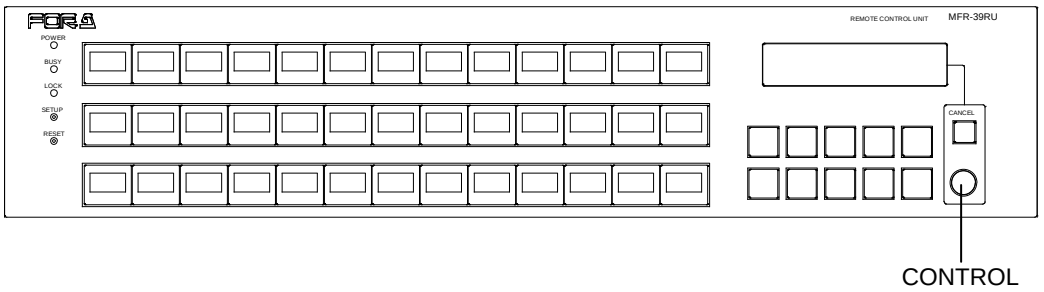
5-1-3. Control Knob

If your MFR Remote control panel has a **Control** knob, you can select destination channels or other items using the knob.
You can also select menu items by turning and pressing the knob to confirm the selection.
Using the control knob, it is easy to select items to be displayed or to change settings by changing modes in the Mode menu. See section 5-3 MODE Button and Mode Menu (MFR-39RU/18RU) for details.

MFR-18RU



MFR-39RU



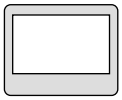
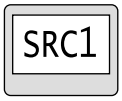
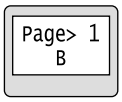
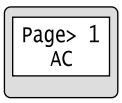
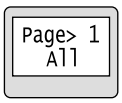
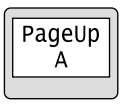
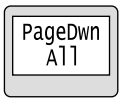
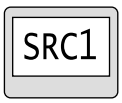
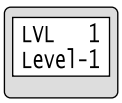
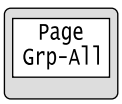
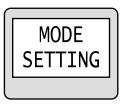
The Control knob can be disabled or enabled in the [Web-based Control: **RU Settings** page].

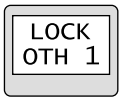
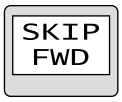
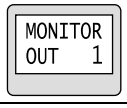
◆ **To enable/disable the Control knob**

(1) Open the Web-based Control on your browser.
(2) Click a remote control unit to display the menu tree. Select the **RU Settings** page.
(3) Select Enable or Disable under **Control** (Dest/Src/Level/Page/Settings Selector).

5-2. Function Buttons

Functions that are assignable to Remote control panel buttons are as shown in the below table. Normally, functions are assigned via Web-based Control. (See "Assign Function" in Web-based Control) MFR-39RU menu display is enabled to assign functions. (See 5-3-3-12. “BTN ASSIGN.") MFR-16RUD can locally assign functions using the display. (See section 5-4-2. "Button Assignment Change".)

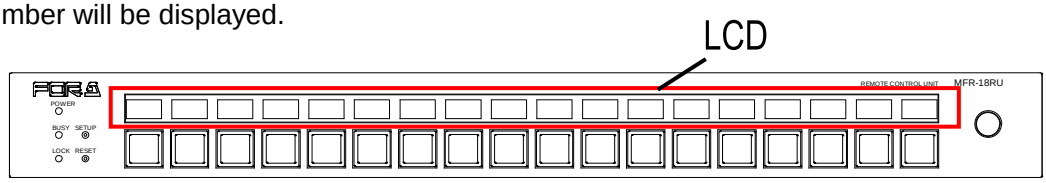
Function	Button indication	Description	Reference
None		No function is assigned.	
Destination		Allows you to change a destination to the destination specifically assigned to the button.	6-1-1
Source		Allows you to change a source to the source specifically assigned to the button.	6-1-1
Bus		Allows you to change a source to the source specifically assigned to the button for a destination of the source-destination assignment of the button.	6-1-2
PAGE	    	Allows you to change pages to be displayed to a specific, next or previous page. There is a menu that allows you to select whether to return to the previously displayed page or to display the next specified page. Target group(s) is displayed on the bottom of the button indication. ∗ Button indications (from the top to the bottom) PAGE JUMP (single) Switches the page to 1 for Group B. PAGE JUMP (multi) Switches the page to 1 for Group A and C. PAGE JUMP (all) Switches the page to 1 for all groups. PAGE UP (single) Moves the page forward by 1 for Group A. PAGE DOWN (all) Moves the page backward by 1 for all groups.	5-1-2
MODE	    	Allows you to change mode menus. Mode function can be assigned to either one or multiple buttons. One button assignment allows you to change modes one by one by every press. To assign modes to respective buttons, select modes in the BTN ASIGN menu. ∗ Button indications From the top to the bottom Destination mode Source mode Level mode Page mode (PAGE_Grp-All / A / B / C) * The example at left shows the PAGE_Grp-All mode Setting mode * Supported for MFR-39RU and MFR-18RU.	5-3
LOCK LOCAL		Allows you to enable or disable Local Lock for source selection included operations.	6-3-1

Function	Button indication	Description	Reference
LOCK	 	Allows you to enable or disable Lock Other/All for current destinations. ∗ Button indications Top: LOCK OTHER Bottom: LOCK ALL	6-3-2
	 	Allows you to enable or disable Lock Other/All for a specific destination. * Button indications Top: LOCK OTHER a destination (1 in this example) Bottom: LOCK ALL a destination (1 in this example)	
TAKE		Allows you to enable the TAKE function for simultaneous crosspoint changes.	6-1-4
LEVEL		Allows you to change a level to the level specifically assigned to the button.	6-5
LINK		Allows you to enable or disable the LINK function.	6-2-4
TENKEY		Allows you to enable numeric keypad mode on the remote control panel for assigning destinations and source by their channel numbers. * Supported only for MFR-39RU.	6-1-1-2
SKIP	 	Allows you to skip the set number of destination or source channels forward or backward to select one. * The control knob needs to be pressed for Source selections. ∗ Button indications Top: Channel number increases in the set step Bottom: Channel number decreases in the set step	6-1-1-1
Monitor Out		Allows you to enable or disable the Monitor Out function. * Supported only for MFR-5000.	
Operation Preview		Allows you to enable or disable the Operation Preview function.	6-4
SALVO	  	Allows you to assign salvos to buttons and execute a salvo assigned to the button or stored to a main or remote control panel. ∗ Button indications Top: Salvo Store – Allows you to assign salvos to buttons. Middle: Salvo Recall (MU) – Executes a main unit-stored salvo Bottom: Salvo Recall (RU) – Executes a remote control panel button-assigned salvo	6-2-1 6-2-2

◆ **Destination Button LCD Indication**

Usually destination channel names are displayed on the LCD above the destination buttons. The MFR-18RU can also display source channel names that are selected for destinations. To display source channel names, set the menu under **Display Setting** in the [Web-based Control: **RU Settings** page].

In the case of breakaway switching with multiple levels, the name of the level with the smallest number will be displayed.



5-3. MODE Button and Mode Menu (MFR-39RU/18RU)

5-3-1. Outline

The MODE button allows you to select different setting modes. As the setting mode changes available items on the MENU and LCD displays and for the control knob change.
(Supported only for MFR-39RU/18RU.)

Modes are selectable to assign. Assign only necessary modes to allow for easier searches.

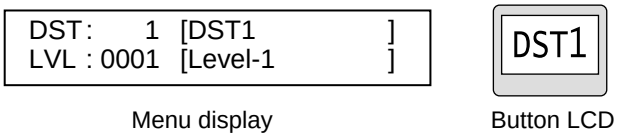
Multiple buttons can be assigned to MODE buttons. If multiple MODE buttons are assigned, the MODE button will be highlighted (the text background illuminates) when it is pressed.

5-3-2. Mode Menu

The Mode menu has 5 mode options. In Setting mode, setting options are different in the MFR-39RU and MFR-18RU.
(The menu display and control knob setting mode are supported only for MFR-39RU.)

◆ **Destination Mode**

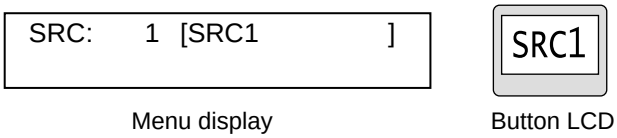
Displays the current destination channel and its level.
The destination and level names are also shown in brackets.
The button indicates the current destination channel name.
To change the destination channel, turn the control knob to select a desired channel.



Menu display　　Button LCD

◆ **Source Mode**

Displays the source channel for the current destination.
The source name is also shown in brackets.
The button indicates the source channel name.
To change the source channel, turn the control knob to select a desired channel and press the knob to confirm the selection.

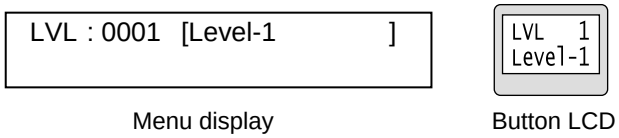


Menu display　　Button LCD

◆ **Level Mode**

Displays the current level and its name of the remote control panel. (The name is in brackets.)

The button indicates the current level and its name.



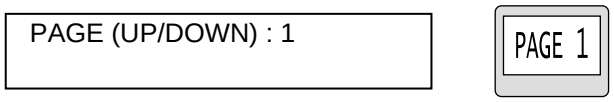
Menu display　　Button LCD

◆ **Page Mode**

Displays the page number of the current assignment of the remote control panel buttons.

The button indicates the current button assignment page number.

To change the page assignment, turn the control knob to select a desired page.



Menu display　　Button LCD

➢ MODE PAGE（PAGE_Grp-ALL）

PAGE JUMP	Moves the page to the specified number for all groups.
PAGE UP/DOWN	Moves the page forward or backward by the specified number for all groups.
MENU display	PAGE (UP/DOWN) Grp-A: 1 B: 1 C: 1 PAGE (JUMP) Grp-A: 1 B: 1 C: 1
LCD display	Page Grp-All

➢ MODE PAGE（PAGE_Grp-A/B/C）

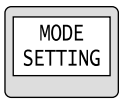
PAGE JUMP	Moves the page to the specified number for the specified group(s).
PAGE UP/DOWN	Moves the page forward or backward by the specified number for the specified group(s).
MENU display	PAGE (UP/DOWN) Grp-C: 1 PAGE (JUMP) Grp-C: 1
LCD display	Page 1 Grp-C

◆ **Setting Mode**

➢ In MFR-39RU

Displays available menu settings that can be changed using the control knob.
Turn the control knob to select an item, then change the setting.
The items that can be changed are highlighted.
▶See section 5-3-3. Setting Mode Menu (MFR-39RU) for details.

MENU display

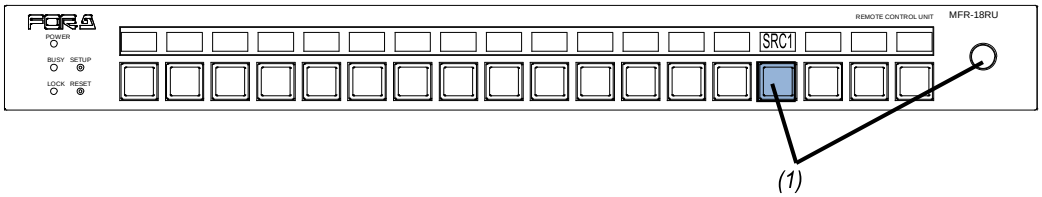


Button LCD

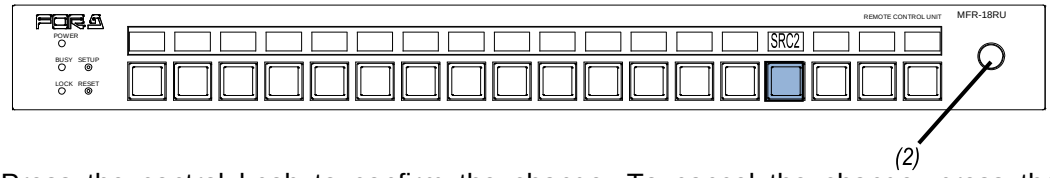
➢ In MFR-18RU

In Setting mode, selecting a source button allows you to change the source channel assignment. Selecting a destination button allows you to change the crosspoint for the destination channel. The procedure is as follows.

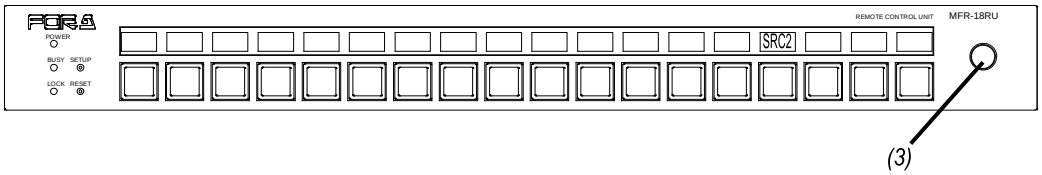
(1) Press the desired source or destination button while holding down the control knob. The button light sequentially changes its color from red to orange, then green.



(2) Turn the control knob to select a source channel to assign to the button.



(3) Press the control knob to confirm the change. To cancel the change, press the selected source button. After confirming or canceling the change, the button light returns to the previous state.



5-3-3. Setting Mode Menu (MFR-39RU)

Setting Mode menu items are as shown below.

◆ **Setting Mode menu items**

MENU indication	Description	Reference
SETTING>DEF MODE <ENT>	Allows you to change the remote control panel start-up default mode.	5-3-3-1
SETTING>DEF DEST <ENT>	Allows you to change the remote control panel start-up default destination.	5-3-3-2
SETTING>DEF LEVEL <ENT>	Allows you to change the remote control panel start-up default level.	5-3-3-3
SETTING>PAGE MODE <ENT>	Allows you to select the behavior of the control knob in Page mode.	5-3-3-4
SETTING>PAGEASSIGN <ENT>	Allows you to select a performance feature for the PAGE button assignment.	5-3-3-5
SETTING>DESTINHIBIT <ENT>	Allows you to set the inhibit function to a desired destination.	5-3-3-6
SETTING>SRCINHIBIT <ENT>	Allows you to set the inhibit function to a desired source.	5-3-3-7
SETTING>NAME TYPE <ENT>	Allows you to select a type for the destination, source and level name displays.	5-3-3-8
SETTING>TENKEY MOD<ENT>	Allows you to select how to confirm changes in numeric keypad mode.	5-3-3-9
SETTING>TENKEY NO <ENT>	Allows you to set thresholds of setting ranges in numeric keypad mode.	5-3-3-10
SETTING>SALVO CLR <ENT>	Allows you to clear the button-assigned Salvo.	5-3-3-11
SETTING>BTN ASSIGN <ENT>	Allows you to assign functions to buttons.	5-3-3-12
SETTING>EXIT <ENT>	Exit the Setting Mode menu.	-

5-3-3-1. DEF MODE

This menu allows you to select a mode to be displayed on the menu display at the start-up of the remote control panel.

```
SETTING>DEF MODE
  DESTINATION <ENT>
```

Turn the control knob to select a mode, then press the knob to confirm.

DESTINATION	: Destination mode
SOURCE	: Source mode
LEVEL	: Level mode
PAGE_Grp-All	: Page mode (all groups)
PAGE_Grp-A	: Page mode (Group A)
PAGE_Grp-B	: Page mode (Group B)
PAGE_Grp-C	: Page mode (Group C)
PAGE	: Page mode
SETTING	: Control knob setting mode

IMPORTANT

Do not turn off the remote control panel until the BUSY indicator, which lights orange, goes off when changing modes. Doing so disables the change.

5-3-3-2. DEF DEST

This menu allows you to select a destination to be displayed on the menu display at the start-up of the remote control panel.

```
SETTING>DEF DEST
  DEF  DEST:  1<ENT>
```

Turn the control knob to select a destination, then press the knob to confirm.

IMPORTANT
Do not turn off the remote control panel until the BUSY indicator, which lights orange, goes off when changing modes. Doing so disables the change.

5-3-3-3. DEF LEVEL

This menu allows you to select a level to be displayed on the menu display at the start-up of the remote control panel.

```
SETTING>DEF LEVEL
  DEF  LEVEL:0001<ENT>
```

Turn the control knob to select a level, then press the knob to confirm.

IMPORTANT
Do not turn off the remote control panel until the BUSY indicator, which lights orange, goes off when changing modes. Doing so disables the change.

5-3-3-4. PAGE MODE

This menu allows you to select the behavior for the control knob in Page mode.

```
SETTING>PAGE  MODE
  PAGE MODE :JUMP  <ENT>
```

Turn the control knob to select a behavior from the below options, and press the knob to confirm.
UP/DOWN: Every turn of the control knob changes the page one page forward or backward.
JUMP : Turn the control knob to display the desired page and press the knob to confirm.

5-3-3-5. PAGE ASSIGN

This menu allows you to select whether to assign the PAGE button to the selected page or all pages by a page button assignment procedure.

```
SETTING>PAGEASSIGN
  ASIGN : ONE PAGE  <ENT>
```

Turn the control knob to select a performance feature from the below options, and press the knob to confirm.
ONE PAGE: Assigns the PAGE button to the selected page.
ALL PAGE: Assigns the PAGE button to the button in all pages.

5-3-3-6. DSTINHIBIT

This menu allows you to restrict the output change of the specific destination channel.

```
SETTING>DSTINHIBIT
  DST  1 : OFF <ENT>
```

Turn the control knob to select a destination channel, and press the knob to confirm.

```
SETTING> DSTINHIBIT
  DST  1 : ON <ENT>
```

Turn the control knob to select ON or OFF, and press the knob to confirm.
ON disables the output selection of the selected destination channel.
OFF cancels the Inhibit setting.

The button assigned to the inhibited destination goes off and the indication will be crossed.

5-3-3-7. SRCINHIBIT

This menu allows you to restrict the output change of the crosspoint of the specific source channel.

```
SETTING>SRCINHIBIT
  SRC  1 : OFF <ENT>
```

Turn the control knob to select a source channel, and press the knob to confirm.

```
SETTING> SRCINHIBIT
  SRC  1 : ON <ENT>
```

Turn the control knob to select ON or OFF, and press the knob to confirm.
ON disables the output selection of the selected source channel.
OFF cancels the Inhibit setting.

The button assigned to the inhibited source channel goes off and the indication will be crossed.

5-3-3-8. NAME TYPE

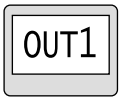
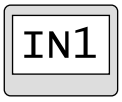
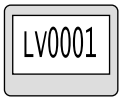
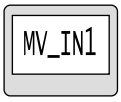
This menu allows you to select a name display type for the destination, source and level.

```
SETTING>NAME TYPE
 DST BTN :PHY NUM <ENT>
```

Turn the control knob to select a button group from the destination, source and level buttons. Press the control knob to confirm the selection.

```
SETTING>NAME TYPE
 DST BTN :PHY NUM <ENT>
```

Turn the control knob to select a display type, and press the knob to confirm.

Display type	Description	Example indication		
		DST	SRC	LEVEL
PHY NUM	Physical number display			
ASCII	1-byte character code (Alphanumeric characters and symbols)			
KANJI	2-byte character code including 1-byte character code (Not selectable for LEVEL)			

* Up to three 2-byte characters can be displayed. Mix use with 1-byte characters is supported.

* Total of one 2-byte character and four 1-byte characters can be displayed in mixed use.

5-3-3-9. TENKEY MOD

This menu allows you to change the method to confirm changes in numeric keypad mode.

```
SETTING>TENKEY MOD
 INPUT MODE:ENTER <ENT>
```

Turn the control knob to select a method from the below options, and press the knob to confirm.

ENTER : Enter a value and press the ENTER button on the displayed numeric keypad on the remote control panel.

DIRECT: Enter a value using the numeric keypad. The value is confirmed.

5-3-3-10. TENKEY NO

This menu allows you to select the threshold of the setting range for each setting category in numeric keypad mode.

```
SETTING>TENKEY NO
 INPUT START NO:0<ENT>
```

Turn the control knob to select 0 or 1, and press the knob to confirm.

5-3-3-11. SALVO CLR

This menu allows you to clear a specific salvo assigned to a button.

```
SALVO DELETE
 NO:      1<ENT>
```

Turn the control knob to select a salvo to clear, and press the knob to confirm.
If any salvo is assigned, the menu display appears as shown below.

```
SALVO DELETE
  (NO SALVO DATA)
```

5-3-3-12. BTN ASSIGN

This menu allows you to assign functions to the buttons.
▶See section 5-2 “Function Buttons” for the assignable functions.

```
SETTING>BTN ASSIGN
 BTN NO: 1<ENT>
```

(1) Select a button to change the button assignment by turning and pressing the control knob, or by pressing the desired button.

```
SETTING>BTN ASSIGN
  PAGE: 1<ENT>
```

(2) Select a page to change the button assignment by turning the control knob. Press the knob to confirm.

```
SETTING>BTN ASSIGN
  FUNC:DEST      <ENT>
```

(3) Turn the control knob to select a function, and press the knob to confirm. Set details for the function if necessary.

```
SETTING>BTN ASSIGN
  EXEC:NO <ENT>
```

The menu display asks you to confirm the assignment change as shown above when necessary settings are complete. To apply the change to the system, turn and press the control knob to select Yes. Selecting No cancels the change and returns to the menu display to select buttons.

◆ **Setting Parameters for Functions**

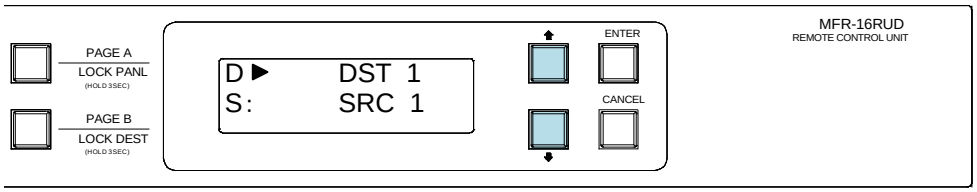
Function	Parameter		Note
(NONE)			
DEST	DEST:XXX	(XXX: Destination Channel number)	
	LEVEL:XXXX	(XXXX: Level)	
SRC	SRC:XXXX	(XXXX: Source Channel number)	
	LEVEL:XXXX	(XXXX: Level)	
BUS	DEST:XXX	(XXX: Destination Channel number)	
	LEVEL:XXXX	(XXXX: Level)	
	SRC:XXXX	(XXXX: Source Channel number)	
	LEVEL:XXXX	(XXXX: Level)	
PAGE	MODE:JUMP	(JUMP: Jump to a specified page /UP : Go forward a page /DOWN: Go back a page)	
	PAGE:XX	(XX: Page number)	* Effective for JUMP
	RETPAGE:XX	(PREV PAGE: Return to the previous page /XX: Jump to the next specified page)	* Effective for JUMP
	GROUP-A: ON	(ON / OFF)	
	GROUP-B: ON	(ON / OFF)	
	GROUP-C: ON	(ON / OFF)	
MODE	DESTINATION:ON	(ON / OFF)	
	SOURCE :ON	(ON / OFF)	
	LEVEL :ON	(ON / OFF)	
	PAGE_Grp-All :ON	(ON / OFF)	
	PAGE_Grp-A:ON	(ON / OFF)	
	PAGE_Grp-B :ON	(ON / OFF)	
	PAGE_Grp-C :ON	(ON / OFF)	
	SETTING :ON	(ON / OFF)	
LOCK LOCAL			
LOCK	LOCK:OTHER	(OTHER / ALL)	
	DEST:XX	(CURRENT: Current destination / XX: Destination Channel number)	
TAKE			
LEVEL	LEVEL:XXXX	(XXXX: Level)	
LINK			
TENKEY			
SKIP	MODE:FWD	(FWD: Forward / BWD: Backward)	
	COUNT:XXX	(XXX: number of channels to skip)	
MON-OUT	OUT :X	(X: MONITOR OUT number)	* MFR-5000 only
O-PREVIEW	DEST:XXX	(XXX: Destination Channel number)	
SALVO	MODE:MU RECALL	(MU RECALL: Execute the main unit-assigned SALVO /RU RECALL: Execute the button-assigned SALVO /RU STORE: Assign a SALVO to a button)	
	NO:XXXX	(XXXX: Salvo number)	* Effective for MU RECALL, and RU RECALL

5-4. Operation Using the Menu Display (MFR-16RUD)

The MFR-16RUD, a remote control unit with a display, allows you to select destination channels and switch crosspoints using the menu display.
Function button assignments are also possible.

◆ **Default Display**

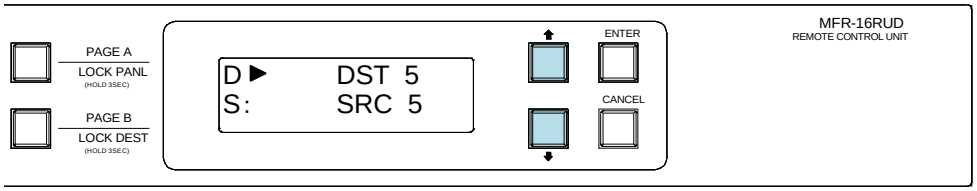
The name of Current Destination Channel is displayed on the first line.
The name of Source Channel selected for Current Destination is displayed on the second line.



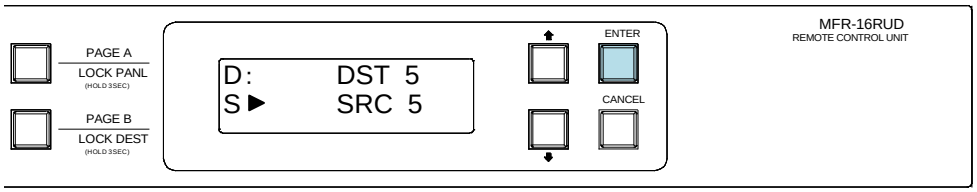
5-4-1. Crosspoint Switching

To switch crosspoints on the MFR-16RUD, proceed as follows:

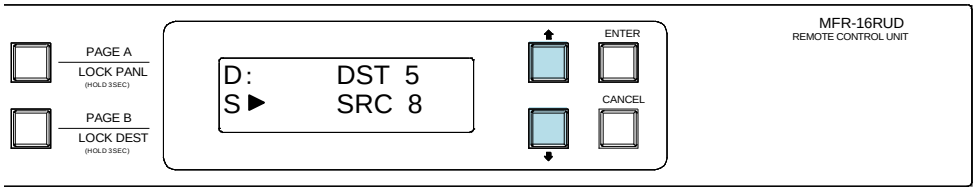
(1) Press the UP or DOWN button to change Current Destination to the desired number. (DST 5 in this example)



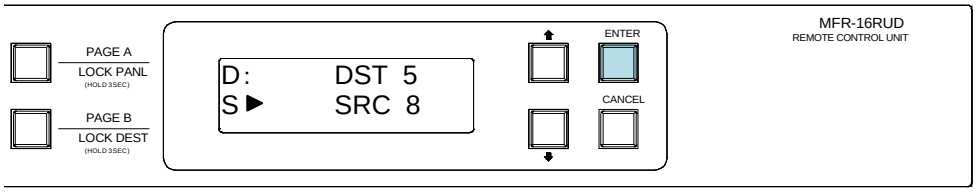
(2) Press ENTER.



The cursor automatically moves to the second line (Source side). Press UP or DOWN to select a source channel.
Note that source names blink during the selection.



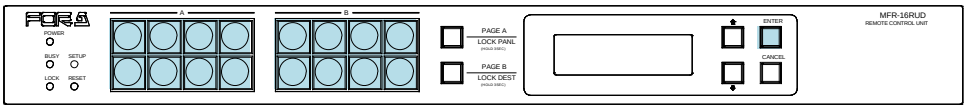
(3) Press ENTER to perform the crosspoint switch. The screen will return to the default display.



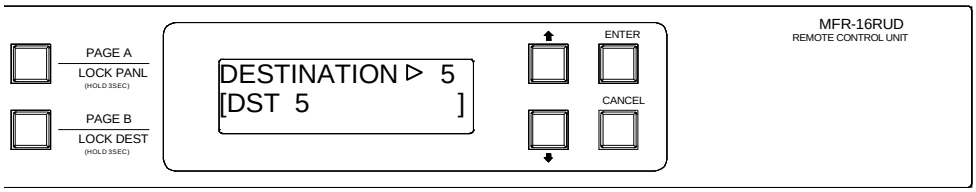
5-4-2. Button Assignment Change

To change button assignments, proceed as follows:

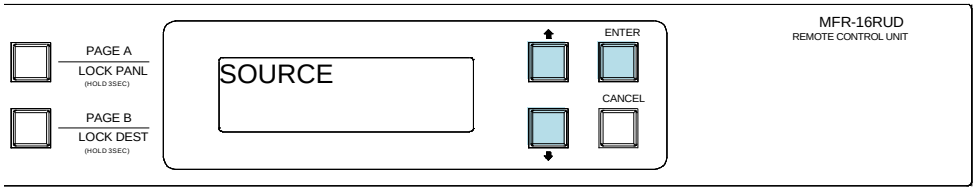
(1) Press a button while holding down ENTER. The button will blink.



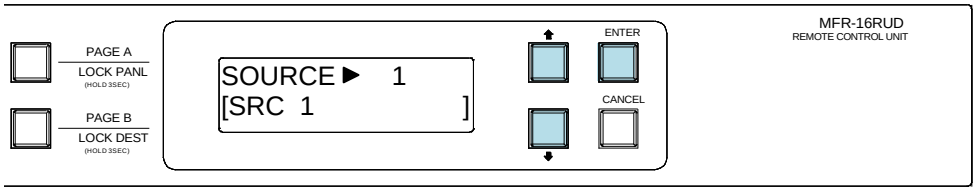
The first line will display the function and its parameter currently assigned to the button and the second line will display its detailed information.



(2) Press UP or DOWN to select a function to be assigned. Press ENTER to apply the change.



(3) The display changes to the parameter selection according to the selected function. Press UP or DOWN to select the parameter value. Press ENTER to confirm the selection. The cursor will move to the next parameter if there are two or more parameters. Set the value and press ENTER in the same way.
Note that parameters blink during the selection.



When all settings are finished, the screen automatically returns to its default display.

◆ **Assignable Function/Parameter List**

Function	Parameter	Description
(NONE)	None	
DESTINATION	DESTINATION ► XXX (XXX: Destination Channel number)	
SOURCE	SOURCE ► YYYY (YYYY: Source Channel number)	
BUS	BUS D ► XXX S ▷ YYYY (XXX: Destination Channel number YYYY: Source Channel number)	
LOCK LOCAL	None	
LOCK	LOCK ► XXX ▷ YYY (XXX:OTH LOCK OTHER /ALL LOCK ALL YYY:CUR Current Destination /Destination Channel number)	
TAKE	None	
LINK	None	
MON-OUT	MON-OUT ► X (X: MONITOR OUT number)	* MFR-5000 only
PREVIEW	PREVIEW ► XXX (XXX: Destination Channel number)	
SALVO	SALVO ► XX ▷ YYYY (XX : MU Main Unit Stored Salvo /RU Remote Control Panel Button Assigned Salvo YYYY: Salvo number)	

5-5. Setup Menu (MFR-39RU)

The SETUP button enables you to use the setup menu.
The Setup menu has following sub menus. To select a submenu, turn the control knob to select and press to confirm.

◆ **Setup Menu Sub-menu List**

Menu display	Description	Reference
SETUP>IP ADDRESS[RU] <ENT>	Allows you to set the IP address for the remote control panel. The last 8 bits will be the unit ID/	5-5-1
SETUP>SUBNET MASK[RU] <ENT>	Displays the subnet mask setting in the Remote Control Unit.	5-5-2
SETUP>PC-LAN[MU]<ENT>	Displays the PC-LAN[MU] menu.	5-5-3
SETUP>RU CONN ID <ENT>	Allows you to set the ID to recognize remote control panels connected to be used in conjunction.	5-5-4
SETUP>RU CONNECT <ENT>	Allows you to select whether to connect and use multiple remote control panels.	5-5-5
SETUP>BRIGHTNESS <ENT>	Allows you to set the brightness for buttons and the menu display.	5-5-6
SETUP>BTN ASSIGN <ENT>	Allows you to assign functions to buttons. Assignments the same as in the Setting mode menu can be performed.	5-5-7
SETUP>VER/ALARM <ENT>	Displays version and alarm information.	5-5-8
SETUP>REBOOT <ENT>	Allows you to reboot the unit.	5-5-9
SETUP>EXIT <ENT>	Allows you to exit the Setup menu. The menu returns to display the menu before entering the SETUP menu. (The CANCEL button works the same.)	-

5-5-1. IP ADDRESS[RU]

This menu allows you to change the IP address of remote control panels. The last 8 bits (the 4th byte) will be the unit ID.

```
SETUP>IP ADDRESS[RU]
 192.168.001.100<ENT>
```

Turn the control knob to select a byte to be changed. The selected byte will be highlighted. After changing the value, press the knob. The next byte will be highlighted to be changed.

```
SETUP>IP ADDRESS
 192.168.001.100<ENT>
```

Pressing the control knob while the 4th byte is highlighted will highlight the whole IP address, and the changed IP address will be saved. Press the control knob again. The remote control panel will restart, or a message appears to ask to restart the remote control panel. Select YES and press the control knob to restart the remote control panel with the new IP address.

IMPORTANT
The saved IP address applies when the remote control panel restarts. Selecting NO will necessitate a manual restart of the remote control panel to apply the new IP address. The IP address must not be identical to the IP address of the MFR main unit or other remote control panels.

5-5-2. SUBNET MASK[RU]

Displays the subnet mask setting in the Remote Control Unit.

```
SETUP>SUBNET MASK[RU]
255.255.255.000
```

5-5-3. PC-LAN[MU]

The PC-LAN[MU] menu allows you to display the network settings for the PC-LAN port on the MU and restart the port.

```
SETUP>PC-LAN[MU]>
          NET          <ENT>
```

Selecting NET allows you to display the network port settings.
Turning the control knob allows you to scroll through all network settings.

```
PC-LAN[MU]>IP ADDRESS
192.168.001.012          <ENT>
```

```
PC-LAN[MU]>SUBNET MASK
255.255.255.000          <ENT>
```

```
PC-LAN[MU]>GATEWAY
000.000.000.000          <ENT>
```

Selecting GUI REBOOT allows you to restart the network port.

```
SETUP>PC-LAN[MU]>
          GUI REBOOT<ENT>
```

```
SETUP>PCLAN[MU]
 EXEC: NO <ENT>
```

To restart the port, turn the control knob to select **YES**, then press the control knob.
To cancel the process, turn the control knob to select **NO**. The display will return to the initial SETUP menu page.

The following message will appear while restarting the port.

```
PC-LAN[MU]>GUI REBOOT
Startup…
```

5-5-4. RU CONN ID

This menu allows you to set the ID for remote control panel IDs to be recognized in the integrated use of multiple remote control panels.

```
SETUP>RU CONN ID
 UNIT ID:  0<ENT>
```

Turn the control knob to select an ID, and press the knob to confirm the selection. See section 5-8-2 “Enabling Multi-Panel Operation” for details.

IMPORTANT
Do not turn the power of the remote control panel off before the orange BUSY lamp goes off when changing ID. Doing so will obstruct the settings to be applied.

5-5-5. RU CONNECT

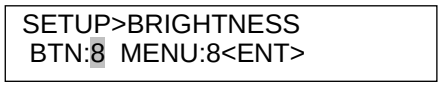
This menu allows you to enable or disable integrated operation of connected multiple remote control panels.

Turn the control knob to select ON or OFF, and press the knob to confirm the selection.

IMPORTANT
Do not turn the power of the remote control panel off before the orange BUSY lamp goes off when changing ID. Doing so will obstruct the settings to be applied.

5-5-6. BRIGHTNESS

This menu allows you to set the brightness for the button LCDs and menu display.



Turn the control knob to select the brightness. Press the control knob to change the BTN and MENU selection. Pressing the control when MENU is selected confirms the changes. After settings are complete, press the CANCEL button to exit the menu.

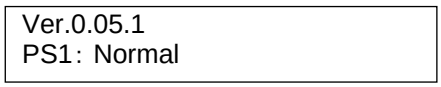
Brightness: (dark) 1 to 8 (bright)

5-5-7. BTN ASSIGN

This menu allows you to assign functions to buttons. The functions that are the same as those assignable in the Setting mode BTN ASSIGN menu (SETTING > BTN ASSIGN) can be assigned.

5-5-8. VER/ALARM

This menu displays the version and alarm information. Turn the control knob to scroll the page.



5-5-9. REBOOT

This menu allows you to execute the restart of the remote control panel.

Turn the control knob to select YES or NO, and press the knob to confirm. Selecting **YES** restarts the remote control panel. Pressing NO returns to the menu display to select menus.

5-6. Setup Menu (MFR-18RU)

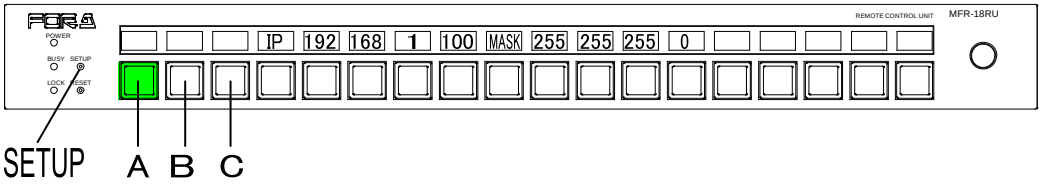
The **SETUP** button allows you to enter **Setup Menu** mode, in which RU and MU PC-LAN network settings are displayed, the MU-PC LAN port can be rebooted and RU network settings can be changed. The left three buttons are used to select information to be displayed or the PC-LAN reboot. To exit Setup Menu mode, press the **SETUP** button again.

Selection buttons (See the figures below)	LAN Port	Display / Execution
Button A	Remote Control Unit (RU)	IP address display and change
		Subnet mask display and change
Button B	PC-LAN on Main Unit (MU)	IP address display
		Subnet mask display
		Default gateway display
Button C	PC-LAN on Main Unit (MU)	Reboot

5-6-1. Displaying Network Settings

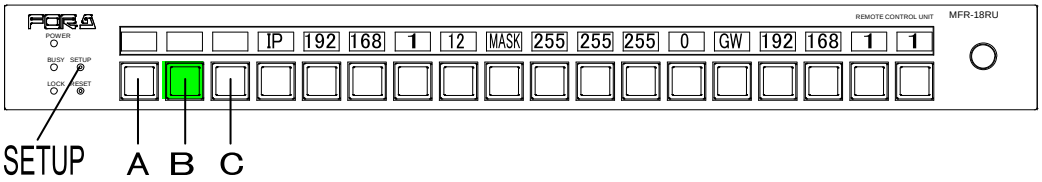
◆ **To Display RU IP Address and Subnet Mask**

Press **SETUP** to enter the Setup Menu mode. The RU IP address and subnet mask are displayed as shown below. (If Button A is off (unlit), press Button **A**.)



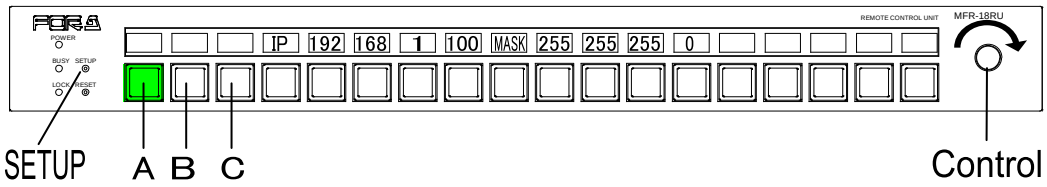
◆ **To Display PC-LAN IP address, Subnet Mask and Default Gateway of MU PC-LAN**

Press Button **B** in Setup Menu mode. The network settings are displayed as shown below in "IP address, Subnet Mask and Default Gateway" order.



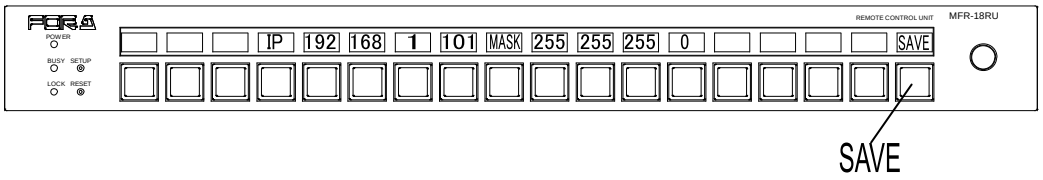
5-6-2. Changing the RU Network Settings

(1) Press **SETUP** to enter the Setup Menu mode. The RU IP address and subnet mask are displayed as shown below. (If Button A is off (unlit), press Button **A**.)



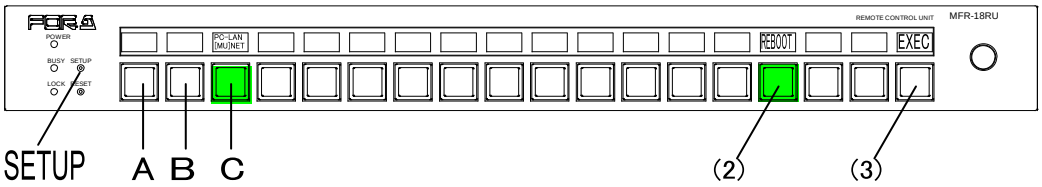
(2) Press and hold down a button below the number for change. The number will blink.
(3) Turn the control knob to change the number value. To clear the number setting, press and hold down the button.

(4) Repeat steps (2) and (3) to change the IP address and subnet mask.
(5) When number values are changed, the **SAVE** button will blink. Press and hold down **SAVE** to confirm changes. The Remote Control Unit will automatically restart.
To cancel the process, display another information without pressing **SAVE**.



5-6-3. Rebooting MU PC-LAN

(1) Press Button **C** in Setup Menu mode.
(2) Press and hold down the **REBOOT** button show below. The **EXEC** button will appear.
(3) Press and hold down **EXEC**. The "PC-LAN Startup" message is displayed during rebooting. The message will disappear when the reboot is complete.



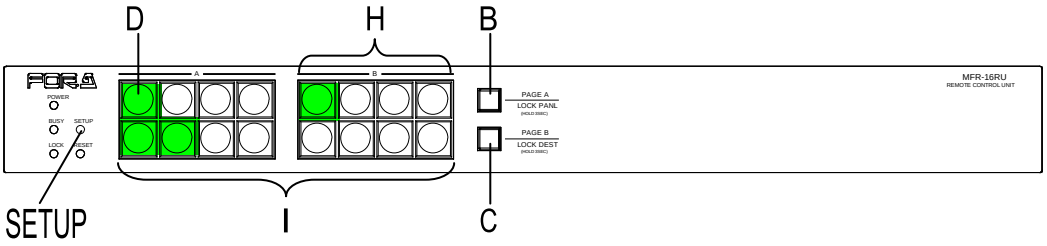
5-7. Setup Menu (Other Remote Control Units)

The **SETUP** button changes the RU to **Setup Menu** mode, which allows you to display RU and MU PC-LAN network settings, reboot the MU PC-LAN port and change the RU network settings To exit Setup Menu mode, press the **SETUP** button again.

◆ IP Address Display

The following procedure shows how to display an IP address in Setup Menu mode using MFR-16RU as an example.

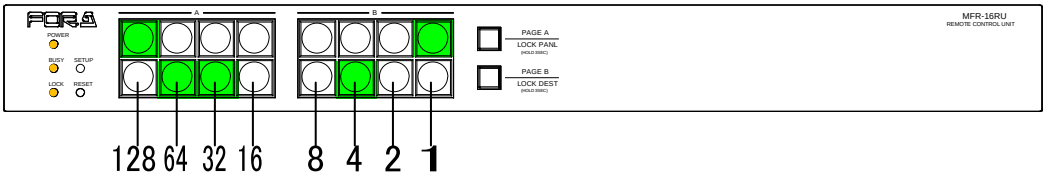
(1) Press **SETUP**. All idicators, POWER, BUSY and LOCK, turn on orange to indicate that the RU enters in Setup Menu mode.
(2) Press Button **D**. (If Button **B** or **C** is lit, press the lit button.)
(3) Press the left-most button of **H** (the first octet button).
The number value will be displayed on the eight buttons of **I**. If the MFR-16RU IP address is set to "192.168.1.100," "192" will be displayed on the eight buttons of **I** (8-bit) by indicating **On** or **Off**.



(4) Press the second button from the left (the second octet button) of **H**.
The number value will be displayed on the eight buttons of **I**.
If the MFR-16RU IP assress is set to "192.168.1.100," "168" will be displayed.

(5) Press the third button from the left (the third octet button) of **H**.
The number value will be displayed on the eight buttons of **I**.
If the MFR-16RU IP assress is set to "192.168.1.100," "1" will be displayed.

(6) Press the right-most button (the fourth octet button) of **H**.
The number value will be displayed on the eight buttons of **I**.
If the MFR-16RU IP address is set to "192.168.1.100," "100" (64+32+4) will be displayed as shown below.



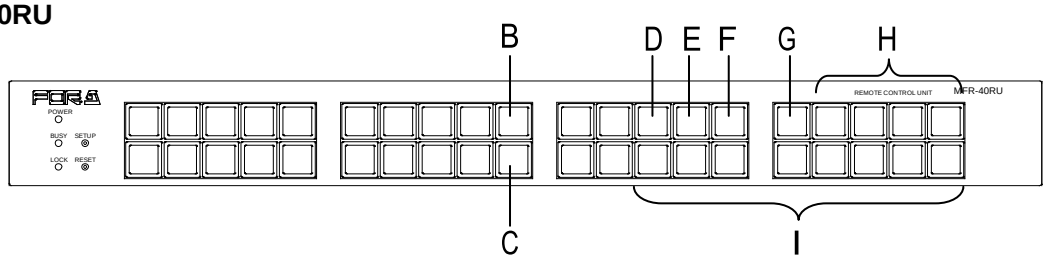
5-7-1. Displaying Network Settings

(1) In Setup Menu mode, press a button shown in the table below to display the desired network setting . Note that button locations vary depending on remote control units.

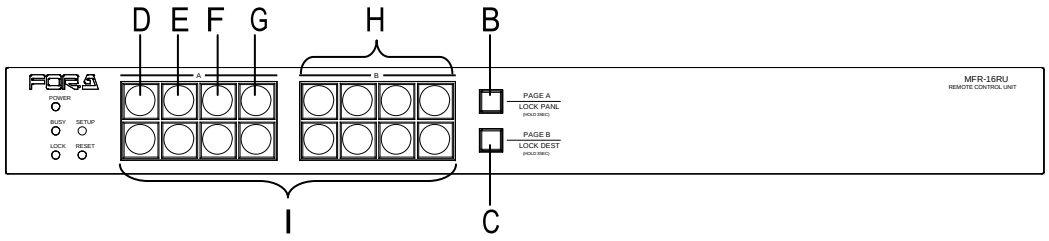
Button operation		LAN port	Display Info.
Press D.	If B is lit, press B. If C is lit, press C.	Remote Control Unit (LAN)	IP address
Press E.	If B is lit, press B. If C is lit, press C.		Subnet mask
Press B, then D.		PC-LAN on Main Unit (MU)	IP address
Press B, then E.			Subnet mask
Press B, then F.			Default Gateway

(2) Press an octet button of Buttons **H** to select an octet. The right-most button represents the fourth octet. (See the previous page.)
(3) The octet value will be displayed on Buttons **I** (eight buttons). (See the previous page.)

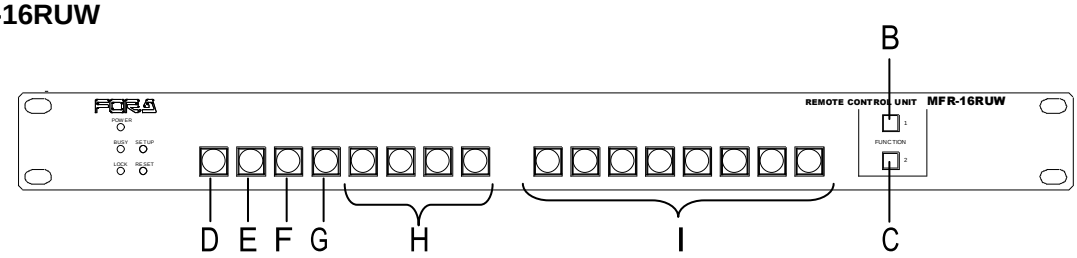
MFR-40RU



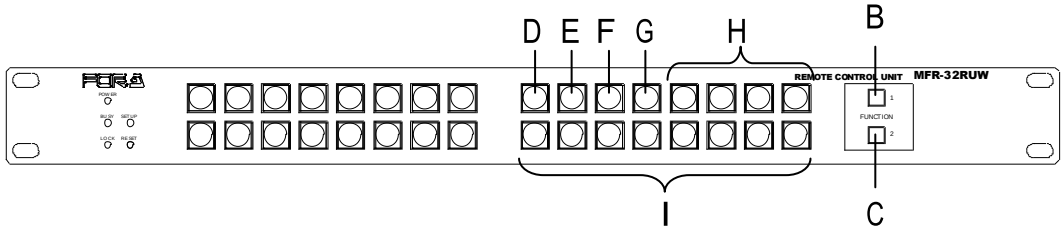
MFR-16RU (MFR-16RUD)



MFR-16RUW



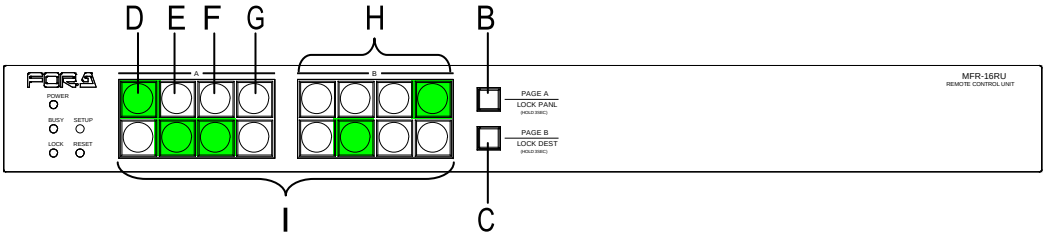
MFR-32RUW



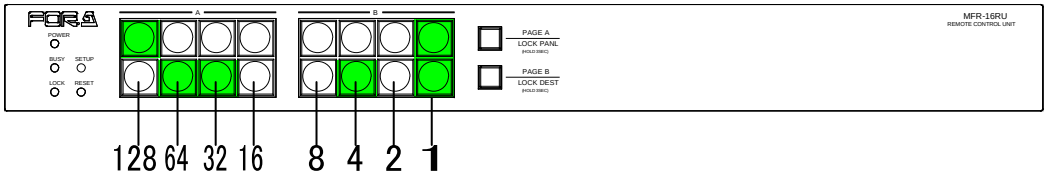
5-7-2. Changing the RU Network Settings

The RU IP address and subnet mask can be changed as shown in the procedure below. In the following procedure changes the MFR-16RU IP address from "192.168.1.100" to "192.168.1.101."
Button locations vary depending on remote control units. Refer to the previous page for button locations of other remote control units.

(1) Press Button **D** in **Setup Menu** mode. (If Button **B** or **C** is lit, press the lit button.)
(2) Press and **hold down** the **right-most** button (the fourth octet) of Buttons **H**. The button will blink and the bottom eight buttons (Buttons **I**) display the value (100) by **On** and **Off**.

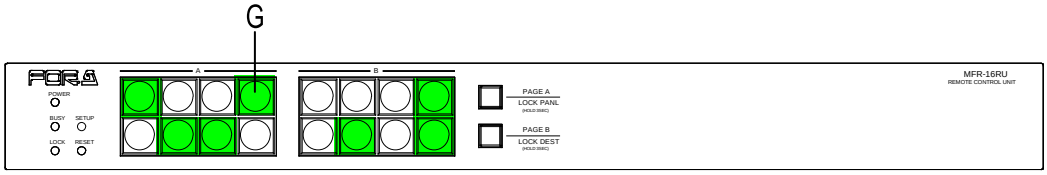


(3) On the bottom row, press the **right-most** button of Buttons **I** to turn on the button. The value will change to "101" (64+32+4+1).



To change the first, second or third octet value, repeat steps (2) and (3), respectively.
To clear an octet value, press the flashing octet selection button on the upper row.

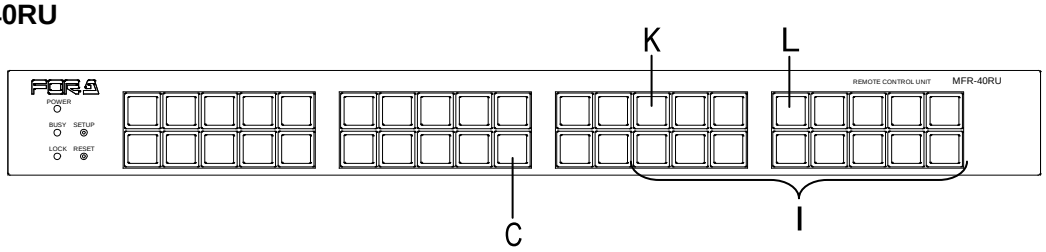
(4) When values are changed, Button **G** will blink. Press and hold down G to confirm the change. The Remote Control Unit will automatically restart. To cancel the process, press Button **B** or **C** without pressing **G**.



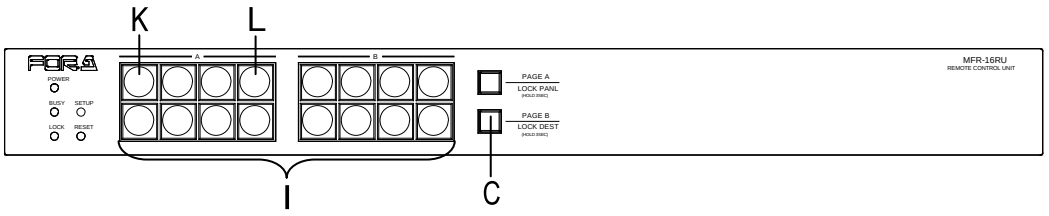
5-7-3. Rebooting MU PC-LAN

(1) Press Button **C** in Setup Menu mode.
(2) Press and hold down Button **K**. Button **L** (EXEC button) will blink.
(3) Press and hold down Button **L**. Buttons **I** will blink during rebooting. The buttons will turn off when the reboot is complete.

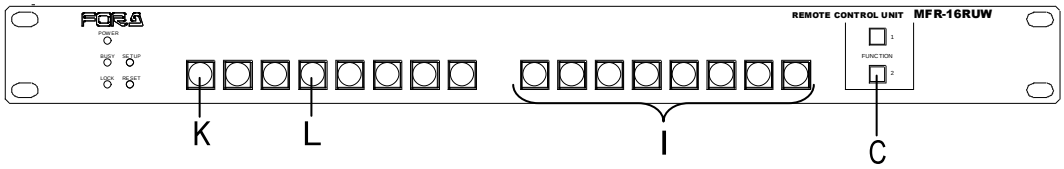
MFR-40RU



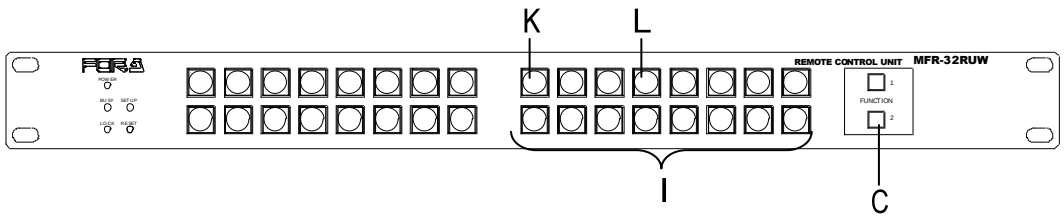
MFR-16RU (MFR-16RUD)



MFR-16RUW



MFR-32RUW



5-8. Multi-Panel Operation

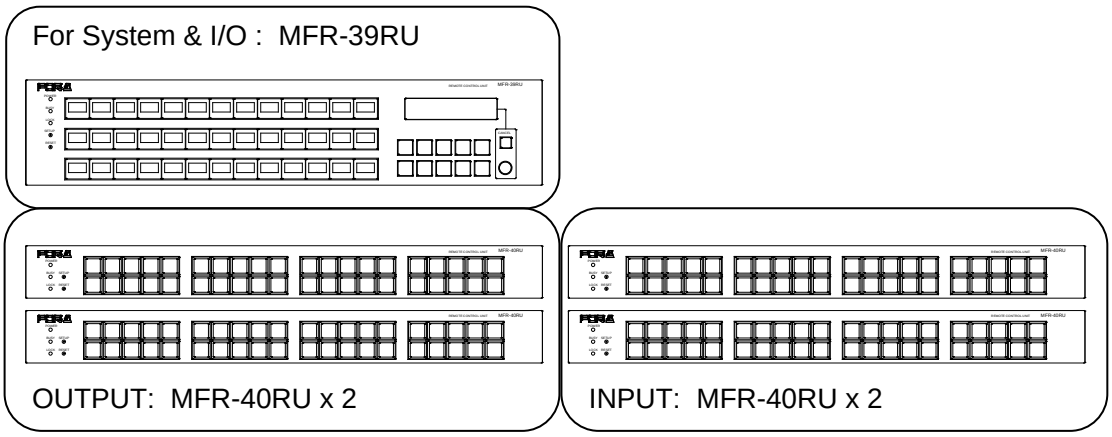
5-8-1. Outline

Multiple remote control panels can be connected to build a large control panel.

NOTE
Up to 5 remote control units can be linked together in Multi-panel Operation mode.

(Ex.) To build a 96 x 96 maximum control system:
Units to use: MFR-40RU x 4, and MFR-39RU x 1
Configuration:
Destination button assignments to: MFR-40RU x 2 and a part of MFR-39RU
Source button assignments to: MFR-40RU x 2 and a part of MFR-39RU

This system can control 96 x 96 inputs and outputs without using the PAGE function.



◆ **Functions that can be integrated**

The following operation can be integrated between the connected remote control panels by the interlock function.

- To select destination channels
- To select mode menus by the MODE button, and to select destination/source channels and levels by the control knob.
- To enable or disable Lock functions (LOCK LOCAL, LOCK OTHER, and LOCK ALL)

● Lock functions in the multi-panel operation

All connected remote control panels work as one remote control panel, so:

LOCK LOCAL: All integrated remote control panels are locked locally.

LOCK OTHER: Restricts units other than the remote control panels in the multi-panel operation system from changing crosspoints.
All integrated remote control panels can unlock the Lock function.

LOCK ALL: Restricts all units within the multi-panel operation system from changing crosspoints.
All integrated remote control panels can unlock the Lock function.

5-8-2. Enabling Multi-Panel Operation

Multi-panel operation can be enabled in the Setup menu or in the [Web-based Control: **RU Settings** page].

The procedure to enable multi-panel operation in the Setup menu is as shown below. (Supported only by MFR-39RU)

Step	Description
1	Press the SETUP button to open the Setup menu.
2	Turn the control knob to select RU CONN ID, and press the knob to confirm. SETUP>RU CONN ID UNIT ID: 0<ENT> Menu display
3	Turn the control knob to select the ID, and press the knob to confirm. **ID:** This ID is used to synchronize remote control panels for multi-panel operation. All panels must have the same ID as the unit ID of the master remote control panel of the system. (ex.) To enable multi-panel operation using a master remote control panel whose unit ID is 100, set the ID as 100 for all integrated remote control panels.
4	Press the CANCEL button to return the menu display to select menus. Turn the control knob to select RU CONNECT, and press the knob to confirm. SETUP>RU CONNECT ENABLE:OFF<ENT> Menu display
5	Turn the control knob to select ON, and press the knob to confirm.

Perform the above procedure for each remote control panel to be integrated.

To enable multi-panel operation in Web-based Control, proceed as follows:
(1) Click the remote control unit for setting to display the menu tree. Select **RU Settings** to display the menu.
(2) Set the master remote control unit using Unit ID under **Master ID** (for RU Linkage).
(3) Set **RU Linkage** to ON.

6. Crosspoint Control

6-1. One Crosspoint Switching

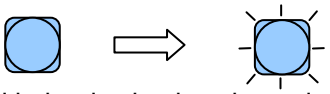
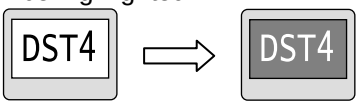
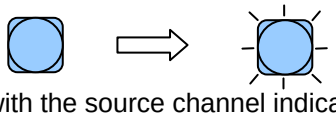
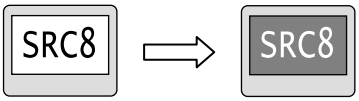
There are two ways of switching crosspoints: Switching a crosspoint one at a time, or switching multiple crosspoints simultaneously. This section describes the switching of one crosspoint.

6-1-1. One Crosspoint Switching by X-Y Setting

A crosspoint can be switched by using the destination and source buttons on the remote control panel.

Destination and source channels must be assigned to those buttons beforehand.
▶ See section 5-3-3-12 “BTN ASSIGN” for details on assigning channels to buttons.

(Ex.) The procedure to output source channel 8 to destination channel 4.

Step	Description	Indications
1	Press a destination button to select destination channel 4.	- The selected destination button lights up.  - The button with the destination channel indication will be highlighted.  - Menu display appears as shown below. DST: 4 [DST4] LVL : 0001 [Level-1]
2	Press a source button to select source channel 8.	- The selected source button lights up.  - The button with the source channel indication will be highlighted. 

- Destination and source channels can also be selected by the control knob or using the display. To select channels by the control knob, the mode menu must be set to destination mode or source mode using the MODE button(s). (Supported only for MFR-39RU and MFR-18RU)
  Operation using the display is available only on MFR-16RUD.

- MFR-18RU is supported for crosspoint changes using the control knob in Setting mode.
  ▶ See section 5-3-2 “Mode Menu” for details.

- Control Assist Buttons
  The following functionalities can be assigned to remote control panel buttons to assist crosspoint switches.
  ▶ See section 6-1-1-1 "SKIP-FWD/SKIP BWD" for SKIP-FWD and SKIP-BWD
  ▶ See section 6-1-1-2 "TENKEY" for -TENKEY

6-1-1-1. SKIP-FWD / SKIP-BWD

The SKIP-FWD button allows you to skip the set destination number or source channels forward to select the current one. The SKIP-BWD button allows you to skip channels backward.
In Destination or Source mode, the set number of channels is skipped. In Level, Page or Setting mode, these buttons are inoperable. (See section 5-3-2. "Mode Menu.")
* To confirm the source selection, press the control knob.

If the source and/or destination channels are categorized, the buttons allows you to go to the first or last channel in the category.

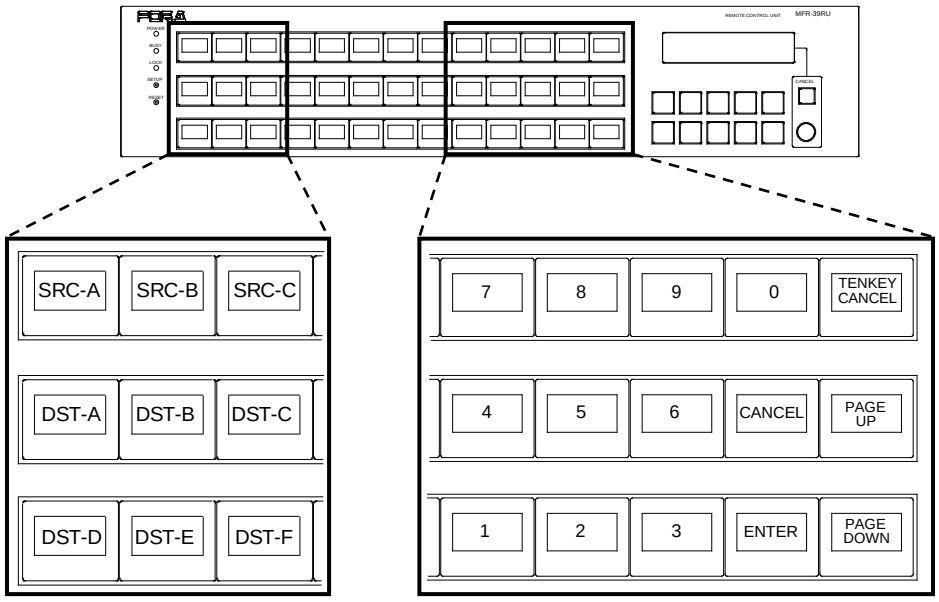
(Ex.) If Category 1: Dest 1 to 13, Category 2: Dest 14 to 20,
SKIP-FWD is set to 5, and
Current destination is 1.
Pressing the SKIP-FWD button selects destination channels 1 → 6 → 11 → 13 → 14 → 19 → 20 → 21 → 26 → 31 → and so on.

The categories are user programmable source or destination channel groups. They are set under **Category** accessed from each Web-based Control page.
[Web-based Control: **Router System Settings** > **Source Name** > **Category**]
[Web-based Control: **Router System Settings** > **Destination Name** > **Category**]

▶ See section 5-3-3-12. "BTN ASSIGN" and 5-4-2. "Button Assignment Change" for details on how to assign these buttons.

6-1-1-2. TENKEY (MFR-39RU)

The TENKEY button is used to enable Tenkey mode. Tenkey mode allows you to select source and destination channels using the numeric keypad that appears on the remote control panel. (Supported only for MFR-39RU)



Category buttons A numeric keypad

Category buttons: Allows you to select a category to select a channel from using the numeric keypad.

- TENKEY CANCEL: Allows you to exit TENKEY mode. The entered number is indicated on the button when "SETTING > TENKEY MOD (INPUT MODE)" is set to ENTER.
- PAGE UP / DOWN: Allows you to change pages for the category buttons.
- ENTER / CANCEL: Allows you to confirm or cancel the change when "SETTING > TENKEY MOD (INPUT MODE)" is set to ENTER. If it is set to DIRECT, entering a value will change and confirm the selection.
- 0 to 9 (numeric keys): Allows you to select a channel in the selected category. The TENKEY NO (INPUT START NO) menu allows you to select whether to count from 0 or 1.

▶ See sections 5-3-3-9 “TENKEY MOD” for TENKEY MOD, and 5-3-3-10 “TENKEY NO” for TENKEY NO.

◆ **Source channel selection using the numeric keypad function**
If categories are set as; SRC-A (SRC 1 to 13), and SRC-B (SRC 14 to 20)

(ex.1) TENKEY MOD (INPUT MODE) is ENTER and TENKEY NO (INPUT START NO) is 1.
- Select SRC-A, enter 3 on a numeric keypad and press ENTER to select SRC 3.
- Select SRC-B, enter 5 on a numeric keypad and press ENTER to select SRC 18.

(ex. 2) TENKEY MOD (INPUT MODE) is DIRECT and TENKEY NO (INPUT START NO) is 0.
- Select SRC-A, and enter 3 on a numeric keypad to select SRC 4.
- Select SRC-B, and enter 0 on a numeric keypad to select SRC 14.

▶ See section 5-3-3-12. "BTN ASSIGN" for details on how to assign the TENKEY button.

6-1-2. A Crosspoint Switching Using a Bus Button

A button to which a destination channel and source channel for the destination is assigned is called a bus button in the remote control panel. The bus buttons allow you to change source channels to be output from destination channels by the push of a button.

Bus button crosspoint switching can switch crosspoints regardless of the current destination selection.
To the contrary, bus button switching cannot change the current destination.

▶ See section 5-2. "Function Buttons" for details on button assignments.
▶ See section 5-3-3-12. "BTN ASSIGN" and 5-4-2. "Button Assignment Change" for details on how to assign the bus buttons.

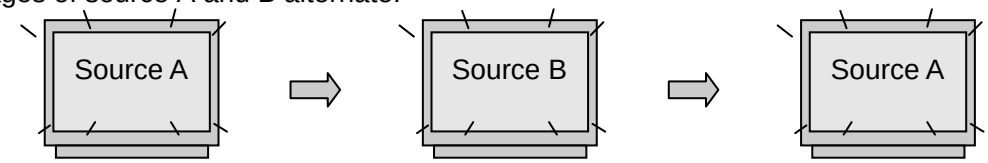
6-1-3. CHOP Function

The CHOP function allows you to alternate 2 images to compare the images.

◆ **Enabling the CHOP function**

(1) Press one of 2 source buttons (source A) to compare.
(2) While holding down the source button, press and release another source button (source B).

Images of source A and B alternate.



Press source button A.
→ Source A is output.

Holding down source button A, press source button B.
→ Source B is output.

Release source button B.
→ Source A is output.

6-1-4. Crosspoint Switching Using TAKE Function

Crosspoint switching using the **Take** function is available by the remote control panel that is assigned **Take**.
The **Take** function enables crosspoint switching by the TAKE button.
The **Take** function has 2 modes that can be assigned to different remote control panel respectively. To select the Take mode, select Preset or Direct under **Take Mode** in in the [Web-based Control: **RU Settings** page].

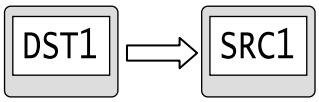
◆ **Preset mode**

Press the TAKE button to enable Take, and select crosspoints, then press the TAKE button to switch crosspoints.

◆ **Direct mode**

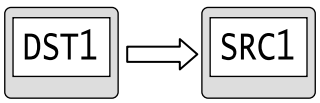
The Take function is always enabled. Select crosspoints, then press the TAKE button to switch crosspoints.

- Ex.1: To use the TAKE button assigned to Preset mode

Step	Description
1	Press the TAKE button. The take function will be enabled, and the button will be highlighted. 
2	Select a crosspoint by selecting a destination button and source button. The selected buttons will blink.  * To switch multiple crosspoints, repeat the procedure.
3	After completing the crosspoint selection, press the blinking TAKE button to switch the crosspoint/s. In multiple crosspoint switching, the last set of destination and source buttons will be highlighted.

Once a crosspoint switch has been completed, the TAKE button preset mode will be disabled. The button will return to direct mode.
To switch crosspoints in the preset mode again, repeat the procedure from step 1.

- Ex. 2: To use the TAKE button assigned to Direct mode

Step	Description
1	In Direct mode, the Take function is always enabled. Select a crosspoint by selecting a destination button and source button. The selected buttons will blink.  * To switch multiple crosspoints, repeat the procedure.
2	After completing the crosspoint selection, press the blinking TAKE button to switch the crosspoint/s. In multiple crosspoint switching, the last set of destination and source buttons will be highlighted.

6-2. Simultaneous Crosspoint Switching

The simultaneous crosspoint switching function allows you to simultaneously switch multiple crosspoints by the press of one button. There are two ways to do so. One is the Salvo function which performs the switching by recalling the pre-assigned crosspoints. The other is the Take function which allows you to assign and switch multiple crosspoints simultaneously.

- The pre-assigned crosspoints for a SALVO can be saved to either the routing switcher main unit or a button on the remote control panel.

6-2-1. Main Unit Stored Salvo

This type of salvo allows you to store crosspoint data to be simultaneously switched. The stored data can be recalled from any connected remote control panel.

◆ Storing Salvo data

Salvo data can be stored in the Web-based Control.

▶ See [Web-based Control: **Salvo** page].

◆ Executing Salvos

Use a SALVO (MU RECALL) button on the remote control panel as shown in the procedure below.

(1) Assign a SALVO button on the remote control panel. Set the salvo for **MU RECALL**, and select a Salvo number.
▶ See section 5-3-3-12 “BTN ASSIGN” and 5-4-2. "Button Assignment Change."

(2) Pressing the SALVO button to executes the salvo. The crosspoints stored to the salvo number are simultaneously set.

6-2-2. Remote Control Panel Button Assigned Salvo

This type of salvo allows to you assign crosspoints to be simultaneously switched to a button. The salvo can be recalled only by the SALVO button of the remote control panel.

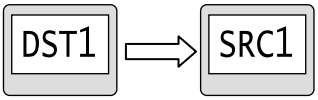
> Remote Control Stored Salvo data can also be stored using the Web-based Control.
> ▶ See [Web-based Control: **Salvo** page]

◆ Storing Salvo Data to the Remote Control Unit

Use a SALVO (RU STORE) button on the remote control panel as shown in the procedure below.

(1) Assign a SALVO button on the remote control panel. Set the salvo for **RU STORE**.
▶ See section 5-3-3-12 “BTN ASSIGN.”

(2) Store salvo data as shown in the table below.

Step	Description
1	Press the SALVO button as shown below. The button is highlighted and ready for crosspoints to be assigned. 
2	To assign crosspoints to a salvo, press a destination button then a source button. The selected buttons flash.  Repeat the procedure for all crosspoints.

3	After completing the crosspoints assignments, press the SALVO button again. The menu display appears as shown below. SALVO STORE NO: 1 (NEW) <ENT>
4	To add crosspoints to an existing salvo, select a salvo number by turning the control knob. Salvo numbers to which no crosspoints are assigned are indicated with (NEW). Turn the control knob to select a number, and press the knob to confirm the selection.

◆ **Executing Salvos**

Use a SALVO (RU RECALL) button on the remote control panel as shown in the procedure below.

(1) Assign a SALVO button on the remote control panel. Set the salvo for **RU RECALL**, and select a Salvo number.
▶ See section 5-3-3-12 “BTN ASSIGN” and 5-4-2. "Button Assignment Change."

(2) Pressing the SALVO button to executes the salvo. The crosspoints stored to the salvo number are simultaneously set.

6-2-3. Simultaneous Switching by the Take Function

The TAKE button on the remote control panel allows you to simultaneously switch preset crosspoints.
▶ See section 5-3-3-12 “BTN ASSIGN” for details on assigning the TAKE button.

◆ **Executing the TAKE function**

Refer to Ex. 1) and Ex. 2) in section 6-1-4. "Crosspoint Switching Using TAKE Function."

6-2-4. Simultaneous Switching by the Link Function

The LINK button on the remote control panel allows you to simultaneously switch crosspoints associated with a specific crosspoint.
Pressing the LINK button enables or disables the Link function. The LINK button is highlighted with a bright background when the function is enabled.
▶ See section 5-3-3-12 “BTN ASSIGN” for details on assigning the LINK button.

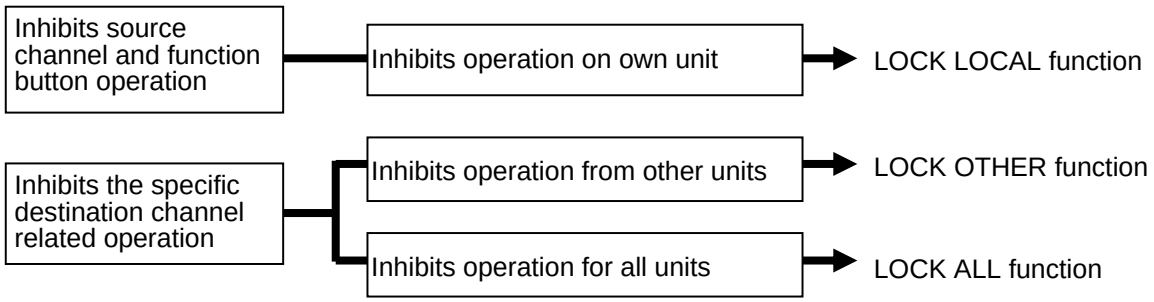
If the **Link** function is turned on, selecting a trigger crosspoint switches the slave crosspoints with it. The trigger and slave crosspoints can be assigned using Web-based Control. Refer to
▶ See [Web-based Control: **Link Settings** page] for more details.

6-3. Lock

Function operation and crosspoint changes can be disabled by the Lock function.

◆ **LOCK Function**

The Lock function is a function that inhibits the use of function buttons or crosspoint changes. There are three types of Lock functions.



6-3-1. LOCK LOCAL

The Lock Local function inhibits operation of buttons and menus that change the source channel or sets or executes Take switching on the unit that enabled the Lock function. (Selecting destination channels is not inhibited.)
This function is used in protecting the system from unintended operation.

◆ **Enabling LOCK LOCAL**

(1) Assign **LOCK LOCAL** to a button on the control unit.
▶ See section 5-3-3-12 “BTN ASSIGN” and 5-4-2. "Button Assignment Change."

(2) Press the assigned LOCK LOCAL button to enable the Lock Local function.

* Operations are locked for units in black box and unlocked for units in white box.

◆ **Disabling LOCK LOCAL**

Press the LOCK LOCAL button again.

If LOCK LOCAL is ON:

On the remote control panel:

- LOCK LED is lit green
- LOCK LOCAL is highlighted (background of the text illuminates.)
- Source and bus button indications are crossed.

To check the LOCK status, press the current destination button.
The MENU display shows the LOCK status (ON or OFF) as shown below.

```
DST:      8 [DST8          ]
LK-LOCAL [PANEL LOCK  ]
```

```
DST:     8 [DST8          ]
LK-OFF   [NOT LOCKED  ]
```

The LOCK LOCAL button and LOCK LED on the remote control panel flash if any inhibited operation such as changing the source channel is performed when Lock Local is enabled. (Only if the LOCK LOCAL button is assigned.)

Note that LOCK LOCAL can be set only on remote control units.

6-3-2. LOCK OTHER / LOCK ALL

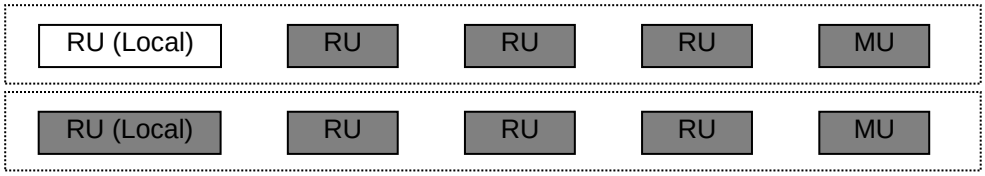
The **Lock Other** and **Lock All** functions disable crosspoint changes for current destination channels to all other units or all units including the unit that enabled the Lock function. Lock functions can be disabled only from the unit that enabled the function.
In multi-panel operation, lock functions can be disabled from any remote control panel in the operation system. Lock Other does not disable operation of remote control panels in the system.

◆ **Enabling LOCK OTHER/LOCK ALL**

<Setting on the Remote Control Panel>

(1) Assign **LOCK OTHER** or **LOCK ALL** to a button on the remote control unit.
▶ See section 5-3-3-12 “BTN ASSIGN” and 5-4-2. "Button Assignment Change."

(2) Press the assigned button to enable the Lock function.



<Setting in the Web-based Control>

Open the [Web-based Control: **Lock Destination** page, and assign a lock button.

◆ **Disabling LOCK OTHER/LOCK ALL**

Press the lock button again.

The Lock function can be disabled from other units than the one that enabled the Lock function by holding down the LOCK button at least 5 seconds.

If LOCK OTHER or LOCK ALL is ON:

On the remote control panel:

- LOCK LED illuminates
  Orange, if LOCK OTHER is issued by itself.
  Red, if LOCK OTHER is issued by another unit.
  Red, if LOCK ALL is issued by any unit.
- The LOCK button is highlighted (background illuminates)

To check the LOCK status, press the current destination button.
The MENU display shows the LOCK status and the number of unit that has issued the LOCK command.

```
DST:     8 [DST8              ]
LK-ID: 103[OTHER PANELS]
```

LOCK OTHER ON

```
DST:     8 [DST8              ]
LK-ID: 103[ALL PANELS  ]
```

LOCK ALL

```
DST:     8 [DST8              ]
LK-OFF   [NOT LOCKED  ]
```

LOCK OFF

The LOCK button and LOCK LED on the remote control unit flash if any inhibited operation such as selecting a source channel is performed when Lock Other (or Lock All) is enabled and the LOCK OTHER (or LOCK ALL) button is assigned.

6-4. Operation Preview Function

The **Operation Preview** function allows you to set an output to be used for the preview.

(ex.) When pressing a source button on the remote control panel for setting a simultaneous crosspoint switch, the selected source will be output to the preview output. Then you can check source images to be assigned to the simultaneous crosspoint switch before pressing TAKE. In addition, when pressing a destination button, the source channel assigned for the destination channel will be output to the preview output.

◆ Assigning Operation Preview to a Button on the Remote Control Panel

The Operation Preview function is disabled as default. To enable the function, assign the function to a button on the remote control panel in the Web-based Control.
Only MFR-39RU and MFR-16RUD units can assign Operation Preview on the front panel operation.

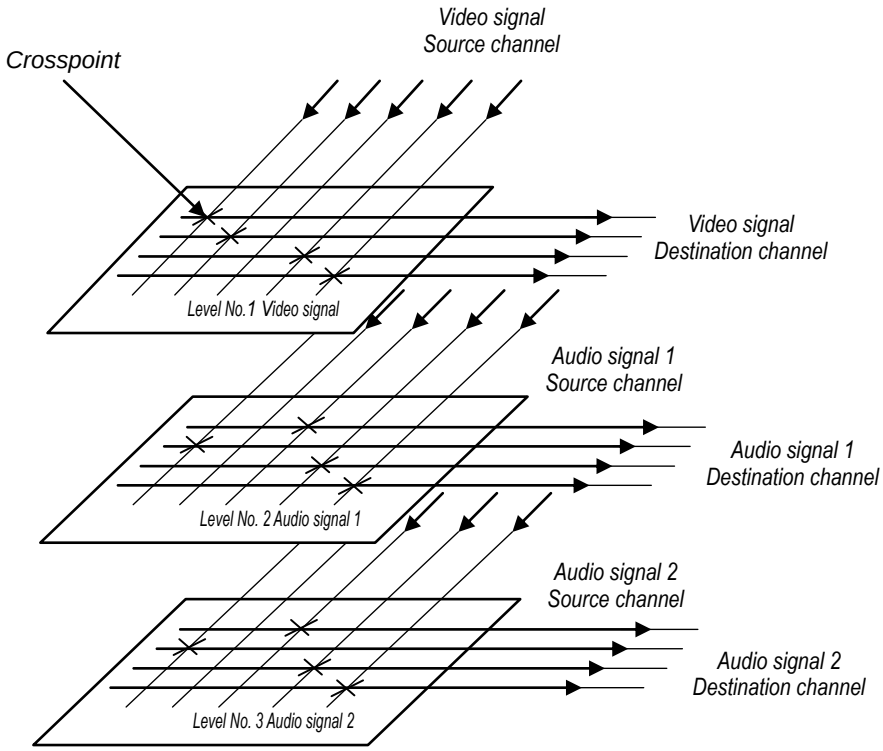
▶ See [Web-based Control: **Assign Function** page].
▶ See sections 5-3-3-12. "BTN ASSIGN" and 5-4-2." Button Assignment Change."

◆ Enabling the Operation Preview function

Press the O-PREVIEW button on each remote control unit to enable the function.
The preview signal will output to the set destination channel.

6-5. Level Control

Generally, routing switchers control crosspoints according to the signal types such as video, audio, time codes, and VCR control. To control switchers, level numbers are used to identify which type of signal to control.



In the above example, if you select level number 1 for the current level, you can switch crosspoints that are set to level 1. If you select level number 2, you can switch crosspoints on level 2. If you select multiple levels, you can switch crosspoints on all of the selected levels at the same time.

◆ Assigning levels

Signals can be assigned to logical inputs and outputs in the [Web-based Control: **Assign Function** page]. When assigning the signals, select a level for respective signals to assign to the respective levels.

◆ Selecting levels on remote control panels

The remote control panel can select channels on the current level. The level selections can be changed using the LEVEL button or control knob. Multiple levels can be set to the current levels by the LEVEL button or control knob.

Pressing the respective LEVEL button allows you to go to the respectively assigned levels.

To change levels on remote control panels using the Control knob, press the MODE button and select Level mode in the mode menu.

▶ See section 5-3 "MODE Button and Mode Menu (MFR-39RU/18RU)" for details on the Mode menu.

6-5-1. Level Indication on the Remote Control Panel

The MFR main unit and the remote control panel can control signals on multiple levels at the same time. The remote control panel indicates the current level(s) by hexadecimal numbers in the menu display and on the LCD.

(ex.1) If all levels 1 through 8 are enabled, the indication is “00FF."

Level 8: ENBL 7: ENBL 6: ENBL 5: ENBL 4: ENBL 3: ENBL 2: ENBL 1: ENBL

>> F F

(ex. 2) If levels 3, 4, 6, and 7 are enabled, the indication is “006C."

Level 8: DSBL 7: ENBL 6: ENBL 5: DSBL 4: ENBL 3: ENBL 2: DSBL 1: DSBL

>> 6 C

* ENBL: enabled
  DSBL: disabled

If multiple levels are selected to the current levels, the smallest enabled level number is indicated in the menu display and on the button.
In case of the above (ex.1): indicated as Level1
In case of the above (ex.2): indicated as Level3

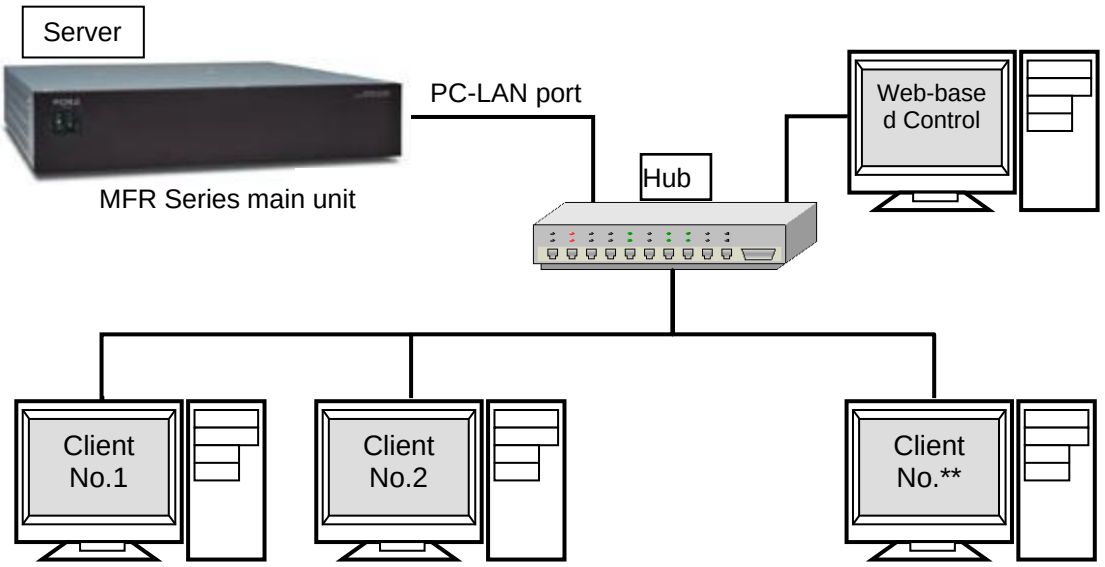
7. Serial / LAN Command Control

7-1. Serial Interface

Crosspoint switchover and tally output can be controlled via the SERIAL ports on the MFR Series main unit or MFR GPI.

7-2. LAN Interface

The MFR Series main unit is able to connect to a third-party automatic control system via the RJ-45 port (PC-LAN port). The TCP/IP communication protocol is supported. The control PC will be the Client, and the MFR Series main unit will be the Server.



◆ **Basic specifications**

Item	Description
IP address (PC-LAN port)	192.168.1.12 (Subnet Mask: 255.255.255.0)
Port number	Setting range: 49152 to 65534 (Default: 23)
Number of PCs	Max. 16
Response / Resending	Wait before sending next command (Resend if the Echo is not returned.)
Login password	None
Communication protocol	TCP/IP, Control PC: Client, MFR-3232: Server Crosspoint Remote Control using ASCII code.
Command protocol	Crosspoint Remote Control protocol

7-3. Control Command

Serial and LAN interfaces for Crosspoint Remote Control use control commands.

◆ Crosspoint information command

Command	Range	Description
<Lvl>	0 - 7	Allows you to specify the level to switch the crosspoint. * When switching one crosspoint.
<Lvls>	0 - 7	Allows you to specify the levels to switch crosspoints. * When switching multiple crosspoints.
<Dest>	00 - FF	Allows you to specify the crosspoint switchover destination.
<Src>	000 - 3FF	Allows you to specify the source of crosspoint switchover.
<ID>		Unit ID. The ID must be different from that of other devices in the same network.

◆ Control commands

Function		Serial	LAN
1	Requests the list of crosspoints	Yes	Yes
2	Requests crosspoint information (Specifies output channel and level)	Yes	Yes
3	Switches over a crosspoint (single channel)	Yes	Yes
4	Switches over crosspoints (multi-channel simultaneous switchover)	Yes	Yes
5	Locks the destination	Yes	Yes
6	Initializes	Yes	—

◆ Commands/Responses

Func.	Command	Response	Ref.
1	@[sp]S?<Lvl>	S:<Lvl><Dest>,<Src> C:<Lvls>/<Dest>,<Src>[…..[S<Number of crosspoints in Salvo>][L<Number of Links>]]:I<ID> (*1) (*2)	—
2	@[sp]X?<Lvl><Dest>		—
3	@[sp]X:<Lvls>/<Dest>,<Src>		—
4	**Clear the preset crosspoint.** @[sp]B:C **Preset the crosspoint.** @[sp]P:<Lvl>/<Dest>,<Src> **Switch over the preset crosspoints simultaneously.** @[sp]B:E		—
	Read the preset crosspoint set to the specified level and destination. @[sp]P?<Lvl><Dest> **Read the preset crosspoint set to the specified level.** @[sp]V?<Lvl>	V:<Lvl><Dest>,<Src>	—
5	**LOCK ALL units.** @[sp]W:<Lvl>/<Dest>,<ID>,1	W!<Lvl><Dest>,<ID>,1	6-3-2
	LOCK OTHER units. @[sp]W:<Lvl>/<Dest>,<ID>,2	W!<Lvl><Dest>,<ID>,2	6-3-2
	Disable LOCK. @[sp]W:<Lvl>/<Dest>,<ID>,0	W!<Lvl><Dest>,<ID>,0	6-3-2
6	@[sp]z:<Lvls>		—

* [sp] indicates a space.

(*1) A response is sent when the specified crosspoint is switched regardless of serial or LAN command.

(*2) The "S" responses indicate tallies (results) and "C" responses indicate controls (requests).

IMPORTANT
-All values are converted to hexadecimal notation. (e.g. Source 16 is represented as <Src> F) Also, the carriage return (ASCII: 0D) is required at the end of all commands. -Send the next command after receiving a prompt (>). The command expiration time (maximum wait time for response) for a short command is 1 second. However, a 5-second wait is suggested due to possible longer response times. -When receiving a long response command, wait for the response command to completely transmit before sending a next command. -The Level setting is used to manage crosspoints by types. When the level setting is not needed, set the level (Lvl or Lvls) to 0.

◆ **Command / Response example**

(A) Responses will be sent as shown below when receiving commands:

A command is received. ↓ Echo ↓ Prompt	 @[sp]X:<Lvls>/<Dest>,<Src>[CR] [CR][LF]>

(B)The following response is sent when a crosspoint is switched.

A crosspoint is switched. ↓ The crosspoint information	 [CR][LF]S:<Lvl><Dest>,<Src>[CR][LF]

Ex. 1) When **Source 5** is selected for **Destination 3** in **Level 1:**
(Function ③ in the previous page)

(A)	@ X:0/2,4[CR] [CR][LF]>
(B)	[CR][LF] S:02,4[CR][LF]

Terminal display:

```
@ X:0/2,4
>
S:02,4
```

Ex. 2) When **Source 113** is selected for **Destination 49** in **Levels 2 to 7**:
(Function ③ in the previous page)

(A)	@ X:123456/30,70[CR] [CR][LF]>
(B)	[CR][LF] S:130,70[CR][LF]
(B)	[CR][LF] S:230,70[CR][LF]
(B)	[CR][LF] S:330,70[CR][LF]
(B)	[CR][LF] S:430,70[CR][LF]
(B)	[CR][LF] S:530,70[CR][LF]
(B)	[CR][LF] S:630,70[CR][LF]

Terminal display:

```
@ X:123456/30,70
>
S:130,70

S:230,70

S:330,70

S:430,70

S:530,70

S:630,70
```

* [CR] and [LF] represent Carridge Return (0x0D) and Line Feed (0x0A) respectively.

8. Troubleshooting

If any of the following problems occur during operation of your MFR-1616 MFR-1616R / MFR-3216 / MFR3232, proceed as indicated below to see if the problem can be corrected before assuming a unit malfunction has occurred.

IMPORTANT
If the problem is not corrected by performing the procedures below, turn the unit off and then on again. If this still does not correct the problem, contact your dealer.

Problem	Check	Remedy
No image output.	Are there signal inputs to the video input connectors?	Input video signals to the video input connectors.
	Are cables properly connected for the signal inputs?	Connect cables properly.
	Is the crosspoint set properly?	Set crosspoints properly.
Unable to control using the remote control panel.	Is the LAN cable properly connected?	Properly connect the LAN cable.
	Is the RU Info page in the Web-based Control indicating NG?	Check the item that is indicated as NG. However, if the Voltage is indicated as NG, contact your FOR-A agent. See the Web-based Control Operation Manual for details.
The secondary CPU is active.	Are both MFR-LAN (CPU1) and MFR-LAN (CPU2) properly connected to the network? (Check the cable and Ethernet hub connections.)	Connect both MFR-LAN (CPU1) and MFR-LAN (CPU2) to the network correctly.
	If network connections are properly made, turn unit power OFF then ON again.	Consult your FOR-A reseller if the secondary CPU is still active after restarting

9. Specifications and Dimensions

9-1. Unit Specifications

9-1-1. MFR-1616/MFR-1616R/MFR-3216/MFR-3232

	MFR-1616	MFR-1616R	MFR-3216	MFR-3232
Video Formats	3G HD: 1080/60p, 1080/59.94p, 1080/50p HD: 1080/60i, 1080/59.94i, 1080/50i, 1080/30p, 1080/30PsF, 1080/29.97p, 1080/29.97PsF, 1080/23.98p, 1080/23.98PsF, 1080/25p, 1080/25PsF, 1080/24PsF, 1080/24p, 720/60p, 720/59.94p, 720/50p SD: 525/60, 625/50			
Inputs x Outputs	16 x 16	16 x 16	32 x 16	32 x 32
Video Inputs	Compliant with the following standards (75Ω BNC): -SMPTE424M (2.97 Gbps, 2.97/1.001 Gbps) -SMPTE292M (1.485 Gbps, 1.485/1.001 Gbps) -SMPTE259M (270 Mbps) -DVB-ASI			
Cable equalization	3G: 70 m (when a 5C-FB equivalent cable is used) HD-SDI: 100 m (when a 5C-FB equivalent cable is used) SD-SDI: 200 m (when a 5C-2V equivalent cable is used)			
Video Outputs	Compliant with the following standards (75Ω BNC) (with automatic reclocking): -SMPTE424M (2.97 Gbps, 2.97/1.001 Gbps) -SMPTE292M (1.485 Gbps, 1.485/1.001 Gbps) -SMPTE259M (270 Mbps) -DVB-ASI			
Reference Inputs	BB: NTSC: 0.429 Vp-p/PAL: 0.45 Vp-p or Tri-level sync: ±0.3Vp-p 75Ω BNC x 1, loop-through (Terminate with 75Ω terminator, if unused.)			
Interfaces				
MFR-LAN	10/100BASE-TX RJ-45 (for RU/GPI connection, up to 128 units)			
	x 1	x 2 (LAN 2: For MFR-SRCPU connection.)		
PC-LAN	10/100BASE-TX RJ-45 x 1 (for computer or other external device connection)			
SERIAL	RS-232C/RS-422 (selectable by internal switches) 9-pin D-sub (male) x 1			
ALARM	9-pin D-sub (female) x 1			
TO RS	Unused			
Temperature	0°C to 40°C			
Humidity	30**%** to 90% (no condensation)			
Power	100VAC to 240VAC ±10%, 50/60Hz			
Power Consumption				
100 V AC to 120 V AC	36 VA (33 W)	37 VA (34 W)	48 VA (45 W)	60 VA (54 W)
200 V AC to 240 V AC	44 VA (34 W)	44 VA (34 W)	57 VA (45 W)	70 VA (52 W)
Dimensions	430(W) x 44(H) x 300(D) mm EIA 1RU	430(W) x 88(H) x 300(D) mm EIA 2 RU		
Weight	5 kg	5 kg	6 kg	6 kg
Consumables	Fan (P-1461) : Replace every 4 years.	Fan (P-1460) Replace every 4 years.		
	Power unit: Replace every 5 years.			

9-1-2. MFR-1616A

Inputs x Outputs	16 stereo pairs (32 channels) × 16 stereo pairs (32 channels)
Audio Inputs	AES/EBU: 1.0Vp-p Unbalanced 75Ω BNC x 16
Audio Outputs	AES/EBU：1.0Vp-p±10% Unbalanced 75Ω BNC x 16
Sampling Frequency	32kHz to 96kHz
Reference Input	BB: NTSC: 0.429 Vp-p/PAL: 0.45 Vp-p or Tri-level sync: ±0.3 Vp-p 75Ω BNC x 1, loop-through (Terminate with 75Ω terminator, if unused.)
Interfaces	
MFR-LAN	10/100BASE-TX RJ-45 x 1 (for RU/GPI connection, up to 128 units)
PC-LAN	10/100BASE-TX RJ-45 x 1 (for computer or other external device connection)
RS-232C	RS-232C 9-pin D-sub (male) x 1
ALARM	9-pin D-sub (female) x 1
Temperature	0°C to 40°C
Humidity	30**%** to 90% (no condensation)
Power	100VAC to 240VAC ±10%, 50/60Hz
Power Consumption	19 VA (17 W) at 100 V AC to 120 V AC 24 VA (17 W) at 200 V AC to 240 V AC
Dimensions	430(W)×44(H)×300(D)mm EIA 1RU
Weight	5 kg
Consumables	Power unit: Replace every 5 years.

9-1-3. MFR-39RU

Buttons/Colors	39 buttons (LED buttons, 7-color) Displayed in each button (Max. 7 characters x 2 lines) 10 buttons (3 colors: red/green/orange), user assignable Menu display x 1 (Max. 23 characters x 2 lines) with Rotary selector
Number of Connections	Max. 128 (including Main, Remote and GPI units)
Interfaces	
MFR-LAN	10/100BASE-TX RJ-45 x 1 (For connection to MU. A network hub required for multiple unit configuration.)
SERVICE	RS-232C 9-pin D-sub (male) x 1 (for maintenance)
Temperature	0°C to 40°C
Humidity	30**%** to 85% (no condensation)
Power	+12 V DC Pin-connector x 2 (redundant power supply as standard)
Consumption	100 V AC to 120 V AC: 17 VA (9 W), 200 V AC to 240 V AC: 22 VA (11 W)
Dimensions	430(W) x 88(H) x 44(D) mm EIA 2 RU
Weight	3 kg
Consumables	AC adaptor: Replace every 5 years.

9-1-4. MFR-40RU

Buttons/Colors	40 buttons (3 colors: red/green/orange), user assignable
Number of Connections	Max. 128 units (including Main, Remote and GPI units)
Interfaces	
MFR-LAN	10/100BASE-TX RJ-45 x 1 (For connection to MU. A network hub required for multiple unit configuration.)
SERVICE	RS-232C 9-pin D-sub (male) x 1 (for maintenance)
Temperature	0°C to 40°C
Humidity	30**%** to 85% (no condensation)
Power	+12 VDC Pin-connector x 2 (redundant power supply as standard)
Consumption	100 V AC to 120 V AC: 10 VA (5 W), 200 V AC to 240 V AC: 15 VA (7 W)
Dimensions	430(W) x 44(H) x 42(D) mm EIA 1 RU
Weight	2 kg
Consumables	AC adaptor: Replace every 5 years.

9-1-5. MFR-18RU

Buttons/Colors	18 buttons (3 colors: red/green/orange), user assignable LCD display x 18 (Max. 7 characters x 2 lines) (Displayed above each button) with Rotary selector
Number of Connection	Max. 128 (including Main, Remote and GPI units)
Interfaces	
MFR-LAN	10/100BASE-TX RJ-45 x 1 (For connection to MU. A network hub required for multiple unit configuration.)
SERVICE	RS-232C 9-pin D-sub (male) x 1 (for maintenance)
Temperature	0°C to 40°C
Humidity	30**%** to 85% (no condensation)
Power	+12 VDC Pin-connector x 2 (redundant power supply as standard)
Consumption	100 V AC to 120 V AC: 12 VA (6 W), 200 V AC to 240 V AC: 18 VA (8 W)
Dimensions	430(W) x 44(H) x 42(D) mm EIA 1 RU
Weight	2 kg
Consumables	AC adaptor: Replace every 5 years.

9-1-6. MFR-16RU/16RUD

Buttons/Color	16 buttons (1 color: green), user assignable Menu Display (Max. 16 characters x 2 lines) (MFR-16RUD only)
Number of Connection	Max. 128 (including Main, Remote and GPI units)
Interfaces	
MFR-LAN	10/100BASE-TX RJ-45 x 1 (For connection to MU. A network hub required for multiple unit configuration.)
Temperature	0°C to 40°C
Humidity	30**%** to 85% (no condensation)
Power	+12 VDC Pin-connector x 1
Consumption	MFR-16RU: 100 V AC to 120 V AC: 7 VA (3 W), 200 V AC to 240 V AC: 11 VA (4 W) MFR-16RUD: 100 V AC to 120 V AC: 8 VA (3 W), 200 V AC to 240 V AC: 11 VA (4 W)
Dimensions	430(W) x 44(H) x 34 (D) mm EIA 1 RU
Weight	1 kg
Consumables	AC adaptor: Replace every 5 years.

9-1-7. MFR-16RUW

Buttons/Color	18 buttons (1 color: green), user assignable
Number of Connection	Max. 128 (including Main, Remote and GPI units)
Interfaces	
MFR-LAN	10/100BASE-TX RJ-45 x 1 (For connection to MU. A network hub required for multiple unit configuration.)
Temperature	0°C to 40°C
Humidity	30**%** to 85% (no condensation)
Power	+12 VDC Pin-connector x 1
Consumption	100 V AC to 120 V AC: 8 VA (3 W), 200 V AC to 240 V AC: 11 VA (3 W)
Dimensions	480(W) x 44(H) x 27 (D) mm EIA 1 RU
Weight	1 kg
Consumables	AC adaptor: Replace every 5 years.

9-1-8. MFR-32RUW

Buttons/Color	34 buttons (1 color: green), user assignable
Number of Connection	Max. 128 (including Main, Remote and GPI units)
Interfaces	
MFR-LAN	10/100BASE-TX RJ-45 x 1 (For connection to MU. A network hub required for multiple unit configuration.)
Temperature	0°C to 40°C
Humidity	30**%** to 85% (no condensation)
Power	+12 VDC Pin-connector x 1
Consumption	100 V AC to 120 V AC: 10 VA (4 W), 200 V AC to 240 V AC: 13 VA (4 W)
Dimensions	480(W) x 44(H) x 27 (D) mm EIA 1 RU
Weight	1 kg
Consumables	AC adaptor: Replace every 5 years.

9-1-9. MFR-GPI

Number of Connection	Max. 128 (including Main, Remote and GPI units)
Interface	
MFR-LAN	10/100BASE-TX RJ-45 x 1 (Ethernet hub is needed for Main and multiple unit connections.)
SERVICE	RS-232C: 9-pin D-sub (male) x 1 (for maintenance)
GPI IN	37-pin D-sub (female) x 4
/TALLY OUT	128-input/output (user assignable)
SERIAL 1-4	RS-232C/422 (selectable): 9-pin D-sub (male) x 4
Temperature	0°C to 40°C
Humidity	30**%** to 85% (no condensation)
Power	+12VDC pin connector x 2 (redundant power supply in standard configuration)
Power Consumption	100 V AC to 120 V AC: 8 VA (4 W) 200 V AC to 240 V AC: 13 VA (6 W)
Dimensions	430(W) x 44(H) x 110(D) mm EIA 1 RU
Weight	2 kg
Consumables	AC adaptor: Replace every 5 years

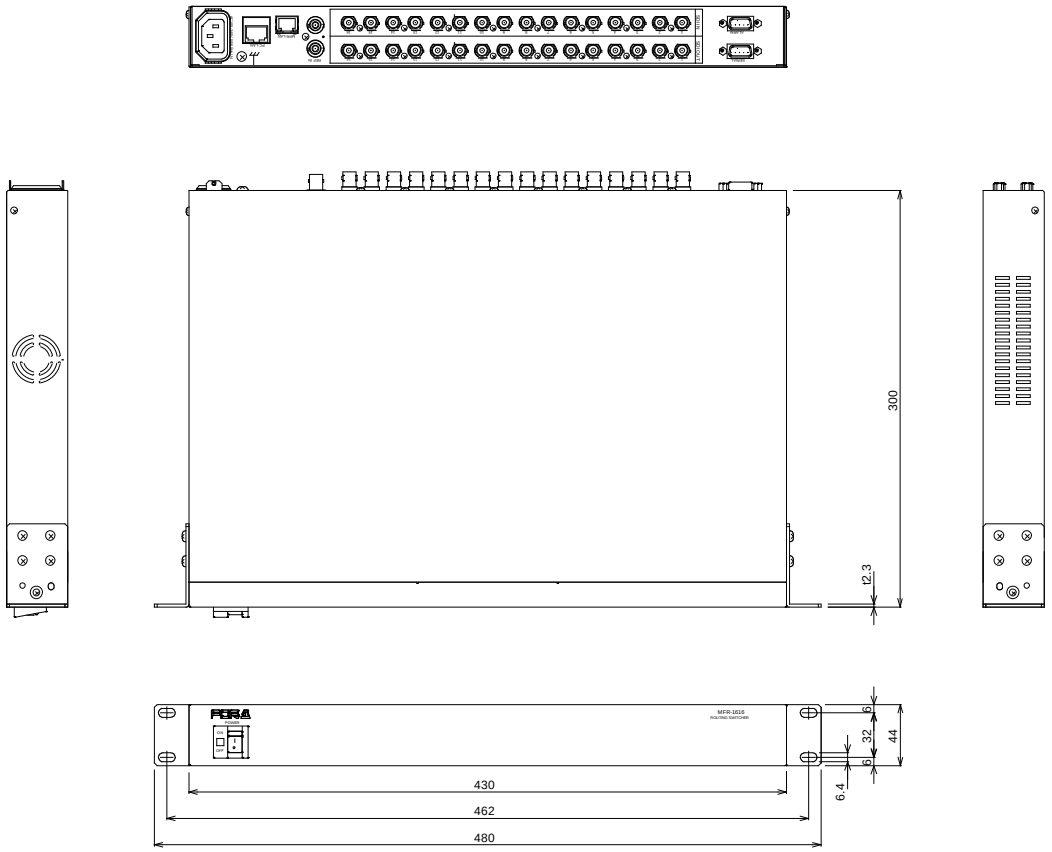
9-1-10. MFR-TALM

Number of Connections	Max. 128 (including Main, Remote and GPI units)
Interface	
MFR-LAN	10/100/1000BASE-T RJ-45 x 1 (Ethernet hub is required for Main and multiple unit connections.)
PC-LAN	10/100BASE-TX RJ-45 x 1 (for PC or other external devices)
GPI IN	37-pin D-sub (female) x 1
/TALLY OUT	32-input/output (user assignable)
RS-422	9-pin D-sub (male) x 4
Temperature	0°C to 40°C
Humidity	30**%** to 85% (no condensation)
Power	+12 V DC pin connector x 2 (redundant power supplies in standard configuration)
Power Consumption	100 V AC to 120 V AC: 17 VA (9 W) 200 V AC to 240 V AC: 20 VA (9 W)
Dimensions	212(W) x 44(H) x 161(D) mm EIA 1 RU half size
Weight	2 kg
Consumables	AC adaptor: Replace every 5 years

9-2. External Dimensions

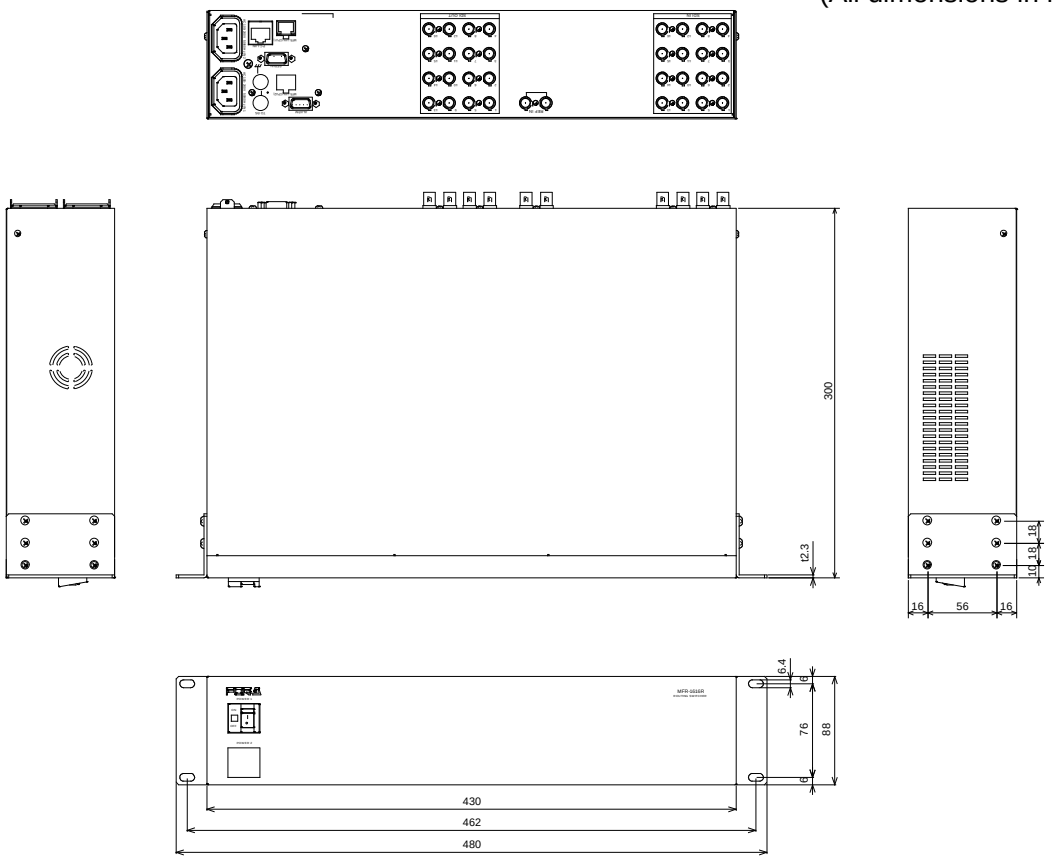
9-2-1. MFR-1616

(All dimensions in mm.)



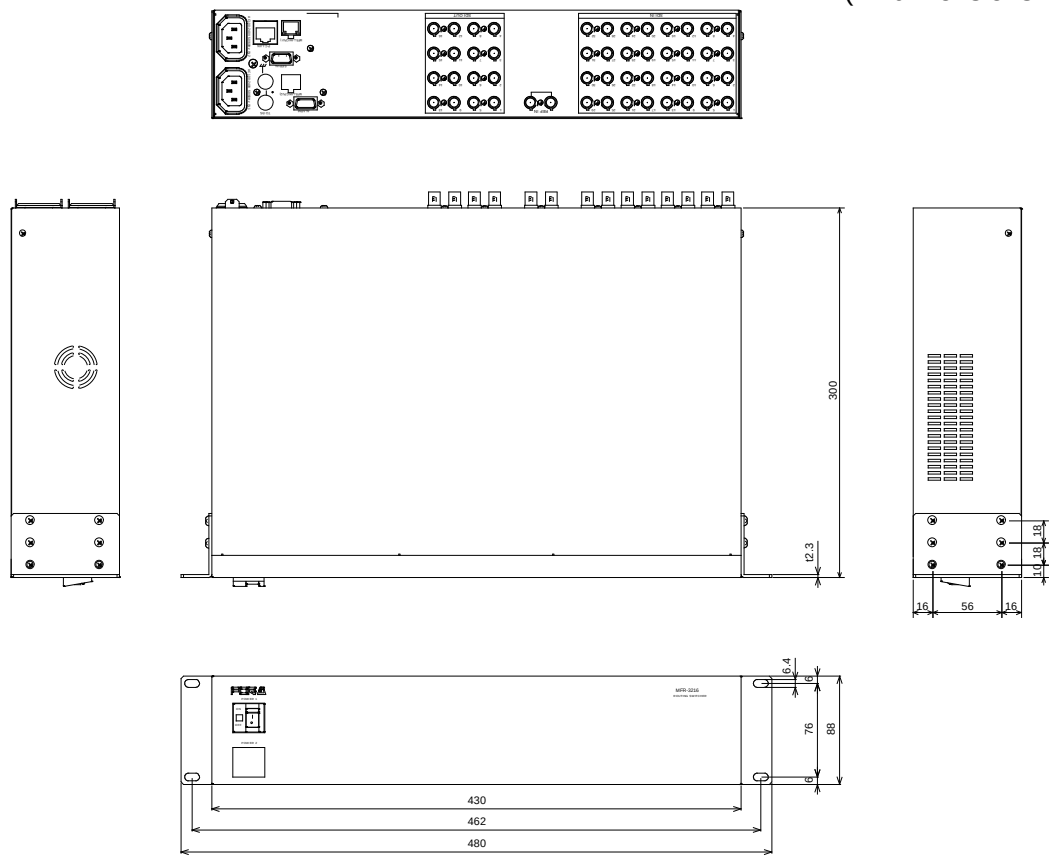
9-2-2. MFR-1616R

(All dimensions in mm.)



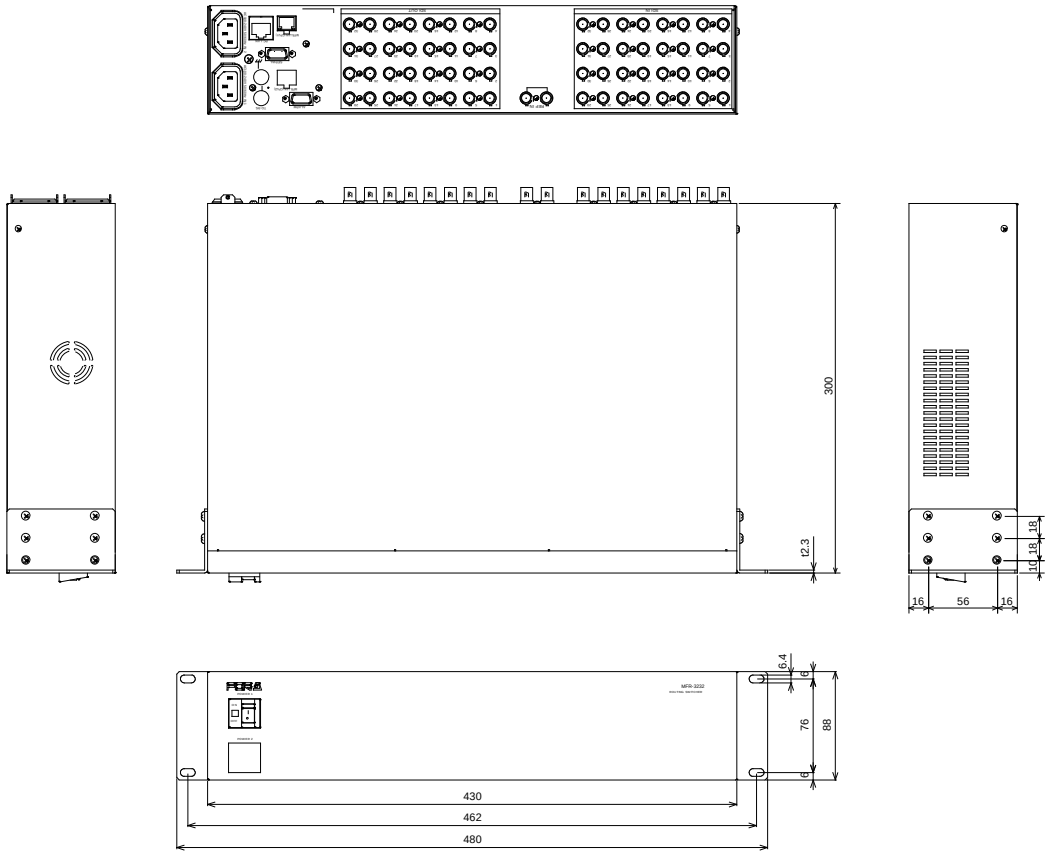
9-2-3. MFR-3216

(All dimensions in mm.)



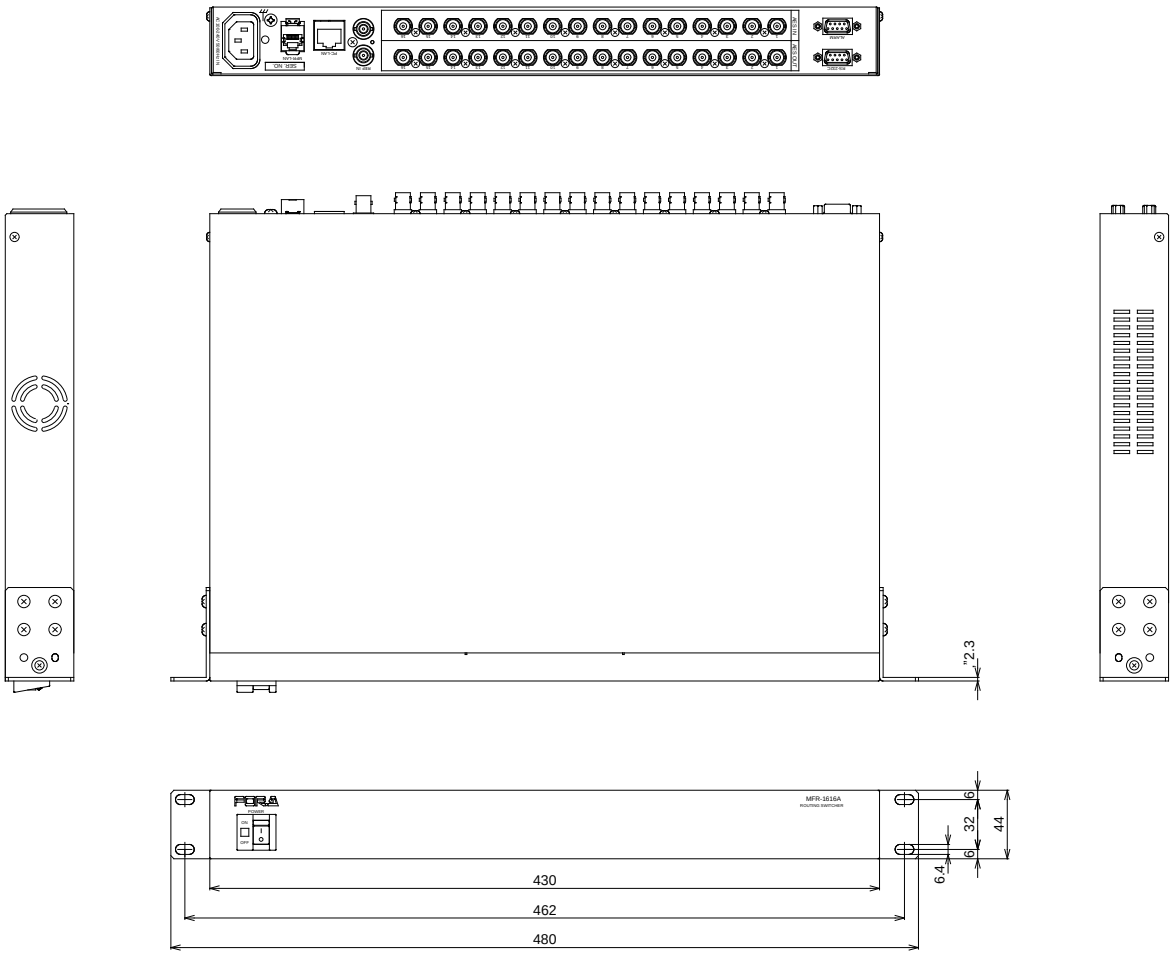
9-2-4. MFR-3232

(All dimensions in mm.)



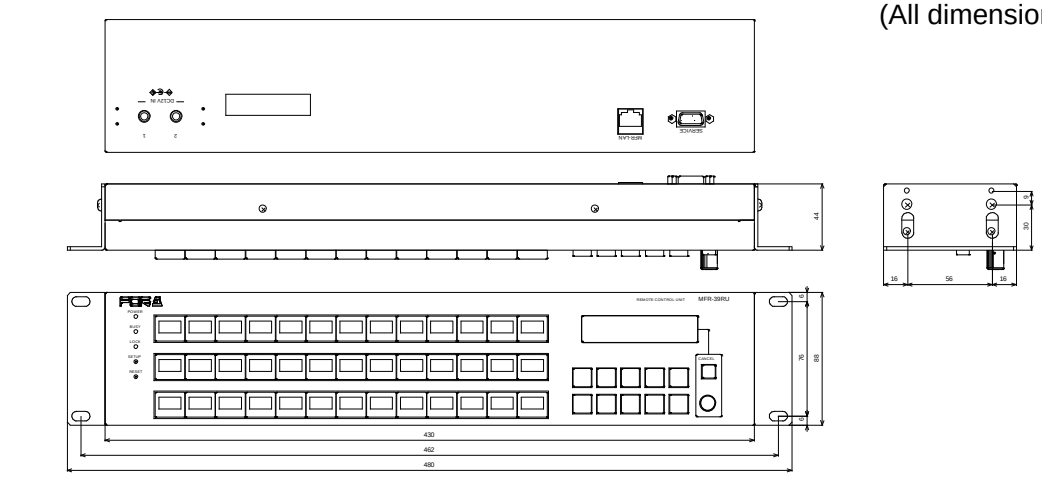
9-2-5. MFR-1616A

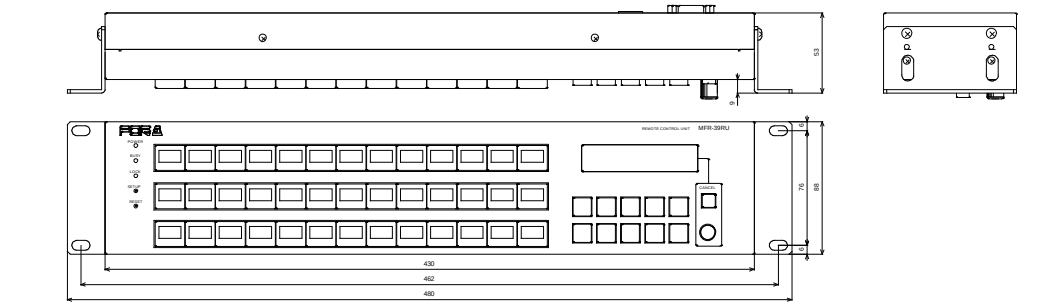
(All dimensions in mm.)



9-2-6. MFR-39RU

(All dimensions in mm.)

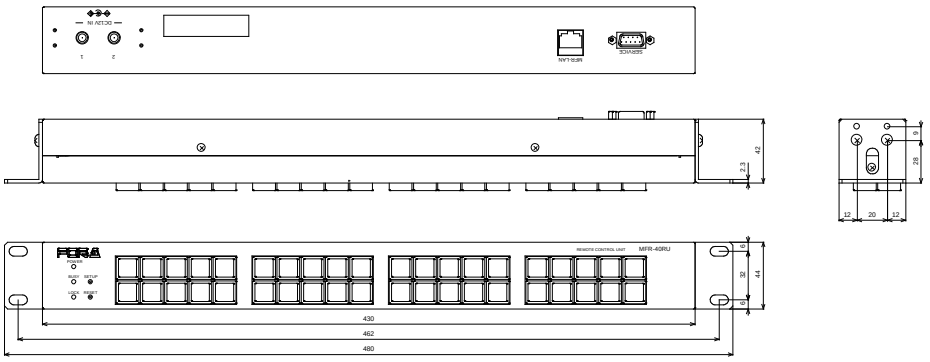


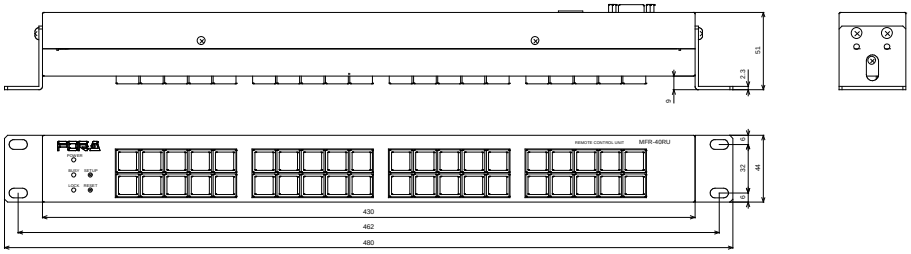


* The panel buttons can be fitted within the rack by sliding the rack ears forward to attach as shown in the bottom figure above.

9-2-7. MFR-40RU

(All dimensions in mm.)

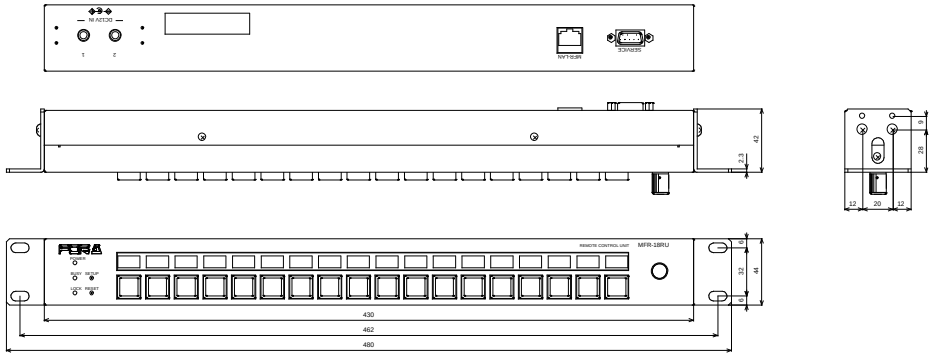


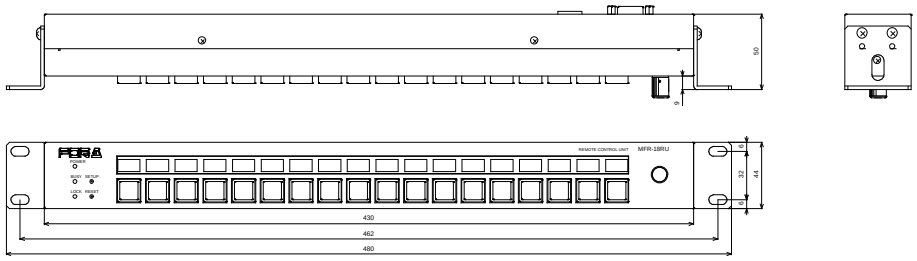


* The panel buttons can be fitted within the rack by sliding the rack ears forward to attach as shown in the bottom figure above.

9-2-8. MFR-18RU

(All dimensions in mm.)

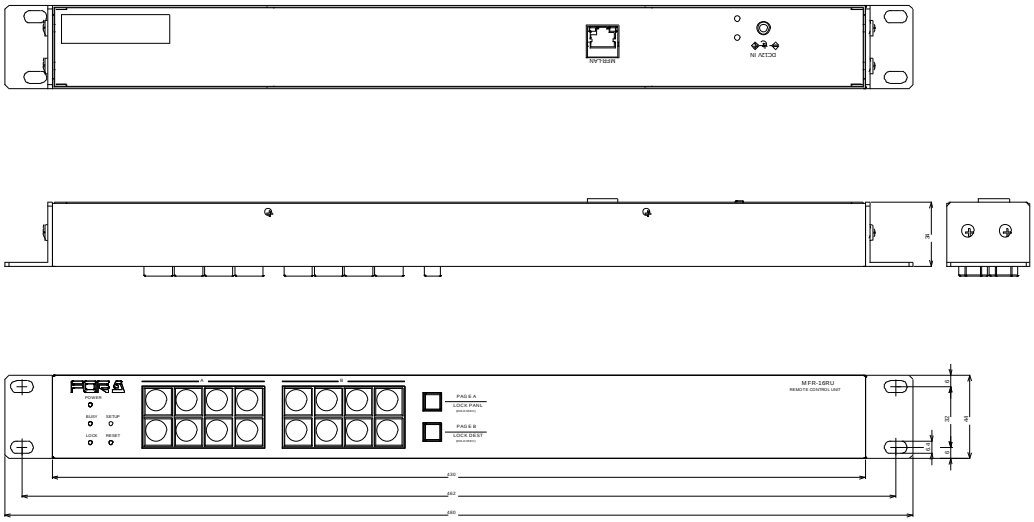




* The panel buttons can be fitted within the rack by sliding the rack ears forward to attach as shown in the bottom figure above.

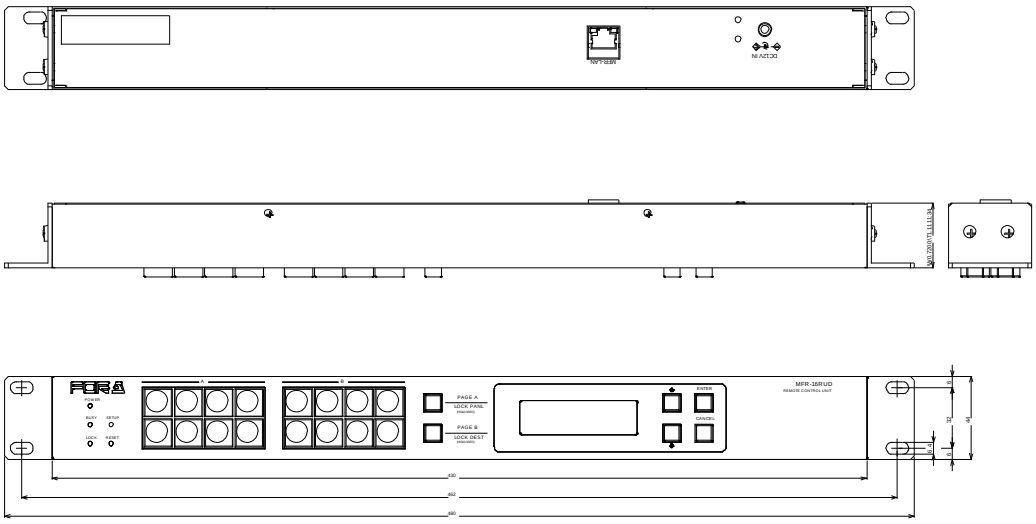
9-2-9. MFR-16RU

(All dimensions in mm.)



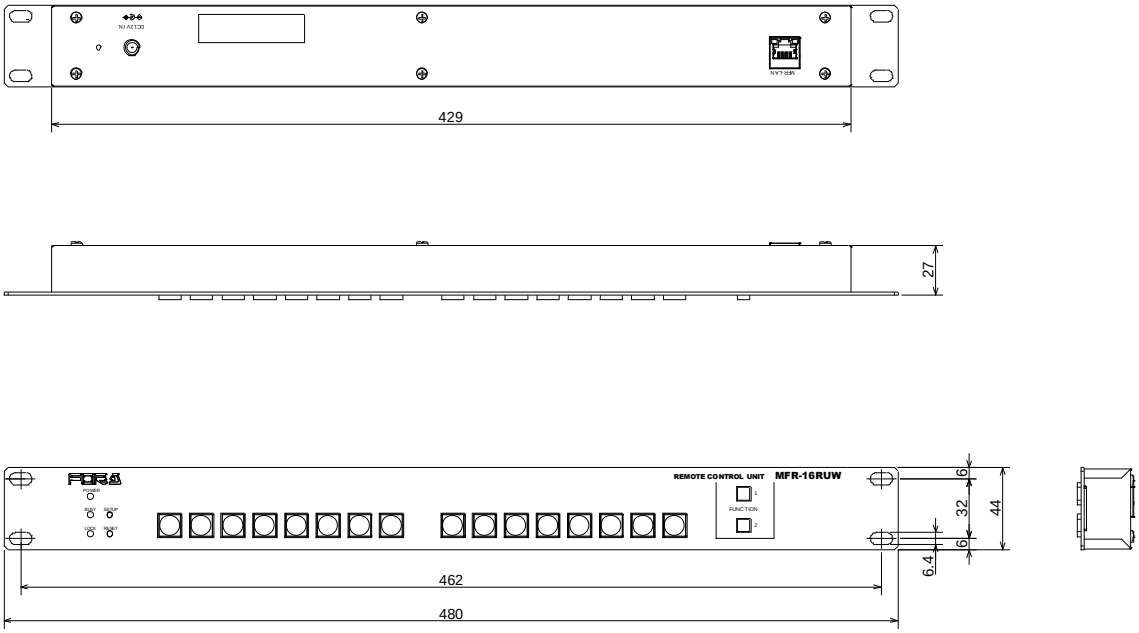
9-2-10. MFR-16RUD

(All dimensions in mm.)



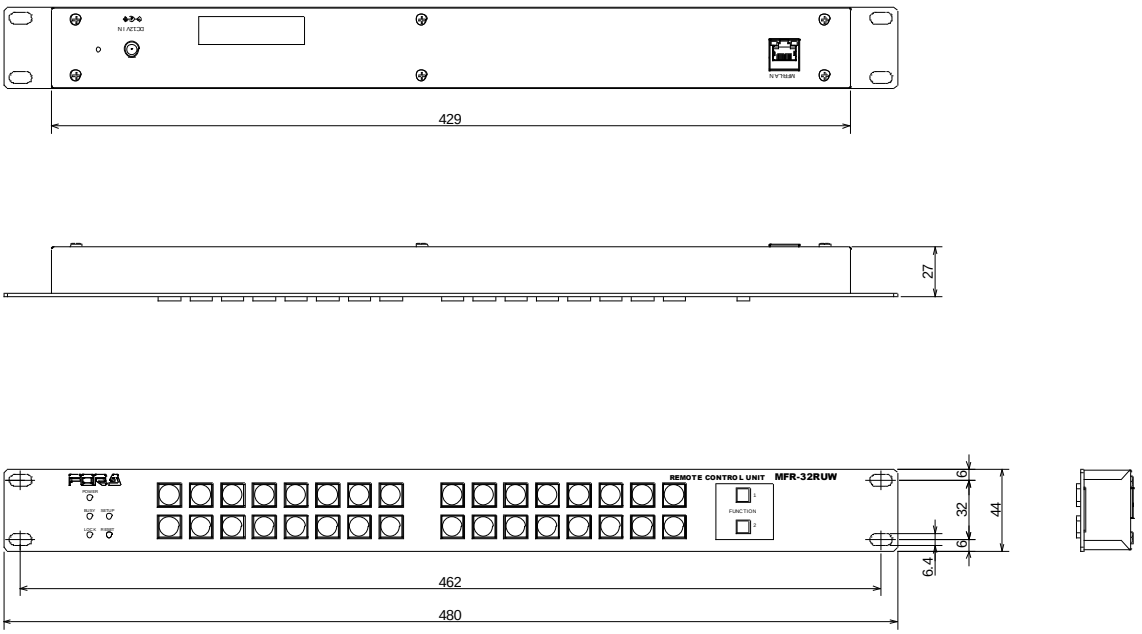
9-2-11. MFR-16RUW

(All dimensions in mm.)



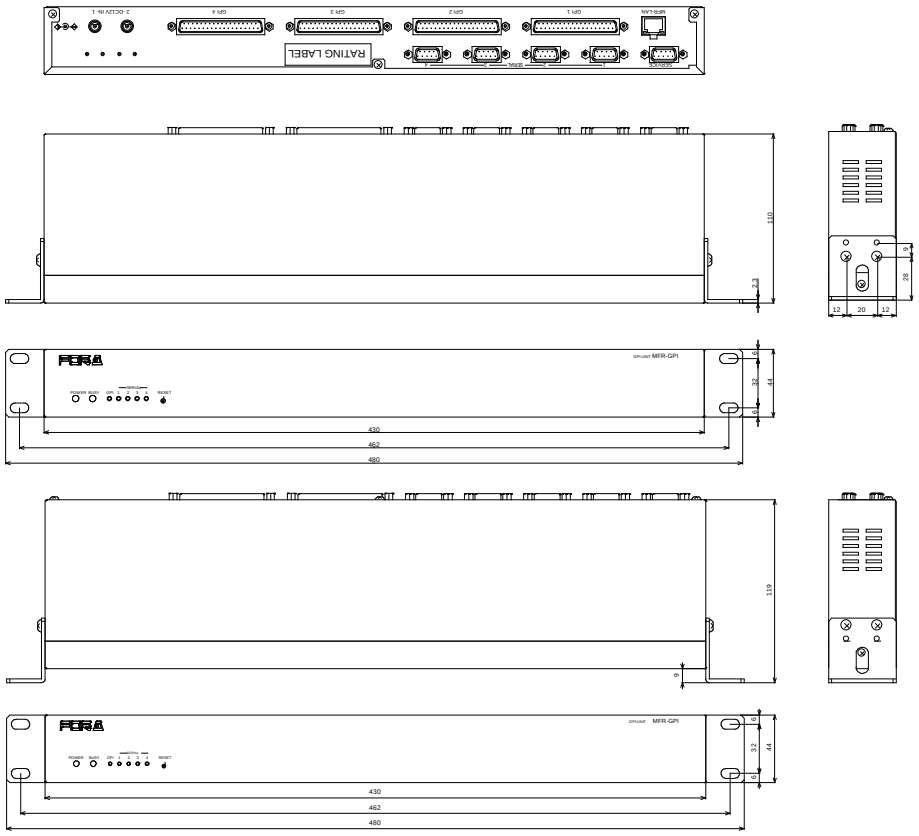
9-2-12. MFR-32RUW

(All dimensions in mm.)



9-2-13. MFR-GPI

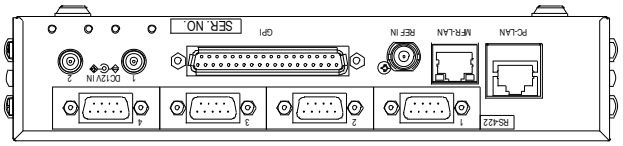
(All dimensions in mm.)

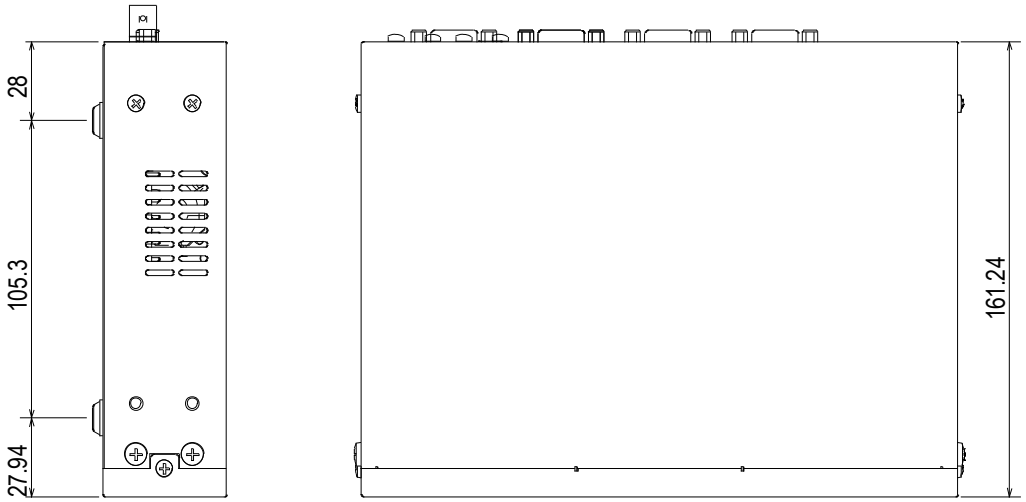


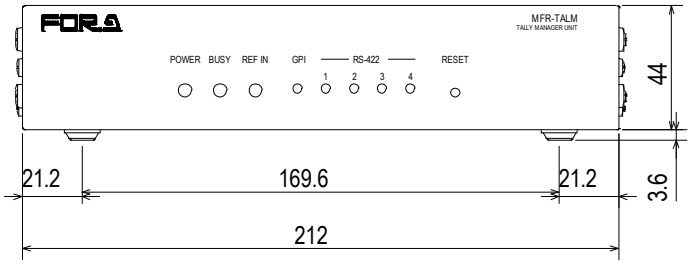
* The panel buttons can be fitted within the rack by sliding the rack ears forward to attach as shown in the bottom figure above.

9-2-14. MFR-TALM

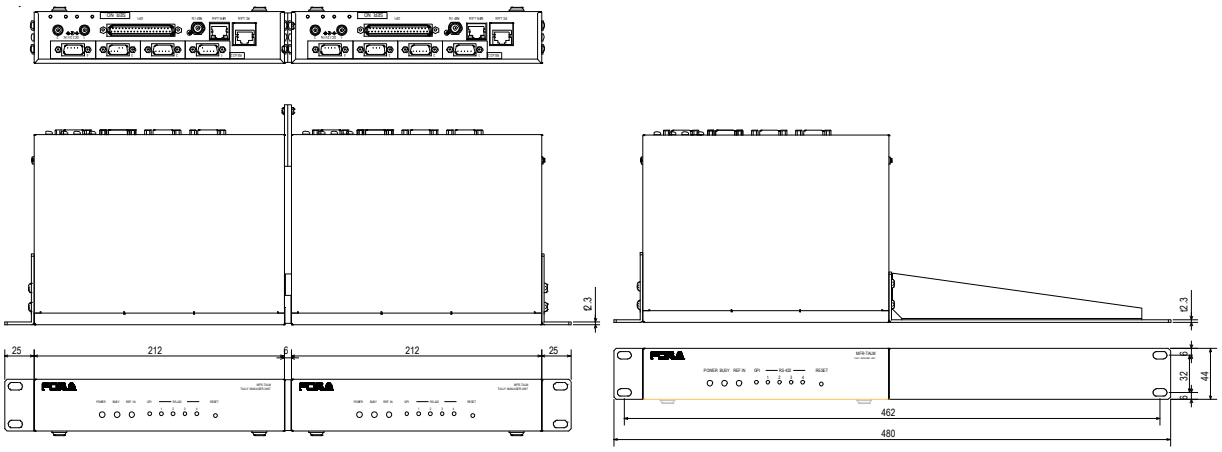
(All dimensions in mm.)



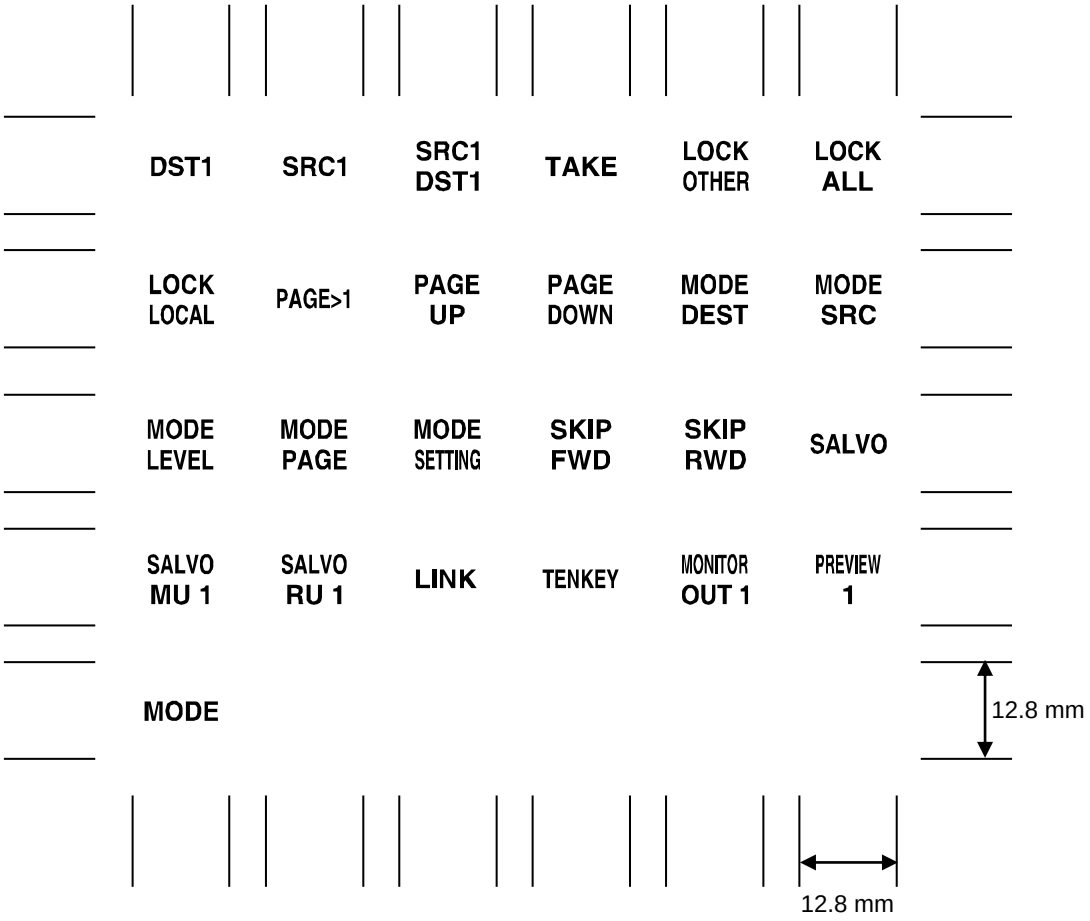




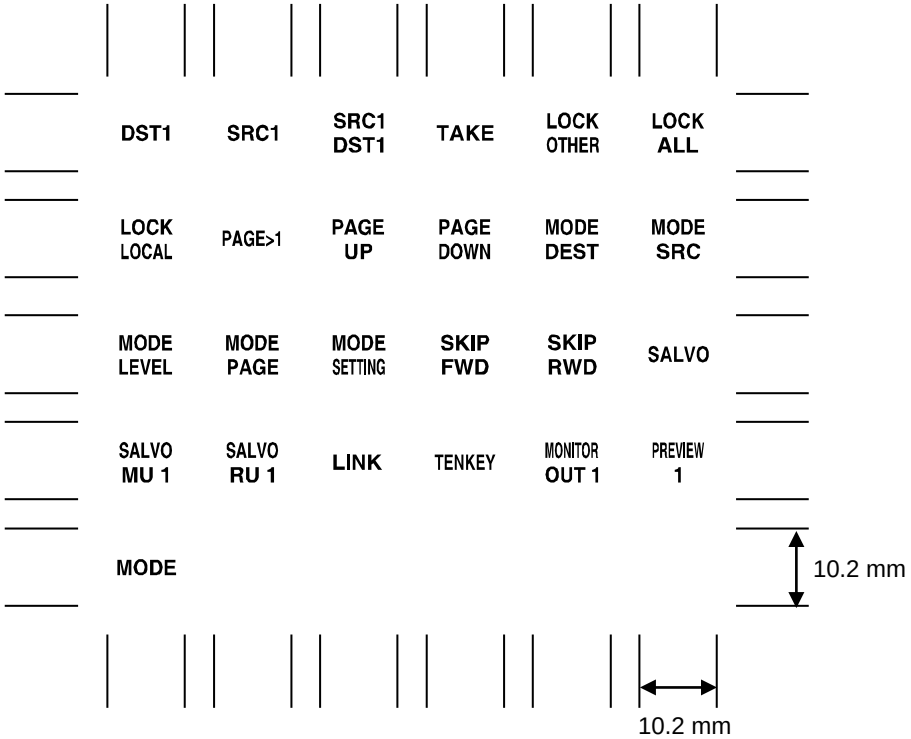
◆ **If attaching the rack mount brackets (Dual / Single)**



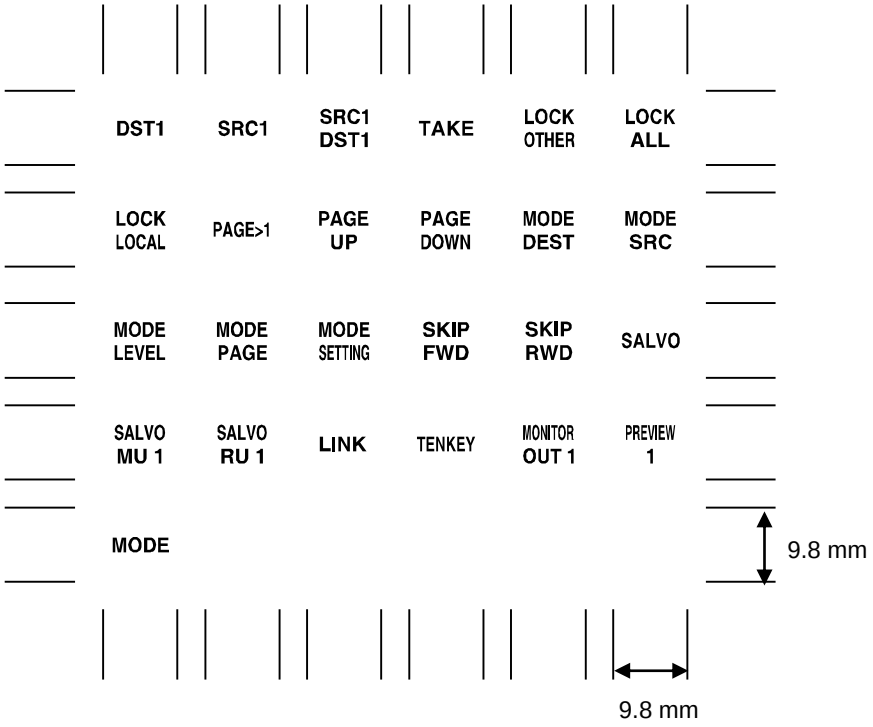
Button Label Template for MFR-40RU/16RU/16RUD



Button Label Template for MFR-39RU



Button Label Template for MFR-16RUW/32RUW



Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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