

# **OPERATION MANUAL**

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**UFM-30DEMUX**

3G/HD/SD Digital Audio Demultiplexer

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**UFM-3DMXAO**

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1<sup>st</sup> Edition - Rev. 1

# Edition Revision History

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Edit.	Rev.	Date	Description	Section/Page
1	-	2013/04/30	First Edition	
1	1	2013/08/27	Supported 3G-SDI and other formats Added "no signal" indication in SDI AUDIO IN SYNC Added "no signal" indication in SDI AUDIO IN PCM Spec details added to Audio Input (SDI embedded) and Audio Output (SDI embedded, AES/EBU) UFM-30DEMUX power current changed	Sec. 6-5-4 Sec. 6-5-5 Sec. 10-1-1 Sec. 10-1-1

# Precautions



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## Important Safety Warnings


### [Power]

 Stop	<p><b>Do not</b> 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.</p>
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### [Circuitry Access]

 Stop	<p><b>Do not</b> touch any parts / circuitry with a high heat factor. Capacitors can retain enough electric charge to cause mild to serious shock, even after power is disconnected. Capacitors associated with the power supply are especially hazardous. Avoid contact with any capacitors.</p>
 Hazard	<p>Unit <b>should not</b> 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.</p>

### [Potential Hazards]

 Caution	<p>If abnormal smells or noises are noticed coming from the unit, turn power off immediately and disconnect power cord to avoid potentially hazardous conditions. If problems similar to above occur, contact authorized service representative <b>before</b> attempting to again operate unit.</p>
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### [Consumables]

 Caution	<p>The consumables used in unit must be replaced periodically. 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 the consumables varies greatly depending on the environment in which they are used, they should be replaced at an early date. For details on replacing the consumables, contact your dealer.</p>
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# Upon Receipt

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## Unpacking

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UFM-30DEMUX Digital Audio De-multiplexer modules 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. Check to ensure no damage has occurred during shipment. If damage has occurred, or items are missing, inform your supplier immediately.

### ◆ UFM-30DEMUX box

ITEM	QTY	REMARKS
UFM-30DEMUX	1 set	Front module 1 Rear module 1
Operation Manual	1	(This manual)

### UFM-3DMXAO box (Analog Output Option)

ITEM	QTY	REMARKS
UFM-3DMXAO	1 set	Front module 1 Rear module 1
Flat cable	1	For connection to UFM-30DEMUX
Gasket	1	For attachment to UFM-30DEMUX

UFM-30DEMUX and UFM-3DMXAO modules are used by installing them into a UF-106B or UF-112 UFM Frame.

UF-106B supports up to 6 pairs of modules (up to 4 pairs if UF-106BPS is installed)

UF-112 supports up to 12 pairs of modules.

### Remote Control Options

ITEM	REMARKS
UFM-30CTL	Control Card

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# 1. Prior to Starting

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## 1-1. Welcome

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Congratulations! By purchasing UFM-30DEMUX Digital Audio De-multiplexer modules 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.

The **UFM-30DEMUX**, Digital Audio De-multiplexer plug-in module is installed into a UF-106B or UF-112 UFM Frame. The unit accepts 3G/HD/SD-SDI signal input, de-multiplexes audio signals and outputs them as AES/EBU digital audio. The de-embedded audio channels can also be mapped into the SDI output. The AES 7/8 port can also output LTC signal by changing the switch setting on the front panel.

The **UFM-3DMXAO** optional analog output module for the UFM-30DEMUX is also installed into the UFM Frame. The unit converts de-embedded digital audio into analog audio signals and outputs them as up to 4 analog stereo pairs.

## 1-2. Features

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- Inputs an SDI stream, and outputs an SDI stream and 4-pair (8ch) AES/EBU.
- Supports 3G/HD/SD-SDI.
- Able to assign 16 channels of SDI de-embedded audio into 8 channels of AES/EBU output.
- Able to D/A-convert and assign 16 channels of SDI de-embedded audio into 8 channels of analog output..
- Able to remap SDI de-embedded audio into the SDI output.
- Supports asynchronous SDI audio input (HD-SDI only).
- Timecode (LTC) output (using the LTC and AES7/8 switchable output or LTC OUT on an optional module card)
- Relay bypass from SDI input to SDI output (when unit power is Off or set to Bypass)
- UFM-3DMXAO option modules provide analog audio output and independent LTC output.

## 1-3. About This Manual

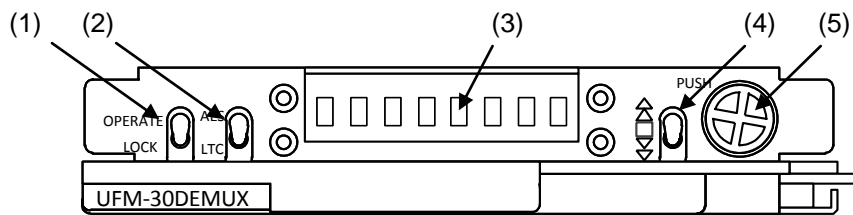
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This manual is intended to help the user easily operate this product and make full use of its functions during operation. Before connecting or operating your unit, read this operation manual thoroughly to ensure you understand the product. Afterwards,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

## 2. Panel Descriptions

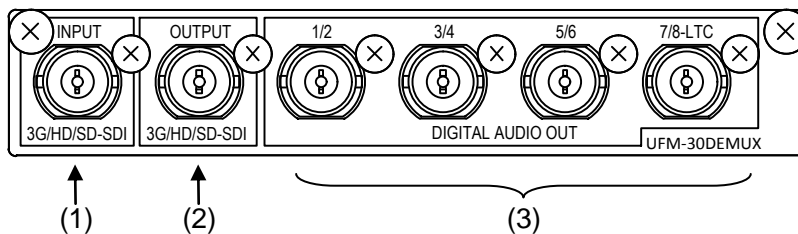
### 2-1. UFM-30DEMUX

#### ◆ Front Panel



No.	Name	Description
(1)	OPERATE/LOCK	If set to OPERATE, the switch is set to Menu mode and menu settings can be made. If set to LOCK, the switch is set to Menu Lock mode and menu settings cannot be made.
(2)	AES/LTC switch	Switches the 7/8-LTC port between AES 7/8 and LTC.
(3)	Display panel	Used to display menus and perform operational settings.
(4)	Up/Down switch	Used to move to higher or lower menu layers.
(5)	Menu Control	Used to perform menu settings.

#### ◆ Rear Panel

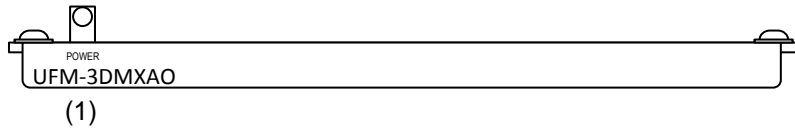


No.	Name	Description
(1)	3G/HD/SD-SDI INPUT	Used to input serial digital component video.
(2)	3G/HD/SD-SDI OUTPUT	Used to output serial digital component video, in which specified audio channels are multiplexed (embedded). The SDI input signal is directly sent to this output via relay, if set to BYPASS or the power supply is down. (See section 6-4-1. "SDI BYPASS.")
(3)	DIGITAL AUDIO OUT	Used to output 4 AES/EBU stereo pairs. Channel 7/8 output can be changed to an LTC output. (See (2) in Front Panel above.)

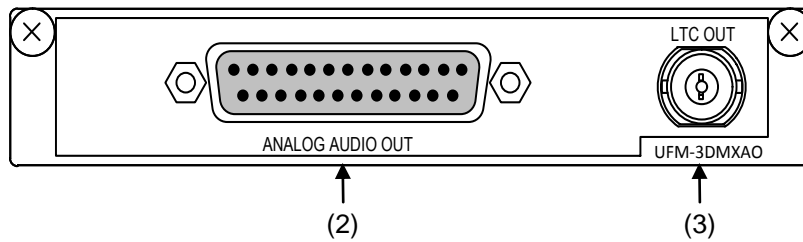


## 2-2. UFM-3DMXAO (Option)

### ◆ Front Panel



### ◆ Rear Panel



No.	Name	Description
(1)	POWER LED	Displays the power status.
(2)	ANALOG AUDIO OUT	Used to output analog audio. See section 3-3-1. "Analog Audio Connection."
(3)	LTC OUT	Used to output LTC time code.

## 3. Connection

### 3-1. Installing to a UFM frame

UFM-30DEMUX and UFM-3DMXAO modules are used by installing them into UF-106B or UF-112 UFM frames.

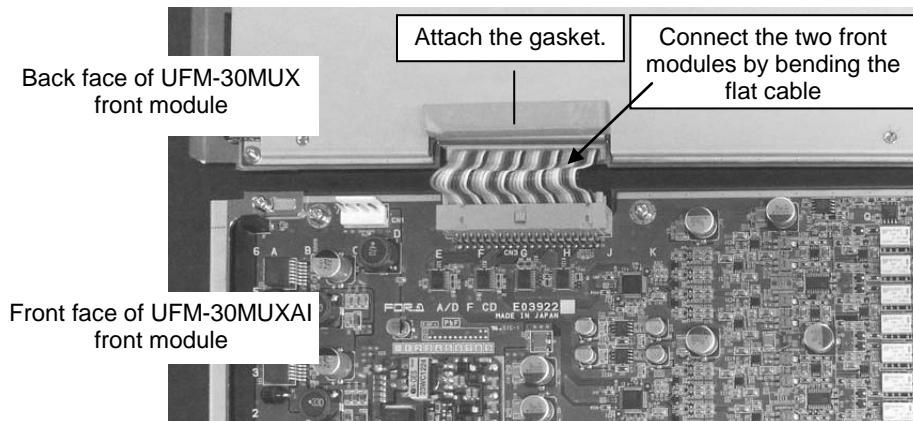
#### ◆ UFM-30DEMUX

UFM-30DEMUX modules can be installed in any empty slot on UFM frames. A UFM-30DEMUX module set consists of a front and rear module. Be sure to always install the front and rear modules in the same slot positions.

#### ◆ UFM-3DMXAO

Install a UFM-3DMXAO module set into the slot **just below the UFM-30DEMUX slot**.

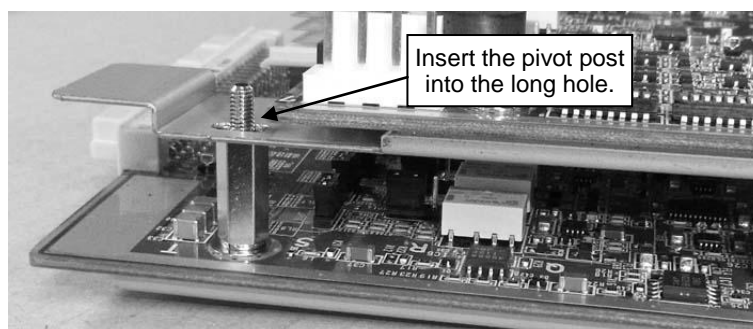
- (1) Attach the gasket supplied with the UFM-3DMXAO on the UFM-30DEMUX card as shown in the figure below.  
Then, connect the UFM-30DEMUX and UFM-3DMXAO front modules with the supplied flat cable. Bend the flat cable as shown in the figure below.



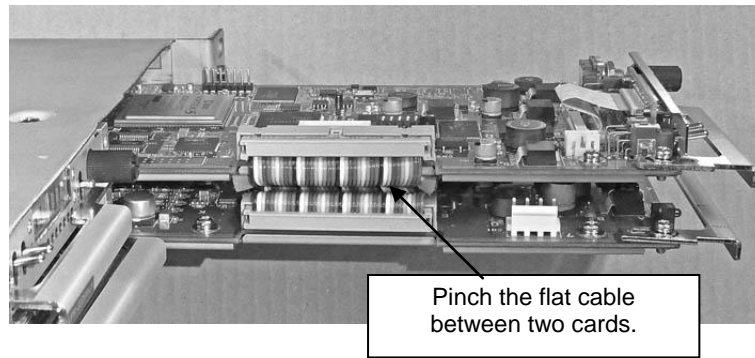
#### IMPORTANT

Make sure that when a UFM-3DMXAO is connected to the UFM-30DEMUX, the supplied gasket is attached to the UFM-30DEMUX card.

- (2) After connecting the flat cable, align the two module cards so that the pivot post on the UFM-3DMXAO card is correctly inserted into the pivot hole of the UFM-30DEMUX card.

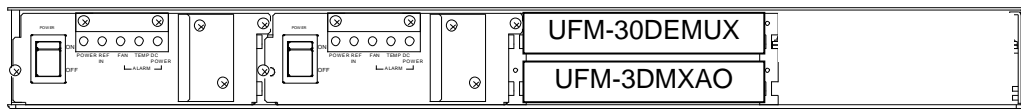


- (3) Insert the two front modules into slots on a UFM frame by pinching the flat cable between two card modules as shown below.

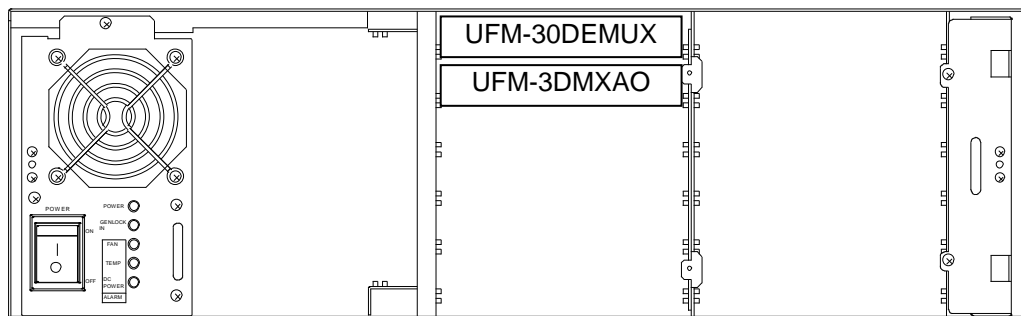


- (4) A UFM-3DMXAO module set consists of a front and rear module. Be sure to install the front and rear modules in the same slot positions.

UF-106B front panel



UF-112 front panel

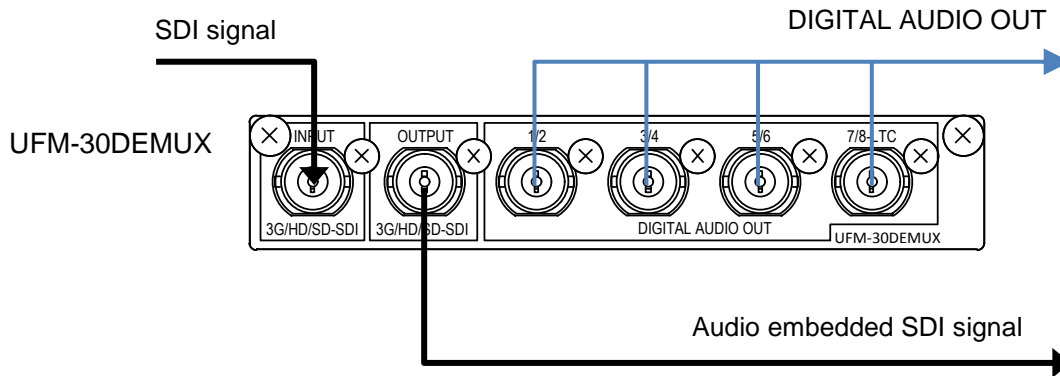


**IMPORTANT**

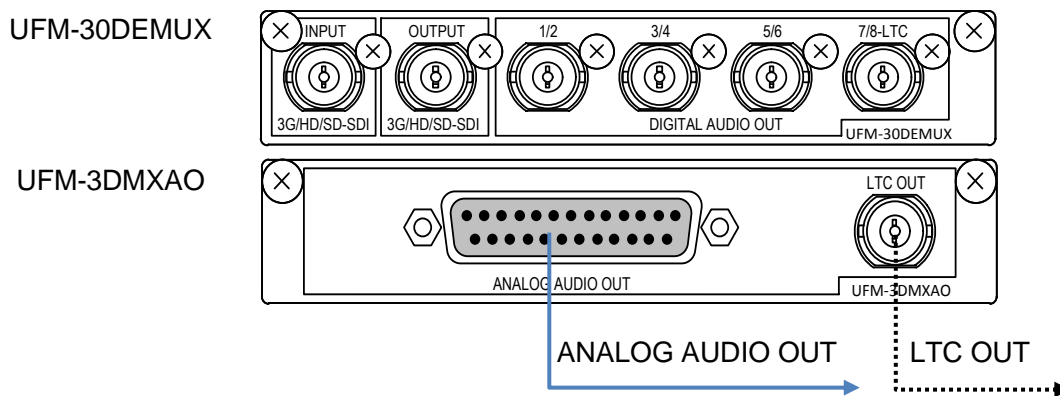
Refer to the UF-106B or UF-112 Operation Manual for details on the module installation.

### 3-2. Basic Configuration (UFM-30DEMUX)

Connect UFM-30DEMUX modules to peripheral devices referring to the figure below.



### 3-3. Optional Configuration (UFM-3DMXAO)



**IMPORTANT**

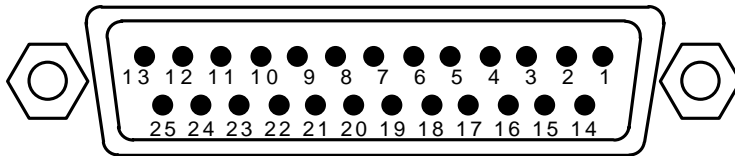
The UFM-30DEMUX and UFM-3DMXAO front modules must be connected using the supplied flat cable.

### 3-3-1. Analog Audio Connection

For balanced audio signals, connect the **hot**, **cold** and **shield** conductor to "+", " - " and "**COM**" pins respectively.

For unbalanced audio signals, connect the conductor that carries **audio** to a "+" pin and **ground** to "**COM**."

#### ◆ Analog Audio Connector (25-pin D-sub , Female, Inch screws)



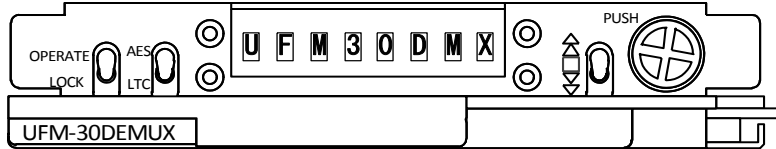
#### ◆ Signal Assignments (25-pin D-sub , Female)

Pin No.	Setting
1	CH4 R+
2	CH4 R COM
3	CH4 L-
4	CH3 R+
5	CH3 R COM
6	CH3 L-
7	CH2 R+
8	CH2 R COM
9	CH2 L-
10	CH1 R+
11	CH1 R COM
12	CH1 L-
13	NC
14	CH4 R-
15	CH4 L+
16	CH4 L COM
17	CH3 R-
18	CH3 L+
19	CH3 L COM
20	CH2 R-
21	CH2 L+
22	CH2 L COM
23	CH1 R-
24	CH1 L+
25	CH1 L COM

## 4. Operation

### 4-1. Power ON

After verifying that all wiring is correctly connected, apply power to the UFM frame. The UFM-30DEMUX will start up and display "UFM30DMX" as shown below.



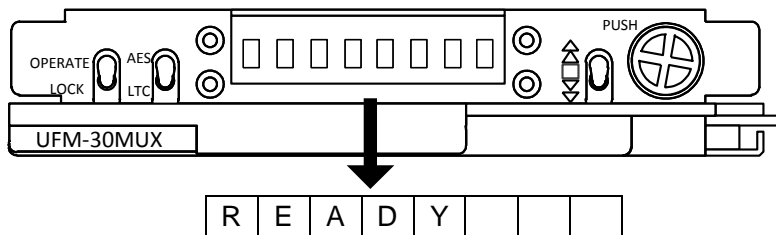
### 4-2. Operation and Menu Modes

#### 4-2-1. Operation (Normal) Mode

After powering itself on, the UFM-30DEMUX will enter **Operation** mode and display the SDI signal status.

If the SDI signal is normal, "**READY**" will be displayed.

If the SDI signal is abnormal, an error message will be displayed. (See the table below.)



SDI status display	Description
READY	SDI signal is present.
NO SIG	No SDI signal is present.
CRC ERR	A CRC error is detected.
OP ERR	An incompatible option item is installed.

#### IMPORTANT

"OP ERR" is displayed when an incompatible option module is connected to the UFM-30DEMUX. Power off the frame, remove and disconnect the optional module.

#### ◆ To return to Operation mode

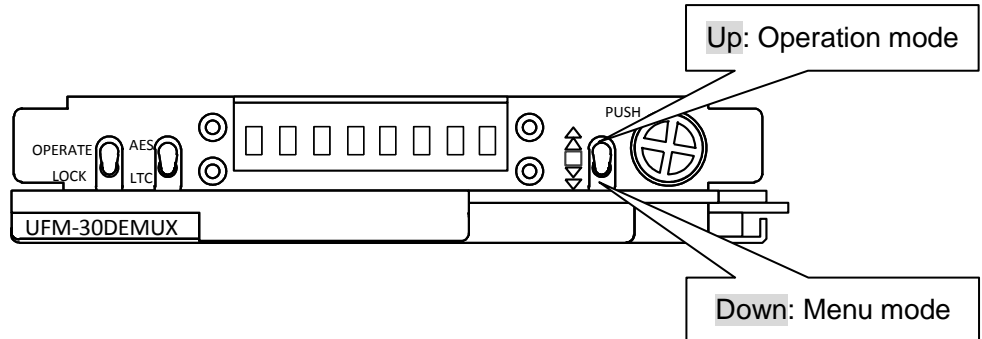
To return to **Operation** mode from **Menu** mode, move the Up/Down switch to the **Up** position.

## 4-2-2. Menu Mode

The Menu mode is used to set up modules.

### ◆ To Enter Menu mode

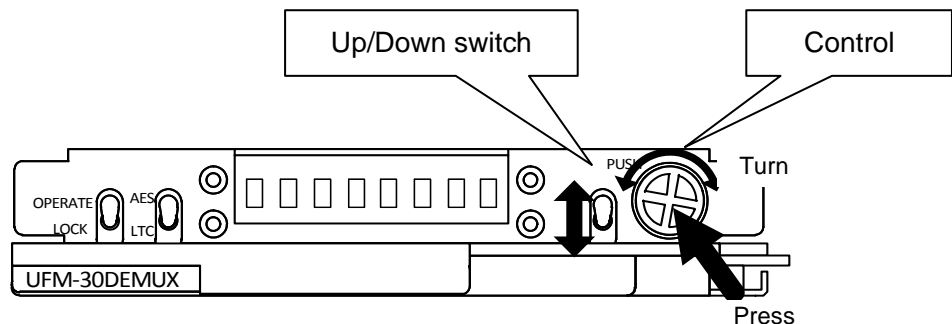
To enter **Menu** mode from **Operation** mode, move the **Up/Down** switch to the **Down** position.



The UFM-30DEMUX menu is composed of three or four levels or hierarchies: menus, parameters, channels and values. Channels are not included in some menus. See section 5-3. "Menu Details" for details.

### ◆ Menu Display

	Menu	Parameter	Channel	Value
(Moving between items or levels)	Input Mapping Output etc.	SDI SYNC SDI MAP EMB THRU etc.	Group1 CH1 CH1/2 etc.	Auto SDI CH1 Stereo etc.
Turn Control	↕	↕	↕	↕
Press Control Up/Down switch to Down	→	→	→	→
Up/Down switch to Up	←	←	←	←



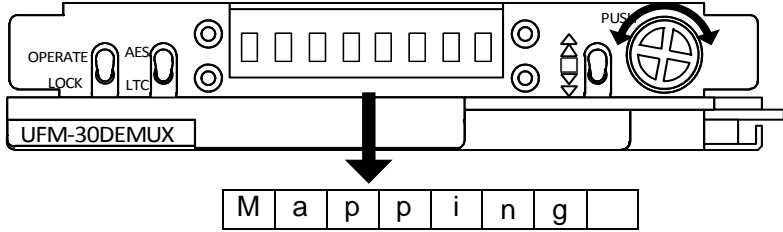
- To select an item in each level, **turn** the **Control** knob.
- To move to a lower level, move the **Up/Down switch** to the **Down** position, and to move to a higher level, move the switch to **Up**.
- Pressing the control knob or moving the switch to **Down** in the Value level applies the changed value. The cursor will automatically return to the Channel level.

### 4-2-3. Menu Operation Example

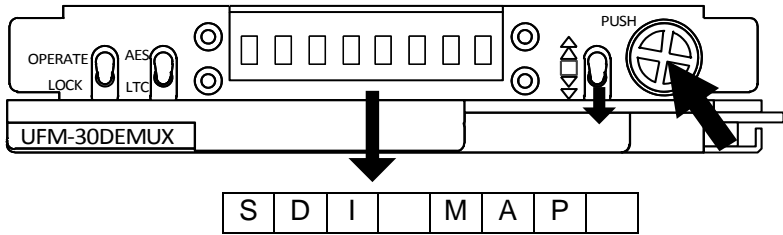
This chapter explains how to set menu parameters using a menu operational example, in which **CH6** SDI de-embedded audio is assigned to **AES CH2** output.

Menu	Parameter	Channel	Value
Input	SDI MAP	CH1	SDI CH1
Mapping	AES MAP	CH2	
Output	ANA MAP	CH3	SDI CH6

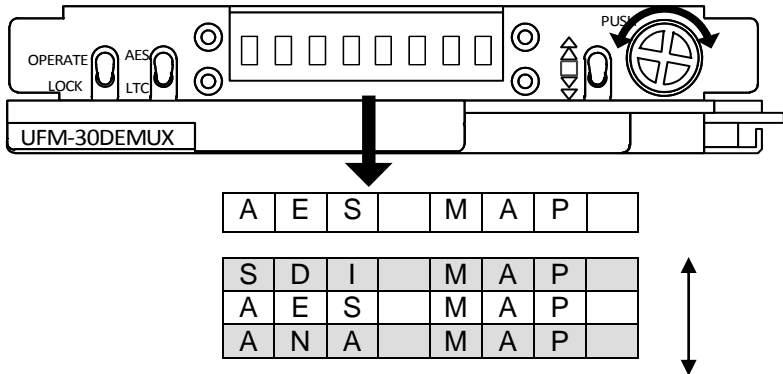
(1) Turn the control knob to select the **Mapping** menu.



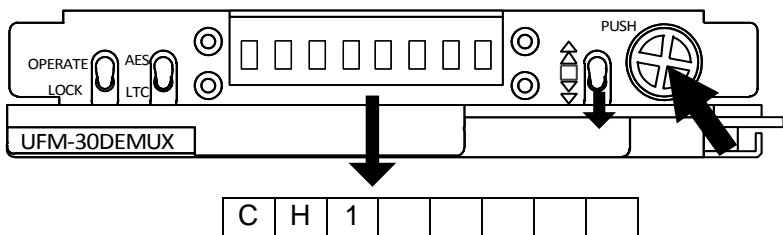
(2) Press the control or move the switch down to go to the parameter level.



(3) Turn the control to select the **AES MAP** (AES OUT MAPPING) parameter.

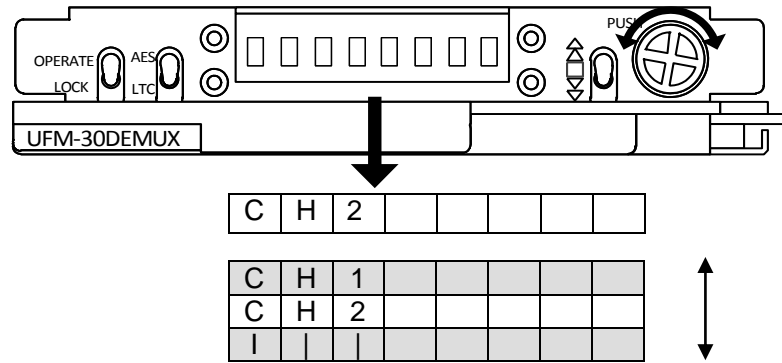


(4) Press the control or move the switch down to go to the channel level.

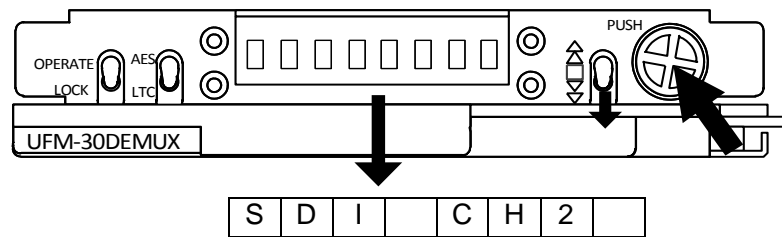




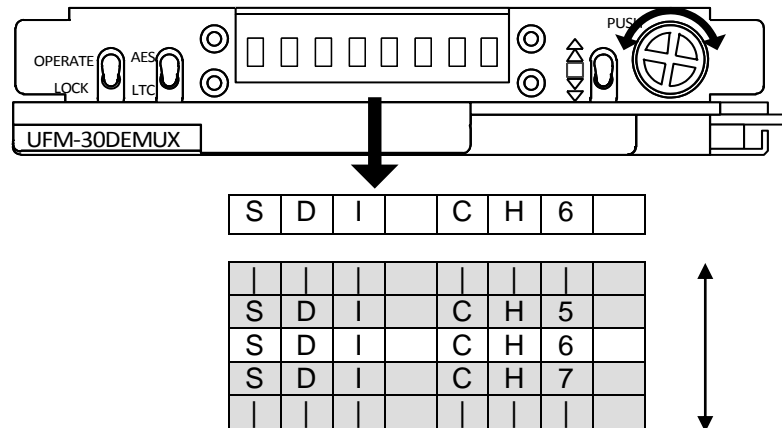
(5) Turn the control to select CH2.



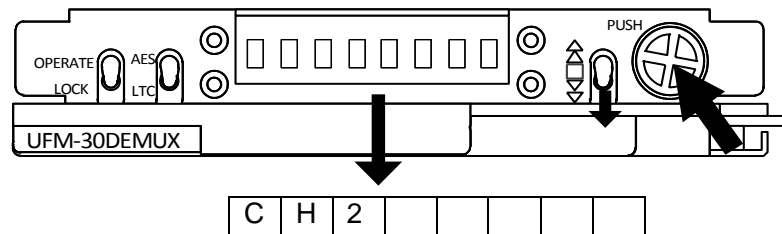
(6) Press the control or move the switch down. The current setting (SDI CH2) will blink.



(7) Turn the control to select SDI CH6.



(8) Press the control or move the switch down to confirm the change. The display will automatically return to the channel level.



To set other channels in the same parameter, repeat Steps (5) to (8).  
 To set another menu parameter, move the switch up once or twice then select a menu and/or parameter, select a channel, then set its value.  
 After all settings are completed, move the switch up the required number of times to return to Operation mode.

## 4-3. Menu List

Menu	Description
Input	Sets up SDI input embedded audio.
Mapping	Assigns SDI de-embedded audio channels to AES, SDI-embedded or analog output channels.
Output	Sets up audio output.
System	Sets up the system and SDI signals.
Status (Display only)	Displays the embedded audio and LTC input status.

### IMPORTANT

To reset all menu parameters to factory settings, see section 6-4-7. "FACTORY SET."

#### ◆ Input Menu

Parameter		Channel	Setting	Refer to
Full name	Menu name			
SDI IN SYNC MODE	SDI SYNC	Group1 to 4	Auto Sync Async	6-1-1
SDI IN PCM MODE	SDI PCM	Group1 to 4	Auto PCM NonPCM	6-1-2
SDI IN GAIN	SDI Gain	CH1 to 16	+20.0dB +19.9dB   -19.9dB -20.0dB	6-1-3

#### ◆ Mapping Menu

Parameter		Channel	Setting	Refer to
Full name	Menu name			
SDI OUT MAPPING	SDI MAP	CH1 to 16	SDI CH1 to 16 SDI GRP1 to 4	6-2-1
AES OUT MAPPING	AES MAP	CH1 to 8	SDI CH1 to 16	6-2-2
ANALOG OUT MAPPING	ANA MAP	CH1 to 8	SDI CH1 to 16	6-2-3

#### ◆ Output Menu

Parameter		Channel		Setting	Refer to
Full name	Menu name				
EMB THRU	EMB THRU	3G HD	Group1 to 4	Embed Through	6-3-1
		SD	---		
SDI OUT STEREO MODE	SDI MODE	CH1/2 to CH15/16		Stereo L-CH R-CH L+R L-Mute R-Mute	6-3-2
AES OUT STEREO MODE	AES MODE	CH1/2 to CH7/8			
ANALOG STEREO MODE	ANA MODE	CH1/2 to CH7/8			

Parameter		Setting		Refer to
Full name	Menu name			
SDI OUT RESOLUTION	SDI RESO	CH1 to 16	24bit 20bit 16bit	6-3-3
AES OUT RESOLUTION	AES RESO	CH1/2 to CH7/8		
SDI OUT GAIN	SDI Gain	CH1 to 16	+20.0dB +19.9dB   -19.9dB -20.0dB	6-3-4
AES OUT GAIN	AES Gain	CH1 to 8		
ANALOG OUT GAIN	ANA Gain	CH1 to 8		
ANALOG OUT LEVEL	ANA LVL	CH1/2 to CH7/8	+10dB +8dB +4dB 0dB -4dB -10dB -20dB	6-3-5

◆ **System Menu**

Parameter		Setting	Refer to
Full name	Menu name		
SDI BYPASS	SDI BYPS	Operate Bypass	6-4-1
SDI LOCK MODE	SDI Lock	Auto Internal	6-4-2
TV SYSTEM	Format	(See the "Format settings" table below)	6-4-3
MINIMUM DELAY	MIN DLY	On Off	6-4-4
REF LEVEL	REF LVL	-20dB -18dB	6-4-5
TEST MODE	Test SIG	On Off	6-4-6
FACTORY SET	FACT SET	EXEC	6-4-7

Format settings

3G SDI	HD SDI		SD SDI
1080/59a	1080/59i	720/59p	525/60 625/50
1080/50a	1080/50i	720/50p	
1080/60a	1080/60i	720/60p	
1080/59b	1080/30p	720/24p	
1080/50b	1080/29p	720/23p	
1080/60b	1080/25p	1035/59i	
	1080/24p	1035/60i	
a: Level A	1080/23p		
b: Level B	1080/24s	s: PsF	
	1080/23s		

◆ **Status Menu (Display only)**

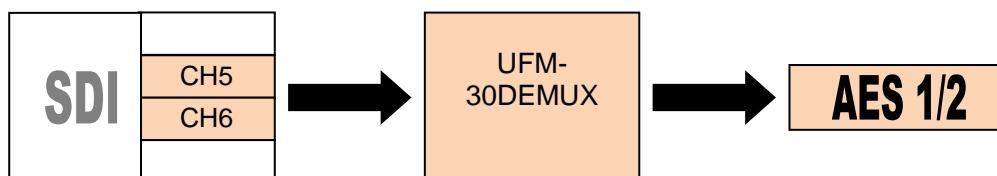
Parameter		Channel	Display	Refer to
Full name	Menu name			
SDI STATUS	SDI ERR		No Error No SIG CRC ERR	6-5-1
SDI TV SYSTEM	Format		(See the "Format settings" table on the previous page.)	6-5-2
SDI AUDIO IN ON/OFF	SDI AUD	Group 1 Group 2 Group 3 Group 4	40000 1 800xx 5 12xxxo 9 16xxxx13	6-5-3
SDI AUDIO IN SYNC	SDI Sync		G4aassG1	6-5-4
SDI AUDIO IN PCM	SDI PCM		G4ppnpG1	6-5-5
LTC IN ON/OFF	LTC In	SDI	On Off	6-5-6
SLOT	Slot		1 to 12	6-5-7
OPTION	Option		No Opt 3DMXAO	6-5-8
VERSION	Version	CPU FPGA CPLD	XX.XX XX.XX XX.XX	6-5-9

## 5. Operation Examples

### 5-1. SDI CH5/6 >> AES CH1/2

This example assigns CH5/6 SDI de-embedded audio to CH1/2 AES audio output.

Audio source	SDI input CH 5 and CH 6
Output channels	AES output CH 1 and CH 2



#### ◆ Setting Required Parameters

Menu	Parameter	Channel	Setting	Description	Refer to
Mapping	AES MAP	CH1	SDI CH5	Assigns CH5/6 SDI de-embedded audio to CH1/2 AES output.	6-2-1
		CH2	SDI CH6		
System	SDI BYPS	---	Operate (default)	Performs audio processing.	6-4-1

For details on the menu setting, see section 4-2-3. "Menu Operation Example."

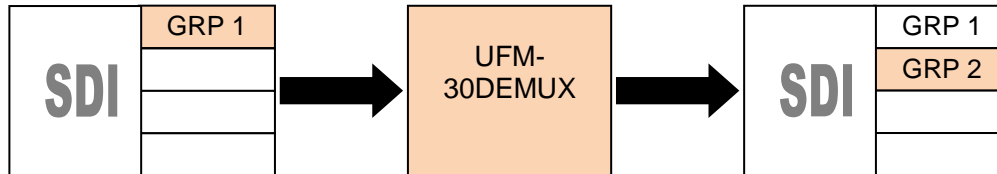
#### ◆ Adjustable Parameters

Menu	Parameter	Channel	Default Setting	Description	Refer to
Input	SDI SYNC	Group 2	Auto	Allows you to select Sync or Async for audio source.	6-1-1
	SDI PCM	Group 2	Auto	Allows you to select PCM or nonPCM for audio source.	6-1-2
	SDI Gain	CH5 CH6	0.0dB	Allows you to adjust input gain.	6-1-3
Output	AES MODE	CH1/2	Stereo	Allows you to select stereo or mono for output audio.	6-3-2
	AES RESO	CH1/2	24bit	Allows you to select bit depth for output audio.	6-3-3
	AES Gain	CH1/2	0.0dB	Allows you to adjust output gain.	6-3-4
System	SDI Lock	---	Auto	Allows you to select an SDI format if set to <b>Internal</b> .	6-4-2
	Test SIG	---	Off	Allows you to output the test signal if set to <b>On</b> .	6-4-6

## 5-2. SDI GRP1 >> SDI GRP2

This example remaps asynchronous SDI embedded audio channels. Embedded audio Group 1 (CH1-4) is assigned to Group 2(CH5-8).

Audio source	SDI input audio Group 1 (CH1 to 4)
Output channels	SDI output audio Group 2 (CH5 to 8 )



### ◆ Setting Required Parameters

Menu	Parameter	Channel	Setting	Description	Refer to
Input	SDI SYNC	Group1	Auto (default)	Automatically changes the mode to asynchronous.	6-1-1
Mapping	SDI MAP	CH5	SDI GRP1	Assigns SDI input audio Group 1 to SDI output audio Group 2.	6-2-1
Output	EMB THRU	Group 2 *	Embed (default)	Embeds the audio source to Group 2.	6-3-1
System	SDI BYPS	---	Operate (default)	Performs audio processing.	6-4-1

\* For SD-SDI signals, Embed or Through should be selected for all groups.

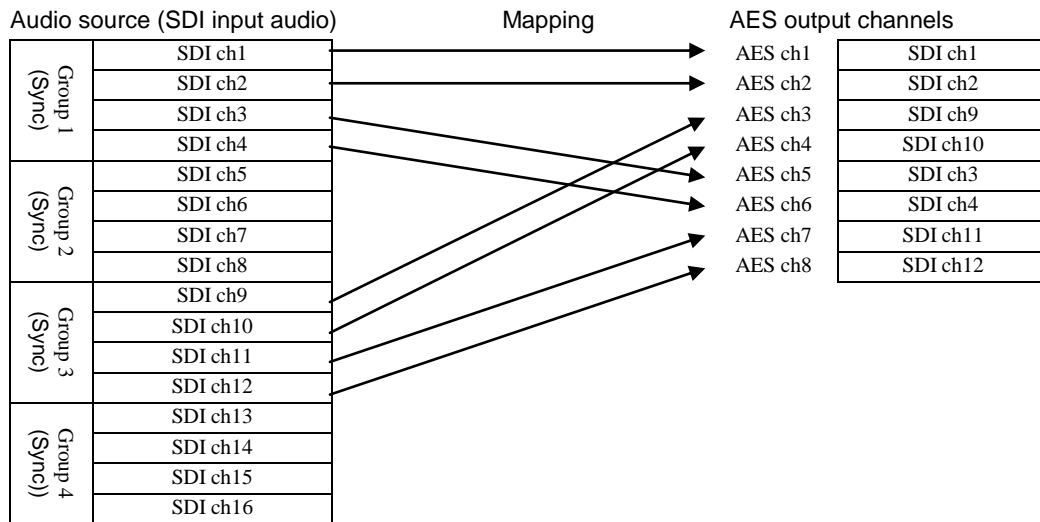
### ◆ Adjustable Parameters

Menu	Parameter	Channel	Default Setting	Description	Refer to
Input	SDI PCM	Group1	Auto	Allows you to select PCM or nonPCM for audio source.	6-1-2
	SDI Gain	CH1-4	0.0dB	Allows you to adjust input gain.	6-1-3
Output	SDI MODE	CH5/6 CH7/8	Stereo	Allows you to select stereo or mono for output audio.	6-3-2
	SDI RESO	CH5-8	24bit	Allows you to select bit depth for output audio.	6-3-3
	SDI Gain	CH5-8	0.0dB	Allows you to adjust output gain.	6-1-3
System	SDI Lock	---	Auto	Allows you to select an SDI format if set to <b>Internal</b> .	6-4-2
	Test SIG	---	Off	Allows you to output the test signal if set to <b>On</b> .	6-4-6

## 5-3. Synchronous / Asynchronous Audio Mapping

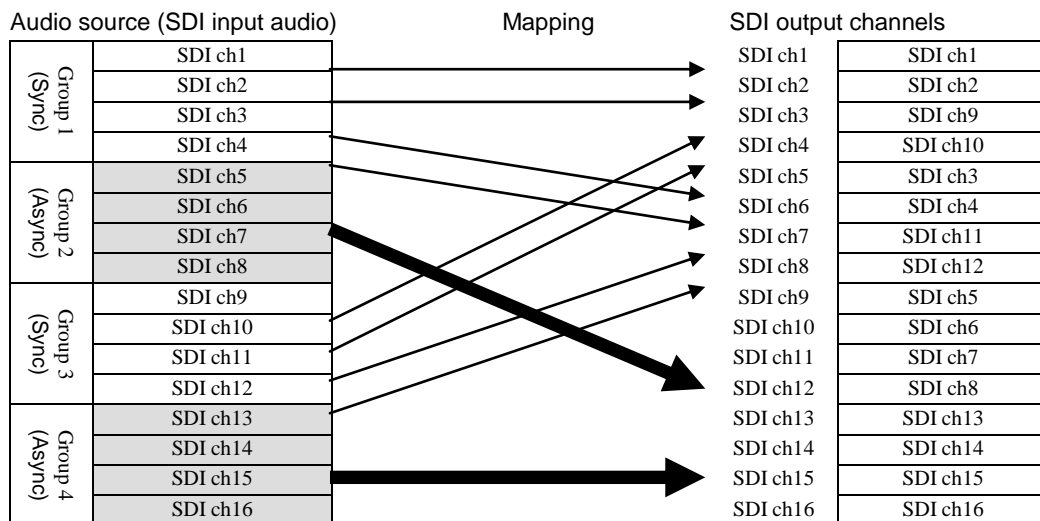
If audio source channels are **synchronized** with the SDI input, they can be freely mapped to audio output channels on a **per-channel** basis. If audio source channels are **asynchronous**, they are mapped on a **per-group** basis.

### ◆ AES Audio Mapping Example (Freely assignable on a per-channel basis)



### ◆ SDI AudioMapping Example (Synchronous and Asynchronous Audio)

Freely assignable on a per-channel (for synchronous audio) and group basis (for asynchronous audio)



#### IMPORTANT

If audio channels are mapped on a per-channel basis and some audio channels are changed from synchronous to asynchronous during processing, the audio channels may play out improperly or noisily. In such case, verify and remap the channels on a per-group basis.

## 6. Menu Details

### 6-1. Input Menu

#### 6-1-1. SDI IN SYNC MODE

Parameter	Channel	Default	Description
SDI SYNC	Group1 to 4	Auto	Selects the sync mode for embedded audio processing. (3G/HD-SDI)  <b>Auto</b> Automatically selects Sync or Async mode according to the information in embedded audio. <b>Sync</b> Processes audio in synchronous mode. <b>Async</b> Processes audio in asynchronous mode.

\* The "asx" of the UDW (user data word) bits in embedded audio packets indicates the audio sync mode.

\* If **Sync** or **Async** is selected, it is also set in the "asx" of the UDW bits in output audio.

#### NOTE

Asynchronous audio mapping can only be performed on a per-group basis. Otherwise, some audio channels may be noisy or output improperly due to the mixture of synchronous and asynchronous audio channels in a group.

SDI embedded audio input cannot be assigned to output audio in Minimum Delay mode.

#### 6-1-2. SDI IN PCM MODE

Parameter	Channel	Default	Description
SDI PCM	Group1 to 4	Auto	Selects PCM (linear PCM, uncompressed) or non-PCM (non-linear PCM) mode for embedded audio processing.  <b>Auto</b> Automatically selects PCM or non-PCM mode according to the information in embedded audio. <b>PCM</b> Processes audio in PCM mode. <b>NonPCM</b> Processes audio in non-PCM mode.

\* The PCM or non-PCM information is included in the corresponding Channel Status bit.

#### ◆ PCM and NonPCM

**Linear PCM audio** indicates raw and uncompressed digital audio data, which is encoded from analog audio signals using the Linear Pulse Code Modulation (LPCM) method.

**NonPCM (non-linear) audio** indicates digital audio data other than linear PCM audio and includes compressed audio streams such as Dolby E or AC3.

#### IMPORTANT

Note that some audio channels may be output improperly if PCM and non-PCM or non-PCM of different-format audio channels are included in a group.



### 6-1-3. SDI IN GAIN

Parameter	Channel	Default	Description
SDI Gain	CH1 to 16	0.0dB	Adjusts the input gain for each embedded audio channel. Gain adjustment cannot be performed for non-PCM audio channels. (See section 6-1-2.)  <b>-20.0dB to +20.0dB</b> (in 0.1dB steps)

## 6-2. Mapping Menu

### 6-2-1. SDI OUT MAPPING

Parameter	Channel	Default	Description
SDI MAP	CH1 to 16	SDI CH1 to 8	Assigns SDI audio input channels to SDI output channels. Basically, audio assignments can be performed on a per-channel basis, however, asynchronous (non-PCM) audio must be assigned on a per-group basis.  Available audio channels are: <b>SDI CH1 to 16</b> <b>SDI GRP1 to 4</b>

### 6-2-2. AES OUT MAPPING

Parameter	Channel	Default	Description
AES MAP	CH1 to 8	SDI CH1 to 8	Assigns SDI audio input channels to AES output channels.  Available audio channels are: <b>SDI CH1 to 16</b>

### 6-2-3. ANALOG OUT MAPPING (UFM-3DMXAO)

Parameter	Channel	Default	Description
ANA MAP	CH1 to 8	SDI CH1 to 8	Assigns SDI audio input channels to analog output channels.  Available audio channels are: <b>SDI CH1 to 16</b>

## 6-3. Output Menu

### 6-3-1. EMB THRU

Parameter	Channel		Default	Description
EMB THRU	3G HD	Group 1 to 4	Embed	<b>Embed</b> Embeds the selected channels under <b>SDI MAP</b> to the SDI output. <b>Through</b> Passes through the SDI input audio without modification.  For 3G/HD-SDI signals, set the parameter for each group. For SD-SDI signals, set the parameter for all groups.
	SD	---		

### 6-3-2. SDI / AES / ANALOG OUT STEREO MODE

Parameter	Channel	Default	Description
SDI MODE	CH1/2 to CH15/16	Stereo	<b>Stereo</b> Outputs audio in normal stereo mode. <b>L-CH</b> Outputs L-CH audio for both L and R. <b>R-CH</b> Outputs R-CH audio for both L and R. <b>L+R</b> Outputs L and R mixed audio (monaural) for both L and R.  <b>L-Mute</b> Mutes L-CH audio. <b>R-Mute</b> Mutes R-CH audio.
AES MODE	CH1/2 to CH7/8		
ANA MODE	CH1/2 to CH7/8		

### 6-3-3. SDI / AES OUT RESOLUTION

Parameter	Channel	Default	Description
SDI RESO	CH1 to 16	24bit	Sets the sampling resolution (bit depth) for output audio. The sampling resolution cannot be set for non-PCM audio. (See section 6-1-2.)  <b>24bit</b> Outputs 24-bit audio. <b>20bit</b> Outputs 20-bit audio. <b>16bit</b> Outputs 16-bit audio.
AES RESO	CH1/2 to 7/8		

### 6-3-4. SDI / AES / ANALOG OUT GAIN

Parameter	Channel	Default	Description
SDI Gain	CH1 to 16	0.0dB	Adjusts the output gain for each audio channel. Gain adjustment cannot be performed for non-PCM audio channels. (See section 6-1-2.)  <b>-20.0dB to +20.0dB</b> (in 0.1dB steps)
AES Gain	CH1 to 8		
ANA Gain	CH1 to 8		

### 6-3-5. ANALOG OUT LEVEL (UFM-3DMXAO)

Parameter	Channel	Default	Description
ANA LVL	CH1/2 to 7/8	+4dB	Adjusts analog audio output level.  <b>-20dB, -10dB, -4dB/0dB, +4dB, +8dB, +10dB</b>

## 6-4. System Menu

### 6-4-1. SDI BYPASS

Parameter	Default	Description
SDI BYPS	Operate	<p>Selects whether the SDI input is processed or bypassed when powered On.</p> <p>Basically, the SDI input signal is directly sent to the SDI output via relay when powered Off.</p> <p><b>Operate</b> Processes and sends the SDI input signal to the SDI output.</p> <p><b>Bypass</b> Directly sends the SDI input to the SDI output via relay.</p>

### 6-4-2. SDI LOCK MODE

Parameter	Default	Description
SDI Lock	Auto	<p>Selects the Auto Detect or Specified TV standard for SDI signals.</p> <p><b>Auto</b> Automatically detects and sets the SDI TV standard. If the SDI input signal is abnormal, the standard set under <b>Format</b> (see the next parameter) is applied.</p> <p><b>Internal</b> Forcibly applies the TV standard set under <b>Format</b> to SDI signals.</p>

### 6-4-3. TV SYSTEM

Parameter	Default	Description
Format	1080/59i	<p>Sets the SDI TV standard. (See the SDI LOCK MODE parameter described above.)</p> <p>See the table below for available formats.</p>

#### Format settings

3G SDI	HD SDI	SD SDI
1080/59a	1080/59i	525/60
1080/50a	1080/50i	625/50
1080/60a	1080/60i	
1080/59b	1080/30p	
1080/50b	1080/29p	
1080/60b	1080/25p	
	1080/24p	
	1080/23p	
	1080/24s	
	1080/23s	
a: Level A		
b: Level B	s: PsF	

### 6-4-4. MINIMUM DELAY

Parameter	Default	Description
MIN DLY	Off	<p><b>On</b> Sets the SDI I/O delay time to minimum (within 4 <math>\mu</math>sec). But SDI audio channels cannot be remapped. (See section 7-3 "MINIMUM DELAY.")</p> <p><b>Off</b> Sets the SDI I/O delay time to normal (1H). SDI audio channels can be remapped.</p>

### 6-4-5. REF LEVEL

Parameter	Default	Description
REF LVL	-20dB	Selects the digital audio reference level. (See section 8-1. "Digital Output Level versus Analog Input Level.")  <b>-20dB</b> <b>-18dB</b>

### 6-4-6. TEST MODE

Parameter	Default	Description
Test SIG	Off	Setting to ON outputs an audio test signal.  <b>On</b> Outputs an internally generated 1 kHz audio test signal to SDI embedded, AES, and Analog outputs. <b>Off</b> Outputs the selected input audio.

### 6-4-7. FACTORY SET

Parameter	Execution	Description
FACT SET	EXEC	Allows you to reset all parameters to factory values. To reset all parameters, <b>press the control</b> or move the <b>Up/Down</b> switch to <b>Up</b> while EXEC is displayed.

## 6-5. Status Menu (Display only)

### 6-5-1. SDI STATUS

Parameter	Description
SDI ERR	Displays the SDI input status.  <b>No Error</b> Normal <b>No SIG</b> No SDI signal detected <b>CRC ERR</b> CRC error detected

### 6-5-2. SDI TV SYSTEM

Parameter	Description
Format	Displays the detected SDI input signal format. If TV standard detection has failed, " <b>UNKNOWN</b> " is displayed.

### 6-5-3. SDI AUDIO IN ON/OFF

Parameter	Channel	Description
SDI AUD	Group 1 Group 2 Group 3 Group 4	Displays the presence or absence of embedded audio in the SDI input on each channel.  <b>4oooo 1</b> CH4 to 1 status <b>8ooxx 5</b> CH8 to 5 status <b>12xxxo 9</b> CH12 to 9 status <b>16xxxx13</b> CH16 to 13 status (o: Audio present            x: Audio absent)

### 6-5-4. SDI AUDIO IN SYNC

Parameter	Description
SDI Sync	Displays the embedded audio sync information in the SDI input on each group.  <b>G4aassG1</b> Group 4 to 1 status (a: Asynchronous          s: Synchronous            x: No signal)

### 6-5-5. SDI AUDIO IN PCM

Parameter	Description
SDI PCM	Displays the embedded audio PCM/non-PCM information in the SDI input on each group.  <b>G4ppnpG1</b> Group 4 to 1 status (p: PCM                    n: Non-PCM                x: No signal)

### 6-5-6. LTC IN ON/OFF

Parameter		Description
LTC In	SDI	Displays the presence or absence of LTC signal.  <b>ON</b> LTC present <b>OFF</b> LTC absent

### 6-5-7. SLOT

Parameter	Description
Slot	Displays the installed slot number of the UFM frame.

### 6-5-8. OPTION

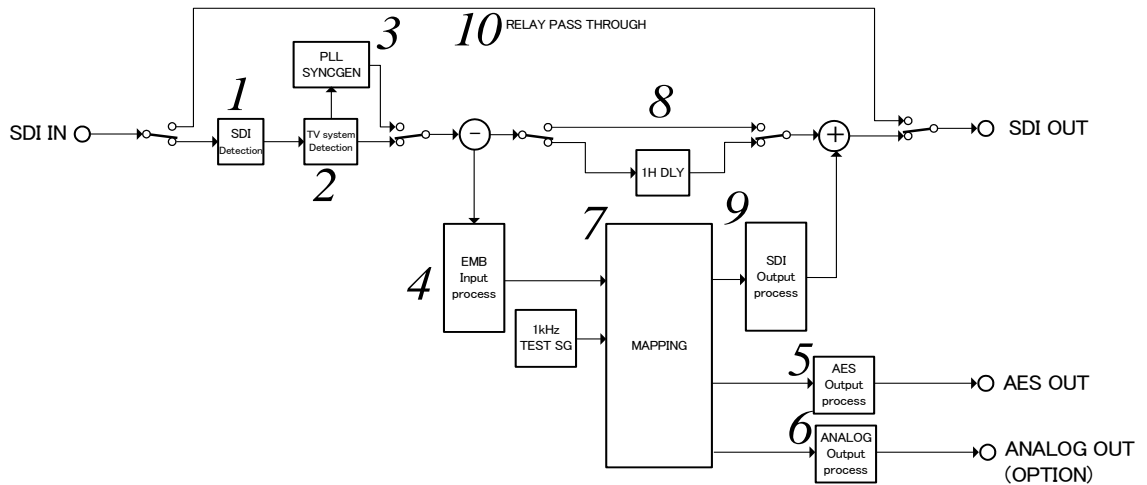
Parameter	Description
Option	Displays the option module status.  <b>No Opt</b> No option installed. <b>3DMXAO</b> UFM-3DMXAO option installed.

### 6-5-9. VERSION

Parameter		Description
Version	CPU FPGA CPLD	Displays version information.

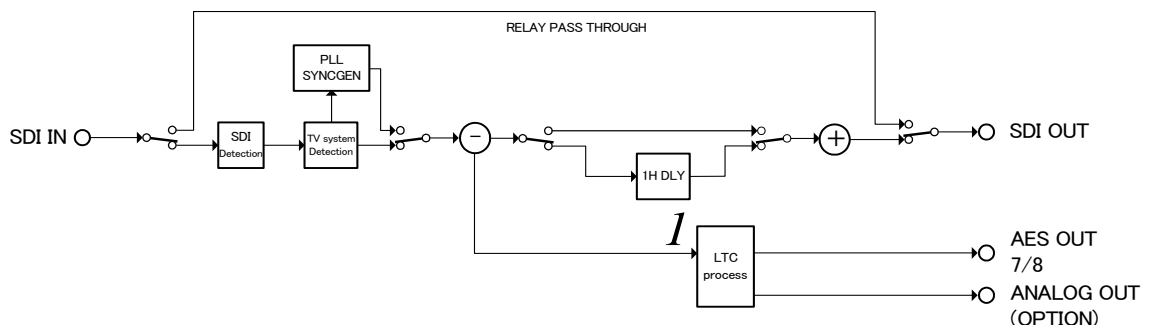
## 7. Workflow Block Diagrams

### 7-1. AUDIO Processing



No.	Process	Menu Parameter Reference			
1	SDI input signal detection	6-5-1	6-5-2		
2	TV standard detection	6-4-3			
3	PLL & SYNC generator	6-4-2			
4	SDI AUDIO input	6-1-1	6-1-2	6-1-3	6-5-3
		6-5-4	6-5-5		
5	AES AUDIO output	6-3-2	6-3-3	6-3-4	
6	ANALOG AUDIO output	6-3-2	6-3-5	6-4-5	
7	Channel mapping	6-2-1	6-2-2	6-2-3	6-4-6
8	Video 1H delay line	6-4-4			
9	SDI AUDIO output	6-3-1	6-3-2	6-3-3	6-3-4
10	SDI Relay pass-through	6-4-1			

### 7-2. TIME CODE Processing

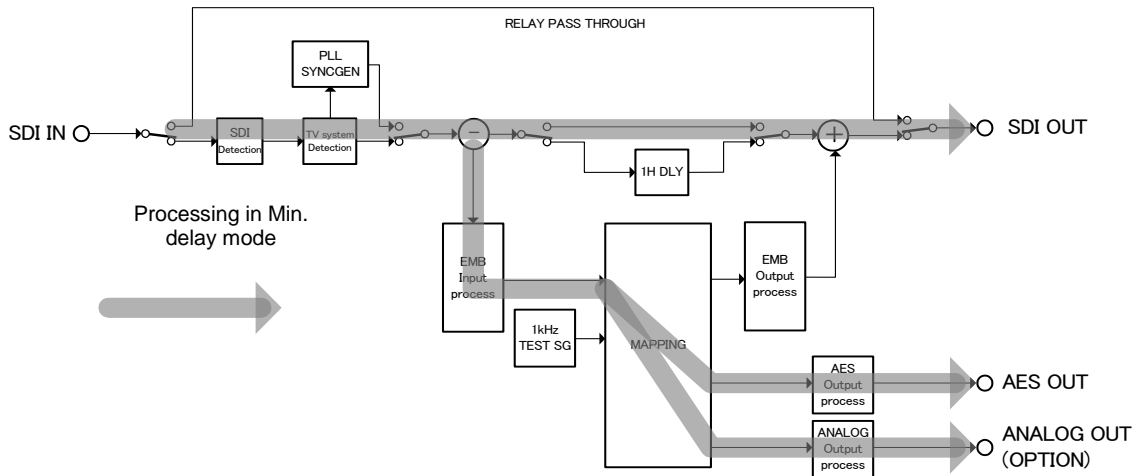


No.	Process	Menu Parameter Reference
1	LTC signal detection	6-5-6

## 7-3. MINIMUM DELAY

Minimum Delay mode allows users to perform signal processing from input to output in a minimum amount of time, within 4  $\mu$ sec. (See section 6-4-4.) In normal processing mode, processing takes about 1 H and can control all menu parameters.

In minimum delay mode, the SDI input audio channels cannot be remapped to the SDI output channels.



### ◆ Available Menu Parameters in Minimum Delay mode

Section	Menu Parameters
6-1-1	SDI IN SYNC MODE
6-1-2	SDI IN PCM MODE
6-1-3	SDI IN GAIN
6-2-2	AES OUT MAPPING
6-2-3	ANALOG OUT MAPPING
6-3-1	EMB THRU
6-3-2	AES STEREO MODE / ANALOG STEREO MODE
6-3-3	AES OUT RESOLUTION
6-3-4	AES OUT GAIN / ANALOG OUT GAIN
6-3-5	ANALOG OUT LEVEL
6-4-1 to 7	All System menu parameters
6-5-1 to 9	All Status menu parameters



## 8. Analog Audio Option (UFM-3DEMUX)

If a UFM-3DEMUX option module is configured, 4 stereo pairs (8 ch) of analog audio output is available. For details on the module installation, see section 3-1. "Installing to a UFM frame."  
For details on the audio connection, see section 3-3. "Optional Configuration (UFM-3DMXAO)."

### 8-1. Digital Output Level versus Analog Input Level

Analog Output Level parameters: ANALOG OUT LEVEL (See section 6-3-5)

Digital Reference Level parameters: REF LEVEL (See section 6-4-5)

◆ **If the digital reference level is set to -20dBFS:**

		Analog output level setting (dB)						
		-20	-10	-4	0	+4	+8	+10
Digital input level (dBFS)	-24	-24dB	-14dB	-8dB	-4dB	0dB	+4dB	+6dB
	-20	-20dB	-10dB	-4dB	0dB	+4dB	+8dB	+10dB
	-18	-18dB	-8dB	-2dB	+2dB	+6dB	+10dB	+12dB
	0	0dB	+10dB	+16dB	+20dB	+24dB	CLIP	CLIP

0dB ≙ 0.775V(rms)

◆ **If the digital reference level is set to -18dBFS:**

		Analog output level setting (dB)						
		-20	-10	-4	0	+4	+8	+10
Digital input level (dBFS)	-24	-26dB	-16dB	-10dB	-6dB	-2dB	+2dB	+4dB
	-20	-22dB	-12dB	-6dB	-2dB	+2dB	+6dB	+8dB
	-18	-20dB	-10dB	-4dB	0dB	+4dB	+8dB	+10dB
	0	-2dB	+8dB	+14dB	+18dB	+22dB	CLIP	CLIP

0dB ≙ 0.775V(rms)

## 9. Troubleshooting

If any of the following problems occur while operating your UFM-30DEMUX, proceed as indicated below to see if the problem can be corrected before assuming a unit malfunction has occurred.

Problem	Check	Action
Cannot operate the front panel switches.	Is the <b>OPERATE/LOCK</b> switch on the front panel set to <b>LOCK</b> ?	Set the switch to <b>OPERATE</b> .
No video displayed.	<SDI signal connection > Is an SDI signal present?  <b>No SIG</b> or <b>CRC ERR</b> is displayed under [Status - SDI ERR] (See section 6-5-1.)	Verify the physical SDI connection.
	<SDI signal format > Is the SDI input format supported? <b>UNKNOWN</b> is displayed under [Status - Format]. (See section 6-5-2.)	Input a supported SDI signal. (See section 6-4-3. "TV SYSTEM" for details on supported TV standards.)
	<SDI signal format > Are the [System - Format] setting (see section 6-4-3) and the SDI input format different?	Set [System - SDI Lock] to <b>Auto</b> . (See section 6-4-2.) Or, set [System - Format] to the SDI input format. (See section 6-4-3.)
Cannot map audio channels.	Is [System - SDI BYPS (SDI BYPASS)] set to <b>Bypass</b> ? (See section 6-4-1.)	Set to <b>Operate</b> .
	Is [System - MIN DLY (MINIMUM DELAY)] set to <b>ON</b> ? (See section 6-4-4.)	Set to <b>OFF</b> .
	Is [Output - EMB THRU] set to <b>Through</b> ? (See section 6-3-1.)	Set to <b>Embed</b> .
Cannot map audio per channel.	Is an audio channel asynchronous? "a" is displayed under [Status - SDI Sync] (See section 6-5-4.)	Group audio mapping is automatically performed if an asynchronous audio channel is included in a group.
Strange or noisy sound output (SDI)	Are asynchronous or non-PCM audio forcibly assigned per channel? (See sections 6-1-1 to 6-1-2.)	Assign audio per group if an asynchronous or non-PCM audio channel is included in a group.
Cannot output audio from AES7/8.	Is the <b>AES/LTC</b> switch on the front panel set to <b>LTC</b> ?	Set the switch to <b>AES</b> .
Cannot output LTC from AES7/8.	Is the <b>AES/LTC</b> switch on the front panel set to <b>AES</b> ?	Set the switch to <b>LTC</b> .

# 10. Specifications and Dimensions

## 10-1. Specifications

### 10-1-1. UFM-30DEMUX

Video formats	3G-SDI: 1080/59.94p, 50p, 60p (Level A and Level B) HD-SDI: 1080/59.94i, 50i, 60i 1080/30p, 29.97p, 25p, 24p, 23.98p, 24PsF, 23.98PsF 720/59.94p, 50p, 60p, 24p, 23.98p 1035/59.94i, 60i SD-SDI: 525/60,625/50 (Auto format detection)
SDI input	3G-SDI: 2.97/1.001 Gbps or 2.97 Gbps HD-SDI: 1.485/1.001 Gbps or 1.485 Gbps SD-SDI: 270 Mbps 75Ω BNC x 1
SDI output	3G-SDI: 2.97/1.001 Gbps or 2.97 Gbps HD-SDI: 1.485/1.001 Gbps or 1.485 Gbps SD-SDI: 270 Mbps 75Ω BNC x 1
Time code input	LTC (SDI-embedded)
Time code output	LTC 1.0 V(p-p) Unbalanced BNC x 1
Audio input	
SDI embedded	3G/HD-SDI Number of channels 16 ch Sampling bit rate 16/20/24-bit Sampling frequency 48 kHz (Synchronous) 48 k/44.1 k/32 kHz (Asynchronous, per group)  SD-SDI Number of channels 16 Sampling bit rate 16/20-bit Sampling frequency 48 kHz (Synchronous only)
Audio output	
SDI embedded	3G/HD-SDI Number of channels 16 ch Sampling bit rate 16/20/24-bit Sampling frequency 48 kHz (Synchronous) 48 k/44.1 k/32 kHz (Asynchronous, per group)  SD-SDI Number of channels 16 Sampling bit rate 16/20-bit Sampling frequency 48 kHz (Synchronous only)
AES/EBU	Unbalanced, 75Ω BNC x 4 Number of channels 8 ch Sampling bit rate 16/20/24-bit Sampling frequency 48 kHz (Asynchronous) 48 k/44.1 k/32 kHz (Asynchronous, 3G/HD only)
Audio in/out gain	Adjustable from -20 to +20 dB (in 0.1dB steps)

I/O delay (SDI IN - OUT)	1H or minimum delay (set in menu) Minimum delay time: within 4 $\mu$ sec (Audio mapping unavailable)
I/O delay (Audio IN-SDI OUT)	Within 1.8 ms
Temperature	0°C to 40°C
Humidity	30% to 85% (no condensation)
Power	Supplied from UFM frame, +24 V DC
Power current	0.4 A
Dimensions	106 (W) x 293.2 (D) mm (Front card) 108.5(W) x 91.6 (D) (Rear card)
Weight	0.5 kg
Consumables	None
Options	UFM-3DMXAO: Analog output option for UFM-30DEMUX UFM-30CTL: Control card

## 10-1-2. UFM-3DMXAO

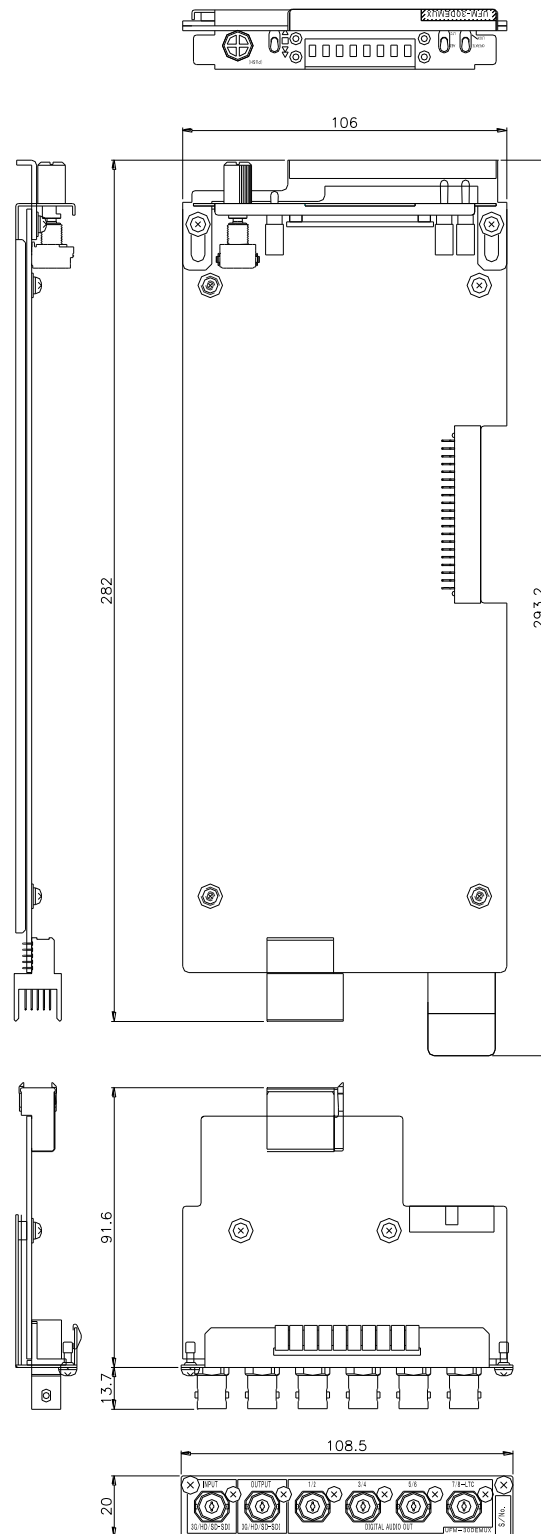
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Audio Input	
SDI-embedded	Input from the SDI OUT on the UFM-30DEMUX as embedded audio. (Free-assignable)
Audio Output	
Analog output	Balanced/Unbalanced 8 ch (4 stereo pairs) 25-pin D-sub (female) x 1,
Digital reference level	-18/-20 dBFS selectable
Output level adjust	-20 dBu/-10 dBu / -4 dBu / 0 dBu / +4 dBu / +8 dBu / +10 dBu selectable (+4 dBu: default)
	Low impedance (balanced: less than 100-ohm, unbalanced: less than 50-ohm)
In/out gain	-20 to +20 dB (adjustable in 0.1 dB steps)
Max output level	+24 dB (Balanced), +18 dB (Unbalanced)
Sampling frequency	48 kHz
Quantization bit	24-bit
Frequency response	$\pm 0.5$ dB (20 Hz to 50 kHz) (reference level: 1 kHz) $\pm 0.3$ dB (50 Hz to 15 kHz) (reference level: 1 kHz) $\pm 0.2$ dB (15 Hz to 20 kHz) (reference level: 1 kHz)
S/N ratio	More than 80 dB (when 1 kHz full-scale, 80kHz-LPF ON)
Distortion	Less than 0.05% (1 kHz, +24 dB output)
Crosstalk	More than 90 dB (1 kHz, +24 dB output)
Time code output	LTC 1.0 V(p-p) Unbalanced BNC x 1
Temperature	
Temperature	0°C to 40°C
Humidity	
Humidity	30% to 85% (no condensation)
Power	
Power	Supplied from UFM frame, +24 V DC
Power current	
Power current	0.35 A
Dimensions	
Dimensions	106 (W) x 303 (D) mm (Front card) 108.5(W) x 66.1 (D) (Rear card)
Weight	
Weight	0.5 kg (including flat cable)

## 10-2. External Dimensions

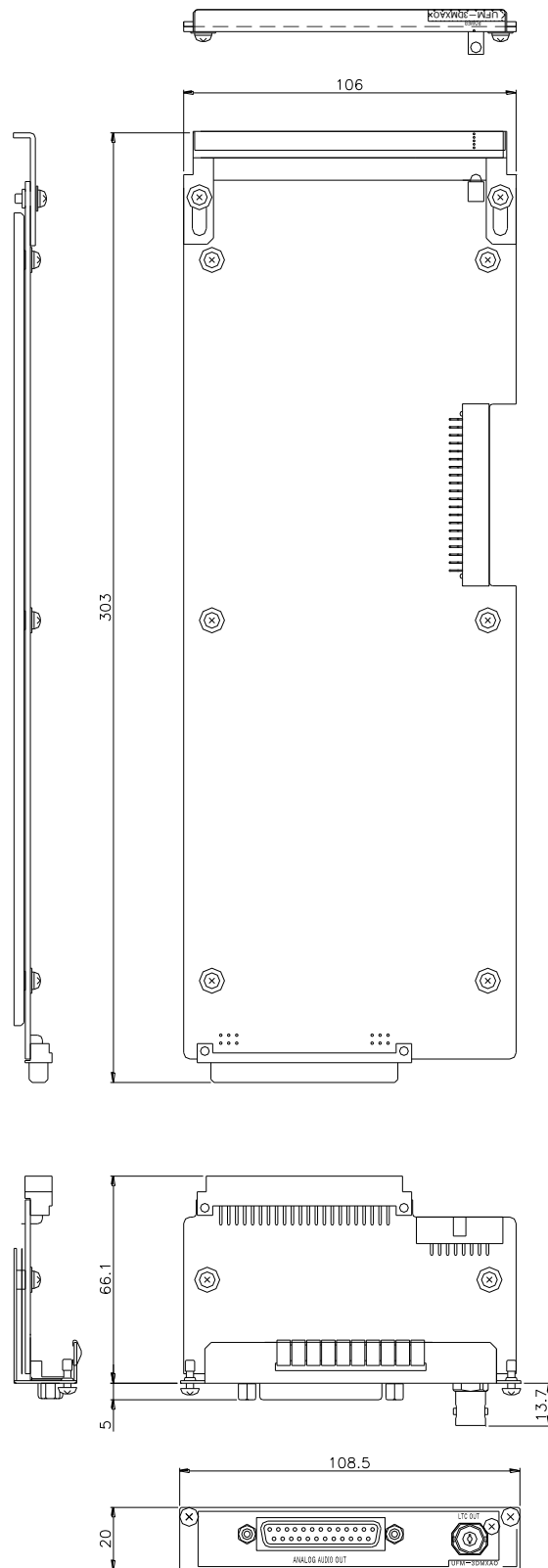
### 10-2-1. UFM-30DEMUX

(All dimensions in mm)



# 10-2-2. UFM-3DMXAO

(All dimensions in mm)



## **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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