SONY

Advanced Data Acquisition and Analysis System i.LINK Interface Module

EX-IF10

Read all the instructions in the manual carefully before use and strictly follow them. Keep the manual for future references.

Instruction Manual
1st Edition (Revised 1)

[For U.S.A. and Canada]

THIS CLASS A DIGITAL DEVICE COMPLIES WITH PART15 OF THE FCC RULES AND THE CANADIAN

ICES-003. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS.

- (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT

MAY CAUSE UNDERSIGNED OPERATION

CET APPAREIL NUMERIQUE DE LA CLASSE A EST CONFORME A LA NORME NMB-003 DU CANADA.

[For EU and EFTA countries]

CE Notice

Marking by the symbol CE indicates compliance with the EMC directive and the Low-voltage directive of the European Community. This marking shows conformity to the following technical standards.

EN 55011 Group 1 Class A / 98:

"Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment"

EN 61000-3-2 / 95:

"Limits for harmonic currents emissions (equipment input current \leqq 16 A per phase)"

EN 61000-3-3 / 95:

"Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current \leq 16 A"

EN 61000-6-2 / 99:

"Electromagnetic compatibility (EMC) - Part 6-2 : Generic standards - Immunity for industrial environments"

EN 61010-1 A1+A2:

"Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements"

[For the customers in Australia]

Australian EMC Notice

This product complies with the following Australian EMC standards.
AS/NZS 4252.1 /94 EMC Generic Immunity Part1
AS/NZS 2064 /92 Emission Standard for ISM Equipment

Bij dit product zijn batterijen geleverd. Wanneer deze leeg zijn, moet u ze niet weggooien maar inleveren als KCA.



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i.LINK is a designation referring to IEEE1394-1995 and IEEE1394a-2000.

i.LINK and the i.LINK logo, are trademarks of SONY.

Safety Precautions

Sony Precision Technology products are designed in full consideration of safety. However, improper handling during operation or installation is dangerous and may lead to fire, electric shock or other accidents resulting in serious injury or death. In addition, these actions may also worsen machine performance.

Therefore, be sure to observe the following safety precautions in order to prevent these types of accidents, and to read these "Safety Precautions" before operating, installing, maintaining, inspecting, repairing or otherwise working on this unit.

Warning Indication Meanings

The following indications are used throughout this manual, and their contents should be understood before reading the text.



WARNING

Failure to observe these precautions may lead to fire, electric shock or other accidents resulting in serious injury or death.



CAUTION

Failure to observe these precautions may lead to electric shock or other accidents resulting in injury or damage to surrounding objects.

EX-IF10

IMPORTANT

To ensure safety, carefully read through the "Safety Precautions" prior to use and make absolutely sure that these precautions are heeded.

If something abnormal (such as smoke, noise or odors) occurs during installation or operation, immediately disconnect the system's power cable and remove its battery pack, and call the service center. Continued use may cause a fire, electric shocks or malfunctioning.

General



WARNING

- To avoid running the risk of receiving electric shocks from touching the parts inside the unit, do not remove the unit's covers.
- Do not push any foreign matter through the ventilation slits of the unit.
- Do not place items containing water or other liquids or cloths containing such on top of the unit.
- If foreign matter or a liquid has found its way inside the unit, immediately disconnect the
 power cable and remove the battery pack, and call the service center. The unit must be
 inspected and repaired.
- · Use a dry cloth to clean the unit.
- Do not use the supplied earphone microphone to listen at high volumes for an extended period of time.

(2) EX-IF10

During installation



WARNING

- Take care not to drop the unit when packing or unpacking it. If the unit has been dropped by mistake, immediately disconnect the power cable and remove the battery pack, and call the service center. The unit must be inspected and repaired.
- · Install the unit securely on a level and stable surface.
- To prevent the temperatures from rising too high inside the unit, make sure that the unit's ventilation slits are not blocked.
- Do not place the unit or any heavy objects on top of the power cable. A damaged power cable can cause a fire and/or electric shocks.
- Leave a clearance of at least 50 mm between the system's rear panel and the objects or surfaces behind it.



CAUTION

- Keep the unit away from transformers, motors, speakers and other objects that generate strong magnetic fields.
- If the unit is exposed to sources of strong extraneous noise, it may not operate properly.
- · Avoid installing the unit in a very humid or dusty location.
- Avoid installing the unit where it will be exposed to direct sunlight or other strong lights or in close proximity to sources of heat.
- Use the system indoors or under conditions equivalent to an indoor environment before it is used again.
- Use the power cable that is provided with the unit.
- When connecting or disconnecting the power cable and signal cables, do not grasp the
 cables themselves but always take hold of the molded parts of their plugs. A damaged
 cable can cause a fire and/or electric shocks.
- Do not run the cables where they will be trodden upon or become entangled.
- Connect the AC power supply cable provided with the EX-IF10 securely.

During operation



WARNING

- Use only the specified supply voltage to power the unit. Use of any other supply voltage
 may cause a fire, electric shocks and/or malfunctioning.
- Do not apply a voltage other than the one specified to the connectors.



CAUTION

• When the unit is not going to be used, always remember to disconnect its power cable and remove its battery pack.

EX-IF10 (3

(4) EX-IF10

Contents

1.	Introdu	ction	1-1
1-1.	Outline		1-1
1-2.	Main Fea	tures	1-2
1-3.	EX Series	s System Configuration	1-3
1-4.	EX-IF10	Product Configuration	1-5
2.	Operati	ng Environment and Setup	2-1
2-1.	System E	nvironment Required for EX Series	2-1
2-2.	System C	Connections	2-1
3.	Parts ar	nd their Functions	3-1
3-1.	Front Pan	nel	3-1
3-2.	Rear Pane	el	3-4
3-3.	Left Side	Panel	3-5
3-4.	Right Sid	e Panel	3-6
4.	Module	Connections	4-1
4-1.	Docking a	and Undocking the Modules	4-1
	4-1-1.	Module Docking Procedure	4-1
	4-1-2.	Module Undocking Procedure	4-2
4-2.	Connection	ng the Input/Output Signals to the Modules	4-2
5.	Prepara	ations	5-1
5-1.	Connection	ng the Power Supply	5-1
5-2.	Other Co	nnections	5-5
	5-2-1.	i.LINK Cable	5-5
	5-2-2.	Trigger	
	5-2-3.	Voice Annotation	
5-3.	C		
	5-3-1.	ID	
	5-3-2.	Shutting Down the Cooling Fan	
	5-3-3.	Restoring the Factory Setting Status	
	5-3-4.	Calibration	5-8

6.	Data Transfer and Reverse Data Transfer	6-1
6-1.	Operation Modes	6-1
6-2.	Data Transfer Mode	6-2
	6-2-1. How to Set the Data Transfer Mode	6-2
	6-2-2. Concerning Trigger Signal Transfer	
6-3.	Reverse Data Transfer	
	6-3-1. Setting the Earphone Volume Level	6-4
7.	Error Displays	7-1
8.	Connectors	8-1
8-1.	NETWORK Connector	8-1
	8-1-1. Pin Assignment	
	8-1-2. i.LINK Specifications	8-2
8-2.	DC-IN Socket	8-3
	8-2-1. Pin Assignment	8-3
9. ;	Specifications of Unit	9-1
9-1.	Module Connections	9-1
9-2.	Operation System	9-1
9-3.	Display System	9-1
9-4.	Trigger Channel	9-1
9-5.	Voice Channel	9-2
9-6.	Power Supply	9-2
9-7.	Dimensions and Mass	9-3
9-8.	Operating Environment	9-3
9-9.	Standard Accessories	
10.	Optional Accessories	10-1
10-1.	Input Modules	
10-2.	Function Module	
10-3.	Other Accessories	
11	Documentation	11-1
11-1.	Block Diagram	
11-1.	Table of EX-IF10 Key Operations	
Inde	2X	I

1. Introduction

1-1. Outline

Reflecting the trend for targets of measurements and analysis to become increasingly diversified, there has arisen the need for systems which can handle a wide range of applications involving small-scale to large-scale measurements.

The EX series data acquisition and analysis system consists of an interface unit and input/function modules. Each module has four-channel input and is designed to accommodate different types of signals, such as IEPE (ICP®) and MIC charge.

Up to six modules can be connected to the interface unit, allowing a maximum of 24 channels. The interface unit is connected to the computer by i.LINK (IEEE1394), and data is transferred to and from the computer.

The interface unit serves as the power supplier and controller to other docked EX input and function modules the hub for data transfer between the computer.

EX-IF10 1-1

1-2. Main Features

Flexible system configuration

The measurement group consists of an interface module which communicates with the computer and transfers the data, and add-on input and function modules.

Flexible support is offered to build everything from compact 4-channel systems to largescale systems with up to 24 channels.

Wide variety of modules

A broad spectrum of applications is supported by a wide range of modules including the IEPE/Direct input (switching between single-ended input and differential input), MIC input, Charge input and analog output modules. More modules will be added to the line-up in the future

Variable sampling

EX series is suitable for most test and measurement applications in a lot of industries with its wide selection of sampling frequencies, which can be set from 8 Hz (3.1 Hz bandwidth) to 65,536 Hz (25.6 kHz bandwidth at $1/2^n$ step) for each module independently.

Quantization of 24 bit ensures higher dynamic ranges of more than 90 dB.

In addition, being capable of switching the bit number of digitized data with 24 or 16 makes it possible for EX series to meet wide needs from normal to higher quantization requirement.

User interfaces

PCscan IV makes it possible to undertake a whole series of processes from data acquisition to its analysis at a high level of efficiency.

Interface software modules for EX will be provided, which makes it possible for applications from third parties developed under LabVIEWTM, MATLAB® and Visual Basic® environments to directly interface with EX, so that tailor-made software can be easily and efficiently developed to meet specific needs.

Space-saving design

As there is no main frame, only those modules required are put together to construct the system: this means that no unnecessary space is taken up as a result.

Multiple power supplies

In addition to AC and DC, EX series can be powered by a battery, which meets the requirement for test and measurement applications having to be carried out outdoor or in the field.

1-2 EX-IF10

1-3. EX Series System Configuration

The EX series is configured with an interface module, input modules and function modules. The user can put together the optimal configuration to meet the needs in various measurement situations.

Number of modules connected

Up to six input modules and function modules can be connected to one interface module (EX-IF10). For details on how to connect the modules, refer to "4. Module Connections."

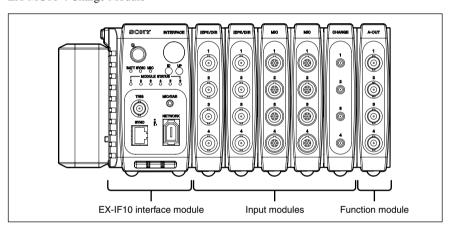
Input modules

Function module

EX-MI10 : IEPE/Direct Module

EX-FA10: Analog Output Module

EX-MM10 : Microphone Module EX-MC10 : Charge Module



Examples of configurations

Example 1: 6 input modules

One to six input modules can be connected. Six modules of the same type or six different types of modules can be connected.

Example 2: Input modules + analog output modules

Up to six input modules and analog output modules can be added together in any selected combination. For instance, combinations such as three input modules and three analog output modules, or five input modules and one analog output module are possible.

Example 3: 6 analog output modules

Analog output modules only can be combined up to six modules.

Sampling frequency and maximum number of available channels

The EX-IF10 transfers data with a rate up to 26 Mbit/s.*1

The available number of channels depends on the measurement condition of sampling frequency and quantization set to modules.

Sampling frequency	Bandwidth	Quantization	
(Hz)	(Hz)	24-bit	16-bit
51.2 k	20 k	Maximum 12 channels	
25.6 k to 25	10 k to 9.7	Maximum 24 channels	
65.536 k	25.6 k	Maximum 12 channels	Maximum 24 channels
32.768 k to 8	12.8 k to 3.1	Maximum 24 channels	
10 k to 10	4 k to 4	Maximum 24 channels	

When 24-bit quantization is used, the data is processed at 32 bits.

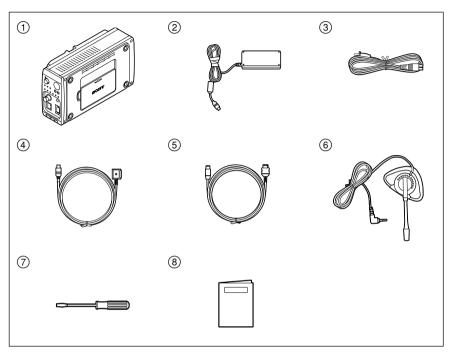
Note

*1: Dependent on the computer environments, both hardware performance and performance consumption by running software, available data transfer rate could be lower than that described above.

1-4 EX-IF10

1-4. EX-IF10 Product Configuration

The EX-IF10 controls the modules, transfers the data, and supplies the power. It also communicates with the computer.



Product	Description	Quantity
① EX-IF10	i.LINK interface module; interfaces with computer, supplies power to measurement modules	1
② AC adapter	AC adapter for EX-IF10	1
③ AC cable	AC power cable for AC adapter	1
④ DC cable	DC power cable (with terminal block) for EX-IF10	1
⑤ i.LINK cable	i.LINK cable for connecting computer (6-pin connector with EX-IF10 (6-pin connector, with locking screws)) 1
6 Earphone microphone	Earphone microphone for EX-IF10 (used to transfer voice annotation)	1
7 Screwdriver	Screwdriver for docking the modules	1
® Instruction manual	The instructions you are now reading	1

EX-IF10 1-5

1-6 EX-IF10

2. Operating Environment and Setup

2-1. System Environment Required for EX Series

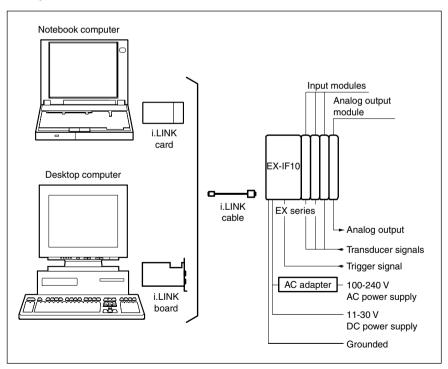
A dedicated software program is needed to control the EX series and acquire and analyze the measurement data. For information about software, please contact the dealer. Refer to the operating instructions of the program concerned for details on the computer environment which is required.

2-2. System Connections

The figure below shows an example of the system connections made when Sony's "PCscan IV STD" data transfer/control software program is used.

For details, refer to the operating instructions of the control software program used.

Example of connections

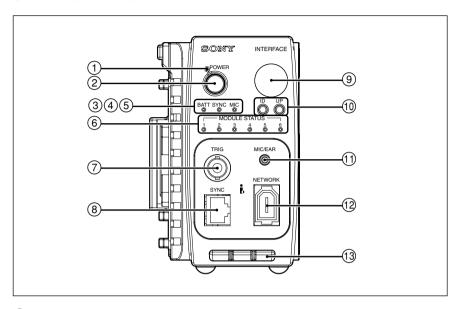


EX-IF10 2-1

2-2 EX-IF10

3. Parts and their Functions

3-1. Front Panel



1 POWER LED

This lights up green when the power of the interface module is ON. It flashes when the supply voltage has dropped down out the designated range.

2 Power switch

When this switch is pressed, the power is turned on, and the LED lights up green. When it is pressed again, the power is turned off, and the LED goes off.

③ BATT LED

This indicates the battery status.

(4) SYNC LED

This indicates the synchronization status. It is not supported at the present time.

EX-IF10 3-1

(5) MIC LED

This indicates the voice annotation input status. It lights up green when voice annotation input signals are supplied in the data transfer mode.

6 MODULE STATUS LEDs

These indicate the statuses of the connected modules.

They are numbered 1, 2 and so on until 8 by the sequence modules docked to the right side of the EX-IF10.

Lighted (green): When modules have been detected properly by the EX-IF10

The LEDs corresponding to the modules which have been con-

nected properly light up green.

Lighted (red): When modules have not been detected properly by the EX-

IF10 or when modules not supported by the EX-IF10 have been

connected.

The LEDs corresponding to malfunctioning modules or modules which are not supported by the EX-IF10 light up red.

They also light with a data overflow during data transfer and

with a data underflow during reverse data transfer.

Lighted (orange): When corresponding modules have been detected being disabled.

7 TRIG connector

This is used to input the trigger signal when the trigger transfer is to be performed.

(8) SYNC connector

This is used for synchronized connections, etc. It is not supported at the present time.

(9) Indicator

This indicates the interface status. After the power is turned on, it may take a few seconds to detect docked modules, depending on the number of docked modules.

When the power is turned on : ID (this is indicated as "1" in the factory setting

status).

When setting the ID : The ID to be set is indicated.

When setting the earphone volume: The level of the earphone volume (0 to 31) is indi-

cated.

When an error has occurred : The error code is indicated.

When Panel Lock is set by the control software:

The two decimal points light up.

3-2 EX-IF10

10 Setting keys

The ID key is used to set the ID, and the UP key is used to set the earphone volume. The keys are also used to set the data transfer mode or return to the factory setting status.

Note

The ID is set in the sync mode. It is not supported at the present time.

11 MIC/EAR jack

This jack is used for connecting the provided earphone microphone.

12 NETWORK connector

This is used to connect the unit to the computer using the i.LINK cable.

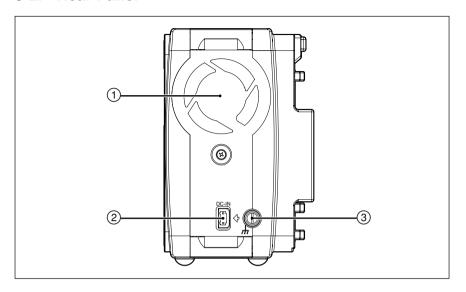
(13) Ventilation slits

Air for cooling the inside of the module passes through these slits.

⚠ WARNING

To prevent the modules from overheating, do not block the ventilation slits.

3-2. Rear Panel



① Cooling fan

This cools the inside of the module.

⚠ WARNING

- To prevent the modules from overheating, do not block the fan's air outlet.
- Leave a clearance of at least 50 mm between the system's rear panel and the objects or surfaces behind it.

(2) DC-IN socket

This is used to supply the external DC voltage to the EX-IF10. Connect the AC adapter or DC power cable supplied here.

③ Grounding terminal

This grounding terminal has the same potential as the ground side of the signal line and chassis. Signal noise is sometimes reduced by grounding this terminal.

⚠ CAUTION

In order for the EX series to comply with the EMC directive, the grounding terminal on the unit's rear panel must be connected without fail.

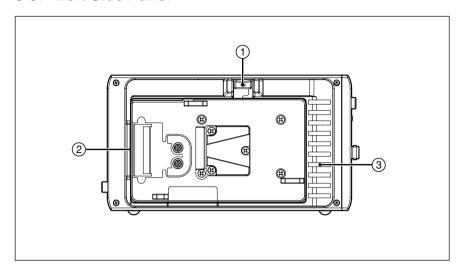
Recommended grounding wire:

Wire with conductor AWG 14 or more

Reference values : Electrical resistance 9.64 Ω /km (at 20 °C)

3-4 EX-IF10

3-3. Left Side Panel



1 Battery removal button

Press this to remove the battery pack.

2 Battery pack compartment

Install the BP-L40 battery pack (option) here. Align the groove in the battery pack with the guide in the compartment, and slide the battery pack until it clicks into place.

⚠ CAUTION

The battery pack is heavy. Also bear in mind that it may be hot to the touch when it has been housed in the compartment. Take care not to drop it.

③ Ventilation slits

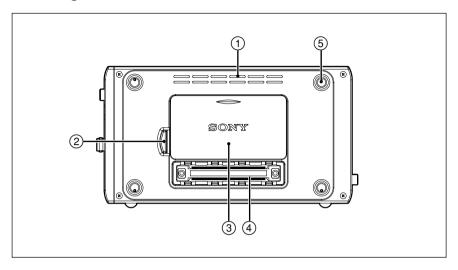
Air for cooling the inside of the module passes through these slits.

⚠ WARNING

To prevent the modules from overheating, do not block the ventilation slits.

EX-IF10 3-5

3-4. Right Side Panel



1 Ventilation slits

Air for cooling the inside of the module passes through these slits.

⚠ WARNING

To prevent the modules from overheating, do not block the ventilation slits.

2 Slide cover unlock button

Press this to open the slide cover.

Slide cover

Open this cover when connecting other modules (the figure shows the cover open). To open the cover, press the part of cover near the SONY logo while holding down the slide cover unlock button, and slide the cover. To close the cover, slide the cover downward until it clicks into position.

(4) Module connector

This is a data bus connector. There is a guide hole at each end of the connector.

Module docking screw holes

These are used when docking the module.

3-6 EX-IF10

4. Module Connections

4-1. Docking and Undocking the Modules

4-1-1. Module Docking Procedure

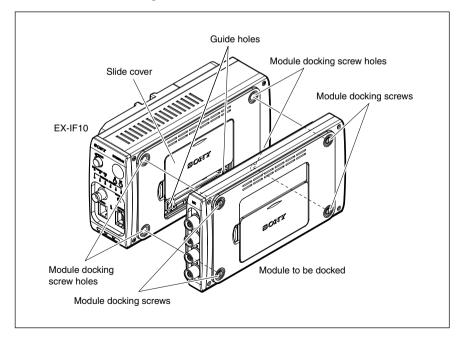
Note

The modules may be docked in any order for use.

When docking the module, be sure to always align the module guide pins and the guide holes of the module connector. The guide pin can damage the connector terminal if the guide holes and guide pins are not aligned correctly.

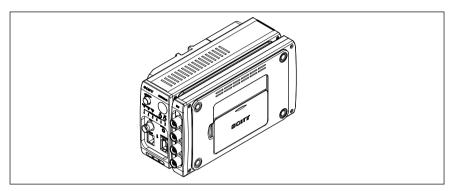
- Open the slide cover while holding down the slide cover unlock button on the right side panel of the EX-IF10.
- 2 Insert the guide pins of the module to be docked into the guide holes of the EX-IF10 connector, and align the left side panel of the module with the right side panel of the EX-IF10.

The positions of the docking screws on the module to be docked will now be lined up with the module docking screw holes on the EX-IF10.



EX-IF10 4-1

- **3** Use the provided screwdriver to loosely secure the module docking screws (× 4) on the right side panel of the module to be docked.
- 4 Securely tighten up the screws loosely secured in step 3 so that the docking screws cannot be seen between the two modules.



5 To dock more modules, repeat steps 1 to 4. (In this case, replace "EX-IF10" with the rightmost docked module.)

4-1-2. Module Undocking Procedure

- 1 Use the provided screwdriver to loosen the module docking screws (× 4) on the right side panel of the module to be undocked.
- Remove the screws which were loosened in the foregoing procedure from the EX-IF10.
 Note

It is now easier to undock the docked module from the EX-IF10. Take care not to topple or drop the modules.

- **3** Undock the docked module from the EX-IF10.
- 4 Slide the slide cover on the right side panel of the EX-IF10 downward until a clicking sound is heard. This sound signals that the cover is closed.

4-2. Connecting the Input/Output Signals to the Modules

Regarding connecting input and output signals to the modules, refer to the operating instructions of each of the modules.

4-2 EX-IF10

5. Preparations

5-1. Connecting the Power Supply

First, connect the system (including the modules). Refer to the following sections at this time.

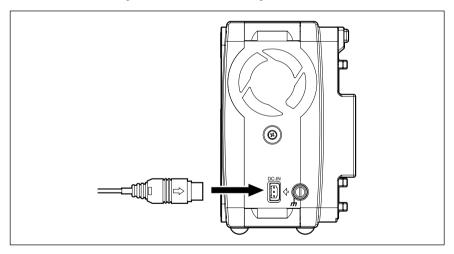
Connecting the cables, etc. Section 2, 3, 5-2 and 8 Docking the modules Section 4

When AC power is used

- 1 Connect the AC power cable (provided) to the AC adapter (provided).
- 2 Connect the DC output cable of the AC adapter to the DC-IN socket.

 Align the → mark on the DC output cable with the → mark on the DC-IN socket.

 Backup can be provided if the BP-L40A battery pack (option) is to be used together with the AC power supply. Normally, the DC-IN input takes precedence. When the voltage supplied to the AC adapter drops below 90 V, the power supply is switched over to the battery pack. The power supply will be switched smoothly with no instantaneous shutdown so that the data transfer and other operations will not be interrupted.



⚠ CAUTION

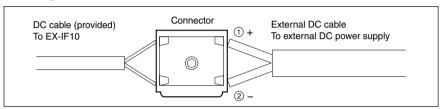
- Always use the AC power cable which was provided with the unit.
- Always supply a voltage that is inside the designated range (AC 100 to 240 V).

EX-IF10 5-1

When DC power is used

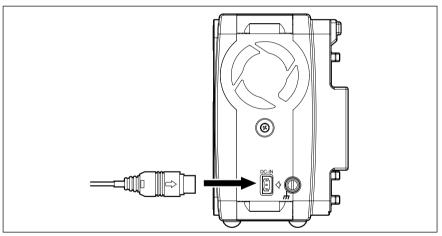
1 Connect one end of the external DC cable to the connector on the DC power cable (provided).

Connect the "+" potential to ① and the "-" potential to ②. Use a cable with a thickness of AWG16 or more for the external DC cable. Connect such a DC power that the voltage at this connector will be 11 to 30 V.



Plug the other end of the DC cable (provided) into the DC-IN socket.

Align the → mark on the DC cable with the → mark on the DC-IN socket.



Backup can be provided if the BP-L40A battery pack (option) is to be used as well. Normally, the DC-IN input takes precedence. If the DC input drops to 11 V or less, the power switches to battery pack operation. The power supply will be switched smoothly with no instantaneous shutdown so that the data transfer and other operations will not be interrupted.

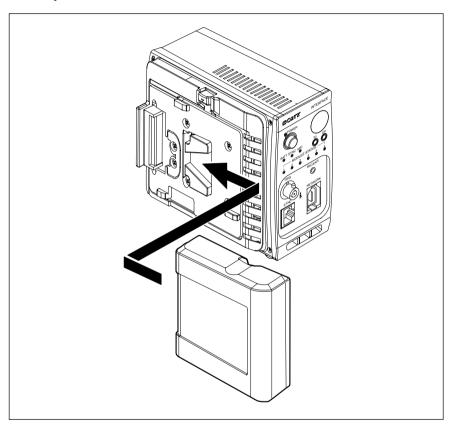
⚠ CAUTION

- Always use the DC power cable supplied with the product. A power cable with a length not exceeding nine meters and AWG 16 or more is recommended for connecting to the terminal.
- Be sure that the supplied voltage is always within the designated range (11 to 30 V DC). Also, be careful not to connect the positive and negative electrodes of the power supply oppositely. Unproper connecting could cause damage to the product.

5-2 EX-IF10

When the battery pack is used

1 Install the BP-L40A battery pack (option) in the battery pack compartment on the left side panel.



When the AC adapter or DC input is to be used, backup can be provided if the battery pack is to be used as well. The power supply will be switched smoothly with no instantaneous shutdown so that the data transfer and other operations will not be interrupted.

Provided below are the approximate operating durations of continuous use with for a fully charged new battery.

When modules of the IEPE/Direct (EX-MI10) type only are docked to the i.LINK Interface Module (EX-IF10)

Configuration	Continuous operation time
4-channel system, EX-MI10 × 1	Approx. 30 minutes
8-channel system, EX-MI10 × 2	Approx. 20 minutes
16-channel system, EX-MI10 × 3	Approx. 15 minutes
24-channel system, EX-MI10 × 4	Approx. 10 minutes

Notes

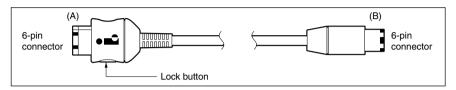
- Use fully charged battery packs. Whether a battery is fully charged or not can easily be checked. Push the CHECK button on the battery pack, Lighting "F" LED indicates that the battery pack is fully charged.
- When DC power is supplied to the system, it takes precedence over the battery pack.
- If the battery pack is not going to be used for a prolonged time, remove it from the unit.
- The battery pack can be charged using the BP-L120 (option). (Refer to "10-3. Other Accessories")
- The battery pack's operating time differs depending on the battery status. This time is shortened if the ambient temperature is low.

5-4 EX-IF10

5-2. Other Connections

5-2-1. i.Link Cable

Connect the (A) side of the i.LINK cable (provided) shown in the figure to the NETWORK connector of the EX-IF10, and connect the (B) side to the i.LINK connector of the computer. (Refer to "8-1. NETWORK Connector.") The EX-IF10 connector comes with a lock. Push down the lock button and insert the connector until a clicking sound is heard.



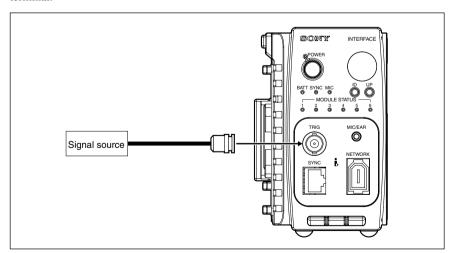
The computer end of the i.LINK cable (provided) is a 6-pin connector. If a 4-pin connector is required, purchase the optional "EX-DK11" i.LINK cable.

Note

To disengage the i.LINK connector of the EX-IF10, pull it free while holding down the lock button

5-2-2. Trigger

To carray out trigger data transfer, connect the trigger signal source to the TRIG connector on the front panel with a BNC cable (option). The TRIG connector is a TTL level input terminal.



5-2-3. Voice Annotation

To use voice annotation, plug the earphone microphone (provided) into the MIC/EAR jack.

EX-IF10 5-5

5-3. Settings

Upon completion of the system connections (refer to "5-1. Connecting the Power Supply" and "5-2. Other Connections"), press the power switch of the EX-IF10 to turn on the power, and perform the settings required for the intended applications.

Note

Use the control software program that is currently in use to control the settings and operation modes (see "6-1. Operation Modes"). The ID, however, can be set only by operating the keys on the EX-IF10.

5-3-1. ID

The ID is set in the sync mode. Identification (ID) numbers 1 to 8 can be set for the EX-IF10. The sync mode is not supported at the present time.

1 Press the ID key for 2 seconds in the STOP mode (refer to "6-1. Operation Modes"). The indicator flashes to signal that the ID setting mode is now established.

Note

The STOP mode is established after the power has been turned on.

2 If the UP key is pressed while the indicator is flashing, the ID is incremented. The set <u>number</u> is displayed.

Note

Each time the UP key is pressed, the number is displayed in the sequence of 1, 2 and so on up to 8 after which the sequence returns to 1, 2 and so on. The initial setting is "1".

3 Hold down the ID key for at least 2 seconds. The set ID is now displayed on the indicator.

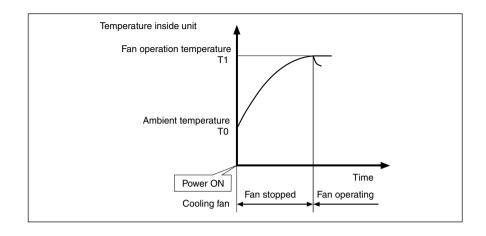
5-3-2. Shutting Down the Cooling Fan

The cooling fan can be shut down if its operating noise affects data acquisition. For the shutdown procedure, refer to the operating instructions of the control software program used. As the internal temperature rises, the fan will automatically start operating even after the cooling fan has been shut down.

Note

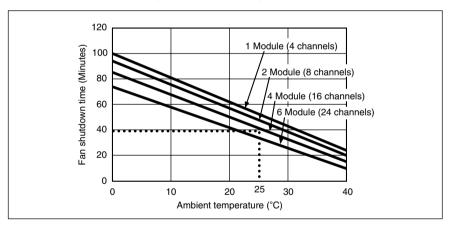
The casing of this system can become extremely hot when the cooling fan stops.

5-6 EX-IF10



General guideline for fan shutdown time (for IEPE/Direct Module)

Fan Shutdown Time During Continuous Usage



This graph serves as a guideline for the time that the fan can be shut down when the IEPE/Direct module is connected.

The possible fan shutdown time can be estimated from the number of connected modules and the ambient temperature.

For instance, this graph indicates that when four IEPE/Direct modules (16 channels) are connected and used continuously at an ambient temperature of 25 °C, the fan can be shut down in about 40 minutes. If the power has not been turned on for an extended period of time, the fan shutdown time can take longer than the time shown in this graph after the power is turned on. In this case, the fan shutdown time can be found by subtracting 5 °C from the ambient temperature.

5-3-3. Restoring the Factory Setting Status

The system settings can be restored to the factory setting status.

Turn on the power while holding down the UP key.

The system is set to the factory setting status. "I n" appears on the indicator, and the connected modules are also returned to the factory setting status.



Indicator

Factory setting status

Item	Setting range	Factory setting status
ID	1 to 8	1
Earphone volume level	1 to 31	16

5-3-4. Calibration

The input module and the function module are calibrated at the time of factory setting, and these settings are stored in the nonvolatile memory of each module. Although the modules do not need to be adjusted frequently, it is recommended that they be calibrated several times a year. Refer to the instruction manual of the control software that you are using for the calibration procedure.

Note

The cooling fan is stopped while calibration is in progress. Calibration will be aborted if the interior of the interface module reaches the fan rotation temperature. If the room temperature is 25 °C, it is recommended that you wait until at least 15 minutes after power-on before performing calibration. Also, do not connect anything to the input connectors of the microphone or charge module when performing calibration.

5-8 EX-IF10

6. Data Transfer and Reverse Data Transfer

6-1. Operation Modes

The operation modes of this system are described in this section.

STOP mode:

This mode is established when the power is turned on. The transfer conditions of the input and output modules can be set in this mode. Perform the module settings in this mode. Data transfer is suspended.

Data transfer mode:

In this mode, the data is transferred from the system to the computer or other external device via i.LINK such as when data is transferred from the input modules to the computer.

The input module settings cannot be changed in this mode. Voice annotation data can also be transferred using the earphone microphone.

Internal memory transfer mode:

In this mode, the data of the input modules is transferred to the internal memory (approx. 48 MB) of the EX-IF10.

Voice annotation data can be transferred by selecting the control software program settings.

Reverse data transfer mode:

In this mode, the data is transferred from the external device to the system via i.LINK such as when data is transferred from the analog output modules.

Voice annotation can also be heard using the earphone microphone in this mode.

Note

Use the control software program to control the operation modes. Settings can be established by key operations for internal memory transfer mode only.

EX-IF10 6-1

6-2. Data Transfer Mode

Upon completion of the preparations undertaken prior to transfer (see section 5), proceed with the data transfer.

6-2-1. How to Set the Data Transfer Mode

For details on the data transfer procedure, refer to the operating instructions of the control software program used. However, if the size of the data concerned is less than 48 MB or so, it can also be transferred to the internal memory of the EX-IF10.

When the earphone microphone is used, voice annotation can be transferred. Furthermore, voice annotation can be heard using the earphone microphone during reverse data transfer. For details on the trigger signal transfer, refer to "6-2-2. Concerning Trigger Signal Transfer".

Durations of data acquisition by EX-IF10 internal memory

With 16-bit quantizing

Sampling frequency	No. of channels	Data transfer time
	4	Approx. 1 min. 30 s
65,536 Hz	8	Approx. 45 s
00,000 112	16	Approx. 22 s
	24	Approx. 15 s
	4	Approx. 9 days
8 Hz	8	Approx. 4.5 days
0112	16	Approx. 2.2 days
	24	Approx. 1.1 days

Data transfer time = $48 \text{ MB/(sampling frequency} \times \text{no. of channels} \times 2)$

In the case of 24-bit quantizing, the data transfer times will be one-half of the figures given above.

Note

Regarding the available setting for sampling frequencies and numbers of channels, refer to "1-3. EX Series System Configuration" for details.

6-2 EX-IF10

Key operations (for transferring data to the internal memory of the EX-IF10)

1 Setting the internal memory transfer mode

In the STOP mode, press the UP key for at least 2 seconds. "p" appears at the higher (left) digit of the indicator.

Note

The ID is displayed at the lower (right) digit.



2 Starting data transfer

Press the ID key. Data transfer to the internal memory is now started. "\(\bigcirc\)" appears at the higher digit of the indicator.



(Example of display: When "1" serves as the ID)

6-3

3 Stopping data transfer

Press the UP key.

Data transfer is now stopped. The ID display is automatically restored on the indicator.

Note

The data in the internal memory can be transferred to the computer.

For details, refer to the operating instructions of the control software program used.

EX-IF10

6-2-2. Concerning Trigger Signal Transfer

Signal transfer can be set to start when the trigger input is set high or low.

For the setting procedure, refer to the operating instructions of the control software program.

Note

The input signals of the modules can be used directly as the trigger signals for the transfer. For details, refer to the operating instructions of the control software program used.

6-3. Reverse Data Transfer

Reverse data transfer is performed in the reverse data transfer mode.

For details on the reverse data transfer mode, refer to the operating instructions of the control software program used.

6-3-1. Setting the Earphone Volume Level

With the EX-IF10, the earphone volume level can be set during reverse data transfer. The volume level can be set from the control software program as well.

1 In the reverse data transfer mode, press the ID key or UP key. This changes the indicator display from ID to volume level.

The setting is decremented using the ID key and incremented using the UP key. (Volume level setting range: 0 to 31)

After the volume level is displayed, release the key. The ID display will be restored half a second after the key is released.

6-4 EX-IF10

7. Error Displays

When an error has occurred, an error code flashes on the front panel indicator.

If the decimal point and numbers are flashing together as with "0.0." it means that an error code is displayed.*

Error code	Error location	Description	Remedy
0.1.	Power supply unit	Low voltage	Provide a DC supply voltage within the allowable range.
0.2.		High temperature	Since the inside of the unit has become hot with the fan control mode set to ON, the fan is already operating. The error will no longer be displayed once the interior temperature cools down.
0.3.		Overheating	Contact a service engineer.
1.0.	Module	EX-IF10 hardware error	Contact a service engineer.
1.1.		Module hardware error	Check the module connections. Are modules not compatible with the EX-IF10 connected? Are more than 6 modules connected? Are connections not faulty?
1.2.		Module connection error	Either a module not compatible with the EX-IF10 is connected, or seven or more modules are connected.
1.5.		Calibration error	Perform calibration.*2
2.0.	i.LINK	Command error	Check the i.LINK cable connection.
3.0.	Buffer	Buffer overflow/ underflow error	Check the status of the computer.

^{*1:} When Panel Lock is set by the control software, the two decimal points light up.

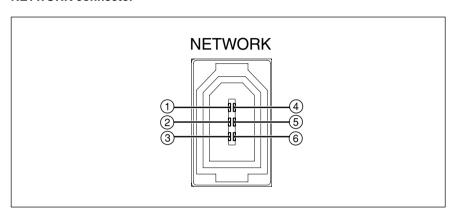
^{*2:} Use your control software to perform calibration.

8. Connectors

8-1. NETWORK Connector

8-1-1. Pin Assignment

NETWORK connector



Pin No.	Signal	Details
1	VP	Power supply
2	VG	Ground
3	TPB-	Twisted pair B
4	TPB+	Twisted pair B
5	TPA-	Twisted pair A
6	TPA+	Twisted pair A

EX-IF10 8-1

8-1-2. i.LINK Specifications

Pin count : 6

Transfer rate : \$400

A maximum data transfer rates of the i.LINK interfaces are approximately 100, 200 or 400 Mbps, and a 200-Mbps interface is represented as S200, and a 400-Mbps interface is represented as S400.

Note

The actual transfer rate can be different from the represented rate depending on the specifications of the devices or when devices with different maximum data transfer rate are connected.

Wattage : 8W (with 16 V, 0.5 A AC adapter)

Supported format: SBP-2

Hop count : Max. 16

Loop connection : Prohibited

Note

Some i.LINK-equipped devices including computers may not repeat data while they are turned off or in the power save mode.

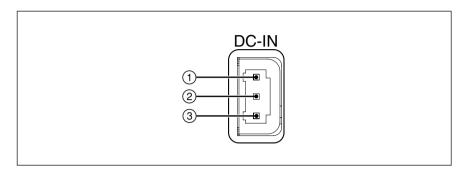
When connecting a device using the i.LINK interface, refer to the instruction manual of the devices as well.

The EX-IF10 does not support the DTLA copy protection technology.

8-2. DC-IN Socket

8-2-1. Pin Assignment

DC-IN socket



Pin No.	Signal	Details
1	NC	
2	-	DC input -
3	+	DC input +

DC input range: 11 to 30 V

WARNING

The internal circuitry may be damaged if an overvoltage is applied.

8-4 EX-IF10

9. Specifications of Unit

9-1. Module Connections

Up to 6 modules can be connected. The channels can be expanded from the minimum of 4 up to a maximum of 24.

9-2. Operation System

Power switch : Sets the power ON/OFF.

ID key : Sets the ID setting mode ON/OFF.

UP key : Increments the ID number.

9-3. Display System

POWER : Indicates power ON or a drop in the supply voltage.

BATT : Indicates the system is powered by the battery pack.

SYNC : Indicates the sync mode (not supported at the present time).

MIC : Indicates the presence or absence of the mic input.

MODULE STATUS

1 to 6 : Indicates the status of each module, whether each module is connected

and whether it is supported by the EX-IF10.

Indicator (7-segment 2-digit display)

: Displays the ID, earphone volume level and error code.

9-4. Trigger Channel

Input : TTL
Trigger start : High, Low

Trigger pulse width: 0.1 µs or more

9-5. Voice Channel

Input/output connector: Stereo mini jack

No. of channels : 1

Input

Bandwidth : 100 Hz and up (2.6 kHz × speed ratio)

AGC : $\pm 30 \text{ dB}$ Impedance : $10 \text{ k}\Omega$

Sampling frequency : Type 1 6400 Hz

Type 2 8192 Hz Type 3 6250 Hz

Output

Adaptive load : 8Ω or more Power : Max. 400 mW, 8Ω

9-6. Power Supply

EX-IF10 i.LINK interface module

Input Supply voltage (rating) : DC16 V Input Supply voltage (allowable range)

: DC11-30 V

Current consumption : EX-MI10 \times 1 1.2 A/12 V

EX-MI10 × 4 2.5 A/12 V Max. 4.3 A/12 V

AC adapter

Input Supply voltage (allowable range)

: AC100-240 V (90-250 V)

Power line frequency : 50-60 Hz Output supply voltage : DC16 V 3.36 A

Current consumption : EX-MI10 \times 1 0.2 A/AC100 V, 0.1 A/AC240 V

EX-MI10 × 4 0.4 A/AC100 V, 0.1 A/AC240 V Max. 0.5 A/AC100 V, 0.1 A/AC240 V

Dimensions : $114.5 \text{ mm (W)} \times 27 \text{ mm (H)} \times 49.5 \text{ mm (D)}$

(Excluding protrusions, cable)

Mass : Approx. 270 g

Power supply priority

 $DC (AC adapter) \rightarrow battery pack$

9-7. Dimensions and Mass

Dimensions : $63 \text{ (W)} \times 110 \text{ (H)} \times 200 \text{ (D)} \text{ mm (excluding protrusions)}$

Mass : Approx. 1.2 kg (main unit only)

9-8. Operating Environment

Operating temperature and humidity

: 0 to 40 °C, 20 to 80 % RH (no condensation)

Storage temperature/humidity: -10 to +50 °C, 10 to 90 % RH (no condensation)

Operating air pressure : 500 to 1060 hPa

Operating position : Horizontal (with front panel facing forward)

Vibration resistance : MIL-STD-810C, ±14.7 m/s² (when placed horizontally)

Shock resistance : 392 m/s², 11 ms (when stored)

Polution degree : 'II'

Over voltage category : 'II'

9-9. Standard Accessories

AC adapter : AC adapter for EX-IF10

AC cable : AC power cable for AC adapter

DC cable : DC power cable (with terminal block) for EX-IF10 i.LINK cable : i.LINK cable for connecting computer (6-pin connector)

with EX-IF10 (6-pin connector, with locking screws)

Earphone microphone : Earphone microphone for EX-IF10 (used to transfer

voice annotation)

Screwdriver : Screwdriver for docking the modules Instruction manual : The instructions you are now reading

EX-IF10 9-3

9-4 EX-IF10

10. Optional Accessories

10-1. Input Modules

EX-MI10 : IEPE/Direct Module

 $\hbox{4-channel input, DC 25.6 kHz band, transducer amplifier with built-in amplifier}$

supported, voltage input switching enabled, BNC connectors

EX-MM10: Microphone Module

4-channel input, DC 25.6 kHz band, built-in microphone amplifier, 7-pin

connector made by LEMO®

EX-MC10: Charge Module

4-channel input, DC 25.6 kHz band, built-in charge amplifier, MicroDot

connectors

10-2. Function Module

EX-FA10 : Analog Output Module

4-channel output, DC 25.6 kHz band, BNC connectors

EX-IF10 10-1

10-3. Other Accessories

EX-HL10 : Guard frame

BP-L40A : Lithium-ion battery pack

Nominal voltage : 14.4 V Capacity : 2.7 Ah

Dimensions : 138 mm (W) \times 37 mm (H) \times 92 mm (D)

Mass : Approx. 520 g

Note

The operating time differs depending on the battery status. This time is reduced when the ambient temperature is low.

BC-L120 : Battery charger

Supply voltage : AC 100-240 V, 50/60 Hz (worldwide specification)

Output : DC16.8 V, 6 A

Power consumption : Less than 150 W, 240 VA (100 V) to 300 VA (240 V)

Operating temperature : -5 °C to +45 °C Storage temperature : -20 °C to +60 °C

Dimensions : $131 \text{ (H)} \times 144 \text{ (W)} \times 330 \text{ (D)} \text{ mm (excluding protrusions)}$

Mass : Approx. 2.5 kg Rapid charging current : Approx. 6.0 A (max)

EX-DK10 : i.LINK 6P-6P cable

3.5 meters, same as standard accessory

EX-DK11 : i.LINK 6P-4P cable

3.5 meters

PCBK11 : Signal cable

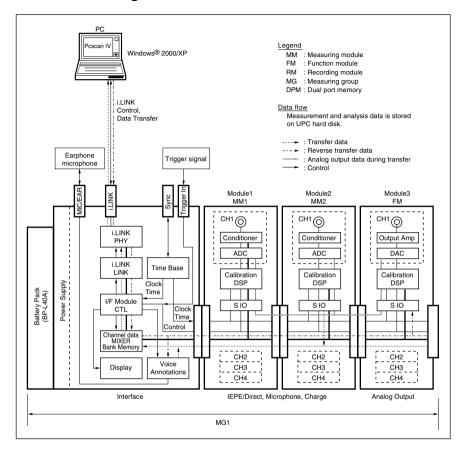
BNC cable, 2 meters long, BNC/BNC connector, 3C

PCBK21 : Signal cable

BNC cable, 2 meters long, BNC/BNC connector, 1.5C

11. Documentation

11-1. Block Diagram



EX-IF10 11-1

11-2. Table of EX-IF10 Key Operations

The table below gives the EX-IF10 key operations. For details, refer to the setting items in sections 5 and 6.

Use the control software program to control the operation mode (STOP mode, Data transfer mode, etc.). Settings can be established by key operations for data transfer mode only.

Notes

- Press the keys in the "Key operation" column of the table to establish the modes.
- "+" in the same column indicates that one key (SW) is pressed while another key (SW) is held down.
- "-" in the same column indicates that another operation is performed after a key (SW) has been operated.

Objective	Operation mode prior to operation	Key operation	Operation
To set the ID	STOP	ID (for 2 s) - UP	The ID is incremented.
		After the ID has been set ID (for 2 s)	The ID setting is entered. (The ID display is automatically restored.)
To return to the factory setting status		UP + power SW	The initial setting status is restored.
To transfer data to the internal memory	STOP	UP (for 2 s) - ID	The transfer of the data to the internal memory is commenced.
		UP (for 2 s) - UP	The transfer of the data to the internal memory is stopped. (The ID display is automatically restored.)
To set the	Reverse data	ID ^(Note)	The volume level is decremented.
earphone volume level	transfer	UP ^(Note)	The volume level is incremented.
volume level			Note The ID display will be automatically restored unless the key is held down for at least half a second.

Index

A	EX-MI10 10-1
AC adapter1-5, 9-3	EX-MM10 10-1
AC cable1-5, 9-3	
2.20 000.0	F
В	Front panel 3-1
BATT LED 3-1	Function module 10-1
Battery pack compartment	
Battery removal button	G
BC-L120 10-2	Grounding terminal
Block diagram	Grounding terminal 3-2
BP-L40A	
DI -L-10/1 10-2	I
	i.LINK cable 1-5, 9-3
С	i.LINK specifications 8-2
Connectors 8-1	ID 5-6
Cooling fan	Indicator 3-2
	Input modules 10-1
D	Input/Output signals to the modules 4-2
Data transfer 6-1	Instruction manual1-5, 9-3
Data transfer mode6-1, 6-2	Internal memory transfer mode 6-1
DC cable1-5, 9-3	
DC-IN socket	K
Dimensions	Key operations 11-2
Display system 9-1	3 1
	L
 E	_
	Left side panel 3-5
Earphone microphone	
Earphone volume level	М
Error displays	Mass9-3
EX-DK10	MIC LED
	MIC/EAR jack 3-3
EX-FA10	Module4-1, 4-2
	Module connections4-1, 9-1
EX-IF10	Module connector 3-6
EX-MC10 10-1	Module docking screw holes 3-6
EV 1510	MODULE STATUS LEDs 3-2

N
NETWORK connector3-3, 8-1
0
Operating environment 9-3
Operation modes 6-1
Operation system 9-1
Optional accessories 10-1
P
PCBK1110-2
PCBK21 10-2
Pin assignment 8-1, 8-3
POWER LED 3-1
Power supply5-1, 9-2
Power switch
R
Rear panel 3-4
Restoring the factory status 5-8
Reverse data transfer6-1, 6-4
Reverse data transfer mode 6-1
Right side panel 3-6
<u> </u>
Screwdriver 1-5, 9-3
Setting keys 3-2
Slide cover 3-6
Slide cover unlock button 3-6
Specifications 9-1
Standard accessories 9-3
STOP mode 6-1
SYNC connector 3-2
SYNC LED

т	
TRIG connector	3-2
Trigger channel	9-1
Trigger signal transfer	6-4
v	
Ventilation slits 3-3	3, 3-5, 3-6
Voice channel	9-2

EX-IF10

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