TS over IP
Transmission Device
UM6000

Users’ Guide

Version 2.2

Hitachi Information & Telecommunication Engineering, Ltd.
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1. Preface

Thank you very much for purchasing TS over IP transmission device UM6000. This document provides the installation and operation methods to use TS over IP transmission device UM6000 safely and correctly. Please read this document before using TS over IP transmission device UM6000.

1.1. Before Reading this Document

This document uses the following icons for safe usage to prevent harm to users or damage to properties.

Please understand the following symbols carefully before reading this document.

| Warning | Indicates that a situation where a death or serious injury may result due to the disregard of this warning and inappropriate use of the device. |
| Caution | Indicates that a situation where a bodily injury may occur and a situation where only physical damage may occur due to the disregard of this caution and inappropriate use of the device. |
1.2. Safety Instruction

Please take notice of the following things to use the device correctly.

⚠️ Warning

- **Use 100V AC (50/60Hz) for the power supply of this product.**
  Using different power supply may result in electric shock, smoke and fire.

- **Connect the plug of the device power cable to an AC outlet equipped with a grounding terminal.** A disconnection or incomplete connection of ground leads to electrical shock and malfunction. Also, plugging in many electrical/electric products at the same time may lead to a fire due to overheat of the AC outlet.

- **Do not use the product in wet and humid place.**
  It causes electric shock.

- **Do not connect the power cable to the AC outlet with the wet hands.**
  It causes electric shock.

- **When the power cable is connected to the AC outlet, do not touch the product with wet hands.** It causes electric shock.

- **If you fall, give a strong shock to the product or damage the exterior, stop using the product immediately.** If you use the product continuously, it causes electric shock, smoke and fire.
⚠️ Caution

- Do not use the product in dusty place.
- Do not block the vent of the product.
- If any failure or error occurs, stop using the product immediately and contact the customer service center stated in the last page of this document.
- Do not repair and alteration by yourself.

Note

- Use the product within the environment specified in the product specifications.
- Do not use the product in the violent vibration place.
- Do not fall and give a shock to the product.
- Do not put or fall something on the product.
- Wipe the product with dried and soft cloth. In the case of heavy dirt, wipe it with the cloth including the neutral detergent diluted with water and then wipe it with a dry cloth. Do not wipe it with thinner and benzene.
- This product has precision mechanical structure. If parts replacement or adjustment is required, contact the customer service center stated in the last page of this document.
1.3. Voluntary Control for Electromagnetic Interference

This device is classified as Class A. If you use this device in the home environment, it may lead to the radio interference. In this case, a user may be requested to take appropriate action.

VCCI-A

1.4. Disclaimer
1.4.1. Precautions for Use

Hitachi is making an effort to improve product quality and reliability. However, the product will fail with a certain probability. Also, the product failure rate will largely vary depending on the usage conditions. To use the product under the highly reliable conditions, describe the precautions as below. Use the product by complying with the contents described in this document. Hitachi is not responsible for any damages caused by not complying with the contents described in this document.

(1) Compliance with Product Specifications

If you use the function and items and usage conditions of the product which are not stated in the product specifications, an operation error may occur. Do not use the product under the conditions which are not specified in the product specifications. Hitachi is not responsible for any results caused by beyond the limitation of usage conditions.

(2) Compliance with Rule and Regulation

Each country provides safety or electromagnetic interference rules and regulations. When designing a system, make sure that the system conforms to those rules and regulations.

(3) Precaution for Usage Purpose

This product is intended to be used for multimedia network communication system and so on. This products is not designed to be installed in systems which may damage human life, human body, property and system error caused by the product failure or systems which require particular quality and reliability (nuclear control system, life support medical control system and so on). Also, the product is not designed to be installed in vibrate transport devices such as vehicles. Therefore do not use the product for the above stated usage purposes.
(4) Prohibition of Alteration

Do not disassemble and alter the product. Hitachi is not responsible for any failures and damages caused by disassembly and alteration of the product.

(5) Combination with other devices and systems

Hitachi is not responsible for any damages caused by malfunction due to the combination with devices or software Hitachi is not involved.

1.4.2. Precautions for using Information

Information stated in this users’ guide is to describe the operation and application examples of the product and not for the purpose of installing in actual device or system. Hitachi is not responsible for any damages caused by using that information.

1.4.3. Intellectual Property

If a problem about intellectual property rights of the third party occurs by having used this product, Hitachi is not responsible for any damages except damages directly related to the product structure and manufacturing method.

1.4.4. Indemnity for Incidental Damage

Hitachi is not responsible for any damages caused by incidental damages (including incidental, indirect damage, lost profits, business interruption due to the unsatisfaction of the system requirements, lost of business information and other pecuniary damages, but there are not limited)

1.4.5. Compliance with Export Control Related Laws and Regulations

If this product (and technologies) are exported to overseas, comply with the “Foreign Exchange and Foreign Trade Act” and other foreign export control related laws, ordinances and legislation such as Export Administration Regulations (EAR) to take necessary procedures.
1.5. Users’ Guide

(1) The contents of this users’ guide are subject to change without prior notice.
(2) This users’ guide is published under strict quality control standards. Should you notice any errors, missing, erratic pagination, missing pages or other problems, please feel free to contact us for this product.

1.6. Disposal of Product

When disposing the product, dispose as the industrial waste.

1.7. Packing Items

This device consists of the followings.

(1) TS over IP transmission device UM6000 1 unit
(2) Power unit 2 units (Mounted on the device)

Accessories attached to the device are as follows.

(1) Power cable 2 cables
(2) SFP module 1 module (a connector type is either RJ-45 or LC)
(3) Users’ guide (this document) 1 copy (attached CD-R)
(4) MIB Tree structure 1 copy (attached CD-R)
    (Supplement to the users’ guide)
(5) Command line setting method 1 copy (attached CD-R)
    (Supplement to the users’ guide)
(6) LCD display contents 1 copy (attached CD-R)
    (Supplement to the users’ guide)
2. Overview

2.1. Overview of Device

This device is the TS over IP transmission device for the remote transmission (transmit and receive) of the maximum 16 MPEG-2 transport streams through IP network. Absorb the transmission delay jitter specific to the IP network by the following methods to perform the stable transmission. However transmission stability depends on the communication line quality. In the case of worth quality line adopted, stable transmission may not be performed.

This device is designed to be able to absorb maximum 100ms delay jitter.

(1) Reproduce the stream in the circuit for absorbing transmission delay jitter based on the originally generated pilot packets (Subordinate synchronization mode).

(2) Reproduce the stream in which the common clock synchronized with GPS was input to both the transmitter and receiver (Reference synchronization mode).

2.2. Feature

(1) Maximum 16 streams (DVB-ASI) can be transmitted and received per unit (Transmitted and received ports can be mixed together).

(2) Multicast and unicast are supported.

(3) Receiving side can only select and receive required streams.

(4) Stable transmission can be performed even through the IP network by the unique circuit for absorbing transmission delay jitter.

(5) Space saving is implemented with the 1U configuration.

(6) Hot swap replaceable duplexed power supply from the front panel is adopted to assure the reliability.

(7) Setting parameter and failure report can be specified and confirmed by the standard interface SNMP and TELNET.

(8) Reference synchronization mode by the external clock 10MHz is also supported.
2.3. System Configuration Example

Figure 2-1 shows the remote transmission system configuration example using this device. The function which inputs the DVB-ASI signal and outputs packets to the IP network is called “transmitter”. The function which inputs packets from the IP network and outputs them as the DVB-ASI signal is called “receiver”.

Reproduce MPEG-2 TS which arrived with delay jitter synchronously.
(1) Absorb delay jitter using the pilot packet
(Subordinate synchronization mode)
(2) Absorb delay jitter using the common clock such as GPS clock
(Reference synchronization mode)

Legend on lines:
- DVB-ASI (Coaxial cable)
- Ethernet (LAN cable)

Figure 2-1 Example of Remote Transmission System using UM6000
2.4. Operation Mode

Select an operation mode (clock mode) of the device from the following three modes.

Table 2-1 List of Operation Mode

<table>
<thead>
<tr>
<th>№</th>
<th>Operation Mode</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Master subordinate synchronization</td>
<td>Transmitter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Receiver</td>
</tr>
<tr>
<td>2</td>
<td>Slave subordinate synchronization</td>
<td>Transmitter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Receiver</td>
</tr>
<tr>
<td>3</td>
<td>Reference synchronization</td>
<td>Transmitter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Receiver</td>
</tr>
</tbody>
</table>

Note: In case of using two cascading transmitters in the subordinate synchronization mode, power supply order must be “Slave” -> “Master”. (For the details, refer to “5.1 Starting up Device”)

Figure 2-2 Schematic Drawing of Operation Mode (Subordinate Synchronization Mode)

Figure 2-3 Schematic Drawing of Operation Mode (Reference Synchronization Mode)
3. Name of Each Component

Figure 3-1 shows the front side of the device. Figure 3-2 shows the rear side of the device. Table 3-1 shows the name of each component and function.

![Figure 3-1 Front View of the Device](image1)

![Figure 3-2 Rear Side of the Device](image2)
### Table 3-1 Name and Function of each Component

<table>
<thead>
<tr>
<th>№</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Power unit mounting screw</td>
<td>Mounting screws to fix the power unit. Make sure to mount screws tightly.</td>
</tr>
<tr>
<td>(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5)</td>
<td>Power unit 1 switch</td>
<td>Power is turned on when turning on the switch and POW1, POW2_LED (Green) light up. If either is switched on, the device is operated normally.</td>
</tr>
<tr>
<td>(6)</td>
<td>Power unit 2 switch</td>
<td></td>
</tr>
<tr>
<td>(7)</td>
<td>Status display LED</td>
<td>Displays the current status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ALM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IALM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>POW1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>POW2</td>
</tr>
<tr>
<td>(8)</td>
<td>LCD for status confirmation</td>
<td>Displays the current device setting parameter.</td>
</tr>
<tr>
<td>(9)</td>
<td>Switch for LCD display</td>
<td>Operates to specify the display contents of LCD for the status confirmation.</td>
</tr>
<tr>
<td></td>
<td>operation</td>
<td></td>
</tr>
<tr>
<td>(10)</td>
<td>Clock interface connector</td>
<td>Input/output port for external clock.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Input the common clock when using it for the reference synchronization. Also, input the output at the maser side to the slave side when transmitters are connected in cascade in the subordinate synchronization.</td>
</tr>
<tr>
<td>(11)</td>
<td>MPEG-2 TS Interface connector</td>
<td>Input/output port for MPEG-2 TS signal is between 1 and 16. Input/output can be selected per port.</td>
</tr>
<tr>
<td>(12)</td>
<td>Network interface connector for monitoring setting</td>
<td>Ethernet port for the control. Communicates with a monitoring terminal.</td>
</tr>
<tr>
<td>(13)</td>
<td>Network interface connector for MPEG-2 TS transmission</td>
<td>Ethernet port for video transmission. Used by connecting the attached SFP connector.</td>
</tr>
<tr>
<td>(14)</td>
<td>Serial interface connector</td>
<td>Serial port to set the parameter of the device. Used for communicating with the setting terminal.</td>
</tr>
<tr>
<td>(15)</td>
<td>Cooling fan</td>
<td>Fan unit to cool down the device.</td>
</tr>
<tr>
<td>(16)</td>
<td>Power 2 inlet</td>
<td>Connects the attached power cable.</td>
</tr>
<tr>
<td>(17)</td>
<td>Power 1 inlet</td>
<td></td>
</tr>
</tbody>
</table>

⚠️ **Caution**

The device has the air intake and exhaust vents of the cooling fan to cool down. Do not block the air intake and exhaust vents.
4. Installation and Operation

4.1. Mounting Method on Rack

(1) Make sure that shelf (or support angle) to support the device is provided.
(2) This device can be mounted on the 19 inch JIS standard or EIA standard rack.
(3) Insert the device into the rack from the front side along the shelf. Then, make sure that the positions of screw mounting hole on the front panel and the screw hole on the rack are aligned with one another. If they are not aligned with one another, correct the position of the shelf.
(4) Fix the front panel of the device to the rack by using the 4 rack exclusive screws (2 screws for the JIS standard conformed rack).

⚠️ Caution

If you try to fix the rack only with the right and left panels of the device front side, the device may be damaged or deformed as the panels do not withstand the high load.
Make sure to support the device by the shelf (or support angle) to prevent the high load to the panels.

4.2. Installing/Removing SFP Module

To install an SFP module in the device, insert the SFP module deep into the connector in a horizontal direction as shown in Figure 4-1. Make sure that the SFP module does not come out even pulled to the removal direction after the insertion.

Also, when removing the SFP module, push down the lock releasing lever in the arrow direction first and then pull out from the connector in a horizontal direction.

![Figure 4-1 Installing/Removing SFP Module](image)
4.3. Connecting Method to External Device

4.3.1. MPEG-2 TS Interface

On the transmitter, connect to the TS signal which is output from an encoder. On the receiver, connect to the TS signal which is output from a modulator.

4.3.2. Network Interface for MPEG-2 TS Transmission

Connect to the router which is located between the transmitter and receiver. For the SFP module connector type, use RJ-45 for the transmission through a twisted pair cable, and use LC for the transmission through an optical fiber.

4.3.3. Network Interface for Monitoring Setting

To set and monitor the device using TELNET/SNMP, connect to a setting/monitoring terminal with a twisted pair cable. Also for a connection cable, use a cross cable when connecting to a setting/monitoring terminal directly and use a straight cable when using HUB.

4.3.4. Serial Interface

When setting using RS-232C, connect to a setting terminal (hyper terminal or PC installed terminal software) with a RS-232C cable. For the connection cable, use "D-sub9 pin, female-female, cross".

4.3.5. Clock Interface

If the subordinate synchronization mode is adopted and the transmitters are connected in cascade, connect between the maser side and slave side transmitter with a coaxial cable. Also when the clock interface is used in the reference synchronization mode, input the common reference clock 10MHz to the transmitter and receiver.

Note: Used only when connected in cascade in the subordinate synchronization mode and used in the reference synchronization mode.
4.4. Setting Method

This device can be set the parameter such as IP address using a setting terminal.
For the setting method, refer to “Command Line Setting Method”.

4.4.1. Network Setting

Set the following items for TS transmission Ethernet (eth0) and control Ethernet (eth1).

<table>
<thead>
<tr>
<th>№</th>
<th>Item</th>
<th>Default Value</th>
<th>Setting Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TS transmission Ethernet IP address</td>
<td>192.168.1.1</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td>2</td>
<td>TS transmission Ethernet subnet mask</td>
<td>255.255.255.0</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td>3</td>
<td>TS transmission Ethernet default gateway</td>
<td>192.168.1.254</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td>4</td>
<td>Control Ethernet IP address</td>
<td>192.168.2.1</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td>5</td>
<td>Control Ethernet subnet mask</td>
<td>255.255.255.0</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td>6</td>
<td>Control Ethernet default gateway</td>
<td>192.168.2.254</td>
<td>User determines according to the usage environment</td>
</tr>
</tbody>
</table>

4.4.2. SNMP Agent Setting

To set the device by the SNMP manager, set the following items.

<table>
<thead>
<tr>
<th>№</th>
<th>Item</th>
<th>Default Value</th>
<th>Setting Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Community name</td>
<td>um6000</td>
<td>15 alphanumeric characters *1</td>
</tr>
</tbody>
</table>

*1 The characters shown below and one-byte space are usable:
0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz!"#$%&'()*+,-./:;<=>?@[
\]^_`{|}~

4.4.3. SNMP private MIB Setting

Set the following items for the standard MIB

<table>
<thead>
<tr>
<th>№</th>
<th>Item</th>
<th>Default Value</th>
<th>Setting Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sysObjectID *1</td>
<td></td>
<td>15 alphanumeric characters *2</td>
</tr>
<tr>
<td>2</td>
<td>sysContact</td>
<td>Hitachi-JTE</td>
<td>15 alphanumeric characters *2</td>
</tr>
<tr>
<td>3</td>
<td>sysName</td>
<td>UM6000</td>
<td>15 alphanumeric characters *2</td>
</tr>
<tr>
<td>4</td>
<td>sysLocation</td>
<td>Yokohama</td>
<td>15 alphanumeric characters *2</td>
</tr>
</tbody>
</table>

*1: The actual sysObjectID in SNMP is the fixed value "1.3.6.1.4.1.11058.70.2003.6.0" + the value set to this "sysObjectID" item. If the value set to this "sysObjectID" item is blank, the actual sysObjectID in SNMP will be "1.3.6.1.4.1.11058.70.2003.6.0".
*2: The characters shown below and one-byte space are usable:
0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz!"#$%&'()*+,-./:;<=>?@[
\]^_`{|}~
4.4.4. SNMP Trap Setting

To use the SNMP trap, set the following items.

<table>
<thead>
<tr>
<th>№</th>
<th>Item</th>
<th>Default Value</th>
<th>Setting Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trap effective flag</td>
<td>0 (Disabled)</td>
<td>0 (Disabled) /1 (Enabled)</td>
</tr>
<tr>
<td>2</td>
<td>Trap output destination address</td>
<td>0.0.0.0.0</td>
<td>User determines according to the usage environment</td>
</tr>
</tbody>
</table>

4.4.5. TS over IP Common Setting

To transmit and receive data, set the following TS over IP common setting items.

*1: Set the TS packet size used on this device (common in all ports).
*2: Specify the number of TS packets stored in RTP (1 packet) within the range of 1 to 7. The transmission efficiency increases with increasing the number of encapsulations.
*3: Set the distribution output for the ASI output port. Specification of each distribution is as follows.

<table>
<thead>
<tr>
<th>Output port number</th>
<th>No distribution</th>
<th>2 distributions</th>
<th>4 distributions</th>
<th>8 distributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IP input port 1</td>
<td>IP input port 1</td>
<td>IP input port 1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>IP input port 2</td>
<td>IP input port 1*</td>
<td>IP input port 1*</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>IP input port 3</td>
<td>IP input port 3</td>
<td>IP input port 1*</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>IP input port 4</td>
<td>IP input port 1*</td>
<td>IP input port 1*</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>IP input port 5</td>
<td>IP input port 5</td>
<td>IP input port 1*</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>IP input port 6</td>
<td>IP input port 5*</td>
<td>IP input port 1*</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>IP input port 7</td>
<td>IP input port 5</td>
<td>IP input port 1*</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>IP input port 8</td>
<td>IP input port 7*</td>
<td>IP input port 1*</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>IP input port 9</td>
<td>IP input port 9</td>
<td>IP input port 1*</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>IP input port 10</td>
<td>IP input port 9*</td>
<td>IP input port 9*</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>IP input port 11</td>
<td>IP input port 9*</td>
<td>IP input port 9*</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>IP input port 12</td>
<td>IP input port 9*</td>
<td>IP input port 9*</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>IP input port 13</td>
<td>IP input port 13</td>
<td>IP input port 9*</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>IP input port 14</td>
<td>IP input port 13*</td>
<td>IP input port 9*</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>IP input port 15</td>
<td>IP input port 13*</td>
<td>IP input port 9*</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>IP input port 16</td>
<td>IP input port 13*</td>
<td>IP input port 9*</td>
<td></td>
</tr>
</tbody>
</table>

Also, if you use the distribution output in the above ports marked as (*), set the
input/output setting of corresponding port to "OFF". If the input/output setting has been set as “DVB-ASI→IP” or “IP→DVB-ASI”, an error status is displayed unless there is an input to corresponding port.

*4: This device can transmit the multicast membership report. Set the transmission cycle within the range of 0 to 360 (s).

*5: For the details of operation, refer to “2.4 Operation Mode”.

4.4.6. Setting per TS over IP Port

Set the following items for ports to be used. Figure 4-4 and Figure 4-5 show the required setting items for the transmitter (transmission port) and the receiver (receiving port).

Table 4-6 List of Setting Items per TS over IP Port

<table>
<thead>
<tr>
<th>№</th>
<th>Item</th>
<th>Default Value</th>
<th>Setting Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Input/output setting *1</td>
<td>0 (OFF)</td>
<td>0 (OFF) /1 (DVB-ASI→IP) /2 (IP→DVB-ASI)</td>
</tr>
<tr>
<td>2</td>
<td>Receiving IP address *2, *4, *13</td>
<td>224.1.1.1(Port1)</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 224.1.1.16 (Port16)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Receiving port number *2, *5, *13</td>
<td>10001 (Port1)</td>
<td>1024-65531</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 10016 (Port16)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>The number of TS packets in the receiving buffer for absorbing IP transmission delay jitter *2, *9</td>
<td>4096</td>
<td>256-8000</td>
</tr>
<tr>
<td>5</td>
<td>Receiving buffer alarm setting *2, *10</td>
<td>75</td>
<td>50-100</td>
</tr>
<tr>
<td>6</td>
<td>Re-multiplexing mode setting *3, *11</td>
<td>0</td>
<td>0 (OFF) /1 (ON:11kbps-1000kbps) /2 (ON:1Mbps-100Mbps)</td>
</tr>
<tr>
<td>7</td>
<td>Re-multiplexing output rate setting *12</td>
<td>-</td>
<td>11-1000 (When the re-multiplexing mode is 1, it will be between 11 and 1000kbps)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-100 (When the re-multiplexing mode is 2, it will be between 1 and 100kbps)</td>
</tr>
<tr>
<td>8</td>
<td>Destination IP address *3, *4</td>
<td>224.1.1.1 (Port1)</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 224.1.1.16 (Port16)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Destination MAC address *3, *6</td>
<td>200000000001(Port01)</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 200000000016(Port16)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Destination port number *3, *5</td>
<td>10001 (Port1)</td>
<td>1024-65535</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 10016 (Port16)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Source port number *3</td>
<td>10001 (Port1)</td>
<td>1024-65535</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 10016 (Port16)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Service type *3, *7</td>
<td>127</td>
<td>0-255</td>
</tr>
<tr>
<td>13</td>
<td>TTL *3, *7</td>
<td>255</td>
<td>0-255</td>
</tr>
<tr>
<td>14</td>
<td>RTP payload *3, *8</td>
<td>33</td>
<td>0-127</td>
</tr>
<tr>
<td>15</td>
<td>RTP SSRC *3, *8</td>
<td>FFFFFFFF</td>
<td>0-FFFFFFFF</td>
</tr>
</tbody>
</table>
*1: For the port which is not in use, set to “0 (OFF)”.  
*2: It is valid only when the input/output setting of the corresponding port is “2 (IP→DVB-ASI)”.  
*3: It is valid only when the input/output setting of the corresponding port is “1 (DVB-ASI→IP)”.  
*4: Set the same value for the receiving IP address of the receiver and the destination IP address of the transmitter. In the case of unicast, set the IP address which is used for the TS transmission Ethernet (eth0) of this device. In the case of multicast, set the multicast IP address.  
*5: Set the same value for the receiving port number of the receiver and the destination port number of the transmitter.  
*6: It will be able to set only when “Specify multicast/unicast” in the TS over IP common setting is “1 (unicast)”. For the destination MAC address, if the receiver exists in the same network, set the MAC address of the receiver. If the receiver does not exist in the same network through a router, set the MAC address of the router.  
*7: Set the service type and TTL in the IP header whose packets are transmitted from the device.  
*8: Set the payload type and SSRC in the RTP header whose packets are transmitted from the device.  
*9: Set the number of TS packets in the receiving buffer for absorbing IP transmission delay jitter depending on the summation of the input rate and the network environment (delay jitter environment). This setting value will be the amount of delay in this device and two times of the setting value will be the buffer capacity. Define the amount of delay to be set (delay time) and set the value converted to the number of TS packets corresponding to the input rate. Amount of delay (delay time) may need to be bigger than the network delay jitter amount in the actual usage environment. The absorbable maximum delay jitter amount of this device is 100ms. Figure 4-2 shows the receiving buffer capacity.

![Figure 4-2 Receiving Buffer Capacity](image-url)
*10: Set the value which indicates the warning for overflow/underflow of the IP receiving buffer (percentage for the number of TS packets in the receiving buffer for absorbing IP transmission delay jitter). Assuming that the number of TS packets in the receiving buffer for absorbing IP transmission delay jitter is 0%, set the overflow/underflow warning within the range of ±50 to 100% (if it is set to 100%, the warning function will be disabled). When the value reaches to the setting value, “plus (+)” indicates the overflow warning, and “minus (-)” indicates the underflow warning. Also, if the value reached to 100%, an error is displayed. Figure 4-3 shows the receiving buffer alarm setting range.

![Figure 4-3 Receiving Buffer Alarm Setting Range](image)

Two times of the number of TS packets in the receiving buffer for absorbing IP Transmission delay jitter is the buffer capacity

The number of TS packets in the receiving buffer for absorbing IP Transmission delay jitter

(Example)
When the number of TS packets in the receiving buffer for absorbing IP Transmission delay jitter is 1000, and the setting of the receiving buffer alarm is 60, Overflow alarm is indicated over 1600.
Underflow alarm is indicated under 400.

*11: Only 4 ports (port 1, 5, 9, and 13) can be set.

*12: When the re-multiplexing mode setting is “ON”, set the output rate.

*13: When the IP receiving setting is performed, regardless unicast or multicast, do not perform another receiving setting by adding two (2) to the receiving port number for the same receiving IP address when some receiving IP address and receiving port number have been set and registered (The port which is two (2) added to receiving port number has been reserved for FEC packet transmission).
Figure 4-4 When Transmitter and Receiver are not Mixed Together on One Device

(Setting items of transmission port)
1. Input/output setting “1 (DVB-ASI→IP)”
4. Destination IP address
5. Destination MAC address
6. Destination port number
7. Source port number
8. Service type
9. TTL
10. RTP payload
11. RTP SSRC

MPEG-2 TS (DVB-ASI) → UM6000 (Transmitter) → TS over IP streams → UM6000 (Receiver) → MPEG-2 TS (DVB-ASI)

(Setting items of receiving port)
1. Input/output setting “2 (IP→DVB-ASI)”
2. Receiving IP address
3. Receiving port number

Figure 4-5 When Transmitter and Receiver are Mixed Together on One Device

(Setting items of transmission port)
1. Input/output setting “1 (DVB-ASI→IP)”
4. Destination IP address
5. Destination MAC address
6. Destination port number
7. Source port number
8. Service type
9. TTL
10. RTP payload
11. RTP SSRC

MPEG-2 TS (DVB-ASI) → UM6000 (Transceiver/Receiver) → TS over IP streams → UM6000 (Transceiver/Receiver) → MPEG-2 TS (DVB-ASI)

(Setting items of receiving port)
1. Input/output setting “2 (IP→DVB-ASI)”
2. Receiving IP address
3. Receiving port number

Same value
Same value
Same value
4.4.7. TS over IP Pilot Setting

Set the followings for the ports to be used. Figure 4-6 and Figure 4-7 show the required settings for the transmitter and receiver.

### Table 4-7 List of TSoverIP Pilot Setting Items

<table>
<thead>
<tr>
<th>№</th>
<th>Item</th>
<th>Default Value</th>
<th>Setting Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receiving IP address</td>
<td>224.1.1.34</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td>2</td>
<td>Receiving port number</td>
<td>20002</td>
<td>1024-65535</td>
</tr>
<tr>
<td>3</td>
<td>Destination IP address</td>
<td>224.1.1.32</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td>4</td>
<td>Destination MAC address</td>
<td>200000000032</td>
<td>User determines according to the usage environment</td>
</tr>
<tr>
<td>5</td>
<td>Destination port number</td>
<td>20001</td>
<td>1024-65535</td>
</tr>
<tr>
<td>6</td>
<td>Source port number</td>
<td>20101</td>
<td>1024-65535</td>
</tr>
<tr>
<td>7</td>
<td>Service type</td>
<td>127</td>
<td>0-255</td>
</tr>
<tr>
<td>8</td>
<td>TTL</td>
<td>255</td>
<td>0-255</td>
</tr>
<tr>
<td>9</td>
<td>RTP payload</td>
<td>33</td>
<td>0-127</td>
</tr>
<tr>
<td>10</td>
<td>RTP SSRC</td>
<td>FFFFFFFF</td>
<td>0-FFFFFFFFFFFFFF</td>
</tr>
</tbody>
</table>

*1: Set the same value for the receiving IP address of the receiver and the destination IP address of the transmitter. In the case of unicast, set the IP address which is used for the TS transmission Ethernet (eth0) of this device. In the case of multicast, set the IP address which is used for the multicast IP address.

*2: Set the same value for the receiving port number of the receiver and the destination port number of the transmitter.

*3: It will be able to set only when “Specify multicast/unicast” in the TS over IP common setting is “1 (unicast)”. For the destination MAC address, if the receiver exists in the same network, set the MAC address of the receiver. If the receiver does not exist in the same network through a router, set the MAC address of the router.

*4: Set the service type and TTL in the IP header whose packets are transmitted from the device.

*5: Set the payload type and SSRC in the RTP header whose packets are transmitted from the device.
Figure 4-6 When Transmitter and Receiver are not Mixed Together on One Device

Figure 4-7 When Transmitter and Receiver are Mixed Together on One Device
4.4.8. TS over IP Filter Setting

If PID filter is required for the ports to be used, set the followings.

Table 4-8 List of TSoverIP Filter Setting Items

<table>
<thead>
<tr>
<th>№</th>
<th>Item</th>
<th>Default Value</th>
<th>Setting Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Specify port 1 filter</td>
<td>All PID filters are OFF</td>
<td>Any of the followings</td>
</tr>
<tr>
<td>2</td>
<td>Specify port 2 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Specify port 3 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Specify port 4 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Specify port 5 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Specify port 6 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Specify port 7 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Specify port 8 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Specify port 9 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Specify port 10 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Specify port 11 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Specify port 12 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Specify port 13 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Specify port 14 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Specify port 15 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Specify port 16 filter</td>
<td>All PID filters are OFF</td>
<td></td>
</tr>
</tbody>
</table>

*1: When the port input/output setting is “DVB-ASI→IP”, set the re-multiplexing mode to “ON”. If it is set to “OFF”, PID filter function is disabled.

4.4.9. Other Operations

Save the settings and then restart the device by using the command line. When required, initialize the setting.

Table 4-9 List of Other Setting Items

<table>
<thead>
<tr>
<th>№</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Saving settings</td>
<td>Save the setting values which were set from 4.4.1 to 4.4.8 by the command line. Saved setting values are applied after the restart.</td>
</tr>
<tr>
<td>2</td>
<td>Initializing setting value</td>
<td>Restore the setting values to factory default settings by the command line.</td>
</tr>
<tr>
<td>3</td>
<td>Restarting device</td>
<td>Restart the device by command line when the setting is changed.</td>
</tr>
</tbody>
</table>

*1: Do not initialize the setting values after starting the service operation.
4.5. Power Unit Replacement Method

(1) Switch off the power unit to be replaced.
(2) Loosen the power unit mounting screws ((1) and (2) or (3) and (4) in Figure 3-2).
When backlash can be seen in the mounting screws, pull out the power unit to the forward direction slowly.
(3) Insert the power unit to be mounted and push it slowly to the position where the front panel of the power unit and the front panel of the device are fit.
(4) Tighten the power unit mounting screws ((1) and (2) or (3) and (4) in Figure 3-2) by fingers to fix them.
Note: The groove of the power unit mounting screw head should be used only when loosing the screw by using a screw driver in the case that a screw is too tight (do not use the glove when loosing the screw).
(5) Set the power of the power unit to “ON” and make sure that the status display LED (POW1 or POW2) lights up green.

⚠️ Caution
Use the Hitachi exclusive power unit.
For the newly mounted power unit at the time of replacement, make sure that the power is turned off before insertion. If the power is still “ON”, it will cause the failure.

4.6. Cooling Fan Replacement Method

(1) Remove the cable connected to the connector located at the right side of the fan.
(2) Loosen the 4 fixing screws to remove the fan.
(3) Mount the new fan for the replacement with the 4 fixing screws.
(4) Connect the cable to the connector located at the right side of the fan and confirm that the fan is rotated and the status display LED (ALM) is switched off.

⚠️ Caution
Use the Hitachi exclusive cooling fan.
4.7. Fuse Replacement Method

(1) Switch off the power switch of the power unit to be replaced.
(2) Remove the power cable of the power unit to be replaced from the power inlet.
(3) Remove the fuse holder located under the power terminal.
(4) The fuse has been inserted into the fuse holder. Replace the fuse with the new one.
(5) Mount the fuse holder on the original location.
(6) Connect the power cable to the power inlet.
(7) Switch on the power unit and confirm that the status display LED (POW1 or POW2) lights up green.

Note: For the replacement fuse, use the following stated fuse.
- Type: Time-lag fuse
- Rating: AC250V 3.15A
- Shape: φ5.2×20mm
- Standard: UL, CSA, PSE

(Example) SOC Corporation ET series ET 3.15A

![Fuse holder](image)

**Figure 4-9 Power Intel with Fuse**

⚠️ Caution

For the mounting of a fuse holder, insert a fuse holder firmly until it clicks in place. If the mounting is insufficient, it may lead to the device failure or accident.
5. Operation Method

5.1. Starting up Device

(1) Power on the power unit 1 switch and the power unit 2 switch of the device (regardless of sequence). This device performs the initial setting processing (configuration) at the time of startup. This processing takes a few tens of seconds.

(2) If there is an error with the internal hardware, the status display LED (ALM) flashes or lights up red.

(3) If the flashing or lighting up still continues, check the error details on the monitoring terminal.

(4) If there is no error and the status display LED (OPERATE) lights up green, the device can be operated.

Note: If the two transmitters are used with the cascade connection in the subordinate synchronization mode, start up the device as follows.
If either of the master or slave has been switched off, needs to be started up again by the following procedure. Also, if the temporary power interruption has occurred due to the electrical power failure or etc, the normal operation will not be performed unless the device is switched on again by the following procedure.

(1) Connect between the external clock input/output ports of the master and slave transmitter by a cable.

(2) Power on the power unit 1 switch and the power unit 2 switch at the slave side (regardless of sequence).

(3) if the status display LED (OPERATE) at the slave lights up green, power on the power unit 1 switch and the power unit 2 switch at the master side (regardless of sequence).

(4) When the status display LED (ALM) and (OPERATE) of the both master and slave light up green, the devices can be operated.
5.2. Operation of Device

(1) The status display LED when the normal operation is performed displays “Under normal operation” shown in the table below. If other operation statuses are displayed, either device or other upstream devices may have a problem. In this case, check the settings of the device, TS (for the transmitter) and IP (for the receiver) signals which are input to the device. Also, if the device is connected to a monitoring terminal through LAN, check the status on the monitoring terminal.

Table 5-1 shows the list of operation status. For the monitoring method, refer to Chapter 6.

<table>
<thead>
<tr>
<th>Operation State</th>
<th>Status of LED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OPERATE</td>
</tr>
<tr>
<td>Power is switched off</td>
<td>Lights-out</td>
</tr>
<tr>
<td>Initial setting is proceeding</td>
<td>Lights-out</td>
</tr>
<tr>
<td>Under normal operation</td>
<td>Lights up green</td>
</tr>
<tr>
<td>Device internal failure</td>
<td>-</td>
</tr>
<tr>
<td>Input error</td>
<td>-</td>
</tr>
<tr>
<td>Error on power unit 1</td>
<td>-</td>
</tr>
<tr>
<td>Error on Power unit 2</td>
<td>-</td>
</tr>
</tbody>
</table>

Note 1: If the device operation is disabled, the above status displays are not applicable.
Note 2: Above flicking cycle is one second.

(2) The current device setting status can be confirmed by the status display LCD. Operate the display contents by the LCD display operation switch. For the details of the display contents and the operation method, refer to "LCD Display Contents" attached to this document.

5.3. Stopping Device

(1) This device stops by switching off the power unit 1 and 2 of the device.
(2) To replace this device, replace it after switching off the device.
6. Monitoring Method

6.1. Confirmation by LED

The normal and error status can be confirmed by the status display LED on the front side.

6.1.1. Device Internal Error

Each processing part of the device is monitored and an error can be displayed. Confirm the error status by the status display LED (ALM) on the front side. The details are as follows.

1. When the device is operated normally, the LED lights up green.
2. When an error occurs on the device, the LED flashes or lights up red. If an error occurs, perform the following checks.

<table>
<thead>
<tr>
<th>Step 1: Confirming cooling fan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirm that the cooling fan on the back side of the device is rotating. If the cooling fan does not rotate, the fan is out of order and the immediate replacement is required.</td>
</tr>
</tbody>
</table>

6.1.2. Confirming TS and IP Input Error

MPEG-2 TS input and video transmission Ethernet input status can be monitored and displayed. Confirm them by the status display LED (IALM) on the front side. The details are as follows.

1. When the normal TS signal has been input, this LED lights up green.
2. If TS and IP input signal is an error, the LED flashes or lights up red. In case of the error, follow the below checks.
### [In case of using the device as a transmitter]

#### Step 1: Confirming status display LCD

Confirm the port status from the Status menu of the status display LCD. If the setting is wrong, set the input/output setting per TS over IP port setting correctly.

#### Step 2: Confirming MPEG-2 TS interface

For the “NG[TS>IP]” port which was displayed in the above step 1, confirm MPEG-2 TS(DVB-ASI) which was input to the device (such as the device stated in the preceding step and the connection cable to the device stated in the preceding step).

#### Step 3: Confirming re-multiplexing output rate and PID filter setting

If the device is used in the re-multiplexing mode, confirm the setting value of the re-multiplexing output rate and the PID filter setting for the port displayed as “NG[TS>IP]” in the above step 1.

### [In case of using the device as a receiver] (1) when flashing red light

#### Step 1: Confirming the setting of the receiving buffer for absorbing IP transmission delay jitter

Confirm the number of TS packets in the receiving buffer for absorbing IP transmission delay jitter and the receiving buffer alarm setting in TS over IP common setting.

#### Step 2: Confirming the external clock (in case of reference synchronization)

Confirm the clock source which is input to the external clock input/output port.
### [In case of using the device as a receiver] (2) When lighting up red

#### Step 1: Confirming status display LCD

Confirm the port status from the Status menu of the status display LCD. If the setting is wrong, set the input/output setting per TS over IP port setting correctly.

#### Step 2: Confirming setting per TS over IP port

For the port “NG[IP>TS]” is displayed in the above step 1, confirm the setting per TS over IP port of the device (receiver) and the counter device (transmitter).

#### Step 3: Confirming the TS over IP common settings

If there is no port “OK[IP>TS]” is displayed in the above step 1, confirm the TS over IP common settings of the device (receiver) and the counter device (transmitter).

#### Step 4: Confirming the pilot setting (in case of the subordinate synchronization)

Confirm the TS over IP pilot setting of the device (receiver) and the counter device (transmitter).

#### Step 5: Confirming the MPEG-2 TS network interface

Confirm a router connected to this device and connection cables to the router.

#### Step 6: Confirming the network environment of the MPEG-2 TS network interface

Confirm the network environment of the MPEG-2 TS network interface.
6.1.3. Confirming Power Failure

Power is monitored and power failure can be displayed. Confirm the status from the status display LED (POW1, POW2) on the front side. The details are as follows.

(1) When the power unit is operating normally, this LED lights up green.

(2) When the power unit has an error, the LED lights up red. If 100V AC power which is input to this device has an error, it will be the power failure. In this case, check the power supply source to this device. If the LED does not light up green yet, a replacement of the power unit is required.

6.2. Confirmation by Monitoring Terminal

When an error occurs, this device can notify the device status to monitoring terminal. The device status is output through the control Ethernet port on the back side of the device.

6.2.1. Confirmation by SNMP

This device can notify the device status of when an error occurs to a monitoring terminal as a SNMP trap. For the details of notification, refer to “UM6000_MIB Tree Structure” supplement to this document.

Note: Please prepare the monitoring terminal by yourself.
7. External View

Figure 7-1 Device External View
## 8. Product Specifications

### Table 8-1 Product Specifications

<table>
<thead>
<tr>
<th>Module</th>
<th>The number of ports</th>
<th>Signal type</th>
<th>Connector shape</th>
<th>Transmission mode</th>
<th>Transmission speed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MPEG-2 TS interface</strong></td>
<td>16</td>
<td>DVB-ASI(EN50083-9)-compliant</td>
<td>BNC coaxial connector (75Ω)</td>
<td>Input port: Packet/burst mode (188/204 bytes)</td>
<td>Maximum 100Mbps</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Output port: packet mode (188/204 bytes)</td>
<td></td>
</tr>
<tr>
<td><strong>Network interface for MPEG-2 TS transmission</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The number of ports</td>
<td>1</td>
<td>1000Base-T/1000Base-LX/1000Base-SX</td>
<td>RJ-45 (1000Base-T)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LC (1000Base-LX or 1000Base-SX)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>* Either of the above connectors is supported by using SFP.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Network interface for monitoring setting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The number of ports</td>
<td>1</td>
<td>10Base-T/100Base-TX</td>
<td>RJ-45</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Serial interface</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The number of ports</td>
<td>1</td>
<td>RS232C</td>
<td>D-sub 9pin (male)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External clock input interface</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The number of ports</td>
<td>1</td>
<td>1.0Vp-p (termination)</td>
<td>BNC coaxial connector (50Ω/75Ω)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Specified the impedance in ordering</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>100V AC±10% (50/60Hz)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>100W or less (duplexed power units)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>8kg or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>10 to 40°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External dimensions</td>
<td>482mm(W)×509.7mm(D)×43.5mm(H)</td>
<td>* Not included any projections</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>