Installation and Service Manual
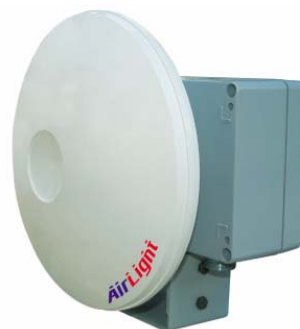
Millimeter-wave Radio Communication System

AirLight ™

60 Series - ME1000/100

70 Series - TE1000/100

COMOTECH CORPORATION

AirLight ™

60 Series – ME1000 / ME100

70 Series – TE1000 / TE100

★ Table of Contents ★

1. Introduction

1-1. AirLight™ Family

AirLight™ applies the original Comotech technology to millimeter-wave and provides the system doing the wireless transmission of various types of digital signals from 100 Mbps to 1.25Gbps. Especially, Fast Ethernet (125 Mbps) and Gigabit Ethernet (1.25Gbps) are provided with standards, and product flexibility is provided to determine the desired standards depending on user requirements.

1-2. Advantages of AirLight™ Series

√ High Tech – Application of original Comotech technology has further enhanced the reliability of millimeter wave band products.

√ Unlicensed Frequency Band – There are many countries that generally don't need license and declare to use the frequency in case of 60 series.

√ High Data Transmission Speed – The systems with various speeds from 100 Mbps to 1.25Gbps can be serviced and supported.

√ High Security and Frequency Reuse – Good security is guaranteed by high directivity, and the reuse of frequency in the unit of pico cell is possible due to the frequency characteristics of the millimeter wave.

TE1000C-24/ME1000C-24
TE100C-24/ME100C-24
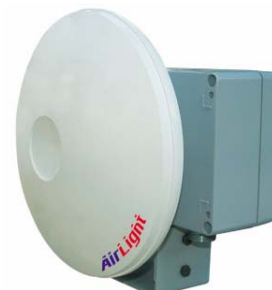
TE1000C-12/ME1000C-12
TE100C-12/ME10C-12

Figure 1-1 AirLight™ ODU (Out Door Unit)

1-3. AirLight™ Features

AirLight™ has the following features.

▶ **Next Generation Communication Technology**

    √   Integration of high tech

    √   Digital direct conversion

    √   Good security

    √   Data acceptance capability with high capacity

    √   Low power consumption

▶ **Wireless and Fiber Distributed Network Configuration**

    √   Use of the unlicensed frequency in the 60GHz band – ME100 / ME1000

    √   Possible to connect to the system using binary digital signals

    √   Support of the maximum 1.25Gbps (Gigabit Ethernet) speed from 100 Mbps

    √   Support of various interfaces: FDDI, UTP, etc.

    √   Possible to design in compliance with the communication regulation of each country (FCC, TELEC, ITU-R)

▶ **Low Cost and High Efficiency**

    √   Possible to configure very high speed network with the low cost

    √   Low maintenance and repair cost without laying

    √   Possible to install and operate with the small number of persons (1 or 2 persons)

    √   Possible to send the data with high capacity and flexibly connect to another system

    √   Possible to connect to IP network

    √   The same transmission efficiency as the wired one

▶ **Efficient Network Management**

    √   Provision of the efficient network management program (IDU)

    √   Support of the RS-485 communication port to check the **AirLight™** state

    √   The management function by ALMP, **AirLight™** Monitoring Program

1-4. AirLight™ Application

AirLight™ is a ultra high speed wireless LAN communication product. Configuring the wireless network with P2P, P2M, or M2P types among large buildings makes it possible to communicate the data with the adjacent system through the wireless network. This configuration can replace the area difficult to lay the optical cables and communication facilities requiring high security. The wired and wireless double security management system, Using both network among banks in the neighborhood, and the regional administration network can be immediately configured. When LAN is configured in the area where buildings such as schools are stand close together, capability expansion is needed, or the current communication network is to be repaired, use it for a temporary installment to provide the stable communication service.

-- **Low Cost for Maintenance and Repair** --

AirLight™ can be installed by only a few workers one or two. The maintenance cost during line operation is extremely low compared to the optical cable, so there is an economical aspect of saving the cost. Furthermore, when the construction of the optical communication network in communication service isn't provided due to the man-made or natural disaster, the service can be seamlessly provided using **AirLight™** during the recovery of the optical communication network.

-- **Large Capability of Data Transmission** --

The current communication market requires more data transmission capability. The network configuration between cities can be achieved by laying the optical cable, but laying the optical cable in the city requires a lot of cost and time.

Using **AirLight™**, there all the problems can be solved in the place that needs LAN communication with large capacity of transmission in the downtown area.

-- Easy to Expand the Capacity --

When the additional lines are needed due to the increase of subscribers in the specific area or data processing capacity needs to be expanded, setting up **AirLight™** can make the communication service quality improved and the capacity expanded.

▶ **GSM/CDMA Mobile Base Station**

When GSM (14 kbps) doing the low speed data communication in the mobile environment is converted into W-CDMA (1 Mbps) making the multimedia service possible, the large data transmission between repeater station can be serviced with **AirLight™**. Moreover, it is possible to process the large amount of data required due to the increase of subscribers.
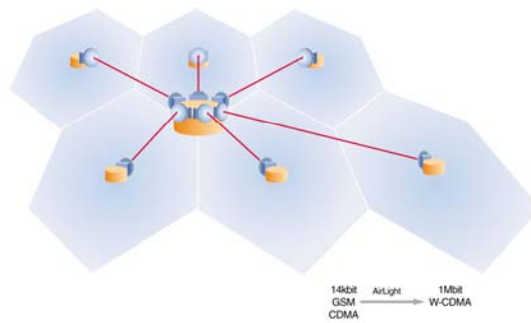
Figure 1-2 GSM/CDMA Mobile Base Station

▶ **P2P LAN Link**

If several groups of LANs need to be connected, the installation is possible by using **AirLight™** more quickly and cheaply than the optical cable. Moreover, the large amount of data comparable to the optical cable speed can be transmitted, and it has an advantage of easy installation and operation. In case of removing the service network, it is possible to reuse the product. Furthermore, in case of expanding lines due to the increase of subscribers, it is extremely easy to replace it with a high-end product.
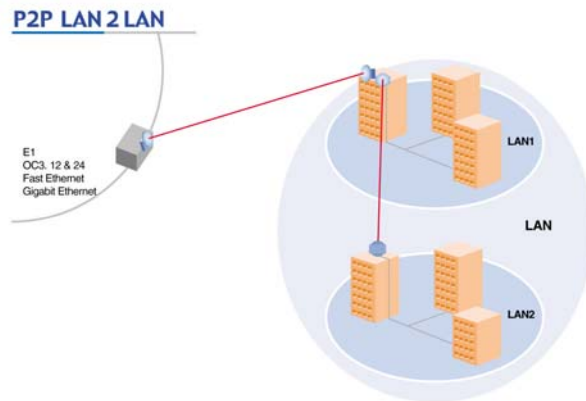
Figure 1-3 P2P LAN2LAN

▶ **Point-to-Point Wireless Link**

In case of providing the communication service across rivers or mountains, the optical line configuration work doesn't come up to **AirLight™** in terms of cost and practical use. It is simple and easy to set up **AirLight™**. In case of expanding lines, it can be replaced with a broadband capacity **AirLight™** product or an additional installation can be set up for service.
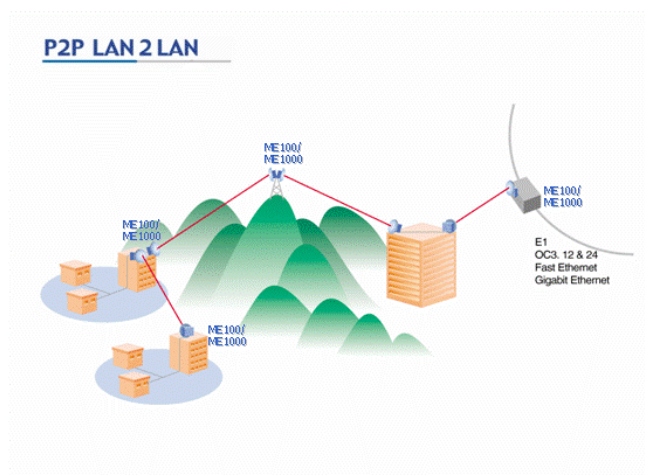
Figure 1-4 Point-to-Point Wireless Link

▶ **W-LAN Network**

When installing the wireless LAN to be used in the downtown, many wireless LAN access points can be grouped for transmission to the adjacent network using **AirLight™**. **AirLight™** guarantees high compatibility and large data transmission. It is the optimal solution to minimize the installation and incidental expenses occurring due to the increase of the data usage in the downtown.
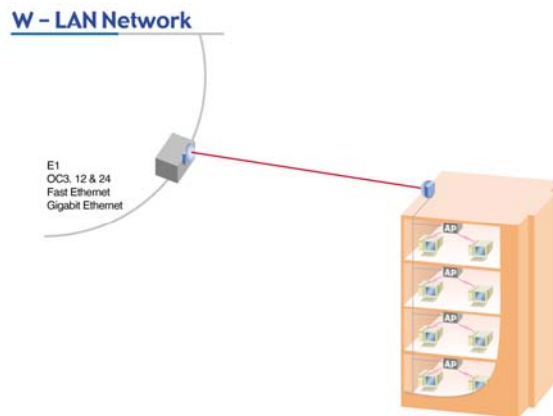
Figure 1-5 W-LAN Network

▶ **Security & Internet**

In case of implementing the centralized management by grouping CCTV security systems in a company, a new transmission line is needed. **AirLight™** can handle all of these matters. In case of using the current wired network and the wireless network with **AirLight™**, the stability of the security system can be enhanced.

Security & Internet

DVR / Data Backup
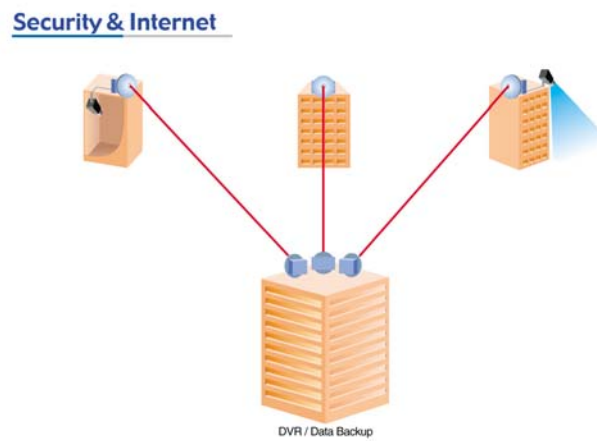
Figure 1-6 Security & Internet

2. Description

AirLight™ consists of a wireless transmitter and receiver, management software(ALMP) and a manual. The wireless transmission and receipt device is physically composed of RF main unit, optic to electrical converter, power supply unit and system protection case with antenna and alignment bracket.

2-1. General Equipment

Main parts of AirLight™ are basically as follow.

TE1000C-24/ME1000C-24   TE1000C-12/ME1000C-12
TE100C-24/ME100C-24   TE100C-12/ME10C-12

Figure 2-1 AirLight™ Part-Name

▶ **Antenna**

Antenna is directly related to the transmission distance of **AirLight™**. The Fig. 2-1 shows the 24 inch and 12 inch Cassegrain parabolic antenna. Various sizes of antennas are available to provide the optimal solution depending on user needs.

▶ **System Body**

It is the part the wireless communication system is mounted to. To support

stable performance from severe weather can didn't such as and heat radiation, an excellent aluminum case is used and the external surface is coated with powder to protect from corrosion.

▶ **Alignment Bracket**

The antenna provided by **AirLight™** has usually narrow beam width, because of the high frequency range of millimeter-wave of 60GHz or 70GHz. Alignment bracket makes the installation easy doing deployment. It can be tilted within 10 degrees upward and downward and 10 degrees left and right.

▶ **ALMP (AirLight™ Monitoring Program)**

The program checking the operation status of **AirLight™** is provided. With the internal functions of the program, the **AirLight™** states such as the receipt status of RF signals, the connection state of internal transmission signals, internal temperature, etc. can be recorded and checked. Currently, it supports IBM-compatible OS and Windows OS, and UNIX, Linux, and Mac OS will also be supported depending on customer requirements.
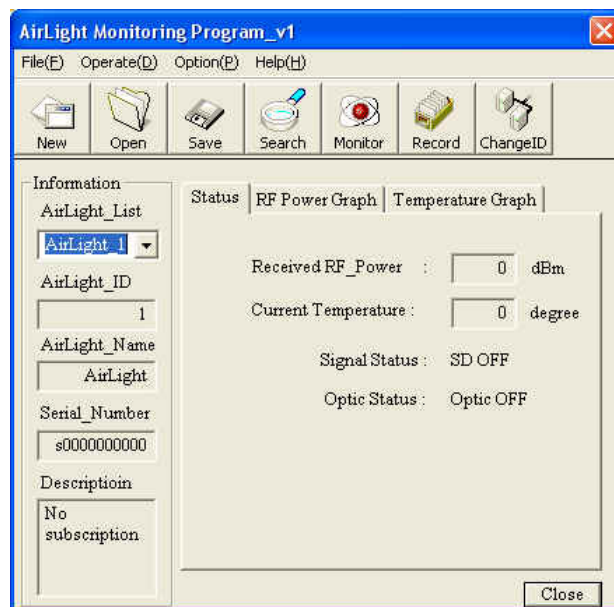
Figure 2-2 ALMP Main Window

3. Deployment

3-1. Pre-Installation Notice

Workers installing **AirLight™** should check the following before installing it.

√   Is the space for installment sufficient and are there any dangerous facilities nearby?
   - The location should be selected to safely install and maintain and suitably manage it.

√   Are things and tools needed for installment secured?
   (Refer to section 3-4.)
   - Thoroughly prepare the things needed for fast installation.

√   Is the structure (ex. mast) suitable to fix the equipment available?
   (Refer to section 3-5.)
   - It should be possible to firmly fix it to get the best communication quality.

⚠️ **WARNING**	**Workers installing the equipment should check the above matters before installation to prevent the accident that may occur during installation.**

3-2. Install-Location Notice

The following matters should be considered to install **AirLight™**.

√ **Line of Sight**

As for the installation conditions of AirLight, buildings, pylons, or trees should not be in the line of sight from another AirLight, and it should be installed fairly high enough from the floor.

√ **Mast**

The mast for AirLight installation must be stably fixed not to be vibrated by gales or rain. Vibration may degrade communication quality.

√ **Permission**

Installation location should be approved by the building owner or superintendent. Installation methods and other matters meet local requirements.

3-3. Safety and Notice

AirLight™ is designed to sand against severe environment, but the following matters should be attended to use it safely for a long time.

▶ **Installation**

√ Putting inflammable materials beside the product may cause a fire.

√ Installing it in the unstable or vibrating place or in the place right ahead of the wall may degrade communication quality.

√ Dropping it or putting a lot of impact on it may cause the product break down, so be careful to handle it.

√ Even though this product is dropped down, it shouldn't contact the electric wire. It is good to take a necessary safety action during installation.

√ If the product isn't installed according to the operating instructions, it may impede wireless communication.

√ Installation and repair need technicality and experience, so the after sales service center or sales store can safely handle it at user request. There is no part a user can fix inside, so if arbitrarily disassembled, it may cause a breakdown or degrade communication quality.

▶ **Power**

√ The power terminal should be securely fixed not to be vibrated. If the connection is unstable, it may cause a fire.

√ Don't put heavy things on the power cord, or don't let the cord pressed under the device so that it shouldn't be damaged. Otherwise it may cause an electric shock and a fire.

√ Don't let the water inside through the power cord protection tube to avoid the electric shock accident.

√ Be careful that putting the power cord beside the heating device may have the coating of the cord melted down.

√ The working voltage must be checked before using the product.

Wrong or not connect power source and voltage cause a failure.

▶ **Caution**

√ This product consists of precise parts, so any disassembling or remodeling the product by user may cause a fatal breakdown. If a failure occurs because of it, the manufacturer isn't responsible for product quality.

√ If the antenna is covered with a lot of filth, get it off with the smooth cloth stained with the neutral detergent and rub. Then, rub it off again with the clean cloth. Using chemicals such as organic solvents, alcohol, and benzene may damage the product. Never use them.

√ Don't use it in the state of failure such as no communication. Immediately turning off the power switch and separating the power source, contact the after sales service center or sales store for safe handling.

√ Turning off the power source reduces the risk of an electric leakage or a fire, when the product isn't used for a long time.

3-4. Tools and Equipments

The following tools and equipments are needed to install **AirLight™**. Workers installing the device should check the following things.

▶ **Things Needed for Installment**

- √ Power cables --- AC: FG, AC(N), AC(L), DC: +V, -V
- √ Cables for administration --- RS-485 twist cables (AWG24)
- √ Optic cables for communication --- SC type, multimode optic cables
- √ Flexible tubes (22mm diameter)
- √ Other tools

▶ **Things Needed for Checking the Communication State**
(Do not provide)

- √ Laptop Computer --- Using the ALMP program
    - RAM: 128 Mbytes
    - Hard Disk: 20Mbytes
    - OS : Microsoft® Window 2000® or XP
    - Video Resolution: 1024 X 768
    - Interface: Serial COM port
- √ RS232 to RS485 converter
- √ Cables needed for other connections

3-5. How to Connect AirLight™

Fully understand the following matters before setting up **AirLight™** and install it.

⚠ **WARNING**	**AirLight™ uses two types of models using AC 100 ~ 240V (50/60Hz) or DC (+/-) 48V as the input power source. Before connecting it to the power source, be sure to check if the purchased product operates with AC or DC.**

3-5-1. Connection Terminals of AirLight™

1. The Power Input Terminals

    There are power input terminals for AC and DC. The one for AC connects it to the 100 ~ 240V (50/60Hz) power source. The one for DC connects it to the (+) 48V or (-) 48V power source.

Note :	**When the power source is connected properly in AirLight™, PWR LED is turned on.**

2. Communication Terminals (Optical)

    The terminal connecting it to the external network uses the optic cable. The multimode SC type connector is default, Wavelengths of ME100 and TE100 are both 1310nm, and those of ME1000 and TE1000 are both 850nm.

Note :	**There is OSD LED in AirLight™. If AirLight™ is correctly connected to the network equipment, it is turned on.**

3. Management Terminals (RS-485)

    After installation or completion, various types of information can be obtained through this communication terminals. (Refer to chapter 4 ALMP.)

3-5-2. Connecting the AC Power Source

There are 3 terminal blocks to connect the power source inside **AirLight™**. The connection is fastened with M3 bolts.

As for the electric wire coming from the outside, use the wire with the diameter of 0.75mm or larger to stably supply the electricity.

It is recommended to use the ring type tinned copper terminal end or PVC insulated type tinned copper terminal end to connect the terminal block and the wire. The internal diameter of the solderless terminal should be 3.2mm.

Table 3-1 Terminal Blocks Connecting the Power Source

Terminal	AC			DC		
	FG	AC(L)	AC(N)	NC	(+)V	(-)V
Input Voltage	Ground	AC100 ~ 240V	0V	Not Connected	Ground	-48V
					+48V	Ground

⚠ WARNING	**There are two types (AC or DC) of power sources for AirLight™. Check if the purchased product operates with AC or DC.**

Note :	**As for the location of the AirLight™ power source terminal, refer to Chapter 7.**

3-5-3. Communication Terminals (Signal I/O Ports)

AirLight™ basically supports optic terminals. The following table 3-2 shows the specification of standard optic terminals. Contact Technical Support Team of Comotech to use the customer's previous network and change the interface.

The communication terminals of **AirLight™** are connected as shown in Fig. 3-1. The RX terminal of AirLight is connected to TX of the network equipment, and the TX terminal is connected to RX.
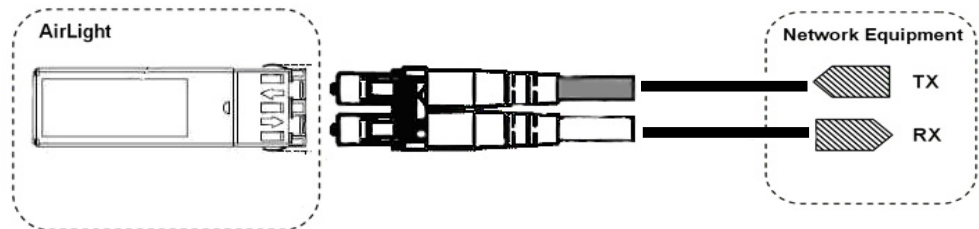

Figure 3-1 Network Connection

The optic fiber type of **AirLight™** is shown in Table 3-2. Connecting to network equipments, refer to the standards of Table 3-2.

Table 3-2 Optic Fiber Type

Model Type	ME100 / TE100	ME1000 / TE1000
I/O Terminal	1310nm / MM / LC	850nm / MM / LC

Note :	**As for the location of the AirLight™ communication terminal, refer to Chapter 7.**

3-5-4. Management Terminals (RS-485 Terminals)

RS-485 is the function provided to check the operation state of **AirLight™**. The RS-485 serial communication is a half duplex method. The 1:N connection is possible. It is possible to connect a master (PC) to many slaves (**AirLight™**). Terminal names are "TRX+" and "TRX-". They are connected in compliance with the polarity. It is recommended to use the shield cable (AWG-24 Twist) for the communication connection cable. The connection terminal consists of two terminals, and as for connection, use solderless terminals.
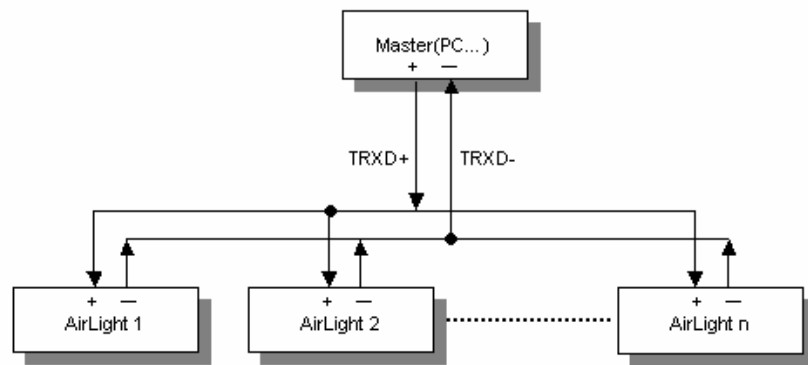

Figure 3-2 Diagram of Connecting AirLight™ to RS-485

RS-485 communication is used with ALMP, so it is desirable to connect it to the PC for communication. To connect it to the PC, the RS-485 to RS-232C converter is needed. This converter isn't basically provided.

Note :	**As for the location of the administration terminal of AirLight™, refer to Chapter 7.**

3-5-5. Alignment Bracket

To make tilt easy during **AirLight™** installment, the attached alignment bracket is provided. The dimension of the bracket is displayed in Figure 3-3.
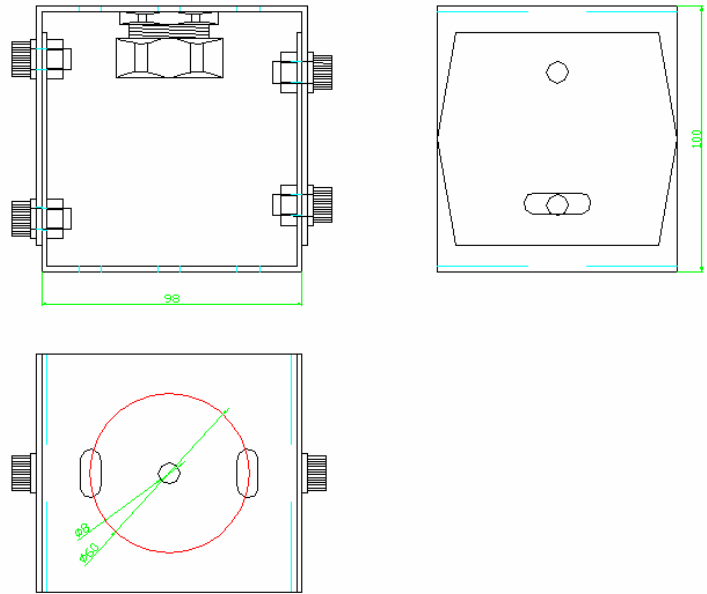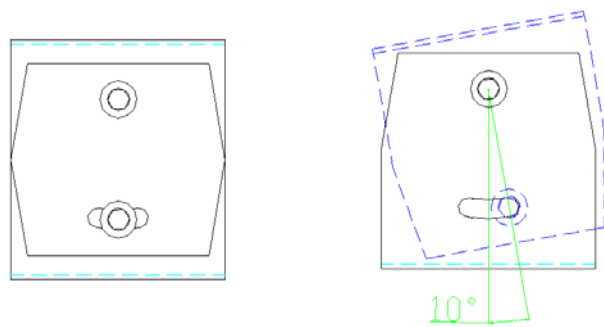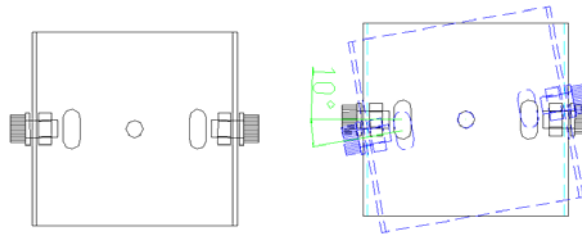

Figure 3-3 Dimension of the Alignment Bracket

All the bolts for fixing basically use M8. To flexibly set up the direction, the alignment bracket can be tilted within 10 degrees up or down and 10 degrees left and right are available for left, right, up and down.

(a) Up / Down Angle

(b) Right / Left Angle

Figure 3-4 Rotated Angle for Alignment

3-5-6. Flexible Tube Terminal

The protection tube (flexible tube) is needed to protect the optic cable, AC power line, and RS-485 cable required to connect **AirLight™** to Hub(or Router etc.) and the PC. Hence, **AirLight™** provides the hole with the 27mm diameter to connect various cables. This hole is well suited with the flexible tube with the 22mm diameter. Basically, the flexible tube connector is attached. Various cables can be used to protect both signal and power cable, such as flexible tube. Use the electromagnetic shielding protection tube if possible.
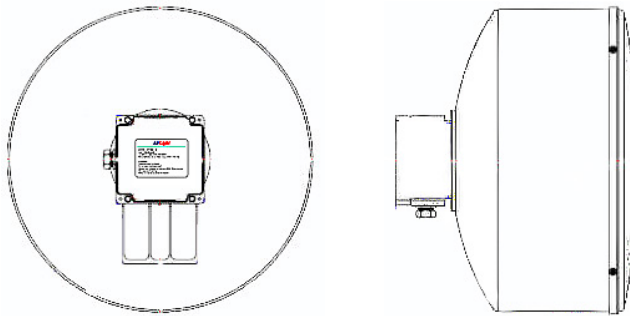
TE1000C-24/ME1000C-24, TE100C-24/ME100C-24
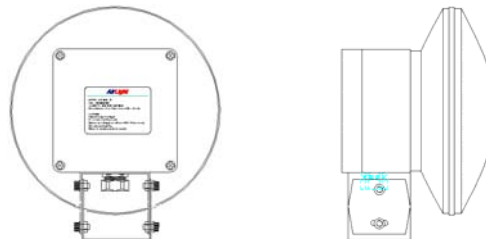
TE1000C-12/ME1000C-12, TE100C-12/ME100C-12

Figure 3-5 Holes for Flexible Tube

3-6. Cabling Check

√   Check if the correct power source is used.

→   Check if it is AC 100V ～ 240V or DC 48V.

√   Check the connected conditions of the power cable. (Refer to chapter 3 power source terminals.).

→   Check if the power cable is correctly connected to the power cable.

→   If the separate power switch is set up, turn it "ON".

√   After the power is properly supplied, check if the DC power source LED is lighted.

→ If it is not lighted, check the power source connection terminal.

√   Check if the optic connector is connected and the OSD LED is lighted.

→   If it is not lighted, check the cable connection conditions and the operating conditions of another device. If it is not connected to another device, the OSD LED is not lighted.

→   Check if the optic cable is OK.

√   Connect the administrative RS-485 cable to the serial terminal of the PC (The adaptor is used) and execute ALMP. Then check if it is normally connected. (Refer to chapter 4 ALMP.)

→   If communication is not possible, check the cable or program setup. The detailed adjustment is possible only if communication is possible.

√   Check the receiving power through the management program (ALMP). Readjust it if needed.

→   As the received RF power level from ALMP gets larger, the stable communication quality can be obtained.

4. AirLight™ Monitoring Program (ALMP)

4-1. Introduction

ALMP provides the following functions by easily grasping the current state and abnormal signs and by having the user administrate them more easily. It checks RF receiving power, internal temperature, various cable connection statuses, alarms, warns abnormalities. Furthermore, the record function of the program makes it possible to track the previous AirLight™ status.

▶ Major Functions

√ Sense of RF receiving power

√ Check of internal temperature of AirLight™

√ Check of optic cable connection status

▶ Additional Functions

√ Alarm and warning functions

√ AirLight™ management function (up to 9 units)

√ Function to output AirLight™ status

√ Function to record AirLight™ status

4-2. Installation

▶ Recommended Operating Environment

√ CPU: Intel Pentium Processor Celeron 400MHz or higher

√ RAM: 64 Mbytes (minimum 16 Mbytes)

√ Hard Disk: 20 Mbytes (minimum 10 Mbytes)

√ OS: Window 98, NT/2000, XP[Service Pack 2.0]

√ Video mode: 1024 X 768 (Minimum: 640 X 480)

√ Interface: Serial COM port (required)

√ Others: RS232 to RS485 converter

▶ Setup

√ Copy the AirLight folder to desired place of the hard disk.

√ Execute ALMP.EXE in the AirLight\ALMP folder.

4-3. Getting Start

4-3-1. Starting ALMP

In order to start ALMP, open the folder where the executable file was copied. If the executable file appears, double-click the ALMP.EXE file to execute the program. If the program is executed, the screen like Fig. 4-1 appears, and the progress bar is executed. If the progress bar is fully progressed, the window to set up the COM port appears as Fig.4-2.
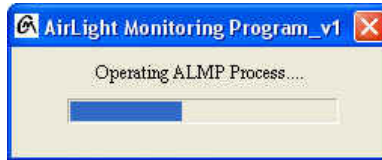
Figure 4-1 ALMP Progress Window

4-3-2. Program Terminal Setup

Terminal setup window to select the COM port is shown in Fig. 4-2. For reference, default values are set up for the other items except for **Port Select**. They can't be changed.

1) Port select: COM port is selected.
2) Bit/Sec: Transmission rate is selected.
3) Data bit: Number of data bits transmitted is selected.
4) Parity bit: Parity to transmit after the parity check is selected.
5) Stop bit: Number of stop bits is selected.
6) Flow control: Flow control is selected.
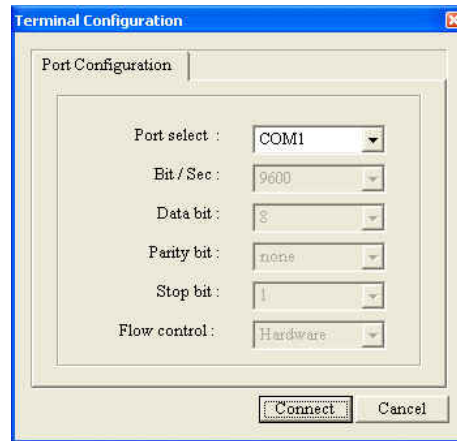
Figure 4-2 Program Terminal Setup Window

Press the **Connect** button after setting up the port and the program window is activated. If the selected port is in use, the warning window such as Fig. 4-3 appears.

Note :	**If the warning window appears, press the OK button to close the warning window and check if the selected port is in use.**

If the selected port is open, press the **Connect** button after closing the port and the program window is activated. Pressing the **Cancel** button makes the program executed with the COM port not opened.

When the program was executed without opening the port, the program information file (AirLight.ini) has to be opened to activate the COM port so that the program normally operates.
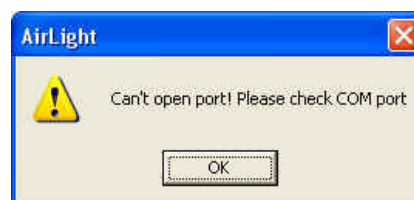

Figure 4-3 Port Open Warning Window

4-3-3. Program Explanation

1> Program Operation

If the port setup is completed, the program window is activated. In case, the information file exists, the program operates based in the file.

Note :	**The program information file is automatically created in the folder where the executable file is located.**

If the program is initially executed, the program information file is created and the automatic search function is executed. The search result shows up as in Fig. 4-4. If the search is completed, "AirLight discovery ..Complete." message is displayed.

Pressing the **OK** button after the message is displayed makes the searched equipment registered in AirLight_List of Fig, 4-5. If there are several equipments searched, they are registered in the ascending order of equipment IDs.

To stop the search during the execution of the automatic search function, press the **Cancel** button to stop the search.

Figure 4-4 Equipment Detection Result Window

2> Main Window

Main window of the ALMP program is shown in Fig. 4-5. The program is composed of four functional components. Each component comprises menus, icon buttons, the information display part, and the status display part.
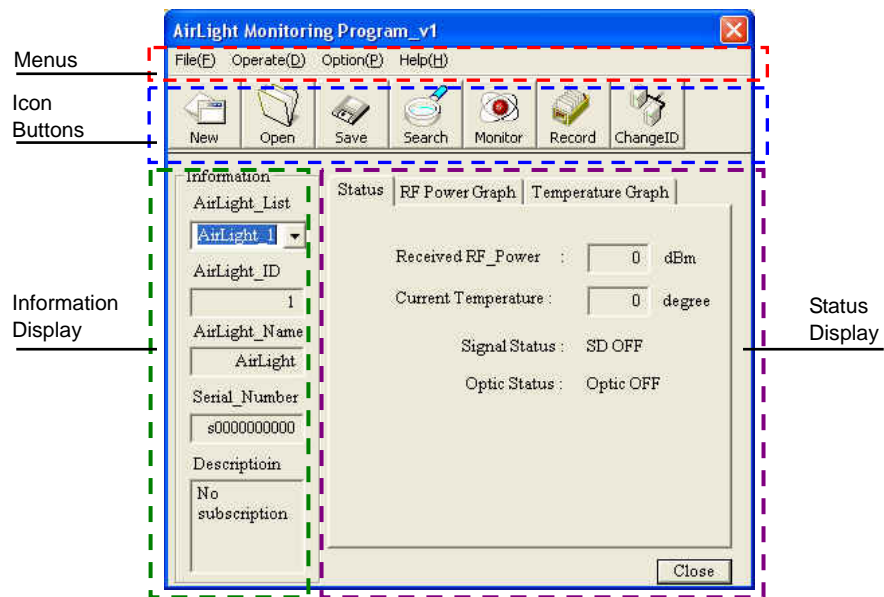
Figure 4-5 Main Window of the Program

3> Program Configuration

As explained in the Main window, the program configuration consists of menu items and icon buttons related to program operation events, the information display part to display the equipment information, and the status display (**Status**, **RF Power Graph**, and **Temperature Graph**) to display the monitoring status. The program configuration can be summarized as follows.

(1) Menu

The menus consist of **File**, **Operate**, **Option**, and **Help** and contain the events related to the entire program operation.

(2) Icon Button

They are the icon type buttons triggering the events related to the program operation. They show the functions frequently used in the menu function.

(3) Information Display

It is the part displaying the list of searched equipments and the status of equipments selected from the list.

(4) Status Display

It is the part showing the equipment operation status when the monitoring function is executed and shows the received power, internal temperature, signal status, and optic cable connection status. Selecting **RF Power Graph** or **Temperature Graph** from the horizontal tabs makes you check the operatiing status with a graph.

Note :	**If the monitoring function is not operating, default values are displayed.**

4> Program Details

The detailed operations of the main program can be classified into the menu items shown in Fig. 4-6. Each menu item contains submenu items corresponding to the menu and can be also called with Alt+Key (Ex.: File -> Alt+F).
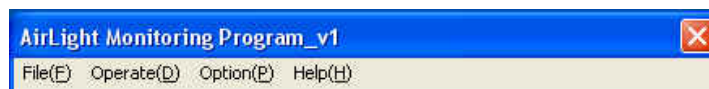

Figure 4-6 Menu Screen

(1) Menu -> File [File(F)]

It represents operations such as program re-run, file related matters, program configuration and program termination. **File** items are classified into five items as in Fig. 4-7.

Figure 4-7 Sub-items of 'File'

(1.1) New

The current connection is discontinued, and it starts with the new connection. Pressing **New** makes the terminal setup window activated for the new connection.

(1.2) OpenFile

If there is an information file (AirLight.ini) already saved or kept, it can be recalled and used. Pressing **OpenFile** makes the file input window shown in Fig. 4-8. If the information file is opened in the file input window, the terminal connection status and the equipment list already registered are recorded and the program window will be activated.

If the selected file is not correct file, the warning window shown in Fig. 4-9 will be activated. Press **OK** button and select the correct file.

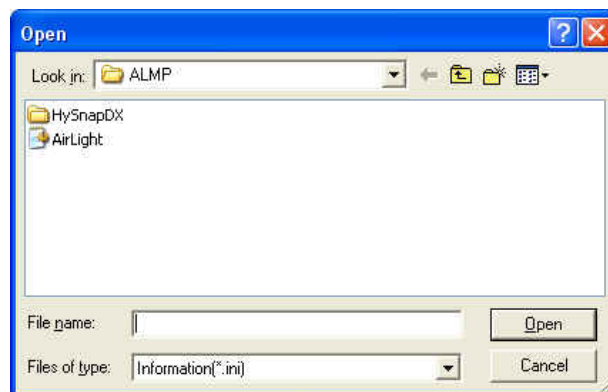| Note :	**If the correct information file is not exist, select New to create a new information file.**

Figure 4-8 File Open Window

Figure 4-9 File Open Error Warning Window

(1.3) SaveFile

The current status is saved. The terminal setup information and the equipment list registered in the program are saved with the information file type (AirLight.ini). The file can be used later on with **FileOpen**. Open AirLight.ini file in the folder where ALMP.exe file is located to check the current record file.

(1.4) Configuration

The program information file is created, or the current information file is changed. If there is an information file already created, the file data are displayed in the data display part of the **Configuration** window.

✓ AirLight Information: The equipment list currently registered can be checked, and the properties of equipments registered can be changed. Moreover, the new equipment list can be added if needed by the user.

Note :	As far as the information on an equipment registered, double-clicking the equipment ID in Registered ID makes the details show up in the information part.

To change equipment properties, modify the item needed to be changed and press the following **Register** button. In order to register a new equipment, enter equipment properties and press the **Register** button. Then a new equipment is registered in **Registered ID**. If the **OK** button is pressed after registration, the modified equipment is available and the equipment connection can be checked. The registration of a new equipment is allowed in the permitted ID range [1~9], and the warning window shown in Fig. 4-11 is activated for the other values. Press the **OK** button, when **Warning** window appears and then register the correct equipment number within the permitted ID range.
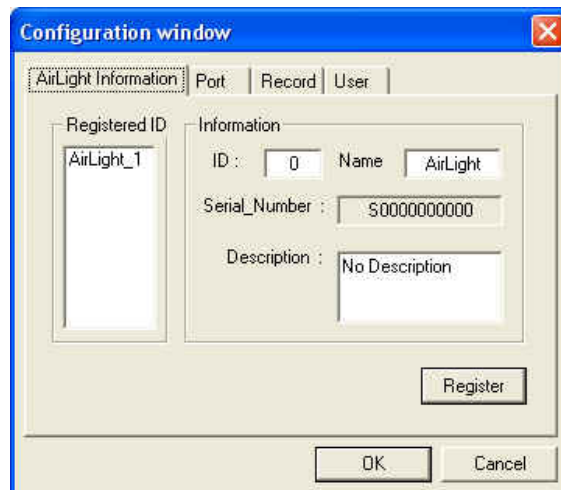

Figure 4-10 AirLight™ Information Configuration Window

Figure 4-11 Equipment ID Input Warning Window

✓ Port: The port setup can be modified just like the terminal setup. Modifying the port currently used, change the **Port select** part and press the update button to register the change.

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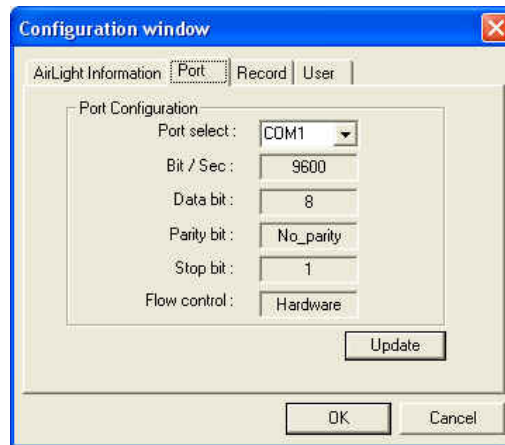
Figure 4-12 Port Setup Configuration Window

✓ Record: It is the part to set up the storage time of the record file, graph scroll time, and **On/Off** of the warning sound depending on the signal status. Input the data to change and press the **Update** button to register the change. If the record time interval is not correctly entered, the warning window shown in Fig. 4-14 is activated.

Note :	If the time input warning window appears, check the time range of the warning window and enter the correct value within the range.
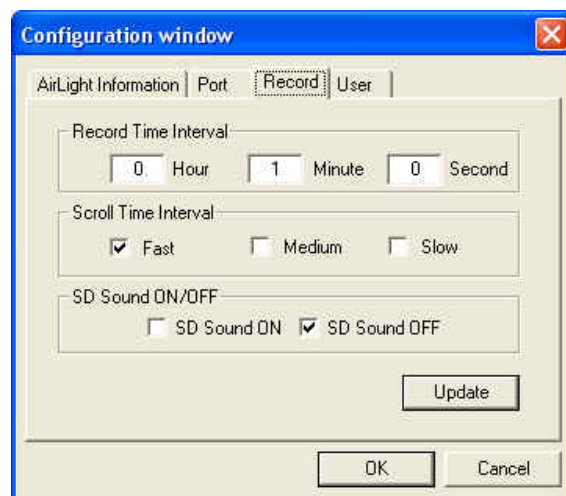
Figure 4-13 Additional Function Configuration Window

Figure 4-14 Record Time Input Warning Window

✓ User: This is the part to record user information. User information such as user name, company information, e-mail address, phone number, fax number, etc. is recorded. Enter necessary items and press the **Update** button for registration. After the setup is all over, press the **OK** button and register the information file again, and then the program setup will be over.
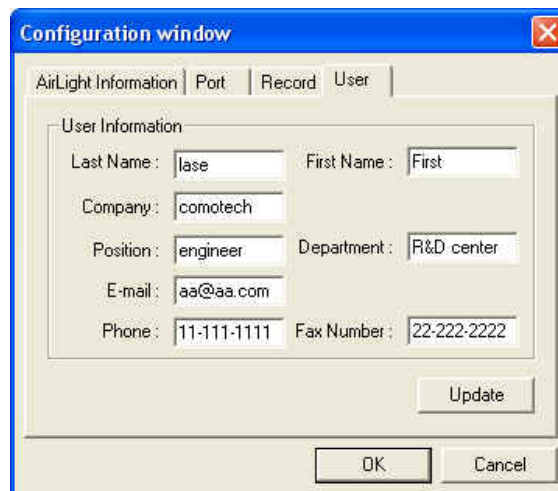
Figure 4-15 User Information Window

(1.5) Exit

The program is terminated.

(2) Menu -> Operation [Operate(D)]

The operation to communicate with the selected equipment can be selected.

Operation items are displayed with 4 operations as in Fig. 4-16.

Figure 4-16 Sub-items of the 'Operate' Item

(2.1) Start Monitor

The monitoring function of the selected equipment is started. If an equipment isn't selected in AirLight_List, the warning window shown in Fig. 4-17 is activated. Press the **OK** button in the warning window and select the equipment from AirLight_List. Selecting the equipment and pressing **Start Monitor** makes the monitoring function execute.

Figure 4-17 Selection Error Warning Window

If there is a problem with the line or data loss during monitoring, the warning window shown in Fig. 4-18 is displayed. Press the **OK** button and check the line or AirLight equipment status.

Figure 4-18 Connection Error Window

(2.2) Stop Monitor

The monitoring function of the selected equipment is stopped.

(2.3) Change ID

The ID, name and details of the selected equipment are modified. Select the equipment in **AirLight_List** and press Change ID, and then the **ID Change** window shown in Fig. 4-19 is activated. The name, ID and details of the selected equipment are displayed, and the existing name and ID are displayed with the inactivated status.

Note :	**If a name and details are to be changed, enter the existing ID in Change ID and enter the name and details to change.**

Enter the name and ID to change in the **Change ID** part. As for details, erase the existing details and prepare them again. Press the **Insert** button after input to change the equipment ID.

 If a new ID specified in Change ID is used, the warning window shown in Fig. 4-20 is activated. Press the **OK** button in the warning window and check if the new ID is in AirLight_List.

Figure 4-19 ID Change Window

Figure 4-20 ID Change Error Window

(2.4) Detect

The function makes it possible to automatically or manually detect the PC in which programs are currently executed and for the equipments connected to the PC. Pressing **Detect** to execute this function makes the **Equipment Detection** window shown in Fig. 4-21 activate.
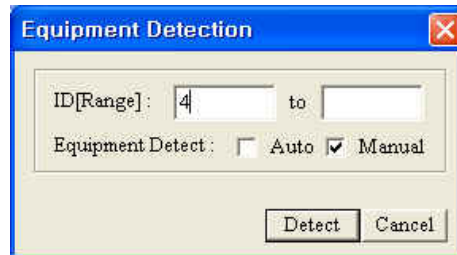
Figure 4-21 Equipment Detection Window

Checking the **Auto** check box of **Equipment Detection** window makes the **ID(Range)** part inactivated, and checking the **Manual** check box makes the **ID(Range)** part activated. **Auto** is the function to automatically detect equipments, and equipments from 1 to 9 are detected. **Manual** is the function to manually detect equipments. It executes the function to get the starting equipment ID or starting and ending IDs and detect equipments within the range entered. Entering the ID of the equipment to detect in the **Equipment Detection** window and pressing the **Detect** button make the detection start. If the ID was not entered or the value beyond the range between 1 and 9 was entered after selecting **Manual**, the warning window shown in Fig. 4-22 shows up.

Note :	**If the detection range is not correct, the equipment is not detected. Check the input value one more time.**

If the entered ID is correct, the detection result window will appear as in Fig. 4-23. The detection result is displayed with the input ID and detection result (**OK** or **None**). If the equipment detection is completed, the message, "AirLight discovery .. Complete." is displayed. After the message is displayed, press the **OK** button to close the detection result window. Pressing the **Cancel** button during detection can stop the detection.

Note :	**Pressing the Cancel button during detection stops the detection in progress. Check the searched equipment and stop the detection function.**

Figure 4-22 Equipment Detection Error Window
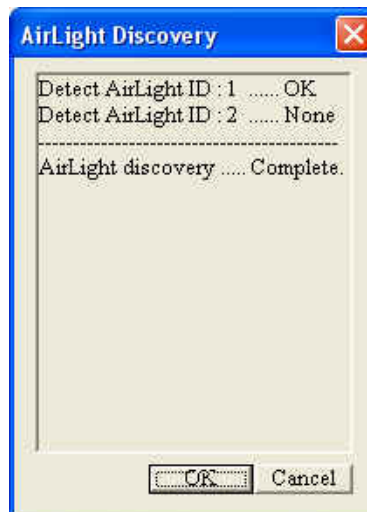
Figure 4-23 Equipment Detection Status Display Window

(3) Menu -> Option [Option(P)]

The additional function is provided in the program. There are functions such as monitoring status record and occurrence of the effect sound depending on the monitoring status as in Fig. 4-24.

Figure 4-24 Sub-items of the Option

(3.1) RecordOn

The types of current equipment status (Record Time, ID, RF-Power, Temperature, SD Status and Optic Status) are saved with the file. Pressing RecordOn makes the time input window activated.

If the record time interval is saved in the information file or the time interval was entered before, the warning window shown in Fig. 4-26 will appear.

Note :	**The existing time interval is recorded in the information file. Refer to the [Record/Sound] part of the information file.**
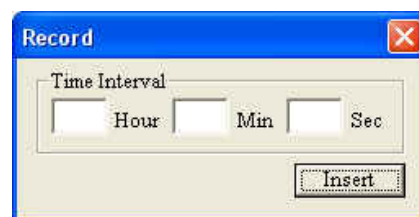
Figure 4-25 Record Time Input Window

To change the time interval, press the **OK** button and enter the time interval. To maintain the existing time interval, press the **Cancel** button and use the existing value. If the **Insert** button is pressed after the time is entered or the existing value is read, the **Save As** window shown in Fig. 4-27 is activated.
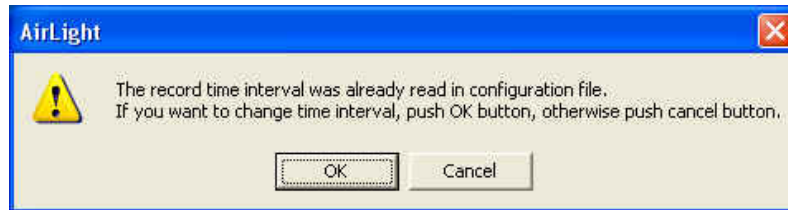
Figure 4-26 Record Time Warning Window

When the **Save as File** window is activated, entering the file name to record and pressing the **Save** button makes the equipment status recorded in the designated file. The file is saved in the general text document format, and the file extension (*.txt) is automatically inserted.
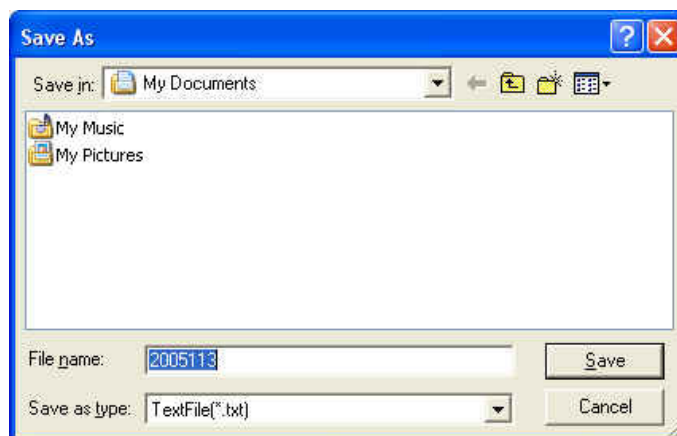
Figure 4-27 Save as Record File Window

(3.2) RecordOff

The status of being recorded is stopped. If **RecordOn** is inactivated, it is being recorded, so recording can be stopped by pressing **RecordOff**.

(3.3) SDSoundON

The warning can be sounded depending on **SD(Signal Detect) Status**. If **SDSoundON** is pressed, the alarm is sounded at the fixed time (in case of SD Status: SD ON). The **SDSoundON** operation occurs while monitoring the particular equipment. If there is no equipment being monitored, the warning window shown in Fig. 4-28 is displayed. Operate it after pressing

the **OK** button in the warning window and starting the monitoring of the particular equipment.

The **SDSoundON** function continues until **SDSoundOFF** operation occurs. Hence, it operates even though the monitoring function is rerun.

Figure 4-28 SD Sound Warning Window

(3.4) SDSoundOff

The alarm function based on **SD Status** is stopped.

(4) Menu -> Help [Help(H)]

The Help with the program can be checked.

Figure 4-29 Sub-items of the Help

(4.1)   About AirLight

Pressing 'About AirLight…' makes the program information shown in Fig. 4-30 displayed. Program version information and web site information on technical support can be checked in order.

Figure 4-30 Program Information Window

5> Icon Buttons

The functions needed for program execution can be used with icon buttons. Each icon button is the same as the execution of the Menu->Item and provides a far friendlier interface. Icon buttons are available as in Fig. 4-31.

Note :	As for the explanation of each function, refer to the program details of the item 4 of 4-3-3.

Figure 4-31 Icon Button

Pressing the **Monitor** button to check the status of a particular equipment makes the **Monitor** button converted to the pressed status as in Fig. 4-32 and the **Monitor** part change to [M]Stop.

Note :	If the equipment is disconnected, [M]Stop changes to Monitor with the connection termination message displayed.

In order to stop monitoring, pressing [M]Stop button makes the monitoring function stopped, and the [M]Stop part changes to **Monitor** again. The detection function can't be used during monitoring, so pressing the **Search** button doesn't make any events occur.

Figure 4-32 Monitor Execution

If the **Record** button is pressed to save the equipment status, the ongoing status can be saved at the input time intervals. Just like the **Monitor** operation, pressing the **Record** button makes it converted to the pressed status as in Fig. 4-33, and the **Record** part changes to **[R]Stop**. In order to stop the **Save** function, pressing the pressed **[R]Stop** button makes the **Save** function stopped. At this time, **[R]Stop** part changes to **Record** again.

Figure 4-33 Record Execution

6> Save File Formats

Executing the **Record** function creates the file to record the current equipment status. The saved files are stored with the formats shown in Table 4-1. The data actually saved appear with the formats shown in Table 4-2.

Table 4-1 Record File Formats

2005-00-00[Year-Month-Day]					
hh:mm:ss	ID	RF	Temper	SD_Status	Optic
[Hour:Minute:Second]	[ID]	[RF power]	[Temperature]	Signal Statis	Optic Cable
00:00:00	0	-20	38	ON	OFF

Table 4-2 Record File Types

```
2005-01-19

hh:mm:ss ID    RF[dBm]   Temper   SD_Status     Optic

17:05:29  2       -38       26        ON           OFF

17:06:29  2       -39       27        ON           OFF

17:06:29  2       -39       27        ON           OFF

17:06:29  2       -38       28        ON           OFF
```

4-3-4. Examples of Program Use

Operating procedures are provided to briefly explain how to operate the program. First, copy the distributed program to the particular system folder. The file is organized with the ALMP.exe file. Click and execute the program. The 'Start' window that is the startup window is activated. When the 'Start' window disappears as the progress bar advances, the 'Terminal Setup' window is activated. Check the status of connection between the equipment and the system and the serial port [COM1, COM2, etc.] connection status. Select the port connected to the 'Port select' part of the 'Port Setup' window. After the selection is made, press the 'Connect' button to activate the terminal connection. If the connection is completed, the main program window is activated and the equipments currently connected are automatically detected. The range of ID 1~9 is detected and the equipment detected during each detection stage is automatically registered in AirLight_List. The detection can be stopped by pressing the 'Cancel' button during automatic detection. If the detection is completed, check the equipments connected to the detection result window, press the 'OK' button, and close the result window. The registered equipment list can be checked in AirLight_List, and the current configuration status is automatically saved in the program information file. Now the monitoring function is executed to check the registered equipment status. As for the monitoring function, select the particular equipment in AirLight_List and press the 'Monitor' button for execution. If another equipment status needs to be checked, release the function of the equipment being monitored and execute the monitoring function of the particular equipment again. In order to record the current data, press the 'Record' button and enter the record time interval in the time input window. If the record file name is entered after the time interval is entered, the data can be recorded with the file.

5. Troubleshooting

The basic method to check the **AirLight™** status is to use ALMP. If **AirLight™** doesn't operate as it does, execute ALMP to check the operation status of **AirLight™**.

5-1. General ALMP Features

An IBM compatible Personal Computer (PC) is needed to execute ALMP. As for the connection between **AirLight™** and the PC, refer to chapter 3. If the installed **AirLight™** is detected and monitoring is started by executing ALMP, the following items can be checked.

√ RF Receiving Power – The receiving power is displayed in real-time.

√ Internal Temperature of AirLight

√ Network Connection Status – Signal Status and Optic Status

5-2. Problem Solving

Check the following before asking for after sales service center.

1. **AirLight™** is not detected in ALMP.

Problem	Cause	Action
Power Source	Power source terminal connection error	Check the connection method and connect it again.
	Cable disconnection	Replace it with a new cable
	Switched 'Off'	Have the switch 'On'.
Administration Communication	Terminal connection error	Check the connection method and connect it again.
	Cable disconnection	Replace it with a new cable
	A bad converter	Replace the converter with a new one. (Contact the vendor.)
	PC port setup error	Set it up with the used port.
	A bad PC serial port	Contact the PC vendor.

2. 'Received RF Power' is "LOW" or 'Signal Status' is "OFF".

Problem	Cause	Action
Power Source	The equipment power source on the other side is "Off".	Authorize the power source normally.
Setup	Wrong direction	Readjust the direction.
	Dirt or dust in the antenna	Clean the antenna.
	The setup distance between equipments is exceeded.	Set it up with less than the effective distance again.
	Rotate and install the equipment on the one side.	Reinstallation (Standardize the rotation direction.)
Environment	Attenuation due to heavy rain	Set it up again considering the local rainfall.
	Antenna burying due to snow fall	Snow removal operations

3. 'Optic Status' comes out with "OFF".

Problem	Cause	Action
Optic Cables	TX and RX terminal connection error	Check the connection method and reconnect it.
	Different optic standards	Check standards and replace the cable with a new one.
	Dirt or dust and breakage in the optic terminal	Clean the terminal and replace the cable with a new one.
Connection Equipment	The connection equipment on the other side is "Off".	Authorize the power source normally.
	Connection equipment error	Check the vendor.

6. Specification

6-1. AirLight™ 70 Series Typical Specification

Parameter		TE1000C-24 TE1000C-12	TE100C-24 TE100C-12
Frequency Range		71~76GHz	
Output Power		+17dBm (50mW)	
Modulation		ASK	
Main Power		+48Vdc or AC100~240(50~60Hz)	
Interface (Multimode)		Optic MMF 850nm, LC-type	Optic MMF 1310nm, LC-type
Data Rate		1.25Gbps	125Mbps
Operation Temperature		-30 ~ +70°C	
Size (WxHxD)		622x622x492(2ft), 304x342x220(1ft),180x180x100(module only)	
Weight		17kg(37.5lbs, 2ft) / 6kg(12.2lbs, 1ft)	
Antenna	Type	Cassegrain	
	Size	2ft(24") / 1ft(12")	

6-2. AirLight™ 60 Series Typical Specification

Parameter		ME1000C-24 ME1000C-12	ME100C-24 ME100C-12
Frequency Range		57~64GHz[1]	
Output Power		+10dBm (10mW)	
Modulation		ASK	
Main Power		+48Vdc or AC100~240(50~60Hz)	
Interface (Multimode)		Optic MMF 850nm, LC-type	Optic MMF 1310nm, LC-type
Data Rate		1.25Gbps	125Mbps
Operation Temperature		-30 ~ +70°C	
Size (WxHxD)		622x622x492(2ft), 304x342x220(1ft),180x180x100(module only)	
Weight		17kg(37.5lbs, 2ft) / 6kg(12.2lbs, 1ft)	
Antenna	Type	Cassegrain	
	Size	2ft(24") / 1ft(12")	

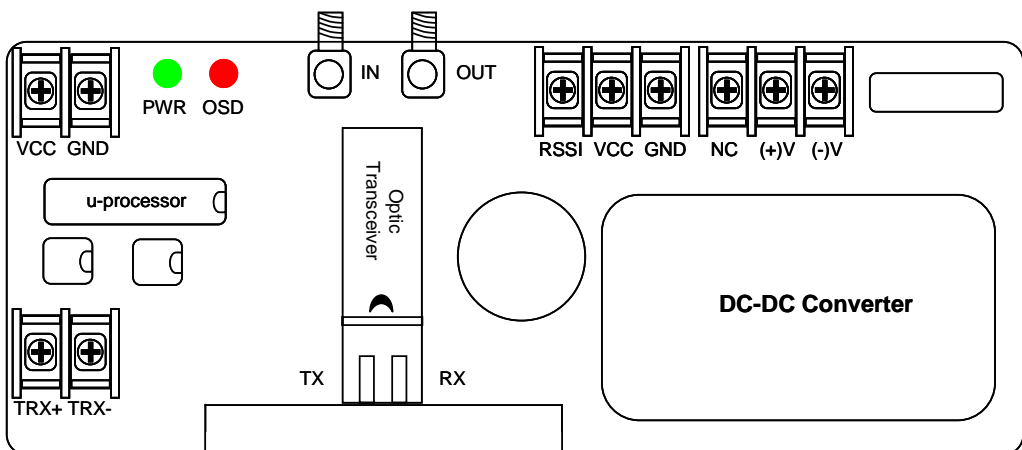1) 59~66GHz TELEC(Japan) specification available.

7. Terminal Location

7-1. The Terminal Location of TE1000C-24/12, ME1000-24/12
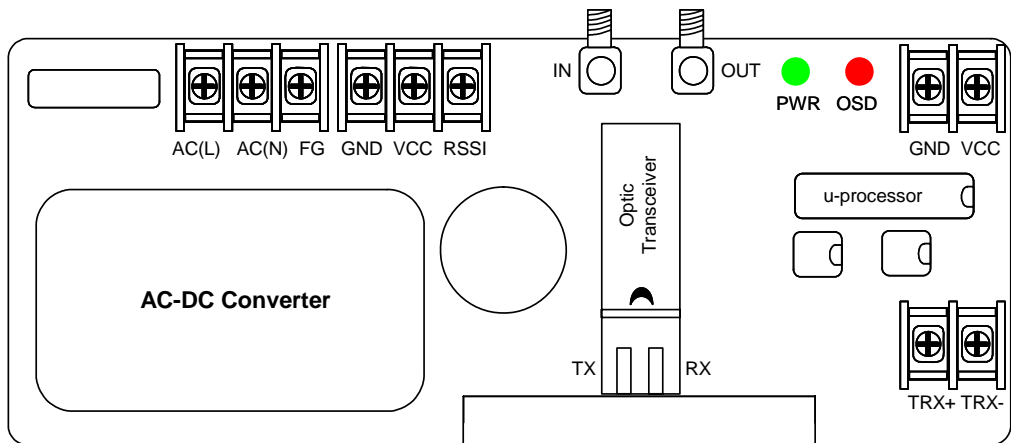
▶ **For AC Power PCB**
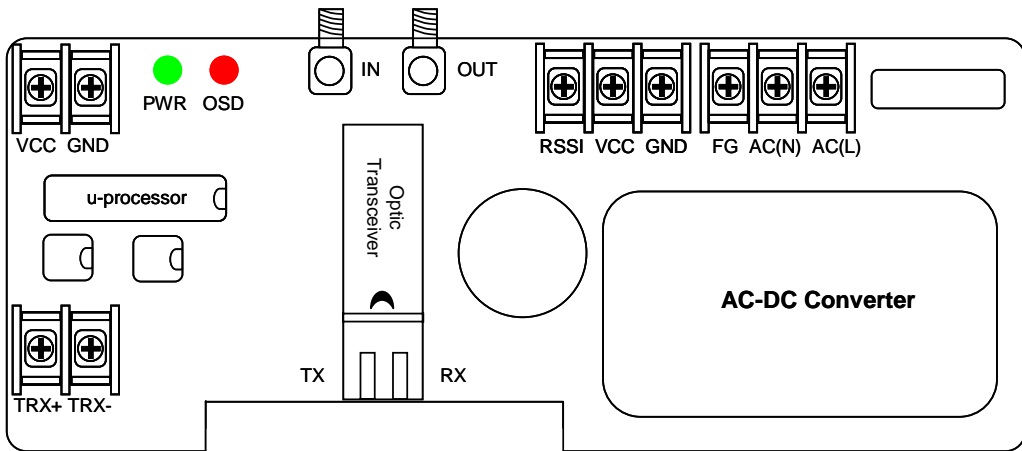
▶ **For DC Power PCB**

7-2. The Terminal Location of TE100C-24/12, ME100-24/12

▶ **For AC Power PCB**

IN   OUT   PWR   OSD   GND   VCC

AC(L) AC(N) FG   GND VCC RSSI

Optic Transceiver

AC-DC Converter

u-processor

TX   RX

TRX+ TRX-

▶ **For DC Power PCB**

IN   OUT   PWR   OSD   GND   VCC

(-)V (+)V NC   GND VCC RSSI

Optic Transceiver

DC-DC Converter

u-processor

TX   RX

TRX+ TRX-

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