TOA

INFRARED WIRELESS MICROPHONE SYSTEM

COOKBOOK

Description

1. Product Outline

A wireless microphone system that aims to eliminate problems that arise when radio waves are used, such as information leaks or interference.

2. Features

Secure Information!

Infrared transmissions, unlike radio waves, cannot pass through solid objects. They can only travel short distances and anything said through them is not going to be picked up by nearby equipment. There is no need to worry any longer about unexpected information leaks. Places where importance is given to information security, such as government ministries and agencies, courts, police or executive boardrooms can rest easily while using this system.

No Interference!

Infrared transmissions, unlike radio waves, cannot pass through solid objects. That means there is no need to worry about interference from wireless microphones being used in adjacent rooms or nearby buildings. And it is possible to operate the system on the same channel in an adjacent room. In the education market, there is no longer any need to worry about channel planning that requires multiple systems to operate for a number of adjacent classrooms.

3. TOA's Infrared Wireless Concept

Enhanced Transmission Stability!

a. An infrared ray emitter is mounted on the upper section of the microphone, ensuring steady light supply to the infrared wireless receiver.
b. Microphones use designs that make it difficult to block rays from transmission areas
c. Equipped with an enhanced luminescence Hi-mode to provide even greater transmission stability
d. A rich variety of infrared wireless receiver variations, including wall-mount and ceiling-mount types
e. Wall-mount receivers are also equipped with light receiving angle adjusters
f. Distributors allow for the multiple placement of up to as many as 16 receivers

4. Even More Benefits

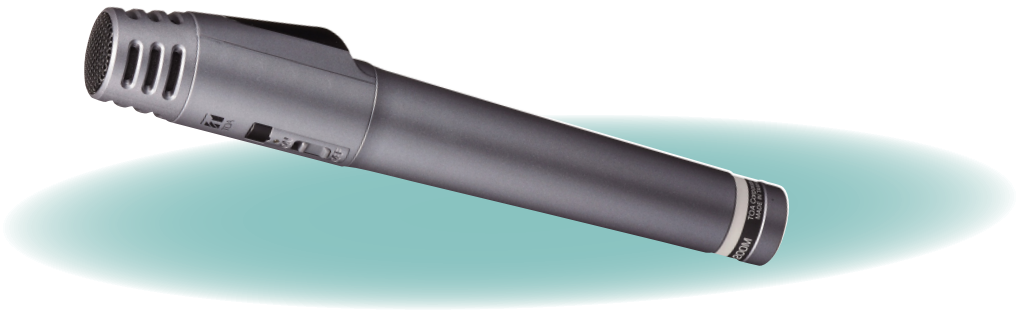
Any microphone in any room

Single-channel operation in multiple classrooms or conference room is possible. It will be no longer necessary to set channels, permitting centralized management of microphones.
It will prevent microphones from loss or theft.

Microphone for individual users

Since the system can be run on the same channel in every room, individual users such as teachers can use their own microphone. Placing limits on who can use the microphones makes equipment secure and hygienic.

Microphones



IR-200M Infrared Wireless Microphone (Hand-held)

- Hand-held microphone for speech use.
- PLL synthesized.
- Two selectable channel frequencies.
- Infrared light emission intensity is adjustable at 2 levels (High/Normal).
- Antibacterial treatment.
- Low battery indicator.

IR-300M Infrared Wireless Microphone (Hands-free)

- Easy-to-wear, neck-suspended design means unit can be ready for use quickly.
- An external MIC input level adjustment function allows sensitivity adjustment if the connected external microphone has a different sensitivity.
- PLL synthesized.
- Two selectable channel frequencies.
- Infrared light emission intensity is adjustable at 2 levels (High/Normal).
- Antibacterial treatment.
- Low battery indicator.

*IR-200M and IR-300M Infrared Wireless Microphones operates on 2 AA batteries. Battery life varies with battery type.

In "High" mode
NiMH: approx. 5 hours
Alkaline: approx.4 hours

In "Normal" mode
NiMH: approx.8 hours
Alkaline: approx.6 hours

Tuner/Distributor

Rear

IR-702T Infrared Wireless Tuner

- Comes with a built-in 2-channel fixed-frequency tuner.
- Rack-mountable with optional brackets.
- Equipped with 2 infrared receiver inputs and enables installation of up to 4 infrared receivers per unit by using YW-1022/1024 Distributor.

Rear

IR-700D Infrared Wireless Distributor

- Distributor dedicated to Infrared Wireless Microphone System.
- By using the IR-700D in conjunction with IR-702T and YW-1022/1024, the system with up to 16 infrared receivers can be configurable.

Receivers

IR-500R Wall-mount Receiver

- Supplied wall-mounting brackets facilitate installation.
- Can be installed in an electric circuit box.
- Infrared reception angle can be changed.

IR-510R Ceiling-Mount Receiver

- Supplied ceiling-mounting brackets facilitate installation.
- It covers a practical radius of approx.8m.

IR-520R Wall-Mount Receiver

- Can be mounted on a wall and on a microphone stand.
- Space-saving receiver

Battery Charger/Battery

IR-200BC Battery Charger

- Capable of charging up to 2 microphones (both hand-held and hands-free types) at time.
- Equipped with protective features for safety considerations (detection of battery irregularities and temperature monitoring for protection against overcharging).
- With rapid charging feature, up to 2 infrared microphones can be simultaneously charged in 3 hours (maximum).

  Note: Can charge only IR-200M and IR-300M with IR-200BT-2

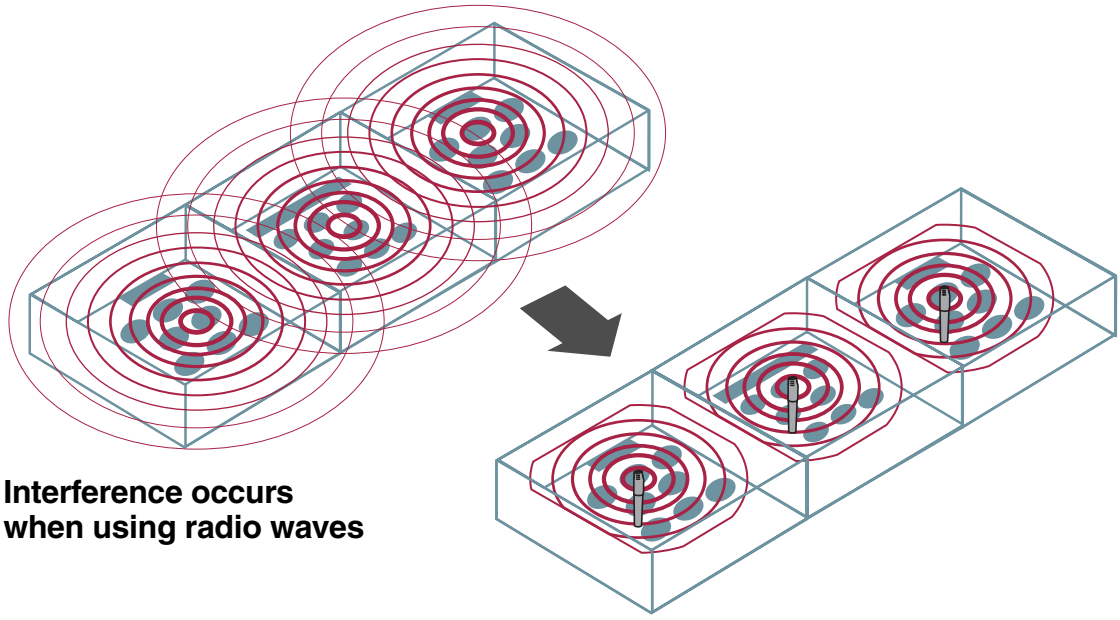
IR-200BT-2 Ni-MH Battery

- Batteries for IR-200M and IR-300M
- Ni-MH rechargeable battery (containing 2 pieces)
- 2300mAh (min)

Infrared System Advantage

Repeated use in Adjacent Rooms

With walls providing a shield, microphones can be used without the worry of interference from adjacent rooms. For example, setting microphones for use on the same channel makes it possible for a single microphone to be used in any room at all.

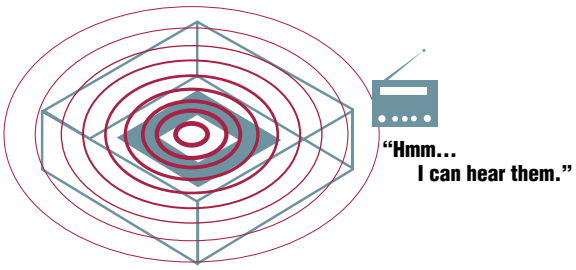


Interference occurs when using radio waves

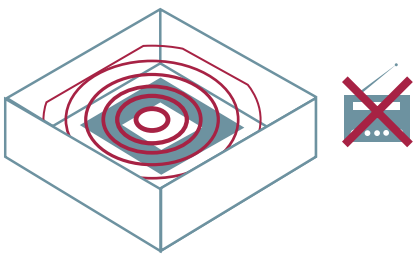
No interference occurs when using infrared

Prevents Close Vicinity Information Leaks

Unlike wireless microphones that use radio waves, there is no careless leaking of conferences or conversations, so the system can be used with peace of mind. It's perfect for such places as courts, police affairs, executive boardrooms or places where important conferences are held.



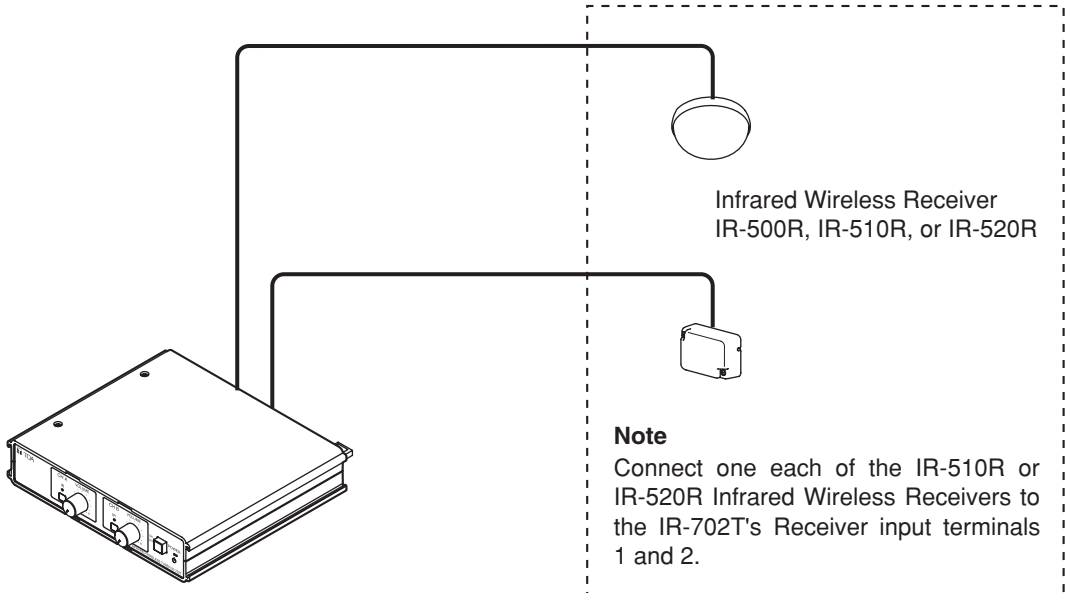
Radio waves can pass through walls and be picked up

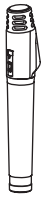


With infrared, transmission is blocked by walls and cannot leak outside

2-channel System

A 2-Channel System with simultaneous use in the same space using the IR-702T Infrared Wireless Tuner





Infrared Wireless Microphone
IR-200M

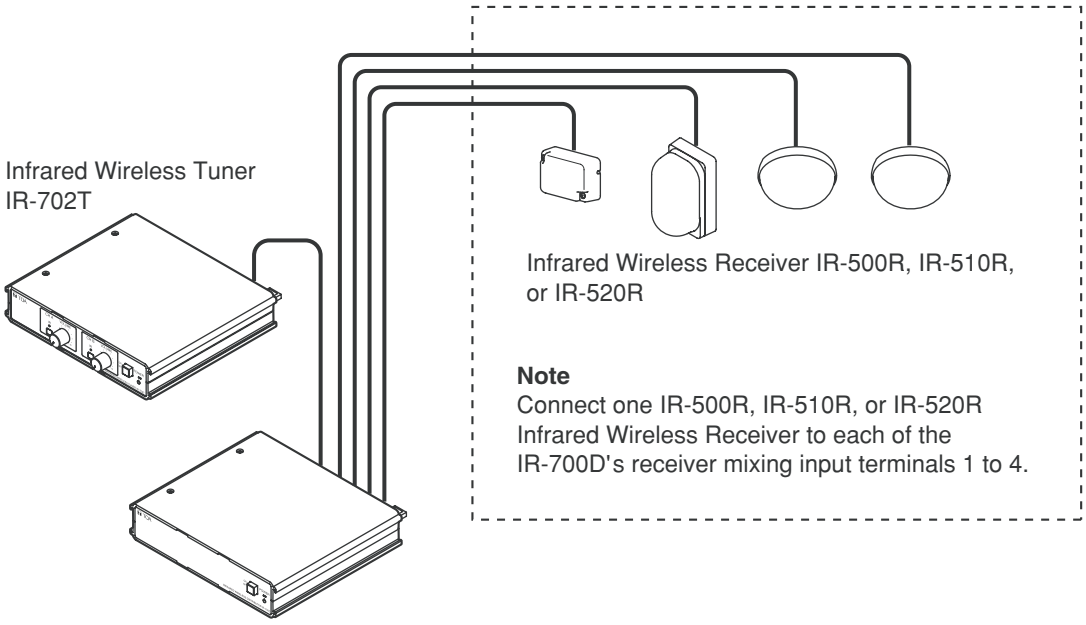
Infrared Wireless Microphone
IR-300M

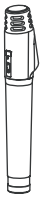
Infrared Wireless Receiver Expansion

Combining IR-702T and IR-700D for infrared wireless receiver expansion

By using the IR-700D, it becomes possible to expand to using as many as 16 receivers.

(When directly connecting to the IR-702T, up to 4 receivers can be expanded.)



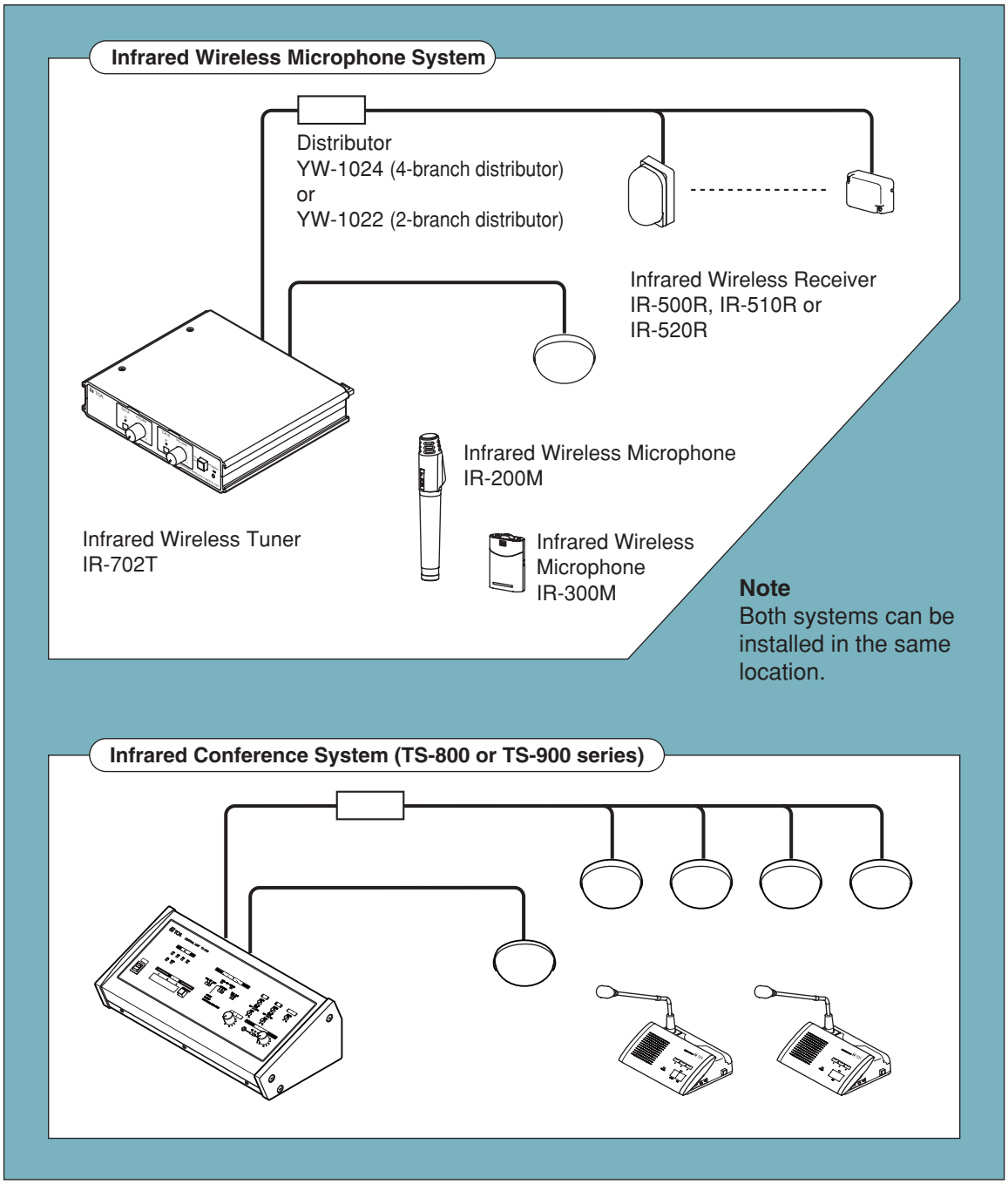


Infrared Wireless Microphone
IR-200M

Infrared Wireless Microphone
IR-300M

Parallel Use with Conference Systems

Parallel use in the same space is possible with the infrared conference system TS-800 and TS-900 series.



Carrier frequencies allocated to each system

Infrared Wireless Microphone System:3.10 MHz and 3.35 MHz

Infrared Conference System: 7.35 MHz, 8.10 MHz, 8.55 MHz, 9.15 MHz, 6.45 MHz, 1.95 MHz and 2.25 MHz

Precautions Regarding the Installation Environment

This system uses infrared transmissions and will not operate properly in an environment where external factors that obstruct infrared transmissions exist. The following are some examples of the external factors that may obstruct infrared transmissions.

a. Plasma Displays (PDP)

When PDP screens emit light, they release extremely large amounts of infrared rays. When using an infrared microphone system in the same place as a PDP, the infrared wireless receiver may pick up the rays and not operate correctly.
For this reason, avoid using the system in conjunction with a PDP.

Note: LCD displays do not affect performance.

b. Parallel Use With Other Infrared Systems

Do not use this system at the same time as other equipment systems using similar infrared transmissions that regularly emit powerful infrared rays.
Such examples include
infrared simultaneous translation systems,
infrared hearing aid systems and
infrared wireless LAN systems.

Note: Infrared remote controls barely affect performance.

c. Sunlight

Correct performance of the system cannot be guaranteed in the event of it being exposed to direct sunlight. For that reason, the system cannot be used outdoors.

Follow construction precautions correctly when installing receivers indoors, and indirect sunlight should not affect their performance.

d. Lighting Equipment

Incandescent lighting (such as halogen lamps) emits components of near infrared rays.
Therefore, if powerful spotlights or down lights directly reflect on a receiver, it may adversely affect transmission performance.
In environments such as large halls where large amounts of incandescent lighting is used and powerful rays emitted, it may affect the performance in such ways as shortening transmittable distances.

Note: Lighting forms such as fluorescent lights or mercury lamps have almost no effect on performance.

e. Specific Blackboard

The system may be unstable depending on blackboard types. Specific blackboard cannot reflect infrared rays.
Therefore, the demonstration will be necessary when installing the system in a room with blackboard.

Receiver Characteristics

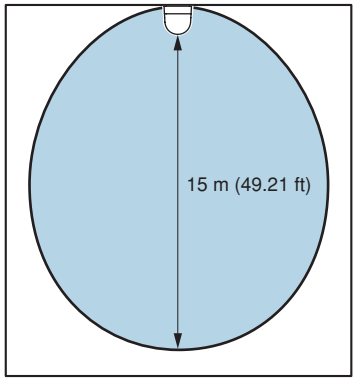
Place infrared wireless receivers correctly to ensure stable use of this system. Since each receiver has its own directivity, take into consideration the areas where a microphone is being used and place receivers so that their coverage areas overlap with each other.

Receiver Communication Areas

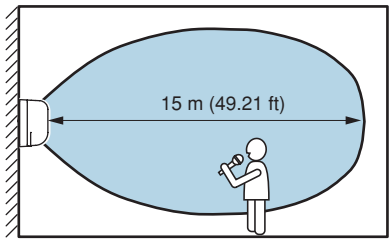
1. IR-500R

Highly sensitive to communications within approximately 80° horizontally and approximately 80° vertically from directly in front of the receiver.
Angle adjustors allow for changes of approximately 30° horizontally or vertically.

[Horizontal direction]



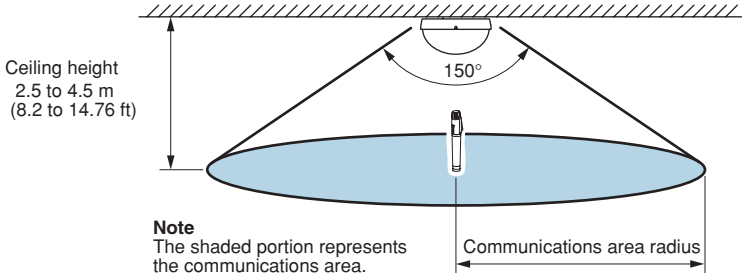
[Vertical direction]



Note
The shaded portion represents the communications area.

2. IR-510R

Communication sensitivity is strong in a 360° radius around the receiver and at about 160° downward from the ceiling.

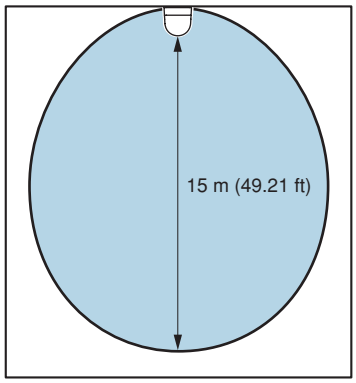


Note
The shaded portion represents the communications area.

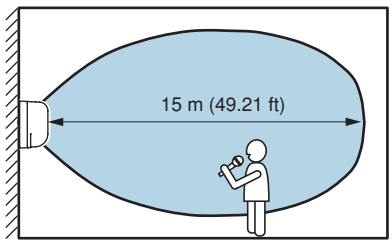
3. IR-520R

Communication sensitivity is strong approximately 80° horizontally and approximately 80° vertically from in front of the receiver (angle changes are not possible)

[Horizontal direction]



[Vertical direction]



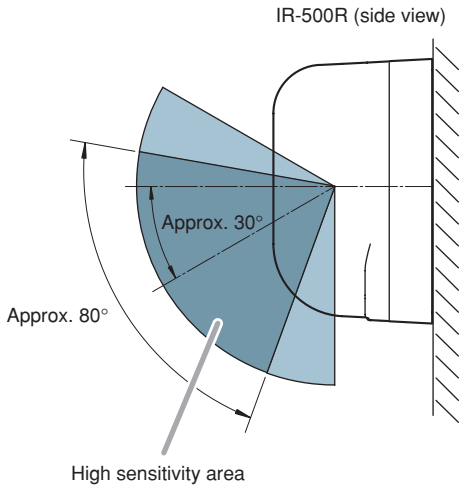
Note
The shaded portion represents the communications area.

Receiver Characteristics

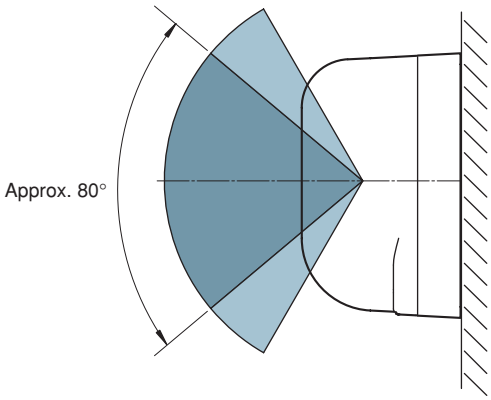
IR-500R Angle Adjustment

With the IR-500R, the angle of the light reception surface can be adjusted depending on the position the receiver is placed.
For example, to obtain a more stable communications environment, adjust receivers downward when setting them in a high position within a room, or direct receivers inward when they are installed at both edges of a room.

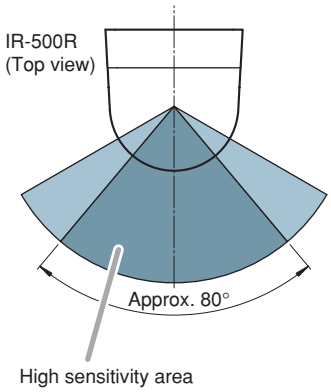
(Factory-preset : approx. 30° downward)



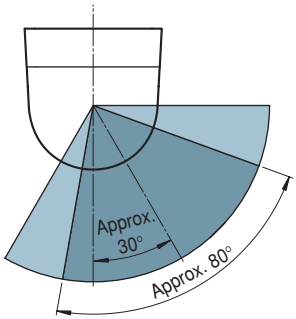
(When moving the reception section to vertical 0° position)



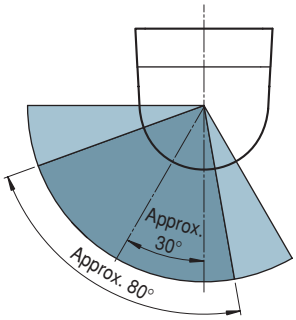
(Factory-preset)



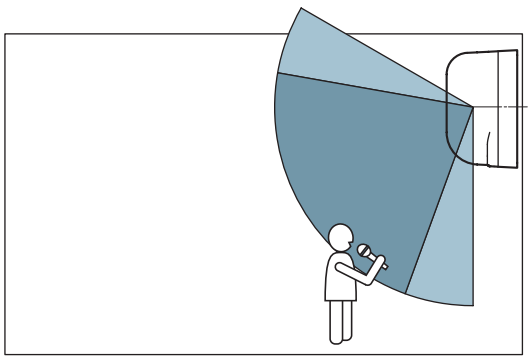
(When moving the reception section to approx. 30° in the right direction)



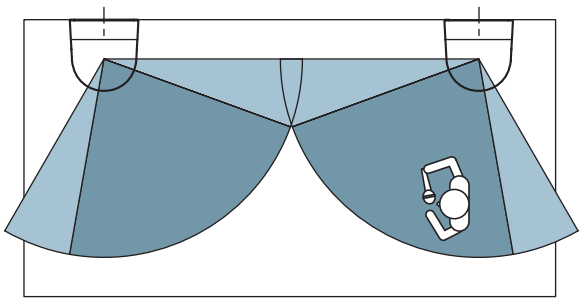
(When moving the reception section to approx. 30° in the left direction)



Adjustment example in vertical direction (when installing the IR-500R at a higher position)



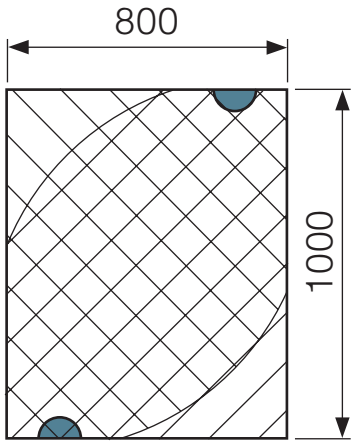
Adjustment example in horizontal direction (when installing the IR-500Rs at the corners of the room)



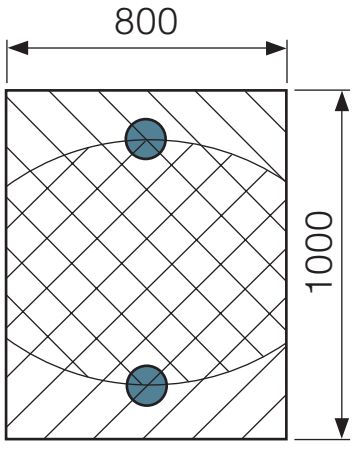
Infrared Wireless Receiver Layout Examples

Example 1: For a small conference room (10m x 8m with a ceiling height of 3m)

1. IR-500R/520R Layout Example
Set two receivers at opposing corners



2. IR-510R Layout Example
Align two receivers equally spaced

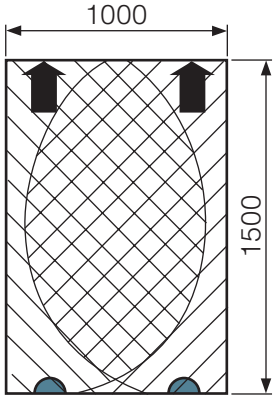


Infrared Wireless Receiver Layout Examples

Example 2: For a classroom (15m x 10m with a ceiling height of 3m)

Note: Arrow directions indicate unstable elements exist.

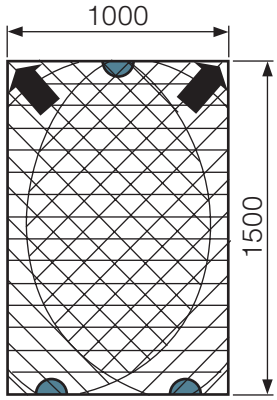
1. Layout Example using two IR-500R/520R receivers
Receivers are set in two places on a single wall.
However, the microphone's direction of usage is limited.



unit: cm

If the microphone is used in the direction indicated by the arrow near the wall opposite the wall where the receiver is installed, signal transmission can become unstable.

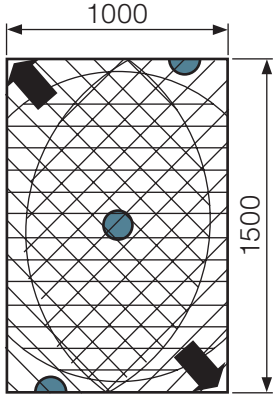
2. Layout Example using three IR-500R/520R receivers
Receivers are installed in three places on the walls of both sides of the room.
The microphone's direction of usage is unlimited.



unit: cm

The possibility of instability exists outwardly at both edges (indicated by the arrows) on the side of one receiver, but it provides almost complete coverage.

3. Combined IR-500R/520R and 510R Layout Example
Receivers are installed in two places at opposing corners.
The microphone's direction of usage is unlimited.



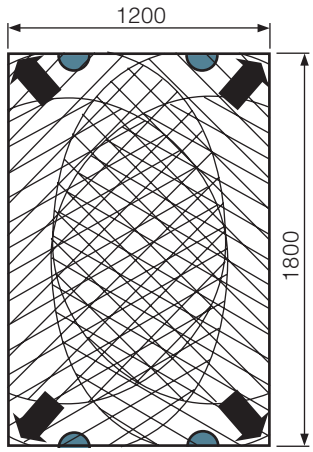
unit: cm

The possibility of instability exists outwardly at both opposing corners (indicated by the arrows), but it provides almost complete coverage

Infrared Wireless Receiver Layout Examples

Example 3: For a medium-sized conference room (18m x 12m with a ceiling height of 3m)

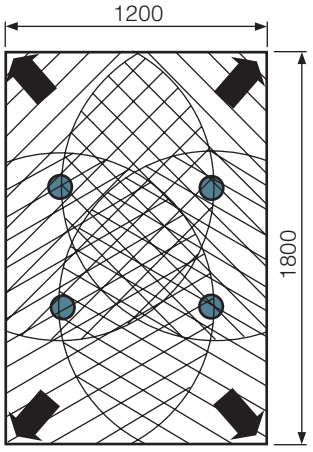
1. Layout Example using four IR-500R/520R receivers
Receivers are installed in four places on the walls on both sides of the room.



unit: cm

Generally stable, although there is the possibility of outward instability in the four corners of the room.

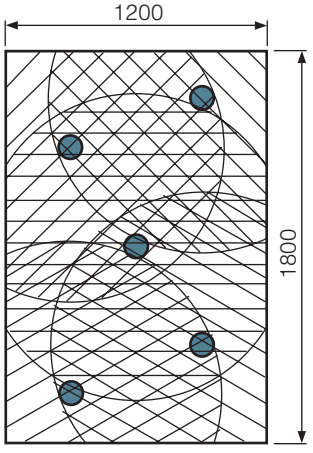
2. Layout Example using four IR-510R receivers
Receivers are separated at equidistant intervals in four places within the room



unit: cm

Generally stable, although there is the possibility of outward instability in the four corners of the room.

3. Layout Example using five IR-510R receivers
Five receivers are installed in a staggered pattern
Aim for even more stability than that provided by four receivers.



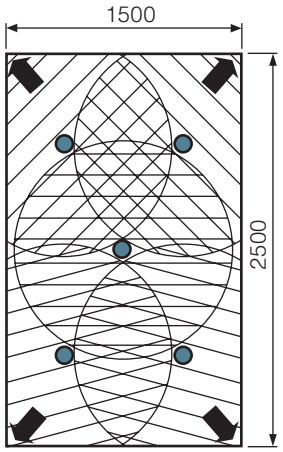
unit: cm

With the coverage areas of three receivers overlapping, it becomes an extremely stable environment

Infrared Wireless Receiver Layout Examples

Example 4: For a large conference room (25m x 15m with a ceiling 4m to 5m high)

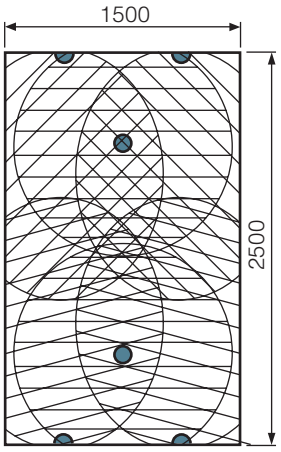
1. Layout Example using five IR-510R receivers
Five receivers are installed, with one in the center and four at equal distances away from it.



unit: cm

Unstable elements exist depending on the conditions of the four corners of the room and the direction of the microphone.

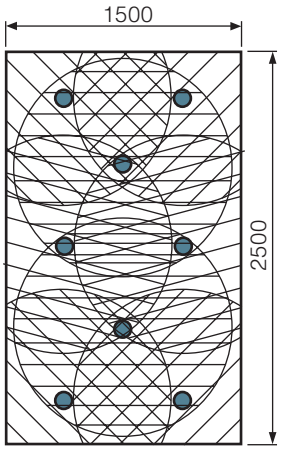
2. Combined IR-500R and IR-510R Layout Example



unit: cm

Generally stable

3. Layout Example using eight IR-510R receivers
Aim for stable coverage over the entire room by increasing the number of receivers.



unit: cm

Wiring Design between the Tuner and the Receivers

To ensure stable use of this system, the following instructions related to the cabling of the tuner and infrared wireless receiver must be followed.

(1) The Maximum Number of Receivers and Distributor Connections

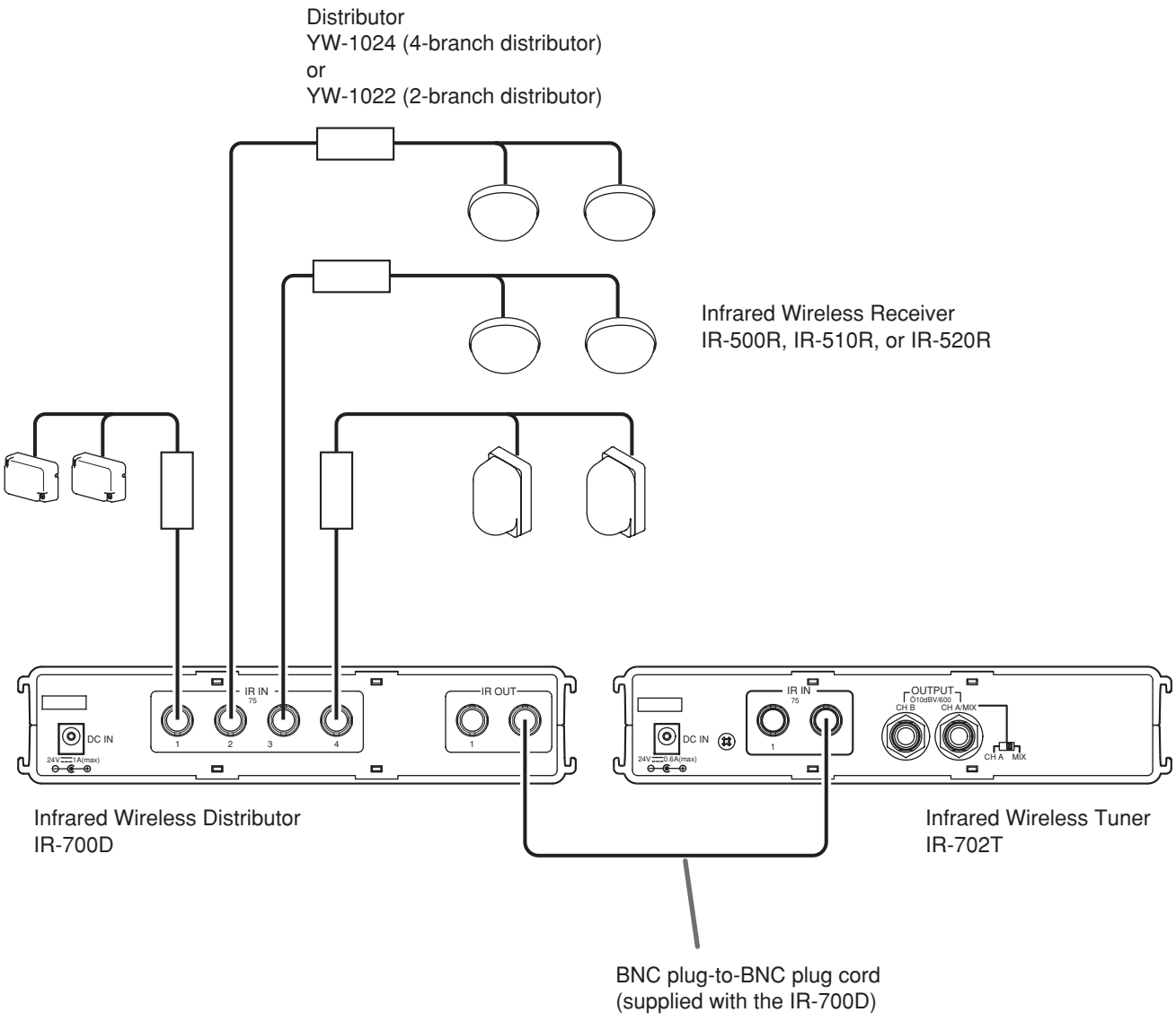
The maximum number of receivers that can be connected to tuner and distributor is as follows:

- When IR-702T is used alone: Up to 4 receivers
- When IR-702T is used with IR-700D: Up to 16 receivers

IR-700D must be used if more than 4 receivers are to be set up.

[Example]

A system having 5 or more receivers to be connected to the IR-702T tuner.



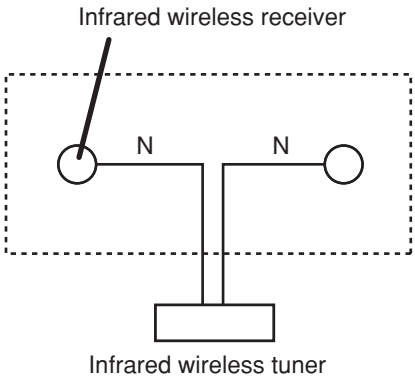
Wiring Design between the Tuner and the Receivers

(2) Cable Length from Tuner to Receivers

Cable length between the Tuner and Infrared Wireless Receiver must be equal. This is necessary because when signals from multiple receivers are mixed, if their phases are reversed, the signals could be cancelled.

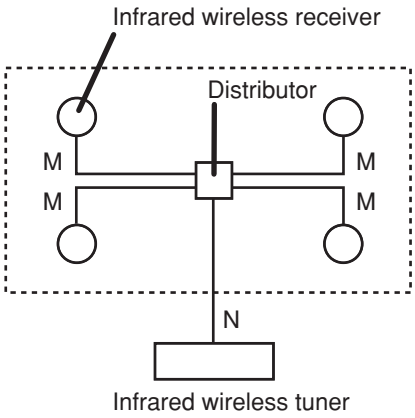
[Example 1]

When installing multiple infrared wireless receivers in the same location, make all "N" distances (cable length between receiver and tuner) equal.



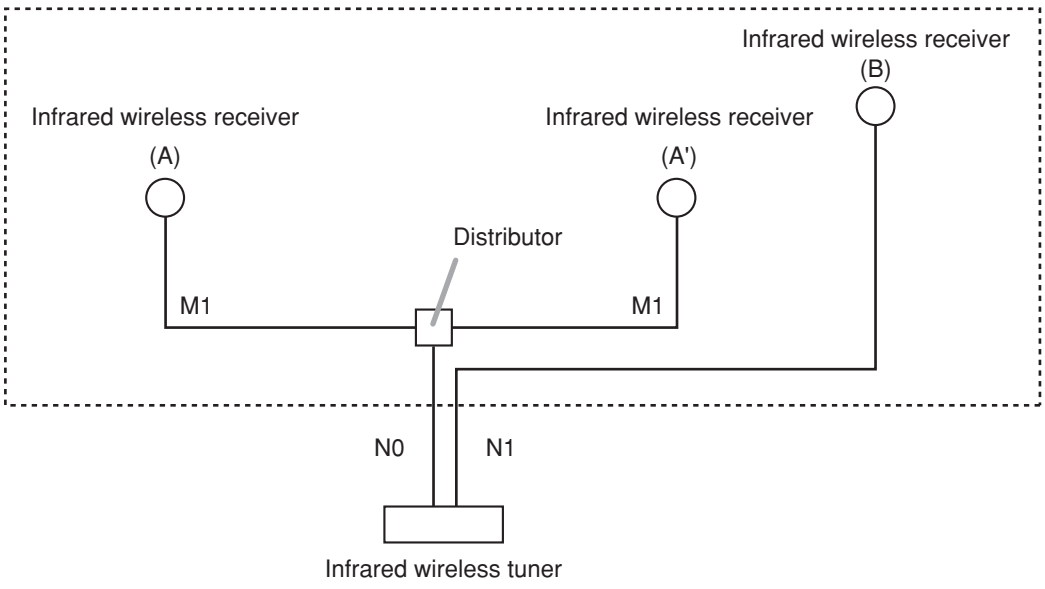
[Example 2]

When installing both the infrared wireless receiver and distributor in the same location, make all "M" lengths (cable length between receiver and distributor) equal.



[Example 3]

Cable length from each infrared wireless receiver to the tuner: M1 + N0 = N1.



Wiring Design between the Tuner and the Receivers

(3) Maximum Cable Length from Tuner to Receivers

Maximum signal attenuation on cable routing must be taken into consideration when designing wiring between infrared wireless receivers and the tuner. The cable routing attenuation is caused by distributor and cable, and the total signal attenuation must not exceed 12 dB.

The loss value for each is as follows:

(1) Loss of the YW-1022 (2-branch distributor): 4.5 dB

(2) Loss of the YW-1024 (4-branch distributor): 8.5 dB

(3) Attenuation for 100 m (109.36 yd) of coaxial cable: As shown in the table below.

RG-59/U	3.3 dB
RG-6/U	2.7 dB
RG-11/U	2.0 dB

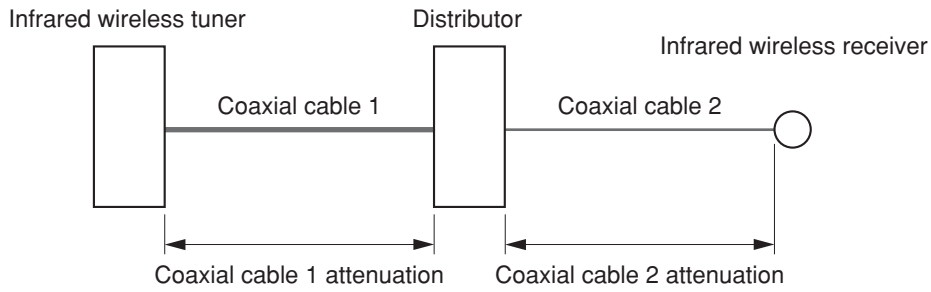
[Example]

Total attenuation for the connection example illustrated below is as follows:

Cable attenuation = (length/100) x attenuation per 100 m

Total attenuation = Cable 1 attenuation + Cable 2 attenuation + Distributor's attenuation

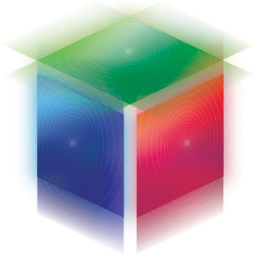
If this total attenuation does not exceed 12 dB, then there should be no problem.



* NOTE: The maximum cable length between each Infrared Wireless Receiver and tuner differs depending on coaxial cable type.

Receiver Setup Points

- Place IR-500R/510R/520R receivers a distance of 6m to 8m apart.
- Setting up receivers while taking into consideration the directions in which a microphone will be used and placing them where they will be accessible from those directions is the best option.
- When using two IR-500R/520R receivers, instead of positioning them along a single wall, in some cases performance may be optimized by setting them up diagonally on opposite walls.
- Depending on the placement conditions, IR-500R/520R can be used in combination with IR-510R.
- Experiment with IR-510R placement, such as setting up receivers in a staggered pattern, to make it easier to create an environment with unimpeded vision.
- Carry out angle adjustments in response to the positioning of IR-500R. In room corners, make adjustments horizontally, while in high positions, make vertical adjustments.
- Accessible distance is about 15m in a direct, unimpeded line.
- Set up receivers so that they are not shielded and take into considerations the conditions in which microphones will be used.
- Use a height of 5m or less as a rough guideline for ceiling heights, with anything higher making transmission stability more difficult to attain.
- Do not install the system outdoors.
- Do not use in conjunction with plasma displays (PDP) or other equipment using infrared.
- Pay caution to light from downlights and spotlights.
- Set up receivers away from windows, lights or obstacles.
- Use curtains or blinds to counter the effects of sunlight.
- Place a greater number of receivers to ensure microphone transmission can be picked up by more receivers, and communications become more stable.
- Regardless of the cable routing used, total cable length between tuners and receivers should be exactly the same.
- If a distributor is used, make sure cables extending from it are equal in length to all points to reduce waste in the cabling.
- Only one YW-1022/1024 distributor can be used per line.



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