

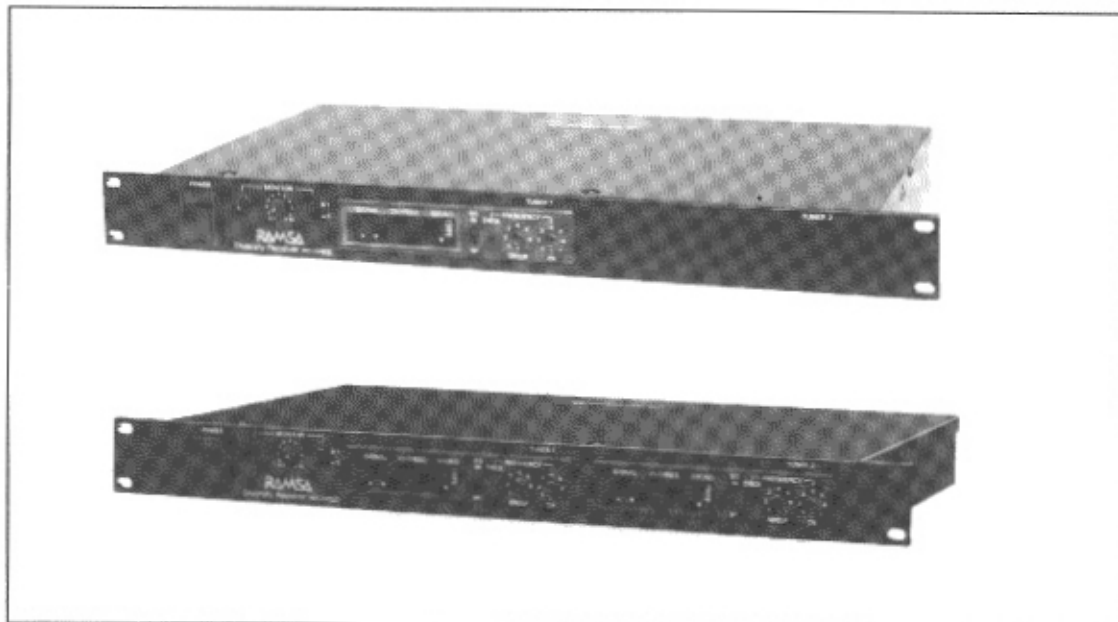
# Operating Instructions

Diversity Receiver

WX-RP810

WX-RP820

**RAMSA**



**Panasonic®**

Before attempting to connect or operate this product, please read these instructions completely



## READ THE FOLLOWING INSTRUCTIONS BEFORE USE

### CAUTION:

It is a violation of Federal Law to begin operating this system prior to obtaining an FCC Radio License.

The FCC ID number for this radio equipment is listed below.

FCC ID for WX-RP810 : ACK9TAWX-RP810

FCC ID for WX-RP820 : ACK9TAWX-RP820

## PREFACE

The WX-RP810 is a single channel diversity receiver and the WX-RP820 is a 2-channel diversity receiver. They are designed to be used with wireless microphones WX-RP110, WX-RP158 and WX-RP300, and wireless antenna WX-RP921 ENG wireless transmitter WX-RP410 can also be used with WX-RP810 and WX-RP820.

Up to 3 receivers WX-RP810 may be used in a system, to receive signals from 3 separate transmitters. As many as 6 transmitters can be used in the system when an additional WX-RP800 tuner is installed into each receiver WX-RP810.

Up to 3 receivers WX-RP820 may be used in a system, to receive signals from 6 separate transmitters.

When used in conjunction with the WX-RP900 antenna distributor(s), anywhere from 2 to 10 WX-RP921's can be used as common antennas for all receivers, depending on room size.

Because this is a diversity receiver system, the occurrence of obstruction related noise and drop-outs due to poor reception areas or dead spots are rare. Digital switching provides seamless shifting between 2 antenna systems for best possible, continuous reception quality.

## FEATURES

- The PLL synthesized Oscillator makes it simple to switch to an operating frequency clear of local interference.
- The compander technique yields a dynamic range of more than 100 dB.
- The space diversity reception system minimizes the possibility of noise and dropouts caused by multipath reflections. This is accomplished by the use of two independent receivers per channel, with a switching circuit which automatically selects the stronger signal for demodulation and audio output.

- Crystal display shows RF signal reception strength, selected antenna, presence of audio signal and receiving frequency.
- A LOCAL OSCILLATOR FREQUENCY is sent to the WX-RP921 Wireless Antenna for down-conversion of the carrier frequency from the wireless microphone transmitter. This allows longer cable runs between the antenna and receiver, for maximum flexibility in permanent installations.

## PRECAUTIONS

The UHF wireless communication system is a sensitive, high quality instrument and should be regarded as such. Because it is an electrical device, the hazard of electric shock exists, if it is used carelessly.

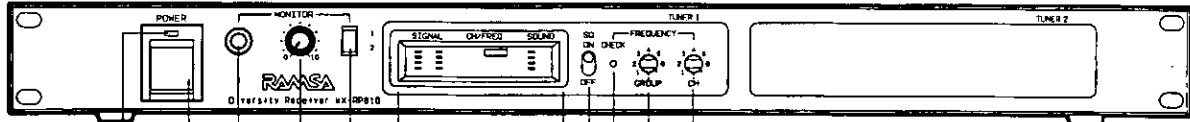
In order to utilize the instrument to its fullest potential, please consider the following points.

1. Handle the equipment with care.  
Do not abuse the equipment. Avoid striking, shaking etc. This equipment contains sensitive components which could be damaged by improper handling or storage.
2. Refer any servicing to qualified service personnel.  
Do not attempt to disassemble the unit. In order to prevent electric shock, do not remove screws or covers. There are no user-serviceable parts inside.
3. For cleaning the unit, wipe with dry cloth.  
If necessary, use a damp cloth with a mild detergent. Do not use chemicals such as benzine, alcohol or thinner for cleaning.
4. Take immediate action if the Diversity Unit should become wet.  
Turn the power OFF and consult with qualified service personnel. Moisture can damage the Diversity Unit and also create the danger of electric shock.
5. Place Two wireless antennas between 16.7ft(5m) and 66ft(20m) apart from each other for the best diversity effect.
6. Do not place the receiving antenna in places affected by strong electrical or magnetic fields, such as near AC power lines, motors, transformers or generators. When operating the wireless system under these conditions, the wireless microphone and antennas should be between 6.7ft (2m) and 33ft (10m) apart from each other to avoid interference. The microphone should not be placed less than 6.7ft (2m) from the antenna under any circumstance.
7. When using multiple wireless microphones, the transmitters should be at least 1.6ft (50cm) apart from each other.

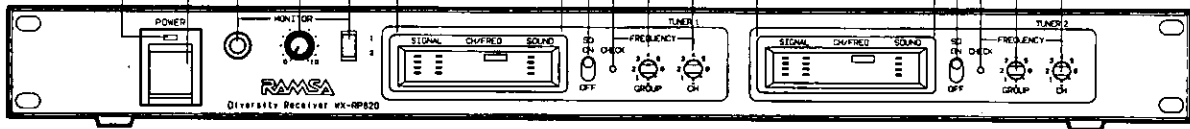
# MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS

## Front Panel

### WX-RP810



### WX-RP820



**(1) Power Indicator**

This indicator lights Red when the Power switch is turned ON.

**(2) Power ON/OFF Switch (POWER)**

This switch turns ON and OFF the power of the Diversity Receiver

**(3) Monitor Jack (MONITOR)**

This is a headphone jack for monitoring the output signal.

**(4) Monitor Level Control (MONITOR)**

Use this control to adjust the audio level in the headphones connected to the Monitor Jack(3).

**Note:** The monitor output sound will be distorted if the level is set too high.

**(5) Monitor selection switch (MONITOR 1/2)**

Select the monitor output of TUNER 1 or TUNER 2.

**Note:** There is no Monitor Output for Tuner 2 if there is no WX-RP800 Tuner Unit installed in the TUNER 2 position of WX-RP810.

**(6) Channel Selection Switch (CH FREQUENCY)**

Refer to page 10.

**(7) Group Selection Switch (GROUP FREQUENCY)**

Refer to page 10.

**(8) Receiving Frequency Check Button (FREQUENCY CHECK)**

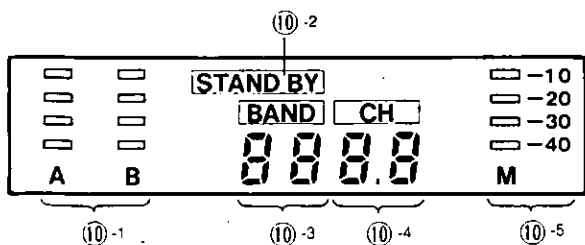
Receiving Frequency will be displayed to the first decimal place for approx. 2.5sec when this button is depressed.

**(9) Squelch On/Off switch (SQ ON/OFF)**

Turns squelch circuit on or off:

Turning squelch on helps prevent the receiver from picking up unwanted interference signals during periods when there is no audio being transmitted from the wireless microphone.

**(10) Crystal Display**



**(10-1) Receiving Signal Level Indicators (SIGNAL A, B)**

These indicators show the signal strength of the RF carrier being received, as well as which antenna, A or B, is active.

The diversity system automatically selects the stronger of the two signals from the antennas. The signal strength meter has a green indication for the active antenna circuit, and a red indication for the inactive one.

**(10-2) STANDBY Indicator**

This STANDBY Indicator lights green to indicate audio output muting. This occurs when setting the receiving frequency and when the Power switch is turned ON to avoid any click or pop noises which can damage speakers.

**(10-3) BAND Indicator (BAND)**

Displays UHF-TV band of the selected receiving frequency (channel 68 or 69).

**Note:** When the FREQUENCY CHECK button is pressed, this display changes over to show the first two digits of the frequency being received for approximately 2.5 seconds. When -- is displayed, the group and channel selection is not correct. In this case, check the group and channel settings on both receiver and transmitter.

**(10-4) Channel Indicator (CH)**

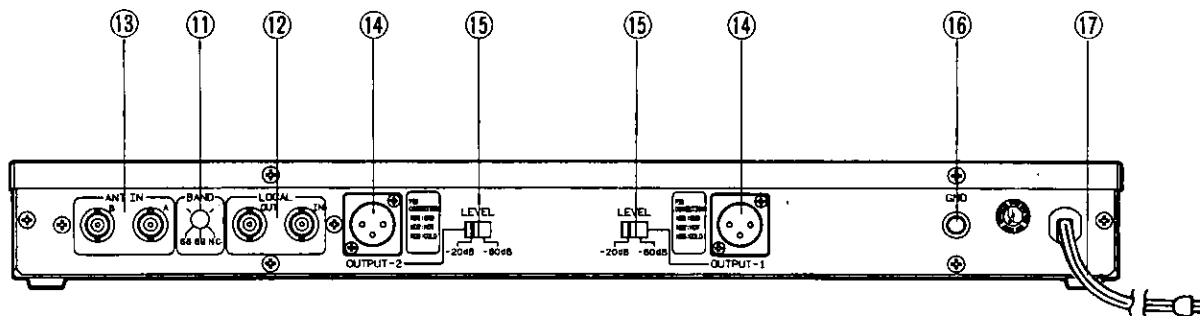
Displays the selected GROUP number in the left digit and CHANNEL number in the right digit.

**Note:** When the FREQUENCY CHECK button is pressed, this display changes over to show the third digit and the first decimal place of the frequency being received for approximately 2.5 seconds. When -- is displayed, the group and channel selection is not correct. In this case, check the group and channel settings on both receiver and transmitter.

**(10-5) Audio Level Indicators (SOUND)**

These indicators show audio level from the wireless microphone.

**Rear Panel**



**(11) Operating Frequency Selection Switch**

**(68/69/N.C.BAND)**

This switch is used to select the operating frequency as follows.

- 68: Set to this position to use Groups 1, 2, 3 or
- 69: Set to this position to use Groups 4, 5, 6 or
- N.C.: Do not set to this position. This pin is not used.

**(12) Local Oscillator Frequency Input/Output Connector (LOCAL IN/OUT)**

**IN :** Input for the local oscillator frequency sent from the LOCAL OUT of another receiver. Connecting a cable to this input disables the receiver's internal local oscillator frequency.

**OUT :** Output for either the internal local oscillator frequency or the local oscillator frequency from another receiver connected via the LOCAL IN.

Used for connection of coaxial cable to the LOCAL IN of another WX-RP810/RP820 or WX-RP900 Antenna Distributor.

Refer to Page 7 for system connection.

**(13) Antenna Input Connector (ANT IN A, B)**

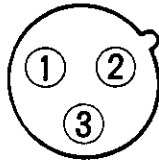
This dual function connector receives the carrier signal received by the antenna, and simultaneously sends the local oscillator frequency to the antenna for down-conversion of the carrier. Connect a coaxial cable from the OUTPUT Connector of Wireless Antenna to this connector.

Refer to Page 7.

**(14) Audio Output Connector (OUTPUT 1, 2)**

Audio Signal is provided at this connector.

1. Ground
2. Hot
3. Cold



**Note:** Audio signal at OUTPUT 2 of WX-RP810 is not available when an optional WX-RP800 tuner unit is not installed.

**(15) Audio Level Selection Switch (LEVEL -20dB/ -60dB)**

Two audio output levels can be selected depending on what type of equipment the audio output is connected to: -20dB (line level) or -60dB (mic level).

**(16) Ground terminal (GND)**

**(17) AC Power Cord**

## LOCAL OSCILLATOR AND DOWN-CONVERSION SYSTEM

The system WX-RP810/WX-RP820 Diversity Receiver and WX-RP921 Antenna has a frequency down-conversion system. It's purpose is to allow longer cable runs between the antennas and the receiver.

The 800 MHz band received by the antennas from the transmitter is a very high frequency. It is therefore subject to large amounts of cable loss as the signal travels from the antenna to the receiver.

This results in noise, interference, and possibly complete loss of signal.

The down-converter in the antenna pre-amp lowers the frequency to the 260 MHz band. This range of frequencies can travel a much greater distance through the cable to the receiver.

The down-conversion process works as follows :

- A local oscillator in the WX-RP810 or WX-RP820 receiver generates a local frequency. This local frequency is sent to the WX-RP921 antenna from the receiver's antenna input connector. Frequency multipliers in the WX-RP921 antenna pre-amp convert the local frequency by a factor of 12 to Second local frequency. The multiplied frequency is then combined with the carrier from the transmitter which is being received by the antenna. The difference of the 2 frequencies is sent to the antenna input of the receiver. The WX-RP810/WX-RP820 receives 260 MHz Band via its antenna input, demodulates it, and finally converts it to an audio signal.
- When more than one receiver is used in a system, any variation between the local oscillator frequencies of each receiver can cause interference noise. It is therefore necessary to have only one local oscillator per system. This is accomplished by serial connection of the local oscillator frequency between receivers via the LOCAL IN and LOCAL OUT connectors.
- When a cable is connected to the LOCAL IN of the WX-RP810 or WX-RP820 receiver, it automatically disables the internal local oscillator of that receiver. The frequency coming into the receiver through the LOCAL IN will be output through the LOCAL OUT. When no cable is connected to the LOCAL IN, the receiver's internal local oscillator is output at the LOCAL OUT. When power is turned off, the LOCAL IN and LOCAL OUT connectors continue to pass signal through.

# SYSTEM CONNECTION

The WX-RP810 and WX-RP820 can function as either a stand-alone receiver with direct connection to the antennas, or as part of a system with multiple receivers, antennas, and antenna distributors.

When used alone, 2 WX-RP921 antennas are connected directly to the antenna inputs. In a system, up to 4 antennas (two A/B diversity pairs) may be connected to the WX-RP900 distributor. The signals picked up by the antennas are mixed by the distributor, and can then be sent to as many as 3 WX-RP810 with 3 WX-RP800 or WX-RP820 receivers.

This insures that each receiver will always pick up from the antenna with the highest signal strength, which minimizes the possibility of dead spots as the microphone transmitters move around the room.

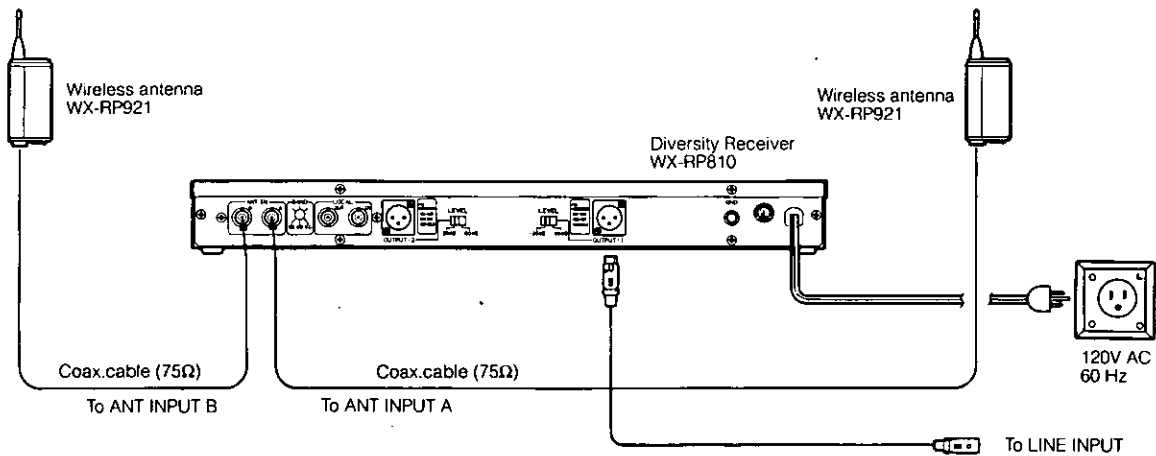
**Caution:**

The following installation should be done by qualified service personnel or system installers.

## Application

### (1) 1 channels diversity receiving system with WX-RP810

1. Connect coaxial cables between OUTPUT connector of each wireless antenna to the antenna input connector (ANT IN A,B) of the receiver.
2. Connect a shielded audio cable between the 3-pin XLR audio output connector (OUTPUT 1) of the receiver and an input channel of a mixer or similar equipment.
3. When connected to a microphone input, use the -60 dB setting.  
When connected to a line level input, use -20 dB.

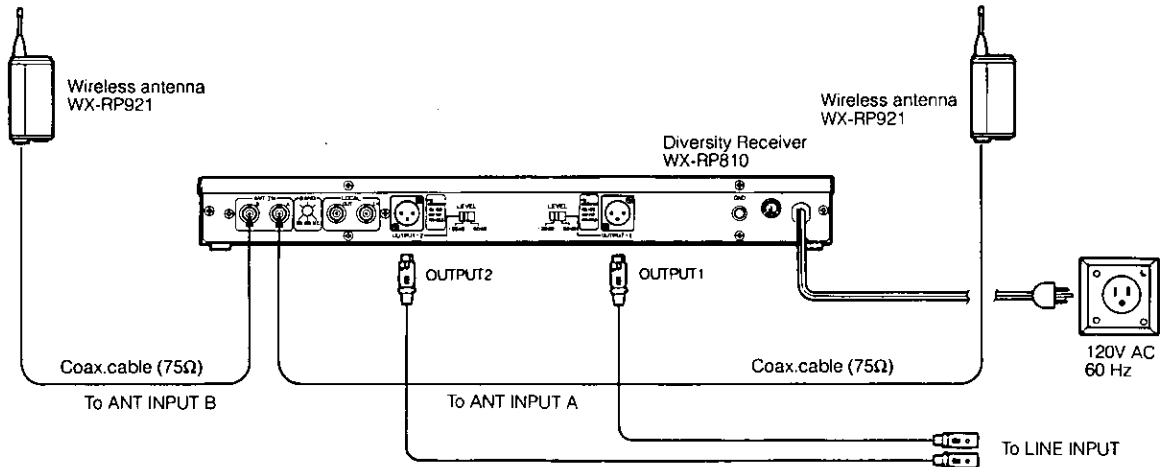


## (2) 2 channels diversity receiving system

### Note:

Install a WX-RP800 tuner unit into the open slot of the receiver WX-RP810.  
Refer to WX-RP800 Operating Instructions for details.

1. Connect coaxial cables between OUTPUT connector of each wireless antenna to the antenna input connectors (ANT IN A, B) of the receiver.
2. Connect a shielded audio cable between the 3-pin XLR audio output connector (OUTPUT 1, 2) of the receiver and an input channel of a mixer or similar equipment.
3. When connected to a microphone input, use  $-60$  dB setting.  
When connected to a line level input, use  $-20$  dB.



## Basic Application

### (3) 6 channels diversity receiving system (using WX-RP900 Distributor)

#### Note :

Install optional WX-RP800 tuner units into 3 WX-RP810 receivers. Refer to Operating Instructions of WX-RP800 for details.

1. Connect coaxial cables between OUTPUT connector of each wireless antenna to the antenna input connectors (ANT IN) A1, A2, B1 and B2 of the WX-RP900 distributor.
2. Connect coaxial cables between antenna output connectors (ANT OUTPUT) A1, A2 and A3 of distributor to antenna input A connectors (ANT IN A) of first, second and third receivers.
3. Connect coaxial cables between antenna output connectors (ANT OUTPUT) B1, B2 and B3 of distributor to antenna input B connectors (ANT IN B) of first, second and third receivers.

#### Note :

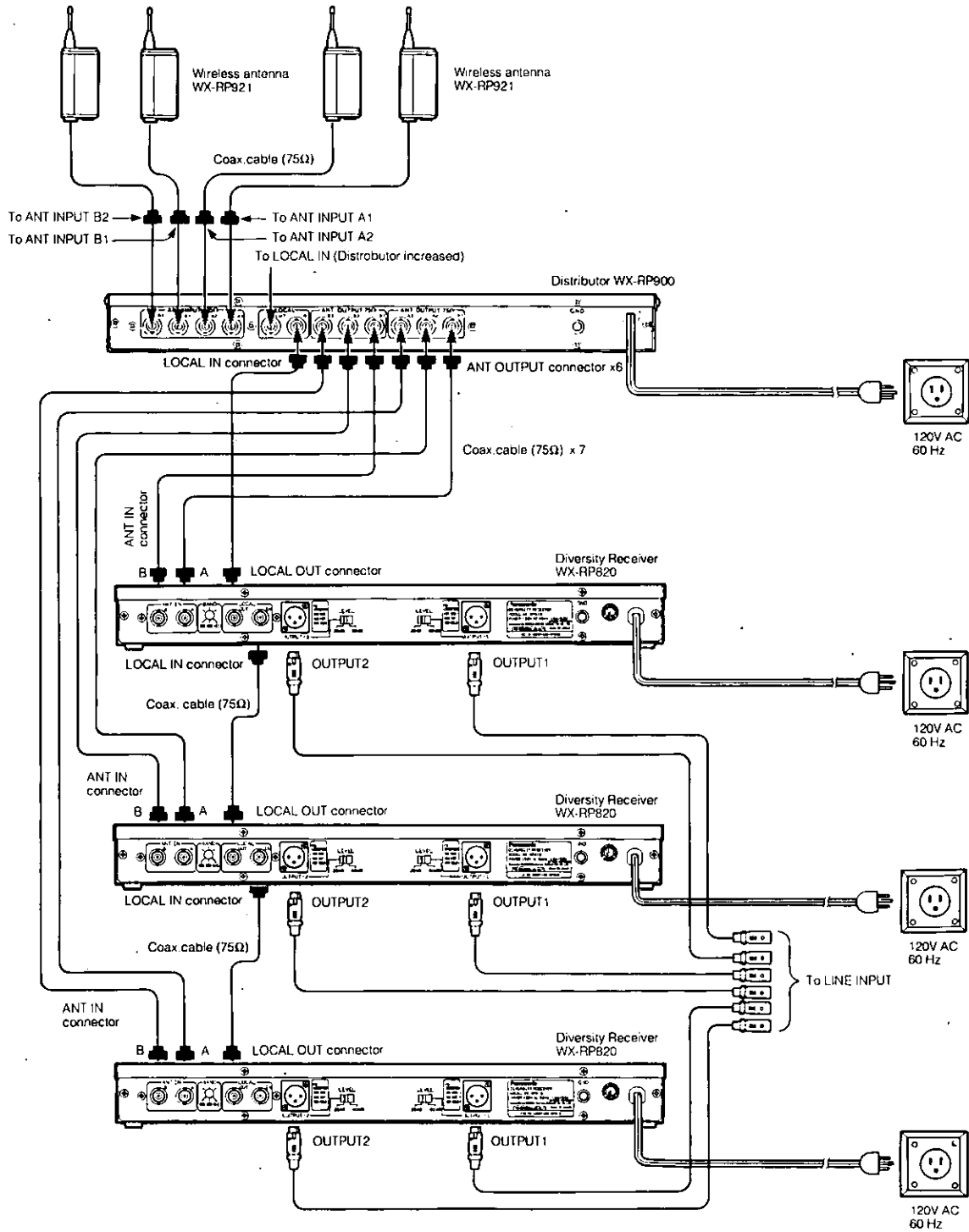
Make sure that number of each distributor output is kept consistent to each receiver, meaning that A1 and B1 from the distributor are connected to the first, A2 and B2 are connected to the second receiver, A3 and B3 are connected to the third receiver.

4. Connect coaxial cable between the local oscillator frequency input connector (LOCAL IN) of the distributor to the local oscillator frequency output connector (LOCAL OUT) of the first receiver.
5. Connect coaxial cable between the local oscillator frequency input connector (LOCAL IN) of the first receiver to the local oscillator frequency output connector (LOCAL OUT) of the second receiver.
6. Connect coaxial cable between the local oscillator frequency input connector (LOCAL IN) of the second receiver to the local oscillator frequency output connector (LOCAL OUT) of the third receiver.
7. Connect a shielded audio cable between the 3-pin XLR audio output connector (OUTPUT 1,2) of the receiver and an input channel of a mixer or similar equipment.
8. When connected to a microphone input, use the  $-60$  dB setting.  
When connected to a line level input, use  $-20$  dB.

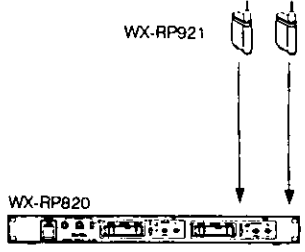
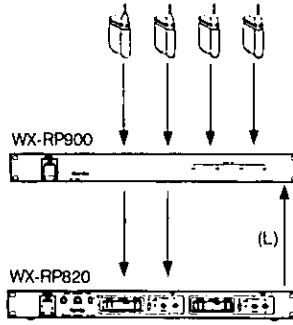
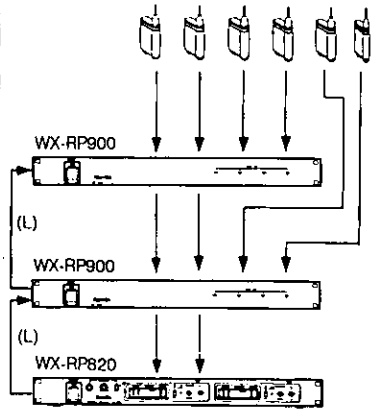
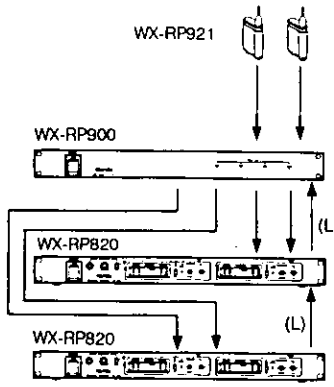
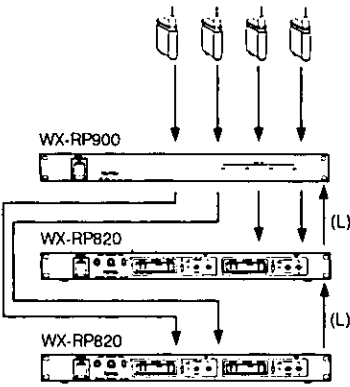
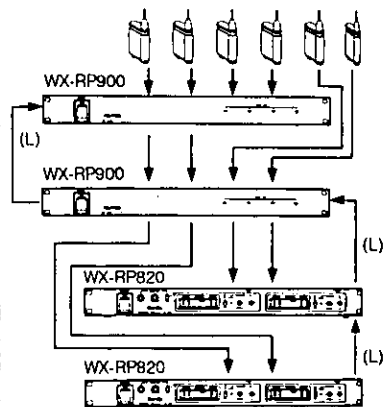
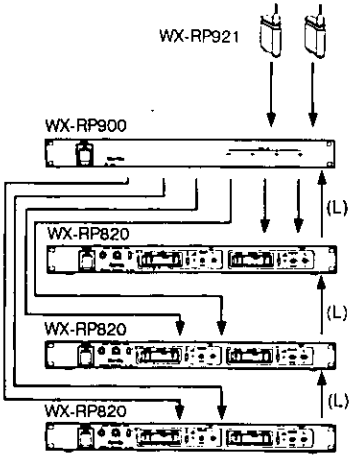
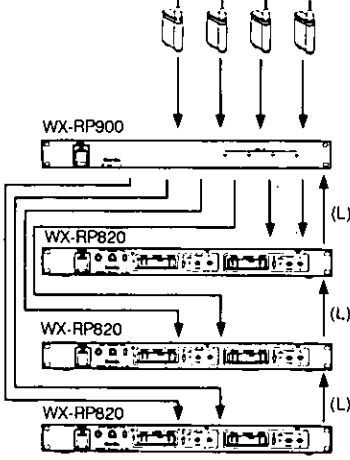
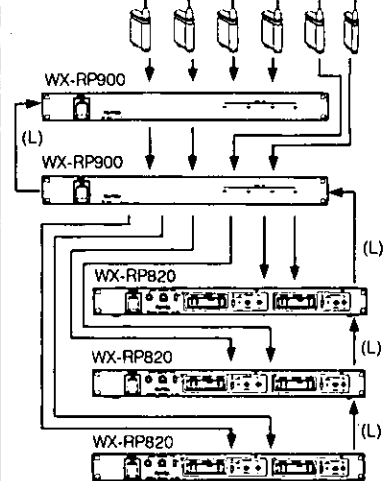


**Notes :**

- Do not place the wireless microphone transmitter less than 6.7ft (2m) apart from the wireless antenna. Otherwise interference noise will occur.
- Place two receiving antennas between 16.7ft (5m) and 66ft (20m) apart from each other for the best diversity effect.
- When using multiple wireless microphones, the transmitters should be at least 1.6ft (50cm) apart from each other.
- Turning the receiver's AC power On or Off in a live system can result in damaging pop noise. Always turn On system power amplifiers last, and turn the amplifiers Off first.



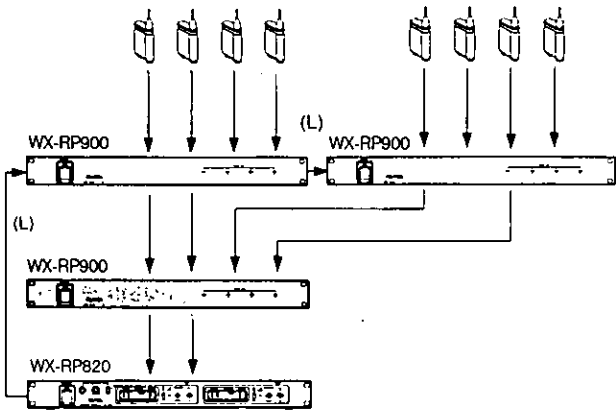
# Advanced Application

Room Size (ft <sup>2</sup> )	10,764.24	21,528.48	32,292.72
Number of Antenna	2	4	6
2 Frequency Receiving System			
4 Frequency Receiving System			
6 Frequency Receiving System			

**Note:** Up to 10 wireless antenna can be used in a system. (L) mark means Local Oscillator Frequency input/output cable connection (LOCAL IN/OUT).

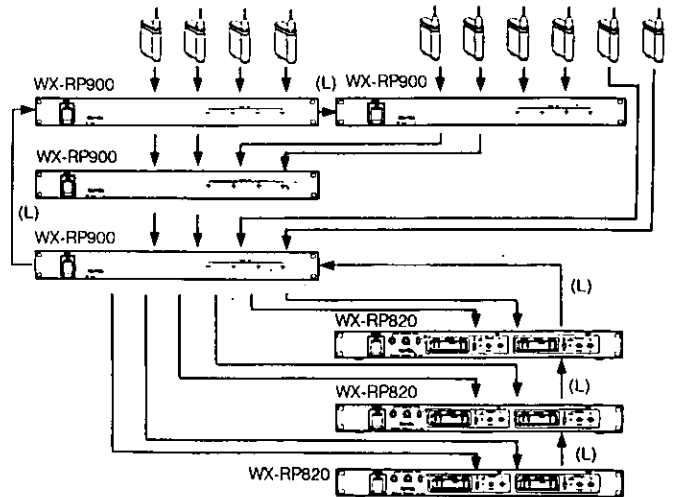
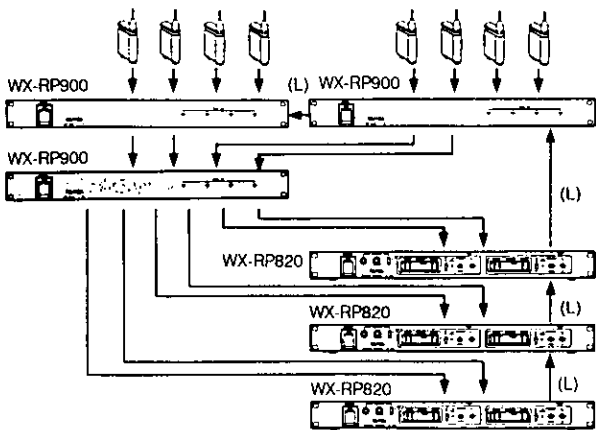
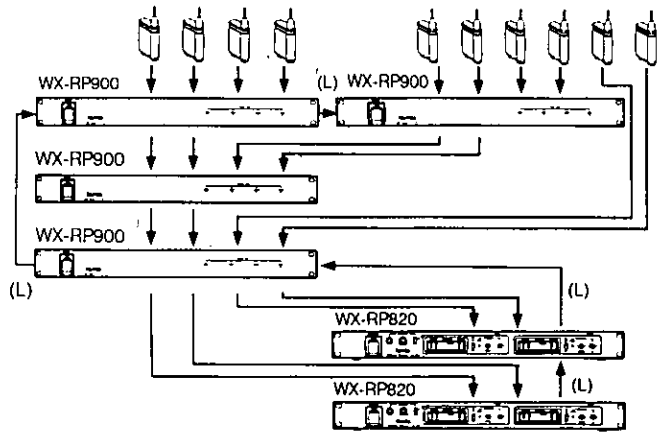
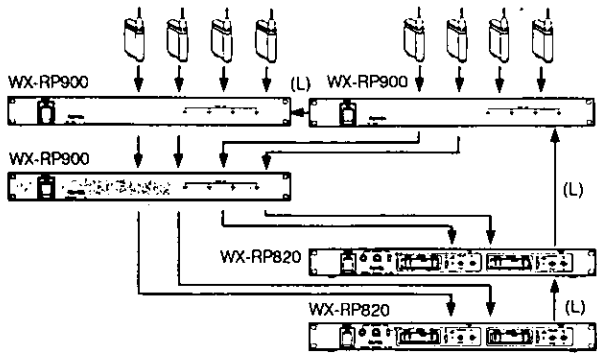
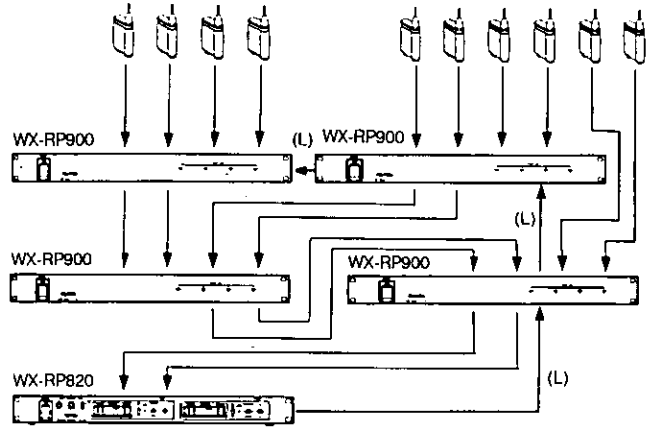
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64,585.44

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## CABLE DISTANCE BETWEEN WIRELESS ANTENNA AND DIVERSITY RECEIVER OR DISTRIBUTOR

### Coaxial cable

Always use a high quality coaxial cable to connect the wireless antennas to their receivers. Various types of coaxial cable have different amounts of loss, so be sure to select the appropriate cable by referring to the following table in order to keep the cable loss to a minimum.

Type (75ohms)	Extendable distance of cable
RG-59/U	100ft (30m) or less
RG-6/U	200ft (60m) or less

## FREQUENCY SETTING

### Group Description

The channel frequencies available for transmission are arranged into groups. The channels within a GROUP are at non-adjacent frequencies. This reduces the likelihood of interference between wireless microphones when multiple WX-RP810/WX-RP820's are used in close proximity. Therefore, one group should always be selected when using more than one wireless microphone/diversity receiver system. Each system may then be set to a different channel within that group.

- Group number 1, 2, 4 and 5 each consists of 6 channels.
- Group number 3 and 6 each consists of 5 channels.
- If suitable channels can not be found in Groups 1 to 6 use the groups 7 and 8.
- More than one group may be used if necessary, but be sure to confirm beforehand that there is no adjacent-channel interference between wireless microphone.

### How to set the frequency

1. Turn OFF the power of the units.
2. Using the screwdriver, set the Operating Frequency Selection Switch (68/69/N.C. BAND) on the rear panel of the receiver to 68 or 69 position.
3. Using the screwdriver, set the Group Selection Switch (GROUP FREQUENCY) on the front panel of the receiver to the same group number as the wireless microphone.
4. Set the Channel Selection Switch (CH FREQUENCY) on the front panel of the receiver to the same channel number as wireless microphone.
5. When using more than 1 wireless microphones, be sure to set each one to the same group number and vary only the channel number on the transmitters and receivers.

**Note:** Receivers set to adjacent channel frequencies should not be used closer than within 333ft (100m) of each other. This may be of concern when it becomes necessary to set each transmitter/receiver to different groups. Refer to the Frequency table on page 11.

### Broadcasting system description and cautions for UHF interference

This diversity receiver works with FM modulated signals in the UHF frequency range of 797.000 MHz to 803.000 MHz. Television channels 68 and 69 also fall within this range. Check the local area for these TV stations. Then select groups as follows.

Channel 68 broadcast area : To use Groups 4, 5, 6 or 7, set the Operating Frequency Selection Switch (68/69/N.C. BAND) to "69" position.

Channel 69 broadcast area : To use Groups 1, 2, 3 or . , set the Operating Frequency Selection Switch (68/69/N.C. BAND) to "68" position.

**Note:** In areas which receive both channels 68 or 69, choose the group with least interference. However, be sure to especially avoid using the following channels which are on the exact same broadcast frequencies:  
 GROUP 2/CHANNEL 6 (CH 68)  
 GROUP :/CHANNEL 3 (CH 69)

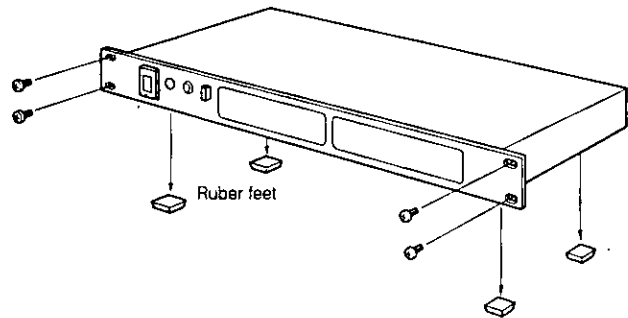
**Frequency List**

Carrier frequency (MHz)	GROUP • CHANNEL							
	GROUP1	GROUP2	GROUP3	GROUP4	GROUP5	GROUP6	GROUP •	GROUP :
797.000	CHANNEL 1							
797.125		CHANNEL 1						
797.250	CHANNEL 2							
797.375		CHANNEL 2						
797.500			CHANNEL 1					
797.625							CHANNEL 1	
797.750	CHANNEL 3							
797.875		CHANNEL 3						
798.000			CHANNEL 2					
798.125							CHANNEL 2	
798.250			CHANNEL 3					
798.375							CHANNEL 3	
798.500		CHANNEL 4						
798.625	CHANNEL 4							
798.750							CHANNEL 4	
798.875							CHANNEL 5	
799.000	CHANNEL 5							
799.125							CHANNEL 6	
799.250			CHANNEL 4					
799.375		CHANNEL 5						
799.500							CHANNEL •	
799.625	CHANNEL 6							
799.750		CHANNEL 6						
799.875			CHANNEL 5					
800.000								CHANNEL 1
800.125				CHANNEL 1				
800.250					CHANNEL 1			
800.375				CHANNEL 2				
800.500					CHANNEL 2			
800.625						CHANNEL 1		
800.750								CHANNEL 2
800.875				CHANNEL 3				
801.000					CHANNEL 3			
801.125						CHANNEL 2		
801.250								CHANNEL 3
801.375						CHANNEL 3		
801.500								CHANNEL 4
801.625								CHANNEL 5
801.750				CHANNEL 4				
801.875					CHANNEL 4			
802.000								CHANNEL 6
802.125				CHANNEL 5				
802.250								CHANNEL •
802.375						CHANNEL 4		
802.500					CHANNEL 5			
802.625								CHANNEL :
802.750				CHANNEL 6				
802.875					CHANNEL 6			
803.000						CHANNEL 5		

## RACK MOUNTING

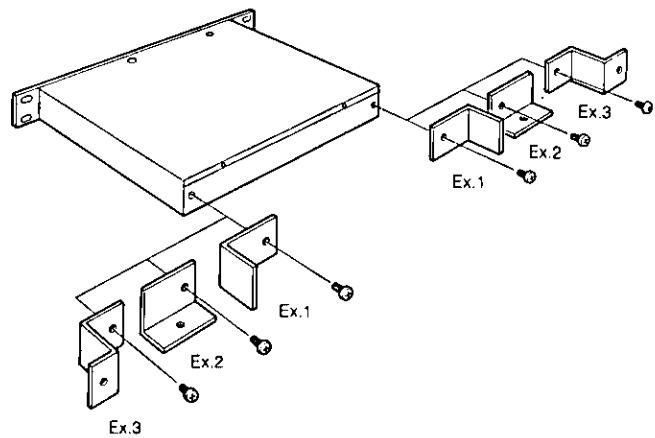
This unit is designed to be mounted in an EIA standard 19 inch rack, using mounting screws.

1. Remove four screws which attach the rubber feet. Remove the four rubber feet from the bottom of the unit.
2. Install the diversity receiver WX-RP810 or WX-RP820 in the EIA 19 inch rack by using four screws. (obtained locally)

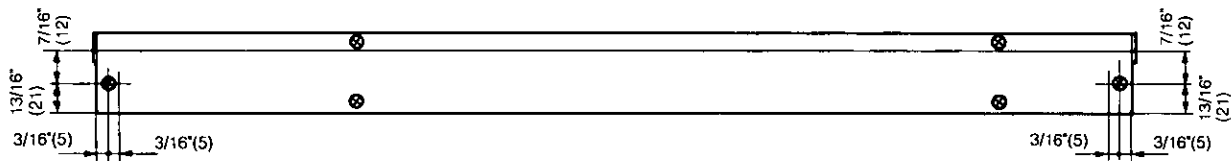


### Cautions :

1. Keep 1 or more rack spaces open at the top and bottom of the unit to insure adequate ventilation.
2. Secure the rear of the unit to the rack by using additional mounting angles (obtained locally) to prevent damage to the unit from vibration.



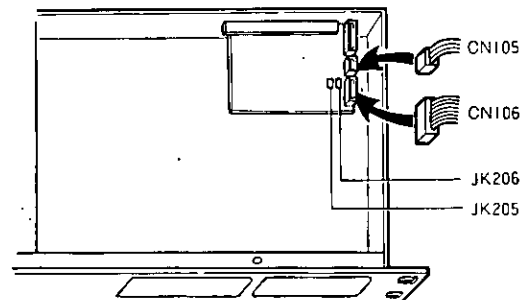
Unit : inch (mm)



## REMOVAL OF TUNER UNIT

Should it become necessary to remove the tuner unit for service, remove the connectors from the tuner unit and reconnect them to the main PCB board of the receiver as follows.

Reconnect the connectors CN105, CN106 on the main PCB board, also connect JK202 to JK205 and JK204 to JK206.



## SPECIFICATIONS

Power Source	: 120V AC 60Hz
Power Consumption	: Approx. 16W (WX-RP810) Approx. 23W (WX-RP820)
Oscillator	: Crystal-controlled PLL Synthesizer
Receiving System	: Super Heterodyne
Receiving Sensitivity	: More than S/N 30dB (20dB $\mu$ V Input, $\pm$ 5KHz FM)
Squelch Sensitivity	: Less than 18dB $\mu$ V
Signal to Noise Ratio	: More than 60dB (60dB $\mu$ V Input, $\pm$ 5KHz FM A-weighted)
Diversity Selection Noise	: More than S/N 40dB (60dB $\mu$ V Input, $\pm$ 5KHz FM)
Residual Noise	: Less than 30 $\mu$ V
Distortion	: Less than 1% (60dB $\mu$ V Input, $\pm$ 12.5KHz FM)
Output Level	: -20dB ( $\pm$ 5KHz FM)
Pilot Tone Frequency	: 32.927KHz
Ambient Operating Temperature	: 14°F - 122°F (-10°C - +50°C)
Dimensions	: 18-7/8" (W) X 1-3/4" (H) X 9-13/16" (L)
(Excluding Rubber foot)	(480 (W) X 44 (H) X 250 (L) mm)
Weights	: 10.57 lbs. (4.8Kg) (WX-RP810) : 11.23 lbs. (5.1Kg) (WX-RP820)

Dimensions and Weights indicated are approximate.  
Specifications are subject to change without notice.

# Panasonic

**Broadcast & Television Systems Company**

**Division of Matsushita Electric Corporation of America**

**RAMSA/Professional Audio Systems**

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