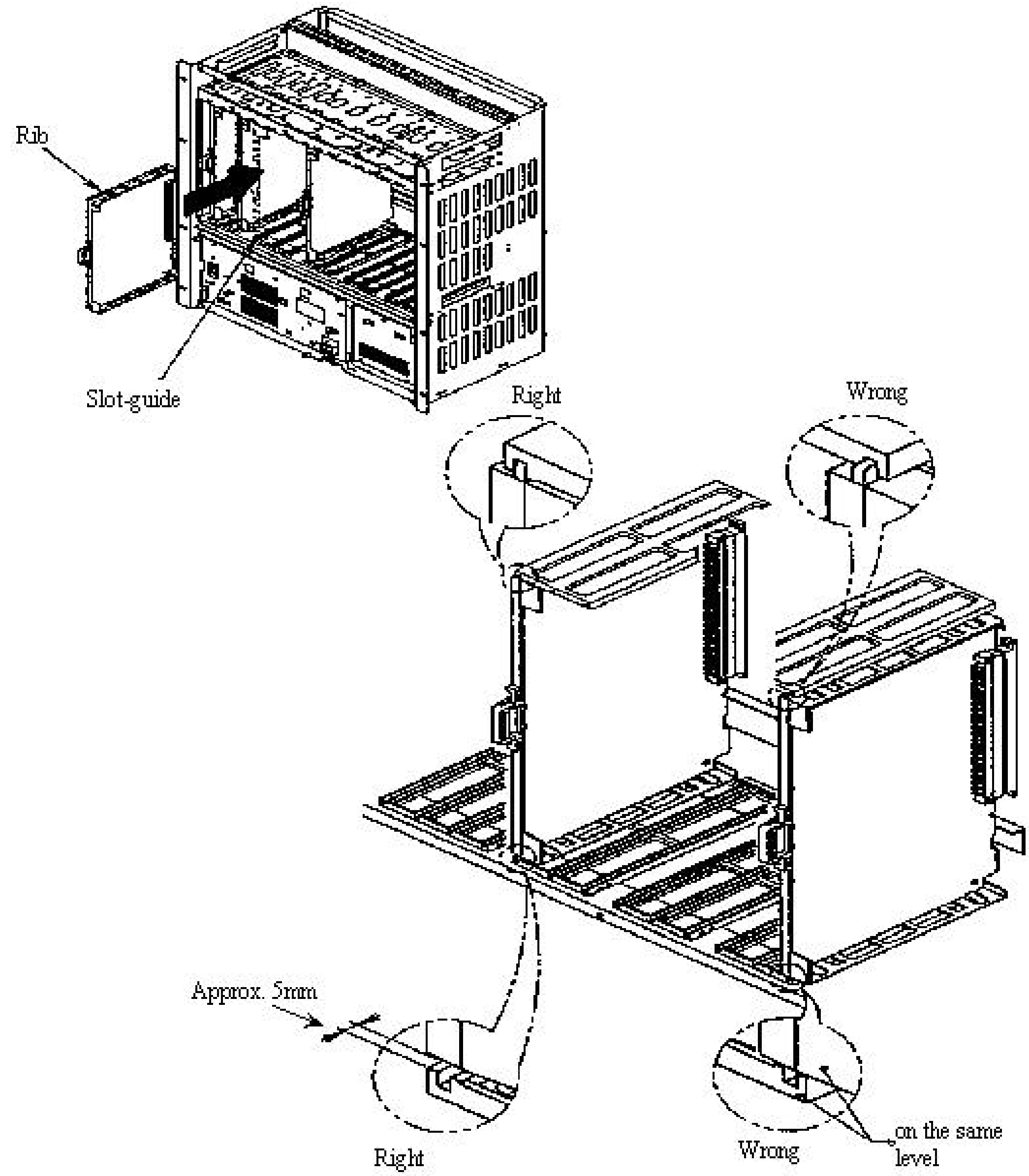

Figure 2-20: Card Installation

14. Connect the RMT or PC to the connector on the ECNT module. See Figure 2-21.

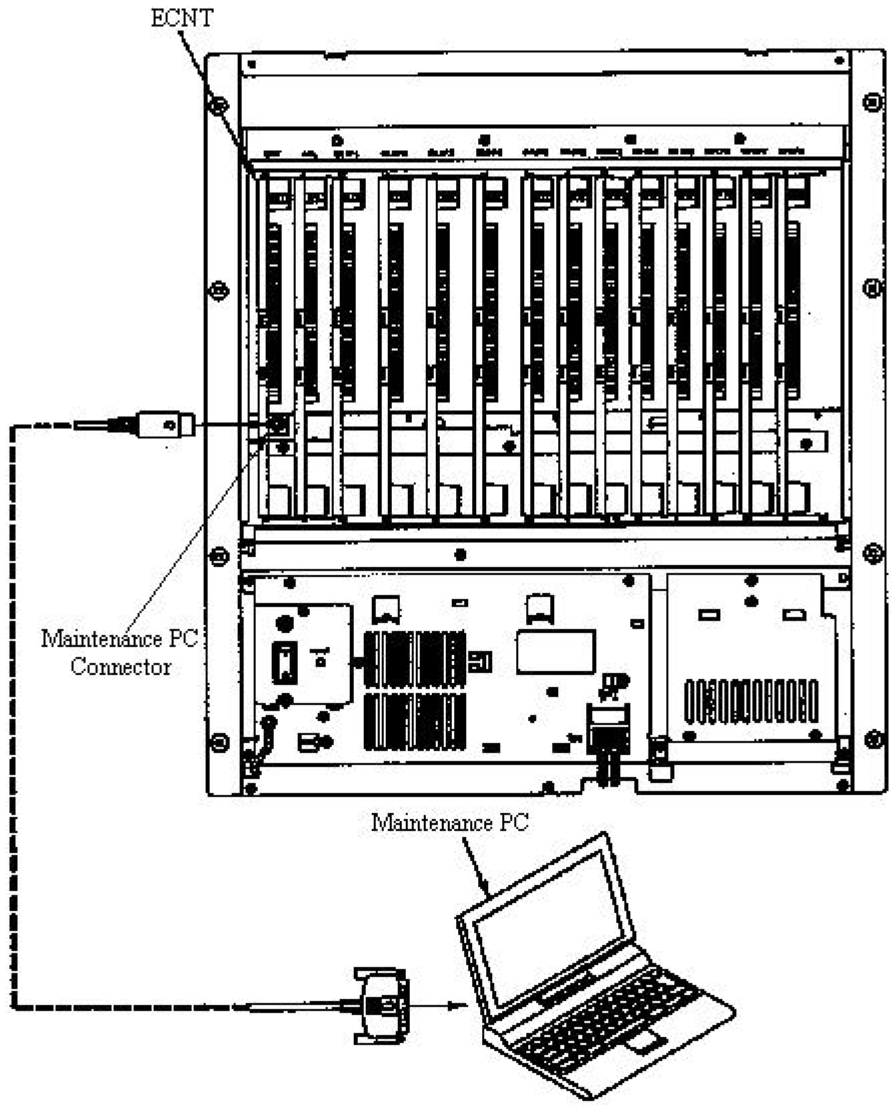

Figure 2-21: Maintenance Terminal or PC Connection

☞ NOTE: *RPC maintenance and configuration can also be made throught the network management system via the COT which is connected to the RPC.*

15. Load operation data.

16. Replace the power source cover on the front of the RPC and secure it with screws as shown in Figure 2-22.

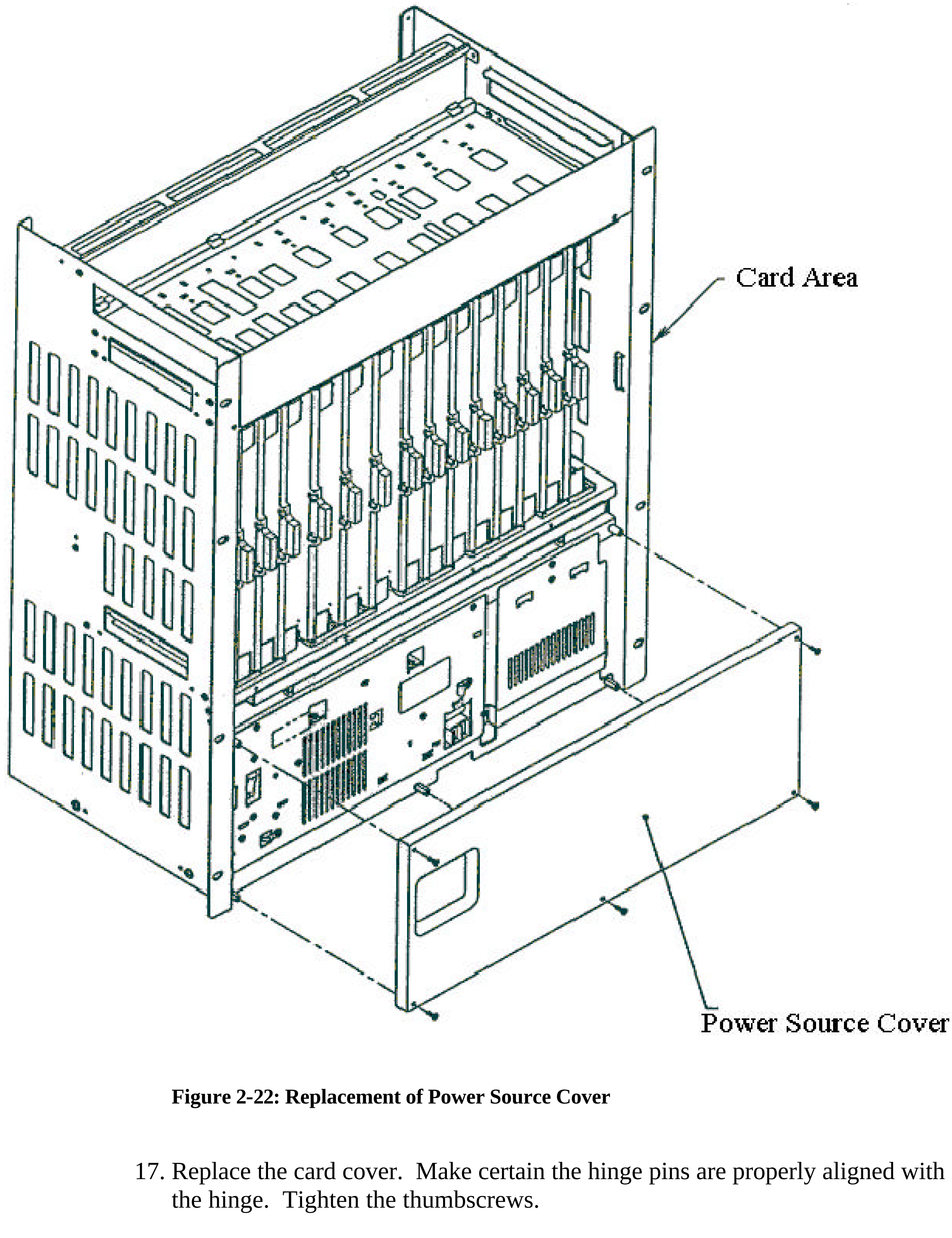

Figure 2-22: Replacement of Power Source Cover

17. Replace the card cover. Make certain the hinge pins are properly aligned with the hinge. Tighten the thumbscrews.

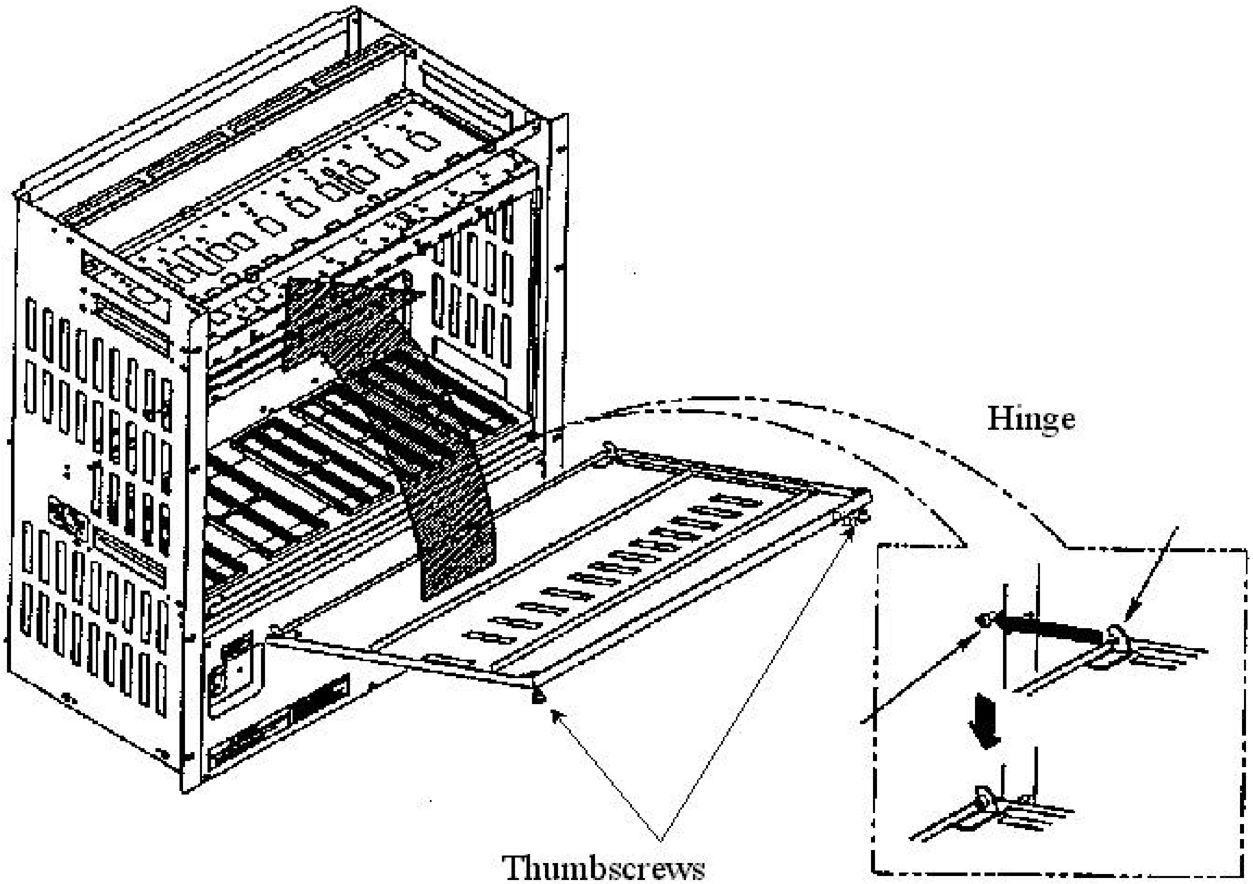

Figure 2-23: Replacement of the Card Cover

18. This concludes the RPC installation.

19. When the RPs have been installed and connected to the RP Interface cards, measure the loop resistance of the cable. Then set the Distance Switch on the RP Interface card based on the loop resistance value. Refer to the table and figure below. The factory setting is Short.

Setting	Loop Resistance
Long	150Ω or more
Short	Less than 150Ω

Table 2-3: Distance Switch Settings

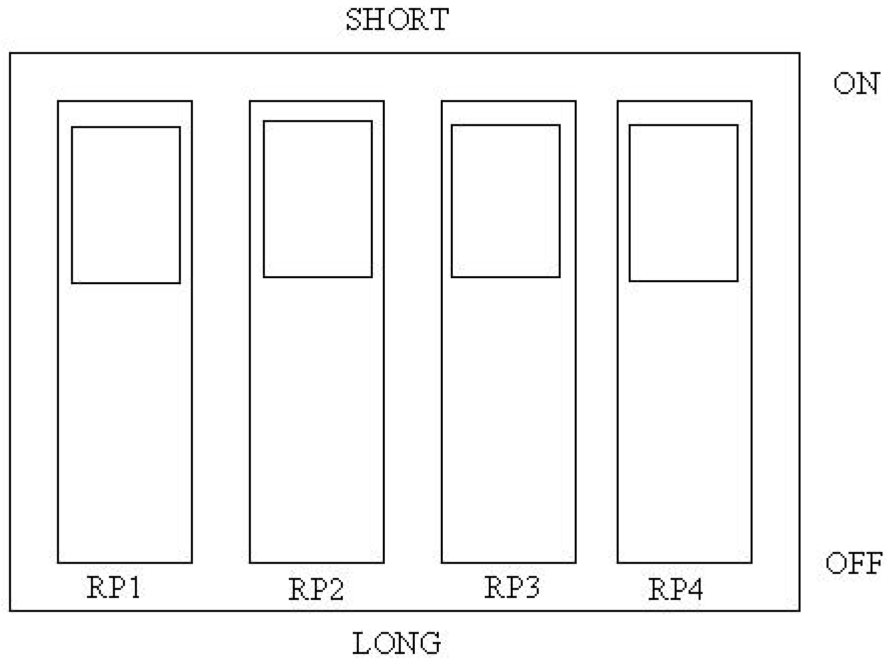

Figure 2-24: Distance Switch

RP Installation

3

3.1 General Description

The Radio Port (RP) is the radio equipment base station that relays the communication from the user side to the operator/network side or vice versa. A standard installation for RP applications places several RPs in a common service area. However, the number of RPs and their distribution deployment depend on the following factors:

- Topography of the service area
- Subscriber distribution in the service area
- Desired Grade of Service and traffic load.

There are two types of RPs:

- Outdoor - is small in size and is encased in a weather-proof cabinet. This gives it the potential for various mounting scenarios - installed on the dedicated poles, buildings, or street lamp poles.
- Indoor - is also small in size and can be installed in public and semi-public locations like an office building, a shopping mall, or an underground parking lot.

The power for the RP is fed from the RPC and a synchronous clock is delivered from the RPC. The radio link between the RP and the FSU, or the RP and the PS is based on RCR-STD 28 Ver.2 PHS technology, which defines frequency bands, protocol, and so on. Both the indoor and the outdoor RPs have a 2 branch built-in antenna.

The architecture of the WLL system is illustrated in Figure 3-1, which is followed by a block diagram of the RP.

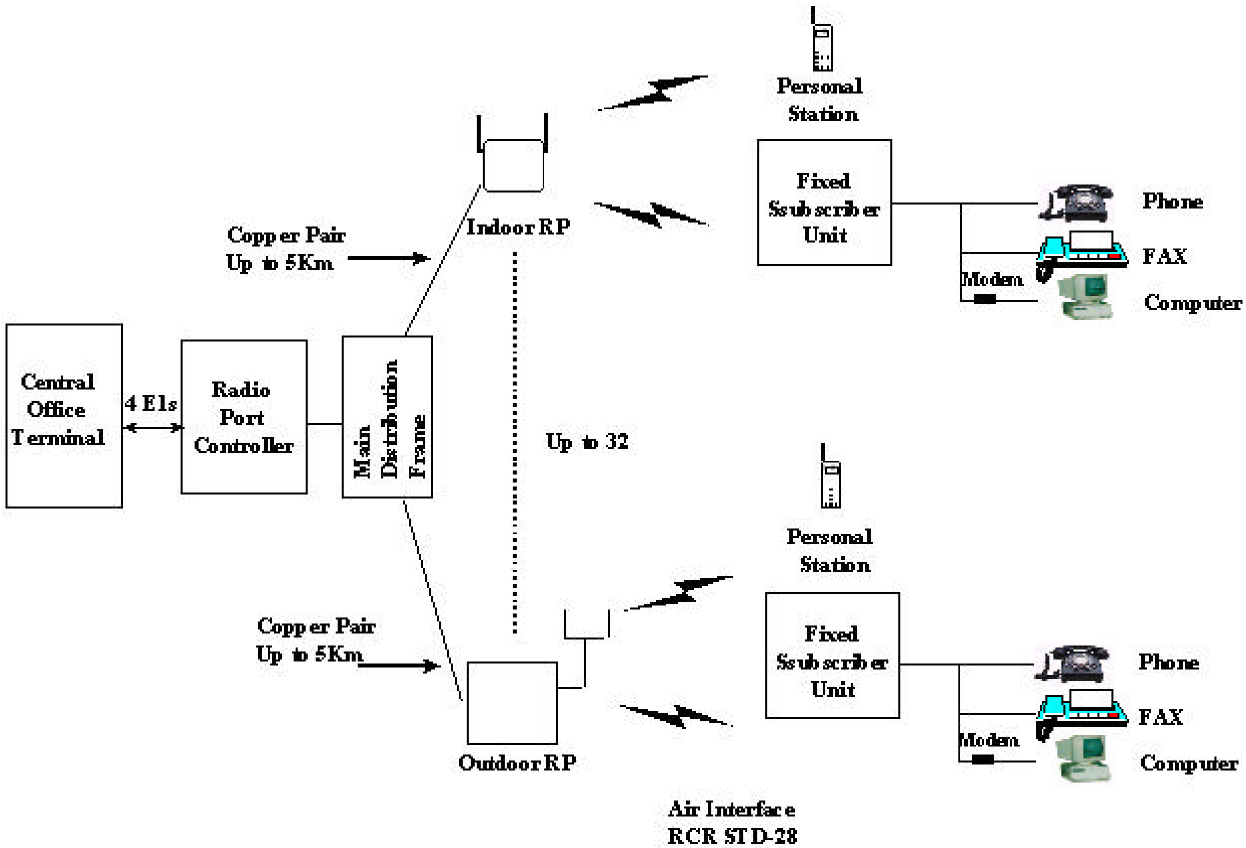

Figure 3-1: RP in the WLL System

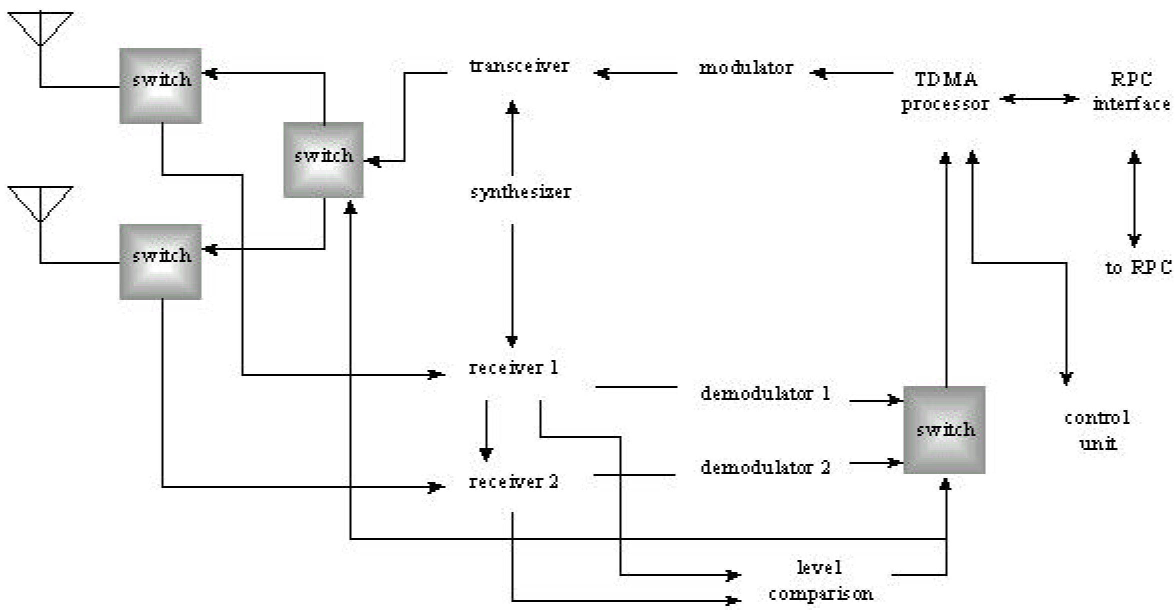

Figure 3-2: Radio Port Block Diagram

3.1.1 Traffic Handling

PHS applies Time Division Multiplex Access (TDMA) and Time Division Duplex (TDD) techniques. Each individual radio link between the RP and the FSU/PS is assigned 1 time slot for a control channel (C-ch) and 3 slots for traffic channels (T-chs).

In the case of a single RP, there are 4 time slots installed for radio links. One slot is the control channel for signaling and the other three are the traffic channels. The number of accommodated subscribers in that RP covering the zone calculated according to the erlang theory is as follows:

- Erlang per zone (3 T-chs, GOS=5%) = 0.899 erlang
- Subscribers (FSUs or PSs) (0.899÷.08) = 11 subscribers

Group Control maximizes the number of channels available for traffic by allowing one control channel to control up to 8 RPs (up to 31 traffic channels), which is an efficient application for high traffic areas. One master RP can control a maximum of 7 RPs in the same area. The master RP has one control channel, and all the other channels are assigned for traffic, leaving 31 channels open for traffic. Figure 3-3 represents the group control configuration with 4 RPs in the group.

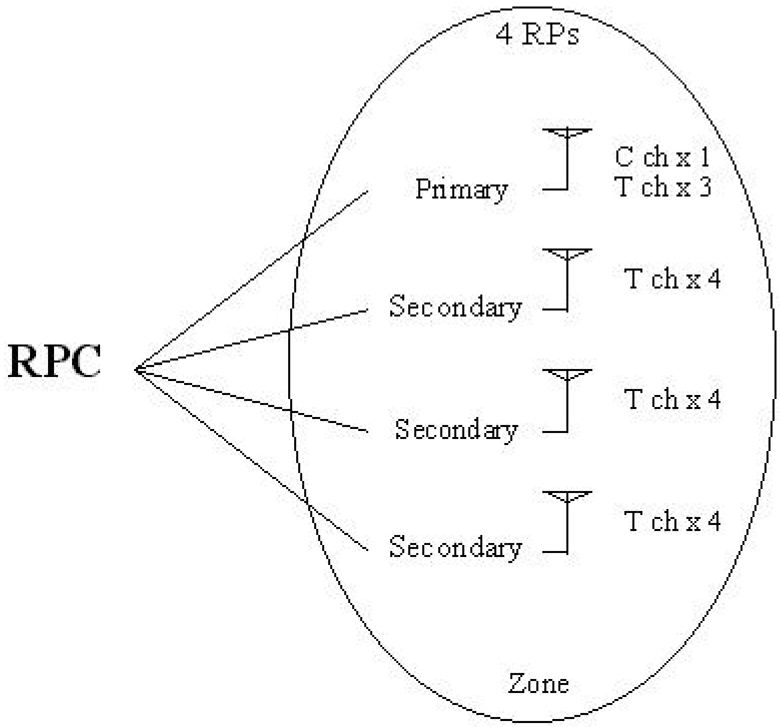

Figure 3-3: Group Control RPs

In the group control mode, the number of accommodated subscribers in the group control coverage zone is calculated in accordance with the erlang theory as follows (with 4 RPs in the group):

- Erlang per zone (15 T-chs, GOS=5%) = 10.663 erlang
- Subscribers (FSUs or PSs) (10.663÷.08) = 132 subscribers

The comparison for the number of accommodated subscribers between the group controlled RPs and the single RP is shown in Figure 3-4.

☞ NOTE: *Figure 3-4 represents the group control with 4 RPs. Each group can have a maximum of 8 RPs.*

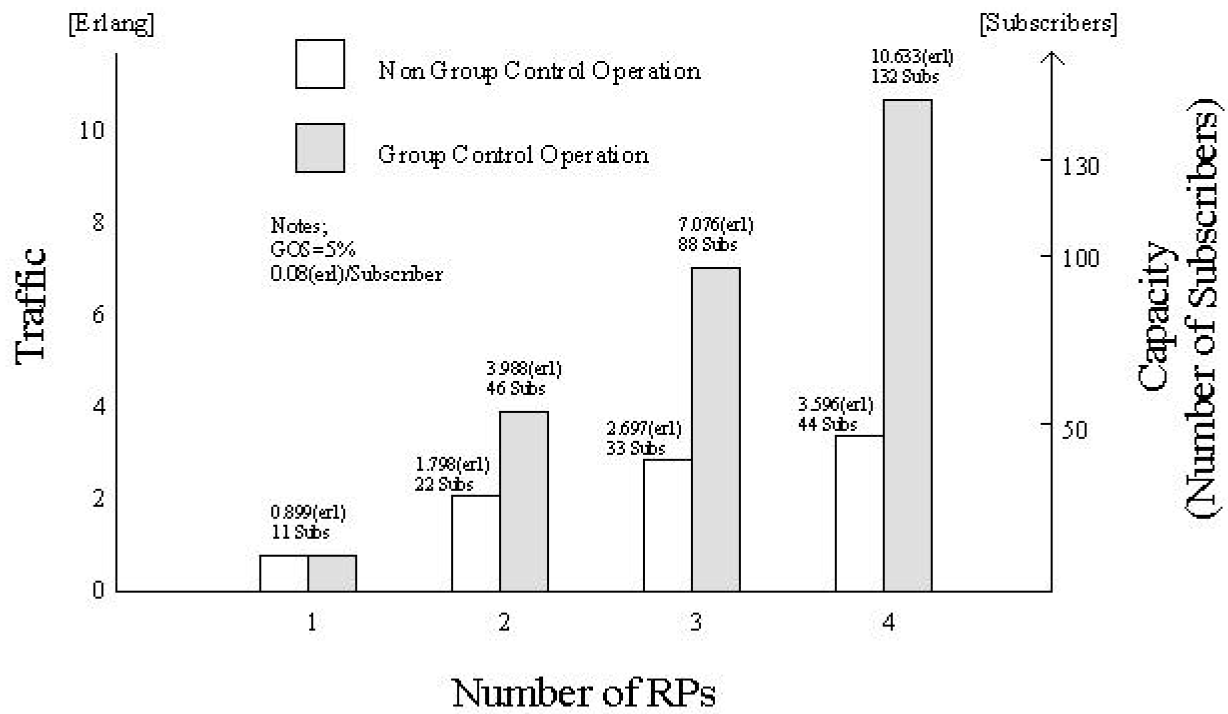

Figure 3-4: Accommodated Subscribers per RP in Group and Non-group Control

The recommended installation design for RPs is as follows:

- A zone of sparse subscribers should be covered by non-group controlled RPs.
- A zone of dense subscribes should be covered by group-controlled RPs.

The number of accommodated subscribers is the greatest when all of the RPs connected to an RPC are configured in the group control mode. In this case (with 4 RPs in each group), the number of service zones is eight (32÷4), and the maximum number of subscribers is 1,056 (132x8). Each Group Control zone supplies 15 traffic channels. Eight zones require 120 channels (15x8) provided by 4 E1 lines with 30 channels each.

3.1.2 Cell Overlap

Maximum service results are achieved when the RP coverage area is strategically installed in a Cell Overlap Capacity.

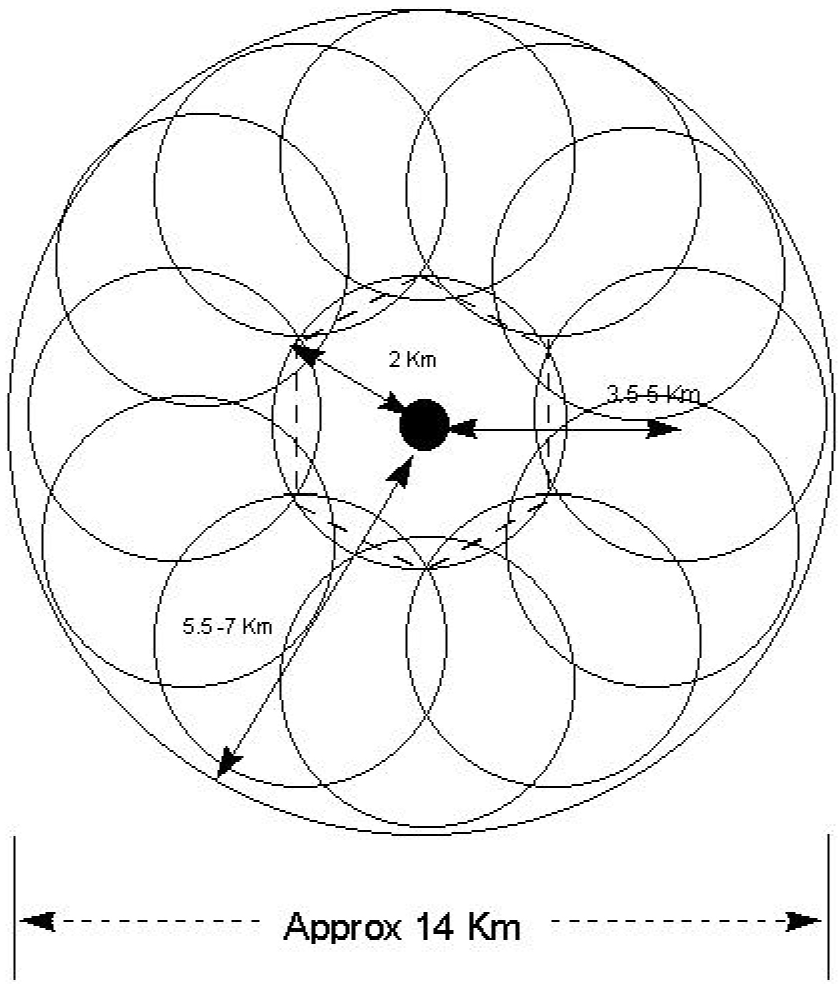

Figure 3-5: Coverage Service Area with Cell Overlap

The combination of Cell Overlap and Dynamic Channel Allocation increases the flexibility and the capacity of the system. Every user has access to all channels (77x4) due to the overlapping base station topology. Cell Overlap enhances the reliability and service quality. One malfunctioning base station does not affect the performance of the system. Due to the Dynamic Channel Allocation, there is no need for frequency planning, which allows the network to meet operators current demands with the option to easily expand at a later date.

3.1.3 Air Interface Handling

The radio interface has four-channel time division multiple access capability with time division duplexing (4-channel TDMA-TDD), which provides one control channel and three traffic channels for each cell station.

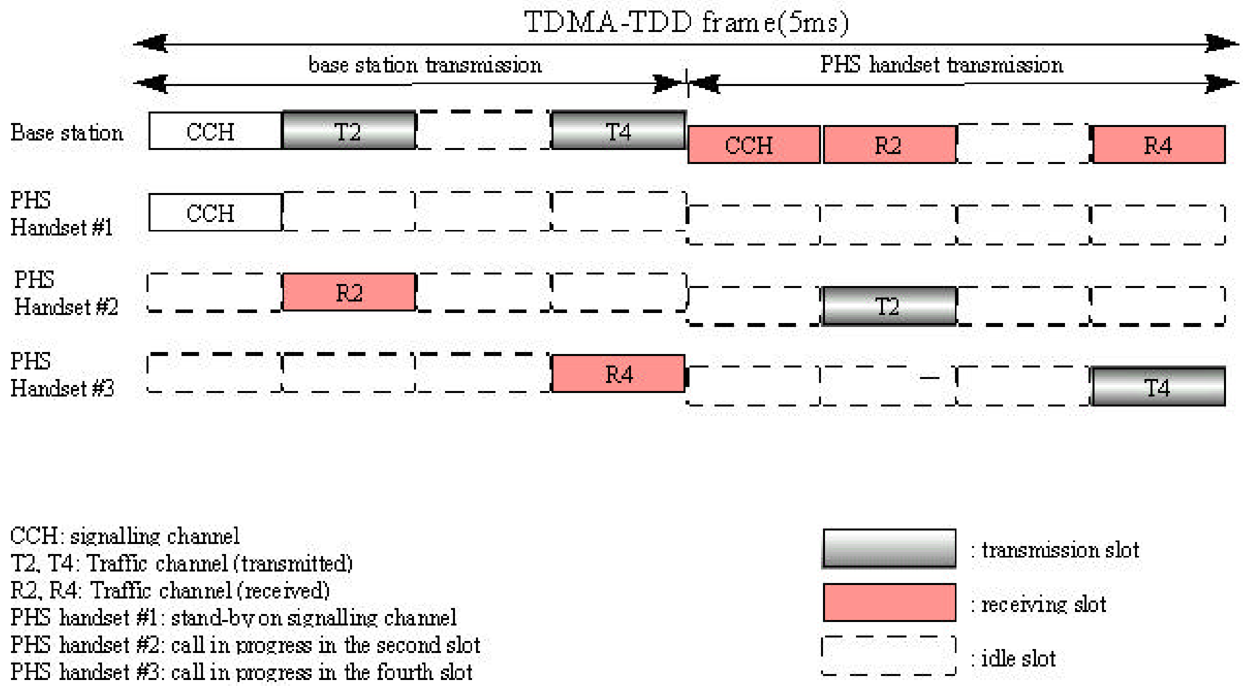

Figure 3-6: Radio Channel Structure

The radio frequency allocation shown in Figure 3-6 displays a typical radio channel structure when three cordless handsets are operating through a single RP. RCR STD-28 does not designate a control channel prior to the operation. Instead, it assigns the control slot to any one of the four available slots.

Traffic channels are not preassigned. Channel assignment is performed by a distributed-autonomous dynamic channel assignment scheme and is an essential function of the WLL radio system. Channel assignment for new communication is selected from the available channel resources mapped in a two-dimensional frequency-time matrix renewed by the result of checking signal strength when the call is established. The RP also completes handling of the signaling process over the radio segment.

Due to the separation of the traffic and control channels, traffic channels can be allocated in a distributed and autonomous manner by employing the switching TDMA mechanism. In order to maximize the benefit of carrier switching TDMA, the RP uses a system that synchronizes radio frames by superimposing synchronization data on the B interface. The result of this synchronization is an improved utilization of frequency as compared to asynchronous systems.

In addition, with TDMA-TDD and the diversity of the RP transmission and reception, it is not necessary to install the multiple antenna or receiver-branch diversity mechanisms in the PS handsets to improve the data communication quality. TDMA enables the antennas to share both transmitting and receiving with the RF switches. To implement receiving diversity, the receiving units have two receiving branches, while the transmitting unit has switches for switching antennas to provide the transmission diversity.

3.2 System Construction

Figure 3-7 represents the RPC and RP configuration.

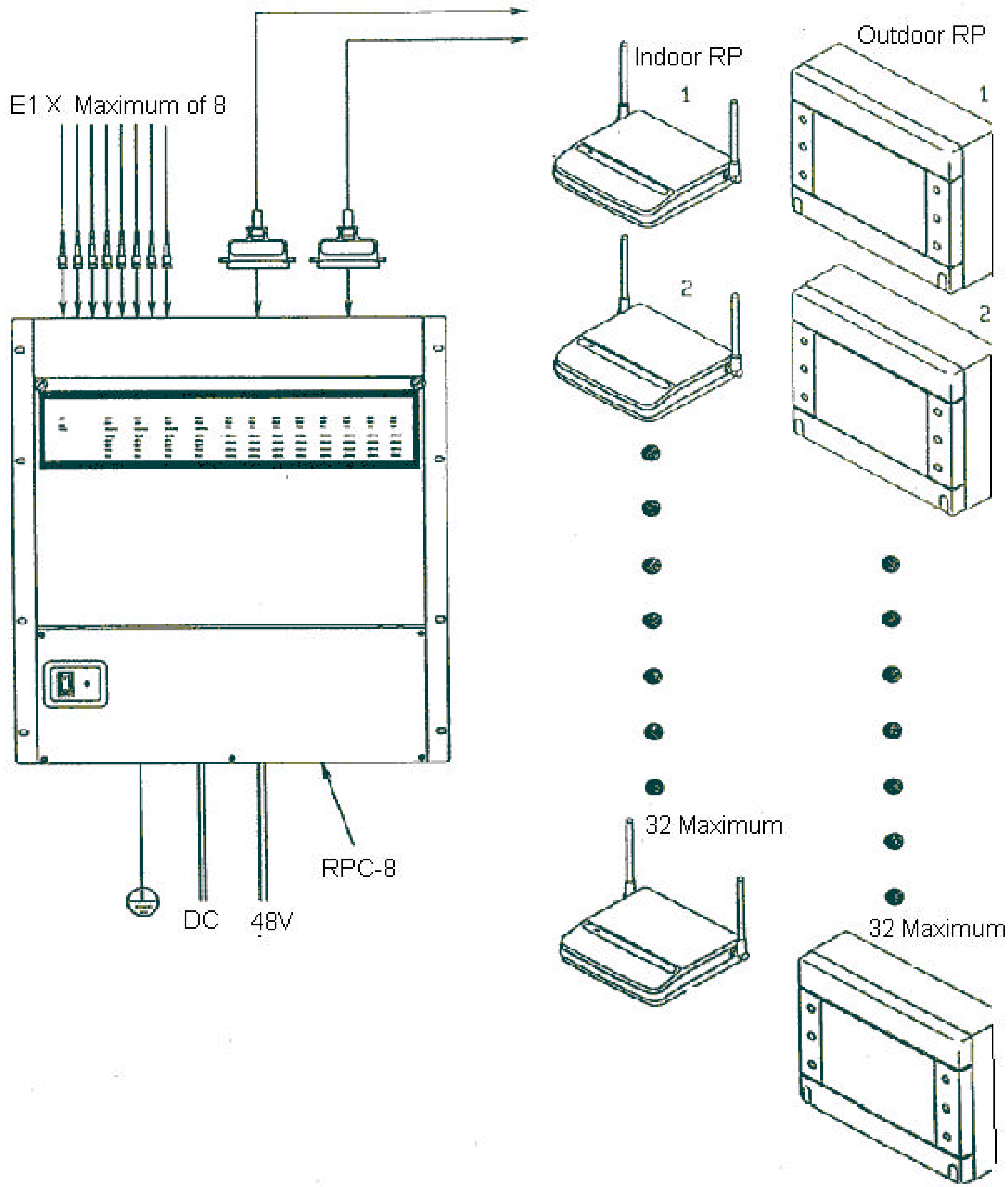

Figure 3-7: RPC and RP Configuration

The dimensions of the indoor Radio Port are as follows:

- Height:142 mm

- Width:154 mm
- Depth:47 mm

The dimensions of the outdoor Radio Port are as follows:

- Height:214±2.5 mm
- Width:260±2.5 mm

3.3 Indoor RP Installation Instructions

This section provides the instructions for installing an indoor RP. The flow chart in Figure 3-8 describes the steps involved in the installation.

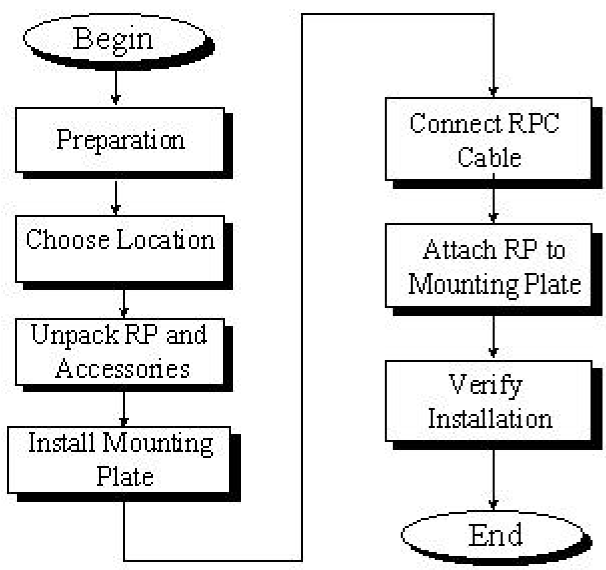

Figure 3-8: Indoor RP Installation Flow Chart

3.3.1 Before Beginning

To ensure that the RP installation goes smoothly, it is necessary to do adequate planning prior to the installation. Things to consider:

- Correct placement of the RP
- Tools required
- Number of people needed to complete the installation

3.3.2 Site Selection

For indoor RP installation, select a site that satisfies the following requireme nts:

- Less than 3 meters from the RP antenna
- Not in direct sunlight or near a heat source such as a radiator
- Free from excessive humidity; not more that 95% non-condensing
- Free from excesses of heat or cold, not lower than -10°C nor higher than +50°C

☞ NOTE: *If more than 3 meters , consult a qualified field engineer.*

3.3.3 Indoor RP Installation

Follow the steps below to install an indoor RP:

1. Carefully unpack the indoor RP and make sure it is in good condition.
2. Attach the mounting plate to a wall with 2 screws as shown in Figure 3-9.

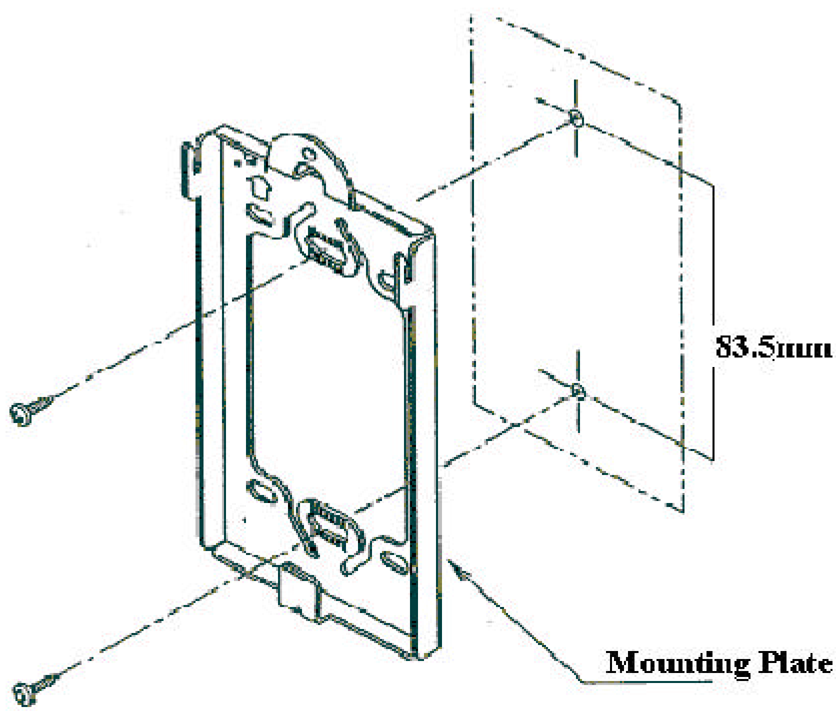

Figure 3-9: Indoor RP Mounting Plate

3. Insert the RJ-11 end of the RPC cable into the connector on the back of the indoor RP. Refer to Figure 3-10.

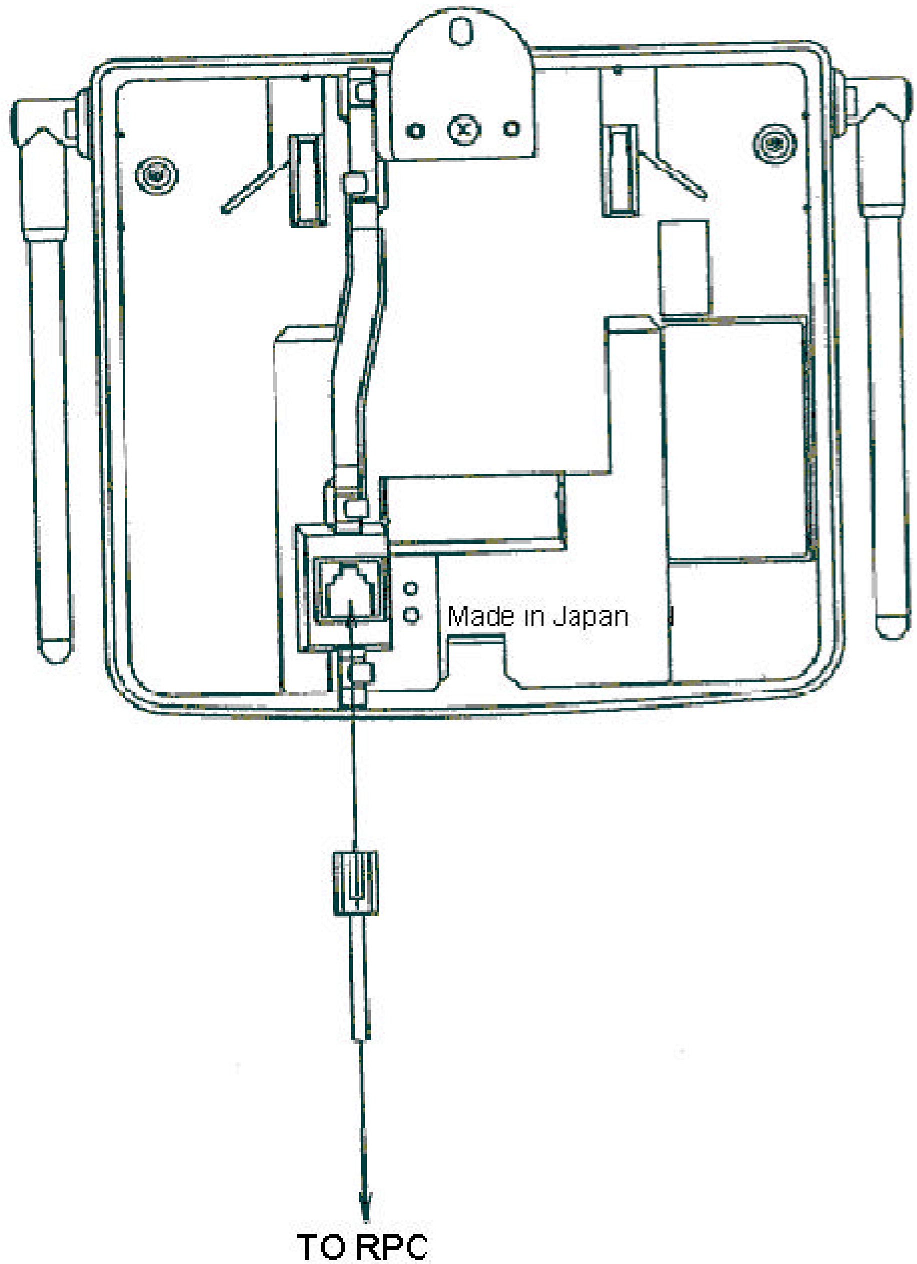

Figure 3-10: Connection to RPC

4. Attach the indoor RP to the mounting plate with the special screw as indicated in Figure 3-11.

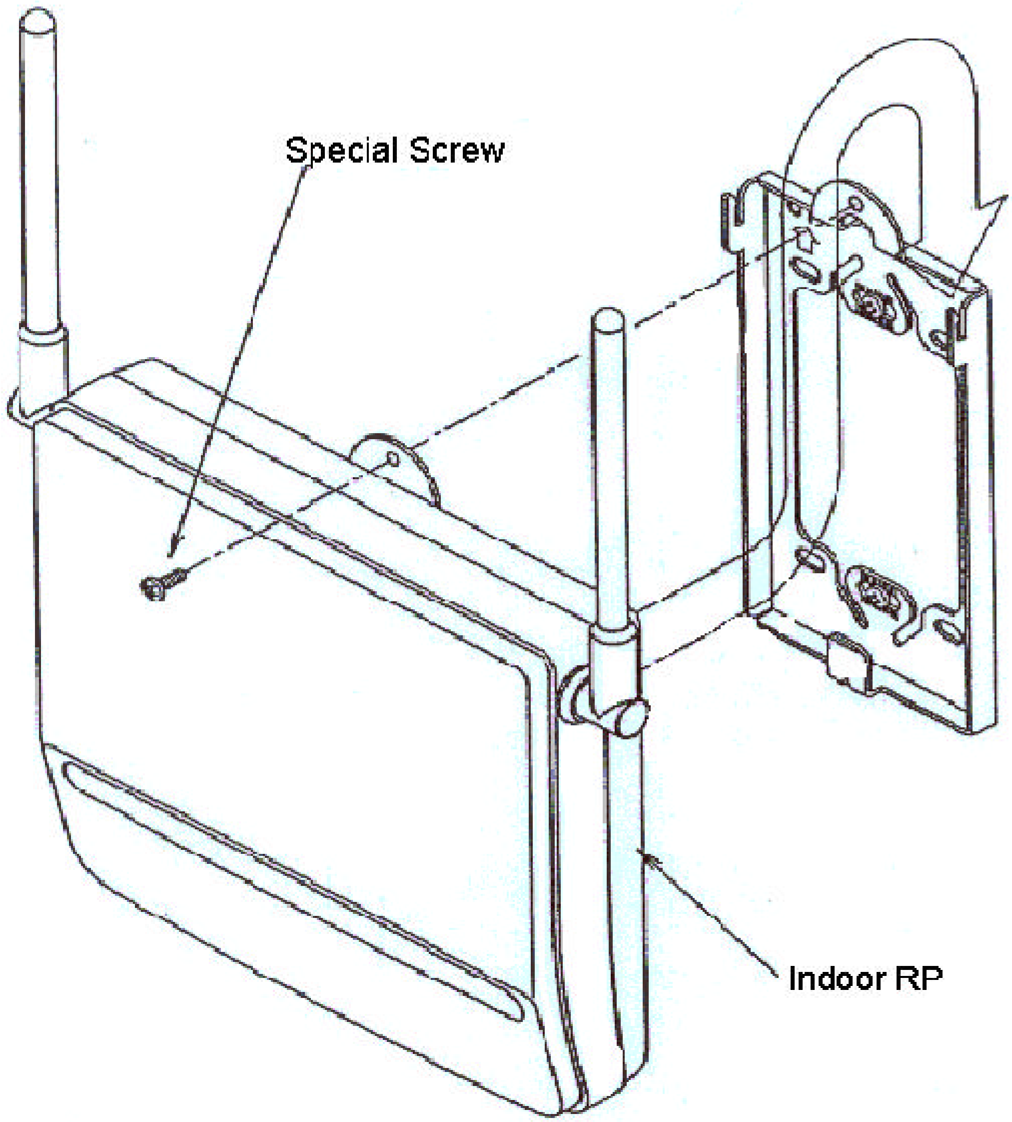

Figure 3-11: Indoor RP and Mounting Plate

5. This concludes the installation of the indoor RP.

3.4 Outdoor RP Installation Instructions

This section provides the instructions for installing the outdoor RP. The flow chart in Figure 3-12 defines that steps involved in the installation.