LMR (Land-to-Mobile Radio) Gateway Solution

AddPac Technology
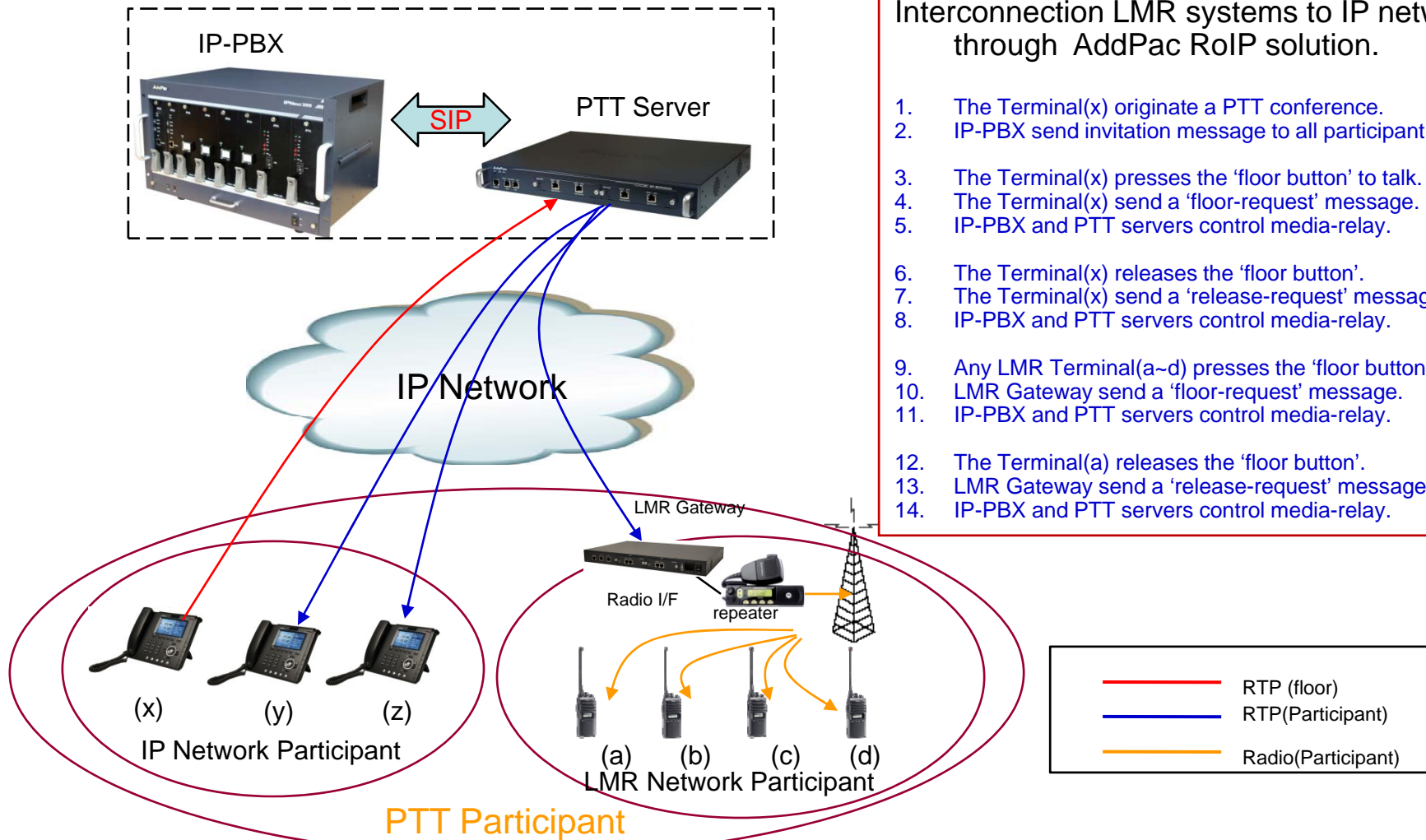
Sales and Marketing

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- System Interface between LMR Gateway and Radio
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LMR Gateway System Overview

- A LMR(Land Mobile Radio) system is a collection of portable and stationary radio units designed to communicate with each other.

- LMR is deployed wherever organizations need to have instant communication between geographically dispersed and mobile personnel.

- Typical LMR system users are public safety organizations (ex: police departments, fire departments, etc).

- The systems are extended the range of communications by repeaters.

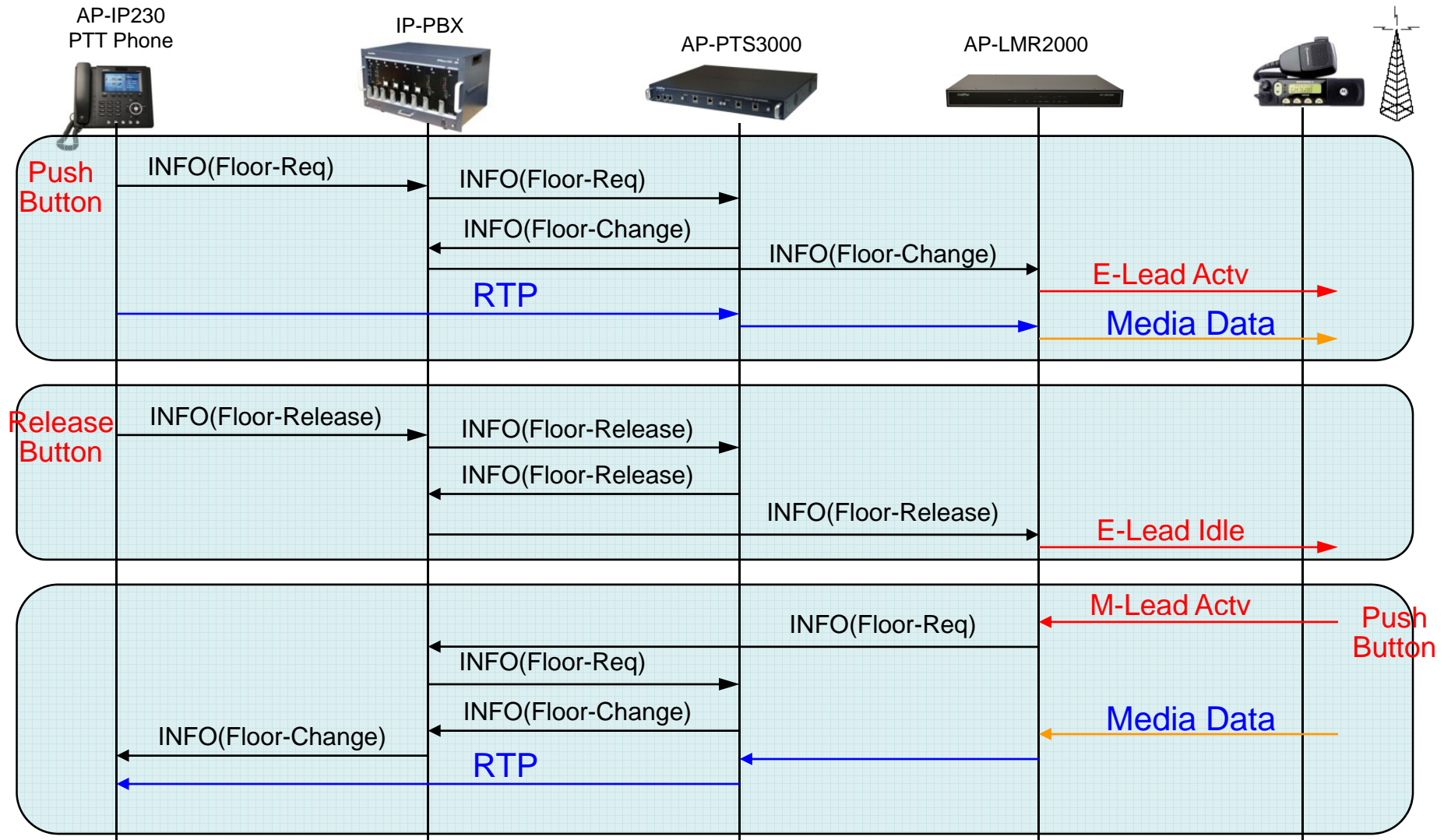- The systems are required interoperability with IP network.

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LMR Gateway Service Diagram

IP-PBX

SIP

PTT Server

IP Network

LMR Gateway

Radio I/F

repeater

(x)　　　(y)　　　(z)

IP Network Participant

(a)　(b)　(c)　(d)

LMR Network Participant

PTT Participant

Interconnection LMR systems to IP network through AddPac RoIP solution.

1.   The Terminal(x) originate a PTT conference.
2.   IP-PBX send invitation message to all participant.

3.   The Terminal(x) presses the 'floor button' to talk.
4.   The Terminal(x) send a 'floor-request' message.
5.   IP-PBX and PTT servers control media-relay.

6.   The Terminal(x) releases the 'floor button'.
7.   The Terminal(x) send a 'release-request' message.
8.   IP-PBX and PTT servers control media-relay.

9.   Any LMR Terminal(a~d) presses the 'floor button' to talk.
10.   LMR Gateway send a 'floor-request' message.
11.   IP-PBX and PTT servers control media-relay.

12.   The Terminal(a) releases the 'floor button'.
13.   LMR Gateway send a 'release-request' message.
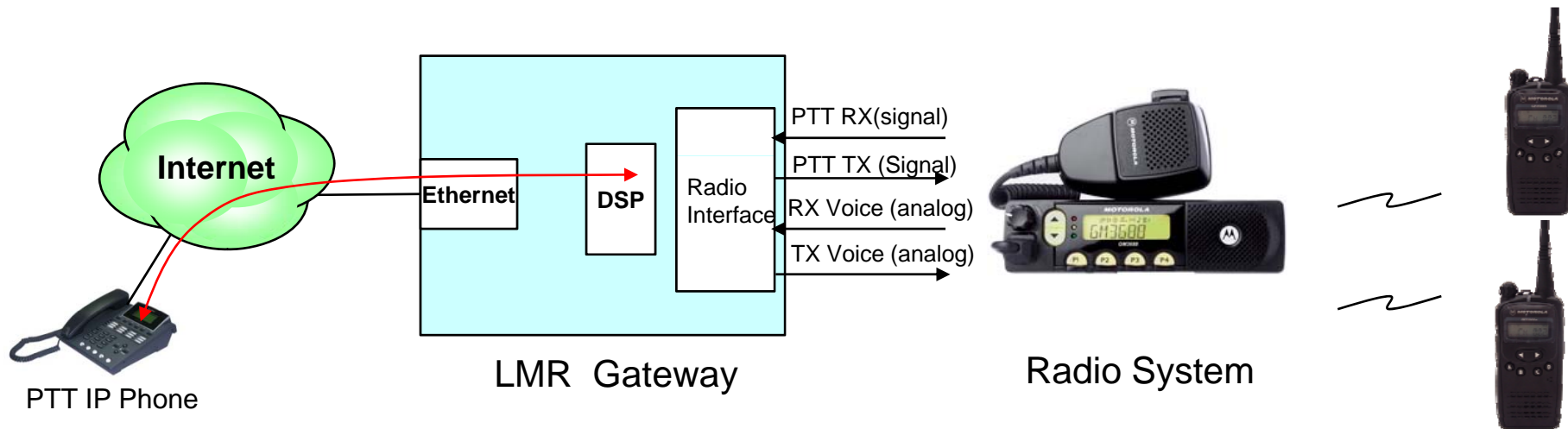14.   IP-PBX and PTT servers control media-relay.

——	RTP (floor)
——	RTP(Participant)
——	Radio(Participant)

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RoIP System Message Flow

AP-IP230
PTT Phone

IP-PBX

AP-PTS3000

AP-LMR2000

Push Button

INFO(Floor-Req)

INFO(Floor-Req)

INFO(Floor-Change)

INFO(Floor-Change)

E-Lead Actv

RTP

Media Data

Release Button

INFO(Floor-Release)

INFO(Floor-Release)

INFO(Floor-Release)

INFO(Floor-Release)

E-Lead Idle

M-Lead Actv

INFO(Floor-Req)

Push Button

INFO(Floor-Req)

INFO(Floor-Change)

Media Data

INFO(Floor-Change)

RTP

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System Interface between LMR Gateway and Radio

CASE A

PTT IP Phone

LMR Gateway

Ethernet — DSP — Radio Interface

PTT RX(signal)
PTT TX (Signal)
RX Voice (analog)
TX Voice (analog)

Radio System

System Interface between LMR Gateway and Radio

CASE B

Internet

Ethernet | DSP | Radio Interface

PTT RX(signal)
PTT TX (Signal)
RX Voice (analog)
TX Voice (analog)

Glue Logic

PTT RX Info. Signal

LMR Gateway

PTT IP Phone

Radio System

LMR Gateway Series

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LMR Gateway Comparison Table

Model	AP-LMS1000	AP-LMS2000
Available Modules	AP-RADIO2 E&M	AP-RADIO2 E&M
Radio Channel	Up to 2 Ch.	Up to 4 Ch.
Module Slot for Radio Interface	One(1) Module Slots	Two(2) Module Slots
LAN Port	2	2
Console	1	1
Power	Single PSU	Single PSU

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AP-LMS2000 LMR Gateway

Main Features

- Radio over IP Service Support
- Radio Systems(Motorola, etc) are Extended to IP Network
- High Performance RISC & Programmable DSP Architecture
- Two(2) 10/100Mbps Fast Ethernet (IP Share ,etc)
- High Performance LAN-to-LAN Routing Capability
- Two(2) Module Slots for Radio Interface (E&M, etc)
- VoIP Codec : G.711/G.726/G.723/G.729, VAD, etc
- Powerful Network Protocols (PPPoE, DHCP, Static Routing, etc)
- IPv4/IPv6 Dual Stack Support
- SIP/H.323 Dual Concurrent Signaling Protocols
- TLS/SRTP VoIP Secure Protocol Support (AES, 3DES, etc)
- Firmware Upgradeable Architecture
- Advanced Voice QoS Mechanism
- Powerful Web based Management
- RS232C Port Support for Command Line Interface

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Hardware Specification

AP-LMR2000 LMR Gateway
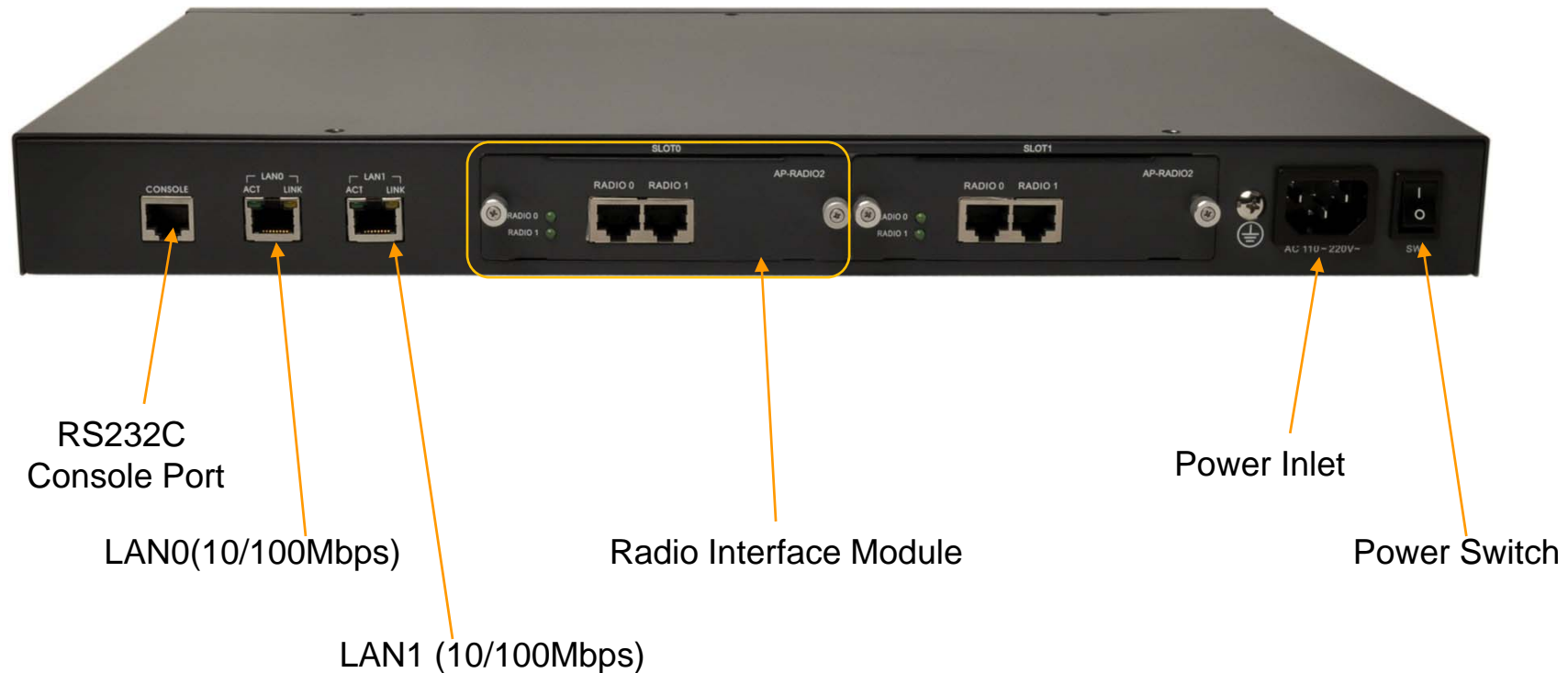
- RISC Microprocessor Computing Power

- Main Chassis
    - Network Interface
        - Two(2) 10/100Mbps Fast Ethernet
        - One(1) RS-232C Console (RJ45)
    - Two(2) Radio Module Slots for E&M, etc
    - Internal Power Supply

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Hardware Specification

AP-LMR2000 LMR Gateway

AP-LMR2000 Back Side

RS232C
Console Port

LAN0(10/100Mbps)

LAN1 (10/100Mbps)

Radio Interface Module

Power Inlet

Power Switch

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Hardware Specification

Example : AP-RADIO2 E&M Interface Module for Radio Interworking

Hardware Specification

Example : E&M Interface for Radio Interworking

Lead Name	Pin	Description
E (Ear or Earth)	Pin 7	Signal wire asserted by the router toward the connected device. Typically mapped to the push-to-talk (PTT) lead on the radio.
M (Mouth or Magnet)	Pin 2	Signal wire asserted by the router toward the connected device. Typically mapped to the push-to-talk (PTT) lead on the radio.
SG (Signal Ground)	Pin 8	Used on E&M signaling Types II, III, and IV.
SB (Signal Battery)	Pin 1	Used on E&M signaling Types II, III, and IV.
Two-Wire Mode		
T1/R1 (Tip-1/Ring-1)	Pin 4,5	In two-wire operation, the T1/R1 leads carry the full-duplex audio path.
Four-Wire Mode		
T/R (Tip/Ring)	Pin6,3	In a four-wire operation configuration, this pair of leads carries the audio in from the radio to the router and would typically be connected to the line out or speaker of the radio.
T1/R1 (Tip-1/Ring-1)	Pin5,4	In a four-wire operation configuration, this pair of leads carries the audio out from the router to the radio and would normally be connected to the line in or microphone on the radio

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AP-LMS1000 LMR Gateway

Main Features

- Radio over IP Service Support

- Radio Systems(Motorola, etc) are Extended to IP Network
- High Performance RISC & Programmable DSP Architecture

- Two(2) 10/100Mbps Fast Ethernet (IP Share ,etc)

- High Performance LAN-to-LAN Routing Capability

- One(1) Module Slots for Radio Interface (E&M, etc)

- VoIP Codec : G.711/G.726/G.723/G.729, VAD, etc

- Powerful Network Protocols (PPPoE, DHCP, Static Routing, etc)

- IPv4/IPv6 Dual Stack Support

- SIP/H.323 Dual Concurrent Signaling Protocols

- TLS/SRTP VoIP Secure Protocol Support (AES, 3DES, etc)

- Firmware Upgradeable Architecture

- Advanced Voice QoS Mechanism
- Powerful Web based Management
- RS232C Port Support for Command Line Interface

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Hardware Specification

AP-LMR1000 LMR Gateway

- RISC Microprocessor Computing Power

- Main Chassis

    - Network Interface

        - Two(2) 10/100Mbps Fast Ethernet

        - One(1) RS-232C Console (RJ45)

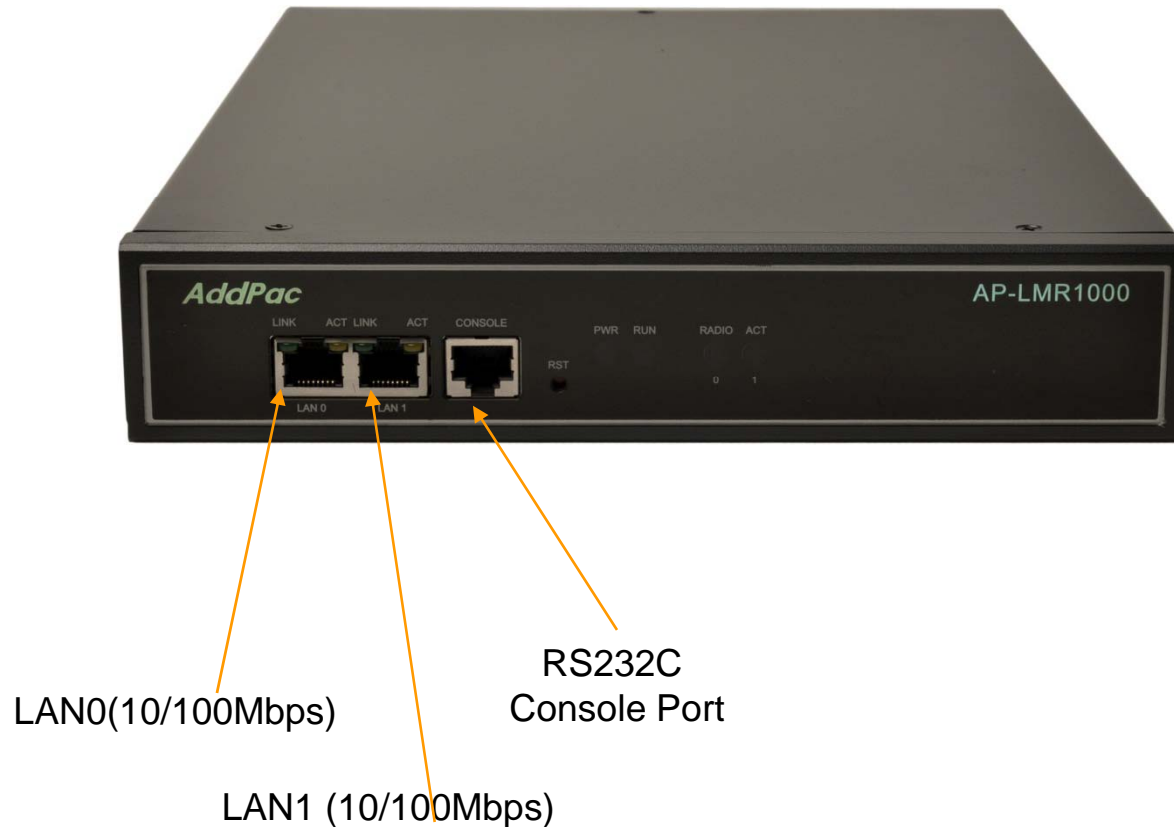   - One(1) Radio Module Slots for E&M, etc

    - Internal Power Supply

Hardware Specification

AP-LMR1000 LMR Gateway

AP-LMR1000 Front Side

LAN0(10/100Mbps)
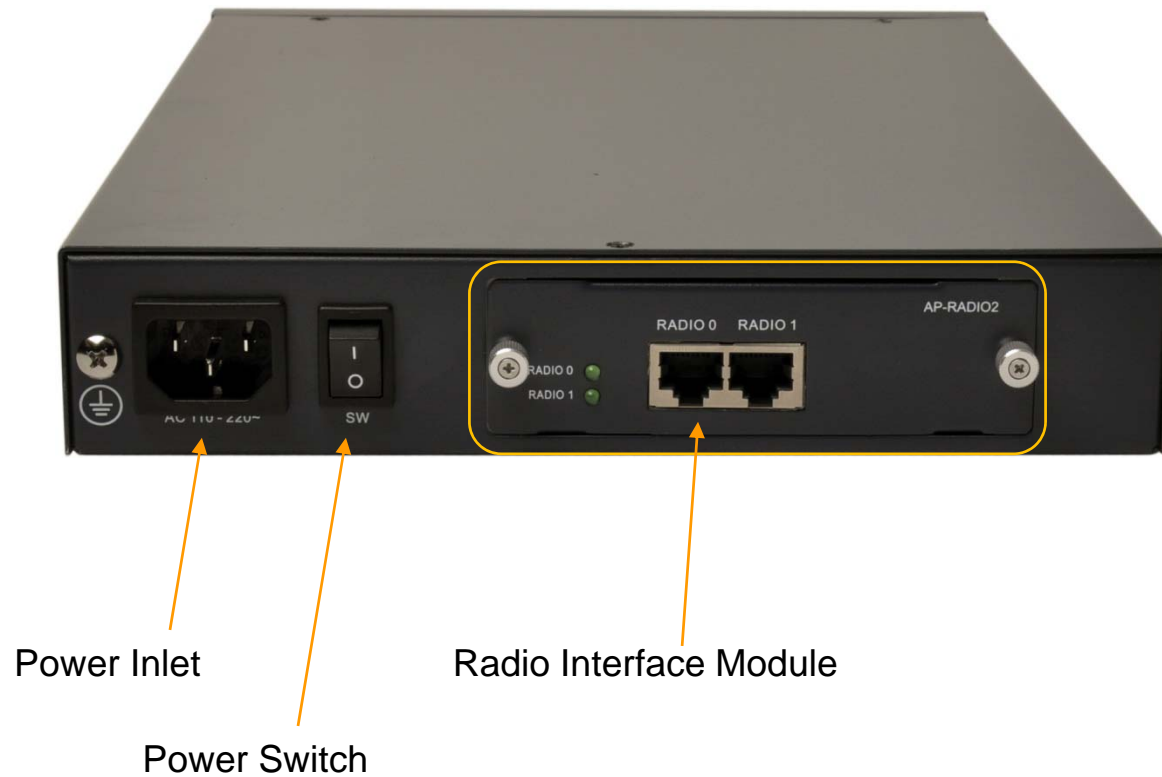
LAN1 (10/100Mbps)

RS232C
Console Port

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Hardware Specification

AP-LMR1000 LMR Gateway

AP-LMR1000 Back Side

Power Inlet

Radio Interface Module

Power Switch

Thank you!

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