SIEMENS

SIMATIC NET

**Industrial Ethernet Wireless LAN
Radio Link Module RLM**

Manual

for 6GK1110-1AA00

**C79000-G8976-C170-01
Release 11/2001**

Disclaimer

We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcome.

Classification of Safety-Related Notices

This document contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:

i | **NOTE:**

Highlights important information on the product, using the product, or part of the documentation that is of particular importance and that will be of benefit to the user.

⚠ **WARNING:**
Indicates that death or severe personal injury can result if proper precautions are not taken.

⚠ **CAUTION:**
with warning triangle Indicates that minor personal injury can result if proper precautions are not taken.

CAUTION:

without warning triangle indicates that damage to property can result if proper precautions are not taken.

Trademarks

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Third parties using for their own purposes any other names in this document which refer to trademarks might infringe upon the rights of the trademark owners.

Safety Instructions Regarding your Product

Before you use the product described here, read the safety instructions below thoroughly.

Qualified Personal

Only qualified personnel should be allowed to install and work on this equipment . Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct use of Hardware Products

Please note the following regarding the correct usage of hardware products:

Caution

This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

Before you use the supplied sample programs or programs you have written yourself, make certain that no injury to persons nor damage to equipment can result in your plant or process.
EU Directive: Do not start up until you have established that the machine on which you intend to run this component complies with the directive 89/392/EEC.

Prior to Startup

Before putting the product into operation, note the following warning:

Caution

Before installation and startup, read the instructions in the appropriate documentation. For ordering data of the documentation, please refer to catalogs or contact your local Siemens representative.

Preface

Purpose of the Operating Instructions

These Operating Instructions support you when configuring, commissioning, and troubleshooting networks including the Industrial Ethernet Wireless LAN Radio Link Module RLM.

The Package

Verify kit contents as described in chapter "2.2 Verify Kit Contents" (page 17).

Mounting the RLM

Follow the instructions in chapter "2 Install the AccessPoint RLM" (page 16).

Further Documentation

Please consult the Industrial Ethernet Wireless LAN manuals.

- Basics
- CP 1515
- RLM Manager, CP 1515 Manager.

The manual "SIMATIC NET Industrial Ethernet Twisted Pair and Fiber Optic Networks" is containing information on other SIMATIC NET products that you can operate in conjunction with RLM in an Industrial Ethernet network.

All manuals are provided on the CD-ROM "SIMATIC Net Wireless LAN, Systemsoftware and Manuals" that was included with your product.

Guide to the Manual

To help you to find specific information quickly, these operating instructions include the following parts:

- At the front of the operating instructions you will find a complete table of contents.
- In the Manual "Industrial Ethernet Wireless LAN, Basics" you will find a Glossary in which the most important specialist terms used in the instructions are defined.
- At the back of the operating instructions, you will find an index with which you can find topics quickly.

Audience

These Operating Instructions are intended for persons involved in configuring, commissioning, and troubleshooting networks including the RLM.

Personnel Qualification Requirements

Only qualified personnel should be allowed to install and work on this equipment.

Qualified personnel as referred to in the operating instructions or in the warning notes are defined as persons who are familiar with the installation, assembly, startup and operation of this product and who possess the relevant qualifications for their work, e.g.:

- Training in or authorization for connecting up, grounding or labeling circuits and devices or systems in accordance with current standards in safety technology;
- Training in or authorization for the maintenance and use of suitable safety equipment in accordance with current standards in safety technology;
- First Aid qualification.

Standards and Approvals

The RLM meets the requirements for the CE mark. For more detailed information about approvals and standards, refer to the manual "Industrial Ethernet Wireless LAN, Basics."

Contents

1 Welcome

1.1 Introducing SIMATIC NET Industrial Wireless LAN

Welcome to the SIMATIC NET Industrial Wireless LAN, the easy way to wireless computing. Building your wireless network has never been easier.

This document introduces you to the Access Point "Radio Link Module (RLM)," and will help you to get your network "on the air" very quickly. It describes the most common configurations and a quick start set-up.

To install and manage SIMATIC NET products, it is assumed that you have a working knowledge of installation procedures for network operating systems under Microsoft Windows.

1.2 About the AccessPoint RLM

The Radio Link Module RLM is a wired to wireless bridge that you can use to connect wireless cells to one another or to a wired (Ethernet) Local Area Network (LAN). The RLM can serve mobile wireless stations, roaming between various locations within a network premises.

Figure 1   Multiple Cell Network

Network Name
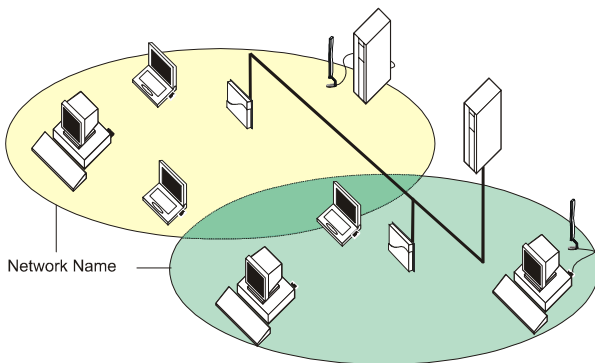
The RLM is a modular unit with an integrated Ethernet interface, and two PC Card slots for using your access point with one or two wireless PC Cards CP 1515.

About the AccessPoint RLM

With two CP 1515 the unit can transmit at different channels. This allows you to load balance a heavily used access point and increase the scalability of the wireless LAN.

To install the RLM, you need at least one PC Card. This card is not included with your kit, but must be ordered as an additional item.

i **NOTE:**

If you use your RLM with two PC Cards CP 1515, you must use at least one Range Extender Antenna and place it at a distance of at least 1.5 meters from the RLM.

1.3 Finding Information

This document was designed to give you a brief introduction about the RLM, and the most important information to get it up and running.

When you install the RLM Manager program, you can display context-sensitive help with each screen by clicking the '?' button on your screen, or pressing the ⌨F1 key on your keyboard.

You can use the "Industrial Ethernet Wireless LAN RLM Manager, CP 1515 Manager" to find detailed information on how to:

- Design a wireless network.
- Setup a LAN administrator station.
- View and modify the start-up configuration of your RLM.
- Monitor and optimize the performance of your wireless network.
- Troubleshoot unexpected performance.

Additional Information (e.g. regulatory information) can be found in the other manuals.

2 Install the AccessPoint RLM

2.1 Overview

Before you start, carefully read the "Industrial Ethernet Wireless LAN" manuals which are included in your RLM kit. This manuals contain installation requirements and important information about using this product.

Installing the RLM is easy. Follow the steps below to power up your wireless network:

1. Verify Kit Contents.
2. Write Down Product Identification.
3. Fix Mounting Plate and Power Supply.
4. Mount the Processor Module and fix with angle iron.
5. Connect the Network Interfaces.
6. Mount the Cover Plate.
7. Power up your RLM to start operation.

2.2   **Verify Kit Contents**

Unpack the RLM and verify that all items are present as pictured in Figure 2.

Figure 2   Kit Contents
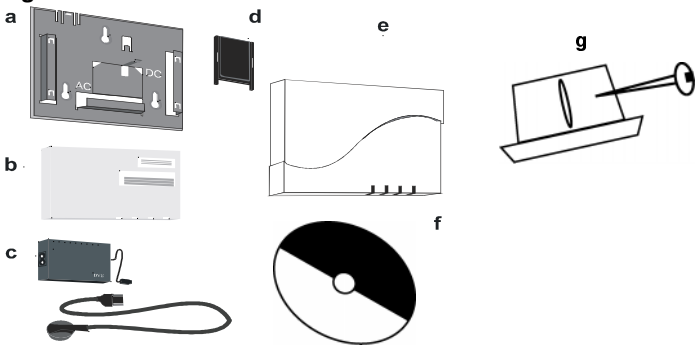
a. Mounting plate to mount the RLM to a wall (see 2.4 Fix Mounting Plate and Power Supply).

b. RLM processor module (see 2.5 Mount the Processor Module and fix with angle iron).

c. Power supply & AC power cord (see 2.4 Fix Mounting Plate and Power Supply).

d. Slot Protector Card (see 2.6 Connect the Network Interfaces).

e. Cover plate (see 2.7 Mount the Cover Plate).

f. CD-ROM containing software and electronic documentation.

g. Angle iron.

2.3 Write Down Product Identification

Before you proceed, write down the following values as printed on the identification label on the top right side of the processor module of your RLM.

Serial Number	S/N
MAC Address	
Ethernet Interface	
Wireless Interface	

Figure 3   RLM Identification Label


```
P/N aaa-aaaaaaa b
Comcode ccccccccc
Eth. MAC Add. dddddddddddd
S/N yyUTmmppxXXX T/N jmmnnnnn
```
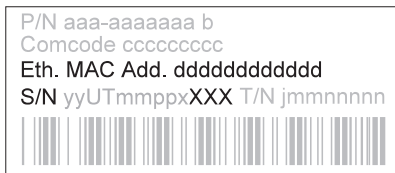
You are also advised to write down the Serial Number and MAC Address of the PC Card(s) that you use with your RLM.

This information is printed on a small label at the backside of the PC Card.

2.4 Fix Mounting Plate and Power Supply

You can mount the RLM on a vertical surface like a wall or place the unit on a flat surface such as a table or cabinet.

Prior to mounting it to a fixed location, consider performing a site survey to determine optimal and safe placement for your RLM(s). See also Installation Requirements (page 30), and Best Place for the RLM (page 30).

1. Fix the mounting plate of the RLM as pictured in Mounting the Power Supply (page 20), with the marked arrow pointing upwards. Use the screws and plugs provided.

⚠ **WARNING:**

In environments where the unit will be exposed to vibrations use the angle iron to protect the processor module against sliding off the mounting plate, causing severe personal injury and/or damage to your SIMATIC NET equipment.

Fix Mounting Plate and Power Supply

Figure 4   Mounting the Power Supply
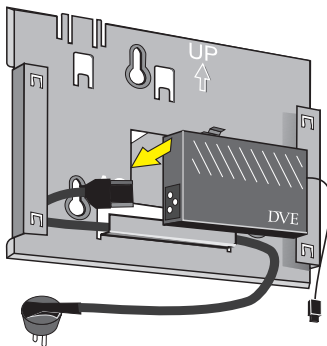
2. Connect the AC power cord to the power supply unit.
3. Place the power supply unit at the mid section of the mounting plate as pictured in Figure 4 Mounting the Power Supply.
4. Use tie-wraps to secure the power cord to the small loops on the mounting plate at the position where the cords will leave the unit.

2.5 Mount the Processor Module and fix with angle iron

1. Connect the DC power cable to the DC power inlet of the processor module.
2. Slide the four recesses of the processor module over the corresponding tabs on the mounting plate (see Figure 5 Attaching the Processor Module).
3. Press firmly to assure the processor module is properly attached.
4. Use the metal bracket supplied to secure the processor module to the mounting plate. Use the fixing screw at the top of the mounting plate to secure the metal bracket.

Mount the Processor Module and fix with angle iron

Figure 5   Attaching the Processor Module
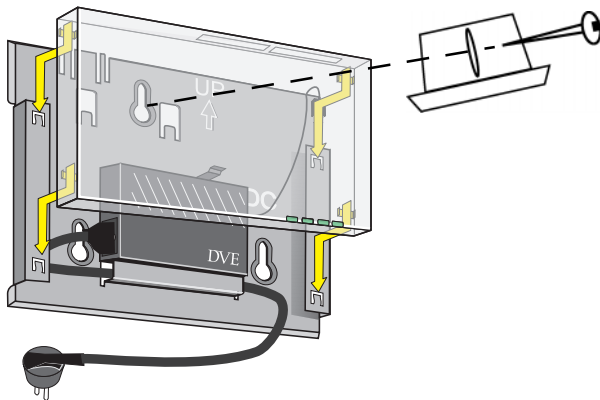
⚠ **CAUTION:**
Before you proceed: Verify that all four recesses are fitted correctly onto the corresponding tabs of the mounting plate. Use the angle iron to fix the processor. If the processor module is not properly seated and not fixed with the angle iron, it may drop causing severe personal injury and/or causing serious damage to the RLM unit.

2.6   Connect the Network Interfaces

1. Insert your PC Card(s) into the processor module.

   One PC Card slot of the RLM is equipped with a plastic Slot Protector Card. The purpose of this card is to protect the unit from dust when it is used with a single PC Card. Only when you intend to install two PC Cards, take out the Slot Protector Card. You are advised to keep the Slot Protector Card for situations when you would like to change the hardware configuration in the future.

Figure 6   Inserting the PC Card
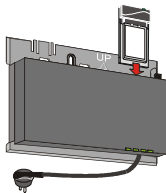
2. Connect your Ethernet cable to the 10/100Base-T Ethernet interface. Use tie-wraps to secure the Ethernet cable to the small loops on the mounting plate at the position where the cable will leave the unit.

2.7   Mount the Cover Plate

1. Position the latches at the inside of the cover underneath the rim at the bottom of the processor module (see arrow-1 in Figure 7 Mounting the Cover Plate).

Figure 7   Mounting the Cover Plate
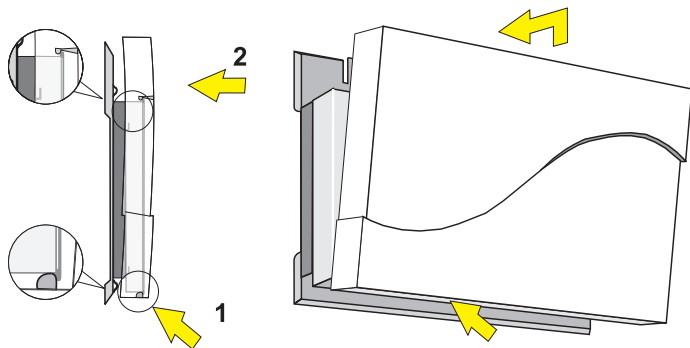
2. Gently press the top of the cover plate towards the unit until it clicks (see arrow-2 in Figure 7 Mounting the Cover Plate).
3. Verify that the unit is properly seated.
4. Power up the device as described on 2.8 Power up your RLM to start operation.

2.8 Power up your RLM to start operation

To power up the RLM, connect the unit to a grounding type AC wall-outlet (100-240 VAC) using the standard power cord as supplied with the unit.

Placement must allow for easily disconnecting the unit from the AC wall-outlet.

When powered on, the unit will perform start-up diagnostics characterized by a LED sequence. The LEDs will change color in the range Amber, Red and Green. When finished (after about 60 seconds), the device will start bridging operation characterized by the LED activity as listed in Table 1.

Table 1 LED Activity Table

LED Definition		Activity	Description
①	Power	Green	Power enabled
•—•	Ethernet	Flicker Green	Ethernet LAN activity
⌒A	Wireless interface A	Flicker Green	Wireless LAN activity
⌒B	Wireless interface B	Flicker Green	Wireless LAN activity

LED activity will only occur when there is network activity on the corresponding RLM network interface.

If the RLM does not switch to normal operation within two minutes, please consult the troubleshooting section of the "Industrial Ethernet Wireless LAN RLM Manager, CP 1515 Manager" (see 1.3 Finding Information).

3 Using the AccessPoint RLM

3.1 Connect Stations to the RLM

When powering up the RLM for the first time, your RLM is ready for use.

The unit will start bridging operation using the parameters as listed in chapter RLM Start-up Configuration (page 44).

This mode enables you to connect wireless computers to your RLM, provided that they have been configured to use parameter values that match the configuration of your RLM.

To connect stations to a brand new RLM:

- Set the configuration profile of the wireless client stations to connect to an "**Access Point**."
- Set the Network Name to "**ANY**."
- Leave Encryption disabled.

For more information, please refer to the "Industrial Ethernet Wireless LAN CP 1515" manual provided on the CD-ROM that was included with your product.

3.2 Customize your RLM

When setting up the Access Points (RLMs) for the first time you will need to verify the TCP/IP settings of the LAN administrator station and Access Point RLM.

You need an IP address for your CP1515 in the LAN administrator station and an IP address for the Access Point RLM.

There are two ways to get an IP address:

- the CP1515 or RLM IP address is configured as "Obtain an IP address automatically" via DHCP. Your LAN admistrator has to configure the DHCP server with the MAC address of the CP1515 and RLM.

- you can set the IP adresses manualy. You must order the korrect IP adresses from your LAN administrator.

(see also manual "Industrial Ethernet Wireless LAN, RLM Manager, CP 1515 Manager", section "About IP Addresses and Subnets").

You can use the RLM Manager to configure and/or monitor your RLM.

3.2.1 Install the RLM Manager Software

1. Insert the SIMATIC NET Wireless LAN CD-ROM in the CD-ROM player of your computer.

   Your operating system will automatically start the CD.

2. Follow the instructions on your screen.

i   **NOTE:**

   If the CD-ROM does not start automatically:

   1. Insert the SIMATIC NET Wireless LAN CD-ROM in the CD-ROM player
   2. Click the Windows Start button
   3. Select Run
   4. Browse to the CD-ROM
   5. Double click the file "Setup.exe"

Previously installed versions of the software will be replaced automatically. The installation program will not delete or overwrite back-ups of configuration files that you might have created with a previous version of the program.

Select a network computer that satisfies the following requirements:

- A Pentium II/266 MHz or faster processor.
- Free disk space of 4 Mb.
- 64 Mb RAM (128 Mb or more recommended).
- Microsoft Windows 98 / ME / 2000 / NT 4.0 operating system.
- Ethernet interface card, or CP 1515 PC Card.
- CD-ROM player.
- TCP/IP protocol installed.

3.3   Installation Requirements

Placement of the RLM must satisfy the following installation requirements:

*   Connect the unit to a grounding type AC wall outlet (100-240 VAC) using the standard power cord as supplied with the unit.
*   Placement must allow for easily disconnecting the unit from the AC wall-outlet.
*   Do not cover the unit, or block the airflow to the unit with any other objects. Keep the unit away from excessive heat and humidity and keep the unit free from vibration and dust.
*   Installation must at all times conform to local regulations.

3.4   Best Place for the RLM

The integrated antennas of PC Cards perform best in an open environment with as few obstructions as possible. To ensure the best performance:

*   Place the RLM as high and as centrally as possible (relative to the wireless stations in the vicinity).
*   Do not conceal the integrated antennas of the PC Card(s).

3.5   Remove the Cover Plate

Removing the cover plate of the RLM may be required in the following situations:

- changing or replacing the PC Card(s), or
- getting access to the 'Reboot' and/or 'Forced Reload' buttons on the processor module.

To remove the cover plate:

1. Place your hands on the cover as pictured Figure 8 Remove the Cover Plate.
2. Gently pull the top of the cover towards you to release the latches (located inside the cover).
3. Lower the cover to remove it from the processor module.

Figure 8   Remove the Cover Plate
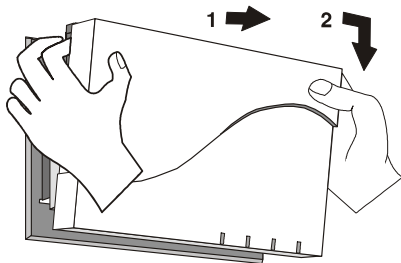
4 Troubleshooting

4.1 Connecting the RLM to an OMC

To connect the RLM 10/100BASE-T Ethernet interface to an SIMATIC NET Optical Media Converter OMC (6GK1100-2AB00 or 6GK1100-2AC00), the RLM Ethernet interface must be configured to 100 Mbit/s. If the RLM is operating in default mode (auto negotiation), a function block will occur when activating the RLM with a connected OMC.

4.2 Roaming via multiple RLMs on a switched LAN

Switched LANs operate by switching the connection paths for each data packet based on the target address. Data packets are only routed through segments leading directly to the target. Switches such as SIMATIC NET OSM and ESM are used for switching connection paths. The switch operates in self-learning mode to create an allocation table of Ethernet (MAC) addresses to the output port.

Any mobile users connected to a switched LAN via RLMs will also have access to switched communication paths. If a mobile user is roaming (switches from one radio cell to another), the switches must activate another communication path. Information on the new coverage area can only

be obtained through messages sent from the user to the corded LAN via the new RLM.

Until this occurs, messages from the switched LAN are still forwarded to the mobile user along the previous communication path. The mobile user can no longer be contacted via this route, however.

In the case of a switched transmission (ISO or ISO on RFC1006 protocol), this interruption can last for up to 10 seconds. With non-switched transmission, the switch "ageing time" determines the downtime of the transmission in the transmission path. The ageing time determines how long an address should be stored in the switch address table. If the ageing time for an address expires before the switch has recognised a message with the associated source address, this address is deleted from the address table. Any future messages sent to this address are distributed to all switch ports (the exact transmission path is unknown). The ageing time of SIMATIC NET OSM/ESM is parameterisable and ranges from 40 to 80 seconds. The ageing time should be assigned a low value in order to minimise interruption times.

5 Further Support

5.1 Who to contact

If you have technical questions about using the described product and your problem is not dealt with in the documentation or in the integrated help system, please contact your Siemens representative or dealer.

You will find the addresses:

- in our catalog IK PI or CA01
- on the Web (http://www.siemens.com/simatic-net)

5.2 Automation and Drives, Service & Support

Service & Support from A&D is available round the clock worldwide.

The languages spoken are German and English.
French, Italian, and Spanish are also spoken on the authorization hotline.

Figure 9   Service and Support

Automation and Drives, Service & Support

Technical Support	Authorization Hotline
Europe and Africa (Nuremberg)	**Europe and Africa** (Nuremberg)
Mo. to Fr. 7:00 to 17:00 (local time, GMT +1)	Mo. to Fr. 7:00 to 17:00 (local time, GMT +1)
Phone:+49 - (0) 180 - 5050 - 222	Phone:+49 - (0) 911 - 895 - 7200
Fax:+49 - (0) 180 - 5050 - 223	Fax:+49 - (0) 911 - 895 - 7201
E-mail:techsupport@ad.siemens.de	E-mail:authorization@nbgm.siemens.de
America (Johnson City)	
Mo. to Fr. 8:00 to 19:00 (local time, GMT -5)	
Phone:+1 - (0) 423 - 262 - 2522	
Fax:+1 - (0) 423 - 262 - 2231	
E-mail:simatic.hotline@sea.siemens.com	
Asia and Australia (Singapore)	
Mo. to Fr. 8:30 to 17:30 (local time, GMT +8)	
Phone:+65 - (0) 740 - 7000	
Fax:+65 - (0) 740 - 7001	
E-mail:simatic.hotline@sae.siemens.com.sg	

SIMATIC Premium Hotline	
Worldwide (Nuremberg) Workdays 0:00 to 24:00 (local time, GMT +1) Phone:+49 - (0) 911 - 895 - 7777 Fax:+49 - (0) 911 - 895 - 7001 E-mail:techsupport@ad.siemens.de	Fast callback guaranteed within a maximum of two hours (charged, only with the SIMATIC Card)

5.3   Service & Support on the Internet

On the World Wide Web, you will find the very latest information on the entire SIMATIC product range, for example, answers to frequently asked questions (FAQs), Tips and Tricks, software updates, and user information.

In addition to this free information, you can also order the following, for which a charge is made:

- Software products
- Sample application programs

These are charged to the SIMATIC CARD.

Internet address:

http://www.siemens.de/automation/service&support

You can also formulate a question for the SIMATIC Knowledge Manager that will find the solution in the knowledge database.

If you are working in an area without an online connection, part of the free information area is available on the "SIMATIC Customer Support Knowledge Base" CD.

5.4   Training for SIMANTIC NET

Who to Contact about Training Courses:

Siemens AG
Trainings-Center für Automatisierungs- und Antriebstechnik
A&D PT 49 Kursbüro

Östliche Rheinbrückenstraße 50
76181 Karlsruhe
Germany

Phone:	+49 - (0) 721 - 595 - 2917
Fax:	+49 - (0) 721 - 595 - 6087
Internet:	http://www.sitrain.com

5.5 Certification

The products of SIMATIC NET are manufactured and marketed using a quality management system complying with DIN ISO 9001 and certified by DQS (certificate registration no. 2613). The DQS certificate is recognized in all IQNet countries (Reg. No. 2613).

A   Specifications

A.1   Hardware

Physical specifications	
Dimensions (hxwxl)	5x18.5x26 cm
Weight	1.75 kg
Power cord length	2.5 meter
Electrical specifications	
Voltage	100-240 V AC, (47-63 Hz)
Current	0.2 A
Power consumption	20 Watt
Temperature and Humidity (no condensing)	
Operating	0° to 40° C 20 to 80%
Storage	-40° to 60° C 15 to 95%
Transit	-10° to 50° C 10 to 90%
Network interfaces	
Ethernet interface	10/100Base-T RJ 45 female socket
Wireless interface	2 x PC Card Type II slots for PC Cards
Serial interface	RS232 Connector (will be supported in a future release)

A.2 Software

wpntxxx.bin	Factory installed operating software for the RLM. This software, that is loaded into the FlashROM of the access point, controls its features and functions. The 'xxx' in the file name refer to the version level of the software. When new features and functionality become available, you can upgrade the RLM by uploading the latest software as described in the "Industrial Ethernet Wireless LAN RLM Manage, CP1515 Manager."
wman_ap.exe	RLM Manager configuration and management software for RLMs. This software runs on Windows 98/2000/ME and Windows NT (v4.0).

A.3 Regulatory Information

Wireless communication is often subject to local radio regulations. Although wireless networking products have been designed for operation in the license-free 2.4 GHz band, local radio regulations may impose a number of limitations to the use of wireless communication equipment.

i	**NOTE:**

For more regulatory information that may apply in your country refer to the manual "Industrial Ethernet Wireless LAN Basics."

B RLM Start-up Configuration

Your AccessPoint RLM comes with the access point operating software factory installed. Together with this software, the access point has also been loaded with a factory-set configuration, that allows for 'out-of-the box' operation.

> **i** | **NOTE:**
>
> The 'factory-set' configuration should not be confused with a 'default' configuration. For example, the device will NOT return to the 'factory-set' configuration, but to the 'default' configuration, when performing a 'reboot' or 'forced reload' (as described in the "Industrial Ethernet Wireless LAN RLM Manager, CP 1515 Manager" provided on the CD-ROM).

To connect to a RLM, the parameters of each wireless station should be configured to match the values as identified for the RLM.

- When powering up the access point for the very first time, these values should match the values listed in Table a Factory-set Start-up Configuration.

- For normal operation these values should match the ones you identified when configuring the access point. You are advised to record this information on the Access Point Configuration Record in this appendix.

- When you set the Access Point RLM to 'forced reload mode' these values should match the settings listed in the "Industrial Ethernet Wireless LAN RLM Manager, CP 1515 Manager."

i	**NOTE:**

Consult the "Industrial Ethernet Wireless LAN RLM Manager, CP 1515 Manager" for detailed troubleshooting hints and procedures.

Table a   Factory-set Start-up Configuration

RLM identifiers	
IP Address	153.69.254.254
Subnet Mask	255.255.0.0
Read Password	public
Read/Write Password	public
Wireless Interface	
Network Name	WaveLAN Network
Encryption	Disabled
RTS/CTS Medium Reservation	Disabled
Multicast Rate	Auto select 1-2 Mbit/s

When installing multiple RLMs, each unit should have a unique IP Address. In environments with DHCP or BOOTP services, this address will be assigned automatically.

If your network does not provide DHCP or BootP services, change the IP address of each RLM into a unique address value using the RLM Manager tool.

Access Point Configuration Record

Common Parameters

Wireless Network

Network Name:
_____

Access Control

Access Control ☐ Enabled
Table File Name: _____
RADIUS server ☐ Enabled

SNMP

System Location: _____
IP Subnet Mask: _____
Read Password: _____
Read/Write Password: _____

Access Point   Unique Identifiers

Serial Number	MAC Address	IP Address	IF	Frequency	Device Location	Date Installed	Configuration File
			☐E ☐A ☐B				
			☐E ☐A ☐B				
			☐E ☐A ☐B				
			☐E ☐A ☐B				
			☐E ☐A ☐B				
			☐E ☐A ☐B				
			☐E ☐A ☐B				
			☐E ☐A ☐B				

Industrial Ethernet Wireless LAN Radio Link Module RLM
C79000-G8976-C170-01