APPLIED WIRELESS ID

SENTINEL-SENSE MPR-1910

Installation & Operation Manual-041396

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AWID

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FCC COMPLIANCE

You are cautioned that changes or modifications not expressively approved by the party responsible for compliance could void you authority to operate the equipment.

FCC RF Radiation Exposure Statement:
1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Information for OEM integrator:
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user manual of the end product. The user manual which is provided by OEM integrators for end users must include the following information in a prominent location.
“To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. If the end product integrating this module is going to be operated in 5.15 ~5.25GHz frequency range, the warning statement in the user manual of the end product should include the restriction of operating this device in indoor could void the user’s authority to operate the equipment.”

Label for end product must include “Contains FCC ID: OGSMPR1910” or “A RF transmitter inside, FCC ID: OGSMPR1910”.

The user is cautioned that this device should be used only as specified within this manual to meet RF exposure requirements. Use of this device in a manner inconsistent with this manual could lead to excessive RF exposure conditions.

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NOTE: READ AND USE THIS MANUAL.

NOTE: FAILURE TO FOLLOW THE INSTALLATION GUIDE MAY RESULT IN POOR PERFORMANCE OR EVEN CAUSE PERMANENT DAMAGE TO THE READER, THUS VOIDS THE PRODUCT WARRANTY.

REVISION HISTORY

Version No.	Revised By	Date	Sections Affected	Remarks
0.1	E. Wei	10/2008	-	Initial version
0.2	E. Wei	7/2009	-	Engineering review update
0.3	E. Wei	9/2009	p. 2	Compliance section added

INTRODUCTION

AWID's Sentinel-Sense MPR-1910 is a long-range (up to 20 feet) Radio Frequency IDentification (RFID) reader module with 3.3 V TTL logical interface that works with most leading passive UHF passive tags. The reader module comes with a unique combination of long read range, small size, and low power consumption. Its primary applications are asset management and tracking, and fleet management applications.

MPR-1910 is delivered with Firmware Version such as 25.xx.xx.

In order to operate an MPR-1910 you will need the following:

- PC running Windows[1] 2000 or higher, CD-ROM drive
- Host software (AWID's demo software or your own custom software)

1.1 SPECIAL FEATURES

- Multi-Protocol: ISO-18000-6 Type B/C, EPC Class 1 Gen 2
- Thin passive tags with long-range performance
- 3.3 V (5.0V tolerable) Serial TTL logical interface

[1] Though MPR-1910 can also be controlled from a non-Windows programming platform, AWID demo and FW upgrade programs are applications to run in Windows.

2 SPECIFICATIONS

Input voltage	+4.5 VDC to +6.3 VDC (suggested: +6.0 VDC)
Input current	1.5 A typical in transmit
Protocol language	ISO Type B/C, EPC Class 1 Gen 2
Read range	Depends on type & size of labels used
Output power	+30 dBm max
Transmit frequency	902.60-927.40 MHz
Receiver frequency	902.60-927.40 MHz (Amplitude Modulated)
Hopping channels	125 Channels
Channel spacing	200 kHz
Hopping sequence	Pseudo random
Operating temperature range	-30° C to +55° C (-22° F to 131° F)
Output data formats	3.3V TTL Serial
I/O Connector	10-pin ZIF
Dimension	2.11”x3.31”x0.35”

2.1 CHANNEL FREQUENCY TABLE

Frequency range: 902.60 ~ 927.40 MHz

Minimum number of frequency channels: 125

CH	902~928	MHz	CH	902~928	MHz	CH	902~928	MHz	CH	902~928	MHz	CH	902~928	MHz
0	902.60	MHz	25	907.60	MHz	50	912.60	MHz	75	917.60	MHz	100	922.60	MHz
1	902.80	MHz	26	907.80	MHz	51	912.80	MHz	76	917.80	MHz	101	922.80	MHz
2	903.00	MHz	27	908.00	MHz	52	913.00	MHz	77	918.00	MHz	102	923.00	MHz
3	903.20	MHz	28	908.20	MHz	53	913.20	MHz	78	918.20	MHz	103	923.20	MHz
4	903.40	MHz	29	908.40	MHz	54	913.40	MHz	79	918.40	MHz	104	923.40	MHz
5	903.60	MHz	30	908.60	MHz	55	913.60	MHz	80	918.60	MHz	105	923.60	MHz
6	903.80	MHz	31	908.80	MHz	56	913.80	MHz	81	918.80	MHz	106	923.80	MHz
7	904.00	MHz	32	909.00	MHz	57	914.00	MHz	82	919.00	MHz	107	924.00	MHz
8	904.20	MHz	33	909.20	MHz	58	914.20	MHz	83	919.20	MHz	108	924.20	MHz
9	904.40	MHz	34	909.40	MHz	59	914.40	MHz	84	919.40	MHz	109	924.40	MHz
10	904.60	MHz	35	909.60	MHz	60	914.60	MHz	85	919.60	MHz	110	924.60	MHz
11	904.80	MHz	36	909.80	MHz	61	914.80	MHz	86	919.80	MHz	111	924.80	MHz
12	905.00	MHz	37	910.00	MHz	62	915.00	MHz	87	920.00	MHz	112	925.00	MHz
13	905.20	MHz	38	910.20	MHz	63	915.20	MHz	88	920.20	MHz	113	925.20	MHz
14	905.40	MHz	39	910.40	MHz	64	915.40	MHz	89	920.40	MHz	114	925.40	MHz
15	905.60	MHz	40	910.60	MHz	65	915.60	MHz	90	920.60	MHz	115	925.60	MHz
16	905.80	MHz	41	910.80	MHz	66	915.80	MHz	91	920.80	MHz	116	925.80	MHz
17	906.00	MHz	42	911.00	MHz	67	916.00	MHz	92	921.00	MHz	117	926.00	MHz
18	906.20	MHz	43	911.20	MHz	68	916.20	MHz	93	921.20	MHz	118	926.20	MHz
19	906.40	MHz	44	911.40	MHz	69	916.40	MHz	94	921.40	MHz	119	926.40	MHz
20	906.60	MHz	45	911.60	MHz	70	916.60	MHz	95	921.60	MHz	120	926.60	MHz
21	906.80	MHz	46	911.80	MHz	71	916.80	MHz	96	921.80	MHz	121	926.80	MHz
22	907.00	MHz	47	912.00	MHz	72	917.00	MHz	97	922.00	MHz	122	927.00	MHz
23	907.20	MHz	48	912.20	MHz	73	917.20	MHz	98	922.20	MHz	123	927.20	MHz
24	907.40	MHz	49	912.40	MHz	74	917.40	MHz	99	922.40	MHz	124	927.40	MHz

Table 1 Channel Frequency Table for MPR-1910

2.2 CONNECTOR PIN ASSIGNMENT

Pin	Function	Pin	Function
1	GPI	6	GND
2	GPO2	7	Unit Enable
3	GPO1	8	SCIR
4	+6.0 V	9	SCIT
5	+6.0 V	10	GND

2.3 MEASURING READ DISTANCE

Make sure you know the tag types. For certain readers and tags, user must also be mindful of the tag's orientation and the reader's antenna orientation, what mounting surface the tags are designed for and how the tags are supposed to be mounted. Any departure from its intended purpose will drastically affect the reader's ability to energize the tag and its read range.

When measuring the reader's read range, make sure that the tag is properly oriented to the reader antenna, and for optimum performance, be sure the operator's finger is not within three (3) inches of the tag's antenna surface.

3 INSTALLATION & OPERATION GUIDELINES

For ease of explanation, MPR reader in this section refers to an RFID device that consists of MPR-1910 and a high performance circular polarized antenna inside a splash proof, UV stabilized housing case. The module should be installed on a heat sink. Example of a heat sink could be an aluminum plate of size 8”x8”x0.1” exposed to convection air flow. The screws at the bottom of module shall be used for mounting the module on the heat sink.

3.1 GENERAL WIRING REQUIREMENTS

MPR-19xx requires 10-pin flat flex cable (FFC) to connect from the supply source. Avoid using long (e.g., 1” or longer) cables when connecting the unit from the power supply source.

INSTALLATION PROCEDURE

This section provides installation and operation information for MPR-1980 reader modules.

3.2 PARTS LIST

Verify that all items listed below are present before starting the installation.

- Sentinel-Sense MPR-1910 Qty=1
- Documentation and command demo program CD Qty=1

3.3 PREPARATION FOR INSTALLATION

Familiarize yourself with the connectors and pin out assignment of each I/O connectors.

3.3.1 Bench Top Verification

It is always a good idea to verify system operation before committing to a full-scale installation. The following are the necessary steps to test the reader's operation in a static environment.

- Connect MPR-1910 to the RS-232 port of a PC through the interface board provided in the demonstration kit
- Connect the power jack from the wall plug power supply to reader module
- Power up PC
- Install demo software on PC
- Activate demo software and verify performance of the reader.
- Select COM port 1 on top page then click "Connect". Follow with some commands.

4 SOFTWARE PROGRAMMING AND SYSTEM OPERATION NOTES

4.1 SYSTEM OPERATION

4.1.1 Running a Custom Software Application or the AWID Demo Program

If AWID Demo Program is not used, it is expected user will launch a Custom Software Application developed using the *MPR Serial Communication Protocol II* to issue commands to the MPR reader/module as specified.

4.1.2 Operating Modes

Typical operating modes for MPR readers can be grouped into the following modes:

Search Mode
This mode is used when operator or user is not certain what family of tags is placed on the items to be tracked. Since most tags are deterministic in nature, MPR reader must cycle through each and every protocol, issue a protocol specific inquiry, to hail and to wait for a response from tags of that specific protocol. Therefore, if there are many different protocols, for an untrained observer, the reader response will appear sluggish.

Mixed Mode
This mode assumes the user is aware of the types of protocol in use, and furthermore, the user made a determined effort to operate the reader in a mixed protocol mode. In this mode, the user can decide how many and which specific protocols to be selected. Once Mix Protocol Mode is selected, the reader will routinely cycle through each protocol, dwell long enough for the reader to wait for a response and then move on to the next protocol. It should be noted that in a mixed protocol mode, the tag must have sufficient time to respond to the reader, and therefore, it can only be used on a conveyor belt arrangement, with specific speed restrictions.

Single Protocol Mode
Single protocol is the normal mode of operation, where the protocol type is known and many tags are expected to pass through the readers.

4.2 USERS NOTE

For System Integrators and/or Software Developers
System Integrators and/or software developers should get familiar with the MPR Serial Communication Protocol II specifications for developing applications that control an MPR-1980.

For Custom System Users
For custom system user, please refer to your host software user guide for information regarding system and software operations

For Demo Software Users

If you are using the AWID RFID demonstration software application which is .NET based with easy-to-follow GUI operations, simply select the COM port for which the MPR-1910 is configured then click “Connect” should get you started.

5 MPR SERIAL COMMUNICATION PROTOCOL

See MPR Serial Communication Protocol Manual II - 041377