PS-1000 Wireless 802.11 Based Communications (WLAN)

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The PS-1000-EXP-WLAN (WiFi) provides communications based on the IEEE 802.11 standard using a Roving Networks RN171 WiFly module. WiFi is a trademark of the Wi-Fi Alliance, which restricts the use of the term Wi-Fi Certified to products that successfully complete interoperability certification testing. See the Roving Networks RN-171 module data sheet for approvals if needed.

The PS-1000 uses WLAN to denote the WiFi communications.

During normal operation, there is no indication on the controller/monitor display regarding the status of the WLAN communications. To access this information as well as the WLAN setup parameters, press and hold **PB1 & PB3** (while viewing the main screen) to access the WLAN menu. When the WLAN menu is accessed, the top line of the LCD display shows the basic state of the module, see below for a list of messages.

WLAN DEACTIVATED	The WLAN option is installed but deactivated via the CONNECT parameter under SETUP menu.
WLAN:CONN w/ TCP	The WLAN is connected to the network and is communicating via the TCP port.
WLAN:AUTH ERROR	The WLAN password/pass-code is invalid, but the net work has been found.
WLAN:CONN NO TCP	The WLAN is connected to the network, but the TCP port is not active.
WLAN:NOT CONN	The WLAN option is not connected to a network. The could be several reasons that are listed below.
HARDWARE FAILURE NO WLAN MODULE	The module was not detected by the LFC2000 CPU board.

Some reasons for not connecting to a network:

- In the case of the static IP mode: Wrong gateway setting, wrong subnet mask, or the IP is out of range for the network IP range.
- Invalid SSID
- Incorrect PASSword/passphrase.
- The signal strength is too low (check STATUS for a level).
- MAC address filtering (check under STATUS menu for the MAC address)

WLAN MENU

The WLAN menu has two choices: STATUS (PB4) & SETUP (PB1). This menu will time-out and the controller returns to the main screen. Press PB2 or PB3 to return to the main screen earlier than the screen time-out.

SETUP MENU

WARNING: When the SETUP MENU is chosen, the WLAN communication is interrupted (IP & TCP port). The WLAN communications will resume when the user exits this menu. If the remote computer (e.g., SCADA) was connected, it must re-establish communications with the controller/monitor, which may require a restart of the remote communications software.

Parameter: CONNECT

YES/NO Activates or deactivates the WLAN communications.

Parameter: IP MODE

Select one of two possible modes: STATIC and DHCP (Dynamic Host Configuration Protocol)

STATIC

The network IP address (IP), subnet mask (SM), and gateway (GW) are set manually.

DHCP (Dynamic Host Configuration Protocol)

The IP, SM, and GW are obtained from the router/switch. One can view these values under the WiFi STATUS menu.

Note: It is recommended to set the network to DHCP, at first, to establish communications (retrieve the assigned IP, GW, & SM under the STATUS menu) and then switch over to STATIC. Most industrial applications will use STATIC IP addresses.

Parameter: IP, Network address (Available when IP MODE = STATIC)

An Internet Protocol address (IP address) is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication. This parameter sets the STATIC internet address. The value is displayed in hexadecimal (the typical decimal dot notation cannot fit on the display).

Note: The IP is set automatically in the DHCP mode (IP MODE=DHCP) and is not available under the SETUP menu. One can view the assigned IP address under the WLAN STATUS menu.

ADJUSTING MULTI-BYTE PARAMETERS (IP, SM, and GW)

- Press ADJ to set each individual byte of the IP address.
- The display shows both the hexadecimal and decimal value of each byte. Use UP and DWN (down) to slew in the correct value.
- Press SEL (select) to choose a specific byte (-A thru -D).
- Press ENT (enter) to return to the parameter select menu.

Parameter: SM, subnet mask (Available when IP MODE = STATIC) Sets the SUBNET MASK value. It is entered the same way as the IP address.

A subnet mask is used to identify network address of an IP address by perfoming a bitwise AND operation on the netmask. A Subnet mask is a 32-bit number that masks an IP address, and divides the IP address into network address and host address. The lower byte of the IP address is the network address if the SM is 255.255.255.0 (FF.FF.F00).

Note: The SM is set automatically in the DHCP mode (IP MODE=DHCP) and is not available under the SETUP menu. One can view the assigned SM value under the WLAN STATUS menu.

Parameter: GW, gateway address (Available when IP MODE = STATIC) Sets the GATEWAY address. It is entered the same way as the IP address.

The gateway address (or default gateway) is a router interface connected to the local network that sends packets out of the local network.

Note: The GW is set automatically in the DHCP mode (IP MODE=DHCP) and is not available under the SETUP menu. One can view the assigned GW address under the WLAN STATUS menu.

Parameter: TCP PORT

Sets the TCP (transfer control protocol) port number (0 to 60000). One uses this port number to communicate over the assigned IP address. The default value is 2000. One can use telnet to communicate with the LFC by entering the IP address and the TCP port address in the communications program.

Parameter: SSID (service set identifier) Sets the primary name associated with an 802.11 wireless local area network (WLAN).

It is an alpha-numeric setting. The WLAN will not connect to the wireless network unless this parameter is set correctly.

Parameter: PASS (password/passphrase)

Sets the WLAN password. Most networks require a password. If the network is open, this parameter is ignored.

Parameter: DvID (DEVICE ID):

Sets the Device ID, which is a string of numbers and letters that can be used to identify, by name, a valve/controller.

Adjusting alpha-numeric string parameters.

- Press ADJ (adjust) to make adjustments to the string.
- Press NXT (next) to select a character and use UP and DWN (down) to adjust the character.
- Make sure the last character is "end." Press and hold DWN until "end" is displayed.
- Press ENT (enter) to return to the parameter select menu.

STATUS MENU

IMPORTANT: Selecting the STATUS will allow one to view the network address (IP), gateway address (GW), etc. Reading the status from the net work will briefly interrupt the LFC command set, so during this time (less than three seconds), the LFC will not respond to commands. However, the net work connection and TCP port should remain connected. The remote software should allow for this condition.

Some of the values listed are adjustable under the SETUP menu (depending on the IP mode). See SETUP menu parameter descriptions for more information about some of the parameters listed below.

NAME/PARM	VALUE DESCRIPTION
IP	Network address in hexadecimal byte representation.
TCP PORT	Port address for communications
SM	Subnet mask in hexadecimal byte representation.
GW	Gateway address in hexadecimal byte representation.
MAC	The unique MAC address, which is six bytes (in hexadecimal) in length.
SIGNAL	Signal strength of the wireless signal in dBm. This value is always negative. The lowest acceptable signal strength is -83dBm (as listed in the data sheet). This value is only valid when the WLAN is connected.
WLAN FW VER	Shows the firmware version of the WLAN module, which is not the same as the controller/monitor firmware version.

DECIMAL TO HEXADECIMAL CONVERSION CHART

Dec	Hex																														
0	00	16	10	32	20	48	30	64	40	80	50	96	60	112	70	128	80	144	90	160	AO	176	80	192	CO	208	DO	224	EO	240	FO
1	01	17	11	33	21	49	31	65	41	81	51	97	61	113	71	129	81	145	91	161	A1	177	B1	193	C1	209	D1	225	E1	241	F1
2	02	18	12	34	22	50	32	66	42	82	52	98	62	114	72	130	82	146	92	162	A2	178	B2	194	C2	210	D2	226	E2	242	F2
3	03	19	13	35	23	51	33	67	43	83	53	99	63	115	73	131	83	147	93	163	A3	179	83	195	C3	211	D3	227	E3	243	F3
4	04	20	14	36	24	52	34	68	44	84	54	100	64	116	74	132	84	148	94	164	A4	180	B4	196	C4	212	D4	228	E4	244	F4
5	05	21	15	37	25	53	35	69	45	85	55	101	65	117	75	133	85	149	95	165	AS	181	85	197	C5	213	DS	229	ES	245	F5
6	06	22	16	38	26	54	36	70	46	86	56	102	66	118	76	134	86	150	96	166	A6	182	B6	198	C6	214	D6	230	EG	246	F6
7	07	23	17	39	27	55	37	71	47	87	57	103	67	119	77	135	87	151	97	167	A7	183	B7	199	C7	215	D7	231	E7	247	F7
8	08	24	18	40	28	56	38	72	48	88	58	104	68	120	78	136	88	152	98	168	A8	184	88	200	C8	216	D8	232	E8	248	F8
9	09	25	19	41	29	57	39	73	49	89	59	105	69	121	79	137	89	153	99	169	A9	185	B9	201	C9	217	D9	233	E9	249	F9
10	0A	26	1A	42	2A	58	3A	74	4A	90	5A	106	6A	122	7A	138	8A	154	9A	170	AA	186	BA	202	CA	218	DA	234	EA	250	FA
11	OB	27	18	43	28	59	3B	75	4B	91	5B	107	6B	123	7B	139	8B	155	9B	171	AB	187	BB	203	CB	219	DB	235	EB	251	FB
12	0C	28	10	44	2C	60	3C	76	4C	92	5C	108	6C	124	70	140	80	156	90	172	AC	188	BC	204	CC	220	DC	236	EC	252	FC
13	OD	29	1D	45	2D	61	3D	77	4D	93	SD	109	6D	125	7D	141	8D	157	9D	173	AD	189	BD	205	CD	221	DD	237	ED	253	FD
14	OE	30	1E	46	2E	62	ЗE	78	4E	94	5E	110	6E	126	7E	142	8E	158	9E	174	AE	190	BE	206	CE	222	DE	238	EE	254	FE
15	OF	31	1F	47	2F	63	3F	79	4F	95	5F	111	6F	127	7F	143	8F	159	9F	175	AF	191	BF	207	CF	223	DF	239	EF	255	FF

Using Windows Telnet

As a communications test, one can use the Microsoft Telnet Client to communicate with the controller/monitor.

Under the RUN item in Windows, type telnet and press ENTER.



Controller/Monitor: Under the STATUS menu, find the IP address. It is displayed as a hexadecimal number. One will have to convert it to dot decimal notation.

Example (your IP will be different): C0.A8.01.4B converts to 192.168.1.75 See the decimal/hexadecimal conversion chart...

The TCP port address can be read in the STATUS menu.

In this example, the TCP port is 2000. It is shown as a decimal number, which most programs expect.



At the telnet prompt, type "o 192.168.1.75 2000" and press return. **NOTE: Again, your IP address will be different (in most cases).**

If the connection fails (after about a minute), check to be sure the IP and the TCP port are correct. Check the WLAN status (WLAN menu/PB2 & PB4). One should be able to find the address via the router interface (typically 192.168.1.1).

If the TCP port connection is made (check WLAN status), type MSV and press return...



PS-1000-EXP-WLAN

Mount the PS-1000-EXP-WLAN board to the using one-inch stand-offs. ³/₄ inch stand-offs can be used, but it's not recommended. The right image shows ³/₄ inch stand-offs. The antenna must be connected to P1 (U.FL). Do not power the controller with the WLAN option without a connected antenna, or damage to the WLAN module could occur.







The included connector with green and yellow wires must connect to TB2. Green connects to TB2-4 (Tx). Yellow connects to TB2-5 (Rx).



PS-1000-EXP-WLAN BOARD OVERVIEW

Upgrading the firmware:

The PS-1000 firmware can be updated without removing the WLAN board or disconnecting TB2. Set S1 to PROG (program) and connect the programmer (e.g., FWL1000) to P5 (PROG PORT). Be sure to set S1 back to WLAN after upgrading the firmware.

WLAN MONITOR port P6:

The user can directly access the WLAN module via P6. This port is used by the factory for testing purposes.

Normal operation: Set S1 to WLAN. The WLAN communications will only function when S1 is set to WLAN.

WLAN WORKSHEET

MODUL	E S/N:
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DATE: _____

CONNECT: YES

IP MODE:

IP	-A	-В	-C	-D	SM	-A	-В	-C	-D
hex					hex				
dec					dec				

GW	-A	-B	-C	-D
hex				
dec				

SSID (Service Set Identifier)

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

PASS (Password/Passcode)

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

DvID (Device ID)

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Note: The last character should be set to "end."

Access MAC address under the STATUS menu. Write in two hexadecimal characters (0-9, A-F) per column. Each WLAN module has a unique MAC address.

MAC:		MAC:						
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