How to build the Wi-Fi remote for Bestway Lay-Z-Spa

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1) Checking compatibility

Table of models (not exhaustive)

Alias	Model Number	Pump specs	Wires	Supported
Riviera	12220	Eggshape		
Monaco	54113	Eggshape		
Vegas	54122	Eggshape	*6*	
Miami	54123	Eggshape	*4/6*	Maybe
Palm Springs	54129	Eggshape	*4*	
Hawaii/Hydrojet	54138	Square	4	Yes
Palm Springs/Hydrojet	54144	Square		
Paris	54148	Eggshape		
Hawaii	54154	Eggshape	*4*	
Siena	54156	Eggshape	*4*	
Honolulu	54174	Eggshape	*6*	
St. Moritz	54175	Eggshape		
Bali	54183	Eggshape		
Milan	54184	Eggshape		
Tahiti	54186	Eggshape		
Helsinki	54189	Eggshape	6	Yes
Cancun	54286	Eggshape		
Ibiza	54291	Eggshape		
Havana	54298	Eggshape		
Unknown 2021	?	Square 2021	6	Yes
Vegas	54112	?	4	

4-wire models are less documented and probably need more electronics and programming skills.

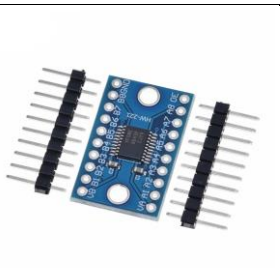
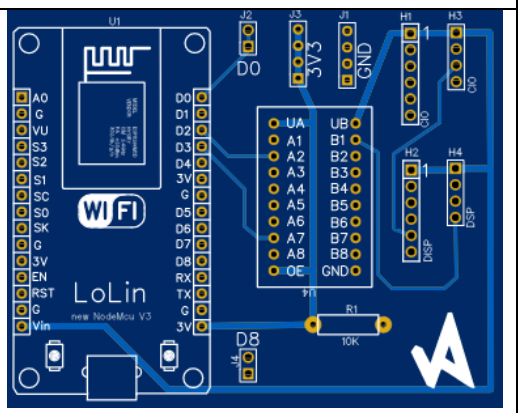
Open the pump to verify number of wires

Unscrew the 6 screws as the picture shows, and carefully lift the display. It is attached with a cable with a connector on it. Check if there are 6 or 4 wires/pins. Other models can be disassembled in a similar manner. On the Hydrojets you must remove the whole cover, not the display. That pump is heavy and fiddlier to disassemble on your own.

Example – eggshaped 6-wire pump

2) Hardware

BOM

ESP8266 NodeMCU 1.0 (12E) (NOT ESP32)	
8 channel bidirectional level converter TXS0108E	
6 or 4 pin male/female pair cable 0.1" spacing: JST SM Housing Connector	
PCB LINKS ARE COMING	
Resistor, 10K Ohms, throughhole	
Female header pins (0.1") to solder to the PCB for the ESP and LLC to be removable.	Optional

Build

Solder the 6-wire cables to the PCB (H1, H2):

https://github.com/visualapproach/WiFi-remote-for-Bestway-Lay-Z-SPA

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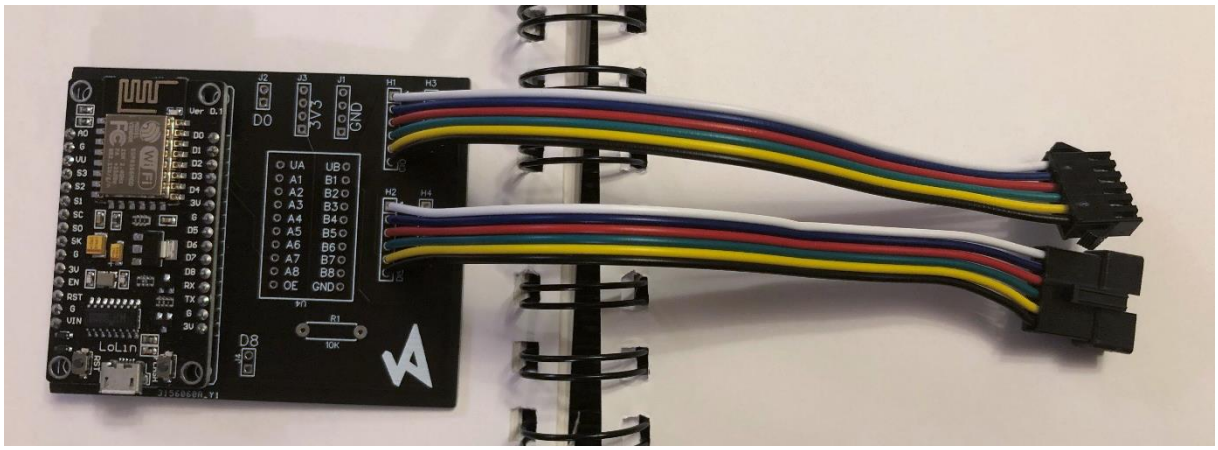

For the 4-wire version, use the 4-hole cables and solder to the two 4-holes section (H3, H4).

Pinout (Colors and pinout on your pump may differ!):

1 (Uppermost. Black on pump)	= 5V
2 (Red on pump)	= GND
3 (Yellow on pump)	= DSP TX
4 (Green on pump)	= CIO TX

Solder the 10 K resistor.

You can go on and solder the LLC and ESP8266 directly to the PCB, but I recommend using female headers. In case you want to switch or reuse them.

D0, D8, 3V3 and GND is left empty. They are there for the possibility to connect auxiliary equipment.

Put the PCB in a box, plastic bag or something to protect against water if you want.

Don't connect the connectors to the pump yet.

3) Software

6-wire

DL and install

Arduino IDE https://www.arduino.cc/

BWC_v2.0.0 library https://github.com/visualapproach/WiFi-remote-for-Bestway-Lay-Z-SPA/tree/master/Code

LittleFS install https://arduino-esp8266.readthedocs.io/en/latest/filesystem.html#uploading-files-to-file-system

Link to LittleFS upload tool https://github.com/earlephilhower/arduino-esp8266littlefs-plugin/releases

From Arduino library manager, install

ArduinoJSON (Benoit Blanchon)

ESPDateTime https://github.com/mcxiaoke/ESPDateTime

WebSockets https://github.com/Links2004/arduinoWebSockets

WiFiManager https://github.com/tzapu/WiFiManager

And for MQTT sketch also

PubSubClient https://github.com/knolleary/pubsubclient

Open File/examples/BWC2.0.0/.. from the Arduino IDE.

Select the right board (NodeMCU12E), and set "FS 2MB/OTA 1MB", speed 80 MHz. select correct COM port.

Upload sketch via USB. Password “esp8266”

Upload LittleFS Data or you will get a 404!

An Access Point is created called "Auto portal". Log in and enter your wifi credentials. Visit IP/ and click "Go to config page" Enter your settings, click SAVE. The device’s IP is shown in the serial monitor window.

From now on you can update the device over the air (OTA) by selecting the new IP instead of the COM port. You need to restart Arduino IDE for this to show up.

4-wire

DL and install

PIO in visual studio code.

BW4W library https://github.com/visualapproach/WiFi-remote-for-Bestway-Lay-Z-SPA/tree/master/Code

Edit models.h to suit your model. (Only 2 models to choose at the moment)

Compile and upload sketch

Upload LittleFS data or you will get a 404!

4) MQTT

This chapter is for advanced users. If you know what MQTT is, and have a MQTT broker, this is what you need to know:

There is two ways to enter your credentials. You can edit the "globals.h" file before compiling and then you are done with it. Or you can go to the web interface and click on the MQTT link. If you save from the MQTT web page it will override globals.h.

Device is publishing following topics:

BW_2.0.0/status

BW_2.0.0/MAC_Address

BW_2.0.0/MQTT_Connect_Count

BW_2.0.0/message

Device is subscribing to topic **BW_2.0.0/command**

Payload in **message** is a JSON string with these key/value pairs:

KEY	VALUE
LCK	LOCKEDSTATE
PWR	POWERSTATE
UNT	UNITSTATE (0=F, 1=C)
AIR	BUBBLESSTATE
GRN	HEATGRNSTATE
RED	HEATREDSTATE
FLT	PUMPSTATE
TGT	TARGET TEMP
TMP	TEMPERATURE
CH1	CHAR1 DISPLAY'S FIRST CHARACTER
CH2	CHAR2
CH3	CHAR3

Payload in **command** must be a JSON string with these key/value pairs:

KEY	VALUE
CMD	INTEGER, see next table
VALUE	MIXED
XTIME	Execution time in UNIX TIMESTAMP or 0 for immediate action
INTERVAL	Repeat every Nth second INTEGER or 0 for NO REPEAT

Available commands (CMD) are

0	SETTARGET
1	SETUNIT
2	SETBUBBLES
3	SETHEATER
4	SETPUMP
5	RESETQ (clear command queue)

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6	REBOOTESP
7	GETTARGET (internal use)
8	RESETTIMES
9	RESETCLTIMER
10	RESETFTIMER
11	SETJETS (only some 4-wire models)
12	TAKECONTROL (only 4-wire)

5) Connect

Unplug pump from mains! Connect device to pump. Close the display with the screws. Turn on pump and enjoy.

6) FAQ

https://github.com/visualapproach/WiFi-remote-for-Bestway-Lay-Z-SPA/discussions

If you like this project, please consider a donation: PayPal.me/TLandahl