Unpacking your Black Emerald Nixie Clock:

1. Once you open the box and expose the clock you will see it is shock mounted in custom formed polyethylene foam, and it fits in the box quite snugly. To remove the clock, reach down on either side of the clock with both hands and place your fingers under the clock and pull up. You may want to squeeze the box between your ankles or have a friend hold the box down. You can pull up on the foam end pieces, but that's the hard way to do it. Remove the 2 end pieces of foam. Once removed, gently cut the plastic wrap away with a sharp pair of scissors or Exacto knife, being careful not to mar the clock's anodized finish or the acrylic top surface.

2. Lift off the acrylic top and set it aside.

3. Remove the dummy header from the ISP connector on the CPU board. This is for shipping purposes only

4. Remove the WiFi module from the small Ziploc bag taped to the PCB and insert it into the 2X4 female header on the CPU board, long end facing inboard.

5. If your clock was not ordered with Badnixie supplied B8971 tubes, use great care when installing your own tubes in the sockets. These tubes fit VERY snug in their sockets, much more so than 7971s and they have the same number of PINs. The difference is this tube is a much smaller package and a bit more difficult to plug in because if its size. Straighten your tube PINS first. I use a small, flat-jawed plier to reduce the possibility of marring the pins. Align the PINs then apply metered downward pressure while gently rocking the tube front to back, all the while being careful not to stress the nipple at the top of the tube, until the PINs bottom out in the receptacles. Some of these nipples are VERY thin and delicate. I know, I broke one!

6. Use the same care and procedure when removing these tubes just reverse the process.

WRLS MOD-PIR ASSEMBLY:

1. Place the 4 adhesive rubber feet on the non-sanded side of the black anodized plate. Position the flats inward to allow them to fit together without hanging over the edge of the plate.

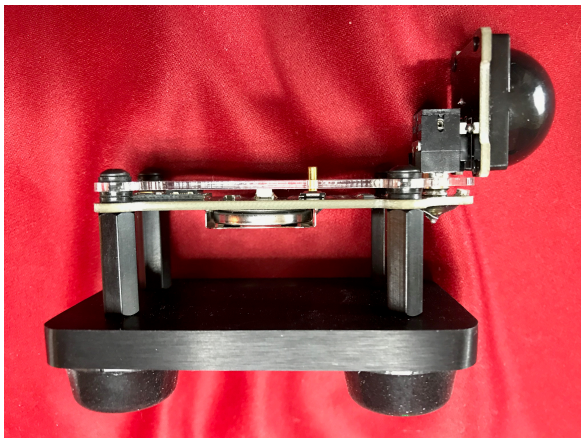
2. Screw the Male end of the four ¼" anodized standoffs into the threaded holes in the base. DO NOT OVER TIGHTEN, snug is good enough.

3. Place PIR PCB over the 4-bolt pattern created by the standoffs with the 1/8" TRS PIN plug facing upward. Place 2 each of the 2mm black washers over each of the 4 holes. Place 1 each black washers on each one of the 4 black oxide button head screws and insert them into acrylic top plate. Position the acrylic top with the screws inserted over the 4 washer sets and guide through them and the PCB then gently tighten FINGER TIGHTEN! This acrylic top is rather delicate.

4. Slide the PIR-Swivel Head female jack gently down on the plug end making sure the base of the jack clears the walls of the hole in the acrylic and snap down into place. Don't FORCE IT. Once snapped into place tighten all 4 screws, again, DO NOT OVER TIGHTEN!

5. Insert the battery + side DOWN per marking on holder.

REFER TO THE MOD_SIX MANUAL on Badnixie.com info page "User Guide V090-18" for operation of your Black Emerald. The new features that are unique to the Black Emerald are addressed in this document. The Users Guide is currently being updated to accommodate the new Wireless MOD-PIR and will be posted soon. See some of the changes below.



WRLS MOD-PIR OPERATION:

Device has two multi color leds, One front facing red/green, and one top RGB for setup,
One push button,

Configuration / setup:
If you press and hold the button, the top led will cycle through modes as indicated by the specific LED color and if you release the button while in that color/mode an operation is selected.

Led colors are somewhat open to interpretation because of the mixing of the RGB led. But these are what they are supposed to be.

Mode color operation
1 Yellow Marry to clock.
2. Cyan Send Version
3 Green Increment PIR Address
4 Red Decrement PIR Address.
5 Magenta Enter Bluetooth Firmware update mode.
6 LED is Off, NOP, exit do nothing

Notes:

Mode 5 only shows up after the cycles have repeated through three times.

The address of the PIR must match the clock's address. This is the same as the FOBs, in fact the PIR is basically acting like a FOB and uses the same subsystem.

After a marry operation, the PIR will send FW version and address to clock for display.

After any address change,
PIR will send address to clock for display and blink address on top led
1 Blue flash to indicate start, then Magenta flashes for the current address

Version sends version, address, and battery voltage to the clock,
Battery voltage currently displays as (example) 2P999V for 2.999 volts

Normal motion detector operation.

Short press on button cycles though LEDs behaviors.
TOP led only
Front led only
No leds.

If the led is enabled, you get an led flash on motion detection, There is a fixed re-trigger time on the PIRsensor itself of a couple of seconds, so you won't get a new transmission unless there is no new motion for that period to allow the PIR sensor to reset.

For detection events, I've been experimenting a bit.
The led will blink green if the PIR receives an ack packet from the clock. And blink red if not.

This is not really all that reliable, even if the PIR flashes red, it does not mean the clock did not receive the packet. just that the PIR did not get the ack. Also in a multi clock setup, all the clocks will ack a PIR packet regardless of address and confuse the issue.

I anticipate using the feature to test initial setup and proper locating of the PIR and then the LED on the PIR would be disabled,

Battery life will be extended significantly if Detection LED events are disabled,

MOD-8971 9.3x FIRMWARE CHANGES:

Main changes relate to the addition of the front facing auxiliary LED (AUXLED) feature and some additional LED display modes for thenew AUXLED and the existing LED on the CPU PCB (CPULED),

Note: The MOD-CPU only has one spare expansion serial data and general purpose IO (GPIO) pin that can be used for different functions, But only one at a time, On the 8971 clock the pin has been re-assigned to drive the AUX LED. And a menu entry has been added to support that re-assignment,

“SYSMNU” changes from older FW are:

‘*’ = default mode

Menu option: "TXD MD" Assign function mode to the TXD / GPIO expansion pin.

1. OFF No function
2. DATA, Use pin for sending serial data. Not currently supported
3. NIXOFF NIXIE tubes off indication, Custom option to support external lighting effects.
4. 1PPS One pulse per second output,
5. AUXLED * Drive the AUX LED. Must be selected to drive auxiliary led

Menu option: “LEDAUX” Assign effect mode to AUX LED.

1. OFF LED always off
2. ON LED always on.
3. 1PPS Blinks once per second.
4. BREATH Ramps brightness up and down in ‘breathing’ effect.
5. RF RCV Blinks on data packet reception from RF-Link
6. PIRTST Blinks on PIR sensor detection event. Wired or wireless.
7. LOCKED * ‘Breathing’ effect only when clock is GPS time locked.

Menu option: “LED MD” Assign effect mode to the CPU LED.

Same options as AUXLED .

Repeater FW/Hardware has not changed, it just looks cooler.