

# PART 7 – Some changes & rethinking, and a new node

While the core is working well – all basic functionality – I still need to make enclosures and idiot-proof buttons etc. A good rule of thumb is the enclosures and physical interface/mounting will cost around 30% of the overall system cost. Even if you have them on hand – you must work on them to make them fit and need tools / fasteners to bring it all together.

I’ve ordered a TYSSO thermal ticket printer for generating a docket/receipt with each order.... Maybe a week away.

## Another / Different Node ?!

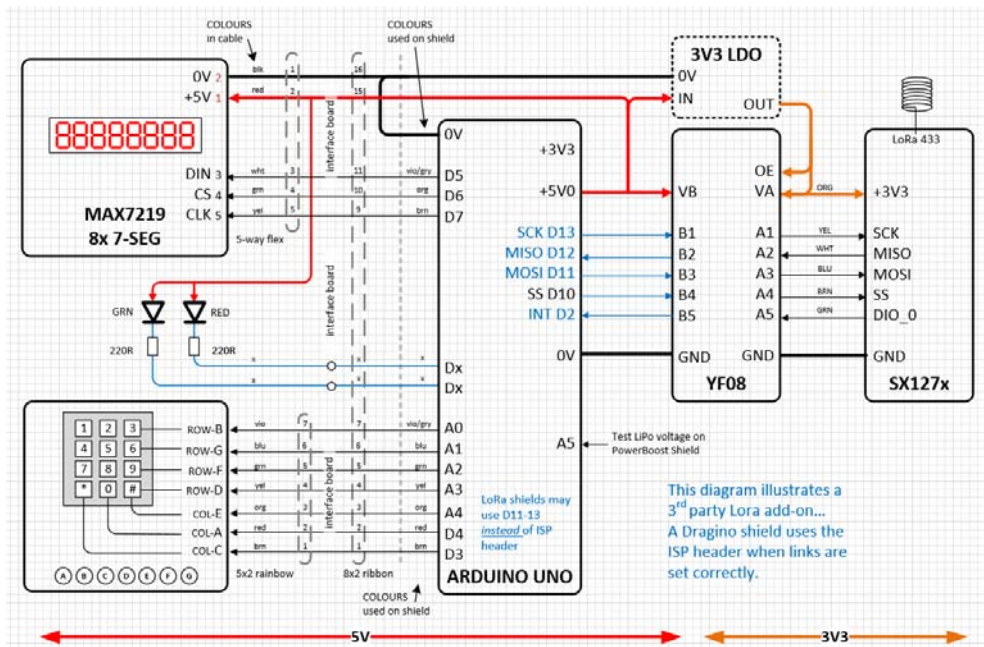
The alphanumeric matrix display node has been bothering me – not for construction – but it probably won’t be bright enough. So – that has been replaced with a second seven-segment display – same hardware & code, just pick different packets out of the LoRa traffic.

In doing this – while not required at the moment, it was easy to add a *site\_id* into the messaging – so that multiple systems could operate in the same radio coverage area.

The serving / order-collection station was *going* to be a second LCD+buttons box, but that bothered me from the user point of view – zero training, non-technical, first-time users – so those nodes become a keypad with small MAX78219 LED display.

I also discovered some (loosely, possibly incorrectly explained –) conflict between the keypad and LoRa when I tried to use the ‘free’ pins on the UNO. Exploration of the LoRa and keypad eliminated that, so I came to the realisation the LoRa board wasn’t assigning SPI pins quite the way it says it does... that’s life.

Here’s the design starting point... it’s been tweaked as I stumbled to this stage but is all working. Still to finalise some pins – to suit the hardware/connector positions.



This includes IMPORTANT annotation for home-made LoRa shields – as well as off-the-shelf (Dragino) boards.

The hardware includes red & green LEDs if I need them for go/no-go indications... I use the MAX7219 to crate some crude alpha messages too with a custom font

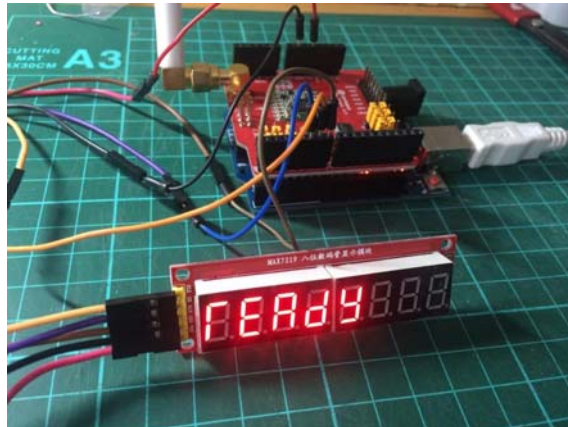
The UNO pin count is getting busy!

Also note the (16-way) ribbon from the shield to an *interface board* – which then splits to the Keypad (10-way) ribbon, MAX and the two LEDs which are loose-wired.

I'll mention that I'm not a fan of breadboards and a jumble of pin-leads for larger projects – *especially* when the prototype is going into a test 'production' scenario.

Here I'm developing & testing for the MAX7219 code – 5 wires are OK... maybe less than 10  
Remember – build, code & test one element at a time – then you're not chasing unexpected or undocumented phantoms!

(e.g. how I found the SPI conflict above... I knew the LoRa and LED worked perfectly, but not *together*.)



The MAX7219 does what I want it to (and it's 'ready')

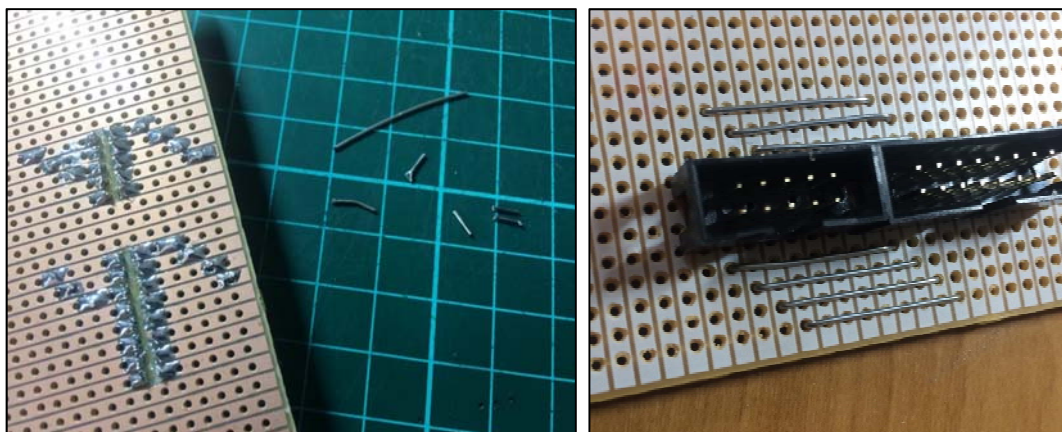
On the preceding page – I have shown an 'interface' board (mid-left) that takes a 16-way cable and splits it out to the keypad, MAX7219 and discrete LEDs.

I could fudge that up with split cables and make a mess – as well as being less reliable – or repairable.

The same reason you should document your build if you want the project to last longer than six months.

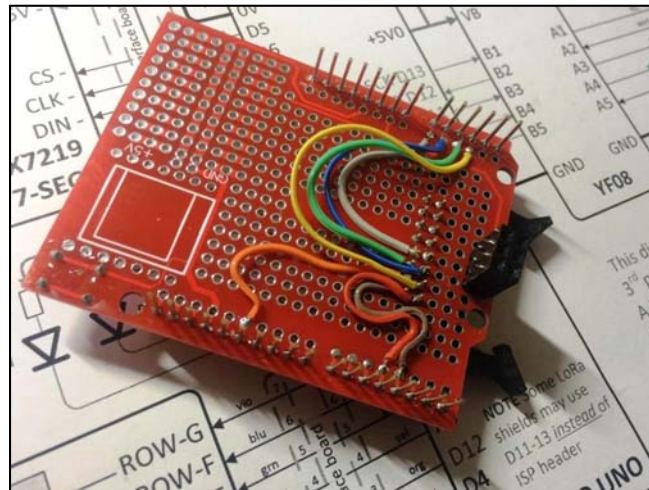
You may have also noticed that I assigned connector pins and mapped them across the two cables in a 1-1 fashion

– so I could do this neatly (and it's useful later when testing / repairing).



We can now make simple busses across the proto/Veroboard. (See the links)  
It's always useful to have a roll of tinned copper wire on your desk – for *many* things.  
Catch, count & clean up your wire tails – they really hurt when you step on them

This build also requires a interface shields on the Arduino stack – to collect all the I/O signals into that ribbon cable – and anything else I might like to put on there. Maybe later – *everything* could be put on a single custom shield or PCB.



This makes it obvious why colour coded wires make it easy to get things right the first time. Leave loops – so there's room to squeeze in other wires as we move forward.

In the two 'busses' there are duplicated colours – just what it was, and I have a finite amount of storage. These wires are stripped from rainbow ribbon cable – thin, convenient, flexible and cheap.