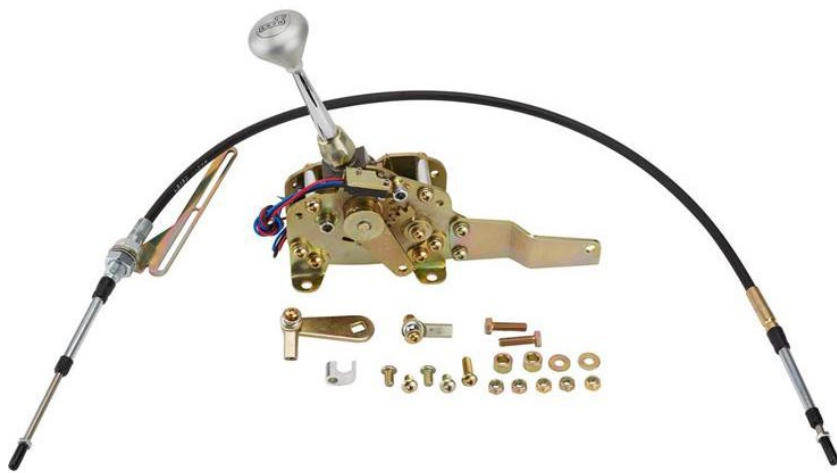


## Lokar Sport Shifter

Many of you know that I bought a Chevrolet Performance Connect and Cruise package back in 2012. That consisted of a 480hp LS3, a 4L70E electronic automatic 4-speed overdrive transmission, wiring harnesses, engine computer, and transmission computer. Right around Easter 2013 my '56 Delray was ready to roll. I had made other modifications like a Morrison chassis, but this email isn't about that. Like any modified classic there are always tweaks and fixes you want to make later. Here's this spring's punch list:

1. Replace the Belair trim on the dash. It was scratched and corroded. I ordered new trim that has the radio holes deleted. I want to cover the big modern radio hole the previous owner cut in. I know our 56 is not a Belair and is a 210 Delray but many 210 owners back in the day got the trim installed for their 210 to dress it up. Super easy then and now.
2. Replace the shifter. Lokar now has an "Electronic Sport Shifter" that looks classic but also has electronic manual "bump shift". Better quality, better looking.
3. Build a custom console to wrap the new shifter, contain and hide the radio and power ports and have more storage.
4. Put in "bucket seat" style 3-point seat belts with the stiff latch so we can put our belts on with one hand like in a modern car.



This email is about my saga replacing the shifter and most notably getting the electronic bump shift to work.

Below is the shifter I originally installed. It worked OK. It was a compromise at the time. I feel it has too much of a drag racing look. It is completely mechanical in that it shifts with a cable and lever on the transmission. It has a ratchet mode for single up and down shifts that I rarely used as it felt imprecise. I always felt like this shifter lacked robustness and felt like it was low quality. For example the shift handle can rock side-to-side pretty easily. It should be more solid. One feature it did have was both a neutral safety switch and a reverse light switch.

Below is the shifter I'm installing now. I got the same shape shift knob as in the picture but polished aluminum. They have different length shafts but the one pictured puts the knob where I want it. The overall build quality is significant. All the metal is twice the thickness of the TCI. The shifter has very solid detents and feels like an OEM shifter. You can see one of the micro switches for the bump/manual shift feature. While in drive you enable the bump shift by pushing the shifter to the right a little. Then push it up and down for shift up and shift down. It has a neutral safety switch but no reverse light switch. I ended up using an OEM neutral safety, reverse light, etc, switch that is bolted on the trans on the shift rod. I'll do a different write-up on that later.



I removed the old shifter and mocked up the new shifter to position it better for my right hand. This shifter has the cable going towards the rear. The former TCI shifter had the cable going toward the front. As a result the cable and mount would hit my seat brackets that are basically square tubes across the car. After a little aluminum fabrication and TIG welding I had the shifter positioned. Another technology I used this time is rivet nuts. There are rivets you put into thin metal to

create threaded built-in nuts. I'll do a write up sometime about them. You can see below the 1 inch high aluminum stand (upper arrow) I made for the shifter so it clears the 1" seat frame (lower arrow). All of this will be covered up with a custom console I'm building that will start at the back of the front seats and go to the firewall with a slanted portion up front in which I'll hide the radio and some power ports. I also bought a couple billet aluminum cup holders for in the console.



Now onto the wiring. The Connect and Cruise package included both an engine and transmission. It also included an Engine Control Unit (ECU) and a Transmission Control Unit (TCU). Normally OEM Chevy vehicles have the transmission control built into the ECU. However, with the Chevy Performance products they made things more modular and do the engine and trans separate in case you buy just an engine or just a transmission. The TCU provided by Chevy is branded as a Chevy part but was made by a 3rd party that makes aftermarket TCUs. The fact that it was a 3rd party was critical to my success and you'll see why later.

The TCU has a USB connector in its harness and there is a Chevy provided Windows application you can use to somewhat tune and watch your transmission function. Part of this application is that you can see if your wired input signals are being recognized by the TCU. The TCU has 3 wires for doing electronic shifting with paddles on your steering wheel or a shifter with a similar feature.

The wires are Manual Enable, Shift Up and Shift Down. I already had these wires in the harness provided originally and I had them tucked away up under the dash. All I had to do was hook them up to the Lokar shifter micro switches such that they would be grounded when switched. You ground Manual Enable to turn it on. You ground Shift Up or Shift Down momentarily to shift up or down.

I wired things up, loaded up the application and checked my signals. The up and down were working fine. However the enable wasn't working. I double checked the shifter switch. It worked right. I checked my wiring at the shifter. It was good. Now I needed to check the wire out to the TCU under the hood. I uncovered the wire below the connector where it goes into the TCU. It worked out to there. I removed the connector from the TCU and checked the female pin in the connector. It worked to there. Then I even took apart the TCU and checked that the signal was getting to the circuit board. It was. At this point I figured I had a bad TCU. Unfortunately, it is 7 years old and out of warranty and is even no longer available. Chevy is using a newer smaller TCU (from the same 3rd party company). I quit for the day and slept on it.

Next day I recalled that there were posts on ls1tech.com about how the software from the 3rd party that makes the Chevy TCU actually worked with the Chevy TCUs. I tried it out just to see if maybe it would work and maybe expose some setting that wasn't enabled. The software worked and recognized my TCU! However, it was way more complicated than the Chevy provided software. I wandered around in it a bit and found out that the input wires for the manual shift (and lots of other things) could be configured in a bunch of ways. At first, I didn't see how this would help me. So, I quit for the day and slept on it again.

Next day I figured out a workaround to the bad digital input. Here's how the TCU takes input signals for controlling different modes. The inputs are wires connected to digital logic inputs in the computer. There are 15 of them in the TCU with about half of them are not in use in the Chevy TCU and unwired in the harness. The digital inputs basically recognize an on or off state on the incoming wire. This TCU is configurable such that the inputs can be active high (over 5 volts) or active low (grounded). That means a wire can provide a positive voltage or be grounded to be "active". Here is a list of the wired modes in the TCU as provided by Chevy:

1. Unlock converter - I have this hooked to my brake light switch. You don't want the convertor locked while braking. This one is active high.
2. Disable overdrive - I don't have this wire connected to anything as I don't need this.
3. Enable configuration B - this TCU has two shift configurations A and B and this wire enables configuration B. (The configuration is fully programmable.)
4. Dyno mode - This is special configurable mode for running on a dyno. I don't have this wire hooked up.
5. Manual Enable - This is what I'm trying to get working and it active low (ground it to be "on").
6. Manual Shift Up - ditto
7. Manual Shift Down - ditto

What I eventually figured out was, with the 3rd party software from the vendor that made the TCU, I could use one of the other existing wires and digital input in the TCU and assign it to the Manual Enable function in the TCU software. I used the Disable Overdrive wire, reassigned it to Manual Enable, and assigned the Disable Overdrive function to the non-functioning signal. I worked like a charm.

So even with a malfunctioning digital input in my TCU, I was able to get my manual shift function working. I know from my past work experience that usually control computers are built with extra inputs and outputs because those inputs can malfunction or fail. Thank goodness this TCU follows that design pattern and thank goodness the 3rd party software works with the Chevy branded TCU and allowed me to reassign the function to a different wire.

Oh, and here's the new trim installed. No radio or holes. Seems Ecklers is the only one that had a configuration with no radio but did have headlight and lighter holes. Danchuk had trim with all the holes or no holes at all. FYI the Ecklers trim is made by Gene Smith, a long-time reproducer of Tri-5 parts.



Thank goodness I can still get car parts delivered. Summit Racing is still giving me next day service with basic ground UPS. Convenient to live near their flagship warehouse.

Stay safe and wash your hands.

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