Hi Charles,

I should write this up more completely for you and others, but here is an initial crack at the items. I'm pretty I've listed everything major... Let me know if you have any questions. If interested, I can later list tools, what has been useful and what has been a waste.

**Required**

Controller

Pretty much any desktop computer with a free PCIe slot for a parallel port card.

Mill (I got the stand, I've attached the mill's manual)

<http://www.machinetoolonline.com/PM-MV-BenchMills.html>

CNC conversion kit (there is no store front, purchases are made through PayPal to [davedaxx1@yahoo.com](mailto:davedaxx1@yahoo.com))

<https://www.youtube.com/playlist?list=PLUyyOw61zxiIj9zWacCDxb1g-8_f-nC82>

Interface board

<http://pico-systems.com/osc2.5/catalog/product_info.php?products_id=30>

Speed controller

<http://pico-systems.com/osc2.5/catalog/product_info.php?products_id=28>

Parallel port card (get this one, don't try to use one already in a computer)

<http://pico-systems.com/osc2.5/catalog/product_info.php?products_id=37>

Parallel port cable (get this one as not all cables follow IEEE standards)

<http://pico-systems.com/osc2.5/catalog/product_info.php?products_id=9>

SSR for controlling spindle direction and for controlling larger SSRs for spindle power and coolant solenoids

<http://pico-systems.com/osc2.5/catalog/product_info.php?products_id=6>

Main SSRs

<https://www.automationdirect.com/adc/Shopping/Catalog/Relays_-z-_Timers/Solid_State_Relays/DIN_Mount_Relays_(AD-SSR8_-z-_AD-SSR2_-z-_AD-SSR6_-z-_AD-HSSR8_Series)/General_Purpose_10A_-_65A,_(AD-SSR8_-z-_AD-SSR2_-z-_AD-SSR6_Series)/AD-SSR810-DC-28R>

Power supplies (look around, can get deals)

<https://www.digikey.com/product-detail/en/tdk-lambda-americas-inc/DPP480481/285-1832-ND/1957227>

<https://www.digikey.com/product-detail/en/tdk-lambda-americas-inc/DPP120121/285-2032-ND/2415175>

Stepper motors and drives (will need power and encoder cables from same store, can optionally get their power supply but it's LOUD)

<http://www.leadshine.com/productdetail.aspx?type=products&category=easy-servo-products&productype=easy-servo-motors&series=ES-M&model=ES-M32320>

<http://www.leadshine.com/productdetail.aspx?type=products&category=easy-servo-products&productype=easy-servo-drives&series=ES-D&model=ES-D508>

**Misc**

I reused the motor contractor, dual start-stop buttons, and e-stop mushroom switch. I added an extra "switch" (not sure what these are called) to the back of the e-stop to control the low voltage side.

A couple of push-buttons (AutomationDirect) for Start/Stop, Pause/Resume functions.

DIN rail, terminal blocks, ground blocks, fuse block, ferrules, ferrule crimper, and clips for mounting plates to the DIN rail (all AutomationDirect)

Custom plates for mounting boards and drives to DIN rail.

**Optional**

Spindle controller (has fault and pulse outputs)

<https://www.anaheimautomation.com/products/brushless/brushless-driver-controller-item.php?sID=280&serID=10&pt=i&tID=999&cID=23>

Power (load) meter (could use an ammeter wired in series with the spindle)

<http://www.murata-ps.com/en/news/new-products/736>

Pendant controller with enhanced e-stop (really nice, get the P4-SE with the enhanced e-stop box)

<http://www.vistacnc.com/b01_pendant_P4_P4S/pendant_P4_P4S.htm>

<http://www.vistacnc.com/b09_eebox/ee_box.htm>

FogBuster (well worth it)

<https://www.tormach.com/store/index.php?app=ecom&ns=prodshow&ref=32682>

Air Compressor (quietest air compressor available? runs around 70dB)

<https://smile.amazon.com/California-Air-Tools-10020C-Compressor/dp/B0188XBTLY/ref=sr_1_1?ie=UTF8&qid=1481834043&sr=8-1&keywords=cat-10020c>

**Potential alternatives**

(Servo alternative)

<https://www.teknic.com/products/clearpath-brushless-dc-servo-motors/>

**Reference**

Some pictures from my installation of the CNC kit

<http://bit.ly/2hEy71E>

Best wishes, Kent