

Special Tools, Materials, Parts & Hardware

Mill Tooling

I found mine on eBay & at Cabin Fever:

- $\varnothing 3/4"$ x $3/4"$ Shank x 4" Cutting Length x $6-1/4"$ OAL; 4-Flute HSS End Mill
- $\varnothing 3/8"$ x $3/8"$ Shank x $2-1/2"$ Cutting Length x $4-1/4"$ OAL; 4-Flute HSS End Mill
- $\varnothing 1/4"$ x $3/8"$ Shank x $1-5/8"$ Cutting Length x $3-1/2"$ OAL; 4-Flute HSS End Mill
- 2" 5-Flute Face Mill w/RCGT1003 Carbide Inserts for Aluminum with R8 Arbor

Shop Tools

- Machinists Jack Set; Little Machine Shop (LMS) #2907
- Machinists Jack, 40–60mm; LMS #5937
- Gauge Block Set, 81 pcs., 1.001" — 4.000"; LMS #5380
- Metric Transfer Punch Set, 1.0mm — 13.0mm; LMS #4884
- V-TapGuide, Inch; LMS #3427
- V-TapGuide, Metric; LMS #3428
- Scotch-Brite EXL Unitized Deburring Wheel, 6"; Amazon ASIN B000X5I6QM or
- SCOTTCHEN Deburring Wheel Nylon Fiber, 8" x 1" x $3/4"$; ASIN B08B69LC11 (works well for Hobbyist use at $1/3$ the cost)

Materials & Purchased Parts

- $2-1/2"$ x $1/8"$ 6061 Aluminum Square Tubing
- $2-1/2"$ x $2-1/2"$ x $3/8"$ 6061 Aluminum Angle
- $1-1/2"$ x $1-1/2"$ x $1/8"$ 6061 Aluminum Angle
- Clear Plastic Angle; TRIMACO "Wall Corner Protective Guard," $1-1/8$ x $1-1/8$ x $1/16"$ Thick; Home Depot

- Saddle/Angle Plate Setting Gage (used between bottom of Cross-Slide & top of Angle Plate); 2-3/4" x 9/16", 20 Ga. (0.95mm) Galvanized Sheet Metal
- Scotch blue™ #2080EL, 2" Painters Tape; Home Depot
- DRO Scales
Available from Amazon or Anytime Tools:
X-Axis: iGaging 6" Absolute DRO Plus Stainless Steel Scale
Z-Axis: iGaging 12" Absolute DRO Plus Stainless Steel Scale
- TouchDRO DIY DRO Adapter for iGaging Scales (Board & Enclosure)
- Lithium-Ion Polymer Battery - 3.7V 400mAh; Adafruit Industries LP8011735 w/25mm JST, Product ID 3898
- Cable Box for Read Head Cables (I had a Phenolic GC Electronics Box from long ago); Zulkit Waterproof Plastic Project Box, 100mm x 68mm x 50mm; Amazon ASIN B07RQMJXK6
- Nylon Cable Chain; 39.3-inch Carrier Drag Chain Cable Wire R18 10x11mm (Inn H x W) Plastic Black Open Type; Amazon ASIN B09681CY2W
- 1/8" Nylon Cable Clamps; 1/8 Inch UV Black Cable Clamp; Amazon ASIN B0054RRX2W
- Self-Adhesive Cable Clip; Amazon ASIN B07GGCS55F
- MAGNITTO Micro USB Cable, Zinc Alloy Metal Braided; Amazon ASIN B07T6DMPJK
- 5VDC/5W USB Power Adapter (any mobile phone power adapter)
- 6' Coiled AC Power Cord; Amazon ASIN B0BG2L9WHC
- IEC 320 C14 to NEMA 5-15R AC Adapter (needed because Coiled Power Cord is IEC 320 C13); Amazon ASIN B0B7SGR1CB
- Square U-Bolt 25mm 304 SS; Amazon ASIN B0B8ZXXXJX
- Amazon Fire HD 8 tablet, 8" HD Display, 32 GB (2022 release)
- NuPro Anti-Glare Screen Protector for Fire HD 8
- iPad Tripod Mount Adapter 360 Degree Rotatable Universal Tablet Clamp Holder; ASIN B08FCHQSMY
- NEEWER Aluminum 50mm Quick Release Plate QR Clamp; ASIN B00KYEO70Q

- NEEWER 2 Pieces Universal Arca Type Quick Release Plate; ASIN B07D7S2F5D
- Tablet Mount Spacer: Ø1-1/2" Black Delrin Rod (both ends faced, 1-1/2" length, drilled through center "F")

Bill of Materials			
<u>Detail</u>	<u>Description</u>	<u>Material</u>	<u>Qty Req'd</u>
1	X-Axis Scale Mount	2-1/2" x 1/8" Thick 6061 Square Tube	1
Not Shown	X-Axis Scale Mount to Cross-Slide Attaching Hardware	SS M5-0.80 x 12mm SBHS SS M5 Flat Washer SS M5 Lock Washer	4 ea.
"	X-Axis Scale	iGaging Purchased Part	1
"	X-Axis Scale Replacement Hardware	SS M3-0.50 x 6mm SHCS	4
"	X-Axis Scale Mounting Hardware	SS M5-0.80 x 10mm SBHS SS M5 Flat Washer SS M5-0.80 K-Nut	2 ea.
2	X-Axis Read Head Mounting Plate	7-1 /2" x 1-1 /2" x 0.080" Normalized 4130 Steel Sheet	1
Not Shown	X-Axis Read Head Mounting Plate to Angle Plate Attaching Hardware, Saddle End	SS M3-0.50 x 12mm SFHS	2
"	X-Axis Read Head Mounting Plate to Angle Plate Attaching Hardware, Middle	SS M3-0.50 x 8mm SFHS	2
"	X-Axis Read Head Mounting Plate to Angle Plate & Project Box Attaching Hardware	SS M3-0.50 x 16mm SFHS SS M3 Flat Washer SS M3-0.50 K-Nut	2 ea.
"	X-Axis Read Head Mounting Hardware	SS M3-0.50 x 5mm SBHS SS M3 mm Fender Washer SS M3 Flat Washer	2 ea.
"	X-Axis Read Head Cable Clamp & Mounting Hardware	SS M3-0.50 x 10mm SFHS SS M3-0.50 K-Nut 1/8" Nylon Cable Clamp SS M3 Flat Washer SS M3-0.50 K-Nut	1 ea.

Bill of Materials			
3	iGaging Absolute DRO Read Head	Purchased Part	2
4	Angle Plate	2-1/2" x 2-1/2" x 1/4" Thick 6061 Aluminum Angle	1
Not Shown	Angle Plate to Saddle Attachment Hardware	SS M5-0.80 x 20mm SHCS SS M5 High Collar Lock Washer	2 ea.
5	Z-Axis Scale Mount Shims	0.071" Thick Normalized 4130 Steel Sheet	2
Not Shown	Z-Axis Scale	iGaging Purchased Part	1
"	Z-Axis Scale Replacement Hardware	SS M3-0.50 x 6mm SHCS	4
"	Z-Axis Scale Mounting Hardware	SS M5-0.80 x 16mm SBHS SS M5 Flat Washer SS M5 Lock Washer	2 ea.
6	Z-Axis Read Head Clear Chip Shield	1-1/8 x 1-1/8" 1/16" Thick Plastic Angle	1
Not Shown	Z-Axis Read Head Mounting Hardware	SS M3-0.50 x 14mm SBHS SS M3 mm Fender Washer SS M3 Flat Washer SS M3-0.50 K-Nut	2 ea.
"	Z-Axis Read Head Cable Clamp & Mounting Hardware	1/8" Nylon Cable Clamp SS M3 Flat Washer SS M3 Ø9mm Fender Washer SS M3-0.50 x 5mm SBHS	1 ea.
7	Rear Carriage Travel Limit Stops	3/4" x 1/2" 6061 Bar Stock	2
Not Shown	Rear Carriage Travel Limit Stop Mounting Hardware	BO M5-0.80 x 10mm SHCS	2
8	TouchDRO Adapter	TouchDRO Board & Enclosure Lithium Rechargeable Battery	1 ea.
"	Project Box	100mm x 68mm x 50mm ABS Project Box	1
Not Shown	TouchDRO to Project Box Attaching Hardware	SS M3-0.50 x 16mm SBHS SS M3-0.50 K-Nut	2 ea.
Not Shown	Project Box Lid Replacement Hardware	BSS 4-40 x 1/4" SBHS (bottom)	2

Bill of Materials			
9	Lower Cable Chain Mount	1-1/2" x 1-1/2" x 1/8" 6061 Angle	1
Not Shown	Lower Cable Chain Mount Mounting Hardware	SS M4-0.70 x 16mm SBHS SS M4 Flat Washer SS M4 Lock Washer	2 ea.
10	Upper Cable Chain Mount	1-1/2" x 1-1/2" x 1/8" 6061 Angle	1
Not Shown	Upper Cable Chain Mount to Project Box Attaching Hardware	BSS 4-40 x 3/8" SBHS	2
Not Shown	Cable Chain	Purchased Part Nylon Carrier Drag Chain Cable R18 10x11mm	1
"	Cable Chain to Lower & Upper Cable Chain Mounts Attaching Hardware	SS M3-0.50 x 6mm SFHS	6

Hardware Notes:

BO = Black Oxide
BSS = Black Oxide Stainless Steel
SS = Stainless Steel
SBHS = Socket Button Head Screw
SFHS = Socket Flat Head Screw
SHCS = Socket Head Cap Screw

My Shop Machines (and add-ons)

- MicroLux 7 x 16 Mini-Lathe
 - Micromark Tachometer
 - LMS Extended Cross-Slide Travel Kit
 - LMS Rotary Encoder DRO's on Compound & Tail Stock
 - Modified LMS Carriage Lock
 - Mansfield Customs (eBay) Carriage Stop
 - Swarf Shield
 - LMS Telescoping Lead Screw Covers

Cross-Feed & Compound Locks

2-Axis iGaging/TouchDRO

- LMS 3990 Mini-Mill
 - LMS 2" Riser Block
 - LMS Tachometer
 - Smaller X-, Y- & Z-Axis Locking Knobs
 - Priest Tools Deluxe Spindle Brake
 - Phenom Engineering Y-Axis Thrust Bearing Kit
 - LMS X-Axis Power Feed
 - 3-Axis iGaging/TouchDRO
 - Upgraded Y-Axis Bellows (McMaster 1320K141)
 - Z-Axis Fine Feed Knob w/Handle
 - Flexible Task Light (Amazon ASIN B09VDLB4JH)
 - Z-Axis Coarse Feed Hand Wheel
- MicroLux Micro-Mill
- Craftsman 10" 3-Wheel Bench Top Band Saw
- DeWalt DWM120 Variable Speed, 4-3/4" x 5" Deep Cut Band Saw mounted on SWAG Off Road Portaband Pro Table
- Craftsman 16" Scroll Saw
- Proxxon FKS/E 3' Tilt Arbor Table Saw
- Central Machinery 1" x 30" Belt Sander
- Ryobi 4" x 36" Belt Sander
- Craftsman 2" x 42" Belt Sander/6" Disk Sander
- WEN Oscillating Spindle Sander
- Delta 8" x 1" Bench Grinder w/ 8" x 1" Deburring & 80 Grit Al₂O₃ Wheels