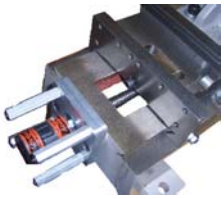
KDN Tool & Automation Engineering Co. LLC
34 Church Street
West Warwick, RI 02893
401-615-0267
www.kdntool.com
sales@kdntool.com
kdntool@cox.net

CX2

CNC RETROFIT FOR SIEG X2 MINI MILL

DESIGNED WITH BUDGET CONSCIOUS HOBBY, EDUCATIONAL, AND LIGHT INDUSTRIAL USERS IN MIND.



TWO BASIC CONFIGURATIONS, ONE FOR SERVO BELT REDUCTION, AND ONE FOR IN-LINE FLEX COUPLING STEP MOTOR PROPULSION

DUPLEX DEEP GROOVE RADIAL BALL BEARINGS WITH PRE-LOAD ADJUSTMENT LOCKNUTS

LEAD NUTS FEATURE ADJUSTMENTS FOR WEAR COMPENSATION AND BACKLASH

TRUE ACME LEAD SCREWS REPLACE STOCK SCREWS AND RACK/PINION

COMPLETE ILLUSTRATED CONVERSION INSTRUCTIONS

STEPPER VERSION

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KIT SPECS:

- **LEAD SCREWS = ½”-10 ACME**
- **LEAD NUTS = BRASS ADJUSTABLE W/ WEAR COMPENSATION (X&Y ONLY)**
- **PRECISION MACHINED 6061 ALUMINUM BEARING RETAINER PLATES**
- **DUPLEX DEEP GROOVE RADIAL BALL BEARINGS**
- **BEARING PRE-LOAD ADJUSTMENT THREAD WITH LOCKNUT**
- **REMOVES Z AXIS RACK AND PINION**
- **REPLACES FACTORY LEAD SCREWS AND NUTS**
- **ALL MAJOR COMPONENTS MADE IN USA**
- **TWO BASIC CONFIGURATIONS: ONE FOR SERVO AND ONE FOR STEPPERS**
- **INCLUDES ALL NECESSARY INSTALLATION HARDWARE**
- **DETAILED ILLUSTRATED INSTRUCTION PACKAGE**
- **SOLID PERFORMANCE AT A BUDGET CONSCIOUS PRICE!**

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CNC Safety

All machinery has a certain level of danger about it. CNC machinery has a heightened level in that it has the potential to move, turn the spindle on, to run off course, etc without any input from you. The wisdom to not "reach-in" or "place your hand too close" while a machine is operating is common place for some, learned the hard way knowledge for others, and still some may never comprehend it at all. Body parts are not replaceable!! End mills, drills, reamers, scales, and clamps, even machine tables are. Respect, good judgment, and common sense are a must for operating CNC machine tools and all the guarding and/or bright colored stickers in the world will not protect you better than they can!!!!! Safety Glasses are also a no-brainer when you are in the trajectory range of an operating machine. Try to fathom the thought of a smoking chip of steel penetrating your eye and it will become quite obvious why you need them.

I recently ordered an industrial sized package of straight edge razor blades and sure enough, printed on the sticker, it said "CAUTION: Blades are sharp". I stopped and thought to myself, "sharp razor blades, what a novel idea".

By assuming the role of a CNC machine tool operator you place yourself at risk of bodily harm / dismemberment or even worse unmentionable dangers. Take this responsibility, apply your own respect, good judgment, and common sense; and you will benefit from an enjoyable CNC machining experience.

Ken Cardolino
KDN Tool & Automation Engineering Co. LLC

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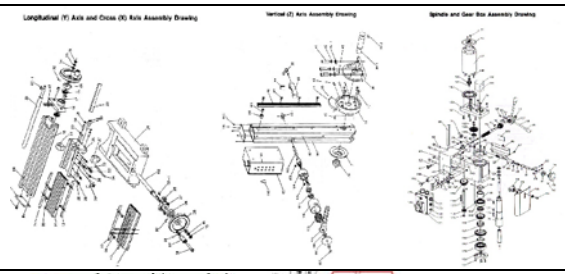
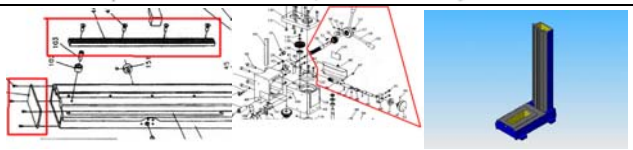
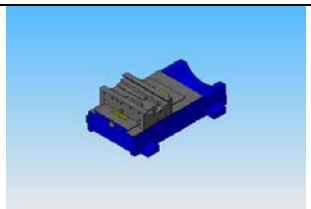
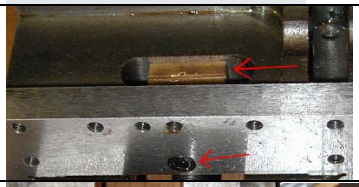
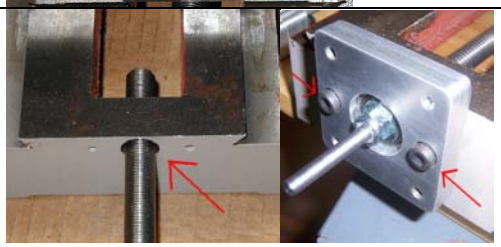
CNC RETROFIT FOR THE SIEG X2 MINI MILL: X & Y AXES

1. Dis-assemble entire mill using the exploded drawings as a guide.	
2. Remove rack gear and column cover from column and pinion and fine feed mechanism from spindle box mount. Continue dis-assembly until you have a bare base and column to work from.	
3. Install saddle onto base, install gib strip, and adjust gib screws for a good sliding fit.	
4. Install new Y axis lead nut and hold in place lightly with M6 retainer screw.	
5. Install Y axis lead screw. Use caution when starting threads into the lead nut. Run threads into lead nut until bearing plate contacts front of base casting. Install two M6 X 20mm plate retaining screws.	
6. Rotate lead screw to pull saddle close to bearing plate. It may be necessary to loosen lead nut retention bolt slightly to improve travel smoothness. Tighten plate retainer screws and rotate lead screw to assure smooth travel.	
7. Y axis is now ready for drive motor.	

1/17/08

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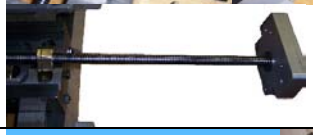
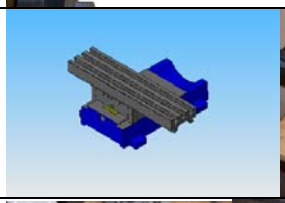
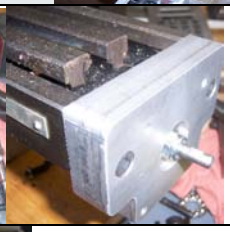
8. Install lead screw/nut into slot in saddle and hold in place lightly with nut retention screws. Rotate lead screw to push bearing plate away from saddle to make room for table adjustment.	  
9. Install mill table onto saddle, install gib strip, and adjust gib screws for a good sliding fit.	 
10. Rotate lead screw to pull bearing plate towards end of mill table. Stop once plate contacts table. Align retention holes and install two M6 X 20mm plate retaining screws.	 
11. Rotate lead screw to pull bearing plate close to saddle. It may be necessary to loosen lead nut retention bolts slightly to improve travel smoothness. Tighten plate retainer screws and rotate lead screw to assure smooth travel.	
12. X axis is now ready for drive motor.	

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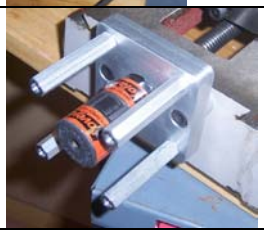
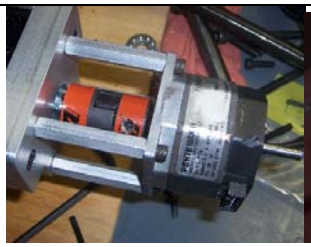
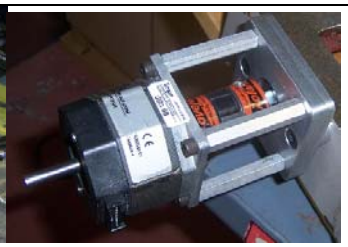
CNC RETROFIT FOR THE SIEG X2 MINI MILL: STEP MOTORS

1. Installation process is the same for all three axes. Only one will be referenced here.	
2. Install four standoff retention studs into bearing plate. Leave 3/8" exposed for standoff engagement.	
3. Install one end of flex coupling onto lead screw shaft. Tighten set screw in coupling hub onto the lead screw shaft extension.	
4. Install four motor standoffs and tighten with 3/8" box wrench.	
5. Axis is now ready for installation of your chosen step motor.	
6. Insert motor shaft into bore of flex coupling. If motor shaft has a flat on it, align it with the set screw on the coupling hub. Lightly push on motor until it's mounting flanges reach the standoffs. Rotate motor until mounting holes line up with standoff threads. Install four #10-32 X ½" screws to retain motor. Finally, tighten coupling setscrew onto motor shaft.	 
7. Axis is now ready for wiring.	

Suggested sources for Step motors, motor drivers, and control software:

Motors

1. www.homeshopcnc.com (Good prices on imported steppers)
2. www.xylotex.com (Imported steppers and domestic drivers)
3. www.clickautomation.com (Mycom / Nyden motors and drivers)

Motor Drivers

1. www.xylotex.com (Imported steppers and domestic drivers)
2. www.stirlingsteele.com (US rep for Canadian driver boxes)
3. www.geckodrive.com (The Ultimate Motor Drivers)
4. www.clickautomation.com (Mycom / Nyden driver lines)
5. www.embeddedtronics.com (Raw pc boards for do-it-yourselfers)

Control Software

1. http://www.dakeng.com/turbo.html (Home of the infamous DOS based TurboCNC)
2. www.deskcnc.com (Home of windows based DeskCNC)
3. www.artofcnc.com (Home to Mach I, II, III software)

Complete Systems

1. www.kdntool.com (Complete system integration)
2. www.cadcamcadcam.com (DeskCNC rep with compatible servo systems)
3. www.timgoldstein.com/secure/eStore/ (Driver and software packages)