ANILAM

ANILAM ELECTRONICS INC.

Anilam Series 1100 Control Retrofit Manual

P/N 70000290C

You have purchased the easiest programming control on the market. The advanced feature versus cost of this control make it one of the most economical controls in todays market and with the canned cycles included, the most advanced control available world wide.

!NOTE! THIS MANUAL IS WRITTEN FOR EXPERIENCED MACHINE TOOL BUILDERS AND RE-BUILDERS. In the following manual you will be led in a step by step description and pictorial through the installation of a new control. Some pages will deal with the installation of the Z axis option. If you have purchased the 2 axis system or the 2+2 system simply disregard these pages. Additional information on the 2+2 system is located at the end of the manual.

Instructions are included for mounting the Z axis scale (included with 2 axis systems) and the Z axis drive housing included with all 3 axis systems.

!!! WARNING !!! In the following text you will find references to an automatic oiler system. To insure a valid warranty on mechanical parts, you must have an automatic oiler installed. One may be purchased with the control package. Call your dealer for pricing and availability.

!!! WARNING !!! This CNC computer console requires a dedicated 115 Volt AC line. This means a direct line from the fuse or panel box to the computer. In lieu of a direct line you may attach the control to a step down transformer connected to the three phase power source. Lines with other equipment plugged in may cause irreparable damage to the computer or associated equipment and will * VOID *** the warranty on the system electronics.**

AXIS DIRECTION SETTING

Please be aware that there are standards in place which govern all numerical machine tool controls. The most important of these is the **AXIS DIRECTION DESIGNATION**. All machines reference the **TOOL** movement, not the part or table movement. Standard movement is Z- when the tool is moving into the work piece. X- when the tool moves to the **RIGHT** (table to left) and Y- when the tool moves **CLOSER** to the operator 9table away from operator). All these movements are view from the normal operators position in front of the machine.

TOOL REQUIREMENT LIST

Step one should be to clean a work area around the machine. This will prevent contaminants from entering areas where precision components are to be installed. Clean the machine with a suitable degreaser. Pay particular attention to the right and left side of the column, the table ends and the front of the knee where the Y axis acme screw exits. These areas will have components mounted on them and must be dirt and burr free.

Step two should be the careful unpacking of the complete assembly. This will require a considerable amount of room and a clean area. Check all packing cartons and material before discarding anything. Individual kits are included with hardware needed for each. Don't mix the hardware. This will ease parts placement on the machine.

The following tools will be needed to assist in the installation.

1. A set of English hex keys. (Allen Wrenches)

2. A set of metric hex keys. (Allen Wrenches)

3. A ball peen hammer and center punch.

4. A set of transfer punches.

5. Drills and taps for 6-32, 8-32, 10-32, 1/4-20, 5/16-18, 5/16-24 & 3/8-16.

6. Tap wrenches for the above.

7. A level.

8. A magnetic indicator base and a .0005" resolution indicator.

9. A set of screw drivers.

10. A file and flat oil stone.

11. A soft faced plastic mallet.

12. A 3/8" electric drill

13. A set of open end wrenches.

14. A digital multi meter with a 10 Amp DC scale.

A WORD ABOUT ACCURACY

The 1100 control has the ability to position any axis to within a maximum of 1 count of accuracy. On a knee type mill this would be either .0005" or .0001". These figures are absolute and are constantly maintained. The bulk of inaccuracies found are the direct result of machine errors. These errors are present regardless of machine type or brand.

These errors may present themselves in several ways. They may be linear errors, pitch errors, or yaw errors. While all machines are built to precise standards, errors will show up as machine members either wear with use, bend under load, shift because of oil clearance tolerances or shift when the direction of travel is reversed.

To insure the highest possible accuracy, we recommend that used machines be inspected by a qualified machine rebuilder. By inspecting and recommending any remedial work necessary, we feel that our control package will live up to the high standards of quality you expect and we strive to maintain at **Anilam.**

To insure maximum life expectancy of your equipment, it is highly recommended that you install a set of way covers on the Y axis ways. By properly oiling the ways and keeping contaminants from the moving parts you will dramatically increase the useful life of the machine hardware.

PREPARING THE MACHINE

*****REMOVE ALL POWER FROM THE MACHINE NOW*****

1. Remove all way covers and way wipers on Y axis. Now pump the oiler several times while moving both axis by hand. You should see oil flowing to the table and saddle ways and a film of oil should be seen on the ways after the table or saddle passes by any point. If any problems are observed, you will have to correct them at disassembly time.

2. To begin the initial installation, remove both hex nuts at the ends of the original acme lead screw on X axis. Pull off the handles and associated sleeves. Remove the woodruff keys on both ends of the screw. Now remove the four socket head screws attaching each end cap to the table. Mark right and left on the caps. The left side cap will be reused at installation time. With a soft plastic mallet, remove the end caps. These are usually pinned in place with roll pins. Some prying may be required to remove these. Set these aside for future use.

3. Loosen and remove the X axis gib. **Care must be taken that the gib is not broken. These are cast iron and do not bend! They crack.** On some machines you will find 2 gib screws for each gib, one at each end. If two are located, loosen the screw on the wide end of the gib and remove the screw. Using a hex key or screwdriver (depending on the screw head design) tighten the one on the small end of the gib to begin pushing the gib out. After sliding out some the large end may be grasped with your fingers and slid completely out.

4. Secure help from a co-worker and a lifting device and slide the table off the end of the saddle. If a suitable bench is nearby, you can raise/lower the knee to set the table at the same height as the bench and slide the table onto it and move the table away from the machine to allow working room.

5. Remove the screws holding the brass split nut into the yoke There may be a small screw retaining the lock screw head. If so remove this first and then remove the lock screw. Now slide the X axis screw and brass nut from the feed nut bracket (yoke). Set the screw carefully aside for future use in a manual mill, should the need arise for replacement.

6. Loosen and remove the nut on the end of the Y axis screw. Again remove the 4 socket head cap screws holding the Y axis end cap to the machine. This cap will not be needed at installation time but the bearings inside may fit a different machine in your inventory. Again Retain them for future use.

7. Remove the Y axis gib (note whether 2 gib screws are present as in X axis) and as before set it aside carefully in a safe area.

8. Follow the same procedure as X axis and remove the Y axis
   feed screw and brass nut. Save for future use if desired.

9. Remove the 4 socket head screws holding the feed nut brkt
   (yoke) to the saddle. Usually these are 3/8-16 or 10mm
   screws. Save the screws and lines for reassembly. Remove any
   oil lines attached to the yoke, lift it up approximately 1"
   and turn the yoke 1/4 turn to remove it.

10. Now mark the sliding Y axis screw covers with front and rear
    to prevent mixup at assembly. If installed in a reverse order
    they will limit the Y travel. Disconnect the flexible oil line
    from the saddle and slide the saddle off the knee. This will
    allow you to clean the saddle ways and check for oil passage
    obstructions. Place the saddle on top of the knee ways and re-
    connect the flexible oil line. Again pump the oiler several
    times and observe that all passages are clear and that the
    oil hole in the gib matches the oil hole in the saddle. When
    you satisfy yourself that the oil flow is OK, disconnect the
    flexible oil line, remove the saddle and set it aside.

Z AXIS PREPARATION

1. Refer to the drawing in the Z axis section for parts identifi-
   cation on the machine. **If installing a three axis system,
   remove the parts marked with an Asterik.** After removing the
   stop screw, remove any linkage connected to the power feed
   unit. This unit will not be needed. Store them as spare parts
   for any other machines you have. **If installing a two axis
   system with a Z axis readout, refer to the Z readout
   installation section on Pages 19 thru 22 before proceeding.**

A SHORT NOTE OF CAUTION ON THE FOLLOWING PAGES

The following procedures are laid out in a progressive fashion to provide continuity to the complete control installation. Some areas of construction are **highlighted** to illustrate points which if ignored could cause repeated callbacks for service. None of these areas are difficult if done logically and thoroughly.

If you have questions regarding any portions of this manual, a simple phone call to the technical department in Miami may be all that is needed to clarify a procedure. The pictorial section in the rear of the manual will also assist visually.

The areas of construction which are critical to a successful installation are listed below.

1. **Ball screw alignment.**

2. **Gib setting.**

3. **Initial system electrical settings.**

4. **Timing Belts.**

5. **bearing preload.**

6. **Lubrication.**

7. **Motor Housing Installation.**

X & Y AXIS BALL SCREW INSTALLATION

1. Remove the X and Y axis ball screws from the cardboard shipping tubes. These are retained in the yoke by one or two screws to prevent axial movement. **The kits are shipped with only one diameter ball nut. If the ball nut is smaller than the yoke bore, use the supplied brass shims. These roll around the ball nut to increase it to 40mm Dia. (1.574").** The yoke may need to be drilled and tapped with either a 1/4-20 or 5/16-18 tap. See next page for drilling the Yoke. These bolt the ball nut to the yoke face. The X axis ball nut is normally bolted to the left side of the yoke. A transfer punch should be used in the slot to mark the hole location. The yoke end which the flange bolts to should be machined square to the bores. **If not, machine to square them with the bores.**

2. Some yokes may have keyways broached internally for keying the original acme brass nuts. If your machine does not have an internal keyway, don't be concerned. The keys are not needed and serve no function.

3. Slide the saddle back on the knee. In the shipping carton you will find a new oil pump <u>if</u> <u>ordered</u> <u>as</u> <u>an</u> <u>option</u>. The optional oiler kit consists of hoses, flow control valves, wiring in sealtite, a new manifold and mounting hardware. This bolts on the column on the rear with two 1/4-20 cap screws. Fill the oiler with way oil and pull the plunger up and release it. This will begin to prime the oil pump. Do this until oil appears at the top of the oil fitting. Install the new flexible oil line included in the optional oiler kit and attach it to the oil manifold of the original machine. <u>NOTE</u>! **An automatic oiler must be installed on every machine. Failure to install or maintain the automatic oiler will void the warranty on mechanical parts. The oiler wiring instructions are included in a later portion of the manual.**

4. Again lift the oiler plunger to oil the saddle ways. This may necessitate several pulls of the handle, waiting about 15 seconds between pulls. Slide the saddle back and forth by hand until a film of oil is seen on the ways. Locate the Y axis gib and lock screws. **Stone and oil both sides of the gib and slide it into the saddle. Install the gib screw (s) and slowly tighten the gib (1/2 turn at a time) until you can't slide the saddle by hand. Now loosen the gib 1/4 turn at time until you can slide it end to end.**

STANDARD YOKE AS SEEN FROM THE LEFT END OF MACHINE

IT IS RECOMMENDED THAT A YOKE OF SUFFICIENT MASS BE INSTALLED. NOTE RIB FOR ADDED RIGIDITY

ENDS MUST BE SQUARE WITH BORES TO PREVENT BALL SCREW DAMAGE

Y AXIS FRONT OF MACHINE
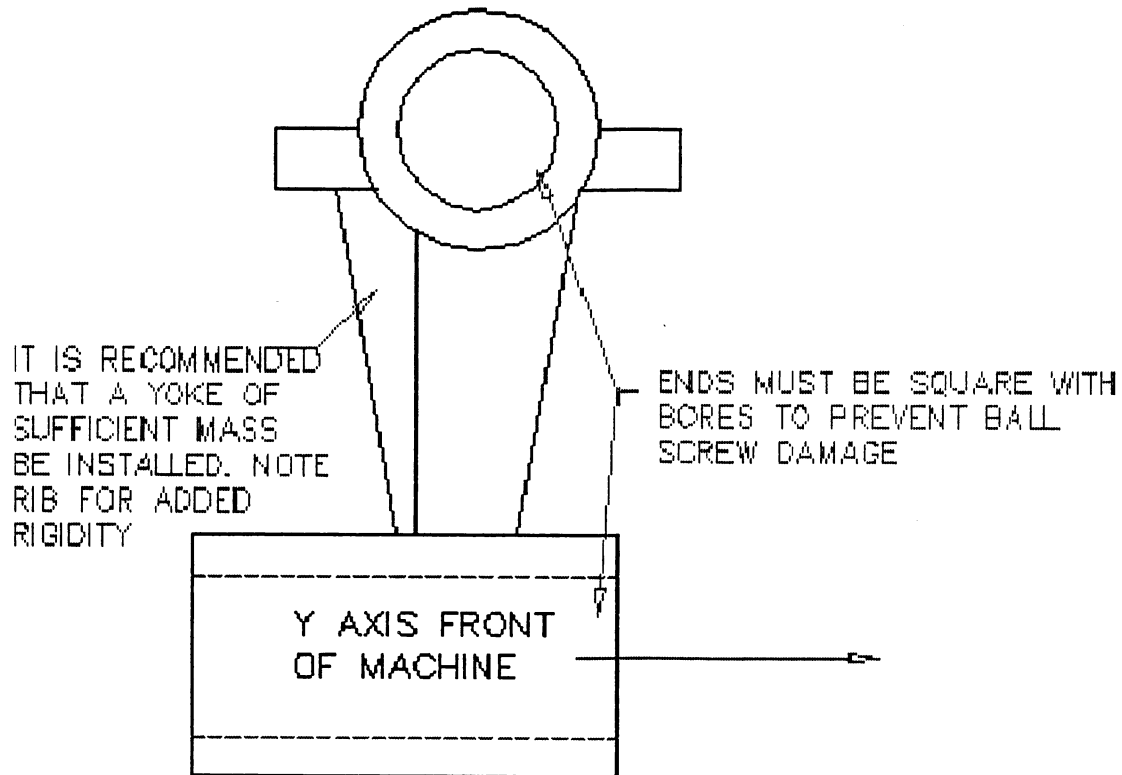
5. **Install the sliding covers under the saddle being careful to replace them correctly as marked during disassembly. Install the yoke in the saddle again being careful to orient it correctly.** Install the X axis ball screw into the X yoke bore. Install the 4 yoke mounting screws and tighten them only snugly. **The yoke will have to be aligned.**

6. Locate the package containing the XY limit switch bracket. This bracket must be installed before the table is replaced and will be mounted on the saddle and to provide the required safety to stop the machine from over traveling in any direction and causing machine damage. Use the drawing on this page as a reference placement guide. Some installer ingenuity may be required here. All types of small knee mills are not alike and may vary from the actual drawing. Use a transfer punch to mark the holes. Drill and tap two 1/4-20 X 3/4" deep holes to bolt on the XY limit switch bracket.

SADDLE

.25 REF

Y PLUS
TRIP

Y MINUS
TRIP
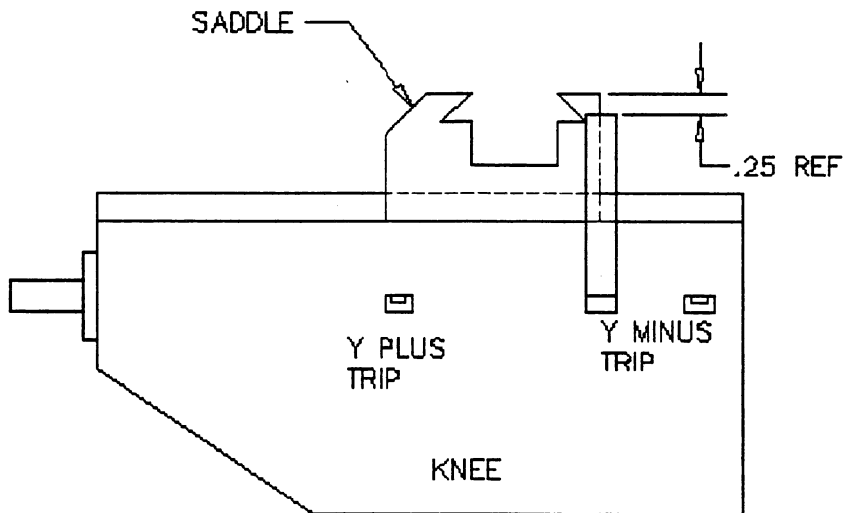
KNEE

7. After securing the limit switch bracket to the side of the
   knee, insert the Y axis ball screw in the bore of the yoke and
   tighten the screws which bolt the ball nuts into the yoke. Do
   this on both X and Y axis. Now install an indicator on a mag-
   netic base for checking the alignment of the X Y yoke assy.
   The X axis ball screw must be indicated on the OD of the screw
   in 2 directions. Only the high points will be indicated, so
   move the indicator slowly. By hand turn the X screw until it
   is about centered in the nut. Slide the indicator base along
   the table way area for indicating the top of the screw. Slide
   the indicator base along the rear of the saddle with the point
   on the side of the screw for aligning in the other direction.
   After squaring, indicate the stub (.625 Dia) on the Y screw by
   sliding the saddle in and out and the indicator base on the
   knee way with the indicator point on the top and side of the
   stub. This should be within .002" or less. If the top of the
   screw is not straight, you will have to shim the yoke. By
   placing .002" of shim under the front side of the yoke, the
   screw stub will pitch up an extra .002" approximately. If the
   side of the stub is off you must remove the Yoke and check it
   for squareness of the bores. If not square the Yoke should be
   replaced. **OUT OF SQUARE INSTALLATIONS WILL CAUSE EXCESSIVE
   BALL SCREW WEAR!**
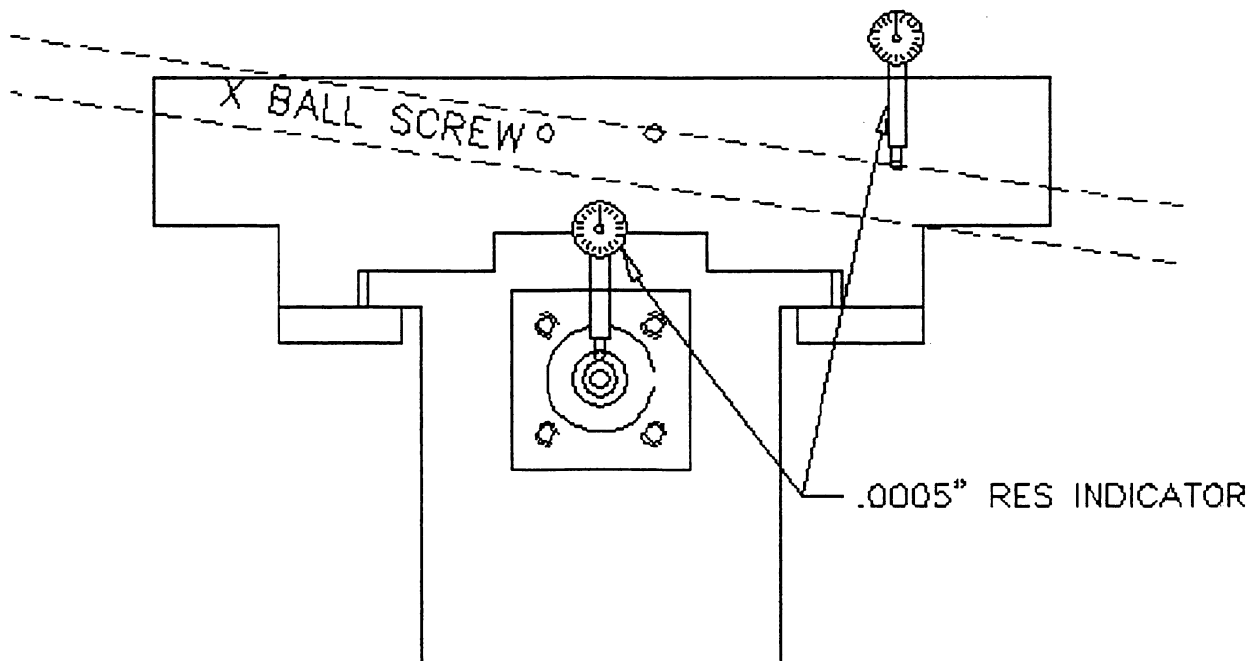
.0005" RES INDICATOR

Y AXIS DRIVE HOUSING PARTS LIST

663122

663110

666622

663149

663127

672948

672947

663121

863205

661733

672305

672188

370117

663205
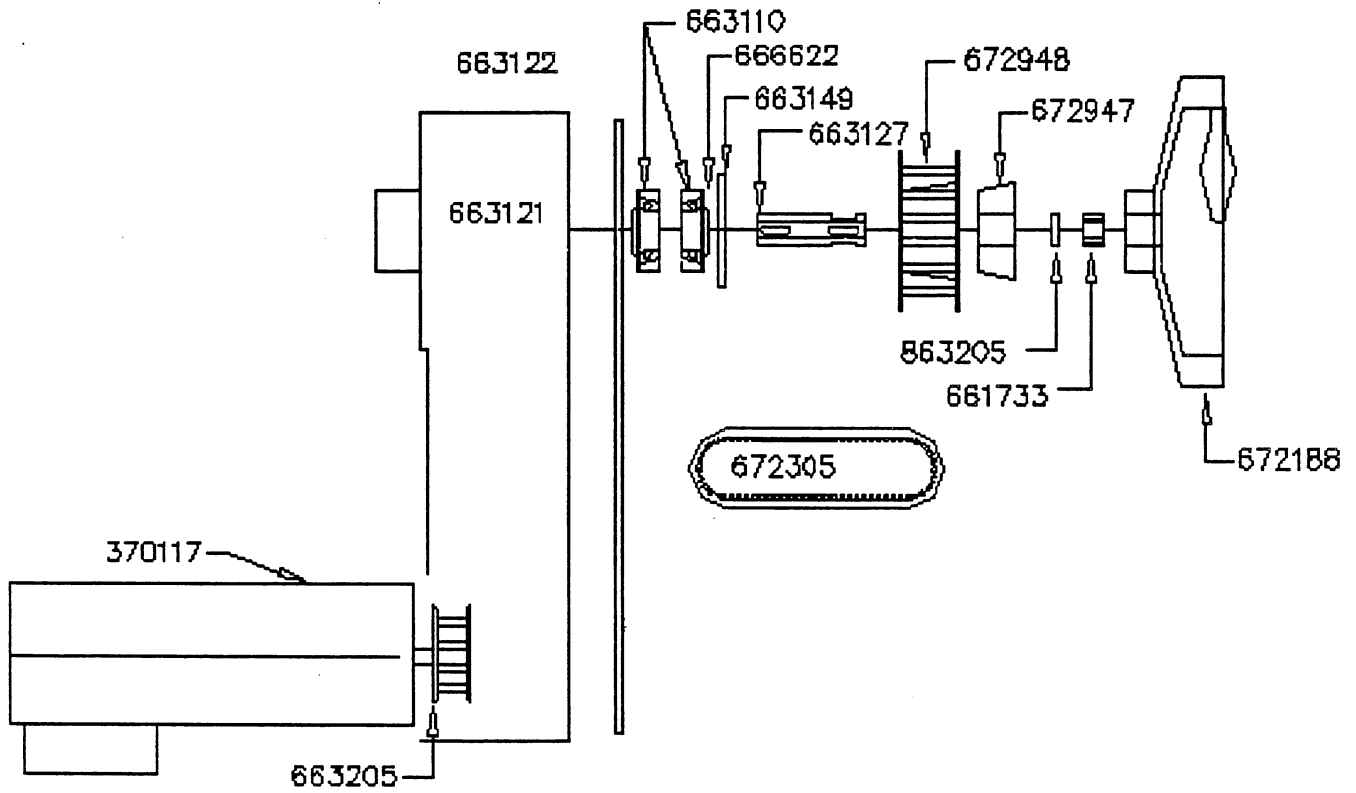
8. **Tighten the four mount screws on the yoke. The two original pins are not used again and should not be placed in the yoke.** Two new pins are shipped with the kits and may be used in new holes you drill after alignment. Now locate the Y axis drive housing. Remove the cover with the six 1/4-20 button head screws. Slide the saddle out towards you and wind the ballscrew in to allow placing the housing on the end of the screw.Using the supplied socket head cap screws for mounting, install the housing loosely. Insure that the ball screw has a woodruff key installed in the key slot. If the keys are hard to install, file the side of them lightly to ease installation. Slide the sprocket adapter on (shown on the next page) and install the 1/2" washer and 1/2-20 nut. **Note that the sleeve fits inside a stamped bearing seal which presses against the bearing. The seal has an inside diameter approximately .030" larger than the sprocket adapter. Be sure the adapter fits inside this seal diameter. If not seal damage will occur, allowing contaminants to enter the thrust bearings. If seal centering is required, loosen the three 1/4-20 button head screws and center the seal.** Place an adjustable wrench on the adapter over the two flats. <u>Using</u> <u>a</u> <u>3/4"</u> <u>wrench</u> <u>tighten</u> <u>the</u> <u>nut</u> <u>to</u> <u>approximately</u> 20 <u>FT/lbs.</u> <u>Take</u> <u>care</u> <u>to</u> <u>not</u> <u>overtighten</u> <u>the</u> <u>nut</u> <u>and</u> <u>strip</u> <u>the</u> <u>ball</u> <u>screw</u> <u>threads</u>. Tighten the four housing mount cap screws. Install the pulley hub in the pulley and put a key in the 3/16" wide key slot. Slide the ball screw pulley in as far as possible and pull out about 1/16". Now tighten the two 1/4-20 set screws to draw the hub into the pulley.Alternate between the two screws until tight.

SADDLE TOP VIEW

BALL SCREW FLANGE —

— YOKE SCREWS

ORIG PINS —
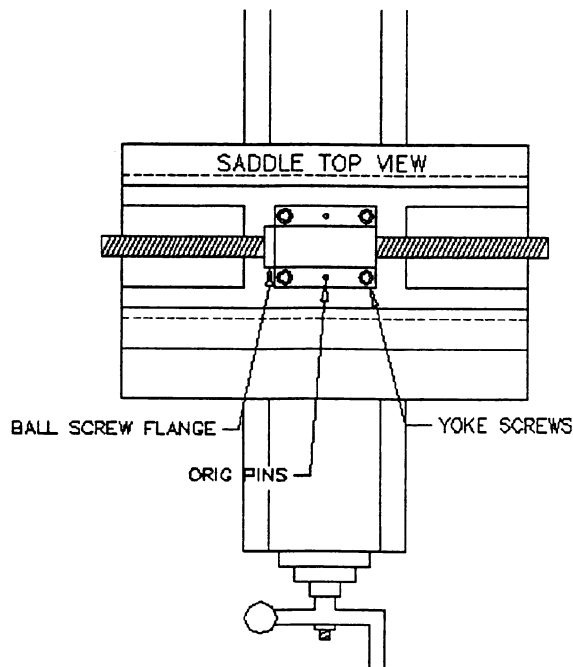
UNIVERSAL SPROCKET
ADAPTER (FOR BRG
COMPRESSION AND
PULLEY MOUNTING)

THIS END
MUST FACE
BEARINGS

└─ Wrench Flat:
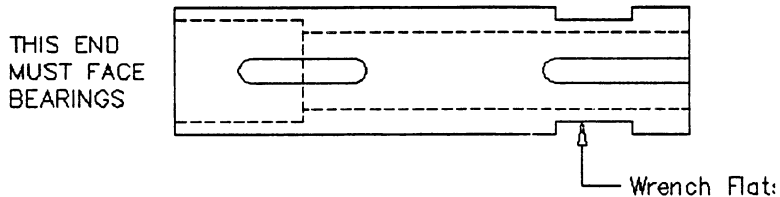
9. Locate the two oil lines which used to oil the original brass
   nuts on X and Y axis. These will now be used to lubricate the
   ball screws. Place the lines in the hole in the edge of the
   mounting flange. Note that there are 2 tapped 10-32 holes in
   the flange. Don't confuse these with the 2 drilled holes
   for the wiper lock screws. The wiper screws are not tapped
   at the beginning of the holes and have set screws located
   deeply within them. **Either of the tapped holes may be used
   for oil. Plug the unused hole with a 10-32 set screw. The hole
   selected for oiling is sized to allow the oil line to be
   snugly slid into the hole. A good method of securing the line
   is a few drops of 5 minute Epoxy available at any hardware
   store.**In the event neither hole is used, you may attach the
   line in a manner which allows it to drip directly on the OD of
   the screw next to the ball nut. **Either method will work but
   one or the other must be used.**

10. Clean, oil and install the table being careful to prevent
    damage to the ball screw. Next stone, clean, oil and install
    the X axis gib. **As in the Y axis, oil the ways first and
    tighten the gib until the table can't be moved by hand from
    end to end of travel. Loosen the gib screw 1/4 turn at a time
    until full table travel is reached.**

11. The X axis drive housing uses the exact same internal parts
    as the Y housing. Remove the six cover screws and set the
    cover aside. Install the housing on the right end of the
    table with the provided cap screws. Only tighten lightly.

    Install the sprocket adapter as on Y axis and after tighten-
    ing the nut and washer on the end of the X ball screw, turn
    the ball screw until the table is flush with the saddle on
    the left end. **Now install the original left end cap with no
    pins.** Tighten the mounting screws. <u>**If the screws don't fit
    correctly, don't force the cover in any direction to allow
    them to fit. You may have to increase the hole and counter
    bore size to allow proper alignment.**</u> Turn the ball screw
    again until the right table end is flush with the right end
    of the saddle. Loosen the mounting screws and allow the
    housing to move freely and center itself. **Do both ends at
    least one more time and the screw should be roughly aligned.**
    By moving the table to each end several times and releasing
    the mount screws, you allow the ball screw to move the cast-
    ing to approximately the correct position.**REMEMBER** <u>the gib
    must be set snugly for this to work.</u>

X AXIS DRIVE HOUSING
PARTS LIST

663122

663110

666622

663149

663127

672948

672947

663120

863205
661733

672305

672188

370117

663205
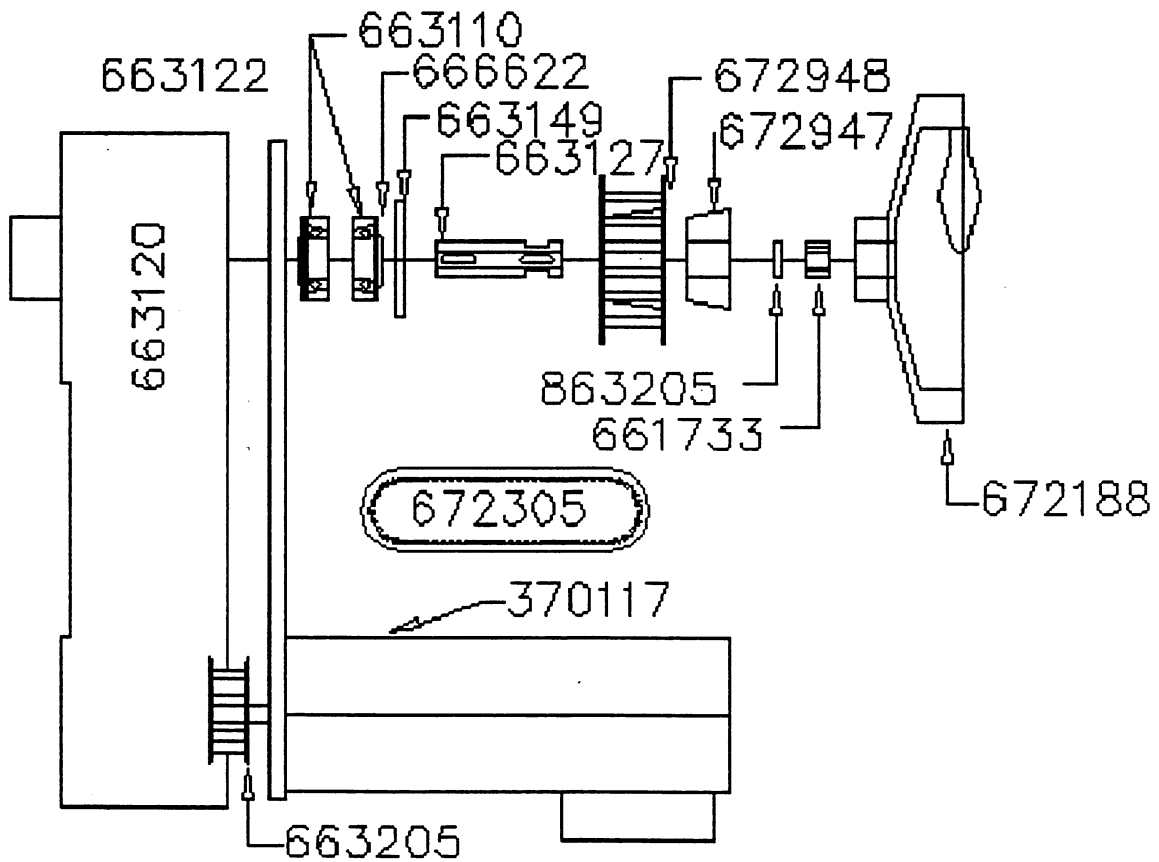
11. The X axis ball screw may be indicated now to verify correct alignment. By using a surface gage and indicator you will be able to check the high point of the screw on each end and next to the saddle. Again the gibs must be correctly set before proceeding. **Move the table to either end and refer to the diagram below for indicator placement. Check the screw next to the saddle and set the indicator to "0" at this point. Slide the indicator to a point next to the end of the the table and again check the high point of the screw. It should be within .002" or less. If not crack the housing mount screws loose slightly and tap the housing with a plastic hammer to align it. Check the screw in the other direction and again align within .002".**

TABLE

PUT SURFACE
GAGE HERE TO
CHECK SCREW
SIDE ALIGNMENT

SADDLE

PUT SURFACE
GAGE HERE TO
CHECK SCREW
BOTTOM ALIGNMENT
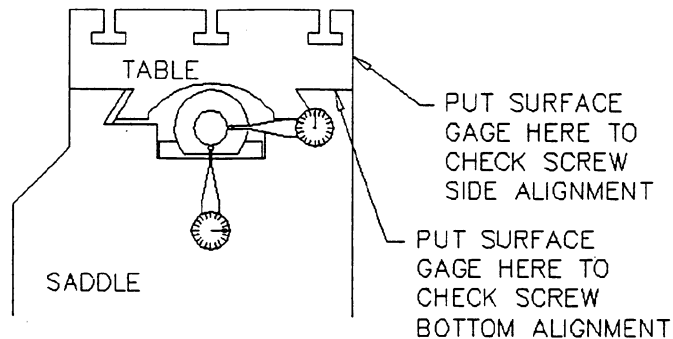
12. Move the table by hand to the opposite end and repeat this procedure on the opposite end. After completion the screw will be correctly aligned.

13. Now the X motor may be mounted. To mount the X motor remove the round access cover on the lower rear face of the housing. This provides access to the belt to test for tension. Using the four 8MM screws, washers and lock washers supplied with the kit, bolt the motor on to the drive housing cover with the plug at a 4:30 position on a clock as seen from the end opposite the pulley shaft. Slide the motor up in the slots and lightly tighten two of the screws. Use a straight edge and scale to place the drive belt pulley on the motor. Measure the pulley hub to cover distance. This should be the same as the dimension from the cover seat on the drive housing to the previously installed ball screw pulley. These must be within 1/16" of each other. Any more will cause premature belt failure. After setting the pulley distance, install the belt and cover/motor assembly. Through the belt access hole you can insure that the belt is on the motor pulley. Loosen the motor screws and allow the motor to drop and tension the belt. Turn the ball screw a few revolutions to be sure the belt teeth are engaged. Tension the belt snugly and tighten the four motor mounting screws. Now install the remaining 3/16" sq drive key in the sprocket adapter in the outer slot. Install the hand wheel leaving about 1/32" clearance between the wheel and the cover. Tighten the two set screws to lock the hand wheel in place.

14. The Y axis motor mounts from the rear of the Y drive housing. Use the same type screws and washers on the motor. Be sure That the Spacer/cover assembly is put on the end of the motor before bolting it to the rear of the housing. The motor is positioned to allow the plug to be parallel with the flat on the cover. This puts the plug at the 4:30 position on a clock as seen from the front. As in X axis, don't tighten the screws yet. Install the drive pulley on the motor and as in X, measure the pulley position so that it lines up with the ball screw pulley. Again 1/16" maximum misalignment. Tension the belt (usually at the correct tension you will be able to turn the belt 90 Deg by fingertips at a point 1/2 way between the pulleys)securely and tighten the motor mounting screws. Install the cover with the six button head cap screws. Now install the remaining 3/16" sq drive key in the sprocket adapter in the outer slot. Install the hand wheel leaving about 1/32" clearance between the wheel and the cover. Tighten the two set screws to lock the hand wheel in place.

Z AXIS READOUT INSTALLATION

        If you have purchased the two axis system, you will receive
a scale assembly kit for use on the Z axis. This acts as a digi-
tal readout for the Z axis and allows you to control the tool
depth. This scale reads out in .0005" increments. **Be sure when
setting the values in the SETUP procedure that the Z axis is
listed as a scale and the resolution is 10 MICRON (.01MM) and the
display is set at 10 MICRON (.01MM).**

1. Unpack the quill scale kit and place on a clean bench. This
   will help in identifying the parts. Refer to the picture below
   for help in identifying which parts to remove from the
   machine head.
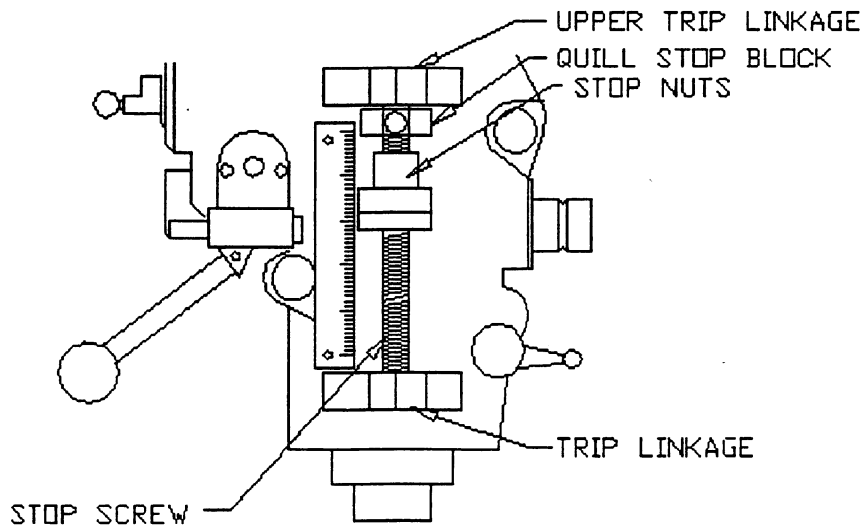
2. The following page has a parts list and pictures to help in
   identifying the scale installation parts.

PARTS

20000606	SCALE, MICRO Q D10	1	EA
97200001	BLOCK QUILL STOP/BT	1	EA
67200751	BLOCK, MTG Z AX SC BACKER BAR	1	EA
67200752	BAR,BACKER Z AX SC MTG	1	EA
67200753	BRKT,Z AX RD HD MTG	1	EA
86100141	SCR MACH 6-32X1" SOC HD	4	EA
86100217	SCR MACH 8-32X 1/2" SOC HD	2	EA
86100310	SCR MACH 10-32X3/4" SOC HD	2	EA
86100318	SCR MACH 10-32X1" SOC HD	2	EA
86300121	WASHER,LOCK #8 SPLIT	2	EA
86300217	WASHER #8 .31 ODx .03THK SS	6	EA

SCALE BACKER BAR

SCALE BACKER BAR MTG BLOCK

READER HEAD BRACKET
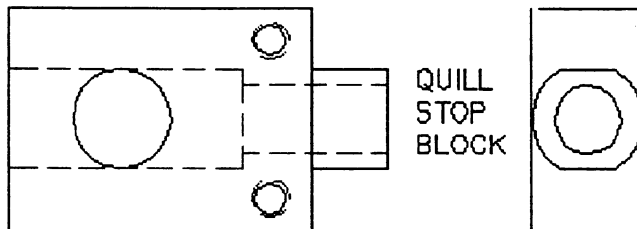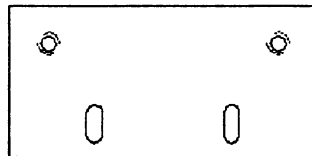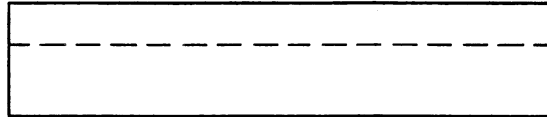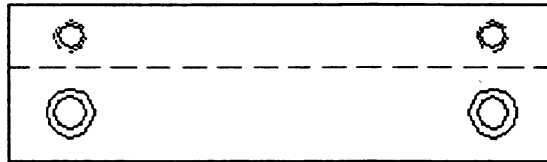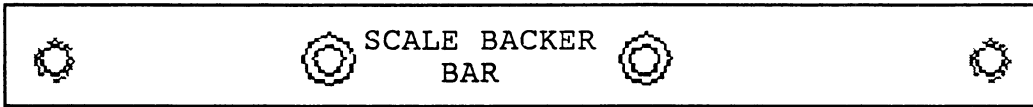
QUILL STOP BLOCK

2. Remove all the stop screw parts and the original stop block.
   A new block is supplied with each kit. The block should have
   as little clearance as possible. If the clearance is exces-
   sive, the block should be welded on one side and reground to
   fit correctly.**The block must fit the slot correctly. A loose
   block will cause the scale to misread as it is moved.**

3. After fitting the block, you may mount the backer bar mtg
   block. This is done by enlarging the tapped ruler mounting
   holes from the original assembly. Mount the block with the
   screws shipped in the kit. Make sure the two tapped holes in
   the front face of the stop block face to the left when assem-
   bling the unit. Now start the spindle and check the Z power
   feed for correct operation. The Feed engagement handle should
   snap to the off position when the stop block contacts the
   adjustable stop nuts. If the handle does not function proper-
   ly, repair before proceeding with the installation.

4. Install the scale backer bar on the mount block with the
   screws in the kit. Install the reader head mount bracket on
   the front face of the of the stop block using two 8-32 X 1/2"
   socket head cap screws. Use flat washers under the screw
   heads.

5. Using the two 10-32 screws, attach the backer bar to the front
   of the backer bar mount bracket. Using an indicator attached
   to the stop block, indicate the edge of the backer bar while
   moving the quill up and down. Align vertically for both ease
   of scale installation and appearance. Any misalignment here
   will be visible when the work is completed.

6. Mount the scale on the backer bar with the two 6-32 screws
   included in the kit. Indicate the edge of the scale to insure
   it is aligned with the vertical quill travel. It should be
   within .002" in the full travel of the quill. Indicate the
   face also to insure the same .002". If The face is not correct
   you must shim under the backer bar to correct this.

ANILAM P/N 2000060
MICRO Q D-10 SCALE
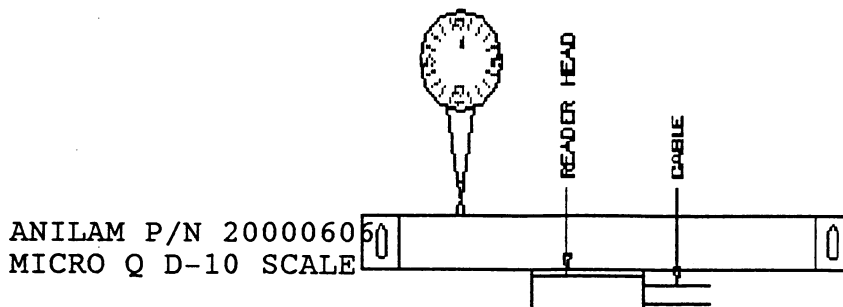
7. Remove the indicator base from the reader head bracket.
   Move the quill until the bracket is behind the reader head.
   The reader head bracket has slots where the attachment screws
   secure it to the stop block. These allow extra in-out
   movement for aligning the reader head. Put the 2 reader
   head attachment screws in the plate. Don't tighten them yet.
   If they are centered in the holes, tighten the plate to stop
   block mounting screws. There should be 1/16" space between
   the back face of the reader head and the bracket.

8. Locate a surface to place the mag base and put an indicator
   point against the face of the reader head. Locate the three
   jack screws next to the reader head mount screws. Tighten
   them one at a time and watch the indicator. When the
   indicator shows the reader head has moved out .002" with
   the first screw, stop tightening this screw. Tighten the
   next screw until movement is seen and back it off slightly
   until the original .002" reading is seen. Follow the same
   procedure for the third screw. Now tighten the two attachment
   screws to secure the head. **Caution!**. Don't overtighten
   the screws and warp the head casting. **2 FT/LBS TORQUE.**

9. Remove the tiny screws attaching the orange alignment
   brackets to the reader head on each end. Slide the brackets
   away from the head about 1/2" and turn sideways to remove
   them. Save these parts for future use.

10. Tywrap the cable to the machine head after determining how
    much slack to leave for quill travel. Remember **NOT TOO TIGHT
    ON THE WIRES. EXCESSIVE STRAIN MAY BREAK THE CONDUCTORS.**
    Run the reader head cable alongside the ram and attach it
    with tywraps. The cable plugs into the servo amp cabinet
    using a PTO connector located on the rear of the cabinet.

LIMIT SWITCH TRIP INSTALLATION

1. By hand you may now move X and Y axis to locate where the limit switch trips will be placed. Trips are held in place by 10-32 soc hd cap screws. Refer to the page with the knee diagram and limit switch bracket for assistance. Move X axis until the saddle is flush with the left end of the table. This is where the machine will hit a limit switch in the X - direction. Place the trip on the rear of the table pushing the limit switch in 1/8" and pencil in the slot on the table rear. Move the X axis until the right end of the table is flush with the right end of the saddle. Again pencil in the slot of the trip. These penciled lines will be the area to drill and tap two 10-32 holes to bolt on the trips. After completion, install the two trips.

2. Using the hand wheel, move Y axis **slowly until you hit a positive stop in the Y + direction.** Turn the hand wheel 2 turns in the opposite direction. This will equal approximately .4". This will be the point at which the Y axis will contact the limit switch. Pencil in the trip slot on the side of the knee and move the Y axis to the opposite end of the travel and again move off the dead stop 2 turns (.4"). Place the remaining limit switch trip there.

SERVO AND COMPUTER MOUNTING

1. The servo mounts on the right hand side of the column base. Drawings are shown on the next 3 pages to facilitate the mounting. Using the drawing for dimensions, locate the four mounting points and center punch the locations. Drill through the casting with a 5/16" drill. Tap the holes 3/8-16 thru. Using the hardware provided, install the mounting bars using a level to place them. The 1/4-20 jack screws in the mounting bars are used to square the mounting faces as needed. Spacers are included in the mounting package. These may be used behind the mounting bars on the top to space them out more than the jack screws allow. Use the longest 3/8-16 cap screws when using the spacers. After mounting the bars, you may attach the servo assembly to the mounting bars.

2. The computer box mounts on the left side of the column, as shown in the drawing on page 26 of the manual. It is a mirror image of the servo mount holes on the opposite side. Again using the drawing as a guide, locate the four 5/16" diameter holes and tap them to 3/8-16 thru. The mounting bars are duplicates of the servo mounting bars including jack screws. Level the bars and with the jack screws, square the mounting faces. Mount the computer enclosure with the 3/8-16 screws, washers, lock washers and nuts provided in the kit.

TYPICAL MOUNTING BARS

SERVO AND COMPUTER ENCLOSURE
EAR MOUNTING SLOTS

1/4-20 JACK SCREW HOLES

SERVO AND
COMPUTER
MOUNT BARS

3/8-16 SOCKET HEAD CAP SCREWS

JACK SCREWS

MOUNT SPACERS
NUTS, LOCK WASHERS AND FLAT WASHERS
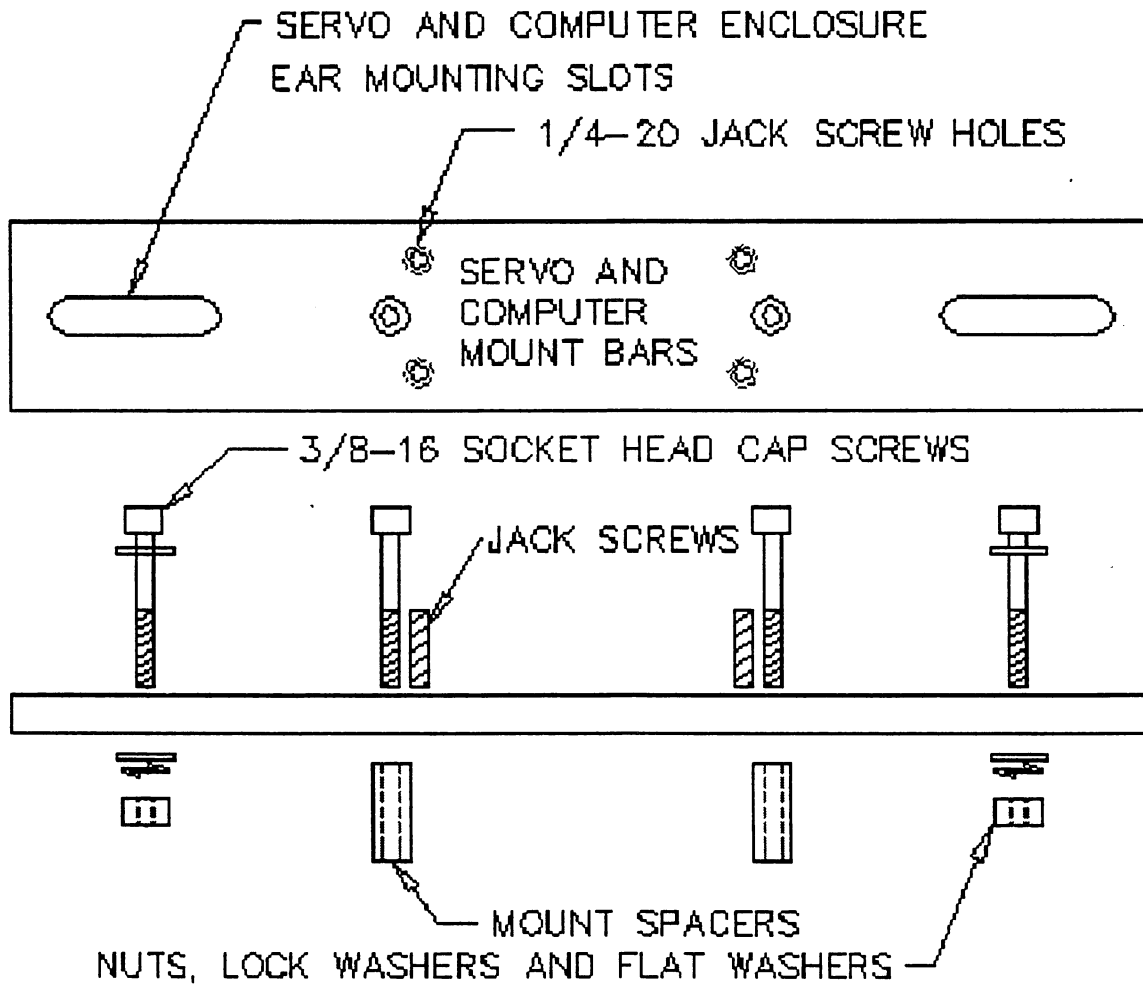
Use Dwg below for servo location on machine.

SERVO CABINET MTG
HOLES 3/8-16 TYP

8"   5"

27 3/8"

KNEE

12 7/8"

COLUMN
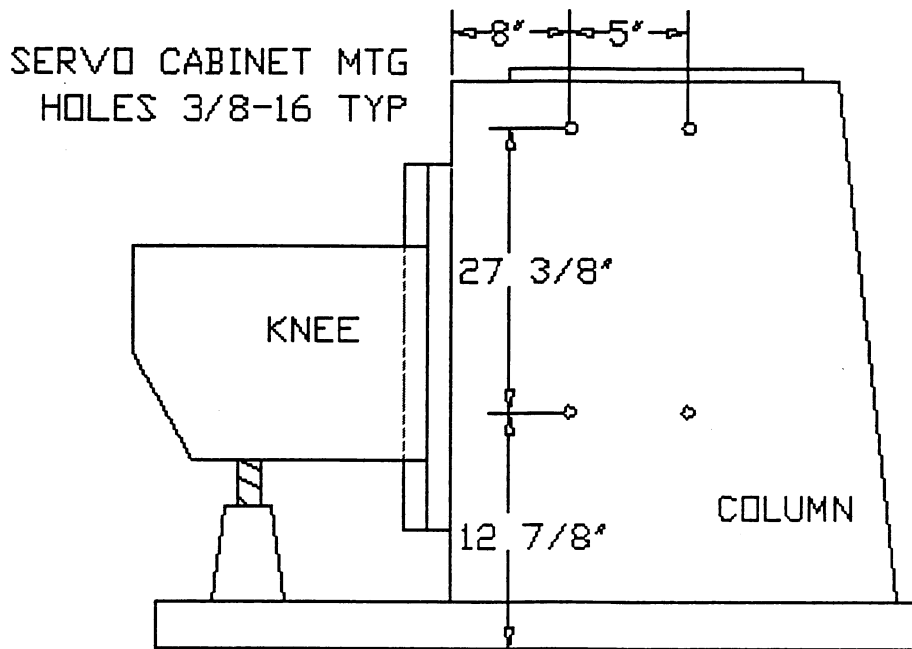
Use Dwg below for computer location on machine.

COMPUTER CASE MTG
HOLES 3/8-16 TYP

KNEE

COLUMN

27 3/8"

12 7/8"

5" 8"
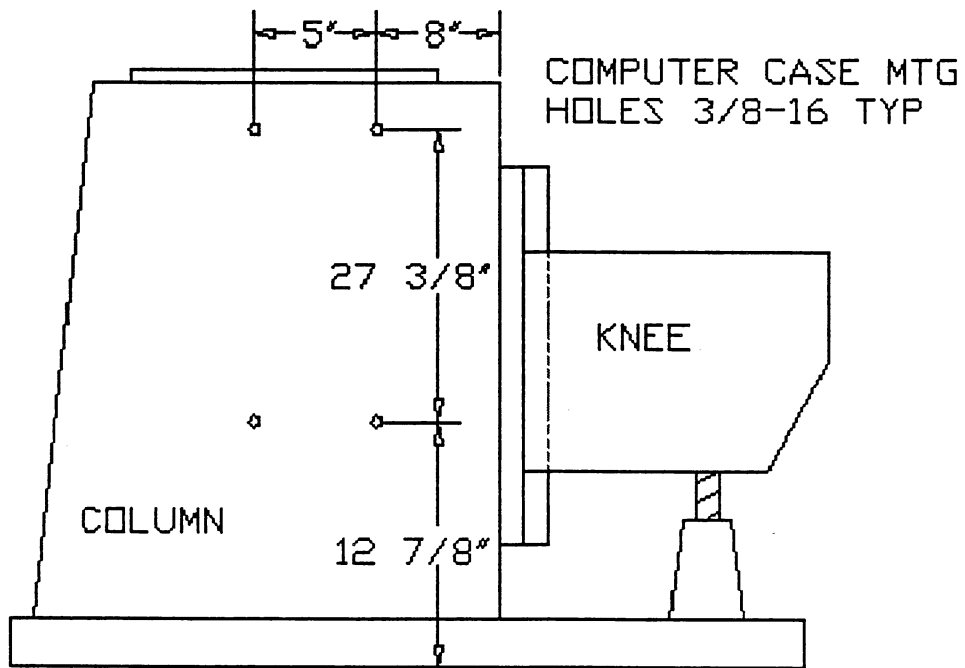
CONSOLE MOUNTING

1. The computer console mounts on an arm secured to the ram and located directly behind the quill handle. **This location will cause an interference problem with the quill handle. A round wheel (8" Dia) may be substituted for the lever type quill handle to alleviate this condition.** The handle will not rotate more than approximately 300 Degrees. On a 3 axis system this will be acceptable because the only time the quill need be moved manually is in setup or inadvertently hitting a quill limit switch. With 2 axis systems the Z axis will have to be positioned manually. Six longer 1/4-20 X 1 1/4" cap screws and 6 longer 1/4-20 X 1" set screws are included in the kits to allow moving the mount back (away from the head)approximate ly 5" on the ram to allow the required clearance. A drawing follows to show the approximate location. Again this location may be changed to suit the customers needs. The large hole in the base plate should fit over the swivel pin on the head knuckle. The base swivel is attached with six 1/4-20 cap screws. Tapped holes next to each mounting screw hole are provided. These may be used with set screws to level the mount. In the event the Ram casting is not machined in this area leveling set screws may be required. See the next page for an assembly view of the console mount with hardware.

CONSOLE ARM MTG SURFACE

Z Axis Housing
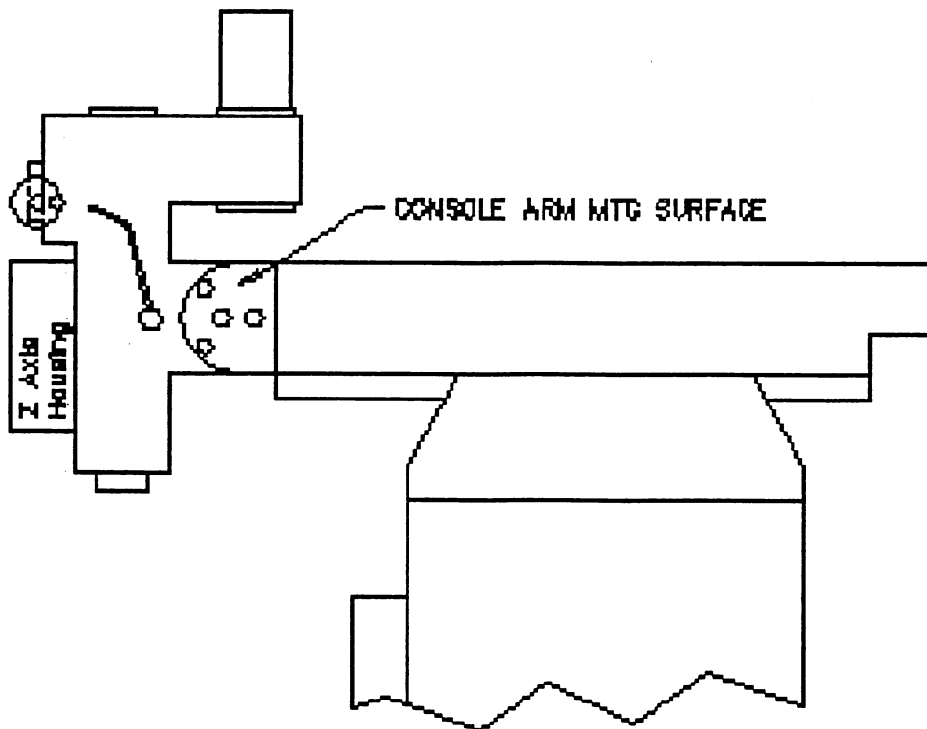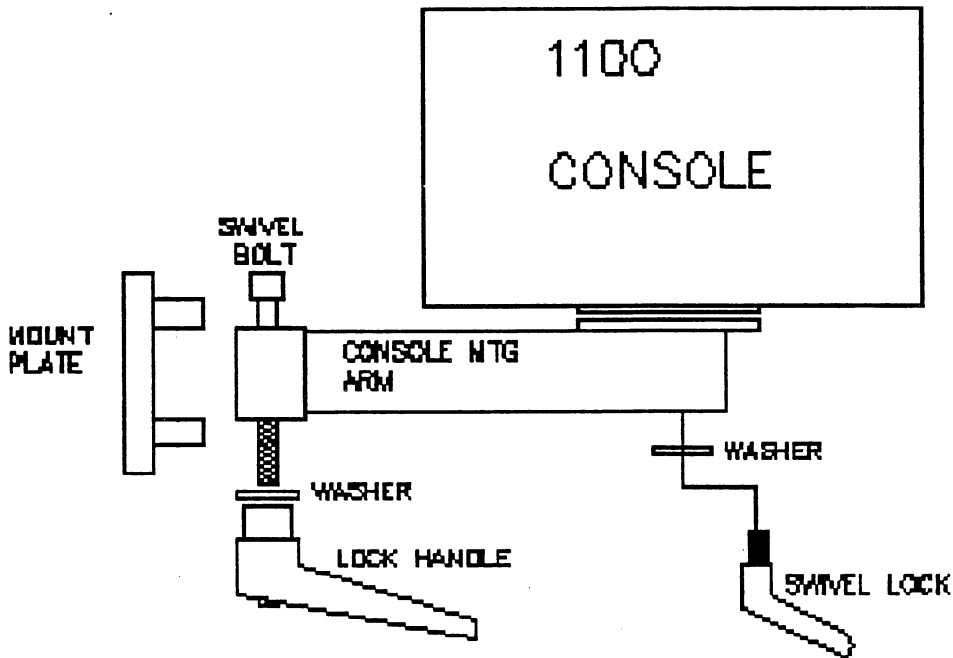
Use the 1/2" washer on the console swivel bolt to allow tightening of the arm. The other swivel handle also has a 1/2-13 sleeve on it. Use the other 1/2 " washer on the handle before installing it to attach the console to the arm. This allows the console to be turned to a comfortable viewing angle. After moving the console, tighten the two handles to lock it in position.

The Z axis option gives the machine the ability to cut parts without operator intervention except for tool changes. The following paragraphs detail installation and check out of the entire Z axis drive assembly. Pictures are included to help clarify the installation. Anilam Electronics can supply a drill jig for hole placement. The P/N 65600004 is a bushed drill jig for the four 1/4-20 mounting holes. Consult your dealer or Anilam Electronics in Miami Fl. 305-477-6265 (Parts Dept).

1. Clean the front and both sides of the Z axis with a suitable machine cleaner. **Tram the head to table alignment and correct if not at "0"**. Refer to the diagram below for correct part removal and remove all these parts. Save these parts for use in the event you remove the control and place it on a newer machine in the future.

REMOVE PARTS MARKED
WITH AN ASTERIK *
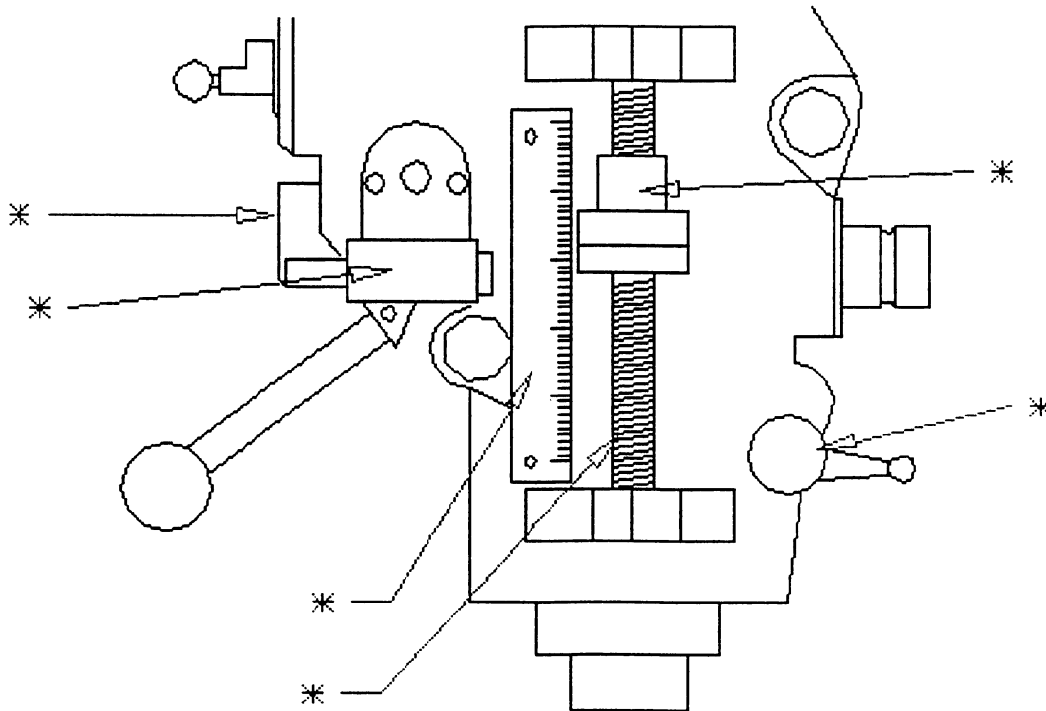
2. Locate the package with the Z axis quill drive and associated hardware. Unpack the parts on a clean bench for aid in identifying associated parts. A scale and micrometer will be needed to check screw length during assembly. The drawings below will aid in identifying the parts in the kit.
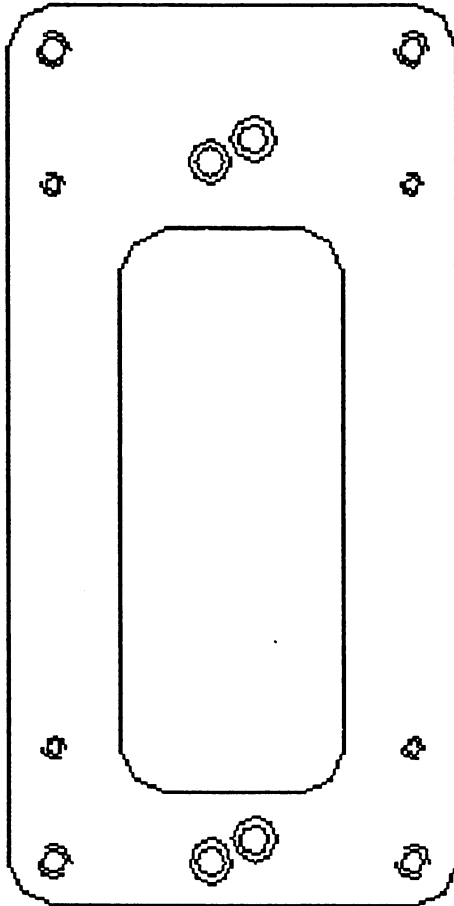
Z AXIS BASE MOUNTING
PLATE

CHIP SHIELD ON
REAR OF BASE
PLATE 2 PLCS

The drawing below shows the mounting plate for the Z axis drive assembly casting. Note the two bent sheet metal plates that mount on the rear of the base plate. These are held in place with 10-32 button head screws. After drilling and tapping the mounting screw holes, install the rear covers and trial fit the assembly. The covers may have to be modified slightly to accommodate your particular machine.

CHIP SHIELDS 2 PLACES
BEHIND MOUNTING PLATE

Z AXIS CASTING
MOUNT HOLES
FOUR PLACES

1/4-20 X 1
SOC HD CAP
SCREWS 4
PLCS

10-32 BUTTON
HD SCR 4 PLCS
IN REAR

DRIVE BLOCK
TRAVELS IN
THIS WINDOW
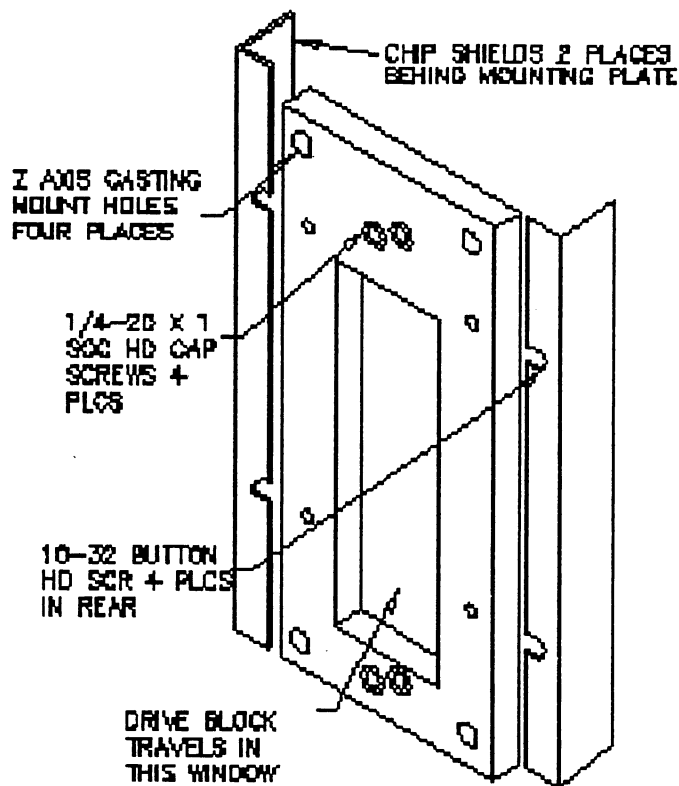
3. A drill jig is recommended (Anilam P/N 656004) for mounting the base plate. The complete Z axis casting assembly bolts to the base plate and care should be exercised when installing the base plate. The drawing below shows the location of the base plate on the head. **Note that the width of the slot in the head may be larger than the width of the jig. In this case you should put a shim on either side of the jig to center it in the slot. Also note the position of the holes in the ears. Be sure the holes are positioned vertically so that all four holes are on the ears and don't break out of the top or bottom of the ears.** The jig is used with a # 7 drill to locate the four mounting holes.

SEE TEXT
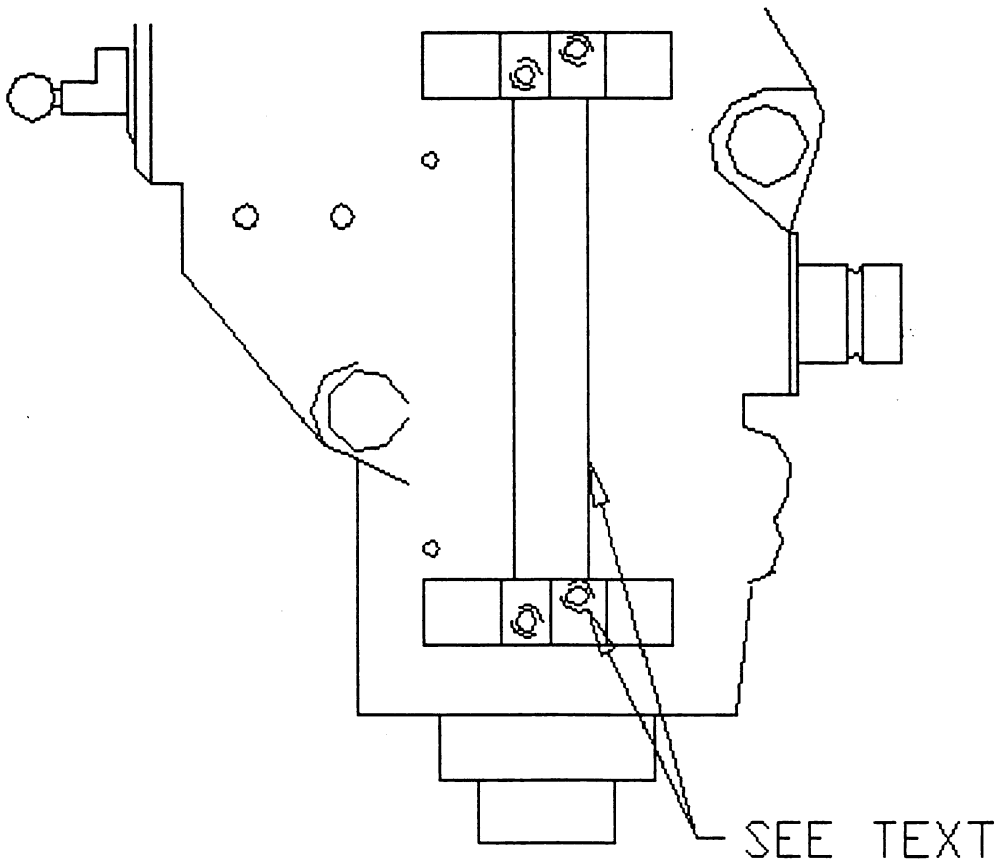
4. After cleaning off the paint and marking the four holes, drill with a #7 drill 1" deep and tap 1/4-20 X 3/4" deep. Using the supplied 1/4-20 X 3/4" socket head screws, attach the base plate and tighten securely.

5. Using either the 10 MM or 3/8" socket head cap screw in the installation kit, attach the drive block to the quill using the tapped hole from the quill stop block. The ball nut tapped holes (1/4-20 two places) **face down** when the drive block is installed on the quill. Note that each drive block is shipped with a key which locks the quill to the drive block. This may be either a square key or a round one, dependent on which kit was ordered. Also some drive blocks may have a foot cast on them which will require drilling the quill and tapping it. A 1/4-20 or 5/16-18 tapped hole will be required. See below for the drive block drawings. **The spindle must be removed from the quill to prevent chips from entering the thrust bearings.**

KEY SLOT

BALL NUT MTG
SURFACE DOWN

KEY SLOT

BALL NUT MTG
SURFACE DOWN

MOUNTING FOOT
REQUIRES EXTRA
TAPPED HOLE IN
QUILL
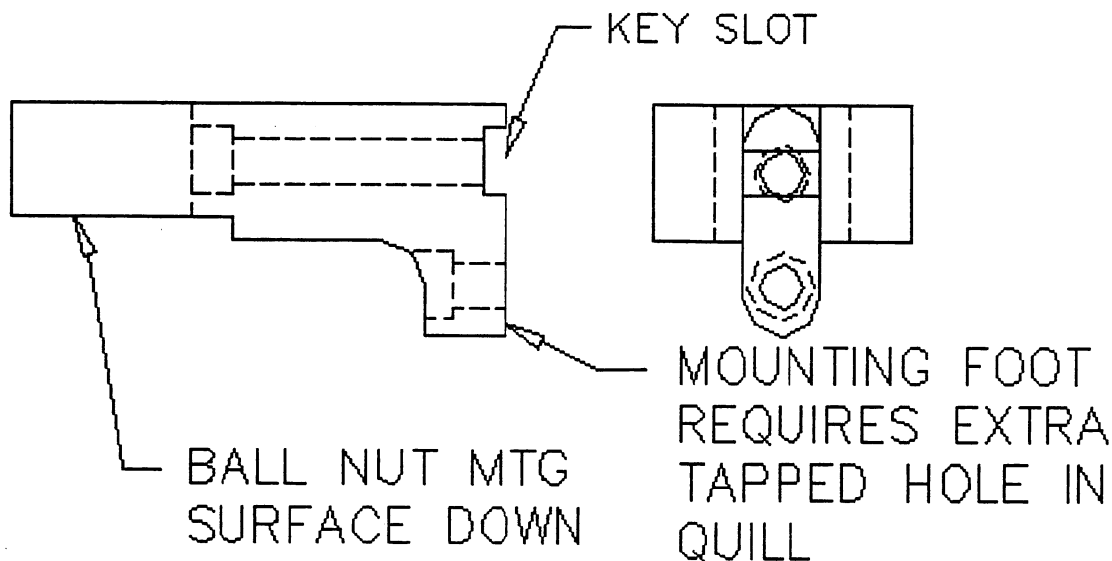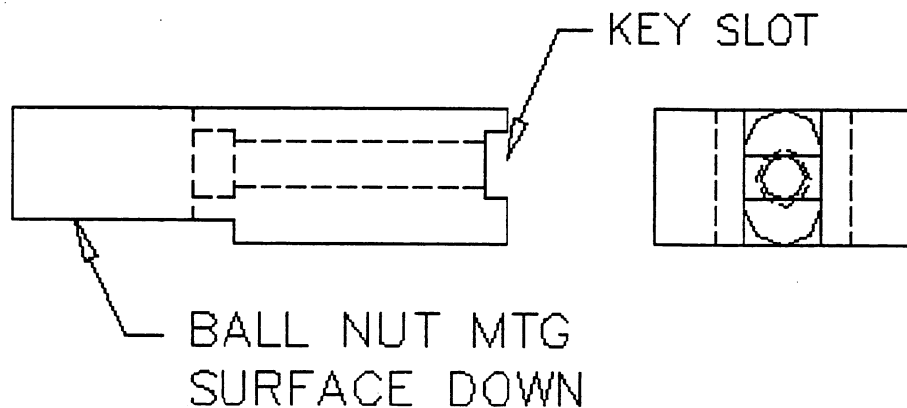
6. Before installing the drive block, check the depth of the counterbore in the quill and the drive block. The sum of these two dimensions must be larger then the thickness of the drive key. If not the block will not bolt squarely on the quill. Use the correct bolt supplied in the kit. A high collar lock washer may be provided for placement under the drive block bolt. Check the bolt length with the washer installed and both placed in the drive block. The correct length should be the same as the thickness of the quill wall. Using a screw which is too long will prevent the spindle from being removed from the quill. This may not pose a problem immediately, but will be a problem should spindle service become necessary.

7. Install the drive block and tighten securely. With an indicator base attached to the table, indicate the ball nut mtg surface from left to right by hand cranking the table. It should be within .001". **REMEMBER THE HEAD MUST BE TRAMMED BEFORE THIS POINT.**

8. Using an indicator and a mag base attached to the drive block, indicate the front face of the base mounting plate. With the quill handle installed, move the quill up and down and indicate the plate face on both sides. **Note that the drive block is narrower than the slot in the quill casting. Hold the block to one side while moving the quill up and down to prevent erroneous readings.** Shims are provided to place behind the plate for squaring it. The plate must be within .004" TIR.

Indicate 2 plcs
Stick Mag Base
Under Here
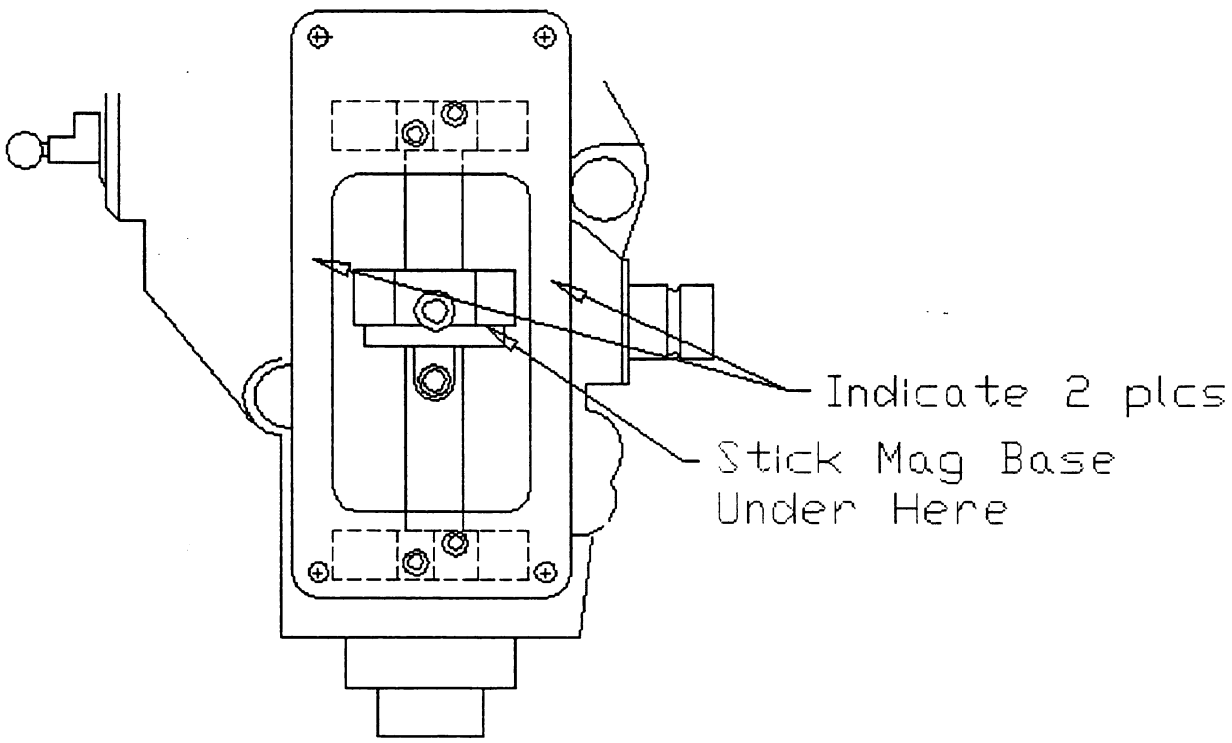
9. Remove the bottom belt access cover and the front cover
    along with any hardware inside. Make sure the belt is free to
    move.

10. Using the three 1/4-20 X 1" and one 1/4-20 X 1 3/4" screws
    and lock washers provided in the installation kit, install
    the drive housing on the base plate. Don't tighten the
    screws. With two washers on the screws, attach the ball nut
    to the drive block and tighten these two screws. Put the
    quill handle back on the machine and manually move the quill
    up to the dead stop. Tighten one of the 2 top screws. Now
    move the quill all the way down with the handle and tighten
    one of the lower screws. Move the quill all the way up and
    loosen and tighten the one upper screw. Again move all the
    way down and loosen and tighten the lower screw. Now tighten
    the remaining mount screws.

11. Install motor on the casting using the 8MM cap screws in the
    kit and the spacer between the motor and casting. Now install
    the pulley on the motor. Use a scale to measure the ball
    screw pulley height and set the motor pulley to the same
    distance within + or - 1/16" . Now tighten the motor pulley
    set screws to prevent movement. Tension the belt securely and
    tighten the motor mount screws.

12. Using the handle again, move the quill to a point .10"
    below the top dead stop. A scale dimension is okay.
    Adjust the upper limit switch to trip off at this height.
    Now move the quill to .10" above the bottom dead stop and
    set the lower switch to trip off at that point. A meter
    may be used to check the switches. Set the meter at the OHMS
    position and check the COM and NO terminals. When the resist-
    ance changes state on the display, the switch has tripped.
    **THESE SWITCHES ARE NOT SET AT THE FACTORY. YOU MUST SET
    THEM TO PREVENT DAMAGE TO THE BALL SCREW OR QUILL!**

13. Connect the limit switch wires to the switches. The 2 slip
    on connectors go on the switch terminals marked COM. The
    short wire with the push on lugs is placed between the NC
    terminals of the two switches. Be sure to clamp and tywrap
    the wires down to prevent them from rubbing moving parts.

14. Install the covers on the top, bottom and front of the Z axis
    drive housing now. This will prevent injury when running the
    system. After completing the installation, be sure to set
    the Z axis pointer to the "0" setting on the scale.

PART	QUANTITY	USE	P/N
1/4-20 x 3/4 Soc Hd	4	mount base plate	86100504
1/4-20 X 1 3/4" Soc Hd	1	mount z casting	86100577
1/4 Lock Washer	4	mount z casting	66100112
8mm Soc Hd Screw	4	mount Z motor	66100718
Washer, Flat 8mm	4	" " "	86300201
Lock Washer 8mm	4	" " "	86300125
1/4-20 X 1" Soc Hd	3	mount Z casting	86100503
6-32 X 1/4" But Hd	19	install covers	66100714
1/4-20 X 1" Soc Hd	2	attach dr block	86100503
1/4 Washer (thick)	2	" " "	86300198
1/2" nuts	4	head replacements	86200191
Washer HI Collar 3/8"	1	under dr block screw	86300179
Screw 10mm Soc Hd	1	attach dr blk	86100170
Washer 10mm Hi Collar	1	" " "	86100164
10-32 X 3/8" But hd	4	attach rear chip shld	86100325
10-32 X 3/8" But Hd	1	attach pointer	86100325
8-32 Set Screw	2	Motor Pulley	66100703
Pulley	1	Motor	67200056

CABLING THE SYSTEM

The following section details installing the cables necessary to run the control. They are detailed for a three axis machine. Follow them and disregard any Z axis references if you have not purchased this option.

1. Locate the Z axis motor cable and connect on the servo at the lower rear of the servo box and attach it from there to the Z axis motor. Install the Z limit switch cable through the servo box and Clamp the motor and limit switch cables along the left side of the ram with the mountable tywraps included in the kit. The servo cabinet has a circuit board mounted directly above the servo cards. It is mounted in a flat plane for ease of access. This board is the distribution board and has a marked receptacle for the limit switch plug. The plug is marked 5 & 6 and plugs into the corresponding 5&6 terminals on the board.

2. The X and Y axis motor cables plug into the underside of the servo cabinet. The schematics included in this manual show the cable numbers for all the harnesses in the kit. Plug them into the correct motors.

3. The large short cable is the console to servo main cable. This connects the computer to the servo amplifiers and has several cables inside it. To begin the installation of this cable, you must remove the plastic shell on the large connectors at both ends. These are referred to as the DB25 connectors. They are marked on both ends. Be careful not to mix up the shells. The three Phillips head screws are removed to remove the shell. Now remove the large lock ring from the sealtite fitting and slide it over the cables and off the end of them. Do this at both ends. Install the wires through the large holes in the rear of the cabinets and slide the lock rings back on the wires. Tighten the rings inside the cabinets until the blue sealing rings on the fittings are compressed slightly. Put the shells back on the DB25 connectors.

4. Install the cables on the correct terminals on the top of the computer. The DB25 connectors and the DB9 connectors have screws permanently attached to them and are to be screwed in place as assembled. They are all marked on both the receptacles and the cable ends. Move to the servo box and again install all the terminals on the distribution board. The 110 VAC supply wires connect to the gray vertical terminal strip on the left center of the cabinet. Put the GREEN wire on the GRND terminal. Put the BROWN wire on the 110 terminal. Put the BLUE wire in the 0 (ZERO) terminal and securely tighten all three terminals.

5. Install the XY limit switch harness through the bottom of the servo cabinet in the hole near the XY motor plugs and again tighten the lock nut until the blue ring is compressed slightly. The wires have green plugs on the ends of them and are marked 1&2 and 3&4. These plug into the P3 connector on the distribution board. The terminals are marked on the side of the mating connectors.

6. Refer to the drawing on the following page for an overview of the correct locations of the cables. Note that the spindle motor and incoming power wiring should be installed in the upper rear area of the servo cabinet. This prevents high voltage wiring from passing by the computer wiring. <u>NOTE THAT THIS WIRING MUST BE CONNECTED! THIS IS A SAFETY FEATURE!</u> This wiring allows the main <u>EMERGENCY STOP</u> button to also shut off the spindle motor. The wiring diagrams show the correct terminals on the disconnect relay to attach the wiring to.

6. The wiring to the display may be connected next. Install the # 31900429 harness in the bottom of the display console with the 90 Degree fitting in the display end. Again remove the lock nut and insert the wires through the hole. Replace the nut over the wires inside and tighten until the blue ring compresses slightly.

7. The side of the screen cover has two receptacles mounted on it. Plug in the two connectors. The RED/BLACK wires with the push on connectors hook up to the fan. The remaining connectors plug into connectors located on the display interface board. They are all keyed and install in only one direction. Also they fit into locations with corresponding numbers of pins. After installing the wiring at the display end, you must install the straight connector at the end of the harness in the top hole of the computer cabinet. Again the connectors are marked and install in corresponding lettered or numbered spaces. The only wires with no connector are the RED BLACK ones which hook up to the terminal strip on the # 4 & 5 terminals.

8. The servo cabinet has contactors inside for the spindle motor. Depending on which options were purchased, the schematics show where to connect the spindle motor wires. The 3 Phase power will also have to be hooked up in the servo box. It connects to the disconnect switch inside the servo box. Again use the schematics for location of the correct relay.

10. The cord exiting the computer enclosure is for the 110V AC power. <u>This must be plugged into an outlet which connects directly to the circuit box (AN ISOLATED LINE with a 60 amp inrush capacity). Any other equipment on the same line could cause problems with the system.</u>

SERVO AND COMPUTER
MOUNT BARS TYP
4 PLACES

SPINDLE MOTOR WIRING

INCOMING POWER

COMPUTER—SERVO
INTERCONNECT
SEALTITE

CUSTOMER ADDED 3
PHASE POWER IN

OILER POWER CABLE

Z LIMIT SWITCHES

Z MOTOR WIRING

COLD AIR INLET

UPPER MOUNT SPACERS

DISPLAY POWER
AND DATA CABLE
SEALTITE

CONSOLE AND SERVO
110V AC POWER
OF/ON SWITCH

OIL LINE TO TABLE

HOT AIR EXIT

PWR CORD

OILER
PUMP

MACHINE BASE REAR

16" REF
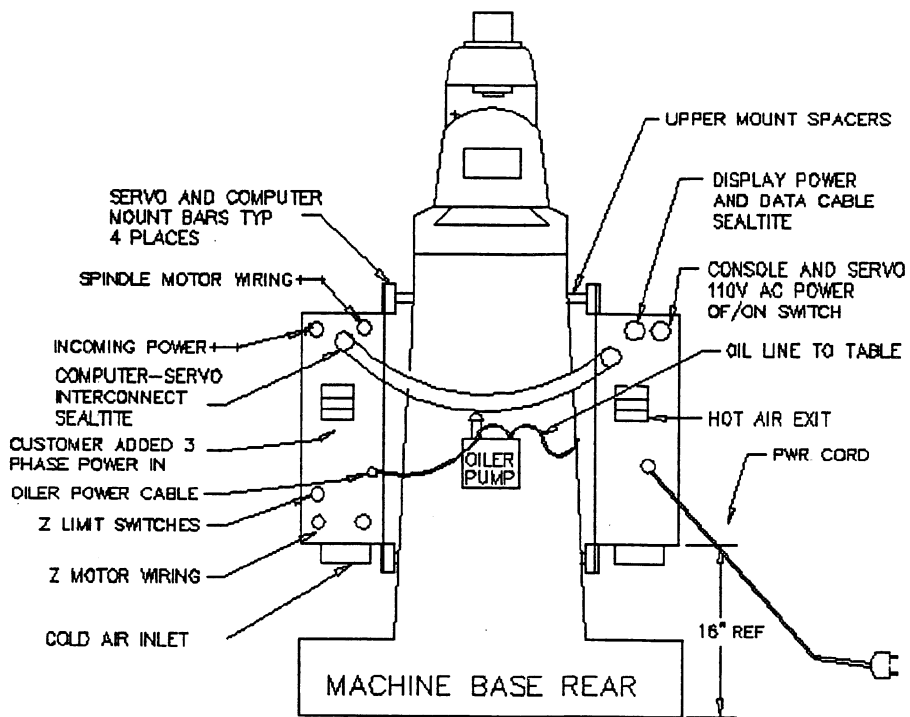
11. The automatic lube pump should be hooked to the 801 Board
    on terminals 3 & 4. Use terminals 3 and 4 with the black wire
    on terminal # 3. The strip is numbered 1 through 5
    with number 1 on the left side. Normally terminal # 5 will
    have no wire on it.

12. If you have an M Function option and wish to hook up a cool-
    ant pump to the relay, a knock out hole is provided in the
    servo cabinet for wiring. See the drawing on the previous
    page for the location of the hole. Use sealtite to encase the
    wiring. Connect the three wires to the coolant relay. The
    power to the relays is already provided inside the cabinet
    from the main disconnect.

MACHINE STARTUP AND TESTING

     After completing the machine wiring, you are ready to begin
the machine startup. Several phases are involved so follow close-
ly to prevent machine damage.

1. Plug in the power cord on the back of the computer console.
   This must be plugged into a dedicated power supply to prevent
   invalidating the warranty on the electronics of the control.
   Turn on the switch of the computer cabinet and also the main
   disconnect on the door of the servo cabinet.

2. After a few seconds the screen should begin to display
   messages as to the progress of the boot up section of the
   control. These messages are for your information only. They
   tell the progress of the boot up. The first screen appears
   on the next page. Note that the soft keys below the screen
   are used to continue. If the F10 key is depressed, you will
   continue on to the next screen.

```
┌─────────────────────────────────────────────────────────┐
│                 ┌───────────────────────┐                │
│                 │    Series 1100 CNC     │               │
│                 └───────────────────────┘                │
│                                                          │
│       ┌──────────────────────────────────────────┐      │
│       │          Manufactured By:                 │      │
│       ├──────────────────────────────────────────┤      │
│       │                                           │      │
│       │        Anilam Electronics Corp.           │      │
│       │        5625 Northwest 79th Avenue         │      │
│       │        Miami, Florida 33166-3532          │      │
│       │            Tel: (305) 592-2727            │      │
│       │            Fax: (305) 591-8502            │      │
│       │                                           │      │
│       │   Copyright (c) 1993 by ANILAM Electronics Corp., │
│       │            Miami, FL, USA                 │      │
│       │                                           │      │
│       ├──────────────────────────────────────────┤      │
│       │         Press F10 to continue.            │      │
│       └──────────────────────────────────────────┘      │
│                                                          │
│  Version: 1.01D-D                    Serial ID: 1766343  │
└─────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────┐
│                                                          │
│                 ┌───────────────────────┐                │
│                 │    Series 1100 CNC     │               │
│                 └───────────────────────┘                │
│                                                          │
│                                                          │
│                 ┌───────────────────────┐                │
│                 │   Software Options      │               │
│                 ├───────────────────────┤                │
│                 │                         │               │
│                 │   1. CNC Control        │               │
│                 │   2. Diagnostics        │               │
│                 │   3. Setup Utility      │               │
│                 │                         │               │
│                 └───────────────────────┘                │
│                                                          │
│  ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮            │
│  Version: 1.01D-D                    Serial ID: 1766343  │
└─────────────────────────────────────────────────────────┘
```

3. The last screen on the previous page gives you the choice of three options. The UP DOWN arrows on the right side of the keyboard give you the ability to move the Highlighted portion of the screen up or down. Try this now to get the feel of how it works.

4. Now move the Highlighter to SETUP UTILITY to allow you to examine the next choice. When it is Highlighted, push the ENTER soft key to select it. This screen gives the installer access to the parameters needed to set up a standard 2 or 3 axis system.

```
┌────────────────────────────────────────────────────────┐
│                                                        │
│        ┌───────────────────────────────────┐           │
│        │    Series 1100 - Setup Utility     │           │
│        └───────────────────────────────────┘           │
│                                                        │
│                                                        │
│              ┌─────────────────────────────┐           │
│              │        Setup Options        │           │
│              │              .              │           │
│              │ ─────────────────────────── │           │
│              │  1. Machine/Installation    │           │
│              │  2. General Software        │           │
│              │  3. Print configurations    │           │
│              │  4. Units in Inch           │           │
│              │                             │           │
│              └─────────────────────────────┘           │
│                                                        │
│                                                        │
│  ▬▬▬ ▬▬▬ ▬▬▬ ▬▬▬ ▬▬▬ ▬▬▬ ▬▬▬ ▬▬▬ ▬▬▬ ▬▬▬ ▬            │
│  Version: 1.01D-D              Serial ID: 1766343      │
└────────────────────────────────────────────────────────┘
```
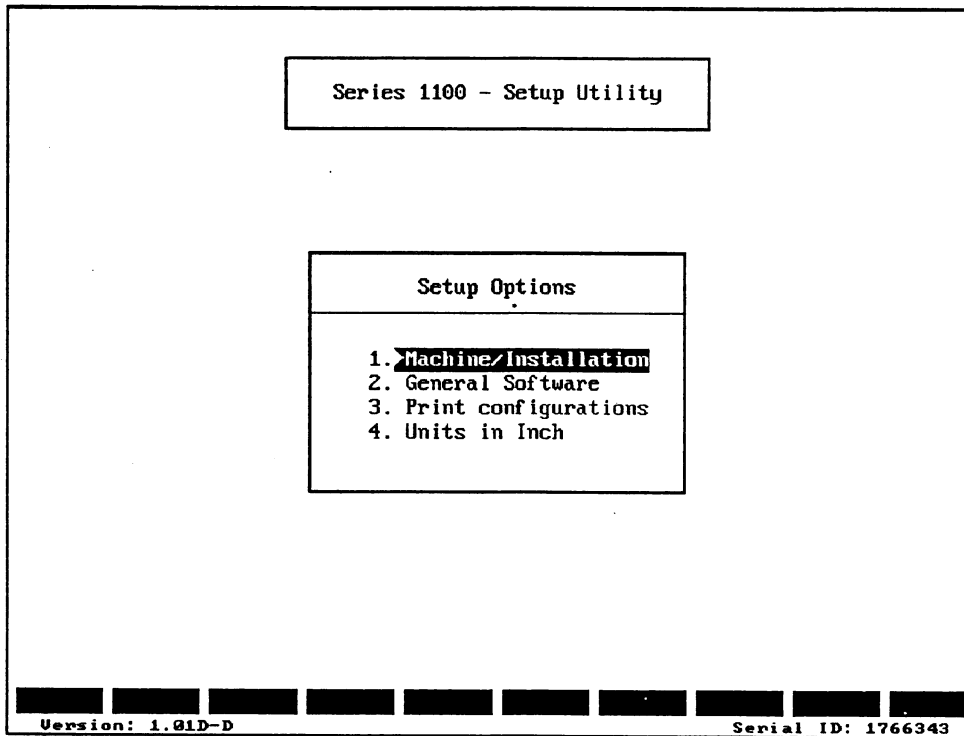
5. Move the Highlighter to the # 1 choice and again push ENTER to continue. This screen gives access to the axis control of the machine. Several choices will be made from this screen. See the next page for the screen and options it offers.

```
┌─────────────────────────────────────────────────────────────┐
│              ┌───────────────────────────────┐              │
│              │   Series 1100 - Setup Utility  │              │
│              └───────────────────────────────┘              │
│         ┌─────────────────────────────────────────┐         │
│         │         Machine axis - Setup            │         │
│         │─────────────────────────────────────────│         │
│         │                                          │         │
│         │    1. ▓Resolution▓                       │         │
│         │    2. Linear correction compensation     │         │
│         │    3. Skew error compensation            │         │
│         │    4. In position                        │         │
│         │    5. Continuous path                    │         │
│         │    6. Default rapid                       │         │
│         │    7. Default feed                        │         │
│         │    8. Positive software limit            │         │
│         │    9. Negative software limit            │         │
│         │   10. Backlash compensation              │         │
│         │   11. Encoder Phase A                     │         │
│         │                                          │         │
│         └─────────────────────────────────────────┘         │
│                                                              │
│  ██████  ██████  ██████  ██████  ██████  ██████  ██████      │
│  Version: 1.01D-D                    Serial ID: 1766343      │
└─────────────────────────────────────────────────────────────┘
```

6. This screen allows setting of several variables.Push the
   ENTER key 1 time. Move the Highlighter to the first line.
   Depress the X key on the keyboard and a box will appear asking
   for the PASSWORD. This password must be entered to allow
   access to the change parameters. The password for setting up
   the system is Y10. Then the ENTER key on the keyboard. A box
   will appear with the choice Scale or Encoder. We will use the
   encoder choice on our retrofits. Use the UP DOWN arrows to
   select ENCDR. Push the Y and Z keys and select ENCDR for them
   also. If Z is a scale then select SCALE for this axis.

7. Using the UP DOWN arrows, move the Highlighter to the Disp.
   Res. line (#2). Again select an X, Y or Z key and choose the
   resolution which appears. We will use 2 MICRON for all three.
   If this is a 2 axis system with a Z scale kit, change the Z
   to 10 MICRON.

8. With the UP DOWN arrow select line 3 (RESOLUTION). This is the
   resolution our scales would use if we chose scales instead of
   encoders in line #1. If a Z scale is used on a two axis
   machine, set the Z resolution to 10 MICRON.

9. Move the Highlighter to line #4 and set the X, Y and Z axis to 1000 lines. This equals the number of encoder lines on the motor encoders. If this is a 2 axis system with Z set to SCALE this Z setting is not used so disregard it and leave the existing number as is.

10. Move the Highlighter to line 5 and select the pitch of the screw. Again select the axis first (X, Y or Z) and the box under the appropriate axis will blank out waiting for new input. After entering all three axis, move the Highlighter to line 5.

11. The ratio is the drive ratio between the motor and ball screw pulleys. On the standard mill kit the ratio is 1.5 for X and Y axis and 1.8 for Z axis. Use the F10 key two times after setting these parameters to return to the MACHINE/INSTALLA-TION screen.

```
┌──────────────────────────────────────────────────────────────┐
│                                                                │
│              ┌──────────────────────────────────┐              │
│              │    Series 1100 - Setup Utility    │              │
│              └──────────────────────────────────┘              │
│                                                                │
│                 ┌───────────────────────────┐                  │
│                 │    Machine/Installation    │                  │
│                 ├───────────────────────────┤                  │
│                 │                            │                  │
│                 │    1. Machine Axis         │                  │
│                 │    2. Spindle Axis         │                  │
│                 │    3. Z Axis Type          │                  │
│                 │    4. Interface            │                  │
│                 │    5. Tool Management       │                  │
│                 │    6. Miscellaneous        │                  │
│                 │    7. ▓Home▓               │                  │
│                 │    8. Language             │                  │
│                 │    9. Software Update      │                  │
│                 │   10. Security             │                  │
│                 │                            │                  │
│                 └───────────────────────────┘                  │
│                                                                │
│  ██ ██ ██ ██ ██ ██ ██ ██ ██ ██                                 │
│  Version: 1.01D-D                   Serial ID: 1766343         │
└──────────────────────────────────────────────────────────────┘
```

12. Move the Highlighter to the HOME selection (#7). Push the ENTER key to go to the HOME screen. Line 1 refers to the homing sequence as being required or not. Set to YES (required). To avoid confusion in setting up a machine you may want to leave this option to NO until the complete system is tested and running correctly. After this phase you may go back into the parameters and change to YES. Move next to line 2 and set the HOMING (optional) sequence. This is merely the order you wish the axis to home the axis. 1 is X axis, 2 is Y axis and 3 is the Z axis. Use the ENTER key to select. Another box will appear and allow you to set these as desired. Normally Z is first then X and Y. Use the ENTER key to continue. Line 3 is the Home TYPE parameters. Select this and set up as follows.

HOME TYPE FOR X WITH NEGATIVE INDEX LIMIT
HOME TYPE FOR Y WITH NEGATIVE INDEX LIMIT
HOME TYPE FOR Z WITH NEGATIVE INDEX LIMIT
Disregard any other axis shown, as these are not included in this package. Again the F10 key should be pushed one time to back up one screen.

```
┌────────────────────────────────────────────────────┐
│          ┌─────────────────────────────┐            │
│          │  Series 1100 - Setup Utility │            │
│          └─────────────────────────────┘            │
│                                                      │
│          ┌─────────────────────────────┐            │
│          │        Home - Setup         │            │
│          │ ┌─────────────────────────┐ │            │
│          │ │ 1.▓Home required......▓  Yes │          │
│          │ │ 2. Home sequence....... {1,2,3,4} │     │
│          │ │ 3. Home type..........      ▶ │ │        │
│          │ │ 4. Datum search speed..     ▶ │ │        │
│          │ └─────────────────────────┘ │            │
│          └─────────────────────────────┘            │
│  ████ ████ ████ ████ ████ ████ ████ ████ ████ ████  │
│  Version: 1.01D-D              Serial ID: 1766343    │
└────────────────────────────────────────────────────┘
```

13. Move the Highlighter to line 4 (Datum Search Speed) and push the ENTER key. The next screen sets the speed at which the axis will seek the index pulse from the encoders. 10 is adequate here. After setting all three push F10 two times to return to the MACHINE/INSTALLATION screen.

14. Now push the F10 key two times to exit the machine setup
    utility. When you see the question SAVE CHANGES ? select the
    F1 (YES) key. This will save and update your machine
    configuration. Now move the Highlighter to the CNC Control
    option. Push the ENTER key and the machine will be temporari-
    ly ready to operate. There is more work to do on the SETUP,
    but we need more information from the machine to do this.

15. By hand crank the machine in a PLUS direction and look at the
    axis display. They should be counting in a plus direction. If
    not you should note which axis are incorrect. After noting
    which ones are incorrect, you must return to the setup
    utility to correct this. Push F10 and exit the control
    screen. Move the Highlighter to the Setup Utility (line 3)
    and push the ENTER key 3 times. This brings you to the
    MACHINE AXIS Setup screen. Move the Highlighter to the #11
    line or ENCODER PHASE A. Now push the ENTER key to advance to
    the next screen. Now move the Highlighter to the axis you
    wish to change. Push the ENTER key one time and the PASSWORD
    box appears. As before push the Y key followed by the ONE
    and ZERO keys (the change parameters password). Now the
    INVERT at the right of the Highlighted row will change to
    NOT INVERT. Change any other axis required and push the
    F10 key four times. Now move the Highlighter to the first
    line (CNC CONTROL) and push the ENTER key. **** **REFER TO
    PAGE TWO FOR AXIS DIRECTION EXPLANATION** ****.

16. Again check the axis by hand and insure the correct polarity.
    If correct, you may continue to setup the system. Again push
    the F10 key to exit the CNC function. Highlight choice 3 (SET
    UP UTILITY) and push the ENTER key. Now highlight the line 6
    DEFAULT RAPID. Push the ENTER key and the next screen will
    show the current settings for the axis. Highlight the X and
    push the ENTER key. Again you will be asked for the password.
    Remember Y10 is the password. After entering this the far
    right numbers will disappear. ENTER the number 200 (200 IPM)
    and push ENTER. After entering the password you may change
    the next two without re-entering the password. Move to Y and
    Z and repeat entering 200. Next push F10 to return to the
    original screen.

17. Move the Highlighter down one line to the DEFAULT FEED line
    (#7). Push ENTER and you will see the feed rate the machine
    will move at when the MANUAL FEED is selected with the HAND
    pushed one time to select the FEED mode. The correct setting
    is 40. Move to the desired axis and push ENTER. The numbers
    at the far right will disappear and you may ENTER the number
    40. Push ENTER to accept this. Repeat for the other axis.
    After setting them push the F10 key four times to return to
    the CNC CONTROL, DIAGNOSTICS AND MACHINE SETUP menu. Choose
    the CNC CONTROL menu and push enter

BACKLASH TESTING AND SETTING.

All control systems have backlash in them. It is inherent in any system which moves a mass under control. It may show up as flexing of structural members, bearing end thrust or windup of the ball screw driving the member. While all differ in their make up, they all appear as lost motion to a control system. This lost motion must be accounted for when positioning a sliding member. The 1100 control has a feature in the machine setup utility which stores this lost motion and calculates the next move with this measurement included or subtracted from the programmed move.

The first step is measuring and minimizing the lost motion. The following steps must be taken so as to not mask a mechanical problem with an electronic cure.

1. With the gibs loosened on both axis and the table centered in its travel, place a magnetic indicator base on the table top. Put the indicator point on the end of the ball screw on X axis. Now grab the ball screw either by the pulley or under the table and rock the ball screw back and forth slightly. If any IN-OUT movement is seen in the screw, you should try to minimize the movement. Shims are packaged with each system for the purpose of shimming the bearings. The brass shim pack is .008" thick and is also a layered pack. There are four .002" layers laminated together. They may be peeled apart with a knife. After separating them, slide a straightedge over them to flatten any burrs.

2. If the end play is greater than .0005", you should insert one .002" shim between the bearings. Refer to the casting layout for how the bearings are installed. The shim goes between the bearings. This preloads the bearings to prevent end play. After shimming the bearing pack proceed to the Y axis.

3. Stick the mag base on top of the knee ways with the point on the end of the Y axis screw. Now repeat the process as in X axis and minimize the end play through shimming the bearings.

4. Set the gibs with an ammeter attached to one armature lead of the axis motor. Refer to the schematics for the wire location. After installing the meter, loosen the gib adjusting screw one full turn. Now move the axis being tested, from end to end. Begin tightening the gib screw until a 1/4 Amp rise is seen in the running amperage. This should set the gib in approximately the right tightness. Remember when the table approaches either end, the table weight will cause a rise in amperage. Set the gib with this taken into account. Check Y axis in the same fashion and set the Y gib.

5. Z axis doesn't need to be checked in the same fashion. To check Z you place an indicator point at the end of the spindle. Push the HAND key until the number 1 appears next to JOG in the upper right display. Now use the Z- key repeatedly until the indicator reads "0". write down the displayed number in Z axis. Push the Z- key several times to bring Z down about .005". Now push the Z+ key repeatedly until the indicator again reads "0". The difference between the Z display number now and the original number written down is the value to store for Z axis backlash.

6. Return to the SETUP UTILITY screen and push the ENTER key. Now push ENTER two more times. Highlight line 10 and again push enter. Now enter the backlash value for X axis. Move down a line and enter Y value. One more line down and enter the Z value. Now go to line 7 and push enter to change the right hand value from OFF to ON. Push F10 several times to return to the initial screen. Select CNC CONTROL and the system should be ready or the next stage of setup.

```
┌─────────────────────────────────────────────────────────┐
│                                                         │
│           ┌───────────────────────────────┐             │
│           │  Series 1100 - Setup Utility  │             │
│           └───────────────────────────────┘             │
│                                                         │
│                                                         │
│        ┌──────────────────────────────────────┐        │
│        │   Positive Software Limit - Setup    │        │
│        │  ┌────────────────────────────────┐  │        │
│        │  │ 1.▶X+ software limit...  0.0000 │  │        │
│        │  │ 2.  Y+ software limit...  0.0000 │  │        │
│        │  │ 3.  Z+ software limit...  0.0000 │  │        │
│        │  │ 4.  U+ software limit...  0.0000 │  │        │
│        │  │ 5.  Max software limit..     Off │  │        │
│        │  └────────────────────────────────┘  │        │
│        └──────────────────────────────────────┘        │
│                                                         │
│  ██ ██ ██ ██ ██ ██ ██ ██ ██ ██                         │
│  Version: 1.01D-D              Serial ID: 1766343       │
└─────────────────────────────────────────────────────────┘
```

GIB ADJUSTING

The X and Z axis gibs were initially adjusted by feel to accommodate the alignment of the drive housings. This should work well for installation purposes but a more thorough method should be done before the machine is put into production.

1. Loosen X and Y gibs approximately 2 full turns of the adjusting screw. Remember some machines have a gib screw on each end of the gib. If so loosen the screw at the wide end of the gib and tighten the screw at the narrow end. **This must be done before proceeding.**

2. The three servo cards have a large plug on the top edge. Refer to the DRVCARD drawing at the end of the manual for a simplified drawing of the servo cards. **PUSH IN THE EMERGENCY STOP BUTTON NOW TO DE-ENERGIZE THE DC POWER SUPPLY BEFORE PROCEEDING!** Remove the ARMATURE/DC BUS plug from the top connector. Install the circuit board P/N 31900476 on the pins on the card being sure to place it so that the two loops sticking out from the board (P/N 31900476) are at the lower edge of the board. Connect a DIGITAL ammeter to the two loops on the board (P/N 31900476)with one meter lead attached to each. Set the meter to the 10 AMP DC scale now.This places the meter in series with the motor armature. This will allow you to measure the amperage when the slide is moving. This is required prior to setup to insure that there are no tight spots in the ways or alignment problems.

3. Replace the ARMATURE/DC BUS plug from the harness onto the pins facing you on the P/N 31900476 board. **BE SURE THAT THE ORANGE WIRES ARE AT THE TOP OF THE PLUG AND THE LAVENDER ONES ARE AT THE BOTTOM.**

4. Start the control and move the axis being checked from extreme to extreme while pumping the oiler pump several times by hand. **This should be done in a FEED mode to allow sufficient time to monitor the meter.** Note the amperage throughout the travel and slowly tighten the gib until a .25 amp rise is seen. Now back off the gib 1/2 turn. This should be approximately the correct setting for the gib. **SETTING THE GIBS TOO TIGHT WILL ADVERSELY AFFECT THE MACHINE ACCURACY. A SURE SIGN OF TOO TIGHT A GIB IS EXCESSIVE BALL SCREW LOST MOTION.**

5. Repeat this for the next axis to be checked. Bear in mind that the amperage seen on X axis will increase at either end. This is caused by the tremendous weight shift as the table reaches either end. **Any large shift in amperage on Y axis could be caused by tight ways at either end (machine worn in center of the travel) or incorrect alignment of the ball screw.**

6. Z axis should be monitored for changes in amperage while moving. There are no gibs to set but any extreme changes will show out of alignment of the casting mounting.

DIAGNOSTICS

The 1100 control is shipped with a Diagnostic diskette. It is located inside the Programming Manual box. Save this disk for future use. When initially setting up the system this disk provides access to the automated signal setting functions. Several other tests are included in this package also. To run the Diagnostic disk, place it in the floppy drive located inside the access door on the left side cabinet.

1. Push in the E STOP switch on the console. Turn off the main power switch on the rear of the computer cabinet for about 5 seconds. Turn on the switch again and watch the console. This will automatically load the software. This may also be done by pushing F10 and returning to the opening screen. If the latter is done, select the #2 choice (DIAGNOSTICS).

2. This will cause the system to reboot and load the diagnostic software. The initial screen will look as follows.
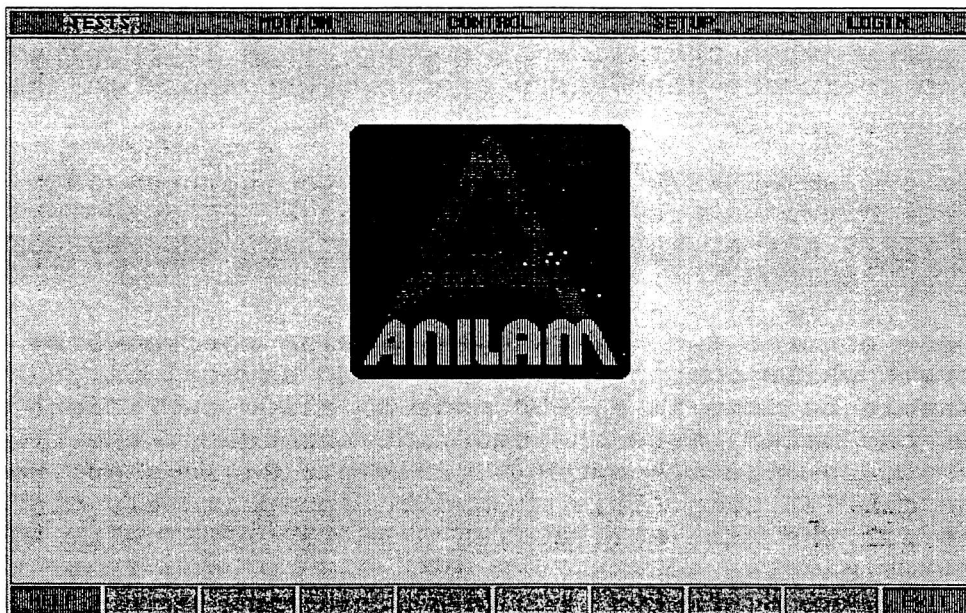
3. This first screen offers the option to continue. If you wish to continue, push the F1 to continue. The next screen seen on the following page again gives you an option. Using the left right keys, move the highlighter at the top of the screen to MOTION and push the ENTER key.

4. Push the F2 key to setup the motion parameters. You will now
   see a small box with the choice of ANALOG BALANCE at the top.
   Set to ANALOG and push enter. Select an axis with the F2 (X)
   F3(Y) or F4(Z). After selecting the axis you will see a screen
   as follows. Read the instructions in the lower box. Note that
   the UP DOWN arrows at the right on the keyboard are used to
   set the ANALOG balance of the D to A board. Make sure the
   number "0" is stored for the axis. Use the UP DOWN arrow to
   move the offset up or down and watch the "0" change. After
   setting to ZERO, look at the solid vertical line directly
   above the "0" value you stored. If you see flags protruding to
   the left or right of the line, this means the servo card must
   be balanced. Find the BAL pot on the edge of the servo card
   and turn the pot while watching the flags. If they start to
   get longer you are turning the wrong way. When the flags do
   not show on either side of the line, the balancing is correct.

5. Set the other axis in the same manner. After completing the
   other axis, push F10 to return to the previous screen. Now
   move the highlighter down one line to SIGNAL GAIN and push
   the ENTER key. Select an axis and push start to run it. The
   screens are self explanatory. The first pattern you will see
   is a default screen from a saved wave pattern. It only
   represents an approximation of a correct pattern. The next
   lines which appear after about 2 seconds are the pattern for
   the axis being tested. Note that when the line rises it
   should not rise a great amount above the top horizontal
   line. If it does it will change color from gray to white.
   This white line indicates overshoot. Follow the instructions
   on the lower screen. They tell you to either raise or lower
   the TACH or SIGNAL pots on the edge of the drive card. The box
   at the right shows the following error. This should be set at
   10% of the rapid speed or 20.0 for a 200IPM mill.After setting
   these values, remove the DIAGNOSTIC disk from the floppy drive
   and turn off the main power switch. Wait 5 seconds and turn on
   the power again. This will reset the computer. The system
   will automatically reboot. Proceed to the software limit set-
   ting to complete the installation.

INITIAL STARTUP

If this is the initial startup, you must balance the motion board before proceeding. To do this first locate the DIAGNOSTICS disk shipped inside each programming manual package.

1. Open the main door on the computer case and locate the six Dzus fasteners on the cover. Turn them 1/2 turn and slide off the cover. Insert the diagnostics disk in the floppy drive.

2. Push the rectangular BLACK button next to the disk drive once to turn off the computer. Now push it again to restart the computer.

3. Select MOTION at the top of the screen with the left ARROW and push ENTER. Push F2 to enter SETUP. Now with the up down arrows on the keyboard, select ANALOG BALANCE. Push F6 and select the X, Y or Z axis.

4. Select the F1 key and start the servos with the SERVO RESET key.

5. Locate the MOTION board in the computer. It has 8 adjustment pots on the edge of it. NOTE THAT FOUR OF THE POTS ARE SEALED WITH RED SEALANT. DO NOT!! ADJUST THESE POTS. THEY ARE SET AT THE FACTORY ONLY

6. Attach a meter to the X servo card on the bottom two pins on the lower edge of the servo card. See the drawing 31900290 in the rear of the manual for assistance in locating the pots. **Your local Radio Shack store has clip on leads for your meter. These will help in attaching the leads on the pins.**

7. Set the meter at the 200 MILLIVOLT scale and turn the R5A pot until the meter reads "0" MV.

8. Again refer to the 31900290 drawing in the rear of the manual for pot numbers and locations for setting the other axis. Don't forget to move the meter leads to the Y or Z servo card pins on the appropriate boards.

9. Replace the computer cover and the initial setup of the motion board is complete.

10. Continue to the DIAGNOSTIC section to tune the electronic balance and servo balance.

The system has settings for software limits. These allow you to describe an area for table and quill travel, out of which the control will not move. This does not limit travel but eliminates the possibility an operator can hit a limit switch and shut the system down. Travel even at rapid into a limit switch will be inhibited. To use software limits you must first determine an initial setup point **(HOME)** and the amount the axis will travel in a PLUS and MINUS direction from that point. The following procedure will allow the entry of the correct values. While it may sound confusing, it will only have to be done in the initial setup. After that you will only need to reset the HOME "0" if you lose power or turn the main power switch off.

To begin the process we will first need to check all the limit switches for proper operation. In a feed mode, travel to all extremes (X+, X-, Y+, Y-, Z+ and Z-) and make sure the unit trips off at all 6 extremes.

1. Move to a known reference point on X axis in the plus direction. A good point would be the end of the table flush with the end of the saddle. Now move the Y axis in a plus direction until the saddle is near the Y+ limit switch. Now move the Z axis in a + direction until the pointer is just below the "0" line on the Z cover scale. These points should be noted for future reference. The Y axis reference point could be a measurement from the table front of the table to the Y axis motor casting. The actual point is not as important as the reference dimension to allow returning to the same point. See the diagram below for a reference dim.

SADDLE TOP VIEW

Y REF
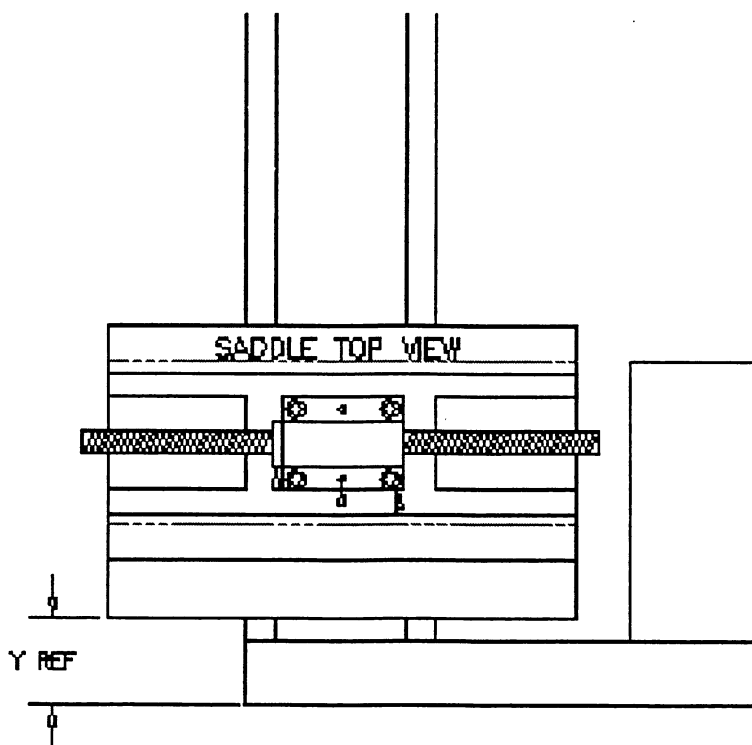
2. Place the machine in the CNC mode if not already done. Now push the MDI soft key. Next push the MILL soft key. Now push the MORE soft key. In the box above the MORE key you have several choices. Use the UP DOWN arrow keys to move the highlighter to the HOME line. Push ENTER and the upper left portion of the display will show a diagram. The unit will now accept data input from you. Push the "0" key and then ENTER. By pushing ENTER you will automatically advance the cursor to the next line. After entering "0's" in all three axis, push the PREV then EXIT keys. This will initiate the HOMING sequence. ***** NOTE ***** This is only done to set up HOME the first time. If the control is turned off or power is lost, you will have the HOME soft key showing in the bottom of the display. Follow the same procedure and manually move to the REFERENCE point on all three axis and push the HOME key. This will also home the machine.

```
X+           0.0        MANUAL
                        IN-POSN              HALTED
Y+        0.00000         ABS                FEED
                         INCH
Z+         0.0000
                        PROGRAM:             JOG: RAPID
                          LOOP: 0        SPINDLE: OFF
BLOCK:                    DWELL: 0.0     COOLANT: OFF
 TOOL: 0      DIA: 0.0000   RPM: 0
 FEED: 0.0      %: 100




MESSAGE:
■■■ ■■■ ■■■ MANUAL ■■■ ■■■ ■■■ ■■■ ■■■ ■■■
```

3. After HOMING the machine, you will have to determine the distance from the HOME "0" to the limit switch trip in all six directions. In MANUAL FEED mode select the X+ key and hold it in until the system trips off in the X+ direction. Note the dimension in the X display and deduct .050" from that number. This is the dimension you will have to enter into the SETUP UTILITY for the X+ software limit. Now hand crank off the X+ limit. Push the X- key now to move to the X- limit switch. As soon as the system trips off in the MINUS direction, deduct .050" from the reading in the X display. This is the number you will enter as the X- software limit.

4. Repeat this procedure for Y and Z axis also. Again write down the numbers minus the .050" dimension. After finishing this on all six directions (four in you have a Z readout only) you may push in the E STOP switch and F10 to exit the CNC mode of the control. In the SETUP UTILITY screen, highlight the #1 selection and push the ENTER key. Now push ENTER again. Now highlight the POSITIVE SOFTWARE LIMIT line and push ENTER. Highlight the axis to change and push enter. If queried for the PASSWORD, put in Y10 again. Put in the correct value you determined before and push ENTER. Change any other axis dimensions required (Y and Z) and push F10 to return to the previous menu.

5. Now select the next line down (NEGATIVE SOFTWARE LIMIT) and push the enter key. Again using the dimensions determined previously, enter the correct dimensions. After finishing this push the F10 key until back at the first menu. Move the HIGH-LIGHTER to the CNC choice and press ENTER. When in the CNC mode you may move at any speed in any direction until the software limit is reached. The unit will ramp down slightly before the limit dimension and stop. Remember that the number displayed may not be the same as the original number entered. This is because the Program "0" may be reset wherever you prefer and a MACHINE "0" is held in a background "0" which does not display on the screen. This BACKGROUND "0" is only used for software limit stopping points.

6. After initial setup of the software limits, you should be finished with the basic setup of the 1100 control. The previous pages on setting the 1100 for a three axis knee mill configuration are for your reference only. In any custom installations, you will have to refer to the 1100 Control Set Up Manual.

STANDARD VALUES

    The first screen seen after initial power up is the one shown below. This one appears after about 30 seconds and denotes the control software has loaded. Note the message on the bottom which says push **F10** to continue. **F10** is the Soft Key on the far lower right of the screen. Soft Keys are simply buttons which through software are reprogrammed to serve differing functions. Farther into this segment of the manual you will see that the **F10** key becomes the **EXIT** key also.

```
┌─────────────────────────────────────────────────┐
│            ┌──────────────────────┐              │
│            │     Series 1100 CNC   │              │
│            └──────────────────────┘              │
│                                                  │
│         ┌──────────────────────────────┐         │
│         │       Manufactured By:       │         │
│         ├──────────────────────────────┤         │
│         │                              │         │
│         │      Anilam Electronics Inc. │         │
│         │      5625 Northwest 79th Avenue│       │
│         │      Miami, Florida 33166-3532│        │
│         │         Tel: (305) 592-2727  │         │
│         │         Fax: (305) 591-8502  │         │
│         │                              │         │
│         │  Copyright (c) 1994 by ANILAM Electronics Inc.,│
│         │          Miami, FL. USA      │         │
│         ├──────────────────────────────┤         │
│         │      Press F10 to continue.  │         │
│         └──────────────────────────────┘         │
│                                                  │
│ Version: 3.10A-D          Serial ID: 1766343     │
└─────────────────────────────────────────────────┘
```
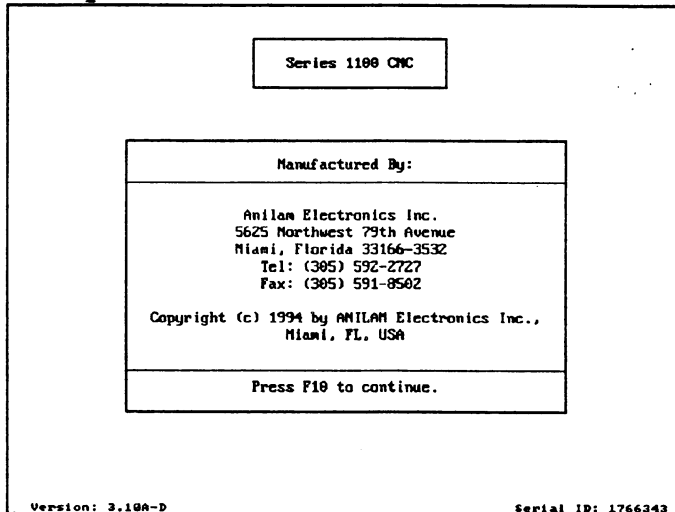
    The second screen shows the **CNC Control** or **Setup** may be chosen. We have chosen the **Setup** for this section. In the next 27 screen pictures we will page through the various setup options. This will help familiarize you with the control default setup. These are for your reference only. If any changes are to be made, **USE** **CAUTION**! Unexpected results could obtained by incorrectly setting a parameter. Call Anilam Miami for additional assistance at 305-477-6265

```
┌─────────────────────────────────────────────────┐
│            ┌──────────────────────┐              │
│            │     Series 1100 CNC   │              │
│            └──────────────────────┘              │
│                                                  │
│                                                  │
│         ┌──────────────────────────────┐         │
│         │       Software Options       │         │
│         ├──────────────────────────────┤         │
│         │   1. CNC Control             │         │
│         │   2. Diagnostics             │         │
│         │   3. Setup Utility           │         │
│         └──────────────────────────────┘         │
│                                                  │
│ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆                    │
│ Version: 3.10A-D          Serial ID: 1766343     │
└─────────────────────────────────────────────────┘
```
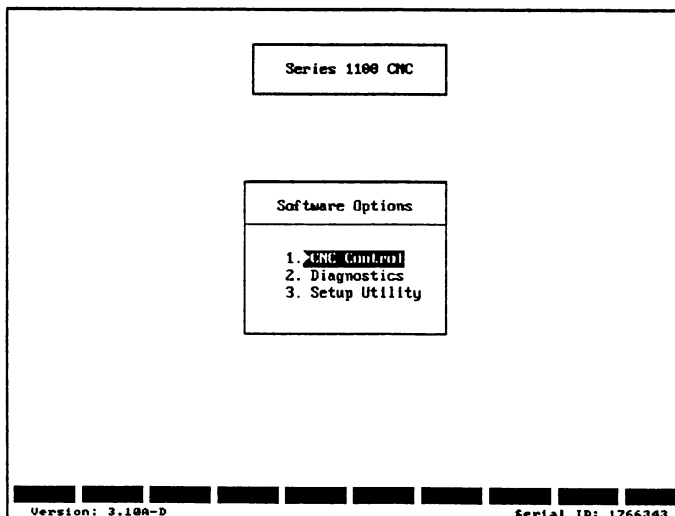
Screen 3 shows the **Setup** choice is highlighted. To move the highlighted choice up or down simply use the UP & DOWN arrows found on the control face plate at the right of the screen. These pictures are not fine enough to show the soft key labels. In actual operation you will see labels above 1 or more of the softkeys.

```
┌──────────────────────────────────────────────┐
│             ┌──────────────────┐              │
│             │   Series 1100 CNC │              │
│             └──────────────────┘              │
│                                                │
│          ┌─────────────────────┐              │
│          │   Software Options   │              │
│          │                      │              │
│          │   1. CNC Control     │              │
│          │   2. Diagnostics     │              │
│          │   3. Setup Utility   │              │
│          │                      │              │
│          └─────────────────────┘              │
│                                                │
│  ██  ██  ██  ██  ██  ██  ██  ██  ██  ██        │
│  Version: 3.10A-D          Serial ID: 1766343  │
└──────────────────────────────────────────────┘
```
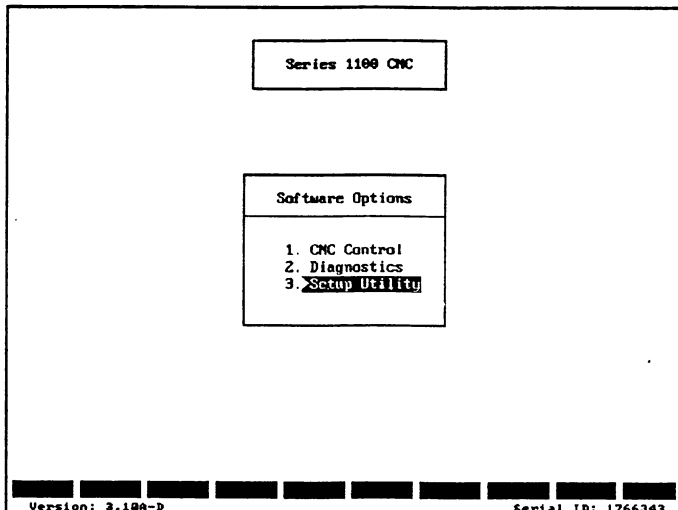
After selecting the **Setup** choice you will find the first actual machine setup screen. As shown the **Machine/Installation** choice is highlighted. Push the **Select** key again to continue.

```
┌──────────────────────────────────────────────┐
│          ┌──────────────────────────┐         │
│          │  Series 1100 - Setup Utility │       │
│          └──────────────────────────┘         │
│                                                │
│            ┌─────────────────────┐            │
│            │    Setup Options     │            │
│            │                      │            │
│            │ 1. Machine/Installation │          │
│            │ 2. General Software  │            │
│            │ 3. Print configurations │          │
│            │ 4. Units in Inch     │            │
│            │                      │            │
│            └─────────────────────┘            │
│                                                │
│  ██  ██  ██  ██  ██  ██  ██  ██  ██  ██        │
│  Version: 3.10A-D          Serial ID: 1766343  │
└──────────────────────────────────────────────┘
```
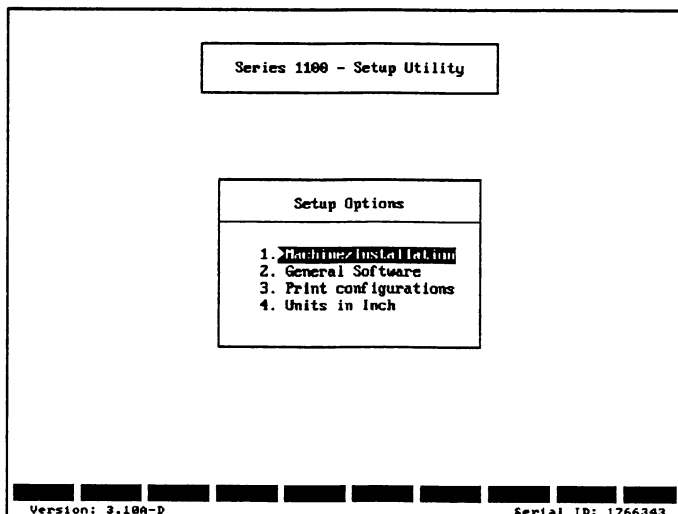
STANDARD VALUES CONTINUED

Screen 5 shows the **Machine Axis** highlighted. Again this screen pops up with the choice automatically highlighted. Push **F5** (Select) to advance to the next screen.

```
┌──────────────────────────────────────────────────┐
│                                                    │
│        ┌────────────────────────────────┐          │
│        │   Series 1100 - Setup Utility  │          │
│        └────────────────────────────────┘          │
│                                                    │
│           ┌──────────────────────────┐             │
│           │   Machine/Installation   │             │
│           ├──────────────────────────┤             │
│           │  1.▓Machine Axis▓         │             │
│           │  2. Spindle Axis          │             │
│           │  3. Z Axis Type           │             │
│           │  4. Interface             │             │
│           │  5. Tool Management       │             │
│           │  6. Miscellaneous         │             │
│           │  7. Home                  │             │
│           │  8. Language              │             │
│           │  9. Software Update       │             │
│           │ 10. DMC Setup             │             │
│           │ 11. Security              │             │
│           └──────────────────────────┘             │
│                                                    │
│ ██ ██ ██ ██ ██ ██ ██ ██ ██ ██                      │
│ Version: 3.10A-D            Serial ID: 1766343     │
└──────────────────────────────────────────────────┘
```
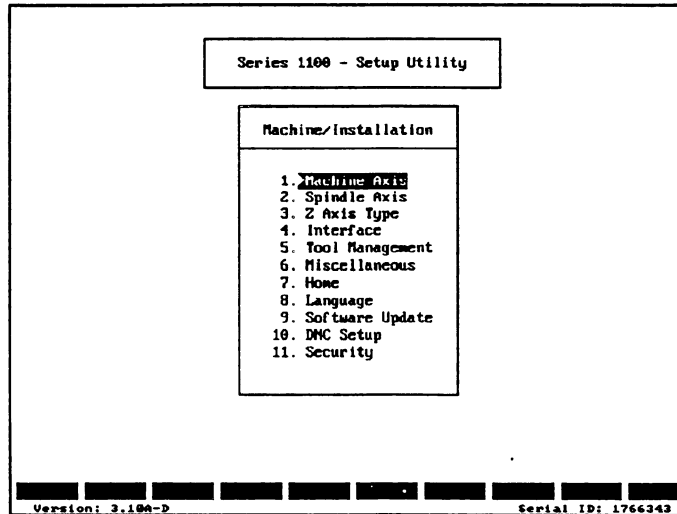
By pushing the **F5** (Select) key now, you again advance to the next screen. Note that this is the first screen with information which can be altered. The first selection is **Resolution**. By depressing **F5** you will bring up the **Axis Resolution** screen. This is preset at the factory with the proper choices for a 3 axis mill.

```
┌──────────────────────────────────────────────────┐
│                                                    │
│        ┌────────────────────────────────┐          │
│        │   Series 1100 - Setup Utility  │          │
│        └────────────────────────────────┘          │
│                                                    │
│        ┌──────────────────────────────────┐        │
│        │      Machine axis - Setup        │        │
│        ├──────────────────────────────────┤        │
│        │  1.▓Resolution▓                   │        │
│        │  2. Linear correction compensation│        │
│        │  3. Skew error compensation       │        │
│        │  4. In position                   │        │
│        │  5. Continuous path               │        │
│        │  6. Default rapid                 │        │
│        │  7. Default feed                  │        │
│        │  8. Positive software limit       │        │
│        │  9. Negative software limit       │        │
│        │ 10. Backlash compensation         │        │
│        │ 11. Encoder Phase A               │        │
│        └──────────────────────────────────┘        │
│                                                    │
│ ██ ██ ██ ██ ██ ██ ██ ██ ██ ██                      │
│ Version: 3.10A-D            Serial ID: 1766343     │
└──────────────────────────────────────────────────┘
```
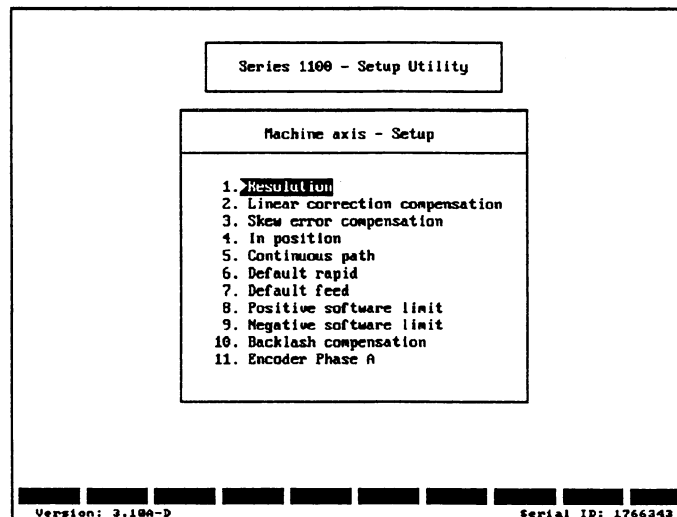
STANDARD VALUES CONTINUED

The highlighter falls on the **Type** of transducer used in the three axis present. **Encdr** is present in all axis because the motors are equipped with encoders. If there were scales on the machine you would have to change the defaults to **SCALE**. To do this you push the axis key (X for X, Y for Y etc.) and the system will ask for a pass word. **Y10** is the setup password. After entering the password the next window opens.

```
                Series 1100 - Setup Utility

              Axis Resolution - Setup

                        X       Y       Z       U
             1. Type    Encdr   Encdr   Encdr   Encdr
             2. Disp. Res.  .002    .002    .002    .002
             3. Resolution  .002    .002    .002    .002
             4. Enc. Lines  1000    1000    1000    635
             5. Pitch   0.20    0.20    0.20    0.20
             6. Ratio   1.50    1.50    1.00    1.00

Version: 3.10A-D                          Serial ID: 1766343
```

Because we are not going to change this parameter push **F10** to exit this screen. The next screen we will select is **Home**. Please read the Axis homing section in the manual before altering any settings in this screen. Homing is very useful in machining but you must know how to use it before turning it on.

```
                Series 1100 - Setup Utility

              Machine/Installation

               1. Machine Axis
               2. Spindle Axis
               3. Z Axis Type
               4. Interface
               5. Tool Management
               6. Miscellaneous
               7. Home
               8. Language
               9. Software Update
              10. DNC Setup
              11. Security

Version: 3.10A-D                          Serial ID: 1766343
```

The next screen is the **Home Setup** screen. This gives the various choices for **Homing** the machine. The first is **Home Yes or No?** Note that **No** is shown. To change to **YES** you again must use the password **Y10**. This allows changing the default setting to **Yes.**

```
          ┌──────────────────────────────┐
          │  Series 1100 - Setup Utility │
          └──────────────────────────────┘


            ┌─────────────────────────────────┐
            │         Home - Setup            │
            ├─────────────────────────────────┤
            │ 1. Home required..............  No │
            │ 2. Home sequence.............. {3,2,1,4} │
            │ 3. Home type..................  ▶ │
            │ 4. Datum search speed........  ▶ │
            │ 5. Home preset...............  ▶ │
            │ 6. Disable index pulse check..  No │
            └─────────────────────────────────┘

  Version: 3.10A-D                Serial ID: 1766343
```

F10 returns to the last screen and you can move the highlighter down 1 to **Home sequence.** This screen allows setting the sequence of axis to be homed (which moves first, second etc). Push **F5** to select this choice. The next screen allows setting the order. Again use the **F5 or F10** keys as needed to back out of this screen.

```
          ┌──────────────────────────────┐
          │  Series 1100 - Setup Utility │
          └──────────────────────────────┘


            ┌─────────────────────────────────┐
            │         Home - Setup            │
            ├─────────────────────────────────┤
            │ 1. Home required..............  Yes │
            │ 2. Home sequence.............. {3,2,1,4} │
            │ 3. Home type..................  ▶ │
            │ 4. Datum search speed........  ▶ │
            │ 5. Home preset...............  ▶ │
            │ 6. Disable index pulse check..  No │
            └─────────────────────────────────┘

  Version: 3.10A-D                Serial ID: 1766343
```

STANDARD VALUES CONTINUED

The next two screen are associated with the **Homing Sequence** and are for your reference only.

```
           Series 1100 - Setup Utility

                 Home - Setup

        1. Home required..............    Yes
        2. >Home sequence..............{3,2,1,4}
        3. Home type..................     ▶
        4. Datum search speed.........     ▶
        5. Home preset................     ▶
        6. Disable index pulse check..    No




 Version: 3.10A-D                Serial ID: 1766343
```

```
           Series 1100 - Setup Utility

                 Home - Setup
                                   Home sequence
        1. Home required.......
        2. >Home sequence........  >Home sequence for X.. Third
        3. Home type...........    Home sequence for Y.. Second
        4. Datum search speed..    Home sequence for Z.. First
        5. Home preset.........    Home sequence for U.. Fourth
        6. Disable index pulse



 Version: 3.10A-D                Serial ID: 1766343
```

STANDARD VALUES CONTINUED

This screen shows the **Home Type** highlighted. Select this to advance to the next screen.

```
┌─────────────────────────────────────────────────────┐
│        ┌──────────────────────────────────┐          │
│        │   Series 1100 - Setup Utility    │          │
│        └──────────────────────────────────┘          │
│                                                       │
│      ┌───────────────────────────────────────┐       │
│      │         Home - Setup                   │      │
│      │                                        │      │
│      │  1. Home required..............  Yes   │      │
│      │  2. Home sequence............. (3,2,1,4)│     │
│      │  3. Home type..................   ►    │      │
│      │  4. Datum search speed.........   ►    │      │
│      │  5. Home preset................   ►    │      │
│      │  6. Disable index pulse check..   No   │      │
│      └───────────────────────────────────────┘       │
│                                                       │
│  ████ ████ ████ ████ ████ ████ ████ ████ ████        │
│  Version: 3.10A-D              Serial ID: 1766343     │
└─────────────────────────────────────────────────────┘
```
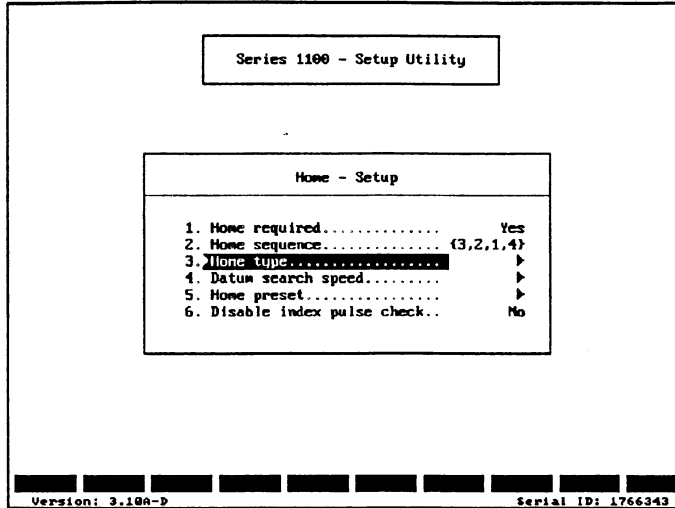
Now the Home type is highlighted. By pushing the **Select** key you advance to the next screen. This shows homing with a **Positive** index limit. This is the only parameter we would advise that you change to meet your requirements. If you would like to home in a **Negative** direction you may change this to **With Negative Index Limit**. This seeks **Home** in a negative direction.

```
┌─────────────────────────────────────────────────────┐
│        ┌──────────────────────────────────┐          │
│        │   Series 1100 - Setup Utility    │          │
│        └──────────────────────────────────┘          │
│                                                       │
│    ┌─────────────────────────────────────────────┐   │
│    │          Home Type - Setup                   │   │
│    │                                              │   │
│    │  1. Home type for X..    With positive index limit │
│    │  2. Home type for Y..    With positive index limit │
│    │  3. Home type for Z..    With negative index limit │
│    │  4. Home type for U..              No homing │   │
│    └─────────────────────────────────────────────┘   │
│                                                       │
│  ████ ████ ████ ████ ████ ████ ████ ████ ████        │
│  Version: 3.10A-D              Serial ID: 1766343     │
└─────────────────────────────────────────────────────┘
```
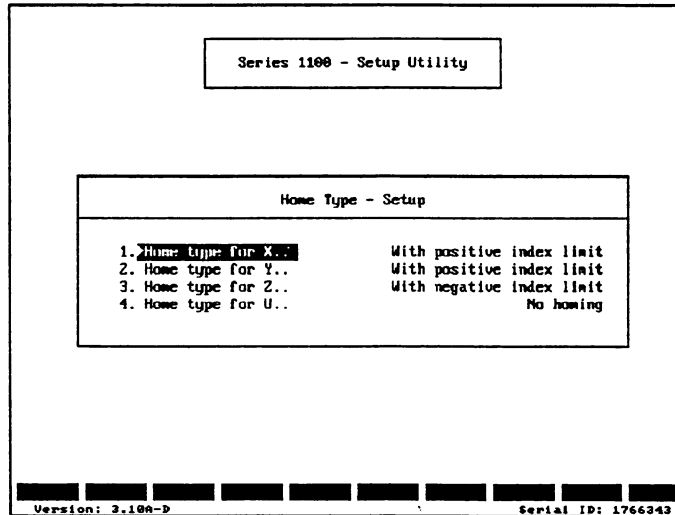
The **Homing Type** for X axis is shown below.

```
┌────────────────────────────────────────────────────────┐
│                                                        │
│           ┌─────────────────────────────────┐          │
│           │   Series 1100 - Setup Utility   │          │
│           └─────────────────────────────────┘          │
│                                                        │
│                                                        │
│         ┌─────────────Home┌─────────────────────────┐  │
│         │                 │ No homing               │  │
│         │                 │►With positive index limit│ │
│         │  1.►Home type for X..│ With positive index and vector limit│
│         │  2. Home type for Y..│ With negative index limit│
│         │  3. Home type for Z..│ With negative index and vector limit│
│         │  4. Home type for U..└─────────────────────────┘
│         │                                              │
│         └──────────────────────────┘                   │
│                                                        │
│                                                        │
│                                                        │
│  ██████ ████ ████ ████ ████ ████ ████ ████ ████ ████   │
│ Version: 3.10A-D                    Serial ID: 1766343 │
└────────────────────────────────────────────────────────┘
```
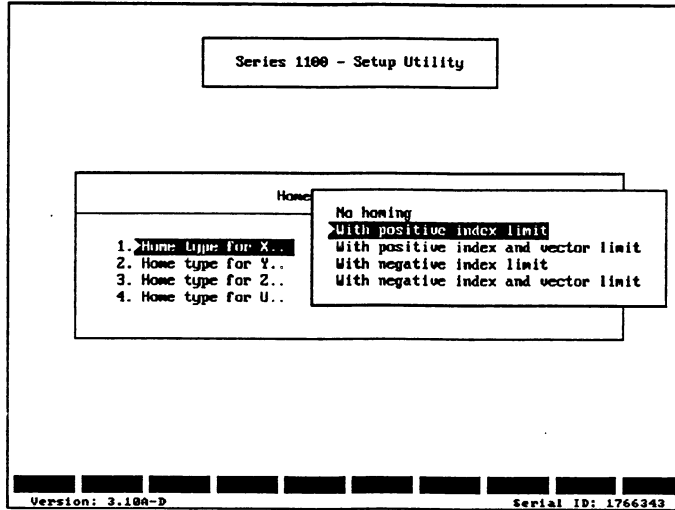
The Datum search Speed allows setting the speed at which homing is done.

```
┌────────────────────────────────────────────────────────┐
│                                                        │
│           ┌─────────────────────────────────┐          │
│           │   Series 1100 - Setup Utility   │          │
│           └─────────────────────────────────┘          │
│                                                        │
│              ┌──────────────────────────────┐          │
│              │         Home - Setup          │          │
│              │                              │          │
│              │  1. Home required..........    Yes       │
│              │  2. Home sequence.......... {3,2,1,4}    │
│              │  3. Home type.................    ►       │
│              │  4.►Datum search speed........    ►       │
│              │  5. Home preset...............    ►       │
│              │  6. Disable index pulse check..   No      │
│              │                              │          │
│              └──────────────────────────────┘          │
│                                                        │
│  ██████ ████ ████ ████ ████ ████ ████ ████ ████ ████   │
│ Version: 3.10A-D                    Serial ID: 1766343 │
└────────────────────────────────────────────────────────┘
```
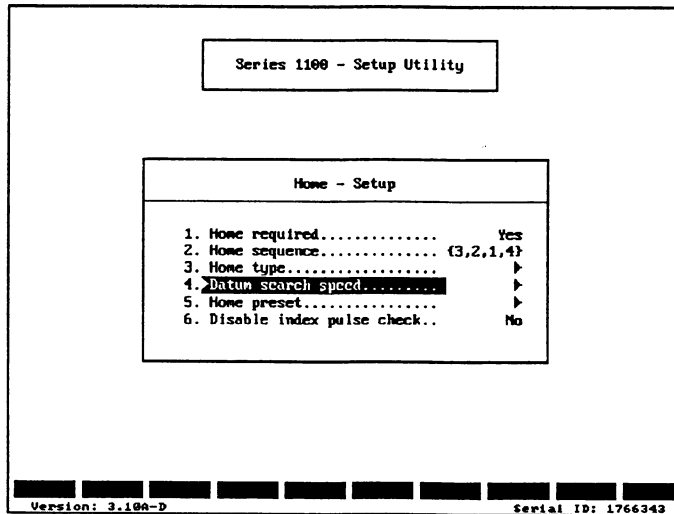
STANDARD VALUES CONTINUED

The search speed is now shown for all three axis. Use the Y10 password to change the sped. **Caution!** don"t raise this speed to a very high number. Homing is only done at .200" increments so raising the speed on a standard mill will not gain anything.

```
┌─────────────────────────────────────────────────┐
│                                                   │
│          ┌─────────────────────────────┐          │
│          │  Series 1100 - Setup Utility │          │
│          └─────────────────────────────┘          │
│                                                   │
│                                                   │
│          ┌─────────────────────────────┐          │
│          │    Datum Search Speed - Setup │          │
│          ├─────────────────────────────┤          │
│          │  1. X datum search feed..  25.0 │        │
│          │  2. Y datum search feed..  25.0 │        │
│          │  3. Z datum search feed..  25.0 │        │
│          │  4. U datum search feed..   0.1 │        │
│          └─────────────────────────────┘          │
│                                                   │
│  ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄              │
│  Version: 3.10A-D           Serial ID: 1766343    │
└─────────────────────────────────────────────────┘
```

Return to the previous screen and select **Home Preset** then push the **Select** key. Do not put information in these screens. They won't normally be used in a knee mill without directional limit switches.

```
┌─────────────────────────────────────────────────┐
│                                                   │
│          ┌─────────────────────────────┐          │
│          │  Series 1100 - Setup Utility │          │
│          └─────────────────────────────┘          │
│                                                   │
│                                                   │
│          ┌─────────────────────────────┐          │
│          │      Home Preset - Setup     │          │
│          ├─────────────────────────────┤          │
│          │  1. X Home preset..   0.0000 │          │
│          │  2. Y Home preset..   0.0000 │          │
│          │  3. Z Home preset..   0.0000 │          │
│          │  4. U Home preset..   0.0000 │          │
│          │  5. Home preset ...     Off  │          │
│          └─────────────────────────────┘          │
│                                                   │
│  ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄ ▄▄▄              │
│  Version: 3.10A-D           Serial ID: 1766343    │
└─────────────────────────────────────────────────┘
```

STANDARD VALUES CONTINUED

The next screen is **Disable Index Pulse Check**. This is set to **No** and should be left at this setting. This tells the control to use an error checking routine with the index pulse search. After a preset distance and no pulse is seen by the control, an error message will be placed on the screen and the axis will cease movement.

```
┌──────────────────────────────────────────────────┐
│        ┌─────────────────────────────┐           │
│        │  Series 1100 - Setup Utility │           │
│        └─────────────────────────────┘           │
│                                                    │
│      ┌───────────────────────────────────┐        │
│      │          Home - Setup             │        │
│      ├───────────────────────────────────┤        │
│      │  1. Home required.............  Yes │        │
│      │  2. Home sequence............. {3,2,1,4} │    │
│      │  3. Home type.................    ▶ │        │
│      │  4. Datum search speed........    ▶ │        │
│      │  5. Home preset...............    ▶ │        │
│      │  6. Disable index pulse check..   No │        │
│      └───────────────────────────────────┘        │
│                                                    │
│ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆                     │
│ Version: 3.10A-D            Serial ID: 1766343    │
└──────────────────────────────────────────────────┘
```

Push F10 to return to the previous screen and move the highlighter to the **General Software** choice as seen below and **SELECT** this screen.

```
┌──────────────────────────────────────────────────┐
│        ┌─────────────────────────────┐           │
│        │  Series 1100 - Setup Utility │           │
│        └─────────────────────────────┘           │
│                                                    │
│         ┌──────────────────────────┐              │
│         │      Setup Options       │              │
│         ├──────────────────────────┤              │
│         │  1. Machine/Installation │              │
│         │  2. General Software     │              │
│         │  3. Print configurations │              │
│         │  4. Units in Inch        │              │
│         └──────────────────────────┘              │
│                                                    │
│ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆ ▆▆                     │
│ Version: 2.10A-D            Serial ID: 1766343    │
└──────────────────────────────────────────────────┘
```

65

STANDARD VALUES CONTINUED

SELECT the screen shown below. This puts you into the **Communications** screens. These determine how the **RS232** port and the printer work.

```
┌──────────────────────────────────────────────┐
│                                                │
│       ┌──────────────────────────────┐         │
│       │  Series 1100 - Setup Utility │         │
│       └──────────────────────────────┘         │
│                                                │
│                                                │
│            ┌──────────────────────┐            │
│            │   General Software   │            │
│            │                      │            │
│            │  1. Control Software │            │
│            │  2.▓Communications▓  │            │
│            │  3. Draw             │            │
│            │  4. Editor           │            │
│            │  5. Program          │            │
│            │  6. Display          │            │
│            │  7. Printer          │            │
│            └──────────────────────┘            │
│                                                │
│                                                │
│  ██ ██ ██  ██ ██ ██  ██ ██ ██  ██              │
│  Version: 3.10A-D          Serial ID: 1766343  │
└──────────────────────────────────────────────┘
```

This screen shows the present configuration for the **RS232** port. Note that most software packages can use these settings. This should rarely have to be changed.

```
┌──────────────────────────────────────────────┐
│                                                │
│       ┌──────────────────────────────┐         │
│       │  Series 1100 - Setup Utility │         │
│       └──────────────────────────────┘         │
│                                                │
│            ┌──────────────────────┐            │
│            │ Communications - Setup│           │
│            │                      │            │
│            │  1.▓Port......▓  COM1 │            │
│            │  2. Baud rate..  9600 │            │
│            │  3. Parity.....  EVEN │            │
│            │  4. Data bits..     7 │            │
│            │  5. Stop bits..     1 │            │
│            │  6. Software...    On │            │
│            └──────────────────────┘            │
│                                                │
│  ██ ██ ██  ██ ██ ██  ██ ██ ██  ██              │
│  Version: 3.10A-D          Serial ID: 1766343  │
└──────────────────────────────────────────────┘
```

STANDARD VALUES CONTINUED

F10 back one screen and move the highlighter to the **Printer** choice.

```
┌────────────────────────────────────────────────┐
│              . .                               │
│          ┌──────────────────────────┐          │
│          │ Series 1100 - Setup Utility │        │
│          └──────────────────────────┘          │
│                                                │
│                                                │
│            ┌────────────────────┐              │
│            │  General Software  │              │
│            ├────────────────────┤              │
│            │                    │              │
│            │ 1. Control Software│              │
│            │ 2. Communications  │              │
│            │ 3. Draw            │              │
│            │ 4. Editor          │              │
│            │ 5. Program         │              │
│            │ 6. Display         │              │
│            │ 7.█Printer█        │              │
│            │                    │              │
│            └────────────────────┘              │
│                                                │
│                                                │
│  ██ ██ ██ ██ ██ ██ ██ ██ ██ ██                │
│ Version: 3.10A-D          Serial ID: 1766343   │
└────────────────────────────────────────────────┘
```

This screen shows the default settings for the printer port. This may be used to print software configurations and print out programs from the control.

```
┌────────────────────────────────────────────────┐
│          ┌──────────────────────────┐          │
│          │ Series 1100 - Setup Utility │        │
│          └──────────────────────────┘          │
│                                                │
│                                                │
│            ┌────────────────────────┐          │
│            │     Setup Options      │          │
│            ├────────────────────────┤          │
│            │ 1. Machine/Installation │          │
│            │ 2. General Software     │          │
│            │ 3.█Print configurations█│          │
│            │ 4. Units in Inch        │          │
│            │                         │          │
│            └────────────────────────┘          │
│                                                │
│                                                │
│  ██ ██ ██ ██ ██ ██ ██ ██ ██ ██                │
│ Version: 3.10A-D          Serial ID: 1766343   │
└────────────────────────────────────────────────┘
```

STANDARD VALUES CONTINUED

Now we come to the time we can actually use the printer port. If you have a parallel printer, connect it to the printer port located on the rear of the computer console. This can be located by opening the computer cabinet and finding the DB 25 connector marled PRINTER. **F10** back to the first screen seen after choosing **Setup Utility**. This will be named **SETUP OPTIONS**. CHOICE 3 IS **print Configurations**. his allows printing of all the parameters stored in the control. Use the **Select Key** to select this choice.

```
┌─────────────────────────────────────────────────┐
│                                                   │
│         ┌─────────────────────────────┐           │
│         │   Series 1100 - Setup Utility │         │
│         └─────────────────────────────┘           │
│                                                   │
│                                                   │
│            ┌───────────────────────────┐          │
│            │      Setup Options         │          │
│            │                            │          │
│            │  1. Machine/Installation   │          │
│            │  2. General Software       │          │
│            │  3. Print configurations   │          │
│            │  4. Units in Inch          │          │
│            └───────────────────────────┘          │
│                                                   │
│  ██ ██ ██ ██ ██ ██ ██ ██ ██ ██                    │
│ Version: 3.10A-D              Serial ID: 1766343  │
└─────────────────────────────────────────────────┘
```
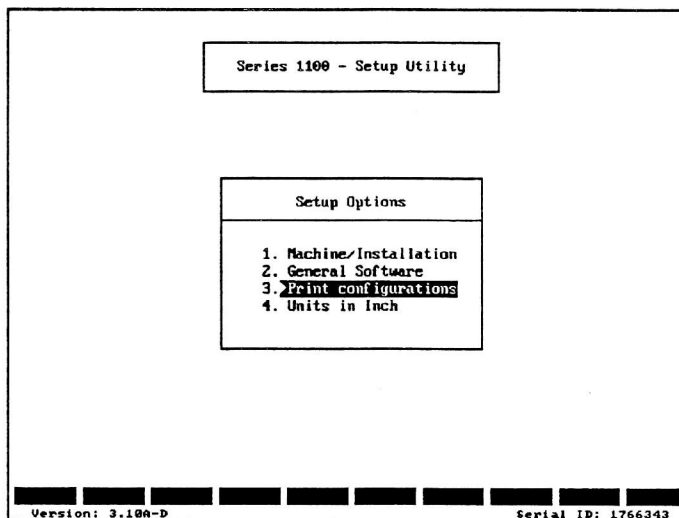
If you do not have a printer attached you will see an error message next.

```
┌─────────────────────────────────────────────────┐
│                                                   │
│         ┌─────────────────────────────┐           │
│         │   Series 1100 - Setup Utility │         │
│         └─────────────────────────────┘           │
│                                                   │
│            ┌───────────────────────────┐          │
│            │     PRINTER NOT READY      │          │
│            │                            │          │
│            │                            │          │
│            │                            │          │
│            └───────────────────────────┘          │
│                                                   │
│  ██ ██ ██ ██ ██ ██ ██ ██ ██ ██                    │
│ Version: 3.10A-D              Serial ID: 1766343  │
└─────────────────────────────────────────────────┘
```

68
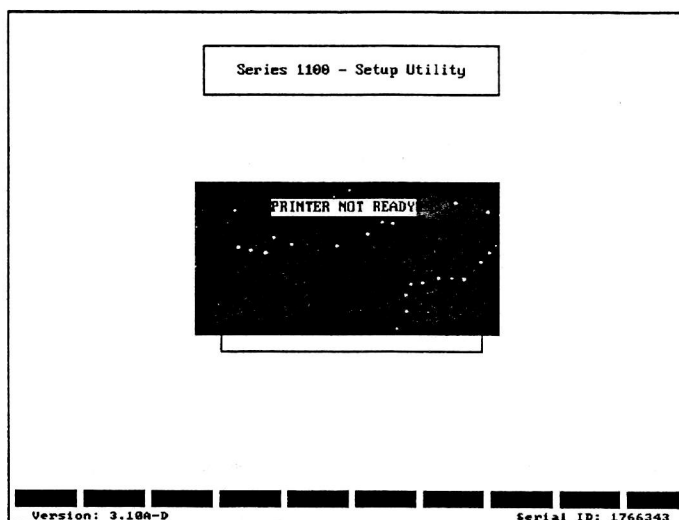
STANDARD VALUES CONTINUED

The next screen shows the **Units in Inch** choice. This is the default screen display units. Leave this set at **INCH**.

```
┌─────────────────────────────────────────────────┐
│              · ...                               │
│       ┌──────────────────────────┐               │
│       │ Series 1100 – Setup Utility │            │
│       └──────────────────────────┘               │
│                                                  │
│                                                  │
│          ┌───────────────────────┐               │
│          │    Setup Options      │               │
│          ├───────────────────────┤               │
│          │ 1. Machine/Installation│              │
│          │ 2. General Software   │               │
│          │ 3. Print configurations│              │
│          │ 4.▶Units in Inch      │               │
│          └───────────────────────┘               │
│                                                  │
│                                                  │
│  ▬▬ ▬▬ ▬▬ ▬▬ ▬▬ ▬▬ ▬▬ ▬▬ ▬▬ ▬▬                   │
│ Version: 3.104-D          Serial ID: 1766343     │
└─────────────────────────────────────────────────┘
```

Use the **F10** key to return to the next screen. This may take several pushes of the key. When asked **Save Changes?** note that the screen soft keys have a **Yes & No** choice now. To save any changes select the **Yes** key. This saves the changes you made to the flash ram on the system. See the section on putting your **Configuration** choices on diskette. This saves them for the future. If you don't save them you could inadvertently wipe them out during a software update. By storing on disk and saving the disk, they may be reinstalled at any time and returned to the original machine specs.

***** <u>BACKING</u> <u>UP</u> <u>THE</u> <u>SYSTEM</u> <u>CONFIGURATION</u> <u>FILE</u> *****

The computer contains two batteries which maintain the CMOS
memory when the computer is turned off. As these batteries age
they tend to lose their charge. If totally discharged, the CMOS
will divest itself of all program and configuration files when
power is removed from the machine. A copy of the configuration
file (S11CONFI.CFG) should be placed on a blank diskette and the
diskette write protect tab should be moved to the protect posi-
tion. The following steps will help in saving the file. Following
these steps is the procedure to reload the file.

1. Put the system in the normal CNC mode.
2. Push the F2 key (PROGRAM) one time.
3. Push the F8 key (DISPLAY) two times.
4. Move the cursor to the ..\ line in the display and push the
   ENTER key.
5. Move the cursor with the arrow keys to S11CONFI.CFG file.
6. Push the F9 (UTILITY) key and then push the ENTER key one
   time.
7. Use the arrow keys to move the cursor to A:.
8. Put a formatted 3 1/2" diskette into the disk drive located
   inside the small door on the computer enclosure.
9. Push the ENTER key.
10. After about 10 seconds the COPYING message at the lower left
    will disappear. Remove the diskette from the drive.
11. Push F8 (DISPLAY) and move the cursor to the USER\ file.
    and push the ENTER key one time.
12. Push the F10 (EXIT) key to return to the CNC mode.

To copy the file back into the system use the following
procedure. **If after copying the file, you make any changes to the
parameters, be sure to recopy the new file on the diskette.**

1. From the CNC mode push the F2 (PROGRAM) key.
2. Move the cursor to the ..\ line and push ENTER.
3. Push F7 (LOG) and move the cursor to A: and push ENTER again.
4. Move the cursor to the S11CONFI.CFG line.
5. Push the F9 (UTILITY) key and the ENTER key.
6. Move the cursor to the D: line and push ENTER.
7. Push F7 (LOG) and move the cursor to D: and push ENTER.
8. Move the cursor to USER\ and push ENTER.
9. Push F10 (EXIT) and the process is complete.

The following pages deal with values stored inside the
control. They are stored inside the CMOS section of memory. In
the event the battery fails on the CMOS board, the following
values will revert to factory settings. These may or may not
allow the machine to function correctly.

When a machine is delivered or assembled in the customers
plant, values are entered in the control. These deal with M
functions, number of axis, ramp up and down speed, homing, soft-
ware limits, axis rapid speed etc. These values are established
by the machine tool builder or retrofitter. They vary from ma-
chine to machine.

The default values that follow are a general guide to a
three axis system. They may be used for reference in re-
establishing parameters in a 3 axis system.

The major difference between a two and three axis system is
the way Z axis is treated. In a three axis system the Z is driven
under power and on page 4 of the parameters, Z is shown as having
an encoder. If this were a 2 axis system, Z axis would be changed
to SCALE and the DISPL. RES would be set at .01 and the RESOLU-
TION would be set at .01. This would convert the Z axis to a
scale type readout only and set the displayed resolution
to .0005". Resolutions finer than .0005" are possible but don't
tend to be easily maintained using the hand lever on the quill.

-Control Software :

Default plane...............   XY
Default units...............   Inch
Default axis values.........   Absolute
Circle adjustments..........   Center
Circle centers..............   Modal
Maximum arc correction......   0.005000
Internal accuracy...........   0.00000100
External accuracy...........   0.00010000
Metric display resolution...   {3,3,3,3}
Inch display resolution.....   {4,4,4,4}
Compensation cutoff angle...   15.0
Keyboard beep...............   Off
Load system macro file......   Always
Load editor help templates..   Always
Disk access marker..........   On

-Communications :

Port.......   COM1
Baud rate..   9600
Parity.....   EVEN
Data bits..   7
Stop bits..   1
Software...   On

-Draw :

Restore to previous session.......   Yes
Default program block mode........   Auto
Axis display......................   On
Display program text..............   Yes
Automatic re-run..................   Yes
Grid..............................   None
Grid size.........................   1.0
Tool display......................   On
Default tool type.................   Flat
Tool length factor................   3.00
Default AUTO-ZOOM scaling factor..   0.85
Auto erase........................   On
Cutter compensation in draw.......   Both
Draw view.........................   ISO
Aspect ratio correction factor....   1.30

-Editor :

Force Caps Lock on PC keyboard...........   Yes
Create backup program....................   No
Delete internal file when program saved..   Yes
Case sensitive Find......................   No
Memory reserved (in K-bytes).............   160

-Program :

Program directory pattern...........   *.M
Program directory display mode.......   Short
Program directory sort order........   Name
Automatically check disk at startup..   Never
Delete backup files during optimize..   Yes

72

Directory for user programs..........   C:\1100USER

```
-Colors :          Foreground    Background
----- Editor ----
Normal Text......  Example White        Black
Marked Text......  Example White        Red
Current Line.....  Example White        Light Gray
Frame............  Example White        Blue
Errors...........  Example Yellow       Blue
Prompts..........  Example White        Black
---- Softkeys ---
Normal...........  Example Yellow       Cyan
Highlight........  Example Black        * message 24211 *
------ Draw -----
Screen...........  Example Black        Black
Frame............  Example White        Black
Rapid............  Example Light Gray   Black
Comp Rapid.......  Example Light Gray   Black
Feed.............  Example Light Magenta Black
Drill Marker.....  Example Yellow       Black
Comp Feed........  Example White        Black
Axes.............  Example Light Green   Black
Rapid style......  Dotted
Feed style.......  Solid
Text.............  Example White        Black
Labels...........  Example White        Black
Prompts..........  Example White        Black
Errors...........  Example White        * message 24208 *
------ Help -----
Background.......  Example Black        Black
Frame............  Example Brown        Black
Axis.............  Example Dark Gray    Black
Workpiece........  Example Light Magenta Black
Tool.............  Example White        Black
Construction.....  Example Light Green   Black
Header text......  Example Light Green   Black
Draw text........  Example Light Green   Black
Entry text.......  Example Light Green   Black
Program text.....  Example Light Green   Black
Error text.......  Example Black        Black
------ CNC ------
Frame............  Example White        Black
Labels...........  Example Light Cyan   Black
Status values....  Example White        Black
Active axis......  Example Light Green   Blue
Error/Highlight..  Example White        Light Gray
Scroll text......  Example Light Magenta Light Gray

-Printer :
Default output device..       Prn
Lines per page.........        55
Page heading...........       Yes
Line numbers...........        No
Print quality..........       Draft
Characters per inch....        10
```

73

-Machine Axis.....
-Resolution :

Type	Encdr	Encdr	Encdr	Encdr
Disp. Res.	.002	.002	.002	.002
Resolution	.002	.002	.002	.002
Enc. Lines	1000	1000	1000	635
Pitch	0.20	0.20	0.20	0.20
Ratio	1.50	1.50	1.80	1.00

Set to SCALE if Scales used
Set Disp Res to .01 all axis
Set Resolution .01 for Scales

-Linear correction compensation :
X Linear correction compensation.. 1.000000
Y Linear correction compensation.. 1.000000
Z Linear correction compensation.. 1.000000
U Linear correction compensation.. 1.000000
Linear correction compensation....   Off

-Skew error compensation :
X Skew error compensation.. 0.0000
Y Skew error compensation.. 0.0000
Z Skew error compensation.. 0.0000
U Skew error compensation.. 0.0000
Skew error compensation....   Off

-In position :   **FOR SCALES THE READINGS WILL BE**
X In position.. 0.0004   **X In Position .. 0.0005**
Y In position.. 0.0004   **Y In Position .. 0.0005**
Z In position.. 0.0004   **Z In Position .. 0.0005**
U In position.. 0.0004   **U In Position .. 0.0005**

-Continuous path :
X Continuous path.. 0.0700
Y Continuous path.. 0.0700
Z Continuous path.. 0.0700
U Continuous path.. 0.0700
Continuous path....   On

-Default rapid :
Default rapid rate X axis..   200.   **MUST SET RAPIDS AT 200 ALL AXIS. CHECK AT STARTUP!**
Default rapid rate Y axis..   200.
Default rapid rate Z axis..   150.
Default rapid rate U axis..   200.

-Default feed :
Default feed rate X axis..   10.0
Default feed rate Y axis..   10.0
Default feed rate Z axis..   10.0
Default feed rate U axis..   10.0

-Positive software limit :
X+ software limit...   0.0000
Y+ software limit...   0.0000
Z+ software limit...   0.0000
U+ software limit...   0.0000
Max software limit..   Off

74

-Negative software limit :
X- software limit...   0.0000
Y- software limit...   0.0000
Z- software limit...   0.0000
U- software limit...   0.0000
Min software limit..   Off

-Backlash compensation :
X backlash compensation.. 0.0000
Y backlash compensation.. 0.0000
Z backlash compensation.. 0.0000
U backlash compensation.. 0.0000
Backlash compensation....   Off

-Encoder Phase A :
Phase for X axis.. Not invert
Phase for Y axis.. Not invert
Phase for Z axis.. Not invert
Phase for U axis.. Not invert

-Encoder Phase B :
Phase for X axis.. Not invert
Phase for Y axis.. Not invert
Phase for Z axis.. Not invert
Phase for U axis.. Not invert

-Vector limits :
X vector limits.. Disable
Y vector limits.. Disable
Z vector limits.. Disable
U vector limits.. Disable

-Active leadscrew :
Standard........
Segment Length..
Active.........   None

-Number of segments :
Number of segments for X..   1
Number of segments for Y..   1
Number of segments for Z..   1
Number of segments for U..   1

-Leadscrew compensation :
        X   Y   Z   U   V   W
   0.00000   0.00000   0.00000   0.00000

-Offset :
Leadscrew offset for X..   0.00000
Leadscrew offset for Y..   0.00000
Leadscrew offset for Z..   0.00000
Leadscrew offset for U..   0.00000

75

Zero cross for X..   0.00000
Zero cross for Y..   0.00000
Zero cross for Z..   0.00000
Zero cross for U..   0.00000

-Segment size
Length of segment for X..   -1.00000
Length of segment for Y..   -1.00000
Length of segment for Z..   -1.00000
Length of segment for U..   -1.00000

-Variable Segment Lengths for X :
Number of segments..   1
Offset..............   0.00000
Zero cross..........   0.00000
Segment length......
Table entries.......

-Segment length for X :
1)   0.00000

-Table entries for X :
1)   0.00000

-Variable Segment Lengths for Y :
Number of segments..   1
Offset..............   0.00000
Zero cross..........   0.00000
Segment length......
Table entries.......

-Segment length for Y :
1)   0.00000

-Table entries for Y :
1)   0.00000

-Variable Segment Lengths for Z :
Number of segments..   1
Offset..............   0.00000
Zero cross..........   0.00000
Segment length......
Table entries.......

-Segment length for Z :
1)   0.00000

-Table entries for Z :
1)   0.00000

-Variable Segment Lengths for U :
Number of segments..   1
Offset..............   0.00000
Zero cross..........   0.00000
Segment length......

Table entries.......

-Segment length for U :
1)   0.00000

-Table entries for U :
1)   0.00000

-Variable Segment Lengths for V :
Number of segments..   1
Offset..............   0.00000
Zero cross..........   0.00000
Segment length......
Table entries.......

-Segment length for V :
1)   0.00000

-Table entries for V :
1)   0.00000

-Variable Segment Lengths for W :
Number of segments..   1
Offset..............   0.00000
Zero cross..........   0.00000
Segment length......
Table entries.......

-Segment length for W :
1)   0.00000

-Table entries for W :
1)   0.00000

-straightness compensation
X straightness compensation..
Y straightness compensation..
Straightness compensation.... Off

-Variable Segment Lengths for X
Number of segments..   1
Offset..............   0.00000
Zero cross..........   0.00000
Segment length......   -1.00000
Table entries.......

-Table entries for X :
1)   0.00000   0.00000

-Variable Segment Lengths for Y
Number of segments..   1
Offset..............   0.00000
Zero cross..........   0.00000
Segment length......   -1.00000
Table entries.......

-Table entries for Y :
1)   0.00000   0.00000

-Feed gain table :					-FEED GAIN TABLE SCALES ONLY			
Kp	25	25	25	25	66	66	66	66
Ki	0	0	0	0	0	0	0	0
Kd	0	0	0	0	0	0	0	0
Il	0	0	0	0	0	0	0	0

-Rapid gain table:					-RAPID GAIN TABLE SCALES ONLY			
Kp	10	10	10	10	25	25	25	25
Ki	0	0	0	0	0	0	0	0
Kd	10	10	10	10	0	0	0	0
Il	0	0	0	0	0	0	0	0

-No motion gain table :					-NO MOTION GAIN TABLE SCALES ONLY			
Kp	10	10	10	10	25	25	25	25
Ki	10	10	10	10	1	1	1	1
Kd	0	0	0	0	0	0	0	0
Il	1	1	1	1	25	25	25	25

X Jog position..   0.0000
Y Jog position..   0.0000
Z Jog position..   0.0000
U Jog position..   0.0000

-Axis Clamping:
Clamping Allowed..   No
Wait for finish...   No
Allowable Error... 0.0000
Axis Ports........

-Axis Clamping Ports:
X Axis Port..   0000
Y Axis Port..   0000
Z Axis Port..   0000
U Axis Port..   0000

-Axis Output Ports:
Port 0..   X
Port 1..   Y
Port 2..   Z
Port 3.. Disabled
Port 4.. Disabled
Port 5.. Disabled

-Position Error Check:
Check idle time (ms).................   100
Maximum lag error....................   0.0080
Minimum lag for speed break..........   0.0004
Check idle time during homing (ms)..   350
Error checking...................... PEC & Rapid Warning
-Rapid Ramping:

Rapid Ramp Buffer..   7
Enable Usage.......   No

-Spindle Axis :
Spindle output........................... Unipolar
Spindle operation........................   DC
Gear ranges used......................... Single-M40
Low setting for M40 gear range...........   50
High setting for M40 gear range..........   6,000
Low setting for M41 gear range...........   50
High setting for M41 gear range..........   6,000
Low setting for M42 gear range...........   165
High setting for M42 gear range..........   501
Low setting for M43 gear range...........   500
High setting for M43 gear range..........   1,471
Low setting for M44 gear range...........   1470
High setting for M44 gear range..........   4,640
Axis used by spindle.....................   V
Gear change RPM..........................   10
Lines on spindle encoder per revolution.. 1,024
Multiplication spindle factor............   1.0
Spindle RPM Display...................... Feedback
Check spindle during gear change.........   Yes

-Special U,W :
Z Axis Type.. Linear

-Prog. Controller Interface :
Type.............. Distrib. Board
Timeout...........   5,000
Output Port.......
S-Function Setup..   0000
M-Function Setup..
Input Port........
Input Functions...

M-Function port assignments:
M 01 ...	0000	0000
M 02 ...	0000	0007
M 03 ...	0001	0002
M 04 ...	0002	0001
M 05 ...	0000	0003
M 06 ...	0000	0000
M 07 ...	0000	0000
M 08 ...	0004	0000
M 09 ...	0000	0004
M 10 ...	0000	0000
M 11 ...	0000	0000
M 12 ...	0000	0000
M 13 ...	0000	0000
M 14 ...	0000	0000
M 15 ...	0000	0000
M 16 ...	0000	0000
M 17 ...	0000	0000
M 18 ...	0000	0000

Any numbers shown here other than "0's" are
standard port setup values. These will remain at
"0's" unless M Functions were purchased with the
control system as an OPTION!

M 19 ...	0000	0000
M 20 ...	0000	0000
M 21 ...	0000	0000
M 22 ...	0000	0000
M 23 ...	0000	0000
M 24 ...	0000	0000
M 25 ...	0000	0000
M 26 ...	0000	0000
M 27 ...	0000	0000
M 28 ...	0000	0000
M 29 ...	0000	0000
M 30 ...	0000	0007
M 31 ...	0000	0000
M 32 ...	0000	0000
M 33 ...	0000	0000
M 34 ...	0000	0000
M 35 ...	0000	0000
M 36 ...	0000	0000
M 37 ...	0000	0000
M 38 ...	0000	0000
M 39 ...	0000	0000
M 40 ...	0000	0000
M 41 ...	0000	0000
M 42 ...	0000	0000
M 43 ...	0000	0000
M 44 ...	0000	0000
M 45 ...	0000	0000
M 46 ...	0000	0000
M 47 ...	0000	0000
M 48 ...	0000	0000
M 49 ...	0000	0000
M 50 ...	0000	0000
M 51 ...	0000	0000
M 52 ...	0000	0000
M 53 ...	0000	0000
M 54 ...	0000	0000
M 55 ...	0000	0000
M 56 ...	0000	0000
M 57 ...	0000	0000
M 58 ...	0000	0000
M 59 ...	0000	0000
M 60 ...	0000	0000
M 61 ...	0000	0000
M 62 ...	0000	0000
M 63 ...	0000	0000
M 64 ...	0000	0000
M 65 ...	0000	0000
M 66 ...	0000	0000
M 67 ...	0000	0000
M 68 ...	0000	0000
M 69 ...	0000	0000
M 70 ...	0000	0000
M 71 ...	0000	0000
M 72 ...	0000	0000
M 73 ...	0000	0000

```
M 74 ...      0000        0000
M 75 ...      0000        0000
M 76 ...      0000        0000
M 77 ...      0000        0000
M 78 ...      0000        0000
M 79 ...      0000        0000
M 80 ...      0000        0000
M 81 ...      0000        0000
M 82 ...      0000        0000
M 83 ...      0000        0000
M 84 ...      0000        0000
M 85 ...      0000        0000
M 86 ...      0000        0000
M 87 ...      0000        0000
M 88 ...      0000        0000
M 89 ...      0000        0000
M 90 ...      0000        0000
M 91 ...      0000        0000
M 92 ...      0000        0000
M 93 ...      0000        0000
M 94 ...      0000        0000
M 95 ...      0000        0000
M 96 ...      0000        0000
M 97 ...      0000        0000
M 98 ...      0000        0000
M 99 ...      0000        0000
```

Output port definitions:
```
0...      0      0     No   High
1...      0      0     No   High
2...      0      0     No   High
3...      0      0     No   High
4...      0      0     No   High
5...      0      0     No   High
6...      0      0     No   High
7...      0      0     No   High
8...      0      0     No   High
9...      0      0     No   High
10..      0      0     No   High
11..      0      0     No   High
12..      0      0     No   High
13..      0      0     No   High
14..      0      0     No   High
15..      0      0     No   High
```

Input port sense:
```
0.... High
1.... High
2.... High
3.... High
4.... High
5.... High
6.... High
7.... High
8.... High
```

9.... High
10... High
11... High

Input Functions:
External finish pulse.......... 0000
External start................ 0000
External hold................. 0000
External feed hold............ 0000
External manual select........ 0200
Start reading keyboard........ 0000
Stop reading keyboard......... 0000
General Error input message.... 0000
General Warning input message.. 0000

Tool Management - Setup
Activate tool length offset..   On Tn
Output signal................   On Tn
Stop program execution.......   On Tn
Default tool-table file...... S11MTOOL.DAT

-Miscellaneous :
Max programmed feedrate..............   80.0
Feedrate for jog on manual panel.....   40.0
Linear axis dry run feedrate........   40.0
Acceleration........................   66,000
Feed velocity offset factor..........   1.04
Rapid velocity offset factor.........   1.04
Force simulation mode................   NO
Servo up delay......................   3
Reverse G2/G3.......................   No
Restore Realtime in PROGRAM page.....   No
Remote handwheels...................   0
Screen blanking delay (minutes)......   10
Automatic feedrate override on arcs..   No

-Home :
Home required..............   Yes
Home sequence.............. {3,2,1,4}
Home type..................
Datum search speed........
Home preset...............
Disable index pulse check..   No

-Home type :
Home type for X..   With positive index limit
Home type for Y..   With positive index limit
Home type for Z..   With negative index limit
Home type for U..   No homing

-Datum search speed :
X datum search feed..   25.0
Y datum search feed..   25.0
Z datum search feed..   25.0
U datum search feed..   0.1

-Home Preset:

X Home preset..	0.0000
Y Home preset..	0.0000
Z Home preset..	0.0000
U Home preset..	0.0000
Home preset ...	Off

-Language: English

The values shown above are taken from a S1100 control set up on a small knee mill. They are general purpose parameters and are to be used for reference only. Exercise care if changing any parameters.

VALUES shown to the right of standard values on the previous pages are noted as optional and under which conditions these values must be changed. Contact your control dealer for assistance in changing these values if required!

The following pictures may be used for reference when assembling an 1100 system on a small knee mill. The first picture on this page shows the X axis ball screw being measured for straightness in one direction for straightness with the X axis table travel. Don't forget to indicate the screw in the other (90 Deg) direction. In measuring the other way, slide the surface gage along the rear of the saddle.
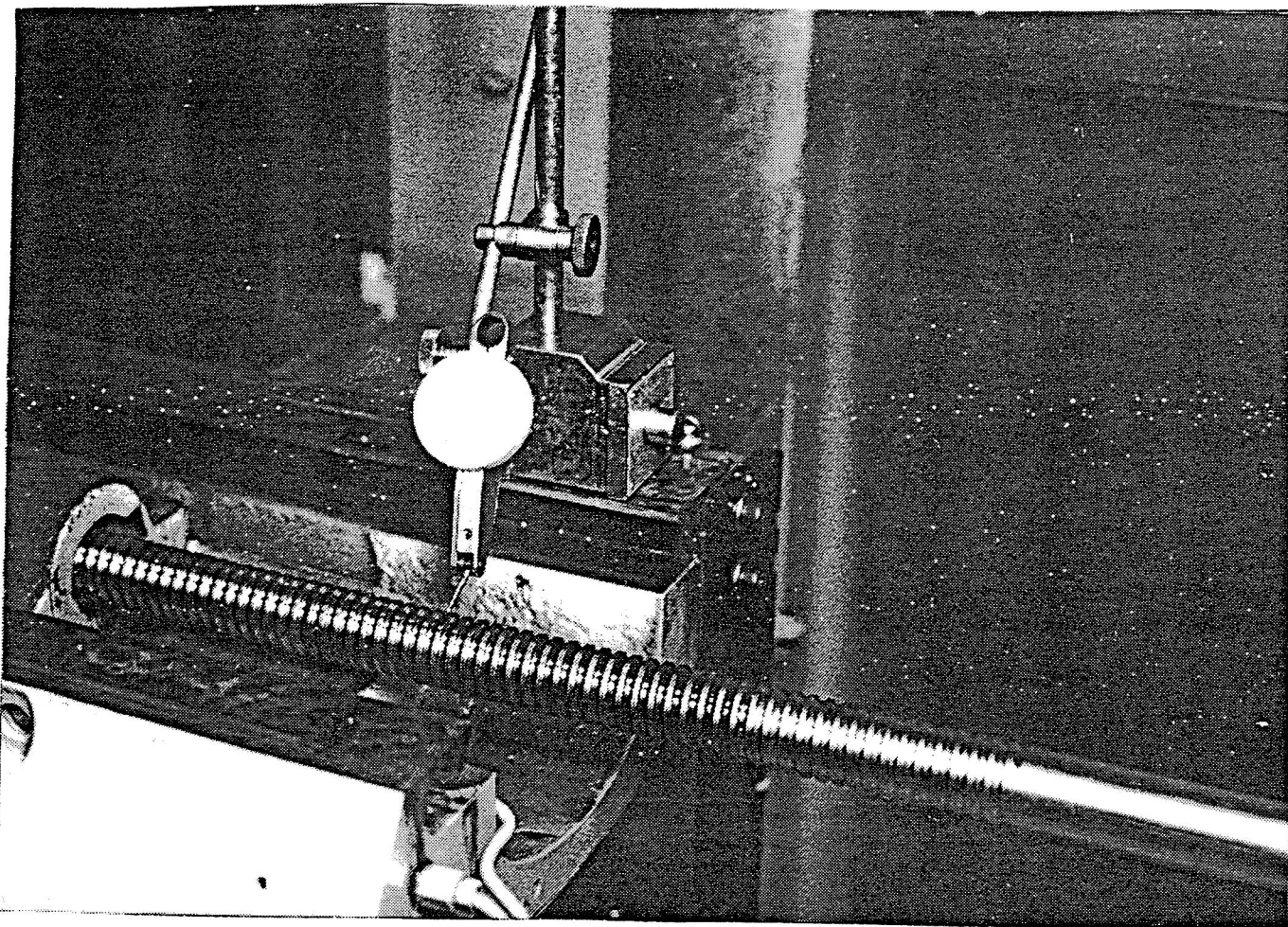
This picture shows the Y axis screw being indicated for straightness along the travel of Y axis. Refer to page 11 for text used with this operation. Remember that the Y axis gibs must be snugged up before sliding the saddle and indicating this stub.
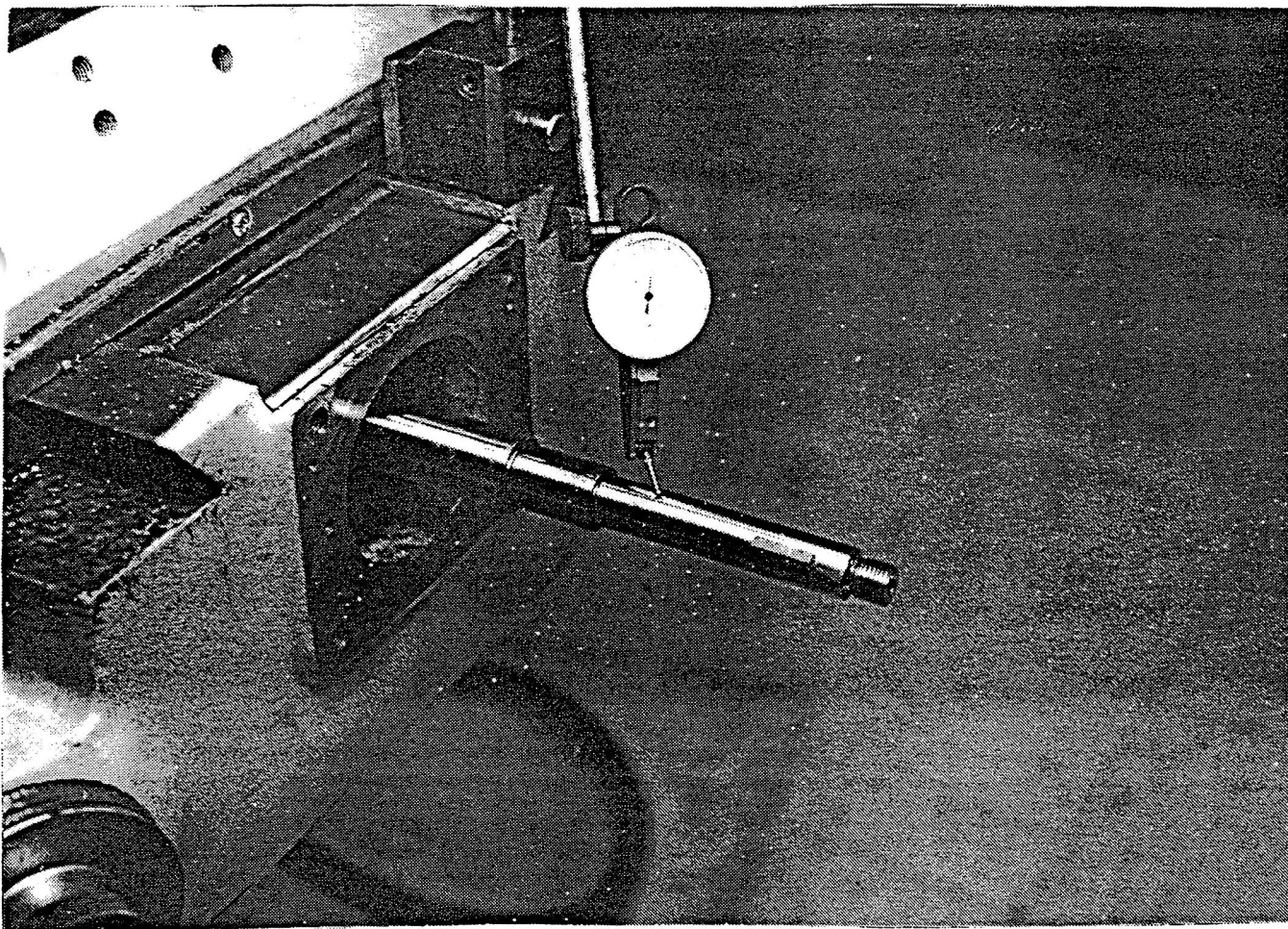
This picture shows the X Y limit switch mounting bracket and the placement on the end of the saddle. Note that the position may vary on your machine. The saddle shown here is an older YCI 1 1/2 mill. Place the top of the bracket below the flat way on the X axis. Also be sure that on some narrower saddles that the left edge doesn't interfere with the dovetail portion of the ways.
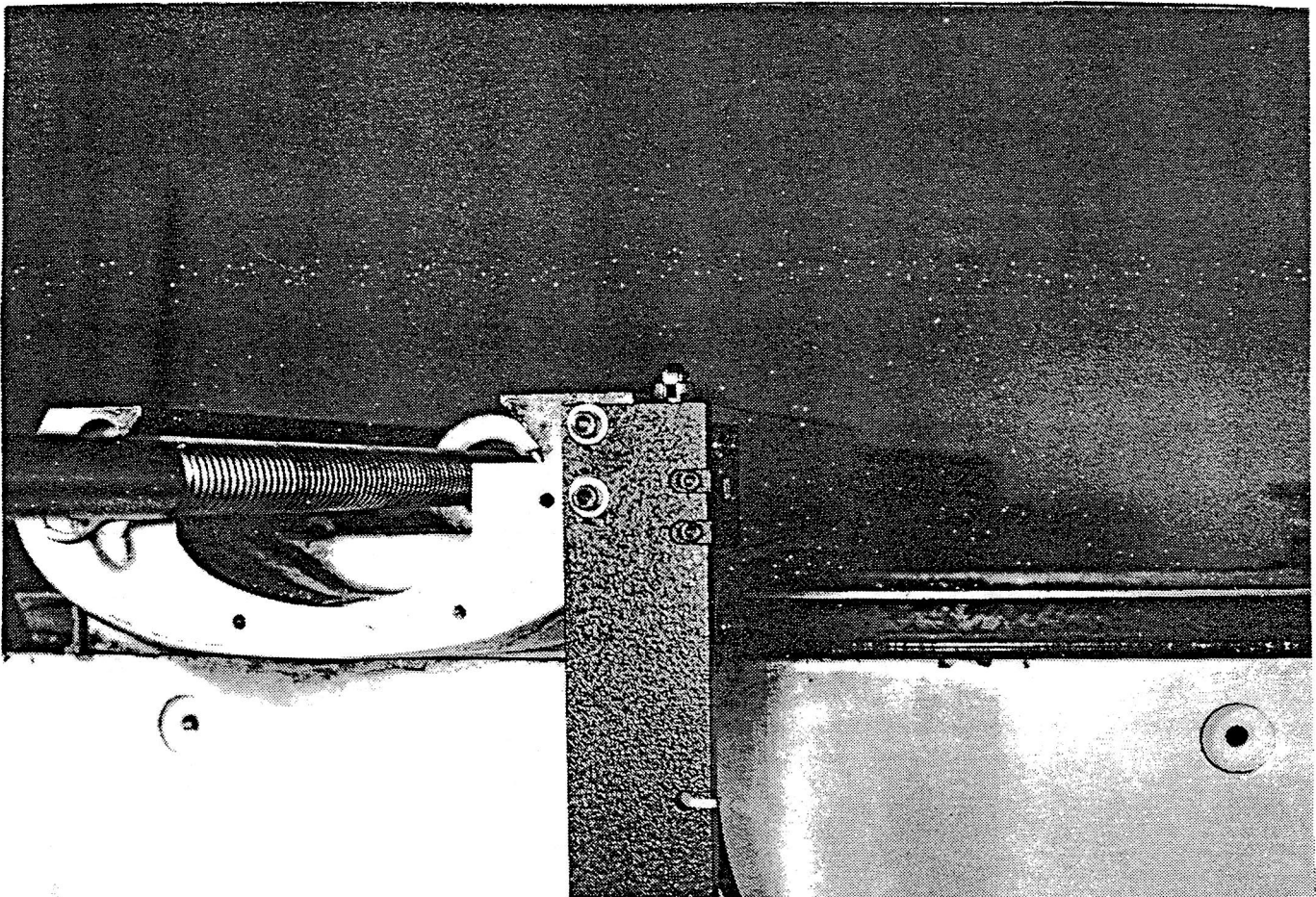
This picture shows the Z axis mounting plate being indicated
after mounting. The quill drive block is already fitted to the
quill and is being used to hold the indicator magnetic base.
Refer to the Z mounting section for the correct procedure. Remem-
ber to hold the drive block to one side when moving the
quill.This will prevent the block from moving side to side and
influencing the readings.
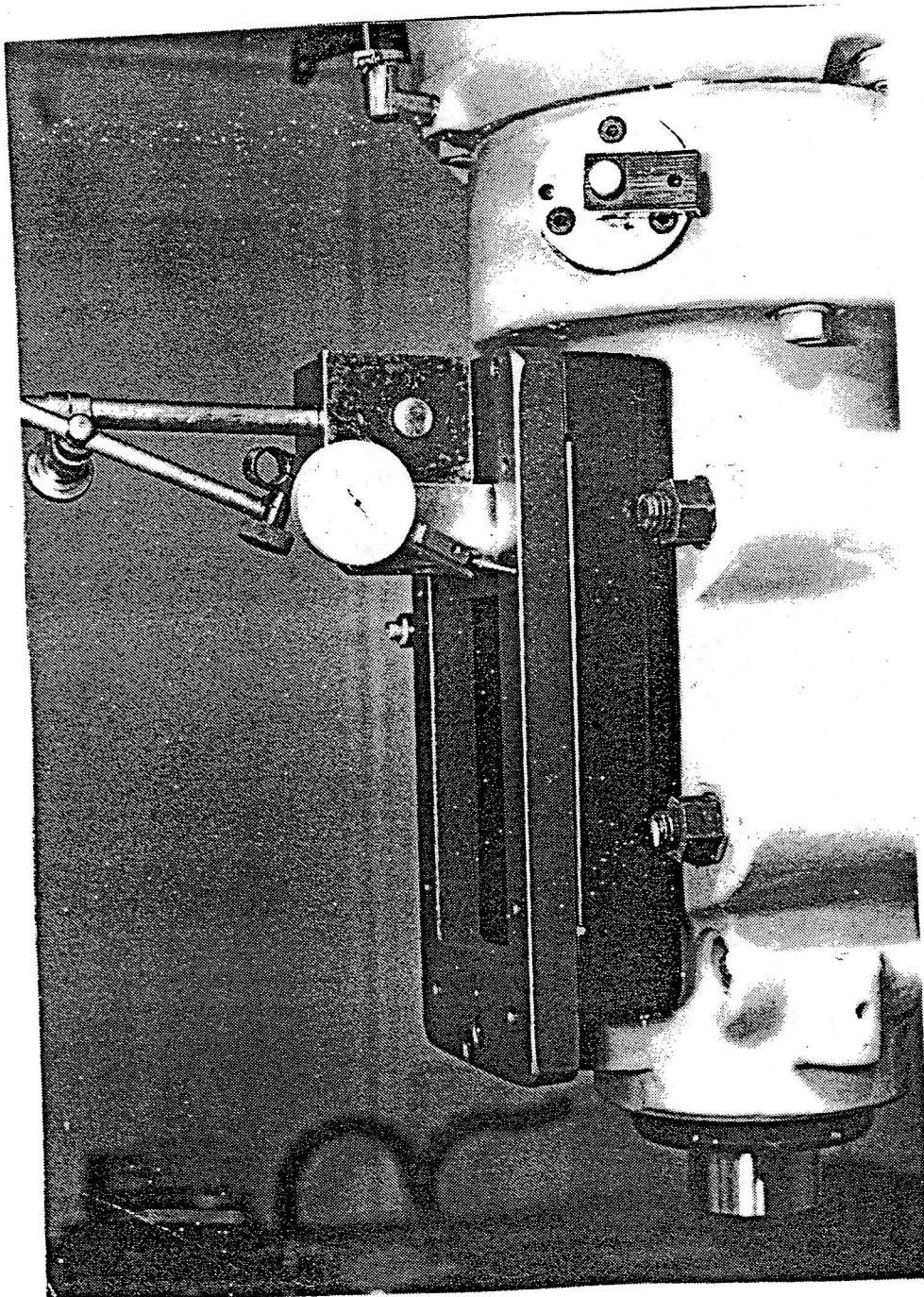
This picture may be used for reference in mounting the Z axis drive casting. Note the limit switches. These must be set before operation of the machine. The one extra hole in the end of the drive block is used to mount a pointer. This allows a visual position reference when the front cover is installed. The pointer and mounting screw is included in the Z kit.
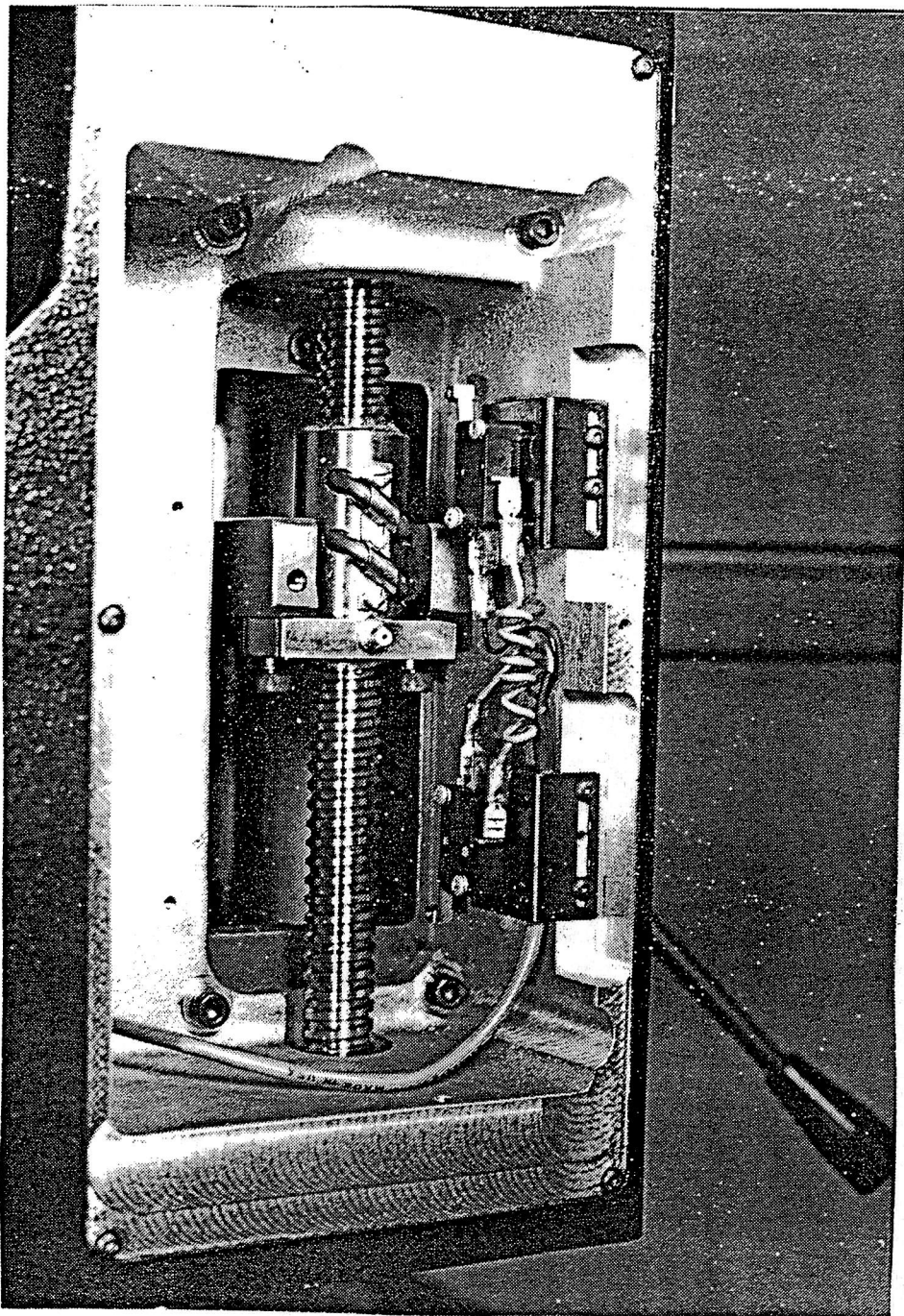
This picture shows the installation of the computer cabinet mount bars. Note that the handle is removed from the access door to prevent it from hitting the rear of the enclosure. The manual has a drawing showing typical placement of the brackets. This location may be changed to suit your particular application.
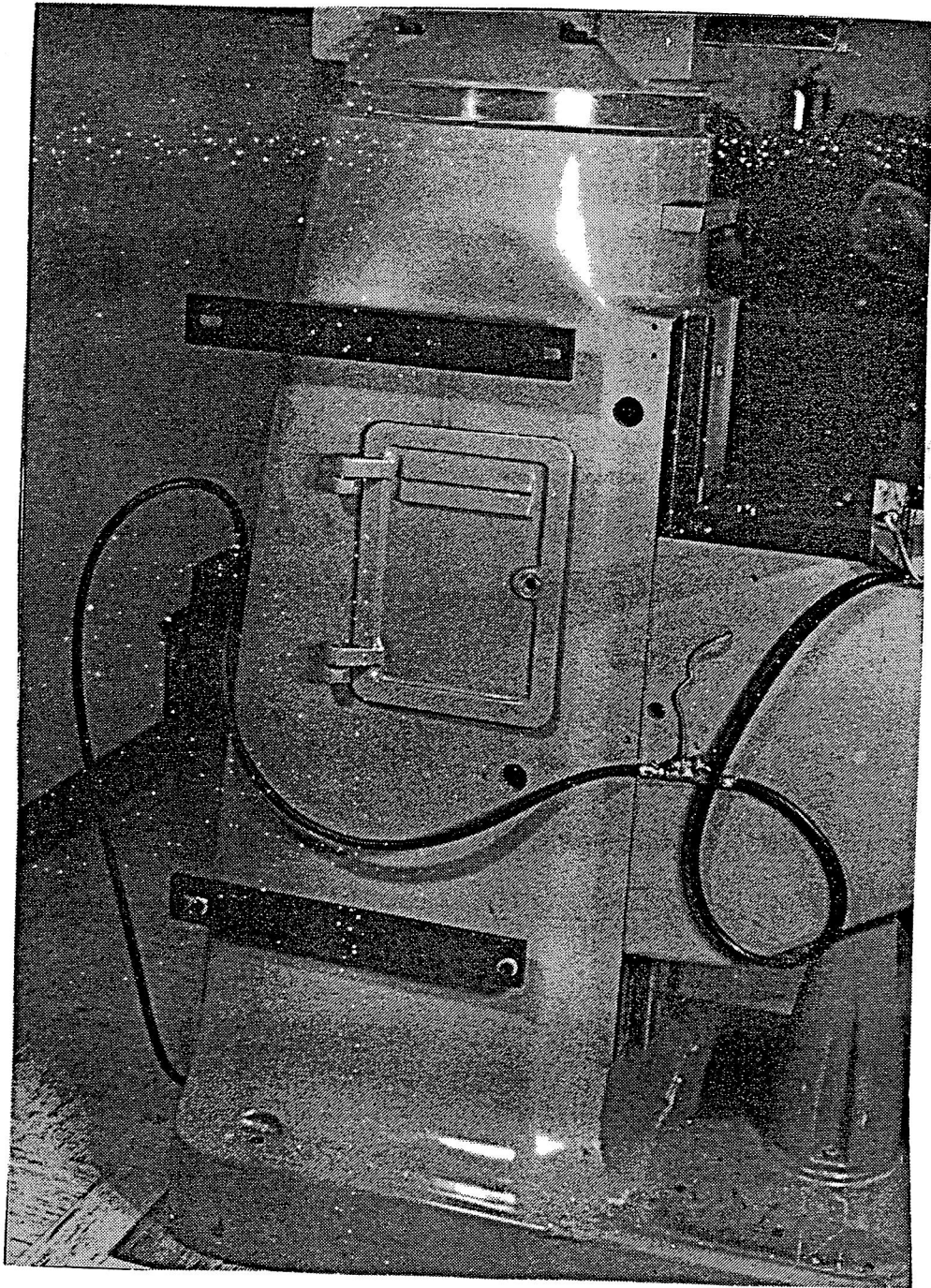
This picture shows a typical mounting of the system oiler. This position removes the oiler from locations where coolant may flood the system. A 48" line is included with the oiler kit to allow this placement. This also prevents interference between the oiler and the computer or servo cabinets.
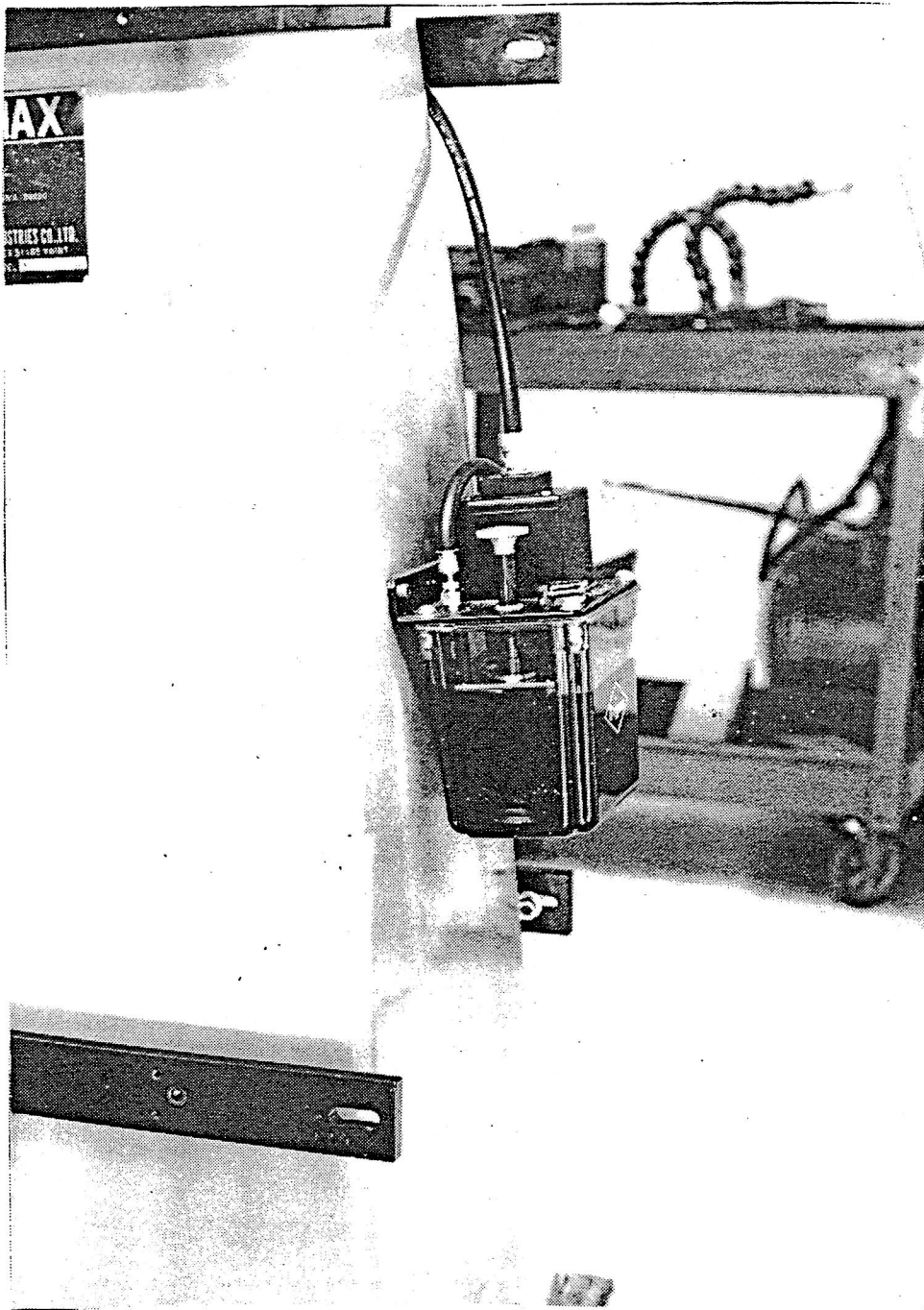
X & Y SCALE INSTALLATION

On some machines you may find scales give a more accurate indication of table and saddle movement. Normally this is not an issue because the rotary encoders on the motors give a better overall running condition. This is due to the fact that the motors are directly linked to the rotary encoder (Ball Screw) feedback loop.

Machines with flexing members can't be as closely controlled with encoders as scales. This condition is usually found with poorly ribbed feed nut brackets. The absence of mass and or ribbing on the vertical Y axis support allows the screw to rotate slightly in either direction before the table or saddle moves. This is especially noticeable when the gibs are set too tightly. Regardless of how machinery is constructed some bending, flexing and loss of rigidity can be expected.

By placing a scale on the X and Y axis we can accurately monitor movement while discounting the errors produced by the bending members. This may slightly decrease machine response but this difference is not normally noticed during machine operation.

· If you have purchased the scale options for X and Y axis, your kit will have some extra parts to deal with. You will receive two scales, associated mounting hardware and two additional scale harness cables. All servo systems are built with encoder feedback wiring in the motor harness. When converting to a scale type system you will have to disconnect the two cables for X and Y feed back from the distribution board. All that is required is a small screwdriver to remove the retaining screws on the connectors. A Schematic follows the text portion of this manual to show which points are used for the scales.

1. Install the scales by following the Quantum installation
   manual P/N 70000036. This details the mechanical portion of
   the scale installation. **Please exercise care when handling
   scales. One careless move or dropping of a scale can render it
   useless!** are constructed with a glass transducer grating
   and may be damaged if handled incorrectly. After installation
   they are very formidable.

2. Open the servo cabinet normally located on the right side of
   the machine. This cabinet contains the distribution board. Two
   connectors on the board are dedicated to X & Y scale/encoder
   inputs. Locate points P7 and P8 on the rear right of the
   board. These are labeled X AXIS and Y AXIS. Remove the
   connectors on these plugs by loosening the two small slotted
   head screws at the edges of the connectors. Pull off the plugs
   on there points and tape up the metal shell of the plugs to
   prevent short circuits. Lay the plugs on the board.

4. Locate the 2 new cables shipped with the kit. They will have
   the same connectors on one end and a PTO connector on the
   other end. The PTO connector will accept the scale cable plug
   at the end of the reader head cable.

5. Install the connector on the distribution plugs at P7 and P8
   and attach with the screws on the plugs. Remove the large nut
   on each of the PTO connectors. Insert the connectors into the
   row of three holes on the lower rear face of the servo
   cabinet. Tighten the nuts to finish the cable installation.
   Secure the wiring in the cabinet and close the cabinet. All
   interior work is done in the cabinet.

6. Locate the X axis cable and plug into the X receptacle on the
   rear of the cabinet. Move the X axis by hand to insure the
   correct plug placement. If correct install the Y axis cable
   also.

7. Verify the correct phasing of the scales before starting the
   servos. Moving the table to the **LEFT** and the saddle
   TOWARDS you should be **PLUS** on both axis. If incorrect,
   return to the machine setup screen and reverse the
   scale/encoder PHASING of either or both axis. This will
   insure correct motion direction. See the setup portion of
   this manual if more information about the preceding is
   needed.

8. Properly tie up all cables to prevent damage to the scales
   or cables when the machine moves to the extremes in any
   direction.

9. Go to the SETUP utility of the control and change the ENCDR options to SCALE and the gain tables to reflect the Scale gains of 66 FEED, 25 RAPID and 25 NO MOTION.

The following pages are to be used as a general guideline. They are laid out in the sequence you will see them when changing the values for encoder/scale combinations. If you have any questions on these screens and how to change them refer to the index of the manual. Pages 51 - 83 deal with setting parameters of operation for the control. The shown values are for general use and may be custom tailored by a **QUALIFIED INSTALLATION TECHNICIAN.**

```
┌─────────────────────────────────────────────────┐
│                                                  │
│        ┌──────────────────────────────┐          │
│        │  Series 1100 - Setup Utility  │          │
│        └──────────────────────────────┘          │
│                                                  │
│                                                  │
│          ┌──────────────────────────┐            │
│          │      Setup Options       │            │
│          ├──────────────────────────┤            │
│          │  1. Machine/Installation │            │
│          │  2. General Software     │            │
│          │  3. Print configurations │            │
│          │  4. Units in Inch        │            │
│          │                          │            │
│          └──────────────────────────┘            │
│                                                  │
│                                                  │
│ � ▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬                          │
│ Version: 1.72A-D              Serial ID: 1766343 │
└─────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────┐
│                                                  │
│        ┌──────────────────────────────┐          │
│        │  Series 1100 - Setup Utility  │          │
│        └──────────────────────────────┘          │
│            ┌──────────────────────┐              │
│            │  Machine/Installation │              │
│            ├──────────────────────┤              │
│            │  1. Machine Axis     │              │
│            │  2. Spindle Axis     │              │
│            │  3. Z Axis Type      │              │
│            │  4. Interface        │              │
│            │  5. Tool Management  │              │
│            │  6. Miscellaneous    │              │
│            │  7. Home             │              │
│            │  8. Language         │              │
│            │  9. Software Update  │              │
│            │  10. DMC Setup       │              │
│            │  11. Security        │              │
│            └──────────────────────┘              │
│                                                  │
│ ▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬ ▬                           │
│ Version: 1.72A-D              Serial ID: 1766343 │
└─────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────┐
│          ┌──────────────────────────────┐       │     ⌢
│          │   Series 1100 - Setup Utility │       │
│          └──────────────────────────────┘       │
│       ┌───────────────────────────────────┐     │
│       │     Machine axis - Setup          │     │
│       ├───────────────────────────────────┤     │
│       │  11. Encoder Phase A              │     │
│       │  12. Encoder Phase B              │     │
│       │  13. Vector limits               │     │
│       │  14. Leadscrew compensation       │     │
│       │  15. Straightness compensation    │     │
│       │  16. ███Feed gain table███        │     │
│       │  17. Rapid gain table            │     │
│       │  18. No motion gain table         │     │
│       │  19. Jog Position                │     │
│       │  20. Axis Clamping               │     │
│       │  21. Axis Ports                  │     │
│       └───────────────────────────────────┘     │
│                                                 │
│ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ │
│ Version: 1.72A-D            Serial ID: 1766343  │
└─────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────┐
│          ┌──────────────────────────────┐       │
│          │   Series 1100 - Setup Utility │       │
│          └──────────────────────────────┘       │
│                                                 │
│        ┌──────────────────────────────┐         │
│        │    Feed Gain Table - Setup   │         │
│        ├──────────────────────────────┤         │
│        │        X     Y     Z     U   │         │
│        │  1. Kp   66    66    25    25 │         │
│        │  2. Ki    0     0     0     0 │         │
│        │  3. Kd    0     0     0     0 │         │
│        │  4. Il    0     0     0     0 │         │
│        └──────────────────────────────┘         │
│                                                 │     ⌢
│                                                 │
│ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ │
│ Version: 1.72A-D            Serial ID: 1766343  │
└─────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────┐
│          ┌──────────────────────────────┐       │
│          │   Series 1100 - Setup Utility │       │
│          └──────────────────────────────┘       │
│       ┌───────────────────────────────────┐     │
│       │     Machine axis - Setup          │     │
│       ├───────────────────────────────────┤     │
│       │  12. Encoder Phase B              │     │
│       │  13. Vector limits               │     │
│       │  14. Leadscrew compensation       │     │
│       │  15. Straightness compensation    │     │
│       │  16. Feed gain table             │     │
│       │  17. ███Rapid gain table███       │     │
│       │  18. No motion gain table         │     │
│       │  19. Jog Position                │     │
│       │  20. Axis Clamping               │     │
│       │  21. Axis Ports                  │     │
│       │  22. Position Error Check          │     │
│       └───────────────────────────────────┘     │
│                                                 │
│ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ ▆▆▆▆ │     ⌢
│ Version: 1.72A-D            Serial ID: 1766343  │
└─────────────────────────────────────────────────┘
```

```
┌──────────────────────────────────────────────────────┐
│          ┌────────────────────────────────┐          │
│          │   Series 1100 - Setup Utility  │          │
│          └────────────────────────────────┘          │
│                                                      │
│                                                      │
│          ┌────────────────────────────────┐          │
│          │    Rapid Gain Table - Setup    │          │
│          │         X     Y     Z     U    │          │
│          │   1. Kp  25    25    10    10  │          │
│          │   2. Ki   0     0     0     0  │          │
│          │   3. Kd  10    10    10    10  │          │
│          │   4. Il   0     0     0     0  │          │
│          └────────────────────────────────┘          │
│                                                      │
│                                                      │
│                                              .       │
│  ████ ████ ████ ████ ████ ████ ████ ████ ████ ████ ████ │
│ Version: 1.72A-D                  Serial ID: 1766343 │
└──────────────────────────────────────────────────────┘
```

```
┌──────────────────────────────────────────────────────┐
│          ┌────────────────────────────────┐          │
│          │   Series 1100 - Setup Utility  │          │
│          └────────────────────────────────┘          │
│          ┌────────────────────────────────┐          │
│          │      Machine axis - Setup      │          │
│          │                                │          │
│          │  13. Vector limits             │          │
│          │  14. Leadscrew compensation    │          │
│          │  15. Straightness compensation │          │
│          │  16. Feed gain table           │          │
│          │  17. Rapid gain table          │          │
│          │  18. No motion gain table      │          │
│          │  19. Jog Position              │          │
│          │  20. Axis Clamping             │          │
│          │  21. Axis Ports                │          │
│          │  22. Position Error Check      │          │
│          │  23. Rapid Ramping             │          │
│          │                                │          │
│          └────────────────────────────────┘          │
│                                                      │
│  ████ ████ ████ ████ ████ ████ ████ ████ ████ ██·██ ████ │
│ Version: 1.72A-D                  Serial ID: 1766343 │
└──────────────────────────────────────────────────────┘
```

```
┌──────────────────────────────────────────────────────┐
│          ┌────────────────────────────────┐          │
│          │   Series 1100 - Setup Utility  │          │
│          └────────────────────────────────┘          │
│                                                      │
│                                                      │
│          ┌────────────────────────────────┐          │
│          │   No Motion Gain Table - Setup │          │
│          │         X     Y     Z     U    │          │
│          │   1. Kp  25    25    10    10  │          │
│          │   2. Ki  10    10    10    10  │          │
│          │   3. Kd   0     0     0     0  │          │
│          │   4. Il   1     1     1     1  │          │
│          └────────────────────────────────┘          │
│                                                      │
│                                                      │
│  ████ ████ ████ ████ ████ ████ ████ ████ ████ ████ ████ │
│ Version: 1.72A-D                  Serial ID: 1766343 │
└──────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────┐
│        ┌───────────────────────────────┐            │
│        │  Series 1100 - Setup Utility  │            │
│        └───────────────────────────────┘            │
│                                                     │
│                                                     │
│              ┌───────────────────┐                  │
│              │                   │                  │
│              │   Save Changes?   │                  │
│              │                   │                  │
│              └───────────────────┘                  │
│                                                     │
│                                                     │
│                                                     │
│  ██ ██ ██  ██  ██  ██  ██  ██  ██  ██  ██           │
│ Version: 1.72A-D                  Serial ID: 1766343│
└─────────────────────────────────────────────────────┘
```

SERIES 1100 2 AXIS SINGLE CABINET CONTROL KITS

The new 2 Axis Single Cabinet control is intended for applications where a dedicated 2 axis control system is needed and a Z axis readout may be added.

The following section is to be used when installing the system. The basic differences from a standard system are listed below.

1. Single cabinet construction.

2. No Z drive housing included.

3. No M-Functions
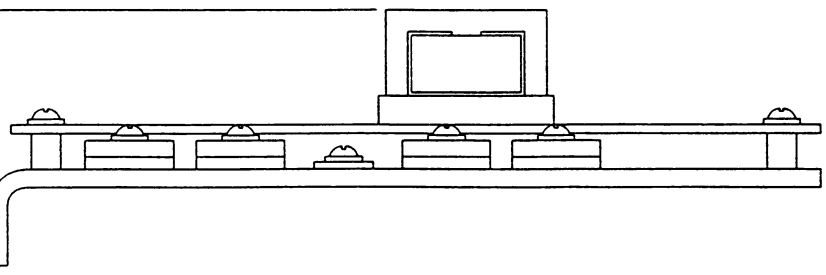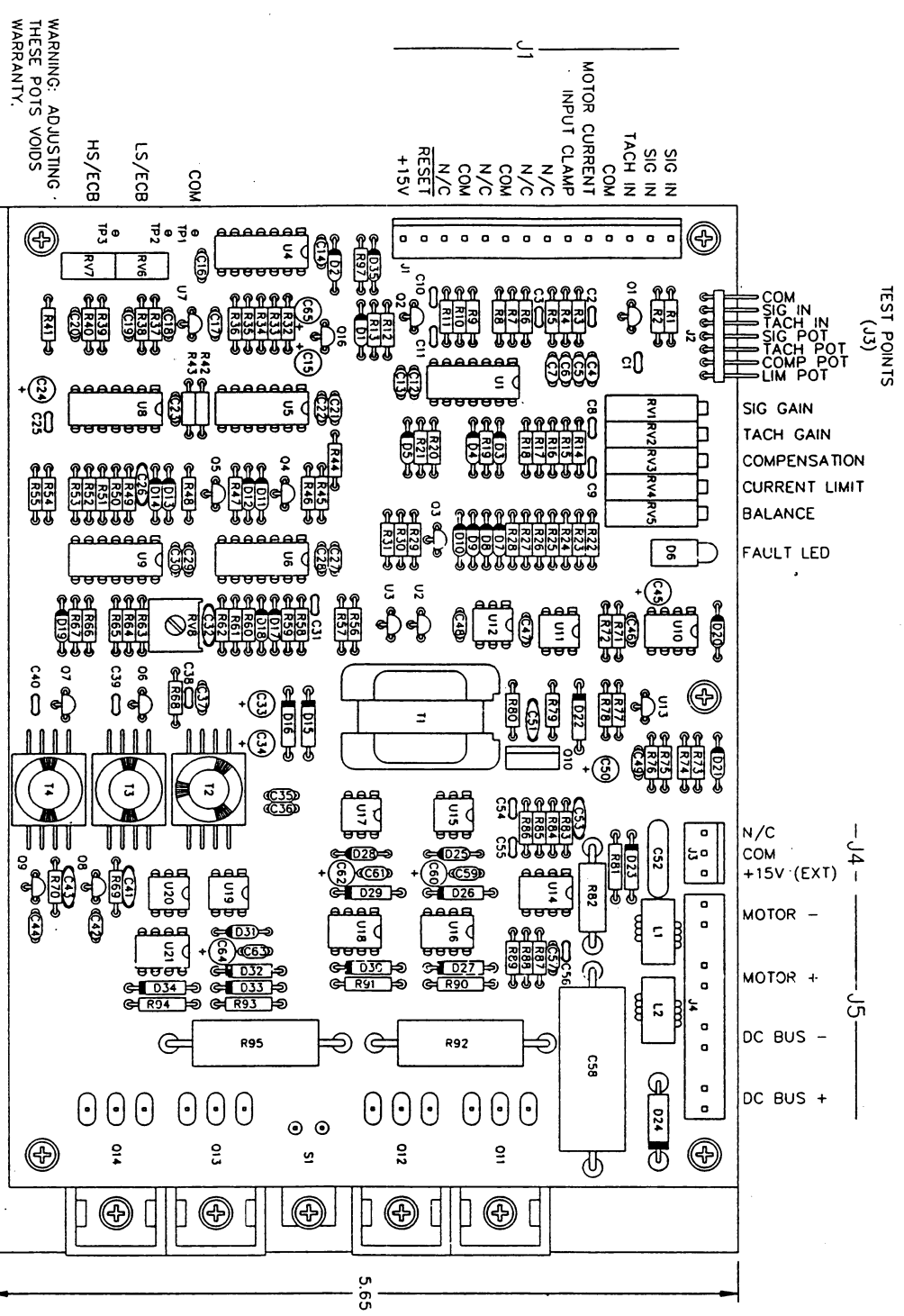
4. No second cabinet (separate computer cabinet).

CONTROL MOUNTING

Use the instructions and diagrams on pages 23 through 26. Note that the diagram on page 25 is the only one to be used. This shows the cabinet on the right side of the machine. If a 2 Axis Single Cabinet kit was ordered you must drill and mount bars on the right side only. Disregard all references to the left side of the machine.

Use the Z AXIS READOUT INSTALLATION instructions on pages 19 through 22 for help in installing the Z readout scale and associated hardware. As with all 2 axis systems you will find a plug on the rear edge of the servo cabinet for the Z scale. This is a PTO style connector with the mating connector ;located at the end of the scale cable.

Schematics number 31900666 Sheets 1 & 2 and 30100241 Sheet 1 at the rear of the manual will help in determining wiring locations. Note that the 2 axis system does not include a spindle relay. Because the control does not operate the Z axis, none is required. **The power requirements are the same for the 110VAC on all systems. See page 2 for additional recommendations.**A clean power line will insure long life to the control.

WARNING: ADJUSTING THESE POTS VOIDS WARRANTY.

J1

MOTOR CURRENT
INPUT CLAMP

SIG IN
SIG IN
TACH IN
COM
N/C
N/C
COM
COM
N/C
RESET
+15V

HS/ECB
LS/ECB
COM

TEST POINTS (J3)

COM
SIG IN
TACH IN
SIG POT
TACH POT
COMP POT
LIM POT

SIG GAIN
TACH GAIN
COMPENSATION
CURRENT LIMIT
BALANCE

FAULT LED

N/C
COM
+15V (EXT)

MOTOR −
MOTOR +
DC BUS −
DC BUS +

—J4—
—J5—

.65
.20
.25
7.50"
8.00"
5.65
ø.218

1.75

NOTE: THE 380-8 IS A CUSTOMER-SPECIFIC PRODUCT FOR ANILAM ELECTRONICS

INSTALLATION DRAWING

MODEL GA380-8
DWN M. HESS
CHK M. HESS
APPR R.A.D.
DATE 21 NOV 92
SCALE 3:4

SCHEM: 380-8000 (C)
PCB: 380-8001 (B)
ASSY: 380-8002 (C)
EPL: 380-8003 (B)

ANILAM

DWG NO 315966
SHEET 1 OF 1
REV B