

microcut[®]

Please Note:

The following product manual is presented in its original form. The contact information included may be outdated. Please use the current contact information below.

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 **microsystems**

microcut II

installation manual

Revision 498

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INTRODUCTION

MICROCUT is a self contained microprocessor controlled positioning system. MICRO CUT must have a place to attach the drive motor (to an existing or a new pulley) and shaft encoder (for position sensing). The motor should turn at least three to four turns per inch of backgauge travel. The shaft encoder sprocket should turn between 2 and 4 times per inch of backgauge travel.

MICROCUT IS NOT INTENDED TO CONTROL THE KNIFE OR THE CLAMP ON THE PAPER CUTTER (MILL TRIMMER). ANYTHING DEALING WITH THE CLAMP AND KNIFE IS NOT TO BE TAMPERED WITH OR ADJUSTED TO INSTALL OR OPERATE MICRO CUT. ANY ALTERATIONS TO THE KNIFE OR CLAMP SAFETIES, CIRCUITS, AND OPERATION, OR ANY INSTALLATION TECHNIQUE WHICH COMPROMISES THE SAFETY OF ANYONE WORKING ON OR AROUND THE PAPER CUTTER (MILL TRIMMER) WILL VOID ANY AND ALL WARRANTIES ON MICRO CUT. THIS POLICY ALSO APPLIES TO CASES WHERE MICRO CUT IS INSTALLED ON DIFFERENT TYPES OF EQUIPMENT OR MACHINERY.

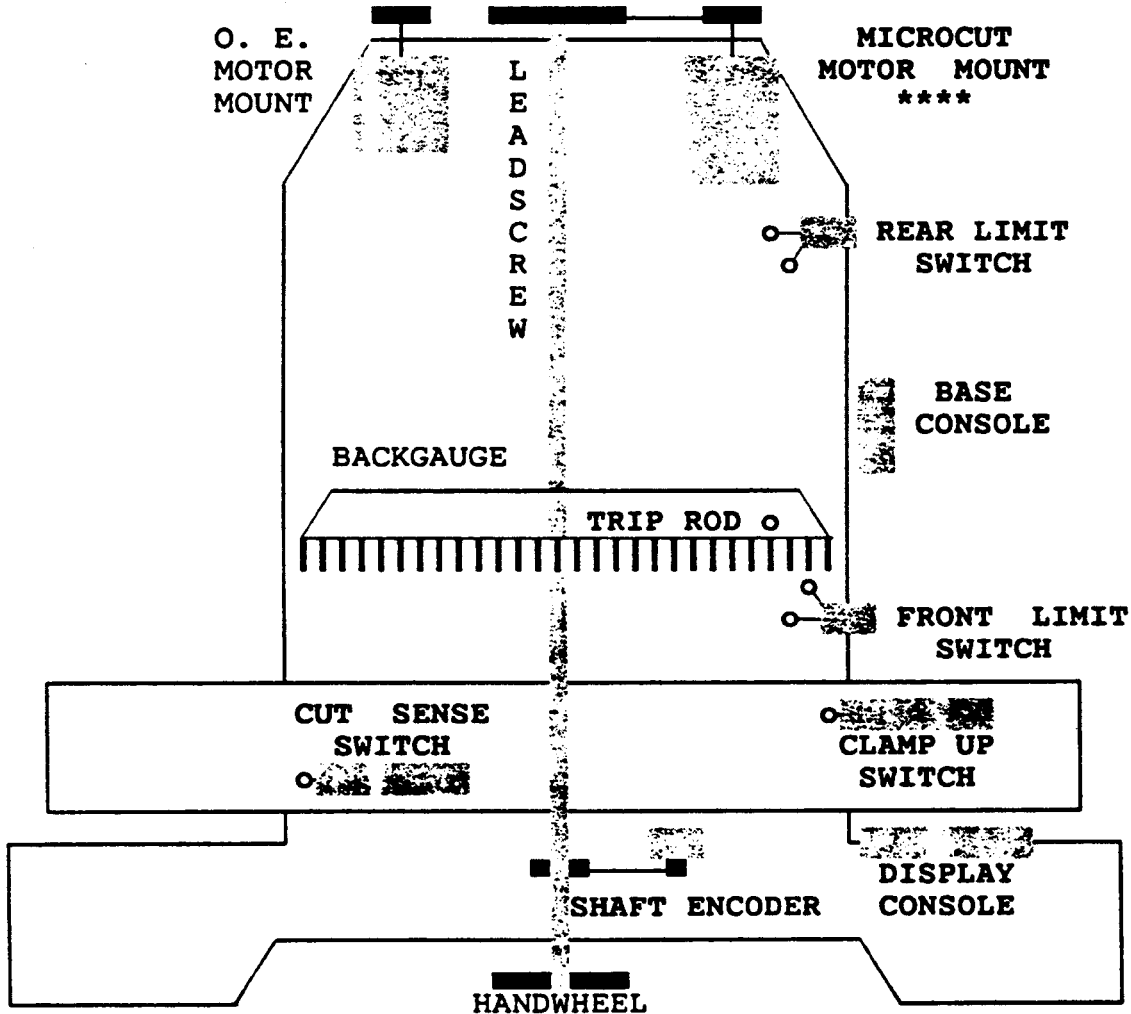
MICROCUT CONSISTS OF PARTS AND ASSEMBLIES WHICH ARE ADDED TO THE MACHINE. GUARDING MAY NEED TO BE ALTERED OR ADDED TO OFFER PROPER PROTECTION. THIS MUST BE DONE BEFORE MICRO CUT IS OPERATED. DO NOT OPERATE THE MACHINE UNTIL THIS GUARDING IS COMPLETE. ALL MOVING PARTS AND HAZARDS MUST BE COVERED IN SUCH A WAY AS TO PREVENT ACCIDENTAL CONTACT OF ANY SORT.

This INSTALLATION MANUAL is organized into: NOTES; HINTS; MECHANICAL INSTALLATION; ELECTRICAL HOOKUP; FINAL SETUP; FINAL CHECKOUT; and ADDITIONAL CONTROL LINES. Read it thoroughly before starting. In general, completion of the mechanical installation is recommended before any wiring is done.

THIS MANUAL IS DESIGNED TO GIVE A CONCEPTUAL APPROACH TOWARDS INSTALLING MICRO CUT. MICRO CUT IS A RETROFIT SYSTEM FOR MANY DIFFERENT TYPES OF MACHINES. ALL INSTALLATIONS WILL VARY. USE THIS MANUAL TO LEARN WHAT EACH COMPONENT MUST DO. THEN MOUNT THE COMPONENT SO THAT IT IS BEST SUITED TO FULFILL ITS PURPOSE.

THE INSTALLATION

DRIVE BELT SWITCHES TO MICROCUT MOTOR



**** ON SOME PAPER CUTTERS IT IS NOT ALWAYS POSSIBLE TO FIND SPACE TO MOUNT A SECOND MOTOR. IT MAY BE NECESSARY TO REMOVE THE ORIGINAL MOTOR AND INSTALL THE MICROCUT MOTOR IN THE OE SPACE.

NOTE: Position of the parts is for visualization only. Every installation will be unique. Mount components for function and form--not necessarily to mimic this diagram.

DO NOT USE GREASE ON THE LEADSCREW MECHANISM. GREASE ATTRACTS ABRASIVE DIRT AND ACTS AS AN INCONSISTENT CUSHION AGAINST THE BACKGAUGE PREVENTING PROPER CUTTING PRECISION. USE A LIGHT MACHINE OIL ONLY ON THE LEADSCREW. OIL THE LEADSCREW DAILY.

RECOMMENDED TOOL LIST

Every installer will want to modify this list. This is only a guide. The tools are listed in approximate order of use:

FOR DETERMINING ALL MICRO CUT PART DRILLING LOCATIONS

Slide T square
Pencil

FOR PREPARING FOR DRILLING HOLES FOR MOUNTING ALL PARTS

Hammer
Center punch (prick punch)

FOR DRILLING ALL HOLES FOR ALL PARTS AT ONE TIME

Paper and rags to cover machine surfaces
#36, #21, #7, 1/4", 21/64", 3/8" high speed drill bits
Electric hand drill
Extension cord

FOR TAPPING ALL HOLES FOR ALL PARTS AT ONE TIME

6-32, 10-32, 1/4-20, 5/16-18, 3/8-16 spiral taps
Tap handles (ratchet type are nice)
Tapping fluid

FOR CLEANING ALL METAL FILINGS OFF OF THE MACHINE

Brush
Rags

FOR BOLTING AND SECURING ALL MICRO CUT PARTS TO THE MACHINE

7/16, 1/2, 9/16 wrenches and sockets
Allen wrench set (SAE)

FOR CUTTING THE SEALTITE TO SIZE FOR ALL OF THE WIRED PARTS

Side cut pliers

FOR WIRING THE PARTS

Wire strippers
Needle nose pliers
Small common screw driver
Large common screw driver

FOR CUTTING THE LIMIT SWITCH TRIP ROD AND PREPARING THE GUARDING

Hack saw
Flat file

DRILL BIT	# 36	# 21	# 7	1/4"	21/64"***
TAP SIZE	6-32	10-32	1/4-20	5/16-18	3/8-16

***This drill (according to the charts) should actually be a 5/16" value, but the extra 1/64" makes tapping much easier.

MICROCUT INSTALLATION NOTES

The following paragraphs cover most of the installation failures seen to date. Please read them carefully.

A. Optimum performance is obtained when the motor is geared for 4 turns for every inch of backgauge drive. A smaller turn ratio causes the backgauge load to slow the motor down. The current used by the motor goes up accordingly. The power that the system uses goes up as the square of this current. Unless the motor is operating at its full 1800 rpm and the high speed adjusting potentiometer is less than 100%, **SPEED WILL NOT BE INCREASED BY DECREASING THE MOTOR TURNS RATIO. THE BACKGAUGE RESISTANCE WILL FORCE THE MOTOR TO RUN OUT OF ITS PREFERRED RPM RANGE. THIS WILL CAUSE EXCESSIVE POWER USE AND MOTOR BRUSH WEAR.**

AFTER THE MOTOR IS INSTALLED, HAVE SOMEONE TURN THE HANDWHEEL TO MOVE THE BACKGAUGE FORWARD ONE INCH. WATCH THE MOTOR PULLEY DURING THIS TIME TO COUNT THE NUMBER OF TURNS IT MAKES. IF IT DOES NOT TURN AT LEAST THREE TIMES AND PREFERABLY FOUR TIMES THEN THE MOTOR PULLEY IS TOO LARGE. TO PREVENT EVENTUAL FAILURE, CORRECT THIS SITUATION IMMEDIATELY.

B. A variable groove pulley is supplied so that the motor turn ratio (see A above) can be approximated in most cases. When the pulley is adjusted properly, snug the locking allen set screw to the FLAT of the pulley, rock the pulley gently to position the set screw on the center of the flat, then completely tighten it. This will prevent the pulley from self adjusting itself later on down the line. If the adjustable groove pulley is too large use the other pulley supplied with the installation kit.

C. **MICROCUT is a totally redundant system specifically designed to operate independently of a machine's existing controls. The use of existing limit switches, terminal blocks, etc. is expressly forbidden and their use will result in the warranty being voided.**

D. **PERFORMANCE**--thick drive belts (B size) slow down positioning. Use an A sectional belt or thinner if possible. Do not overtorque the backgauge gibbs, and if there are nylon glider plugs in the backgauge, make sure they are not tight against the table (there should be at least .002" clearance). Make sure the motor turns at least three times and preferably four times per inch of backgauge travel. This will give MICRO CUT enough "leverage" to drive smoothly and settle into position quickly.

DO NOT USE GREASE ON THE LEADSCREW MECHANISM. GREASE ATTRACTS ABRASIVE DIRT AND ACTS AS AN INCONSISTENT CUSHION AGAINST THE BACKGAUGE PREVENTING PROPER CUTTING PRECISION. USE A LIGHT MACHINE OIL ONLY ON THE LEADSCREW. OIL THE LEADSCREW DAILY.

E. Supply the proper DEDICATED 110 VAC power line. The computer competes against the drive motor for its current. The motor by its very nature is a better competitor. Therefore MICRO CUT requires a power supply capable of giving 30 amps. If a transformer is used, at 110 VAC, the minimum size would be a 3 KVA. 5 KVA is better, and is required (if a clean 110 VAC line is not available) if the installation uses a 1 H.P. motor. A transformer DOES NOT imply that the power source is dedicated. Other devices on the same line such as welders, air compressors, drills, or fluorescent lights can require current surges that will deplete the transformer and thus affect MICRO CUT. **Graphics West Micro Systems does not encourage the use of transformers for supplying power to MICRO CUT.** If nothing but "dirty" power is available we suggest the use of an active tracking filter. Contact us by means of phone, telex, or FAX (numbers are on the cover of this manual) for any questions you may have.

F. DO NOT mount a separate 110 VAC power switch. One is not supplied with MICRO CUT because one is not needed. There is a power switch on the back of the display console. This switch insures that the power supplies will come up in order so that none of the job or cutter parameter memory is lost. If power is lost during a storm, the switch should be turned off until power is returned to the building. 110 VAC power to the unit should be turned off before installing the display console. The switch on the display console should be turned off before the 110 VAC power is connected.

- G. The boxes are packed in an order. For instance, all the brackets and hardware for the shaft encoder are supplied in the encoder box (inside of box 2). If these parts are not randomly mixed with all of the other parts, their use will be more obvious and installation can progress much more smoothly. There will usually be extra brackets left over. We supply a bracket set that can be used for any combination of mountings. Save any extra brackets for future needs.
- H. The slots in the brackets are designed for use with the supplied hardware 3/8" and 1/4". Do not use undersized bolts.
- I. The base console mounts easiest if the display and shaft encoder cables exit at the bottom of the console.
- J. The display console should be mounted on a solid part of the cutter. Hollow covers tend to transmit a lot of vibration through the display and to the computer.
- K. Use at least two tie straps to mount the display cable to the display yoke. This will act as a strain relief and prevent subsequent connection problems where the cable enters the display console.
- L. The shaft encoder drive sprocket (on the leadscrew) should be inspected to make sure that the faces line up and that the gap on either side (caused by the width of the saw blade used to cut it in half) is the same. These sprockets are cut and stocked in matched halves. As long as the alignment is proper there should not be a problem with chain wear. Usually the clamp can be installed on the leadscrew before the sprocket halves are slid into position. This makes the installation much easier.
- M. A 24 tooth sprocket should be used on the shaft encoder if the leadscrew pitch is less than (or equal to -- this is a rough value) 1/2" per turn. For courser leadscrews, a 12 tooth sprocket should be supplied. Verify that the sprocket is proper at the start of the installation. Also check the leadscrew sprocket for proper bore size. **The shaft encoder should make between 2 and 4 revolutions per inch of backgauge movement.**
- N. There is no provision for checking zero set timing on the shaft encoder. Generally this is not a problem, but in machines with a large shaft encoder turns ratio, it is possible that MICRO CUT may calibrate one shaft encoder revolution off. After installation have MICRO CUT calibrate several times. If it does have a timing problem (calibrates off) loosen the shaft encoder swing bracket and remove the chain. Turn the shaft encoder sprocket a quarter turn clockwise and re-tension the assembly. Go through the SET-UP ROUTINE (OPERATOR'S MANUAL). Repeat the checking procedure.
- O. A spring lever arm is supplied as a convenience for mounting the CUT SENSING SWITCH in certain applications. DO NOT use this for the CLAMP SENSING SWITCH. It will allow too much play and will not suffice when the operator is running a full lift of stock.
- P. The switch heads on the CUT and CLAMP switches can be mounted in any of four different ways by removing the four fastening screws. Likewise, the roller lever arm can be mounted facing away from or towards the center of the switch. The locking washer for this arm can be used to allow "only straight" or "any angled" position of the arm.
- Q. The switch blocks in the CUT and CLAMP sensing switches will try to slip out during wiring if the switch is mounted in the tripped position. It may be necessary to loosen the switch mount to install the wiring while the switch is in its relaxed position. If this is not done, the switch may not operate properly.
- R. The cut switch DOES NOT conduct current when the knife is up. All other switches will NEGATE backgauge drive unless they ARE CONDUCTING current. The clamp sensing switch will negate all backgauge drive. The limit switches will negate high speed drive in their appropriate direction.
- S. Make sure that all wires are securely tightened BEFORE operating the spacer.

T. The 1/4-20 threaded rod in the kit is for motor mounting on most Harris Sabers and Citations. The slots on the rear of the motor mounting plate can be used to sandwich the plate under the OE rear limit switch bracket. The 1/4-20 rod supports the plate caddy corner to this.

U. The SET-UP ROUTINE (OPERATOR'S MANUAL) has been simplified. Read the prompting display. It will tell you what to do in order to calibrate MICRO CUT into its new machine.

V. NOTE ON SIDELOADING: The paddle switch is used to sense when the side load has taken place and when the paddle has cleared the table. It DOES NOT sense whether the paper is loaded properly and WILL NOT prevent jam-ups. It is used only to auto-advance the backgauge after a side load has been completed. For absolute safety, an opto-sensing switch should be mounted across the throat of the side loading table. The closed contacts of this device should then be wired in series with the CLAMP SENSING switch (terminals 9 and 10 of the switch block) so that if either sensor prevents current flow, the backgauge drive will be inhibited.

Everything safely possible has been done to make the installation of MICRO CUT easy. With proper care, it has been shown that installations can be simple and call backs for repairs and make-rights few.

HINTS

MICROCUT will work best with a motor pulley ratio which allows about one inch of backgauge travel for every three to four revolutions of the motor. While MICRO CUT will automatically self-adapt to different ratios, settling time will be minimized if this ratio is used. Try to choose pulleys accordingly. A thin belt will, in general, allow for faster settling than a thicker belt ("A" groove versus "B" groove). A cogged type V-belt (rather than solid) performs best. Leave the original equipment motor drive intact if possible. This will ease the installation of the new limit switches since the backgauge will have to be moved to either table extreme.

To save trouble in wiring, MICRO CUT is supplied with connectors on the display and shaft encoder cables. Each cable is about 12 feet long. Mount the base console and components so that the cables will reach. The base console is a junction box for all of the components and should be mounted in a central location (on the sidegauge or on the rear of the cutter housing). Where necessary, longer cables can be ordered. This may involve some lead time and an additional charge for the service.

The cut sensing switch should not finish its activation cycle until the knife is well past bottom dead center. On some cutters release of the hand switches will return the clamp to the top while leaving the knife at mid stroke. If the cut sensing switch completes its cycle before the knife passes bottom dead center (and assures itself of an uninterrupted completion of cycle) and the hand switches are released, MICRO CUT may push the paper forward into the blade trying to drive to the next stop value.

On some paper cutters the clamp and knife can only be operated together. In this case activation of either one implies activation of the other. This will be found on certain mill trimmers. Only one switch need be mounted for both the CLAMP and CUT sense. Wire the cut switch to the open contacts (clamp up). The clamp up switch will wire to the closed. Note: Some city codes allow only two wires per piece of sealtite. In this case, both switches should be used, with two pieces of sealtite accordingly.

Lay out the **ENTIRE** mechanical installation **BEFORE** drilling any holes. Visualize the entire installation to be sure all cables will reach and can be run smoothly.

Use a small amount of silicone spray, spray oil, or water inside the end of the sealtite before stuffing the wire through. This will prevent the wire from snagging in the tubing.

It is advisable to cut all of the sealtite first. The simplest way to snake the wire is to pull a sealtite length of wire off of the spool, add a couple of feet to the length, and then double it over. Snake the doubled over end into the sealtite until it exits the far end. Then cut the wire a few feet longer than needed.

Remember you are mounting:

1. Base console
2. Front and rear limit switches with trip rod
3. Clamp up switch
4. Cut sensing switch
5. Motor
6. Shaft encoder
7. Display console
8. Paddle switch (for side loading systems only)

Complete the mechanical portion of the installation. Then wire the switches and the motor. This will save time and help to prevent errors.

THE BASE CONSOLE

The base console is the black oil-tight dust-proof enclosure that is 12" X 14" X 4" in size packed in the bottom of BOX 1. The mounting bracket is the rectangular gold alodined assembly with slotted sides found at the top of BOX 1. The hardware bag is in the center section of BOX 1.

Use the mount assembly to mark for four 3/8-16 threaded holes at a central location on the cutter (side gauge or rear of housing). This console acts as a junction box for all components which will be mounted. Try to place it where it can be gotten to easily for wiring and service. Care should be taken to avoid mounting the console in the way of access doors, grease fittings, etc. on the cutter. Bolt the mount assembly to the cutter with 3/8-16 X 5/8 bolts, lock washers, and flat washers (see NOTE). On some tables the sidegauge is quite thin. Then it may be necessary to use extra flat washers, thread a nut onto the bolt first, or cut the bolt. Make sure that the bolt does not protrude through the sidegauge. Mount the base console to the mounting bracket with the hardware supplied.

Mount the console so that the cables will exit toward the bottom. This will help when routing the sealrite later in the installation.

NOTE: Some sidegauges are ribbed. It may be necessary to use threaded rod with nuts to approximate studs to which the mounting bracket can be attached. These rods are in the switch box section (lower half) of BOX 2. They will have to be cut to length after the mounting bracket is attached to the cutter and before the base console is installed.

THE LIMIT SWITCHES

All parts are in the switch box (16" X 16" X 6" box) contained within BOX 2. The limit switches have yoke lever arms and slotted angle mounting brackets. The trip rod is in the pocket with the 3/8-16X12" threaded rod. The 3/8 hardware bag for mounting the switches is in the center pocket of this box. The base plate/hardware bag for the trip rod is in the same pocket. The extension plate is the 3" X 8" plate contained in its own pocket near the side of the box.

Move the backgauge to at least three inches in front of its rearmost position. Mount the rear limit switch assembly (both switches are identical and, thus, interchangeable) to the side gauge of the table so that it will be tripped at least three inches from the rearmost position of the backgauge (see TRIP ROD NOTE below). An extension plate is provided in the event that the sidegauge is not long enough (washers may be required to space the switch out or in so that it aligns with the front limit switch). Mount the front limit switch assembly so that it is tripped at least two inches before the backgauge contacts the false paper clamp (front mechanical limit with the metal plate attached to the bottom of the clamp--some clamps do not have a false paper clamp). Check alignment carefully.

The backgauge can travel beyond these high speed limit switches in slow speed only. Do not mount the switches too far from the table ends or a large amount of slow speed will occur. Do not mount the switches too near the ends or the coast required to stop the backgauge on the limit switch (should a runaway condition ever occur) will cause a collision. **MICROCUT contains multiple back ups to prevent runaway conditions. Several failures have to occur simultaneously in their odd failure mode to allow a runaway condition. Any computer controlled drive system can fail this way no matter how many safeties are incorporated. MICROCUT uses mechanical limit switches as an ultimate safeguard. They must be installed properly if they are to be of any consequence.**

TRIP ROD NOTE: Mount the switches on the same side of the table as the base console. The switches are tripped by the trip rod assembly which can be mounted to the backgauge with the two 1/4-20 bolts and flat washers supplied. The slot allows the rod to be slid towards (or away from) the limit switches for proper alignment. If there is not room for the slotted plate, the rod can be removed from the plate and mounted directly to the backgauge by its 3/8-16 threaded end. In this case care must be taken to avoid breakage of the aluminum rod as it is tightened into the backgauge (a common problem since the drilled hole will probably not be exactly perpendicular to the surface). The mounting should be well in back of the fingers to avoid clamp interference.

THE CLAMP UP SWITCH

This is packed in the switch box (16" X 16" X 6") contained in BOX 2. Either one of the roller arm switches on the long slotted brackets can be used. The 3/8" hardware bag (in the same box) contains nuts, bolts, and washers for mounting.

Use one or two 3/8-16 X 5/8" bolts with lock and flat washers to mount this switch so that it is tripped (or released) only when the clamp is in its full up position. Note that some clamps suffer a certain amount of hydraulic sag. Adjust the switch to be tripped a bit low in these cases. Mount the switch to the base console side of the cutter if possible. This will reduce the amount of sealtite to be strung later in the installation. Some bending of the bracket may be necessary for some mounting configurations (make a cut along the bent edges to do this). Alternatively the 3/8-16 X 12" threaded rod may be cut to length to space the switch out to meet the clamp. A 2" X 2" X 2" angle piece is included to be used as a trip plate if needed. This can be mounted with one or two 1/4-20 X 1/2" bolt(s) with lockwasher(s).

NOTE: It may be helpful to plan the SHAFT ENCODER mounting first. There will usually be a spare right angle bracket which may be useful when mounting the CLAMP UP SWITCH in certain instances.

THE CUT SENSING SWITCH

DO NOT INTERFERE WITH ANY PART OF THE ORIGINAL EQUIPMENT KNIFE CIRCUIT--ANY ALTERATION TO EITHER THE KNIFE OR CLAMP CIRCUITS, SAFETIES AND MECHANISMS IS EXPRESSLY FORBIDDEN.

This is packed in the switch box (16" X 16" X 6") contained in BOX 2. Either one of the roller arm switches on the long slotted brackets can be used. The 3/8" hardware bag contains nuts, bolts, and washers for mounting. There is a spring lever arm in one of the other hardware bags which can be used to trip the cut sensing switch in certain mounting applications.

Use one or two 3/8-16 X 5/8" bolts with lock and flat washers to mount this switch so that it cycles (on-off-on or off-on-off) during the knife stroke. Use the original equipment knife cam if possible since cams generally give smoother action than moving mechanical parts. **DO NOT INTERFERE WITH ANY PART OF THE ORIGINAL EQUIPMENT KNIFE CIRCUIT--MAKE SURE THAT THE O.E. SWITCHES ALREADY MOUNTED ON THE CAM ARE WELL CLEAR OF THE MICRO CUT SENSING SWITCH.** If part of the knife linkage is used, check for impact on the switch during knife cycling which could cause fatigue. If the linkage is adjustable (for varied knife lengths), verify that the switch will function for all adjustments. Make sure that the switch does not return to its normal (knife up) position until the knife is well past bottom dead center (see below). Make sure that the switch will not be stressed or broken if the knife is cycled in the reverse direction (as could happen during a knife change). A spring lever arm is supplied as well as a roller arm to increase the mounting possibilities. **IF THE SPRING LEVER ARM IS USED, MAKE SURE THAT IT IS NOT STRESSED TO THE POINT THAT IT WILL SNAP BACK AND RE-TRIP THE SWITCH WHEN IT IS FINALLY RELEASED. THIS WOULD CAUSE INTERMITTENT DOUBLE MARKING OF CUTS DURING PROGRAMMING.**

NOTE: The cut switch may be mounted anywhere on the cutter. It is only important that the mounting allows the switch to cycle from OFF(see * below) to ON and back to OFF during the knife cycle. Ideally the cycle back to OFF will not occur before the knife is committed to its upstroke--on some cutters the clamp and knife are controlled by the same valve and release of the knife buttons releases the clamp (to the top) while the knife stays down; if the cut sense switch completes its cycle on the downstroke and the knife buttons are released before the upstroke, MICRO CUT could push the stock into the back of the knife trying to advance to the next stop.**

*** OFF means the switch does not conduct current. ON means the switch conducts current. The switch has both normally open and normally closed contacts to increase mounting possibilities.

THE MOTOR MOUNTING

The motor is shipped in its own box. The pulley for the motor is in the MISCELLANEOUS BOX (10" X 16" X 6") contained in BOX 2. Two pulleys are included--one which is adjustable and one smaller one which is not. The motor mounting plate is in the top of the switch box (16" X 16" X 6") contained in BOX 2. The 3/8 hardware bag and threaded rod in this same box can be used to mount the plate to the cutter. The 5/16 hardware bag contains the bolts and washers to secure the motor to the mounting plate.

Some cutters have original equipment electromagnetic backgauge brakes which will require either the removal of a fuse or wire to defeat them. Others may require the addition of a switch to lock on a backgauge drive clutch. On some cutters it will be necessary to mount a new pulley on the leadscrew for the MICRO CUT motor (Senators with gearbox drive, some Michael Miracles). On others it will be necessary to mount the motor to the leadscrew through an existing gearbox (Pacemaker II spacers--see NOTE below). In general, it is best to mount the MICRO CUT motor so that it lines up with the existing leadscrew drive pulley. In many cases the same belt can be used for the new motor as was used for the original equipment drive. Note that only one drive system can be attached to the leadscrew at a time--this prevents the possibility of one system fighting the other. In cases where an additional pulley has been added it will be necessary to electrically defeat (fuses) or mechanically defeat (belts or gears) the original equipment drive system (excluding the case or a non-power backgauge).

Mount the motor plate to the table with at least two 3/8-16 bolts with lockwashers. (On Pacemaker II spacers this would be to the front inside of the gearbox to align the motor with the V-belt pulley on the box--see NOTE.) The motor mounts to the plate with four 5/16-18 X 1" bolts with lock and flat washers. Use one of the supplied pulleys and O.E. belt (if possible) to attach the MICRO CUT motor to the backgauge drive.

NOTE: On Pacemaker II's it will be necessary to lock the high speed clutch on. Pull the cover plate off of the O.E. reverse drive control switch to check for the wire numbers to this switch. Jumper the wires on the reverse switch to lock the high speed clutch on. It will be necessary to mount the MICRO CUT rear limit switch so that it trips at least three inches before the rear of the table to prevent the O.E. limit from negating the high speed clutch. Key in a maximum rear value of less than the O.E. rear limit position at the SET-UP ROUTINE (OPERATOR'S MANUAL).

THE SHAFT ENCODER

All parts for mounting the shaft encoder are located in the shaft encoder box (6" X 16" X 6") contained in BOX 2.

MICROCUT uses a shaft encoder with internal zero set to keep track of backgauge position. The shaft encoder is driven off the leadscrew with a sprocket-chain-sprocket arrangement. The sprocket for the leadscrew is split to allow for easier attachment to the leadscrew (see NOTE below). Use the shaft encoder plates supplied to mount the shaft encoder near an unthreaded part of the leadscrew. This can usually be done without any drilling or tapping to the cutter. Play with the brackets a bit before you jump to any conclusions about how to mount the shaft encoder. Clamp the split sprocket to the leadscrew so that it lines up with the shaft encoder sprocket. Measure and break the drive chain to length. Install it to the sprockets. Take up any slack with the shaft encoder swing mounting bracket.

Make sure that the split sprocket is mounted so that there is no undue stress on the chain at the junction of the sprocket halves.

NOTE: This is not always the case. Polars require that the sprocket be mounted to an extension rod off of the back of the leadscrew (the 3/8-16 threaded rod works beautifully for this purpose - replace the existing bolt or rod) and the sprocket need not be split. On Senators with O.E. gearbox drive it is necessary to use a small motor drive gear at the back of the table (small because of available space). The small size requires that this be a cogged gear to prevent belt slippage and power loss which would be experienced if a V-belt were wrapped on this diameter. Mounting space on the leadscrew does not allow for a sprocket to be mounted as well, so the shaft encoder sprocket is mounted onto the motor shaft. This does not require a split sprocket either.

THE DISPLAY CONSOLE

The display console is located in the center section of BOX 1 along with the display cable. The Panavise mounting bracket and flathead allen screw hardware bag are packed in the miscellaneous box (10" X 16" X 6") contained in BOX 2.

The display console should mount on the front of the cutter near the operator, but out of his way as he works. Watch the operator work to see if he has a tendency to swing paper to one side or the other during loading and unloading. Also watch to see which side of the cutter he works towards. A ball joint mounting assembly (Panavise) is supplied. Attach this to the cutter with three 1/4-20 X 1/2" allen flathead screws. Place the display mounting rod onto the ball joint assembly and tighten slightly. The display arm which connects to the ball joint can be installed with either the short or the long side down. The display can be positioned as necessary by swinging the ball joint and tilting the yoke assembly.

Avoid mounting the console to thin hollow guards which may subject it to undue vibration.

THE PADDLE SWITCH

SIDE LOADING ONLY

If ordered the paddle switch and all mounting brackets and hardware are shipped in their own box.

The paddle switch is used to (optionally) advance the backgauge after the side load is completed. Use the hardware supplied to mount the switch to the top rail of the loader. Hang the switch down so that the paddle linkage will snap the yoke trip arm in one direction as the paddle enters onto the table and the switch will trip back to its "normal" position as the paddle exits.

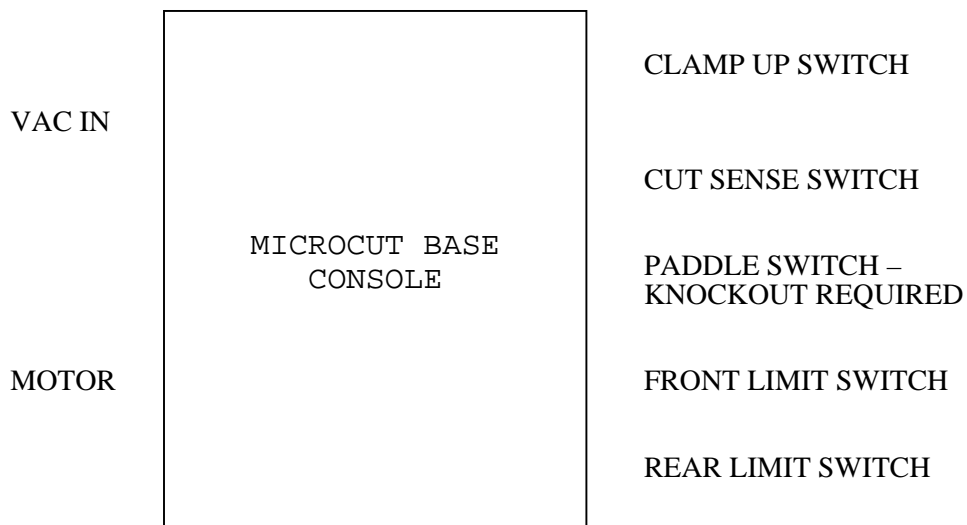
NOTE: The paddle switch DOES NOT defeat backgauge drive. It is used strictly to sense the completion of the paper load so that the gauge may advance to the first cut location automatically. If the paddle switch is not hooked up, then the option of AUTO ADVANCE will not be offered in the MODIFICATION ROUTINE (see the OPERATOR'S MANUAL). If side loading is used, a separate photo-switch (JAM-UP SENSE) should be mounted to sense across the throat of the side loader to sense the presence of any paper (or obstruction). The contacts should conduct current only when there is no obstruction which could cause a jam-up of the gauge. This photo-switch should be wired in SERIES with the CLAMP UP switch. Run the wires back to the base console. Remove the wire to the CLAMP UP SWITCH at terminal #10 and attach it to one of the photo-switch wires with a wire nut. Attach the other wire from the photo-switch to terminal #10. When the wiring is complete no terminal # should have more than one wire attached to it. The motor will be disabled whenever there is anything blocking the JAM-UP SENSE photo-switch. A mechanical switch cannot accurately sense a potential jam-up and should not be used for such a purpose.

SEALTITE

Run sealtite from the base console to the following components (see NOTE below):

1. Rear limit switch
2. Front limit switch
3. Motor
4. Clamp up switch
5. Cut sensing switch
6. Paddle switch (side loading only)

Use a separate piece of sealtite for each component. Do not double up on components. Wait until after the wires are strung (next section) before tying the sealtite up with the straps supplied.



NOTE: RUN THE SEALTITE TO THE BASE CONSOLE OPENING NEAREST EACH COMPONENT'S TERMINAL CONNECTION. THIS WILL KEEP THE INTERNAL WIRING MUCH NEATER.

Use a small amount of silicone spray, spray oil, or water inside the end of the sealtite before stuffing the wire through. This will prevent the wire from snagging in the tubing.

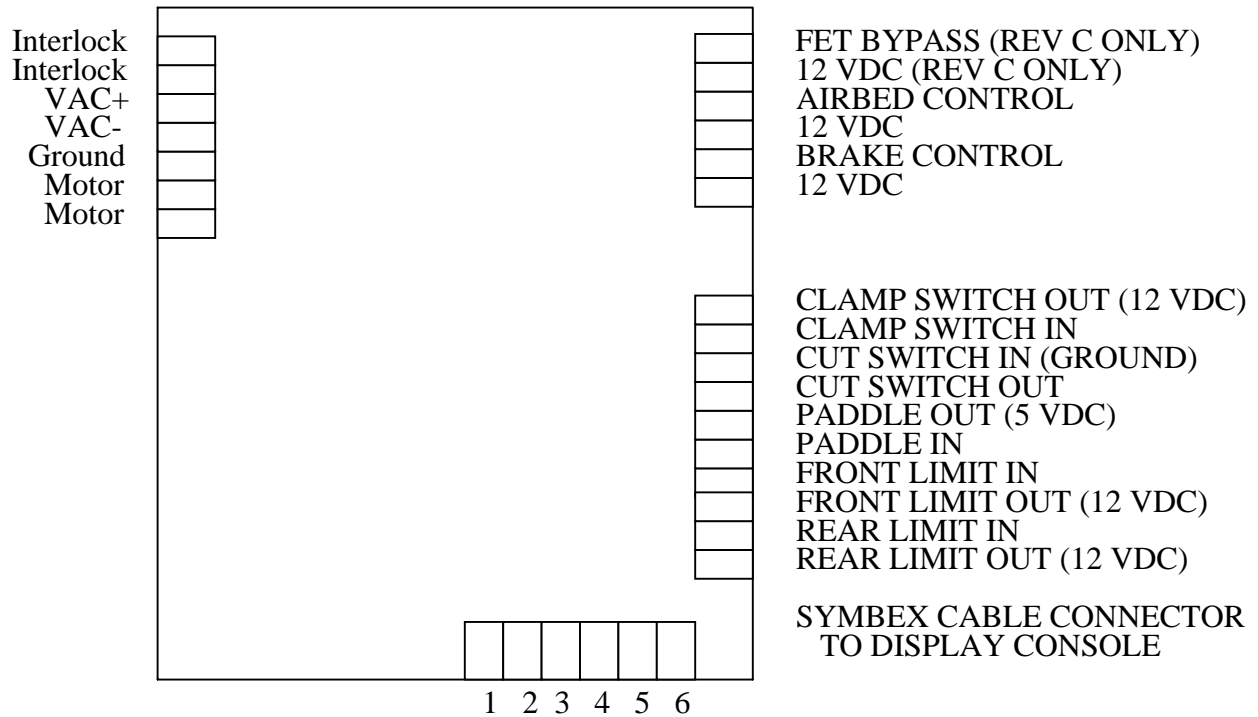
It is advisable to cut all of the sealtite first. The simplest way to snake the wire is to pull a sealtite length of wire off of the spool, add a couple of feet to the length, and then double it over. Snake the doubled over end into the sealtite until it exits the far end. Then cut the wire a few feet longer than needed.

CABLES

Attach the cables supplied to the shaft encoder and display console. Snake the cables through the cutter so that they are out of harm's way (and hopefully out of sight). Be careful of moving parts (clamp, knife, motors, belts, etc.). Tie any excess cable under the table with the tie straps supplied. Use tie straps for strain relief on the display console cable by tying the cable onto the cross bar between the yokes.

WIRING THE SWITCHES AND MOTOR

Use the 14 gauge wire for all switches and for the motor. Connect wires (two per component) to the appropriate devices. The LIMIT switches must conduct power ONLY when tripped towards the center of the table. The CUT switch must NOT conduct current when the knife is up. The CLAMP UP switch should conduct current ONLY when the clamp is in it's full up position. The PADDLE switch should conduct current ONLY when the paddle is clear of the table (for cases where the paddle switch was installed only--do not jumper these terminals). Motor polarity will be determined at the SET UP ROUTINE later in the installation.



SHAFT ENCODER

- 1=SHIELD--HEAVY BLACK
- 2=GROUND--THINNER BLACK
- 3=5 VDC--RED
- 4=ZERO INDEX--GREEN
- 5=SIGNAL A--YELLOW (BLUE) OR WHITE (CLEAR)
- 6=SIGNAL B--WHITE (CLEAR) OR YELLOW (BLUE)

110 VAC IN

The power for MICRO CUT should be from a 30 AMP DEDICATED breaker. The cleaner the power the better. Transformers do not insure good power. Other devices on the same line as the transformer can cause problems. Transformers tend to let the spikes commonly found on "dirty" power lines through to do damage to the computer. Transformers also act as large inductors, so that when the motor starts or stops the computer sees large voltage swings. If a transformer must be used it should be well oversized (5 KVA or larger preferred). **Graphics West Micro Systems does not encourage the use of transformers for supplying power to MICRO CUT.** If nothing but "dirty" power is available we suggest the use of an active tracking filter. Contact us by means of phone, telex, or FAX (numbers are on the cover of this manual) for any questions you may have.

AN UNCLEAN POWER LINE WILL SEND SPIKES INTO THE COMPUTER AND ITS SURROUNDING CIRCUITRY. WHILE MICRO CUT IS DESIGNED AS BEST AS POSSIBLE TO OVERCOME THESE SPIKES, IN TIME THE SPIKES WILL BEAT THE CIRCUITRY TO DEATH AND FAILURE WILL OCCUR. THE CLEANER THE POWER, THE LONGER MICRO CUT WILL WORK RELIABLY. START FROM THE BEGINNING WITH A GOOD CLEAN POWER LINE. DO NOT WAIT FOR PROBLEMS TO OCCUR.

THE FINAL SETUP

1. Use the tie straps and mounting straps (with 10-32X1/2" allen screws) to secure all sealtite and cabling.
2. Move the backgauge so that it is at least ten inches from either end of the table limits.
3. Turn the power on to both the cutter and MICROCUT.
4. Refer to the SET-UP ROUTINE in the OPERATOR'S MANUAL to calibrate MICROCUT to the cutter it is now installed on.

NOTE: TO MAKE SURE THAT ALL OF THE SWITCHES ARE WIRED AND OPERATING PROPERLY, REFER TO THE TABLE BELOW DURING THE DIAGNOSTICS CHECK IN THE SET-UP ROUTINE:

<u>LIGHT #</u>	<u>FUNCTION</u>	<u>ON WHEN</u>	<u>OFF WHEN</u>
10	REAR LIMIT	OK TO DRIVE	DRIVE DISABLED
11	FRONT LIMIT	OK TO DRIVE	DRIVE DISABLED
12	CLAMP SWITCH	OK TO DRIVE	DRIVE DISABLED
28	CUT SENSE	CUTTING	KNIFE UP
29	PADDLE SENSE	OK TO DRIVE	PADDLE OUT

IF ANY OF THE SWITCHES ARE INCORRECT AT THIS POINT, TURN THE POWER OFF AND CORRECT BEFORE PROCEEDING. REFER TO THE "DIAGNOSTIC LIGHTS" SECTION IN THE SERVICE MANUAL FOR ASSISTANCE IF NECESSARY.

FINAL CHECKOUT

1. Inspect all components and cables for tightness, alignment and routing.
2. **Add additional guarding as required to insure full operator safety.** Check around all parts and assemblies which were added or affected by the addition of MICRO CUT. Make sure that all moving parts or hazards are guarded fully.

MICROCUT CONSISTS OF PARTS AND ASSEMBLIES WHICH ARE ADDED TO THE MACHINE. GUARDING MAY NEED TO BE ALTERED OR ADDED TO OFFER PROPER PROTECTION. THIS MUST BE DONE BEFORE MICRO CUT IS OPERATED. DO NOT OPERATE THE MACHINE UNTIL THIS GUARDING IS COMPLETE. ALL MOVING PARTS AND HAZARDS MUST BE COVERED IN SUCH A WAY AS TO PREVENT ACCIDENTAL CONTACT OF ANY SORT.

3. Cut the limit trip rod to an appropriate length and file the edges smooth. t
4. Make the appropriate notations in the OPERATOR'S MANUAL--USE THE ORIGINAL EQUIPMENT CONTROLS. Ø
5. Check MICRO CUT to make sure all of its functions and operations are performing properly (positioning, settling, programming, etc.). operat
6. Refer to "ADJUSTING MOTOR SPEED" in the SERVICE MANUAL for adjusting the high speed and slow speed to the operator's preference. adjust
7. Train the operator(s).

ADDITIONAL CONTROL LINES

MICROCUT has two additional control lines which can be used to control the switching of 12 VDC coiled relays (not included). The **CONTACTS OF THESE RELAYS** can then be used to control other functions of the machine. Refer to the diagram in the **WIRING THE SWITCHES AND MOTOR** section of the manual for the location of these lines.

Control line 1: Relay switches on whenever fast forward is used. This could be used as an air bed disable by switching the air solenoid through the normally closed contacts.

Control line 2: Relay switches on whenever the cut ready light is on. This could be used as an electromagnetic brake enable to lock the backgauge after position has been reached in automatic mode.

MICROCUT SPARE PARTS PRICE LIST

<u>PART</u>	<u>PRICE</u>
Base console	2500.00
Display console	3000.00
1/2 HP motor	275.00
1 HP motor	460.00
Shaft encoder (bare)	350.00
Shaft encoder assembly	425.00
Limit switch (snap lock type)	75.00
Clamp, cut sensing switch	30.00
Spring lever arm for cut switch	12.00
Display cable	75.00
Shaft encoder cable	50.00
Motor brushes (pair)	25.00
Key diffuser with lens (engraved)	7.00
Key light	2.00
Nylatron chain (1 foot piece)	10.00
Unbored 24 tooth sprocket	12.00
Bored 24 tooth sprocket	35.00
3/8" bore 12 tooth sprocket	25.00
Manual	25.00
Display console repair	250.00
Base console repair	250.00

Base console spares kit component breakdown:
(prices are extended according to quantity)

2--relays	45.00
4--FET transistors	72.00
2--LM339 quad comparators	6.00
2--DS3632 dual relay drivers	18.00
2--4081 quad AND gates	4.50
2--555 timers	4.50
2--7404 hex inverter	4.50
2--4029 presettable counter	4.50
2--LM324 quad op amp	6.00
5--30 amp fuses	3.00
5--5 amp fuses	3.00
5--3 amp fuses	3.00
SUBTOTAL	178.50
Full kit price	150.00

Base console parts are available individually as well.

**PRICES, AVAILABILITY, AND SPECIFICATIONS SUBJECT
 TO CHANGE WITHOUT NOTIFICATION.**

PERSONAL NOTE SPACE

PERSONAL NOTE SPACE

microcut II

USER'S MANUAL

Revision 498

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GMS

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MICROCUT DESCRIPTION

MICROCUT is a solid state electronic motor drive control system that contains 999 programmable jobs and 500 storage locations.

In the **AUTOMATIC MODE** of operation **MICROCUT** will position the backgauge sequentially according to the stop points that have been programmed on the selected job. At the end of the sequence it will then return to the beginning again.

The **DISPLAY CONSOLE** mounts on the front of the cutter and is used for display readouts and all operator inputs.

The display console keys have been thoughtfully labeled. Read them AND the prompting display--the operating methods and options of MICROCUT will then be very simple.

This manual is designed to allow an operator to train himself. Where the prompting display is used, the manual gives the prompt message boxed in on the right side of the page. Please refer to the TABLE OF CONTENTS for any of the operations you may require. MICROCUT IS DESIGNED TO BE USED IN MANY DIFFERENT WAYS. THIS MANUAL GIVES THE BASICS OF OPERATION, NOT EVERY OPTION. PLAY WITH MICROCUT TO SEE WHAT IT CAN REALLY DO FOR YOU.

TURNING POWER "ON" TO MICROCUT

MAKE SURE THAT ALL GUARDS AND SAFETIES ARE IN PLACE BEFORE TURNING ON POWER. INSPECT THE MACHINE FOR ANY MOVING PARTS OR HAZARDS THAT ARE NOT FULLY GUARDED. CORRECT ANY SAFETY PROBLEMS BEFORE CONTINUING. MAKE SURE THERE ARE NO OBSTRUCTIONS TO NORMAL OPERATION. MAKE SURE EVERYONE IS CLEAR OF DANGER.

START UP PROCEDURE

INSTRUCTION

Locate the ON/OFF switch on the rear of the DISPLAY CONSOLE. Press it and wait for the prompt:
Press the **AUTOMATIC** key. The backgauge will move to the rear of the table slowly to calibrate itself.

IN CASE OF EMERGENCY, you can **PRESS ANY KEY TO STOP THE MOVEMENT OF THE BACKGAUGE**. To resume the operation, turn power off and start again from the top of this page.

YOU WOULD NOT NORMALLY PRESS A KEY HERE UNLESS THE BACKGAUGE HAD TO BE STOPPED.

DISPLAY READS

PRESS AUTOMATIC
TO START

PRESS ANY KEY
TO STOP

TURN POWER OFF
RESTART

After the backgauge reaches the rear of the machine the RED readout will read the correct position. **MICROCUT** is calibrated and ready to use. The **MANUAL** key will light.

If there are any problems during start up the prompt will give you an error message. Please consult the **SERVICE MANUAL** for assistance.

MANUAL DRIVE OPERATION

Pressing the key marked **FORWARD** will drive the backgauge toward the knife, slowly at first, then fast. The RED display will give the true position of the backgauge.

Pressing the key marked **REVERSE** will do the same thing, except the backgauge will move in reverse.

To obtain **SLOW SPEED ONLY** toggle the proper key for either direction.

The backgauge will automatically slow as it approaches either table extreme.

NOTE: THE BACKGAUGE SHOULD ALWAYS BE POSITIONED MOVING IN THE FORWARD DIRECTION TO PREVENT BACKLASH AND INACCURATE CUTTING.

SEMI-AUTOMATIC OPERATION

This routine is used to move the backgauge to a position in either **MANUAL** or **PROGRAM** modes of operation. The light must be lit on either the **MANUAL** or the **PROGRAM** key.

INSTRUCTION

The UPPER line of the CLEAR PROMPT DISPLAY may contain one of 2 possible readouts:

DISPLAY READS

MICROCUT

OR

JOB# CUT#

Enter a position using the **NUMBER** keys. Example: 8 inches-- press the **8** key and then press the **0** (zero) key three times.

MICROCUT
8.000

Press the **MOVE** key. It will light showing that **MICROCUT** is moving. When the **MOVE** key light goes out, you are in position. Press the **MANUAL** key to stop the backgauge **BEFORE** it reaches position.

For entering fractions see **CALCULATOR KEY OPERATION**.

NOTE: When entering a position you must roll out the number or the computer will give you an **ERROR** (8 inches = **8.000**, 8 1/2 inches = **8.500**).

To move a distance, press the **+ or -** key and enter the distance to move. Then press the **MOVE** key.

CALCULATOR KEYS

The calculator keys are used just like a normal calculator, the numbers will appear on the right hand side of the prompting display after the + or - key is hit. The / key can be used for fractions. You don't have to know decimal equivalents to program this unit. The computer will figure it out for you. The **ENTER**, + or - key will total the display.

Fraction calculation example:

INSTRUCTION

Key **2, 5, 0, 0, 0**.

Press the **+** key.

Press the **9** key.

Press the **/** key.

Key in **1, 6**.

Press the **ENTER** key.

DISPLAY READS

MICROCUT
25.000

MICROCUT
25.000+

MICROCUT
25.000 9

MICROCUT
25.000+ 9/

MICROCUT
25.000+ 9/16

MICROCUT
25.562

Calculator keys can be used in all methods of operation.

Calculations can also be chained together.

INCH OR CENTIMETER OPERATION

Cuts can be entered in INCHES or CENTIMETERS or a combination of both. Simply press the **IN** key for inches or **CM** key for centimeters. The APPROPRIATE KEY WILL LIGHT telling you what units you are in.

PROGRAMMING A JOB

This routine is used to program a series of stop points into **MICROCUT** so that it can operate in **AUTOMATIC MODE**. To enter the **PROGRAM MODE** the **MANUAL** key must be lit (press the **MANUAL** key).

INSTRUCTION

Press the **PROGRAM** key. The key will light and the prompt will show:

DISPLAY READS

1= NEW 2= OLD
LAST= SAME JOB

Press the number **1** key to tell **MICROCUT** that you want to program a new job. The display will show:

1= AUTO JOB SEL.
2= MANUAL SEL.

AUTO JOB SELECT means the computer will select the lowest numbered open job # for you. Press the number **1** key for this. **MANUAL SELECT** means you will assign a job #.

If you press the **2** key the display will show:

JOB #000 ENTER
DESIRED NUMBER

Pressing the **NUMBER KEYS** will roll the job number. For example: press **9, 5, 4**. The **ENTER** key will let you continue.

JOB #954 ENTER
DESIRED NUMBER

The **FORWARD**, **REVERSE**, and **MOVE** keys can be used to position the backgauge. Stop positions can be entered into memory with the **KNIFE STROKE** or with the **NUMBER** and **CALCULATOR** and **ENTER** keys.

JOB #954 CUT #001

CORRECTING OR REVIEWING CUT LOCATIONS:

LAST key -- backs up the CUT#, allows reprogramming if desired.

ENTER key -- Enters the cut value shown in the display.

CLEAR key -- clears the lower line of the display.

MOD key -- allows cuts to be added or deleted.

When you are finished programming the job press the **AUTOMATIC** key. The computer will end the job and the backgauge will move to the first cut position.

INSERT CUT

This routine will add a cut (or an eject) into the selected job number.

OPTION 1: PROGRAM KEY LIT IN PROGRAM OR REVIEW MODES--

INSTRUCTION

Use the **ENTER** or **LAST** key to locate the cut number to be added. Press the **MOD** key to tell **MICROCUT** you want to modify the job.

DISPLAY READS

JOB #954 CUT #010
30.000

The display will show:
Press the **YES** key.

JOB #954 CUT #010
INSERT CUT?

The display will blank out, ready for you to enter a cut (or eject) by using the **NUMBER, CALCULATOR,** and **ENTER** (or **EJECT**) keys. If this is a new job you can also use the **FORWARD** and **REVERSE** keys and the handwheel along with the **KNIFE STROKE** to enter the new cut position. The **KNIFE STROKE** will not enter a new cut if you are in **REVIEW MODE**.

OPTION 2: CUT READY LIGHT ON IN AUTOMATIC MODE--

INSTRUCTION

Press the **MOD** key. The display will show:
Press the **NO** key.

DISPLAY READS

JOB #954 CUT #010
CHANGE CUT? Y, N

Answer **NO** to the question:

JOB #954 CUT #010
LAY COMP?

The display will show:
Press the **YES** key.

JOB #954 CUT #010
INSERT CUT?

The display will blank out, ready for you to enter a cut (or eject) by using the **NUMBER, CALCULATOR,** and **ENTER** (or **EJECT**) keys. You can also use the **FORWARD** and **REVERSE** keys and the handwheel along with the **KNIFE STROKE** to enter the new cut position.

DELETE CUT

This routine will remove a cut (or eject) from memory in the selected job number.

OPTION 1: PROGRAM KEY LIT IN PROGRAM OR REVIEW MODES--

INSTRUCTION

Use the **ENTER** or **LAST** key to locate the cut to be deleted.
Press the **MOD** key to tell **MICROCUT** you want to modify the job.

DISPLAY READS

JOB #954 CUT #010
30.000

The display will show:
Press the **NO** key.

JOB #954 CUT #010
INSERT CUT?

The display will show:
Press the **YES** key.

JOB #954 CUT #010
DELETE CUT?

The cut is deleted from the job memory.

OPTION 2: CUT READY LIGHT ON IN AUTOMATIC MODE--

INSTRUCTION

Press the **MOD** key. The display will show:
Press the **NO** key.

DISPLAY READS

JOB #954 CUT #010
CHANGE CUT? Y, N

Answer **NO** to the question:

JOB #954 CUT #010
LAY COMP?

The display will show:
Press the **NO** key.

JOB #954 CUT #010
INSERT CUT?

The display will show:
Press the **YES** key.

JOB #954 CUT #010
DELETE CUT?

The cut is deleted from the job memory.

EJECT OR TURNAROUND

The eject or turnaround is programmed in the same manner as a cut position but instead of pressing the **ENTER** key, press the **EJECT** key. Ejects do not count as a cut and you will see that the cut number does not advance in the display. In automatic operation, the backgauge will move to that location, not wait for the cut, but move directly to the next position instead.

STEP & REPEAT

This routine enters a number of equally spaced stops **WHILE PROGRAMMING A JOB**. It can be used for labels or coupons. The **PROGRAM** key must be lit (see PROGRAMMING A NEW JOB).

INSTRUCTION

Press the **PROGRAM** key. The display will show:
Press the **YES** key.

If **NO** is answered here **MICROCUT** will skip the next prompt and calculate the first stop value automatically. If you know the first cut value, answer **YES**.

Use the **NUMBER** keys with **ENTER** or the **KNIFE STROKE** to enter the first cut.

Use the **NUMBER** keys with **ENTER** to tell **MICROCUT** the number of labels or coupons.

Use the **NUMBER** keys with **ENTER** to tell **MICROCUT** the label or coupon size.

If **NO** is answered the next prompt will be skipped and **MICROCUT** will program only for the label (coupon) size. If there is a trim (gutter) press the **YES** key.

Use the **NUMBER** keys with **ENTER** to tell **MICROCUT** the trim (gutter) value.

If the first cut value was not known or if it was entered with the **KNIFE STROKE** this prompt will be skipped. Answer **YES** to keep the first stop, **NO** to omit it.

DISPLAY READS

JOB #954 CUT #001
STEP & REPEAT? Y, N

JOB #954 CUT #001
FIRST CUT KNOWN?

JOB #954 CUT #001
FIRST CUT AT?

JOB #954 CUT #001
NUMBER UP:

JOB #954 CUT #001
LABEL SIZE?

JOB #954 CUT #001
TRIM YES OR NO?

JOB #954 CUT #001
ENTER TRIM VALUE

JOB #954 CUT #001
BACKTRIM SHEET?

NOTE: The first stop should be kept if the sheet has not been trimmed to size before starting the STEP & REPEAT sequence. If the sheet has been through a four side trim to remove variances due to gripper adjustments, then you will probably not want to backtrim (answer **NO**).

The LOWER LINE of the prompt display will flash the positions as **MICROCUT** calculates them. **MICROCUT** stays in the PROGRAM mode to allow additional job programming as desired.

SHEET DIVIDE

This routine is used WHILE IN THE PROGRAMMING MODE to divide a sheet into equal sizes. It is useful for spreading a size error equally when splitting an undersized sheet into logs. The **PROGRAM** key must be lit (see PROGRAMMING A NEW JOB).

INSTRUCTION

Press the **PROGRAM** key. The display will show:
Press the **NO** key.

The display will show:
Press the **YES** key.

Use the **NUMBER** keys with **ENTER** or the **KNIFE STROKE** to enter the sheet size. The **NUMBER** keys are allowed to key in a value up to twice the maximum rear.

Use the **NUMBER** keys and **ENTER** to tell **MICROCUT** what to divide the sheet by.

If the sheet size was entered with a **KNIFE STROKE** this prompt will not be shown. Press the **YES** key if the sheet needs to be cut to initial size.

DISPLAY READS

JOB #954 CUT #001
STEP & REPEAT? Y, N

JOB #954 CUT #001
DIVIDE SHEET? Y, N

JOB #954 CUT #001
ENTER SHEET SIZE

JOB #954 CUT #001
DIVIDE BY:

JOB #954 CUT #001
BACKTRIM SHEET?

NOTE: If the first calculated stop is greater than the maximum rear limit **MICROCUT** will give you a TOO FAR BACK error message.

The LOWER LINE of the prompt display will flash the positions as **MICROCUT** calculates them. **MICROCUT** stays in the PROGRAM mode to allow additional job programming as desired.

JOB REVIEW

This routine is used to select or review jobs which have already been programmed into **MICROCUT**. The **MANUAL** key must be lit before **JOB REVIEW** can be started. If it is not lit, press the **MANUAL** key.

INSTRUCTION

Press the **PROGRAM** key. The display will show:
Press the **2** key.

Press the **1** key and **MICROCUT** will ask you to select a job number. See below for a description of option **2**.

Choice **1**: Use the **NUMBER** keys with **ENTER** to select a job number. If the number is invalid, **MICROCUT** will prompt a **JOB NOT FOUND** error message.

DISPLAY READS

1= NEW 2= OLD
LAST= SAME JOB

1= CHOOSE A JOB #
2= REVIEW JOBS

JOB #000 ENTER
DESIRED NUMBER

Press **2**: the computer will display the lowest programmed job number in sequence to the highest. Press the **NO** key to see the **JOB#** and **FIRST CUT** of each job programmed. Press the **YES** key to select the displayed **JOB#**.

You can now toggle the **ENTER** key to review the cuts on the selected job. Press the **AUTOMATIC** key to go into **AUTOMATIC MODE** or the **MANUAL** key to go into **MANUAL MODE**.

AUTOMATIC OPERATION

Select the desired job number (or program a new one)--refer to the TABLE OF CONTENTS for sections dealing with programming and reviewing jobs. Make sure that the desired job and starting cut number are displayed in the upper line of the prompting display.

Press the **AUTOMATIC** key. **MICROCUT** will position the backgauge at the programmed stop value. The **AUTOMATIC** key will light when the position has been achieved. The **CUT READY LIGHT** will light whenever the backgauge is within the settling tolerances AND the **AUTOMATIC** key is lit. If the backgauge is knocked out of its settling tolerances (see the **MODIFICATIONS** section of this manual) the **CUT READY LIGHT** will go out.

If the **CUT READY LIGHT** flickers the tolerances may be set too tightly (see the **MODIFICATIONS** section of this manual).

The **LAST** key will back **MICROCUT** up to the previous stop.

The **MOVE** key or the **KNIFE STROKE** will advance **MICROCUT** to the next stop.

The **MOD** key allows program changes (**CUT READY LIGHT** on).

The **MANUAL** key exits **AUTOMATIC MODE**.

No other keys are operational in **AUTOMATIC MODE**.

To modify an **EJECT**, press and hold the **MOD** key until the eject value is reached.

To exit **AUTOMATIC MODE** temporarily press the **MANUAL** key. **MANUAL** and **SEMI-AUTOMATIC MODES** can be used without affecting the **JOB#** and **CUT#** in the prompt display. Press the **AUTOMATIC** key to enter **AUTOMATIC MODE** at the same place you exited.

CHANGE CUT

This routine is used to change a stop value in the selected job number.

OPTION 1: PROGRAM KEY LIT IN PROGRAM OR REVIEW MODES--

INSTRUCTION

Use the **ENTER** or **LAST** key to locate the cut to be changed. Press the **CLEAR** key to blank the display. Use the **NUMBER** and/or **CALCULATOR** keys to display the new cut value. Press the **ENTER** key when ready.

DISPLAY READS

JOB #954 CUT #010
40.000

NOTE: The **CLEAR** key is optional. You can "write over" the existing cut with the **NUMBER** keys or add and subtract from it with the **CALCULATOR** keys IF **CLEAR** is not pressed. To return to the original cut value (BEFORE PRESSING **ENTER**) press the **LAST** key to back up and then the **ENTER** key to come back to the original cut.

OPTION 2: CUT READY LIGHT ON IN AUTOMATIC MODE--

INSTRUCTION

Press the **MOD** key. The display will show:
Press the **YES** key.

DISPLAY READS

JOB #954 CUT #010
CHANGE CUT? Y, N

If this is a one time only change press the **YES** key. The backgauge can be moved and the cut will change this lift only. Press the **NO** key for permanent changes.

JOB #954 CUT #010
THIS LIFT ONLY?

Turn the handwheel or use the **DRIVE** keys to reposition the backgauge. Do a **KNIFE STROKE** or press the **ENTER** key. This will change the value of the cut at that particular location only.

Press the **AUTOMATIC** key if you decide you do not want to change the cut after all.

LAY COMPENSATE

This is used to adjust all FORWARD MOVING stop values in the selected job number. If it is done in the middle of a side of cuts it WILL NOT AFFECT cuts already made on that side. This is a useful feature if trims (gutters) were not laid out accurately before printing (adjustments can be made at the trim point and all labels will remain on size). It is also useful when compensating for gripper adjustments in cases where a four side trim out is not performed before cutting the printed sheet. There is no limit to the number of times this feature can be used on a job. **Every trim (gutter) could be different and yet the STEP & REPEAT programming method can still be used to assure equal sized labels.**

CUT READY LIGHT ON IN AUTOMATIC MODE--

INSTRUCTION

Press the **MOD** key. The display will show: Press the **NO** key.

Answer **YES** to the question:

If this is a one lift only change press the **YES** key. The backgauge can be moved and the lay will change this lift only. Press the **NO** key for permanent changes.

DISPLAY READS

JOB #954 CUT #010
CHANGE CUT? Y, N

JOB #954 CUT #010
LAY COMP?

JOB #954 CUT #010
THIS LIFT ONLY?

Turn the handwheel or use the **DRIVE** keys to reposition the backgauge. Do a **KNIFE STROKE** or press the **ENTER** key. This will change the value of all the forward moving cuts.

Press the **AUTOMATIC** key if you decide you do not want to change the lay after all.

JOB DELETE

This routine is used to remove a no longer wanted job from memory.

INSTRUCTION

Find the job you want to delete (see--JOB REVIEW).

Press the **PROGRAM** key. The display will show:
Press the **YES** key.

Your job is erased.

DISPLAY READS

JOB #954 CUT #010
40.000

JOB #954 CUT #010
DELETE JOB? Y, N

MODIFICATIONS

This routine is used for a number of different options which are standard in **MICROCUT** spacer systems. This routine must be entered from the **MANUAL MODE**. Press the **MANUAL** key if it is not already lit. Press and **HOLD** the **PROGRAM** key. While holding this key, press the **MOD** key. **MICROCUT** will enter the **MODIFICATION ROUTINE**.

INSTRUCTION

Answer the question:

The false clamp is a metal plate which attaches to the bottom of some clamps and limits the maximum forward travel.

DISPLAY READS

FALSE PAPER
CLAMP ON? Y, N

Answer the question:

CONTINUE MODS?
YES OR NO

If you answer **NO MICROCUT** will return you to **MANUAL MODE**. If you answer **YES MICROCUT** will continue with more questions and options.

Press **YES** to show the thousandths in the display. Press **NO** to show just the hundredths.

YES= SHOW .001'S
NO= SHOW JUST .01

NOTE: Even though the display may not show the .001's, MICROCUT will still position to the .001's in accuracy.

YES will show the true position of the backgauge at all times. If the **NO** key is pressed then **MICROCUT** will show the programmed value as current position as long as the **CUT READY LIGHT** is ON.

SHOW TRUE SIZE IF
CUT READY ON?

NOTE: If the backgauge is knocked beyond the settling tolerances--see 2 steps further on--THE TRUE POSITION WILL THEN BE SHOWN UNTIL THE SETTLING TOLERANCES ARE SATISFIED AGAIN.

Press the **YES** key if you want **MICROCUT** to reposition the backgauge if it is knocked out of settling tolerance in **AUTOMATIC MODE** (see directly below).

SELF CORRECTING
IN AUTOMATIC?

Enter **1** to **9**. The larger the number, the faster **MICROCUT** settles. Usually **2** or **3** is recommended. Poorly maintained machines may require larger values.

TOLERANCE IS
0.003 INCHES

NOTE: If the tolerance is set too small the CUT READY LIGHT will have a tendency to flicker on and off when MICROCUT reaches the stop position in AUTOMATIC MODE. This flickering will not damage **MICROCUT** but it does tend to be annoying to the operator. Refer to **INSTALLATION NOTES** in the **INSTALLATION MANUAL** for tips on improving the settling capability of **MICROCUT**.

Answer the question:

If **YES** is pressed **MICROCUT** will drive the backgauge to the full rear of the table at the end of each job sequence.

SIDE LOADING?
YES OR NO

IF you answered **YES** above, do you want **MICROCUT** to automatically move to the first cut after side loading is done (**PADDLE SENSE SWITCH REQUIRED**)?

AUTO ADVANCE
AFTER SIDE LOAD?

Press **YES** to have the backlighting for the prompt display **ON**. Press **NO** to turn it off.

PROMPT DISPLAY
BACKLIGHTING? Y, N

MICROCUT can be calibrated for errors up to $\frac{3}{8}$ of an inch. If the error is more, the mechanical condition of the machine should be closely inspected. If you say **YES**, move the backgauge to a known position, use the **NUMBER** keys to display that value in the prompt, and press the **ENTER** key.

CALIBRATE GAUGE?
YES OR NO

Calibration requires that the backgauge be squared first (the gibbs should be adjusted for this). Cut a trimmed lift of stock at 20 inches (**MICROCUT**). Move the backgauge to 10 inches (**MICROCUT**) and cut the stock again. Remove the top inch of the stock in each pile (to remove the knife draw). Flip the front pile (which is exactly 10 inches long) over and place it on top of the back pile. Compare the lengths. Most people can feel a few thousandths. This is much more accurate than a ruler.

DO NOT USE GREASE ON THE LEADSCREW MECHANISM. GREASE ATTRACTS ABRASIVE DIRT AND ACTS AS AN INCONSISTENT CUSHION AGAINST THE BACKGAUGE PREVENTING PROPER CUTTING PRECISION. USE A LIGHT MACHINE OIL ONLY ON THE LEADSCREW. OIL THE LEADSCREW DAILY.

SETTING UP MICROCUT

1. Turn the power ON to MICROCUT. Wait for the MEMORY TEST to complete.
2. If the display says PRESS AUTOMATIC TO START, DON'T press the **AUTOMATIC** key, but instead press and hold any **NUMBER** key and then press the **PROGRAM** key. Release both keys and this will take you into the SETUP ROUTINE.

NOTE: MICROCUT software comes in two different SET-UP ROUTINE versions. If the prompts appear differently than listed here, refer to the ADDENDUM TO SETTING UP MICROCUT (see the TABLE OF CONTENTS).

The first 24 lights in the base console should be on. If not stop here and see **DIAGNOSTIC LIGHTS** in the **SERVICE MANUAL**. If all lights are on press the **YES** key.

SETUP STEP 001
DIAGNOSTICS OK?

The display will show:
Press **NO** to save the job memory and skip the next prompt.
Press **YES** to erase all of the job memory.

SETUP STEP 002
CLEAR MEMORY Y,N

If **YES** was selected, press **NO** to erase all of the job memory. If **YES** is pressed the job memory will be saved.

SETUP STEP 002
SAVE JOBS YES, NO

The display will show:
The memory test is non destructive (the job memory won't be altered). Press **YES** or **NO** to this option.

SETUP STEP 003
MEMORY TEST Y, N

Turn the handwheel forward and backward. Does the display count down moving forward and up going back? Press the **FORWARD** and **REVERSE** keys. Does the motor drive the backgauge in the right direction?

SETUP STEP 004
CHECK DIRECTION

If the count or drive direction are wrong: Turn the 110 VAC power to MICROCUT off. Open the base console door. Count direction wrong -- interchange the shaft encoder wires 5 & 6. Motor direction wrong -- interchange the motor wires.

Press the **REVERSE** key until the backgauge reaches the rear limit switch. Release the key. MICROCUT will take over to calibrate.

MANUALLY TURN THE HANDWHEEL SO THAT THE BACKGAUGE IS AT AN **EXACT** INCH VALUE. THIS IS INDEPENDENT OF THE **MICROCUT** DISPLAY.

SETUP STEP 005
REAR POSITION =

Use the **NUMBER** and **ENTER** keys to tell **MICROCUT** the current backgauge position. This is a reference value and should be as exact as possible.

MICROCUT will move FORWARD to the front of the table and stop. Please wait.

SETUP STEP 005
MOVING FORWARD

This is the same as when the rear value was entered. The backgauge must be at an exact inch value less than 10 inches. Use the **NUMBER** and **ENTER** keys to enter the front reference position value.

SETUP STEP 006
FRONT POSITION =

Use the **NUMBER** and **ENTER** keys to tell **MICROCUT** how far forward the backgauge can move if the false paper clamp (sole plate) is attached to the bottom of the clamp. (SEE NOTE AT BOTTOM OF PAGE.)

SETUP STEP 007
FALSE CLAMP ON =

Use the **NUMBER** and **ENTER** keys to tell **MICROCUT** how far forward the backgauge can move if the false paper clamp is off. (SEE NOTE AT BOTTOM OF PAGE.)

SETUP STEP 008
MOST FORWARD =

Use the **NUMBER** and **ENTER** keys to tell **MICROCUT** how far back the backgauge can be driven (before the mechanical stop).

SETUP STEP 009
MAXIMUM REAR =

Answer the question:

If there is no false clamp press either the **YES** or the **NO** key.

FALSE PAPER
CLAMP ON? Y, N

NOTE: The false clamp is a metal plate which attaches to the bottom of the clamp for some paper cutters. It is removed to make very short cuts. This requires two different front travel limit values. If there is not a false clamp, then the two front travel limit values will be the same.

Press the **YES** key if you want **MICROCUT** to reposition the backgauge if it is knocked out of settling tolerance in **AUTOMATIC MODE** (see directly below).

SELF CORRECTION
IN AUTOMATIC?

Enter **1** to **9**. The larger the number, the faster **MICROCUT** settles. Usually **2** or **3** is recommended. Poorly maintained machines may require larger values.

TOLERANCE IS
0.003 INCHES

NOTE: If the tolerance is set too small the CUT READY LIGHT will have a tendency to flicker on and off when MICROCUT reaches the stop position in AUTOMATIC MODE. This flickering will not damage MICROCUT but it does tend to be annoying to the operator. Refer to INSTALLATION NOTES in the INSTALLATION MANUAL for tips on improving the settling capability of MICROCUT.

Answer the question:

If **YES** is pressed **MICROCUT** will drive the backgauge to the full rear of the table at the end of each job sequence.

SIDE LOADING?
YES OR NO

IF you answered **YES** above, do you want **MICROCUT** to automatically move to the first cut after side loading is done (**PADDLE SENSE SWITCH REQUIRED**)?

AUTO ADVANCE
AFTER SIDE LOAD?

Press **YES** to have the backlighting for the prompt display **ON**. Press **NO** to turn it off.

PROMPT DISPLAY
BACKLIGHTING? Y, N

MICROCUT now knows what type of machine it has been installed on and is ready to use.

TURN POWER OFF
RESTART

TURN THE POWER OFF AND BACK ON. The display will read PRESS AUTOMATIC TO START. You are ready to operate MICROCUT.

ADDENDUM TO SETTING UP MICROCUT

1. Make sure all power is OFF to **MICROCUT**. Make sure that the backgauge is in the middle of the table.
 2. Supply the 110 VAC power to **MICROCUT**. Use the ON/OFF switch to power ON the display.
 3. If the display says PRESS AUTOMATIC TO START, DON'T press the **AUTOMATIC** key, but instead press and hold any **NUMBER** key and then press the **PROGRAM** key. Release both keys, and this will take you into the SETUP ROUTINE.
-

The first 24 lights in the base console should be on. If not stop here and see DIAGNOSTIC LIGHTS in the SERVICE MANUAL. If all lights are on press the YES key.

**MICROCUT
DIAGNOSTICS OK?**

The display will show:

The memory test is non destructive (the job memory won't be altered). Press **YES** or **NO** to this option.

**DO YOU WANT TO
TEST THE MEMORY?**

The display will show:

Press **YES** to save the job memory and skip the next prompt. Press **NO** to erase all of the job memory.

**DO YOU WANT TO
SAVE THE MEMORY?**

If **NO** was selected, press **YES** to erase all of the job memory. If **NO** is pressed the job memory will be saved.

**DO YOU WANT TO
ERASE THE JOBS?**

The display will then show:

Make sure the clamp and knife are both up and press the **YES** key.

**ARE CLAMP AND
KNIFE BOTH UP?**

The display will then show:

Make sure the backgauge is not tripping either limit switch. Press the **YES** key.

**IS THE BACKGAUGE
OFF THE LIMITS?**

The display will then show: Use the **FORWARD** and **REVERSE** keys to check for proper backgauge drive direction. Use the **YES** or **NO** key to tell **MICROCUT** if the motor direction is correct. **MICROCUT** will respond by telling you to invert the motor or the shaft encoder A and B lines (see SERVICE MANUAL) **OR BY GOING ON TO THE NEXT PROMPT.**

**USE DRIVE KEYS
IS DIRECTION OK?**

The display will show:

MICROCUT will move the backgauge to the rear of the table automatically. Please wait.

**CALIBRATING
PLEASE WAIT**

MANUALLY TURN THE HANDWHEEL SO THAT THE BACKGAUGE IS AT AN EXACT INCH VALUE.

**ENTER REAR
REFERENCE VALUE**

Use the **NUMBER** and **ENTER** keys to tell **MICROCUT** the current backgauge position. This is a reference value and should be as exact as possible. The **CM** key will change units to centimeters if this is a preferred measurement to use.

MICROCUT will move forward to the front of the table and stop. Please wait.

MOVING FORWARD
PLEASE WAIT

This is the same as when the rear value was entered. The backgauge must be at an exact value less than 10 inches. Use the **NUMBER** and **ENTER** keys to enter the reference position value.

ENTER FRONT
REFERENCE VALUE

Use the **NUMBER** and **ENTER** keys to tell **MICROCUT** how far forward the backgauge can move if the false paper clamp (sole plate) is attached to the bottom of the clamp. (SEE ***NOTE AT BOTTOM OF PAGE.**)

FPC WIDTH IS
0.000 INCHES

Use the **NUMBER** and **ENTER** keys to tell **MICROCUT** how far forward the backgauge can move if the false paper clamp is off. (SEE ***NOTE AT BOTTOM OF PAGE.**)

MINIMUM FRONT IS
0.000 INCHES

Use the **NUMBER** and **ENTER** keys to tell **MICROCUT** how far back the backgauge can be driven (before the mechanical stop).

MAXIMUM REAR IS
0.000 INCHES

Answer the question:
If there is no false clamp press either the **YES** or the **NO** key.

FALSE PAPER
CLAMP ON? Y, N

Press **YES** to show the thousandths in the display. Press **NO** to show just the the hundredths.

YES= SHOW .001'S
NO= SHOW JUST .01

NOTE: Even though the display may not show the .001's, MICROCUT will still position to the 001's in accuracy.

YES will show the the true position of the backgauge at all times. If the **NO** key is pressed, then **MICROCUT** will show the programmed value as current position as long as the CUT READY LIGHT is ON.

SHOW TRUE SIZE IF
CUT READY ON?

NOTE: If the backgauge is knocked behind the settling tolerances---see 2 steps further on---THE TRUE POSITION WILL THEN BE SHOWN UNTIL THE SETTLING TOLERANCES ARE SATISFIED AGAIN.

***NOTE: The false clamp is a metal plate which attaches to the bottom of the clamp for some paper cutters. It is removed to make very short cuts. This requires two different front travel limit values. If there is not a false clamp, then the two front travel limit values will be the same.**

Press the YES key if you want MICROCUT to reposition the backgauge if it is knocked out of settling tolerance in AUTOMATIC MODE (see directly below).

SELF CORRECTION
IN AUTOMATIC?

Enter 1 to 9. The larger the number, the faster MICROCUT settles. Usually 2 or 3 is recommended. Poorly maintained machines may require larger values.

TOLERANCE IS
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NOTE: If the tolerance is set too small the CUT READY LIGHT will have a tendency to flicker on and off when MICROCUT reaches the stop position in AUTOMATIC MODE. This flickering will not damage MICROCUT but it does tend to be annoying to the operator. Refer to INSTALLATION NOTES in the INSTALLATION MANUAL for tips on improving the settling capability of MICROCUT.

Answer the question:

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SIDE LOADING?
YES OR NO

IF you answered **YES** above, do you want MICROCUT to automatically move to the first cut after side loading is done (PADDLE SENSE SWITCH REQUIRED)?

AUTO ADVANCE
AFTER SIDE LOAD?

Press **YES** to have the backlighting for the prompt display ON. Press **NO** to turn it off.

PROMPT DISPLAY
BACKLIGHTING? Y, N

MICROCUT now knows what type of machine it been installed on and is ready to use.

TURN POWER OFF
RESTART

TURN THE POWER OFF AND BACK ON. The display will read PRESS AUTOMATIC TO START. You are ready to operate MICROCUT.

IN-MM-CM COMPARISON TABLE

<u>INCHES</u>	<u>MM</u>	<u>CM</u>
5	127	12.7
10	254	25.4
15	381	38.1
20	508	50.8
25	635	63.5
30	762	76.2
35	889	88.9
40	1016	101.6
45	1143	114.3
50	1270	127.0
55	1397	139.7
60	1524	152.4
65	1651	165.1
70	1778	177.8
75	1905	190.5
80	2032	203.2
85	2159	215.9
90	2286	228.6
95	2413	241.3
100	2540	254.0
105	2667	266.7
110	2794	279.4

INCHES = CM/2.54 = MM/25.4

CM = MM/10 = 2.54 x INCHES

MM = 25.4 x INCHES = 10 x CM

USE OF ORIGINAL EQUIPMENT CONTROLS

MICROCUT uses its own drive motor. To insure that this does not conflict with the original equipment drive sometimes it is necessary to remove drive belts or fuses (for electric backgauge brakes) or add switches (to activate drive clutches). **ANY ALTERATIONS TO THE PAPER CUTTER TO ACCOMMODATE MICRO CUT INVOLVE THE BACKGAUGE DRIVE ONLY. NO ALTERATION TO ANY OTHER PART OF THE MACHINE IS ALLOWED.**

Follow the instructions written below by the installer to convert the machine back to its original equipment drive:

microcut II

service manual

Revision 498

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FOREWORD

MICROCUT is designed to be very easy to service and maintain. The spacer can be divided into two main systems--the motor drive and the computer. The motor drive has diagnostic lights (in the base console) which help simplify troubleshooting. Refer to the "DRIVE TROUBLESHOOTING" section for any related problems.

Problems in the computer can be subdivided into the following sections:

- A. Operational
- B. Counting
- C. Memory
- D. Miscellaneous

In general complications in the computer should be approached by turning the power off and back on to see if things straighten out automatically. If this occurs frequently (more than once a year, excluding thunder storms), MICROCUT should have its AC power supply checked. This should be a dedicated line with a 30 Amp breaker. A separate ground should be run as well (see INSTALLATION MANUAL--110 VAC IN). Connections on the display cable or electrical problems within the machine itself could also be at fault.

Refer to the TABLE OF CONTENTS for the appropriate page number in this manual for any problems you may have.

BASIC TROUBLESHOOTING

The MICRO CUT display console houses two printed circuit boards--the CPU board and the display board. There are two computers in the display console. One is for counting the pulses sent from the shaft encoder to keep track of backgauge position. The other handles the housekeeping work (keyboard, display, memory, math, drive, etc.). Both computers reside on the CPU board along with the 5 volt supply and the job memory (see NOTE). The display board consists of keys, displays (current position and prompting), various control IC's and the warning buzzer. In general, these parts are not user serviceable. The display console has been designed with a universal mount and a plug-in connecting cable so that it is very easy to remove and exchange. This would be the procedure for any serious problems in the computers.

There are, however, a number of problems that can be taken care of in regard to the computers. They fit into four basic categories:

1. Operational
2. Counting
3. Memory
4. Miscellaneous

There is overlap in these categories. To simplify the matter, the following pages contain titles of possible problems and steps to take if a problem does exist.

During thunderstorms or in the event of an electrical disturbance, it is possible for any computer to "lose track" of itself. If such a failure occurs, turning the power off and then back on should correct it. See the note in the FOREWORD of this manual.

NOTE: MICRO CUT uses non volatile memory for job data storage. There are no batteries. Memory will last indefinitely. Every time MICRO CUT manipulates memory, it double checks all alterations. The 5 VDC supply is self-adjusting. No maintenance of any sort is necessary in the display console.

1. MICROCUT WILL NOT SWITCH ON:

- a. The power switch on the display console has not been toggled.
- b. The base console door is open and the door interlock switch has not been defeated (units before 1987 only have this interlock switch--later units need not be concerned with this).
- c. The wall circuit breaker has been turned off or is tripped.
- d. The cable between the base console and the display is disconnected or poorly connected.
- e. Refer to the section "DIAGNOSTIC LIGHTS" in this manual.

2. MICROCUT DEFAULTS INTO SET-UP ROUTINE.

- a. The power is being disconnected and reconnected at the 110 VAC source. Use the switch supplied on the back of the display console only (see OPERATOR'S MANUAL--TURNING POWER ON TO MICROCUT).
- b. The 110 VAC line into MICROCUT is inadequate. Check the ground and verify that the circuit is dedicated and capable of supplying 30 amps (see the INSTALLATION MANUAL--110 VAC IN).

3. NO BACKGAUGE DRIVE.

- a. The motor belt or pulley is loose.
- b. There is a mechanical bind preventing drive.
- c. A fuse is blown. Check the fuses and replace if necessary.
- d. The motor speed adjusting potentiometers are set too low to overcome the backgauge drive resistance. Check these adjusting potentiometers in the center area of the base console and turn them more towards 100%. See ADJUSTING MOTOR SPEEDS in this manual.
- e. There is a bad FET on the power board in the base console. Check for diagnostic light #19 when MICROCUT is in the SET-UP ROUTINE **AND** the prompt reads DIAGNOSTICS OK? BOARD REV C--use a soldering iron to lift the center leg of one FET (there are 3 FETs labeled on the power board in the base console) at a time. Turn the power back on and check for drive. When drive is obtained solder previously removed FETs in one at a time and recheck drive capability. Leave any FETs that disable drive out. Schedule service for final repairs. If two FETs are removed and there is still no drive, replace one of the removed FETs and unsolder the last one. Then check for drive. BOARD REV E--the same procedure as REV C but remove each of the fuses (1,2,3) instead of unsoldering the FETs. **REFER TO THE NEXT PARAGRAPH.**
- e. The motor brushes are bad. Examine them for wear. Carefully clean the motor to remove all built up carbon dust.

4. FET(s) CONTINUE TO FAIL.

- a. The motor pulley ratio is wrong. The motor pulley ratio should be about 4 motor turns per 1" of backgauge drive. If the ratio is less, the backgauge resistance will drag the motor speed down. This will cause the system to use excessive current, especially during starts. **REFER TO THE "NOTES" SECTION OF THE INSTALLATION MANUAL FOR FURTHER CLARIFICATION.**
- b. The 110 VAC line is inadequate. Check 110 VAC line carefully. Refer to the INSTALLATION MANUAL--110 VAC IN.
- c. There is a bad connection to the display console. Check The cable. Replace if necessary.

5. KEY(S) FAILS TO RESPOND:

Refer to the prompting display and key lights to make sure the key failure is not due to the operational approach. For instance:

- a. No keys respond - prompt reads PRESS AUTOMATIC TO START or MICRO CUT is in the AUTOMATIC MODE.
- b. The **MOVE** key does not respond - there is no number in the prompt to move to.
- c. The **AUTOMATIC** key does not respond - MICRO CUT is already in the AUTOMATIC MODE or there is no JOB# in the prompting display.

There are other possibilities as well--for instance if MICRO CUT is waiting for a reply to a question.

6. UNIT IS OFF CALIBRATION BY ONE SHAFT ENCODER REVOLUTION.

- a. Zero set timing is off. Loosen the shaft encoder chain and rotate the shaft encoder gear 1/3 turn. Retension and go through the SET-UP ROUTINE to recalibrate (see OPERATOR'S MANUAL).

7. MICRO CUT IS OUT OF CALIBRATION:

- a. Check the dimension units (INCH or CM).
- b. Refer to the OPERATOR'S MANUAL--MODIFICATIONS.

8. MICRO CUT DOES NOT COUNT ONE FOR ONE WITH THE TABLE:

- a. The wrong units are selected. Check the **IN** and **CM** keys.
- b. The reference values used in the SET-UP ROUTINE (see OPERATOR'S MANUAL--SET-UP ROUTINE) were not exact.
- c. The shaft encoder or the leadscrew sprocket is loose. Check for tightness. Mark the sprockets at a mechanical reference point and run the backgauge back and forth. Check the markings at the same reference point for alignment.
- d. Failed shaft encoder - replace.

9. IMPROPER OR ERRATIC COUNTING (BACKGAUGE POSITION).

- a. The shaft encoder cable has failed. Check the cable for bad solder joints. Replace if necessary.
- b. There is a connection problem. Check the wires going into the SHAFT ENCODER TERMINAL BLOCK in the base console.
- c. The display cable is not making a good connection. Check the connections or replace the cable.

NOTE: Cable connections can fail due to contamination. Keep the cable ends away from dirt and oil (etc.) when they are not connected. Sometimes a connection problem here can be cured just by removing the connector and putting it back on. The sliding action of the pins can help self clean them. It is a good idea to insert and remove the cables a few times at the time of installation. Refer to the section titled MAINTENANCE in this manual.

10. MICROCUT TENDS TO SUFFER COUNT FAILURES.

- a. The backgauge speed is set too high. Note that this maximum speed depends upon the shaft encoder gearing. If the shaft encoder turns twice per inch, the maximum speed is 16"/second. If the shaft encoder turns four times per inch the maximum speed is 8"/second. Adjust as necessary.
- b. MICRO CUT has an inadequate 110 VAC supply. A poor 110 VAC line forces MICRO CUT to compensate more and more in it's count protection software and slows down the maximum counting speed which it can handle before defaults occur.
- c. Connection problem. See previous paragraph (9).
- d. The shaft encoder is failing. This can cause a degradation of the A and B signals (see the SHAFT ENCODER section of this manual) which can cause subsequent count detection errors. Replace the shaft encoder.

11. OPERATING MODE KEY(S) DO NOT LIGHT UP:

- a. The mode has not been selected; try again.
- b. There is a burned out bulb -- replace as necessary.

12. THERE IS GARBAGE IN THE MEMORY.

- a. The memory was not erased at the time of installation. Enter the SETUP ROUTINE and erase the job memory (see the OPERATOR'S MANUAL--SET-UP ROUTINE).

13. OUT OF MEMORY.

- a. Memory was not erased at the time of installation. Enter the SETUP ROUTINE and erase all of the job memory (see the OPERATOR'S MANUAL).
- b. All of the job memory space has been used. Delete unused jobs as desired or enter the SET-UP ROUTINE and erase all of the job memory (see the OPERATOR'S MANUAL).

14. CUT READY LIGHT FLICKERS ON AND OFF

- a. The settling tolerances are set at too small a value. Refer to OPERATOR'S MANUAL--MODIFICATIONS.
- b. There is a connection problem at the CUT READY socket on the display board or the light is burned out.

15. CUT IS NOT RECOGNIZED.

- a. The cut sensing switch is out of adjustment. Check LED 28 for cyclical operation. Adjust the switch as necessary. This switch can be located by following the cut switch wires out of the base console. Refer to the INSTALLATION MANUAL--WIRING THE SWITCHES AND MOTOR for the location of these wires. Also see the INSTALLATION MANUAL--CUT SWITCH.

16. BACKGAUGE DRIVES INTO THE FALSE CLAMP WITHOUT STOPPING:

- a. The false clamp option is incorrect. See the OPERATOR'S MANUAL--MODIFICATIONS.

NOTE: The key caps pry off. Bulbs can be replaced from the front side without disassembly of the display console. It is recommended that power be turned off. Double wide keys may have only one bulb burned out. A cut off applicator tip from a tube of silicone seal works well to remove the lights. Needle nose pliers work also but tend to break the glass.

17. AUTO ADVANCE DOES NOT OPERATE AFTER SIDE LOAD:

- a. Auto advance was not selected. If so the **MOVE** key will advance the backgauge. See the OPERATOR'S MANUAL--MODIFICATIONS.
- b. The paddle switch was not activated. Refer to light #29 in the "DIAGNOSTIC LIGHTS" section. NOTE: for auto advance to work, a paddle switch **MUST** be installed.

DRIVE TROUBLESHOOTING

MICROCUT has several safety and internal checks which can negate backgauge drive. Three of these are centered with the computer, the rest are in the drive system itself. Check the computer symptoms before opening the base console door (which will interrupt power to MICROCUT and turn it off.)

The computer safety overrides are:

1. Master Reset - If the displays come on properly at power up, then master reset is fine. Failure would imply a problem in the computer or base console power supply. Refer to the DIAGNOSTIC LIGHTS section. Diagnostic light #18 will be unlit.
2. Count OK - MICROCUT'S intelligent counting system checks for an out-of-tolerance condition every time the shaft encoder passes its internal zero set (the shaft encoder is the device attached to the leadscrew which puts out rotational counting pulses and enables MICROCUT to sense backgauge position). If an out-of-tolerance condition exists, MICROCUT will immediately disable the drive system. If this happens, the current position display will be blank and the prompt display will read ERROR--CORRECT POSITION UNKNOWN. Diagnostic #18 will be unlit. If counting failures persist, refer to the BASIC TROUBLESHOOTING and the SHAFT ENCODER sections of this manual.
3. Motor On/Off Command - This should operate only when commanded. If operating properly, diagnostic #25 will light for motor drive.

All other motor drive problems would center around the base console mounted on the side or back of the cutter. Refer to the following section for these.

DIAGNOSTIC LIGHTS

NOTE: Diagnostic lights are no more reliable than the solid state circuitry which they monitor. Before making absolute decisions, a voltage reading should be taken to make sure the failure isn't in the light itself. The lights are supplied for convenience only and do a remarkably good job when used properly. A light's failure mode is for it to be unlit. Therefore, all checks require a lit condition.

A door safety interlock automatically shuts off power to MICROCUT when the base console door is swung open (units before 1987 only). If AC power is still supplied to the box, only diagnostic #1 will be lit. To defeat the interlock, pull straight out on the plunger until it snaps into position. Now (assuming the ON/OFF switch on the display console is off) only diagnostics #1 through 4 should come on.

In order to troubleshoot the system it will be necessary to enter the SET-UP ROUTINE (refer to the SET-UP ROUTINE section in the OPERATOR'S MANUAL). When troubleshooting is complete, turn power off to exit the SET-UP ROUTINE.

All of the first 24 diagnostic lights should be lit. Approach them in order. The first unlit light will diagnose the problem directly. If all lights are lit and drive is still not operating, refer to Diagnostic #25 and 26 (motor ON/OFF command).

LIST OF DIAGNOSTIC LIGHT FUNCTIONS BY REFERENCE NUMBER:

1. Measures AC power into MICROCUT. If unlit, check the wall circuit breaker responsible for delivering power to MICROCUT.
2. Measures AC power through the door interlock. Check to make sure the interlock switch is defeated (see above).
3. Measures the AC power through the 12 VDC power supply fuse. If unlit, replace the fuse with a 3 amp equivalent.
4. Measures the 12 VDC supply. If unlit, this represents a failure in the transformer or full wave bridge on the PC board. Replacement of the base console is recommended.
5. Measures AC power through the ON/OFF relay contactor. Visually inspect the uppermost relay to make sure it is pulled in. If not, check the connections to the display console. If so, replace the contactor.
6. Measures AC power through the motor drive fuse. If unlit, replace the fuse with a 30 amp equivalent.
7. Measures power out of the motor drive full wave bridge attached to the heatsink. If unlit, replace the full wave bridge.
8. Measures 12 VDC power through the ON/OFF contactor. Assuming diagnostic #5 was on, the contactor is pulled in. Therefore it will be necessary to clean the contact points or replace it entirely. This contactor is in the upper left corner of the power board.
9. Measures the power from the on board 5 VDC supply mounted to the backside of the heatsink. Failure could be due to a short in the shaft encoder, although this would be very rare. Replacement of the device or the full base console is recommended.
10. Measures power back from the rear limit switch. Check the switch for proper position (backgauge forward of switch). **TURN POWER OFF AT THE WALL BREAKER** and check for loose wires.

11. Measures power back from the front limit switch. Check the switch for proper position (backgauge to the rear of the switch). **TURN POWER OFF AT THE WALL BREAKER** and check for loose wires.
12. Measures power back from the clamp up switch. Check to make sure the switch is being mechanically tripped. **TURN THE POWER OFF AT THE WALL BREAKER** and check for loose wires.
13. Measures torque enable signal from motor drive supply control circuit. Check to make sure the power pots for slow and high speed are **NOT** set to 0. (See **ADJUSTING MOTOR SPEEDS SECTION**). If failed, replacement of the base console is recommended.
14. Measures motor drive supply enable signal. Failure indicates a problem with U8. Replace this chip or the base console.
15. Measures the CPU speed command. This should be on for high speed, off for slow. Entrance to the **SET-UP ROUTINE (DIAGNOSTICS OK?** prompt) automatically sets up for high speed. Check for a bad connection between the base console and display. Replacement of the display console or the cable may be necessary. Voltmeter verification of the speed signal can be obtained (signal - 0 volts for fast, 5 volts for slow).
16. Processed speed command. If 15 was on and 16 is not, replace the 7404 IC in the base console.
17. Measures the motor power supply. Failure here indicates a bad heatsink triac (2N5445), or a bad opto triac (MOC3010). Replacement of the base console is recommended. Verify this light by measuring for between 60 and 90 VDC between the top of the 2N5445 triac and the black line going out to the shaft encoder (bottom terminal strip - system ground).
18. Measures the CPU drive system enable line (master reset). If cycling the power on and off does not cure this replacement of the display console or cable may be necessary.
19. Measures the motor power/brake relay coil. A non-lit condition here probably indicates a blown FET. Refer to the **BASIC TROUBLESHOOTING** section of this manual. A welded shut FET bypass relay can also cause this problem.
20. *Measures power through contacts of the power/brake relay. Clean the contacts or replace the relay.
21. .*Measures power through contacts of the direction relay. Clean the contacts or replace.
22. Measures power through the motor. **NOTE:** the motor is turned on by switching in ground. There should be power at both sides of the motor when it is not being asked to operate. Turn off the power **AT THE WALL BREAKER**. Check for loose wires or worn motor brushes. Voltage checks to and from the motor can be made by measuring from the black line going to the shaft encoder (ground) to either motor wire. Voltage (in high speed) should be between 60 and 130 VDC (motor off).
23. *Measures power through contacts of the direction relay. Clean the contacts of the relay or replace.
24. *Measures power through contacts of the power/brake relay. Clean the relay contacts or replace.

NOTE: If the backgauge drives back but not forward (or vice versa), clean the direction relay contacts or replace the relay.

***These relays are switched dry and should not fail this way. If problems persist, replace the console.**

END OF ALL LIGHT CHECK

ADDITIONAL DIAGNOSTIC LIGHTS

25. CPU motor on/off signal. Should go on for motor on, off otherwise. Failure to go on represents a connection problem to the display or a display console failure. The signal should be 0 volts for motor ON and 5 volts for motor OFF.
26. Processed motor on/off command. Should go on for motor on, off otherwise. Check the base console.
27. Direction relay coil. Should go on for forward, off for reverse. Signal voltage should be-- Reverse=0 VDC, forward=5 VDC.
28. Cut switch. Should be off normally (knife up). This diagnostic should cycle on during the knife stroke and not turn off until after the knife starts its upward (return) stroke (see the NOTE in the INSTALLATION MANUAL under "CUT SWITCH"). Check the switch adjustment to make sure the knife linkage (or cam depending upon the installation) is tripping it properly. If so, **TURN OFF THE POWER AT THE WALL CIRCUIT BREAKER** and check for loose wires. The switch should conduct current during the knife stroke only. If light 28 will not go out remove the wires to the CUT SENSING switch at terminals 7 and 8 of the ten pin terminal strip in the base console. If 28 stays on then there is a problem in the display console. Otherwise the error is at the switch.
29. Paddle switch--side loading only. If the paddle switch is installed, the paddle is clear of the cutter, and 29 is off, check the switch trip arm and adjust the switch if necessary. **TURN POWER OFF AT THE WALL BREAKER** and check for loose wires.
30. A quadrature signal from the shaft encoder. This should go on and off independently of light 31 (stairstepping behavior) as the shaft encoder is turned very slowly. If not, replace the shaft encoder. See SHAFT ENCODER in this manual.
31. A quadrature signal from the shaft encoder. This should go on and off independently of light 30 (stairstepping behavior) as the shaft encoder is turned very slowly. If not, replace the shaft encoder. See SHAFT ENCODER in this manual.
32. Shaft encoder zero set. The light will go low at the zero set and remain low for a VERY BRIEF arc of the shaft encoder revolution thereafter. See SHAFT ENCODER in this manual.

PROMPT ERROR MESSAGE LIST

MICROCUT has several prompts to tell the operator of existing or pending error conditions. The following list is a synopsis of these codes. Refer to other sections of the SERVICE MANUAL for additional information.

CANNOT BE ZERO

The fraction when using the calculator keys cannot have zero in the denominator.

CHECK DIAGNOSTICS

MICROCUT has sensed an error which may be easier to evaluate by inspecting the DIAGNOSTIC lights in the base console. Turn the power off to MICROCUT. Open the base console door and pull out on the door interlock (units before 1987 only). Turn the power back on and enter the SET-UP ROUTINE--see the OPERATOR'S MANUAL. Also refer to the prompt **DIAGNOSTICS OK?**

CLAMP DOWN

The clamp sensing switch is not tripped properly. This may be due to a mechanical problem with the clamp or the switch or there may be a connection problem between the switch and MICROCUT.

CLAMP SWITCH HAS A WIRING PROBLEM

MICROCUT senses that the clamp is down when it is supposed to be up. Check the wires for continuity through the switch (see the INSTALLATION MANUAL).

COUNTING SYSTEM ERROR--RESTART

MICROCUT's intelligent counting system has detected an out of range error condition and can not correct itself back to within limits. The backgauge drive is disabled and the buzzer will go on and off. Refer to other sections in this manual--BASIC TROUBLESHOOTING and THE SHAFT ENCODER.

CUT STROKE EARLY

MICROCUT is not in position for the knife stroke but it senses that the knife is being operated. Bring the knife back up to the top of its stroke and allow MICROCUT to position the backgauge correctly. See the prompt **OUT OF POSITION**.

CUT SWITCH HAS A WIRING PROBLEM

MICROCUT senses that the knife is down when it is supposed to be up. Check the wires for proper connection (see the INSTALLATION MANUAL).

DIAGNOSTICS OK?

MICROCUT wants you to check the first 24 diagnostic lights in the base console to make sure everything is operating properly. Refer to the section DIAGNOSTIC LIGHTS in this manual.

DRIVE OVERHEATED WAIT FOR COOLING

The backgauge drive circuitry has been run hard enough to heat past 80% of its rated capability. MICROCUT will not allow additional drive until the components cool down adequately. See the prompt **OIL LEADSCREW OR REDUCE SPEED**.

ERROR--CORRECT POSITION UNKNOWN

MICROCUT has lost the ability to know where the backgauge is accurately. It will be necessary to turn the power off and start again. Refer to other sections of this manual--BASIC TROUBLESHOOTING and THE SHAFT ENCODER.

FAST DRIVE PROB.

MICROCUT has not detected any motion during a period of time when the backgauge should have been moving. This may be due to either a drive or a counting error. If the backgauge moves a bit and then stops, MICROCUT is not seeing the motion and has a counting problem. If no motion occurs then MICROCUT is suffering from a drive error. Refer to other sections of this manual--BASIC TROUBLESHOOTING and THE SHAFT ENCODER.

FRONT LIMIT ERROR

MICROCUT has sensed that the front limit has tripped even though it should not have. Check the switch carefully.

FRONT LIMIT HAS A WIRING PROBLEM

MICROCUT senses that the front limit is tripped when it is not supposed to be. Check the wires for proper connection (see the INSTALLATION MANUAL).

INVERT CLEAR AND BLUE WIRES

The shaft encoder is counting in the wrong direction (SET-UP ROUTINE for new installations only). It will be necessary to invert the signal A and B wires from the encoder to continue. Refer to the SHAFT ENCODER (SERVICE and INSTALLATION MANUALS) and the WIRING and CABLES sections (INSTALLATION MANUAL) elsewhere in this documentation. **NOTE: On some cables these wires are white and yellow.**

INVERT MOTOR WIRES

The motor is driving in the wrong direction (SET-UP ROUTINE for new installations only). It will be necessary to invert the motor wires so that the motor can drive in the right direction before setting up MICROCUT to operate on its new machine.

JOB NOT FOUND

The old job that was manually selected is not in the job memory. Try a different job number or review all of the jobs.

JOB NUMBER USED

The new job that has been manually selected is already programmed. It will be necessary to choose a different number or erase this number before programming.

KNIFE DOWN

MICROCUT will display this prompt after a knife stroke is performed in either the PROGRAM or AUTOMATIC MODES of operation. The prompt will clear and operation will continue normally as soon as MICROCUT senses that the knife is no longer down.

LIMIT ERROR CHECK SWITCHES

MICROCUT has sensed that BOTH the front and rear limit switches are tripped at the same time. This should be an impossibility and needs to be checked out carefully.

MAKE ADJUSTMENTS TO CONTINUE

The **NO** key has been pressed in response to one of MICRO CUT's questions. Adjustments will need to be made (depending upon the question) before a routine can be continued (this prompt is used while checking switches in the SET-UP ROUTINE).

MEMORY FAILURE TURN POWER OFF

MICROCUT has sensed a failure in the job memory and will not let operation continue. Turn the power off. It is advisable to enter the SET-UP ROUTINE and test the memory. If the error is fairly high in the address range, it may be possible to erase some of the lower jobs and continue on. MICRO CUT may skip over the bad location after power is turned off but memory errors may occur if jobs are altered in the future. Schedule service on the memory chip as soon as possible.

MEMORY POSITIONS AVAILABLE:

MICROCUT is warning the operator that there are only so many memory positions left (at the entrance to programming a new job). If the job will require more than the shown number of cuts left, delete some of the older less used jobs before continuing.

NO MORE JOB #S

All of MICRO CUT's 255 auto select jobs have been used. It will be necessary to manually select a job number or erase one of the numbered jobs between 1 and 255.

NO MOTION SEEN

MICROCUT has not detected any motion during a period of time when the backgauge should have been moving. This may be due to either a drive or a counting error. If the backgauge moves a bit and then stops, MICRO CUT is not seeing the motion and has a counting problem. If no motion occurs then MICRO CUT is suffering from a drive error. Refer to this manual--BASIC TROUBLESHOOTING and THE SHAFT ENCODER.

NOT ENOUGH MEMORY

MICROCUT does not have enough unused job memory available to program the number of stops requested in either the STEP & REPEAT or DIVIDE SHEET routine.

NUMBER TOO BIG

The sum of numbers when using the calculator keys is larger than the maximum allowed value (maximum rear value usually, twice the maximum rear value in SHEET DIVIDE ROUTINE).

NUMBER TOO SMALL

The result of a subtraction is less than zero or the position to MOVE to is less than the physical table limit (see **TOO FAR FORWARD**).

OIL LEADSCREW OR REDUCE SPEED

The backgauge drive circuitry has been run hard enough to heat past 80% of its rated capability. MICRO CUT will not allow additional drive until the components cool down adequately. Perform maintenance on the cutter to avoid this problem again, or slow down the drive speed (see the OPERATOR'S MANUAL or SERVICE MANUAL). See the prompt **DRIVE OVERHEATED WAIT FOR COOLING**.

OUT OF MEMORY

All of the available job memory has been used. Note that while MICRO CUT has the option for 999 different job numbers, each job may take up several of the available memory locations. The memory space will be used up before all 999 jobs are programmed. Delete some of the unused or seldom used jobs to make room for the new ones.

OUT OF POSITION

MICRO CUT is not in position for the knife stroke but it senses that the knife is being operated. Bring the knife back up to the top of its stroke and allow MICRO CUT to position the backgauge correctly. See the prompt **CUT STROKE EARLY**.

OUT OF TOLERANCE

The duplicated memory in MICRO CUT does not match. Go through the SET-UP ROUTINE (OPERATOR'S MANUAL) to correct this. If the prompt comes up again there may be a failed memory chip in MICRO CUT. Test the memory in the SET-UP ROUTINE to see if this is the case.

PRESS ANY KEY TO STOP

This prompt appears only when MICRO CUT is starting up, and it is possible that someone (or something) is around the machine in such a way as to be endangered by the movement of MICRO CUT. ANY KEY WILL STOP MICRO CUT FROM MOVING THE BACKGAUGE.

REAR LIMIT ERROR

MICRO CUT has sensed that the rear limit has been tripped for much too long a distance moving forward. NOTE: This error will occur during calibration (when power is first turned on) if MICRO CUT has to move forward more than a few inches to get off of the rear limit switch. In some cases the rear limit may trip several inches before the rear of the table (although this is not the preferred manner of installation). If this is the case then turn the power off and restart normally. If this sense were not in MICRO CUT and an error (bad connection) occurred from the rear limit switch, MICRO CUT could run the backgauge into the front of the cutter. This check prevents that from happening if such a failure occurs.

REAR LIMIT HAS A WIRING PROBLEM

MICRO CUT senses that the rear limit switch is tripped when it is not supposed to be. Check the wires for proper connection (see the INSTALLATION MANUAL).

SLOW DRIVE PROB.

MICRO CUT has not detected any motion during a period of time when the backgauge should have been moving. This may be due to either a drive or a counting error. If the backgauge moves a bit and then stops, MICRO CUT is not seeing the motion and has a counting problem. If no motion occurs then MICRO CUT is suffering from a drive error. Refer to this manual--BASIC TROUBLESHOOTING and THE SHAFT ENCODER.

!!!TARGET LOST!!!

At least one of MICRO CUT's internal data backup registers does not agree with the others in regards to the position which MICRO CUT is supposed to drive to. MICRO CUT performs its operations in several areas at the same time in order to compare results--if electrical disturbances occur which prevent the results from being equal, MICRO CUT halts operation with this error prompt. This safety gives assurance that MICRO CUT will not make errors in positioning. If this message occurs often check the MICRO CUT power supply line very carefully. Refer to the INSTALLATION MANUAL--NOTES; HINTS; 110 VAC; or POWER SUPPLY.

THE SIDE LOADING THROAT IS JAMMED

The side loading throat is jammed. MICRO CUT will not allow drive until the obstruction is cleared.

TOO FAR BACK

The position that was requested is beyond the physical limits of the table. MICRO CUT limits the prompt display to realistic values as the number keys are pressed (if the resulting number is larger than the maximum rear it blanks the leading digit). However in the SHEET DIVIDE routine MICRO CUT allows values to twice the maximum rear in the event that a pre-sized sheet is to be cut in two with no backtrim. If the first cut value calculated in SHEET DIVIDE is larger than the maximum rear value this prompt will show. If a cut is made in the PROGRAM mode that is behind the maximum rear value (entered in the SET-UP ROUTINE) this error will appear.

TOO FAR FORWARD

The position that was requested is beyond the physical limits of the table. If the position is between the minimum front and the false paper clamp (false clamp ON in the MODIFICATION ROUTINE--OWNER'S MANUAL) MICRO CUT will continue with the prompt **FALSE CLAMP ON?** and wait for a **YES** or a **NO** response.

TURN POWER OFF RESTART!

Microcut has been told to stop or it has completed a routine which requires a full restart to recalibrate. Turn the power off, then back on and press the **AUTOMATIC** key to start.

ADJUSTING MOTOR SPEEDS

Open up the base console door. There are two potentiometers, one labeled for the high speed, one for slow. Adjusting these towards 100% will increase the speed each is labeled for. Adjustment towards 0% decreases the motor speed.

NOTE: Early units had four potentiometers. In this case, adjust the ones marked speed to 100%. Use the power potentiometers to control the backgauge velocity.

MAINTENANCE

MICROCUT has been designed to be virtually maintenance free. Memory is non-volatile requiring no battery backup. The power supplies are self adapting.

The 1/3 and 1/2 horse power motor brushes should be checked every 5000 hours of operation. The brushes in the 3/4 and 1 horse power motors should be checked every 1000 hours of operation (500 hours on very large or stiff tables) for wear. Replace as appropriate. Clean the motor of carbon dust as required.

CAUTION: Turn power off AT THE WALL BREAKER before checking the motor brushes.

Connections can cause problems in any electrical circuit. To avoid problems with connections, it is advised that once a year a "tune up" be performed:

1. Turn the power for MICROCUT off at the wall breaker.
2. Unplug the cable which connects the display console to the base console at both ends. Plug it in and out several times at each end to clean the connecting pins. Screw it back into the consoles at either end. Make sure that there is adequate strain relief so that the connector will not be damaged if the display console is pivoted on its mounting base.
3. Use a small screwdriver to check for tightness on all of the wire connections.
5. Unplug the connector on the shaft encoder and plug it back in several times.
6. Check all wiring for any nicks or cuts.
7. Pull out the relays in the base console and reinsert them several times to make sure that they are well connected to the power board.

Occasionally check all of the MICROCUT components (switches, motor, shaft encoder, display and base consoles) to make sure none of the mounts have loosened. Tighten as necessary.

DO NOT USE GREASE ON THE LEADSCREW MECHANISM. GREASE ATTRACTS ABRASIVE DIRT AND ACTS AS AN INCONSISTENT CUSHION AGAINST THE BACKGAUGE PREVENTING PROPER CUTTING PRECISION. USE A LIGHT MACHINE OIL ONLY ON THE LEADSCREW. OIL THE LEADSCREW DAILY.

MICROCUT JOB MEMORY WILL NOT BE ALTERED. ALL OF THE JOBS WHICH WERE PROGRAMMED BEFORE MAINTENANCE WILL STILL BE PROGRAMMED AFTERWARDS.

THE SHAFT ENCODER

The shaft encoder is attached to the leadscrew mechanism with a chain. It sends out two different signals as the leadscrew rotates so that the computer can measure backgauge movement. A zero set is internal to the shaft encoder as well to allow the computer to keep track of each complete revolution.

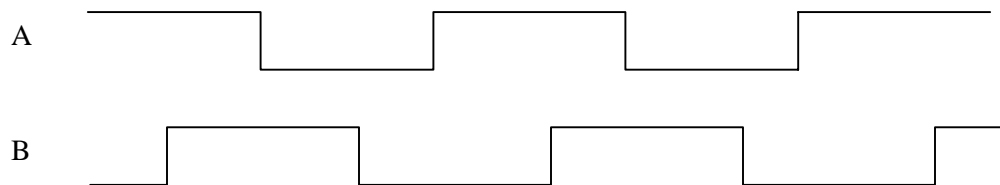
The **MICROCUT** shaft encoder is an incremental (quadrature) type. There are five lines attached at the shaft encoder:

		DISPLAY TERMINAL	CANNON CONNECTOR
Black	=	Ground (GND)	5
Red	=	5 VDC (5V)	4
Green	=	Zero Set (Z)	3
White or Clear	=	Signal (A)	2 or 1
Yellow or Blue	=	Signal (B)	1 or 2

NOTE: Terminal 6 is the cable shield and connects only at the base console.

The shaft encoder is a disc type optical interrupter with 500 windows separated by lines. The lines block light to a pair of phototransistors while the windows allow light through.

As the shaft encoder turns its signals look like this:



<u>Traveling:</u>	<u>Left to Right</u>	<u>Right to Left</u>
A goes low	B is high	B is low
A goes high	B is low	B is high
B goes low	A is low	A is high
B goes high	A is high	A is low

A brief inspection shows us that the direction of count can be reversed by interchanging the A and B signal lines. If these are wired backwards at the time of installation, **MICROCUT** will tell the installer (in the SET-UP ROUTINE) to invert the lines.

One of **MICROCUT**'s computers analyzes all signal transitions, and count direction is determined (forward or back) from the value (high or low) of the other signal line. An up and a down transition occur in both A and B per shaft encoder window yielding four counts per window. The 500 windows per revolution allow information to one two-thousandth of a revolution. At every zero set, the count is checked and corrected to +- 2000 or 0 counts from the last zero set. If the count is too far out of tolerance, the microprocessor will shut the backgauge drive off and signal the operator in the prompting display (ERROR--CORRECT POSITION UNKNOWN). Refer to the BASIC TROUBLESHOOTING and PROMPT ERROR MESSAGE LIST sections of this manual.