

Safety Warnings

Read and **heed** all “DANGER “ and “CAUTION” labels on the machine.

MOVING PARTS CAN CAUSE INJURIES! Keep hands and clothing clear of spindle and tooling plate at all times.

DO NOT OPERATE WITH DOOR or SPLASH SHIELD OPEN!

DO NOT OPEN DOOR DURING OPERATION!

DO NOT operate machine without guards, doors and covers in place.

DO NOT operated while under the influence of alcohol or drugs, including prescription drugs.

DO NOT wear loose clothing while operating machine.

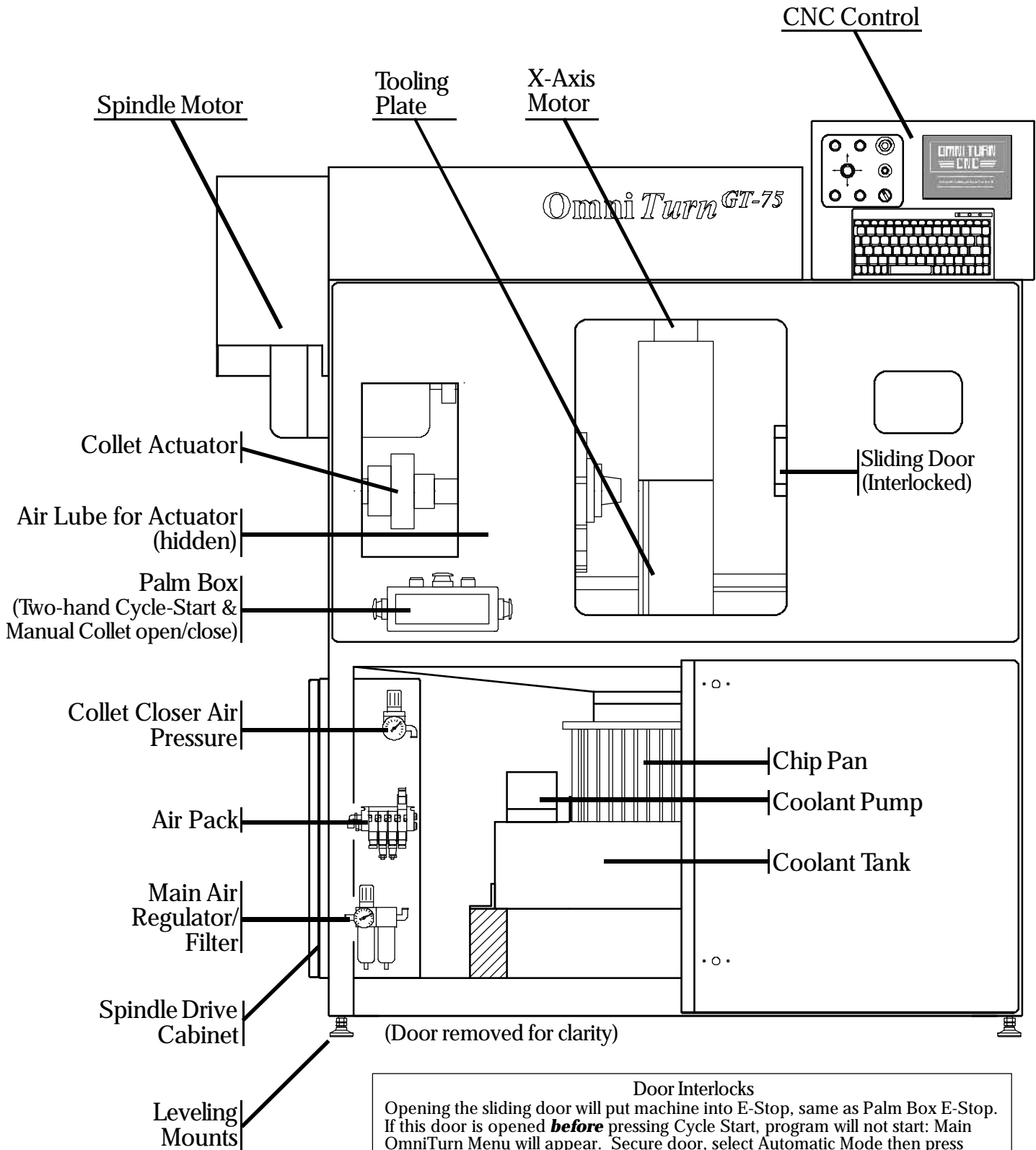
DO NOT wear jewelry (necklaces, bracelets, watches, rings) while operating machine.

Keep long hair tied up and out of the way.

Wear eye and face protection.

Report any malfunction to your supervisor.

OmniTurn GT-75 Major Components



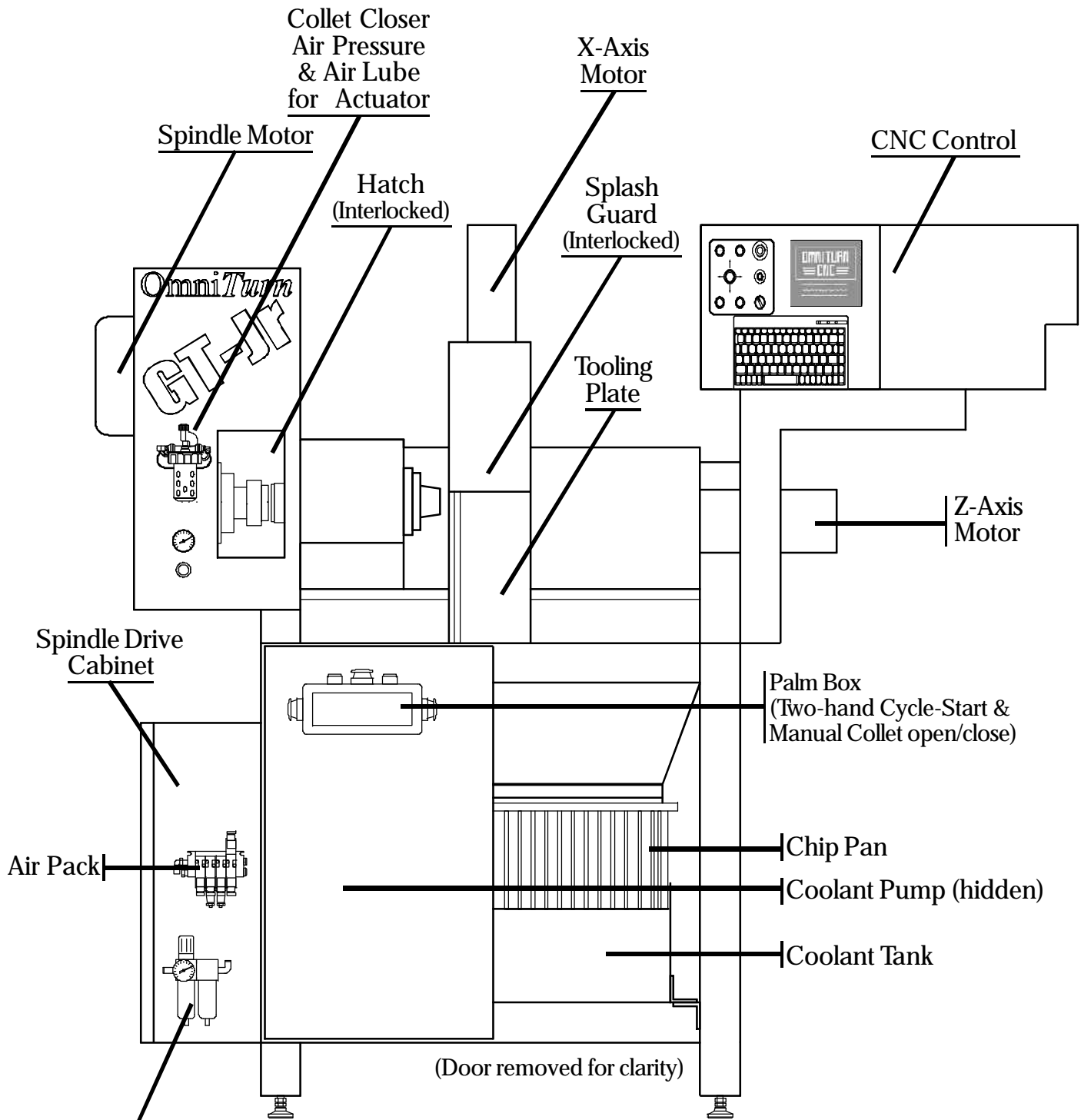
Door Interlocks

Opening the sliding door will put machine into E-Stop, same as Palm Box E-Stop. If this door is opened **before** pressing Cycle Start, program will not start: Main OmniTurn Menu will appear. Secure door, select Automatic Mode then press Cycle Start.

If door is opened **while** program is running, all motion will stop and Main OmniTurn Menu will appear. Secure door, select Jog Mode then send slide Home (H,Z,X) before re-starting program.

If door is opened during **threading cycle**, all motion will stop as above, but CNC Control must be shut off, then on to re-boot.

OmniTurn GT-Jr Major Components



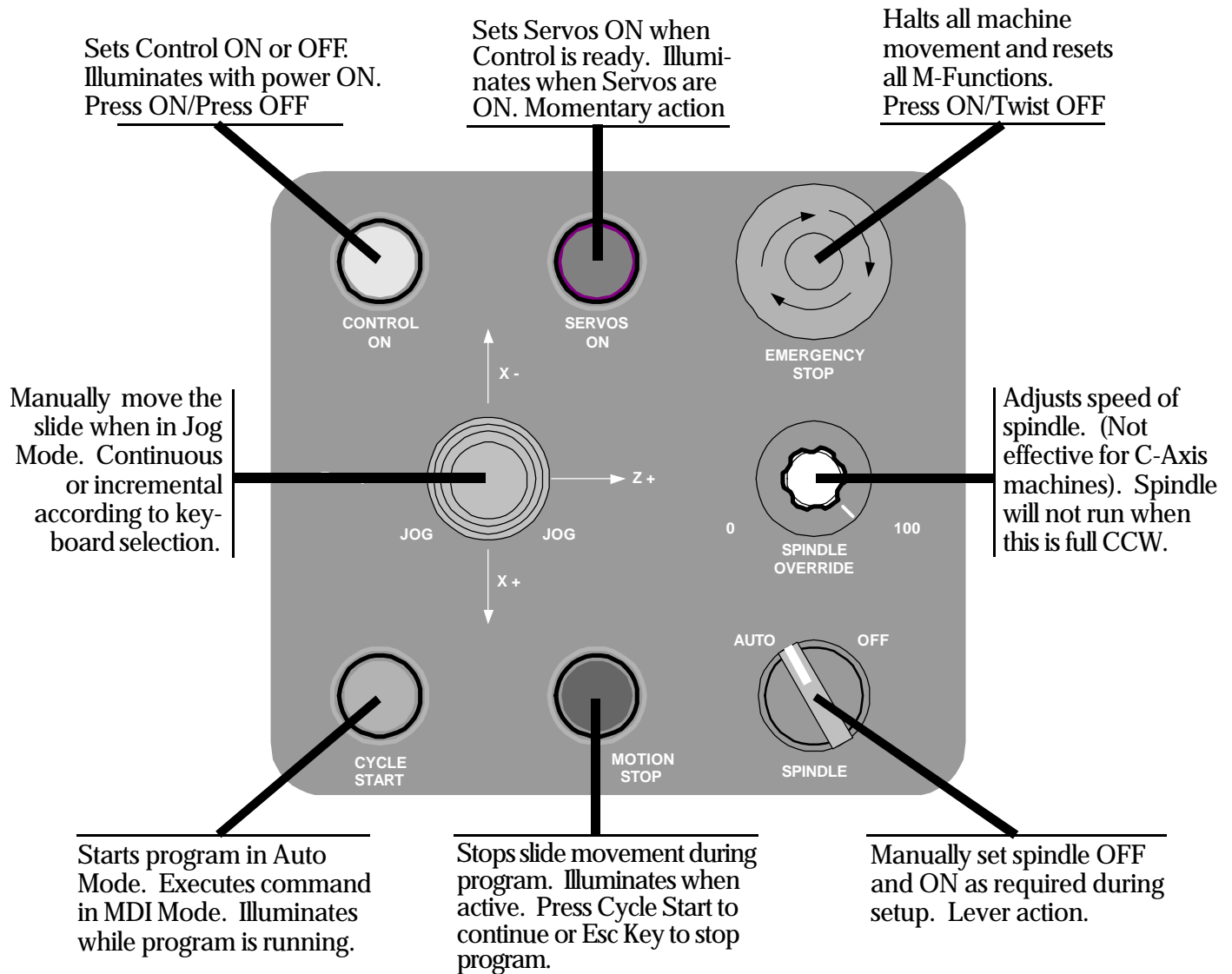
Door Interlocks

Lifting the splash guard or opening the hatch will put GT-Jr into E-Stop, same as Palm Box E-Stop. If these are opened **before** pressing Cycle Start, program will not start: Main OmniTurn Menu will appear. Secure hatch or splash guard, select Automatic Mode then press Cycle Start.

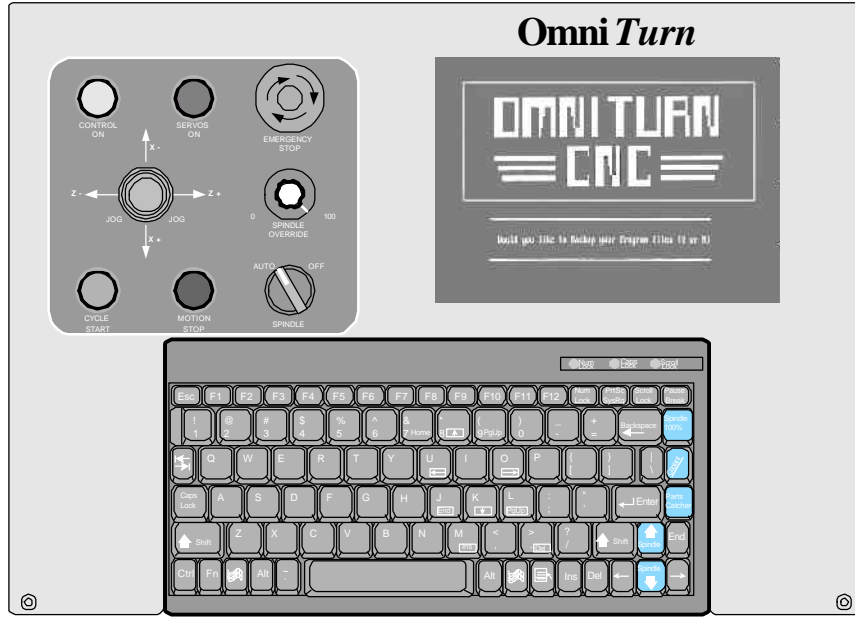
If guard or hatch is opened **while** program is running, all motion will stop and Main OmniTurn Menu will appear. Secure guard or hatch, select Jog Mode then send slide Home (H,Z,X) before re-starting program.

If guard or hatch is opened during **threading cycle**, all motion will stop as above, but CNC Control must be shut off, then on to re-boot.

OmniTurn Front Panel: Knobs & Switches

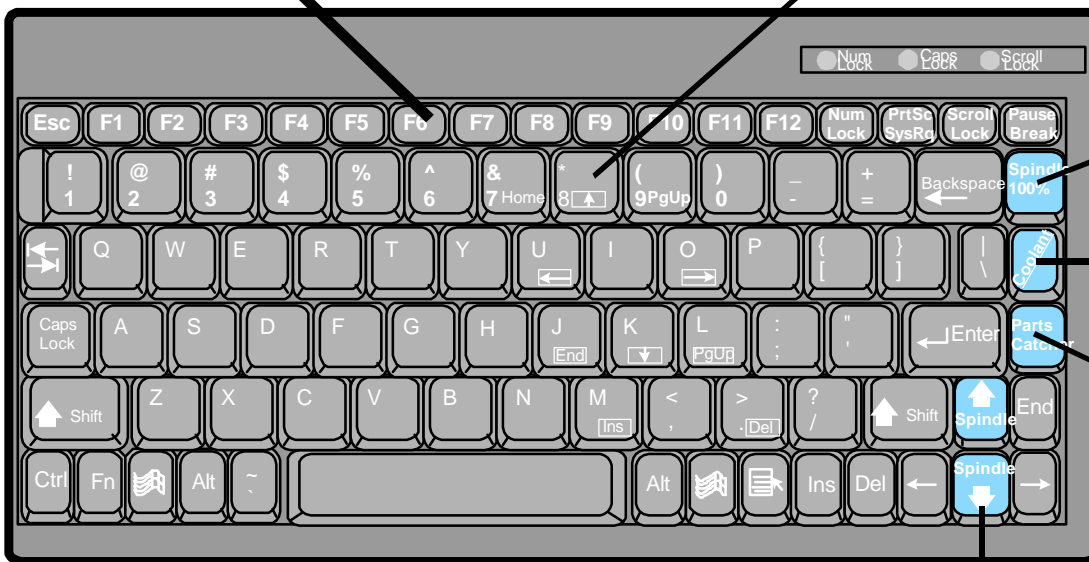


OmniTurn Front Panel: Keyboard



Function Keys set Feed Rate Override while running program. Special functions are described on page 5.3.

Number Keys set Jog speed and Jog increment in Jog Mode. Functions are described starting on page 1.9.



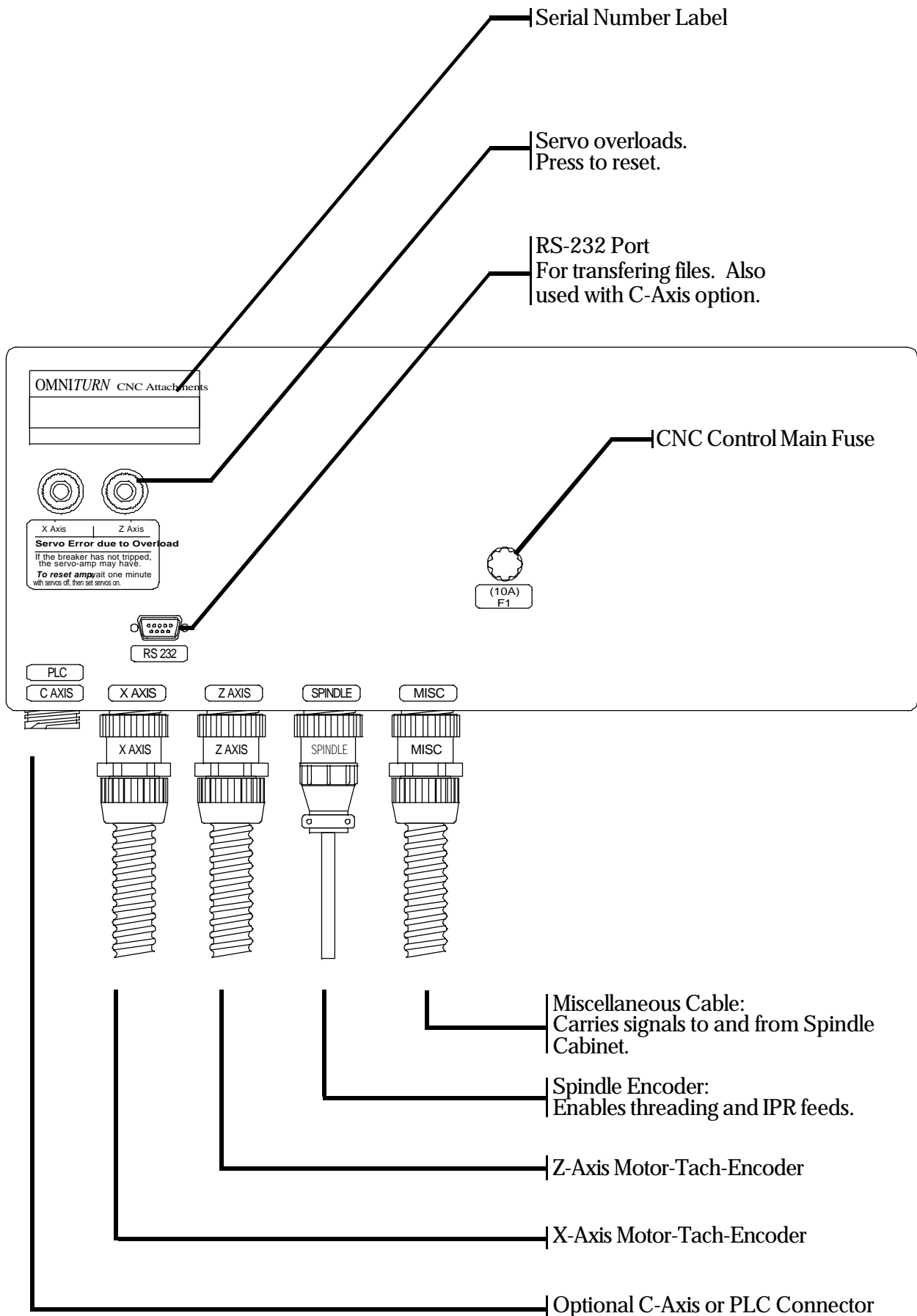
Set spindle speed to 100%. (PgUp)

Set coolant ON/OFF (PgDn)

Set M25/M26 or Parts Catcher out/in

Increase or Decrease spindle speed. Effective for C-Axis and standard spindles.

OmniTurn Rear Panel



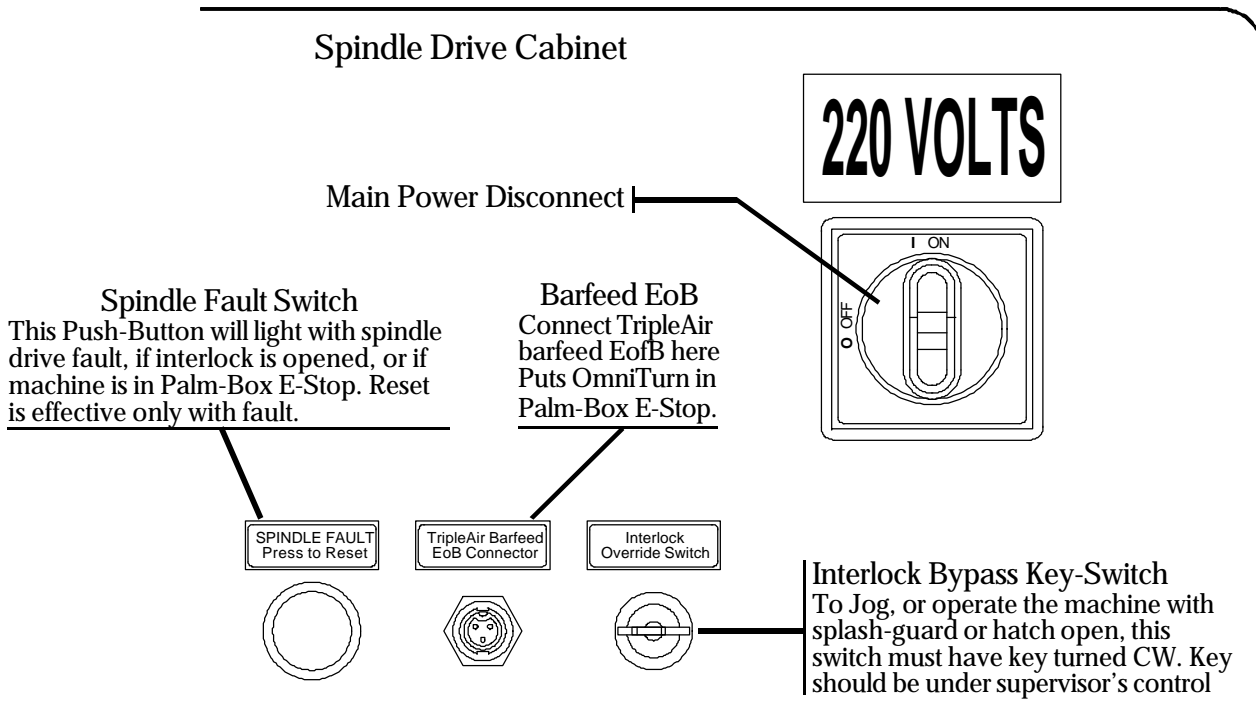
Start - Up: Apply Power

After the OmniTurn has been installed and all of the cables are connected set 220vac disconnect ON. The 220vac disconnect is located on the Spindle Drive Cabinet at left-hand side of the GT-75 or GT-Jr, as illustrated below.



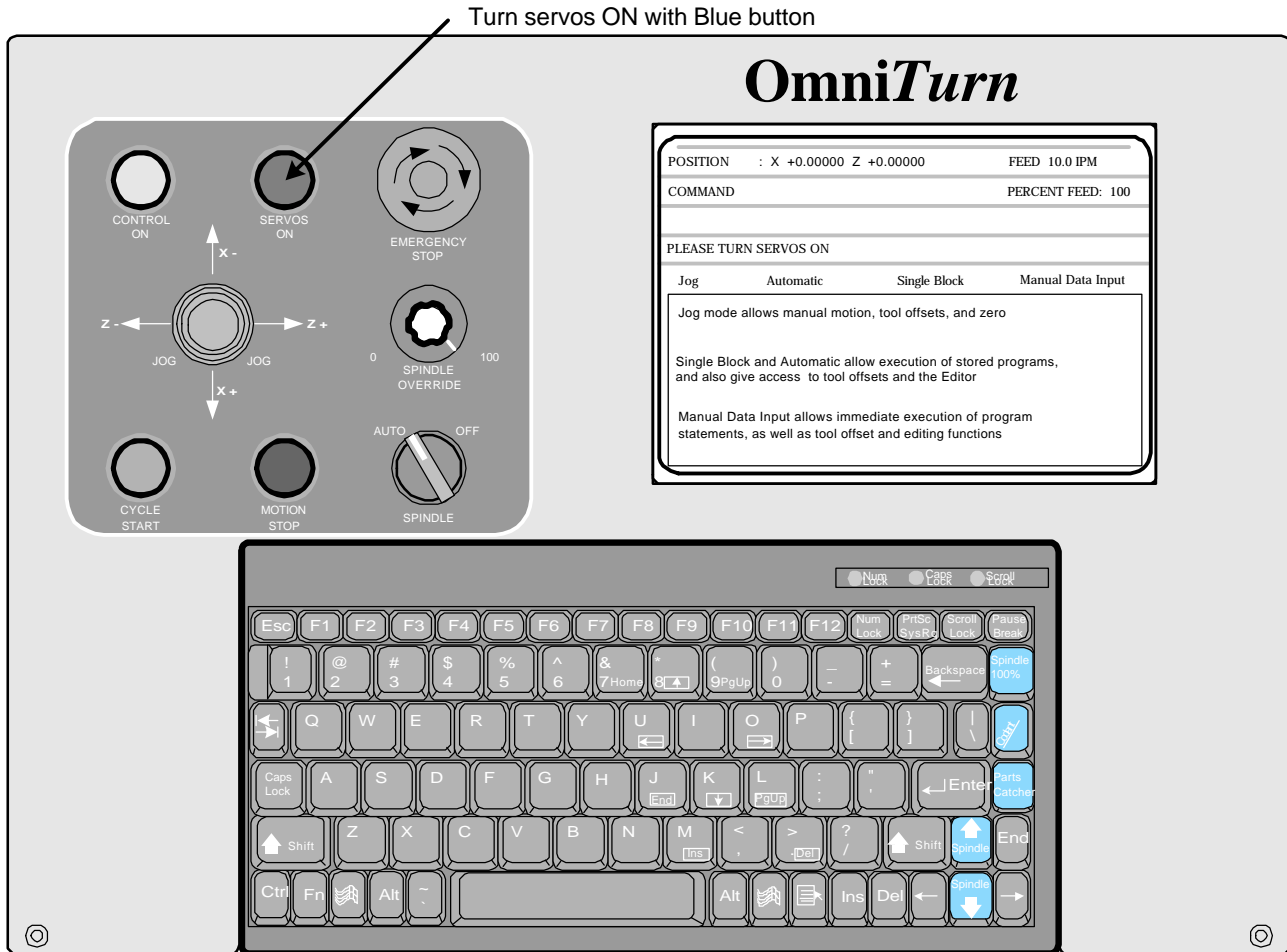
OmniTurn front panel Keyboard

After boot-up, the first screen you see will ask you to back-up your program files. Always select “Y” to backup. Only those programs which have been edited will be copied to the floppy disk at rear of machine



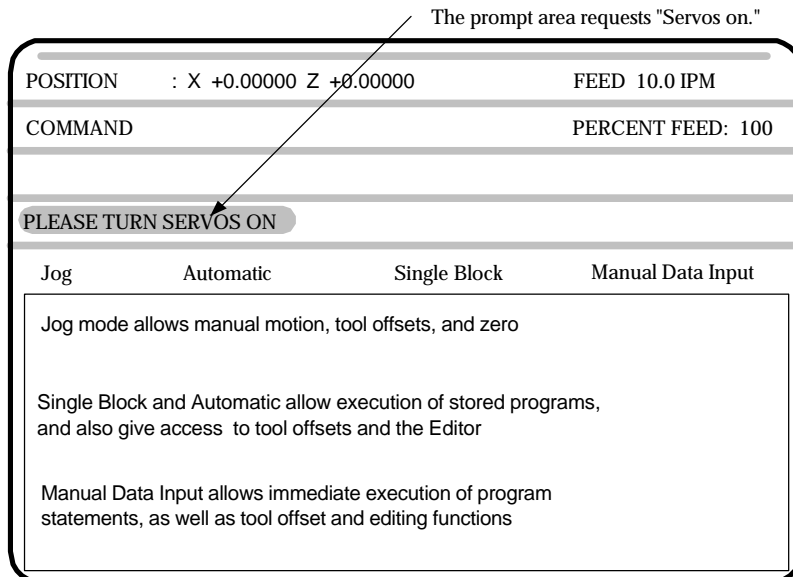
Start - Up: Turn on Servos

After the programs have been backed up you will be prompted to turn the servos on.

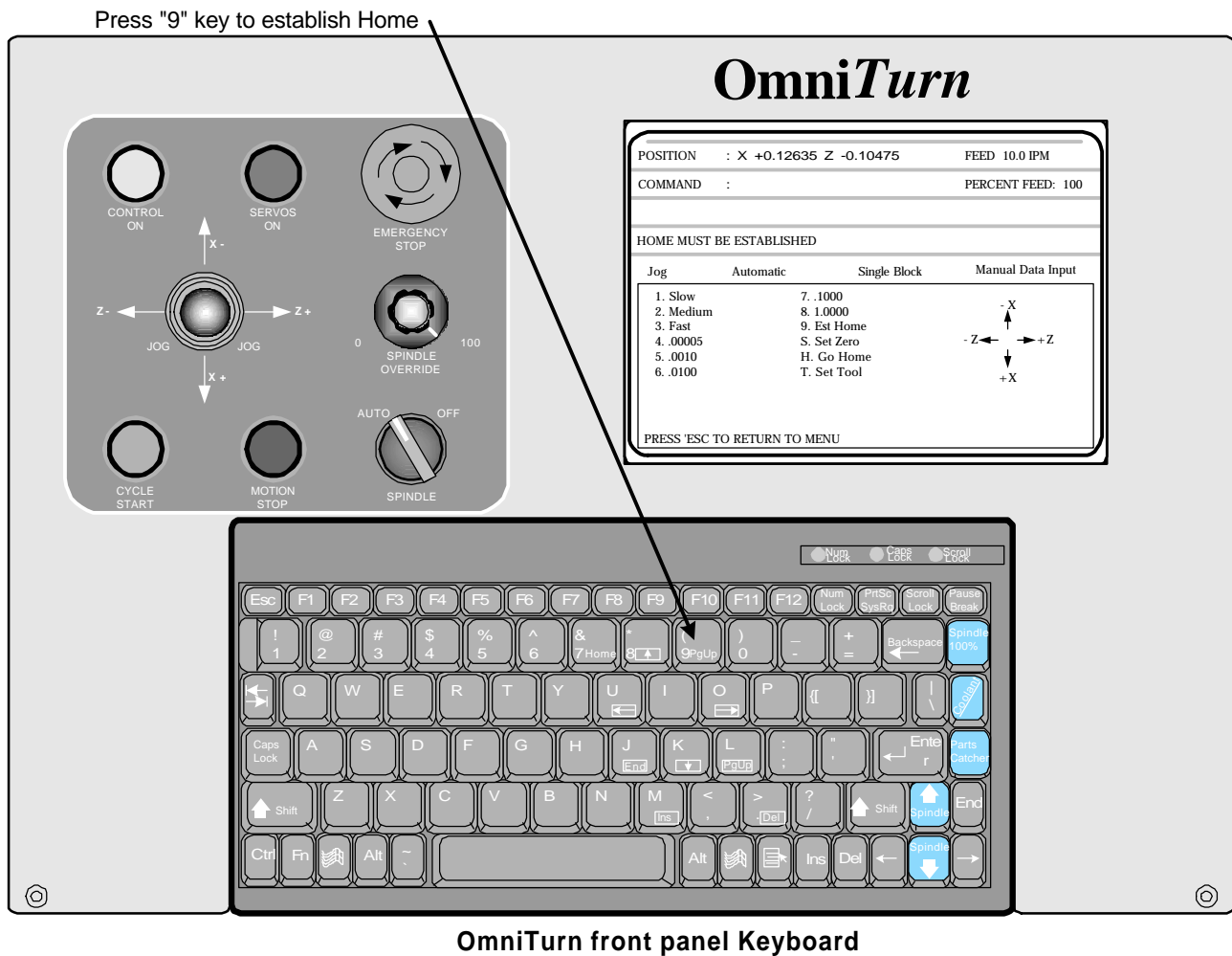


OmniTurn front panel Keyboard

Press the blue “Servos On” pushbutton. It should illuminate and you should hear a slight hum as the axes motors engage. This part of the screen is the prompt area, and different information will be presented here according to the current mode or page.



Start - Up: Establish Home



Establish “Home”

After the servos are turned on, the control automatically goes to the JOG mode. This is done so that machine “HOME” can be established. The control will not allow you to leave the JOG mode until the homing procedure has been completed.

Press “2” (Medium Jog) or “3” (Fast Jog) on the Keyboard, and use the Jog Stick to move slide to within 0.200” from Zero in X and Z as illustrated on the next page. Press “9” on the Keyboard, then press Cycle Start to start the homing procedure. The slide will move slowly in +Z, then in -X, seeking the home marks on the motor encoders. When homing is complete, X & Z position indicators will read 0.00000.

The following three pages describe the homing procedure in detail.

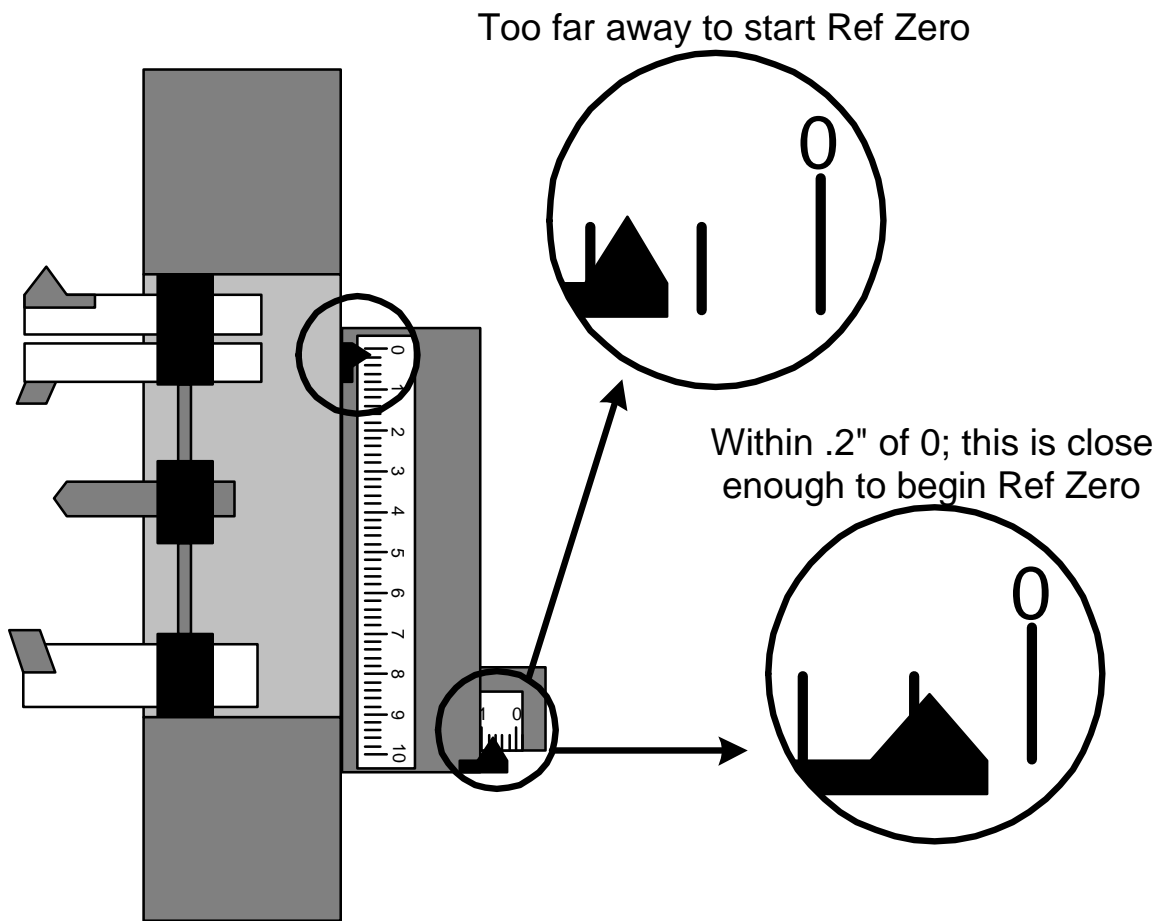
Power Down Procedure

It is a good practice, but not necessary, to press the E-Stop before turning the control off. To turn the control off, press the amber Control ON button. Then set the spindle drive disconnect to OFF.

Establish Home: Detail

Press “2” (Medium Jog) or “3” (Fast Jog) on the Keyboard, and use the Jog Stick to move slide to within 0.200” from Zero in X and Z as illustrated below. The X axis should be on the plus side of zero, and the Z axis should be on the minus side.

If you are too far away from zero you will be off by .200” when the Ref Zero is found because the axis has a “home” every revolution.



When the slide has been jogged to within 0.200” of zero for **both** axes, press the “9” key on the keyboard, then press Cycle Start pushbutton to complete the homing sequence.

The control will first move the Z and then X axis.

After the procedure, check that the location for zero is where you want it. If you have missed the zero, press the “2” key (Med Jog) then jog the slide to the correct location, then press “9” then Cycle Start again.

Verify that the position display at the top of the screen now reads zero for both axes.

See following page for the screens which display the process.

Establish Home: Screens

POSITION	: X +0.15095 Z -0.15860	FEED	10.0 IPM
COMMAND	: X-40	PERCENT FEED:	100
MAKE JOG SELECTION			
Jog	Automatic	Single Block	Manual Data Input
1. Slow		7. .1000	
2. Medium		8. 1.0000	
3. Fast		9. Est Home	
4. .00005		S. Set Zero	
5. .0010		H. Go Home	
6. .0100		T. Set Tool	
PRESS 'ESC TO RETURN TO MENU			

Press 9 when BOTH axes are within 0.200" of Home.

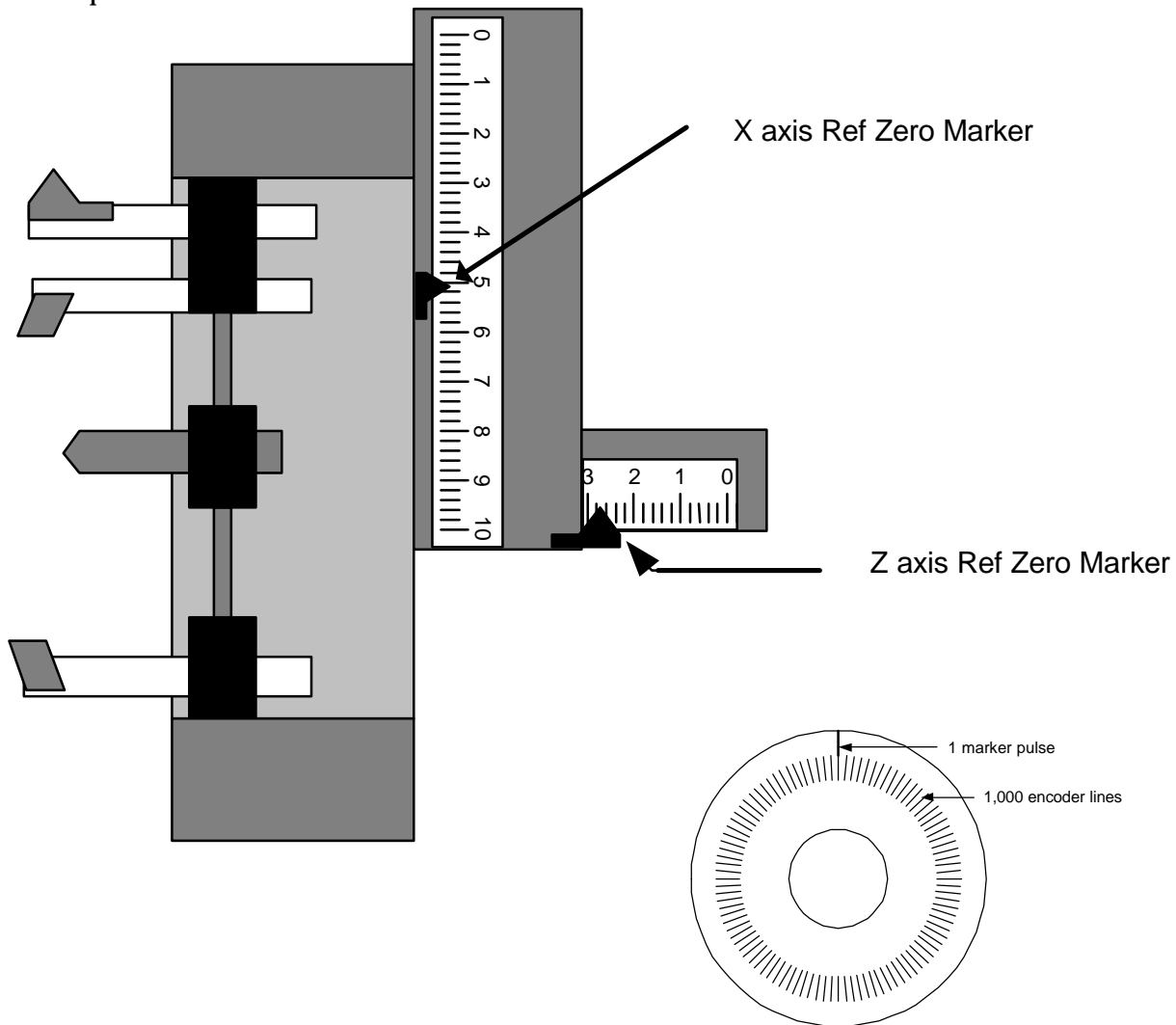
POSITION	: X +0.00000 Z +0.00000	FEED	10.0 IPM
COMMAND	: X-40	PERCENT FEED:	100
PRESS CYCLE START TO ESTABLISH HOME			
Jog	Automatic	Single Block	Manual Data Input
1. Slow		7. .1000	
2. Medium		8. 1.0000	
3. Fast		9. Est Home	
4. .00005		S. Set Zero	
5. .0010		H. Go Home	
6. .0100		T. Set Tool	
PRESS 'ESC TO RETURN TO MENU			

After selecting "Jog 9" (Est Home), press Cycle Start to complete the homing sequence.

After Home has been established, you can leave the Jog Mode by pressing "Esc" key on the keyboard to go to the Main Menu, or you can stay in the Jog Mode and establish the tool offsets. On the following pages the Jog Mode is discussed in detail.

Establish Home: Explanation

On each axis is a scale that is marked with .2" graduations. These scales are used to establish HOME. Home is a reference point that can be easily found and repeated. The .2" scales are just an aid to find this home point.



How HOME is established

The HOME location will repeat itself from start-up to start-up within .00005". So when you start up the machine from one day to the next it will repeat itself very closely. The point is established by the following:

On the end of the servo motor that drives the axis is an encoder that tells the control how far the slide has traveled. This encoder follows the slide travel incrementally. The encoder does not know exactly where the slide is, only how far it has traveled. The encoder works by counting fine lines printed on a disk.

The drawing above is a sketch of this type of rotary encoder. The inside ring of lines is counted to maintain location. The outside line is used to find a definite location. The encoder will "see" this line once every revolution of the ball screw used to position the slide. The ball screw used on the OmniTurn moves the slide .2" / revolution. So if we position the slide within .2" of what we want to call HOME and then tell the control to slowly rotate the screw while looking for the single pulse we can establish this as an easily repeatable location. This is how HOME is established.

Jog

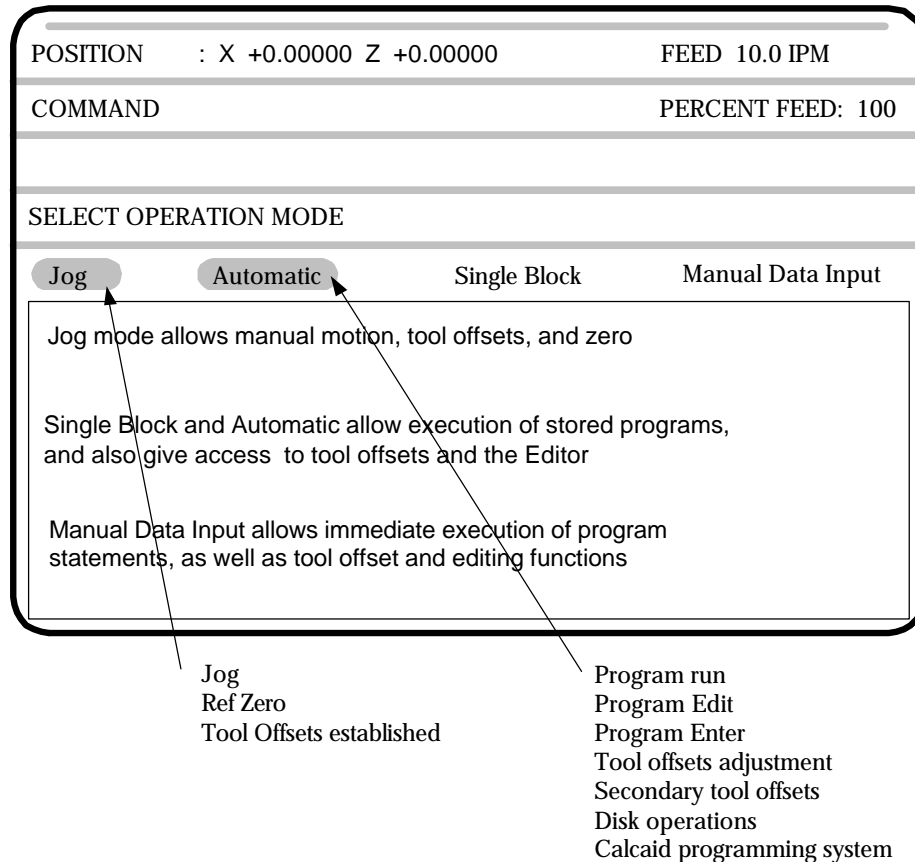
The purpose of the jog mode is to:

- Establish your "HOME" position. This is always done after starting up the control.
- Set tool offsets
- Move the slide manually
- Bore soft jaws or collets

To enter the jog mode:

If you are just powering up the control it will automatically take you to the jog screen after the servos are turned on.

If you are at the main menu as shown below, type "J" .



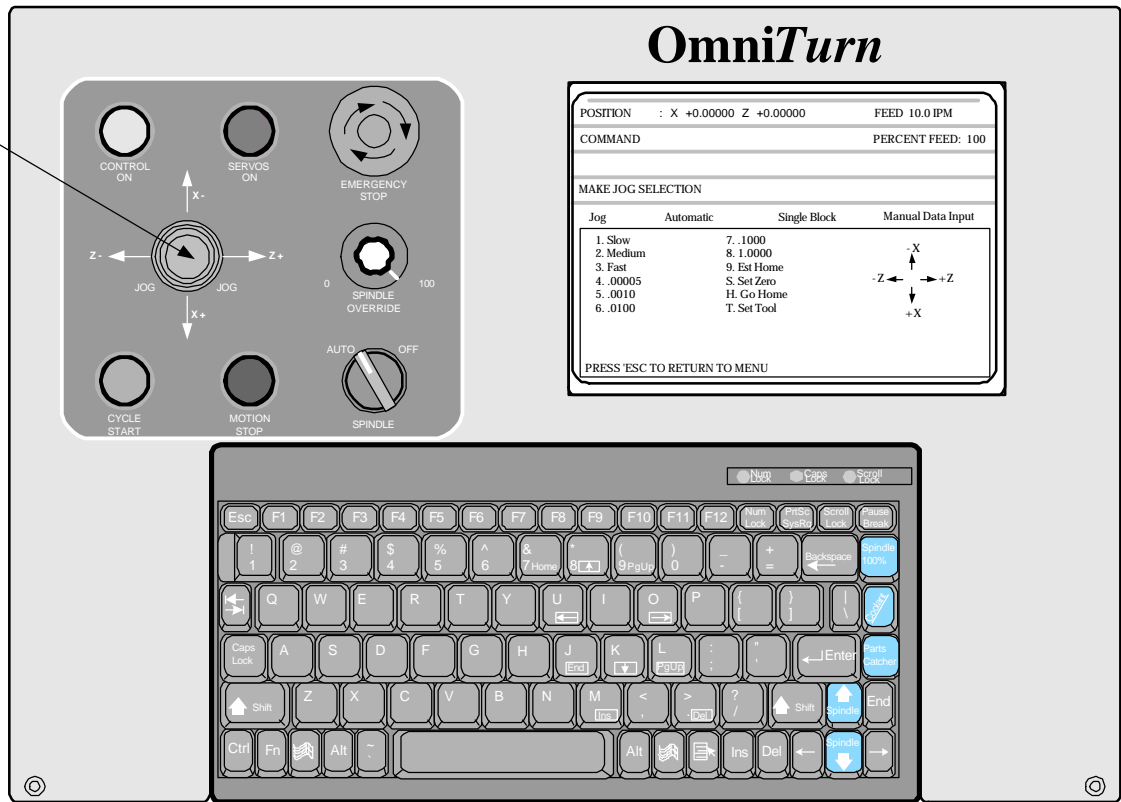
Jogging with the Joy Stick

The method for moving the slide is to use the "Joy stick" actuator on the operators panel. Deflecting this actuator in the four directions available produces the following motions:

- | | |
|-------|--|
| Up | X axis minus (away from you on attachment; up on GT-75 & Jr) |
| Down | X axis plus (toward you on attachment; down on GT-75 & Jr) |
| Left | Z axis minus (toward spindle) |
| Right | Z axis plus (away from spindle) |

Jog

Joy stick for jog operations



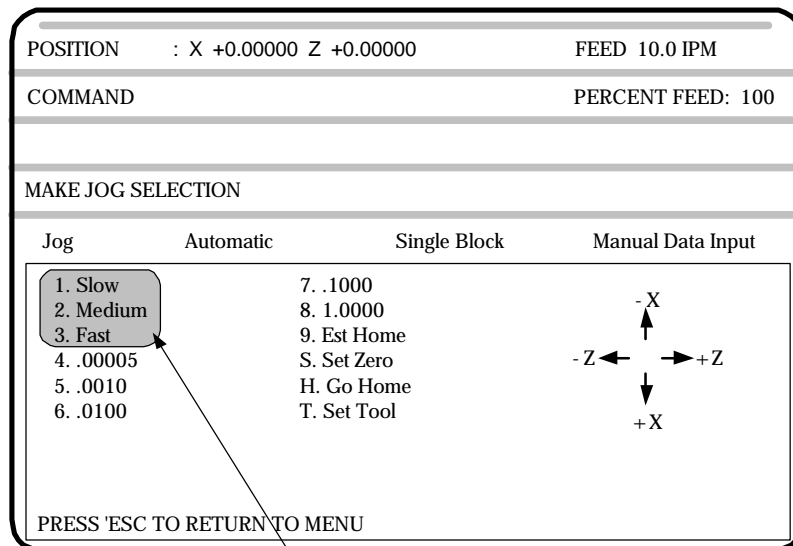
OmniTurn front panel Keyboard

The speed or increment of the jog mode can be selected. This is done by pressing a number between 1 -8 on the keyboard. The jog speed or increment selected will change shade. To select a new speed just select a new number.

Continuous Jog Mode

Deflecting the joystick after selecting 1 -3 will move the slide at a continuous rate:

- | | | |
|----|--------|-----------------------|
| 1. | SLOW | 1 inch per minute |
| 2. | MEDIUM | 10 inches per minute |
| 3. | FAST | 100 inches per minute |



Continuous jog selections

Jog

Incremental Jog Mode

Deflecting the joystick after selecting 4 -8 will move the slide the indicated increment in the direction deflected. Each deflection produces one increment. Holding the joystick in the deflected position will not move the slide more than one increment. The cycle start light flashes to indicate recognition and then execution of the increment.

POSITION : X +0.00000 Z +0.00000 FEED 10.0 IPM
COMMAND PERCENT FEED: 100

MAKE JOG SELECTION

Jog	Automatic	Single Block	Manual Data Input
1. Slow		7. .1000	
2. Medium		8. 1.0000	
3. Fast		9. Est Home	
4. .00005		S. Set Zero	
5. .0010		H. Go Home	
6. .0100		T. Set Tool	

PRESS 'ESC TO RETURN TO MENU

Incremental jog selections

The #9 selection is covered in the Establish Home section

POSITION : X +0.00000 Z +0.00000 FEED 10.0 IPM
COMMAND PERCENT FEED: 100

MAKE JOG SELECTION

Jog	Automatic	Single Block	Manual Data Input
1. Slow		7. .1000	
2. Medium		8. 1.0000	
3. Fast		9. Est Home	
4. .00005		S. Set Zero	
5. .0010		H. Go Home	
6. .0100		T. Set Tool	

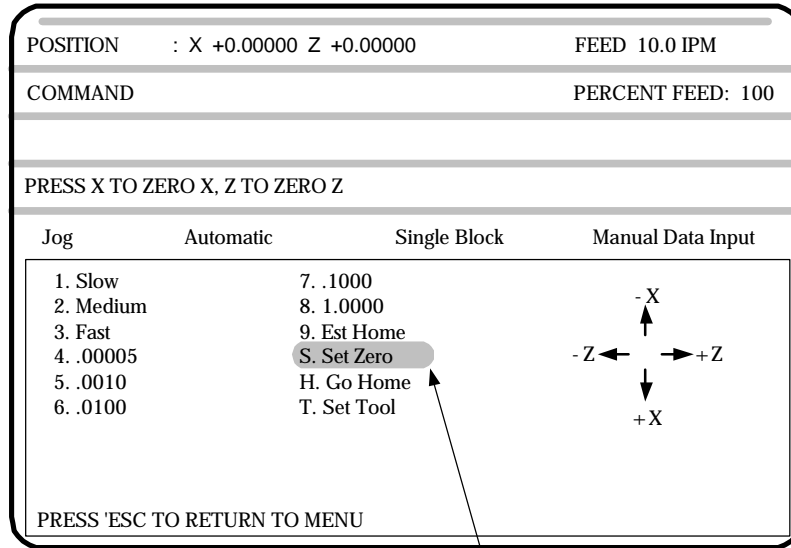
PRESS 'ESC TO RETURN TO MENU

Begin finding "HOME" of slide

Jog

To set a floating zero

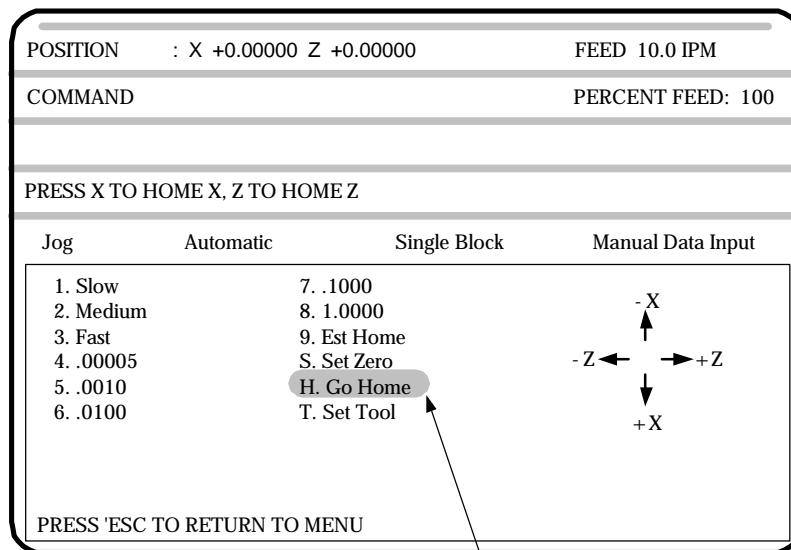
Depressing "S" will cause the present position of the axis to become the zero point. This setting of zero does not effect the location of the Home. This is a local zero that is used in the manual mode if the operator cares to use it. When this option is used, the control will prompt you to "PRESS X TO ZERO X, Z TO ZERO Z". You can terminate this procedure at any time by pressing the "ESC" key.



Set current position to Zero

To send the slide HOME

Depressing "H" will bring up the message "PRESS X TO HOME X, Z TO HOME Z". It is suggested to depress Z first, as this will home Z axis and get the tools back out of the way. Then depress X and the slide will home in the X axis. This function is used to check that the Home you have set is still where you think it should be. Never use this function until you have first gone through the "REFERENCE ZERO" procedure after start-up.



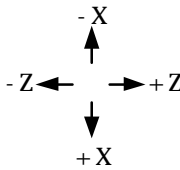
Send the slide HOME

Jog

To set Tool Offsets

The "T" selection is used to begin the Tool Offset procedure.
This is covered in Section 3, "TOOL OFFSETS".

POSITION : X +0.0000 Z +0.0000		FEED 10.0 IPM	
COMMAND		PERCENT FEED: 100	
OFFSET NUMBER:			
Jog	Automatic	Single Block	Manual Data Input
1. Slow	7. .1000		
2. Medium	8. 1.0000		
3. Fast	9. Est Home		
4. .00005	S. Set Zero		
5. .0010	H. Go Home		
6. .0100	T. Set Tool		
0 IS NOT A VALID OFFSET NUMBER			
PRESS 'ESC TO RETURN TO MENU			



Begin the Tool Offset entering procedure

Hard Disk Features

Backing Up Programs

OmniTurn CNC Controls are shipped with a solid-state hard drive (**C:**) for system and programs, and one 3.5 floppy drive, (**A:**) for part program backup.

The user is given an opportunity to backup his program files when machine is booted up. There is no convenient, automatic way to backup before shutting down, so we back-up at turn-on instead.

The solid-state hard-drives are very reliable, and unlikely to 'crash' but like any piece of machinery, they *will* crash someday. Back up your programs when you boot up.

The message "**Do you want to back up your program files?**" will be displayed.

Answering yes by pressing 'Y' will backup the files to drive A:.

Only new programs or those which have changed since last backup are copied.

Copying Programs

User can **copy** programs between hard drive and floppy using the file handler from Auto Mode by selecting F8 (DiskOps), then choosing 1 (Copy Files to/from Hard Drive).

See next page for full description of file handling.

Programs are listed in alphabetical order, and can be searched by the first letter of the name. The first ten lines of each program are displayed, but the entire program can be reviewed if desired: tab to the preview window below the programs window, then use arrow keys or page up/page down keys to look at every block. Editing in these windows will not change program.

Individual programs can be **deleted** from the hard drive by hi-lighting them in the hard drive window, then pressing Ctrl-D. **To copy an entire diskette of programs to hard drive, hi-light any file in floppy window, then press Ctrl-C.**

To Restore Hard Drive

The hard-drive is high-reliability 'solid-state, with no moving parts. A hard drive restore disk is shipped in a pouch inside the rear panel of the control for use in the rare event that the hard drive fails for any reason. After the new hard drive is installed, follow the instructions on the restore disk label.

Copying Programs to and from the Hard Drive

The OmniTurn allows true “background editing” because programs copied to the Users Disk may be edited at a desk-top computer while the program is running on the OmniTurn. The newly edited program can be copied back to the hard drive from the Auto Mode screen with almost no interruption in the machining process.

In Auto Mode select F8.
Disk Options Menu will appear.

Press 1 to copy programs TO or FROM the hard drive.
OmniTurn File Copy Screen will appear.

There are four windows, a help line and an exit button.

1. Upper left window lists the programs on the User Disk
2. Lower left window displays the program lines of the program high-lighted in the upper left window.
3. Upper right window lists the programs on the Hard Drive
4. Lower right windows displays the program lines of the program high-lighted in the upper right window.
5. The text below the top two windows displays the action as the highlight is moved from window to window.

Use the arrow keys, or the initial letter of the program name to highlight a program to view or copy.

Use the Tab key to move from window to window, including the Exit box. Holding the Shift key, then pressing Tab will move the cursor to the previous window.

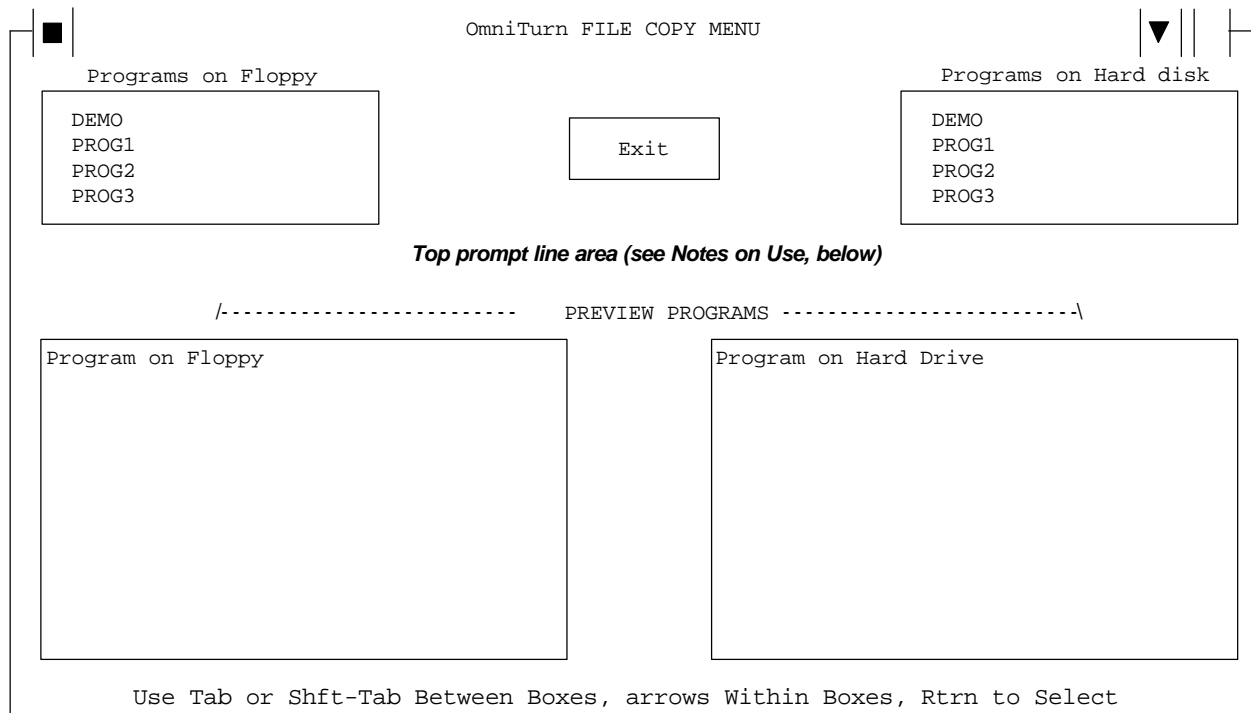
To copy a high-lighted program to or from the hard drive, press the Rtrn key.

To **delete** a high-lighted program **from the hard drive** press and hold Ctrl key, then press d key (Ctrl-D). There is **no prompt**: the program is deleted. You cannot delete programs from the floppy.

To **copy all programs from floppy to hard drive**, high-light any program in floppy window, then press Ctrl-C.

Changes made in the preview window WILL NOT change the program.

To exit the file handler press and hold the Alt key, then press X, or use the Tab key to move the cursor to highlight the Exit button, then press Rtrn.



Using the File Handler: Notes and Prompts

NOTE: You must have floppy in drive a:

Bottom Prompt Line: (moving around)

Use Tab or Shft-Tab Between Boxes, Arrows Within Boxes, Rtrn to Select

Use tab key to move counter-clockwise between windows; shift key with tab key to move clockwise.

When in any window, use up and down arrow keys to move from line to line.

Top Prompt Line, Initial condition:

Press Arrow or Initial Letter to Select Program. Press Tab Key for Next Window

The cursor is in the Programs on Floppy window. If user presses the initial letter of any program on disk, the cursor will jump to first program which starts with that letter, the program will be selected, and the program lines will be displayed in the Floppy Preview Programs window. If the user presses the down arrow, the first program will be selected, and the program lines displayed.

When program is selected, Top Prompt Line changes:

Copy filename to Hard Drive? (Rtrn = Copy this File; Ctrl-C = Copy ALL Files)

If the user presses Enter, the program is copied and the Top Prompt changes as follows:

Copying filename to Hard Drive appears while program is being copied, then filename Copied to Hard Drive appears after program has been copied. If the user presses and holds Ctrl key, then presses 'C' key (Ctrl-C), all programs will be copied to the hard drive.

Tab to program view window with program selected:

User may view entire program by using arrow keys. **Changes made in preview window will not affect program.**

Tab to Hard Drive window to copy programs to floppy, or to delete programs:

Copy FILENAME to Floppy? (Rtrn = Copy: Ctrl-D to Delete !NO PROMPT!)

To Exit, Tab to exit window:

Press Rtrn (or Space) to Exit, else Tab to Next Window