# **BENCHMAN®** Machining Center

Addendum: Control Program Version 2.0



A DAVENPORT INDUSTRIES DIVISION

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# **BENCHMAN®-XT Control Program Version 2.0 Upgrade**

The Version 2.0 Upgrade of the BENCHMAN®-XT Control Program offers several new features, and is Year 2000 compliant.

### **1. Installation**

Put the BENCHMAN®-XTControl Program Version 2.0 CD into the CD-ROM drive of the computer.

From the Windows<sup>®</sup> NT desktop, click on Start > Run.

Type in [drive letter]:\setup.exe.

Follow the instructions on the screen.

A 3.5" floppy disk with machine-specific parameters will be supplied with the Control Program CD. When prompted during installation, insert the disk, and click on the Install box.



Once installed, you can start the BENCHMAN<sup>®</sup> Control Program by clicking on **Start > Programs > BENCHMAN XT > BENCHMAN XT** in the Windows<sup>®</sup> NT desktop.

#### 2. Menu Commands



The Main Menu Commands in the Control Program (located in the top left corner) are unchanged; but there have been several additions and revisions to their pull-down menu options.

#### 2.A.View Menu

The ATC Control toolbar option has been added to this menu. When there is a check mark next to ATC Control, the ATC toolbar is visible in the control program.





ATC Control Toolbar

#### 2.B. Tools Menu

Tools		
Tool <u>L</u> ibrary	Ctrl+T	
Insert <u>T</u> ool from		F
<u>C</u> onfigure ATC		
Operate <u>A</u> TC	F12	
ATC Com Port		
Tool Length Offset Probe		
ATC Terminal Mode		

The **Tool Library** and **Operate ATC** dialog boxes have been modified. The **Tool Wizard** option has been removed from the **Tools** menu. Three ATC command options have been added: **ATC Com Port**, **Tool Length Offset Probe**, and **ATC Terminal Mode**.

#### 2.B.1. Tool Library

Click on the Tool Library menu option to open the Setup Tool Library dialog box.

Setup Tool Lib	rary		×
Tool Library	Tool <u>T</u> ype: Ball Mill	Diameter: 0.157	OK
	D <u>e</u> scription: Tool 1		Cancel <u>C</u> opy Tool
Tool 00	Station: 1	Height/Offset:	Paste Tool
	Use Spindle Locking Pin 🔽	Current Z	Applu
	Num Teeth: 5		
Tool 01	Material Type: High Speed Steel		
		Diameter Offset: 0	
Tool 02 💌	Edit Tool <u>M</u> aterials		

The only change is the Use Spindle Locking Pin option. When checked, the tool will be locked into the spindle. This option should only be used when machining deep cuts into hard materials.

#### 2.B.2 Operate ATC



Click on the **Operate ATC** menu option to open the **Automatic Tool Changer Control** dialog box. The buttons to manually control the ATC have been rearranged for ease of use.

Automatic To	ool Chang	er Contro			19992	
Up + + Down	Out	Down	<b></b>	C Empty I C Ready	Show: © <u>S</u> tations © Tools	Home Set Curr. GoTo Curr. Reset Close



Click on the ATC Com Port menu option to open the ATC Com Port Configuration dialog box.

ATC Com Port Configur	ation	×
Serial Port Number Port #1 Port #2	Com Rate © 19200 baud © 9600 baud	OK Cancel

The ATC previously plugged into the COM1 port only on your computer. Now you can use this dialog box to set the serial port to COM1 or COM2. This allows you to use the COM1 port for another device.

#### 2.B.4. Tool Length Offset Probe

Tool Library	Ctrl+T	
Insert <u>T</u> ool from		
Configure ATC		
Operate <u>A</u> TC	F12	
ATC Com Port		
Tool Length Offset Probe	N	
ATC Terminal Mode	N	

The **Tool Length Offset Probe** option is only available if you have the **ACC-5269 Tool Length Offset Probe** option on your BENCHMAN<sup>®</sup>-XT. See Section 4.A. for more information for using the **Tool Length Offset Probe** features in the control program.

Tool <u>L</u> ibrary	Ctrl+T
Insert <u>T</u> ool from	•
Configure ATC	
Operate <u>A</u> TC	F12
ATC Com Port	
Tool Length Offset Probe	
ATC Terminal Mode	

The ATC Terminal Mode is an inactive menu option, and is only used by authorized service personnel for diagnostic testing.

#### 2.C. Setup Menu

<u>S</u> etup	
Set <u>P</u> osition <u>Z</u> ero Position	Ctrl+Shift+Z
<u>J</u> og Settings <u>R</u> un Settings <u>V</u> erify Settings	Ctrl+R
Set/Check <u>H</u> ome <u>G</u> oto Position	Ctrl+H F8
<u>U</u> nits <u>C</u> oordinate Systems <u>O</u> ffsets	+ +
<u>S</u> pindle <u>B</u> acklash Soft <u>L</u> imits	
Pr <u>e</u> ferences Verify Current Tool Tool Locking	+
Digitizing Probe Enabled Tool Length Offset Probe Enabled CAN Module Enabled Configure System	

The Set/Check Home dialog box has been simplified. The Verify Current Tool, Tool Locking, and Configure System commands have all been added.

The Digitizing Probe Enabled, Tool Length Offset Probe Enabled, and CAN Module Enabled indicators have also been added; and can only be used if you have any of those options installed on your machine.

#### 2.C.1. Set/Check Home

Click on **Setup > Set/Check Home** to open the **Home to Reference Point** dialog box. Click on **Home** to send the BENCHMAN<sup>®</sup>-XTto its machine home reference point.

Set <u>P</u> osition <u>⊇</u> ero Position	Ctrl+Shift+Z
Jog Settings <u>R</u> un Settings ⊻erify Settings	Ctrl+R
Set/Check <u>H</u> ome Goto Position	Ctrl+H F8
Units Coordinate Systems Offsets	•
<u>S</u> pindle <u>B</u> acklash Soft <u>L</u> imits	
Pr <u>e</u> ferences Verify Current Tool Tool Locking	,
Digitizing Probe Enabled Tool Length Offset Probe Enable CAN Module Enabled Configure System	ed



#### 2.C.2. Verify Current Tool

Set <u>P</u> osition	
<u>Z</u> ero Position	Ctrl+Shift+Z
Jog Settings	
Run Settings	Ctrl+R
⊻erify Settings	
Set/Check Home	CHUL
Seveneck <u>n</u> ome	
Goto Position	F8
<u>U</u> nits	•
<u>C</u> oordinate Systems	+
Offsets	
<u>s</u> pindie	
Backlash	
Soft Limits	
Pr <u>e</u> ferences	
Verify Current Tool	N
Tool Locking	V3 V
<ul> <li>Digitizing Probe Enabled</li> </ul>	
✓ Tool Length Offset Probe Enabled	
CAN Module Enabled	
Configure System	

Click on the Verify Current Tool option in the Setup menu to open the Current Tool Confirmation dialog box. This will allow you to confirm that the correct tool is in the spindle, or allow you to change the setting to the tool that is in the spindle.

Current Tool Confirmation	×
Current Tool in Spindle pocket# 2 NOTE: Verify that the indicated tool in the spindle is correct. If not, select the current tool from the drop down list.	Cancel
Failure to correctly confirm the tool selection can result in ATC collisions with the spindle. To	ol In Spindle 🔽

#### 2.C.3. Tool Locking

Setup		
Set <u>P</u> osition <u>Z</u> ero Position	Ctrl+Shift+Z	
<u>J</u> og Settings <u>R</u> un Settings ⊻erify Settings	Ctrl+R	
Set/Check <u>H</u> ome <u>G</u> oto Position	Ctrl+H F8	
<u>U</u> nits <u>C</u> oordinate Systems <u>O</u> ffsets	* *	
<u>S</u> pindle <u>B</u> acklash Soft <u>L</u> imits		
Pr <u>e</u> ferences Verify Current Tool		
Tool Locking	•	Always
<ul> <li>Digitizing Probe Enabled</li> <li>Tool Length Offset Probe Enabled</li> <li>CAN Module Enabled</li> </ul>	d -	Never ✔ Use Tool Library Settings
Configure System		

The Tool Locking menu allows you to override the Use Spindle Locking Pin option in the Setup Tool Library (refer to Section 2.B.1). Click Always to set the spindle to lock on every tool, or click Never to not lock any tool, regardless of Setup Tool Library setting. Click Use Tool Library Settings to use the Setup Tool Library setting for each tool.

## Warning!

# ALL THE SYSTEM SETTINGS FOR EACH BENCHMAN®-XT ARE PRE-SET AT THE FACTORY! YOU SHOULD NOT USE THE CONFIGURE SYSTEM COMMAND WITHOUT CONSULTING THE SERVICE DEPARTMENT AT LIGHT MACHINES FIRST!



The **Configure System** utility is used to review parameters for the machining center, and will allow you to make changes or enable options. It should only be used if you are using system options that need to be turned on/off like the **Digitizing Probe**, **CAN Module**, or **Tool Length Offset Probe**. If you are experiencing problems with your machine, consult Light Machines' Service Department first.

When you click the **Configure System** option, you are prompted with the following message:



Changes made to the system configuration will not take effect unless the control program is closed, then re-opened. Click **Yes** to close the BENCHMAN<sup>®</sup> control program, and open the **Configuration Utility** dialog box; or click **No** to return to the control program.

Benchman XT/4000 Configuration U	Itility	X
	Machine Serial Number 123-11AA-1111	OK Cancel About
	This utility is used to define machine specific configuration options. After selection you must exit the Benchman application, if running, for the changes to take effect. Hit the appropriate button to make your selections.	Open Save As
	General Servos Advanced	

## NOTE! CHANGING SYSTEM SETTINGS WITHOUT CONSULTING LIGHT MACHINES CORP. COULD CAUSE THE MACHINE TO MALFUNCTION!

Click on the **General** button to open the **Configuration Parameters Selection** dialog box. This screen will allow you to make general changes to the machining center.

Configuration Parameter Selection Options			
	Motion control board address	800(320 hex)	
	Model G Benchman XT G Benchman 4000 ATC Serial Port G COM #1 G COM #12 Spindle 7.5K RPM Tool Changer 20 tools S Contects State Sta	Colart Units Colart Units Colart Colart Air Vise Door Opener Pneumatic #1 Pneumatic #1 Pneumatic #1 Manual Dravbar Enro Comp Anse Digitizing Probe Co CAN BUS Support	

Click on the **Servo** button to open the **Configure Servo Parameters** dialog box. This screen allows you to change the parameters for the X, Y, and Z axis servo motors.

-	ro Parameters			
Axis	X Axis 💌			Cancel
Кр	40	Following	.1	
Ki	2	SPU	50000	Set
Kd	80	Int Range	40	
Kv	80	Accel.	20	Heset
K∀ff	80	Decel.	20	
CAUTION If you cha controls u	l: inge these parameters in instable. Make sure you	ncorrectly you ca I are confident of	n make the system the values selected	<b></b>

Click on the Advanced button to open the Advanced Settings dialog box. This screen will allow you to make changes to the spindle and axes settings.



#### 2.C.5. Option Indicators



The **Option Indicators** can be used to turn factory-installed options on or off. If there is a check mark next to an option, it has been activated in the **XT Configurator**. If there is no check mark, it is not activated.

Click on an option to open the **BENCHMAN®-XT Configuration Utility**. See Section 4.A. for more information on activating/deactivating options.

#### 2.D. Window Menu



The Window menu has three options for modifying the display of NC programs in the Edit Window: Cascade, Tile Horizontal, and Tile Vertical.

Click on Cascade to tile your programs on top of each other as shown.



Click on **Tile Vertical** to stretch your programs in the vertical direction, and place them side by side.



Click on Tile Horizontal to stretch your programs in the horizontal direction, and place them on top of each other.

I de la		
<ul> <li>▲</li> <li>▲</li> <li>▲</li> <li>▲</li> <li>▲</li> <li>▲</li> <li>▲</li> <li>↓</li> <li>↓</li></ul>	G Untitled3	
<ul> <li>↓</li> <li>↓</li></ul>		2
L L L L L L L L L L L L L L		-
L 2 2 Jordiled2 C 2 I I L 2 Jordiled1 C 2 L 2 Jordiled1 C 2 L		
Indicat Indicat Indicat I I I I I I I I I I I I I		
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#### **3.A. Standard Tool Bar**

The Standard Tool Bar contains new icons. The Help icon has been moved to the end of the Standard Tool Bar.



#### 3.A.1. Set Home



Set Home

Click on the Set Home icon to open the Home to Reference Point dialog box. Refer to Section 2.C.1.

#### 3.A.2. Edit Window Options



**Tile Horizontal** 

Click on these icons to modify the display of multiple NC programs in the edit window. Refer to Section 2.D. for more information.

#### 3.A.3. Automatic Tool Changer (ATC)

The Automatic Tool Changer toolbar has been added to the BENCHMAN<sup>®</sup>-XT control program to give quick access to ATC commands. To enable/disable the ATC tool bar, see Section 2.A.



The Drawbar icon allows you to clamp or unclamp a tool in the spindle. CAUTION! WHEN DEPRESSED, THE DRAWBAR ICON WILL UNCLAMP THE TOOL IN THE SPINDLE. ANY TOOL THAT IS IN IT COULD FALL OUT!

The **Configure ATC** icon opens the Configure ATC dialog box. This allows you to set the tools in specific stations on the ATC.

Configure ATC			×
Tool:	Tool In This Station	Tool in spindle	<u>OK</u>
2			Cancel
3	Select the tool from each to the tool currently in the	ch station's list whi hat station. The to	hs chicorresponds polimustibe
4	library to change a tool	s selected station. 's station.	Use the tool

The **Operate ATC** icon opens the **Automatic Tool Changer Control** dialog box. See Section 2.B.2. for more information.

The **Insert Tool** icon produces a drop-down menu of defined tool stations. Click on a tool number to insert the tool from that station in the spindle.



The **Current Tool** icon opens the **Current Tool Confirmation** dialog box. See Section 2.C.3. for more information.

Some features have been added for the Tool Length Offset Probe option. This option can be used to measure tool height offsets, and store them in the control program.

#### 4.A. Activating/Deactivating Tool Length Probe Option

To activate/deactivate the probe option, click on Setup, then Configure System, or click on the Tool Length Offset Probe Enabled option in the Setup Menu.

Cat Pasition		
∠ero Position	Ctrl+Shift+Z	
Joa Settinas		
Bun Settings	Ctrl+B	
Verifu Cettinge	Gainti	
veniy seangs		
Set/Check <u>H</u> ome	Ctrl+H	
Goto Position	F8	
<u>U</u> nits	•	
<u>C</u> oordinate Systems	•	
Offsets		
<u>S</u> pindle		
<u>B</u> acklash		
Soft <u>L</u> imits		
Preferences		
Verify Current Tool		
Tool Locking	•	
✓ Digitizing Probe Enabled		
<ul> <li>Tool Length Offset Probe Enabled</li> </ul>	1	
CAN Module Enabled		
Configure Sustem		
Conligure system		

The program will prompt you with the message that it will shut down the control program, and open the **Configure** utility.



Click Yes to open the Configuration Utility dialog box. Remember, changes made to the system configuration will not take place unless the system is closed, and then re-opened.



#### Click on General to open the Configuration Parameter Selection Options dialog box.

Configuration Parameter Selection Opti	ons	×
	Motion control board address	800(320 hex)
ENCHMAN	Model C Benchman XT C Benchman 4000 ATC Serial Port C COM #1 C COM #2	Cancel Ca
	Spindle 7.5K RPM	Error Comp Axes Digitizing Probe
	Tool Changer 20 tools	Tool Length Offset Probe 🔽 🗟 CAN BUS Support 🗖

The **Digitizing Probe** and **Tool Length Offset Probe** features are listed under **Options**. Click once in the box next to each feature. A check mark in the box means the option is activated; a blank box means the option is deactivated.

When you activate an option, a check mark will appear next to it in the Setup menu in the control program (see Section 2.C.5).

When the **Digitizing Probe** and/or **Tool Length Offset Probe** option is activated, a probe icon is added to the Outputs toolbar.



When the **Tool Length Offset Probe** option is activated, the **Tool Length Offset Probe** menu item under **Tools** becomes active.

Tools	
Tool <u>L</u> ibrary	Ctrl+T
Insert <u>T</u> ool from	•
Configure ATC	
Operate <u>A</u> TC	F12
ATC Com Port	
Tool Length Offset Probe	
ATC Terminal Mode	

Click on Tool Length Offset Probe to open the Tool Height Pickup Selection dialog box.

<b>Tool Height Pickup Selection</b>		×
Tool Pocket Assignments           Pocket #01 ⇒ Tool #01           Pocket #02 ⇒ Tool #02           Pocket #03 ⇒ Tool #03           Pocket #05 ⇒ Tool #04           Pocket #05 ⇒ Tool #05           Pocket #07 ⇒ Tool #06           Pocket #08 ⇒ Tool #08           Pocket #09 ⇒ Tool #09	Note: Set up the nominal tool parameters for each tool assigned to the tool changer in the tool library and then verify the ATC tool pocket assignments in the list to the left. Remove>> Tool Library ID# << Change Tool#1> 0.157 in dia. Ball mill	OK Cancel Save
Pocket #10 > Tool #10 Pocket #11 > Tool #11 Pocket #12 > Tool #12 Pocket #13 > Tool #13 Pocket #13 > Tool #13 Pocket #15 > Tool #15 Pocket #16 > Tool #16 Pocket #17 > Tool #16	< Clear Refresh <view Use the "Change" button to modify the ATC tool assignments as required, connect the tool pickup probe and then hit the "Run" button.</view 	Do Pickup

Click on Do Pickup to open the Tool Length Offset Pickup dialog box.

Tool Length Offset Pickup		×
Current Tool		ССК.
Tool#1> 0.157 in dia. Ball mill	•	Cancel
To calibrate the pickup points for each tool use the Jog Control to place the each tool tool over the pick up probe and hit the "Set Coords" button. Probe velocity (in/min) 10.000 Probe min. Z position 0.000	<ul> <li>Engage Pickup</li> <li>Engage Probe</li> <li>Probe Hit</li> </ul>	Set Coords View Tool GoTo Coords Go Home
_ Jog Control		Next Tool
Jog Increment       ▲       ×         (in , deg)       ▲       ×         0.010       ▲       ►       Y         Jog Velocity       ▼       Z         (in/min , deg/min)       Cont.       Incr.	0.000	Do Pickup Stop