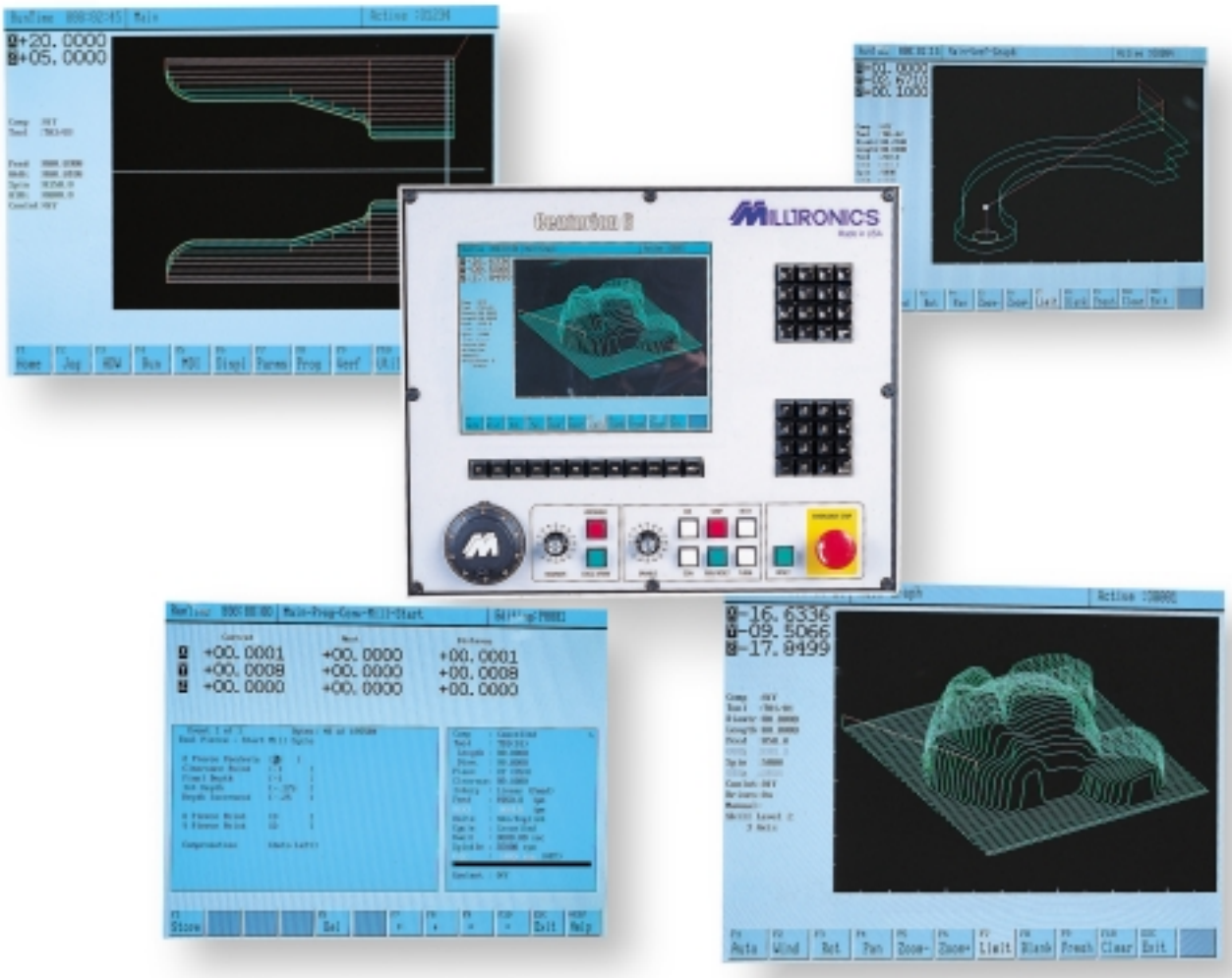
MILLTRONICS

CENTURION CNC CONTROLS



Advanced CNC Controls - Technology For Tomorrow

MADE IN U.S.A.

When Milltronics built its first CNC control over 25 years ago the mission was to build the friendliest CNC control possible. Our belief then, and now, is that the easier a control is to program and operate the more productive the machine tool will become.

Our quest has always been to combine the latest technology with innovative features into a balanced CNC control. A CNC control that would not compromise features for simplicity, or performance for value but would instead excel in all categories.

Twenty five years and nearly 10,000 controls later the Centurion 6 controls have arrived to set new standards in value and performance.

DESIGNED FOR THE

A Front Panel Designed For The Operator

An operator will spend thousands of hours working with the front panel of any CNC. This is why we have designed our front panel around an oversized high resolution LCD color screen, rather than the tiny monochrome monitor often found on other CNC's.

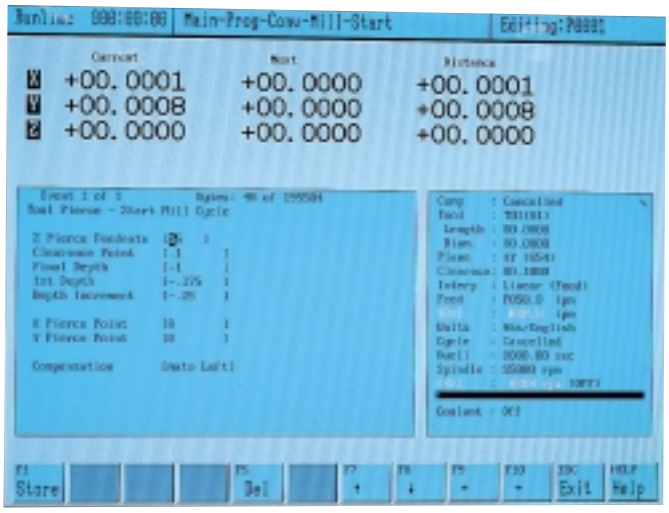
We did not stop with the screen either. We listened to operators frustrated with insensitive flat keypads and added a sealed full travel keypad. Machine function buttons such as flood, mist and spindle illuminate when selected. In fact, buttons that require operator response, such as Cycle Start, flash as needed to prompt the operator through the task at hand.

Dual Processor Control Utilizes Latest Computer Technology

It is estimated that 90% of all computer related engineering efforts are directed towards the rapidly advancing PC arena. Centurion controls take advantage of these advances by utilizing a PC based Pentium processor to handle the operator interface and a robust 32 bit Motorola processor to handle the motion control. These combined processors provide data throughput and features unsurpassed in the industry.

Because Centurion controls are based on a PC platform, expandable data storage, memory and communications are possible. You can also rest assured that the open PC architecture permits service and upgrades to be performed well into the future and at substantially less cost than dedicated systems. Additionally, all Centurion controls are 5 axis standard - allowing quick and inexpensive installation of additional axis.

FEATURES TO SAVE TIME



Conversational Programming

A menu based question and answer format prompts the operator through program creation. In most applications there is no need to memorize complex G and M codes.

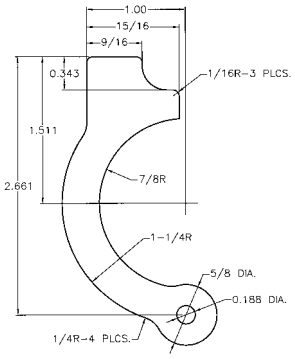
Conversational programming is not only quick and easy, it is extremely powerful too. In fact, many operations available with conversational programming are nearly impossible to duplicate with G and M code programming. For instance, the simple task of incrementing a tool to depth with G and M codes usually involves complex looping of subprograms or many redundant commands. With conversational programming this task is reduced to simple statements where only the cut increment and depths need to be entered.

Advanced Trigonometry Assist

This feature is much more than the scientific calculator found on other CNC controls.

"Trig Help" as we call it, is a concept where we can use the CNC's computing power to calculate arc start and end points without the need for trigonometry. The programmer only needs to estimate the end point of the line or arc and the CNC connects the geometry to the nearest intersection on its own.

On most other CNC controls intersection points need to be exactly calculated in order for the program to run. Needless to say this is not only difficult but also time consuming.

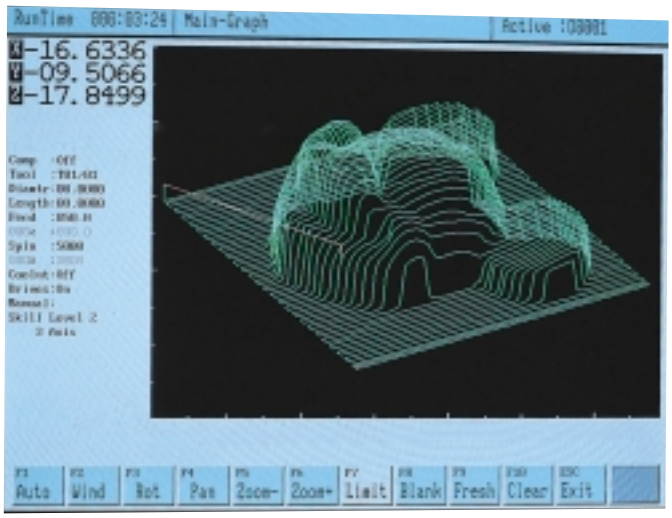


Conversationally programmed in under 5 minutes without trigonometry!

Concurrent Programming And More....

Maximize productivity by programming while the machine is in operation. Create new programs, modify existing programs, even edit the program in operation, all while the machine is cutting.

Concurrent features do not stop with programming. Editing of tool and fixture offsets, copying of programs to / from floppy disk and sending programs through the RS232 port are allowed as well.



Full Color Graphics

Full Color graphics allow verification of tool path and part profile prior to program execution. Zoom in/out, rotate or window on detail for clearer view.

Unlike graphic systems on other CNC controls, the Centurion graphics are intertwined with the motion control system of the machine. This provides synchronized display between the graphics and machine movement and guarantees that there will be no discrepancy between what is seen on screen and what the machine actually does.

Unique Graphics Based Mid Program Start Feature

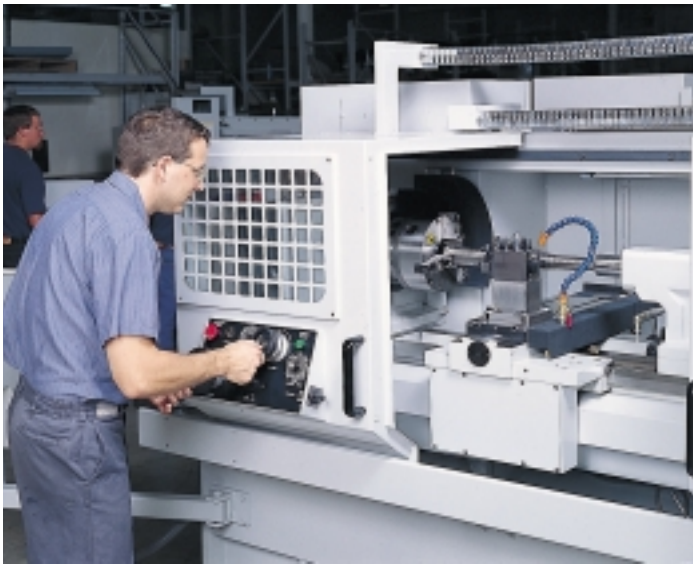
Starting in the middle of a program is often one of the more challenging tasks facing a CNC operator. Although this would seem to be a simple task the fundamental nature of CNC's make it anything but.
Milltronics has solved this problem with a unique process where an operator can verify a program graphically up to the point where starting is desired and then simply switch over to the Run mode. Not only is this easier and quicker than sorting through difficult machine code, it also ensures that modal codes are executed completely and in sequence.

Handwheel Controlled Program Execution

This useful feature allows an operator to take total control of machine movement and run problematic programs with confidence.

With this feature enabled, program movement only occurs while the handwheel is being turned; stop turning the handwheel and machine movement stops immediately. The faster the handwheel is turned the faster the feedrate.

Ask any experienced CNC operator if they have ever crashed a machine and the answer most likely will be yes. The usual cause is that the operator simply could not react fast enough to the situation at hand. With this feature an operator can avoid crashes and safely work near rotating lathe chucks or expensive fixtures.



HIGH SPEED CONTROL

High Speed Control

All Centurion CNC controls have addressed the complex dynamics required for a CNC to truly be categorized as high speed. The end result is Centurion controls now set the standard for performance within their class.

Processor Speed

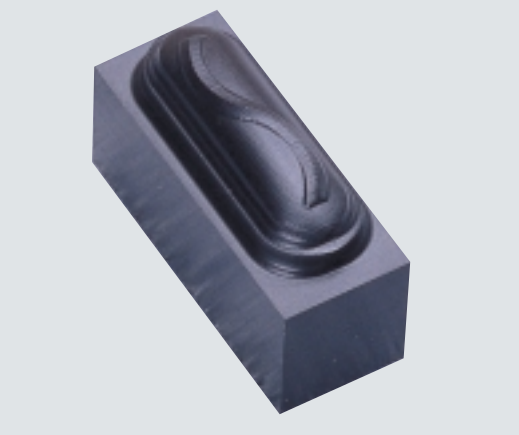
There are literally thousands of calculations required for each and every axis movement. When trying to machine complex geometry often the microprocessor of the control creates a bottleneck restricting the attainable feedrate. To minimize processing bottlenecks, Centurion CNC controls utilize two 32 bit processors providing over 150 megahertz combined processing speed. With these two processors working together, over 1300 blocks per second can be achieved.

Intelligent Axis Acceleration And Deceleration

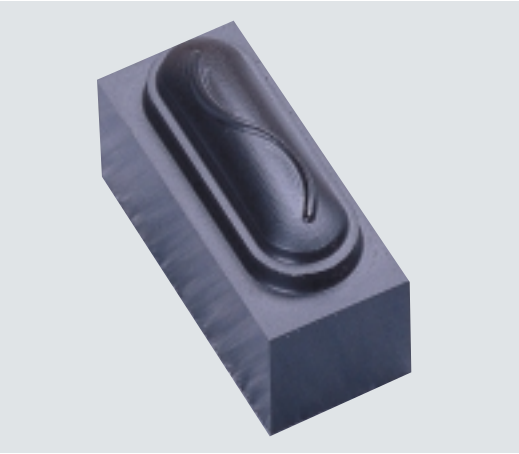
Controlling how an axis decelerates and accelerates is one of the most crucial factors relating to machine speed. Understanding that it is impossible for a servo motor to stop and start a heavy machine slide anywhere close to 1,000 times per second leaves the only hope of achieving speed through greater intelligence of the acceleration and deceleration slopes. All Centurion controls search as much as 255 moves ahead into a program to determine the directional changes that lay ahead. Once these directional changes are known the CNC dynamically adjusts the deceleration and acceleration slopes to minimize stopping and starting.

Accuracy

Servo motors can not instantaneously respond to a given command. This lack of response negatively effects accuracy and further deteriorates as the feedrate increases. To counter the disastrous effects of servo response, Centurion CNC controls utilize a complex "Feed Forward" error correction algorithm that reduces inaccuracy without compromising speed. Until now feed forward error correction has been found only on a handful of the world's most expensive CNC controls and should in no way be confused with inferior error correction systems that rely on slowing feedrates to maintain accuracy.



Part machined on conventional CNC control without "Feed Forward" error correction.



Part machined on Centurion 6 CNC with "Feed Forward" error correction.

Centurion controls with "Feed Forward" error correction have been found to reduce cycle times as much as 30% over inferior *slow-down* error correction methods.

SPECIFICATION

Control	
Processor - Motion Control	Motorola 32 bit
Processor - Operators Interface	Pentium 130 megahertz (or greater)
Program Throughput	Over 1,300 blocks per second
Axis Control	5 axis - Standard
Memory - Data Storage	
Floppy Disk	3-1/2" 1.44 MB - Standard 120 MB SuperDisk®- Optional 100 MB Zip®Drive - Optional
Hard Disk	2 + Gig - Optional
RAM Memory - Volatile	16 MB - Standard 32 MB - Optional
RAM Memory - Program Storage	6 MB - Standard 140 MB - Optional
RAM Memory - Operating System	2 MB

Features	Centurion 6	Centurion 6 SLS	Centurion 6T
Absolute / Incremental	S	S	S
Inch / Metric	S	S	S
Conversational Programming	S	S	S
Trigonometry Assist ("Trig Help")	S	S	S
Corner Chamfering And Rounding	S	S	S
Cutter Compensation	S	S	S
Color Graphics - Tool Path And Part Profile	S	S	S
Canned Drilling Cycles	S	S	S
Diagnostics	S	S	S
Excess Error Protection	S	S	S
Full Language Errors Message	S	S	S
Backlash Compensation	S	S	S
Ballscrew Pitch Error Correction	S	S	S
Mirror, Scale And Rotate	S	S	S
EIA / ISO Code (Fanuc™) Compatibility *	S	S	S
Macro Programming	S	S	S
Subprogram Looping And Nesting	S	S	S
3 Point Circular Interpolation	S	S	S
Polar Coordinates	S	S	S
Auto / Block Operation	S	S	S
Programmable Dwell	S	S	S
Block Skip	S	S	S
Concurrent Programming	S	S	S
Hard Tapping (Optional)	O	O	S
Digitizing Ready	S	S	S

Features	Centurion 6	Centurion 6 SLS	Centurion 6T
Program Interrupt And Resume	S	S	S
Graphics Based Mid Program Start	S	S	S
Program Start From Block Or Tool Number	S	S	S
Handwheel Run	S	S	S
Teach Programming	-	S	S
Feed Forward Error Correction	O	O	O
Selectable Corner Accuracy	S	S	S
Automatic Homing	S	S	S
Circular Interpolation	S	S	S
Axis Jog	S	S	S
Software Limits	S	S	S
Unidirectional Approach	S	S	S
Dry Run	S	S	S
Automatic Tool Setting Program	S	S	-
Selectable Languages	S	S	S
Multiple Work Offsets	S	S	S
1 Button Tool / Fixture Offset Entry	S	S	S
8 MB Text Editing With Cut, Copy, Move And Search - Replace	S	S	S
Pocketing And Framing Cycles	S	S	NA
Tapered And Round Walls	S	S	NA
3D Sweep Routine	S	-	NA
Helical Interpolation	S	S	NA
Bolthole Drill Cycle	S	S	NA
Engraving, With Serializing	S	S	NA
Speed And Feed Calculator	S	-	-
Online Help Screens	-	S	-
Teach Programming	-	S	S
Auxiliary Keyboard Jack	S	S	S
Current Meter	S	O	S
True Spindle Speed Feedback	S	O	S
Network Capable	O	O	S
Electronic Handwheel	S	S	S

(*)Compatibility varies with control version

ADVANCED FEATURES

Flexible Communications

Anyone who has struggled transferring programs to a CNC will appreciate the IBM format 1.44 Mb floppy disk drive and RS232 communications port standard on the Centurion controls.

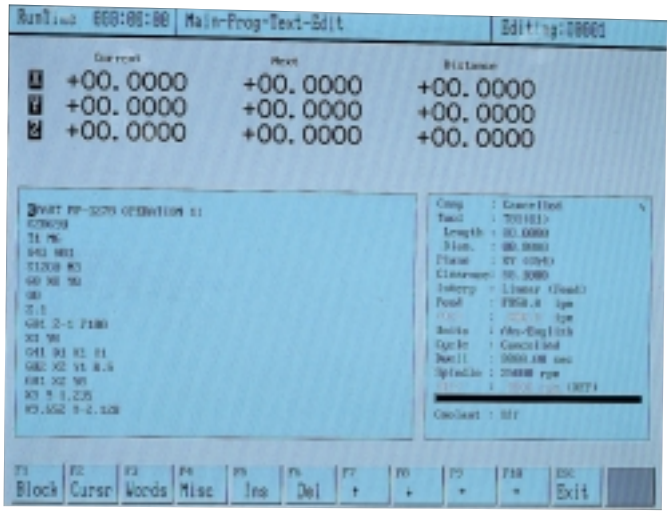
Networking

With Centurion control's PC architecture it is possible to connect to a Local Area Network. Networking offers numerous advantages over RS232 communications as it provides transparent transfer of data at speeds surpassing 1,000,000 baud - more than 100 times faster than typical RS232 communications.

Text Programming / Compatibility

All Centurion controls accept the G and M codes recognized as industry standard. If you currently program in code, utilize a CAD CAM system, or are considering adding a CAD CAM system in the future, you can rest assured that compatibility will not be an issue.

A full word processor style editor is utilized on all CNC controls and offers helpful features such as search, search and replace, cut, copy and move. Programs as large as 8 Mb can be edited concurrent to program execution.



Macro Programming

Powerfull macro programming is standard on all Centurion CNC controls. Macro programming allows you to take full advantage of the CNC capabilities and opens new doors to tool management and more ...

Large Program Execution

Programs surpassing 8 Mb can be executed conventionally without the need for DNC. This large program execution capability not only frees you from restrictive DNC methods, it also permits subprogram calls - greatly enhancing multiple cavity work.

CENTURION 6 SLS

"SLS" Skill Level Select

This innovative feature allows the CNC control to be configured to match the skills of the CNC operator.
We have worked with a number of first-time CNC operators and have recognized that the more features, screens and selections a CNC control has, the more intimidating it is for the operator. Often these selections overwhelm the new operator, undermining confidence and lengthening the learning curve.

Skill Level Select solves this by allowing the operator to enable/disable features to a comfortable level. Operate the CNC in an easy to use two axis format, step up to a simplified three axis operation and, when ready, turn on all the features to maximize productivity.

In the highest skill level you will be ready for even the most challenging programs - from custom codes to parametric programming.
Truly a control that meets all needs!

On-line Help

In another effort to help the new operator the Centurion 6 SLS control is equipped with on-line help.

If an operator has a question about a conversational programming screen, pressing the Help button will pull down an illustration defining the operation at hand.

Manual Operation with Teach Programming

The SLS control not only supports full manual operation of the machine, it also allows a program to be constructed as the machine is operated manually. When manually machining a part for the first time an operator simply needs to press a button after each move and the present machine location is stored in an executable CNC program. The program is stored both in conversational and ISO format making future editing easy.

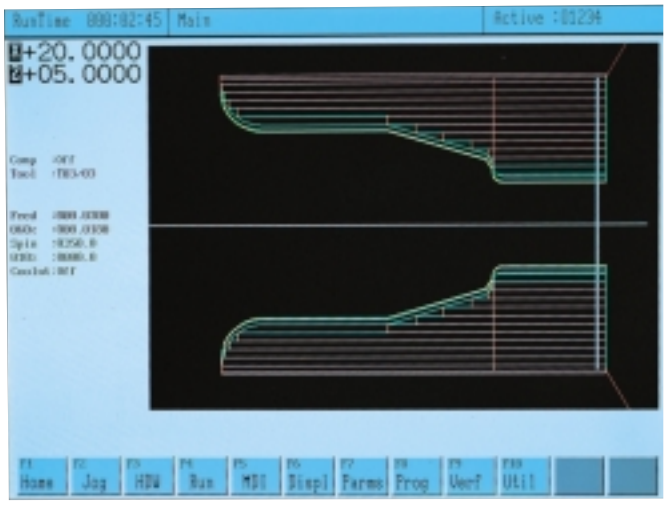
Dual Handwheel Operation (Option)

An electronic dual handwheel station can be added to any SLS control. This option places the X and Y axis handwheels in a convenient location to reduce operator fatigue.

CENTURION 6T LATHE

Manual Operation

The Centurion 6T CNC control fills the void between manual engine lathes and difficult to use CNC turning centers. Operation in full manual, simple MDI and fully automatic operation is standard. For full manual operation a conveniently located remote panel places the necessary controls at the operators fingertips. Single operations that cannot be made by simply turning handwheels, such as tapers, radii and threading, can be made quickly and easily with conversationally prompted MDI screens.



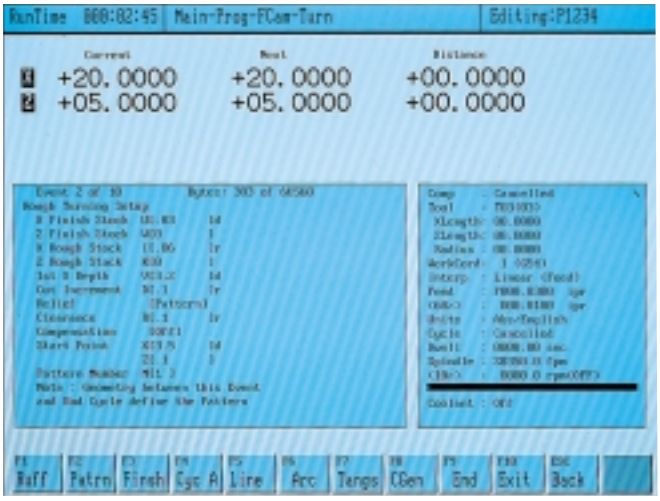
Teach Mode Programming

Teach mode programming allows an operator to construct a program through a combination of manual and MDI commands. Other teach systems only allow manual machine movements to be entered into a program. These systems are highly restrictive in that it is impossible to cut threads, radii and tapers by simply turning a handwheel. The Centurion 6T control allows not only manual moves to be entered directly into a program, but also a series of conversationally prompted MDI events including threading, tapers and arcs.

Automatic Operation

Like the other Centurion CNC controls the Centurion 6T control has all of the advanced features you could ask for. Conversational programming, Trig Help, Graphics and more are all standard.

Virtually any part can be programmed quickly and easily with conversational programming.



DIGITIZING

Digitizing

Digitizing option permits quick, easy and cost effective duplication of parts with unattended operation.

In lathe applications a digitized 2D part profile is ready to run at the CNC with no additional processing. Output file is standard ISO G and M code. Not only can it be edited with any text editor, it can also be input into other CNC controls to maximize productivity.

In milling applications both 2D part profiles and complex 3D surfaces can be captured. Output is standard ISO G and M code as well. With the use of the off-line Digiscan software a digitized file can be inverted (male to female), cutter compensated, scaled, rotated, mirror imaged and more... Digiscan can also translate the file into a DXF or CDL format for input into popular CAD CAM systems.
Even if your needs do not call for Digitizing now it can be installed on all Centurion controls at a later date - installation is a simple four wire connection.

Increased Data Storage

6 MB or optional 140 MB program storage available utilizing reliable “Disk - on - Chip”® technology. 2 GB hard drive may also be added for increased storage capability.

Tool Offset Probing

A table mounted probe allows tool radius and length offsets to be set quickly and consistently. Probe can be used in-process to determine tool breakage.

Workpiece Probing

The Workpiece Probing option aids in repeat setup of difficult parts. It provides the ability to automatically set and correct work coordinates, tool offsets, rotation angle and more after inspection of a fixtured part.

Off-line Software

Off-line software of all Centurion CNC controls is available. Off-line software allows programs to be created and graphically verified the same as they are at the machine.

Software also serves as a storage library for part programs and supports RS232 communications for trouble free communication with the CNC.
An additional feature allows import of DXF or CDL CAD files which expands difficult part programming capabilities.