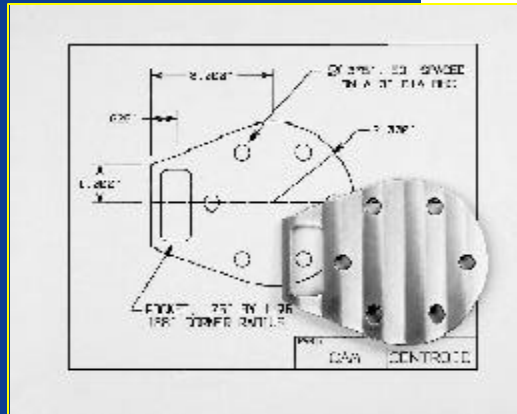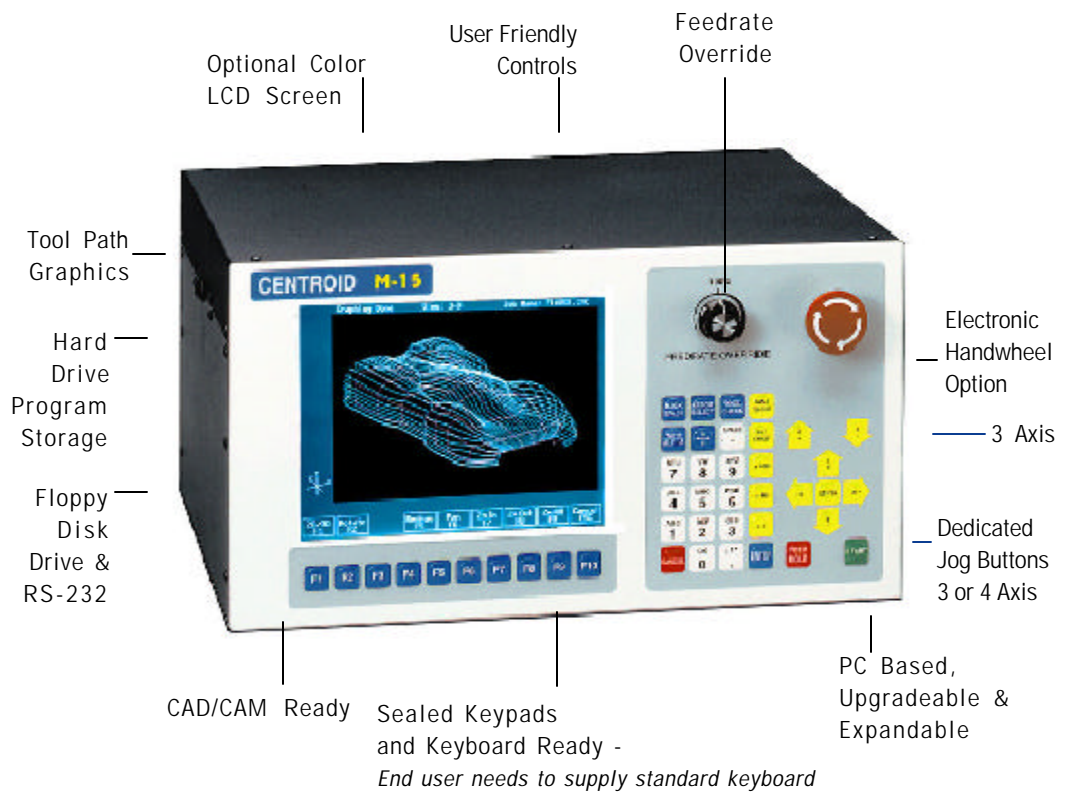# CENTROID™

M-15
CNC Control For Mills

Easy To Use...
The Advanced
Features You
Need!

3 Axis
CNC
Controls

So Easy, You'll Cut Parts The First Day…

With Centroid's easy-to-learn Graphical G-code Editing, simple setup, and full featured 3D graphics, you'll have everything you need to be productive the first day.

Optional Color LCD Screen

User Friendly Controls

Feedrate Override

Tool Path Graphics

Hard Drive Program Storage

Floppy Disk Drive & RS-232

Electronic Handwheel Option

3 Axis

Dedicated Jog Buttons 3 or 4 Axis

CENTROID M-15

CAD/CAM Ready

Sealed Keypads and Keyboard Ready - *End user needs to supply standard keyboard*

PC Based, Upgradeable & Expandable

Graphical G-code Editing
Program lines and arcs graphically. The easy fill-in-the-blank format generates industry standard G-code programs automatically. Lines, arcs, bolt hole circles, and pockets can be programmed directly from the dimensions on your blueprint.

View Your Part…Fast! With 2 & 3D Graphics
Centroid graphics virtually eliminate programming errors. A single touch of a button shows you graphics as you work, even for partially completed programs. Compare your work to the blueprint and get back to your program quickly. For an even better look, zoom and pan your part, or change to 3D to get an isometric view.

Canned Cycles
Canned cycles make everyday jobs a snap. Choose bolt hole patterns, rectangular or circular pockets and frames, or facing. Use Repeat to duplicate whole parts, make a matrix of holes, or repeat a contour to depth. Mirror, rotate, and scale your part.

## No Print? No Problem! Use the Teach Feature
With Teach, use an edge finder or the tool itself to "Teach" your way around an existing part. Let the M-15 record the locations of lines and arcs into your program automatically. You can then cut the part like any other program.

Math Help
Centroid's Geometry Solver helps you find those unknown intersections and tangent points that draftsmen often leave off blueprints. Just fill in the known information from the blueprint. Geometry Solver gives you the solution for the unknown points and automatically inserts the answer.

## Fast Setup, Even for 3 Axis Parts
Centroid's M-15 increases your production, while making setup as simple as most 2-axis controls. The Z-axis setup is fast and easy. On-screen "How-to" pictures and menu driven selections make it one of the easiest milling controls to set up and operate.
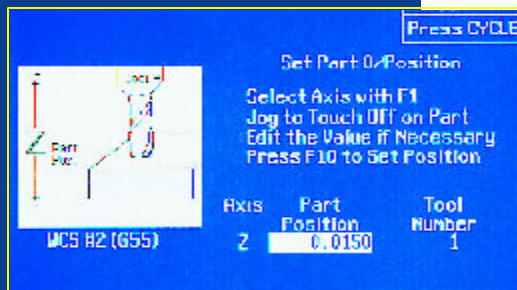
s Fast & Easy Set-Up

High Speed Contouring

The M-15 is perfect for cutting detailed, complex CAD/CAM or Engraving programs at high speeds! Even the largest files can be run without hesitation, thanks to the Unlimited Part Program Size* feature. A high-speed throughput block rate, combined with 2000 block accel/decel lookahead, the M-15 cuts at 100 in./min. while holding tight tolerances. Many controls make that claim, but few can actually do it.
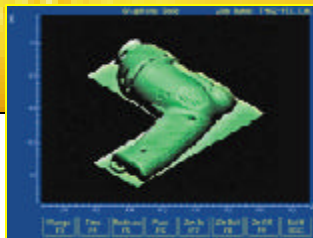
▲ Digitizing & Probing

◄ Create & Manipulate

Digitizing*

Copy contoured 3D surfaces found on freeform or artistic parts. Duplicate surfaces automatically using Digitizing and your existing machine; an extra computer is not needed. Cut an exact 1:1 duplicate without program modifications, or export the surface data for editing with your off-line CAD/CAM system.

Probing Cycles*

Let Centroid's Probing cycles save your shop countless hours of setup time. Whether it's establishing fixture offsets, measuring tool heights, or finding part edges; Probing does it for you. Use any one of the six handy automatic cycles to find part centers and corners of pockets, bosses, and slots.

CAD/CAM and Engraving

Import DXF (CAD drawings) and lay down toolpaths at the control. *Mastercam v3.21 Level 1, standard on all color models. Use for pocketing, island avoidance, and contouring, includes automatic finish pass, radius on and off, depth repeat, mirror, scale, and copy. For 3D shapes, upgrade to Mastercam Level 2 fpr Swept, Rule, and Revolved surfaces. Engrave letters, numbers, and symbols with Centroid Engraving; write on an arc or angle, quick and simple to use, has 20 built-in fonts.

Work Coordinate Systems*, Subprograms and Macros*

Cut the same part programs in multiple vises or fixtures with Multiple Work Coordinate Systems (WCS). For those who prefer advanced G-code features, the M-15 also supports subprograms and macros.

Retrofits and Special Applications

Centroid CNC controls fit a wide variety of applications. Revitalizing old NC/CNC machines with a new M-15 is a profitable alternative that many shops are choosing. Centroid's fully prepared kit includes console, servo amplifier, motors, 110 volt operation, and support arm — all pre-wired and ready to bolt on. There's nothing else to buy. Centroid's product support, ease of use, and superior design assures success.

Optional Equipment

So Advanced, You'll Cut Parts The Competition Can't

Centroid's M-15 gives you advanced features needed to tackle jobs other controls can't. High Speed Continuous Contouring combined with Unlimited Part Program Size*, Multiple Work Coordinate Systems*, Digitizing*, Probing* and Engraving* give you the ability to program and cut unusual or complex 3D parts. And since all Centroid controls are PC based, your M-15 can grow to meet all your future needs.

Optional Automatic Tool Measurement
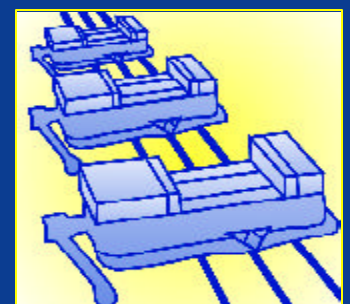
s Supports Multiple Vises

Control Computer Features

- 32 bit PC Based DSP technology
- Updateable software
- High-speed block process speed
- Internal hard drive
- Digital servo drives and motors
- Alphanumeric keyboard (splash-proof)
- VGA LCD display
- RS-232, mouse, & parallel ports
- Mastercam v.3.21, Level 1*

Axis Control

- High-speed 3D contouring
- 3-axis simultaneous control
- 640kb standard program size (unlimited part program size optional
- CAD/CAM ready
- Least input increment of .0001" (.001mm)
- Emergency stop
- Hold tolerances even on high-speed moves
- Backlash compensation
- Lead screw compensation

Operation

- Icon and Soft Key-based operating system
- MDI
- Run mode
- Single block mode
- Manual feed mode (jog) incremental or continuous feed
- Manual pulse generator (MPG optional, 2 types)
- Sequence and N number search
- Program restart with Smart search

Interpolation

- Positioning [G0]
- Linear interpolation (3 or 4-axis simultaneously) [G1]
- Circular interpolation (any plane) [G2&3]
- Helical interpolation (any plane) [G2&3]
- Dwell [G4]

Programming

- Conversational
- Mastercam Version 3.21 Level 1*
- EIA FANUC™ style G-codes
- 3D toolpath graphics (G-code backplot)
- Program number = DOS legal file name
- Sequence number N with 9 digits
- Absolute / Incremental programming [G90&91]
- Inch /metric conversion [G20&21]
- Circular interpolation planes [G17-19]
- Coordinate system setting [G92]
- Specifying the radius of an arc (R value)
- Data setting [G10]
- Canned drilling cycles [G73,80,81,82,83,85,89]
- Work coordinate system options:
  [G28] Reference Point Return
  [G29] Return from Reference Point
  [G30] 2nd Reference Point Return
  [G52] Local Coordinate System
  [G53] Machine Coordinate System

Graphical G-code Editing

- Full 3D graphics (isometric and tri-planar)
- Pocket cycles (circular and rectangular)
- Frame mill cycle (circular and rectangular)
- Ramped plunges on canned cycles
- Position, line, arc events
- Automatic corner radius
- Subroutines for copy, repeat, rotate, mirror; with nesting
- Drilling cycles
- Tapping cycles
- Bolt hole circles
- Boring cycles
- Automatic angle calculator
- Graphical Math Help for solving angles, intersections, tangents; with paste to event
- Linear and polar values on same event
- Run time estimate

Specifications subject to change without notice.

Limited time offer. Required Color Display

Full M-Function Control

M-functions are programmable for special considerations. The following is a list of the predefined M-codes supplied with the M-15 control.

M00 Stop	M102 Program restart
M01 Optional stop	M103 Start timer
M02 Home, restart	M104 Cancel timer
M25 Z to home	M108 Enable feed & spindle override
M26 Set home	M109 Disable feed & spindle override
M93 Release power	

Tool Functions, Tool Compensation

- Tool function T0 - T200
- Tool offset 200 pairs ± 6 digits
- Tool length compensation [G43&44]
- Tool length compensation cancel [G49]
- Tool radius compensation [G41&42]
- Tool radius compensation cancel [G40]

Part Program Storage and Editing

- Program storage = available hard drive space
- Full screen unlimited file size text editor
- Read / write to floppy disk
- Built-in hard drive
- Save programs off-line via comport / RS232 or LAN connection

Feed Function

- Rapid traverse
- Rapid traverse override (variable via feedrate pot)
- Rapid traverse automatic accel / decel
- Feedrate override 2% to 200% variable

Display

- VGA LCD Display
- Current position display (DRO)
- Status display
- Program display
- Run time & parts counter
- Directory load function
- Self diagnostics
- Real time alarm message display
- English language (Spanish optional)

Data Input/Output and Communications

- 1.44 MB floppy disk drive, DOS-compatible
- RS-232
- PC LAN compatible

Utilities

- Format floppy command
- Backup data & system files (menu driven)
- Restore data & system files (menu driven)
- PLC and system diagnostics
- Import/export program

Physical Characteristics

- 9" x 17" x 13" Control Console
- Electrical enclosure weight: 50 lbs.
- Console weight: 29 lbs.

M-15 Options

- Graphical G-code Editing
- Engraving
- Digitizing: grid and radial, with mult. patches
- Probing cycles: boss, bore, web, pocket
- Tapping cycles*
- Work coordinate systems [G28-30 and G52-59]
- Subprograms [M98] and Macros [M65]
- Mirror and Scaling [G50&51]
- MPG handwheel
- Mastercam. level 2*
- PC Keyboard Tray
- Ball screw compensation

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