

WinDelta

CNC System



CNC Specifications



CNC Hardware Specs

- Intel Atom D2550/*Core i7 CPU 2 GB DDR3 Memory • 16 GB SSD/*64 GB SSD Storage • Serial Ports • RS232, RS422/RS485 Networking • T10/T100 Ethernet Port Device • 1x PS/2, 2x USB 2.0 10.4"/12.1" TFT LCD Inputs • Display • 4:3 AR, 800 x 600 Resolution
 - 400 cd/m² Luminance
 - MDI 1st Panel + 2nd Panel
- **CNC Environmental Specs**
 - Operating Temp
 - Storage Temp •
- Operating Humidity •
- 0 to 50 °C (0 to 122 °F)
- -20 to 60 °C (-4 to 140 °F)
 - 5% to 85% RH, noncondensing

- Handwheel •
- Axis Control •
- Standard I/O
- 8-Function Remote Jog Unit (MPG)
- 5 axis at 0.5 ms servo update rate
- 13 axes at 1 ms servo update rate
 - 59 DI/33 DO
 - 6-channel D/A
 - *5 Channel A/D Optional
- **Expansion I/O** 2x Remote I/O ports (64I/64O each)
- Power Input 24 VDC

- *Indiantan Ontion
- *Indicates Option

- Vibration 16.7 Hz: acceleration of 1.5G
 - 10 to 57 Hz: amplitude of 0.075 mm
 - 57 to 150 Hz: acceleration of 1G
- EMI/EMS 1.5 kV CE certified



Board Options

CONSOLE	CONTROI	DRIVES & MOTORS	
DISPLAY 10.4"/12.1"/15"/17" LCD Touchscreen Display	NODE-1000 Industrial CNC Chassis	DB-87360 Extended I/O Board 100-Pin 6-Axis & System I/O IDC-40 (19 DI/10 DO)	General Drives A/B, CW/CCW, Pulse/Direction, or Valtage Controlled drives
MDI PANEL D5/D6 1 st Panel	PCI-8516M6 6-Axis Motion Board + I/O 100-Pin Axes & System I/O IDC-40 (19 DI/10 DO)	DB-25 (24 DI) IDC-20 (16 DO) DB-87361	or voltage controlled drives
OP PANEL D1/D2/D5/D6 Panels	DB-25 MPG Interface DB-25 24DI IDC-20 (16 DO) RIO-Master x1	Basic I/O Board 100-Pin 6-Axis & System I/O IDC-40 (19 DI/10 DO)	YASKAWA M-II Sigma V/VII Mechatrolink-II Drives
DB-87164/A Panel I/O Board RIO-Slave (641/640)	PCI-8512M2 Yaskawa M-II Motion Board + I/O Yaskawa Mechatrolink-II x2	DB-87363 Extended Yaskawa I/O Board IDC-40 (19 DI/10 DO) DB-25 (24 DI) IDC-20 (16 DO)	MACHINE
MPG Remote Manual Pulse Generator Handwheel	IDC-40 (19 DI/10 DO) DB-25 MPG Interface DB-25 Axis Interface x2 IDC-40 (24 DI/16 DO) RIO-Master x2	DB-87364 Basic Yaskawa I/O Board IDC-40 (19 DI/10 DO)	DB-87164 General I/O Board RIO-Slave (641/640)
	DYNA	PATH 🔦	

Console Options

Mode Switch Series

DynaPath Mode Screen Series





D6





CNC Features and Functions

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	JOG	MPG		TOOL	T			ALIGN / SPOIL BOARD	BACK		

WOODWISE JO	G	SYSTE	M TAG	2014/7 Priority	/15 PM 02:43:0 /: None
SYSTEM INPUT BITS	SYSTEM OUTPUT BITS	BITS	BITS		SCROLL
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0SHLa	0COTR	0YSVs	1154	1RpLa —	
OSLLa	0×ldx	0ZSVs	1ErRL	1SSEq	SCROLL
0EDTa	0Yldx	0CSVs	1156	1SIPa	DOWN
0MEMa	0Zldx	0XSYs	1157	1TpMa	
OMDIa	0Cldx	0YSYs	1158	1TpAg	SCROLL
0JOGq	0WCcq	0ZSYs	1159	1TpNa	LEFT
0INCa	0PLBa	0CSYs	1MEdt	1RTAa	
0MPGa	1075	1118	1SIGq	1SZra	SCROLL
0HOMa	0XLLa	1119	1SvEr	1HdnX	PIGHT
0HokX	0YLLa	1120	1RTCa	1HdnY	Kiohi
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4				•	RESET
MESSAGE:	Machine Homin	g Is Required			
INPUT OUTPUT	SYSTEM BIT	SYSTEM REGISTER		AUXILIARY BIT	BACK

Operation	•	Mode Switch, Mode Select, or
		touchscreen only
Manual Mode	•	Jog, Inc. Jog, MPG, DRO
		functions
Home Mode	•	Individual axis or simultaneous
	•	Home location offset
Tool and	٠	54 Fixture offsets plus External
Fixture Tables	•	Tool length, radius, wear tables
	•	Workpiece align functions
Auto Mode	•	MDI, Memory functions
	•	Feed, Spindle, Rapid overrides
	•	MPG Run, Retrace at any line
Edit Mode	•	ISO G/M/S/T-Code support
	•	Save to, Load from USB
	•	Built-in FTP server for remote
		part program management
Conversational	٠	Irregular contours, pockets,
Programming		and islands
	٠	Background editing
	•	DXF Import
System	•	Remote diagnostics
	•	Alarm history management
	•	User access levels

- Motion 6 CNC synchronous axes
 - 6 PLC axes
 - 4 independent paths
 - 2 independent channels
 - PTP, Linear, circular, helical, NURBS interpolation
 - Abs/Rel position move
 - ECAM, E-gearing registration
 - 1000 block look-ahead
 - Corner accuracy setting
 - Jerk control
 - Trapezoidal and S-curve accel/decel
 - Soft axis limits
 - Backlash, pitch error compensation
 - Tool radius, length compensation
 - Canned cycle and macro support
 - 20 μs / 5 μs block processing
 - 500 μ s / 1000 μ s servo update time
 - Fully Digital / Analog voltage command
 - Position loop feedback PI, feed forward
 - Notch filter for resonance control
- **Tuning** Online servo tuning for resonance, vibration, torque filter, velocity loop, position loop, and feed-forward



Software Specifications



Mil_CNC4 - Project Manager (Win32) - (Sin	1)			-	10.000	10.0	
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* Information							
() System), Build), Log), Find in Files							
Ready							NUM

	•
Preprocess	•
opeca	•
DI Map	•
DO Map	•
Aux Bit Map	•

Kernel & OS •

- **Register Map**
 - Timers 1024
 - Counters 1024 ٠
 - PLC Ladder, ST, FB, IL

runtime)

access cost

0.08 ms

3072

3072

4096

4096

- IEC61131-3 standard
- Multiple modules, each with multiple files

Windows XP Embedded

18 ns PLC function DWORD

500 PLC rungs (with add, sub,

mul, and div functions) under

Real-time multi-task kernel (RTX

- 1/10/100 ms deterministic execution
- External PLC
- GNU C/C++ DLL (call-C)

- PLC Editing
 - Get/set bits and registers by tag Online editing
 - Remote monitoring/debugging
 - Equipped with all standard man-HMI Editing • machine interface functions for CNC operation, program editing, coordinate display, parameters tables, alarm diagnostics, and security administration
- Other Features Customizable HMI with GPeX graphical programming tool
 - Can communicate with all major ٠ brand PLCs
 - SQL server with remote access .
 - Web browsing
 - 3D engine for graphics and visualization



Advanced Axis Motion Control and Tuning



Tuning Utility

helps system integrators quickly identify system response data to determine proper gains.

Resonance plots aid system integrators to quickly identify resonance conditions and avoid it by applying a notch filter.



Advanced Path Planning with Look Ahead





Enhanced Accuracy with Feed Forward

Without Feed Forward and Friction Compensation

XY and Z axes motion accuracy is prone to in correctable position errors, as demonstrated in the following plots on a circular tool path of 28.3mm diameter, at 8 m/min feed rate. In this case the final trajectory has a maximum position error exceeding 20 μ m and more than 6 μ m reversal spikes are presented.

With Feed Forward and Friction Compensation

XY and Z axes motion accuracy is greatly increased, as demonstrated in the following plots on a circular tool path of 28.3 mm diameter, at 8 m/min feed rate. The final trajectory has a maximum position error within 5 μ m and the reversal spikes are less than 2 μ m.





Electric Panel Application

The DynaPath WinDelta

CNC system has been adapted for applications ranging from machining centers, turning centers, gear hobbers, tool grinders, optical grinders, and EDMs.

A reference machining center application is illustrated here.

A Minimal System Footprint

enables application flexibility and simplifies integration.



System I/O Daughter Board

aggregates I/O to the system to minimize integration work, while quick change connectors allow easy board serviceability.



Yaskawa Σ-V Mechatrolink-II servo drives offer top end, deterministic, digital communications for daisychaining of up to 32 drives.



DynaPath WinDelta Controls

are designed for heavy duty industrial applications. The fanless, all metal extruded case allows sufficient heat dissipation, while completely sealing itself to protect against dirty environments.



Contact Information

USA

Dynapath Systems, Inc. 34155 Industrial Rd. Livonia, MI 48150

Tel: 248-488-0440 Fax: 248-488-0430 Web: http://www.dynapath.com

Email: sales@dynapath.com

Taiwan

捷准科技股份有限公司 302新竹县竹北市新泰路31号6楼

电话:886-3-554-5710 传真:886-3-554-2241

电子邮件: info@pcbased.com 公司网址: http://www.pcbased.com

Email : info@pcbased.com

China

上海捷准工业自动化设备有限公司 上海市莲花路2080弄50号 邮编:201103

电话: 86-21-64656336 传真: 86-21-64016987

