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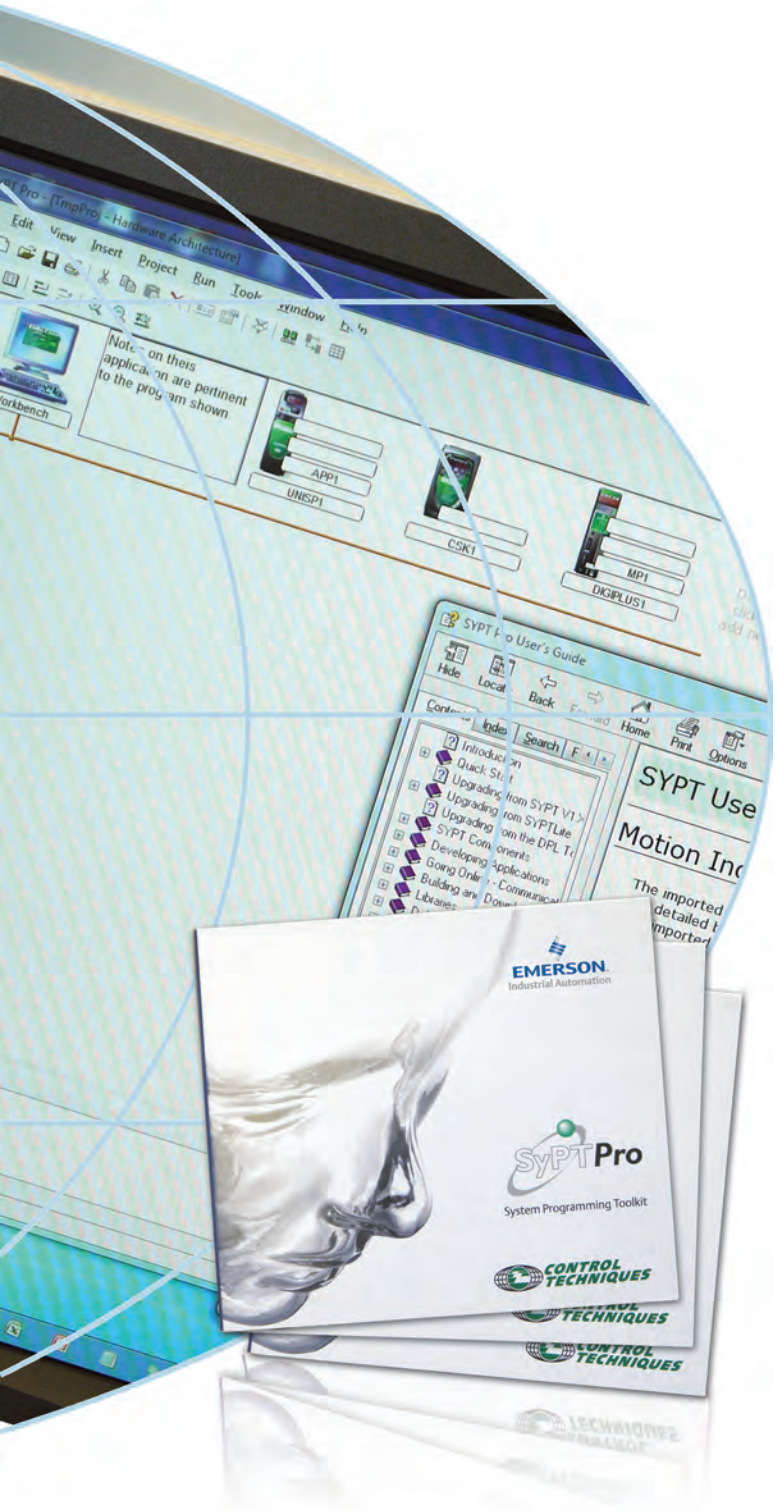
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**EMERSON**<sup>TM</sup>  
Industrial Automation




# Software

Drive Programming  
& Configuration Tools



## Tools for Selecting, Programming and Commissioning Drives



The software featured in this brochure is free of charge and can be downloaded from the “Software” menu under the “Downloads” tab on the Control Techniques website: \*  
[www.controltechniques.com](http://www.controltechniques.com)



Control Techniques' FREE software tools make it easier to access a Control Techniques drive's full feature set.

### FREE, Easy-to-Use Software for Every Need

Emerson Control Techniques' complete line of AC, DC and Servo drives and motors delivers excellent performance and reliability. To provide even greater value for our customer's investment, Control Techniques provides a suite of free software tools with every drive we sell. These powerful PC-based tools provide fast, easy access to the full feature set of Control Techniques soft starters and AC, DC and Servo drives.

Control Techniques software makes it easy to size the right drives to the right application, optimize drive tuning, back-up the configuration, configure the on-board automation and motion controller, and set up drive-to-drive and network communications links.

#### Drive Analysis Software

- **CTSize** – Servo sizing tool
- **CT Energy Savings Estimator**
- **CT Harmonic Calculator** - Supply harmonics calculator

#### Drive Commissioning Software

- **CTSoft, DSSoft, SXSoft** - Drive parameter configuration
- **CTScope** - Real-time software oscilloscope

#### Connectivity Software

- **CTOPCServer** – OPC compliant server for interfacing PC software and Control Techniques drives

#### Programming Software

- **PowerTools Pro** – Easy configuration and programming of servo applications
- **SyPTPro** – Drive automation and motion programming environment
- **SyPTLite** – Ladder program editor for basic PLC control

The software packages connect using Ethernet, CTNet, serial or USB connections. Ethernet communications allow the drives to be accessed remotely from anywhere in the world.

## Control Techniques Software Compatibility

Drive Type	Drive/Control Module	Control Techniques Reference Brochure	Analysis			Commissioning					Connectivity			Programming		
			CT Energy Savings Estimator	CT Harmonic Calculator	CTSize	CTSoft	DSSoft	SXSoft	CTScope	Drive Keypad	CTOPC Server	CTNet	CTSync	SyPTLite	SyPTPro	PowerTools Pro
AC	Commander SK (w/Logic Stick)	BRO-CSK-1107	✓	✓		✓			✓	✓	✓			✓		
	Commander SX	n/a							✓							
	Unidrive SP	BRO-USP-1107	✓	✓		✓			✓	✓	✓			✓	✓	
	Unidrive SP (w/SM-Applications Lite V2)	BRO-SMOP-1107	✓	✓		✓			✓	✓	✓			✓	✓	
	Unidrive SP (w/SM-Applications Plus)		✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	
DC	Mentor MP/Quantum MP (w/SM-Applications Lite V2)	BRO-DCMP-1107	✓	✓		✓			✓	✓	✓			✓	✓	
	Mentor MP/Quantum MP (w/SM-Applications Plus)		✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	
Servo	Unidrive SP (with SM-EZMotion)	BRO-SMOP-1107			✓	✓				✓						✓
	Epsilon EP (all)	BRO-EEP-1107			✓											✓
	Digitax ST-B	BRO-DST-1107			✓	✓			✓	✓	✓			✓		
	Digitax ST-I		✓	✓			✓	✓	✓			✓	✓			
	Digitax ST-P		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓		
	Digitax ST-Z	n/a			✓	✓			✓	✓	✓			✓		✓
	MDS with FM-3 or FM-4 Module				✓											✓
Soft Starters	Digistart CS	FLI-DGCS 1107					✓			✓						
	Digistart IS	FLI-DGIS 1107					✓			✓						

## Innovative Drive Solutions for the 21st Century

### Innovative, Intelligent Drive Technology

Control Techniques offers a full line of motor drives ranging from fractional to 2,900hp and voltage ratings from 120 to 690V. These versatile drives provide scalable communications protocols and PLC intelligence using SM (“Solution Module”) Option Module technology, an innovative modular approach to system design and integration.

These drives deliver exceptional control and the ability to interface with virtually any fieldbus network creating high-speed drive-to-drive networks optimized for peak performance and low cost.



Control Techniques' simple, flexible product lines make choosing the right drive very easy. For more demanding solutions, engineers in our network of Drive and local Application Centers are available to discuss your needs and provide advice.

# Analysis Software – CTSize

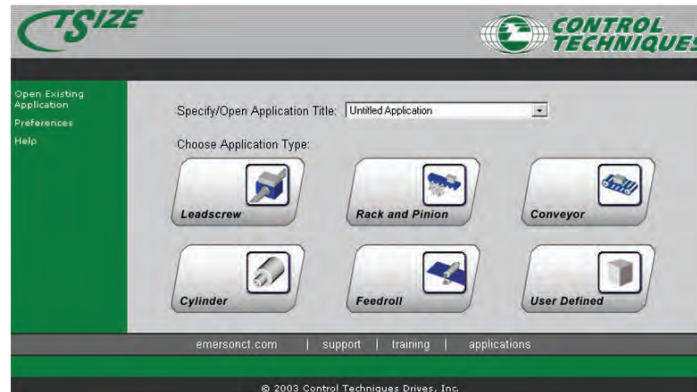
## Key Features:

- User-configurable units — Select Metric or English units or set up custom units
- Extensive Help file — Explains each page of software in a detailed and easily understood format
- Pre-defined and multi-segment profiles — Select one of four basic profile types or create complex profiles with the multi-segment function
- Multiple gearbox reductions — Select up to three stages of speed reduction from five types: Belt/Pulley, Gear/Gear, Chain/Sprocket, User Gearbox and Catalog Gearbox
- Inertia calculator — Select from one of six pre-defined shapes and add or subtract individual inertias
- Detailed printout — Easily document results with the detailed printout of all application requirements and drive/motor combination information

**NOTE:**  
At the time of print, CTSize runs on Windows XP® only. Upcoming releases will be upgraded to run on Windows 7®.

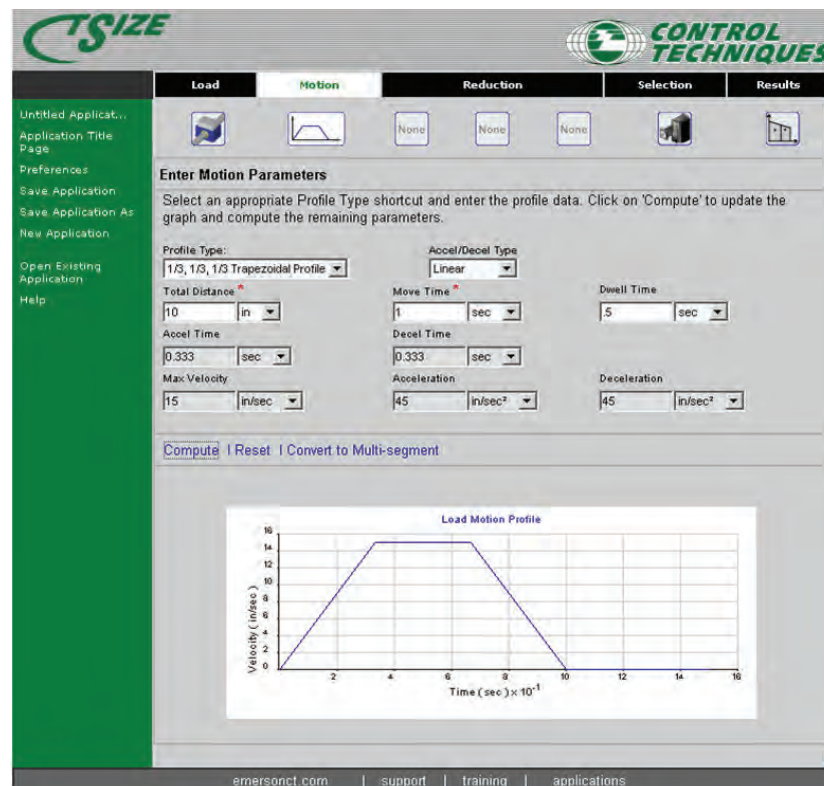
## CTSize Servo Sizing Software

CTSize is an easy-to-use servo sizing software package that quickly steps the user through the sizing process using five structured tabs: Load, Motion, Reduction, Selection and Results. Start with the application's known information and let CTSize do the rest. Pre-configured applications (Leadscrew, Rack-and-Pinion, Conveyor, Cylinder and Feedroll) and user-defined applications facilitate sizing by requiring only the necessary input parameters based on the selected load type.



Select application type from Home page.

When profiles are complete, results are organized with the optimum selection parameters and speed/torque displayed at the top, and alternative solutions listed at the bottom. The list of alternative solutions can be sorted using a variety of filters to quickly find the drive and motor models required.



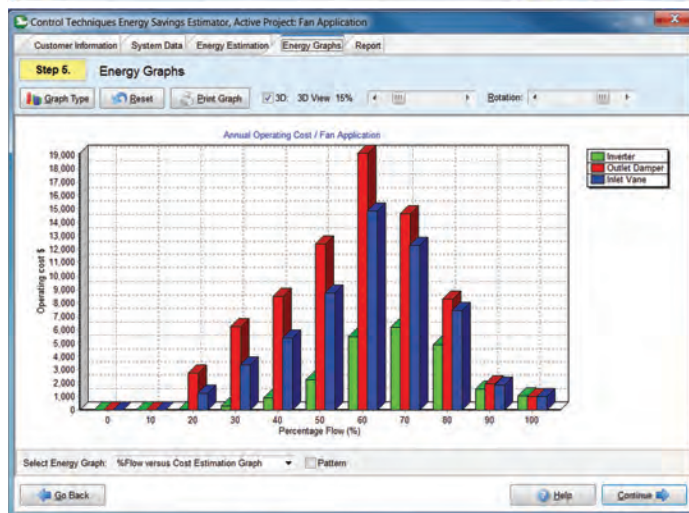
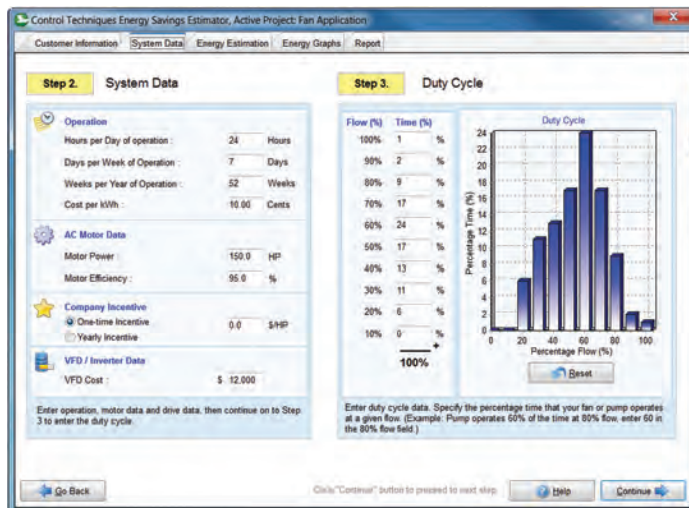
# CT Energy Savings Estimator, CT Harmonic Calculator

## CT Energy Savings Estimator

This energy-optimizing software helps analyze energy usage for fan and pump applications and calculate cost savings using variable frequency drives (VFDs).

### Key Features:

- Compare energy consumption between VFDs and mechanical flow control methods
- Display energy cost, savings and payback data
- Customize client reports
- Built-in engineering calculator
- Carbon dioxide savings
- Helps calculate projected simple payback.

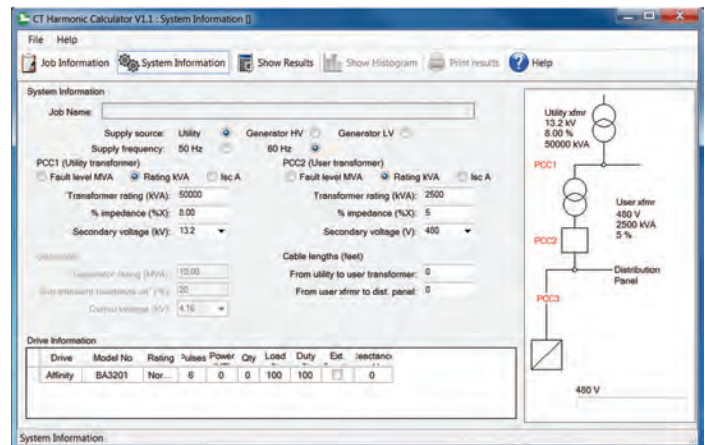


## CT Harmonic Calculator

This tool calculates the supply harmonic levels based upon the electrical supply system characteristics and selected drives. It is used to select the most economical drive configurations that meet the desired local harmonic standards.

### Key Features:

- System harmonic analysis for drive systems
- Analyze drives configured for 12-, 18- or 24-pulse drives
- Compare results with IEEE 519 and IEC 61000-2 limits
- Display results in tabular form or as a histogram



## Commissioning Software – CTSoft



### Key Features:

- Graphical User Interface (GUI) provides dynamic illustrations of analog and digital I/O and internal signal flow
- Parameter database saves, loads complete parameter sets
- Drive can be reset to factory defaults or configurations stored via the software
- Setup wizards
- Parameter listings for each drive menu
- Menu block diagrams
- Terminal configuration
- Parameter comparison (against default and against file)
- Monitoring screens
- Custom lists for storing frequently-used parameters
- Control panel view for Commander SK AC drive with similar functionality to remote keypad

### Overview

All Control Techniques motor drives (with the exception of the Epsilon EP and MDS Servo drives) can be configured for basic operation using keypad controls on the front of the drive. CTSoft and CTScope commissioning software can speed up the setup process by quickly accessing the drive's parameter set and by using built-in wizards and monitoring screens.

### CTSoft Drive Configuration Software

CTSoft is a Microsoft Windows-based drive configuration tool that simplifies and speeds the process of drive system, setup and diagnostics. CTSoft uses wizards to simplify commissioning.

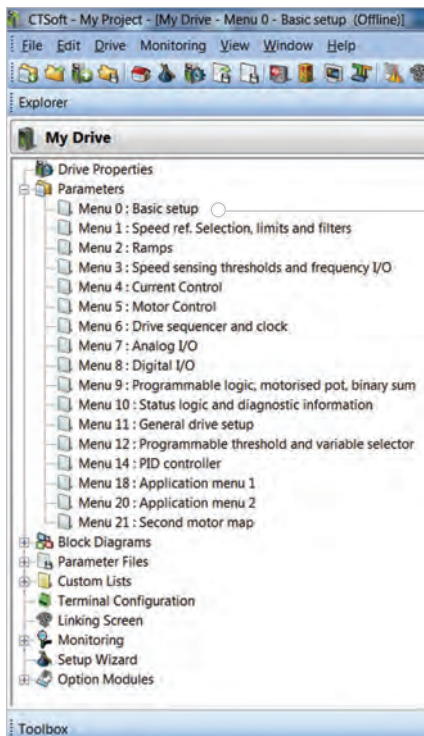
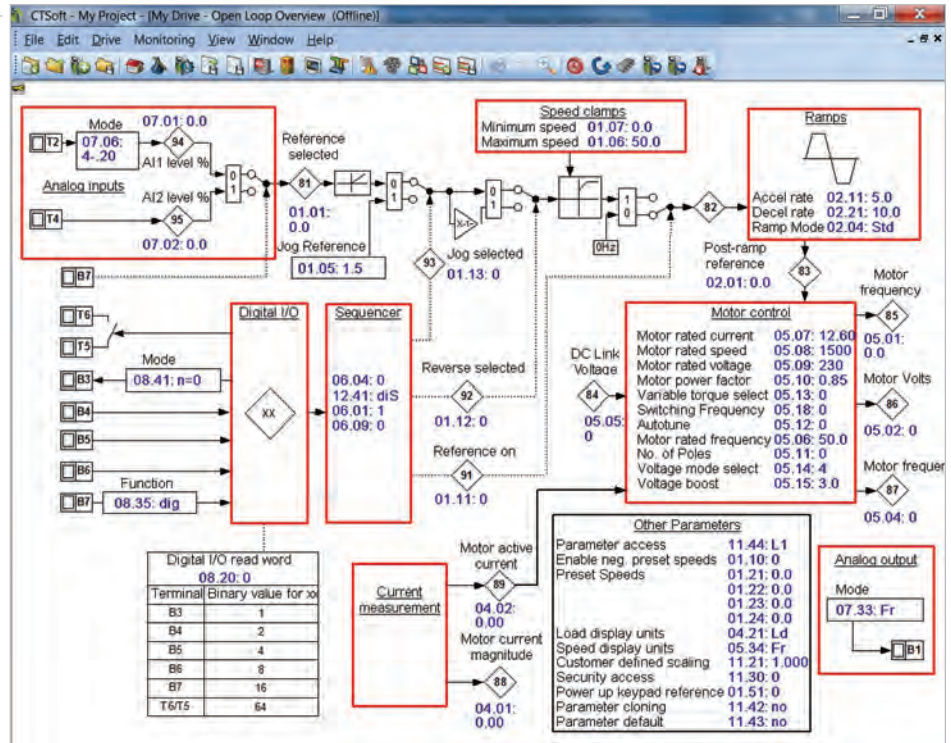
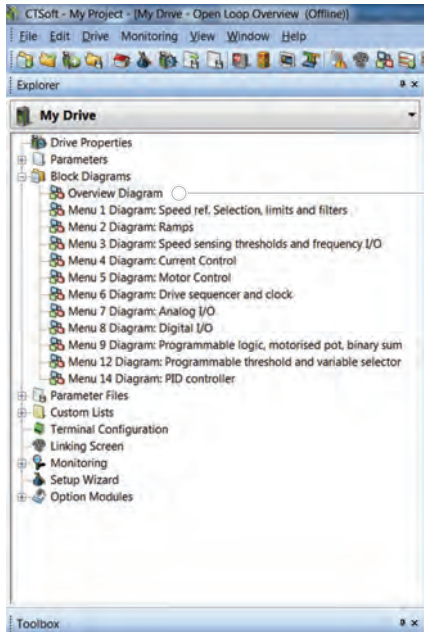


*CTSoft features easy-to-use Setup Wizard to simplify setup*

Parameter programming and monitoring can be accomplished using parameter tables or dynamic graphical flow diagrams (see illustration at top of next page).

### The Control Techniques Value Proposition

When planning a drive control system, it's important to consider the **total cost of ownership**. Unlike other manufacturers, Control Techniques delivers robust, feature-packed AC, DC and Servo drives as well as a suite of **free software** tools with no maintenance or licensing fees.



Related parameters are grouped into logical menus. Once the documentation package is installed, extensive Help menus and parameter descriptions are easily accessible by simply double-clicking on the parameter of interest.

Parameter	Description	Default	Memory	Units
00.00	Parameter 0	0	0	
00.01	Minimum set speed	0.0	0.0	Hz
00.02	Maximum set speed	60.0	60.0	Hz
00.03	Acceleration rate 1	5.0	0.5	s/100 Hz
00.04	Deceleration rate 1	10.0	0.5	s/100 Hz
00.05	Drive configuration	ALAV	ALAV	
00.06	Motor rated current	5.20	3.20	A
00.07	Motor rated full load rpm	1800	1725	RPM
00.08	Motor rated voltage	230	230	V
00.09	Motor rated power factor	0.85	0.83	
00.10	Security status	L1	L2	
00.11	Start / stop logic select	4	4	
00.12	Brake controller enable	diS	diS	
00.15	Jog reference	1.5	1.5	Hz
00.16	Analog input 1 mode (terminal T2)	VeLt	VeLt	
00.17	Allow negative references	OFF	OFF	
00.18	Preset speed 1	0.0	0.0	Hz
00.19	Preset speed 2	0.0	0.0	Hz
00.20	Preset speed 3	0.0	0.1	Hz
00.21	Preset speed 4	0.0	0.0	Hz
00.22	Load display units	Ld	Ld	
00.23	Speed display units	Fr	Fr	
00.24	Customer defined scaling	1.000	1.000	
00.25	User security code	0	0	
00.27	Power-up keypad reference	0	0	
00.28	Parameter cloning	ne	no	
00.29	Load defaults	no	no	
00.30	Ramp mode select	Std	FSLHV	
00.31	Stopping mode select	1	1	
00.32	Dynamic V to f select	OFF	OFF	
00.33	Catch a spinning motor select	0	0	
00.34	Terminal B7 mode select	dig	dig	
00.35	Digital output control (terminal B3)	n=0	n=0	
00.36	Analog output control (terminal B1)	Fr	Fr	
00.37	Maximum switching frequency	3	3	kHz
00.38	Auto-tune	0	0	
00.39	Motor rated frequency	60.0	60.0	Hz
00.40	Number of motor poles	Auto	Auto	

Parameters different from default values are highlighted to facilitate testing and troubleshooting.

# Commissioning Software – DSSoft, CTScope

Also available...

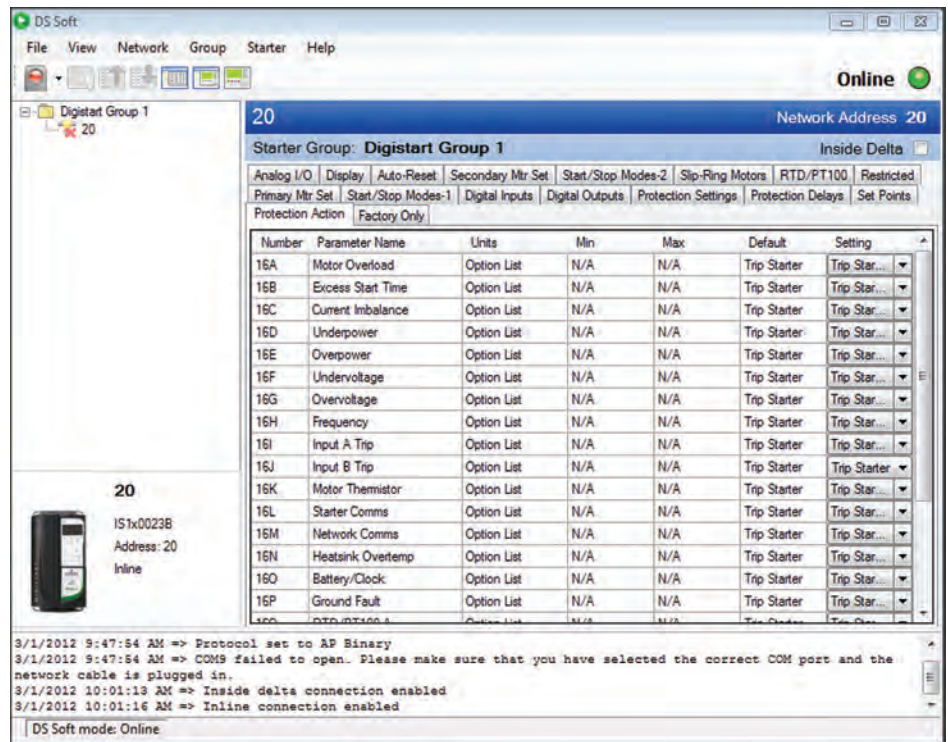
## SXSoft

This parameter configuration tool for Control Techniques Commander SX AC drives allows the user to:

- Easily configure the drive using wizards
- Read, save and load drive configuration settings
- Visualize, modify configuration with animated diagrams

## DSSoft Soft Starter Configuration

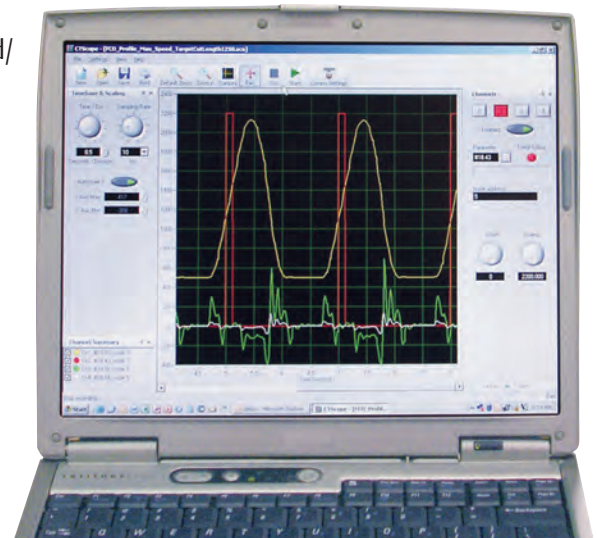
DSSoft commissioning software is used to configure Digistart IS soft starters. The software allows the user to read, save and load soft starter configuration settings.



Note: DSSoft requires a USB or Modbus interface.

## CTScope Digital Oscilloscope

CTScope is a Windows-based software utility designed to trend/trace the value of parameters in Control Techniques drives and SM Option Modules. CTScope has the look and feel of a hardware oscilloscope and can plot up to four channels of data simultaneously. All channel data is shown in single-scope view for easy comparison. Channel data can be offset or scaled to display data with different magnitudes (e.g. comparing a digital input with an encoder count).



## Key Features:

- Each channel can obtain parameter value from a different node address
- Start and Stop triggers available (e.g. start on the rising edge of a parameter value)
- Files can be saved with or without recorded data
- Cursors measure differences between points on traced data
- Scope view can be scrolled or panned to examine past recorded data or zoomed to examine small data artifacts



# Connectivity Software – CTOPCServer, Fieldbus

## CTOPCServer

Based on a Microsoft Windows foundation, CTOPCServer provides open and transparent data exchange with higher-level information systems. OPC has become the industry standard for connecting industrial automation components to higher-level information systems including:

- SCADA (Supervisory, Control and Data Access)
- MRP (Manufacturing Resource Planning)
- ERP (Enterprise Resource Planning)
- Other productivity solutions

It is very common for these information systems to include an OPC client that can connect to any number of OPC server-enabled devices such as CTOPCServer or other third-party servers. The standard allows OPC clients to browse data from the server thus eliminating the need for gateway data concentrators or proprietary drivers and gateways.

CTOPCServer “serves” data to the various OPC clients. Typically, the CTOPC server will reside on the same PC as the OPC client. The CTOPC server then polls data from all the Control Technique components connected via Modbus RTU, Modbus TCP/IP or CNet (see brochure BRO-OPTIONS-1107 for more information on CNet).

The CTOPC server is configured through a Microsoft Excel spreadsheet that defines which data is polled from the various components on the network. The OPC client is configured to connect to CTOPCServer. The OPC client can then be used to browse and select data from CTOPCServer.

## Fieldbus Communications

Control Techniques recognizes the importance of simplicity in fieldbus communications. Incorporating a vast range of fieldbus options onto our drives has been an important step in making system configuration and troubleshooting quick and easy. From SM (“Solutions Modules”) Option Modules to FM (“Function Modules”) modules and built-in drive communications, Control Techniques offers its customers fieldbus solutions that are so flexible and easy, some customers have used our drives as network gateways!

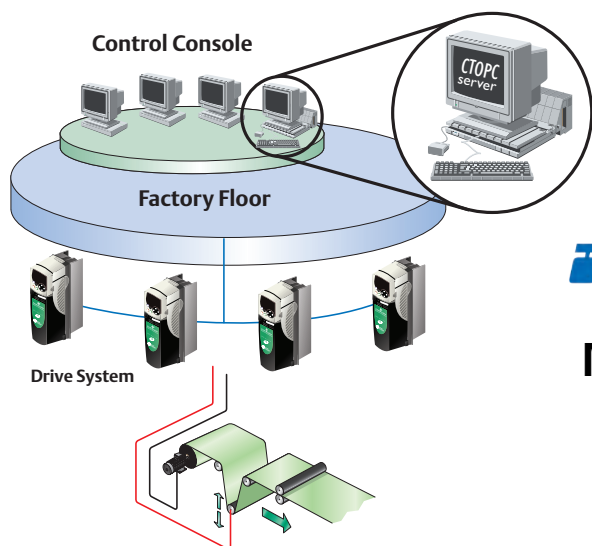
Choose the master controller, select the fieldbus of choice, then choose Control Techniques – the industry’s most flexible drives.

### How it works...

Fieldbus networks exchange data using either cyclic or acyclic data. Cyclic data is information pre-configured to pass from one device to another at a known rate. Cyclic data is expected on both the sender and the receiver end of the message. Therefore, if this cyclic data is not delivered with the proper timing, faults will occur on the network that may be monitored for reliability assurance.

Acyclic messages are messages that are sent and received at any time as they are generated by the sender. Acyclic messages generally have a lower priority than cyclic messages and they incorporate a “request” / “response” communications scheme in which the message sender waits to receive a response from the target before generating another message. This response tells the sender whether or not the message was successfully transmitted over the network.

A wide array of communications options is available:



## “Motion Made Easy”™

“Motion Made Easy” is more than just a collection of motion products, it is a comprehensive motion control philosophy focused on providing a motion control system that is easy to Select, Setup, Program and Service. “Motion Made Easy” scalable servo solutions integrate the industry’s easiest-to-use motion control software with powerful, intelligent servo drives and rugged, reliable servo motors.

### Easy Selection

CTSize software assists with the selection of matched motors and drives. The software generates drive-matched speed-to-torque curves that can be printed or saved for comparing different motion profiles.

### Easy Setup and Programming

Selecting motion capabilities is made easy using PowerTools Pro’s drag-and-drop, point-and-click and fill-in-the-blank programming for base and indexing set-up plus easy-to-use macros for more complex applications. PowerTools Pro is used with Control Techniques Servo drives including Epsilon EP, MDS and Digitax ST-Z and Unidrive SP equipped with SM-EZMotion Option Module.

### Easy Network Setup

PowerTools Pro’s drag-and-drop, point-and-click and fill-in-the-blank approach is also used to quickly and easily configure networks. Supported networks include Modbus RTU/TCP (follower), RTU/TCP (master) and EtherNet/IP and other industrial-standard networks.



# Programming Software – PowerTools Pro

# PowerTools Pro

## PowerTools Pro Motion Control Software

PowerTools Pro software enables users to fully realize the power of Control Techniques’ SM-EZMotion Option Module, FM3/FM4 module, Epsilon EP-B/I/P Servo drives, Digitax ST-Z Servo drives and Unidrive SP Servo drives. A familiar Microsoft Windows interface provides operators and machine builders with the tools to access everything needed for complete servo control – Motion Profiles, Logic Control, Programmable Limit Switches, Queuing, Analog-In, User Variables, High-Speed Capture, Electronic Gearing, background tasks and more.

### Key Features:

- Quick, easy application development
- Familiar hierarchy view provides an easy, flexible and powerful programming environment
- Scrolling menu selections
- “Drag-and-drop” parameters and I/O assignments
- “Fill-in-the-blank” programming
- Software oscilloscope and online Watch Window for diagnostic, fault and parameter updates

### Matching Controls to Applications

A properly matched servo drive and motor is capable of running hundreds of different applications. What differentiates these applications is the type of control needed to ensure correct operation and performance. The “Motion Made Easy” product family allows the user to specify the amount and type of control needed for an application. From simple speed control to complex synchronized motion control, choose the module with the features needed to optimize high-performance Control Techniques drives (see table, right).

### Six-Step, Top-Down Simplicity

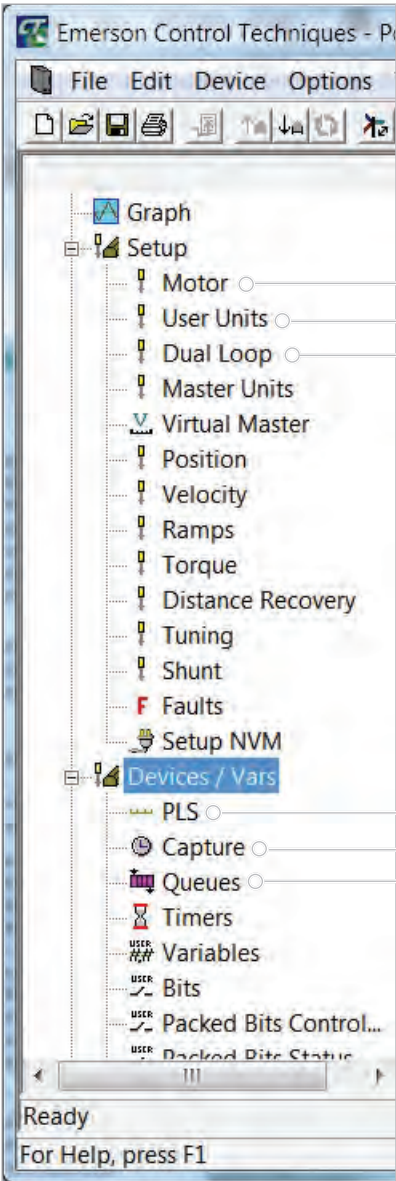
Developing applications with PowerTools Pro is an easy six-step, top-down process that gets applications up and running quickly. The six task areas that need to be completed – in order – are:

1. Hardware configuration
2. Drive setup
3. I/O setup
4. Network
5. Motion
6. Programs

Some criteria may not need completing as some applications such as a “flying cutoff” require neither “programming” nor network parameters to operate.

Functions	FM3E	Epsilon EP-B	Epsilon EP-I	Epsilon EP-P	Digitax ST-Z Unidrive SP
Analog Input Control	✓	✓	✓	✓	✓
Analog Output	✓	✓	✓	✓	✓
Auto-tune	✓	✓	✓	✓	✓
Custom Motors	✓	✓	✓	✓	✓
DeviceNet Option	✓		✓	✓	✓
Homing	✓		✓	✓	✓
Index Chaining, Compounding	✓		✓	✓	✓
Indexing	✓		✓	✓	✓
Jogging	✓	✓	✓	✓	✓
Modbus RTU	✓	✓	✓	✓	✓
Motor Brake Control	✓		✓	✓	✓
Position, Velocity Mode	✓	✓	✓	✓	✓
Rotary Rollover	✓		✓	✓	✓
Software Oscilloscope	✓	✓	✓	✓	✓
Software Watch Window	✓	✓	✓	✓	✓
Torque Level Flags	✓		✓	✓	✓
Torque Limit	✓	✓	✓	✓	✓
User Units	✓		✓	✓	✓
Ethernet Option	✓			✓	✓
Feedhold, Feedrate Override	✓			✓	✓
Gearing	✓			✓	✓
LCD Keypad/Display	✓	✓			✓
NVM Parameter Storage	✓			✓	✓
Position Capture	✓	✓		✓	✓
Profibus Option	✓			✓	✓
Programmable Limit Switch	✓			✓	✓
S-Curve Ramps	✓			✓	✓
Secure Download	✓			✓	✓
Synchronized Motion	✓			✓	✓
Timed Index	✓			✓	✓
User Programs	✓			✓	✓
User Variables, User Bits	✓			✓	✓
Camming				✓	✓
Modbus Master				✓	✓
Multiple Profile Summation				✓	✓
Position Capture Object				✓	✓
Program Multi-tasking				✓	✓
Queuing				✓	✓
Timers	✓			✓	✓
Torque Mode	✓	✓		✓	✓
Virtual Master	✓			✓	✓
Absolute Encoder Feedback					✓
Dual Loop Mode				✓	✓

# Programming Software – PowerTools Pro



## Easy Hardware Configuration

### Motor Selection and Tuning

Select motor data for Control Techniques-supported motors or use the motor AutoTune routine for third party motors. Each motion is capable of having a real-time or encoder-generated time base and all are accessible via programs, I/O or PowerTools Pro's online screen as well as Modbus, DeviceNet, Profibus and Ethernet.

### Units Setup

All motion is configured in "User Units" which are selected based on real machine parameters. Select inches, millimeters, degrees or whichever unit of measure the application calls for. Simply scale the units into units of revolutions once and the remainder are completed automatically.

### Dual Loop

Allows a second encoder to be used for position as well as a motor encoder used for velocity and commutation. Excellent for linear actuator applications where there is a requirement for minimizing backlash in the mechanical system.

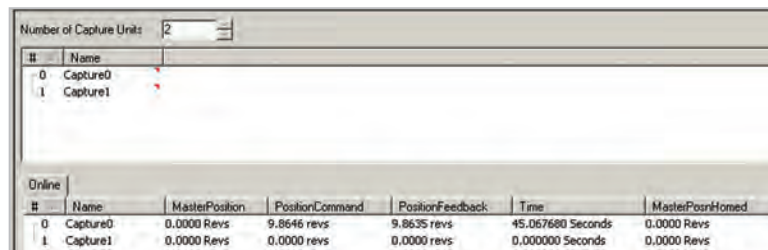
## Easy Device Setup

### PLS

Configurable PLS functionality adds advanced flexibility normally found on complex PC-based systems. In addition to local PLS functionality which may be configured for every index, users may add up to 8 configurable global PLSs. Sources for the global PLSs include Motor Position Feedback, Motor Position Command and Master Position Feedback.

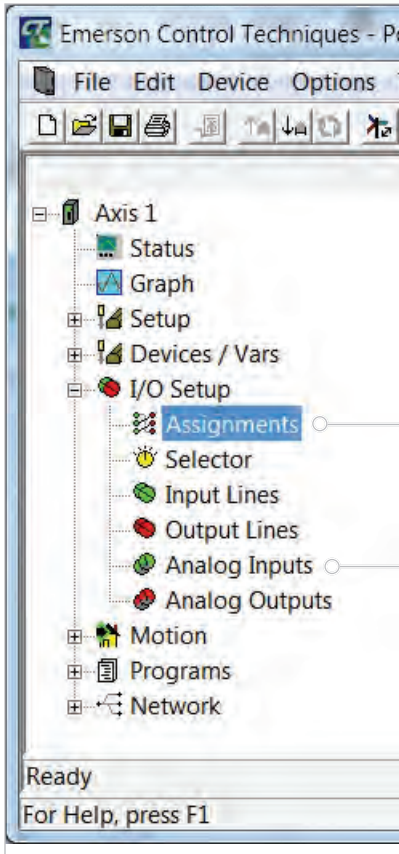
### Capture

Many high-speed applications require the ability to accurately capture a position at a specified moment in time so that a motion profile can be initialized. Enter the Position Capture object. The capture component is fully controlled by the user and, when activated, captures and stores (within 1 to 2µsec): Time, Command Position, Feedback Position and Master Feedback Position.



Number of Capture Units: 2						
#	Name	MasterPosition	PositionCommand	PositionFeedback	Time	MasterPosHomed
0	Capture0	0.0000 Revs	9.8646 revs	9.8635 revs	45.067680 Seconds	0.0000 Revs
1	Capture1	0.0000 Revs	0.0000 revs	0.0000 revs	0.000000 Seconds	0.0000 Revs

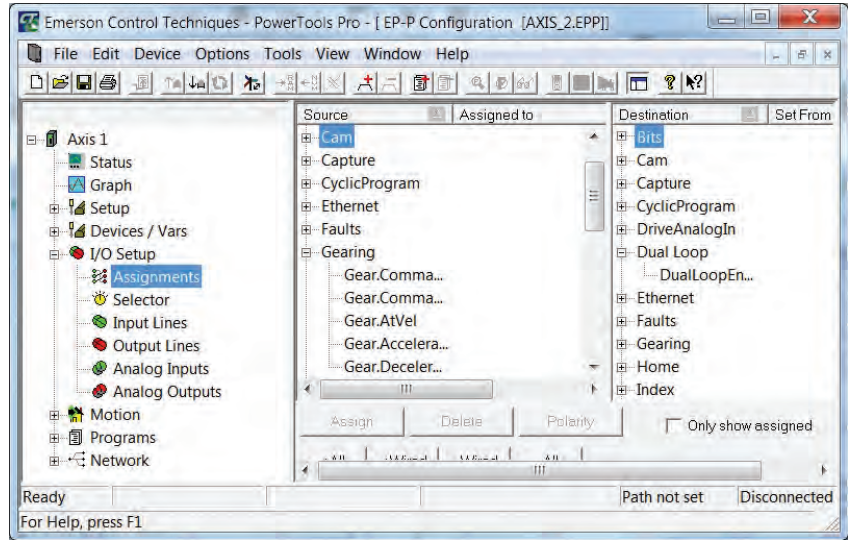
**Queues** – Queue is used in applications where multiple products exist between the incoming product sensor and the location where the process takes place (i.e. applying labels, bar code printing, vision inspection, part rejection, etc.). Up to eight queues can be used simultaneously to control all of the processes in an application.



## Easy I/O Setup

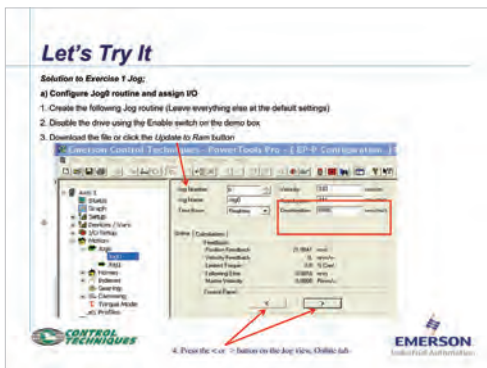
### Assignments

PowerTools Pro's "virtual wiring" allows users to create programs right out of the box without writing a single line of code. For example, the assignment view below shows how easily a camming routine can be initialized.

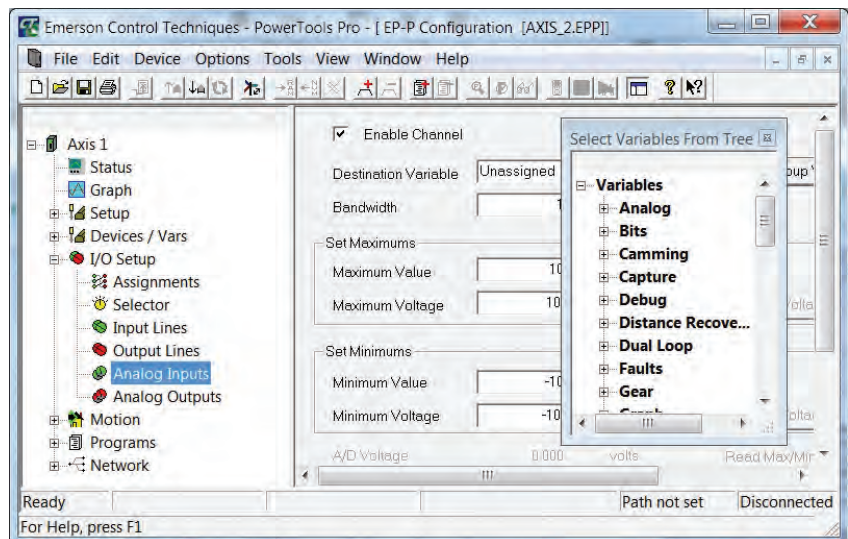


### Analog Inputs

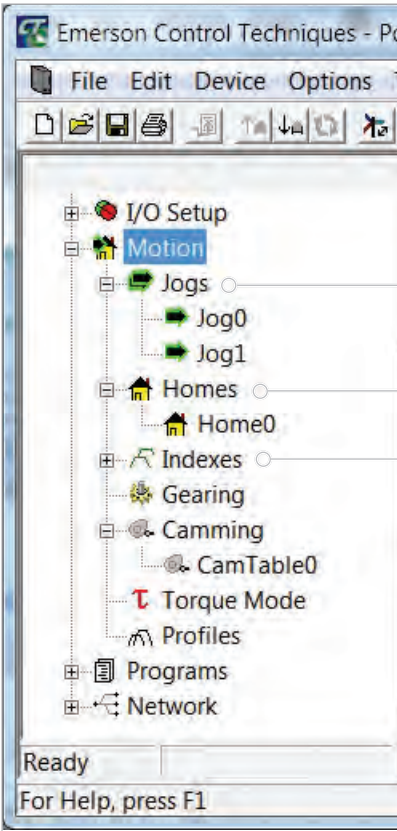
Use Analog Input to adjust velocity, torque, distance or any other parameter in the module (see below). Instead of trying to convert Volts into other units, simply enter the maximum/minimum voltages and the corresponding maximum/minimum value in the application units. The 14-bit analog-to-digital signal is then automatically scaled into User Units.



A comprehensive Getting Started guide is available to help simplify setup.



# Programming Software – PowerTools Pro



## Easy Motion Setup

### Jog Set Up

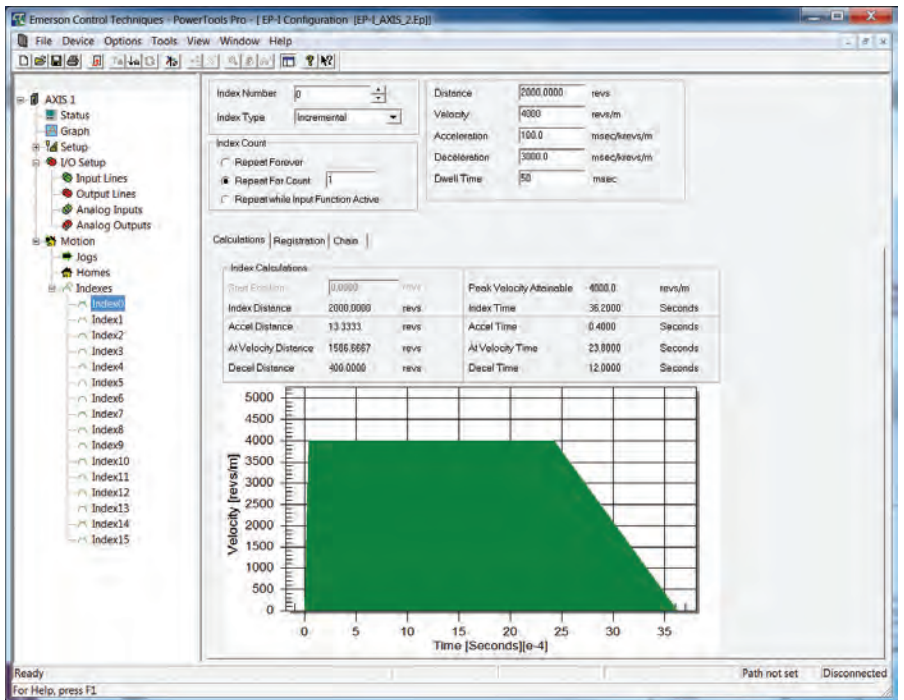
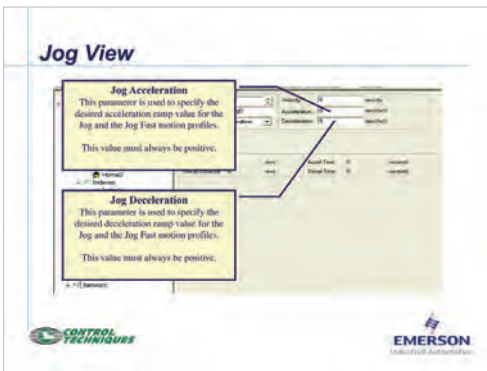
Select from two jogs, each with its own velocity, acceleration and deceleration. Select from real-time or synchronized (referenced to master encoder) time base. Initiate jogs from a user program, an Assignment (I/O Control) or a fieldbus.

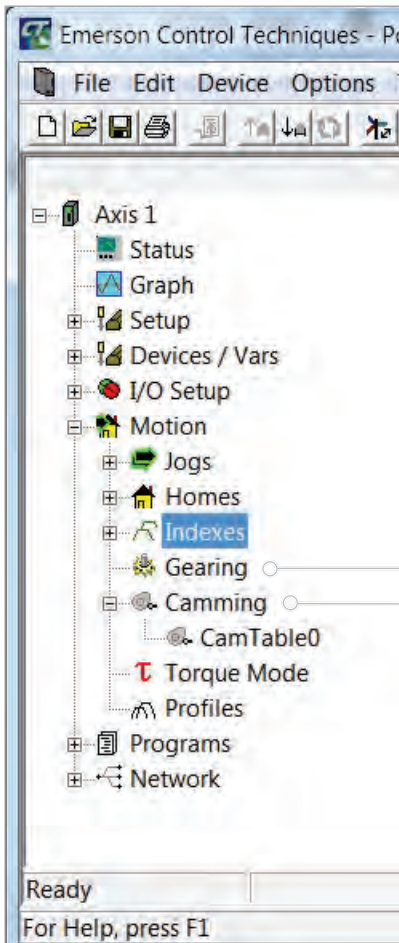
### Homing Routines

PowerTools Pro includes flexible yet easy homing routines. Define the reference type for the Home function (select from “Marker,” “Sensor” or “Sensor Then Marker” as shown below). A dynamic Home provides full programmability allowing users to define the Home Velocity, Acceleration and Deceleration as well as Home Offset (distance traveled after reference) and End of Home Position. Home routines can be initiated from a user program, an Assignment or a fieldbus.

### Indexes

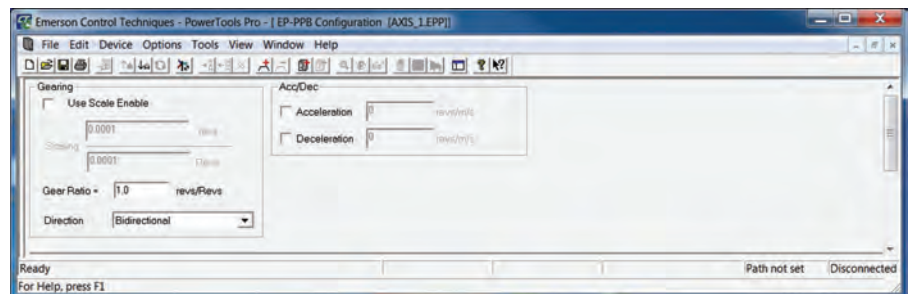
Setting up indexes is easily accomplished by filling in the blanks to create an index profile. Select from Incremental, Absolute, Registration, Rotary Plus or Rotary Minus types. Choose the index time base by selecting either real-time or synchronized to a master.





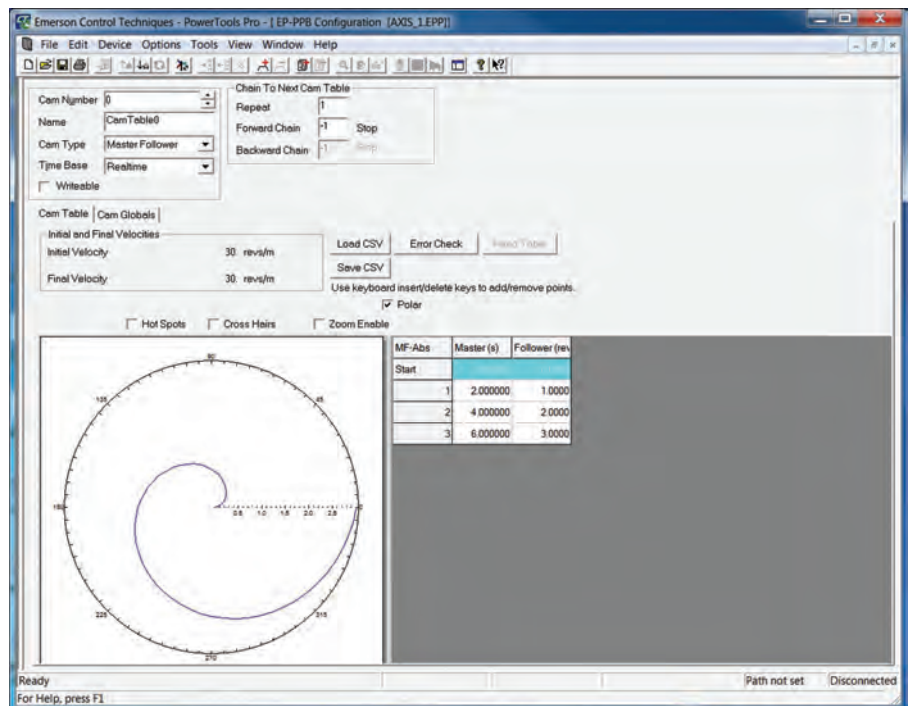
## Gearing

Perform electronic line shafting applications using the EP-P, FM-3E, FM-4E or SM-EZMotion Option Module by defining a ratio between master and follower axes. Once a ratio is defined, follower axis motion is linked to master axis motion at a specified ratio while the gearing function is active. The master can change velocity and direction and the follower maintains geared relationship.

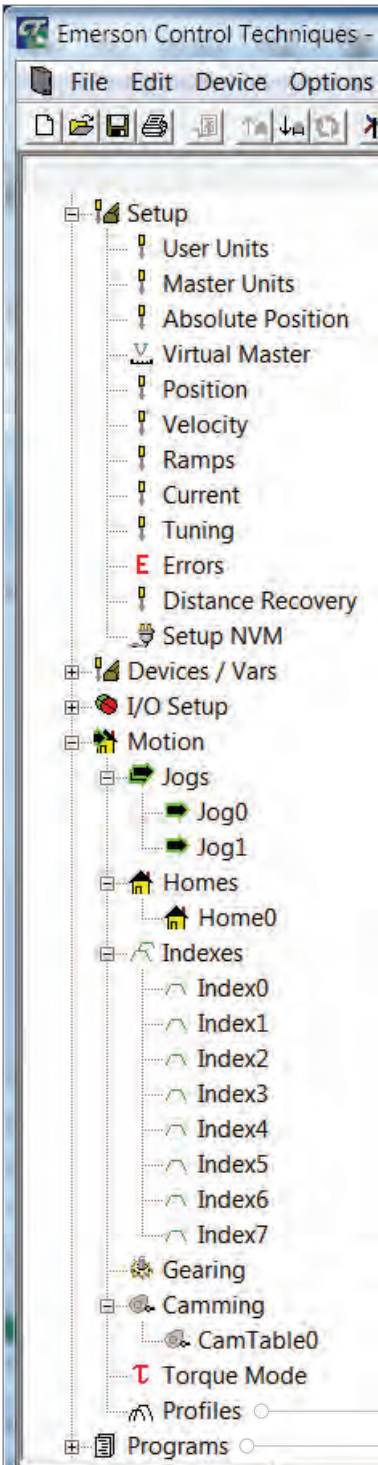


## Camming

Electronic cams provide a non-linear motion function for a single axis. As the “master” axis (the cam lobe) rotates, the “follower” axis produces a non-linear motion profile. This profile can then be produced with a single motor driving a linear axis programmed with an electronic cam. The cam motion object uses a master/follower principal in a synchronized mode and also has a follower with



# Programming Software – PowerTools Pro



Real-time mode that allows the follower to travel through its cam table without a physical master axis moving, or **virtual master**.

Control Techniques provides a “cam” as a collection of cam table(s) that can be used individually or chained together to form a full motion sequence. Each cam table is a user-specified sequence of master and follower movements along with the interpolation type. Coupled with a user program to monitor the flow, the motion can dynamically be altered by changing the cam table chains selecting a different sequence of tables. You can further adjust the flow by dynamically changing the cam tables themselves or using a cam table time base index to smoothly adjust time or distance on the fly.

Cam types:

- Master - Follower
- Absolute MFI\*
- Incremental MFI\*
- Time-Based Index\*\*
- Cubic Spline\*\*\*

\* Valid interpolation types: linear, square, S-curve, cosine and “jerk-free”

\*\* Valid Interpolation types: square, S-curve and “jerk-free”

\*\*\* Linear, Cubic

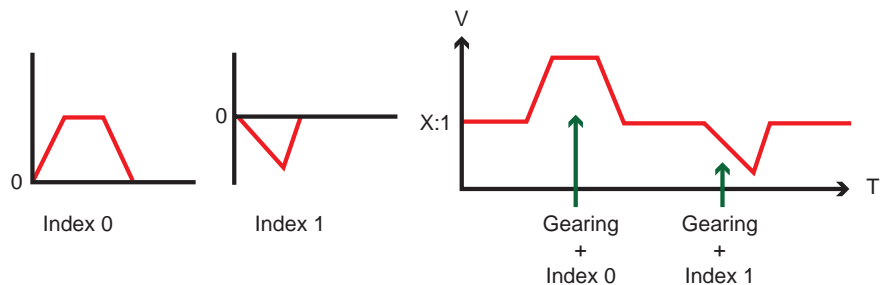
## Profiles

PowerTools Pro allows the user to simultaneously execute any two motion types together as a summed profile (i.e. Gear + Index, Jog + Index, Index + Index, etc.). Summing profiles is ideal for phasing applications such as random infeed, rotary knife, merge conveyor and any number of other applications. S-curve acceleration is available for a “jerk-free” application.

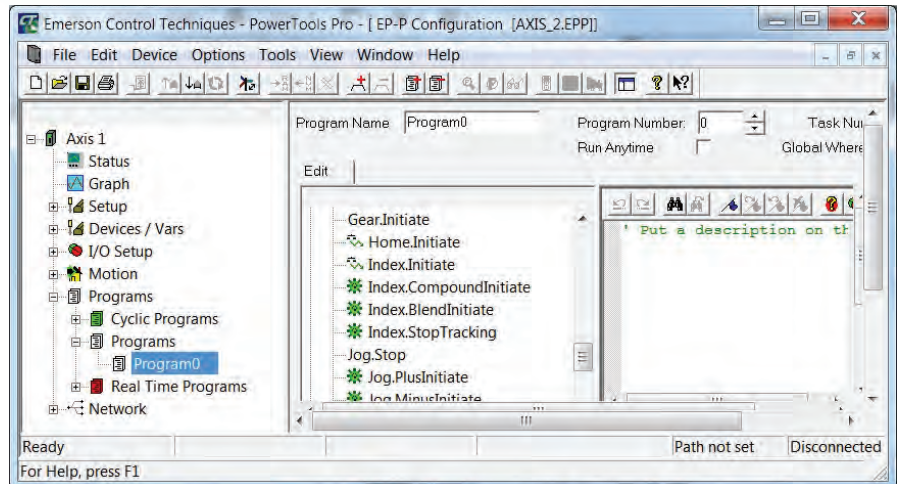
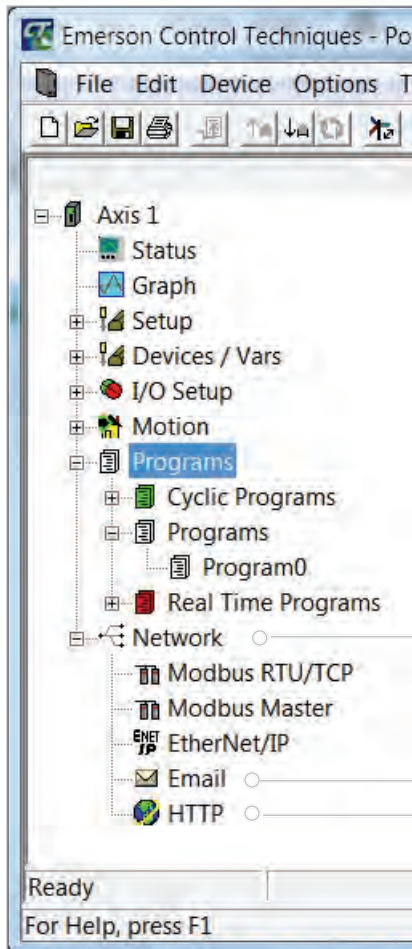
## Programs

### Programs

Combine program flow and motion instructions to create fully-customized user programs up to 1,000 lines of code. Use Conditional Branching, Wait For, Program Calls, Formulas, User Variables and numerous motion instructions to solve even the most complex application. Easily create programs by dragging and dropping or typing program instructions, variables, I/O and formula operands into the program screen.







## Network

### Network

Drag-and-drop functionality with fill-in-the-blank capabilities facilitates network configuration. Supported networks include Modbus RTU/TCP (follower), RTU/TCP (master) and EtherNet/IP among other industrial-standard protocols.

## Monitoring Parameters

PowerTools Pro allows the user to monitor motion in many flexible ways. Many of the views have online sections for displaying the latest value currently being used in a drive.

The “Watch Window” function helps simplify troubleshooting an application by allowing the user to define the variables to monitor while on line .

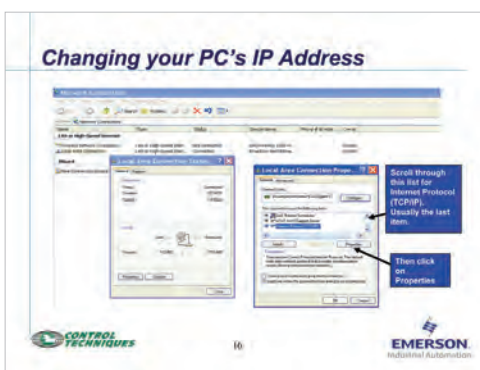
PowerTools Pro’s graphical data capture allows the user to capture real-time drive data on up to four channels during initial configuration, tuning and debugging.

## Email

Set up the drive to email the user based on programmed conditional arguments (EP-P, FM-3E and FM-4E only).

## HTTP

Monitor user-selected drive parameters remotely over the Internet (EP-P, FM-3E and FM-4E only).

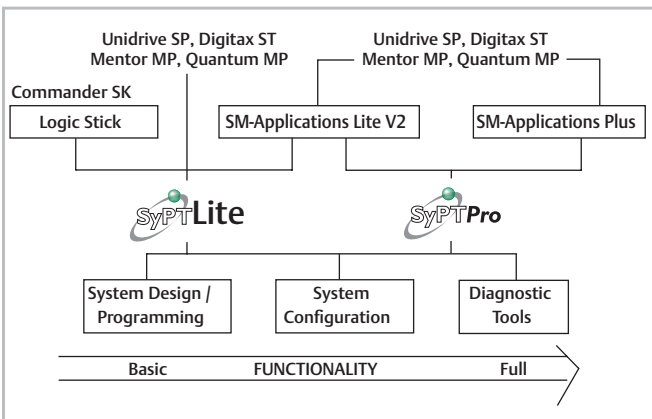


# Programming Software – Systems Programming Toolkit

## Systems Programming Toolkit (SyPT)

SyPTPro and SyPTLite are flexible, powerful programming tools developed by Control Techniques for use by both OEMs and end users. SyPT software allows the user to optimize the functionality of Control Techniques' range of AC, DC and Servo drives. SyPT can be used to program everything from a simple single-drive application requiring Run and Stop controls to a complex, fully-networked, multi-drive control system for machine and process control.

### SyPT Functionality



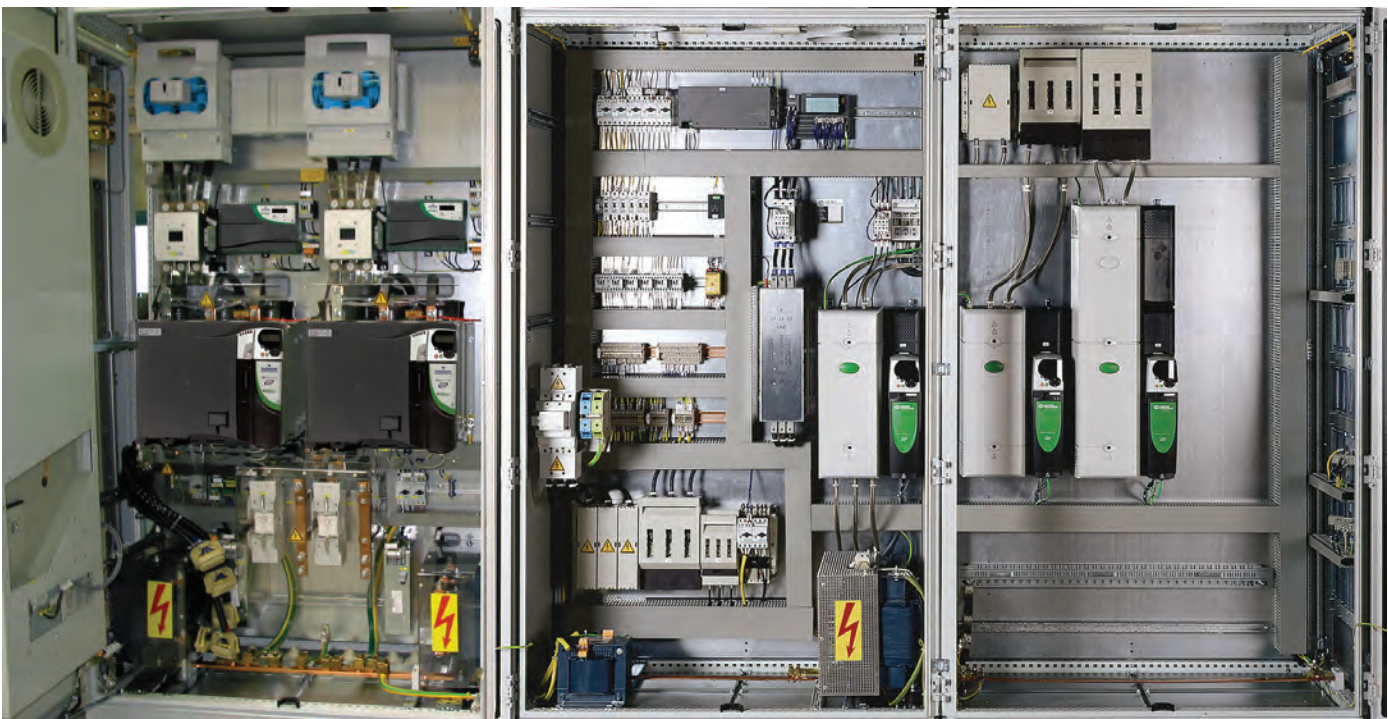
**SyPTLite** is used to create simple Ladder Logic programs that can be used to control the drive and replace small PLCs.

**SyPTPro** is for advanced machine programming, providing IEC61131-3 style programming with Ladder Logic, Function Block and DPL (text-based) editors.

**SyPTPro** is used for comprehensive distributed machine control and/or motion control by configuring all drives and control modules. SyPT Pro can also replace costly PLCs used for machine I/O. Both SyPTLite and SyPTPro can be used with several different hardware configurations to achieve the required level of control required for the application. The chart on page 19 shows the capabilities of the various combinations of software and hardware to assist in selecting the most appropriate Control Techniques products.

### PLC Functionality Using SyPT

The Control Techniques Unidrive SP AC and Servo drive is the true Solutions Platform, offering a wide range of application tool solutions and giving users unparalleled flexibility in configuring PLC logic and implementing applications. Real cost and space savings are quickly achievable with the flexible modular approach of selecting hardware and IEC61131-3 software (the only global standard for industrial control programming) for the Unidrive SP.



# Programming Software – SyPT

## Drive-Based PLC Functionality

Integrated PLC functionality reduces panel space, simplifies wiring and maximizes productivity and profitability by offering performance and features that make a machine run faster and under tighter control.

SM-Applications functionality – whether integrated (Digitax ST-P) or via SM Option Modules (Unidrive SP and Mentor MP) – convert the drive into a high-performance automation controller, removing the requirement for expensive PLC hardware and providing the power and performance to enhance machine and factory productivity.

PLC configuration of up to four functionality levels is accomplished using either SyPTLite or SyPTPro. These programming tools make it easy to bring PLC functionality to an application by allowing easy access to real-time processing and diagnostic controls.

The LogicStick (included with Commander SK) unlocks PLC functionality, enabling this small drive to deliver cost-saving PLC control to many general-purpose applications.

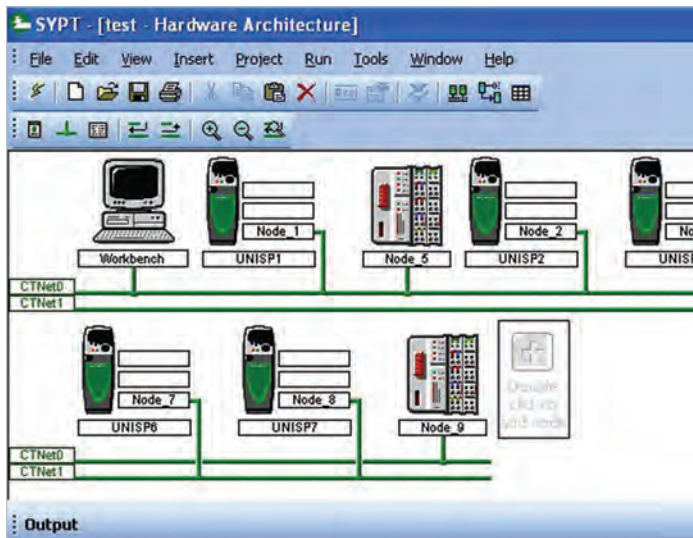
## SyPT Programming – Up to Four Levels of PLC Functionality

Functionality Level	1	2	3	4
<b>Functionality Level Key Attribute</b>	Simple Logic Control	Real Time Functionality	Motion Control	Machine Control
<b>Software</b>	SyPTLite	SyPTLite	SyPTPro	SyPTPro
<b>Hardware</b>				
<b>AC Drives</b>	Unidrive SP, Commander SK + Logic Stick	Unidrive SP + SM-Applications Lite V2	Unidrive SP + SM-Applications Lite V2	Unidrive SP + SM-Applications Plus
<b>DC Drives</b>	Mentor MP, Quantum MP	Mentor MP or Quantum MP + SM-Applications Lite V2	Mentor MP or Quantum MP + SM-Applications Lite V2	Mentor MP or Quantum MP + SM-Applications Plus
<b>Servo Drives</b>	Digitax ST-B, -I, -P	Digitax ST-I, -P	Digitax ST-I	Digitax ST-P
<b>Editors</b>	Ladder Logic	Ladder Logic Function Blocks Text Editor (DPL)	Ladder Logic Function Blocks Text Editor (DPL)	Ladder Logic Function Blocks Text Editor (DPL)
<b>Memory</b>	4kB (SP, ST), 6kB (MP), 3kB (SK)	15kB	384kB	384kB
<b>Max. Rungs of Ladder Logic</b>	50	150	>500	>5000
<b>Task Update Rate (Approx.)</b>	64msec (SP,ST, MP), 20msec (SK)	1 - 200msec	250µsec - 8msec	250µsec - 8msec
<b>Tasks Available</b>	Background	Initial Background Clock	Initial Background Clock Position Loop Event Error	Initial Background Clock Position Loop Event Error
<b>Additional Digital I/O</b>				2 Inputs 2 Outputs CTNet I/O
<b>Additional Connectivity</b>				RS485 CTNet CTSync

# Programming Software – SyPTPro

## SyPTPro – System Programming Toolkit

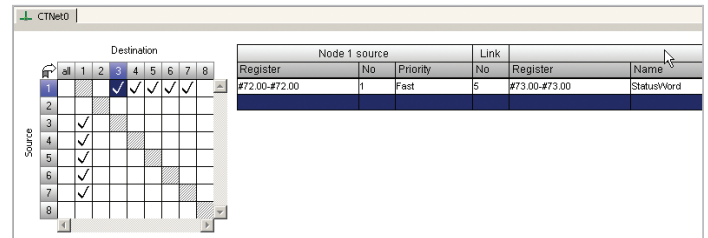
SyPTPro is Control Techniques’ professional drive programming toolkit for OEMs and end users. This IEC61131-3 software offers enhanced functionality allowing the user to connect drives, operator interfaces and I/O to a network and configure data exchange. SyPTPro provides a choice of three different languages – Function Block diagram, Ladder diagram and DPL (Drive Programming Language) – with a real-time multi-tasking environment. A suite of monitoring and diagnostic features helps reduce development time allowing machines to get into service faster.



SyPTPro is used to program Unidrive SP, Mentor MP and Quantum MP DC drives (fitted with SM-Applications Plus and SM-Applications Lite V2 Option Modules), as well as Digitax ST-I and Digitax ST-P Servo drives.

## Industrial Network

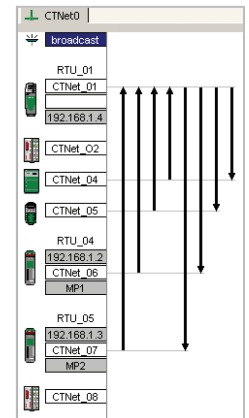
With SyPTPro you can configure a single drive or a complete drive system connected to networks including CTNet, Ethernet and Modbus RTU. Build a complete multi-axis project in one programming environment—SyPT Pro—then download configurations to all drives via CTNet through one network connection node.



CTNet is an industrial network that is deterministic, robust and tolerant to noise and interference (see brochure BRO-OPTIONS-1107 for more information on CTNet).

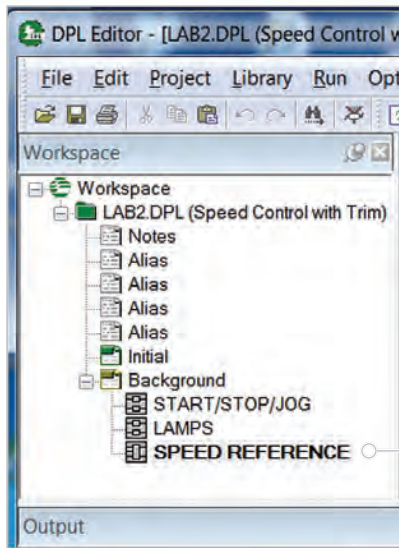
## Cyclic Data Links

The Cyclic Data links view is an architectural representation of the nodes on the network as well as data links that are created. The user can manage data links from this view by drawing in links and defining data in the links as desired. This becomes very helpful when planning and configuring network data.



## Programming Flexibility

SyPTPro facilitates programming in the user’s choice of three programming languages. The software also provides a multi-tasking environment where the tasks are scheduled according to the required speed of execution or triggered by events.



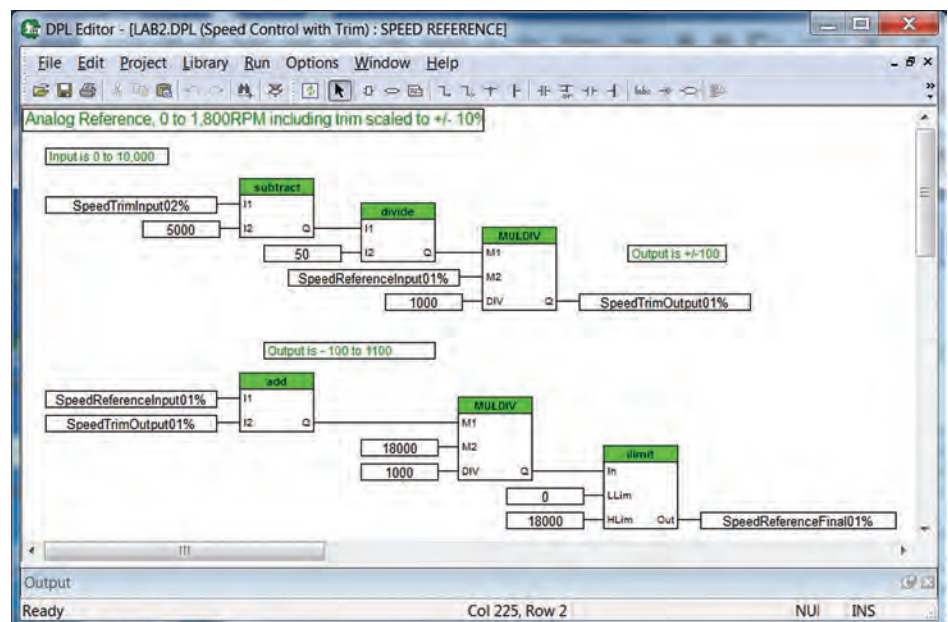
### Function Blocks

SyPTPro incorporates an IEC61131-3 Function Block diagram editor and includes a library of more than 380 Function Blocks for simple and complex functions. The library represents years of application experience to make software easier to write and easy to re-use. In addition to the standard Function Blocks, users can create User Defined Function Blocks (UDFB). This feature opens the door to creating special functions. It is also possible to use pre-defined Function Blocks inside the UDFB. Intellectual property can be protected by creating UDFBs that allow access to source code users only.



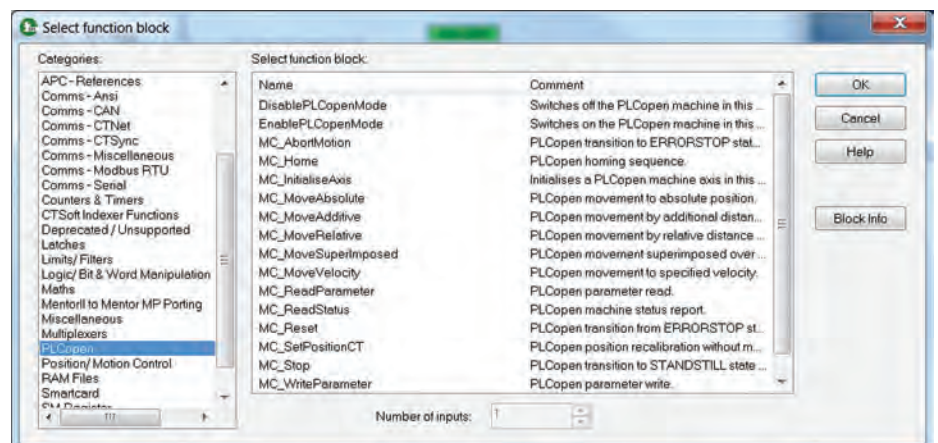
*There's an easier way to protect your intellectual property...*

*SyPTPro allows you to create User-Defined Function Block that allow access to source code users.*

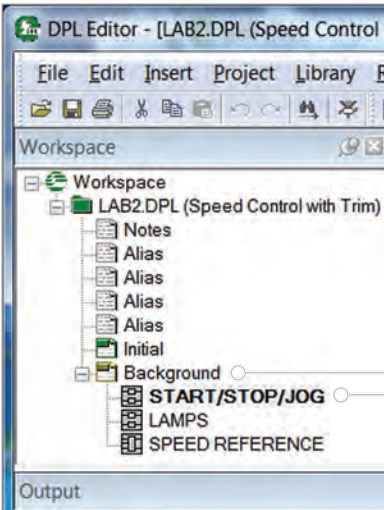


### PLCopen – Open Motion Programming

PLCopen-style programming for motion control uses industry standard Function Blocks for motion control. By taking advantage of this feature integrated in SyPT Pro, development time can be reduced. PLCopen standard Function Blocks are listed in the Function Block library shown below. These Function Blocks are among the 380 functions built into SyPTPro.

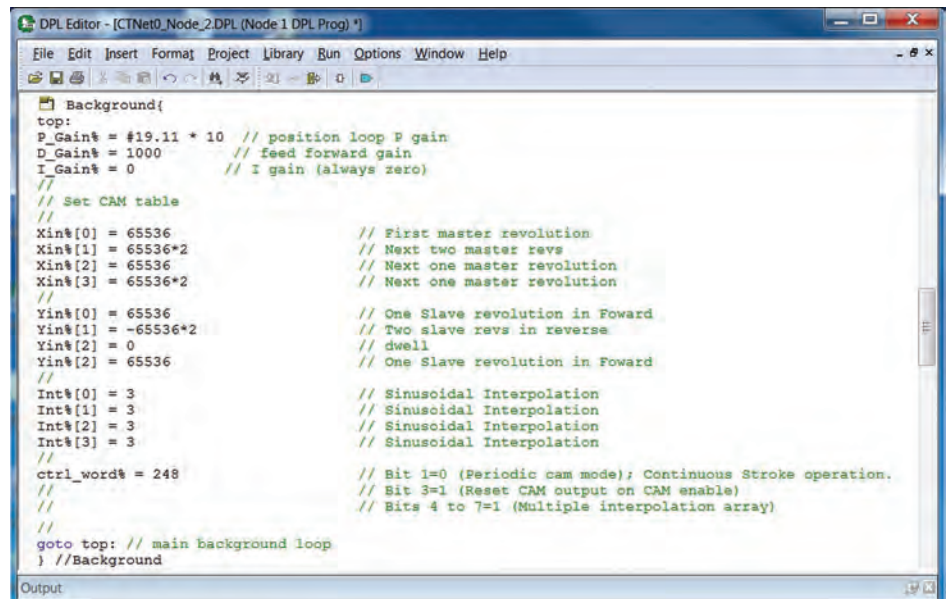


# Programming Software – SyPTPro



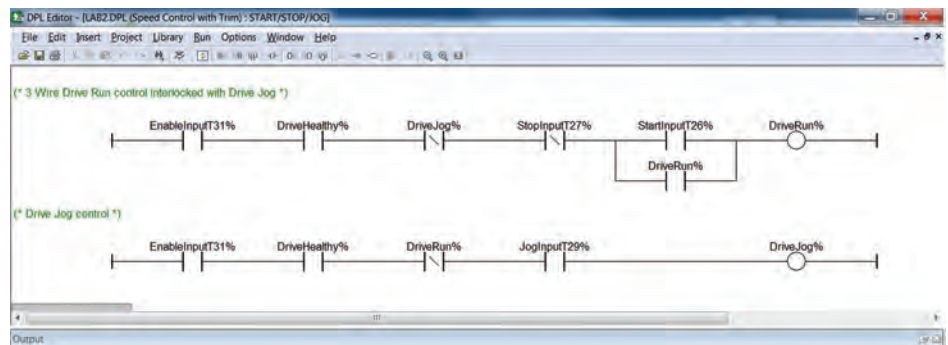
## DPL – Drive Programming Language

Drive Programming Language (DPL) is a structured text language as easy to use as BASIC, DPL incorporated many standard constructs such as IF, THEN, ELSE, FOR and NEXT loops. DPL is ideal for initialization, configuration and general programming and may be mixed throughout the program with the other graphical editors such as Ladder.



## Ladder Logic

SyPTPro incorporates an IEC 61131-3 style Quick Ladder Logic editor. This form of programming will be familiar to all PLC programmers and is the ideal format for sequencing and I/O control. Using an SM-Applications Plus Option Module, over 5000 rungs of logic may be stored and executed. All of the normal Ladder Logic functions are available plus high level blocks for communications, word manipulation, math operands and much more.

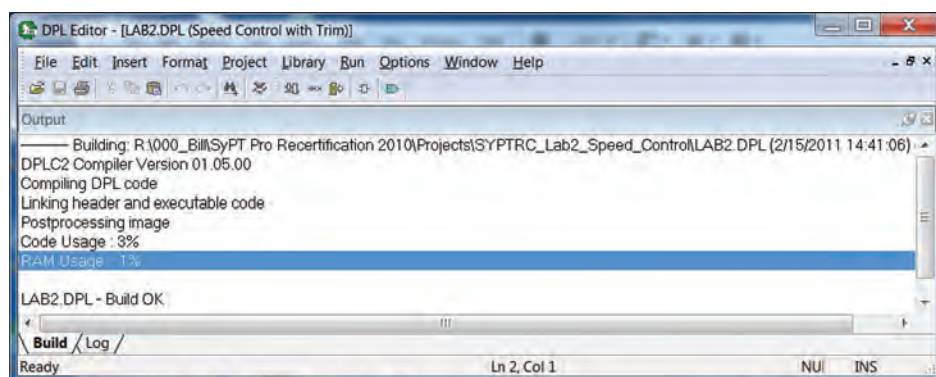




## Diagnostics and Debugging

SyPTPro contains a suite of diagnostic tools that help find problems with the system or software quickly and easily.

**Output Window** — After compiling the code, file size will be displayed. In the event of compiler errors, the error and link to the line where the error occurred will be displayed allowing the programmer to quickly locate and correct errors.



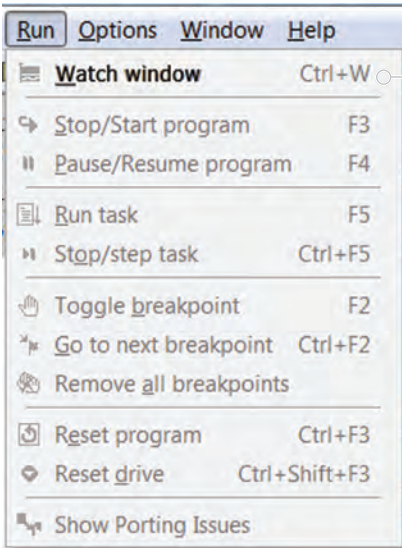
**Break Points** — Adds break points into a DPL program allowing code to be run in sections.

**Single Step** — Run code one line at a time.

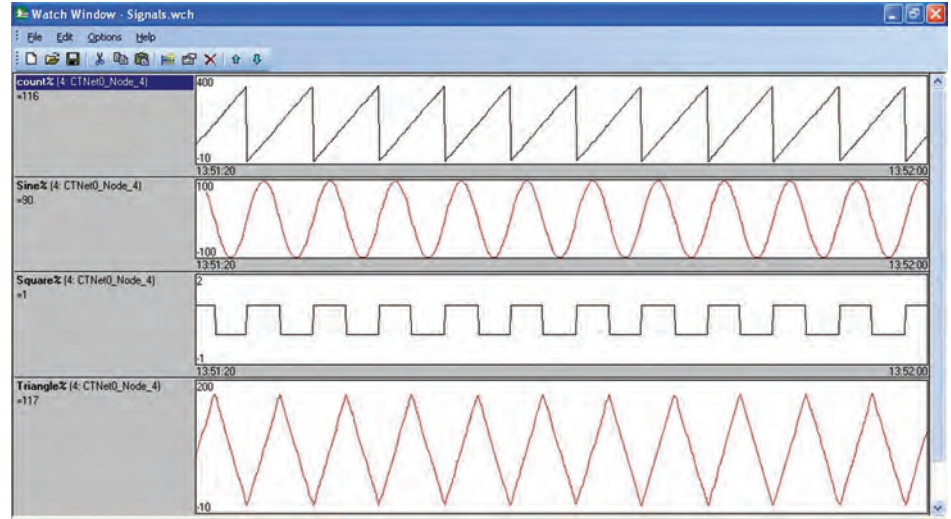
**Bookmarks** — Adds bookmarks to quickly navigate to code.

Other tools include Start/Stop programs, Pause/Resume programs and the ability to change variables directly from the DPL editor.

# Programming Software – SyPTPro



## System Watch Window



In the Watch Window, variables can appear with the following information:

- Variable name Node to which it belongs
- Value in decimal format
- Value in hexadecimal format
- Bit field
- Graphic curve representing its value

A pop-up window allows a user to change drive parameters and program variables. Variables from multiple nodes on the network can be monitored simultaneously for analysis of coordinated drive performance.

The Watch Window also includes an “Immediate Window” that allows users to modify parameters and view the effect of the changes in real-time.



**SyPTPro helps you see it all...**

*SyPTPro's Watch Window allows you to monitor variables on almost every motion system component.*

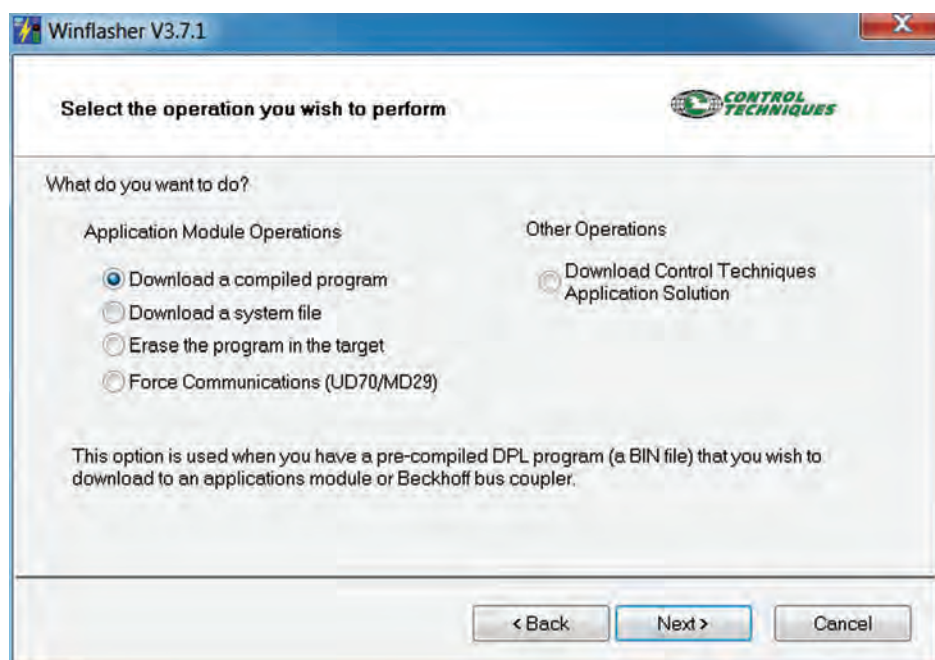
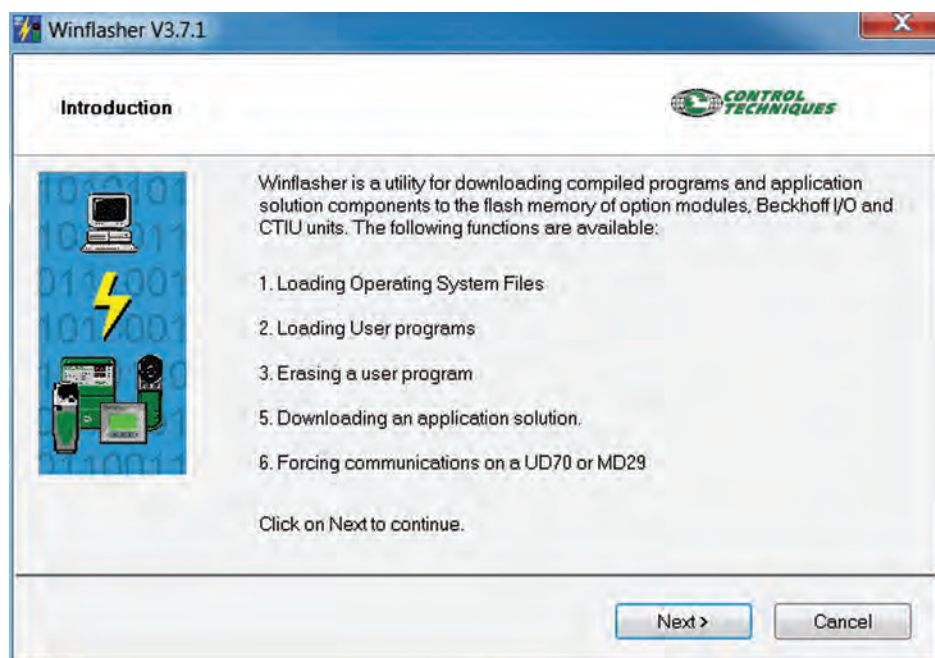




Winflasher allows maintenance personnel to perform basic program maintenance with just a few clicks of the mouse.

## Maintenance – Winflasher

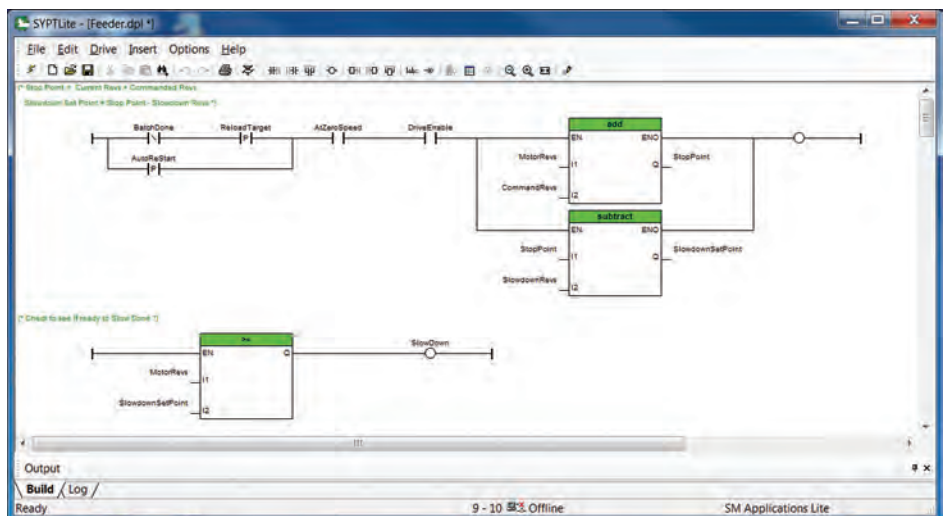
SyPT Pro includes a simple file management utility called Winflasher that is specifically designed for maintenance personnel. Drive firmware and user programs can be easily downloaded using Winflasher without the need to navigate the full SyPT Pro programming tool.



## Programming Software – SyPTLite

### SyPTLite

SyPTLite is a Ladder diagram editor that allows users to develop programs that can be executed onboard Commander SK with LogicStick as well as on Unidrive SP, Digitax ST and Mentor MP built-in PLC or on SM-Applications Lite V2 Option Modules. SyPTLite is designed to meet the needs of automation users wishing to extend the functionality of the drive by adding simple PLC functionality such as drive control and sequencing. The software has been developed with an intuitive, easy-to-use interface providing access to all drive parameters and to monitor and debug online programs.



SyPTLite contains a comprehensive library of functions based on a subset of functions available in the full SyPTPro programming tool:

- Arithmetic blocks
- Comparison blocks
- Timers
- Counters
- Multiplexers
- Latches
- Bit manipulation

#### Typical applications include:

- Current / torque monitoring
- Torque proving
- Gate / barrier control
- Sequencing for mixing
- Active / Sleep control for time specific functions

### SyPTLite with Commander SK LogicStick

Commander SK is Control Techniques' simplest, easiest-to-use general-purpose drive. However, the Commander SK



contains features and functions one may not expect to find in an economical drive, such as the flexibility to program PLC applications onboard the drive. Insert a LogicStick into the front of the drive to quickly add memory

for storage of PLC programs created using SyPTLite. The drive is prioritized to execute all motor control-related functions first and then use any remaining processing time to execute the SyPTLite Ladder diagram as a background activity.

### SyPTLite with Unidrive SP, Digitax ST, Mentor MP and Quantum MP's Onboard PLC

These drives support Ladder-programming capability. The drive is capable of storing and executing a SyPTLite program without the requirement for additional SM Option Modules. The drive is prioritized to execute all motor control related functions first and then use any remaining processing time to execute the SyPTLite Ladder diagram as a background activity. A SyPTLite program may be copied to or from the drive's SmartCard memory device, allowing the data to be safely stored or retrieved for serial machine manufacture and maintenance purposes.

### SyPTLite with Digitax ST-I and Unidrive SP, Mentor MP and Quantum MP with SM-Applications Option Modules

The SM-Applications Lite V2 Option Module contains a high-performance microprocessor that provides access to PLC power and more than doubles the program size available up to 10kB. This Option Module provides the flexibility needed to determine how the program task will run, either background or cyclic. The cyclic task program starts on a fixed time-base synchronized with the drive's internal control loops. The time-base is selectable between 1 - 200msec. The SM-Applications Lite V2 Option Module and SyPTLite offer a compelling alternative to traditional mini-PLC systems in applications where cost, footprint size or performance is important.



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\*Operated by sister company, Leroy Somer®