



Quick Start Guide for ServoWorks CNC Products



IMPORTANT!

DO NOT INSTALL THIS PRODUCT
WITHOUT READING THIS GUIDE.
THIS PRODUCT CANNOT BE
CORRECTLY INSTALLED
WITHOUT PROPER INSTRUCTION.
**FAILURE TO COMPLY WITH
PRODUCT DOCUMENTATION WILL
VOID THE PRODUCT WARRANTY.**

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IMPORTANT!

Service Pack 3 (SP3) for Windows XP is compatible with RTX 8.1 with Service Pack 1 (SP1), which is the version currently provided with your ServoWorks CNC product. However, Service Pack 3 for Windows XP is NOT COMPATIBLE with RTX 8.1 without Service Pack 1, or with any earlier versions of RTX.

For more information, see the *ServoWorks CNC Installation and Setup Manual* for your interface system (VersioBus, Realtime Express or MECHATROLINK), or see the *Installation Manual for Simulation Versions of ServoWorks CNC Products*.

Warning

The product described herein has the potential – through misuse, inattention, or lack of understanding – to create conditions that could result in personal injury, damage to equipment, or damage to the product(s) described herein. Machinery in motion and high-power, high-current servo drives can be dangerous; potentially hazardous situations such as runaway motors could result in death; burning or other serious personal injury to personnel; damage to equipment or machinery; or economic loss if procedures aren't followed properly. Soft Servo Systems, Inc. assumes no liability for any personal injury, property damage, losses or claims arising from misapplication of its products. In no event shall Soft Servo Systems, Inc. or its suppliers be liable to you or any other person for any incidental collateral, special or consequential damages to machines or products, including without limitation, property damage, damages for loss of profits, loss of customers, loss of goodwill, work stoppage, data loss, computer failure or malfunction claims by any party other than you, or any and all similar damages or loss even if Soft Servo Systems, Inc., its suppliers, or its agent has been advised of the possibility of such damages.

It is therefore necessary for any and all personnel involved in the installation, maintenance, or use of these products to thoroughly read this pamphlet and related manuals and understand their contents. Soft Servo Systems, Inc. stands ready to answer any questions or clarify any confusion related to these products in as timely a manner as possible.

The selection and application of Soft Servo Systems, Inc.'s products remain the responsibility of the equipment designer or end user. Soft Servo Systems, Inc. accepts no responsibility for the way its controls are incorporated into a machine tool or factory automation setting. Any documentation and warnings provided by Soft Servo Systems, Inc. must be promptly provided to any end users.

This document is based on information that was available at the time of publication. All efforts have been made to ensure that this document is accurate and complete. However, due to the widely varying uses of this product, and the variety of software and hardware configurations possible in connection with these uses, the information contained in this manual does not purport to cover every possible situation, contingency or variation in hardware or software configuration that could possibly arise in connection with the installation, maintenance, and use of the products described herein. Soft Servo Systems, Inc. assumes no obligations of notice to holders of this document with respect to changes subsequently made. Under no circumstances will Soft Servo Systems, Inc. be liable for any damages or injuries resulting from any defect or omission in this manual.

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Overview

This pamphlet will explain which documents and manuals you need to download and follow in order to properly set up your ServoWorks CNC product, integrate it with your machine tool, set up your PLC environment, test and tune your system, write part programs, and operate your ServoWorks CNC product.

Your required documents and manuals will vary depending upon the product you have purchased, and the interface system you are using.

In addition, for explanations of terms, refer to the *Soft Servo Glossary for ServoWorks CNC Products and SMP Series General Motion Control Products*, also available online.



IMPORTANT!

The product contained herein is a specialized, industrial product. It is not a general consumer product. You cannot properly install, set up or operate this product without referring in detail to the documentation for this product.

Product Documentation

The software and hardware documentation for the installation, setup, integration and operation of the product(s) contained herein can be found as follows:

URL: <http://www.softservo.com/pub/users/>
Username: users
Password: softservo

Troubleshooting

Visit Soft Servo Systems' support center (technical FAQ) at:

URL: <http://www.softservo.com/support>
Username: ssscuser
Password: 9555users

Contact Information

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CNC Engine, LadderWorks, MC-Quad, Motion Engine, MotionLite, PLC Engine,
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ServoWorks CNC Product Installation for Simulation Editions

If you have purchased a Simulation Edition of a ServoWorks CNC product, you will need to download and follow the instructions in the *Installation Manual for Simulation Versions of ServoWorks CNC Products*.

This manual will instruct you to:

- Check to make sure your PC complies with the minimum requirements to run a ServoWorks CNC product
- Check your PC's HAL type for compatibility with RTX, and change your PC settings if necessary
- Check that you have the correct operating system patches for your Windows operating system
- Install and register the ServoWorks CNC software (including obtaining a license code for your ServoWorks CNC product, and a license key for your Ardence RTX product)

ServoWorks CNC Product Setup and Integration for the VersioBus II Interface System

If you have purchased a ServoWorks CNC product for the VersioBus II interface system, you will need to download and follow the instructions in the *ServoWorks CNC Setup and Integration Manual for the VersioBus II Interface System* and the *Hardware and Wiring Manual for the VersioBus II Interface System*.

These manuals will instruct you to:

- Check to make sure your PC complies with the minimum requirements to run a ServoWorks CNC product
- Check your PC's HAL type for compatibility with RTX, and change your PC settings if necessary
- Check that you have the correct operating system patches for your Windows operating system
- Check that the Ethernet network card device driver is enabled
- Install and register the ServoWorks CNC software (including obtaining a license code for your ServoWorks CNC product, and a license key for your Ardence RTX product)
- Insert your VersioBus II adapter board
- Install and configure the device driver for your VersioBus II adapter board (if you have purchased an FP-105)
- Connect your DC-155(s) to the VersioBus II adapter board and set the proper dipswitch identification number(s)
- Connect your IM-305(s) (if applicable) to the VersioBus II adapter board and set the proper dipswitch identification numbers
- Connect a handwheel to the VersioBus II adapter board (if applicable)
- Power up your VersioBus II components
- Reserve IRQ #5 for your VersioBus II adapter board (if you have purchased an FP-85 or FP-114)
- Connect the servo drives to the DC-155(s)
- Connect your general I/O devices to the VersioBus II adapter board, DC-155(s) and/or IM-305(s)
- Set up synchronous control with slave axes (if applicable)

ServoWorks CNC Product Setup and Integration for the Panasonic Realtime Express (RTEX) Interface System

If you have purchased a ServoWorks CNC product for the RTEX interface system, you will need to download and follow the instructions in the *ServoWorks CNC Setup and Integration Manual for the Panasonic Realtime Express (RTEX) Interface System*.

This manual will instruct you to:

- Check to make sure your PC complies with the minimum requirements to run a ServoWorks CNC product
- Check your PC's HAL type for compatibility with RTX, and change your PC settings if necessary
- Check that you have the correct operating system patches for your Windows operating system
- Check that the Ethernet network card device driver is enabled
- Install and register the ServoWorks CNC software (including obtaining a license code for your ServoWorks CNC product, and a license key for your Ardence RTX product)
- Insert your RTEX adapter board
- Configure the device driver for your RTEX adapter board
- Physically connect the servo drives in your RTEX Ethernet servo network, and configure the RTEX communication settings on each node
- Integrate an optional AnyWireBus Gateway module in your Ethernet servo network (for AnyWire I/O modules)
- Configure the RTEX system information file
- Set the ServoWorks CNC parameters for your RTEX system
- Set the A4N servo drive parameters using PANATERM or ServoWorks MotionLite
- Set the absolute encoder reference position (if applicable)
- Set up synchronous control with slave axes (if applicable)
- Make A4N servo drive I/O connections
- Connect any optional AnyWire I/O modules
- Set up VersioBus II I/O components if you include optional VersioBus II I/O in your RTEX interface system

ServoWorks CNC Product Setup and Integration for the MECHATROLINK Interface Systems

If you have purchased a ServoWorks CNC product for a MECHATROLINK II or III interface system, you will need to download and follow the instructions in the *ServoWorks CNC Setup and Integration Manual for the MECHATROLINK Interface System*.

This manual will instruct you to:

- Check to make sure your PC complies with the minimum requirements to run a ServoWorks CNC product
- Check your PC's HAL type for compatibility with RTX, and change your PC settings if necessary
- Check that you have the correct operating system patches for your Windows operating system
- Check that the Ethernet network card device driver is enabled
- Install and register the ServoWorks CNC software (including obtaining a license code for your ServoWorks CNC product, and a license key for your Ardence RTX product)
- Insert your MECHATROLINK adapter board
- Reserve IRQ #10 for your MECHATROLINK adapter board (if you have purchased the NT115)
- Install and configure the device driver for your MECHATROLINK adapter board (if you have purchased the NT110, NT112 or MP2110)
- Physically connect the modules in your MECHATROLINK network, and configure the MECHATROLINK communication settings on each node
- Configure the MECHATROLINK system information file
- Register the NT110 or NT112 RealTime DLL (if you have purchased the NT110 or NT112)
- Set the ServoWorks CNC parameters for your MECHATROLINK system (the "encoder resolution" parameter is handled as a special case for the MECHATROLINK interface system)
- Set the absolute encoder reference position (if applicable)
- Set up synchronous control with slave axes (if applicable)
- Set up VersioBus II I/O components if you include optional VersioBus II I/O in your MECHATROLINK interface system

Testing and Tuning Your ServoWorks CNC System (excluding ServoWorks S-100T)

All ServoWorks CNC systems require testing and tuning to tweak the system parameters and optimize system performance for your motors and servo loops.

You will need to download and follow the instructions in the *ServoWorks MotionLite Operator's Manual* and the *Reference Manual for ServoWorks CNC Parameters and Functions*.

The *ServoWorks MotionLite Operator's Manual* will instruct you in how to set up, configure, test and tune your ServoWorks CNC system. ServoWorks MotionLite allows you to view and set motor parameters and servo loop parameters and provides full real-time monitoring of position and I/O signals, and data sampling and data plotting of actual position, position command, position error and velocity. ServoWorks MotionLite's Test Mode allows you to test the performance of the system with either velocity (voltage) loop performance testing to calibrate the system for smooth movements, or with position loop performance testing to test rapid positioning. You can also save and plot sample motion test data for position, position error and velocity.

The *Reference Manual for ServoWorks CNC Parameters and Functions* explains each system parameter: its description, valid values, units, default values, limits, etc.

Upon completion of installation, setup and integration, we highly recommend that you back up your current parameter settings. Refer to the *Windows Registry Reference Manual for ServoWorks CNC Products and SMP Series General Motion Control Products*.

Testing and Tuning Your ServoWorks S-100T System

ServoWorks S-100T systems require testing and tuning to tweak the system parameters and optimize system performance for your motors and servo loops.

You will need to download and follow the instructions in the *ServoWorks S-100T Operator's Manual* and the *ServoWorks S-100T Parameters Manual*.

The *ServoWorks S-100T Operator's Manual* will instruct you in how to set up, configure, test and tune your ServoWorks S-100T system. ServoWorks S-100T allows you to view and set system parameters, and provides testing functions for testing and tuning the system.

The *ServoWorks S-100T Parameters Manual* explains each ServoWorks S-100T system parameter: its description, valid values, units, default values, limits, etc.

Upon completion of installation, setup and integration, we highly recommend that you back up your current parameter settings. Refer to the *Windows Registry Reference Manual for ServoWorks CNC Products and SMP Series General Motion Control Products*.

LadderWorks PLC Setup and Integration

All ServoWorks CNC products include LadderWorks PLC. You will need to download and follow the instructions in the following documents:

- *LadderWorks PLC User's Manual* – this document will instruct you in using the LadderWorks Console and LadderWorks PLC utilities to create a sequence program for PLC control of your machine, as well as debugging and compiling that sequence program.
- *LadderWorks PLC Programming Language – Basic Commands and Function Blocks* – this document will explain the basic commands and function blocks available for the ladder logic of your PLC sequence program.
- *LadderWorks PLC I/O Mapping for ServoWorks MC-Quad and the ServoWorks S-100M Series* and the *LadderWorks PLC I/O Mapping for ServoWorks S-100T* document the details of the F, G, X and Y signal mapping used by LadderWorks. Refer to the *LadderWorks PLC I/O Mapping for ServoWorks S-100T* for the ServoWorks S-100T product, and the *LadderWorks PLC I/O Mapping for ServoWorks MC-Quad and the ServoWorks S-100M Series* for all other ServoWorks CNC products.
- *LadderWorks PLC Reference Manual* – this manual is a reference for the operation of the LadderWorks PLC Engine, the memory addresses and static memory used by LadderWorks PLC, the PLC axis control signals, and the LadderWorks PLC architecture – you may or may not need to refer to this document.

For ServoWorksPLC Application Suite users, please contact our office for more information.

ServoWorks MC-Quad Operation

You will need to download the *ServoWorks MC-Quad Operator's Manual*, the *ServoWorks MC-Quad Part Programming Manual*, and the *ServoWorks CNC Macro Programming Manual*. (There is also a *Quick Reference Guide for Soft Servo Macro Specifications* available.)

The *ServoWorks MC-Quad Operator's Manual* will explain how to operate ServoWorks MC-Quad: how to navigate, set the home position, customize your display, monitor the status of operations, lock or unlock axes, manually operate your machine tool, set tool offsets and workpiece coordinates, prove a part program and run production in Auto Mode.

The *ServoWorks MC-Quad Part Programming Manual* and the *ServoWorks CNC Macro Programming Manual* will explain the G codes you can use to create part programs, and how to create macros for those part programs using system variables, mathematical and logical operations, branching and repetition, etc.

ServoWorks S-100T Operation

You will need to download the *ServoWorks S-100T Operator's Manual*, the *ServoWorks S-100T Part Programming Manual*, and the *ServoWorks CNC Macro Programming Manual*. (There is also a *Quick Reference Guide for Soft Servo Macro Specifications* available.)

The *ServoWorks S-100T Operator's Manual* will explain how to operate ServoWorks S-100T : how to navigate, set the home position, customize your display, monitor the status of operations, lock or unlock axes, manually operate your machine tool, set tool offsets and workpiece coordinates, prove a part program and run production in Auto Mode.

The *ServoWorks S-100T Part Programming Manual* and the *ServoWorks CNC Macro Programming Manual* will explain the G codes (including canned cycles) you can use to create part programs, and how to create macros for those part programs using system variables, mathematical and logical operations, branching and repetition, etc.

ServoWorks S-100M, S-120M and S-140M Operation

You will need to download the *Operator's Manual for ServoWorks S-100M, S-120M and S-140M*, the *Part Programming Manual for ServoWorks S-100M, S-120M and S-140M*, and the *ServoWorks CNC Macro Programming Manual*. (There is also a *Quick Reference Guide for Soft Servo Macro Specifications* available.)

The *Operator's Manual for ServoWorks S-100M, S-120M and S-140M* will explain how to operate ServoWorks S-100M, S-120M and S-140M: how to navigate, set the home position, customize your display, monitor the status of operations, lock or unlock axes, manually operate your machine tool, set tool offsets and workpiece coordinates, prove a part program and run production in Auto Mode.

The *Part Programming Manual for ServoWorks S-100M, S-120M and S-140M* and the *ServoWorks CNC Macro Programming Manual* will explain the G codes (including canned cycles) you can use to create part programs, and how to create macros for those part programs using system variables, mathematical and logical operations, branching and repetition, etc.

ServoWorks Development Kit (SDK)

You will need to download the *Programming Manual for the ServoWorks Development Kit (SDK)* and the *ServoWorks API (SWAPI) Reference Manual for C/C++ and Visual Basic*.

The *Programming Manual for the ServoWorks Development Kit (SDK)* explains the ServoWorks CNC technology and software architecture, VersioBus communications and hardware, the base software components, Ardence RTX, and how to set up your SDK environment.

The *ServoWorks API (SWAPI) Reference Manual for C/C++ and Visual Basic* explains each of the nearly 100 APIs available for creating and customizing a ServoWorks CNC application: function descriptions, function declarations, function parameters, possible returns, examples and more.