# CX-Supervisor
# Getting Started

**Software Release 1.1**

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# *Notice*

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided in them. Failure to heed precautions can result in injury to people or damage to the product.

| | |
|---|---|
| **DANGER!** | Indicates information that, if not heeded, is likely to result in loss of life or serious injury. |
| **WARNING** | Indicates information that, if not heeded, could possibly result in loss of life or serious injury. |
| **Caution** | Indicates information that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation. |

# *OMRON Product References*

All OMRON products are capitalised in this manual. The word “Unit” is also capitalised when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation “PLC” means Programmable Logic Controller and is not used as an abbreviation for anything else.

# *Visual Aids*

The following headings appear in the left column of the manual to help you locate different types of information.

Indicates information of particular interest for efficient and convenient operation of the product.

***1, 2, 3…*** Indicates lists of one sort or another, such as procedures, checklists etc.

 Represents a shortcut on the Toolbar to one of the options available on the menu of the same window.

# *About this Manual*

This manual describes the CX-Supervisor application and its installation.

This manual contains the following:

***Getting Started***. A description of CX-Supervisor installation and its use for the first time.

A ***Glossary of Terms*** and ***Index*** are also provided.

| | |
|---|---|
| **Warning:** | Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given. |

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# Getting Started with CX-Supervisor

This chapter introduces the CX-Supervisor application to a new user.

## Welcome to CX-Supervisor

CX-Supervisor is a SCADA (Supervisory Control and Data Acquisition) package that creates graphical user interfaces. It works closely with the communications driver CX-Server to control and monitor hardware and equipment in a plant. It allows information to be presented to an operator in a clear, concise and unambiguous manner using graphics objects, pushbuttons and control facilities, animations, graphs and diagrams.

CX-Supervisor offers a comprehensive range of facilities for the SCADA developer and is capable of developing solutions with the following features:

- Operator interface to processes.
- Data acquisition and monitoring.
- Information management.
- Manufacturing control.
- Supervisory control.
- Batch sequencing.
- Continuous process control.
- Alarm monitoring and reporting.
- Material handling (monitoring and control).
- Simulation and modeling through graphic animation.
- Data Logging.
- Error logging.
- Project Editor and cross referencing.
- Report editor.
- Database Connectivity.
- Connection to OPC Servers.
- Use of any ActiveX object.
- Use of Visual Basic and Java Script

CX-Supervisor runs in a 32 bit Microsoft Windows environment i.e. Windows 95 / 98 / 2000 / Millennium, Windows NT V4.0 or later, on standard PC desktop computers. CX-Supervisor is intuitive and easy to use, and allows the SCADA developer to rapidly configure, test and debug a project.

CX-Supervisor comprises two separate executable Windows programs, CX-Supervisor Development environment version and CX-Supervisor Runtime-only environment version. SCADA applications are created and tested using the development environment and then delivered as a final customer application with the runtime-only environment.

The runtime-only environment may only be used for executing an application previously generated using the development environment. It is not possible to generate a new runtime application using the runtime environment.

**Note:** It is important that this copy of the CX-Supervisor software is registered with the local OMRON Sales Office, in order to qualify for technical support. OMRON will not be able to help unless this copy has been registered.

## About this Manual

This manual helps a new user get started with CX-Supervisor, by describing the software installation and computer configuration, and by leading the user through the basics of CX-Supervisor application programming.

Separate OMRON manuals describe the related CX Automation Suite products; CX-Server, CX-Programmer etc.

Some small example applications are included with the CX-Supervisor software to demonstrate some of the most useful features. These can be used to help with product familiarity.

CX-Supervisor comes with a comprehensive context-sensitive on-line help system, which is designed to complement this manual, and provide a quick reference at any point in the CX-Supervisor application when the manual is not to hand. This general help system uses a fast 'hypertext' system which allows progressively more information to be obtained about any topic by selecting keywords within the descriptive text.

Throughout this manual, it is assumed that a working knowledge of Microsoft Windows is obtained, and that the user can:

- Use the keyboard and mouse.
- Select options from Windows menus.
- Operate dialog boxes.
- Locate, open and save data files.

- Edit, cut and paste text.
- Drag and drop.
- Start programs from the “START” button.

If Windows has not been used before, it is recommended that some time working with the Microsoft documentation is spent before using CX-Supervisor.

This introductory chapter deals with several important aspects of installing CX-Supervisor and setting it up for use. It is recommend that this entire chapter be read before installing the software.

# System Requirements

CX-Supervisor operates on IBM compatible personal computers with 200 MHz Pentium central processor. It is designed to run in the Microsoft Windows 95 / 98 / 2000 / Millennium and Windows NT V4.0 environment.

**Note:** CX-Supervisor is not guaranteed to be compatible with computers running Windows emulation (e.g. Apple Macintosh).

## Hardware Requirements

The following configuration is the **minimum** system requirements for running CX-Supervisor:

- IBM PC compatible 200 MHz Pentium processor or better.
- 64Mbyte of RAM minimum.
- 40Mbyte available hard disk space.
- 640 x 480 VGA display.
- A CD ROM drive is required in order to install the CX-Supervisor software.

The following configuration is the **recommended minimum** system environment for running CX-Supervisor effectively:

- IBM PC compatible Pentium 350 MHz processor.
- 128Mbyte of RAM.
- 50Mbyte available hard disk space.
- 1024 x 768 Super VGA display.

### Operating Systems and Environments

The operating systems on which this software should be run are:

- Microsoft Windows 95 / 98.
- Microsoft Windows Millennium Edition.
- Microsoft Windows 2000.
- Microsoft Windows NT V4.0. (Service Pack 3+).

### Interfaces to Hardware Communications

CX-Supervisor utilises communications driver CX-Server for direct communication with OMRON factory automation equipment.

If it is intended for a PLC to be connected to the computer for executing program code and testing, one of the following is required:

- RS-232C connection via a standard serial port on the computer (COM1 etc.).
- RS-422 connection to a 422 serial board.
- Standard Ethernet board.
- A Network Service Board.

Refer to the appropriate hardware system manuals for full information about connecting and configuring these devices for the environment

## Installing CX-Supervisor

The CX-Supervisor software is supplied on CD ROM and is installed easily from within Windows.

To install CX-Supervisor, load the disk in the disk drive.

The AutoRun feature should automatically start the setup program. If this has been disabled see the README.TXT on the CD ROM.

After installation the text file README.TXT in the CX-Supervisor directory contains up-to-date information about the software. Read this file for details of any changes or new features in CX-Supervisor made since this manual was produced

The installation of CX-Supervisor should take no more than a few minutes

## Copy Protection

CX-Supervisor is copy protected to prevent illegal use. If the protection is not installed certain features are inaccessible. To gain access to these features one of the following protection methods must be installed.

## Software Copy Protection using a Token

The software copy protection mechanism within CX-Supervisor prevents illegal use of the software by locking it to a specific hard disk. When CX-Supervisor is run, it looks for this particular disk, and fails if the disk is not found. The mechanism consists of a user token, which must be installed on the system before the software is used.

**Note:** PLEASE READ THIS SECTION CAREFULLY! There are some important points to note about this copy protection system and how it might affect the computer.

### Activating CX-Supervisor Token

The software copy protection mechanism within CX-Supervisor locks it to a specific hard disk. When CX-Supervisor is run, it looks for this particular disk, and does not continue if the disk is not found. The mechanism consists of a user token, which must be transferred from the master diskette to the hard disk before running CX-Supervisor.


The CX-Supervisor Token Mover can be started from the **Start** button, and displays a dialog which provides a number of movement options.

***1, 2, 3…***

1. Make sure Token Diskette #1 is in the installation drive. Use the Scan buttons to check the integrity of the diskette and hard drive. If this is the first installation of CX-Supervisor, tokens should exist only on the diskette.
2. Click on *Activate CX-Supervisor*. The appropriate files are copied into a new directory on the hard disk.
3. Click on *Scan Installed Copy for Tokens*. If the token has been installed correctly, the program displays the number of tokens installed as 1.
4. Click on *Exit* when complete.

With a successful installation of the token, CX-Supervisor is ready to be used. Remove the diskette from its drive, and store it with the CX-Supervisor CD in a safe place. In the unlikely event of any problems or error messages, refer to the OMRON support office.

### Token Installation

The CX-Supervisor token protects the installed software, certain files are created on the system that are not normally visible. It is important that these hidden files are not touched, moved or deleted: if they are, the user token will be damaged, and CX-Supervisor will not work.

If the names of the hidden files are visible on the screen, be careful: it is possible to invalidate the CX-Supervisor software.

**Restrictions**
The user token must be transferred back to the master diskette. For example, moving CX-Supervisor to a different computer, or in certain other situations, the token can only be transferred to or from a CX-Supervisor token diskette.

It is not possible to install the user token to either a RAM disk or a network server machine.

**System Backup**
Most backup utilities do not touch the hidden files created by the protection mechanism. However, some utilities allow hidden files to be backed-up and restored. This option should not normally be used, because it would cause the protection mechanism to consider the token invalid. The hidden files used by the protection mechanism do not have the Archive file attribute set, so it may be possible to restrict a backup to files with this attribute set.

**File Maintenance**
Some file management utilities (e.g. Xtree, Norton Utilities) list hidden files, and can move them to other directories, or remove them from the system. Thus, a user might delete the CX-Supervisor copy protection files accidentally. If any software mentions these files during a maintenance operation that removes files, immediately *STOP* and move the token back to the CX-Supervisor master token diskette, using the Token Mover. Re-install the token after all maintenance has been done.

**Disk Cache Operation**
Disk caching software may interfere with the installation of CX-Supervisor, and should be disabled temporarily during the installation process. The '/d' option of Multisoft Corporation's PC-Kwik utility should be disabled, for example HyperCache has a similar non-standard option for accessing diskettes, which should also be disabled during installation.

**Disk Compression**
The copy protection mechanism is compatible with disks that have been compressed with programs such as SuperStor, Stacker and DoubleSpace. However, the CX-Supervisor token must be moved back to the master diskette when installing any of these compression systems, as mentioned in their manuals. Failure to do so can cause the protection mechanism to consider the token invalid.

**Disk Defragmenters**
CX-Supervisor copy protection mechanism is compatible with and not affected by disk defragmenters such as Central Point's Compress, Digital Research's Diskopt, Stac's Sdefrag and Microsoft's Defrag.

**Backing up CX-Supervisor Token Diskettes**
The two token diskettes each contain a 'fingerprint', which is written to a non-standard track. This prevents the diskette from being copied, even by advanced disk copying programs. It

is not possible, therefore, to copy these diskettes for backup purposes. If the masters become damaged or lost, contact the local OMRON support office for a replacement.

The CX-Supervisor program diskettes can be backed up, however, to allow the masters to be stored in a safe place.

## Hardware Copy Protection using a Dongle

The hardware copy protection method consists of a small box called a “Dongle” which is usually plugged into the parallel port. The port can still be used as normal i.e. to connect a printer. When CX-Supervisor is run the port is checked for a valid dongle and the program fails if it is not present.

### Fitting a CX-Supervisor Dongle

The hardware copy protection consists of fitting a dongle on the PC. When CX-Supervisor program is run, it looks for a signal from the dongle, and only continues if the signal is found.

Installation of the dongle is as follows:

***1, 2, 3…***

1. Remove any connection to the parallel port of the PC.
2. Connect the dongle to the parallel port of the computer noting any instructions supplied.
3. Replace the original connection to the output port of the dongle.

### Activating a CX-Supervisor Dongle

Use the Dongle Installer to activate the CX-Supervisor Dongle.

***1, 2, 3…***

1. Verify the settings in the Printer Port field and Port Type field.
2. Verify the settings in the Network Protocol field. If the dongle is attached to a local computer, this setting must be set to ‘None’.
3. Select the Activate pushbutton. Shutdown and restart the computer for the settings to take effect.

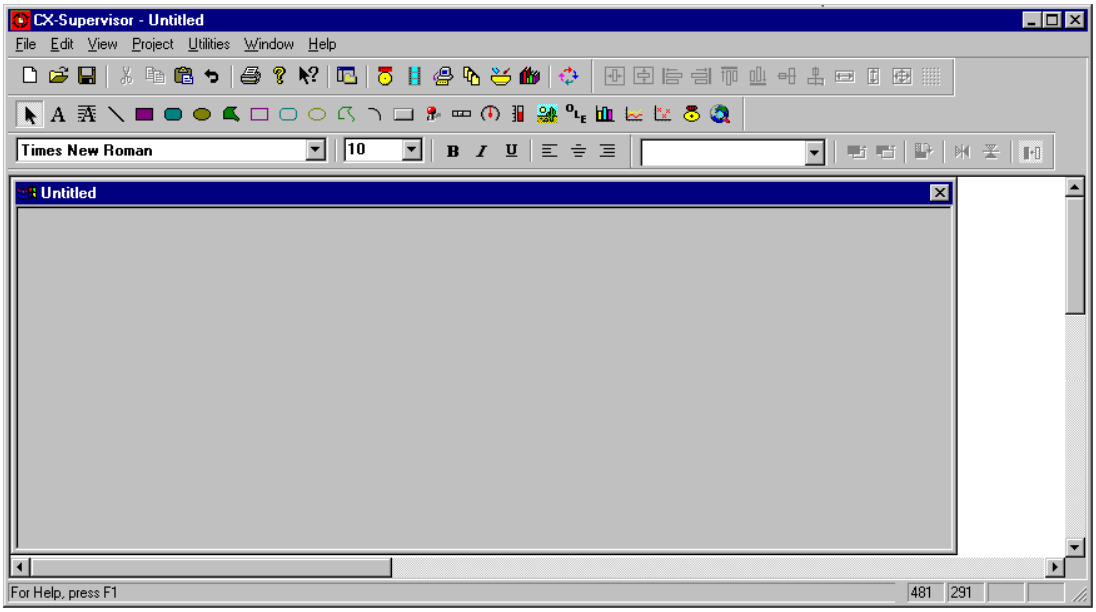
# Starting CX-Supervisor

After the software installation the *Programs* option from the **Start** button shows a new group window for CX-Supervisor under the OMRON heading. The software is ready to run and can be started by clicking on the CX-Supervisor Developer icon.

When CX-Supervisor is first started up, it displays a window similar to the one shown below. The CX-Supervisor window offers many features to ease the process of programming, using the mouse or keyboard or both. It is possible to configure the display for any size monitor so that as much or as little information is visible as required, using options from the *View*

menu. Any display configuration changes are saved in the Windows environment, and restored next time CX-Supervisor is run.

Use this section to become familiar with the layout of the CX-Supervisor display, and to set it up as desired.




## Customising CX-Supervisor Settings

By default CX-Supervisor shows the Toolbar, Control bar and Status bar. The display of these can be selected by activating the option associated with the *View* menu.

To display a bar or the palette toolbox, click on the menu item with the mouse. A tick next to a name indicates that it is currently displayed. CX-Supervisor saves the settings when it is exited and restores them when it is next executed

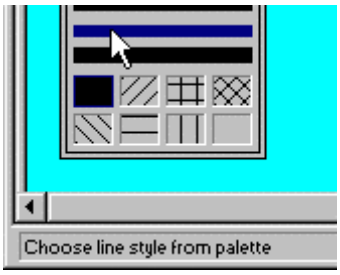
## The CX-Supervisor Help System

CX-Supervisor comes with a detailed context-sensitive help system: at any time while using the software, help can be obtained on the particular point currently being worked on, or on general aspects of CX-Supervisor. This system is intended to complement the manual, by providing on-line reference to specific functions of the software and how to use them.

There are three types of CX-Supervisor help: index, context sensitive help and status bar help. An index of help topics can be accessed at any time by clicking *Index* from the *Help* menu. Instructions on how to use help can be accessed by clicking *Using Help* from the *Help* menu.

Alternatively, help on the topic currently in use can be obtained by pressing <F1>. Some dialogs also provide a **Help** pushbutton.

At the bottom of the CX-Supervisor screen is a general status bar, which provides several helpful pieces of information as the mouse is moved over display components.




CX-Supervisor also includes “point and click” help. To use this facility click on the icon. The cursor changes to an arrow with a question mark next to it. Use this cursor to point at any menu item or button on the display, and then click. Context-sensitive help for that item is then displayed.

General information regarding CX-Supervisor can be obtained by selecting *About CX-Supervisor* from the *Help* menu.

# GLOSSARY OF TERMS

**ADO** ADO stands for ActiveX Data Objects and is data access technology which uses OLE-DB to access data sources in a uniform way e.g. MS-Access databases, MS-Excel spreadsheets and Comma Separated Variable files.

**Application** A software program that accomplishes a specific task. Examples of applications are CX-Supervisor, CX-Programmer, Microsoft Word for Windows and Microsoft Excel. CX-Supervisor and its development environment allows the creation and testing of new applications through a Graphical User Interface (GUI).

**Bitmap** The representation of an image stored in a computer's memory. Each picture element (pixel) is represented by bits stored in the memory. In CX-Supervisor a bitmap image can be installed as a single object.

**Communications Driver** The relevant communications management system for OMRON PLCs in conjunction with Microsoft Windows, providing facilities for other CX Automation Suite software to maintain PLC device and address information and to communicate with OMRON PLCs and their supported network types.

**DDE** Dynamic Data Exchange. A channel through which correctly prepared programs can actively exchange data and control other applications within Microsoft Windows. CX-Supervisor, through the use of its script language, allows extensive use of DDE functionality.

**Development environment** SCADA applications are created and tested using the development environment within CX-Supervisor. On completion, the finished application can be delivered as a final customer application to be run by the run-time environment.

**GUI** Graphical User Interface. Part of a program that interacts with the user and takes full advantage of the graphics displays of computers. A GUI employs pull-down menus and dialog boxes for ease of use. Like all Microsoft Windows based applications, CX-Supervisor has a GUI.

**I/O type** Input / Output type. An attribute of a point that defines the origin and destination of the data for that point. The data for a point can originate (be *input* from) and is destined (is *output* to) to the internal computer memory, PLC, DDE target application.

| | |
|---|---|
| **Icon** | Pictorial representations of computer resources and functions. The CX-Supervisor development environment and run-time environment are run from icons. Icons are also used in CX-Supervisor to indicate an OLE object. |
| **Microsoft Excel** | A spread sheet application. |
| **Microsoft Windows** | A windowing environment for MS-DOS computers, that is noted for its GUI, and for features such as multiple typefaces, desk accessories (such as a clock, calculator, calendar and notepad), and the capability of moving text and graphics from one application to another via a clipboard.<br><br>CX-Supervisor will run only under Microsoft Windows. DDE functions communicating with other applications supported by CX-Supervisor use Microsoft Windows as a basis. |
| **Microsoft Word** | A word processing application.<br><br>See also SVGA mode and VGA mode. |
| **Object** | In CX-Supervisor, an object can be text, graphics, a control, a bitmap, or OLE object as created in the development environment. A complex object can exist as a combination of two or more objects of any of the above types. Specifically, graphical objects can be categorised as a line, an arc, a polygon (including a square and rectangle), a round rectangle, an ellipse (including a circle), or a Polyline. A control is essentially a complex graphic object and is specifically either a pushbutton, a toggle button, a slider, a trend graph, a rotational gauge or a linear gauge. |
| **OLE** | Object Linking and Embedding. Used to transfer and share information between Microsoft Windows based applications and accessories. When OLE is used in CX-Supervisor, it is possible to view or even edit a file from a target application. |
| **OLE-DB** | OLE-DB is the underlying database technology, on which ADO relies. OLE-BD is designed to be the successor to ODBC. |
| **Operator** | A symbol used as a function, with infix syntax if it has two arguments (e.g. “+”) or prefix syntax if it has only one argument (e.g. NOT). The CX-Supervisor script language uses operators for built-in functions such as arithmetic and logic. |

**Pages** The combination and manipulation of pages containing objects within projects forms the basis of CX-Supervisor. More than one page can exist for each project. The pages in a project provide the visual aspect of CX-Supervisor corresponding to a display with the objects contained in each page providing a graphical representation of the system being monitored.

**Pixel** A single displayable point on the screen from which a displayed image is constructed. The screen resolution of the computer's Visual Display Unit (VDU) is defined by the number of pixels across and the number of pixels down (e.g. 1024 x 768).

**PLC** Programmable Logic Controller.

**Point** A point is used to hold a value of a predefined type - Boolean, Integer, Text, etc. The contents of a point may be controlled by an object or I/O mechanism such as DDE. The contents of a point may control the action or appearance of an object, or be used for output via an I/O mechanism.

**Project** A CX-Supervisor application will consist of one or a number of pages linked together. The pages may contain passive or active graphics, text or animations, and may be grouped together logically to form a project. A project may consist of many pages, or simply a single page. Projects may be built and tested within the CX-Supervisor development environment, and run stand-alone under the CX-Supervisor run-time environment.

Only one project at a time may be open for editing within the CX-Supervisor development environment.

**Run Time Environment** SCADA applications are run using the run-time environment of CX-Supervisor, following creation of the application in the CX-Supervisor development environment.

**SCADA** Supervisory Control and Data Acquisition. (see CX-Supervisor)

**SVGA mode** A mode of video display that provides 800 $\times$ 600 pixel resolution (or higher) with 16 or more colours and is supported on Super Video Graphics Adapter systems.

**CX-Supervisor** A SCADA software application which creates and maintains graphical user interfaces and communicates with **PLCs** and other I/O mechanisms.

**Topic** Within the CX-Supervisor script language, Topic is used in DDE functions to specify a file name pertaining to an outside application. Using DDE functions, CX-Supervisor allows the opening of a file, part of the server application.

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|---|---|
| **VGA mode** | A mode of video display that provides 640 × 480 pixel resolution with 16 colours and is supported on Video Graphics Adapter systems. |
| **Windows Desktop** | An integral part of Microsoft Windows which allows Microsoft Windows based applications to be started from icons and for all applications to be organised. CX-Supervisor can be run from Windows Desktop. |

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