Introduction to iFIX

Contents

1.   Introduction to Intellution Dynamics

Intellution® Dynamics™ is the next generation in industrial automation software systems. Since the introduction of THE FIX™ (*Fully Integrated Control System*) in 1984, FIX products have been setting the industry standard for powerful, reliable automation solutions. With Intellution Dynamics, we have once again taken industrial automation to a new level by creating a breakthrough software system that redefines the way you create and maintain your industrial automation solutions.

Intellution Dynamics Overview

Intellution Dynamics is the first fully-integrated family of software automation products based on open, component-based technology. It is designed to remove the constraints of packaged software and allow easy integration and interoperability between your plant floor and business systems, as well as between Intellution Dynamics components and third-party applications. It includes many significant functional and architectural enhancements over previous versions of iFIX, including:

- •   Powerful Plug & Solve™ Architecture

- •   Componentized Object Structure

- •   Integrated Intellution WorkSpace™ Development Environment

- •   Microsoft Visual Basic® for Applications (VBA) Scripting

- •   Comprehensive OLE for Process Control (OPC), OLE, and ActiveX™ Support

- Increased Security and Reliability

- Advanced Graphics

- Extensible Configuration Wizard Architecture

- Extensive Internet Support

- Enhanced Alarming

- Increased Networking Capabilities

These advancements significantly reduce the design time for automation projects, allow faster and simpler system upgrades and maintenance, provide seamless integration between Intellution Dynamics and third-party applications, and dramatically increase productivity.

The open architecture of Intellution Dynamics lets you customize your system by integrating third-party components and applications. This Plug and Solve architecture allows you to quickly and easily enhance, or in certain cases replace, Intellution Dynamics' built-in capabilities with your own applications and objects. The power and flexibility of this architecture encourages continuous process improvement by allowing you to build and reuse applications faster than ever before while significantly reducing the cost of integration. With Intellution Dynamics, you can quickly and easily make changes to your system without slowing down or disrupting your plant's process.

Intellution Dynamics Components

At the heart of Intellution Dynamics is iCore, the powerful technology that provides an unmatched distributed architecture. iCore is built on standard technologies, such as ActiveX, OPC, VBA, and Component Object Model (COM), to provide easy integration of third-party applications across wide-area networks and the Internet. iCore provides LAN redundancy to enhance system performance. The iCore platform hosts a number of Intellution and third-party application components, as illustrated in the following figure.

SCADA	HMI	iBatch	iWebServer	iLogic	iDownTime	Third-Party Applications

Common iFIX Applications

Graphics   Historical   I/O Drivers   Scheduling   OPC Data Server   Reporting   Terminal Server

*i*Core

Security   Alarming   Networking   VBA   OPC Client   SCU   WorkSpace
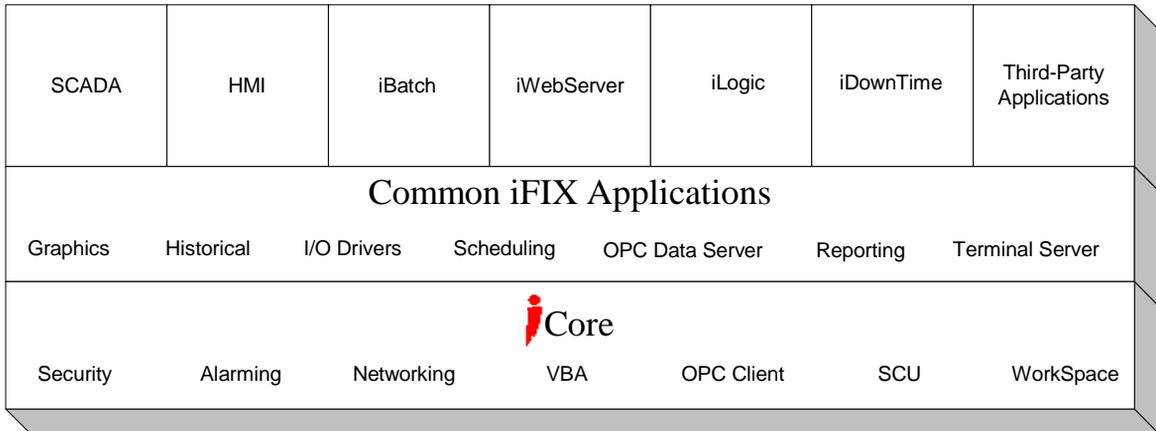
Figure 1-1: Intellution Dynamics iCore Platform

An important component of iCore is the Intellution WorkSpace. This intuitive interface organizes all system components into a single integrated development environment (IDE) and provides you with a single point of configuration. The Intellution WorkSpace allows you to easily navigate through, access, and manipulate all the integrated components of your system. It offers powerful browsing capabilities, find and replace options, and third-party integration.
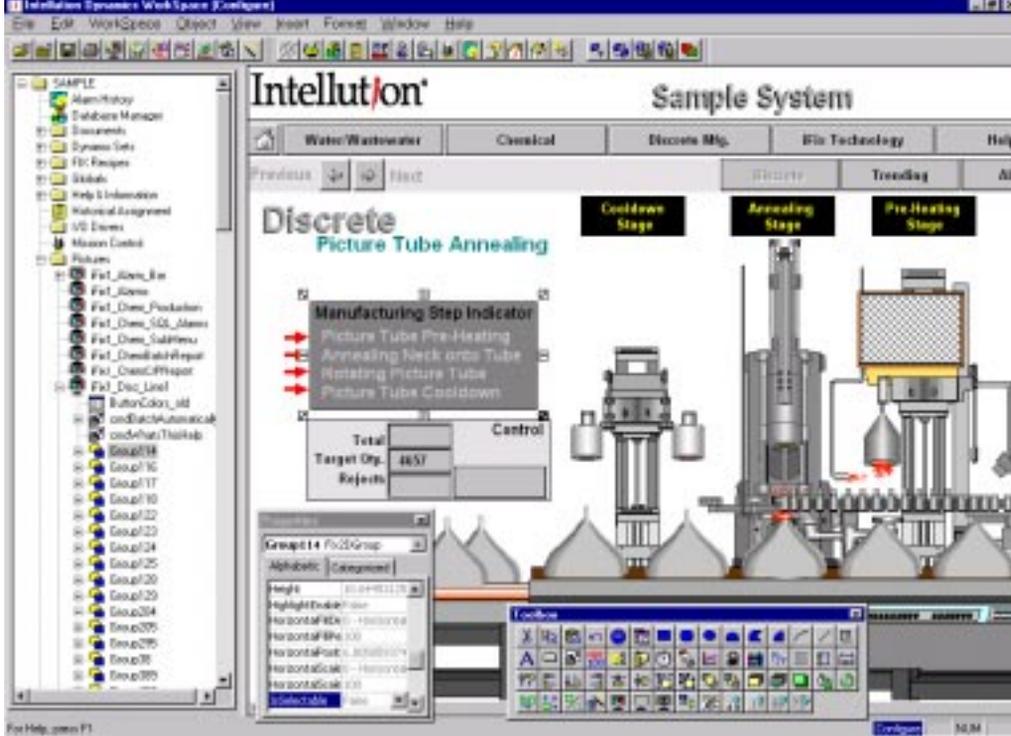
Figure 1-2: The Intellution WorkSpace

The Intellution WorkSpace includes two fully-integrated environments known as configuration and run-time. These environments provide everything you need to develop and view the graphical displays, schedules, reports, and scripts that help you interact with real-time data. The configuration environment provides all of the graphic, text, data, animation, and charting tools necessary to create displays that are attractive, organized, and easy to use and understand. The run-time environment provides the means necessary to view these displays in real-time. You can easily switch between the two environments with a simple mouse click. Switching between the run-time and configuration environments allows you to quickly test changes to displays while real-time alarming and data acquisition continues.

It is important to note that while in the configuration environment, there is no interruption to your process. All the functions that control and monitor your system, such as alarming, reporting, and scheduling, continue to run in the background.

Intellution Dynamics Plug-In Components

Intellution Dynamics lets you effectively customize your system by seamlessly incorporating the following Intellution software components, as well as many third-party applications.

iFIX

The SCADA component of iFIX provides monitoring, supervisory control, alarming, and control functions. It guarantees the absolute integrity of data and provides complete distributed networking capabilities.

The HMI component of iFIX is the "window into your process". It provides all the tools you need to develop pictures that operators can use to monitor your process.

iBatch

iBatch is the high-performance automation application that lets you model your plant, manage recipes, execute batches, create electronic batch records, and generate reports based on any batch process. With iBatch, you'll have the tools necessary to reduce cycle time, increase flexibility, comply with regulatory demands, and track batch production.

iWebServer

iWebServer is a thin client product that provides authorized users with read-only access to designated plant processes using any standard Internet browser. It provides a secure architecture that insulates your SCADA nodes from unauthorized access. With iWebServer you can view your process graphics in real-time from anywhere in the world with the assurance that unauthorized changes cannot be made to your system under any circumstances.

iDownTime

Equipment use and downtime are typically tracked and reported as key performance indicators in manufacturing companies. iDownTime allows you to accurately report equipment efficiency, and extends your ability to analyze, understand, and address each source of downtime.

iDownTime collects and organizes downtime information in a way that provides you with a complete breakdown of downtime events by *location* and *reason*. A location refers to a piece of equipment or any monitored point in a production line, and a reason refers to cause of downtime. You can view this information in the iDownTime Control which you place in a picture in the Dynamics WorkSpace. Once collected, you can also view this information through a set of interactive reports in Microsoft Excel™.

Enabling Technologies

As the solutions required by end users and system integrators become more and more complex, it becomes increasingly difficult to anticipate the individual needs of each customer. With this challenge in mind, we incorporated the following industry-standard technologies into Intellution Dynamics to provide a powerful development environment that can be easily tailored to meet your specific requirements:

•   OLE for Process Control (OPC)

•   Visual Basic for Applications (VBA)

•   ActiveX

These enabling technologies allow us to capitalize on our leading 32-bit technology position and provide a definitive and visual difference that is meaningful to both new end users and system integrators.

OLE for Process Control (OPC)

OPC is a software standard designed to provide automation applications with easy access to industrial plant floor data. We have led the development of OPC through our active role in the founding of the OPC Task Force, a consortium of leading industrial automation suppliers formed to speed the development of an OLE-based communication standard. The goal of OPC is to define a standard interface based on Microsoft's Component Object Model (COM) technology that allows greater interoperability between automation and control applications, control devices, and business and office applications.

Using OPC, the Intellution WorkSpace can communicate directly with any local OPC server.

Visual Basic for Applications (VBA)

VBA is a powerful scripting tool that is fully integrated into iFIX to let you quickly and easily automate operator tasks and create automation solutions. VBA scripts can be as simple or complex as you need them to be, allowing you to add custom functionality and extend iFIX as needed to accommodate your automation strategy. Its powerful and easy-to-use development environment allows you to reuse existing Visual Basic code.

ActiveX

ActiveX is a set of programming technologies created by Microsoft that enables software components created in different languages to interact with one another in a networked environment. It evolved from the OLE development standard, which in recent years has expanded far beyond the concepts of *object linking and embedding* that formed the original acronym. Intellution Dynamics is a container for ActiveX controls.

Like OLE, ActiveX is built on the COM programming model to support the full integration of software components. It supports Distributed COM (DCOM) for the transparent integration of those same components across distributed networks, including the Internet and intranets. However, ActiveX has been optimized for size and speed to allow developers to use subsets of the complex OLE interface to create highly interactive applications. ActiveX allows any OCX (ActiveX control) developed by a third-party to behave just like any object created by Intellution.

Secure Containment

To protect your system from possible problems with ActiveX controls, Intellution Dynamics provides Secure Containment. Unlike most systems that support ActiveX controls, if an ActiveX control crashes while Intellution Dynamics is running, it is sealed off and your system continues to run normally. With Secure Containment, there is no loss of data or interruption to your control process.

2. System Architecture

This chapter describes the powerful and unique system architecture of iFIX. It includes information about:

- iFIX Nodes

- Universal Data Access

- Scan, Alarm, and Control

- Scheduler

- Distributed Networking

- Redundancy

- Alarming

- Security

- VisiconX

iFIX Nodes

An iFIX node is any computer that runs iFIX. An actual node can be any of the node types shown in the following graphic. Each node type is described in detail following the graphic.
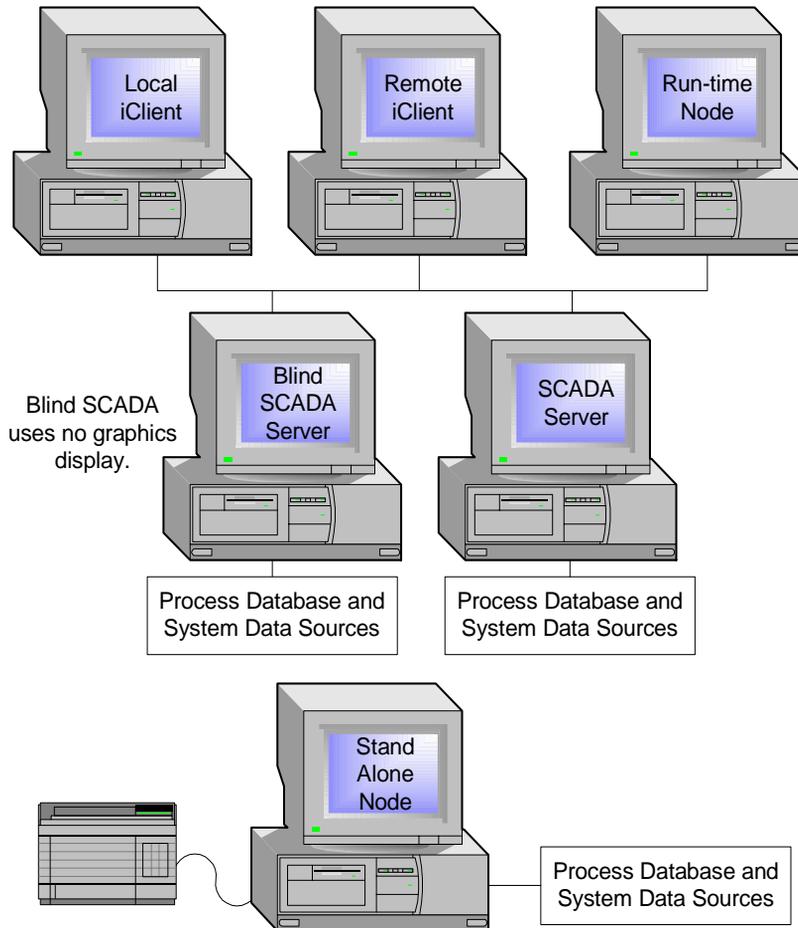
Access to the...	SCADA Server	iClient	Run-time Node
Run-time environment	Yes	Yes	Yes
Configuration environment	Yes	Yes	No

Figure 2-1: iFIX Node Types

All SCADA Servers have a process database and are directly connected to data. Blind SCADA Servers use no graphics display. iClients are networked to a SCADA Server. They act as clients to the SCADA Server.

Local and Remote Nodes

When working with a distributed iFIX system, *local* refers to the node on which you are currently working and *remote* refers to any node that you need a communication link to access.

Stand Alone Node

When working with a centralized iFIX SCADA system, *stand alone* refers to a node that performs all functions. Stand alone nodes do not use a network.

SCADA Server

A *SCADA server* (or *SCADA node*) runs the data acquisition and management component of iFIX. Usually, a SCADA node resides on the plant floor and has direct connections to the process hardware.

Blind SCADA Server

A *blind SCADA server* (or *blind SCADA node*) uses no graphics display. This configuration frees up more of a computer's resources for data acquisition and network management functions. Graphics can be viewed using an iClient.

Run-time Node

A *run-time node* does not let you modify graphic displays or the process database. Pre-configured files are installed on these nodes so that you can monitor the process, change process settings, and acknowledge alarms.

iClient

An *iClient* (or *view node*) is the most common type of node. View nodes display the real-time graphics that come with iFIX. The term *view node* means that the node runs the graphics display program, but the node can run other applications as well.

iClient Read Only

The iClient Read Only has the same functionality as an iClient, except that you will be not able to write to the iFIX database or to OPC servers. You can, however, write to a relational database. The iClient Read Only is similar in functionality to PlantTV for FIX, with the added benefit of leveraging the iClient features, such as the event scheduler, VBA, and ActiveX controls.

iClientTS

iClientTS™ is a thin-client and web solution that runs on a Microsoft Windows 2000 Terminal Server-enabled machine. The multi-session environment allows multiple thin clients to log on to the Server and initiate individual sessions of iFIX. iFIX is not installed on the individual client machines, only on the Terminal Server. The user's experience is nearly identical to running iFIX on their local node. From the client, it is not obvious that a user is in a Terminal Server session. Virtually all iFIX client functions work including scripts, trending, alarms, and security. iClientTS also allows you to remotely support iFIX from any computer on your network or anywhere in the world.

iFIX Terminal Server allows multiple clients to run individual instances of iFIX from one Server. A sample iFIX Terminal Server environment, shown in *Figure 2-2*, includes a Server, one or more iFIX SCADA nodes, and multiple clients.

Terminal Server Clients
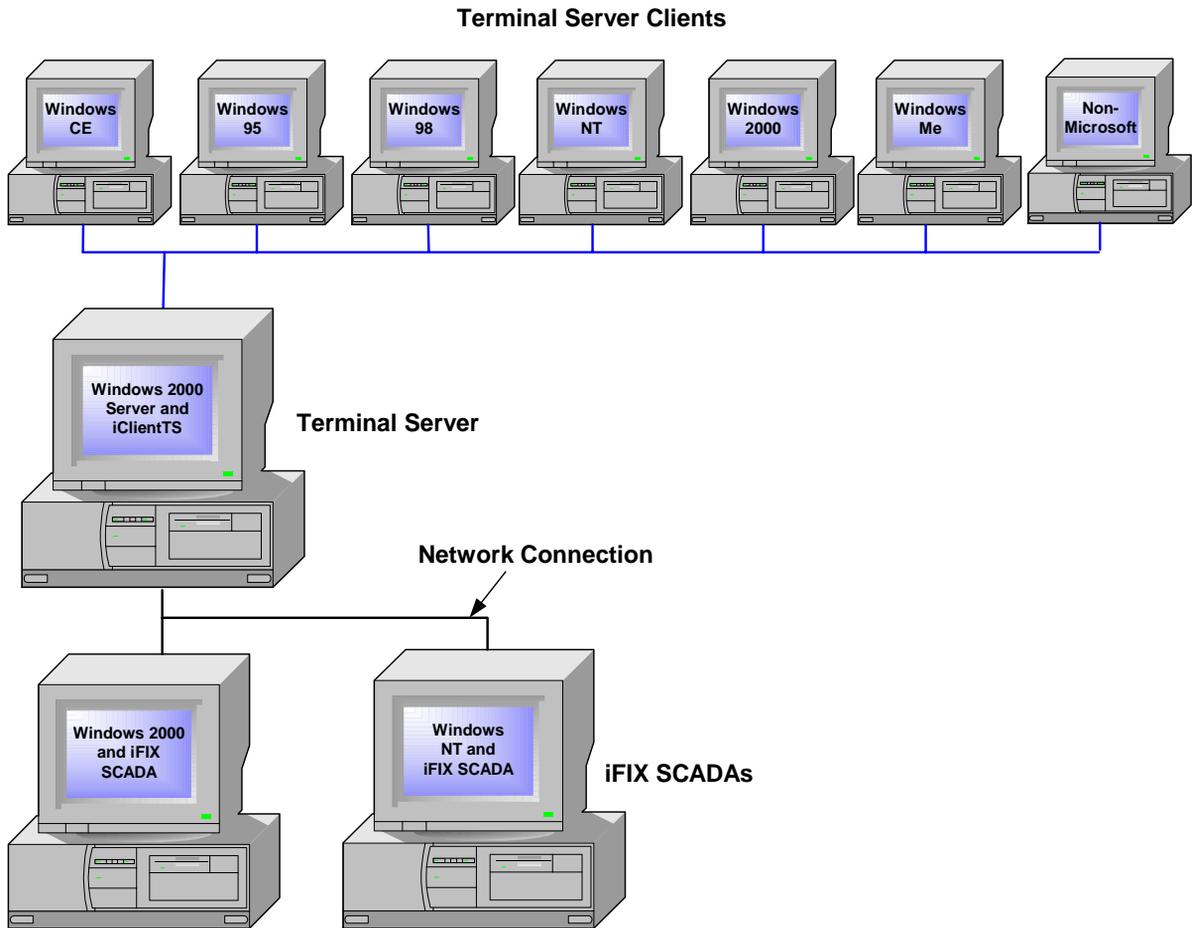
Figure 2-2: Sample iClientTS Terminal Server Environment

Thin clients access the Terminal Server through Microsoft Remote Desktop Protocol (RDP) or Citrix Independent Computing Architecture (ICA) protocol.   Each thin client accesses applications on the Server by connecting to the Terminal Server machine either through a locally-installed .EXE login (Full Client) or through Internet Explorer 5.0 (Terminal Services Advanced Client). No iFIX software is installed or runs on the thin client machine.

A separate session of iFIX runs on the Terminal Server for each thin client. This allows very thin clients with minimal client-side resources to execute an individual instance of iFIX. The user's experience is nearly identical to running iFIX on their local machine. If you have clients and SCADAs in your iFIX Terminal Server environment, you can access and manage any of the SCADAs from a thin client. For example, from a thin client machine, you can build graphics, add tags, and change setpoints on a networked SCADA.

For more information on the Terminal Server environment, refer to the *Terminal Services Configuration Overview* section of the Windows 2000 Server Help.

Universal Data Access

Typically, a plant is controlled through a network of sensors and controls connected to I/O devices, such as programmable logic controllers (PLCs®) and softlogic controls (SLCs). Although this type of system provides the automatic control that keeps the plant running, it is often difficult for plant personnel to *see* what's actually going on in the control process at any time. iFIX solves this problem by making data from various sources available to plant workers and managers in formats that are useful and easy to understand.

A *data source* includes the data you want to access and the information needed to get that data. The data sources available with iFIX include tags, I/O addresses, object properties, historical data, picture properties, VBA events, global variables, and expressions.

With the open architecture of iFIX, data can be accessed from a wide variety of sources using OLE, OPC, ActiveX, ODBC, and DDE. With comprehensive client and server support for these object technologies, iFIX is able to read data from and write data to the following sources:

•   Third-party applications

•   Other iFIX databases

•   I/O drivers

It is this ability to access data universally that gives iFIX its remarkable power and versatility.

OLE, OPC, and ActiveX Support

iFIX includes comprehensive OLE, OPC, and ActiveX client and server support as the foundation for providing an integrated *plug and solve* architecture. This technology is the primary mechanism that lets you easily integrate third-party objects and controls into iFIX and embed iFIX objects into other applications. OLE Automation server support allows you to expose the properties of iFIX components. For example, it allows you to generate pictures without accessing the software's user interface.

Open Database Connectivity (ODBC) Support

ODBC support allows iFIX to access data from a database using Structured Query Language (SQL) as a standard language. Each database management system (DBMS) requires an *ODBC driver*, which is a dynamic-link library (DLL) used to gain access to a data source. Among the database management systems used by iFIX are Microsoft Access, SQL Server, and Oracle. Refer to the *Using SQL* manual and *Writing Scripts* manual for more information on ODBC support.

Dynamic Data Exchange (DDE) Support

DDE is a form of communication that uses shared memory to exchange data between applications. With DDE support, if data in a linked application (a spreadsheet or word processor, for example) changes, the data in the process database also changes, and vice-versa. Refer to the *Using DDE* manual for complete information on DDE support.

I/O Drivers

Intellution provides a wide variety of high-performance I/O drivers that support best-selling and specialty I/O devices. We also offer the OPC Toolkit, a plug-in component to iFIX that lets you easily write high performance, reliable I/O servers that communicate between your process hardware and your iFIX, OLE Automation, and OPC client applications. High performance I/O drivers provide such capabilities as automatic communication error detection, reporting, and recovery; built-in datascopes; and support for redundant communications. Receiving information from third-party servers is also supported, but typically does not offer any of the high data integrity of an Intellution high-performance I/O driver.

OLE for Process Control (OPC)

The Intellution WorkSpace uses OPC to communicate directly with any local OPC server. You can add a local OPC server to your iFIX node using the Data Server Installer program. This utility, located in your Dynamics directory, lets you add, modify, and remove OPC servers from the list of data servers available to iFIX. For more information about using the Data Server Installer, refer to the program's online help.

The WorkSpace cannot directly communicate with remote OPC servers. If you need to communicate with a remote OPC server, use the OPC Client driver. This driver lets you communicate with any local or remote OPC server and store the information in the process database. When the OPC Client driver communicates with a remote OPC server, it uses Microsoft's Distributed Component Object Model (DCOM) to establish the connection. The WorkSpace does not support using DCOM directly to a remote OPC server. For more information about using the OPC Client, refer to the driver's online help. You can obtain the OPC Client driver by installing from the I/O Drivers and OPC Servers CD.

Scan, Alarm, and Control Program

The Scan, Alarm, and Control program (view) is a system application that runs on a SCADA node. This program is responsible for executing the logic of the database chains. SAC performs the following functions:

- Retrieves data from various data sources

- Translates the data into the format expected by the database

- Checks the data against the alarm limits and generates alarm messages

- Executes the control logic

- Detects exceptions

- Makes requested writes to the database

Each database chain also contains the information that determines whether SAC processes the chain based on time-based, exception-based, or one-shot processing. A node can perform both time-based and exception-based processing simultaneously. This feature gives you the ability to use the best processing strategy for each data point in your system.

Time-Based Processing

Most applications work by acquiring and calculating data at regular intervals, defined in seconds, minutes, or hours. iFIX can perform any combination of time-based processing. This allows you to balance system resources between data that needs to be acquired quickly and data that can be acquired over longer intervals.

The frequency with which SAC retrieves data is called the *scan time*. SAC can perform time-based processing in:

- Subseconds (0.05 seconds to 0.95 seconds)

- Minutes

- Seconds

- Hours

Exception-Based Processing

Often, it is more efficient to process data after key events occur, such as the changing of a set point or the closing of a contact. Processing that is triggered by events rather than time is known as *exception-based* processing.

Exception-based processing is essential for true distributed SCADA applications that monitor a large number of I/O devices. For example, an oil field may be monitoring pipelines through a large network of remote terminal units (RTUs). The data from the RTUs changes infrequently, so there's no need to acquire data at a fixed interval. However, when the data does change, oil field operators need to know about it immediately. iFIX senses the changed value and processes it immediately.

SAC can perform exception-based processing on the following events:

- Data changes in the database.

- Unsolicited messages from the process hardware.

- Operator actions.

- Instructions from software applications.

One-Shot Processing

When the first block in a chain has a scan time of zero, SAC processes the chain only when the primary block goes on scan. This is known as *one-shot processing*.

Scheduler

There are certain tasks that you will want to perform at a specified time or interval or when a change occurs in the process. To schedule these tasks you will need to define the time or event that triggers the action that you want to occur. The Scheduler is an iFIX application that runs in the foreground or background, monitoring the system and triggering actions based on timers or events. It can be run as a service under Windows NT or Windows 2000, allowing you to log in and out of an NT or 2000 node without affecting or triggering scheduled events regardless of whether or not the Intellution WorkSpace is running.

Distributed Networking

iFIX networking design incorporates two basic principles: true distributed processing and on-demand data transfer.

Distributed Processing

Many systems operate in a hierarchical fashion that leave individual computers vulnerable to system failures anywhere on the network. The architecture of iFIX allows plants to distribute critical functions among all nodes on the network.

In a distributed processing network, each node independently executes the tasks assigned to it. One advantage of this strategy is that nodes can be taken off-line without bringing the whole network down. When a node looks for data from an off-line node, the networking application notifies the requesting node, so that the node handles the missing data gracefully. Even though each node has integrity as an independent station, nodes can also access data anywhere on the network. For example, a View node can display a picture with links to many different SCADA nodes without requiring additional configuration work or the need to have a local copy of the database.

Dynamic Connections

You can also configure your node to automatically make connections online to remote SCADA nodes that are not specifically configured on your node. These connections, called *dynamic connections*, are described in more detail in the *Configuring Remote Nodes* section in the *Setting up the Environment* manual.

Centralized Processing

Some applications only need one node to perform the required functions. It is easy to convert a distributed node to a stand alone node or a stand alone node to a distributed node. iFIX operates just as smoothly in a single computer environment as it does in a distributed computer environment.

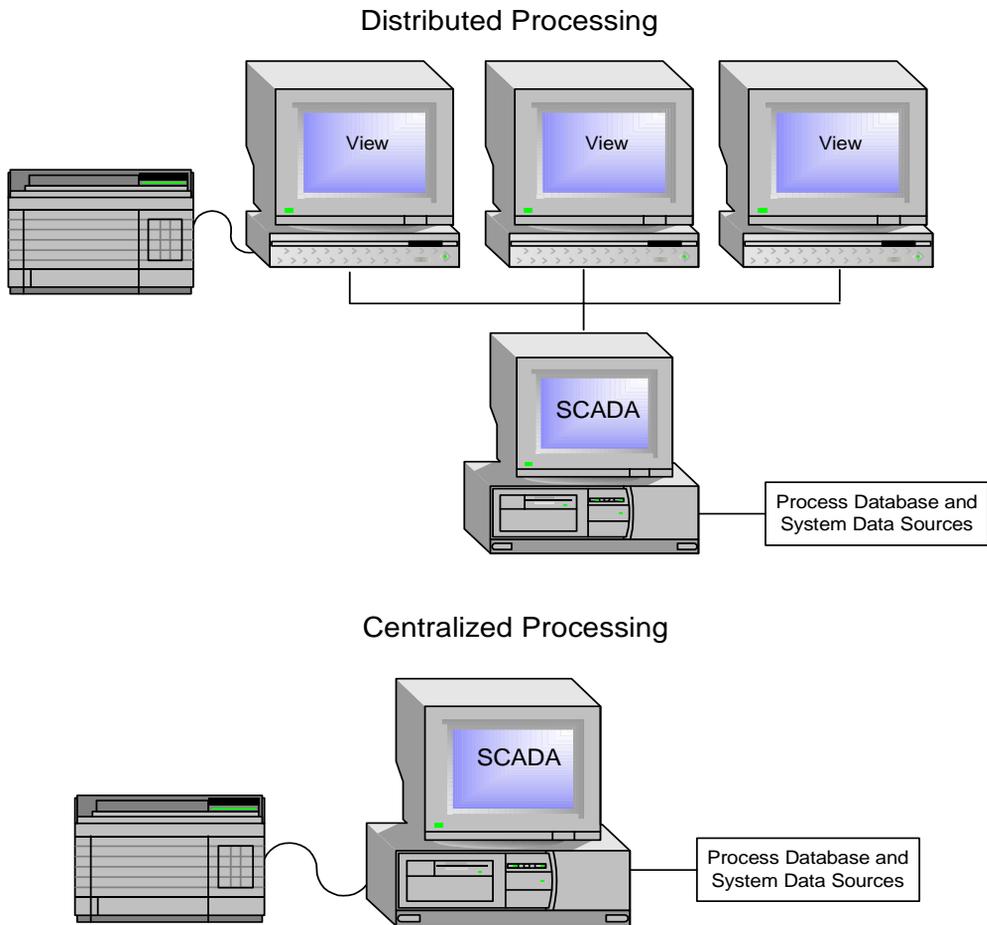The following figure shows a distributed and centralized process.

Figure 2-3: Distributed and Centralized Processing

Redundancy

iFIX includes a redundancy feature that maximizes system performance by recognizing multiple paths to your data. Should a SCADA node or LAN connection become unavailable, iFIX can switch from one path to another automatically. The process of switching from one connection to another is known as *failover*. Failover works the same whether you are using backup SCADA or LAN redundancy.

iFIX redundancy allows you to connect a View node to both primary and backup SCADA nodes that are connected to the same PLC. If the connection to the primary SCADA node is lost, FIX automatically fails over to the backup SCADA node. With LAN redundancy, you can establish two physical network connections between a View node and a SCADA node so that if one network path is lost, iFIX automatically fails over to the other network path. These two features can be used together for the highest level of reliability.

Security

iFIX provides a powerful and sophisticated user-based security system which allows you to protect against unauthorized:

•	Access to iFIX applications.

•	Access to critical application functions.

•	Access to operator display files (pictures) and recipes.

•	Write access to database blocks.

Using Windows Security

As an option, the Security Configuration program lets you specify an operator's Windows user name and password as their iFIX login name and password. This feature synchronizes the user accounts and lets you take advantage of your existing Windows user accounts when logging into iFIX. You also gain the following advantages of Windows security, when you synchronize user accounts:

•   Case-sensitive passwords.

•   Passwords that expire.

•   Online password changes.

Once you synchronize Windows and iFIX user accounts, operators can log into iFIX by entering their Windows login name and password. iFIX sends this information, along with the domain name specified in the operator's iFIX account, to a Windows domain controller for authentication. If Windows verifies the user name and password, iFIX completes the login process. Otherwise, it logs an error.

Security Areas

To protect database blocks from unauthorized writes, iFIX employs *security areas*. You can think of a security area as a group of database blocks with the same security level. Operators with rights to a particular security area can write to any database block that is a member of that security area.

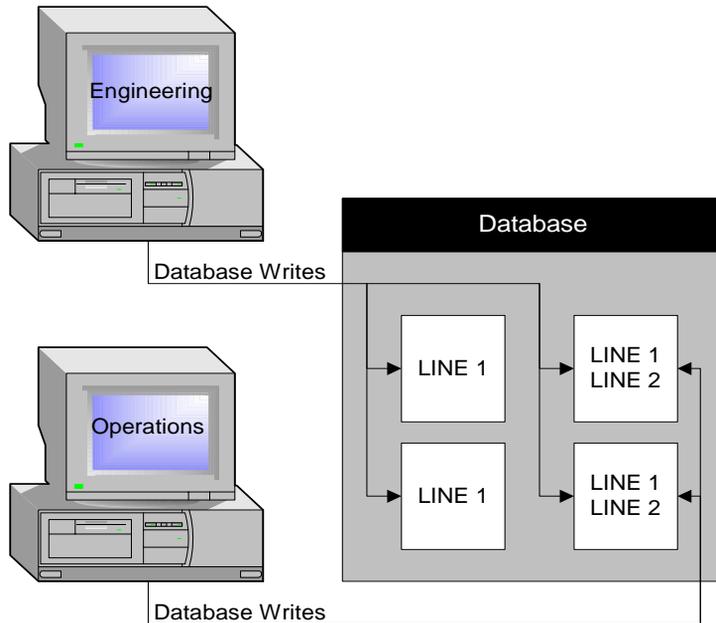The following figure illustrates how iFIX uses security areas.

Figure 2-4: Security Areas

In this example, there are two security areas known as LINE1 and LINE2. All four database blocks shown belong to LINE1, but only the two database blocks on the right belong to LINE2. The Engineering group is assigned rights to LINE1 and the Operations group is assigned rights to LINE2. Since all database blocks belong to LINE1, the Engineering group can write to all four database blocks. The Operations group is assigned rights to LINE2, but not to LINE1. Therefore, the Operations group can only write to the two database blocks on the right.

3.   Using the Intellution WorkSpace

The Intellution WorkSpace is your starting point for using iFIX. It provides an integrated and flexible configuration environment that lets you create and modify documents for the local node. As part of this environment, the Intellution WorkSpace also launches and is integrated with iFIX applications, eliminating the need to switch to other programs. Instead, the Intellution WorkSpace provides a work area with all the necessary tools to add a picture, create a schedule, or change a script.

Using the Intellution WorkSpace, you can also integrate ActiveX documents from other programs, such as Word and Excel, with your iFIX files. Like iFIX documents, ActiveX documents appear in the work area that the Intellution WorkSpace supplies. And if you create your own custom ActiveX documents, the WorkSpace automatically displays the menus and toolbars that these documents define when you open them.

You can display a hierarchical view of your files with the Intellution WorkSpace. This view serves as a navigational tool to help you locate iFIX documents and acts as a launch pad for iFIX and third-party applications.

The Intellution WorkSpace also lets you access the Visual Basic Editor (VBE). This editor lets you integrate Visual Basic for Applications (VBA) scripts into your iFIX files. By writing a VBA script, you can customize and automate the behavior of iFIX. For example, you can write a script to handle custom run-time data entry instead of using the data entry mechanisms provided with iFIX.

But the Intellution WorkSpace is not only a configuration tool. It also provides a run-time environment as well that lets operators display and run your iFIX documents. This environment lets you enable security restrictions that lock operators into a pre-defined set of pictures.

Understanding the Intellution WorkSpace

Before you begin using the Intellution WorkSpace, you should understand certain key concepts. Please take a few minutes and review this information.

Understanding the System Tree

Your main navigational tool for locating files is the *system tree*. This tool appears as a hierarchical display of folders, as the following figure shows. By opening and closing folders, you can locate and display your documents in one step.
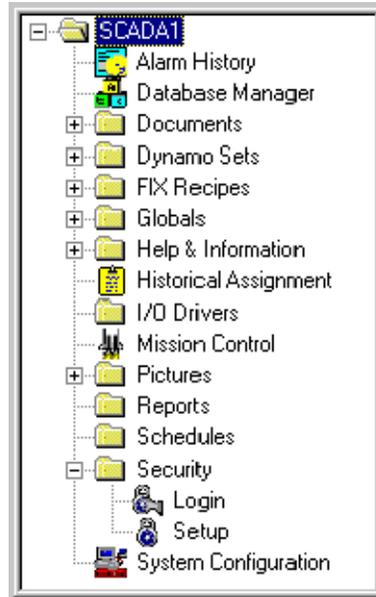
The system tree also acts as a program launcher. By double-clicking an application in the system tree, you can start any iFIX or third-party application.

Understanding the Workarea

The *workarea*, shown in the following figure, is the window that displays your iFIX and ActiveX documents. Whenever you open a document, the Intellution WorkSpace displays the file in the workarea and automatically activates the tools needed to modify it.
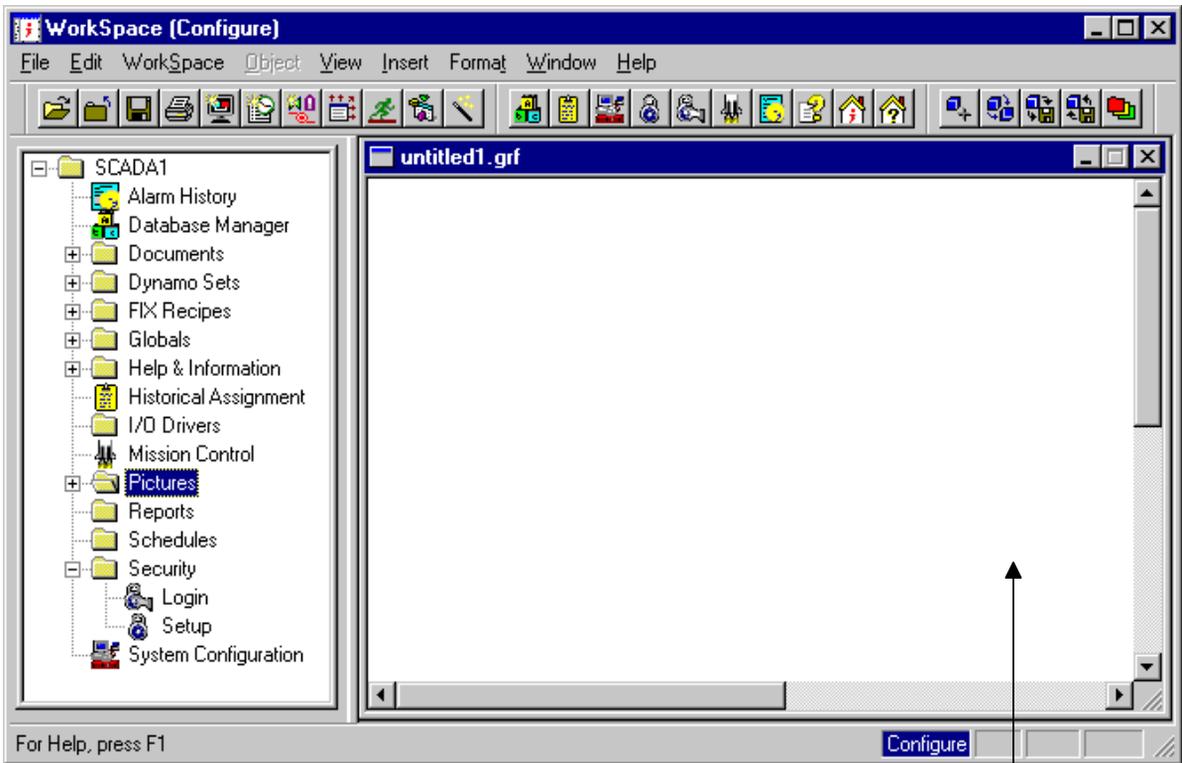
Workarea

Figure 3-1: Intellution WorkSpace

For example, when you double-click a picture, it appears in the workarea window and all the tools associated with modifying a picture become active. It's almost as if you started a separate graphics program and opened the picture. This feature makes creating and modifying iFIX documents fast and easy because you do not need to leave the Intellution WorkSpace or search for the appropriate application to launch. All of the tools you need are built-in and ready to use.

4. Creating Pictures in iFIX

iFIX allows developers and process engineers to create dynamic pictures with minimal effort. By providing an open-environment, iFIX lets you incorporate internet controls (OCXs), reuse elements from other sources (such as bitmaps), or embed other OLE automation applications into your pictures.

While creating pictures in the Intellution WorkSpace, you can utilize features that give you the control you need to customize your drawings. You can view your pictures by switching to the run-time environment with the click of a mouse.

iFIX includes the following set of performance support tools that let you tap the power of iFIX with minimal effort:

- Wizards

- Experts

- Dynamos

Wizards and Experts

Wizards and Experts are simplified user interfaces that help you accomplish a task:

Wizards – consist of a series of dialog boxes that guide you through a process and engage you in dialog that helps you understand that process.

Experts – consist of one dialog box that requires minimum input to quickly perform a task. They provide an easier way to animate objects or execute scripts, tasks that you can also accomplish using the Animations dialog box.

iFIX Wizards and Experts exist to help both advanced and novice users. Advanced users can carry the process to additional steps, perhaps by using a powerful feature of VBA, re-entering an Expert after performing another function, or learning a new feature by implementing it.

Novice users can run a Wizard or Expert in an effort to complete a more complicated task without adapting to new concepts or technology. Although the underlying foundation of Wizards and Experts is Visual Basic, you don't need to see or understand VBA to use these tools.

Ultimately, employing Wizards and Experts in your picture development means you can complete desired tasks and enjoy the results.

Dynamos

As you develop a system of operator displays, you may want to use an object you created for one picture in several other pictures. iFIX offers a convenient way to save custom-built objects and application scripts into a higher-level reusable object set, called Dynamos. Dynamos allow you to customize your pictures by creating a consistent design across your operator displays.

iFIX provides a wide selection of pre-built Dynamos that use the most common shapes and objects in the process automation industry today. You can also build and save your own Dynamos by creating a new iFIX object in the Intellution WorkSpace and dragging the new Dynamo into the set. Using existing Dynamo sets can expedite your picture development, thereby increasing the performance of your entire operation.

Creating Pictures with Purpose

Whether you are a new or an expert user, iFIX gives you the power and flexibility to create pictures that provide solutions to your process needs. Let's take two scenarios to illustrate this concept:

- *Joe*. Joe is a system developer for a small shop. He is slightly intimidated by Visual Basic and would prefer not to learn scripting to create and control his pictures. However, he wants to take advantage of VBA's capabilities by customizing a few objects in his picture.

   Joe's Solution. Using iFIX Experts, Joe attaches scripts to the objects in his picture without leaving his development screen or entering the VBA environment. Experts give him a simple means to perform the processes he wants. As shown in the following figure, the Fill Expert helps Joe animate the fill property of an object in his picture.
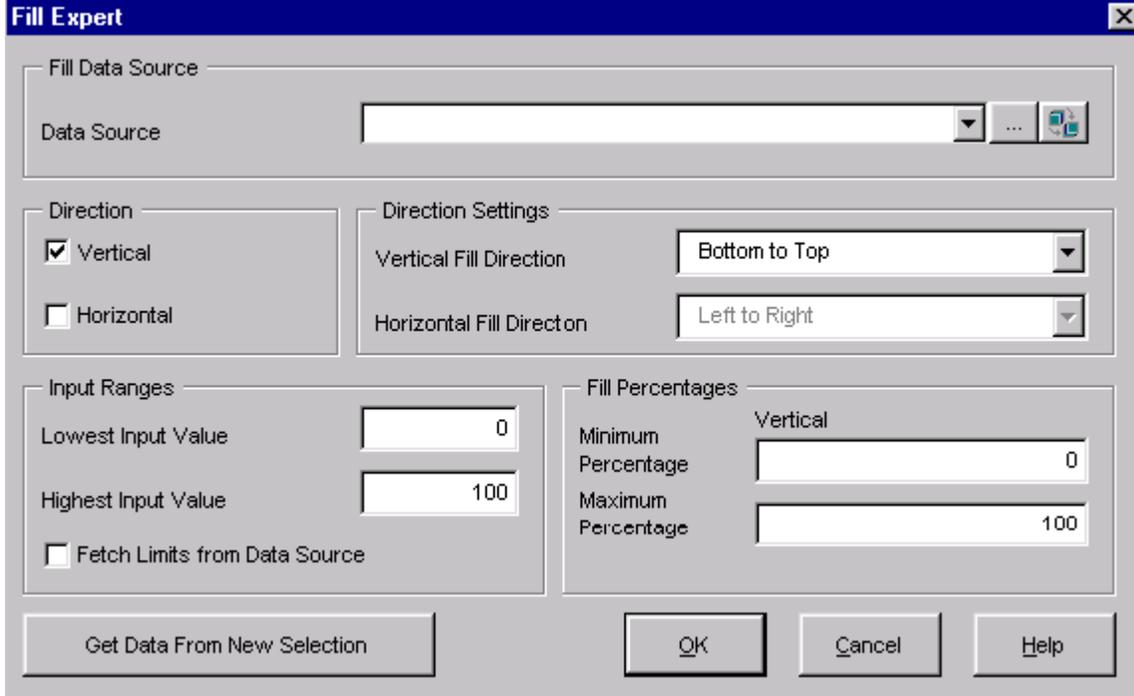
Figure 4-1: iFIX Fill Expert

- *Janet.* Janet is a Process Manager for a large processing plant. She is well-versed in VBA, and is more than eager to unleash the power of iFIX using her knowledge of Visual Basic. Specifically, Janet wants the ability to override the default property settings of a series of existing objects and create her own properties, including complex animations from several different data sources and algorithms. She also wants to add custom controls and toolbars to simplify the process for her developers.

  Janet's Solution. iFIX provides the tools that Janet needs to fully customize her environment and fine-tune the control she has over her application. Using the Animations dialog box, she animates certain properties of her objects by specifying a data source and conversion method. Then, by writing VBA scripts, she overrides existing defaults, inserts custom controls, and creates a development toolbar that saves her developers time.

Having all the power you need doesn't mean it should be difficult to use. Developing complex pictures using process automation software was once a tedious and intimidating venture, as it required you to use proprietary command languages and graphics formats that, in the end, gave you limited flexibility. iFIX offers an alternate solution – an easy-to-implement and use, object and task-oriented development tool that lets you create pictures with purpose.

Using Basic Drawing Tools

The iFIX configuration environment contains several tools that help you access, modify, and apply an object's characteristics into your picture design. These tools are described in the following sections.

Using Drawing Cursors

When you draw pictures, you have many different cursors to use depending on what you are trying to do. Many of these cursors appear when you have selected an object and place the cursor over the object's *handles*. The handles of an object provide points that control the movement of the object. Object handles appear in three types, depending on the operation you are trying to perform:

• **Resize handles** – allow you to resize an object. These automatically appear when you initially add most any object.

• **Reshape handles** – allow you to reshape an object. These automatically appear when you initially add lines, arcs, chords, and pies.

• **Rotate handles** – allow you to rotate an object. These handles only appear when you rotate a particular object (excluding ovals, rounded rectangles, charts, and bitmaps).

The following example illustrates a rectangle with resize handles. There are four diagonal handles, two left and right handles, and two top and bottom handles, as shown. When you initially add an object, object handles appear. If you select outside the object, its handles disappear. Place the cursor on the object and click (select) the object to display the handles again.
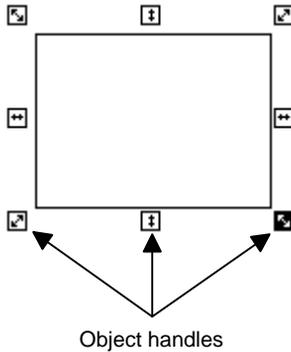
Object handles

Figure 4-2: Object Handles

When you display the object's handles, you can control that object on the screen. Notice that when you display the handles, that object's name is highlighted in the system tree.

Using Toolbars

iFIX provides both WorkSpace and Picture toolbars to help you perform various functions. Although both WorkSpace and Picture toolbars help you perform actions in your picture, the Picture toolbars contain specific tools to help you create and modify objects and their properties. You can also create your own toolbars, or write scripts for custom buttons in toolbars.

Using the Toolbox

The iFIX Toolbox is a complete set of customizable drawing tools, Experts and animation objects. The Toolbox makes the most commonly used tools and buttons accessible. It may be positioned anywhere in the picture, or resized as desired. The toolbox contains an extensive selection of drawing tools including rectangles, rounded rectangles, ovals, chords, polygons, lines, arcs and polylines. You can add objects such as alarm summaries, bitmap images, datalinks, charts to the Toolbox for easy access.

Using the Object Pop-up Menu

As you create a picture, you can display a pop-up menu for the picture or an object in the picture. To display an object's pop-up menu, right-click the object. This menu provides quick access to the object's properties and animations, as well as common operations you can perform with the object, such as copying and pasting.

Depending on the object you add, the pop-up menu may vary to include operations specific to that object. For example, if you add a chart, you can access the Chart Configuration dialog box from the object pop-up menu.

Using the Properties Window

You can display the properties of an object with the Properties window. This window displays a two-column list of the selected object's properties that accept data. The Properties window is *modeless*, meaning that you can jump to different positions in the picture and the window will stay on your screen. This is a convenient way to quickly read properties of several objects in your picture or a picture itself. If no object is selected, the current picture's properties are shown in the window. You can also display a different set of properties by selecting the object or picture from the drop-down list at the top of the window.

Using the Color Box

The iFIX color box contains all the tools you need to assign colors for your objects and create customized color schemes. The color box offers over 16 million color possibilities for use in your pictures, and you can access them from anywhere in the Intellution WorkSpace.

There are two color boxes you can choose from, depending on how you want to apply colors:

Select Color box – lets you select a foreground, background, or edge color for a specific object.

Color Selection box – a modeless box that allows you to select different shapes in your picture while the dialog box remains on your screen. You can color as many objects as you like using this box, and you can choose which property of the selected object or objects you want to modify.

Using Screen Regions

As you create pictures in the WorkSpace, you can optimize the speed at which your pictures update by using screen regions. The viewport is divided into 30 screen regions (6 by 5) which determine how pictures are updated. By grouping dynamically changing objects into screen regions, static objects are not unnecessarily redrawn each time a picture is updated.

To view screen regions in the WorkSpace, select Screen Regions from the View menu. When this feature is enabled, each time you click on an object in a picture, the screen region it occupies changes color.

5.   Creating and Managing a Process Database

iFIX® provides process information for plant managers, supervisors, and operators in the form of reports, displays, archived data, alarms, messages, and statistical charts. The sources of this information are OPC servers or process hardware — the controllers, sensors, motors, switches, and other devices — required to manufacture your product.

iFIX reads process information from these devices and saves it in one or more *process* databases residing on your SCADA servers. The database plays an integral part in your industrial automation strategy; it is the primary source of process data for most iFIX applications. Whether you collect historical values or generate shift reports, iFIX enables you to create a database that supports your specific industrial control and automation needs.

Database Manager

Your main tool for creating and managing process databases is Database Manager. This program lets you open and configure the database of any SCADA server. You can also:

•   Query and sort the database.

•   Find and replace database information.

•   Import and export a database.

•   Generate multiple database blocks automatically.

•   Customize your display.

Each process database you open appears as a spreadsheet in Database Manager as shown in *Figure 5-1*. Blocks appear as rows and block fields appear as columns, allowing you to select a row or field by clicking the mouse. You can also select multiple rows and columns by clicking and dragging the mouse.

Database   Edit   View   Blocks   Drivers   Tools   Help

	Tag Name	Type	Description	Scan Time	I/O Dev	I/O Addr	Cur Value	
1	AI1	AI		0.05	SIM	RA	63.75	
2	BATCHPROD	AI	Batch product ID calulation 1st blk	1	SIM	104	3	
3	BINLVL_AI	AI	Powder bin level track	1	SIM	802	100.0	
4	BLKLVL_AI	AI	Bulk tank level feedback AI	0.50	SIM	402	80.3	
5	BLOCK1	AI		1	SIM	0	0.00	
6	CIPLVL_AI	AI	CIP tank level feedback AI	0.50	SIM	1202	84.2	
7	CO2LVL_AI	AI	CO2 tank level track	1	SIM	702	90.0	
8	FG_SCAN	AI	Scan through FG to avoid race condition	1	SIM	14	5	
9	FG_UNIT_COST_A	AI	Finished Goods Unit Cost	1	SIM	36	0.000	
10	MIXBID_AI	AI	Mix tank hold Batch ID value for SQT	1	SIM	505	1	
11	MIXLVL_AI	AI	Mix tank level feedback AI	0.50	SIM	502	84.8	
12	PKGING_AI	AI	Packager prod/ing code breakdown	1	SIM	1004	-1	
13	RAMP1	AI	hi	1	SIM	RA	62.92	
14	RANDOM_1TO4	AI	Pick random number (1.0..4.0)	1	SIM	RG	1.5	
15	RANDOM_1TO10	AI	Pick random number (1.0..10.0)	1	SIM	RG	3.9	
16	RANDOM_CUSTO	AI	Pick random number (1.0..4.0)	1	SIM	RG	6.1	
17	RANDOM_SHIPQT	AI	Pick random number (1..80)	1	SIM	RG	63.8	
18	RCLLVL_AI	AI	Reclaim tank level track	1	SIM	902	71.0	
19	REABID_AI	AI	Reactor hold Batch ID value for SQT	2	SIM	605	1	
20	REALVL_AI	AI	Reactor tank level feedback AI	0.50	SIM	602	7.4	
21	RM_SCAN	AI	Scan through RM to avoid race condition	1	SIM	15	5	
22	RM_STOCK_AI	AI	Amount of Raw Material in Stock AI	1	SIM	49	-32.768	
23	RM_UNIT_COST_A	AI	Raw Material Unit Cost	1	SIM	47	0.00	
24	TANKLEVEL	AI	Tank Water Level	1	SIM	1910	????	
25	TANKTEMP	AI	Tank Temperature 1.0 float	1	SIM	RA	92.92	

For Help, press F1   OFF   EDIT   default   default   default

Figure 5-1: iFIX Database Manager

Understanding a Database

Every SCADA server loads a process database at start-up. Once loaded, the database:

• Receives values from an I/O driver or OLE for Process Control (OPC) server.

• Manipulates values according to its configuration (a control strategy).

• Compares the values to alarm limits you define.

• Outputs adjusted values to the I/O driver or OPC server.

• Sends alarms to operator displays, printers, files, and network alarm destinations.

The following figure illustrates how values enter a database, travel through a sequence of blocks, and exit the database as output.
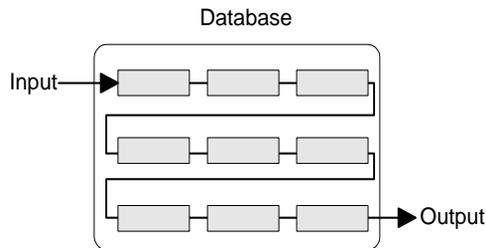
Figure 5-2: I/O Data and the Database

Chaining Blocks

Blocks by themselves perform specific tasks in the database. By combining two or more blocks together, you can form *chains.* Each chain performs the tasks of its component blocks by passing data from one block to the next. When properly configured, chains can generate alarms, acquire data, and verify, automate, and

maintain a process. In automating large processes involving a number of I/O devices, a database can contain many chains, each designed to automate and maintain a specific function or process step.

Processing the Database

In order for your blocks and chains to function, the Scan, Alarm, and Control program (SAC) processes them at the time interval you define. SAC processes your blocks and chains by:

- **Scanning** individual blocks in the chain, reading new I/O values and returning values to the process hardware.

- **Alarming** on incoming values if they exceed pre-defined limits you specify.

- **Controlling** the automation process by assuring that each block verifies or manipulates incoming values according to its configuration and sends values on to the next block in the chain.

The following figure shows SAC reading process values, sending these values through database chains, and returning the output values.
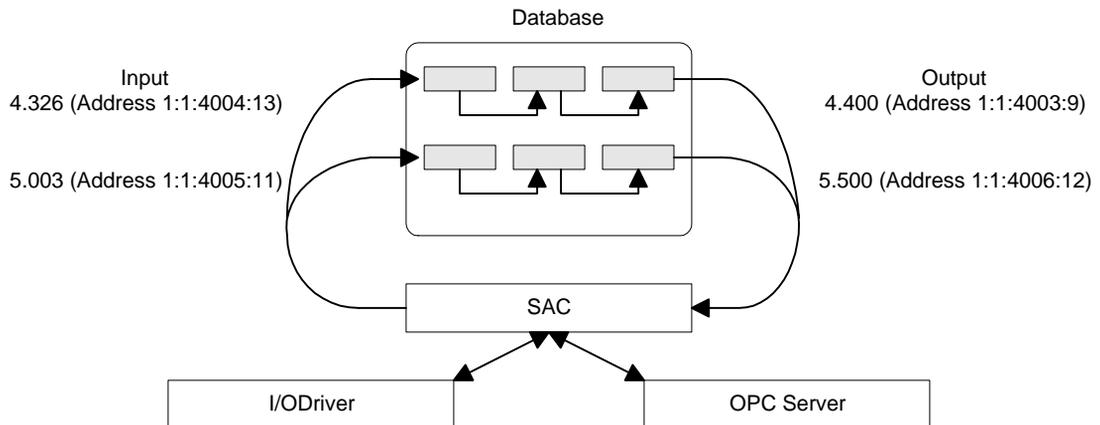
Figure 5-3: SAC Processing I/O Data

Using the Process Database

Once you create a process database, your SCADA server can monitor process conditions and report alarms. Alarms occur when an incoming value exceeds a pre-defined limit. Using the Intellution WorkSpace, you can draw and animate any object by rotating, coloring, or scaling it when an alarm occurs. These visual cues help operators respond to alarms in a timely fashion.

Trending Process Data

SCADA servers can also trend and display real-time and historical values. Process trends enable you to record and analyze process-critical values and allow you to:

• Archive process variables to meet federal regulations.

• Monitor the efficiency of products.

• Maintain equipment.

• Analyze post-process data.

For more information on collecting historical values, refer to the *Trending Historical Data* manual.

Creating Scripts and Schedules with Process Data

Using Visual Basic for Applications (VBA) or the Scheduler, you can adjust database values, place blocks on scan or off scan, change a block's mode, or launch a script based on a value change or an alarm. For example, using a time-based schedule, you could set the values of a dozen blocks prior to the manufacture of your product or you could automatically ramp a value based on an event (such as a valve closing). Likewise, you could write a script to monitor the value of a block and, when an alarm occurs, open a diagnostic picture.

Archiving Process Data

In addition to using scripts and schedules to write values to the process database, you can use a relational database. Writing values from a relational database is similar to writing values with a script. In both cases, values are written at a pre-defined time or when an event occurs (such as a contact opening). However, unlike scripts and schedules, writing data from a relational database requires that you configure the SQL Trigger and SQL Data blocks in the process database.

These blocks also let you archive data to a relational database. Once the relational database receives and stores the process data, you can query it to retrieve and analyze any information. For more information on setting up and using a relational database, refer to your ODBC manuals and the *Using SQL* manual.

6.   Understanding Alarms and Messages

Process conditions change constantly as your plant runs. Your operators need to monitor these conditions to ensure that your plant runs safely, and does not waste material or damage equipment.

You can safely and efficiently manage your plant by enabling the iFIX alarm system. Once you enable alarming, iFIX sends alarms to report potentially harmful process conditions requiring a response. Typically, this happens when process values exceed their pre-defined limits. For example, a tank's fluid level that is too high is an alarm condition to which an operator must respond.

iFIX also sends messages to report non-critical information that does not require a response. For example, when a tank's input valve opens or closes, iFIX sends a message to the operator that the valve's state has changed. iFIX sends messages to inform you when:

•   An operator inputs a value.

•   A process database event occurs.

•   A system-level event occurs, such as when iFIX completes its start-up sequence.

Using alarms and messages, you can create a reliable, flexible, and easy-to-use system that reports potential problems and system activity. As operators respond to alarms, they ensure your process runs in a safe and efficient manner. For example, by responding to an alarm that a tank's level is too low, operators can save you money that you would have to spend replacing damaged equipment if the level was not adjusted.

Alarm Destinations

An *alarm destination* is an alarm service enabled in the System Configuration Utility (SCU). You can enable one or more alarm destinations on any iFIX node you set up. Once you enable an alarm service, iFIX starts a task to provide that service. For example, when you enable the Alarm Printer Service, iFIX starts a task to print the alarms and messages.

Alarm Areas

An *alarm area* is a physical or functional division of your plant. Once you enable an alarm destination, you assign alarm areas to it. In the following figure, OVEN1 has database blocks in alarm areas Line 1, Line 2, and Line 3 and OVEN2 has database blocks in alarm areas Line 4 and Line 5. These are physical divisions and correspond to individual production lines.
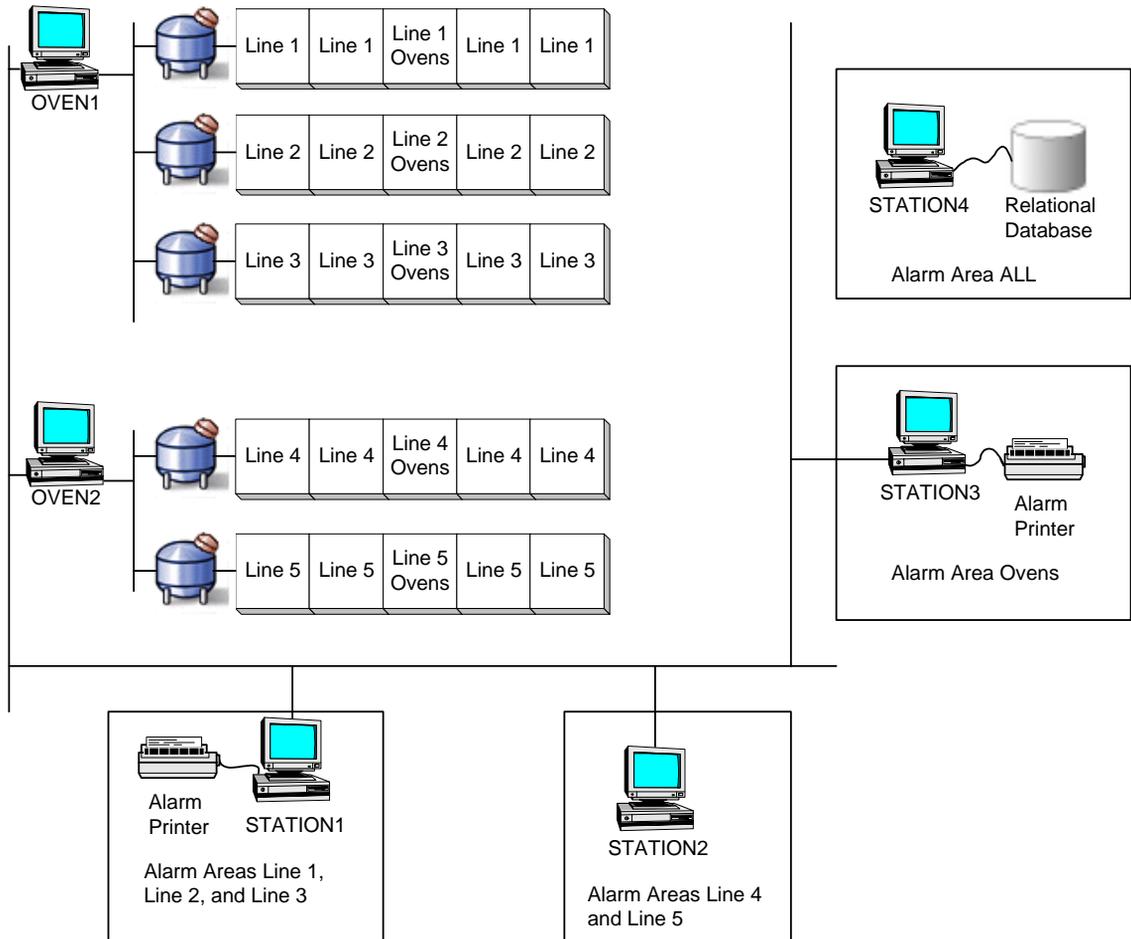
Figure 6-1: Sample Alarm Areas

Alarm area Ovens, on the other hand, is a functional division. It corresponds to an oven temperature. Operators monitor the temperature separately because it is critical to the overall process.

Routing Alarms and Messages

iFIX can route alarms and messages after you assign alarm areas to database blocks and alarm destinations. The area name acts as a routing label between the database blocks and alarm destinations in the same alarm area.

You can create any alarm area by naming it. iFIX saves these names in an *alarm area database*. Each iFIX SCADA server can have its own custom alarm area database. However, this approach makes troubleshooting more difficult. A better approach is to share the database by copying it to a file server.

Alarm Limits and Alarm Conditions

In order for iFIX to determine if an analog process value is in alarm, you must enter pre-defined values, called *alarm limits*, that you do not want the block to exceed. Should a block exceed one of these limits, iFIX generates an alarm, as the following figure shows.

When the process value exceeds the High Alarm limit, iFIX generates an alarm.

High Alarm Limit

95

90

85

Process value
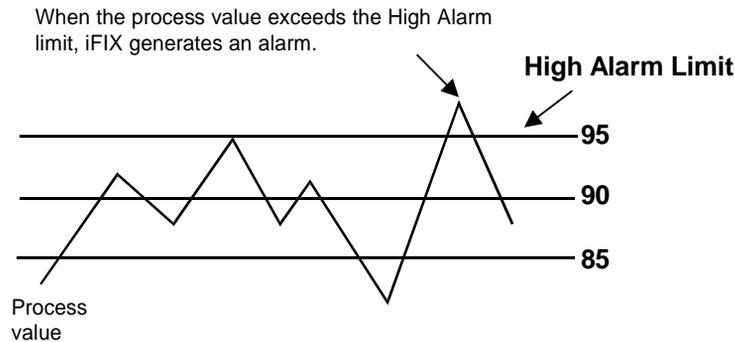
Digital Alarm Limits

For digital blocks, you can specify alarm conditions, not alarm limits. An *alarm condition* indicates when you want a digital block to generate an alarm. For example, if you set up a block to monitor a motor that is ON, you can configure the block to generate an alarm when the motor changes to a different state or when it switches OFF.

Alarm Priority

In addition to alarm limits, you can select an *alarm priority* for your database blocks. This priority ranges from low to medium to high and indicates the importance of a block's alarms. Typically, you assign the priority of your most critical blocks to high. This distinguishes high priority alarms from less-critical ones. You can also filter your alarms based on their priority so that operators see only the alarms you want displayed, as the following section explains.

Filtering Alarms by Alarm Area

Alarm areas also act as a filter for alarms and messages. For example, using the configuration in *Figure 6-1*, STATION3 only receives alarms and messages from alarm area Ovens. iFIX filters out the alarms and messages from all other alarm areas.

To allow greater flexibility, you can also apply both filters simultaneously, as the following figure shows.

High Priority Alarms   Medium Priority Alarms

Line 1, Ovens   Line 1, Line 3

Alarm filters let you select the alarms and messages you want to display.

High   Alarm Priority Filter

Line 1   Alarm Areas Filter

High Priority Alarms from Alarm Area Line 1   Alarm Service
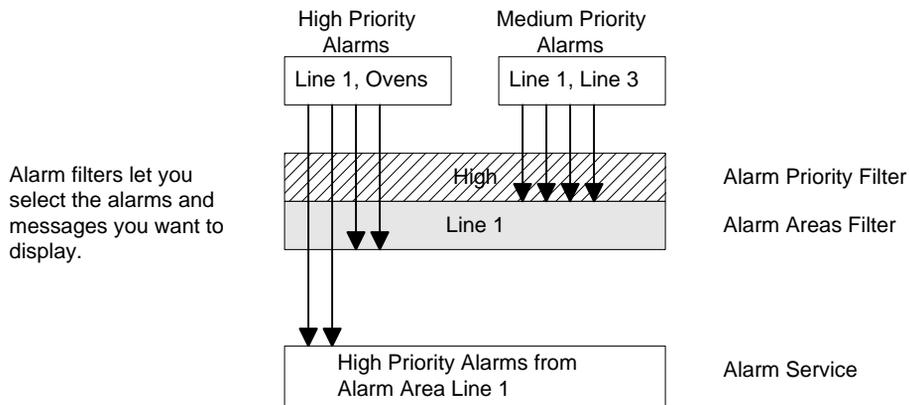
Figure 6-2: Using the Alarm Priority and Alarm Area Filters

Understanding Message Types

In addition to alarms, iFIX sends the following types of messages to alarm destinations:

Event Messages – record events occurring in your process database.

Application Messages – describe database-related activity generated by an iFIX application or entered by an operator.

System Messages – provide information about errors, system alert messages, and system-level events, such as when a task completes.

Using Alarms and Messages

iFIX provides many methods for receiving and displaying alarms. These methods include:

- Coloring an object based on alarm.

- Triggering a script to run when an alarm occurs.

- Viewing the alarms and messages received in real-time with the Alarm Summary object.

- Recording, storing, and retrieving alarms and messages for subsequent analysis or historical reference.

The following sections describe each of these functions.

Working with the Alarm ODBC Service

Another way to save and analyze iFIX alarms and messages is to enable the Alarm ODBC Service. This service sends alarms and messages to an ODBC relational database, allowing you to retrieve any information you want by querying the database.

You can send alarms and messages to the following relational databases:

- SQL Server (6.5 or above)

- Oracle (7.2 or above)

Other ODBC databases, while not tested by Intellution, should also work.

Using the Alarm Horn

When a new alarm occurs in the system, iFIX can notify you through the Alarm Horn. When enabled, the Alarm Horn sends a continuous beeping sound through your PC's speakers to inform you of a new alarm.

7. iFIX and VBA

Visual Basic for Applications, or VBA, is the scripting language built into iFIX. VBA was once only available in Microsoft Office applications. However, Microsoft has made VBA available through licensing, so companies like Intellution can fully integrate this powerful language directly into their products.

What You Can Do With iFIX and VBA

VBA can be used to customize and extend the functionality of iFIX. For example, you can create a custom wizard that automatically builds an iFIX picture at the click of a button. In addition, VBA enables you to manipulate, retrieve, and modify data from iFIX applications. For example, you can write a script that reads data from a database block and stores that information into a Microsoft SQL Server database. You can manipulate the objects in an iFIX picture based on the information in a Microsoft Word document. When you use VBA with iFIX, you build the most powerful industrial automation solution available.

Once you begin working with the iFIX object model, you will start to understand how powerful VBA really is. Through VBA, you can:

• Extend or customize the functionality of iFIX applications.

• Manipulate an iFIX application or its data.

• Create your own custom dialog boxes to exchange data with operators.

• Integrate data from several iFIX applications.

• Create wizards that can perform several tasks at the click of a button.

After you launch VBA, the Visual Basic Editor appears. The VBE consists of several different tools and windows to help you design, create, and manage your VBA projects. The tools you will use most often are shown in the following figure.
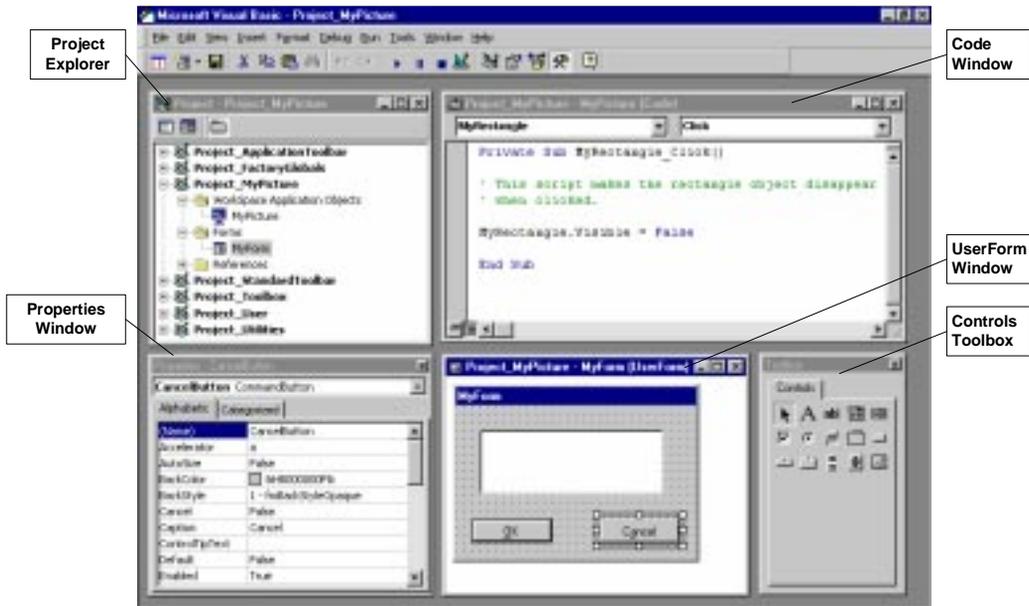
Figure 7-1: Microsoft Visual Basic Editor

VBA Coding Help Features

The VBA editor includes a number of extremely useful features to help you write code accurately and quickly. These features try to anticipate what you are writing in the code, and they prompt you with possible data types, built-in procedure templates, member functions, and more, as you type.

Visual Basic makes writing code easy, with features that can automatically fill in statements, properties, and arguments for you. As you enter code, the editor displays lists of appropriate choices, statement or function prototypes, or values.

Auto List Members

When you enter the name of a control in your code, the Auto List Members feature presents a drop-down list of properties available for that control. Type in the first few letters of the property name and the name will be selected from the list; the <TAB> key will complete the typing for you. This option is also helpful when you aren't sure which properties are available for a given control.
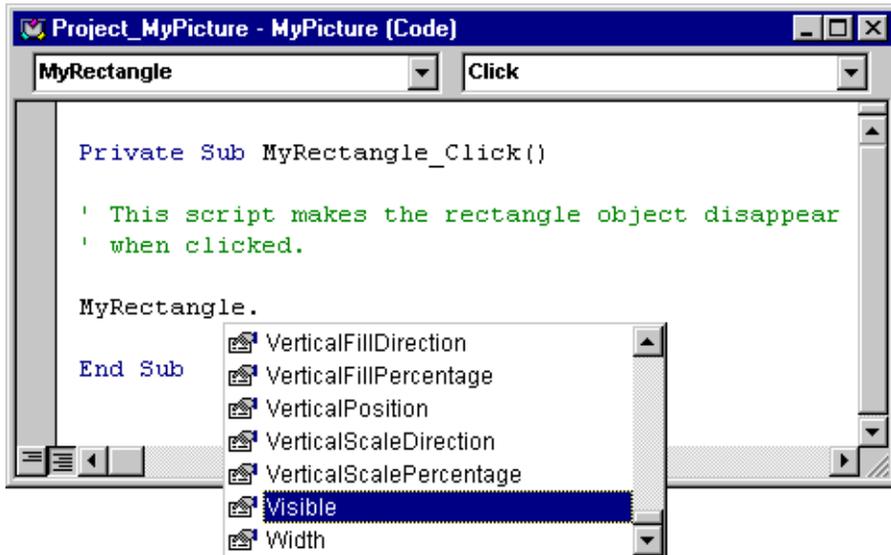
Figure 7-2: Auto List Members Feature

Auto Quick Info

The Auto Quick Info feature displays the syntax for statements and functions. When you enter the name of a valid Visual Basic statement or function the syntax is shown immediately below the current line, with the first argument in bold. After you enter the first argument value, the second argument appears in bold.
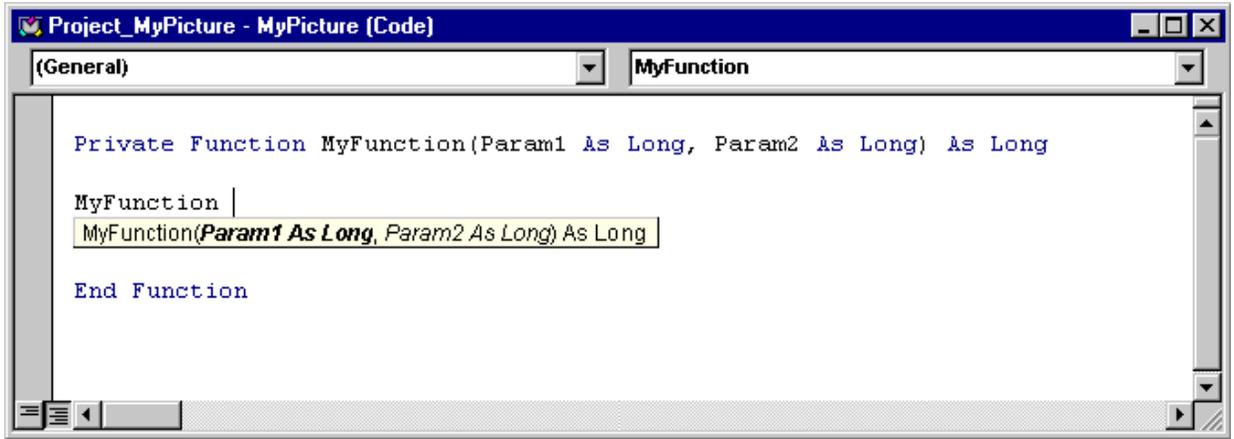
Figure 7-3: Auto Quick Info Feature

Context Sensitive Help

Many parts of Visual Basic are *context sensitive*, which means that you can get Help on these parts directly without having to go through the Help menu. For example, to get Help on any iFIX object, method, property, or event, or any VBA keyword, click that word and press F1.

8. Using the iFIX Sample System

iFIX includes a sample system which consists of three industry demos: Water & Wastewater, Chemical, and Discrete manufacturing. The sample system demonstrates the power and flexibility of iFIX, while providing a learning tool for new users. You can dissect and study these demos to assist you as you create your own applications.

All animations and controls in the sample system are driven by Intellution's real-time process database using the simulation driver that comes with every installation of iFIX. This driver provides several test signals, including a ramp, sine wave, and I/O addresses that you can use to simulate pump and motor control, sequencing, and so forth. None of the animations are driven by scripts or code. Every object, picture, tool, and function in the system was developed using the tools included on your iFIX CD, including the context-sensitive Help provided throughout the sample system.

Together, the demos in the sample system demonstrate the following features in iFIX:

- Tag groups
- Alarm counters
- Reports
- VisiconX
- iFIX graphics

- Pop-up pictures
- Trending
- Picture layers
- Simulation database
- ToolTips

From this screen you can:

- Enter any of the three industry demos.

- Visit the Intellution web site.

- Open the sample system Help.

- View web-based PowerPoint slides that describe the technology innovation of Intellution's software.

- Read the iFIX electronic books.

- Locate the address of other Intellution offices worldwide.

- Exit the sample system.

Quick Tour of the Water & Wastewater Demo

The Water & Wastewater demo shows a picture of a water filtration and chemical feed system as shown in *Figure 8-1*. This demo shows the use of tag groups, pop-up pictures, alarm counters, trending, and reports. All graphics in this picture were created using iFIX objects. This section guides you through exploring tag groups and pop-up pictures. The chemical feed picture in the Water & Wastewater demo shows two storage tanks of Sodium Hydroxide connected to three pumps that control input to the tanks. This picture uses tag groups for pump and valve control, and Multistate Digital Input blocks. The use of tag groups and Multistate Digital blocks show how you can use a single database tag to indicate one of several conditions such as Stop, Fail, Auto, and Manual.
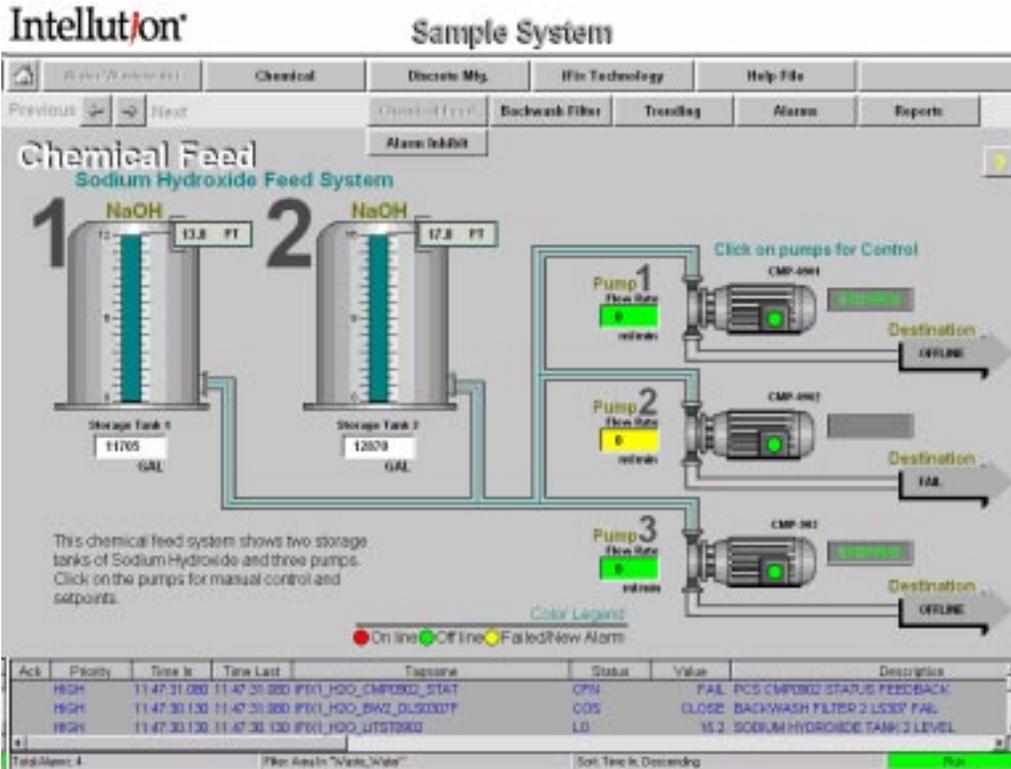
Figure 8-1: iFIX Sample Wastewater System Demo

This picture also includes a Backwash Filter sequencing process. Instead of having three different pictures for each backwash filter, we use only one picture and use tag groups to substitute the appropriate tags for each filter. Click on the Next button to display the Backwash Filter screens. From the Backwash Filter screen you can select one of the three different filters to display, start, or stop the sequence, and control the various blowers and valves.

Quick Tour of the Chemical Demo

The Chemical demo shows some of the various tank, pipe, and valve Dynamos in iFIX as shown in *Figure 8-2*. The tank levels, mixers, temperatures, and valve positions come from simulation I/O points in the real-time database using Analog

Input (AI) and Digital Input (DI) blocks. The pipe flows are calculated using calculation (CA) blocks. All of the pipe colors come from a global color threshold table that contains a single set of color definitions for values of 0 – 100%.
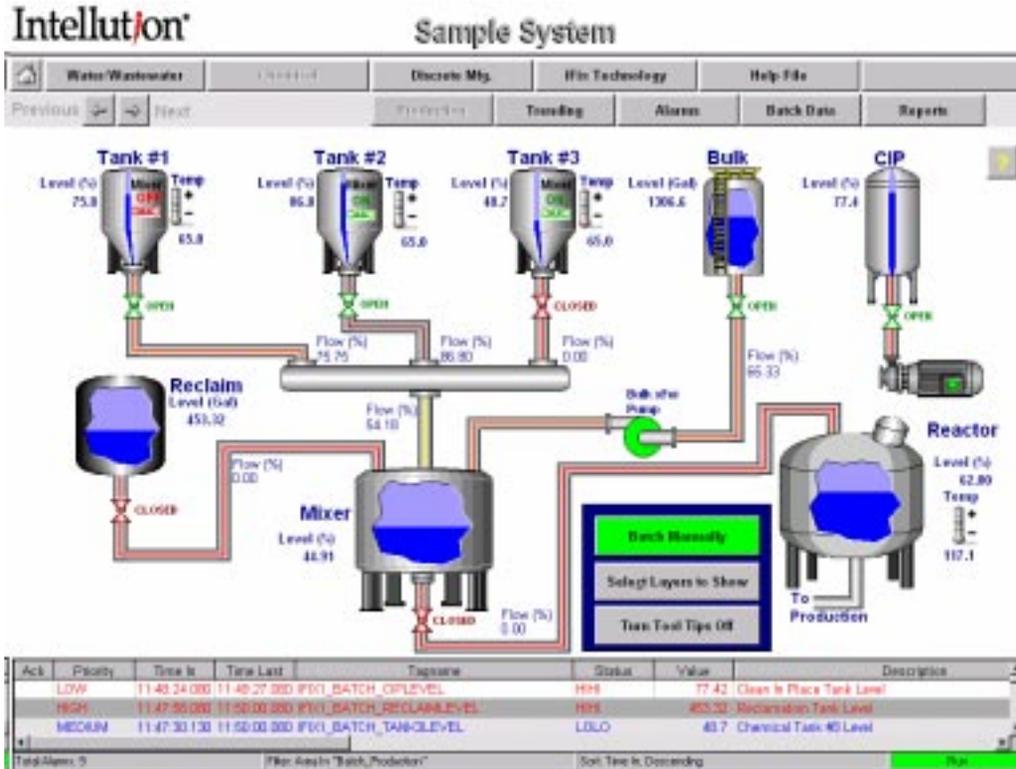
Figure 8-2: iFIX Sample Chemical System Demo

This demo demonstrates picture layers, ToolTips, VisiconX, alarms, and reports. This section guides you through exploring picture layers, ToolTips, and VisiconX.

Quick Tour of the Discrete Manufacturing Demo

The Discrete Manufacturing demo shows a picture tube annealing assembly line as shown in *Figure 8-3*. This is the simplest of the three demos and demonstrates the use of the simulation database and iFIX graphics capability. All the graphics in this picture were created using iFIX objects. No bitmaps are used in this picture.
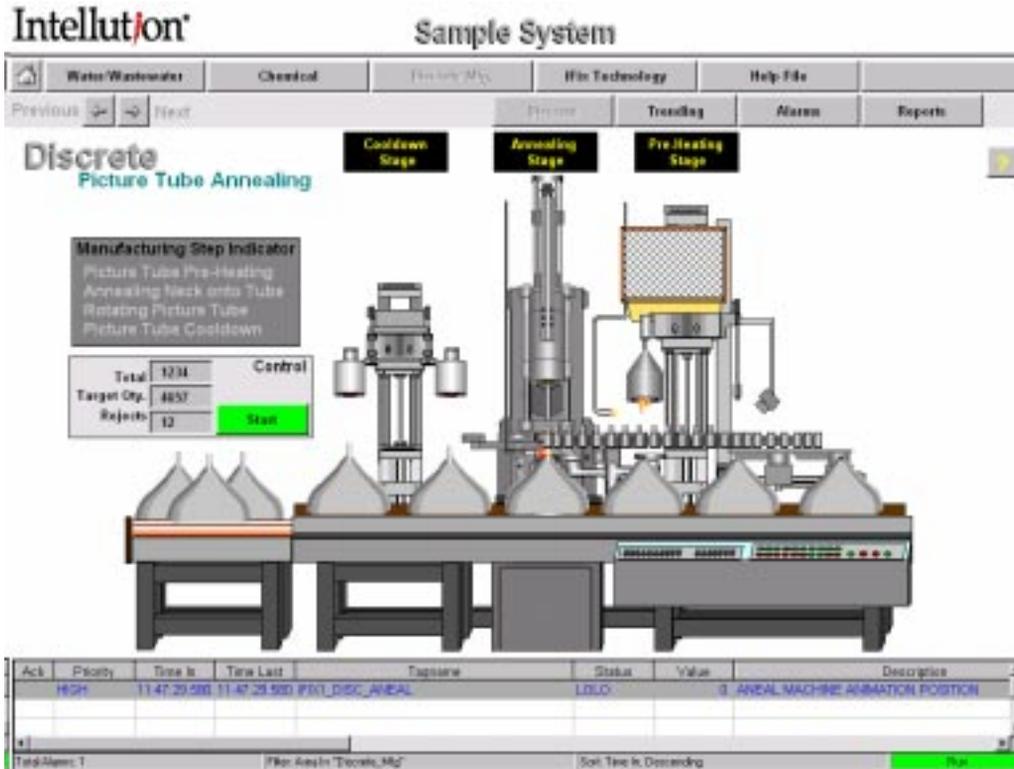
Figure 8-3: iFIX Sample Discrete Manufacturing System Demo

The Annealing Process

In the Discrete Manufacturing demo, picture tubes move from right to left down the assembly line. There are three stages in this process, as shown at the top of the picture: pre-heating stage, annealing stage, and the cool down stage. The tubes are

pre-heated, then rotated as the tube necks are annealed on. Finally, they move under the cooling flange which drops over the necks to cool them before they move on to the rest of the production line.

The entire annealing process is driven by Analog Input (AI) and Digital Input (DI) tags in the process database. When you start the production line, a set of Program Blocks (PG) in the process database act as a PLC and write values to the AI and DI tags to simulate the process.

Manufacturing Step Indicator

The Manufacturing Step Indicator to the left in the picture shows which steps are currently being performed on the production line. Notice the red arrows and flashing red text that indicate which processes are currently being performed on the production line.

As the tubes move down the assembly line, the total number of tubes produced and the number of rejects updates automatically in the Total, Target Qty, and Rejects fields located at the bottom of the Manufacturing Step Indicator. Click on the ? button, then click on any of these fields for a description of how the field was created and its purpose within the picture.

9. Additional Functionality

iFIX provides two additional functions that offer you the benefit of easy data access and real-time and historical data reporting.

VisiconX

VisiconX™ is an Intellution Plug and Solve Solution™ for iFIX™. It is an easy-to-use, object-oriented development tool that makes accessing data in any type of database a snap! Its simple point-and-click interface provides the means to configure access to any database and then create an SQL query as simple or complex as necessary to retrieve the information you need.

VisiconX consists of a suite of Intellution controls inserted into a picture in the Intellution Dynamics WorkSpace™. These controls access Microsoft's ActiveX™ Data Objects (ADO), which eliminate the need to write Microsoft® Visual Basic® scripts or create a customized program to access and manipulate data. A task that previously required hours of development time is reduced to seconds!

The VisiconX SQL Wizard also makes it easy for you to retrieve the precise information you need. The SQL Wizard helps you choose options for your query and then builds the SQL Select statement for you. If you want, you can bypass the SQL Wizard and query the database using a stored procedure or by entering an SQL Select statement yourself.

Besides making data access easier and quicker, iFIX users will also appreciate knowing that VisiconX enforces access to secured databases. VisiconX can use either a user name and password or the features of Windows NT or Windows 2000 integrated security to perform a security check. The security check must succeed before VisiconX returns any data.

Reports

iFIX provides real-time data to plant personnel and other software applications throughout a plant. This real-time data presentation is the key to more efficient use of resources and personnel, and ultimately, to more automation.

Detailed reports are important tools for reviewing the performance of a process. They allow you to quickly grasp the relationships between specific pieces of manufacturing process data so that you can make effective decisions. Using any third-party reporting application that supports ODBC queries, you can create customized reports based on iFIX real-time and historical data. When you use iFIX real-time data, you generate the report with current data extracted from a FIX database. When you create a report using iFIX historical data, you generate the report based on data gathered over a period of time.

For example, suppose you are the production manager of a cookie factory. At the end of each shift you want to generate a customized report that shows the amount of down time on each production line. You would use the Scheduler to request this report at certain times using iFIX historical data. In addition, if a failure occurs on a particular line you want to have your system automatically generate a report showing the tank level of each ingredient, the state of the mixer and dropper, and the temperature of the oven at the time of the failure. When a failure occurs, the requested iFIX real-time data is extracted from the iFIX database and displayed in a report. The data in this report can then be analyzed to help prevent future failures.

For your reporting solution, we recommend using Seagate Crystal Reports™ Professional Version 8. This reporting application uses ODBC to access iFIX data sources, allowing you to create professional, customized reports. Its Report Experts make the process of defining your query and designing the layout of your report quick and easy. Crystal Reports provides unlimited sorting capability and lets you insert informative graphs that help you to effectively analyze your process data. Once created, your queries can be saved so you can quickly generate future reports based on these predefined queries.

Crystal Reports v8.0 run-time DLL installation is included on the iFIX CD. These DLLs allow you to enable the target system to execute Crystal Reports without requiring a development copy to reside on each node.

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